

PERPETUAL TROUBLE SHOOTER'S MANUAL

Reg. U.S. Pat. Off.

VOLUME XIII

by

JOHN F. RIDER



JOHN F. RIDER PUBLISHER, INC.

404 Fourth Avenue

New York City

Other Books
by
JOHN F. RIDER

SERVICING SUPERHETERODYNES
SERVICING RECEIVERS BY MEANS OF RESISTANCE
MEASUREMENT
PERPETUAL TROUBLE SHOOTER'S MANUAL
VOLUME I
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VOLUMES I TO V ABRIDGED
ALIGNING PHILCO RECEIVERS, VOLUMES I AND II
AUTOMATIC FREQUENCY CONTROL SYSTEMS
FREQUENCY MODULATION
SERVICING BY SIGNAL TRACING
THE OSCILLATOR AT WORK
THE METER AT WORK
VACUUM TUBE VOLTMETERS
RESONANCE AND ALIGNMENT
AUTOMATIC VOLUME CONTROL
ALTERNATING CURRENTS IN RADIO RECEIVERS
D-C. VOLTAGE DISTRIBUTION IN RADIO RECEIVERS
AUTOMATIC RECORD CHANGERS AND RECORDERS

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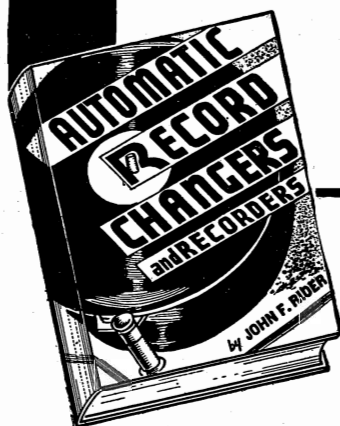
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RIDER

Publications



*Just what
the Servicing Industry
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RIDER'S "Automatic Record Changers and Recorders"

800,000 record changers are providing an important source of profit for the wide-awake service shops of the country and creating a need for adequate and ready reference data to speed up trouble shooting and repair. Rider anticipated this need and has prepared—just when you need it—a sturdily bound volume containing everything you need know on any automatic record changer or recorder coming to your shop.

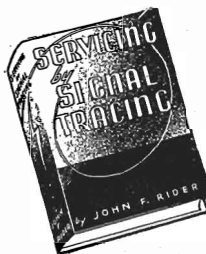
Heretofore, the serviceman's prime interest has revolved around the invisible defects which accompany the operation of electrical devices. Mechanics in radio receivers was limited to a lesser degree. However, with the introduction of the automatic record changer, some knowledge of the development of motion by means of gears, levers and cams has become necessary. Hence the birth of Automatic Record Changers and Recorders. Printed on 8½ x 11 paper, the same size as Rider Manuals, the book covers, by means of explanatory text, mechanical and electrical diagrams, all the information you must have to service these high cost instruments quickly and profitably.

CONTENTS

Chapter I—MOTORS AND DRIVES. D-C Motors. A-C Motors. Universal Motors. Maintenance of Motors. Commonplace Troubles. SPEED REGULATORS and REDUCTION DRIVES. Chapter II—RECORDERS AND PHONOGRAPHS. The Cutting Head. The Groove. Recording Needles. Pick-ups. Phonograph Needles. Chapter III—AUTOMATIC RECORD CHANGERS. Mechanisms. Troubles. Chapter IV—ANALYSIS OF RCA MODEL RP-152-C RECORD CHANGER. MANUFACTURERS' SERVICE DATA.

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Signal Tracing is destined to become the universally adopted method of locating defects in communication systems, no matter what the nature of the system—if it is a home broadcast receiver, auto-radio receiver, police receiver, commercial, marine, navy or army receiver. Every public address system, every centralized radio system comes within the capabilities of signal tracing. . . . Television receivers, facsimile receivers and other systems intended for special application can be serviced with equal ease. . . . Signal Tracing, founded upon the signal itself, is the most basic, most fundamental method of trouble shooting ever devised. . . . It is free of every limitation which in the past has

hindered speedy service operations. . . .

You can't afford to be without this book. . . . We mean every word of this statement. . . . It is vital to your immediate welfare—to your future. . . . Get your copy today—NOW!

CONTENTS

Chapter I—Introduction to Signal Tracing. Chapter II—Amplifier Operation and The Signal. Chapter III—Diode Detector Tube Systems. Chapter IV—Multi-Element Detector Systems. Chapter V—Oscillator Tube Systems. Chapter VI—Mixer Tube Systems. Chapter VII—Control Circuits and Voltages. Chapter VIII—Coupling Devices. Chapter IX—The T-R-F Receiver. Chapter X—The Superheterodyne Receiver. Chapter XI—Television and Facsimile Receivers. Chapter XII—Public Address Systems. Chapter XIII—Localizing Defects by Signal Tracing. Chapter XIV—Signal Tracing in Receiver Design.

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The vacuum-tube voltmeter has been rapidly forging to the front as a favorite tool of engineers, research workers and servicemen. By its proper use, dynamic measurements can be made under any and all conditions with a minimum of effort and time. Here is a book that is a perfect mine of information for everybody who wants to know all about these important instruments. Not only is the theory explained upon which the functioning of the different types of v-t voltmeters is based, but the practical applications of these instruments are completely described. Like nearly all types of voltmeters, multipliers and shunts are employed with vacuum-tube voltmeters to extend their ranges. These and their uses are explained, as is the calibration of the different types.

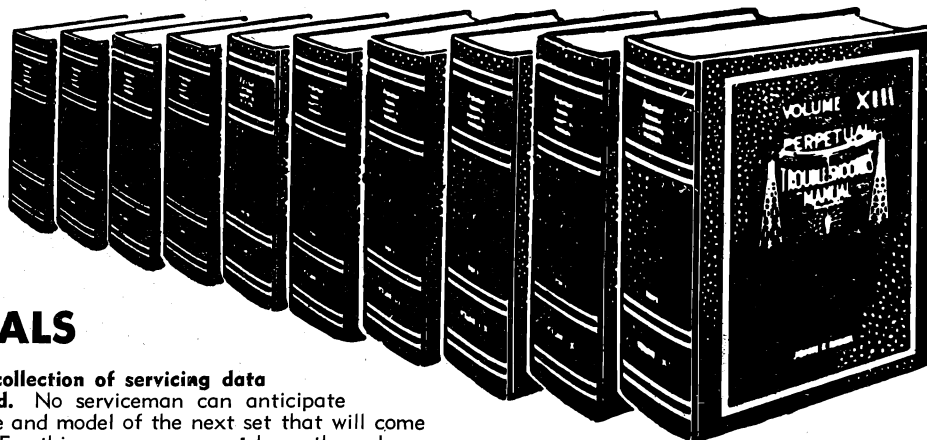
For those men who are interested in the construction of v-t voltmeters, adequate information will be found for v-t voltmeters were built in the author's laboratory, and constants are given for the components of many types, as well as a wealth of other useful data.

CONTENTS

Chapter I. Fundamentals of Vacuum-Tube Voltmeter. Chapter II. Diode Vacuum-Tube Voltmeters. Chapter III. Triode Vacuum-Tube Voltmeters. Chapter IV. Slide-Back Vacuum-Tube Voltmeters. Chapter V. Rectifier-Amplifier Vacuum-Tube Voltmeters. Chapter VI. Tuned Vacuum-Tube Voltmeters. Chapter VII. Audio-Frequency and Logarithmic Vacuum-Tube Voltmeters. Chapter VIII. Vacuum-Tube Voltmeters for D-C Voltage, Current, and Resistance Measurements. Chapter IX. Design and Construction of Vacuum-Tube Voltmeters. Chapter X. Calibration and Testing of V-T Voltmeters. Chapter XI. Applications of V-T Voltmeters. Bibliography.

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MAKE SERVICING EASY



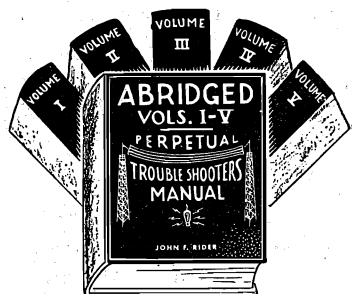
RIDER MANUALS

The greatest collection of servicing data ever assembled. No serviceman can anticipate the year, make and model of the next set that will come to his bench. For this reason you **must** have the volume of Rider Manuals that contains the servicing information on that particular set. Benefit from the **complete** servicing information that only Rider Manuals can give you: Data on alignment, I-F peaks, operating voltages, parts lists and parts values, voltage ratings of condensers,

wattage ratings of resistors, coil resistance data, and all the other information that is vital if you are to know exactly what the manufacturer put in that receiver. No more new receivers after April 22nd! The old sets will now come into the service shop. **So be prepared!**

ABRIDGED MANUAL

Volumes I-V



The servicing information you need to service the old receivers will be found in the Abridged Manual, Volumes I-V. It is a compilation of the most widely distributed receivers released after 1929 that formerly appeared in Volumes I-V.

As can be readily appreciated, it is by no means as complete as the original first five individual volumes; these contained a total of approximately 5000 pages, whereas the Abridged Volume contains 2000 pages.

In order to select the proper receivers for inclusion in the Abridged Manual, all the manufacturers who were responsible for the sale of the greatest number of sets between 1930 and 1935 were contacted, and information was obtained as to the most widely distributed receivers. The Abridged Manual was then compiled.

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- VOL. XIII. This newest Rider Manual covers the servicing data on receivers manufactured as late as March, 1942. Because of the curtailment of receiver manufacturing, every effort was made to include information on those receivers produced during the latter months of 1941 and the early months of 1942. This addition of Rider's Volume XIII makes available to the radio industry more than 18,000 pages of authentic servicing information.1,672 pages, Net Price \$11.00
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INSIDE THE VACUUM TUBE

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The latest development in radio—**FREQUENCY MODULATION**—is on the air. More and more stations all over the country are making provision for “static-less” broadcasting and the number of F-M receivers on the market is increasing. . . . Here is your chance to get in at the start—Rider’s newest book explains the transmission and reception of frequency-modulated signals with especial attention given to the different types of f-m receivers now available—their adjustments and maintenance. . . . This is a “must” for every serviceman who has an eye on the future. . . . It is an investment that will pay real dividends!



CONTENTS

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It is only through knowledge of the principles underlying the functioning of any piece of apparatus that a man can get the utmost use from it. To that end, it will be found that the subject matter of this book is treated from an entirely new angle, the theory upon which each meter is based is separate and distinct from any other type and complete in itself. Inasmuch as some types of meters can do several jobs, the practical aspects of the meter are confined to the latter portion of the book. Thus, you can cover whichever phase of the subject you are interested in, and with the new construction of the book—the separation of text and illustrations—you will be able to obtain the information quickly and with the minimum of effort.

CONTENTS

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Here is your opportunity to get the true facts about oscillators! Rider's "The Oscillator at Work" is worth many times the price asked because it helps protect the investment you have made in oscillator equipment.



CONTENTS

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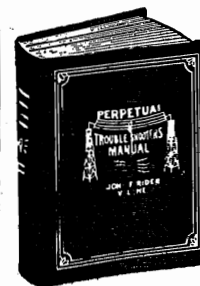
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RIDER

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to servicing and adjustment problems. Order your copy today!

CONTENTS

I—The Theory of the Tube. A complete explanation of the different types of cathode-ray tubes. How the spot is focussed and how the beam of electrons is deflected. II—Sweep Circuits. How and why the spot moves across the screen and forms the image. III—A-C. Voltages on Both Sets of Plates. An explanation of the patterns formed on the cathode-ray tube screen when a.c. voltages are applied. IV—Commercial Cathode-Ray Oscillographs. A detailed description of the various cathode-ray oscillographs that are on the market. V—Practical Application of the Cathode-Ray Oscillograph. General directions for adjusting the cathode-ray oscillograph for all tests. VI—Alignment of Tuned Circuits. Understandable explanation of the theory of the frequency modulated oscillator and how it is used in testing with the cathode-ray oscillograph. VII—The A-F. Frequency Modulator. How overall a-f. response curves of audio units are developed and what they mean. VIII—Auto Radio Vibrator Testing. The connections for testing vibrators with the cathode-ray tube oscillograph. IX—Transmitter Adjustment. How the modulation of a wave is measured and the trapezoidal pattern is developed on the screen. X—Other Applications of the Cathode-Ray Oscillograph. Beat patterns, c-w. reception and detection.

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SERVICING SUPERHETERODYNES

No other circuit in the radio field has undergone all the changes that have been incorporated in the superheterodyne. In order to service these receivers with profitable speed, you must be able to analyze the different portions of the circuit quickly and this is just what Rider tells you how to do in this book. Not only is the theory of all types of Superhets thoroughly covered, but actual servicing details are most complete. Many thousands of Servicemen are using "Servicing Superheterodynes" daily and are finding the investment one that paid dividends in increased profits.

CONTENTS

I—The Principles Underlying the Operation of the Superheterodyne Receiver. II—The Generation of and the Relation Between Harmonics. III—Explanation of the Different Types of Superheterodyne Circuits. IV—Function and Characteristics of Individual Parts of the Superheterodyne Receiver. V—Special Circuits and Tube Applications. VI—Troubles and Symptoms Encountered in Superheterodynes. VII—Application of Test Oscillators. VIII—Vibrator Units. Appendix—Intermediate Peak Frequencies of Commercial Receivers with Model Numbers.

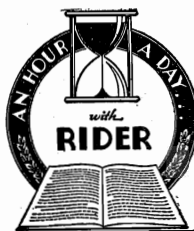
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Alternating Currents in Radio Receivers

Are you familiar with the different forms of alternating currents which are present in a radio receiver? When once you understand the basic facts relating to the cycle—frequency—sine waves—harmonics—complex waves—modulated waves—phase relations—you will have no trouble in understanding the servicing problems which involve these factors.

D.C. Voltage Distribution

Only a casual glance at the schematics of some of the 1939 multi-tube sets will convince you that the distribution of the D.C. voltage to the tube elements is complicated. The many different forms these systems take should be recognized at a glance and understood. You should know thoroughly how the value of resistance and wattage rating of each resistor is calculated and why.



96 Pages Each
Net Price 90c Each

Resonance and Alignment

Do you know what happens when you tune a circuit to resonance? In order to align a receiver, oscillator, or transformer properly, so that maximum efficiency is attained, you must be familiar with more than just the mechanical operation. Are you familiar with I.F., oscillator, R.F. and detector alignment for all types of circuits—single, double and triple tuned systems?

Automatic Volume Control

Automatic volume control has now become a standard feature of every well made receiver. Are you familiar with every type in use and can you recognize one system from another by examining the schematic? Do you know how various types of tubes are used in each circuit? Noise suppression systems, time delay circuits—audio-frequency volume expander systems and other such networks have greatly increased servicing problems.

HARD COVERS TYPE SET PROFUSELY ILLUSTRATED HANDY POCKET SIZE

SERVICING RECEIVERS BY MEANS OF RESISTANCE MEASUREMENT

Take the guesswork out of servicing by using an ohmmeter in your trouble shooting. This book tells you how to make and correctly interpret point to point resistance measurements. It will simplify your servicing problems and enable you to use the resistance data furnished in RIDER MANUALS to the best advantage. Now that more and more manufacturers are supplying resistance data, you need this book to speed up your servicing with greater accuracy. Let Rider show you how to use a modern servicing procedure on the complicated receivers—you will find in this book the usual Rider clarity of explanation of how theory is applied to practice.

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Two Volumes

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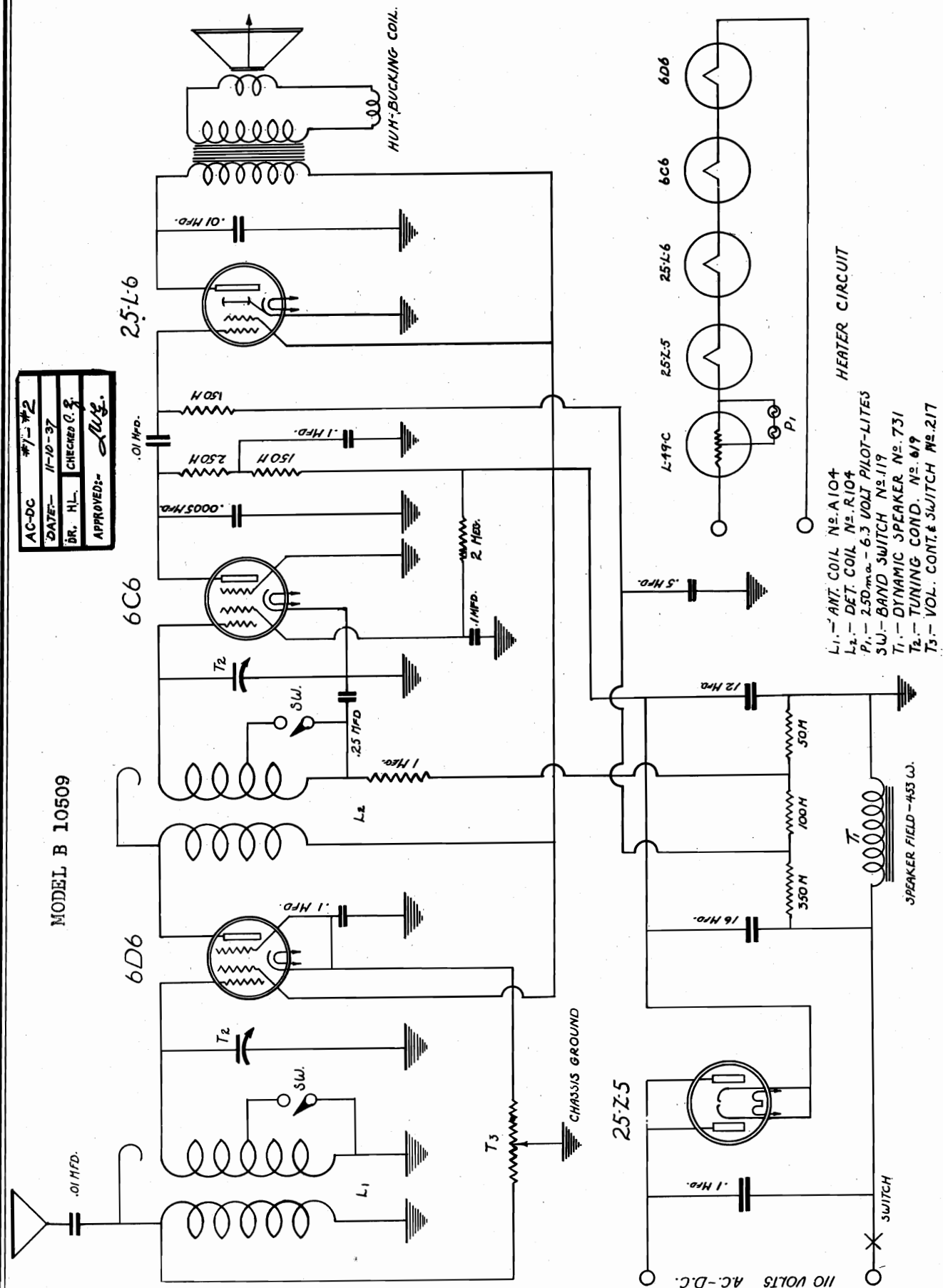
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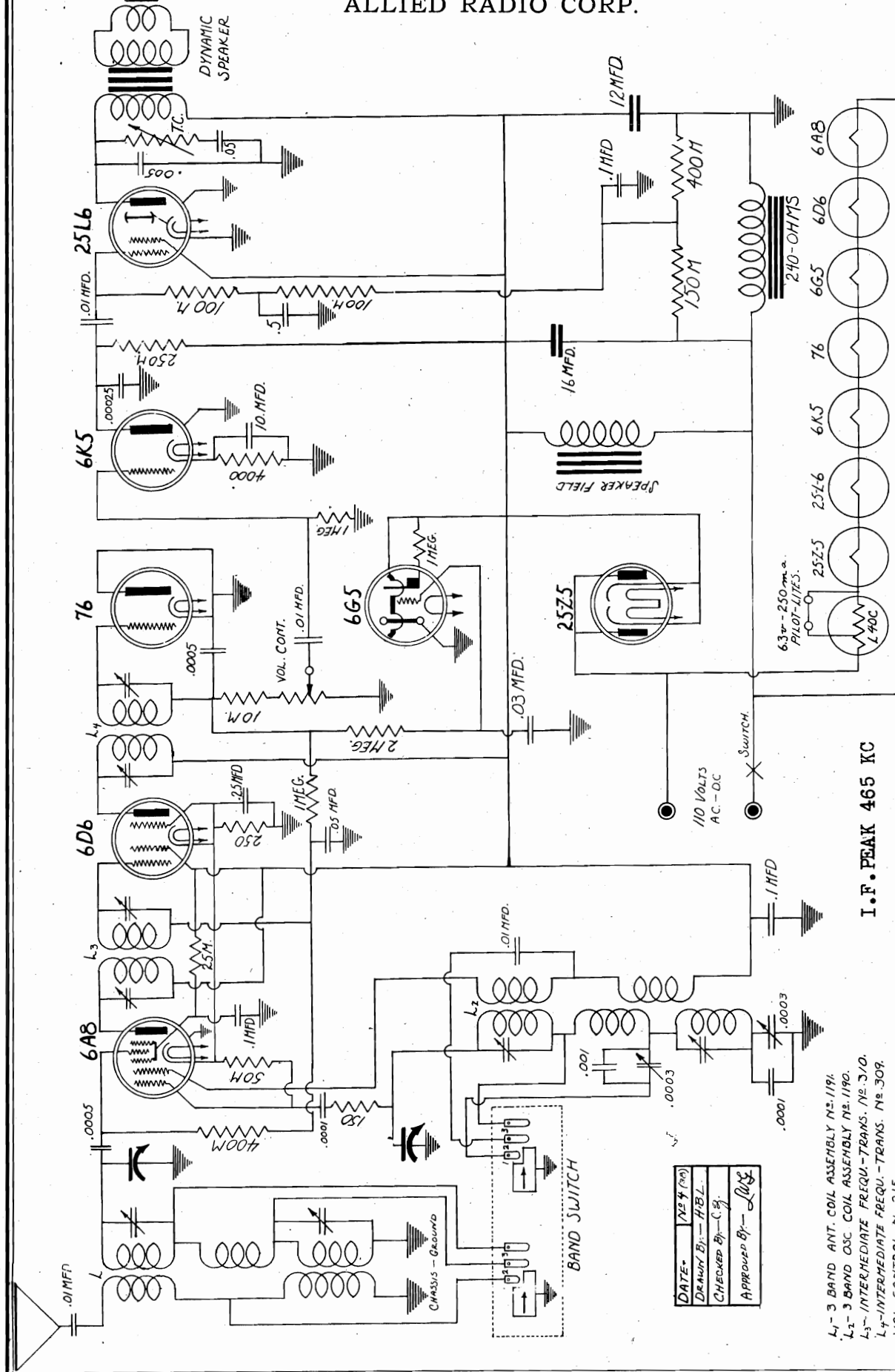
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MODEL B 10509



MODEL B10510

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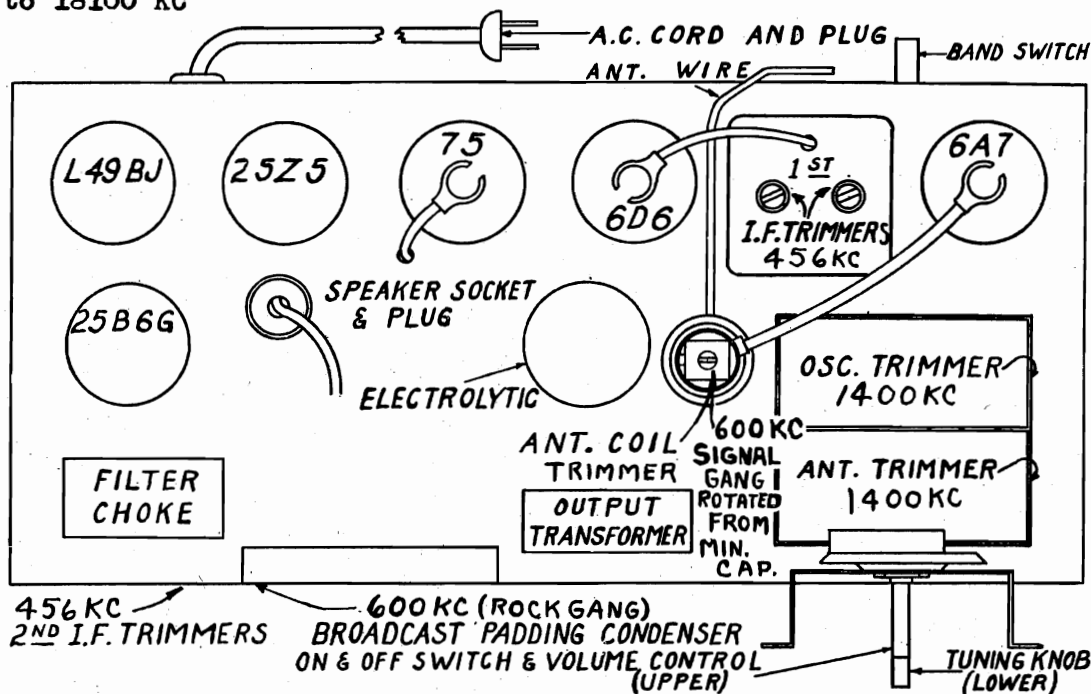
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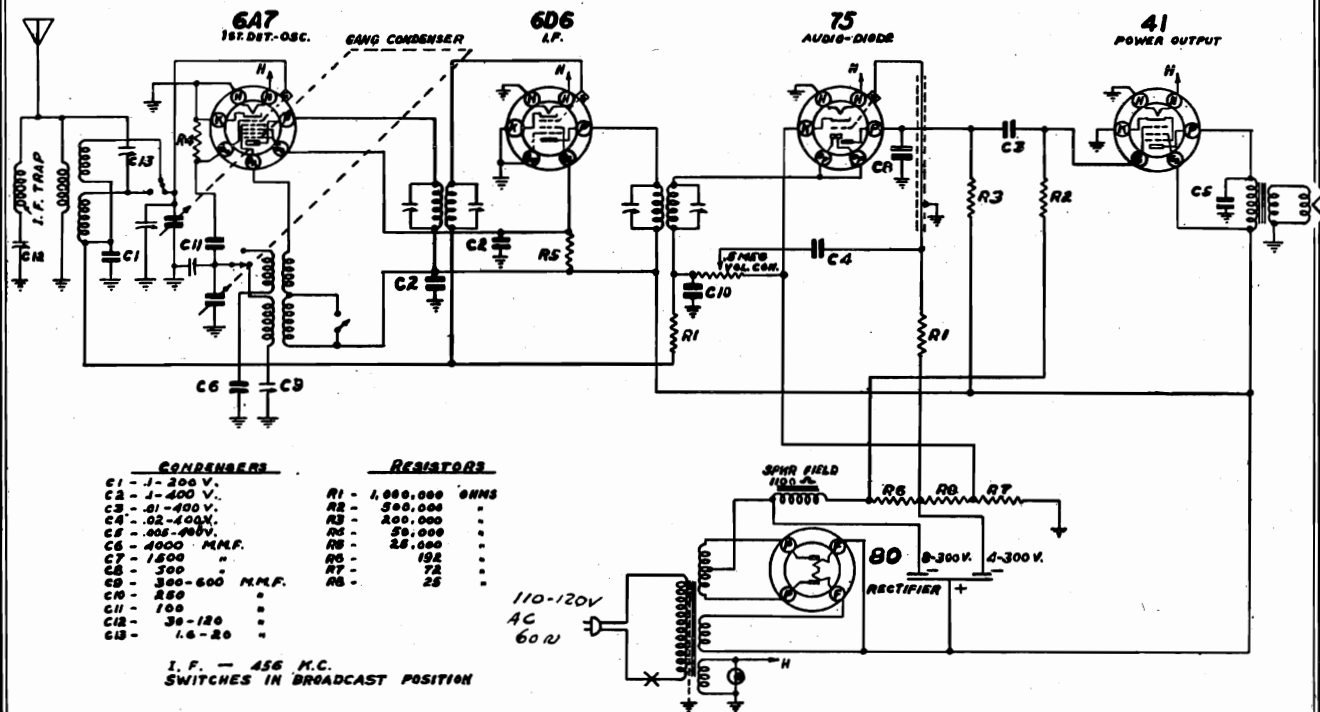
L₁-3 BAND ANT. COIL ASSEMBLY N^o. 1191.
L₂-3 BAND OSC. COIL ASSEMBLY N^o. 1190.
L₃-INTERMEDIATE FREQU.-TRANS. N^o. 310.
L₄-INTERMEDIATE FREQU.-TRANS. N^o. 309.
VOL. CONTROL N 215.
TONE CONTROL N^o. 304A.
5 1/2" DYNAMIC SPKR. N^o. 732. 8" SPKR. N^o. 725.
BAND SWITCH N^o. 121.

CONVENTIONAL ALIGNMENT SEE VOL.VIII



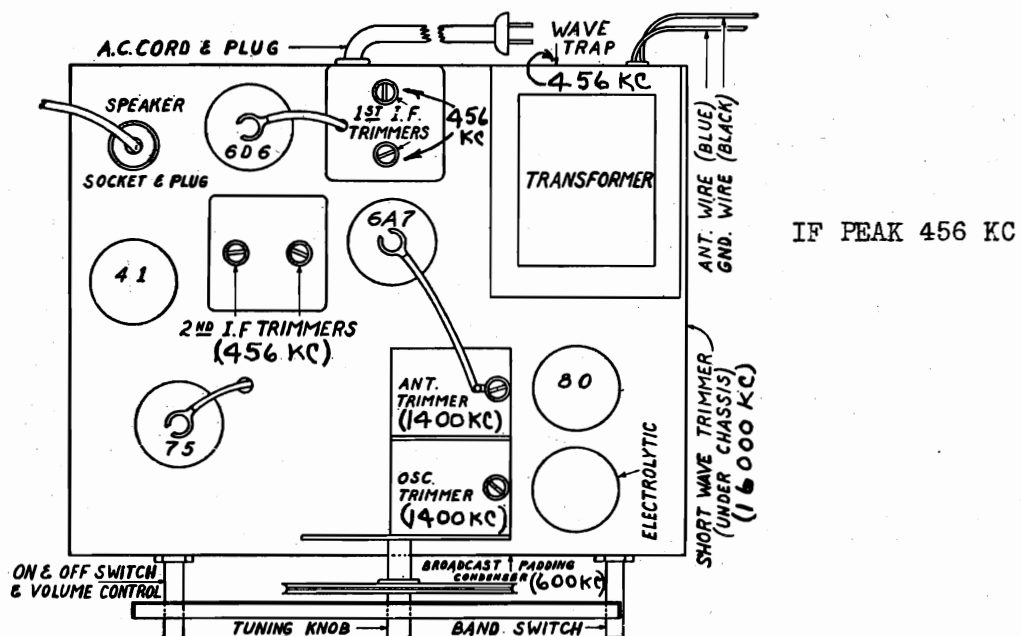
Part No.	Description				
P506	Socket, Type 6A7	P1542	Gang Condenser	P148	.05 Mfd. 200 V
P521	Socket, Type 75	P1543	Dial Scale	P164	.01 Mfd. 400 V
P536	Socket, Type 6D6	P1551	Iron Core Filter Choke	P334	.05 Mfd. 400 V
P559	Socket, Type 25Z5	P1552	Output Transformer	P336	.0005 Mica Condenser
P1549	Socket, Type 148B	P1555	Volume Control & Switch	P480	.0001 Mica Condenser
P1550	Socket, Type 25B6G	P1556	Antenna Coil	P1574	.0015 plus or 5% Mica
P530	Tube Shield	P1558	2nd LF. Transformer	P1557	Riveted Mica Condenser
P1647	Trimmer	P1559	Oscillator Coil		
P918	1st LF. Transformer	P1560	Speaker		RESISTORS
P929	AC Cord & Plug	P1561	Electrolytic Condenser	P1567	Candohm Resistor
P1489	Painter	P1562	Band Change Switch	P166	25,000 1/4 Watt
P1491	Dial Glass	P1568	Knob, (Specify Color)	P419	20,000 1/4 Watt
P1496	Rubberized Belt	P1656	20 Antenna Cord	P1563	150 1/3 Watt
P1497	Takeup Spring			P139	250,000 1/4 Watt
P1498	Drive Bushing		CONDENSERS	P162B	1 Megohm 1/3 Watt
P1503	Pilot Light Socket	P141	.25 Mfd. 200 V	P1584	100,000 Ohm 1/3 Watt
P1504	Pilot Light Bulb	P142	.01 Mfd. 200 V	P1585	400,000 Ohm 1/3 Watt
P1508	Beaffle Board	P143	.02 Mfd. 200 V	P1586	15,000 Ohm 1/3 Watt

ALLIED RADIO CORP.



FREQUENCY RANGE -
535 to 1750 - KC
5600 to 18100 - KC

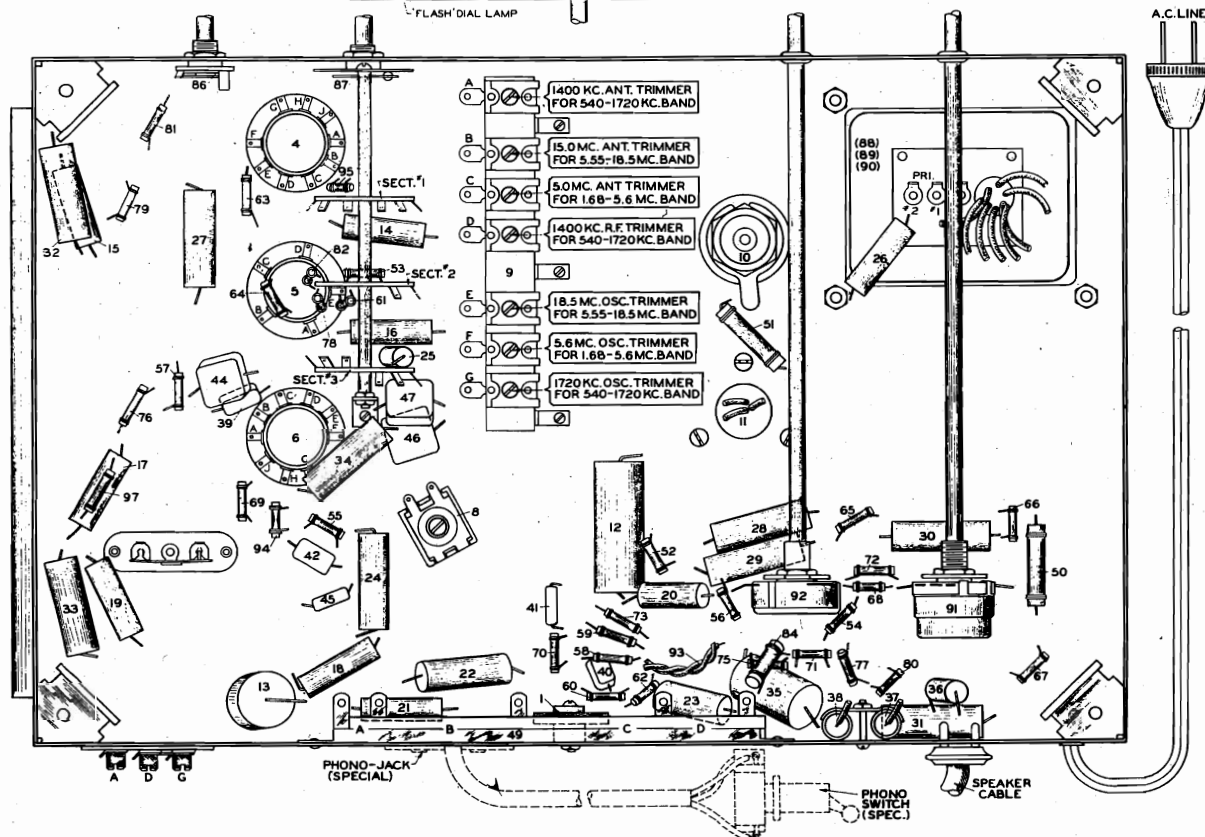
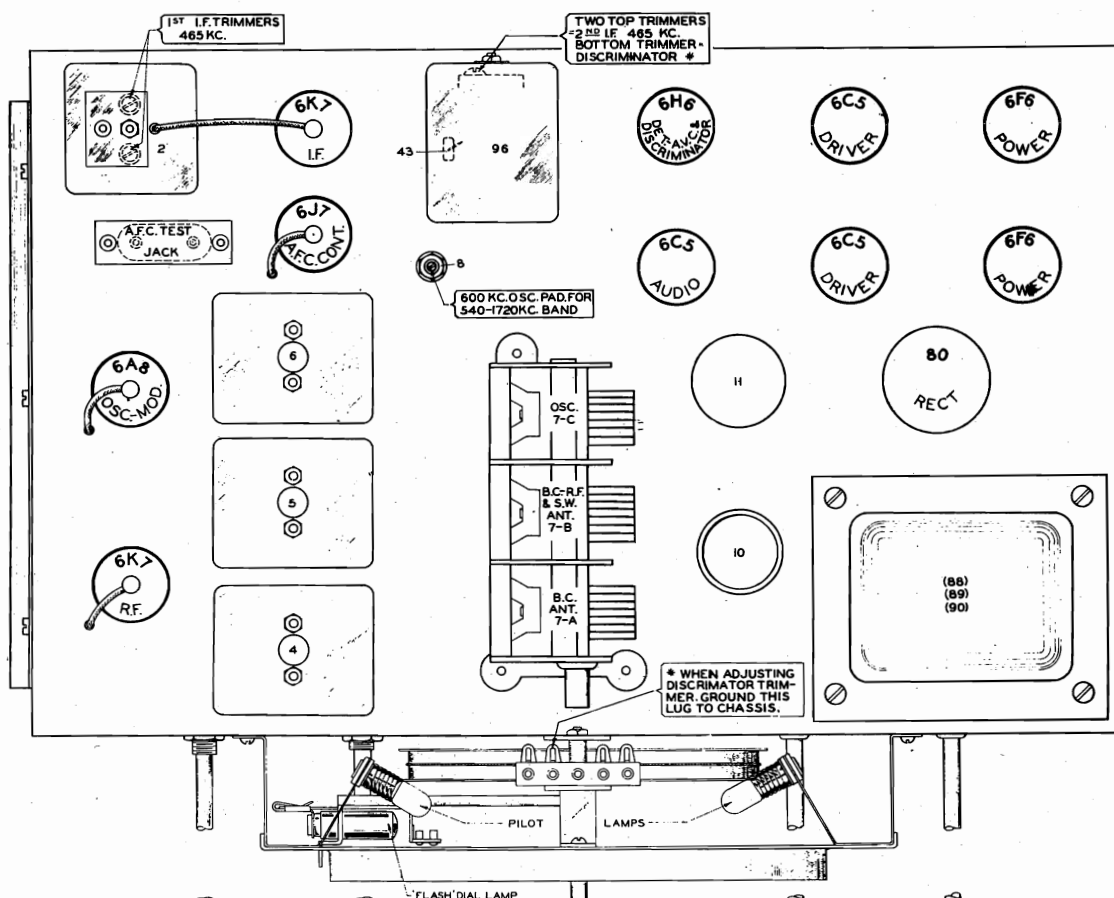
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ALLIED RADIO CORP.

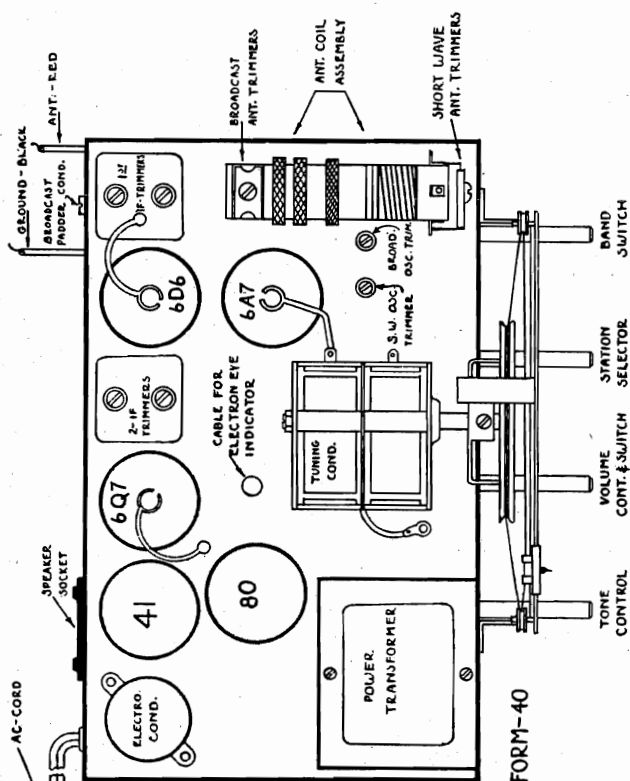
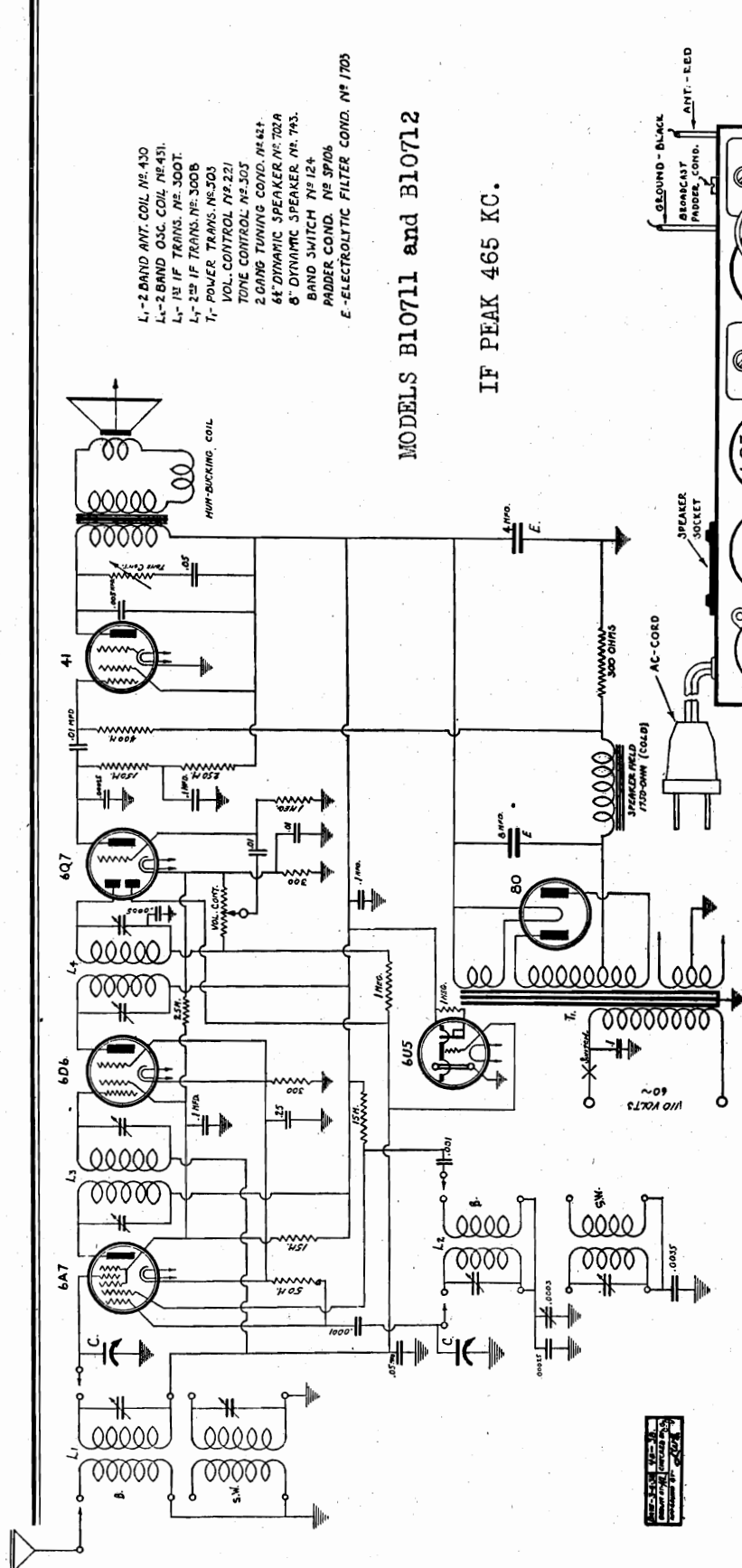
MODELS B10580, B10581, B10582

FOR OTHER DATA, SEE INDEX



MODELS B10711 and B10712

IF PEAK 465 KC.



INTERMEDIATE FREQUENCY: Set oscillator to 485 KC. Feed this to the grid of the pentagrid converter tube. Adjust trimmers on the intermediate frequency transformers for peak readings as indicated on the output meter which is to be placed across the output transformer.




BROADCAST BAND: Set the band switch for broadcast reception. Adjust oscillator to 1400 KC and connect the output of the generator to the antenna connection at the rear of the chassis through a .0002 mfd. mica condenser. Set the pointer on the dial to 1400 KC making sure that the volume control is set at its maximum position. Adjust the broadcast antenna and broadcast oscillator trimmers for maximum signal (as indicated on the output meter). Re-set the dial pointer on the receiver and on the test oscillator to 800 KC. Slowly increase or decrease the broadcast padding condenser while tuning back and forth across the signal with the station selector knob until the maximum reading is obtained on the output meter. Re-check the 1400 KC alignment as the adjustment at 800 KC may have slightly disturbed the original 1400 KC setting.

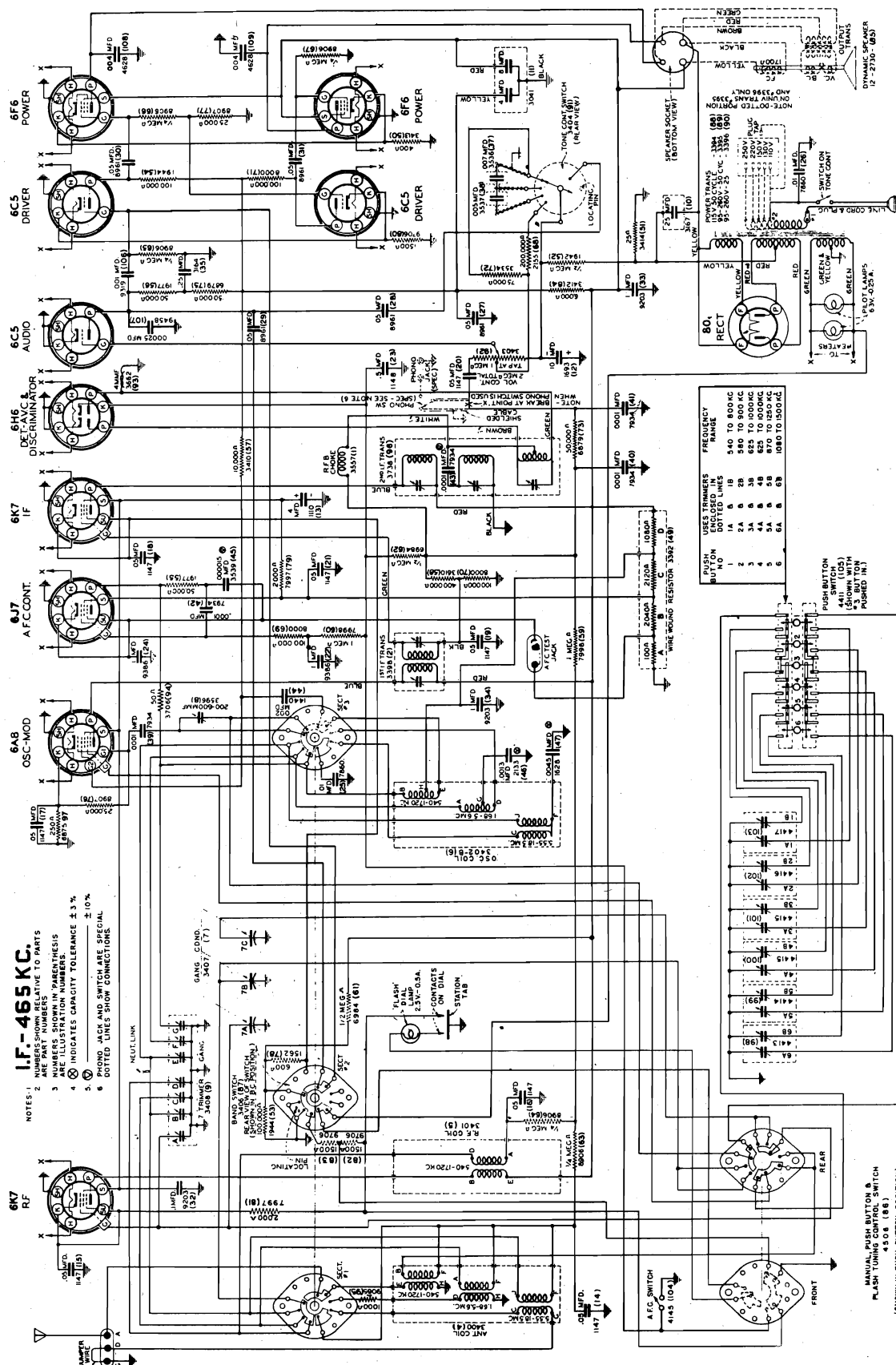
SHORT WAVE: Set band switch on short wave position. Connect the antenna of the radio receiver to the output of the test oscillator through a 400 ohm carbon resistor. Set oscillator and receiver dial at 15 megacycles. Adjust the short wave antenna and short wave oscillator trimming condensers for maximum output as indicated by readings on the output meter. No other adjustments are necessary for aligning this band.

It is advisable to check the sensitivity at 6000 KC to determine whether the circuits are properly aligned. Should the receiver lack sensitivity at this frequency check the .0035 mica condenser for short circuit.

I.F.-465 KC.

NOTES-1

- 1. NUMBERS SHOWN IN CIRCLES INDICATE PART NUMBERS.
- 2. NUMBERS SHOWN RELATIVE TO PARTS ARE PART NUMBERS.
- 3. NUMBERS SHOWN IN PARENTHESES ARE ILLUSTRATION NUMBERS.
- 4.  INDICATES CAPACITY TOLERANCE.
- 5. .
- 6.  PHONO JACK AND SWITCH ARE SPECIFIED BY DOTTED LINES SHOW CONNECTIONS.



4506 (86)
(SHOWN IN PUSH BUTTON POSITION)
REAR VIEW OF SWITCH

(e) Tune receiver dial and set test oscillator frequency to EXACTLY 1400 kilocycles. Adjust 1400 K.C. R.F. and antenna trimmers for maximum sensitivity.

(f) Set test oscillator frequency and receiver dial to approximately 600 kilocycles. Then while rocking gang condenser slightly to right and left, adjust 600 K.C. oscillator padder for maximum signal response.

ALIGNING 189.5-6 MEGACYCLE BAND:

- Replace .00025 Mfd. test oscillator antenna lead series condenser with a 400 ohm resistor.
- Adjust band selector switch to 189.5-6 megacycles, tune receiver dial and set test oscillator frequency to EXACTLY 5.6 megacycles. Bring in 5.6 megacycle test signal to maximum output by adjusting 5.6 M. C. oscillator trimmer.
- Tune receiver dial and test oscillator frequency to EXACTLY 5.6 megacycles and adjust 5 M.C. antenna trimmer for maximum sensitivity.

ALIGNING 5.55-18.5 MEGACYCLE BAND:

- Leave 400 ohm resistor in series with test oscillator lead and place band selector switch for operation on 5.55-18.5 megacycle band, tune receiver dial and set test oscillator frequency to EXACTLY 18.5 megacycles.
- Adjust 18.5 M.C. oscillator trimmer to bring in 18.5 megacycle test signal to maximum output.

NOTE: When adjusting this trimmer two peaks, the fundamental and the image peak will be noticed. CARE MUST BE TAKEN THAT THE FUNDAMENTAL PEAK AND NOT THE IMAGE PEAK IS USED FOR ALIGNING THE RECEIVER AT 18.5 MEGACYCLES. Always back off the trimmer to minimum capacity, then screw down the trimmer (add capacity) until the FIRST peak which is the fundamental and the proper one to use is tuned in. If the trimmer is screwed down beyond the point where the first peak is received the incorrect image peak will be tuned in. After completing adjustment of the oscillator trimmer at 18.5 megacycles, always check to see if the proper peak has been used. To do this leave test oscillator frequency at 18.5 megacycles, increase the output of the test oscillator and tune receiver dial to approximately 17.5 megacycles. Then vary the receiver dial slightly to the right and left of 17.5 megacycles, and if the fundamental peak was used in aligning at 18.5 megacycles the test oscillator signal will be heard at approximately 17.5 megacycles on the receiver dial.

- Tune receiver dial and set test oscillator frequency to EXACTLY 15 megacycles. Rock gang condenser slightly to right and left and adjust 15 M.C. antenna trimmer for maximum 15 megacycle test signal response.

To assure more accurate trimmer setting, repeat all above adjustments several times always using lowest possible test oscillator output consistent with readable output meter scale deflection.

(c) Turn receiver on, place A.F.C. switch knob in left position and if meter needle jumps off scale adjust output of test oscillator until an approximate 2 M.A. deflection is obtained on the 0 to 5 milliammeter scale.

(d) Place band selector switch for operation on 1720-540 K.C. broadcast band—and set receiver dial somewhere near 1000 kilocycles at a point where no station is heard.

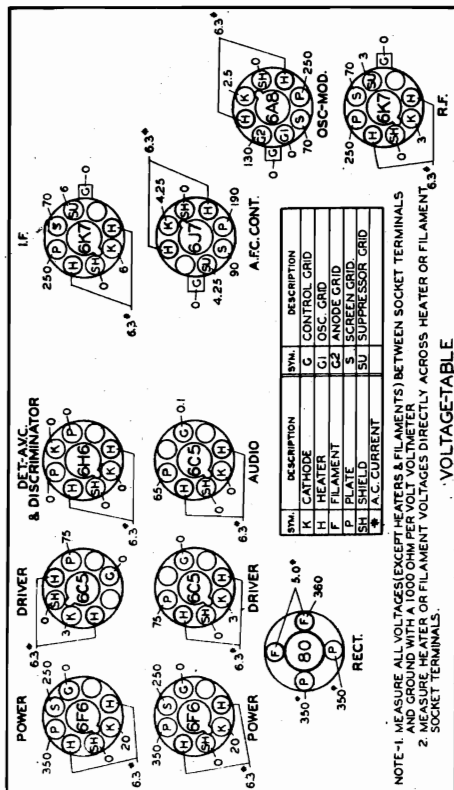
(e) Rotate A.F.C. switch knob from maximum left hand to middle position and note whether the milliammeter reading changes as the position of the A.F.C. switch is changed. No change in reading indicates probable proper discriminator trimmer adjustment, while a noticeable change indicates improper discriminator trimmer adjustment.

IMPORTANT: DO NOT ADJUST DISCRIMINATOR TRIMMER UNLESS IT IS ABSOLUTELY NECESSARY. Place A.F.C. switch in middle position and note milliammeter reading, then place A.F.C. switch in maximum left hand position. With A.F.C. switch in maximum left hand position, CAREFULLY ADJUST DISCRIMINATOR TRIMMER UNTIL MILLIAMMETER READING IS EXACTLY THE SAME IN BOTH POSITIONS.

NOTE: As the discriminator trimmer screw is screwed in (increasing capacity) the milliammeter reading should decrease and as the discriminator trimmer is unscrewed (decreasing capacity) the milliammeter reading should increase. IF WHEN ADJUSTING THE DISCRIMINATOR TRIMMER THE MILLIAMMETER READING DOES NOT SHARPLY INCREASE OR DECREASE AS THE TRIMMER IS ADJUSTED EVEN AFTER SEVERAL TURNS OF THE TRIMMER SCREW, THIS DOES NOT INDICATE PROPER BALANCING BUT DOES INDICATE INCORRECT ADJUSTMENT AND THE DISCRIMINATOR TRIMMER SHOULD BE SET TO ABOUT 1/2 CAPACITY AND THE ADJUSTMENT OF THE DISCRIMINATOR TRIMMER MADE ALL OVER AGAIN.

ALIGNING 1720-540 KILOCYCLE BAND:

- Check tuning dial adjustment by turning gang condenser until plates touch maximum capacity stop (completely in mesh), at which point the dial needle must be exactly even with the last line at the low frequency end of the dial calibration. If the dial needle does not point exactly to the last line, move needle to correct position.
- Remove test oscillator lead from grid of 6A8 tube and connect to receiver "A" antenna post through a .00025 Mfd. condenser.
- Place A.F.C. control knob in middle A.F.C. "off" position. Adjust band selector switch for operation on the 1720-540 kilocycle band.
- Set test oscillator frequency and receiver dial to EXACTLY 1720 kilocycles, and BRING IN 1720 KILOCYCLE TEST OSCILLATOR SIGNAL TO MAXIMUM OUTPUT BY ADJUSTING 1720 KILOCYCLE OSCILLATOR TRIMMER.



VOLTAGE TABLE

ALIGNMENT PROCEDURE:

SHOULD REALIGNMENT BE NECESSARY, THERE ARE SEVERAL PRECAUTIONS THAT MUST BE CAREFULLY OBSERVED, THESE ARE:

- Do not align set until it has reached normal operating temperature. Place the receiver in operation at least 15 minutes before attempting to realign the set.
- The importance of using the proper type of test equipment and FOLLOWING THE ALIGNMENT PROCEDURE EXACTLY AS GIVEN CANNOT BE TOO STRONGLY EMPHASIZED—failure to do so will result in low sensitivity, poor selectivity, incorrect dial calibration, distortion and unsatisfactory operation of the automatic frequency control.
- It is absolutely necessary that an accurately calibrated test oscillator with some type of output measuring device and a double scale milliammeter—0 to 1 M.A. and 0 to 5 M.A. be used.

ALIGNING I.F. STAGE AT 465 KILOCYCLES:

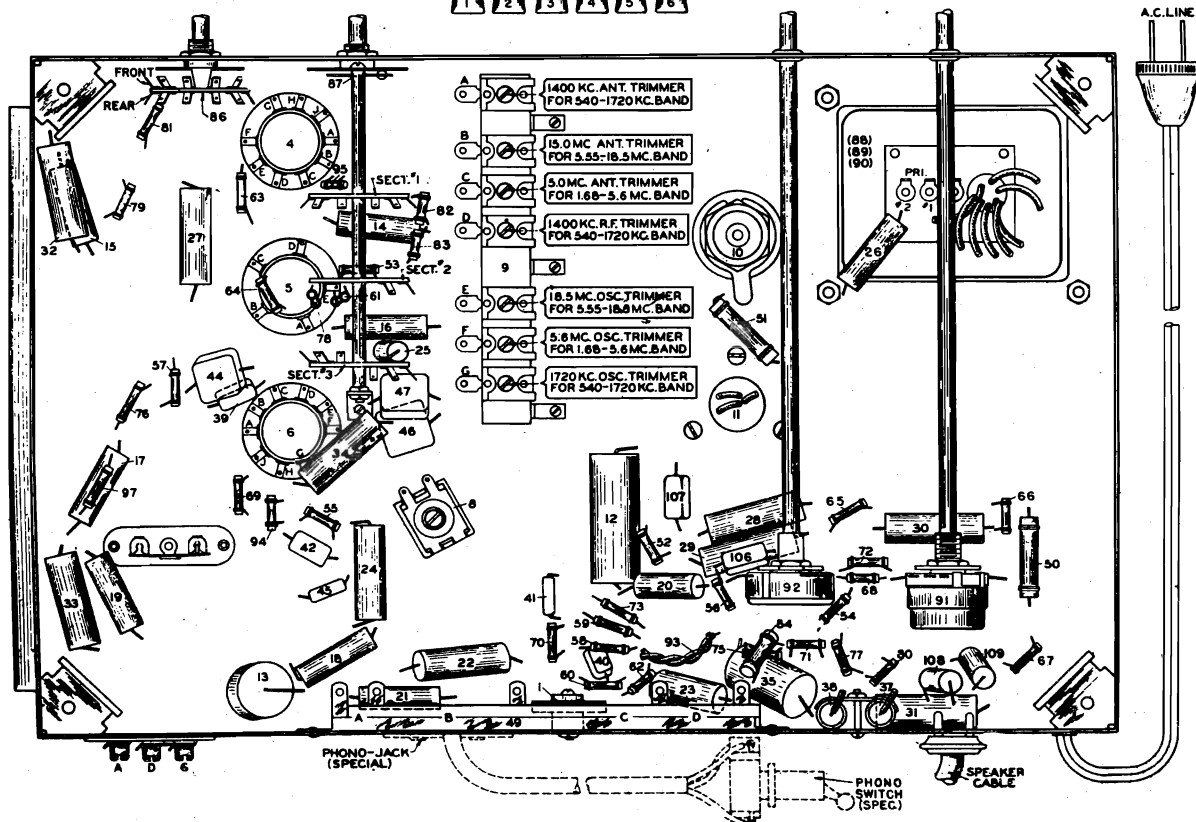
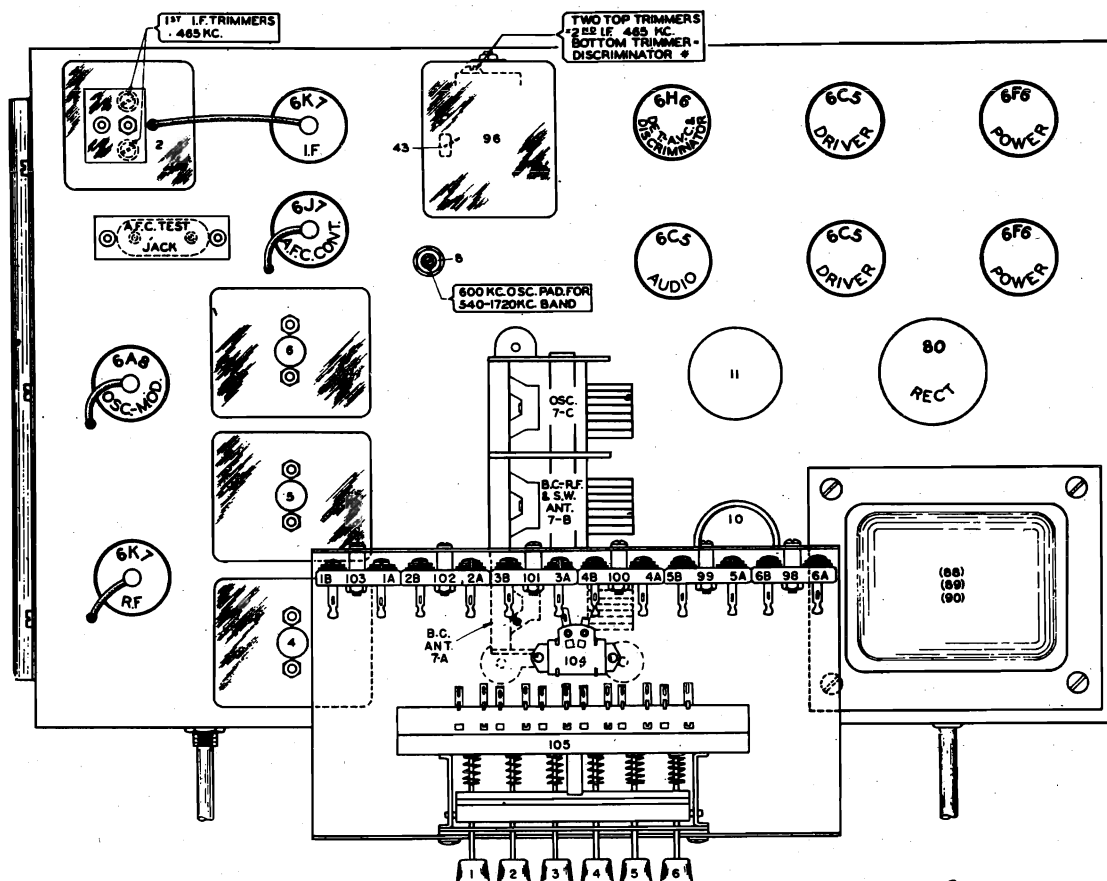
- Place automatic frequency control knob in the middle A.F.C. "off" position.
- Attach the ground lead of the test oscillator to the chassis. Connect the other lead to the grid cap of the 6A8 tube through a .02 Mfd. series condenser. DO NOT REMOVE GRID CLIP.
- Set test oscillator to EXACTLY 465 kilocycles and turn volume control on full.

ALIGNING DISCRIMINATOR CIRCUIT:

- Place switch underneath push button plate assembly (above gang condenser) in A.F.C. "on" position. Leave test oscillator set to EXACTLY 465 KILOCYCLES and connect to grid of 6A8 tube through a .02 Mfd. Condenser—insert lead of double scale 0 to 1 and 0 to 5 milliammeter into A.F.C. test jack located on top of chassis adjacent to the 6A7 tube. To avoid possibility of damaging the meter should one of the milliammeter leads short to the metal chassis, ALWAYS TURN OFF RECEIVER WHEN INSERTING OR REMOVING MILLIAMMETER LEADS FROM A.F.C. TEST JACK.

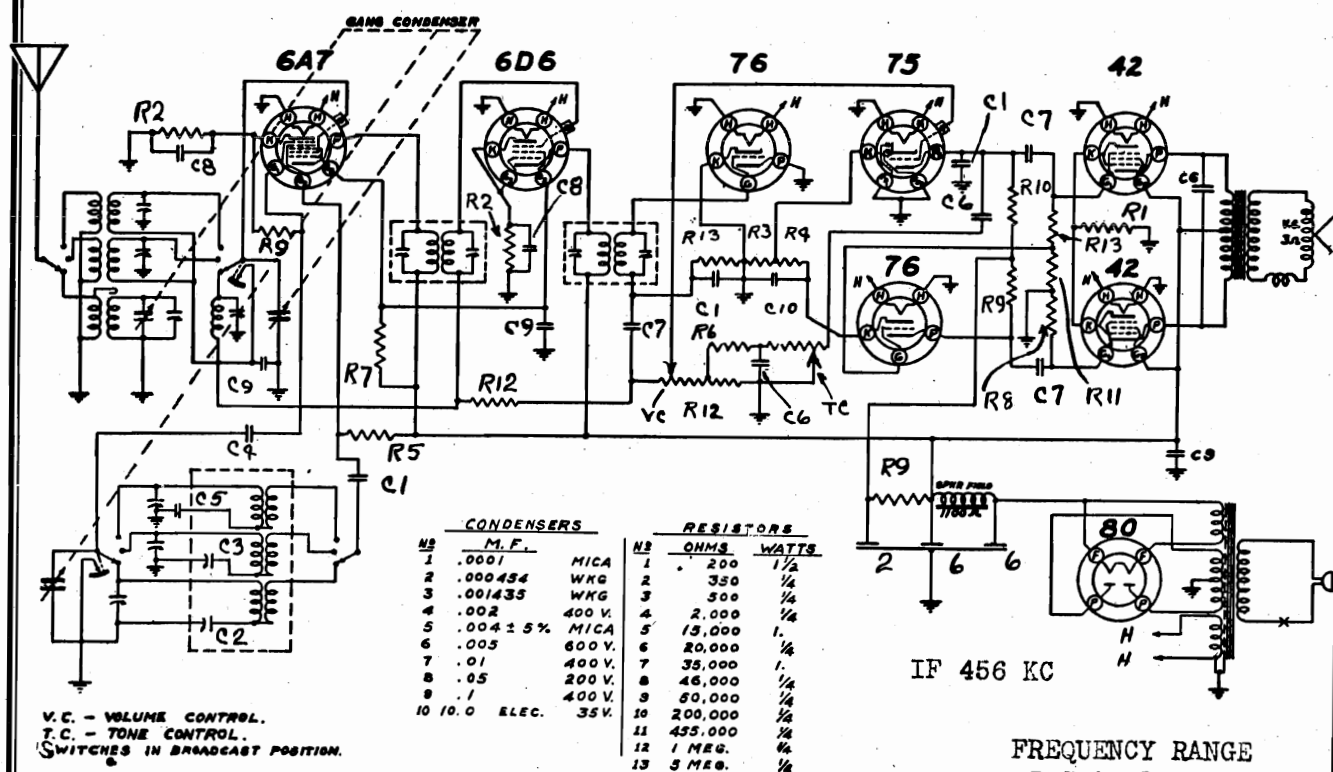
Short out A.F.C. mute switch by grounding the second from the left (looking at the front of the chassis) of the four lugs mounted on top of the dial assembly. The proper lug to ground is indicated in the "Note X" on chassis top parts view.

ALLIED RADIO CORP.



MODEL B10773

ALLIED RADIO CORP.



Eight Tube AC Superheterodyne

ALIGNMENT DATA AND SERVICING

GENERAL DATA

The alignment of this receiver requires the use of a test oscillator that will cover the frequencies of 456, 600, 1400, 1730, 1800, 4000, 5600, 6000, 16,000 and 18,100 KC and an output meter to be connected across the primary or secondary of the output transformers. If possible, all alignments should be made with the volume control on maximum and the test oscillator output as low as possible, to prevent the AVC from operating and giving false readings.

CORRECT ALIGNMENT PROCEDURE

The intermediate frequency (I.F.) stage should be aligned properly as the first step. After the I.F. transformers have been properly adjusted and peaked, the Broadcast Band should always be the next procedure; after which, either or both of the Short Wave Bands may be aligned.

I.F. ALIGNMENT

With the wave switch in the Broadcast Band and the gang condenser set at minimum. Adjust the test oscillator to 456 KC and connect the output to the grid of the first detector tube (6A7) through a .05 or .1 mfd. condenser. The ground on the test oscillator can be connected to the chassis ground. Align all four I.F. trimmers to peak or maximum reading on the output meter.

BROADCAST BAND ALIGNMENT

Connect the output of the signal generator to the antenna lead (blue) through a .0002 mfd. mica condenser. Set the gang condenser to minimum and the oscillator to 1730 KC and adjust the "oscillator trimmer" to receive this signal. Make no other adjustments at this frequency. Then set the generator to 1400 KC and tune in this signal by rotating the gang to 1400 on the dial. Adjust the "preselector" and "antenna" trimmer to maximum signal. Set the signal generator to 600 KC and tune in the signal on the receiver. **Note:** approximately the same sensitivity should be noted at this point as was at 1400 KC. The

signal strength may sometimes be improved by padding the circuits. This is done by slowly increasing or decreasing the oscillator padding condenser and, at the same time, continuously tuning back and forth across the signal with the receiver until the maximum reading is obtained on the output meter. This adjustment may seem a little complicated but is the easiest way to adjust the oscillator to the preselector of the R.F. section. Return to 1400 KC and again go over the adjustments of this frequency to be certain that they were not put slightly out of alignment when adjustment was made at 600 KC.

POLICE BAND ALIGNMENT

The police band is adjusted by first replacing the .0002 dummy with a 400 ohm resistor and setting the generator to 5600 KC. With the gang set at minimum, adjust the "police oscillator trimmer" to receive this signal, then set the signal generator to 4000 KC and adjust "police antenna trimmer" to give maximum output. Next, set the oscillator to 1800 KC and "pad" the circuit of this frequency as described in the instructions for padding the broadcast circuits.

SHORT WAVE BAND ALIGNMENT

The short wave band is adjusted by setting the generator to 18,100 KC and with the gang at minimum, adjust the "short wave oscillator trimmer" to receive the signal. Set the generator at 16,000 KC, tune in the signal and adjust the "short wave antenna" trimmer to give maximum output. As there is no variable low frequency padding condenser on this band, the sensitivity of the receiver should be checked at 6000 KC to determine whether the circuits are in line at this frequency. Should the receiver lack sensitivity at 6000 KC, the antenna and oscillator coils, as well as the .004 mica padding condenser, should be tested for defects as sometimes these components become subject to mechanical or electrical injuries, despite their rugged construction and liberal ratings.

ALLIED RADIO CORP.

PROCEDURE FOR SETTING TELEPHONE DIAL STATIONS **CHOOSING THE STATIONS TO BE USED**

The telephone dial has 10 buttons located in a ring within the dial scale. Make a list of 10 of your favorite stations, stations which are tuned in regularly. Shown in Fig. 1 is the approximate frequency

range that each button will cover. **Note:** If 2 stations happen to fall within the range of one button, one station will necessarily have to be tuned in with the selector knob.

PROCEDURE FOR ADJUSTING THE TELEPHONE DIAL BUTTONS

(1) Choose one of the stations out of the list of stations selected and by means of the station selector very carefully tune in this station, noting at the same time the exact pointer location on the dial.

(2) Now select the proper button for the first station chosen by referring to Fig. 1 and noting the button into whose range the station falls. For example, station WGN with a frequency of 720 KC comes under the button whose frequency ranges from 670 to 755 KC. Usually the button nearest the tuning point or the bottom of the dial will be the proper button.

(3) Loosen the button by unscrewing it (not the dial) $\frac{1}{2}$ turn to the left. Now press the button in all the way and rock the dial back and forth a trifle until a click is heard. Do not release the button now but set the pointer to its former location and with the dial in this position, being careful not to move it, proceed to tighten the button by turning it in the opposite direction (to the right). Make sure the button is very securely tightened as it may get out of adjustment.

(4) From the station call sheet supplied remove the proper station disc and insert into the push button so that the wording is horizontal when the button is at the bottom, and then insert a clear celluloid insert. Follow this same procedure for the remaining buttons.

(5) If for any reason it is necessary to remove a station call letter disc, the use of a pen knife or any sharp pointed instrument will facilitate the removal.

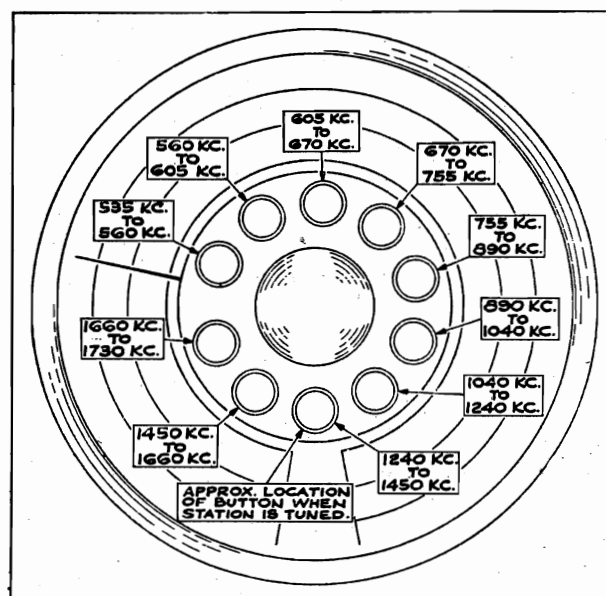
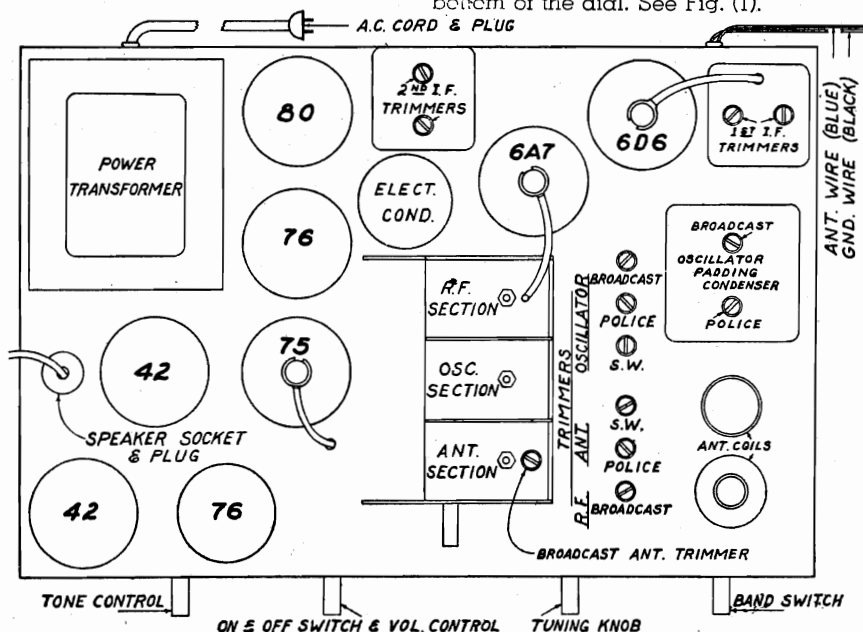
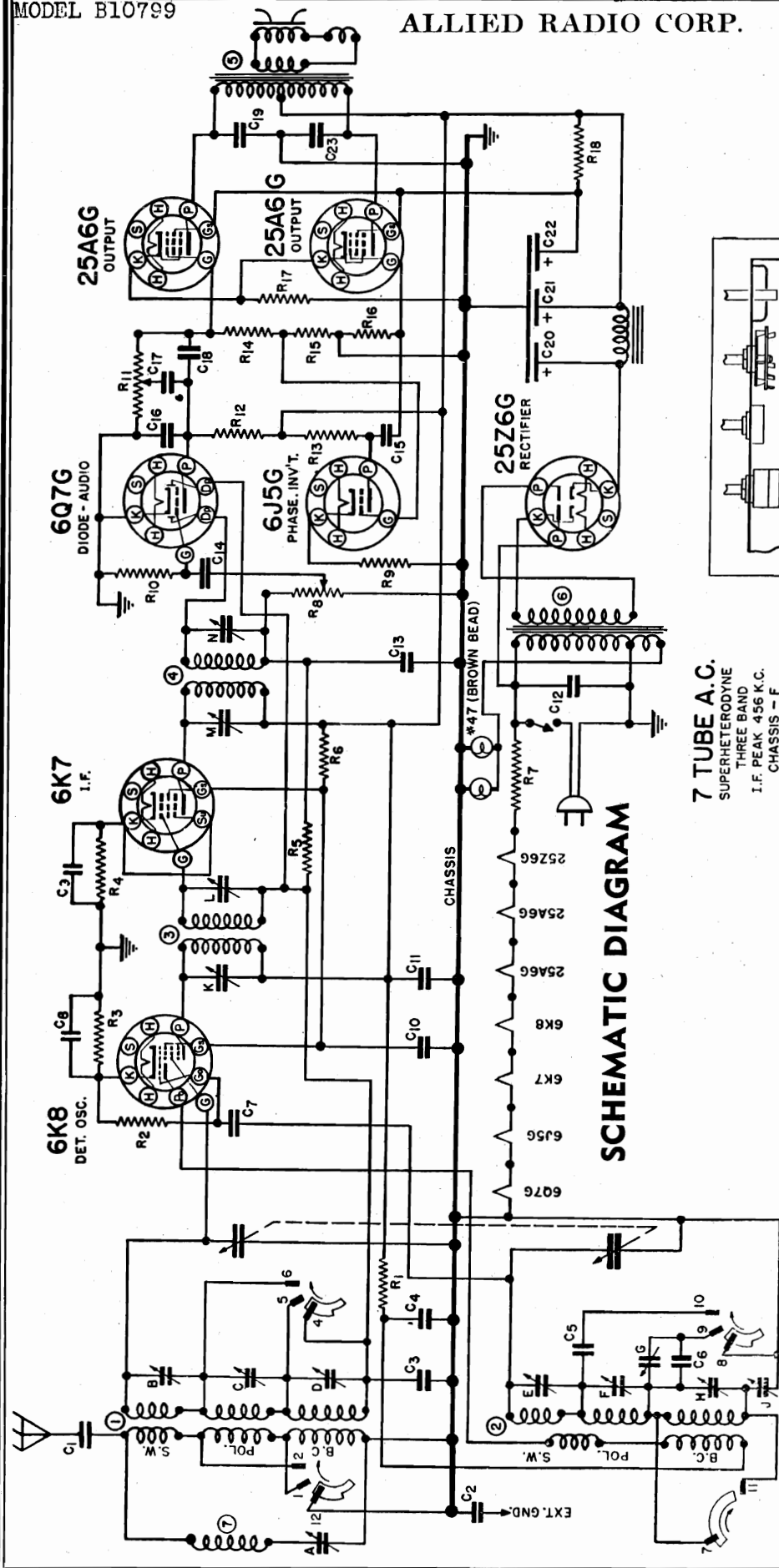


Figure 1

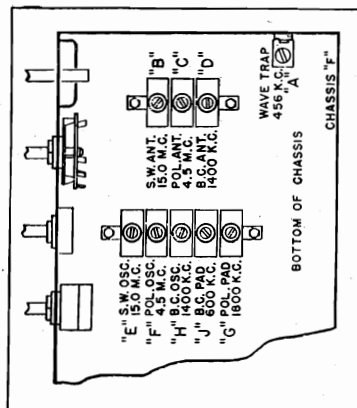
Press in the button of the station desired tuned and rotate the dial slowly until a click is heard and the dial will not turn in either direction until the button is released. The station is now tuned in and can be adjusted to the volume desired by means of the volume control. The proper direction of rotation of the dial can be determined by turning the dial in the direction which will not allow the wide space adjacent to the pointer to converge into the space at the bottom of the dial. See Fig. (1).





SCHEMATIC DIAGRAM

7 TUBE A.C.
SUPERHETERODYNE
THREE BAND
I.F. PEAK 456 K.C.
CHASSIS - F



TRIMMER LOCATION 7 TUBE A.C.

DIAG. NO.	PART NO.	DESCRIPTION	DIAG. NO.	PART NO.	DESCRIPTION	DIAG. NO.	PART NO.	DESCRIPTION
C1	C-4	.01 MFD.	R8	V-20	1 MEGOHM VOLUME CONT.	1	L-50	ANTENNA COIL
C2	C-5	.01 MFD.	R9	R-18	3,000 OHM .25 W.	2	L-51	OSCILLATOR COIL
C3	C-13	.05 MFD.	R10	R-46	6 MEGOHM .25 W.	3	I-20	1ST. I.F. TRANSFORMER
C4	C-14	.05 MFD.	R11	V-15	.5 MEGOHM TONE CONT.	4	I-28	2ND. I.F. "
C5	C-109C	4,000 MMFD.	R12	R-41	.25 MEGOHM .25 W.	5	S-613	SPKR. &
C6	C-118B	500 MMFD.	R13	R-36	.1 MEGOHM ±5%	6	T-23	POWER
C7	C-115	.01 MFD.	R14	R-51	.5 MEGOHM ±5%	7	L-52	WAVE TRAP
C8	C-13	.05 MFD.	R15	R-50	45,000 OHM ±5%	A		3-35 MMFD.
C9	C-13	.05 MFD.	R16	R-41	.25 MEGOHM	B		3-35 MMFD.
C10	C-1	.1 MFD.	R17	R-310	475 OHM	C		3-35 "
C11	C-2	.1 MFD.	R18	R-122	5,000 OHM	D		3-35 "
C12	C-14	.05 MFD.				E		3-35 "
C13	C-110	100 MMFD.				F		200-600 MMFD.
C14	C-27	.006 MFD.				G		200-600 MMFD.
C15	C-4	.01 MFD.				H		200-600 MMFD.
C16	C-111	250 MMFD.				J		200-600 MMFD.
C17	C-27	.006 MFD.						

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AUTOMATIC TUNING

ADJUSTMENT. All adjustments are simply made from the front of the cabinet without the use of tools since the push-button knobs serve this purpose.

To make adjustments, turn each knob to the left about 1 complete turn. The knob is knurled to provide a positive grip for this purpose. A groove is also provided across the knob for use of a small coin to lock each setting with ease and surety.

With the knob turned free, depress as far as possible and hold down, meanwhile tune to any desired station with the manual tuning control. At this point, the automatic push button knob should be turned to the right until securely tightened. Be sure the knob is being held down in position while it is being tightened. To assure accurate adjustment, the volume control should be set at a moderate level and the station tuned in slowly to a point of maximum volume and clarity. It is not necessary to follow any particular sequence of stations since each button is adjustable to any station.

ALIGNMENT DATA AND SERVICING

GENERAL DATA. The alignment of this receiver requires the use of a test oscillator that will cover the frequencies of 456, 600, 1400, 1800, 4500, 6000 and 15000 KC and an output meter to be connected across the primary or secondary of the output transformers. If possible, all alignments should be made with the volume control on maximum and the test oscillator output as low as possible to prevent the AVC from operating and giving false readings.

CORRECT ALIGNMENT PROCEDURE. The intermediate frequency (I.F.) stages should be aligned properly as the first step. After the I.F. transformers have been properly adjusted and peaked, the wave trap and then the Short Wave, Police and Broadcast bands in the order given, should be the next procedure.

I. F. AND WAVE TRAP ALIGNMENT. With the wave switch in the Broadcast Band and the gang condenser set at minimum, adjust the test oscillator to 456 KC and connect the output to the grid of the first detector tube (6K8) through a .05 or .1 mfd. condenser. The ground on the test oscillator should be connected to the chassis ground. Align all four I.F. trimmers to peak or maximum reading on the output meter. After aligning the I.F.'s, have the band switch in the broadcast band and the generator set at 456 KC. Connect the antenna lead to the generator through a 200 MMF condenser. Adjust the wave trap trimmer to give a minimum signal. It will be necessary to increase the output of the generator to secure an accurate minimum with the wave trap. (A)

SHORT WAVE BAND ALIGNMENT. Change the band switch to the S. W. position and connect the generator to the antenna with a 400 ohm dummy. Adjust the S. W. oscillator to give a maximum output with the dial at 1500 KC. Next adjust the S. W. antenna to give a maximum peak and check dial to prevent alignment on the image frequency. With a strong signal input turn the dial to approximately 1 M. C. lower in frequency and pick up the image frequency. If the image is not received, it will be necessary to return the dial to 15000 KC to reduce the capacity in the oscillator trimmer until a second signal is received. Proceed as before with the alignment of the antenna and recheck for image frequency. Check the sensitivity at 6000 KC to determine if the coils and mica pad are not defective.

POLICE BAND ALIGNMENT. Change the band switch to the police position and, with the same dummy antenna, line up the police oscillator trimmer and police antenna trimmer in the same way as for the short wave band, setting the dial at 4500 KC and the generator at the same frequency. Check for image frequency at approximately 1 MC lower on the dial as described for the short wave band. Next, set the generator at 1800 KC and tune in the signal with the dial. Adjust the police pad by rocking the gang back and forth while adjusting the pad until maximum output is attained. Recheck the adjustment at 4500 KC as the pad adjustment may have caused misalignment.

BROADCAST BAND ALIGNMENT. With the switch turned to the broadcast position, connect the antenna to the generator through a 200 MMF dummy and set the dial and generator at 1400 KC. Align the BC oscillator trimmer and BC antenna trimmer. Set the generator at 600 KC and adjust the BC pad as described for the police band. Return to 1400 KC and recheck alignment at this point.

STANDARD BROADCAST BAND (BC). (174 to 560 Meters)

POLICE BAND (PB). (53 to 175 Meters)—

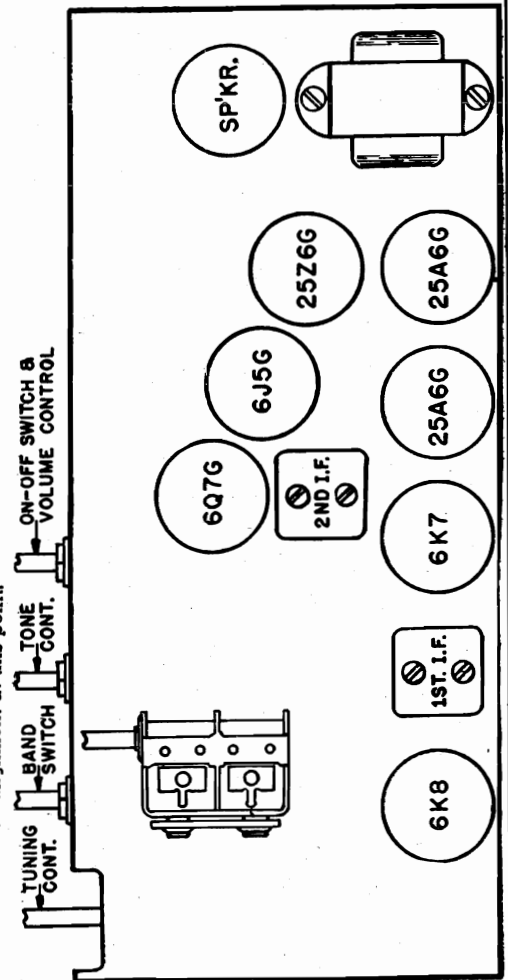
FOREIGN AND AMERICAN SHORT WAVE BAND (SW). (15.6 to 53 Meters)—

49 METER BAND.

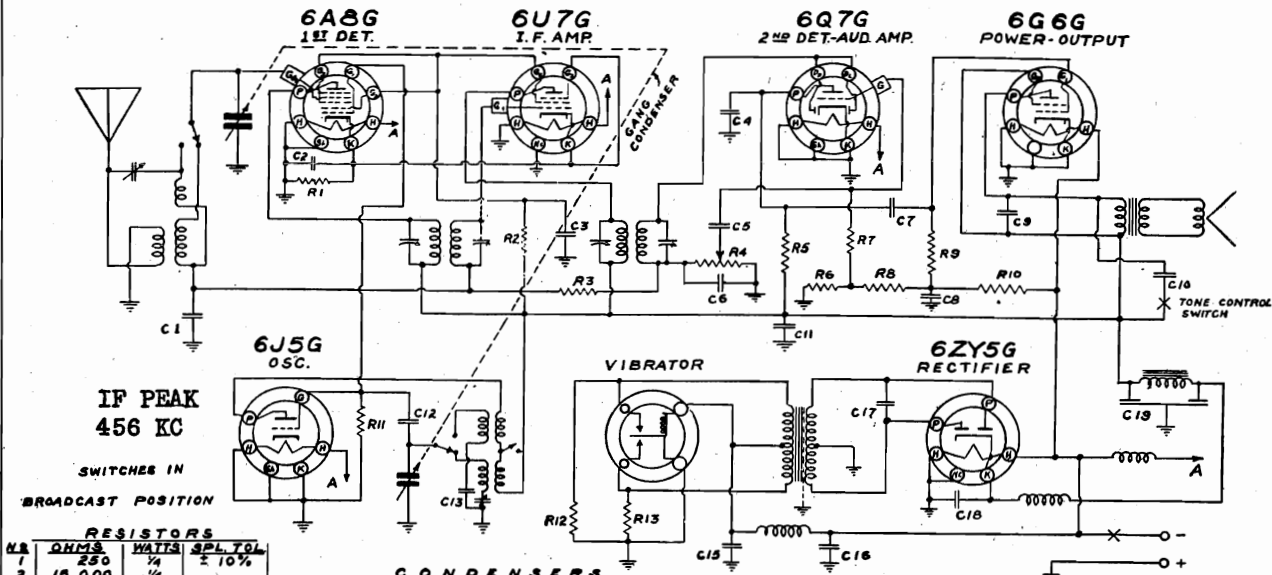
31 METER BAND.

25 METER BAND.

19 METER BAND.



ALLIED RADIO CORP.



RESISTORS	OHMS	WATTS	SPL. TOL.
1	250	1/4	± 10%
2	15,000	1/4	± 10%
3	1 MEG	1/4	± 10%
4	500,000	1/4	± 10%
5	150,000	1/4	± 10%
6	150,000	1/4	± 10%
7	500,000	1/4	± 10%
8	500,000	1/4	± 10%
9	400,000	1/4	± 10%
10	100,000	1/4	± 10%
11	40,000	1/4	± 10%
12	150	1/4	± 10%
13	150	1/4	± 10%

CONDENSERS	CAR.-MFD.	TYPE	NB CAR.-MFD.	TYPE
1	.05	200 V.	11	.00005
2	.25	200 V.	12	.004
3	.1	200 V.	13	.004
4	.00025	MICA	14	.01
5	.01	400 V.	15	.01
6	.00025	MICA	16	.01
7	.01	400 V.	17	.01
8	.05	400 V.	18	.01
9	.005	600 V.	19	.01
10	.02	400 V.	20	.01

IF. ALIGNMENT

With the wave switch in the broadcast band and the gang condenser set at minimum, adjust the test oscillator to 456 KC and connect the output of test oscillator or signal generator to the grid of the first detector tube (6A8G) through a .05 or .1 mfd. condenser. The ground on the test oscillator can be connected to the chassis ground. Align all four I.F. trimmers to peak or maximum reading on the output meter.

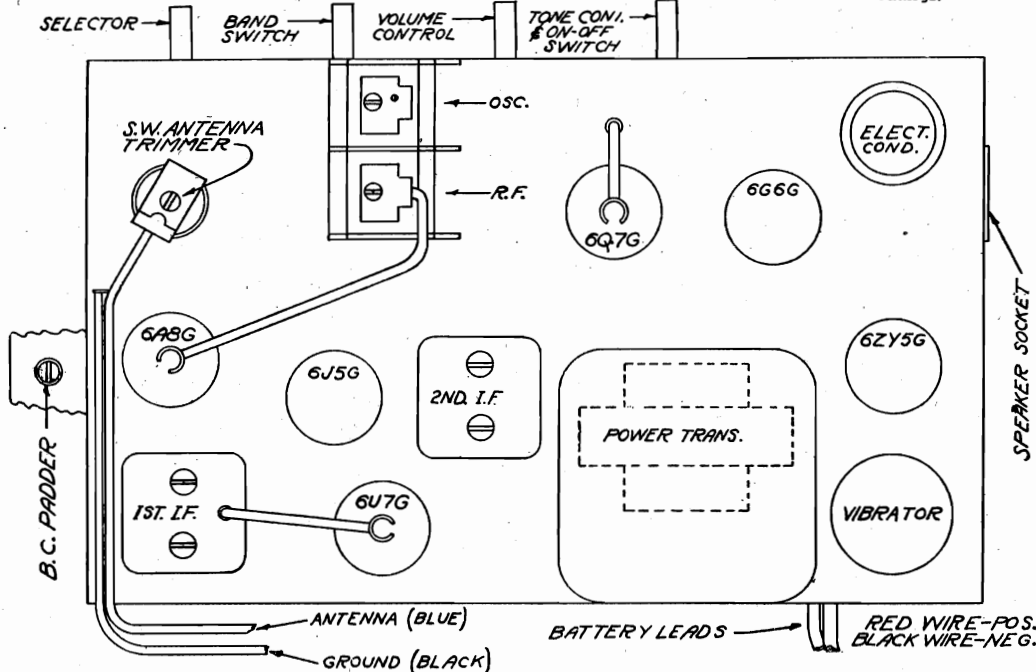
BROADCAST BAND ALIGNMENT

Connect the output of the signal generator to the antenna lead (blue) through a .0002 mfd. mica condenser. Set the oscillator to 1730 KC and adjust the Broadcast "oscillator trimmer" to receive this signal. Make no other adjustments at this frequency. Then set the generator to 1400 KC and tune in this signal by rotating the gang to 1400 on the dial. Adjust the Broadcast "antenna" trimmer to a maximum signal. Set the signal generator to 600 KC and tune in the signal

on the receiver. Note: Approximately the same sensitivity should be noted at this point as was at 1400 KC. The signal strength may sometimes be improved by padding the circuits. This is done by slowly increasing or decreasing the oscillator padding condenser and, at the same time, continuously tuning back and forth across the signal with the receiver until the maximum reading is obtained on the output meter. This adjustment may seem a little complicated but is the easiest way to adjust the oscillator to the antenna. Return to 1400 KC and again go over the adjustments of this frequency to be certain that they were not put slightly out of alignment when adjustment was made at 600 KC.

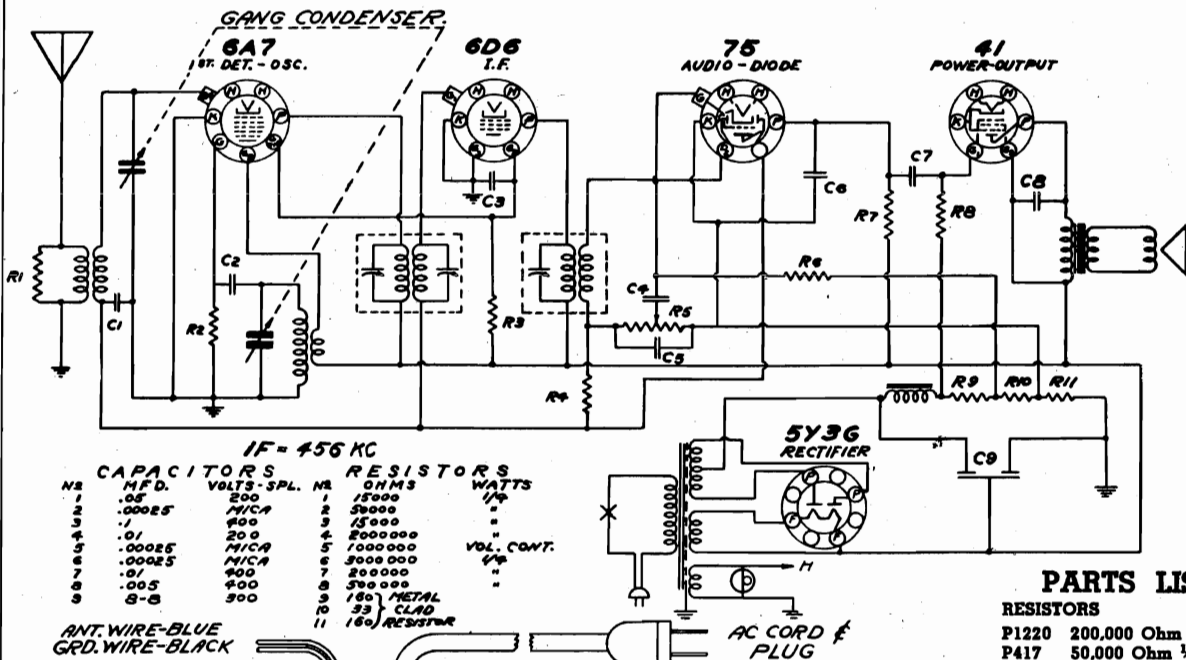
SHORT WAVE BAND ALIGNMENT

The short wave band is adjusted by setting the generator to 16,000 KC and tuning in the signal. Adjust the "short wave antenna" to give maximum output. As there is no variable low frequency padding condenser on this band, the sensitivity of the receiver should be checked at 6000 KC to determine whether the circuits are in line at this frequency. Should the receiver lack sensitivity at 6000 KC, the antenna and oscillator coils, as well as the .004 mica padding condenser, should be tested for defects as sometimes these components become subject to mechanical or electrical injuries, despite their rugged construction and liberal ratings.



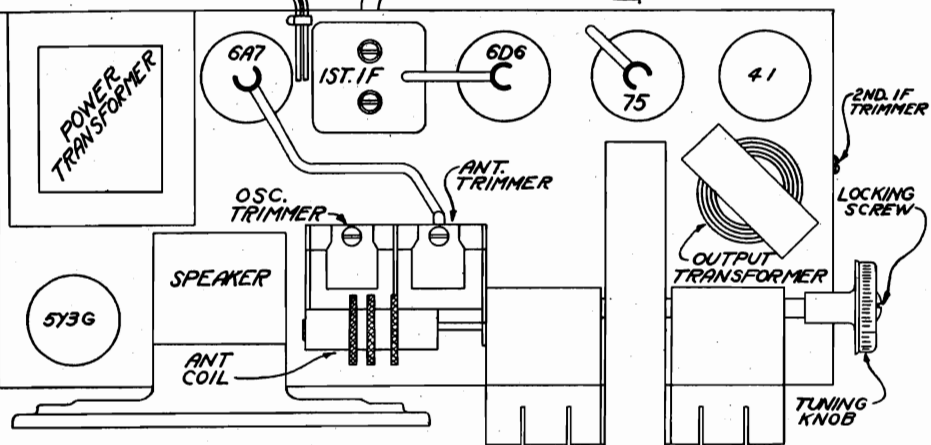
ALLIED RADIO CORP.

MODEL E10840



PARTS LIST

- RESISTORS**
- P1220 200,000 Ohm 1/4 Watt
 - P417 50,000 Ohm 1/4 Watt
 - P258 15,000 Ohm 1/4 Watt
 - P137 500,000 Ohm 1/4 Watt
 - P1114 2,000,000 Ohm 1/4 Watt
 - P2438 Candohm Resistor
- CONDENSERS**
- P164 .01 Mfd. 400 Volt
 - P1322 .005 Mfd. 600 Volt
 - P334 .05 Mfd. 400 Volt
 - P148 .05 Mfd. 200 Volt
- MICA CONDENSERS**
- P817 .00025
- ELECTROLYTIC CONDENSERS**
- P2397 Dual 8 Mfd. 300 W.V.
- ADJUSTABLE CONDENSERS**
- P2411 Gang Condenser
- TRANSFORMERS AND COILS**
- P2395 110 V. Power Transformer
 - P2396 125 V. Power Transformer
 - P2391 Output Transformer
 - P1506 1st I.F. Transformer
 - P2394 2nd I.F. Transformer
 - P2412 Oscillator Coil
 - P2393 Antenna Coil



CORRECT ALIGNMENT PROCEDURE

The intermediate frequency (I.F.) stage should be aligned properly as the first step. After the I.F. transformers have been properly adjusted and peaked, the Broadcast Band alignment should be the next procedure.

I.F. ALIGNMENT

Adjust the test oscillator to 456 KC and connect the output to the grid of the first detector tube (6A7) through a .05 or .1 mfd. condenser. The ground on the test oscillator can be connected to the chassis ground. Align all three I.F. trimmers to peak or maximum reading on the output meter.

BROADCAST BAND ALIGNMENT

Adjust the oscillator to 1730 KC and connect the output to the antenna lead (Blue) through a .0002 mfd. mica condenser. Set the gang condenser to minimum capacity and adjust the gang condenser trimmer (oscillator) to receive this signal. After this has been carefully done, the next step is to set the generator to 1400 KC and after tuning in the signal adjust the antenna trimmer to peak. This is all that is necessary for the alignment unless the plates of the gang condenser have been bent out of shape. In case of bent plates, set the test oscillator and the receiver to 600 KC and bend the plates into the position for maximum output.

PROCEDURE FOR SETTING UP AND OPERATING AUTOMATIC PUSH BUTTONS

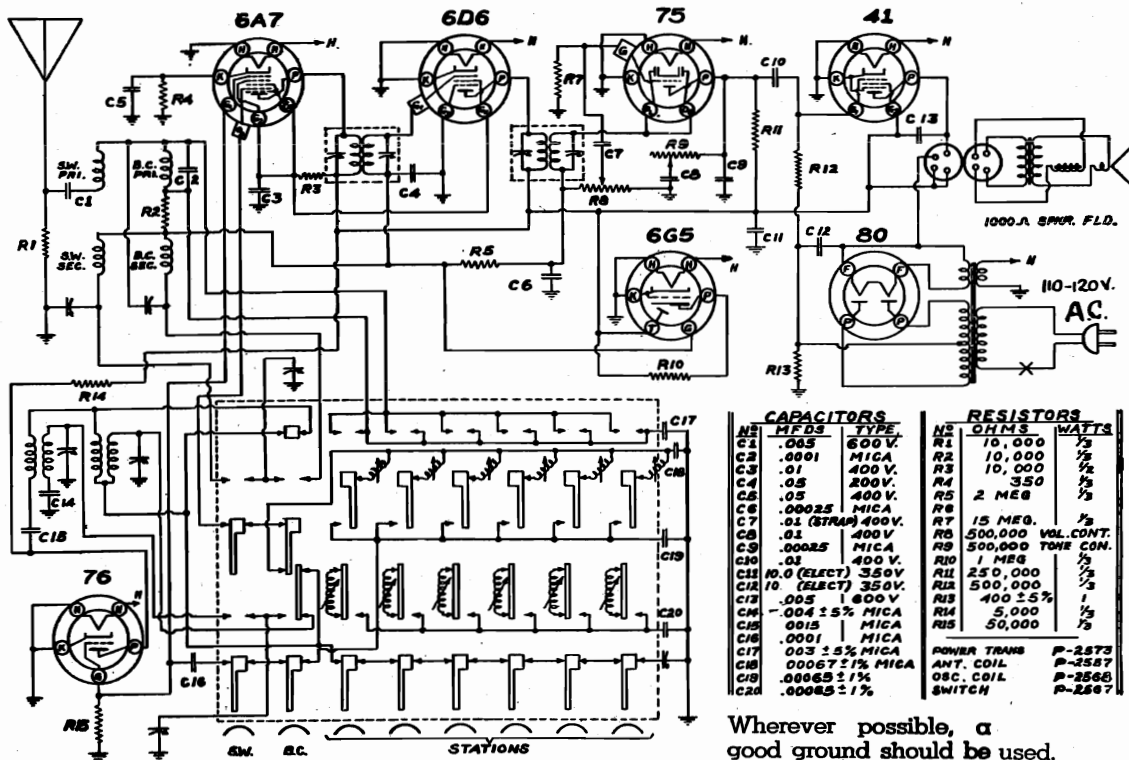
Select four strong local stations tuned in regularly. Now loosen **Locking Screw** (see chassis layout) several turns with a coin or a screw driver and **press** in any one of the four push buttons. Holding the button down, tune in any one of four selected stations by rotating the tuning knob (side knob) slowly back and forth until the signal is cleared.

Release the push button and press in another button and hold down, tuning in another favorite station with tuning knob. Follow the same procedure for the remaining stations. Now hold tuning knob (side knob) securely and with coin or screw driver, tighten locking screw. This screw holds all stations in adjustment.

In order to change any station already set up, to another, hold tuning knob securely, loosen locking screw and select the new station as explained above. Tear the correct station call letter tabs from the set of sheets supplied and push them into rectangular windows above each push button.

The automatic push button dial is now set up for quick tuning.

ALLIED RADIO CORP.

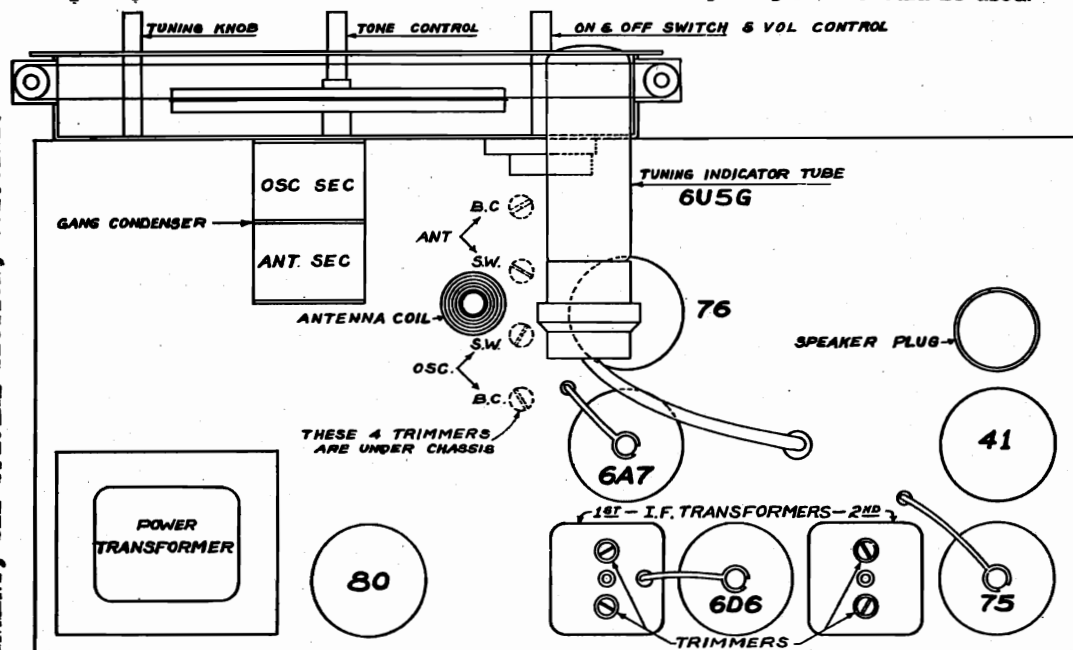


IF PEAK
456 KC

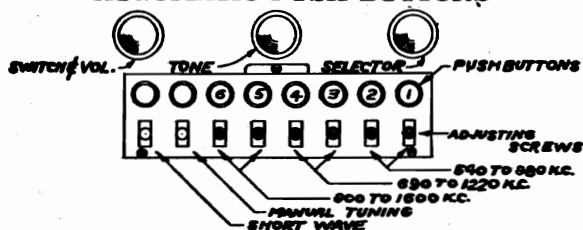
This receiver is designed to operate over two tuning ranges; the broadcast range which extends from 545 to 1720 kc (174.4 to 550.4 meters) and the international short wave band which extends from 5800 to 18,100 kc (16.5 to 51.7 meters). This latter range is the one which includes the 5 internationally assigned bands—the 16, 19, 25, 31 and 49 meter bands.

CAPACITORS			RESISTORS		
NO.	MFDS	TYPE	NO.	OHMS	WATTS
C1	.005	600 V.	R1	10,000	1/2
C2	.0001	MICA	R2	10,000	1/2
C3	.01	400 V.	R3	10,000	1/2
C4	.05	200 V.	R4	350	1/2
C5	.05	400 V.	R5	2 MEG	1/2
C6	.00025	MICA	R6	15 MEG	1/2
C7	.01 (STRAP)	400 V.	R7	500,000 VOL. CONT.	1/2
C8	.01	400 V.	R8	500,000 TONE CONT.	1/2
C9	.00025	MICA	R9	1 MEG	1/2
C10	.01	400 V.	R10	250,000	1/2
C11	R.O (ELECT)	350 V.	R11	500,000	1/2
C12	R.O (ELECT)	350 V.	R12	400 ± 5%	1/2
C13	.005	100 V.	R13	5,000	1/2
C14	.004 ± 5%	MICA	R14	50,000	1/2
C15	.0015	MICA	R15	50,000	1/2
C16	.0001	MICA			
C17	.003 ± 5%	MICA			
C18	.00067 ± 1%	MICA			
C19	.00065 ± 1%	MICA			
C20	.00065 ± 1%	MICA			

Wherever possible, a good ground should be used.



PROCEDURE FOR SETTING UP AUTOMATIC PUSH BUTTONS



1. Choose a station having a frequency within the range of button No. 1 (540 to 980 kc).
2. Press "Manual Tuning" button and tune this sta-

- tion conventionally by using the selector knob.
3. Now press button No. 1 and turn adjusting screw in either direction until the previously selected station is heard. Adjust the screw until the dark area of the "electric eye" is smallest. This setting will give the best tonal response with maximum sensitivity.
4. Remove the call letters of the station from the call letter sheet furnished and insert in the window of the adjusting screw.
5. Repeat the above procedure for the remaining five (5) stations.

NOTE: It is advisable to retain the call letter sheet in case of station change later on.

©John F. Rider



TUBES: The following tubes are required for this receiver: 6K8 oscillator and modulator, 6SK7 I.F. amplifier, 6H6 2nd detector and AVC, 6F5 1st audio, 25L6G beam power output, 25Z6G rectifier, F6B ballast tube.

MODEL 6H43
MODEL 6H44

ANDREA RADIO CORP.

"S" BAND ALIGNMENT: Connect the high-potential lead from the generator in series with a 400-ohm resistor to the antenna (red) lead of the set, and the low side of the generator to the ground (black) lead of the set. Put the wave band switch at the S position, adjust the generator to 22,000 kc., and the receiver to 22.0 mc. Vary the S band oscillator shunt trimmer slowly from maximum to minimum. You will hear the signal at two settings of the trimmer, one nearer the minimum capacity (plates open) and one near the maximum capacity (plates closed). The setting near minimum capacity is correct, because the setting near maximum capacity is at the image frequency.

Now adjust the antenna shunt trimmer. During this adjustment, be sure to rock the gang condenser back and forth slowly each time you make an adjustment of the trimmer. As you continue to do this, you will reach a point where further turning of the trimmer screw, while rocking the gang condenser, will not increase the signal response. This is the correct adjustment.

A simple method of determining if the receiver and generator are tuned for correct alignment is as follows:

Set the signal generator at 22,000 kc. and tune the receiver slowly from 21,000 to 23,000 kc. Two signals should be heard, 940 kc. apart. One will be lower in frequency than 22,000 kc. and the other will be higher. The higher frequency, as indicated on the dial, is the correct aligning frequency, and the lower one is the image.

As a further check, leave the receiver tuned to the higher frequency. Very slowly, increase the generator frequency from 22,000 kc. to about 23,000 kc.

A signal will be heard near 23,000 kc. if all the settings are correct for alignment. If there is no signal, the original settings were on the image frequency. In that case, you must start again from the beginning, in order to be sure of accurate results.

After you have found the correct settings, the image, or lower, frequency response on the receiver will always sound weaker than the true signal.

"I" BAND ALIGNMENT: With the signal generator connected in accordance with the preceding instructions, set the generator at 6,000 kc., turn the wave band switch to the I position, and adjust the dial to 6 mc. Following the procedure just described, adjust the I band oscillator shunt trimmer for maximum signal response. Next, adjust the I band antenna shunt trimmer. Rock the gang condenser back and forth slowly as you adjust the trimmer, in accordance with the instructions for the S band adjustment. This completes the adjustment for the I band.

"M" BAND ALIGNMENT: Replace the 400-ohm resistor in the generator lead by a .00025 mfd. condenser. Set the generator at 1,500 kc., turn the wave band switch to the M position, and set the dial of the receiver at 1,500 kc. Adjust the M band oscillator shunt trimmer for maximum signal response. Next adjust the antenna shunt trimmer for maximum response.

This band must be aligned at 600 kc. also. Set the generator accordingly, and tune the receiver to 600 kc. Adjust the M band oscillator series trimmer for maximum response. During this adjustment, be sure to rock the gang condenser for each small change of capacity of the series trimmer. When this adjustment has been completed, recheck the antenna adjustment at 1,500 kc. This completes the adjustment of the M band.

WARNING! Always remove the line plug from the electric outlet before removing the chassis from the cabinet. Also—connect the speaker plug to the receiver before switching on the power. Otherwise, damage will result.

I. F. REALIGNMENT GENERALLY SUFFICIENT: As a rule, it is not necessary to readjust the short wave oscillator and antenna shunt and series trimmers unless they have been tampered with, or require replacing. Consequently, careful realignment of the I.F. system is all that requires attention, ordinarily. Before making any adjustments, tune in one particular station and note the quality of reception so that you can check the improvement after the I.F. system has been realigned.

USE SIGNAL GENERATOR AND OUTPUT VOLTMETER: For realigning, use a signal generator to supply a modulated carrier of 470, 600, 1,500, 6,000, and 22,000 kc., plus an output voltmeter. Alignment by any other means is not recommended. Your service test generator should be checked frequently for change in calibration by getting a zero beat between the generator and broadcast stations of known frequency.

SPECIAL NOTES: Always check the pointer setting with the alignment scale located on the top rear flocked plate before you start alignment adjustments. Otherwise, inaccuracies will be introduced.

When the variable plates are completely closed, the back extension of the pointer should be exactly in line with the end of the vertical marking at the left side of the alignment scale looking from the front of the chassis.

After installing the chassis in the cabinet, it is essential that you check the pointer alignment with the glass scale on the cabinet by turning the pointer fully to the left. Then clamp the chassis loosely in position so that the pointer lines up with the left end of the calibration line on the glass scale. Tighten the chassis firmly in the cabinet, making certain that the chassis does not move its position, and thereby cause the pointer position to shift with respect to the calibrated scale on the cabinet. Otherwise, poor calibration will result.

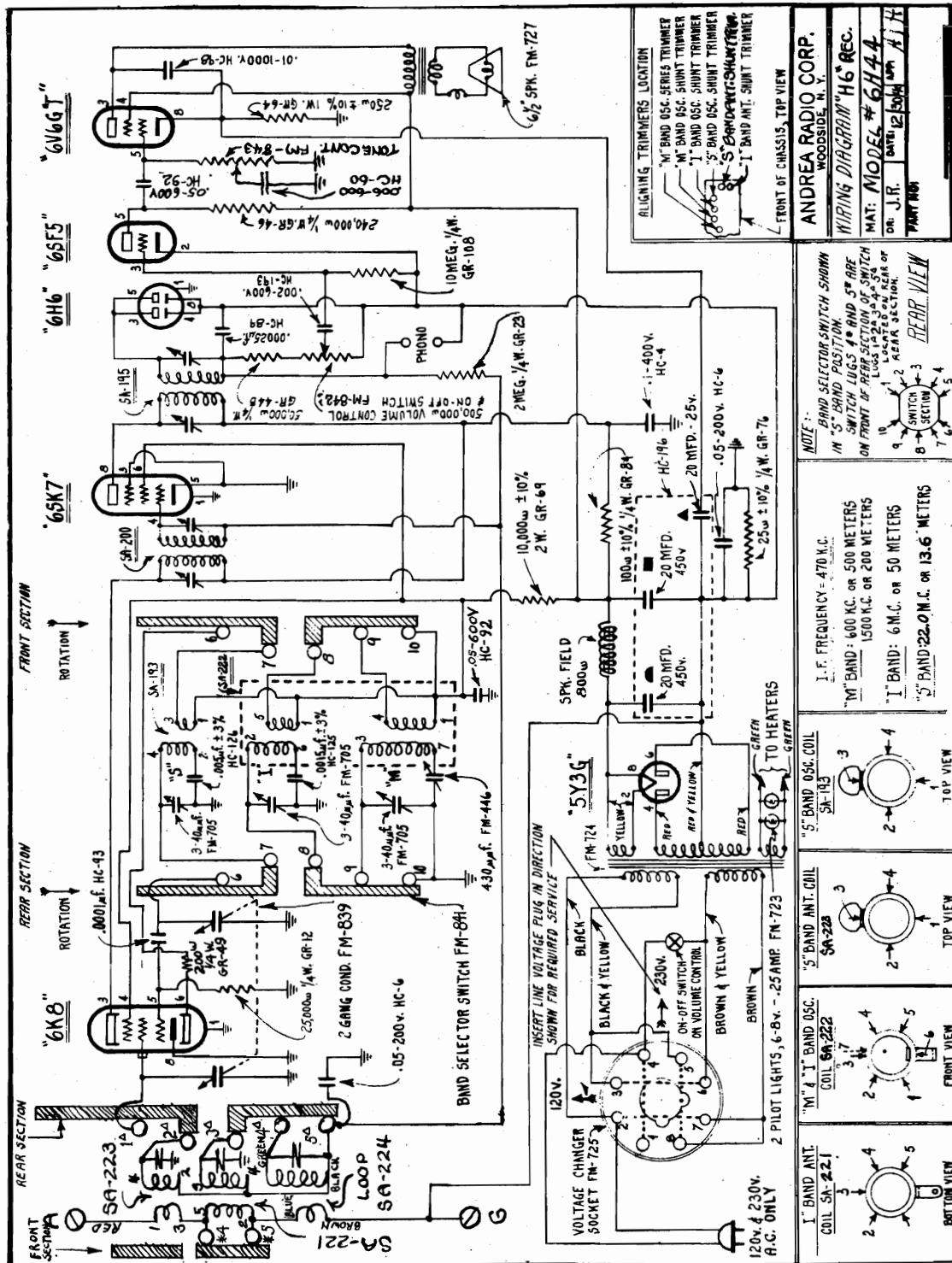
NOTES ON REALIGNING THE BANDS: During the aligning measurements, the output of the signal generator must be kept so low that it will not cause the AVC circuit in the set to function. In other words, when the volume control on the set is turned to maximum, the output should not show more than .5 volt across the voice coil, or 50 milliwatts in the plate circuit of the output tube.

Generally, at frequencies above 7,000 kc., the signal generator frequency will change with each adjustment of the generator output attenuator control. Hence, the receiver must be retuned each time the attenuator is adjusted.

Some generators cause trouble by direct radiation to the set at frequencies above 8 mc. Experience indicates that more accurate alignment is possible when the generator is separated by several feet from the receiver under test, in order to eliminate this direct pickup.

470 KC. I. F. ALIGNMENT: Connect the high-potential lead of the signal generator in series with a .1 mfd. condenser to the grid of the 6K8 tube. Set the generator at 470 kc., and adjust the output until a small deflection is obtained in the output meter. Adjust the trimmer condensers on the top of the 1st and 2nd I.F. transformers (see circuit diagram) for maximum deflection on the output meter. After this adjustment has been made, disconnect the generator from the grid of the 6K8 tube. This completes the alignment of the I.F. system.

ANDREA RADIO CORP.



6SF5 1st Audio
5Y3G Rectifier
6SK7 I.F. Amplifier

**TUBES: 6X8 Oscillator & Modulator
6V6GT Beam Power Output
6HG 2nd Detector & AVC**

[illegible]

WOODSIDE, N. Y.

MAT:

DATE	4/9/96	TIME	7:00A
BY	RLW		

PART NO:

1. ELECTROLYTICS, (A), (B), (C), AND (D)
IN SAME CAN, HC-202

117V. A.C. OR D.C., OR BATTERY OPERATION WHEN

$$I.F. = 455 \text{ K.C.}$$

INSERTED IN CHANGE-OVER PLATE.

SA-188

1

GREEN NOT
4)

GREEN DO!

SA-207

LOOP

600K.C. —
OSC. SERIES

TRIMMER

DI-POLE ANT.
100ALINE

IF. 4.3 MC.

14H7

12K8

14H7

14H7

14H7

14C7

14C7

14C7

TO B+ 195V

7A6

PHONO

AMP

INP

AMPLITUDE
A.V.C.

TUNING
INDICATOR

117V
AC
DC

NOTE: ALL RESISTORS $\frac{1}{2}$ WATT and ALL CONDENSERS
400V UNLESS OTHERWISE SPECIFIED

K = 1000 Ohms
M = 1 Megohm

NOTE- ALL RESISTORS $\frac{1}{2}$ WATT and ALL CONDENSERS
400V UNLESS OTHERWISE SPECIFIED

K = 1000 Ohms
M = 1 Megohm

117
AG
DC

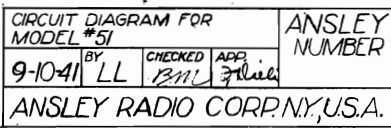
NOTE 105-125 VOLT AC

For 104-125 volt AC operation 7 volt tubes used connected in parallel to 6.3 volt supply to AM tuner.

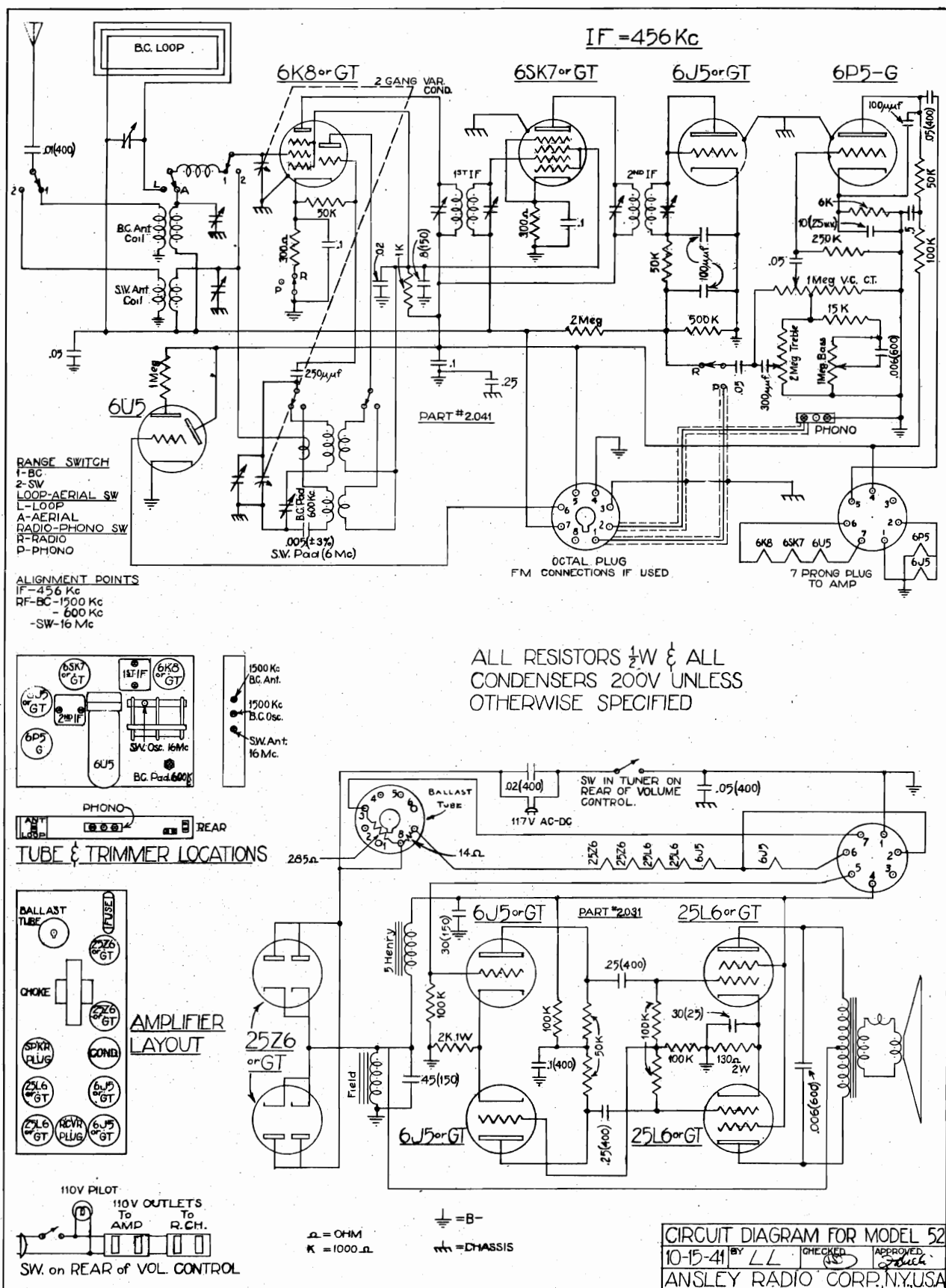
ALIGNMENT POINTS

TUBE and TRIMMER LOCATIONS **VARIABLE CONDENSER**

7A6	14C7 2 ND PLIN	14C7 2 ND IF	14H7 4F	14H7 4F
DISC 0 0 IF	3 RD IF	14H7	CONV OSC 12K 8	OSC. 0 0 IF
<div style="display: flex; justify-content: space-between; align-items: center;"> <div>ANT.</div> <div>R.F.</div> <div>OSC.</div> </div>				

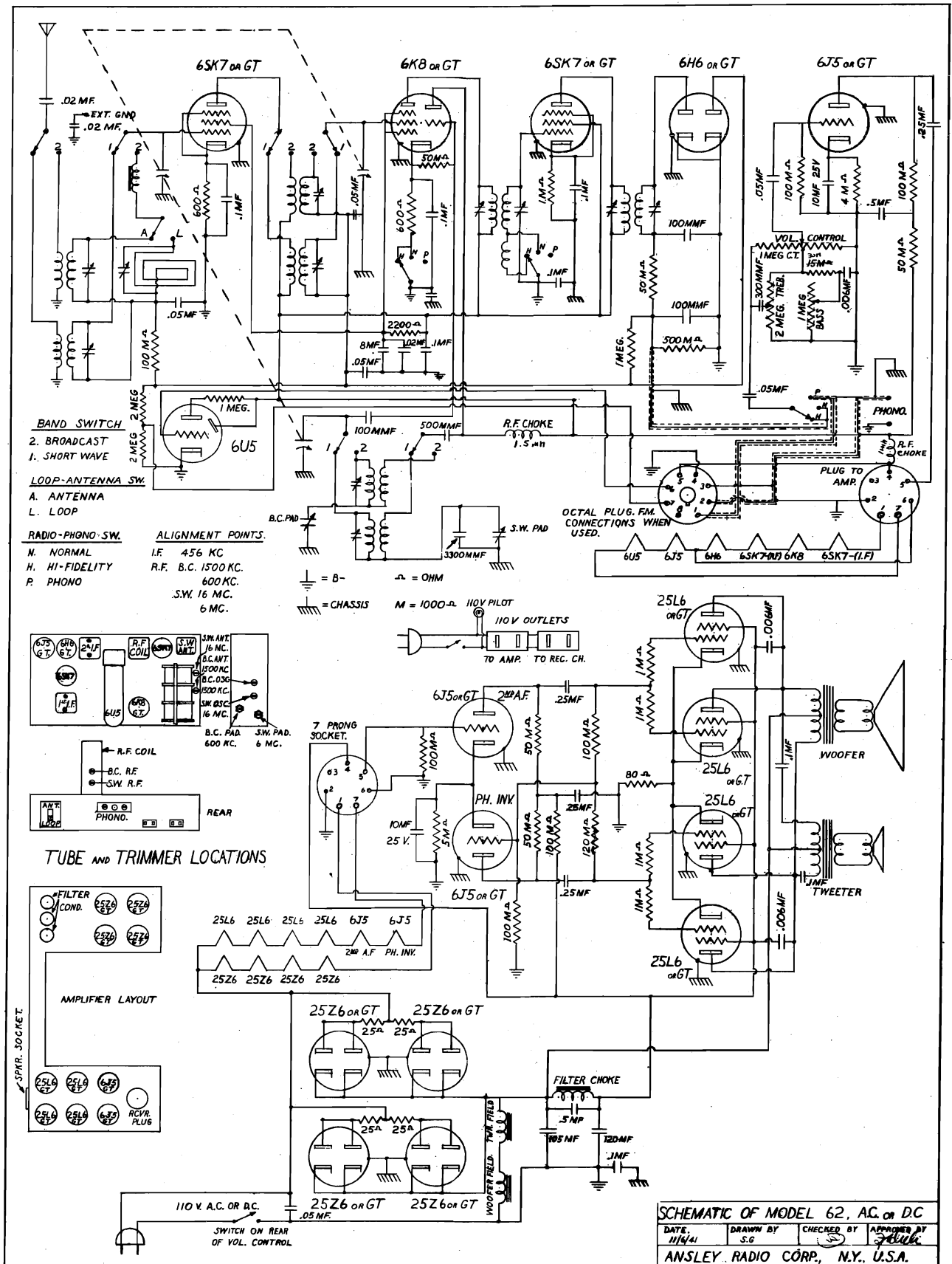
$$IF = 456 \text{ Kc}$$


ANSLEY RADIO CORP.

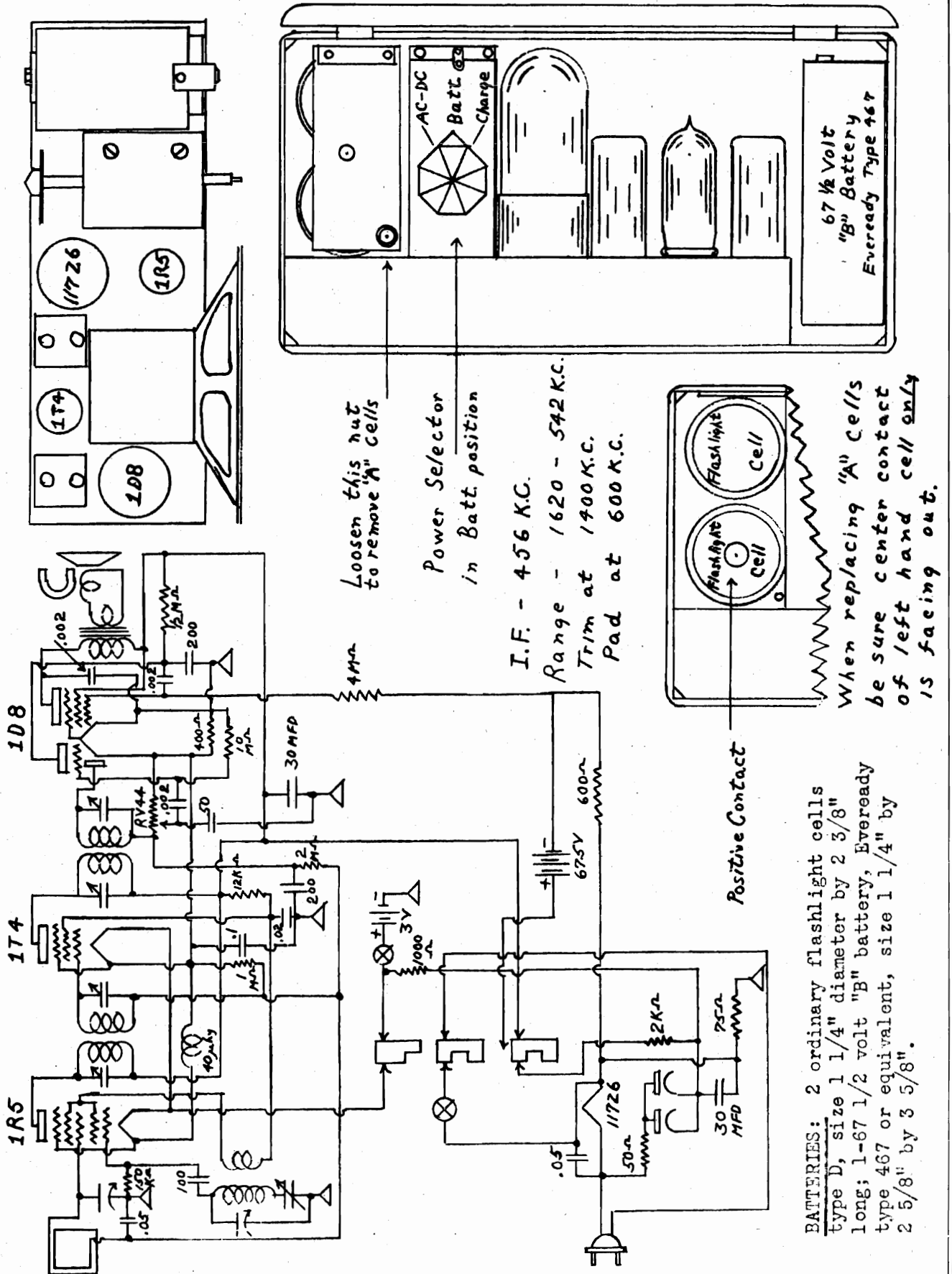


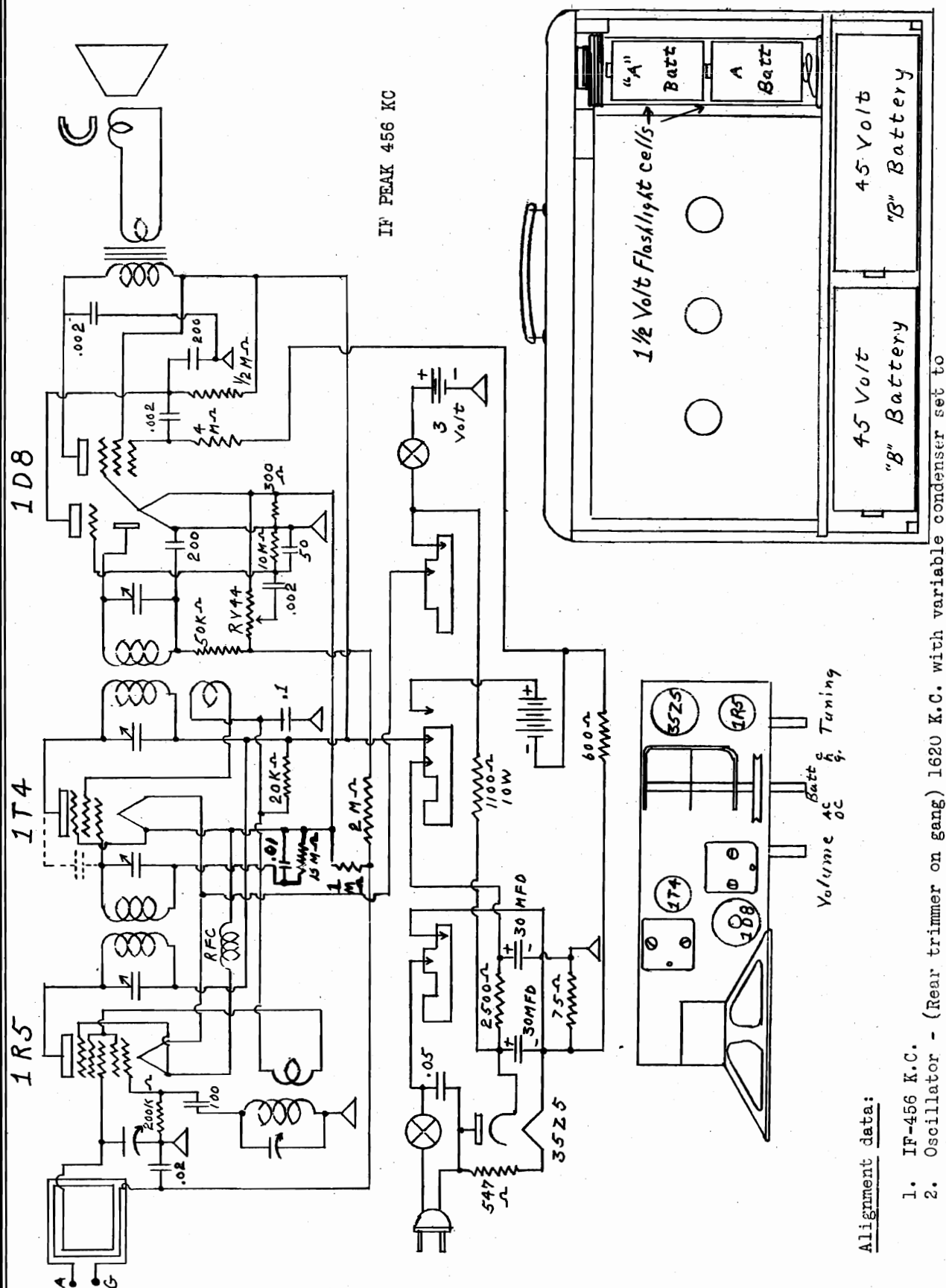
[illegible]

ANSLEY RADIO CORP.



AUTOMATIC RADIO & TELEV. CORP. CO., INC. Personal MODEL Tom Thumb 3 in 1



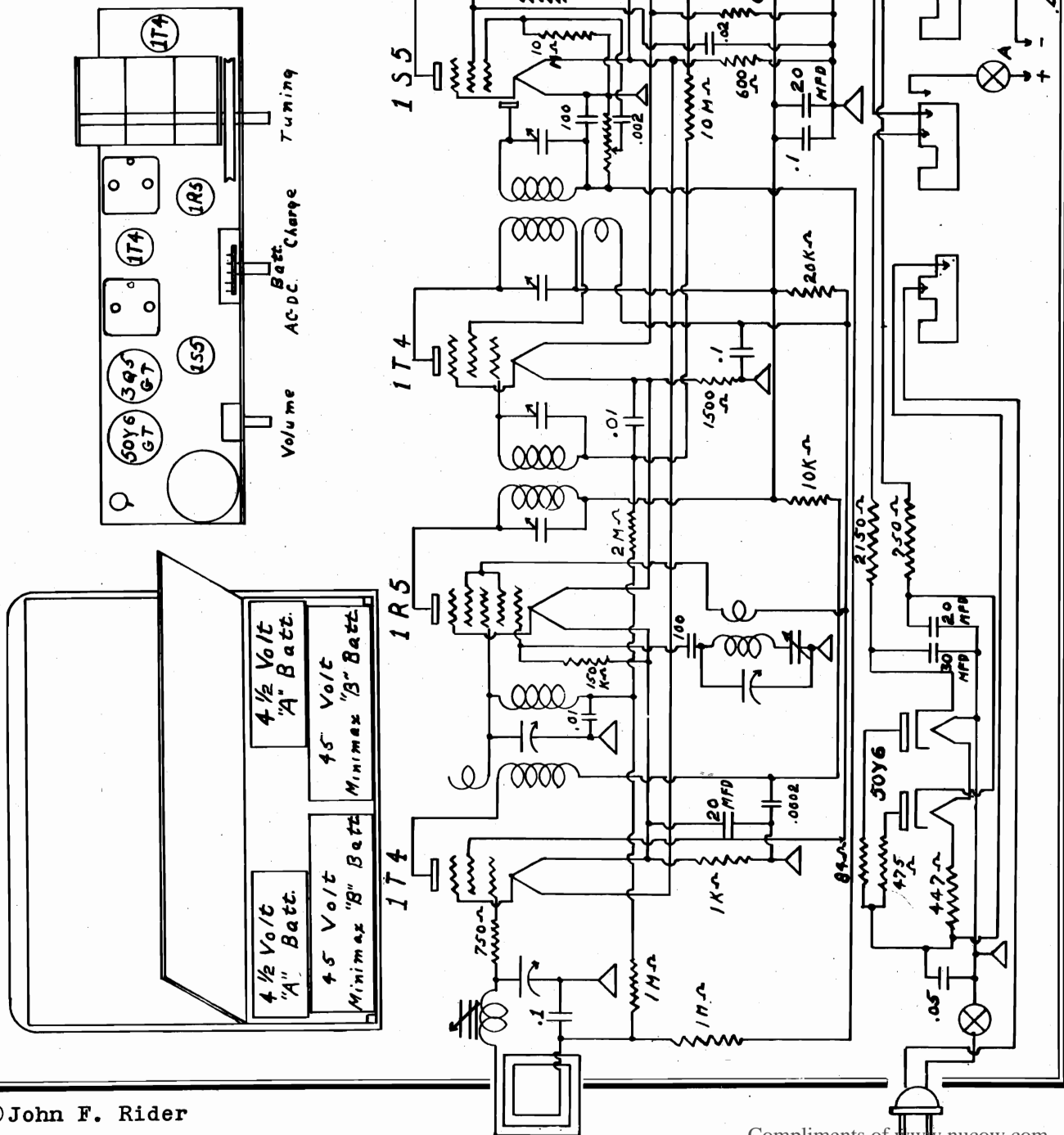


Alignment data:

1. IF-456 K.C.
2. Oscillator - (Rear trimmer on gang) 1620 K.C. w
minimum capacity
3. Trim loop at 1400 K.C. (front trimmer)

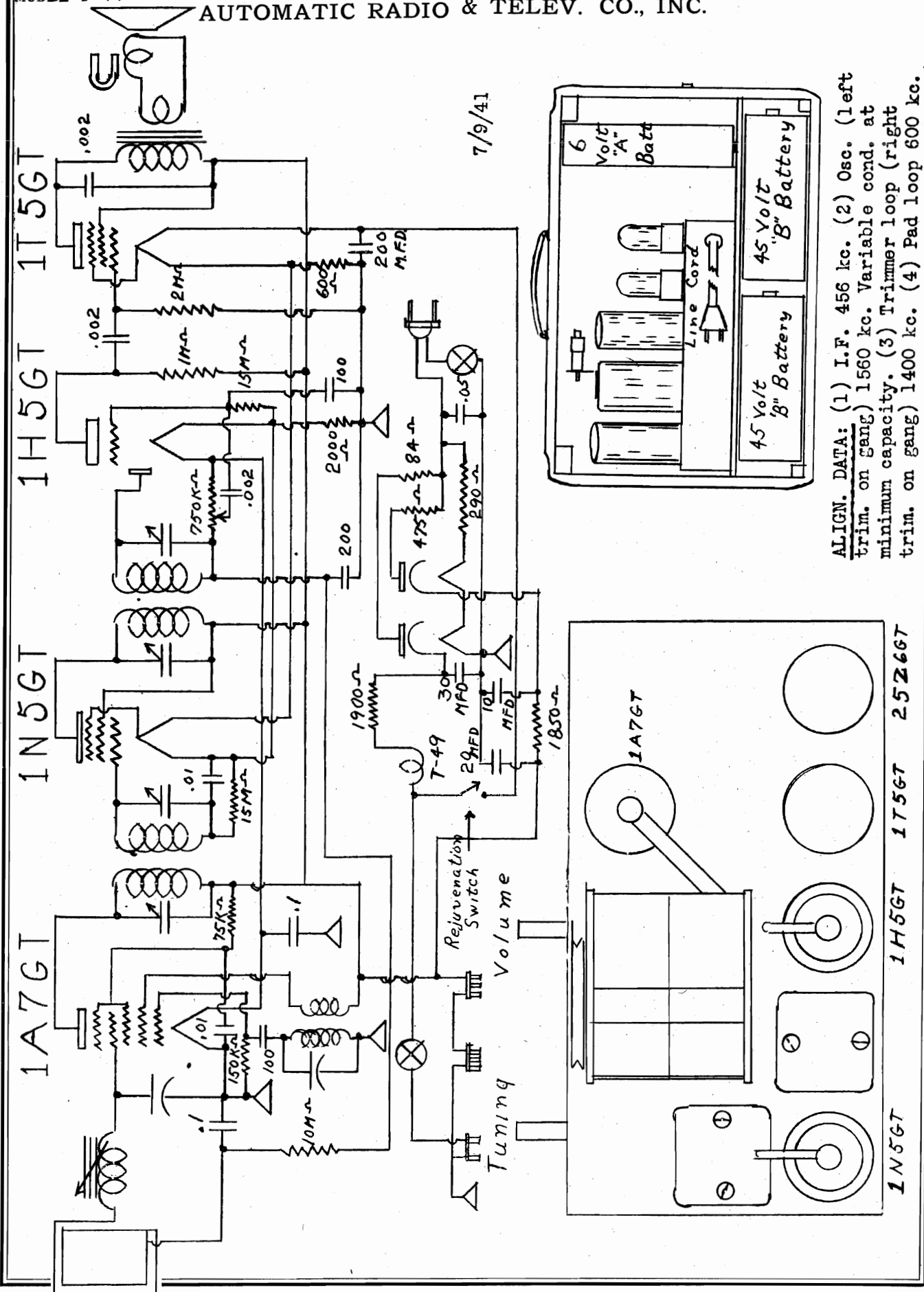
AUTOMATIC RADIO & TELEV. CO., INC.

ALIGNMENT DATA: (1) I.F. 456 kc. (2) Osc. (middle trimmer on gang) set at 1620 kc. (3) Trim R.F. stage (front trim.) at 1400 kc, pad at 600 kc. (4) Trim ant. stage (back trim.) at 1400 kc, adjust loop load coil at 600 kc.



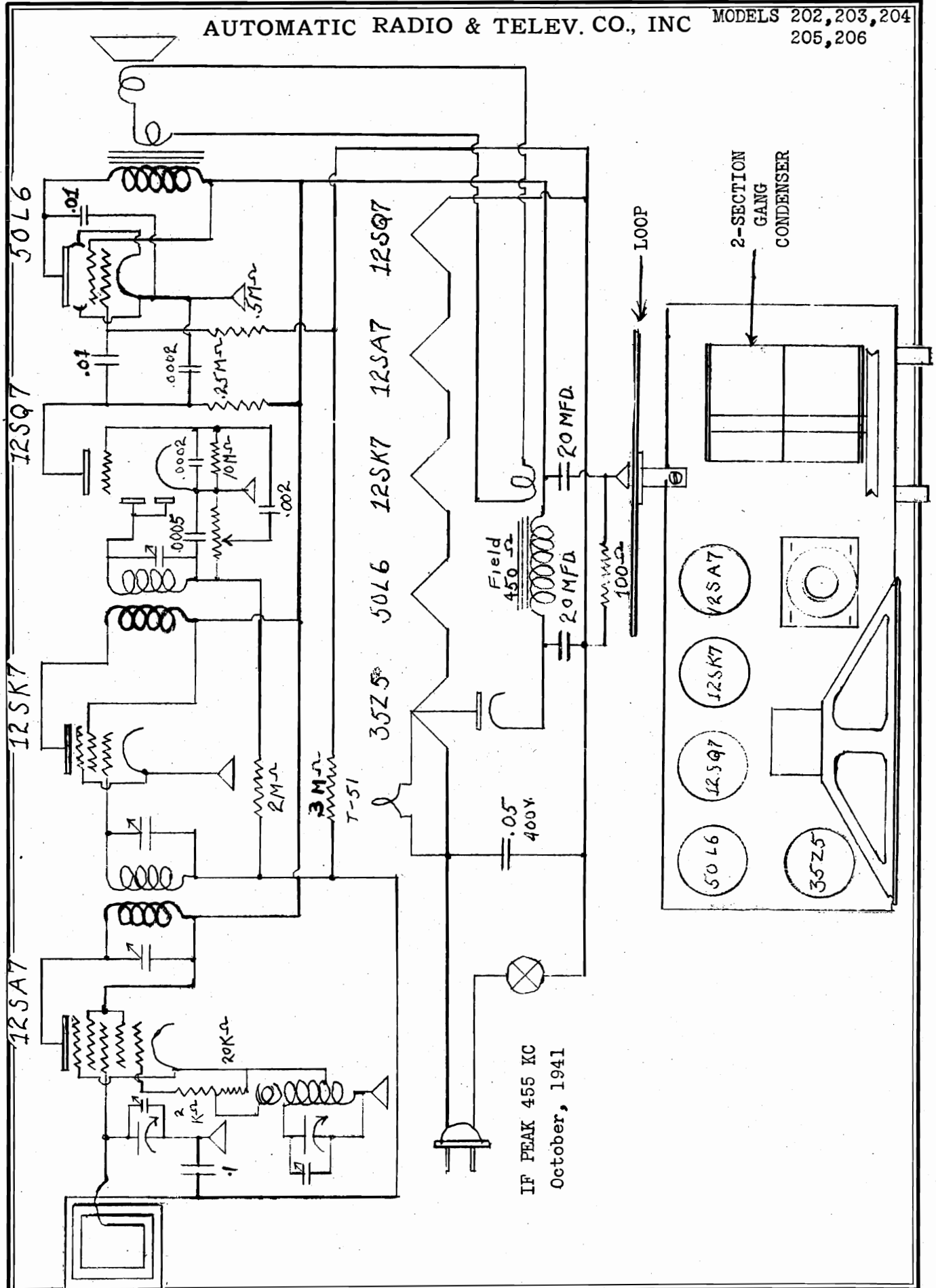
MODEL P-77

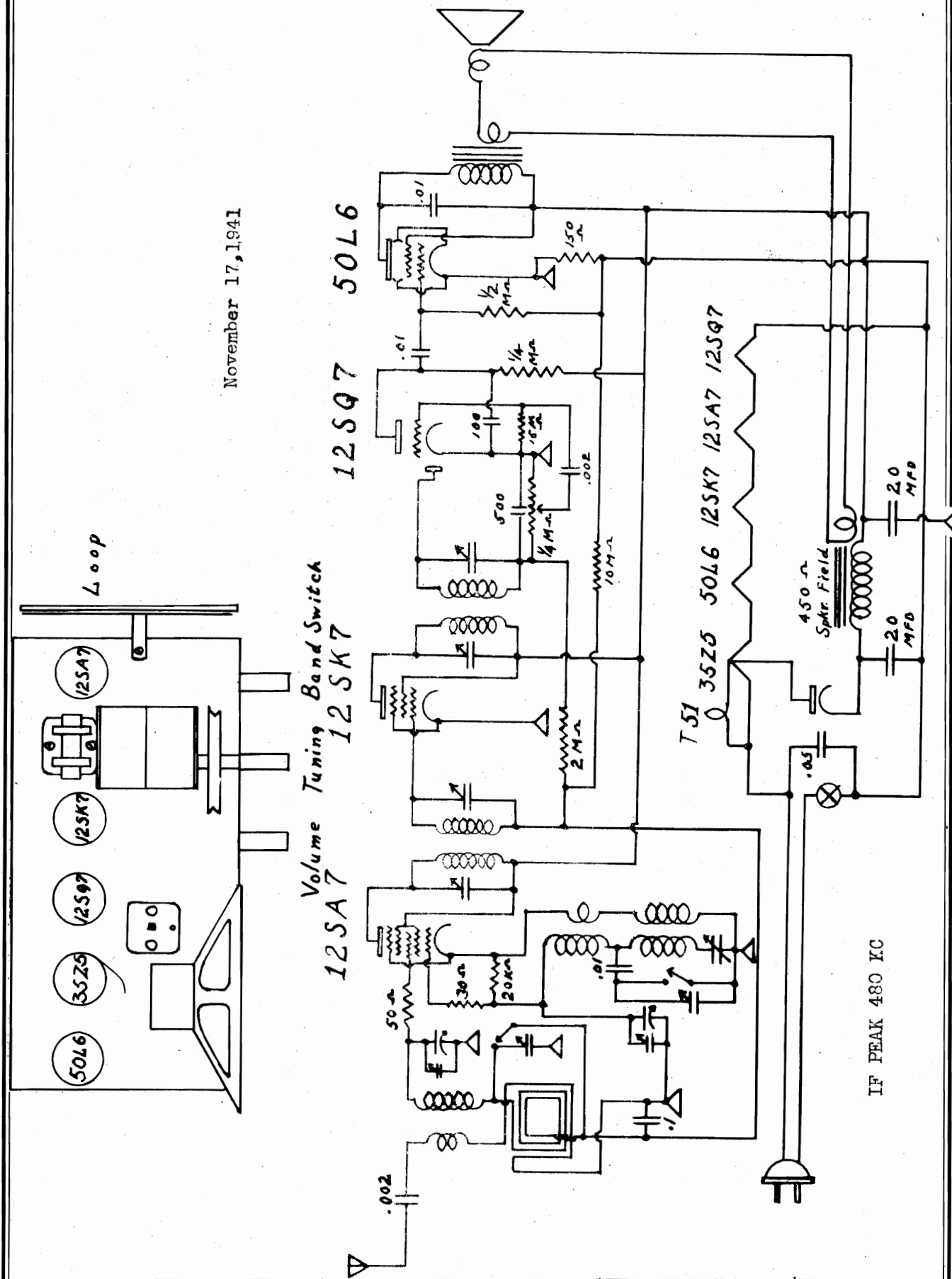
AUTOMATIC RADIO & TELEV. CO., INC.



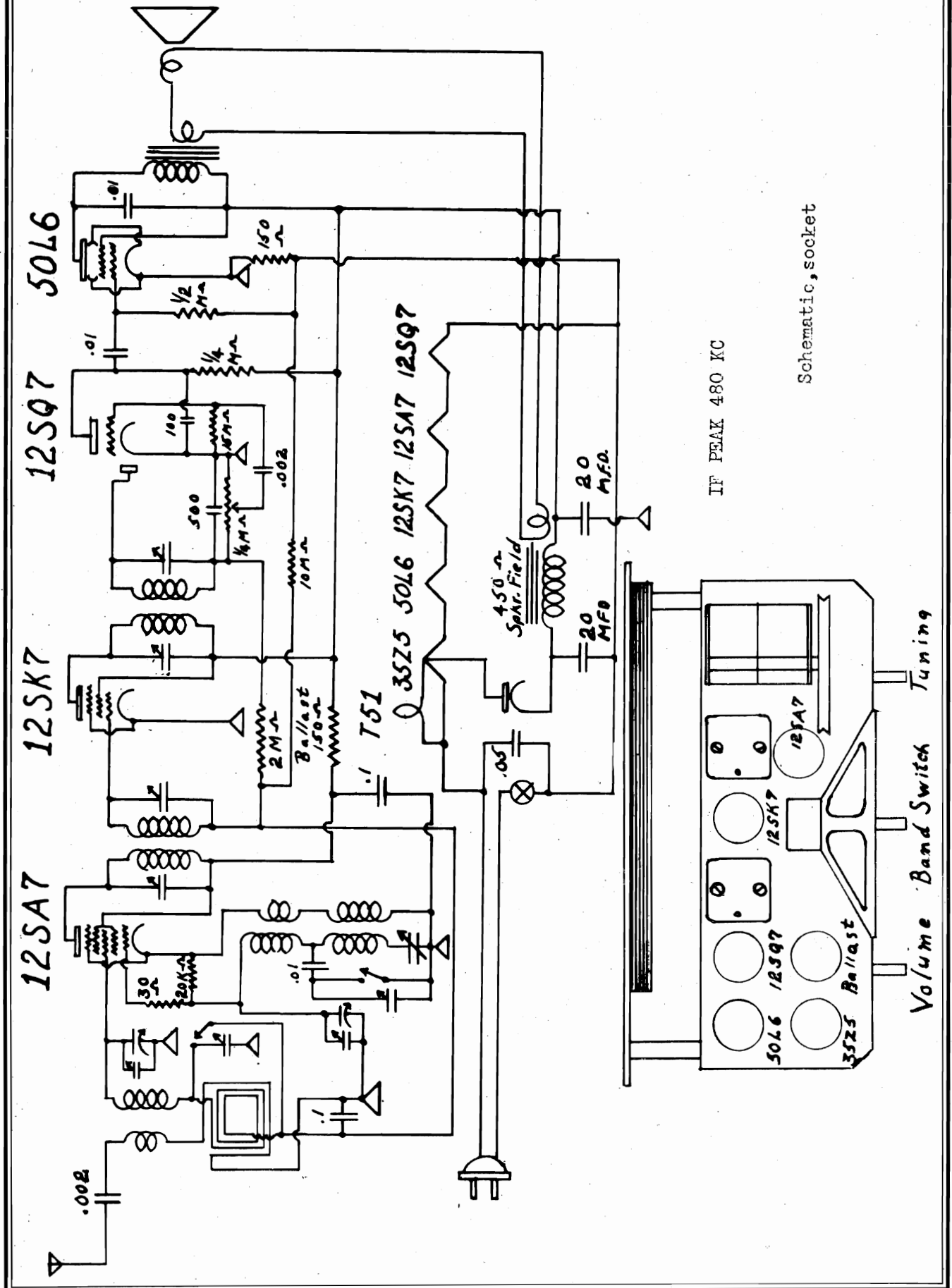
AUTOMATIC RADIO & TELEV. CO., INC

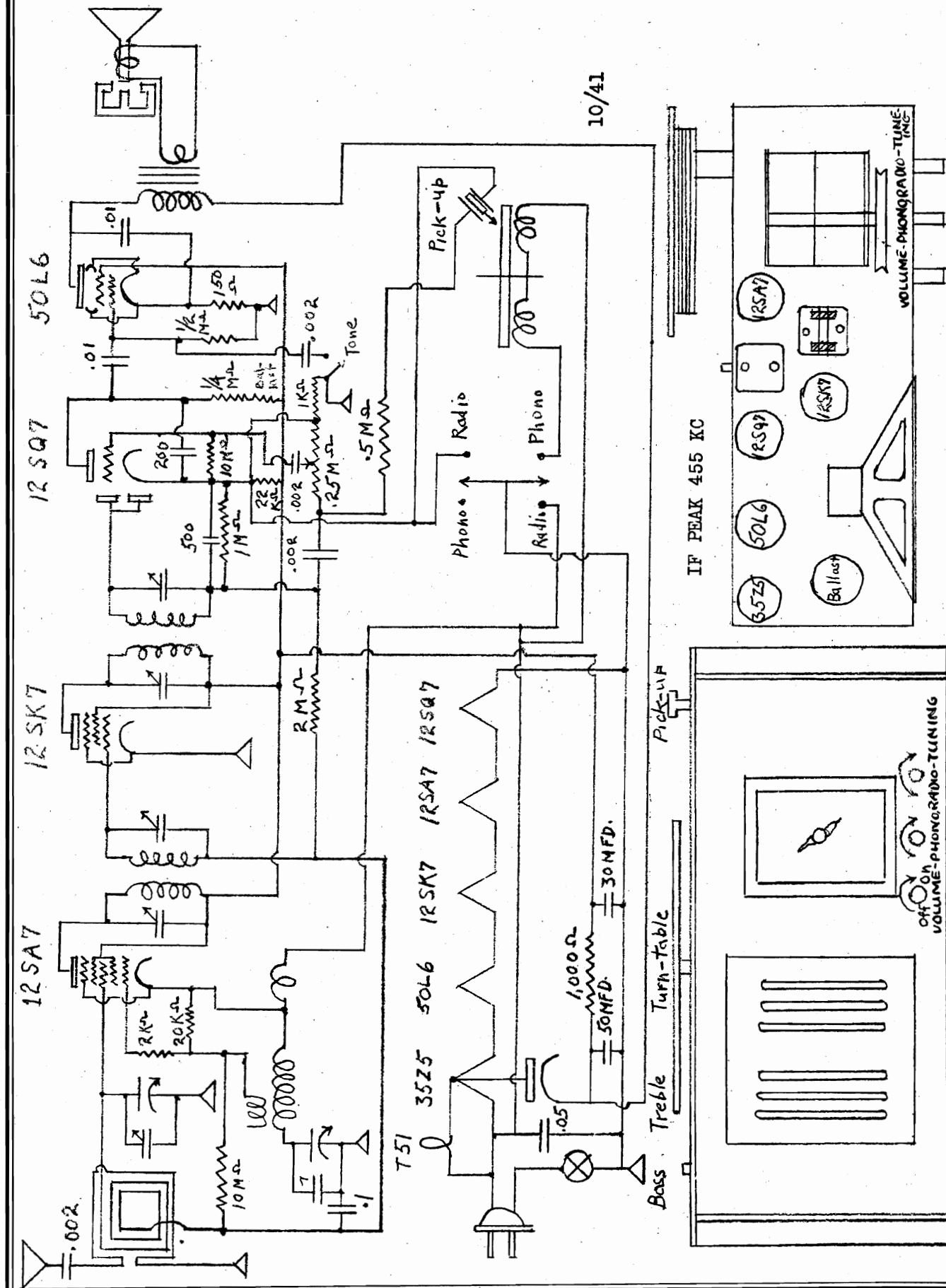
MODELS 202, 203, 204
205, 206





AUTOMATIC RADIO & TELEV. CO., INC.





BELMONT RADIO CORP.

Code No. Part No. Description

RESISTORS

R1	13017	10M ohm— $\frac{1}{2}$ w.
R2	1304	3 megohm— $\frac{1}{2}$ w.
R3	1309	200M ohm— $\frac{1}{2}$ w.
R4	130194	35M ohm— $\frac{1}{2}$ w.
R5	13094	50M ohm— $\frac{1}{2}$ w.
R6	1304	3 megohm— $\frac{1}{2}$ w.
R7	101250	1 megohm—Volume control and switch— $\frac{1}{4}$ w.
R8	130257	5 megohm— $\frac{1}{2}$ w.
R9	13019	1 megohm— $\frac{1}{2}$ w.
R10	130146	2 megohm— $\frac{1}{2}$ w.
R11	13079	400 ohm— $\frac{1}{2}$ w.

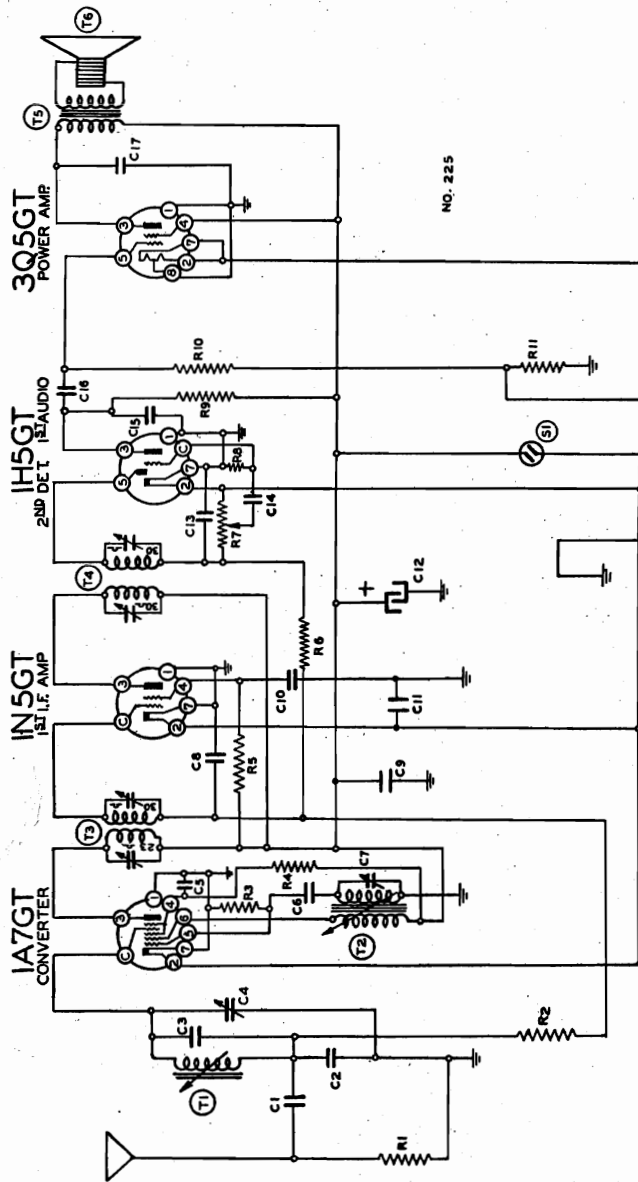
CONDENSERS

C1	12936	.0003 mica
C2	100112	.001 x 200 v.
C3	129177	.000045—Ceramic
C4	124165	Antenna trimmer
C5	1009	.05 x 200 v.—Condenser
C6	12912	.00025 mica
C7	124165	Oscillator trimmer
C8	1009	.05 x 200 v. Condenser
C9	1006	.25 x 200 v. Condenser
C10	10020	.1 x 200 v.
C11	10017	.5 x 120 v.
C12	119117B	10 mid. x 150 v. Lytic
C13	1295	.0001 mica
C14	10012	.003 x 600 v. Condenser
C15	1295	.0001 mica
C16	10026	.02 x 400 v. Condenser
C17	1007	.005 x 600 v.

C4 and C7 are in same unit.

PARTS

T1	1364	Antenna Coil (Permeability tuning assem.)
T2	1364	Oscillator Coil (Complete)
T3	108202	Input I. F. Coil 455 kc.
T4	108133B	Output I. F. Coil 455 kc.
T5	10591B	Output transformer
T6	114238	5" P.M. speaker
S1		Switch-on Volume control



INTERMEDIATE
FREQUENCY
455 K.C.

February 1941

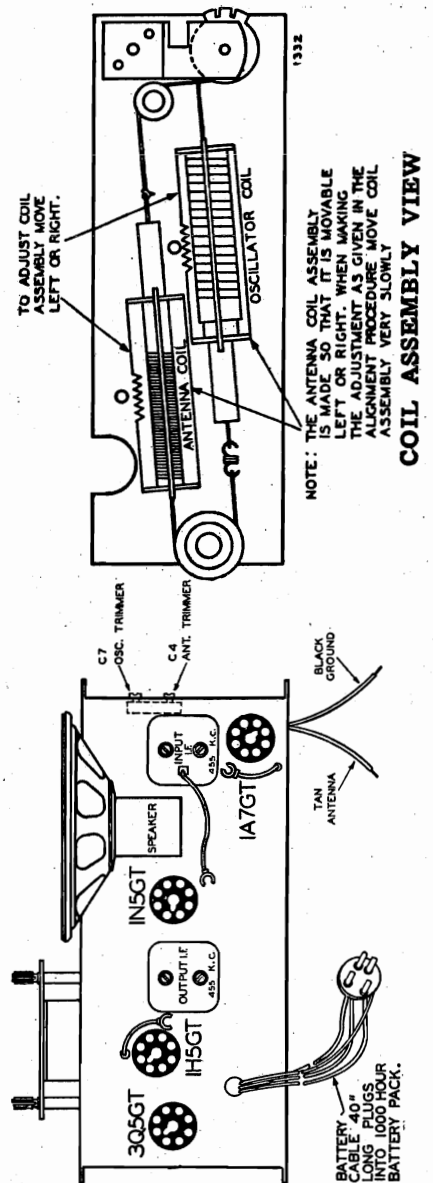
BOTTOM VIEW OF CHASSIS

VR PAGES MEASURED WITH A HIGH RESISTANCE VOLTAGE MEASURING SOCKET TERMINAL AND CHASSIS.



ALL POTENTIALS MEASURED FROM CHASSIS FRAME. ALL VOLTAGES MEASURED WITH 5000 OHM PER VOLT.

REAR OF CHASSIS



COIL ASSEMBLY VIEW

MODEL 4BA1
MODEL 5DA1

BELMONT RADIO CORP.

TECHNICAL DATA

MODEL 4BA1

ALIGNMENT
PROCEDURE

Power Consumption - - - - - A—250 Amp. B .014 Amps. Sensitivity for 50 Milliwatt Output: 45 Microvolts Average
Power Output - - - - - 160 Milliwatts Undistorted Selectivity - - - - - 48 KC at 1000 Times Signal at 1000 KC
Tuning Frequency Range - - - - - 540 to 1700 KC

BAND	SIGNAL GENERATOR Frequency Setting	Connection to Radio	Position of Iron Cores (Dial Setting)	Trimmers Adjusted (in Order Shown)	Trimmer Function	Adjustment
455 Kc. I. F.	.1 MFD.	Connect to Grid of 1A7	Iron Cores All the way out	Two trimmers on top of output I. F. can	Output I. F.	maximum output
	.1 MFD.	Connect to Grid of 1A7	Iron Cores All the way out	Two trimmers on top of input I. F. can	Input I. F.	maximum output
BROAD- CAST BAND	1700 Kc.	Connect to Grid of 1A7	Iron Cores All the way out	Trimmer (C2) (See chassis view)	Oscillator	maximum output
	1700 Kc.	Connect to Antenna Clip	Iron Cores All the way out	Trimmer (C4) (See chassis view)	Antenna	maximum output
	1400 Kc.	Connect to Antenna Clip	Turn Dial to 1400 Kc.	Adjust position of antenna coil (See coil assembly view)	Antenna Coil Adjustment	maximum output (See Note "A")
	1700 Kc.	Connect to Antenna Clip	Turn Dial to 1700 Kc.	Adjust trimmer (C4) (See chassis view)	Antenna	Check for tracking (See Note "B")

NOTE "A"—The antenna coil assembly is made so that it is movable. When making the adjustment as given in the alignment procedure, move the coil assembly very slowly. It can be moved by hand, or by pivoting one edge of the blade of a screwdriver in the hole and engaging the blade in the gear teeth of the coil form.

Conn. grd. lead of radio
chassis to grd. post of
signal generator.

The following equipment
is required for aligning:

Dummy antenna .1mfd.
and 200 mmf.

Vol. control- Max. all adjs. BAND

TECHNICAL DATA

MODEL 5DA1

Power Consumption - - - - - 35 Watts Selectivity - 59 KC Broad at 1000 Times Signal at 1000 KC
Power Output - - - - - 800 Milliwatts Undistorted Tuning Frequency Range - - - - - 535 to 1720 KC
Sensitivity (for .05 Watts Output) - 30 Microvolts Average Intermediate Frequency - - - - - 455 KC
Speaker - - - - - 5 in. P. M. Dynamic

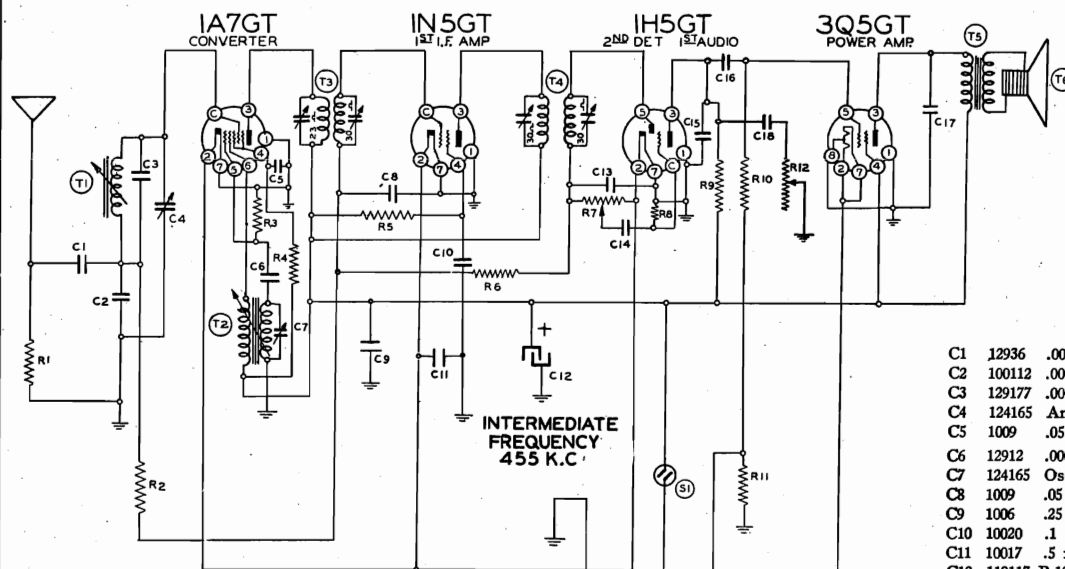
ALIGNMENT PROCEDURE

BAND	SIGNAL GENERATOR Frequency Setting	Connection to Radio	Position of Iron Cores (Dial Setting)	Trimmers Adjusted (in Order Shown)	Trimmer Function	Adjustment
I. F.	.1 MFD.	Connect to Grid of 12SA7	Iron Cores All the way out	Two trimmers on top of output I. F. can	Output I. F.	Adjust to maximum output
	.1 MFD.	Connect to Grid of 12SA7	Iron Cores All the way out	Two trimmers on top of input I. F. can	Input I. F.	Adjust to maximum output
BROAD- CAST BAND	1720 Kc.	Connect to Grid of 12SA7	Iron Cores All the way out	Trimmer (C6) (See chassis view)	Oscillator	Adjust to maximum output
	1720 Kc.	Connect to Outside Antenna Clip	Iron Cores All the way out	Trimmer (C3) (See chassis view)	Antenna	Adjust to maximum output
	1400 Kc.	Connect to Outside Antenna Clip	Turn Dial to 1400 Kc.	Adjust position of antenna coil (See coil assembly view)	Antenna Coil Adjustment	Adjust to maximum output (See Note "A")
	1720 Kc.	Connect to Outside Antenna Clip	Turn Dial to 1720 Kc.	Adjust trimmer (C3) (See chassis view)	Antenna	Check for tracking (See Note "B")

NOTE "A"—The antenna coil assembly is made so that it is movable. When making the adjustment as given in the alignment procedure, move the coil assembly very slowly. It can be moved by hand, or by pivoting one edge of the blade of a screwdriver in the hole and engaging the blade in the gear teeth of the coil form.

NOTE "B"—After the antenna coil has been tracked at 1400 Kc. it is necessary to check the antenna trimmer (C3) adjustment again at 1720 Kc. If no appreciable change in trimmer adjustment is made the coil is in track, if the trimmer requires considerable change it will be necessary to again adjust the position of the antenna coil at 1400 Kc. These two adjustments should be tried several times until no change of trimmer adjustment is required at 1720 Kc.

BELMONT RADIO CORP.



CONDENSERS

C1	12936	.0003 mica
C2	100112	.001 x 200 v.
C3	129177	.000045—Ceramic
C4	124165	Antenna trimmer
C5	1009	.05 x 200 v.—Condenser
C6	12912	.00025 mica
C7	124165	Oscillator trimmer
C8	1009	.05 x 200 v. Condenser
C9	1006	.25 x 200 v. Condenser
C10	10020	.1 x 200 v.
C11	10017	.5 x 120 v.
C12	119117-B	10 mid. x 150 v. Lytic
C13	1295	.0001 mica
C14	10012	.003 x 600 v. Condenser
C15	1295	.0001 mica
C16	10026	.02 x 400 v. Condenser
C17	1007	.005 x 600 v.
C18	100112	.001 x 200 v.

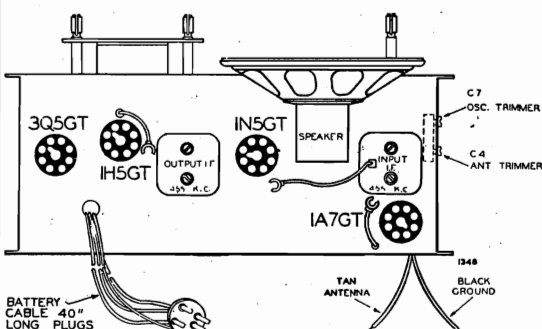
C4 and C7 are in same unit

RESISTORS

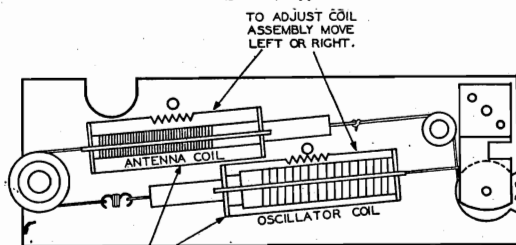
R1	13017	10M ohm— $\frac{1}{2}$ w.
R2	1304	3 megohm— $\frac{1}{2}$ w.
R3	1309	200M ohm— $\frac{1}{2}$ w.
R4	130194	35M ohm— $\frac{1}{2}$ w.
R5	13094	50M ohm— $\frac{1}{2}$ w.
R6	1304	3 megohm— $\frac{1}{2}$ w.
R7	101250	1 megohm—Volume control and switch— $\frac{1}{2}$ w.
R8	130257	5 megohm— $\frac{1}{2}$ w.
R9	13019	1 megohm— $\frac{1}{2}$ w.
R10	130146	2 megohm— $\frac{1}{2}$ w.
R11	13079	400 ohm— $\frac{1}{2}$ w.
R12	101231	1 megohm tone control

PARTS

T1	1364	Antenna Coil
T2	1364	Oscillator Coil
T3	108202	Input I. F. Coil 455 kc.
T4	108153B	Output I. F. Coil 455 kc.
T5	10591B	Output transformer
T6	114215R	6" P.M. Speaker
S1		Switch-on volume control



CHASSIS VIEW



NOTE: THE ANTENNA COIL ASSEMBLY IS MADE SO THAT IT IS MOVABLE LEFT OR RIGHT. WHEN MAKING THE ADJUSTMENT AS GIVEN IN THE ALIGNMENT PROCEDURE MOVE COIL ASSEMBLY VERY SLOWLY

COIL ASSEMBLY VIEW

Power Consumption - A—.250 Amp. B .014 Amps.

Power Output - - - 160 Milliwatts Undistorted

Sensitivity for 50 Milliwatt Output: 45 Microvolts Average

Selectivity - 48 KC at 1000 Times Signal at 1000 KC

Tuning Frequency Range - - - - - 540 to 1700 KC

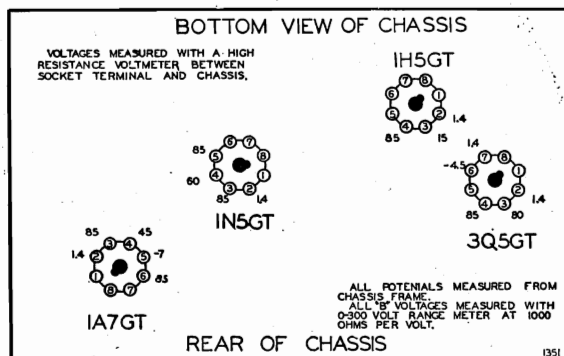
BAND	SIGNAL GENERATOR Frequency Setting	Dummy Antenna	Connection to Radio	Position of Iron Cores (Dial Setting)	Trimmers Adjusted (in Order Shown)	Trimmer Function	Adjustment
455 Kc.	455 Kc.	.1 MFD.	Connect to Grid of 1A7	Iron Cores All the way out	Two trimmers on top of output I. F. can	Output I. F.	maximum output
I. F.	455 Kc.	.1 MFD.	Connect to Grid of 1A7	Iron Cores All the way out	Two trimmers on top of input I. F. can	Input I. F.	maximum output
BROAD-CAST BAND	1700 Kc.	.1 MFD.	Connect to Grid of 1A7	Iron Cores All the way out	Trimmer (C7) (See chassis view)	Oscillator	maximum output
	1700 Kc.	200 MMF.	Connect to Antenna Clip	Iron Cores All the way out	Trimmer (C4) (See chassis view)	Antenna	maximum output
	1400 Kc.	200 MMF.	Connect to Antenna Clip	Turn Dial to 1400 Kc.	Adjust position of antenna coil (See coil assembly view)	Antenna Coil Adjustment	maximum output (See Note "A")
	1700 Kc.	200 MMF.	Connect to Antenna Clip	Turn Dial to 1700 Kc.	Adjust trimmer (C4) (See chassis view)	Antenna	Check for tracking (See Note "B")

NOTE "A"—The antenna coil assembly is made so that it is movable. When making the adjustment as given in the alignment procedure move the coil assembly very slowly. It can be moved by hand or by pivoting one edge of the blade of a screwdriver in the hole and engaging the blade in the gear teeth of the coil form.

• Volume control—Maximum all adjustments.

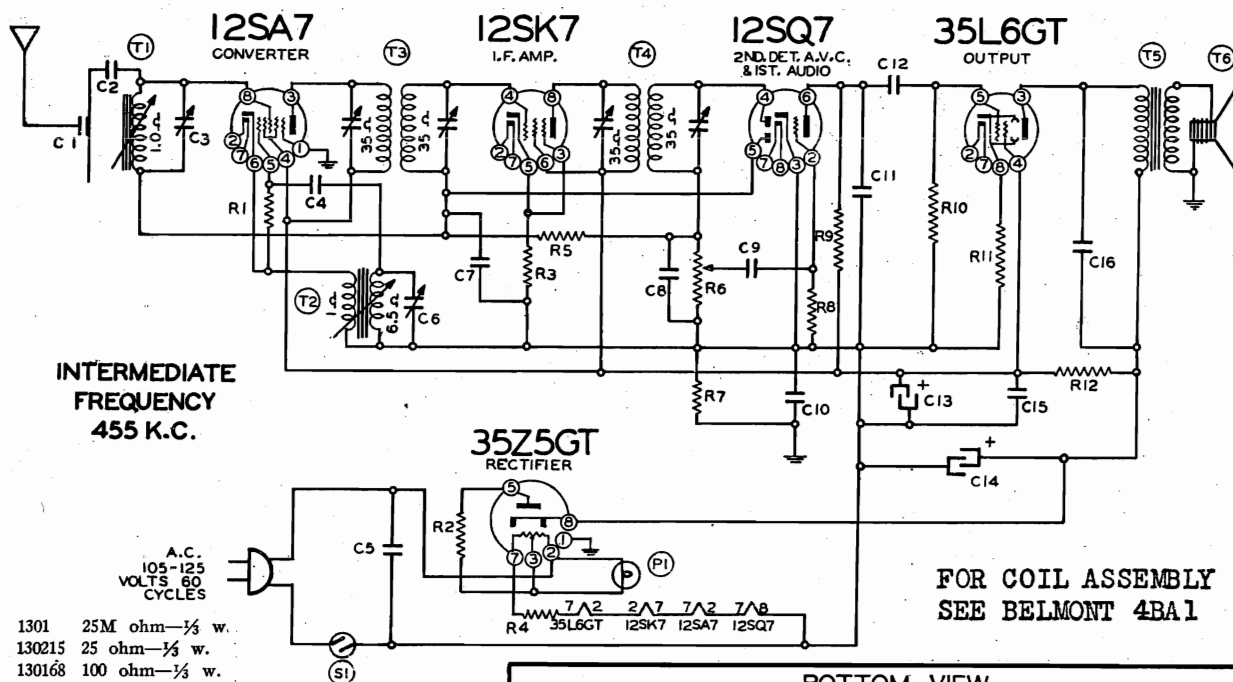
• Dummy antenna .1 mfd. and 200 mmf.

NOTE "B"—After the antenna coil has been tracked at 1400 Kc. it is necessary to check the antenna trimmer (C4) adjustment again at 1700 Kc. If no appreciable change in trimmer adjustment is made the coil is in track, if the trimmer requires considerable change it will be necessary to again adjust the position of the antenna coil at 1400 Kc. These two adjustments should be tried several times until no change of trimmer adjustment is required at 1700 Kc.



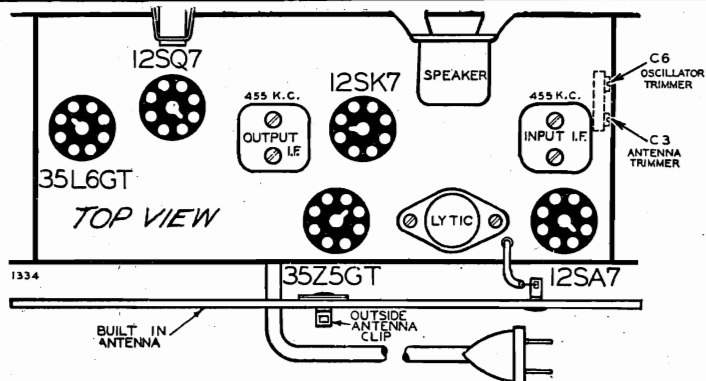
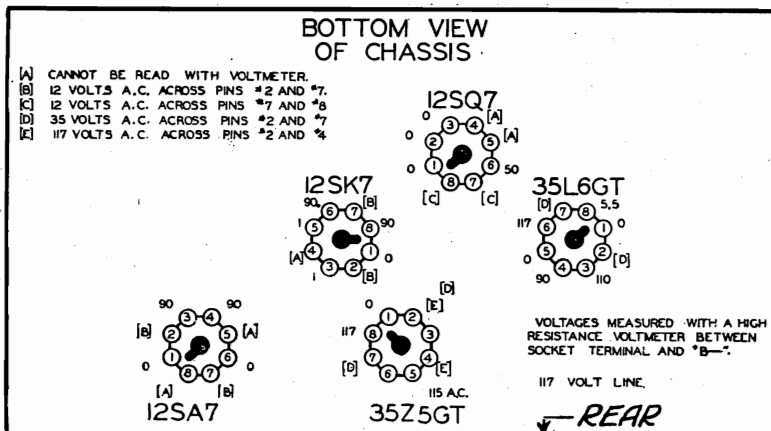
REAR OF CHASSIS

BELMONT RADIO CORP



- R1 1301 25M ohm— $\frac{1}{2}$ w.
R2 130215 25 ohm— $\frac{1}{2}$ w.
R3 130168 100 ohm— $\frac{1}{2}$ w.
R4 130315 75 ohm— $\frac{1}{2}$ w.
R5 1304 3 megohm— $\frac{1}{2}$ w.
R6 101251 1 megohm volume control and switch
R7 1309 200M ohm— $\frac{1}{2}$ w.
R8 130257 5 megohm— $\frac{1}{2}$ w.
R9 1309 200M ohm— $\frac{1}{2}$ w.
R10 1303 500M ohm— $\frac{1}{2}$ w.
R11 130166 150 ohm— $\frac{1}{2}$ w.
R12 130287 1200 ohm—1 w.
C1 131262 Washer cond. (ant. clip on ant. plate)
C2 12912 .00025 mica
C3 124150 Antenna section dual trimmer
C4 12938 .00005 mica
C5 1001 .1 x 400 v.
C6 124150 Oscillator section dual trimmer
C7 1009 .05 x 200 v.
C8 1295 .0001 mica
C9 10025 .002 x 600 v.
C10 100110 .2 x 400 v.
C11 12921 .0002 mica
C12 100106 .004 x 600 v.
C13 11992 20 mfd. x 150 v. lytic
C14 11992 40 mfd. x 150 v. lytic
C15 100-9 .05 x 200 v.
C16 10026 .02 x 400 v.
C3 and C6 are in same unit.
C13 and C14 are in same unit.

- T1 13611 Antenna Assembly (Permeability tuning Antenna Section)
T2 13611 Permeability tuning assembly (Oscillator Section)
T3 108140J Input I.F. coil 455 kc.
T4 108141E Output I.F. coil 455 kc.

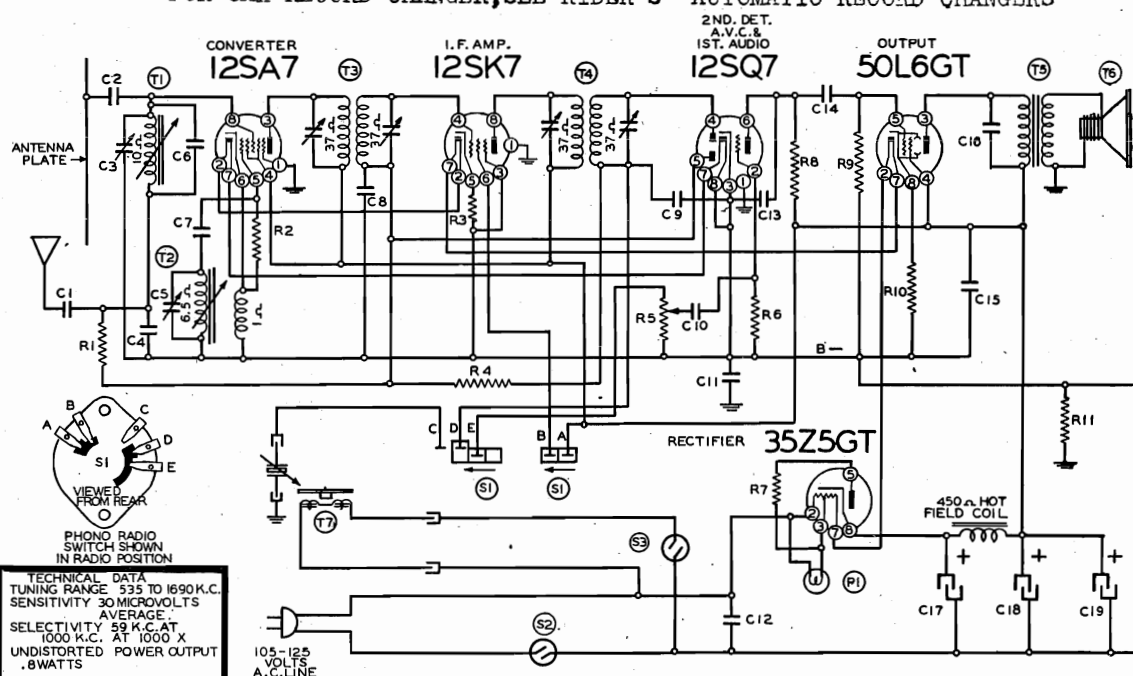


SIGNAL GENERATOR							
BAND	Frequency Setting	Dummy Antenna	Connection to Radio	Position of Iron Cores (Dial Setting)	Trimmers Adjusted (in Order Shown)	Trimmer Function	Adjustment
I. F.	455 Kc.	.1 MFD.	Connect to Grid of 12SA7	Iron Cores All the way out	Two trimmers on top of output I. F. can	Output I. F.	Adjust to maximum output
	455 Kc.	.1 MFD.	Connect to Grid of 12SA7	Iron Cores All the way out	Two trimmers on top of input I. F. can	Input I. F.	Adjust to maximum output
BROAD-CAST BAND	1720 Kc.	.1 MFD.	Connect to Grid of 12SA7	Iron Cores All the way out	Trimmer (C6) (See chassis view)	Oscillator	Adjust to maximum output
	1720 Kc.	200 MMF.	Connect to Outside Antenna Clip	Iron Cores All the way out	Trimmer (C3) (See chassis view)	Antenna	Adjust to maximum output
	1400 Kc.	200 MMF.	Connect to Outside Antenna Clip	Turn Dial to 1400 Kc.	Adjust position of antenna coil (See coil assembly view)	Antenna Coil Adjustment	Adjust to maximum output (See Note "A")
	1720 Kc.	200 MMF.	Connect to Outside Antenna Clip	Turn Dial to 1720 Kc.	Adjust trimmer (C3) (See chassis view)	Antenna	Check for tracking (See Note "B")

MODEL 5D16

BELMONT RADIO CORP.

" FOR OAK RECORD CHANGER, SEE RIDER'S "AUTOMATIC RECORD CHANGERS"



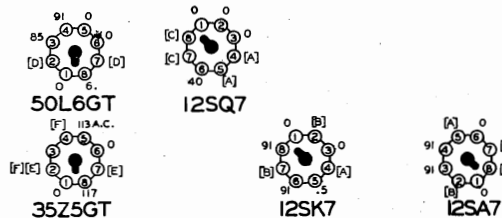
TECHNICAL DATA
 TUNING RANGE 535 TO 1690 K.C.
 SENSITIVITY 30 MICROVOLTS
 AVERAGE
 SELECTIVITY 59 K.C. AT
 1000 K.C. AT 1000 X
 UNDISTORTED POWER OUTPUT
 .8 WATTS
 MAX. POWER OUTPUT
 1.4 WATTS IN VOICE COIL.
 POWER CONSUMPTION:
 RADIO CHASSIS 3.5 WATTS
 PHONO MOTOR 20 WATTS
 I.F. 455 K.C.

IF PEAK 455 KC

BOTTOM VIEW OF CHASSIS

VOLTAGES MEASURED WITH A HIGH RESISTANCE VOLT-METER
 BETWEEN SOCKET TERMINALS & B-MINUS.
 PHONO-RADIO SWITCH, TO BE IN RADIO POSITION.
 VOLUME CONTROL AT MINIMUM & NO SIGNAL.

[A] - CANNOT BE MEASURED WITH VOLT-METER. [D] - 47 VOLTS A.C. ACROSS PINS 2 & 7.
 [B] - 11 VOLTS A.C. ACROSS PINS 2 & 7. [E] - 34 VOLTS A.C. ACROSS PINS 2 & 7.
 [C] - 11 VOLTS A.C. ACROSS PINS 7 & 8. [F] - 117 VOLTS A.C. ACROSS PINS 2 & 4.



REAR OF CHASSIS

VOLTAGE CHART

- Connect B- of radio chassis to ground post of signal generator through .1 Mfd. condenser.
- Volume control—Maximum all adjustments.

CONDENSERS

- C8, C15 .05 x 200 Volt Tubular Condenser.
 C11 .1 x 400 Volt Tubular Condenser.
 C10 .002 x 600 Volt Tubular Condenser.
 C14 .006 x 600 Volt Tubular Condenser.
 C16 .01 x 400 Volt Tubular Condenser.
 C12 .1 x 400 Volt Tubular Condenser.
 C17, C18, C19 Electrolytic Filter Condenser. 50 to 60 Cycles. 40 Mfd. x 150 V.; 20 Mfd. x 150 V.; 20 Mfd. x 150 V.
 C17, C18, C19 Electrolytic Filter Condenser. 25 Cycles. 60 Mfd. x 150 V.; 40 Mfd. x 150 V.; 40 Mfd. x 150 V.
 C3, C5 Ant. and Osc. Dual Trimmer Condenser.
 C2 .0003 Mica Type Condenser—20%
 C1, C7, C9 .0001 Mica Type Condenser—20%
 C4 .0008 Mica Type Condenser—10%
 C13 .00025 Mica Type Condenser—20%
 C6 .00005 Ceramic Condenser—10%.

RESISTORS

- R5, S2 Volume Control and Switch (500M Ohms)
 R1, R11 200M Ohm—1/2 Watt Resistor—20%
 R2 20M Ohm—1/2 Watt Resistor—10%
 R3 100 Ohm—1/2 Watt Resistor—10%
 R4 3 Megohm—1/2 Watt Resistor—20%
 R8 250M Ohm—1/2 Watt Resistor—20%
 R6 5 Megohm—1/2 Watt Resistor—25%
 R7 25 Ohm—1/2 Watt Resistor—10%
 R9 750M Ohm—1/2 Watt Resistor—20%
 R12 30 Ohm—1 Watt Resistor—20%
 R10 150 Ohm—1/2 Watt Resistor—10%
 200 Ohm—1/2 Watt Resistor—10%
 1200 Ohm—1 Watt Resistor—10%

Following Resistors Used Only When
 P.M. Dynamic Speaker is Used:

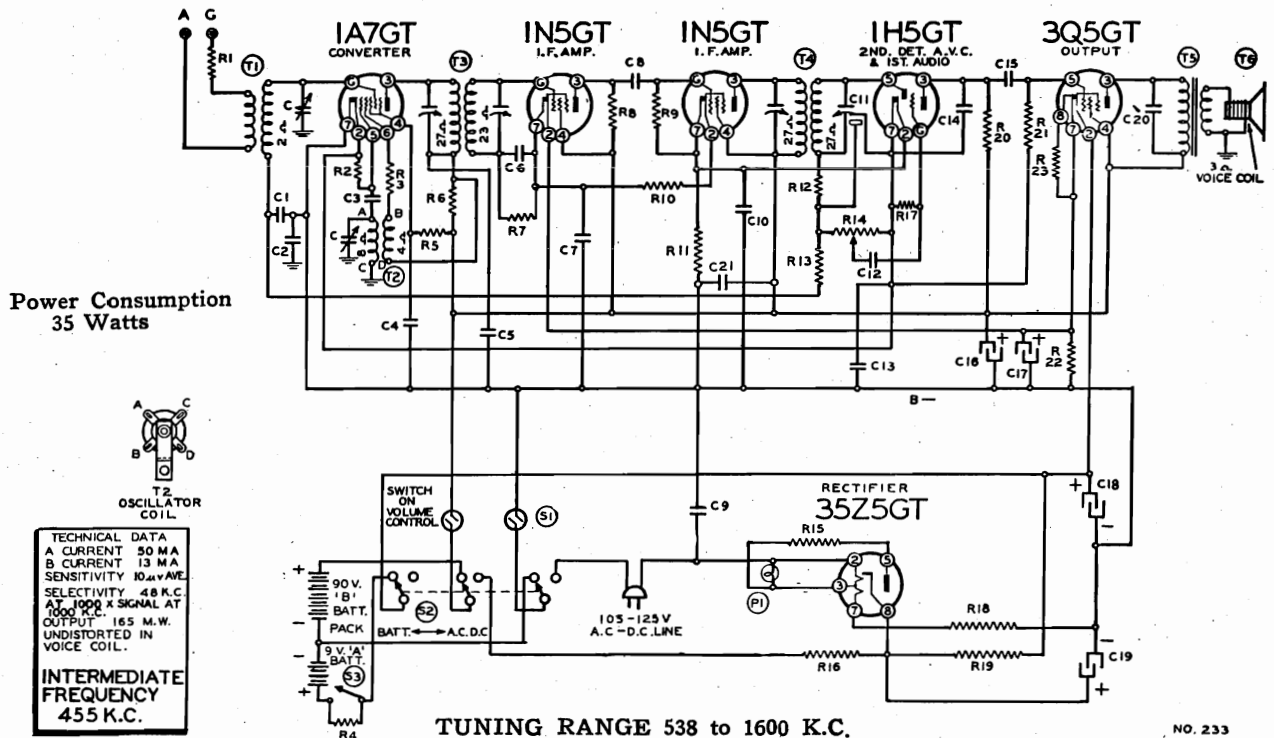
BAND	SIGNAL GENERATOR			Position of Iron Cores (Dial Setting)	Trimmers Adjusted to Maximum (in Order Shown)
	Frequency Setting	Dummy Antenna	Connection to Radio		
I. F.	455 Kc.	.1 MFD.	Connect to Antenna Plate	Iron Cores All the way out	Two trimmers on top of output I.F. (See Chassis View)
	455 Kc.	.1 MFD.	Connect to Antenna Plate	Iron Cores All the way out	Two trimmers on top of input I.F. (See Chassis View)
BROAD-CAST BAND	1690 Kc.	.1 MFD.	Connect to Antenna Plate	Iron Cores All the way out.	Oscillator trimmer (C5) (See Chassis View)
	1690 Kc.	200 MMF.	Connect to Antenna Plate	Iron Cores All the way out	Antenna trimmer (C3) (See Chassis View)
	1400 Kc.	200 MMF.	Connect to Antenna Plate	Turn Dial to 1400 Kc.	Adjust position of antenna coil right or left. (See Note "A")
	1690 Kc.	200 MMF.	Connect to Antenna Plate	Turn Dial to 1690 Kc.	Adjust antenna trimmer (C3) (See Chassis View) (See Note "B")

NOTE "A"—The antenna coil assembly is made so that it is movable right or left. When making the adjustment as given in the alignment procedure move the coil assembly very slowly. It can be moved by hand or by pivoting one edge of the blade of a screwdriver in the hole and engaging the blade in the gear teeth of the coil form.

FOR ADDITIONAL
 DATA SEE INDEX

NOTE "B"—After the antenna coil has been tracked at 1400 Kc. it is necessary to check the antenna trimmer (C3) adjustment again at 1690 Kc. If no appreciable change in trimmer adjustment is made, the coil is in track, if the trimmer requires considerable change it will be necessary to again adjust the position of the antenna coil at 1400 Kc. These two adjustments should be tried several times until no change of trimmer adjustment is required at 1690 Kc.

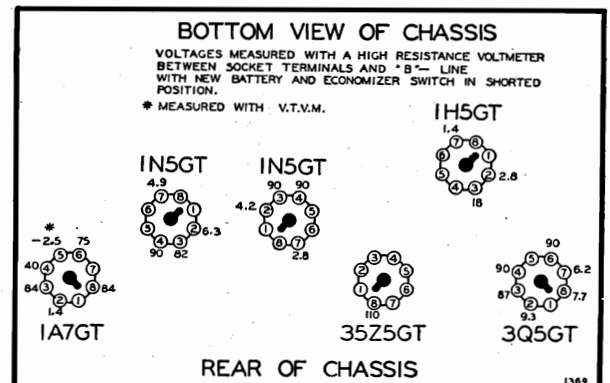
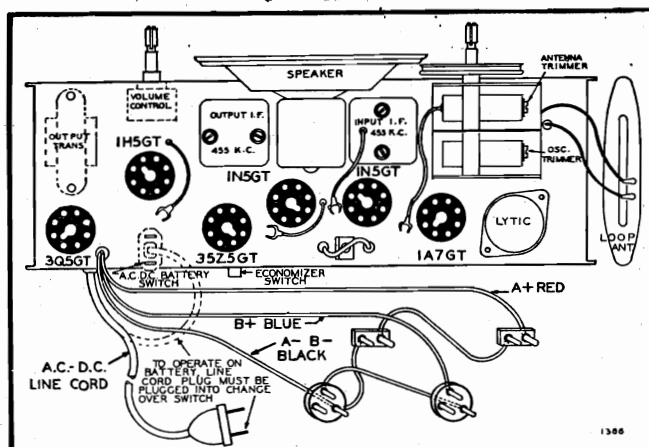
BELMONT RADIO CORP.



BAND	SIGNAL GENERATOR		Connection to Radio	Dial Setting	Trimmers Adjusted (in Order Shown)	Adjustment
	Frequency Setting	Dummy Antenna				
455 Kc. I. F.	455 Kc.	.1 MFD.	Connect to Grid of 1A7	Rotor full open (Plates out of mesh)	Input and Output Trimmers on Top of I. F. cans	Maximum output (See Note "A")
BROAD-CAST BAND	1600 Kc.	.1 MFD.	Connect to Grid of 1A7	Rotor full open (Plates out of mesh)	Osc. Trimmer on gang (See chassis view)	Maximum output (See Note "A")
	1400 Kc.	200 MMF.	Connect to Antenna Clip	Set dial at 1400 Kc.	Ant. Trimmer on gang (See chassis view)	Maximum output (See Note "B")

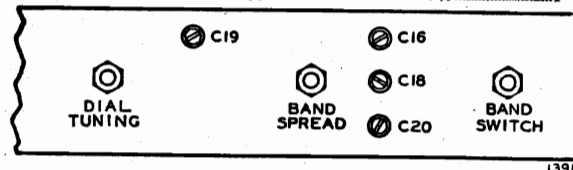
NOTE "A"—The loop antenna need not be connected to the radio when making these adjustments, but a 1. Meg. Resistor must be substituted across the loop clips. The ground of the signal generator is connected to the B— and the other lead from the signal generator in series with .1 MFD. dummy to the grid of the 1A7GT tube.

NOTE "B"—This adjustment should be made with the ground lead of the signal generator connected to the external ground terminal. The other lead of the signal generator is connected in series with a 200 Mmf. dummy to the external antenna terminal.

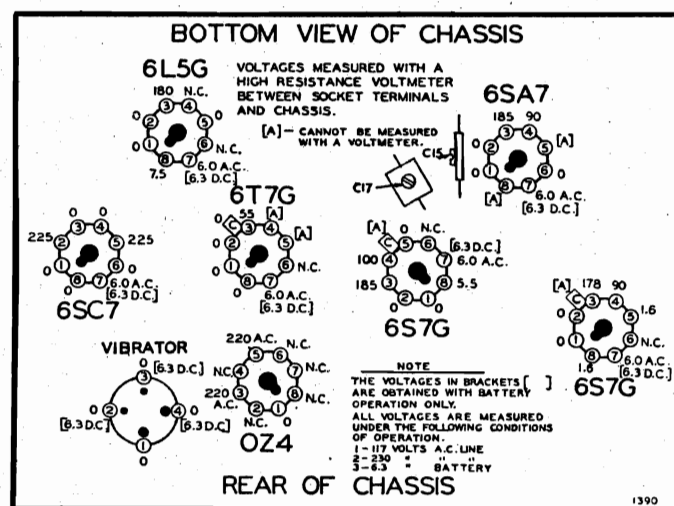


Part No.	Schematic Diagram Reference	Description	No. Used In Set	Selling Price Each
CONDENSERS				
1001	C6, C37	.1 x 400 Volt Tubular Condenser	2	.25
10011	C26, C27, C31,	C32, C34 .01 x 400 Volt Tubular Condenser	5	.25
10013	C8, C23	.05 x 400 Volt Tubular Condenser	2	.25
10020	C5	.1 x 200 Volt Tubular Condenser	1	.25
10022	C4, C22, C35	.05 x 200 Volt Tubular Condenser	3	.25
10025	C29	.002 x 600 Volt Tubular Condenser	1	.25
10026	C13, C14	.02 x 400 Volt Tubular Condenser	2	.25
10031	C24, C25	.5 x 120 Volt Tubular Condenser	2	.60
10071	C41	.004 x 600 Volt Tubular Condenser	1	.25
100100	C33	.008 x 1600 Volt Tubular Condenser	1	.25
100117	C12	.25 x 400 Volt Tubular Condenser—With Bracket	1	.35
119127	C36, C38, C39,	C40 Electrolytic Filter Condenser. 40 Mfd. x 25 V.—40 Mfd. x 300 V.—20 Mfd. x 300 V.—20 Mfd. x 300 V.	1	1.50
124169	C9, C10, C11	S.W.—M.W.—B.C.—Triple Unit Antenna Trimmer Condenser Strip	1	.60
124170	C1, C2, C3	S.W.—M.W.—B.C.—Triple Unit Antenna Trimmer Condenser Strip	1	.60
124172	C16, C18, C20	S.W.—M.W.—B.C.—Triple Unit Antenna Trimmer Condenser Strip	1	.55
129178	C19	B.C. Osc. Series Pad Condenser	1	.35
129179	C17	M.W. Osc. Series Pad Condenser	1	.45
129180	C15	S.W. Osc. Series Pad Condenser	1	.55
1295	C21, C28	.0001 Mica Type Condenser—20%	2	.25
12912	C30	.00025 Mica Type Condenser—20%	1	.25
12940	C7	.0001 Mica Type Condenser—10%	1	.25

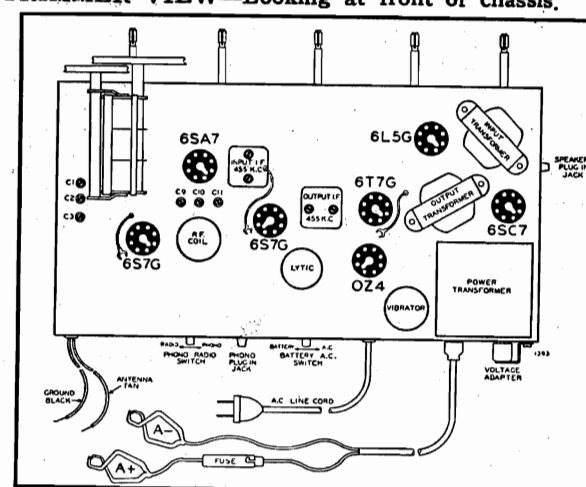
RESISTORS					
3 Megohm	$\frac{1}{2}$	Watt Resistor	20%	1	20
200M Ohm	$\frac{1}{2}$	Watt Resistor	20%	1	20
50M Ohm	$\frac{1}{2}$	Watt Resistor	20%	1	20
1 Megohm	$\frac{1}{2}$	Watt Resistor	20%	1	20
100M Ohm	$\frac{1}{2}$	Watt Resistor	20%	1	20
50 Ohm	$\frac{1}{2}$	Watt Resistor	20%	1	20
1500 Ohm	$\frac{1}{2}$	Watt Resistor	20%	1	20
35M Ohm	$\frac{1}{2}$	Watt Resistor	20%	1	20
3500 Ohm	$\frac{1}{2}$	Watt Resistor	20%	1	20
75M Ohm	$\frac{1}{2}$	Watt Resistor	10%	1	20
200 Ohm	$\frac{1}{2}$	Watt Resistor	20%	2	20
300 Ohm	$\frac{1}{2}$	Watt Resistor	20%	1	20
1500 Ohm	1	Watt Resistor	10%	1	20
1500 Ohm	$\frac{1}{2}$	Watt Resistor	10%	1	20
5 Megohm	$\frac{1}{2}$	Watt Resistor	25%	1	20
12M Ohm	2	Watt Resistor	10%	1	20
1M Ohm	$\frac{1}{2}$	Watt Resistor	10%	1	20
2M Ohm	$\frac{1}{2}$	Watt Resistor	20%	1	20
15M Ohm	$\frac{1}{2}$	Watt Resistor	20%	1	20
10 Ohm	$\frac{1}{2}$	Watt Resistor	20%	1	20



TRIMMER VIEW—Looking at front of chassis.



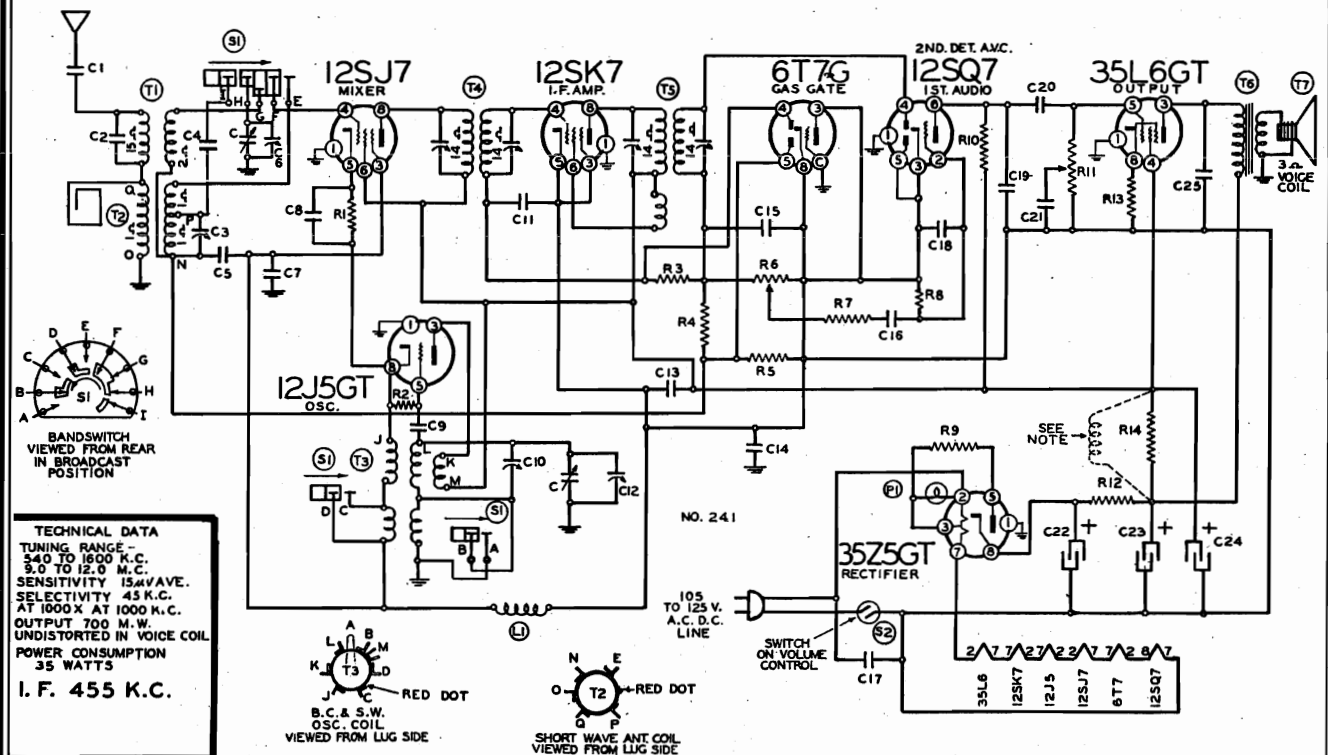
VOLTAGE CHART



CHASSIS VIEW showing tube location.
NOTE: Antenna and ground leads at back of chassis.

BELMONT RADIO CORP.

MODEL 7D22



On sets which have an electrodynamic speaker, R12 is eliminated and the hot side of C22 is connected in parallel with C23. R14 is replaced by the speaker field. B+ of output transformer is connected to No. 4 pin of 35L6 tube.

Schematic
 Part Diagram
 No. Reference

Description

No. Selling
 Used Price
 In Set Each

CONDENSERS

100128	C5	.05 x 120 Volt Tubular Condenser	1	.25	130218	R1	5M Ohm— $\frac{1}{2}$ Watt Resistor—10%	1	.20
100119	C7, C14	.1 x 400 Volt Tubular Condenser	2	.25	130166	R13	150 Ohm— $\frac{1}{2}$ Watt Resistor—10%	1	.20
100127	C8	.01 x 120 Volt Tubular Condenser	1	.25	13084	R12	200 Ohm— $\frac{1}{2}$ Watt Resistor—20%	1	.20
10020	C13	.1 x 200 Volt Tubular Condenser	1	.25	130128	R9	20 Ohm— $\frac{1}{2}$ Watt Resistor—20%	1	.20
1009	C11	.05 x 200 Volt Tubular Condenser	1	.25	130128	R2, R7	50M Ohm— $\frac{1}{2}$ Watt Resistor—20%	2	.20
100138	C17, C20	.03 x 400 Volt Tubular Condenser	2	.25	13012	R14	1200 Ohm—1 Watt Resistor—10%	1	.20
10026	C25	.02 x 400 Volt Tubular Condenser	1	.25	130287	R14	3.2 Megohm— $\frac{1}{2}$ Watt Resistor—20%	2	.20
10019	C16, C21	.006 x 600 Volt Tubular Condenser	2	.25	13038	R3, R5	2 Megohm— $\frac{1}{2}$ Watt Resistor—20%	1	.20
10037	C1	.003 x 600 Volt Tubular Condenser	1	.25	130257	R4	5 Megohm— $\frac{1}{2}$ Watt Resistor—25%	1	.20
119129		Electrolytic Filter Cond. Added for 25 Cycle Only. 40 Mfd. x 150 Volts Across C22 and 20 Mfd. x 150 Volts Across C23.	1	1.25	1309	R10	200M Ohm— $\frac{1}{2}$ Watt Resistor—20%	1	.20
119128	C22, C23, C24	Electrolytic Filter Condenser. 40 Mfd.—20 Mfd.—20 Mfd. x 150 Volts, 50-60 Cycles	1	1.25					
124139	C3, C10	S.W. Antenna and Oscillator Trimmer Condenser	2	.25					
129181	C4	.000445 Mica Type Condenser—3%	1	.30					
12921	C15	.0002 Mica Type Condenser—20%	1	.25					
1295	C9, C18	.0001 Mica Type Condenser—20%	2	.25					
12960	C2	.00015 Mica Type Condenser—20%	1	.25					
12912	C19	.00025 Mica Type Condenser—20%	1	.25					

RESISTORS

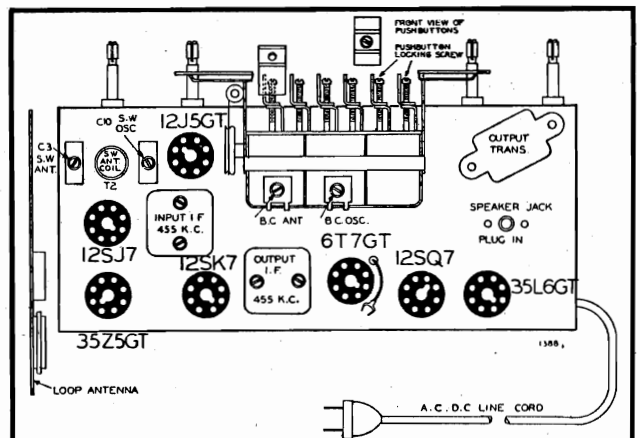
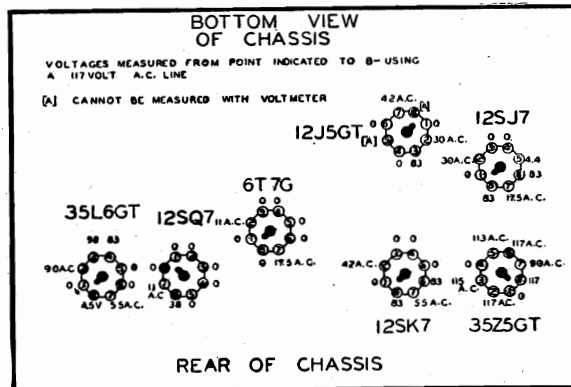
130218	R1	5M Ohm— $\frac{1}{2}$ Watt Resistor—10%	1	.20
130166	R13	150 Ohm— $\frac{1}{2}$ Watt Resistor—10%	1	.20
13084	R12	200 Ohm— $\frac{1}{2}$ Watt Resistor—20%	1	.20
130128	R9	20 Ohm— $\frac{1}{2}$ Watt Resistor—20%	1	.20
130128	R2, R7	50M Ohm— $\frac{1}{2}$ Watt Resistor—20%	2	.20
13012	R14	1200 Ohm—1 Watt Resistor—10%	1	.20
130287	R14	3.2 Megohm— $\frac{1}{2}$ Watt Resistor—20%	2	.20
13038	R3, R5	2 Megohm— $\frac{1}{2}$ Watt Resistor—20%	1	.20
130257	R4	5 Megohm— $\frac{1}{2}$ Watt Resistor—25%	1	.20
1309	R10	200M Ohm— $\frac{1}{2}$ Watt Resistor—20%	1	.20

COILS

108206	T4	Input I.F. Coil Complete in Can.	1	1.25
108205	T5	Output I.F. Coil Complete in Can.	1	1.25
110184	T3	B.C. S.W.—Oscillator Coil	1	.80
111249	T2	S.W. Antenna Coil Complete	1	.50
111251	T1	Loop Antenna Assembly	1	1.50
12316	L1	Choke Coil	1	.30

SPEAKER

114262	T7	Six Inch Electro Dynamic Speaker (Less Output Transformer)	1	4.00
105134	T6	Output Transformer for Speaker	1	.75



MODEL 7H31
MODEL 7D22
MODEL 590

BELMONT RADIO CORP.

ALIGNMENT PROCEDURE MODEL 7D22

- Volume control—Maximum all adjustments.
- Connect B—of radio chassis to ground post of signal generator through .1 Mfd. condenser.

BAND	SIGNAL GENERATOR		Connection to Radio	Position of Band Switch	Variable Condenser Setting	Trimmers Adjusted to Maximum
	Frequency Setting	Dummy Antenna				
I. F.	455 Kc.	.1 MFD.	Grid of 12SK7 I. F.	Broadcast	Rotor full open (Plates out of mesh)	Two trimmers on top of Output I. F.
	455 Kc.	.1 MFD.	Grid of 12SJ7 Mixer	Broadcast	Rotor full open (Plates out of mesh)	Two trimmers on top of Input I. F.
SHORT WAVE BAND	12 Mc.	400 Ohms	External Antenna and B—	Short Wave	Set Dial at 12 Mc.	S.W. Osc. trimmer C10 S.W. Ant. trimmer C3
BROADCAST BAND	1600 Kc.	.1 mmf.	Grid of 12SJ7	Broadcast	Rotor full open (Plates out of mesh)	B.C. Osc. trimmer C12 on Gang
	1400 Kc.	200 mmf.	External Antenna and B—	Broadcast	Set Dial at 1400 Kc.	B.C. Ant. trimmer C6

NOTE: The Oscillator Frequency is lower than the signal frequency and should be aligned accordingly.

The loop antenna should be connected to the radio when making all adjustments.

ALIGNMENT PROCEDURE MODEL 7H31

- Volume control—Maximum all adjustments.
- Connect radio chassis to ground post of signal generator.

BAND	SIGNAL GENERATOR		Connection to Radio	Position of Band Switch	Variable Condenser Setting	Trimmers Adjusted to Max.
	Frequency Setting	Dummy Antenna				
I. F.	455 Kc.	.1 MFD.	Grid of 6S7 I. F.	Broadcast	Tuning & Bandsread Plates out of mesh	Two trimmers on top of Output I. F.
	455 Kc.	.1 MFD.	Grid of 6SA7 I. F.	Broadcast	Tuning & Bandsread Plates out of mesh	Two trimmers on top of Input I. F.
SHORT WAVE BAND	17 Mc.	400 ohms	Antenna lead	Short Wave	Set Dial at 17 Mc.	Trimmer C16—S. W. osc. (See Note A)
	17 Mc.	400 ohms	Antenna lead	Short Wave	Set Dial at 17 Mc.	Trimmer C1-C9 S. W. ant. and R. F.
	8 Mc.	400 ohms	Antenna lead	Short Wave	Set Dial at 8 Mc.	Trimmer C15 S. W. osc. series pad (See note "B")
MEDIUM WAVE BAND	6 Mc.	400 ohms	Antenna lead	Medium Wave	Set Dial at 6 Mc.	Trimmer C18 M. W. osc.
	6 Mc.	400 ohms	Antenna lead	Medium Wave	Set Dial at 6 Mc.	Trimmer C2-C10 ant. and R. F.
	2.5 Mc.	400 ohms	Antenna lead	Medium Wave	Set Dial at 2.5 Mc.	Trimmer C17 osc. series pad (See note "B")
BROADCAST BAND	1720 Kc.	200 mmf.	Antenna lead	Broadcast	Tuning & Bandsread Plates out of mesh	Trimmer C20 B. C. osc.
	1400 Kc.	200 mmf.	Antenna lead	Broadcast	Set Dial at 1400 Kc.	Trimmer C3-C11 B. C. ant. R. F.
	600 Kc.	200 mmf.	Antenna lead	Broadcast	Set Dial at 600 Kc.	Trimmer C19 B. C. osc. series pad (See note "B")

NOTE "A"—It is extremely necessary that the fundamental oscillator signal be tuned in and not the image frequency which will fall below the fundamental.

NOTE "B"—Turn the dial back and forth slightly (rock) and adjust trimmer until the peak of greatest intensity is obtained. After each range is completed, repeat the procedure as a final check.

ALIGNMENT PROCEDURE MODEL 590

The following equipment is required for aligning.

- Dummy antenna .1 mfd. and 200 mmf.

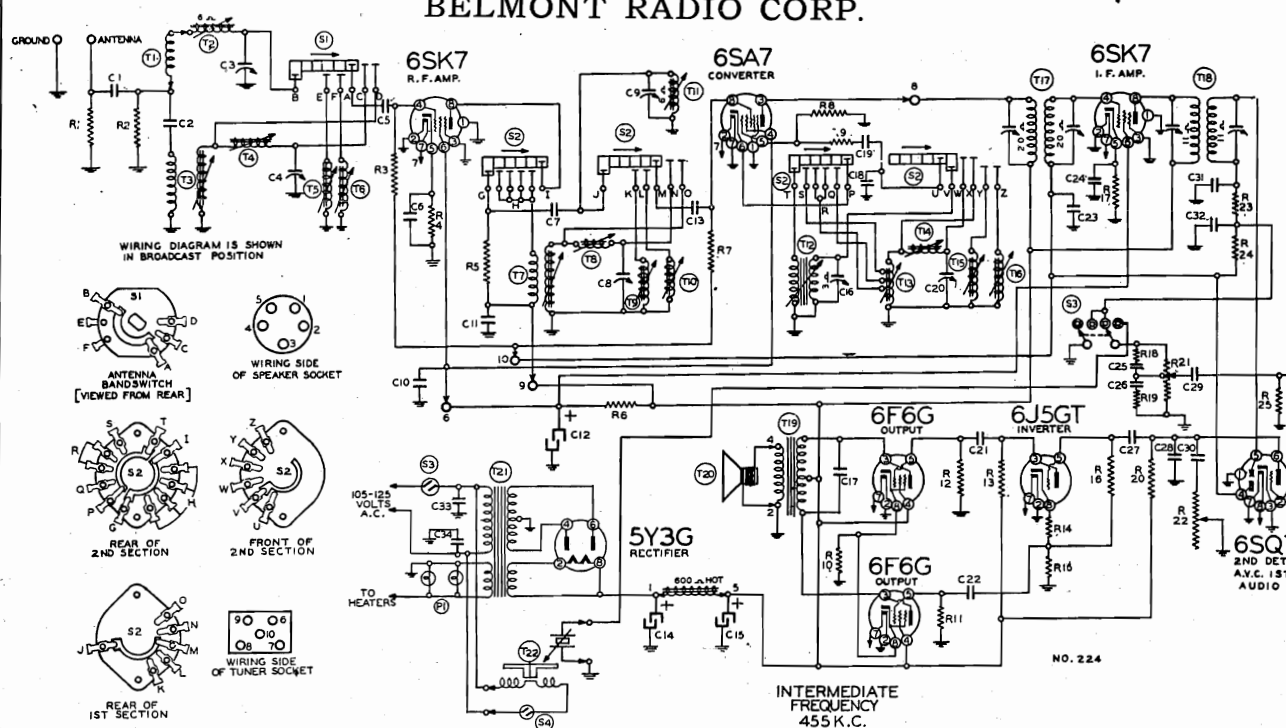
- Volume control—Maximum all adjustments.
- Connect ground lead of radio chassis to ground post of signal generator.

BAND	SIGNAL GENERATOR		Connection to Radio	Position of Iron Cores (Dial Setting)	Trimmers Adjusted (in Order Shown)	Trimmer Function	Adjustment
	Frequency Setting	Dummy Antenna					
455 Kc. I. F.	455 Kc.	.1 MFD.	Connect to Grid of 1A7	Rotor full open (Plates out of mesh)	Trimmers on top of I. F. cans	Output and input I. F.	maximum output (See Note "A")
BROADCAST BAND	1600 Kc.	.1 MFD.	Connect to Grid of 1A7	Rotor full open (Plates out of mesh)	Trimmer on gang (See chassis view)	Oscillator	maximum output (See Note "A")
	1400 Kc.	200 MMF.	Connect to Antenna Clip	Set dial at 1400 Kc.	Trimmer on gang (See chassis view)	Antenna	maximum output (See Note "B")

NOTE "A"—The loop antenna need not be connected to the radio when making these adjustments, but a 1. Meg. Resistor must be substituted across the loop clips. The ground of the signal generator is connected to the chassis and the other lead from the signal generator in series with .1 MFD. dummy to the grid of the 1A7GT tube.

NOTE "B"—This adjustment should be made with the ground lead of the signal generator connected to the external ground terminal. The other lead of the signal generator is connected in series with a 200 Mmf. dummy to the external antenna terminal.

BELMONT RADIO CORP.

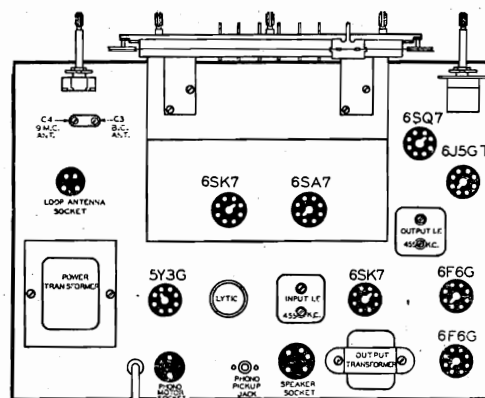
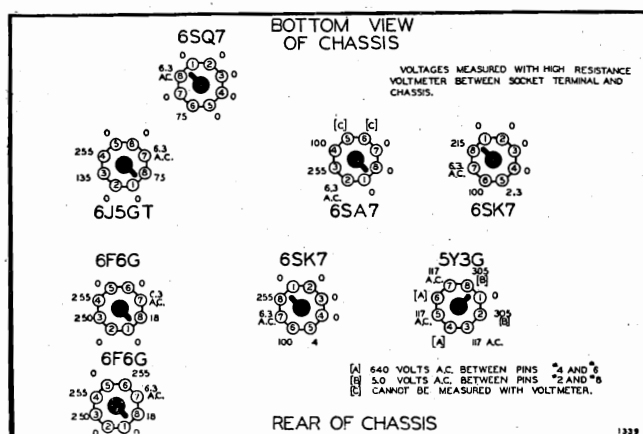


RESISTORS

R1	1301	25M ohm— $\frac{1}{2}$ w.
R2	1301	25M ohm— $\frac{1}{2}$ w.
R3	13019	1 megohm— $\frac{1}{2}$ w.
R4	130239	250 ohm— $\frac{1}{2}$ w.
R5	130218	5M ohm— $\frac{1}{2}$ w.
R6	10662	12,500 ohm—3 w.
R7	13019	1 megohm— $\frac{1}{2}$ w.
R8	130232	25M ohm— $\frac{1}{2}$ w.
R9	130174	50 ohm— $\frac{1}{2}$ w.
R10	130220	300 ohm—1 w.
R11	1303	500M ohm— $\frac{1}{2}$ w.
R12	1303	500M ohm— $\frac{1}{2}$ w.
R13	130103	100M ohm— $\frac{1}{2}$ w.
R14	130218	5M ohm— $\frac{1}{2}$ w.
R15	130103	100M ohm— $\frac{1}{2}$ w.
R16	13019	1 megohm— $\frac{1}{2}$ w.
R17	13070	500 ohm— $\frac{1}{2}$ w.
R18	13011	250M ohm— $\frac{1}{2}$ w.
R19	130149	15M ohm— $\frac{1}{2}$ w.
R20	13011	250M ohm— $\frac{1}{2}$ w.
R21	101253	$\frac{1}{2}$ megohm—volume control
R22	101254	1 megohm—tone control
R23	13012	50M ohm— $\frac{1}{2}$ w.
R24	1304	3 megohm— $\frac{1}{2}$ w.
R25	130257	5 megohm— $\frac{1}{2}$ w.

CONDENSERS

C1	1292	.0005 mica
C2	10047	.002 x 600 v.
C3	124143	B.C. antenna trimmer
C4	124143	9 mc. antenna trimmer
C5	1292	.0005 mica
C6	10020	.1 x 200 v.
C7	129168	.0001 mica
C8	124138	9 mc. R.F. trimmer
C9	124139	B.C. R.F. trimmer
C10	10074	.1 x 400 v.
C11	10074	.1 x 400 v.
C12	119109	10.0 x 350 w.v. lytic
C13	1292	.0005 mica
C14	119109	15.0 x 450 w.v. lytic
C15	119109	15.0 x 450 w.v. lytic
C16	124144	B.C. oscillator trimmer
C17	10071	.004 x 600 v.
C18	129167	.0002 Silver mica
C19	129165	.00005 mica
C20	124145	9 mc. osc. trimmer
C21	10085	.05 x 400 v.
C22	10085	.05 x 400 v.
C23	10026	.02 x 400 v.
C24	10020	.1 x 200 v.
C25	129114	.0003 mica
C26	100122	.03 x 200 v.
C27	10026	.02 x 400 v.
C28	12921	.0002 mica
C29	10019	.006 x 600 v.
C30	10019	.006 x 600 v.
C31	129165B	.00005 mica
C32	129165B	.00005 mica
C33	10061	.02 x 600 v. Bakelite
C34	10061	.02 x 600 v. Bakelite



C3 and C4 are in the same unit
C12 and C14 and C15 are in the same unit

PARTS

T1	111238	Loop ant. assembly
T2	111195	B.C. ant. coil
T3	111190	9 mc. ant. coil
T4	111189	6 mc. ant. coil
T5	111191	12 mc. ant. coil
T6	111192	15 mc. ant. coil
T7	10959	9 mc. R.F. coil
T8	10958	6 mc. R.F. coil
T9	10960	12 mc. R.F. coil
T10	10961	15 mc. R.F. coil
T11	10962	B.C. R.F. coil
T12	110161	B.C. oscillator coil
T13	110157	9 mc. oscillator coil
T14	110156	6 mc. oscillator coil
T15	110158	12 mc. oscillator coil
T16	110159	15 mc. oscillator coil
T17	108177	Input I.F. coil 455 kc.
T18	108176C	Output I.F. coil 455 kc.

MODEL 8AE1

BELMONT RADIO CORP

The following equipment is required for aligning:

- An all wave signal generator which will provide an accurately calibrated signal at the test frequencies as listed.
- Output indicating meter.
- Non-metallic screwdriver.
- Dummy antennas—1 mlf., 200 mmf., and 400 ohms.

• Tone control—Treble.

• Volume control—Maximum all adjustments.

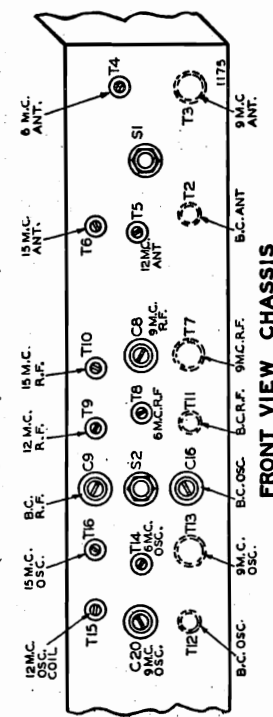
• Connect radio chassis to ground post of signal generator with a short heavy lead.

• Connect dummy antenna value in series with generator output lead.

• Connect output meter across primary of output transformer.

• Allow chassis and signal generator to "heat up" for several minutes.

BAND	SIGNAL GENERATOR Frequency Setting	Dummy Antenna	Connection to Radio	Position of Band Switch	Dial Pointer Setting	Trimmers Adjusted in Order Shown	Trimmer Function	Adjustment
I. F.	455 Kc.	.1 MFD.	Grid of 6SK7 (I.F.)	Broadcast	Set Dial at 1600 Kc.	Two Trimmers on Top	Output L. F.	Adjust to maximum output
	455 Kc.	.1 MFD.	Grid of 6SA7	Broadcast	Set Dial at 1600 Kc.	Two Trimmers on Top	Input L. F.	Adjust to maximum output
31 METER BAND	9.6 Mc.	400 ohms.	Antenna lead	31M	Set Dial at 9.6 Mc.	(See Trimmer View) C20 (See Trimmer View) C8 (See Trimmer on Top) C4	Osc. R. F. Ant.	Adjust to maximum output
49 METER BAND	6.1 Mc.	400 ohms.	Antenna lead	49M	Set Dial at 6.1 Mc.	(See Trimmer View) T14 (See Trimmer View) T8 (See Trimmer View) T4	Osc. R. F. Ant.	Adjust to maximum output
25 METER BAND	11.8 Mc.	400 ohms.	Antenna lead	25M	Set Dial at 11.8 Mc.	(See Trimmer View) T15 (See Trimmer View) T9 (See Trimmer View) T5	Osc. R. F. Ant.	Adjust to maximum output
19 METER BAND	15.2 Mc.	400 ohms.	Antenna lead	19M	Set Dial at 15.2 Mc.	(See Trimmer View) T16 (See Trimmer View) T10 (See Trimmer View) T6	Osc. R. F. Ant.	Adjust to maximum output
BROAD-CAST BAND	1600 Kc.	200 mmf.	Antenna lead	Broadcast	Set Dial at 1600 Kc.	(See Trimmer View) C16 (See Trimmer View) C9 (See Trimmer on Top) C3	Osc. R. F. Ant.	Adjust to maximum output
	1400 Kc.	200 mmf.	Antenna lead	Broadcast	Set Dial at 1400 Kc.	Rotate Core T2 (See Iron Core Adjustment View)	R. F. Ant.	Adjust to maximum output



Power Consumption, Radio only - 100 Watts

Power Output - 5 Watts Undistorted

Sensitivity for 500 Milliwatt Output: 10 Microvolts Average

Selectivity - 35 KC Broad at 1000 Times Signal at 1000 KC

Tuning Frequency Range Broadcast Band - 540 to 1600 KC

49M Band - 5.9 to 6.1 MC

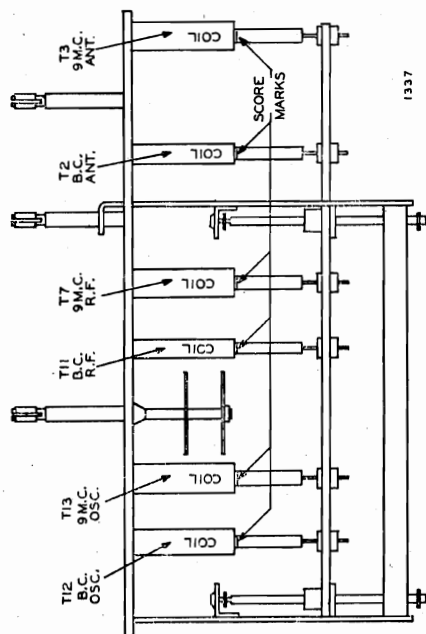
31M Band - 9.1 to 10 MC

25M Band - 11.4 to 12.1 MC

19M Band - 14.9 to 15.4 MC

Intermediate Frequency - 455 KC

Speaker - 12 in. Electro Dynamic



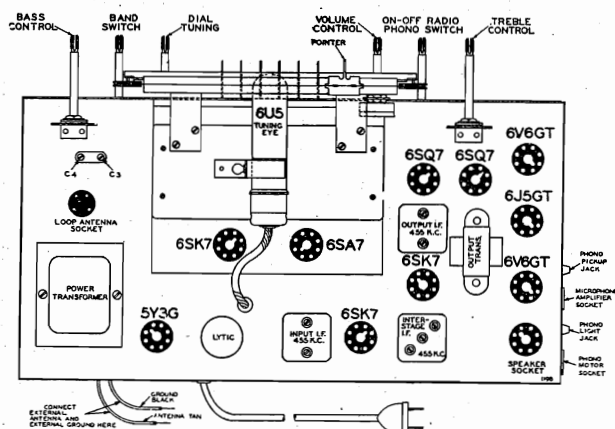
Do not realign the band spread scales score marks are even with the edge of unless you are positive they are out of the coil forms.

adjustment. When adjustment is necessary proceed as follows.

You are now ready to continue with the trimmer adjustments as shown on the alignment chart.

Rotate each iron core until the fine

BAND	SIGNAL GENERATOR				Dial Pointer Setting	Trimmers Adjusted in Order Shown	Trimmer Function	Adjustment
	Frequency Setting	Dummy Antenna	Connection to Radio	Position of Band Switch				
I. F.	455 Kc.	.1 MFD.	Grid of 6SK7 (I.F.)	Broadcast	Set Dial at 1600 Kc.	Two Trimmers on Top	Output I. F.	Adjust to Maximum output
	455 Kc.	.1 MFD.	Grid of 6SA7	Broadcast	Set Dial at 1600 Kc.	Two Trimmers on Top	Input I. F.	Adjust to Maximum output
31 METER BAND	9.6 Mc.	400 ohms	Antenna lead	31M	Set Dial at 9.6 Mc.	(See Trimmer View) C20 (See Trimmer View) C8 (See Trimmer on Top) C4	Osc. R. F. Ant.	Adjust to Maximum output
49 METER BAND	6.1 Mc.	400 ohms	Antenna lead	49M	Set Dial at 6.1 Mc.	(See Trimmer View) T14 (See Trimmer View) T8 (See Trimmer View) T4	Osc. R. F. Ant.	Adjust to Maximum output
25 METER BAND	11.8 Mc.	400 ohms	Antenna lead	25M	Set Dial at 11.8 Mc.	(See Trimmer View) T15 (See Trimmer View) T9 (See Trimmer View) T5	Osc. R. F. Ant.	Adjust to Maximum output
19 METER BAND	15.2 Mc.	400 ohms	Antenna lead	19M	Set Dial at 15.2 Mc.	(See Trimmer View) T16 (See Trimmer View) T10 (See Trimmer View) T6	Osc. R. F. Ant.	Adjust to Maximum output
BROADCAST BAND	1600 Kc.	200 mmf.	Antenna lead	Broadcast	Set Dial at 1600 Kc.	(See Trimmer View) C16 (See Trimmer View) C9 (See Trimmer on Top) C3	Osc. R. F. Ant.	Adjust to Maximum output
	1400 Kc.	200 mmf.	Antenna lead	Broadcast	Set Dial at 1400 Kc.	Rotate Core T11 Rotate Core T2 (See Iron Core Adjustment View)	R. F. Ant.	Adjust to Maximum output



Speaker - - 12 in. Electro Dynamic

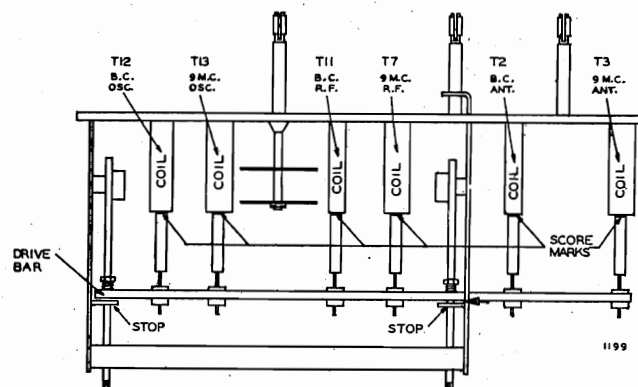


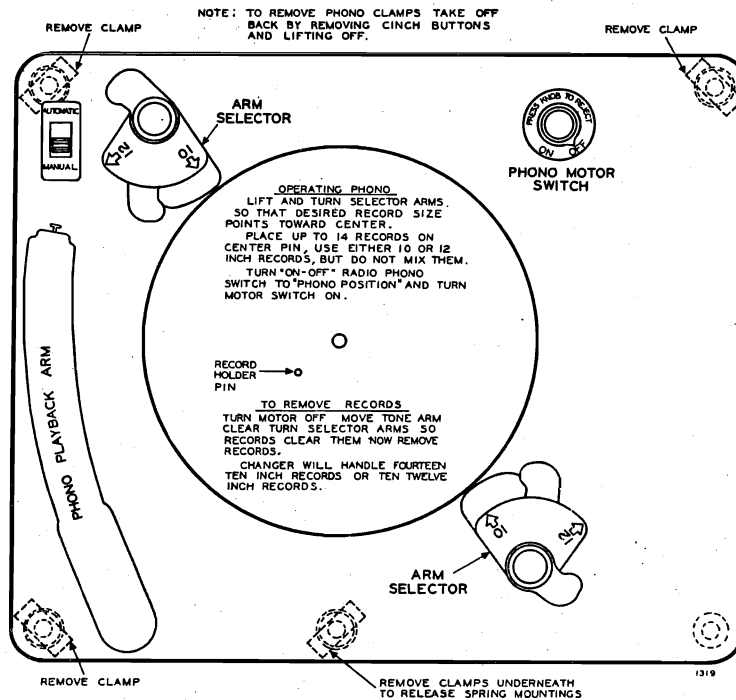
Diagram illustrating the front view of the chassis, showing component locations and labels:

- 12 M.C. OSC. COIL (T15)
- 15 M.C. OSC. (T16)
- B.C. R.F. (C9)
- 12 M.C. R.F. (T9)
- 15 M.C. R.F. (T10)
- 15 M.C. ANT. (T6)
- 6 M.C. ANT. (T4)
- C20 9 M.C. OSC. (T12)
- T14 6 M.C. OSC.
- S2
- T8 6 M.C. R.F.
- C8 9 M.C. R.F.
- 12 M.C. ANT. (T5)
- S1
- T12 B.C. OSC.
- T3 9 M.C. OSC.
- C16 B.C. OSC.
- T11 B.C. R.F.
- T7 9 M.C. R.F.
- T2 B.C. ANT.
- T3 9 M.C. ANT.

FRONT VIEW CHASSIS

BELMONT RADIO CORP.

Automatic Record Changer--Operating Instructions



Setting for Size of Record

The Changer plays up to fourteen 10" or ten 12" records at one loading. All records must be the same size for each loading.

On each post you will see selecting arms. The position of these arms determines the setting for different size records. To set for 10 or 12 inch records, it is merely necessary to grasp the posts by the knobs at the top, lift, and turn until the 10" or 12" arrows are pointing toward the center of the turntable. When in either the 10" or 12" position, the posts will snap into place except when they are lifted by hand. Be sure to set both posts for the same size record.

Loading

See that the selecting arms of both posts are turned toward the center of the turntable as indicated by the engraved arrows, and that both sets of arms are set for the same size (10" or 12") records as described in the preceding paragraph.

Place the stack of records (up to fourteen 10" or ten 12") over the center

pin so that they will rest on the selecting arms.

Starting the Changer

1. Turn on the radio (allowing approximately 30 seconds for the tubes to warm up) and turn the phonograph-radio knob, to the phonograph position.

2. Turn the switch knob on the Record Changer panel to "ON". The motor will then start and the record changer will go into automatic operation of its own accord.

How to Reject a Record

Merely press the switch knob on the Changer panel. You can do it any time after the needle has come into contact with that record.

Automatic--Manual Switch

When this switch is pushed towards the manual position the selector arms can be turned out of the way and individual records played without the automatic changer working--To operate the changer again push the switch to automatic, start the motor and press the reject button.

Unloading

First switch off the motor. Grasp each post by its knob at the top and turn them out of the way.

Lift the played records from the turntable. Then return the posts to the proper playing position as indicated by the arrows on the selecting arms.

The Changer may then be loaded with a new stack of records according to the size shown on the selecting arms.

Turning Off Changer

Throw Changer switch knob to "OFF" position.

Lift tone arm and place it in the rest position. (If you happen to turn off the Changer switch while the mechanism is going through a "change cycle," you will notice that it does not stop until the cycle has been completed, and the tone arm is again in playing position, at which point it is ready to be lifted to the rest position. If you prefer to turn off your Changer with the radio switch, be sure to turn it off while needle is resting upon a record; otherwise, the selecting arms cannot be correctly reset.

To avoid warping of records, never leave records resting on posts.

If Changer is Left Running

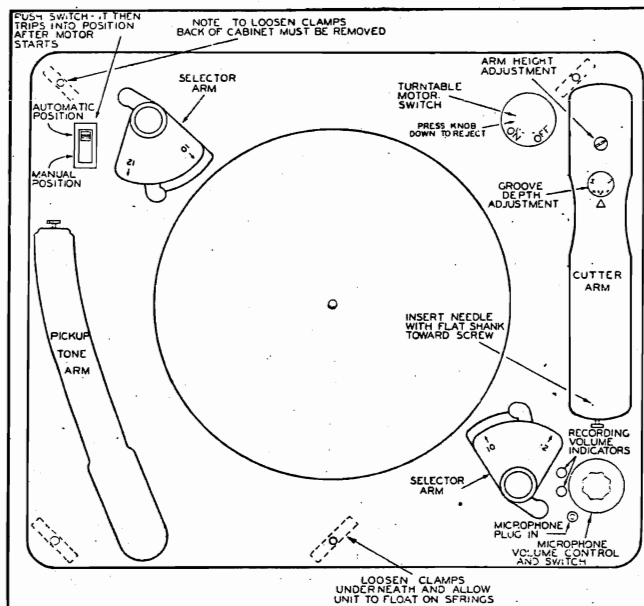
No damage will be done if you forget to turn off Changer after it has played its entire load of records. It will simply repeat the last record until stopped or reloaded.

Phonograph Needles

In general there are two types of needles which can be satisfactorily used on an Automatic Record Changer: those which require changing after approximately 12 records, and the so-called permanent type needles which are rated in terms of "hours of service." In no case should the manufacturers' claims for these needles be exceeded, since in all probability the needles are rated in terms of their maximum life.

MODEL 11AE2

BELMONT RADIO CORP.



NOTE—Some radios of this model are equipped with a recording arm on the record changer with which you can make your own records. If your radio has the recording unit follow the instructions below for making records.

The Mike volume control must be turned off (all the way left) except when recording with the microphone.

The two volume indicator lights along side the microphone volume control are used for setting the proper recording level. When recording radio programs the radio volume control should be adjusted so that the red indicator light remains off while the white continues to flicker. When recording with the microphone the lights should be adjusted in the same manner but using the microphone volume control.

Operating the Phono on Home Recordings

Turn radio on. Put phono switch in "Phono" position.

Push manual switch toward manual side to play home recordings.

Put your record on turntable and start motor. Place playback arm on record and control tone and volume with the radio volume and tone control knobs.

Be sure mike control is turned off when playing records.

Recording Radio Programs

Turn the radio on and tune in the program you wish to record. Put manual switch in manual position. Start motor and then gently lower cutting needle onto blank record, about $\frac{1}{4}$ " from outer edge. Radio Volume will drop—Adjust volume control so red volume indicator light is off and white indicator light continues to flicker.

Microphone Recording

Turn the mike volume control well up. Phono pushbutton should be in "Phono" position. Put manual switch in manual position. Start motor, and set cutting needle gently on start of record. Adjust volume indicator lights the same as in recording radio programs.

NOTE: The cutting arm must be raised about three inches to move it freely across the record.

How to Make Perfect Recordings

Cutting Needle

The cutting stylus is razor sharp and must not be dropped on the record or allowed to rest on the turntable.

For best operation, the instrument should be level in all directions. To check this, place a small level, if you have one, on the turntable. If you do not have a level, a marble will do. If the marble rolls off the turntable, it is low in the direction in which it rolls. Place something under the cabinet until the machine is reasonably level.

Shavings

The cutting stylus cuts out a fine shaving that is just a little thicker than a human hair. These shavings should not be allowed to gather under the cutting stylus.

While cutting, gently brush the shavings from the left side of the record in, toward the center pin, allowing them to

collect there until the recording is completed.

Do Not Use Too Much Volume

The most frequent cause of poor recordings is too much volume or overloading. If some passages of your recording are smooth and clear while others are raspy, rough and distorted, you are probably using too much volume. Overloading occurs most often on strong passages. The remedy is to reduce the volume slightly and watch the volume indicator lights.

Too little volume will show up when you play the record back. The volume control on playbacks will have to be turned up quite high and needle scratch will be excessive.

Cutting Arm Adjustments

The cutting arm is adjusted at the factory for proper operation, however,

with various types of blanks this adjustment may sometimes have to be altered. With a blank record on the table, the height adjustment on the cutter arm should be adjusted so that the needle screw is centered in the slot when the needle rests on a blank record.

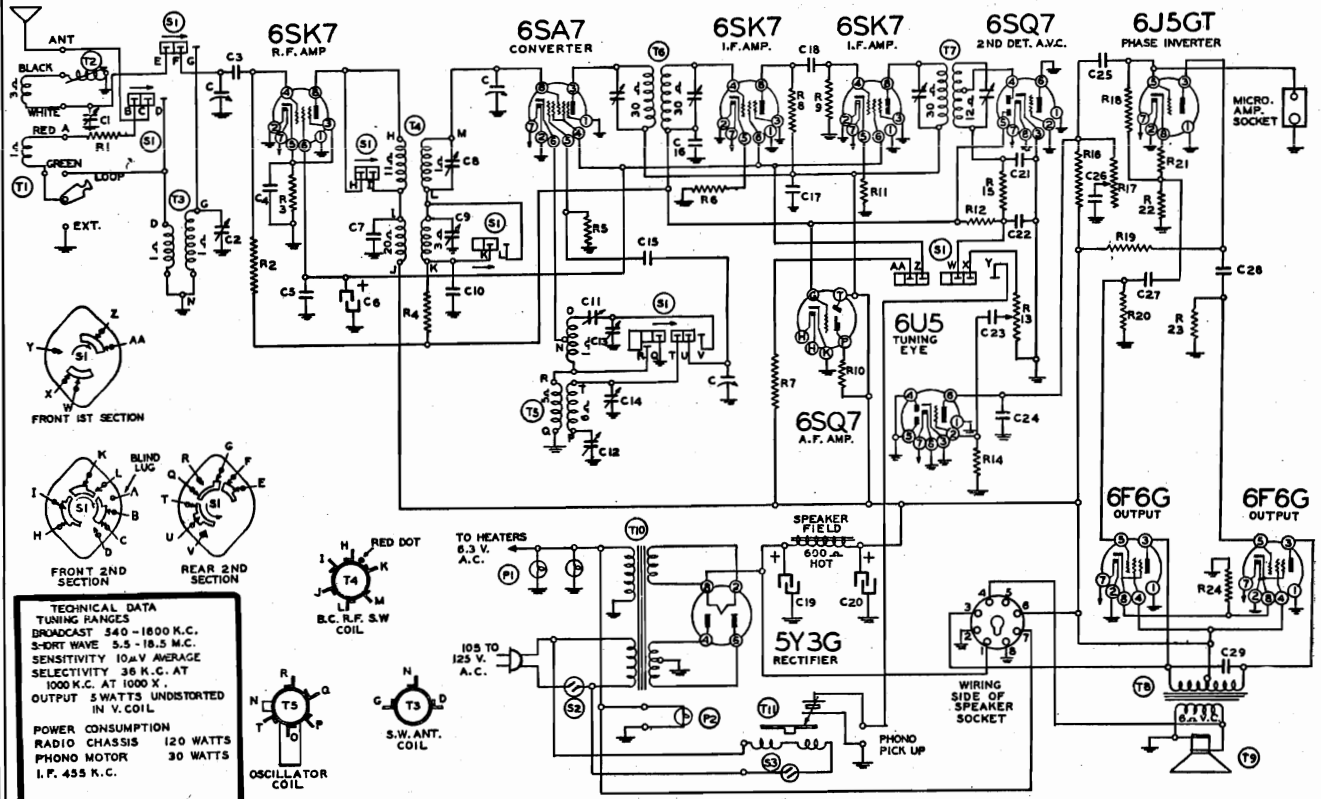
Several blank grooves should now be cut to see if the groove is the proper depth. The depth adjustment screw on the cutter arm will increase the depth of the groove if turned to the letter "H" and will decrease the groove if turned to the letter "L"—For a medium groove turn to "M".

If the groove is too shallow, the playback needle will not stay in the groove. If it is too deep, not enough wall will be left between grooves and the playback needle will break through from one track to the next after a few playings.

A properly cut groove will leave a shaving just a little heavier than a human hair.

BELMONT RADIO CORP

MODEL 11A24



Part No. Schematic Diagram Reference

Description

No. Used In Set Price Each

114261B T9

SPEAKER
 Ten Inch Electrodynamc Speaker (Less Output Transformer) 1 6.00

CONDENSERS

102152	C	Three Gang Variable Condenser.....	1	4.00
10020	C4	.1 x 200 Volt Tubular Condenser.....	1	.25
10026	C10, C16, C25	.02 x 400 Volt Tubular Condenser.....	3	.25
10025	C23	.002 x 600 Volt Tubular Condenser.....	1	.25
1009	C27	.05 x 200 Volt Tubular Condenser.....	1	.25
10013	C28	.05 x 400 Volt Tubular Condenser.....	1	.25
10011	C26	.01 x 400 Volt Tubular Condenser.....	1	.25
10071	C29	.004 x 600 Volt Tubular Condenser.....	1	.25
10017	C5, C17	.25 x 400 Volt Tubular Condenser.....	2	.35
119124	C6, C19, C20	Electrolytic Filter Condenser—10 Mfd. x 350 V.; 25 Mfd. x 450 V.; 25 Mfd. x 450 V. 1	1.50	
124180	C2	S.W. Antenna Trimmer.....	1	.55
124179	C8, C9	S.W. and B.C. R.F. Trimmer—Dual.....	1	.45
124181	C13, C14	S.W. and B.C. Osc. Trimmer—Dual.....	1	.40
124182	C1	B.C. Antenna Trimmer.....	1	.20
129157	C12	.000525 Compression Cond.—B.C. Pad.....	1	.35
1292	C3, C18	.0005 Mica Type Condenser—20%.....	2	.25
129160	C7	.0004 Mica Type Condenser—20%.....	1	.35
12939	C15	.00005 Mica Type Condenser—20%.....	1	.25
12931	C21, C22	.0001 Mica Type Condenser—2%.....	2	.25
129156	C11	.0024 Compression Mica Condenser.....	1	.50
12912	C24	.00025 Mica Type Condenser—20%.....	1	.25

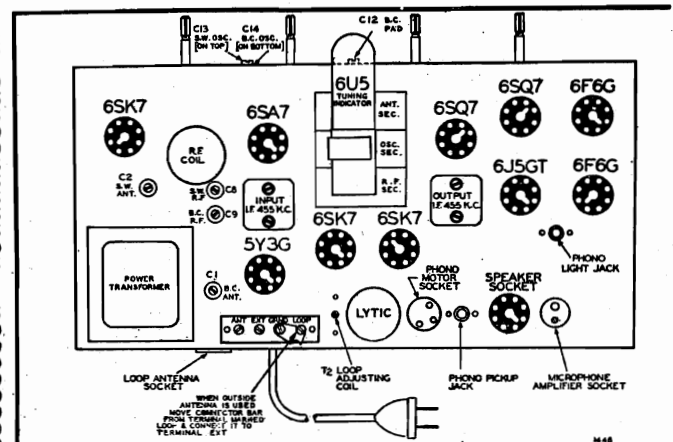
RESISTORS

101270	R13, S2	Volume Control and Switch (500M Ohms).....	1	1.25
101271	R17	Tone Control (1 Megohm).....	1	.90
13019	R2, R18	1 Megohm— $\frac{1}{2}$ Watt Resistor—20%.....	2	.20
1305	R4	300M Ohm— $\frac{1}{2}$ Watt Resistor—20%.....	1	.20
130208	R5	40M Ohm— $\frac{1}{2}$ Watt Resistor—20%.....	1	.20
13054	R6, R11	500 Ohm— $\frac{1}{2}$ Watt Resistor—20%.....	2	.20
130263	R8	12M Ohm— $\frac{1}{2}$ Watt Resistor—20%.....	1	.20
13020	R9, R19, R22	100M Ohm— $\frac{1}{2}$ Watt Resistor—20%.....	3	.20
130304	R7	12M Ohm—2 Watt Resistor—10%.....	1	.20
13012	R15	50M Ohm— $\frac{1}{2}$ Watt Resistor—20%.....	1	.20
130170	R12	3 Megohm— $\frac{1}{2}$ Watt Resistor—25%.....	1	.20
130225	R14	15 Megohm— $\frac{1}{2}$ Watt Resistor—30%.....	1	.20
13043	R21	2500 Ohm— $\frac{1}{2}$ Watt Resistor—20%.....	1	.20
1303	R20, R23	500M Ohm— $\frac{1}{2}$ Watt Resistor—20%.....	2	.20
13011	R16	250M Ohm— $\frac{1}{2}$ Watt Resistor—20%.....	1	.20
130311	R24	300 Ohm—1 Watt Resistor—20%.....	1	.20
13099	R3	300 Ohm— $\frac{1}{2}$ Watt Resistor—20%.....	1	.20
13024	R1	400 Ohm— $\frac{1}{2}$ Watt Resistor—20%.....	1	.20
	R10	1 Megohm—In Eye Socket.....	1	.20

COILS

108169J	T6	Input I. F. Coil Complete in Can.....	1	1.00
108130C	T7	Output I.F. Coil Complete in Can.....	1	1.25
10957	T4	B.C.—S.W. R.F. Coil Complete in Can.....	1	1.25
110149	T5	B.C.—S.W. Oscillator Coil.....	1	.75
111176	T3	S.W. Antenna Coil.....	1	.50
111153	T2	Loop Adjusting Coil With Iron Slug.....	1	.50
111257	T1	Loop Antenna Assembly.....	1	2.00

FOR NEW PRODUCTS RECORD CHANGER 320
 SEE RIDER'S "AUTOMATIC RECORD
 CHANGERS AND RECORDERS".

**CHASSIS VIEW****ANTENNA AND GROUND TERMINALS**

When using an external antenna and ground, move the metal strap (connector bar) from terminal marked LOOP and connect it to terminal marked EXT.

The antenna and ground wires should then be connected to the terminals marked "Ant."—"Gnd."

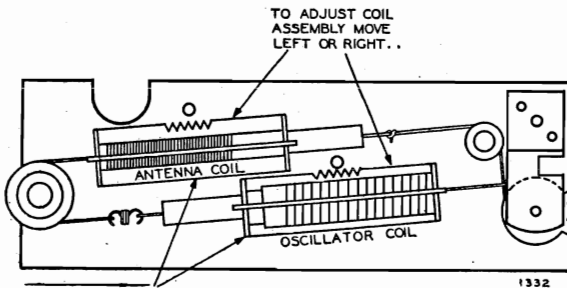
MODEL 5D16
MODEL 11A24

BELMONT RADIO CORP.

MODEL 5D16

NOTE: THE ANTENNA COIL ASSEMBLY IS MADE SO THAT IT IS ADJUSTABLE LEFT OR RIGHT WHEN MAKING THE ADJUSTMENT AS GIVEN IN THE ALIGNMENT PROCEDURE. MOVE COIL ASSEMBLY VERY SLOWLY.

COIL ASSEMBLY VIEW



1332

MODEL 11A24

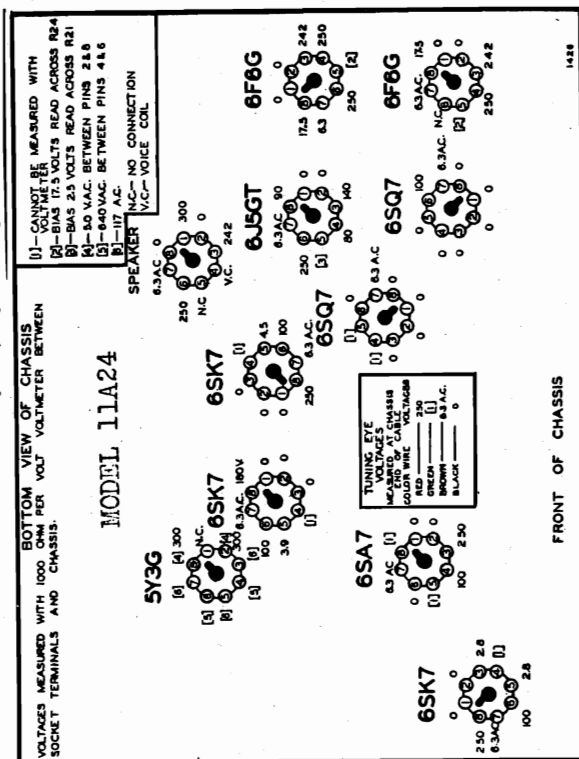
Alignment Procedure

- Volume control—Maximum all adjustments.
- Connect dummy antenna value in series with generator output lead.

BAND	SIGNAL GENERATOR			Position of Band Switch	Variable Condenser Setting	Trimmers Adjusted to Maximum (in Order Shown)	
	Frequency Setting	Dummy Antenna	Connect on to Radio				
I. F.	455 Kc.	.1 MFD.	Grid of 6SK7	Broadcast	Rotor full open (Plates out of mesh)	Two trimmers on top Output I. F.	
	455 Kc.	.1 MFD.	Grid of 6SA7 Mixer	Broadcast	Rotor full open (Plates out of mesh)	Two trimmers on top Input I. F.	
SHORT WAVE BAND	17 Mc.	400 Ohms	External Antenna and Ground	Short Wave	Set Dial at 17 Mc.	C13, S.W. Osc.	
	17 Mc.	400 Ohms	External Antenna and Ground	Short Wave	Set Dial at 17 Mc.	C8, S.W. R.F., C2 S.W. Antenna	
BROADCAST BAND	6 Mc.	400 Ohms	External Antenna and Ground	Short Wave	Set Dial at 6 Mc.	C11 S.W. Osc. Series Pad See Note "A"	
	1580 Kc.	200 mmf.	Grid of 6SK7 R. F. Tube	Broadcast	Rotor full open (Plates out of mesh)	C14 B.C. Osc.	
BROADCAST BAND	540 Kc.	200 mmf.	Grid of 6SK7 R. F. Tube	Broadcast	Set Dial at 540 Kc. (Plates in Mesh)	C12 B.C. Osc. Series Pad	
	1400 Kc.	200 mmf.	Grid of 6SK7 R. F. Tube	Broadcast	Set Dial at 1400 Kc.	C9 B.C. R.F.	
LOOP ALIGNMENT	1400 Kc.	200 mmf.	External Antenna and Ground	Broadcast	Set Dial at 1400 Kc.	C1 B.C. Ant.	
	600 Kc.	200 mmf.	External Antenna and Ground	Broadcast	Set Dial at 600 Kc.	T2 Iron Core Tracking Coil	

NOTE "A"—Turn the dial back and forth slightly (rock) and adjust trimmer until the peak of greatest intensity is obtained.

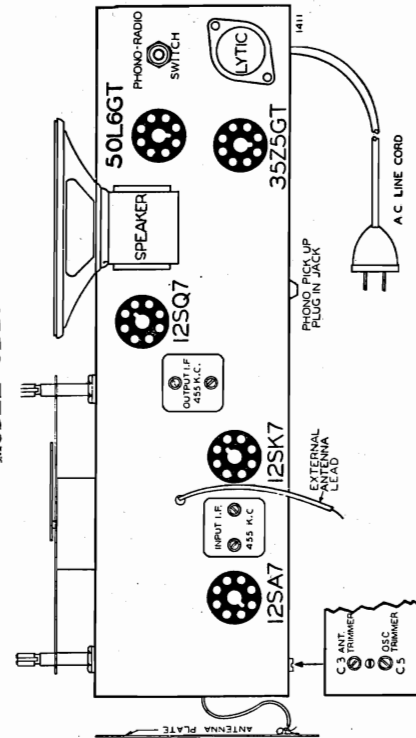
After each band is completed, repeat the procedure as a final check.



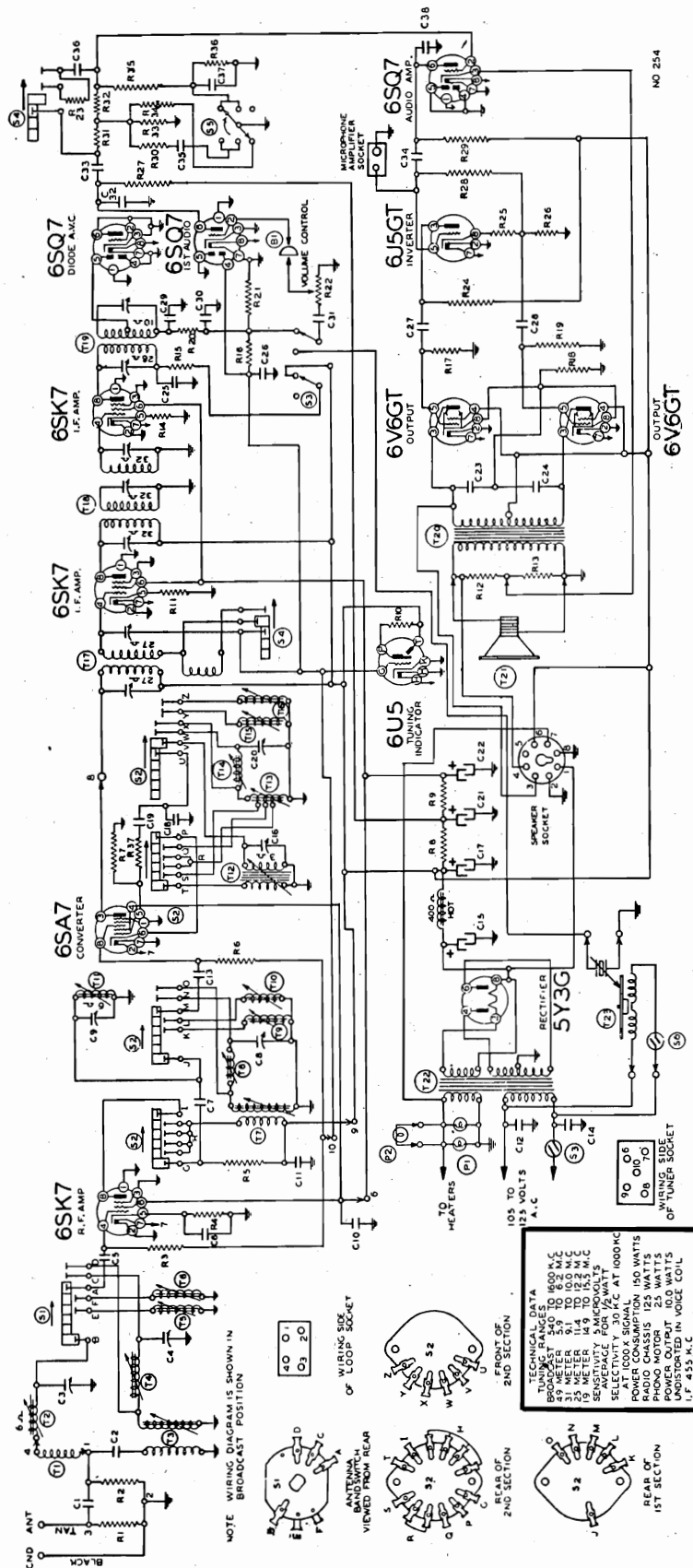
FRONT OF CHASSIS

CHASSIS VIEW—Showing tube location and type.
Note External Antenna Lead at back of chassis.

MODEL 5D16



BELMONT RADIO CORP



CONDENSERS

C1	1292	.0005 mica
C2	10047	.002 x 600 v.
C3	124143	B.C. antenna trimmer
C4	124143	9 mc. antenna trimmer
C5	1292	.0005 mica
C6	10020	.1 x 200 v.
C7	129168	.0001 mica
C8	124138	9 mc. K.F. trimmer
C9	10074	.1 x 400 v.
C10	10074	.1 x 400 v.
C11	10074	.1 x 400 v.
C12	10061	.02 x 600 v.
C13	1292	.0005 mica
C14	10061	.02 x 600 v.
C15	119112	30.0 mid. lytic
C16	124144	B.C. oscillator trimmer
C17	119112	30.0 mid. lytic x 450 w.v.
C18	129167	.0002 silver mica
C19	129165	.00005 mica
C20	124145	9 mc. oscillator trimmer
C21	119112	10.0 mid. lytic
C22	11969	16 mid. x 350 w.v.
C23	10065	.015 x 600 v.
C24	10065	.015 x 600 v.
C25	1001	.1 x 400 v.

C26 10020

C27 10013

C28 1009

C29 1295

C30 1295

C31 10020

C32 12912

C33 1001

C34 10013

C35 100118

C36 129185

C37 10037

C38 12912

C39 12912

C40 12912

C41 12912

C42 12912

C43 12912

C44 12912

C45 12912

C46 12912

C47 12912

C48 12912

C49 12912

C50 12912

R10

R11

R12

R13

R14

R15

R16

R17

R18

R19

R20

R21

R22

R23

R24

R25

R26

R27

R28

R29

R30

R31

R32

R33

R34

1 megohm in tuning indicator cable

500 ohm-1/2 w.

1500 ohm-1/2 w.

2M ohm-1/2 w.

2M ohm-1/2 w.

1 megohm-1/2 w.

500M ohm-1/2 w.

250 ohm-1/2 w.

500M ohm-1/2 w.

500M ohm-1/2 w.

500M ohm-1/2 w.

500M ohm-1/2 w.

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500M ohm-1/2 w.

C26 10020

C27 10013

C28 1009

C29 1295

C30 1295

C31 10020

C32 12912

C33 1001

C34 10013

C35 100118

C36 129185

C37 10037

C38 12912

C39 12912

C40 12912

C41 12912

C42 12912

C43 12912

C44 12912

C45 12912

C46 12912

C47 12912

C48 12912

C49 12912

C50 12912

CONDENSERS

C1	1292	.0005 mica
C2	10047	.002 x 600 v.
C3	124143	B.C. antenna trimmer
C4	124143	9 mc. antenna trimmer
C5	1292	.0005 mica
C6	10020	.1 x 200 v.
C7	129168	.0001 mica
C8	124138	9 mc. K.F. trimmer
C9	10074	.1 x 400 v.
C10	10074	.1 x 400 v.
C11	10074	.1 x 400 v.
C12	10061	.02 x 600 v.
C13	1292	.0005 mica
C14	10061	.02 x 600 v.
C15	119112	30.0 mid. lytic
C16	124144	B.C. oscillator trimmer
C17	119112	30.0 mid. lytic x 450 w.v.
C18	129167	.0002 silver mica
C19	129165	.00005 mica
C20	124145	9 mc. oscillator trimmer
C21	119112	10.0 mid. lytic
C22	11969	16 mid. x 350 w.v.
C23	10065	.015 x 600 v.
C24	10065	.015 x 600 v.
C25	1001	.1 x 400 v.

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C27 10013

C28 1009

C29 1295

C30 1295

C31 10020

C32 12912

C33 1001

C34 10013

C35 100118

C36 129185

C37 10037

C38 12912

C39 12912

C40 12912

C41 12912

C42 12912

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C46 12912

C47 12912

C48 12912

C49 12912

C50 12912

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C4	124143	9 mc. antenna trimmer
C5	1292	.0005 mica
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C7	129168	.0001 mica
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C11	10074	.1 x 400 v.
C12	10061	.02 x 600 v.
C13	1292	.0005 mica
C14	10061	.02 x 600 v.
C15	119112	30.0 mid. lytic
C16	124144	B.C. oscillator trimmer
C17	119112	30.0 mid. lytic x 450 w.v.
C18	129167	.0002 silver mica
C19	129165	.00005 mica
C20	124145	9 mc. oscillator trimmer
C21	119112	10.0 mid. lytic
C22	11969	16 mid. x 350 w.v.
C23	10065	.015 x 600 v.
C24	10065	.015 x 600 v.
C25	1001	.1 x 400 v.

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C27 10013

C28 1009

C29 1295

C30 1295

C31 10020

C32 12912

C33 1001

C34 10013

C35 100118

C36 129185

C37 10037

C38 12912

C39 12912

C40 12912

C41 12912

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C43 12912

C44 12912

C45 12912

C46 12912

C47 12912

C48 12912

C49 12912

C50 12912

CONDENSERS

C1	1292	.0005 mica
C2	10047	.002 x 600 v.
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C4	124143	9 mc. antenna trimmer
C5	1292	.0005 mica
C6	10020	.1 x 200 v.
C7	129168	.0001 mica
C8	124138	9 mc. K.F. trimmer
C9	10074	.1 x 400 v.
C10	10074	.1 x 400 v.
C11	10074	.1 x 400 v.
C12	10061	.02 x 600 v.
C13	1292	.0005 mica
C14	10061	.02 x 600 v.
C15	119112	30.0 mid. lytic
C16	124144	B.C. oscillator trimmer
C17	119112	30.0 mid. lytic x 450 w.v.
C18	129167	.0002 silver mica
C19	129165	.00005 mica
C20	124145	9 mc. oscillator trimmer
C21	119112	10.0 mid. lytic
C22	11969	16 mid. x 350 w.v.
C23	10065	.015 x 600 v.
C24	10065	.015 x 600 v.
C25	1001	.1 x 400 v.

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C27 10013

C28 1009

C29 1295

C30 1295

C31 10020

C32 12912

C33 1001

C34 10013

C35 100118

C36 129185

C37 10037

C38 12912

C39 12912

C40 12912

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C42 12912

C43 12912

C44 12912

C45 12912

C46 12912

C47 12912

C48 12912

C49 12912

C50 12912

CONDENSERS

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C3	124143	B.C. antenna trimmer
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C5	1292	.0005 mica
C6	10020	.1 x 200 v.
C7	129168	.0001 mica
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C9	10074	.1 x 400 v.
C10	10074	.1 x 400 v.
C11	10074	.1 x 400 v.
C12	10061	.02 x 600 v.
C13	1292	.0005 mica
C14	10061	.02 x 600 v.
C15	119112	30.0 mid. lytic
C16	124144	B.C. oscillator trimmer
C17	119112	30.0 mid. lytic x 450 w.v.
C18	129167	.0002 silver mica
C19	129165	.00005 mica
C20	124145	9 mc. oscillator trimmer
C21	119112	10.0 mid. lytic
C22	11969	16 mid. x 350 w.v.
C23	10065	.015 x 600 v.
C24	10065	.015 x 600 v.
C25	1001	.1 x 400 v.

C26 10020

C27 10013

C28 1009

C29 1295

C30 1295

C31 10020

C32 12912

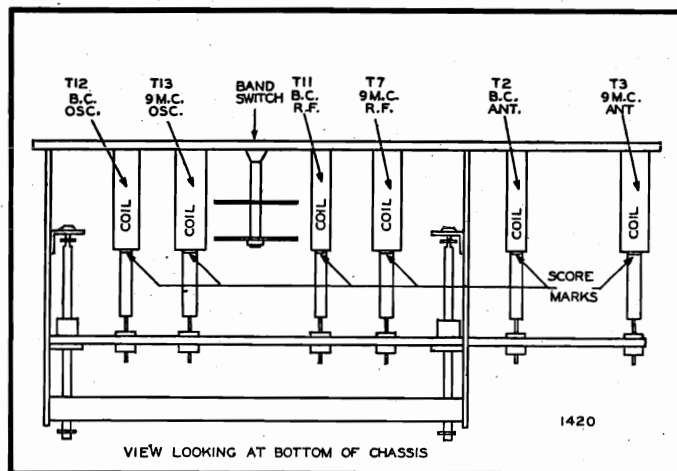
C33 1001

C34 10013

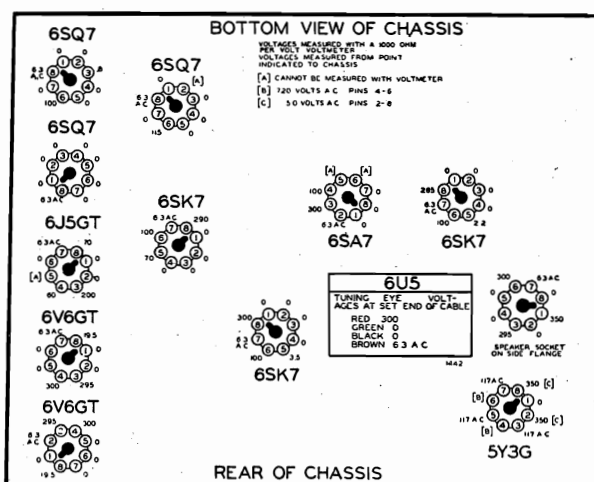
C35 100118</

MODEL 12A51

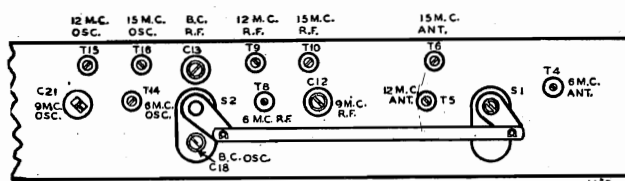
BELMONT RADIO CORP.



IRON CORE ADJUSTMENT VIEW



VOLTAGE CHART



TRIMMER VIEW

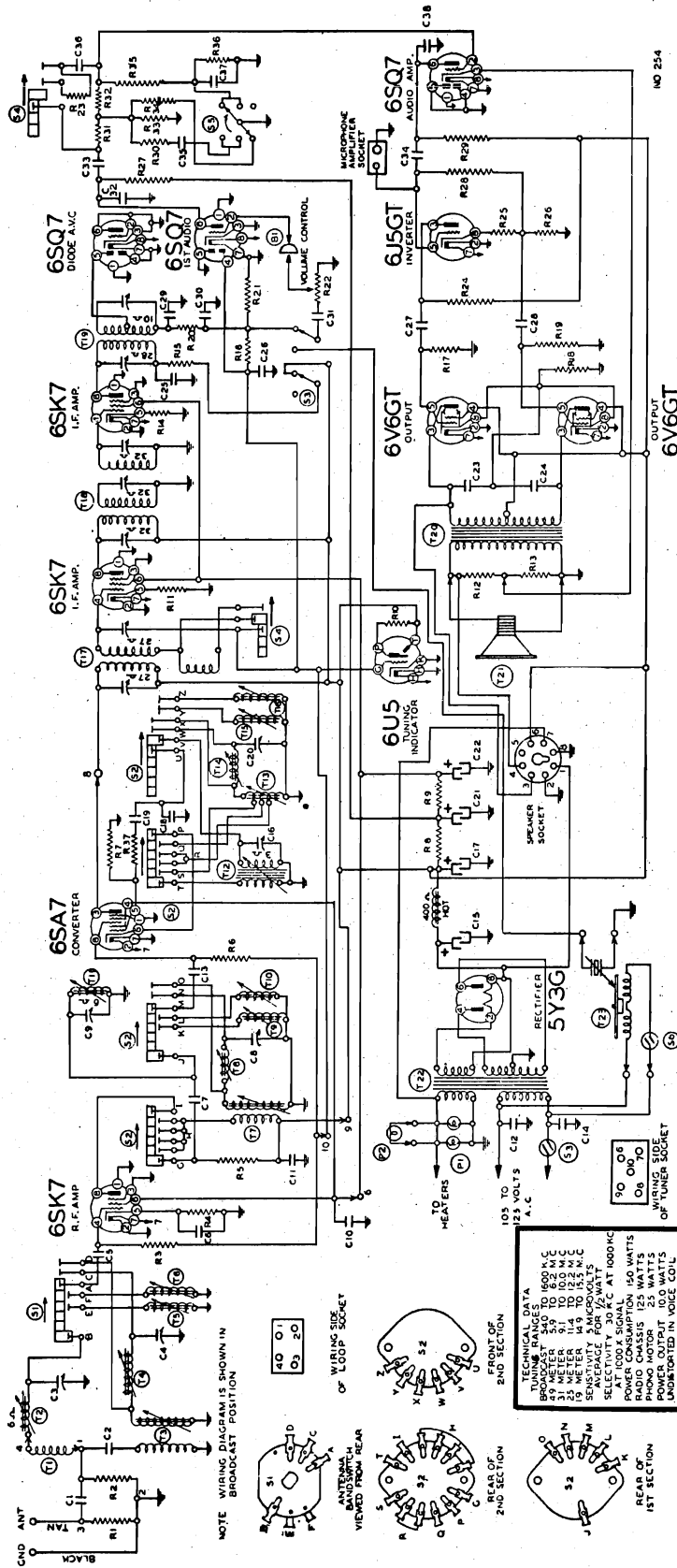
ALIGNMENT PROCEDURE

- Tone control—Treble.
- Volume control—Maximum all adjustments.
- Connect dummy antenna value in series with generator output lead.

- Use an all wave signal generator which will provide an accurately calibrated signal at the test frequencies as listed.

BAND	SIGNAL GENERATOR			Position of Band Switch	Dial Pointer Setting	Trimners Adjusted To Maximum
	Frequency Settng	Dummy Antenna	Connection to Radio			
I. F.	455 Kc.	.1 MFD.	Grid of 6SK7 (I.F.)	Broadcast	Set Dial at 1600 Kc.	On Top of Output I. F.
	455 Kc.	.1 MFD.	Grid of 6SA7	Broadcast	Set Dial at 1600 Kc.	On Top of Input I. F.
31 METER BAND	9.6 Mc.	400 ohms	Antenna lead	31M	Set Dial at 9.6 Mc.	(See Trimmer View) C21—Osc. (See Trimmer View) T14—Osc. (See Chassis View) C4—Ant.
49 METER BAND	6.1 Mc.	400 ohms	Antenna lead	49M	Set Dial at 6.1 Mc.	(See Trimmer View) T14—Osc. (See Trimmer View) T8—R.F. (See Trimmer View) T4—Ant.
25 METER BAND	11.8 Mc.	400 ohms	Antenna lead	25M	Set Dial at 11.8 Mc.	(See Trimmer View) T15—Osc. (See Trimmer View) T9—R.F. (See Trimmer View) T5—Ant.
19 METER BAND	15.2 Mc.	400 ohms	Antenna lead	19M	Set Dial at 15.2 Mc.	(See Trimmer View) T16—Osc. (See Trimmer View) T10—R.F. (See Trimmer View) T6—Ant.
BROADCAST BAND	1600 Kc.	200 mmf.	Antenna lead	Broadcast	Set Dial at 1600 Kc.	(See Trimmer View) C18—Osc. (See Trimmer View) C13—R.F. (See Chassis View) C3—Ant.
	1400 Kc.	200 mmf.	Antenna lead	Broadcast	Set Dial at 1400 Kc.	Rotate Core T11—R.F. Rotate Core T2—Ant. (See Iron Core Adjustment View)

BELMONT RADIO CORP.



00005	Mica	Type	Condenser	-10%	1
00001	Mica	Type	Condenser	-20%	1
00002	Silver Mica	Type	Condenser	-3%	1
RESISTORS					
Volume Control (500M Ohms)					1
25M	Ohm	-1/4	Watt Resistor	-10%	3
60M	Ohm	-1/2	Watt Resistor	-10%	1
10M	Ohm	-2	Watt Resistor	-10%	1
500	Ohm	-1/4	Watt Resistor	-10%	1
150M	Ohm	-1/4	Watt Resistor	-10%	1
10M	Ohm	-1/4	Watt Resistor	-10%	1
500M	Ohm	-1/4	Watt Resistor	-20%	3
250	Ohm	-2	Watt Resistor	-10%	1
50M	Ohm	-1/4	Watt Resistor	-10%	3
50M	Ohm	-1/4	Watt Resistor	-10%	1
1	Megohm	-1/4	Watt Resistor	-20%	2
5M	Ohm	-1/4	Watt Resistor	-10%	1
25M	Ohm	-1/4	Watt Resistor	-10%	1
250	Ohm	-1/4	Watt Resistor	-10%	1
1	Megohm	In	Tuning Eye Cable		1
50	Ohm	-1/4	Watt Resistor		1
25M	Ohm	-1/4	Watt Resistor	-10%	2
25M	Ohm	-1/4	Watt Resistor	-10%	2
120M	Ohm	-1/4	Watt Resistor	-10%	1
1	Megohm	-1/4	Watt Resistor	-20%	1
150M	Ohm	-1/4	Watt Resistor	-10%	2
2	Megohm	-1/4	Watt Resistor	-10%	1
350M	Ohm	-1/4	Watt Resistor	-10%	1
200M	Ohm	-1/4	Watt Resistor	-10%	1
75M	Ohm	-1/4	Watt Resistor	-10%	1
1.5	Megohm	-1/4	Watt Resistor	-10%	1

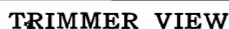
ALIGNMENT PROCEDURE

- Tone control—Treble.
- Volume control—Maximum all adjustments.
- Use an all wave signal generator which will provide an accurately calibrated signal at the test frequencies as listed.

IMPORTANT: Before removing chassis, remove the escutcheon and dial scale and then the pointer which is fastened to the pointer carriage by a small screw.

Make a list of your 6 favorite stations. Push out the call letters of these stations from the call letter sheets supplied. Insert a call letter in the slot on top of each pushbutton.

Next pull one of the pushbuttons all the way out as far as it will come. Now tune in the station you want with the tuning knob—Tune back and forth until the station is clear and distinct. Now push the button **hard** all the way in to lock the station in place, (push directly on front of button). Continue setting each pushbutton in the same way. Pressing the proper button will now tune the station you want. If it does not do so you did not push the button hard enough to lock it in place when setting up the station.

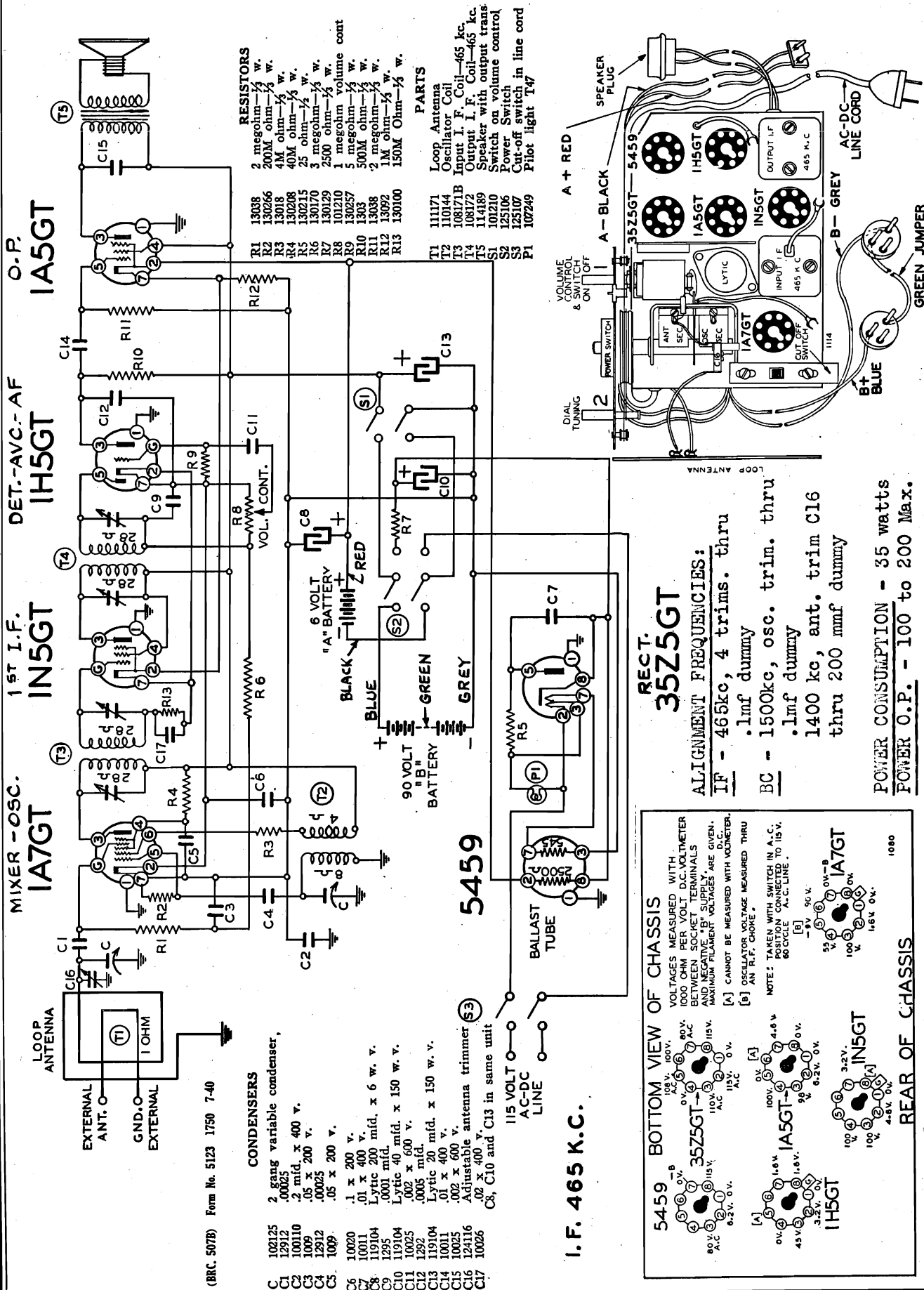


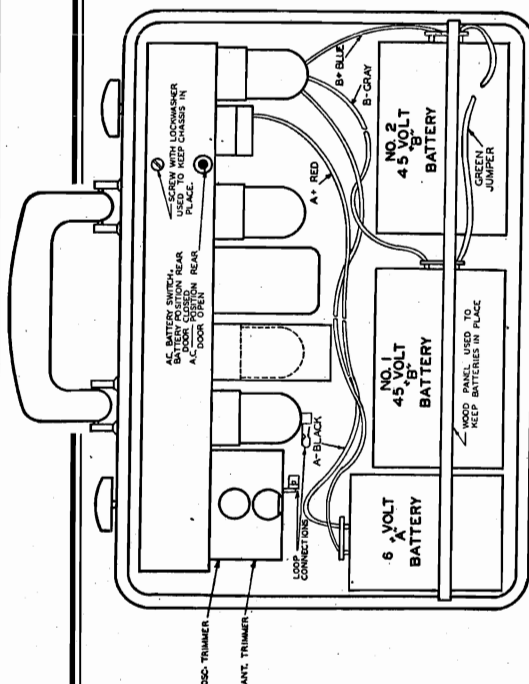
108210	T17	Input I. F. Coil.....	1	1.25
108155C	T18	Interstage I. F. Coil.....	1	1.25
108209	T19	Output I. F. Coil.....	1	1.25
111209	T1	Loop Antenna Assembly.....	1	2.00

114269	T21	Twelve Inch Electrodynamic Speaker (Less		
		Output Transformer)	1	9.00
105115B	T20	Output Transformer for Speaker.....	1	1.25



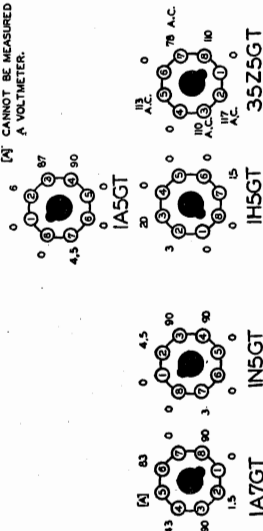
MODEL 546



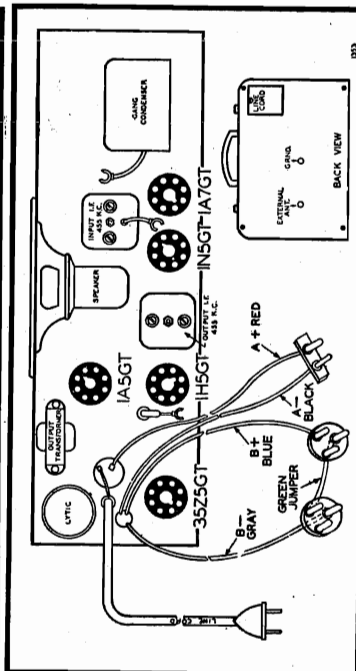


BOTTOM VIEW OF CHASSIS

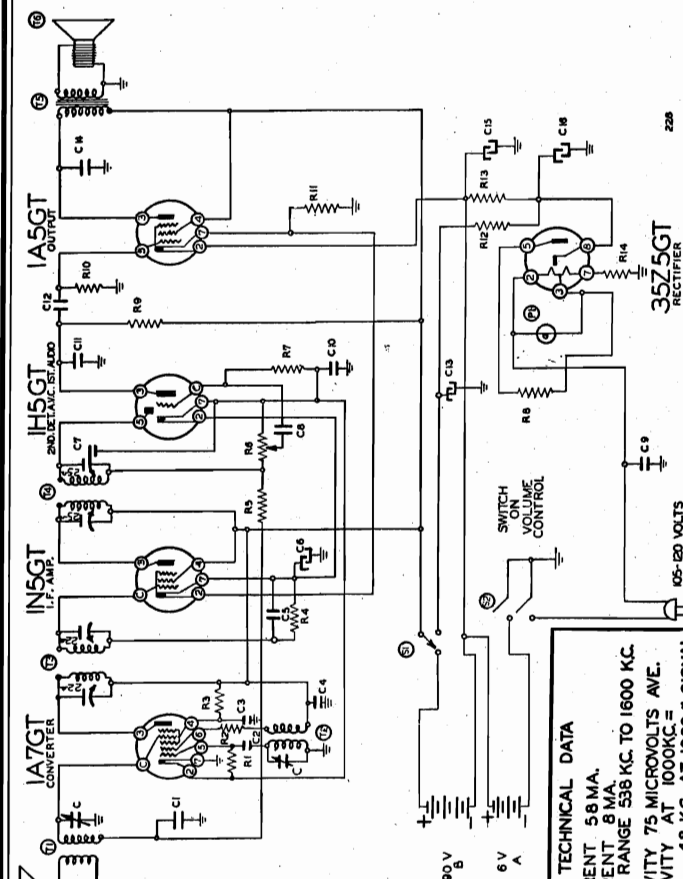
VOLTAGES MEASURED WITH A HIGH RESISTANCE VOLTMETER BETWEEN SOCKET TERMINAL AND CHASSIS. [A] CANNOT BE MEASURED WITH A VOLTMETER.



REAR OF CHASSIS



CHASSIS VIEW showing tube location and battery cables
—INSET back view, shows external ant. and ground connections.



TECHNICAL DATA
A—CURRENT 58 MA.
B—CURRENT 8 MA.
TUNING RANGE 538 KC. TO 1600 KC.
SENSITIVITY 75 MICROVOLTS AVE.
SELECTIVITY AT 1000 KC. =
OUTPUT 180 MW UNDISTORTED 3 OHM
I.F. 455 K.C.

Code No. Part No. Description

RESISTORS

- R1 1309 200M ohm— $\frac{1}{2}$ w.
- R2 130193 3M ohm— $\frac{1}{2}$ w.
- R3 130305 65M ohm— $\frac{1}{2}$ w.
- R4 130225 15 megohm— $\frac{1}{2}$ w.
- R5 1304 3 megohm— $\frac{1}{2}$ w.
- R6 101252 1 megohm—Volume control
- R7 130223 10 megohm— $\frac{1}{2}$ w.
- R8 130197 20 ohm— $\frac{1}{2}$ w.
- R9 13019 1 megohm— $\frac{1}{2}$ w.
- R10 1304 3 megohm— $\frac{1}{2}$ w.
- R11 130345 1M ohm— $\frac{1}{2}$ w.
- R12 130129 2500 ohm— $\frac{1}{2}$ w.
- R13 130344 1975 ohm—6 watt
- R14 130343 545 ohm—14 watt

CONDENSERS

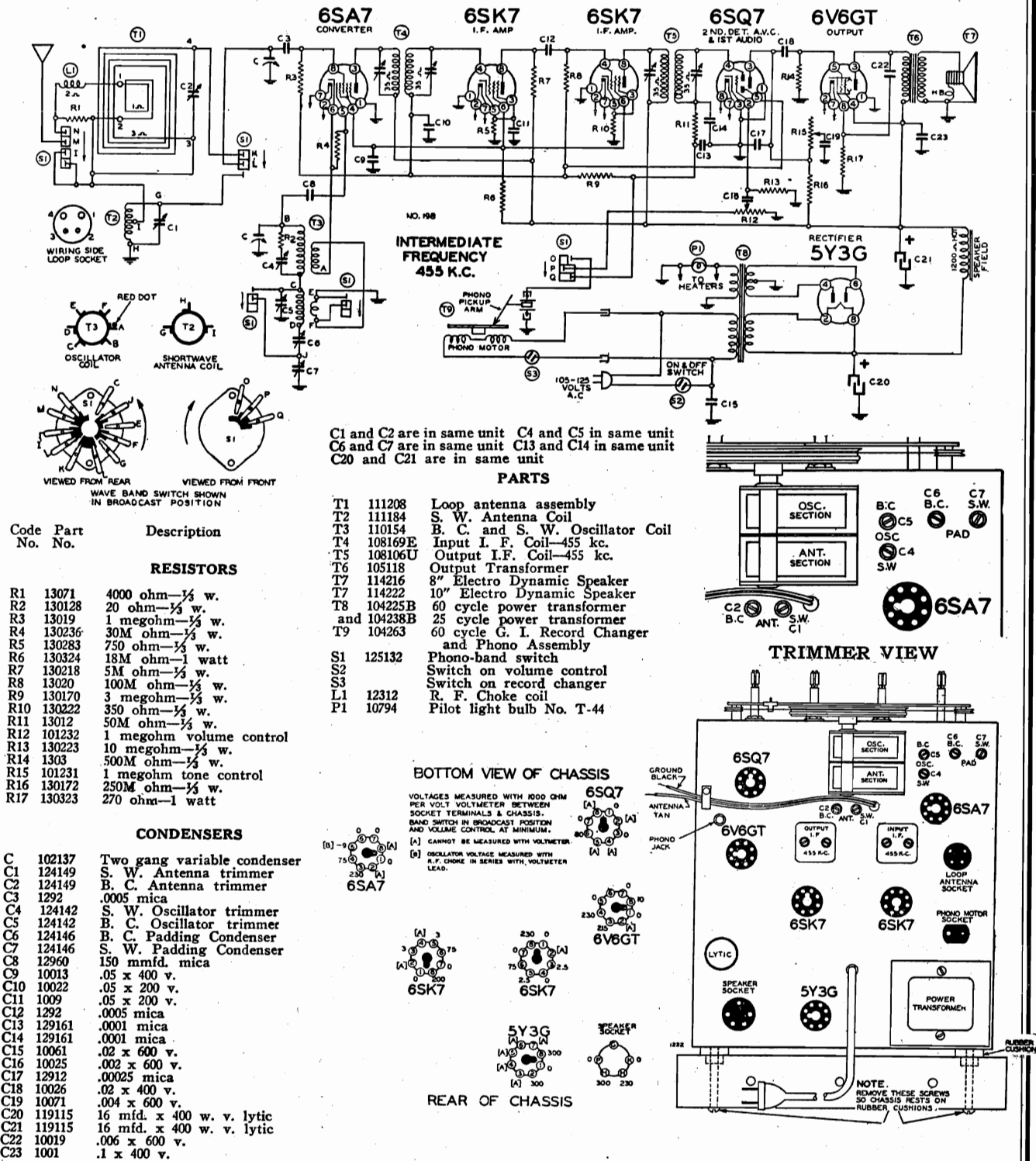
- C 102141 Gang condenser
- C1 1009 .05 x 200 v. condenser
- C2 1295 .0001 mica
- C3 100128 .05 x 120 v. condenser
- C4 100135 .25 x 120 v. condenser

PARTS

- T1 111241 Loop antenna assembly
- T2 110179 Oscillator coil
- T3 108201 Input I. F. coil
- T4 108200 Output I. F. coil
- T5 105127 Output transformer
- T6 114240 Speaker 5" P.M.
- S1 125153 A. C. Battery switch
- S2 101252 Switch on Volume control
- P1 107362 Pilot Lite bulb—T47

FOR ALIGNMENT
SEE INDEX

BELMONT RADIO CORP.



FOR GENERAL INSTRUMENT 102
RECORD CHANGER, SEE RIDER'S
"AUTOMATIC RECORD CHANGERS
AND RECORDERS".

Radio Only 70 Watts
Power Consumption Motor Only 20 Watts
Power Output 2.1 Watts Undistorted
Sensitivity for 500 Milliwatt Output: 15 Microvolts Average
Selectivity - 51 KC Broad at 1000 Times Signal at 1000 KC
Tuning Frequency Range Broadcast Band - 530 to 1600 KC
Shortwave Band - 5.46 to 18.3 MC
Intermediate Frequency 455 KC
Speaker 8 in. Electro Dynamic
or 10 in. Electro Dynamic

MODEL 671B

BELMONT RADIO CORP.

ALIGNMENT PROCEDURE

- Volume control—Maximum all adjustments.
- Connect radio ground to ground post of signal generator with a short heavy lead.
- Connect dummy antenna value in series with generator output lead.
- Connect output meter across primary of output transformer.
- Allow chassis and signal generator to "heat up" for several minutes.

The following equipment is required for aligning:

- An all wave signal generator which will provide an accurately calibrated signal at the test frequencies as listed.
- Output indicating meter.
- Non-metallic screwdriver.
- Dummy antennas—1-mf., 200 mmf., 400 ohms.

BAND	SIGNAL GENERATOR Frequency Setting	Dummy Antenna	Connection to Radio	Position of Band Switch	Variable Condenser Setting	Trimmers Adjusted (In Order Shown)	Trimmer Function	Adjustment
I. F.	455 Kc.	.1 MFD	Grid of 6SA7 Mixer	Broadcast	Rotor full open (Plates out of mesh)	Trimmers on top (See Top View)	Input and Output I. F.	Adjust to maximum output
SHORT WAVE BAND (See Note A)	17 Mc.	400 Ohms	External Antenna and Ground	Short Wave	Set Dial at 17 Mc.	Trimmer C4	Short Wave oscillator	Adjust to maximum output
	17 Mc.	400 Ohms	External Antenna and Ground	Short Wave	Set Dial at 17 Mc.	Trimmer C1	Short Wave antenna	Adjust to maximum output
	6 Mc.	400 Ohms	External Antenna and Ground	Short Wave	Set Dial at 6 Mc.	Trimmer C7	Short Wave oscillator series pad	Adjust to maximum rock dial. (See note "C")
BROAD- CAST BAND (See Note A)	1600 Kc.	200 mmf.	Grid of 6SA7	Broadcast	Rotor full open (Plates out of mesh)	Trimmer C3	Broadcast oscillator	Adjust to maximum output
	530 Kc.	200 mmf.	Grid of 6SA7	Broadcast	Rotor full closed	Trimmer C6	Broadcast oscillator series pad	Adjust to maximum output
LOOP ALIGN- MENT (See Note B)	1400 Kc.	200 mmf.	External Antenna and Ground	Broadcast	Set Dial at 1400 Kc.	Trimmer C2 (See Top View)	Broadcast antenna	Adjust to maximum output
	600 Kc.	200 mmf.	External Antenna and Ground	Broadcast	Set Dial at 600 Kc.	Trimmer C6 (See Top View)	Broadcast oscillator series pad	Adjust to maximum output

NOTE "A"—The signal generator is connected to the "ANT." and "GND." leads when aligning the Short Wave Band and to the grid of the 6SA7 tube and ground terminal when setting the Broadcast Band oscillator end frequencies, (1600 and 530 K. C.).

The loop antenna should be connected to the radio when making these adjustments.

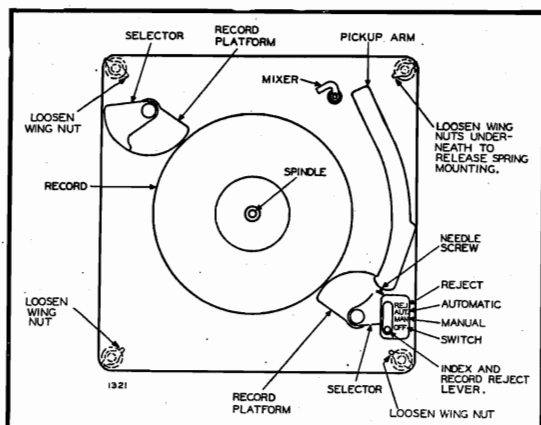
NOTE "B"—Loop alignment is made with the chassis mounted in the cabinet and the loop antenna connected. The signal generator is connected to the "ANT." and "GND." leads.

NOTE "C"—Turn the dial back and forth slightly (rock) and adjust trimmer until the peak of greatest intensity is obtained.

Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.

After each band is completed, repeat the procedure as a final check.

Automatic Record Changer—Operating Instructions



General

This Record Changer will play automatically a series of standard 10- or 12 inch records of the type generally available today, or records of any size up to 12 inches changed manually. This Changer does not require any adjustment by operator for playing different size records. Stacks of mixed sizes may be played but this is not recommended or guaranteed. Records of the last few years with the standard eccentric or spiral finishing groove will operate the automatic mechanism.

Controls and Moving Mechanism

Index and Record Reject Lever: This lever is located near the right front corner of the phonograph with its index plate marked for four positions—

OFF-MAN-AUT-REJ.

When you desire to change record selections manually, this lever should be set in the "MAN." (MANUAL) position.

To play a series of records, the lever should be set at the "AUT." (AUTOMATIC) position.

To reject a record being played, or to start the record-changing cycle, in case the record just played does not have the standard eccentric or spiral stopping groove; simply push the lever to the "REJ." (REJECT) position and let go. The pickup arm will raise up and swing outwards and the next record will drop.

Keep the lever in its "MAN." position when not actually playing records automatically.

To start the turntable set the switch to the "MAN." or "AUT." position. To stop the turntable, set the switch to the "OFF" position.

Manual Operation

1. Insert Needle in pickup and clamp securely with needle screw protruding from front of pickup arm.
2. Lift record platforms and rotate away from turntable.
3. Place record to be played on turntable.
4. Advance index and reject lever to "MAN."
5. Place needle on blank edge of record and push pickup arm gently toward center to start needle in groove.
6. When playing is completed lift pickup arm slightly to clear record and replace same on rest.
7. Return index and reject lever to "OFF".

Automatic Operation

1. Insert long playing needle in pickup and clamp securely with needle screw protruding from front of pickup arm. Return arm to rest.
2. Rotate record platforms to index position (locked in place by pin).
3. Place records to be played over the turntable spindle and on the record platforms.
4. Push index and reject lever to "REJ." position and release. The first record will then feed and play thru, followed by the balance of the records.
5. After last record has been played, allow pickup arm to reset on record. Return arm to rest and push lever to "OFF".
6. Raise and turn record platforms away from turntable.
7. Remove records carefully from turntable. Be careful not to strain spindle.

CAUTION—This Changer is designed and built to play standard 10- and 12-inch records in good condition automatically. To obtain the benefit of satisfactory operation it is necessary that instructions be followed explicitly and in no case use force, as this may cause damage.

Mechanism

Do not rotate turntable in reverse direction or bend or strain turntable spindle when loading or unloading records.

Do not overload with records. The maximum load is either:

- 10 - 12 inch records
- 12 - 10 inch records
- 10 - 10 and 12 inch records mixed

Do not touch pickup arm when it is in motion during automatic function or stop the mechanism until pickup arm reaches playing position and is returned to rest provided.

Do not move platforms by selector. Always raise and turn by hub of record platform.

Records

Do not use warped records; records with rough, square, or uneven edges; records that are extra thin or extra thick.

Do not use other than standard 10 inch or 12 inch records.

Do not leave records on record platforms. This will cause warpage.

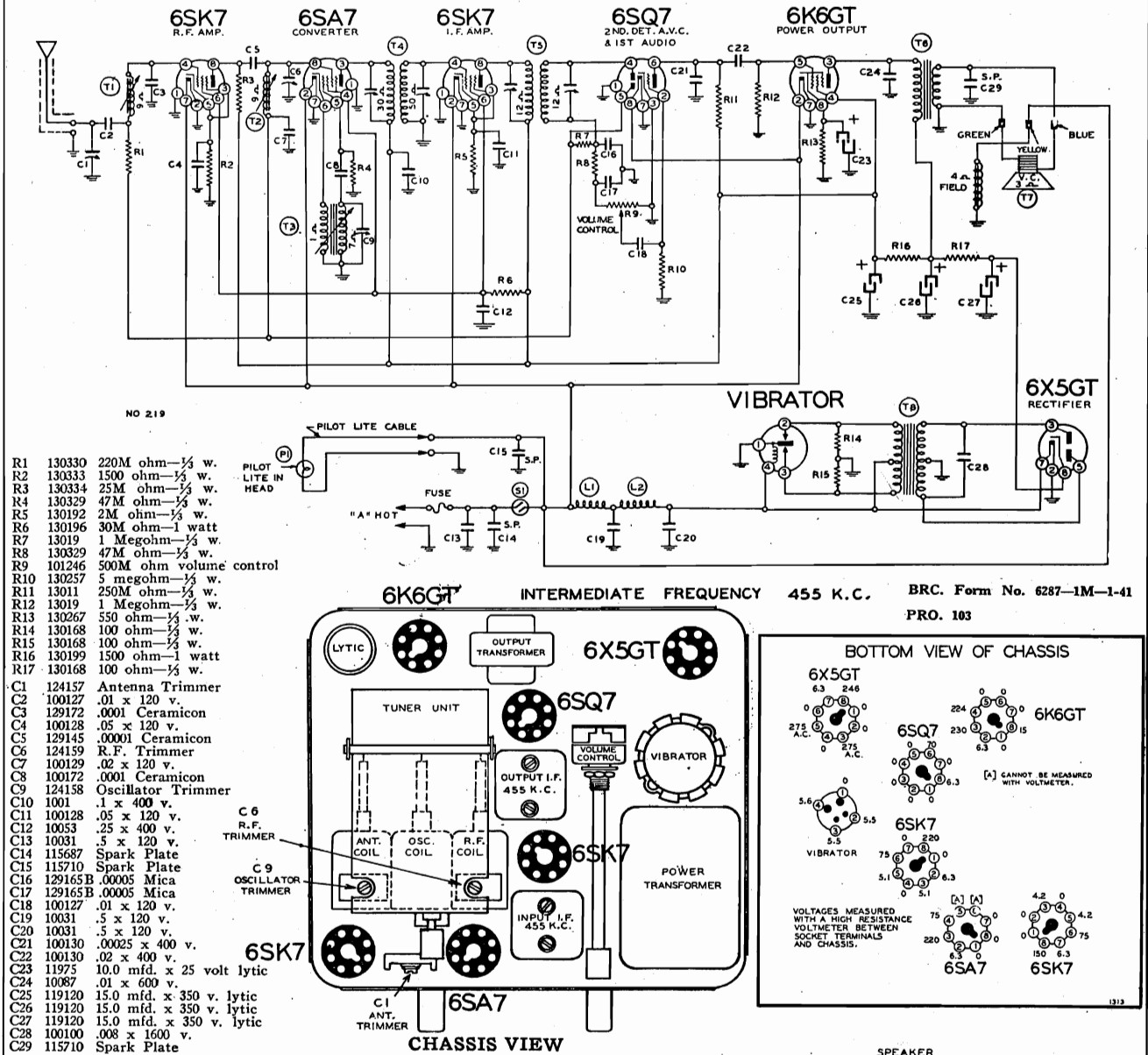
Needles

Single-playing needles may be used for manual operation, but they are somewhat inconvenient.

Multiple-playing needles are essential for automatic operation to conserve record life, as well as being a convenience for manual operation.

NEVER put a needle into pickup, once it has been removed, since this will result in unnecessary wear on the records—many times that resulting from normal use.

BELMONT RADIO CORP.



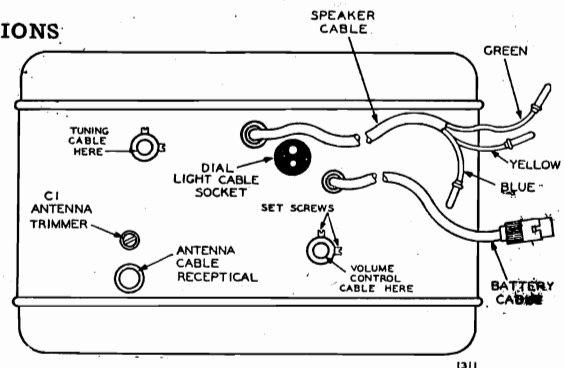
C16 and C17 are in same unit.
C21 and C22 are in same unit.
C25, C26, and C27 are in same unit.

SPECIFICATIONS

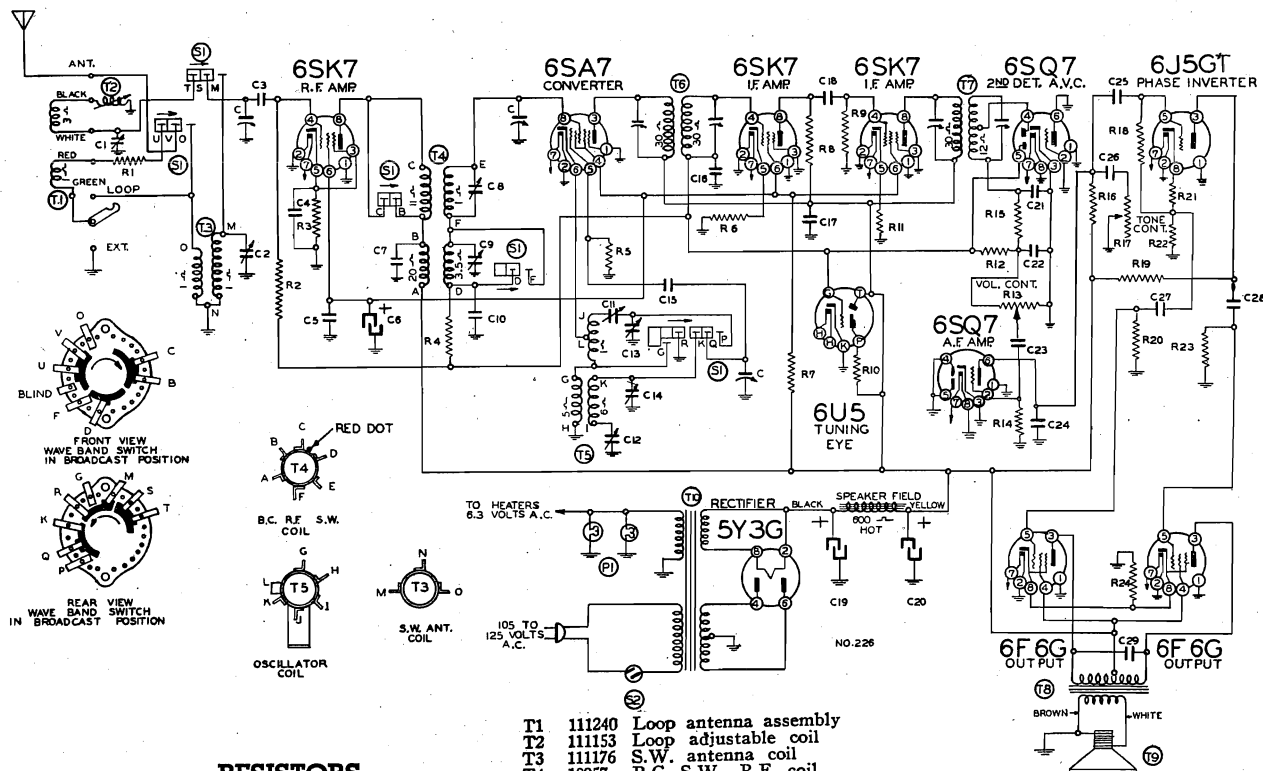
Battery Drain	-	-	-	-	-	7 Amps.
Power Output	-	-	-	-	-	1.8 Watts Undistorted
Sensitivity for 1 Watt Output	-	-	-	-	-	6 Microvolt Average
Selectivity	-	-	-	-	-	38 KC Broad at 1000 Times Signal at 1000 KC
Tuning Frequency Range	-	-	-	-	-	540 to 1600 KC
Intermediate Frequency	-	-	-	-	-	455 KC
Speaker	-	-	-	-	-	6 in. Electro Dynamic

• Dummy antennas—.1 mf., 35 mmf.

BAND	SIGNAL GENERATOR Frequency Setting	Dummy Antenna	Connection to Radio	Remote Tuner Dial Setting	Trimmers Adjusted (in Order Shown)	Trimmer Function	Adjustment
I. F.	455 Kc.	.1 MFD.	Grid of 6SK7 I. F. Tube	Set dial at 1400 Kc.	See Chassis View	Output I. F.	Adjust to maximum output
	455 Kc.	.1 MFD.	Grid of 6SA7 I. F. Tube	Set dial at 1400 Kc.	See Chassis View	Input I. F.	Adjust to maximum output
BROAD- CAST BAND	1600 Kc.	35 mmf.	Antenna lead	Set dial at 1600 Kc.	Trimmer C9, C6, C1 See Chassis View	Oscillator R. F. antenna	Adjust to maximum output
	1400 Kc.	35 mmf.	Antenna lead	Set dial at 1400 Kc.	Rotate cores of antenna and R. F. coils	Antenna and R. F.	Adjust to maximum output



BELMONT RADIO CORP.



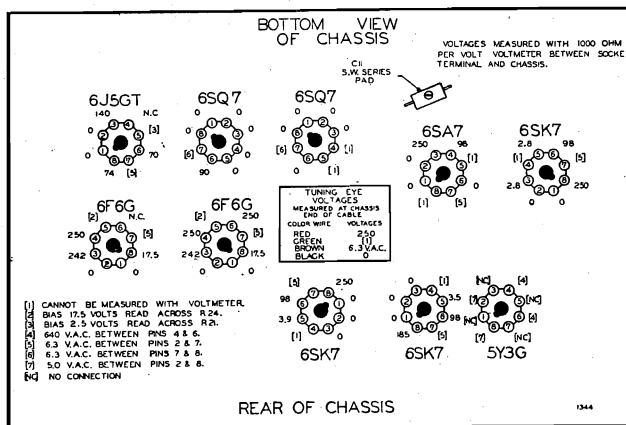
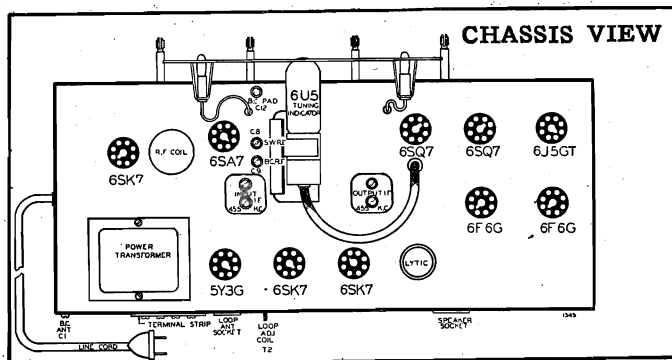
RESISTORS

R1	13024	400 ohms— $\frac{1}{2}$ w.
R2	13019	1 megohm— $\frac{1}{2}$ w.
R3	13099	300 ohms— $\frac{1}{2}$ w.
R4	13054	300M ohm— $\frac{1}{2}$ w.
R5	130208	40M ohm— $\frac{1}{2}$ w.
R6	13054	500 ohm— $\frac{1}{2}$ w.
R7	130304	12M ohm— $\frac{1}{2}$ w.
R8	130263	12M ohm— $\frac{1}{2}$ w.
R9	13020	100M ohm— $\frac{1}{2}$ w.
R10		1 megohm—in eye socket
R11	13054	500 ohm— $\frac{1}{2}$ w.
R12	10170	3 megohm— $\frac{1}{2}$ w.
R13	101214	Volume control (500M ohm)
R14	130225	15 megohm— $\frac{1}{2}$ w.
R15	13012	50M ohm— $\frac{1}{2}$ w.
R16	13011	250M ohm— $\frac{1}{2}$ w.
R17	101213	Tone control (1 megohm)
R18	13019	1 megohm— $\frac{1}{2}$ w.
R19	13020	100M ohm— $\frac{1}{2}$ w.
R20	1303	500M ohm— $\frac{1}{2}$ w.
R21	13043	2500 ohm— $\frac{1}{2}$ w.
R22	13020	100M ohm— $\frac{1}{2}$ w.
R23	1303	500M ohm— $\frac{1}{2}$ w.
R24	130311	300 ohm— $\frac{1}{2}$ w.

CONDENSERS

C	102129	Three gang variable condenser
C1	124132	B.C. antenna trimmer
C2	124117	S.W. antenna trimmer
C3	1292	.0005 mica
C4	10020	.1 x 200 v.
C5	100117	.25 x 400 v.
C6	119124	10 mfd. lytic—350 w. v.
C7	129160	.0004 mica
C8	124131	S.W. R.F. trimmer
C9	124131	B.C. R.F. trimmers
C10	10026	.02 x 400 v.
C11	129156	.0024 compression S.W. pad
C12	129157	.000525 compression B.C. pad
C13	124130	S.W. oscillator trimmer
C14	124130	B.C. oscillator trimmer
C15	12939	.00005 mica
C16	10026	.02 x 400 v.
C17	100117	.25 x 400 v.
C18	1292	.0005 mica
C19	119124	25 mfd. lytic—450 w. v.
C20	119124	23 mfd. lytic—450 w. v.
C21	1295	.0001 mica
C22	1295	.0001 mica
C23	10025	.002 x 600 v.
C24	12912	.00025 mica
C25	10026	.02 x 400 v.
C26	10011	.01 x 400 v.
C27	1009	.05 x 200 v.
C28	10013	.05 x 400 v.
C29	10071	.004 x 600 v.

- T1 111240 Loop antenna assembly
T2 111153 Loop adjustable coil
T3 111176 S.W. antenna coil
T4 10957 B.C. S.W.—R.F. coil
T5 110149 B.C. S.W. oscillator coil
T6 1081691 Input I.F. 465 kc.
T7 108130D Output I.F. 465 kc.
T8 10554B Output transformer
T9 114192B 10" dynamic speaker (600 ohm field)
T10 104202 Power transformer
S1 125111 Wave band switch
S2 On-off switch on volume control
P1 10794 (2) pilot light bulbs T-44
C6, C19 and C20 in one unit
C8 and C9 in one unit
C13 and C14 in one unit



ALIGNMENT PROCEDURE

- Volume control—Maximum all adjustments.
 - Connect radio ground to ground post of signal generator with a short heavy lead.
 - Connect dummy antenna value in series with generator output lead.
- The following equipment is required for aligning.
- An all wave signal generator which will provide an accurately calibrated signal at the test frequencies as listed.
 - Dummy antennas—1 mf., 200 mmf., 400 ohms.

SIGNAL GENERATOR				
BAND	Frequency Setting	Dummy Antenna	Connection to Radio	Position of Band Switch
I. F.	455 Kc.	.1 MFD.	Grid of 6SK7 I. F.	Broadcast
	455 Kc.	.1 MFD.	Grid of 6SA7 Mixer	Broadcast
SHORT WAVE BAND (See Note A)	17 Mc.	400 Ohms	External Antenna and Ground	Short Wave
	17 Mc.	400 Ohms	External Antenna and Ground	Short Wave
	6 Mc.	400 Ohms	External Antenna and Ground	Short Wave
BROADCAST BAND (See Note A)	1580 Kc.	200 mmf.	Grid of 6SK7 R. F. Tube	Broadcast
	540 Kc.	200 mmf.	Grid of 6SK7 R. F. Tube	Broadcast
	1400 Kc.	200 mmf.	Grid of 6SK7 R. F. Tube	Broadcast
LOOP ALIGNMENT (See Note B)	1400 Kc.	200 mmf.	External Antenna and Ground	Broadcast
	600 Kc.	200 mmf.	External Antenna and Ground	Broadcast

Trimmer C13	Set Dial at 17 Mc.	Two trimmers on top	Short Wave oscillator	Adjust to maximum output
Trimmers C8, C2	Set Dial at 17 Mc.	Two trimmers on top	Short Wave R. F. and S. W. Antenna	Adjust to maximum output
Trimmer C11 (See voltage chart)	Set Dial at 6 Mc.	Two trimmers on top	Short Wave oscillator series pad	Adjust to maximum rock dial. (See note "C")
Trimmer C14	Rotor full open (Plates out of mesh)		Broadcast oscillator	Adjust to maximum output
Trimmer C12	Set Dial at 540 Kc. (Plates in Mesh)		Broadcast oscillator series pad	Adjust to maximum output
Trimmer C9	Set Dial at 1400 Kc.		Broadcast R. F.	Adjust to maximum output
Trimmer C1	Set Dial at 1400 Kc.		Broadcast antenna	Adjust to maximum output
Trimmer T2	Set Dial at 600 Kc.		Iron Core Tracking Coil	Adjust to maximum output

NOTE "A"—The signal generator is connected to the "ANT." and "GND." terminals on the rear of the chassis when aligning the Short Wave Band and to the grid of the 6SK7 R. F. Tube and ground terminal when setting the Broadcast Band oscillator end frequencies, (1580 and 540 K. C.).

The loop antenna need not be connected to the radio when making these adjustments.

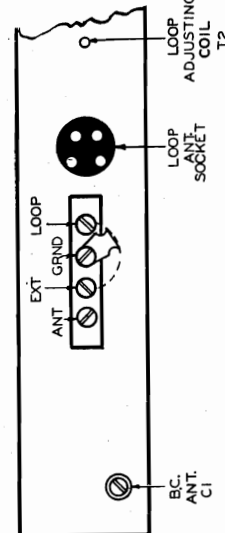
NOTE "B"—Loop alignment is made with the chassis mounted in the cabinet and the loop antenna connected to the terminal board. The signal generator is connected to

the "ANT." and "GND." terminals and the jumper on the terminal board connected to "EXT." terminal.

NOTE "C"—Turn the dial back and forth slightly (rock) and adjust trimmer until the peak of greatest intensity is obtained.

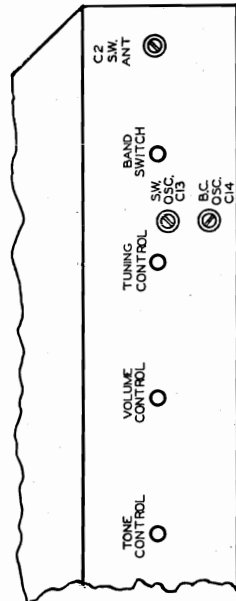
Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.

After each band is completed, repeat the procedure as a final check.



ANT. & GROUND TERMINALS—When using an external antenna and ground, move the metal strap shown above and fasten it under the screw marked "Ext."

The antenna and ground wires should then be connected to the terminals marked "Ant." — "Grnd."

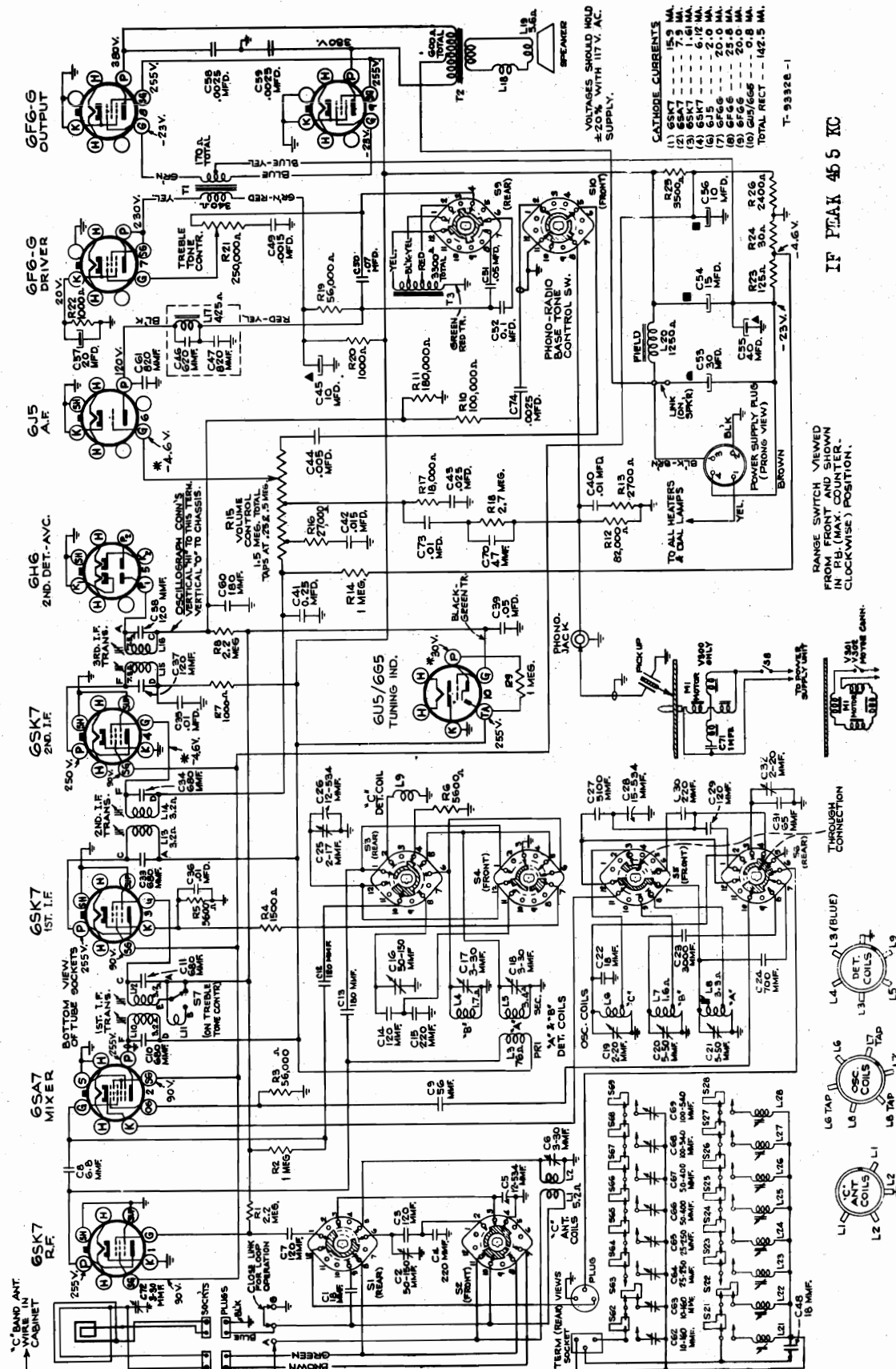


TRIMMER VIEW—FRONT OF CHASSIS

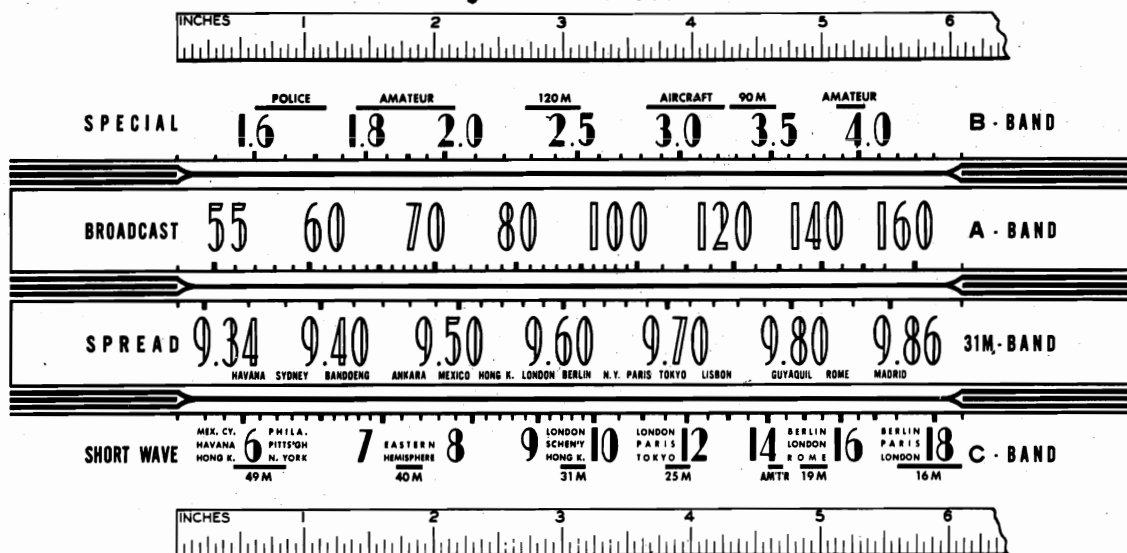
Tuning Frequency Range Broadcast Band - 540 to 1580 KC

Short Wave Band - 5.5 to 18.5 MC

BRUNSWICK RADIO DIV.— RADIO & TELEVISION, INC.



MODELS 275, 276, 277

BRUNSWICK RADIO DIV. RADIO & TELEVISION, INC.
Alignment Procedure

Cathode-Ray Alignment is the preferable method. Connections for the oscillograph are shown in the schematic diagram.

Output Meter Alignment.—If this method is used, connect the meter across the voice coil, and turn the receiver volume control to maximum.

Test-Oscillator.—For all alignment operations, connect the low side of the test-oscillator to the receiver chassis, and keep the output as low as possible to avoid a-v-c action.

Calibration Scale.—The glass tuning dial may be easily removed from the cabinet and temporarily attached to the chassis for quick reference during alignment. In the event that only the chassis is returned for service, and the cabinet with its tuning dial is left in the customer's home, the calibration scale printed in this service note can be used in conjunction with an ordinary 12-inch ruler as an accurate and convenient substitute for the regular dial.

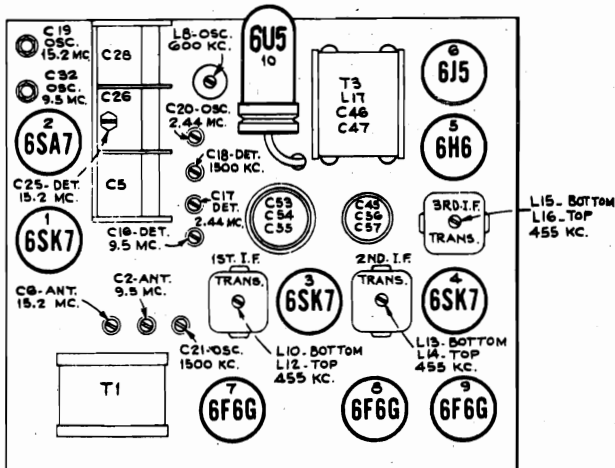
Each method is described below.

Using Tuning Dial.—

1. Slide out the flat spring clamp at each end of the dial, and remove the glass dial from the cabinet.

2. With gang in full mesh, move the dial pointer to the reference mark at the left-hand end of the dial backing plate.

3. Place the glass dial under the pointer so that the extreme left scale graduations coincide with the pointer. Use scotch tape to hold the glass dial in this position.



Using Calibration Scale.—

1. With gang in full mesh, move the dial pointer to the reference mark at the left-hand end of the dial backing plate.

2. Place a flat 12-inch ruler on the dial backing plate so the left-end of ruler is at the reference mark at left-end of backing plate. Temporarily fasten the ruler with scotch tape to the backing plate.

3. Refer to calibration scale printed in this service note. This is a reduced reproduction of the dial with an inch-scale drawn at top and bottom. To find the correct pointer position in inches for any desired frequency, draw a vertical line through this frequency on the calibration scale.

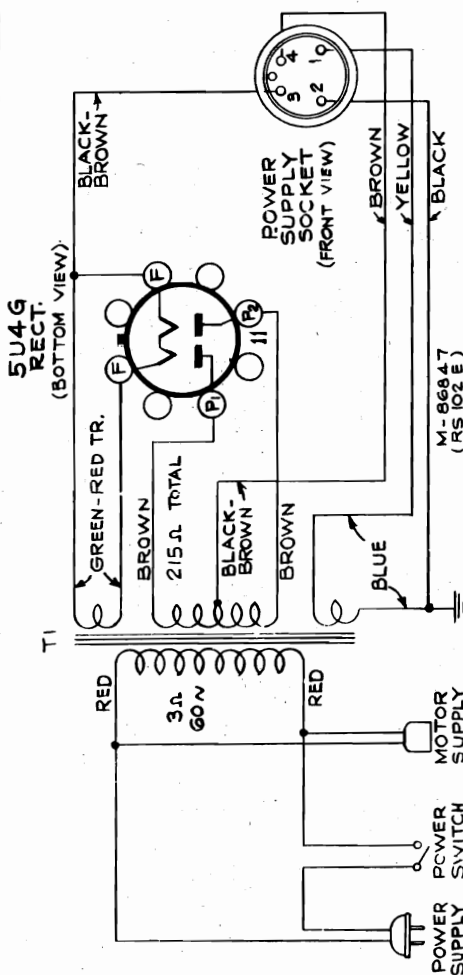
Dial-Pointer Adjustment.—After the chassis is replaced in cabinet, move the dial pointer (if necessary) so that it is at the left-hand graduation on the dial with the gang in full mesh.

Steps	Connect the high side of the test-osc. to—	Tune test-osc. to—	Turn radio dial to—	Adjust the following for maximum peak output
1	Turn "Treble Tone Control" (center knob) so that I-F is in "Sharp" position.			counter-clockwise
2	2nd I-F grid, in series with .01 mfd.	455 kc	"A" Band Quiet Point at HF end	L15 and L16* (3rd I-F Trans.)
3	1st I-F grid, in series with .01 mfd.			L13 and L14* (2nd I-F Trans.)
4	1st-Det. grid, in series with .01 mfd.			L10 and L12* (1st I-F Trans.)
5	Turn Treble Tone Control full clockwise to "Broad" position. Response on CRO should be the conventional double-humped type. If necessary, retouch 3rd I-F transformer slightly (so as not to disturb the "Sharp" curve appreciably). Leave control in sharp position for the following steps.			
6	Ant. terminal, in series with 47 mmfd. (link closed)	15.2 mc	"C" Band 15.2 mc	C19 (osc.)** C25 (det.) C6 (ant.)
7		9.5 mc	"31M" Band 9.5 mc	C32 (osc.)** C18 (det.) C2 (ant.)
8	Rear stator of gang, in series with .01 mfd.	2.44 mc	"B" Band 2.44 mc	C20 (osc.) C17 (det.)
9		600 kc	"A" Band 600 kc	L8 (osc.) Rock in
10		1,500 kc	"A" Band 1,500 kc	C21 (osc.) C18 (det.)
11	Repeat steps 9 and 10.			
12	Install and connect chassis in cabinet. Tune in a radiated oscillator signal at 1,500 kc and peak the "A" band trimmer C72 (on loop). Rock in L8 for peak output.			

* Adjust for coincidental curves and maximum gain.

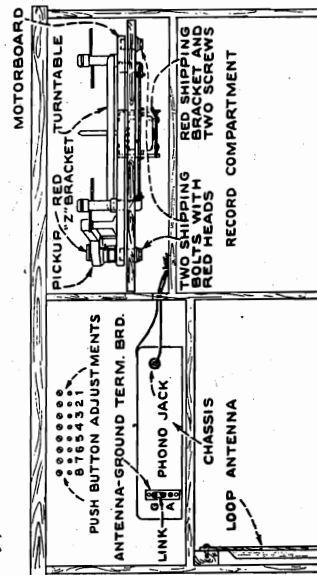
** Use minimum capacity peak if two peaks can be obtained. (Check for correct peak on "C" band by tuning receiver to 14.29 mc, where a weaker signal should be received.)

FOR RCA RECORD CHANGER RP-152D
SEE RIDER'S "AUTOMATIC RECORD
CHANGERS AND RECORDERS"



Push Button Adjustment

On the 880 to 1,550 kc push-buttons the higher frequency stations may be received with No. 7 or 8 either in or out (oscillator frequency either 455 kc below or 455 kc above the station frequency). The adjustment with this core in its out position (oscillator frequency 455 kc above the station frequency) is the correct one.



The station push buttons connect to separate magnetite-core oscillator coils and separate antenna trimmers which must be adjusted for the desired stations. Use an insulated screwdriver or alignment tool. Allow at least five minutes warm-up period before making adjustments.

In the event that the receiver is to be used with an external antenna use one or two feet of wire (as an antenna) to ensure sharp peaking during the final adjustment procedure. For loop operation, the link should be strapped across terminals on back of set. In either case the procedure is as follows:

1. Make a list of the desired stations, arranged in order from low to high frequencies.
2. Turn the range selector to "A" band, and manually tune in the first station on the list.
3. Turn range selector to "Electric Tuning" (PB) position, push in station button No. 1 (extreme left). Then adjust the No. 1 oscillator core to receive the station.
4. After oscillator core is set correctly, adjust No. 1 antenna trimmer for maximum output.

Clockwise adjustment of cores and trimmers tunes the circuits to lower frequencies.

5. Adjust for each of the remaining stations in the same manner.
6. Make a final careful adjustment of the oscillator cores and antenna trimmers.

FREQUENCY RANGES

Broadcast "A" .. 540-1,600 kc
Med. Wave "B" ... 1.55-4.0 mc
Short Wave "C" .. 5.8-18.0 mc
LOUDSPEAKER (PL-94-1)
Type .. 15-in. Electrodynamic
V.C. Imp. .. 7.2 ohms at 400 c.

POWER OUTPUT RATING

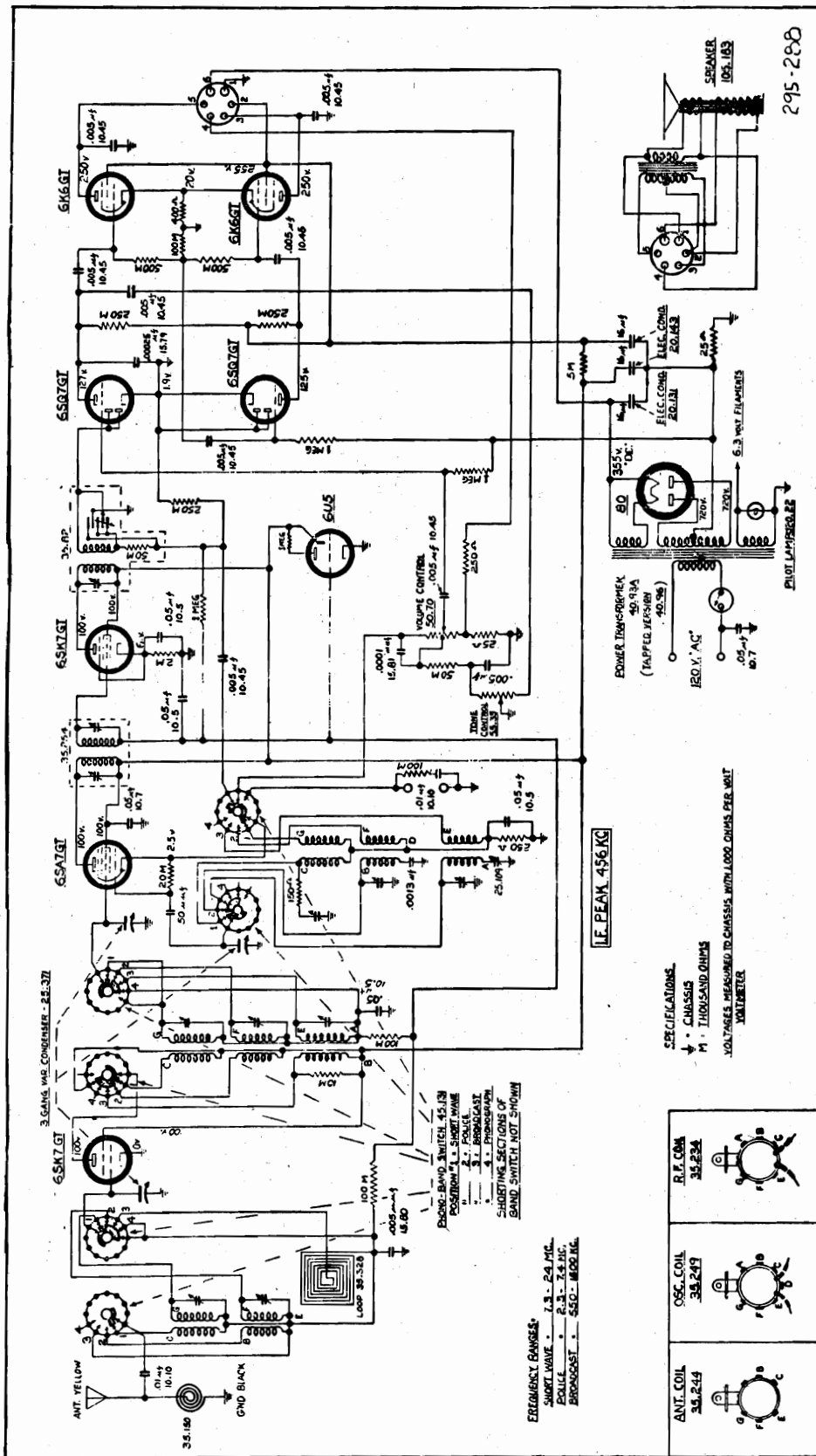
Undistorted	18 w.
Maximum	20 w.
POWER SUPPLY RATINGS	
105-125 v., 60 c. ...	200 w.
105-125 v., 50 c. ...	200 w.
SPREAD BAND	
...	9.34-9.86 mc

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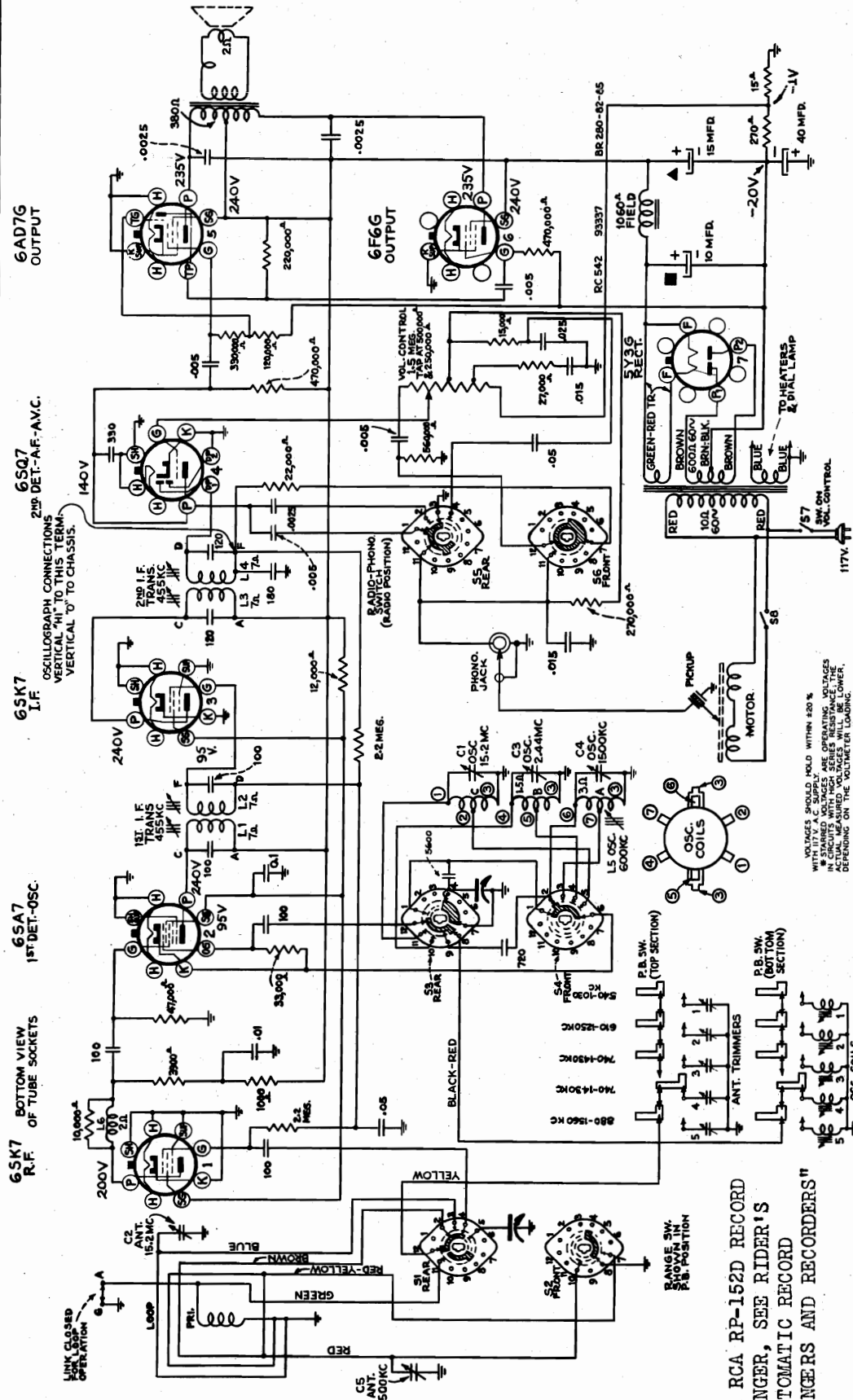
FOR RCA RP-160 RECORD CHANGER, SEE
RIDER'S "AUTOMATIC RECORD CHANGERS
AND RECORDERS".

This model is a 9 tube (including tuning eye) three wave band Super-heterodyne Receiver designed to operate on 105-125 Volts, 50-60 cycles Alternating Current (AC) only.

TUNING RANGE: 550 to 1600 kilocycles (KC) (Domestic Broadcast), 2.3 to 7.0MC (Megacycles) (Police Call Band), 7.5 to 24.MC (Megacycles) (International Short Wave).



BRUNSWICK RADIO DIV.—
RADIO & TELEVISION, INC.



FOR PUSH-BUTTON DATA, SEE INDEX

PHONOGRAPH (RP-152-D)
Type Automatic
Record Cap. . . . 8 10-in. or 7 12-in.
Turntable Speed 78 rpm
Type Pickup Crystal
Pickup imp. 100,000 ohms @ 1000 c.
Average O.P. 1 1/2 v. @ 1000 c. ac. 2 mag.

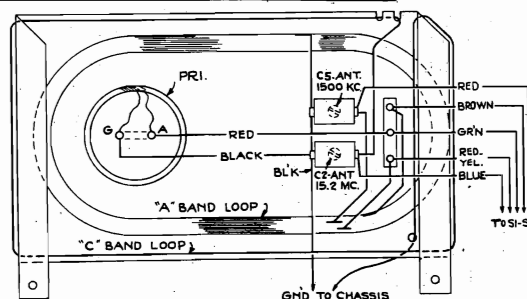
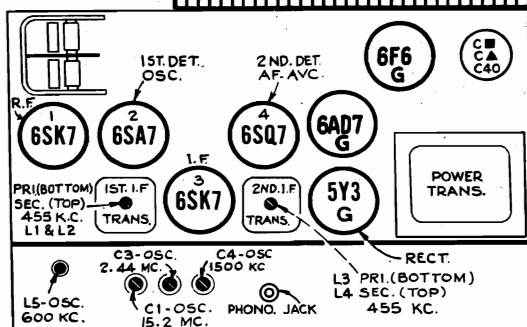
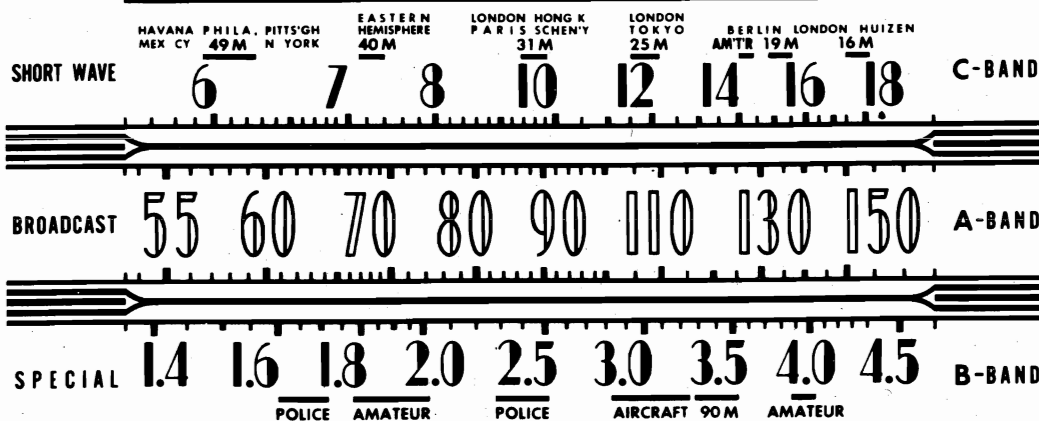
FREQUENCY RANGES
Broadcast "A" 540-1,560 kc
Med. Wave "B" 1.4-4.5 mc
Short Wave "C" 5.8-18 mc
POWER SUPPLY RATINGS
105-125 v., 60 c. 100 w.
105-125 v., 50 c. 100 w.

LOUDSPEAKER (RL-70L-6)
Diameter 12 in.
Voice coil imp. at 400 c. 2.2 ohms
POWER OUTPUT RATING
Undistorted 4.5 w.
Maximum 5.0 w.
INTERMEDIATE FREQUENCY 455 kc

FOR RCA RP-152D RECORD
CHANGER, SEE RIDER'S
"AUTOMATIC RECORD
CHANGERS AND RECORDERS"

MODELS 280, 282, 285, 285-1

BRUNSWICK RADIO DIV.—
RADIO & TELEVISION, INC.



Calibration Scale.—The glass tuning dial may be easily removed from the cabinet and temporarily attached to the chassis for quick reference during alignment. Or, if necessary, the calibration scale printed in this service note can be used in conjunction with an ordinary 12-inch ruler as an accurate and convenient substitute for the regular dial.

Each method is described below.

Using Tuning Dial.—

1. Slide out the flat spring clamp at each end of the dial, and remove the glass dial from the cabinet.
2. With gang in full mesh, move the dial pointer to the reference mark at the left-hand end of the dial backing plate.
3. Place the glass dial under the pointer so that the extreme left scale graduations coincide with the pointer. Use scotch tape to hold the glass dial in this position.
4. After completion of the alignment, replace the glass dial

in cabinet, taking care that the fibre light shields are in correct position at ends of dial.

Using Calibration Scale.—

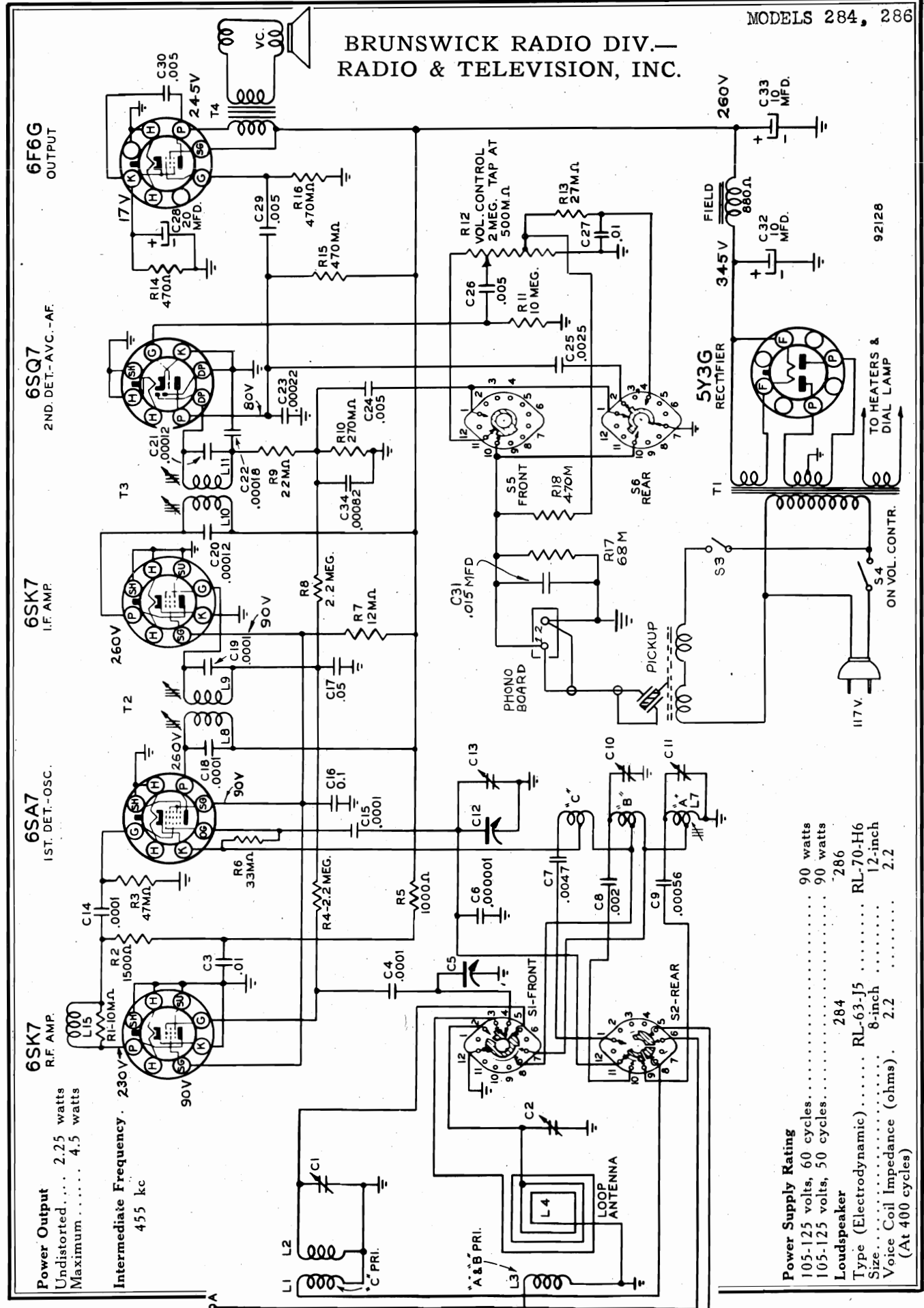
1. With gang in full mesh, move the dial pointer to the reference mark at the left-hand end of the dial backing plate.
2. Place a flat 12-inch ruler on the dial backing plate so the left-end of ruler is at the reference mark at left-end of backing plate. Temporarily fasten the ruler with scotch tape to the backing plate.
3. Refer to calibration scale printed in this service note. This is a reproduction of the dial with an inch-scale drawn at top and bottom. To find the correct pointer position in inches for any desired frequency, draw a vertical line through this frequency on the calibration scale. For example, 1,500 kc is approximately 4 inches from the reference mark.

Dial-Pointer Adjustment.—After the chassis is replaced in cabinet, move the dial pointer (if necessary) so that it is at the left-hand graduation on the dial with the gang in full mesh.

Steps	Connect the high side of the test-osc. to—	Tune test-osc. to—	Turn radio dial to—	Adjust the following for maximum peak output—
1	I-F grid, in series with .01	455 kc	"A" band, Quiet point at 1,500 kc end of dial	L3 and L4 (2nd I.F. trans.)
2	1st-Det. grid, in series with .01			L1 and L2 (1st I.F. trans.)
3	Antenna terminal, in series with 300 ohms (link open)	15.2 mc	15.2 mc "C" band	C1 (osc.)* C2 (ant.)
4		2.44 mc	2.44 mc "B" band	C3 (osc.) Rock in
5	Antenna terminal, in series with 200 mmfd. (link open)	1,500 kc	1,500 kc "A" band	C4 (osc.) C5 (ant.)
6		600 kc	600 kc "A" band	L5 Rock in
7	Repeat steps 5 and 6.			

* Use minimum capacity peak if two peaks can be obtained. Check to determine that the correct peak has been used, by tuning receiver to 14.29 mc, where a weaker signal should be received.

Note: Oscillator tracks above signal on all bands.

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RADIO & TELEVISION, INC.

BRUNSWICK RADIO DIV.— RADIO & TELEVISION, INC.

Alignment Procedure

Steps	Connect the high side of the test-osc. to—	Tune test-osc. to—	Turn radio dial to—	Adjust the following for maximum peak output
1	6SK7 grid in series with .01 mfd.	455 kc	"A" band Quiet point between 550-750 kc	L10 and L11 (2nd I-F trans.)
2	6SA7 grid in series with .01 mfd.			L8 and L9 (1st I-F trans.)
3	Ant. terminal in series with 47 mmfd.	15 mc	15 mc "C" band	C13 (osc.)* C1 (ant.)
4	Ant. terminal in series with 300 ohms	2.44 mc	2.44 mc "B" band	C10 (osc.)*
5	Ant. terminal in series with 200 mmfd.	1,500 kc	1,500 kc "A" band	C11 (osc.) C2 (ant.)
6		600 kc	600 kc "A" band	L7 (osc.) Rock gang
7	Repeat steps 5 and 6.			

* Use minimum capacity peak if two peaks can be obtained.

The oscillator tracks above the signal frequency on all bands.

Output Meter Alignment.—If this method is used, connect the meter across the voice coil, and turn the receiver volume control to maximum.

Test-Oscillator.—For all alignment operations, connect the low side of the test-oscillator to the receiver chassis, and keep the output as low as possible to avoid a-v-c action.

Calibration Scale.—The glass tuning dial may be easily removed from the cabinet and temporarily attached to the chassis for quick reference during alignment. Or, if necessary, the calibration scale printed in this service note can be used in conjunction with an ordinary 6-inch ruler as an accurate and convenient substitute for the regular dial.

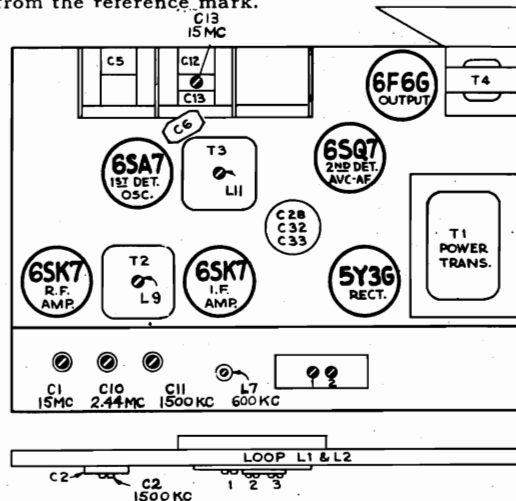
Using Calibration Scale:

1. With gang in full mesh, move the dial pointer to the reference mark at the left-hand end of the dial backing plate.
2. Place a flat 6-inch ruler on the dial backing plate so the left-end of the ruler is at the reference mark at the left-end of backing plate. Temporarily fasten the ruler with scotch tape to the backing plate.
3. Refer to calibration scale printed in this service note. This is a reduced reproduction of the dial with an inch-scale drawn at top and bottom. To find the correct

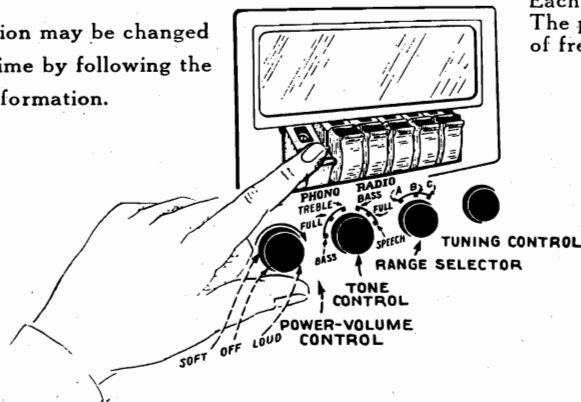
Frequency Range

Standard Broadcast (A)..... 540-1,600 kc
Medium Wave (B)..... 1.6-4.5 mc
Short Wave (C)..... 5.8-18 mc

pointer position in inches for any desired frequency, draw a line through this frequency on the calibration scale. For example, 1,500 kc is approximately $3\frac{3}{4}$ inches from the reference mark.



A station may be changed at any time by following the above information.



The push-buttons should be adjusted for six favorite stations after the receiver has been operating for a brief warm-up period. Each button may be set up to any standard broadcast station. The preferable arrangement is to adjust for stations in the order of frequency, from low to high. Proceed as follows:

Cut out the tabs for your six favorite stations and arrange them in order of frequency in the recesses on the push-buttons.

Press down on the first push-button and hold it down. The screw in back of the push-button is now accessible and should be loosened one or two turns with a screw-driver.

While still holding down the push-button, tune in the first station represented by the station tab with the tuning knob, by Dial Tuning. When the station is heard at its best, tighten up the screw in back of the push-button. Now let go of the push-button, turn the tuning knob in order to detune and again press down the button and let go. The station should be heard again. If not, repeat the above adjustment process until reception is satisfactory.

Proceed to set up the other five push-buttons in a similar manner.

TRIMMER #2
150N VARIABLE
CONDENSER
FRONT SECTION

C CHASSIS VIEWED FROM THE BOTTOM

TRIMMER LOCATIONS

SWITCH IN PHONE POSITION
ALL WIRELESS PHONES
FROM THE FRONT (Rear only)

POSITIONS
1 - PHONE
2 - PUSH BUTTONS
3 - SHORT WAVE
4 - BAND CAST

A - FRONT OF FRONT SECTION
B - REAR " "
C - FRONT " REAR "
D - REAR " "

LE-455 KC.

MODELS 289, 291, 294

BRUNSWICK RADIO DIV.— RADIO & TELEVISION, INC.

RADIO-PHONOGRAPH COMBINATIONS MODELS 289-291-294

These models employ a 9 tube radio chassis in conjunction with a new type automatic record changer, using a feather-weight pickup which reduces record wear and objectionable needle scratch. A permanent needle is built into the phono pickup so that no other needles need be used.

This combination will operate only on 105-125 volt, 60 cycle current.

For PHONOGRAPH operation, the band switch knob is rotated all the way to the left (counter-clockwise). The records are stacked up on the changer, and the turntable switch is slid to the "on" position. Push the lever adjacent to it, momentarily to "start", and operation will commence. The Volume and Tone controls are then set as desired.

For PUSH BUTTON operation, the Band Switch is turned to the second position. Any of the six pre-set stations may now be tuned in by depressing the corresponding button. The procedure for setting up these buttons will be described later.

The Short Wave band covers the frequencies from 5.5 to 18.5 Megacycles. The channels used for local and international short wave broadcasts are indicated by meter blocks and are designated on the lower part of the dials as 16M, 19M, 25M, 31M, 39M and 49M. Tuning is the same as for the regular broadcasts except that greater care must be exercised since tuning is extremely sharp and many stations may be passed over if the tuning knob is rotated too rapidly.

The Broadcast band covers the range from 535 to 1650 kilocycles. All of the American broadcast stations and some police calls may be heard on this band.

In tuning on either band, for best results, the station should be tuned for maximum. The volume is then reduced to the desired level. Never reduce volume by detuning, as distortion and noisy reception may result.

Push Button Alignment

To set up the receiver for push button operation, proceed as follows:

Looking into the back of the cabinet directly behind the buttons, above the dial will be seen two rows of screws. These are painted in various colors. Viewed from the rear these are: from left to right, YELLOW, BLUE, BROWN, BROWN, and ORANGE. Each of these may be adjusted to cover a band of frequencies as tabulated below:

Yellow	- 850 to 1570 kilocycles
Blue	- 550 to 1450 kilocycles
Brown	-- 570 to 1250 kilocycles
Orange	- 535 to 950 kilocycles

The bottom row of adjusting screws are the oscillator trimmers which determine the frequency of the station to be received. The upper row is for the antenna adjustment.

The simplest procedure, when a suitable oscillator is available, is to feed the desired frequency into the antenna, depress the button; turn the oscillator trimmer till the signal is picked up, then reduce the output from the oscillator so that it is just audible. Now adjust the antenna trimmer for maximum. Proceed to the next button and repeat the operation.

In the absence of such equipment, turn the Band Switch all the way to the right for dial tuning of broadcast stations. Start at the low frequency end of the band and tune in the program of the station it is desired to receive. Note the frequency of this station. Without touching the tuning, throw the Band Switch over to the second or Push Button position. Depress the first button, corresponding to the orange screws. Slowly

rotate the lower (oscillator) orange screw till the same program is received. Check this by switching back to dial tuning. (Broadcast position on the band switch). When this has been determined, the signal may now be clarified by carefully adjusting the trimmer of the same color (orange) directly above it. Now repeat the operation by tuning in, on the dial, the next station, of a higher frequency than it is desired to set up; and so on until all six have been aligned. Note that there are two BLUE and two BROWN SETS of screws. Each button will cover only a range of frequencies as noted above, and therefore a group of stations falling within these limits must be selected. The antenna trimmer in each case is directly over the corresponding oscillator.

The station markers may now be inserted into the recesses in the buttons and the cel-luloid covers forced in over them.

ALIGNMENT INSTRUCTIONS

Re-alignment of this receiver should not be attempted unless all other possible causes of faulty operation have been thoroughly investigated. An accurately calibrated signal generator which will cover the necessary wave bands, and an output meter for indicating the effect of adjustments are required.

During the alignment procedure all adjustments should be made under the following conditions:

- 1) Line Voltage as indicated on instruction sheet.
- 2) Volume & Tone control at maximum volume positions.
- 3) Minimum Input from signal generator.

If this procedure is not adhered to, all adjustments will appear very broad. This is due to the action of the automatic volume control.

I. F. Adjustment - The signal generator is set at 455 KC and is connected to the grid of the converter tube (6X47) through a .5 mfd condenser. Be sure to connect a resistor of approximately 25,000 Ohms between the converter grid and ground so that the grid circuit is at ground potential for D. C. It is unnecessary to disconnect the grid from the rest of the circuit.

The input I. F. Transformer trimmers - are both adjusted for maximum output as indicated by the output meter connected across either the voice coil or the primary coil of the loud speaker.

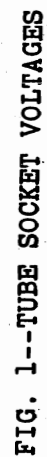
The Output I. F. Transformer trimmers - are adjusted for maximum output as indicated on the output meter. The input I. F. should now be rechecked for maximum output.

Short Wave - Set the band switch to the third position which is the short wave band.

Connect the signal generator thru a standard dummy antenna to the antenna and ground leads of the receiver. Set the generator at 17 MC; turn the condenser until a response is indicated. The pointer should coincide with the 17 MC mark on the dial. Adjust the short wave antenna trimmer (#5, see diagram) for maximum output while rocking the condenser gang from left to right.

Broadcast Band

It is desirable to align this band on the loop. The signal generator is coupled to the receiver by means of a 2 or 3 turn loop. Set the band switch in the broadcast position and condenser places completely out of mesh. Set the signal generator at 1650 KC and adjust the broadcast oscillator trimmer (#3, see diagram) until a response is indicated on the output meter. The generator is now set at 1400 KC. Turn the variable condenser until a response is indicated. The dial pointer should now coincide with the 1400 KC mark on the dial. Now adjust the broadcast inter-stage trimmer (#2) for maximum. This trimmer is located on the right side of the front section of the variable condenser. Set the generator at 800 KC and rotate the variable condenser until a response is indicated. Adjust the broadcast oscillator padder condenser (#4) for maximum response while "rocking" the gang condenser. The High frequency adjustment should now be re-checked.



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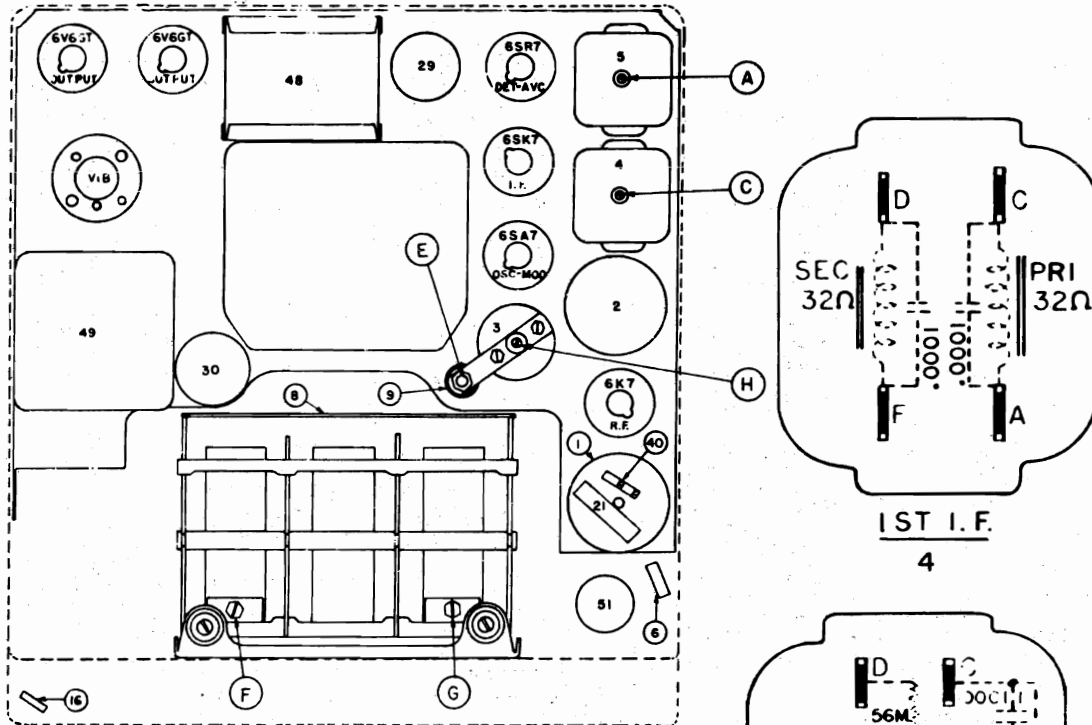


FIG. 3--PARTS LAYOUT--Top View

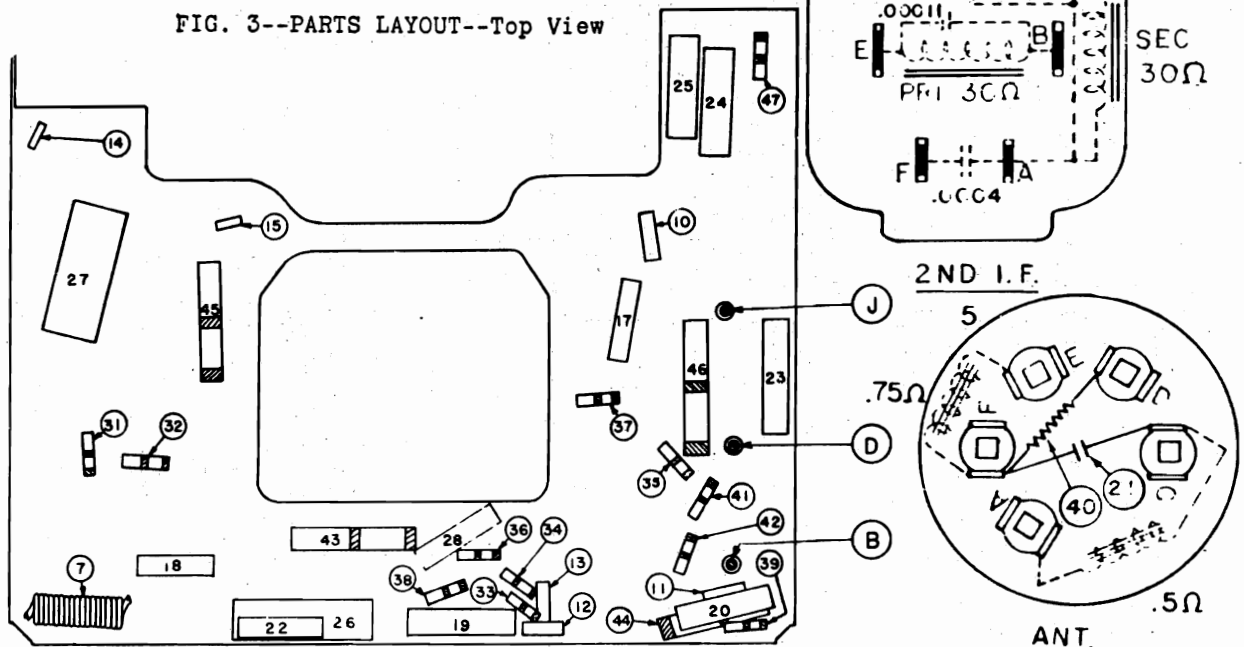
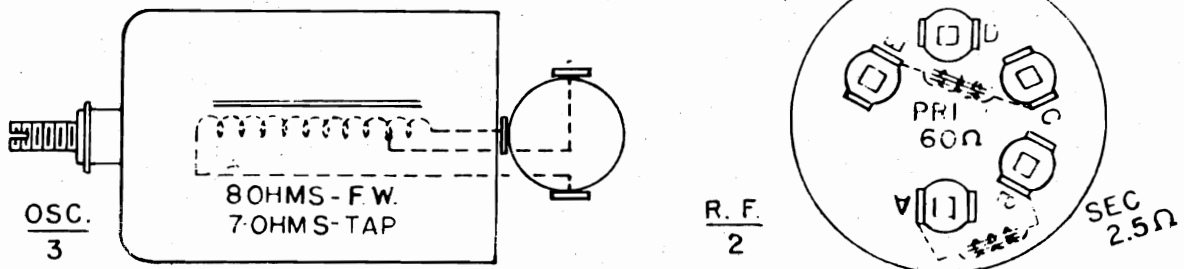
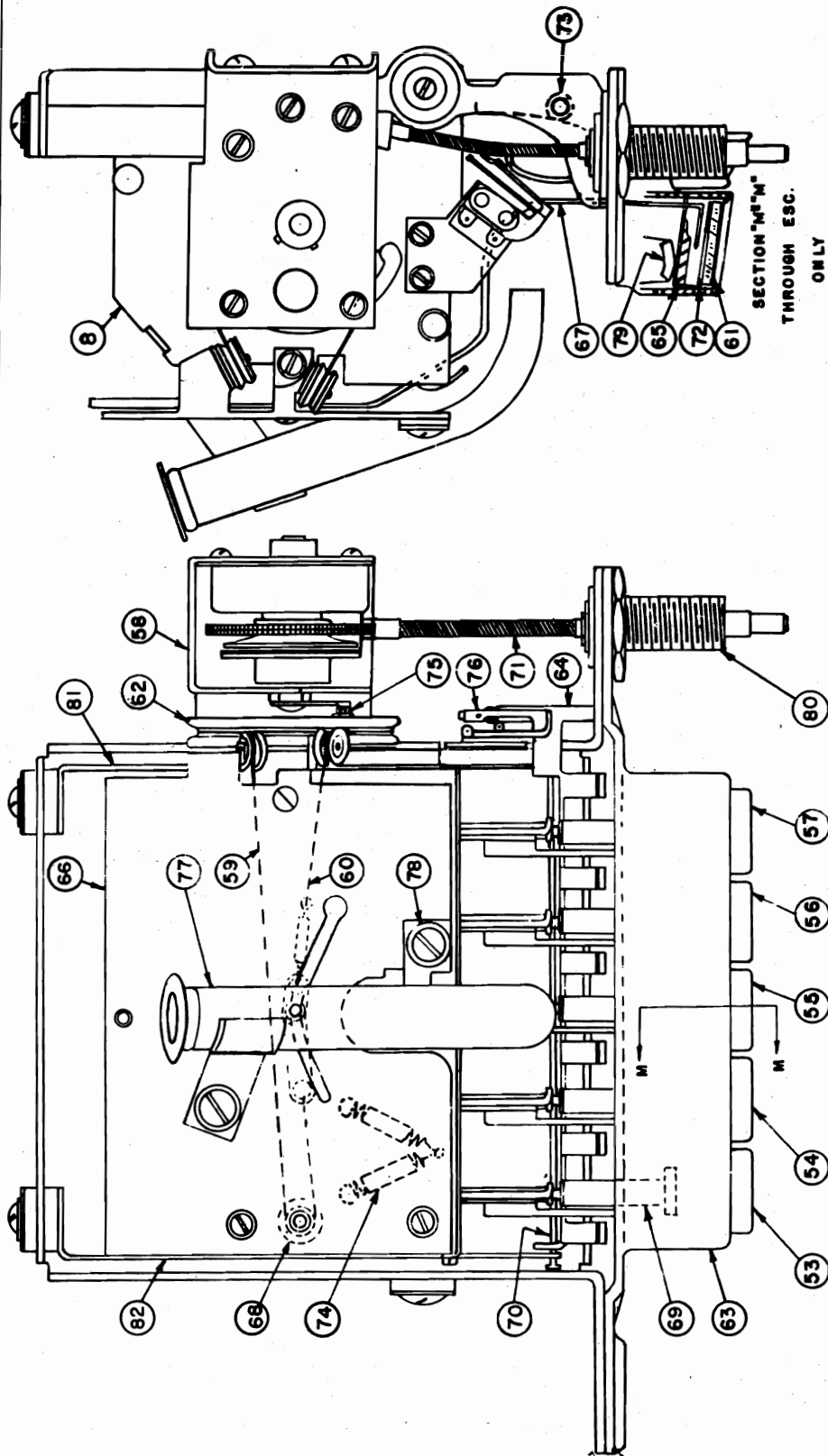


FIG. 4--PARTS LAYOUT--Bottom View



BUICK MOTOR



ANTENNA SYSTEM: The 1941 Buick uses a roof peak antenna as standard equipment.

TUNING CONTROLS: Tuning is accomplished by means of the conventional manual tuning control or by means of a five push button mechanical tuner which may be set up for any desired group of stations.

An electric clutch is provided which automatically disconnects the manual tuning mechanism when any one of the buttons is pressed.

NOTE: Do not attempt to operate the push button tuning unless the set is connected to a six volt battery and turned on.

MODEL 980650

BUICK MOTOR

CIRCUIT ALIGNMENT

Should realignment be necessary, the circuits can be properly adjusted only by the use of a calibrated test oscillator or signal generator and an output meter.

1. Aligning I-F Stages at 260 Kilocycles

- (a) Connect the ground lead of the signal generator to the chassis.
- (b) Connect the signal lead of the signal generator to the R.F. section of the gang condenser (Illus. F, Fig. 3) through a .1 mfd. condenser.
- (c) Connect the output meter from the plate prong of one 6V6GT tube to the plate prong of the other 6V6GT tube.
- (d) Set the signal generator to 260 Kilocycles and turn volume control on full.
- (e) Set the condenser gang to a point around 600 Kilocycles where no station is received.
- (f) Adjust the four screws on the two I.F. coils (Illus. A,B,C & D, Figs. 3 & 4) until maximum output is obtained. Repeat these adjustments with as low an output from the signal generator as possible for a readable indication on the output meter.

2. Aligning at 1560 Kilocycles

- (a) Leave the signal generator connected as before.
- (b) Turn the tuning condenser plates all the way out and against the high frequency stop.
- (c) Set the signal generator to 1560 Kilocycles.
- (d) Adjust the trimmer (Illus. E, Fig. 3) for maximum output.

3. Aligning at 1400 Kilocycles

- (a) Connect the signal lead of the signal generator to the antenna connection of the receiver through a .00005 mfd. mica condenser.
- (b) Set the signal generator to 1400 Kilocycles.
- (c) Rotate the variable plates of the gang condenser until the signal is tuned for maximum output.
- (d) Adjust the trimmers (Illus. F, G, Fig. 3) for maximum output.

4. Aligning at 600 Kilocycles

- (a) Leave the signal generator connected as before.
- (b) Set the signal generator to 600 Kilocycles.
- (c) Tune this signal in on the set.
- (d) Adjust the oscillator coil iron core aligning screw (Illus. H, Fig. 3) while rocking the condenser gang back and forth through the signal until maximum output is obtained.
- (e) Adjust screw (Illus. J, Fig. 4) for maximum output.
- (f) Repeat adjustments made under 3 and 4 above.

5. Adjustment of Radio to Car Antenna

The radio should be adjusted to the car antenna after mounting in the car. The following adjustment should be made:

- (a) Tune in a weak station near the high frequency end of the dial (approximately 1400 KC.)
- (b) Adjust the antenna trimmer (Illus. G, Fig. 3) for maximum output.

BUICK MOTOR

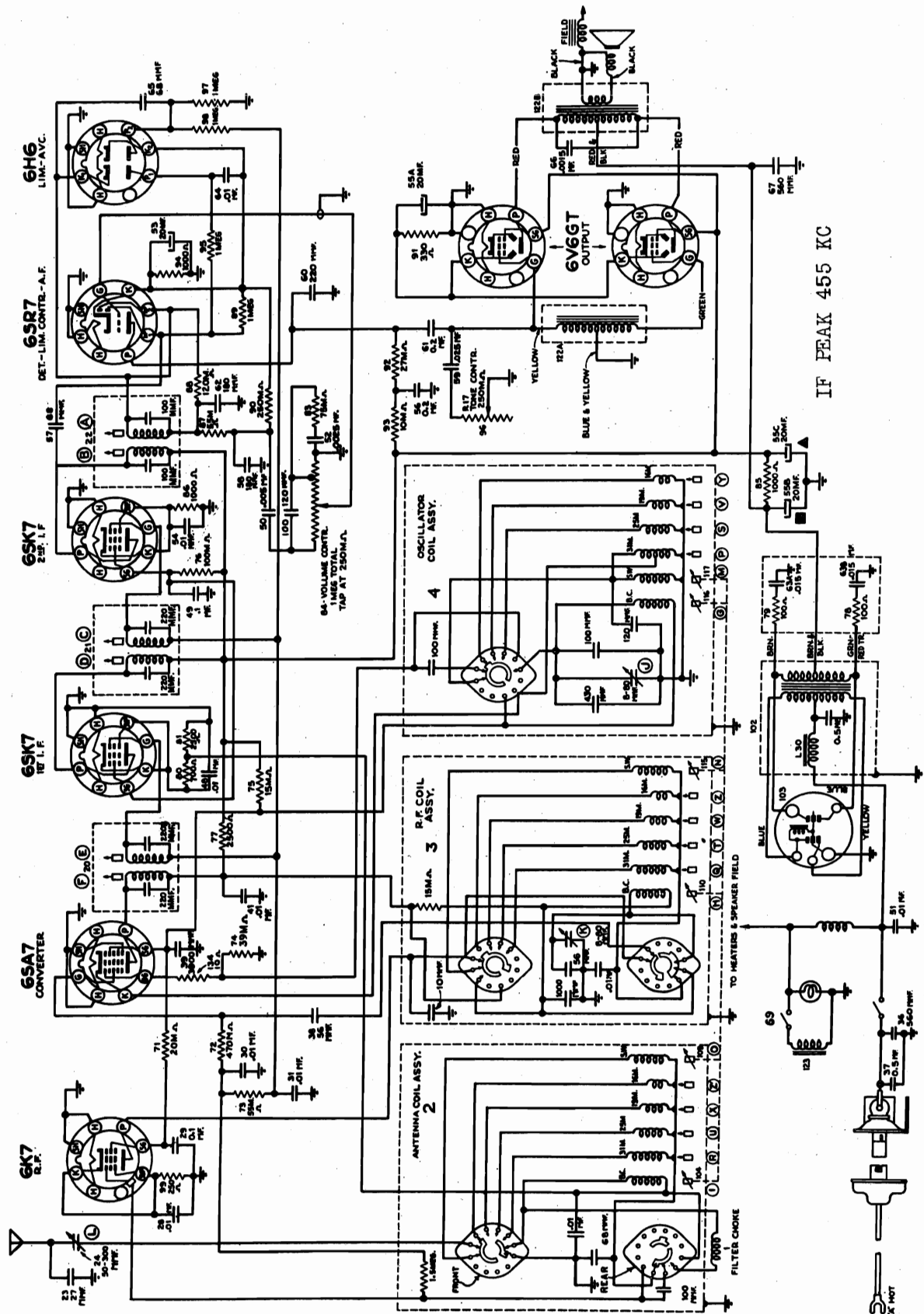
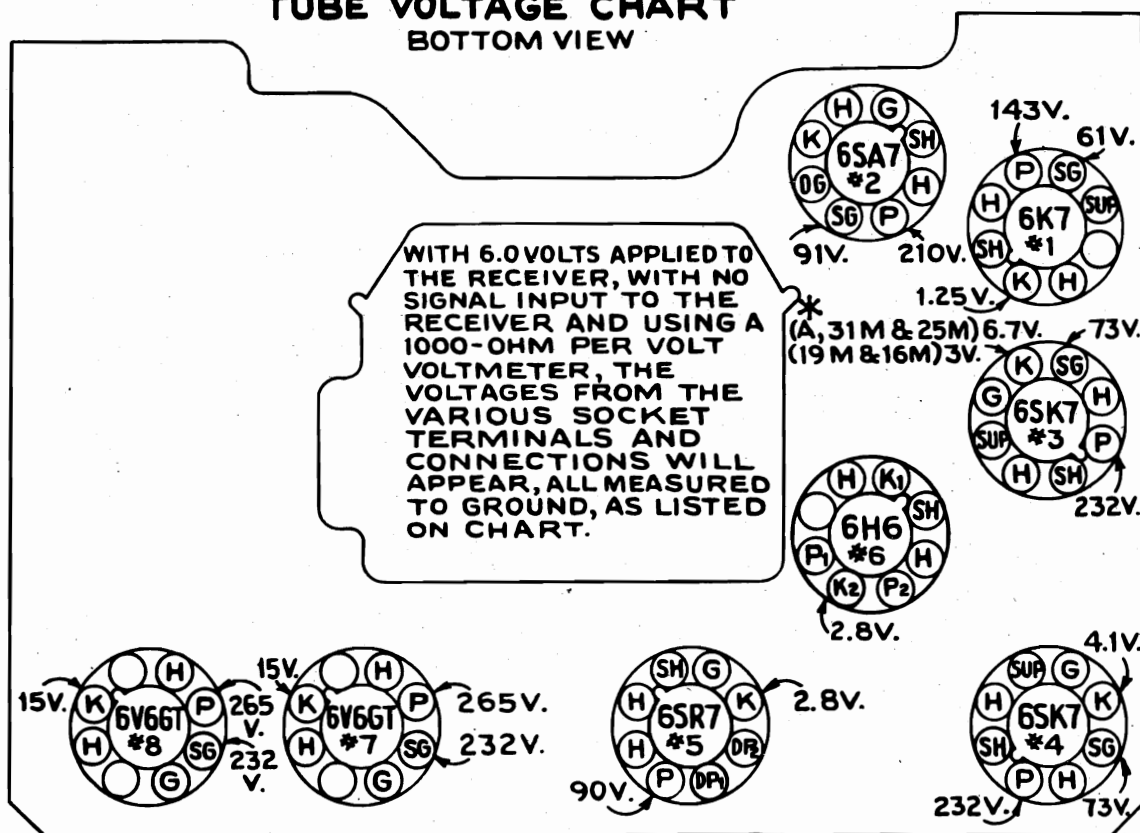


FIG. 4--PARTS LAYOUT--Bottom View

TUBE VOLTAGE CHART

BOTTOM VIEW



*** ALL VOLTAGES GIVEN SHOULD BE CHECKED WITH BAND SELECTOR SWITCH SET IN THE BROADCAST BAND POSITION EXCEPT (6SK7, TUBE No.3) AS NOTED ON SKETCH.**

FIG. 1--TUBE SOCKET VOLTAGES

BUICK MOTOR

MODEL 980660

CIRCUIT ALIGNMENT

ALIGNMENT PROCEDURE: The adjustable trimmers and iron cores in this receiver have been very carefully adjusted at the factory and should require no further adjustment (except the antenna trimmer item L), unless tampered with or a defective unit has been replaced. It is, therefore, advisable not to attempt any adjustment unless it is definitely known that an adjustment is necessary.

Should realignment be necessary the circuits can be properly adjusted only by the use of a calibrated test oscillator or signal generator and an output meter.

To align the circuits of this receiver correctly, an accurately calibrated oscillator or signal generator and an output meter must be used. In aligning this receiver it is very important that the correct frequencies be used and that all alignment adjustments be made in sequence specified below starting with the I.F. Amplifier, then aligning the broadcast band and finally the short wave bands. Slight misalignment of either the I.F. or R.F. circuits will result in a loss of sensitivity over most of the dial.

All R.F. and I.F. adjustments are accessible after removing the speaker cover and rear cover. The I.F. primary windings are adjusted by iron core screws B, D, F, located on top of the I.F. transformers, Fig. 3, and the secondary windings A, C, E are adjusted by core screws located at the bottom of each I.F. transformer, Fig. 4.

1. Aligning I.F. Stages at 455 K.C.

- Connect output meter across the voice coil of the speaker.
 - Connect the high side of the signal generator to the grid of the second I.F. tube 6SK7, (Pin #4, Fig. 2) through a .01 mfd. condenser and the low side of the signal generator should be connected to the frame of the chassis.
 - Turn the volume control on full.
 - Adjust signal generator to 455 K.C.
 - Adjust core screws (illus. A & B, Figs. 4 & 3) on the 3rd I.F. transformer for maximum reading on the output meter.
- NOTE: Always use the lowest signal generator output that will give a reasonable deflection on the output meter.
- Connect the signal generator lead through the .01 condenser to the grid of the first I.F. tube--6SK7, Pin #4--and adjust core screws (illus. C & D, Figs. 4 & 3), in the 2nd I.F. transformer for maximum output as in (e).
 - Connect the signal generator lead through the .01 condenser to the grid of the tube 6SA7, (Pin #9) and adjust core screws (illus. E & F, Figs. 4 & 3) in the first I.F. transformer for maximum output.

NOTE: These adjustments should be repeated several times and during alignment, the signal generator output should be kept to as low a value as is consistent with obtaining a readable indication on the output meter.

2. Broadcast Band Alignment

Six trimming adjustments are provided which include trimmers L, K, J, associated with illus. #2, 3, 4 and the three iron cores I, H, G, which are mounted in front of the coil assemblies in conjunction with the core draw bar. If realignment is found necessary, the R.F. circuits should be adjusted in the following sequence:

- Tune the receiver to the extreme high frequency end of the dial and against the stop.

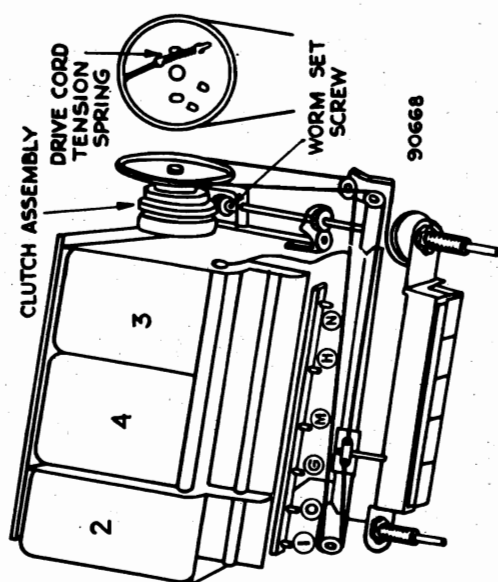


FIG. 5--DIAL CORD LAYOUT

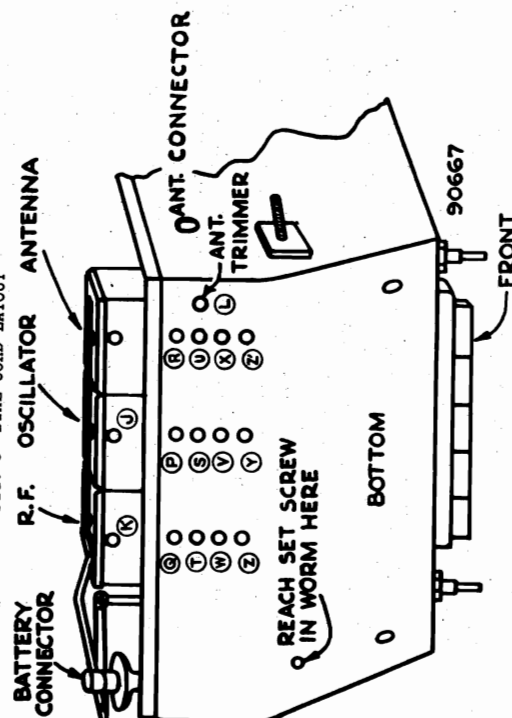


FIG. 6--TRIMMER LOCATIONS

2. Broadcast Band Alignment--Cont'd.

- (b) Turn each of the three core screws (Illus. G, H, & I, Fig. 6) in a counter-clockwise direction 8 TURNS. (This is done in order to separate the cores from the coil windings far enough so that the cores will have no effect on the frequency of the circuits.)
- (c) Connect the "high" side of the signal generator, through a 30 mmf. condenser, to the Buick shielded antenna lead-in cable, (Part No. 1321036), and the "low" side to the shield of the cable.
- (d) Connect the output meter across the voice coil and turn the volume control to maximum.
- (e) Adjust the frequency of the signal generator to exactly 1590 K.C. and peak trimmers (Illus. J, K & L, Fig. 6) for maximum signal output, at the same time reducing the signal generator output to as low a value as is consistent with a reliable indication on the output meter.
- (f) Change the frequency of the signal generator to 1560 K.C. and turn the oscillator core screw (Illus. G, Fig. 5) clockwise until maximum output is obtained.
- (g) Change the frequency of the signal generator to 1200 K.C. and TUNE the RECEIVER by means of the manual tuning knob for maximum signal at approximately 1200 K.C. Check the dial calibration at 1200 K.C. (between 110 and 150 on the dial) and if the receiver does not appear to track at this point repeat paragraph F.
- (h) Adjust the core screws (Illus. H & I, Fig. 5) for maximum signal output.
- (i) Change the frequency of the signal generator to 600 K.C.
- (j) TUNE the RECEIVER by means of manual tuning knob for maximum signal at 600 K.C.
- (k) Adjust the antenna and R.F. trimmers (Illus. L & K, Fig. 6) for maximum output.
- (l) Reset signal generator to 1200 K.C. and tune receiver for maximum output at 1200 K.C.
- (m) Adjust antenna and R.F. cores (Illus. H & I, Fig. 5) for maximum output.

3. Short Wave Alignment

Because of the extensive frequency range of this receiver it is necessary that the short wave bands be aligned in exact accordance with the following procedure. Be sure to make all adjustments in the order specified below.

- (a) Do not attempt to align the short wave bands without having first completed the broadcast alignment.
NOTE: THIS IS VERY IMPORTANT.
- (b) Turn the band indicator to "31 METERS", and the volume control to maximum.
- (c) Tune the receiver so that the dial pointer is at the extreme high frequency end of the 31 meter band and adjust iron core screws (Illus. M, N & O, Fig. 5) so that each core end is flush with the coil forms, which extend beyond the shield.
- (d) Turn iron trimmer core screws (Illus. R, U, X, Z, Q, T, W, Z, P, S, V, Y, Fig. 6) in a counter-clockwise direction as far as they will go.
NOTE: Do not force the cores against their stops as too much force may fracture the core.

- (e) Connect the "high" side of the signal generator through a 30 mmf. condenser, and the Buick shielded antenna lead-in to the antenna connection of the receiver, and the "low" side to the shield of the lead-in.
- (f) Adjust the signal generator frequency to 9.6 MC. and move the pointer to 9.6 MC. on the dial scale.
- (g) Turn core screw (Illus. P, Fig. 6) in a COUNTERCLOCKWISE direction until the FIRST peak is obtained and adjust carefully for maximum reading on the output meter.
- (h) Turn core screw (Illus. Q, Fig. 6) in a clockwise direction until the SECOND peak is obtained if more than one peak can be found and adjust for maximum reading on the output meter, at the same time reducing the signal generator output to as low a value as is consistent with a reliable indication on the output meter.
- (i) Adjust core screw (Illus. R, Fig. 6) as in (h) above.
- (j) Change the signal generator frequency to 11.8 MC., the band indicator to "25 METERS" and move the pointer to 11.8 MC. on the dial scale.
- (k) Adjust core screw (Illus. S, Fig. 6) as in (g) above.
- (l) Adjust core screws (Illus. T & U, Fig. 6) as in (h) above.
- (m) Change the signal generator frequency to 15.2 MC., the band indicator to "19 METERS", and move the dial pointer to 15.2 MC. on the dial scale.
- (n) Adjust core screw (Illus. V, Fig. 6) as in (g) above.
- (o) Adjust core screws (Illus. W & X, Fig. 6) as in (h) above.
- (p) Change the signal generator frequency to 17.8 MC., the band indicator to "16 METERS", and move the pointer to 17.8 MC. on the dial scale.
- (q) Adjust core screw (Illus. Y, Fig. 6) as in (h).
- (r) Adjust core screws (Illus. Z & Z1, Fig. 6) as in (g).
- (s) Repeat operations e, f, g, h, i, j, k, l, m, n, o, p, q, and r, described above at least three times.

4. General Alignment Information

Alignment of the short wave bands should never be attempted without first completing the broadcast alignment.

The most satisfactory method of aligning or checking the "Spread-Band" ranges is on actual reception of short wave stations of KNOWN FREQUENCY, by adjusting the iron oscillator coil for each band (Illus. P, S, V & Y, Fig. 6) so that these stations come in at the correct points on the dial. (Note: Repeat R, F & Ant.).

In exceptional cases, when the set is being serviced in a location where the noise level is high enough to prevent reception of short wave stations, a signal generator should be used for alignment, but an extremely high degree of accuracy is required in the frequency settings of the signal generator, as a slight error will produce considerable inaccuracy on the spread-band dial.

BUICK MOTOR

MODEL 980660
 MODELS 980690, 980691
 MODEL 1323457

TUNER SERVICE PARTS			MODEL 1323457
Part No.	Description	Part Name	Description
56	Coil	Ant., R.F. & Osc. coil & bkt. assy.	
57	Coil	Oscillator series	
58	Coil	Oscillator shunt	
59	Control	Volume-tone-on-off switch	
61	Condenser	.000125 mfd. compensating	
62	Condenser	.0002 mfd. molded	
63	Condenser	.005 mfd. 800 V. tub.	
64	Condenser	Ant. trimmer	
65	Tuner assy.	Push button--latching device (Includes 75 to 89)	
66	Cord	Pointer cord & link assy.	
67	Core	Connecting link and core assy.	
68	Diffuser		
69	Plate	Pointer plate assy.	
70	Spring	Pointer return	
71	Spring	Latch bar spring	
72	Bracket	Light bkt. & lead assy.	
73	Bulb		
74	"C" washer	Pointer cord & link mtg.	
75	Button	Push button & shaft assy.	
76	Tip	(P.B.) tuning shaft tip	
77	Tip	Latching button-manual	
78	Bumper	Rubber bumper strip	
79	Nut	Tuning nut (P.B.)	
80	Nut	Tuning nut (manual)	
81	Nut	Nut & sleeve-manual tuning screw	
82	Spring	P. B. shaft-friction spring	
83	Spring	Manual shaft-friction spring	
84	Shaft	Manual tuning screw	
85	"C" washer	Manual tuning nut retainer	
86	"C" washer	Spring retaining washer--P.B.	
87	Spring	Push button return	
88	Spring	Manual tuning shaft return	
89	Washer	Cup washer--man. tuning spring	

VOLUME CONTROL MAXIMUM.
 Signal Generator output minimum for satisfactory output indication.

Series Condenser Or Dummy Antenna	Connect To	Signal Generator Frequency	Adjust Screws In Order
0.1 Mfd.	Grid side of R.F. Sec. (14B) of Gang Condenser	262 K.C.	A B C D
0.1 Mfd.	Grid Side of R.F. Sec. (14B) of Gang Cond.	1615 K.C.	E
.000060 Mfd.	Antenna Connector	1450 K.C.	F G
.000060 Mfd.	Antenna Connector	600 K.C.	H J
.000060 Mfd.	Antenna Connector	1450 K.C.	F G
.000060 Mfd.	Antenna Connector	600 K.C.	H J

Adjust trimmer G to match car antenna (1450 KC) when radio is installed.

Rock gang condenser back and forth through signal during 600 K.C. adjustment of screws H & J. See Bulletin 5D-2 for complete Alignment Procedure.

PUSH BUTTON SET-UP

Release holding spring in bottom of button, pull button off. Loosen re-set screw, tune in desired station. Push in re-set screw until it bottoms. Release and tighten screw. Replace button.

MODEL 980660

5. Adjusting Antenna Compensating Condenser

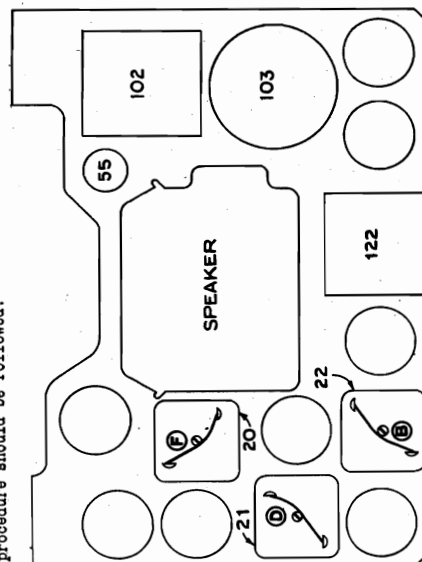
This adjustment should only be made after the receiver has been properly installed in the car with the antenna connected to the receiver. Tune the receiver to a weak signal at the high frequency end of the broadcast band at about 1200 K.C. and with the antenna fully extended, adjust the antenna compensating trimmer (illus. 1, Fig. 6) for maximum signal strength.

Do not attempt to make any other alignment adjustments with the receiver installed in the car.

- Remove speaker (front) cover, rear cover and the bottom of tuner section. Unsolder the connecting leads from the volume control and other points in the chassis.
- Remove the link and arm arrangement that operates the band switches by first removing the two units, (A), holding the short link arm (B) to the band indicator shaft.
- Remove screws (C) and link arms (D) from each of the band switch shafts, but in removing the center one, care should be taken not to lose the two steel rollers and "S" spring (which are loose on the assembly) from the detent device at the base of the center coil unit.
- Remove the four units (E) which hold the coil plate (F) to the tuner assembly and withdraw the coil plate from the assembly, being careful to prevent the coil cores from striking any part of the assembly which may result in breakage of the core.
- After removing the two small screws located at the base of each coil unit, the coil units can then be removed from the coil plate.
- In re-assembling the cores into the coil units, hold the coil plate (F) slightly "off-square" from the cores, then insert the core nearest its coil, one by one, as the coil plate is brought square with the tuner assembly frame.

REMOVAL OF COIL UNIT

Should it become necessary to remove a coil unit, the following procedure should be followed:

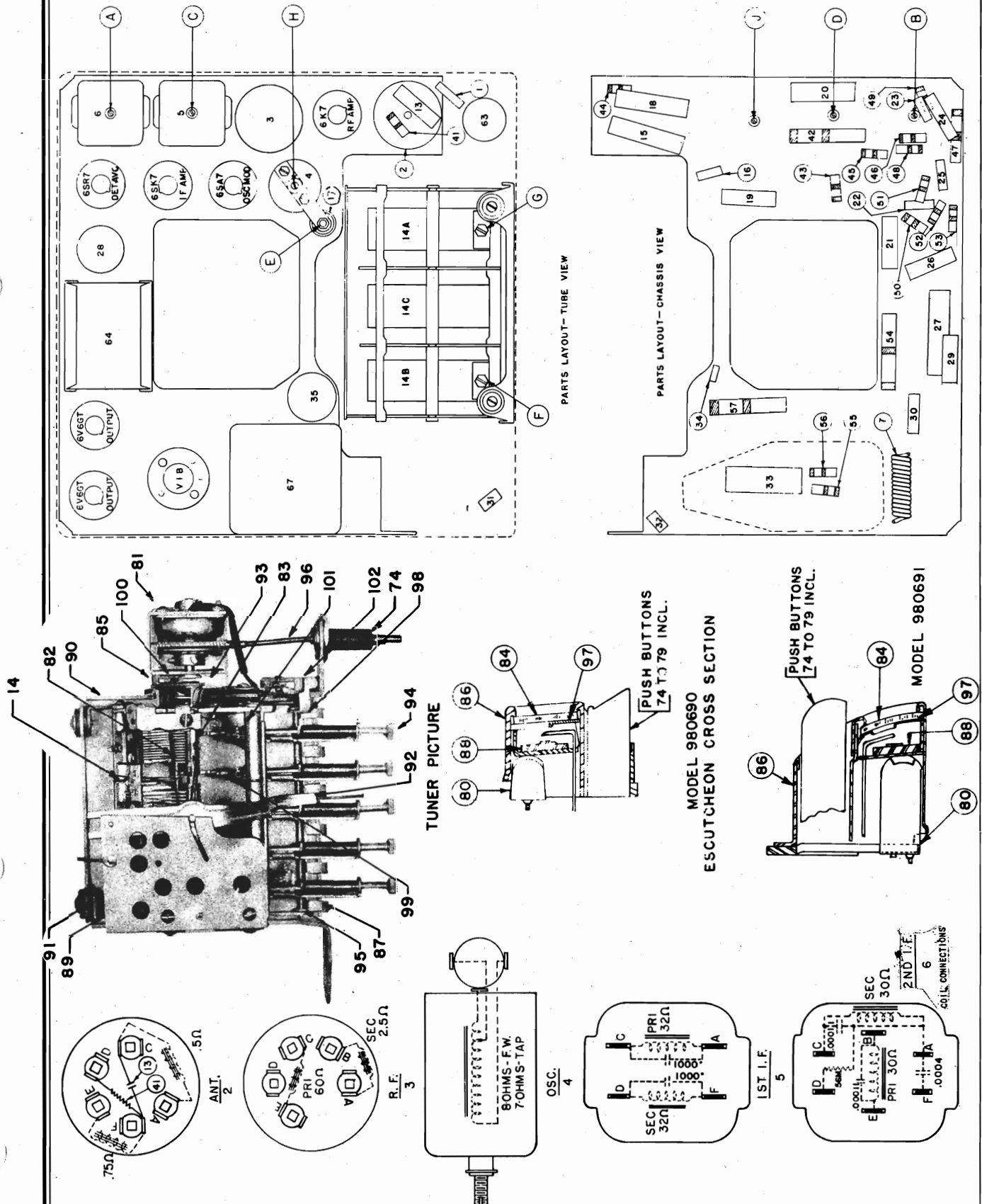




FOR OTHER DATA, SEE INDEX

BUICK 1942 MODELS 980690 - 980691

BUICK MOTOR



MODEL 1323457

BUICK MOTOR

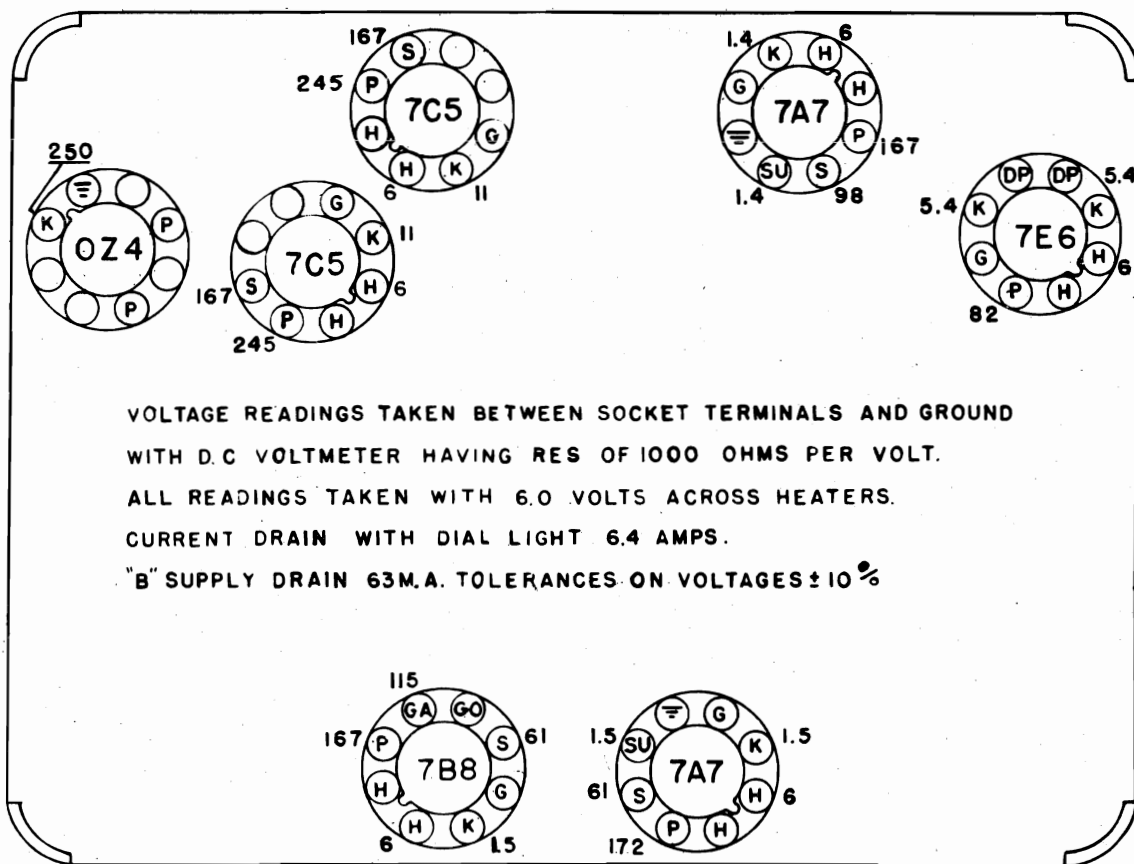


FIG. 1--TUBE SOCKET VOLTAGES

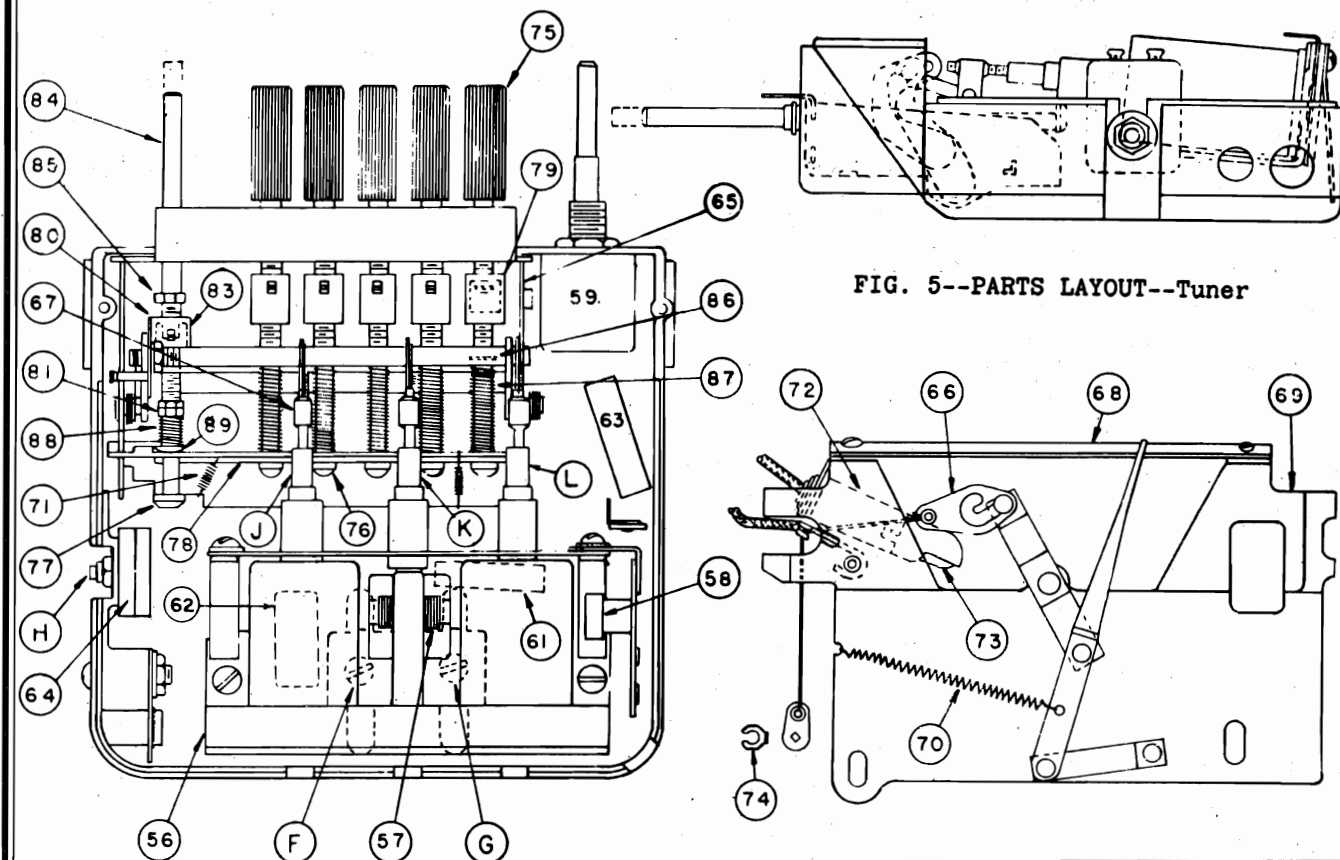
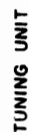


FIG. 5--PARTS LAYOUT--Tuner

MODEL 1323457



AMPLIFIER UNIT

GENERAL: The Buick model 1323457 is a 7 tube three unit radio built especially for 1941 Buick cars. It is arranged with an arm rest mounting tuner, and amplifier unit for trunk mounting and a header speaker to be mounted in the rear of the car.

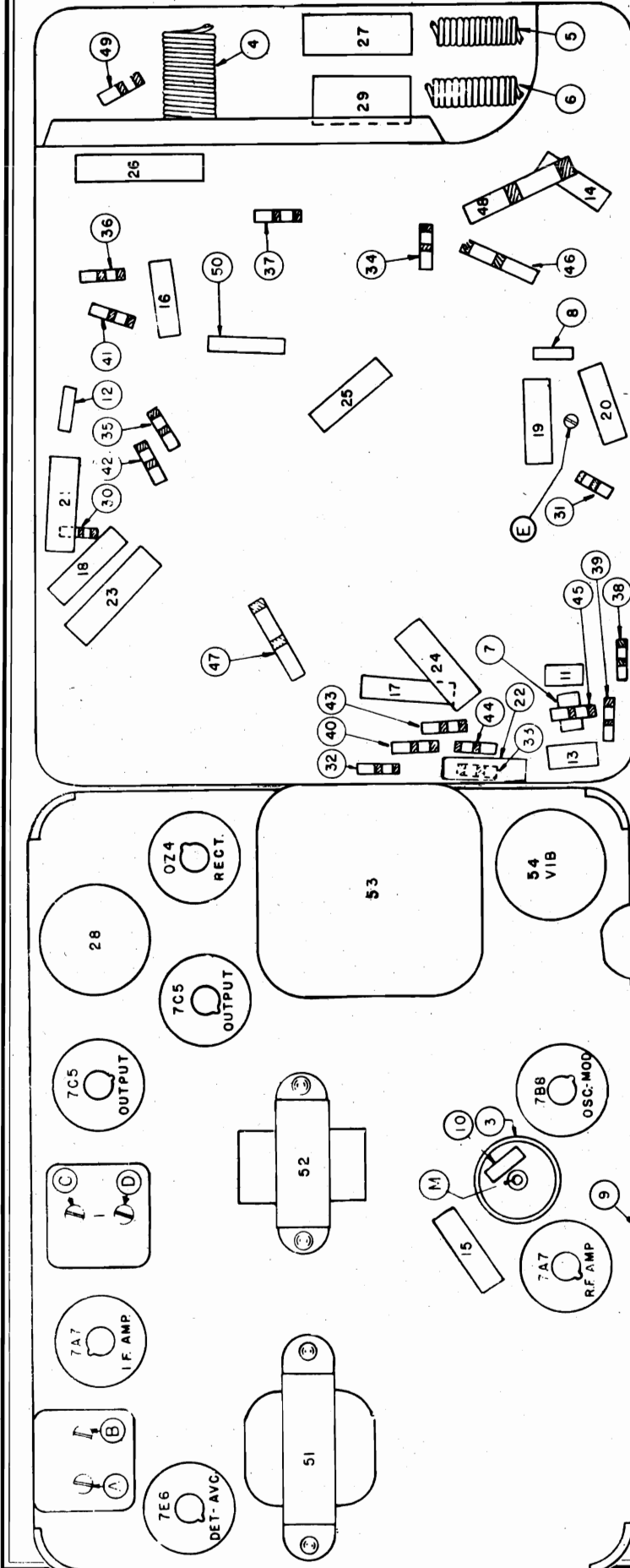


FIG. 3--PARTS LAYOUT--Top View

FIG. 4--PARTS LAYOUT--Bottom View

TUNING CONTROL: Tuning is accomplished by means of a manual tuning control or by means of five push buttons each of which adjusts the position of three iron cores in the tuning unit to preselected frequencies.

Setting up the push buttons for any desired station is accomplished by pressing the button into its latched position and rotating in the manner of a manual tuning control until the desired station is tuned in. No locking device is required to retain this setting.

Note: Do not hold button in beyond its normal latching position when setting up station.

The manual control operates by pressing the tuning knob into its latched position and tuning in the conventional manner.

BUICK MOTOR

CAPACITY ALIGNMENT1. Aligning I.F. stages at 455 K.C.

- (a) Connect the ground lead of the signal generator to the chassis frame.
- (b) Connect the signal lead of the signal generator to the grid of the 7B8 tube (Grid side of condenser 12) through a 0.1 mfd. condenser.

2. Mechanical alignment of cores--Cont'd.

- (b) Remove the pointer plate (note insulating washers under mounting screw) without disturbing the tuning mechanism.
- (c) Using a spare core as a gauge, adjust the oscillator core K so that its rear surface is exactly flush with the front end of the oscillator coil winding.
- (d) Manually tune the set to a point where the front surface of the oscillator core is flush with the front end of the oscillator coil fiber mounting bushing.
- (e) Adjust the antenna and R.F. cores (Illus. J, L, Fig. 5) so that the front surfaces of these cores are flush with the front ends of the coil fiber mounting bushing. Paragraphs (c), (d) and (e) mechanically align the cores so that all three are just at the point of entering their respective windings when the tuning mechanism is against the high frequency stop.
- (f) Replace the pointer plate assembly.

3. Aligning at 1560 K.C.

- (a) Connect the signal lead of the signal generator to the antenna connection of the receiver through an .000075 mfd. condenser.
- (b) Turn the manual control of the set to the high frequency end against stop.
- (c) Set signal generator to 1560 K.C.
- (d) Adjust the oscillator trimmer (Illus. F, Fig. 5) for maximum output.

4. Aligning at 600 K.C.

- (a) Leave the signal generator connected the same as before and set frequency to 600 K.C.
- (b) Tune in this frequency on the set.
- (c) Adjust the R.F. trimmer (Illus. G, Fig. 5) for maximum output.
- (d) Adjust the antenna trimmer (Illus. H, Fig. 5) for maximum output.

5. Aligning at 1400 K.C.

- (a) Set the signal generator to 1400 K.C. and tune set to this signal.
- (b) Adjust the antenna core (Illus. J, Fig. 5) and the R.F. core (Illus. L, Fig. 5) for maximum output.

6. Realigning at 600 and 1400 K.C.

- (a) Repeat the alignment outlined under paragraphs 4 and 5 with as low an output from the signal generator as possible.
- (b) Apply cement to the core screws to prevent their changing alignment.

7. Adjusting receiver to car antenna.

After the receiver is installed in the car readjust the antenna trimmer (Illus. H, Fig. 5) on a weak station near 1400 K.

CIRCUIT ALIGNMENT

If realignment is found necessary, the circuits can be properly aligned only with the use of a calibrated test oscillator or signal generator and an output meter. Extreme care should be exercised in following the alignment instructions in order to obtain the best performance possible.

ALIGNMENT PROCEDURE

Two separate alignment procedures are included in these instructions. The first or capacity alignment is to be considered the usual alignment procedure and the second or capacity and inductance alignment is to be used only when there is definite evidence that the iron cores of the tuning coils are out of alignment.

CAPACITY ALIGNMENT1. Aligning I.F. stages at 455 K.C.

- (a) Connect the ground lead of the signal generator to the chassis frame.
- (b) Connect the signal lead of the signal generator to the grid of the 7B8 tube (Grid side of condenser 12) through a 0.1 mfd. condenser.
- (c) Connect an output meter across the speaker voice coil. (If speaker is disconnected a 4 ohm load may be used instead.)
- (d) Set signal generator to 455 K.C.
- (e) Turn the set volume control on full and tune the set to a position where no squeals or beat notes may be heard, and so that when the tuning control knob is rotated within narrow limits there is no appreciable change in output. The tone control should be rotated to its extreme high position (clockwise.)
- (f) Adjust the I.F. trimmers (Illus. A, B, C, D, Fig. 3) and the I.F. core adjustment (Illus. E, Fig. 4) until maximum output is obtained.
- (g) Repeat these adjustments with as low an output from the signal generator as possible for more accurate alignment.
- (h) Connect the signal generator to the antenna connection of the set through an 80 mfd. condenser.
- (i) Adjust the I.F. trap adjustment (Illus. M, Fig. 3) for MINIMUM output.

2. Alignment at 1560 K.C.

- (a) Leave signal generator connected the same as for the I.F. trap adjustment.
- (b) Tune the set to the extreme high frequency position against the stop.
- (c) Set the signal generator to 1560 K.C.
- (d) Adjust the oscillator trimmer (Illus. F, Fig. 5) for maximum output.

3. Alignment at 600 K.C.

- (a) Set the signal generator to 600 K.C. and tune the set to this signal.
- (b) Adjust the R.F. trimmer (Illus. G, Fig. 5) and the antenna trimmer (Illus. H, Fig. 5) for maximum output.

CADILLAC DIV.—GEN. MOTORS

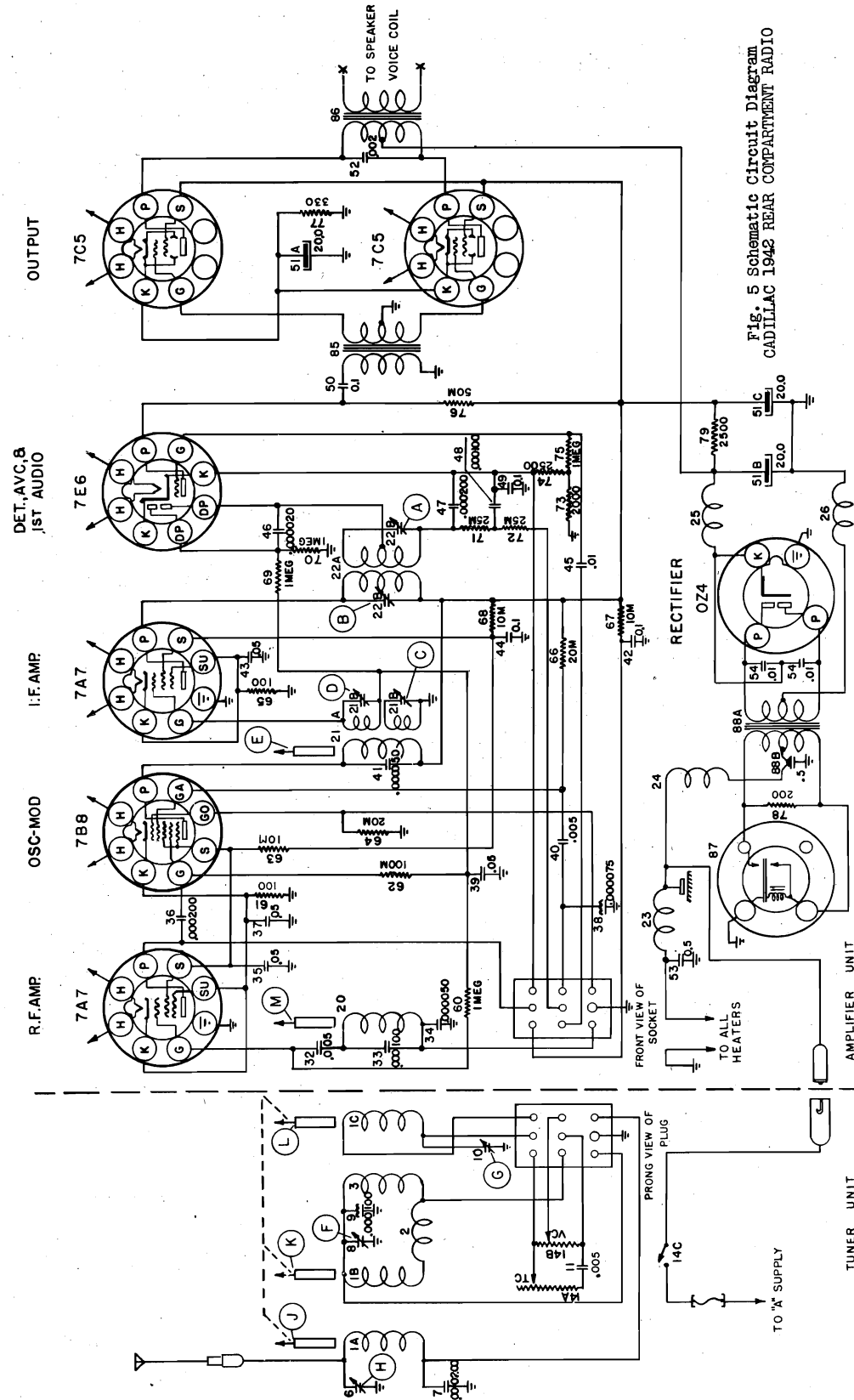


Fig. 5 Schematic Circuit Diagram
CADILLAC 1942 REAR COMPARTMENT RADIO

CADILLAC DIV.—GEN. MOTORS

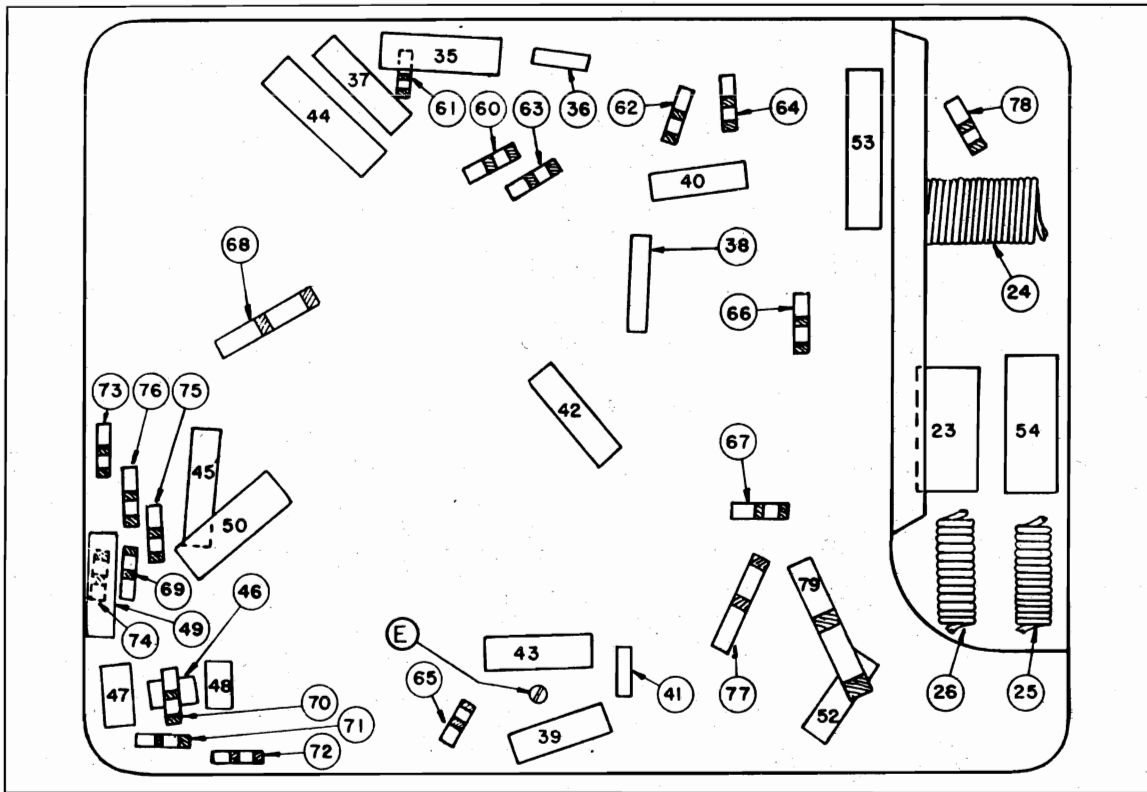


Fig. 2 Parts Layout - Bottom View
CADILLAC 1942 REAR COMPARTMENT RADIO

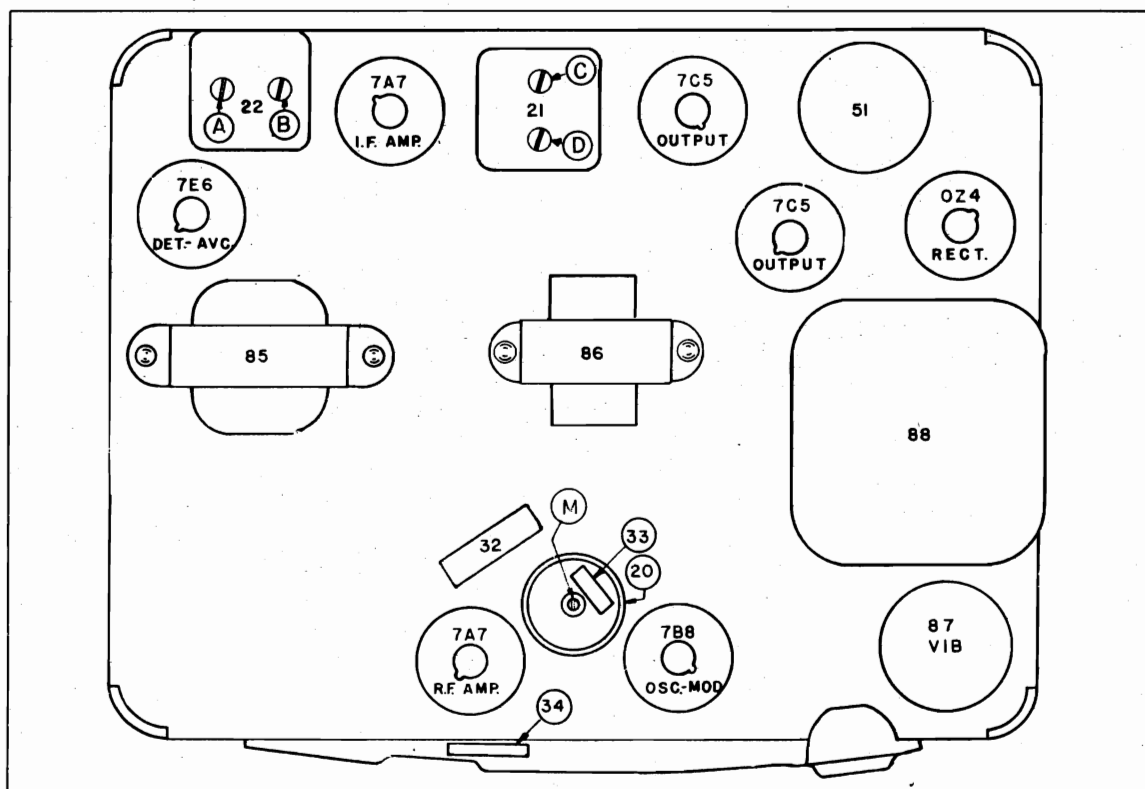


Fig. 1 Parts Layout - Top View
CADILLAC 1942 REAR COMPARTMENT RADIO

CADILLAC DIV.—GEN. MOTORS

TO CONTROL THE Vacuum Aerial (Cont'd.)

within the other. For maximum reception both rods should be extended to their full height, the inner rod being extended manually.

TO CHANGE STATION SETTING OF PUSH BUTTONS

The five push buttons should be set up for five stations which are received favorably in your vicinity. The procedure for setting up the push buttons is as follows:

1. Turn on the radio and allow it to warm up from ten to fifteen minutes.
2. Depress button to be set up until it latches and remains depressed.
3. Without pressing or holding the button down, turn it, as in manual tuning, until the desired station is tuned in. This should be done very carefully until the station comes in sharp and clear, free from background noise.
4. Repeat this process for any other buttons which you wish to change.

The setting of any button may be changed at any time by following this procedure.

CAUTION: TURNING ANY OF THE PUSH BUTTONS CHANGES ITS STATION SETTING. DO NOT TURN ANY BUTTON UNLESS YOU WISH TO CHANGE THE SETTING.

CIRCUIT ALIGNMENT

If realignment is found necessary, the circuits can be properly aligned only with the use of a calibrated test oscillator or signal generator and an output meter. Extreme care should be exercised in following the alignment instructions in order to obtain the best performance possible.

ALIGNMENT PROCEDURE

Two separate alignment procedures are included in these instructions. The first or capacity alignment is to be considered the usual alignment procedure and the second or capacity and inductance alignment is to be used only when there is definite evidence that the iron cores of the tuning coils are out of alignment.

CAPACITY ALIGNMENT

1. Aligning I.F. stages at 455 KC.
 - (a) Connect the ground lead of the signal generator to the chassis frame.
 - (b) Connect the signal lead of the signal generator to the grid of the 7B8 (Grid side of condenser 36) through a 0.1 mfd condenser.
 - (c) Connect an output meter across the speaker voice coil. (If speaker is disconnected a 4 ohm load may be used instead.)
 - (d) Set signal generator to 455 KC.
 - (e) Turn the set volume control on full and tune the set to a position

SPECIFICATIONS

Power Output 5 Watts Undistorted
 Power Consumption 7.5 Amperes at 6 Volts
 Sensitivity 6 Microvolts at 1 Watt Output
 Selectivity at 1000 times signal 35 KC
 Tuning Range 545 to 1600 KC
 Manual Tuning 545 to 1600 KC
 Automatic Tuning (all 5 buttons) 21 oz. Permanent Magnet, Elliptical Speaker
 Intermediate Frequency Peak 455
 Antenna Trimmer - Designed for 80 mmf. vacuum trunk antenna

TUBE COMPLEMENT

Quantity	Part No.	Type	Function
2	12L3583	7A7	RF and IF Amplifier
1	12L3585	7B8	First Detector - Oscillator
1	12L3582	7E6	Second Detector AVC and First Audio Amplifier
2	12L3586	7C5	Power Amplifier
1	7237180	0Z4	Rectifier

CIRCUIT

This model is a 7-tube three unit radio covering the standard broadcast band and designed for installation in the rear trunk compartment with the remote control in the right rear arm rest. The speaker is mounted in the trunk on the ledge behind the rear seat back, the sound being projected through an opening in this ledge.

The permeability tuned remote control unit contains the complete tuning and control mechanism and coils.

The receiver unit contains the RF tubes, the IF amplifier, audio system and power supply. This unit is connected to the remote tuner unit by a shielded plug-in cable.

Tuning is accomplished by means of the conventional manual control or by means of five push buttons. Pushing any of the buttons operates a small mechanical motor which moves the tuning cores in or out of the coils to a pre-selected position.

The separate rear compartment speaker is a new elliptical design and is 6-1/4" x 9-1/4". The speaker's 21 ounce permanent magnet insures excellent tone quality under all operating conditions.

TO CONTROL THE VACUUM AERIAL

To the left of the volume control rod is the knob which controls the vacuum aerial. Pulling this button upward will raise the aerial and pushing it downward will lower the aerial. The vacuum aerial has two rods, one sliding

CADILLAC DIV.—GEN. MOTORS

Capacity Alignment (Cont'd.)

where no squeals or beat notes may be heard, and so that when the tuning control knob is rotated within narrow limits there is no appreciable change in output. The tone control should be rotated to its extreme high position (clockwise).

- (f) Adjust the I.F. trimmers A, B, C, and D, and the I.F. core adjustment E until maximum output is obtained.
- (g) Repeat these adjustments with as low an output from the signal generator as possible for more accurate alignment.
- (h) Connect the signal generator to the antenna connection of the set through a 70 mmfd. condenser.
- (i) Adjust the I.F. trap adjustment M for minimum output.

2. Alignment at 1615 KC.

- (a) Leave signal generator connected the same as for the I.F. trap adjustment.
- (b) Tune the set to the extreme high frequency position against the stop.
- (c) Set the signal generator to 1615 KC.
- (d) Adjust the oscillator trimmer F for maximum output.

3. Alignment at 600 KC.

- (a) Set the signal generator to 600 KC and tune the set to this signal.
- (b) Adjust the R.F. trimmer G and the antenna trimmer H for maximum output.

CAPACITY AND INDUCTANCE ALIGNMENT

1. Aligning I.F. stages at 455 KC.

Align the I.F. stages as outlined under paragraph 1 under "Capacity Alignment".

2. Mechanical Alignment of Cores.

- (a) Turn the manual control of the set to the high frequency end, against stop.
- (b) Remove the pointer plate (note insulating washers under mounting screws) without disturbing the tuning mechanism.
- (c) Using a spare core as a gauge, adjust the oscillator core K so that its rear surface is exactly flush with the front end of the oscillator coil winding.
- (d) Manually tune the set to a point where the front surface of the oscillator core is flush with the front end of the oscillator coil fibre mounting bushing.

Capacity and Inductance Alignment (Cont'd.)

- (e) Adjust the antenna and R.F. cores J and L so that the front surfaces of these cores are flush with the front ends of the coil fibre mounting bushing. Mechanically align the cores so that all three are just at the point of entering their respective windings when the tuning mechanism is against the high frequency stop.
- (f) Replace the pointer plate assembly.

3. Aligning at 1615 KC.

- (a) Connect the signal lead of the signal generator to the antenna connection of the receiver through a 70 mmfd. condenser.
- (b) Turn the manual control of the set to the high frequency end against stop.
- (c) Set signal generator to 1615 KC.
- (d) Adjust the oscillator trimmer "F" for maximum output.

4. Aligning at 600 KC.

- (a) Leave the signal generator connected the same as before and set frequency to 600 KC.
- (b) Tune in this frequency on the set.
- (c) Adjust the R.F. trimmer G for maximum output.
- (d) Adjust the antenna trimmer H for maximum output.

5. Aligning at 1400 KC.

- (a) Set the signal generator to 1400 KC and tune set to this signal.
- (b) Adjust the antenna core J and the R.F. core L for maximum output.

6. Realignment at 600 and 1400 KC.

- (a) Repeat the alignment outlined under paragraphs 4 and 5 with as low an output from the signal generator as possible.
- (b) Apply cement to the core screws to prevent their changing alignment.
- (c) Adjusting receiver to car antenna.

After the receiver is installed in the car, readjust the antenna trimmer H on a weak station near 1400 KC.

CADILLAC DIV.—GEN. MOTORS

Part No.	Illust. No.	Part Name	Description	List Price
<u>TUNER MECHANICAL PARTS</u>				
7242580	95	Tuner Assy.	Push Button latching devise - Includes item 96 to 110.	\$8.50
7241863	96	Button	Push Button & Shaft	
7239986	97	Bumper	Rubber Strip	
7240925	98	Nut	P. B. Tuning. . . . .	.36
7240090	99	Nut	Manual Tuning.	
7240109	100	Nut	Nut & Sleeve-Manual Screw . . . . .	.12
7239987	101	Shaft	Manual Tuning	
7240246	102	Spring	P. B. Shaft Friction	
7240074	103	Spring	Manual Shaft Friction	
7239971	104	Spring	P. B. Return	
7240111	105	Spring	Man. Shaft Return	
7240472	106	Tip	P. B. Tuning Shaft. . . . .	.05
7241834	107	Tip	Manual Shaft Latching . . . . .	.05
7240108	108	Washer	Manual Tuning Nut Retainer	
7239991	109	Washer	Spring Retainer-P. B.	
7240112	110	Washer	Cup-Manual Tuning Spring. . . . .	.03
7242588	111	Core	Connecting Link & Core Assy. . . . .	.70
7240036	112	Plate	Pointer Plate Assy.-Includes Items 113 to 117.	1.60
7240033	113	Cord	Pointer Cord & Link Assy. . . . .	.20
7240001	114	Diffuser		.20
7240215	115	Light	Light Bracket & Lead Assy . . . . .	.40
7240007	116	Spring	Pointer Return. . . . .	.05
7238985	117	Washer	Holding Pointer Cord & Link . . . . .	.03
7239990	118	Spring	Latch Bar	

MISCELLANEOUS PARTS

7241084	Cable	Tuner Cable & Plug to Set.	4.00
7241503	Cable	Speaker. . . . .	.85
7242591	Escutcheon	Tuner Front Cover & Dial Assy.	2.10
7241082	Knob	Control.	
7239940	Knob	Dummy. . . . .	.25
7239545	Knob	Tone Control . . . . .	.30
7241078	Lead	"A" Lead Assy.-Fuse to Tuner . . . . .	.35
7241070	Lead	"A" Lead Assy.-Tuner to Set. . . . .	.40
5272607	Lead	Fuse to Ammeter.	1.60
7238455	Socket	Loktal Tube Base	
7236279	Socket	Octal Tube Base.	
7233944	Socket	Vibrator	
7241514	Speaker		9.00

TUBE COMPLEMENT

1213583	7A7	R.F. Amp	1.25
1213585	7B8	Osc. Modulator	1.25
1213583	7A7	I.F. Amplifier	1.25
1213852	7E6	Det. AVC & First Audio	
1213586	7C5	Push-Pull Output	1.25
7237180	OZ4	Rectifier.	1.60

INSTALLATION PARTS

7241060	Parts Pkg. Assy.		
1880659	Generator Condenser . . . . .	\$	.45
1879526	Coil Condenser. . . . .		.35
1435482	Distributor Suppressor. . . . .		.30
7240138	Front Wheel Static Collector. . . . .		.20
7240808	Insulating Ferrule. . . . .		.12
147685	Fuse 14 Amp . . . . .		.10
120617	Screw		
131015	Washer		
113987	Screw		
132900	Screw		
121801	Lockwasher		

CADILLAC DIV.—GEN. MOTORS

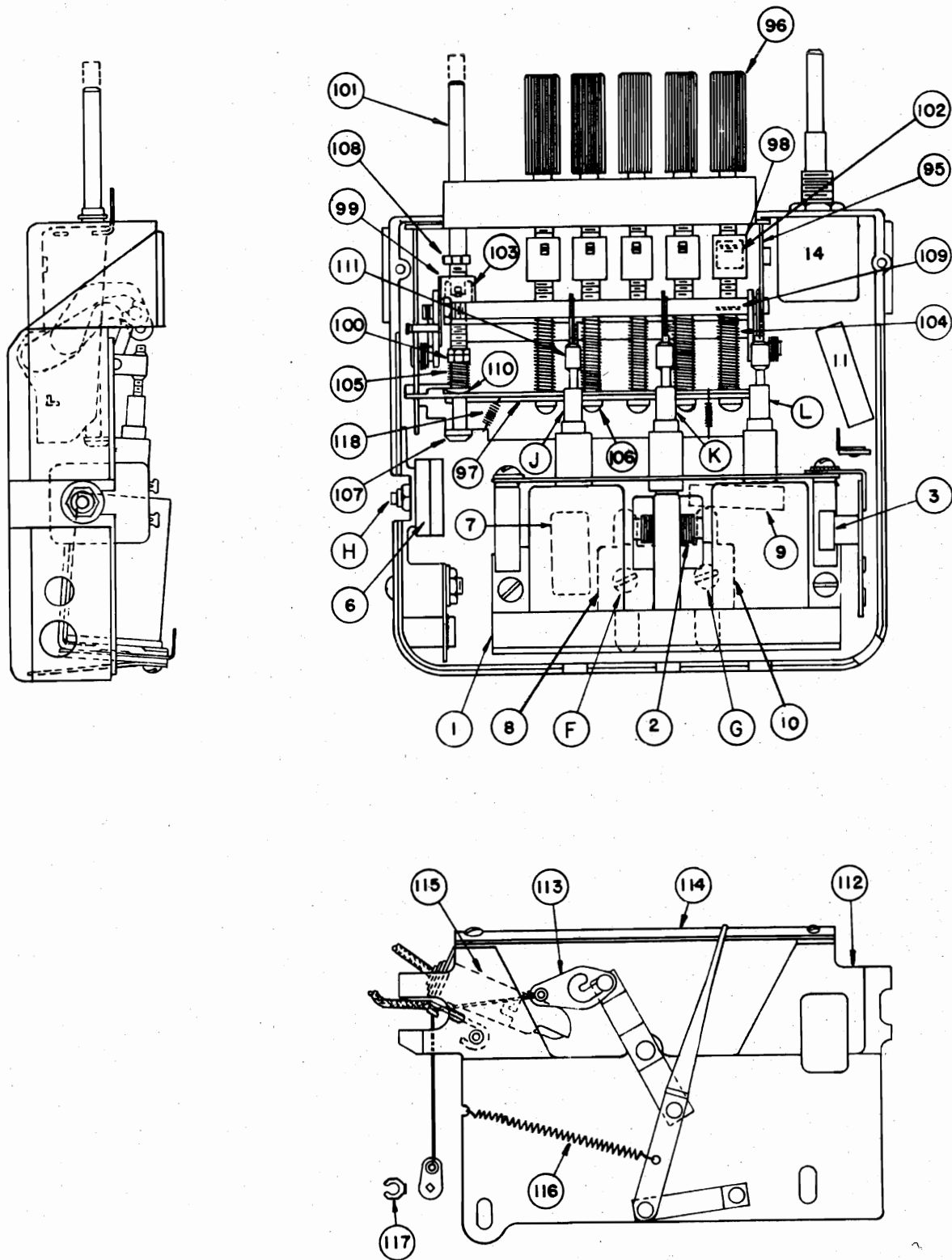


Fig. 3 Parts Layout - Tuner
CADILLAC 1942 REAR COMPARTMENT RADIO

CADILLAC DIV.—GEN. MOTORS

MODEL 7241938

MODEL 7241951

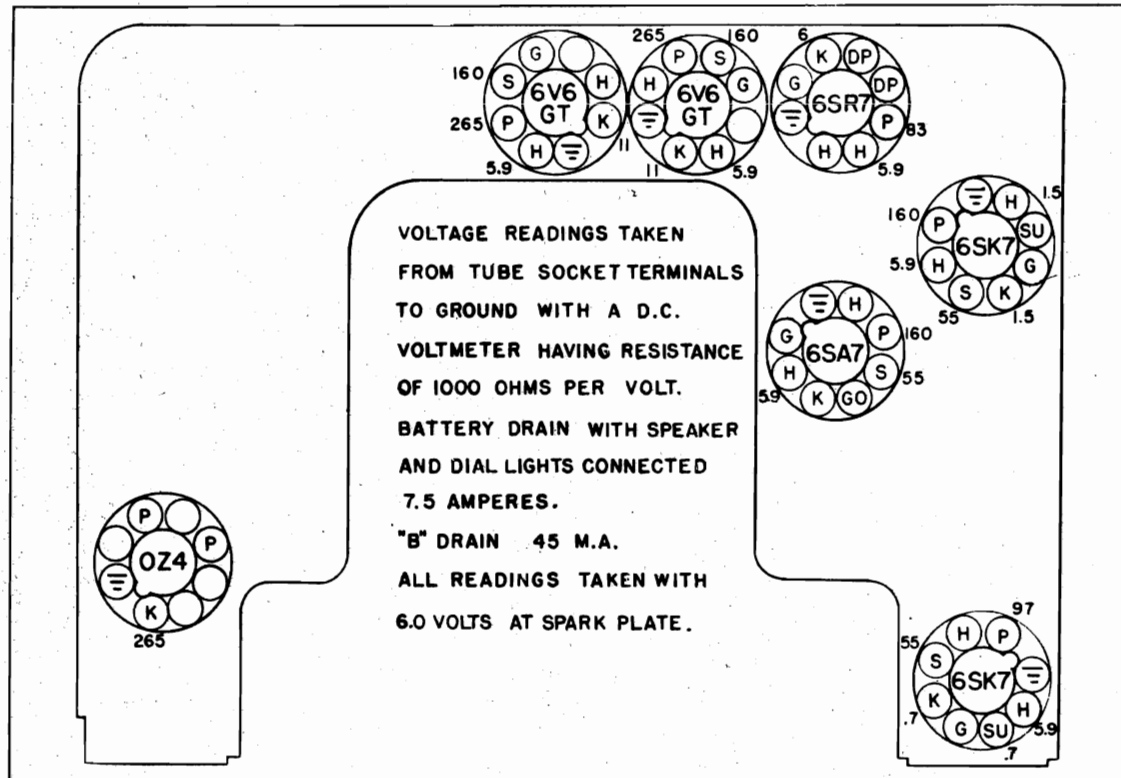


Fig. 6 Voltage Chart
CADILLAC 1942 AUTOMATIC RADIO

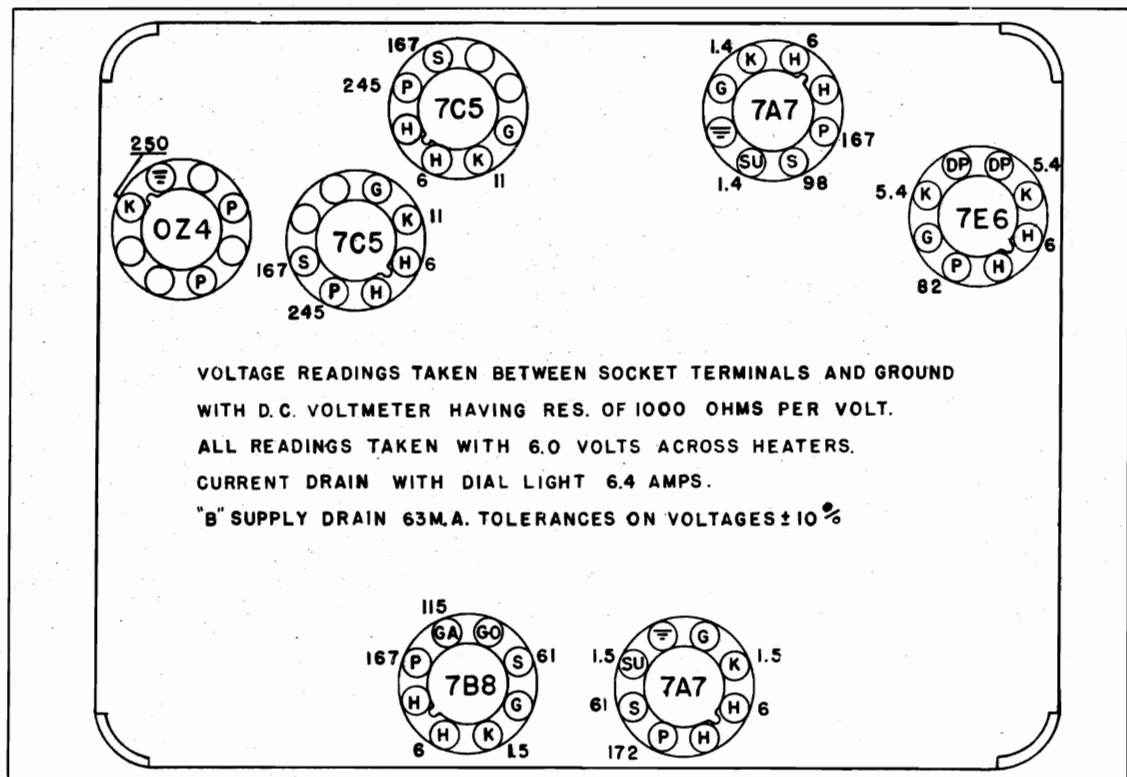


Fig. 4 Voltage Chart
CADILLAC 1942 REAR COMPARTMENT RADIO

CADILLAC DIV.—GEN. MOTORS

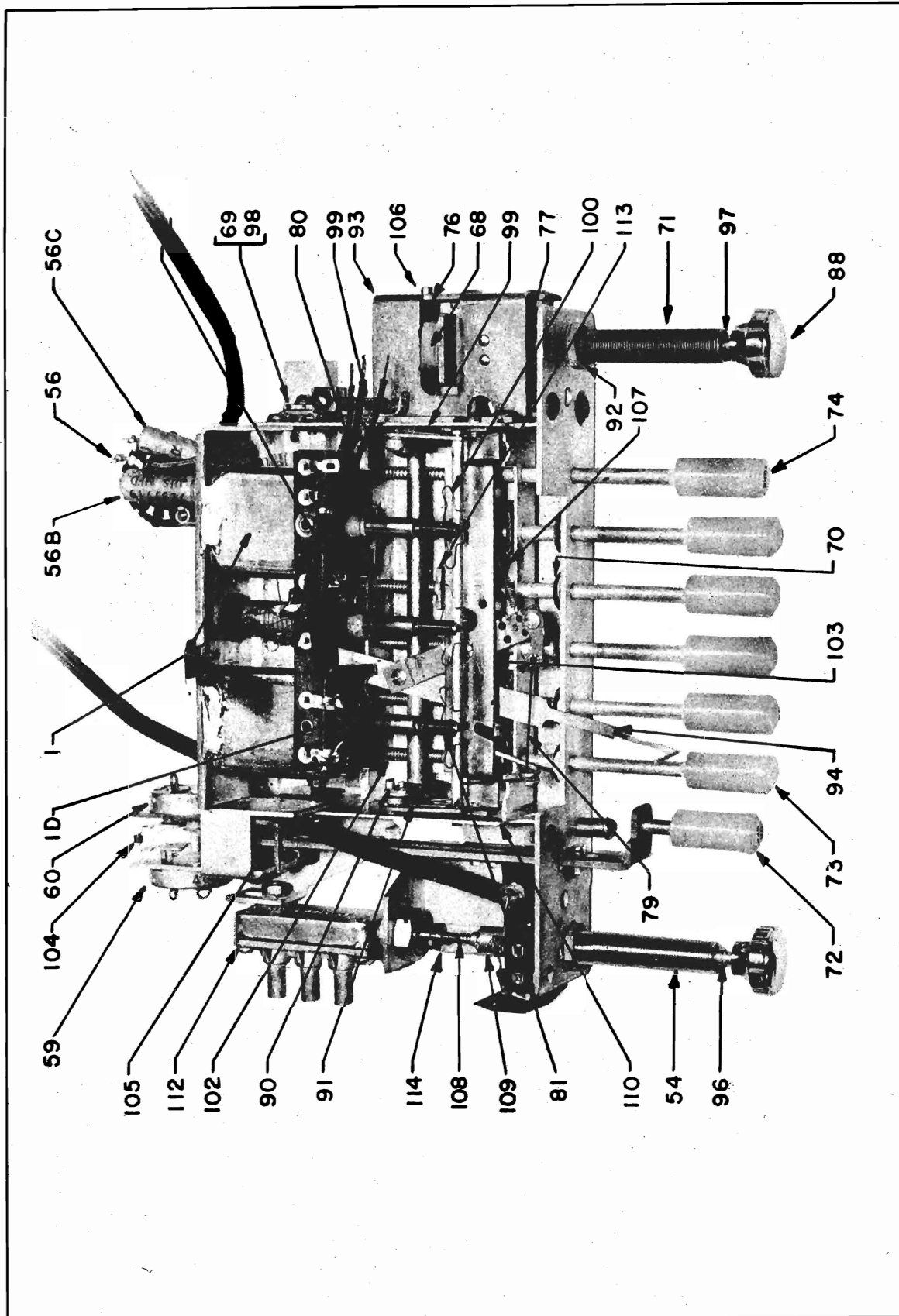
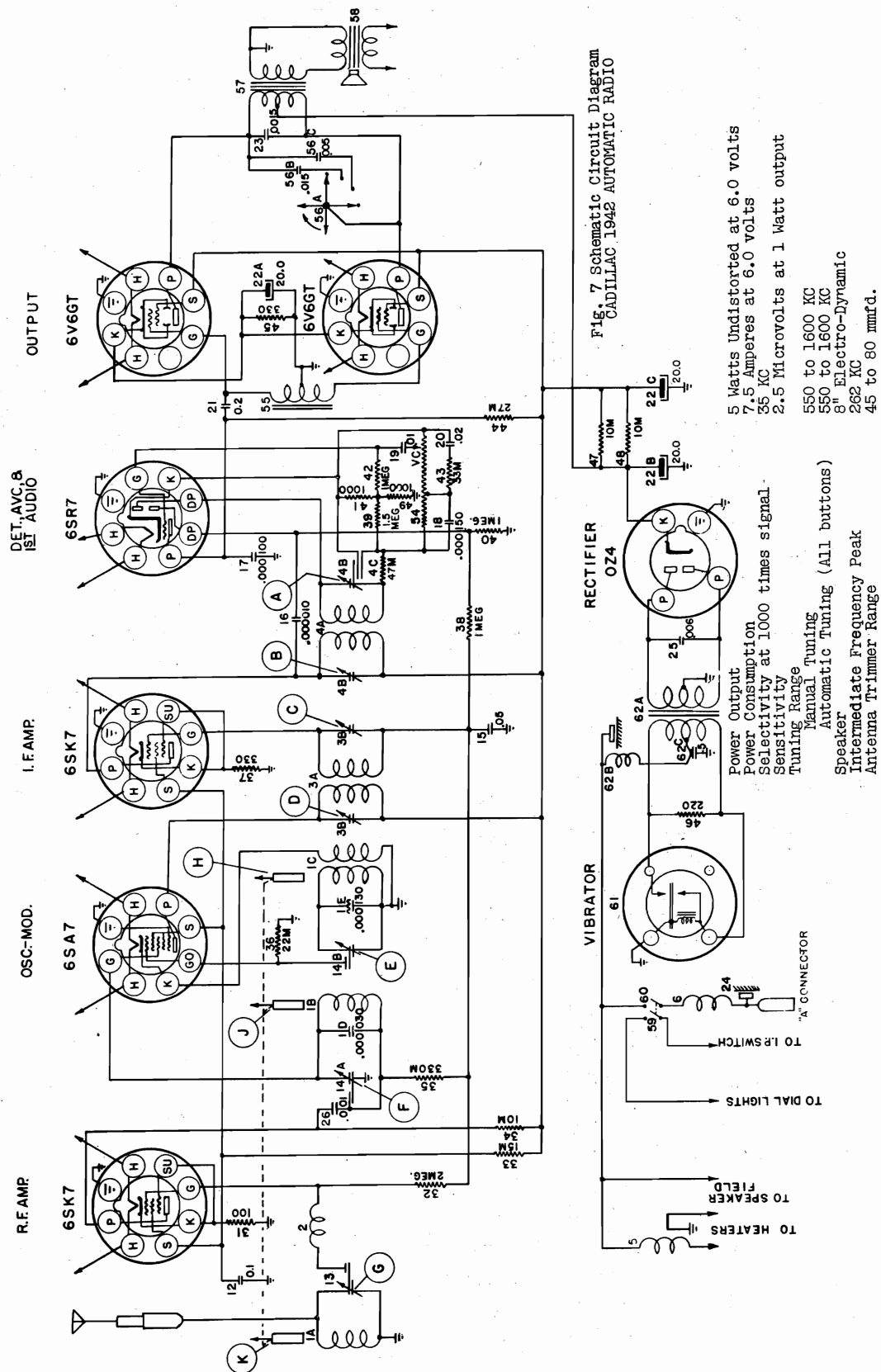


Fig. 5 Parts Layout - Tuner
CADILLAC 1942 AUTOMATIC RADIO

CADILLAC DIV.—GEN. MOTORS



CADILLAC DIV—GEN MOTORS

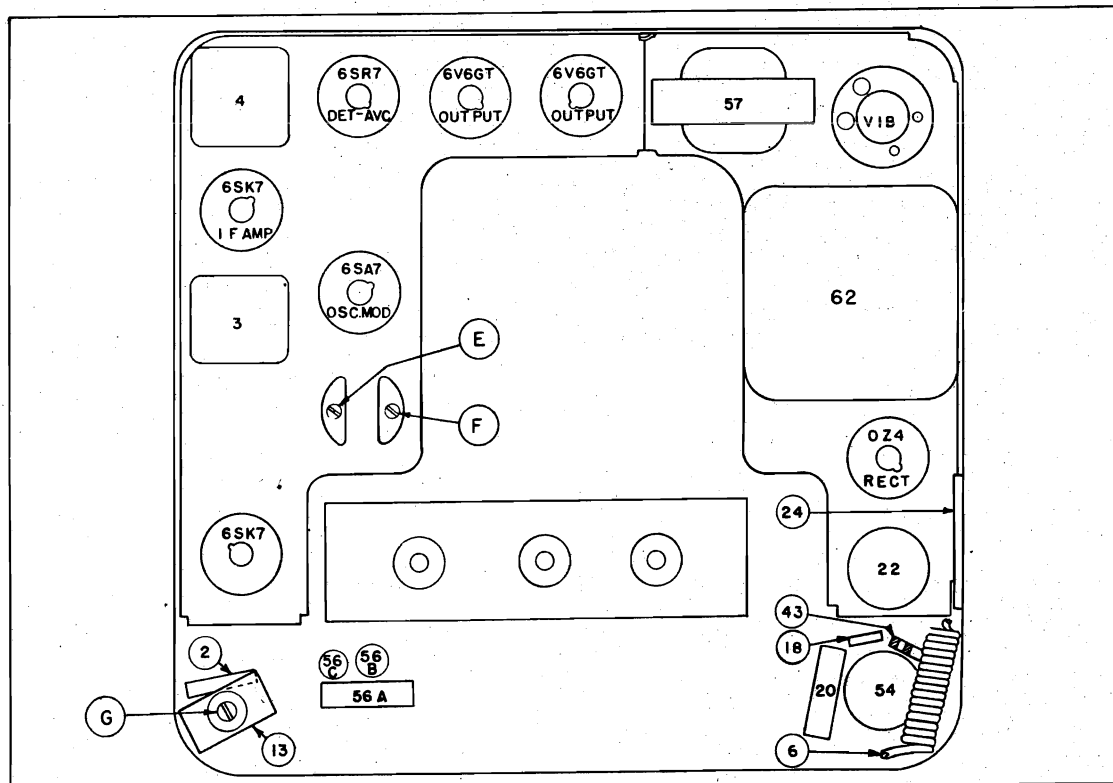


Fig. 3 Parts Layout - Rear View
CADILLAC 1942 AUTOMATIC RADIO

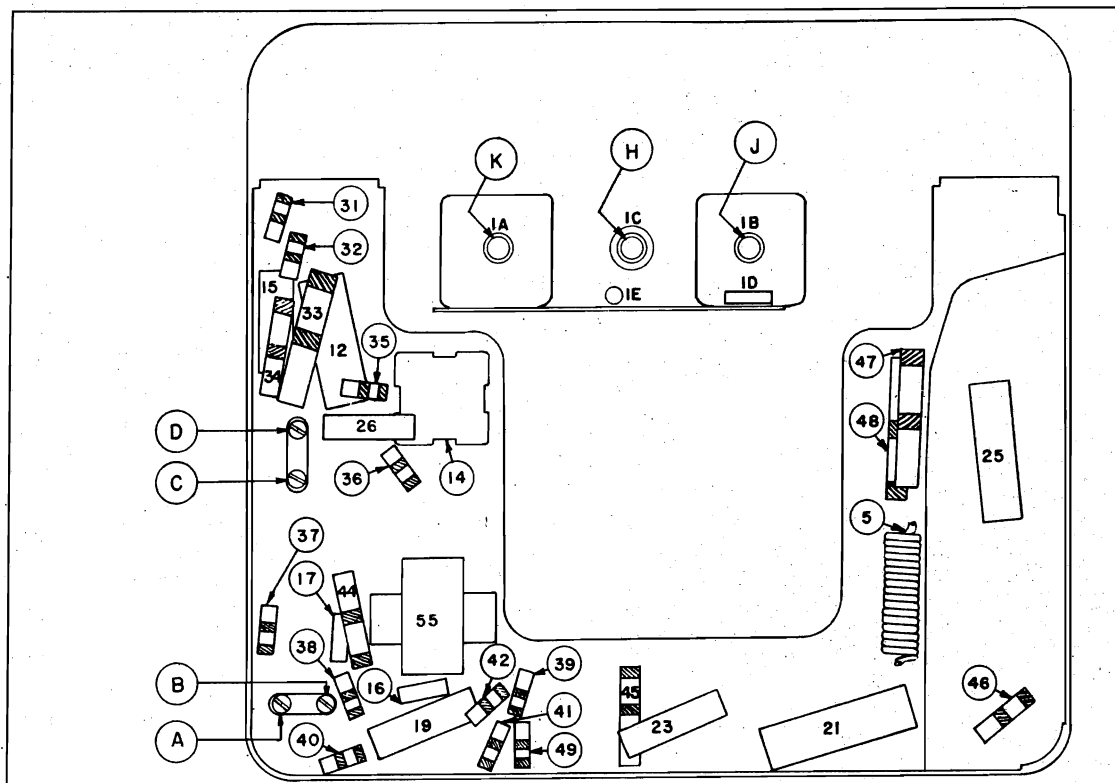


Fig. 4 Parts Layout - Front View (Less Tuner)
CADILLAC 1942 AUTOMATIC RADIO

CADILLAC DIV.—GEN. MOTORS

Capacity Alignment (Cont'd.)

- (b) Tune the receiver to the signal and adjust the trimmers F and G for maximum output. Signal generator signal should be as low as possible and still give a satisfactory meter reading.

This type of tuning circuit does not require alignment at 600 KC.

4. Alignment with Car Antenna

Antenna trimmer G must be adjusted to match car antenna when receiver is installed; use a weak station signal between 1000 and 1500 KC. The antenna should be fully extended when making this adjustment.

CAPACITY AND INDUCTANCE ALIGNMENT1. I.F. Alignment at 262 KC.

Follow the procedure as outlined under I.F. Alignment at 262 KC Capacity Alignment.

2. Alignment at 1615 KC.

- (a) Connect the signal lead of the signal generator to the antenna connection of the set through a .000070 mfd condenser.

- (b) Set signal generator to 1615 kilocycles.

- (c) Rotate the manual tuning mechanism until the high frequency stop is reached. Mechanically align the iron cores K, H, & J by setting the oscillator core H so that its front edges project out $1-5/32$ " from the end of the coil form and the antenna and R.F. cores K & J project $1-5/32$ " from the end of their respective coil forms.

- (d) Adjust the oscillator trimmer E, R.F. trimmer F, and antenna trimmer G for maximum output.

3. Alignment at 1400 KC.

- (a) Set signal generator to 1400 K.C. and tune set to this signal.

- (b) Adjust the R.F. core J for maximum output.

- (c) Adjust the antenna core K for maximum output.

4. Realignment at 1615 and 1400 KC.

- (a) Repeat alignment of trimmer E and trimmers F and G at 1615 KC.

- (b) Repeat alignment of cores K and J at 1400 KC. Apply shellac to the core screws to seal the adjustment.

5. Alignment with car antenna.

Antenna trimmer G must be adjusted to match car antenna when receiver is installed; use a weak station signal between 1000 and 1500 KC. The antenna should be fully extended when making this adjustment.

CIRCUIT ALIGNMENT

Alignment Procedure: The trimmer condensers in this receiver have been carefully adjusted at the factory and should require no further adjustment (except the antenna trimmer) unless tampered with or unless a defective coil has been replaced. It is advisable not to attempt any adjustment unless it is definitely known that an adjustment is necessary.

An accurately calibrated test oscillator or signal generator and an output meter must be used to align the receiver circuits correctly. To make all alignment adjustments, the front and back covers must be removed. All trimmers are readily accessible. The antenna trimmer is adjusted in the rear of the case near the antenna socket.

Due to the fact that the iron cores have been sealed in place at the factory, only the trimmer adjustments as outlined under capacity alignment should be made unless the coils of the iron cored tuning unit are changed.

CAPACITY ALIGNMENT1. I.F. Alignment at 262 KC

- (a) Connect an output meter across the voice coil terminals of the speaker leaving the speaker connected.

- (b) Connect the ground lead of the signal generator to the chassis frame.

- (c) Connect the signal lead of the signal generator to the grid of the 6SA7 tube through the 0.1 mfd condenser.

- (d) Turn set volume control on full and tone control to the extreme treble end. Set the signal generator at 262 KC. Tune the receiver to a frequency where no squeals or beat notes may be heard and so that when the tuning control is moved in narrow limits no appreciable change in output may be noted.

- (e) Adjust the I.F. trimmers A, B, C, & D for maximum output, beginning with trimmer A.

2. Alignment at 1615 KC

- (a) Connect the signal lead of the signal generator to the receiver antenna connection through a .000070 mfd condenser or 7241619 alignment dummy.

- (b) Turn the manual tuning control of the receiver to the stop at the extreme high frequency end of the dial.

- (c) Set the signal generator to 1615 KC.

- (d) Adjust the oscillator trimmer E for maximum output.

3. Alignment at 1400 KC

- (a) Set the signal generator to 1400 KC.

MODEL 7241951

CADILLAC DIV.—GEN. MOTORS

Part No.	Illust. No.	Part Name	Description	List Price	Part No.	Illust. No.	Part Name	Description	List Price
TUNER MECHANICAL PARTS									
7241957	68	Bearing	Face Worm.	.12	5274994		Cable	Volume Control	.40
7242321	69	Bracket	Slide Assy.	.25	7242331		Cover	Front.	1.60
7242421	70	*Bumper	Plunger Shock Absorber	.03	7242413		Cover	Rear	1.60
7242385	71	Bushing	Manual Drive	.50	5274973		Cable	Tone Control	.25
7242481	72	Button	On-Off Switch Button & Plunger	.80	7242478		Lead	"A" Lead & Connector-Set to Fuse	.12
7242367	73	*Button	Push Button & Screw.	.30	7242478		Nut	Spacer	.25
7242369	74	*Button	T.C. Button & Plunger.	.30	7242399		Nut	Mounting Plate Assy.	1.35
7242347	75	Clamp	Core Clamp (Not shown on tuner picture)	.80	7239475		Shroud	Antenna Connector.	.12
7240993	76	Clutch	Man Drive Shaft.	.28	7236279		Socket	Octel Base Tube	.16
7241267	77	Collar	Tone Plunger Assy.	.40	7233944		Socket	Vibrator	.25
7241671	78	Collar	Pointer Drive.	.40	7238456		Lead	"A" Lead & Connector-Fuse to Ammeter	.10
7242138	79	Core	Iron Tuning.	.12	147685		Fuse	14 Ampere.	1.00
7240921	80	Coupling	Core	.12					
7242494	81	Dial	Calibrated	1.25					
7242397	82	Escutcheon	Assy. (Includes Items 86-87-& 96**)	3.00					
7242277	83	**Frame	Dial Glass	.15	7237987		6SK7	R.F. Amp	1.00
7242285	84	**Glass	Dial Glass	.08	7237886		6SA7	Oscillator-Modulator	1.00
7242307	85	Knob	Control.	.90	7237887		6SK7	I.F. Amp	1.00
7242360	86	Light	Dial Light & Lead Assy	.45	7240267		6SR7	Det. A.V.C. & 1st Audio	1.05
7241370	87	Lever	String Drive Assy.	.12	1213637		6V8GT	Push Pull Output	1.05
7240922	88	Link	Connecting	.05	7237180		OZ4	Rectifier.	1.60
7236431	89	Nut	Thin-On Control Bushing.	1.00					
7242364	90	Outrigger	Assy.	.03					
7242392	91	Pointer	Assy.	.03					
7242286	92	**Retainer	Dial Glass	.03					
7242366	93	Shaft	Manual Assy.	.92					
7240982	94	Spacer	Shoulder-Spacing Latch Bar	.03					
7241042	95	Spring	Connecting Link-Also Manual Latch Bar Return	.15					
7241045	96	Spring	Core Coupling.	.05					
7241039	97	*Spring	Latch Bar (Not shown on tuner picture)	.04					
7241169	98	*Spring	Plunger Return	.03					
7241185	99	*Spring	Tuning Nut Yoke.	.08					
7242313	100	Spring	Switch Coupling.	.03					
7240815	101	Spring	Switch-Plunger Return.	.03					
7240915	102	Spring	Tension-Clutch Shaft	.06					
7241694	103	Spring	Pointer Return	.08					
7240812	104	Spring	Vacuum Valve Yoke.	.10					
7242514	105	Sleeve	Vacuum Control Shaft	.10					
7242509	106	Tuner	Staked Assy. Includes items 70, 73, 74, 101, 102, 103, 111, & 113 (*)	10.00					
7242425	107	*Tip	Latching Button (Not shown on tuner picture)	.20					
7240845	108	Valve	Vacuum	.20					
7240740	109	*Yoke	Tuning Nut	.20					
7240752	110	Yoke	Vacuum Valve Drive	.20					
MISCELLANEOUS CHASSIS & TUNER PARTS									
5274994		Cable	Volume Control	.40					
7242331		Cover	Front.	1.60					
7242413		Cover	Rear	1.60					
5274973		Cable	Tone Control	.25					
7242478		Lead	"A" Lead & Connector-Set to Fuse	.12					
7242478		Nut	Spacer	.25					
7242399		Nut	Mounting Plate Assy.	1.35					
7239475		Shroud	Antenna Connector.	.12					
7236279		Socket	Octel Base Tube	.16					
7233944		Socket	Vibrator	.25					
7238456		Lead	"A" Lead & Connector-Fuse to Ammeter	.10					
147685		Fuse	14 Ampere.	1.00					
TUBE COMPLEMENT									
6SK7		R.F. Amp		1.00					
6SA7		Oscillator-Modulator		1.00					
6SK7		I.F. Amp		1.00					
6SR7		Det. A.V.C. & 1st Audio		1.05					
6V8GT		Push Pull Output		1.05					
OZ4		Rectifier.		1.60					
MOUNTING & INSTALLATION PARTS									
7242412		Bracket Radio Support.		.40					
7242535		Parts Pkg. Assy.		.45					
1890859		Gen. Cond.		.35					
1879526		Coil Cond.		.30					
1435492		Dist. Suppressor.		.20					
7240138		Front Wheel Static Collector.		.05					
120396		Washer.		.15					
7242386		Ground Spring		.05					
5274049		Ground Strap.		.15					
7240761		Serrated Washer		.12					
120390		Lockwasher		.12					
120375		Hex Nut		.12					
7240908		Insulating Ferrule.		.12					
155343		Screw		.12					
120854		Screw		.12					
120392		Washer		.12					
161627		Screw		.12					
7242536		Parts Pkg. Assy.		.80					
7242535		Trim Plate Assy.		.80					
1305217		Hex. Nut		.80					

[illegible]

FIG. 1 CIRCUIT DIAGRAM—RADIO 985792

GENERAL: This auto radio is a five-tube single unit universal receiver with automatic push-button tuning. The power supply consists of an 0Z4G rectifier tube used in conjunction with a full wave plug-in vibrator. The receiver is designed to mount through the instrument panel in all 1942 Chevrolet cars, and may be mounted under the instrument panel in other cars and trucks.

Antenna System: The antenna system used with this receiver consists of a rod-type antenna with a specially designed low capacity lead-in.

CHEVROLET DIV.—GEN. MOTORS

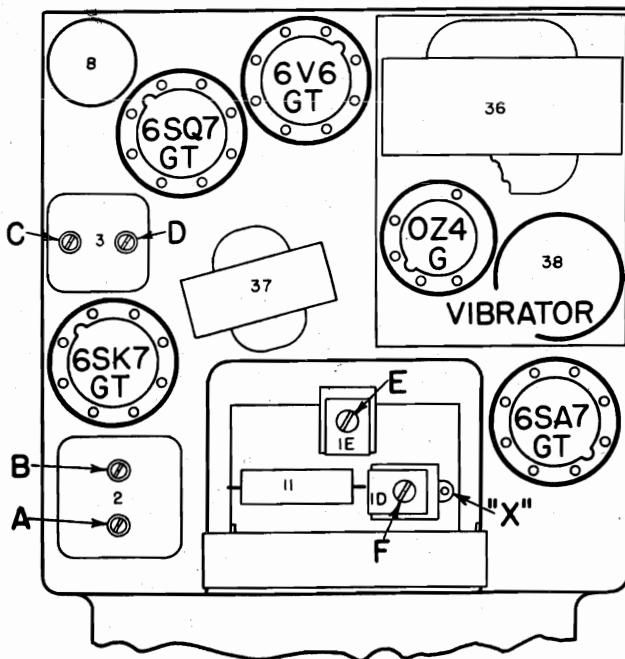
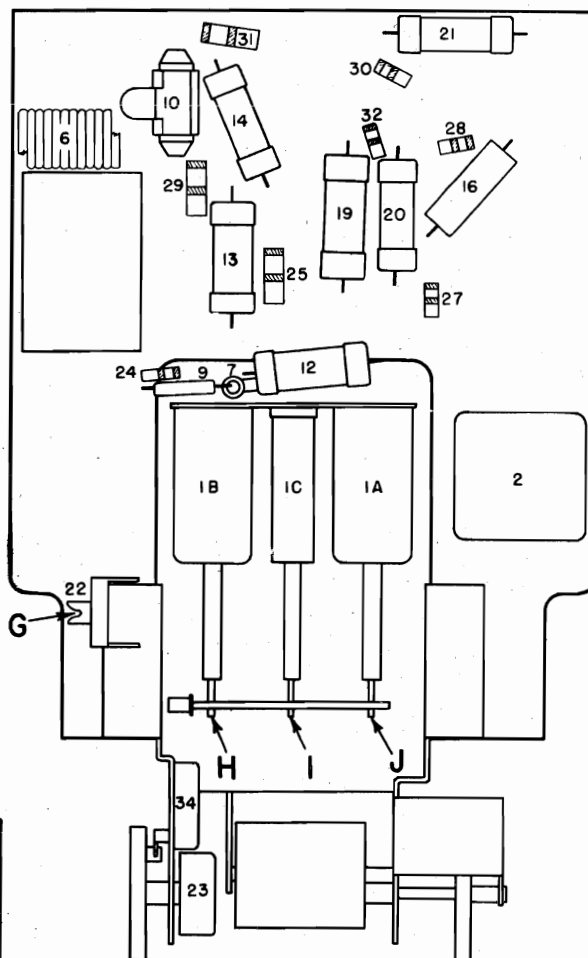
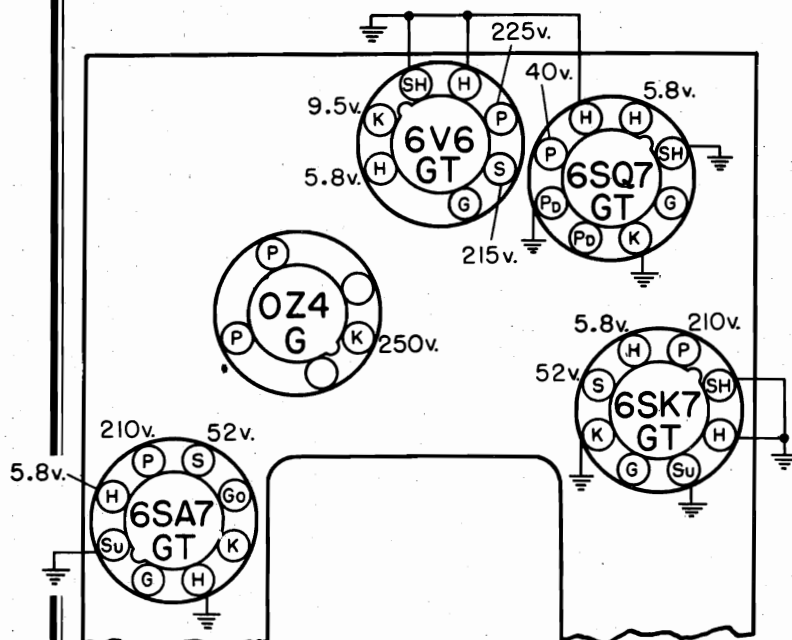


FIG. 2 PARTS LAYOUT—RADIO 985792



RADIO DATA

MODEL NUMBER — 985792
 SERIAL NUMBER — B-42-1000 AND UP
 TUBE COMPLEMENT — 6SA7GT, 6SK7GT,
 6SQ7GT, 6V6GT, OZ4G
 BATTERY CURRENT — 6.2 AMPERES
 B+ VOLTS — 250 VOLTS
 I.F. KC — 260
 R.F. KC — 1610 - 540
 VIBRATOR TYPE — NON. SYNCHRONOUS
 YEAR — 1942



BOTTOM VIEW OF TUBE SOCKETS

READINGS TAKEN FROM TUBE SOCKET CONTACTS TO GROUND WITH A D.C. VOLTMETER HAVING A RESISTANCE OF 1000 OHMS PER VOLT. ALL VOLTAGES EXCEPT THE HEATER VOLTAGES MEASURED ON THE 0-250 VOLT SCALE.

"A" BATTERY 6.0 VOLTS. CURRENT DRAIN 6.2 AMPERES.
 "B" SUPPLY DRAIN APPROXIMATELY 45 MA.

FIG. 3 VOLTAGE CHART—RADIO 985792

RADIO BULLETIN 3-37
 Part No. 985792
 Date 10-1-41

CHEVROLET DIV.—GEN. MOTORS

Circuit Alignment

All of the adjustable condensers in this receiver are very accurately adjusted at the factory and will need no further adjustment (excepting antenna trimmer condenser), unless tampered with or a defective coil has been replaced. If realignment is found to be necessary, the circuits can be properly adjusted only with the use of a calibrated test oscillator or signal generator and output meter. **NOTE:** Do not attempt to align this receiver without carefully noting the following instructions.

1. Aligning I.F. Stage at 260 Kilocycles

Turn volume control to the maximum position.

- Connect the signal lead of the test oscillator to terminal "X" (see parts layout), which is the control grid lead of the 6SA7GT tube, through a .1 mfd. condenser.
- Connect the ground lead of the test oscillator to the chassis frame.
- Connect the output meter from the plate prong of the 6V8GT output tube to ground. Care should be taken when connecting the output meter to insert a series condenser to protect the meter from d.c. voltages.
- Set the test oscillator to exactly 260 kilocycles.
- Adjust the trimmers "A," "B," "C" and "D" on the I.F. transformers for maximum output (see parts layout). These adjustments should be repeated several times and during alignment the test oscillator output should be kept to as low a value as is consistent with obtaining a readable indication on the output meter.

2. Aligning at 1610 Kilocycles

- Leave the test oscillator leads connected the same as for aligning the I.F. circuits.
- Set the test oscillator to 1610 kilocycles.
- Adjust the condenser "E" (see parts layout) for maximum output. It is very important that this frequency be set accurately as a slight missetting will cause the receiver to be out of track over the high frequency end of the dial.

3. Aligning at 1400 Kilocycles

- Remove the signal lead of the test oscillator from the grid of the 6SA7GT tube and connect to the antenna terminal of the receiver THROUGH A .000075 MFD. MICA CONDENSER connected in place of the .1 mfd. condenser previously used. (It is very important that a .000075 mfd. mica condenser be used when aligning the antenna stage of these receivers in order that this circuit can be made to track properly.)
- Set the test oscillator to 1400 kilocycles.

- Tune the receiver until this frequency is tuned in with maximum output.
- Adjust the antenna compensating condenser "G" (see parts layout) for maximum output.
- Adjust the grid coil trimmer condenser "F" for maximum output.

NOTE: With permeability tuning it is necessary to adjust the capacity at only one frequency. The coils are so wound that tracking is automatic and the usual low frequency adjustments are not necessary. If the entire alignment procedure has been accomplished accurately, the receiver should be uniformly sensitive over the entire frequency range.

Instructions for the Replacement of Tuning Core Assembly
Part No. 1216034

- Remove broken or defective core assembly (part No. 1216034) consisting of the three cores. This is accomplished by removing the coupling springs (two part Nos. 1216036) and sliding the cores out (as a complete unit) of the coils.
- Install new core assembly, using the reverse of procedure No. 1.
- Tune receiver to high frequency stop position by turning manual station selector control. With cores at high frequency stop position make sure that the dial is correctly set to the reference line above the 1600 kilocycle graduation line.
- Connect the signal generator to the antenna terminal of the receiver and the output meter to the output of the receiver as outlined in the Alignment Instructions.
- Set the signal generator to exactly 1610 kilocycles, **taking care not to change the receiver dial position.**
- Adjust the oscillator and grid coil trimmers (see Parts Layout—"E" and "F") for maximum output meter indication.
- Set the receiver dial to the 1300 kilocycle graduation line. (In order to make certain that the 1300 kilocycle point on the dial will be used for reference throughout this procedure it is suggested that one of the push buttons be set up for this position.)
- Set signal generator to exactly 1300 kilocycles, **taking care not to change the receiver dial position.**
- Align the oscillator core (see Parts Layout—"I") for maximum output. Then adjust the other two cores for maximum output indication (see Parts Layout—"H" and "J").
- Repeat operations 3, 5, 6, 7, 8 and 9 until no further improvement can be made.

IMPORTANT NOTE: Never attempt to remove or replace one core at a time. The entire assembly (Part No. 1216034) should be removed and replaced as such.

CHEVROLET DIV.—GEN. MOTORS

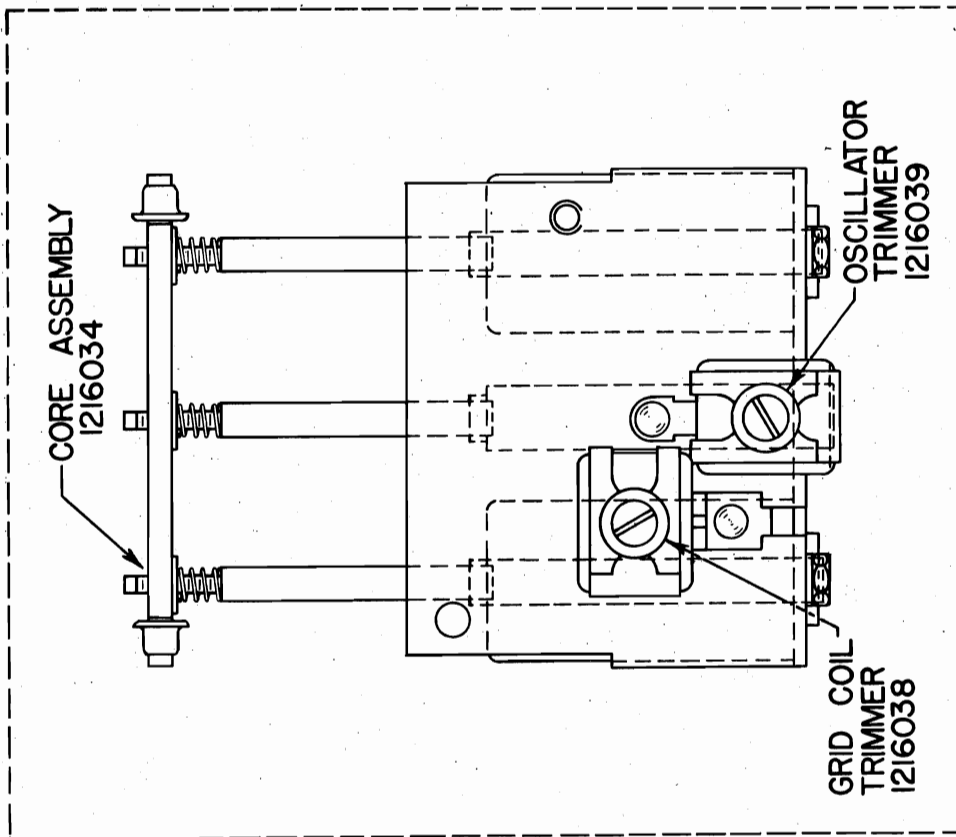


FIG. 6 PERMEABILITY COIL ASSEMBLY PARTS—RADIO 985792

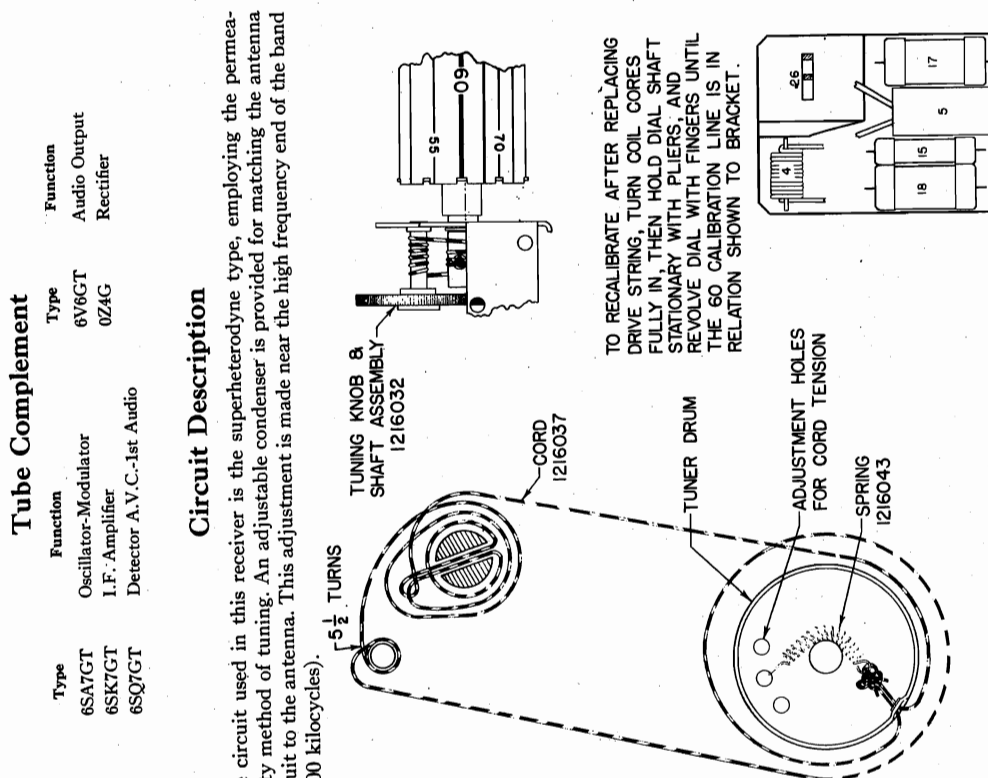


FIG. 5 POWER PACK PARTS LAYOUT RADIO 985792

FIG. 4 DIAL CORD HOOK-UP—RADIO 985792

Tube Complement		
Type	Function	Type
6SA7GT	Oscillator-Modulator	6V6GT
6SK7GT	I.F. Amplifier	0Z4G
6SQ7GT	Detector A.V.C.-1st Audio	
		Audio Output Rectifier

Circuit Description

The circuit used in this receiver is the superheterodyne type, employing the permeability method of tuning. An adjustable condenser is provided for matching the antenna circuit to the antenna. This adjustment is made near the high frequency end of the band (1400 kilocycles).

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FIG. 1 CIRCUIT DIAGRAM—RADIO 985793

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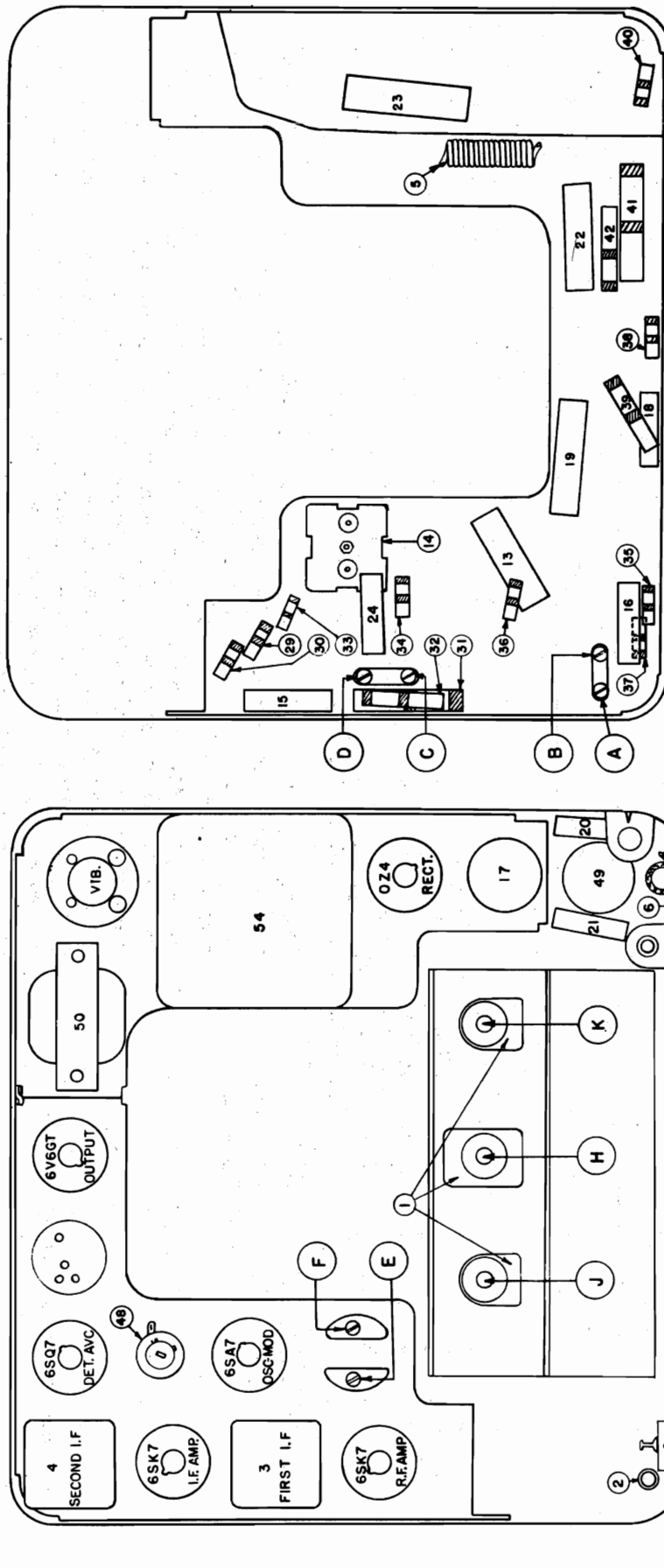


FIG. 3 PARTS LAYOUT—RADIO 985793

Circuit Description

The circuit used in this receiver is the conventional superheterodyne type and uses no regeneration. The tuning circuits are tuned by varying the inductance of the antenna, R.F. and oscillator coils by means of iron cores which slide in and out of the coils like pistons. The alignment of the cores has been sealed at the factory and further adjustment should not be required unless the coils have been changed or an iron core has been replaced. A special tone control circuit is employed to give the desired tone without distortion.

Antenna Circuit: The antenna circuit is directly coupled to the antenna. The antenna, oscillator and R.F. circuits are tuned by means of iron cores. The antenna circuit is adjusted for slight variations in antenna capacity by means of an antenna trimmer located on the bottom of the receiver case.

Date 10-1-41

CHEVROLET DIV.—GEN. MOTORS

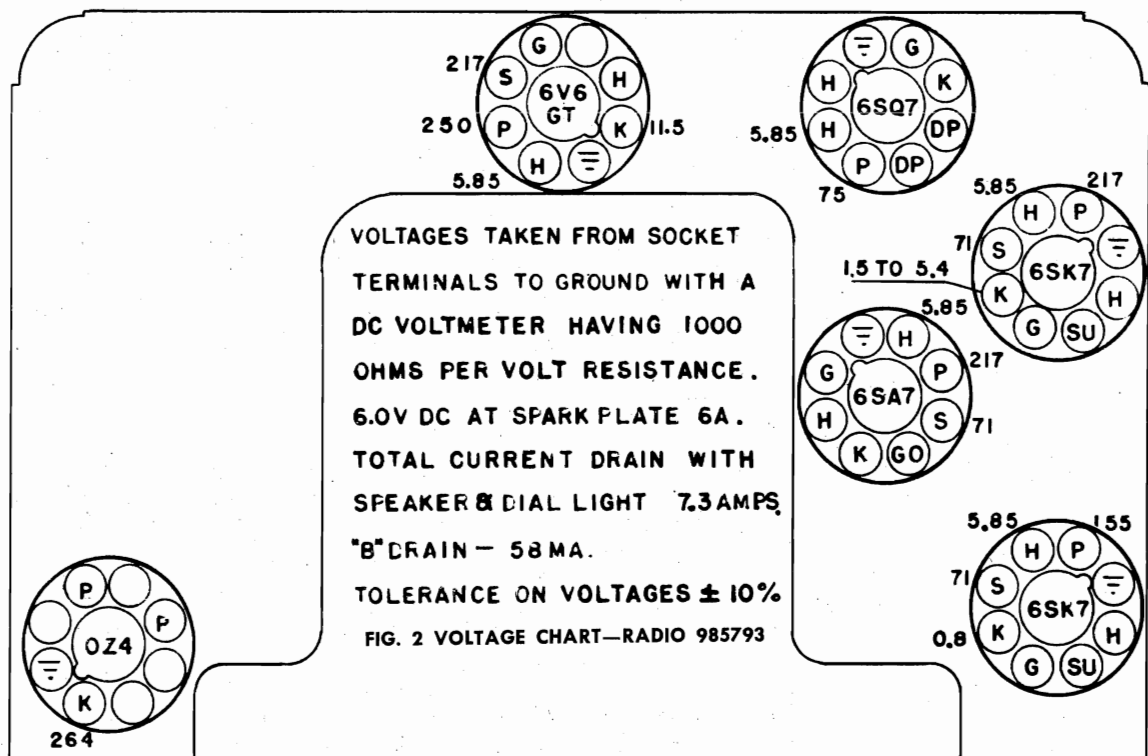


FIG. 4 DIAL CORD HOOK-UP—RADIO 985793

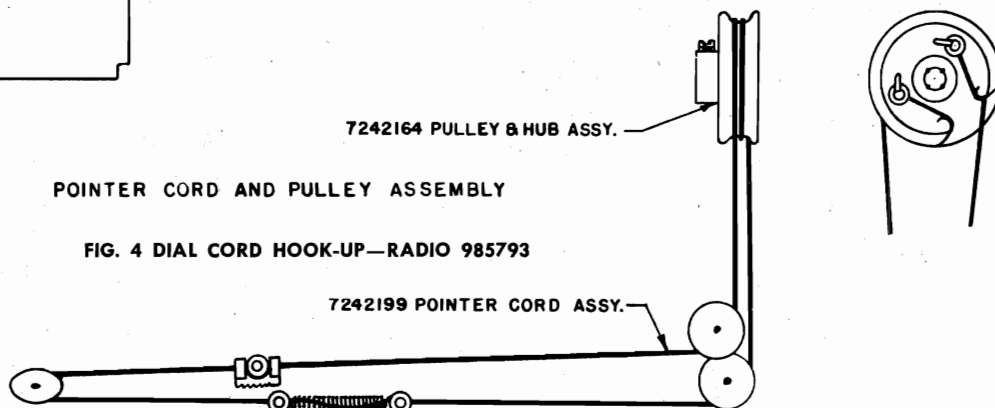
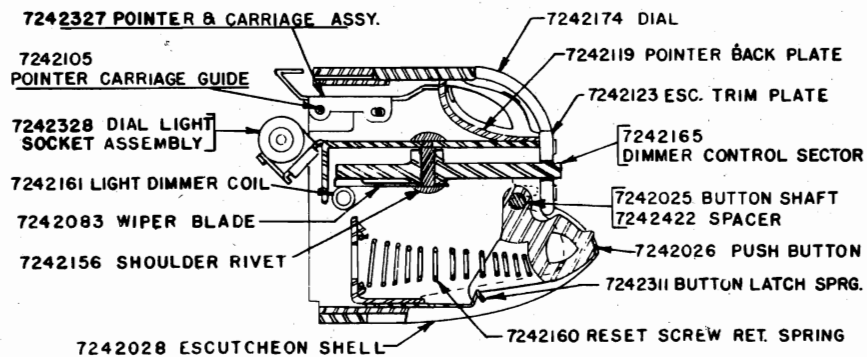


FIG. 5 ESCUTCHEON CROSS SECTION—RADIO 985793



MODEL 985793

CHEVROLET DIV.—GEN. MOTORS

Capacity Alignment**Capacity and Inductance Alignment****1. I.F. Alignment at 262 Kilocycles**

- (a) Connect a 0.1 mfd. condenser between the plate prong of the 6V6GT output tube and one terminal of the output meter, to protect the meter from DC voltages. Connect the other terminal of the output meter to ground.
- (b) Connect the ground lead of the signal generator to the chassis frame.
- (c) Connect the signal lead of the signal generator to the grid (G) prong of the 6SA7 tube socket through a 0.1 mfd. condenser.
- (d) Turn the set volume control on full and rotate the tone control knob to the center (Music) position. Adjust the signal generator to 262 kilocycles, and tune the receiver to a frequency where no squeals or beat notes may be heard and so that when the tuning control is moved through narrow limits no appreciable change in output is noticeable.
- (e) Adjust the I.F. trimmers A, B, C, and D for maximum output.

2. Aligning at 1615 Kilocycles

- (a) Connect the signal lead of the signal generator to the receiver antenna connection through a .000070 mfd. condenser.
- (b) Turn the manual control of the receiver to the stop at the extreme high frequency end of the dial.
- (c) Set the signal generator to 1615 kilocycles.
- (d) Adjust the oscillator trimmer "E" for maximum output.
- (e) Adjust the R.F. trimmer "F" for maximum output.
- (f) Adjust the antenna trimmer "G" for maximum output.

3. Aligning at 1400 Kilocycles

- (a) Set the signal generator frequency to 1400 kilocycles.
- (b) Tune the receiver to this signal and readjust the R.F. trimmer "F" and antenna trimmer "G" for maximum output. The signal generator output should be as low as possible and still give a satisfactory output meter reading.

NOTE: This type of tuning circuit does not require alignment at 600 kilocycles.

4. Alignment with Car Antenna

Antenna trimmer "G" must be adjusted to match the car antenna when receiver is installed. With the antenna fully extended tune in a weak station near 1400 on the dial and adjust the antenna trimmers for maximum volume.

This alignment should be used only when there is definite evidence that the iron cores are out of adjustment.

1. I.F. Alignment at 262 Kilocycles

The same procedure as previously outlined should be followed.

2. Aligning at 1615 Kilocycles

- (a) Connect the signal lead of the signal generator to the antenna connection of the set through a .000070 mfd. condenser.
- (b) Set the signal generator to 1615 kilocycles.
- (c) Rotate the manual tuning knob until the pointer is against the high frequency stop. Mechanically align the iron cores H, J and K by setting the oscillator core "H" so that its front edge sticks out $\frac{1}{16}$ " from the end of the coil form. The antenna core "K" and the R.F. core "J" should be approximately lined up with the oscillator core by aligning their front edge with that of the oscillator core.
- (d) Adjust the oscillator trimmer "E," the R.F. trimmer "F" and the antenna trimmer "G" for maximum output.

3. Aligning at 1400 Kilocycles

- (a) Adjust the signal generator to 1400 kilocycles and tune set to this signal.
- (b) Adjust the R.F. core "J" for maximum output.
- (c) Adjust the antenna core "K" for maximum output.

NOTE: When checking maximum output remove hand from the vicinity of the cores as body capacity will affect reading.

4. Realignment at 1615 and 1400 Kilocycles

- (a) Repeat alignment of trimmers "F" and "G" at 1615 kilocycles.
- (b) Repeat alignment of cores "K" and "J" at 1400 kilocycles. Do not change adjustment of oscillator core "H." Make sure insulated core spring is properly in place.

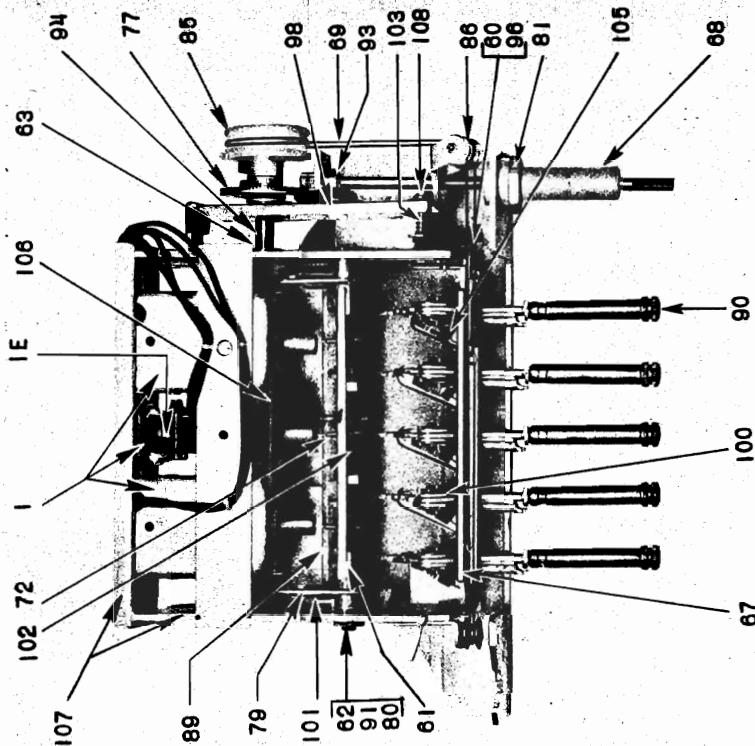
5. Alignment with Car Antenna

Antenna trimmer "G" must be adjusted to match the car antenna when receiver is installed. With the antenna fully extended tune in a weak station near 1400 on the dial and adjust the antenna trimmer for maximum volume.

CHEVROLET DIV.—GEN. MOTORS

Tuner Unit and Parts—Cont'd

Pro- duction Part No.	Service Part No.	Part Name	Description—Function	Illus. No.
7242028		Escutcheon	Shell	75
7241590		Gear	Crown Gear Assy.	77
7242105		Guide	Dial Pointer Carriage	78
7240922		Link	Connecting Link	79
7242143		Nut	Adjusting—Rotor Arm Bearing (No. 12-28)	80
7241191		Nut	Spacer	81
7242119		Plate	Dial Pointer Back	82
7242123		Pointer	Escutcheon Trim (Chrome)	83
7242327		Pulley	Dial—With Carriage Assy.	84
7242164		Pulley	Dial Pointer Drive Pulley Assy.	85
7242058		Rivet	With Stud	86
7242156		Rivet	Shoulder—Dimmer Control	88
7242356		Rotor	Rotor Arm and Gear Assembly	89
7242163		Screw	Reset—For Station Setting	90
7242144		Screw	Set—For adjusting Rotor Arm Bearing	91
7242025		Shaft	Push Button	92
7242128		Shaft	Manual Tuning Shaft and Bracket Assy.	93
7242438		Shaft	Pulley Shaft and Pinion Assy.	94
7242328		Socket	Dial Light Socket Assy.	95
7238531		Spacer	Latch Bar	96
7242422		Spacer	Tuning Button Shaft (Washer)	97
7242355		Spring	Brake Assy.	98
**7242311		Spring	Push Button Latch	99
***7242851		Spring	Push Button Latch Spring and Back Plate Assy.	99
7241042		Spring	Connecting Link	101
7242552		Spring	Iron Tuning Core	102
7242253		Spring	Latch Bar Hook-Up	103
7242160		Spring	Reset Screw Return	104
7242189		Spring	Slide Bar Return	105
7242180		Strip	Limiter (on oscillator coil)	106
7242374		Tuner Unit	Mechanical Staked Assy.	107
7242946		Washer	Latch Bar Hook-Up	108



TUNER UNIT PARTS—RADIO 985793

Tuner Unit and Parts

Pro- duction Part No.	Service Part No.	Part Name	Description—Function
7242203		Bar	Latch Assembly Bar
7242361		Bearing	Parallel Guide Bar Assembly
145635		Bearing	Ball—Rotor Arm Bearing
7242152		Button	Pulley Shaft
7242026		Blade	Push—Tuning
7242083		Bumper	Dial Light Dimmer Wiper
7242354		Bushing	Rubber—Slide Bar Return Shock Absorber
7242084		Cord	Manual Tuning Shaft Drive
7242199		Coil Assy.	Dial Pointer Cord Assy.
7242485		Coil	Permeability Tuning Unit
7242161		Core	Dial Light Dimmer
7242251		Control	Iron Tuning Core
7242165		Dial	Dial Light Dimmer Sector
7242174			Calibrated (Glass)

Miscellaneous Chassis Parts

Pro- duction Part No.	Service Part No.	Part Name	Description—Function
125588		Bulb	Dial Light
7242271		Cable	Speaker Cable and Plug
7241179		Cable	Volume Control
7242310		Cover	Front Case Cover Assy.
7242445		Cover	Rear Case Cover Assy.
5274907		Lead	Antenna Lead Assy.
7236279		Socket	Octal Tube
7242273		Socket	Speaker Plug
7239125		Socket	Vibrator

MODEL 985794

CHEVROLET DIV.—GEN. MOTORS

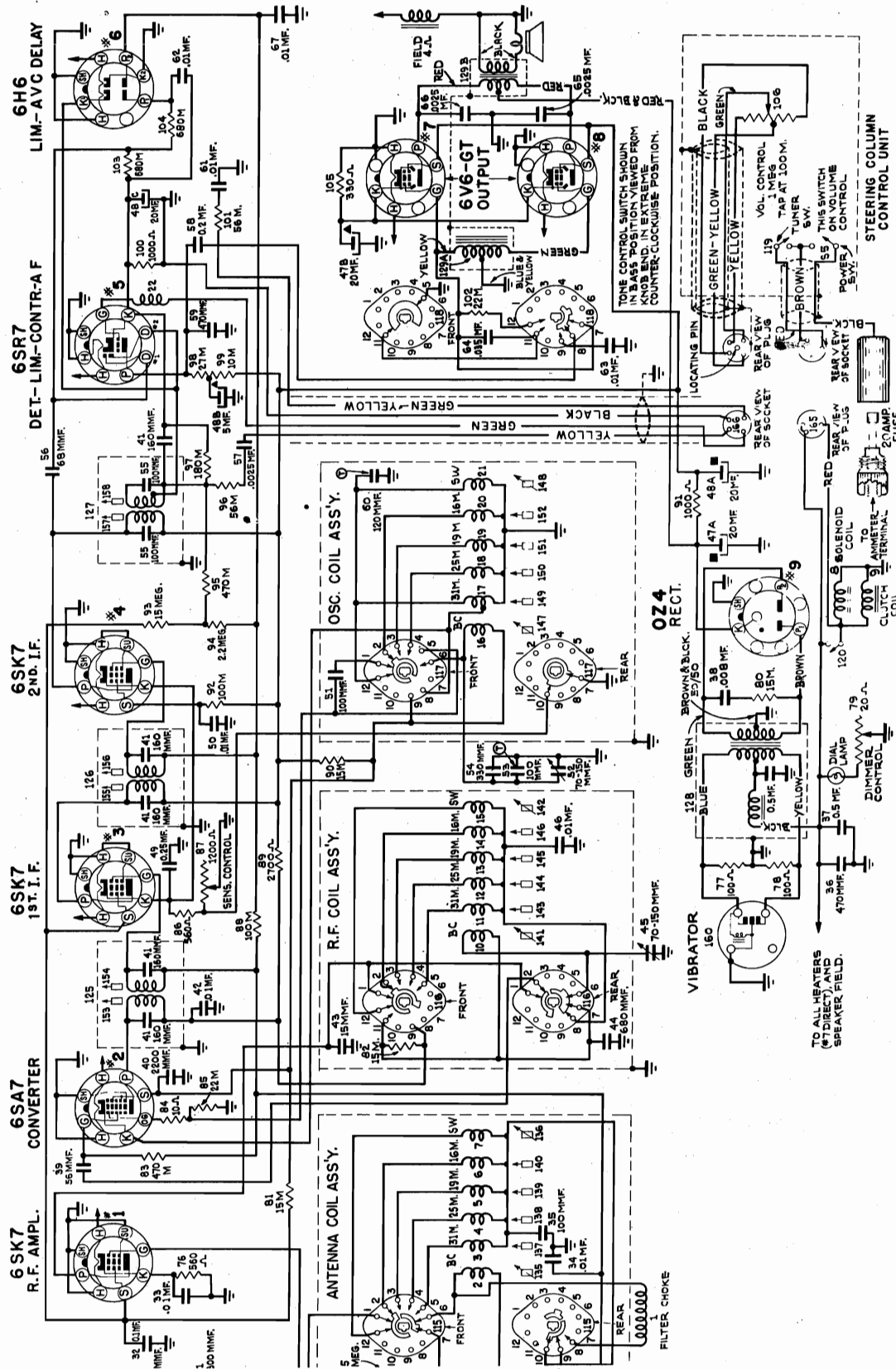


FIG. 1 CIRCUIT DIAGRAM—RADIO 985794 Date 10-1-41

CHEVROLET DIV.—GEN. MOTORS

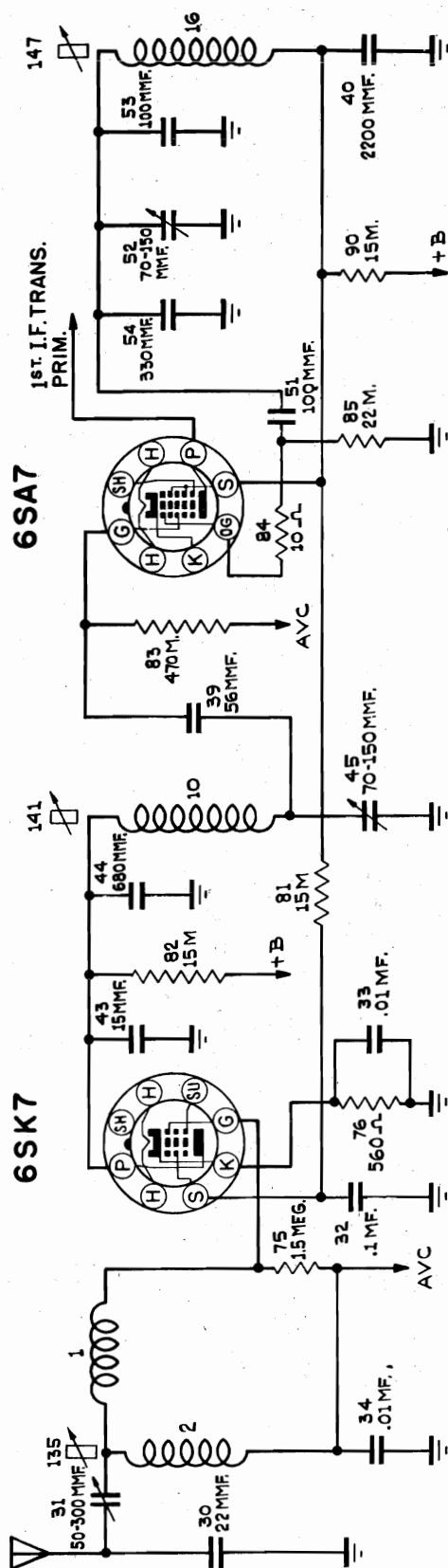


FIG. 2 "A" BAND COIL CIRCUIT—RADIO 985794

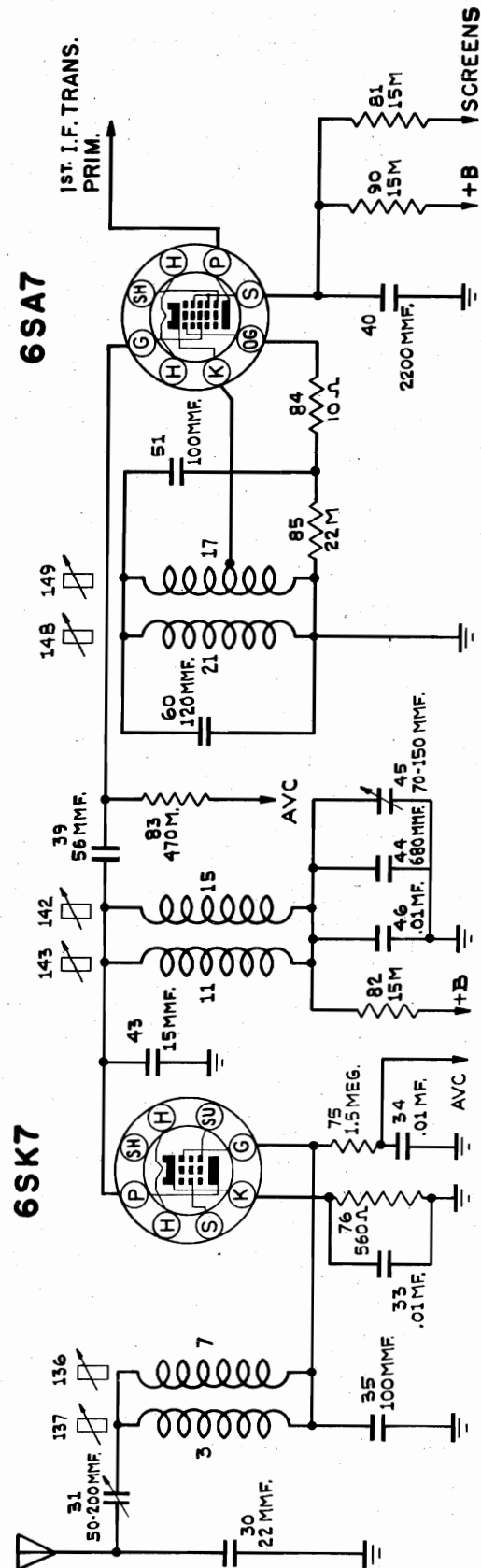


FIG. 3—31 METER BAND COIL CIRCUIT—RADIO 985794

MODEL 985794

CHEVROLET DIV.—GEN. MOTORS

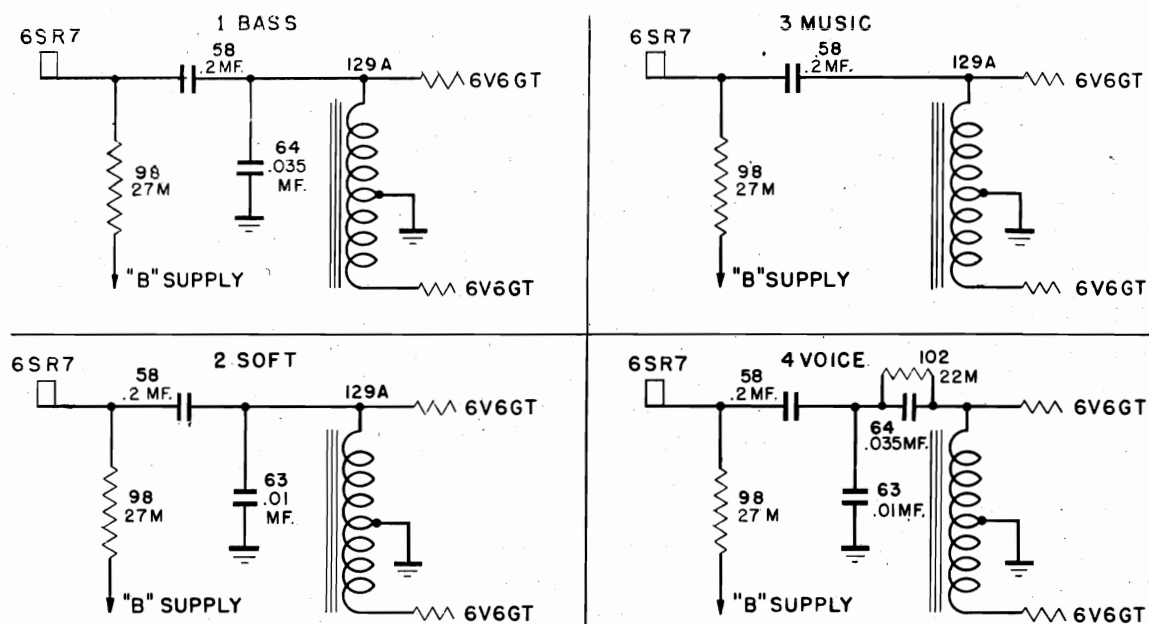


FIG. 4 TONE CONTROL POSITION WIRING—RADIO 985794

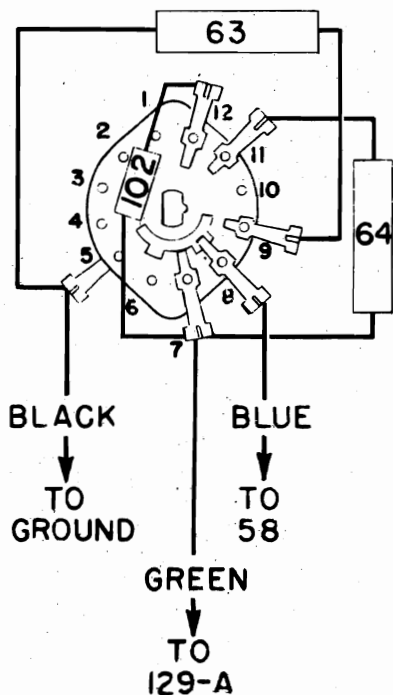


FIG. 5 TONE CONTROL WIRING—RADIO 985794

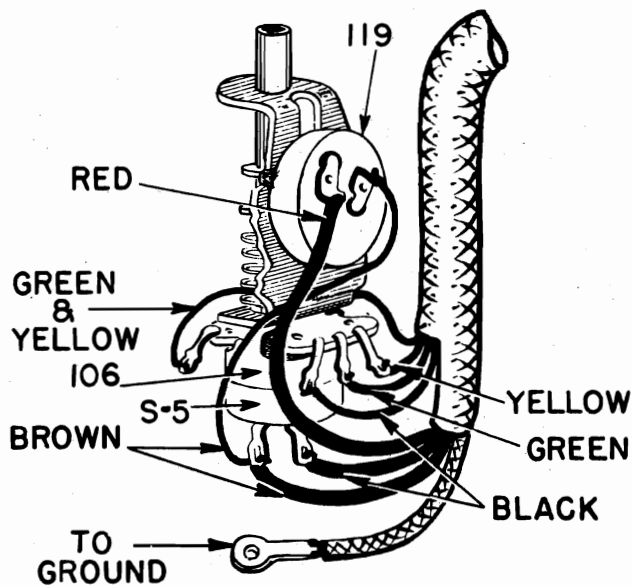


FIG. 6 VOLUME CONTROL AND ON-OFF SWITCH—RADIO 985794

CHEVROLET DIV.—GEN. MOTORS

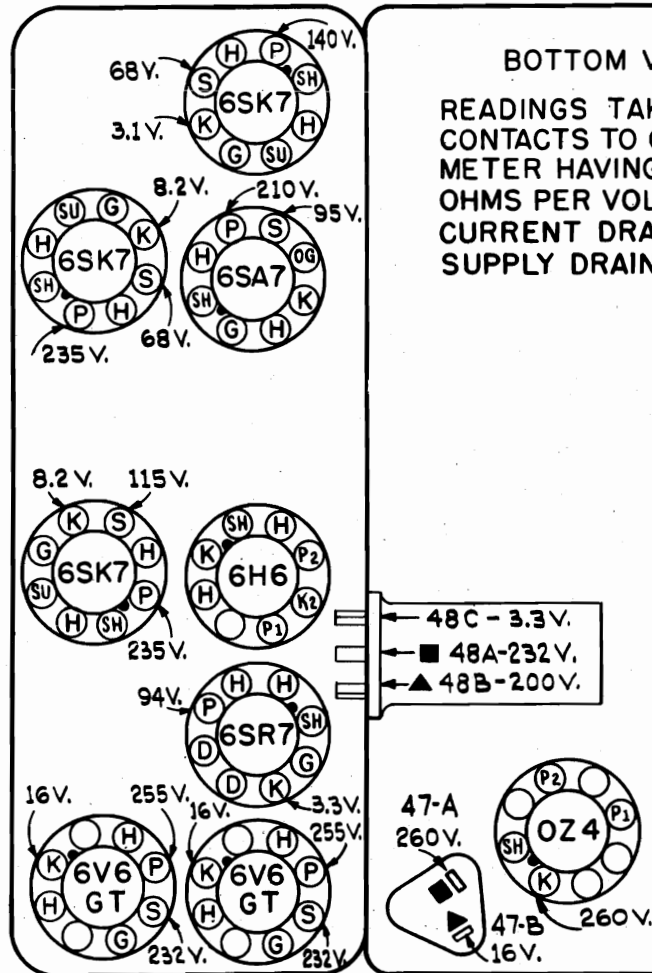


FIG. 8 VOLTAGE CHART—RADIO 985794

CORD DRIVE FOR BAND INDICATOR DRUM

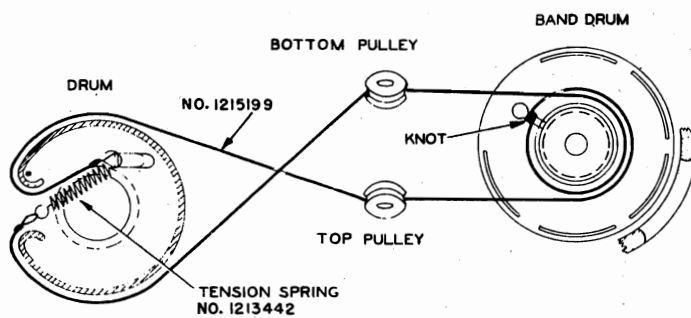
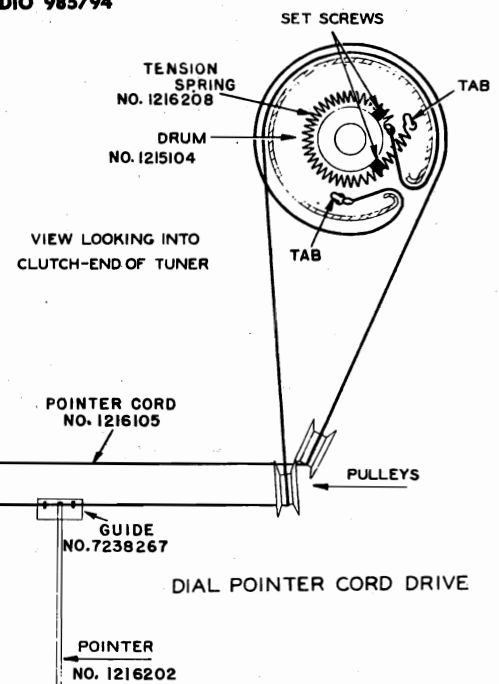


FIG. 7 CORD DRIVE ASSEMBLIES—RADIO 985794



MODEL 985794

CHEVROLET DIV.—GEN. MOTORS

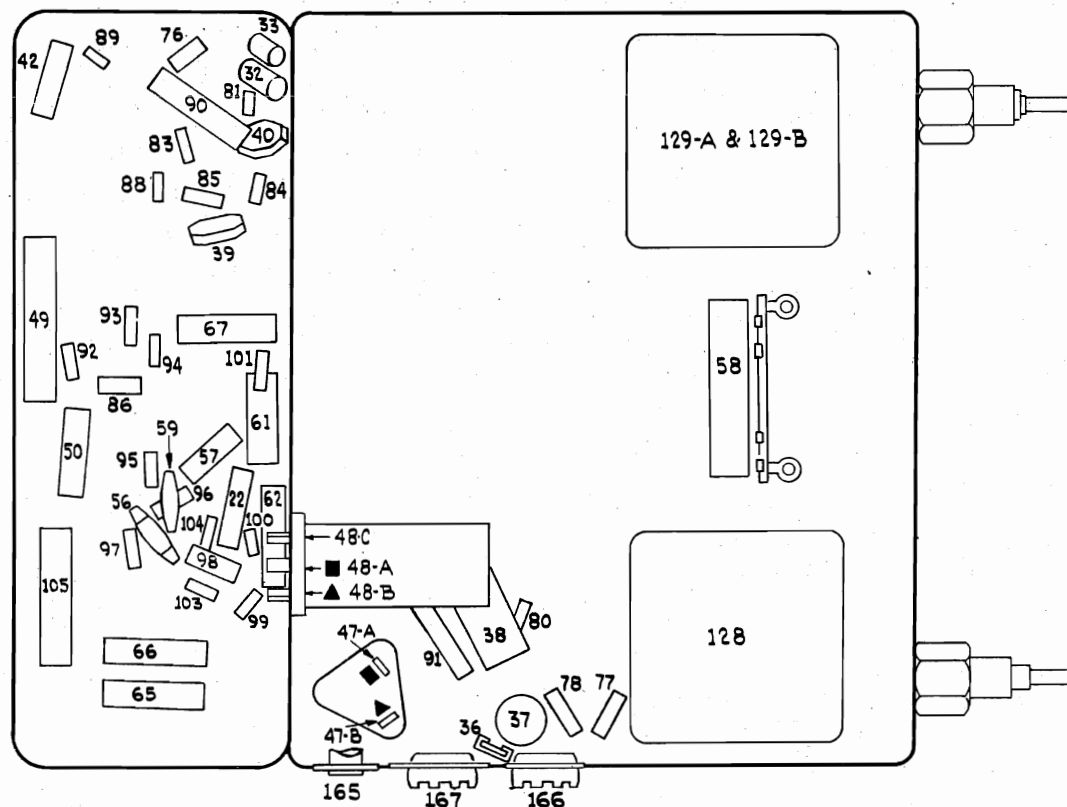


FIG. 9 PARTS LOCATING DIAGRAM (TOP VIEW)—RADIO 985794

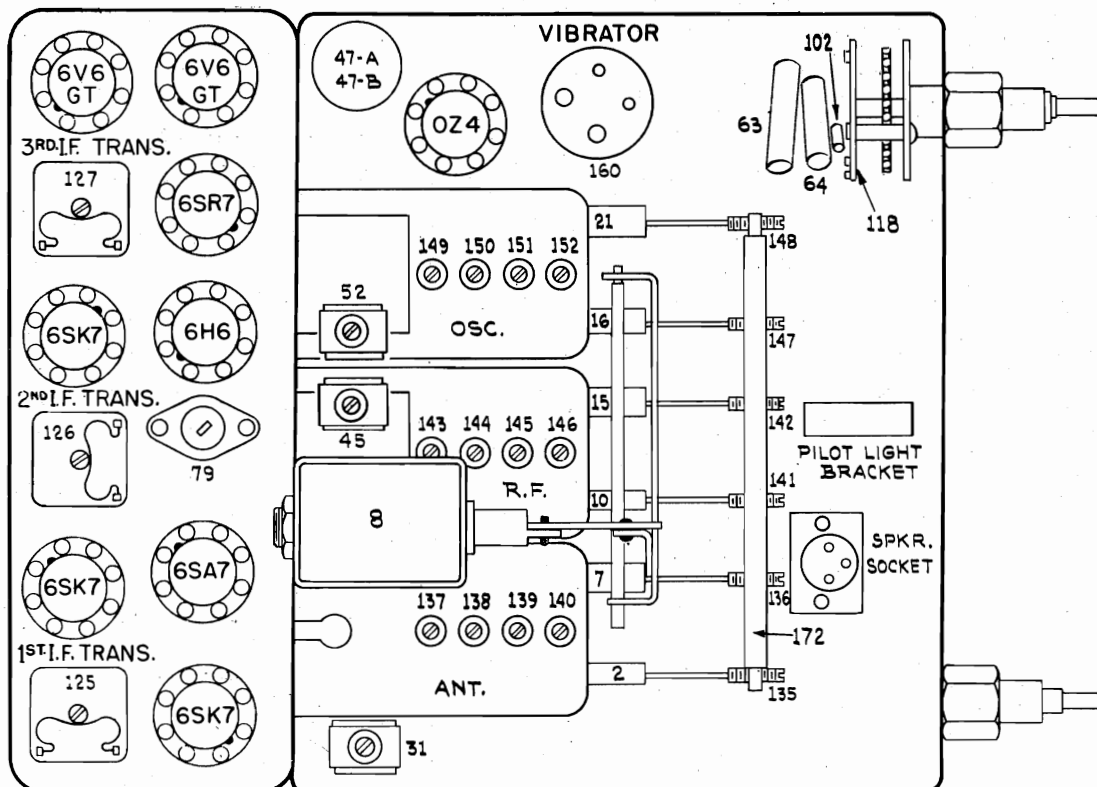


FIG. 10 PARTS LOCATING DIAGRAM (BOTTOM VIEW)—RADIO 985794

CHEVROLET DIV.—GEN. MOTORS

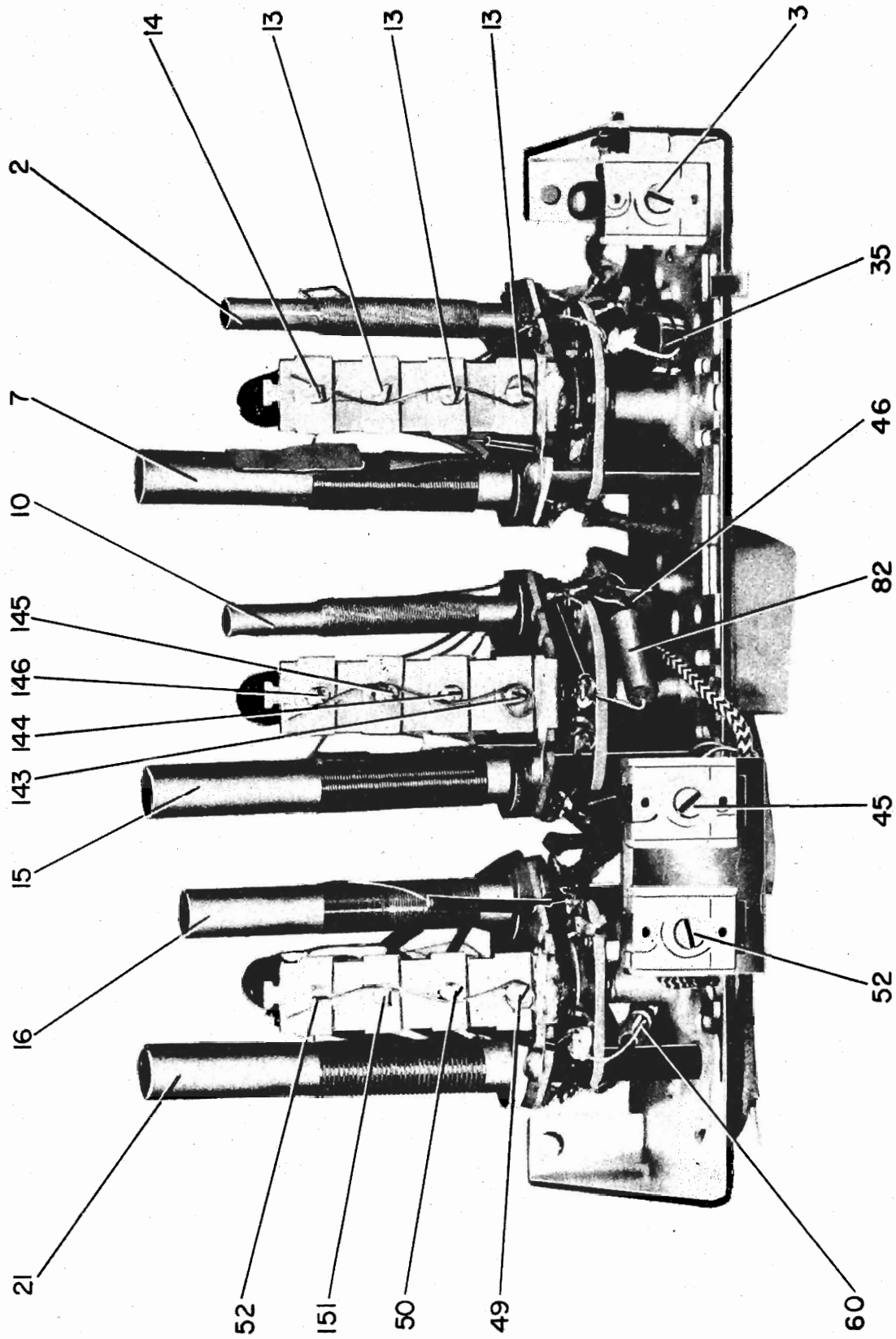


FIG. 11 COIL ASSEMBLY (BOTTOM VIEW)—RADIO 985794

CHEVROLET DIV.—GEN. MOTORS

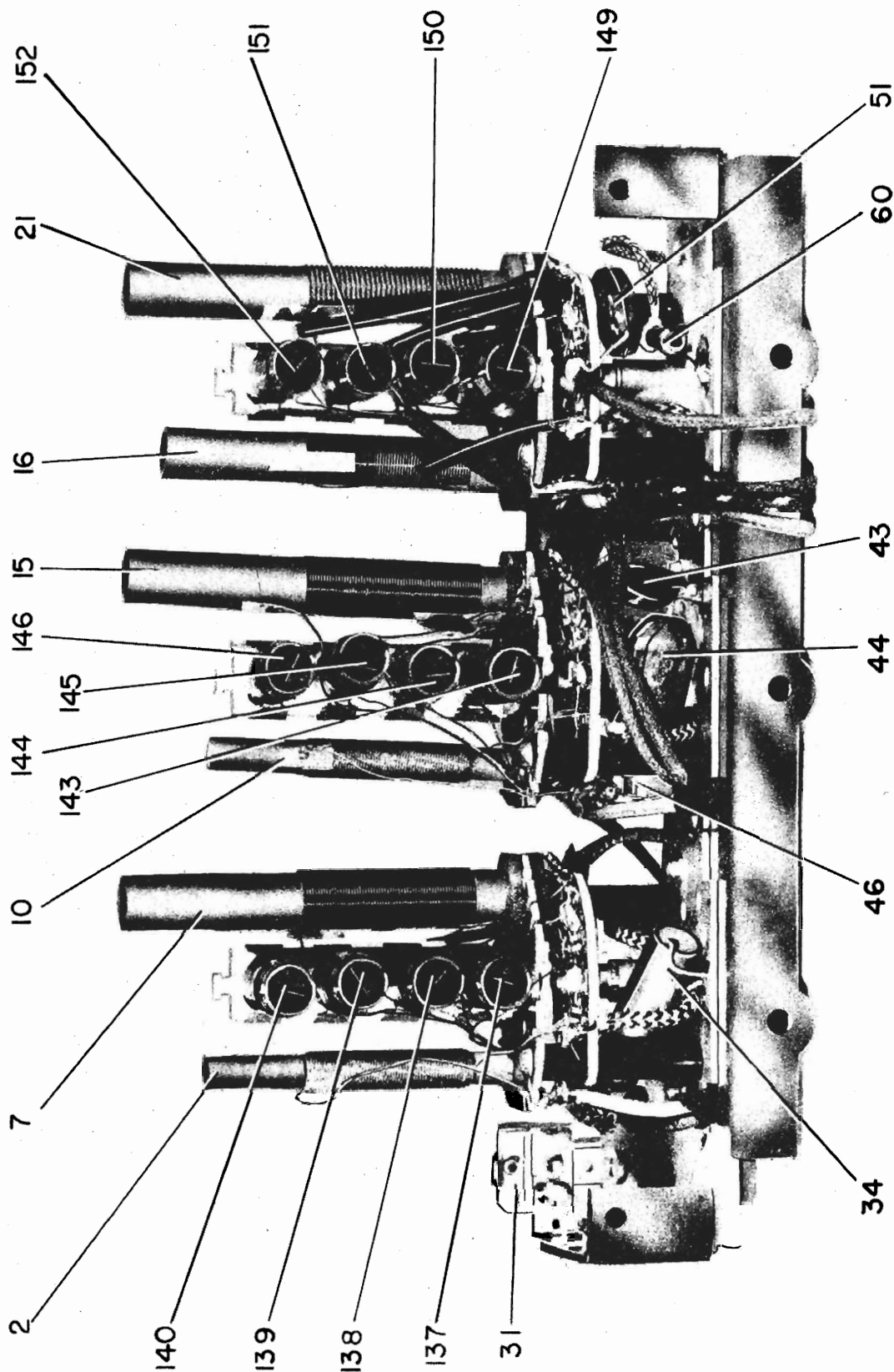


FIG. 12 COIL ASSEMBLY (TOP VIEW)—RADIO 985794

Exploded view diagram of a mechanical device, likely a cryptographic rotor machine, showing various components and their assembly relationships. The parts are labeled with numbers and descriptions:

- 188 POLE NO.1214452
- 8 COIL NO.1216055
- 173 BRACKET NO.1216103
- 175 BRACKET NO.1215102
- 136
- 186 PLUNGER NO.1216201
- 195 SPRING NO.1214826
- 178 GEAR NO.1216106
- 9 COIL NO.1215092
- 177 DRUM NO.1215104
- 179 GEAR NO.1216092
- 176 CORD NO.1216105
- 185 PLATE NO.1216200
- 182 PLATE NO.1215111
- 194 SPRING NO.1214844
- 170 ARM NO.1216102
- 192 SLEEVE NO.1216206
- 120 SWITCH NO.1215613
- 102
- 118 SWITCH NO.1215612
- 64
- 63
- 184 PLATE NO.1216110
- 79 CONTROL NO.1215082
- 171 ARM NO.1215097
- 183 PLATE NO.1216109
- 174 BRACKET NO.1216104
- 181 NUT NO.1305217
- 191 SHAFT NO.125116
- 141
- 142
- 147
- 148

FIG. 13 TUNER UNIT (BOTTOM VIEW)—RADIO 985794

CHEVROLET DIV.—GEN. MOTORS

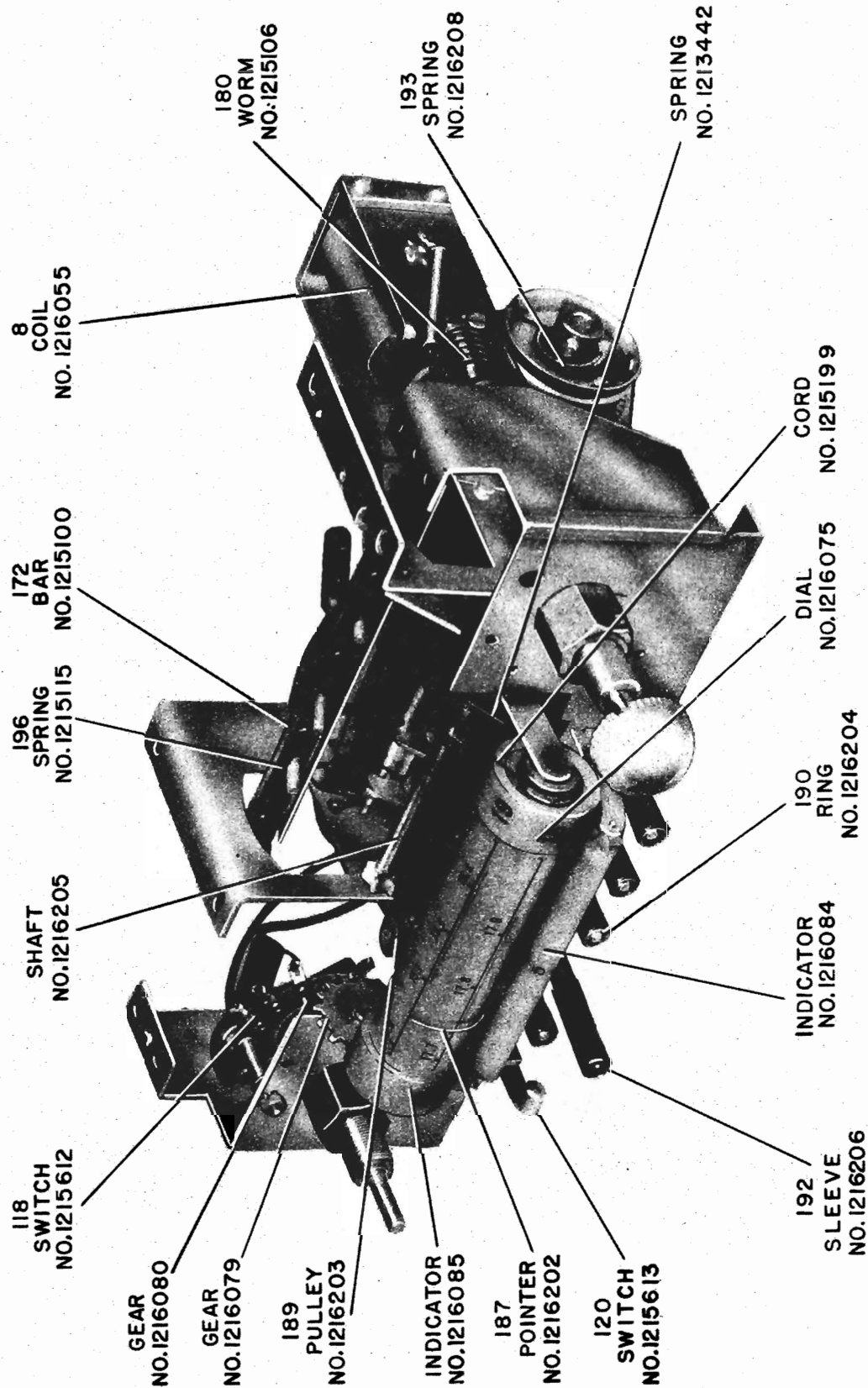


FIG. 14 TUNER UNIT (TOP VIEW)—RADIO 985794

CHEVROLET DIV.—GEN. MOTORS

Service Parts List

Pro- duction Part No.	Service Part No.	Part Name	Description—Function	Illus. No.	Pro- duction Part No.	Service Part No.	Part Name	Description—Function	Illus. No.
1215060	Coil	Choke coil—R.F. grid	1	7238787	7231594	Condenser	Tubular—0.25 mfd., 200 volts—6SK7 cathode	49
1216050	Coil	Antenna coil—"A" band	2	1215200	1215192	Condenser	Tubular—0.1 mfd., 1000 volts—3rd 6SK7 screen	50
1216051	Coil	Antenna shunt coil—31 meter band	3	1215076	1210275	Condenser	Moulded—0.001 mfd., oscillator grid coupling	51
1216052	Coil	Antenna shunt coil—25 meter band	4	1216097	.....	Condenser	Trimmer—70-150 mfd., oscillator tuning	52
1216053	Coil	Antenna shunt coil—19 meter band	5	1214932	.....	Condenser	Ceramic—0.001 mfd., "A" oscillator grid	53
1216054	Coil	Antenna shunt coil—16 meter band	6	7236158	.....	Condenser	Silvered mica moulded—0.0033 mfd., "A" oscillator grid	54
1215066	Coil	Solenoid coil, (Fig. 13-14)	7	.....	.....	.....	.....	55
1216055	Coil	Clutch coil, (Fig. 13)	8	Not Serviced	.....	Condenser	0.001 mfd.—I.F. circuit (See Ill. 127)	56
1215092	Coil	Clutch coil	9	1215078	1215081	Condenser	Moulded—0.00068 mfd., limiter coupling	57
1216050	Coil	R.F. coil—"A" band	10	1215195	.....	Condenser	Tubular—0.025 mfd., 1400 volts—audio coupling	58
1216051	Coil	R.F. shunt coil—31 meter band	11	1215194	7235836	Condenser	Tubular—0.2 mfd., 300 volts, audio coupling	59
1216052	Coil	R.F. shunt coil—25 meter band	12	1215080	1209878	Condenser	Moulded—0.0047 mfd., 6SR7—plate filter	60
1216053	Coil	R.F. shunt coil—19 meter band	13	1215186	.....	Condenser	Ceramic—0.0012 mfd., S.W. oscillator grid	61
1216054	Coil	R.F. shunt coil—16 meter band	14	1215192	.....	Condenser	Tubular—0.1 mfd., 1000 volts, V.C. Comp.	62
1215066	Coil	R.F. coil—S.W.	15	1215200	1215192	Condenser	Tubular—0.1 mfd., 1000 volts—Limiter Filter (Fig. 13)	63
1216056	Coil	Oscillator coil—"A" band	16	1215192	.....	Condenser	Tubular—0.1 mfd., 1000 volts—Tone Control, (Fig. 13)	64
1216057	Coil	Oscillator shunt coil—31 meter band	17	7242448	.....	Condenser	Tubular—0.035 mfd., 400 volts—Tone Control, (Fig. 13)	65
1216058	Coil	Oscillator shunt coil—25 meter band	18	1215195	.....	Condenser	Tubular—0.025 mfd., 1400 volts—6V6 Plate	66
1216059	Coil	Oscillator shunt coil—19 meter band	19	1215195	.....	Condenser	Tubular—0.025 mfd., 1400 volts—6V6 Plate	67
1216060	Coil	Oscillator shunt coil—16 meter band	20	1215200	1215192	Condenser	Tubular—0.1 mfd., 1000 volts, A.V.C. Filter	68
1215068	Coil	Oscillator coil—S.W.	21	1211141	.....	Resistor	Insulated—1.5 meg., 1/4 watt R.F. Grid	75
1216061	Coil	Choke coil—Grid 6SR7	30	7233314	.....	Resistor	Insulated—560 ohms, 1/4 watt 6SK7 Cathode	76
7242577	Condenser	Moulded—0.00022 mfd., antenna filter	31	1211000	.....	Resistor	Insulated—100 ohms, 1/2 watt, Primary Buffer	77
1215074	Condenser	Trimmer—50-300 mfd., antenna tuning	32	1216042	.....	Control	Dimmer control (20 ohm resistance), (Fig. 13)	78
1215201	Condenser	Tubular—0.1 mfd., 300 volts—screen filter	33	1215181	.....	Resistor	Insulated—15,000 ohms, 1/2 watt, Secondary Buffer	79
1215200	1215192	Condenser	Tubular—0.1 mfd., 1000 volts—R.F. cathode	34	1214567	1211089	Resistor	Insulated—15,000 ohms, 1/2 watt, 6SK7 Screen	81
1215200	1215192	Condenser	Tubular—0.1 mfd., 1000 volts—A.V.C.	35	121089	.....	Resistor	Insulated—15,000 ohms, 1/2 watt, R.F. Plate	82
7236146	Condenser	Silvered mica moulded—0.001 mfd. S.W. tuning	36	7240588	1210470	Resistor	Insulated—470,000 ohms, 1/4 watt, 6SA7 Grid	83
1214168	Condenser	Mica—0.0047 mfd. "A" filter	37	1215107	.....	Resistor	Insulated—10 ohms, 1/4 watt, 6SA7 Oscillator Grid	84
7232580	Condenser	Tubular—0.5 mfd., 150 volts "A" filter	38	1215182	.....	Resistor	Insulated—22,000 ohms, 1/4 watt, 6SA7 Osc. Grid Leak	85
1215191	Condenser	Tubular—0.08 mfd., 1200 volts—secondary buffer	39	7233514	.....	Resistor	Insulated—560 ohms, 1/4 watt, 6SK7 Cathode	86
7236157	Condenser	Moulded—0.00056 mfd., 6SA7—signal grid	40	1215179	.....	Control	Sensitivity control (1200 ohm)	87
Not Serviced	Condenser	Silvered mica moulded—0.002 mfd. 6SA7 Screen	41	1209883	.....	Resistor	Insulated—100,000 ohms, 1/4 watt A.V.C. Filter	88
1215200	1215192	Condenser	Tubular—0.1 mfd., 1000 volts—B+ filter	42	1211049	.....	Resistor	Insulated—2700 ohms, 1/4 watt, B+ Filter	89
7238991	Condenser	Moulded—0.00015 mfd., R.F. plate	43	7236689	.....	Resistor	Insulated—15,000 ohms, 2 watt, Screen Dropping	90
7242579	Condenser	Moulded—0.00068 mfd., R.F. plate	44	7233653	.....	Resistor	Insulated—1000 ohms, 2 watt/B+ Filter	91
1216097	Condenser	Trimmer—70-150 mfd., R.F. tuning	45	1215183	.....	Resistor	Insulated—100,000 ohms, 1/4 watt, 3rd 6SK7 Screen	92
1215200	1215192	Condenser	Tubular—0.1 mfd., 1000 volts—B+ filter	46	7236812	1209883	Resistor	Insulated—15 meg., 1/2 watt, Screen Dropping	93
1214489	Condenser	Electrolytic	47	1213343	.....	Resistor	Insulated—2.2 meg., 1/4 watt, Noise Limiter	94
.....	A—20 mfd., 400 volts—filter	48	7240588	1210470	Resistor	Insulated—470,000 ohms, 1/4 watt, Noise Limiter	95
1215184	Condenser	Electrolytic	48	1211194	1211112	Resistor	Insulated—56,000 ohms, 1/4 watt, Audio Diode Filter	96
.....	B—20 mfd., 25 volts—by-pass	.....	.....	.....	.....	.....	.....
.....	A—20 mfd., 350 volts—filter
.....	B—5 mfd., 300 volts—hum filter
.....	C—20 mfd., 25 volts—by-pass

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Service Parts List—Cont'd

Pro- duction Part No.	Part Name	Description—Function	Illus. No.	Pro- duction Part No.	Service Part No.	Part Name	Description—Function	Illus. No.
7242582	Resistor	Insulated—180,000 ohms, 1/4 watt, Audio Diode Filter.	97	1215090	.....	Core	Trimmer, for oscillator coil, 31 meter band.	149
1214551	Resistor	Insulated—27,000 ohms, 1/4 watt, 6SR7 Plate.	98	1215090	.....	Core	Trimmer, for oscillator coil, 25 meter band.	150
7236701	Resistor	Insulated—10,000 ohms, 1/4 watt, 6SR7 Plate Filter.	99	1215090	.....	Core	Trimmer, for oscillator coil, 19 meter band.	151
7236684	Resistor	Insulated—1000 ohms, 1/4 watt, 6SR7 Cathode.	100	1215084	1214923	Speaker	Complete elliptical speaker.	152
7236832	Resistor	Insulated—56,000 ohms, 1/4 watt, Compensation.	101	1215615	.....	Coil	Antenna coil, switch, and can assembly.	.....
1215182	Resistor	Insulated—22,000 ohms, 1/4 watt Tone Control, (Fig. 13).	102	1215616	.....	Coil	R.F. coil, switch, and can assembly.	.....
1213488	Resistor	Insulated—680,000 ohms, 1/4 watt Limited Bias Load.	103	1215614	.....	Coil	Oscillator coil, switch, and can assembly.	.....
1213488	Resistor	Insulated—680,000 ohms, 1/4 watt Limiter Filter.	104	1215198	7239439	Vibrator	Plug-in-Unit.	160
1214572	Resistor	Insulated—330 ohms, 2 watt—6V6 Cathode.	105					
1215610	Control	Steering post volume control and power switch.	106					
1216062	Switch	Antenna coil switch wafer.	115					
1215094	Switch	R.F. coil switch wafer.	116					
1216063	Switch	Oscillator coil switch wafer.	117					
1215612	Switch	Tone control switch (in radio set), (Fig. 13-14).	118					
1216064	Switch	Steering post tuning switch.	119					
1215613	Switch	Tuning switch and arm complete (in radio set), (Fig. 13-14).	120					
1215608	Transformer	First I.F. transformer.	125	1216045	.....	Unit	Tuner—mechanical staked assy. (includes push arm and reset screws), (Fig. 13-14).	.....
1215608	Transformer	Second I.F. transformer.	126	1216101	.....	Arm	Pawl arm—operates push bar indicator.	.....
1215609	Transformer	Third I.F. transformer.	127	1216102	.....	Arm	Push arm assembly and set-up sleeve (Fig. 13).	170
1215611	Transformer	Vibrator transformer.	128	1215097	.....	Arm	Selector arm and link assembly, (Fig. 13).	171
1215091	Transformer	Audio pack.	129	145635	.....	Ball	1/8" dia.—steel ball for worm gear.	.....
		A—Driver		1215099	.....	Bar	Pointer slide bar.	.....
		B—Output		1216103	.....	Bar	Rock bar, gear sector, and core rail assy., (Fig. 14).	172
1216065	Core	Tuning core for "A" band antenna coils—"Red".	135	1216104	.....	Bracket	Solenoid coil holder (plunger end), (Fig. 13).	173
1216066	Core	Tuning core for "A" band antenna coils—"Green".	135	1215102	.....	Bracket	Solenoid coil holder (pole piece end), (Fig. 13).	174
1216067	Core	Tuning core for "A" band antenna coils—"Yellow".	135	1214822	.....	Clip	Solenoid mounting bracket, (Fig. 13).	175
1215089	Core	Tuning core for S.W. Antenna coil, (Fig. 13).	136	1216105	.....	Cord	Retaining clip for selector arm shaft.	.....
1215090	Core	Trimmer, for antenna coil—31 meter band.	137	1214464	.....	Cover	Pointer cord, (Fig. 13).	176
1215090	Core	Trimmer, for antenna coil—25 meter band.	138	7235945	.....	Disc	Clutch coil cover.	.....
1215090	Core	Trimmer, for antenna coil—19 meter band.	139	1215104	.....	Drum	Rubber disc for clutch.	.....
1215090	Core	Trimmer, for antenna coil—16 meter band.	140	1216106	.....	Gear	Pointer drive cord and clutch disc, (Fig. 13).	177
1216065	Core	Tuning core for "A" band R.F. coils—"Red".	141	1216092	.....	Gear	Clutch pinion gear and spindle, (Fig. 13).	178
1216066	Core	Tuning core for "A" band R.F. coils—"Green".	141	1215106	.....	Gear	Scissors gear and disc for clutch, (Fig. 13).	179
1216067	Core	Tuning core for "A" band R.F. coils—"Yellow".	141	7239267	.....	Guide	Worm gear, (Fig. 14).	180
1215089	Core	Tuning core for S.W.—R.F. coil.	142	1216107	.....	Guide	Dial pointer guide (carriage).	.....
1215090	Core	Trimmer, for R.F. coil—31 meter band.	143	368319	.....	Nut	Pointer cord guide.	.....
1215090	Core	Trimmer, for R.F. coil—25 meter band.	144	7231480	.....	Nut	3/8—32 hex. nut for clutch spindle sleeve.	.....
1215090	Core	Trimmer, for R.F. coil—19 meter band.	145	1305217	.....	Nut	3/8—32 hex. nut for dimmer control.	.....
1215090	Core	Trimmer, for R.F. coil—16 meter band.	146	1214821	.....	Nut	Locknut for worm gear bearing screw.	181
1216065	Core	Tuning core for "A" band oscillator coil—"Red".	147	1216108	.....	Plate	Front bearing plate.	.....
1216066	Core	Tuning core for "A" band oscillator coil—"Green".	147	1215111	.....	Plate	Push arm stop plate, (Fig. 13).	182
1216067	Core	Tuning core for "A" band oscillator coil—"Yellow".	148	1216109	.....	Plate	Rear bearing plate, (Fig. 13).	183
		Tuning core for S.W. oscillator coil.		1216110	.....	Plate	L.H. end plate, (Fig. 13).	184
				1216200	.....	Plate	R.H. end plate, (Fig. 13).	185
				1216201	.....	Plunger	Solenoid plunger and stud, (Fig. 13).	186
				1216202	.....	Pointer	Dial pointer only, (Fig. 14).	187
				1214452	.....	Pole	Solenoid pole piece, (Fig. 13).	188

Tuner Unit Parts

Pro- duction Part No.	Service Part No.	Part Name	Description—Function	Illus. No.
1216045	Unit	Tuner—mechanical staked assy. (includes push arm and reset screws), (Fig. 13-14).	.....
1216101	Arm	Pawl arm—operates push bar indicator.	.....
1216102	Arm	Push arm assembly and set-up sleeve (Fig. 13).	170
1215097	Arm	Selector arm and link assembly, (Fig. 13).	171
145635	Ball	1/8" dia.—steel ball for worm gear.	.....
1215099	Bar	Pointer slide bar.	.....
1216103	Bar	Rock bar, gear sector, and core rail assy., (Fig. 14).	172
1216104	Bracket	Solenoid coil holder (plunger end), (Fig. 13).	173
1215102	Bracket	Solenoid coil holder (pole piece end), (Fig. 13).	174
1214822	Clip	Solenoid mounting bracket, (Fig. 13).	175
1216105	Cord	Retaining clip for selector arm shaft.	.....
1214464	Cover	Pointer cord, (Fig. 13).	176
7235945	Disc	Clutch coil cover.	.....
1215104	Drum	Rubber disc for clutch.	.....
1216106	Gear	Pointer drive cord and clutch disc, (Fig. 13).	177
1216092	Gear	Clutch pinion gear and spindle, (Fig. 13).	178
1215106	Gear	Scissors gear and disc for clutch, (Fig. 13).	179
7239267	Guide	Worm gear, (Fig. 14).	180
1216107	Guide	Dial pointer guide (carriage).	.....
368319	Nut	Pointer cord guide.	.....
7231480	Nut	3/8—32 hex. nut for clutch spindle sleeve.	.....
1305217	Nut	3/8—32 hex. nut for dimmer control.	.....
1214821	Nut	Locknut for worm gear bearing screw.	181
1216108	Plate	Front bearing plate.	.....
1215111	Plate	Push arm stop plate, (Fig. 13).	182
1216109	Plate	Rear bearing plate, (Fig. 13).	183
1216110	Plate	L.H. end plate, (Fig. 13).	184
1216200	Plate	R.H. end plate, (Fig. 13).	185
1216201	Plunger	Solenoid plunger and stud, (Fig. 13).	186
1216202	Pointer	Dial pointer only, (Fig. 14).	187
1214452	Pole	Solenoid pole piece, (Fig. 13).	188

CHEVROLET DIV.—GEN. MOTORS

Chassis Parts—Miscellaneous—Cont'd

Pro- duction Part No.	Service Part No.	Part Name	Description—Function	Illus. No.
1216076		Drum	Range switch intermediate shaft drive cord drum.	
1216077		Escutcheon	Control panel escutcheon and window	
1215143		Gasket	Rubber gasket for speaker cover.	
1216078		Gear	Range switch intermediate shaft gear—less set screws	
1216079		Gear Assy.	Tone control, drum drive gear (See Illus.), (Fig. 14)	
			Includes: 1—gear 1—stud 1—washer	
1216080		Gear	Tone control intermediate gear (See Illus.), (Fig. 14)	
1216081		Grommet	Rubber grommet for "A" band antenna or R.F. coil can opening.	
1216082		Grommet	Rubber grommet for "A" band antenna or R.F. coil mounting.	
1215147		Grommet	Rubber grommet "A" band oscillator coil can opening.	
1216083		Grommet	Rubber grommet for "A" band oscillator coil mounting.	
1215148		Grommet	Rubber grommet for S.W. band antenna, R.F. or oscillator coil can opening.	
7252948		Grommet	Rubber grommet for S.W. band antenna R.F. or oscillator coil mounting.	
1216084		Indicator	Push bar tuning indicator drum (See Illus.), (Fig. 14)	
1216085		Indicator	Tone indicator drum (See Illus.), (Fig. 14)	
125588		Lamp	Dial lamp—Mazda No. 55.	
1216086		Link	Coil switch link and arm assembly.	
7238510		Nut	Hex nut for volume control or tuning shaft bushing	
1216227		Nut	No. 5-40 nut for tone control switch.	
1216087		Panel	Control panel, bracket and pulleys, and gear assembled.	
1216088		Plate	Coil mounting and range switch detent plate assembly.	
1215154		Pulley	Bracket and 2 pulleys for control panel.	
1215157		Screw	Guide screw for tuning knob shaft.	
1216229		Screw	No. 6-32x $\frac{3}{8}$ " screw for push bar indicator drum index spring.	
1215160		Screw	No. 6-32x $\frac{1}{4}$ " hex head for coil switch link.	
1216047		Screw	No. 8-32x $\frac{1}{2}$ " set screw for range switch shaft cord drum or gear.	
1215161		Shaft	Coil assembly switch shaft.	
1215162		Shaft	Dial shaft.	
1216089		Shaft	Manual tuning flexible shaft.	
1216090		Shaft	Pivot shaft for push bar indicator drum.	
1215165		Shaft	Range switch intermediate shaft.	
1216091		Shaft	Range switch knob shaft and gear.	
1216093		Socket	Dial lamp socket and lead.	
1215174		Socket	Speaker plug socket.	
1213439		Socket	Tube socket.	

Tuner Unit Parts—Cont'd

Pro- duction Part No.	Service Part No.	Part Name	Description—Function	Illus. No.
1216203		Pulley	L.H. pulley and bracket assembly (1 pulley), (Fig. 14)	189
1215114		Pulley	R.H. pulley and bracket assembly (2 pulleys) (see Illus.), (Fig. 13).	
7252972		Retainer	Clip to fasten cam shaft pawl arm to selector arm.	
1216206		Screw	Push arm set-up screw and sleeve assembled (Fig. 13-14).	192
1214845		Screw	No. 6-32x $\frac{1}{4}$ " self-tapping, for tuner frame.	
1215127		Screw	No. 8-32x $\frac{1}{4}$ " self-tapping, for solenoid bracket.	
1215126		Screw	No. 10-32x $\frac{3}{8}$ " hex. head, for solenoid coil.	
7240316		Screw	No. 10-32x $\frac{3}{8}$ " screw for worm gear bearing.	
127555	128036	Screw	Set screw for worm gear.	
1216205		Shaft	Camshaft (See Illus.), (Fig. 14)	191
1215116		Shaft	Selector arm and link pivot shaft, (Fig. 13)	
1214466		Spring	Clutch spring.	
1215120		Spring	Core rail tension spring—L.H.	
1215234		Spring	Core rail tension spring—R.H.	
1216207		Spring	Pawl arm spring.	
1216208		Spring	Pointer cord spring, (Fig. 14)	193
1214844		Spring	Push arm return spring, (Fig. 13)	194
1215235		Spring	Rocker bar gear sector spring.	
1216209		Spring	Rocker bar tension spring.	
1214826		Spring	Selector arm and link spring, (Fig. 13)	195
7236121	Not Serviced	Spring	Tension spring for clutch scissors gear.	
1215115		Spring	Tuning core holding spring, (Fig. 14)	196
1216210		Washer	"C" washer for pawl arm.	
1214609		Washer	"C" washer to hold indicator drum pawl arm.	
7235892		Washer	Fibre washer for worm gear bearing.	
1214837		Washer	Flat washer for selector arm shaft.	
1213909		Washer	Rubber, for push arm.	
1214823		Washer	Spring washer for worm gear bearing.	

Chassis Parts—Miscellaneous

Pro- duction Part No.	Service Part No.	Part Name	Description—Function	Illus. No.
169066		Ball	$\frac{3}{8}$ " dia. steel ball for switch detent.	
1216068		Bar	Tuning push bar.	
1216069		Board	Terminal board for antenna coil shield can.	
1215123		Bracket	S.W. shunt coil mounting bracket.	
1216070		Bushing	Tuning shaft bushing.	
1215130		Cable	Antenna cable and socket.	165
1216071		Can	Antenna coil assembly shield can.	
1216072		Can	R.F. or oscillator coil assembly shield can.	
1216073		Case	Receiver case—less control panel.	
1216074		Clip	Mounting clip for shunt coils.	
1215134		Clip	Retaining clip for coil shield can (fastens on end of coil bracket).	
1215199		Cord	Band indicator drive cord (See Illus.), (Fig. 14)	
1216075		Dial	Dial cylinder and band indicator strip (See Illus.), (Fig. 14)	

CHEVROLET DIV.—GEN. MOTORS

Circuit Description—Cont'd

circuit arrangement formed by the main tuning inductance (item 16) 2200 mmf. condenser (item 40) and condensers consisting of items 52, 53 and 54 in which item 53 is the negative temperature coefficient condenser.

The two 6SK7 tubes are used in the two stage I.F. amplifier. In the short wave position, both tubes get their bias from the 560 ohm resistor (item 86), but in the broadcast position a 1200 ohm variable resistor (item 87) is connected in series with the 560 ohm resistor and is adjusted in the factory for uniform sensitivity. The variable resistor (item 87) increases the bias on the 6SK7 tubes, therefore, the I.F. stage gain in the broadcast position is less than that in the short wave position so that the desired sensitivity is obtained on all bands.

The 6SR7 tube serves three distinct functions. The diode plate No. 2 is used for signal detection. Diode No. 1 is used for supplying bias for the noise limiter circuit, while the triode part is used for the audio amplifier. Diode plate No. 1 gets its signal from the primary of the 3rd I.F. transformer through the 88 mmf. condenser (item 56) and inasmuch as the secondary of the transformer is tapped down the bias for the noise-limiter circuit is greater than the DC voltage of the rectified signal. The bias for the tube is developed across the 1000 ohm resistor (item 100).

The 6H6 tube performs two functions: plate No. 1 is used in the noise limiter circuit and plate No. 2 is used for providing A.V.C. delay. A.V.C. is derived from the high end of diode load resistor (item 97) and the delay is provided by means of a bleeding resistor (item 93) from +B. For signals below the A.V.C. level, diode plate No. 2 of the 6H6 is conducting because of the + voltage from resistors 93 and 94. Under these conditions the A.V.C. line is therefore at essentially zero potential, but as signal input increases the junction of resistor 97 and the low side of the 3rd I.F. transformer secondary assumes a negative potential and when this counteracts the positive voltage from resistors 93 and 94 on 6H6 diode plate No. 2 this diode ceases to conduct. As signal input increases further, A.V.C. is applied to the R.F. and I.F. tubes.

The noise limiter functions automatically whenever a noise pulse appearing at the 3rd I.F. transformer exceeds 100 per cent modulation. Cathode No. 1 of the 6H6 is connected to the second detector diode (No. 2 of the 6SR7) and diode plate No. 1 of the 6H6, does not conduct in the absence of noise because of the negative control voltage applied through resistor 104 to diode plate No. 1 of the 6H6. This voltage is derived from the primary of the 3rd I.F. transformer by diode No. 2 of the 6SR7 and varies with the signal input in such a way that the ratio of control voltage to the second detector diode voltage is constant. This ratio determines the modulation percentage at which the noise limiter functions. If the ratio is too low, the noise limiter will cut modulation peaks and if the ratio is too high the limiter will not eliminate noise as effectively as it could. The voltage ratio is determined by the design of the complete 3rd I.F. transformer circuit and should not be changed.

Mounting and Installation Parts

Pro- duction Part No.	Service Part No.	Part Name	Description—Function	Illus. No.
605302	Condenser	.5 mfd., generator (1).....	.....
1882272	Condenser	.5 mfd., ignition coil (1).....	.....
605303	Condenser	.5 mfd., regulator (1).....	.....
605301	Condenser	.5 mfd., voltage regulator (1).....	.....
7230032	Suppressor	Distributor suppressor (1).....	.....
1882054	Washer	For mounting coil condenser (1).....	.....
1215229	Package	Electrical Mounting Parts (Accessory Bag No. 3)— Consists of the following parts:	.....
1853686	Adapter	Suppressor adapter (1).....	.....
1882053	Clip	Ground clip for coil condenser (1).....	.....
605307	Coil	Regulator choke (1).....	.....
605204	Condenser	.01 mfd., regulator field (1).....	.....
1849161	Condenser	.5 mfd., ammeter (1).....	.....
1215660	Control Assy.	Steering Post Control (Accessory Bag No. 6).....	.....
606218	Cover	Cable Cover (1).....	.....
606347	Spring	Cable cover spring (1).....	.....

Circuit Description

The circuit used in this receiver is the conventional superheterodyne type with two stages of I.F. and six tuned I.F. circuits. In the short wave position the band switch operates by shunting respective coils (with their magnetite trimmer cores) across the main variable tuning inductances in the antenna, R.F. and oscillator circuits. When tuning either of the four short wave bands the signal is fed to the grid of the R.F. amplifier tube 6SK7 which also receives its A.V.C. bias through the 1.5 megohm resistor (item 75).

In the broadcast band position the filter choke (item 1) is included in the circuit and in conjunction with the input capacity of the tube constitutes a low-pass filter which effectively prevents unwanted disturbances from reaching the R.F. tube. The variable trimmer (item 31) is used for compensating the slight variations in the effective capacities of the antenna and the shielded lead-in cable. Bias for the 6SK7 tube is developed across the 560 ohm resistor (item 76).

The 6SA7 tube serves the combined functions of 1st detector and oscillator. In the short wave position the oscillator section of 6SA7 uses the conventional Hartley circuit, however the band switching arrangement of this section differs slightly from that of the antenna and R.F. sections, in that a 31-meter auxiliary oscillator coil (item 17) is permanently shunted across the main tuning coil (item 21) and a tap is brought out for return to the cathode. In changing to the 25, 19 and 16 meter bands, the respective auxiliary oscillator coils (items 18, 19 and 20) are shunted in parallel to the previous combination. The negative coefficient 120 mmf. condenser (item 60) in parallel to the main tuning coil (item 21) constitutes the temperature compensating arrangement for the short wave bands. In the broadcast band the oscillator uses a modified Colpitts

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Circuit Alignment

The adjustable condensers and magnetite cores in this receiver have been very carefully adjusted at the factory and should require no further adjustment (except antenna compensating condenser, item 31) unless tampered with or a defective unit has been replaced. It is advisable not to attempt any adjustment unless it is definitely known that an adjustment is necessary.

To align the circuits of this receiver correctly a signal generator and an output meter must be used. In aligning the receiver it is very important that the correct frequencies be used, and that all alignment adjustments be made in sequence, starting with the I.F. amplifier, then aligning the broadcast band, and finally the short wave bands. Slight misadjusting of either the I.F. or R.F. circuits will result in a weak set over most of the dial. All R.F. and I.F. adjustments are accessible after removing the speaker cover, top cover and rear bottom cover. The I.F. primary windings are adjusted by magnetite core screws Nos. 153, 155 and 157, located on top of the I.F. transformers (Fig. 1); and the secondary windings are adjusted by core screws Nos. 154, 156 and 158, located at the bottom of each I.F. transformer (Fig. 1).

1. Aligning I.F. Stages at 455 Kilocycles

- Connect one terminal of the output meter to the plate of one of the 6V6GT output tubes and connect the other terminal through a .1 mfd. condenser to the plate of the other 6V6GT output tube.
- Connect the output of the signal generator through a .01 mfd. condenser to the grid of the 2nd I.F. tube, 6SK7 (Pin No. 4). Connect the ground lead from the signal generator to the frame of the receiver chassis.
- Turn the volume control on full.
- Adjust the signal generator to 455 kilocycles.
- Adjust core screws (157 and 158) on the 3rd I.F. transformer for maximum reading on the output meter.

NOTE: Always use the lowest signal generator output that will give a reasonable deflection on the output meter.

- Connect the signal generator lead through the .01 condenser to the grid of the 1st I.F. tube, 6SK7 (Pin No. 4), and adjust core screws (155 and 156) in the 2nd I.F. transformer for maximum output.
- Connect the signal generator lead through the .01 condenser to the grid of the 6SA7 tube (Pin No. 8) and adjust core screws (153 and 154) in the 1st I.F. transformer for maximum output.

2. Aligning the R.F. Amplifier

The main tuning cores should never be touched unless a coil or core is replaced. Where one of these parts has been replaced the complete broadcast band alignment procedure (No. 3) should be followed. Generally when checking the R.F. circuits for proper peak-

ing the following procedure and sequence must be used. There are fifteen trimmer screws properly labeled "Antenna," "Oscillator," and "R.F." The broadcast band is designated by the letter "A" and the four short wave bands are designated by the numbers indicating the bands—31, 25, 19 and 16. The labels all appear on the coil assembly shields.

(a) "A" Band, or Broadcast:

If the dial pointer is right on calibration, merely trim the "A" band, antenna and R.F. trimmers at 1200 kilocycles. If the pointer is slightly off calibration it can be corrected by bending.

NOTE: When the radio is installed in the car the antenna trimmer should be aligned on the "A" band between 1000 and 1200 kilocycles.

(b) 31 Meter Band:

Using a signal of 9.6 megacycles, tune in the signal with the receiver. If the pointer is slightly off calibration readjust the oscillator trimmer and then trim antenna and R.F. trimmers for maximum output at 9.6 megacycles.

(c) 25 Meter Band:

Using a signal of 11.8 megacycles tune in the signal with the receiver. If the pointer is slightly off calibration readjust the oscillator trimmer and then trim the antenna and R.F. trimmer for maximum output at 11.8 megacycles.

(d) 19 Meter Band:

Using a signal of 15.2 megacycles tune in the signal with the receiver. If the pointer is slightly off calibration readjust the oscillator trimmer and then trim the antenna and R.F. trimmers for maximum output at 15.2 megacycles.

(e) 16 Meter Band:

Using a signal of 17.8 megacycles tune in the signal with the receiver. If the pointer is slightly off calibration readjust the oscillator trimmer and then trim the antenna and R.F. trimmers for maximum output at 17.8 megacycles.

NOTE: The 31-meter band affects the tuning of the other short wave bands, therefore it must always be aligned first. It is equally important that the antenna trimmer (item 31) be aligned first on the broadcast band for proper tracking.

3. Broadcast Band Alignment

Six adjustments are provided which include trimmers Nos. 31, 45 and 52 associated with circuits Nos. 2, 10, 16 and the three iron cores Nos. 135, 141, and 147, which are mounted in front of the coil assemblies in conjunction with the core draw-bar No. 172. If complete realignment is found necessary the R.F. circuits should be adjusted in the following sequence.

(a) Tune the receiver to the extreme high frequency end of the band.

(b) Turn each of the three core screws (135, 141 and 147) in a counterclockwise direction ten turns.

NOTE: This is done in order to separate the cores from the coil windings far enough so that the cores will have no effect on the frequency of the circuits.

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Circuit Alignment—Cont'd

- (c) Connect the signal generator through a 35 mmf. condenser to the standard Chevrolet shielded antenna lead-in. Connect the ground lead from the signal generator to the shield of the antenna lead-in cable.
- (d) Connect one terminal of the output meter to the plate of one of the 6V6GT output tubes, and connect the other terminal through a .1 mfd. condenser to the plate of the other 6V6GT output tube.
- (e) Adjust the frequency of the signal generator to 1645 kilocycles and peak trimmers Nos. 31, 45 and 52 for maximum signal output, at the same time reducing the signal generator output to as low a value as is consistent with a reliable indication on the output meter.
- (f) Change the frequency of the signal generator to 1620 kilocycles and turn the oscillator core screw (147) clockwise until maximum output is obtained.
- (g) Change the frequency of the signal generator to 1200 kilocycles and tune the receiver for maximum signal at 1200 kilocycles.
- (h) Adjust core screws (135 and 141) for maximum signal output.
- (i) Change the frequency of the signal generator to 800 kilocycles.
- (j) Tune the receiver for maximum signal output at 800 kilocycles.
- (k) Adjust the antenna and R.F. trimmers (31 and 45) for maximum output.
- (l) Reset the signal generator to 1200 kilocycles and tune the receiver for maximum output at 1200 kilocycles.
- (m) Adjust the antenna and R.F. cores (135 and 141) for maximum output.

4. Complete Short Wave Alignment

Because of the extensive range of this receiver, it is necessary that the short wave bands be completely aligned in exact accordance with the following procedure. Be sure to make all adjustments in the order specified.

- (a) Check broadcast band antenna trimmer (item 31) for maximum peaking at 1200 kilocycles. This is very important.
- (b) Tune the receiver so that the dial pointer is at the extreme high frequency end of the 31-meter band, and adjust the magnetite core screws (136, 142 and 148) so that each core end is flush with the coil forms (items No. 7, No. 15 and No. 21) which extend beyond the shield.
- (c) Turn the magnetite trimmer core screws (137, 138, 139, 140, 143, 144, 145, 146, 149, 150, 151 and 152) in a counter-clockwise direction, as far as they will go.

NOTE: Do not force the cores against their stops as too much force may fracture the core. Connect the signal generator through a 35 mmf. condenser and the Chevrolet shielded antenna lead-in, to the antenna connection of the receiver. Connect the ground lead from the signal generator to the shield of the lead-in.

- (e) Turn the band indicator to 31 meters and turn the volume control to the maximum position.
- (f) Adjust the signal generator frequency to 9.6 megacycles and move the pointer to 9.6 megacycles on the dial scale.

- (g) Turn the core screw (149) in a clockwise direction until the first peak is obtained, and then adjust carefully for maximum reading on the output meter.
- (h) Turn the core screw (143) in a clockwise direction until the 2nd peak is obtained, if more than one peak can be found, and adjust for maximum reading on the output meter at the same time reducing the signal generator output to as low a value as is consistent with a reliable indication on the output meter.
- (i) Turn the core screw (137) in a clockwise direction or until 2nd peak is obtained, and adjust for maximum reading on the output meter.
- (j) Change the signal generator frequency to 11.8 megacycles, the band indicator to 25 meters, and move the pointer to 11.8 megacycles on the dial scale.
- (k) Turn the core screw (150) in a clockwise direction, until 1st peak is obtained, and adjust for maximum reading on the output meter.
- (l) Turn core screws (144 and 138) in a clockwise direction until 2nd peak is obtained, and adjust for maximum reading on output meter.
- (m) Change the signal generator frequency to 15.2 megacycles, the band indicator to 19 meters, and move the dial pointer to 15.2 megacycles on the dial scale.
- (n) Turn core screw (151) in a clockwise direction until the 1st peak is obtained and adjust for maximum reading on the output meter.
- (o) Turn core screws (145 and 139) in a clockwise direction until 2nd peak is obtained, and adjust for maximum reading on output meter.
- (p) Change the signal generator frequency to 17.8 megacycles, the band indicator to 16 meters, and move the pointer to 17.8 megacycles on the dial scale.
- (q) Adjust core screw (152) by turning in a clockwise direction until 2nd peak is obtained and adjust for maximum output.
- (r) Adjust core screws (146 and 140) by turning in a clockwise direction until 1st peak is obtained and adjust for maximum reading on output meter.
- (s) Repeat all operations starting with (e) until no further improvement can be obtained.

5. General Alignment Information

Alignment of the short wave bands should never be attempted without first peaking trimmer condenser No. 31 in accordance with the procedure outlined under "Broadcast Band Alignment" (3). A slight misalignment of this trimmer condenser will result in unsatisfactory short wave operation, the reason being that trimmer condenser No. 31 is in the circuit on all bands but it should be peaked on the broadcast band only.

The most satisfactory method of aligning or checking the spread band ranges is on actual reception of short wave stations of known frequency by adjusting the magnetite core oscillator coil for each band, so that the short wave stations come in at the correct points on the dial. In exceptional cases, when the set is being serviced in a location where the noise level is high enough to prevent reception of short wave stations a signal

CHEVROLET DIV.—GEN. MOTORS

Circuit Alignment—Cont'd

generator should be used for alignment, but an extremely high degree of accuracy is required in the frequency settings of the signal generator as a slight error will produce considerable inaccuracy on the spread band dial.

When adjusting the magnetite core trimmer in the auxiliary short wave coils, if more than one peak is found, select the peak specified in the alignment procedure for each band.

6. Adjusting Antenna Compensating Condenser

This adjustment should be made after the receiver has been properly installed in the car. Tune the receiver to a weak signal at the high frequency end of the broadcast band at about 1200 kilocycles. This signal should be just audible with volume control on full. Adjust the antenna compensating condenser for maximum signal strength.

NOTE: When aligning the antenna trimmer condenser, be sure that the antenna is fully extended.

7. Instructions for Removal of Coil Unit

- Remove the top, rear bottom, and speaker cover from the receiver.
- Remove the row of tubes immediately behind coil unit assembly.
- Remove the two No. 8 self-tapping screws that hold the antenna connector to the side of the case, then unsolder the antenna cable shielding from the two grounding lances which will leave this part entirely free. Remove cable clamps which hold the leads from the oscillator coils to the chassis. Free these leads. Unsolder the leads from the antenna, R.F. and oscillator coil assembly whichever is to be removed.

- Remove the two No. 8 screws which hold the solenoid mounting bracket to the main tuner frame. Place the solenoid out of the way, taking care that the armature does not get damaged. Unsolder the small condenser (item 30) from the case. Remove No. 8 self-tapping screw which anchors the coil mounting bracket to the side of the case.

- Remove the $\frac{1}{2}$ hex. head screw from the end of the switch shaft to be found at the center of the coil unit base. Remove the two nuts from the end of the band indicator shaft. The short link arm which is retained by these nuts is to be removed after the main assembly is free. Remove the two $\frac{1}{2}$ hex. head screws that hold the coil unit base to the main coil assembly bracket.

- Turn the tuning indicator to the high frequency end of the band, then remove the three No. 8 self-tapping screws and the two No. 8 machine screws that hold the coil unit mounting bracket to the chassis. Remove the sleeve covered tension wire on the core bar, part No. 1215116, and back out the threaded portion of the two cores. This will leave the wire only passing through the threaded holes in the core bar. Carefully pull the cores from the coil forms by drawing the whole assembly towards the I.F. transformers. With the coil unit assembly in this position the affected coil can be removed by first moving it away from the coil unit assembly bracket until the projections at its base just clear the bracket, then raising the base

end and withdrawing the unit over the I.F. transformer. **CAUTION:** When performing this operation take care that the band indicator shaft is not withdrawn with the coil unit assembly bracket, and that shield can is disengaged from the spring clip on the chassis at the front end of the coil can.

8. To Disassemble Coil Units

- Turn all trimmer screws until they are within the coil unit cover.
- Remove the small spring steel clip, part No. 1215134, which anchors the coil bracket to the end of the cover. Two corners of this clip dig into the metal of the cover and care must be exercised when removing it so that no damage is done to the protruding coil tubes.
- Remove the two $\frac{1}{2}$ nuts holding the shield can in place and slide the cover off.

9. Reassembling Coil Units

- Replace the cable clamp which holds the coil leads located between the 6SK7 and the 6SR7.
- In replacing the cores into the coil tubes, grasp the threaded stud end, raise the core and work it into the coil tube.
- When the oscillator coil is removed be sure that the two detent balls at the switch shaft do not get lost.
- The two nuts which hold the short link arm to the band indicator shaft must be taken up tight.
- While replacing the coil unit mounting bracket be sure that the three spring clips enter their slots in the shield cans properly.

10. Stiff Manual Tuning

Excessive stress on the worm bearing caused by tension or compression in the flexible manual tuning shaft may cause stiff manual tuning. Such stress can readily be eliminated by loosening and retightening the set screw in the worm.

11. Tone Control

The four positions of the tone control are: Bass, Soft, Music and Voice. The tone control and its tone compensating network in the circuit are between the audio amplifier and the output stage. When the switch is in the "bass" position, a .035 mfd. condenser (item 64) shunts the output of the 6SR7 audio frequency amplifier stage resulting in minimum highs, since a large portion of the high audio frequencies are by-passed to ground. In the "soft" position, a .01 mfd. condenser (item 63) shunts the output of the 6SR7 audio frequency amplifier stage to ground (the same as item 64 does in the "bass" position), but because the shunting capacity is less, the reduction of high frequencies will not be so pronounced as in the "bass" position. Neither high nor low frequencies are attenuated over the normal amplifier response in the "music" position, resulting in a maximum high and low frequency response.

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CHEVROLET DIV.—GEN. MOTORS

Circuit Alignment—Cont'd

With the tone control in the "voice" position, the output of the 6SR7 audio amplifier stage is shunted to ground with a .01 mfd. condenser (item 63) thus by-passing some of the high frequencies. A parallel combination consisting of a 22,000 ohm resistor (item 102) and a .035 mfd. condenser (item 64) is connected in series with the output of the 6SR7 audio amplifier stage, resulting in a reduced low frequency response since this combination has a higher impedance at low frequencies than at high frequencies, thus both the high and the low frequencies are attenuated resulting in optimum tone balance for speech programs.

12. Band Switching Circuits

The two switch sections as shown on the schematic diagram in the antenna stage and in the R.F. stage are actually one switch wafer in each case. The top section on the diagram is that set of contacts toward the coils as viewed from the coils. The lower set of contacts is that set of contacts away from the coils. The switch sections are all shown in the 16-meter band position. Referring to the top wafer sections, when the upper rotor fingers touch terminals No. 2, the 16-meter band is in the circuit. Terminals No. 3 are the 19-meter band contacts. Terminals No. 4 are the 25-meter band contacts. Terminals No. 5 are the 31-meter band contacts. Terminals No. 6 are the "A" band or broadcast band contacts.

The "A" band coil circuit shows the actual simplified circuit diagram for the "A" band without the switch contacts being shown. The same applies to the 31-meter band coil circuit. Coils 7, 15, 21 and 17 remain in the circuit at all times for short wave operation. When switching to the 25-meter band, coil No. 3 is replaced by coil No. 4. Coil No. 11 is replaced by coil No. 12. Coil No. 18 is switched across coils Nos. 21 and 17, thus on each of the 25, 19 and 16-meter bands there are three oscillator coils in parallel at the same time. The sensitivity control is removed from the circuit for short wave operation thereby giving full sensitivity on short waves.

In order to provide good tracking sensitivity only perfectly matched main tuning cores are used in the receivers on the "A" band (Nos. 135, 141 and 147). The cores are color coded with a spot of red, yellow or green paint on the stud-end of the core. Only one particular color will be used in each receiver. When servicing one of these cores always replace the defective core assembly with a replacement core bearing the exact color coding, or replace all three cores with a new set of cores of another color code.

13. Adjustment of Clutch Assembly

- Remove bottom covers (front and rear).
- Loosen both set screws on hub of pointer drive cord drum (item 177, Fig. 13).
- Move core bar (item 172, Fig. 14) against stop pin with tuning cores all the way inside the coils.
- Scissors bakelite gear and clutch assembly (item 179, Fig. 13) counter-clockwise one tooth and engage with worm (item 180, Fig. 14), taking care not to lose scissors action.

- Rotate drum (item 177, Fig. 13) until dial pointer (item 187, Fig. 14) lines up with the last mark at the low frequency end of the dial drum.

- Insert a .010 metal shim between brass gear and clutch lining. Press entire assembly firmly together and tighten set screws on drum hub after which remove the metal shim.

CAUTION: During the preceding steps of adjustment, it is very important that the core bar position is maintained and that neither the bakelite nor the brass gear become disengaged from the worm.

14. Solenoid Pole Piece Adjustment

- Insert plunger (item 186, Fig. 13) all the way in solenoid assembly until link strikes extruded lip on end of solenoid. (No push arm engaged to selector bar.)
- Loosen lock nut (item 181, Fig. 13) and screw in pole piece until it touches the plunger.
- Back off pole piece $1\frac{1}{4}$ turns and tighten lock nut in place.

GENERAL: This auto radio is a nine tube self-contained receiver built expressly for installation in 1942 Chevrolet automobiles. Special features incorporated in this receiver are: automatic tuning; single band sequence tuning from instrument panel; steering column station selection and volume control; elliptical speaker; permeability tuning; sensitivity control; automatic noise limiter circuit; four position tone control; 0Z4 rectifier; and a primary type vibrator.

Antenna System: There are two antenna systems available for use with this receiver; the cowl rod antenna, and the telescopic reel type antenna. Either of the antennas will operate very efficiently with this Chevrolet radio.

Tube Complement

Type	Function	Type	Function
6SK7	R.F. Amplifier	6H6	Noise Limiter and A.V.C.
6SA7	Oscillator-Modulator	6V6GT	Output (2)
6SK7	I.F. Amplifier (2)	0Z4	Rectifier
6SR7	2nd Detector and A.F.		

FIG. 5 CIRCUIT DIAGRAM PORTABLE RADIO #985866

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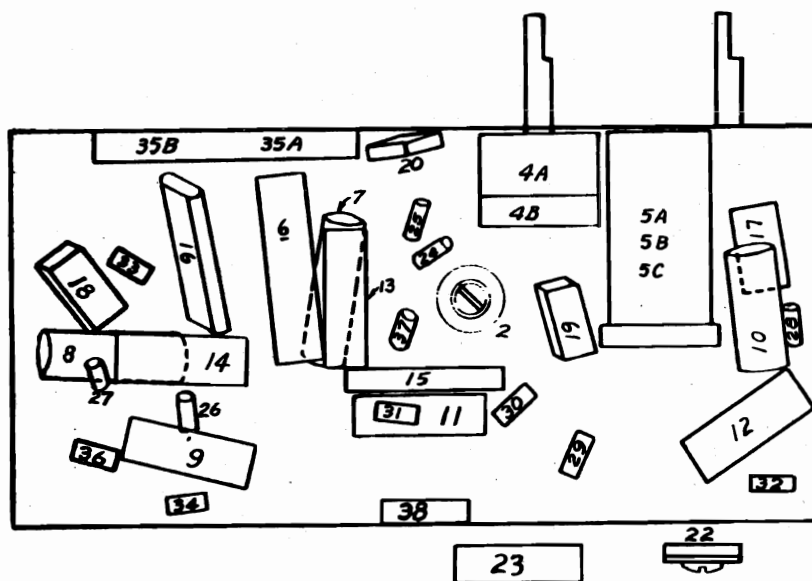


FIG. 3 PARTS LOCATING DIAGRAM PORTABLE RADIO #985866

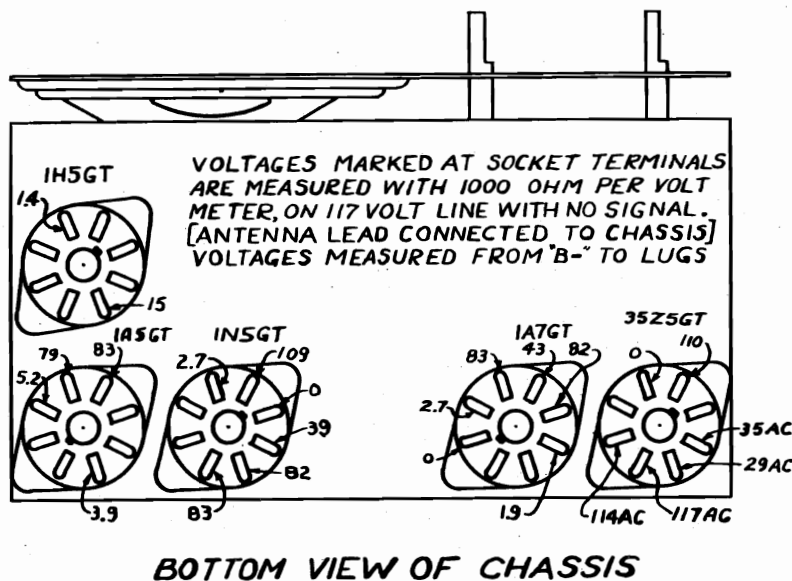


FIG. 4 Tube Voltage Chart
NOTES FOR VOLTAGE CHART

Voltages measured with 1000 ohm per volt D.C. voltmeter between socket terminals and negative "B" supply.

*-Oscillator voltage measured with R.F. choke in series with voltmeter lead.

NOTE: Voltages as indicated are measured with power switch in AC-DC position and radio connected to 115 volt 60 cycle AC line.

The diagram illustrates the internal wiring of a radio receiver. Key components and their connections are as follows:

- AC-DC Converter (38):** Labeled "AC-DC. 115 V." and "BATT. 38". It is connected to the "LINE CORD" (41) and the "A" BATTERY (6 V.).
- "A" BATTERY (6 V.):** A large rectangular battery on the right side of the chassis.
- "B" BATTERY (45 V.):** Two large rectangular batteries at the bottom, labeled "B" BATTERY 45 V. and "B" BATTERY 45 V. BLACK.
- Vacuum Tubes:** Five vacuum tubes are shown in the center, labeled 22, 39, 40, and 41. They are connected to the AC-DC converter and the "A" BATTERY.
- Wiring:** The diagram shows various colored wires (BLUE, BLACK, RED, GREEN) connecting the components. A "LINE CORD" (41) is shown on the left, and a "GREEN" wire is connected to the bottom of the chassis.

LOOP ANT. LEADS

"B" BATT. PLUGS

2A

2B

1

35Z5 GT

1A7GT

1ST I.F. 455 KC. 39

2ND I.F. 455 KC. 40

1H5GT

1A5GT

1A7GT

1H5GT

1A5GT

AC-DC. BATTERY SWITCH

AC-DC. LINE CORD

"A" BATT. PLUG TUBE LAYOUT PORTABLE RADIO #985866 41

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SUBJECT: TECHNICAL SERVICE INSTRUCTIONS

GENERAL: This Plug-in Portable radio is a five tube receiver designed to operate from either self-contained dry batteries or from 105-125 volt, 50/60 cycle A.C. or D.C. house lighting current.

ANTENNA: The antenna is a loop type inside the cabinet and, under normal operating conditions, no other antenna is necessary. For remote locations, where reception may be weak, provision is made for attachment of an outside antenna to a wire extending from the back of the cabinet.

TUBE COMPLEMENT

TYPE	FUNCTION	TYPE	FUNCTION
1A7GT	Mixer, 1st Detector-Oscillator	1B5GT	2nd Det.-A.V.C.-1st A.F. Amplifier
1B5GT	I.F. Amplifier	1A5GT	Power Output
		35Z5GT	Rectifier

CIRCUIT DESCRIPTION

The circuit used in this receiver is the conventional superheterodyne type designed for loop antenna operation.

The range of frequencies covered is from 540 to 1620 kilocycles.

POWER SUPPLY: This radio is designed to operate from either batteries or from 105-125 volts A.C. (50/60) or D.C. supply line.

A switch accessible from the rear of the radio switches the radio for either battery or A.C.-D.C. operation.

CIRCUIT ALIGNMENT

The adjustable condensers in this receiver have been very carefully adjusted at the factory and will require no further adjustment unless tampered with or a defective coil has been replaced. If re-alignment is found necessary, the circuits can be adjusted only with the use of a calibrated test oscillator or signal generator and an output meter.

IMPORTANT: If maximum sensitivity is to be obtained from this receiver, after re-alignment, it is very important that the following procedure be closely observed:

1. Aligning I.F. stages at 455 kilocycles.

- Connect the signal lead of the test oscillator to the grid of the 1A7GT tube, through a .1 mfd. condenser.
- Connect the ground lead of the test oscillator to the chassis.

CIRCUIT ALIGNMENT (Cont'd)

- Connect the output meter across primary winding of the output transformer.

- Set the test oscillator to exactly 455 kilocycles.

- Adjust the trimmers on the 1st and 2nd I.F. transformers carefully for maximum output.

These adjustments should be repeated several times and during the alignment the test oscillator output should be kept to as low a value as is consistent with obtaining readable indication on the output meter.

2. Aligning at 1620 kilocycles.

- Leave the test oscillator leads connected the same as for aligning the I.F. circuits.

- Turn the rotor plates of the gang condenser all the way out and against the high frequency stop.

- Set the test oscillator to 1620 kilocycles.

- Adjust the trimmer of the oscillator section of the condenser gang for maximum output. It is very important that this frequency be set accurately as a slight mis-setting will cause the receiver to be out of track over the entire high frequency end of the dial.

3. Aligning at 1400 kilocycles.

- This adjustment should be made with the chassis, loop antenna, and batteries installed in the cabinet.

- Connect the signal lead of the test oscillator to the external antenna terminal on the loop antenna through a 200 mmfd. dummy.

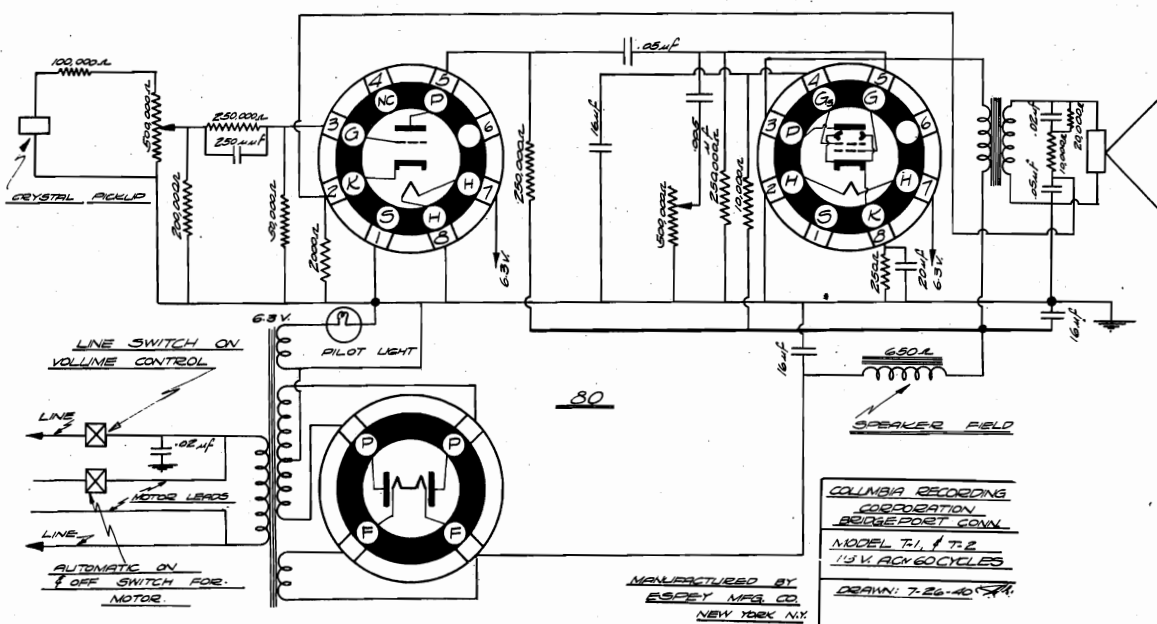
- Connect the ground lead of the test oscillator to the chassis.

- Set the test oscillator to 1400 K.C.

- Turn the condenser rotor plates until this frequency is tuned in with maximum output.

- Adjust the trimmer on the condenser gang for maximum output.

70L 7GT



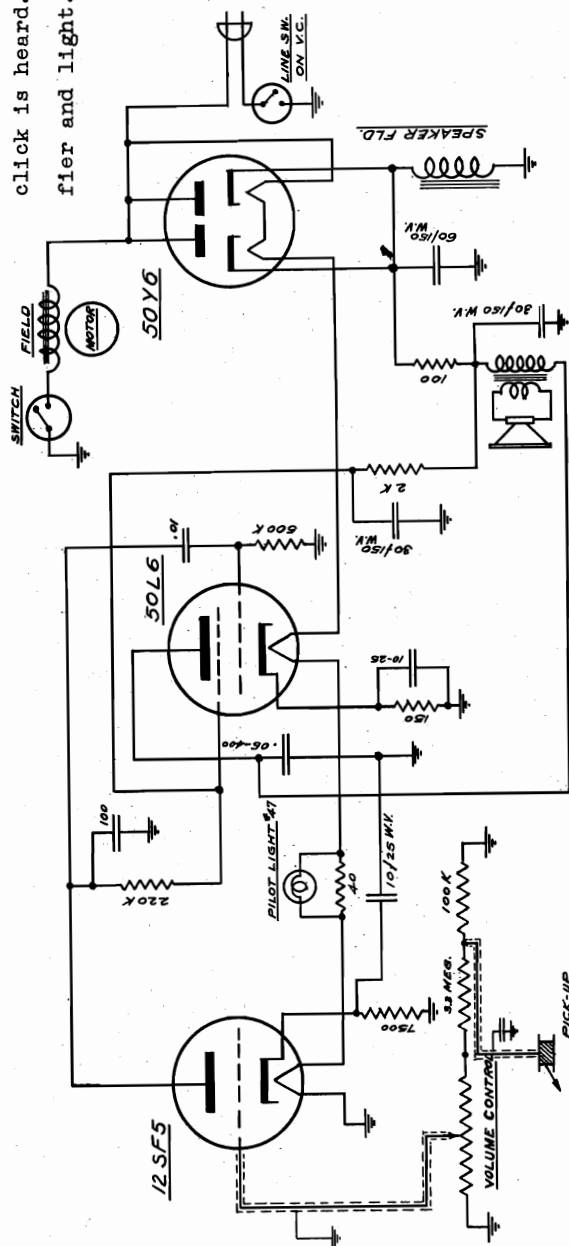
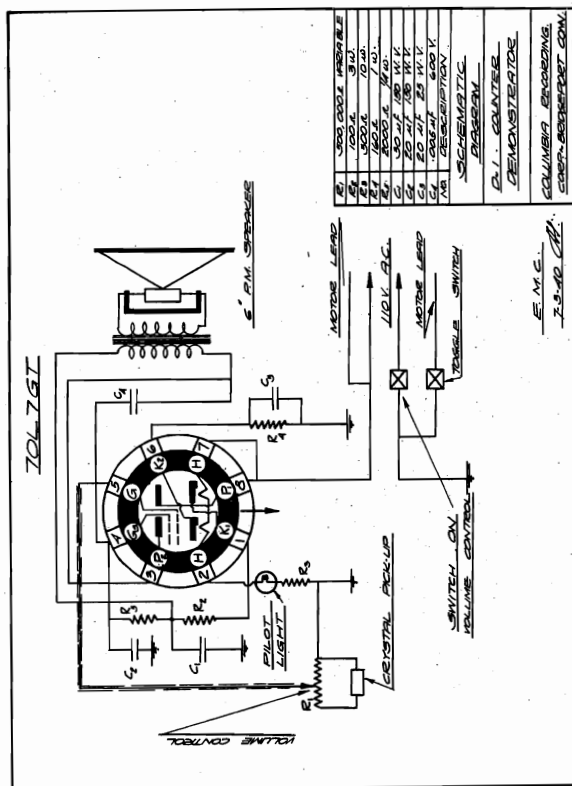
INSTRUCTIONS FOR OPERATING

MODEL D1 COUNTER DEMONSTRATOR
OPERATE ON 110-120 VOLTS A. C. 60 CYCLES ONLY

To turn the amplifier on, rotate the knob marked "Volume" in a clockwise position until a click is heard. After about thirty seconds the machine will be ready to operate. This knob can then be used to control the volume required.

The toggle switch is for starting and stopping the motor without turning the amplifier off.

When the demonstrator is not being used, turn the "Volume" knob counter-clockwise until a click is heard. This will turn off the amplifier and light.

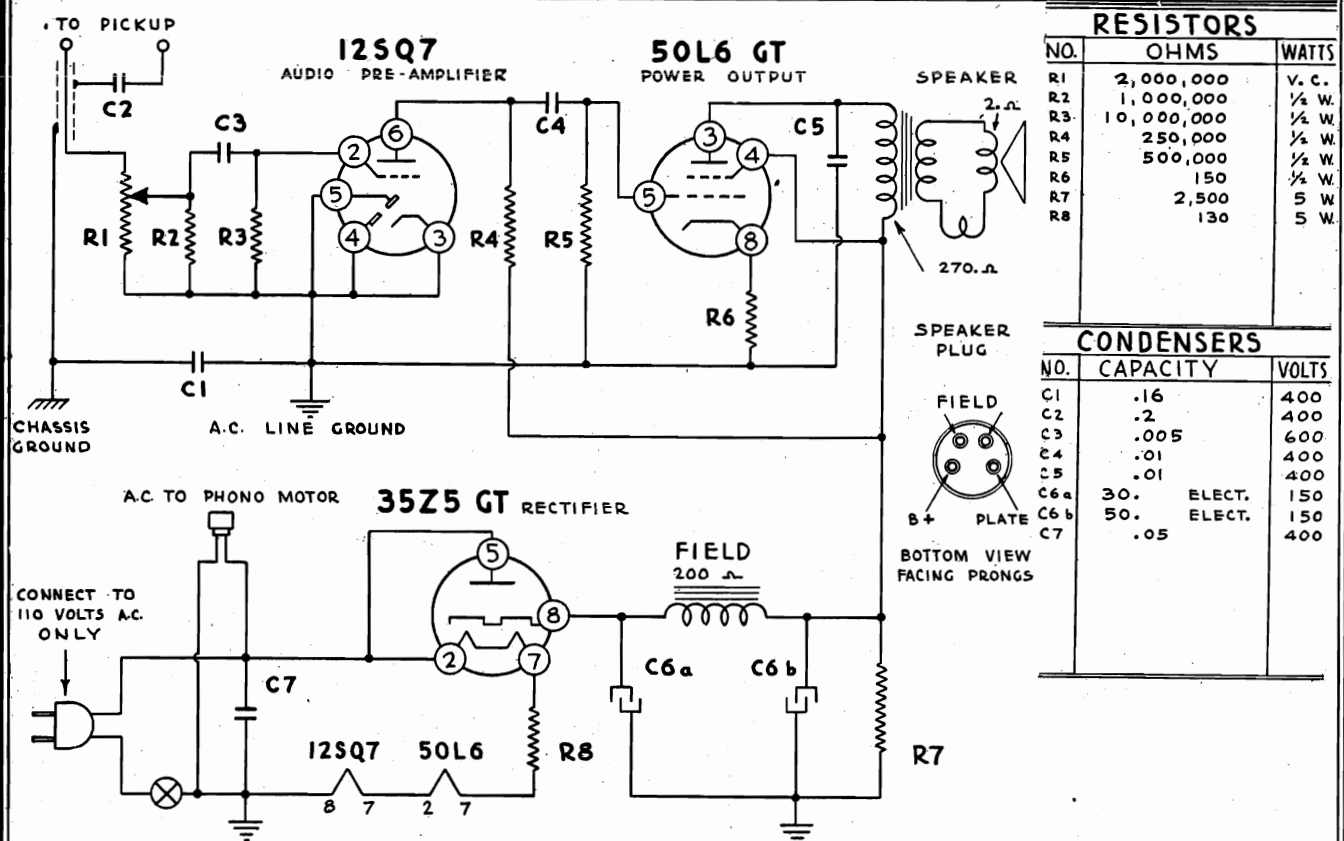


SCHEMATIC DIAGRAM

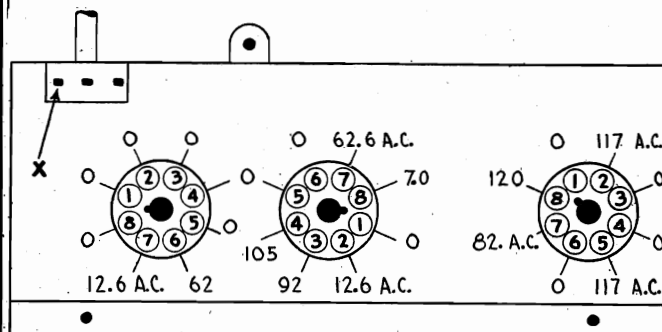
COLUMBIA

RECORDING CORP.
MODEL D-3.

CONTINENTAL RADIO & TELEV. CORP.



SCHEMATIC DIAGRAM XA3



12SQ7

50L6 GT

35Z5 GT

Operation on 110-120 volts, (RC50) 60 cycle A. C. (Alternating Current), ONLY.
Power Consumption: 55 watts.

NOTE: RC50 may be changed to RC51, 50 cycle Model by the purchase of 50 cycle speed reduction spring bushing. This bushing is placed over the motor shaft (thereby increasing its diameter) running against the idler wheel. Turntable must be removed for this change.

All prices quoted are list and subject to trade discount. All parts should be ordered from local Admiral Distributor. Shipments are F.O.B. if ordered direct from the factory. When remitting in advance please include postage.

A handling charge of \$0.25 will be made on all orders under \$0.75 list.

Prices are subject to change without notice.

PAPER CONDENSERS

P1194	.005 mfd. 600 volt.....	.15
P164	.01 mfd. 400 volt.....	.25
P334	.05 mfd. 400 volt.....	.30
P4950	.16 mfd. 400 volt.....	.30
P4881	.2 mfd. 400 volt.....	.30

ELECTROLYTIC CONDENSERS

P4932	{50 mfd. 150 volt}	1.50
	{30 mfd. 150 volt}	

RESISTORS

P5161	150 ohm, 5 watt.....	.25
P3803	150 ohm, 1/2 watt.....	.15
P5162	2,500 ohm, 5 watt.....	.45
	W. W.....	.45
P3868	250,000 ohm, 1/2 watt.....	.15

P3876	500,000 ohm, 1/2 watt.....	.15
P3882	1,000,000 ohm, 1/2 watt.....	.15
P3889	10,000,000 ohm, 1/2 watt.....	.15

VARIABLE RESISTORS

P5141	2 Meg. Volume Control and Switch.....	1.00
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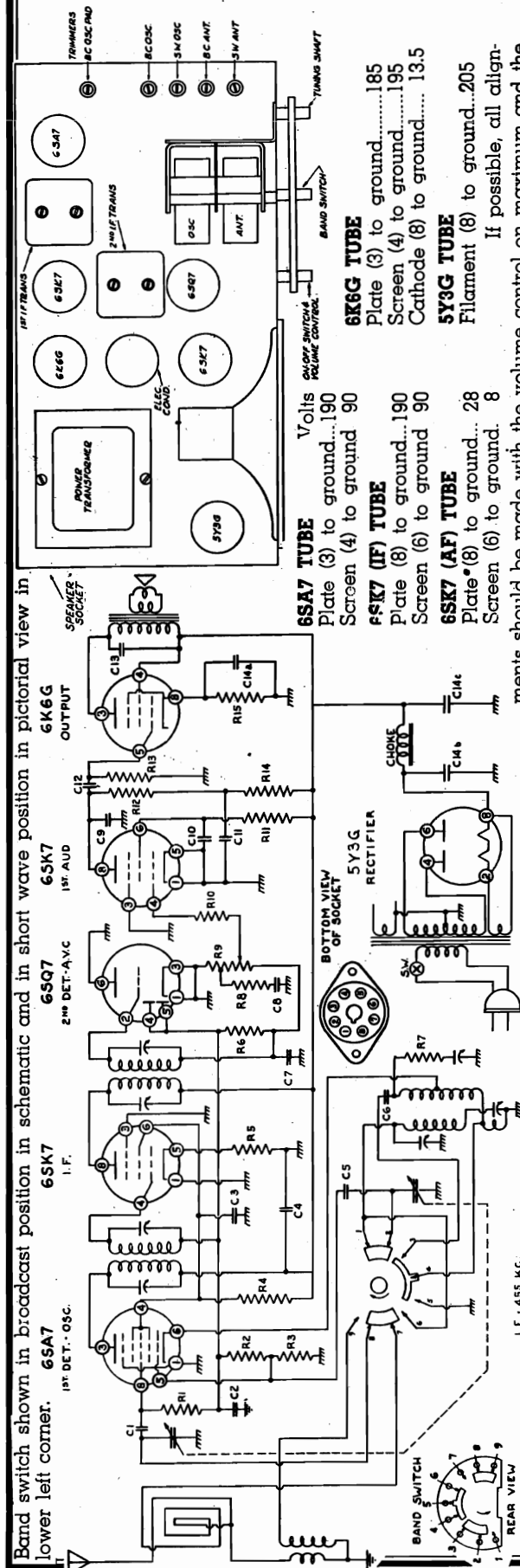
MISCELLANEOUS

P5164	Speaker and Output Transformer.....	4.40
P946	Speaker Plug.....	.10
P945	Speaker Socket.....	.10
P4583	Tube Socket.....	.15
P4894	Line Cord.....	.55
P3557	Line Cord Clamp.....	.10
P4496	Motor A. C. Cord and Socket.....	.40

PHONOGRAPH PARTS

(See Record Changer Service Manual For Detailed List)

RC4010	Record changer mounting spring, 1/2 doz.....	.10
RC7017	Record changer mounting screw.....	.05
P4781	Record changer mounting bracket.....	.10
RC6008	Admiral Lifetime Needle.....	1.50
RC3020	Center post.....	1.35
RC50	Record changer (60 cycle) 60 to 50 cycle, speed reduction spring bushing.....	.15



All voltages measured with a 1,000 ohm per volt meter on the 250 volt scale. Line voltage 117 volts A.C. Volume control maximum and no signal tuned in. Power consumption 45 watts.

Speaker (Part No. P-4464) 8" PM Type

D.C. voice coil resistance.....	3.1 ohms
Voice coil impedance at 400 cycles.....	3.5 ohms

Short Wave Antenna Coil (Part No. P3378)

Looking at the connection end in a clockwise direction starting at the mounting lug side the connections are: No. 1, AVC; No. 2, Ant; No. 3, Grid; No. 4, Ground.

Primary—No. 2 and No. 4—Resistance.....	3 ohm
Secondary—No. 1 and No. 3—Resistance.....	.07 ohm

Oscillator Coil (Part No. P4135)

Looking at the mounting bracket end in a clockwise direction starting at the chassis the connections are: No. 1, pad; No. 2, B.C. grid; looking at the other end in a clockwise direction starting at the chassis the connections are: No. 3, ground; No. 4, sec. tap; No. 5, open; No. 6, S.W. grid; No. 7, tickler.

Tickler—No. 3 and No. 7—Resistance.....	.8 ohm
S.W. Secondary—No. 6 and No. 7—Resistance.....	.07 ohm
B.C. Secondary—No. 2 and No. 1—Resistance.....	5.1 ohms

First I.F. Transformer (Part No. P4108)

Primary—Blue, plate; red, B+—Resistance.....	18.2 ohms
Secondary—White, grid; black, AVC—Resistance.....	15.1 ohms

Second I.F. Transformer (Part No. P4109)

Second 1r: Transformer (Part No. F4109)
 Primary—Blue, plate; red, B+—Resistance.....20.8 ohms
 Secondary—White, diode; black, AVC—Resistance.....17.4 ohms

Screen (4) to ground..... 90

6SK7 (IF) TUBE

Plate (8) to ground..... 190

Screen (6) to ground..... 90

6SK7 (AF) TUBE

Plate (8) to ground..... 28

Screen (6) to ground..... 8

6K6G TUBE

Plate (3) to ground..... 185

Screen (4) to ground..... 195

Cathode (8) to ground..... 13.5

5Y3G TUBE

Filament (8) to ground..... 205

If possible, all align-

Screen (6) to ground. 8 If possible, all alignments should be made with the volume control on maximum and the signal generator output as low as possible, to prevent the AVC from operating and giving false readings.

L.F. ALIGNMENT

Adjust the signal generator to 455 K.C. and connect the output to the grid of the first detector tube (6SA7) through a .05 or .1 mfd. condenser.

Align all I.F. trimmers to peak or maximum reading on the output meter.

BROADCAST BAND ALIGNMENT

Adjust the signal generator to 1630 K.C. and connect the output to the antenna lead, through a .0002 mfd. mica condenser. Set the gang condenser to minimum capacity and adjust the B.C. oscillator trimmer to receive this signal. After this has been carefully done, the next step is to set the signal generator to 1400 K.C. and after tuning in the signal adjust the B.C. antenna trimmer to peak. Set the signal generator to 600 K.C., tune the signal and then slowly increase or decrease the B.C. oscillator padding condenser and at the same time continuously tune back and forth across the signal with the receiver until the maximum reading is obtained on the output meter.

Return to 1400 K.C. and again go over the adjustments of this frequency to be certain that they were not put slightly out of alignment when adjustment was made at 600 K.C.

SHORT WAVE BAND ALIGNMENT

Adjust the signal generator to 18,100 K.C. and connect the output to the antenna lead, through a 400 ohm resistor. Set the gang condenser to minimum capacity and adjust the S.W. oscillator trimmer to receive this signal. Set the signal generator to 16,000 K.C., tune signal and adjust the S.W. antenna trimmer to peak.

MODEL K63

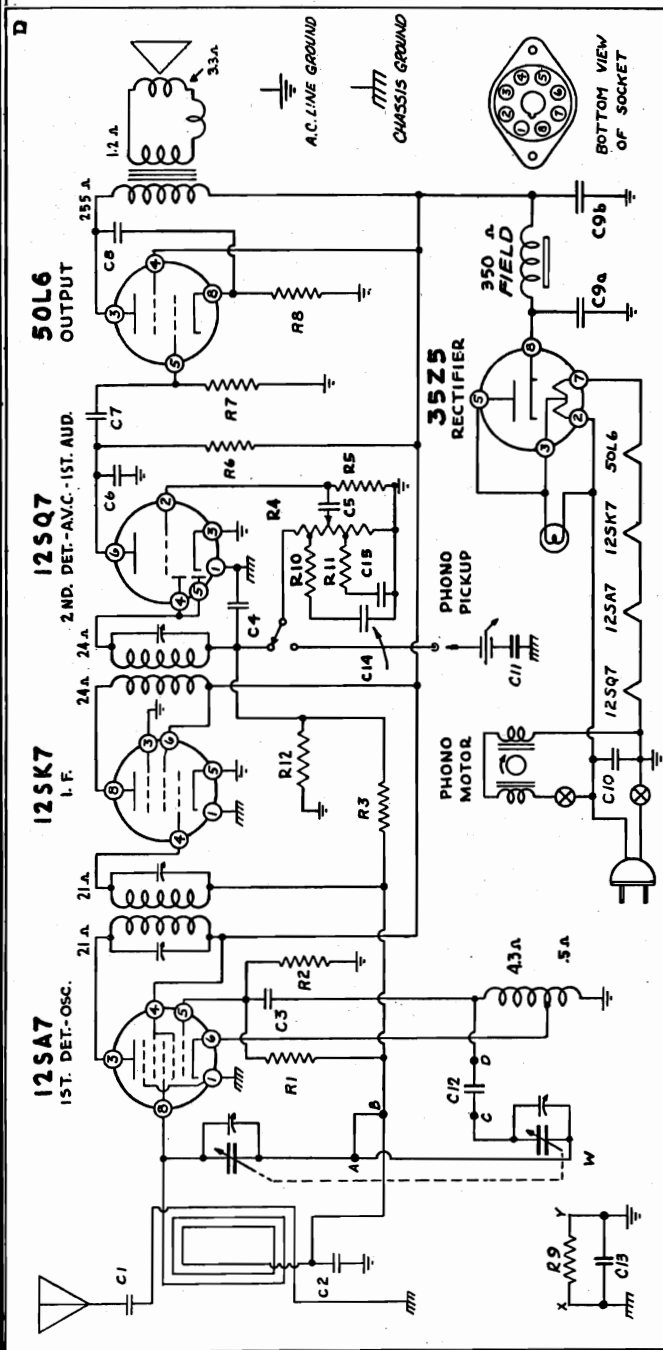
ISSUE A
AUGUST 1940

CONDENSERS

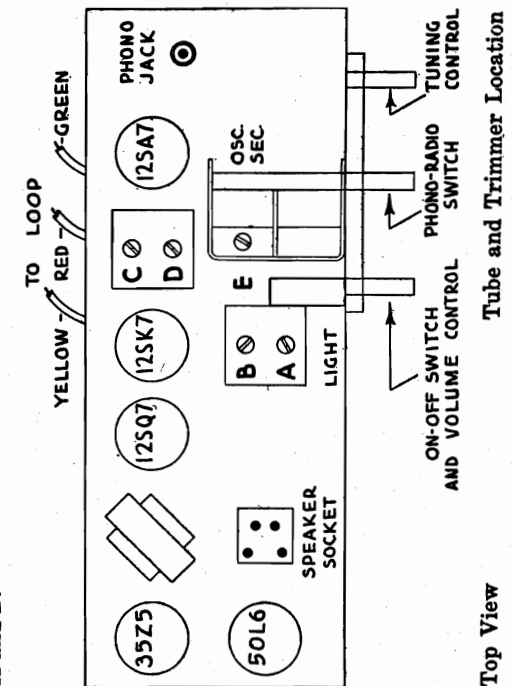
No.	Cap. (Mfd.)	Volts
C1	.001	600
C2	.1	200
C3	.00005	Mica
C4	.00025	Mica
C5	.005	600
C6	.0005	Mica
C7	.01	400
C8	.02	400
C9a	50. Elect.	150
C9b	30. Elect.	150
C10	.05	400
C11	.2	400
C12	.02	400
C13	.16	200
C14	.005	400
C15	.005	400

RESISTORS

No.	Ohms	Watts
R1	10,000,000	$\frac{1}{4}$
R2	25,000	$\frac{1}{4}$
R3	2,000,000	$\frac{1}{4}$
R4	1,000,000	V.C.
R5	5,000,000	$\frac{1}{4}$
R6	250,000	$\frac{1}{4}$
R7	500,000	$\frac{1}{4}$
R8	150-10%	$\frac{1}{4}$
R9	150,000	$\frac{1}{2}$
R10	100,000	$\frac{1}{2}$
R11	50,000	$\frac{1}{2}$
R12	1,000,000	$\frac{1}{2}$



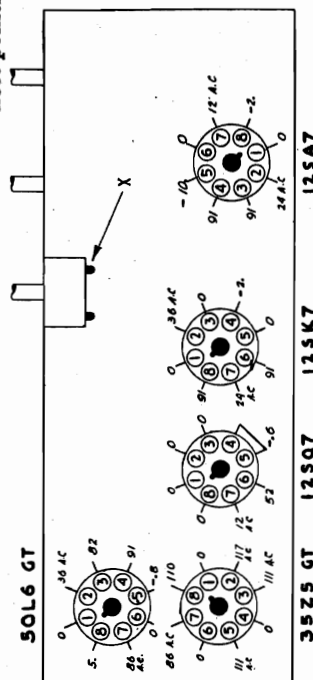
In model M5-PH only, connect points w, x, and y together. R9 and C13 are not used. Also C12 is not used, and point C connects to D. Disconnect points A and B.



Top View

Tube and Trimmer Location

20,000 ohm per volt meter used. No station tuned in.



Voltage Chart

Bottom View

Line—117 volts, 60 cycles, A.C.—Set volume control at max.

Wattage: Radio only, 30 watts; Record changer only, 15 watts.

Voltages shown are positive D.C. from chassis to socket terminal unless noted.

MODELS M5, XM5
MODELS B6, XB6
MODEL C6

CONTINENTAL RADIO & TELEV. CORP.

ALIGNMENT PROCEDURE

STEP	Connect Signal Generator To—	Dummy Antenna Between Radio and Generator	Set Generator Controls To—	Set Radio Controls To—	Adj. Following Trimmers to Max. Output	Special Instructions
1	Green Loop Lead	.1 mfd.	455 Kc.	1630 Kc.	A, B, C, D, I.F.	Note I - II
2	Green Loop Lead	.1 mfd.	1630 Kc.	1630 Kc.	E Bc. Osc.	Note I
3	Loop Radiator	Two Feet From Radio No Connection	1400 Kc.	1400 Kc.	F Bc. Ant. (On Loop)	Note III

NOTE I —Chassis may be connected or disconnected from cabinet loop during these adjustments.

NOTE II —Trimmer B not in later production models.

NOTE III—Chassis must be connected to cabinet loop. Use Aerometer or 10" diameter one turn loop on signal generator.

ALIGNMENT PROCEDURE

STEP	Connect Signal Generator to—	Dummy Antenna Between Radio and Generator	Set Generator Controls to—	Set Radio Controls to—	Adj. Following Trimmers to Max. Output
1	Tuning Cond. Ant. Stator	.1	455 Kc.	1630 Kc.	A, B, C, D, I. F.
2	Tuning Cond. Ant. Stator	.1	1630 Kc.	1630 Kc.	E Osc.
3	Tuning Cond. Ant. Stator	.1	1400 Kc.	1400 Kc.	F R. F.
4	Loop Radiator	Two feet from Radio No Connection	1400 Kc.	1400 Kc.	G Ant.

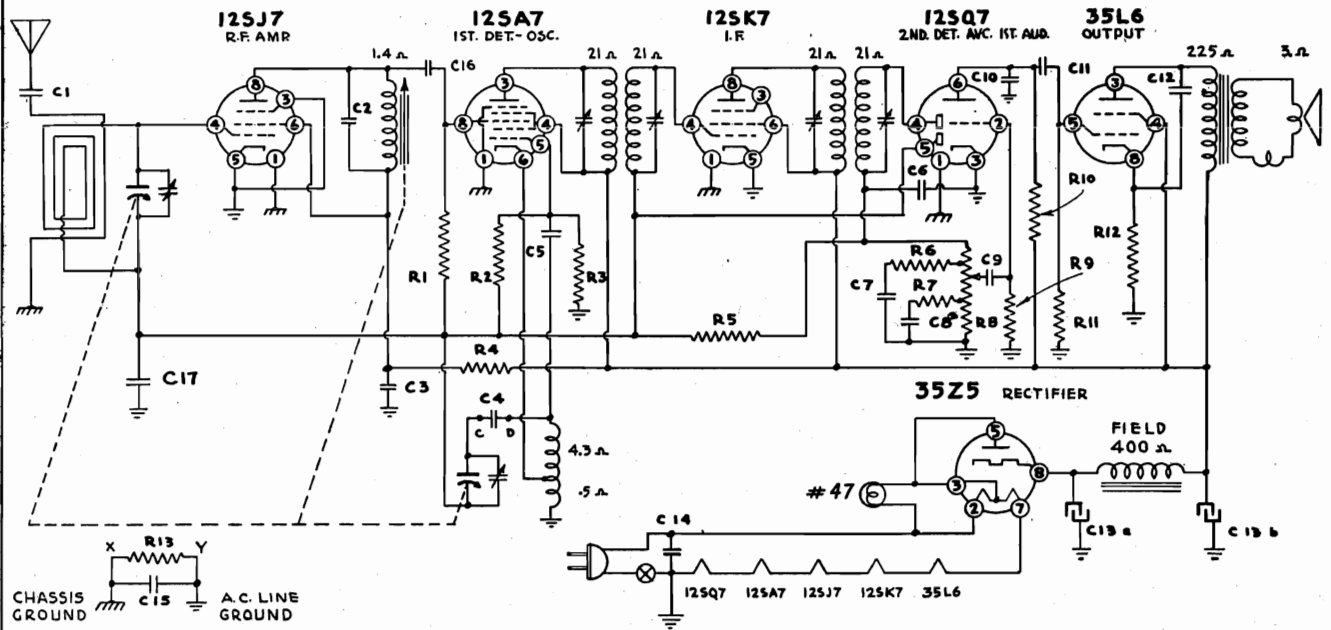
Use Aerometer or 10" diameter one turn loop on Signal Generator in Step 4.

STEP	Connect Signal Generator To—	Dummy Antenna Between Radio and Generator	Set Generator Controls To—	Set Radio Controls To—	Adj. Following Trimmers to Max. Output	Special Instructions
1	Tuning Cond. Ant. Stator	.1 mfd.	455 Kc.	1630 Kc. BC Range	A, B, C, D, I.F.	Note A
2	Tuning Cond. Ant. Stator	.1 mfd.	1630 Kc.	1630 Kc. BC Range	E Bc. Osc.	Note A
3	Green Loop Lead	400 ohms	9.5 Mc.	9.5 Mc. SW Range	G Sw. Osc.	Note A
4	Green Loop Lead	400 ohms	9.5 Mc.	9.5 Mc. SW Range	H Sw. Ant.	Note A
5	Loop Radiator	Two Feet From Radio No Connection	1400 Kc.	1400 Kc. BC Range	F Bc. Ant.	Note B

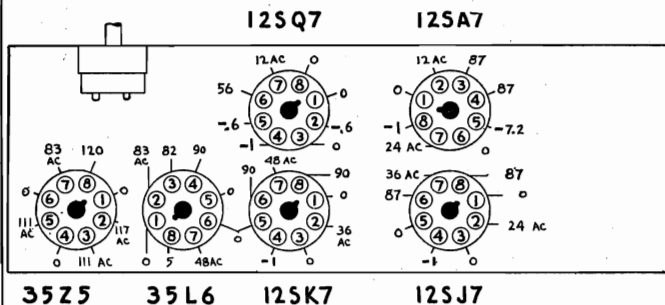
NOTE A—Chassis may be connected or disconnected from cabinet loop during these adjustments.

NOTE B—Chassis must be connected to cabinet loop. Use Aerometer or 10" diameter one turn loop on signal generator.

CONTINENTAL RADIO & TELEV. CORP.



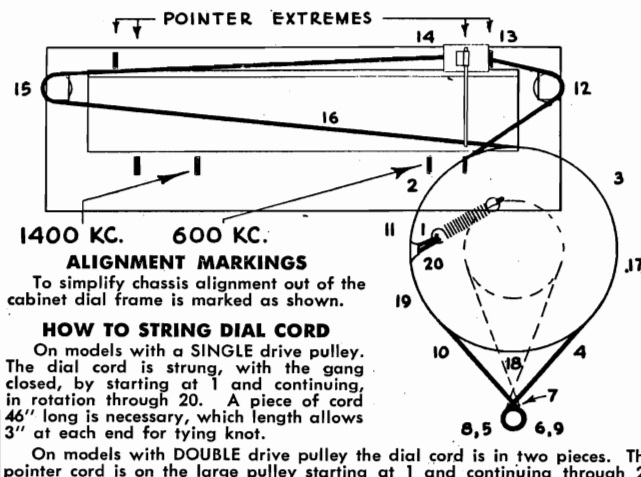
In model B6 only, X and Y are connected together. R13, C15, and C4 are not used. C is connected to D.



Bottom View—Voltage Chart

Voltages are positive D. C. unless noted. Measured from chassis with 20,000 ohm per volt meter. On XB6 Series use floating ground instead of chassis.

Line—117 volts, 60 cycle A.C. Volume control at maximum. No station tuned in.



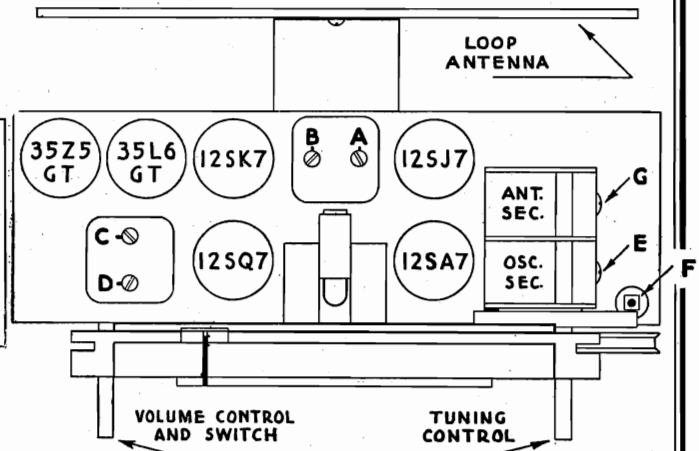
To simplify chassis alignment out of the cabinet dial frame is marked as shown.

HOW TO STRING DIAL CORD

On models with a SINGLE drive pulley. The dial cord is strung, with the gang closed, by starting at 1 and continuing in rotation through 20. A piece of cord 46" long is necessary, which length allows 3" at each end for tying knot.

On models with DOUBLE drive pulley the dial cord is in two pieces. The pointer cord is on the large pulley starting at 1 and continuing through 20 BUT in the following special order, 1, 2, 3, 4, 18, 19, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20. The drive cord is on the smaller dotted pulley, in the dotted position.

To clarify dial cord arrangement the dial frame is shown as transparent.



Top View—Tube and Trimmer Location

Volume control tapped at 100,000 ohms and 200,000 ohms from zero end.

RESISTORS

No.	Ohms
R1	10,000
R2	10,000,000
R3	25,000
R4	100
R5	1,000,000
R6	50,000
R7	30,000
R8 V. C.	500,000
R9	5,000,000
R10	250,000
R11	500,000
R12	150
R13	150,000

CONDENSERS

No.	Capacity (Mfd.)
C1	.005
C2	.000785
C3	.05
C4	.02
C5	.00005
C6	.00025
C7	.01
C8	.01
C9	.01
C10	.0005
C11	.01
C12	.02
C13a	30. Elect.
C13b	50. Elect.
C14	.05
C15	.2
C16	.00025
C17	.1

Set to be used on 110-120 volts D.C. (Direct Current) or A.C. (Alternating Current) 40 to 60 cycles, ONLY. Current consumption: 30 watts.

MODEL C6

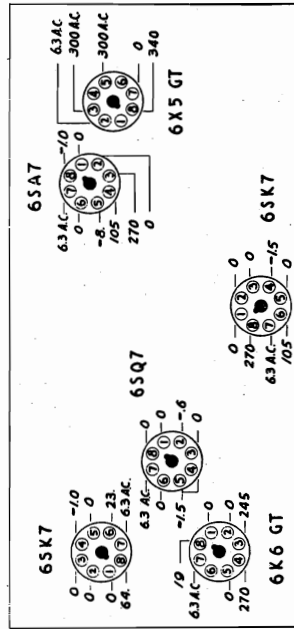
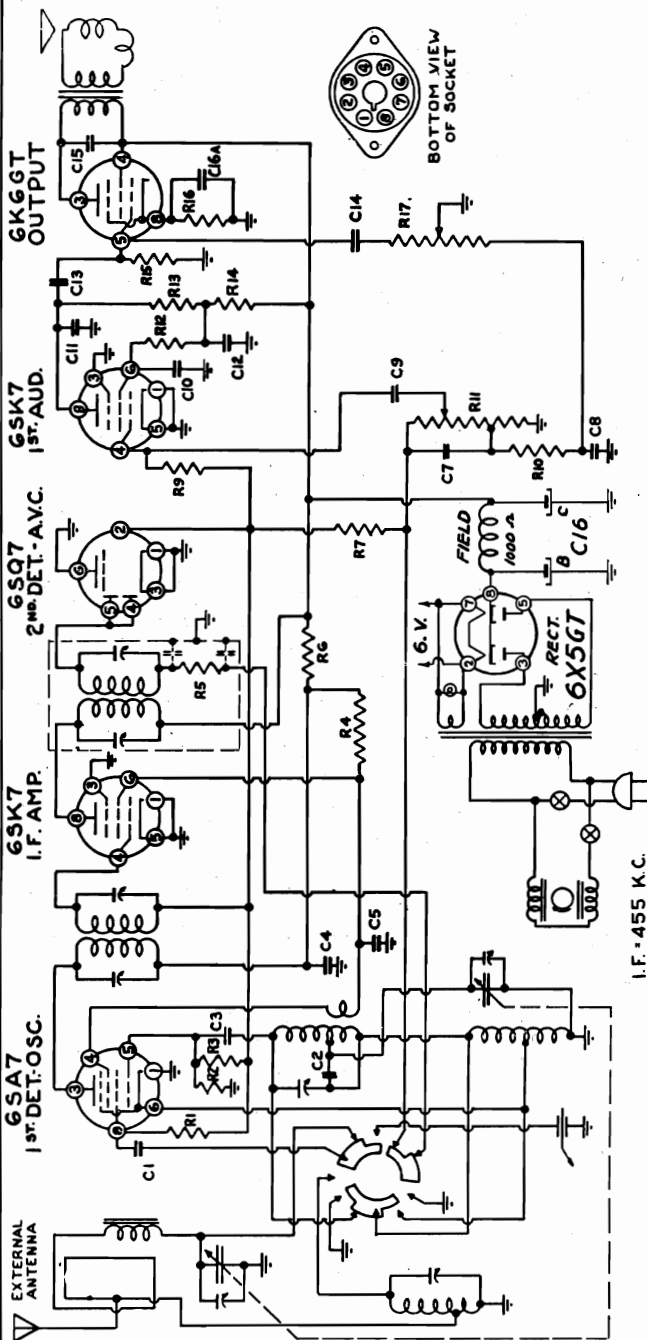
CONTINENTAL RADIO & TELEV. CORP.

RESISTORS

No.	Ohms
R1	2,000,000
R2	20,000
R3	10,000,000
R4	15,000
R5	70,000
R6	100,000
R7	1,000,000
R8	1,000,000
R9	20,000
R10	500,000
R11	1,000,000
R12	200,000
R13	50,000
R14	500,000
R15	600,000
R16	500,000
R17	500,000

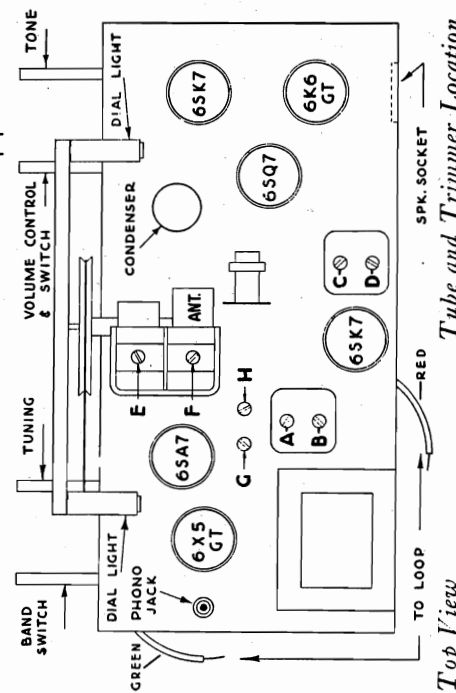
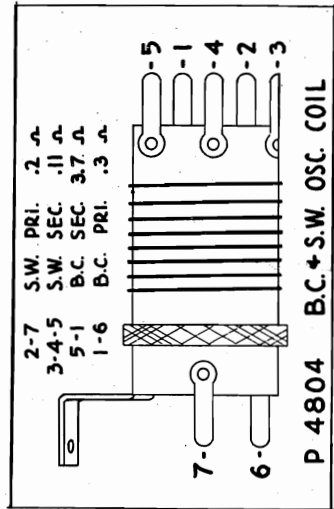
CONDENSERS

No.	Capacity (Mfd.)
C1	.00025
C2	.00025—10%
C3	.00005
C4	.05
C5	.05
C6	.00025
C7	.02
C8	.01
C9	.05
C10	.00025
C11	.1
C12	.01
C13	.002
C14	.005
C15	20.
C16a	20.
C16b	20.
C16c	20.



Bottom View

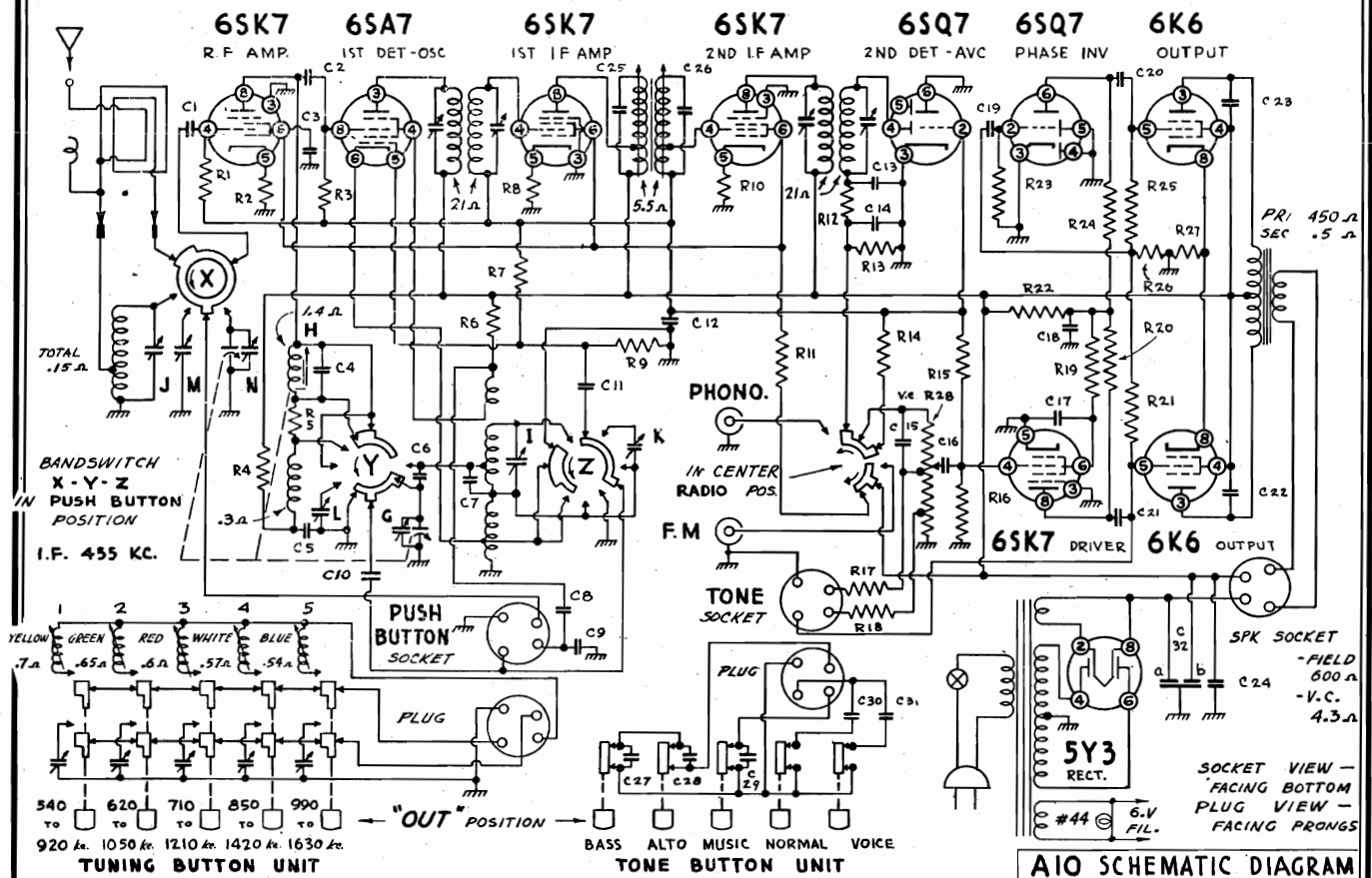
Top View



Tube and Trimmer Location

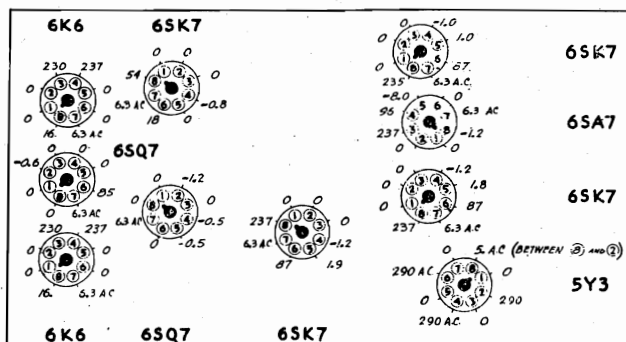
	Pri.	Sec.
First I.F. Trans.	15. ohms	11. ohms
Second I.F. Trans.	22. ohms	18. ohms
Output Trans.	455. ohms	
Voice Coil—D.C.	2. ohms	
Ant. Loading Coil	1.3 ohms	
Sw. Ant. Coil	.05 ohm	

CONTINENTAL RADIO & TELEV. CORP.



For Condenser and Resistor values see Replacement Parts List.

Volume control tapped at 300,000 ohms and 600,000 ohms from ground end.



Bottom View

Voltage Chart

Voltages measured with 20,000 ohm per volt meter, from terminal to chassis and are positive D.C., unless noted otherwise.

Line—117 volts, 60 cycles, A.C. Vol. max, No station.

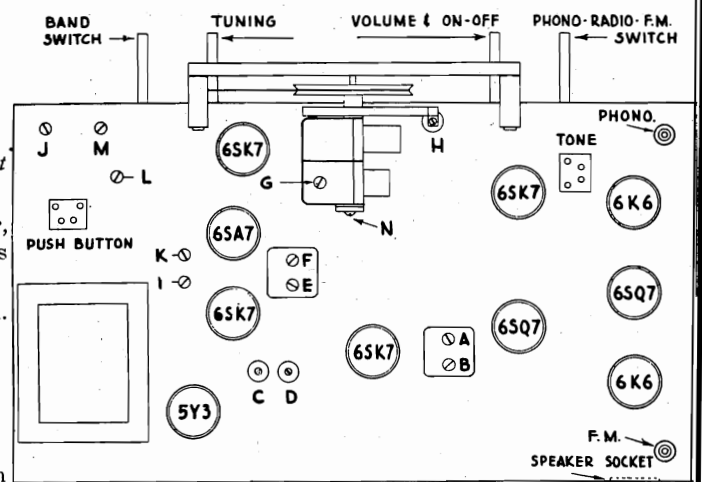
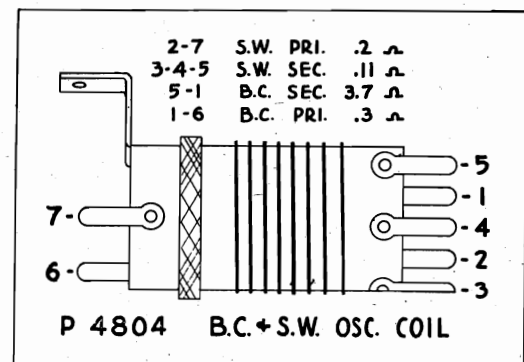
Switches set at RADIO and BROADCAST.

Changer only, 15 watts.

Radio only, 90 watts—RADIO position.

Radio only, 80 watts—PHONO position.

(R.F. and I.F. screens disconnected in PHONO position which also makes plate voltages higher.)



Tube and Trimmer Location

MODEL A-10

CONTINENTAL RADIO & TELEV. CORP.

STEP	Connect Signal Generator To—	Dummy Ant. Between Radio and Generator	Set Generator Controls To—	Set Radio Controls To—	Adj. Following Trimmers To Max. Output
1	6SA7 Grid	.1 mfd.	455 Kc.	1630 Kc. B. C. Range	A, B, C, D, E, F I.F.
2	Green Loop Lead (Grid)	.1 mfd.	1630 Kc.	1630 Kc. B. C. Range	G Bc. Osc.
3	Green Loop Lead (Grid)	.1 mfd.	1400 Kc.	1400 Kc. B. C. Range	H Bc. RF.
4	Yellow Loop Lead (Ground)	400 ohms	11.7 Mc.	11.7 Mc. 25M Range	I 25m Osc.
5	Yellow Loop Lead (Ground)	400 ohms	11.7 Mc.	11.7 Mc. 25M Range	J 25m Ant.
6	Yellow Loop Lead (Ground)	400 ohms	9.5 Mc.	9.5 Mc. 31M Range	K 31m Osc.
7	Yellow Loop Lead (Ground)	400 ohms	9.5 Mc.	9.5 Mc. 31M Range	L - M 31m R.F. Ant.
8	Loop Radiator	Two Feet From Radio No Connection	1400 Kc.	1400 Kc. B. C. Range	N Bc. Ant.

Use Aerometer or 10" diameter one turn loop on Signal Generator in Step 8

REPLACEMENT PARTS LIST

RESISTORS

		Ohms	Watts	
P3800	R2	100	1/2	.15
P3806	R8, R10	200	1/2	.15
P5178	R27	320	1-10%	.25
P3820	R4	500	1/2	.15
P3833	R5	3,000	1/2	.15
P3841	R3	10,000	1/2	.15
P1944	R6	15,000	2	.25
P3844	R9	20,000	1/2	.15
P2184	R11	25,000	1	.20
P3853	R12, R18, R22	50,000	1/2	.15
P3860	R17	100,000	1/2	.15
P3864	R20, R24	200,000	1/2	.15
P3876	R13, R21, R25, R26	500,000	1/2	.15
P3882	R14, R19	1 megohm	1/2	.15
P3883	R1	2 megohm	1/2	.15
P3886	R7, R15, R16, R23	5 megohm	1/2	.15

VARIABLE RESISTORS

P5152	R28	V. C. 1 megohm..	1.10
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PAPER CONDENSERS

		Mfd.	Volts	
P3203	C30	.001	600	.15
P904	C31	.002	600	.15
P1322	C22, C23, C27, C29	.005	600	.15
P164	C19, C20, C21, C28	.01	400	.25
P143	C16	.02	400	.25
P334	C3, C5, C8, C12	.05	400	.30
P276	C17, C24, C18	.1	400	.30

MICA CONDENSERS

		Mfd.		
P1382	C11, C13	.00005	.....	.15
P480	C14	.0001	.....	.15
P5184	C6	.0002	10%	.25
P817	C1, C2, C7, C15	.00025	.....	.20
P4368	C10	.0005	2 1/2%	.40
P5163	C25, C26	.0005	10%	.25
P5087	C4	.000785	2 1/2%	.50
P2565	C9	.003	5%	.40

TRANSFORMERS AND COILS

G6502	Loop Assembly	2.50
G6500	Sw. Choke Coil	.25
G6476	R.F. Coil Assembly	.40
P4802	Sw. Ant. Coil	.40
P4804	Bc. and Sw. Osc. Coil	.80
G6532	2nd I.F. Transformer	1.25
P5114	1st and 3rd I.F. Trans.	1.15
P5159	Output Transformer	1.90
P5119	Power Trans., 60 cylce.	5.20

PERMEABILITY UNIT

G6521	Unit Complete	7.50
P5106	Push Button Switch	2.50
P5093	Trimmer Strip	1.25
P4363	Iron Core	.15
P5171	Iron Core Lock Nut	.05
P4352	Coil Clip	.05
G6522	Coil, 1 Yellow dot	.25
G6523	Coil, 2 Green dot	.25
G6524	Coil, 3 Red dot	.25
G6525	Coil, 4 White dot	.25
G6526	Coil, 5 Blue dot	.25
P1957	Plug only	.10
P5088	Push Button	.10
P5104	Mtg. Bracket	.05

TONE CONTROL UNIT

G6528	Unit Complete	3.75
P5107	Push Button Switch	2.20
G6530	Fibre Strip and All Condensers	1.00
P3596	Cinch Clips	.05
P1957	Plug	.10
P5088	Push Button	.10
P5142	Upper Mtg. Bracket	.05
P5143	Lower Mtg. Bracket	.05

ELECTROLYTIC CONDENSERS

P4372	{ C32 a 20 mfd. 450 volt }	1.15
	{ C32 b 16 mfd. 450 volt }	

VARIABLE CONDENSERS

P5092	Gang Condenser	2.70
P5003	Trimmer (on gang)	.20
P5147	Double Trimmer	.40
P5156	Trimmer with bracket	.25

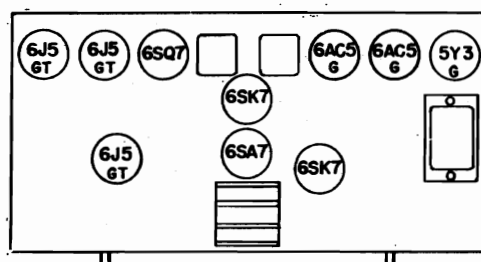
MISCELLANEOUS

P5180	Speaker	7.25
P5084	Speaker Socket	.15
P4583	Tube Socket	.15
P5065	Socket, for Push Button Units	.15
P3005	5Y3 Socket	.15
P4404	Phono—F. M. Jack	.10
P5149	Phono, Radio, F. M. Switch	.90
P5105	Band Switch	2.00
P3557	Line Cord Clamp	.15
P4894	Line Cord	.65
P4787	Shielded Cable and Plug	.60
P2739	A.C. Phono Cable & Socket	.60
P4139	Pilot Light Socket and Leads	.25
P1713	Pilot Light	.25
P4248	Pilot Light Shield	.05
G6516	Drive Drum and Cam Assembly	.25
P5066	Drive Shaft	.10
P1399	Horseshoe Washer	.05
P1587	Spring Washer	.05
P2925	Tension Spring	.05
P4979	Iron Slug	.35
G6517	Iron Slug Lift Assembly	.35
P5032	"T" Ferrule	
P269	Washer	.10
P5109	Spring	set
P931	Screw	
G6518	Dial Scale Assembly	1.00
G6519	Band Indicator Assembly	.50
P5135	"U" Lever Only	.15
P5053	Pointer	.05
P3911	Pointer Clip	.05
P5047	Dial Crystal	.60
P5151	Large Escutcheon	1.85
P5112	Left Escutcheon	.55
P5410	Right Escutcheon	.40
P5111	Removable Piece for above	.35
P5121	Spring Clip for above	.15
P4626	Tinnerman Clips for above	.05
P5136	Plain Knobs	.15
P5137	Marked Knob	.15
P5088	Push Button	.10
P4444	Chassis Mtg. Screws	.05
G6101	Mtg. Foot Assembly	.25
4207	Cabinet	

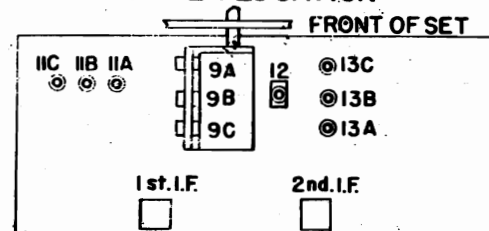
[illegible]

American Broadcast Band—540 to 1630 KC (555 to 184 Meters)
Police, Amateur, etc.—1600 to 5200 KC (187 to 57.5 Meters)
Short Wave (Foreign)—5.2 to 18.0 MC (57.5 to 16.6 Meters)

2—6SK7, 1—6SA7, 1—6SQ7, 3—6J5, 2—6AC5GT, and 1—5Y3G. (Tubes may be metal or Bantam (GT) equivalents.)



TRIMMER LOCATION



MODELS 02CA, 02CB, Chassis 55 THE CROSLEY CORP.

Preliminary

Output Meter Connections.....Plate to Plate of 6AC5G's
 Generator Ground Connection.....To chassis or Ground Lead
 Dummy Antenna to be in series with generator output.....See Chart Below
 Position of Volume Control.....Fully On
 Position of Master Tone Control.....All Buttons Out

ALIGNMENT PROCEDURE CHART

Signal Generator							
Align- ment Sequence	Dummy Antenna	Frequency Setting	Input Connection to Receiver	Band Switch	Tuning Cond. Setting	Trimmer Adjusted	Remarks
1.	.02 MF.	455 Kc.	Stator lug Rear section of Gang Cond.	B. C.	Fully open	2nd I-F (2) 1st I-F (2)	Adjust for Maximum. Adjust for Maximum.
2.	.0002 MF.	1630 Kc.	Ant. Terminal	B. C.	Fully open	B. C. "OSC" Trimmer	Adjust for peak; gang does not have to tune thru signal. Loop must be connected.
3.	.0002 MF.	600 Kc.	Ant. Terminal	B. C.	Approx. 60 on dial	B. C. "OSC" Series Trimmer	Adjust for maximum output while rocking gang thru signal.
4.	Repeat Step No. 2 to check possible shift due to series adjustment.						
5.	.0002 MF.	1400 Kc.	Ant. Terminal	B. C.	Approx. 140 on dial	B. C. "ANT" Trimmer B. C. "R-F" Trimmer	Adjust for maximum output do not touch B. C. Osc. Trimmer. Adjust for maximum output.
6.	400 ohm (carbon)	5.3 Mc.	Ant. Terminal	Police	Fully open	Pol "OSC"	Adjust for peak; gang does not have to tune thru signal.
7.	400 ohm (carbon)	5.0 Mc.	Ant. Terminal	Police	Approx. 5.0	Pol "ANT" Trimmer	Adjust for maximum output.
8.	400 ohm (carbon)	18.3 Mc.	Ant. Terminal	S. W.	Fully open	S. W. "OSC"	Adjust for peak. Gang does not have to tune thru signal.
9.	400 ohm (carbon)	18.0 Mc.	Ant. Terminal	S. W.	Approx. 18	S. W. "ANT" Trimmer	Adjust for maximum output while rocking gang thru signal.
10.	Repeat the above alignment procedure for more accurate adjustments. Always keep signal generator output as low as possible to prevent action of the A. V. C. circuit.						

IMPORTANT ALIGNMENT NOTES

When aligning the shortwave bands "OSC" trimmers care must be exercised to see that the circuits are aligned on the correct frequency and not on the image which is approximately 910 kilocycles less as indicated on the Receiver dial. To check, increase generator output, tune-in the generator frequency and then tune-in the image frequency which should be weaker than the fundamental and come in approximately 910 kilocycles lower on the Receiver dial than the fundamental. If image cannot be tuned-in, the "OSC" trimmer is adjusted to the wrong peak. (Correct peak is the second peak on trimmer from the closed position).

TUBE VOLTAGE CHART

SOCKET VOLTAGES MEASURED AT 117.5 V. LINE (BETWEEN SOCKET PIN AND CHASSIS) WITH 1000 OHM PER VOLT, 500 V. RANGE VOLTMETER (D. C.)

TUBE	FUNCTION	PIN NUMBER							
		1	2	3	4	5	6	7	8
6SK7—R. F. Amplifier.....	Gnd.	Gnd.	Gnd.	0	Gnd.	74	6.3 A. C.	180	
6SA7—Converter.....	Gnd.	Gnd.	180	74	0	0-S. W. } 4.0 B. C. }	6.3 A. C.	0	
6SK7—I. F. Amplifier.....	Gnd.	Gnd.	180	0	Gnd.	74	6.3 A. C.	180	
6SQ7—Det. A. S. C. 1st A. F.....	Gnd.	0	Gnd.	0	0	75	6.3 A. C.	Gnd.	
6J5GT—Phase Inverter.....	Gnd.	Gnd.	145	J. B.	0	J. B.	6.3 A. C.	40	
6J5GT(2)—P. P. A. F. Drivers.....	Gnd.	Gnd.	180	0	0	J. B.	6.3 A. C.	6.5	
6AC5GT(2)—P. P. Output.....	Gnd.	Gnd.	304	J. B.	6.5	J. B.	6.3 A. C.	Gnd.	
5Y3G—Rectifier.....	N. C.	310	J. B.	308 A. C.	J. B.	308 A. C.	J. B.	310	

MAX. POWER OUTPUT.....12.0 WATTS

POWER CONSUMPTION.....90 WATTS

DROP ACROSS SPEAKER FIELD.....120 VOLTS

J. B.—Junction Block

N. C.—No Connection

Voltagcs may vary 10% of values given.

THE CROSLEY CORP.

SETTING THE PUSH BUTTONS (Station Selector)

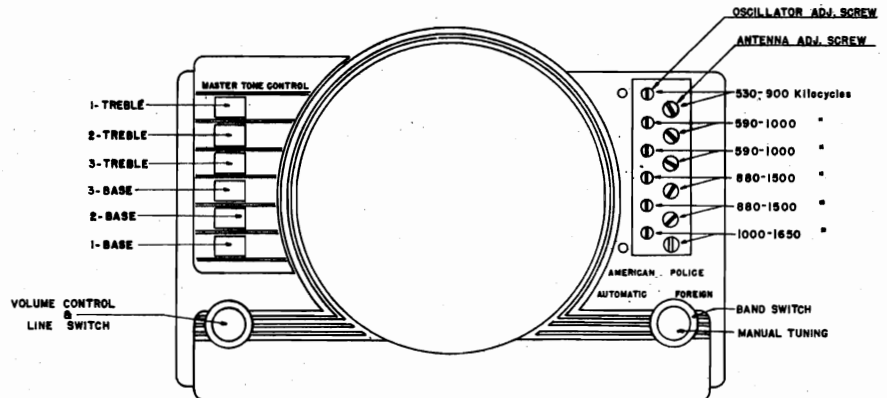
The six station selector push buttons are set up by means of two adjusting screws per button. These adjusting screws are made accessible by removing the station selector push button escutcheon. Pry off carefully being carefully not to scratch the main escutcheon.

Select the call letter tabs of your six favorite broadcast stations from the station call letter sheets supplied. Place the call letter tabs in the window above that push button which is to be adjusted for that station. It is not essential that all push buttons be set at one time.

Note: When placing call tabs in the window be sure to arrange them according to their frequency (kilocycles) that is: the station whose frequency

is well within the range covered by the No. 1 button, should be placed above that button and so on with the rest of the buttons to be set. After tabs are in place break off the celluloid covers from the strip furnished and snap in place over the call letters to protect and hold them in place.

The frequencies of your favorite stations may be found in your local paper or by consulting a station listing sheet.

**SET-UP PROCEDURE**

Remove station selector push button escutcheon. Turn the receiver on and let it operate for a sufficient length of time to permit the tubes to reach their normal operating conditions.

Note: To simplify the set up and insure accurate adjustments the following pre-adjustments should be made.

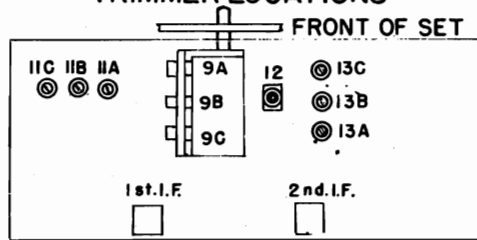
Tighten all Antenna Trimmer screws moderately tight. See Fig. 1. Turn the Oscillator adjusting screws to the left (counter clockwise) until the threaded portion extends approximately $\frac{1}{2}$ inch. Note: Care should be taken when adjusting the oscillator screws so that the selected station is not passed over. Turn the screws slowly.

It is essential that the frequency (kilocycles) of the station selected is within the range of the push button to be set for that station. See Fig. 1.

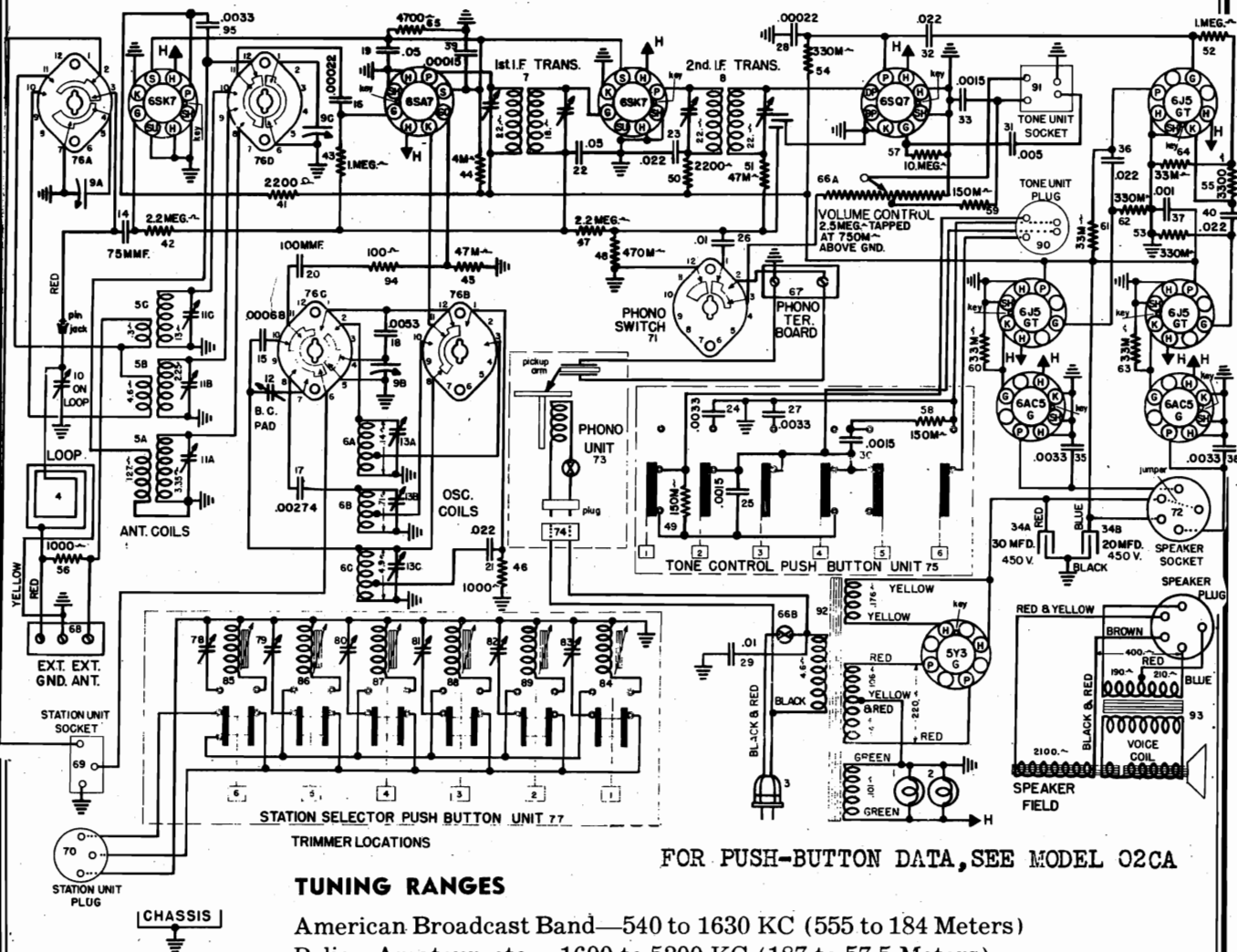
1. Turn the band change switch to the "American" position. Using the station selector knob, carefully tune in the station to which the No. 1 push button is to be set. Note program.
2. Turn the band change switch to the "Automatic" position and using a small screw driver, carefully turn in a clockwise direction the Oscillator adjusting screw until the station previously tuned in manually is heard again. Adjust for maximum output in the speaker.
3. Adjust the Antenna adjusting screw for maximum volume in the speaker.
4. Turn band change switch from "Automatic" to "American" and back again to check if adjustment has been correctly made. There should be no change in tone quality when switched from one to the other.
5. Repeat above procedure for the remaining push buttons.

To tune the receiver with the push buttons, set the band change switch on "Automatic" and depress completely the button corresponding to the station you wish to hear.

TRIMMER LOCATIONS



WIRING DIAGRAM, MODELS 02CP AND 02CQ — CHASSIS MODEL No. 70



FOR PUSH-BUTTON DATA, SEE MODEL 02CA

TUNING RANGES

American Broadcast Band—540 to 1630 KC (555 to 184 Meters)
Police, Amateur, etc.—1600 to 5200 KC (187 to 57.5 Meters)
Short Wave (Foreign)—5.2 to 18.0 MC (57.5 to 16.6 Meters)

FEATURES

Some of the features of these outstanding phonocombinations that will add greatly to your enjoyment are as follows: a large efficient built-in antenna; Litz wound coils; a three gang tuning condenser providing maximum selectivity and sensitivity; push-pull audio tubes, dynamically coupled to push-pull triode output for maximum distortionless reproduction; six station selector pushbuttons; a full twelve inch concert dynamic speaker; six push buttons controlling a "Master Tone Control" system which provides more than 60 different combinations of bass and high notes; and an extremely high quality unit for the reproduction of phonograph records, including the "Floating Jewel Tone System" (a Crosley invention) which assures a quality of reproduction never before obtainable.

THE CROSLEY CORP.

MODELS 02CP, 02CQ,
Chassis 70

Preliminary

Output Meter Connections.....Plate to Plate of 6AC5G's
 Generator Ground Connection.....To chassis or Ground Lead
 Dummy Antenna to be in series with generator output.....See Chart Below
 Position of Volume Control.....Fully On
 Position of Master Tone Control.....All Buttons Out

ALIGNMENT PROCEDURE CHART

Signal Generator							
Align- ment Sequence	Dummy Antenna	Frequency Setting	Input Connection to Receiver	Band Switch	Tuning Cond. Setting	Trimmer Adjusted	Remarks
1.	.02 MF.	455 Kc.	Stator lug Rear section of Gang Cond.	B. C.	Fully open	2nd I-F (2) 1st I-F (2)	Adjust for Maximum. Adjust for Maximum.
2.	.0002 MF.	1630 Kc.	Ant. Terminal	B. C.	Fully open	B. C. "OSC" Trimmer	Adjust for peak; gang does not have to tune thru signal. Loop must be connected.
3.	.0002 MF.	600 Kc.	Ant. Terminal	B. C.	Approx. 60 on dial	B. C. "OSC" Series Trimmer	Adjust for maximum output while rocking gang thru signal.
4.	Repeat Step No. 2 to check possible shift due to series adjustment.						
5.	.0002 MF.	1400 Kc.	Ant. Terminal	B. C.	Approx. 140 on dial	B. C. "ANT" Trimmer B. C. "R-F" Trimmer	Adjust for maximum output do not touch B. C. Osc. Trimmer. Adjust for maximum output.
6.	400 ohm (carbon)	5.3 Mc.	Ant. Terminal	Police	Fully open	Pol "OSC"	Adjust for peak; gang does not have to tune thru signal.
7.	400 ohm (carbon)	5.0 Mc.	Ant. Terminal	Police	Approx. 5.0	Pol "ANT" Trimmer	Adjust for maximum output.
8.	400 ohm (carbon)	18.3 Mc.	Ant. Terminal	S. W.	Fully open	S. W. "OSC"	Adjust for peak. Gang does not have to tune thru signal.
9.	400 ohm (carbon)	18.0 Mc.	Ant. Terminal	S. W.	Approx. 18	S. W. "ANT" Trimmer	Adjust for maximum output while rocking gang thru signal.
10.	Repeat the above alignment procedure for more accurate adjustments. Always keep signal generator output as low as possible to prevent action of the A. V. C. circuit.						

IMPORTANT ALIGNMENT NOTES

When aligning the shortwave bands "OSC" trimmers care must be exercised to see that the circuits are aligned on the correct frequency and not on the image which is approximately 910 kilocycles less as indicated on the Receiver dial. To check, increase generator output, tune-in the generator frequency and then tune-in the image frequency which should be weaker than the fundamental and come in approximately 910 kilocycles lower on the Receiver dial than the fundamental. If image cannot be tuned-in, the "OSC" trimmer is adjusted to the wrong peak. (Correct peak is the second peak on trimmer from the closed position).

TUBE VOLTAGE CHART

SOCKET VOLTAGES MEASURED AT 117.5 V. LINE (BETWEEN SOCKET PIN AND CHASSIS) WITH 1000 OHM PER VOLT, 500 V. RANGE VOLTMETER (D. C.)

TUBE	FUNCTION	PIN NUMBER							
		1	2	3	4	5	6	7	8
6SK7—R. F. Amplifier.....	Gnd.	Gnd.	Gnd.	0	Gnd.	74	6.3 A. C.	180	
6SA7—Converter.....	Gnd.	Gnd.	180	74	0	{0-S. W. } {4.0 B. C.}	6.3 A. C.	0	
6SK7—I. F. Amplifier.....	Gnd.	Gnd.	Gnd.	0	Gnd.	74	6.3 A. C.	180	
6SQ7—Det. A. S. C. 1st A. F.....	Gnd.	0	Gnd.	0	0	75	6.3 A. C.	Gnd.	
6J5GT—Phase Inverter.....	Gnd.	145	J. B.	0	0	J. B.	6.3 A. C.	40	
6J5GT(2)—P. P. A. F. Drivers.....	Gnd.	Gnd.	180	0	0	J. B.	6.3 A. C.	6.5	
6AC5GT(2)—P. P. Output.....	Gnd.	Gnd.	304	J. B.	6.5	J. B.	6.3 A. C.	Gnd.	
5Y3G—Rectifier.....	N. C.	310	J. B.	308 A. C.	J. B.	308 A. C.	J. B.	310	

MAX. POWER OUTPUT.....12.0 WATTS

POWER CONSUMPTION.....90 WATTS

DROP ACROSS SPEAKER FIELD.....120 VOLTS

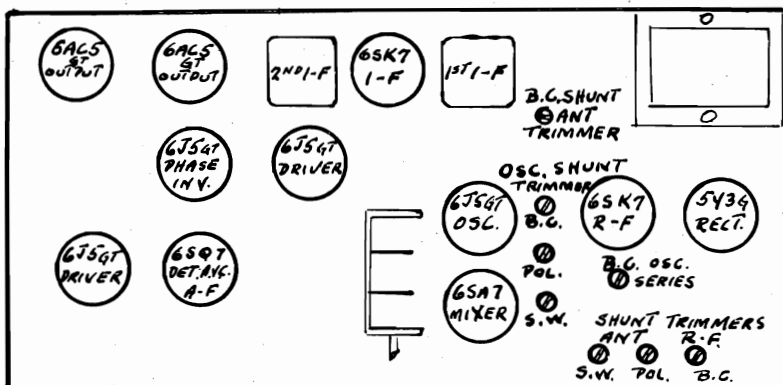
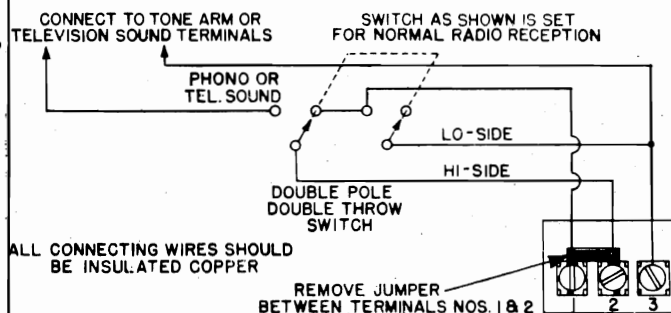
J. B.—Junction Block

N. C.—No Connection

Voltages may vary 10% of values given.

[illegible]

This chassis is so constructed as to be adaptable to a phonograph pickup (high impedance type) for the reproduction of recordings. The terminals may also be used for the reproduction of television sound as supplied by a suitable television converter unit. The double pole double throw switch for changing from Radio to Phono or television sound, should be connected as shown in the diagram. The terminals are coded as follows: 1, 2, 3, respectively. The No. 2 terminal connects to the high side of the phono pickup or television A-F connections.



The No. 3 terminal is the ground or low side connection. The No. 1 terminals should be connected to the No. 3 terminals by some means (as indicated in the above diagram). This prevents any radio signals from the receiver proper interfering with the Phono or Television sound reproduction.

THE CROSLEY CORP.

ALIGNMENT PROCEDURE

Preliminary

Output Meter Connections.....Plate to Plate of 6AC5G's
 Generator Ground Connection.....To chassis or Ground Lead
 Dummy Antenna to be in series with generator output.....See Chart Below
 Position of Volume Control.....Fully On
 Position of Tone Control.....Treble or Speech

ALIGNMENT PROCEDURE CHART

Signal Generator							
Align- ment Sequence	Dummy Antenna	Frequency Setting	Input Connection to Receiver	Band Switch	Tuning Cond. Setting	Trimmer Adjusted	Remarks
1.	.02 MF.	455 Kc.	Stator lug Rear sec- tion of Gang Cond.	B. C.	Fully open	2nd I-F (2) 1st I-F (2)	Adjust for Maximum. Adjust for Maximum.
2.	.0002 MF.	1600 Kc.	Ant. Lead (Red)	B. C.	Fully open	B. C. "OSC" Trimmer	Adjust for peak; gang does not have to tune thru signal. Loop must be connected.
3.	.0002 MF.	600 Kc.	Ant. Lead (Red)	B. C.	Approx. 60 on dial	B. C. "OSC" Series Trimmer	Adjust for maximum output while rocking gang thru signal.
4.	Repeat Step No. 2 to check possible shift due to series adjustment.						
5.	.0002 MF.	1400 Kc.	Ant. Lead (Red)	B. C.	Approx. 140 on dial	B. C. "ANT" Trimmer B. C. "R-F" Trimmer	Adjust for maximum output do not touch B. C. Osc. Trimmer. Adjust for maximum output.
6.	400 ohm (carbon)	5.3 Mc.	Ant. Lead (Red)	Police	Fully open	Pol "OSC"	Adjust for peak; gang does not have to tune thru signal.
7.	400 ohm (carbon)	5.0 Mc.	Ant. Lead (Red)	Police	Approx. 5.0	Pol "ANT" Trimmer	Adjust for maximum output while rocking gang thru signal.
8.	400 ohm (carbon)	18.3 Mc.	Ant. Lead (Red)	S. W.	Fully open	S. W. "OSC"	Adjust for peak. Gang does not have to tune thru signal.
9.	400 ohm (carbon)	18.0 Mc.	Ant. Lead (Red)	S. W.	Approx. 18	S. W. "ANT" Trimmer	Adjust for maximum output while rocking gang thru signal.
10.	Repeat the above alignment procedure for more accurate adjustments. Always keep signal generator output as low as possible to prevent action of the A.V.C. circuit.						

IMPORTANT ALIGNMENT NOTES

When aligning the shortwave bands "OSC" trimmers care must be exercised to see that the circuits are aligned on the correct frequency and not on the image which is approximately 910 kilocycles less as indicated on the dial. To check, increase generator output, tune-in the generator frequency and then tune-in the image frequency which should be weaker than the fundamental and come in approximately 910 kilocycles lower on the dial than the fundamental. If image cannot be tuned-in, the "OSC" trimmer is adjusted to the wrong peak. (Correct peak is the second peak on trimmer from the closed position).

SOCKET VOLTAGES MEASURED @ 117.5 VOLTS LINE (BETWEEN SOCKET PIN AND CHASSIS)
 WITH 1000 OHM PER VOLT, 500 VOLT RANGE VOLTMETER (D. C.)

PIN NUMBER

TUBE FUNCTION		1	2	3	4	5	6	7	8
6SK7—R. F. Amplifier	GND	GND	GND	0	0	59	6.3 NC	217	
6SA7—Converter	GND	GND	217	59	0	3.0 B.C.O.-S.W.	6.3 NC	0	
6J5GT—Oscillator	GND	GND	217	0	0	0	6.3 NC	0	
6SK7—I. F. Amplifier.....	GND	GND	GND	0	GND	59	6.3 NC	204	
6SQ7—Det. A. V. C. 1st A. F.....	GND	0	0	0	0	74	6.3 NC	GND	
6J5GT—Phase Inverter	GND	0	153	J. B.	0	0	6.3 NC	3.5	
6J5GT (2)—P. P. A. F. Drivers.....	GND	GND	217	J. B.	0	0	6.3 NC	8.5	
6AC5GT(2)—P. P. Output.....	GND	GND	305	0	8.5	0	6.3 NC	GND	
5Y3G—Rectifier	NC	310	0	308 AC	0	308 AC	5 AC	0	

MAX. POWER OUTPUT @ 117.5 V. LINE.....8.0 Watts

POWER CONSUMPTION @ 117.5 V. LINE.....80 Watts

DROP ACROSS SPEAKER FIELD90 Volts

J.B.—JUNCTION BLOCK.

Voltages may vary 10% of values given.

N.C.—NO CONNECTION.

MODEL CR26, Wireless

Record Player

THE CROSLEY CORP.

THE CROSLEY AUTOMATIC WIRELESS RECORD PLAYER MODEL CR26

The Crosley Automatic Wireless Record Player Model CR26, with the automatic record changer will enable one to greatly increase his enjoyment of recorded music.

After correct adjustments have been made, it will be possible to place the Record Player in any part of the room, place the selected recordings on the changer, set the volume control of the receiver at the desired level, and enjoy your favorite recorded music.

RECORDED MUSIC

Modern records are made by electrical processes and the bringing out of their full tonal perfection requires a well-designed electrical tone arm such as is provided in this Record Changer Model CR26.

Fully as remarkable is the wide variety of selections that are obtainable. They range from the latest hit tunes played by the most popular bands, to complete operas and symphonies recorded by the world's leading artists. These longer works are to be had in the form of a set of double sided records so arranged that the first half of the work is heard by playing one side of all the records, and the last half by playing the other side. Be sure to purchase records so arranged if it is desired to use them on an Automatic Changer.

POWER SUPPLY FOR AUTOMATIC WIRELESS RECORD CHANGER

The Changer is equipped with a constant-speed self-starting motor. Under all normal conditions it starts automatically and runs at correct speed.

Each Changer is designed to operate on a certain voltage and frequency (cycles) only. Be sure to look at your radio nameplate and see that the instrument you have conforms to your power supply before plugging in cord. The rating of your power supply can be determined by calling the local electric company.

PLACING UNIT IN OPERATION

The Crosley Automatic Wireless Record Player will operate on 850 to 600 Kilocycles (usually 85 to 60 on the radio dial). Turn the receiver "ON" and adjust the dial pointer to a position between 85 and 60 where there is no station interference. Turn volume control fully on. Plug the unit power cord into a convenient wall receptacle. Place a 10-inch record on turntable of unit and turn "OFF-ON" motor switch to "ON" position (Fig. 1). Allow approximately 30 seconds for the unit to warm up, then gently lift tone arm onto recording, or merely depress "Reject" knob.

Turn the adjusting screw (Fig. 1) until record being played is heard through the receiver. Turning the adjustment screw to the left increases the frequency, that is, the signal from unit will be picked up closer to 85 on the dial of the receiver. Turning to the right decreases the frequency and the signal will be picked by the receiver closer to 60 on the dial.

The adjusting screw should be turned so as to obtain the sharpest signal. Adjust radio volume control to desired level for recordings being played.

SETTING FOR SIZE OF RECORD

The Changer plays up to fourteen 10" or ten 12" records at one loading. All records must be the same size for each loading.

On each post you will see selecting arms. The position of these arms determines the setting for different size records. To set for 10 or 12-inch records, it is merely necessary to grasp the posts by the knobs at the top, lift, and turn until the 10" or 12" arrows are pointing toward the center of the turntable. When in either the 10" or 12" position, the posts will snap into place except when they are lifted by hand. Be sure to set both posts for the same size record.

Figure (1) shows the Changer with the selecting arms set for 10" records and ready to be loaded; the tone arm in the rest position.

Figure (2) shows the Changer set for 12" records and ready to be loaded the tone arm in the rest position.

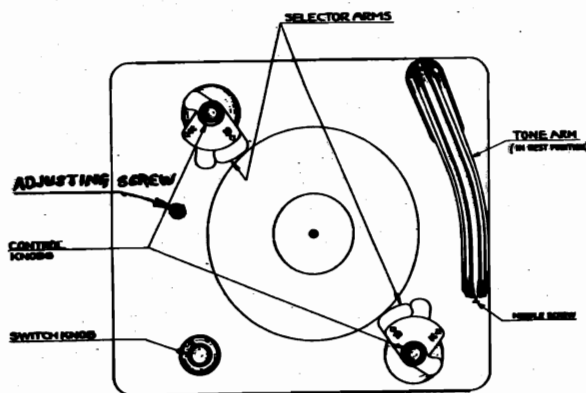


Fig. 1

THE CROSLEY CORP.

TURNING OFF CHANGER

- (1) Throw Changer switch knob to "OFF" position.
- (2) Lift tone arm and place it in the rest position. (If you happen to turn off the Changer switch while the mechanism is going through a "change cycle", you will notice that it does not stop until the cycle has been completed, and the tone arm is again in playing position, at which point it is ready to be lifted to the rest position. If you prefer to turn off your Changer by the use of any other switch than the one on the Changer itself, be sure to turn it off while needle is resting upon a record; otherwise, the selecting arms cannot be correctly reset.
- (3) To avoid warping of records, never leave records resting on the posts.

IF CHANGER IS LEFT RUNNING

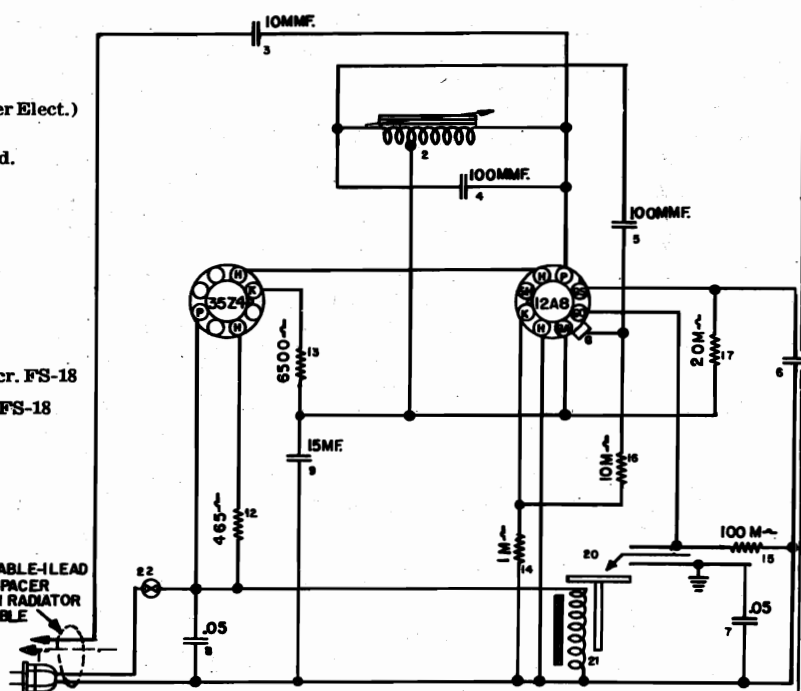
No damage will be done if you forget to turn off Changer after it has played its entire load of records. It will simply repeat the last record until stopped or reloaded.

FAILURE TO PLAY THE NEXT RECORD

An old record may occasionally be found (made before the introduction of automatic changers) which does not carry the needle close enough to center-pin of turntable, to set the changer mechanism in operation. Should one of these old records be found in the stack, merely depressing the button will instantly set the Changer mechanism in action again. Any need for doing this can be avoided by placing the old record at top of stack to be played, so that it will come into position last.

Item No.	Part No.	Description
1	B-131602	Cable and Plug (4 lead)
2	LW-131609	Osc. Coil
3	G8-34002	Condenser 10 Mmfd. Mica
4	G2-34002	Condenser 100 Mmfd. Mica
5	G2-34002	Condenser 100 Mmfd. Mica
6	W-50105	Condenser .1 Mfd. 200 V.
7	W-32380	Condenser .05 Mfd. 200 V.
8	W-32380	Condenser .05 Mfd. 200 V.
9	W-131607	Condenser 2x15 Mfd. 150 V. (Paper Elect.)
10	W-34736	3/4 Dia. Hole Plug
11	B-131604	Chassis
12	W-131606	Resistor 465 ohm 10W. Wire Wd.
13	35934	Resistor 6,500 Ohm 1/2 W. Ins.
14	50046	Resistor 1,000 Ohm 1/2 W. Ins.
15	35600	Resistor 100,000 Ohm 1/2 W. Ins.
16	36317	Resistor 10,000 Ohm 1/2 W. Ins.
17	36760	Resistor 20,000 Ohm 1/2 W. Ins.
18		
19		
20	D-131529	Auto. Record Changer Unit
21		Motor with D-131529
22		Switch with D-131529
23		
24		
25	49742	#6-32x 1/8 Rd. Cr. Rec. Hd. Mch. Scr. FS-18
26		
27	W-131603	#8 x 3/4 Rd. Cr. Rec. Hd. P. K. Scr. FS-18
28	131610	Tube Socket
29	W-49674	.120 x 1/4 Eyelet
30		
31	W-49382	Coil Form Mtg. Clip
32	W-49859	Iron Core
33		
34	21253	Coil Mtg. Brkt.
35		
36		
37	W-45056	Rubber Grommet
38	N-5062	#6-32 Hex Nut
39		
40		
41	D-131617A	CD Cabinet
42		
43		
44	W-131605	Cable Lock Plate
45		
46	131792	CD Carton
47		
48	W-47217	Grommet
49		

WIRING DIAGRAM — MODEL CR26



CAUSE OF NOISY RECORDS

A background of noise and scratching indicates worn records. Poor tone may be evidence of a worn needle. Some records will wear longer than others, even if kept equally clean. This is due not only to quality of manufacture, and care given the records, but also to the kind of music recorded.

MODEL CR26, Wireless
Record Player

THE CROSLEY CORP.

LOADING

See that the selecting arms of both posts are turned toward the center of the turntable as indicated by the engraved arrows, and that both sets of arms are set for the same size (10" or 12") records as described in the preceding paragraph. Place the stack of records (up to fourteen 10" or ten 12") over the center pin so that they will rest on the selecting arms.

STARTING THE CHANGER

Turn the "OFF-ON" motor switch knob to the "ON" position (Fig. 1), the motor will then start and the record changer will go into automatic operation of its own accord.

HOW TO REJECT A RECORD

Merely press the switch knob on the Changer panel. You can do it any time after the needle has come into contact with that record.

PLAYING INDIVIDUAL RECORDS

Should it be desired to play an individual record merely set up the machine as described above for the proper size (10" or 12" as indicated on the selecting arms), place the record on top of the arms as described under "Loading", and set the machine in operation by means of the switch knob described under "Starting the Changer". In other words, play an individual record in the same manner as you would play a stack of that size.

NOTE: If the record player refuses to operate, **CHECK** the tubes to be sure they are pushed well down into their respective sockets. The tubes are accessible by removing the bottom of the Record Player. After correct adjustments have been made it is necessary only to turn "ON" the receiver and tune-in on the frequency setting the Record Player, just as though you are tuning-in a regular broadcasting station, provided, of course, the Record Player is in operating condition.

If at any time extremely noisy conditions are encountered, wind a lead from the radio receiver antenna around the Record Player Power Cord.

UNLOADING

First switch off the motor. Grasp each post by its knob at the top and turn them out of the way. (See Figure 3).

This view shows the Changer with the tone arm in the rest position, and the selecting fingers turned for unloading.

Lift the played records from the turntable. Then return the posts to the proper playing position as indicated by the arrows on the selecting arms. (See Fig. 1 and 2). The Changer may then be loaded with a new stack of records according to the size shown on the selecting arms.

USE OF TONE CONTROL

If the radio through which this Changer is being played has a tone control switch, do not forget to adjust it, as well as the volume control, to the position which best brings out the tonal qualities of the kind of records being played.

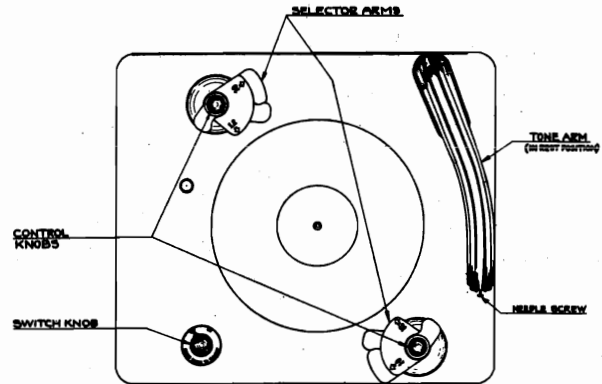


Fig. 2

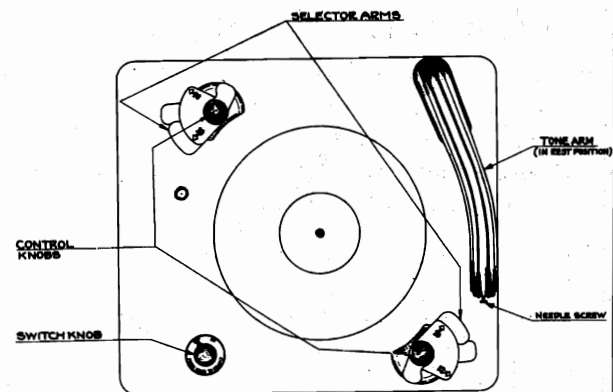
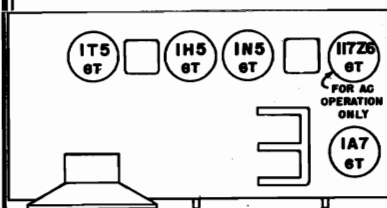


Fig. 3

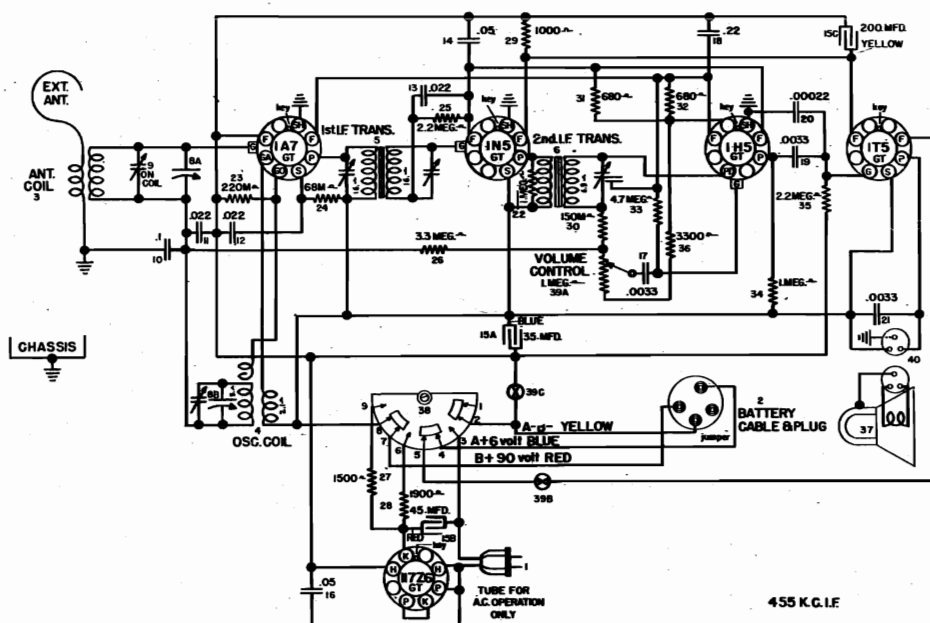
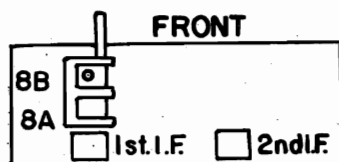
SERVICE INFORMATION — Model 90 Chassis

WIRING DIAGRAM

TUBE LAYOUT



TRIMMER LOCATIONS

**SOCKETS VOLTAGES — Model 52-PA**

Voltmeter, 100 V. Range, no signal input

Tube		@ 117.5-Volt Line				Battery Pack			
Type	Function	Filament Volt	Plate Volt	Screen Volt	Cathode Volt	Filament Volt	Plate Volt	Screen Volt	Cathode Volt
1A7GT	Osc. Modulator	1.3	80	34	.....	1.7	90	36	.....
1N5GT	I. F. Amplifier	3.8	80	80	.....	4.4	90	90	.....
1H5GT	Det.-A. S. C. 1st A. F.	2.6	7	.....	.....	3.0	8	.....	.....
1T5GT	Out Put	5.1	72	80	.....	6.0	88	90	.....
117Z6GT	Rectifier	117.5 A. C.	117.5 A. C.	.....	115	.....	.....	.....	.....

ALIGNMENT PROCEDURE

Volume Control on full Output meter connected to Plate and Screen of 1T5GT

SIGNAL GENERATOR		DUMMY ANTENNA	TUNING COND. SETTING	TRIMMERS TO ADJUST (See Fig. 1)	REMARKS
FREQUENCY SETTING	CONNECTION TO RADIO				
455 Kc	Ant. Lead	.0001 MF	Fully open	2nd 1-F(1)	Adjust for maximum signal.
455 Kc	Ant. Lead	.0001 MF	Fully open	1st 1-F (2)	Adjust for maximum signal. Located top of 1st 1-F ass'y.
1650	Ant. Lead	.0001 MF	Fully open	"OSC" Shunt on gang	Adjust for maximum output. Gang does not have to tune through signal.
1400	Ant. Lead	.0001 MF	140 on dial	"ANT" shunt on loop	Adjust for maximum output.

A Battery drain @ 6 volts, .05 Amp.; "B" Battery drain @ 90 V., 12 M. A.
Power consumption @ 117.5 volts line — 20 Watts

The chassis as employed in this model receiver is a five tube (including rectifier), single band superheterodyne, designed to operate from an "A and B" Battery Pack, or 110 volts A.C. (50-60 cycle) or 110 volt D.C. electric circuits.

TUBES USED —one 1A7GT, one—IN5GT, one—IH5GT, one—IT5GT and one—117Z6GT*

BATTERIES REQUIRED —one No. CR-57 Crosley "A and B" Battery Pack (6 Volt "A"—90 Volt "B").

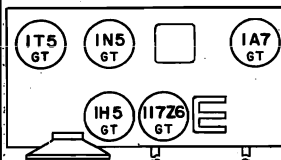
THE CROSLEY CORP.

MODEL 52PA, Chassis 67

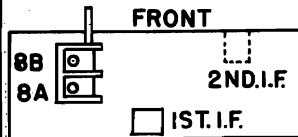
MODEL 52PB, Chassis 71

SERVICE INFORMATION — Model 67 Chassis

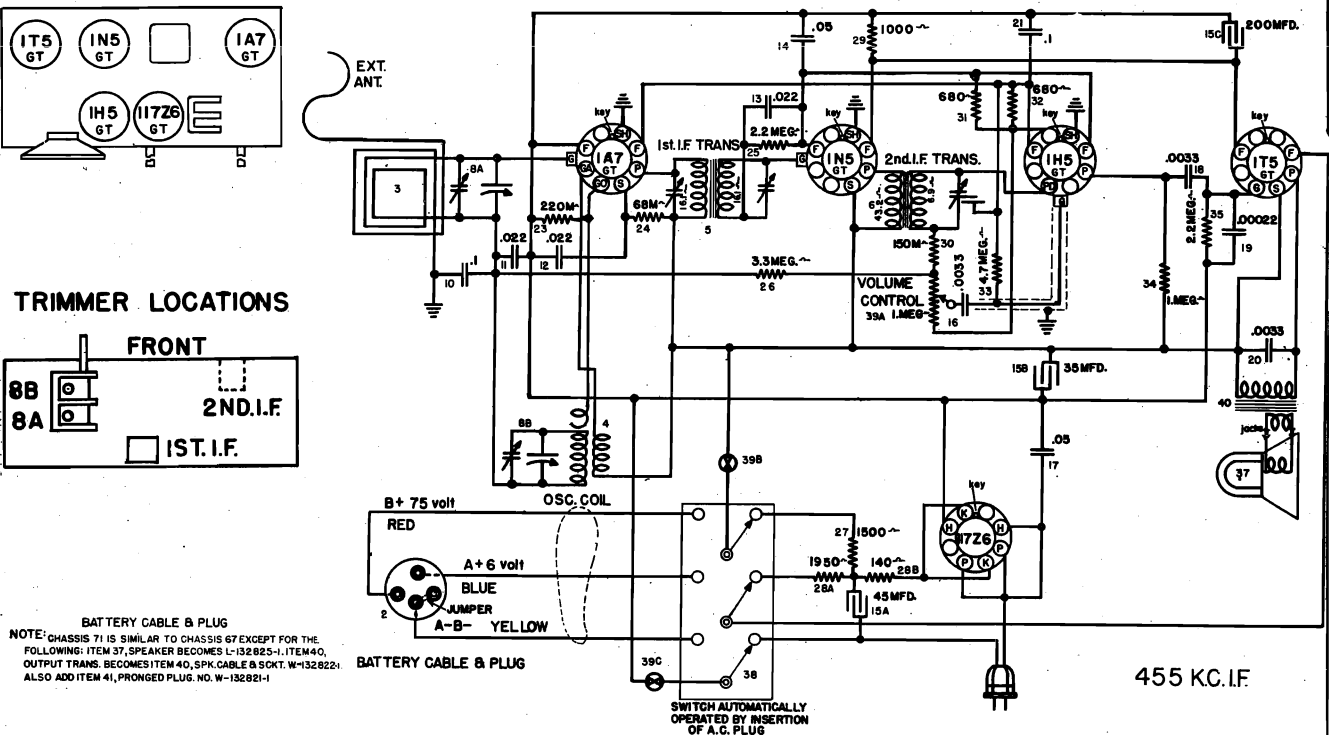
TUBE LAYOUT



TRIMMER LOCATIONS



WIRING DIAGRAM



NOTE: CHASSIS 71 IS SIMILAR TO CHASSIS 67 EXCEPT FOR THE FOLLOWING: ITEM 37, SPEAKER BECOMES 1-132B25-1, ITEM 40, OUTPUT TRANS. BECOMES ITEM 40, SPK. CABLE & SOCKET, W-132B22-1. ALSO ADD ITEM 41, PRONGED PLUG, NO. W-132B21-1.

BATTERY CABLE & PLUG

SWITCH AUTOMATICALLY
OPERATED BY INSERTION
OF A.C. PLUG

455 KC.I.F.

SOCKET VOLTAGES — Model 52-PA

Measured from "B" minus using 1000 Ω/V

Voltmeter, 100 V. Range, no signal input

Tube		@ 117.5-Volt Line				Battery Pack			
Type	Function	Filament Volt	Plate Volt	Screen Volt	Cathode Volt	Filament Volt	Plate Volt	Screen Volt	Cathode Volt
1A7GT	Osc. Modulator	1.3	80	34	.....	1.7	75	30	.....
1N5GT	I. F. Amplifier	3.8	80	80	.....	4.4	75	75	.....
1H5GT	Det.-A. S. C. 1st A. F.	2.6	7	.....	.....	3.0	6	.....	.....
1T5GT	Out Put	5.1	72	80	.....	6.0	68	75	.....
117Z6GT	Rectifier	117.5 A. C.	117.5 A. C.	.....	100	.....	.....	.....	.....

ALIGNMENT PROCEDURE

Volume Control on full Output meter connected to Plate and Screen of 1T5GT

FREQUENCY SETTING	CONNECTION TO RADIO	DUMMY ANTENNA	TUNING COND. SETTING	TRIMMERS TO ADJUST (See Fig. 1)	REMARKS
455 Kc	Ant. Lead	.0001 MF	Fully open	2nd 1-F(1) front chassis flange	Adjust for maximum signal.
455 Kc	Ant. Lead	.0001 MF	Fully open	1st 1-F (2)	Adjust for maximum signal. Located top of 1st 1-F ass'y.
1650	Ant. Lead	.0001 MF	Fully open	"OSC" Shunt on gang	Adjust for maximum output. Gang does not have to tune through signal.
1400	Ant. Lead	.0001 MF	140 on dial	"ANT" shunt on gang	Adjust for maximum output.
600	Ant. Lead	.0001 MF	60 on dial	Iron core in "OSC" coil	Adjust for maximum signal while rocking gang.

Repeat above procedures for more accurate adjustments.
Maximum power output @ 75 V. "B" — approx. 200 M. W. undistorted

A Battery drain @ 6 volts, .05 Amp.; "B" Battery drain @ 75 V., 9 M. A.
Power consumption @ 117.5 volts line — 20 Watts

The chassis as employed in this model portable receiver is a five tube (including rectifier), single band super-heterodyne, designed to operate from an "A and B" Battery Pack, or 110 volts A.C. (50-60 cycle) or 110 volt D.C. electric circuits.

TUNING RANGE

— 550-1600 Kilocycles — 546-187.5 Meters

TUBES USED

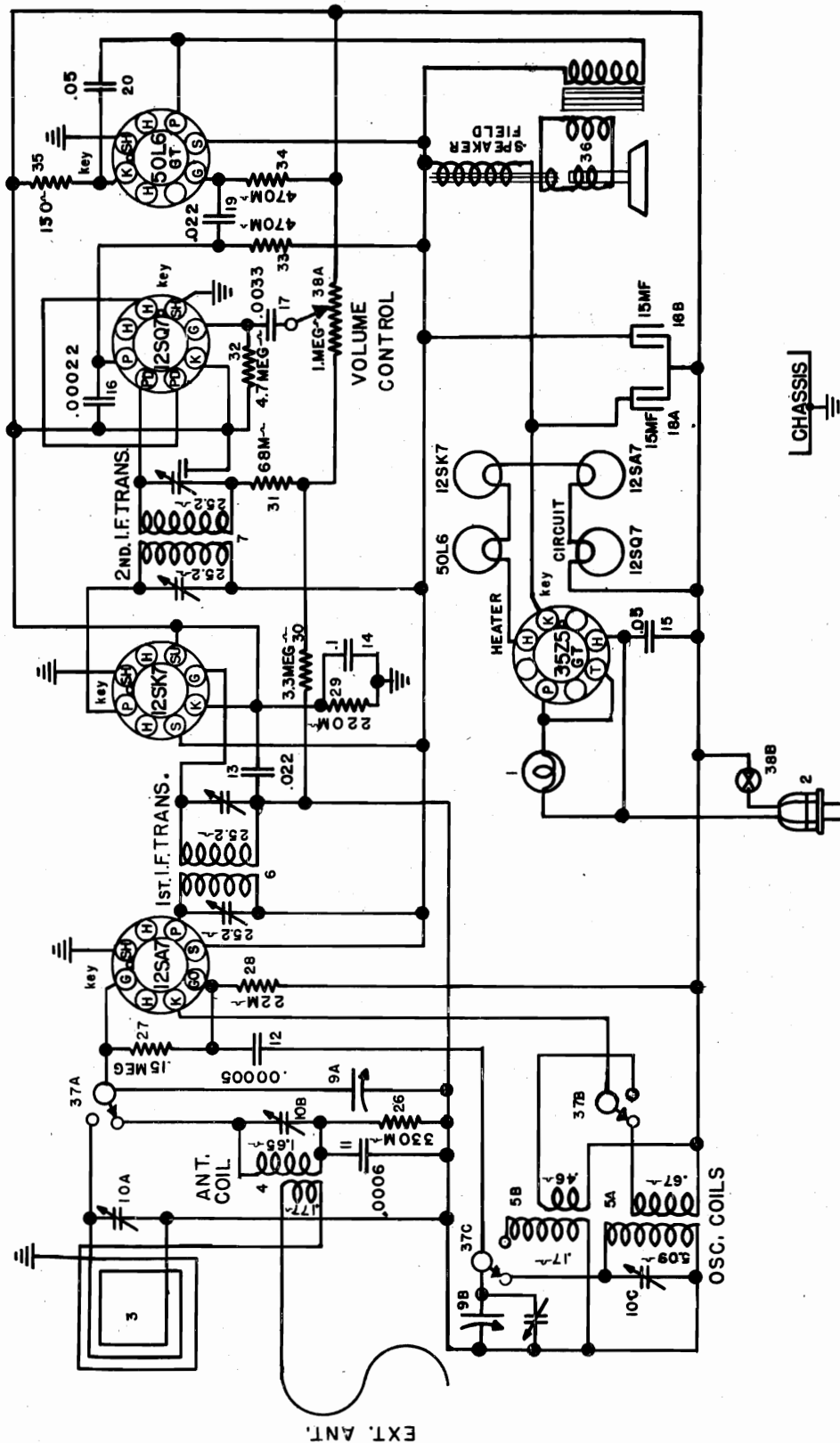
— one 1A7GT, one 1N5GT, one 1H5GT, one 1T5GT and one 117Z6GT

BATTERIES REQUIRED

— one No. CR67 Crosley "A and B" Battery Pack (6 Volt "A"—75 Volt "B") or equivalent.

**MODELS 52TD, 52TD-U, 52TE,
52TE-U, Chassis 77;
52TF, 52TF-U, Chassis 76**

THE CROSLEY CORP.



455K.C.I.F.

NOTE-ON 52TD-J, 52TE-J & 52TF-J, ITEM 36 (SPEAKER) BECOMES G3-49675, ALL OTHER PARTS & CONNECTIONS

REMAIN THE SAME

NOTE-ON 52 TF, ITEM 3 (LOOP ANT) BECOMES GB132245-1
ALL OTHER PARTS & CONNECTIONS REMAIN THE SAME.

The back on receivers employing the 77 chassis is part of the loop antenna assembly. To gain access to the tubes, carefully pry out two trimount studs which fasten back to top of cabinet. Then remove the two screws at lower edge and carefully lay loop on table. Do not disconnect lead wires to the loop.

The back on receivers employing the 76 chassis is fastened with wood screws. Remove the back, then remove the two screws at lower edge of loop support and carefully lay loop back to gain access to the tubes.

THE CROSLEY CORP.

MODELS 52TD, 52TD-U, 52TE,
52TE-U, Chassis 77; 52TF
52TF-U, Chassis 76

Chassis No. 76 and No. 77 are identical electrically in that they are both five-tube, two band, superheterodyne receivers, designed to operate on either A.C. or D.C. electric circuits, as specified on model label.

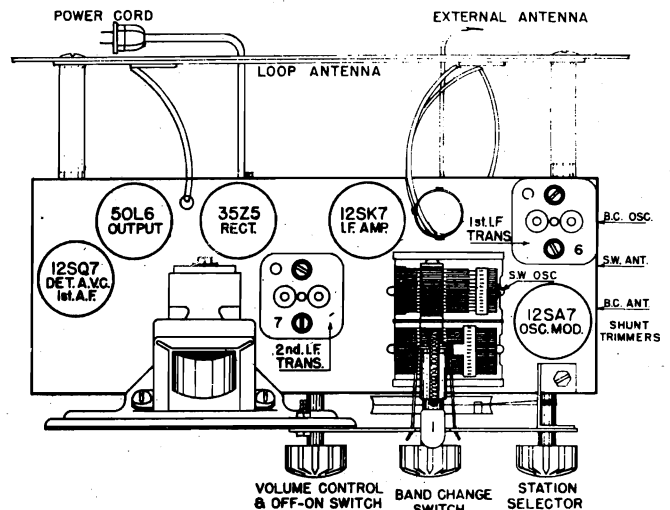
TUNING RANGE

Broadcast Band—1600 to 540 kilocycles, or 18.75 to 555 meters
Short Wave Band—15 to 6 megacycles, or 20 to 50 meters.

TUBES

FUNCTION

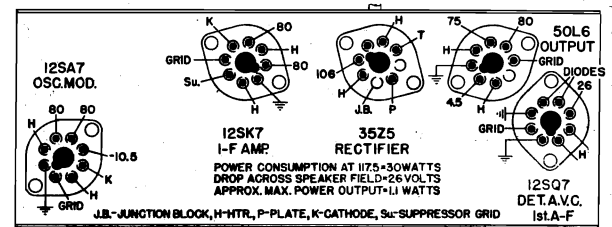
1 — 12SA7	Oscillator Modulator
1 — 12SK7	Intermediate Frequency Amplifier
1 — 12SQ7	Detector, A.V.C. and 1st Audio Amplifier
1 — 50L6GT	Beam Power Output
1 — 35Z5GT	Rectifier



ALIGNMENT PROCEDURE

Preliminary

Output Meter Connections Plate and screen of 50L6
Generator Ground Connections Ground Lead and Chassis
Dummy Antenna to be in series with generator output
Position of Volume Control Fully on



VOLTAGES MEASURED BETWEEN SOCKET PIN & GND. SIDE OF VOL. CONT. WITH 250VOLT, 1000 OHMS. PER. VOLT. METER. READINGS MAY VARY 10%.

POWER SUPPLY

Make certain that the power rating on the model and license label is the SAME as your lighting circuit BEFORE plugging the receiver power cord into a convenient receptacle. Never put your hand in the receiver cabinet without first disconnecting receiver plug from the electric circuit.

ALIGNMENT PROCEDURE CHART

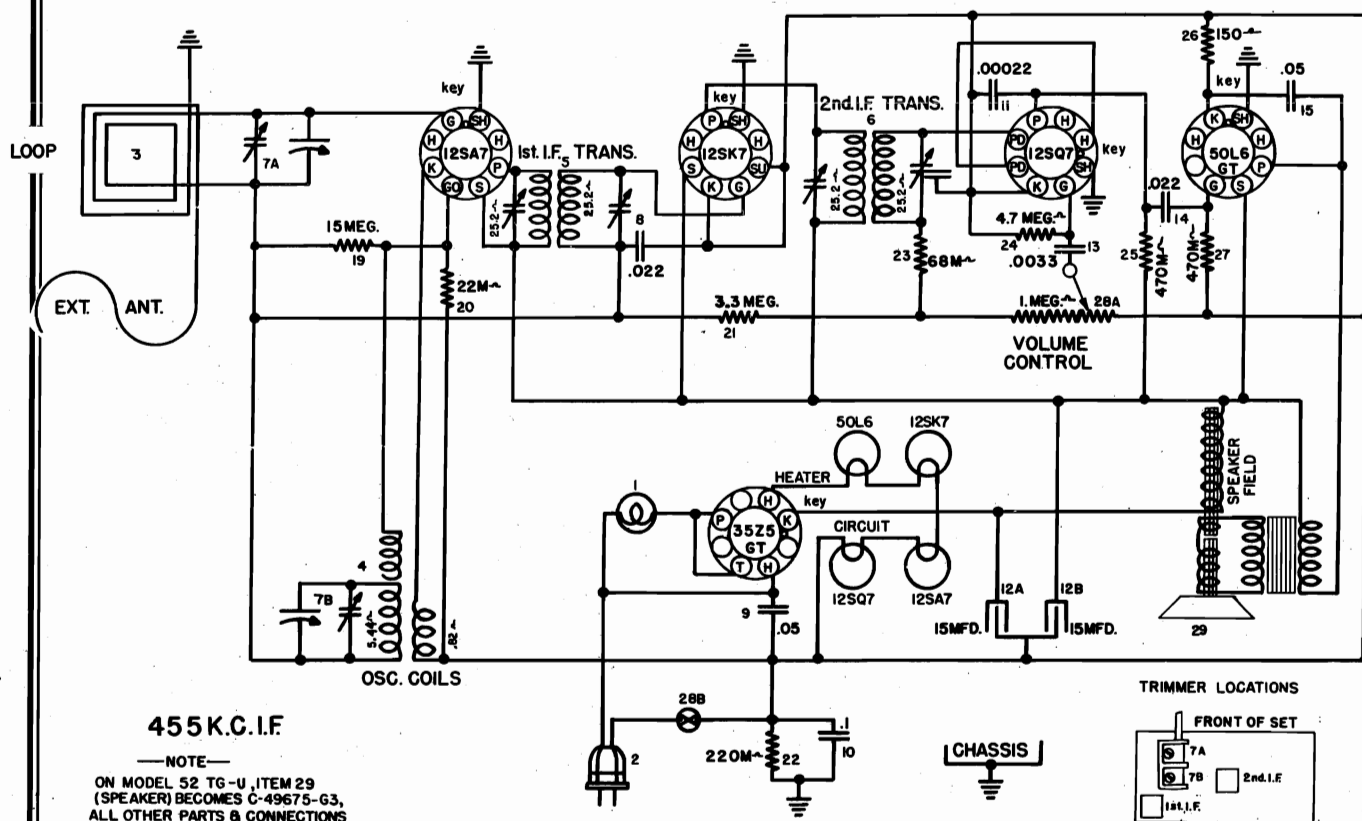
Alignment Sequence	Dummy Antenna	Frequency Setting	Input Connection to Receiver	Band Switch	Tuning Cond. Setting	Trimmer Adjusted	Remarks
1.	Signal Generator .0001 MF.	455 KC.	Antenna Lead	BC	Fully Open	2nd I-F(2) 1st L-F(2)	Adjust for maximum signal. Adjust for maximum signal.
2.	400 ohm Carbon Resistor	15.3 MC.	Antenna Lead (red)	S.W.	Fully Open	S.W. "Osc."	Adjust for maximum output.
3.	400 ohm Carbon	15.0 MC.	Antenna Lead (red)	S.W.	15 on Dial	S.W. "Ant."	Adjust for maximum signal while rocking gang through it.
4.	.0001 MF.	1650 KC.	Antenna Lead (red)	BC	Fully Open	B.C. "Osc."	Adjust for maximum output. Gang does not have to tune through signal.
5.	.0001 MF.	1400 KC.	Antenna Lead (red)	BC	140 Dial	B.C. "Ant."	Adjust for maximum output.

When aligning the shortwave band "OSC" trimmer, care must be exercised to see that the circuit is aligned on the correct frequency and not on the image which is approximately 910 kilocycles less as indicated on the dial. To check, increase generator output, tune in the generator frequency and then tune in the image frequency which should be weaker than the fundamental and come in approximately 910 kilocycles lower on the dial than the fundamental. If image cannot be tuned in, the "OSC" trimmer is adjusted to the wrong peak. (Correct peak is the second peak on trimmer from the closed position.)

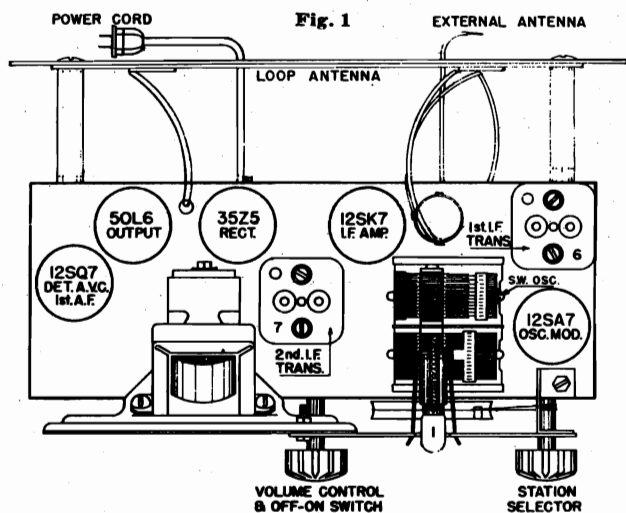
Repeat the original alignment procedure for more accurate adjustments. Always keep signal generator output as low as possible to prevent action of the A.V.C. circuit.

MODELS 52TG, Chassis 74,
52TG-U, Chassis 74U

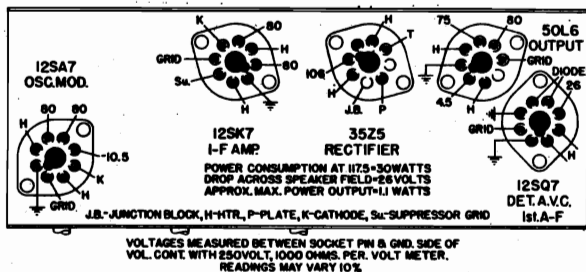
THE CROSLLEY CORP.



TUNING RANGE—Broadcast Band—1600 to 540 kilocycles, or 18.75
to 555 meters.

**ALIGNMENT PROCEDURE****Preliminary**

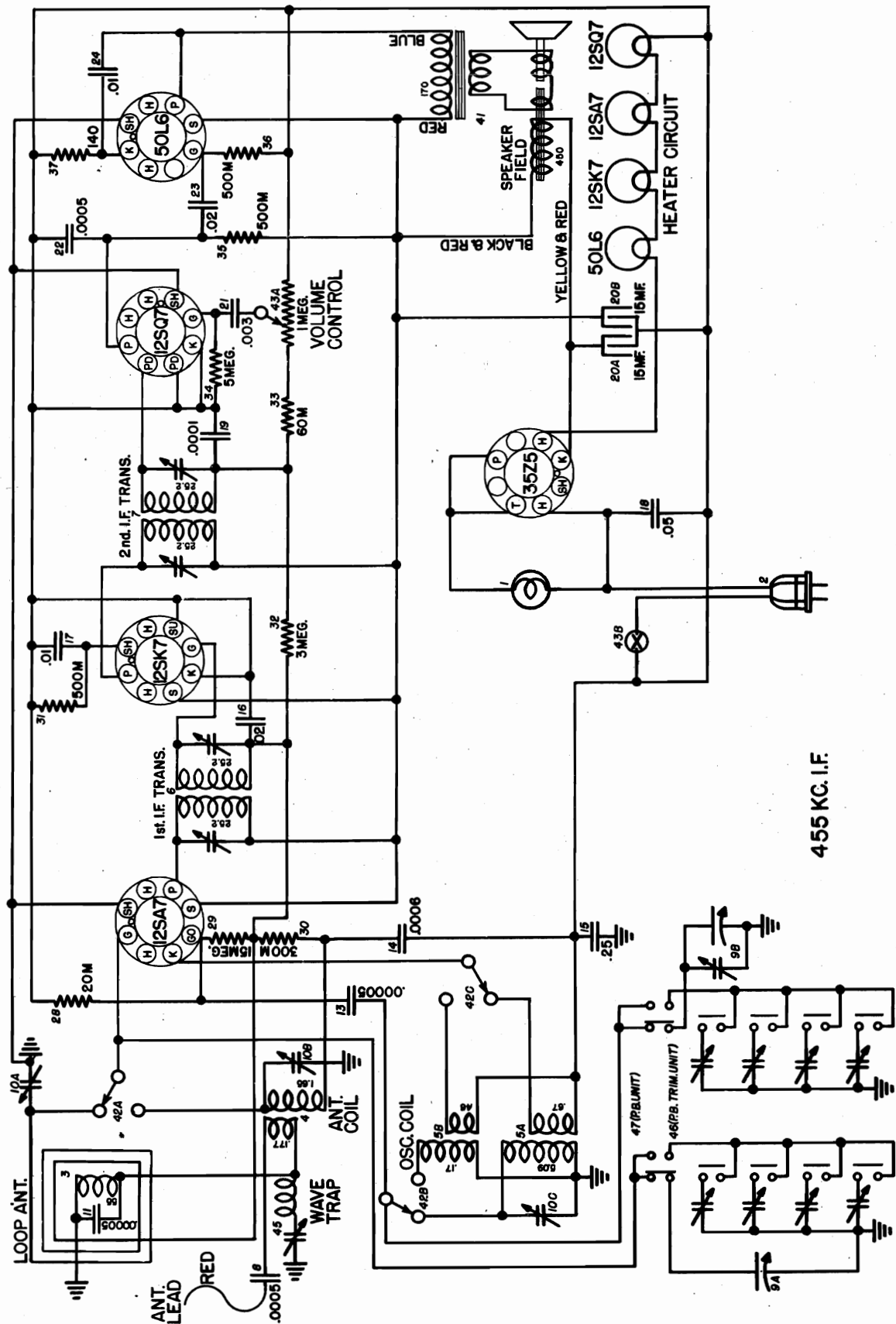
Output Meter Connections Plate and screen of 50L6
Generator Ground Connections Ground Lead and Chassis
Dummy Antenna to be in series with generator output
Position of Volume Control Fully on

**ALIGNMENT PROCEDURE CHART**

Alignment Sequence	Dummy Antenna	Frequency Setting	Input Connection to Receiver	Band Switch	Tuning Cond. Setting	Trimmer Adjusted	Remarks
1.	.0001 MF.	455 KC.	Antenna Lead	BC	Fully Open	1st I-F(2) 2nd I-F(2)	Adjust for maximum signal. Adjust for maximum signal.
2.	.0001 MF.	1650 KC.	Antenna Lead	BC	Fully Open	B.C. "Osc."	Adjust for maximum output. Gang does not have to tune through signal
3.	.0001 MF.	1400 KC.	Antenna Lead	BC	140 Dial	B.C. "Ant."	Adjust for maximum output.

Repeat the original alignment procedure for more accurate adjustments. Always keep signal generator output as low as possible to prevent action of the A.S.C. circuit.

THE CROSLEY CORP.



MODELS TK52, TK52W

Chassis 64

"Set-Up Procedure"

ALIGNMENT CHART

CHASSIS 63 and 64

Sequence	SIGNAL GENERATOR			Band Switch	Tuning Cond. Setting	Trimmer Cond. Adjusted	Remarks
	Dummy Antenna	Frequency Setting	Input Connection To Radio				
1.	.05 Mf.	456 Kc.	Antenna	S. B.	Fully on	2nd I-F (2) 1st I-F (2)	Adjust for maximum output. Adjust for maximum output.
2.	400 Ohm carbon	15.4 Mc.	Antenna	S. W.	Fully open	S. W. "OSC" (Rear section tuning cond.)	Adjust for maximum output.
3.	400 Ohm carbon	15.0 Mc.	Antenna	S. W.	Approx. 15 on dial	S. W. "ANT" (Center trimmer right end of chassis)	Adjust for maximum output while rocking gang thru signal.
4.	.0002 Mf.	1600 Kc.	Antenna	S. B.	Fully on	B. C. "OSC" (Front trimmer right end of Chassis)	Adjust for maximum output. Gang does not have to tune thru signal.
5.	.0002 Mf.	1400 Kc.	Antenna	S. B.	Approx. 140 on dial	B. C. "ANT" (Rear trimmer right end of chassis)	Adjust for maximum output.

(Foot Note) (1). Do not use a ground return from the signal generator unless it is found to be absolutely necessary. If necessary a small condenser (approx. .001 mf. 400 V) should be connected in series with the ground lead of the generator and receiver chassis.

When aligning the short wave band "OSC" trimmer, care must be exercised to see that the circuits are aligned on the correct frequency and not on the image which is approximately 910 kilocycles less as indicated on the dial. To check, increase generator output, tune in the generator frequency and then tune in the image frequency which should be weaker than the fundamental and come in approximately 910 kilocycles lower on the dial than the fundamental. If the image cannot be tuned in, the "OSC" trimmer is adjusted to the wrong peak. (Correct peak is the second peak on trimmer from the closed position.)

Repeat the original alignment procedure for more accurate adjustments. Always keep signal generator output as low as possible to prevent action of the A. V. C. circuit.

WAVE TRAP

Some chassis of this model are equipped with a wave trap for the purpose of eliminating interference from code stations which operate on a frequency of approximately 455 kilocycles. This assembly consists of a coil, and a trimmer condenser as illustrated by the dotted lines in the Wiring Diagram. The wave trap should not be adjusted until all other adjustments have been made. To make the adjustment, feed a 455 kilocycle signal from the signal generator through a 50 mmf. condenser into the antenna terminal of the receiver. With the gang condenser open and the volume control fully on, adjust the trimmer condenser on the wave trap for MINIMUM output.

Should the interfering station be operating on a frequency of slightly more or less than 455 kilocycles, the exact frequency should be determined with the aid of the signal generator. Then instead of feeding a 455 kilocycle signal into the receiver the exact frequency of the interfering signal should be used. If it is not possible to determine the exact frequency of the interfering signal the antenna may be attached to the receiver and the receiver tuned to the position where the interfering signal is most noticeable. Then adjust the wave trap for minimum interference.

THE SETTING AND OPERATION OF THE ELECTRIC PUSH BUTTONS

Select and remove the call letter tabs of your four favorite local broadcast stations from the station call letter sheets supplied. Place them in the windows above the push buttons, in the order of their frequency (Kilocycles). That is, the station whose frequency is within the frequency range of the left hand button should be inserted (from top) in the window directly above that button and so on for the following three. The push button on the right MUST be depressed when receiver is to be tuned with the station selector knob. Place the "Manual" or "Dial" tab in window above this button.

The frequencies (Kilocycles) of your local stations may be found in your daily paper or by referring to any station list.

THE CROSLEY CORP.

MODELS TK52, TK52W
Chassis 64

NOTE: To simplify the set-up and insure correct adjustments of push buttons the following pre-adjustments should be made:

1. Tighten all the padder condensers' screws.
2. Then loosen each "ANT" padder screw approximately two turns.

While adjusting "OSC" padder screws always turn very slowly as they tune very sharp and it is possible to tune past station without hearing the signal.

SET-UP PROCEDURE

1. Turn the set on and leave operate for about ten or twenty minutes before attempting to set the push buttons.
2. Due to the wide range to which each button will tune it is essential that the stations selected are well within each buttons tuning range.
3. Push in the "Manual" button (extreme right) and using the station selector knob, tune in the station to which the No. 1 button is to be set.
4. Push in the No. 1 button and using a long, thin screw driver adjust the "OSC"/A padder screw, turning slowly (extreme right looking at rear of cabinet) until the station you tuned in (MANUALLY) is heard again. The padder condensers are accessible through the long horizontal opening in the upper left side of cabinet back. Be sure to adjust for maximum volume in speaker.
5. Adjust the No. 1 push button "ANT"/AA padder condenser for maximum volume in speaker.
6. Push in "Manual" push button and re-check station to make sure button is correctly set. There should be no change in volume when switched from push button to manual.
7. The set up for No. 1 button is then complete. Set up remaining buttons, using same procedure; adjust the "OSC" padder first, then the "ANT" padder, etc.

To tune the receiver with the push buttons, simply press in the button which corresponds to the call letters of the desired station: The volume may be adjusted to suit.

Tubes Used Functions

12SA7	Oscillator—Modulator
12SK7	Intermediate Frequency Amplifier
12SQ7	Detector, A.V.C. 1st Audio Amplifier
50L6	Beam Power Output
35Z5	Rectifier

Tube may be GT (Bantam) or metal equivalents.

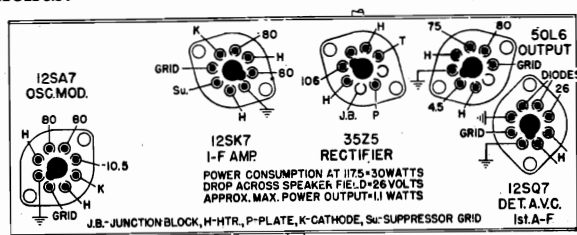


Fig. 4—Socket Voltage Chart

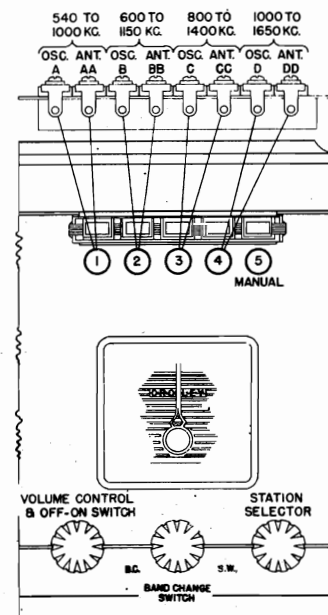
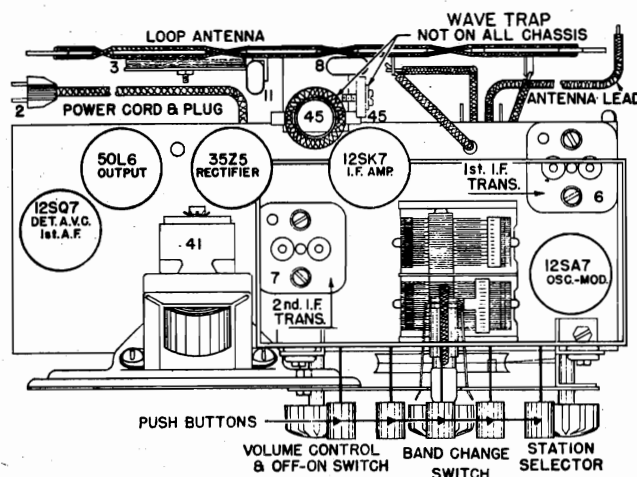


Fig. 3—Front View



THE CROSLEY CORP.

Model No. 52-TP is a Table Model Phono-Combination incorporating a five-tube, two-band superheterodyne receiver and a sensitive and efficient unit for the reproduction of phonograph recordings. Designed to operate on A.C. electric circuits as specified on model label.

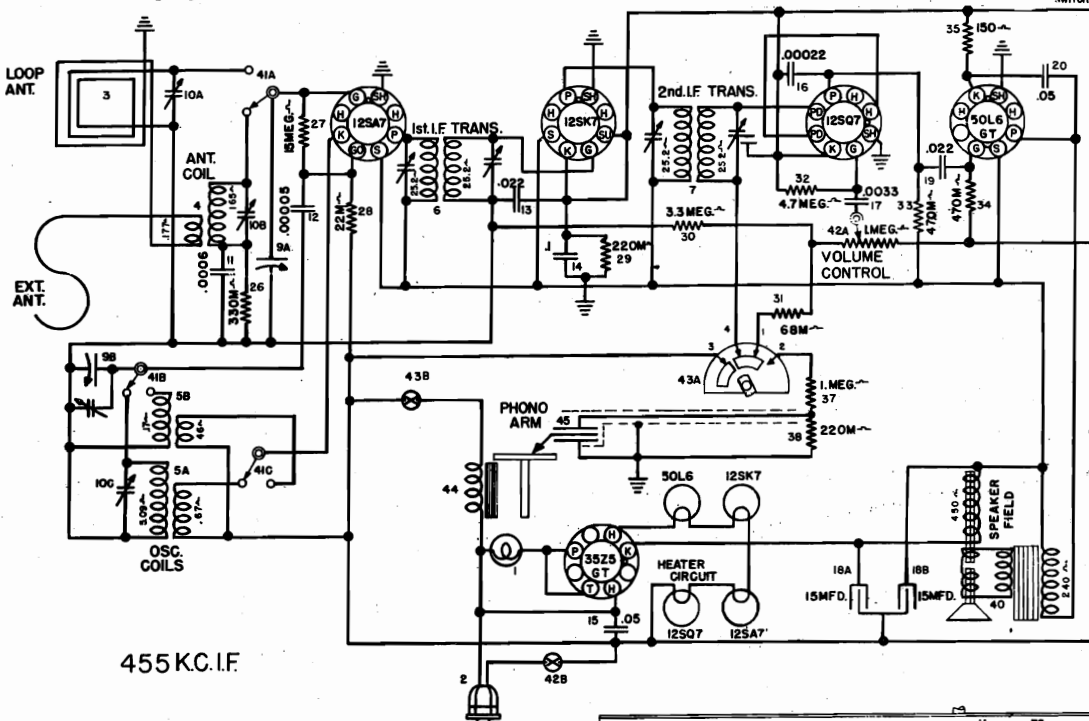
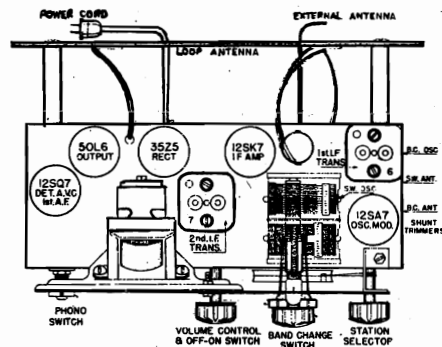
TUNING RANGE—Broadcast Band—1600 to 540 kilocycles, or 18.75 to 555 meters.
Short Wave Band—15 to 6 megacycles, or 20 to 50 meters.

TUBES—1—12SA7, 1—12SK7, 1—12SQ7, 1—50L6GT, 1—35Z5GT. Tubes must be GT (Bantam) or metal equivalent.

ANTENNA—This model has a built-in loop antenna. Under normal conditions this loop antenna will provide sufficient pickup for satisfactory reception from nearby and powerful stations, whose operating frequency is between 1600 and 540 kilocycles. Due to the slightly directional effect of the loop antenna, reception from some stations may be improved by turning the receiver. For Short Wave or distant reception on the broadcast band, an outdoor antenna should be installed. Connect the antenna lead-in wire to the red lead extending from the rear of the cabinet.

GROUND—NEVER ATTACH A GROUND WIRE TO THIS RECEIVER.

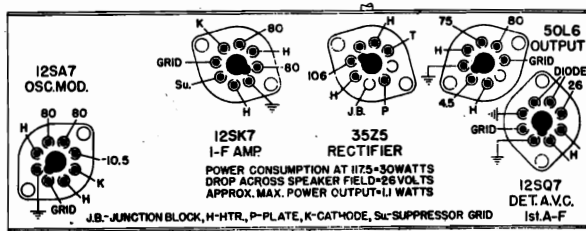
POWER SUPPLY—Make certain that the power rating on the model and license label is the SAME as your lighting circuit BEFORE plugging the receiver power cord into a convenient receptacle. Never put your hand in the receiver cabinet without first disconnecting receiver plug from the electric circuit.



ALIGNMENT PROCEDURE

Preliminary

Output Meter Connections Plate and screen of 50L6
Generator Ground Connections Ground Lead and Chassis
Dummy Antenna to be in series with generator output
Position of Volume Control Fully on

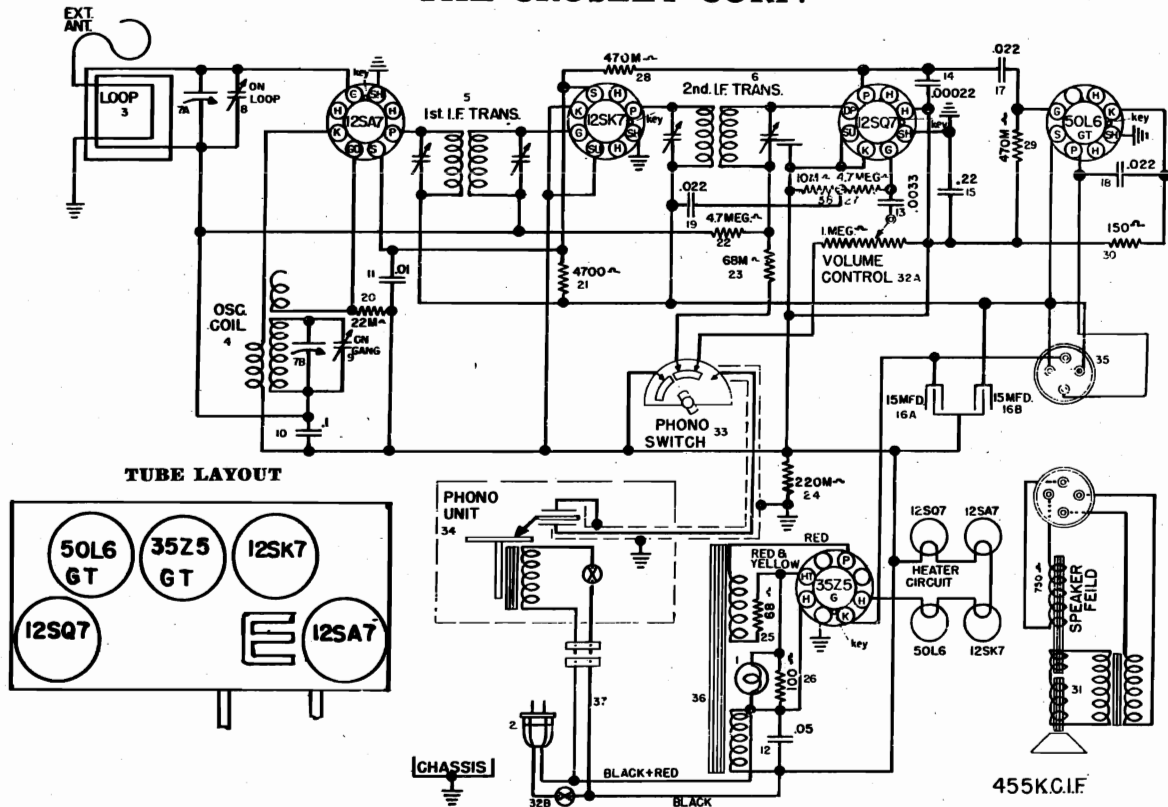


VOLTAGES MEASURED BETWEEN SOCKET PIN & GND. SIDE OF
VOL. CONT. WITH 250VOLT, 1000 OHMS. PER. VOLT METER
READINGS MAY VARY 10%

Alignment Sequence	Dummy Antenna	Frequency Setting	Input Connection to Receiver	Band Switch	Tuning Cond. Setting	Trimmer Adjusted	Remarks
1.	.0001 MF.	455 KC.	Antenna Lead	BC	Fully Open	1st I-F(2) 2nd I-F(2)	Adjust for maximum signal. Adjust for maximum signal.
2.	400 ohm Carbon Resistor	15.3 MC.	Antenna Lead (red)	S.W.	Fully Open	S.W. "Osc."	Adjust for maximum output.
3.	400 ohm Carbon	15.0 MC.	Antenna Lead (red)	S.W.	15 on Dial	S.W. "Ant."	Adjust for maximum signal while rocking gang through it.
4.	.0001 MF.	1650 KC.	Antenna Lead (red)	BC	Fully Open	B.C. "Osc."	Adjust for maximum output. Gang does not have to tune through signal
5.	.0001 MF.	1400 KC.	Antenna Lead (red)	BC	140 Dial	B.C. "Ant."	Adjust for maximum output.

When aligning the shortwave band "OSC" trimmer, care must be exercised to see that the circuit is aligned on the correct frequency and not on the image which is approximately 910 kilocycles less as indicated on the dial. To check, increase generator output, tune in the generator frequency and then tune in the image frequency which should be weaker than the fundamental and come in approximately 910 kilocycles lower on the dial than the fundamental. If image cannot be tuned in, the "OSC" trimmer is adjusted to the wrong peak. (Correct peak is the second peak on trimmer from the closed position.) Repeat original alignment procedure for more accurate adjustments. Keep signal generator output low as possible to prevent action of A.S.C. circuit.

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Connect output meter to plate and screen of 50L6. Connect generator ground to chassis through .001 mf. Volume control on full.

TUNING RANGE—Broadcast Band—1600 to 540 kilocycles, or 18.75 to 555 meters.

TUBES—1—12SA7, 1—12SK7, 1—12SQ7, 1—50L6GT, 1—35Z5GT. Tubes must be GT (Bantam) or metal equivalent.

ANTENNA—This model has a built-in loop antenna. Under normal conditions this loop antenna will provide sufficient pickup for satisfactory reception from nearby and powerful stations, whose operating frequency is between 1600 and 540 kilocycles. Due to the slightly directional effect of the loop antenna, reception from some stations may be improved by turning the receiver. For distant reception on the broadcast band, an outdoor antenna should be installed. Connect the antenna lead-in wire to the red lead extending from the rear of the cabinet.

GROUND—NEVER ATTACH A GROUND WIRE TO THIS RECEIVER.

POWER SUPPLY—Make certain that the power rating on the model and license label is the SAME as your lighting circuit BEFORE plugging the receiver power cord into a convenient receptacle. Never put your hand in the receiver cabinet without first disconnecting receiver plug from the electric circuit.

ALIGNMENT PROCEDURE CHART

Alignment Sequence	Dummy Antenna	Frequency Setting	Input Connection to Receiver	Phono. Radio Switch	Tuning Cond. Setting	Trimmer Adjusted	Remarks
1.	.0001 MF.	455 KC.	Antenna Lead	Radio	Fully Open	1st I-F(2) 2nd I-F(2)	Adjust for maximum signal. Adjust for maximum signal.
2.	.0001 MF.	1650 KC.	Antenna Lead (red)	Radio	Fully Open	B.C."Osc."	Adjust for maximum output. Gang does not have to tune through signal.
3.	.0001 MF.	1400 KC.	Antenna Lead (red)	Radio	140 Dial	B.C."Ant."	Adjust for maximum output.

Repeat the original alignment procedure for more accurate adjustments. Always keep signal generator output as low as possible to prevent action of the A. S. C. circuit.

Socket Voltage is measured @ 117.5 V line

TUBE VOLTAGE CHART

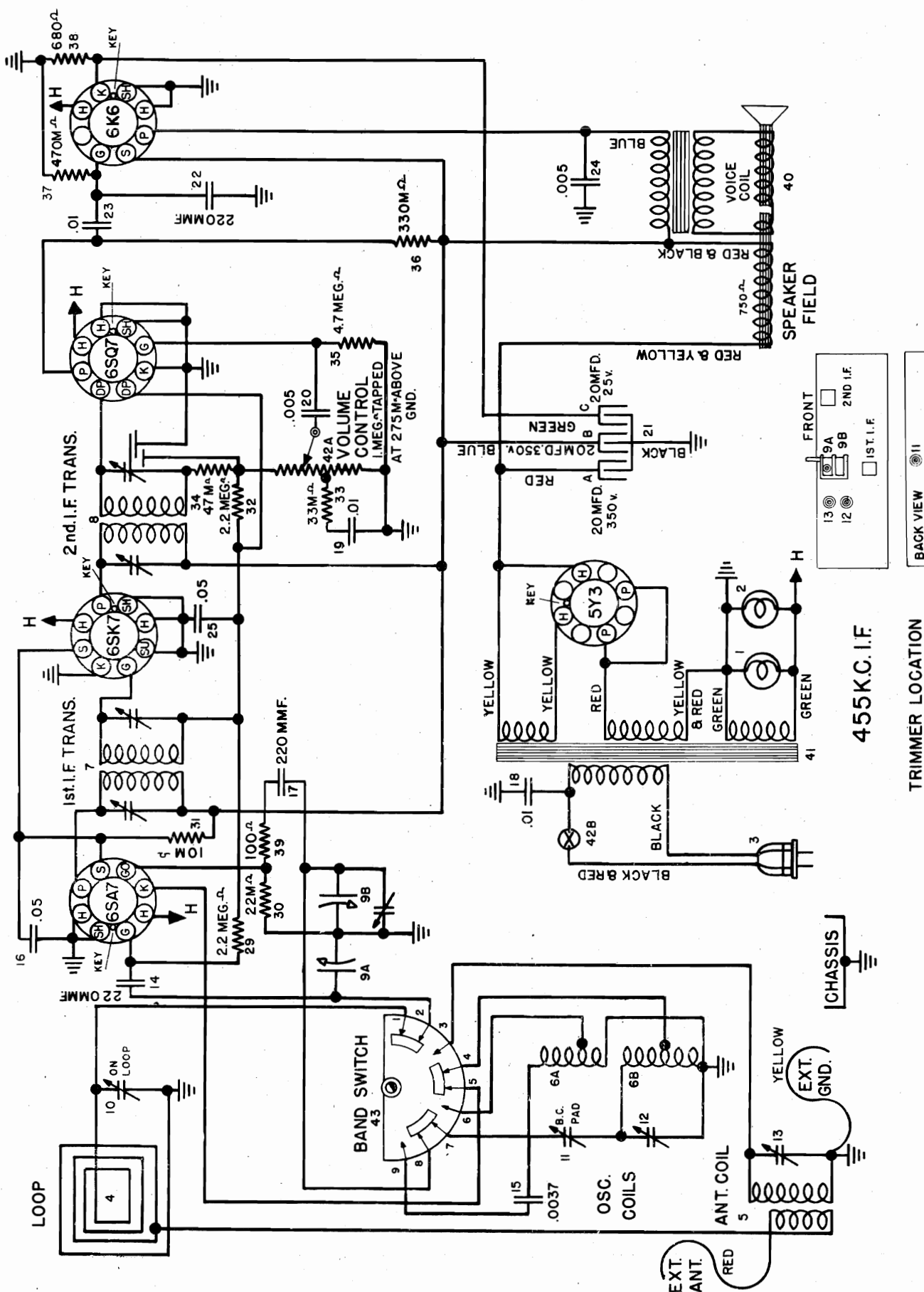
(BETWEEN SOCKET PINS AND B-) WITH 1000 OHM PER VOLT—500 V. RANGE D. C. VOLTMETER

TUBE	FUNCTION	PIN NUMBER							
		1	2	3	4	5	6	7	8
12SA7	Osc. Mod.	....	....	123	78	Neg.	0	....	Neg.
12SK7	I. F. Amp.	....	....	0	Neg.	0	78	....	123
12SQ7	Det., Etc.	....	0	0	0	Neg.	18.5*	....	0
50L6	B. P. O.	....	....	112	123	0	....	....	8.5
35Z5	Rect.	....	....	....	....	208AC	....	....	188

All voltages may vary 10% of values indicated. Neg. indicates Neg. reading on Voltmeter Scale but of too small a value to record accurately.

*Measured on 100 V. Scale. Power consumption at 117.5 V. line, 60 watts. Phono Motor 20 watts additional. Drop across Speaker Field—65 V Current thru Speaker Field—90 M. A.

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MODEL 53TF, Chassis 73

TUBE VOLTAGE CHART

SOCKET VOLTAGES MEASURED AT 117.5 V. LINE (BETWEEN SOCKET PIN AND CHASSIS) WITH 1000 OHM PER VOLT,
500 V. RANGE VOLTMETER (D. C.)

TUBE	FUNCTION	PIN NUMBER						
		1	2	3	4	5	6	7
6SA7—OSC.—Mod.....		0	0	180	73		0	6.3 A. C.
6SK7—I. F. Amplifier.....		0	0	0	0	0	73	6.3 A. C.
6SQ7—Det. A. S. C. 1st A. F.....		0	0	0	0	0	68	6.3 A. C.
6K6G or GT—Output.....		0	0	160	180	0	180	6.3 A. C.
5Y3G—Rectifier.....		0	225		270 A.C.		270 A. C.	225

MAX. POWER OUTPUT.....3.0 WATTS.

POWER CONSUMPTION.....55 WATTS.

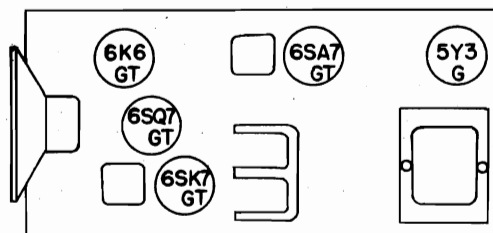
DROP ACROSS SPEAKER FIELD.....45 VOLTS.

Voltages may vary 10% of values given.

This is a five-tube, two-band superheterodyne receiver, designed for operation on Alternating Current (A. C.) power supply as specified on the Model and License Label.

TUBES	FUNCTION
1—6SA7	Oscillator-Modulator
1—6SK7	Intermediate Frequency Amplifier
1—6SQ7	Detector, A. S. C., 1st Audio Amplifier
1—6K6 G or GT	Pentode Output
1—5Y3G	Rectifier.

TUBE LAYOUT



TUNING RANGE

Broadcast Band—550 Kc. to 1600 Kc.

Short Wave Band—5.2 Mc. to 18.0 Mc.

ALIGNMENT PROCEDURE

Output Meter Connections.....	Plate and Screen of 6K6G
Generator Ground Connection.....	To Chassis or Ground Lead
Dummy Antenna to be in series with generator output.....	See Chart Below
Position of Volume Control.....	Fully On

ALIGNMENT PROCEDURE CHART

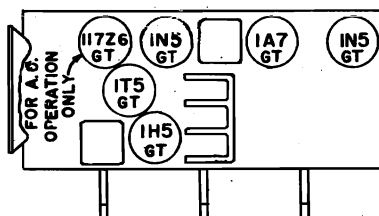
Align- ment Sequence	Dummy Antenna	Frequency Setting	Input Connection to Receiver	Band Switch	Tuning Cond. Setting	Trimmer Adjusted	Remarks
1.	.02 MF.	455 Kc.	Stator lug Rear section of Gang Cond.	B. C.	Fully open	2nd I-F (2) 1st I-F (2)	Adjust for Maximum. Adjust for Maximum.
2.	400 ohm (carbon)	18.3 Mc.	Ant. Terminal	S. W.	Fully open	S. W. "OSC"	Adjust for peak. Gang does not have to tune thru signal.
3.	400 ohm (carbon)	18.0 Mc.	Ant. Terminal	S. W.	Approx. 18	S. W. "ANT" Trimmer	Adjust for maximum output while rocking gang thru signal. do not touch B. C. Osc. Trimmer.
4.	.0002 MF.	1650 Kc.	Ant. Terminal	B. C.	Fully open	B. C. "OSC" Trimmer	Adjust for peak; gang does not have to tune thru signal. Loop must be connected.
5.	.0002 MF.	600 Kc.	Ant. Terminal	B. C.	Approx. 60 on dial	B. C. "OSC" Series Trimmer	Adjust for maximum output while rocking gang thru signal.
6.	.0002 MF.	1400 Kc.	Ant. Terminal	B. C.	Approx. 140 on dial	B. C. LOOP "ANT" Trimmer	Adjust for maximum output do not touch B. C. Osc. Trimmer.
7.	Repeat the above alignment procedure for more accurate adjustments. Always keep signal generator output as low as possible to prevent action of the A. S. C. circuit.						

IMPORTANT ALIGNMENT NOTES — When aligning the shortwave band "OSC" trimmer care must be exercised to see that the circuit is aligned on the correct frequency and not on the image which is approximately 910 kilocycles less as indicated on the Receiver dial. To check, increase generator output tune-in the generator frequency and then tune-in the image frequency which should be weaker than the fundamental and come in approximately 910 kilocycles lower on the Receiver dial than the fundamental. If image cannot be tuned-in, the "OSC" trimmer is adjusted to the wrong peak. (Correct peak is the second peak on trimmer from the closed position.)

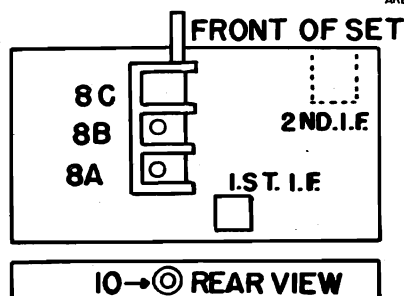
MODELS 62FA, 62FB,
Chassis 58

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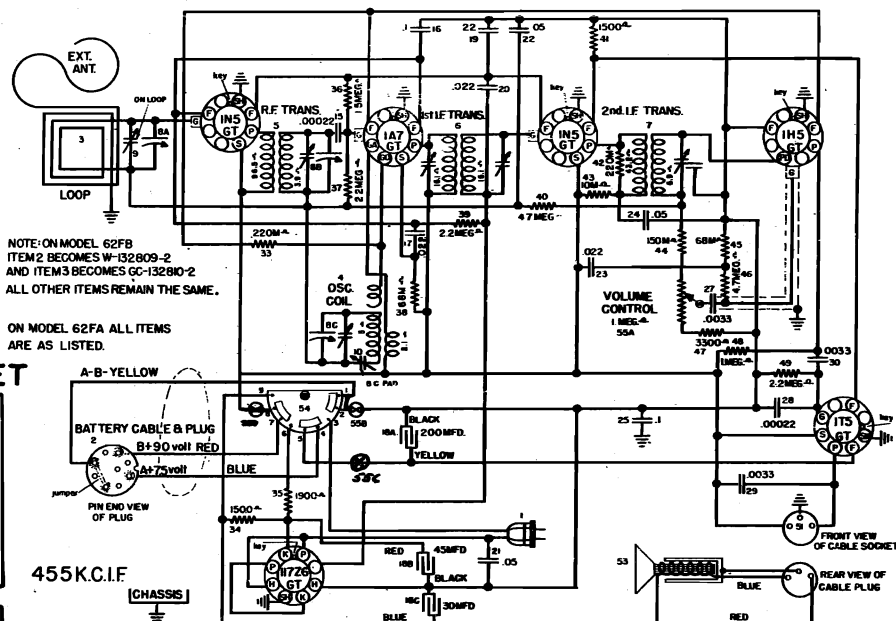
TUBE LAYOUT



TRIMMER LOCATIONS



WIRING DIAGRAM



SOCKETS VOLTAGES — Chassis No. 58

Measured from "B" minus using 1000 Ω/V

Voltmeter, 100 V. Range, no signal input

Tube		@ 117.5-Volt Line				Battery Pack			
Type	Function	Filament Volt	Plate Volt	Screen Volt	Filament Volt	Filament Volt	Plate Volt	Screen Volt	Filament Volt
1N5GT	R. F. Amplifier	2.8	90	90	4.0	2.8	90	90	4.0
1A7GT	Osc. Modulator	1.4	90	36	2.7	1.4	90	90	2.8
1N5GT	I. F. Amplifier	4.0	76	90	5.3	4.0	76	76	5.4
1H5GT	Det.-A. S. C. 1st A. F.	0	12	.....	1.3	0	12	.....	1.4
1T5GT	Out Put	5.4	83	90	6.7	5.4	83	90	7.5
117Z6GT	Rectifier	117.5 A. C.	117.5 A. C.	.....	97	.....	.....	.....	.....

ALIGNMENT PROCEDURE

Volume Control on full Output meter connected to Plate and Screen of 1T5GT

SIGNAL GENERATOR		DUMMY ANTENNA	TUNING COND. SETTING	TRIMMERS TO ADJUST (See Fig. 1)	REMARKS
FREQUENCY SETTING	CONNECTION TO RADIO				
455 Kc	Ant. Lead	.0001 MF	Fully open	2nd 1-F (1)	Adjust for maximum signal.
455 Kc	Ant. Lead	.0001 MF	Fully open	1st 1-F (2)	Adjust for maximum signal. Located top of 1st 1-F ass'y.
1650	Ant. Lead	.0001 MF	Fully open	"OSC" Shunt on gang	Adjust for maximum output. Gang does not have to tune through signal.
1400	Ant. Lead	.0001 MF	140 on dial	"ANT" shunt on gang	Adjust for maximum output.
1400	Ant. Lead	.0001 MF	140 on dial	"RF" shunt on gang	Adjust for maximum output.
600	Ant. Lead	.0001 MF	60 on dial	"OSC." Series Pad	Adjust for maximum output while rocking gang.

Repeat above for more accurate adjustments
Maximum power output @ 90 V. "B" — approx. 340 M. W.

A Battery drain @ 7.5 volts, .05 Amp.; "B" Battery drain @ 90 V., 12.5 M. A.
Power consumption @ 117.5 volts line — 22 Watts

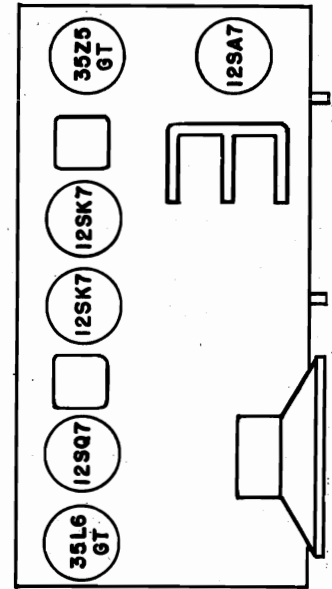
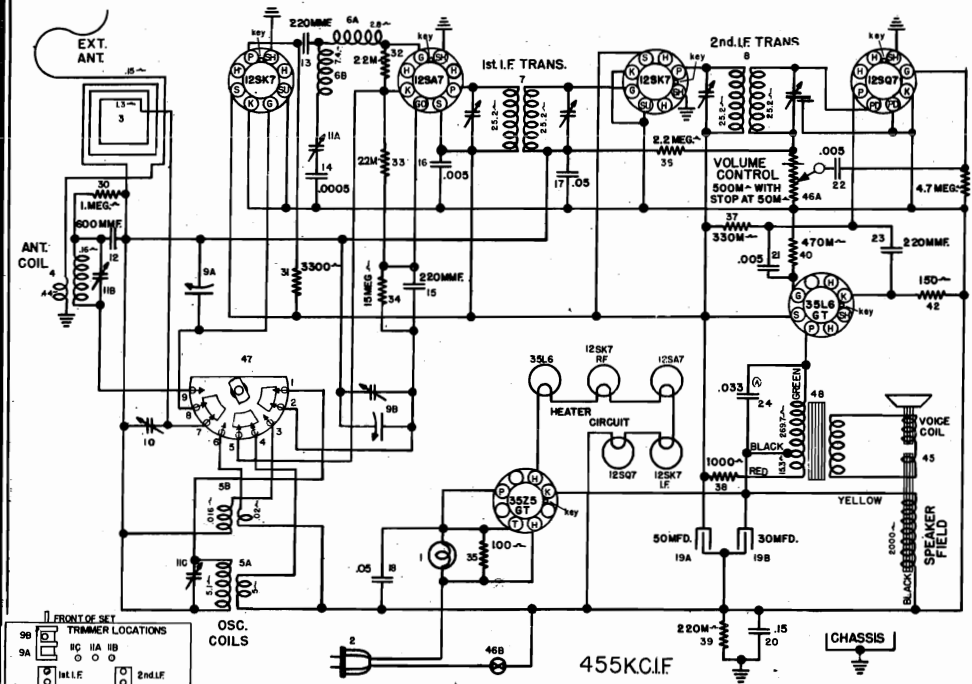
The chassis as employed in this model receiver is a six tube (including rectifier), single band superheterodyne, designed to operate from an "A and B" Battery Pack, or 110 volts A.C. (50-60 cycle) or 110 volt D.C. electric circuits.

TUNING RANGE — 550-1600 Kilocycles — 546-187.5 Meters

TUBES USED — one 1A7GT, two—1N5GT, one—1H5GT, one—1T5GT and one—117Z6GT*

BATTERIES REQUIRED — one No. CR-58 Crosley "A and B" Battery Pack (7.5 Volt "A"—90 Volt "B").

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TUBE LOCATION

ALIGNMENT PROCEDURE

Preliminary
Output Meter Connections.....To Voice Coil Terminals of Speaker or to Plate of 35L6GT and Cathode of 35Z5GT
Generator Ground Connections.....In Series with .001 MFD. Condenser
Dummy Antenna.....400 Ohm Carbon Resistor in Series with Generator Output
Position of Volume Control.....Fully On

ALIGNMENT CHART

Step	Signal Generator Frequency Setting	Input	Band Switch	Tuning Cond. Setting	Trimmer Adjusted	Remarks	Location
1	456 Kc.	Antenna	S. B.	Fully open	2nd I-F (2)	Adjust for maximum output.	Tops of I. F. Trans.
1-A	456	Antenna	S. B.	Fully open	1st I-F (2)	Adjust for minimum output.	Center Section of 3 Sec. Trimmer.
2	15.3 Mc.	Antenna	S. W.	Fully open	S. W. "OSC"	Adjust for maximum output.	Top of Tuning Condenser
3	15.0 Mc.	Antenna	S. W.	Approx. 15 on dial	S. W. "Ant."	Adjust for maximum output while rocking gang thru signal.	L. H. Section of 3 Sec. Trimmer.
4	1650 Kc.	Antenna	S. B.	Fully open	B. C. "OSC" (front trimmer right end of chassis)	Adjust for maximum output. Gang does not have to tune thru signal.	R. H. Section of 3 Sec. Trimmer.
5	1400 Kc.	Antenna	S. B.	Approx. 1400 on dial	B. C. "ANT"	Adjust for maximum output.	On Cabinet Back.

When aligning the short wave band "OSC" trimmer care must be exercised to see that the circuits are aligned on the correct frequency and not on the image which is approximately 910 kilocycles less as indicated on the dial. To check, increase generator output, tune-in the generator frequency and then tune-in the image frequency which should be weaker than the fundamental and come in approximately 910 kilocycles lower on the dial than the fundamental. If image cannot be tuned in, the "OSC" trimmer is adjusted to the wrong peak. (Correct peak is the second peak on trimmer from the closed position). Repeat original alignment procedure for more accurate adjustments. Always keep signal generator output low as possible to prevent action of A.S.C. circuit.

Socket Voltage is measured @ 117.5 V line

TUBE VOLTAGE CHART

(BETWEEN SOCKET PINS AND B-) WITH 1000 OHM PER VOLT—500 V. RANGE D. C. VOLTMETER

TUBE	FUNCTION	1	2	3	4	5	6	7	8
12SK7	R. F. Amp.	.....	.....	0	Neg.	0	76	.....	40
12SA7	Osc. Mod.	.....	.....	76	76	Neg.	0	.....	Neg.
12SK7	I. F. Amp.	.....	.....	0	Neg.	0	76	.....	76
12SQ7	Det., Etc.	.....	0	0	0	Neg.	16*	.....	0
35L6	B. P. O.	.....	.....	92	76	0	.....	.....	4
35Z5	Rect.	.....	.....	.....	.....	113AC	.....	.....	100

All voltages may vary 10% of values indicated. Neg. indicates Neg. reading on Voltmeter Scale but of too small a value to record accurately.

*Measured on 100 V. Scale. Power consumption at 117.5 V. line, 30 watts. Drop across Speaker Field—100 V. Current thru Speaker Field—32 M.A

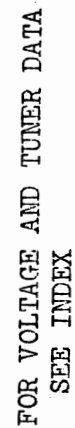
This model Crosley is a six-tube, two-band superheterodyne receiver, designed for operation on 105-130-volt electric circuits, either D. C. or 50-60 cycles A. C.

TUNING RANGE—Standard Broadcast Band—1600 to 540 Kilocycles or 187.5 to 555 meters.

Short Wave Band—5.8 to 15.0 Megacycles or 62.5 to 20 meters.

TUBES—1—12SK7, 1—12SA7, 1—12SK7, 1—12SQ7, 1—35L6, 1—35Z5. Tubes may be GT (Bantam) or metal equivalents.

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MODELS TA62, TA62W
Chassis 63

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ALIGNMENT PROCEDURE**Preliminary**

Output Meter Connections.....Plate and Screen 25L6GT
 Generator Ground Connections.....See foot note (1)
 Dummy Antenna in series with Generator output.....See Chart below
 Position of Volume Control.....Fully on
 Depress Manual Push-Button

Signal Generator							Remarks
Sequence	Dummy Antenna	Frequency Setting	Input Connection for Radio	Band Switch	Tuning Cond. Setting	Trimmer Adjusted	
1	.05 Mf.	456 Kc.	Antenna	S. B.	Fully open	2nd I-F (2) 1st I-F (2)	Adjust for maximum output. Adjust for maximum output.
2	400 ohm carbon	15.4 Mc.	Antenna	S. W.	Fully open	S. W. "OSC" (rear section of tuning condenser)	Adjust for maximum output.
3	400 ohm carbon	15.0 Mc.	Antenna	S. W.	Approx. 15 on dial	S. W. "Ant." (center trimmer right end of chassis)	Adjust for maximum output while rocking gang thru signal.
4	.0002 Mf.	1600 Kc.	Antenna	S. B.	Fully open	B. C. "OSC" (front trimmer right end of chassis)	Adjust for maximum output. Gang does not have to tune thru signal.
5	.002 Mf.	1400 Kc.	Antenna	S. B.	Approx. 1400 on dial	B. C. "ANT" (rear trimmer right end of chassis)	Adjust for maximum output.

(1) Do not use a ground return from the signal generator unless it is found to be absolutely necessary.

If necessary a small condenser (approx. a .001 mf.—400 Volt) should be connected in series with the ground lead of the generator and receiver chassis.

IMPORTANT ALIGNMENT NOTES

When aligning the shortwave band "OSC" trimmer care must be exercised to see that the circuits are aligned on the correct frequency and not on the image which is approximately 910 kilocycles less as indicated on the dial. To check, increase generator output, tune-in the generator frequency and then tune-in the image frequency which should be weaker than the fundamental and come in approximately 910 kilocycles lower on the dial than the fundamental. If image cannot be tuned in, the "OSC" trimmer is adjusted to the wrong peak. (Correct peak is the second peak on trimmer from the closed position).

Repeat the original alignment procedure for more accurate adjustments. Always keep signal generator output as low as possible to prevent action of the A.V.C. circuit.

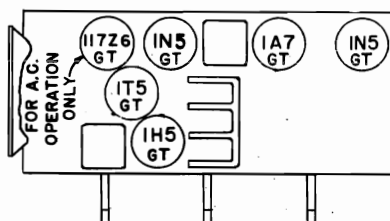
WAVE TRAP W MODELS

The Wave Trap should not be adjusted until all other adjustments have been made. To make the adjustment feed a 455 kilocycle signal from the signal terminal of the receiver. With the gang condenser open and the volume control fully on, adjust the trimmer condenser on the wave trap for MINIMUM output.

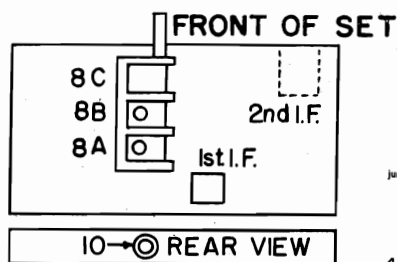
Should the interfering station be operating on a frequency of slightly more or less than 455 kilocycles the exact frequency should be determined with the aid of the signal generator. Then instead of feeding a 455 kilocycle signal into the receiver the exact frequency of the interfering signal should be used. If it is not possible to determine the exact frequency of the interfering signal the antenna may be attached to the receiver and the receiver tuned to the position where the interfering signal is more noticeable. Then adjust the wave trap for minimum interference.

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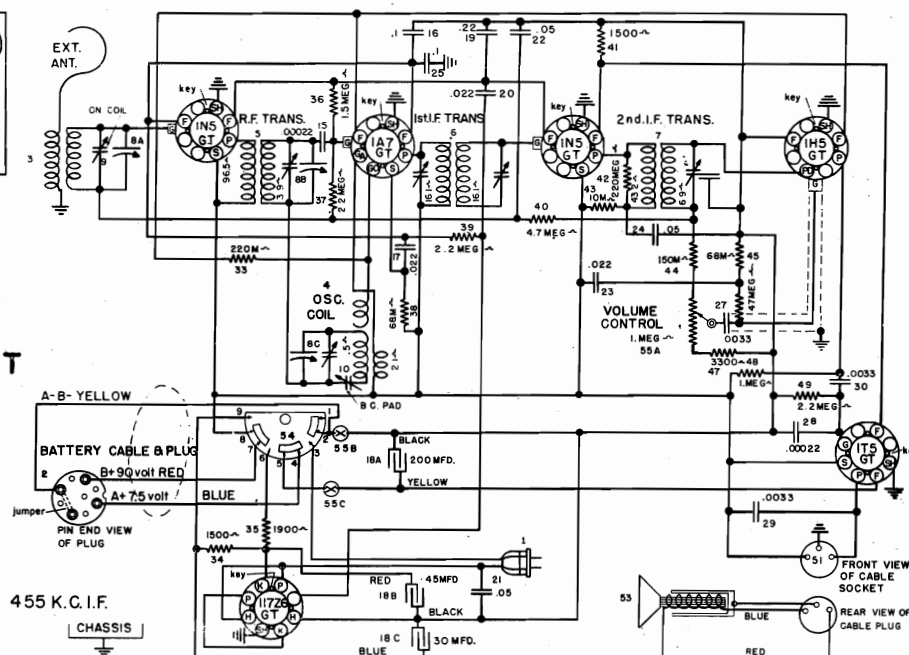
TUBE LAYOUT



TRIMMER LOCATIONS



WIRING DIAGRAM



TUNING RANGE

— 550-1600 Kilocycles — 546-187.5 Meters

TUBES USED

— one 1A7GT, two—IN5GT, one—IH5GT, one—IT5GT and one—117Z6GT*

BATTERIES REQUIRED

— one No. CR-58 Crosley "A and B" Battery Pack (7.5 Volt "A"—90 Volt "B").

*Note: The 117Z6GT rectifier tube is not required for battery operation and is therefore not supplied as original equipment with your receiver. If 110 volt current is made available in your home the above tube should be purchased from your Crosley dealer.

SOCKETS VOLTAGES — Chassis No. 93

Measured from "B" minus using 1000 Ω /V

Voltmeter, 100 V. Range, no signal input

Tube		@ 117.5-Volt Line				Battery Pack			
Type	Function	Filament Volt	Plate Volt	Screen Volt	Filament Volt	Filament Volt	Plate Volt	Screen Volt	Filament Volt
1N5GT	R. F. Amplifier	2.8	90	90	4.0	2.8	90	90	4.0
1A7GT	Osc. Modulator	1.4	90	36	2.7	1.4	90	90	2.8
1N5GT	I. F. Amplifier	4.0	76	90	5.3	4.0	76	76	5.4
1H5GT	Det.-A. S. C. 1st A. F.	0	12	.....	1.3	0	12	.....	1.4
1T5GT	Out Put	5.4	83	90	6.7	5.4	83	90	7.5
117Z6GT	Rectifier	117.5 A. C.	117.5 A. C.	.....	97	.....	.....	.....	.....

ALIGNMENT PROCEDURE

Volume Control on full Output meter connected to Plate and Screen of 1T5GT

SIGNAL GENERATOR

FREQUENCY SETTING	CONNECTION TO RADIO	DUMMY ANTENNA	TUNING COND. SETTING	TRIMMERS TO ADJUST (See Fig. 1)	REMARKS
455 Kc	Ant. Lead	.0001 MF	Fully open	2nd 1-F (1)	Adjust for maximum signal.
455 Kc	Ant. Lead	.0001 MF	Fully open	1st 1-F (2)	Adjust for maximum signal. Located top of 1st 1-F ass'y.
1650	Ant. Lead	.0001 MF	Fully open	"OSC" Shunt on gang	Adjust for maximum output. Gang does not have to tune through signal.
1400	Ant. Lead	.0001 MF	140 on dial	"ANT" shunt on gang	Adjust for maximum output.
1400	Ant. Lead	.0001 MF	140 on dial	"RF" shunt on gang	Adjust for maximum output.
600	Ant. Lead	.0001 MF	60 on dial	"OSC." Series Pad	Adjust for maximum output while rocking gang.

Repeat above for more accurate adjustments
Maximum power output @ 90 V. "B" — approx. 340 M. W.

A Battery drain @ 7.5 volts, .05 Amp.; "B" Battery drain @ 90 V., 12.5 M. A.;
Power consumption @ 117.5 volts line — 22 Watts

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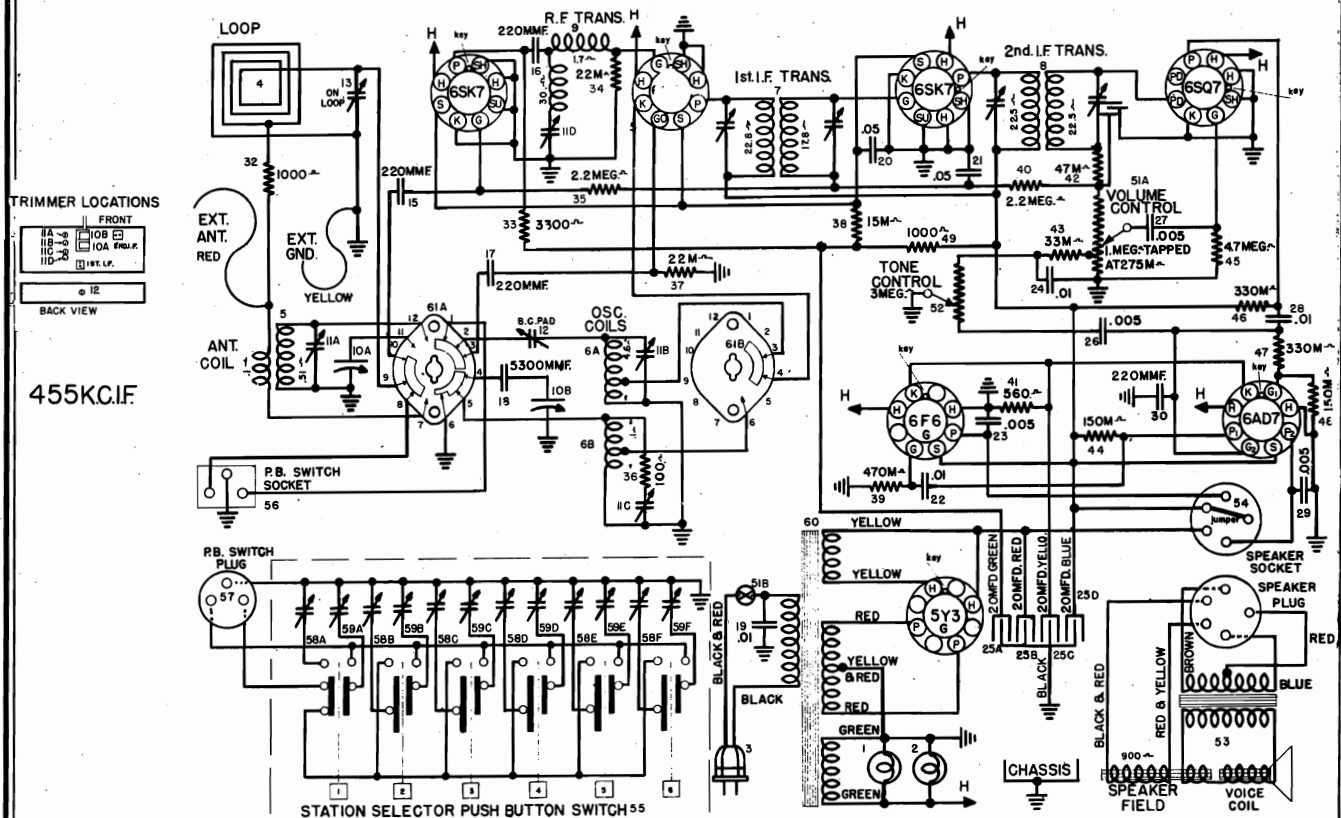
ALIGNMENT PROCEDURE

Output Meter Connections.....Plate of 6AD7 to Plate of 6F6
 Generator Ground Connection.....To Chassis or Ground Lead
 Dummy Antenna to be in series with generator output.....See Chart Below
 Position of Volume Control.....Fully On
 Position of Tone Control.....Treble or Speech

ALIGNMENT PROCEDURE CHART

Signal Generator							
Align- ment Sequence	Dummy Antenna	Frequency Setting	Input Connection to Receiver	Band Switch	Tuning Cond. Setting	Trimmer Adjusted	Remarks
1.	.02 MF.	455 Kc.	Stator lug Rear section of Gang Cond.	B. C.	Fully open	2nd I-F (2) 1st I-F (2)	Adjust for Maximum. Adjust for Maximum.
2.	.02 MF.	455 Kc.	Stator lug Rear section of Gang Cond.	B. C.	Fully Open	Adj. Wave Trap Trimmer.	Adjust for Minimum.
3.	.0002 MF.	1650 Kc.	Ant. Terminal	B. C.	Fully open	B. C. "OSC" Trimmer	Adjust for peak; gang does not have to tune thru signal. Loop must be connected.
4.	.0002 MF.	600 Kc.	Ant. Terminal	B. C.	Approx. 60 on dial	B. C. "OSC" Series Trimmer	Adjust for maximum output while rock- ing gang thru signal.
5.	Repeat Step No. 3 to check possible shift due to series adjustment.						
6.	.0002 MF.	1400 Kc.	Ant. Terminal	B. C.	Approx. 140 on dial	B.C. LOOP "ANT" Trimmer	Adjust for maximum output do not touch B. C. Osc. Trimmer.
7.	400 ohm (carbon)	18.3 Mc.	Ant. Terminal	S. W.	Fully open	S. W. "OSC"	Adjust for peak. Gang does not have to tune thru signal.
8.	400 ohm (carbon)	18.0 Mc.	Ant. Terminal	S. W.	Approx. 18	S. W. "ANT" Trimmer	Adjust for maximum output while rocking gang thru signal. do not touch B. C. Osc. Trimmer.
9.	Repeat the above alignment procedure for more accurate adjustments. Always keep signal generator output as low as possible to prevent action of the A. S. C. circuit.						

IMPORTANT ALIGNMENT NOTES—When aligning the shortwave band "OSC" trimmer care must be exercised to see that the circuit is aligned on the correct frequency and not on the image which is approximately 910 kilocycles less as indicated on the Receiver dial. To check, increase generator output, tune-in the generator frequency and then tune-in the image frequency which should be weaker than the fundamental and come in approximately 910 kilocycles lower on the Receiver dial than the fundamental. If image cannot be tuned-in, the "OSC" trimmer is adjusted to the wrong peak. (Correct peak is the second peak on trimmer from the closed position.)

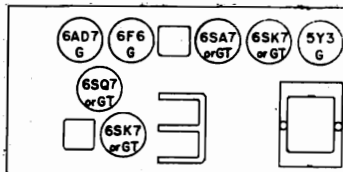


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SOCKET VOLTAGES MEASURED AT 117.5 V. LINE (BETWEEN SOCKET PIN AND CHASSIS) WITH 1000 OHM PER VOLT, 500 V. RANGE VOLTMETER (D. C.)

TUBE	FUNCTION	PIN NUMBER						
		1	2	3	4	5	6	7
6SK7—R. F. Amplifier		0	0	0	0	0	80	6.3 A. C.
6SA7—OSC.—Mod.		0	0	260	80	0	0	6.3 A. C.
6SK7—I. F. Amplifier		0	0	0	0	0	80	6.3 A. C.
6SQ7—Det. A. S. C. 1st A. F.		0	0	0	0	0	85	6.3 A. C.
6AD7—Phase Inverter		0	0	255	260	0	180	6.3 A. C.
6F6—Output		0	0	255	260	0	235	6.3 A. C.
5Y3G—Rectifier		N. C.	330	J. B.	300A.C.	J. B.	300 A. C.	J. B.

MAX. POWER OUTPUT.....6.5 WATTS
 POWER CONSUMPTION.....85 WATTS
 DROP ACROSS SPEAKER FIELD.....70 VOLTS
 J. B.—Junction Block. N. C.—No Connection



SETTING THE PUSH BUTTONS

The six station selector push buttons are set up by means of two adjusting screws per button. These adjusting screws are made accessible by removing the push button escutcheon.

Select the call letter tabs of your six favorite broadcast stations from the station call letter sheets supplied. Place the call letter tabs in the window above that push button which is to be adjusted for that station. It is not essential that all push buttons be set at one time.

Note: When placing call tabs in the window be sure to arrange them according to their frequency (kilocycles) that is: the station whose frequency is well within the range covered by the No. 1 button, should be placed above that button and so on with the rest of the buttons to be set. After tabs are in place break off the celluloid covers from the strip furnished and snap in place over the call letters to protect and hold them in place.

The frequencies of your favorite stations may be found in your local paper or by consulting a station listing sheet.

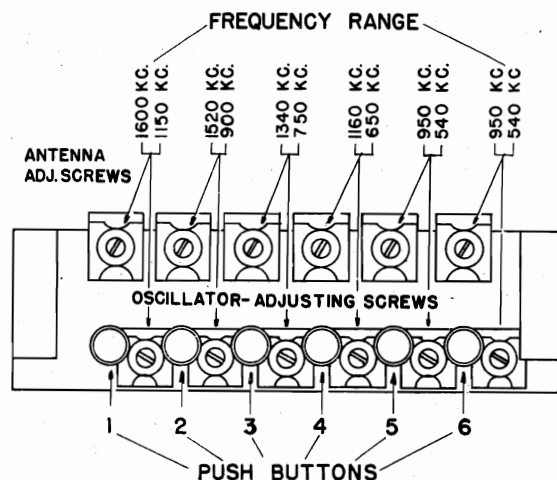


Fig. 1

TUNING THE RECEIVER-MANUAL OPERATION

Turn the band change switch knob to the desired frequency band. Turn the volume control knob approximately half way in a clockwise direction. Rotate the station selector knob (right hand knob) slowly until a station is heard. Increase or decrease the volume as desired by readjusting the volume control knob. For best quality of reception always adjust the station selector to the middle of the range on the dial within which the program is being received. It should be remembered in tuning in stations on the Shortwave band that tuning is much sharper and greater care must be exercised when adjusting the station selector.

SET-UP PROCEDURE

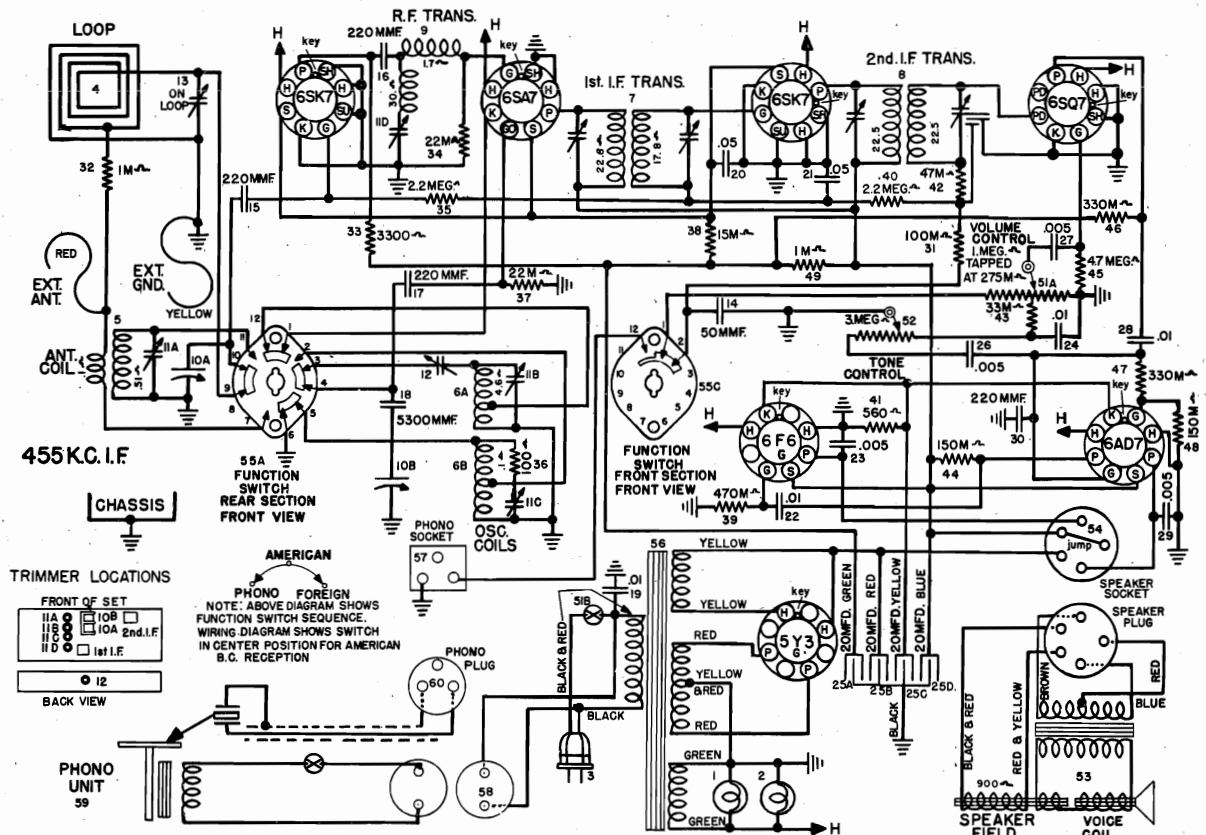
Remove station selector push button escutcheon. Turn the receiver on and let it operate for a sufficient length of time to permit the tubes to reach their normal operating conditions.

It is essential that the frequency (kilocycles) of the station selected be within the range of the push button to be set for that station. See Fig. 1.

1. Turn the band change switch to the "American" position. Using the station selector knob, carefully tune in the station to which the No. 1 push button is to be set. Note program.
2. Turn the band change switch to the "Automatic" position and using a small screw driver, carefully turn in a clockwise direction the Oscillator adjusting screw until the station previously tuned in manually is heard again. Adjust for maximum output in the speaker.
3. Adjust the Antenna adjusting screw for maximum volume in the speaker.
4. Turn band change switch from "Automatic" to "American" and back again to check if adjustment has been correctly made. There should be no change in tone quality when switched from one to the other.
5. Repeat above procedure for the remaining push buttons.

To tune the receiver with the push buttons, set the band change switch on "Automatic" and depress completely the button corresponding to the station you wish to hear.

THE CROSLEY CORP.



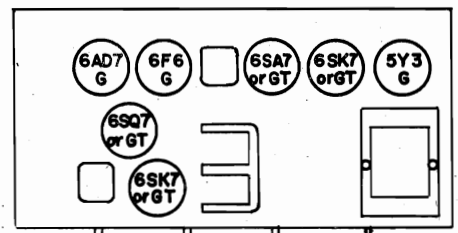
WIRING DIAGRAM

TUNING RANGES

American Broadcast Band—540 to 1600 KC (555 to 187 Meters)
Shortwave (Foreign)—4.7 to 18.0 MC (63.8 to 16.6 Meters)

TUBES

2—6SK7, 1—6SA7, 1—6SQ7, 1—6AD7, 1—6F6, 1—5Y3G.



TUBE VOLTAGE CHART

SOCKET VOLTAGES MEASURED AT 117.5 V. LINE (BETWEEN SOCKET PIN AND CHASSIS) WITH 1000 OHM PER VOLT, 500 V. RANGE VOLTMETER (D. C.)

TUBE	FUNCTION	PIN NUMBER							
		1	2	3	4	5	6	7	8
6SK7	R. F. Amplifier	0	0	0	0	0	80	6.3 A. C.	235
6SA7	OSC.—Mod.	0	0	260	80	0	0	6.3 A. C.	0
6SK7	I. F. Amplifier	0	0	0	0	0	80	6.3 A. C.	260
6SQ7	Det. A. S. C. 1st A. F.	0	0	0	0	0	85	6.3 A. C.	0
6AD7	Phase Inverter and Output	0	0	255	260	0	180	6.3 A. C.	23
6F6	Output	0	0	255	260	0	235	6.3 A. C.	23
5Y3G	Rectifier	N. C.	330	J. B.	300A.C.	J. B.	300A.C.	J. B.	330

MAX. POWER OUTPUT.....6.5 WATTS
POWER CONSUMPTION.....85 WATTS
DROP ACROSS SPEAKER FIELD.....70 VOLTS
J. B.—Junction Block. N. C.—No Connection

Voltages may vary 10% of values given.

MODELS TA62, TA62W

MODEL 72CP, Chassis 85

THE CROSLEY CORP.

MODEL 72CP

ALIGNMENT PROCEDURE

Output Meter Connections.....Plate of 6AD7 to Plate of 6F6
 Generator Ground Connection.....To Chassis or Ground Lead
 Dummy Antenna to be in series with generator output.....See Chart Below
 Position of Volume Control.....Fully On
 Position of Tone Control.....Treble or Speech

ALIGNMENT PROCEDURE CHART

Signal Generator							
Align- ment Sequence	Dummy Antenna	Frequency Setting	Input Connection to Receiver	Band Switch	Tuning Cond. Setting	Trimmer Adjusted	Remarks
1.	.02 MF.	455 Kc.	Stator lug Rear section of Gang Cond.	B. C.	Fully open	2nd I-F (2) 1st I-F (2)	Adjust for Maximum. Adjust for Maximum.
2.	.02 MF.	455 Kc.	Stator lug Rear section of Gang Cond.	B. C.	Fully Open	Adj. Wave Trap Trimmer.	Adjust for Minimum.
3.	.0002 MF.	1650 Kc.	Ant. Terminal	B. C.	Fully open	B. C. "OSC" Trimmer	Adjust for peak; gang does not have to tune thru signal. Loop must be connected.
4.	.0002 MF.	600 Kc.	Ant. Terminal	B. C.	Approx. 60 on dial	B. C. "OSC" Series Trimmer	Adjust for maximum output while rock- ing gang thru signal.
5.	Repeat Step No. 3 to check possible shift due to series adjustment.						
6.	.0002 MF.	1400 Kc.	Ant. Terminal	B. C.	Approx. 140 on dial	B. C. LOOP "ANT" Trimmer	Adjust for maximum output do not touch B. C. Osc. Trimmer.
7.	400 ohm (carbon)	18.3 Mc.	Ant. Terminal	S. W.	Fully open	S. W. "OSC"	Adjust for peak. Gang does not have to tune thru signal.
8.	400 ohm (carbon)	18.0 Mc.	Ant. Terminal	S. W.	Approx. 18	S. W. "ANT" Trimmer	Adjust for maximum output while rocking gang thru signal. do not touch B. C. Osc. Trimmer.
9.	Repeat the above alignment procedure for more accurate adjustments. Always keep signal generator output as low as possible to prevent action of the A. S. C. circuit.						

IMPORTANT ALIGNMENT NOTES—When aligning the shortwave band "OSC" trimmer care must be exercised to see that the circuit is aligned on the correct frequency and not on the image which is approximately 910 kilocycles less as indicated on the Receiver dial. To check, increase generator output, tune-in the generator frequency and then tune-in the image frequency which should be weaker than the fundamental and come in approximately 910 kilocycles lower on the Receiver dial than the fundamental. If image cannot be tuned-in, the "OSC" trimmer is adjusted to the wrong peak. (Correct peak is the second peak on trimmer from the closed position.)

MODELS TA62, TA62W

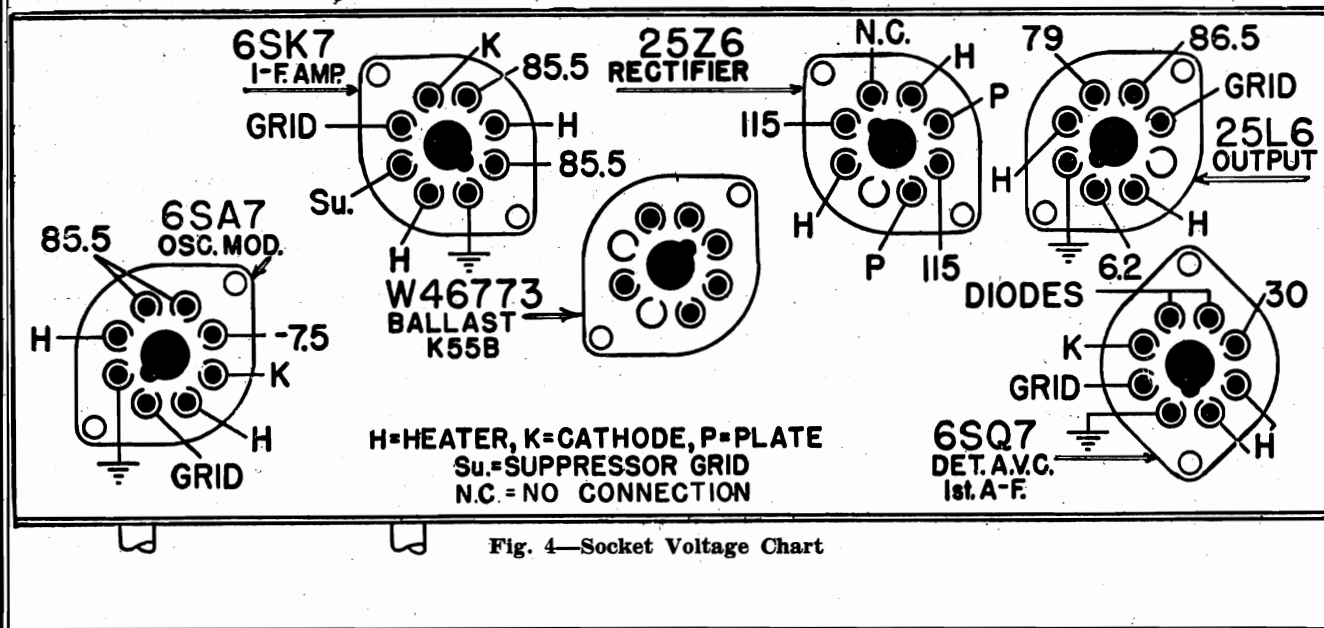
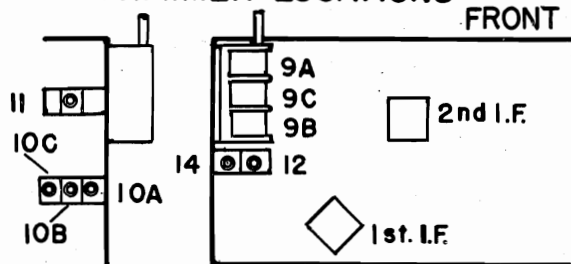


Fig. 4—Socket Voltage Chart



Compliments of www.nucow.com

MODELS 82CP, 82CQ
Chassis 75

THE CROSLEY CORP.

ALIGNMENT PROCEDURE

Preliminary

Output Meter Connections.....Plate to Plate of 6K6GT's
Generator Ground Connection.....To Chassis or Ground Lead
Dummy Antenna to be in series with generator output.....See Chart Below
Position of Volume Control.....Fully On
Position of Treble Control.....Treble or Speech

ALIGNMENT PROCEDURE CHART

Signal Generator							
Align- ment Sequence	Dummy Antenna	Frequency Setting	Input Connection to Receiver	Band Switch	Tuning Cond. Setting	Trimmer Adjusted	Remarks
1.	.02 MF.	455 Kc.	Stator lug Rear section of Gang Cond.	B. C.	Fully open	2nd I-F (2) 1st I-F (2)	Adjust for Maximum. Adjust for Maximum.
2.	.0002 MF.	1650 Kc.	Ant. Terminal	B. C.	Fully open	B. C. "OSC" Trimmer	Adjust for peak; gang does not have to tune thru signal. Loop must be connected.
3.	.0002 MF.	600 Kc.	Ant. Terminal	B. C.	Approx. 60 on dial	B. C. "OSC" Series Trimmer	Adjust for maximum output while rocking gang thru signal.
4.	Repeat Step No. 2 to check possible shift due to series adjustment.						
5.	.0002 MF.	1400 Kc.	Ant. Terminal	B. C.	Approx. 140 on dial	B. C. "ANT" Trimmer B. C. "R-F" Trimmer	Adjust for maximum output do not touch B. C. Osc. Trimmer. Adjust for maximum output.
6.	400 ohm (carbon)	18.3 Mc.	Ant. Terminal	S. W.	Fully open	S. W. "OSC"	Adjust for peak. Gang does not have to tune thru signal.
7.	400 ohm (carbon)	18.0 Mc.	Ant. Terminal	S. W.	Approx. 18	S. W. "ANT" Trimmer	Adjust for maximum output while rocking gang thru signal.
8.	Repeat the above alignment procedure for more accurate adjustments. Always keep signal generator output as low as possible to prevent action of the A. V. C. circuit.						

IMPORTANT ALIGNMENT NOTES—When aligning the shortwave bands "OSC" trimmers care must be exercised to see that the circuits are aligned on the correct frequency and not on the image which is approximately 910 kilocycles less as indicated on the Receiver dial. To check, increase generator output; tune-in the generator frequency and then tune-in the image frequency which should be weaker than the fundamental and come in approximately 910 kilocycles lower on the Receiver dial than the fundamental. If image cannot be tuned-in, the "OSC" trimmer is adjusted to the wrong peak. (Correct peak is the second peak on trimmer from the closed position).

TUBE VOLTAGE CHART

SOCKET VOLTAGES MEASURED AT 117.5 V. LINE (BETWEEN SOCKET PIN AND CHASSIS) WITH 1000 OHM PER VOLT, 500 V. RANGE VOLTMETER (D. C.)

TUBE	FUNCTION	PIN NUMBER							
		1	2	3	4	5	6	7	8
6SK7GT—R. F. Amplifier.....		0	0	0	0	0	82	6.3 A. C.	210
6SA7GT—OSC.—Mod.....		0	0	210	82BC	0	0	6.3 A. C.	0
6SK7GT—I. F. Amplifier.....		0	0	0	0	-6.5BC - -OSW -	82	6.3 A. C.	210
6SQ7—Det. A. S. C. 1st A. F.....		0	0	1.4	0	0	78	6.3 A. C.	0
6J5GT—Phase Inverter.....		0	0	125	N. C.	0	0	6.3 A. C.	5.2
6K6GT(2)—Output.....		0	0	200	210	0	0	6.3 A. C.	13
5Y3G—Rectifier.....		N. C.	300	N. C.	338	J. B.	338 A. C.	J. B.	300

MAX. POWER OUTPUT.....6.5 WATTS

POWER CONSUMPTION.....85 WATTS

DROP ACROSS SPEAKER FIELD.....90 VOLTS

N. C.—No Connection

Voltages may vary 10% of values given.

THE AUTOMATIC RECORD CHANGER—This record changer will automatically play a series of twelve 10" or ten 12" records of the standard 78 R. P. M. type. The records must be all one size when loading, and may consist of less records than listed above. Records of any size up to 12" may be played manually.

FEATURES—Some of the features of these outstanding phono-combinations that will add greatly to your enjoyment are as follows: a large efficient built-in antenna; Litz wound coils; a three gang tuning condenser providing maximum selectivity and sensitivity; push-pull output tubes for maximum distortionless reproduction; continuously variable tone control; ten inch concert dynamic speaker; and an extremely high quality unit for the reproduction of phonograph records, including the "Floating Jewel Tone System" (a Crosley invention) which assures a quality of reproduction never before obtainable.

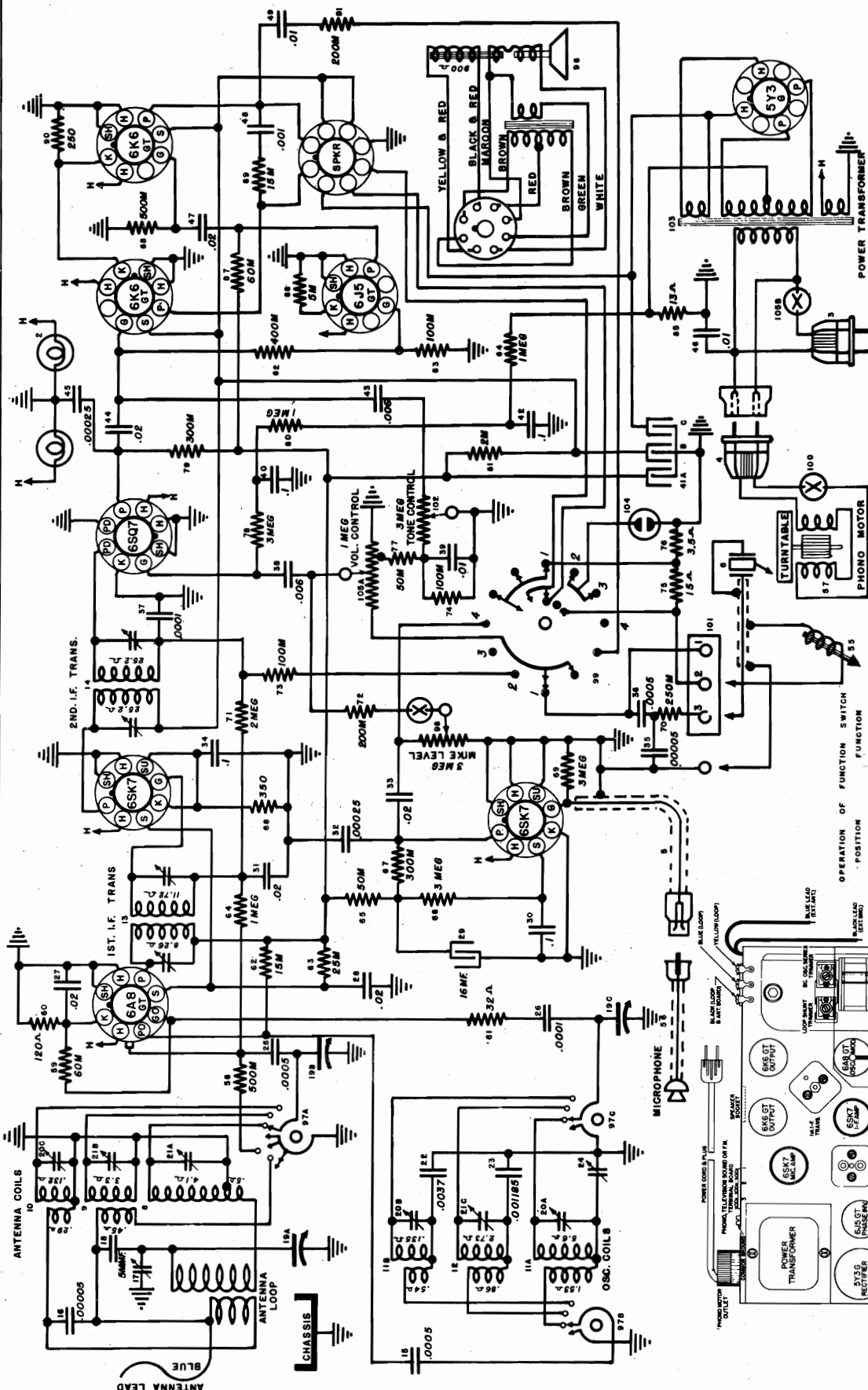
FOR RADIO PRODUCTS RECORD CHANGER 50 OR GENERAL INSTRUMENT RECORD CHANGER 201, SEE RIDER'S "AUTOMATIC RECORD CHANGERS AND RECORDERS".

FOR SEEBURG JR RECORD CHANGER
AND RECORDER, SEE RIDER'S
"AUTOMATIC RECORD CHANGERS
AND RECORDERS".

APPROX. TUNING RANGE

550 to 1600 Kilocycles
6.0 to 18.0 Megacycles
1.6 to 5.0 Megacycles

455 KC. I. F.



OPERATION	OF	FUNCTION	SWITCH
POSITION		FUNCTION	
1----		RECORD	PLAYING
2----		RADIO	RECEIVING
3----		RADIO	RECORDING
4----		MIKE	RECORDING

The diagram illustrates the internal wiring and component layout of a portable electronic device. The components are as follows:

- POWER CORD & PLUG**: Connected to the main power input.
- PHONO MOTOR ON TILT**: Located at the bottom left, connected to the power transformer.
- POWER TRANSFORMER**: The central power source, labeled with "I" and "II".
- 5Y3G RECTIFIER**: Converts AC from the transformer.
- 6X5 ST PHASE INV**: A phase inverter stage.
- 6SK7 AF AMP**: Two audio amplifier stages.
- Loud SPEAKER**: Mounted on a base plate, connected to the 6SK7 AF AMPs.
- BASE CONTROL SECTION**: Includes a tuning knob and a function switch.
- RADIO FUNCTION SWITCH**: Controls the radio operation.
- TUNING KNOB**: For frequency selection.
- FUNCTION SWITCH**: Selects between different operating modes.
- WIRING**: Numerous connections link all components, including ground points and signal paths.

MODEL CB82-R, Chassis 28

THE CROSLEY CORP.

RADIO RECEIVER ALIGNMENT PROCEDURE

PRELIMINARY

Output Meter Connections.....Plate to Plate of 6K6G's
 Generator Ground Connection.....To chassis or Ground Lead
 Dummy Antenna to be in series with generator output.....See Chart Below
 Position of Volume Control.....Fully On
 Position of Tone Control.....Treble or Speech
 Position of Function Switch.....Radio
 Position of Mike Level Control.....All the Way to Left (Off)

ALIGNMENT PROCEDURE CHART

Signal Generator							
Align- ment Sequence	Dummy Antenna	Frequency Setting	Input Connection to Receiver	Band Switch	Tuning Cond. Setting	Trimmer Adjusted	Remarks
1.	.02 MF.	455 Kc.	Grid of 6A8GT	B. C.	Fully open	2nd I-F (2) 1st I-F (2)	Adjust for Maximum. Adjust for Maximum.
2.	.0002 MF.	1650 Kc.	Ant. Lead (Blue)	B. C.	Fully open	B. C. "OSC" Trimmer	Adjust for peak; gang does not have to tune thru signal.
3.	.0002 MF.	600 Kc.	Ant. Lead (Blue)	B. C.	Approx. 60 on dial	B. C. "OSC" Series Trimmer	Adjust for maximum output while rocking gang thru signal.
4.	Repeat Step No. 2 to check possible shift due to series adjustment						
5.	.0002 MF.	1400 Kc.	Ant. Lead (Blue)	B. C.	Approx. 140 on dial	B. C. "ANT" Trimmer B. C. "PRE" Trimmer	Adjust for maximum output to not touch B. C. Osc. Trimmer. Adjust for maximum output.
6.	400 ohm (carbon)	5.3 Mc.	Ant. Lead (Blue)	Police	Fully open	Pol "OSC"	Adjust for peak gang; does not have to tune thru signal.
7.	400 ohm (carbon)	5.0 Mc.	Ant. Lead (Blue)	Police	Approx. 5.0	Pol "ANT"	Adjust for maximum output while rocking gang thru signal.
8.	400 ohm (carbon)	18.3 Mc.	Ant. Lead (Blue)	S. W.	Fully open	S. W. "OSC"	Adjust for peak. Gang does not have to tune thru signal.
9.	400 ohm (carbon)	18.0 Mc.	Ant. Lead (Blue)	S. W.	Approx. 18	S. W. "ANT"	Adjust for maximum output while rocking gang thru signal.

IMPORTANT ALIGNMENT NOTES

When aligning the shortwave bands "OSC" trimmers care must be exercised to see that the circuits are aligned on the correct frequency and not on the image which is approximately 910 kilocycles less as indicated on the dial. To check, increase generator output, tune-in the generator frequency and then tune-in the image frequency which should be weaker than the fundamental and come in approximately 910 kilocycles lower on the dial than the fundamental. If image cannot be tuned-in, the "OSC" trimmer is adjusted to the wrong peak. (Correct peak is the second peak on trimmer from the closed position).

Repeat the original alignment procedure for more accurate adjustments. Always keep signal generator output as low as possible to prevent action of the A.V.C. circuit.

SOCKET VOLTAGES MEASURED @ 117.5 VOLTS LINE (BETWEEN SOCKET PIN AND CHASSIS)
 WITH 1000 OHM PER VOLT, 500 VOLT RANGE VOLTMETER (D. C.)

TUBE FUNCTION	PIN NUMBER							
	1	2	3	4	5	6	7	8
6SK7—Pre-Amp.	0	0	.....	....	0	J. B.	*6.3	52
6A8GT—Osc.-Mod.	0	0	198	76.5	0	132	*6.3	1
6SK7—I. F. Amp.	0	0	2.4	0	2.3	76.5	*6.3	226
6SQ7—Det. A. V.C.-A. F.	0	0	0	0	0	98	*6.3	0
6J5GT—Phase Invert.	0	0	118.5	0	0	J. B.	*6.3	6.0
6K6G—Output	0	0	226	236	0	J. B.	*6.3	15.5
6K6G—Output	0	0	226	236	0	J. B.	*6.3	15.5
5Y3G—Rectifier	NC	310	J. B.	*300	J. B.	*300	J. B.	310

*Measure with A. C. Voltmeter.

MAX. POWER OUTPUT @ 117.5 V. LINE..... 5.0 Watts

POWER CONSUMPTION @ 117.5 V. LINE..... 66 Watts (Radio Only)

TOTAL POWER CONSUMPTION @ 117.5 V. LINE.....110 Watts (Including Phono Motor)

DROP ACROSS SPEAKER FIELD

Voltages may vary 10% of values given.

J. B.—JUNCTION BLOCK

N. C.—NO CONNECTION

THE CROSLEY CORP.

MODEL 494 Record
Player for Model
758 Receiver

Model 758 Receiver.

remove the jumper wire from the "PHONO SOCKET" (see Diagram of Connections in the receiver instruction booklet) and insert plug (eight prong) from the Record Player.

If it is desired to change over to 78 R.P.M. records

other is accomplished by changing the drive pinion on the motor shaft. The large pinion is for 78 R.P.M. and the small pinion is for 33 1/3 R.P.M. A special wrench is supplied to fit the set screws that hold pinions on motor shaft. The special friction drive takes up the difference in pinions automatically.

CONTROLS

The Phono-Radio Switch when turned to the right (clockwise) connects the pickup to the radio receiver and at the same time shorts radio signals, when turned to the left (counter clockwise) it disconnects the pickup and permits the radio to function normally.

The motor switch is controlled by the starting and stopping lever. This lever, through cam action engages and disengages the special friction drive pulley at the same time it throws the motor switch "On" and "Off".

The Phono Record Player is so wired that the volume control of the receiver is used to vary the amount of output.

OPERATION

After all connections have been made, the Phono Record Player should be placed upon a solid stand and set so that the turn table is level.

Place selected record on the turn table. (33 1/3 R.P.M. See note for information on 78 R.P.M.)

Loosen the Pickup rest bracket by rolling the rubber locking ring down. Insert needle in pickup.

Turn Phono-Radio Switch to the right, Phono position.

Pull starting level forward.

Lift pickup and gently lower it on the record so that the needle point enters the outside groove.

Adjust volume control (on receiver) to the desired level.

CARE OF RECORD PLAYER

1—Never leave Pickup set on the record when not in use. Lock in stand with rubber lock ring.

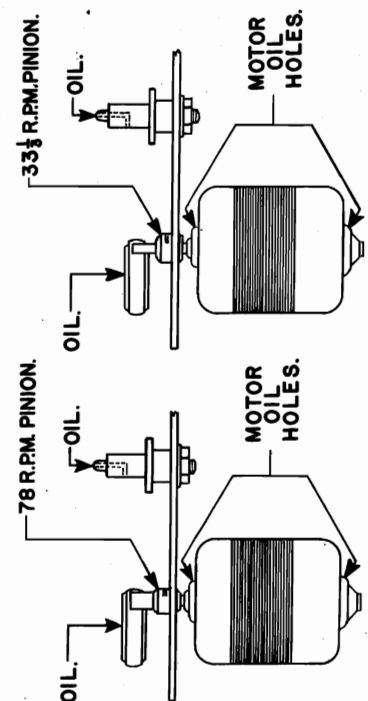
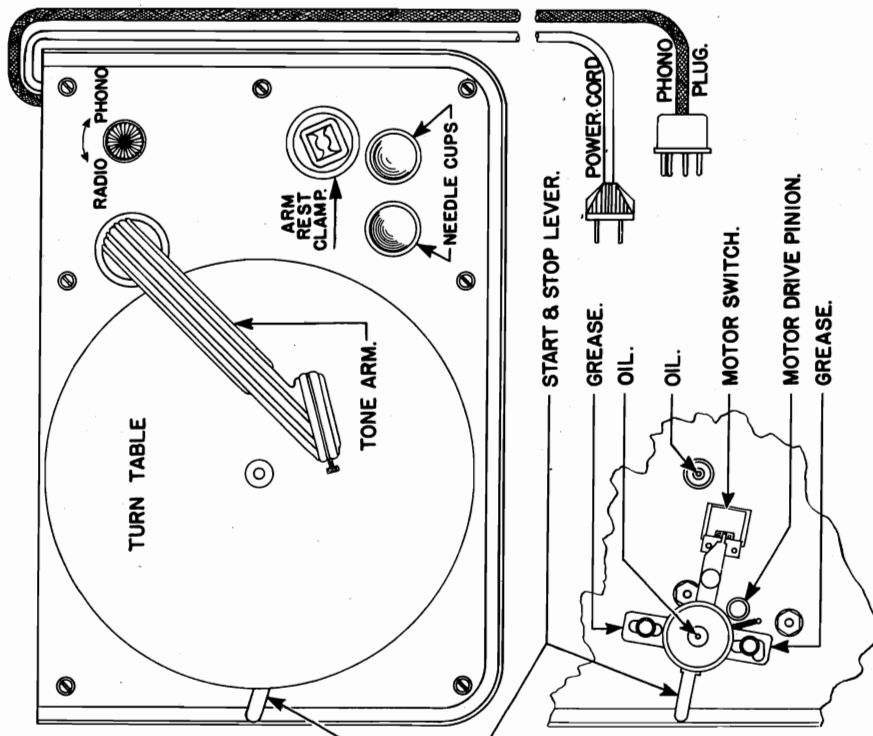
2—Do not rotate needle in the pickup after once used, as this causes excessive record wear, resulting in poor reproduction.

3—Oil the motor once, for about every 200 hours of service. Be sure that the wick in the oil well is saturated but not to the extent that the oil overflows.

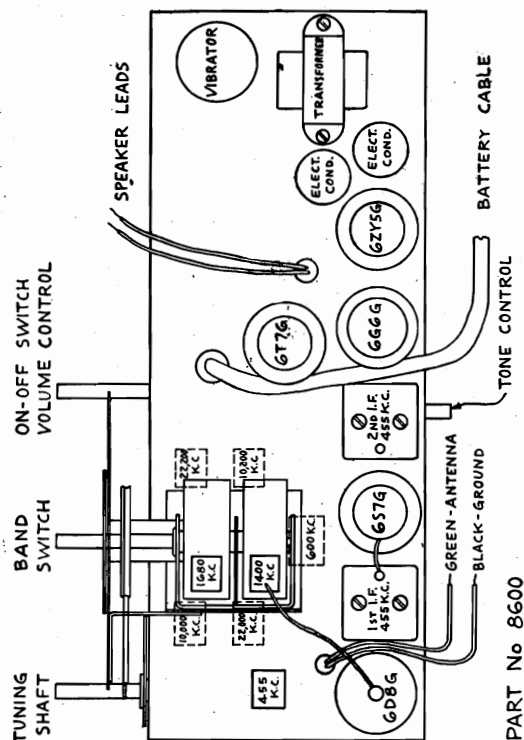
4—The friction drive pulley bearing is provided with an oil hole on the top of the bearing stud. Oil as needed.

5—The turn table spindle is provided with an oil hole on top. To oil turn table spindle, remove the turn table and clean bearing, then oil surface of bearing. Replace turn table and fill oil hole in top of spindle.

6—It may be advisable to apply a little light grease to the slide bar studs at least once a year.



8600
ALIGNMENT OF SHORT WAVE BANDS
S. W. Band No. 1



ALIGNMENT OF SHORT WAVE BANDS

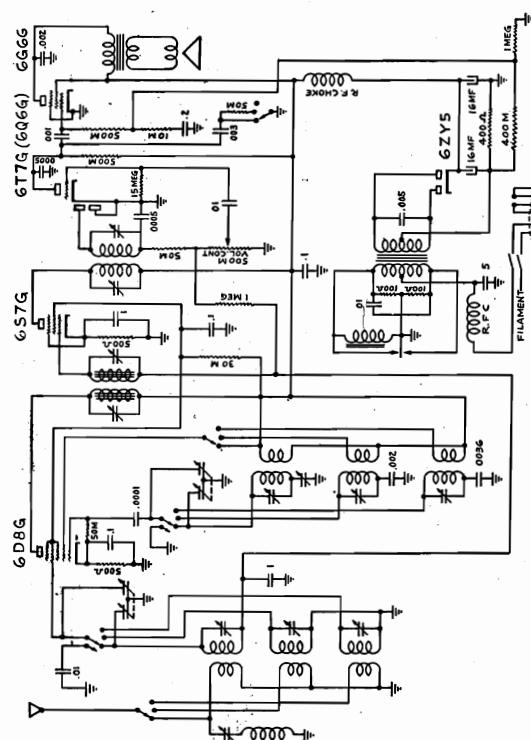
Rotate the band selector switch to the center position (No. 1 on band selector knob). Disconnect the 200 mfd. condenser from the output of the signal generator and in its place substitute a 400 ohm resistor which serves as a dummy antenna for aligning both short wave bands. The other end of the 400 ohm resistor is connected to the antenna lead of the receiver. Set the tuning condenser of the receiver at minimum capacity (plates all the way out). Produce a weak signal of 10,000 KC in the signal generator. Screw the S. W. No. 1 OSCILLATOR TRIMMER all the way down and then unscrew to the second peak at which the signal is heard. If the trimmer is not unscrewed to the second peak, the circuits will not be in proper relation and the calibration will be incorrect and there may also be a dead spot on some position on the dial. Next produce a signal of 10,000 KC in the signal generator and tune this signal carefully to the receiver. If the signal can be heard at two places, the proper signal to tune is the one which is closest to the 10.2 mark on the dial chart of the receiver. Adjust the S. W. No. 1 ANTENNA TRIMMER until a definite peak is noted in the output meter. During this adjustment, rock the tuning condenser back and forth through the signal. While adjusting this trimmer in order to assure perfect alignment.

S. W. Band No. 2

Using exactly the same procedure and taking the same precautions as for S. W. Band No. 1, turn the band selector switch to the No. 2 position. Align the S. W. No. 2 OSCILLATOR TRIMMER at 22,200 KC. with the signal generator producing a signal of 22,200 KC. and with the tuning condenser set at minimum capacity (plates all the way out). Align the S. W. No. 2 ANTENNA TRIMMER at 22,000 KC. with the signal generator producing a 22,000 KC. signal and be sure to tune the receiver to the signal nearest the 22 mark on the dial chart. The same procedure of screwing the oscillator trimmer all the way down and then unscrewing to the second peak and the same precautions of rocking the tuning condenser back and forth through the signal are followed to secure a proper alignment of this band.

TUBES

Tubes required are:
 1—6D8G Oscillator Translator
 1—6S7G I.F. Amplifier
 1—6T7G Detector AVC Audio
 1—6G6G Power Output
 1—6ZY5G Rectifier



PART No. 8584

ALIGNMENT PROCEDURE

Intermediate Frequency Alignment

Turn the band selector switch to the broadcast position ("B") on the band selector knob). Connect a .01 mfd. condenser to the output terminal of the signal generator and connect the other end of this condenser to the control grid of the 6SFG tube. Do not disconnect the grid clip on the tube. Generate a weak 455 KC signal in the signal generator, and adjust the trimmer of the second I.F. transformer for maximum response in the output meter. If the signal measures above $\frac{1}{2}$ volt during the adjustment, reduce its strength. Now transfer the connection of the signal generator through the .01 mfd. condenser to the grid of the 6D8G tube and align the trimmers of the first I.F. transformer.

R. F. ALIGNMENT

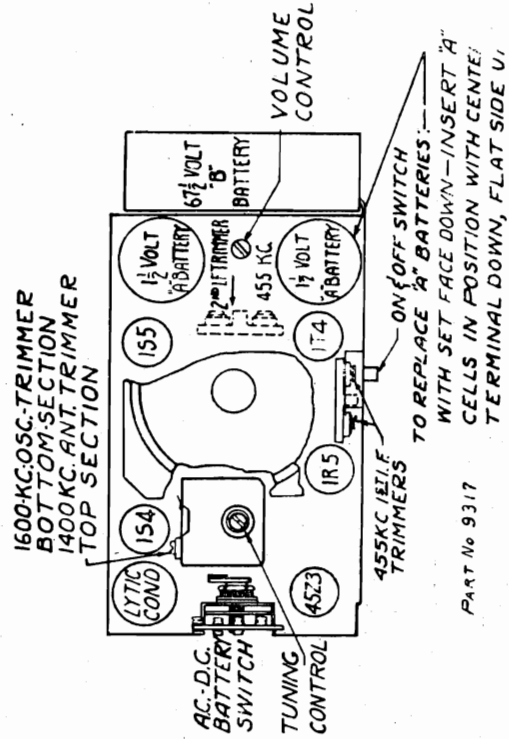
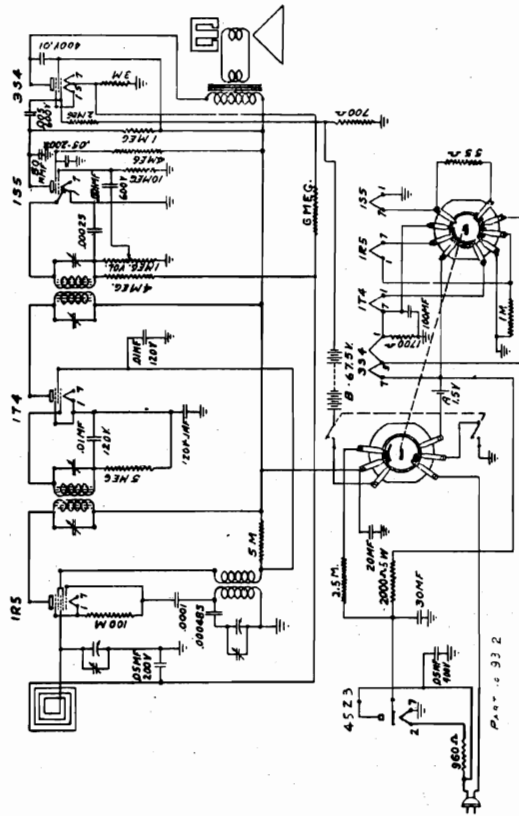
Disconnect the .1 mfd. condenser from the output of the signal generator and in its place substitute a 200 or 250 mmf. condenser, connecting the other end of this condenser to the ANTENNA LEAD of the receiver. Turn the tuning condenser to about 600 KC. With the generator producing a fairly powerful signal of 455 KC. adjust the WAVE TRAP trimmer for MINIMUM RESPONSE. Set the tuning condenser of the receiver at minimum capacity (plates all the way out). Generate a weak signal of 1680 KC. in the signal generator. Adjust the BROADCAST OSCILLATOR TRIMMER until the signal is tuned in. Next produce a weak signal of 1400 KC. in the signal generator. Tune the receiver very carefully to the signal and adjust the BROADCAST ANTENNA TRIMMER for maximum response in the output meter. Produce a 600 KC signal in the signal generator and tuning the receiver carefully to this signal, adjust the BROADCAST OSCILLATOR PADDER for maximum response. The tuning condenser of the receiver should be rocked back and forth through the signal while varying the padder in order to assure perfect alignment. The last three adjustments should be repeated two or three times for perfect alignment.

Tune in a broadcast station of known frequency between 1200 and 800 KC and set the pointer to the proper calibration on the dial chart. Be sure to use a station whose frequency is reliable as the accuracy of calibration depends on this setting. Note that the square dots in the upper half of the black band are accurately calibrated for the frequencies of the broadcast band.

MODEL 378
MODEL 3781

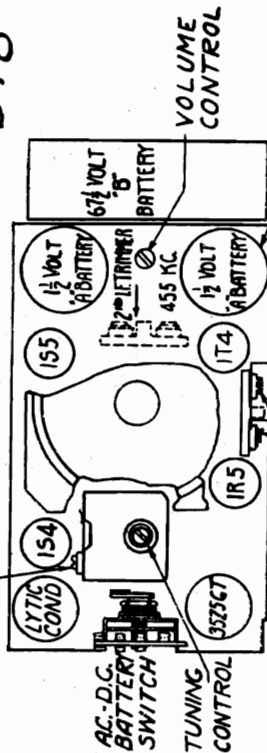
DETROLA CORP.

MODEL 3781 AC-DC



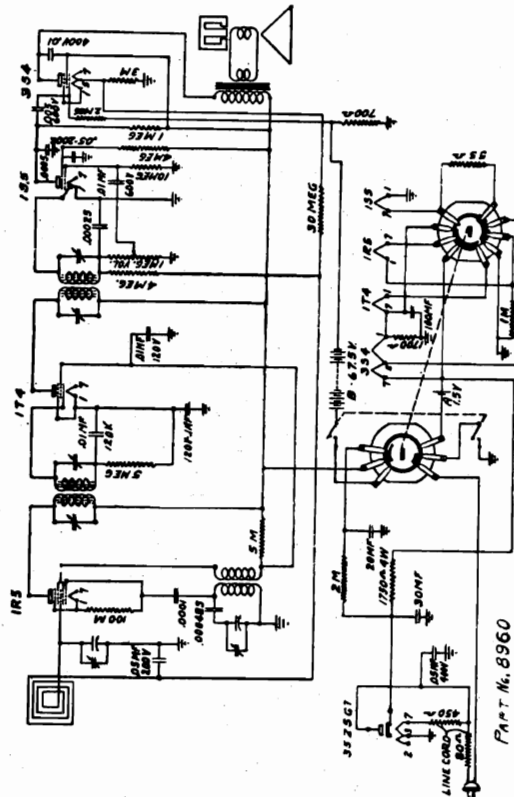
MODEL 378

1600 KC. OSC. TRIMMER
BOTTOM SECTION
1400 KC. ANT. TRIMMER
TOP SECTION



ON/OFF SWITCH
TO REPLACE "A" BATTERIES—
WITH SET FACE DOWN—INSERT "A"
CELLS IN POSITION WITH CENTER
TERMINAL DOWN, FLAT SIDE UP

PART No. 8974



PART No. 8960

DETROLA CORP.

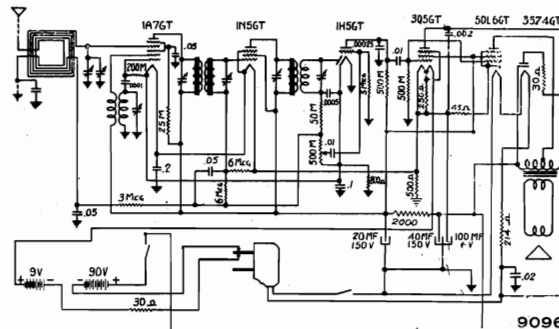
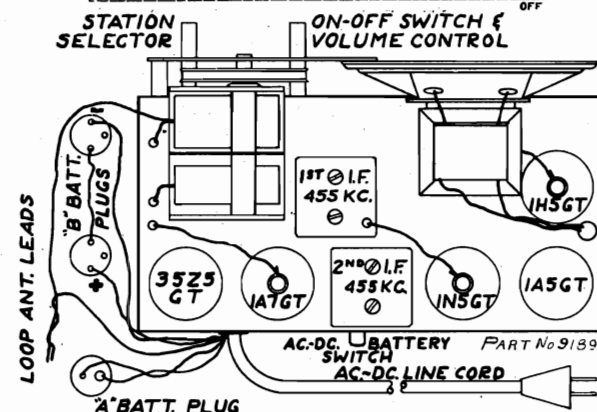
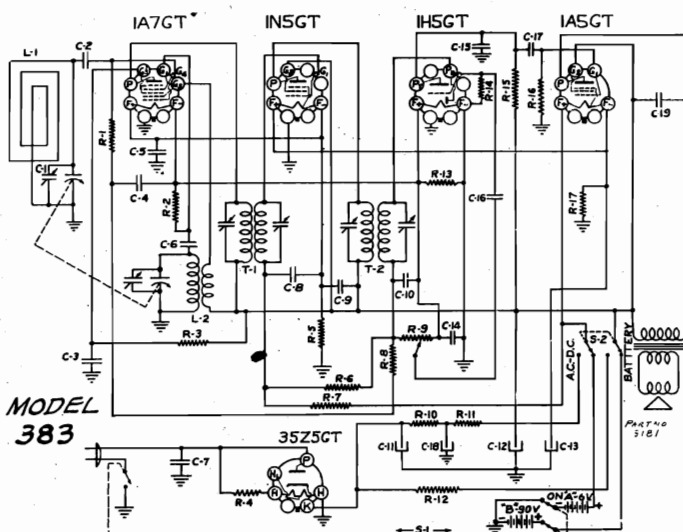
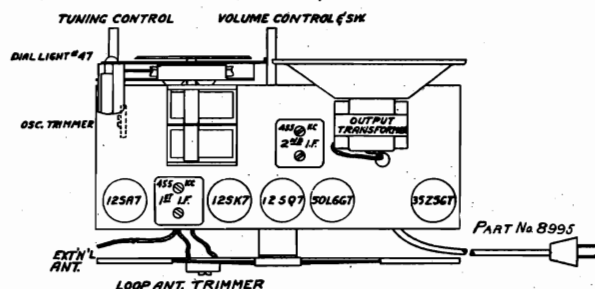
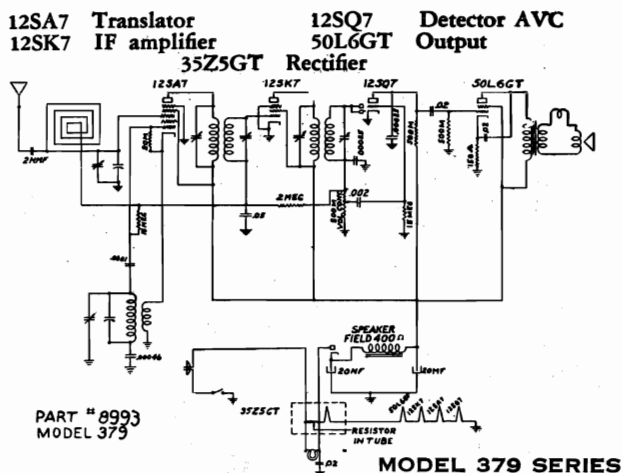
MODELS 386, 3861 MODEL 379
 MODELS 389, 389-1, MODEL 383
 389-2

ALIGNMENT PROCEDURE

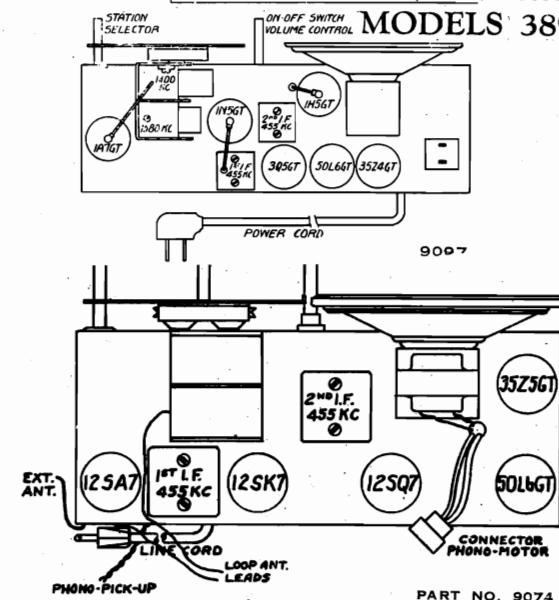
I.F. Frequency 455 KC. Set Range 510-1580 KC.

Connect the test oscillator, or signal generator, to the set as follows: Connect the "hot" side of the signal generator to the grid of the 1A7GT tube, and the ground side to the chassis. If the set is aligned on AC or DC be sure that the test oscillator or signal generator is isolated from the receiver and line by either a transformer or .2MFD condensers in both test leads. An output meter should be connected across the voice coil leads of the speaker to indicate resonance. Align the I.F. trimmers at 455 KC. for maximum meter reading.

Turn the condenser plates all the way out. Set the test oscillator to 1580 KC and adjust the oscillator trimmer for maximum signal. Disconnect the test oscillator and tune in a weak station near 1400 KC. at full volume. Adjust the trimmer on the front of the variable condenser for maximum signal. When aligning the set do not set the receiver on or near a metal work bench or other large metal object, as it will affect the tracking of the receiver.

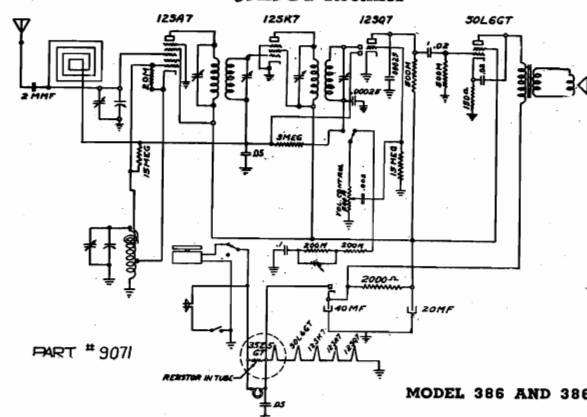


MODELS 389



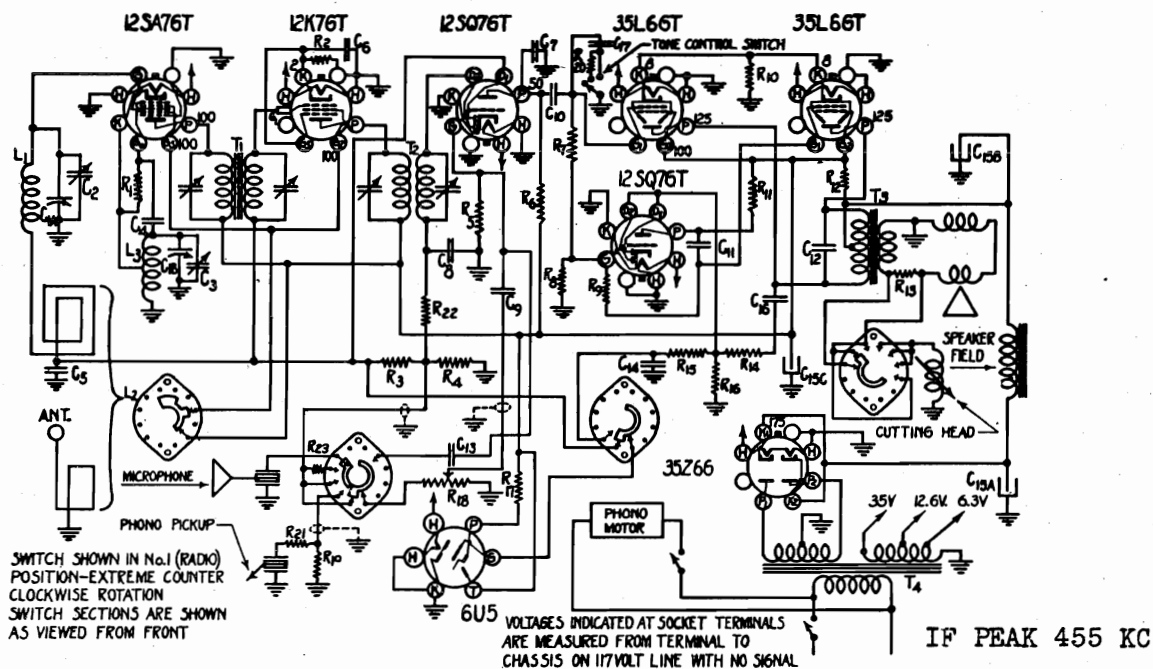
The following tubes are used in this receiver.

12SA7 Translator
 12SK7 IF amplifier
 35Z5GT Rectifier
 12SQ7 Detector AVC
 50L6GT Output



MODEL 390

DETROLA CORP.



Schematic Location

Part Number

Description

Schematic Location

Part Number

Description

CHASSIS PARTS

	4417	Button, Snap (Dial Mounting)
	8931	Cable, Tuning Tube
	2163	Cable, drive
	3227	Cap, Grid
R18	8910	Control, Volume and Switch
	1732	Cord, Line
	6424	Clamp, Linecord
	4314	Clamp, Tapped-For Tuning Tube
	4315	Clamp, Plain-For Tuning Tube
L3	8422	Coil, Oscillator
L1	8423	Coil, Tracking
C1a,b	8911	Condenser, Variable (with Pulley)
C2,3	8504	Condenser, Dual Trimmer
C15a,b,c	8425	Condenser, Electrolytic (20-250)-(20-150)-(20-150)
C4		Condenser, 100 Mmf. Mica
C5,14		Condenser, 1 Mfd. 200 v.
C6		Condenser, .05 Mfd. 200 v.
C7		Condenser, 250 Mmf. Mica
C8		Condenser, 100 Mmf. Mica
C9		Condenser, .002 Mfd. 600 v.
C10,16		Condenser, .01 Mfd. 400 v.
C11		Condenser, .05 Mfd. 400 v.
C12,13		Condenser, .001 Mfd. 600 v.
C17		Condenser, .005 Mfd. 600 v.
	7209	Grommet, Tuner Assembly Mtg.
	9121	Dial Chart
	8941	Microphone Socket Assembly
	6244	Pulley, Idler
	5026	Pointer
	6158	Pilot Lite
	1207	Retainer, "C" Washer (Holds Tuning Shaft)
R1		Resistor, 20M, 1/3 Watt
R2		Resistor, 200 Ohm, 1/3 Watt
R3,4,14,16		Resistor, 1 Meg. 1/3 Watt
R5		Resistor, 10 Meg. 1/3 Watt
R6,7,8,9,11		Resistor, 200M. 1/3 Watt
R10		Resistor, 120 Ohm, 1/2 Watt
R12		Resistor, 1000 Ohm, 1 Watt
R13		Resistor, 35 Ohm, 1/2 Watt
R15		Resistor, 2 Meg. 1/3 Watt
R17		Resistor, 1 Meg (in Tuning Tube Socket)
R19,20,21,22		Resistor, 50M, 1/3 Watt
R23		Resistor, 4 Meg. 1/3 Watt
	8440	Socket, Dual Dial Lamp
	8648	Spring, Drive Cable
	8427	Shaft, Drive
	8428	Switch, Tone Control

	8932	Switch, Master Control
	8919	Speaker, 6 1/2" Dynamic
	8918	Transformer, Power, 60 cycle
	8933	Transformer, Power, 50 cycle
	89191	Transformer, Output
	8434	Transformer, 1st IF
	8435	Transformer, 2nd IF
	CABINET ASSEMBLY PARTS	
		Back for Cabinet
		Book, Instruction
	8462	Bushing, Rubber (Recorder Unit Mtg.)
	9208	Plate, Instruction
	8477	Plate, Motor-on-off
	8287	Plug, 1 Prong (for Cutter Leads)
	3288	Plug, 1 Prong (for Phono Pickup Leads)
	8493	Plug, 2 Prong (for Motor Leads)
	8454	Switch, Motor
	2997	Washer, Rubber (for Recorder Mtg.)

RECORDER UNIT PARTS

	6943	Hex Nut for Pivot Post
	6947	Motor Mounting Screw
	6948	Adjusting Screw (Follower Arm)
	9413	Turntable Shaft Locking Screw
	9417	Recorder Arm Rest
	9418	Follower Arm Complete
	9424	Pickup Cartridge
	9426	Pickup Arm Complete
	9428	Cutter Head Tension Spring
	9484	Magnetic Cutter Head with Leads
	9434	Recorder Arm Complete
	9438	Pivot Post Return Spring
	9450	10" One-piece Turntable
	9456	Turntable Drive Disc Stud Clip
	9458	Lead Screw and Pinion Assembly
	9463	Turntable Drive Disc Tension Spring
	9464	Turntable Shaft
	9466	Turntable Drive Disc
	9467	Turntable Drive Disc Mounting Bracket Assembly

The following parts are for models with ONE-PIECE.

TURNTABLE ONLY

	9469	Retractable Pin Spring
	9470	Retractable Pin
	9472	Rotor Shaft Pulley
	9474	Rotor Shaft Pulley Set-Screw
	9481	Motor 60 Cycle
	9482	Motor 50 Cycle

DETROLA CORP.

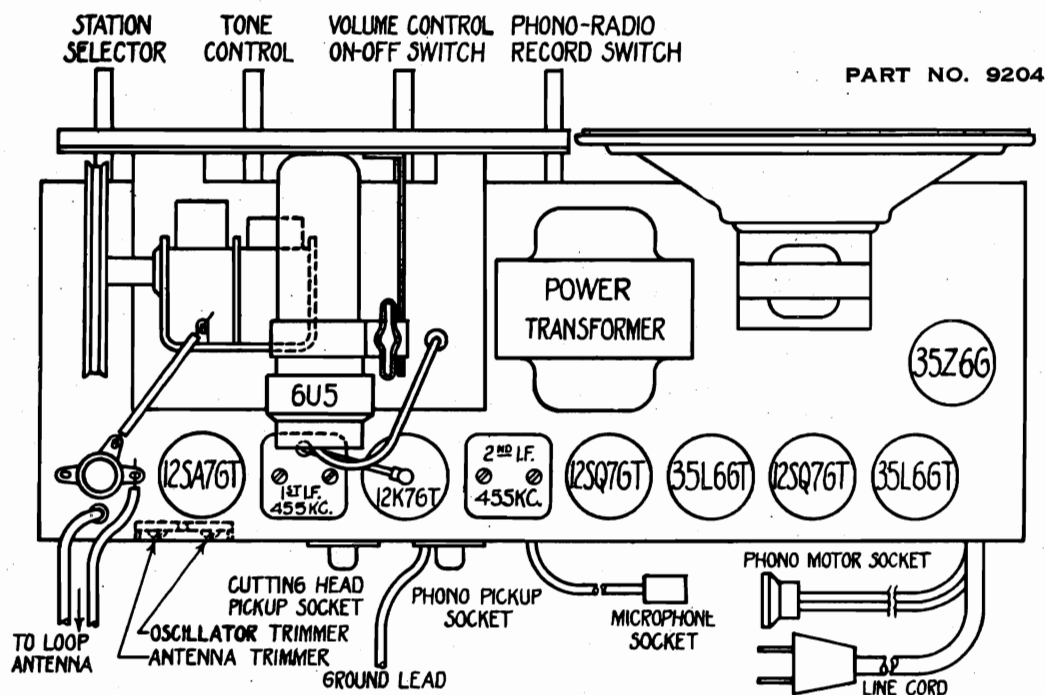
Voltages indicated at socket terminals are measured with 1000 ohm per volt meter, on 117 volt line, no signal.

ALIGNMENT PROCEDURE

Output meter connection Across speaker voice coil
 Connection of generator ground lead To Chassis
 Connection of generator output lead See chart below
 Dummy antenna value to be used in series with generator See chart
 Position of volume control Full on (Clockwise)

POSITION OF VARIABLE	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	TRIMMERS ADJUSTED (IN ORDER SHOWN)
Open (Min. capacity)	455 kc.	.1 mfd.	Ant. section of variable	T2, T1.
Min. capacity	1720 kc.	50 mmf.	Ant. Terminal	Oscillator Trimmer
Tune in signal from generator	1400 kc.	50 mmf.	Ant. Terminal	Antenna Trimmer

ALL ALIGNMENT OPERATIONS MUST BE DONE WITH THE MASTER CONTROL SWITCH IN THE NO. 1 (RADIO) POSITION.



LOOP ANTENNA

This receiver is equipped with a loop antenna. This antenna is somewhat directional in its reception characteristics, therefore turning the receiver to a particular position will often improve reception or reduce interference.

ANTENNA AND GROUND CONNECTIONS

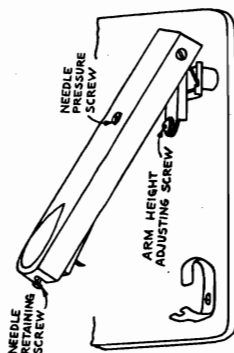
When this receiver is used inside a building which has metal lath or a large amount of steel in it, or in a location where reception conditions are poor, an outdoor antenna and a ground may be necessary.

Two terminals are provided on the back of the cabinet for connection of antenna and ground.

MODEL 390

DETROLA CORP.

RECORDING ARM ADJUSTMENTS



The recorder arm and recording head are adjusted at the factory for best operation. The following paragraph tells how to correct these adjustments should they, for any reason, become changed from their factory setting.

The bottom of the recording arm should be exactly 1/4 inch from the surface of the record. This should be measured beside the needle retaining screw on the end of the arm. The screw for making this adjustment can be found when the arm is raised, on a small platform near the hinge. Turning the adjusting screw to the left raises the arm, turning to the right lowers it. In making an adjustment turn the screw only a small fraction of a turn at a time.

Make a cut of at least ten or fifteen turns to see whether or not the needle is exerting the correct pressure on the record. This is correct when the groove cut by the needle is of approximately the same width as the space between grooves. On top of the cutting arm is a flat head screw. Turning this screw to the right increases the depth of cut, to the left decreases it. This adjustment is quite critical and the screw should be turned not more than 1/4 turn at a time.

PHONO OPERATION

Turning the Master Control Switch to the No. 2 or Phono position, connects the phono pickup to the audio amplifier of the receiver and disconnects the radio. The Volume control acts for phono the same as for radio.

Always place the pickup arm on the rest provided when not in use.

RECORDING

The recording mechanism will cut records up to 10 inches in diameter. Recordings of excellent quality can be made if the instructions in the following paragraphs are very carefully followed.

INSERTING THE RECORDING NEEDLE IN THE HEAD OF THE RECORDER ARM

Notice that the shank of the recording needle is ground flat on one side. Loosen the screw in the end of the Recorder Arm. Insert the needle into the hole in the under side so that the flat side is towards the front of the cabinet. Tighten the retaining screw so that the needle is held firmly. Check to make sure that the recording needle is tight each time a recording is made.

TO RECORD A RADIO PROGRAM

Place a blank record on the turntable making sure that the small pin on the turntable projects through the hole provided for it in the record. This is necessary to prevent the record from slipping and ruining the recording.

Turn the Master Control Switch to the No. 1 (Radio) position. Tune in the program you desire to record. Observe the tuning eye carefully and be sure that the station is tuned in perfectly.

Turn the Master Control Switch to the "Record Radio" (No. 3) position. Notice that the shadow on the tuning eye screen now varies in width with the volume of sound.

Adjust the Volume Control so that the eye just closes (See paragraph titled "THE TUNING EYE").

Turn the phono motor ON.

Raise the Recorder Arm and move it so that the needle is just inside the edge of the record. Lower the arm carefully on the record.

When the recording arm is lowered on the record an arm on the under side of the recorder unit engages the lead screw which moves the arm across the record. The arm must be raised about three inches to disengage the lead screw so that the arm can be moved.

As the recording is being made, a small shaving is cut out of the record by the recording needle. This piles up in the center of the record.

After the record has been cut, raise the recorder arm, swing it outwardly and place it on the rest. Stop the turntable and remove the shaving which has been cut out of the record.

The record may now be played in the normal manner.

TO RECORD WITH THE MICROPHONE

Plug the Microphone into the socket provided on the rear of the cabinet.

Turn the Master Control Switch to the No. 5 position.

Speak into the microphone and adjust the volume control until the eye just closes as described in the preceding paragraph. Whatever sound is picked up by the microphone will be recorded on the record. Keep the microphone some distance away from the receiver, preferably to one side so that it does not pick up the sound from the speaker. Keep the microphone at least six inches from your mouth and try to keep the same voice level as used initially in setting the volume.

Place the recording arm on the record as described above.

TO RECORD WITH MICROPHONE AND RADIO AT THE SAME TIME

Position No. 4 of the Master Control Switch arranges the circuits so that it is possible to make a recording from a radio program and with the microphone at the same time.

Tune in the program you desire to record exactly as described under "Recording Radio Programs".

Turn the Master Control Switch to the No. 4 position. Adjust eye so that it does not completely close at maximum radio signal.

Speak into the microphone with sufficient volume so that the eye just closes at the maximum combined radio and voice signal. To make the voice predominate, retard the volume setting which reduces the radio volume, and speak a little closer to the microphone.

Place the recorder arm on the record and proceed with the recording.

PUBLIC ADDRESS

The No. 6 position of the Master Control Switch connects the circuits so that the microphone, and the audio amplifier and speaker of the receiver may be used as a small public address system. Keep the microphone as far as possible from the speaker so that the sound from the speaker will not reach the microphone, causing a "howl" or whistle.

GENERAL INFORMATION

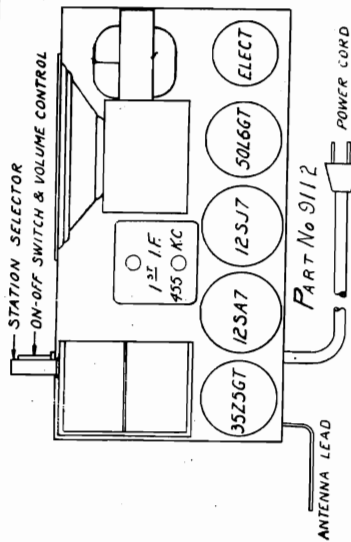
In the recording positions (Positions 3, 4 and 5 of the Master Control Switch) the volume from the speaker is reduced. This is done automatically by the switch for three reasons, some of the power from the output tube is needed for operating the recording head, the volume level necessary for recording is too high for the average size room, and to prevent the sound from the speaker from reaching the microphone.

If the recording needle is not very sharp, the quality of the recording will be poor. A needle which has become dull through use or which has been otherwise damaged should be replaced.

The Master Control Switch should always be turned to the No. 1 (Radio) position when listening to radio programs.

The pickup and the recording arms should always be placed on the rests provided for them when they are not in use, to protect them from damage.

DETROLA CORP.

MODEL 392
MODELS 3862, 3863

The following tubes are used in this receiver:

12SA7 Translator
12SJ7 Detector
50L6GT Output
35Z5GT Rectifier

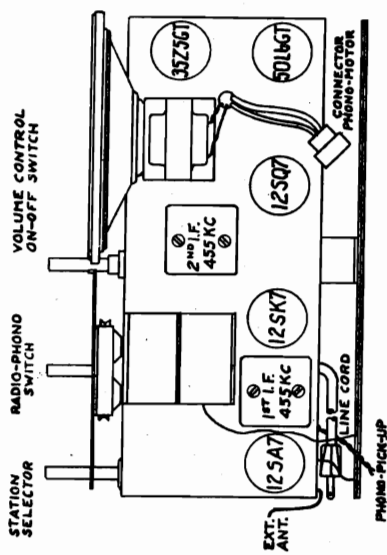
If this receiver should fail to operate when connected to direct current reverse the attachment plug in the light socket.

MODEL 392 SERIES

12SA7

12SJ7

50L6GT

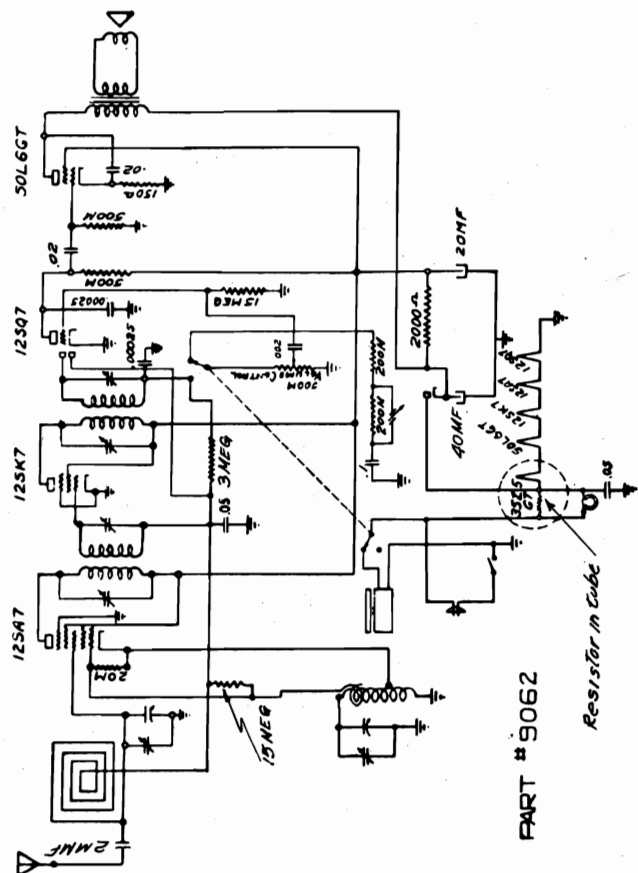


The following tubes are used in this receiver.

12SA7 Translator
12SK7 IF Amplifier
12SQ7 Detector AVC
50L6GT Output
35Z5GT Rectifier

MODEL 3862 AC-DC PHONO COMBINATION

MODEL 3863 AC PHONO COMBINATION

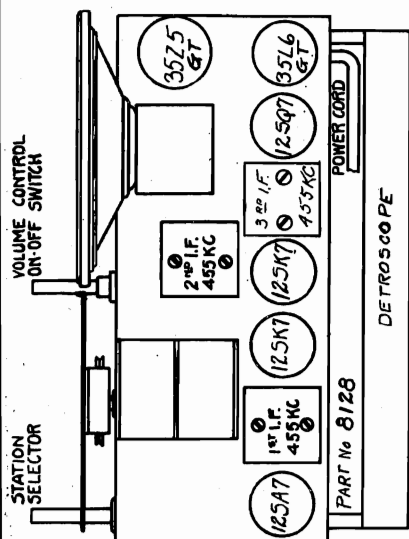


PART #9062

Resistor in Tube

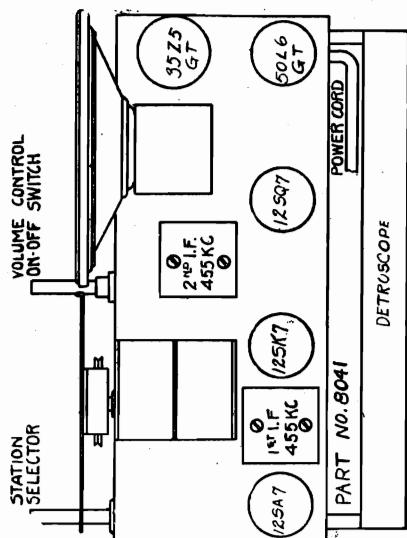
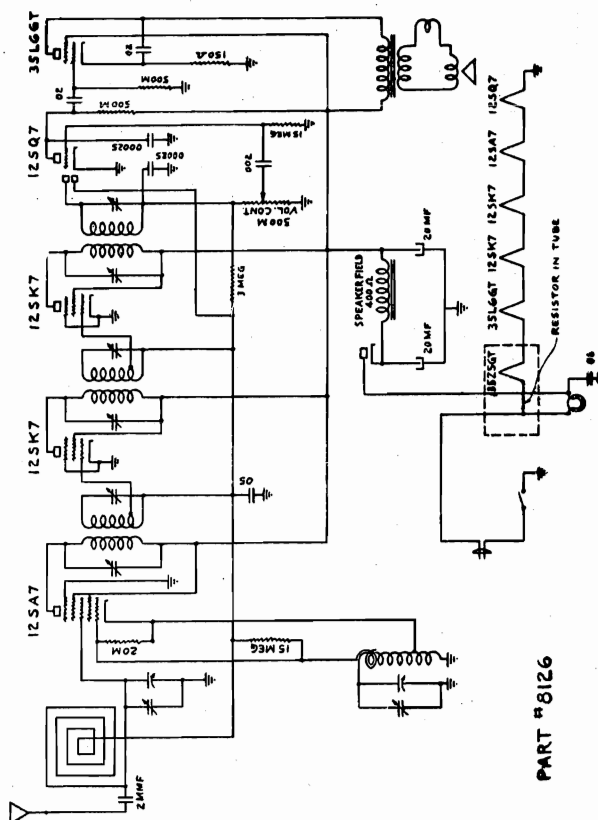
MODEL 393
MODEL 394

DETROLA CORP.



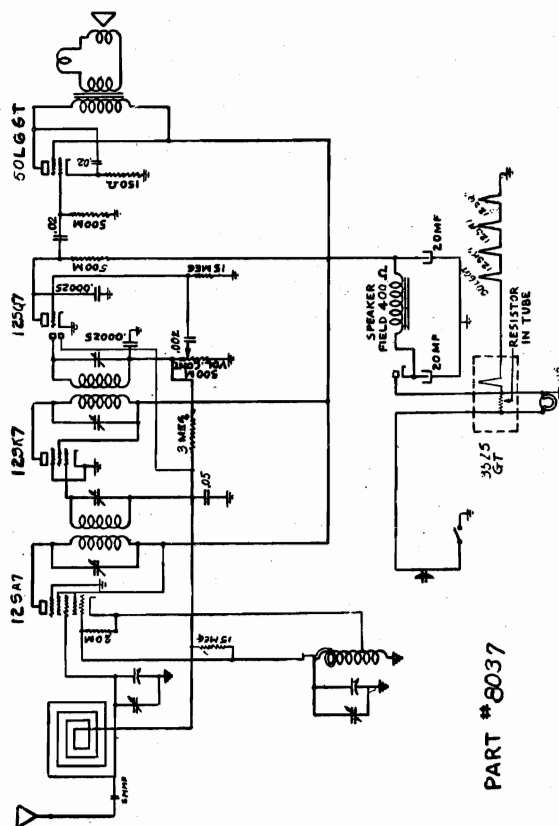
The following tubes are used in this receiver.
12SA7 Translator 12SQ7 Detector AVC
12SK7 1st IF Amplifier 35L6GT Output
12SK7 2nd IF Amplifier 35Z5GT Rectifier

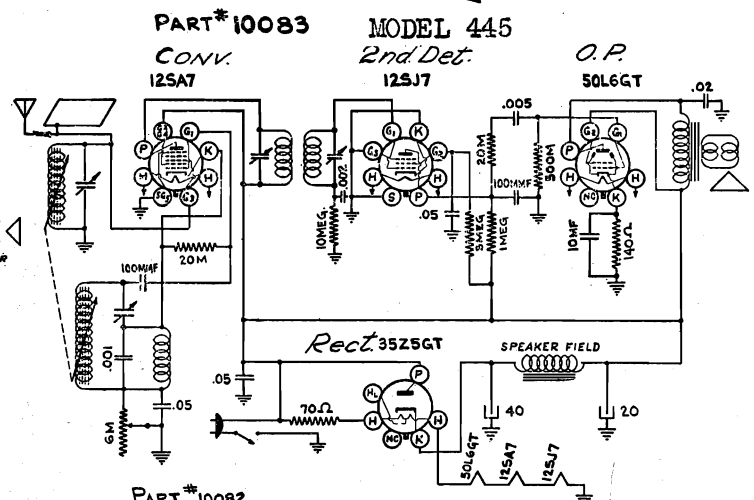
MODEL 394 SERIES



The following tubes are used in this receiver.
12SA7 Translator 12SQ7 Detector AVC
12SK7 IF amplifier 50L6GT Output
35Z5GT Rectifier

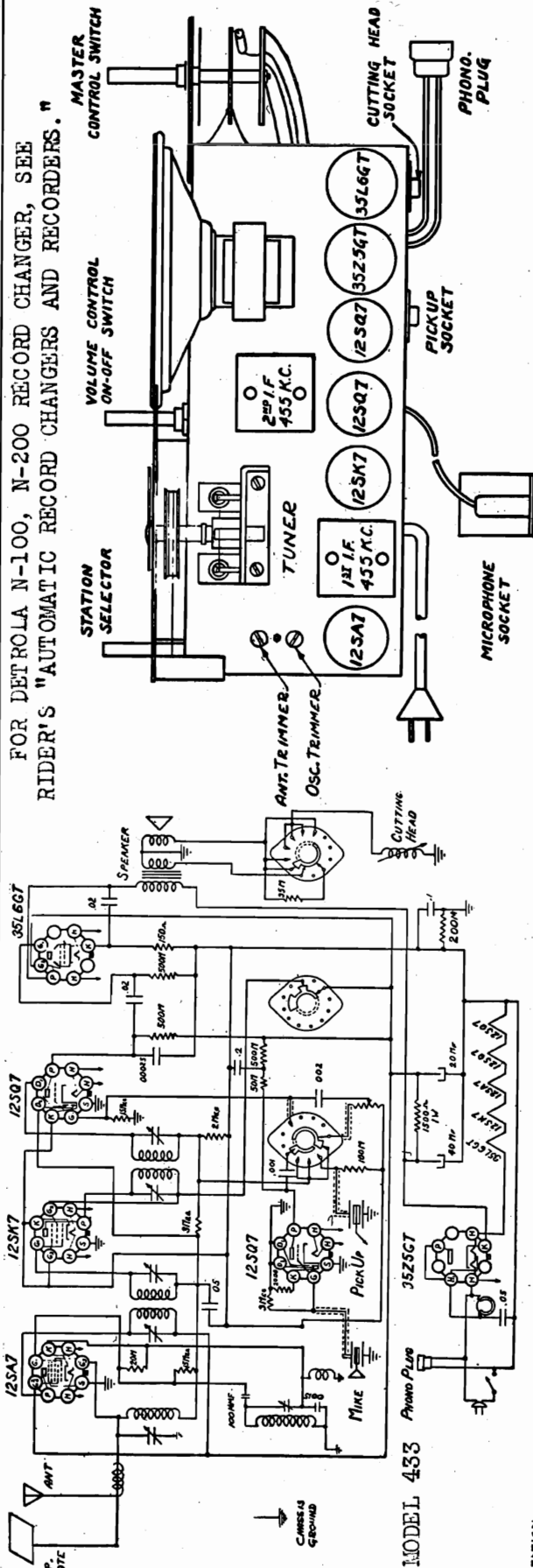
MODEL 393 SERIES





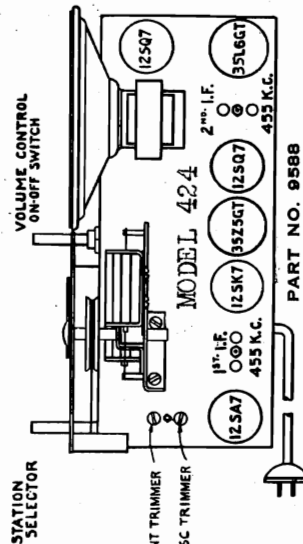
MODEL 433 MODEL 424

DETROLA CORP.



ALIGNMENT PROCEDURE
MODEL 433

Output meter connection Across speaker voice coil
 Connection of generator ground lead To Chassis
 Connection of generator output lead See chart below
 Dummy antenna value to be used in series with generator Full on (Clockwise)
 Position of volume control Full on (Clockwise)



GENERATOR	CONNECTION AT RADIO	DUMMY ANTENNA	DIAL	TRIMMERS TO TUNE	REMARKS
IF 455 KC	12SA7 Grid	.1 mfd.	H. F. End	IF Transformers	Tune to Max.
1720 KC	Antenna	200 mmf.	H. F. End (1720)	4 Trimmers	Set Limit Of Band
1400 KC	"	"	1400	Oscillator Trimmer	Tune to Max.
				Antenna Trimmer	

Repeat Above Alignment Procedure at least once more.

ALL ALIGNMENT OPERATIONS MUST BE DONE WITH THE MASTER CONTROL SWITCH IN THE NO. 1 (RADIO) POSITION.

PART No 9587

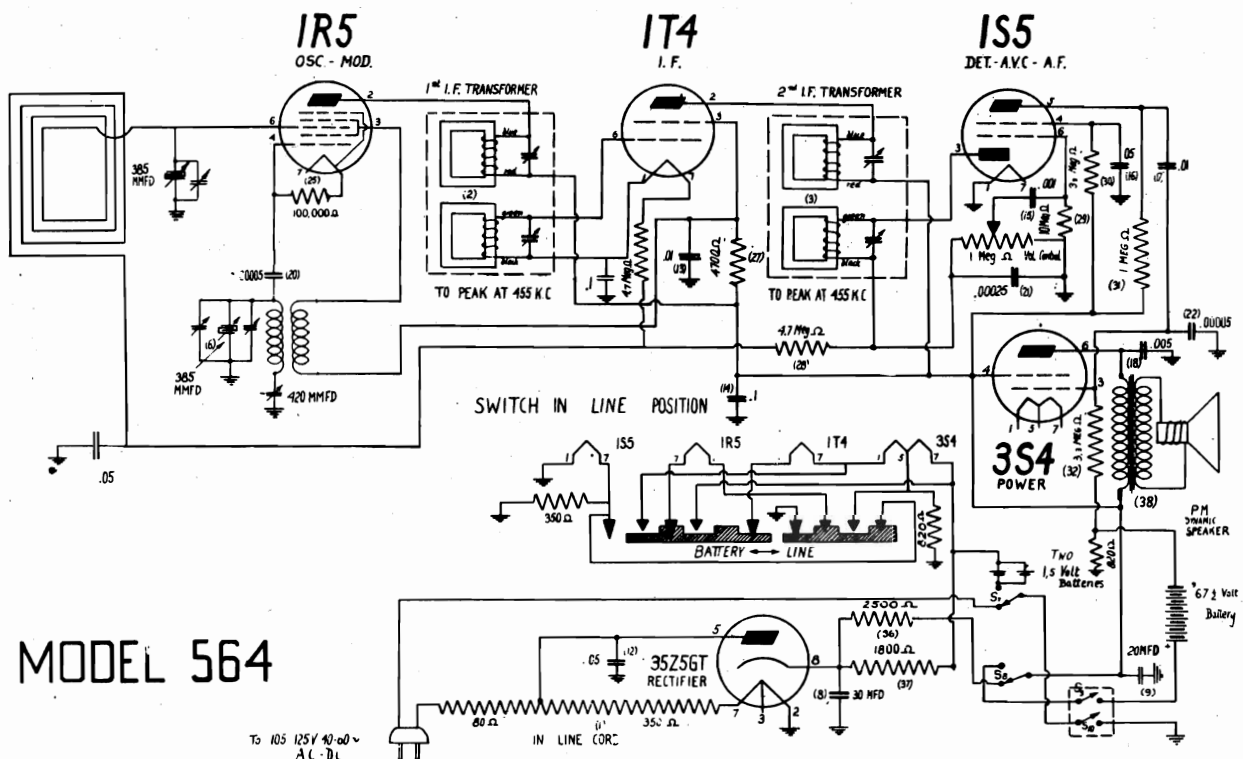
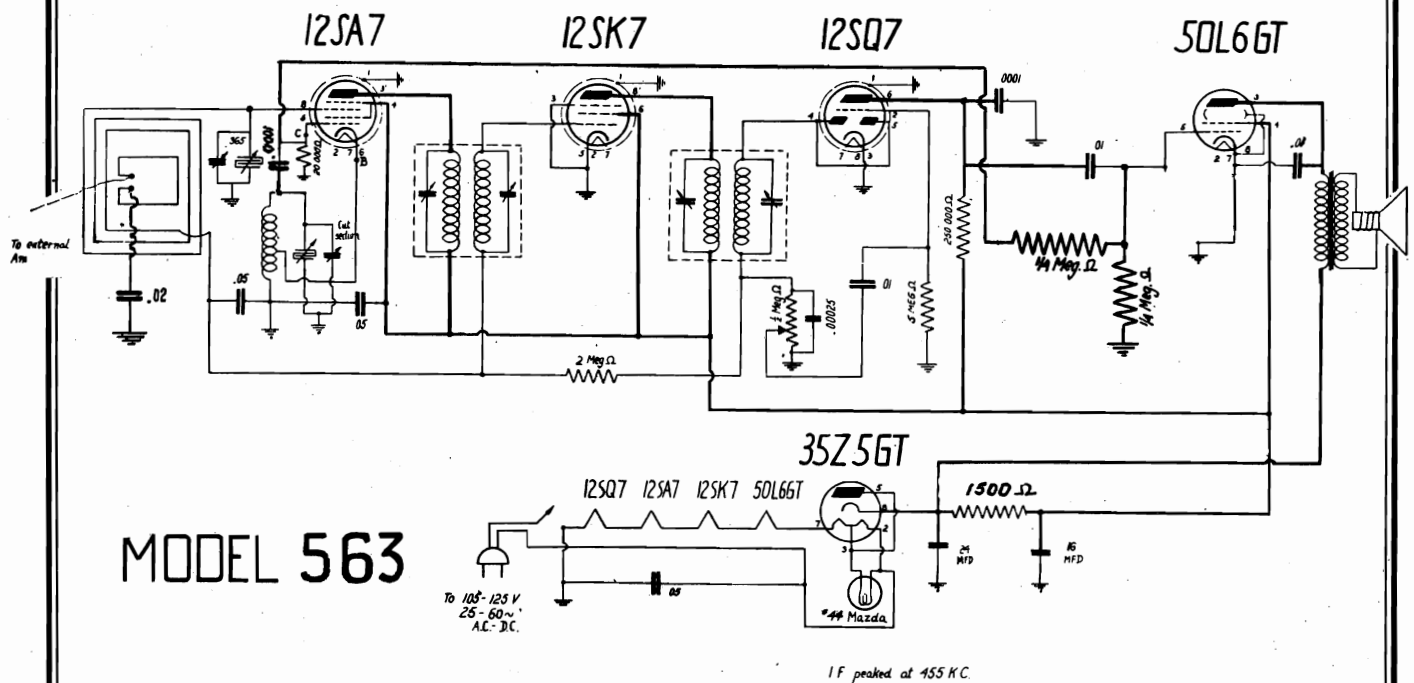
DeWALD RADIO MFG. CORP.

MODEL 563

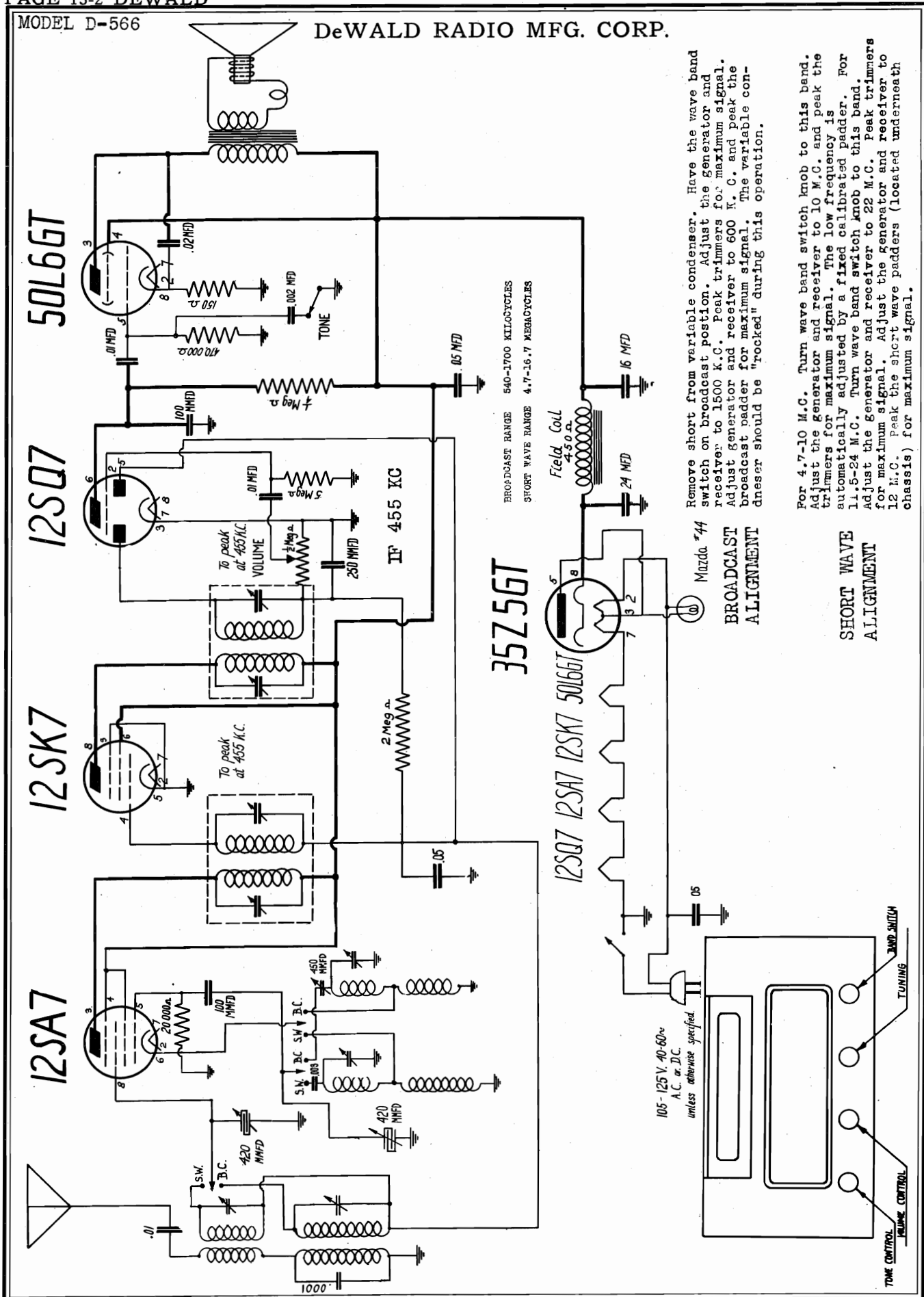
MODEL 564

TO CALIBRATE RECEIVER

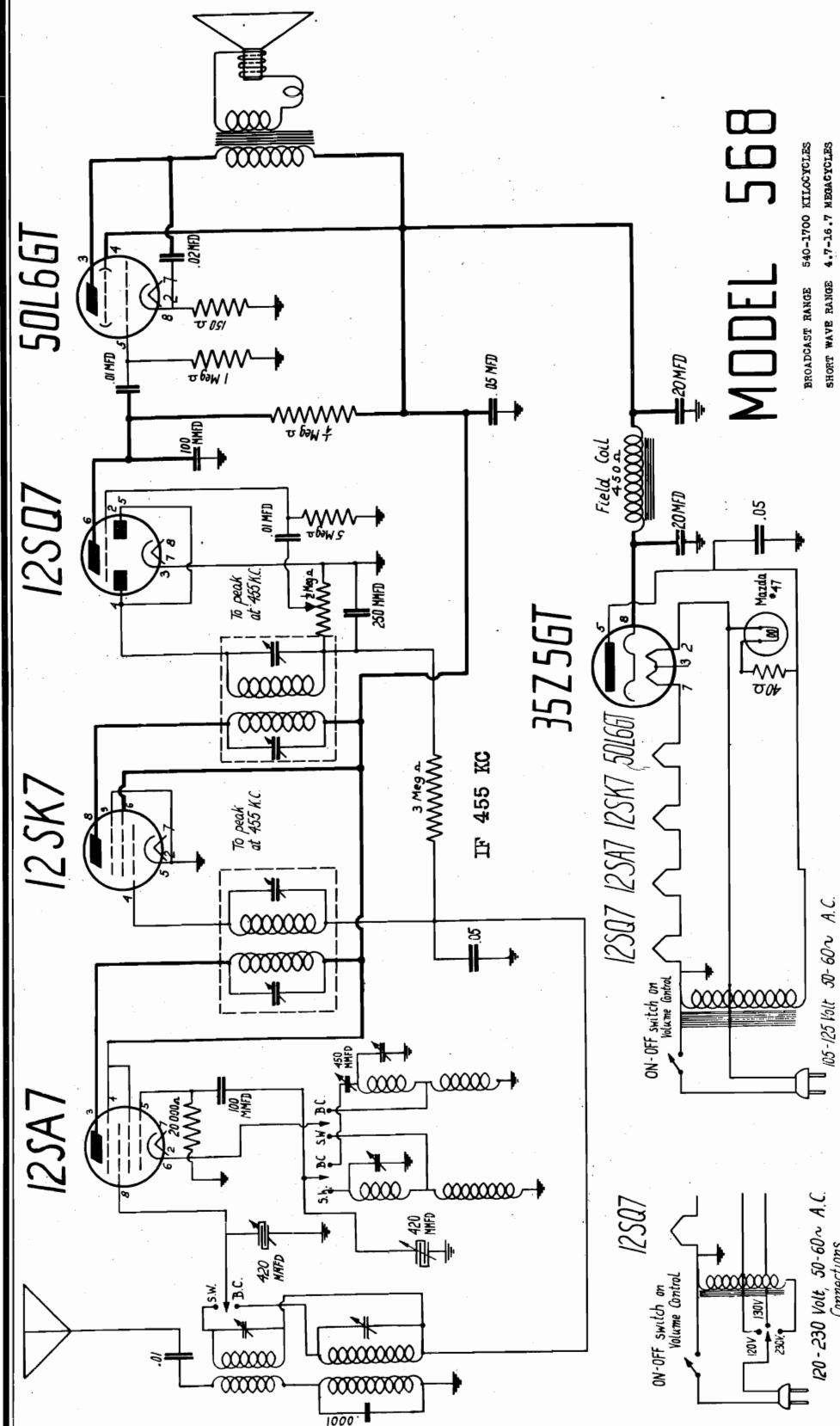
Attach the hot side of signal generator to one of the flexible antenna loop leads. Connect the ground side to the other flexible lead. Adjust the signal generator to 455 KC and peak the I.F. trimmers for maximum signal. Adjust the receiver dial and generator to 1500 KC peak the variable condenser trimmer screws for maximum gain.



DeWALD RADIO MFG. CORP.



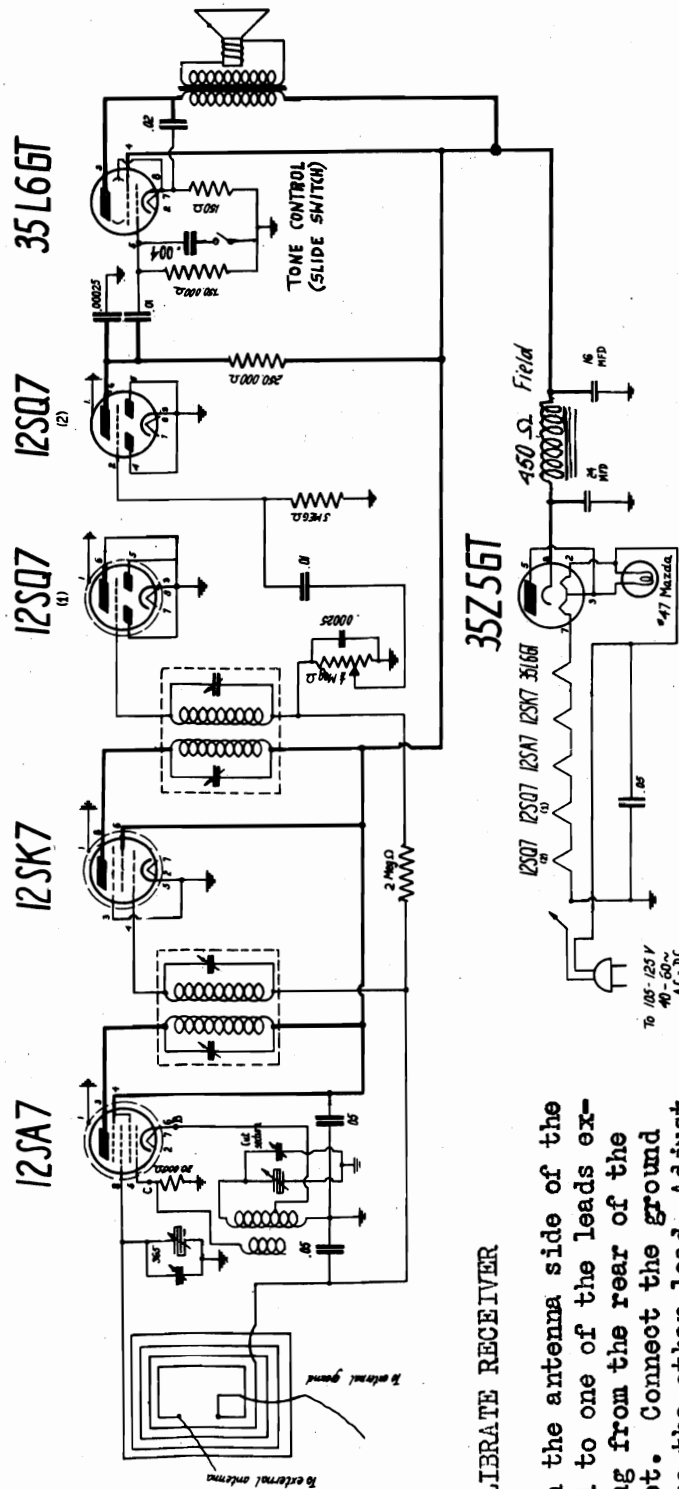
DeWALD RADIO MFG. CORP.

**BROADCAST ALIGNMENT**

Set the signal generator and receiver dial to 1500 kilocycles. Adjust the broadcast oscillator trimmer screw until the signal from the generator is heard. Peak the antenna trimmer screw for maximum output. Now, set the signal generator and receiver dial to 600 kilocycles. Peak the broadcast padder for maximum output. The variable condenser should be "rocked" during this operation.

SHORT WAVE OPERATION

Slide the wave band switch button to the short wave position. Set the signal generator and receiver to 16 megacycles. Adjust the short wave oscillator coil trimmer until the generator signal is heard. Peak the short wave antenna coil trimmer for maximum output. The low frequency end of the dial is automatically adjusted.



MODEL 666-T

IF peaked at 455 KC.

IMPORTANT

Since the loop used has a directional effect, it may be found that it is necessary at times to turn the receiver for best reception on weaker stations.

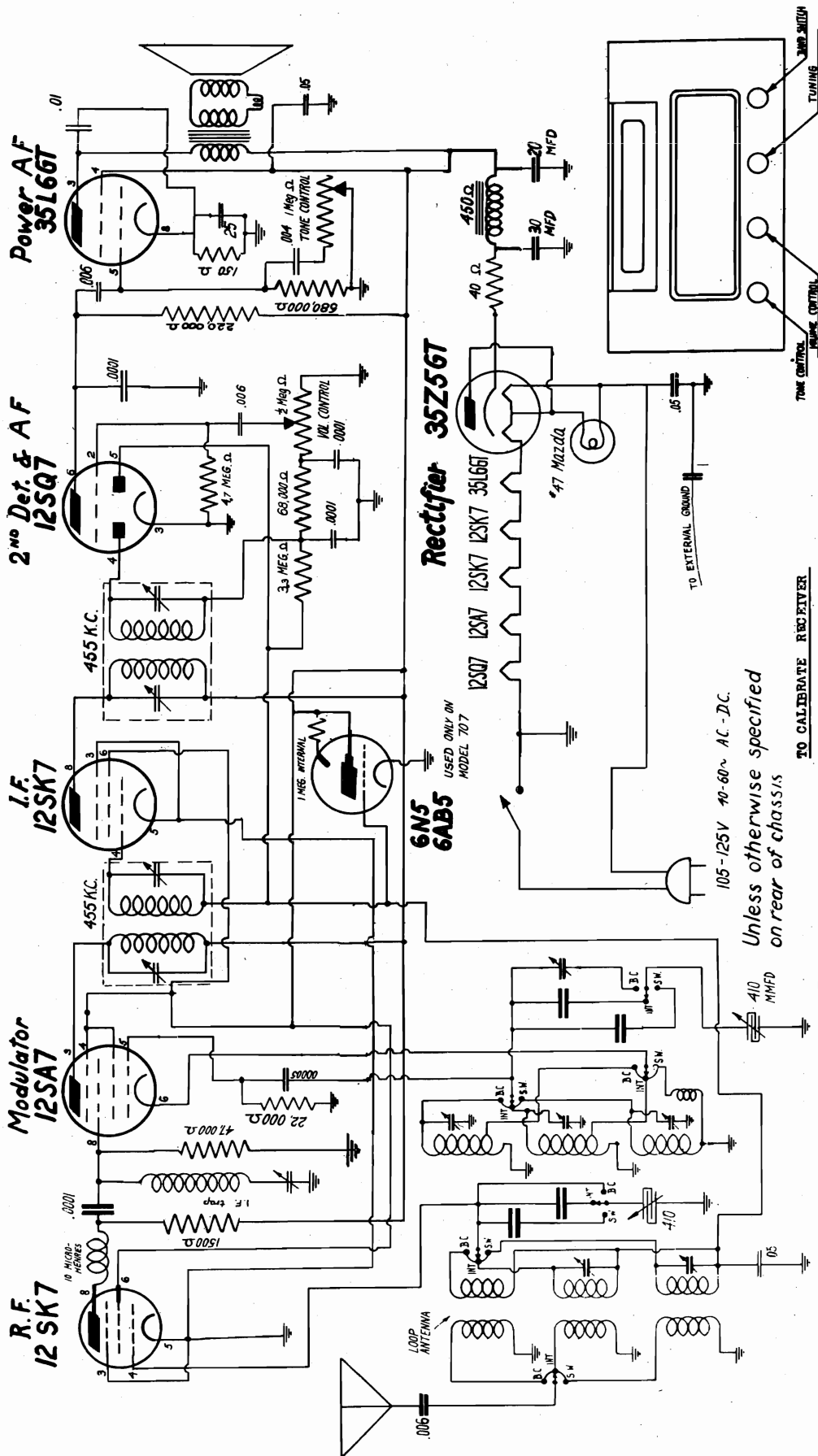
TO CALIBRATE RECEIVER

Attach the antenna side of the signal to one of the leads extending from the rear of the cabinet. Connect the ground side to the other lead. Adjust the signal generator to 455 KC and peak the I.F. trimmers for maximum signal. Set the signal generator and the receiver to 1500 KC and peak the variable condenser trimmers for maximum signal. The low frequency end of the dial is automatically calibrate by a cut section variable condenser.

MODEL 666T

This model is a six tube superheterodyne receiver with full automatic volume control. A self-contained loop is incorporated which makes the use of an antenna unnecessary. The range coverage is 540-1700 kilocycles. The receiver has been designed to operate on 105-125 volts, 40-60 cycles A.C.-D.C. unless otherwise specified.

DeWALD RADIO MFG. CORP.



I. F. ALIGNMENT Connect antenna lead of the signal generator to antenna lead of receiver and ground lead of generator to receiver chassis. Short circuit front section of variable condenser. Adjust generator to 455 K.C. and peak I.F. trimmers for maximum signal.

ALIGNMENT FOR MODELS 670, 707, 672-A

SHORT WAVE ALIGNMENT

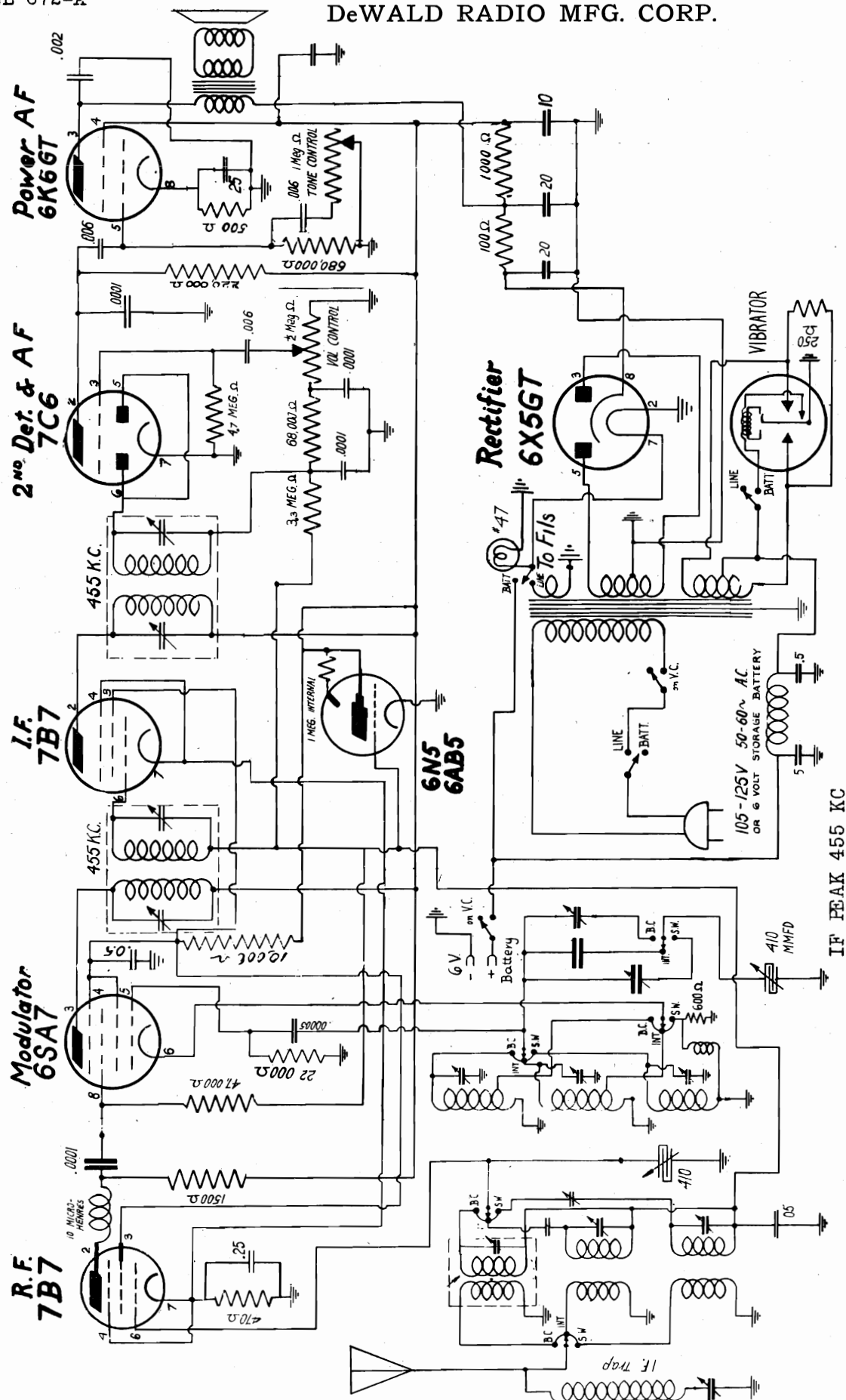
For 4.7-10 M.C. Turn wave band switch knob to this band. Adjust the generator and receiver to 10 M.C. and peak the trimmers for maximum signal. The low frequency is automatically adjusted by a fixed calibrated pad. For 11.5-24 M.C. Turn wave band switch knob to this band. Adjust the generator and receiver to 22 M.C. peak trimmers for maximum signal. The low frequency is automatically adjusted by a fixed calibrated pad.

BROADCAST ALIGNMENT

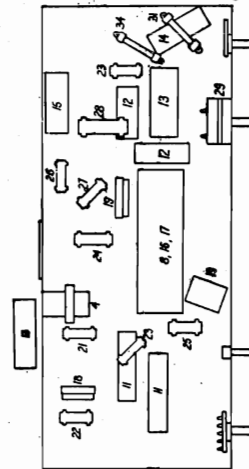
Remove short from variable condenser. Have the wave band switch on broadcast position. Adjust the generator and receiver to 1500 K.C. peak trimmers for maximum signal. Adjust generator and receiver to 600 K.C. and peak the broadcast pad for maximum signal. The variable condenser should be "rooked" during this operation.

MODEL 672-A

FOR ALIGNMENT SEE MODEL 670



MODEL 674



BOTTOM VIEW OF CHASSIS

[illegible]

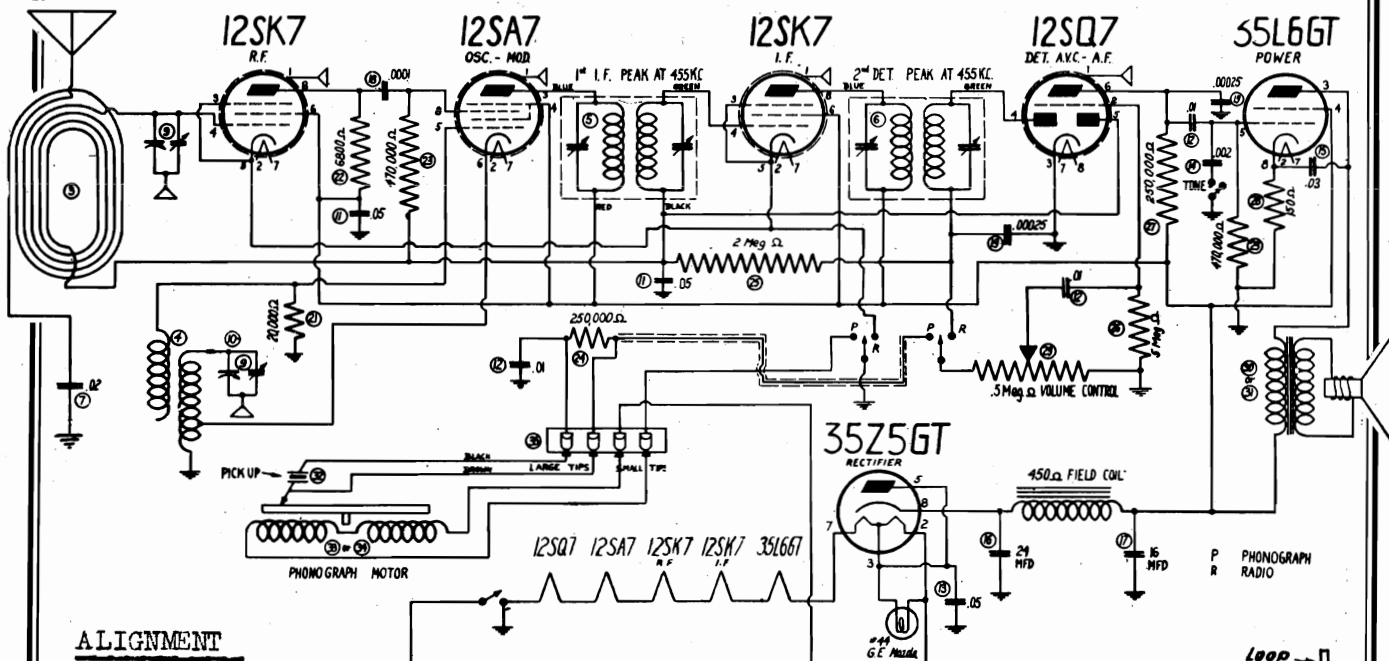
BOTTOM VIEW OF CHASSIS
ALL ABOVE VOLTAGES MEASURED FROM SOCKET TERMINAL TO CHASSIS WITH A
1000 Ω PER VOLT VOLTMETER

RADIO-~~PH~~ONOGRAPH SWITCH

The control on the extreme right is used to operate either the radio or play phonograph disc recordings. When the knob is in the counterclockwise direction, the radio receiver will function. To play records, turn the knob clockwise. This will adjust the instrument for phonograph operation. If a rise in hum level is noticed when handling the phonograph pick-up, reverse the line cord plug in the electric outlet.

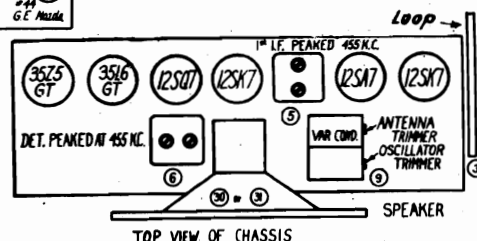
MODEL 675

DeWALD RADIO MFG. CORP.

**ALIGNMENT**

I.F.-----455 K.C.
R.F.-----1700 to
1400 K.C.

FOR CONVENTIONAL
ALIGNMENT SEE
SPECIAL SECTION
VOL. EIGHT



TOP VIEW OF CHASSIS

SERVICE NOTES

Tuning Control Drive Ratio _____ 12:1
Power Consumption (with phono) _____ 40 watts
Intermediate Frequency _____ 455 K.C.
Tuning Frequency Range _____ 540-1700 K.C.
Maximum Power Output _____ 0.9 watts
Loud Speaker _____ Cone Diameter--5 inches
Voice Coil Impedance _____ (at 400 cycles) 3 ohms

Plate (8) of 12SK7 R. F. tube to common ground _____ 17 volts
Screen (6) of 12SK7 R.F. tube to common ground _____ 85 volts
Plate (3) of 12SA7 tube to common ground _____ 85 volts
Screen (4) of 12SA7 tube to common ground _____ 85 volts
Plate (8) of 12SK7 I.F. tube to common ground _____ 85 volts
Screen (6) of 12SK7 I.F. tube to common ground _____ 85 volts
Plate (3) of 35L6GT tube to common ground _____ 80 volts
Screen (4) 35L6GT tube to common ground _____ 85 volts
Cathode (8) 35L6GT tube to common ground _____ 5.0 volts
Cathode (8) 35Z5GT tube to common ground _____ 120 volts
Heater (2) and (7) of 12SA7 tube _____ 12.4 volts AC
Heater (2) and (7) of 12SK7 R.F. tube _____ 12.4 volts AC
Heater (2) and (7) of 12SK7 I.F. tube _____ 12.4 volts AC
Heater (2) and (7) of 12SQ7 tube _____ 12.4 volts AC
Heater (2) and (7) of 35L6GT tube _____ 35.0 volts AC
Heater (2) and (7) of 35Z5GT tube _____ 35.0 volts AC

SERVICE INFORMATION

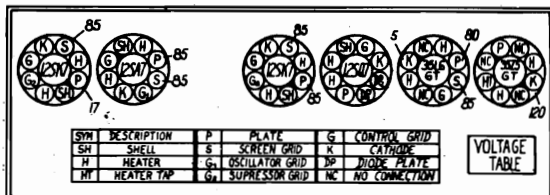
Voltages--Line 117 Volts AC--Power Consumption 40 Watts including Phono-graph Motor. Volume Control maximum. Meter 1000 ohms per volt, 250 volt

R.F. Alignment

Connect an output meter across the voice coil. Rotate the volume control to maximum. Set test oscillator to 455 kilocycles and apply signal to control grid of 12SK7 R.F. through a .05 mfd. capacitor. Align the second I.F. transformer trimmers, next adjust the first I.F. transformer trimmers. Keep the test oscillator output to a level that will give a good meter reading.

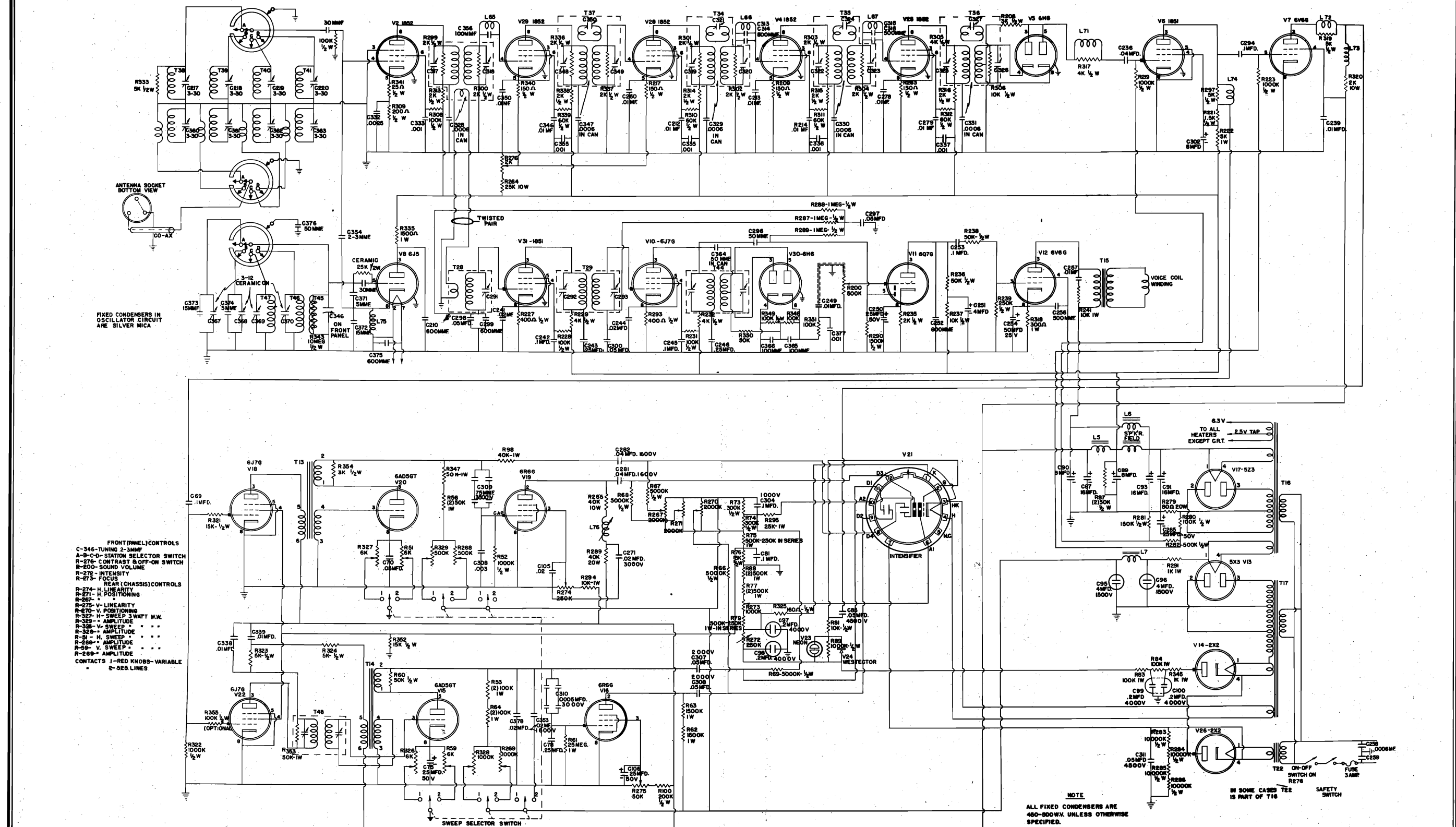
R.F. Alignment

Attach high side of test oscillator to flexible lead extending from rear of chassis through a .00025 mfd. condenser. Connect the low side to the receiver chassis. Adjust the test oscillator and receiver to 1700 kilocycles. Peak 1700 kilocycles oscillator trimmer for maximum output. Change test oscillator signal and receiver dial to approximately 1400 kilocycles. Then trim 1400 kilocycles antenna trimmer for maximum output.



BOTTOM VIEW OF CHASSIS

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MODELS 180X
to 183X

1. AUDIO CIRCUITS

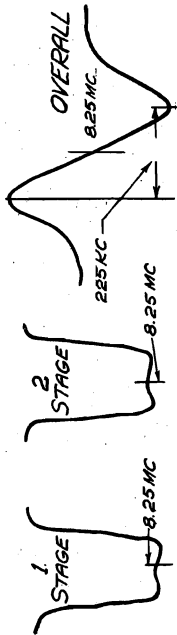
ALIGNMENT AND PRODUCTION TESTING OF TELEVISION RECEIVERS.

Operation of the audio frequency amplifier may be checked by touching the grid of the 6Q7 and noting hum pickup in the speaker. The first video IFT should be adjusted roughly as it affects the sound I.F. characteristic.

Next, the I.F. amplifier should be aligned, using an oscillograph connected to the screen of the 2nd I.F. tube (screen by pass removed) and a wobulator connected to the proper points to indicate the desired characteristic. The 2nd I.F.T. should be adjusted first with the wobulator connected to the grid of the first I.F. tube (185L), and then the first I.F.T. adjusted with the wobulator connected to the converter grid. Next the 6J7 screen by pass should be put back, the oscillograph shifted to the diode output at the first audio coupling condenser, the .001 de-emphasis condenser opened, and the discriminator transformer adjusted.

The output of the wobulator should be of the order of 5000 microvolts which may be obtained from the RCA wobulator using the low tap with a 10 ohm resistor shunting it to ground. A Ferris signal generator may be used as a marker connecting it to the wobulator output (low tap) through a 100 ohm resistor.

The appearance of the characteristics are indicated by the sketches below. The exact shape of these curves will vary somewhat with individual receivers.



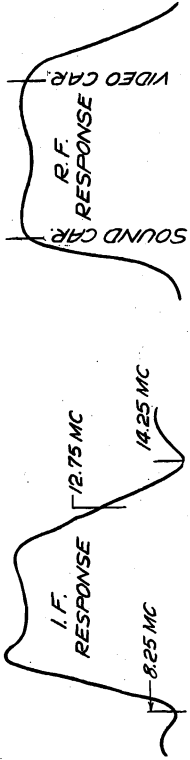
A check on alignment should be made using a Ferris signal generator with about 5000 microvolts output. Tuning the signal generator through the band two equal peaks ($\pm 10\%$) and a null point should be observed. The null point should be at 8.25 mc (± 15 Kc).

Sensitivity should then be checked using the Ferris signal generator connected to the converter grid, and the oscillograph connected to the plate of the 6V6G audio output tube. The input for an average output for the two peaks of 50 V. p. to p. (1" di-rect on 188) should be from 30 to 100 microvolts. (At this low input the two peaks may not be exactly equal due to the fact that signal level affects the I.F. tuning to some extent.)

2. VIDEO I.F. CIRCUITS

An oscillograph is attached to the 6H6 video detector load. An I.F. wobulator is connected successively to the last I.F. stage, next to the last, and so on, back to the mixer grid with adjustment of the corresponding I.F. transformer at each step. In this alignment the overall curve is approximately that shown below. This sketch is illustrative of several receivers but the exact amount of dip is somewhat variable and the final adjustment generally involves use of an actual test pattern received by R.F. It

is desirable that the video I.F. alignment shall have the 6db attenuation at the carrier to provide successful reception of the single side band transmission. 4 of the 5 picture I.F. transformers are triple tuned while the first I.F. transformer is a double tuned unit. When tuning the video I.F. transformer in the plate of the mixer tube, the R.F. circuits should be disconnected from the grid of the mixer before attaching the I.F. signal wobulator to this grid so as to insure flat input.



The trap to reject the adjacent channel picture carrier and the traps to reject the associated sound carrier are all pre-tuned and need no further adjustment. These traps are tuned in manufacture using a Q-meter.

3. R.F. CIRCUITS

The R.F. circuits are aligned by using an input wobulator having relatively high voltage of the order of 1 volt covering the channels as follows:

1	50-56 Mc
2	60-66 Mc
4	78-84 Mc
6	96-102 Mc

To determine the characteristic of these R.F. circuits independent of I.F. response, an oscillograph is connected with its grounded terminal to the B plus supply (using care not to touch the oscillograph) and with its vertical input amplifier connected to the mixer screen. In this way the mixer screen response represents quite adequately the band pass characteristics of the R.F. circuits. This high level wobulator is applied to the antenna terminals, following which the R.F. antenna coil and the mixer grid coil are tuned with the corresponding condensers for each band. The response curve for each band is represented by the sketch above, showing the response for one of the bands which is typical of all of them. The higher channels are somewhat broader than this. During this alignment the oscillator tube has been removed.

Alignment of the oscillator itself is made by using a signal generator tuned to the carrier frequency for the sound channel. Then the oscillator trimmers are adjusted for each of the 4 channels mentioned above so that the sound carrier is received as indicated by the loud speaker. To insure that the oscillator is tuned above the desired carrier the signal generator is then tuned to the picture carrier and a check of received signal is made through the video channel. Another check is to see that the minimum capacity of the oscillator trimmer is used where it is possible to get 2 oscillator frequencies which pass a sound signal. This adjustment of the oscillator is made with the front knob trimmer set at $\frac{1}{2}$ capacitance. A final sensitivity measurement is now made using the signal generator on the carrier frequencies for sight and sound for all 4 channels.

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with the two linearity controls on the sweep deck. In case these adjustments do not cover a sufficient range additional small capacitances are placed in parallel with the grid of the bottom condenser of the potential divider which feeds the grid of the sweep amplifier tube. This added condenser is actually placed from grid to ground of the sweep amplifier tube. In this way the ratio of signal from the oscillator to the signal from the amplifier will be controlled, thus correcting the linearity so that an overall linear sawtooth is produced by combination of a sweep oscillator output which is exponential and a sweep amplifier output which by its grid characteristic produces a reverse curvature.

After linearity has been adjusted the horizontal amplitude control should have at least one inch additional amplitude available. The vertical amplitude control should have several inches of additional amplitude available.

The black sweep control knobs, which are connected by turning the sweep selector switch on the front panel counter-clockwise (to position 2), should be checked to insure that the vertical frequency range includes 30 and 60 fields per second with adequate overlap, and that the horizontal frequency range includes 8000 and 15,750 lines per second with adequate overlap. The black knobs should be set up at the standard 525 lines 30 frames.

The red sweep control knobs, which are connected by turning the sweep selector switch clockwise (to position 1) should be capable of being adjusted to the following color combinations:

(a) CBS color pictures use 375 lines per frame at 60 frames per second which requires a horizontal scanning rate of 22,500 lines per second, and a vertical scanning rate of 120 field scans per second.

(b) NBC has transmitted color with 441 lines per frame and 60 frames per second, requiring 26,460 scanning lines per second, and 120 vertical fields per second.

The Du Mont sync transformer should be adjusted as follows:

A Du Mont picture signal should be applied to the 185L first video grid in accordance with the previous instructions, or received over the air. A diode rectifier with its output connected to an oscillograph should be very loosely coupled to the grid of the horizontal oscillator (green lead on Du Mont sync transformer). This may be done by clipping a battery clip around an insulated portion of the green lead. The oscillograph sweep should be synchronized to the 60 cycle power line, the beam of the CRT should be cut off, and the sweep oscillator tubes of the television receiver removed. The Du Mont sync transformer should then be adjusted for maximum amplitude of the envelope of the H.F. burst pulse as indicated on the oscillograph.

The test pattern should be clean and crisp with no signs of any breakdown visible. Breakdown will cause intermittent black lines which jump back and forth vertically or horizontally tear out similar to that produced by noise, which is particularly noticeable at the black circle of the test pattern.

Very often faulty coupling condensers in the deflection circuits will cause this trouble and tapping them with an insulated red will help locate the faulty part.

The picture sensitivity should be approximately 200 microvolts input signal on all channels to yield 15 volts peak to peak at the final video 6V6 amplifier plate, using an oscillograph for measurement and using a signal generator with 30% modulation. 4

Sound Rejection

While an attenuation ratio of 100 at the sound carrier was sufficient with A.M. sound, it is not adequate with F.M. sound. The signal generator should be tuned through the sound band which is 150 Kc (± 75 Kc) and the attenuation ratio should be at least 100 throughout this band at R.F.

Adjacent Channel Sound Rejection

Previously rejection ratios of 1000 to 1 at R.F. was attained, measurements should be made by tuning through the band as above and the ratio should be over 500 throughout the band.

The sound sensitivity at R.F. should be approximately the same as at I.F.

4. VIDEO AND SWEEP CIRCUITS

This alignment of the video amplifier and the sweep circuits can be made either with an over-the-air test pattern or with a test pattern from a coaxial line. When an over-the-air transmission is used the signal is applied to the antenna terminals.

However, when a coaxial line signal is used, it is necessary to observe the precaution of a suitable input network for applying the signal to the grid of the 185L first video amplifier tube. This tube has a fixed bias within the set to which its grid lead is returned and its cathode is grounded. It is therefore desirable to insert a coupling condenser of at least 0.1 ufd from the coaxial line and supply a grid leak from the 185L grid lead of at least $\frac{1}{2}$ megohm between the 185L grid cap and the lead wire from beneath the chassis which would otherwise normally be connected to the 185L. In this way the proper fixed bias is still applied to this tube.

After alignment has been made as outlined above there are certain tests and precautions that should be followed closely in order to eliminate the possibility of shipping either defective receivers or those that are not up to standard in efficiency and quality. A co-ax line carrying a composite video signal to be used for checking video amplifier and sync circuits should be monitored to make sure that Horizontal Blanking is no more than 16% and front porch comprises 2% of total. Vertical Blanking should be from 7 to 8%.

The 185L tube and 6V6 tube of the 2 stage video frequency amplifier have their frequency constants such that the overall response to the cathode-ray tube grid is essentially flat from 30 cps to 3 $\frac{1}{2}$ megacycles with a gradual drop to approximately 4 $\frac{1}{2}$ megacycles at which time the response is down to about 30%. This original design was checked with the video frequency wobulator and it has been found unnecessary to check each receiver individually except for general observation of a test pattern which is adequate to show up any actual mistake in the circuit wiring of the peaking coils, etc.

The sweep circuits are tested to determine the adequacy of amplitude and frequency range. Linearity adjustment is made

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MODELS 180X
to 183X

SERVICE NOTES

DU MONT TELEVISION RECEIVERS

THE FOLLOWING information was compiled by the Service Department and is based on actual experience acquired in the field over the last three years.

ANTENNA INSTALLATION

ERECT the antenna in the clear whenever possible, as high and as far back from the street as possible.

ANTENNAS over 15 feet high should be guyed securely. Mount antenna securely on a chimney or wall, using the hardware and mounting brackets supplied by the antenna manufacturer.

INSTALLATION crew should consist of two men. One man on the roof to rotate the antenna and locate the position. Another man at the set to watch the results. These two men should be in constant communication. Philco phones will serve the purpose. Connect the speaker of the Philco phones to 25 feet of transmission wire with a pair of insulation-piercing clips - this enables you to clip on the lead-in wire without breaking the insulation. Connect the master station in series with the antenna lead-in wire and antenna plug at the set, thereby giving constant communication with the operator on the roof without using extra lead-in wire for the phones.

DIPOLE

THE DIPOLE (both rods) should be equal to one-half wave-length of the radiation to be received, for maximum result, and connected to the receiver by means of a transmission line - twin conductor.

FREQUENCIES assigned to each of the New York stations and dipole needed to match the wave length are listed below:

Station	Frequency in M.C.	Length of Dipole	Length of Reflector
WNBT	50-56	100"	112"
WCBW	60-66	90"	96"
WARD	78-84	72"	76"

THIS does not necessarily mean that a separate antenna is required for each station. It has been found that in most parts of the Metropolitan area, a satisfactory signal can be picked up from all three stations on an antenna tuned to WCBW's frequency, 90 inch dipole (45 inches each rod) with reflector. HOWEVER, in some of the outlying points in Long Island, Westchester, and New Jersey it may be necessary to erect a second antenna tuned to WARD's frequency, 72 inches (36" each rod) to pick up their signal, until such time as WARD's power is raised to normal strength.

REFLECTOR

WHEN the receiver is located at a considerable distance from the transmitter, better pick-up and directional properties are required, and a second rod connected parallel to, and 1/4 wave length behind the dipole will reflect the signal back and aid signal strength considerably. The reflector will also help reduce reflections.

THE LENGTH of the reflector rod should be slightly over the overall length of the dipole (see table).

WHEN two antennas of varying lengths are used, remember that the distance between the dipole and the reflector rod of each antenna should approximate 1/4 wave length of the transmitted signal, or 1/8 the length of the dipole.

REFLECTIONS

METAL structures, large buildings in the path of the signal, will reflect the transmitted waves and cause multiple "ghost" images on the screen of the receiver. These "ghosts" are very annoying and should be eliminated by rotating the antenna or changing the location. The use of reflector rods may at times serve the purpose.

SOMETIMES, however, the reflected waves are a blessing in disguise, especially in large cities where low buildings are sandwiched in between high buildings. Very often it is possible to pick up a reflected signal below the line-of-sight, or turn the dipole completely away from the line-of-sight to eliminate "ghosts" and pick up a reflected signal with better results than on a direct pick-up.

IN CERTAIN locations, in large cities, signals radiated by the various stations are reflected from many angles and it will be impossible to eliminate "ghosts" on all stations. In such cases, a second antenna will have to be erected. But, bear in mind that a satisfactory signal either direct or reflected, can always be picked up within the transmission radius with the proper equipment.

TRANSMISSION LINE

THE TWISTED pair transmission line or lead-in wire used should have an impedance of 72 ohms per 100 feet. This type of transmission line can be used in most installations, but it must be remembered that there is an appreciable loss of signal strength in ordinary twisted wires - approximating 20% for lengths from 100 feet to 200 feet.

IN CASES where the signal strength is low to begin with, or where an exceptionally long lead-in is required, co-axial cable is recommended. There is very little loss in comparatively long lengths of co-axial cable.

WHEN the signal level is weak the contrast or sensitivity control of the set has to be turned on "full" and all kinds of noises will be picked up, interfering with the picture. This kind of interference will cause small white spots and flashes similar to a snow storm on the screen, and is known as "snow in the picture".

IF CO-AXIAL cable is used in such cases, the signal level will be raised and the noise level lowered proportionately, giving a clear picture at all times.

----- SERVICE NOTES -----

HERE are some of the most common service problems encountered in the field:

1. Receiver dead
2. Sound but no picture
3. Picture but no sound
4. Poor sound
5. Poor synchronizing picture tears out
6. Bright spot on screen of CRT Sound OK

MODELS 180X
to 183X

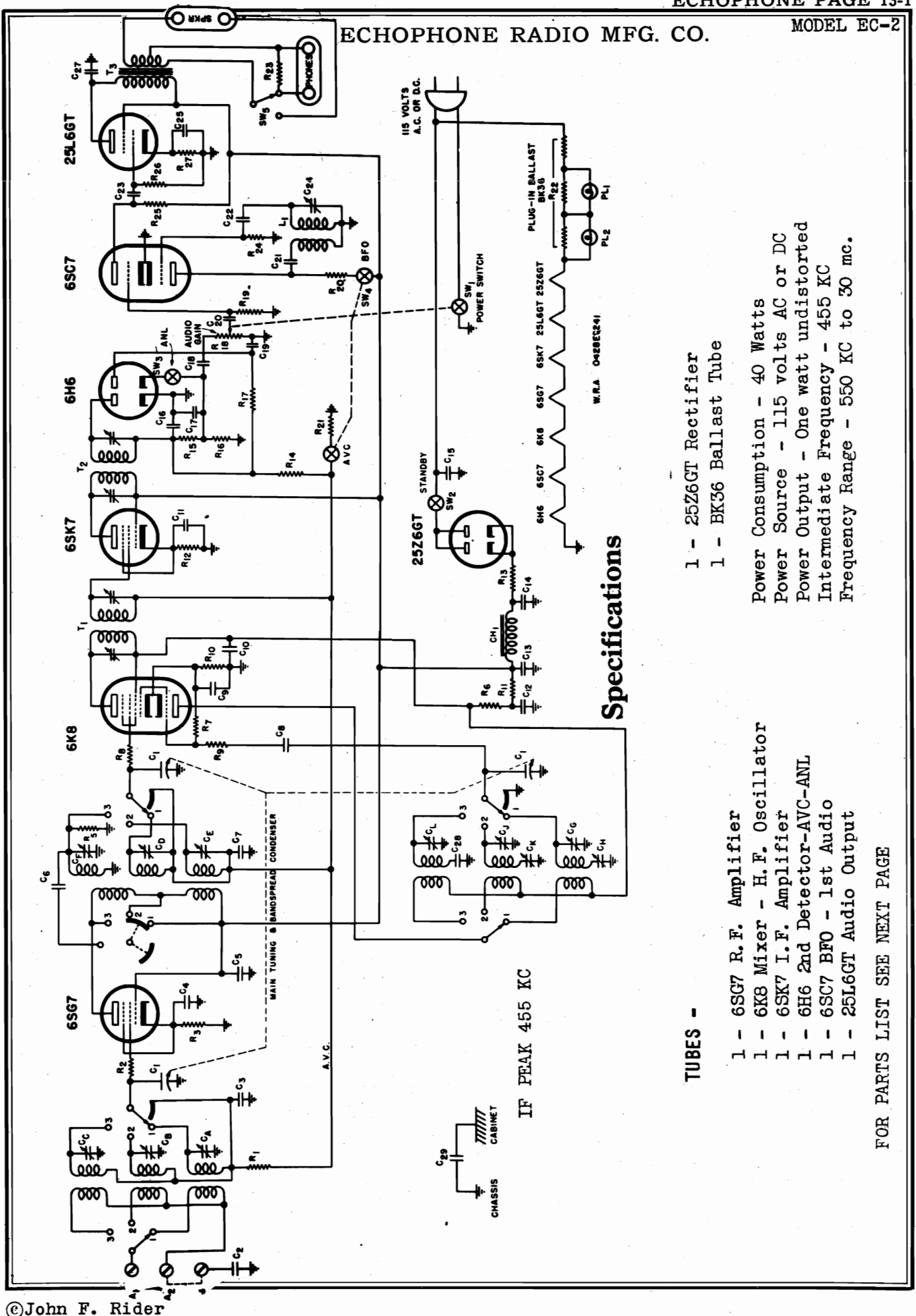
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7. No control of focus or intensity
 - (a) Fibre tongue is usually broken on controls. The fibre tongue insulates the intensity and focus control pots from ground as they are 4000 volts above ground. If no fibre tongues are available, turn controls with an insulated screwdriver to the proper intensity and focus.
 - (b) The 750K and 2 meg. bleeder resistors mounted on the front panel between the focus and intensity pots may be open.
8. Breakdown in raster or test pattern
 - (a) Check for leakage at CRT socket and base.
 - (b) If breakdown is due to leakage at CRT socket, you will hear a sizzling noise at base of CRT socket. If socket hasn't arced across causing complete breakdown, you can put a 25 watt lamp in tube socket to dry out moisture. If that doesn't do it, replace CRT socket and if CRT base is badly burned from arcing send CRT to plant to be rebased.
 - (c) Breakdown is noticed on the raster by the separation of the line structure.
9. Microphonics
 - (a) Check the 6J5 oscillator, 1852 mixer and the 1851 first audio tubes for microphonic conditions.
10. Sound in picture
 - (a) Check 1851 first video amplifier tube.
 - (b) Check 6V6G video amplifier tube.
 - (c) R.F. and detector circuits being off, frequency due to drift or misalignment. Realignment will be necessary.
11. Vertical or horizontal lines on screen
 - (a) Caused by no plate voltage on 6AD5 horizontal or vertical sweep oscillator, due to open plate supply resistors. On the vertical side there are four 100K 1 watt resistors. Always turn down the intensity control if there is a bright horizontal or vertical line on screen or it will become burned.
12. Intermittent sound or picture
 - (a) Due to shorted antenna line.
13. Poor linearity
 - (a) Due to defective 6R6G horizontal or vertical amplifier tube. On the right side of the sweep deck, you will find the horizontal linearity control. On the left side you will find the vertical linearity control. By adjusting controls, poor linearity can be corrected.
- Receiver dead
 - (a) If receiver is dead check a.c. plug and check back of cabinet 8. to make sure safety switch is closed.
 - (b) If 3 amp. fuse is blown, look for a shorted or arcing 2A2, 4000 volt, high voltage rectifier tube.
 - (c) Check for shorted or arcing 5X3, 1500 volt, high voltage rectifier tube.
 - (d) Check for shorted or arcing 2X2, 4500 volt intensifier-rectifier tube mounted in a horizontal position.
 - (e) Check for a shorted high voltage filter condenser in the 1500 or 4000 volt supply.
 - (f) Check for a shorted .05-.4500 volt coupling condenser mounted in a horizontal position under sweep deck.
2. Sound but no picture
 - (a) Check video amplifier by touching grid of 1851 first video amplifier tube. You should see broad white bars on CRT indicating that that circuit is OK. If no response is noted, check that portion of the circuit the 1851, or 6V6G video amplifier tubes may be defective.
 - (b) Drift in oscillator - realign oscillator trimmer.
 - (c) Check 1852 video I.F. amplifier tubes for open filament or shorts.
3. Picture but no sound
 - (a) Check oscillator for drift realign oscillator trimmer.
 - (b) Check 6V6G audio amplifier tube. Check 6Q7G, 6J7G, also 1851 first audio I.F. amplifier tube. These tubes will also cause the sound to be distorted, weak and intermittent.
4. Poor sound
 - (a) Defective 6V6G audio amplifier tube.
 - (b) Shorted or gassy 1st audio 1851 tube.
 - (c) 6Q7G audio amplifier tubes not all the way in sockets - press tubes all the way in socket.
5. Poor synch. Picture tears out
 - (a) A weak signal due to a broken or shorted antenna lead-in or a defective synch. separator tube, will cause the picture to lose synch. Also check frequency controls for correct adjustment.
6. Bright spot on screen of CRT Sound OK
 - (a) If this condition exists, turn intensity off at once as this will burn a spot on the screen of the CRT. Look for a defective 5X3, 1500 volt rectifier tube. If tube is OK look for a shorted 4 mid. 1500 volt filter condenser.

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PASSAIC,
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ECHOPHONE RADIO MFG. CO.

MODEL EC-2



Specifications

TUBES -

- 1 - 6SG7 R.F. Amplifier
- 1 - 6K8 Mixer - H.F. Oscillator
- 1 - 6SK7 I.F. Amplifier
- 1 - 6H6 2nd Detector-AVC-ANL
- 1 - 6SC7 BFO - 1st Audio
- 1 - 25L6GT Audio Output

- 1 - 25Z6GT Rectifier
- 1 - BK36 Ballast Tube

Power Consumption - 40 Watts
 Power Source - 115 volts AC or DC
 Power Output - One watt undistorted
 Intermediate Frequency - 455 KC
 Frequency Range - 550 KC to 30 mc.

FOR PARTS LIST SEE NEXT PAGE

MODEL EC-2

ECHOPHONE RADIO MFG. CO.

RESISTORS

SYMBOL	OHMS	WATTAGE	SYMBOL	OHMS	WATTAGE
R ₁	250,000	1/3	16	250,000	1/3
2	30	1/3	17	1 meg	1/3
3	200	1/3	18	500,000	Audio Gain #25-048
5	10,000	1/3	19	5 meg	1/3
6	300	1/3	20	10,000	1/3
7	50,000	1/3	21	150	1/3
8	30	1/3	22	Ballast Resistor	BK 36
9	100	1/3	23	300	1/2
10	300	1/3	24	50,000	1/3
11	1,000	1/3	25	250,000	1/3
12	200	1/3	26	500,000	1/3
13	15	1/2	27	150	1/3
14	3 meg	1/3			
15	100,000	1/3			

CONDENSERS

SYMBOL	CAPACITY	VOLTAGE	TYPE	SYMBOL	CAPACITY	VOLTAGE	TYPE
C ₁	Main tuning and bandsread			15	.02 mfd	400	Paper
2	.01 mfd	400	Paper	16	100 mmf		Mica
3	.05 mfd	200	Paper	17	100 mmf		Mica
4	.05 mfd	200	Paper	18	.01 mfd	400	Paper
5	.1 mfd	200	Paper	19	.05 mfd	200	Paper
6	5-6½ mmf		Ceramicon	20	.005 mfd	400	Paper
7	.05 mfd	200	Paper	21	.01 mfd	200	Paper
8	25 mmf		Mica	22	100 mfd	#44-055	
9	.05 mfd	200	Paper	23	.01 mfd	400	Paper
10	.02 mfd	200	Paper	24	450 mmf	#44-055	
11	0.1 mfd	200	Paper	25	10 mfd	25	Electrolytic
12	30 mfd	150	Electrolytic	27	.02 mfd	600	Paper
13	30 mfd	150	Electrolytic	28	.0054 mfd		Mica
14	40 mfd	150	Electrolytic	29	0.1 mfd	200	Paper

Alignment Procedure

EQUIPMENT NEEDED FOR ALIGNING AND PRELIMINARY ADJUSTMENTS:

An all wave signal generator which will provide an accurately calibrated signal at the test frequencies listed.

Output indicating meter

Non-metallic screw driver

Dummy antenna 400 ohm, 200 mmf. and 0.1 mfd.

Connect signal generator ground to ground terminal (G) of receiver.

Set bandsread at 100.

Connect output meter across primary of output transformer.

Gain controls - Maximum all adjustments.

I.F. ALIGNMENT

Connect 0.1 mfd. dummy antenna between high side of generator and 6K8 grid.

Set signal generator to 455 kc.

Adjust all trimmers on T₁, T₂ and T₃ for maximum output.

Adjust the BFO control to give the desired beat note with the 455 kc I.F. signal. This adjustment, C24, is located under chassis.

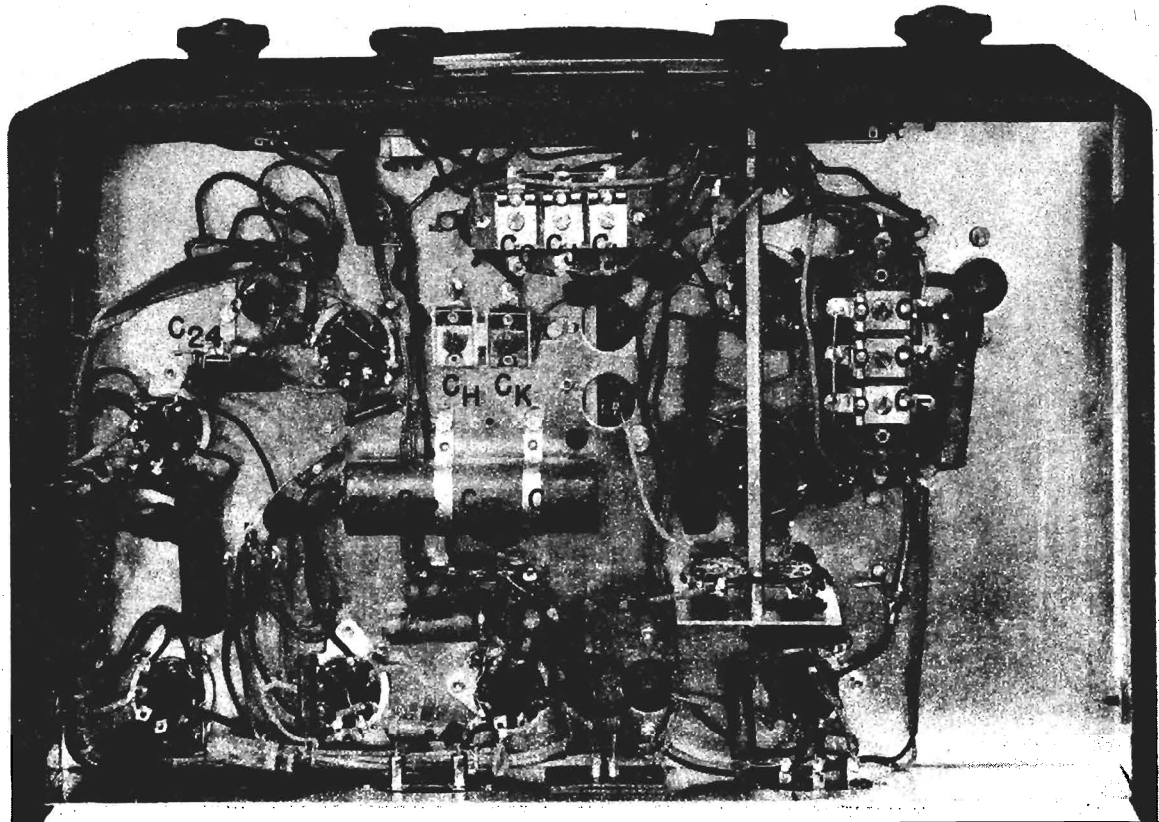
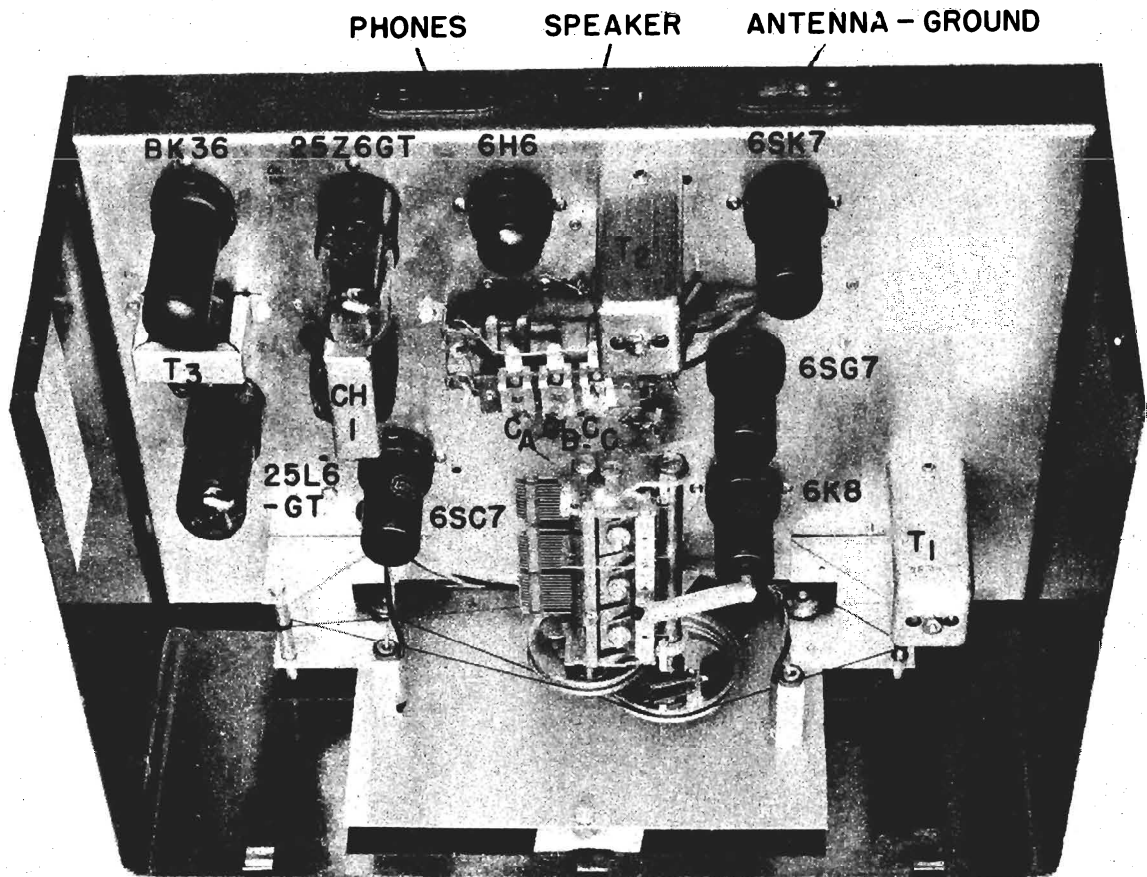
R. F. ALIGNMENT

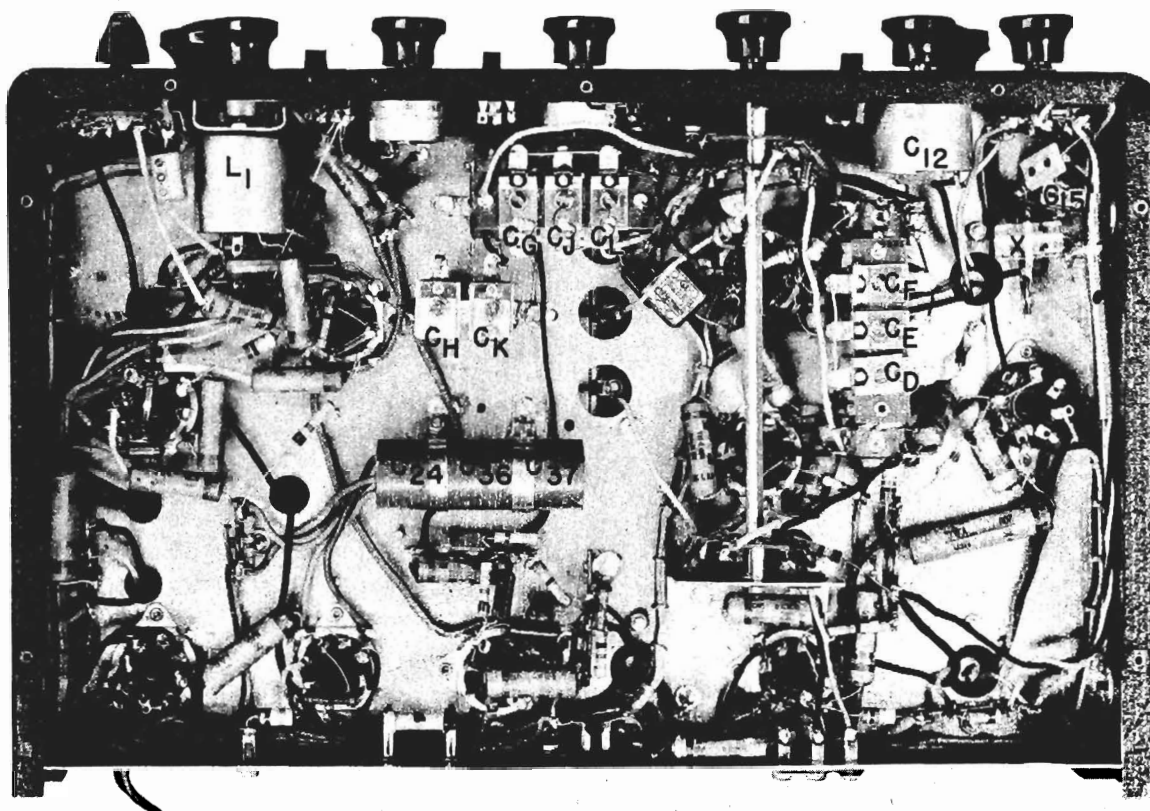
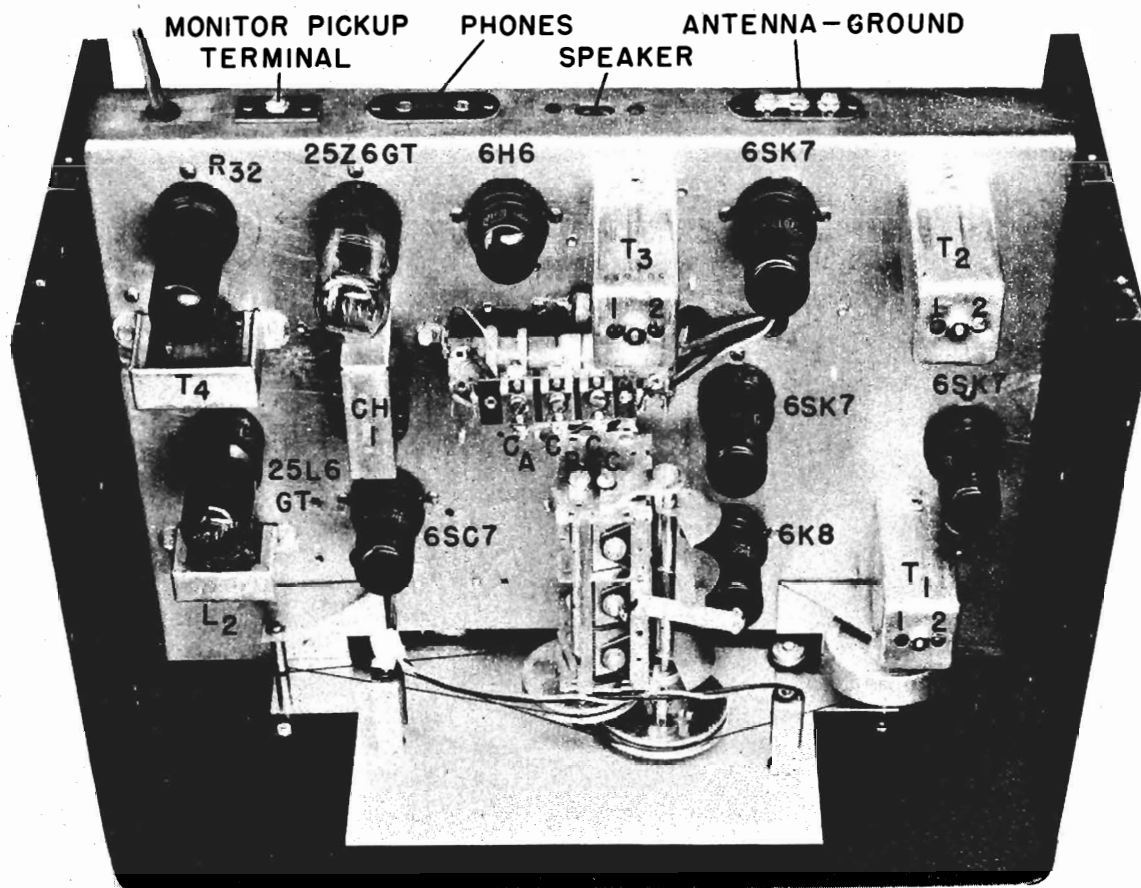
The following table indicates R. F. alignment procedure.

Band	Signal Generator		Pad	Trimmers	Adjustment
	Frequency Setting	Dummy Antenna			
1	600 kc 1800 kc	200 mmf 200 mmf	C _H none	none C _A C _E C _G	maximum output maximum output
2	2.5 mc 7.0 mc	400 ohm 400 ohm	C _K none	none C _B C _D C _J	maximum output
3	no padding condenser 28 mc	400 ohm	on this band	C _C C _F C _L	maximum output

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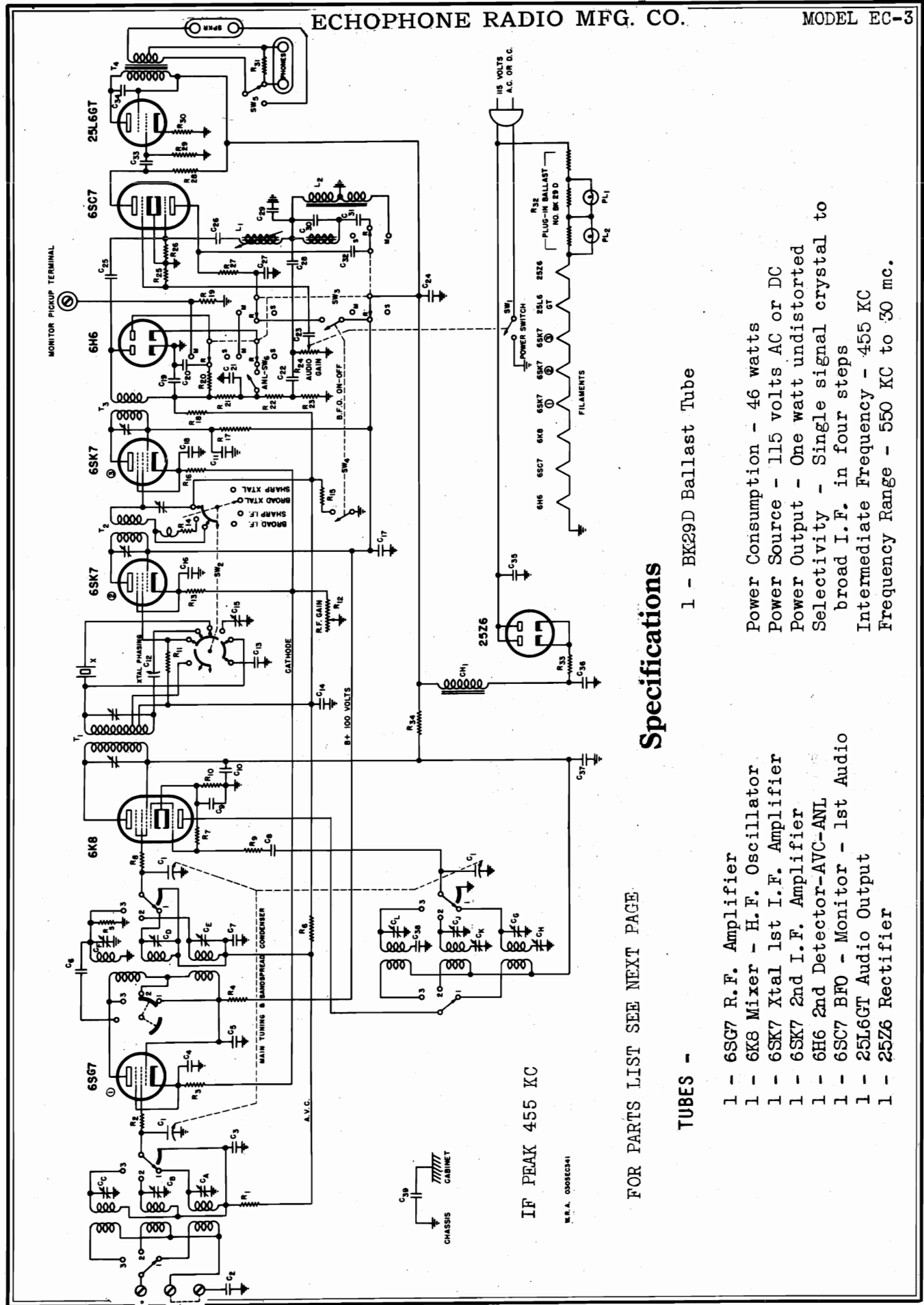
MODEL EC-2





ECHOPHONE RADIO MFG. CO.

MODEL EC-3



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FOR PARTS LIST SEE NEXT PAGE.

Specifications

TUBES -

- 1 - 6SG7 R.F. Amplifier
- 1 - 6SK8 Mixer - H.F. Oscillator
- 1 - 6SK7 Xtal 1st I.F. Amplifier
- 1 - 6SK7 2nd I.F. Amplifier
- 1 - 6H6 2nd Detector-AVC-ANL
- 1 - 6SC7 BFO - Monitor - 1st Audio
- 1 - 25L6GT Audio Output
- 1 - 25Z6 Rectifier

1 - BK29D Ballast Tube

- Power Consumption - 46 watts
- Power Source - 115 volts AC or DC
- Power Output - One watt undistorted
- Selectivity - Single signal crystal to broad I.F. in four steps
- Intermediate Frequency - 455 KC
- Frequency Range - 550 KC to 30 mc.

MODEL EC-3.

ECHOPHONE RADIO MFG. CO.

CONDENSERS

SYMBOL	CAPACITY	VOLTAGE	TYPE	SYMBOL	CAPACITY	VOLTAGE	TYPE
C1	Main Tuning & Bandsread	400	Paper	C21	50 mmf	400	Mica
2	.01 mfd	200	Paper	22	.01 mfd	400	Paper
3	.05 mfd	200	Paper	23	.005 mfd	400	Paper
4	.05 mfd	200	Paper	24	40 mfd	150	Electrolytic
5	.02 mfd	200	Paper	25	Twisted Leads		
6	5-6 1/2 mfd	200	Ceramic	26	.02 mfd	200	Paper
7	.05 mfd	200	Paper	27	.02 mfd	200	Paper
8	25 mmf	200	Mica	28	.0001 mfd		Mica
9	.05 mfd	200	Paper	29	.0054 mfd		Mica
10	.05 mfd	200	Paper	30	.0005 mfd		Mica
11	.02 mfd	200	Paper	31	25 mmf		Mica
12	25 mmf	Variable		32	.05 mfd	200	Paper
13	4-5 mmf	200	Mica	33	.02 mfd	400	Paper
14	1-9 mmf	200	Paper	34	.02 mfd	600	Paper
15	1-9 mmf	200	Paper	35	.05 mfd	400	Paper
16	.05 mfd	200	Paper	36	30 mfd	150	Electrolytic
17	.25 mfd	200	Paper	37	30 mfd	150	Electrolytic
18	.05 mfd	200	Paper	38	.0054 mfd		Mica
19	50 mmf	200	Mica	39	.25 mfd	200	Paper
20	.05 mfd	200	Paper				

Alignment Procedure

EQUIPMENT NEEDED FOR ALIGNING AND PRELIMINARY ADJUSTMENTS:

An all wave signal generator which will provide an accurately calibrated signal at the test frequencies listed.

Output indicating meter

Non-metallic screw driver

Dummy antenna 400 ohm, 200 mmf. and 0.1 mfd.

Connect signal generator ground to ground terminal (G) of receiver.

Set bandsread at 100.

Connect output meter across primary of output transformer.

Gain controls - Maximum all adjustments.

I.F. ALIGNMENT

Connect 0.1 mfd. dummy antenna between high side of generator and 6K3 grid.

Set signal generator to 455 kc.

Set receiver selectivity in "I.F. SHARP" position.

Adjust all trimmers on T₁, T₂ and T₃ for maximum output.

Remove knob from PITCH CONTROL (L₁) and loosen the set screw holding the shaft extension. This is located on the underside of the chassis.

Adjust the BFO control to give a beat note with the 455 kc. I.F. signal.

If necessary, change the setting by adjusting the screw located under the PITCH CONTROL knob.

Tighten the set screw holding the extension shaft and replace the knob.

Place the SELECTIVITY switch in the CRYSTAL BROAD POSITION.

Detune the signal generator so that a high pitched note is heard (BFO "ON").

Adjust the crystal phasing control for maximum rejection or until minimum volume is obtained.

Adjust #2 trimmer on T₁ noting that the output reaches a maximum, goes through a dip and then back to maximum.

Wobulate the signal generator tuning adjustment and align to the dip between the two peaks.

A distinct change in the crystal note to a wishy sound will be noted when the correct adjustment has been reached.

Now readjust the other trimmers for maximum gain without changing any other adjustments.

Set the selectivity switch to the I.F. Sharp position and adjust the trimmer (C₁₅) under T₁ for maximum output.

R. F. ALIGNMENT

The following table indicates R.F. Alignment procedure.

Band	Signal Generator Frequency	Dummy Antenna	Trimmers	Adjustment
1	600 kc	200 mmf C ₁	none	maximum output
	1800 kc	200 mmf none C ₁	C ₁ C ₂ C ₃	maximum output
2	2.5 mc	400 ohm C ₄	none	maximum output
	7.0 mc	400 ohm none C ₄	C ₄ C ₅ C ₆	maximum output
3	no padding	condenser on this band	C ₇ C ₈ C ₉	maximum output
	28 mc	400 ohm	C ₇ C ₈ C ₉	maximum output

RESISTORS

SYMBOL	OHMS	WATTAGE	SYMBOL	OHMS	WATTAGE	SYMBOL	DESCRIPTION
R1	50,000	1/3	R18	2 meg	1/3	T1	1st I.F. Transformer
2	30	1/3	19	4,000	1/3	T2	2nd I.F. Transformer
3	200	1/3	20	1 meg	1/3	T3	3rd I.F. Transformer
4	1,000	1/3	21	100,000	1/3	T4	Audio output transformer
5	10,000	1/3	22	250,000	1/3	CH1	Filter Choke
6	50,000	1/3	23	500,000	1/3	L1	B.F.O. Coil
7	50,000	1/3	24	500,000	1/3	L2	Monitor Oscillator coil
8	30	1/3	25	5 meg	1/3	SW1	Power switch on audio
9	100	1/3	26	50,000	1/3	SW2	Selectivity switch
10	300	1/3	27	10,000	1/3	SW3	Send-Receive-Monitor switch
11	1 meg	1/3	28	250,000	1/3	SW4	BFO-AVC switch
12	10,000	1/3	29	500,000	1/3	SW5	Speaker-Phones switch
13	400	1/3	30	150	1/2	SW6	ANL switch
14	200	1/3	31	300	1/2		
15	100	1/3	32	Ballast Resistor	1/2		
16	300	1/3	33	15	1/3		
17	1,000	1/3	34	1,000	1/3		

ECHOPHONE RADIO MFG. CO.

MODEL EC-2

MODEL EC-3

BFO-ON-OFF:- This switch removes the AVC and places the BEAT FREQUENCY OSCILLATOR in operation for the reception of CW signals, and for locating weak DX signals. Code signal intensity should be adjusted by the R.F. GAIN CONTROL.

PITCH CONTROL:- Allows adjustment of the beat note obtained from the BEAT OSCILLATOR to a pitch most pleasing to the listener.

AML-ON-OFF:- The AUTOMATIC NOISE LIMITER switch will effectively minimize ignition and similar types of interference which would be objectionable to short wave reception. Best results are obtained with the R.F. Gain full on and the A.F. Gain set near minimum.

Amateurs who operate on C.W. will find the MONITOR circuit in the EC-3 an aid to easier and more efficient operating

A short wire must be connected to the single MONITOR PICKUP TERMINAL at the rear of the receiver to allow a small amount of R.F. energy to be picked up from the transmitter by the monitor circuit. The length of this wire and its proximity to the transmitter can only be determined experimentally, because it depends entirely on the power of your transmitter. Too much coupling is indicated by a raspy note when the monitor circuit is in operation.

The value of the "CRYSTAL SHARP" SELECTIVITY position will be apparent when it is desired to receive CW signals on any of the amateur bands. The tremendous sideband interference encountered will be reduced to a minimum when the SELECTIVITY knob is in the "CRYSTAL SHARP" position and the CRYSTAL PHASING control is adjusted for maximum reduction of unwanted signals. Since tuning becomes easier with decreasing selectivity the receiver should not be set at a SELECTIVITY greater than is necessary. Thus, for best fidelity on the Broadcast band the SELECTIVITY should be "IF BROAD". For amateur phone work the SELECTIVITY may be "IF SHARP" or "SELECTIVITY". This switch allows four step selectivity to meet all receiving requirements.

CRYSTAL PHASING:- This control is in the circuit only when the SELECTIVITY switch is in the "CRYSTAL SHARP" or "CRYSTAL BROAD" positions. The function of the PHASING control is to eliminate the unwanted interfering sideband signal.

CONTROLS & THEIR FUNCTIONS:

A.F. GAIN:- The ON-OFF switch is part of the A.F. Gain Control. Turning this knob to the right turns the receiver ON and increases the volume. Turning it all the way to the left decreases the volume until the switch clicks and the receiver goes off. The pilot lights indirectly illuminate the dial scale when the power is on.

MAIN TUNING:- The main tuning control, when rotated, will tune the receiver to any frequency throughout its range.

R.F. GAIN:- This control adjusts the sensitivity of the receiver by varying the cathode bias on the R.F. and I.F. amplifier. Maximum sensitivity will be obtained when this control is rotated as far as it will go to the right.

BAND SWITCH:- Turning this knob connects the proper coils in the circuit to tune the desired frequency range.

Band 1 - 550 to 2100 K.C.
Band 2 - 2.1 to 8.1 M.C.
Band 3 - 8 to 30 M.C.

BAND SPREAD TUNING:- The band spread control acts as an electrical vernier on the main tuning condenser. The 80, 40, 20 and 10 meter amateur bands are calibrated on the band spread scale together with a logging scale. To use these amateur band calibrations it is necessary that careful adjustment of the main tuning pointer be made; the most convenient way being to set the BAND SPREAD TUNING pointer to your transmitter frequency or some known receiver frequency, then adjust the MAIN TUNING pointer until the signal is heard. If this is not possible it will be necessary to locate the bands by setting the main tuning pointer at the high frequency end of the desired amateur band; then adjust the band spread pointer until amateur signals are heard. The band may then be scanned by the BAND SPREAD TUNING to check the calibration. Slight readjustment of the main tuning may be necessary for best accuracy of the BAND SPREAD scale.

"STDBY-RECEIVE-MONITOR" This switch must be in the RECEIVE position for normal operation of the receiver. The STANDBY position renders the EC-3 inoperative for standby purposes. The MONITOR position places the CW MONITOR in operation to allow the C.W. operator to listen to his keying.

MAIN TUNING:- The main tuning control, when rotated, will tune the receiver to any frequency throughout its range.

BAND SWITCH:- Turning this knob connects the proper coils in the circuit to tune the desired frequency range.
Band 1 - 550 to 2100 K.C.
Band 2 - 2.1 to 8.1 M.C.
Band 3 - 8 to 30 M.C.

BAND SPREAD TUNING:- The band spread control acts as an electrical vernier on the main tuning condenser. The 80, 40, 20 and 10 meter amateur bands are calibrated on the band spread scale together with a logging scale. To use these amateur band calibrations it is necessary that careful adjustment of the main tuning pointer be made; the most convenient way being to set the BAND SPREAD TUNING pointer to your transmitter frequency or some known receiver frequency, then adjust the MAIN TUNING pointer until the signal is heard. If this is not possible it will be necessary to locate the bands by setting the main tuning pointer at the high frequency end of the desired amateur band; then adjust the band spread pointer until amateur signals are heard. The band may then be scanned by the BAND SPREAD TUNING to check the calibration. Slight readjustment of the main tuning may be necessary for best accuracy of the BAND SPREAD scale.

"STDBY-RECEIVE" This switch must be in the RECEIVE position for normal operation of the receiver. The STANDBY position renders the EC-2 inoperative for standby purposes.

BFO-ON-OFF:- This switch removes the AVC and places the BEAT FREQUENCY OSCILLATOR in operation for the reception of CW signals, and for locating weak DX signals.

AML-ON-OFF:- The AUTOMATIC NOISE LIMITER switch will effectively minimize ignition and similar types of interference which would be objectionable to short wave reception.

PHONES - SPKR:- On the rear apron of the chassis will be found two phone tip jacks. Headphones may remain permanently connected to the receiver. The PHONES-SPKR switch makes it possible to select either.

IMPORTANT:- This receiver, unless otherwise marked, must be operated from 115-125 volts - Alternating OR Direct Current power. If the set does not operate in one minute when connected to Direct Current, reverse the power plug in the receptacle.

Make sure the antenna is not grounded at some point, and is securely connected to the antenna terminal.

The speaker wires may not be plugged into the SPEAKER terminal strip. Be sure the PHONES-SPKR switch is in the SPKR position and the STANDBY switch is in the RECEIVE position.

ANTENNA:- A wire approximately 50 to 75 feet long, including the lead-in, will provide very satisfactory reception throughout the tuning range of the receiver. It should be connected to the A1 terminal of the antenna terminal strip located on the rear apron of the chassis; the jumper between A2 and G should remain in place. A good antenna of this type should be erected as high as possible; insulated from ground, and at right angles to interference producing power lines. A ground connected to the G terminal may be used if it is found to materially improve the operation of the receiver. DO NOT GROUND CHASSIS DIRECT.

A doublet antenna should be connected to terminals A1 and A2. The jumper may remain connected between A2 and G or removed depending upon its favorable effect on reception.

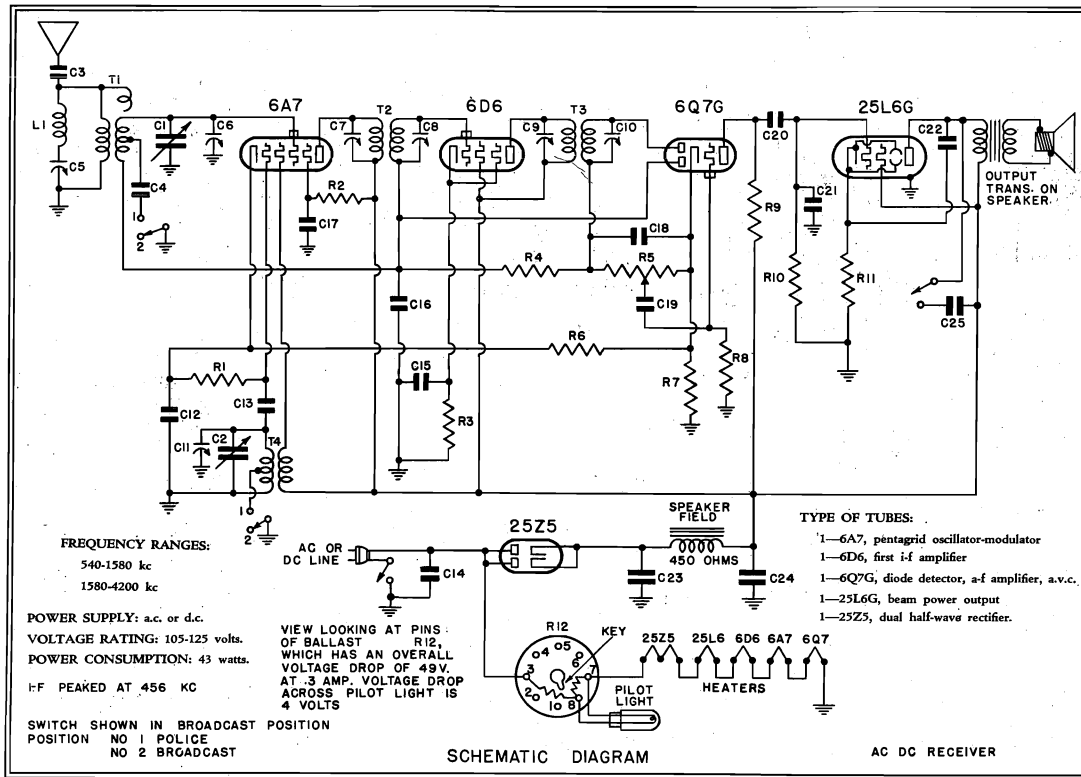
NOTE:- If a ground is used it should always be connected to the G terminal, NEVER to the chassis itself.

CONTROLS & THEIR FUNCTIONS:

A.F. GAIN:- The ON-OFF switch is part of the A.F. Gain Control. Turning this knob to the right turns the receiver ON and increases the volume. Turning it all the way to the left decreases the volume until the switch clicks and the receiver goes off. The pilot lights indirectly illuminate the dial scale when the power is on.

EMERSON RADIO & PHONOGRAPH CORP

MODEL BH-203
Chassis BH



REPLACEMENT PARTS LIST

*Item	Part No.	DESCRIPTION
T1	3RT-384A	Two-band antenna coil.....
T2	3RT-320B	456 kc first i-f transformer.....
T3	3RT-321B	456 kc second i-f transformer.....
T4	3RT-319A	Two-band oscillator coil.....
L1	4DT-343	456 kc adjustable wave-trap.....
R1	KR-53	50,000 ohm 1/4 watt carbon resistor.....
R2	ZZR-196	30,000 ohm 1/4 watt carbon resistor.....
R3	3CR-295	410 ohm 1/2 watt wire-wound resistor.....
R4, R8	HR-42	2 megohm 1/4 watt carbon resistor.....
R5	3FR-256	Volume control with line switch—500,000 ohms.....
R6, R7	3CR-294	240 ohm 1/2 watt wire-wound resistor.....
R9	KR-55	250,000 ohm 1/4 watt carbon resistor.....
R10	KR-56	500,000 ohm 1/4 watt carbon resistor.....
R11	3FR-293	140 ohm 1/2 watt wire-wound resistor.....
R12	2UR-224	Plug-in type ballast resistor.....
C1, C2	3HC-387	Two-gang variable condenser.....
C3	3HC-274	0.002 mf, 600 volt tubular condenser.....
C4	4DC-367	0.0012 mf mica condenser.....
+C5		Trimmer, part of wave-trap assembly.....
+C6, C11		Trimmer, part of variable condenser.....
+C7, C8		Trimmer, part of first i-f transformer assembly.....
+C9, C10		Trimmer, part of second i-f transformer assembly.....
C12, C17	AC-6	0.1 mf, 200 volt tubular condenser.....
C13	AAC-106A	0.00005 mf mica condenser.....
C14	2VC-242A	0.1 mf, 400 volt molded condenser.....
C15	FC-29	0.02 mf, 200 volt tubular condenser.....
C16, C25	BC-12	0.05 mf, 200 volt tubular condenser.....
C18, C21	AC-384	0.0002 mf, 600 volt tubular condenser.....
C19	KC-58	0.01 mf, 400 volt tubular condenser.....
C20	LC-65	0.02 mf, 400 volt tubular condenser.....
C22	FC-336	0.025 mf, 400 volt tubular condenser.....
C23, C24	3CC-261	20 mf, 150 volt wet electrolytic condenser.....
	3RS-231A	Wave-band switch.....
	3RS-251	5 1/2" dynamic speaker.....
	4BL-94	Pilot light, 6.3 volt, .25 amp., Mazda No. 44.....
	3ES-256A	Tone control switch.....
	5HD-49	Six-button mechanical tuning unit.....
	5HZ-801	Station name tabs (complete set).....
	5HZ-802	Celluloid station name tab caps (set of 6).....
	5BB-58	Pilot light socket.....

The color coding of the i-f transformer leads is as follows:
Grid—green Plate—blue
Grid return—black B plus—red

*Item number locates the article on the schematic diagram.

†These trimmers are part of coil assemblies and cannot be supplied separately.

‡These trimmers are part of variable condenser and cannot be supplied separately.

VOLTAGE ANALYSIS

Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed below are from point indicated to ground (chassis) with the volume control turned on full and no signal. Line voltage for these readings was 117.5 volts, 60 cycles, a.c. All readings except cathodes and heaters were taken on 250 volt scale.

Tube	Plate	Screen	Cathode	Osc. Plate	Fil.
6A7	100	50	2.3	100	6.3
6D6	100	100	3.5	—	6.3
6Q7G	43	—	1.2	—	6.3
25L6G	92	100	6.5	—	25.0

Voltage at 25Z5 cathode—130 volts. Voltage across speaker field—30 volts. Voltage drop across ballast resistor (pins Nos. 3, 7)—49 volts. Voltage drop across pilot light section (pins Nos. 8 and 7)—4 volts.

ADJUSTMENTS

An oscillator with frequencies of 456 and 1400 kc is required.

An output meter should be used across the voice coil or output transformer for observing maximum response.

The set's oscillator is higher in frequency than the signal, so images should be observed on the low frequency side of the signals.

The last motion in adjusting trimmers should always be a tightening one, not a loosening one.

Never leave a trimmer with the outside plate so loose that there is no tension on the screw. Either bend the plate up or remove the screw entirely.

Always use as weak a test signal as possible during alignment.

Use a .0001 mf mica condenser as a dummy antenna during alignment.

Location of Coils and Trimmer Adjustments

The two i-f transformers are in oblong coil cans located on top of the chassis deck. The first i-f transformer is the one behind the variable condenser. The trimmers for these transformers are accessible through holes in the tops of the cans.

The 456 kc wave-trap is mounted on the top of the chassis to left of variable condenser. Its trimmer is mounted on the trap.

The antenna coils for the broadcast and police bands are wound on one form and are mounted underneath the chassis deck below the variable condenser.

The oscillator coils for the broadcast and police bands are wound on one form and are mounted on the rear wall of the chassis deck near the variable condenser.

The trimmers for the broadcast antenna and oscillator coils are located on the variable condenser. The trimmer on the section closest to dial is for the antenna coil.

I-f Transformer and Wave-Trap Alignment

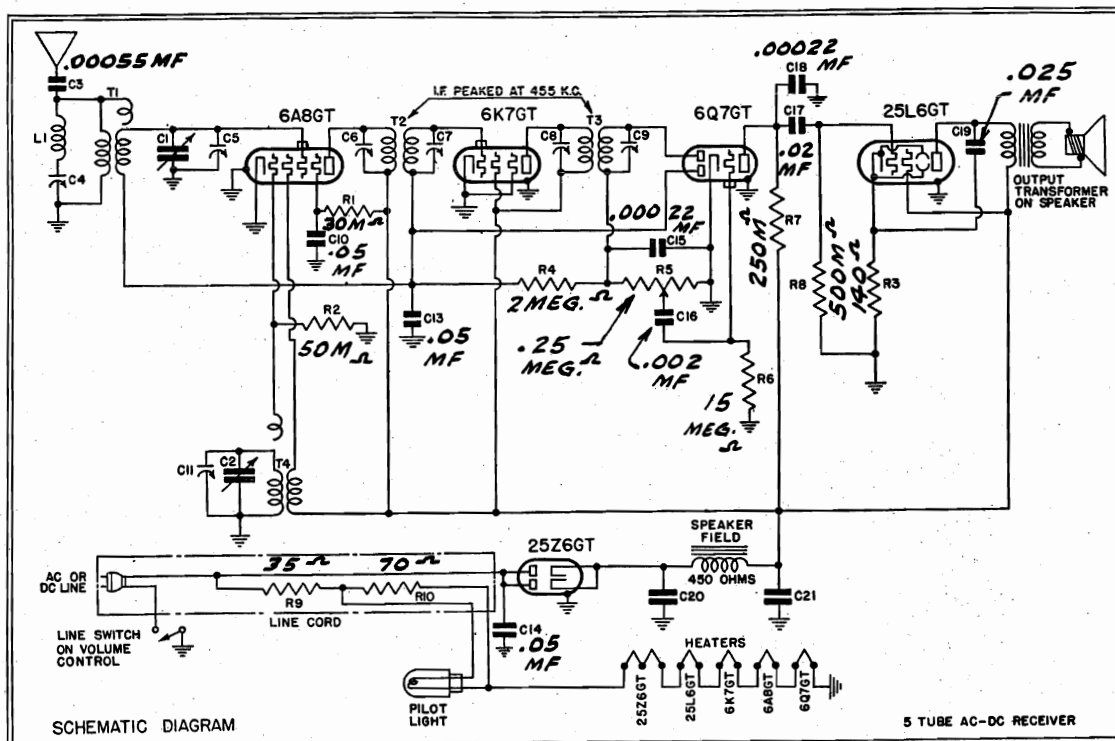
Turn the switch clockwise to the broadcast position and rotate the variable condenser to the minimum capacity position. Feed 456 kc to the grid cap of the 6A7 tube through a .02 mf condenser and adjust the four i-f trimmers for maximum response. Feed 456 kc to the antenna through a .0001 mf condenser and adjust the wave-trap trimmer for minimum response. (See General Notes, No. 7.)

R-f Alignment

With the wave-band switch (rear of chassis) in the broadcast position, clockwise, loosen indicator drive pulley set screw and set the dial indicator at 140. Feed 1400 kc through a .0001 mf condenser to the antenna lead and adjust first the oscillator trimmer (on left section of variable condenser) then the antenna trimmer (on right section of variable condenser) for maximum response. The police band is self-tracking and does not require any adjustment.

MODELS CH246, CH253, CH256,
Chassis CH
MODELS CL246, CL253, CL256,
Chassis CL

EMERSON RADIO & PHONOGRAPH CORP.



SCHEMATIC DIAGRAM FOR CH CHASSIS BEARING SERIAL NUMBERS BELOW 2,395,000

PRODUCTION CHANGES

1. Chassis bearing serial numbers below 2,395,000 differ from the above as follows:

T4	4XT-458	Oscillator coil. (See production change no. 2)
T2	4XT-434	Double-tuned 455 kc first i-f transformer
T3	4XT-435	Double-tuned 455 kc second i-f transformer
R4	KR-57	1 megohm 1/4 watt carbon resistor
R9, R10	4XW-112	Resistance line cord with pilot light section (R9—150 ohms; R10—40 ohms)
C13	AC-6	0.1 mf, 200 volt tubular condenser
C20, C21	4HC-348B	Dual 20 mf, 150 volt dry electrolytic condenser
	4BL-94	Pilot light, 6.3 volt, .25 amp., Mazda No. 44
	4XS-324	4" dynamic speaker
	4XZ-811C	Dial drive shaft

2. Chassis which use oscillator coil 4XT-458 may use 6JT-467 or 6JT-467A as replacement. For correct lug connections for either of the three coils see illustration on next page.

3. Condenser C12 is not used in CH chassis which have the negative connected to the chassis.

4. Not used in CL above 2,656,950.

FOR ALL OTHER DATA SEE EMERSON PAGE 10-22, RIDER'S VOL.X

VOLTAGE ANALYSIS

Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed below are from point indicated to B minus (line switch) with the volume control turned on full and no signal. Line voltage for these readings was 117.5 volts, 60 cycles, a.c. All readings except heaters and cathodes were taken on 250 volt scale. Measurements made with 117.5 volts d.c. will be lower than those given below.

FOR CH SERIAL NUMBERS BELOW 2,395,000:

Tube	Plate	Screen	Cathode	Osc. Plate	Fil.
6A8	100	55	0	100	6.3
6K7	100	100	0	—	6.3
6Q7	43	—	0	—	6.3
25L6	92	100	5.5	—	25.0

Voltage at 25Z6 cathode—125 volts.

Voltage across speaker field—28 volts.

Voltage across pilot light—4 volts.

FOR CH SERIAL NUMBERS ABOVE 2,395,000 AND CL SERIAL NUMBERS BELOW 2,656,950:

Tube	Plate	Screen	Cathode	Osc. Plate	Fil.
12A8	94	50	0	94	12
12K7	94	94	0	—	12
12Q7	40	—	0	—	12
†35L6	87	94	5.2	—	35

†Voltage at 35Z4 cathode—121 volts.

Voltage across speaker field—27 volts.

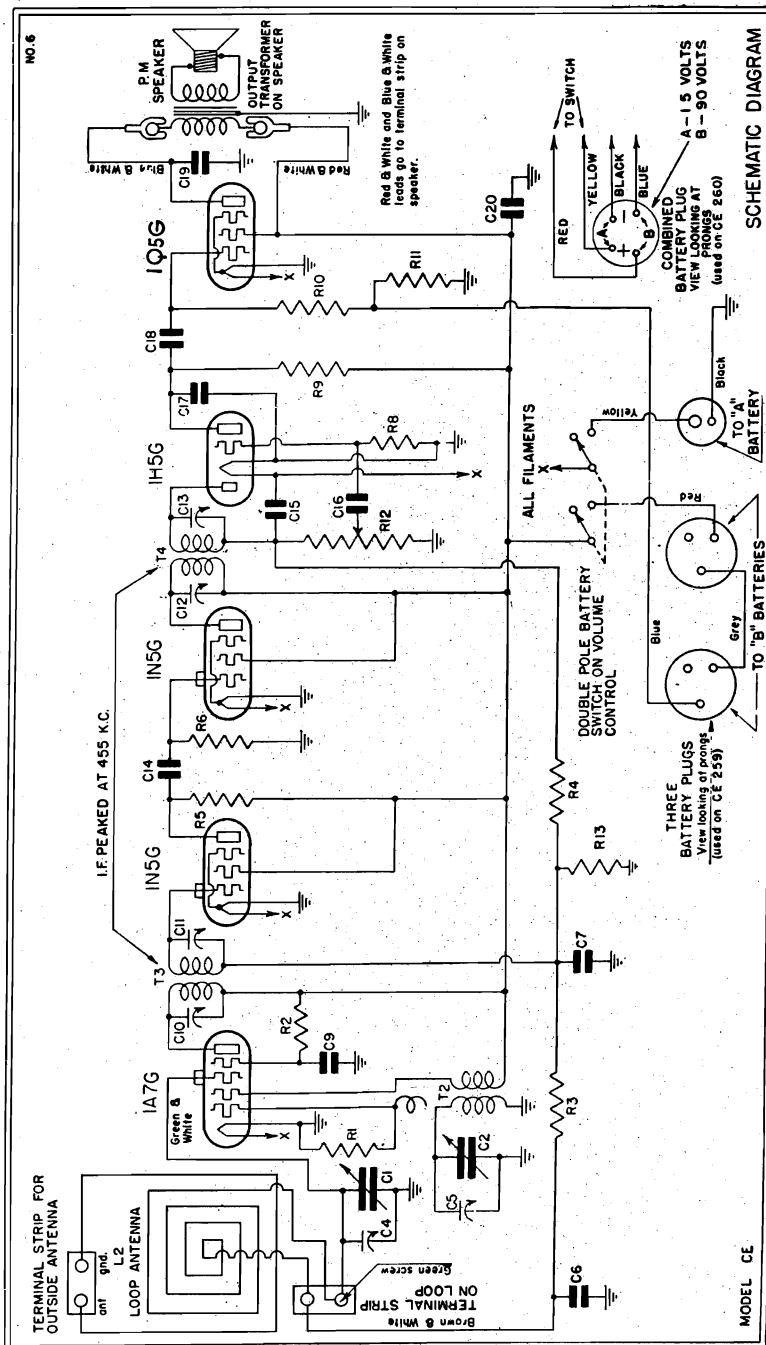
Voltage across pilot light section of ballast resistor (R9)—3.5.

Voltage drop across entire ballast resistor (R9 and R10)—13.5.

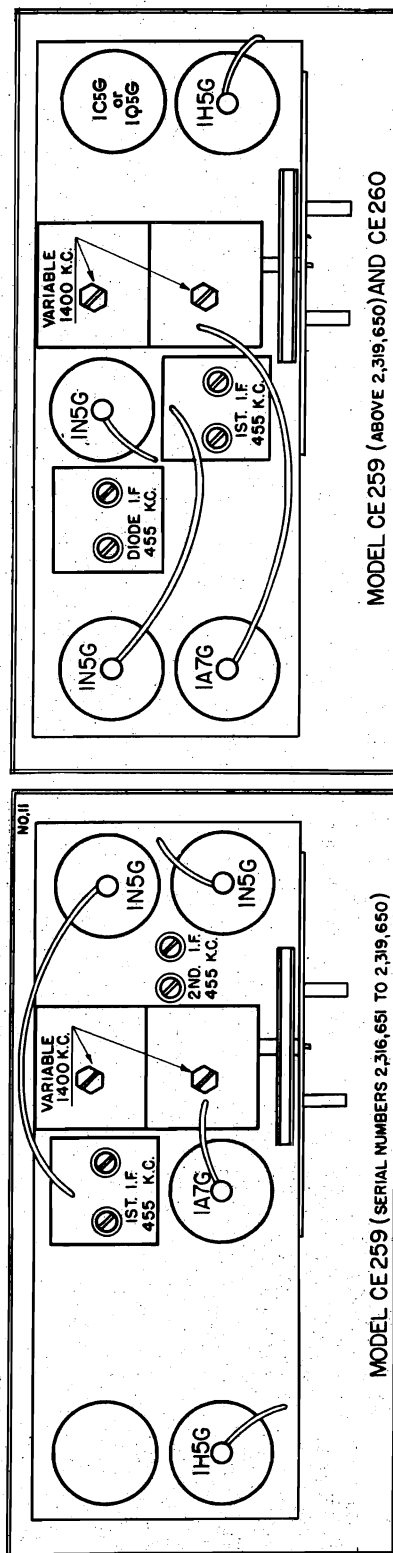
†Plate and screen voltages for 50L6 are 5% lower.

Heater voltage—50 volts.

†Voltage at 35Z5 cathode—115 volts.



SCHEMATIC DIAGRAM FOR MODELS CE-259, CE-260 AND CE-263 (See Production Change No. 7)



LOCATION OF TUBES AND TRIMMING CONDENSERS

MODELS CE-259, CE-260 & CE-263 (See Production Changes Nos. 3, 7)

MODELS CE259,
CE260, CE263
Chassis CE, Late

EMERSON RADIO & PHONOGRAPH CORP.

REPLACEMENT PARTS LIST

When ordering replacement parts specify part numbers.

*Item	Part No.	DESCRIPTION
L2	6EW-146	Loop antenna assembly (for CE-259 only).....
L2	6EW-152	Loop antenna assembly (for CE-260 only).....
L2	6EW-157	Loop antenna assembly (for CE-263 only).....
T2	6JT-467A	Oscillator coil (see production change no. 1c).....
T3	6JT-466B	Double-tuned 455 kc first i-f transformer (see production change no. 1a).....
T4	6MT-472A	Double-tuned 455 kc diode i-f transformer (see production change no. 1b).....
R1	KR-53	50,000 ohm $\frac{1}{4}$ watt carbon resistor (see production change no. 5).....
R2	ZZR-196	30,000 ohm $\frac{1}{4}$ watt carbon resistor (see production change no. 1f).....
R3, R6	KR-54	100,000 ohm $\frac{1}{4}$ watt carbon resistor.....
R4, R8, R13	HR-42	2 megohm $\frac{1}{4}$ watt carbon resistor.....
R5	OR-73	25,000 ohm $\frac{1}{4}$ watt carbon resistor (see production change no. 7b).....
R9, R10	KR-56	.5 megohm $\frac{1}{4}$ watt carbon resistor.....
R11	6ER-358	680 ohm $\frac{1}{2}$ watt wire-wound resistor (see production change no. 7a).....
R12	3HR-240B	Volume control 500,000 ohms with double pole line switch (for CE-259 and CE-263).....
R12	3HR-240C	Volume control 500,000 ohms with double pole line switch (for CE-260).....
C1, C2	4XC-391B	Two-gang variable condenser.....
†C4, C5		Trimmers, part of variable condenser (see production change no. 3).....
C6, C7	BC-12	0.05 mf, 200 volt tubular condenser.....
C9, C18	LC-65	0.02 mf, 400 volt tubular condenser.....
†C10, C11, C12, C13		Trimmers, part of i-f transformer.....
C14	5AC-384	0.0002 mf, 600 volt tubular or mica condenser.....
C15, C17	4XC-394A	0.00022 mf mica condenser (see production change no. 4).....
C16	KC-58	0.01 mf, 400 volt tubular condenser.....
C19	NNC-199	0.001 mf, 600 volt tubular condenser.....
C20	6EC-432	8 mf, 100 volt dry electrolytic condenser.....
	6ES-367A	5" permanent magnet dynamic speaker.....
	4XD-51A	Dial face (see production change no. 2).....
	6ED-69	Indicator dial.....
	4MZ-588B	Dial pointer.....
	4XE-3	Dial crystal (for CE-259 and CE-260).....
	4XE-3B	Dial crystal (for CE-263).....
	5JZ-824	Drive cord spring.....
	4YZ-772	Dial drive cord.....
	6EW-135A	Battery cable (for CE-259).....
	6EW-148	Battery cable (for CE-260).....

*Item number locates the article on the schematic diagram.

†Not supplied separately.

PRODUCTION CHANGES

Chassis bearing serial numbers below 2,319,650 use:

- Double-tuned 455 kc first i-f transformer, part no. 4XT-434A
- Double-tuned 455 kc diode i-f transformer, part no. 4XT-435B.....
- Oscillator coil, part no. 4XT-433.....
- The low side of the volume control (R12) is connected to A plus instead of A minus (chassis) as shown in the schematic.
- Condenser C19 is connected from plate to B plus instead of from plate to ground as shown in the schematic.
- Resistor R2 is 50,000 ohms, part no. KR-53, instead of 30,000 ohms.
- Chassis using oscillator coil 4XT-433 have a 60 mmf condenser connected from oscillator grid to the grid terminal of the coil. Coil 6JT-467A has an extra capacity winding on the form which replaces this condenser.

Chassis bearing serial numbers below 2,408,049 use dial face, part no. 4XD-51

On Model CE-260 the antenna trimming condenser (C4) is mounted on the loop antenna frame instead of on the variable condenser.

In chassis bearing serial numbers above 2,319,650 condenser C15 is connected from the high side of the volume control to ground instead of to A plus as shown in the schematic.

Chassis bearing serial numbers below 2,439,541 use R1, 200,000 ohm $\frac{1}{4}$ watt carbon resistor.....

Chassis bearing serial numbers below 2,440,834 use R5, 10,000 ohm $\frac{1}{4}$ watt carbon resistor.....

Chassis bearing serial numbers below 2,593,855 use 1C5G output tube in same position on chassis as 1Q5G output tube and also have following changes:

- Resistor R11 was 740 ohm $\frac{1}{2}$ watt wire-wound resistor.....
- Resistor R5 was 10,000 ohm $\frac{1}{4}$ watt carbon resistor.....

Chassis bearing serial numbers above 2,593,855 use a resistor 50,000 ohms in series with the high side of the volume control. This resistor is not shown on the schematic diagram.

EMERSON RADIO & PHONOGRAPH CORP.

MODELS CE259,
CE260, CE263
Chassis CE, Late

DESCRIPTION

TYPE: Single-band superheterodyne.

FREQUENCY RANGE:

540-1730 on early CE-259

530-1600 on all Models CE-260, CE-263 and later CE-259.

NUMBER OF TUBES: Five.

TYPE OF TUBES:

1—1A7G, oscillator-modulator

1—1N5G, 1st i-f amplifier

1—1N5G, 2nd i-f amplifier

1—1H5G, 2nd detector, a.v.c., a-f amplifier

†1—1C5G, pentode output, or, 1Q5G, beam power output
(see production change no. 7).

POWER SUPPLY: A and B batteries.

VOLTAGE RATING:

1.5 volts A

90 volts B

CURRENT DRAIN:

.3 amps A at 1.5 volts

.01 amps B at 90 volts.

GENERAL NOTES

1. Batteries. The Models CE-259, CE-260 and CE-263 are designed to house the complete set of batteries within the cabinet.
2. The color coding of the i-f transformer leads is as follows:
Grid—green Plate—blue
Grid return—black B plus—red
3. The color coding of the battery cable is as follows:
Red—B plus, 90 volts Yellow—A plus, 1.5 volts
Blue—B minus Black—A minus.
4. If replacements are made in the r-f section of the circuit, the receiver should be carefully re-aligned.
5. Models CE-259, CE-260 and CE-263 have self-contained antennas and do not require additional antenna or ground connections. For permanent home installations of either model, however, if it is desired to improve reception of weak stations, an additional outdoor antenna should be used. For this purpose a terminal strip is provided in the cabinet for antenna and ground connections. (See diagram on last page.)
6. The self-contained loop antenna operates at maximum efficiency when its position is at right angles to the broadcasting source. It is important, therefore, once the station is tuned in, to rotate the cabinet back and forth through a quarter of a circle (90 degrees), leaving it at the position where the station is received with maximum volume.

BATTERY COMPLEMENT

FOR MODEL CE-259 (Portable)

Type Battery	No. Req.	Eveready Part No.	Ray-o-vac Part No.	Burgess Part No.
1½ volt "A"	1	742 (plug-in type)	P-94A (plug-in type)	4FA-PI (plug-in type)
45 volt "B"	2	762 (plug-in type)	P-5303 (plug-in type)	B30-PI (plug-in type)

FOR MODEL CE-260

Combined "A" and "B" Pack	1	748 (plug-in type)	AB82 (plug-in type)
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FOR MODEL CE-263 (Portable)

1½ volt "A"	1	741 (plug-in type)	P-96A (plug-in type)	8F (plug-in type)
45 volt "B"	2	762 (plug-in type)	P-5303 (plug-in type)	B30-PI (plug-in type)

VOLTAGE ANALYSIS

Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed are from point indicated to chassis with volume control turned on full and no signal. The battery voltages for these readings were: "A" 1.5 volts, "B" 90 volts.

Tube	Plate	Screen	Osc. Plate	Fil.
1A7G	82	52	82	1.5
1N5G, 1st i-f	70	82	—	1.5
1N5G, 2nd i-f	82	82	—	1.5
1H5G	25	—	—	1.5
†1C5G or 1Q5G	77	82	—	1.5

Bias for the 1C5G or 1Q5G tube is obtained across the resistor R11. The voltage drop across this resistor should be 7.8 volts with 1C5G or 7volts with 1Q5G (see production change no. 7.)

MODELS CE259,
CE260, CE263

EMERSON RADIO & PHONOGRAPH CORP.

Chassis CE, Late

ADJUSTMENTS

An oscillator with frequencies of 455 and 1400 kc is required.

An output meter should be used across the voice coil or output transformer for observing maximum response.

Always use as weak a test signal as possible when aligning the receiver.

Location of Coils and Trimmer Adjustments

The oscillator coil is located beneath the chassis. The trimmer for the oscillator coil is on the rear section of the variable condenser.

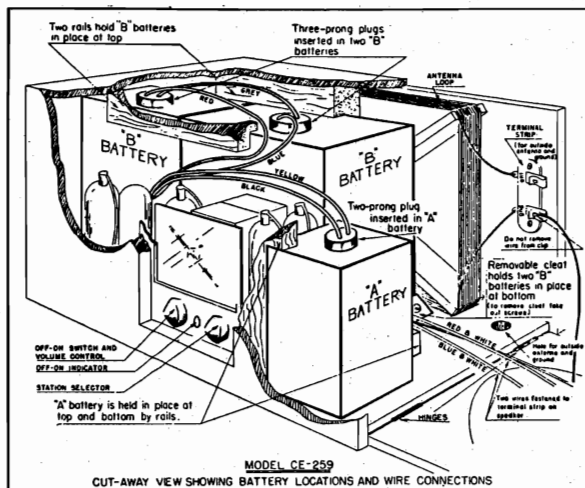
The loop antenna acts as the antenna coil. The trimmer for the loop, when provided, is on the front section of the variable condenser or on the loop frame. (See Production Change No. 3.)

I-f Alignment

Model CE-259 (below serial number 2,319,650). Swing variable condenser to maximum capacity position.

Model CE-259 (above serial number 2,319,650), CE-260 and CE-263. Swing the variable condenser to minimum capacity position.

Feed 455 kc to the grid of the 1A7G tube through a 0.01 mf condenser. Adjust the four i-f trimmers for maximum response.



Battery Installation for Model CE-259

The diagram above illustrates the proper position of the batteries in the portable cabinet. To install and connect the batteries in this cabinet observe the following procedure:

1. Open the end side of the cabinet (side with speaker grille) by removing the two wood screws in the top corners of the panel. The panel is hinged at the bottom. Open the panel by pulling the small leather tab at the top edge.
2. A small wood cleat is fastened to the bottom of the cabinet directly below the two large wood rails. Remove this cleat by taking out the small wood screws.
3. The three-prong plugs on the battery cable from the receiver should be plugged into the two "B" batteries.
4. Slide the "B" batteries, one at a time, in an upright position between the two wood rails in the cabinet, as indicated in the diagram.
5. Replace the small wood cleat in front of the second battery and fasten it securely with the wood screws.
6. The small two-prong plug in the battery cable should be plugged into the "A" battery. Place the "A" battery in the front corner of the cabinet as shown in the diagram.
7. Be sure that all of the cable wires are free and clear of the chassis. Care should be taken also to keep the wires from jamming between the wood rails and the batteries.

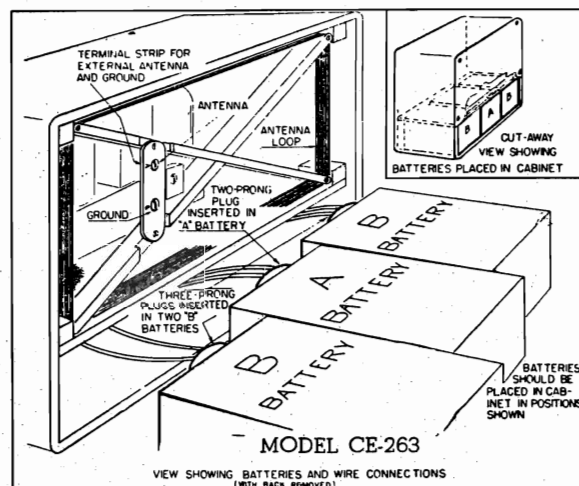
R-f Alignment

Set the dial pointer at 140. Set the signal generator at 1400 kc and feed its output into a loop of wire about 12 inches in diameter. Hold this radiating loop about 12 inches from and parallel to the receiver loop antenna. Advance the output of the signal generator until deflection is obtained on the output meter. Adjust first the oscillator trimmer (on front section of variable condenser or on loop frame) then the antenna trimmer (on rear section of variable condenser) for maximum response.

If the loop antenna has been replaced it may be necessary to adjust the loop inductance as follows. Align at 140. Set the pointer at 60 and feed 600 kc to the antenna lead. A portion of the outside turn of the loop may be swung to either side of the center to give maximum response. Realign at 140.

Battery Installation for Model CE-260

The cabinet for this model is designed to house completely the combined "A" and "B" pack. Place the battery pack in the cabinet at the rear of the receiver and insert the four-prong plug of the battery cable into the socket on the top of the battery.



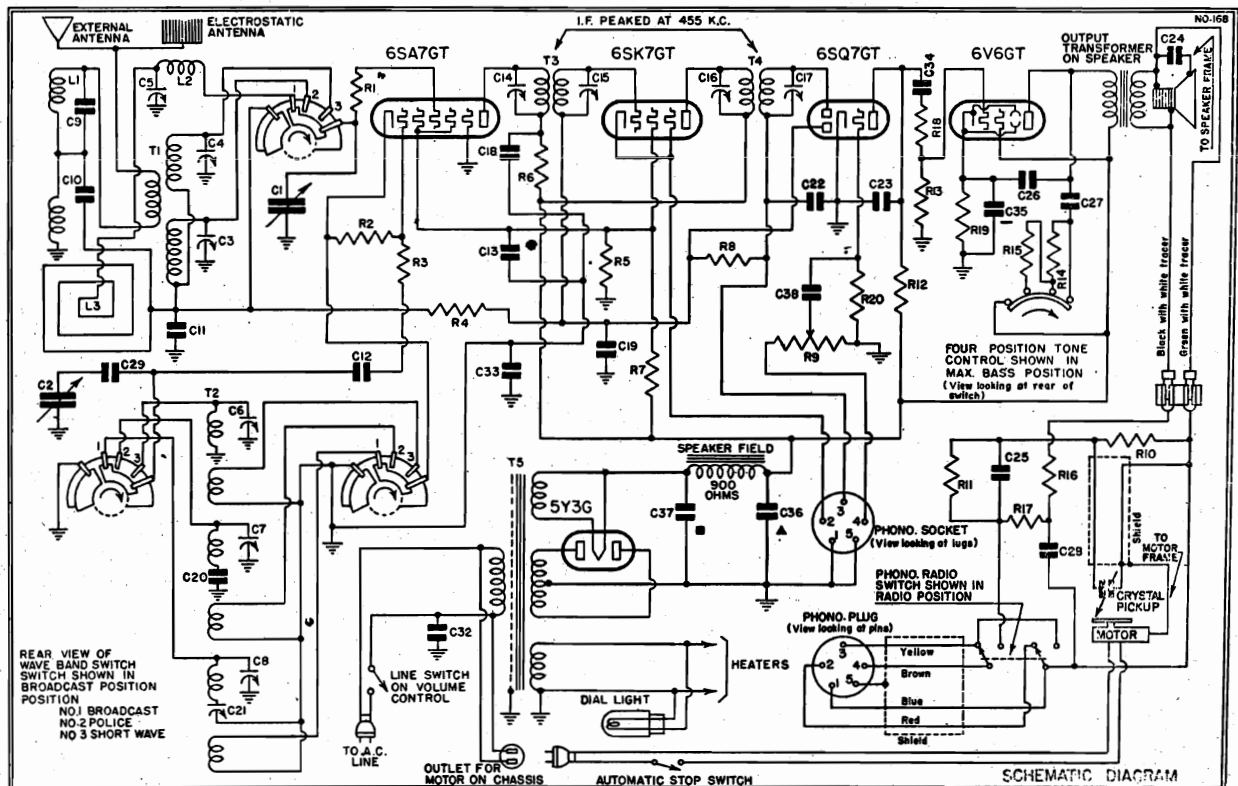
8. Close the end panel and replace the wood screws, fastening them securely.

Battery Installation for Model CE-263

The cabinet for this model contains a shelf under the receiver for housing the batteries. The illustration above indicates the position of the batteries. To install and connect the batteries observe the following procedure:

1. Remove the back panel of the cabinet by taking out the wood screws.
2. Locate the battery cable on the bottom shelf of the cabinet.
3. With the batteries out of the cabinet insert the three-prong plugs on the battery cable into the two "B" batteries and the small two-prong plug into the "A" battery.
4. Place the batteries in the cabinet as indicated in the illustration. Note that the "A" battery is placed between the two "B" batteries. Also note that the plug end of the battery is up against the front panel of the cabinet.
5. Replace the back panel of the cabinet and fasten it in place with the wood screws.

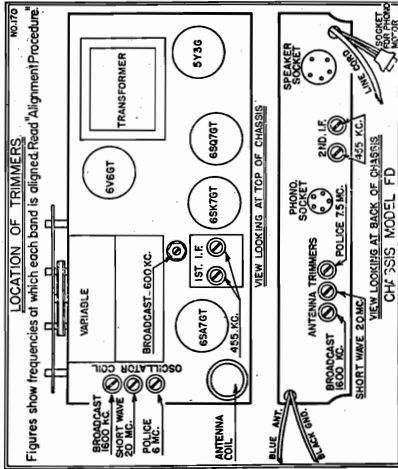
EMERSON RADIO & PHONOGRAPH CORP.

MODEL FD396,
Chassis FD

When ordering, specify part numbers. List price each, effective as of January 15, 1941. Subject to change without notice.

*Item No.	Part No.	DESCRIPTION	Price
L1, C9	8FT-573A	Antenna choke and 455 kc fixed wave-trap.....	.75
L2	7XT-564	Broadcast antenna loading coil.....	.25
L3	7XW-283	Broadcast antenna loop assembly.....	.70
T1	7XT-562	Police and short-wave antenna coil.....	.55
T2	7XT-563A	Three-band oscillator coil.....	1.45
T3	7QT-548D	Double-tuned 455 kc first i-f transformer.....	.90
T4	8ST-588B	Double-tuned 455 kc second i-f transformer.....	.95
T5	8DT-554	Power transformer.....	4.85
R1, R3	7XR-406	100 ohm 1/4 watt carbon resistor.....	.16
R2	LR-60	20,000 ohm 1/4 watt carbon resistor.....	.16
R4	KR-54	100,000 ohm 1/4 watt carbon resistor.....	.16
R5	3LR-265	40,000 ohm 1/2 watt carbon resistor.....	.16
R6	PR-79	1,000 ohm 1/4 watt carbon resistor.....	.16
R7	8DR-397	15,000 ohm 3 watt carbon resistor.....	.30
R8, R11	HR-42	2 megohm 1/4 watt carbon resistor.....	.16
R9	6GR-352	Volume control .25 meg. with line switch.....	.90
R10, R13, R17	KR-56	500,000 ohm 1/4 watt carbon resistor.....	.16
R12	KR-55	250,000 ohm 1/4 watt carbon resistor.....	.16
R14	4XR-334	2,500 ohm 1 watt carbon resistor.....	.16
R15	LR-64	5,000 ohm 1/4 watt carbon resistor.....	.16
R16	3BR-247	40,000 ohm 1/4 watt carbon resistor.....	.16
R18	KR-53	50,000 ohm 1/4 watt carbon resistor.....	.16
R19	8QR-421	240 ohm 1 watt wire-wound resistor.....	.16
R20	3RR-275	10 megohm 1/4 watt carbon resistor.....	.16
C1, C2	7AC-442	Two-gang variable condenser.....	2.90
C3, C4, C5	7XC-485	Triple trimmer strip for antenna circuits.....	.45
†C6, C7, C8		Trimmed, part of oscillator coil.....	
C9		0.001 mf condenser, part of 455 kc wave-trap.....	
C10, C33	KC-58	0.01 mf, 400 volt tubular condenser.....	.20
C11	2ZC-253	0.0025 mf mica condenser.....	.30
C12	5LC-410A	0.00011 mf mica condenser.....	.20
C13	EEC-132	.1 mf, 400 volt tubular condenser.....	.20
†C14, C15, C16, C17		Trimmed, part of i-f transformers.....	
C18, C27	LC-64	0.05 mf, 400 volt tubular condenser.....	.20
C21	2NC-231D	Single adjustable padding condenser. Range: 150-300 mmf.....	.30
C24	FC-29	0.02 mf, 200 volt tubular condenser.....	.20
C28	ZZC-211	0.03 mf, 200 volt tubular condenser.....	.20
C29	AAC-110	0.002 mf mica condenser.....	.20
C32	3LC-297A	0.01 mf, 400 volt tubular condenser.....	.20
C34	LC-65	0.02 mf, 400 volt tubular condenser.....	.20
C35, C36, C37	8DC-522	Multiple dry electrolytic condenser.....	1.05
C38	3HC-274	C35—20 mf, 25 volt; C36—15 mf, 350 volt; C37—15 mf, 400 volt 0.002 mf, 600 volt tubular condenser.....	.20

EMERSON RADIO & PHONOGRAPH CORP.



I-f Alignment

Rotate the wave-band switch to the broadcast (clockwise) position. Set the variable condenser at the minimum capacity position and feed 455 kc through a 0.02 mf paper condenser, to the grid of the 6SA7 tube. The input may be fed to the stator lug of the front condenser section. Adjust the four i-f trimmers for maximum response.

Broadcast Alignment

Rotate the wave-band switch to the broadcast (clockwise) position. Set the dial pointer at 160 and feed 1600 kc from the signal generator into a loop of wire about 12 inches in diameter. Hold this radiating loop about 12 inches from and parallel to the receiver loop antenna and advance the output of the generator until a deflection is obtained on the output meter. Adjust first the oscillator coil trimmer then the antenna trimmer for maximum response. Reset the pointer at 60, feed 1600 kc and rock the variable condenser while adjusting the series padder for maximum response. Return to 1600 kc and check alignment. If readjustment is necessary return to 600 and repeat entire procedure.

Police Alignment

Set the wave-band switch at the police band (central) position and the pointer at 7.5. Feed 7500 kc to the antenna and adjust the oscillator trimmer for maximum response. Then adjust the antenna trimmer for maximum response. The police band padder is fixed and therefore requires no adjustment.

Short-Wave Alignment

Set the wave-band switch at the short-wave (counter-clockwise) position. Move the pointer to 20 and feed 20,000 kc to the antenna (using a 400 ohm dummy antenna) and adjust the short-wave oscillator trimmer for maximum response. If two peaks are obtained choose the minimum capacity peak. Then adjust the antenna coil trimmer for maximum response. If two peaks are obtained choose the maximum capacity peak.

GENERAL NOTES

- The receiver should never be turned on with either the speaker plug or the 6V6GT tube out of their respective sockets, since the rapid rise in rectifier voltage will damage the electrolytic condenser.
- When replacing the chassis in the cabinet take precautions to keep any part of the dial and condenser assembly from touching the cabinet, otherwise microphonism will result.
- The color coding of the i-f transformers is as follows:
Grid—green
B plus—red
Plate—blue
Grid return—black
- The color coding of the power transformer is as follows:
Primary—two black leads
High-voltage secondary—two red leads
6.3 volt secondary—two green leads
5 volt secondary—two yellow leads.
- The adjustable padding condenser for the broadcast band is mounted on the top of the chassis, with the screw adjustment accessible in the top of the chassis. The police and short-wave bands have fixed padders, C20 and C29 on the schematic. When replacing these fixed padders be careful to use a condenser which has a capacity within 2% of the specified value, otherwise the short-wave coils may not track.
- The phonograph motor is equipped with an automatic stop switch. To set this stop, with receiver switched off, push the motor start lever arm toward the rear (arm crosses under pickup near rear of cabinet). Then, with record in place on turntable, swing the vertical arm (which is at the left rear of the pickup) about its pivot so that the pickup bears against the arm when the needle reaches the spiral groove at the center of the record. This adjustment may have to be changed with different records.

VOLTAGE ANALYSIS

Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed below are from point indicated to ground (chassis) with the volume control turned full and no signal. Line voltages for these readings was 117 volts, 60 cycles, a.c. All readings except B plus at rectifier, heaters, and cathode voltages were taken on 250 volt scale.

Tube	Plate	Screen	Cathode	FIL
6SA7GT	250	85	0	6.3 ac
6K7GT	250	85	0	6.3 ac
6SQ7GT	125	—	0	6.3 ac
6V6GT	235	250	0	6.3 ac

ADJUSTMENTS

An oscillator with frequencies of 455, 600, 1600, 7500 and 20,000 kc should be used.

An output meter should be used across the voice coil or speaker output transformer for observing maximum response.

Use a dummy antenna for aligning the police and short-wave bands. A .0001 mf condenser in series with a 400 ohm carbon resistor may be used for the police band dummy antenna. For the short-wave band a 400 ohm carbon resistor may be used. Always use as weak a test signal as possible during alignment.

The set's oscillator is higher in frequency than the signal on all three bands, so images should be observed on the low frequency side of the signals.

DESCRIPTION

TYPE: Three-band superheterodyne.

FREQUENCY RANGES:

- 540-1750 kc. (555-170 meters)
- 2300-7500 kc. (130-40 meters)
- 6.9-22 mc. (43.5-13.6 meters)

NUMBER OF TUBES: Five.

TYPE OF TUBES:

- 1—6SA7GT, pentagrid converter
- 1—6K7GT, i-f amplifier
- 1—6SQ7GT, diode detector, audio amplifier and a.v.c.
- 1—6V6GT, power output
- 1—5Y3G, full-wave rectifier.

POWER SUPPLY: A.C. only.

VOLTAGE RATING: 105-125 volts.

POWER CONSUMPTION:

- 55 watts for the receiver.
- 75 watts for the combination.

EMERSON RADIO & PHONOGRAPH CORP. MODEL E0388 Chassis E0 Phono.

Receivers using 55, 75, 85, 6Q7, 12Q7, 6F5 and similar type tubes used as first audio amplifiers (see Fig. A).

1. Remove the adapter plug from the phonograph connecting cable.
2. Remove the control grid lead from the tube; connect the red wire emerging from the connecting cable to the grid cap of the tube; connect the black wire emerging from the connecting cable to the grid lead which originally connected to the grid cap.
3. The connecting cable shield must be connected to B— on the receiver chassis.

MODEL: EO-388 Phonograph Adapter

CHASSIS MODEL: EO

MOTOR:

Alternating current type

Run-drive.

PICK-UP: Crystal.

POWER CONSUMPTION: 20 watts.

VOLTAGE RATING: 105-125 volts.

VOLUME CONTROL: 5 megohms, with line switch.

CRYSTAL PICK-UP: 8CFM-64 Rim drive motor, 117 volt a.c.

CRYSTAL PICK-UP: 8CC-486A Crystal pick-up

CRYSTAL PICK-UP: TTS-111R Phono-radio switch

CRYSTAL PICK-UP: 6VG-24 Rubber needle cup

CRYSTAL PICK-UP: 7MW-305 Phonograph connecting cable and adapter plug.

CRYSTAL PICK-UP: —EO-388—S1

CRYSTAL PICK-UP: —EO-388—S2

OPERATION

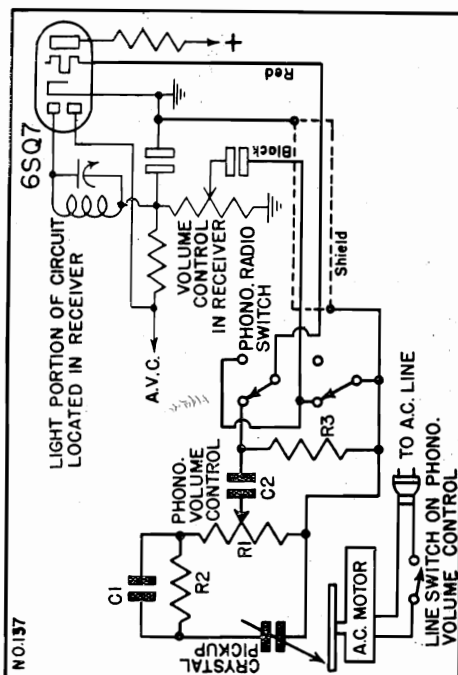
To connect the record player to the Models DM-331, DP-332 or any other radio receiver equipped with a 6SQ7 or 12SQ7 second detector and first audio amplifier proceed as follows:

1. Remove the back from the cabinet (if cabinet is equipped with a back).
2. Locate and remove the 6SQ7 or 12SQ7 tube from its socket, inserting the prong end of the adapter (which comes attached to the 388 cabinet by a length of cable) into the socket from which the 6SQ7 or 12SQ7 tube has been removed. See Figure 1.
3. Insert the 6SQ7 or 12SQ7 tube into the top of the adapter, plug. See Figure 1.
4. The back may then be replaced on the cabinet.

With the "Phono" switch in the adapter turned to the position marked "Radio," the receiver may be used in the ordinary manner. The receiver on-off switch and volume control must be operated to control the receiver.

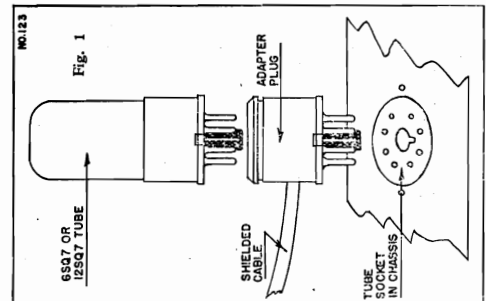
With the "Phono" switch in the adapter turned to the position marked "Phono" the phonograph may be operated. The phonograph volume is controlled by the same knob which switches the motor on and off. The radio receiver volume control will have no effect in "Phono" position.

To turn the receiver off be sure to turn off both motor switch and receiver switch.



FOR OTHER DATA SEE THAT PERTAINING TO MODEL EQ410, EMERSON PAGE 12-22

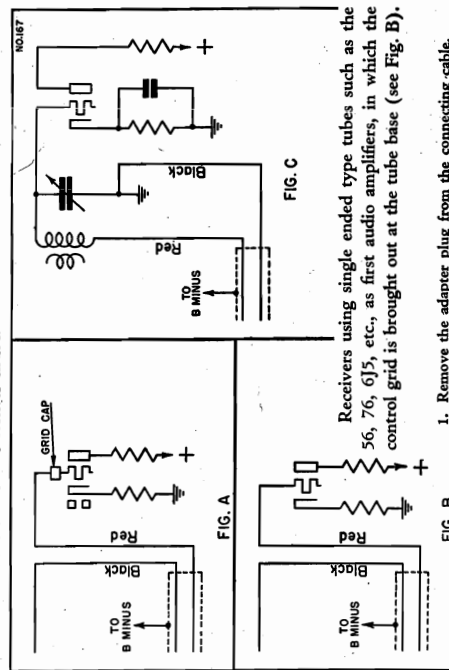
- R1 Volume control, 5 megohms, with line switch.
R2 2 megohm 1/4 watt carbon resistor.
R3 15 megohm 1/4 watt carbon resistor.
C1 0.00011 mf mica condenser.
C2 0.002 mf, 600 volt tubular condenser.



GENERAL NOTES

1. This adapter may be used with any receiver which employs a 6SQ7, 6SQ7GT, 12SQ7 or 12SQ7GT tube for its first audio amplifier.
2. The motor used in the adapter is of the A.C. ONLY type and will be damaged if used on direct current.
3. The regular receiver volume control operates when the adapter switch is in the "radio" position.
4. The phonograph volume control and motor on-off switch are operated by the same knob.
5. The motor on-off switch does not switch the receiver on or off.
6. THIS RECORD PLAYER HAS BEEN DESIGNED TO OPERATE WITHOUT A GROUND. UNDER NO CIRCUMSTANCES SHOULD ANY GROUND (OR GROUND WIRE) BE PERMITTED TO COME IN CONTACT WITH ANY METAL PART OF THE COMBINATION.

Receivers using single ended type tubes such as the 56, 76, 6J5, etc., as first audio amplifiers, in which the control grid is brought out at the tube base (see Fig. B).



1. Remove the adapter plug from the connecting cable.

2. Remove the grid lead from the control grid socket lug; connect the red wire emerging from the connecting cable to the grid socket lug; connect the black wire emerging from the connecting cable to the wire which originally connected to the control grid socket lug.

3. The connecting cable shield is connected to B— on the receiver chassis.

Receivers using a plate bend detector tube and having no first audio tube (see Fig. C).

1. Remove the adapter plug from the connecting cable.
2. Remove lead to the low end of the secondary on the detector coil; connect the red wire emerging from the connecting cable to the low end of the detector secondary; connect the black wire emerging from the connecting cable to the lead which originally connected to the secondary of the coil.
3. The connecting cable shield is connected to B— on the receiver chassis.

Note: This record player is not recommended for use with receivers using a grid leak detector and having only one audio stage.



*Item No.	Part No.	REPLACEMENT PARTS LIST	Price
T1	8QT-576	Short-wave antenna coil	\$.45
T2	8QT-577	Two-band oscillator coil .....	.55
T3	7QT-548E	Double-tuned 455 kc first i-f transformer.....	.90
T4	7BT-550	Double-tuned 455 kc second i-f transformer.....	.80
T5	8QT-584	Power transformer	4.70
L1	8QW-286	Broadcast loop antenna	1.85
L2	8QT-578	Broadcast antenna loading coil .....	.25
L3	7RT-531A	Antenna choke and 455 kc wave-trap.....	.85
R1	KR-54	100,000 ohm $\frac{1}{4}$ watt carbon resistor.....	.16
R2	LR-60	20,000 ohm $\frac{1}{4}$ watt carbon resistor.....	.16
R3	8DR-397	15,000 ohm 3 watt carbon resistor.....	.30
R4	3BR-247	40,000 ohm $\frac{1}{4}$ watt carbon resistor.....	.16
R5	OR-73	25,000 ohm $\frac{1}{4}$ watt carbon resistor.....	.16
R6	8QR-420	Volume control .5 megohm with line switch.....	.90
R7	3RR-275	10 megohm $\frac{1}{4}$ watt carbon resistor.....	.16
R8	KR-55	250,000 ohm $\frac{1}{4}$ watt carbon resistor.....	.16
R9, R11	KR-56	500,000 ohm $\frac{1}{4}$ watt carbon resistor.....	.16
R10	8QR-421	240 ohm 1 watt wire-wound resistor.....	.16
R12	LR-65	10,000 ohm $\frac{1}{4}$ watt carbon resistor.....	.16
R13	PR-79	1,000 ohm $\frac{1}{4}$ watt carbon resistor.....	.16
R14, R15	HR-42	2 megohm $\frac{1}{4}$ watt carbon resistor.....	.16
R16	NNR-220	3 megohm $\frac{1}{4}$ watt carbon resistor.....	.16
C1, C2	8QM-634	Six-button tuning unit with two-gang variable condenser.....	5.45
C4		0.0001 mf mica condenser—Part of L3	
C5	KC-58	0.01 mf, 400 volt tubular condenser.....	.20
C6		Trimmer, part of T1	
C7		Trimmer, part of L1	
C8	AAC-111	.003 mf mica condenser.....	.20
C9, C33	5LC-410A	.00011 mf mica condenser.....	.20
C10, C11	8QC-505	Dual oscillator trimming condenser.....	.30
C12	2NC-231A	Single adjustable padding condenser.....	.30
C13, C19	EEC-132	0.1 mf, 400 volt tubular condenser.....	.20
C14, C15		Trimmers, part of i-f transformers	
C16, C17			
C18	BC-12	0.05 mf, 200 volt tubular condenser.....	.20
C20	3HC-274	0.002 mf, 600 volt tubular condenser.....	.20
C21, C22	5AC-384	0.0002 mf, 600 volt tubular condenser.....	.20
C23, C25	LC-65	0.02 mf, 400 volt tubular condenser.....	.20
C26, C27		Multiple dry electrolytic condenser.....	1.05
C28	8QC-509	C26, 15 mf—400 volt; C27, 15 mf—350 volt; C28, 20 mf—25 volt.	
C29	3LC-297	0.01 mf, 400 volt tubular condenser.....	.20
C30	AAC-106A	0.00005 mf mica condenser.....	.20
C31	3PC-306	0.005 mf mica condenser.....	.20
C32	4VC-370A	0.00015 mf mica condenser.....	.20

EMERSON RADIO & PHONOGRAPH CORP. MODEL FF411, Chassis FF

REPLACEMENT PARTS LIST

When ordering state part number. List price each as of February 15, 1941. (Subject to change without notice.)

*Item No.	Part No.	DESCRIPTION	PRICE
L2	7UW-296	Loop antenna	\$.85
T1	7UT-539A	Oscillator coil	.45
T2	7UT-540	Iron core double-tuned 455 kc first i-f transformer	1.90
T3	7UT-541	Iron core single-tuned 455 kc second i-f transformer	1.30
R1	KR-54	100,000 ohm 1/4 watt carbon resistor	.16
R2	LR-64	5,000 ohm 1/4 watt carbon resistor	.16
R3	LR-65	10,000 ohm 1/4 watt carbon resistor	.16
R4	3RR-274	5 megohm 1/4 watt carbon resistor	.16
R5	7UR-380	Volume control 1.5 megohm with double pole battery switch	.90
R6	3RR-275	10 megohm 1/4 watt carbon resistor	.16
R7, R9	NNR-220	3 megohm 1/4 watt carbon resistor	.16
R8	KR-57	1 megohm 1/4 watt carbon resistor	.16
R10	7UR-394	2200 ohm 1/4 watt carbon resistor	.16
R11	7UR-392	1800 ohm 1/4 watt carbon resistor	.16
C1, C2	7UC-469	Two-gang variable condenser	2.20
C3, C4	FC-29	Trimmers, part of variable condenser	.20
C5, C12, C14	5LC-410A	0.02 mfd, 200 volt tubular condenser	.20
C7, C8, C11	7UC-476	0.00011 mfd mica condenser	.50
C10	3HC-274	Fixed trimming condensers, contained inside i-f can	.20
C13	3HC-274	10 mfd, 100 volt dry electrolytic condenser	.20
C16, C17	NNC-199	0.002 mfd, 600 volt tubular condenser	.20
		0.001 mfd, 600 volt tubular condenser	.20

GENERAL NOTES

- The color coding of the i-f transformer leads is as follows:
Grid—green Plate—blue
Grid return—black B plus—red
- The color coding of the battery cable is as follows:
Red—B plus, 90 volts Blue—B minus
- If replacements are made in the r-f section of the circuit, the receiver should be carefully re-aligned.
- The self-contained loop antenna operates at maximum efficiency when its position is at right angles to the broadcasting source. It is important, therefore, once the station is tuned in, to rotate the cabinet back and forth through a quarter of a circle (90 degrees), leaving it at the position where the station is received with maximum volume.

DESCRIPTION

TYPE: Single-band (battery operated) superheterodyne.

FREQUENCY RANGE: 540-1700 kc.

NUMBER OF TUBES: Four.

TYPE OF TUBES:

- 1—1R5, oscillator-modulator
- 1—1T4, i-f amplifier
- 1—1S5, 2nd detector, a.v.c., a-f amplifier
- 1—1S4, pentode output.

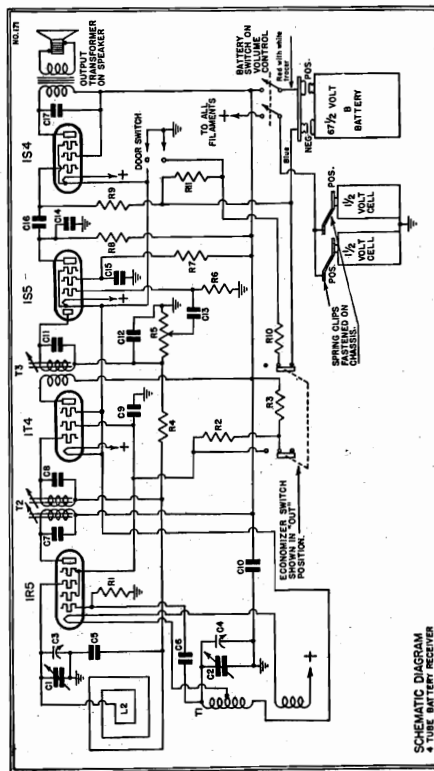
POWER SUPPLY: A and B batteries.

VOLTAGE RATING:

- "A" Battery—1.5 volts
- "B" Battery—67.5 volts.

CURRENT DRAIN:

- "A" Battery—0.25 amp.
- "B" Battery—0.0075 amp with Battery Saver "OUT" 0.0055 amp with Battery Saver "IN"



SCHEMATIC DIAGRAM
4 TUBE BATTERY RECEIVER

VOLTAGE ANALYSIS

Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed are from points indicated to chassis with volume control turned on full and no signal. The battery voltages for these readings were: "A" 1.5 volts, "B" 67.5 volts. All readings except filament were taken on the 250 volt scale, with battery saver "out."

Tube	Plate	Screen	FIL
1R5	57	60	1.5
1T4	57	60	1.5
1S5	93	93	1.5
1S4	55	60	1.5

Bias for the 1S4 tube is obtained across the resistor R11. The voltage drop across this resistor should be 7.5 volts with battery saver "out" or 5.4 volts with battery saver "in."
*The operating voltage of this tube cannot be measured because of the high resistor in the circuit.

ADJUSTMENTS

Location of Coils and Trimmer Adjustments

The first i-f transformer is located in the bottom outer edge of the chassis behind the lower flashlight cell. The brass screws which protrude from either end of the can are the core adjustment for tuning the transformer. The second i-f transformer is located between the 1T4 and 1S5 tubes. The single trimming core screw extends from the end of the can.

The oscillator coil is located inside the chassis, beside the variable condenser. Trimmer for the oscillator is located on the lower section of the variable condenser.

The loop antenna acts as the antenna coil. Trimmer for the loop is located on the upper section of the variable condenser.

BATTERY COMPLEMENT

The cabinet is designed to house the complete set of batteries. The battery complement should be as follows:

Type Battery	Number Required
1 1/2 volt "A"	2
67 1/2 volt "B"	1

Standard "D" size (1 1/4" diameter) flashlight cell
Eveready "Mini-max" No. 467

MODEL FJ412, Chassis FJ

EMERSON RADIO & PHONOGRAPH CORP.

ADJUSTMENTS

An oscillator with frequencies of 455 and 1400 kc is required.

An output meter should be used across the voice coil or output transformer for observing maximum response.

Always use as weak a test signal as possible when aligning the receiver.

Location of Coils and Trimmer Adjustments

The first i-f transformer is mounted on top of the chassis deck next to the 12SA7 tube. The trimmers are accessible through holes in the top of the can.

The second i-f transformer is mounted on top of the chassis next to the variable condenser. The trimmers are accessible through holes in the top of the can.

The trimmer for the oscillator coil is mounted on the front section of the variable condenser. The loop antenna trimmer is located on the loop assembly.

i-f Alignment

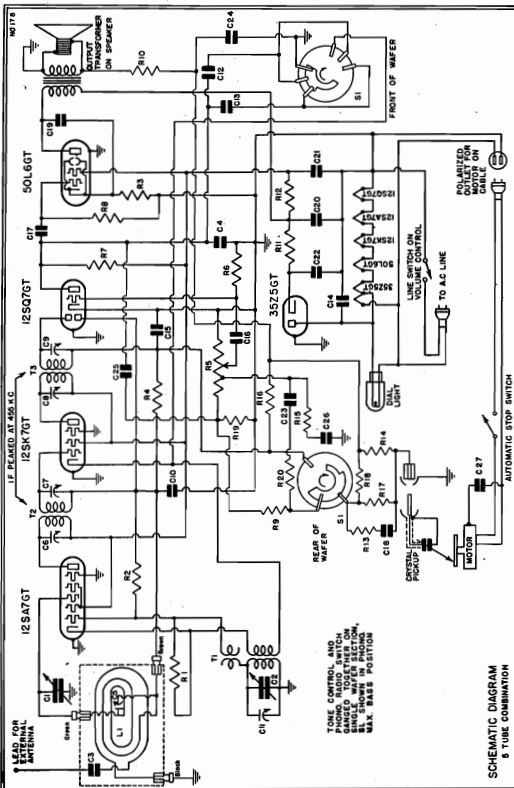
Swing the variable condenser to the minimum capacity position. Feed 455 kc to the grid of the 12SA7GT tube through a .01 mf condenser and adjust the four i-f trimmers for maximum response. The grid of the 12SA7GT tube may be reached by clipping the input lead to the stator lug of the antenna section.

R-f Alignment

Set the dial pointer at 140. Feed 1400 kc from the signal generator into a loop of wire about one foot in diameter. Hold this radiating loop about 12 inches away from and parallel to the receiver loop antenna. Advance the input to the loop until a satisfactory deflection is obtained on the output meter. Adjust first the oscillator trimmer then the antenna trimmer for maximum response. If the loop antenna has been replaced it may be necessary to retrack the loop inductance. With the dial set at 60 feed 600 kc to the antenna lead. A portion of the outside may be swung to either side of the center to give maximum response. Repeat the trimmer alignment at 140.

REPLACEMENT PARTS LIST

Item	Part No.	DESCRIPTION
L1	9TW-343	Antenna loop assembly
T1	9T-617	Oscillator coil
T2	8PT-586A	Double-tuned 455 kc first i-f transformer
T3	8PT-587	Double-tuned 1400 kc second i-f transformer
R1	20K-327	20 megohm 1/2 watt carbon resistor
R2	4KR-327	15 megohm 1/2 watt carbon resistor
R3	3FR-293	140 ohm 1/2 watt wire-wound resistor
R4	NNR-220	3 megohm 1/2 watt carbon resistor
R5	4KR-327	15 megohm 1/2 watt carbon resistor
R6	20K-327	20 megohm 1/2 watt carbon resistor
R7	20K-327	20 megohm 1/2 watt carbon resistor
R8	20K-327	20 megohm 1/2 watt carbon resistor
R9	20K-327	20 megohm 1/2 watt carbon resistor
R10	20K-327	20 megohm 1/2 watt carbon resistor
R11	20K-327	20 megohm 1/2 watt carbon resistor
R12	20K-327	20 megohm 1/2 watt carbon resistor
R13	20K-327	20 megohm 1/2 watt carbon resistor
R14	20K-327	20 megohm 1/2 watt carbon resistor
R15	20K-327	20 megohm 1/2 watt carbon resistor
R16	20K-327	20 megohm 1/2 watt carbon resistor
R17	20K-327	20 megohm 1/2 watt carbon resistor
R18	20K-327	20 megohm 1/2 watt carbon resistor
R19	20K-327	20 megohm 1/2 watt carbon resistor
R20	20K-327	20 megohm 1/2 watt carbon resistor
R21	20K-327	20 megohm 1/2 watt carbon resistor
R22	20K-327	20 megohm 1/2 watt carbon resistor
R23	20K-327	20 megohm 1/2 watt carbon resistor
R24	20K-327	20 megohm 1/2 watt carbon resistor
R25	20K-327	20 megohm 1/2 watt carbon resistor
R26	20K-327	20 megohm 1/2 watt carbon resistor
R27	20K-327	20 megohm 1/2 watt carbon resistor
R28	20K-327	20 megohm 1/2 watt carbon resistor
R29	20K-327	20 megohm 1/2 watt carbon resistor
R30	20K-327	20 megohm 1/2 watt carbon resistor
R31	20K-327	20 megohm 1/2 watt carbon resistor
R32	20K-327	20 megohm 1/2 watt carbon resistor
R33	20K-327	20 megohm 1/2 watt carbon resistor
R34	20K-327	20 megohm 1/2 watt carbon resistor
R35	20K-327	20 megohm 1/2 watt carbon resistor
R36	20K-327	20 megohm 1/2 watt carbon resistor
R37	20K-327	20 megohm 1/2 watt carbon resistor
R38	20K-327	20 megohm 1/2 watt carbon resistor
R39	20K-327	20 megohm 1/2 watt carbon resistor
R40	20K-327	20 megohm 1/2 watt carbon resistor
R41	20K-327	20 megohm 1/2 watt carbon resistor
R42	20K-327	20 megohm 1/2 watt carbon resistor
R43	20K-327	20 megohm 1/2 watt carbon resistor
R44	20K-327	20 megohm 1/2 watt carbon resistor
R45	20K-327	20 megohm 1/2 watt carbon resistor
R46	20K-327	20 megohm 1/2 watt carbon resistor
R47	20K-327	20 megohm 1/2 watt carbon resistor
R48	20K-327	20 megohm 1/2 watt carbon resistor
R49	20K-327	20 megohm 1/2 watt carbon resistor
R50	20K-327	20 megohm 1/2 watt carbon resistor
R51	20K-327	20 megohm 1/2 watt carbon resistor
R52	20K-327	20 megohm 1/2 watt carbon resistor
R53	20K-327	20 megohm 1/2 watt carbon resistor
R54	20K-327	20 megohm 1/2 watt carbon resistor
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R58	20K-327	20 megohm 1/2 watt carbon resistor
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R63	20K-327	20 megohm 1/2 watt carbon resistor
R64	20K-327	20 megohm 1/2 watt carbon resistor
R65	20K-327	20 megohm 1/2 watt carbon resistor
R66	20K-327	20 megohm 1/2 watt carbon resistor
R67	20K-327	20 megohm 1/2 watt carbon resistor
R68	20K-327	20 megohm 1/2 watt carbon resistor
R69	20K-327	20 megohm 1/2 watt carbon resistor
R70	20K-327	20 megohm 1/2 watt carbon resistor
R71	20K-327	20 megohm 1/2 watt carbon resistor
R72	20K-327	20 megohm 1/2 watt carbon resistor
R73	20K-327	20 megohm 1/2 watt carbon resistor
R74	20K-327	20 megohm 1/2 watt carbon resistor
R75	20K-327	20 megohm 1/2 watt carbon resistor
R76	20K-327	20 megohm 1/2 watt carbon resistor
R77	20K-327	20 megohm 1/2 watt carbon resistor
R78	20K-327	20 megohm 1/2 watt carbon resistor
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R80	20K-327	20 megohm 1/2 watt carbon resistor
R81	20K-327	20 megohm 1/2 watt carbon resistor
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R84	20K-327	20 megohm 1/2 watt carbon resistor
R85	20K-327	20 megohm 1/2 watt carbon resistor
R86	20K-327	20 megohm 1/2 watt carbon resistor
R87	20K-327	20 megohm 1/2 watt carbon resistor
R88	20K-327	20 megohm 1/2 watt carbon resistor
R89	20K-327	20 megohm 1/2 watt carbon resistor
R90	20K-327	20 megohm 1/2 watt carbon resistor
R91	20K-327	20 megohm 1/2 watt carbon resistor
R92	20K-327	20 megohm 1/2 watt carbon resistor
R93	20K-327	20 megohm 1/2 watt carbon resistor
R94	20K-327	20 megohm 1/2 watt carbon resistor
R95	20K-327	20 megohm 1/2 watt carbon resistor
R96	20K-327	20 megohm 1/2 watt carbon resistor
R97	20K-327	20 megohm 1/2 watt carbon resistor
R98	20K-327	20 megohm 1/2 watt carbon resistor
R99	20K-327	20 megohm 1/2 watt carbon resistor
R100	20K-327	20 megohm 1/2 watt carbon resistor
C1	20K-327	20 megohm 1/2 watt carbon resistor
C2	20K-327	20 megohm 1/2 watt carbon resistor
C3	20K-327	20 megohm 1/2 watt carbon resistor
C4	20K-327	20 megohm 1/2 watt carbon resistor
C5	20K-327	20 megohm 1/2 watt carbon resistor
C6	20K-327	20 megohm 1/2 watt carbon resistor
C7	20K-327	20 megohm 1/2 watt carbon resistor
C8	20K-327	20 megohm 1/2 watt carbon resistor
C9	20K-327	20 megohm 1/2 watt carbon resistor
C10	20K-327	20 megohm 1/2 watt carbon resistor
C11	20K-327	20 megohm 1/2 watt carbon resistor
C12	20K-327	20 megohm 1/2 watt carbon resistor
C13	20K-327	20 megohm 1/2 watt carbon resistor
C14	20K-327	20 megohm 1/2 watt carbon resistor
C15	20K-327	20 megohm 1/2 watt carbon resistor
C16	20K-327	20 megohm 1/2 watt carbon resistor
C17	20K-327	20 megohm 1/2 watt carbon resistor
C18	20K-327	20 megohm 1/2 watt carbon resistor
C19	20K-327	20 megohm 1/2 watt carbon resistor
C20	20K-327	20 megohm 1/2 watt carbon resistor
C21	20K-327	20 megohm 1/2 watt carbon resistor
C22	20K-327	20 megohm 1/2 watt carbon resistor
C23	20K-327	20 megohm 1/2 watt carbon resistor
C24	20K-327	20 megohm 1/2 watt carbon resistor
C25	20K-327	20 megohm 1/2 watt carbon resistor
C26	20K-327	20 megohm 1/2 watt carbon resistor
C27	20K-327	20 megohm 1/2 watt carbon resistor



SCHEMATIC DIAGRAM FOR MODEL FJ

VOLTAGE ANALYSIS

Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed below are from point indicated to B minus (line switch) with the volume control turned on full and no signal. Line voltage for these readings was 117.5 volts, 60 cycles, a.c. All readings except heaters and cathodes were taken on 250 volt scale.

Tube	Plate	Screen	Cathode	FIL
12SA7GT	88	88	0	12
12SK7GT	88	88	0	12
12SQ7GT	30	0	0	12
50L6GT	100	88	5.3	50

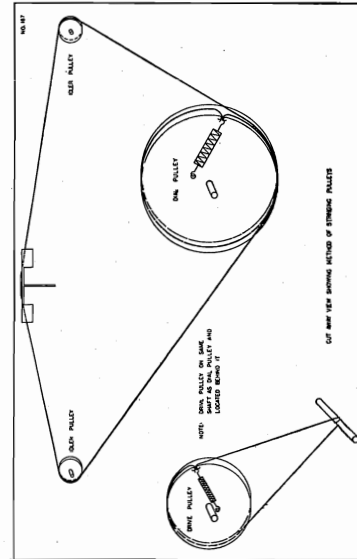
GENERAL NOTES

Voltage at 35Z5 cathode—120 volts.
Voltage across pilot light—4.5 volts.

- If replacements are made or the wiring disturbed in the i-f section of the circuit, the receiver should be carefully realigned.
- The color coding of the i-f transformer leads is as follows:
Grid—green
Plate—blue
Grid return—black
B plus—red
- The receiver has a self-contained antenna and does not require additional antenna connections. For permanent home installations, however, it is desired to improve reception of weak stations, an additional outdoor antenna should be used. For this purpose a lead has been brought out of the rear near the line cord.
- The self-contained loop antenna has directional properties. It is important, therefore, once the station is tuned in, that the cabinet be rotated on its base back and forth through a quarter of a circle (90 degrees), and left at the position where the station is received with maximum volume.

DESCRIPTION

- The receiver has a self-contained antenna and does not require additional antenna connections. For permanent home installations, however, it is desired to improve reception of weak stations, an additional outdoor antenna should be used. For this purpose a lead has been brought out of the rear near the line cord.
- TYPE: Single-band superheterodyne and phonograph.
FREQUENCY RANGE: 540-1600 kc.
NUMBER OF TUBES: Five.



MODEL: FJ412

CHASSIS MODEL: FJ

POWER SUPPLY: A.C. only.

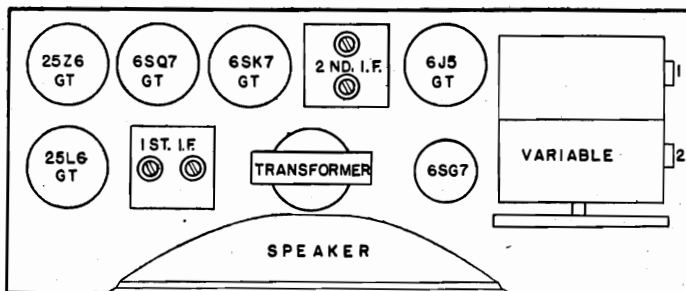
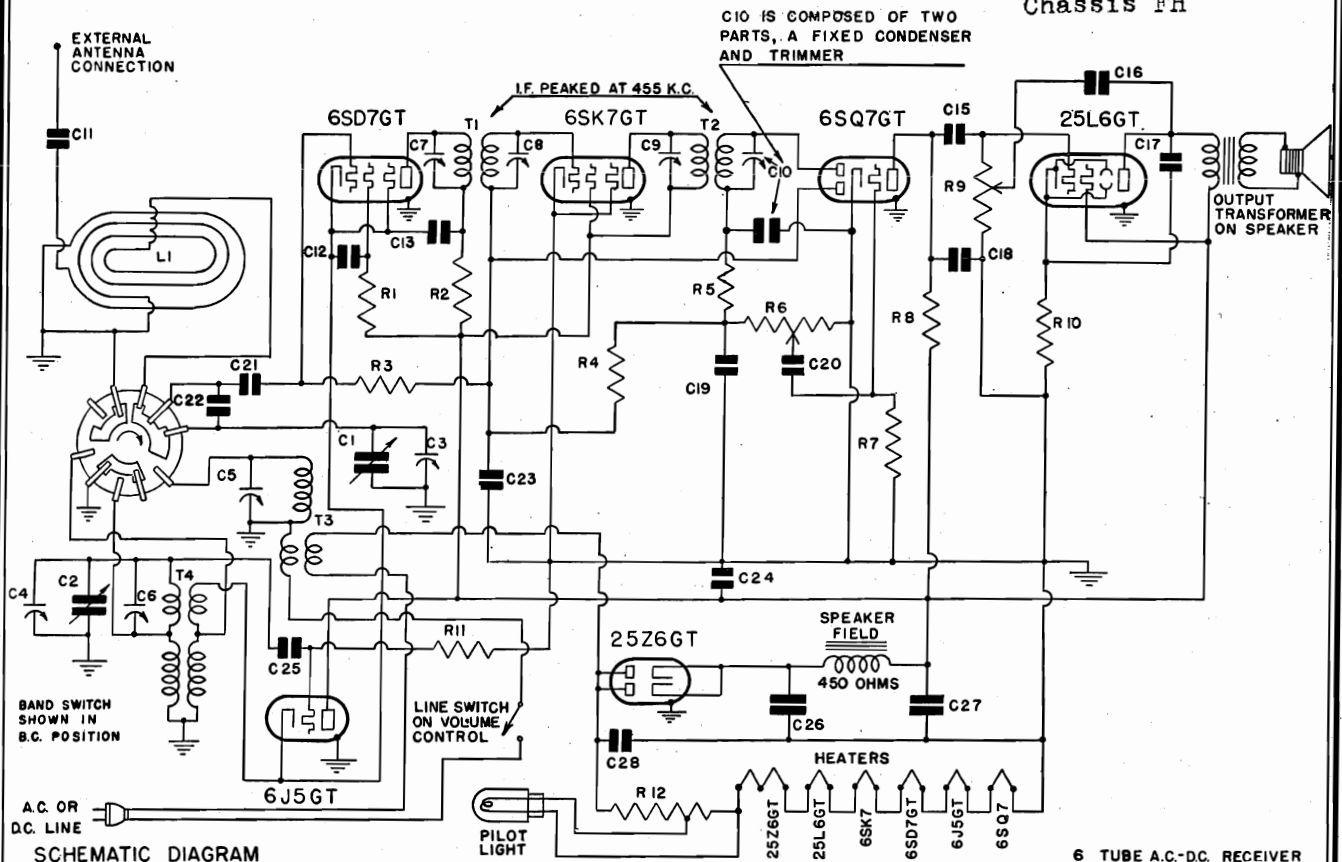
VOLTAGE RATING: 105-125 volts.

POWER CONSUMPTION:

30 watts for the receiver.

20 watts for phono motor.

EMERSON RADIO & PHONOGRAPH CORP. MODELS FH413, FH440, Chassis FH



1. BROADCAST OSCILLATOR TRIMMER
1600 K.C.
2. BROADCAST LOOP ANTENNA TRIMMER
1600 K.C.

3. SHORT WAVE OSCILLATOR TRIMMER
12 M.C.
4. SHORT WAVE ANTENNA TRIMMER
12 M.C.

VOLTAGE ANALYSIS

Tube	Plate	Screen	Cathode	Fil.
6SG7 or 6SD7	92	63	0	6.3
6J5	102	—	0	6.3
6SK7	102	102	0	6.3
6SQ7	30	—	—	6.3
25L6	92	102	6.5	25

Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed below are from point indicated to B minus (line switch) with the volume control turned on full and no signal. Line voltage for these readings was 117.5 volts, 60 cycles, a.c. All readings except heaters and cathodes were taken on 250 volt scale. Measurements made with 117.5 volts d.c. will be lower than those given below.

MODELS FH413, FH440
Chassis FH

EMERSON RADIO & PHONOGRAPH CORP.

ADJUSTMENTS

An oscillator with frequencies of 455, 600, 1600 and 12,000 kc is required.

An output meter should be used across the voice coil or output transformer for observing maximum response.

Always use as weak a test signal as possible when aligning the receiver.

I-f Alignment

Swing the variable condenser to the minimum capacity position. Feed 455 kc to the grid of the 6SD7 tube through a .01 mf condenser and adjust the four i-f trimmers for maximum response.

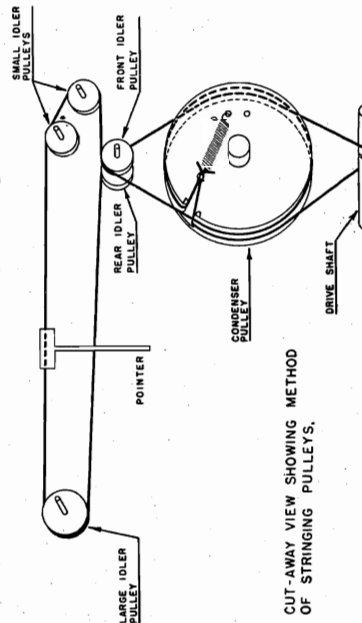
Note: The grid of the 6SD7 tube is the No. 4 pin.

R-f Alignment

Rotate the wave-band switch counter-clockwise to the short-wave position. Set the dial pointer at 12 megacycles and using a 300 ohm carbon resistor as a dummy antenna feed 12 megacycles from the generator to the external antenna lead emerging from the rear of the chassis. Adjust first the short-wave oscillator trimmer and then the short-wave antenna trimmer for maximum response.

Rotate the wave-band switch clockwise to the broadcast position. Set the dial pointer at 160 and feed 1600 kc from the signal generator into a loop of wire about 12 inches in diameter. Hold this radiating loop about 12 inches from the loop antenna and advance the signal generator until a deflection is obtained on the output meter. Adjust first the oscillator trimmer (rear section of the variable condenser) and then the antenna trimmer (front section of the variable condenser) for maximum response.

If the loop has been replaced it may be necessary to adjust the loop inductance as follows: Align at 1600. Set the pointer at 60 feed 1600 kc into the radiating loop. A portion of the middle of the loop may then be swung to either side of the center to give maximum response. Realign at 1600.



CUT-AWAY VIEW SHOWING METHOD OF STRINGING PULLEYS.

REPLACEMENT PARTS LIST

When ordering, specify part numbers. List price each effective as of December 15, 1941. Subject to change without notice.

*Item	Part No.	DESCRIPTION	PRICE
L1	9HW-338	Loop antenna assembly (see production change no. 1a)	.65
T1	8CT-566B	Double-tuned 455 kc first i-f transformer	.85
T2	9HT-615	Double-tuned 455 kc second i-f transformer (see production change no. 1b)	1.15
T3	9HT-616	Short-wave antenna coil	.30
T4	9HT-614	Two-band oscillator coil	1.05
R1, R11	KR-53	50,000 ohm 1/4 watt carbon resistor	.16
R2	LR-64	5,000 ohm 1/4 watt carbon resistor	.16
R3, R4	NNR-220	3 megohm 1/4 watt carbon resistor	.16
R5		50,000 ohm 1/4 watt carbon resistor, part of T2.	
R6	9HR-441	Volume control, .5 megohm	.80
R7	3RR-275	10 megohm 1/4 watt carbon resistor	.16
R8	KR-56	500,000 ohm 1/4 watt carbon resistor	.16
R9	9HR-442	Tone control, 400,000 ohm	.60
R10	3FR-293	140 ohm 1/2 watt wire-wound resistor	.16
R12	9HR-443	Ballast resistor, 155 ohm	.50
C1, C2	9HC-530	Two-gang variable condenser	2.35
†C3, C4		Trimmers, part of variable condenser.	
†C5		Trimmer, part of T3.	
†C6		Trimmer, part of T4.	
†C7, C8, C9		Trimmers, part of i-f transformers.	
†C10		Trimmer and 0.0001 mf, mica condenser, part of T2.	
C11, C20	3HC-274	0.002 mf, 600 volt tubular condenser	.20
C12	FC-29	0.02 mf, 200 volt tubular condenser	.20
C13	BC-12	0.05 mf, 200 volt tubular condenser	.20
C15, C17	LC-65	0.02 mf, 400 volt tubular condenser	.20
C16, C18, C21	4XC-394A	0.00022 mf, mica condenser	.20
C28	LC-64	0.05 mf, 400 volt tubular condenser	.20
C19, C25	5LC-410A	0.00011 mf, mica condenser	.20
C22	9HC-531	0.00046 mf, mica condenser	.20
C23	AC-6	0.1 mf, 200 volt tubular condenser	.20
C24	KC-58	0.01 mf, 400 volt tubular condenser	.20
C26, C27	6JC-426R	Dual 20 mf, 150 volt dry electrolytic condenser	.90
	9HS-549	Dynamic speaker	4.35
	9HS-541	Dynamic speaker for Model 440	3.50
	9HS-542	Band switch	.80

*Item number locates the article on the schematic diagram.

†Not supplied separately.

PRODUCTION CHANGES

1. Chassis bearing serial numbers above 4,671,200 use:

- a-9HW-376 loop antenna .65
- b-9HT-638 second i-f transformer 1.25

EMERSON RADIO & PHONOGRAPH CORP. MODELS FL414 to FL419 Inc. Chassis FL

When ordering, specify part numbers. List price each effective as of March 1, 1941. Subject to change without notice.

*Item	Part No.	DESCRIPTION	PRICE
L1	9LW-344	Loop antenna assembly	.80
L2	9LT-619	455 kc wave-trap	.40
T1	70T-548G	Double-tuned 455 kc first i-f transformer	.90
T2	9LT-618	Double-tuned 455 kc second i-f transformer	1.15
T3	8LT-570A	Oscillator coil	.40
R1	LR-60	20,000 ohm 1/4 watt carbon resistor	.16
R2	3RR-275	10 megohm 1/4 watt carbon resistor	.16
R3	3FR-293	140 ohm 1/4 watt wire-wound resistor	.16
R4	NNR-220	3 megohm 1/4 watt carbon resistor	.16
R5	9LR-446	Volume control .5 megohm with line switch (see production change No. 1a)	.80
R6	4XR-327	15 megohm 1/4 watt carbon resistor	.16
R7, R8	KR-56	500,000 ohm 1/4 watt carbon resistor	.16
R9	KR-53	50,000 ohm 1/4 watt carbon resistor, part of T2	.16
R10	LR-65	10,000 ohm 1/4 watt carbon resistor	.16
R11	OR-73	25,000 ohm 1/4 watt carbon resistor	.16
R12	KR-57	1 megohm 1/4 watt carbon resistor	.16
C1, C2	7BC-445B	Two-gang variable condenser	1.95
C3, C16	3HC-274	0.0002 mf, 600 volt tubular condenser	.20
C4	5AC-384	0.05 mf, 200 volt tubular condenser	.20
C5, C13	B12	Trimmers, part of i-f transformers	.20
C6, C7, C8		Trimmer and fixed condenser, part of T2	
C9		Trimmers, part of variable condenser	
C10, C11	4XC-394A	0.00022 mica condenser	.20
C12	LC-64	0.05 mf, 400 volt tubular condenser	.20
C14	5LC-410A	0.00011 mica condenser	.20
C15, C19	LC-65	0.02 mf, 400 volt tubular condenser	.20
C17	EC-23	0.03 mf, 400 volt tubular condenser	.20
C18	EC-23	Dual 20 mf, 150 volt dry electrolytic condenser	.90
C20, C21	6FC-68P	5" dynamic speaker	5.65

PRODUCTION CHANGES

1. Chassis bearing serial numbers below 4,540,900 use:

- (a) Volume control 7BR-363C .85
(b) Drive shaft 7BH-40D .10

VOLTAGE ANALYSIS

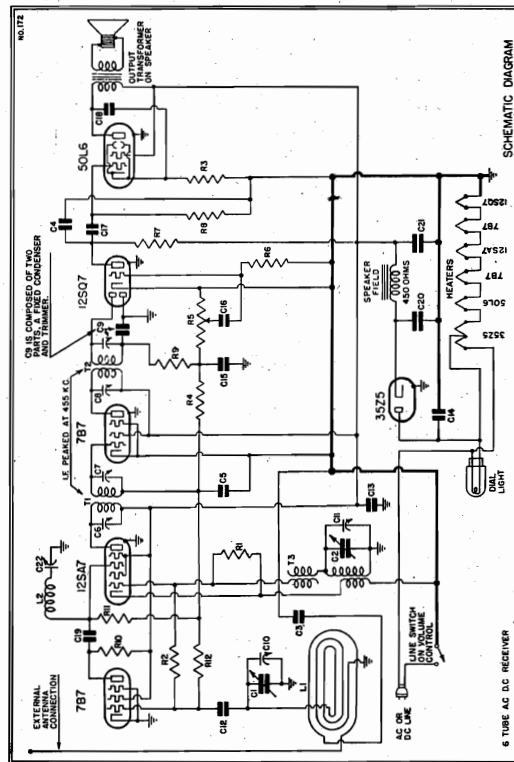
Readings should be taken with a 1000 ohm-per-volt meter. Voltages listed below are from point indicated to B minus (line switch) with the volume control turned on full and no signal. Line voltage for these readings was 117.5 volts, a.c. All readings except heaters and cathodes were taken on 250 volt scale. Measurements made with 117.5 volts d.c. will be lower than those given below.

Tube	Plate	Screen	Cathode	FIL
7B7 (c-f)	18	88	0	5.5
12SA7	88	88	0	12.0
7B7	88	85	0	5.5
12SQ7	30	—	0	12.0
50L6	82	88	5.6	30.0

3. The color coding of the i-f transformer leads is as follows:
Voltage at 5725 cathode—120 volts.
Voltage across speaker field—32 volts.
Voltage across pilot light—4.5 volts.

DIAL CORD REPLACEMENT

Draw the cord snugly around the condenser pulley and knot it, with no slack, near the notch in the pulley, after which the spring may be hooked to the cord and pulley. The dial face should bear against the fibre washer when finally assembled.



SCHEMATIC DIAGRAM FOR MODEL FL

TYPE: Single-band Superheterodyne.

TYPE OF TUBES:

- 1—7B7, e-f amplifier
1—12SA7, pentagrid oscillator-modulator
1—7B7, first i-f amplifier
1—12SQ7, diode detector, e-f amplifier, a.v.c.
1—50L6, beam power output
1—35Z5, half-wave rectifier.

POWER SUPPLY: A.C. or D.C.

VOLTAGE RATING: 100-125 volts.

POWER CONSUMPTION: 30 watts.

ADJUSTMENTS

I-f and Wave-trap Alignment

An oscillator with frequencies of 455 and 1400 kc is required.
An output meter should be used across the voice coil or output transformer for observing maximum response.

Always use as weak a test signal as possible when aligning the receiver.

Feed 455 kc to the external antenna lead and adjust the wave-trap for minimum response.

Location of Coils and Trimmer Adjustments

The first i-f transformer is mounted on top of the chassis deck to the left of the variable condenser. The trimmers are accessible through holes in the top of the can.

The second i-f transformer is mounted on top of the chassis between the 7B7 tube and the speaker. The trimmers are accessible through holes in the top of the can.

The 455 kc wave-trap is located below the chassis deck.

The trimmers for the antenna and oscillator coils are located on the variable condenser. The trimmer on the front section is for the oscillator coil.

The oscillator coil is located underneath the chassis. The loop antenna coil is the antenna coil.

The self-contained loop antenna operates at maximum efficiency when its position is at right angles to the broadcasting source. It is important, therefore, once the station is tuned in, to rotate the cabinet back and forth through a quarter of a circle (90 degrees), leaving it at the position where the station is received with maximum volume.

EMERSON RADIO & PHONOGRAPH CORP. MODEL FO420, Chassis FO

ADJUSTMENTS

I-f Alignment

Swing the variable condenser to the minimum capacity position. Feed 455 kc to the grid of the 12SA7 tube through .01 mf trimmer and adjust the four I-f trimmers for maximum response.

Note: The grid of the 12SA7 tube is connected to the lower anode of the rear variable condenser section. Connection of the rear variable condenser to the lower anode of the 12SA7 tube is easily identified by the connection of the green lead to the loop.

R-f Alignment

Set the dial pointer at 150. Set the signal generator at 1500 kc. Hold the signal generator lead about 12 inches from and parallel to the receiver loop antenna. Advance the output of the signal generator until deflection is obtained on the output meter. Adjust the antenna trimmer (on the loop assembly) for maximum response.

If the loop antenna has been replaced it may be necessary to adjust the loop inductance as follows. Align at 150. Set the signal generator at 1500 kc. Advance the output of the outside turn of the loop until the center of the loop may be swung to either side of the center to give maximum response. Readjust at 150.

VOLTAGE ANALYSIS

Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed below are from point indicated to B minus (line switch) with the volume control turned on full and no signal. Line voltage for these readings was 117.5 volts, 60 cycles, a.c. All readings except heaters and cathodes were taken on 250 volt scale.

Tube	Plate	Screen	Cathode	FIL
12SA7GT	90	90	0	12
12SK7GT	90	90	0	12
12SQ7GT	30	—	0	12
50L6GT	100	87	5.5	50

DIAL CORD REPLACEMENT

Use a turn and a half of cord, part number 7BZ467A. Draw the cord snugly around the condenser pulley and knot it, with no slack, near the notch in the pulley, after which the cord should be drawn to the condenser pulley. The dial face should bear against the fibre washer when finally assembled.

The color coding of the i-f transformer leads is as follows:

Grid—green	Plate—blue
Grid return—black	B plus—red

The receiver has a self-contained antenna and does not require additional antenna connections. For permanent home installations, however, if it is desired to improve reception of weak stations, an additional outdoor antenna should be connected to the antenna terminals. A lead has been brought out of the rear near the line cord.

The self-contained loop antenna has directional properties. It is recommended, therefore, once the station is tuned in, that the antenna be rotated to the position where the desired station is received with maximum volume.

When replacing the chassis in the cabinet take precautions to keep any part of the dial and condenser assembly from touching the cabinet, otherwise microphonism will result.

An oscillator with frequencies of 455, 600 and 1500 kc is required.

An output meter should be used across the voice coil or output transformer for observing maximum response.

Always use as weak a test signal as possible when aligning the receiver.

Location of Coils and Trimmer Adjustments

The first i-f transformer is located on top of the chassis deck. The trimmers are available through holes in top of the can.

The second i-f transformer is located on the rear wall underneath the chassis. The trimmers are available through holes in the rear chassis wall.

The loop antenna trimmer is mounted on the loop assembly, variable condenser.

The oscillator coil is located underneath the chassis. The loop antenna acts as the antenna coil.

DESCRIPTION

TYPE: Single-band superheterodyne and phonograph.

FREQUENCY RANGE: 540-1630 kc.

NUMBER OF TUBES: Five.

TYPE OF TUBES:

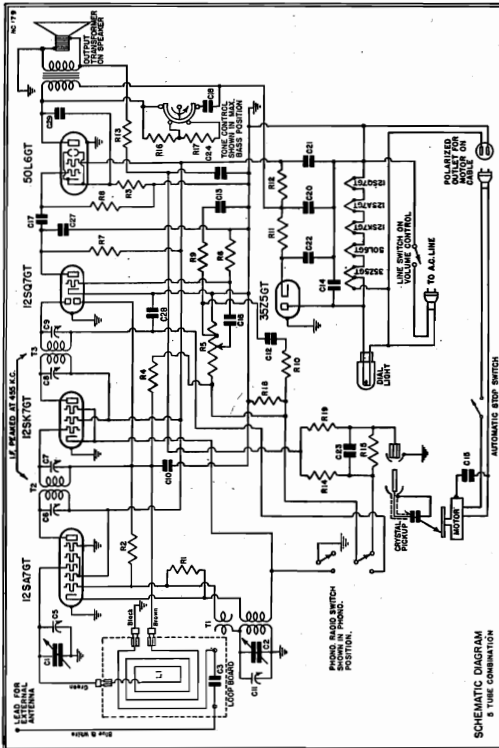
- 1—12SA7GT, pentagrid oscillator-modulator
- 1—12SK7GT, first i-f amplifier
- 1—12SQ7GT, diode detector, a-f amplifier, a.v.c.
- 1—50L6GT, beam power output
- 1—35Z5GT, half-wave rectifier.

POWER SUPPLY: A.C. only.

VOLTAGE RATING: 105-125 volts.

POWER CONSUMPTION:

- 30 watts for receiver.
- 20 watts for phonograph.



REPLACEMENT PARTS LIST

When ordering, specify part numbers. Use price each, effective as of March 15, 1941. Subject to change without notice.

*Item No.	Part No.	DESCRIPTION	Price
L1	8SW-22A	Antenna loop assembly	\$1.95
T1	8DT-272	Oscillator coil 455 kc	.45
T2	7QT-548	Double-tuned 455 kc second i-f transformer	1.00
T3	8ST-588C	20,000 ohm 1/4 watt carbon resistor	.85
R1	4XR-327	15 megohm 1/4 watt carbon resistor	.16
R2	3FR-293	140 ohm 1/4 watt wire-wound resistor	.16
R3	NNR-220	3 megohm 1/4 watt carbon resistor	.16
R4	9OR-448	Volume control 2.5 megohm tapped at .5 megohm	.85
R5	KR-56	500,000 ohm 1/4 watt carbon resistor	.16
R6	KR-54	100,000 ohm 1/4 watt carbon resistor	.16
R7	KR-52	1 megohm 1/4 watt carbon resistor	.16
R8	KR-57	750 ohm 1/4 watt carbon resistor	.16
R9	9JR-450	50,000 ohm 1/4 watt carbon resistor	.16
R10	9JR-424	2 megohm 1/4 watt carbon resistor	.16
R11	9JR-424	2 megohm 1/4 watt carbon resistor	.16
R12	9JR-424	2 megohm 1/4 watt carbon resistor	.16
R13	9JR-424	2 megohm 1/4 watt carbon resistor	.16
R14	9JR-424	2 megohm 1/4 watt carbon resistor	.16
R15	9JR-424	2 megohm 1/4 watt carbon resistor	.16
R16	9JR-424	2 megohm 1/4 watt carbon resistor	.16
R17	9JR-424	2 megohm 1/4 watt carbon resistor	.16
R18	9JR-424	2 megohm 1/4 watt carbon resistor	.16
R19	9JR-424	2 megohm 1/4 watt carbon resistor	.16
R20	9JR-424	2 megohm 1/4 watt carbon resistor	.16
R21	9JR-424	2 megohm 1/4 watt carbon resistor	.16
R22	9JR-424	2 megohm 1/4 watt carbon resistor	.16
R23	9JR-424	2 megohm 1/4 watt carbon resistor	.16
R24	9JR-424	2 megohm 1/4 watt carbon resistor	.16
R25	9JR-424	2 megohm 1/4 watt carbon resistor	.16
R26	9JR-424	2 megohm 1/4 watt carbon resistor	.16
R27	9JR-424	2 megohm 1/4 watt carbon resistor	.16
R28	9JR-424	2 megohm 1/4 watt carbon resistor	.16
R29	9JR-424	2 megohm 1/4 watt carbon resistor	.16
R30	9JR-424	2 megohm 1/4 watt carbon resistor	.16
R31	9JR-424	2 megohm 1/4 watt carbon resistor	.16
R32	9JR-424	2 megohm 1/4 watt carbon resistor	.16
R33	9JR-424	2 megohm 1/4 watt carbon resistor	.16
R34	9JR-424	2 megohm 1/4 watt carbon resistor	.16
R35	9JR-424	2 megohm 1/4 watt carbon resistor	.16
R36	9JR-424	2 megohm 1/4 watt carbon resistor	.16
R37	9JR-424	2 megohm 1/4 watt carbon resistor	.16
R38	9JR-424	2 megohm 1/4 watt carbon resistor	.16
R39	9JR-424	2 megohm 1/4 watt carbon resistor	.16
R40	9JR-424	2 megohm 1/4 watt carbon resistor	.16
R41	9JR-424	2 megohm 1/4 watt carbon resistor	.16
R42	9JR-424	2 megohm 1/4 watt carbon resistor	.16
R43	9JR-424	2 megohm 1/4 watt carbon resistor	.16
R44	9JR-424	2 megohm 1/4 watt carbon resistor	.16
R45	9JR-424	2 megohm 1/4 watt carbon resistor	.16
R46	9JR-424	2 megohm 1/4 watt carbon resistor	.16
R47	9JR-424	2 megohm 1/4 watt carbon resistor	.16
R48	9JR-424	2 megohm 1/4 watt carbon resistor	.16
R49	9JR-424	2 megohm 1/4 watt carbon resistor	.16
R50	9JR-424	2 megohm 1/4 watt carbon resistor	.16
R51	9JR-424	2 megohm 1/4 watt carbon resistor	.16
R52	9JR-424	2 megohm 1/4 watt carbon resistor	.16
R53	9JR-424	2 megohm 1/4 watt carbon resistor	.16
R54	9JR-424	2 megohm 1/4 watt carbon resistor	.16
R55	9JR-424	2 megohm 1/4 watt carbon resistor	.16
R56	9JR-424	2 megohm 1/4 watt carbon resistor	.16
R57	9JR-424	2 megohm 1/4 watt carbon resistor	.16
R58	9JR-424	2 megohm 1/4 watt carbon resistor	.16
R59	9JR-424	2 megohm 1/4 watt carbon resistor	.16
R60	9JR-424	2 megohm 1/4 watt carbon resistor	.16
R61	9JR-424	2 megohm 1/4 watt carbon resistor	.16
R62	9JR-424	2 megohm 1/4 watt carbon resistor	.16
R63	9JR-424	2 megohm 1/4 watt carbon resistor	.16
R64	9JR-424	2 megohm 1/4 watt carbon resistor	.16
R65	9JR-424	2 megohm 1/4 watt carbon resistor	.16
R66	9JR-424	2 megohm 1/4 watt carbon resistor	.16
R67	9JR-424	2 megohm 1/4 watt carbon resistor	.16
R68	9JR-424	2 megohm 1/4 watt carbon resistor	.16
R69	9JR-424	2 megohm 1/4 watt carbon resistor	.16
R70	9JR-424	2 megohm 1/4 watt carbon resistor	.16
R71	9JR-424	2 megohm 1/4 watt carbon resistor	.16
R72	9JR-424	2 megohm 1/4 watt carbon resistor	.16
R73	9JR-424	2 megohm 1/4 watt carbon resistor	.16
R74	9JR-424	2 megohm 1/4 watt carbon resistor	.16
R75	9JR-424	2 megohm 1/4 watt carbon resistor	.16
R76	9JR-424	2 megohm 1/4 watt carbon resistor	.16
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R78	9JR-424	2 megohm 1/4 watt carbon resistor	.16
R79	9JR-424	2 megohm 1/4 watt carbon resistor	.16
R80	9JR-424	2 megohm 1/4 watt carbon resistor	.16
R81	9JR-424	2 megohm 1/4 watt carbon resistor	.16
R82	9JR-424	2 megohm 1/4 watt carbon resistor	.16
R83	9JR-424	2 megohm 1/4 watt carbon resistor	.16
R84	9JR-424	2 megohm 1/4 watt carbon resistor	.16
R85	9JR-424	2 megohm 1/4 watt carbon resistor	.16
R86	9JR-424	2 megohm 1/4 watt carbon resistor	.16
R87	9JR-424	2 megohm 1/4 watt carbon resistor	.16
R88	9JR-424	2 megohm 1/4 watt carbon resistor	.16
R89	9JR-424	2 megohm 1/4 watt carbon resistor	.16
R90	9JR-424	2 megohm 1/4 watt carbon resistor	.16
R91	9JR-424	2 megohm 1/4 watt carbon resistor	.16
R92	9JR-424	2 megohm 1/4 watt carbon resistor	.16
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R99	9JR-424	2 megohm 1/4 watt carbon resistor	.16
R100	9JR-424	2 megohm 1/4 watt carbon resistor	.16
R101	9JR-424	2 megohm 1/4 watt carbon resistor	.16
R102	9JR-424	2 megohm 1/4 watt carbon resistor	.16
R103	9JR-424	2 megohm 1/4 watt carbon resistor	.16
R104	9JR-424	2 megohm 1/4 watt carbon resistor	.16
R105	9JR-424	2 megohm 1/4 watt carbon resistor	.16
R106	9JR-424	2 megohm 1/4 watt carbon resistor	.16
R107	9JR-424	2 megohm 1/4 watt carbon resistor	.16
R108	9JR-424	2 megohm 1/4 watt carbon resistor	.16
R109	9JR-424	2 megohm 1/4 watt carbon resistor	.16
R110	9JR-424	2 megohm 1/4 watt carbon resistor	.16
R111	9JR-424	2 megohm 1/4 watt carbon resistor	.16
R112	9JR-424	2 megohm 1/4 watt carbon resistor	.16
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R118	9JR-424	2 megohm 1/4 watt carbon resistor	.16
R119	9JR-424	2 megohm 1/4 watt carbon resistor	.16
R120	9JR-424	2 megohm 1/4 watt carbon resistor	.16
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R152	9JR-424	2 megohm 1/4 watt carbon resistor	.16
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R156	9JR-424	2 megohm 1/4 watt carbon resistor	.16
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R163	9JR-424	2 megohm 1/4 watt carbon resistor	.16
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R167	9JR-424	2 megohm 1/4 watt carbon resistor	.16
R168	9JR-424	2 megohm 1/4 watt carbon resistor	.16
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R170	9JR-424	2 megohm 1/4 watt carbon resistor	.16
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R185	9JR-424	2 megohm 1/4 watt carbon resistor	.16
R186	9JR-424	2 megohm 1/4 watt carbon resistor	.16
R187	9JR-424	2 megohm 1/4 watt carbon resistor	.16
R188	9JR-424	2 megohm 1/4 watt carbon resistor	.16
R189	9JR-424	2 megohm 1/4 watt carbon resistor	.16
R190	9JR-424	2 megohm 1/4 watt carbon resistor	.16
R191	9JR-424	2 megohm 1/4 watt carbon resistor	.16
R192	9JR-424	2 megohm 1/4 watt carbon resistor	.16
R193	9JR-424	2 megohm 1/4 watt carbon resistor	.16
R194	9JR-424	2 megohm 1/4 watt carbon resistor	.16
R195	9JR-424	2 megohm 1/4 watt carbon resistor	.16

EMERSON RADIO & PHONOGRAPH CORP. MODELS FP421, FP422

Chassis FP

VOLTAGE ANALYSIS

Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed below are from point indicated to B minus (line switch) with the volume control turned on full and no signal. Line voltage for these readings was 117.5 volts, 60 cycles, a.c. All readings except heaters and cathodes were taken on 250 volt scale. Measurements made with 117.5 volts d.c. will be lower than those given below.

Tube	Plate	Screen	Cathode	File
12SA7GT	88	88	0	12
12SK7GT	88	88	0	12
12SQ7GT	30	—	0	12
50L6GT	82	88	5.6	50

ADJUSTMENTS

Voltage at 35Z5 cathode—120 volts.
Voltage across speaker field—32 volts.
Voltage across pilot light—4.5 volts.

I-f Alignment

Swing the variable condenser to the minimum capacity position. Feed 455 kc to the grid of the 12SA7GT tube through a .01 mf condenser and adjust the four i-f trimmers for maximum response. The grid of the 12SA7GT tube may be reached by clipping the input lead to the stator lug of the antenna section.

An output meter should be used across the voice coil or output transformer for observing maximum response.

Always use as weak a test signal as possible when aligning the receiver.

R-f Alignment

Set the dial pointer at 140. Feed 1400 kc from the signal generator into a loop of wire about one foot in diameter. Hold this radiating loop about 12 inches away from and parallel to the receiver loop antenna. Advance the input to the loop until a satisfactory deflection is obtained on the output meter. Adjust first the oscillator trimmer then the antenna trimmer for maximum response. If the loop antenna has been replaced it may be necessary to retrace the loop inductance. With the dial set at 60 feed 600 kc to the antenna lead. A portion of the outside may be swung to either side of the center to give maximum response. Repeat the trimmer alignment at 140.

Location of Coils and Trimmer Adjustments

The first i-f transformer is mounted on top of the chassis deck next to the loop antenna. The trimmers are accessible through holes in the top of the can.

The second i-f transformer is mounted on top of the chassis next to the 50L6 tube. The trimmers are accessible through holes in the top of the can.

The trimmers for the antenna loop and the oscillator coil are located on the variable condenser. The front section is for the oscillator. The rear section is for the antenna loop. The oscillator coil is located beneath the chassis deck.

TYPE: Single-band superheterodyne.

FREQUENCY RANGE: 540-1630 kc.

NUMBER OF TUBES: Five.

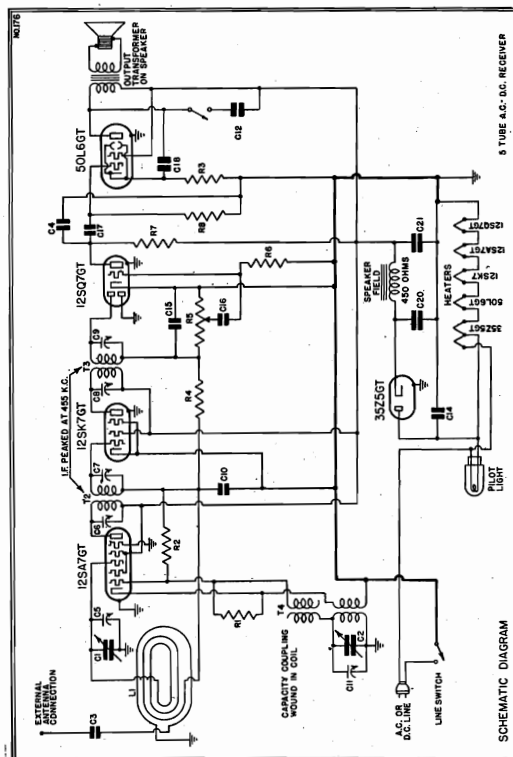
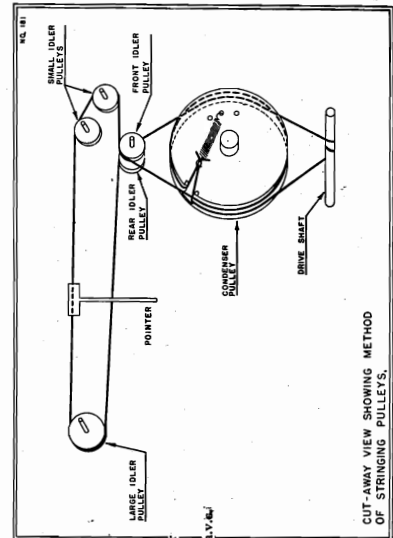
TYPE OF TUBES:

- 1—12SA7, pentagrid oscillator-modulator
- 1—12SK7, first i-f amplifier
- 1—12SQ7, diode detector, a-f amplifier, i.v.a.
- 1—50L6GT, beam power output
- 1—35Z5GT, half-wave rectifier.

POWER SUPPLY: A.C. or D.C.

VOLTAGE RATING: 105-125 volts.

POWER CONSUMPTION: 30 watts.



MODELS: FP-421 and FP-422

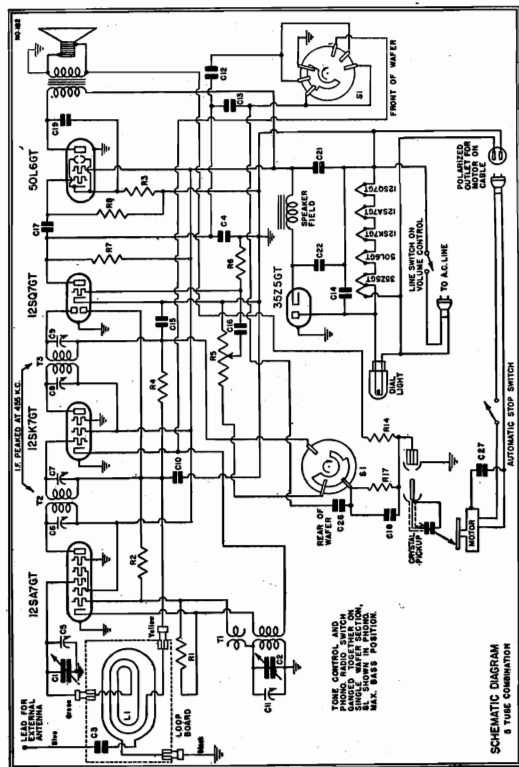
CHASSIS MODEL: FP

GENERAL NOTES

- If replacements are made or the wiring disturbed in the r-f section of the circuit, the receiver should be carefully realigned.
- In operating the receiver on d.c. it may be necessary to reverse the line plug for correct polarity.
- The color coding of the i-f transformer leads is as follows:
Plate—blue
B plus—red
Grid—green
Grid return—black
- The receiver has a self-contained antenna and does not require additional antenna connections. For permanent home installations, however, if it is desired to improve reception of weak stations, an additional outdoor antenna should be used. For this purpose a lead has been brought out of the rear near the line cord.
- The self-contained loop antenna has directional properties. It is important, therefore, once the station is tuned in, that the cabinet be rotated on its base back and forth through a quarter of a circle (90 degrees), and left at the position where the station is received with maximum volume.

REPLACEMENT PARTS LIST

Item	Part No.	DESCRIPTION
L1	7BW-179	Loop antenna assembly
T4	9PT-620	Oscillator coil
T2	8CT-568B	Double-tuned 455 kc first i-f transformer
T3	9PT-621	Double-tuned 455 kc second i-f transformer
R1	1R-60	20,000 ohm 1/4 watt carbon resistor
R2, R6	4XR-327	15 megohm 1/4 watt carbon resistor
R3	3FR-293	140 ohm 1/4 watt wire-wound resistor
R4	NNR-220	3 megohm 1/4 watt carbon resistor
R5	9PR-447	Volume control .5 megohm
R7, R8	KR-56	500,000 ohm 1/4 watt carbon resistor
C1, C2	9PC-533	Two-gang variable condenser
C3, C16	3HC-274	0.002 mf, 600 volt tubular condenser
C4	5AC-384	0.0002 mf, 600 volt tubular condenser
C5, C11		Trimmers, part of variable condenser.
C6, C7, C8, C9		Trimmers, part of i-f transformers.
C10	AC-6	0.1 mf, 200 volt tubular condenser
C12	9PC-544	0.04 mf, 200 volt tubular condenser

MODEL FW 423, Chassis FW
EMERSON RADIO & PHONOGRAPH CORP.

SCHEMATIC FOR MODEL FW

Location of Coils and Trimmer Adjustments

The first i-f transformer is mounted on top of the chassis deck next to the 12SA7 tube. The trimmers are accessible through holes in the top of the can.

The second i-f transformer is mounted on top of the chassis next to the 12SQ7 tube. The trimmers are accessible through holes in the top of the can.

The trimmers for the antenna and oscillator coils are located on the variable condenser. The trimmer on the front section is for the oscillator coil.

The oscillator coil is located underneath the chassis. The loop antenna acts as the antenna coil.

- In operating the receiver on d.c. it may be necessary to reverse the line plug for correct polarity.

- The color coding of the i-f transformer leads is as follows:
Grid—green
Plate—blue
Grid return—black
B plus—red

- The receiver has a self-contained antenna and does not require additional antenna connections. For permanent home installations, however, if it is desired to improve reception of weak stations, an additional outdoor antenna should be used. For this purpose a lead has been brought out of the rear near the line cord.

- The self-contained loop antenna operates at maximum efficiency when its position is at right angles to the broadcasting source. It is important, therefore, once the station is tuned in, to rotate the cabinet back and forth through a quarter of a circle (90 degrees), leaving it at the position where the station is received with maximum volume.

- Before turning the phono motor on check the a.c.-d.c. switch underneath the turntable on the motor board, making sure that it is in a position corresponding to the power supply.

VOLTAGE ANALYSIS

Readings should be taken with a 1000 ohm-per-volt meter. Voltages listed below are from point indicated to B minus (line switch) with this meter. The meter should be set on full and no signal. Line voltage for these readings was 117.5 volts, 60 cycles, a.c. All readings except heaters and cathodes were taken on 250 volt scale. Measurements made with 117.5 volts d.c. will be lower than those given below.

Tube	Plate	Screen	Cathode	Fil.
12SA7	88	88	0	12
12SQ7	88	88	0	12
35Z5	30	—	0	12
50L6	82	88	5.6	50

An oscillator with frequencies of 455 and 1400 kc is required.

An output meter should be used across the voice coil or output transformer for observing maximum response.

Always use as weak a test signal as possible when aligning the receiver.

ADJUSTMENTS

I-f Alignment

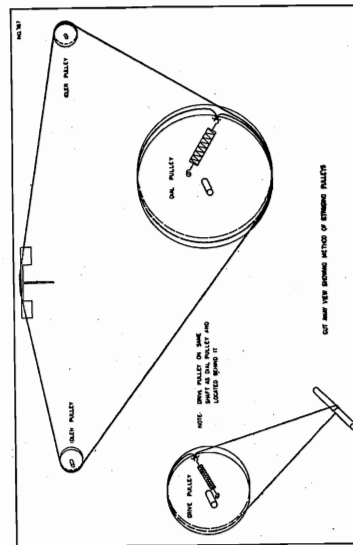
Swing the variable condenser to the minimum capacity position. Feed 455 kc to the grid of the 12SA7 tube through a .01 mf condenser and adjust the four i-f trimmers for maximum response.

Note: The grid of the 12SA7 tube is connected to the lower stator lug of the rear variable condenser section. Connection may be made with a test clip to the upper stator lug.

R-f Alignment

Set the dial pointer at 1400. Set the signal generator at 1400 kc and feed its output into a loop of wire about 12 inches in diameter. Hold this radiating loop about 12 inches from and parallel to the receiver loop antenna. Advance the output of the signal generator until the station is heard. Then adjust the antenna trimmer (on front section of variable condenser) then the antenna trimmer (on rear section of variable condenser) for maximum response.

If the loop antenna has been replaced it may be necessary to adjust the loop inductance as follows: Align at 1400 kc. A position of the outside turn of the loop may be swung to either side of the center to give maximum response. Readjust at 1400.



SEE HOW THE LOOP ANTENNA METHOD OF ALIGNMENT WORKS

*Item	Part No.	DESCRIPTION
L1	9WW-362	Antenna loop assembly
T1	9JT-517	Oscillator coil
T2	8PT-386A	Double-tuned 455 kc first i-f transformer
T3	8PT-387	Double-tuned 455 kc second i-f transformer
R1	LR-60	20,000 ohm 1/4 watt carbon resistor
R2, R6	4XR-327	15 megohm 1/4 watt carbon resistor
R3	3FR-293	140 ohm 1/4 watt carbon resistor
R4, R17	NNR-220	3 megohm 1/4 watt carbon resistor
R5	9SR-452	Volume control, .5 megohm
R7, R8, R14	KR-56	500,000 ohm 1/4 watt carbon resistor
C1, C2	9SC-344	Two-gang variable condenser
C3, C16	3HC-274	0.002 mf, 600 volt tubular condenser
C4	3RC-373	0.0004 mf, 600 volt tubular condenser
C5, C11		Trimmers, part of variable condenser
C6, C7, C8, C9		Trimmers, part of i-f transformers
C10	AC-6	0.1 mf, 200 volt tubular condenser
C12	9JC-341	0.0006 mf, 600 volt tubular condenser
C13	9JC-342	0.0015 mf, 600 volt tubular condenser
C14	LC-64	0.02 mf, 400 volt tubular condenser
C15	5AC-384	0.0002 mf, 600 volt tubular condenser
C17	LC-65	0.02 mf, 400 volt tubular condenser
C18	IC-47	0.0005 mf, mica condenser
C19	KC-58	0.01 mf, 400 volt tubular condenser
C21, C22	6JC-268	Dual 20 mf, .25 volt dry electrolytic condenser
C26	4AC-394A	0.000026 mf mica condenser
C27	9JC-334	0.05 mf, 200 volt tubular condenser

EMERSON RADIO & PHONOGRAPH CORP.

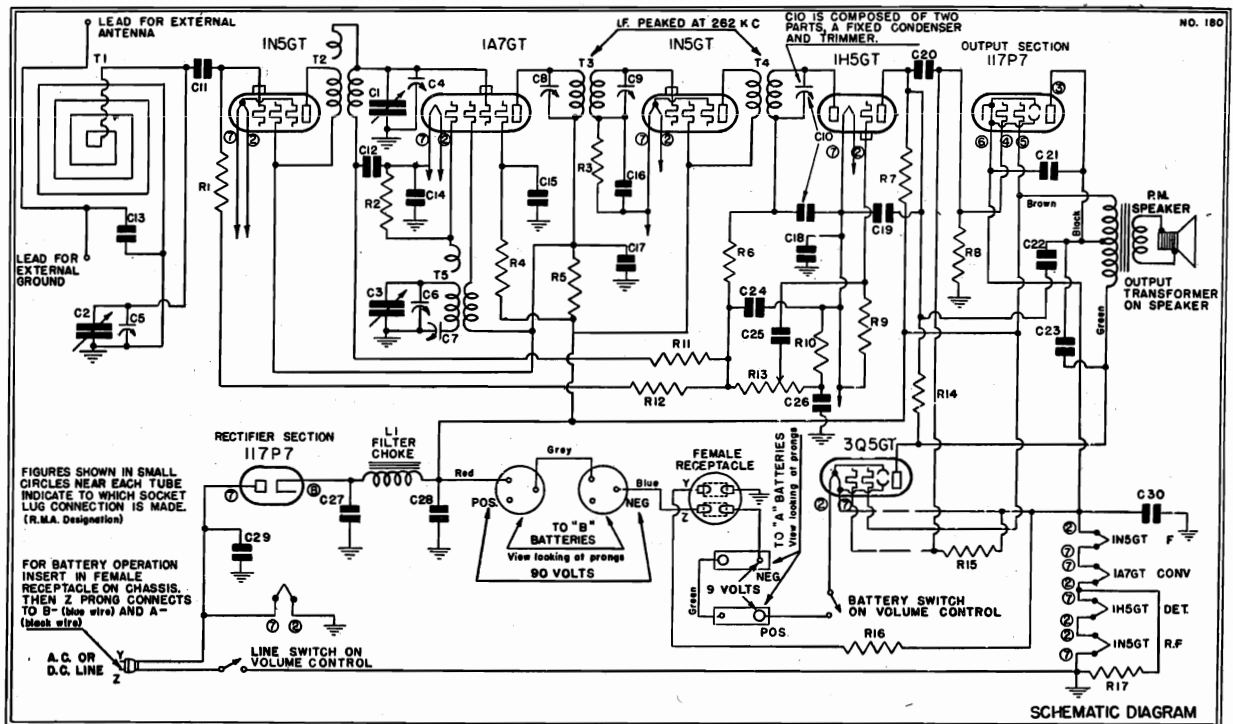
MODELS FU424,

FU427, FU428

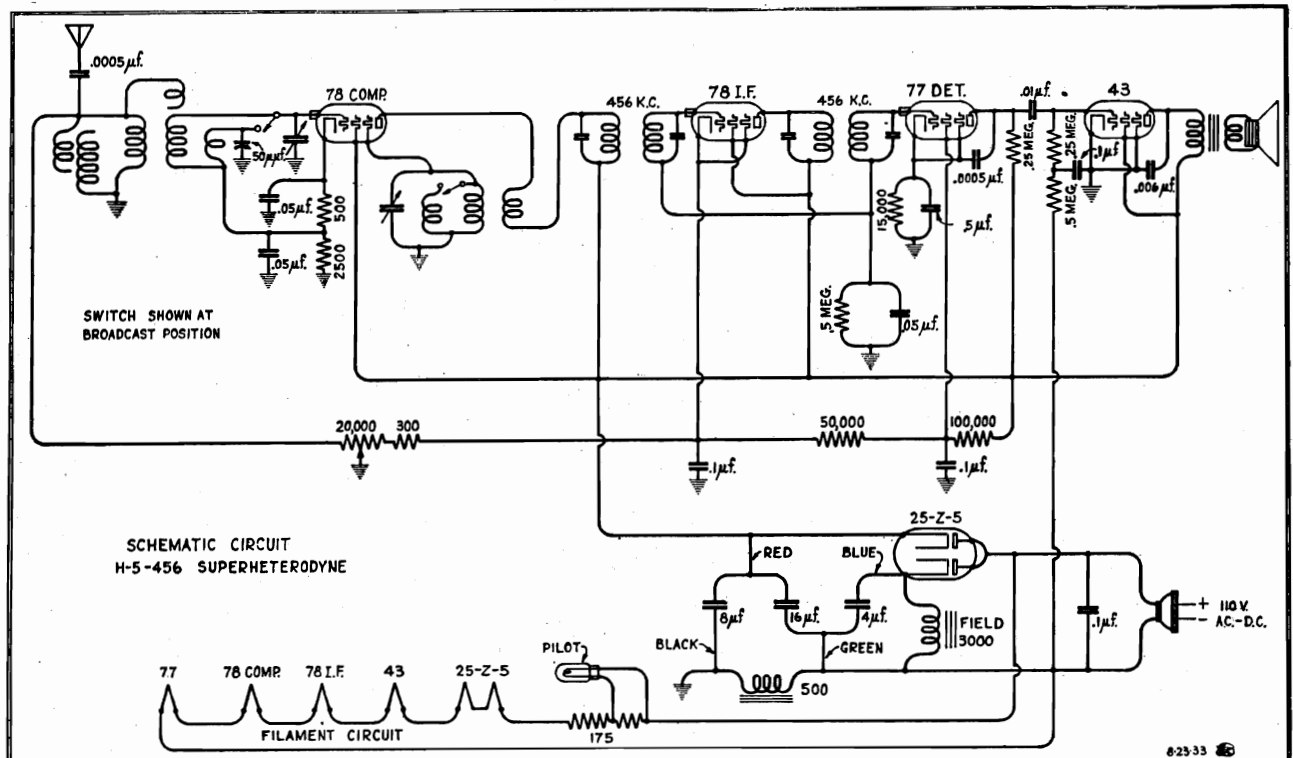
Chassis FU

MODEL H-5 Universal

Compact



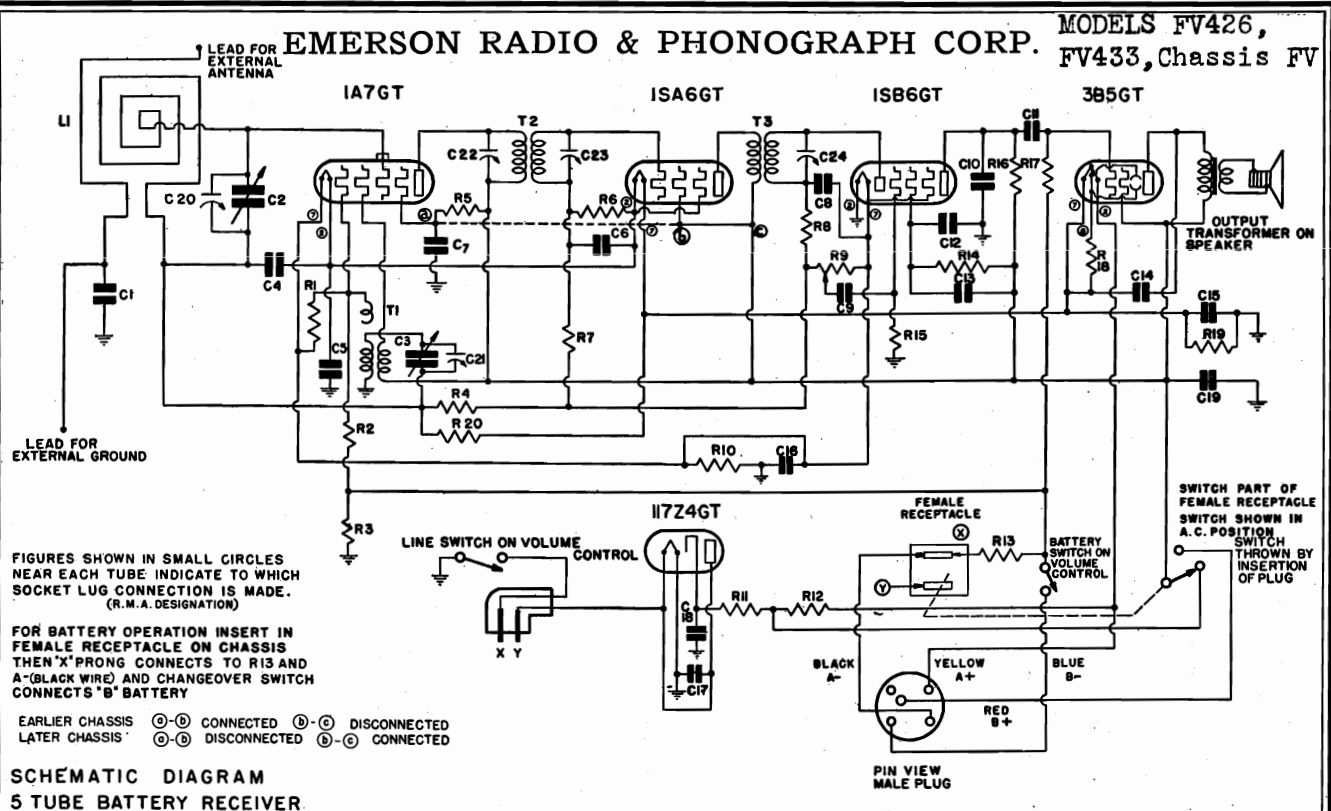
SCHEMATIC DIAGRAM FOR MODEL FU



Universal Compact

Five Tube Superheterodyne - - Short-and-Long Wave - - 75 to 550 Meters

Either A. C. or D. C. - - 110-120 Volts - - Adaptable for 220 Volts - - 25 to 60 Cycles



VOLTAGE ANALYSIS

Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed below are from point indicated to B minus (line switch) with the volume control turned on full and no signal. Line voltage for these readings was 117.5 volts, 60 cycles, a.c. All readings except heaters and cathodes were taken on 250 volt scale. Measurements made with 117.5 volts d.c. will be lower than those given below.

Tube	Plate	Screen	Osc. Plate	Fil.
1A7GT	69	46	69	1.4
1SA6GT	69	70	—	1.4
1SB6GT	9	5	—	1.4
3B5GT	67	69	—	2.5

Voltage at 117Z4GT cathode—125 volts.

Voltage drop across R11, R12—117 volts.

DESCRIPTION

TYPE: Universal (battery, a.c.-d.c.) superheterodyne.

FREQUENCY RANGE: 540-1600 kc.

NUMBER OF TUBES: Five.

TYPE OF TUBES:

- 1—1A7GT, oscillator-modulator
- 1—1SA6GT, i-f amplifier
- 1—1SB6GT, 2nd detector, a.v.c., a-f amplifier
- 1—3B5GT, beam power output (battery operation)
- 1—117Z4, half-wave rectifier (line operation).

POWER SUPPLY: Battery, a.c. or d.c.

VOLTAGE RATING: (Line operation) 105-125 volts, a.c.-d.c.

POWER CONSUMPTION: (Line operation) 13 watts.

CURRENT DRAIN:

- (Battery operation) "A" battery .02 amp.
- "B" battery 0.007 amp.

GENERAL NOTES

- The color coding of the i-f transformer leads is as follows:

Grid—green Plate—blue
 Grid return—black B plus—red

- The color coding of the battery cable is as follows:

Red—B plus, 67.5 volts Yellow—A plus, 7.5 volts
 Blue—B minus Black—A minus

- If replacements are made in the r-f section of the circuit, the receiver should be carefully re-aligned.

- Battery Operation:** Important: Remove the line plug from the electrical outlet. Insert the plug into the receptacle at the bottom of the receiver. This is important since the receiver will not operate from batteries with the plug out of the receptacle. The loose portion of the cord can then be coiled and placed in the cabinet.

- The receiver has a self-contained antenna and normally does not require additional antenna or ground connection. For permanent home installations, however, in a location far removed from broadcasting stations, an additional outside antenna should be used. The outside antenna and ground connections should be made to the two leads at the rear of the cabinet.

- The self-contained loop antenna has directional properties. It is important, therefore, once the station is tuned in, that the cabinet be rotated on its base back and forth through a quarter of a circle (90 degrees), and left at the position where the station is received with maximum volume.

MODELS FV426, FV433
Chassis FV

EMERSON RADIO & PHONOGRAPH CORP.

REPLACEMENT PARTS LIST

Specify part numbers when ordering. List price each, effective as of December 15, 1941. (Subject to change without notice.)

*Item	Part No.	DESCRIPTION	PRICE
L1	9VW-355	Loop antenna	\$.90
T1	9VT-360	Oscillator coil .....	.50
T2	9VT-668	Double-tuned 455 kc first i-f transformer.....	1.45
T3	9VT-632	Single-tuned 455 kc second i-f transformer.....	1.25
R1	10TR-485	220,000 ohm $\frac{1}{4}$ watt carbon resistor.....	.16
R2, R16	KR-57	1 megohm $\frac{1}{4}$ watt carbon resistor.....	.16
R3	9ZR-478	470,000 ohm $\frac{1}{4}$ watt carbon resistor.....	.16
R4, R6, R17	9ZR-480	3.3 megohm $\frac{1}{4}$ watt carbon resistor.....	.16
R5	9ZR-477	22,000 ohm $\frac{1}{4}$ watt carbon resistor.....	.16
R7, R20	3RR-275	10 megohm $\frac{1}{4}$ watt carbon resistor.....	.16
R8	10TR-486	47,000 ohm $\frac{1}{4}$ watt carbon resistor.....	.16
R9	9VR-453	Volume control with line switch 1.5 megohm.....	.90
R10	4CR-321	290 ohm $\frac{1}{2}$ watt wire-wound molded resistor.....	.16
R11, R12	9VR-462	Candohm ballast resistor: R11—960 ohms, 3.5 watts; R12—1375 ohms, 3.6 watts.....	.40
R13	7VR-488	290 ohm $\frac{1}{2}$ watt metallized filament, ceramic coated resistor.....	.16
R14, R15	10TR-487	4.7 megohm $\frac{1}{4}$ watt carbon resistor.....	.16
R18	3VR-271	510 ohm 1 watt wire-wound molded resistor.....	.16
R19	9VR-463	800 ohm 1 watt wire-wound molded resistor.....	.16
C1, C9, C11, C14 }	3HC-274	0.002 mf, 600 volt tubular condenser.....	.20
C2, C3	9VC-547	Two-gang variable condenser.....	2.90
C4, C16	AC-6	0.1 mf, 200 volt tubular condenser.....	.20
C5	5AC-388A	0.25 mf, 100 volt tubular condenser.....	.20
C6	KC-58	0.01 mf, 400 volt tubular condenser.....	.20
C7	9VC-566	5. mf, 100 volt dry electrolytic condenser.....	.50
C8	4XC-394A	0.0002 mf mica condenser.....	.20
C10	4XC-393A	0.00006 mf mica condenser.....	.20
C12	ZZC-211	0.03 mf, 200 volt tubular condenser.....	.20
C13	3VC-324	0.003 mf, 600 volt tubular condenser.....	.20
C15	9VC-560	40 mf, 40 volt dry electrolytic condenser.....	.55
C17	LC-64	0.05 mf, 400 volt tubular condenser.....	.20
C18, C19	8TC-529C	Dual 40 mf, 150 volt dry electrolytic condenser.....	1.00
†C20, C21		Trimmer condenser, part of variable condenser.	
†C22, C23, C24		Trimmer condenser, part of i-f transformers.	
	9VS-562	4" P.M. dynamic speaker.....	6.00

*Item number locates the article on the schematic diagram.

†Not supplied separately.

Location of Coils and Trimmer Adjustments

The first i-f transformer is mounted on top of the chassis deck next to the variable condenser. The trimmers are accessible through holes in the top of the can.

The second i-f transformer is mounted on top of the chassis between the volume control and the speaker. The trimmer is accessible through a hole in the top of the can.

The trimmers for the antenna and oscillator coils are located on the variable condenser. The trimmer on the lower section is for the oscillator coil.

The oscillator coil is located underneath the chassis. The loop antenna acts as the antenna coil.

I-f Alignment

Swing the variable condenser to the minimum capacity position. Feed 455 kc to the grid of the 1A7GT tube through a .01 mf condenser and adjust the three i-f trimmers for maximum response.

R-f Alignment

Set the dial pointer at 140. Set the signal generator at 1400 kc and feed its output into a loop of wire about 12 inches in diameter. Hold this radiating loop about 12 inches from and parallel to the receiver loop antenna. Advance the output of the signal generator until deflection is obtained on the output meter. Adjust first the oscillator trimmer (on front section of variable condenser) then the antenna trimmer (on rear section of variable condenser) for maximum response.

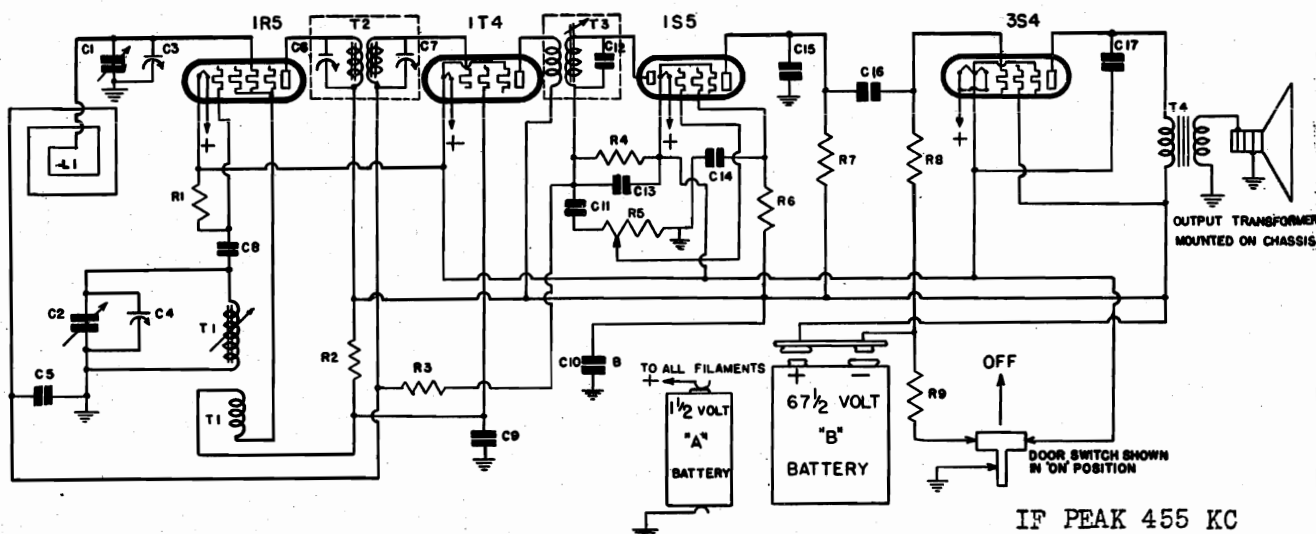
If the loop antenna has been replaced it may be necessary to adjust the loop inductance as follows: Align at 140. Set the pointer at 60 and feed 600 kc to the antenna lead. A portion of the outside turn of the loop may be swung to either side of the center to give maximum response. Realign at 140.

EMERSON RADIO & PHONOGRAPH CORP.

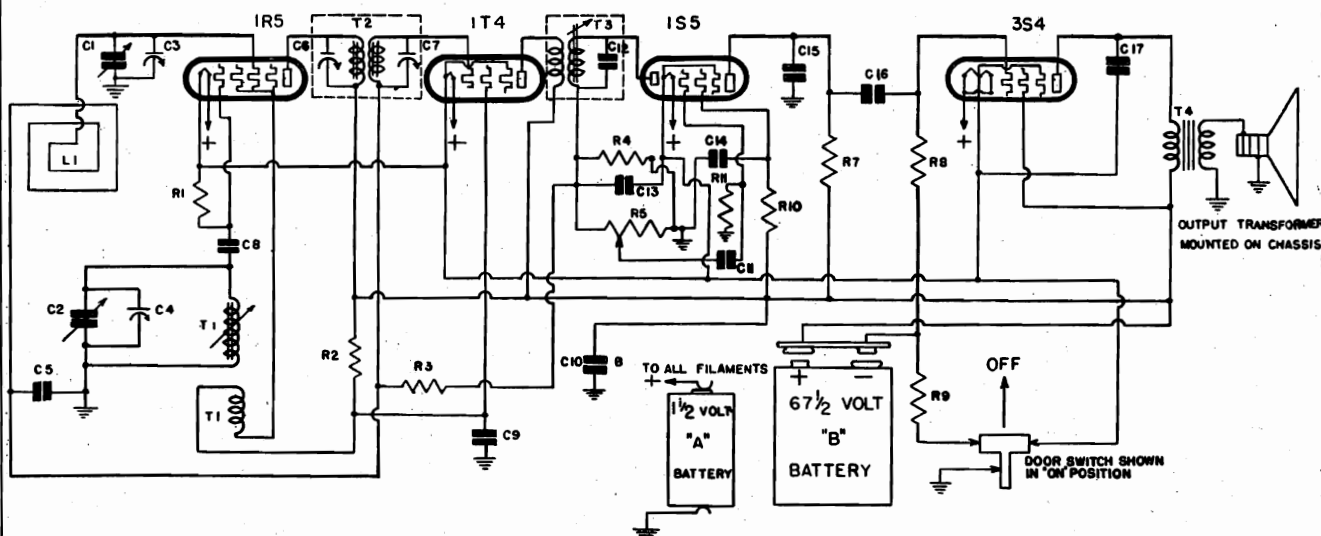
MODEL FR432

Chassis FR

Early, Late



FR SCHEMATIC DIAGRAM FOR CHASSIS BEARING SERIAL NUMBERS BELOW 4,818,700



FR SCHEMATIC DIAGRAM FOR CHASSIS BEARING SERIAL NUMBERS ABOVE 4,818,700

VOLTAGE ANALYSIS

Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed are from point indicated to chassis with volume control turned on full and no signal. The battery voltages for these readings were: "A" 1.5 volts, "B" 67.5 volts. All readings except filaments were taken on the 250 volt scale.

Tube	Plate	Screen	Fil.
1R5	57	35	1.5
1T4	57	35	1.5
1S5	*12	*3	1.5
3S4	55	60	1.5

Bias for the 3S4 tube is obtained across the resistor R9. The voltage drop across this resistor should be 7.5 volts.

*The operating voltage of this tube cannot be measured because of the high resistor in the circuit.

MODEL FR432, Chassis FR EMERSON RADIO & PHONOGRAPH CORP.
Early, Late

REPLACEMENT PARTS LIST

When ordering state part number. List price each as of June 15, 1941. (Subject to change without notice.)

*Item	Part No.	DESCRIPTION	PRICE
L1	9RW-350A	Loop antenna	\$.60
T1	9RT-622	Oscillator coil .....	.75
T2	9RT-623	Double-tuned 455 kc first i-f transformer.....	1.70
T3	9RT-624	Single-tuned 455 kc second i-f transformer.....	1.40
T4	9RT-625	Output transformer .....	.90
R1	KR-54	100,000 ohm $\frac{1}{4}$ watt carbon resistor.....	.16
R2	KR-63	15,000 ohm $\frac{1}{4}$ watt carbon resistor.....	.16
R3, R6, R8	NNR-220	3 megohm $\frac{1}{4}$ watt carbon resistor.....	.16
R4, R7	KR-57	1 megohm $\frac{1}{4}$ watt carbon resistor.....	.16
R5	9RR-449	Volume control, 3 megohm.....	.65
R9	9RR-458	980 ohm $\frac{1}{2}$ watt wire-wound resistor.....	.16
R10		5 megohm $\frac{1}{4}$ watt carbon resistor.....	.16
C1, C2	9RC-535G	Two-gang variable condenser.....	2.50
†C3, C4		Trimmers, part of variable condenser.	
C5, C9, C14	9RC-537	0.02 mf, 100 volt tubular condenser.....	.12
†C6, C7		Trimmers, part of first i-f transformer.	
C8	9RC-539	0.00005 mf, ceramic condenser.....	.20
C10	9RC-536	8 mfd, 100 volt dry electrolytic condenser.....	.50
C11, C17	9RC-552	0.003 mf, 150 volt tubular condenser.....	.12
†C12		Part of second i-f transformer.	
C13, C15	9RC-540	0.0001 mf, ceramic condenser.....	.20
C16	9RC-538	0.001 mf, 100 volt flat tubular condenser.....	.12
	9RS-553	Permanent magnet dynamic speaker.....	3.75

*Item number locates the article on the schematic diagram.

†Not supplied separately.

ADJUSTMENTS

An oscillator with frequencies of 455 and 1600 kc is required.

An output meter should be used across the voice coil or output transformer for observing maximum response.

Always use as weak a test signal as possible when aligning the receiver.

Location of Coils and Trimmer Adjustments

The first i-f transformer is located next to the output transformer.

The trimmers are accessible through holes in top of the can.

The second i-f transformer is located between the 1T4 and 1S5 tubes. The single trimming core screw extends from the end of the can.

The oscillator coil is located next to the first i-f transformer. The trimmer for the oscillator is located on the smaller variable condenser section.

The 600 kc oscillator core adjustment is the brass screw protruding from the end of the oscillator coil.

The loop antenna acts as the antenna coil. Trimmer for the loop is located on the larger section of the variable condenser.

I-f Alignment

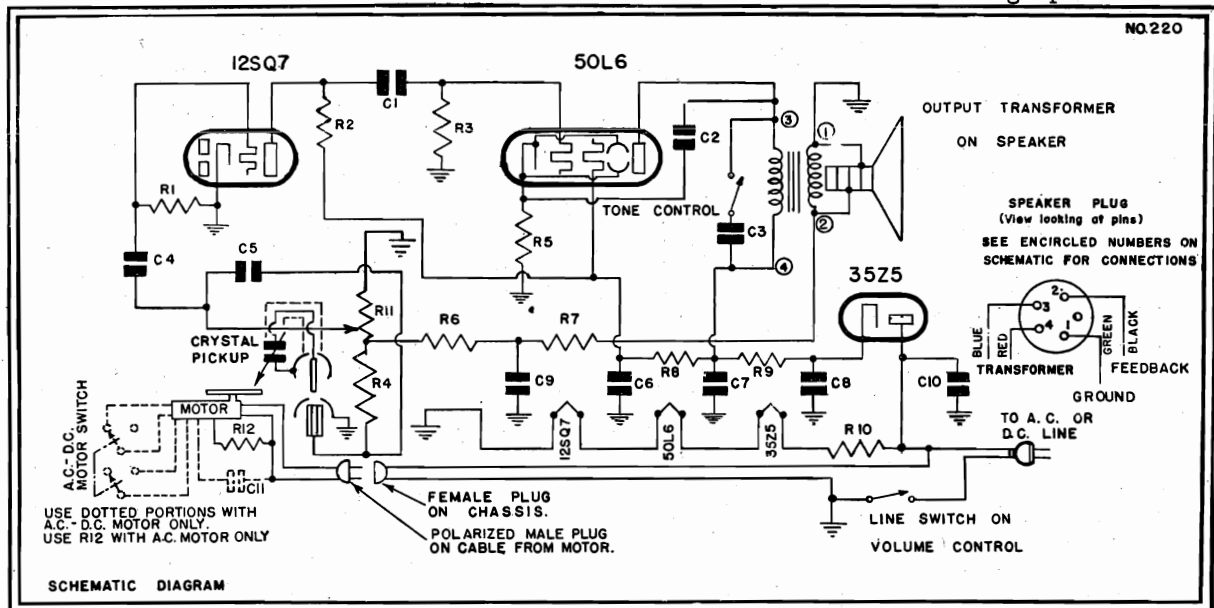
Swing variable condenser to minimum capacity position.

Feed 455 kc to the grid of the 1R5 tube through a 0.01 mf condenser. Adjust the three i-f trimmer screws for maximum response. (Clip the i-f input to the stator lug of the larger variable condenser section.)

R-f Alignment

Set the dial pointer at 160. Set the signal generator at 1600 kc and feed its output into a loop of wire about one foot in diameter. Hold this radiating loop about one foot away from and parallel to the receiver loop antenna. Advance the output of the generator until deflection is obtained on the output meter. Adjust first the oscillator trimmer (smaller section of variable condenser) then the antenna trimmer (larger section of variable condenser) for maximum response. Set the dial pointer at 60. Feed 600 kc and rock the variable condenser while adjusting the oscillator core adjustment for maximum response. Return to 1600 and check alignment. If re-adjustment is necessary return to 600 and repeat entire procedure.

EMERSON RADIO & PHONOGRAPH CORP.

MODELS FY434, Chas. FY
FY2-434, Chassis FY2
Phonograph

REPLACEMENT PARTS LIST

When ordering, specify part numbers. List price each effective as of Dec. 1, 1941. Subject to change without notice.

*Item	Part No.	DESCRIPTION	PRICE
R1	4XR-327	15 megohm $\frac{1}{4}$ watt carbon resistor.....	\$.16
R2, R3	KR-56	500,000 ohm $\frac{1}{4}$ watt carbon resistor.....	.16
R4, R6	KR-57	1 megohm $\frac{1}{4}$ watt carbon resistor.....	.16
R7	KR-53	50,000 ohm $\frac{1}{4}$ watt carbon resistor.....	.16
R8	KR-51	2,500 ohm $\frac{1}{4}$ watt carbon resistor.....	.16
R9	9JR-450	175 ohm 1 watt carbon resistor.....	.16
R10	9YR-460	133 ohm 3 watt wire-wound resistor.....	.25
R11	9YR-459	Volume control 2.5 megohm.....	.80
R12	KR-55	250,000 ohm $\frac{1}{4}$ watt carbon resistor (FY).....	.16
C1, C2	LC-65	0.02 mf, 400 volt tubular condenser.....	.20
C3	BC-12	0.05 mf, 200 volt tubular condenser.....	.20
C4	3HC-274	0.002 mf, 600 volt tubular condenser.....	.20
C5	IC-51A	0.00001 mf, mica condenser.....	.20
C6, C7 C8	8JC-513B	Multiple dry electrolytic condenser, 150 volt; C6, C8—20 mf, C7—40 mf.....	.95
C9	FC-29	0.02 mf, 200 volt tubular condenser.....	.20
C10	LC-64	0.05 mf, 200 volt tubular condenser (FY2).....	.20
C11	9JC-534	0.05 mf, 200 volt tubular condenser.....	.20

*Item number locates the article on the schematic diagram.

VOLTAGE ANALYSIS

Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed below are from point indicated to B minus (line switch) with the volume control turned on full and no signal. Line voltage for these readings was 117.5 volts, 60 cycles, a.c. All readings except heaters and cathodes were taken on 250 volt scale. Measurements made with 117.5 volts d.c. will be lower than those given below.

Tube	Plate	Screen	Cathode	Fil.
12SQ7GT	35	—	0	12
50L6GT	120	115	6.0	50

Voltage at 35Z5 cathode—135 volts.

TYPE OF TUBES:

- 1—12SQ7, first audio
- 1—50L6, beam power output
- 1—35Z5, half-wave rectifier.

POWER CONSUMPTION:

- 45 watts (FY)
- 65 watts (FY2)

POWER SUPPLY:

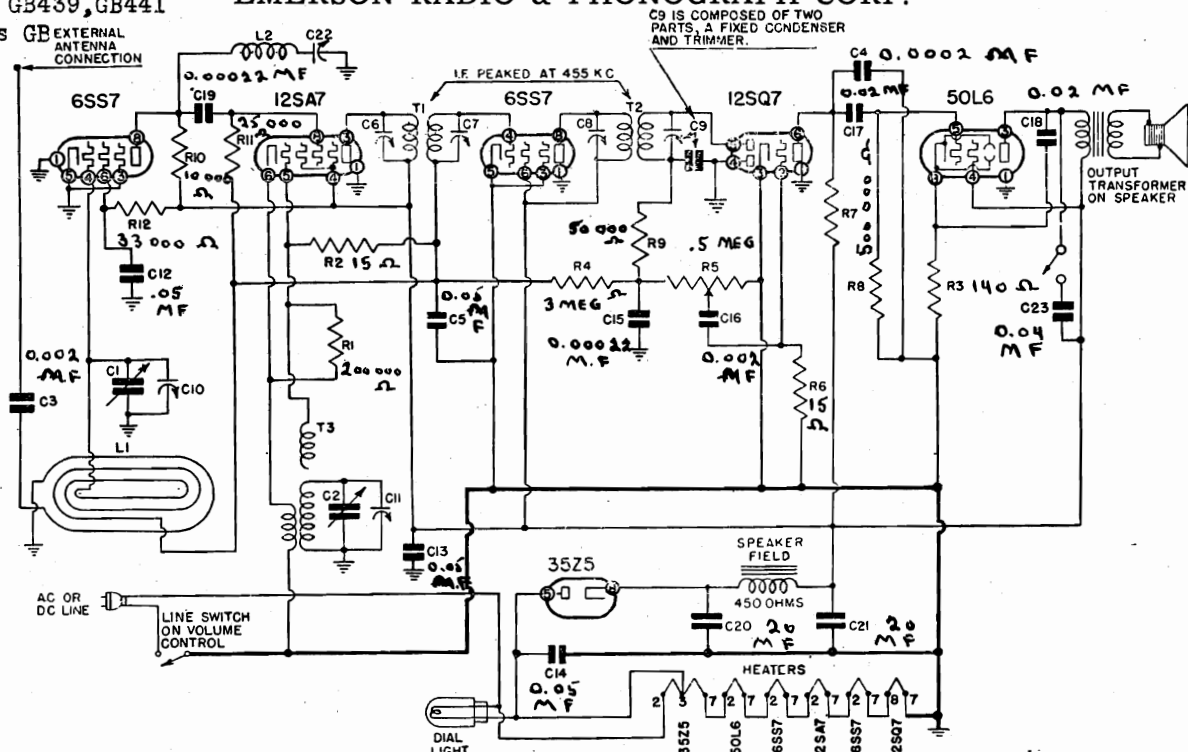
- a.c. (FY)
- a.c.-d.c. (FY2)

VOLTAGE RATING: 105-125 volts.

MODELS GB439, GB441

EMERSON RADIO & PHONOGRAPH CORP.

Chassis GB



VOLTAGE ANALYSIS

Voltage at 35Z5GT cathode—115 volts.

Tube	Plate	Screen	Cathode	Fil.
6SS7 (r-f)	50	57	0	6.0
12SA7	87	89	0	12.0
6SS7	88	89	0	6.0
12SQ7	30	—	0	12.0
50L6GT	82	89	5.3	50.0

Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed below are from point indicated to B minus (line switch) with the volume control turned on full and no signal. Line voltage for these readings was 117.5 volts, 60 cycles, a.c. All readings except heaters and cathodes were taken on 250 volt scale. Measurements made with 117.5 volts d.c. will be lower than those given below.

Location of Coils and Trimmer Adjustments

The first i-f transformer is mounted on top of the chassis deck next to the loop antenna. The trimmers are accessible through holes in the top of the can.

The second i-f transformer is mounted on top of the chassis between the 50L6 tube and the speaker. The trimmers are accessible through holes in the top of the can.

The trimmers for the antenna and oscillator coils are located on the variable condenser. The trimmer on the front section is for the oscillator coil.

The oscillator coil is located underneath the chassis. The loop antenna acts as the antenna coil.

I-f and Wave-trap Alignment

Swing the variable condenser to the minimum capacity position. Feed 455 kc to the grid of the 12SA7 tube through a .01 mf condenser and adjust the four i-f trimmers for maximum response.

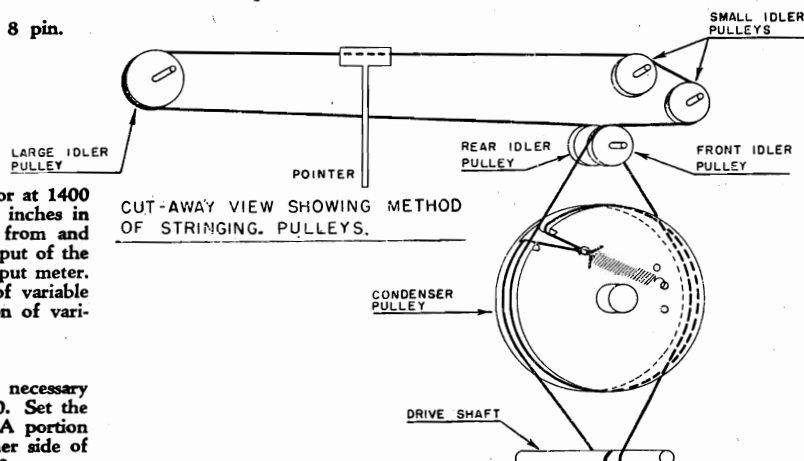
Feed 455 kc to the external antenna lead and adjust the wave-trap for minimum response.

Note: The grid of the 12SA7 tube is the No. 8 pin.

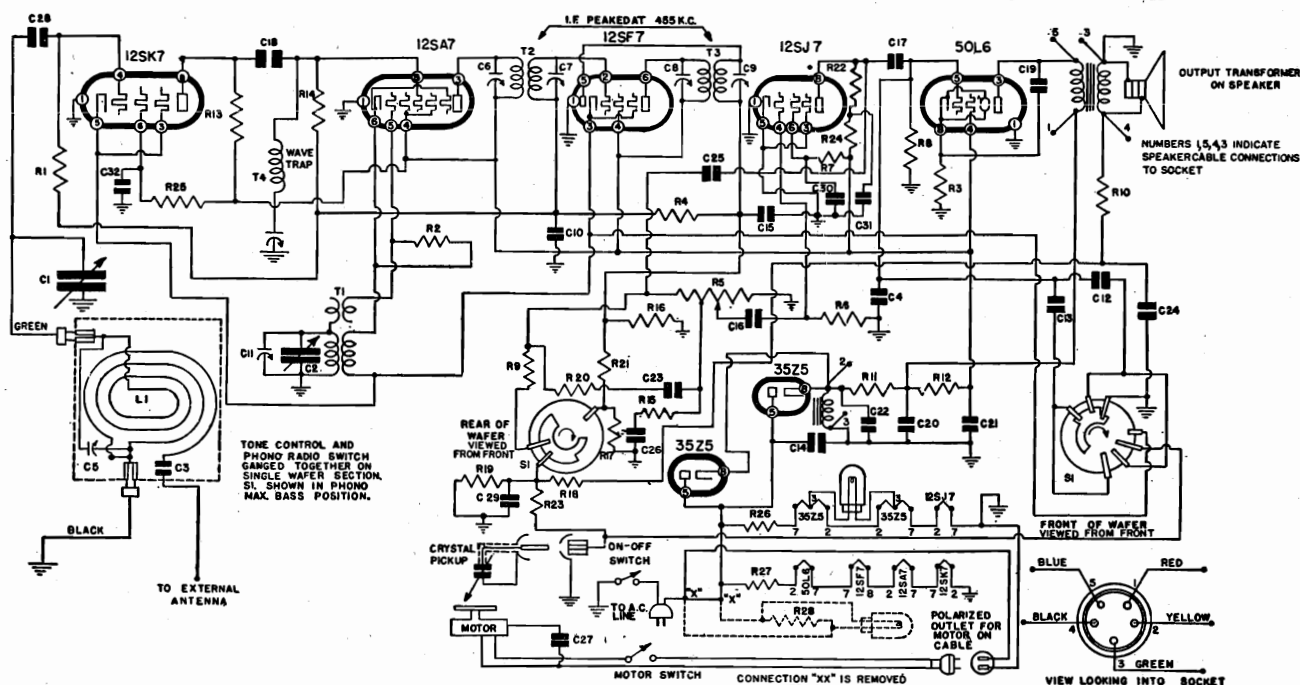
R-f Alignment

Set the dial pointer at 140. Set the signal generator at 1400 kc and feed its output into a loop of wire about 12 inches in diameter. Hold this radiating loop about 12 inches from and parallel to the receiver loop antenna. Advance the output of the signal generator until deflection is obtained on the output meter. Adjust first the oscillator trimmer (on front section of variable condenser) then the antenna trimmer (on rear section of variable condenser) for maximum response.

If the loop antenna has been replaced it may be necessary to adjust the loop inductance as follows. Align at 140. Set the pointer at 60 and feed 600 kc to the antenna lead. A portion of the outside turn of the loop may be swung to either side of the center to give maximum response. Realign at 140.



MODELS GH437,GH447,
Chassis GH;GH2-447
Chassis GH2



SCHEMATIC DIAGRAM FOR MODEL GH

POWER SUPPLY: a.c. only, 60 cycle (GH)
a.c.-d.c. (GH2)

TYPE OF TUBES:

- 1-12SA7, pentagrid oscillator-modulator
1-12SK7, r-f amplifier
1-12SF7, diode detector, i-f amplifier, a.v.c.
1-12SJ7, a-f amplifier
1-50L6GT, beam power output
2-35Z5GT, half-wave rectifier.

VOLTAGE RATING: 105-125 volts.

POWER CONSUMPTION:

- 30 watts for the receiver.
20 watts for a.c. phono motor.
30 watts for a.c.-d.c. phono motor.

ADJUSTMENTS

An oscillator with frequencies of 455 and 1400 kc is required. I-f and Wave-trap Alignment

An output meter should be used across the voice coil or output transformer for observing maximum response.

Always use as weak a test signal as possible when aligning the receiver.

Swing the variable condenser to the minimum capacity position. Feed 455 kc to the grid of the 12SA7 tube through a .01 mf condenser and adjust the four i-f trimmers for maximum response.

Feed 455 kc to the external antenna lead and adjust the wave-trap for minimum response.

Location of Coils and Trimmer Adjustments

The first i-f transformer is mounted on top of the chassis deck next to the 12SA7 tube. The trimmers are accessible through holes in the top of the can.

The second i-f transformer is mounted on top of the chassis next to the 50L6 tube. The trimmers are accessible through holes in the top of the can.

The trimmer for the oscillator coil is located on the variable condenser.

The antenna trimmer is mounted on the loop.

The oscillator coil is located underneath the chassis. The loop antenna acts as the antenna coil.

Note: The grid of the 12SA7 tube is the No. 8 pin.

R-f Alignment

Set the dial pointer at 140. Set the signal generator at 1400 kc and feed its output into a loop of wire about 12 inches in diameter. Hold this radiating loop about 12 inches from and parallel to the receiver loop antenna. Advance the output of the signal generator until deflection is obtained on the output meter. Adjust first the oscillator trimmer (on front section of variable condenser) then the antenna trimmer (on rear section of variable condenser) for maximum response.

If the loop antenna has been replaced it may be necessary to adjust the loop inductance as follows: Align at 140. Set the pointer at 60 and feed 600 kc to the antenna lead. A portion of the outside turn of the loop may be swung to either side of the center to give maximum response. Realign at 140.

MODELS GH437, GH447,
Chassis GH; GH2-447
Chassis GH2

EMERSON RADIO & PHONOGRAPH CORP.

REPLACEMENT PARTS LIST

When ordering, specify part numbers. List price each, effective as of December 1, 1941. Subject to change without notice.

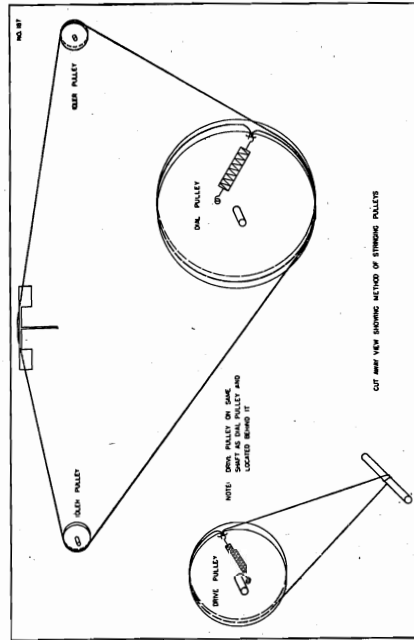
*Item	Part No.	DESCRIPTION	PRICE
L1	10HW-385	Loop antenna assembly	\$1.45
T1	10HT-642	Oscillator coil	.60
T2	8LT-371	455 kc first i-f transformer	1.20
T3	10HT-655	455 kc second i-f transformer	1.20
T4	9LT-619	455 kc wave-trap	.65
R1, R7, R18, R19	KR-57	1 megohm 1/4 watt carbon resistor	.16
R2	LR-60	20,000 ohm 1/4 watt carbon resistor	.16
R3	3FR-293	140-ohm 1/4 watt wire-wound resistor	.16
R4	NNR-220	3 megohm 1/4 watt carbon resistor	.16
R5	9JR-445	Volume control 2.5 meg	.90
R6	3RR-275	10 megohm 1/4 watt carbon resistor	.16
R8, R16, R17, R20	KR-56	500,000 ohm 1/4 watt carbon resistor	.16
R9, R10, R24	KR-53	50,000 ohm 1/4 watt carbon resistor	.16
R11	9JR-450	175 ohm 1 watt carbon resistor	.16
R12	8JR-424	750 ohm 1 watt wire-wound resistor	.16
R13	LR-65	10,000 ohm 1/4 watt carbon resistor	.16
R14	OR-73	25,000 ohm 1/4 watt carbon resistor	.16
R15, R23	KR-54	100,000 ohm 1/4 watt carbon resistor	.16
R21, R22	KR-55	100,000 ohm 1/4 watt carbon resistor	.16
R25	ZZR-196	30,000 ohm 1/4 watt carbon resistor	.16
R26, R27, R28	10HR-468	Ballast resistor: R26—233 ohm, 6 watt; R27—190 ohm, 5 watt; R28—250 ohm, 3 watt	.35
C1, C2	10HC-568	Two-gang variable condenser	3.35
C3, C16	3HC-274	0.002 mf, 600 volt tubular condenser	.20
C4	3RC-373	0.0004 mf, 600 volt tubular condenser	.20
*C5		Trimmer, part of loop assembly	
*C6, C7, C8, C9		Trimmer, part of variable condenser	
*C11		Trimmer, part of variable condenser	
C10	AC-6	0.1 mf, 200 volt tubular condenser	.20
C12	9JC-341	0.0006 mf, 600 volt tubular condenser	.20
C13	9JC-342	0.0015 mf, 600 volt tubular condenser	.20
C14	LC-64	0.05 mf, 400 volt tubular condenser	.20
C15	5AC-384	0.0002 mf, 600 volt tubular condenser	.20
C17	LC-65	0.02 mf, 400 volt tubular condenser	.20
C18	5LC-410A	0.00011 mf, mica condenser	.20
C19	8WC-524	0.005 mf, 400 volt tubular condenser	.20
C20, C21, C22	10HC-569	Multiple dry electrolytic condenser: 150 volt; C20—20 mf; C21—80 mf; C22—40 mf	1.25
C23	AC-7A	0.00025 mf, mica condenser	.20
C24, C27, C30	BC-12	0.05 mf, 200 volt tubular condenser	.20
C31, C32	4HC-395A	0.000026 mf, mica condenser	.20
C25	NNC-199	0.001 mf, 600 volt tubular condenser	.20
C26	4XC-394A	0.00022 mf, mica condenser	.20
C28	4VC-371A	0.0003 mf, mica condenser	.20
C29	10HS-386	6 1/2" dynamic speaker (speaker field 3000 ohms)	.90
9PM-89	10PM-105	Phono motor (Model 437)	12.00
10HPM-101	10HPM-106	Phono motor (Model 447, single post)	11.25
10HPM-100	10HPM-104	Phono motor (Model 447)	39.00
10HPM-10V	9PC-555	Crystal pickup (Model 437)	7.50
	10HC-592	Crystal pickup (Model 447, single post)	7.50
	10HC-593	Crystal pickup (Model 447)	8.15
	10HC-594	Crystal pickup (Model GH2-447)	6.60

*Item number locates the article on the schematic diagram.

†Not supplied separately.

Readings should be taken with a 1000 ohms-per-volt meter

Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed below are from point indicated to B minus (line switch) with the volume control turned on full and no signal. Line voltage for these readings was 117.5 volts, 60 cycles, A.C. All readings except heaters and cathodes were taken on 250 volt scale. Measurements made with 117.5 D.C. will be given, lower than those given below.



VOLTAGE ANALYSIS

Tube	Plate	Screen	Cathode	Fil.
12SA7	88	88	0	12 a.c.
12SK7	48	46	0	12 a.c.
12SF7	89	89	0	12 a.c.
12S7	8	14	—	12 a.c.
50L6GT	108	89	5.1	50 a.c.

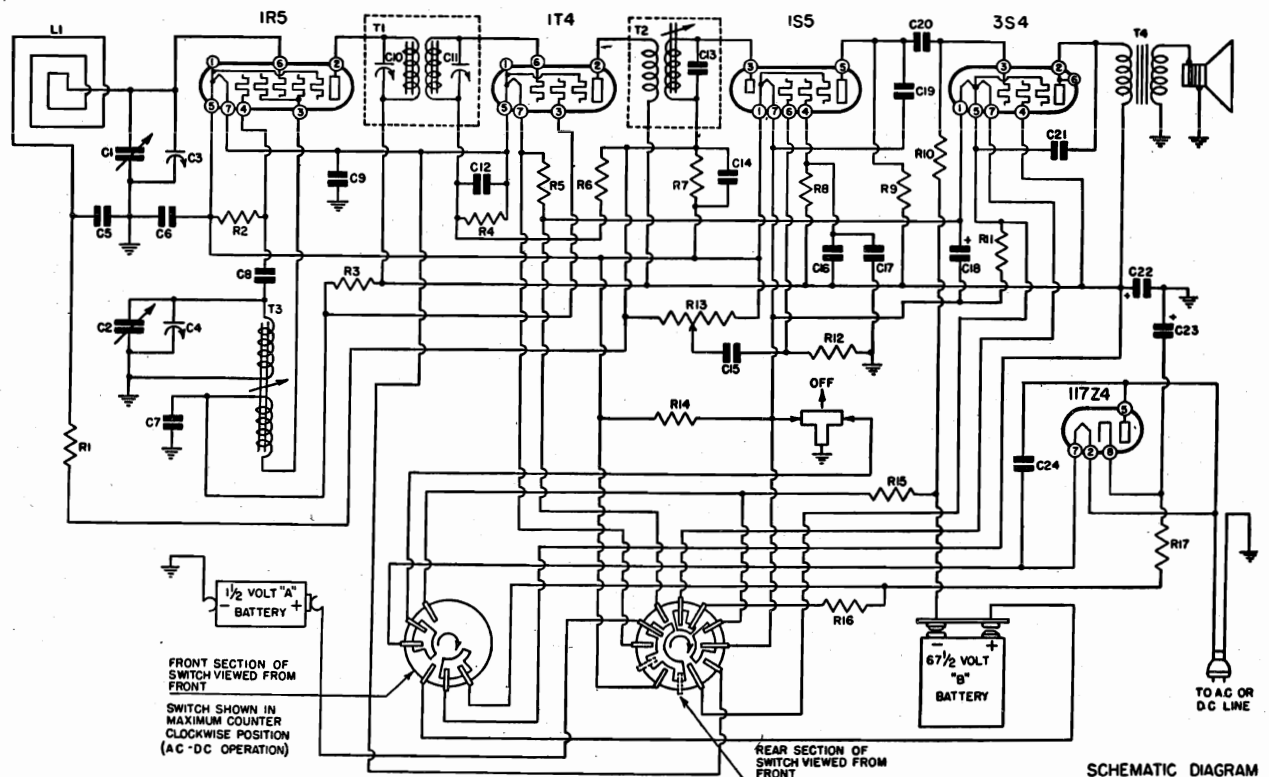
Voltage at 35Z5GT cathode—127 volts.

Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed below are from point indicated to B minus (line switch) with the volume control turned on full and no signal. Line voltage for these readings was 117.5 volts, 60 cycles, a.c. All readings except heaters and cathodes were taken on 250 volt scale. Measurements made with 117.5 volts d.c. will be lower than those given below.

EMERSON RADIO & PHONOGRAPH CORP.

MODEL GC44B

Chassis GC



ADJUSTMENTS

R-f Alignment

An oscillator with frequencies of 455 and 1600 kc is required.

An output meter should be used across the voice coil or output transformer for observing maximum response.

Always use as weak a test signal as possible when aligning the receiver.

Location of Coils and Trimmer Adjustments

The first i-f transformer is located next to the output transformer.

The trimmers are accessible through holes in top of the can.

The second i-f transformer is located between the 1T4 and 1S5 tubes. The single trimming core screw extends from the end of the can.

The oscillator coil is located next to the first i-f transformer. The trimmer for the oscillator is located on the smaller variable condenser section.

The 600 kc oscillator core adjustment is the brass screw protruding from the end of the oscillator coil.

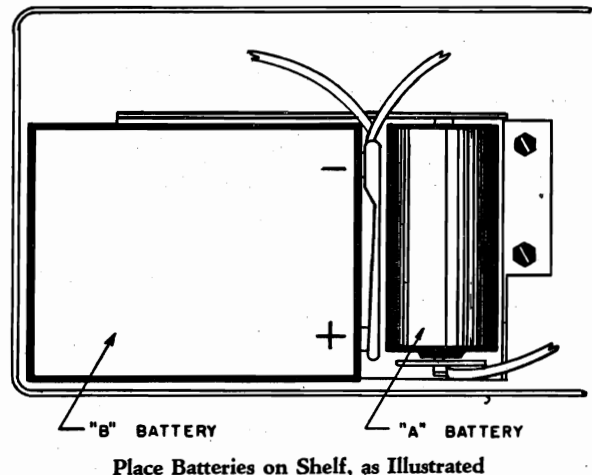
The loop antenna acts as the antenna coil. Trimmer for the loop is located on the larger section of the variable condenser.

I-f Alignment

Rotate variable condenser to minimum capacity position.

Feed 455 kc to the grid of the 1R5 tube through a 0.01 mf condenser. Adjust the three i-f trimmer screws for maximum response. (Clip the i-f input to the stator lug of the larger variable condenser section.)

Set the dial pointer at 160. Set the signal generator at 1600 kc and feed its output into a loop of wire about one foot in diameter. Hold this radiating loop about one foot away from and parallel to the receiver loop antenna. Advance the output of the generator until deflection is obtained on the output meter. Adjust first the oscillator trimmer (smaller section of variable condenser) then the antenna trimmer (larger section of variable condenser) for maximum response. Set the dial pointer at 60. Feed 600 kc and rock the variable condenser while adjusting the oscillator core adjustment for maximum response. Return to 1600 and check alignment. If re-adjustment is necessary return to 600 and repeat entire procedure.



MODEL GC448
Chassis GC

EMERSON RADIO & PHONOGRAPH CORP.

REPLACEMENT PARTS LIST

Specify part numbers when ordering. List price each, effective as of December 15, 1941. (Subject to change without notice.)

Part No.	*Item	DESCRIPTION	PRICE
9RW-350A	L1	Loop antenna	..... \$ .65
9RT-623A	T1	Double-tuned 455 kc first i-f transformer	..... 1.65
9RT-624	T2	Single-tuned 455 kc second i-f transformer	..... 1.40
9RT-622	T3	Oscillator coil	..... .80
9RT-625A	T4	Output transformer	..... .75
NNR-220	R1, R10	3 megohm 1/4 watt carbon resistor	..... .16
KR-54	R2	100,000 ohm 1/4 watt carbon resistor	..... .16
KR-63	R3	15,000 ohm 1/4 watt carbon resistor	..... .16
4XR-327	R4, R6	15 megohm 1/4 watt carbon resistor	..... .16
3GR-300	R5	75 ohm 1/2 watt carbon resistor	..... .16
KR-57	R7, R9	1 megohm 1/4 watt carbon resistor	..... .16
3RR-274	R8	5 megohm 1/4 watt carbon resistor	..... .16
4XR-334	R11	2500 ohm 1 watt carbon resistor	..... .16
3RR-275	R12	10 megohm 1/4 watt carbon resistor	..... .16
9RE-449A	R13	Volume control 3, megohm	..... .65
10CR-466	R14	500 ohm 1 watt carbon resistor	..... .16
9RR-458	R15	980 ohm 1/2 watt wire-wound, moulded resistor	..... .16
10CR-464	R16	1500 ohm 5 watt wire-wound, ceramic insulated resistor	..... .25
10CR-465	R17	950 ohm 5 watt wire-wound, ceramic insulated resistor	..... .25
9RC-535G or 9RC-535A	C1, C2	Two-gang variable condenser	..... 3.05
†C3, C4		Trimmer condenser on variable condenser	.....
C5, C17	9RC-337	0.02 mf, 100 volt tubular condenser	..... .20
C6, C7, C9	5AC-388A	0.25 mf, 100 volt tubular condenser	..... .20
C8	9RC-339	0.00005 mf, ceramic condenser	..... .20
†C10, C11		Trimmer, part of i-f transformer	.....
C12	10CC-563	0.01 mf, 100 volt tubular condenser	..... .20
†C13		Fixed condenser, part of i-f transformer	.....
C14, C19	9RC-540	0.0001 mf, ceramic condenser	..... .20
C15	9RC-553	0.001 mf, 100 volt tubular condenser	..... .20
C16, C21	10CC-562	0.002 mf, 150 volt tubular condenser	..... .20
C18	9VC-560	40. mf, 40 volt dry electrolytic condenser	..... .45
C20	9RC-538	0.001 mf, 100 volt flat wound condenser	..... .12
C22, C23	6QC-437D	Dual dry electrolytic condenser, C22—40 mf, 150 volts; C23—20 mf, 150 volts	..... .75
C24	LC-64A	0.05 mf, 400 volt tubular condenser	..... .20
	10CS-577	3 1/4" P.M. dynamic speaker	..... 3.50
	10CS-578	Power change-over switch	..... 1.05
	9RS-559A	Lid operated on-off switch	..... .35
	10CW-381	Line connector plug and cable assembly	..... .25
	10CW-380	Line cord and socket assembly	..... .60
	9RW-367	"ip" battery cable	..... 2.00
	9RK-18	Tuning wheel	..... .15
	9RK-19	Volume wheel	..... .15

*Item number locates the article on the schematic diagram.

†Not supplied separately.

SERVICE NOTES

MODEL: GC-448

CHASSIS MODEL: GC

GC-448

DESCRIPTION

TYPE: Universal (battery, a.c.-d.c.) superheterodyne.

FREQUENCY RANGE: 540-1600 kc.

NUMBER OF TUBES: Five.

TYPE OF TUBES:

1—1R5, oscillator-modulator
 1—1T4, i-f amplifier
 1—1S5, 2nd detector, a.v.c., a-f amplifier
 1—3S4, pentode output
 1—117Z4GT, half-wave rectifier.

POWER SUPPLY: Battery, a.c. or d.c.

VOLTAGE RATING:

Line operation—105-125 volts, a.c.-d.c.
 "A" Battery—1.5 volts.
 "B" Battery—67.5 volts.

CURRENT DRAIN:

"A" Battery—0.25 amp.
 "B" Battery—0.0075 amp.

GENERAL NOTES

- The color coding of the i-f transformer leads is as follows:
 Grid—green
 Plate—blue
 B plus—red
 Grid return—black
- The color coding of the battery cable is as follows:
 Red—B plus, 67 1/2 volts
 White—B minus.
- If replacements are made in the r-f section of the circuit, the receiver should be carefully re-aligned.
- The receiver has a self-contained antenna and does not require additional antenna or ground connection.
- The self-contained loop antenna operates at maximum efficiency when its position is at right angles to the broadcasting source. It is important, therefore, once the station is tuned in, rotate the cabinet back and forth through a quarter of a circle (90 degrees), leaving it at the position where the station is received with maximum volume.

BATTERY COMPLEMENT

The cabinet is designed to house the complete set of batteries. The battery complement should be as follows:

Type Battery	Number Required	Manufacturer's Part Number
1 1/2 volt "A"	1	Standard "D" size (1 1/8" diameter) flashlight cell
67 1/2 volt "B"	1	Eveready "Mini-max" No. 467

VOLTAGE ANALYSIS (Battery Operation)

Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed are from point indicated to chassis with volume control turned on—full and no signal. The battery voltages for these readings were: "A" 1.5 volts, "ip" 67.5 volts. All readings except filament were taken on the 250 volt scale.

Tube	Plate	Screen	Fil.
1R5	54	29	1.4
1T4	54	29	1.4
1S5	*4	—	1.4
3S4	51	54	1.4

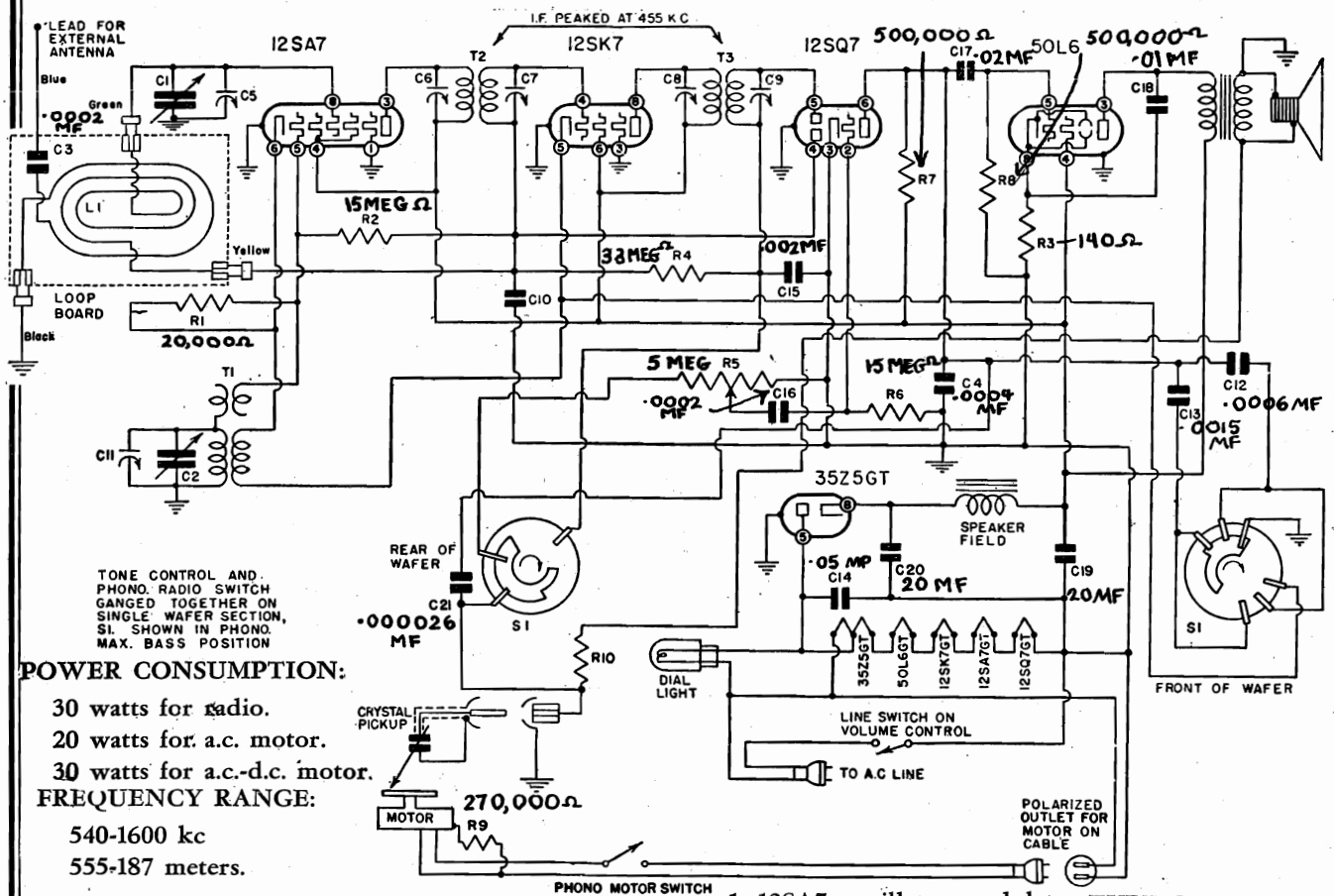
VOLTAGE ANALYSIS

Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed below are from point indicated to B minus (line switch) with minimum volume control and no signal. The voltages for these readings were 117.5 volts, 60 cycles, a.c. All readings except heaters and cathodes were taken on 250 volt scale. Measurements made with 117.5 volts d.c. will be lower than those given below.

Tube	Plate	Screen	Fil.
1R5	72	39	1.4
1T4	72	39	1.4
1S5	*6	—	1.4
3S4	69	72	2.8

*The operating voltage of this tube cannot be measured because of the high resistor in the circuit. Voltage at 117Z4 cathode—125.

EMERSON RADIO & PHONOGRAPH CORP. MODELS GK450, Ch. GK; GK2-450, Chassis GK2



R-f Alignment

Set the dial pointer at 140. Set the signal generator at 1400 kc and feed its output into a loop of wire about 12 inches in diameter. Hold this radiating loop about 12 inches from and parallel to the receiver loop antenna. Advance the output of the signal generator until deflection is obtained on the output meter. Adjust first the oscillator trimmer (on front section of variable condenser) then the antenna trimmer (on rear section of variable condenser) for maximum response.

If the loop antenna has been replaced it may be necessary to adjust the loop inductance as follows: Align at 140. Set the pointer at 60 and feed 600 kc to the antenna lead. A portion of the outside turn of the loop may be swung to either side of the center to give maximum response. Realign at 140.

ADJUSTMENTS

- 1-12SA7, oscillator-modulator TYPE OF TUBES:
 1-12SK7, i-f amplifier
 1-12SQ7, diode detector, a-f amplifier and a.v.c.
 1-50L6GT, beam power output
 1-35Z5GT, half-wave rectifier

I-f Alignment

Swing the variable condenser to the minimum capacity position. Feed 455 kc to the grid of the 12SA7 tube through a .01 mf condenser and adjust the four i-f trimmers for maximum response.

Note: The grid of the 12SA7 tube is connected to the lower stator lug of the rear variable condenser section. Connection may be made with a test clip to the upper stator lug.

POWER SUPPLY: a.c. only. 60 cycle. (GK)
 a.c.-d.c. (GK2)

VOLTAGE RATING: 105-125 volts.

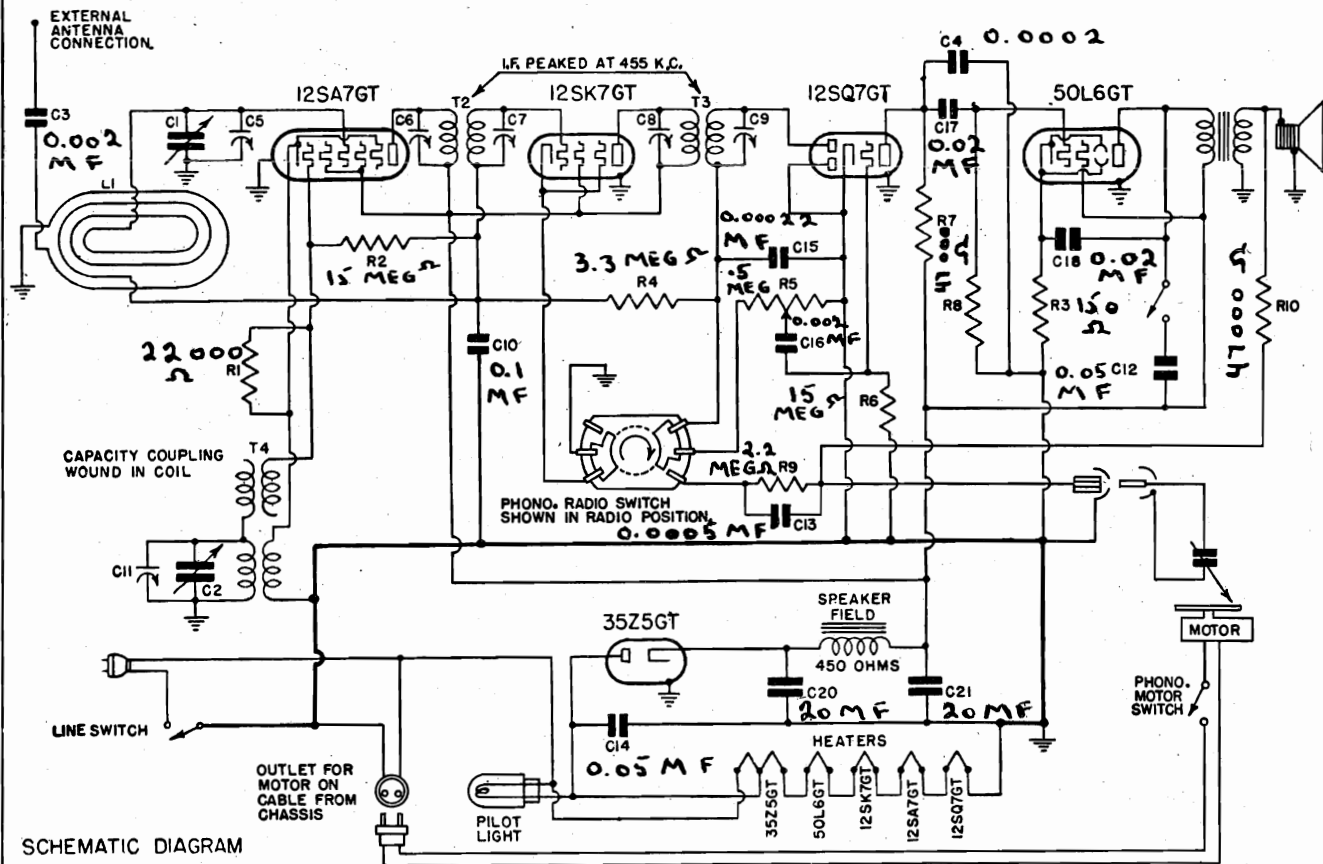
VOLTAGE ANALYSIS

Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed below are from point indicated to B minus (line switch) with the volume control turned on full and no signal. Line voltage for these readings was 117.5 volts, 60 cycles, a.c. All readings except heaters and cathodes were taken on 250 volt scale. Measurements made with 117.5 volts d.c. will be lower than those given below.

Voltage at 35Z5GT cathode—118 volts.

Tube	Plate	Screen	Cathode	Fil.
12SA7	75	85	0	12 a.c.
12SK7	85	85	0	12 a.c.
12SQ7	25	—	0	12 a.c.
50L6GT	75	85	6.6	50 a.c.

MODEL FZ452, Chassis EMERSON RADIO & PHONOGRAPH CORP.



VOLTAGE ANALYSIS

Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed below are from point indicated to B minus (line switch) with the volume control turned on full and no signal. Line voltage for these readings was 117.5 volts, 60 cycles, a.c. All readings except heaters and cathodes were taken on 250 volt scale.

Tube	Plate	Screen	Cathode	Fil.
12SA7	88	88	0	12
12SK7	88	88	0	12
12SQ7	30	—	0	12
50L6	82	88	5.6	50

Voltage at 35Z5 cathode—120 volts.
Voltage across speaker field—32 volts.
Voltage across pilot light—4.5 volts.

I-f Alignment

Swing the variable condenser to the minimum capacity position. Feed 455 kc to the grid of the 12SA7 tube through a .01 mf condenser and adjust the four i-f trimmers for maximum response.

Note: The grid of the 12SA7 tube is connected to the stator lug of the rear variable condenser section. Connection may be made with a test clip.

Location of Coils and Trimmer Adjustments

The first i-f transformer is mounted on top of the chassis deck to the right of the variable condenser. The trimmers are accessible through holes in the top of the can.

The second i-f transformer is mounted on top of the chassis between the variable condenser and the speaker. The trimmers are accessible through holes in the top of the can.

The trimmers for the antenna and oscillator coils are located on the variable condenser. The trimmer on the front section is for the oscillator coil.

The oscillator coil is located underneath the chassis. The loop antenna acts as the antenna coil.

R-f Alignment

Set the dial pointer at 140. Set the signal generator at 1400 kc and feed its output into a loop of wire about 12 inches in diameter. Hold this radiating loop about 12 inches from and parallel to the receiver loop antenna. Advance the output of the signal generator until deflection is obtained on the output meter. Adjust first the oscillator trimmer (on front section of variable condenser) then the antenna trimmer (on rear section of variable condenser) for maximum response.

If the loop antenna has been replaced it may be necessary to adjust the loop inductance as follows. Align at 140. Set the pointer at 60 and feed 600 kc to the radiating loop. A portion of the outside turn of the loop may be swung to either side of the center to give maximum response. Realign at 140.

TYPE OF TUBES:

- 1—12SA7, pentagrid oscillator-modulator
- 1—12SK7, first i-f amplifier
- 1—12SQ7, diode detector, a-f amplifier, a.v.c.
- 1—50L6, beam power output
- 1—35Z5, half-wave rectifier.

POWER SUPPLY: A.C. only.

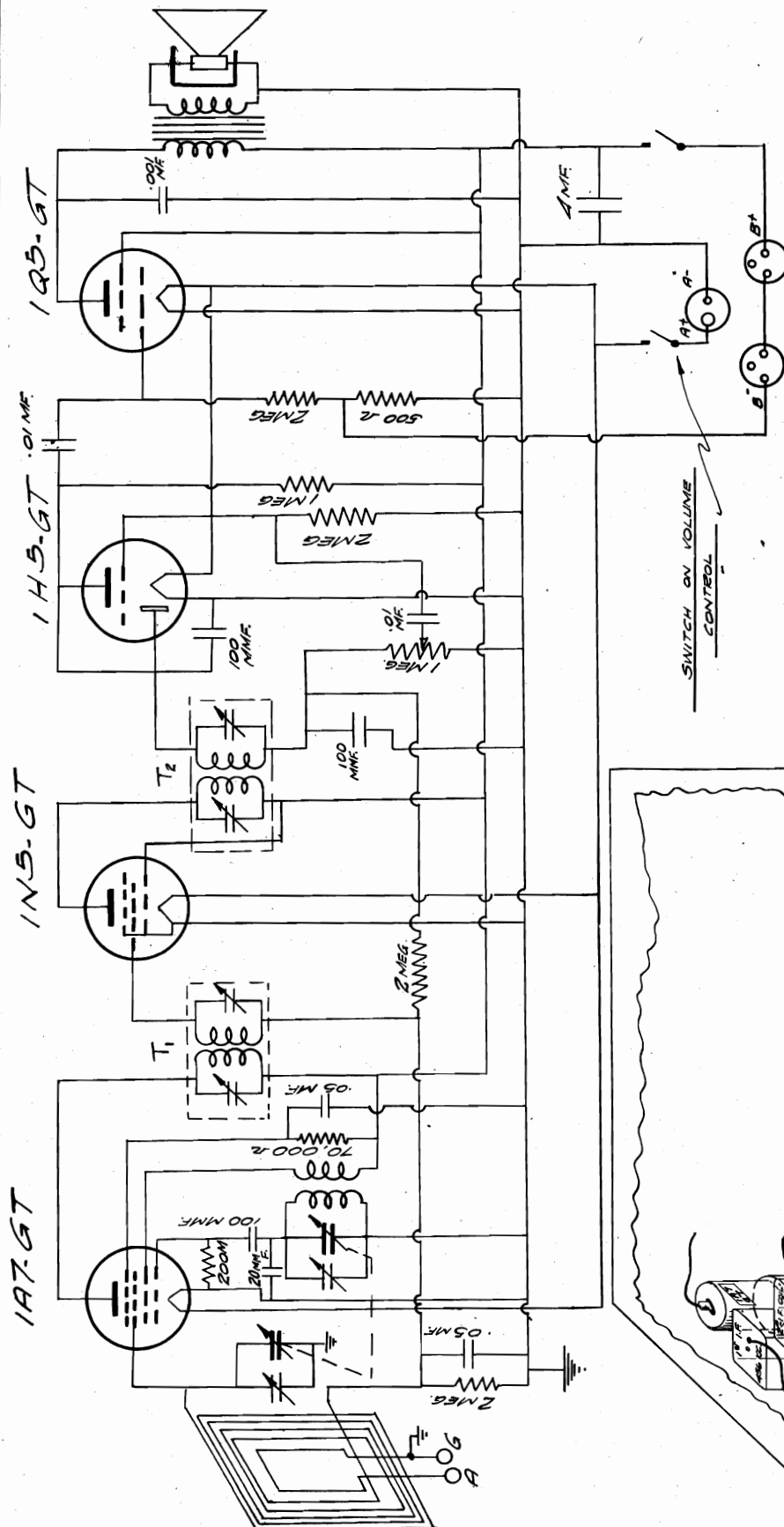
VOLTAGE RATING: 105-125 volts.

POWER CONSUMPTION:

30 watts for receiver

15 watts for phono motor.

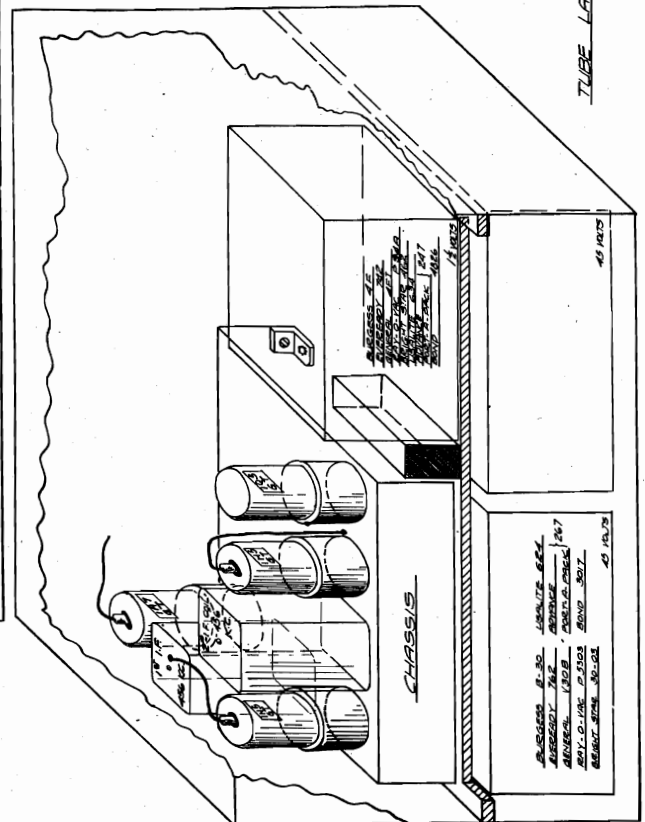
ESPEY MFG. CO., INC.



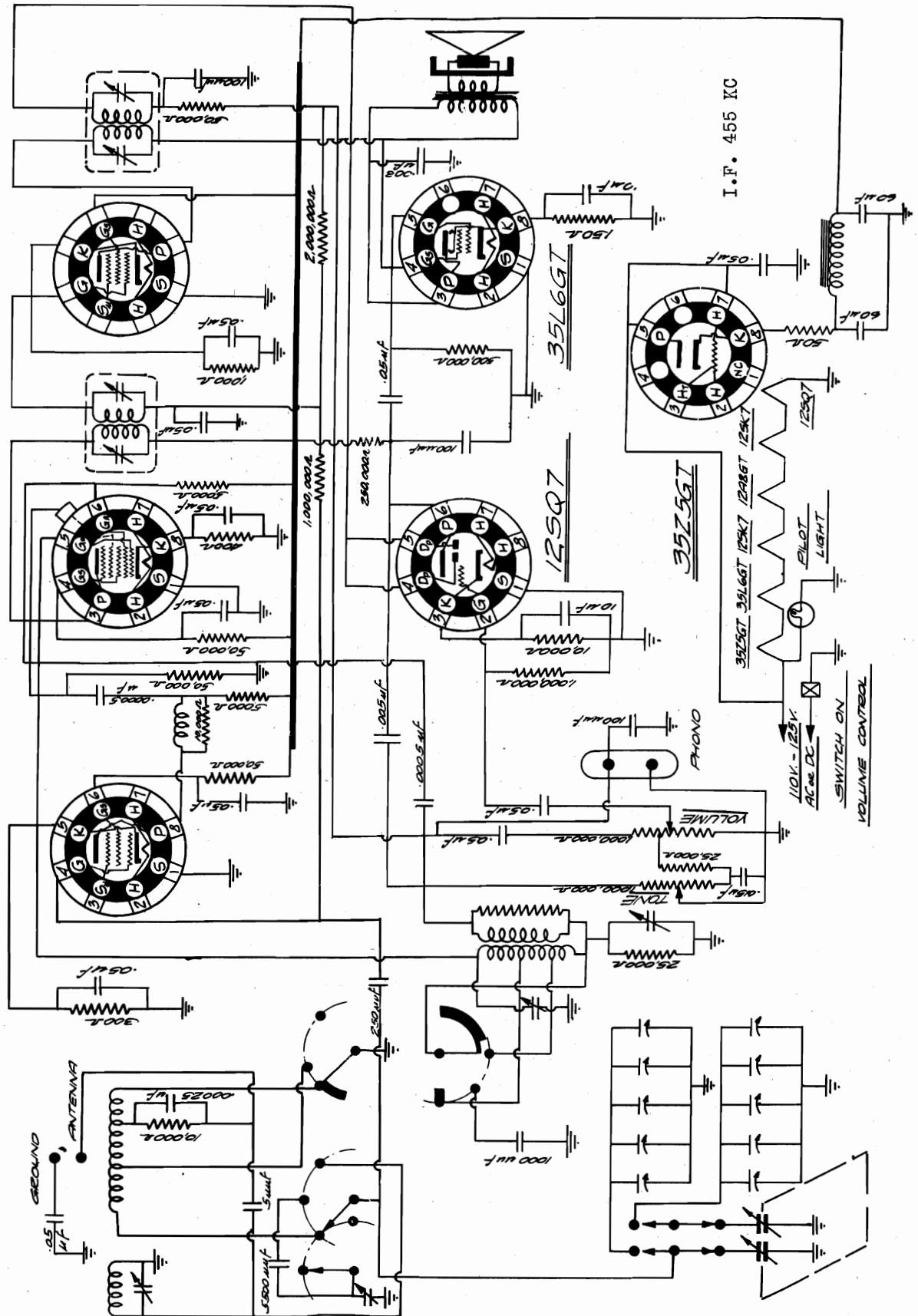
ESPEY MFG. CO. INC.
NEW YORK, N.Y.
CIRCUIT DIAGRAM
MODEL "040"
DATE: 3-23-39
CHECKED: J.A.V.

I.F. 455 KC

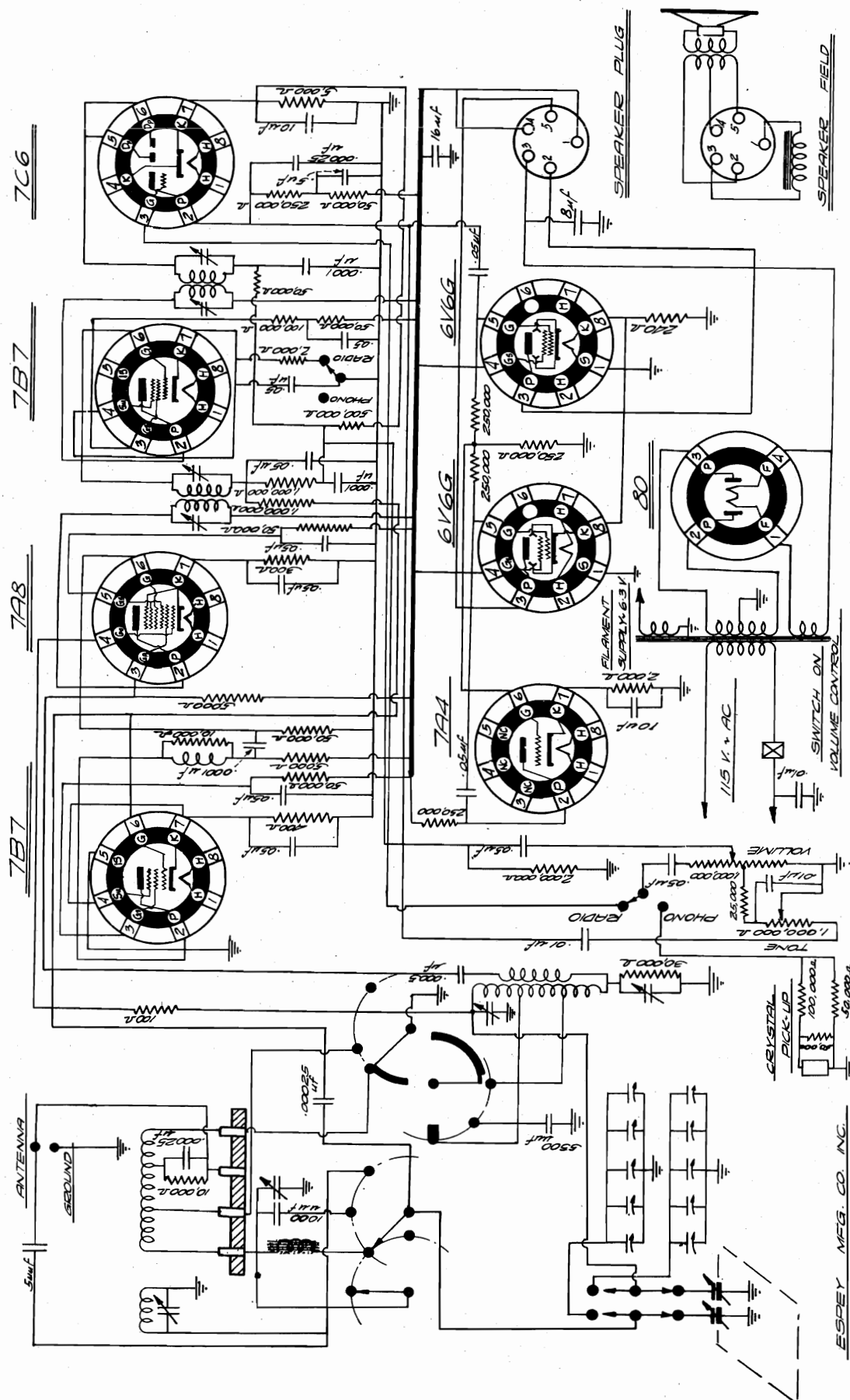
TUBE LAYOUT AND BATTERY LAYOUT
MODEL NO. 040



ESPEY MFG. CO INC.
SCHEMATIC DIAGRAM
INSTR. NO. 060
12/6/40

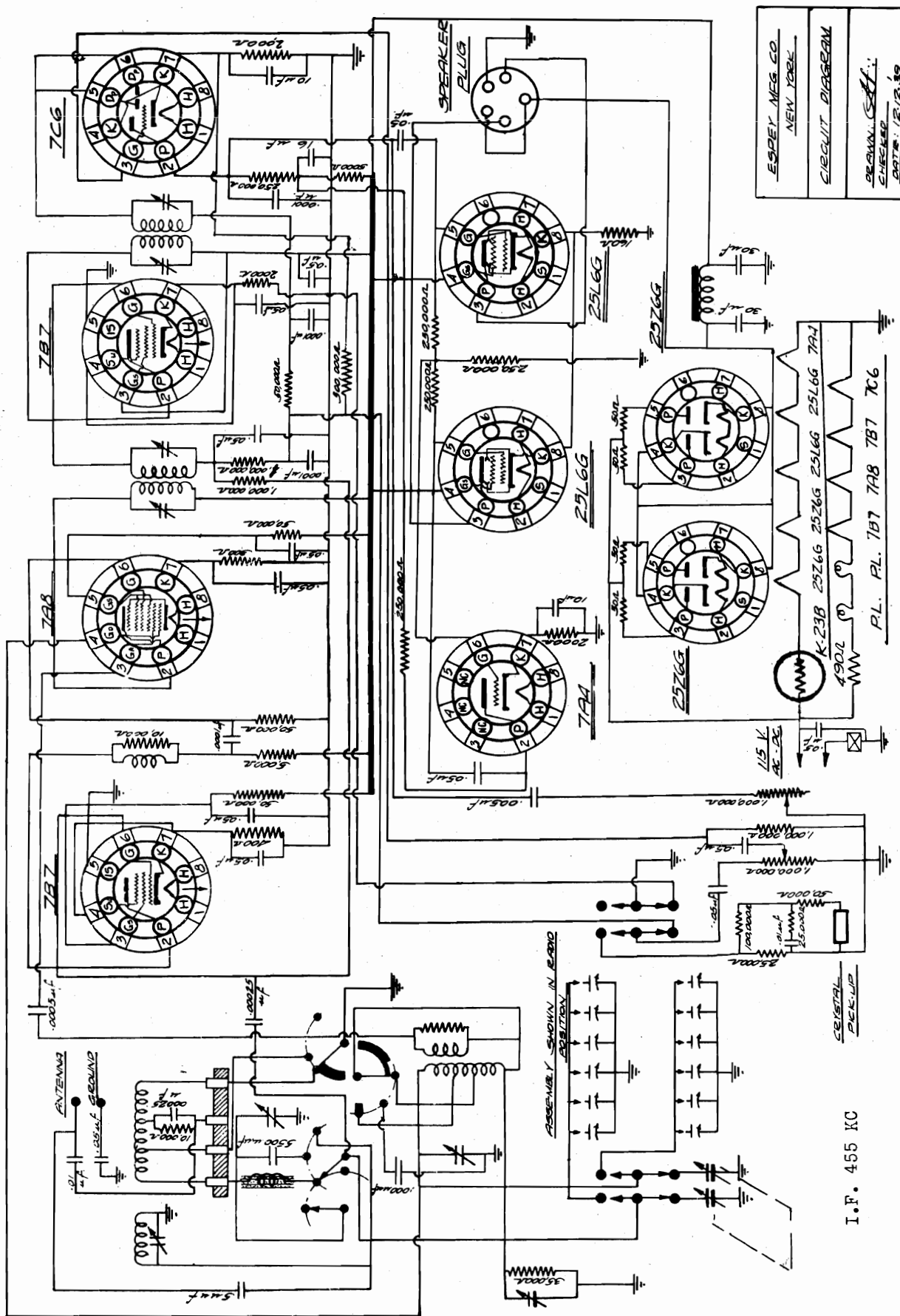


I.F. 455 KC



ESPEY MFG. CO. INC.
SCHEMATIC DIAGRAM
MODEL NO. 080
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MODEL ~ 0/01



I.F. 455 KC

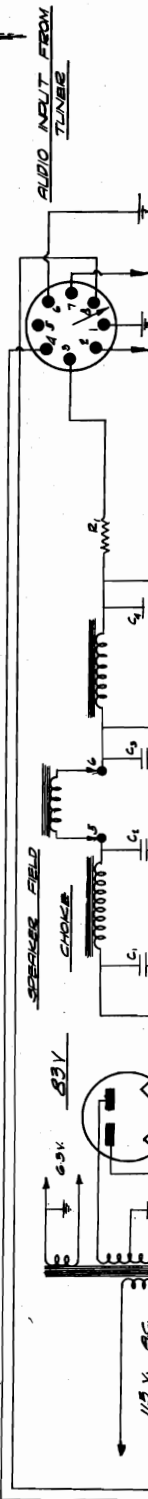
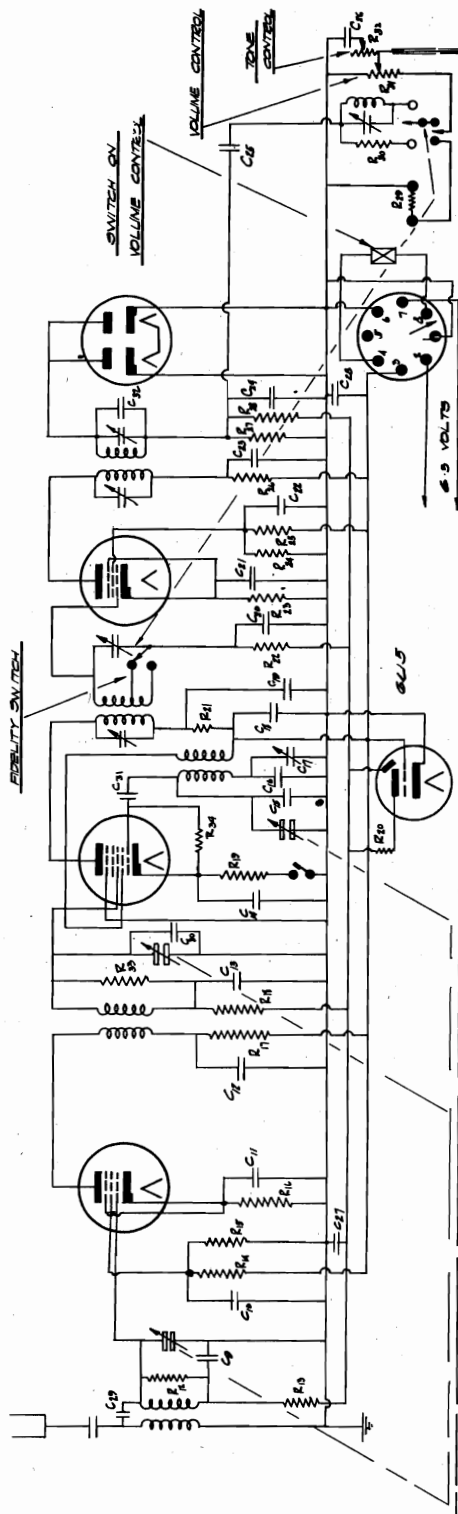
MODEL 0102

ESPEY MFG. CO., INC.

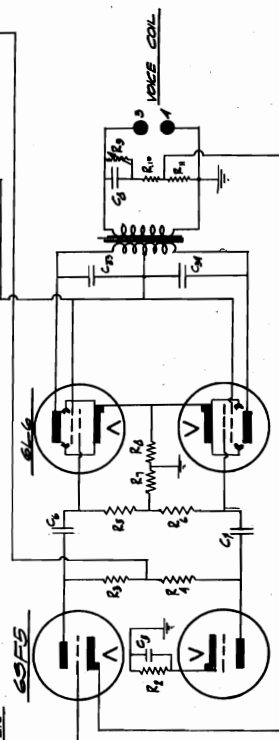
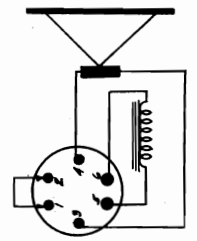
65K7

65K7

65K7



C1	50000	C1	10000	C1	10000
C2	50000	C2	10000	C2	10000
C3	50000	C3	10000	C3	10000
C4	50000	C4	10000	C4	10000
C5	50000	C5	10000	C5	10000
C6	50000	C6	10000	C6	10000
C7	50000	C7	10000	C7	10000
C8	50000	C8	10000	C8	10000
C9	50000	C9	10000	C9	10000
C10	50000	C10	10000	C10	10000
C11	50000	C11	10000	C11	10000
C12	50000	C12	10000	C12	10000
C13	50000	C13	10000	C13	10000
C14	50000	C14	10000	C14	10000
C15	50000	C15	10000	C15	10000
C16	50000	C16	10000	C16	10000
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C76	50000	C76	10000	C76	10000
C77	50000	C77	10000	C77	10000
C78	50000	C78	10000	C78	10000
C79	50000	C79	10000	C79	10000
C80	50000	C80	10000	C80	10000
C81	50000	C81	10000	C81	10000
C82	50000	C82	10000	C82	10000
C83	50000	C83	10000	C83	10000
C84	50000	C84	10000	C84	10000
C85	50000	C85	10000	C85	10000
C86	50000	C86	10000	C86	10000
C87	50000	C87	10000	C87	10000
C88	50000	C88	10000	C88	10000
C89	50000	C89	10000	C89	10000
C90	50000	C90	10000	C90	10000
C91	50000	C91	10000	C91	10000
C92	50000	C92	10000	C92	10000
C93	50000	C93	10000	C93	10000
C94	50000	C94	10000	C94	10000
C95	50000	C95	10000	C95	10000
C96	50000	C96	10000	C96	10000
C97	50000	C97	10000	C97	10000
C98	50000	C98	10000	C98	10000
C99	50000	C99	10000	C99	10000
C100	50000	C100	10000	C100	10000

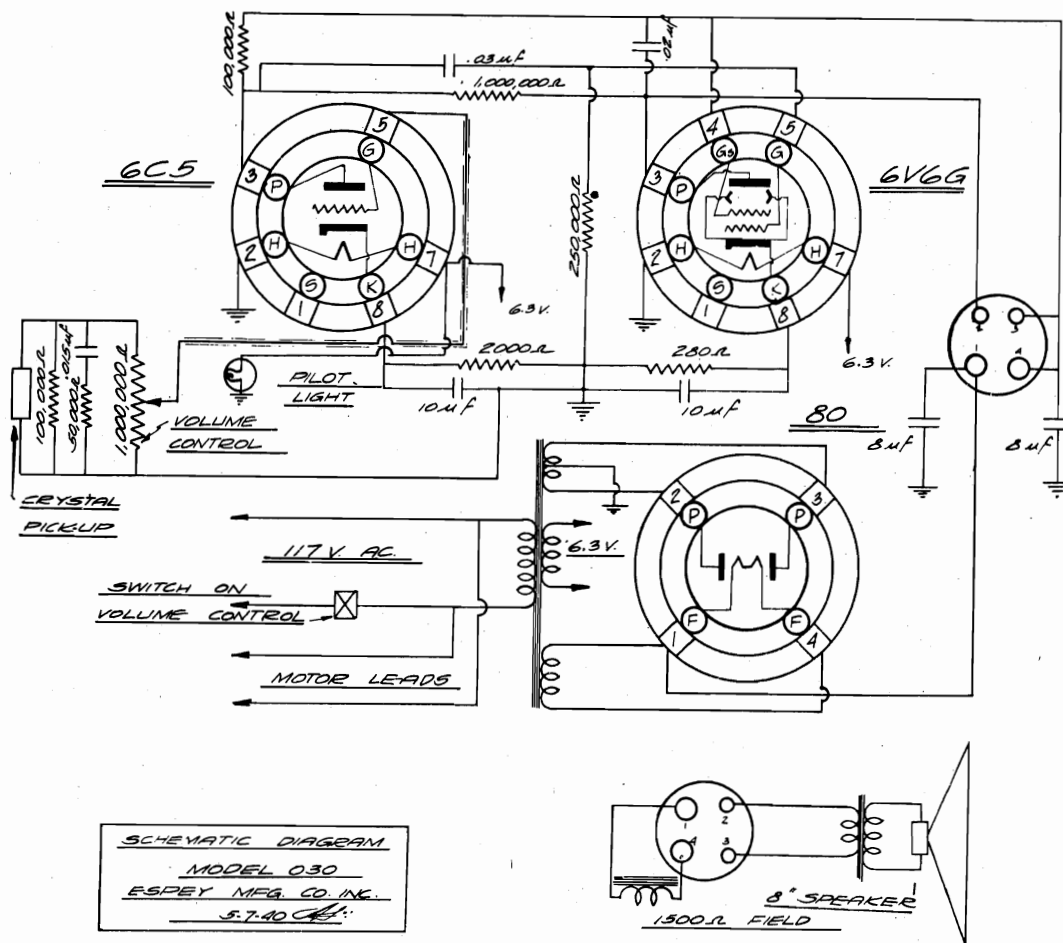
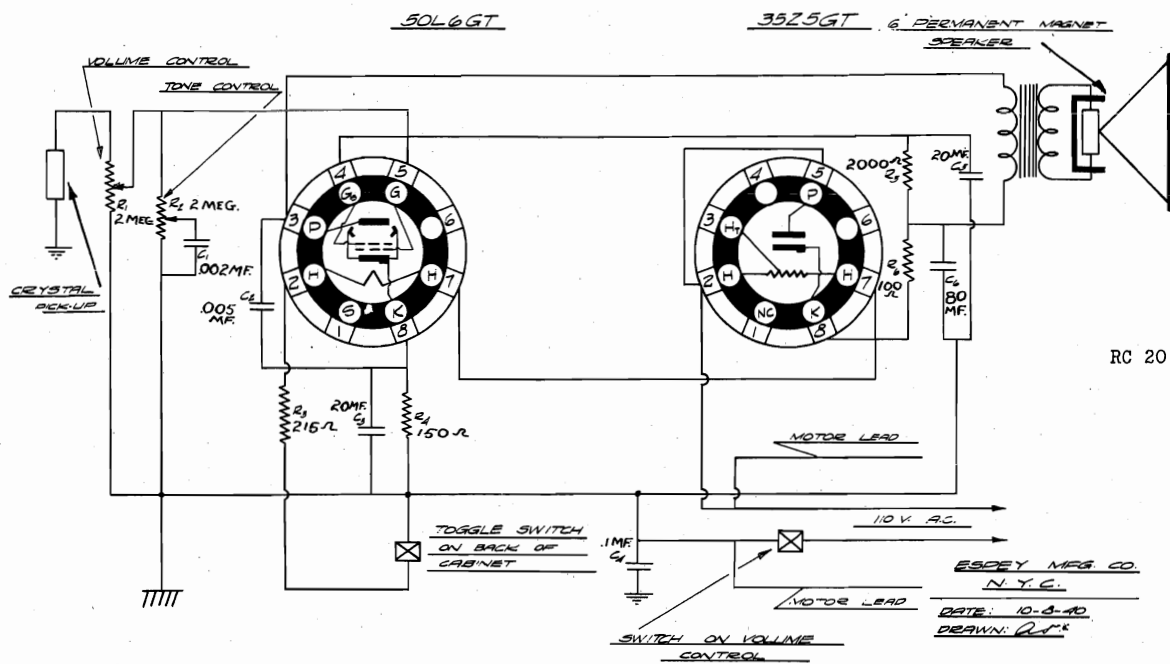


MODEL 0102
WAXE AC REVER
MANUFACTURED BY
THE
ESPEY MFG. CO
E. 26-41 84

I.F. 455 KC

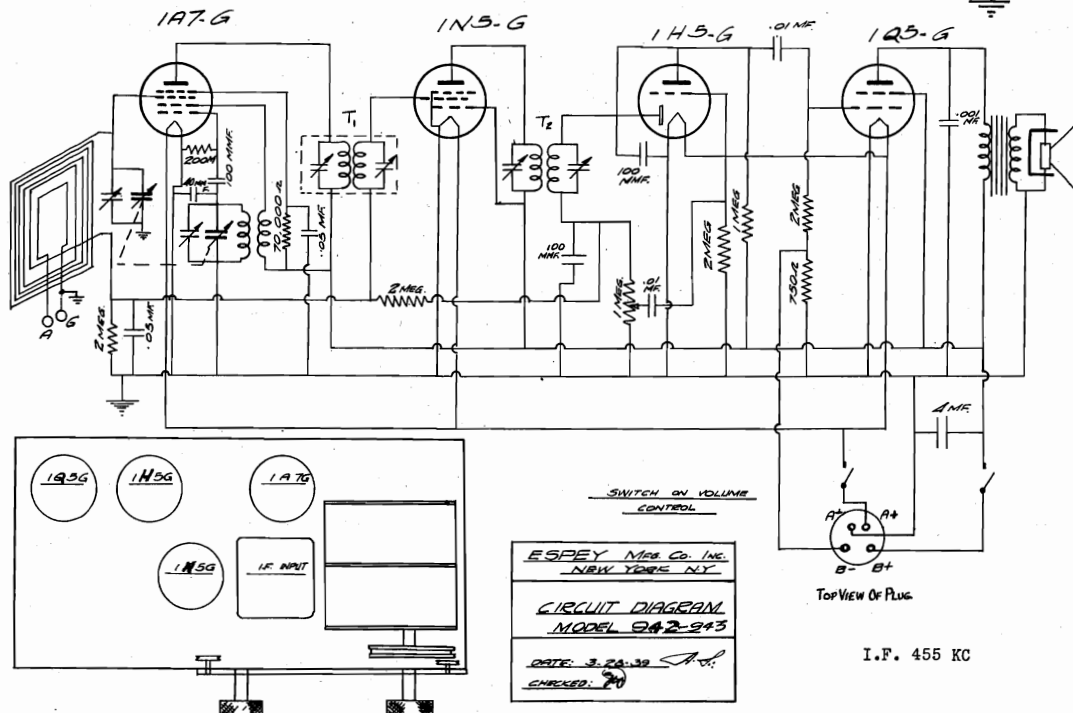
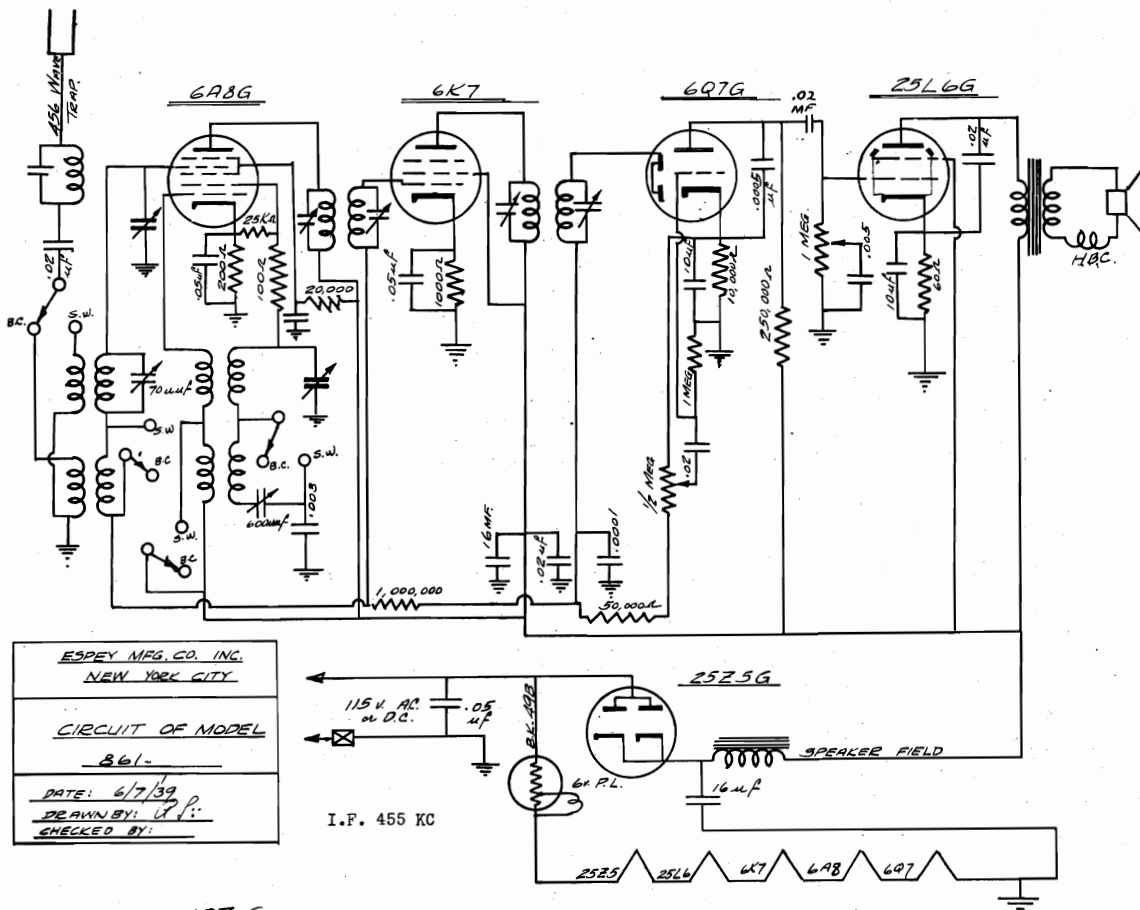
ESPEY MFG. CO., INC.

MODEL RC20
MODEL 030



MODEL 861
MODELS 942, 943

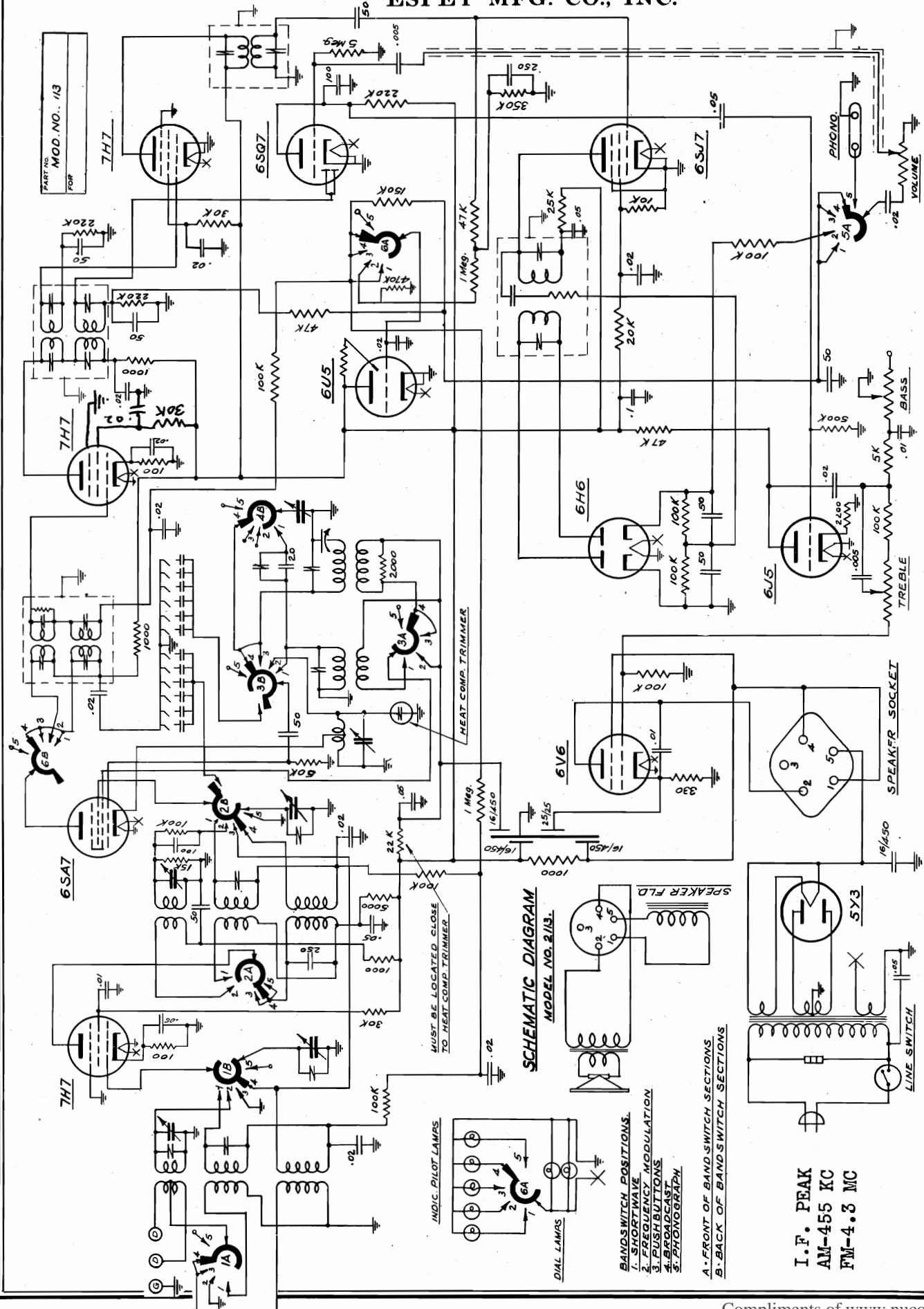
ESPEY MFG. CO., INC.





MODEL 2113

ESPEY MFG. CO., INC.



[illegible]

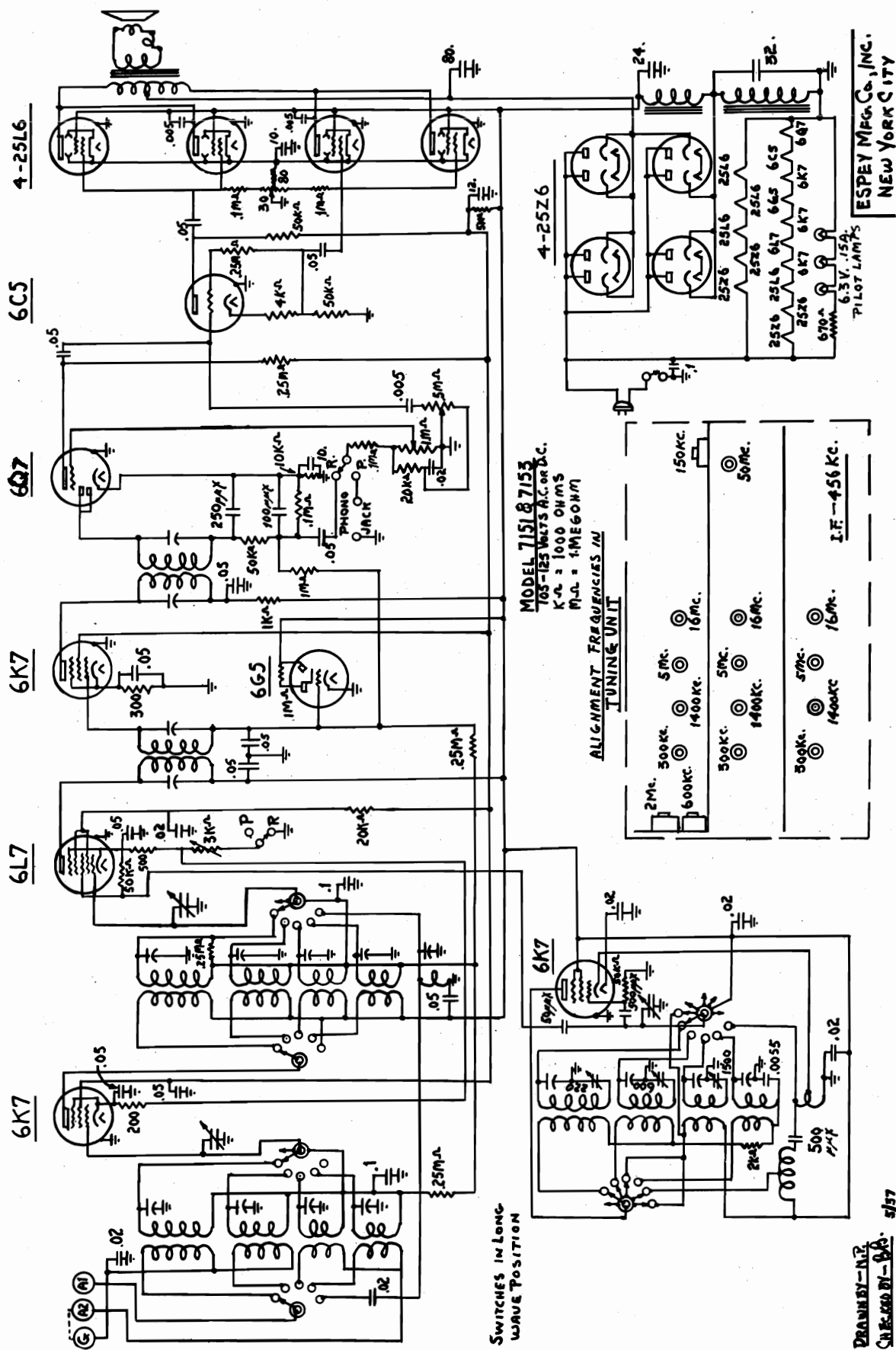
**NOTE: DO NOT SCALE DRAWING
UNLESS SPECIFIED.**

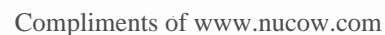
I.F. PEAK
AM-455KC
FM-4.3 MC

SCHEMATIC DIAGRAM
MODEL NO.2143.

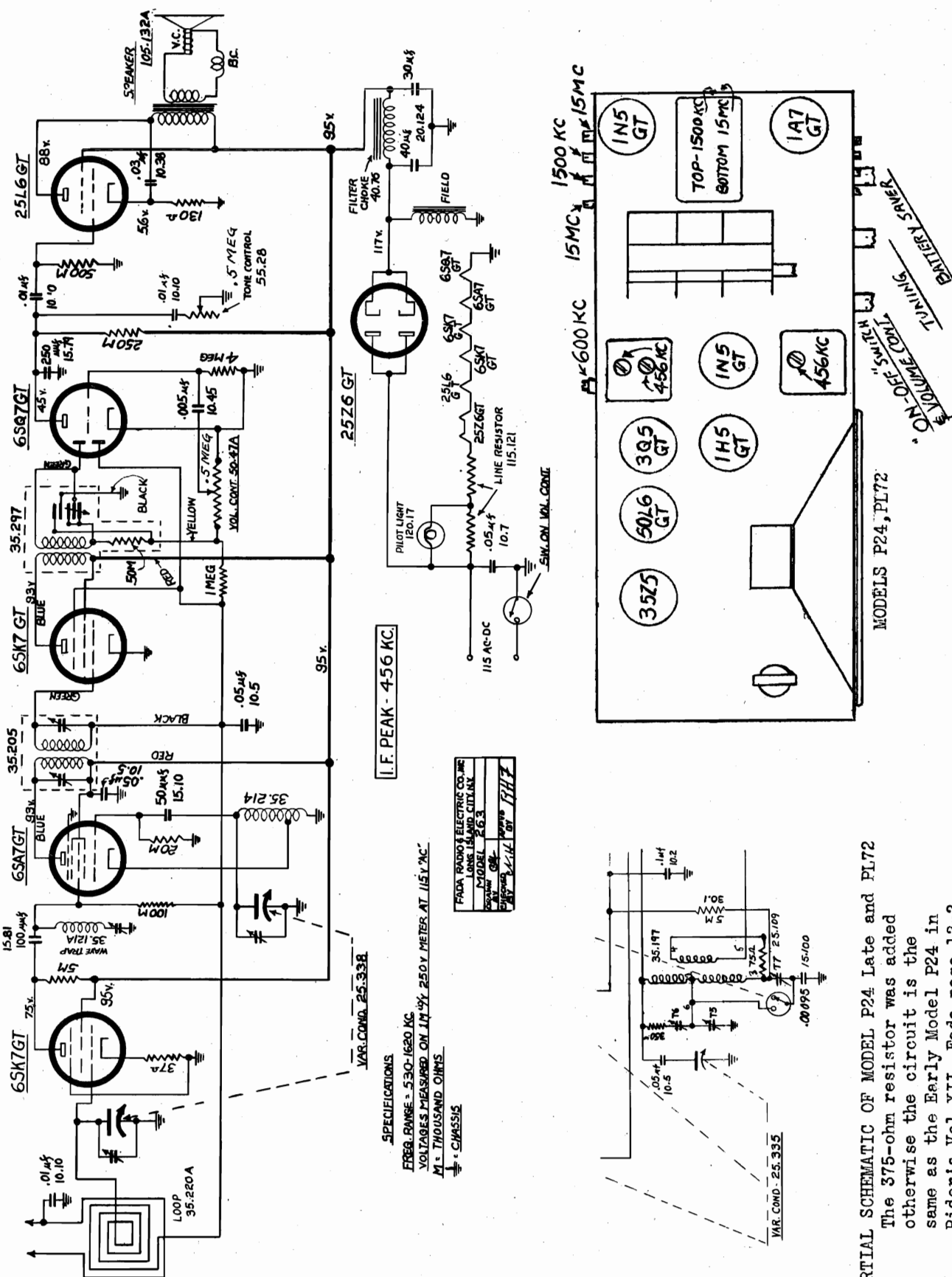


ESPEY MFG. CO., INC.



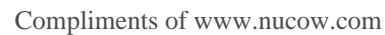


FADA RADIO & ELECTRIC CO.

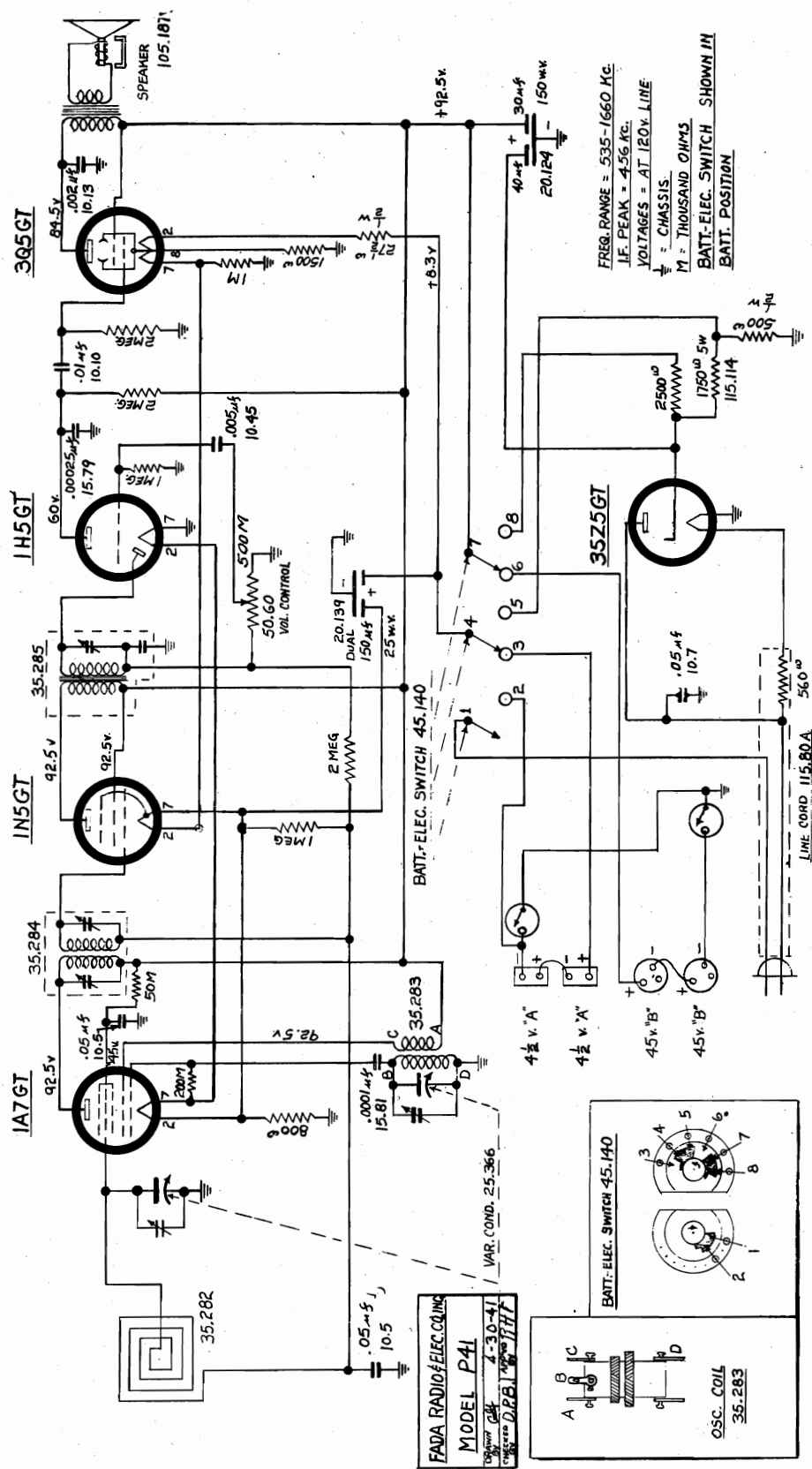


PARTIAL SCHEMATIC OF MODEL P24 Late and PL72

The 375-ohm resistor was added otherwise the circuit is the same as the Early Model P24 in BRider's Vol.XII, Fada page 12-2



ALIGNMENT: Vol. con. pos.: It is important that loop and batteries occupy same relative positions as in carrying case. IF- Var. cond. fully open. Feed 456 kc sig. into con. grid of 1A7GT tube. Adj. 3 IF trims. for max. o.p. RF- Couple gen. lead loosely to loop, set gen. to 1700 kc. Adj. osc. trim. to pick up this sig. with variable cond. fully open. Change to 1500 kc and adj. 1500 kc ant. trim. for greatest o.p. On 600 kc it may be necessary to bend plates to insure proper tracking.



ALIGNMENT: Vol. con. pos.: It is important that loop and batteries occupy same relative positions as in carrying case. IF- Var. cond. fully open. Feed 456 kc sig. into con. grid of 1A7GT tube. Adj. 3 IF trims. for max. o.p. RF- Couple gen. lead loosely to loop, set gen. to 1700 kc. Adj. osc. trim. to pick up this sig. with variable cond. fully open. Change to 1500 kc and adj. 1500 kc ant. trim. for greatest o.p. On 600 kc it may be necessary to bend plates to insure proper tracking.

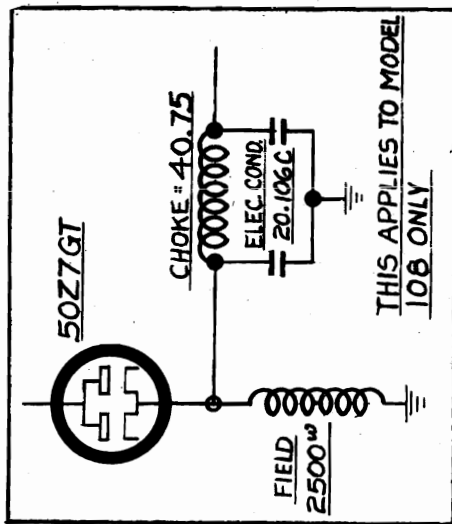
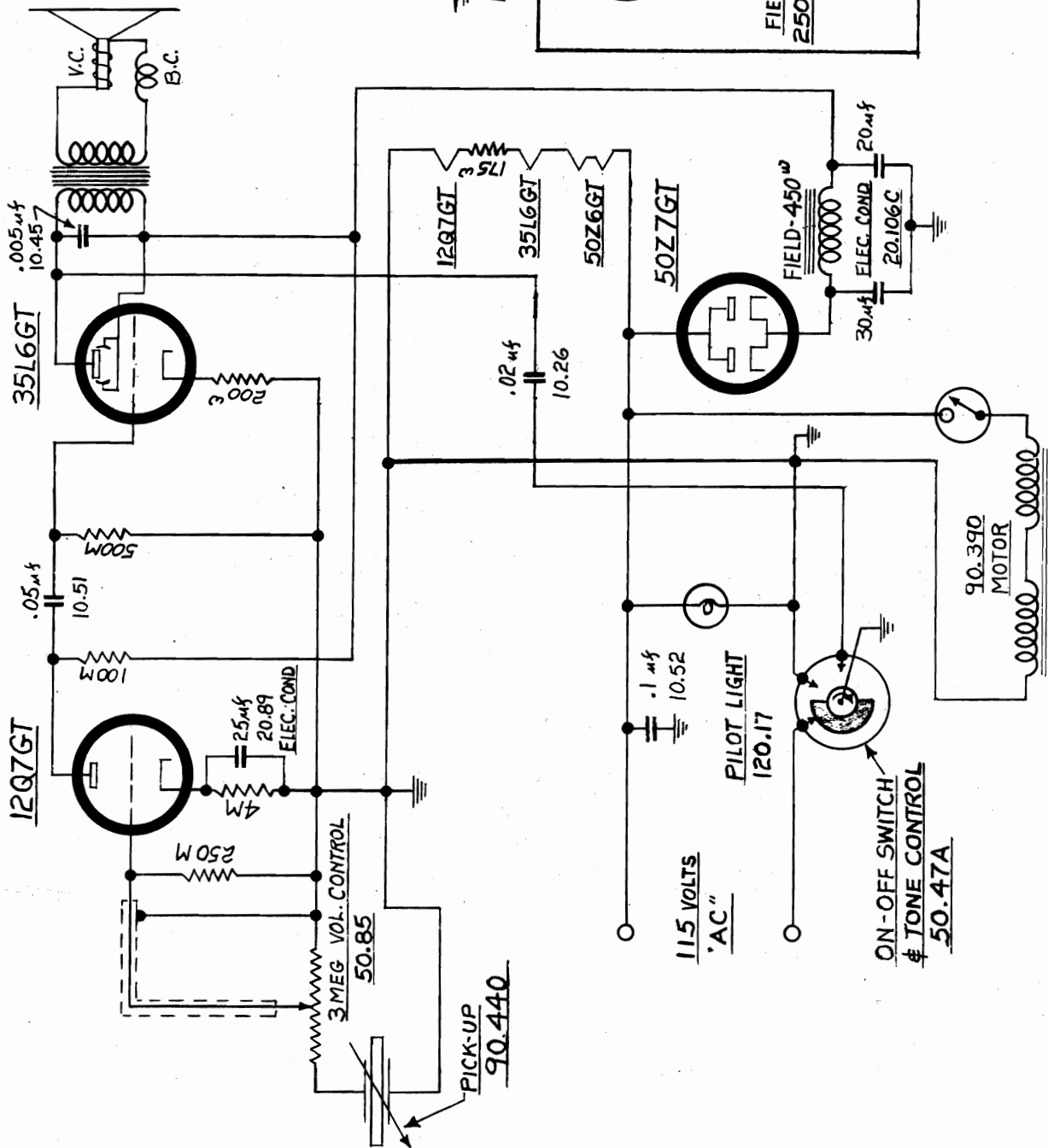
MODELS 107, 108
Phono.

FADA RADIO & ELECTRIC CO.

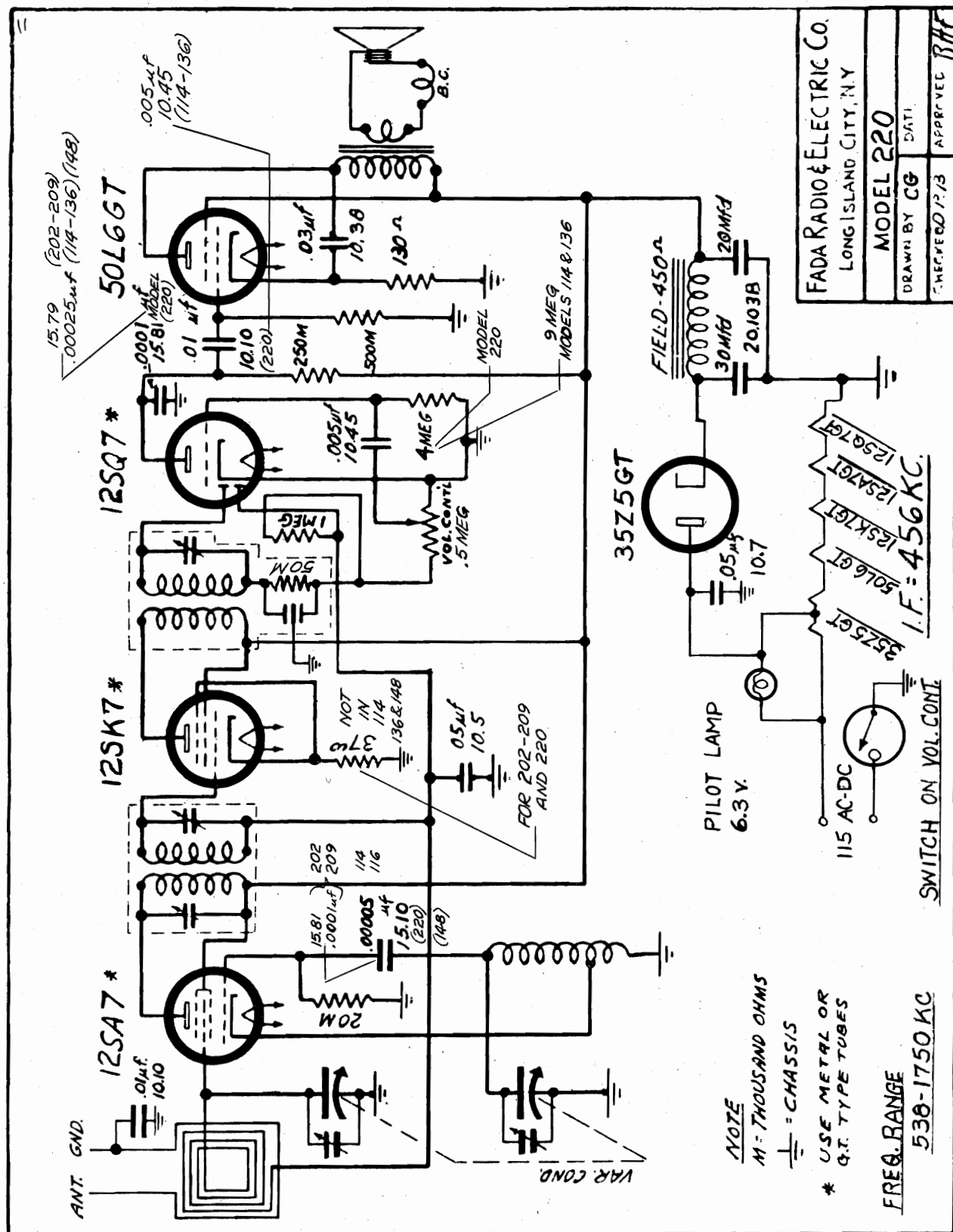
MODEL 107 - SPEAKER 105.172
MODEL 108 - SPEAKER 105.145

FADA RADIO & ELEC. CO., INC. LONG ISLAND CITY, N.Y.	
RECORD PLAYER - 107-108	
DRAWN BY 24	DATE 9-23-41
CHECKED BY 24	APPROVED BY 24

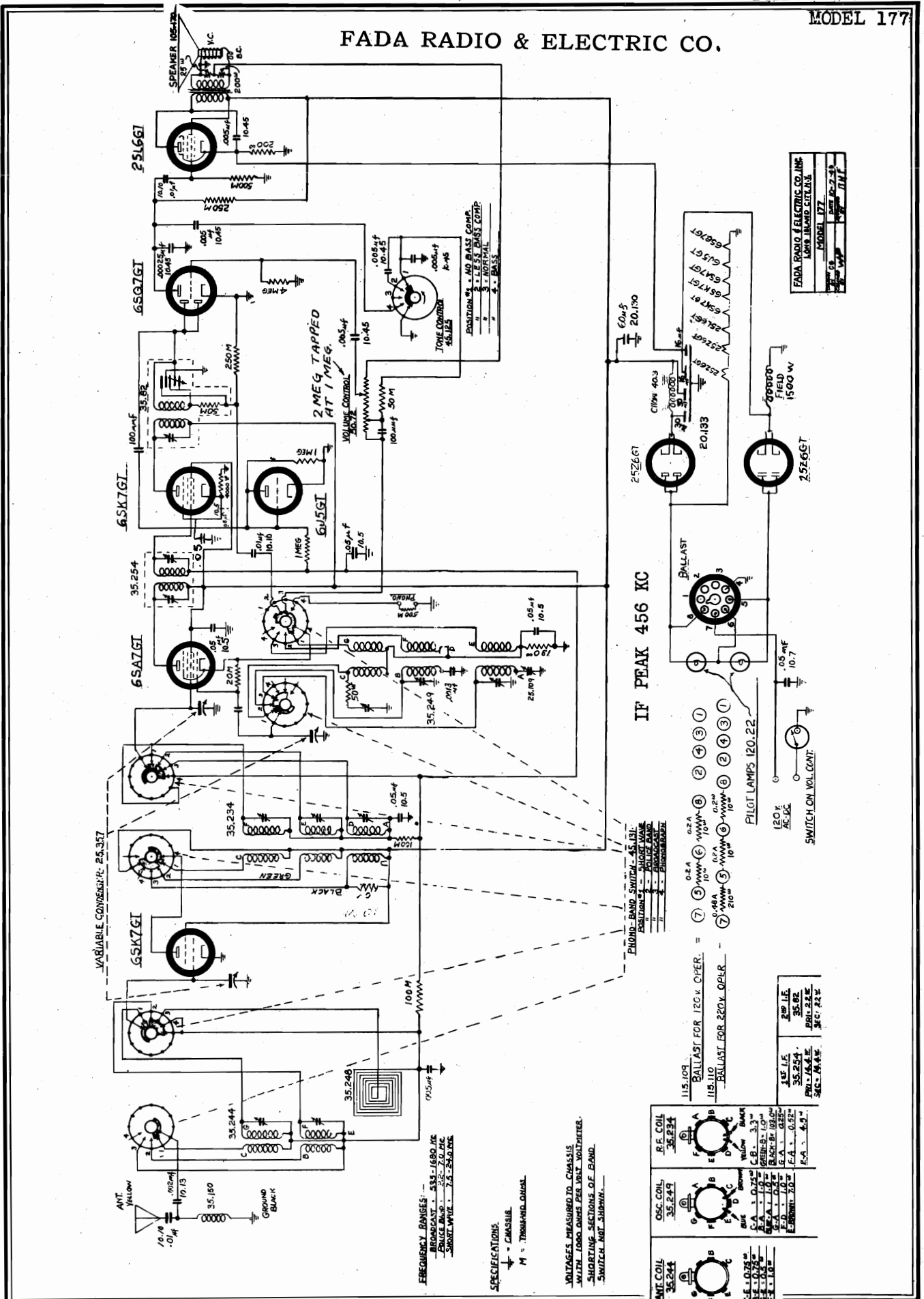
CHASSIS
M = THOUSAND OHMS



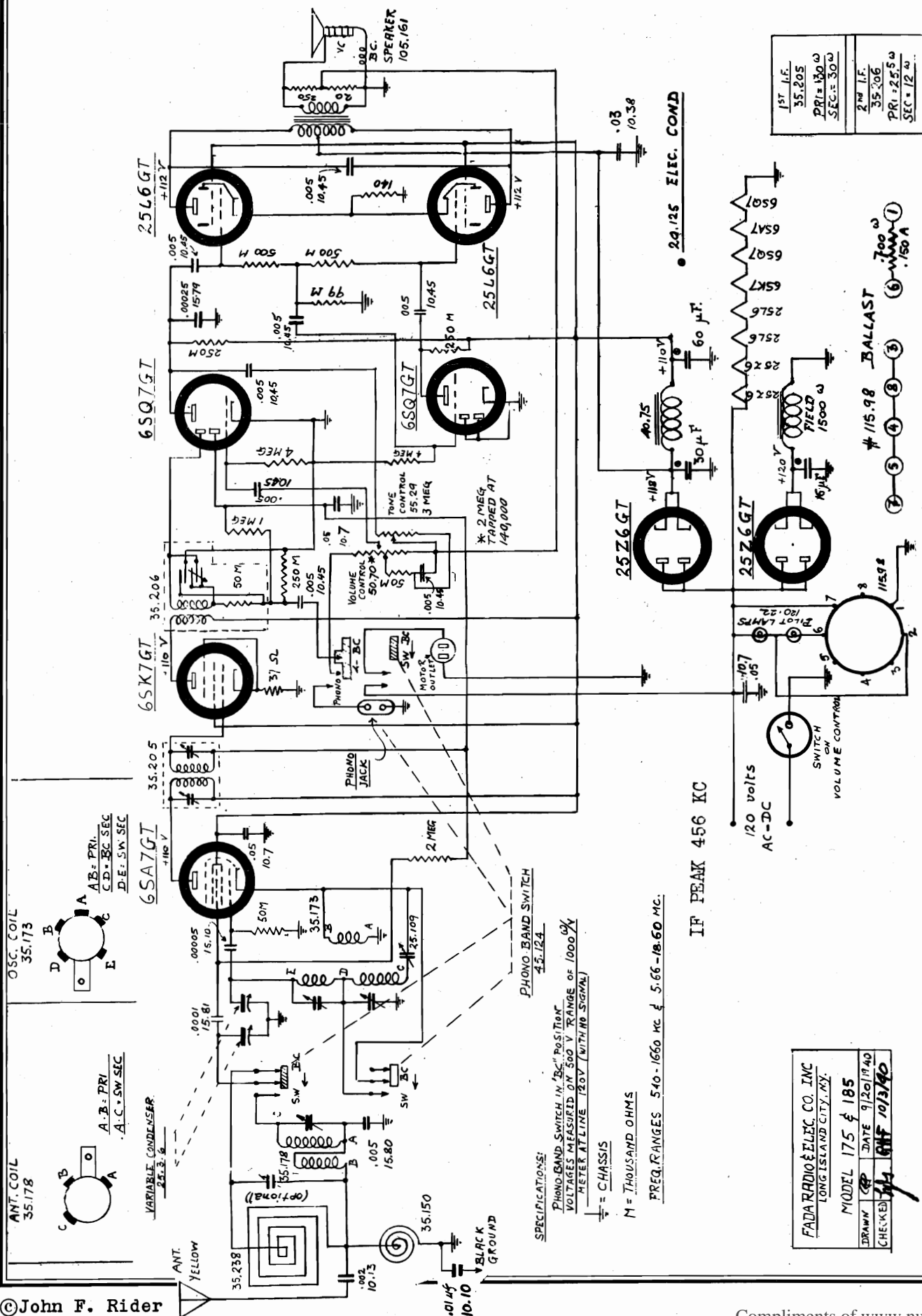
FADA RADIO & ELECTRIC CO.

MODELS 114, 136, 148,
202, 209, 220

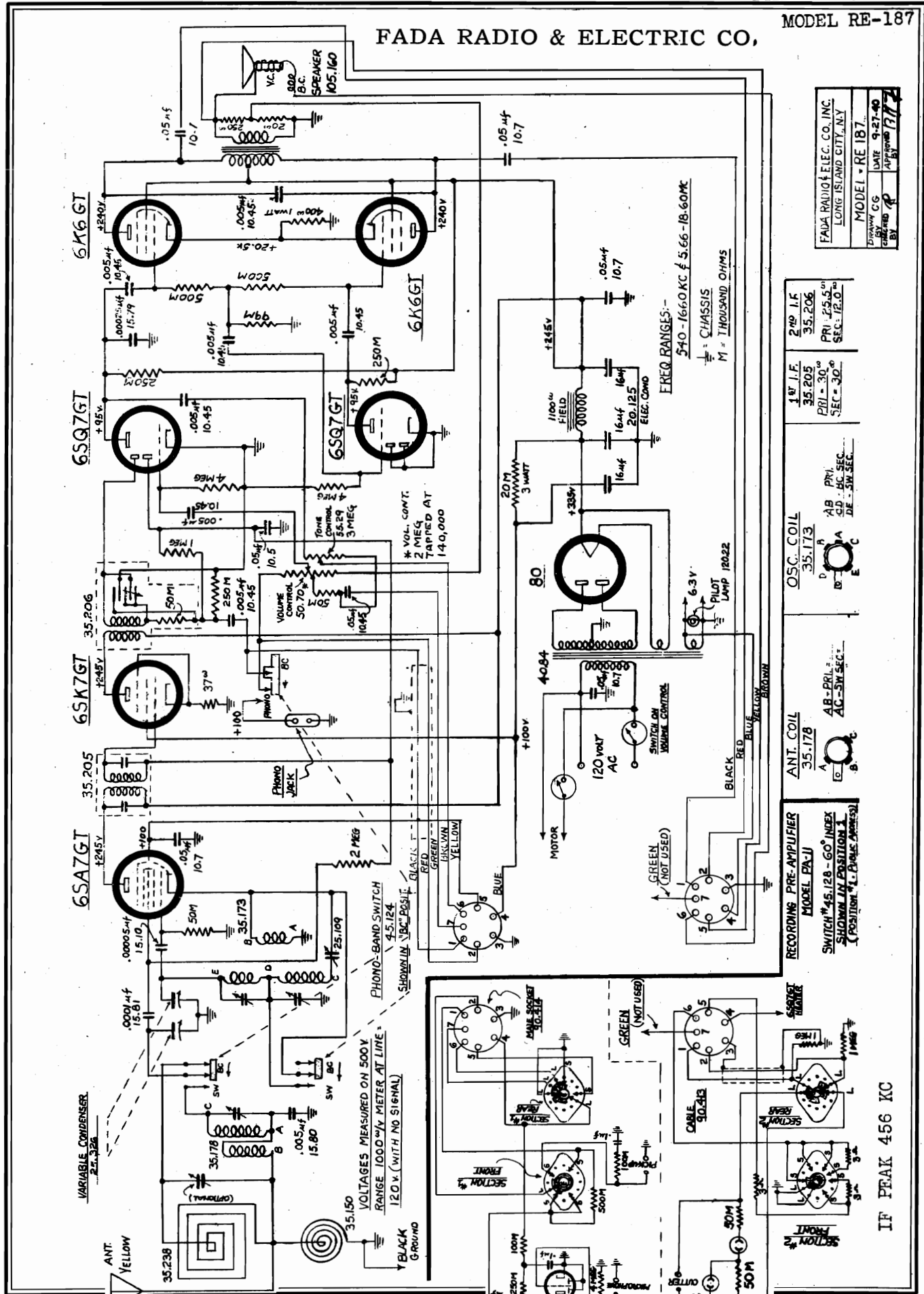
Compliments of www.nucow.com



FADA RADIO & ELECTRIC CO.



FADA RADIO & ELECTRIC CO.

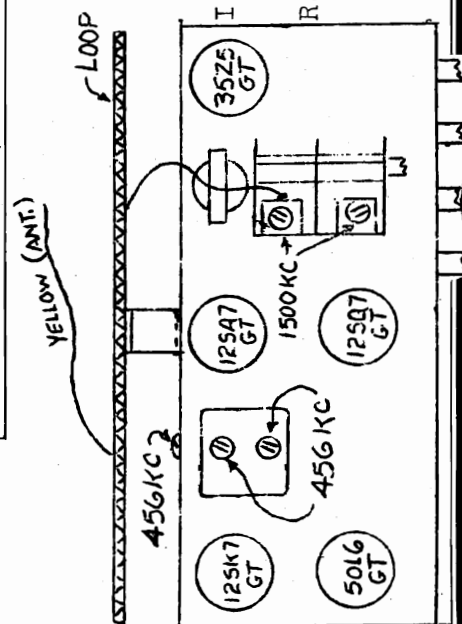




ALIGNMENT PROCEDURE

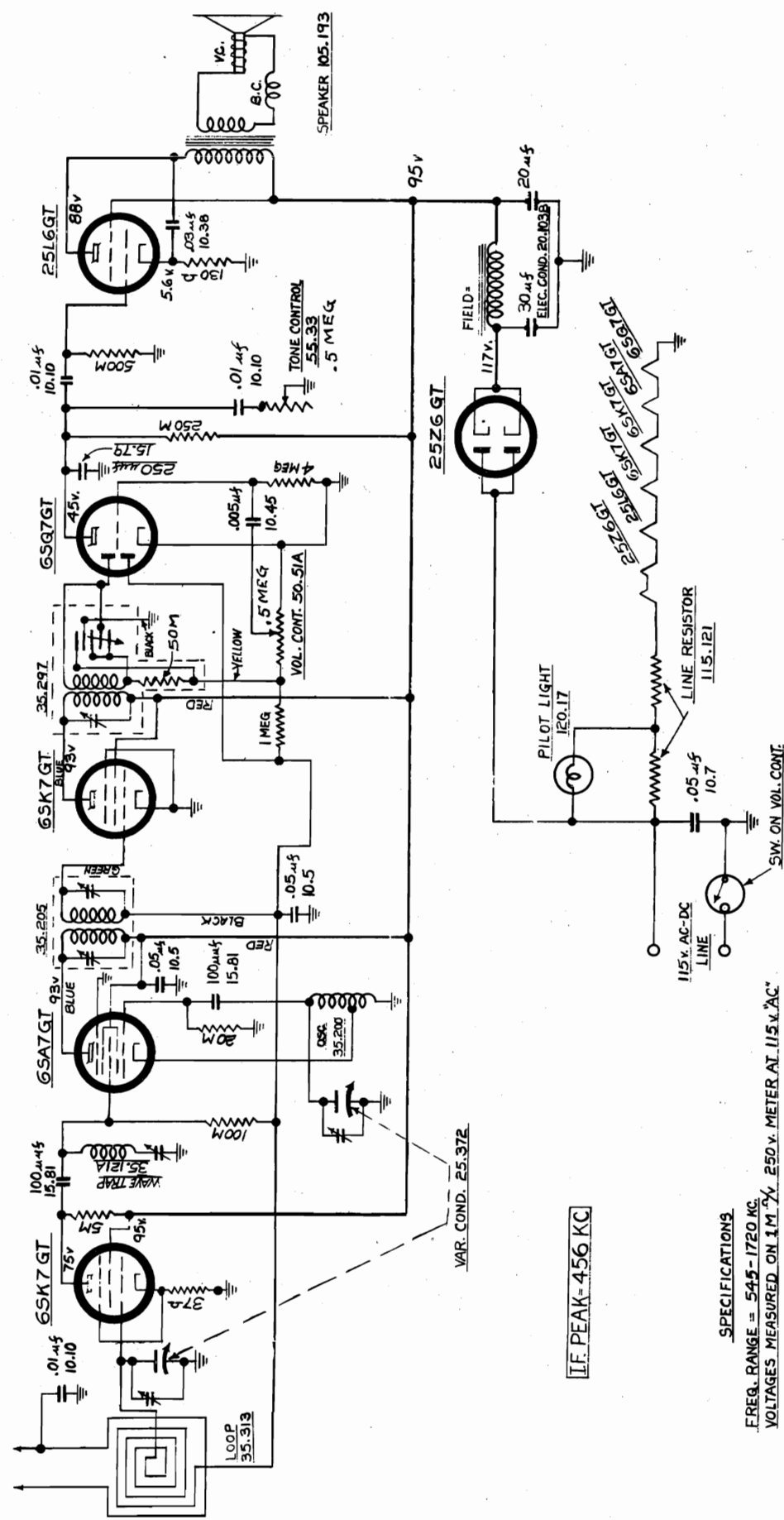
Feed 456 K.C. signal to 12SA7 control grid (top rear section of variable condenser). Adjust T-1-2-3 for maximum output.

Feed 1500 K.C. signal to yellow (ant.) lead in series with 200 mmmf. condenser. Adjust T-4 for calibration (1500 KC) and T5 for maximum output. Check sensitivity on 600 KC. It may be necessary to bend plates to insure proper tracking.



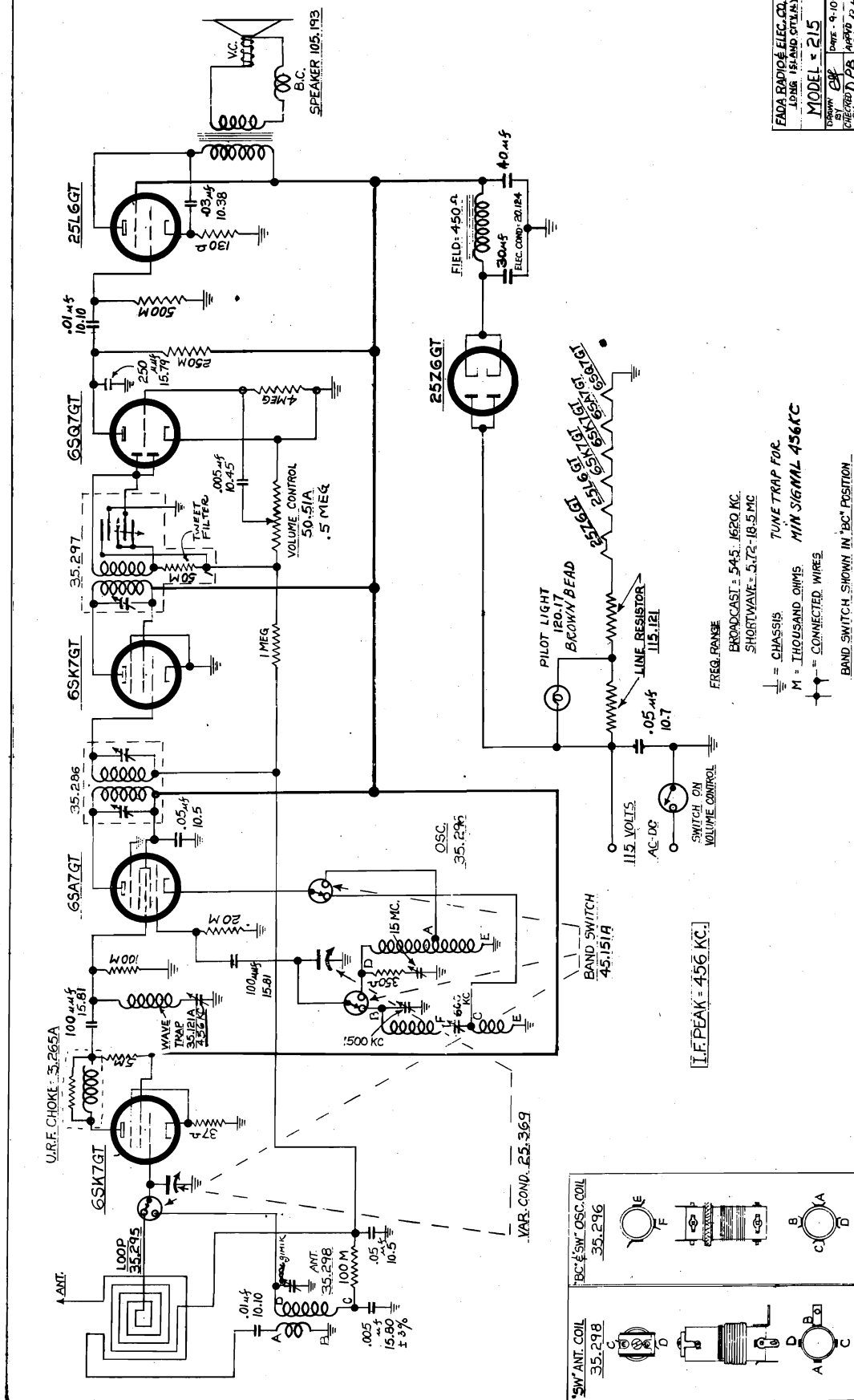
FADA RADIO & ELECTRIC CO.

MODEL 214



FADA RADIO & ELECT. CO. INC.	
LONG ISLAND CITY, N.Y.	
MODEL 214	DATE 8-29-41
DESIGNED BY D.P.B.	BY D.P.B.

EADA RADIO & ELEC. CO. INC. LONG ISLAND CITY, N.Y.	
MODEL = 215	
DRAWN BY	DATE - 9-10-41
CHECKED BY	APPROVED BY



F TRAP
456 KC(MIN.)

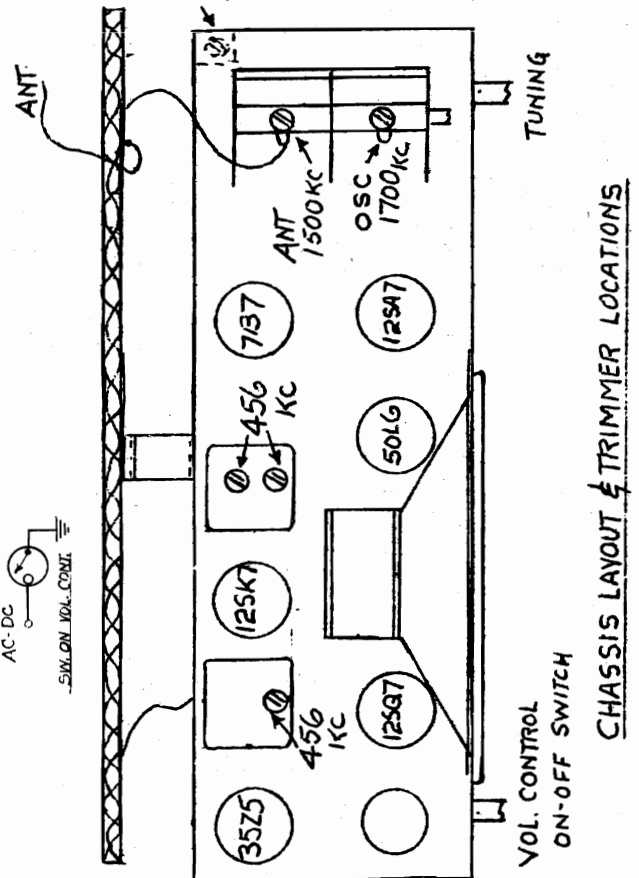


CHASSIS

AS LOW AS POSSIBLE.

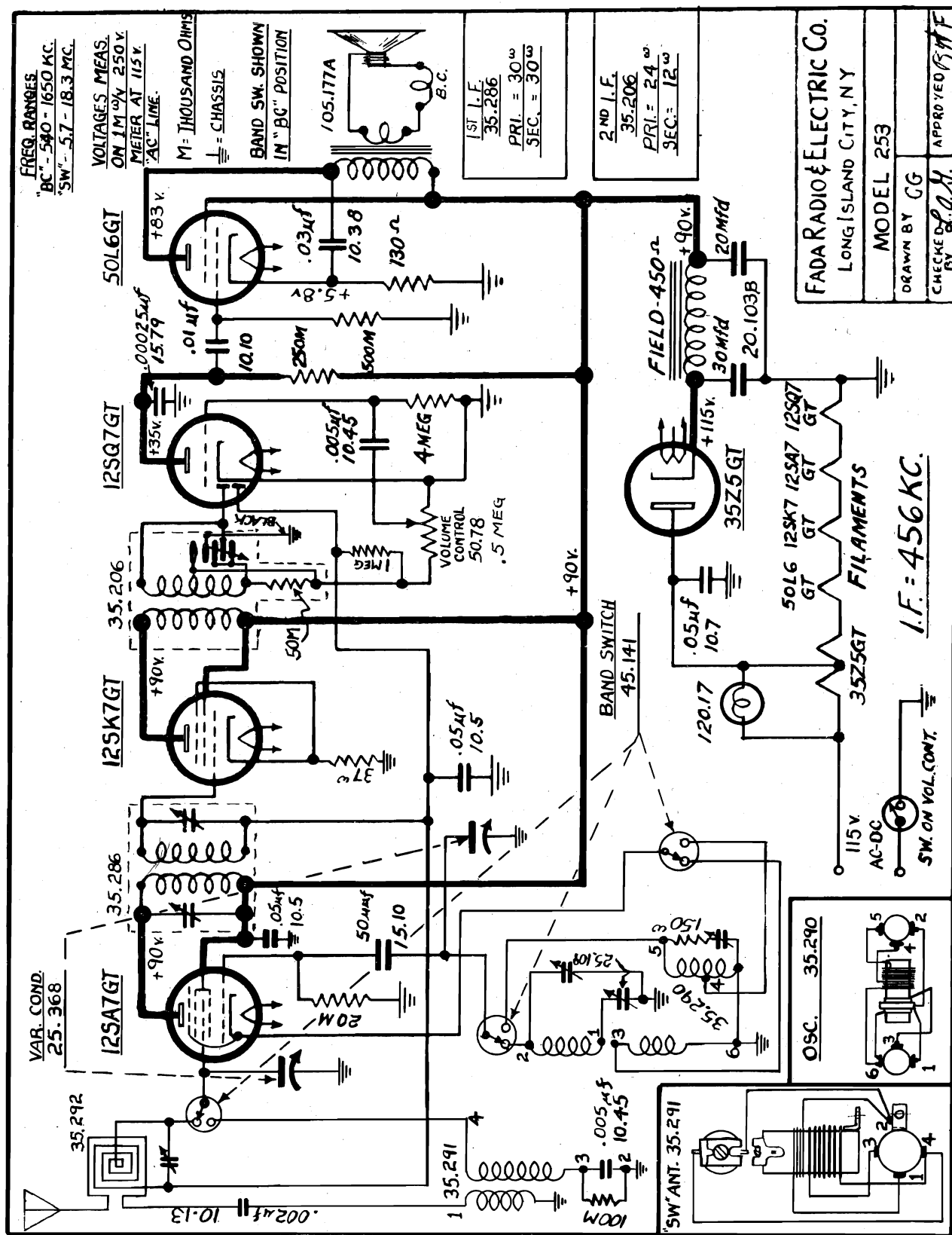
IF- (1) Feed 456 kc, in series with .01 cond., to con-
grid of RF tube - loop term. (rear sec. var. cond.).
Adj. 3 IF trims. for max. (2) Adj. IF trap for min.
RF- (1) Feed 1700 kc sig. in series with 200 mmf. cond
to yellow ant. lead. Set osc. trim. cond. to pick up
this frequency at approx. 1700 kc on dial. (2) Change
to 1500 kc and adj. ant. trim. for max. (3) Check sen-
sitivity on 600 kc.

NOTE: On the early runs of this model, 6SS7 and 12SK7 tubes were employed in the RF and IF stages. In the event of 6SS7 failure, the 12SK7 may be substituted. The 40-ohm series resistor (black) in the heater circuit (not shown) can be removed if, due to low line voltage, the heat-up period is delayed. On the later runs, 7B7s were employed in place of the above.

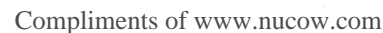


MODEL 253

FADA RADIO & ELECTRIC CO.



©John F. Rider



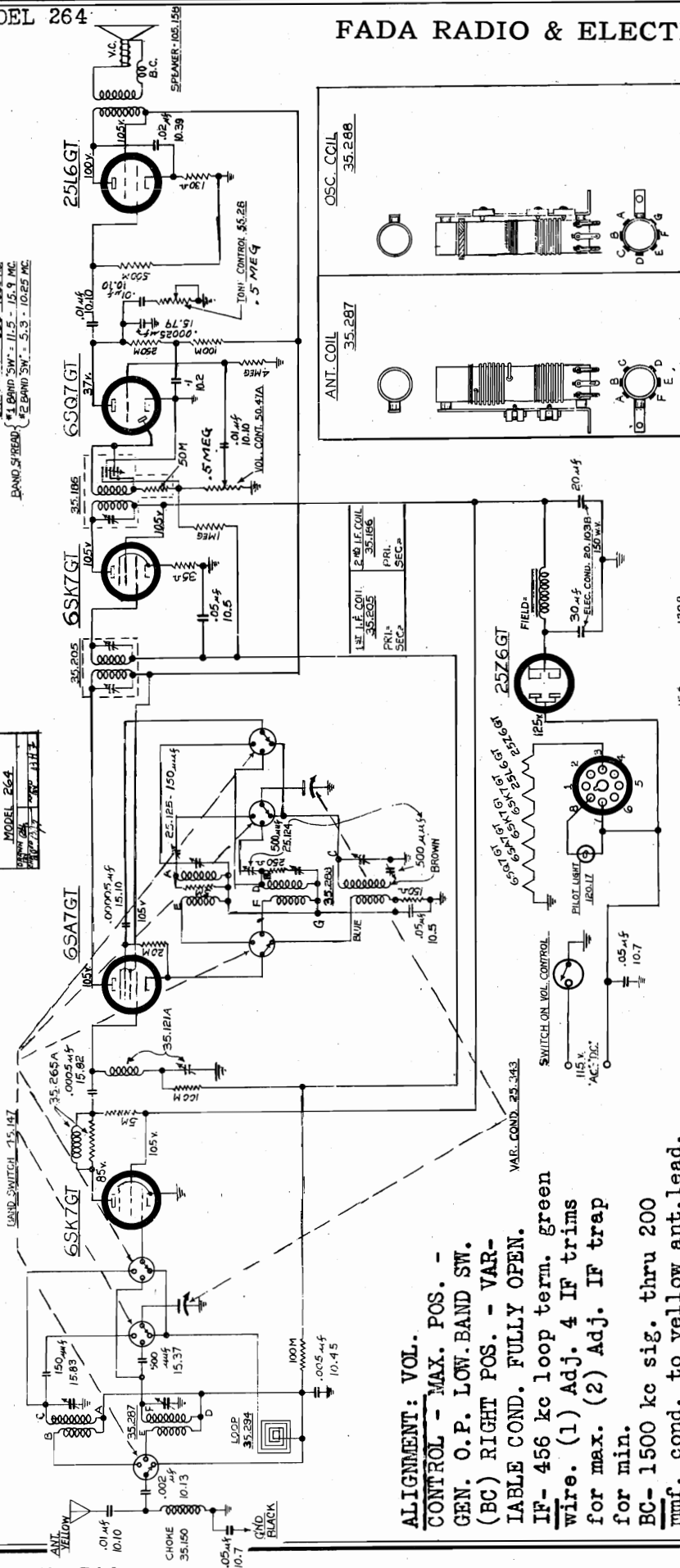
MODEL 264

FADA RADIO & ELECTRIC CO.

FREQ. RANGE:

BROADCAST - 530 - 1625 KC
BAND SW. = 11.5 - 15.9 MC
BAND SW. = 5.3 - 10.25 MC

FADA RADIO & ELECTRIC CO. INC.
MODEL 264
1937
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1999
2000



ALIGNMENT: VOL.

CONTROL - MAX. POS. -

GEN. O.P. LOW-BAND SW.

(BC) RIGHT POS. - VAR-

IABLE COND. FULLY OPEN.

IF- 456 kc loop term. green

wire. (1) Adj. 4 IF trims

for max. (2) Adj. IF trap

for min.

BC- 1500 kc sig. thru 200

mmf. cond. to yellow ant. lead.

(1) Adj. 1500 kc osc. trim. for

max. Rock variable. (2) Readj.

600 kc trim. for max. Rock var.

SW 1- Band switch left pos. 14.5

mc sig. to yellow ant. lead in series with

400 ohm carbon res. (1) Adj. 14.5 mc osc.

and ant. trims. for max. Image should ap-

pear on 15.4 mc and weaker. (2) Readj. at

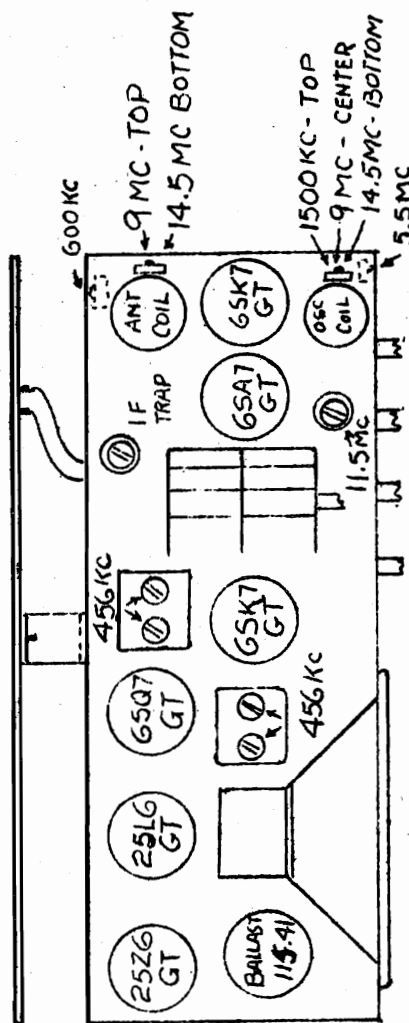
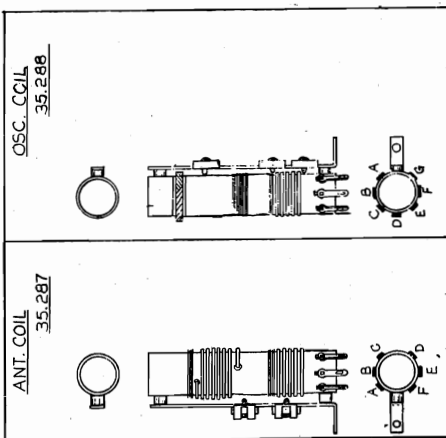
11.5 mc trim. for max. Rock variable.

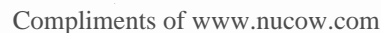
SW 2- Band switch center pos. (1) Set to

9 mc. Adj. 9 mc osc. and ant. trim. for max.

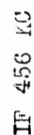
(2) Change to 5.5 mc and adj. 5.5 mc trim.

for max. Rock variable.





MODEL - 286



MODELS 288, 295



SPECIFICATIONS
⚡ = CHASSIS
M = THOUSAND OHMS
VOLTAGES MEASURED TO GROUND
VOLTMETER

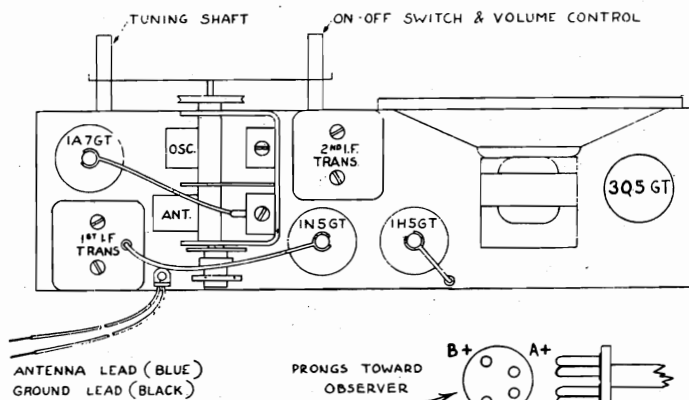
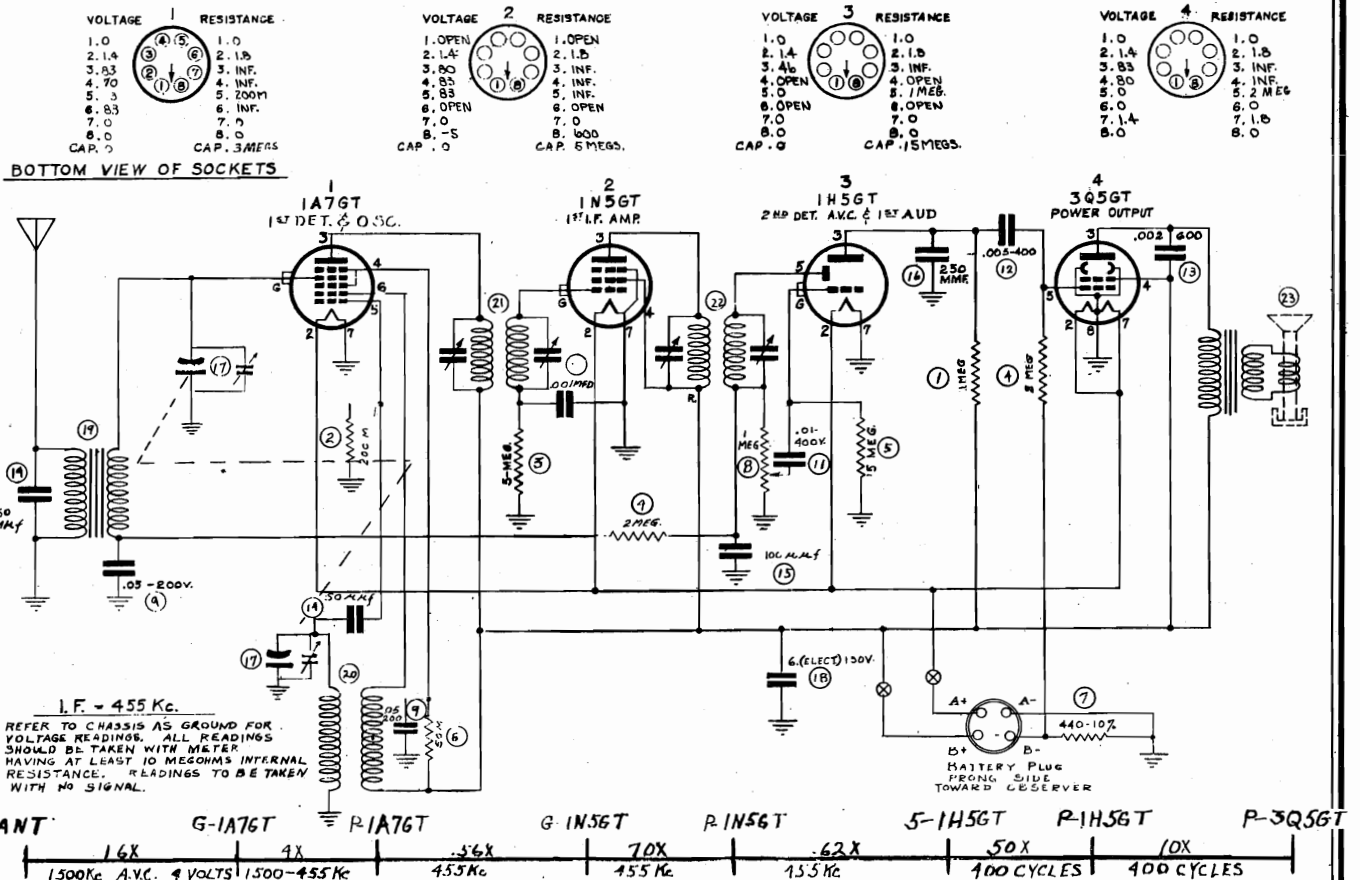
<p>R.F. COIL <u>35,234</u></p>	
<p>OSC. COIL <u>35,249</u></p>	
<p>ANT. COIL <u>35,244</u></p>	

295-288



FARNSWORTH TELEV. & RADIO CORP.

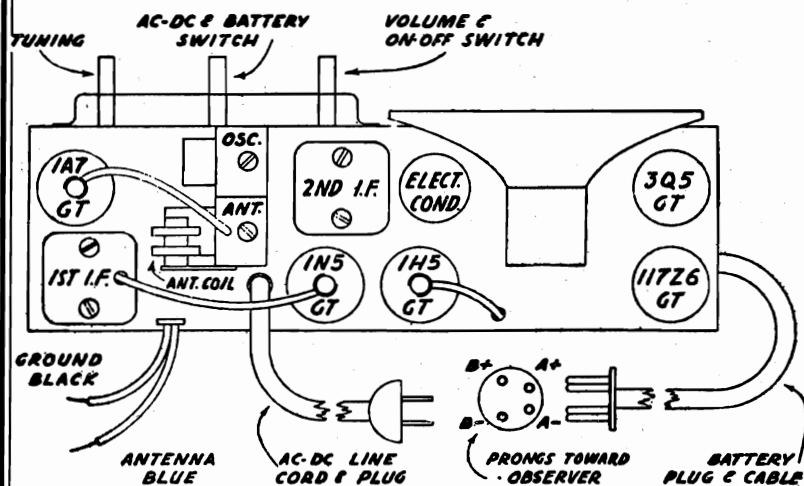
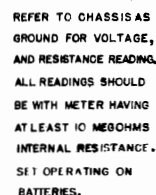
MODEL CT-41



TABULATION FOR ALIGNMENT

STEPS	USE IN SERIES WITH GENERATOR	SET GENERATOR AT	SET GANG AT	ADJUST	LOCATED	TO OBTAIN
1.	CONNECT HIGH SIDE OF GENERATOR TO ANTENNA	455 Kc.	QUIET POINT	2ND I.F. TRIMMERS 1ST I.F. TRIMMERS	TOP OF I.F. TRANS	MAXIMUM OUTPUT
2.	250 M.M.F.	1730 Kc.	1730 Kc.	OSCILLATOR TRIMMER	SEE FIG	
3.	250 M.M.F.	1500 Kc.	1400 Kc. & ROCK GANG	ANTENNA TRIMMER		

VOLTAGE		RESISTANCE		VOLTAGE		RESISTANCE		VOLTAGE		RESISTANCE		VOLTAGE		RESISTANCE	
1	1.0	1.0	1.0	1	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
2	1.4	1.0	1.4	2	1.4	1.0	1.4	2	1.4	1.0	1.4	2	1.4	1.0	1.4
3	1.8	1.0	1.8	3	1.8	1.0	1.8	3	1.8	1.0	1.8	3	1.8	1.0	1.8
4	2.2	1.0	2.2	4	2.2	1.0	2.2	4	2.2	1.0	2.2	4	2.2	1.0	2.2
5	2.6	1.0	2.6	5	2.6	1.0	2.6	5	2.6	1.0	2.6	5	2.6	1.0	2.6
6	3.0	1.0	3.0	6	3.0	1.0	3.0	6	3.0	1.0	3.0	6	3.0	1.0	3.0
7	3.4	1.0	3.4	7	3.4	1.0	3.4	7	3.4	1.0	3.4	7	3.4	1.0	3.4
8	3.8	1.0	3.8	8	3.8	1.0	3.8	8	3.8	1.0	3.8	8	3.8	1.0	3.8
9	4.2	1.0	4.2	9	4.2	1.0	4.2	9	4.2	1.0	4.2	9	4.2	1.0	4.2
10	4.6	1.0	4.6	10	4.6	1.0	4.6	10	4.6	1.0	4.6	10	4.6	1.0	4.6
11	5.0	1.0	5.0	11	5.0	1.0	5.0	11	5.0	1.0	5.0	11	5.0	1.0	5.0
12	5.4	1.0	5.4	12	5.4	1.0	5.4	12	5.4	1.0	5.4	12	5.4	1.0	5.4
13	5.8	1.0	5.8	13	5.8	1.0	5.8	13	5.8	1.0	5.8	13	5.8	1.0	5.8
14	6.2	1.0	6.2	14	6.2	1.0	6.2	14	6.2	1.0	6.2	14	6.2	1.0	6.2
15	6.6	1.0	6.6	15	6.6	1.0	6.6	15	6.6	1.0	6.6	15	6.6	1.0	6.6
16	7.0	1.0	7.0	16	7.0	1.0	7.0	16	7.0	1.0	7.0	16	7.0	1.0	7.0
17	7.4	1.0	7.4	17	7.4	1.0	7.4	17	7.4	1.0	7.4	17	7.4	1.0	7.4
18	7.8	1.0	7.8	18	7.8	1.0	7.8	18	7.8	1.0	7.8	18	7.8	1.0	7.8
19	8.2	1.0	8.2	19	8.2	1.0	8.2	19	8.2	1.0	8.2	19	8.2	1.0	8.2
20	8.6	1.0	8.6	20	8.6	1.0	8.6	20	8.6	1.0	8.6	20	8.6	1.0	8.6
21	9.0	1.0	9.0	21	9.0	1.0	9.0	21	9.0	1.0	9.0	21	9.0	1.0	9.0
22	9.4	1.0	9.4	22	9.4	1.0	9.4	22	9.4	1.0	9.4	22	9.4	1.0	9.4
23	9.8	1.0	9.8	23	9.8	1.0	9.8	23	9.8	1.0	9.8	23	9.8	1.0	9.8
24	10.2	1.0	10.2	24	10.2	1.0	10.2	24	10.2	1.0	10.2	24	10.2	1.0	10.2
25	10.6	1.0	10.6	25	10.6	1.0	10.6	25	10.6	1.0	10.6	25	10.6	1.0	10.6
26	11.0	1.0	11.0	26	11.0	1.0	11.0	26	11.0	1.0	11.0	26	11.0	1.0	11.0
27	11.4	1.0	11.4	27	11.4	1.0	11.4	27	11.4	1.0	11.4	27	11.4	1.0	11.4
28</															



ELEC. SPEC.: 5-tube AC-DC or 4-tube battery receiver. Outside ant. may be connected to blue wire, and ground to black wire. POWER SUPPLY: General 60B6L or Burgess 6TA-60 can be used and will fit inside cabinet. Large units as Burgess 17G-D60, Eveready 748, Ray-O-Vac AB-82, Bond 0528 or General 60DL-11L may be used, but will not fit inside cabinet. Battery drain is .2 amp., at $1\frac{1}{2}$ volts and 9 ma., at 90 volts.

TABULATION FOR ALIGNMENT

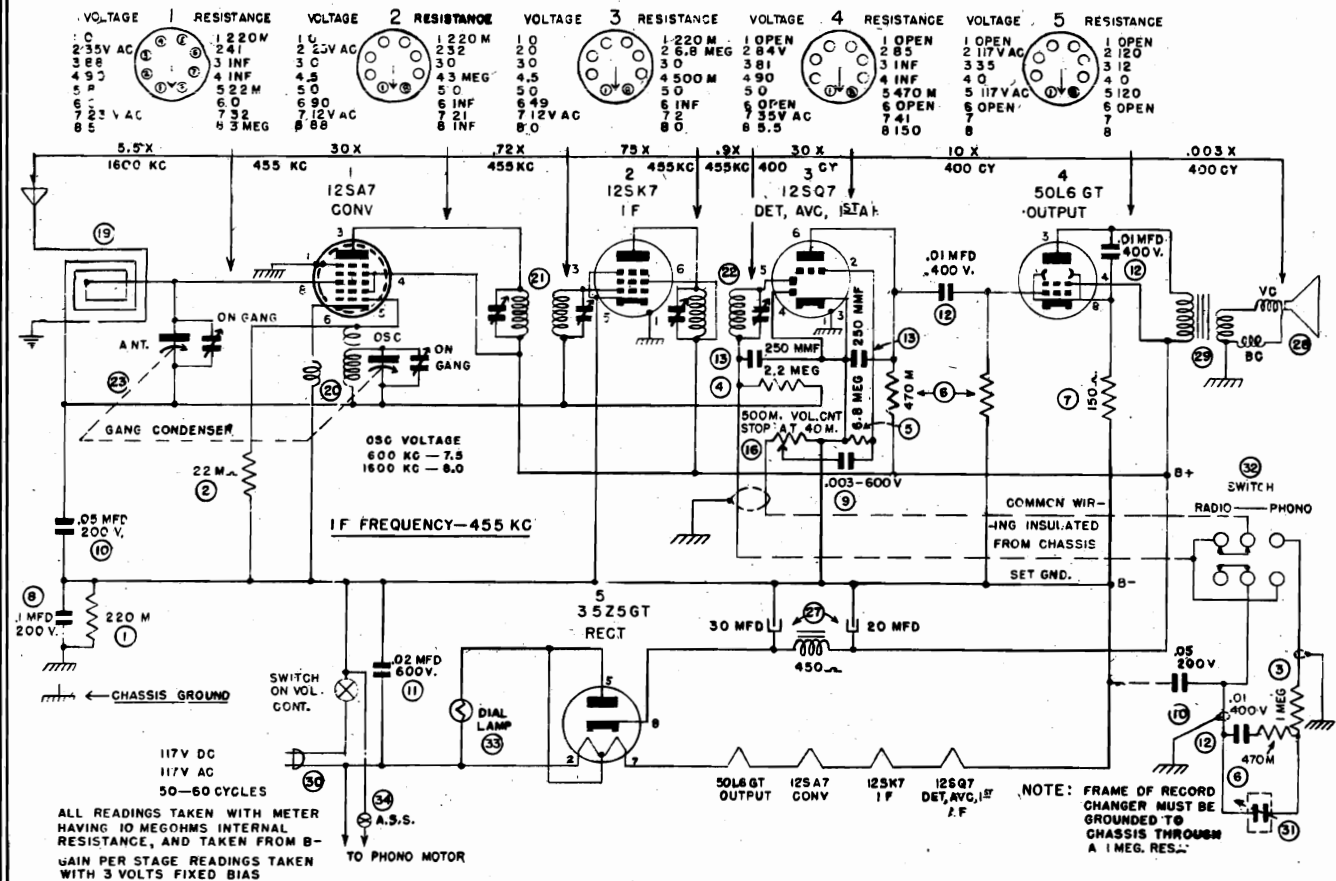
STEPS	USE IN SERIES WITH GENERATOR	SET GENERATOR AT	SET GANG AT	ADJUST	LOCATED	TO OBTAIN
1.	CONNECT HIGH SIDE OF GENER- ATOR TO ANTENNA	455 Kc.	QUIET POINT	2ND I.F. TRIMMERS	TOP OF I.F. TRANS	MAXIMUM OUTPUT
				1st I.F. TRIMMERS		
2.	250 M.M.F.	1730 Kc.	1730 Kc.	OSCILLATOR TRIMMER	SEE FIG.	
3.	250 M.M.F.	1500 Kc.	1400 Kc. & ROCK GANG	ANTENNA TRIMMER		

CT-54, CK-58,
Chassis C108-2

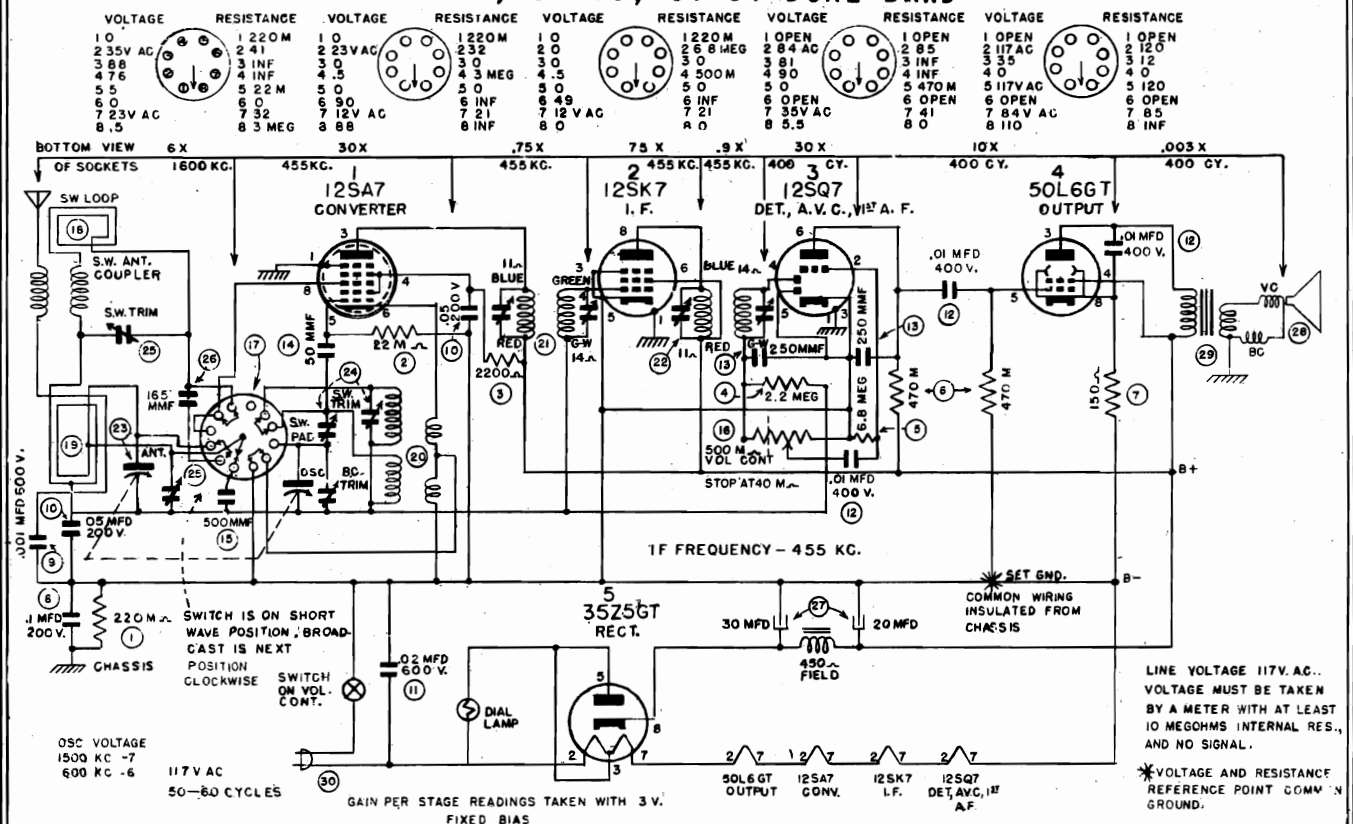
FARNSWORTH TELEV. & RADIO CORP

CT-50, CT-51, CK-58 SINGLE BAND

MODELS CT-50, CT-51,
Chassis C108-1;
CT-52, CT-53,
Chassis C109-1;



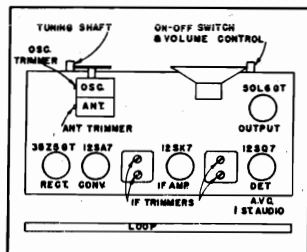
CT-52, CT-53, CT-54 DUAL BAND



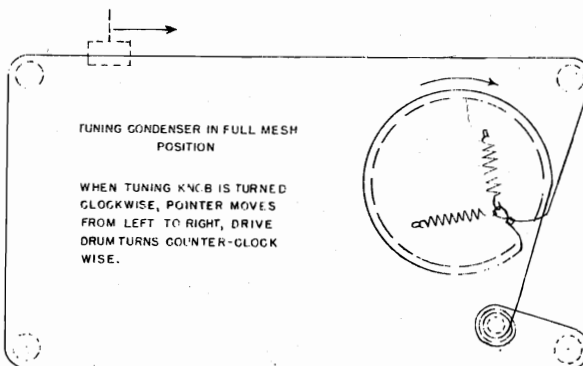
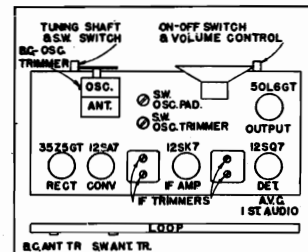
CHASSIS C108-1,
C108-2, 109-1

FARNSWORTH TELEV. & RADIO CORP.

SINGLE BAND
TUBE LAYOUT



DUAL BAND
TUBE LAYOUT



DIAL STRINGING

WHEN ALIGNING THE SHORT WAVE OSCILLATOR TIGHTEN THE ADJUSTING SCREW FOR MAXIMUM CAPACITY AND THEN LOOSEN IT UNTIL THE FIRST PEAK IS REACHED. DO NOT USE THE SIGNAL HEARD AT THE LOWER CAPACITY SETTING AS IN THIS RECEIVER THE OSCILLATOR WORKS AT A FREQUENCY LOWER THAN THE ONE THE R.F. IS TUNED TO. IF THE LOOP IS TUNED TO 9.0 MC THE OSCILLATOR IS TUNED TO 8,545 KC THAT IS SIGNAL FREQUENCY MINUS I.F. FREQUENCY, INSTEAD OF SIGNAL FREQUENCY PLUS I.F. FREQUENCY, OR 9,455 KC AS IS CUSTOMARY.

TABULATION FOR ALIGNMENT OF SIGNAL AND DUAL BAND RECEIVERS

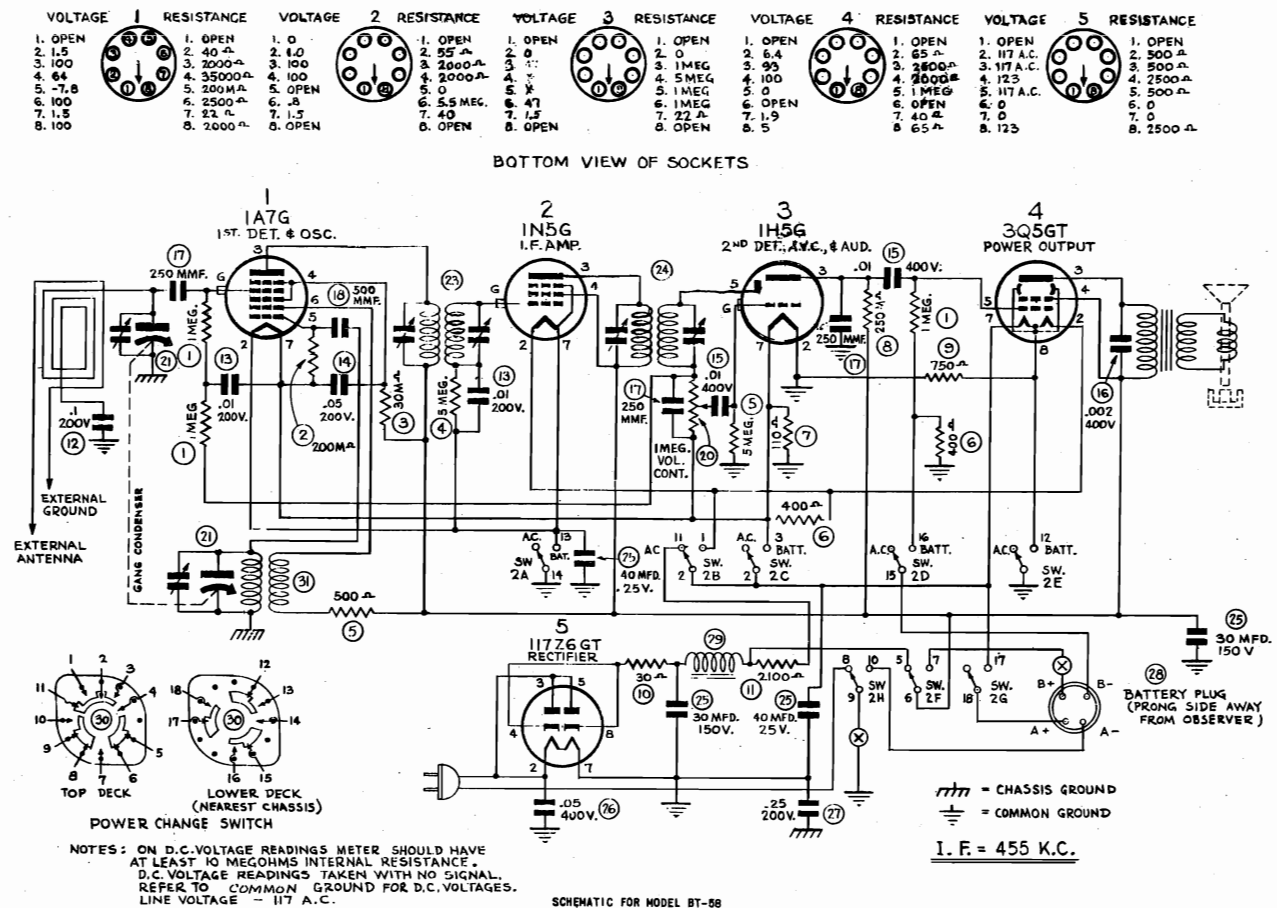
STEPS	DUMMY ANTENNA	SET GENERATOR AT	SET GANG AT	ADJUST	LOCATED	TO OBTAIN
1	SET VOLUME CONTROL FOR MAXIMUM OUTPUT					MAXIMUM OUTPUT
2	100 MMF	445 Kc	MINIMUM CAPACITY	2ND I.F. TRIMMERS	TOP OF I.F. TRANSFORMERS	
3				1ST I.F. TRIMMERS		
4				1720 Kc	B.C. Osc. TRIMMERS		ON TUNING CONDENSER
5		1500 Kc	STRONGEST SIGNAL AND ROCK GANG	B.C. R.F. TRIMMER	*ON LOOP ANTENNA	
6	CHECK	1500 Kc, 1000 Kc AND 600 Kc				

SHORT WAVE BAND ALIGNMENT FOR CT-52, CT-53 AND CT-54 DUAL BAND RECEIVERS

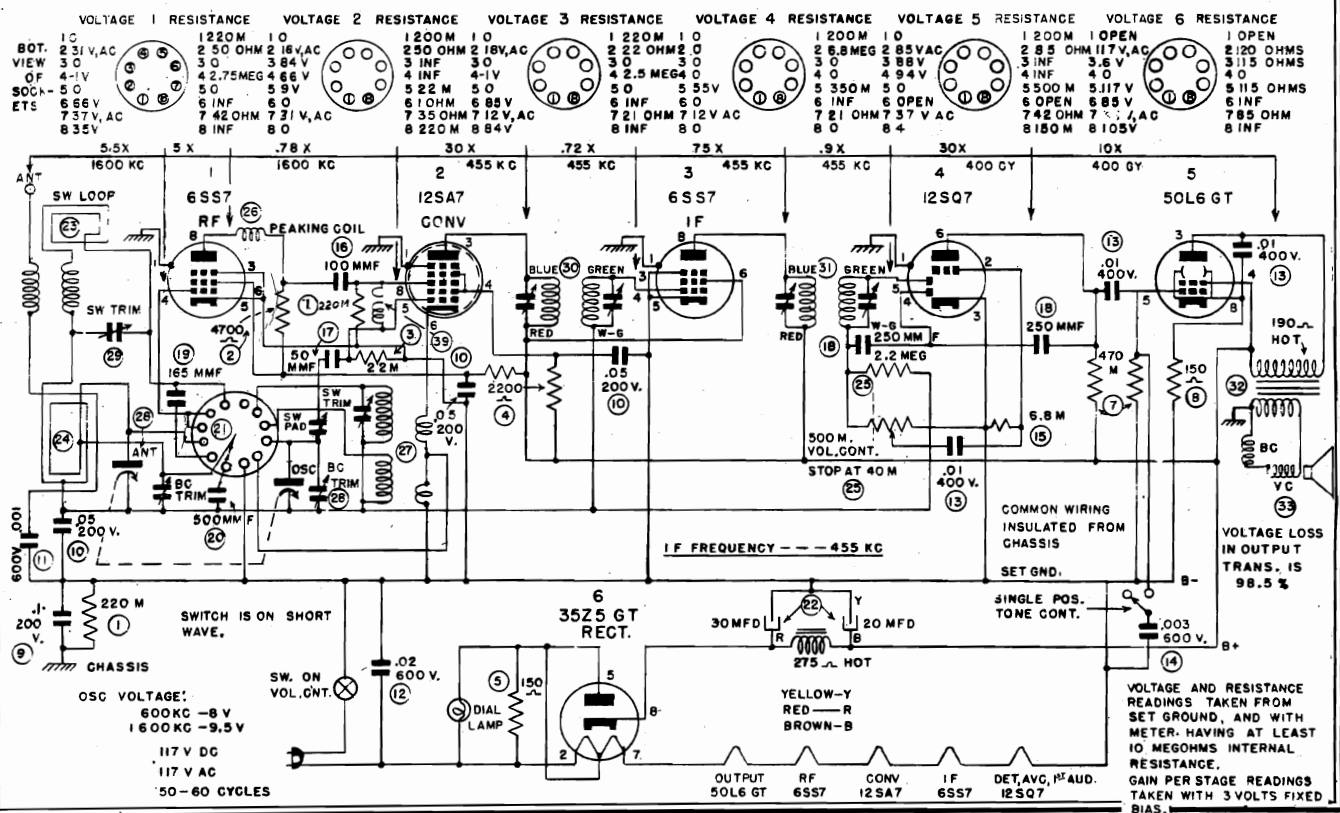
7	400 OHMS	12.1 Mc	MINIMUM CAPACITY	S.W. Osc. TRIMMER	REAR OF CHASSIS
8		12.0 Mc	12.0	S.W. R.F. TRIMMER	ON LOOP ANTENNA
9		9.4 Mc	9.4 Mc ROCK GANG FOR MAXIMUM SIGNAL	S.W. Osc. PADDER	FRONT OF CHASSIS
*					

MAXIMUM OUTPUT

FARNSWORTH TELEV. & RADIO CORP.



FARNSWORTH TELEV. & RADIO CORP.
CT-61 - CT-62 - CK-66 SINGLE BAND



CHASSIS C106-1, C106-2,
C110-1, C110-2

FARNSWORTH TELEV. & RADIO CORP.

6SS7 - R.F. AMPLIFIER

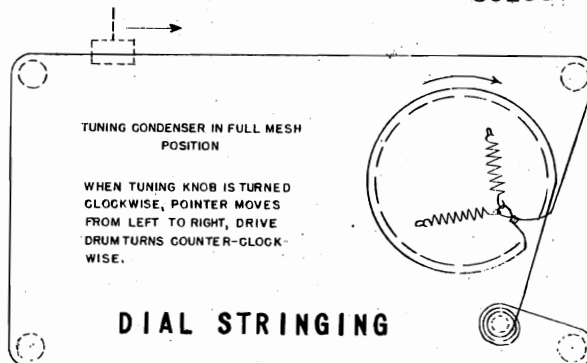
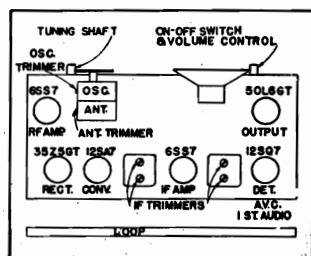
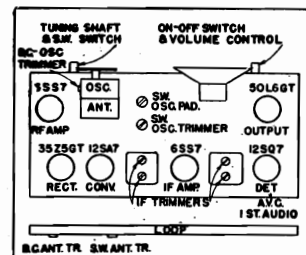
12SQ7 - DET., A.V.C. AND AUDIO

12SA7 - CONVERTER AND OSCILLATOR

50L6GT - OUTPUT

6SS7 - I.F. AMPLIFIER

35Z5GT - RECTIFIER

SINGLE BAND
TUBE LAYOUTDUAL BAND
TUBE LAYOUT

WHEN ALIGNING THE SHORT WAVE OSCILLATOR TIGHTEN THE ADJUSTING SCREW FOR MAXIMUM CAPACITY AND THEN LOOSEN IT UNTIL THE FIRST PEAK IS REACHED. DO NOT USE THE SIGNAL HEARD AT THE LOWER CAPACITY SETTING AS IN THIS RECEIVER THE OSCILLATOR WORKS AT A FREQUENCY LOWER THAN THE ONE THE R.F. IS TUNED TO. IF THE LOOP IS TUNED TO 9.0 Mc THE OSCILLATOR IS TUNED TO 8,545 Kc THAT IS SIGNAL FREQUENCY MINUS I.F. FREQUENCY, INSTEAD OF SIGNAL FREQUENCY PLUS I.F. FREQUENCY, OR 9,455 Kc AS IS CUSTOMARY.

TABULATION FOR ALIGNMENT OF SINGLE AND DUAL BAND RECEIVERS

STEPS	DUMMY ANTENNA	SET GENERATOR AT	SET GANG AT	ADJUST	LOCATED	TO OBTAIN
1		SET VOLUME CONTROL FOR MAXIMUM OUTPUT				
2	100 MMF	455 Kc	MINIMUM CAPACITY	2ND I.F. TRIMMERS	TOP OF I.F. TRANSFORMERS	MAXIMUM OUTPUT
3				1ST I.F. TRIMMERS		
4				B.C. Osc. TRIMMERS	ON TUNING CONDENSER	
5				B.C. R.F. TRIMMERS	*ON LOOP ANTENNA	
6	CHECK	1500 Kc, 1000 Kc AND 600 Kc	STRONGEST SIGNAL AND ROCK GANG			

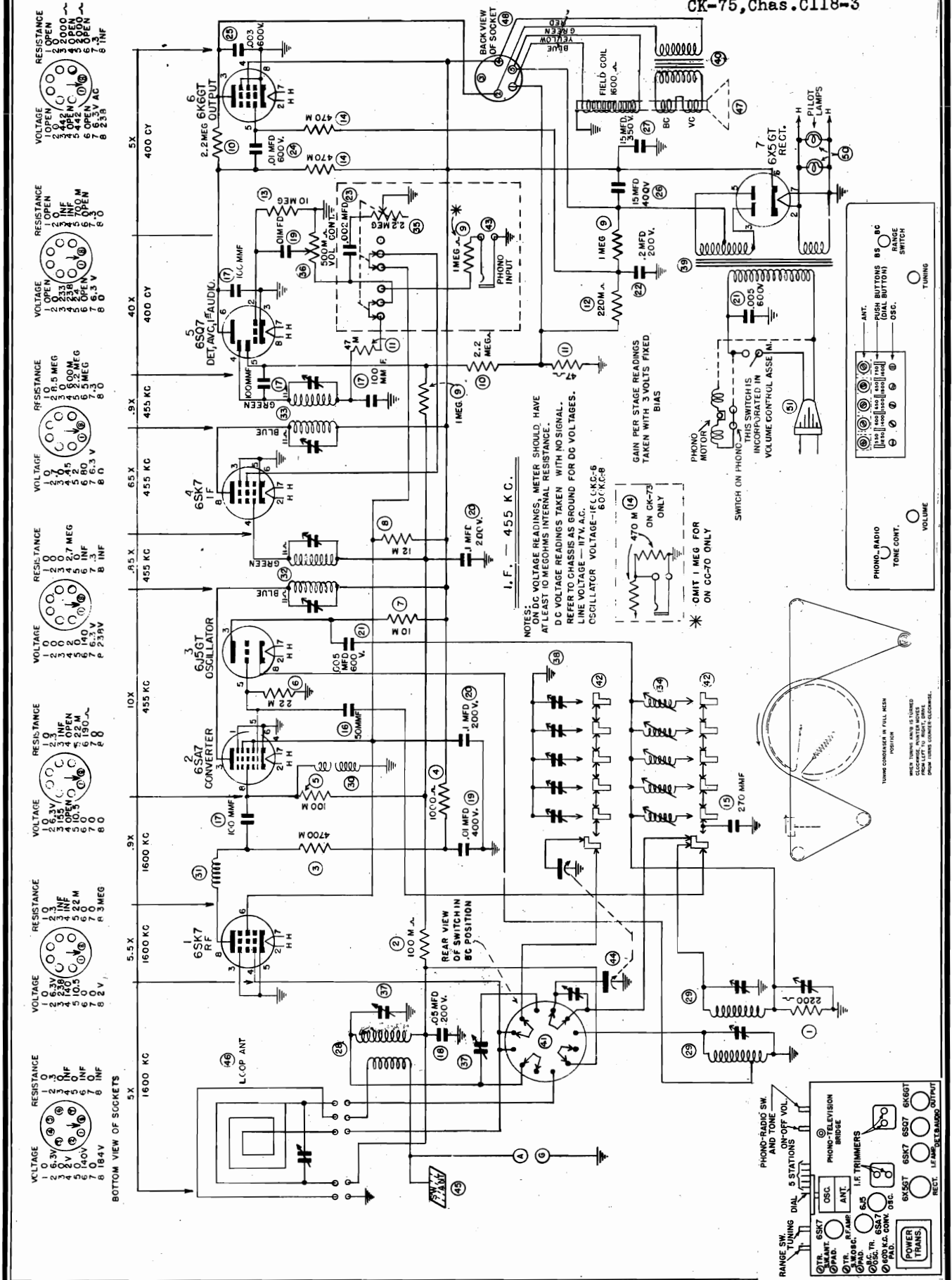
SHORT WAVE BAND ALIGNMENT FOR CT-63 AND CT-64 DUAL BAND RECEIVERS

7	400 OHMS	12.1 Mc	MINIMUM CAPACITY	S.W. Osc. TRIMMER	REAR OF CHASSIS	MAXIMUM OUTPUT
8		12 Mc	12 Mc	S.W. R.F. TRIMMER	ON LOOP ANTENNA	
9		9.4 Mc	9.4 Mc ROCK GANG FOR MAXIMUM SIGNAL	S.W. Osc. PADDER	FRONT OF CHASSIS	

* SEE CHASSIS LAYOUT ON FRONT PAGE.

FARNSWORTH TELEV. & RADIO CORP.

MODELS CC-70, Chas. C118-1;
CK-73, CK-74, Chas. C118-2;
CK-75, Chas. C118-3



CHASSIS C118-1, C118-2,
C118-3

FARNSWORTH TELEV. & RADIO CORP.

WATTS
VOLTAGEAT 117 VOLTS A.C.
A.C.CC MODEL 60, CK MODELS 80
105-125

PUSH BUTTON SET UP

TO PREVENT THE BUTTONS FROM BEING SET UP ON THE WRONG STATION A SIGNAL GENERATOR SHOULD BE USED.

ADJUST THE LOWER SCREW FIRST AS THIS IS THE OSCILLATOR, UNTIL THE SIGNAL IS HEARD MOST CLEARLY (SEE FIG.). THEN ADJUST THE TRIMMER SCREW DIRECTLY ABOVE THE OSCILLATOR FOR MAXIMUM VOLUME.

EQUIPMENT AND PROCEDURE FOR ALIGNMENT

WHEN ALIGNING THIS RECEIVER A SIGNAL GENERATOR CALLIBRATED AT 455 Kc, 600 Kc, 1500 Kc, 1720 Kc, 9.5 Mc, 12 Mc, AND 12.1 Mc, ALSO AN OUTPUT INDICATOR ARE REQUIRED. ALL ADJUSTMENTS SHOULD BE MADE WITH THE VOLUME CONTROL SET FOR MAXIMUM VOLUME, KEEPING THE GENERATOR OUTPUT AS LOW AS POSSIBLE TO PREVENT A.V.C. ACTION AND FALSE READINGS. BEFORE RE-ALIGNING THE SET BE SURE ALL ADJUSTING SCREWS FOR THE IRON CORE OSCILLATOR COILS ARE FLUSH WITH OR INSIDE THE CHASSIS BASE.

CONNECT THE LOW SIDE OF THE SIGNAL GENERATOR TO THE TERMINAL MARKED G. (GROUND), AND THE HIGH SIDE OF THE GENERATOR TO THE TERMINAL MARKED A. (ANTENNA). (SEE FIG.A).

CAUTION—OFTEN TWO PEAKS ARE FOUND AT 12.1 Mc. USE THE ONE FOUND AT THE MAXIMUM SETTING OF THE OSCILLATOR TRIMMER.

CAUTION—BE SURE AND REMOVE THE DIAL POINTER BEFORE REMOVING THE SET FROM THE CABINET.

STEPS	USE IN SERIES WITH ANTENNA	SET GENERATOR AT	SET GANG AT	ADJUST	LOCATED	TO OBTAIN
1.	SET VOLUME CONTROL AT MAXIMUM					
2.	250 MMFD.	455 Kc.	NOTE A	2ND I.F. TRIMMERS	TOP 2ND I.F. TRAN.	MAXIMUM OUTPUT
3.				1ST I.F. TRIMMERS	TOP 1ST I.F. TRAN.	
4.		1720 Mc.	1720	B.C. R.F. TRIMMER	SEE FIG.	
5.		1500 Kc.	1500	B.C. R.F. TRIMMER	ON THE LOOP	
6.		600 Kc.	600 Kc. ROCK GANG	B.C. PADDER	SEE FIG.	
7.	RECHECK 1600 Kc.					
8.	400 OHMS	12.1 Mc.	12.1 Mc.	S.W. OSC. TRIMMER		
9.		12.1 Mc.	12.1 Mc.	S.W. R.F. TRIMMER		
10.		9.5	9.5 Mc. ROCK GANG	S.W. PADDER		

CHASSIS C128-1, C128-2,
C128-3, C128-4

FARNSWORTH TELEV. & RADIO CORP.

PUSH BUTTON SET UP

TO PREVENT THE BUTTONS FROM BEING SET UP ON THE WRONG STATIONS A SIGNAL GENERATOR SHOULD BE USED.

THE BUTTON TO THE EXTREME RIGHT IS THE MANUAL TUNING BUTTON.

ADJUST THE LOWER SCREW (SEE FIG.) FIRST AS THIS IS THE OSCILLATOR; THEN ADJUST THE UPPER SCREW FOR MAXIMUM OUTPUT.

TABULATION FOR ALIGNMENT

STEPS	IN SERIES WITH ANTENNA	SET GENERATOR AT	SET GANG AT	ADJUST	LOCATED	TO OBTAIN
1,	250 M.M.F.	455 Kc.	NOTE A	2ND I.F. TRIMMERS	TOP OF I.F. TRANS.	MAX. OUTPUT
2				1ST I.F. TRIMMERS		
3			PUSH STATION BUTTON	WAVE TRAP TRIMMER	SEE FIG.	MIN. OUTPUT
4		1720 Kc.	1720 Kc.	B.C. Osc. TRIMMER		
5		1500 Kc.	1500 Kc.	B.C. ANT. TRIMMER	SEE FIG.	MAXIMUM OUTPUT
6		600 Kc.	NOTE B	600 Kc. PAD		
7	RECHECK	1500 Kc.				
8	400 OHMS	18 Mc.	18 Mc.	S.W. Osc. TRIMMER *		
9		16 Mc.	16 Mc.	S.W. ANT. TRIMMER **		
10	CHECK	6 Mc.				
11	400 OHMS	12 Mc.	12 Mc.	S.B. Osc. TRIMMER *		
12				S.B. ANT. TRIMMER **		
13		9.5 Mc.	9.5 Mc.	S.B. Osc. PADDER		
14				S.B. ANT. PADDER		
15	RECHECK	12 Mc.				

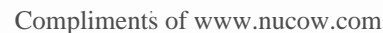
After pointer has been set on BC and calibrations checked, with range switch on Band Spread (Full CCW) set condenser so pointer is on 12 MC on "Foreign Spread Band." Set "Spread Band" Osc. trimmer for maximum output. Check for image on 11.1 Mc. (A weakened signal should be heard). Align antenna Band Spread trimmer for maximum signal. Turn condenser so pointer is on 9.5 Mc. adjust Spread Band Osc. padder for maximum signal. Check for image. (No signal should be heard on 10.4 Mc). Align Antenna Band Spread padder for maximum signal. Go back to 12 Mc and repeat above. If much readjustment has to be made on trimmers, the padders must be checked again. Great care must be taken in adjusting Band Spread trimmers. Image must be checked. A fibre screwdriver must be used to adjust band spread.

*Tighten oscillator trimmer screw for maximum capacity, then unscrew until second peak is secured.

**Tighten R.F. trimmer screw for maximum capacity, then unscrew until first peak is secured.

NOTE A. Set gang at minimum.

NOTE B. Strongest signal and rock gang.



MODEL CK-111,
Chassis C116-1

FARNSWORTH TELEV. & RADIO CORP.

ALIGNMENT INSTRUCTIONS

AN OUTPUT METER AND A SIGNAL GENERATOR ARE REQUIRED FOR PROPER ALIGNMENT OF THESE SETS. THE OSCILLATOR SHOULD BE CALIBRATED AT THE FOLLOWING POINTS, 455 Kc, 600 Kc, 900 Kc, 1500 Kc, 1720 Kc, 9.5 Mc, 12 Mc, 16 Mc AND 18.1 Mc. ALWAYS KEEP THE OUTPUT OF THE SIGNAL GENERATOR AS LOW AS POSSIBLE TO PREVENT A.V.C. ACTION AND FALSE SETTINGS. CONNECT THE HIGH SIDE OF THE GENERATOR TO THE ANTENNA TERMINAL AND THE LOW SIDE OF IT TO THE GROUND TERMINAL MAKING CERTAIN JUMBER ON TERMINAL STRIP IS DISCONNECTED. BEFORE ALIGNING TIGHTEN WAVE TRAP TRIMMER SCREW.

TABULATION FOR ALIGNMENT

STEPS	IN SERIES WITH ANTENNA	SET GENERATOR AT	SET GANG AT	ADJUST	LOCATED	TO OBTAIN
1	250 M.M.F.	455 Kc.	Note A	2nd I.F. Trimmers	Top of I.F. Trans.	Max. Output
2				1st I.F. Trimmers		
3			Push Station Button	Wave Trap Trimmer	See Fig.	Min. Output
4		1720 Kc.	1720 Kc.	B.C. Osc. Trimmer		
5		1500 Kc.	1500 Kc.	B.C. Mixer Trimmer		
6				B.C. Ant. Trimmer		
7		600 Kc.	Note B	600 Kc. Pad		
8	RECHECK	1400 Kc.				
9	400 Ohms	18 Mc.	18 Mc.	S.W. Osc. Trimmer *	SEE FIG.	MAXIMUM OUTPUT
10		16 Mc.	16 Mc.	S.W. Mixer Trimmer **		
11				S.W. Ant. Trimmer **		
12	CHECK	6 Mc.				
13	400 Ohms	12 Mc.	12 Mc.	B.S. Osc. Trimmer *		
14				B.S. Mixer Trimmer **		
15				B.S. Ant. Trimmer **		
16		9.5 Mc.	9.5 Mc.	B.S. Osc. Padder		
17				B.S. Mixer Padder		
18				B.S. Ant. Padder		
19	RECHECK	12 Mc.				

AFTER POINTER HAS BEEN SET ON BC AND CALIBRATION CHECKED: WITH RANGE SWITCH ON BAND SPREAD (FULL CCW) SET CONDENSER SO POINTER IS ON 12 MC ON "FOREIGN SPREAD BAND." SET "SPREAD BAND" OSC. TRIMMER FOR MAXIMUM OUTPUT. CHECK FOR IMAGE ON 11.1 MC (A WEAK SIGNAL SHOULD BE HEARD). ALIGN RF AND ANTENNA BAND SPREAD TRIMMERS FOR MAXIMUM SIGNAL. TURN CONDENSER SO POINTER IS ON 9.5 MC, ADJUST SPREAD BAND OSC. PADDER FOR MAXIMUM SIGNAL. CHECK FOR IMAGE. (NO SIGNAL SHOULD BE HEARD ON 10.4 MC). ALIGN RF AND ANTENNA BAND SPREAD PADDER FOR MAXIMUM SIGNAL. GO BACK TO 12 MC AND REPEAT ABOVE. IF SUCH READJUSTMENT HAS TO BE MADE ON TRIMMERS, THE PADDERS MUST BE CHECKED AGAIN. GREAT CARE MUST BE TAKEN IN ADJUSTING BAND SPREAD TRIMMERS. IMAGES MUST BE CHECKED. A FIBRE SCREWDRIVER MUST BE USED TO ADJUST BAND SPREAD.

*TIGHTEN OSCILLATOR TRIMMER SCREW FOR MAXIMUM CAPACITY, THEN UNSCREW UNTIL SECOND PEAK IS SECURED.

**TIGHTEN RF TRIMMER SCREW FOR MAXIMUM CAPACITY, THEN UNSCREW UNTIL FIRST PEAK IS SECURED.

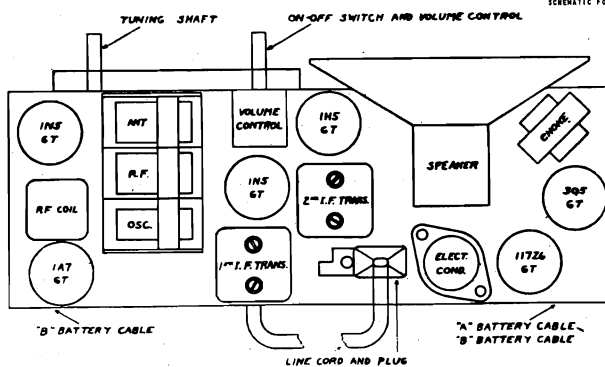
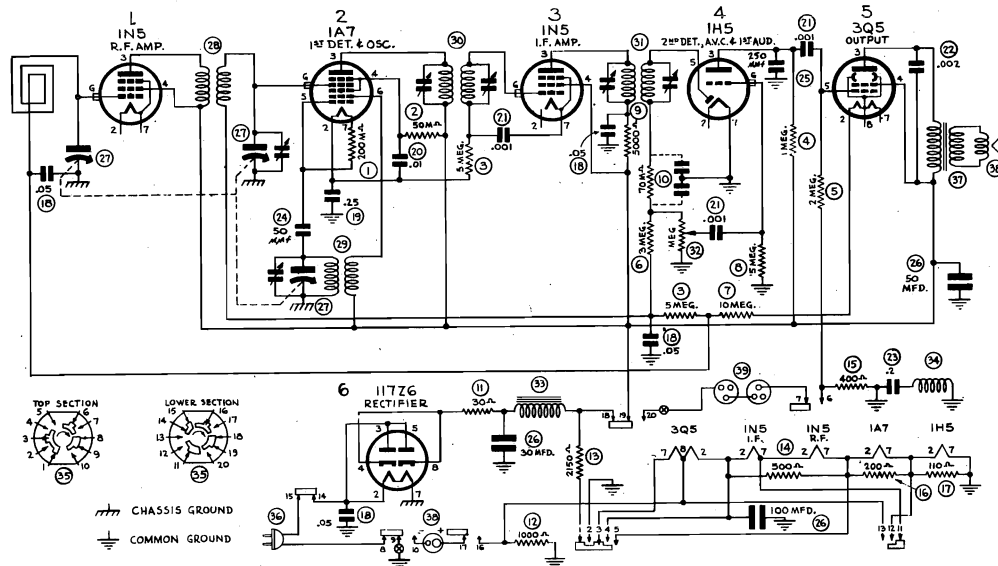
NOTE A. SET GANG AT MINIMUM.

NOTE B. STRONGEST SIGNAL AND ROCK GANG.

FARNSWORTH TELEV. & RADIO CORP.

VOLTAGE	1 RESISTANCE	VOLTAGE	2 RESISTANCE	VOLTAGE	3 RESISTANCE	VOLTAGE	4 RESISTANCE	VOLTAGE	5 RESISTANCE	VOLTAGE	6 RESISTANCE
1. OPEN	1. OPEN	1. OPEN	1. OPEN	1. OPEN	1. OPEN	1. OPEN	1. OPEN	1. OPEN	1. OPEN	1. OPEN	1. OPEN
2. 4.2	2. 500 A	2. 2.9	2. 100	2. 4.8	2. 80 A	2. 9	2. 9	2. 9.4	2. 9.4	2. 9.4	2. 500 A
3. 8.7	3. 2500 A	3. 100	3. 100	3. 150	3. 1500 A	3. 47	3. 47	3. 150	3. 150	3. 150	3. 500 A
4. 100	4. 100	4. 4.4	4. 4.4	4. 100	4. 100	4. 0	4. 0	4. 0	4. 0	4. 0	4. 1500 A
5. 0	5. 0	5. 2.2	5. 2.2	5. 0	5. 0	5. 0	5. 0	5. 0	5. 0	5. 0	5. 500 A
6. 16	6. 16	6. 100	6. 100	6. 0	6. 0	6. 0	6. 0	6. 0	6. 0	6. 0	6. 0
7. 5.9	7. 5.9	7. 1.4	7. 1.4	7. 22 A	7. 22 A	7. 41 A	7. 41 A	7. 41 A	7. 41 A	7. 41 A	7. 0
8. OPEN	8. OPEN	8. 100	8. 100	8. 2500 A	8. 2500 A	8. 0	8. 0	8. 0	8. 0	8. 0	8. 1500 A
CAP 1.2	CAP 1.2	CAP 3 MEG.	CAP 2.2	CAP 4 MEG.	CAP 0	CAP 5 MEG.	CAP 0	CAP 15 MEG.	CAP 0	CAP 0	CAP 0

BOTTOM VIEW OF SOCKETS



"A" BATTERIES

- 1 BURGESS No. 6F
- 1 EVEREADY No. 745
- 1 RAY-O-VAC No. P96A
- 1 BOND 4824
- 1 GENERAL 6F1

"B" BATTERIES

- 2 BURGESS No. B30
- 2 EVEREADY No. 482
- 2 RAY-O-VAC No. 5303
- 2 BOND 3017
- 2 GENERAL V30B

WATTS
VOLTAGE

AT 117 VOLTS A.C.
A.C.

25
105-125

This six tube AC-DC or five tube battery operated portable receiver has a built in loop antenna. To connect an external antenna and ground remove the screws in the back of the cabinet then remove the back. The external antenna and ground may now be connected to the two wires at the top side of the cabinet. Try reversing the connections of the two wires to obtain best results.

ALIGNMENT

The alignment of this receiver requires the use of a signal generator that will cover the frequencies of 455, 1400 and 1600 Kc., and an output meter connected across the secondary of the output transformer. All alignments should be made with the set operating on the self-contained batteries.

TABULATION FOR ALIGNMENT

STEPS	USE IN SERIES WITH GENERATOR	SET GENERATOR AT	SET GANG AT	ADJUST	LOCATED	TO OBTAIN
1.	.02 MFD IN EACH LEAD CONNECT HIGH SIDE OF GENERATOR TO GRID CAP OF 1A7G TUBE	455 Kc.	QUIET POINT	2ND I.F. TRIMMERS 1ST I.F. TRIMMERS	TOP OF I.F. TRANS.	MAXIMUM OUTPUT
2.	HIGH SIDE TO GRID OF 1N5 R.F. TO BE THRU .02 MFD.	1600 Kc.	MINIMUM	OSCILLATOR TRIMMER	HOLE IN TOP OF R.F. COIL CAN	
3.	HIGH SIDE TO GRID OF 1N5 R.F. TO BE THRU .02 MFD.	1400 Kc.	1400 Kc. & ROCK GANG	R.F. TRIMMER	ON GANG SEE FIG.	

MODELS BT70,BT71
BK73,BK77,BK78



MODELS BT70, BT71,

MODELS BK84 - BK85, etc.

FARNSWORTH TELEV. & RADIO CORP.

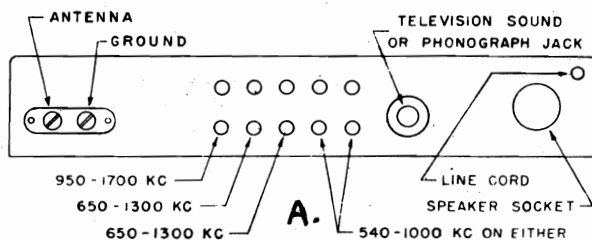
WHEN ALIGNING THIS RECEIVER A SIGNAL GENERATOR CALLIBRATED AT 455 Kc, 600 Kc, 1500 Kc, 1600 Kc, 6 Mc, 10 Mc, AND 18.1 Mc. ALSO AN OUTPUT INDICATOR ARE REQUIRED. ALL ADJUSTMENTS SHOULD BE MADE WITH THE VOLUME CONTROL SET FOR MAXIMUM VOLUME, KEEPING THE GENERATOR OUTPUT AS LOW AS POSSIBLE TO PREVENT A.V.C. ACTION AND FALSE READINGS. BEFORE RE-ALIGNING THE SET BE SURE ALL ADJUSTING SCREWS FOR THE IRON CORE OSCILLATOR COILS ARE FLUSH WITH OR INSIDE THE CHASSIS BASE.

CONNECT THE LOW SIDE OF THE SIGNAL GENERATOR TO THE TERMINAL MARKED G. (GROUND), AND THE HIGH SIDE OF THE GENERATOR TO THE TERMINAL MARKED A. (ANTENNA). (SEE FIG. A.)

CAUTION—OFTEN TWO PEAKS ARE FOUND AT 18 Mc. USE THE ONE FOUND AT THE MAXIMUM SETTING OF THE OSCILLATOR TRIMMER.

TABULATION FOR ALIGNMENT

STEPS	USE IN SERIES WITH ANTENNA	SET GENERATOR AT	SET GANG AT	ADJUST	LOCATED	To OBTAIN	
1.	SET VOLUME CONTROL AT MAXIMUM						
2.	250 MMFD.	455 Kc.	NOTE A	2ND I.F. TRIMMERS	TOP 2ND I.F. TRAN.	MAXIMUM OUTPUT	
3.				1ST I.F. TRIMMERS	TOP 1ST I.F. TRAN.		
4.		1600 Kc.		B.C.R.F. TRIMMER	SEE FIG.		
5.		1500 Kc.	B.C.R.F. TRIMMER	ON THE LOOP			
6.		600 Kc.	B.C.	SEE FIG.			
7.	RECHECK 1600 Kc.						
8.	400 OHMS	18.1 Mc.	NOTE A	S.W. Osc. TRIMMER			
9.		16 Mc.	NOTE B	S.W.R.F. TRIMMER			
10.	CHECK SIGNAL AT 6 Mc. NOTE A. AND 10 Mc. NOTE B.			SET GANG AT MINIMUM STRONGEST SIGNAL AND ROCK GANG			

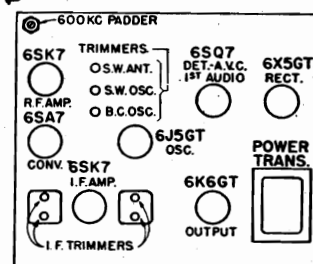


PUSH BUTTON SET UP

TO PREVENT THE BUTTONS FROM BEING SET UP ON THE WRONG STATION A SIGNAL GENERATOR SHOULD BE USED.

ADJUST THE LOWER SCREW FIRST AS THIS IS THE OSCILLATOR, UNTIL THE SIGNAL IS HEARD MOST CLEARLY (SEE FIG.). THEN ADJUST THE TRIMMER SCREW DIRECTLY ABOVE THE OSCILLATOR FOR MAXIMUM VOLUME.

B. CHASSIS LAYOUT



[illegible]

SCHEMATIC FOR MODELS BC-82 AND BC-83

MODELS BC82, BC83

FARNSWORTH TELEV. & RADIO CORP.

ALIGNMENT INSTRUCTIONS

AN OUTPUT METER AND A SIGNAL GENERATOR ARE REQUIRED FOR PROPER ALIGNMENT OF THESE SETS. THE OSCILLATOR SHOULD BE CALIBRATED AT THE FOLLOWING POINTS, 455 Kc, 600 Kc, 900 Kc, 1500 Kc, 1600 Kc, 1.8 Mc, 5 Mc, 5.4 Mc, 6 Mc, 10 Mc, 16 Mc AND 18.1 Mc.

TABULATION FOR ALIGNMENT

STEPS	IN SERIES WITH ANTENNA	SET GENERATOR AT	SET GANG AT	ADJUST	LOCATED	TO OBTAIN	
1.	SET VOLUME AND TONE CONTROLS AT MAXIMUM						
2.	250 MMFD.	455 Kc.	NOTE A	2ND I.F. TRIMMERS	TOP OF I.F. TRANS.	MAX. OUTPUT	
3.				1ST I.F. TRIMMERS			
4.				WAVE TRAP TRIMMER	REAR OF CHASSIS	MIN. OUTPUT	
5.		1600 Kc.	NOTE B	Osc. B.C. TRIMMER	ON LOOP	MAXIMUM OUTPUT	
6.		1500 Kc.		R.F. B.C. TRIMMER			
7.		600 Kc.		600 Kc. PAD			SEE FIG.
8.		RECHECK 1500 Kc.					
9.	400 OHMS	5.4	NOTE A	OSC. POLICE TRIMMER*			
10.		5 Mc.	NOTE B	R.F. POLICE TRIMMER**			
11.	CHECK 1.8 Mc.						
12.	400 OHMS	18.1 Mc.	NOTE A	OSC. S.W. TRIMMER*			
13.		16 Mc.	NOTE B	R.F.S.W. TRIMMER**			
14.	CHECK 6 AND 10 Mc.						

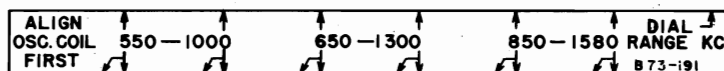
* TIGHTEN OSCILLATOR TRIMMER SCREW FOR MAXIMUM CAPACITY, THEN UNSCREW UNTIL SECOND PEAK IS SECURED.

** TIGHTEN R.F. TRIMMER SCREW FOR MAXIMUM CAPACITY, THEN UNSCREW UNTIL FIRST PEAK IS SECURED.

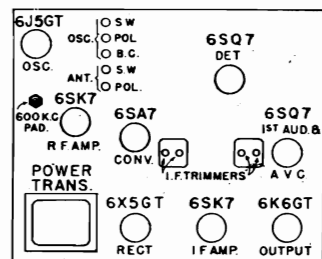
NOTE A. SET GANG AT MINIMUM.

NOTE B. STRONGEST SIGNAL AND ROCK GANG.

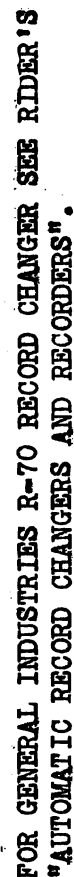
BUTTON LAYOUT



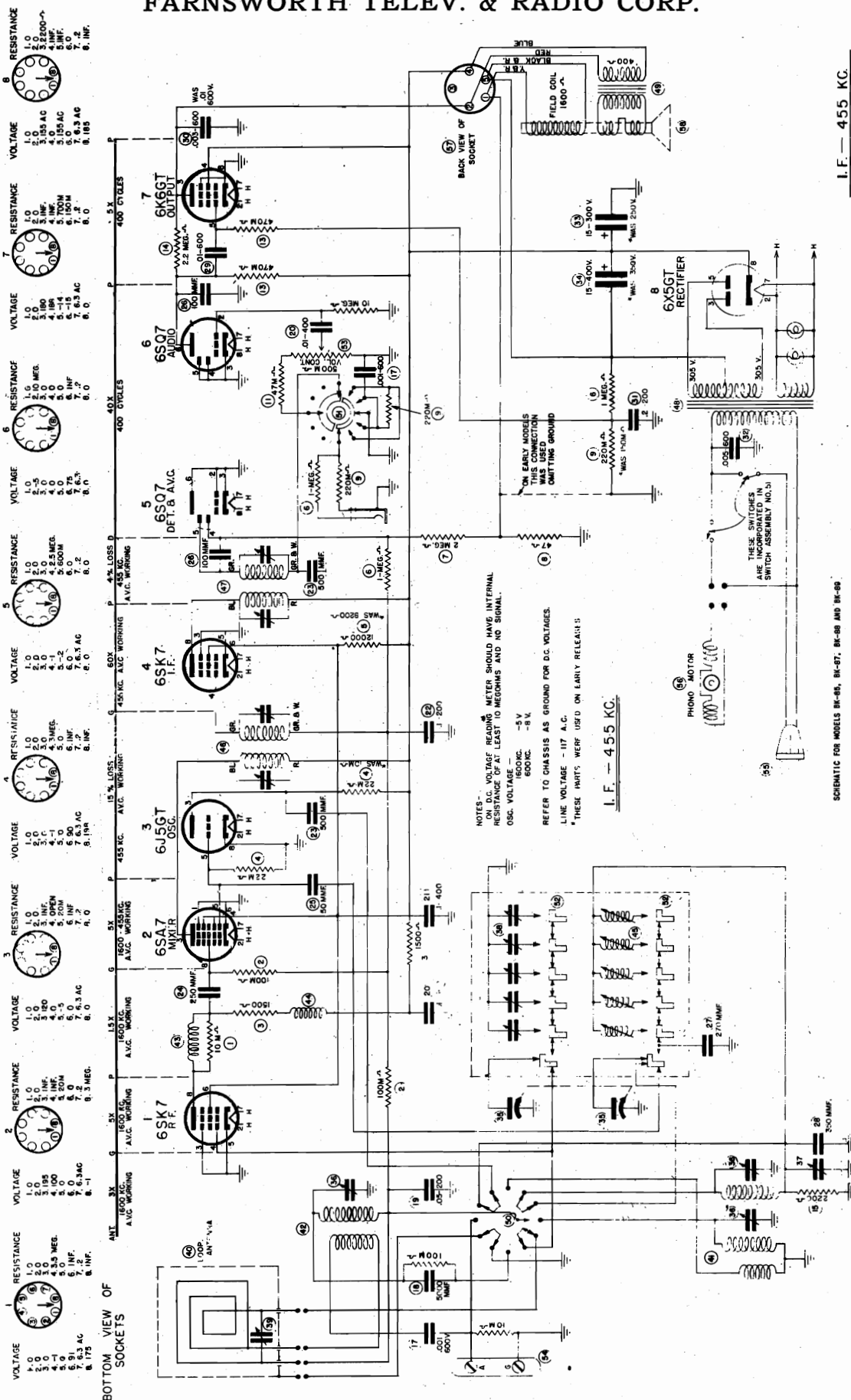
OSCILLATOR TRIMMERS — BOTTOM ROW



MODEL BKR84



I.F.— 455 KC.



FOR OTHER DATA SEE INDEX

SCHEMATIC FOR MODELS BK-86, BK-87, BK-88 AND BK-89

MODELS BT1010,BT1010X
BC1020,BC1020X,BK10305



S WERE TAKEN WITH A VOLT-METER HAVING AT LEAST 10 MEGOHMS INTERNAL, USE CHASSIS AS GROUND FOR VOLTAGE REFERENCE POINT.

SCHEMATIC FOR MODELS BT-1010, BC-1020,
RK-10305, BT-1010X, BC-1020X

MODELS BT1010, BT1010X
BC1020, BC1020X, BK10305

FARNSWORTH TELEV. & RADIO CORP. ALIGNMENT INSTRUCTIONS

THE OSCILLATOR SHOULD BE CALIBRATED AT THE FOLLOWING POINTS, 455 Kc, 600 Kc, 1500 Kc, 1900 Kc, 6 Mc, 7 Mc, 6 Mc, 10 Mc, 20 Mc, AND 22 Mc.;

STEPS	IN SERIES WITH ANTENNA	SET GENERATOR AT	SET GANG AT	ADJUST	LOCATED	To OBTAIN		
1.	SET VOLUME AND TONE CONTROLS AT MAXIMUM							
2.	1 MFD. COND To 6SA7 GRID (ON VAR. COND)	455 Kc.	NOTE A	2ND I.F. TRIMMERS	TOP OF I.F. TRANS.	MAX. OUTPUT		
3.				1ST I.F. TRIMMERS				
4.	250 MMFD.	1900 Kc.			OSC. B.C. TRIMMER	SEE FIG.	MAXIMUM OUTPUT	
5.		1500 Kc.		R.F. B.C. TRIMMER				
6.				ANT. B.C. TRIMMER				
7.		600 Kc.	NOTE B	600 Kc. PAD.				
8.	RECHECK 1500 Kc.							
9.	400 OHMS	7.0	NOTE A	OSC. TROPICAL TRIMMER*				
10.		6.0		R.F. TROPICAL TRIMMER**				
				ANT. TROPICAL TRIMMER**				
11.	RECHECK 6 Mc.							
12.	400 OHMS	22 Mc.	NOTE A	OSC. S.W. TRIMMER*				
13.		20 Mc.	NOTE B	R. F. S. W. TRIMMER**				
				ANT. S.W. TRIMMER**				
14.	RECHECK 20 Mc.							
			NOTE A.	SET GANG AT MINIMUM.				
			NOTE B.	STRONGEST SIGNAL AND ROCK GANG				

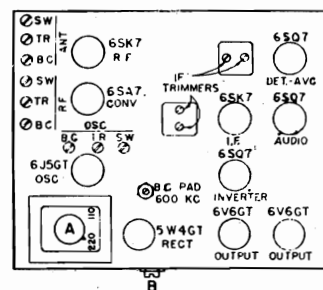
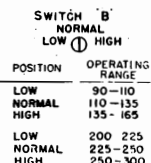
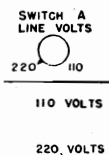
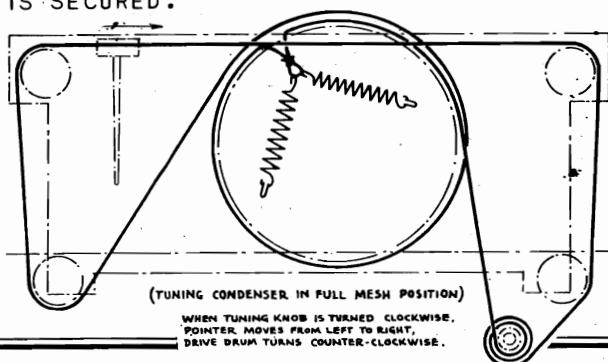
NOTE A. SET GANG AT MINIMUM.

NOTE B. STRONGEST SIGNAL AND ROCK GANG.

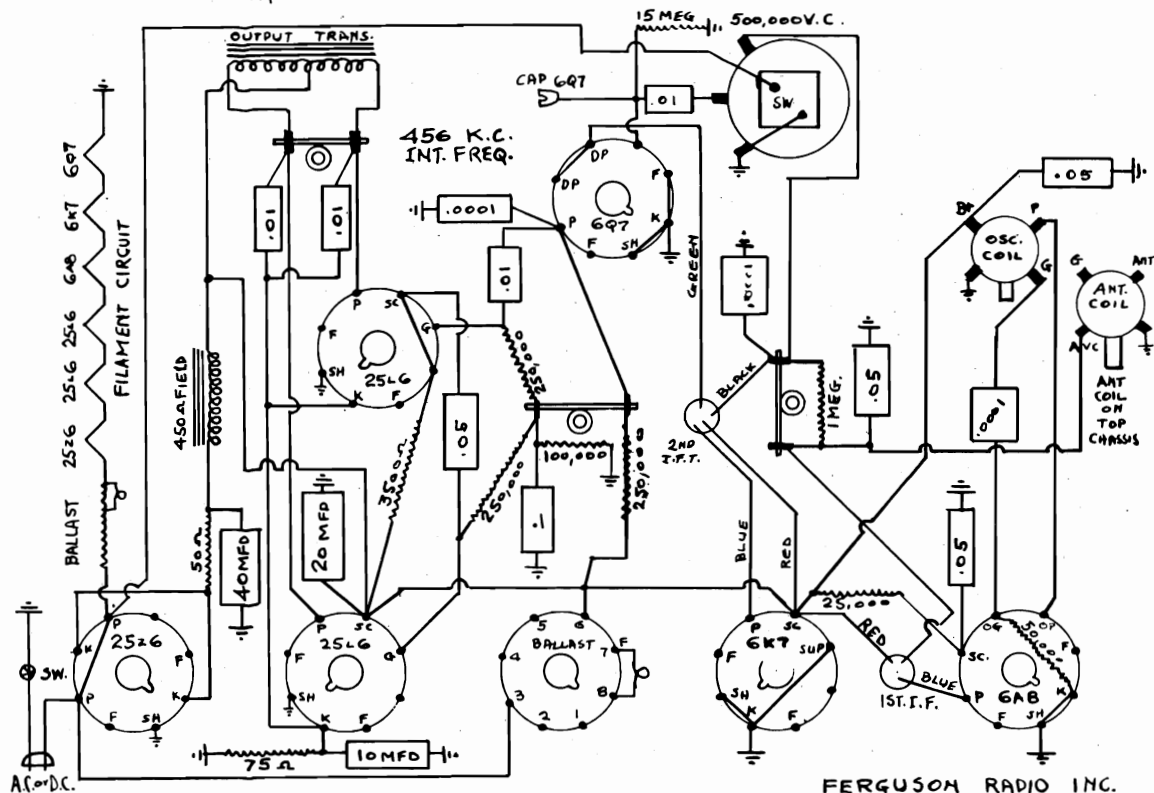
*TIGHTEN OSCILLATOR TRIMMER SCREW FOR MAXIMUM CAPACITY, THEN UNSCREW UNTIL SECOND PEAK IS SECURED.

**TIGHTEN R.F. TRIMMER SCREW FOR MAXIMUM CAPACITY, THEN UNSCREW UNTIL FIRST PEAK IS SECURED.

CHASSIS LAYOUT



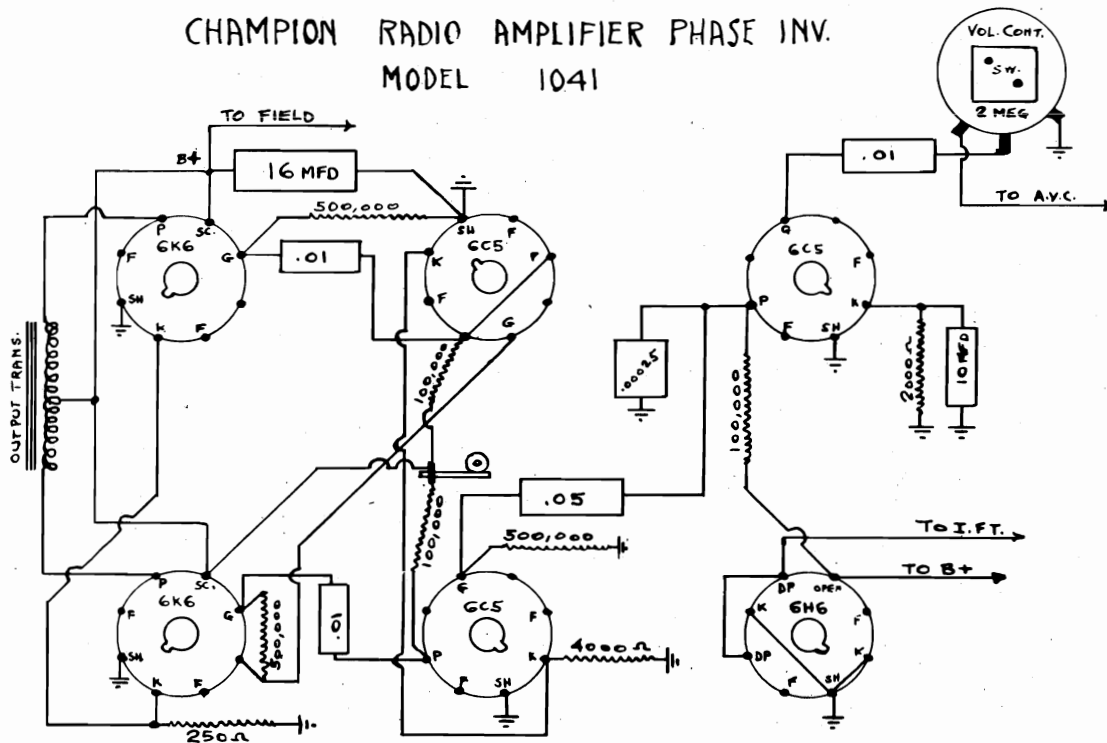
3 GANG 3 BAND SUPERHETERODYNE DETAILS SHEET #2.



MODEL 1041
MODEL 7540 Ampl.

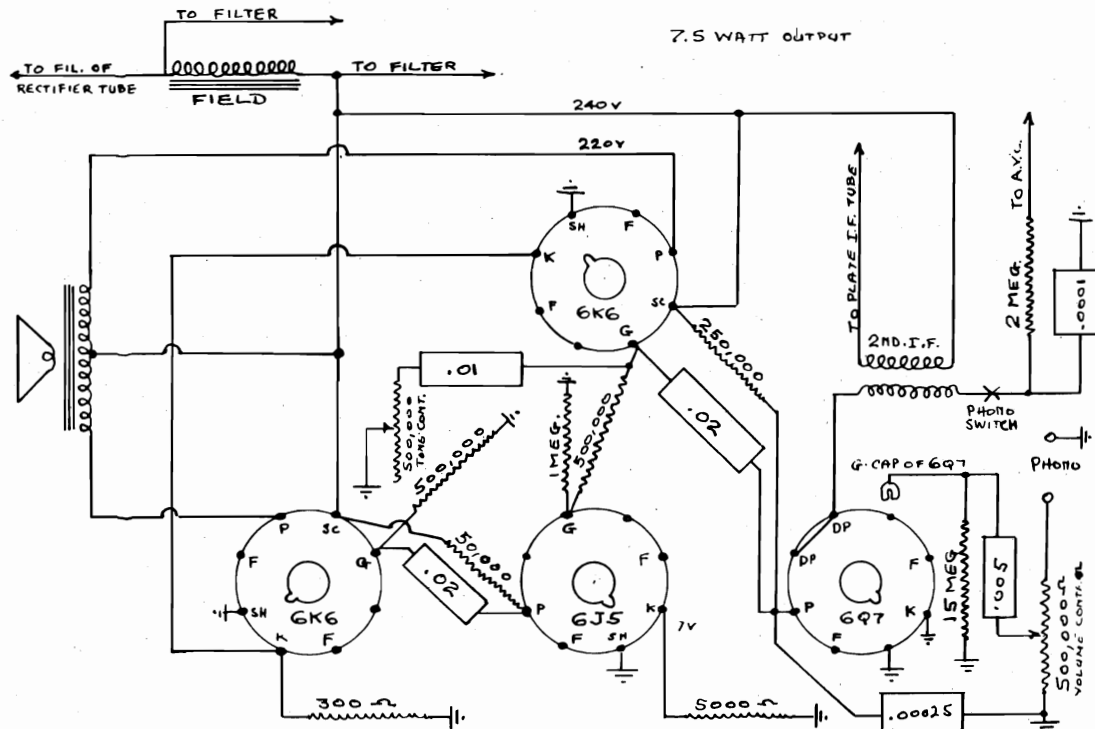
FERGUSON RADIO, INC.

CHAMPION RADIO AMPLIFIER PHASE INV.
MODEL 1041



FERGUSON RADIO INC.

FERGUSON RADIO INC.
CHAMPION RADIO = MODEL 7540 P.P. AMPLIFIER USED WITH MODEL 6340 RADIO

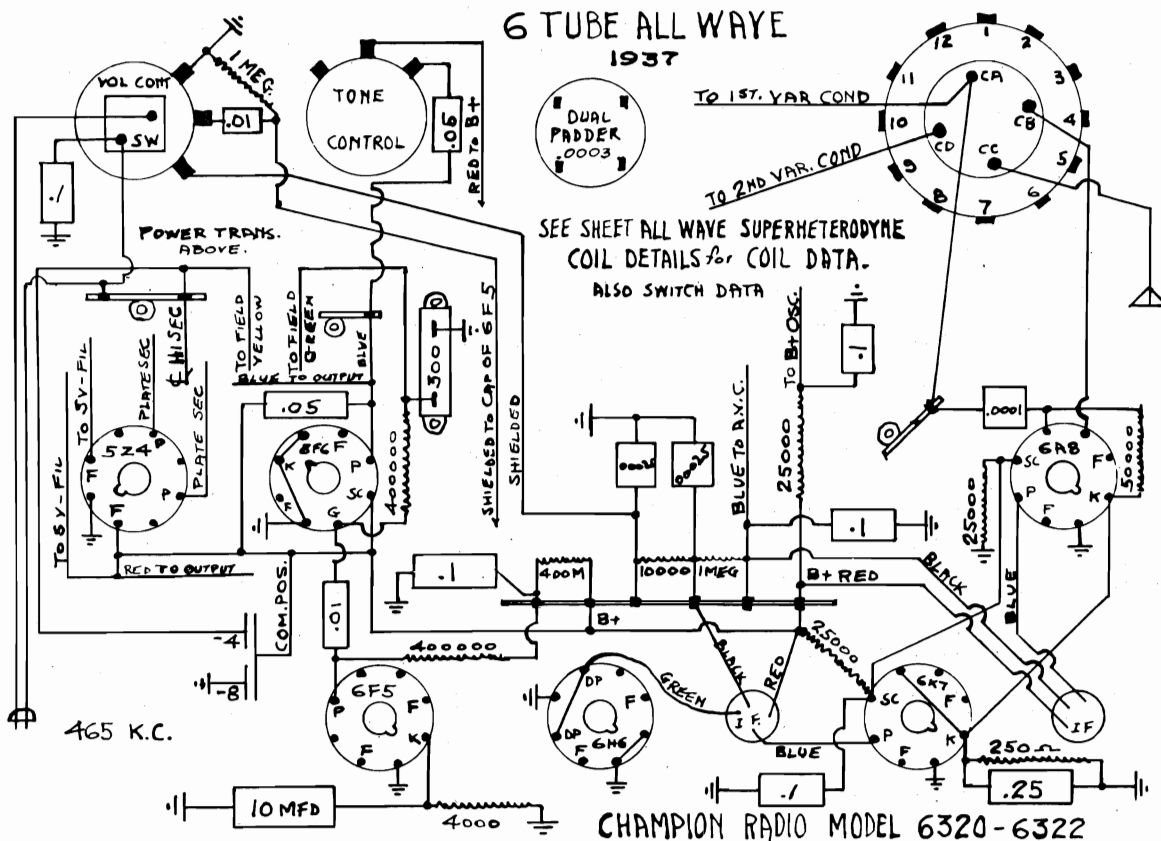
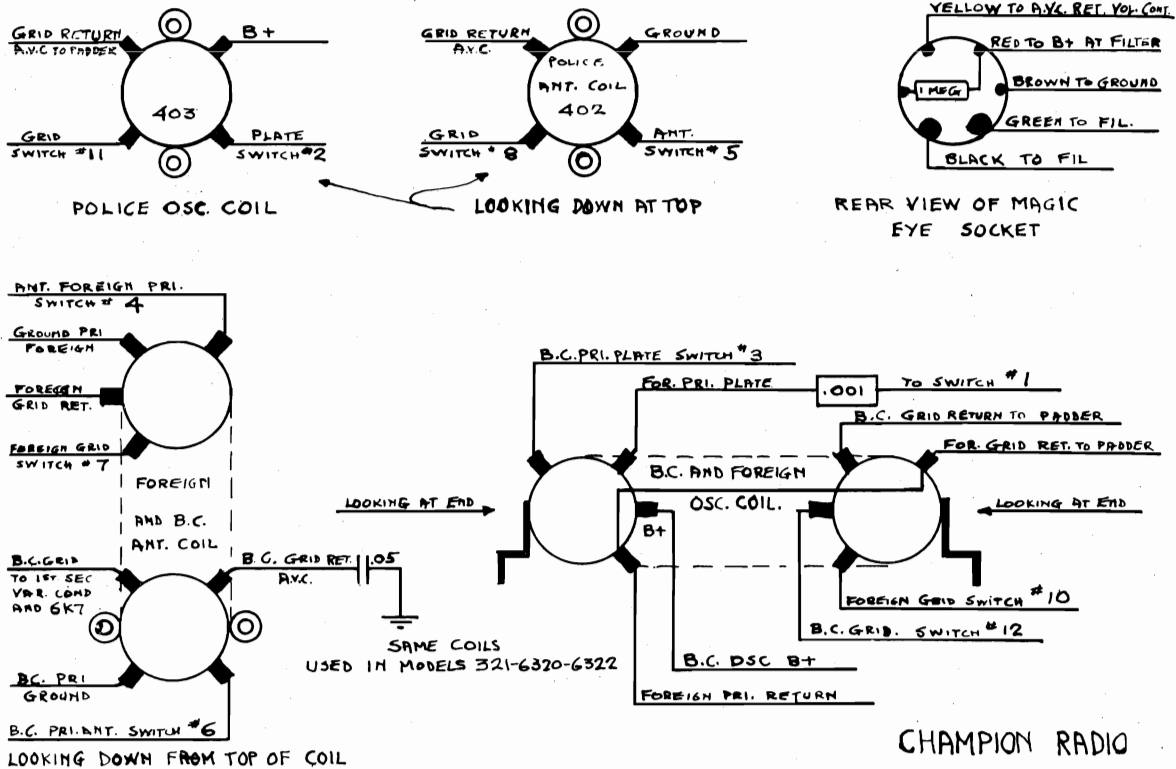


MODELS 6320, 6322

FERGUSON RADIO, INC.

ALL WAVE SUPERHETERODYNE COIL DETAILS

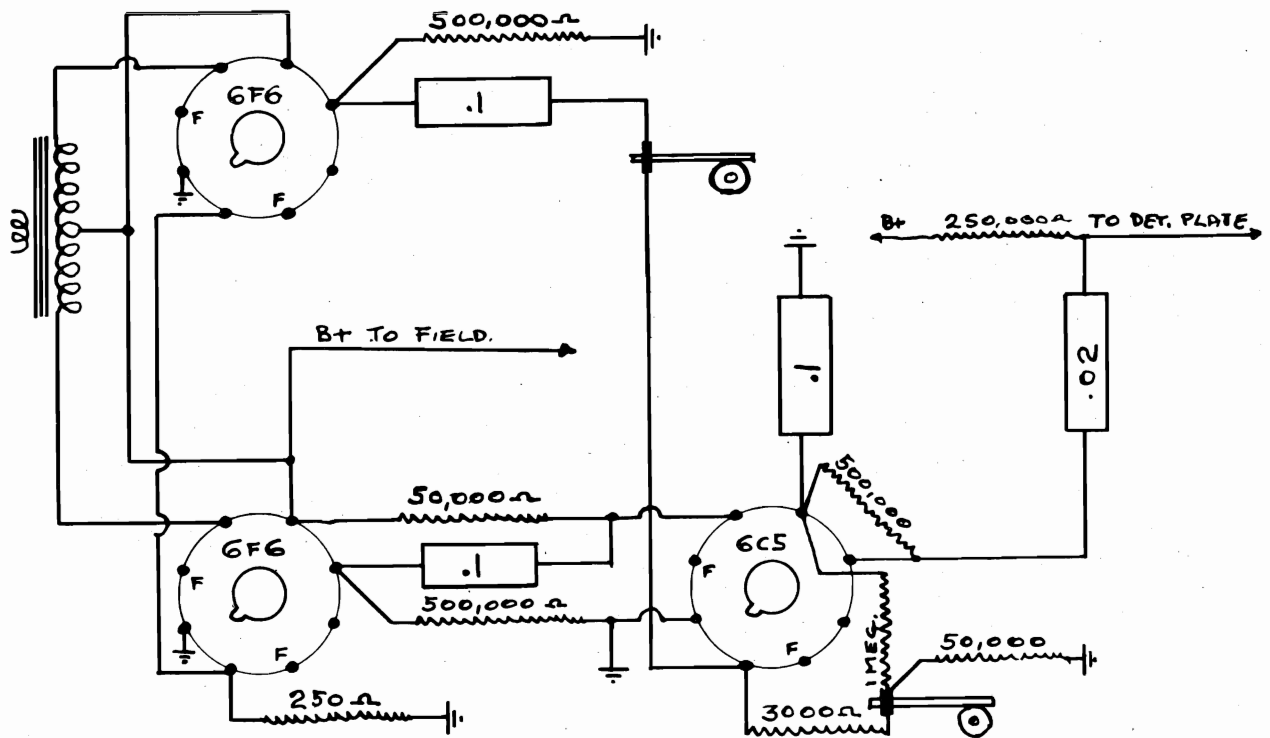
1937 CHASSIS



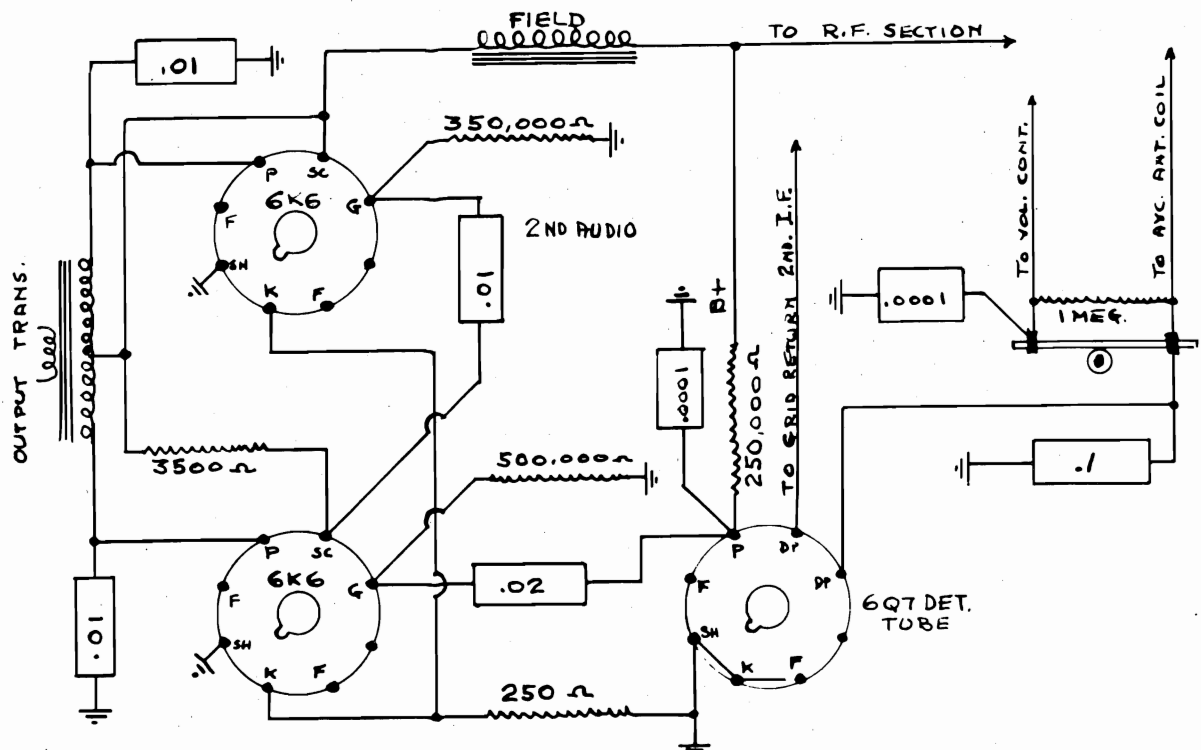
FERGUSON RADIO, INC.

MODEL 3-Tube Amplifier
MODEL 7140

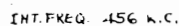
3 TUBE AMPLIFIER
USED WITH CHAMPION 5ND 6 TUBE TUNER



PUSH PULL AMPLIFIER USED ON MODEL 7140
BALANCE OF CIRCUIT SAME AS MODEL 6140 AK.



CHAMPION RADIO MODEL 8341 M



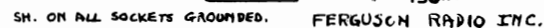
PNP B.C. AT 600 K.C.

TRIM B.C. AT 1450 K.C.

TRIM FOR. AT 15 M.C.

POLICE BAND NO ADJ.

105 VOLT A.C. OR D.C.



FIRESTONE TIRE & RUBBER CO.

VOLTAGE	1	2	3	4	5	6 & 7	8
1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
2.0	2.0	2.4	2.4	2.4	2.4	2.4	2.4
3.0	3.0	3.25	3.0	3.0	3.0	3.0	3.0
4-1	4.0	4.56	4.0	4.0	4.0	4.0	4.0
5-7	5.0	5.7	5.0	5.0	5.0	5.0	5.0
6-8	6.0	6.7	6.0	6.0	6.0	6.0	6.0
7-9	7.0	7.7	7.0	7.0	7.0	7.0	7.0
8-10	8.0	8.7	8.0	8.0	8.0	8.0	8.0
9-11	9.0	9.7	9.0	9.0	9.0	9.0	9.0
10-12	10.0	10.7	10.0	10.0	10.0	10.0	10.0
11-13	11.0	11.7	11.0	11.0	11.0	11.0	11.0
12-14	12.0	12.7	12.0	12.0	12.0	12.0	12.0
13-15	13.0	13.7	13.0	13.0	13.0	13.0	13.0
14-16	14.0	14.7	14.0	14.0	14.0	14.0	14.0
15-17	15.0	15.7	15.0	15.0	15.0	15.0	15.0
16-18	16.0	16.7	16.0	16.0	16.0	16.0	16.0
17-19	17.0	17.7	17.0	17.0	17.0	17.0	17.0
18-20	18.0	18.7	18.0	18.0	18.0	18.0	18.0
19-21	19.0	19.7	19.0	19.0	19.0	19.0	19.0
20-22	20.0	20.7	20.0	20.0	20.0	20.0	20.0
21-23	21.0	21.7	21.0	21.0	21.0	21.0	21.0
22-24	22.0	22.7	22.0	22.0	22.0	22.0	22.0
23-25	23.0	23.7	23.0	23.0	23.0	23.0	23.0
24-26	24.0	24.7	24.0	24.0	24.0	24.0	24.0
25-27	25.0	25.7	25.0	25.0	25.0	25.0	25.0
26-28	26.0	26.7	26.0	26.0	26.0	26.0	26.0
27-29	27.0	27.7	27.0	27.0	27.0	27.0	27.0
28-30	28.0	28.7	28.0	28.0	28.0	28.0	28.0
29-31	29.0	29.7	29.0	29.0	29.0	29.0	29.0
30-32	30.0	30.7	30.0	30.0	30.0	30.0	30.0
31-33	31.0	31.7	31.0	31.0	31.0	31.0	31.0
32-34	32.0	32.7	32.0	32.0	32.0	32.0	32.0
33-35	33.0	33.7	33.0	33.0	33.0	33.0	33.0
34-36	34.0	34.7	34.0	34.0	34.0	34.0	34.0
35-37	35.0	35.7	35.0	35.0	35.0	35.0	35.0
36-38	36.0	36.7	36.0	36.0	36.0	36.0	36.0
37-39	37.0	37.7	37.0	37.0	37.0	37.0	37.0
38-40	38.0	38.7	38.0	38.0	38.0	38.0	38.0
39-41	39.0	39.7	39.0	39.0	39.0	39.0	39.0
40-42	40.0	40.7	40.0	40.0	40.0	40.0	40.0
41-43	41.0	41.7	41.0	41.0	41.0	41.0	41.0
42-44	42.0	42.7	42.0	42.0	42.0	42.0	42.0
43-45	43.0	43.7	43.0	43.0	43.0	43.0	43.0
44-46	44.0	44.7	44.0	44.0	44.0	44.0	44.0
45-47	45.0	45.7	45.0	45.0	45.0	45.0	45.0
46-48	46.0	46.7	46.0	46.0	46.0	46.0	46.0
47-49	47.0	47.7	47.0	47.0	47.0	47.0	47.0
48-50	48.0	48.7	48.0	48.0	48.0	48.0	48.0
49-51	49.0	49.7	49.0	49.0	49.0	49.0	49.0
50-52	50.0	50.7	50.0	50.0	50.0	50.0	50.0
51-53	51.0	51.7	51.0	51.0	51.0	51.0	51.0
52-54	52.0	52.7	52.0	52.0	52.0	52.0	52.0
53-55	53.0	53.7	53.0	53.0	53.0	53.0	53.0
54-56	54.0	54.7	54.0	54.0	54.0	54.0	54.0
55-57	55.0	55.7	55.0	55.0	55.0	55.0	55.0
56-58	56.0	56.7	56.0	56.0	56.0	56.0	56.0
57-59	57.0	57.7	57.0	57.0	57.0	57.0	57.0
58-60	58.0	58.7	58.0	58.0	58.0	58.0	58.0
59-61	59.0	59.7	59.0	59.0	59.0	59.0	59.0
60-62	60.0	60.7	60.0	60.0	60.0	60.0	60.0
61-63	61.0	61.7	61.0	61.0	61.0	61.0	61.0
62-64	62.0	62.7	62.0	62.0	62.0	62.0	62.0
63-65	63.0	63.7	63.0	63.0	63.0	63.0	63.0
64-66	64.0	64.7	64.0	64.0	64.0	64.0	64.0
65-67	65.0	65.7	65.0	65.0	65.0	65.0	65.0
66-68	66.0	66.7	66.0	66.0	66.0	66.0	66.0
67-69	67.0	67.7	67.0	67.0	67.0	67.0	67.0
68-70	68.0	68.7	68.0	68.0	68.0	68.0	68.0
69-71	69.0	69.7	69.0	69.0	69.0	69.0	69.0
70-72	70.0	70.7	70.0	70.0	70.0	70.0	70.0
71-73	71.0	71.7	71.0	71.0	71.0	71.0	71.0
72-74	72.0	72.7	72.0	72.0	72.0	72.0	72.0
73-75	73.0	73.7	73.0	73.0	73.0	73.0	73.0
74-76	74.0	74.7	74.0	74.0	74.0	74.0	74.0
75-77	75.0	75.7	75.0	75.0	75.0	75.0	75.0
76-78	76.0	76.7	76.0	76.0	76.0	76.0	76.0
77-79	77.0	77.7	77.0	77.0	77.0	77.0	77.0
78-80	78.0	78.7	78.0	78.0	78.0	78.0	78.0
79-81	79.0	79.7	79.0	79.0	79.0	79.0	79.0
80-82	80.0	80.7	80.0	80.0	80.0	80.0	80.0
81-83	81.0	81.7	81.0	81.0	81.0	81.0	81.0
82-84	82.0	82.7	82.0	82.0	82.0	82.0	82.0
83-85	83.0	83.7	83.0	83.0	83.0	83.0	83.0
84-86	84.0	84.7	84.0	84.0	84.0	84.0	84.0
85-87	85.0	85.7	85.0	85.0	85.0	85.0	85.0
86-88	86.0	86.7	86.0	86.0	86.0	86.0	86.0
87-89	87.0	87.7	87.0	87.0	87.0	87.0	87.0
88-90	88.0	88.7	88.0	88.0	88.0	88.0	88.0
89-91	89.0	89.7	89.0	89.0	89.0	89.0	89.0
90-92	90.0	90.7	90.0	90.0	90.0	90.0	90.0
91-93	91.0	91.7	91.0	91.0	91.0	91.0	91.0
92-94	92.0	92.7	92.0	92.0	92.0	92.0	92.0
93-95	93.0	93.7	93.0	93.0	93.0	93.0	93.0
94-96	94.0	94.7	94.0	94.0	94.0	94.0	94.0
95-97	95.0	95.7	95.0	95.0	95.0	95.0	95.0
96-98	96.0	96.7	96.0	96.0	96.0	96.0	96.0
97-99	97.0	97.7	97.0	97.0	97.0	97.0	97.0
98-100	98.0	98.7	98.0	98.0	98.0	98.0	98.0
99-101	99.0	99.7	99.0	99.0	99.0	99.0	99.0
100-102	100.0	100.7	100.0	100.0	100.0	100.0	100.0
101-103	101.0	101.7	101.0	101.0	101.0	101.0	101.0
102-104	102.0	102.7	102.0	102.0	102.0	102.0	102.0
103-105	103.0	103.7	103.0	103.0	103.0	103.0	103.0
104-106	104.0	104.7	104.0	104.0	104.0	104.0	104.0
105-107	105.0	105.7	105.0	105.0	105.0	105.0	105.0
106-108	106.0	106.7	106.0	106.0	106.0	106.0	106.0
107-109	107.0	107.7	107.0	107.0	107.0	107.0	107.0
108-110	108.0	108.7	108.0	108.0	108.0	108.0	108.0
109-111	109.0	109.7	109.0	109.0	109.0	109.0	109.0
110-112	110.0	110.7	110.0	110.0	110.0	110.0	110.0
111-113	111.0	111.7	111.0	111.0	111.0	111.0	111.0
112-114	112.0	112.7	112.0	112.0	112.0	112.0	112.0
113-115	113.0	113.7	113.0	113.0	113.0	113.0	113.0
114-116	114.0	114.7	114.0	114.0	114.0	114.0	114.0
115-117	115.0	115.7	115.0	115.0	115.0	115.0	115.0
116-118	116.0	116.7	116.0	116.0	116.0	116.0	116.0
117-119	117.0	117.7	117.0	117.0	117.0	117.0	117.0
118-120	118.0	118.7	118.0	118.0	118.0	118.0	118.0
119-121	119.0	119.7	119.0	119.0	119.0	119.0	119.0
120-122	120.0	120.7	120.0	120.0	120.0	120.0	120.0
121-123	121.0	121.7	121.0	121.0	121.0	121.0	121.0
122-124	122.0	122.7	122.0	122.0	122.0	122.0	122.0
123-125	123.0	123.7	123.0	123.0	123.0	123.0	123.0
124-126	124.0	124.7	124.0	124.0	124.0	124.0	124.0
125-127	125.0	125.7	125.0	125.0	125.0	125.0	125.0
126-128	126.0	126.7	126.0	126.0	126.0	126.0	126.0
127-129	127.0	127.7	127.0	127.0	127.0	127.0	127.0
128-130	128.0	128.7	128.0	128.0	128.0	128.0	128.0
129-131	129.0	129.7	129.0	129.0	129.0	129.0	129.0
130-132	130.0	130.7	130.0	130.0	130.0	130.0	130.0
131-133	131.0	131.7	131.0	131.0	131.0	131.0	131.0
132-134	132.0	132.7	132.0	132.0	132.0	132.0	132.0
133-135	133.0	133.7	133.0	133.0	133.0	133.0	133.0
134-136	134.0	134.7	134.0	134.0	134.0	134.0	134.0
135-137	135.0	135.7	135.0	135.0	135.0	135.0	135.0
136-138	136.0	136.7	136.0	136.0	136.0	136.0	136.0
137-139	137.0	137.7	137.0	137.0	137.0	137.0	137.0
138-140	138.0	138.7	138.0	138.0	138.0	138.0	138.0
139-141	139.0	139.7	139.0	139.0	139.0	139.0	139.0
140-142	140.0	140.7	140.0	140.0	140.0	140.0	140.0
141-143	141.0	141.7	141.0	141.0	141.0	141.0	141.0
142-144	142.0	142.7	142.0	142.0	142.0	142.0	142.0
143-145	143.0	143.7	143.0	143.0	143.0	143.0	143.0
144-146	144.0	144.7	144.0	144.0	144.0	144.0	144.0
145-147	145.0	145.7	145.0	145.0	145.0	145.0	145.0
146-148	146.0	146.7	146.0	146.0	146.0	146.0	146.0
147-149	147.0	147.7	147.0	147.0	147.0	147.0	147.0
148-150	148.0	148.7	148.0	148.0	148.0	148.0	148.0
149-151	149.0	149.7	149.0	149.0	149.0	149.0	149.0

MODEL S7350-1

FIRESTONE TIRE & RUBBER CO.

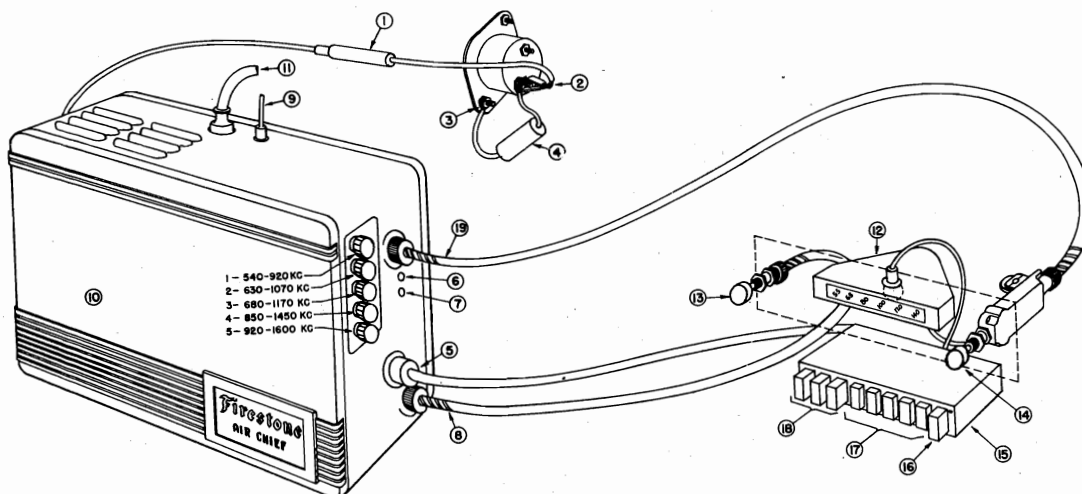


Figure 2

- | | |
|------------------------------------------------|--------------------------------------------------|
| 1. Fuse Container | 10. Front Cover, Removable for Tube Replacement. |
| 2. Connection to Ammeter | 11. Speaker Cable |
| 3. Grounding of Ammeter Condenser | 12. Manual Tuning Control |
| 4. Ammeter Condenser | 13. On-Off Switch and Volume Control Knob. |
| 5. Push Button and Tone Control Cable | 14. Station Selector Knob |
| 6. Hole for Antenna Matching Adjustment (Man.) | 15. Push Button Tuning Control |
| 7. Hole for Antenna Matching Adjustment (P.B.) | 16. MONOMATIC TUNING BUTTON |
| 8. Volume Control Cable | 17. Station Call Letter Indicator |
| 9. Antenna Lead-in Cable | 18. TRIMATIC Tone Control Buttons |
| | 19. Station Selector Cable |

ALIGNMENT PROCEDURE

SET DIAL TO	GENERATOR FREQUENCY	DUMMY ANTENNA	ADJUSTMENTS (IN ORDER SHOWN)	TRIMMER FUNCTION
540 kc	455 kc	.1 mfd.	T2, T1	IF
600 kc	455 kc	.1 mfd.	C14*	IF Wave Trap
Highest Frequency	1600 kc	.0001 mfd.	VC-2	Osc.
600 kc	600 kc	.0001 mfd.	C4	Shunt Coil
1400 kc	1400 kc	.0001 mfd.	VC-1	Transl. & Ant.

IMPORTANT ALIGNMENT NOTES

*The signal generator should be adjusted for high output and the trimmer should be adjusted for minimum response.

The alignment procedure should be repeated in the original order, step by step, to insure greater accuracy.

Always keep the output power from the generator at its lowest possible value to prevent AVC of the receiver from interfering with accurate alignment, except as noted by (*) above.

To adjust image rejector, return set to button #5. Set generator to 1500 kc and adjust #5 button for maximum signal at 1500 kc.

THE GENERATOR CHARGING RATE

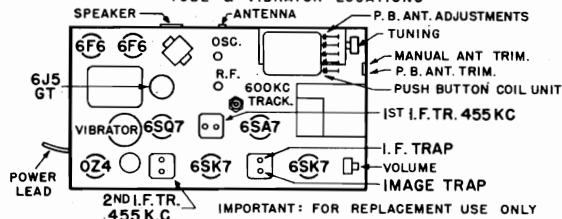
Unless the car has an automatic voltage regulator, it is usually necessary to advance the generator charging rate to compensate for

the additional drain of the radio. Under no conditions should the rate be increased beyond that specified by the manufacturer as the safe limit.

FIRESTONE AIR CHIEF STOCK NO. S-7350-1

CODE NO. F-PM-7

TUBE & VIBRATOR LOCATIONS



MODEL S7350-1

FIRESTONE TIRE & RUBBER CO.

MODEL S7350-1

MODEL S7399-2

SETTING UP THE MONOMATIC TUNING MECHANISM:

Make a list of the five stations for which you desire Monomatic tuning. The stations chosen must be such that each will come within a different frequency range, as indicated by the following list. For example, it would not be possible to choose both a 550 kc station and a 600 kc station, since 600 kc does not come within the range of position #2. Arrange the stations, in order of their frequency; that is, the station of lowest frequency will be #1; of next higher frequency, #2, etc.

STATION	FREQUENCY RANGE
#1	540 to 920 kc
#2	630 to 1070 kc
#3	690 to 1170 kc
#4	850 to 1450 kc
#5	920 to 1570 kc

Operate the Monomatic button (marked "Push") until the dial becomes illuminated, indicating that the receiver is adjusted for Dial Tuning. Then tune your #1 station, using the Station Selector knob.

Operate the Monomatic button until the #1 station indicator (furthest left of the station indicators) becomes illuminated.

Turn the knob, located on the side of the set, see Figure 2, which has the range 540-920 kc indicated below it, until the desired station is heard at maximum volume.

TO SET UP THE BUTTONS FOR AUTOMATIC TUNING:

1. Turn the set on and allow it to operate at least fifteen minutes before attempting to set up the buttons.
2. Make a list of the frequencies of five nearby stations to which you wish to set up the buttons. Be sure to select the most powerful nearby stations, since weak signals will not give as satisfactory results.
3. Turn the set around so that the back of the set is facing you and remove the cabinet back.
4. Just behind the dial plate, when viewed from the rear, will be seen ten push button adjusting screws (see Fig. 1). These screws are used to tune in the stations that the buttons are to be set to.

5. Each of the push buttons can be made to tune in stations in a definite frequency range as shown in Fig. 1.

Buttons No. 1 and 2 may be set up to any station which operates between 540 and 1000 KC. in frequency. Buttons No. 3 and 4 may be set up to stations operating between 750 and 1375 KC., while button No. 5 may be set up to stations operating between 980 and 1600 KC. ALWAYS TRY TO SELECT THE BUTTON WHICH CAN BE SET UP TO A STATION WHOSE FREQUENCY IS WELL WITHIN THE BUTTON'S OPERATING RANGE.

6. Turn the band switch to the "AM" position, push in the button labeled "MANUAL," then using the tuning knob (see Fig. 1) tune in the station you wish to set to button No. 1.
7. Push in button No. 1 and using a screwdriver, turn adjusting screw No. 1a (the extreme right hand screw) until the station you had previously tuned in is again heard. If it is not heard, advance the volume control and adjust the screw again. Be sure to adjust screw No. 1a to the point where the program is heard with the deepest tone.
8. Insert the screwdriver in screw No. 1b (just to the left of, and behind, 1a) and turn it until the program is heard with the maximum volume. Check the setting of screw No. 1a, making sure it still is adjusted to give deepest tone.
9. The set-up for button No. 1 is now complete.
10. To set up the remaining buttons use the same procedure; push in the "MANUAL" button; tune in the station, using the tuning knob; push in the button to be set up; adjust its associated "a" adjusting screw until the station is tuned in (screw 2a for button No. 2, etc., see Fig. 1); the associated "b" screw is then adjusted for maximum volume.
11. Call letter tabs which may be used to label the buttons are provided with your radio. They fit in the small space above each push button.
12. To use push buttons at any time, turn the band switch to the "AM" position and push the proper button.

Return to Manual then tune in your #2 station on the dial, then operate the Monomatic button until the #2 indicator becomes illuminated. Then proceed to adjust the knob for this station in the same manner as just done for the #1 station.

Proceed in the same manner for the remaining stations on your list. Insert the proper call letter, cut from the sheets supplied, in the indicator button slots.

After setting button #5 the antenna should be matched by adjusting the screw marked P.B. Antenna Trimmer in Fig. 2, as #7. This screw is covered by a 'snap button. Slowly turn this screw until maximum volume is secured.

After this adjustment is made, it is recommended that all the buttons be re-checked for maximum response.

After this re-check is completed, it is necessary to adjust the manual antenna trimmer, see Fig. 2, #6. The adjusting screw for this is accessible after removing the snap button. Return the set to dial tuning, turn the manual tuning control until a station near 1400 kc is heard then adjust this screw for maximum volume.

Be sure to replace snap buttons after completing these adjustments.

MODEL S7399-2

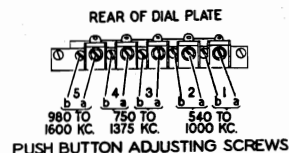
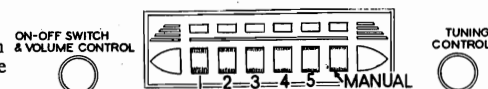
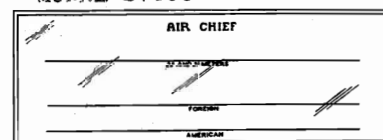


Fig. 1

MODEL S7350-1
MODEL S7350-2

FIRESTONE TIRE & RUBBER CO.

S-7350-1

PART NO.	NAME OF PART	LIST PRICE	PART NO.	NAME OF PART	LIST PRICE
1. 773-14	10 M. Ohms.	.15	29. 25-105	.05-400	.15
2. 773-16	22 M. Ohms.	.15	30. 25-110	.006-1200	.15
3. 773-24	1 Meg. Ohms.	.15	31. 25-103	.1-400 V.	.17
4. 773-4	100 Ohms.	.15	32. 25-118	.5-100 V.	.22
5. 78-42	.5 Meg. Ohms. Volume Control	.15	33. 25-109	.007-1600 V.	.17
6. 773-18	47 M. Ohms.	.15	34. 25-100	Spark Plate	.17
7. 773-7	330 Ohms.	.15	35. 25-99	Electrolitic	.95
8. 773-29	10 Meg. Ohms.	.15	36. 26-113	Trimmer	.28
9. 773-21	220 M. Ohms.	.15	37. 26-114	Trimmer Ass'y	.40
10. 773-11	2200 Ohms.	.15	38. 38-276	R.F. Coil Ass'y	1.40
11. 773-23	470 M. Ohms.	.15	39. 38-274	1st I.F. Ass'y	1.40
12. 77-125	470 Ohms. 1 Watt	.15	40. 38-275-	2nd I.F. Ass'y	1.65
13. 773-17	33 M. Ohms.	.15	41. 94-79	Output Trans.	1.35
14. 77-123	1000 Ohms. W.W. 1 Watt	.15	42. 11-163	Speaker & Cable Ass'y	4.50
15. 78-31	Sensitivity C.	.40	43. 94-78	Power Trans.	3.25
16. 25-112	.01 - 200 V.	.15	44. 76-1	Vibrator	2.55
17. 253-1	100 MMF	.15	45. 38-277	Vib. Choke	.51
18. 25-111	.05 - 200	.15	46. 38-278	A. Choke	.40
19. 25-106	100 MMF XM-262	.17	47. 48-7	Fuse 20 Amp.	.06
20. 25-117	Comp. Cap.	.28	48. 41-71	Control Unit	11.70
21. 258-1	270 MMF Sil. Mica Cap.	.28	49. 90-70	Switch & Stepper Ass'y	4.10
22. 25-121	20 MMF	.15	50. 38-273	Premeability Tuner	5.10
23. 253-2	250 MMF	.17	51. 38-280	Shunt Tracking Coil	.70
24. 253-3	500 MMF	.17	52. 38-272	P.B. Coil Ass'y	7.25
25. 25-116	.005 400 V.	.15	53. 80-136	Control Socket	.17
26. 25-114	.25 200 V.	.17	54. 38-279	Ant. Spark Chole	.34
27. 25-104	.005-400 V.	.15	55. 56-628	Ant. Cable Recp.	.15
28. 25-102	.05-200	.15			

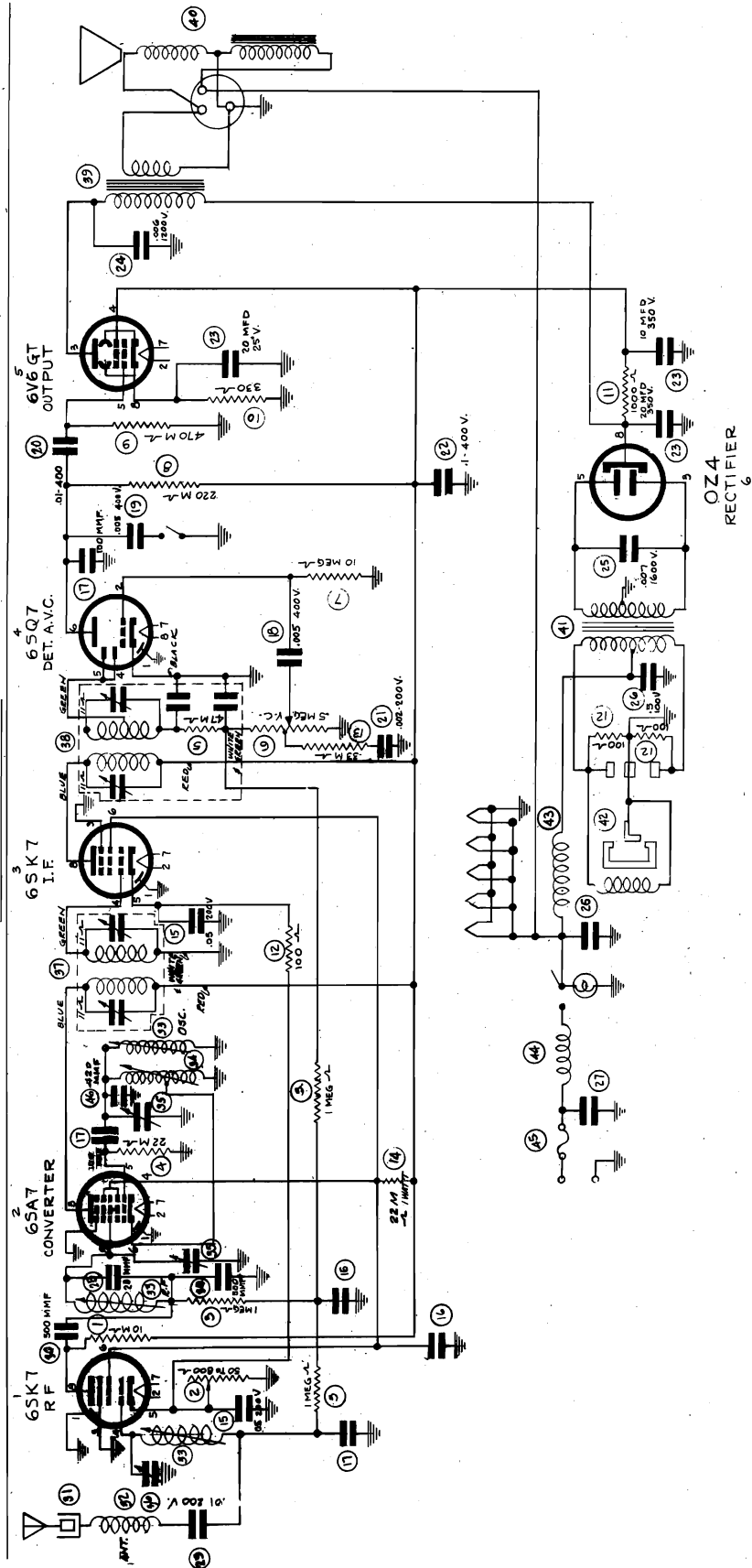
S-7350-2

PART NO.	NAME OF PART	LIST PRICE	PART NO.	NAME OF PART	LIST PRICE
1. 773-14	10 M Ohm.	.15	24. 25-110	.006 1200 V.	.17
2. 78-31	Sensitivity C.	.15	25. 25-109	.007-1600 V.	.17
3. 773-24	1 Meg.	.15	26. 25-118	.5-100 V.	.22
4. 773-16	22 M Ohm. 1/2 W.	.15	27. 25-100	Spark Plate	.17
5. 773-18	47 M Ohm.	.15	28. 25-121	20 MMF.	.15
6. 78-42	.5 Meg. Vol. Control	.95	29. 25-112	01-200 V.	.15
7. 773-29	10 Meg.	.15	30. 253-3	500 MMF.	.15
8. 773-21	220 M Ohm.	.15	31. 56-628	Antenna Cable Neck	.10
9. 773-23	470 M Ohm.	.15	32. 38-279	Antenna Spark Choke	.34
10. 773-7	330 Ohm.	.15	33. 38-273	Premeability Tuner	5.10
11. 77-123	1000 Ohm.	.15	34. 38-280	Shunt Tracking Coil	.70
12. 773-4	100 Ohm.	.15	35. 26-116	Trimmer Assembly	.40
13. 773-17	33 M Ohm.	.15	36. 26-115	Antenna Trimmer	.25
14. 77-69	22 M Ohm. 1 W.	.15	37. 38-274	1st I.F. Assembly	1.40
15. 25-111	.05 200 V.	.15	38. 38-275	2nd I.F. Assembly	1.40
16. 25-102	.05 200 V.	.15	39. 94-80	Output Transformer	1.20
17. 253-1	100 MMF.	.15	40. 11-164	Speaker & Cable	3.40
18. 25-104	.005-400 V.	.15	41. 94-78	Power Transformer	3.25
19. 25-116	.005-400 V.	.15	42. 76-1	Vibrator	2.55
20. 25-113	.01-400 V.	.15	43. 38-277	Vibrator Choke	.51
21. 25-119	.002-200 V.	.15	44. 38-278	A Choke	.40
22. 25-103	.1-400 V.	.17	45. 48-7	Fuse 20 Amp.	.10
23. 25-99	Electrolytic	.95	46. 25-124	Silver Mica Cond. 420 MMF.	.35

FIRESTONE TIRE & RUBBER CO.

VOLTAGE	1	2	3	4	5	6
1.0	1.0	1.0	1.0	1.0	1.0	1.0
2.0	2.0	2.0	2.0	2.0	2.0	2.0
3.0	3.0	3.0	3.0	3.0	3.0	3.0
4.0	4.0	4.0	4.0	4.0	4.0	4.0
5.0	5.0	5.0	5.0	5.0	5.0	5.0
6.0	6.0	6.0	6.0	6.0	6.0	6.0
7.0	7.0	7.0	7.0	7.0	7.0	7.0
8.0	8.0	8.0	8.0	8.0	8.0	8.0
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98.0	98.0	98.0	98.0	98.0	98.0	98.0
99.0	99.0	99.0	99.0	99.0	99.0	99.0
100.0	100.0	100.0	100.0	100.0	100.0	100.0

BOTTOM VIEW OF SOCKETS



IF PEAK 455 KC FOR PARTS LIST SEE INDEX

MODEL S7350-2

FIRESTONE TIRE & RUBBER CO.

ALIGNMENT PROCEDURE

PRELIMINARY

Output meter connections.....Across loud speaker voice coil
 Connection of signal generator ground lead.....Receiver chassis
 Connection of signal generator output lead.....Ant. Term
 Dummy antenna value to be in series with generator output.....See chart below
 Position of Volume Control.....Fully on
 Position of Tone Control....."Speech"

SET DIAL TO	GENERATOR FREQUENCY	DUMMY ANTENNA	ADJUSTMENTS (IN ORDER SHOWN)	TRIMMER FUNCTION
540 kc	455 kc	.1 mfd.	1st & 2nd I.F. TR.	I.F.
540 kc	455 kc	.1 mfd.	I.F. Wave Trap	I.F. Wave Trap
600 kc	600 kc	.0001 mfd.	600 kc Track	L.F. Pad
Highest Frequency	1600 kc	.0001 mfd.	Osc.	Osc.
600 kc	600 kc	.0001 mfd.	Antenna Tri.	Shunt Coil
1400 kc	1400 kc	.0001 mfd.	R.F.	Transl. & Ant.

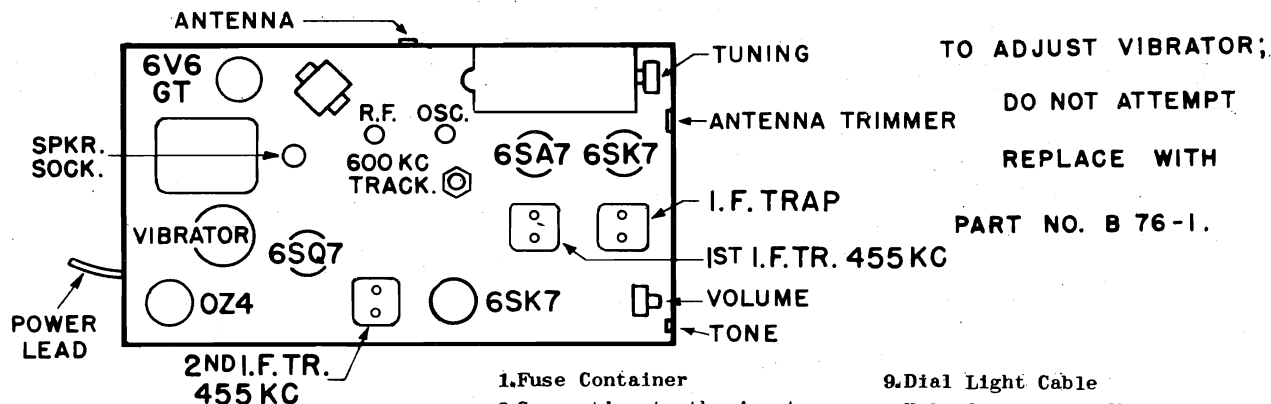
IMPORTANT ALIGNMENT NOTES

The alignment procedure should be repeated in the original order, step by step to insure greater accuracy.

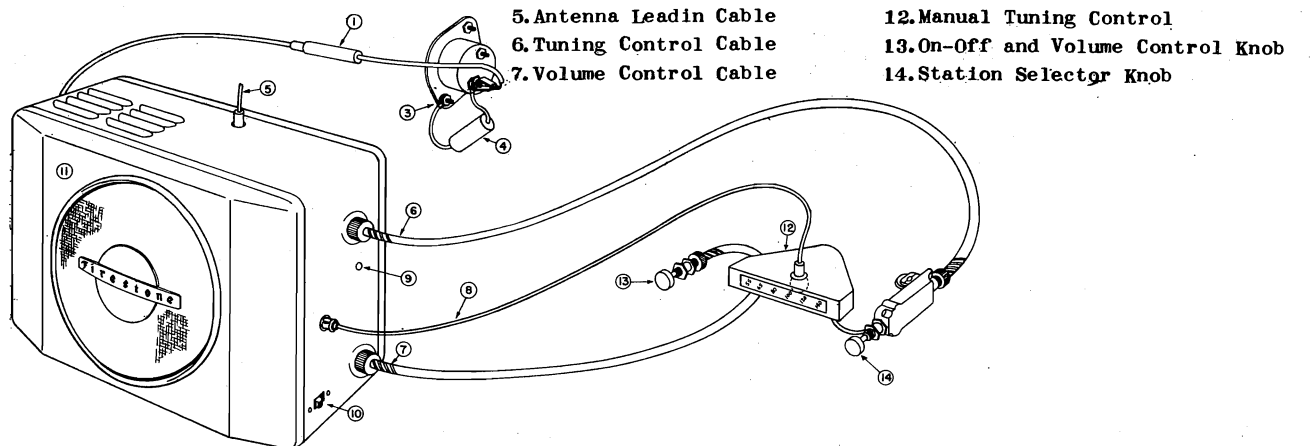
generator at its lowest possible value to prevent AVC of the receiver from interfering with accurate alignment, except as noted by (*) above.

Always keep the output power from the

TUBE & VIBRATOR LOCATIONS



CONNECTING THE RECEIVER

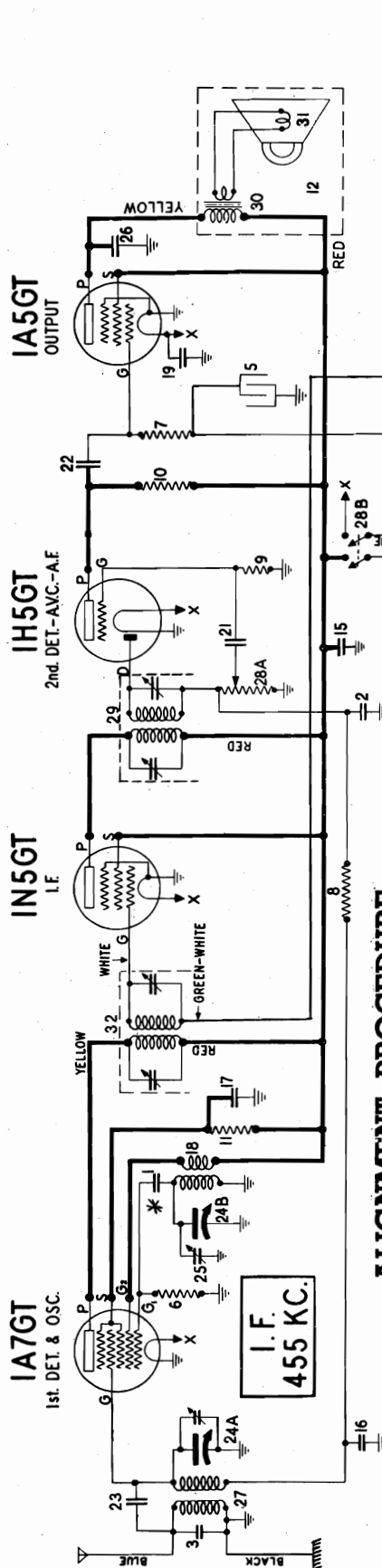


1. Fuse Container
2. Connection to the Ammeter
3. Grounding of the Ammeter
4. Ammeter Condenser
5. Antenna Leadin Cable
6. Tuning Control Cable
7. Volume Control Cable
8. Dial Light Cable
9. Hole for Antenna Matching
10. Tone Control Switch Adjustment
11. Front Cover
12. Manual Tuning Control
13. On-Off and Volume Control Knob
14. Station Selector Knob

FIRESTONE TIRE & RUBBER CO.

MODEL S7396-2

MODEL S7405-8



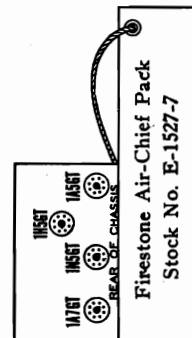
ALIGNMENT PROCEDURE

Dummy Ant. in Series with Sig. Gen.	Connection of Sig. Generator Output to Receiver	Signal Generator Frequency	Receiver Dial Setting
1 MFD Condenser	Control Grid of 1A7GT	455 KC.	Any Point Where It Does Not Affect Signal
200 MMFD. Condenser	Antenna Lead (Blue Wire)	1500 KC.	1500 KC
200 MMFD. Condenser	Antenna Lead (Blue Wire)	1500 KC.	Tune To 1500 KC Generator Signal

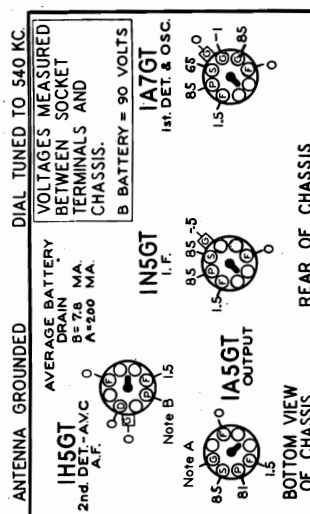
Trimmer Number	Trimmer Description	Type of Adjustment
1-2	2nd I.F.	Adjust for maximum output. Then repeat adjustment.
3-4	1st I.F.	Adjust for maximum output.
5	Broadcast Oscillator (Shunt)	Adjust trimmer for maximum output.
6	Broadcast Antenna	Adjust for maximum output.

*No. 1. In Model S7405-8. 260 mmf

TUBE LOCATIONS



Rear of Set

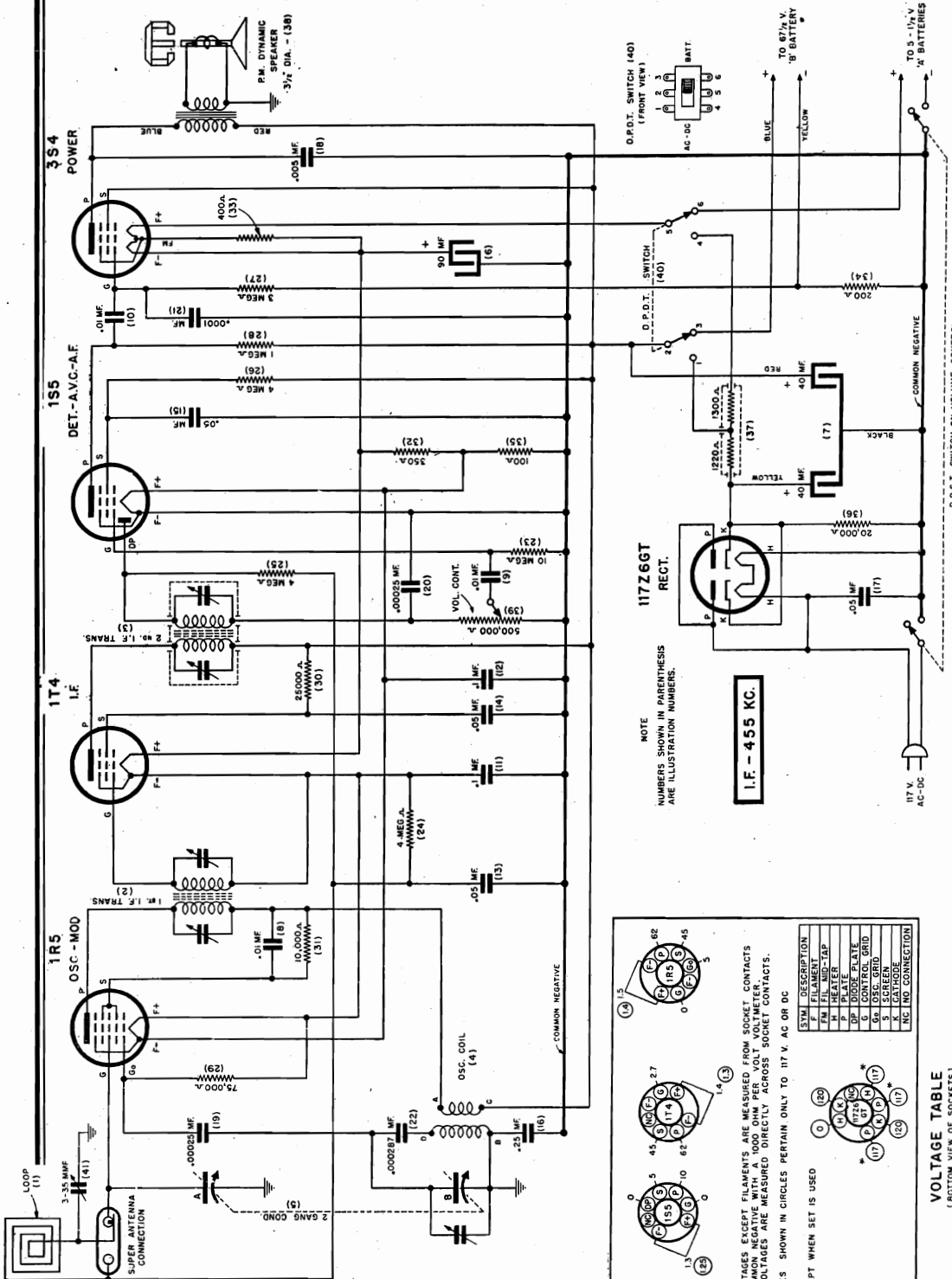


SOCKET VOLTAGES

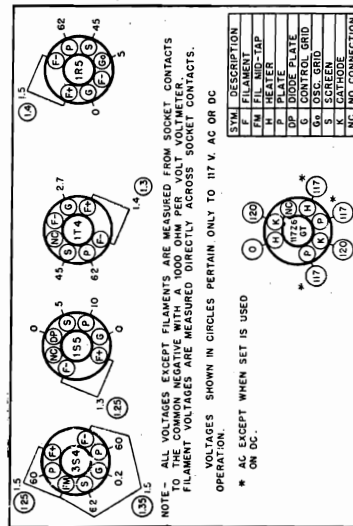
NOTE A: The bias for the control grid of the 1A5GT tube is -5 volts measured across resistors 13 & 20.

NOTE B: Due to the high resistance of plate resistor NO. 10 only a slight deflection will be obtained when using a meter having a resistance of 1000 ohms per volt.

11	112995	1/4 watt	Resistor - carbon 15,000 ohms
12	500E86	1/4 watt	Speaker - P.M. (6")
13	118078	Resistor - 560 ohms 1/4 watt	
14	118206	Condenser - .25 mfd. 600 volt	
15	118206	Condenser - .05 mfd. 600 volt	
16	118206	Coil - oscillator	
17	118206	Resistor - .25 mfd. 150 volt	
18	118206	Resistor - carbon 47 ohms 1/4	
19	118206	Condenser - .004 mfd. 600 volt	
20	118206	Condenser - .01 mfd. 600 volt	
21	118206	Capacitor - wire (2 mmf.)	
22	118206	Condenser - tuning (with drum)	
23	118206	Condenser - .002 mfd. 600 volt	
24	118206	Coil - antenna	
25	118206	Volume control & meg. with switch	
26	118206	Transformer - 2nd I.F.	
27	118206	Transformer - output for R-500E86 speaker	
28	118206	Cone & Voice coil for R-500E86 speaker	
29	118206	Transformer - 1st I.F.	
30	118206	Transformer - 1st I.F.	
31	118206	Transformer - 1st I.F.	
32	118206	Transformer - 1st I.F.	



MARCH
1941



VOLTAGE TABLE
(BOTTOM VIEW OF SOCKETS)

Set receiver dial to:	TEST OSCILLATOR	
	Adjust test oscillator frequency to:	Attach output of test oscillator to:
Any point where no interfering signal is received.	Exactly 455 K. C.	High side to lug on stator of gang condenser to which loop lead is connected.
1 Exactly 1550 K.C.	Exactly 1550 K.C.	Use Small Loop to couple test oscillator to receiver loop.
2 Approx. 1400 K.C.	Approx. 1400 K.C.	Use Small Loop to couple test oscillator to receiver loop.

ALIGNMENT PROCEDURE

Refer to parts layout diagram for location of trimmers mentioned below:

Adjust each of the second I.F. transformer trimmers for maximum output, then adjust each of the first I.F. transformer trimmers for maximum output.

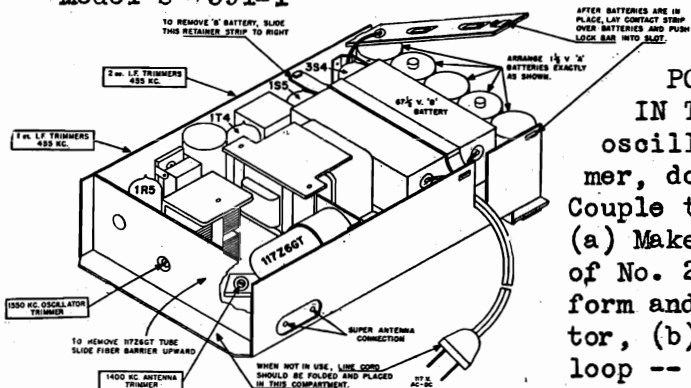
Adjust 1550 K. C. oscillator trimmer for maximum output.

While rocking gang condenser adjust 1400 K. C. loop trimmer for maximum output.

MODEL S7397-1
MODEL S7397-2(443)

Model S-7391-1

FIRESTONE TIRE & RUBBER CO.



IMPORTANT: BEFORE ALIGNING, PLACE LOOP ANTENNA AND BATTERIES IN THE SAME POSITION THEY WILL BE IN WHEN THE SET IS IN THE CABINET. -- When adjusting 1550 kc. oscillator trimmer and 1400 kc. antenna trimmer, do not connect test oscillator to loop. Couple test oscillator to receiver loop by:

- Make a loop consisting of five to ten turns of No. 20 to 30 size wire wound on a three inch form and attach across output of test oscillator,
- Place test oscillator loop near set loop -- BE SURE THAT NEITHER MOVES WHILE ALIGNING.

ALIGNMENT PROCEDURE

Model S-7397-2

Be sure to follow procedure carefully and in the order given—otherwise the receiver will be insensitive and the dial calibration incorrect. For alignment procedure read tabulations from left to right. If more than one adjustment is required on any one band, make the adjustment marked (1) first, (2) next, (3) third.

Before starting alignment, check tuning dial adjustment by: turn gang condenser until plates touch maximum capacity stop (completely in mesh) at which point the dial indicator must be exactly even with the last line at the low frequency end of the dial calibration. If dial needle does not point exactly to last line move needle to correct position.

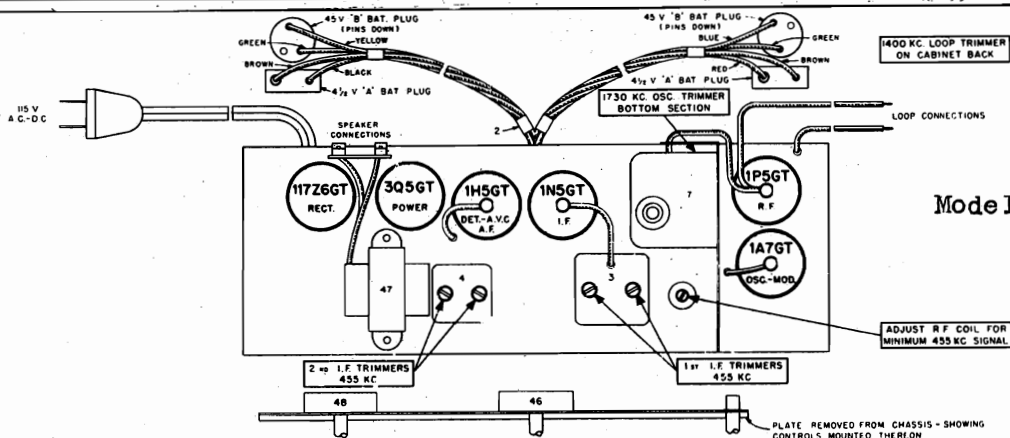
Use an accurately calibrated test oscillator with some type of output measuring device.

BEFORE ALIGNING, PLACE LOOP ANTENNA AND THE BATTERY IN THE SAME APPROXIMATE POSITION IN THE BACK OF CHASSIS THAT THEY WILL BE IN WHEN THE SET IS IN THE CABINET AND THE CABINET BACK CLOSED.

AS THE DIAL SCALE PARTIALLY COVERS THE I.F. TRIMMER, IT IS NECESSARY TO REMOVE DIAL SCALE FROM FRAME ON WHICH IT IS MOUNTED BY REMOVING THE STUDS THAT HOLD SCALE IN PLACE WHEN ALIGNING I.F. TRANSFORMERS.

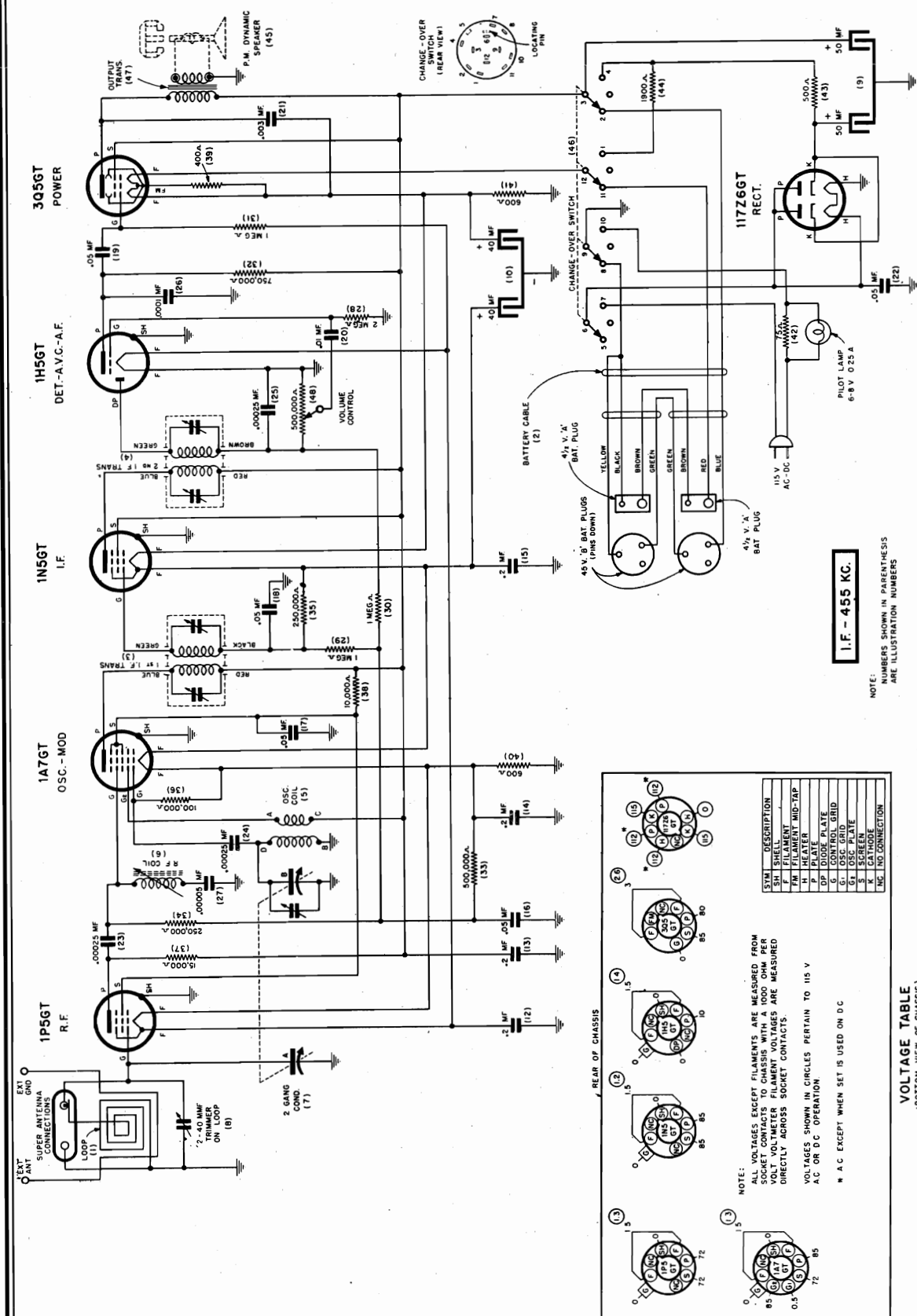
When adjusting 1600 kilocycle oscillator trimmer 600 K.C. padder, 455 K.C. R.F. trimmer and 1400 kilocycle antenna trimmer, do not connect test oscillator to loop. Couple test oscillator to receiver loop by: (a) Make a loop consisting of five to ten turns of No. 20 to 30 size wire wound on a three inch form and attach across output of test oscillator. (b) Place test oscillator loop near set loop—BE SURE THAT NEITHER MOVES WHILE ALIGNING.

TEST OSCILLATOR				
Set receiver dial to:	Adjust test oscillator frequency to:	Use dummy antenna in series with output of test oscillator consisting of:	Attach output of test oscillator to:	Refer to parts layout diagram for location of trimmers mentioned below:
Any point where no interfering signal is received.	Exactly 455 K.C.	0.2 Mfd. condenser	High side to grid cap of 1A7GT tube. Low side to frame of gang condenser.	Adjust each of the second I.F. transformer trimmers for maximum output, then adjust each of the first I.F. transformer trimmers for maximum output.
1 Rotate gang condenser to Maximum Capacity	Exactly 455 K.C.	None	Use Small Loop to couple test oscillator to receiver loop.	Adjust R.F. coil for minimum 455 K. C. signal.
2 Exactly 1730 K.C.	Exactly 1730 K.C.	None	Use Small Loop to couple test oscillator to receiver loop.	Adjust 1730 K.C. oscillator trimmer for maximum output.
3 Approx. 1400 K.C.	Approx. 1400 K.C.	None	Use Small Loop to couple test oscillator to receiver loop.	While rocking gang condenser adjust 1400 K.C. loop trimmer for maximum output.



Model S-7397-2

FIRESTONE TIRE & RUBBER CO.



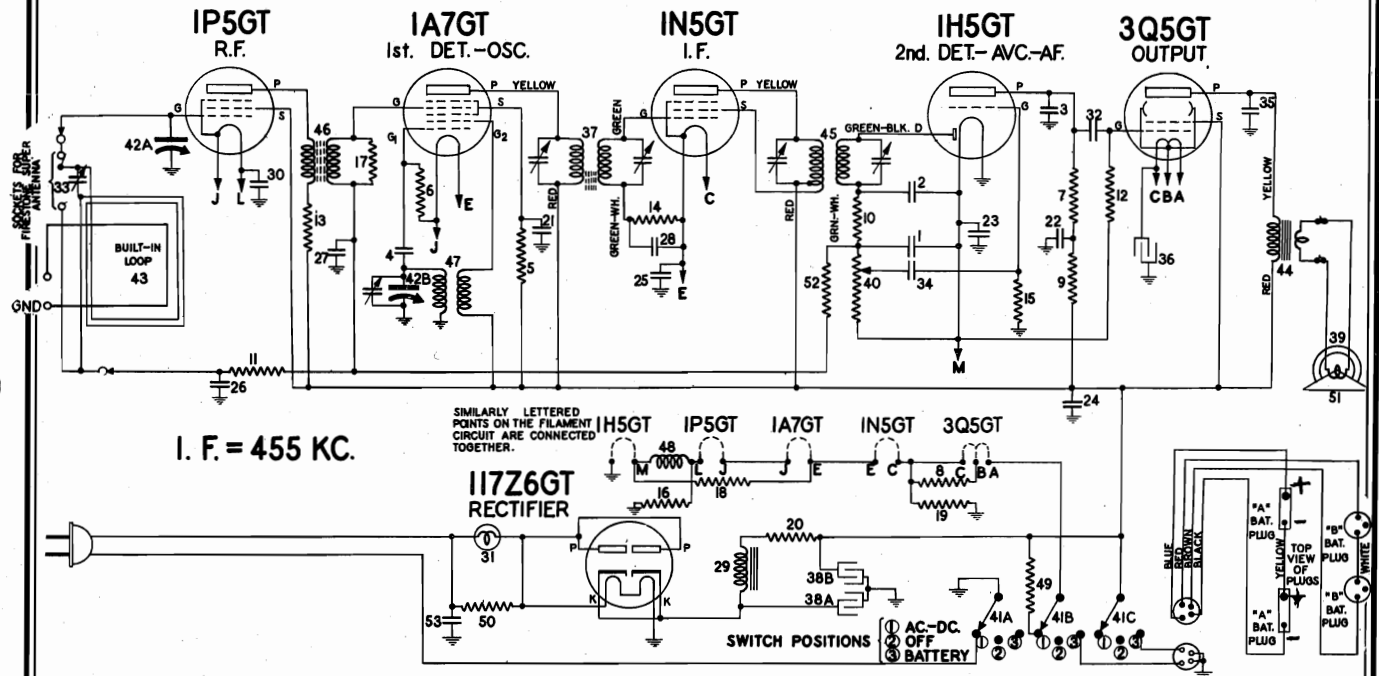
THIS RECEIVER CAN BE OPERATED EITHER WITH DRY BATTERIES OR FROM 110-120 VOLT DIRECT CURRENT OR 50-60 CYCLE ALTERNATING CURRENT. Thus the set may be operated on farms, in summer camps, hunting lodges, auto trailers, boats, or in any isolated districts where electric service is not available by using batteries. Where 110-120 volt direct current or 50-60 cycle alternating current is available, the radio may be operated direct from the electric lines without using the battery or making any change in the receiver.

When the Power Switch is in the AC-DC position the batteries are entirely disconnected and the set receives all its power from the AC or DC electric line.

FIRESTONE TIRE & RUBBER CO.

MODEL S7397-2

Code A-377



FOR PARTS LIST SEE NEXT PAGE

WARNING: THE ADJUSTMENTS DESCRIBED ON THIS PAGE ARE TO BE MADE BY A QUALIFIED SERVICE MAN ONLY. IF THESE ADJUSTMENTS ARE TAMPERED WITH BY ANYONE ELSE THE WARRANTY IS VOID.

ALIGNMENT PROCEDURE

FOR ALIGNMENT an output meter and an accurately calibrated signal generator are required.

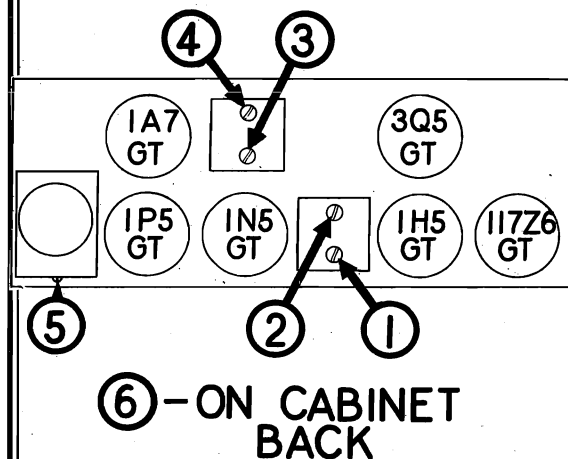
1. Connect the output meter across the voice coil or between the plate of the 3Q5GT output tube and ground through a 0.1 Mfd. condenser, depending on the type of meter. (The more sensitive type should be connected across the voice coil.)
2. Connect the ground lead of the signal generator through a .1 Mfd. condenser to the chassis.
3. Turn the volume control to the maximum volume position and keep it in this position while aligning.
4. With the gang condenser in full mesh, set the dial pointer to the low frequency end of the dial scale.

Dummy Ant. in Series with Sig. Gen.	Connection of Sig. Generator Output to Receiver	Signal Generator Frequency	Receiver Dial Setting	Trimmer Number	Trimmer Description	Type of Adjustment
.1 MFD. Condenser	Control Grid of 1A7GT	455 KC	Any Point Where It Does Not Affect Signal	1-2	2nd I.F.	Adjust for maximum output. Then repeat adjustment.
				3-4	1st I.F.	
200 MMFD. Condenser	Lead from sig. gen. placed near loop	1500 KC	1500 KC	5	Broadcast Oscillator (Shunt)	Adjust trimmer for maximum output.
200 MMFD. Condenser	Lead from sig. gen. placed near loop	1500 KC	Tune To 1500 KC Generator Signal	6	Broadcast Antenna	Adjust for maximum output.

MODEL S7397-2

Code A-377

FIRESTONE TIRE & RUBBER CO.



INSTALLATION OF BATTERIES

BATTERIES USED

Quantity	Rating	Firestone Stock Number
2	4½ Volt "A"	E-1526-7
2	45 Volt "B"	E-1526-8

These batteries are placed on their sides in the bottom compartment of the cabinet as shown on page two of this booklet and on the label at the rear of the chassis. After plugging the four-pronged plug on the battery cable into the socket on the rear of the chassis, plug the two three-prong plugs on the battery cable into the sockets on the ends of the "B" batteries and the two two-prong plugs into the sockets on the ends of the "A" batteries. The four prong plug on the opposite end of the battery cable must be plugged into the socket on the rear of the chassis before connecting the batteries.

ELECTRICAL PARTS

Diagram Number	Part Number	Description	List Price
1-2-3	83783	Condenser—mica 110 mmfd.	\$.20
4	85061	Condenser—mica 51 mmfd.	.15
5	110552	Resistor—carbon 47,000 ohms ¼ watt.	.12
6	110553	Resistor—carbon 220,000 ohms ¼ watt.	.12
7	110554	Resistor—carbon 1 megohm ¼ watt.	.12
8	110556	Resistor—carbon 330 ohm ¼ watt.	.12
9	110559	Resistor—carbon 470,000 ohms ¼ watt.	.12
10	110564	Resistor—carbon 100,000 ohms ¼ watt.	.12
11-12	110570	Resistor—carbon 2.2 meg. ¼ watt.	.15
13	110573	Resistor—carbon 2,200 ohms ¼ watt.	.12
14-15	110580	Resistor—carbon 3.3 meg. ¼ watt.	.12
16	112974	Resistor—carbon 220 ohm ¼ watt.	.15
17	116052	Resistor—carbon 33,000 ohm 1/10 w.	.12
18-19	116080	Resistor—insulated 680 ohms ¼ watt.	.15
20	116034	Resistor—220 ohms 2 watt w.w.	.20
21 to 23	116625	Condenser—.1 mfd. 600 volts.	.25
24	118290	Condenser—.5 mfd. 150 volt.	.50
25	116706	Condenser—.2 mfd. 600 volts.	.35
26 to 28	116819	Condenser—.05 mfd. 600 volts.	.20
29	117888	Filter choke	.85
30	118231	Condenser—.25 mfd. 150 volt.	.32
31	118921	Lamp-dial (Mazda No. 47)	.15
32	119193	Condenser—.01 mfd. 600 volts.	.15
33	119345	Condenser—trimmer (loop)	.20
34-35	119875	Condenser—.002 mfd. 600 volts.	.15
36	161273	Condenser—electrolytic 50 mfd. 35 volt.	.50
37	500759	Transformer—1st. I.F.	1.20
38A-38B	501213	Condenser—electrolytic { A—40 mfd. 150 volts } { B—20 mfd. 150 volts }	1.20
39	R501350	Speaker—P.M. dynamic (5")	5.40
40	501353	Volume control—1 meg.	1.00
41A to 41C	501354	Switch—A.C.-D.C. & battery	1.30
42A-42B	501355	Condenser—variable tuning (with drum)	1.80
43	501373	Loop antenna	1.80
44	501374	Transformer—output for speaker	1.80
45	501380	Transformer—2nd I.F.	1.60
46	501382	Coil—R.F.	.90
47	501383	Coil—oscillator	.60

Diagram Number	Part Number	Description	List Price
48	501384	Choke coil	.35
49	501386	Resistor—1660 ohms 6 watts wire wound.	.35
50	501390	Resistor—33 ohms 2 w. wire wound.	.18
51	501445	Cone & V.C. for R-501350 speaker.	1.50
52	110570	Resistor—carbon 2.2 meg. ¼ watt.	.15
53	116819	Condenser—.05 mfd. 600 volts.	.20

MISCELLANEOUS PARTS

Part Number	Description	List Price
501376	Battery cable—complete	\$1.20
114955	Clamp for dial cord	.01
112745	Clip—coil mounting	.01
113019	Clip—dial scale retaining	.01
116948	Cord—dial drive (supplied in 6 ft. lengths)	.18
114254	C-washer for tuning shaft	Per doz. .10
501371	Dial scale	.60
501352	Jack—for external loop	.45
501360	Knob	.15
12349	Nut—8-32 for mounting speaker	Per C .45
500748	Plug—2 prong male for battery cable	.03
116398	Plug—3 prong male for battery cable	.06
500747	Plug—4 prong male for battery cable	.05
501348	Pointer—dial	.15
501349	Pointer—power knob	.15
501357	Screen—speaker	.65
83624	Screw—self tapping 8 x 1/4	.01
117716	Shield—tube	.07
501347	Socket—dial lamp	.20
500681	Socket—4 prong (battery cable)	.10
116690	Socket—octal base	.12
89027	Washer—spring type for tuning shaft	.01
501361	Window—dial	.35

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

NOTE: The possession of this price list by any person is not to be construed as an offer to sell to him, nor anyone else, the goods listed herein at prices stated.

Line Voltage—117 Volts A.C.

SOCKET VOLTAGES

No Sig. Input—Volume on Full

TUBE	FUNCTION	FIL.	K	G	G ₁	G ₂	S	P	D
1P5GT	R.F. Amp.	1.4	—	Note A	—	—	98	91	—
1A7GT	1st. Det.—Osc.	1.3	—	Note A	—2	98	58	98	—
1N5GT	I.F. Amp.	1.4	—	Note B	—	—	98	98	—
1H5GT	2nd. Det.—A.V.C. A.F.	1.4	—	0	—	—	—	13	Note A
3Q5GT	Output	1.4	—	Note A	—	—	98	94	—
1I7Z6GT	Rectifier	111 A.C.	121	VOLTAGE ON P ₁ & P ₂ = 111 VOLTS A.C.					

NOTE A: Voltage on these elements is 1.4 volts measured across filament of 1H5GT.

NOTE B: Voltage on the grid of the 1N5GT I.F. cannot be measured with a standard voltmeter. Use a voltmeter of 1,000 ohms per volt.

Voltages shown on the circuit diagram are from socket terminals to ground buss. In measuring voltages use a voltmeter having a resistance of at least 1000 ohms per volt. Allowances should be made for variations in line voltage.



NOTE: IT IS ABSOLUTELY NECESSARY THAT AN ACCURATELY CALIBRATED TEST OSCILLATOR WITH SOME TYPE OF OUTPUT MEASURING DEVICE BE USED WHEN ALIGNING THE RECEIVER AND THAT THE PROCEDURE BE CAREFULLY FOLLOWED, OTHERWISE THE RECEIVER WILL BE INSENSITIVE AND THE DIAL CALIBRATION WILL BE INCORRECT, THE TRIMMERS WILL BE REFERRED TO BY THEIR FUNCTION AS INDICATED ON THE PARTS DIAGRAM.

Connect the test oscillator to the antenna of the set through a 200 mmfd. (0002) condenser. With the gang condenser set at minimum capacity, set the test oscillator at 1720 KC, and adjust the oscillator (or 1720 KC trimmer) on gang condenser. Next—set the test oscillator at 1400 KC, and tune in the signal on the gang condenser. Adjust the antenna trimmer (or 1400 KC trimmer) for maximum signal. Next set the test oscillator at 800 KC, and tune in signal on condenser to check alignment of coils.



MODEL S7398-3

FIRESTONE TIRE & RUBBER CO.

ALIGNMENT EQUIPMENT & PROCEDURE

FOR ALIGNMENT: An output meter and an accurately calibrated signal generator are required.

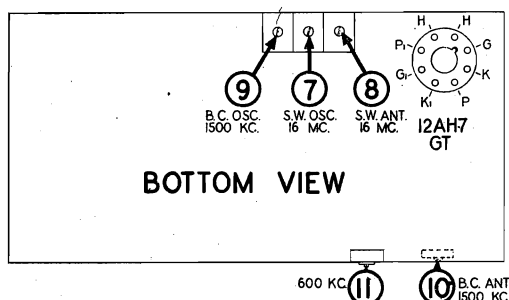
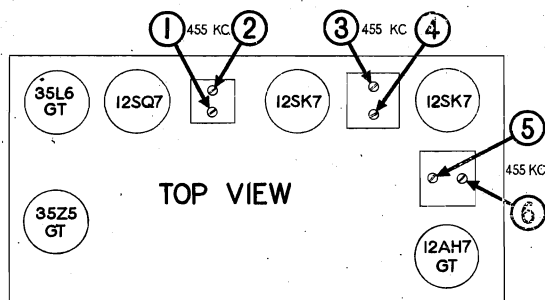
1. Connect the output meter across the voice coil or between the plate of the 35L6GT output tube and the cathode of the 12SQ7 through a .1 mfd. condenser. (The more sensitive type of meter should be connected across the voice coil.)
2. Connect the ground lead of the signal generator to B— through a .25 mfd. condenser. If oscillation is encountered try dressing leads and changing point of connection to B—.
3. Volume control in maximum position. Weak signal input.

Dummy Ant. in Series with Sig. Gen.	Connection of Sig. Generator Output to Receiver	Signal Generator Frequency	Band Switch Position	Receiver Dial Setting	Trimmer Number	Trimmer Description	Type of Adjustment
.1 MFD. Condenser	Lug on Rear Section of Gang Cond.	455 KC	American	Any Point Where It Does Not Affect the Signal	1-2 3-4 5-6	3rd I.F. 2nd I.F. 1st I.F.	Adjust for Maximum Output. Then repeat Adjustment.
400 OHM Carbon Resistor	Antenna Terminal (Blue Wire)	16 MC	Foreign	16 MC	7	Foreign Oscillator	Adjust for Maximum Output. Check to see if Proper Peak was Obtained by Tuning in Image at Approx. 15.1 MC. If Image does not appear, Realign at 16 MC, with Trimmer Screw farther out. Recheck Image.
400 OHM Carbon Resistor	Antenna Terminal (Blue Wire)	16 MC	Foreign	Tune to 16 MC Generator Signal	8	Foreign Antenna	Adjust for Maximum Output. Try to Increase Output by Detuning Trimmer and Retuning Receiver Dial until Maximum Output is Obtained.
200 MMFD. Mica Condenser	Antenna Terminal (Blue Wire)	1500 KC	American	1500 KC	9	Broadcast Oscillator (Shunt)	Adjust for Maximum Output.

Now replace the chassis and loop antenna in the cabinet before proceeding further.

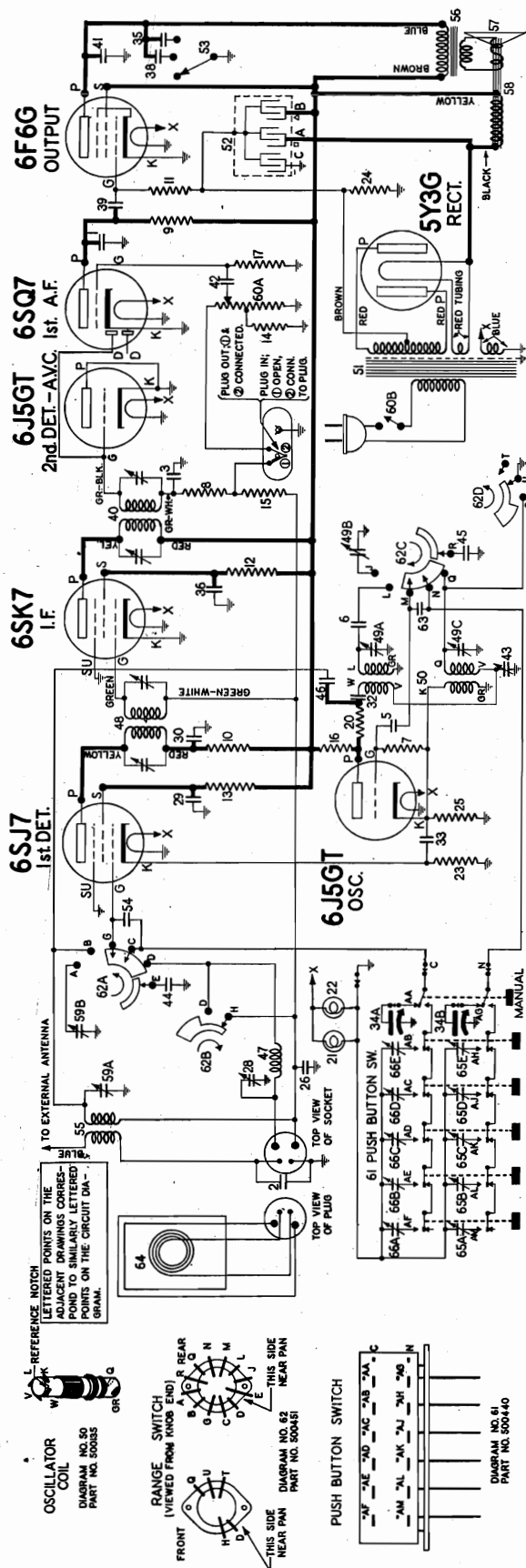
200 MMFD. Mica Condenser	Antenna Terminal (Blue Wire)	1500 KC	American	Tune to 1500 KC Generator Signal	10	Broadcast Antenna	Adjust for Maximum Output.
200 MMFD. Mica Condenser	Antenna Terminal (Blue Wire)	600 KC	American	Tune to 600 KC Generator Signal	11	Broadcast Oscillator (Series)	Adjust for Maximum Output. Try to Increase Output by Detuning Trimmer and Retuning Receiver Dial until Maximum Output is Obtained.

DIAL AND MISCELLANEOUS PARTS



Part Number	Description	List Price
116467	Base for Mtg. Electrolytic Cond.	\$0.04
114955	Clamp, for dial cord	.01
112745	Clip, Coil mounting	.01
113019	Clip, Dial scale retaining	.01
117057	Cord, Drive supplied in 3' lengths	.15
500300	Dial scale	.48
500474	Escutcheon, Dial	1.90
119644	Knob, volume & tuning	.18
119746	Knob, band or tone	.16
85296	Lamp—Dial 6 to 8 volt (Mazda 51)	.16
110496	Plug, Speaker (4 Prong)	.12
500310	Pointer	.18
81145	Retaining Ring for tuning shaft	Per C
119587	Screw, No. 2 x 3/8 Phillips Round Hd.	.02
116793	Socket, for dial light	.40
500051	Socket, for loop antenna	.15
110501	Socket, 4 prong (for Spkr.)	.16
160392	Socket, Octal (Rectifier)	.12
116690	Socket, Octal Base	.12
111090	Spacer, Steel, Mtg. for gang	.02
119823	Spring, Dial cord tension	.06
119525	Tuning shaft	.10
111456	Washer, spring washer for tuning shaft	Per C

ALL PRICES SUBJECT TO CHANGE WITHOUT NOTICE.

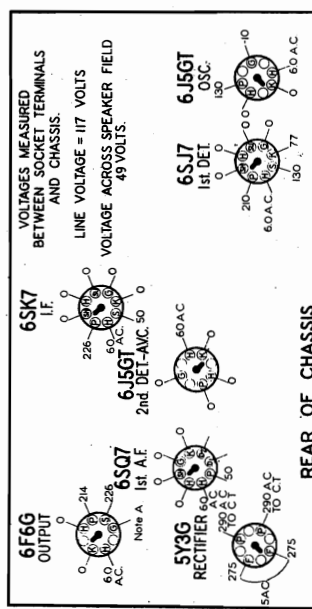


NOTE: MENTION CODE NO. A-370 WHEN ORDERING PARTS.

SOCKET VOLTAGES

Volume on Full with no Signal

Dial Tuned to 540 KC.



NOTE A: Grid voltage on the 6F6G output tube is -17 volts measured across resistor No. 24. Use a high resistance voltmeter of 1000 ohms per volt.

ELECTRICAL PARTS

Diagram Number	Part Number	Description	List Price
1-2-3	85599	Condenser—mica 280 mmfd.	.50
4	85599	Condenser—mica 3000 mmfd.	.15
5	85597	Resistor—carbon 47,000 ohms 1/4 watt.	.35
6	110552	Resistor—carbon 470,000 ohms 1/4 watt.	.12
7	110553	Resistor—carbon 220,000 ohms 1/4 watt.	.12
8	110553	Resistor—carbon 470,000 ohms 1/4 watt.	.12
9	110553	Resistor—carbon 470,000 ohms 1/4 watt.	.12
10	110553	Resistor—carbon 470,000 ohms 1/4 watt.	.12
11	110553	Resistor—carbon 470,000 ohms 1/4 watt.	.12
12	110553	Resistor—carbon 470,000 ohms 1/4 watt.	.12
13	110553	Resistor—carbon 470,000 ohms 1/4 watt.	.12
14	110553	Resistor—carbon 470,000 ohms 1/4 watt.	.12
15	110553	Resistor—carbon 470,000 ohms 1/4 watt.	.12
16	110553	Resistor—carbon 470,000 ohms 1/4 watt.	.12
17	110553	Resistor—carbon 470,000 ohms 1/4 watt.	.12
18	110553	Resistor—carbon 470,000 ohms 1/4 watt.	.12
19	110553	Resistor—carbon 470,000 ohms 1/4 watt.	.12
20	110553	Resistor—carbon 470,000 ohms 1/4 watt.	.12
21	110553	Resistor—carbon 470,000 ohms 1/4 watt.	.12
22	110553	Resistor—carbon 470,000 ohms 1/4 watt.	.12
23	110553	Resistor—carbon 470,000 ohms 1/4 watt.	.12
24	110553	Resistor—carbon 470,000 ohms 1/4 watt.	.12
25	110553	Resistor—carbon 470,000 ohms 1/4 watt.	.12
26	110553	Resistor—carbon 470,000 ohms 1/4 watt.	.12
27	110553	Resistor—carbon 470,000 ohms 1/4 watt.	.12
28	110553	Resistor—carbon 470,000 ohms 1/4 watt.	.12
29	110553	Resistor—carbon 470,000 ohms 1/4 watt.	.12
30	110553	Resistor—carbon 470,000 ohms 1/4 watt.	.12
31	110553	Resistor—carbon 470,000 ohms 1/4 watt.	.12
32	110553	Resistor—carbon 470,000 ohms 1/4 watt.	.12
33	110553	Resistor—carbon 470,000 ohms 1/4 watt.	.12
34	110553	Resistor—carbon 470,000 ohms 1/4 watt.	.12
35	110553	Resistor—carbon 470,000 ohms 1/4 watt.	.12
36	110553	Resistor—carbon 470,000 ohms 1/4 watt.	.12
37	110553	Resistor—carbon 470,000 ohms 1/4 watt.	.12
38	110553	Resistor—carbon 470,000 ohms 1/4 watt.	.12
39	110553	Resistor—carbon 470,000 ohms 1/4 watt.	.12
40	110553	Resistor—carbon 470,000 ohms 1/4 watt.	.12
41	110553	Resistor—carbon 470,000 ohms 1/4 watt.	.12
42	110553	Resistor—carbon 470,000 ohms 1/4 watt.	.12
43	119334	Condenser—padder	.36
44	180846	Condenser—compensating, 100 mmfd.	.28
45	181315	Condenser—twisted wire—5 mmfd.	.16
46	500108	Coil—compensating	.50
47	500131	Transformer—1st I.F.	1.08
48	49B-49C	Condenser—three section trimmer	.50
49	500133	Coil—B.C. & S.W. Osc.	.73
50	500137	Transformer—power (60 cycles)	.35
51	500202	Condenser—electrolytic	5.60
52	500201	Condenser—electrolytic	1.35
53	500207	Switch—tone compensating, 200 mmfd.	.55
54	500212	Coil—short wave antenna	.50
55	500249	Transformer—output for R-500426 Spkr.	1.35
56	R-500710	Cone & Voice Coil for R-500426 Spkr.	1.25
57	R-500426	Speaker, dynamic (6")	4.80
58	500438	Condenser—trimmer two section	.35
59	500439	Volume Control—1 Meg. (with switch)	1.40
60	500440	Switch—push button	2.25
61	500451	Switch—band	1.51
62	500484	Condenser—compensating, 215 mmfd.	.38
63	500490	Loop antenna & cabinet back	1.90
64	500553	Trimmers—push button (top bank)	1.10
65	500554	Trimmers—push button (bottom bank)	1.10

INTERMEDIATE FREQUENCY 455 KC

FIRESTONE TIRE & RUBBER CO.

ALIGNMENT EQUIPMENT & PROCEDURE

THIS RECEIVER MAY BE ALIGNED IN THE CABINET WITH LOOP CONNECTED

1. Connect the output meter across the voice coil or from the plate of the 6F6G output tube to chassis through a .1 mfd. condenser.
2. Connect the ground lead of the signal generator to the receiver chassis.
3. Make sure that the wires coming from the chassis and push button switch are connected as shown in the figure below.
4. Push in the "manual" button and keep it pushed in. Check the pointer to see that it is correctly set to 540 KC. with gang in full mesh.
5. Turn the volume control to the maximum volume position, and the tone control to the "speech" position.
6. FOLLOW THE ORDER OF ALIGNMENT INDICATED BELOW

Dummy Ant. in Series with Sig. Gen.	Connection of Sig. Generator Output to Receiver	Signal Generator Frequency	Band Switch Position	Receiver Dial Setting	Trimmer Number	Trimmer Description	Type of Adjustment
.1 MFD Condenser	Lug on Outer Section of Gang Cond.	455 KC	Broadcast	Any Point Where It Does Not Affect the Signal	1-2	2nd I.F.	Adjust for Maximum Output. Then repeat Adjustment.
					3-4	1st I.F.	
400 OHM Carbon Resistor	Blue Lead from Chassis	16 MC	Foreign	16 MC	5	Foreign Oscillator	Adjust for Maximum Output. Check to see if Proper Peak was Obtained by Tuning in Image at Approx. 15.1 MC. If Image does not appear, Realign at 16 MC, with Trimmer Screw farther out. Recheck Image.
400 OHM Carbon Resistor	Blue Lead from Chassis	16 MC	Foreign	Tune to 16 MC Generator Signal	6	Foreign Antenna	Adjust for Maximum Output. Try to Increase Output by Detuning Trimmer and Retuning Receiver Dial until Maximum Output is Obtained.
400 OHM Carbon Resistor	Blue Lead from Chassis	11.5 MC	Intermediate	11.5 MC	7	Spread Band Oscillator	Adjust for Maximum Output. Check to see if Proper Peak was Obtained by Tuning in Image at Approx. 10.6 MC. If Image does not appear, Realign at 11.5 MC, with Trimmer Screw farther out. Recheck Image.
400 OHM Carbon Resistor	Blue Lead from Chassis	11.5 MC	Intermediate	Tune to 11.5 MC Generator Signal	8	Spread Band Antenna	Adjust for Maximum Output.
No Connection	Place Lead from Signal Gen. Near Loop	1500 KC	Broadcast	1500 KC	9	Broadcast Oscillator (Shunt)	Adjust for Maximum Output.

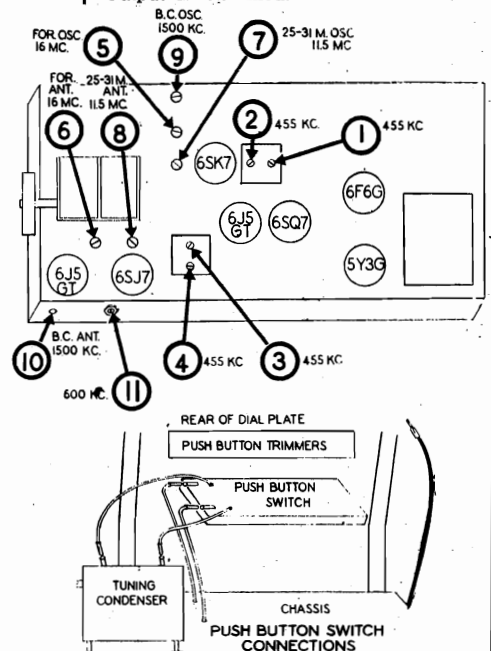
NOW PLACE THE CABINET BACK AND LOOP ANTENNA INTO POSITION AT THE BACK OF THE CABINET.

No Connection	Place Lead from Signal Gen. Near Loop	1500 KC	Broadcast	Tune to 1500 KC Generator Signal	10	Broadcast Antenna	Adjust for Maximum Output.
No Connection	Place Lead from Signal Gen. Near Loop	600 KC	Broadcast	Tune to 600 KC Generator Signal	11	Broadcast Oscillator (Series)	Adjust for Maximum Output. Try to Increase Output by Detuning Trimmer and Retuning Receiver Dial until Maximum Output is Obtained.

MISCELLANEOUS PARTS

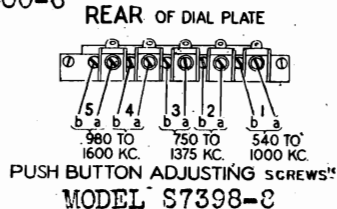
Part Number	Description	List Price
116467	Base for mounting electrolytic condenser.....	\$.04
83552	Bolt—chassis mounting No. 10—7/8.....	.03
114955	Clamp—for dial cord.....	.01
112745	Clip—coil mounting.....	.01
117057	Cord—drive—supplied in 3' lengths.....	.15
500436	Dial background.....	.14
500400	Dial scale.....	3.00
113402	Drum—dial cord drive.....	.56
500427	Knob—tone & range.....	.16
500406	Knob—tuning & volume.....	.16
12349	Nut—8-32 for mounting gang.....	.45
119911	Phono—terminal strip.....	.16
500445	Pointer.....	.20
500405	Pushbutton.....	.12
81145	Retaining ring for tuning shaft.....	.50
83624	Screw—self tapping 8 x 1/4.....	.01
85827	Set screw—8-32 square head.....	.02
500411	Shaft—tuning.....	.30
111090	Spacer—steel mounting for gang.....	.09
113177	Spring—dial cord tension.....	.15
500051	Socket for loop antenna.....	.12
119791	Socket—octal.....	.15
114876	Socket—octal (rectifier).....	.15
114878	Socket—octal with special ground.....	.15
117315	Tab—Station call letter.....	.55
111456	Washer—spring washer for tuning shaft.....	5Q

ALL PRICES SUBJECT TO CHANGE WITHOUT NOTICE



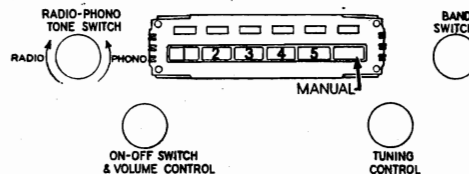
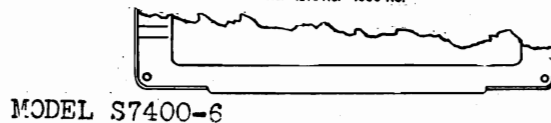
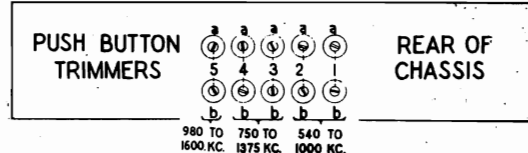
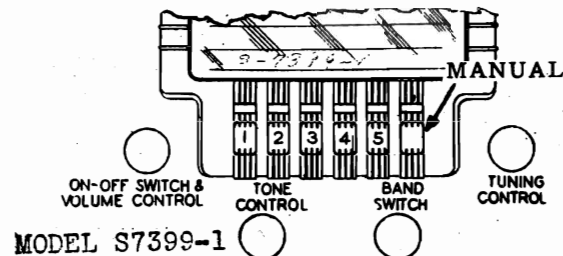
MODEL S7398-8
MODEL S7399-1
MODEL S7400-6

FIRESTONE TIRE & RUBBER CO.



TO SET UP THE BUTTONS FOR AUTOMATIC TUNING: FOR ALL MODELS

1. Turn the set on and allow it to operate at least fifteen minutes before attempting to set up the buttons.
2. Make a list of the frequencies of five nearby stations to which you wish to set up the buttons. Be sure to select the most powerful nearby stations, since weak signals will not give as satisfactory results.
3. Turn the set around so that the back of the set is facing you. Through the ten holes in the back of the chassis will be seen ten adjusting screws. (See Fig. 1). These screws are used to tune in the stations that the buttons are to be set to.
4. Each of the push buttons can be made to tune in stations in a definite frequency range as shown in Fig. 1. It is imperative that in setting up the buttons you select stations whose frequency is in the indicated range of that button. **ALWAYS TRY TO SELECT THE BUTTON WHICH CAN BE SET UP TO A STATION WHOSE FREQUENCY IS WELL WITHIN THE BUTTON'S OPERATING RANGE.**
5. Turn the band switch to the "AM" position, push in the button labeled "MANUAL," then using the tuning knob (see Fig. 1) tune in the station you wish to set to button No. 1.
6. Push in button No. 1 and using a screwdriver turn adjusting screw No. 1a (the top one) until the station you had previously tuned in is again heard. If it is not heard, advance the volume control and adjust the screw again. Be sure to adjust screw No. 1a to the point where the program is heard with the deepest tone.
7. Insert the screwdriver in adjusting screw No. 1b (the one below 1a) and turn it until the program is heard with the deepest tone. Now again check the setting of screw No. 1a, making sure it is adjusted to give the deepest tone.
8. The set-up for button No. 1 is now complete.
9. To set up the remaining buttons use the same procedure; push in the "MANUAL" button; tune in the station, using the tuning knob; push in the button to be set up; adjust its associated "a" adjusting screw until the station is tuned in (screw 2a for button No. 2, etc., see Fig. 1); the associated "b" screw is then adjusted for deepest tone as before.
10. Call letter tabs which may be used to label the buttons are provided with your radio. They fit in the small space above each push button.
11. To use push button at any time, turn the band switch to the "AM" position and push the proper button.



Voltage S-7399-1 only

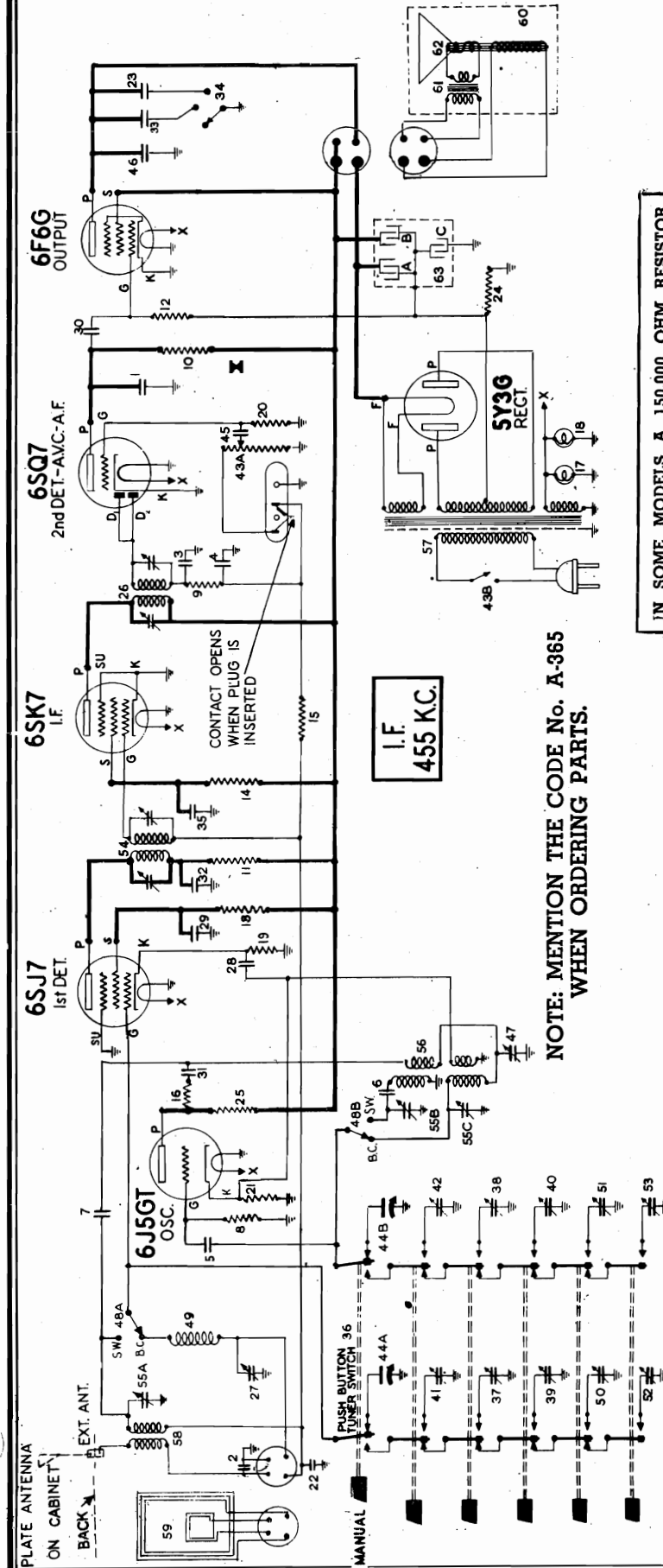
SOCKET VOLTAGES — ALL D.C. POTENTIAL MEASURED TO CHASSIS

NO SIGNAL CONDITION		DIAL TUNED TO 540 KC.							
TUBE	FUNCTION	H	K	G	S	SU	P	D ₁	D ₂
6SJ7	1st DET.	6.0 A.C.	.5	0	160	0	225		
6J5GT	OSC.	6.0 A.C.	0	-5			150		
6SK7	I.F.	6.0 A.C.	0	0	62	0	230		
6SQ7	2nd DET. — A.V.C. & A.F.	6.0 A.C.	0	0			92	0	0
6F6G	OUTPUT	6.0 A.C.	0	Note A	230		215		
5Y3G	RECTIFIER	5.0 A.C.					Plates 350 V.A.C to C.T.		

NOTE A: The bias for this grid is -15 volts measured across resistor No. 24.

Use a high resistance voltmeter of at least 1000 ohms per volt.

FIRESTONE TIRE & RUBBER CO.



ELECTRICAL PARTS

Diagram Number	Part Number	Description	List Price
47	11934	Condenser—padder	\$0.36
48A-48B	50057	Switch—band	1.20
49	500108	Coil—compensator	.50
50 to 53	500127	Condenser—push button trimmer (540-1000 KC)	.24
54	500131	Transformer—1st I.F.	1.00
55A-55B-55C	500133	Condenser—third section trimmer	.50
56	500135	Coil—B.C. & S.W. Osc.	.75
57	500137	Transformer—power (60 cycles)	3.50
	500202	Transformer—power (25 cycles)	3.60
Diagram Number	Part Number	Description	List Price
58	500147	Coil—short wave antenna	\$0.55
59	500179	Loop antenna	2.40
60	M-500180	Speaker—dynamic (8")	6.50
61	M-500194	Transformer—output for M-500180 speaker	1.75
62	M-500195	Cone & Voice coil for M-500180 speaker	1.70
63A-63C	500201	Condenser—electrolytic	1.35
		A=20 mfd.—350 V.	
		B=10 mfd.—350 V.	
		C=20 mfd.—25 V.	

Diagram Number	Part Number	Description	List Price
1	83539	Condenser—mica 260 mmfd.	\$0.20
2-3-4	83783	Condenser—mica 110 mmfd.	.20
5	83061	Condenser—mica 51 mmfd.	.15
6	88887	Condenser—mica .0042 mfd.	.35
7	110810	Condenser—wire 3 mmfd.	.12
8-9	110852	Resistor—carbon 47,000 ohms 1/4 watt.	.12
10	110553	Resistor—carbon 220,000 ohms 1/4 watt.	.12
11	110557	Resistor—carbon 4,700 ohms 1/4 watt.	.12
12	110559	Resistor—carbon 470,000 ohms 1/4 watt.	.12
13-14	110564	Resistor—carbon 100,000 ohms 1/4 watt.	.12
15	110570	Resistor—carbon 2.2 meg. 1/4 watt.	.15
16	110590	Resistor—carbon 180 ohms 1/4 watt.	.12
17-18	110629	Dial light bulb—6.3 volt.	.15
19	112952	Resistor—carbon 3,300 ohms 1/4 watt.	.10
20	112975	Resistor—carbon 10 meg. 1/4 watt.	.12
21	116078	Resistor—560 ohms 1/4 watt.	.12
22-23	116819	Condenser—.05 mfd. 600 volt.	.20
24	117075	Resistor—300 ohm 1 watt W.W.	.16
25	118805	Resistor—carbon 10,000 ohms 1 watt.	.15
26	119024	Transformer—2nd I.F.	1.15
27	119132	Condenser—trimmer	.20
28 to 33	119193	Condenser—.01 mfd. 600 volt.	.15
34	119289	Switch—tone	.60
35	119414	Condenser—.02 mfd. 600 volt.	.15
36	119603	Push Button Switch	2.30
37 to 40	119663	Condenser—Push Button trimmer (750-1375 KC.)	.24
41-42	119664	Condenser—Push Button trimmer (980-1600 KC.)	.24
43A-43B	119779	Volume control—1/2 meg. (with switch)	1.25
44A-44B	119812	Gang condenser	2.05
45-46	119817	Condenser—.004 mfd. 600 volt.	.15

MODEL S7399-1

FIRESTONE TIRE & RUBBER CO.

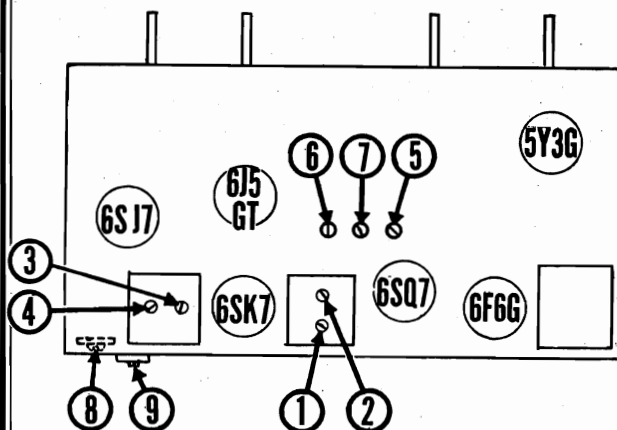
ALIGNMENT EQUIPMENT & PROCEDURE

NOTE: THIS SET MAY BE COMPLETELY ALIGNED WITHOUT REMOVING FROM THE CABINET.
FOR ALIGNMENT: An output meter and an accurately calibrated signal generator are required.

1. Connect the loop as indicated in the circuit diagram and keep it in the circuit at all times.
2. Connect the output meter across the voice coil or from the plate of the 6F6G output tube to chassis through a .1 mfd. condenser. Connect the ground lead of the signal generator to the receiver chassis.
3. Turn volume control to the maximum position and keep it in this position throughout alignment procedure.
4. Push the MANUAL button in and keep it pushed in.

Dummy Ant. in Series with Sig. Gen.	Connection of Sig. Generator Output To Receiver	Signal Generator Frequency	Band Switch Position	Receiver Dial Setting	Trimmer Number	Trimmer Description	Type of Adjustment
.1 MFD. Condenser	Rear Lug of Gang Condenser	455 KC	Broadcast	Any Point Where It Does Not Affect The Signal	1-2	2nd I. F.	Adjust for maximum output. Then repeat adjustment.
					3-4	1st I. F.	
400 OHM Carbon Resistor	External Antenna Terminal Blue Wire	16 MC	Foreign	16 MC	5	Foreign Oscillator (Shunt)	Adjust for maximum output. Check to see if proper peak was obtained by tuning in image at approx. 15.1 MC. If image does not appear realign at 16 MC. with trimmer screw farther out. Recheck image.
400 OHM Carbon Resistor	External Antenna Terminal Blue Wire	16 MC	Foreign	Tune to 16 MC. Generator Signal	6	Foreign Antenna	Adjust for maximum output. Try to increase output by detuning trimmer and retuning receiver dial until maximum output is obtained.
200 MMFD. Mica Condenser	External Antenna Terminal Blue Wire	1500 KC	Broadcast	1500 KC	7	Broadcast Oscillator (Shunt)	Adjust for maximum output.
200 MMFD. Mica Condenser	External Antenna Terminal Blue Wire	1500 KC	Broadcast	Tune To 1500 KC Generator Signal	8	Broadcast Antenna	Adjust for maximum output.
200 MMFD. Mica Condenser	External Antenna Terminal Blue Wire	600 KC	Broadcast	Tune To 600 KC Generator Signal	9	Broadcast Oscillator (Series Pad)	Adjust for maximum output. Try to increase output by detuning trimmer and retuning receiver dial until maximum output is obtained.

TRIMMER LOCATIONS

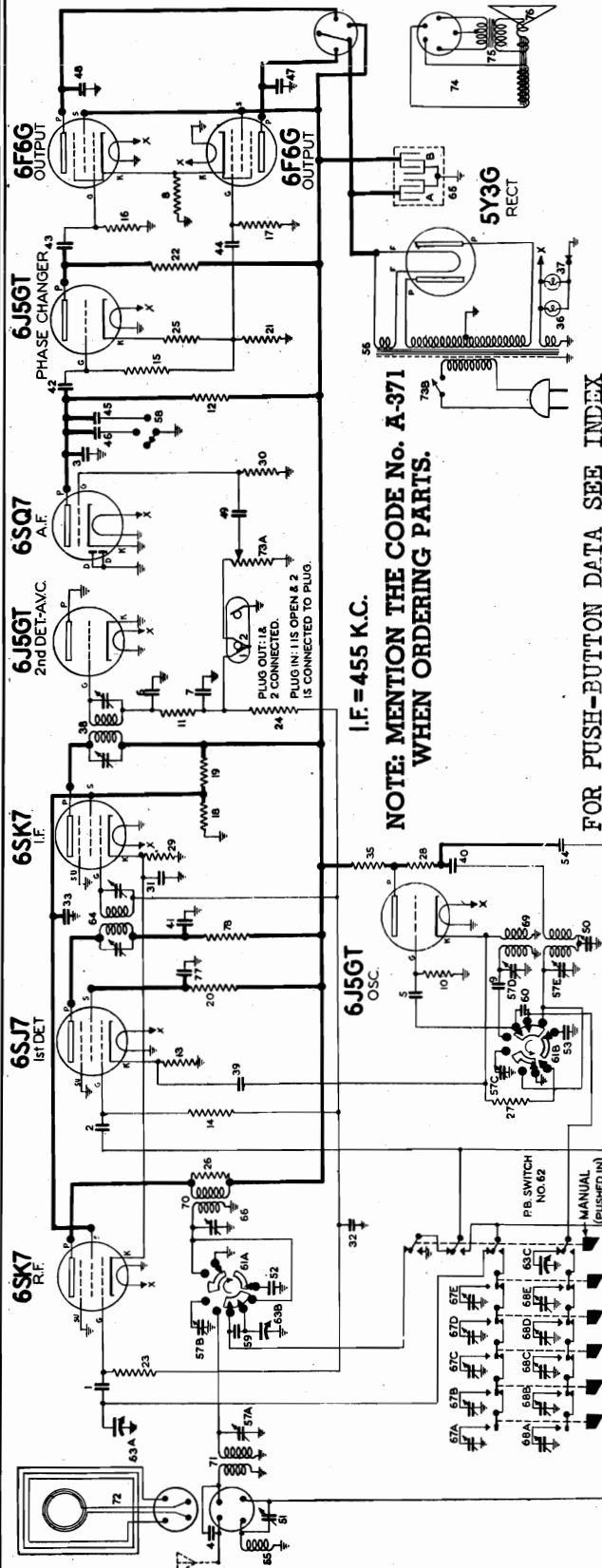


DIAL AND MISCELLANEOUS PARTS

Part Number	Description	List Price
116467	Base for mtg. electrolytic condenser	\$0.04
500181	Cabinet back complete	1.50
119559	Clamp—dial scale	.08
114955	Clamp—for dial cord	.01
112745	Clip—coil mounting	.01
117057	Cord—drive (supplied in 3' lengths)	.15
500139	Dial scale	.35
119782	Dial background	.06
500167	Escutcheon—dial	.85
119644	Knob—push on	.18
119746	Knob—range	.16
116584	Plug (rubber)	.02
119781	Pointer	.14
119911	Phono-terminal strip	.16
119654	Push button	.06
81145	Retaining ring for tuning shaft	Per C .50
114914	Screw—special head—for mtg. escutcheon	Per Dz. .15
119778	Shaft—tuning	.10
110501	Socket—4 prong (for spkr.)	.16
111008	Socket—dial lamp	.12
114878	Socket—octal—with special ground	.15
119791	Socket—octal	.12
114876	Socket—octal (rectifier)	.15
500051	Socket for loop antenna	.15
119823	Spring—dial cord tension	.06
119739	Station call tabs	.48
111456	Washer—spring washer	Per C .50

ALL PRICES SUBJECT TO CHANGE WITHOUT NOTICE.

FIRESTONE TIRE & RUBBER CO.



NOTE: MENTION THE CODE NO. A-371
WHEN ORDERING PARTS.

I.F. = 455 K.C.

FOR PUSH-BUTTON DATA SEE INDEX

Diagram Number	Part Number	Description	List Price
1-2-3	83339	Condenser—mica 250 mmfd.	1.10
4-5	83783	Condenser—mica 110 mmfd.	1.20
6-7	83061	Condenser—mica 51 mmfd.	.80
8	88462	Resistor—W.W. 270 ohms 1 watt.	.78
9	88467	Condenser—mica .0042 mfd.	1.60
10-11	110552	Resistor—carbon 47,000 ohms 1/4 watt.	1.25
12	110553	Resistor—carbon 220,000 ohms 1/4 watt.	1.20
13	110554	Resistor—carbon 470,000 ohms 1/4 watt.	1.20
14 to 17	110559	Resistor—carbon 15,000 ohms 2 watts.	1.15
18-19	110561	Resistor—carbon 22,000 ohms 1/4 watt.	1.20
20	110562	Resistor—carbon 22,000 ohms 1/4 watt.	1.20
21-22	110563	Resistor—carbon 2.2 meg. 1/4 watt.	1.20
23-24	110570	Resistor—carbon 2,200 ohms 1/4 watt.	1.20
25	110573	Resistor—carbon 6800 ohms 1/4 watt.	1.20
26	110588	Resistor—carbon 180 ohms 1/4 watt.	1.20
27-28	110590	Resistor—carbon 220 ohms 1/4 watt.	1.20
29	110594	Resistor—insulated 10 meg. 1/4 watt.	1.20
30	116050	Condenser—.1 mfd. 600 volt.	1.20
31	116052	Condenser—.05 mfd. 600 volt.	1.20
32-33-34	116819	Resistor—carbon 10,000 ohms 1 watt.	1.20
35	118905	Lamp-Dial (Mazda No. 47).	1.15
36-37	118921	Transformer—2nd I.F.	1.15
38	119024	Condenser—.01 mfd. 600 volt.	1.15
39-40-41	119193	Condenser—.02 mfd. 600 volt.	1.15
42-43-44	119414	Condenser—.008 mfd. 600 volt.	1.15
45	119416	Condenser—.004 mfd. 600 volt.	1.15
46-47-48	119817	Condenser—.002 mfd. 600 volt.	1.15
49	119875	Condenser—padder	.36
50	119934	Condenser—trimmer (Loop)	.18
51	160449	Condenser—compensating 100 mmfd.	.28
52-53	160646	Condenser—twisted wire 5 mmfd.	.16
54	161315	Coil—compensating	.50
55	500108	Transformer—power (25 cycles)	6.50
56	500116	Transformer—power (60 cycles)	8.00

Diagram Number	Part Number	Description	List Price
57A to 57E	500168	Condenser—trimmer (S section).	.65
58	500207	Switch—tone	.35
59-60	500484	Condenser—compensating 215 mmfd.	.38
61A-61B	500794	Switch—band	1.80
62	500795	Switch—push button	2.90
63A to 63C	500796	Condenser—variable tuning	3.50
64	500801	Transformer—1st I.F.	1.20
65	500807	Condenser—electrolytic, A-20 mid.-400 volt.	.75
66	500842	Condenser—trimmer	1.30
67A to 67E	500860	Condenser—push but. trimmers (top bank)	1.10
68	500861	Condenser—push but. trimmers (bottom bank)	1.10
69	500865	Coil—oscillator (B.C. & S.W.)	1.20
70	500866	Coil—broadcast R.F.	.80
71	500867	Coil—short wave antenna	.78
72	500868	Loop antenna	1.60
73A-73B	500877	Volume control—1/2 meg (with switch)	1.25
74	M-500880	Speaker—dynamic (12" with transformer)	1.10
75	M-501309	Transformer—output for M-500880 spkr.	1.80
76	M-501310	Cone & voice coil for M-500880 spkr.	1.80
77	119193	Condenser—.01 mfd. 600 volt.	.15
78	110588	Resistor—carbon 6800 ohms 1/4 watt.	.12

SOCKET VOLTAGES—ALL D.C. POTENTIAL MEASURED TO CHASSIS

NO SIGNAL CONDITION

TUBE	FUNCTION	H	K	G	S	SU	P	D ₁	D ₂
6SK7	R.F.	6.0 A.C.	3	0	85	0	210		
6SJ7	1st Det.	6.0 A.C.	0	150	0	190			
6J5GT	Osc.	6.0 A.C.	—3			140			
6SK7	I.F.	6.0 A.C.	0	85	0	210			
6J5GT	2nd Det A.V.C.	6.0 A.C.	0			0			
6SQ7	A.F.	6.0 A.C.	0			75	0		
6J5GT	Phase Changer	6.0 A.C.	38	*0		160			
(2) 6F6G	Output	6.0 A.C.	16	0	210	310			
5Y3G	Rectifier	5.0 A.C.							

Plates 370 V.A.C. to C.T.

*to K

Use a high resistance voltmeter of at least 1000 ohms per volt.

MODEL S7399-2

FIRESTONE TIRE & RUBBER CO

ALIGNMENT EQUIPMENT & PROCEDURE

THIS RECEIVER MAY BE ALIGNED IN THE CABINET WITH LOOP CONNECTED

1. Connect the output meter across the voice coil or from plate to plate of the 6F6G output tubes.
2. Connect the ground lead of the signal generator to the receiver chassis.
3. Push in the "manual" button and keep it pushed in. Check the pointer to see that it is correctly set to 540 KC. with gang in full mesh.
4. Turn the volume control to the maximum volume position, and the tone control to the "speech" position.
5. FOLLOW THE ORDER OF ALIGNMENT INDICATED BELOW.

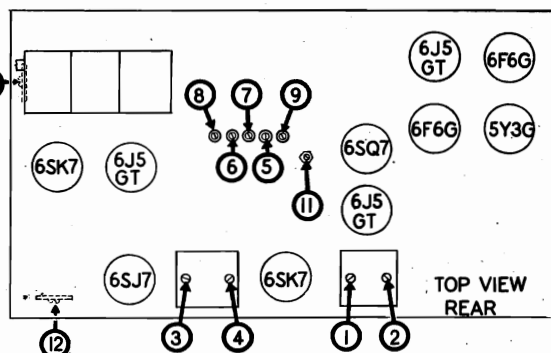
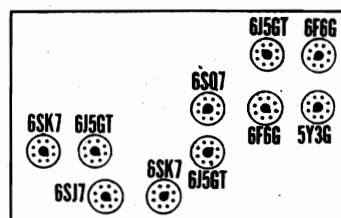
Dummy Ant. in Series with Sig. Gen.	Connection of Sig. Generator Output to Receiver	Signal Generator Frequency	Band Switch Position	Receiver Dial Setting	Trimmer Number	Trimmer Description	Type of Adjustment
.1 MFD Condenser	Lug on Middle Section of Gang Cond.	455 KC	American	Any Point Where It Does Not Affect the Signal	1-2	2nd I.F.	Adjust for Maximum Output. Then re- peat Adjustment.
					3-4	1st I.F.	
400 OHM Carbon Resistor	Blue Lead from Chassis	16 MC	Foreign	16 MC	5	Foreign Oscillator	Adjust for Maximum Output. Check to see if Proper Peak was Obtained by Tuning in Image at Approx. 15.1 MC. If Image does not appear, Realign at 16 MC, with Trimmer Screw farther out. Recheck Image.
400 OHM Carbon Resistor	Blue Lead from Chassis	16 MC	Foreign	Tune to 16 MC Generator Signal	6	Foreign Antenna	Adjust for Maximum Output. Try to Increase Output by Detuning Trimmer and Retuning Receiver Dial until Maximum Output is Obtained.
400 OHM Carbon Resistor	Blue Lead from Chassis	11.5 MC	25-31 M.	11.5 MC	7	Spread Band Oscillator	Adjust for Maximum Output. Check to see if Proper Peak was Obtained by Tuning in Image at Approx. 10.6 MC. If Image does not appear, Realign at 11.5 MC, with Trimmer Screw farther out. Recheck Image.
400 OHM Carbon Resistor	Blue Lead from Chassis	11.5 MC	25-31 M.	Tune to 11.5 MC Generator Signal	8	Spread Band Antenna	Adjust for Maximum Output.
No Connection	Place Lead from Signal Gen. Near Loop	1500 KC	American	1500 KC	9	Broadcast Oscillator (Shunt)	Adjust for Maximum Output.
No Connection	Place Lead from Signal Gen. Near Loop	1500 KC	American	Tune to 1500 KC Generator Signal	10	Broadcast Detector	Adjust for Maximum Output.
No Connection	Place Lead from Signal Gen. Near Loop	600 KC	American	Tune to 600 KC Generator Signal	11	Broadcast Oscillator (Series)	Adjust for Maximum Output. Try to Increase Output by Detuning Trimmer and Retuning Receiver Dial until Maximum Output is Obtained.
No Connection	Place Lead from Signal Gen. Near Loop	1500 KC	American	Tune to 1500 KC Generator Signal	12	Broadcast Antenna	Adjust for Maximum Output.

MISCELLANEOUS PARTS

Part Number	Description	List Price
116584	Bumper plug (rubber)	\$0.02
500883	Cabinet back	.80
114955	Clamp—for dial cord	.01
112745	Clip—coil mounting	.01
117057	Cord—drive (supplied in 3 ft. lengths)	.15
500800	Dial scale	1.80
113402	Drum—dial cord drive	.56
500500	Escutcheon—push button	1.10
160193	Knob—Volume & Tuning	.18
161366	Knob—Band & Tone	.18
119911	Phono—terminal strip	.16
500856	Pointer	.18
500405	Push button	.12
81145	Retaining ring for tuning shaft	Per C .50
114914	Screw—special head for mtg escutcheon	per Dz. .15
85827	Set screw—8-32 square head for drive drum	.02
500411	Shaft—tuning	.30
119791	Socket—octal	.12
114876	Socket—octal (rectifier)	.15
114878	Socket—octal, with spec. ground	.15
500051	Socket for loop antenna	.15
160026	Socket—condenser mtg.	.04
117704	Socket—for speaker, 5 prong	.13
113177	Spring—dial cord tension	.09
114041	Tab—station call letters	.35
111456	Washer—spring washer for tuning shaft	Per C .50

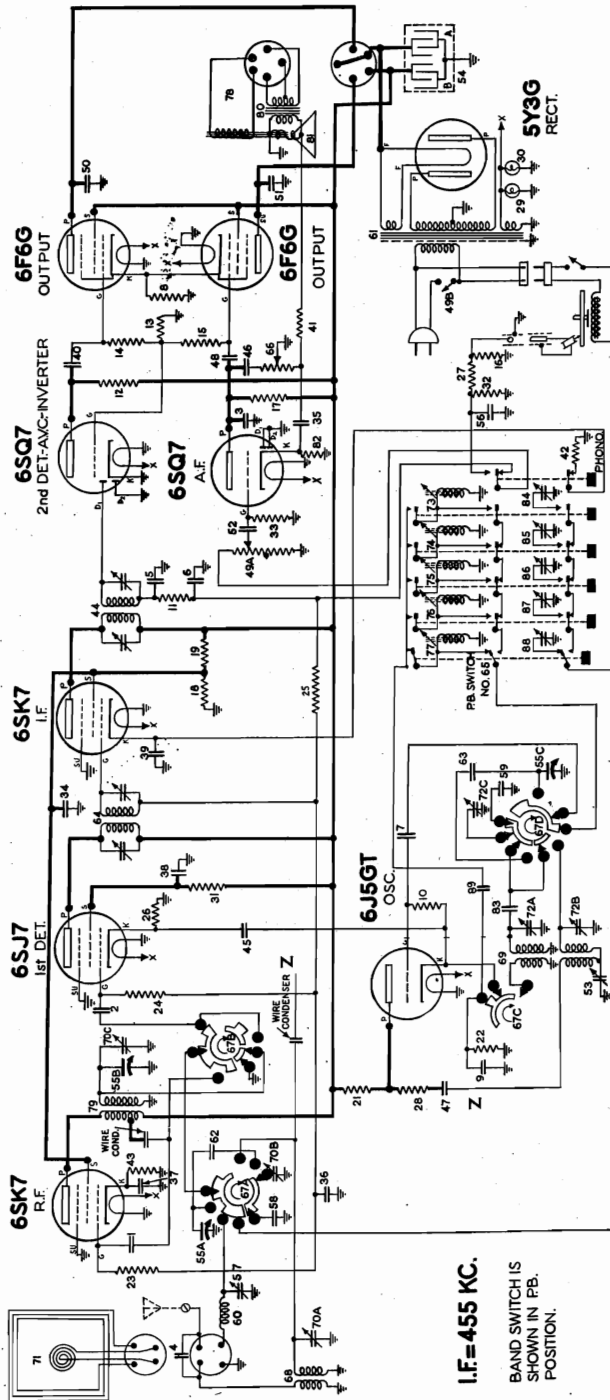
ALL PRICES SUBJECT TO CHANGE WITHOUT NOTICE

TUBE LOCATIONS



FIRESTONE TIRE & RUBBER CO.

MODEL S7400-2
Air Chief



"Z" POINTS
CONNECT
TOGETHER.

I.F. = 455 KC.

BAND SWITCH IS
SHOWN IN P.B.
POSITION.

**NOTE: Mention
Code No. A-372
when ordering
parts.**

ELECTRICAL PARTS

Diagram Number	Part Number	Description	List Price
1-2-3	89539	Condenser—mica 280 mmfd.	\$0.20
4-5-6	83793	Condenser—mica 110 mmfd.	.15
7	85081	Condenser—mica 51 mmfd.	.15
8	88482	Resistor—wire wound 270 ohms 1 watt.	.15
9	89114	Condenser—800 mmfd.	.20
10-11	110552	Resistor—carbon 47,000 ohms 1/4 watt.	.12
12 to 15	110553	Resistor—carbon 220,000 ohms 1/4 watt.	.12
16	110554	Resistor—carbon 1 megohm 1/4 watt.	.12
17	110559	Resistor—carbon 470,000 ohms 1/4 watt.	.12
18-19	110561	Resistor—carbon 15,000 ohms 2 watts.	.30
20-21	110569	Resistor—carbon 10,000 ohms 1/4 watt.	.12
22-23	110570	Resistor—carbon 2.2 meg. 1/4 watt.	.15
24-25	110570	Resistor—carbon 330,000 ohms 1/4 watt.	.12
26	110584	Resistor—carbon 60 ohms 1/4 watt.	.12
27	110590	Resistor—carbon 150 ohms 1/4 watt.	.12
28-30	110629	Dial Light Bulb—150 mmfd. (Mazda No. 44)	.12
31-32	112392	Resistor—carbon 10 meg. 1/4 watt.	.12
33-35	112625	Resistor—carbon 1 mid. 600 volt.	.25
36 to 40	112619	Condenser—1 mid. 600 volt.	.12
41	112625	Resistor—carbon 10,000 ohms 1 watt.	.12
42-43	112805	Resistor—carbon 270 ohms 1/4 watt.	.10
44	113024	Transformer—2nd I.F.	1.15
45-46-47	113193	Condenser—.01 mid. 600 volt.	.15
48	113414	Condenser—.02 mid. 600 volt.	.15
49A-49B	113602	Volume Control—1 meg. (with switch).	1.25
50-51	113817	Condenser—.004 mid. 600 volt.	.15
52	113875	Condenser—.002 mid. 600 volt.	.15
53	113934	Condenser—padder	.36
54	160008	Condenser—electrolytic {A-30 mid. 450 volt}	1.50
55A to 55C	160373	Condenser—variable tuning	3.20
56	160430	Condenser—.001 mid. 600 volt.	.15
57	160449	Condenser—trimmer (loop)	.18
58-59	160646	Condenser—compensating 100 mmfd.	.28

NO SIGNAL CONDITION
SOCKET VOLTAGES—ALL D.C. POTENTIAL MEASURED TO CHASSIS
DIAL TUNED TO 540 KC.

TUBE	FUNCTION	H	K	G	S	SU	P	D ₁	D ₂
6SK7	R.F.	6.0 A.C.	2	0	72	0	190		
6SJ7	1st Det.	6.0 A.C.	5	0	100	0	190		
6J5GT	Osc.	6.0 A.C.	0	—3			140		
6SK7	I.F.	6.0 A.C.	2	0	72	0	190		
6SQ7	2nd Det.—A.V.C. Inverter	6.0 A.C.	0	0			50	0	0
6SQ7	A.F.	6.0 A.C.	2	0			50	0	0
2 (6F6G)	Output	6.0 A.C.	12	0	190		290		
5Y3G	Rectifier	5.0 A.C.							

Use a high resistance voltmeter of at least 1000 ohms per volt.

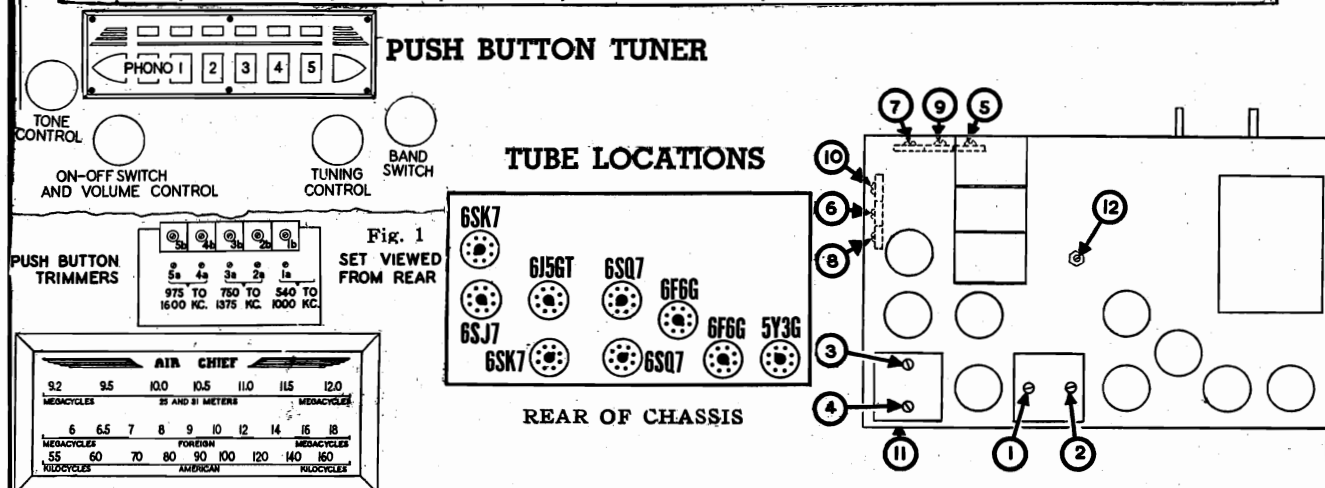
MODEL S7400-2

Air Chief

FIRESTONE TIRE & RUBBER CO.

1. Connect the output meter across the voice coil or from plate to plate of the 6F6G output tubes.
2. Connect the ground lead of the signal generator to the receiver chassis.
3. Turn the volume control to the maximum volume position, and the tone control to the high position.
4. FOLLOW THE ORDER OF ALIGNMENT INDICATED BELOW.

Dummy Ant. in Series with Sig. Gen.	Connection of Sig. Generator Output to Receiver	Signal Generator Frequency	Band Switch Position	Receiver Dial Setting	Trimmer Number	Trimmer Description	Type of Adjustment
.1 MFD Condenser	Lug on Middle Section of Gang Cond.	455 KC	Broadcast	Any Point Where It Does Not Affect the Signal	1-2 3-4	2nd I.F. 1st I.F.	Adjust for Maximum Output. Then repeat Adjustment.
400 OHM Carbon Resistor	Blue Lead from Chassis	16 MC	Foreign	16 MC	5	Foreign Oscillator	Adjust for Maximum Output. Check to see if Proper Peak was Obtained by Tuning in Image at Approx. 15.1 MC. If Image does not appear, Realign at 16 MC, with Trimmer Screw farther out. Recheck Image.
400 OHM Carbon Resistor	Blue Lead from Chassis	16 MC	Foreign	Tune to 16 MC Generator Signal	6	Foreign Antenna	Adjust for Maximum Output. Try to Increase Output by Detuning Trimmer and Retuning Receiver Dial until Maximum Output is Obtained.
400 OHM Carbon Resistor	Blue Lead from Chassis	11.5 MC	25-31M	11.5 MC	7	Spread Band Oscillator	Adjust for Maximum Output. Check to see if Proper Peak was Obtained by Tuning in Image at Approx. 10.6 MC. If Image does not appear, Realign at 11.5 MC, with Trimmer Screw farther out. Recheck Image.
400 OHM Carbon Resistor	Blue Lead from Chassis	11.5 MC	25-31M	Tune to 11.5 MC Generator Signal	8	Spread Band Antenna	Adjust for Maximum Output.
No Connection	Place Lead from Signal Gen. Near Loop	1500 KC	Broadcast	1500 KC	9	Broadcast Oscillator (Shunt)	Adjust for Maximum Output.
NOW PLACE THE CHASSIS AND LOOP ANTENNA INTO THE SAME RELATIVE POSITION AS WHEN IN THE CABINET.							
No Connection	Place Lead from Signal Gen. Near Loop	1500 KC	Broadcast	Tune to 1500 KC Generator Signal	10	Broadcast Detector	Adjust for Maximum Output.
No Connection	Place Lead from Signal Gen. Near Loop	1500 KC	Broadcast	Tune to 1500 KC Generator Signal	11	Broadcast Antenna	Adjust for Maximum Output.
No Connection	Place Lead from Signal Gen. Near Loop	600 KC	Broadcast	Tune to 600 KC Generator Signal	12	Broadcast Oscillator (Series)	Adjust for Maximum Output. Try to Increase Output by Detuning Trimmer and Retuning Receiver Dial until Maximum Output is Obtained.



Turn the BAND SWITCH to the "AM" position, then using the tuning knob (see Fig. 1) tune in the station you wish to set to button No. 1.

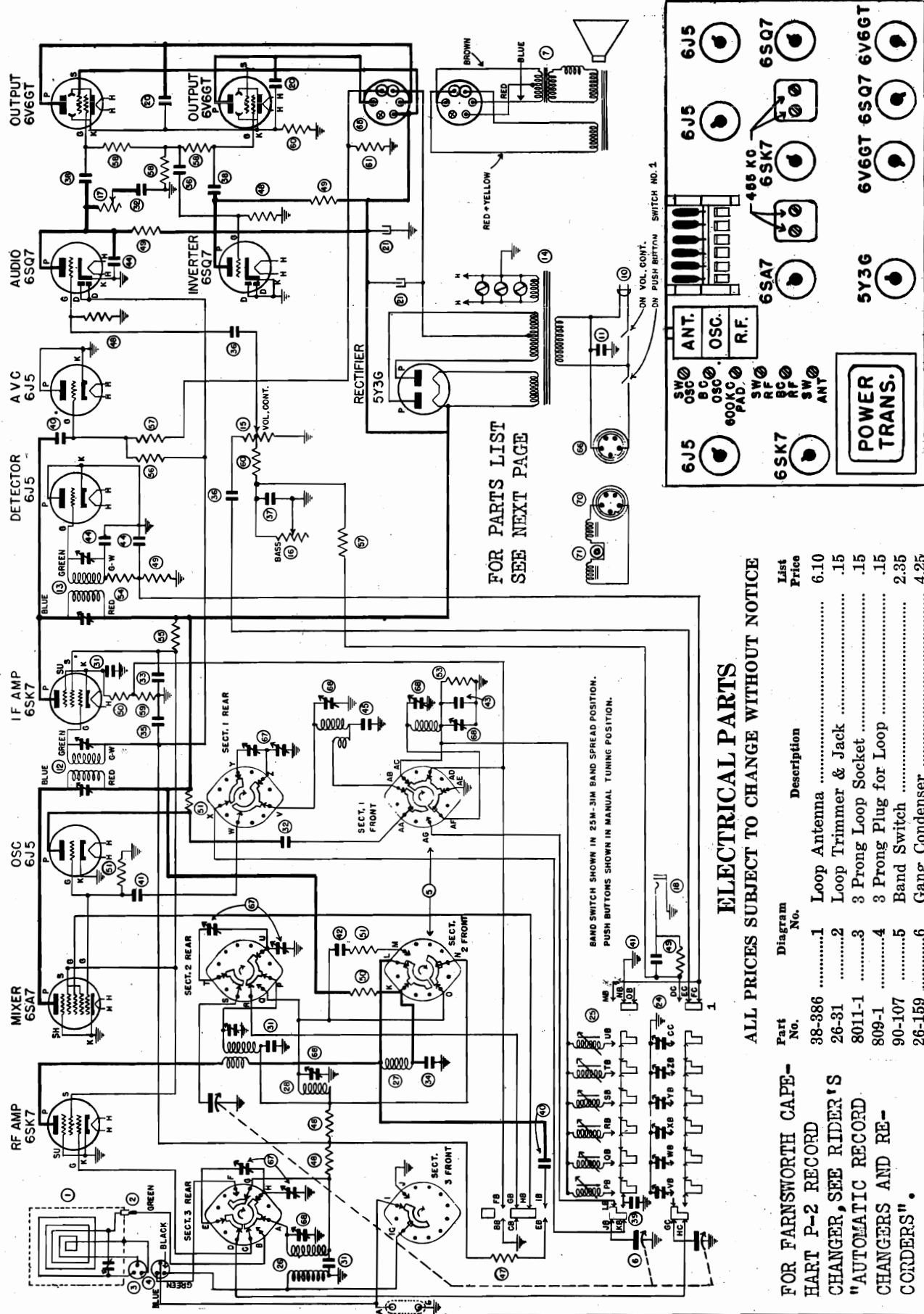
Turn the Band Switch to the "AUT" position and push in button No. 1. Using a screwdriver turn adjusting screw No. 1a until the station you had previously tuned in is again heard. If it is not heard, advance the volume control and adjust the screw again. Be sure to adjust screw No. 1a to the point where the program is heard with the deepest tone.

Insert the screwdriver in adjusting screw No. 1b and turn it until the program is heard with maximum volume. Now again check the setting of screw No. 1a making sure it is adjusted to give the deepest tone.

The set-up for button No. 1 is now complete.

To set up the remaining buttons use the same procedure; turn the Band Switch to the "AM" position, tune in the station using the tuning knob; turn the Band Switch to the "AUT" position; push in the button to be set up; adjust its associated "a" adjusting screw until the station is tuned in (screw "2a" for button No. 2, etc., see Fig. 1); the associated "b" screw is then adjusted for maximum volume as before.

FIRESTONE TIRE & RUBBER CO.



FOR PARTS LIST
SEE NEXT PAGE

BC ANT TRIMMER IS IN LOOP ANT

ELECTRICAL PARTS

ALL PRICES SUBJECT TO CHANGE WITHOUT NOTICE

Part No.	Diagram No.	Description	List Price
38-386	1	Loop Antenna	6.10
26-31	2	Loop Trimmer & Jack	.15
8011-1	3	3 Prong Loop Socket	.15
809-1	4	3 Prong Plug for Loop	.15
90-107	5	Band Switch	2.35
26-159	6	Gang Condenser	.425
81-54	7	14" Speaker	11.00

MODEL S7400-3

FIRESTONE TIRE & RUBBER CO.

ELECTRICAL PARTS

Part No.	Diagram No.	Description	List Price
38-364	26	S. W. Antenna Coil	.60
38-367	27	Plate Choke	.60
38-362	28	B. C. Mixer Coil	.50
38-363		S. W. Mixer Coil	.65
38-365	30	B. C. & S. W. Osc. Coil, Includ. con.	1.25
256-1	31	.05 Mfd. 200V Condenser	.15
255-1	32	.005 Mfd. 400V Condenser	.15
25-34	33	0.1 Mfd. 400V Condenser	.20
255-2	34	.05 Mfd. 400V Condenser	.20
256-2	35	0.1 Mfd. 200V Condenser	.15
255-1	36	.01 Mfd. 400V Condenser	.15
255-4	37	.002 Mfd. 400V Condenser	.15
255-3	38	.02 Mfd. 400V Condenser	.15
258-1	39	270 Mmf. Silver Mica Condenser	.25
253-2	40	250 Mmf. Mica Condenser	.15
253-5	41	50 Mmf. Mica Condenser	.15
25-49	42	10 Mmf. Mica Condenser	.15
258-2	43	350 Mmf. Silver Mica Condenser	.30
253-1	44	100 Mmf. Mica Condenser	.15
2514-1	45	6000 Mmf. Mica Condenser	.40
773-19	47	Carbon Resistor 100,000 Ohms	.15
773-29	48	Carbon Resistor 10 Meg. Ohms	.15
773-23	49	Carbon Resistor 470,000 Ohms	.15
773-10	50	Carbon Resistor 1,500 Ohms	.15
773-16	51	Carbon Resistor 22,000 Ohms. 1 Watt	.15
773-14	53	Carbon Resistor 10,000 Ohms	.15
773-18	54	Carbon Resistor 47,000 Ohms	.15
77-155	55	Carbon Resistor 12,000 Ohms. 2 Watt	.15
773-24	56	Carbon Resistor 1 Meg. Ohms	.15
773-25	57	Carbon Resistor 2.2 Meg. Ohms	.15
773-21	58	Carbon Resistor 220,000 Ohms	.15
773-10	59	Carbon Resistor 3,300 Ohms	.15
77-61	60	220 Ohms. W. W. 2W. Resistor	.20
774-3	61	22 Ohms. W. W. 1/2 W. Resistor	.15
804-2	65	Speaker Socket	.10
22-131	66	Plug & Wire Assy.	.60
26-162	67	Dual Trimmer Strip	.40
26-161	68	6 Gang Trimmer Strip	.80
80-28	70	Male Plug Phono Motor	.15
44-27	71	60 Cycle Motor	.70
		A.V.C. Coupling Condenser 40 is 25 Mmf.	
		Part number 253-4	.15
		A.V.C. Isolating Resistors for 6SK7 & 6SA7	
		marked 48 should be 47 100,000 Ohms.	
		Bass Boost Resistor marked 60 should be 58	
		220,000 Ohms	
27-118	10	Line Cord and Plug	.55
25-31	11	Line Buffer	.20
36-158	12	1st I. F. Transformer	1.60
38-160	13	2nd I. F. Transformer	1.60
344-1	14	60 Cycle Transformer	5.75
78-17	15	Volume Control	.80
78-53	16	Bass Control	.75
78-54	17	Treble Control	.75
805-1	18	Phono Jack	.15
80-33		A-G Terminal Strip	.15
255-1	20	.01 Mfd. 400V Condenser	.15
2511-1	21	25 Mfd.—450 Volt Electrolytic	.75
90-34		Push Button Switch	3.50
26-46	24	Trimmer Strip (Push Button)	1.15

SOCKET VOLTAGES—ALL D.C. VOLTAGES MEASURED TO CHASSIS

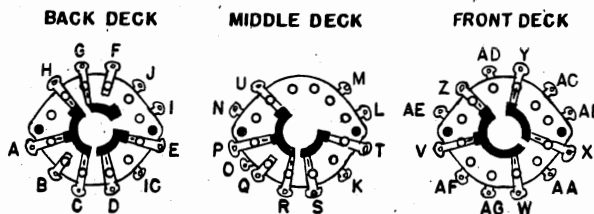
ANTENNA GROUNDED

DIAL TUNED TO 540 K.C.

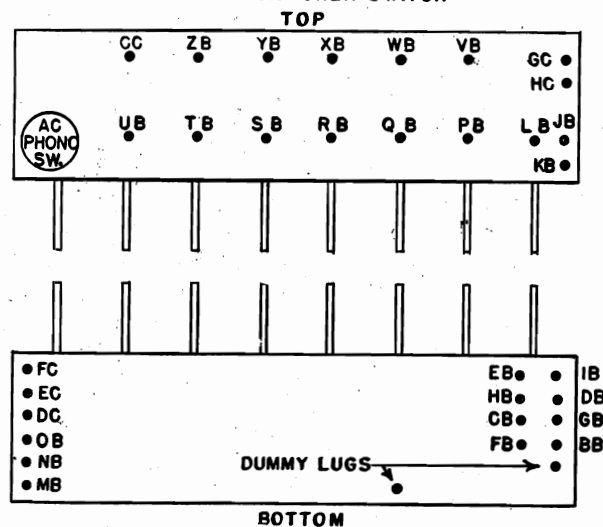
TUBE	FUNCTION	H	K	G	G ₁	S	SU	P	D ₁	D ₂
6SK7	R.F.	6.3	0	Note A		105		235		
6SA7	Mixer	6.3	0	Note A		105		255		
6J5	Oscillator	6.3	0					130		
6SK7	I.F.	6.3	8.5	Note A		105		255		
6J5	Detector	6.3	0					0		
6J5	A. V. C.	6.3	0	Note A				0		
6SQ7	1st Audio	6.3	0					62	Note A	Note A
6SQ7	Inverter	6.3	0					62	0	0
6V6GT	Audio	6.3	15			255		240		
6V6GT	Audio	6.3	15			255		240		
5Y3G	Rectifier	5						350 A.C.		

NOTE A: Due to the high resistance in the circuit, only very slight deflections of the voltmeter will be obtained.

BACK VIEW OF RANGE SWITCH DECKS



PUSH BUTTON TUNER SWITCH



LETTERS ON TERMINALS OF SWITCHES SHOWN ABOVE CORRESPOND TO SIMILARLY LETTERED TERMINALS ON THE SWITCHES SHOWN IN THE CIRCUIT DIAGRAM.

A Firestone "Powerscope" is built into this receiver and under normal conditions will give satisfactory reception. In locations remote from broadcasting stations, or where poor receiving conditions exist, it may be necessary to use an outside antenna. This antenna may be a single wire from 35 feet to 75 feet long, including the lead-in wire, erected as high as possible and as far from electric light wires (or other sources of noise) as possible. When an antenna is used a good ground should also be used. The antenna wire is connected to the screw marked "Ant." and the ground to the terminal, marked "Gnd." located at the rear of the chassis.

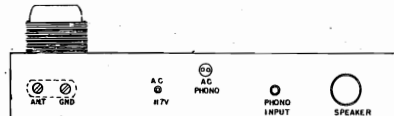


Fig. 1

The "Powerscope" in these instruments is rotatable and may be turned by means of the right hand knob on the panel. A stop is provided to prevent the "Powerscope" from turning too far. This knob should be used to adjust the "Powerscope" towards the station, or that direction which gives the best reception, i. e., loudest signals with least interference. In some locations it may be found that stations can only be received with the "Powerscope" in one position. This is a local condition and may be due to local shielding.

FIRESTONE TIRE & RUBBER CO.

FOR TUNER DATA SEE MODEL S7400-4

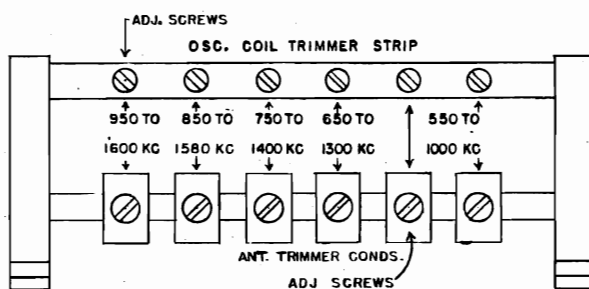
ALIGNMENT PROCEDURE

FOR ALIGNMENT: An output meter and an accurately calibrated signal generator are required.

1. Connect the output meter across the voice coil or across the plates of the 6F6G output tubes depending on the type of meter. (The more sensitive type should be connected across the voice coil.)
2. Connect the ground lead of the signal generator to the receiver chassis or to the "G" terminal at the back of the chassis.
3. Turn the volume control to within 15° of the maximum volume position and keep it in this position throughout the alignment procedure.
4. Push in the "Manual" button and keep it pushed in. Check the pointer to see that it is correctly set.

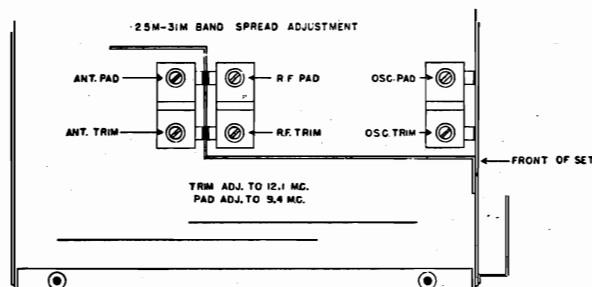
Dummy Ant. in Series with Sig. Gen.	Connection of Sig. Generator Output to Receiver	Signal Generator Frequency	Band Switch Position	Receiver Dial Setting	Trimmer Description	Type of Adjustment
.1 MFD Condenser	Lug on Rear Section of Gang. Cond.	455 KC	Broadcast	Any Point Where It Does Not Affect the Signal	2nd I.F. 1st I.F.	Adjust for Maximum Output. Then Repeat Adjustment.
250 MMF.	"Ant." Terminal	1600 KC	Broadcast	1600 KC	Broadcast Oscillator (Shunt)	Adjust for Maximum Output.
250 MMF.	"Ant." Terminal	1500 KC	Broadcast	Tune to 1500 KC Generator Signal	Broadcast R.F. Loop Trimmer	Adjust for Maximum Output.
250 MMF.	"Ant." Terminal	600 KC	Broadcast	Tune to 600 KC Generator Signal	600 KC Padder	Adjust for Maximum Output. Try to Increase Output by Rocking the Gang until Maximum Output is Obtained.
400 OHM Carbon Resistor	"Ant." Terminal	18.1 MC	Foreign	18.1 MC	Shortwave Oscillator	Adjust for Maximum Output. Check to see if Proper Peak was Obtained by Tuning in Image at Approx. 17.2 MC. If Image does not appear, Realign at 18.1 MC, with Trimmer Screw farther out. Recheck Image.
400 OHM Carbon Resistor	"Ant." Terminal	16 MC	Foreign	Tune to 16 MC Generator Signal	Shortwave Antenna Shortwave R.F.	Adjust for Maximum Output. Try to Increase Output by Rocking the Gang until Maximum Output is Obtained.
400 OHM. Carbon Resistor	"Ant." Terminal	9.5 MC	25M-31M	9.5 MC	Band Spread* Oscillator Pad	Adjust for Maximum Output. To check for Correct Alignment Tune Generator to 10.4 MC. If Image comes in alignment is correct.
400 OHM. Carbon Resistor	"Ant." Terminal	9.5 MC	25M-31M	9.5 MC	Band Spread* R. F. Pad.	Adjust for Maximum Output.
400 OHM. Carbon Resistor	"Ant." Terminal	9.5 MC	25M-31M	9.5 MC	Band Spread* Ant. Pad	Adjust for Maximum Output.
400 OHM. Carbon Resistor	"Ant." Terminal	12 MC	25M-31M	12 MC	Band Spread* Osc. Trimmer	Adjust for Maximum Output. To Check for Correct Alignment Tune Generator to 12.9 MC. If Image Comes In Alignment is Correct.
400 OHM. Carbon Resistor	"Ant." Terminal	12 MC	25M-31M	12 MC	Band Spread* R.F. Trimmer.	Adjust For Maximum Output.
400 OHM. Carbon Resistor	"Ant." Terminal	12 MC	25M-31M	12 MC	Band Spread* Ant. Trimmer	Adjust For Maximum Output.

*BAND SPREAD CONDENSERS MOUNTED UNDEREATH CHASSIS PAN. SEE ILLUSTRATION BELOW.

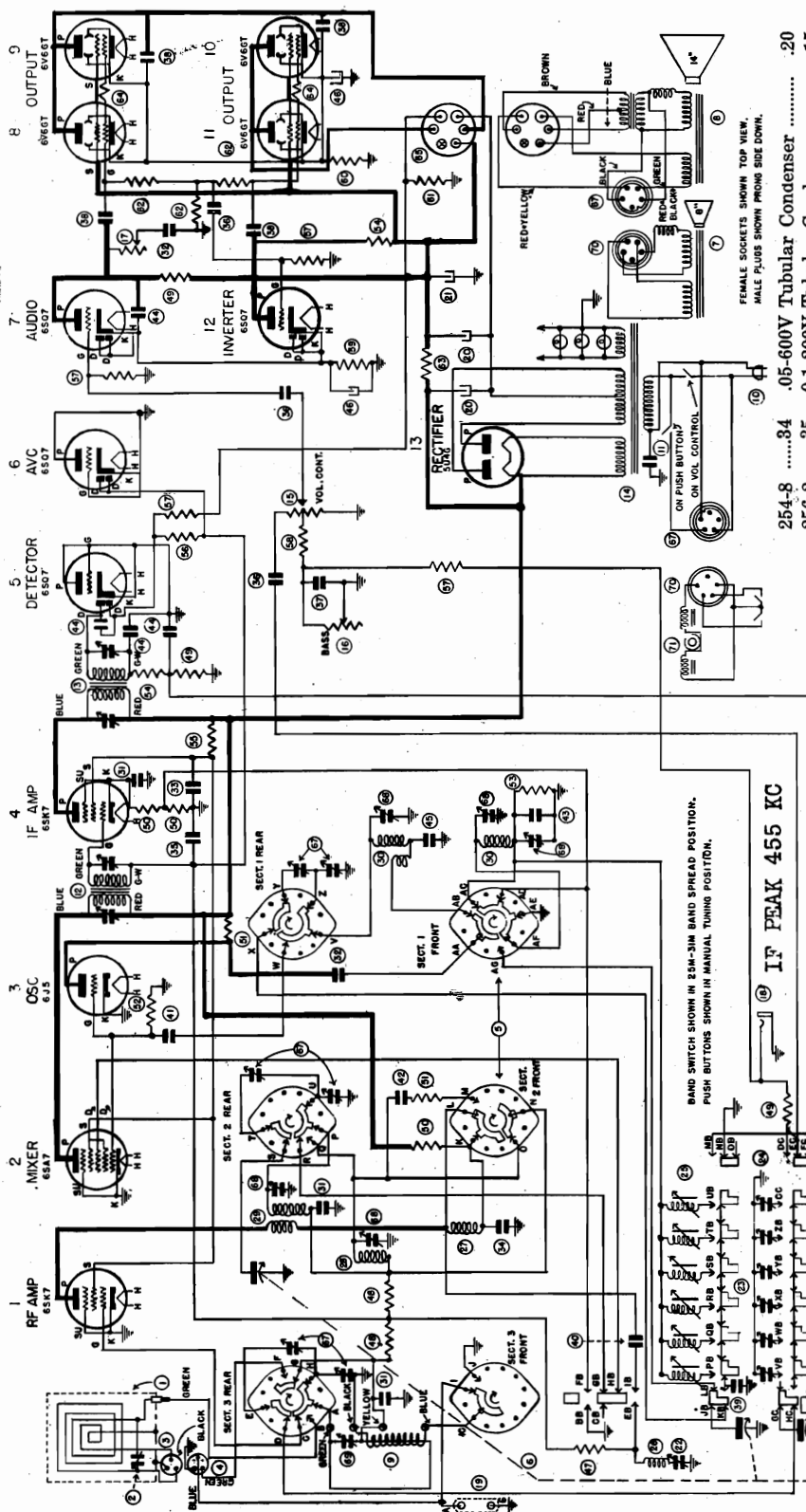


VIEWED FROM REAR OF CABINET

Fig. 3



FIRESTONE TIRE & RUBBER CO.

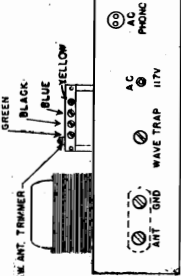


FEMALE SOCKETS SHOWN TOP VIEW.
MALE PLUGS SHOWN FROM SIDE DOWN.

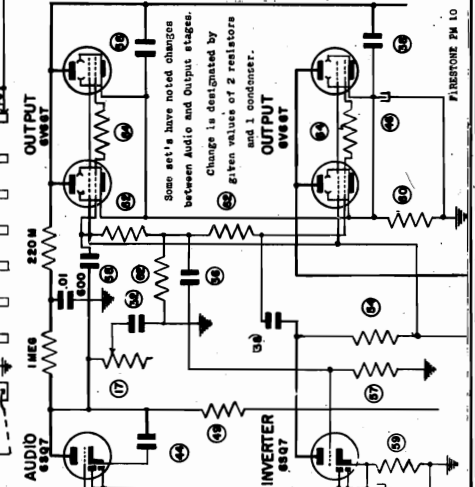
254-8	.....34	.05-600V Tubular Condenser	.....	.20
256-2	.....35	0.1-200V Tubular Condenser	.....	.15
255-1	.....36	.01-400V Tubular Condenser	.....	.15
255-4	.....37	.002-400V Tubular Condenser	.....	.15
254-6	.....38	.02-600V Tubular Condenser	.....	.25
258-1	.....39	270 Mmf. Silver Mica Condenser	.....	.15
253-2	.....40	250 Mmf. Mica Condenser	.....	.15
253-5	.....41	50 Mmf. Mica Condenser	.....	.15
25-49	.....42	10 Mmf. Mica Condenser	.....	.30
258-2	.....43	350 Mmf. Silver Mica Condenser	.....	.15
253-1	.....44	100 Mmf. Mica Condenser	.....	.40
2514-1	.....45	6000 Mmf. Mica Condenser	.....

Part Diagram No.	Description	List Price
26-46.....24	Trimmer Strip (Push Button)	1.15
38-148.....25	Oscillator Coil Strip	2.45
38-82.....26	Wave Trap Coil .....	.60
38-367.....27	Plate Choke .....	.60
38-362.....28	B. C. Mixer Coil .....	.50
38-363.....29	S. W. Mixer Coil .....	.65
38-365.....30	Osc. Coil (BC &SN) includes condenser	1.25
256-1.....31	.05-200V Tubular Condenser	15

FOR OTHER PARTS
SEE NEXT PAGE



FOR FARNSWORTH CAPEHART RECORD CHANGER
P-2, SEE RIDER'S "AUTOMATIC RECORD
CHANGERS AND RECORDERS".



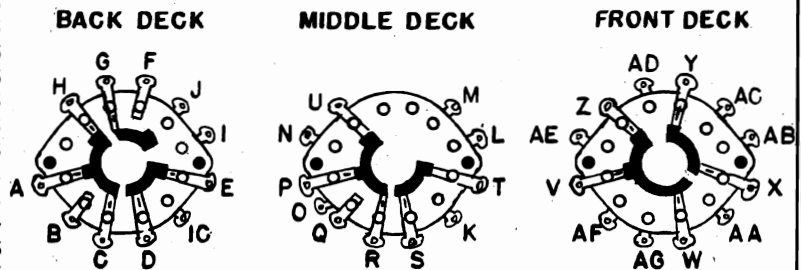
FIRESTONE TIRE & RUBBER CO. MODELS S7400-4, S7400-5

PARTS LIST CONT.

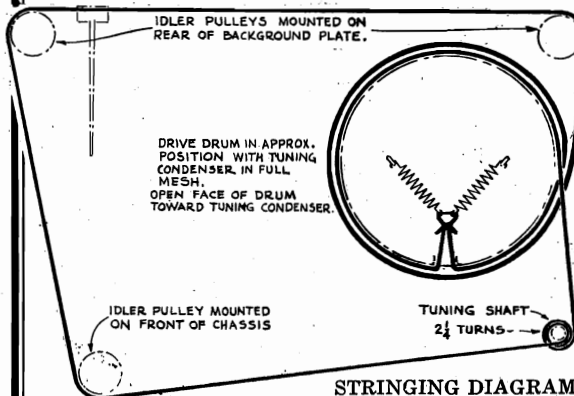
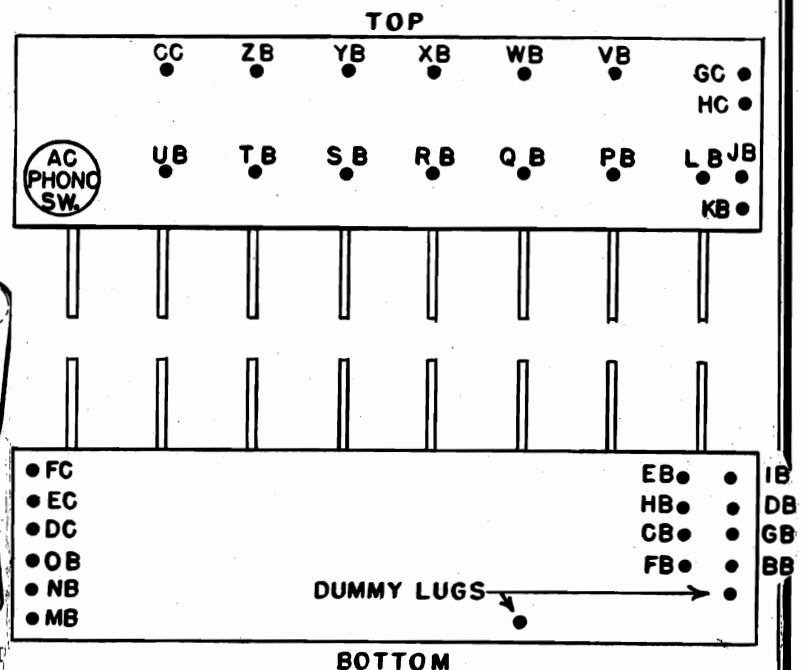
771-19	.....48	Carbon Resistor 100,000 Ohms.....	15
773-23	.....49	Carbon Resistor 470,000 Ohms.....	15
773-10	.....50	Carbon Resistor 1,500 Ohms.....	15
773-16	.....51	Carbon Resistor 22,000 Ohms.....	15
77-156	.....52	Carbon Resistor 22,000 Ohms.....	15
771-14	.....53	Carbon Resistor 10,000 Ohms.....	15
773-18	.....54	Carbon Resistor 47,000 Ohms.....	15
77-155	.....55	Carbon Resistor 12,000 Ohms.....	15
773-24	.....56	Carbon Resistor 1 Meg. Ohms.....	15
773-25	.....57	Carbon Resistor 2.2 Meg. Ohms.....	15
773-21	.....58	Carbon Resistor 220,000 Ohms.....	15
773-12	.....59	Carbon Resistor 3,300 Ohms.....	15
77-153	.....60	150W. W. W. 4 Watt Resistor.....	25
77-152	.....61	15W. W. W. 1/2 Watt Resistor.....	15
773-20	.....62	150M Ohm. Carbon Resistor.....	15
77-64	.....63	100 Ohm. 4 Watt W. W. Resistor.....	15
773-6	.....64	220 Ohm. Carbon Resistor.....	15
804-2	.....65	Speaker Socket 6 Prong.....	10
22-131	.....66	Plug & Wire Assby.....	60
26-162	.....67	Dual Trimmer Strip.....	40

LETTERS ON TERMINAL OF SWITCHES SHOWN TO THE RIGHT, CORRESPOND TO SIMILARLY LETTERED TERMINALS ON THE SWITCHES SHOWN IN THE CIRCUIT DIAGRAM.

BACK VIEW OF RANGE SWITCH DECKS



PUSH BUTTON TUNER SWITCH



STRINGING DIAGRAM

BOTTOM

SOCKET VOLTAGES—ALL D.C. VOLTAGES MEASURED TO CHASSIS

ANTENNA GROUNDED

DIAL TUNED TO 540 K.C. PUSH BUTTON ADJUSTMENT

TUBE	FUNCTION	H	K	G	G ₁	S	SU	P	D ₁	D ₂
6SK7	R.F.	6.3 A.C.	0	Note A		105	0	250		
6SA7	Mixer	6.3 A.C.	0	Note A	Note A	105	0	255		
6J5	Oscillator	6.3 A.C.	0					125		
6SK7	I. F.	6.3 A.C.	7.4			105	7.4	255		
6SQ7	Detector	6.3 A.C.	0						Note A	Note A
6SQ7	A.V.C.	6.3 A.C.		0				0	Note A	Note A
6SQ7	1st Audio	6.3 A.C.	1	0				105	1	1
6SQ7	Inverter	6.3 A.C.	1	0				105	1	1
6V6GT	Audio	6.3 A.C.	18			255		250		
6V6GT	Audio	6.3 A.C.	18			255		250		
6V6GT	Audio	6.3 A.C.	18			255		250		
6V6GT	Audio	6.3 A.C.	18			255		250		
5U4G	Rectifier	5 A.C.					350 A.C.			

Directly back of dial assembly are 6 screws. The right hand pair connect with left hand button looking from front. (1) Make list of 6 stations in order of freqs. (2) Press "Manual" button, tune in lowest freq. station. (3) Press button selected for station. (4) Adj. upper brass screw until station is heard clearly. (5) Adj. lower screw in same pair for maximum volume.

NOTE A: Due to the high resistance in the circuit, only very slight deflections of the voltmeter will be obtained.

MODELS S7400-4, S7400-5

FIRESTONE TIRE & RUBBER CO.

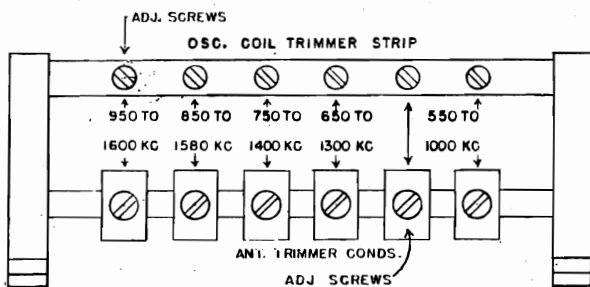
ALIGNMENT PROCEDURE

FOR ALIGNMENT: An output meter and an accurately calibrated signal generator are required.

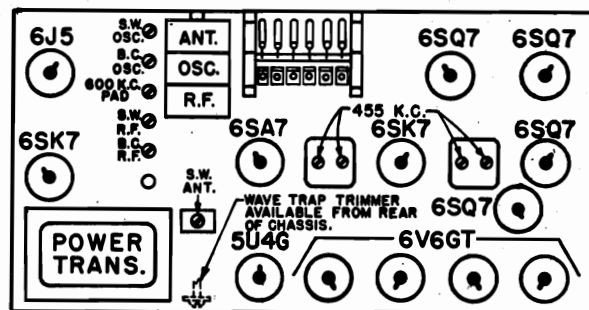
1. Connect the output meter across the voice coil or across the plates of the 6V6GT output tubes depending on the type of meter.
(The more sensitive type should be connected across the voice coil.)
2. Connect the ground lead of the signal generator to the receiver chassis or to the "G" terminal at the back of the chassis.
3. Turn the volume control to within 15° of the maximum volume position and keep it in this position throughout the alignment procedure.
4. Push in the "Manual" button and keep it pushed in. Check the pointer to see that it is correctly set.

Dummy Ant. in Series with Sig. Gen.	Connection of Sig. Generator Output to Receiver	Signal Generator Frequency	Band Switch Position	Receiver Dial Setting	Trimmer Description	Type of Adjustment
.1 MFD Condenser	Lug on Rear Section of Gang. Cond.	455 KC	Broadcast	Any Point Where It Does Not Affect the Signal	2nd I.F.	Adjust for Maximum output.
250 MMF.	"Ant." Terminal	455 KC	Push in No. 6 Button	Any Point Where It Does Not Affect the Signal	1st I.F.	Adjust for Maximum Output. Tighten screw next to 6SA7. Adjust other screw for maximum output. Adjust screw next to 6SA7 for maximum output. Do not touch the other screw again.
250 MMF.	"Ant." Terminal	1600 KC	Broadcast	1600 KC	Wave Trap	Adjust for MINIMUM Output. Using a Strong Signal from Generator.
250 MMF.	"Ant." Terminal	1500 KC	Broadcast	Tune to 1500 KC Generator Signal	Broadcast Oscillator (Shunt)	Adjust for Maximum Output.
250 MMF.	"Ant." Terminal	600 KC	Broadcast	Tune to 600 KC Generator Signal	Broadcast R.F. Loop Trimmer	Adjust for Maximum Output.
400 OHM Carbon Resistor	"Ant." Terminal	18.1 MC	Foreign	18.1 MC	600 KC Padder	Adjust for Maximum Output. Try to increase Output by Rocking the Gang until Maximum Output is Obtained.
400 OHM Carbon Resistor	"Ant." Terminal	16 MC	Foreign	Tune to 16 MC Generator Signal	Shortwave Oscillator	Adjust for Maximum Output. Check to see if Proper Peak was Obtained by Tuning in Image at Approx. 17.2 MC. If Image does not appear, Realign at 18.1 MC, with Trimmer Screw Farther out. Recheck Image.
400 OHM Carbon Resistor	"Ant." Terminal	9.5 MC	25M-31M	9.5 M.C	Shortwave Antenna	Adjust for Maximum Output.
400 OHM Carbon Resistor	"Ant." Terminal	9.5 MC	25M-31M	9.5 M.C	Shortwave R.F.	Try to Increase Output by Rocking the Gang until Maximum Output is Obtained.
400 OHM Carbon Resistor	"Ant." Terminal	9.5 MC	25M-31M	9.5 M.C	Band Spread* Oscillator Pad	Adjust for Maximum Output. To check for Correct Alignment Tune Generator to 10.4 MC. If Image comes in alignment is correct.
400 OHM Carbon Resistor	"Ant." Terminal	9.5 MC	25M-31M	9.5 M.C	Band Spread* R. F. Pad	Adjust for Maximum Output.
400 OHM Carbon Resistor	"Ant." Terminal	12 MC	25M-31M	12 MC	Band Spread* Ant. Pad	Adjust for Maximum Output.
400 OHM Carbon Resistor	"Ant." Terminal	12 MC	25M-31M	12 MC	Band Spread* Osc. Trimmer	Adjust for Maximum Output. To Check for Correct Alignment Tune Generator to 12.9 MC. If Image Comes in Alignment is Correct.
400 OHM Carbon Resistor	"Ant." Terminal	12 MC	25M-31M	12 MC	Band Spread* R.F. Trimmer	Adjust For Maximum Output.
400 OHM Carbon Resistor	"Ant." Terminal	12 MC	25M-31M	12 MC	Band Spread* Ant. Trimmer	Adjust For Maximum Output.

*BAND SPREAD CONDENSERS MOUNTED UNDERNEATH CHASSIS PAN. SEE ILLUSTRATION BELOW.

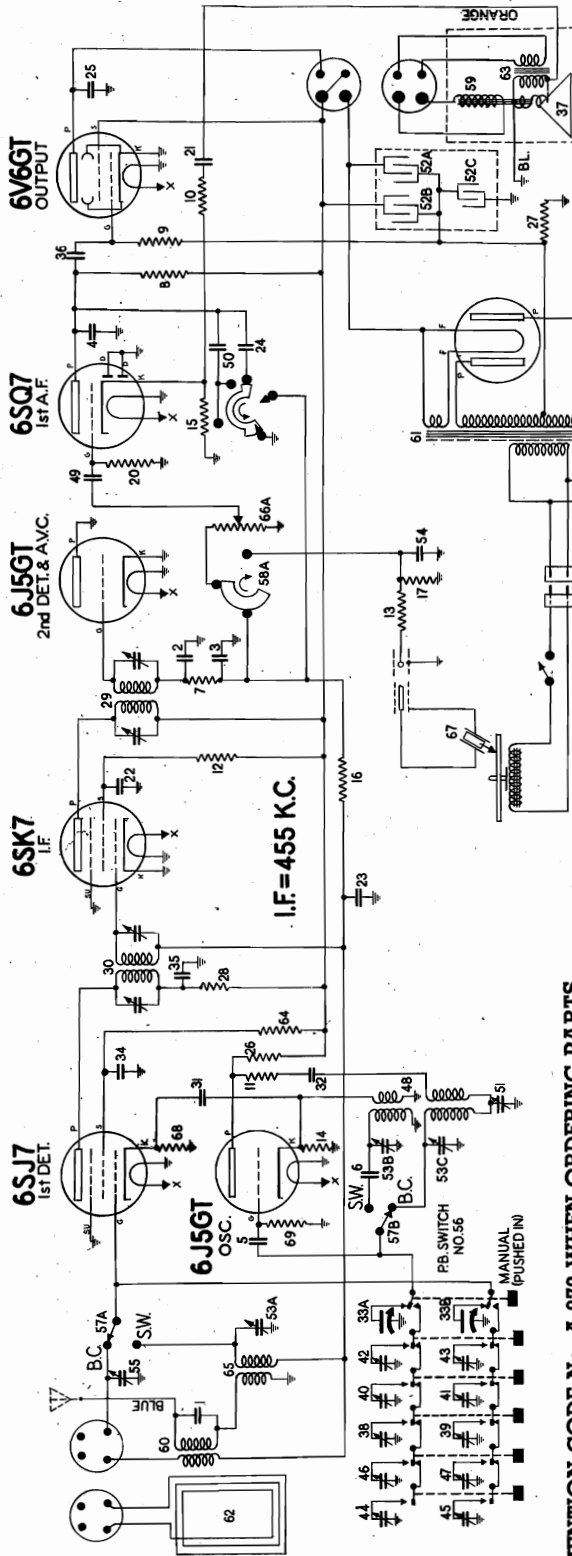


VIEWED FROM REAR OF CABINET
Push Button Adjustment



B C ANT TRIMMER IS IN LOOP ANT

FIRESTONE TIRE & RUBBER CO.



NOTE: MENTION CODE NO. A-373 WHEN ORDERING PARTS.

Diagram Number	Part Number	Description	List Price
1 to 4	82793	Condenser, mica 110 mmfd.	\$0.20
5	82081	Condenser, mica 51 mmfd.	.15
6	89587	Resistor-carbon 47,000 ohms 1/4 watt.	.35
7	110532	Resistor-carbon 220,000 ohms 1/4 watt.	.12
8-9	110533	Resistor-carbon 6800 ohms 1/4 watt.	.12
10	110534	Resistor-carbon 180 ohms 1/4 watt.	.12
11	110590	Resistor-carbon 100,000 ohms 1/4 watt.	.12
12-13	110564	Resistor-carbon 560 ohms 1/4 watt.	.12
14-15	110570	Resistor-carbon 2.2 meg. 1/4 watt.	.12
16	110578	Resistor-carbon 330,000 ohms 1/4 watt.	.12
17	110584	Lamp-dial (Marzda No. 44 frosted)	.25
18-19	112636	Resistor-carbon 10 meg. 1/4 watt.	.12
20	112975	Resistor-carbon 10 meg. 1/4 watt.	.12
21	116623	Condenser-.02 mfd. 600 volt.	.25
22	119414	Condenser-.02 mfd. 600 volt.	.20
23	116819	Condenser-.06 mfd. 600 volt.	.15
24	119415	Condenser-.06 mfd. 600 volt.	.15
25	119416	Condenser-.06 mfd. 600 volt.	.15
26	118605	Resistor-180 ohms 1 watt W.W.	.12
27	118812	Resistor-carbon 4700 ohms 1/4 watt.	.12
28	119024	Transformer-2nd I.F.	1.15
29	500801	Transformer-1st I.F.	1.20
30	500801	Transformer-2nd I.F.	1.15
31-32	500801	Condenser-.01 mfd. 600 volt.	.15
33A-33B	119291	Condenser-variable tuning	2.75
34-35-36	119414	Condenser-.02 mfd. 600 volt.	.15
37	500969	Cone & Voice coil for M-500948 speaker	2.00
38 to 41	119663	Condenser-push button trimmer (med. freq.)	.24
42-43	119664	Condenser-push button trimmer (high freq.)	.24
44 to 47	119753	Condenser-push button trimmer (low freq.)	1.00
48	500248	Coil-oscillator	.15
49-50	119875	Crad.-ser.-.002 mfd. 600 volt.	.35
51	119834	Condenser-padder	.15

NO SIGNAL CONDITION									
TUBE	FUNCTION	H	K	G	S	SU	P	D ₁	D ₂
6SJ7	1st Det.	6.0 A.C.	9.0	0	105	0	220		
6J5GT	Osc.	6.0 A.C.	0	-3		0	165		
6SK7	I.F.	6.0 A.C.	0	0	46	0	230		
6J5GT	2nd Det.-A.V.C.	6.0 A.C.	0	0		0	0		
6SQ7	1st A.F.	6.0 A.C.	1	0		0	75	0	0
6V6GT	Output	6.0 A.C.	0	Note A	230		220		
5Y3G	Rectifier	5.0 A.C.							
Plates 350 V.A.C. to C.T.									

NOTE A: The 6V6GT grid bias voltage is -13.5 volts measured across resistor No. 27. Use a high resistance voltmeter of at least 1000 ohms per volt.

FOR PUSH-BUTTON DATA SEE INDEX

MODEL S7400-6

FIRESTONE TIRE & RUBBER CO.

ALIGNMENT EQUIPMENT & PROCEDURE

1. Connect the output meter across the voice coil or from plate of the 6V6GT output tube to chassis through a .1 mfd. condenser. (The more sensitive type should be connected across the voice coil.)
2. Connect the ground lead of the signal generator to the receiver chassis.
3. Turn the RADIO-PHONO TONE SWITCH to the extreme clockwise position.
4. Turn the volume control to the maximum position and keep it in this position throughout the alignment procedure.
5. Push in the "Manual" button and keep it pushed in. Check the pointer to see that it is correctly set to 540 KC. with gang in full mesh.
6. The loop must be connected as indicated in circuit diagram at all times.

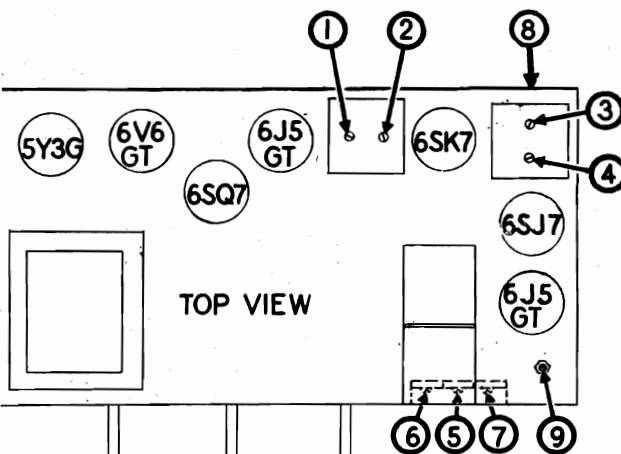
Dummy Ant. in Series with Sig. Gen.	Connection of Sig. Generator Output to Receiver	Signal Generator Frequency	Band Switch Position	Receiver Dial Setting	Trimmer Number	Trimmer Description	Type of Adjustment
1 MFD. Condenser	Lug on rear Section of Gang Cond.	455 KC	American	Any Point Where It Does Not Affect the Signal	1-2 3-4	2nd I.F. 1st I.F.	Adjust for Maximum Output. Then repeat Adjustment.
400 OHM Carbon Resistor	Antenna Terminal (Blue Wire)	16 MC	Foreign	16 MC	5	Foreign Oscillator	Adjust for Maximum Output. Check to see if Proper Peak was Obtained by Tuning in Image at Approx. 15.1 MC. If Image does not appear, Realign at 16 MC, with Trimmer Screw farther out. Recheck Image.
400 OHM Carbon Resistor	Antenna Terminal (Blue Wire)	16 MC	Foreign	Tune to 16 MC Generator Signal	6	Foreign Antenna	Adjust for Maximum Output. Try to Increase Output by Detuning Trimmer and Retuning Receiver Dial until Maximum Output is Obtained.
200 MMFD. Mica Condenser	Antenna Terminal (Blue Wire)	1500 KC	American	1500 KC	7	Broadcast Oscillator (Shunt)	Adjust for Maximum Output.

Now replace the chassis and loop antenna in the cabinet before proceeding further.

200 MMFD. Mica Condenser	Antenna Terminal (Blue Wire)	1500 KC	American	Tune to 1500 KC Generator Signal	8	Broadcast Antenna	Adjust for Maximum Output.
200 MMFD. Mica Condenser	Antenna Terminal (Blue Wire)	600 KC	American	Tune to 600 KC Generator Signal	9	Broadcast Oscillator (Series)	Adjust for Maximum Output. Try to Increase Output by Detuning Trimmer and Retuning Receiver Dial until Maximum Output is Obtained.

MISCELLANEOUS PARTS

Part Number	Description	List Price
500936	Cabinet Back .....	.50
160395	Cable, Motor .....	.48
117493	Cable, Pickup .....	.40
114955	Clamp, for Dial Cord .....	.01
112745	Clip, Coil Mounting .....	.01
117057	Cord, Drive (Supplied in 3 ft. Lengths) .....	.15
500100	Dial Scale	1.00
117029	Drive Drum & Bushing .....	.50
500110	Escutcheon, Dial (with Glass)	1.30
500111	Escutcheon, Push Button .....	.40
119644	Knob, Volume & Tuning .....	.18
119746	Knob, Band or Tone .....	.16
160269	Pointer .....	.18
500112	Push Button .....	.12
81145	Retaining Ring for Tuning Shaft	Per C
114914	Screw Special Head for Mtg. Escutcheon	Per Doz.
85827	Set Screw, 8-32 Square Head .....	.02
500051	Socket for Loop Antenna .....	.15
160039	Socket, Phono .....	.08
110501	Socket, 4 Prong (for Speaker) .....	.16
119791	Socket, Octal .....	.12
114876	Socket, Octal (Rectifier) .....	.15
114878	Socket, Octal with Special Ground .....	.15
116467	Socket, Condenser Mtg. .....	.04
111090	Spacer, steel, Mtg. for Gang .....	.02
113177	Spring, Dial Cord Tension .....	.09
117315	Tab, Station Call Letters .....	.55
118606	Tuning Shaft .....	.18
111456	Washer, Spring Washer for Tuning Shaft	Per C



FOR GENERAL INDUSTRIES 201 RECORD CHANGER, SEE RIDER'S "AUTOMATIC RECORD CHANGERS AND RECORDERS".

FIRESTONE TIRE & RUBBER CO.

MODEL S7401-1
Lumitone

ALIGNMENT PROCEDURE

Lack of sensitivity and poor tone quality may be due to any one or a combination of causes such as weak or defective tubes or speaker, open or grounded bias resistor, bypass condenser, etc. Never attempt to realign set until all other possible sources of trouble have been first thoroughly investigated and definitely proved not to be the cause.

NOTE: IT IS ABSOLUTELY NECESSARY THAT AN ACCURATELY CALIBRATED TEST OSCILLATOR WITH SOME TYPE OF OUTPUT MEASURING DEVICE BE USED WHEN ALIGNING THE RECEIVER AND THAT THE PROCEDURE BE CAREFULLY FOLLOWED, OTHERWISE THE RECEIVER WILL BE INSENSITIVE AND THE DIAL CALIBRATION WILL BE INCORRECT. THE TRIMMERS WILL BE REFERRED TO BY THEIR FUNCTION AS INDICATED ON THE PARTS DIAGRAM.

GENERAL DATA. The alignment of this receiver requires the use of a test oscillator that will cover the frequencies of 456, 600, 1400 and 1720 KC and an output meter to be connected across the primary or secondary of the output transformer. If possible, all alignments should be made with the volume control on maximum and the test oscillator output as low as possible to prevent the AVC from operating and giving false readings.

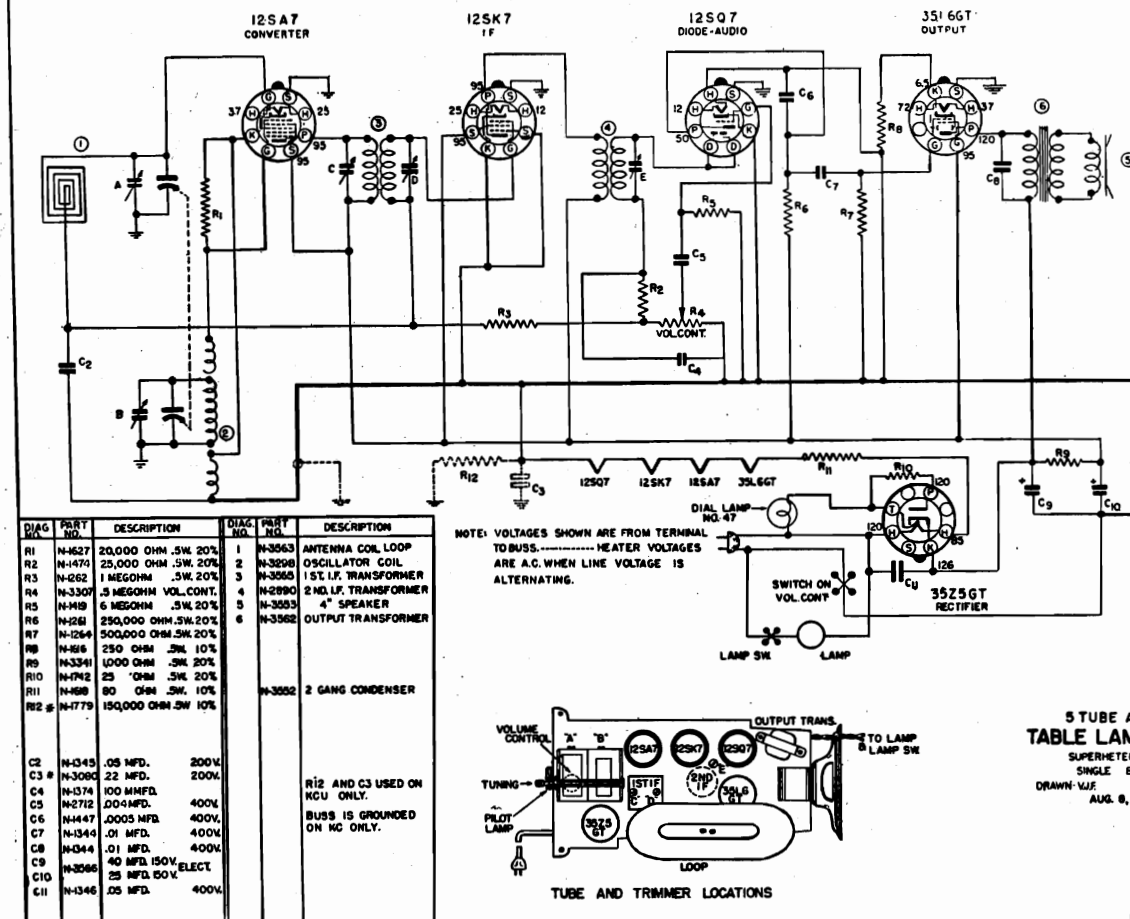
CORRECT ALIGNMENT PROCEDURE. Remove the chassis from the cabinet and set on a bench taking care that no iron or other metal is near the loop. (See section on replacement of tubes). Do not make this setup on a metal bench. The intermediate frequency (I.F.) stages should be aligned properly as the first step. After the I.F. transformers have been properly adjusted and peaked, the broadcast band should be adjusted.

I. F. ALIGNMENT. With the gang condenser set at minimum, adjust the test oscillator to 456 KC and connect the output to the grid of the first detector tube (12SA7) through a .05 or .1 mfd. condenser. The ground on the test oscillator should be connected to the chassis ground. Align all three I.F. trimmers to peak or maximum reading on the output meter.

BROADCAST BAND ALIGNMENT. Connect the test oscillator to a loop transmitter and couple to the loop antenna on the receiver. With the gang condenser set at minimum capacity, set the test oscillator at 1720 K.C. and adjust the oscillator (or 1720 KC trimmer) on gang condenser. Next—set the test oscillator at 1400 KC, and tune in the signal on the gang condenser. Adjust the antenna trimmer (or 1400 KC trimmer) for maximum signal. Next set the test oscillator at 600 KC, and tune in signal on condenser to check alignment of coils.

Voltages shown on the circuit diagram are from socket terminals to chassis base. In measuring voltages use a voltmeter having a resistance of at least 1000 ohms per volt. Allowances should be made for variations in line voltage.

SCHEMATIC DIAGRAM



MODEL S7401-1

Lumitone

FIRESTONE TIRE & RUBBER CO.

70 and 100 watt size with a medium base. For better illumination use the 50, 100 and 150 watt size with a medium base. Standard 60 or 100 watt bulbs can be used successfully in the lamp, but only one intensity of light will be obtained.

TUBES USED. Five tubes are used. Their type numbers and locations are shown on the tube location diagram inside the base of the lamp. Before attempting to replace tubes see the section on **replacement of tubes.**

ANTENNA AND GROUND. This radio lamp has a self contained loop antenna and requires no external antenna or ground. On weak stations the signal can be improved by rotating the lamp slightly.

TUNING DIAL (Station Selector). Rotate the dial in the base of the lamp slowly over a narrow range of the dial at a point where the desired station is located, until the station is received with maximum volume; then readjust the volume control to the proper level. **Never** use the station selector to adjust volume as this practice results in distorted tone quality and deficient bass response. The Volume Control only is to be used for this purpose. For maximum clarity the indicator knob should be adjusted to the center of the area covered by the station being tuned.

CONTROLS AND OPERATION

three light bulb is used. If a standard single light bulb is used only one intensity of light will be obtained.

REPLACEMENT OF TUBES

(See Figure 1)

If tubes are removed from their sockets for test or replacement purposes, make certain that each tube is placed in its proper socket. (See tube layout diagram in the base of the lamp). Failure to replace the tubes in their proper sockets may result in damage to the tube, or the receiver, or both.

TUNING RANGE

This receiver is designed to operate over the standard broadcast band which extends from 535 to 1720 Kilocycles (KC) (174 to 560 Meters) and includes the popular 1712 KC police channel.

This new Radio-Lamp of yours incorporates the latest developments and refinements that radio engineers have devised. In order to realize the advantages to the fullest extent you must thoroughly understand its operation and use. Therefore it is important that you read the following pages carefully. PLEASE READ THESE INSTRUCTIONS ALL THE WAY THROUGH BEFORE ATTEMPTING TO USE THE RECEIVER.

ASSEMBLY OF LAMP. Screw the small shade on the lamp socket and screw the lamp bulb in the socket. Then place the large shade on the small shade and the assembly is complete.

TYPE OF LAMP BULB REQUIRED. The lamp is designed to use a three light bulb. This type of bulb will give three intensities of light and comes in two sizes. For normal illumination use the 30,

POWER SUPPLY. This receiver is designed to operate on any alternating current supply (AC) ranging from 110 to 120 volts, 50 to 60 cycles; or on any direct current supply (DC) ranging from 110 to 120 volts.

SPECIAL INSTRUCTIONS FOR DC OPERATION. When operating from a DC (direct current) power supply, it may be necessary to reverse the power cord plug in the wall socket before the receiver will function, due to the polarity condition of a direct current supply. If the receiver fails to perform after being turned on one minute, simply reverse the power plug.

LAMP SWITCH. The switch located in lamp socket must be turned in a clockwise direction to secure the three intensities of light if a

Remove the shades and lamp bulb to prevent damage. Next loosen screw H and slip off washer G and the dial F. Next unscrew E and the screw next to it. (These screws have red heads). At the top of lamp just below the lamp socket, will be found nut A which must be loosened sufficiently to allow collar B to be moved high enough to allow the two halves of the lamp base to be separated.

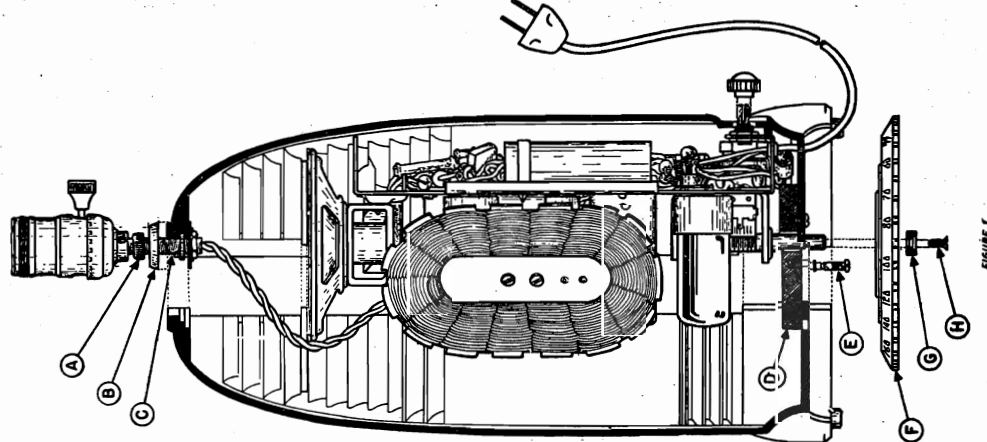
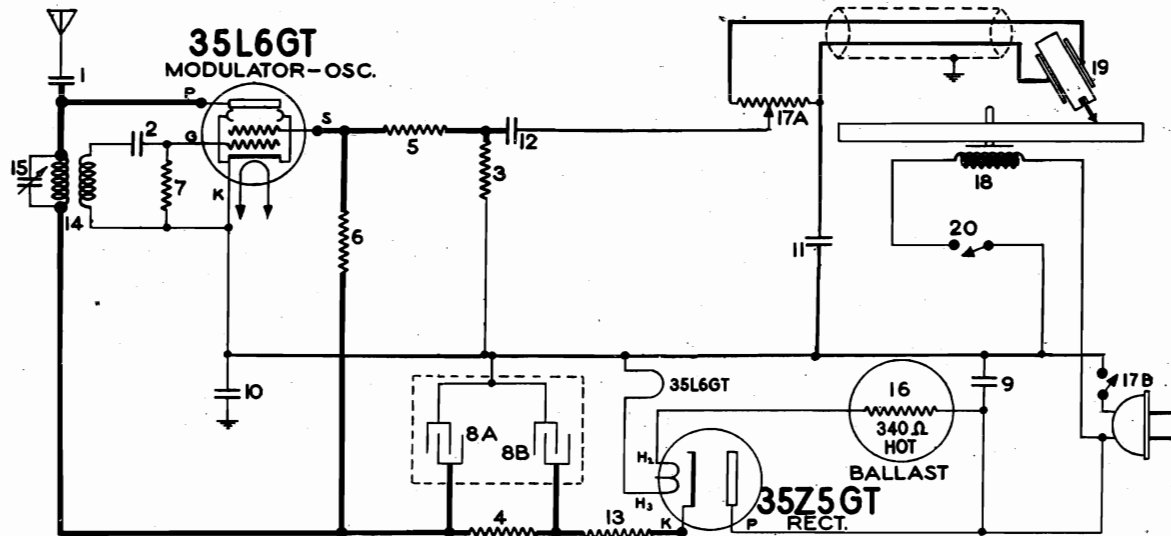


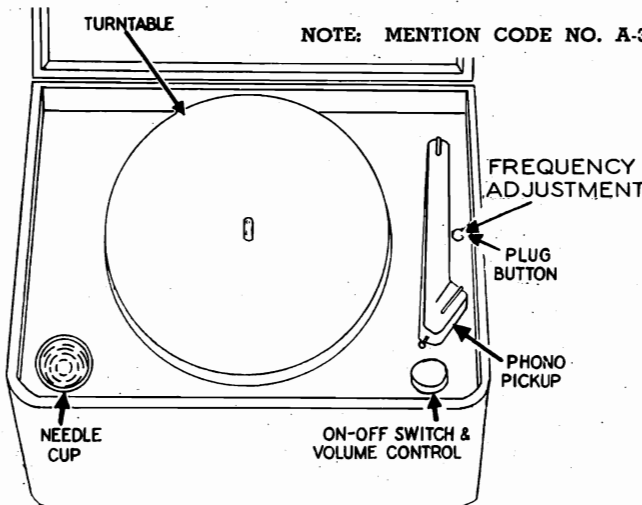
FIGURE 1.

FIRESTONE TIRE & RUBBER CO.

MODEL S7401-6 Phono.



NOTE: MENTION CODE NO. A-367 WHEN ORDERING PARTS



ELECTRICAL PARTS

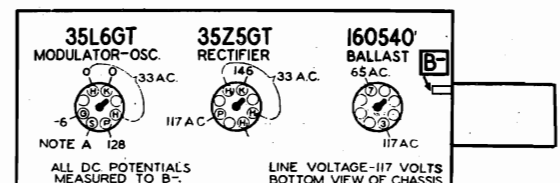
Diagram Number	Part Number	Description	List Price
1	83539	Condenser—mica, 260 mmfd.	\$0.20
2	83783	Condenser—mica, 110 mmfd.	.20
3	110559	Resistor—carbon 470,000 ohms 1/4 watt.	.12
4	110569	Resistor—carbon 10,000 ohms 1/4 watt.	.12
5	110578	Resistor—carbon 68,000 ohms 1/4 watt.	.12
6	110580	Resistor—carbon 3.3 meg. 1/4 watt.	.12
7	116051	Resistor—insulated 33,000 ohms 1/4 watt.	.15
8A-8B	116470	Condenser—electrolytic 20-20 mfd. 150 volt.	.95
9-10	116625	Condenser—.1 mfd. 600 volt.	.25
11-12	116819	Condenser—.05 mfd. 600 volt.	.20
13	118823	Resistor—1000 ohms 1 watt Wire Wound.	.15
14	160499	Coil—oscillator	.26
15	160501	Condenser—tuning	.22
16	160540	Ballast tube	.60
17A-17B	160576	Volume control—250,000 ohms with switch.	1.45
18	160603	Motor—less turntable	5.65
19	160617	Crystal cartridge	4.50
20	160693	Switch—On-Off	.42

MISCELLANEOUS PARTS

Part Number	Description	List Price
116467	Base for mtg. electrolytic condenser.	\$0.04
112798	Clip—for mtg. oscillator coil.	.01
160617	Crystal cartridge	4.50
161104	Idler wheel with rubber rim.	1.00
160219	Knob—push on	.06
160033	Needle cup	.08
113463	Rubber bushing—motor mtg.	.03
119791	Socket—8 prong	.12
114876	Socket—octal base (for rectifier).	.15
161105	Turntable—9"	2.00

PRICES SUBJECT TO CHANGE WITHOUT NOTICE.

SOCKET VOLTAGES



NOTE A: Voltage on the screen of the 35L6GT cannot be measured with the ordinary voltmeter because of the high resistance of resistor No. 6.
Use a voltmeter of at least 1000 ohms per volt.

ADJUSTMENTS

Set the receiver that is to be used with this record player to some frequency between 540 and 750 KC. Choose a frequency that is clear and free from interfering stations. Keep in mind the fact that strong signals may be present at night where there are no signals in the daytime. Remove the plug near the volume control on top of the record player. Using an insulated screwdriver turn the screw, located beneath this plug, until the signal from the record player is heard in the receiver. This will be heard as a reduction in noise as the signal comes in tune with the receiver. If a record is being played, the music or sound from it may be tuned in. If it is desired to change the frequency, set the receiver to the new frequency and turn the screw until the signal is heard. Turning the adjusting screw clockwise increases the frequency and turning it counter-clockwise lowers the frequency.

When the record player is located at some distance from the receiver, or under conditions when the signal from it is too weak, the coil of wire from the record player should be uncoiled enough to give a satisfactory signal. Under no conditions should more wire be uncoiled than is necessary for a reasonably strong signal in the receiver.

HOWLS OR SQUEALS

Howls or squeals from this unit may be caused by the following:

1. Interference caused by choosing a frequency which is not clear. To remedy, change the record player frequency to one where there is no interference.
2. Too weak a signal permitting interference from a weak station. To remedy, uncoil some of the wire from the coil under the record player, or move the record player nearer the set.
3. Too strong a signal permitting vibration from the speaker to cause microphonics. (The record player and receiver are in this case usually very close together.) To remedy, place the record player on another support or mount it on sponge rubber. Coiling up the wire coming from the chassis may help if the signal is too strong.

MODEL S7402-5

Commentator

FIRESTONE TIRE & RUBBER CO.

TUNING RANGE

This receiver is designed to operate over the standard broadcast band which extends from 535 to 1720 Kilocycles (KC) (174 to 560 Meters) and includes the popular 1712 KC police channel.

Lack of sensitivity and poor tone quality may be due to any one or a combination of causes such as weak or defective tubes or speaker, open or grounded bias resistor, bypass condenser, etc. Never attempt to realign set until all other possible sources of trouble have been first thoroughly investigated and definitely proved not to be the cause.

NOTE: IT IS ABSOLUTELY NECESSARY THAT AN ACCURATELY CALIBRATED TEST OSCILLATOR WITH SOME TYPE OF OUTPUT MEASURING DEVICE BE USED WHEN ALIGNING THE RECEIVER AND THAT THE PROCEDURE BE CAREFULLY FOLLOWED, OTHERWISE THE RECEIVER WILL BE INSENSITIVE AND THE DIAL CALIBRATION WILL BE INCORRECT. THE TRIMMERS WILL BE REFERRED TO BY THEIR FUNCTION AS INDICATED ON THE PARTS DIAGRAM.

ALIGNMENT PROCEDURE

GENERAL DATA. The alignment of this receiver requires the use of a test oscillator that will cover the frequencies of 456, 600, 1400 and 1720 KC and an output meter to be connected across the primary or secondary of the output transformer. If possible, all alignments should be made with the volume control on maximum and the test oscillator output as low as possible to prevent the AVC from operating and giving false readings.

CORRECT ALIGNMENT PROCEDURE. The intermediate frequency (I.F.) stages should be aligned properly as the first step. After the I.F. transformers have been properly adjusted and peaked, the broadcast band should be adjusted.

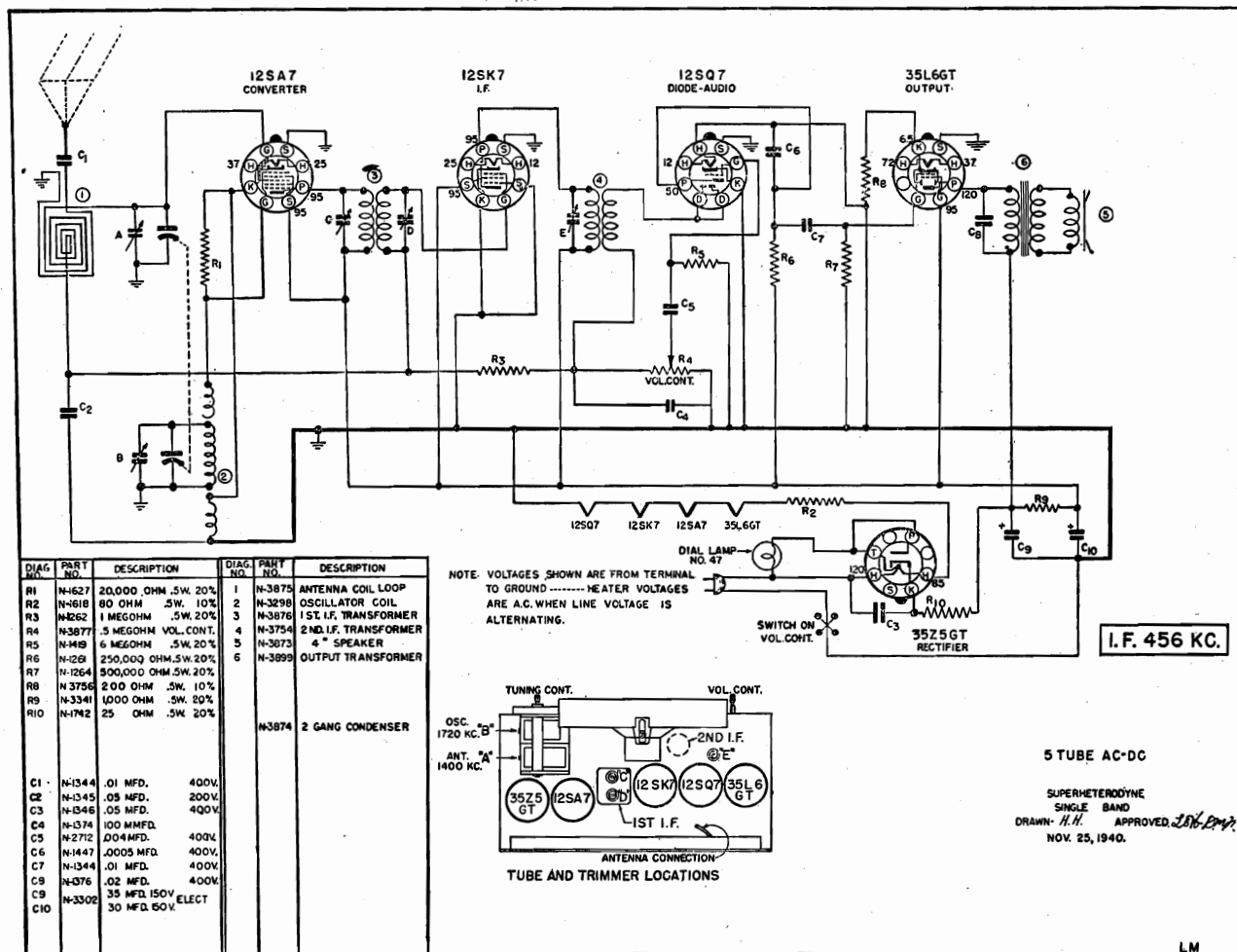
I. F. ALIGNMENT. With the gang condenser set at minimum, adjust the test oscillator to 456 KC and connect the output to the grid of the first detector tube (12SA7) through a .05 or .1 mfd. condenser. The ground on the test oscillator should be connected to

the chassis ground. Align all three I.F. trimmers to peak or maximum reading on the output meter.

BROADCAST BAND ALIGNMENT. Remove chassis, and loop antenna from cabinet and set them up on the bench so that they occupy exactly the same respective positions on the bench as they did in the cabinet. Care should be taken to have no iron or other metal near the loop. Do not make this set-up on a metal bench.

Connect the test oscillator to the antenna of the set through a 100 mmfd. (.0001) condenser. With the gang condenser set at minimum capacity, set the test oscillator at 1720 KC, and adjust the oscillator (or 1720 KC trimmer) on gang condenser. Next—set the test oscillator at 1400 KC, and tune in the signal on the gang condenser. Adjust the antenna trimmer (or 1400 KC trimmer) for maximum signal. Next set the test oscillator at 600 KC, and tune in signal on condenser to check alignment of coils.

Voltages shown on the circuit diagram are from socket terminals to chassis base. In measuring voltages use a voltmeter having a resistance of at least 1000 ohms per volt. Allowances should be made for variations in line voltage.



FIRESTONE TIRE & RUBBER CO.

TUNING RANGE

This receiver is designed to operate over the standard broadcast band which extends from 535 to 1720 Kilocycles (KC) (174 to 560 Meters) and includes the popular 1712 KC police channel.

ALIGNMENT PROCEDURE

Lack of sensitivity and poor tone quality may be due to any one or a combination of causes such as weak or defective tubes or speaker, open or grounded bias resistor, bypass condenser, etc. Never attempt to realign set until all other possible sources of trouble have been first thoroughly investigated and definitely proved not to be the cause.

NOTE: IT IS ABSOLUTELY NECESSARY THAT AN ACCURATELY CALIBRATED TEST OSCILLATOR WITH SOME TYPE OF OUTPUT MEASURING DEVICE BE USED WHEN ALIGNING THE RECEIVER AND THAT THE PROCEDURE BE CAREFULLY FOLLOWED, OTHERWISE THE RECEIVER WILL BE INSENSITIVE AND THE DIAL CALIBRATION WILL BE INCORRECT. THE TRIMMERS WILL BE REFERRED TO BY THEIR FUNCTION AS INDICATED ON THE PARTS DIAGRAM.

GENERAL DATA. The alignment of this receiver requires the use of a test oscillator that will cover the frequencies of 456, 600, 1400 and 1720 KC and an output meter to be connected across the primary or secondary of the output transformer. If possible, all alignments should be made with the volume control on maximum and the test oscillator output as low as possible to prevent the AVC from operating and giving false readings.

CORRECT ALIGNMENT PROCEDURE. The intermediate frequency (I.F.) stages should be aligned properly as the first step. After the I.F. transformers have been properly adjusted and peaked, the broadcast band should be adjusted.

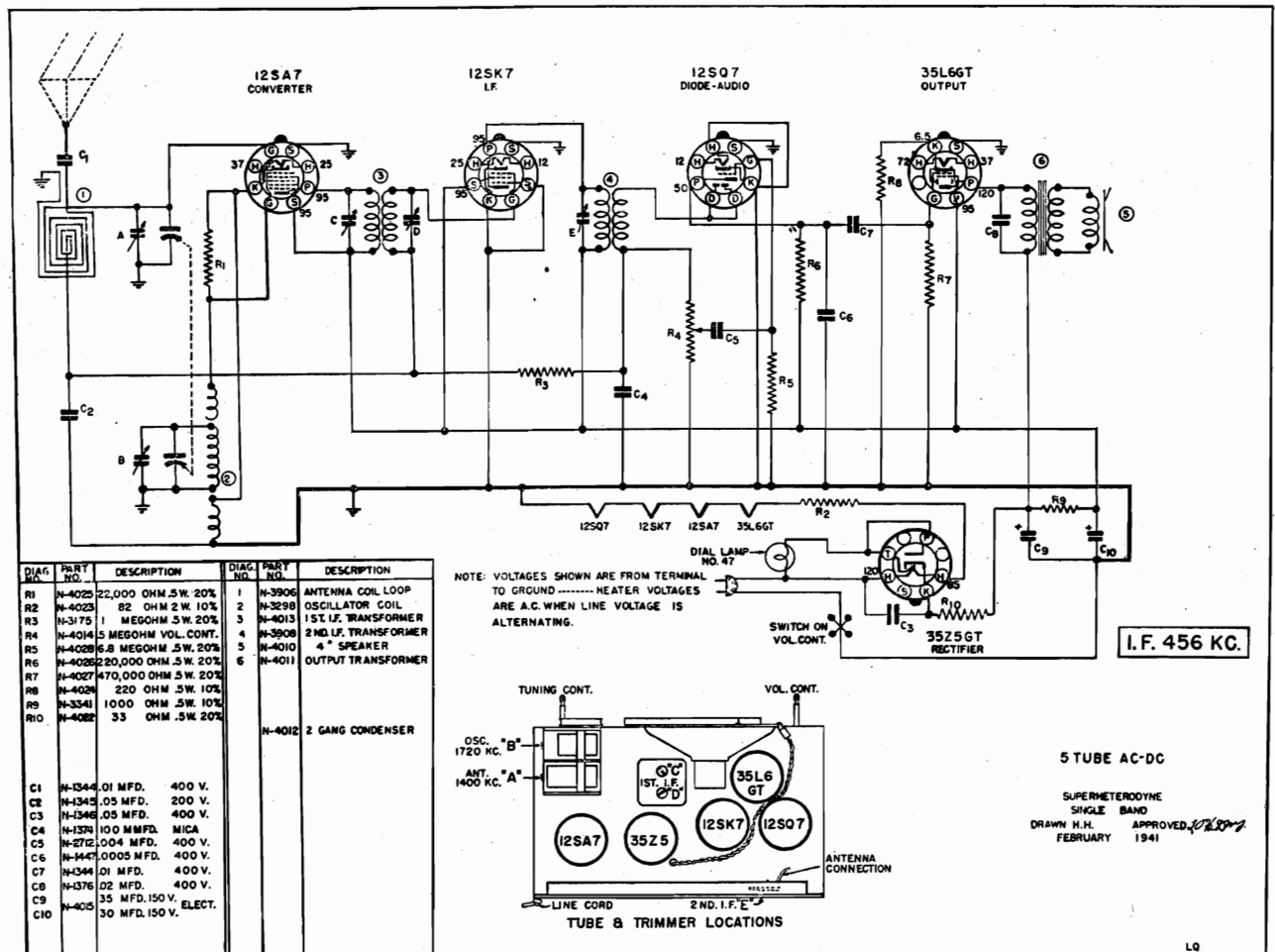
I. F. ALIGNMENT. With the gang condenser set at minimum, adjust the test oscillator to 456 KC and connect the output to the grid of the first detector tube (12SA7) through a .05 or .1 mfd. condenser. The ground on the test oscillator should be connected to

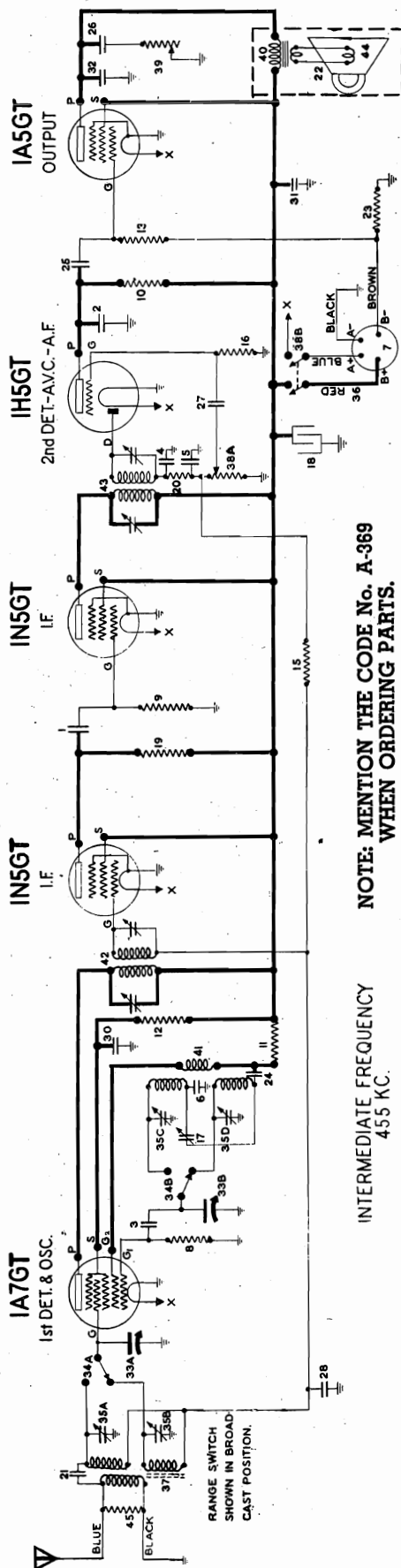
the chassis ground. Align all three I.F. trimmers to peak or maximum reading on the output meter.

BROADCAST BAND ALIGNMENT. Remove chassis, and loop antenna from cabinet and set them up on the bench so that they occupy exactly the same respective positions on the bench as they did in the cabinet. Care should be taken to have no iron or other metal near the loop. Do not make this set-up on a metal bench.

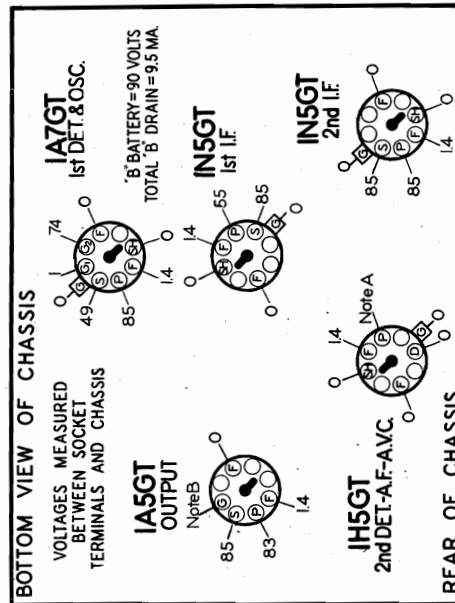
Connect the test oscillator to the antenna of the set through a 100 mmfd. (.0001) condenser. With the gang condenser set at minimum capacity, set the test oscillator at 1720 KC, and adjust the oscillator (or 1720 KC trimmer) on gang condenser. Next—set the test oscillator at 1400 KC, and tune in the signal on the gang condenser. Adjust the antenna trimmer (or 1400 KC trimmer) for maximum signal. Next set the test oscillator at 600 KC, and tune in signal on condenser to check alignment of coils.

Voltagies shown on the circuit diagram are from socket terminals to chassis base. In measuring voltagies use a voltmeter having a resistance of at least 1000 ohms per volt. Allowances should be made for variations in line voltage.





SOCKET VOLTAGES
ANTENNA GROUNDED
DIAL TUNED TO 540 KC.



MISCELLANEOUS PARTS LIST IS ON OTHER SIDE

ELECTRICAL PARTS

Diagram Number	Part Number	Description	List Price
1	83539	Condenser—mica, 260 mmfd.	\$.20
2	83783	Condenser—mica, 110 mmfd.	.20
3-4-5	85061	Condenser—mica, 51 mmfd.	.15
6	88587	Condenser—mica, .0042 mfd.	.35
7	88631	Plug—4 prong, male	.06
8	110553	Resistor—carbon, 220,000 ohms, 1/4 watt	.12
9	110580	Resistor—carbon, 3.3 meg, 1/4 watt	.12
10	110554	Resistor—carbon 1 megohm 1/4 watt	.12
11	110557	Resistor—carbon, 4,700 ohms, 1/4 watt	.12
12	110566	Resistor—carbon, 33,000 ohms, 1/4 watt	.12
13	110570	Resistor—carbon, 2.2 meg., 1/4 watt	.15
15-16	110580	Resistor—carbon, 3.3 meg., 1/4 watt	.12
17	112799	Condenser—padder	.36
18	112898	Condenser—electrolytic 16 mfd., 150 volt	.50
19	118063	Resistor—carbon, 10,000 ohms, 1/4 watt	.12
20	110565	Resistor—carbon, 22,000 ohms, 1/4 watt	.12
21	114969	Condenser—mica, 15 mmfd.	.12
22	M-500350	Speaker—P.M. (8")	6.30
23	116078	Resistor—560 ohms, 1/4 watt	\$.012
24-25-26	119193	Condenser—.01 mfd., 600 volt	.15
27	119817	Condenser—.004 mfd., 600 volt	.15
28 to 30	116819	Condenser—.05 mfd., 600 volt	.20
31	116625	Condenser—.1 mfd., 600 volt	.25
32	119875	Condenser—.002 mfd., 600 volt	.15
33A-33B	500358	Condenser—tuning (with drum)	3.50
34A-34B	119859	Range switch	.65
35A-35D	119536	Condenser—trimmer (4 sections)	.60
36	119537	Battery cable	.40
37	119541	Coil—antenna	1.25
38	500356	Volume control—1 meg. (with switch)	1.40
39A-39B	500357	Tone control—100,000 ohms	.90
40	M-500364	Transformer—output for M-500350 speaker	1.70
41	119669	Coil—oscillator	.75
42	119720	Transformer—1st I.F.	1.25
43	119673	Transformer—2nd I.F.	1.25
44	M-119750	Cone and voice coil for M-500350 speaker	1.60
45	116063	Resistor—carbon, 10,000 ohms, 1/4 watt	.12

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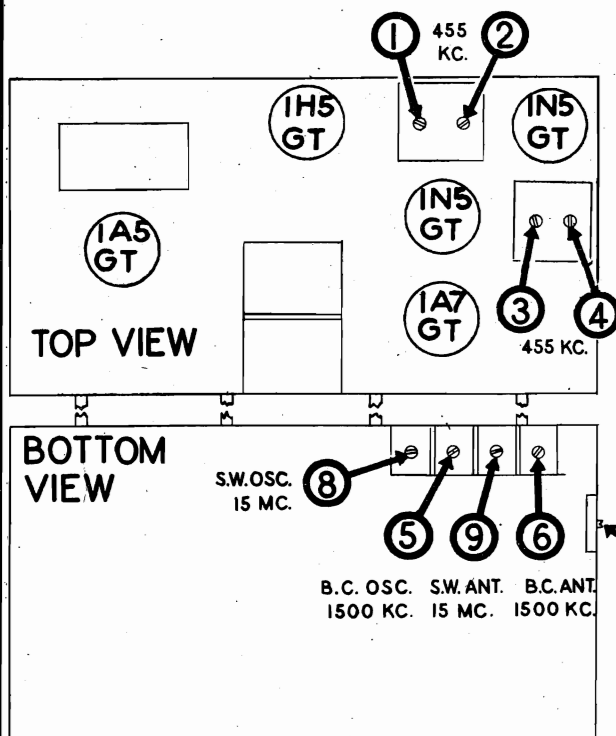
FIRESTONE TIRE & RUBBER CO.

ALIGNMENT PROCEDURE

FOR ALIGNMENT an output meter and an accurately calibrated signal generator are required.

1. Connect the output meter across the voice coil or between the plate of the 1A5GT output tube and ground through a 0.1 Mfd. condenser, depending on the type of meter. (The more sensitive type should be connected across the voice coil.)
2. Connect the ground lead of the signal generator to the black ground wire or the chassis.
3. Turn the volume control to the maximum volume position and keep it in this position while aligning.
4. With the gang condenser in full mesh, set the dial pointer to the low frequency edge of the dial scale.

Dummy Ant. in Series with Sig. Gen.	Connection of Sig. Generator Output To Receiver	Signal Generator Frequency	Band Switch Position	Receiver Dial Setting	Trimmer Number	Trimmer Description	Type of Adjustment
.1 MFD. Condenser	Control Grid of 1A7GT	455 KC	Broadcast	Any Point Where It Does Not Affect The Signal	1-2 3-4	2nd I. F. 1st I. F.	Adjust for maximum output. Then repeat adjustment.
200 MMFD. Mica Condenser	Antenna Lead (Blue Wire)	1500 KC	Broadcast	1500 KC	5	Broadcast Oscillator (Shunt)	Adjust for maximum output.
200 MMFD. Mica Condenser	Antenna Lead (Blue Wire)	1500 KC	Broadcast	Tune To 1500 KC Generator Signal	6	Broadcast Antenna	Adjust for maximum output.
200 MMFD. Mica Condenser	Antenna Lead (Blue Wire)	600 KC	Broadcast	Tune To 600 KC Generator Signal	7	Broadcast Oscillator (Series Pad)	Adjust for maximum output. Try to increase output by detuning trimmer and retuning receiver dial until maximum output is obtained.
400 OHM Carbon Resistor	Antenna Lead (Blue Wire)	15 MC	Foreign	15 MC	8	Foreign Oscillator (Shunt)	Adjust for maximum output. Check to see if proper peak was obtained by tuning in image at approx. 14.1 MC. If image does not appear realign at 15 MC, with trimmer screw farther out. Recheck image.
400 OHM Carbon Resistor	Antenna Lead (Blue Wire)	15 MC	Foreign	15 MC	9	Foreign Antenna	Adjust for maximum output. Try to increase output by detuning trimmer and retuning receiver dial until maximum output is obtained.

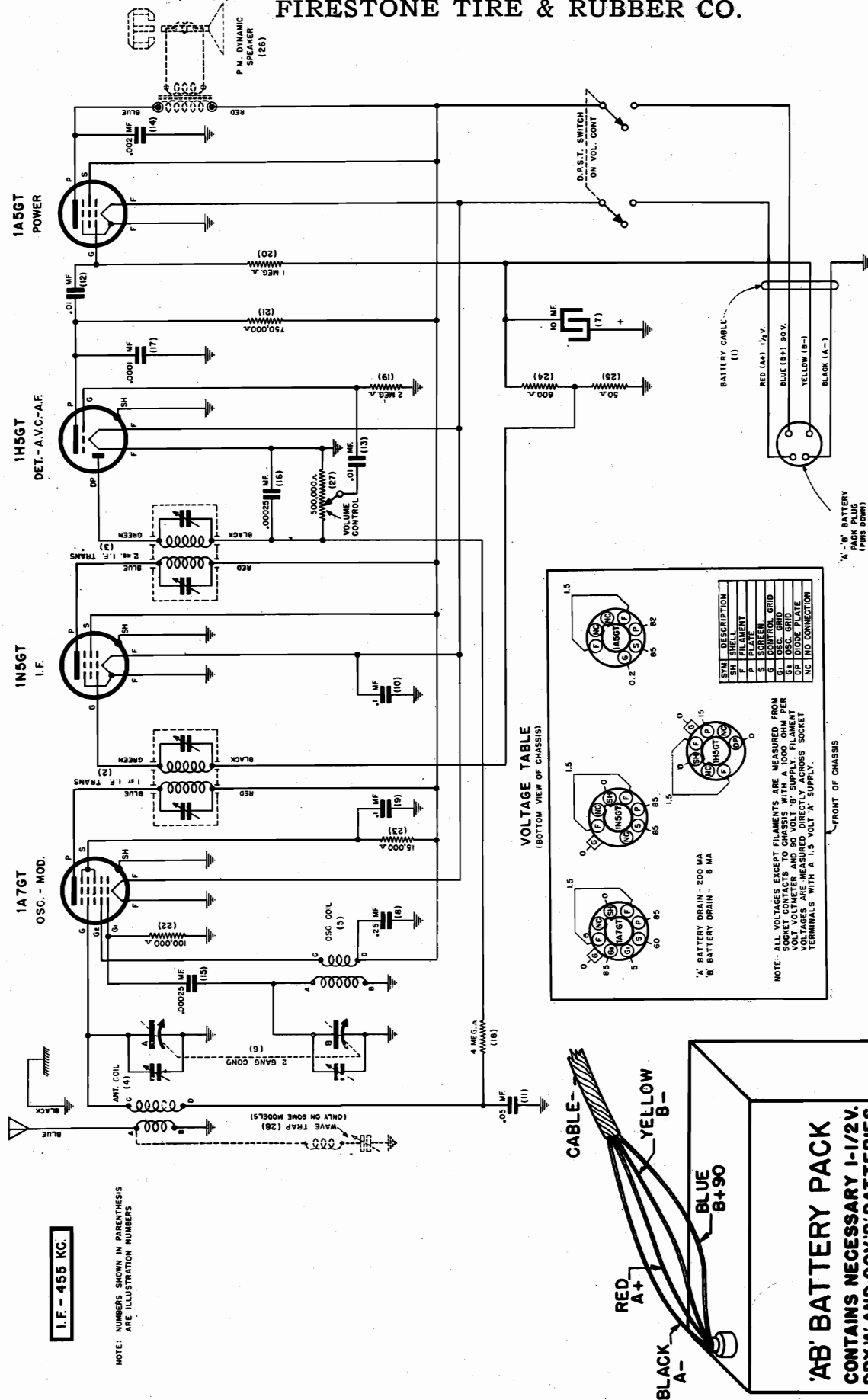


MISCELLANEOUS PARTS

Part Number	Description	List Price
500368	Cabinet back	\$0.70
114955	Clamp, for Dial Cord .....	.01
112745	Clip, Coil Mounting .....	.01
117057	Cord, Drive supplied in 3 Ft. Lengths .....	.15
500359	Dial Scale .....	.50
500395	Escutcheon—Dial	1.50
119644	Knob, (Unmarked) .....	.18
119746	Knob, Band .....	.16
500382	Lever, for on-off indicator .....	.12
88631	Plug, 4 prong male for battery cable .....	.06
160436	Pointer .....	.18
81145	Retaining Ring, for tuning shaft	Per C .50
114914	Screw, Special Head for Mtg. Escutcheon	Per Doz. .15
85827	Set Screw, 8-32 Sq. Head for Ind. Lever .....	.02
500354	Shaft, tuning .....	.12
600116592	Shield, Tube .....	.10
119791	Socket, Octal .....	.12
111090	Spacer, Steel Mtg. for gang .....	.02
114968	Spring, Dial cord tension .....	.03
117157	Spring, for On-Off indicator .....	.03
111456	Washer, Spring washer for tuning shaft	Per C .50

MODEL S74C5-8 (445)

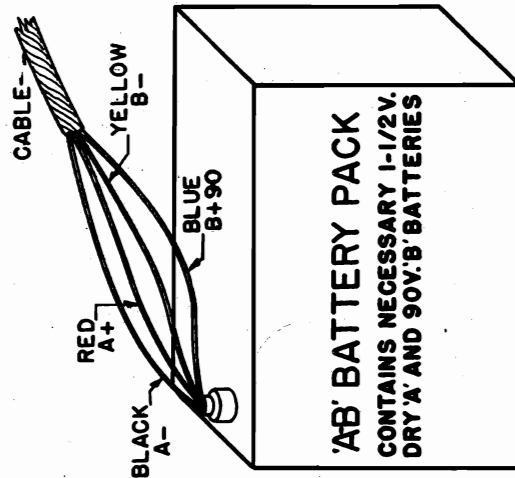
FIRESTONE TIRE & RUBBER CO.



Firestone battery stock No. E-1527-7 is built of the finest material and is especially designed for best operation of your radio. When used on an average of two to three hours per day it will provide approximately 750-1000 hours' service.

The diagram illustrates connection of battery designed for use with your Model S-7405-8 Firestone Radio. Before attempting to install battery TURN ON-OFF SWITCH TO "OFF" POSITION.

BATTERY LIFE depends on the number of hours per day the set is operated, and the quality of the battery used.



FIRESTONE TIRE & RUBBER CO.

AERIAL

USE A GOOD AERIAL—RECEPTION WILL BE POOR IF THE RADIO IS OPERATED WITHOUT AN AERIAL OR WITH A POOR ONE—WITH A GOOD AERIAL GOOD RESULTS CAN BE EXPECTED. AS THE BEST AERIAL TO USE DEPENDS ON THE LOCATION, SURROUNDING OBJECTS, ETC., BE SURE TO:

1. Always use the best possible aerial. Remember an outdoor aerial erected as high as possible is the best one to use. If it is impractical to use an outdoor aerial, erect one in the attic or around the picture moulding.
2. A 35 to 100 foot aerial should be ample for most locations. While in shielded locations and in remote districts a longer aerial may have to be used, always keep the aerial as short as possible consistent with satisfactory reception.
3. Insulate aerial from its supports by glass or porcelain insulators, and keep lead-in wire away from buildings, etc., with stand-off insulators.
4. Use insulated window lead-in strip to bring aerial lead-in into house.
5. Use an approved lightning arrester.
6. Connect aerial lead-in to blue lead coming out rear of chassis.
7. Attach a good ground to the black lead coming out at rear of chassis. A cold water pipe, steam radiator, or an iron rod driven two to four feet in moist ground will provide a good ground.

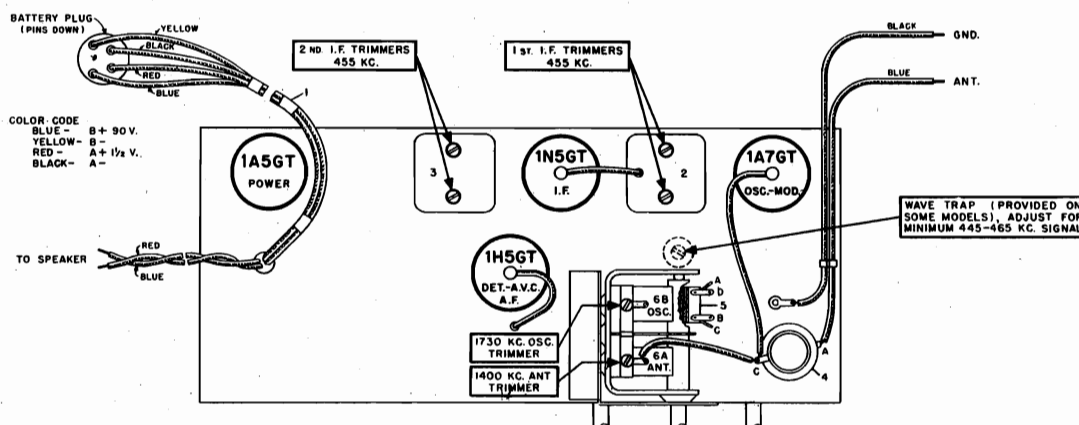
ALIGNMENT PROCEDURE

Be sure to follow procedure carefully and in the order given—otherwise the receiver will be insensitive and the dial calibration incorrect. For alignment procedure read tabulations from left to right. If more than one adjustment is required on any one band, make the adjustment marked (1) first, (2) next, (3) third.

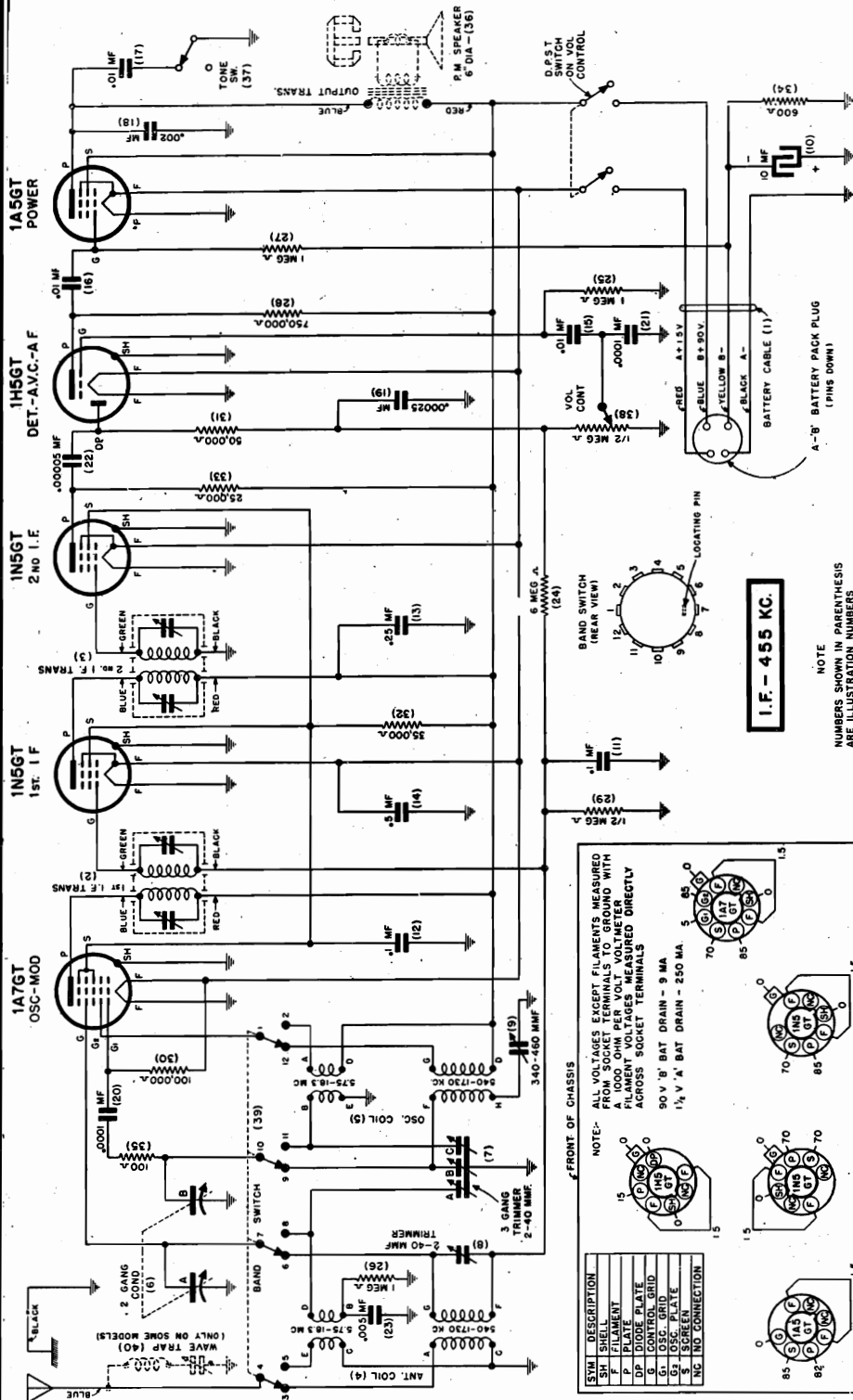
Before starting alignment:

- (a) Check tuning dial adjustment by turning gang condenser until plates touch maximum capacity stop (completely in mesh) at which point the dial needle must be exactly even with the last line at the low frequency end of the dial calibration. If dial needle does not point exactly to the last line move to correct position.
- (b) Use an accurately calibrated test oscillator with some type of output measuring device.
- (c) Have ground lead of test oscillator attached to chassis.

Set receiver dial to:	TEST OSCILLATOR			Refer to parts layout diagram for location of trimmers mentioned below:
	Adjust test oscillator frequency to:	Use dummy antenna in series with output of test oscillator consisting of:	Attach output of test oscillator to:	
I.F. Any point where no interfering signal is received	455 K. C.	.02 MFD condenser	High side to grid terminal of 1A7GT tube DO NOT REMOVE CAP.	Adjust each of the second I. F. transformer trimmers for maximum output—then adjust each of the first I. F. trimmers for maximum output.
(1) Exactly 1730 K. C.	Exactly 1730 K. C.	.00025 MFD condenser	Receiver blue antenna lead	Adjust 1730 K. C. oscillator trimmer for maximum output.
(2) Approx. 1400 K. C.	Exactly 1400 K. C.	.00025 MFD condenser	Receiver blue antenna lead	While rocking gang condenser adjust 1400 K. C. antenna trimmer for maximum output.



FIRESTONE TIRE & RUBBER CO.

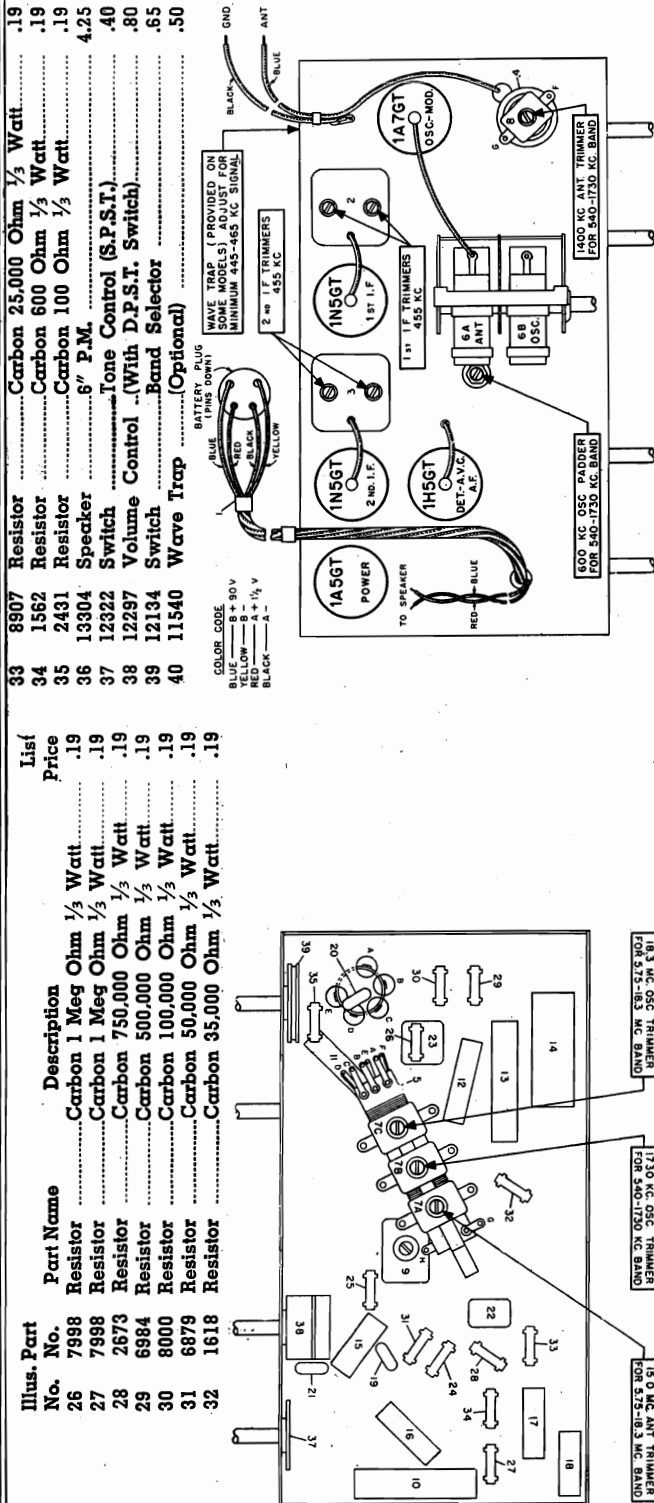


Part No.	Part Name	Description	List Price
1	Cable	Battery with 4 Prong Plug	\$0.40
2	Coil	First I.F. Transformer	.90
3	Coil	Second I.F. Transformer	.90
4	Coil	Antenna	.60
5	Coil	Oscillator	.55
6	Condenser	Tuning (2 Gang) with Pulley	1.65
7	Condenser	Trimmer (3 Gang)	.47
8	Condenser	Trimmer 3-35 MMF	.21
9	Condenser	Padding Total Range 200-500 MMF.	.45
10	Condenser	Working Range 380-460 MMF.	
11	Condenser	Tubular Dry Elec. (10 Mid. 25 V.	
12	Condenser		
13	Condenser		
14	Condenser		
15	Condenser		
16	Condenser		
17	Condenser		
18	Condenser		
19	Condenser		
20	Condenser		
21	Condenser		
22	Condenser		
23	Condenser		
24	Resistor		
25	Resistor		

PARTS LIST

Part No.	Part Name	Description	List Price
1	Cable	Battery with 4 Prong Plug	\$0.40
2	Coil	First I.F. Transformer	.90
3	Coil	Second I.F. Transformer	.90
4	Coil	Antenna	.60
5	Coil	Oscillator	.55
6	Condenser	Tuning (2 Gang) with Pulley	1.65
7	Condenser	Trimmer (3 Gang)	.47
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13	Condenser		
14	Condenser		
15	Condenser		
16	Condenser		
17	Condenser		
18	Condenser		
19	Condenser		
20	Condenser		
21	Condenser		
22	Condenser		
23	Condenser		
24	Resistor		
25	Resistor		

FIRESTONE TIRE & RUBBER CO.

ALIGNMENT
PROCEDURE

Be sure to follow procedure carefully and in the order given—otherwise the receiver will be insensitive and the dial calibration incorrect. For alignment procedure read tabulations from left to right. If more than one adjustment is required on any one band, make the adjustment marked (1) first, (2) next, (3) third.

Before starting alignment: (a) Check tuning dial adjustment by turning gang condenser until plates touch maximum capacity stop (completely in mesh) at which point the dial needle must be exactly even with the last line at the low frequency end of dial calibration. If dial needle does not point exactly to last line move to correct position.

(b) Use an accurately calibrated test oscillator with some type of output measuring device.

(c) Have ground lead of test oscillator attached to chassis.

Place band switch for operation on:	Set receiver dial to:	Adjust test antenna in series with output of test oscillator consisting of:	TEST OSCILLATOR		Refer to parts layout diagram for location of trimmers mentioned below:
			Use dummy antenna in series with output of test oscillator consisting of:	Attach output of test oscillator to:	
I. F. alignment use any band position.	Any point where no interfering signal is received.	.02 MFD. condenser		High side to grid terminal of 1A7G tube. DO NOT REMOVE CAP.	Adjust each of the second I. F. transformer trimmers for maximum output—then adjust each of the first I. F. trimmers for maximum output.
1730 to 540 K.C. Band	1 Exactly 1730 K.C. 2 Exactly 1400 K.C. 3 Approx. 600 K.C.	.00025 MFD. condenser .00025 MFD. condenser .00025 MFD. condenser		High side to Receiver blue antenna lead High side to Receiver blue antenna lead High side to Receiver blue antenna lead	Adjust 1730 K.C. oscillator trimmer for maximum output. While rocking gang condenser adjust 1400 K.C. antenna trimmer for maximum output. While rocking gang condenser adjust 600 K.C. oscillator padder for maximum output.
5.75 to 18.3 M.C. Band	1 Exactly 18.3 M.C. 2 Approx. 15 M.C.	400 Ohm carbon resistor 400 Ohm		High side to Blue Antenna Lead High side to Blue Ant. Lead	Adjust 18.3 M.C. oscillator trimmer for maximum output—be sure to use proper peak. If more than one peak is noticed, back off trimmer to minimum capacity, then screw down trimmer (add capacity) until the second peak—which is the proper one to use is tuned in. While rocking gang condenser adjust 1F M.C. antenna trimmer for maximum output.

Lack of sensitivity and poor tone quality may be due to **any one or a combination of causes such as weak or defective tubes or speaker, open or grounded bias resistor, bypass condenser, etc.** Never attempt to realign set until all other possible sources of trouble have been first thoroughly investigated and definitely proved not to be the cause.

NOTE: IT IS ABSOLUTELY NECESSARY THAT AN ACCURATELY CALIBRATED TEST OSCILLATOR WITH SOME TYPE OF OUTPUT MEASURING DEVICE BE USED WHEN ALIGNING THE RECEIVER AND THAT THE PROCEDURE BE CAREFULLY FOLLOWED, OTHERWISE THE RECEIVER WILL BE INSENSITIVE AND THE DIAL CALIBRATION WILL BE INCORRECT. THE TRIMMERS WILL BE REFERRED TO BY THEIR FUNCTION AS INDICATED ON THE PARTS DIAGRAM.

GENERAL DATA. The alignment of this receiver requires the use of a test oscillator that will cover the frequencies of 456, 600, 1400 and 1720 KC and an output meter to be connected across the primary or secondary of the output transformer. If possible, all alignments should be made with the volume control on maximum and the test oscillator output as low as possible to prevent the AVC from operating and giving false readings.

CORRECT ALIGNMENT PROCEDURE. The intermediate frequency (I.F.) stages should be aligned properly as the first step. After the I.F. transformers have been properly adjusted and peaked, the broadcast band should be adjusted.

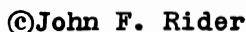
I. F. ALIGNMENT. With the gang condenser set at minimum, adjust the test oscillator to 456 KC and connect the output to the grid of the first detector tube (12SA7) through a .05 or .1 mfd. con-

denser. The ground on the test oscillator should be connected to the ground buss, indicated in circuit diagram. Align all four I.F. trimmers to peak or maximum reading on the output meter.

BROADCAST BAND ALIGNMENT. Remove the chassis from the cabinet and set on a bench, taking care that no metal is near the loop. Do not make this setup on a metal bench.

Connect the test oscillator to the antenna of the set through a 200 mmfd. (.0002) condenser. With the gang condenser set at minimum capacity, set the test oscillator at 1720 KC, and adjust the oscillator (or 1720 KC trimmer) on gang condenser. Next—set the test oscillator at 1400 KC, and tune in the signal on the gang condenser. Adjust the antenna trimmer (or 1400 KC trimmer) for maximum signal. Next set the test oscillator at 600 KC, and tune in signal on condenser to check alignment of coils.

Voltages shown on the circuit diagram are from socket terminals to chassis base. In measuring voltages use a voltmeter having a resistance of at least 1000 ohms per volt. Allowances should be made for variations in line voltage.



FIRESTONE TIRE & RUBBER CO.

MODELS S7425-6(Late),
S7425-9

ALIGNMENT PROCEDURE

ALIGNMENT: An output meter and an accurately calibrated signal generator are required.

Connect the output meter across the voice coil or, using a .1 mfd. condenser in series, connect as follows:

MODEL S-7425-9: Between the 35L6GT plate and B— terminal shown on voltage chart.**MODEL S-7425-6:** Between the 35L6GT plate and chassis.

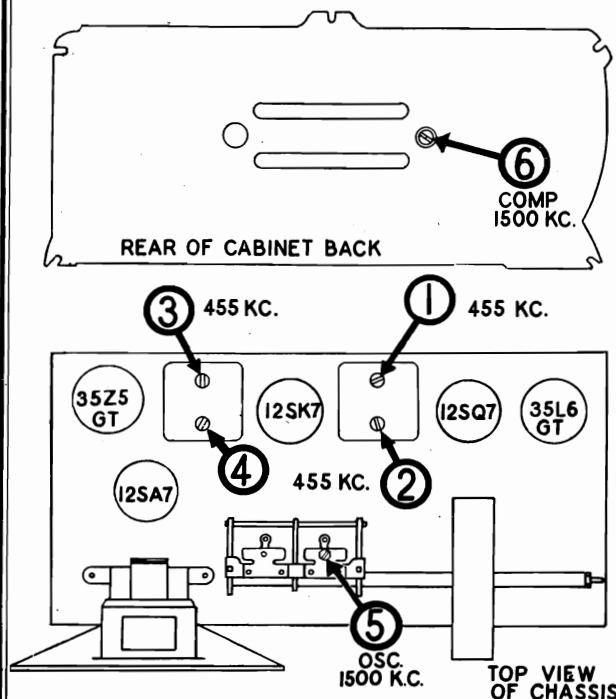
Connect the ground lead of the signal generator to the chassis of the receiver through a .25 mfd. condenser and keep it connected in this manner throughout the entire alignment procedure. Failure to do this may have serious results as one side of the power line may be grounded in the signal generator. If oscillation or hum occurs in the model S-7425-9, connect the ground lead of the signal generator through a .25 condenser to B— as shown on the Voltage Chart.

TO CALIBRATE THE DIAL:—Remove the chassis from the cabinet and set it on a flat surface (insulated from ground). With the gang in full mesh, the last dial division (just below 55) on the low frequency end, should be exactly $4\frac{3}{8}$ inches above the table surface. If this is not the case, release the set screw in the collar which connects the gang condenser shaft with the tuning unit, and holding the gang in full mesh, turn the dial until the last division is exactly $4\frac{3}{8}$ inches above the table surface. Now re-tighten the set screw in the collar. The $4\frac{3}{8}$ inch division on the ruler (when measured vertically from table surface), is to be used as the dial indicator for all calibrations and alignment.FOR OTHER DATA
SEE FIRESTONE
PAGE 11-24 IN
RIDER'S VOL. XI

Dummy Ant. in Series with Signal Generator	Connection of Sig. Generator Output to Receiver	Signal Generator Frequency	Receiver Dial Setting	Trimmer Number	Trimmer Description	Type of Adjustment
.1 MFD. Condenser	Green wire of Loop (Loop must be connected)	455 KC	Any point where it does not affect the signal	1-2	2nd I.F.	Adjust for maximum output. Then repeat adjustment.
				3-4	1st I.F.	
200 MMFD. Mica Condenser	"Ant." Terminal	1500 KC	1500 KC	5	Broadcast Oscillator (Shunt)	Adjust trimmer to bring in signal.
200 MMFD. Mica Condenser	"Ant." Terminal	1500 KC	Tune to 1500 KC Generator Signal	6	Broadcast Antenna (Shunt)	Adjust for maximum output.

Now remove the output meter and signal generator connections and replace the set in the cabinet. Replace the cabinet back and MAKE SURE THAT THE GREEN WIRE GOES TO THE UPPER RECEPTACLE OF THE LOOP AND THE GREEN-WHITE WIRE TO THE LOWER RECEPTACLE. Place the antenna lead from the signal generator near the back of the cabinet and turn the output up until the 1500 KC signal is weakly heard. Adjust trimmer No. 6 for maximum output by ear.

MISCELLANEOUS PARTS



Part Number	Description	List Price
117231	Back—cabinet, for S-7425-6	\$0.20
117865	Back—cabinet, for S-7425-9	.20
117211	Cabinet	3.60
112745	Clip—coil mounting	.01
113558	Clutch spring—for tuner (on cam shaft)	.04
113504	Collar—coupling (between tuner unit and gang cond. shaft)	.08
113560	Dial Scale—celluloid strip	.22
113592	Felt Pad (cabinet feet ivory) 3/16"	.06
113549	Felt Strip—(white) behind push button levers	.03
113572	Key—for push button (right hand)	.24
113557	Key—for push button tuner (left hand)	.24
113531	Knob—tuning (ivory)	.30
113574	Knob—volume (ivory)	.18
113500	Mechanical tuner unit—less tenite tips for push buttons	3.90
116689	Pad—for push button levers	.02
83624	Screw—self tapping 8 x 1/4"	.01
85827	Set Screw—8/32 Square head	.02
113538	Screw—for tuning knob (chrome head)	.14
113636	Screw—No. 8 x 3/4" chassis mtg.	.01
113699	Screw—No. 8 x 1" for chassis mtg.	.01
113542	Socket—dial lamp—insulated	.10
116690	Socket (octal base) (small)	.12
113559	Spring—for key return	.02
113550	Tabs—station call letter	.28
113529	Tip—for push button (ivory)	.05
114132	Window for dial	.16

MODEL S7427-7

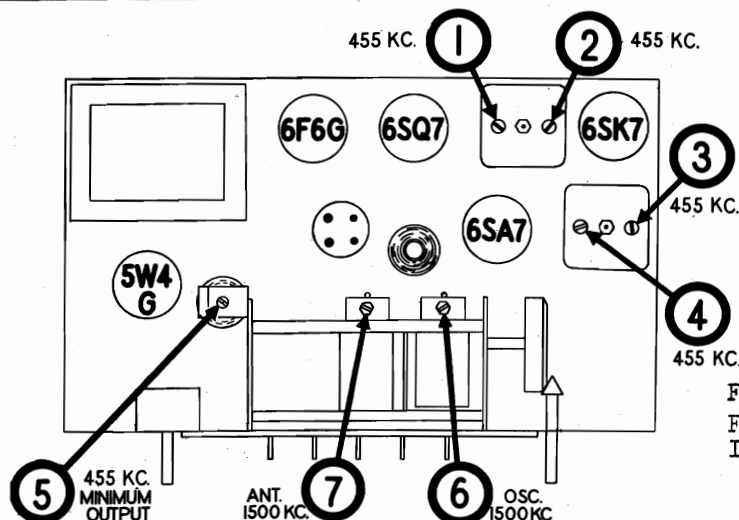
FIRESTONE TIRE & RUBBER CO.

ALIGNMENT EQUIPMENT & PROCEDURE

FOR ALIGNMENT: An output meter and an accurately calibrated signal generator with a tuning range from 455 KC to 1500 KC are required.

1. Connect the output meter across the voice coil or between the plate of the 6F6-G output tube and ground, depending on the type of meter. (The more sensitive type should be connected across the voice coil).
2. Connect the ground lead of the signal generator to the "G" terminal or the chassis.
3. Turn the volume control to the maximum volume position and keep it in this position throughout the entire alignment procedure.
4. Remove the connector from between the "A" and "X" terminals on the antenna strip.

DUMMY ANT. IN SERIES WITH SIG. GEN.	CONNECTION OF SIG. GENERATOR OUTPUT TO RECEIVER	SIGNAL GENERATOR FREQUENCY	RECEIVER DIAL SETTING	TRIMMER NUMBER	TRIMMER DESCRIPTION	TYPE OF ADJUSTMENT
.1 MFD. CONDENSER	LEFT LUG ON GANG COND.	455 KC	ANY POINT WHERE IT DOES NOT AFFECT THE SIGNAL	1-2	2nd I.F.	ADJUST FOR MAXIMUM OUTPUT THEN REPEAT ADJUSTMENT.
				3-4	1st I.F.	
200 MMFD. MICA CONDENSER	"A" TERMINAL	455 KC	ANY POINT WHERE IT DOES NOT AFFECT THE SIGNAL	5	WAVE TRAP	ADJUST FOR MINIMUM OUTPUT USING A STRONG GENERATOR SIGNAL.
200 MMFD. MICA CONDENSER	"A" TERMINAL	1500 KC	1500 KC	6	BROADCAST OSCILLATOR (Shunt)	ADJUST FOR MAXIMUM OUTPUT.
200 MMFD. MICA CONDENSER	"A" TERMINAL	1500 KC	TUNE TO 1500 KC GENERATOR SIGNAL	7	BROADCAST ANTENNA (Shunt)	ADJUST FOR MAXIMUM OUTPUT.



FOR OTHER DATA SEE
FIRESTONE PAGE 11-39
IN RIDER'S VOL. XI

HOW TO SET UP AND USE THE PUSH BUTTON TUNER

To set up the push buttons, proceed as follows:

1. Turn on the set and allow it to operate for at least one-quarter hour before attempting to set up the push buttons. Be sure that the set is connected to an antenna system before starting.
2. Select the five stations to which the buttons are to be set. Be sure to select nearby, powerful stations, since weak signals will generally give better results when tuned in manually. Any button may be set to any desired station.
3. Grasp the tuning knob and push it in (the movement is slight, about 1/8 inch) so that the drive pinion engages the condenser drive gear and the set may be tuned manually.
4. Tune in the station to which you wish to set the particular button. Be sure to tune in the station correctly by TUNING TO THE POINT WHERE THE PROGRAM IS HEARD WITH THE LEAST HISS OR DISTORTION.
5. Grasp the push button being set up, and turn it to the left (counter-clockwise) about one whole turn.
6. Push this button all the way in, and then release it. Now turn it to the right (clockwise) until reasonably tight. This completes the set-up operation.
7. Set up the remaining four buttons in a similar manner.
8. Label each button with the call letters of the stations you have selected, using the call letter tabs packed with your receiver. Paste the call letter tab in the recess above the push button.
9. To use your push button tuner, push in the button labelled with the call letters of the desired station. Be sure to push the button all the way in.

©John F. Rider



69025937

VOLTAGE CHART				
TUBE	USE	BATTERY INPUT	PLATE INPUT	SCREEN GRID
1R5	OSC/MOD	62.5V	33V	71V 350 to 500
174	1.5 AMP	62.5V	42V	71V 49V
185	1.5 A.C.	38.8V	18V	37V 12.5V
354	PIR/AMP	58 V	62.5V	67V 71V 10V
1748T	DECT.	—	—	10V CATHODE

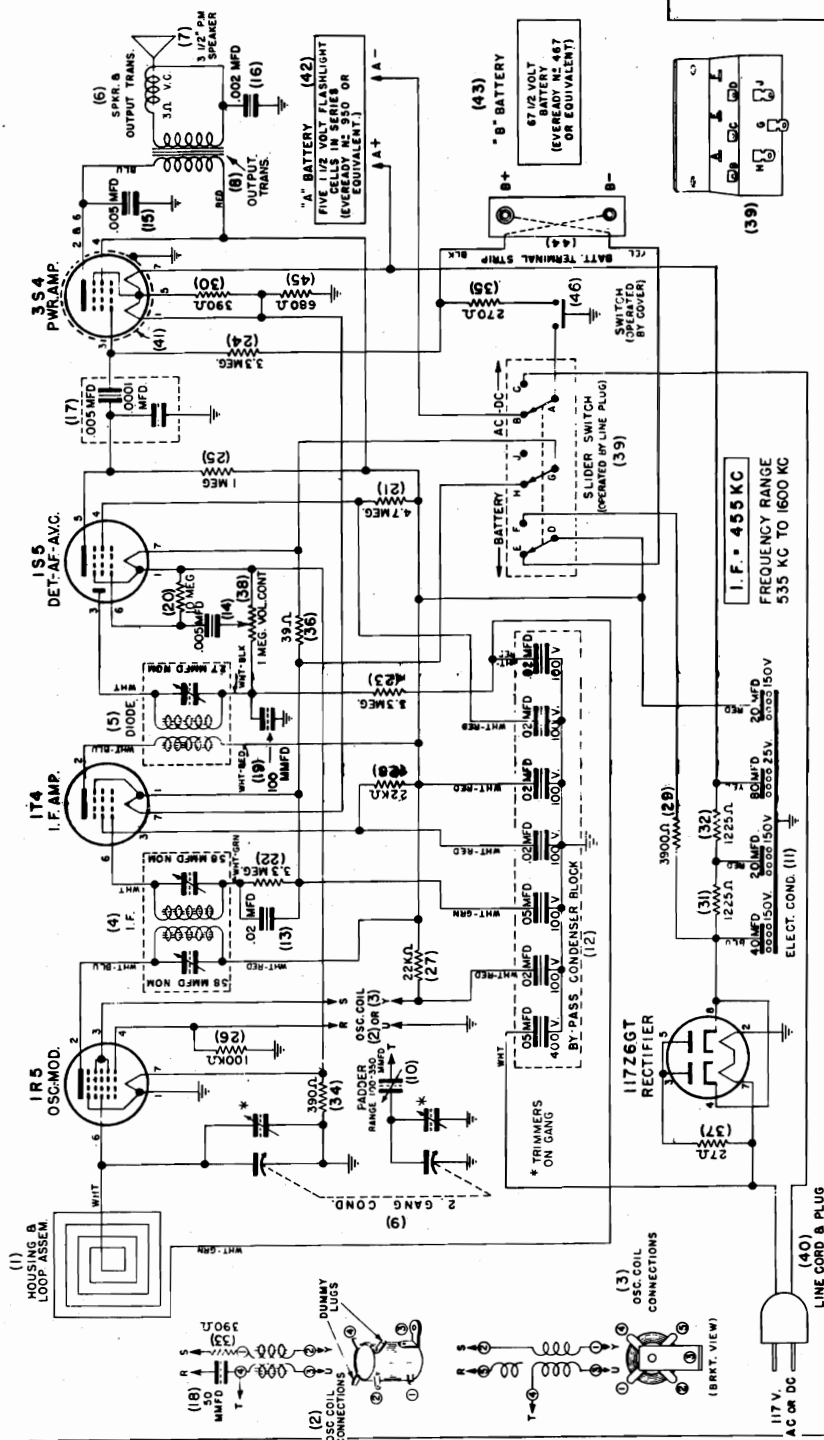
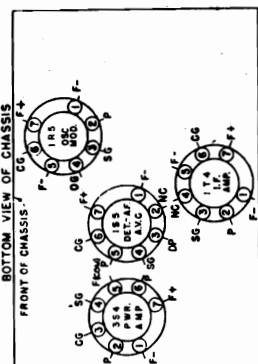
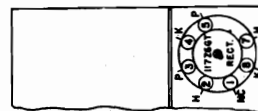
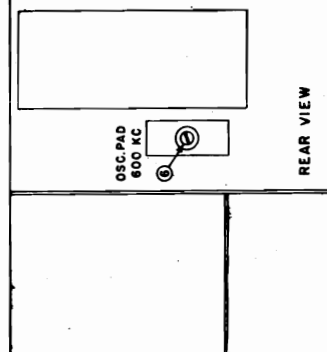
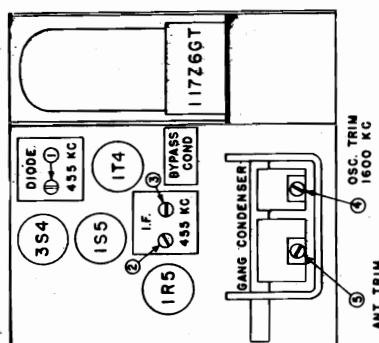
NOTE: ALL VOLTAGES MEASURED ON A 20,000 OHMS PER VOLT VOLTMETER USING THE 250 V. SCALE.

RECOMMENDED BATTERY DRAIN - 50 MA. AT 75 VOLTS

BATTERY RATING - 8.0 AH. AT 67.5 VOLTS

MAXIMUM POWER OUTPUT - 100 MILLIWATTS.

NOTE: ALL VOLTAGES MEASURED ON A 20,000 OHMS PER VOLT VOLTMETER USING THE 250 V. SCALE.



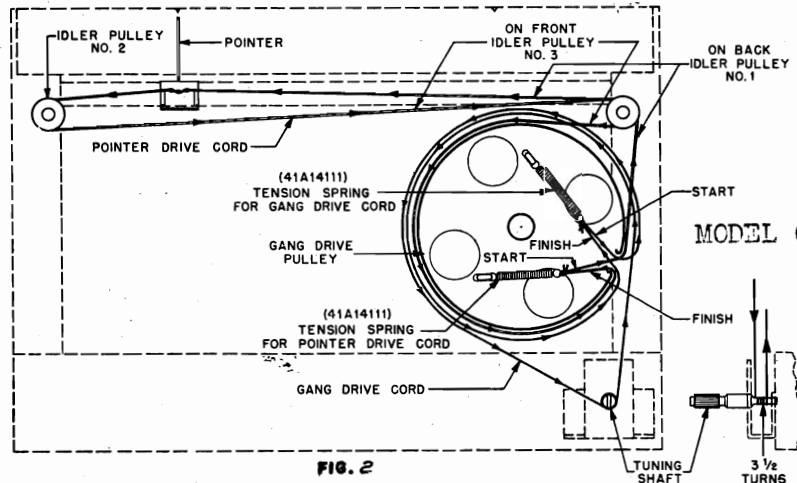
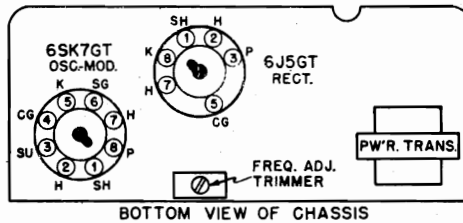
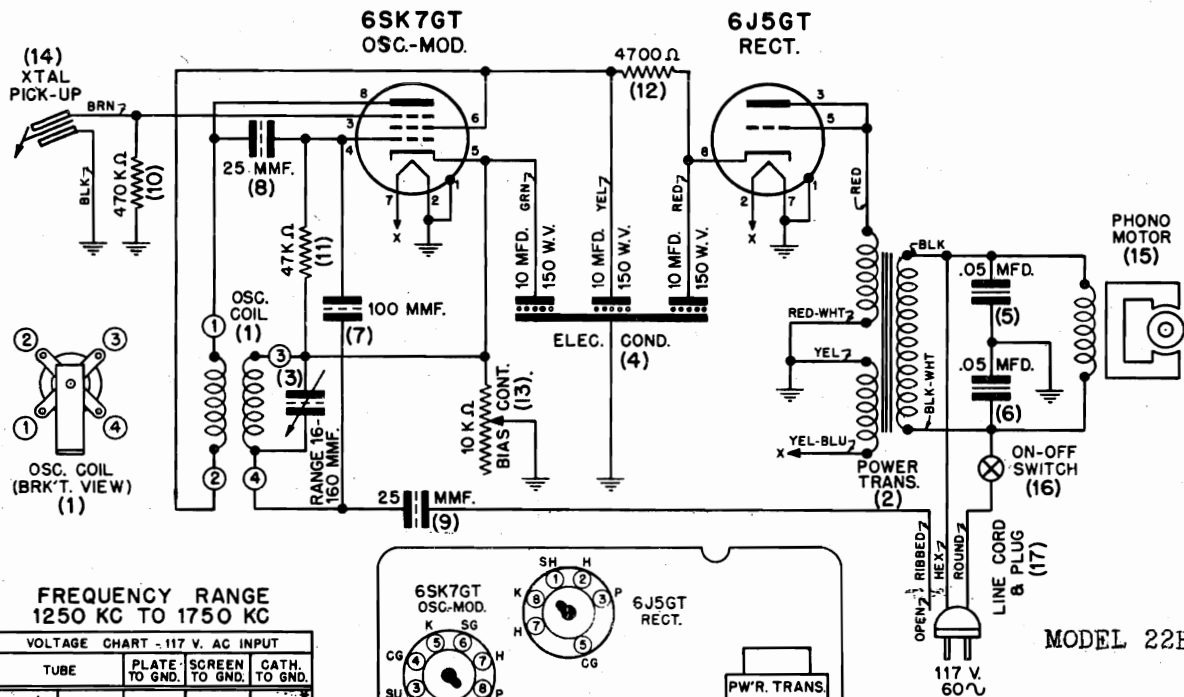
ALIGNMENT CHART

Connect output of signal generator to a 5" diameter, 3 turn loop. With volume on full and output meter connected across voice coil, bring loop close enough to receiver loop until an output of 50 milliwatts is obtained (.38 v. on output meter). Vary distance between generator & receiver loop to maintain this output during alignment.

• Rock condenser until greatest output is obtained.

OPERATIONS IN ORDER	GANG CONDENSER SET AT	DUMMY ANTENNA	GENERATOR CONNECTED TO	ADJUST TRIMMERS NO.	GENERATOR SET AT
1	MINIMUM	1 MFD.	OSC. MOD. GRID	1-2-3	455 KC.
2	1600 KC.	1 MFD.	OSC. MOD. GRID	4	1600 KC.
3	1400 KC.	NONE	"	5	1400 KC.
4	600 KC.**	NONE	"	6	600 KC.

GALVIN MFG. CO.

MODEL 22B Phono.
MODEL 60XW3

GANG DRIVE CORD

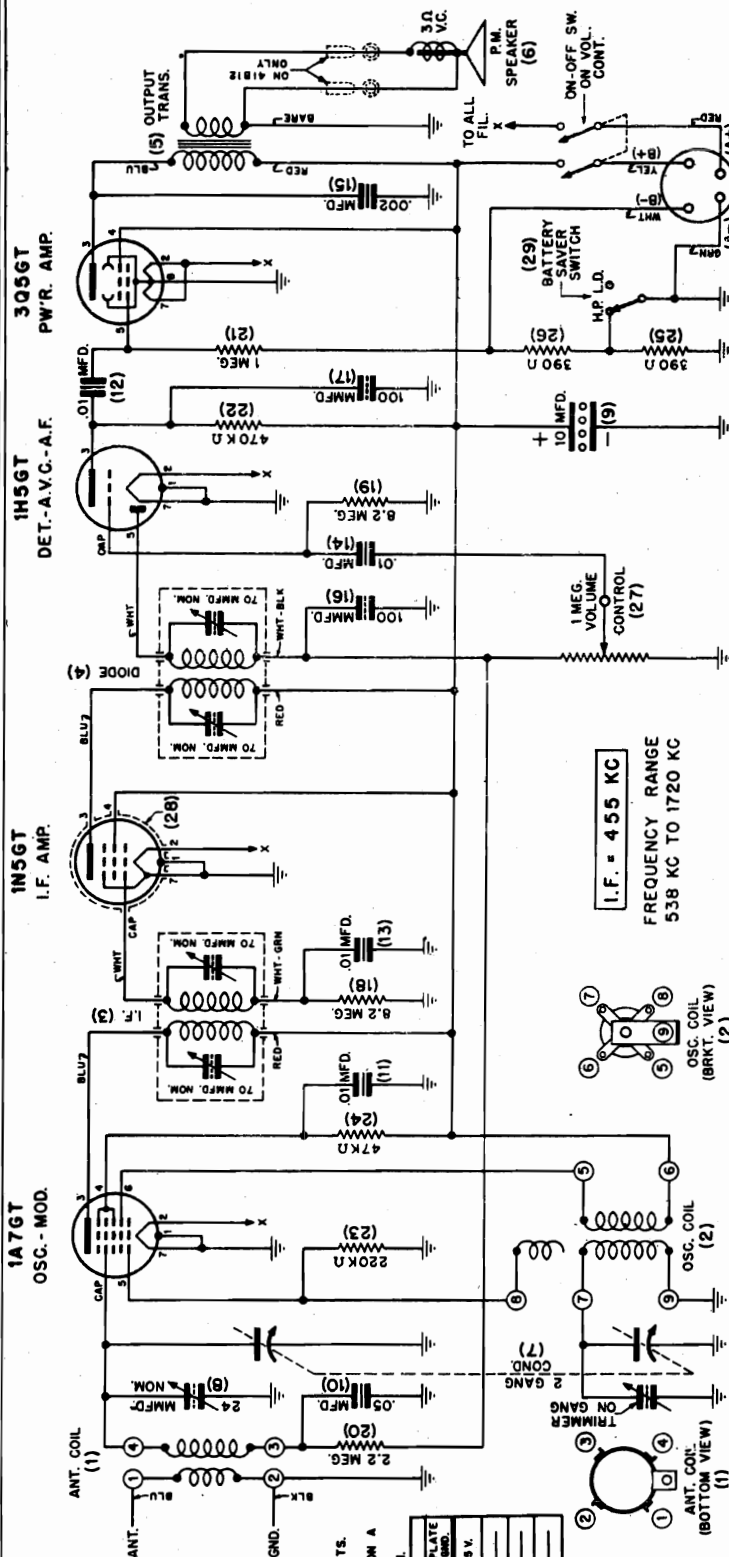
1. Remove the chassis from cabinet.
2. Remove broken string.
3. Turn gang to fully meshed position.
4. Cut a 35" length of 30 lb. silk fish cord.
5. Tie one end of cord to tension spring (Part No. 41A14111).
6. Hook other end of spring to gang drive pulley as shown in Fig. 2.
7. Pass cord through slot in gang drive pulley and wind, in a counter-clockwise direction, around and down to tuning shaft.

8. Wind cord 3-1/2 turns counter-clockwise around tuning shaft exactly as shown in Fig. 2.
9. Route cord up and wind one full turn around gang drive pulley, in a counter clockwise direction, to slot.
10. Pass cord through slot and tie cord to spring.
- NOTE: Before tying cord, adjust length so that spring will exert a light pull on cord.
11. Place a drop of shellac on cord knot.

POINTER DRIVE CORD

1. Remove the chassis from cabinet.
2. Remove broken string.
3. Turn gang to fully meshed position.
4. Cut a 40" length of 30 lb. silk fish cord.
5. Tie one end of cord to tension spring (Part No. 41A14111).
6. Hook other end of spring to gang drive pulley as shown in Fig. 2.
7. Pass cord through slot in gang drive pulley and route cord upward to idler pulley No. 1 (Back pulley).
8. Route cord in a counter-clockwise direction around idler pulley No. 1 and across chassis to idler pulley No. 2.
9. Continue in a counter-clockwise direction around idler pulley

- No. 2 and back across chassis to idler pulley No. 3 (Front Pulley).
10. Continue in a clockwise direction around idler pulley No. 3 and in a counter-clockwise direction around gang drive pulley to slot.
11. Pass cord through slot and tie to spring.
- NOTE: Before tying cord, adjust length so that spring will exert a light pull on cord.
12. Replace pointer on cord. To calibrate, tune in a station of known frequency and adjust pointer on cord to indicate station frequency. Fasten to cord with a drop of shellac.
13. Place a drop of shellac on cord knot.



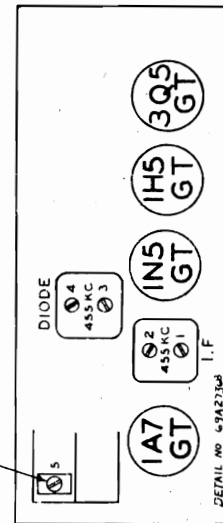
Average Microvolt Input *	Generator Set At	Generator Feeder Connected to	Dummy Antenna Capacity	Leak Resistance	Output Meter Reading **
3600	455	I.F. Grid	.1 Mfd.	.5 Meg	.38
106	455	Mod. Grid	.1 Mfd.	.5 Meg	.38
120	600	Mod. Grid	.1 Mfd.	.5 Meg	.38
22	600	Ant. Terminal	200 Mmf.	None	.38

Volume Control Set at Maximum
* .05 Watts = .38 Volts

** Output Meter Connected Across Voice Coil.

ANT COIL TRIMMER OSC TRIMMER
ADJUST AT 1400 KC

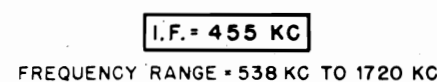
Operations In Order	Gang Condenser Set At	Dummy Antenna	Generator Connected To	Adjust Trimmers No.	Generator Set At
1	Minimum		OSC-Mod	1-2-3-4	455K.C.
2	1720K.C.		OSC-Mod	5	1720K.C.
3	1400K.C.	200Mmf	Ant. Lead.	6	1400K.C.



* X DRAIN - .25 AMP
"B" DRAIN IN "L.D." POSITION - 8 MA
"B" DRAIN IN "H.P." POSITION - 12 MA
MAX. P.W.R. OUTPUT - 300 MILLIWATTS.
NOTE: ALL VOLTAGES MEASURED ON A
1000 OHM PER VOLT VOLTMETER.
BATT. SAVER SW. IN "H.P." POSITION.

TUBE	VOLTAGE	CHART
1A7GT	OSC-MOD	85 V.
1H5GT	I.F. AMP	85 V.
1H5GT	DET.-A.V.C.-A.F.	85 V.
3Q5GT	P.W.R. AMP.	85 V.

MODEL 51F11



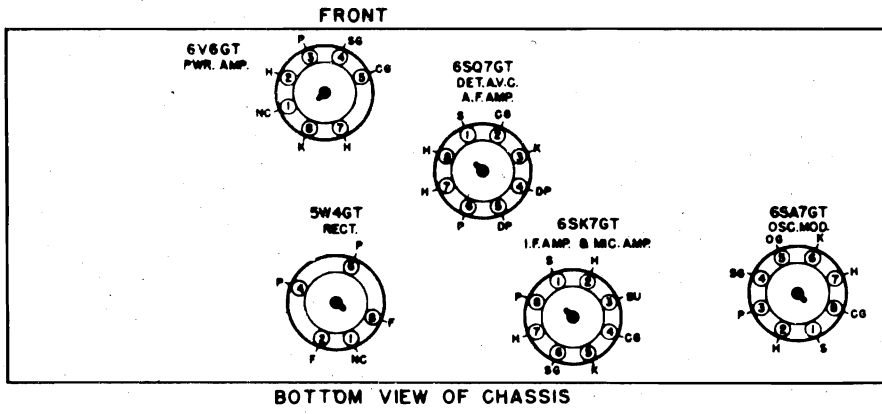
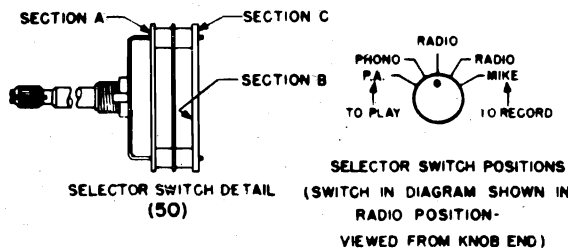
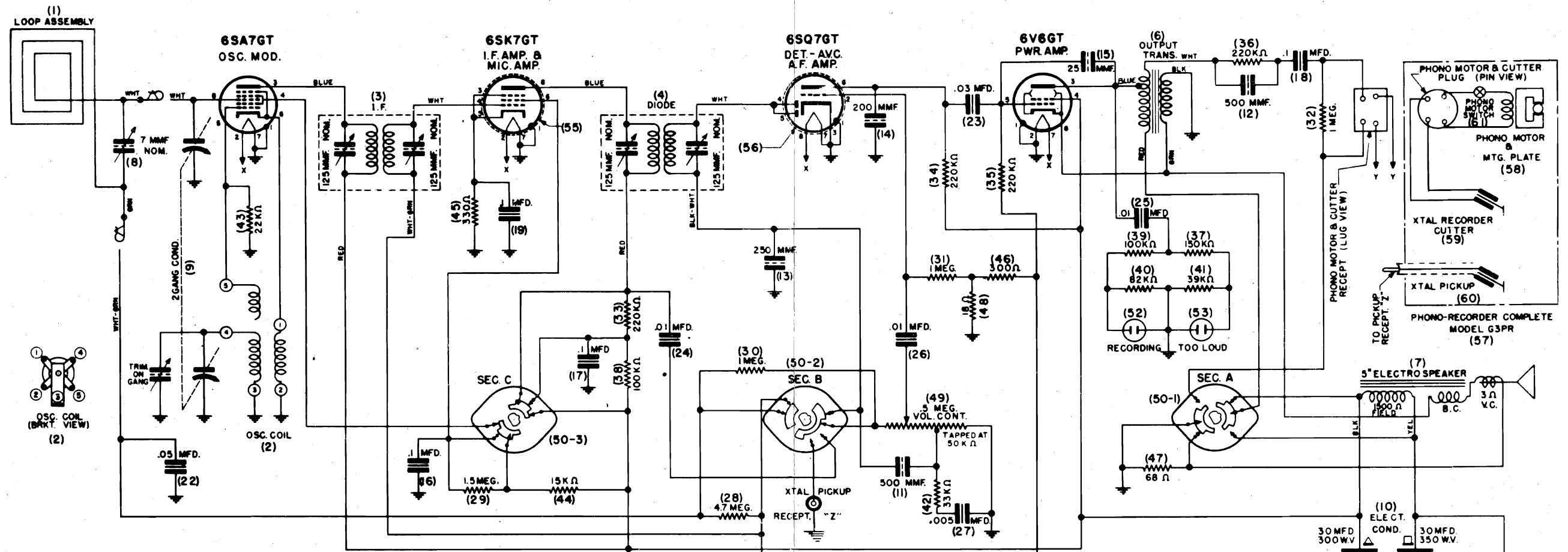
NOTE:- ALL VOLTAGES MEASURED WITH A
20,000 OHM PER VOLT VOLTMETER.

MAX. PWR. OUTPUT - 3.5 WATTS.
*PHONO-RADIO-TONE SWITCH IN
RADIO POSITION.
**BIAS, MEASURED FROM B- TO
CHASSIS. -15 VOLTS

MODEL 51511 SCHEMATIC DIAGRAM PARTS LIST

DIAG. PART NO.	DESCRIPTION	DIAG. PART NO.	DESCRIPTION
1	1X27890 BACK & LOOP ASSEMBLY	23	666202 CARBON RESISTOR (2.2 MEG-1/2WATT-20% INS.
2	1X27892 OSCILLATOR COIL	25	666159 1/2 MEG-1/2WATT-20% INS.
3	1X27850 I.F. COIL & SHIELD ASSEMBLY	26	661610 CARBON RESISTOR (170,000-1/2WATT-20% INS.
4	1X27856 DIODE COIL & SHIELD ASSEMBLY	26	662620 CARBON RESISTOR (220,000-1/2WATT-20% INS.
5	50289020 SPACER (5" ELECTRO)	27	666165 CARBON RESISTOR (100,000-1/2WATT-20% INS.
6	25292020 POWER TRANSFORMER	28	666202 CARBON RESISTOR (17,000-1/2WATT-20% INS.
7	25A19676 OUTPUT TRANSFORMER	29	666612 CARBON RESISTOR (22,000-1/2WATT-20% INS.
8	20A116710 TRIMMER & "U" BRACKET (7 MUF NOM.)	30	666605 CARBON RESISTOR (12,000-1/2WATT-10% N.I.
9	19280507 VARIABLE LC CONDENSER (2 GANG)	31	666626 CARBON RESISTOR (600-1/2WATT-20% INS.
10	29A27681 ELECT. COND. & STRAP (500V-350W.V.-30 MFD/300W.V.-20 MFD/25W.V.)	32	666682 CARBON RESISTOR (390-1/2WATT-10% N.I.
11	2186500 MOLDED MICA COND. (500 MFD-20-100W.V.) BRN "0"	33	18K19939 VOL. CONT. & SWITCH (.5" MEG)
12	2186511 MOLDED MICA COND. (100WFD-200-100W.V.) BRN "0"	35	104219850 HEAD BALANCE & TONE SWITCH
13	8598607 TUNBLUR CONDENSER (.05 MFD-100W.V.)	36	30A151 LIP COIL & PLUG (6 FT)
14	8598616 TUNBLUR CONDENSER (.05 MFD-100W.V.)	37	65X11150 FLANG (3-1/2"-15A TUB. BLAY CLEAR #1/2"
15	8598621 TUNBLUR CONDENSER (.05 MFD-100W.V.)	38	26A11760 BANTAM TUBE SHIELD
16	8598605 TUNBLUR CONDENSER (.05 MFD-100W.V.)	39	1X27890 CARBON B-I-L-RC RECORD CHANGER (COMPLETE)
17	8598604 TUNBLUR CONDENSER (.05 MFD-100W.V.)	40	592827687 PHONO MOTOR & MFG. PLATE (117 VOLT 60 CYCLE)
18	8598633 TUNBLUR CONDENSER (.05 MFD-200W.V.)	41	59K276187 PHONO PICKUP ARM (COMPLETE)
19	8598608 TUNBLUR CONDENSER (.05 MFD-100W.V.)	42	59K276131 CARTRIDGE & LEADS (ONLY)
20	8598613 TUNBLUR CONDENSER (.05 MFD-600W.V.)	42	10K21750 SLIDER SWITCH (2 POS., 5 P.D.T.)
21	666202 CARBON RESISTOR (4.7 MEG-1/2WATT-20% INS.		

GALVIN MFG. CO.



VOLTAGE CHART - 117 V. AC INPUT			
TUBE	PLATE TO GND	SCREEN TO GND	CATH. TO GND
6SA7GT OSC. MOD.	210 V	90 V	0
6SK7GT I.F. AMP. & MIC. AMP.	210 V	90 V	3 V
6SQ7GT DET.-AVC. A.F. AMP.	95 V	—	0
6V6GT PWR. AMP.	185 V	210 V	0
5W4GT RECT.	AC	—	310 V FROM PL.

⊗ BIAS MEASURED FROM B- TO CHASSIS -15V
ALL MEASUREMENTS MADE WITH A 20,000 OHM PER VOLT VOLTMETER.
MAXIMUM POWER OUTPUT - 3.5 WATTS.

I.F. = 455 KC

FREQUENCY RANGE = 538 KC TO 1720 KC.

Motorola
MODEL 51 R 11
CHASSIS NO. H-198

DIAG. NO.	PART NO.	DESCRIPTION	DIAG. NO.	PART NO.	DESCRIPTION	DIAG. NO.	PART NO.	DESCRIPTION
1	21627175	LOOP ANTENNA & BACK	22	889005	TUBULAR CONDENSER (.05 MFD-100V.V.)	44	666013	CARBON RESISTOR (15,000-1/2WATT-20K) N.I.
2	21627182	OSCILLATOR COIL	23	859804	TUBULAR CONDENSER (.03 MFD-100V.V.)	45	666014	CARBON RESISTOR (3300-1/2WATT-20K) INS.
3	11627187	I.F. COIL & SHIELD ASSEMBLY	24	889909	TUBULAR CONDENSER (.01 MFD-100V.V.)	46	666187	CARBON RESISTOR (3000-1/2WATT-10K) N.I.
4	11627185	DIODE COIL & SHIELD ASSEMBLY	25	889909	TUBULAR CONDENSER (.01 MFD-100V.V.)	47	666188	CARBON RESISTOR (680-1/2WATT-10K) INS.
5	25628202	POWER TRANSFORMER	26	889901	TUBULAR CONDENSER (.01 MFD-100V.V.)	48	666189	CARBON RESISTOR (180-1/2WATT-10K) N.I.
6	25628219	OUTPUT TRANSFORMER	27	889913	TUBULAR CONDENSER (.005 MFD-500V.V.)	49	18A28750	VOLUME CONTROL & SWITCH (.5 MEG)
7	50628307	SPEAKER (5" ELECTRO)	28	666368	CARBON RESISTOR (11.7 MEG-1/2WATT-20K) INS.	50	18A28721	SELECTOR SWITCH (5 POSITION)
8	20A18710	TRIMMER & "N" BRACKET (7 MFD. NOM.)	29	666378	CARBON RESISTOR (1.5 MEG-1/2WATT-20K) INS.	51	65X10667	BULB (6.3V.-25A TUB. BAY.) CLEAR #UL
9	19828597	VARIABLE CONDENSER (2 GANG)	30	666159	CARBON RESISTOR (1 MEG-1/2WATT-20K) INS.	52	6522177	NEON BULB
10	23A27118	ELECT. COND. (30 MFD/350V.V.-30 MFD/300V.V.-80 MFD/250V.V.)	31	666159	CARBON RESISTOR (1 MEG-1/2WATT-20K) INS.	53	6522177	NEON BULB
11	2166500	MOLDED MICA COND. (500MFD-20V-100V.V.) BRN "0"	32	666159	CARBON RESISTOR (1 MEG-1/2WATT-20K) INS.	54	30X21859	LINE CORD & PLUG (9 FT.)
12	2166500	MOLDED MICA COND. (500MFD-20V-100V.V.) BRN "0"	33	666204	CARBON RESISTOR (220,000-1/2WATT-20K) INS.	55	26A11760	BANTAM TUBE SHIELD
13	2166517	MOLDED MICA COND. (250MFD-20V-100V.V.) BRN "0"	34	666204	CARBON RESISTOR (220,000-1/2WATT-20K) INS.	56	26A11760	BANTAM TUBE SHIELD
14	2166501	MOLDED MICA COND. (200MFD-20V-100V.V.) BRN "0"	35	666204	CARBON RESISTOR (220,000-1/2WATT-20K) INS.	57	11628765	MODEL 68PH PHONO-REORDER (COMPL. ETC)
15	2166535	MOLDED MICA COND. (25 MFD-20V-100V.V.) BRN "0"	36	666204	CARBON RESISTOR (220,000-1/2WATT-20K) INS.	58	59K28759	PHONO-REORDER MOTOR (117V. 60C)
16	889907	TUBULAR CONDENSER (.1 MFD-100V.V.)	37	665599	CARBON RESISTOR (100,000-1/2WATT-20K) INS.	59	59K28766	UTTER ARM (LESS MOUNTING)
17	889907	TUBULAR CONDENSER (.1 MFD-100V.V.)	38	666155	CARBON RESISTOR (100,000-1/2WATT-20K) INS.	60	18A28767	UTTER CARTRIDGE (ONLY)
18	889907	TUBULAR CONDENSER (.1 MFD-100V.V.)	39	666135	CARBON RESISTOR (100,000-1/2WATT-20K) INS.	61	59K28775	PICKUP ARM (WITH MOUNTING)
19	889914	TUBULAR CONDENSER (.1 MFD-100V.V.)	40	666135	CARBON RESISTOR (100,000-1/2WATT-20K) INS.	62	18A28776	PICKUP CARTRIDGE (ONLY)
20	8A28966	TUBULAR CONDENSER (.05 MFD-600V.V.)	41	666126	CARBON RESISTOR (39,000-1/2WATT-20K) INS.	63	18A11589	SLIDER SWITCH (S.P.S.T.)
21	8A28966	TUBULAR CONDENSER (.05 MFD-600V.V.)	42	666329	CARBON RESISTOR (33,000-1/2WATT-20K) INS.	64	59K28821	CRYSTAL MICROPHONE (COMPLETE)
			43	666212	CARBON RESISTOR (22,000-1/2WATT-20K) INS.	65	59K28821	CRYSTAL MICROPHONE CARTRIDGE (ONLY)

GALVIN MFG. CO.

MODEL 51F11

MODEL 61F21

MODEL 51 F 11

ALIGNMENT CHART

Operations In Order	Gang Condenser Set At	Dummy Antenna	Generator Connected to	Adjust Trimmers No.	Generator Set At
1	1720 K.C.	.1 Mfd.	Osc. Mod. Grid	1-2-3-4	455 K.C.
2	1720 K.C.	200 Pmf.	Ext. Ant.	5	1720 K.C.
3	1400 K.C.	200 Pmf.	Connection	6	1400 K.C.

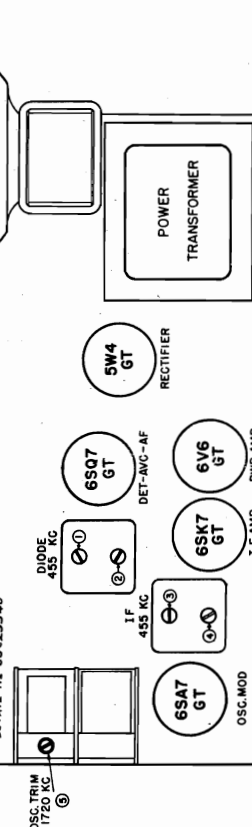
SENSITIVITY AND STAGE GAIN MEASUREMENTS

Average Microvolt Input *	Generator Set At	Generator Feeder Connected to	Dummy Antenna Capacity	Leak Resistance	Output Meter Reading **
1750	455 K.C.	I.F. Grid	.1 Mfd.	.5 Meg.	.38
22	455 K.C.	Mod. Grid	.1 Mfd.	.5 Meg.	.38
3	600 K.C.	Ant. Terminal	200 Pmf.	None	.38

Volume Control Set at Maximum
*.05 Watts = .38 Volts

Tone Control Set at High Position.
** Output meter connected across voice coil.

DETAIL N2 63C23540



⑥ LOOP ANT.
TRIMMER 1400 KC.

TUBE & TRIMMER LAYOUT

CHASSIS N2 H-184
MODEL N2 51F11

MODEL 61 F 21

ALIGNMENT CHART

Operations In Order	Gang Condenser Set At	Dummy Antenna	Band Switch Set At	Generator Connected To	Adjust Trimmers No.	Generator Set At
1	1720 K.C.	.1 Mf.	B.C.	Mixer Grid	1-2-3-4	455 K.C.
2	1720 K.C.	200 Pmf.	B.C.	Ext. Ant.	5	1720 K.C.
3	1400 K.C.	200 Pmf.	B.C.	Connection	6	1400 K.C.
4	600 K.C.	200 Pmf.	B.C.	Ext. Ant.	7	600 K.C.
5	12.2 M.C.	400 Ohms	S.W.	Ext. Ant.	8	12.2 M.C.
6	11.0 M.C.	400 Ohms	S.W.	Ext. Ant.	9	11.0 M.C.

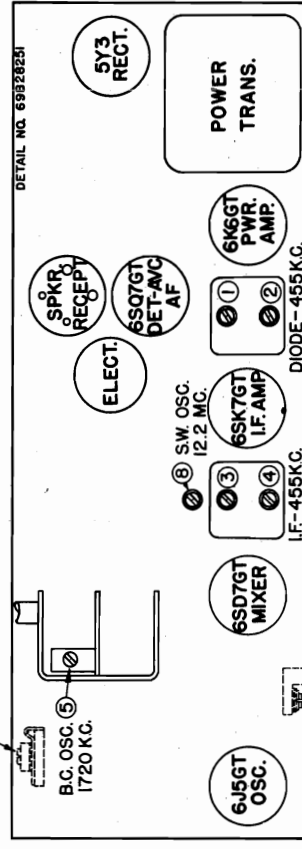
SENSITIVITY AND STAGE GAIN MEASUREMENTS

Average Microvolt Input *	Generator Set At	Generator Feeder Connected to	Dummy Antenna Capacity	Leak Resistance	Output Meter Reading **
2100	455 K.C.	I.F. Grid	.1 Mfd.	.5 Meg.	.38
10	455 K.C.	Mixer Grid	.1 Mfd.	.5 Meg.	.38
12	600 K.C.	Mixer Grid	.1 Mfd.	.5 Meg.	.38
11	600 K.C.	Ant. Terminal	200 Pmf.	None	.38

Volume Control Set at Maximum
*.05 Watts = .38 Volts

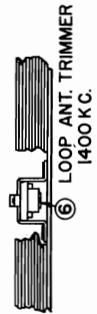
Tone Control Set at High Position.
** Output meter connected across voice coil.

S.W. ANT. ⑨
11 MC.



⑦ B.C. PAD 600 KC.

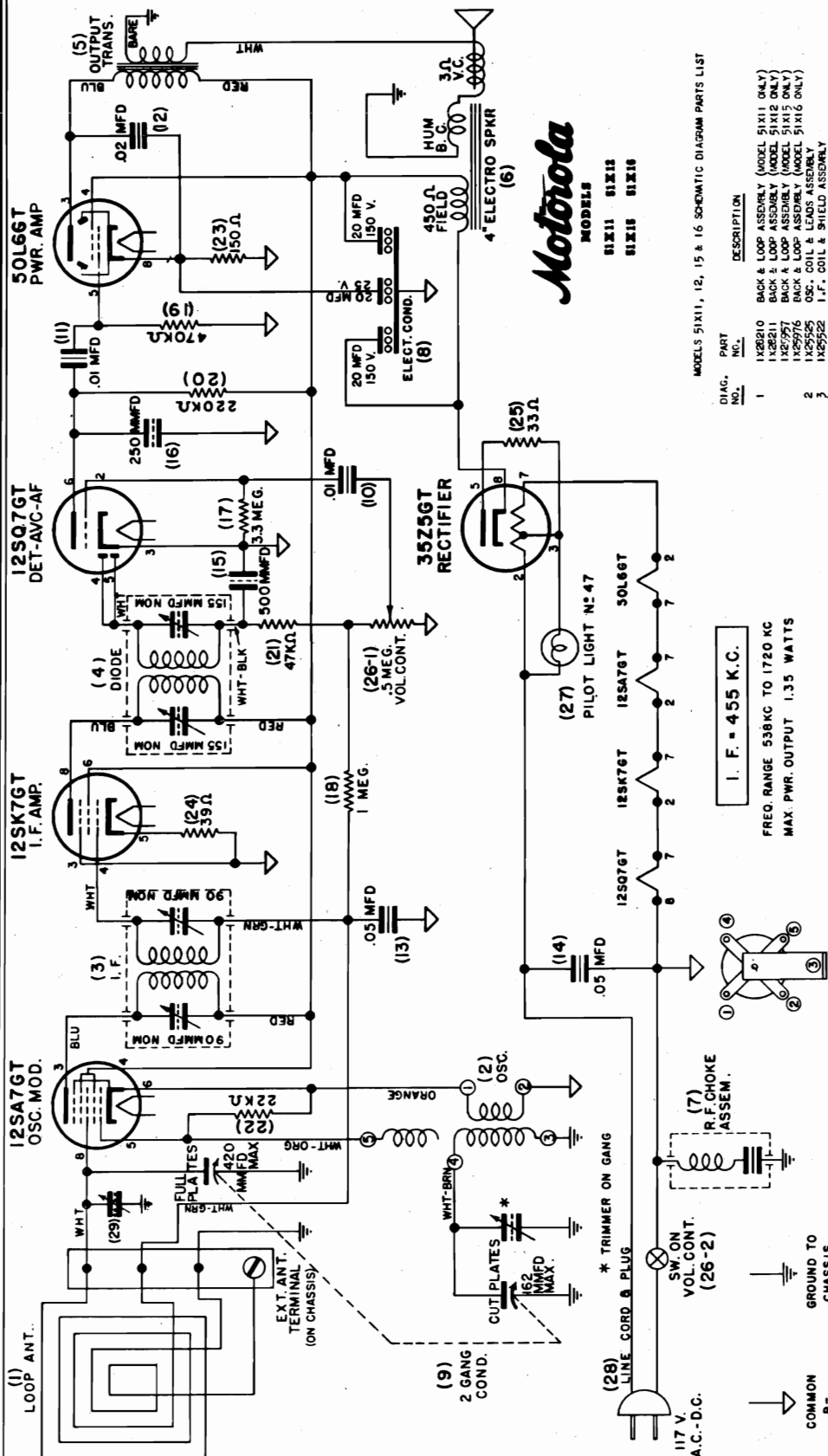
MODEL 61 F 21 TUBE & TRIMMER LAYOUT
CHASSIS NO. 185



⑥ LOOP ANT. TRIMMER
1400 KC.

MODELS 51X11, 51X12,
51X15, 51X16

GALVIN MFG. CO.



Motorola

MODELS

51X11 51X12
51X15 51X16

MODELS 51X11, 12, 15 & 16 SCHEMATIC DIAGRAM PARTS LIST

DIAG. NO.	PART NO.	DESCRIPTION
1	12B210	BACK & LOOP ASSEMBLY (MODEL 51X11 ONLY)
1	12B211	BACK & LOOP ASSEMBLY (MODEL 51X12 ONLY)
1	12B212	BACK & LOOP ASSEMBLY (MODEL 51X15 ONLY)
1	12B213	BACK & LOOP ASSEMBLY (MODEL 51X16 ONLY)
2	12S575	OSC. COIL & SHIELD ASSEMBLY
3	12S576	I.F. COIL & SHIELD ASSEMBLY
4	12S577	DIODE COIL & SHIELD ASSEMBLY
5	25A2050	OUTPUT TRANSFORMER
6	50A2050	SPEAKER (1" ELECTRO)
7	1A2559	R.F. CHOKE ASSEMBLY
8	23A2550	ELECT. COND. & STRAP (20-20/150V & 20/25V)
9	1A2550	GANG & PULLY ASSEMBLY (2 GANG)
10	1A2551	TUBULAR CONDENSER (10-100V)
11	89A205	TUBULAR CONDENSER (10-100V)
12	89A206	TUBULAR CONDENSER (10-100V)
13	89A207	TUBULAR CONDENSER (10-100V)
14	89A208	TUBULAR CONDENSER (10-100V)
15	21B650	MOLDED MICA CONDENSER (500 MFD)
16	21B651	MOLDED MICA CONDENSER (500 MFD)
17	66A217	CARBON RESISTOR (1/2 WATT, 100 OHMS)
18	66A218	CARBON RESISTOR (1/2 WATT, 100 OHMS)
19	66A219	CARBON RESISTOR (1/2 WATT, 100 OHMS)
20	66A220	CARBON RESISTOR (1/2 WATT, 100 OHMS)
21	66A221	CARBON RESISTOR (1/2 WATT, 100 OHMS)
22	66A222	CARBON RESISTOR (1/2 WATT, 100 OHMS)
23	66A223	CARBON RESISTOR (1/2 WATT, 100 OHMS)
24	66A224	CARBON RESISTOR (1/2 WATT, 100 OHMS)
25	66A225	CARBON RESISTOR (1/2 WATT, 100 OHMS)
26	10A1629	VOL. CONTROL & SWITCH (1/2-1/2-20) N.I.
27	50A1629	SW. CORD & PLUG (6 FT.)
28	20A2810	TRIMMER CONDENSER (7 MFD NOM.)

I. F. = 455 K.C.

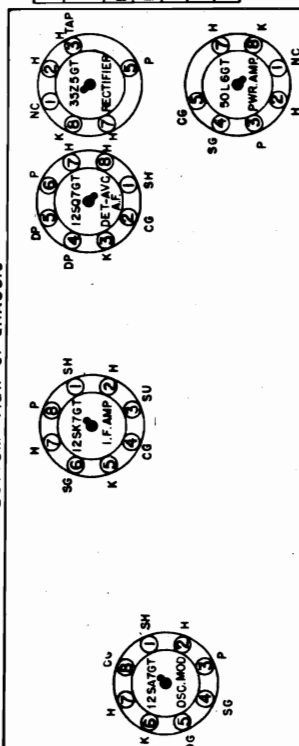
FREQ. RANGE 530 KC TO 1720 KC
MAX. PWR. OUTPUT 1.35 WATTS

TUBE	PLATE/SCREEN CATH. TO B- TO B- TO B-
12SA7GT	OSC. MOD. 80V. 0
12SK7GT	I.F. AMP. 80V. .5V.
12SQ7GT	DET. AVC-AF 45V. 0
50L6GT	PWR. AMP. 75V. 5.5V.
35Z5GT	RECT. A.C. 105V.

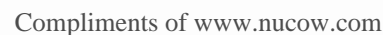
NOTE: ALL VOLTAGES MEASURED ON A 1000 OHMS PER VOLT VOLTMETER
INPUT: 117 V. A.C.

BRACKET VIEW (2)
OF OSC. COIL

BOTTOM VIEW OF CHASSIS



Motorola



MODELS 51X11 to 51X16
MODEL 62T2

GALVIN MFG. CO.

MODEL
62T2

ALIGNMENT CHART

Operations In Order	Gang Condenser Set At	Dummy Antenna	Band Switch Set At	Generator Connected to	Adjust Trimmers No.	Generator Set At
1	Minimum 1720 K.C.	.1 Mfd.	B.C.	Osc-Mod.Grid	1-2-3-4	455 K.C.
2	Minimum 1720 K.C.	.1 Mfd.	B.C.	Osc-Mod.Grid	5	1720 K.C.
3	538 K.C.	.1 Mfd.	B.C.	Osc-Mod.Grid	6	538 K.C.
4	1400 K.C.	200 Mmf.	B.C.	External Antenna Terminal	7	1400 K.C.
5	18 M.C.	.1 Mfd.	S.W.	Osc-Mod.Grid	8	18 M.C.
6	16 M.C.	400 Ohms	S.W.	External Antenna Terminal	9	16 M.C.
7	1400 K.C.	200 Mmf.	B.C.	External Antenna Terminal	10	1400 K.C.

Volume Control Set at Maximum.

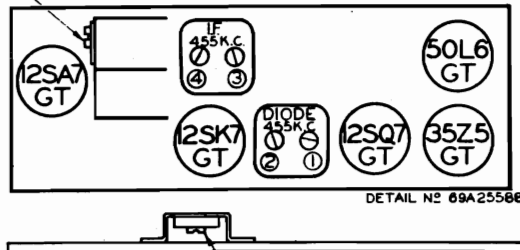
SENSITIVITY AND STAGE GAIN MEASUREMENTS

Average Microvolt Input *	Generator Set At	Generator Feeder Connected to	Dummy Antenna Capacity	Leak Resistance	Output Meter Reading **
2500	455	I.F. Grid	.1 Mfd.	.5 Meg	.38
35	455	Mod. Grid	.1 Mfd.	.5 Meg	.38
40	600	Mod. Grid	.1 Mfd.	.5 Meg	.38
4	600	R.F. Grid	.1 Mfd.	.5 Meg	.38
3	600	Ant. Terminal	200 Mmf.	None	.38

Volume Control Set at Maximum.
* .05 Watts .38 Volts.

Tone Control set in treble position.
** Output meter connected across voice coil.

OSC. TRIMMER
ADJUST AT 1720 K.C.



LOOP ANT. TRIMMER
ADJUST AT 1400 K.C.

ALIGNMENT CHART

Operations In Order	Gang Condenser Set At	Dummy Antenna	Generator Connected To	Adjust Trimmers No.	Generator Set At
1	Minimum	.1 Mfd.	Osc.Mod.Grid	1-2-3-4	455 K.C.
2	1720 K.C.	.1 Mfd.	Osc.Mod.Grid	5	1720 K.C.
3	1400 K.C.	400 Ohms	External Antenna Terminal	6	1400 K.C.

SENSITIVITY AND STAGE GAIN MEASUREMENTS

Average Microvolt Input *	Generator Set At	Generator Feeder Connected To	Dummy Antenna Capacity	Leak Resistance	Output Meter Reading **
2600	455	I.F. Grid	.1 Mfd.	.5 Meg.	.38
25	455	Mod. Grid	.1 Mfd.	.5 Meg.	.38
30	600	Mod. Grid	.1 Mfd.	.5 Meg.	.38
5	600	Ant.Terminal	400 Ohms	None	.38

Volume Control Set at Maximum

** Output meter connected across voice coil.

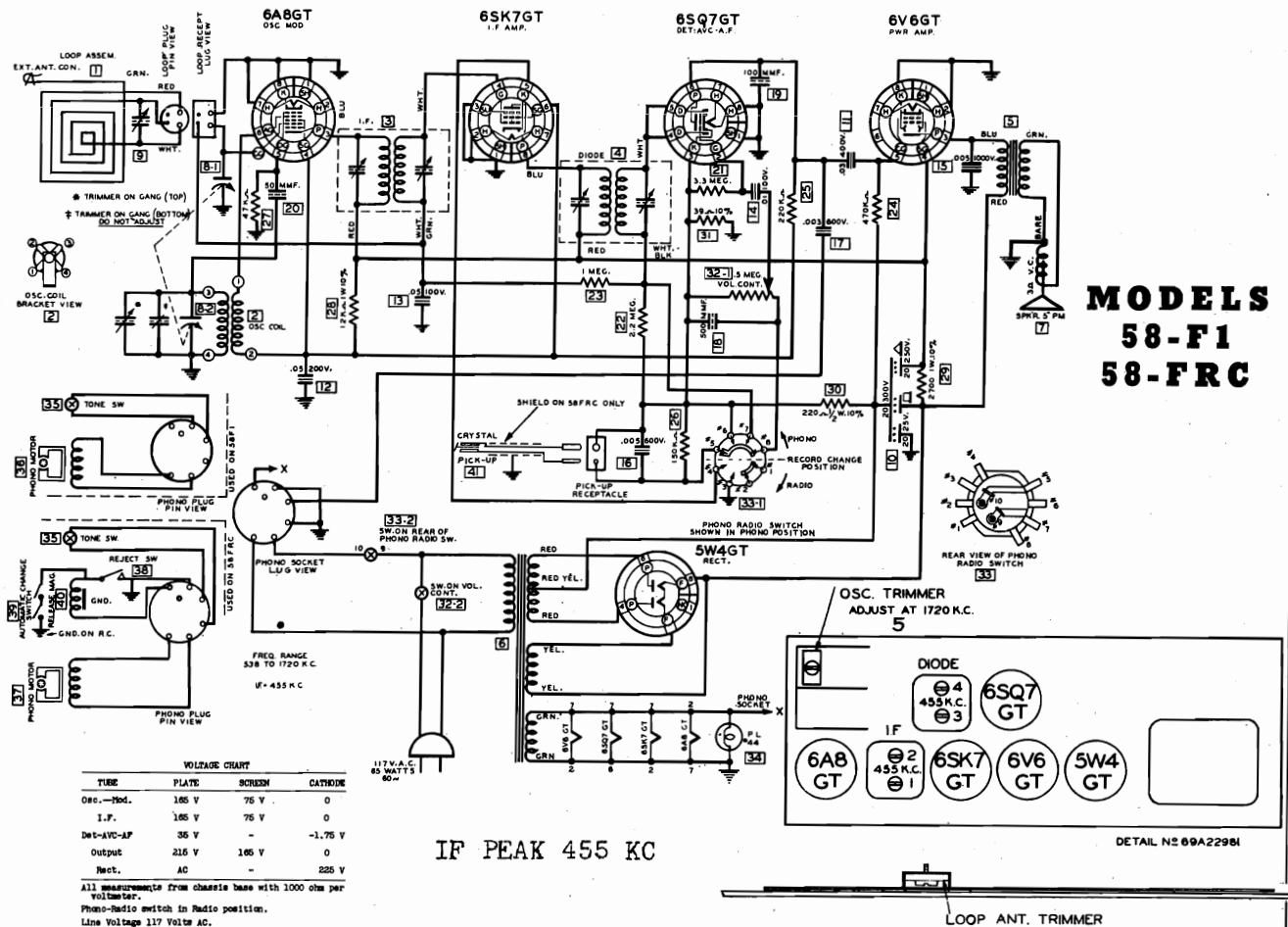
* .05 Watts = .38 Volts

MODELS

51X11 51X14
51X12 51X15
51X13 51X16

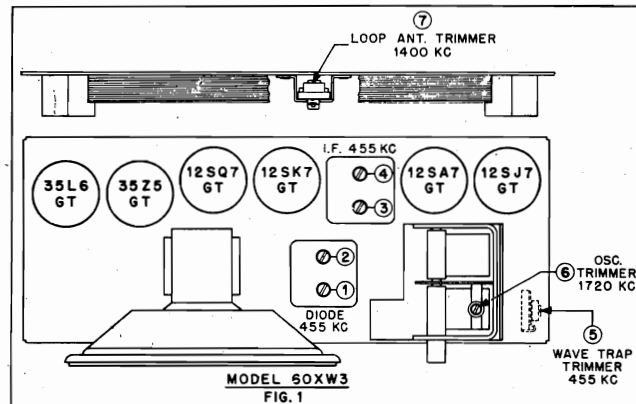
DETAIL NO 69A25566

GALVIN MFG. CO.



FOR SERVICE INFORMATION AND PARTS PRICE LIST ON THE AUTOMATIC RECORD CHANGER AND PHONO-GRAPH SECTION, REFER TO FORM S-8-E.

FOR OTHER DATA SEE INDEX



BOTTOM VIEW OF CHASSIS & SOCKETS

VOLTAGE CHART

TUBE	PLATE TO B.	SCREEN TO B.	CATH. TO B.
12S7GT R.F. AMP.	40 V.	85 V.	0
12SA7GT OSC. MOD.	85 V.	85 V.	0
12SK7GT I.F. AMP.	85 V.	85 V.	0
12SQ7GT DET.-AVC-A.F.	30 V.	—	0
35L6GT PWR. AMP.	80 V.	85 V.	4 V.
32Z5GT RECT. A.C.	—	—	105 V.

LEGEND

- ⬇ GROUND TO CHASSIS
- ⬇ GROUND TO B —
- * TRIMMER ON GANG (TOP)
- † TRIMMER ON GANG (BOTTOM, DO NOT ADJUST)

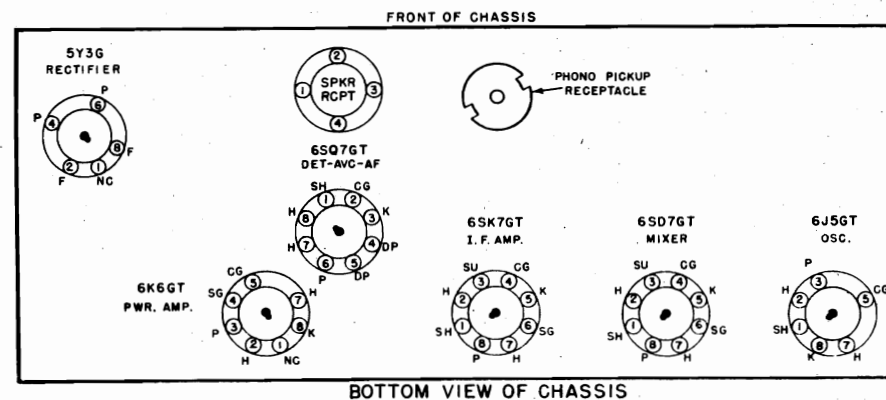
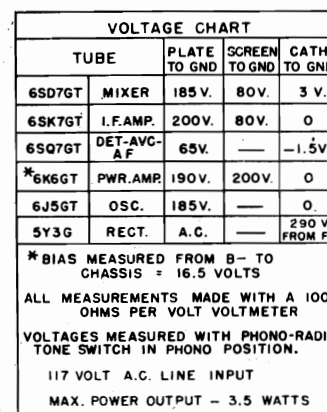
INPUT: 117 V. A.C.
 OUTPUT: MAX. POWER 1.75 WATTS
 NOTE: ALL VOLTAGES MEASURED ON A 1000 OHMS PER VOLT VOLTMETER

OPERATIONS IN ORDER	GANG CONDENSER SET AT	DUMMY ANTENNA	GENERATOR CONNECTED TO	ADJUST TRIMMERS NO	GENERATOR SET AT
1	Minimum	.1 MFD	R.F. Grid	1-2-3-4	455 Kc.
2	Minimum	.1 MFD	R.F. Grid	5*	455 Kc.
3	1720 Kc.	.1 MFD	R.F. Grid	6	1720 Kc.
4	1400 Kc.	200 MMFD.	Ant. Terminal	7	1400 Kc.

AVERAGE MICROVOLT INPUT	GENERATOR SET AT	GENERATOR FEEDER CONNECTED TO	DUMMY ANTENNA CAPACITY	LEAK RESISTANCE	OUTPUT METER READING
4750	455 K.C.	I.F. Grid	.1 Mfd.	.5 Meg.	.38
110	455 K.C.	Mod. Grid	.1 Mfd.	.5 Meg.	.38
55	600 K.C.	Mod. Grid	.1 Mfd.	.5 Meg.	.38.
7	600 K.C.	R.F. Grid	.1 Mfd.	.5 Meg.	.38
6	600 K.C.	Ant. Terminal	200 Mmfd.	None	.38

** Output meter connected across voice coil.

PART	
SCREEN TO GND	CATH TO GND
80V.	3 V.
80V.	0
—	-1.5V.
200V.	0



VOLTAGE CHART				
TUBE		PLATE TO GND	SCREEN TO GND	CATH. TO GND
6SD7GT	MIXER	185 V.	80V.	3 V.
6SK7GT	I.F.AMP.	200V.	80V.	0
6SQ7GT	DET-AVG-AF	65V.	—	-1.5V
*6K6GT	PWR.AMP.	190V.	200V.	0
6J5GT	OSC.	185V.	—	0
5Y3G	RECT.	A.C.	—	290 V. FROM P.

* BIAS MEASURED FROM B- TO CHASSIS = 16.5 VOLTS

ALL MEASUREMENTS MADE WITH A 100 OHMS PER VOLT VOLTMETER

VOLTAGES MEASURED WITH PHONO-RADIO TONE SWITCH IN PHONO POSITION.

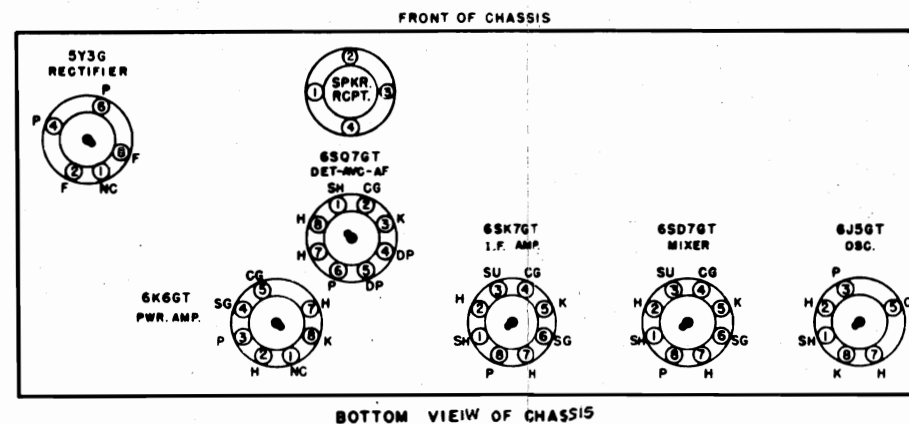
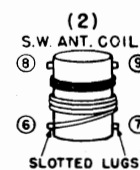
117 VOLT A.C. LINE INPUT

MAX. POWER OUTPUT - 3.5 WATTS

H-185		MODEL 61F21 SCHEMATIC DIAGRAM PARTS LIST			
NO.	PART NO.	DESCRIPTION	NO.	PART NO.	DESCRIPTION
1	1X28191	BACK & LOOP ASSEMBLY	29	686366	CARBON RESI STOR (4.7 MEG-1/3WATT-20K) INS.
2	2A427298	SH-FT. WAVE ANTENNA COIL	30	686366	CARBON RESI STOR (4.7 MEG-1/3WATT-20K) INS.
3	2A427297	B.C. & W. RESILIA FOR COIL	31	686201	CARBON RESI STOR (3.3 MEG-1/3WATT-20K) INS.
4	1X28090	I.F. COIL & SHIELD ASSEMBLY	32	686202	CARBON RESI STOR (2.2 MEG-1/3WATT-20K) INS.
5	1X28088	DIODE COIL & SHIELD ASSEMBLY	33	686160	CARBON RESI STOR (470,000-1/3WATT-20K) INS.
6	50B27374	SPEAKER (10" ELECTRO)	34	686349	CARBON RESI STOR (220,000-1/3WATT-10K) INS.
7	25A2171	OUTPUT TRANSFORMER	35	686204	CARBON RESI STOR (220,000-1/3WATT-20K) INS.
8	25B21248	POWER TRANSFORMER	36	686321	CARBON RESI STOR (47,000-1/3WATT-20K) INS.
9	40A28041	BAND SWITCH (2 POSITION)	37	686358	CARBON RESI STOR (35,000-1/2WATT-10K) INS.
10	20A17935	B.C. PADDOR (RANGE 300 MF TO 800 MAF)	38	686372	CARBON RESI STOR (1,000-1/3WATT-20K) INS.
11	1X28006	GANG & PULLEY ASSEMBLY (2 GANG)	39	686026	CARBON RESI STOR (6800-1/3WATT-20K) N.I.
12	20A27325	TRIMMER A "Z" BRACKET (50 MFD NOM)	40	686167	CARBON RESI STOR (200-1/3WATT-10K) N.I.
13	20A27326	TRIMMER A "Z" BRACKET (118 MFD NOM)	41	686371	CARBON RESI STOR (200-1/3WATT-10K) N.I.
14	20A16710	TRIMMER A "M" BRACKET (7 MFD NOM)	42	18K26678	VOLUME CONTROL & SWITCH (.5 MEG)
15	25A27716	ELECT. COND. (30 MFD/350V.-V, 30 MFD/300V.-V.)	43	40K28108	PHONO-RADIO & TONE SWITCH
16	2A427296	POLYSTYRENE TUN. COND. (.007 MFD-50-100V.-V.)	44	30K21819	LINE COIL & PLUG (9 FT.)
17	689807	TUBULAR CONDENSER (.1 MFD-100V.-V.)	45	65X10867	BUILD (6.3V-250 MA. BAY) CLEAR #14
18	689816	TUBULAR CONDENSER (.05 MFD-100V.-V.)	46	25A17270	SANTAL TURE 9-11LED
19	689805	TUBULAR CONDENSER (.05 MFD-100V.-V.)	47	1X27850	MODEL 11-14RC RECORD CHANGER (COMPLETE)
20	689805	TUBULAR CONDENSER (.05 MFD-100V.-V.)	48	59B27687	PHONO MOTOR & MTG. PLATE (117V-40 CYCLES)
21	689802	TUBULAR CONDENSER (.02 MFD-100V.-V.)	49	59K28740	PHONO PICKUP ARM (COMPLETE)
22	689801	TUBULAR CONDENSER (.01 MFD-100V.-V.)	50	10A27346	SLIDER SWITCH & SHELL (PHONO MOTOR ON-OFF)
23	689813	TUBULAR CONDENSER (.005 MFD-600V.-V.)			
24	689813	TUBULAR CONDENSER (.005 MFD-600V.-V.)			
25	689813	TUBULAR CONDENSER (.005 MFD-600V.-V.)			
26	21B6503	MOLDED MICA COND. (50 MAF-20K-400V.-V.) BSN "0"			
27	21B6500	MOLDED MICA COND. (500 MAF-20K-400V.-V.) BSN "0"			
28	21B6500	MOLDED MICA COND. (500 MAF-20K-400V.-V.) BSN "0"			
29	21B6500	MOLDED MICA COND. (500 MAF-20K-400V.-V.) BSN "0"			

Motorola

MODELS
61 T 21



VOLTAGE CHART				
TUBE		PLATE TO GND	SCREEN TO GND	CATH. TO GND
6SD7GT	MIXER	185 V.	80V.	3 V.
6SK7GT	I.F. AMP.	200V.	80V.	0
6SQ7GT	DET.-AVC-AF	65V.	—	-1.5 V.
*6K6GT	PWR. AMP.	190V.	200V.	0
6J5GT	OSC.	185 V.	—	0
5Y3G	RECT.	A.C.	—	250 V. FROM FIL.

* BIAS MEASURED FROM B- TO CHASSIS + 16.3 VOLTS.

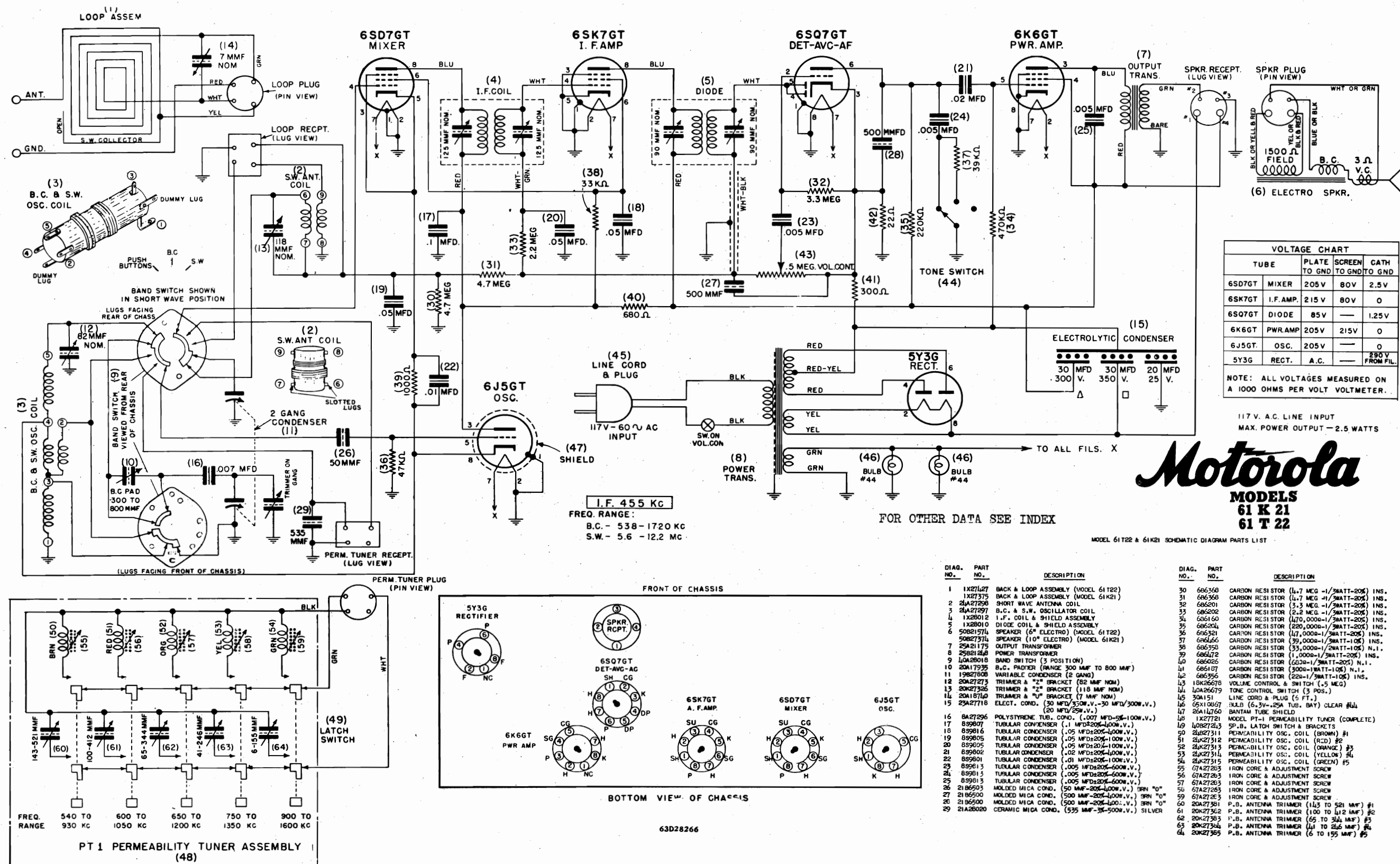
ALL MEASUREMENTS MADE WITH A 1000 OHMS PER VOLT VOLTMETER

117 V. A.C. LINE INPUT

MAX. POWER OUTPUT — 3.5 WATTS

MODEL 61721 SCHEMATIC DIAGRAM PARTS LIST					
DIAG. NO.	PART NO.	DESCRIPTION	DIAG. NO.	PART NO.	DESCRIPTION
1	1X271682	BACK & LOOP ASSEMBLY	29	666368	CARBON RESISTOR (1.7 MEG-1/3WATT-20%) INS.
2	2A427298	SHORT WAVE ANTENNA COIL	30	666368	CARBON RESISTOR (4.7 MEG-1/3WATT-20%) INS.
3	2A427297	B.C. & S.W. OSCILLATOR COIL	31	666201	CARBON RESISTOR (3.3 MEG-1/3WATT-20%) INS.
4	1X28012	I.F. COIL & SHIELD ASSEMBLY	32	666202	CARBON RESISTOR (2.2 MEG-1/3WATT-20%) INS.
5	1X28015	DUODE COIL & SHIELD ASSEMBLY	33	666160	CARBON RESISTOR (470,000-1/3WATT-20%) INS.
6	50021574	SPEAKER (6" ELECTRO)	34	666304	CARBON RESISTOR (200,000-1/3WATT-20%) INS.
7	25A21175	OUTPUT TRANSFORMER	35	666321	CARBON RESISTOR (47,000-1/3WATT-20%) INS.
8	25B21260	POWER TRANSFORMER	36	666366	CARBON RESISTOR (39,000-1/3WATT-10%) INS.
9	1A426261	BAND SWITCH (2 POSITION)	37	666358	CARBON RESISTOR (33,000-1/3WATT-10%) INS.
10	20A17935	B.C. PHADER (RANGE 300 MAZ TO 800 MAZ)	38	666472	CARBON RESISTOR (1,000-1/3WATT-20%) INS.
11	13627508	VARIABLE CONDENSER (2 GAND)	39	666026	CARBON RESISTOR (680-1/3WATT-20%) N.I.
12	20A27273	TRIMMER & "Z" BRACKET (82 MAF NOM)	40	666187	CARBON RESISTOR (300-1/3WATT-10%) N.I.
13	20K27326	TRIMMER & "Z" BRACKET (118 MAF NOM)	41	666356	CARBON RESISTOR (220-1/3WATT-10%) INS.
14	20A18740	TRIMMER & "W" BRACKET (7 MAF NOM)	42	18K26678	VOLUME CONTROL & SWITCH (.5 MEG)
15	23A27718	ELECT. COND. (30 MFD/350V.-V. 30 MFD/300V.-V.) (20 MFD/250V.-V.)	43	18A26679	TUNE CONTROL SWITCH (3 POS.)
16	8427296	POLYSTYRENE TUB. COND. (.007 MFD-100K.-V.)	44	30A151	LINE COND & PLUG (6 FT.)
17	859807	TUBULAR CONDENSER (.1 MFD-100V.-V.)	45	65X10667	BULB (6.3V.-25A TUB. BAY) CLEAR GUL
18	859816	TUBULAR CONDENSER (.05 MFD-100V.-V.)	46	65X10667	BULB (6.3V.-25A TUB. BAY) CLEAR GUL
19	859805	TUBULAR CONDENSER (.05 MFD-100V.-V.)	47	25A11760	BANTAM TUBE SHIELD
20	859805	TUBULAR CONDENSER (.05 MFD-100V.-V.)	48	25A11760	BANTAM TUBE SHIELD
21	859802	TUBULAR CONDENSER (.05 MFD-100V.-V.)			
22	859801	TUBULAR CONDENSER (.01 MFD-100V.-V.)			
23	859813	TUBULAR CONDENSER (.005 MFD-600V.-V.)			
24	859813	TUBULAR CONDENSER (.005 MFD-600V.-V.)			
25	859813	TUBULAR CONDENSER (.005 MFD-600V.-V.)			
26	216503	MOLDED MICA COND. (50 MAF-205-1000V.-V.) BRN "0"			
27	216500	MOLDED MICA COND. (500 MAF-205-1000V.-V.) BRN "0"			
28	2136500	MOLDED MICA COND. (500 MAF-205-1000V.-V.) BRN "0"			

GALVIN MFG. CO.



MODELS 61K21, 61T22

MODELS 62L11, 62L12

GALVIN MFG. CO.

MODELS**61 K 21****61 T 22**

ALIGNMENT CHART

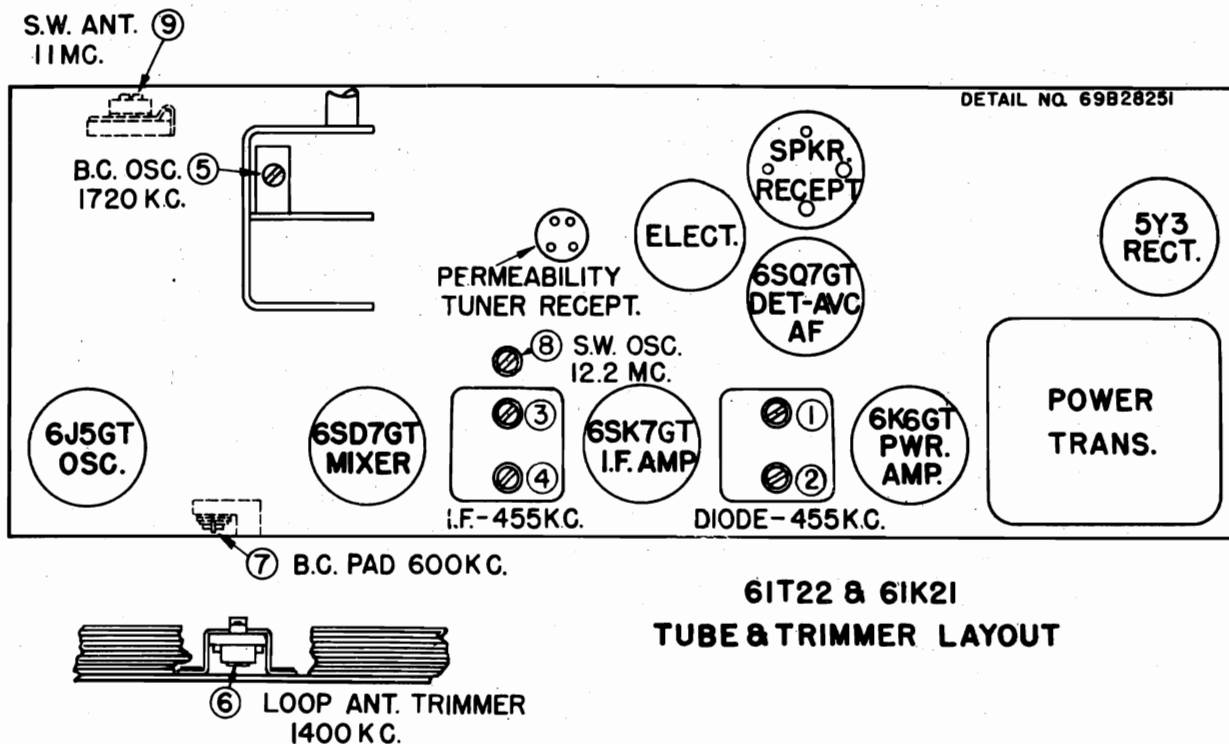
Operations In Order	Gang Condenser Set At	Dummy Antenna	Band Switch Set At	Generator Connected To	Adjust Trimmers No.	Generator Set At
1	1720 K.C.	.1 Mfd.	B.C.	Osc.Mod.Grid	1-2-3-4	455 K.C.
2	1720 K.C.	200 Mmf	B.C.	Ext.Ant. Connection	5	1720 K.C.
3	1400 K.C.	200 Mmf	B.C.	Ext.Ant. Connection	6	1400 K.C.
4	600 K.C.	200 Mmf	B.C.	Ext.Ant. Connection	7	600 K.C.
5	12.2 M.C.	400 Ohms	S.W.	S.W.Collector	8	12.2 M.C.
6	11 M.C.	400 Ohms	S.W.	S.W.Collector	9	11 M.C.

SENSITIVITY AND STAGE GAIN MEASUREMENTS

Average Microvolt Input *	Generator Set At	Generator Feeder Connected To	Dummy Antenna Capacity	Leak Resistance	Output Meter Reading **
2100	455 K.C.	I.F. Grid	.1 Mmf.	.5 Meg.	.38
10	455 K.C.	Mod. Grid	.1 Mmf.	.5 Meg.	.38
12	600 K.C.	Mod. Grid	.1 Mmf.	.5 Meg.	.38
11	600 K.C.	Ant.Terminal	200 Mmf.	None	.38

Volume Control Set at Maximum
 * .05 Watts .38 Volts
 Master Switch at B.C. Position

Tone Control Set at High Position.
 ** Output Meter Connected Across Voice Coil.

**MODELS****62L11****62L12**

ALIGNMENT CHART

OPERATIONS IN ORDER	GANG CONDENSER SET AT	DUMMY ANTENNA	GENERATOR CONNECTED TO	ADJUST TRIMMERS NO.	GENERATOR SET AT
1	Minimum	.1 Mfd.	Osc.-Mod. Grid	1-2-3-4	455 K.C.
2	Minimum *	.1 Mfd.	RF Grid	5	1600 K.C.
3	1400 K.C.	.1 Mfd.	RF Grid	6	1400 K.C.
4	600 K.C.	.1 Mfd.	RF Grid	7 **	600 K.C.
5	1400 K.C.	None	***	8	1400 K.C.
6	Repeat above steps for maximum accuracy.				

* Adjust pointer to zero.

** Rock condenser until greatest output is obtained.

*** Connect output of signal generator to a 5' diameter 3 turn loop. With volume on full and output meter connected across voice coil bring loop close enough to receiver loop (receiver loop should be in front up position) until an output of 50 Milliwatts is obtained. 50 Milliwatts = .38 Volts on output meter.

Vary distance between generator and receiver loop to maintain this output during alignment.

NOTE: Trimmer No. 8 is adjusted with chassis in cabinet.

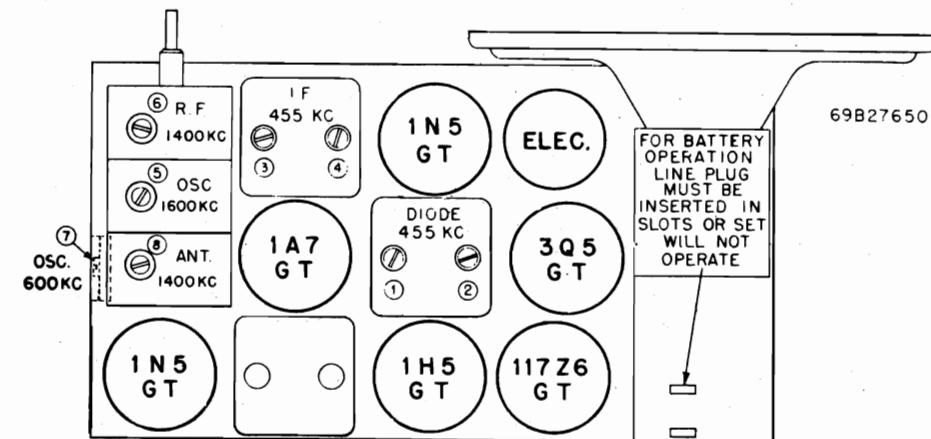
SENSITIVITY AND STAGE GAIN MEASUREMENTS

AVERAGE MICROVOLT INPUT	GENERATOR SET AT	GENERATOR FEEDER CONNECTED TO	DUMMY ANTENNA CAPACITY	LEAK RESISTANCE	OUTPUT METER READING
5500	455	IF Grid	.1 Mfd.	.5 Meg.	.38
105	455	Mod. Grid	.1 Mfd.	.5 Meg.	.38
110	600	Mod. Grid	.1 Mfd.	.5 Meg.	.38
6	600	RF Grid	.1 Mfd.	None	.38

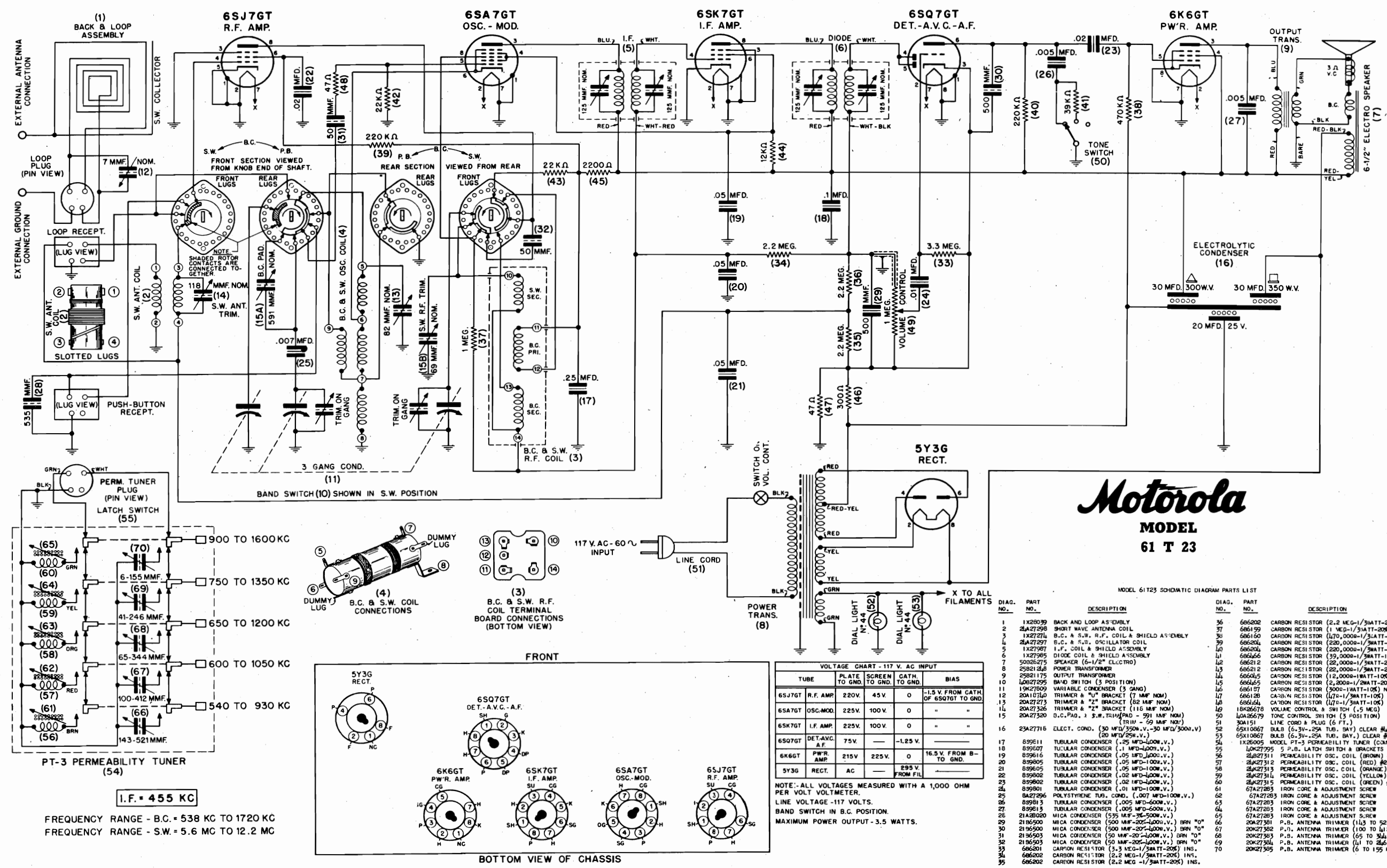
Volume Control Set at Maximum

* .05 Watts = .38 Volts

** Output meter connected across voice coil.



GALVIN MFG. CO.



GALVIN MFG. CO.

MODEL 61T23
MODEL 81F21

MODEL 81 F 21

ALIGNMENT CHART
Model 61T23

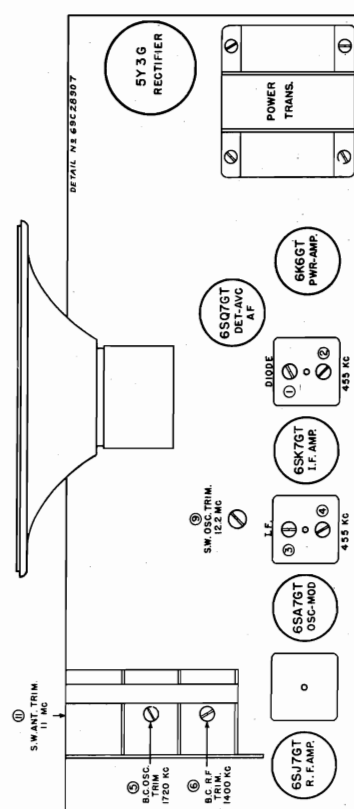
Operations In Order	Gang Condenser Set At	Dummy Antenna	Band Switch Set At	Generator Connected To	Adjust Trimmers No.	Generator Set At
1	1720 K.C.	.1 Mfd.	B.C.	Osc. Mod. Grid	1-2-3-4	455 K.C.
2	1720 K.C.	200 Mmf.	B.C.	R.F. Grid	5	1720 K.C.
3	1400 K.C.	200 Mmf.	B.C.	Ext. Ant.	6	1400 K.C.
4	1400 K.C.	200 Mmf.	B.C.	Connection	7	1400 K.C.
5	600 K.C.	200 Mmf.	B.C.	Ext. Ant.	8	600 K.C.
6	12.2 M.C.	400 Ohms	S.W.	Connection	9	12.2 M.C.
7	11.0 M.C.	400 Ohms	S.W.	Ext. Ant.	10	11.0 M.C.
8	11.0 M.C.	400 Ohms	S.W.	Connection	11	11.0 M.C.

SENSITIVITY AND STAGE GAIN MEASUREMENTS

Average Microvolt Input *	Generator Set At	Dummy Antenna Capacity	Leak Resistance	Output Meter Reading **
1900	455 K.C.	.1 Mfd.	.5 Meg.	.38
8	455 K.C.	.1 Mfd.	.5 Meg.	.38
7	600 K.C.	.1 Mfd.	.5 Meg.	.38
4	600 K.C.	200 Mmf.	None	.38

Volume Control Set at Maximum
* .05 Watts = .38 Volts

** Output meter connected across voice coil.

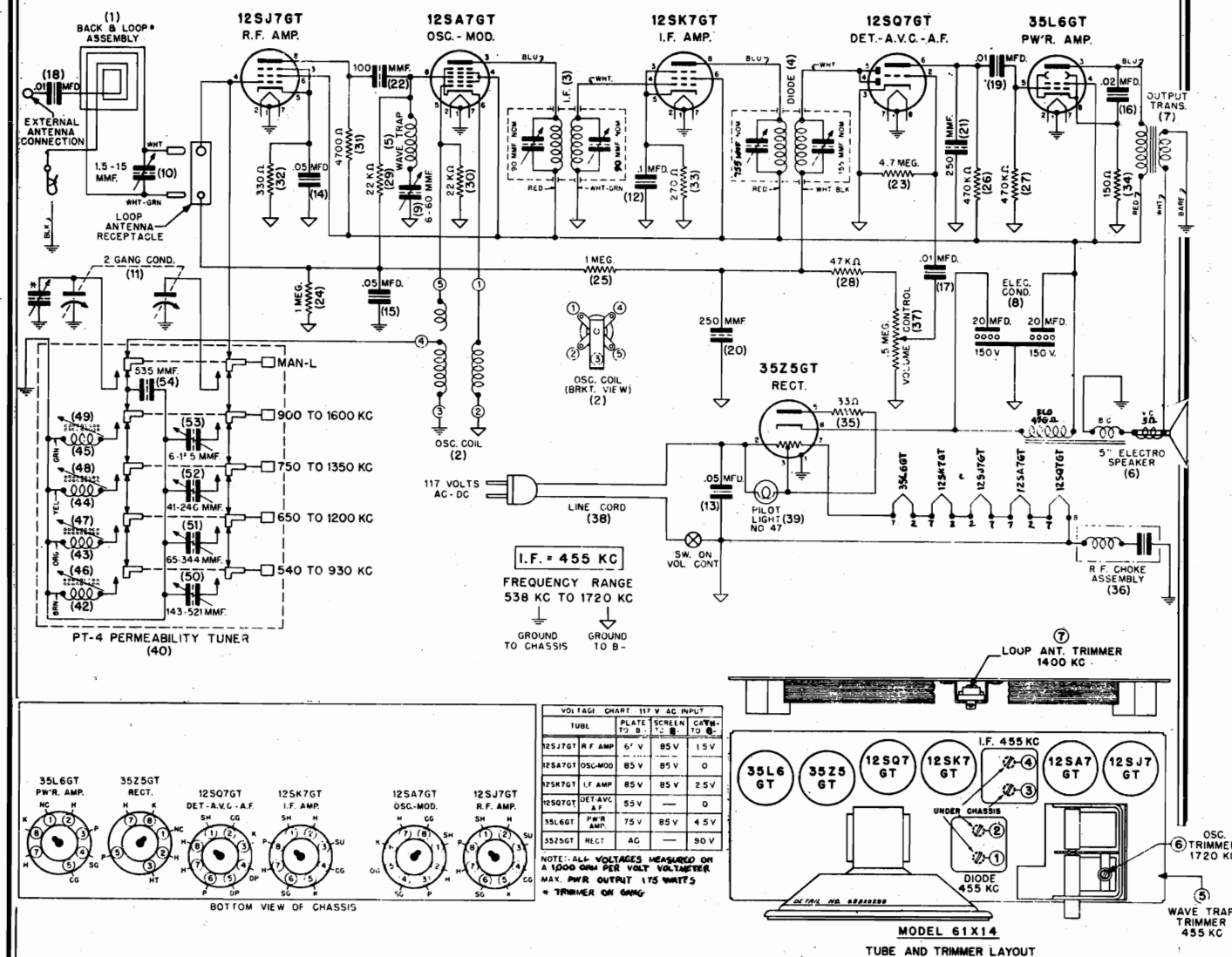


MODEL NO. 81F21

TUBE & TRIMMER DETAIL
CHASSIS NO. H-186

GALVIN MFG. CO.

MODEL 61X14



ALIGNMENT CHART

OPERATIONS IN ORDER	GANG CONDENSER SET AT	DUMMY ANTENNA	GENERATOR CONNECTED TO	ADJUST TRIMMERS NO.	GENERATOR SET AT
1	1720 K.C.	.1 Mfd.	Osc. Mod. Grid	1-3-3-4	455 K.C.
2	1720 K.C.	.1 Mfd.	Ant. Terminal	5*	455 K.C.
3	1720 K.C.	200 Mmf.	Ant. Terminal	6	1720 K.C.
4	1400 K.C.	200 Mmf.	Ant. Terminal	7	1400 K.C.

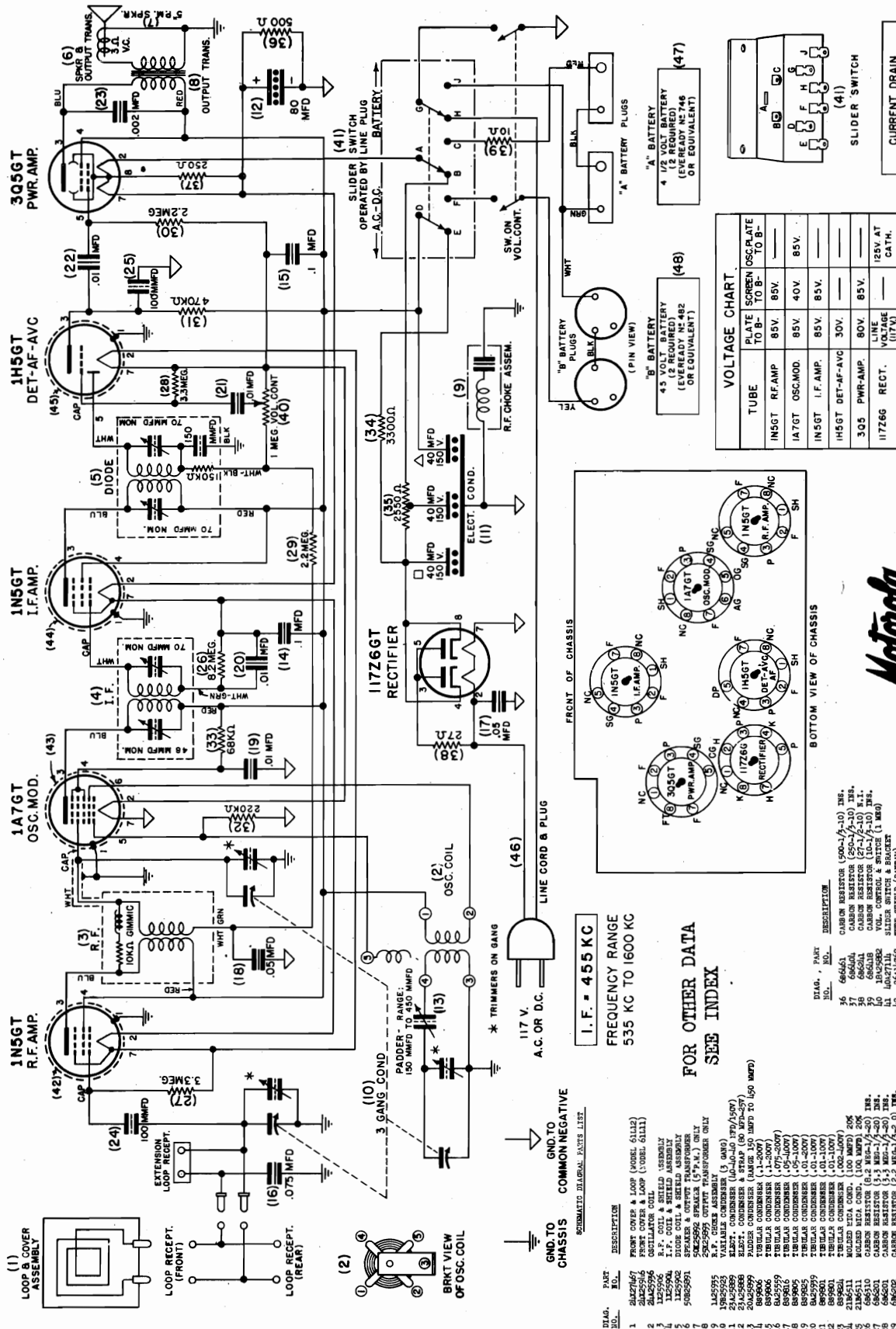
* Adjust (wave trap) to minimum reading of output meter - Volume Control set at Maximum.

SENSITIVITY AND STAGE GAIN MEASUREMENTS

AVERAGE MICROVOLT INPUT *	GENERATOR SET AT	GENERATOR FEEDER CONNECTED TO	DUMMY ANTENNA CAPACITY	LEAK RESISTANCE	OUTPUT METER READING **
4750	455	I.F. Grid	.1 Mfd.	.5 Meg.	.38
55	455	Mod. Grid	.1 Mfd.	.5 Meg.	.38
8	600	Mod. Grid	.1 Mfd.	.5 Meg.	.38
5	600	Ant. Terminal	200 Mmf.	None	.38

Volume Control Set at Maximum
*.05 Watt = .38 Volts** Output meter connected
across voice coil.

GALVIN MFG. CO.



62L11
62L12

TUBE SHIELD (BANTAM)
TUBE SHIELD (BANTAM)
LINE CORD & PLUG (6FT.)
"A" BATTERY (4-1/2 VOLT) (2 REQUIRED)
EVEREADY #7146 OR EQUIVALENT
"B" BATTERY (45 VOLT) (2 REQUIRED)
EVEREADY #482 OR EQUIVALENT

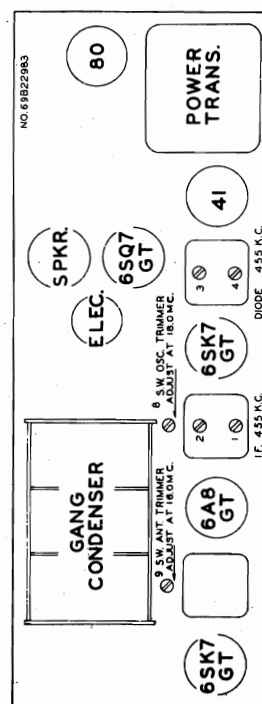
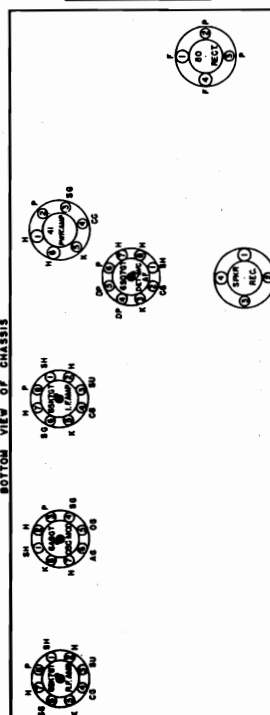
CHANGES INDICATED

FOR OTHER DATA SEE INDEX

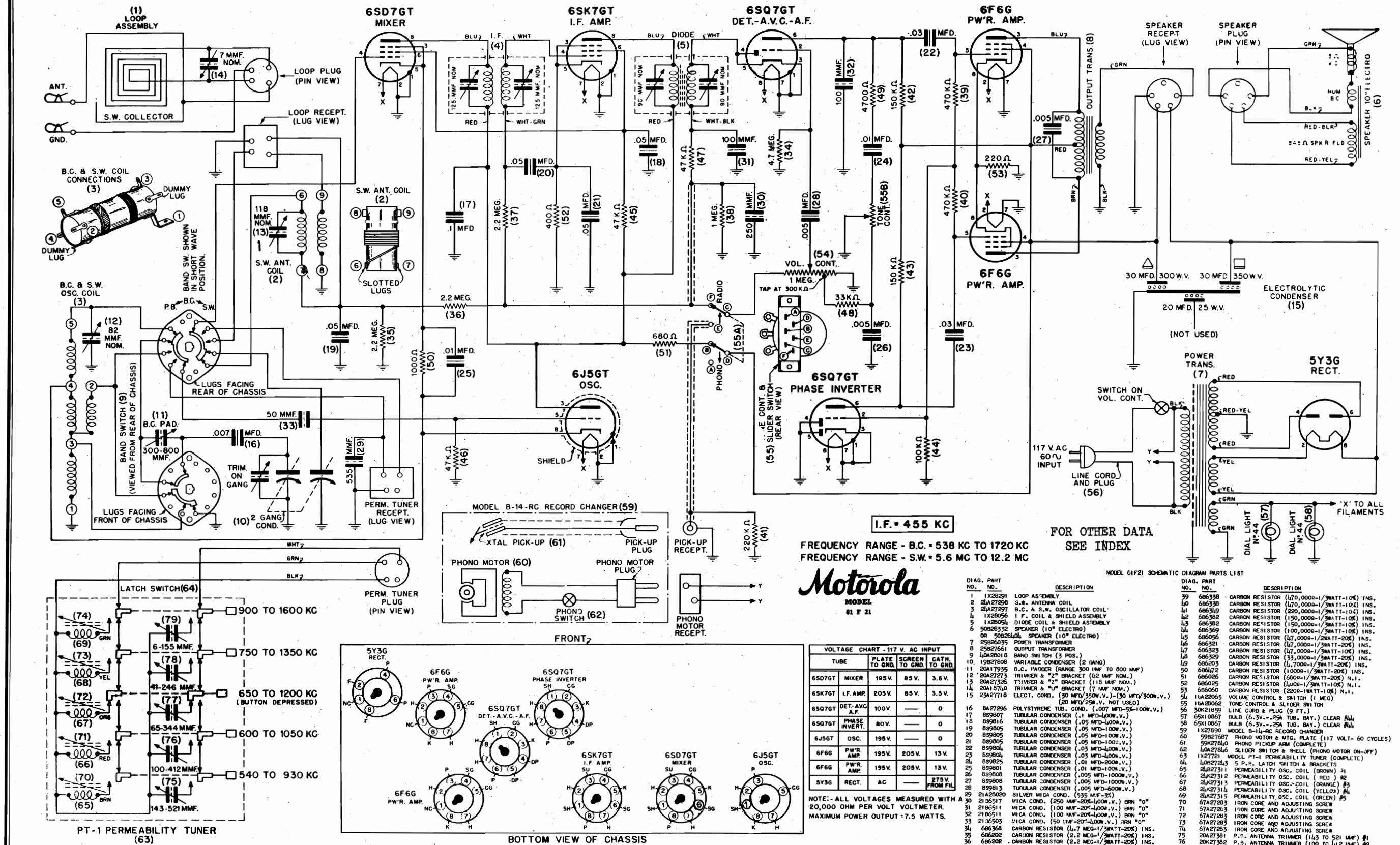
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TUBE	PLATE TO GND	SCREEN TO GND	CATH. TO GND
5SK7GT	225 V.	70 V.	0
1A8GT	OSC. MOD.	225 V.	70 V.
5SK7GT	L.F. AMP.	225 V.	70 V.
6X4	RECT.	80 V.	—
5X7GT	AVC. 2F	80 V.	—
41	PHR. AMP.	215 V.	225 V.
90	RECTIFIER	A.C.	—
			100V. (P.A.P.I.)

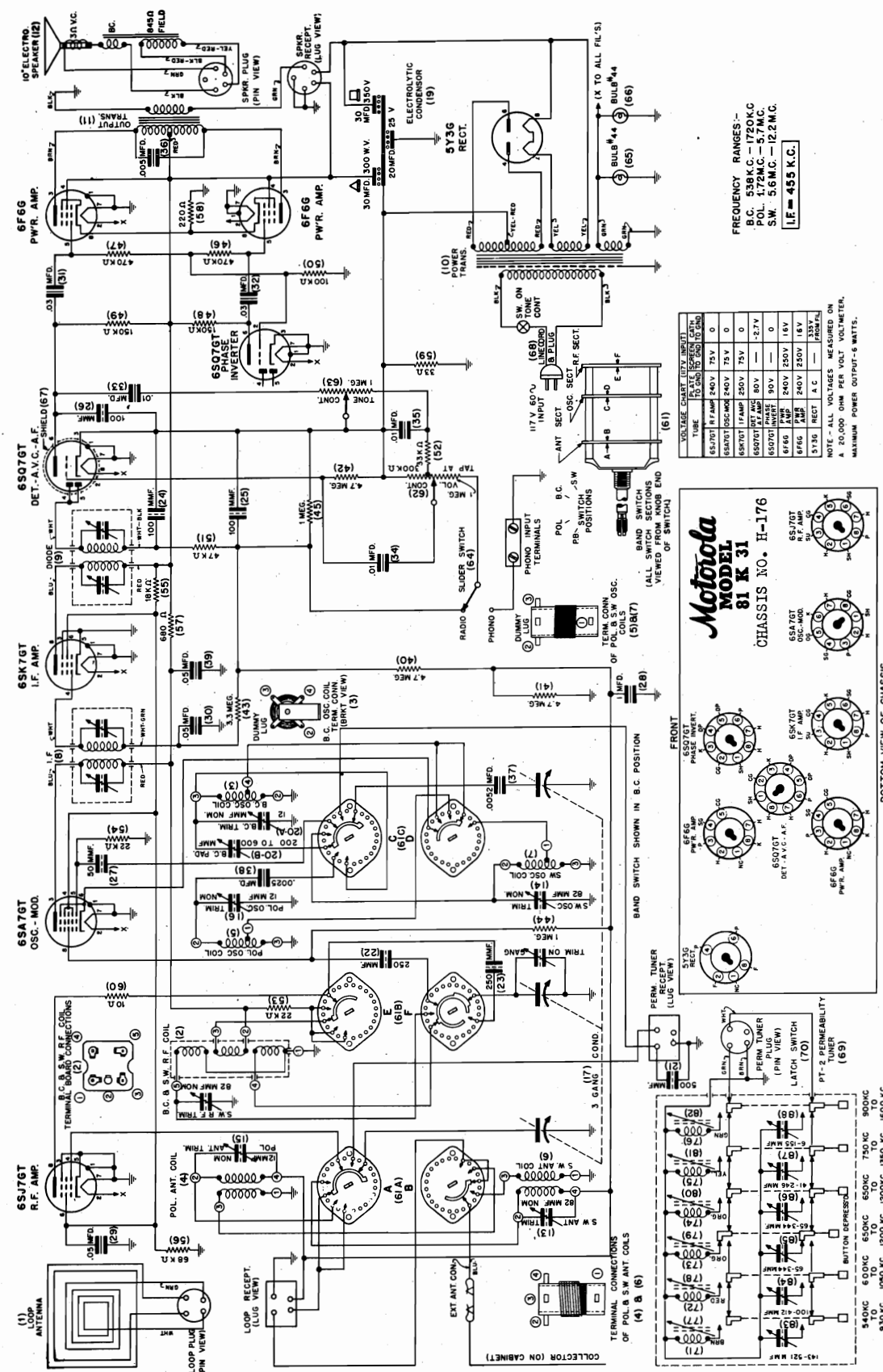
ALL MEASUREMENTS MADE WITH A 1000 OHMS PER VOLT VOLTMETER



GALVIN MFG. CO.



GALVIN MFG. CO.



FREQUENCY RANGES:-
 B.C. 538 K.C. — 1720 K.C.
 P.O. 1.72 M.C. — 5.7 M.C.
 S.W. 5.6 M.C. — 12.2 M.C.
I.F. = 455 K.C.

VOLTAGE CHART (RTV WIRE)			
TUBE	PLATE TO GRID	GRID TO GRID	CATH TO GRID
65-70T	240 V	75 V	0
65A70T	240 V	75 V	0
65A70T OSC MOD	240 V	75 V	0
65B70T	250 V	75 V	0
65C70T	240 V	75 V	0
65D70T	240 V	75 V	0
65E70T	240 V	75 V	0
65F70T	240 V	75 V	0
65G70T	240 V	75 V	0
65H70T	240 V	75 V	0
65I70T	240 V	75 V	0
65J70T	240 V	75 V	0
65K70T	240 V	75 V	0
65L70T	240 V	75 V	0
65M70T	240 V	75 V	0
65N70T	240 V	75 V	0
65O70T	240 V	75 V	0
65P70T	240 V	75 V	0
65Q70T	240 V	75 V	0
65R70T	240 V	75 V	0
65S70T	240 V	75 V	0
65T70T	240 V	75 V	0
65U70T	240 V	75 V	0
65V70T	240 V	75 V	0
65W70T	240 V	75 V	0
65X70T	240 V	75 V	0
65Y70T	240 V	75 V	0
65Z70T	240 V	75 V	0
65AA70T	240 V	75 V	0
65AB70T	240 V	75 V	0
65AC70T	240 V	75 V	0
65AD70T	240 V	75 V	0
65AE70T	240 V	75 V	0
65AF70T	240 V	75 V	0
65AG70T	240 V	75 V	0
65AH70T	240 V	75 V	0
65AI70T	240 V	75 V	0
65AJ70T	240 V	75 V	0
65AK70T	240 V	75 V	0
65AL70T	240 V	75 V	0
65AM70T	240 V	75 V	0
65AN70T	240 V	75 V	0
65AO70T	240 V	75 V	0
65AP70T	240 V	75 V	0
65AQ70T	240 V	75 V	0
65AR70T	240 V	75 V	0
65AS70T	240 V	75 V	0
65AT70T	240 V	75 V	0
65AU70T	240 V	75 V	0
65AV70T	240 V	75 V	0
65AW70T	240 V	75 V	0
65AX70T	240 V	75 V	0
65AY70T	240 V	75 V	0
65AZ70T	240 V	75 V	0
65BA70T	240 V	75 V	0
65BB70T	240 V	75 V	0
65BC70T	240 V	75 V	0
65BD70T	240 V	75 V	0
65BE70T	240 V	75 V	0
65BF70T	240 V	75 V	0
65BG70T	240 V	75 V	0
65BH70T	240 V	75 V	0
65BI70T	240 V	75 V	0
65BJ70T	240 V	75 V	0
65BK70T	240 V	75 V	0
65BL70T	240 V	75 V	0
65BM70T	240 V	75 V	0
65BN70T	240 V	75 V	0
65BO70T	240 V	75 V	0
65BP70T	240 V	75 V	0
65BQ70T	240 V	75 V	0
65BR70T	240 V	75 V	0
65BS70T	240 V	75 V	0
65BT70T	240 V	75 V	0
65BU70T	240 V	75 V	0
65BV70T	240 V	75 V	0
65BW70T	240 V	75 V	0
65BX70T	240 V	75 V	0
65BY70T	240 V	75 V	0
65BZ70T	240 V	75 V	0
65CA70T	240 V	75 V	0
65CB70T	240 V	75 V	0
65CC70T	240 V	75 V	0
65CD70T	240 V	75 V	0
65CE70T	240 V	75 V	0
65CF70T	240 V	75 V	0
65CG70T	240 V	75 V	0
65CH70T	240 V	75 V	0
65CI70T	240 V	75 V	0

Motorola
MODEL
81 K 31
CHASSIS NO. H-176

BOTTOM VIEW OF CHASSIS:

MODEL 81K31

GALVIN MFG. CO.

ALIGNMENT CHART

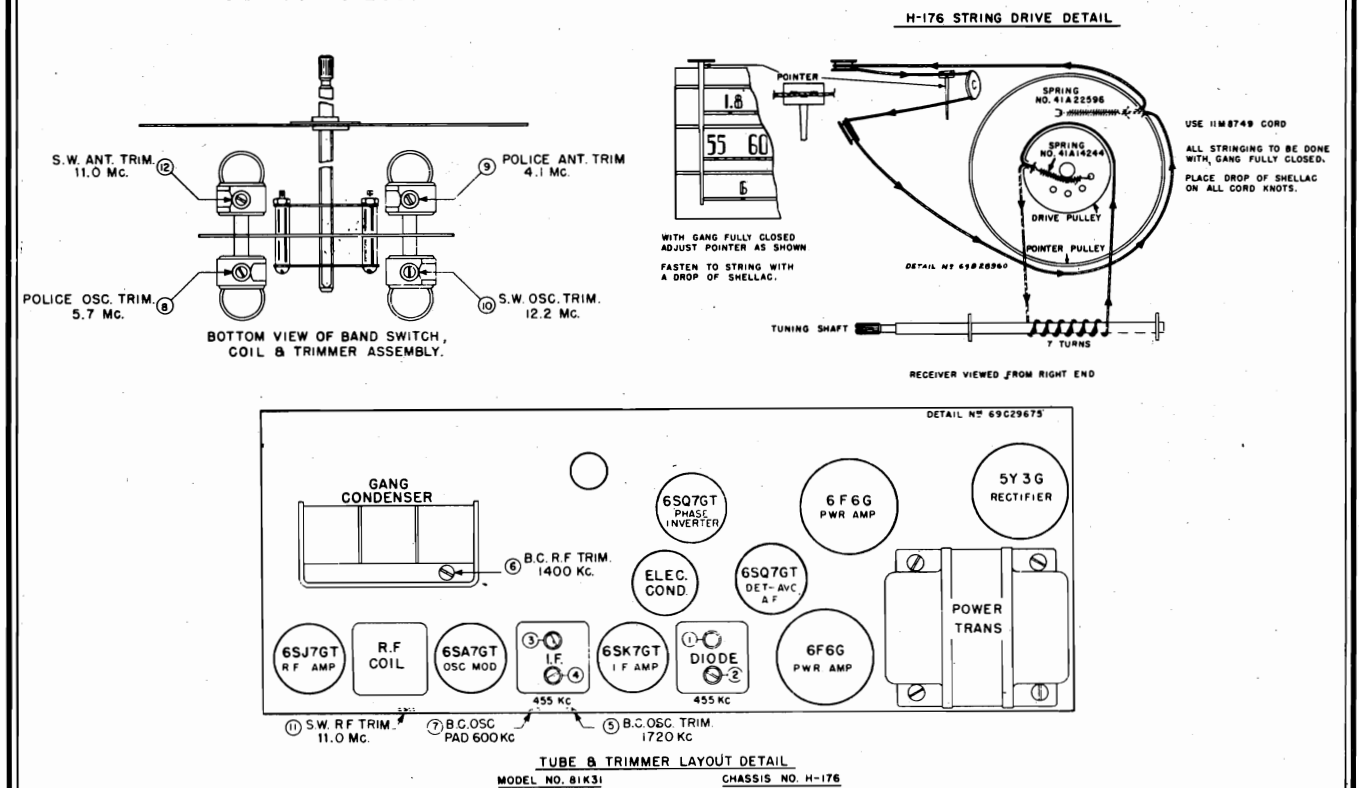
Operations In Order	Gang Condenser Set At	Dummy Antenna	Band Switch Set At	Generator Connected To	Adjust Trimmers No	Generator Set At
1	1720 K.C.	.1 Mfd.	B.C.	Osc.Mod.Grid	1-2-3-4	455 K.C.
2	1720 K.C.	200 Mmf	B.C.	Ext.Ant. Connection	5	1720 K.C.
3	1400 K.C.	200 Mmf	B.C.	Ext.Ant. Connection	6	1400 K.C.
4	600 K.C.	200 Mmf	B.C.	Ext.Ant. Connection	7	600 K.C.
5	5.7 M.C.	400 Ohms	Pol.	Ext.Ant. Connection	8	5.7 M.C.
6	4.1 M.C.	400 Ohms	Pol.	Ext.Ant. Connection	9	4.1 M.C.
7	12.2 M.C.	400 Ohms	S.W.	Ext.Ant. Connection	10	12.2 M.C.
8	11.0 M.C.	400 Ohms	S.W.	Ext.Ant. Connection	11	11.0 M.C.
9	11.0 M.C.	400 Ohms	S.W.	Ext.Ant. Connection	12	11 M.C.

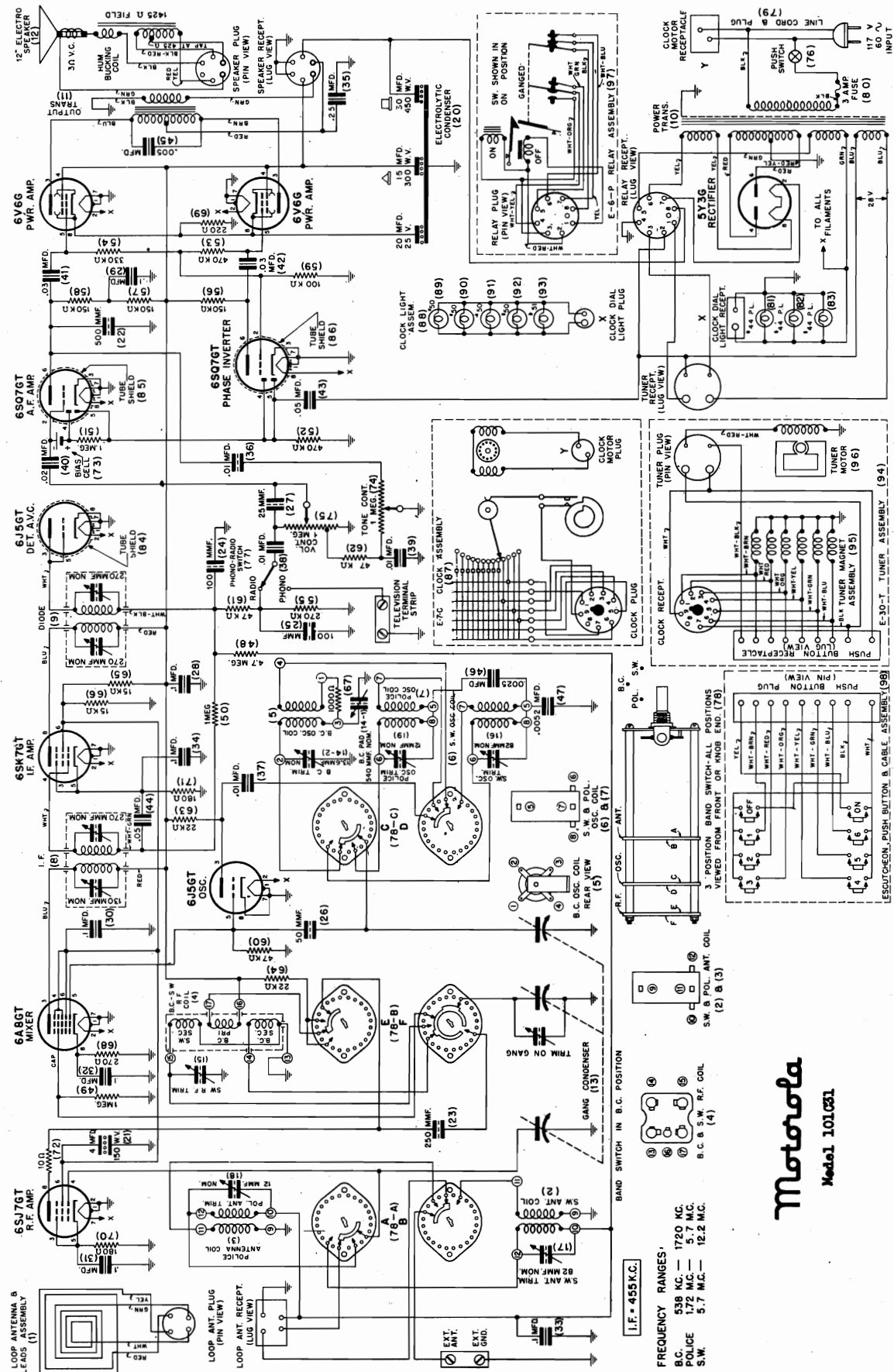
SENSITIVITY AND STAGE GAIN MEASUREMENTS

Average Microvolt Input *	Generator Set At	Generator Feeder Connected to	Dummy Antenna Capacity	Leak Resistance	Output Meter Reading **
4000	455 K.C.	I.F. Grid	.1 Mfd.	.5 Meg.	.38
70	455 K.C.	Osc.Mod.Grid	.1 Mfd.	.5 Meg.	.38
75	600 K.C.	Osc.Mod.Grid	.1 Mfd.	.5 Meg.	.38
4	600 K.C.	R.F. Grid	.1 Mfd.	.5 Meg.	.38
3	600 K.C.	Ant.Terminal	200 Mmf.	None	.38

Volume Control Set at Maximum
* .05 Watts = .38 Volts
Band Switch Set at B.C.

Tone Control Set At High
 ** Output meter connected across voice coil.





FREQUENCY RANGES:

B.C. 530 KC. — 1720 KC.
 B.C. 1720 KC. — 5.7 MC.
 S.W. 5.7 MC. — 12.2 MC.

Motorola

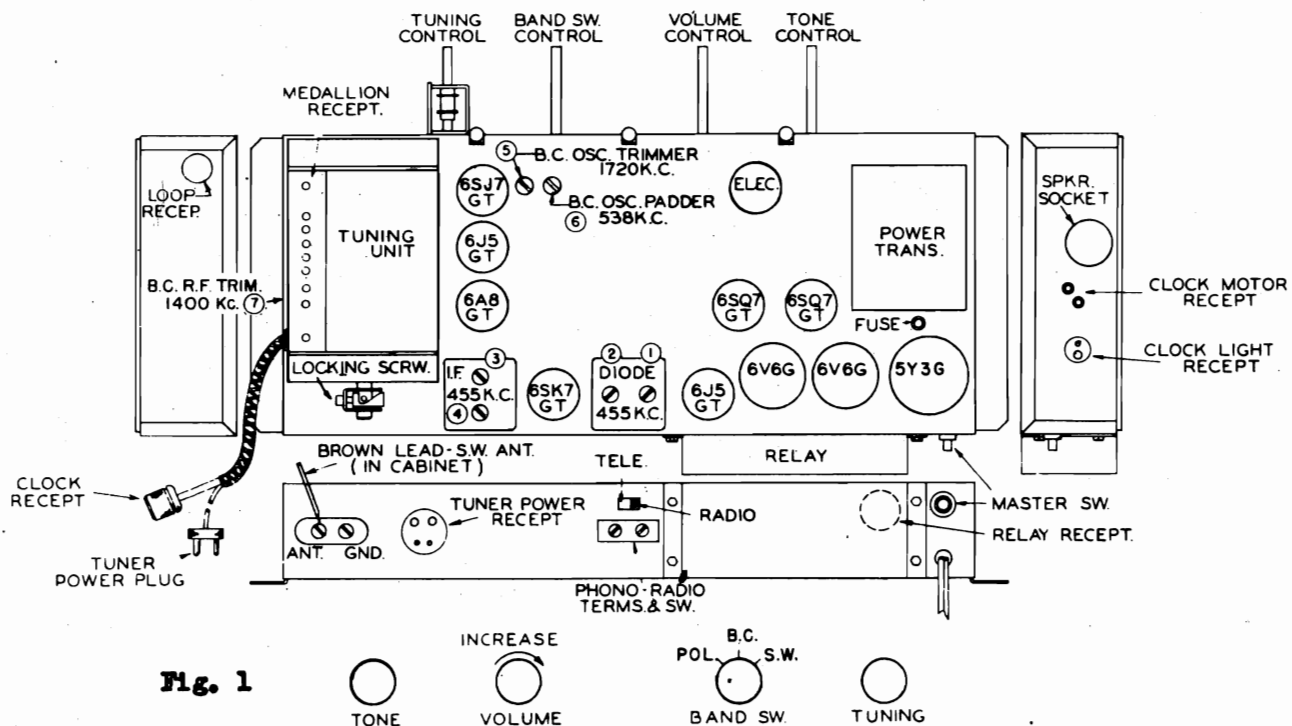
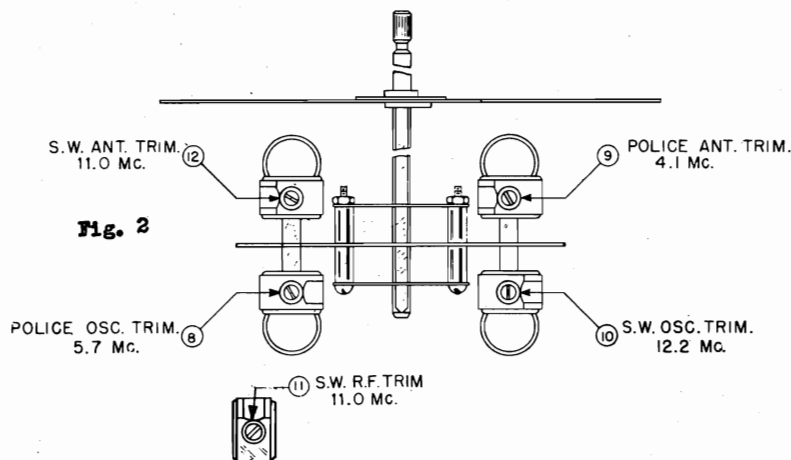
Model 101C31

MODEL 101C31

ALIGNMENT CHART

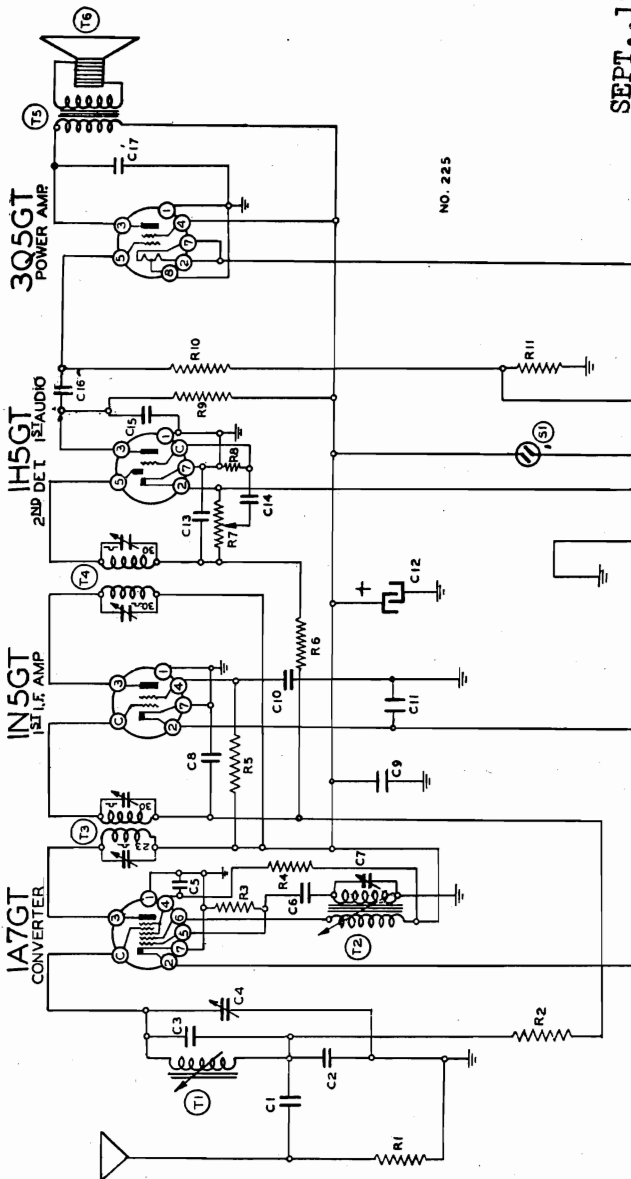
OPERATIONS IN ORDER	GANG CONDENSER SET AT	DUMMY ANTENNA	BAND SWITCH SET AT	GENERATOR CONNECTED TO	ADJUST TRIMMERS NO.	GENERATOR SET AT
1	MINIMUM 1720 K.C.	.1 Mfd.	B. C	Osc. Mod. Grid.	1-2-3-4	455 K. C.
2	1720 K. C.	.1 Mfd.	B. C	Osc. Mod. Grid.	5	1720 K. C.
3	538 K. C.	.1 Mfd.	B. C	Osc. Mod. Grid.	6	538 K. C.
4	1400 K. C.	400 Ohms	B. C	External Antenna Terminal	7	1400 K. C.
5	5.7 MC.	.1 Mfd.	P O I	Osc. Mod. Grid.	8	5.7 M. C.
6	4.1 M. C.	400 Ohms	P O I	External Antenna Terminal	9	4.1 M. C.
7	12.2 M. C.	.1 Mfd.	S W	Osc. Mod. Grid.	10	12.2 M. C.
8	11.0 M. C.	400 Ohms	S W	External Antenna Terminal	11	11.0 M. C.
9	11.0 M. C.	400 Ohms	S W	External Antenna Terminal	12	11.0 M. C.

Volume Control set at Maximum Tone Control set in Treble Position.



GAMBLE-SKOGMO, INC.

SEPT., 1941



NO. 225

INTERMEDIATE
FREQUENCY
455 K.C.

BOTTOM VIEW OF CHASSIS

VOLTAGES MEASURED WITH A HIGH
RESISTANCE METER BETWEEN
SOCKET TERMINAL AND CHASSIS.

1H5GT

1N5GT

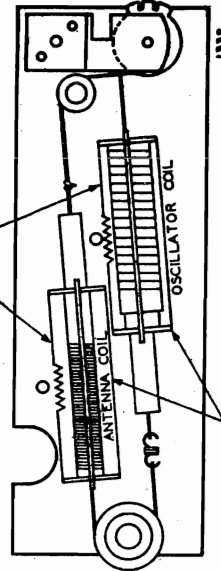
1A7GT

3Q5GT

ALL POTENTIALS MEASURED FROM
CHASSIS FRAME. ALL VOLTAGES
MEASURED WITH
OHMS PER VOLT.

REAR OF CHASSIS

1351



NOTE: THE ANTENNA COIL ASSEMBLY
IS ADJUSTED SO THAT WHEN MAKING
LEFT OR RIGHT ADJUSTMENTS IN THE
ALIGNMENT PROCEDURE, MOVE COIL
ASSEMBLY VERY SLOWLY

COIL ASSEMBLY VIEW

Antenna Coil Permeability tuning assem.

- PARTS**
- T1 1364 Antenna Coil Permeability tuning assem.
 - T2 1364 Oscillator Coil Complete.
 - T3 108202 Input I. F. Coil 455 kc.
 - T4 108153B Output I. F. Coil 455 kc.
 - T5 10591B Output transformer
 - T6 114215R 6" P.M. speaker
 - S1 Switch-on Volume control

Code No. Part No. Description

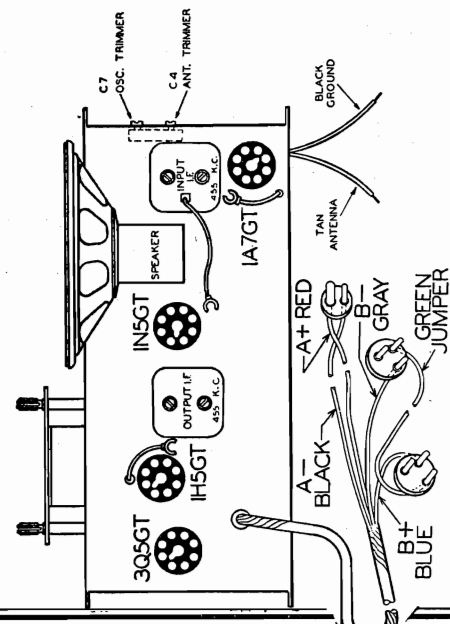
RESISTORS

- R1 13017 10M ohm- $\frac{1}{2}$ w.
- R2 1304 3 megohm- $\frac{1}{2}$ w.
- R3 1309 200M ohm- $\frac{1}{2}$ w.
- R4 130194 35M ohm- $\frac{1}{2}$ w.
- R5 13094 50M ohm- $\frac{1}{2}$ w.
- R6 1304 3 megohm- $\frac{1}{2}$ w.
- R7 101250 1 megohm-Volume control and switch
 $\frac{1}{2}$ w.
- R8 130257 5 megohm- $\frac{1}{2}$ w.
- R9 13019 1 megohm- $\frac{1}{2}$ w.
- R10 130146 2 megohm- $\frac{1}{2}$ w.
- R11 13079 400 ohm- $\frac{1}{2}$ w.

CONDENSERS

- C1 12936 .0003 mica
- C2 100112 .001 x 200 v.
- C3 129177 .000045-Ceramicon
- C4 124165 Antenna trimmer
- C5 1009 .05 x 200 v.-Condenser
- C6 12912 .00025 mica
- C7 124165 Oscillator trimmer
- C8 1009 .05 x 200 v. Condenser
- C9 1006 .25 x 200 v. Condenser
- C10 10020 .1 x 200 v.
- C11 10017 .5 x 120 v.
- C12 19117B 10 mfd. x 150 v. lytic
- C13 1295 .0001 mica
- C14 10012 .003 x 600 v. Condenser
- C15 1295 .0001 mica
- C16 10026 .02 x 400 v. Condenser
- C17 1007 .005 x 600 v.

C4 and C7 are in same unit.



MODELS C4B15, C4B16
MODEL C640

GAMBLE-SKOGMO, INC.

ALIGNMENT PROCEDURE

MODELS C4B15, C4B16

The following equipment is required for aligning.

- Dummy antenna, 1 mfd. and 200 mmf.
- Volume control—Maximum all adjustments.
- Connect ground lead of radio chassis to ground post of signal generator.

BAND	SIGNAL GENERATOR Frequency Setting	Dummy Antenna	Connection to Radio	Position of Iron Cores (Dial Setting)	Trimmers Adjusted (in Order Shown)	Trimmer Function	Adjustment
I. F.	455 Kc.	.1 MFD.	Connect to Grid of 1A7	Iron Cores All the way out	Two trimmers on top of output I. F. can	Output I. F.	maximum output
	455 Kc.	.1 MFD.	Connect to Grid of 1A7	Iron Cores All the way out	Two trimmers on top of input I. F. can	Input I. F.	maximum output
	1700 Kc.	.1 MFD.	Connect to Grid of 1A7	Iron Cores All the way out	Trimmer (C7) (See chassis view)	Oscillator	maximum output
BROAD- CAST BAND	1700 Kc.	200 MMF.	Connect to Antenna Clip	Iron Cores All the way out	Trimmer (C4) (See chassis view)	Antenna	maximum output
	1400 Kc.	200 MMF.	Connect to Antenna Clip	Turn Dial to 1400 Kc.	Adjust position of antenna coil (See coil assembly view)	Antenna Coil Adjustment (See Note "A")	maximum output
	1700 Kc.	200 MMF.	Connect to Antenna Clip	Turn Dial to 1700 Kc.	Adjust trimmer (C4) (See chassis view)	Antenna	Check for tracking (See Note "B")

NOTE "A"—The antenna coil assembly is made so that it is movable. When making the adjustment as given in the alignment procedure move the coil assembly very slowly. It can be moved by hand or by pivoting one edge of the blade of a screwdriver in the hole and engaging the blade in the gear teeth of the coil form.

NOTE "B"—After the antenna coil has been tracked at 1400 Kc. it is necessary to check the antenna trimmer (C4) adjustment again at 1700 Kc. If no appreciable change in trimmer adjustment is made the coil is in track, if the trimmer requires considerable change it will be necessary to again adjust the position of the antenna coil at 1400 Kc. These two adjustments should be tried several times until no change of trimmer adjustment is required at 1700 Kc.

ALIGNMENT PROCEDURE

MODEL C640

IMPORTANT!—See alignment instructions

- Volume control—Maximum all adjustments.
- Connect B - of radio chassis to ground post of signal generator through .1 Mfd. condenser.
- Connect dummy antenna value in series with generator output lead.
- Connect output meter across primary of output transformer.
- Allow chassis and signal generator to "heat up" for several minutes.

The following equipment is required for aligning:

- An all wave signal generator.
- Output indicating meter.
- Non-metallic screwdriver.
- Dummy antennas—1 Mfd.

BAND	SIGNAL GENERATOR Frequency Setting	Dummy Antenna	Connection to Radio	Variable Condenser Setting	Trimmers Adjusted (in Order Shown)	Trimmer Function	Adjustment
I. F.	455 Kc.	.1 MFD.	Grid of 12SA7	Rotor full open (Plates out of mesh)	Four Trimmers on Top (See Fig. 1)	Output and Input I. F.	Adjust to maximum output
BROAD- CAST BAND	1600 Kc.	.1 MFD.	Grid of 12SA7	Rotor full open (Plates out of mesh)	Trimmer bottom of rear section of gang (See bottom of radio)	Broadcast Oscillator	Adjust to maximum output
	1400 Kc.	See Note "A"		Set dial at 1400 Kc.	Trimmer bottom of front section of gang (See bottom of radio)	Broadcast Antenna	Adjust to maximum output

NOTE "A"—Lay the output lead from the generator in back of the loop antenna. Turn up the output of the generator, picking up the energy in the loop antenna without any electrical connection from the generator.

FREQUENCY RANGE
540 to 1600 K.C.

Power Consumption.....35 Watts
Power Output.....1 Watt Undistorted, 1.5 Watts Maximum
Intermediate Frequency.....455 K.C.

FOR SCHEMATIC AND OTHER DATA SEE RIDER'S VOL. XII

ANTENNA PLATE

12SA7
CONVERTER

12SK7
I.F. AMP.

12SQ7
2ND DET.
A.V.C.
& 1ST AUDIO

50L6GT
OUTPUT

35Z5GT
RECTIFIER

105-125 VOLTS
A.C. D.C.

OFF & ON SWITCH
ON VOL CONTROL

NO 251

IF PEAK 455 KC

AUGUST, 1941

TECHNICAL DATA
TUNING RANGE 537 TO 1720 K.C.
SENSITIVITY 30 MICROVOLTS
AVERAGE.
SELECTIVITY 73 K.C. AT
1000X AT 1000 K.C.
POWER OUTPUT
1.0 WATTS AT 10% DISTORTION
1.5 WATTS MAX. IN VOICE COIL
POWER CONSUMPTION 35 WATTS
I.F. 455 K.C.

PRICES SUBJECT TO CHANGE WITHOUT NOTICE.

Part No.	Schematic Diagram Reference	Description	No. Used In Set	Selling Price Each	114268 T7
CONDENSERS					
					114260 T7
1009	C4	.05 x 200 Volt Tubular Condenser.....	1	.25	105139 T6
10011	C14, C15	.01 x 400 Volt Tubular Condenser.....	2	.25	
10013	C10	.05 x 400 Volt Tubular Condenser.....	1	.25	
10025	C12	.002 x 600 Volt Tubular Condenser.....	1	.25	
10091	C6	.15 x 400 Volt Tubular Condenser.....	1	.25	108157H T4
11992	C8, C9	Electrolytic Filter Condenser. 50 to 60 Cycles. 20 Mfd. x 150 V.; 40 Mfd. x 150 V.....	1	1.50	1081570 T5 13618 T2, T3
11993	C8, C9	Electrolytic Filter Condenser. 25 Cycles 40 Mfd. x 150 V.; 60 Mfd x 150 V.....	1	1.75	
124137	C3, C7	Ant. and Osc. Dual Trimmer Condenser.....	1	.35	
129114	C2	.0003 Mica Type Condenser—20%.....	1	.25	128657-36
12939	C5	.00005 Mica Type Condenser—20%.....	1	.25	128657-9
12912	C11	.00025 Mica Type Condenser—20%.....	1	.25	115779-18 T1
1292	C13	.0005 Mica Type Condenser—20%.....	1	.25	115779-9 T1
					131193
					131356
					10798E
					121171
RESISTORS					
101272	R6, S1	Volume Control and Switch (500M Ohms).....	1	1.00	
130176	R1	20M Ohm— $\frac{1}{4}$ Watt Resistor—10%.....	1	.20	
130293	R11	30 Ohm—1 Watt Resistor—20%.....	1	.20	
130100	R2, R8	150M Ohm— $\frac{1}{4}$ Watt Resistor—20%.....	2	.20	
130240	R5	30 Ohm— $\frac{1}{4}$ Watt Resistor—10%.....	1	.20	1121010
1304	R4	3 Megohm— $\frac{1}{4}$ Watt Resistor—20%.....	1	.20	1121008
130257	R7	5 Megohm— $\frac{1}{4}$ Watt Resistor—25%.....	1	.20	13143
13011	R9	250M Ohm— $\frac{1}{4}$ Watt Resistor—20%.....	1	.20	1121006
130166	R10	150 Ohm— $\frac{1}{4}$ Watt Resistor—10%.....	1	.20	1209
130287	R3	1200 Ohm—1 Watt Resistor—10%.....	1	.20	120184
Used only when P. M. Dynamic Speaker is used.					128523-17 128523-8

Four Inch P.M. Dynamic Speaker (Less Output Transformer).	1	2.50
or		
Four Inch Electrodynamic Speaker. (Less Output Transformer).	1	2.50
Output Transformer for Either Speaker.	1	1.00

Input I.F. Coil Complete in Can.....	1	1.00
Output I.F. Coil Complete in Can.....	1	1.00
Ant. and Osc. Coil Permeability Tuning Unit Complete—Ready to Mount.....	1	3.50

Bakelite Cabinet—Walnut	1	2.00
Bakelite Cabinet—Ivory Color	1	3.00
Antenna Plate—Walnut Color	1	.15
Antenna Plate—Ivory Color	1	.20
Snap-in Rivets to Fasten Ant. Plate	2	.01
Snap-in Rivets to Fasten Ant. Plate	2	.01
Line Cord and Plug	1	.50
Eight Prong Octal Wafer Socket	5	.15

Dial Scale	1	.40
Crystal for Dial Scale.....	1	.15
Snap-in Rivets to Fasten Crystal.....	2	.01
Pointer	1	.15
String for Dial.....		Yd. .15
Coiled Tension Spring for Dial String.....	1	.05
Knob—Walnut	2	.10
Knob—Ivory	2	.10

MODEL C5D14

GAMBLE-SKOGMO, INC.

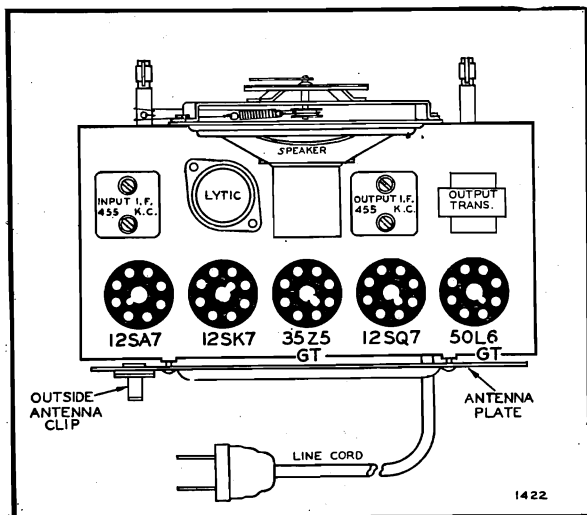
ALIGNMENT PROCEDURE

- Volume control—Maximum all adjustments.
- Connect B— of radio chassis to ground post of signal generator through .1 Mfd. condenser.

BAND	SIGNAL GENERATOR Frequency Setting	Dummy Antenna	Connection to Radio	Position of Iron Cores (Dial Setting)	Adjust Trimmers to Maximum (in Order Shown)
I. F.	455 Kc.	.1 MFD.	Connect to Metal Antenna Backplate	Iron Cores All the way out	Two trimmers on top of output I. F. can
	455 Kc.	.1 MFD.	Connect to Metal Antenna Backplate	Iron Cores All the way out	Two trimmers on top of input I. F. can
BROAD- CAST BAND	1720 Kc.	.1 MFD.	Connect to Metal Antenna Backplate	Iron Cores All the way out	Osc. Trimmer (C7) (See voltage chart)
	1720 Kc.	200 MMF.	Connect to Outside Antenna Clip	Iron Cores All the way out	Ant. Trimmer (C3) (See voltage chart)
	1400 Kc.	200 MMF.	Connect to Outside Antenna Clip	Turn Dial to 1400 Kc.	Adjust position of antenna coil (See coil assembly view)
	1720 Kc.	200 MMF.	Connect to Outside Antenna Clip	Turn Dial to 1720 Kc.	Adjust trimmer (C3) (See voltage chart)

NOTE "A"—The antenna coil assembly is made so that it is movable. When making the adjustment as given in the alignment procedure move the coil assembly very slowly. It can be moved by hand or by pivoting one edge of the blade of a screwdriver in the hole and engaging the blade in the gear teeth of the coil form.

NOTE "B"—After the antenna coil has been tracked at 1400 Kc. it is necessary to check the antenna trimmer (C3) adjustment again at 1720 Kc. If no appreciable change in trimmer adjustment is made the coil is in track. If the trimmer requires considerable change it will be necessary to again adjust the position of the antenna coil at 1400 Kc. These two adjustments should be tried several times until no change of trimmer adjustment is required at 1720 Kc.



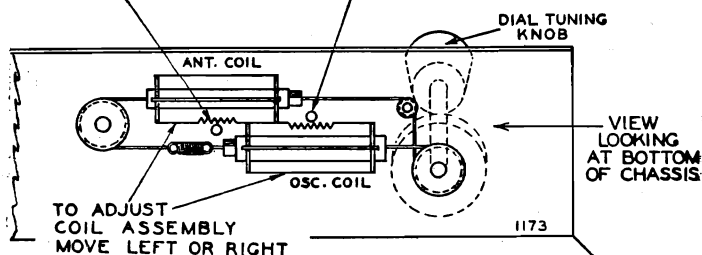
CHASSIS VIEW, showing tube location and the outside antenna clip.

Antenna

This radio is designed to pick up strong local stations without requiring an outside antenna. For best results, however, an outside antenna approximately 50 to 75 feet long including lead-in is recommended. It should be erected as high as possible and as far from surrounding objects as practical. For minimum interference it should be at right angles to street car lines, incoming power lines and other electrical apparatus which may be in the vicinity. A ground is not required.

Periodic inspection of the antenna system is recommended to be sure that all connections are clean and tight, and that the antenna is well insulated from the ground at all points.

NOTE "A" THE ANTENNA COIL ASSEMBLY IS MADE SO THAT IT IS MOVABLE LEFT OR RIGHT. WHEN MAKING THE ADJUSTMENT AS GIVEN IN THE ALIGNMENT PROCEDURE MOVE THE COIL ASSEMBLY VERY SLOWLY. IT CAN BE MOVED BY HAND OR BY PIVOTING ONE EDGE OF THE BLADE OF A SCREWDRIVER IN THE HOLE AND ENGAGING THE BLADE IN THE GEAR TEETH OF THE COIL FORM.

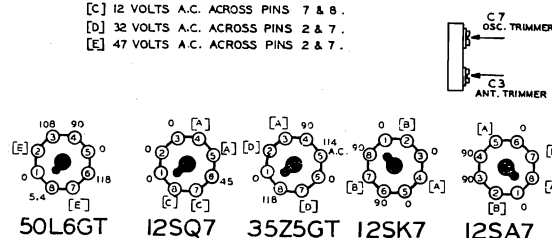


COIL ASSEMBLY VIEW

BOTTOM VIEW
OF CHASSIS

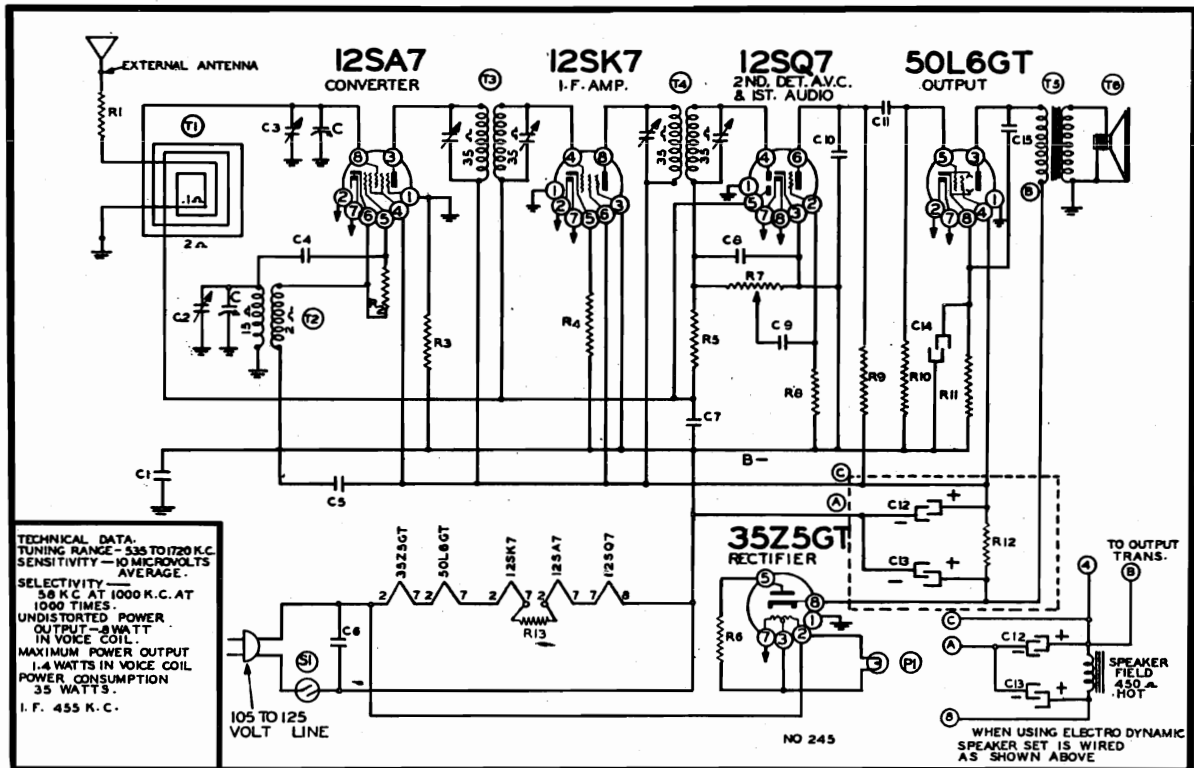
VOLTAGES MEASURED WITH A HIGH RESISTANCE VOLT-METER BETWEEN SOCKET TERMINALS & B—, 117 VOLT LINE.

- [A] CANNOT BE MEASURED WITH VOLT-METER.
- [B] 12 VOLTS A.C. ACROSS PINS 2 & 7.
- [C] 12 VOLTS A.C. ACROSS PINS 7 & 8.
- [D] 32 VOLTS A.C. ACROSS PINS 2 & 7.
- [E] 47 VOLTS A.C. ACROSS PINS 2 & 7.



REAR OF CHASSIS

GAMBLE-SKOGMO, INC.



Schematic
Part Diagram
No. Reference

Description

No. Selling
Used Price
In Set Each

CONDENSERS

102151	C, C2	Two Gang Variable Condenser with Osc. Trimmer Condenser	1	2.50
1001	C6	.1 x 400 Volt Tubular Condenser	1	.25
1009	C5, C7	.05 x 200 Volt Tubular Condenser	2	.25
10025	C9	.002 x 600 Volt Tubular Condenser	1	.25
10091	C1	.15 x 400 Volt Tubular Condenser	1	.25
100106	C11	.004 x 600 Volt Tubular Condenser	1	.25
10026	C15	.02 x 400 Volt Tubular Condenser	1	.25
119134	C12, C13, C14	Electrolytic Filter Condenser, 25 to 60 Cycles, 20 Mfd. x 150 V.; 40 Mfd. x 150 V.; 40 Mfd. x 25 V.	1	1.25
124180	C3	Antenna Trimmer	1	.55
12921	C4	.0002 Mica Type Condenser—20%	1	.25
1295	C8	.0001 Mica Type Condenser—20%	1	.25
12912	C10	.00025 Mica Type Condenser—20%	1	.25

RESISTORS

101265	R7, S1	Volume Control and Switch (1 Megohm)	1	1.00
13094	R2	50M Ohm— $\frac{1}{2}$ Watt Resistor—10%	1	.20
130215	R6	25 Ohm— $\frac{1}{2}$ Watt Resistor—10%	1	.20
1309	R3	200M Ohm— $\frac{1}{2}$ Watt Resistor—20%	1	.20
13097	R4	200 Ohm— $\frac{1}{2}$ Watt Resistor—10%	1	.20
1304	R5	3 Megohm— $\frac{1}{2}$ Watt Resistor—20%	1	.20
130257	R8	5 Megohm— $\frac{1}{2}$ Watt Resistor—25%	1	.20
1303	R9	500M Ohm— $\frac{1}{2}$ Watt Resistor—20%	1	.20
13037	R10	750M Ohm— $\frac{1}{2}$ Watt Resistor—20%	1	.20
130166	R11	150 Ohm— $\frac{1}{2}$ Watt Resistor—10%	1	.20
130287	R12	1200 Ohm—1 Watt Resistor—10%	1	.20
130293	R13	30 Ohm—1 Watt Resistor—10%	1	.20
13026	R1	1M Ohm— $\frac{1}{2}$ Watt Resistor—10%	1	.20

COILS

108140N	T3	Input I.F. Coil Complete in Can	1	1.00
108141G	T4	Output I.F. Coil Complete in Can	1	1.00
110487	T2	Oscillator Coil	1	.50
111258	T1	Loop Antenna (Specify Color)	1	1.25
128730		Cardboard Back Only (Specify Color)	1	.10

A - CANNOT BE MEASURED WITH VOLTMETER
B - 12 VOLTS A.C. ACROSS PINS 2-7
C - 12 VOLTS A.C. ACROSS PINS 7-8
D - 48 VOLTS A.C. ACROSS PINS 2-7
E - 275 VOLTS A.C. ACROSS PINS 2-7
F - 117 VOLTS A.C. ACROSS PINS 2-4

SPEAKER

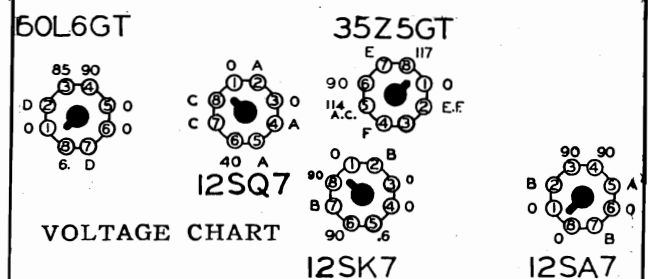
114251	T6	Five Inch P.M. Dynamic Speaker Less Output Transformer	1	3.50
114258	T6	Five Inch Electro Dynamic Speaker Less Output Transformer	1	3.50
105108D	T5	Output Transformer	1	1.00

DIAL AND TUNING PARTS

107249	P1	6-8 Volt Pilot Lite Bulb, Type T-47	1	.10
107389B		Socket Assembly for Dial Light	1	.10
1121000		Dial Scale	1	1.75
112998		Diffuser for Dial	1	.10
131211		Snap-in Rivets to Fasten Dial Scale	2	.01
112999		Pointer	1	.10
120145		Coiled Tension Spring for Dial String	1	.05
1209		String for Dial	1	.15
117919		Tuning Shaft	1	.10
128686-37		Knob—Walnut—"Volume"	1	.20
128687-37		Knob—Walnut—"Tuning"	1	.20
128686-8		Knob—Ivory—"Volume"	1	.20
128687-8		Knob—Ivory—"Tuning"	1	.20

BOTTOM VIEW OF CHASSIS

ALL VOLTAGES MEASURED BETWEEN SOCKET PIN & B-
WITH A 1000 OHMS PER VOLT VOLTMETER.
117 VOLT LINE.



MODEL C5D15
MODEL 534

GAMBLE-SKOGMO, INC.

MODEL 534

ALIGNMENT PROCEDURE

- Volume control—Maximum all adjustments.

- Connect — B of radio chassis to ground post of signal generator through .1 Mfd. condenser.
- Connect dummy antenna value in series with generator output lead.
- Connect output meter across primary of output transformer.
- Allow chassis and signal generator to "heat up" for several minutes.

The following equipment is required for aligning:

- An all wave signal generator which will provide an accurately calibrated signal at the test frequencies as listed.
- Output indicating meter.
- Non-metallic screwdriver.
- Dummy antennas—.1 Mfd., and 20 Mmi.

BAND	SIGNAL GENERATOR Frequency Setting	Dummy Antenna	Connection to Radio	Variable Condenser Setting	Trimmers Adjusted (in Order Shown)	Trimmer Function	Adjustment
I. F.	455 Kc.	.1 MFD.	Grid of 12SK7 I. F. Tube	Rotor full open (Plates out of mesh)	Two trimmers on top (See Top View)	Output I. F.	Adjust to maximum output
	455 Kc.	.1 MFD.	Grid of 12SA7	Rotor full open (Plates out of mesh)	Two trimmers on top (See Top View)	Input I. F.	Adjust to maximum output
BROAD- CAST BAND	1650 Kc.	.1 MFD.	Grid of 12SA7	Rotor full open (Plates out of mesh)	Trimmer—Bottom of gang (See Top View)	Oscillator	Adjust to maximum output
	1400 Kc.		(See Note "A" and "B")	Set dial at 1400 Kc.	Trimmer—Bottom of gang (See Top View)	Antenna	Adjust to maximum output (See Note "A")

Loop aerial should be connected when aligning receiver.

NOTE "A"—Mount the chassis and the loop antenna in the cabinet, connect the loop antenna to the chassis. Adjust the antenna trimmer through hole in bottom of cabinet.

NOTE "B"—Lay the output lead from the signal generator in back of the loop antenna. Turn up the output of the generator, picking up the energy in the loop antenna without any electrical connection from the signal generator.

MODEL C5D15

ALIGNMENT PROCEDURE

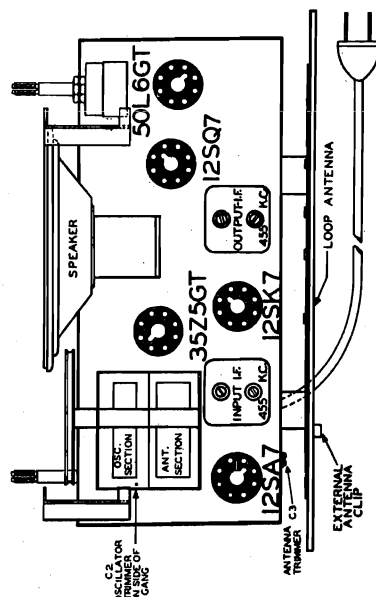
- Volume control—Maximum all adjustments.

- Connect B— to ground post of signal generator.

BAND	SIGNAL GENERATOR Frequency Setting	Dummy Antenna	Connection to Radio	Variable Condenser Setting	Trimmers Adjusted to Maximum (in Order Shown)
I. F.	455 Kc.	.1 MFD.	Grid of 12SK7 I. F. Tube	Rotor full open (Plates out of mesh)	Two trimmers on top of Output (See Chassis View)
	455 Kc.	.1 MFD.	Grid of 12SA7	Rotor full open (Plates out of mesh)	Two trimmers on top of Input (See Chassis View)
BROAD- CAST BAND	1720 Kc.	.1 MFD.	Grid of 12SA7	Rotor full open (Plates out of mesh)	Oscillator Trimmer on gang (See Chassis View)
	1400 Kc.		(See Note "A")	Set dial at 1400 Kc.	Antenna Trimmer C3 (See Chassis View)

Loop aerial should be connected when aligning receiver.

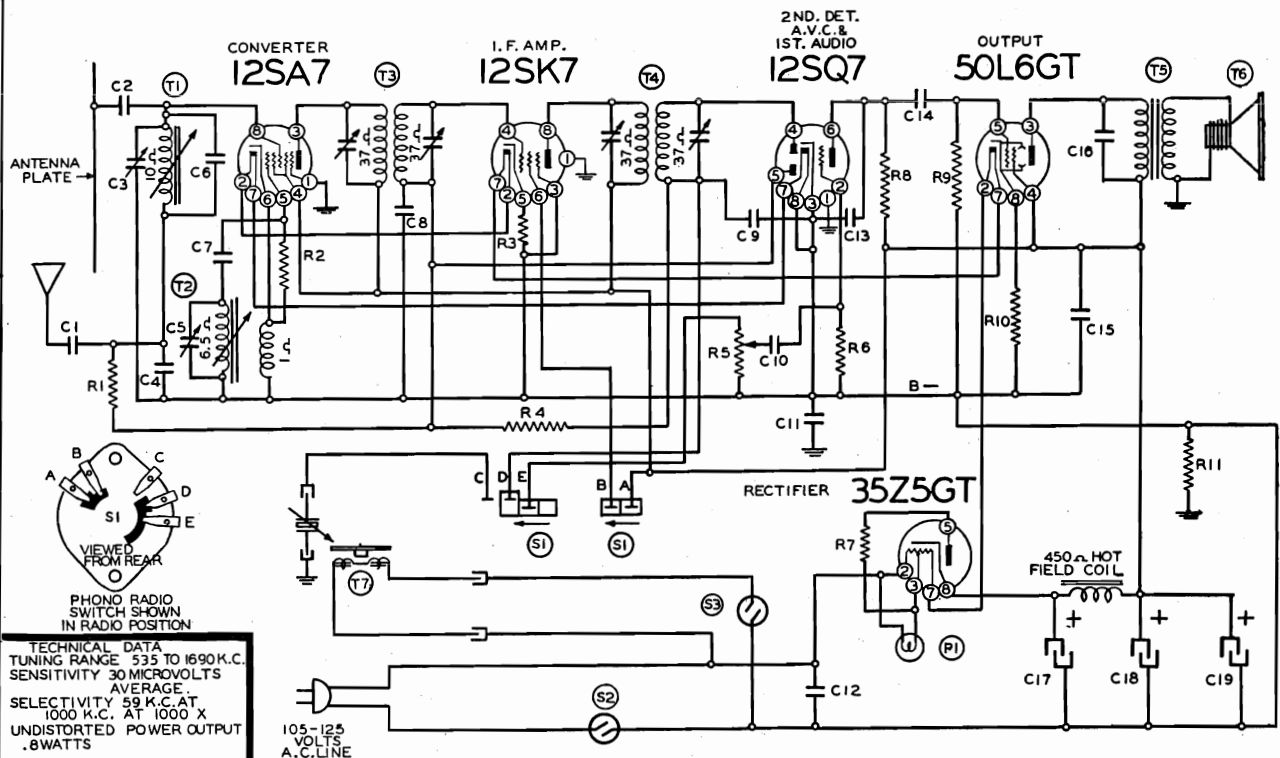
NOTE "A"—Lay the output lead from the signal generator in back of the loop antenna. Turn up the output of the generator, picking up the energy in the loop antenna without any electrical connection from the signal generator.



CHASSIS VIEW showing tube location.

NOTE: External Antenna Clip at back of chassis.

GAMBLE-SKOGMO, INC.



NO 244

Replacement Parts List "AUTOMATIC RECORD CHANGERS AND RECORDERS".

FOR OAK RECORD CHANGER SEE RIDER'S

Part No.	Schematic Diagram Reference	Description	No. Used In Set	Selling Price Each
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108140L T3
 108145E T4
 13616 T1, T2

COILS	
Input I.F. Coil Complete in Can.....	1.00
Output I.F. Coil Complete in Can.....	1.00
Ant. and Osc. Coil Permeability Unit Complete Ready to Mount.....	3.75

CONDENSERS	
1009 C8, C15	.05 x 200 Volt Tubular Condenser.....2
100119 C11	.1 x 400 Volt Tubular Condenser.....1
10025 C10	.002 x 600 Volt Tubular Condenser.....1
10019 C14	.006 x 600 Volt Tubular Condenser.....1
10011 C16	.01 x 400 Volt Tubular Condenser.....1
1001 C12	.1 x 400 Volt Tubular Condenser.....1
11994 C17, C18, C19	Electrolytic Filter Condenser. 50 to 60 Cycles. 40 Mfd. x 150 V.; 20 Mfd. x 150 V.; 20 Mfd. x 150 V.....1
11995 C17, C18, C19	Electrolytic Filter Condenser. 25 Cycles. 60 Mfd. x 150 V.; 40 Mfd. x 150 V.; 40 Mfd. x 150 V.....2.00
124136 C3, C5	Ant. and Osc. Dual Trimmer Condenser.....1
129114 C2	.0003 Mica Type Condenser—20%.....1
1295 C1, C7, C9	.0001 Mica Type Condenser—20%.....3
129162 C4	.0008 Mica Type Condenser—10%.....1
12912 C13	.00025 Mica Type Condenser—20%.....1
129183 C6	.00005 Ceramicon Condenser—10%.....1

114257 T6
 114198B T6
 105108C T5

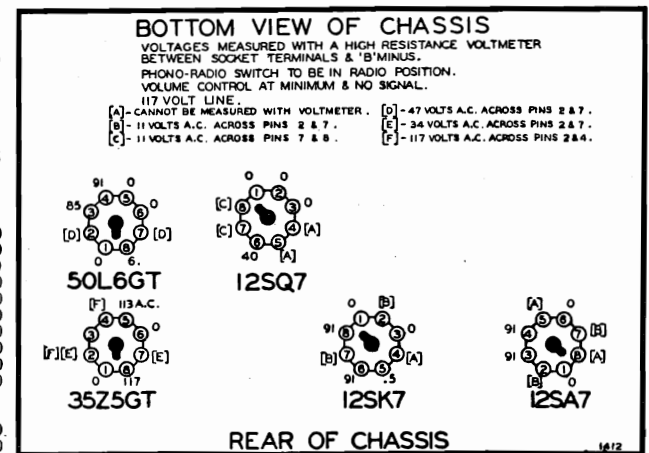
SPEAKER	
Five Inch Electrodynamic Speaker (Less Output Transformer)	3.50
OR	
Five Inch P.M. Dynamic Speaker (Less Output Transformer)	3.50
Output Transformer for Speaker.....	1.00

RESISTORS	
101266 R5, S2	Volume Control and Switch (500M. Ohms) 1
1309 R1, R11	200M Ohm—1/2 Watt Resistor—20%.....2
130176 R2	20M Ohm—1/2 Watt Resistor—10%.....1
130168 R3	100 Ohm—1/2 Watt Resistor—10%.....1
1304 R4	3 Megohm—1/2 Watt Resistor—20%.....1
13011 R8	250M Ohm—1/2 Watt Resistor—20%.....1
130257 R6	5 Megohm—1/2 Watt Resistor—25%.....1
130215 R7	25 Ohm—1/2 Watt Resistor—10%.....1
13037 R9	750M Ohm—1/2 Watt Resistor—20%.....1
130293 R12	30 Ohm—1 Watt Resistor—20%.....1

1.00
 .20
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Following Resistors Used Only When P.M. Dynamic Speaker is Used:	
130166 R10	150 Ohm—1/2 Watt Resistor—10%.....1
13097	200 Ohm—1/2 Watt Resistor—10%.....1
130287	1200 Ohm—1 Watt Resistor—10%.....1

.20
 .20
 .20



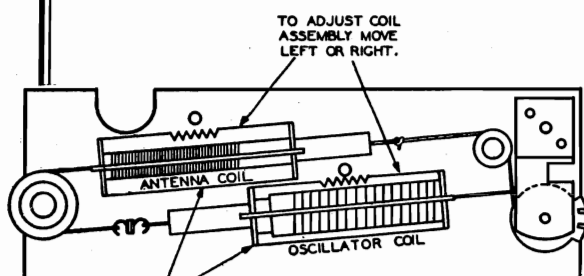
REAR OF CHASSIS

VOLTAGE CHART

MODEL C5D16

GAMBLE-SKOGMO, INC.

POWER SUPPLY— Unless your radio is marked otherwise, it must be operated from 105 to 125 volts, 60 cycle A.C. If in doubt, phone your electric light company. Receivers of this same model which are for use on special voltages are marked accordingly. Reversing the plug may reduce station hum.

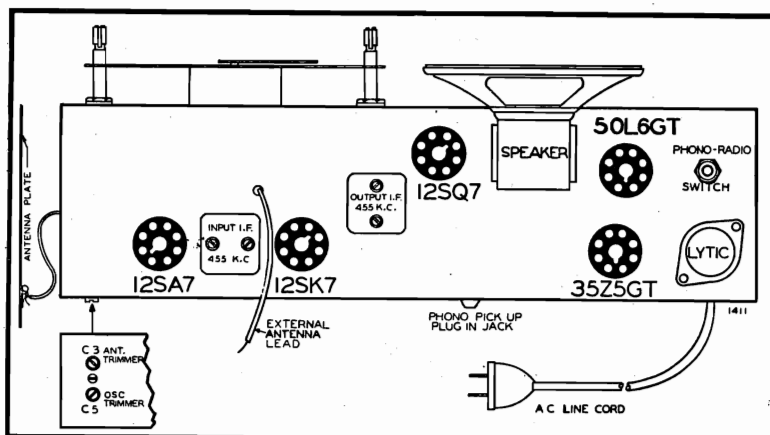


NOTE: THE ANTENNA COIL ASSEMBLY IS MADE SO THAT IT IS MOVABLE LEFT OR RIGHT. WHEN MAKING THE ADJUSTMENT AS GIVEN IN THE ALIGNMENT PROCEDURE MOVE COIL ASSEMBLY VERY SLOWLY.

COIL ASSEMBLY VIEW

Antenna

This radio is designed to pick up strong local stations without requiring an outside antenna. For best results, however, an outside antenna approximately 50 to 75 feet long including lead-in is recommended. It should be erected as high as possible and as far from surrounding objects as practical. For minimum interference it should be



CHASSIS VIEW—Showing tube location and type. Note External Antenna Lead at back of chassis.

at right angles to street car lines, incoming power lines and other electrical apparatus which may be in the vicinity. A ground is not required.

Periodic inspection of the antenna system is recommended to be sure that all connections are clean and tight, and that the antenna is well insulated from the ground at all points.

ALIGNMENT PROCEDURE

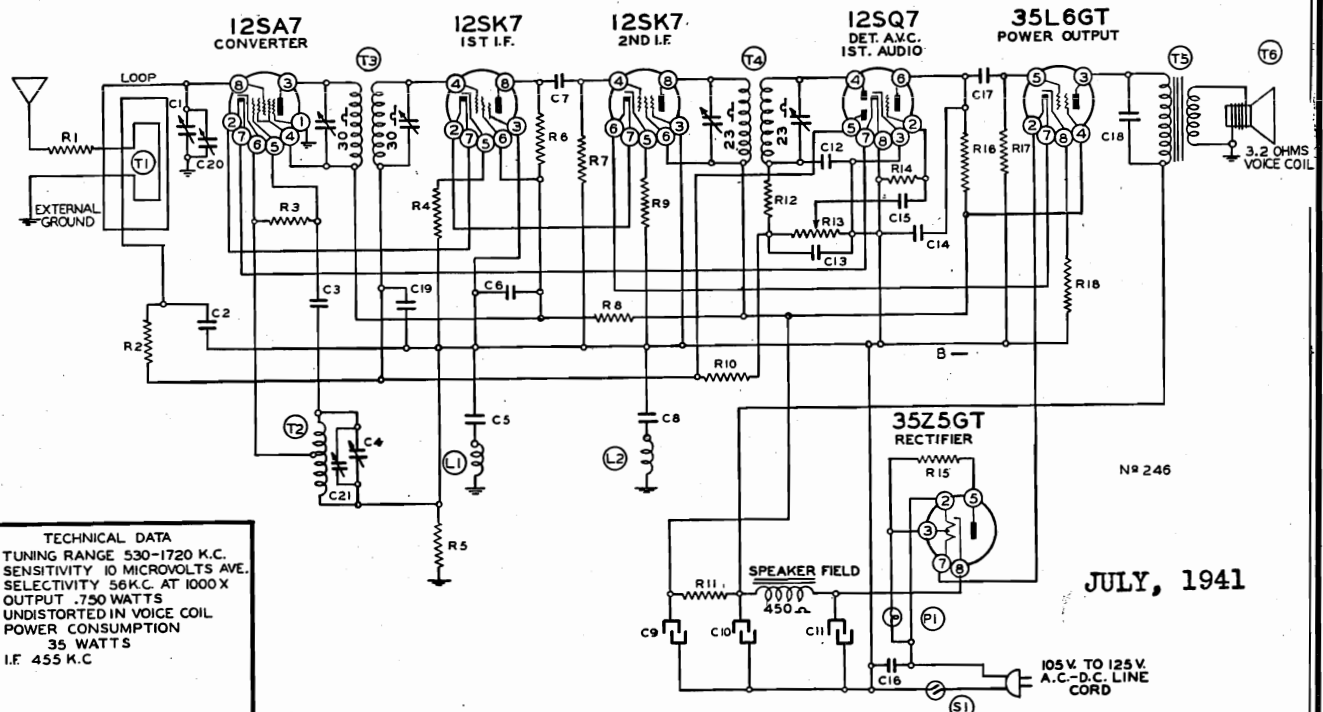
- Connect B— of radio chassis to ground post of signal generator through .1 Mfd. condenser.
- Volume control—Maximum all adjustments.

BAND	SIGNAL GENERATOR		Connection to Radio	Position of Iron Cores (Dial Setting)	Trimmers Adjusted to Maximum (in Order Shown)
	Frequency Setting	Dummy Antenna			
I. F.	455 Kc.	.1 MFD.	Connect to Antenna Plate	Iron Cores All the way out	Two trimmers on top of output I.F. (See Chassis View)
	455 Kc.	.1 MFD.	Connect to Antenna Plate	Iron Cores All the way out	Two trimmers on top of input I.F. (See Chassis View)
BROAD-CAST BAND	1690 Kc.	.1 MFD.	Connect to Antenna Plate	Iron Cores All the way out	Oscillator trimmer (C5) (See Chassis View)
	1690 Kc.	200 MMF.	Connect to Antenna Plate	Iron Cores All the way out	Antenna trimmer (C3) (See Chassis View)
	1400 Kc.	200 MMF.	Connect to Antenna Plate	Turn Dial to 1400 Kc.	Adjust position of antenna coil right or left. (See Note "A")
	1690 Kc.	200 MMF.	Connect to Antenna Plate	Turn Dial to 1690 Kc.	Adjust antenna trimmer (C3) (See Chassis View) (See Note "B")

NOTE "A"—The antenna coil assembly is made so that it is movable right or left. When making the adjustment as given in the alignment procedure move the coil assembly very slowly. It can be moved by hand or by pivoting one edge of the blade of a screwdriver in the hole and engaging the blade in the gear teeth of the coil form.

NOTE "B"—After the antenna coil has been tracked at 1400 Kc. it is necessary to check the antenna trimmer (C3) adjustment again at 1690 Kc. If no appreciable change in trimmer adjustment is made the coil is in track, if the trimmer requires considerable change it will be necessary to again adjust the position of the antenna coil at 1400 Kc. These two adjustments should be tried several times until no change of trimmer adjustment is required at 1690 Kc.

GAMBLE-SKOGMO, INC.



Replacement Parts List

In ordering parts refer to model number on chassis label.

Use Only Genuine Factory Replacement Parts.

Part No.	Schematic Diagram Reference	Description	No. Used In Set	Selling Price Each	Part No.	Schematic Diagram Reference	Description	No. Used In Set	Selling Price Each
CONDENSERS					MISCELLANEOUS				
102153	C1, C4, C20, C21	Two Gang Condenser Complete with Tuner Assembly and Ant. and Osc. Trimmers	1	6.00	107249	P1	6-8 Volt Pilot Lite Bulb. Type T-47	1	.10
10026	C8, C17, C18	.02 x 400 Volt Tubular Condenser	3	.25	107389		Socket Assembly for Pilot Lite	1	.10
10025	C15	.002 x 600 Volt Tubular Condenser	1	.25	10798		Line Cord and Plug	1	.50
1009	C2, C19	.05 x 200 Volt Tubular Condenser	2	.25	121210		8 Prong Molded Octal Sockets	6	.15
10020	C6	.1 x 200 Volt Tubular Condenser	1	.25	128659-36		Bakelite Cabinet—Walnut	1	3.75
100110	C5	.2 x 400 Volt Tubular Condenser	1	.25	128659-9		Bakelite Cabinet—Ivory Color	1	5.00
1001	C16	.1 x 400 Volt Tubular Condenser	1	.25	134123		Rubber Bumpers for Bottom of Cabinet	4	.03
119135	C9, C10, C11	Electrolytic Filter Condenser. 20 Mfd. x 150 V.; 20 Mfd. x 150 V.; 40 Mfd. x 150 V.	1	1.25	131356		Snap-in Buttons to Fasten Back	4	.01
1295	C3, C7, C12, C13, C14	.0001 Mica Type Condenser—20%	5	.25	128740		Back for Cabinet—Brown	1	.10
RESISTORS					128740B		Back for Cabinet—Ivory Color	1	.10
101274	R13, S1	Volume Control and Switch (1 Megohm)	1	1.00	DIAL AND TUNING PARTS				
13082	R6	10M Ohm— $\frac{1}{2}$ Watt Resistor—10%	1	.20	1121012		Dial Scale	1	.90
1304	R10	3 Megohm— $\frac{1}{2}$ Watt Resistor—20%	1	.20	112998		Diffuser	1	.10
13021	R3	20M Ohm— $\frac{1}{2}$ Watt Resistor—20%	1	.20	131211		Snap-in Rivets to Fasten Dial	2	.01
130166	R18	150 Ohm— $\frac{1}{2}$ Watt Resistor—10%	1	.20	1121013		Pointer	1	.15
13097	R11	200 Ohm—1 Watt Resistor—10%	1	.20	120377		Coiled Tension Spring for Dial String	2	.03
130215	R15	25 Ohm— $\frac{1}{2}$ Watt Resistor—10%	1	.20	120214		String for Dial	Per Yd.	.15
13019	R17	1 Megohm— $\frac{1}{2}$ Watt Resistor—20%	1	.20	120424		Spring—On Tuning Shaft	1	.03
130257	R14	5 Megohm— $\frac{1}{2}$ Watt Resistor—25%	1	.20	1209		String for Tuning Shaft	Per Yd.	.15
13020	R12	100M Ohm— $\frac{1}{2}$ Watt Resistor—20%	1	.20	117922		Tuning Shaft	1	.10
1309	R16	200M Ohm— $\frac{1}{2}$ Watt Resistor—20%	1	.20	128699-18		Pushbuttons—Left—Walnut	3	.10
130168	R4	100 Ohm— $\frac{1}{2}$ Watt Resistor—10%	1	.20	128700-18		Pushbuttons—Right—Walnut	3	.10
1303	R7	500M Ohm— $\frac{1}{2}$ Watt Resistor—20%	1	.20	128699-9		Pushbuttons—Left—Ivory	3	.10
13097	R9	200 Ohm— $\frac{1}{2}$ Watt Resistor—10%	1	.20	128700-9		Pushbuttons—Right—Ivory	3	.10
130345	R1, R8	1M Ohm— $\frac{1}{2}$ Watt Resistor—10%	1	.20	131383		Screw Driver	1	.10
130100	R2, R5	150M Ohm— $\frac{1}{2}$ Watt Resistor—20%	2	.20	128523-17		Knob—Walnut	2	.10
COILS					128523-8		Knob—Ivory	2	.10
108140P	T3	Input I. F. Coil Complete in Can	1	1.00	112973		Set of Station Call Letters	1	.15
108145G	T4	Output I. F. Coil Complete in Can	1	1.00	112979		Set of Tabs for Call Letters	1	.10
110146	T2	Oscillator Coil	1	.75	SPEAKER				
111260	T1	Loop Antenna Assembly—Specify Color	1	1.25	114263	T6	4 x 6 Inch Oval Electrodynamic Speaker (Less Output Transformer)	1	3.50
105140	L1	I. F. Filter Choke	1	.05	105106B	T5	Output Transformer for Speaker	1	1.00
105141	L2	Filter Choke	1	.05	TECHNICAL DATA				
					TUNING RANGE 530-1720 K.C.				
					SENSITIVITY 10 MICROVOLTS AVE.				
					SELECTIVITY 56 K.C. AT 1000X				
					OUTPUT .750 WATTS				
					UNDISTORTED IN VOICE COIL				
					POWER CONSUMPTION 35 WATTS				
					I.F. 455 K.C.				

All prices quoted are list and are subject to the usual trade discounts.

Shipments are F. O. B. our factory. When remitting in advance, please include postage. Prices subject to change without notice.

WE CANNOT SUPPLY SPEAKER CONES OR FIELDS SEPARATELY, WE CAN REPLACE OR REPAIR A DAMAGED SPEAKER FOR \$2.75 IF IT IS RETURNED TO OUR FACTORY, TRANSPORTATION CHARGES PREPAID.

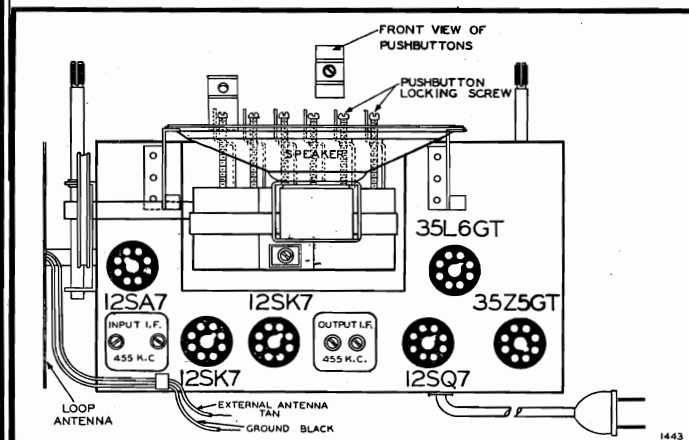
GAMBLE-SKOGMO, INC.

ALIGNMENT PROCEDURE

- Volume control—Maximum all adjustments.
- Connect B— of radio chassis to ground post of signal generator through .1 Mfd. condenser.

BAND	SIGNAL GENERATOR Frequency Setting	Dummy Antenna	Connection to Radio	Variable Condenser Setting	Trimmers Adjusted to Maximum
I. F.	455 Kc.	.1 MFD.	Grid of 12SK7 2nd I. F.	Rotor full open (Plates out of mesh)	Two trimmers on top of Output I. F.
	455 Kc.	.1 MFD.	Grid of 12SA7 Converter	Rotor full open (Plates out of mesh)	Two trimmers on top of Input I. F.
BROAD- CAST BAND	1720 Kc.	.1 mmf.	Grid of 12SA7	Rotor full open (Plates out of mesh)	Osc. trimmer C21 See voltage chart view
	1400 Kc.	200 mmf.	External Antenna and B—	Set Dial at 1400 K. C.	Ant. trimmer C20 See voltage chart view

The loop antenna should be connected to the radio and in its proper position when making all adjustments.



Chassis View, Showing Tube Location and the
External Antenna and Ground Leads

Setting the Pushbuttons

Make a list of your 6 favorite stations—push out the call letters of these stations from the call letter sheets supplied. Next insert a long slim screw driver into the hole in front of one of the pushbuttons and unscrew the pushbutton locking screw (to the left) several turns. Now with the screw driver still engaged in the locking screw slot push it all the way in. Hold it in this position and tune in the station you want with the tuning knob. Now tighten up the pushbutton locking screw by turning it to the right. Tighten firmly. Continue setting each button in the same way. When you have set your stations insert the call letter of each station in the front of the proper button and put one of the celluloid tabs over the station call letter.

To change stations simply repeat the above procedure.

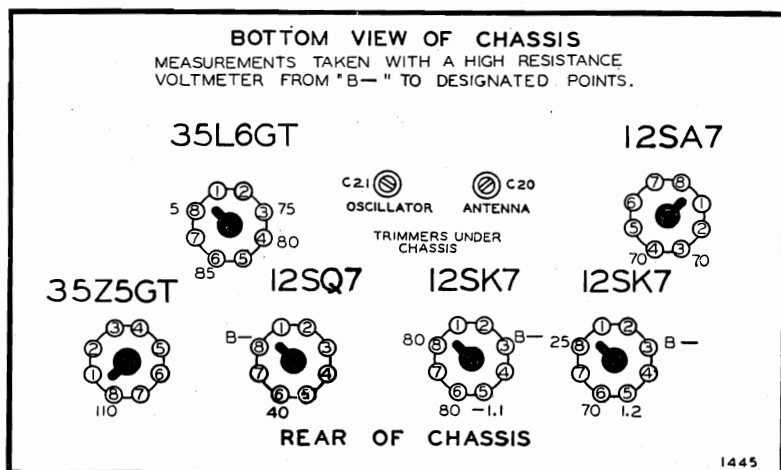
If you are unable to set a station on any particular button it is probably because the pushbutton locking screw has not been unloosened (turned to the left).

Antenna

This radio is designed to pick up strong local stations without requiring an outside antenna. The built-in aerial may be somewhat directional therefore try the radio in several positions.

For best results, however, an outside antenna approximately 50 to 75 feet long including lead-in is recommended. It should be erected as high as possible and as far from surrounding objects as practical. For minimum interference it should be at right angles to street car lines, incoming power lines and other electrical apparatus which may be in the vicinity. A ground is advisable. A good ground will often reduce noise. The ground wire should be connected with a clamp to a well cleaned water pipe or to a piece of pipe driven several feet into damp earth.

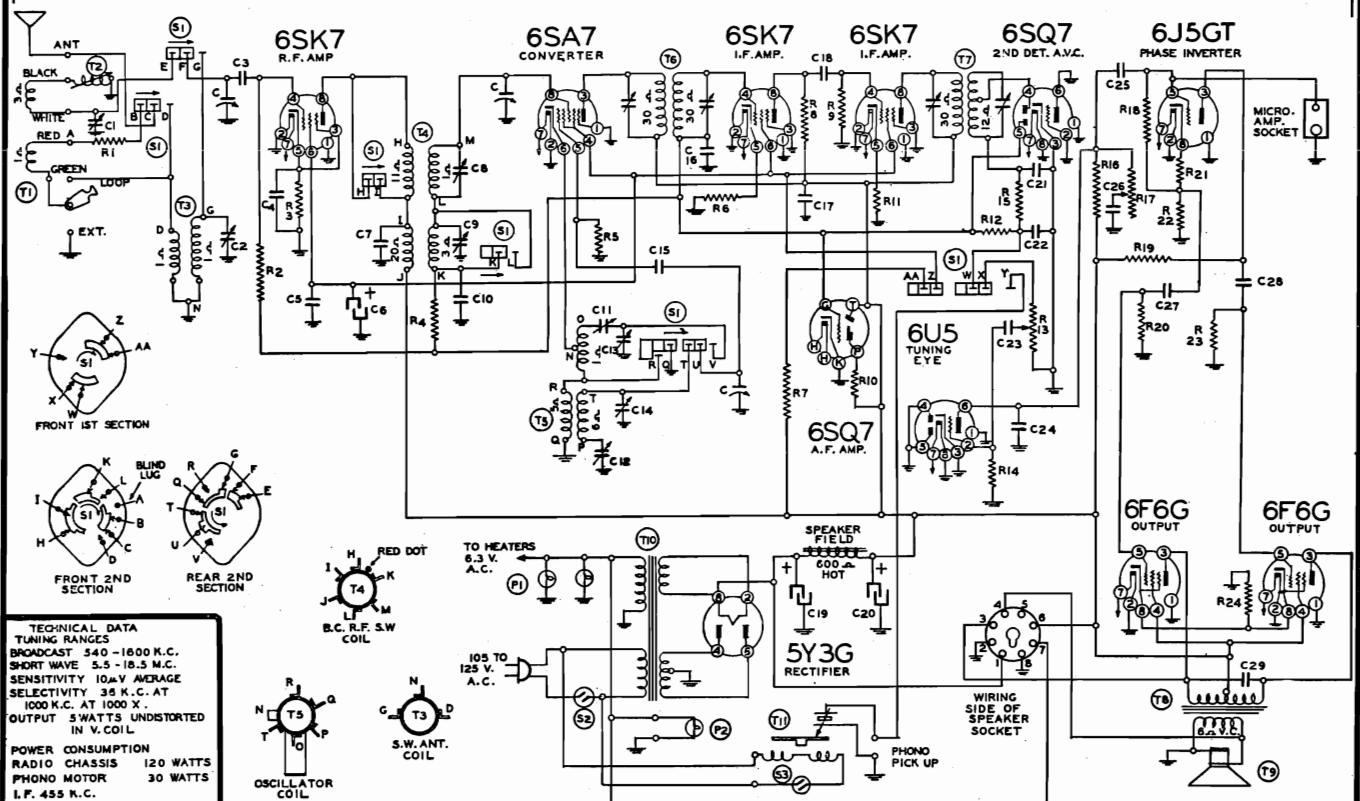
Periodic inspection of the antenna and ground system is recommended to be sure that all connections are clean and tight, and that the antenna is well insulated from the ground at all points.



VOLTAGE CHART

Unless your radio is marked otherwise, it must be operated from 105 to 125 volts, 50 to 60 cycle, or the same D. C. Voltage. If in doubt, phone your electric light company. Receivers of this same model which are for use on special voltages are marked accordingly. When using your radio on A. C., reversing the plug may reduce station hum. If set does not operate in one minute on direct current reverse the plug.

GAMBLE-SKOGMO, INC.



Replacement Parts List

In ordering parts or writing refer to the model number

Part No.	Schematic Diagram Reference	Description	No. Used In Set	Price Each
CONDENSERS				
102152	C	Three Gang Variable Condenser.....	1	4.00
10020	C4	.1 x 200 Volt Tubular Condenser.....	1	.25
10026	C10, C16, C25	.02 x 400 Volt Tubular Condenser.....	3	.25
10025	C23	.002 x 600 Volt Tubular Condenser.....	1	.25
1009	C27	.05 x 200 Volt Tubular Condenser.....	1	.25
10013	C28	.05 x 400 Volt Tubular Condenser.....	1	.25
10011	C26	.01 x 400 Volt Tubular Condenser.....	1	.25
10071	C29	.004 x 600 Volt Tubular Condenser.....	1	.25
100117	C5, C17	.25 x 400 Volt Tubular Condenser.....	2	.35
119124	C6, C19, C20	Electrolytic Filter Condenser—10 Mfd. x 350 V.; 25 Mfd. x 450 V.; 25 Mfd. x 450 V. 1	1	1.50
124180	C2	S.W. Antenna Trimmer.....	.55	10554F T8
124179	C8, C9	S.W. and B.C. R.F. Trimmer—Dual.....	.45	104202C T10
124181	C13, C14	S.W. and B.C. Osc. Trimmer—Dual.....	.40	
124182	C1	B.C. Antenna Trimmer.....	1	20 104203C
129157	C12	.000525 Compression Cond.—B.C. Pad.....	1	.35
1292	C3, C18	.0005 Mica Type Condenser—20%.....	2	.25
129160	C7	.0004 Mica Type Condenser—20%.....	1	.35
12939	C15	.00005 Mica Type Condenser—20%.....	1	.25
1295	C21, C22	.0001 Mica Type Condenser—2%.....	2	.25
129156	C11	.0024 Compression Mica Condenser.....	1	.50
12912	C24	.00025 Mica Type Condenser—20%.....	1	.25
RESISTORS				
101270	R13, S2	Volume Control and Switch (500M Ohms).....	1	1.25
101271	R17	Tone Control (1 Megohm).....	1	.90
13019	R2, R18	1 Megohm— $\frac{1}{2}$ Watt Resistor—20%.....	2	.20
1305	R4	300M Ohm— $\frac{1}{2}$ Watt Resistor—20%.....	1	.20
130208	R5	40M Ohm— $\frac{1}{2}$ Watt Resistor—20%.....	1	.20
13054	R6, R11	500 Ohm— $\frac{1}{2}$ Watt Resistor—20%.....	2	.20
130263	R8	12M Ohm— $\frac{1}{2}$ Watt Resistor—20%.....	1	.20
13020	R9, R19, R22	100M Ohm— $\frac{1}{2}$ Watt Resistor—20%.....	3	.20
130304	R7	12M Ohm—2 Watt Resistor—10%.....	1	.20
13012	R15	50M Ohm— $\frac{1}{2}$ Watt Resistor—20%.....	1	.20
130170	R12	3 Megohm— $\frac{1}{2}$ Watt Resistor—25%.....	1	.20
130225	R14	15 Megohm— $\frac{1}{2}$ Watt Resistor—30%.....	1	.20
13043	R21	2500 Ohm— $\frac{1}{2}$ Watt Resistor—20%.....	1	.20
1303	R20, R23	500M Ohm— $\frac{1}{2}$ Watt Resistor—20%.....	2	.20
13011	R16	250M Ohm— $\frac{1}{2}$ Watt Resistor—20%.....	1	.20
130311	R24	300 Ohm—1 Watt Resistor—20%.....	1	.20
13099	R3	300 Ohm— $\frac{1}{2}$ Watt Resistor—20%.....	1	.20
13024	R1	400 Ohm— $\frac{1}{2}$ Watt Resistor—20%.....	1	.20
	R10	1 Megohm—In Eye Socket.....	1	.20
COILS				
108169J	T6	Input I. F. Coil Complete in Can.....	1	1.00
108130C	T7	Output I.F. Coil Complete in Can.....	1	1.25
10957	T4	B.C.—S.W. R.F. Coil Complete in Can.....	1	1.25
110149	T5	B.C.—S.W. Oscillator Coil.....	1	.75
TRANSFORMERS				
		Output Transformer for Speaker.....	1	1.50
		Power Transformer, 50 to 60 Cycles 105-125 Volt Primary.....	1	4.50
		Power Transformer 25 to 60 Cycles 105-125 Volt Primary.....	1	
BANDSWITCH				
		Band Switch Complete.....	1	1.50
MISCELLANEOUS				
		Line Cord and Plug.....	1	.50
		Rubber Cushions to Float Chassis.....	4	.10
		Eight Prong Octal Molded Socket for Speaker.....	1	.15
		Eight Prong Octal Molded Socket.....	10	.15
		Socket and Cable Assembly for Tuning Eye.....	1	.75
		6-8 Volt Pilot Lite Bulb Type T-44.....	2	.10
		Socket Assembly for Pilot Lite.....	2	.10
		Bracket for Tuning Eye.....	1	.15
		Clamp for Tuning Eye.....	1	.15
		Wing Bolt for Above.....	1	.05
DIAL AND TUNING PARTS				
		Dial Scale.....	1	.60
		Snap-in Rivets to Fasten Dial Scale.....	.01	
		Escutcheon and Crystal for Dial.....	1	1.50
		Pointer.....	1	.15
		Knob—"Volume".....	1	.20
		Knob—"Tuning".....	1	.20
		Knob—"Tone".....	1	.20
		Knob—"Band".....	1	.20
		Tuning Shaft.....	1	.10
		Pulley with Bushing.....	1	.25
		String for Dial.....	Yd. 15	
		Coiled Tension Spring for Dial String.....	1	.05

MODEL 11A24

GAMBLE-SKOGMO, INC.

Alignment Procedure

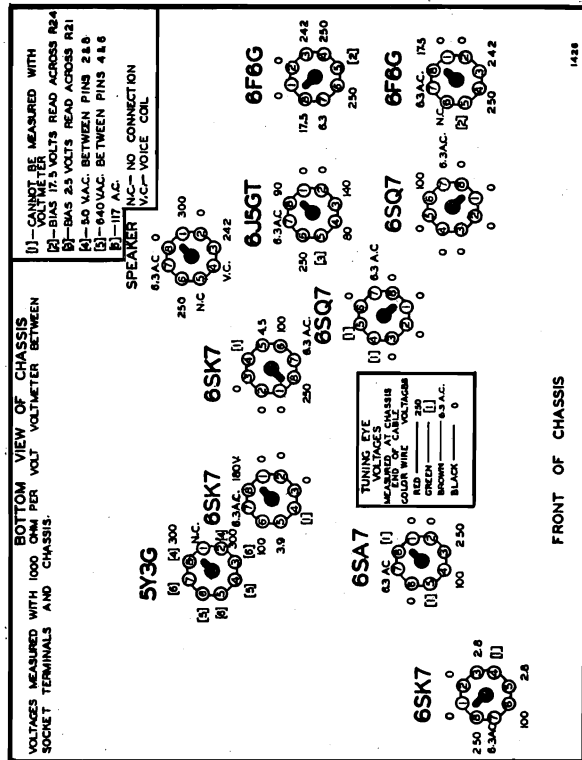
- Volume control—Maximum all adjustments.
- Connect dummy antenna value in series with generator output lead.

SIGNAL GENERATOR

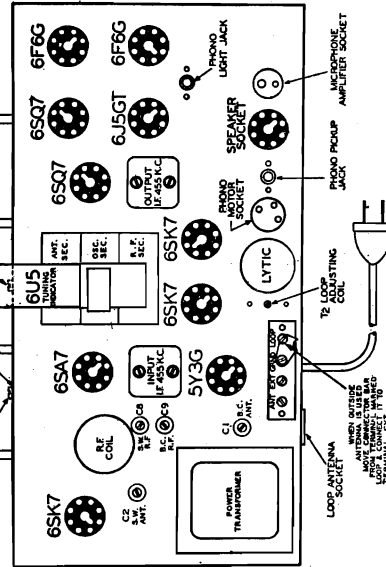
BAND	Frequency Setting	Dummy Antenna	Connect on to Radio	Position of Band Switch	Variable Condenser Setting	Trimmers Adjusted to Maximum (in Order Shown)
I. F.	455 Kc.	.1 MFD.	Grid of 6SK7	Broadcast	Rotor full open (Plates out of mesh)	Two trimmers on top Output I. F.
	455 Kc.	.1 MFD.	Grid of 6SA7	Broadcast	Rotor full open (Plates out of mesh)	Two trimmers on top Input I. F.
SHORT WAVE BAND	17 Mc.	400 Ohms	External Antenna and Ground	Short Wave	Set Dial at 17 Mc.	C13, S.W. Osc.
	17 Mc.	400 Ohms	External Antenna and Ground	Short Wave	Set Dial at 17 Mc.	C8, S.W. R.F., C3 S.W. Antenna
	6 Mc.	400 Ohms	External Antenna and Ground	Short Wave	Set Dial at 6 Mc.	C11 S.W. Osc. Series Pad See Note "A"
BROAD-CAST BAND	1580 Kc.	200 mmf.	Grid of 6SK7 R. F. Tube	Broadcast	Rotor full open (Plates out of mesh)	C14 B.C. Osc.
	540 Kc.	200 mmf.	Grid of 6SK7 K. F. Tube	Broadcast	Set Dial at 540 Kc. (Plates in Mesh)	C12 B.C. Osc. Series Pad
	1400 Kc.	200 mmf.	Grid of 6SK7 K. F. Tube	Broadcast	Set Dial at 1400 Kc.	C9 B.C. R.F.
LOOP ALIGN-MENT	1400 Kc.	200 mmf.	External Antenna and Ground	Broadcast	Set Dial at 1400 Kc.	C1 B.C. Ant.
	600 Kc.	200 mmf.	External Antenna and Ground	Broadcast	Set Dial at 600 Kc.	T2 Iron Core Tracking Coil

NOTE "A"—Turn the dial back and forth slightly (rock) and adjust trimmer until the peak of greatest intensity is obtained.

After each band is completed, repeat the procedure as a final check.



FRONT OF CHASSIS



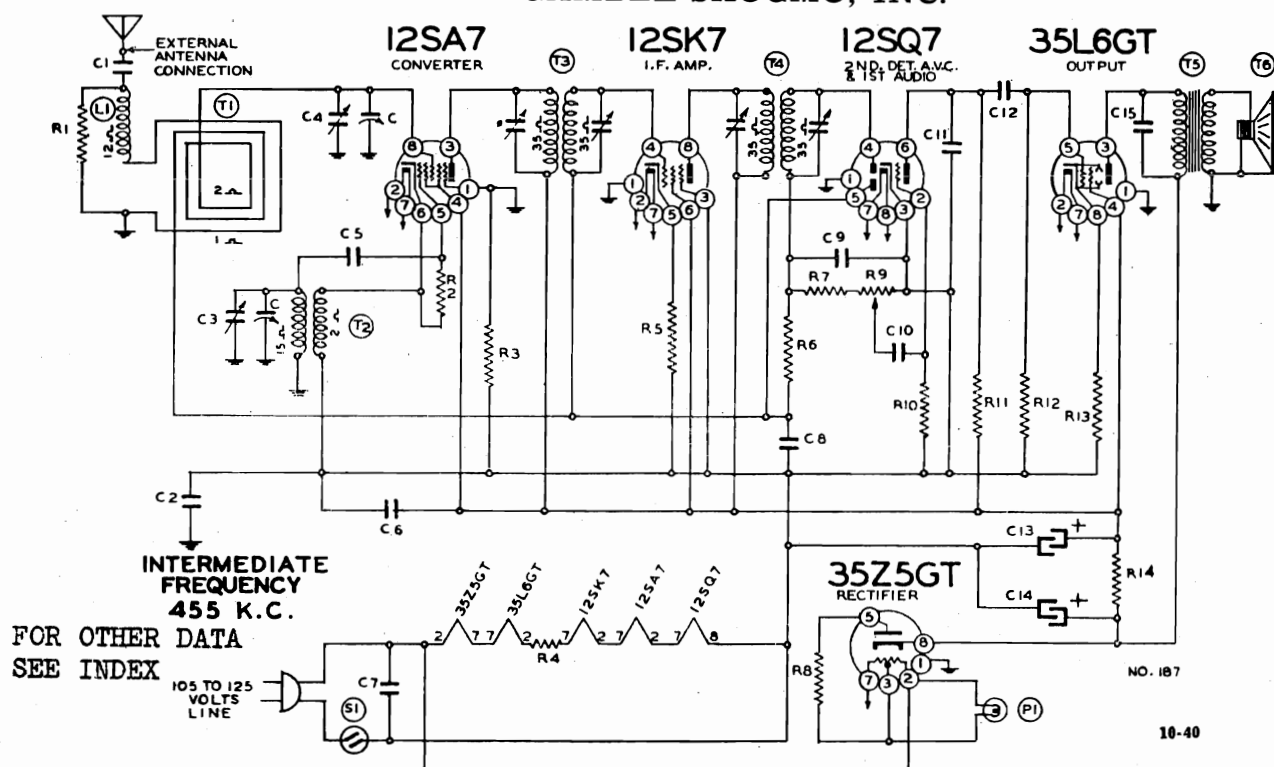
CHASSIS VIEW ANTENNA AND GROUND TERMINALS

When using an external antenna and ground, move the metal strap (connector bar) from terminal marked LOOP and connect it to terminal marked EXT.

The antenna and ground wires should then be connected to the terminals marked "Ant." and "Gnd."

MODEL 534

GAMBLE-SKOGMO, INC.



FOR OTHER DATA
SEE INDEX

INTERMEDIATE
FREQUENCY
455 K.C.

CONDENSERS

C	102132	2 gang variable condenser
C1	10011	.01 x 400 v.
C2	10091	.15 x 400 v.
C3		Oscillator trimmer on gang
C4		Antenna trimmer on gang
C5	12921	.0002 mfd. mica
C6	1009	.05 x 200 v.
C7	1001	.1 x 400 v.
C8	1009	.05 x 200 v.
C9	1295	.0001 mfd. mica
C10	10025	.002 x 600 v.
C11	12912	.00025 mfd. mica
C12	100106	.004 x 600 v.
C13	11992	20 mfd. lytic x 150 v. v.
C14	11992	40 mfd. lytic x 150 v. v.
C15	10026	.02 x 400 v.

C13 and C14 are in same unit

PARTS

T1	111182	Loop antenna—complete assembly
T2	110145	Oscillator coil
T3	108140I	Input I. F.—455 kc.
T4	108141D	Output I. F.—455 kc.

COILS

108140-I T3	Input I.F. Coil in Can—455 K.C.	1	1.00
108141-D T4	Output I.F. Coil in Can—455 K.C.	1	1.00
110145 T2	Oscillator Coil	1	.50
111182 T1	Loop Antenna Assembly Complete with Back (Specify Color)	1	1.50

Replacement
Parts List

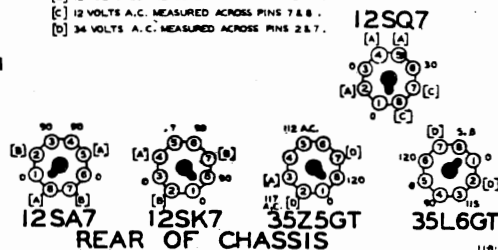
T5	105104	Output Transformer
T6	114201	5" P. M. Speaker
L1	12311	Loading coil
S1		On-off switch on volume control
P1	107249	Pilot light bulb T47

RESISTORS

R1	130314	2200 ohm— $\frac{1}{2}$ w.
R2	13094	50M ohm— $\frac{1}{2}$ w.
R3	1309	200M ohm— $\frac{1}{2}$ w.
R4	130315	75 ohm— $\frac{1}{2}$ w.
R5	130203	40 ohm— $\frac{1}{2}$ w.
R6	1304	3 megohm— $\frac{1}{2}$ w.
R7	1301	25M ohm— $\frac{1}{2}$ w.
R8	130215	25 ohm— $\frac{1}{2}$ w.
R9	101198	1 megohm volume control
R10	130257	5 megohm— $\frac{1}{2}$ w.
R11	1303	500M ohm— $\frac{1}{2}$ w.
R12	1303	500M ohm— $\frac{1}{2}$ w.
R13	130166	150 ohm— $\frac{1}{2}$ w.
R14	130287	1200 ohm—1 w.

BOTTOM VIEW OF CHASSIS

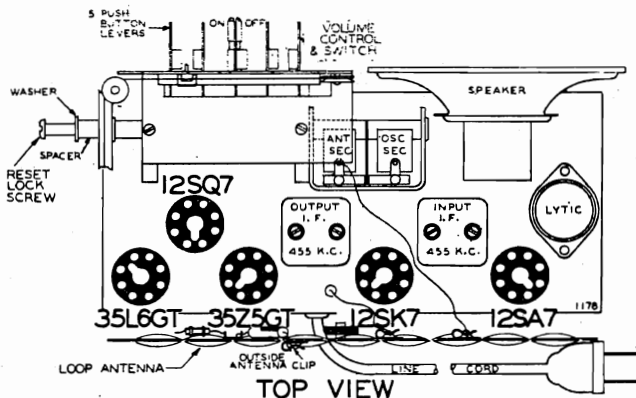
VOLTAGES MEASURED WITH 1000 OHM PER VOLT
VOLTMETER BETWEEN SOCKET TERMINALS 8-9
WITH A LINE VOLTAGE OF 110 V. VOLUME CONTROL AT MINIMUM.
[A] CANNOT BE MEASURED WITH VOLTMETER.
[B] 12 VOLTS A.C. MEASURED ACROSS PINS 2 & 7.
[C] 12 VOLTS A.C. MEASURED ACROSS PINS 7 & 8.
[D] 34 VOLTS A.C. MEASURED ACROSS PINS 2 & 7.

Setting the Automatic
Pushbuttons

Make a list of your 5 favorite stations. Push out the call letters of these stations from the call letter sheets supplied. Insert a call letter in the front of each pushbutton.

Press one of the buttons all the way down and hold it FIRMLY. Now tune in the station you want with the tuning knob. Tune back and forth until the station is clear, then release the button. NOTE: If the tuning knob turns quite hard when the button is held down firmly (loosen the reset lock screw several turns with a screwdriver or coin (quarter).

Continue, setting each of the remaining pushbuttons in the same way. Now turn the tuning knob all the way to the right and tighten the reset lock screw. This screw prevents the pushbuttons from slipping off the stations you have set. To change stations loosen lock screw and proceed as above.



GAMBLE-SKOGMO, INC.

TECHNICAL DATA

A—CURRENT 58 MA.
 B—CURRENT 8 MA.
 TUNING RANGE 538 KC. TO 1600 KC.
 SENSITIVITY 75 MICROVOLTS AVE.
 SELECTIVITY AT 1000KC.=
 48 KC. AT 1000 X SIGNAL
 OUTPUT 180 MW UNDISTORTED 3 OHM
 I.F. 455 K.C. VOICE COIL

Code No. Part No. Description

RESISTORS

R1	1309	200M ohm— $\frac{1}{2}$ w.
R2	130193	3M ohm— $\frac{1}{2}$ w.
R3	130305	65M ohm— $\frac{1}{2}$ w.
R4	130225	15 megohm— $\frac{1}{2}$ w.
R5	1304	3 megohm— $\frac{1}{2}$ w.
R6	101252	1 megohm—Volume control
R7	130223	10 megohm— $\frac{1}{2}$ w.
R8	130197	20 ohm— $\frac{1}{2}$ w.
R9	13019	1 megohm— $\frac{1}{2}$ w.
R10	1304	3 megohm— $\frac{1}{2}$ w.
R11	130345	1M ohm— $\frac{1}{2}$ w.
R12	130129	2500 ohm— $\frac{1}{2}$ w.
R13	130344	1975 ohm—6 watt
R14	130343	545 ohm—14 watt

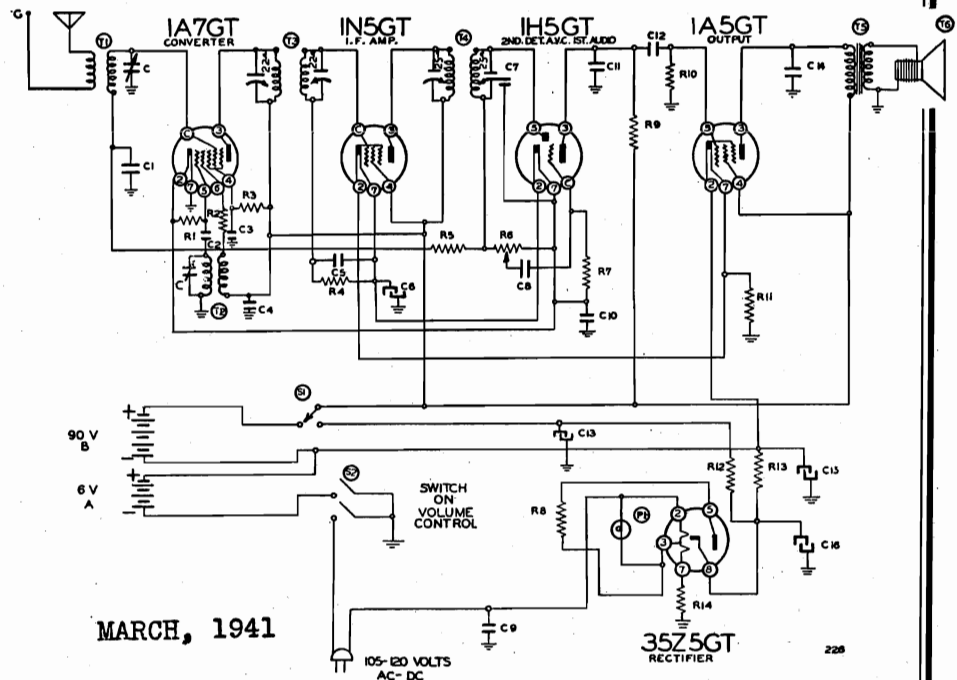
CONDENSERS

C	102141	Gang condenser
C1	1009	.05 x 200 v. condenser
C2	1295	.0001 mica
C3	100128	.05 x 120 v. condenser
C4	100135	.25 x 120 v. condenser
C5	100127	.01 x 120 v. condenser
C6	119123	20.0 mfd.—50 w. v. Lytic
C7		Approximately 100 mfd. in I.F. can
C8	100134	.006 x 120 v. condenser
C9	10013	.05 x 400 v. condenser
C10	100133	.1 x 120 v. condenser
C11	1295	.0001 mica
C12	100127	.01 x 120 v. condenser
C13	119123	40.0 mfd.—150 w. v. Lytic
C14	10025	.002 x 600 v. condenser
C15	119123	200.0 mfd.—10 w. v. Lytic
C16	119123	40.0 mfd.—150 w. v. Lytic

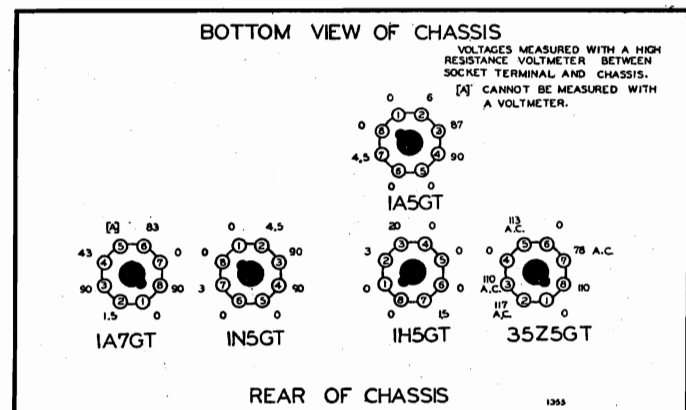
C6, C13, C15 and C16 are in one unit

PARTS

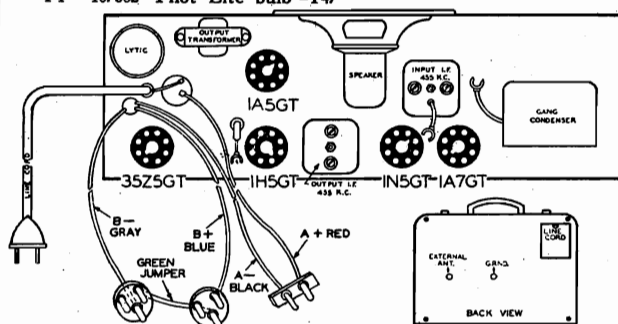
T1	111241	Loop antenna assembly
T2	110179	Oscillator coil
T3	108201	Input I. F. coil
T4	108200	Output I. F. coil
T5	105127	Output transformer
T6	114240	Speaker 5" P.M.
S1	125153	A. C. Battery switch
S2	101252	Switch on Volume control
P1	107362	Pilot Lite bulb—T47



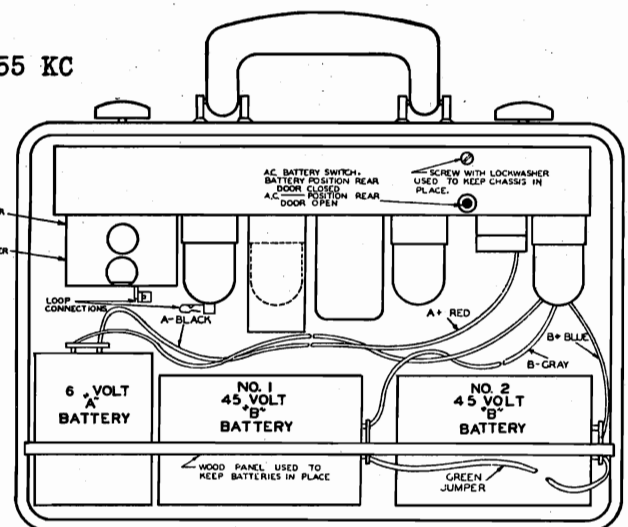
MARCH, 1941



IF PEAK 455 KC



CHASSIS VIEW showing tube location and battery cables
 —INSET back view, shows external ant. and ground connections.



BATTERY CONNECTIONS—When replacing batteries connect cables as shown above.

MODEL C590
MODEL 642

GAMBLE-SKOGMO, INC.

ALIGNMENT PROCEDURE MODEL C590

The following equipment is required for aligning.

- Dummy antenna .1 mfd. and 200 mmf.

- Volume control—Maximum all adjustments.
- Connect ground lead of radio chassis to ground post of signal generator.

BAND	SIGNAL GENERATOR				Trimmer Function	Adjustment
	Frequency Setting	Dummy Antenna	Connection to Radio	Position of Iron Cores (Dial Setting)	Trimmers Adjusted (in Order Shown)	
455 Kc. I. F.	455 Kc.	.1 MFD.	Connect to Grid of 1A7	Rotor full open (Plates out of mesh)	Trimmers on top of I. F. cans	Output and input I. F. maximum output (See Note "A")
BROAD- CAST BAND	1600 Kc.	.1 MFD.	Connect to Grid of 1A7	Rotor full open (Plates out of mesh)	Trimmer on gang (See chassis view)	Oscillator maximum output (See Note "A")
	1400 Kc.	200 MMF.	Connect to Antenna Clip	Set dial at 1400 Kc.	Trimmer on gang (See chassis view)	Antenna maximum output (See Note "B")

NOTE "A"—The loop antenna need not be connected to the radio when making these adjustments, but a 1. Meg. Resistor must be substituted across the loop clips. The ground of the signal generator is connected to the chassis and the other lead from the signal generator in series with .1 MFD. dummy to the grid of the 1A7GT tube.

NOTE "B"—This adjustment should be made with the ground lead of the signal generator connected to the external ground terminal. The other lead of the signal generator is connected in series with a 200 Mmf. dummy to the external antenna terminal.

ALIGNMENT PROCEDURE MODEL 642

IMPORTANT:—See alignment instructions

- Volume control—Maximum all adjustments.
- Connect B - of radio chassis to ground post of signal generator through .1 Mfd. condenser.
- Connect dummy antenna value in series with generator output lead.
- Connect output meter across primary of output transformer.
- Allow chassis and signal generator to "heat up" for several minutes.

The following equipment is required for aligning:

- An all wave signal generator.
- Output indicating meter.
- Non-metallic screwdriver.
- Dummy antennas—1 Mfd.

BAND	SIGNAL GENERATOR				Variable Condenser Setting	Trimmers Adjusted (in Order Shown)	Trimmer Function	Adjustment
	Frequency Setting	Dummy Antenna	Connection to Radio	Position of Iron Cores (Dial Setting)				
I. F.	455 Kc.	.1 MFD.	Grid of 12SA7	Rotor full open (Plates out of mesh)	Four Trimmers on Top (See Fig. 1)	Output and Input I. F.	Broadcast Oscillator	Adjust to maximum output
BROAD- CAST BAND	1600 Kc.	.1 MFD.	Grid of 12SA7	Rotor full open (Plates out of mesh)	Trimmer rear section of gang.	Broadcast Oscillator	Broadcast Antenna	Adjust to maximum output
	1400 Kc.	See Note "A"		Set dial at 1400 Kc.	Trimmer front section of gang	Broadcast Antenna		Adjust to maximum output

NOTE "A" Lay the output lead from the generator in back of the loop antenna. Turn up the output of the generator, picking up the energy in the loop antenna without any electrical connection from the generator.

POWER SUPPLY:

Caution:—This radio, unless otherwise marked, must be operated from 105-115 volts, A. C. (50/60 cycles) or D. C. supply only. If you are in doubt as to the voltage rating of the power supply, consult your local power company before inserting plug. Do not insert plug unless all tubes are in their proper sockets.

FREQUENCY RANGE

535 to 1600 K.C.

35 Watts

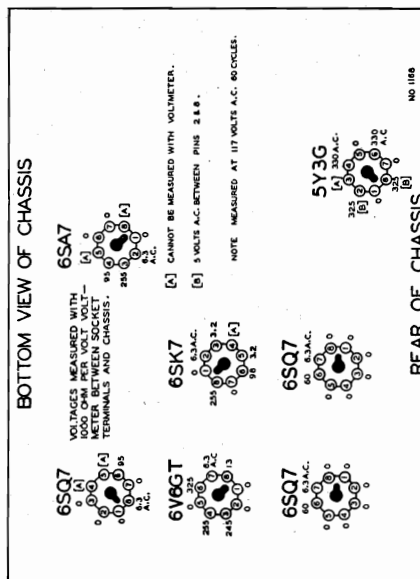
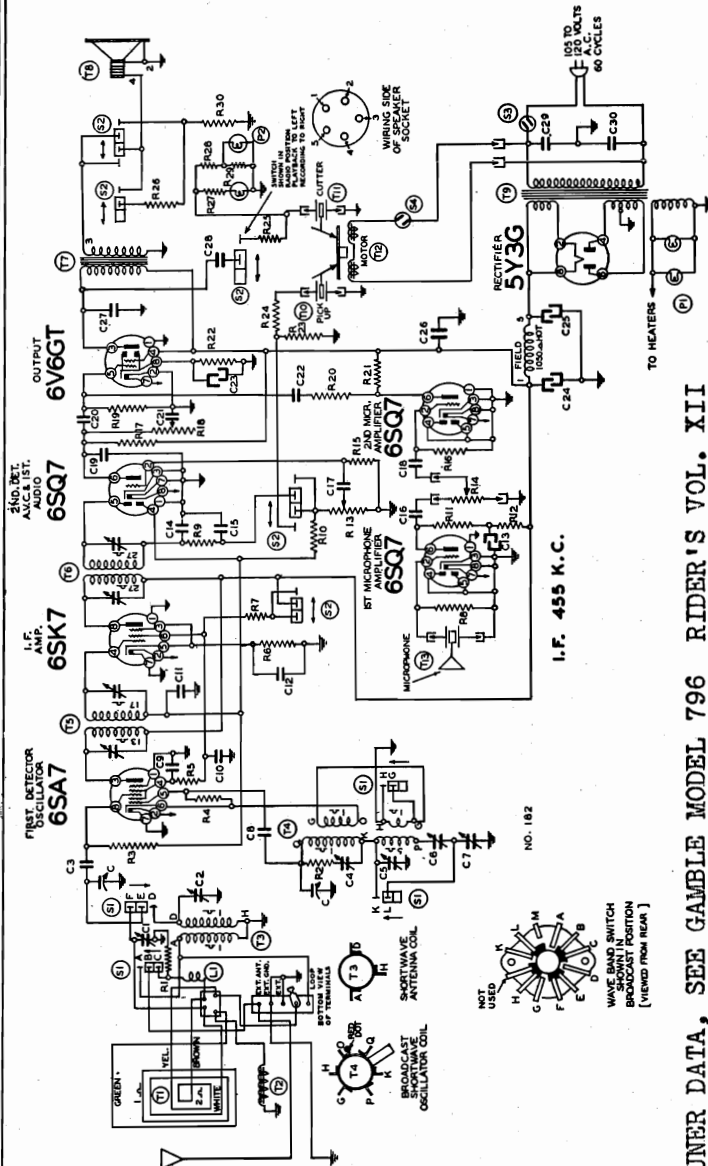
Power Consumption _____ 1 Watt Undistorted, 1.5 Watts Maximum

Power Output _____ 455 K.C.

Intermediate Frequency _____
Receivers of this model which are to be used on voltages other than 105-115 volts A. C. (50/60 cycle), or 105-115 volts D. C. are so marked. The power consumption of this receiver is 35 watts.

GAMBLE-SKOGMO, INC.

FOR DATA ON GENERAL INDUSTRIES R70
RECORD CHANGER, SEE RIDER'S
"AUTOMATIC RECORD CHANGERS AND
RECORDERS".



FOR TUNER DATA, SEE GAMBLE MODEL 796 RIDER'S VOL. XII

FIG. 6

Circuit Diagram	Ref. No.	Part No.	Description	Circuit Diagram	Ref. No.	Part No.	Description
			RESISTORS				CONDENSERS
R1	13018	4M	ohm- $\frac{1}{3}$ w.	C	102131	2 gang	variable condenser
R2	130197	20 ohm- $\frac{1}{3}$ w.		C1	124117	B.C.	Antenna Trimmer
R3	1304	3 megohm- $\frac{1}{3}$ w.		C2	124116	S.W.	Antenna Trimmer
R4	130236	30M ohm- $\frac{1}{3}$ w.		C3	1292	.0005	mica
R5	13092	1M ohm- $\frac{1}{3}$ w.		C4	124112	S.W.	Oscillator Trimmer
R6	13083	300 ohm- $\frac{1}{3}$ w.		C5	124112	B.C.	Oscillator Trimmer
R7	130313	20M ohm- $\frac{1}{2}$ watt		C6	124134	B.C.	Series Pad
R8	130257	5 megohm- $\frac{1}{2}$ w.		C7	124134	S.W.	Series Pad
R9	13012	50M ohm- $\frac{1}{2}$ w.		C8	12991	.00015	mica
R10	1304	3 megohm- $\frac{1}{3}$ w.		C9	10013	.05 x 400 v.	
R11	1303	500M ohm- $\frac{1}{3}$ w.		C10	1001	1 x 400 v.	
R12	13012	50M ohm- $\frac{1}{3}$ w.		C11	1009	.05 x 200 v.	
R13	101215	1 megohm	volume control	C12	1009	.05 x 200 v.	
R14	101219	1 megohm	microphone control	C13	11967	8 mfd. lytic	
R15	130223	10 megohm- $\frac{1}{3}$ w.		C14	129161	.0001	mica
R16	130223	10 megohm- $\frac{1}{3}$ w.		C15	129161	.0001	mica
R17	13011	250M ohm- $\frac{1}{3}$ w.		C16	10026	.02 x 400 volts	
R18	101216	1 megohm	tone control	C17	10071	.004 x 600 v.	
R19	1303	500M ohm- $\frac{1}{2}$ w.		C18	10025	.002 x 600 v.	
R20	13020	100M ohm- $\frac{1}{2}$ w.		C19	1292	.0005	mica
R21	1303	500M ohm- $\frac{1}{2}$ w.		C20	10013	.05 x 400 v.	
R22	130227	250 ohm-1 watt		C21	10019	.006 x 600 v.	
R23	13019	1 megohm- $\frac{1}{2}$ w.		C22	10013	.05 x 400 v.	
R24	1303	500M ohm- $\frac{1}{2}$ w.		C23	119110	40 mfd. lytic	
R25	130194	35M ohm- $\frac{1}{2}$ w.		C24	119110	20 mfd. lytic	
R26	130166	150 ohm- $\frac{1}{2}$ w.		C25	119110	20 mfd. lytic	
R27	1309	200M ohm- $\frac{1}{2}$ w.		C26	1001	1 x 400 v.	
R28	1309	200M ohm- $\frac{1}{2}$ w.		C27	10019	.006 x 600 v.	
R29	1309	200M ohm- $\frac{1}{2}$ w.					
R30	10661	6 ohm-5 watt					

MODEL 797

GAMBLE-SKOGMO, INC.

ALIGNMENT PROCEDURE

IMPORTANT: See Aligning Instructions.

- Volume control—Maximum all adjustments.
- Connect radio ground to ground post of signal generator with a short heavy lead.
- Connect dummy antenna value in series with generator output lead.
- Connect output meter across primary of output transformer.
- Allow chassis and signal generator to "heat up" for several minutes.

The following equipment is required for aligning:

- An all wave signal generator, which will provide an accurately calibrated signal at the test frequencies as listed.
- Output indicating meter.
- Non-metallic screwdriver.
- Dummy antennas—1 mf., 200 mmf 400 ohms.

SIGNAL GENERATOR

BAND	Frequency Setting	Dummy Antenna	Connection to Radio	Position of Band Switch	Variable Condenser Setting	Trimmers Adjusted (in Order Shown)	Trimmer Function	Adjustment
I. F.	455 Kc.	.1 MFD.	Grid of 6SK7	Broadcast	Rotor full open (Plates out of mesh)	Two trimmers on top (See Fig. 3)	Output I. F.	Adjust to maximum output
	455 Kc.	.1 MFD.	Grid of 6SA7 Mixer	Broadcast	Rotor full open (Plates out of mesh)	Two trimmers on top (See Fig. 3)	Input I. F.	Adjust to maximum output
SHORT WAVE BAND (See Note A)	17 Mc.	400 Ohms	External Antenna and Ground	Short Wave	Set Dial at 17 Mc.	Trimmer C4 (See Fig. 4)	Short Wave oscillator	Adjust to maximum output
	17 Mc.	400 Ohms	External Antenna and Ground	Short Wave	Set Dial at 17 Mc.	Trimmer C2 (See Fig. 4)	Short Wave antenna	Adjust to maximum output
	6 Mc.	400 Ohms	External Antenna and Ground	Short Wave	Set Dial at 6 Mc.	Trimmer C7 (See Fig. 4)	Short Wave oscillator series pad	Adjust to maximum rock dial. (See note "C")
BROADCAST BAND (See Note A)	1570 Kc.	200 mmf.	Grid of 6SA7	Broadcast	Rotor full open (Plates out of mesh)	Trimmer C3 (See Fig. 4)	Broadcast oscillator	Adjust to maximum output
	532 Kc.	200 mmf.	Grid of 6SA7	Broadcast	Set Dial at 532 K. C.	Trimmer C6 (See Fig. 4)	Broadcast oscillator series pad	Adjust to maximum output
LOOP ALIGNMENT (See Note B)	1400 Kc.	200 mmf.	External Antenna and Ground	Broadcast	Set Dial at 1400 Kc.	Trimmer C1 (See Fig. 5)	Broadcast antenna	Adjust to maximum output
	600 Kc.	200 mmf.	External Antenna and Ground	Broadcast	Set Dial at 600 Kc.	Trimmer T2 (See Fig. 5)	Iron Core Tracking Coil	Adjust to maximum output

POWER SUPPLY:

NOTE "A"—The signal generator is connected to the "ANT." and "GND." terminals on the rear of the chassis when aligning the Short Wave Band and to the grid of the 6SA7 tube and ground terminal when setting the Broadcast Band oscillator and frequencies, (1570 and 532 K. C.).

NOTE "B"—Loop alignment is made with the chassis mounted in the cabinet and the loop antenna connected. The signal generator is connected to the "ANT." and "GND." terminals and the jumper on the terminal board connected to "EXT." terminal. (See Fig. 3).

NOTE "C"—Turn the dial back and forth slightly (rock) and adjust trimmer until the peak of greatest intensity is obtained. Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.

After each band is completed, repeat the procedure as a final check.

BAND SWITCH
 Extreme Right Rotation
 Center Position
 Power Consumption (Radio Chassis only, less Phono Motor).....50 Watts
 Power Output.....3.6 Watts Undistorted, 5.4 Watts Maximum
 Intermediate Frequency.....455 K.C.

FIG. 4

FREQUENCY RANGE
 532 to 1570 KC. (Kilocycles)
 5.4 to 18.3 MC. (Megacycles)

FIG. 3—TOP VIEW

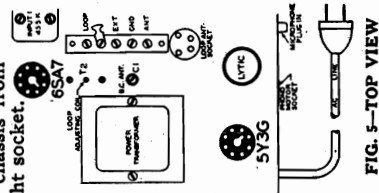
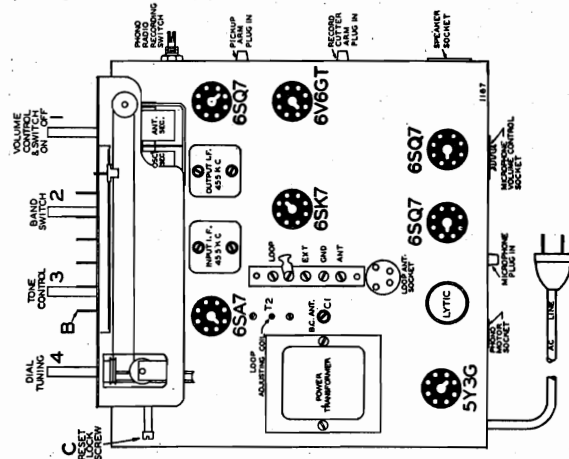
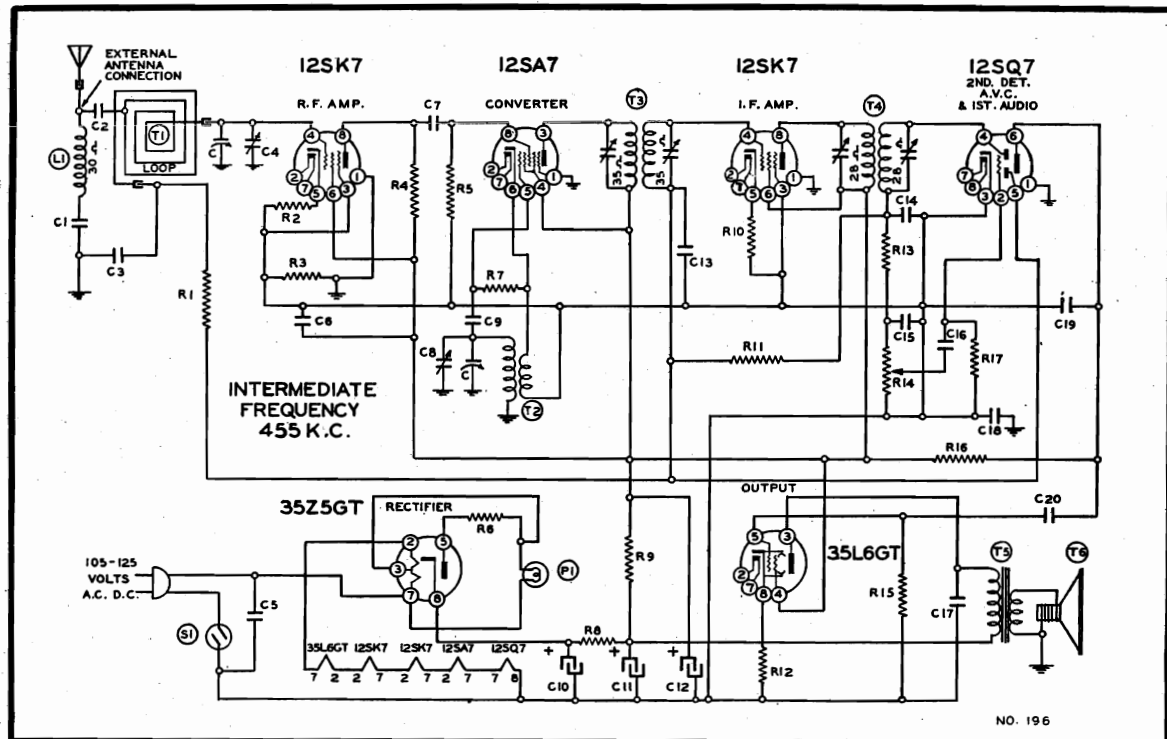
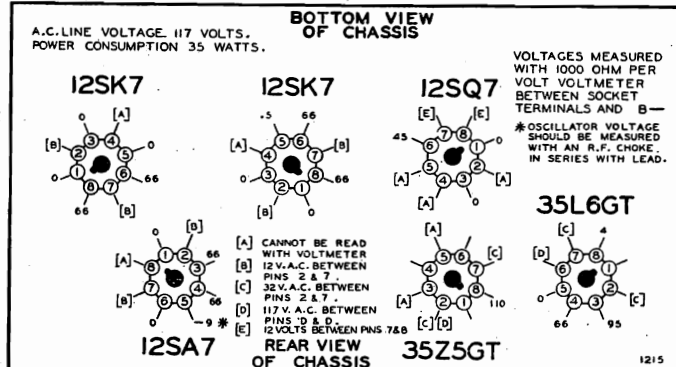


FIG. 5—TOP VIEW

GAMBLE-SKOGMO, INC.



NOVEMBER, 1940

R17 130257 5 megohm— $\frac{1}{2}$ w.

CONDENSERS

Code No.	Part No.	Description
C	102116	2 gang variable condenser
C1	10011	.01 x 400 v.
C2	129132	.000125 mica
C3	10026	.02 x 400 v.
C4		B.C. Antenna Trimmer
C5	1001	.1 x 400 v.
C6	1006	.25 x 200 v.
C7	1295	.0001 mica
C8		B.C. Oscillator Trimmer
C9	1295	.0001 mica
C10	11994	40 mfd.—150 w.v. lytic
C11	11994	20 mfd.—150 w.v. lytic
C12	11994	20 mfd.—150 w.v. lytic
C13	1009	.05 x 200 v.
C14	1295	.0001 mica

RESISTORS

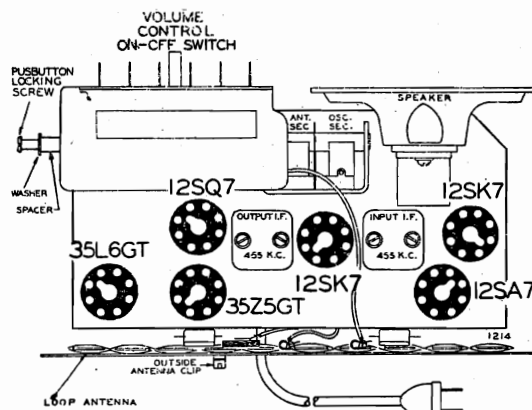
Code No.	Part No.	Description
R1	130100	150M ohm— $\frac{1}{2}$ w.
R2	130168	100 ohm— $\frac{1}{2}$ w.
R3	130100	150M ohm— $\frac{1}{2}$ w.
R4	130218	5M ohm— $\frac{1}{2}$ w.
R5	13020	100M ohm— $\frac{1}{2}$ w.
R6	130215	25 ohm— $\frac{1}{2}$ w.
R7	13094	50M ohm— $\frac{1}{2}$ w.
R8	130296	200 ohm—1 w.
R9	130287	1200 ohm—1 w.
R10	130248	40 ohm— $\frac{1}{2}$ w.
R11	1304	3 megohm— $\frac{1}{2}$ w.
R12	130166	150 ohm— $\frac{1}{2}$ w.
R13	13012	50M ohm— $\frac{1}{2}$ w.
R14	101193	1 megohm volume control
R15	1303	500M ohm— $\frac{1}{2}$ w.
R16	1309	200M ohm— $\frac{1}{2}$ w.
C15	12939	.00005 mica
C16	10025	.002 x 600 v.
C17	10026	.02 x 400 v.
C18	100110	.2 x 400 v.
C19	1295	.0001 mica
C20	100106	.004 x 600 v.

C10, C11 and C12 are in same unit

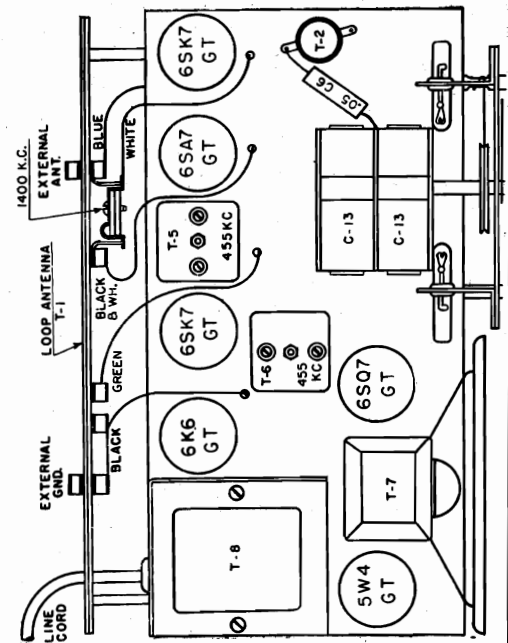
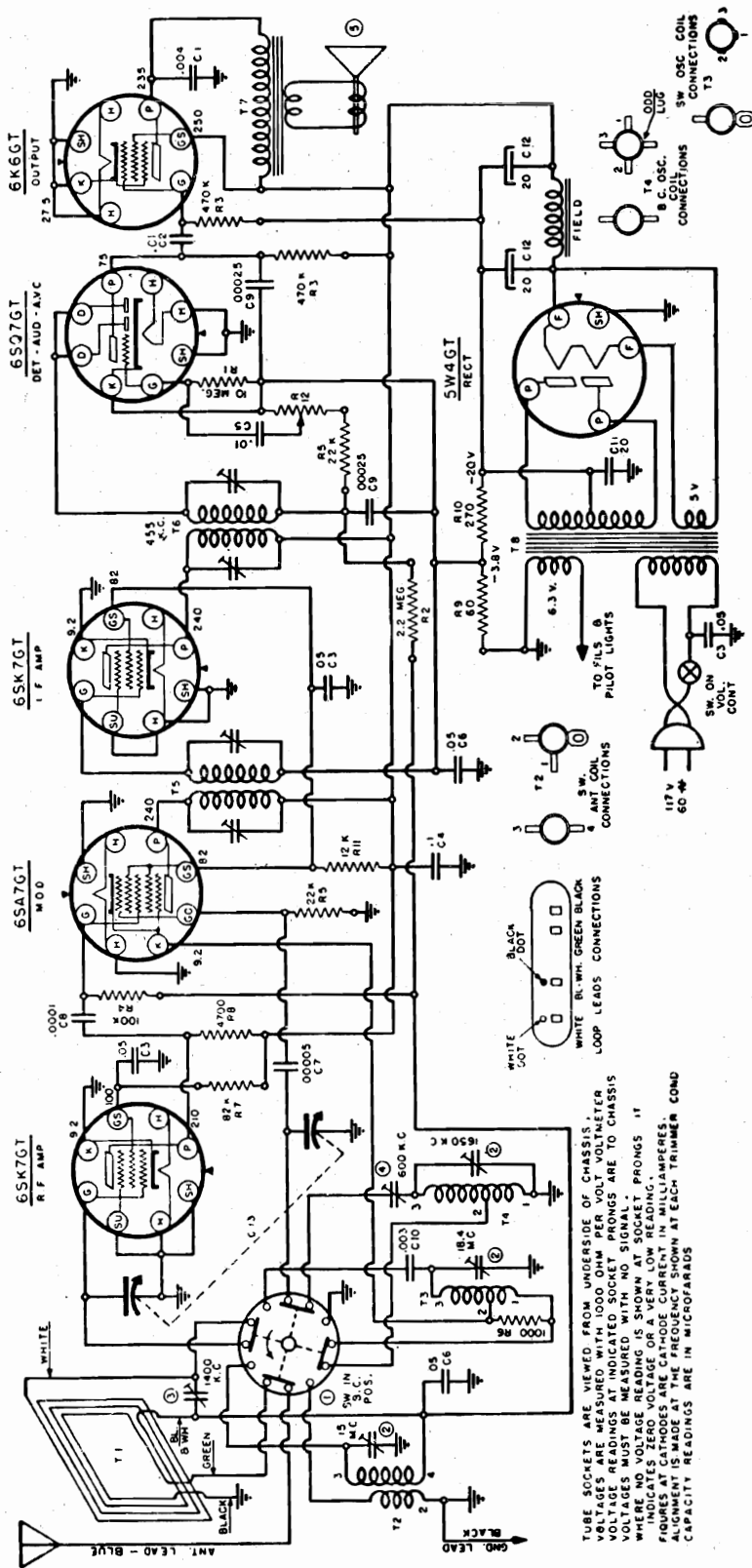
PARTS

T1	111145	Loop Antenna Assembly
T2	110128	Oscillator Coil
T3	108140G	Input I.F. Coil—465 kc.
T4	108145C	Output I.F. Coil—465 kc.
T5	10595B	Output Transformer
T6	114174	5" P.M. Speaker
L1	1237	Loading Coil
S1		On-off switch on volume control
P1	107249	Pilot light T47

FOR TUNER DATA SEE INDEX



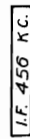
MODEL 906



CODE	PART NO.	DESCRIPTION
R 1	60 179	10 MEG OHM
R 2	60 178	2.2 MEG OHM
R 3	60 178	470 K
R 4	60 178	100 K
R 5	60 185	22 K
R 6	60 217	1000
R 7	60 435	1/2 WATT
R 8	60 435	1/2 WATT
R 9	60 182	1/2 WATT
R 10	60 245	1 WATT
R 11	60 182	1 WATT
R 12	24 146	500 K

CODE	PART NO.	DESCRIPTION	CODE	PART NO.	DESCRIPTION
T 1	82 145	LOOP ANTENNA COIL	C 1	16 51	600 V TUBULAR COND.
T 2	10 357	5 W OSCILLATOR COIL	C 2	16 119	400 V
T 3	10 320	5 W OSCILLATOR COIL	C 3	16 116	200 V
T 4	10 326	5 W OSCILLATOR COIL	C 4	16 116	200 V
T 5	10 312	5 W OSCILLATOR COIL	C 5	16 116	200 V
T 6	10 312	5 W OSCILLATOR COIL	C 6	16 116	200 V
T 7	80 195	OUTPUT TRANSFORMER (ON SPKR)	C 7	16 116	200 V
T 8	80 195	POWER TRANSFORMER	C 8	16 116	200 V
T 9	80 195	POWER TRANSFORMER	C 9	16 116	200 V
T 10	80 195	POWER TRANSFORMER	C 10	16 116	200 V
T 11	80 195	POWER TRANSFORMER	C 11	16 116	200 V
T 12	80 195	POWER TRANSFORMER	C 12	16 116	200 V
T 13	80 195	POWER TRANSFORMER	C 13	16 116	200 V
T 14	80 195	POWER TRANSFORMER	C 14	16 116	200 V
T 15	80 195	POWER TRANSFORMER	C 15	16 116	200 V

EAHER 10"
E 25131



MODEL 1010-B
CIRCUIT DIAGRAM E 25143

Watts input at 117 V. line 80. Watts output 3.0 Undistorted 4.5 Maximum.
Selectivity at 1000 times signal 34 kc band width Intermediate frequency 456 kc.

Tuning Ranges: Broadcast 540 to 1725 kc Short-wave 6.0 to 18.0 mc

<p>Sensitivity: Broadcast 5 to 6 Microvolts Short-wave 20 to 45 Microvolts</p>	<p>Frequency range 50 to 150 MC Short-wave 0.5 to 15.0 MC</p>
-------------------------------------------------------------------------------------------	-------------------------------------------------------------------

I.T. 456kc at 6SA7 grid (Stator of center section of variable condenser) 65 to 75 Microvolts.
 Tube Functions: 6SK7 R.F. Amplifier, 6SA7 first detector, 6J5GT Oscillator, 6SK7 I.F. Amplifier, 6J5GT Diode Detector, 6SQ7 First Audio Amplifier, 6J5GT Phase Inverter, 2-SK6GT Power Output and 5Y3G Rectifier.

Voltages will be found on circuit diagram.

MODEL 1010B
MODEL 1070A

The following equipment is needed for aligning this receiver:

Signal generator covering Broadcast and short-wave bands, output meter, screw driver, dummy antennas of 200 MMF - 400 Ohms and .1MFD

The receiver and generator should be allowed to warm up for a few minutes. The volume control should be set at maximum and the sensitivities given are for .5 watt output.

The following chart gives connections and operations in their order for proper alignment of this receiver. The trimmer locations will be found on the circuit diagram.

Generator Frequency	Connection at Radio	Dummy Antenna	Range Switch	Dial Setting	Trimmers to Tune	Approx. Sensitivity
I.F. 456 K.C.	6SA7 Grid Center Stator of Var. Cond.	.1 MFD.	B.C.	H.F. End	I.F. Trimmers to Max.	65-75 M.V.
B.C. 1725 K.C.	Antenna	200 MMF.	"	H.F. End Limit of Travel	B. C. Oscillator	
1400 K. C.	"	"	"	1400 K.C. See Note "A"	B.C. Ant. & Loop Tune to Max.	5-6 M.V.
600 K. C.	"	"	"	Rock Rotor	Padder	5-6 M.V.
S.W. 15.2 M.C.	"	400 Ohm	S.W.	15.2 M.C.	S.W. Osc. & Ant. to Max.	40 M.V.
6.0 M.C.	"	"	"	6.0 M.C.	Check	20 M.V.

Issue A
August, 1940
Serial No.
100001 up

Note "A" - If the pointer is not at 1400 kc with a 1400 kc signal it may be loosened from the dial cord and moved to correct the calibration. This should be checked across the band to arrive at the optimum condition.

Note "B" - Care should be taken not to align on the image frequency. This may be checked by rotating the dial of the signal generator. Another signal should be heard at dial frequency plus 912 kc. This signal should be checked carefully on the short wave band, making sure the lowest frequency signal agrees with the dial setting in frequency and that it is the strongest of the two.

SPECIFICATIONS 1070-A

Watts input at 117 V. line: 52 Watts output: 1.7 Undistorted 2.7 Maximum

Selectivity at 1000 times signal - 34kc band width Intermediate frequency 456kc

Speaker 6 1/4" Electrodynamic, 1100 ohm field

Tuning Ranges:

Broadcast Band	540 to 1725 kc	25 Meter Band	10.8 to 12.1 mc
31 Meter Band	9.3 to 9.81 mc	19 Meter Band	14.9 to 15.5 mc

Sensitivity: For .5 watt output:

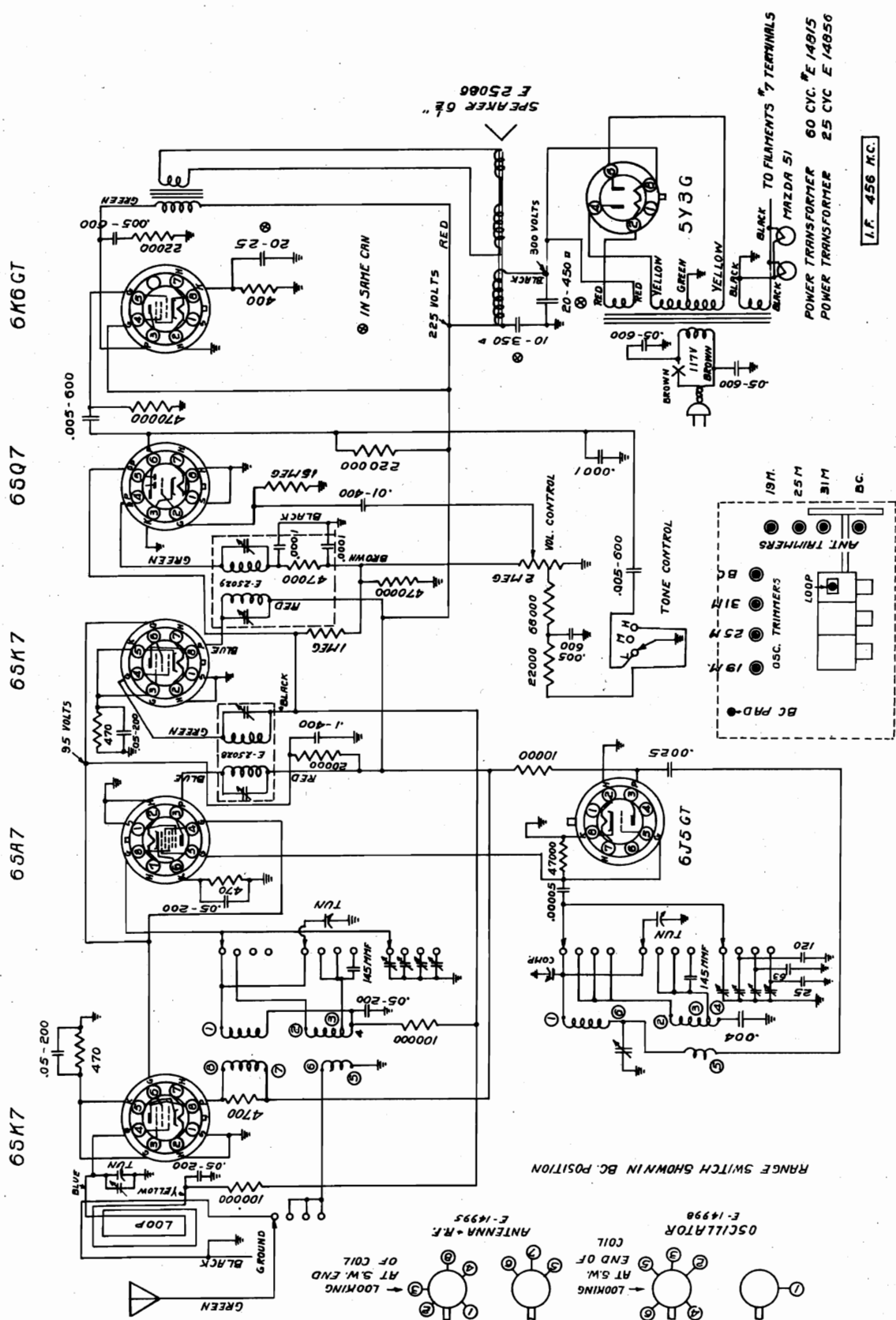
Broadcast Band	3 to 5 Microvolts	25 Meter Band	25 to 30 "
31 Meter Band	20 to 25 "	19 Meter Band	40 to 50 "

I. F. 456kc at 6SA7 grid (Stator of middle section of variable condenser) 65 to 70 Microvolts.

Tube Functions: 6SK7-R. F., 6SA7 first detector, 6J5GT oscillator, 6SK7 I. F. amplifier, 6SQ7 diode detector and first audio amplifier, 6K6GT power output tube, 5Y3G rectifier.

Generator Frequency	Connection at Radio	Dummy Antenna	Range Switch Setting	Dial Setting	Trimmers to Tune	Approx. Sensitivity .5 Watt O. P.
I. F. 456 k.c.	Center Stator of Var. Cond.	.1 Mfd.	B. C.	H. F. End	I. F. Trans. Tune to Max.	65 to 75 Mv.
B. C. 1725 k.c.	Ant.	200 Mmf.	B. C.	H. F. Limit of Travel	B. C. Osc.	—
1400 k.c.	"	"	"	1400— See Note "A"	B. C. Ant. " " Loop Tune to Max.	3-5 Mv.
600 k.c.	"	"	"	600— Rock Rotor	Padder	3-5 Mv.
31 M. Band 9.6 m.c.	"	400 Ohms.	31 M.	9.6 m. c.	31 M. Osc. 31 M. Ant. Tune to Max.	20-25 Mv.
25 M. Band 11.6 m.c.	"	"	25 M.	11.6 m. c.	25 M. Osc. 25 M. Ant. Tune to Max.	25-30 Mv.
19 M. Band 15.2 m.c.	"	"	19 M.	15.2 m. c.	19 M. Osc. 19 M. Ant. Tune to Max.	40-50 Mv.

GAMBLE-SKOGMO, INC.



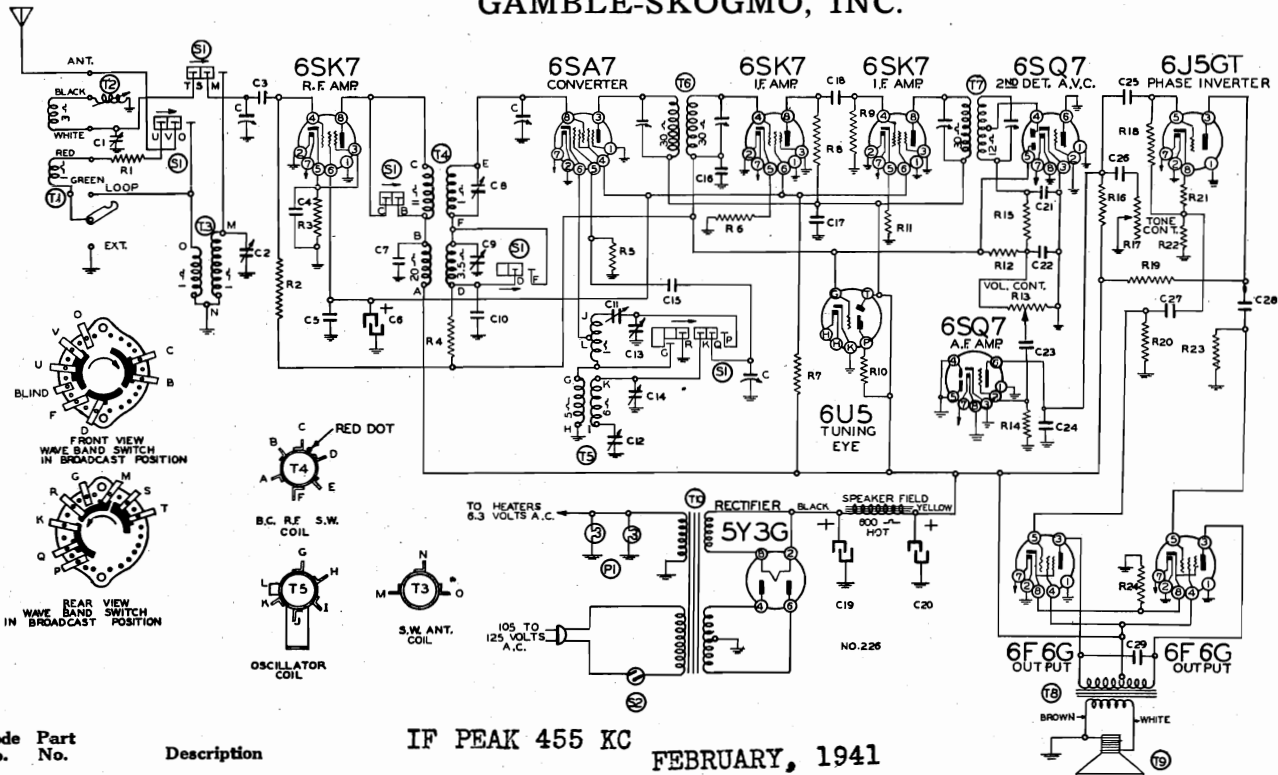
AT TOP OF CHASSIS
JULY, 1940
MODEL 1070 A
Serial numbers above 100,001
CIRCUIT DIAGRAM E 25140

I.F. 456 M.C.

TRIMMER LOCATIONS
LOOKING AT TOP OF CHASSIS

MODEL C1131

GAMBLE-SKOGMO, INC.



Code Part
No. No. Description

IF PEAK 455 KC

FEBRUARY, 1941

RESISTORS

R1	13024	400 ohms— $\frac{1}{4}$ w.
R2	13019	1 megohm— $\frac{1}{4}$ w.
R3	13099	300 ohms— $\frac{1}{4}$ w.
R4	1305	300M ohm— $\frac{1}{4}$ w.
R5	130208	40M ohm— $\frac{1}{4}$ w.
R6	13054	500 ohm— $\frac{1}{4}$ w.
R7	130304	12M ohm— $\frac{1}{4}$ w.
R8	130263	12M ohm— $\frac{1}{4}$ w.
R9	13020	100M ohm— $\frac{1}{4}$ w.
R10		1 megohm—in eye socket
R11	13054	500 ohm— $\frac{1}{4}$ w.
R12	130170	3 megohm— $\frac{1}{4}$ w.
R13	101214	Volume control (500M ohm)
R14	130225	15 megohm— $\frac{1}{4}$ w.
R15	13012	50M ohm— $\frac{1}{4}$ w.
R16	13011	250M ohm— $\frac{1}{4}$ w.
R17	101213	Tone control (1 megohm)
R18	13019	1 megohm— $\frac{1}{4}$ w.
R19	13020	100M ohm— $\frac{1}{4}$ w.
R20	1303	500M ohm— $\frac{1}{4}$ w.
R21	13043	2500 ohm— $\frac{1}{4}$ w.
R22	13020	100M ohm— $\frac{1}{4}$ w.
R23	1303	500M ohm— $\frac{1}{4}$ w.
R24	130311	300 ohm—1 w.

CONDENSERS

C	102129	Three gang variable condenser
C1	124132	B.C. antenna trimmer
C2	124117	S.W. antenna trimmer
C3	1292	.0005 mica
C4	10020	.1 x 200 v.
C5	100117	.25 x 400 v.
C6	119124	10 mfd. lytic—350 w. v.
C7	129160	.0004 mica
C8	124131	S.W. R.F. trimmer
C9	124131	B.C. R.F. trimmers
C10	10026	.02 x 400 v.
C11	129156	.0024 compression S.W. pad
C12	129157	.000525 compression B.C. pad
C13	124130	S.W. oscillator trimmer
C14	124130	B.C. oscillator trimmer
C15	12939	.00005 mica
C16	10026	.02 x 400 v.
C17	100117	.25 x 400 v.
C18	1292	.0005 mica
C19	119124	25 mfd. lytic—450 w. v.
C20	119124	25 mfd. lytic—450 w. v.
C21	1295	.0001 mica
C22	1295	.0001 mica
C23	10025	.02 x 600 v.
C24	12912	.00025 mica
C25	10026	.02 x 400 v.
C26	10011	.01 x 400 v.
C27	1009	.05 x 200 v.
C28	10013	.05 x 400 v.
C29	10071	.004 x 600 v.

TECHNICAL DATA

Power Consumption - - - - - 120 Watts

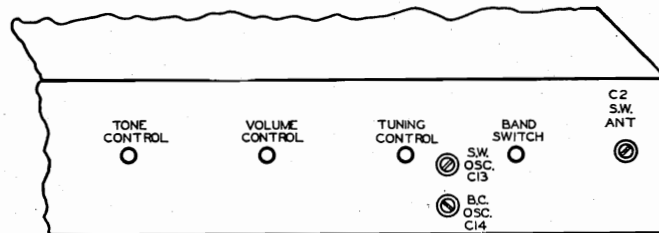
Power Output - - - - - 5 Watts Undistorted

Sensitivity for 500 Milliwatt Output: 6 Microvolts Average

Selectivity - 36 KC Broad at 1000 Times Signal at 1000 KC

Tuning Frequency Range Broadcast Band - 540 to 1580 KC

Short Wave Band - - - 5.5 to 18.5 MC



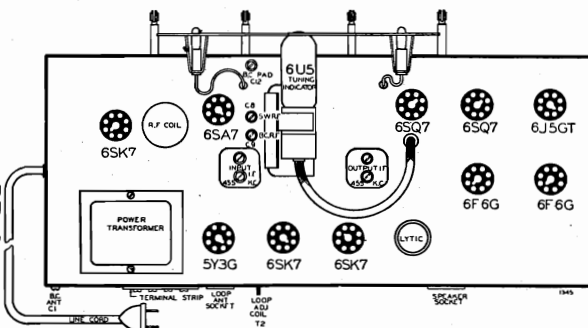
TRIMMER VIEW—FRONT OF CHASSIS

PARTS

T1	111240	Loop antenna assembly
T2	111153	Loop adjustable coil
T3	111176	S.W. antenna coil
T4	10957	B.C. S.W.—R.F. coil
T5	110149	B.C. S.W. oscillator coil
T6	108169I	Input I.F. 465 kc.
T7	108130D	Output I.F. 465 kc.
T8	10554B	Output transformer
T9	114192B	10" dynamic speaker (600 ohm field)
T10	104202	Power transformer
S1	125111	Wave band switch
S2		On-off switch on volume control
P1	10794	(2) pilot light bulbs T-44

C6, C19 and C20 in one unit
C8 and C9 in one unit
C13 and C14 in one unit

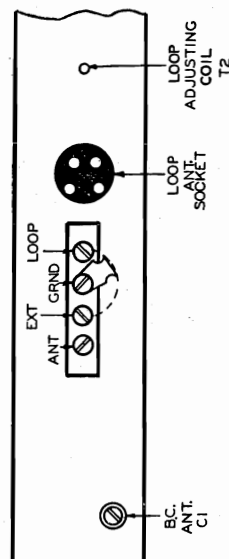
CHASSIS VIEW



ALIGNMENT PROCEDURE

- Volume control—Maximum all adjustments.
 - Connect radio ground to ground post of signal generator with a short heavy lead.
 - Connect dummy antenna value in series with generator output lead.
- The following equipment is required for aligning.
- An all wave signal generator which will provide an accurately calibrated signal at the test frequencies as listed.
 - Dummy antennas—1 mf., 200 mmf., 400 ohms.

BAND	SIGNAL GENERATOR Frequency Setting	Dummy Antenna	Connection to Radio	Position of Band Switch	Variable Condenser Setting	Trimmers Adjusted (in Order Shown)	Trimmer Function	Adjustment
I. F.	455 Kc.	.1 MFD.	Grid of 6SK7 I. F.	Broadcast	Rotor full open (Plates out of mesh)	Two trimmers on top	Output I. F.	Adjust to maximum output
	455 Kc.	.1 MFD.	Grid of 6SA7 Mixer	Broadcast	Rotor full open (Plates out of mesh)	Two trimmers on top	Input I. F.	Adjust to maximum output
SHORT WAVE BAND (See Note A)	17 Mc.	400 Ohms	External Antenna and Ground	Short Wave	Set Dial at 17 Mc.	Trimmer C13	Short Wave oscillator	Adjust to maximum output
	17 Mc.	400 Ohms	External Antenna and Ground	Short Wave	Set Dial at 17 Mc.	Trimmers C8, C2	Short Wave R. F. and S. W. Antenna	Adjust to maximum output
	6 Mc.	400 Ohms	External Antenna and Ground	Short Wave	Set Dial at 6 Mc.	Trimmer C11 (See voltage chart)	Short Wave oscillator series pad	Adjust to maximum rock dial. (See note "C")
BROADCAST BAND (See Note A)	1580 Kc.	200 mmf.	Grid of 6SK7 R. F. Tube	Broadcast	Rotor full open (Plates out of mesh)	Trimmer C14	Broadcast oscillator	Adjust to maximum output
	540 Kc.	200 mmf.	Grid of 6SK7 R. F. Tube	Broadcast	Set Dial at 540 Kc. (Plates in Mesh)	Trimmer C12	Broadcast oscillator series pad	Adjust to maximum output
	1400 Kc.	200 mmf.	Grid of 6SK7 R. F. Tube	Broadcast	Set Dial at 1400 Kc.	Trimmer C9	Broadcast R. F.	Adjust to maximum output
LOOP ALIGNMENT (See Note B)	1400 Kc.	200 mmf.	External Antenna and Ground	Broadcast	Set Dial at 1400 Kc.	Trimmer C1	Broadcast antenna	Adjust to maximum output
	600 Kc.	200 mmf.	External Antenna and Ground	Broadcast	Set Dial at 600 Kc.	Trimmer T2	Iron Core Tracking Coil	Adjust to maximum output

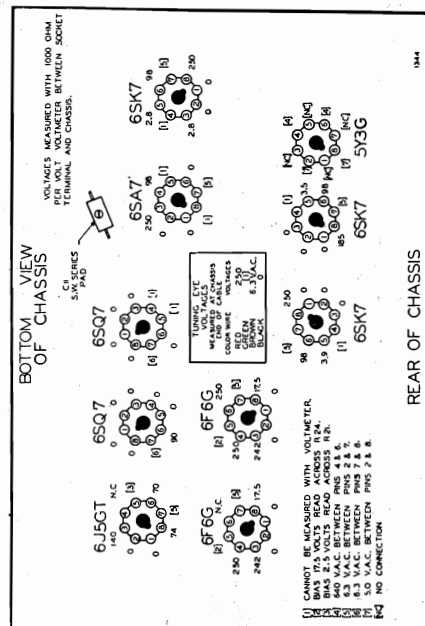


ANT. & GROUND TERMINALS—When using an external antenna and ground, move the metal strap shown above and fasten it under the screw marked "Ext."

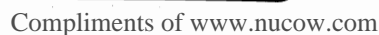
The antenna and ground wires should then be connected to the terminals marked "Ant." — "Grnd."

IMPORTANT—Loosen the screws which hold the chassis to the cabinet and pull out the shipping strips under the chassis—The chassis will then rest on its rubber cushions.

POWER SUPPLY—Unless your radio is marked otherwise, it must be operated from 105 to 125 volts, 50 to 60 cycle A.C. current. If in doubt, phone your electric light company. Receivers of this same model which are for use on special voltages are marked accordingly. When using your radio on A.C. current, reversing the plug may reduce station hum.



6B10-592X



GAMBLE-SKOGMO, INC.

ALIGNMENT PROCEDURE

Volume Control—Maximum All Adjustments.

Allow Chassis and Signal Generator to "Heat Up" for several minutes.

The following equipment is required for aligning:

A Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.

Output Indicating Meter—Non-Metallic Screwdriver.

Dummy Antennas—.1 mf., 200 mmf.

SIGNAL GENERATOR			DUMMY ANTENNA	CONDENSER SETTING	ADJUST TRIMMERS TO MAXIMUM
FREQUENCY SETTING	ANTENNA CONNECTION	GROUND CONNECTION			(See Trimmer Illustration below)
456 KC	External Antenna Clip on Loop	External Ground Clip on Loop	.1 mf.	Turn Rotor to full open	1st I.F. (C6) & (C7) 3rd I.F. (C13) & (C14)
1600 KC	External Antenna Clip	External Ground Clip	.1 mf.	Turn Rotor to full open	Oscillator (C3)
1400 KC	External Antenna Clip See Note A	External Ground Clip	200 mmf.	Turn Rotor to max. output	Antenna (C2)

SPECIFICATIONS

Input Voltages and Currents—Battery Operation

"A" Batteries..... 9 Volts—50 Ma.

"B" Batteries..... 90 Volts—11.5 Ma.

Power Consumption (At 117 volts AC Supply) 28 Watts

Power Output

Battery Operation - - - 150 Mw Undistorted
350 Mw Maximum

AC Operation - - - 200 Mw Undistorted
400 Mw Maximum

Selectivity - 50 KC Broad at 1000 Times Signal

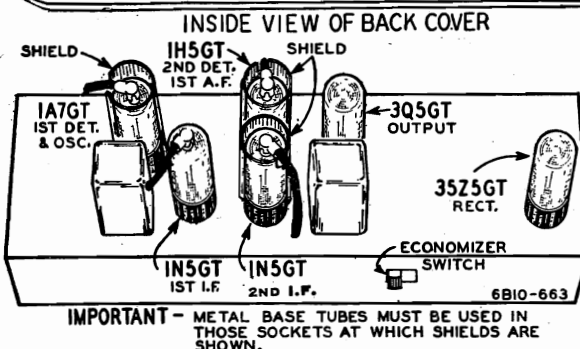
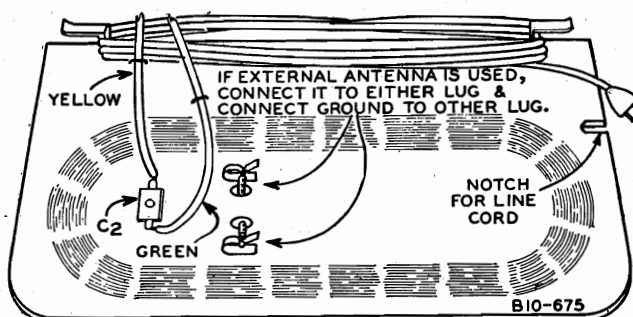
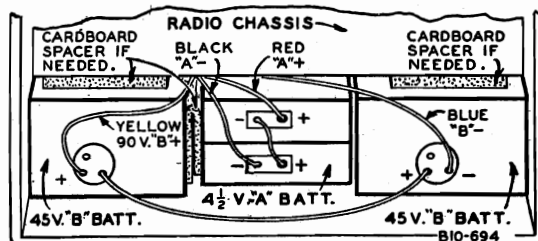
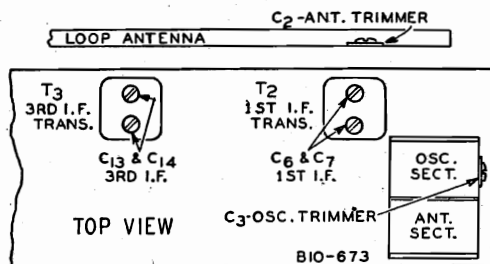
Intermediate Frequency - - - 456 KC

Speaker - - - 6" P.M. Dynamic

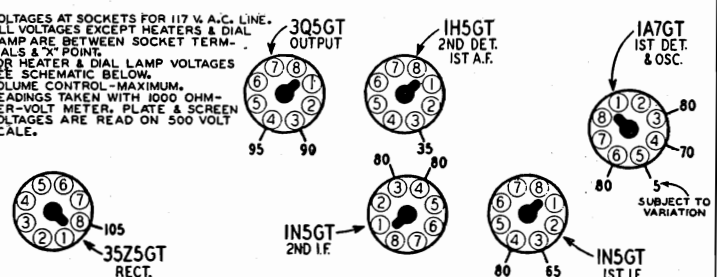
Tuning Frequency Range - - 540 to 1600 KC

Sensitivity (For 05 Watt Output)

External Antenna - - - 10 Microvolts Average



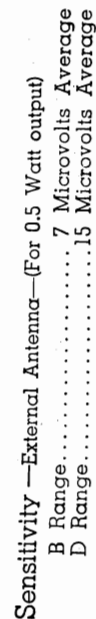
VOLTAGES AT SOCKETS FOR 117 V. A.C. LINE. ALL VOLTAGES EXCEPT HEATERS & DIAL LAMP ARE BETWEEN SOCKET TERMINALS & GROUND POINT. FOR HEATER & DIAL LAMP VOLTAGES SEE SCHEMATIC BELOW. VOLUME CONTROL—MAXIMUM. READINGS TAKEN WITH 1000 OHM PER-VOLT METER. PLATE & SCREEN VOLTAGES ARE READ ON 500 VOLT SCALE.



NOTE A—Re-assemble chassis in cabinet. Close back on cabinet.

CALIBRATION—To obtain dial scale calibration, tune in an 800 KC signal. The pointer should be at the 800 KC mark on the dial. If it is not, loosen pointer set screw and set the pointer at the 800 KC mark. Retighten set screw.

GAMBLE-SKOGMO, INC.



SPECIFICATIONS

Power Consumption 57 Watts (At 117 volts 60 cycles)
Power Output.....1.7 Watts Undistorted
2.5 Watts Maximum
Selectivity.....40 KC Broad at 1000 times Signal
Intermediate Frequency......456 KC
Speaker.....8" Electro-Dynamic

Sensitivity—External Antenna—(For 0.5 Watt output)

B Range.....	7 Microvolts	Average
D Range.....	15 Microvolts	Average

Speaker 8" Electro-Dynamic

GAMBLE-SKOGMO, INC.

ALIGNMENT PROCEDURE

Volume Control—Maximum All Adjustments.

Connect Radio Chassis to Ground Post of Signal Generator with a Short Heavy Lead.

Allow Chassis and Signal Generator to "Heat Up" for several minutes.

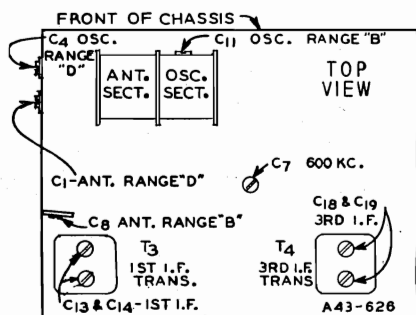
The following equipment is required for aligning:

An All Wave Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.

Output Indicating Meter—Non-Metallic Screwdriver.

Dummy Antennas—.1 mf., 100 mmf., and 400 ohms.

SIGNAL GENERATOR FREQUENCY SETTING	CONNECTION AT RADIO	DUMMY ANTENNA	BAND SWITCH SETTING	CONDENSER SETTING	ADJUST TRIMMERS TO MAXIMUM
Console Model—It is not necessary to remove chassis from cabinet. Merely remove chassis mounting screws so that chassis may be turned to reach oscillator trimmer on gang condenser.					
I.F.					
456 KC	Grid of 1st Det.	.1 mf.	B Range	Turn Rotor to Full Open	1st I.F. (C13) & (C14) 3rd I.F. (C18) & (C19)
RANGE B					
1600 KC	External Antenna Clip or Lead	100 mmf.	B Range	Turn Rotor to Full Open	Oscillator Range B (C11)
1400 KC	External Antenna Clip or Lead	100 mmf.	B Range	Turn Rotor to Max. Output Set Indicator to 1400 KC— See Note A	Ant. Range B (C8)
600 KC	External Antenna Clip or Lead See Note B	100 mmf.	B Range	Turn Rotor to Max. Output	600 KC (C7) Rock Rotor—See Note C
RANGE D					
18,300 KC	External Antenna Clip or Lead	400 Ohm	D Range	Turn Rotor to Full Open	Oscillator Range D (C4)
17,000 KC	External Antenna Clip or Lead	400 Ohm	D Range	Turn Rotor to Max. Output	Ant. Range D (C1) Rock Rotor—See Note C
LOOP RANGE B					
1400 KC	External Antenna Clip or Lead See Note D	100 mmf.	B Range	Turn Rotor to Max. Output	Ant. Range B (C8)



Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.
After each range is completed, repeat the procedure as a final check.

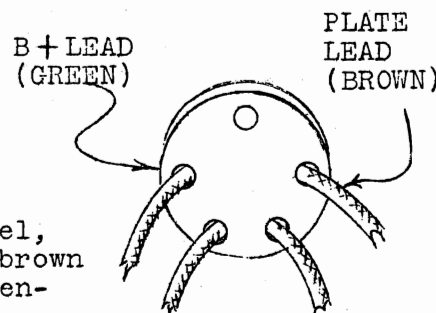
NOTE A—If the pointer is not at 1400 KC on the dial, remove pointer from drive cord. Tune in a 1400 KC signal. Set pointer at the 1400 KC mark on the dial scale. Attach pointer to drive cord.

NOTE B—(Table Model) By means of wooden blocks, stand the loop aerial assembly upright exactly 4 inches from the back of the chassis.

NOTE C—Turn the rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.

NOTE D—(Table Model) Re-assemble chassis in cabinet. Replace back on cabinet. Connect ground post of signal generator to external ground clip on loop antenna (Table Model) or ground screw on chassis (Console Model).

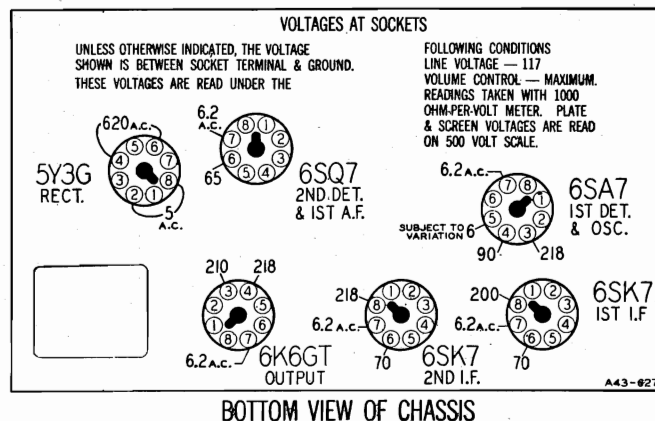
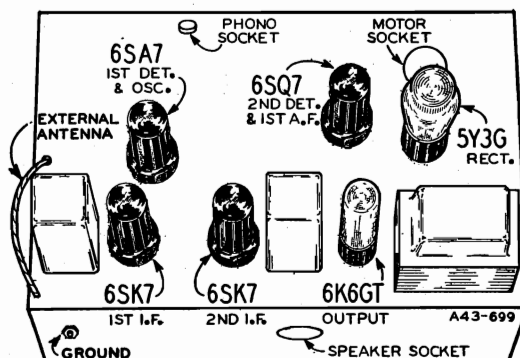
CAUTION—When aligning the short wave band, be sure NOT to adjust at the image frequency. This can be checked as follows: Let us say the signal generator is set for 15,000 KC. The signal will then be heard at 15,000 on the dial of the radio. The image signal, which is much weaker, will be heard at 15,000 less 912 KC, or 14,088 KC on the dial. It may be necessary to increase the input signal to hear the image.



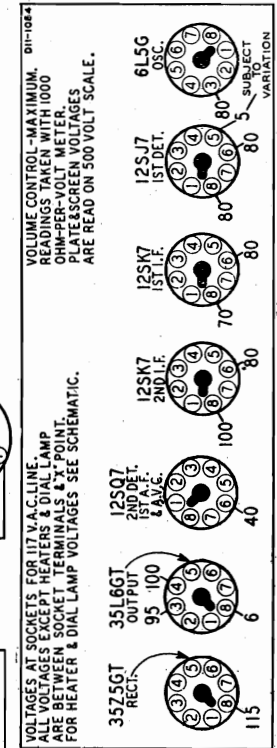
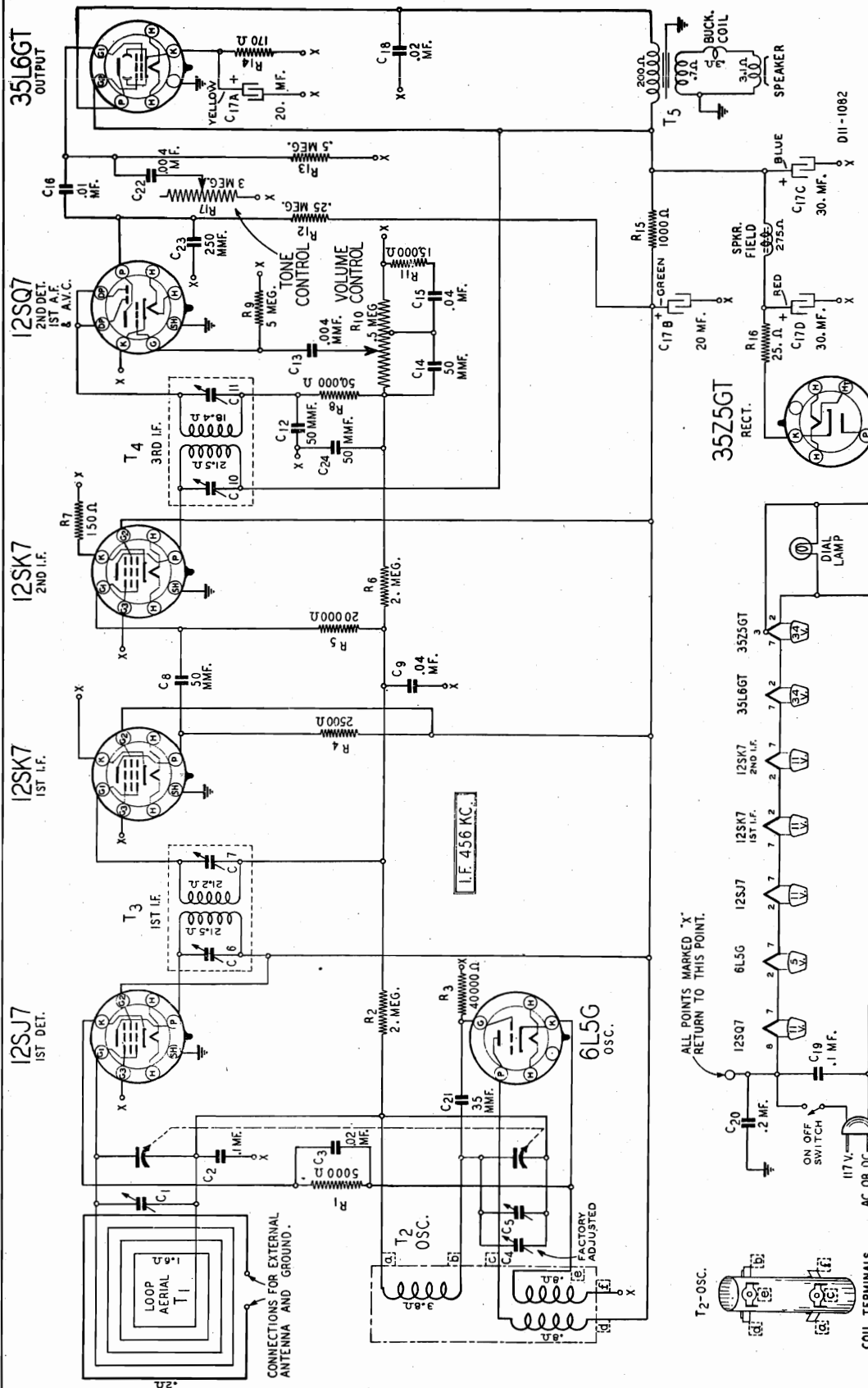
SPEAKER PLUG
(Rear View)

In a few cases in the first shipments of this model, some of the speakers had reversed green lead and brown lead connections at the speaker plug. If hum is encountered, check these connections.

The illustrations below show the correct connections for the green (B+) and brown (plate) speaker leads.



BOTTOM VIEW OF CHASSIS



GAMBLE-SKOGMO, INC.

MODEL 3128, Late
MODEL 4132

MODEL 4132 ALIGNMENT PROCEDURE

Volume Control—Maximum All Adjustments.

Connect Radio Chassis to Ground Post of Signal Generator with a Short Heavy Lead.

Allow Chassis and Signal Generator to "Heat Up" for several minutes.

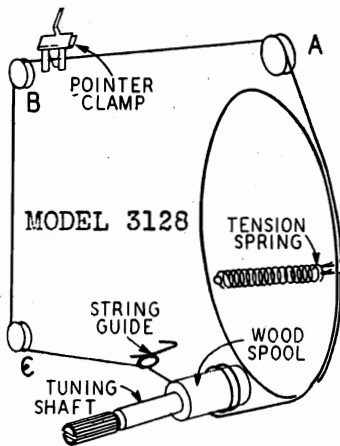
The following equipment is required for aligning:
An All Wave Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.Output Indicating Meter—Non-Metallic Screwdriver.
Dummy Antennas—.1 mf., 200 mmf., and 400 ohms.

SIGNAL GENERATOR						
	FREQUENCY SETTING	CONNECTION AT RADIO	DUMMY ANTENNA	BAND SWITCH	CONDENSER SETTING	ADJUST TRIMMERS TO MAXIMUM
I. F.						1st I.F. (C13) & (C14) 2nd I.F. (C15) & (C16) 3rd I.F. (C22)
	456 KC	Grid of 1st Det.	.1 mf.	B Range	Turn Rotor to Full Open	
RANGE B	1610 KC	Antenna Lead	200 mmf.	B Range	Turn Rotor to Full Open	Oscillator Range B (C8)
	1500 KC	Antenna Lead	200 mmf.	B Range	Turn Rotor to Max. Output Set Indicator to 1500 KC— See Note A	1st Ant. Range B (C11) 2nd Ant. Range B (C10)
	600 KC	Antenna Lead	200 mmf.	B Range	Turn Rotor to Max. Output	600 KC (C5) Rock Rotor—See Note B
RANGE D	18,300 KC	Antenna Lead	400 Ohm	D Range	Turn Rotor to Full Open	Oscillator Range D (C7)
	16,000 KC	Antenna Lead	400 Ohm	D Range	Turn Rotor to Max. Output	Ant. Range D (C9) Rock Rotor—See Note B
	6000 KC	Antenna Lead	400 Ohm	D Range	Turn Rotor to Max. Output	6000 KC (C4) Rock Rotor—See Note B

After each range is completed, repeat the procedure as a final check.

NOTE A—If the pointer is not at 1500 KC on the dial, remove pointer from drive cord. Set pointer at the 1500 KC mark on the dial scale. Attach pointer to drive cord.

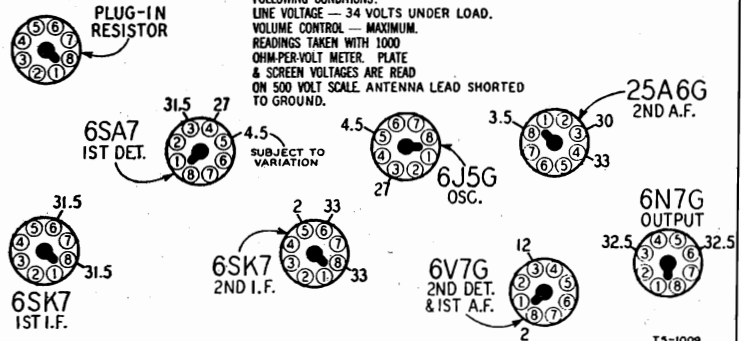
NOTE B—Turn the rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.



DRIVE CORD REPLACEMENT

Turn gang condenser to full open position. Using a new drive cord 50" in length, attach one end to tension spring. Fasten other end of tension spring to hook on drive pulley. Pass cord through slot in pulley rim and around idler pulleys A, B and C as shown. Pass cord through string guide.

VOLTAGES AT SOCKETS

UNLESS OTHERWISE INDICATED, THE VOLTAGE SHOWN IS BETWEEN SOCKET TERMINAL & GROUND. THESE VOLTAGES ARE READ UNDER THE FOLLOWING CONDITIONS:
LINE VOLTAGE — 34 VOLTS UNDER LOAD.
VOLUME CONTROL — MAXIMUM.
READINGS TAKEN WITH 1000 OHM-PER-VOLT METER. PLATE & SCREEN VOLTAGES ARE READ ON 500 VOLT SCALE. ANTENNA LEAD SHORTED TO GROUND.

MODEL 4132

TS-1009

MODEL 3128

ALIGNMENT PROCEDURE

Volume Control—Maximum All Adjustments.

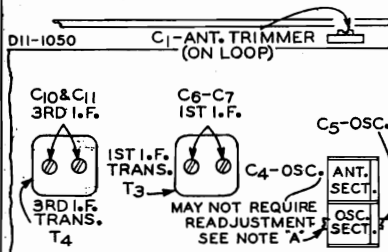
Allow Chassis and Signal Generator to "Heat-Up" for several minutes.

The equipment in column at right is required for aligning:

Signal Generator which will provide an accurately calibrated signal at test frequencies as listed.

Output Indicating Meter; Non-Metallic Screwdriver.

Dummy Antennas—.1 mf., 200 mmf.



SPECIFICATIONS

Power Consumption 28 Watts
(At 117 volts AC Supply)Power Output75 Watt Undistorted
1.3 Watts Maximum

Selectivity... 49 KC Broad at 1000 times Signal

Intermediate Frequency..... 456 KC

Speaker 5" Electro-Dynamic

Tuning Frequency Range 528 to 1610 KC

Sensitivity (For .05 watt output)—External Ant.
9 Microvolts Average

SIGNAL GENERATOR					ADJUST TRIMMERS TO MAXIMUM (See Trimmer Illustration)
FREQUENCY SETTING	ANTENNA CONNECTION	GROUND CONNECTION	DUMMY ANTENNA	CONDENSER SETTING	
I.F. 456 KC	Signal Grid of 1st Det. Connect at Stator of Large Gang Section.	Point "X" 125Q7— 1st A.F. } Prong No. 3 }	.1 n.f.	Turn Rotor to Full Open	1st I.F. (C6) & (C7) 3rd I.F. (C10) & (C11)
1610 KC	Signal Grid of 1st Det.	Point "X"	.1 mf.	Turn Rotor to Full Open	Oscillator (C5) See Note A
1400 KC	External Antenna Clip	Point "X"	200 mmf.	Turn Rotor to Max. Output Set Indicator to 1400 KC— See Note B	Antenna (C1)

After each range is completed, repeat the procedure as a final check.

NOTE A—Adjust Oscillator (C5) trimmer on gang condenser. Oscillator (C4) auxiliary trimmer on other

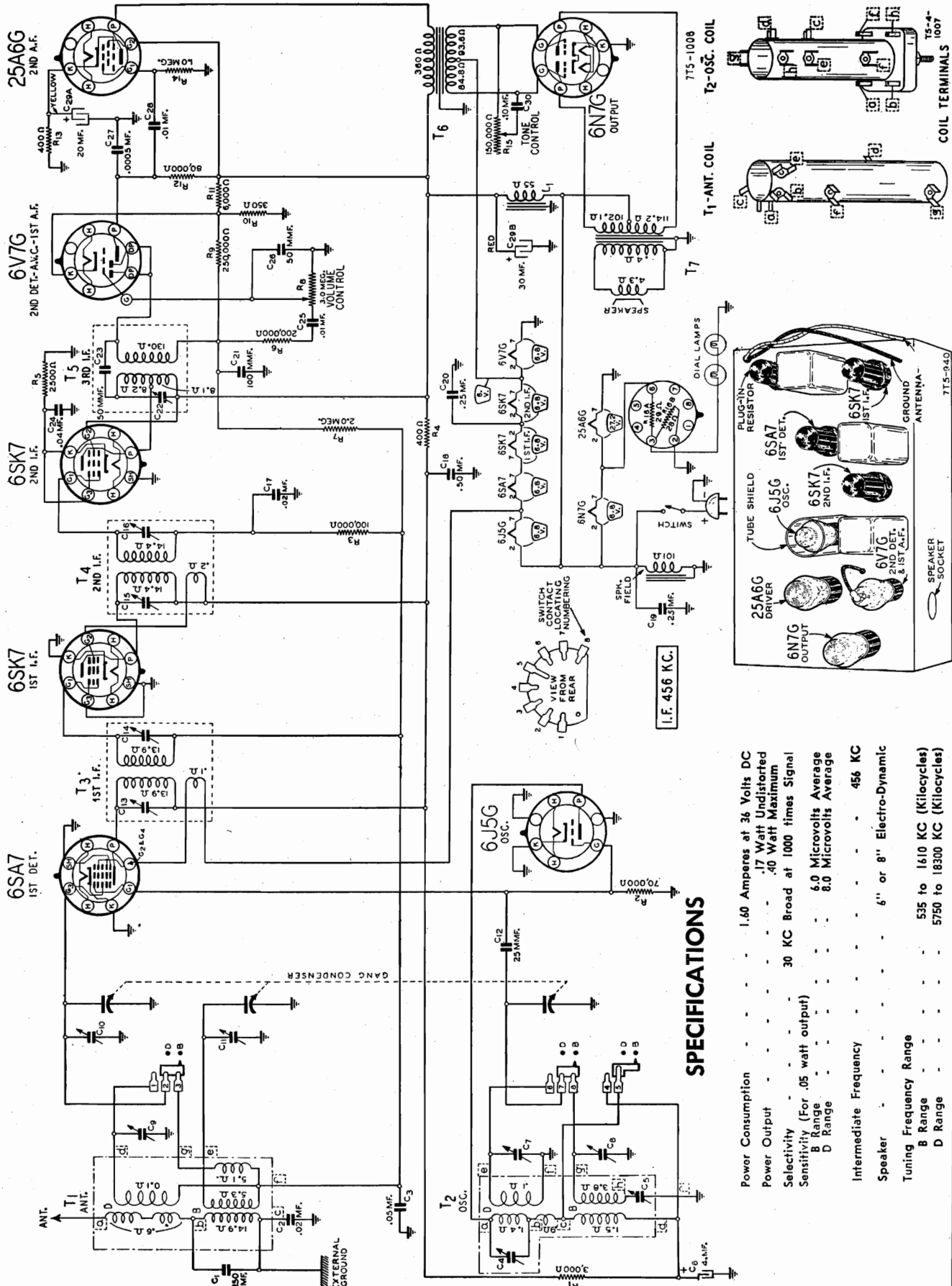
side of gang is adjusted at factory and ordinarily need not be readjusted in the field.

NOTE B—If the pointer is not at 1400 KC on the dial, set pointer at this mark on the dial scale.

MODEL 3128

MODEL 4132

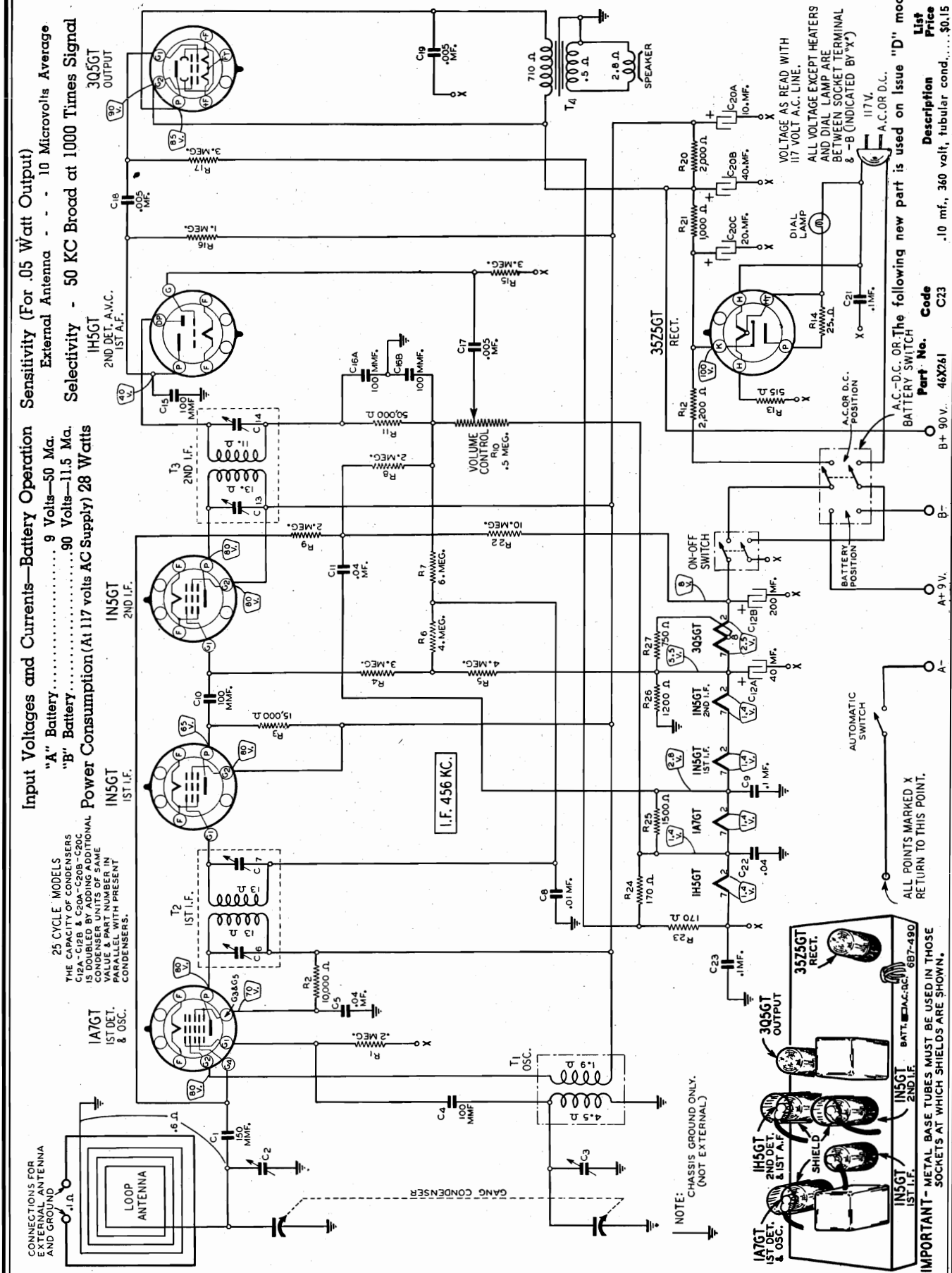
GAMBLE-SKOGMO, INC.



SPECIFICATIONS

Power Consumption	1.60 Amperes at 36 Volts DC
Power Output	.17 Watt Undistorted .40 Watt Maximum
Selectivity	30 KC Broad at 1000 times Signal
Sensitivity (For .05 watt output)	6.0 Microvolts Average B Range 8.0 Microvolts Average D Range
Intermediate Frequency	456 KC
Speaker	6" or 8" Electro-Dynamic
Tuning Frequency Range	535 to 1610 KC (Kilocycles) B Range 5750 to 18300 KC (Kilocycles) D Range

GAMBLE-SKOGMO, INC.



Take out the 2 screws, one at each side on the outside of the cabinet. Grasp the chassis shelf at each rear corner and edge it away from the cabinet front until the chassis shelf and chassis slide easily out of the cabinet.

To remove the shelf from the chassis, take out the bolt and the 2 screws at the bottom of the shelf.

Using Radio Without Batteries—
The radio may be used without batteries when it is operated on AC-DC. If this is done, tape the prongs of the battery plugs to prevent them from accidentally touching each other, and place the plugs and cables in the battery compartment.

The metal chassis is connected to one side of the line through a .10 microfd. condenser. Both AC and DC power lines are generally grounded on one side. If the side of the line not connected to the metal chassis through this condenser is grounded and the metal chassis comes in contact with an external ground, this condenser will be connected across the line and there will be an increase in hum.

Therefore, in any service work on the chassis, keep it on a wood or other insulated surface to avoid contacting with ground. The person working on the set should avoid getting in contact with any ground.

CHANGES MADE FOR ISSUE "D" March 11, 1940

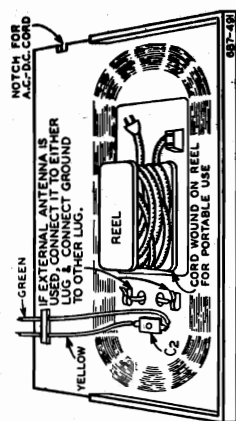
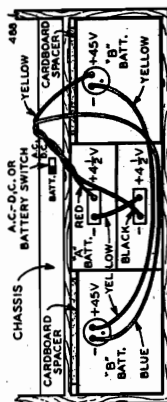
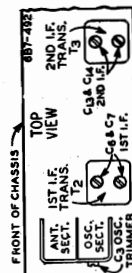
To satisfy additional Underwriters requirements, the chassis has been isolated from the AC-DC line except for a connection through a .1 mf. condenser - See schematic On these models the battery wires are held by a clamp located under the chassis shelf. On previous issues this clamp was above the shelf. The battery compartment cardboard fillers have been made smaller to clear the above mentioned clamp.

On chassis with the above changes incorporated, the issue letter becomes "p."

ALL voltages on this issue chassis except the heaters and radial lamp are measured between socket terminal and B- (indicated by "X") - See schematic

NOTE A—Chassis must be in cabinet. Connect a loop approximately one foot in diameter across the antenna and ground posts of the signal generator. The back of the cabinet must be in place. Place radio approximately 3 feet from loop so as to pick up signal. Radio should not be in proximity to any metal (metal bench, etc.).

CALIBRATION [For models with pointer in front of dial scale]—To obtain dial scale calibration, tune in an 800 KC signal. The pointer should be at the 800 KC mark on the dial. If it is not, hold the pulley at the back of the dial and loosen the pointer screw. Set the pointer at the 800 KC mark. Hold the pointer and retighten the pointer screw.



ALIGNMENT PROCEDURE

Volume Control—Maximum All Adjustments.

Connect Radio Chassis to Ground Post of Signal Generator with a Short Heavy Lead.

Allow Chassis and Signal Generator to "Heat Up" for several minutes.

The following equipment is required for aligning:

A Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.

Output Indicating Meter—Non-Metallic Screwdriver.

Dummy Antenna—1 mf.

SIGNAL GENERATOR		DUMMY ANTENNA	CONDENSER SETTING	ADJUST TRIMMERS TO MAXIMUM (See Trimmer illustration below and illustration of Back—Page 1)
FREQUENCY SETTING	CONNECTION AT RADIO			
455 KC	Signal Grid of 1st Det. (Top Cap)	.1 mf.	Turn Rotor to full open	1st L.F. (C4) & (C7) 2nd L.F. (C13) & (C14)
1600 KC	Signal Grid of 1st Det.	.1 mf.	Turn Rotor to full open	Oscillator (C3)
1500 KC	None—See Note A		Turn Rotor to max. output	Antenna (C3)

Series 6B7

CHANGES MADE FOR ISSUE "B"

To satisfy Underwriter's requirements, the chassis issue will become "B" when several changes in the routing of wires and the arrangement of parts in the chassis have been made.

Chassis with these changes have had the 6 lug terminal strip 4A98 removed.

**PROLONGING TUBE LIFE
CHANGES FOR ISSUE "C"**

Jan. 3, 1940

To compensate for variations in tube characteristics as well as high line voltages, the following changes have been made in the filament series circuit to reduce the voltages across the tube filaments and to prolong tube life.

Resistor R12, which is in series with the filament series, has been changed from 1950 ohms to 2200 ohms.

There was unequal emission from the 2 sections of the filament of the 3Q5GT output tube. This caused unequal voltages across the 2 sections of the filament and shortened the tube life. There is now a 750 ohm resistor (R27) across one section which equalizes the currents through both portions.

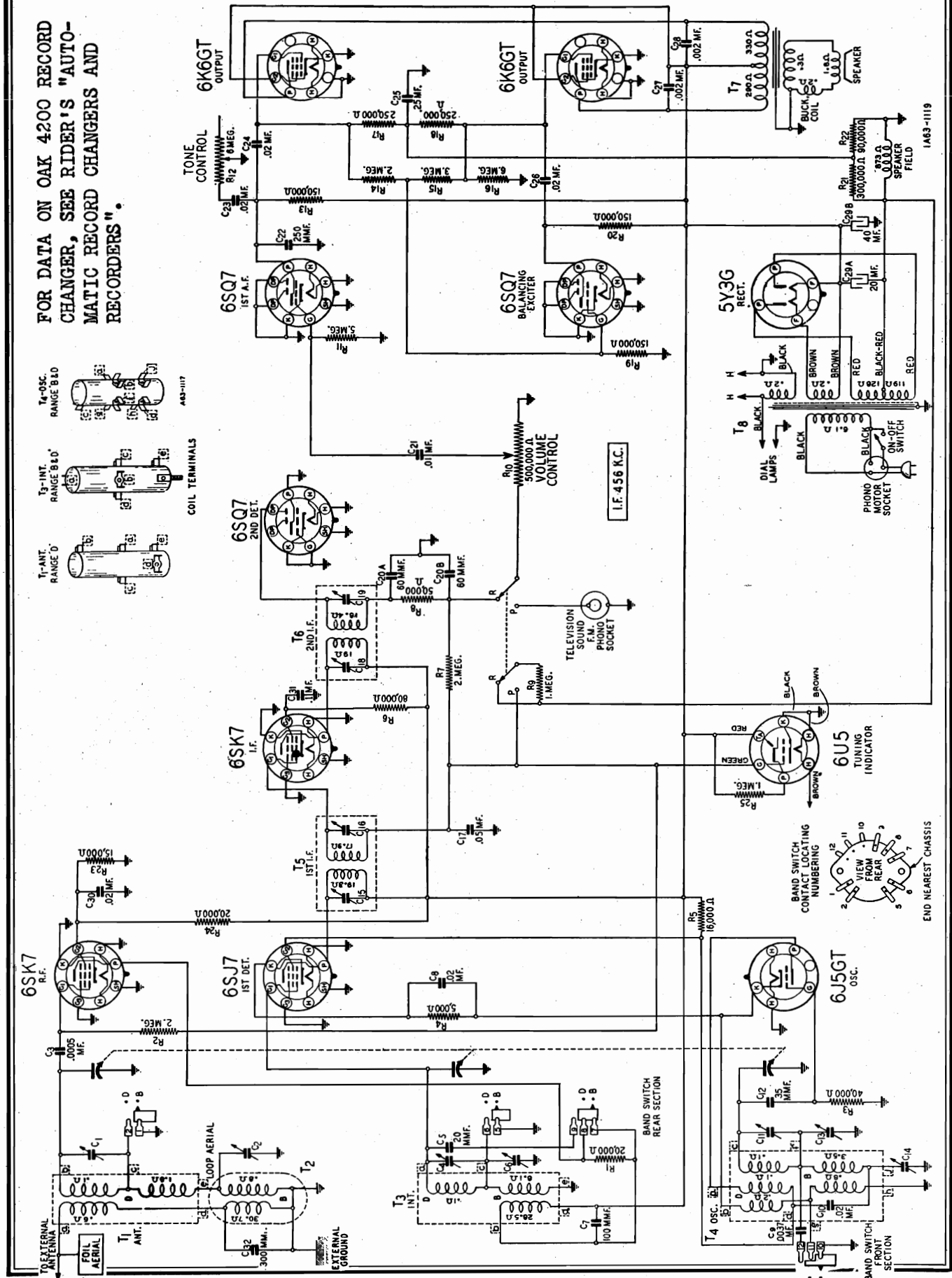
The four $1\frac{1}{2}$ volt tube filaments were shunted with 1200 ohms - Resistors R19 - 800 ohms and R18 400 ohms (See old schematic). The connecting point between these 2 resistors established the grid (bias) voltage for the output tube. These 4 tubes are now shunted by one 1200 ohm Resistor R26.

The 1A7GT 1st Detector Filament is now shunted with a 1500 ohm resistor - R25.

The 1H5GT 2nd Detector filament is now shunted with 340 ohms - Resistors R24 and R23 in series. The connecting point between these two resistors establishes the grid (bias) voltage for the output tube.

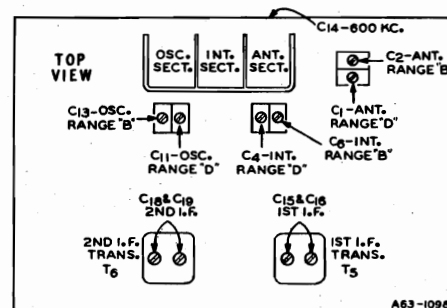
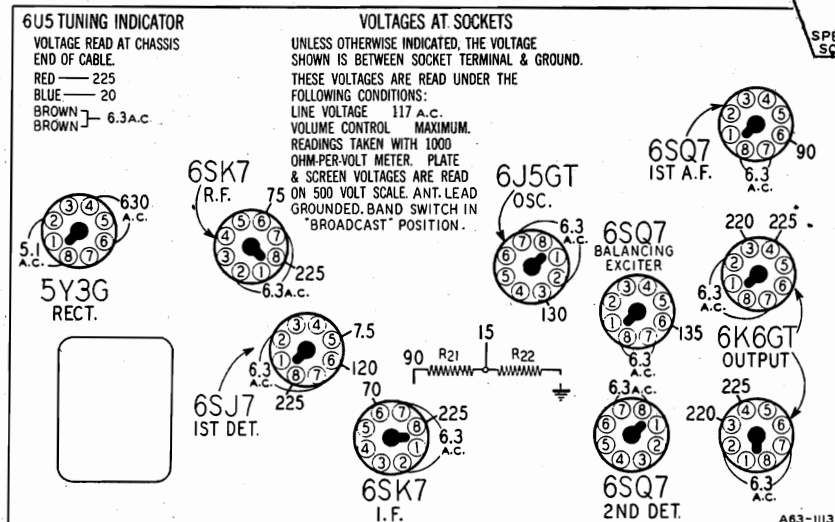
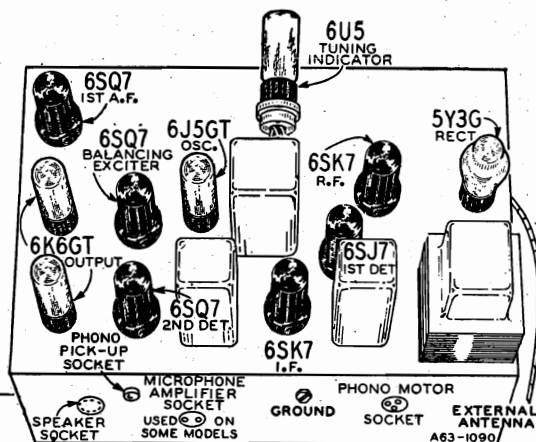
GAMBLE-SKOGMO, INC.

FOR DATA ON OAK 4200 RECORD CHANGER, SEE RIDER'S "AUTOMATIC RECORD CHANGERS AND RECORDERS".



SPECIFICATIONS

Power Consumption	-	85 Watts (At 117 volts 60 cycles)
	-	105 Watts (Phonograph Operating)
Power Output	- - - - -	4 Watts Undistorted
	- - - - -	5.5 Watts Maximum
Selectivity	- - -	35 KC Broad at 1000 times Signal
Intermediate Frequency	- - - - -	456 KC
Speaker	- - - - -	8", 10" or 12" Electro-Dynamic
Tuning Frequency Range		
B Range	- - - - -	535 to 1610 KC
D Range	- - - - -	5.35 to 18.3 MC
Sensitivity—External Antenna—(For 0.5 Watt output)		
B Range	- - - - -	2.0 Microvolts Average
D Range	- - - - -	4.0 Microvolts Average



Turn gang condenser to open position. Use new drive cord 55" in length.

Secure one end of tension spring to hook on drive pulley. Bend spring around drive pulley shaft—see illustration. Pass cord through slot in

pulley rim. Wind cord $\frac{1}{4}$ turn clockwise (from drive pulley and of chassis) around drive pulley. Pass cord over top of idler pulleys A, C and D (see illustration). Then wind cord $2\frac{1}{2}$ turns clockwise (from front of chassis) around tuning shaft spool. These turns should progress away from chassis. Pass cord over top of drive pulley for $\frac{1}{4}$ turn clockwise (from drive pulley and of chassis) and through slot in pulley rim. Fasten cord to tension spring—see illustration.

NOTE A—If the pointer is not at 1400 KC on the dial, remove pointer from drive cord. Set pointer at the 1400 KC mark on the dial scale. Attach pointer to drive cord.

NOTE B—Turn the rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.

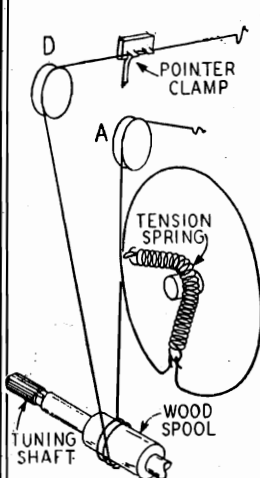
Volume Control—Maximum All Adjustments.

Connect Radio Chassis to Ground Post of Signal Generator with a Short Heavy Lead.

Allow Chassis and Signal Generator to "Heat Up" for several minutes.

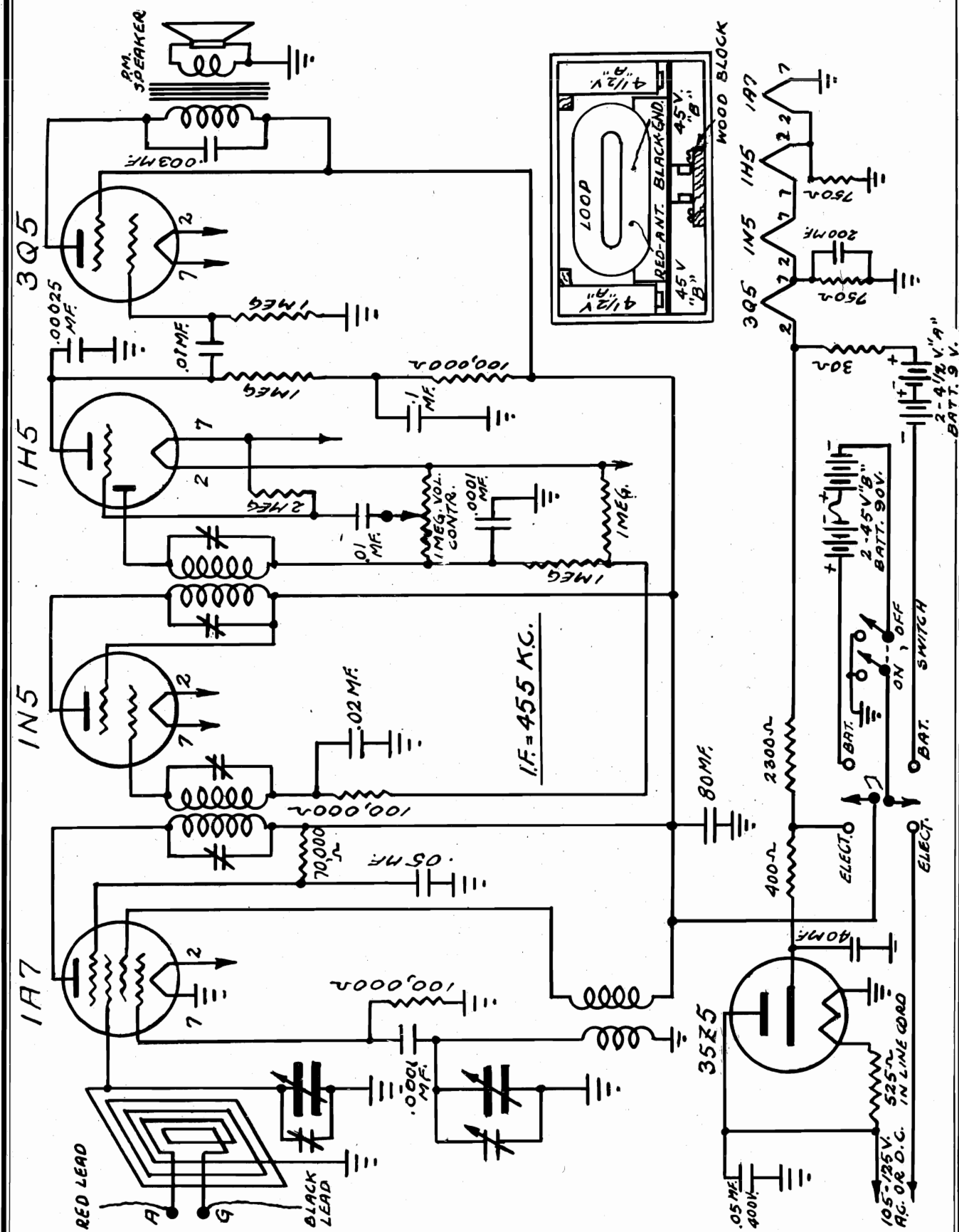
The following equipment is required for aligning:
An All Wave Signal Generator which will provide
an accurately calibrated signal at the test fre-
quencies as listed.

Dummy Antennas—1 mf., 100 mmf., and 400 ohms.



SIGNAL GENERATOR		DUMMY ANTENNA	BAND SWITCH SETTING	CONDENSER SETTING	ADJUST TRIMMERS TO MAXIMUM	
FREQUENCY SETTING	CONNECTION AT RADIO					
I.F.	456 KC	Signal Grid of 1st Det.	.1 mf.	B Range	Turn Rotor to Full Open	1st I.F. (C15) & (C16) 2nd I.F. (C18) & (C19)
RANGE D	18,300 KC	Antenna Lead	400 Ohm	D Range	Turn Rotor to Full Open	Oscillator Range D (C4)
	17,000 KC	Antenna Lead	400 Ohm	D Range	Turn Rotor to Max. Output	Ant. Range D (C1) Int. Range D (C4) Rock Rotor—See Note B
RANGE B	1610 KC	Antenna Lead	100 mmf.	B Range	Turn Rotor to Full Open	Oscillator Range B (C13)
	1400 KC	Antenna Lead	100 mmf.	B Range	Turn Rotor to Max. Output Set Indicator to 1400 KC— See Note A	Ant. Range B (C2) Int. Range B (C6)
	600 KC	Antenna Lead	100 mmf.	B Range	Turn Rotor to Max. Output	600 KC (C14) Rock Rotor—See Note B
LOOP RANGE R	1400 KC	Antenna Lead	100 mmf.	B Range	Turn Rotor to Max. Output	Ant. Range B (C2)

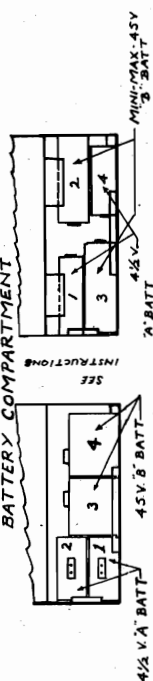
GAROD RADIO CORP.



REAR VIEW OF CABINET SHOWING

BAND RANGE FREQUENCY METERS

REAR VIEW OF CABINET SHOWING
BATTERY COMPARTMENT

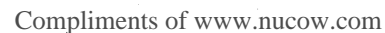


BAND	RANGE	METERS
3- SW.	5.9 - 18.2 mc	50.8-166.5
2- BDC:ST	54.5 - 1350 kc	550'-193
1- LW	140 - 370 kc	2140'-810

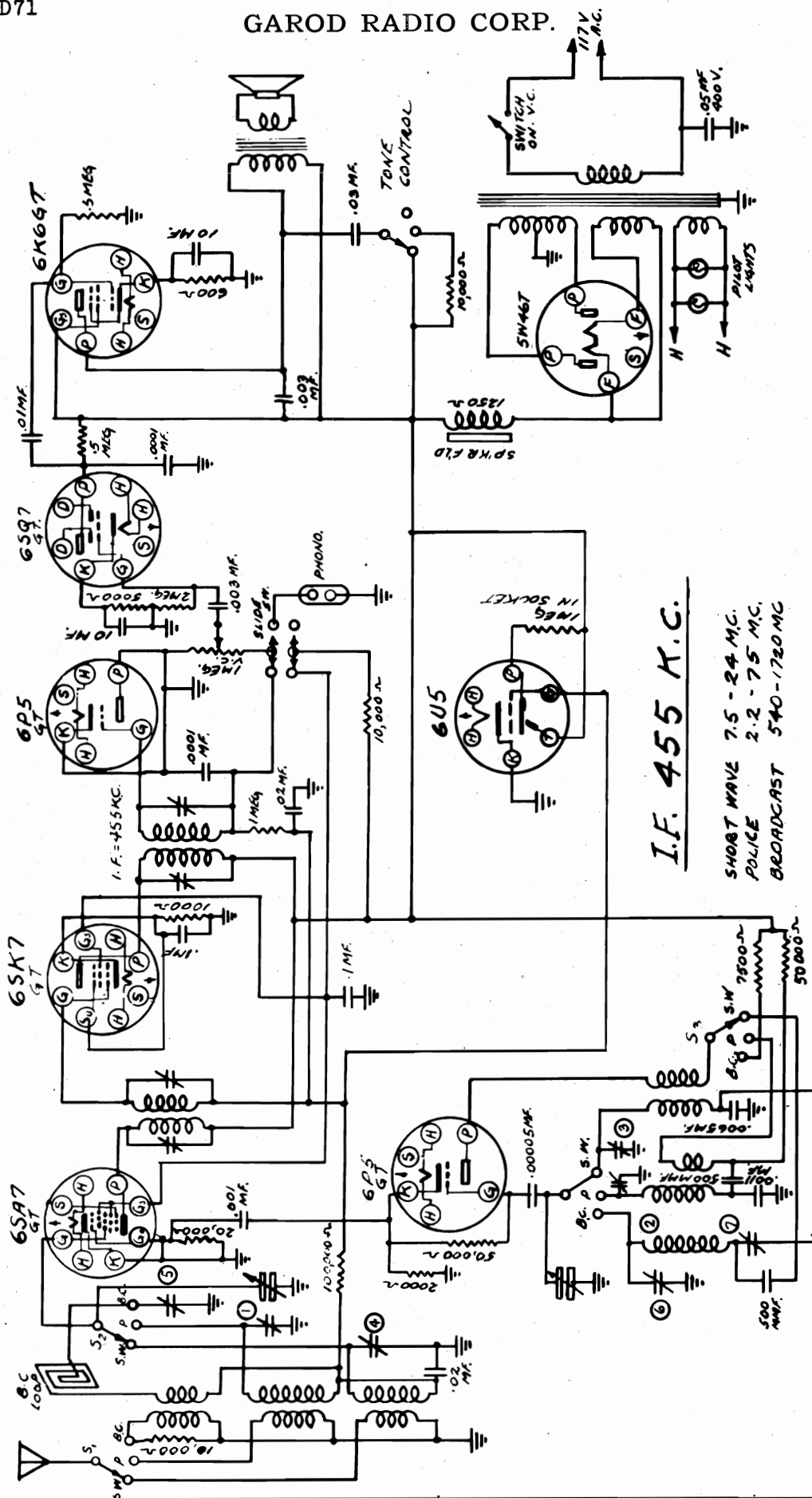
SWITCH POSITIONS 1, 2, & 3 ARE GANGED
ON BAND SWITCH

I.F. 455

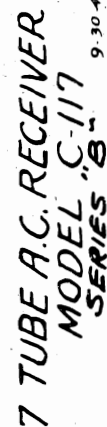
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**2 V
A.C.**



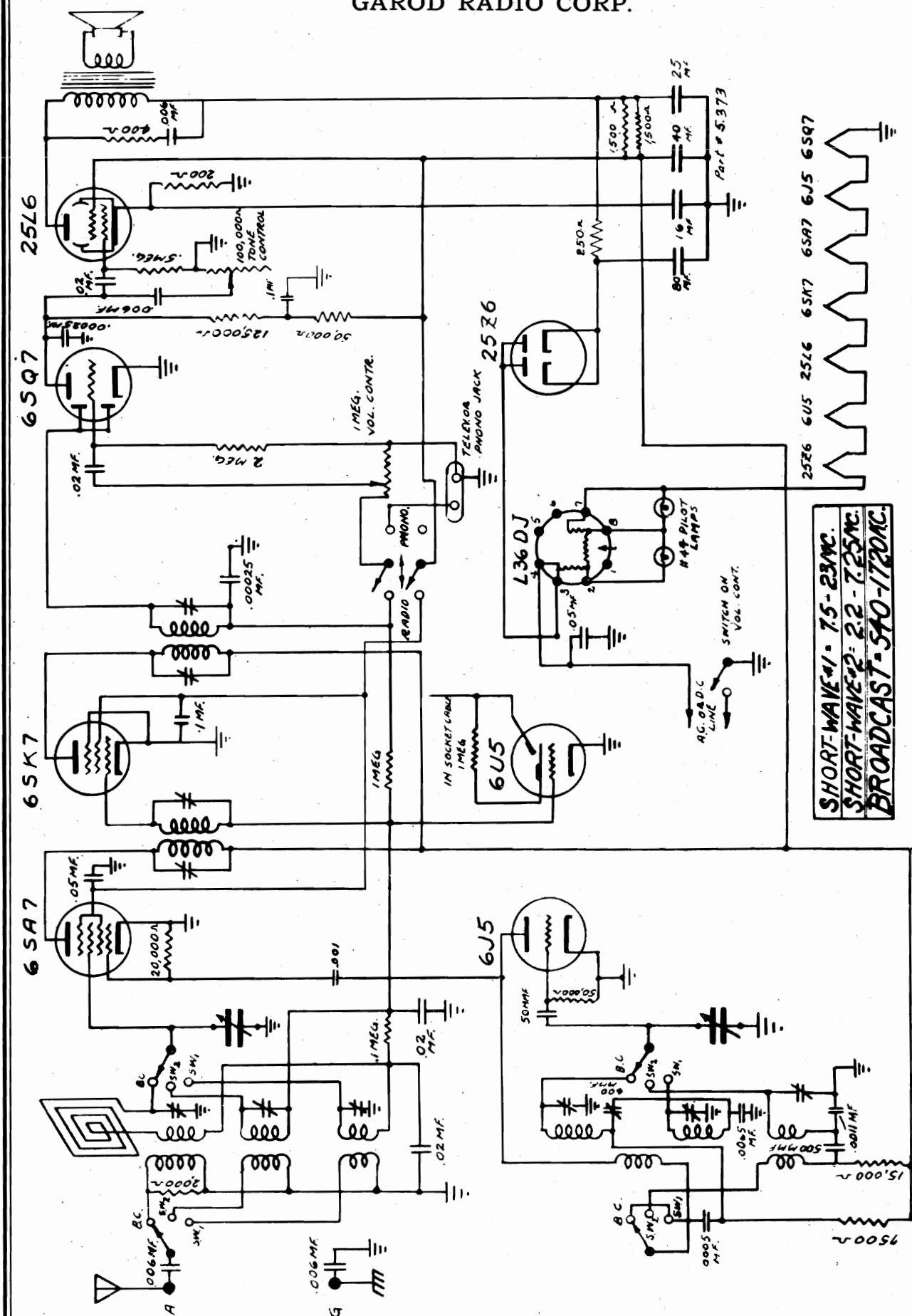
MODEL C117



SHORT WAVE / = 7.5 - 24 MC.
POLICE (S.W.2) = 2.2 - 7.5 MC.
BROADCAST = 540 - 1720 KC.

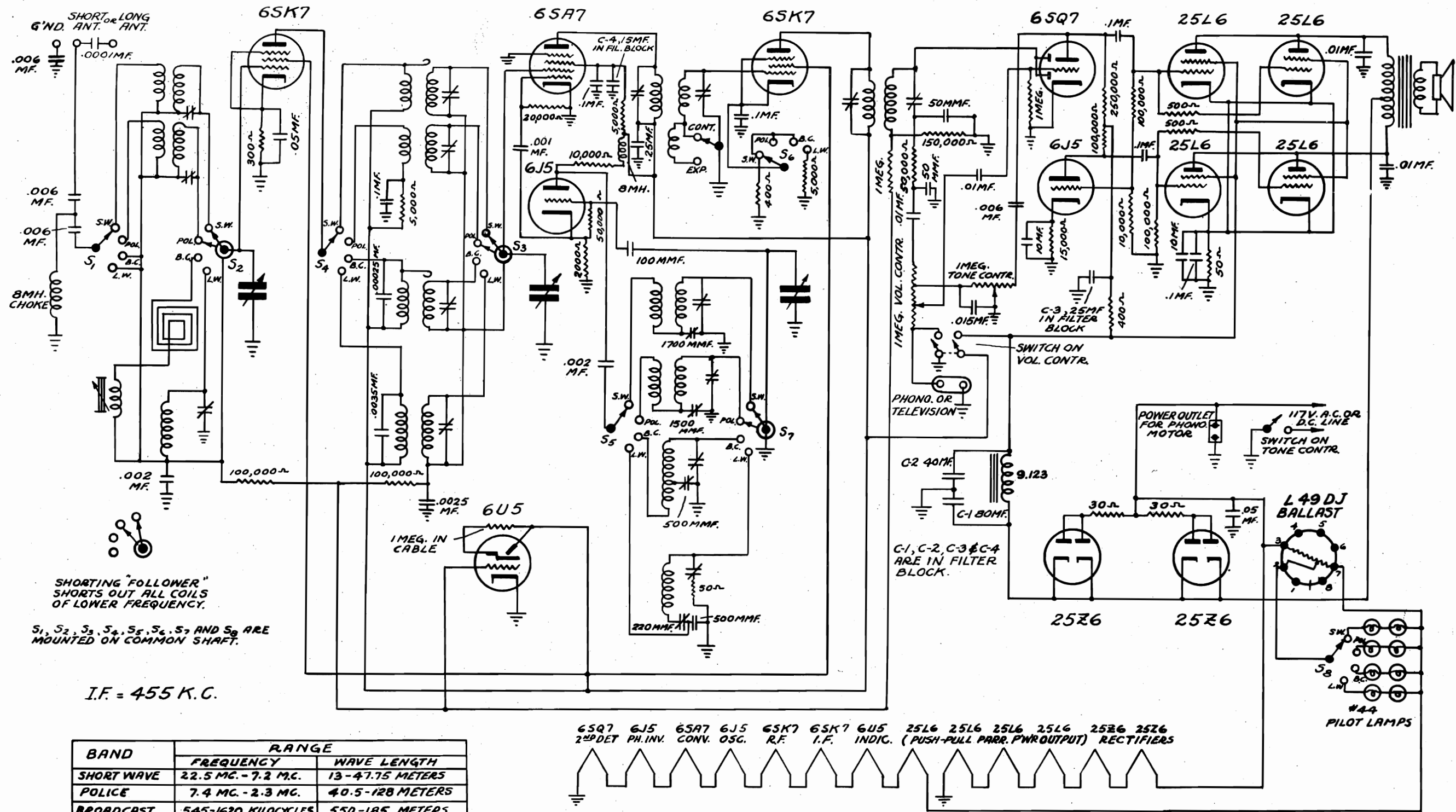
$$I.F. = 455 \text{ K.C.}$$

GAROD RADIO CORP.



SHORT-WAVE#1 - 7.5-23MC.
SHORT-WAVE#2: 2.2-7.25MC.
BROADCAST - 540-1720KC.

$$I.F. = 455 \text{ KC.}$$



13 TUBE A.C./D.C. RECEIVER

GAROD RADIO CORP.

MODELS C124,1444,1454,
1464,1474,4014

This model is a 13-tube (plus ballast) 4-band radio receiver. It is for operation on 105 to 125 volts, DC or AC (50 to 60 cycles).

The frequency coverage is as follows:

Frequency	Power	Bandwidth	Modulation	Antenna	Height	Location	Remarks
Long Wave Band	142 to 375 Kilocycles.						
Broadcast Band	543 to 1600 Kilocycles.						
First Short Wave	2.35 to 7.6 Megacycles.						
Second "	7.2 to 22.5 Megacycles.						

The controls on this receiver are as follows: (from left to right)

- (1) Band Switch
- (2) Band Expansion (High Fidelity)
- (3) Volume & Phono Switch
- (4) Tone Control & Line Switch
- (5) Tuning.

All packing should be removed before attempting to set up the receiver. The tubes should be examined to make sure that they are mounted firmly in their sockets, as they may be jarred loose in shipment.

ANTENNA - A highly selective loop antenna is included in the cabinet of this receiver. By turning the cabinet slightly, maximum volume with a minimum of noise may be had. Where conditions do not permit placement of the receiver in a position for best reception, it may be desirable to connect a short antenna to the binding post marked "A" which is located on the Loop Antenna. Where reception from greater distances is desired, it is necessary to install a well-insulated outdoor antenna about 50 feet long.

BROADCAST BAND: The dummy antenna for this band should consist of a 250 mm. trimmer capacitor only. The signal generator is set at 1620 kc, the band switch set at broadcast position. The variable condenser should be opened so that the plates are entirely out of mesh. The oscillator trimmer is then adjusted for maximum response on that frequency (1620KC). Set the signal generator at 1400KC and tune the receiver until a response is indicated. The dial pointer should coincide with the 1400 kc mark on the dial. Now adjust the inststage trimmer.

connected with the antenna loading coil. The antenna loading coil is now set for a maximum. This is located on the left and right. The antenna behind the gang condenser. The 1400 kc adjustment should then be rechecked.

LONG WAVE BAND: The band selector switch is set in position for operation on the long wave band. The receiver and generator are both tuned to 300 kc and the oscillator trimmer is adjusted for maximum response. The antenna and first detector trimmers are adjusted in the order named for maximum output.

The signal generator is then set at 150 kc and the signal is tuned in. The low pass filter is then adjusted for maximum response while the gang tuning capacitor is rocked slightly to the left and right. The 300 kc adjustment should then be rechecked.

Realignment of this receiver should not be attempted unless all other possible causes of faulty operation have been thoroughly investigated. An accurately calibrated signal generator which will cover the necessary wave-bands and an output meter for indicating the effect of adjustments are required.

It is important to remember that in receivers of this kind which are equipped with automatic volume control, it is necessary to use the minimum possible signal from the signal generator; otherwise the A.V.C. action will tend to nullify the variations in output as the trimmers are adjusted.

I.F. ADJUSTMENT: The signal generator is set at 455 kc and is connected through a .5 mmfd condenser to the grid of the first detector (6SA7). This connection may be made to the stator lug on the middle section of the variable condenser. With the band switch set on "Broadcast", the Band Expansion Switch in the selective position (left), the pointer set at about 800 kc and the receiver volume control at its maximum position, the I.F. trimmers are adjusted for maximum output. These trimmers may be found on top of the I.F. transformer shield cans.

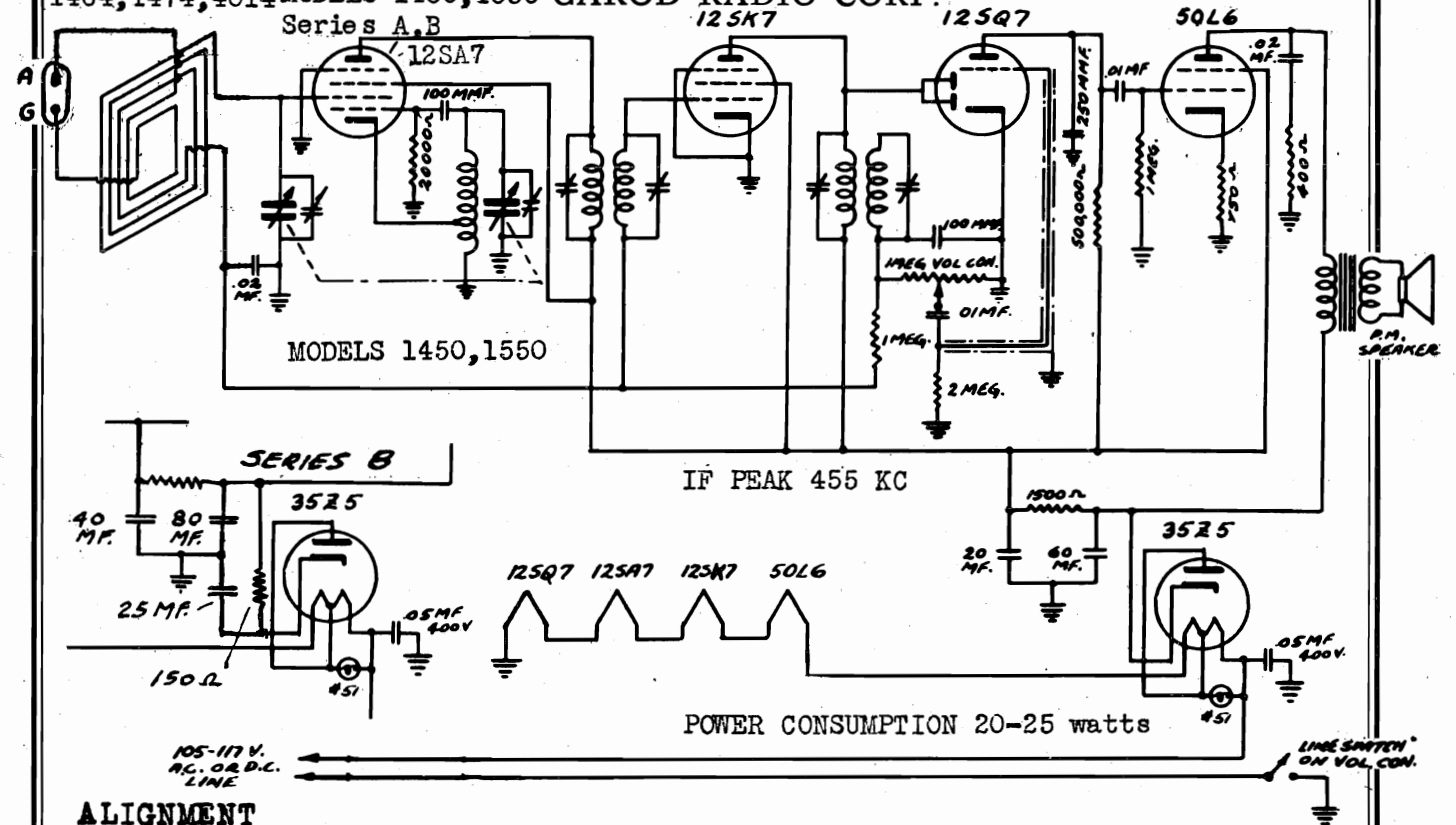
SECOND SHORT WAVE BAND: Turn the dial control knob so that the condenser plates are entirely out of mesh. Set the band switch to the second or higher frequency short wave band. The signal generator should be connected to the short-antenna binding post through the dummy antenna consisting of a 250 mmfd mica condenser and a 400 OHM non-inductive resistor. The oscillator trimmer condenser should be opened to minimum capacity and the signal generator then set to 22.5 megacycles. The oscillator trimmer is then increased in capacity until maximum response is obtained. Two responses are possible and it is important that the high frequency response (oscillator trimmer low capacity) be used. The signal generator is then set to 19MC and the variable condenser turned until a response is obtained. The pointer should coincide with the 19MC mark on the dial. The antenna preselector and first detector trimmers are then adjusted. In the order named, for maximum output. The variable condenser should be rocked slightly during this last adjustment. The signal generator is now set at 8 mc and the signal tuned in on the dial. The paddler for this band is adjusted for maximum reading of the output meter while the generator tuning condenser is rocked slightly to right and left. The high frequency adjustment should then be rechecked.

FIRST SHORT WAVE BAND: The band selector switch is set in position for operator (on the first short wave (second from left)). The variable condenser is opened so that the plates are completely unmeshed and the oscillator trimmer is opened to minimum capacity. The signal generator is set to 7.6 mc and the oscillator trimmer condenser is increased in capacity until a response is heard. Two responses are possible and it is important that the higher frequency response (oscillator trimmer low capacity) be used. Set the signal generator at 7 mc and turn the tuning control until a response is indicated on the output meter. The pointer should now coincide with the 7 mc marker on the dial. The antenna preselector and first detector trimmers are then adjusted in the order named for maximum output. After high frequency adjustments have been made, set the signal generator at 2.5 mc and turn the variable gang condenser until a response is observed. Adjust just the padding condenser for this band for maximum gain while rocking the tuning condenser slightly to the right and the left. The higher frequency adjustment should then be rechecked.

at 570 mc and gain one variable gang, condenser until a response is observed. Adjust the padding condenser for this band for maximum gain while rocking the tuning condenser slightly to the right and the left. The higher frequency adjustment should then be rechecked.

PAGE 13-10 GAROD

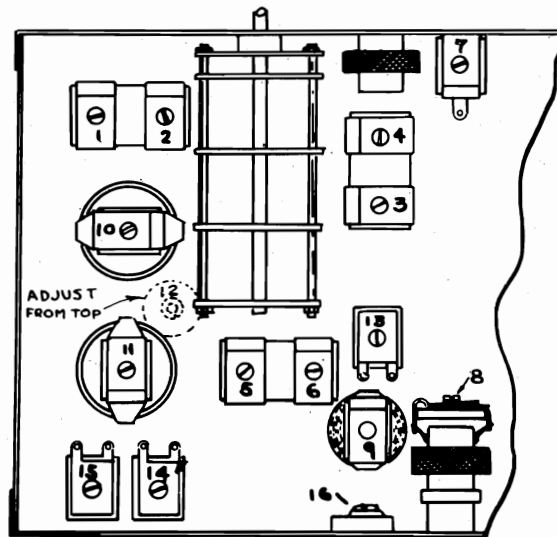
MODELS C124,1444,1454,
1464,1474,4014 MODELS 1450,1550 GAROD RADIO CORP.



ALIGNMENT

Should it become necessary to realign the receiver at any time, proceed in the usual manner by first adjusting the I.F. transformers, for maximum output as indicated by an output meter connected across the voice coil. Then turn the dial to 1500 KC. Set the signal generator (or 1500KC local station) to this frequency and tune in the signal by means of the oscillator trimmer on the variable condenser, (Front section). Then adjust the antenna trimmer for maximum output. No other adjustments are necessary.

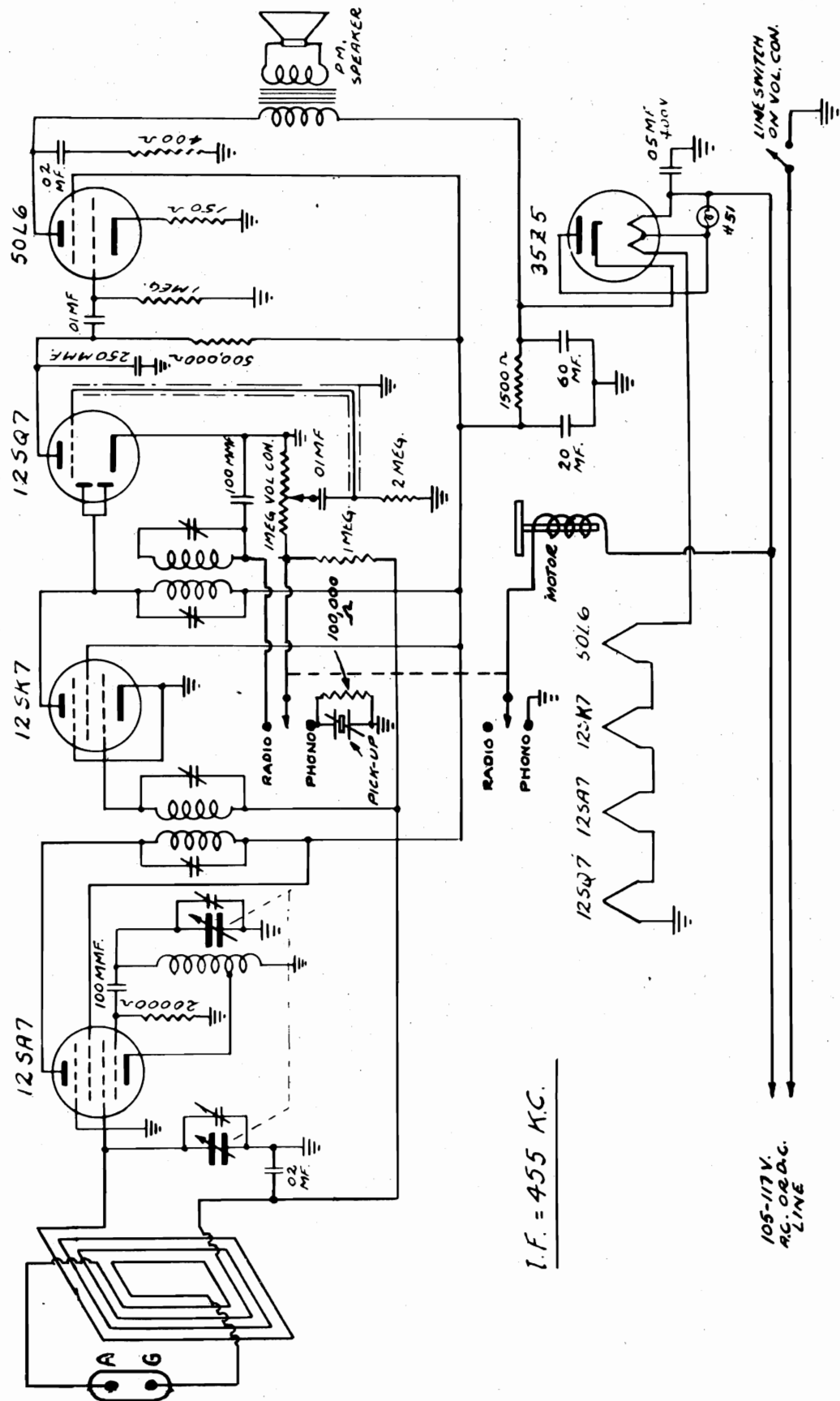
C124, 4014, 1444
1454, 1464, 1474



BOTTOM VIEW OF CHASSIS SHOWING
LOCATION OF TRIMMERS + PADDERS.

ALIGNMENT CHART		
NUMBER (SEE DIAGRAM)	FUNCTION	ALIGNMENT FREQUENCY
1	2ND. S.W. ANT. TRIMMER	19 MC.
2	1ST. S.W. ANT.	7 MC.
3	2ND. S.W. INTER. (1ST. DET.)	19 MC.
4	1ST. S.W. " "	7 MC.
5	2ND. S.W. OSC	22.5 MC.
6	1ST. S.W. " "	7.6 MC.
7	L.W. ANT.	300 KC.
8	L.W. INTER (1ST. DET.)	300 KC.
9	L.W. OSC.	300 KC.
10	B.C. INTER. (1ST. DET.)	1400 KC.
11	B.C. OSC	1620 KC.
12	B.C. LOOP PADDER	600 KC.
13	2ND. S.W. " "	8 MC.
14	1ST. S.W. " "	2.5 MC.
15	B.C. " "	600 KC.
16	L.W. " "	150 KC.
	I.F. FREQUENCY	455 KC.

GAROD RADIO CORP.



MODELS 501P, 501PD

NOTE:- ON MODEL **SOIPD** AN AC-DC INVERTER IS CONNECTED BETWEEN THE MOTOR & LINE.

105-117 V.
A.C. OR D.C.
LINE

I.F. = 455 KC.



GENERAL ELECTRIC CO.

MODELS HM-3, JM-3, JM-4
Phonographs**MODEL HM-3 MODEL JM-3****Electrical Specifications**

Rating "A"—115-125 volts, 60 cycles, 20 watts.

Rating "V"—115-125 volts, 50 cycles, 20 watts.

Rating "C"—115-125 volts, 25 cycles, 20 watts.

MODEL JM-4**Electrical Specifications**

Rating "A6"—115-125 volts, 60 cycles, 20 watts.

Rating "A5"—115-125 volts, 50 cycles, 20 watts.

INFORMATION

When connecting this record player to an a-c/d-c receiver insert a .25 mfd. 400 V. paper capacitor between the black lead of the record player and the chassis ground, and a .005 or .01 mfd., 400 V. paper capacitor between the green lead of the record player and the circuit tapped in the radio.

Radio Receiver Connections

There are several different methods which may be used to connect the record player to the radio receiver depending upon the provisions incorporated in the radio for handling phonograph connections and upon the type of installation desired. Several methods are outlined below for super-heterodyne receivers.

The process of changing from radio reception to record-player operation and vice versa requires either the manual insertion of the record-player leads in the radio circuit each time the process is performed or the use of a switch to automatically perform the operation. The convenience of a switching arrangement will so far outweigh the labor involved in manual operation that the slight additional cost of a switch will pass unnoticed.

There follow several general methods of installation which should not be assumed to be comprehensive or all-conclusive.

Method No. 1.—(For radios equipped with phono pin-jack terminals.) The Model HM-3 is equipped with a plug for connecting to radios equipped with a phono pin jack. The green lead of the record player is connected to the pin terminal and the black lead to the shield of the plug. Some radio models automatically switch to record-player operation when the plug is inserted in the terminal; other models require pushing or rotating a switch incorporated on the radio control panel.

Method No. 2.—(For radios equipped with phono terminals.) Consult the instruction pamphlet which was supplied with your radio to determine which phono terminals are for connections to the record player. There may be three or four terminals, depending upon the type of radio. Determine which terminal is connected to the high side of the volume control. For radio operation, there will be a link connection between this volume-control terminal and the radio diode load terminal. On a three-terminal board, the remaining terminal will be chassis ground. On a four-terminal board, one of the remaining terminals will be chassis ground and the other a diode return.

Using manual insertion of the record player into the radio circuits, it is only necessary to remove the link from between the diode load and volume-control terminals and reinsert it between the diode load and chassis ground terminals (on a three-terminal board), or between diode load and diode return (on a four-terminal board). The green lead on the record player is then connected to the volume control terminal and the black lead to the chassis ground terminal. To return to radio operation, merely remove the link and reinsert between the diode load and volume-control terminals.

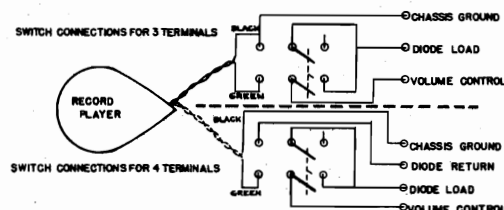
It may not be necessary to disconnect the record-player leads when returning to radio operation depending upon the circuit design in your radio receiver. If the tone quality and volume are impaired when the record player remains connected, then it will be necessary to remove the record-player leads from the radio terminals each time you turn from record-player performance to radio reception.

Using switch operation requires the use of a double-pole, double-throw toggle or rotary switch. The general method of connection is as shown in Fig. 1.

The record player can remain permanently connected when using this method of switch connection.

Some late radio models have the switch already incorporated in the push-button assembly.

Method No. 3.—(For radios not equipped with phono or pin-jack terminals but on which phono terminals are to be located.) First, pull the radio power-cord plug out of the power-supply socket; then remove the radio receiver chassis from the cabinet to allow access to the high side of the volume control. Unsolder the lead from the high side of the volume control and solder it on to one lead of a two-conductor shielded pair. Solder the other conductor of the shielded pair to the high side of the volume control. This shielded pair should be long enough to extend to the outside rear of the radio chassis. Solder the shields to the chassis. Procure a three-terminal board and mount it on the shelf of the cabinet at the rear of the chassis. Connect the shield to one outside terminal and the new volume-control conductor to the other outside terminal, leaving the center terminal for the remain-



ing conductor. Connect the record player to the two outside terminals. When record-player operation is desired, interconnect the center terminal and the shield terminal. When radio operation is desired, interconnect the center terminal and the volume-control terminal. It may be necessary, depending upon the circuit in your radio receiver, to remove the record-player leads from the terminals each time radio reception is to be enjoyed. Tone and volume performance will indicate connection requirements. A switch may be inserted to perform the change-over operations by connecting as shown in Fig. 1. (Read descriptive material pertaining to Fig. 1.)

Method No. 4.—Some radio models will permit satisfactory record-player operation with the green lead of the record player connected to grid of the first audio tube and the black lead connected to the chassis ground. This method, however, requires tuning the radio to a dead spot on the band and may, in addition, require shorting the antenna to ground. NOTE.—Do not remove radio grid lead from the first audio tube.

The above instructions apply to the Models JM-3 and JM-4 as well as to Model HM-3.

See Index for Parts Lists of these Models. Note that two different motor assemblies have been used.

MODEL HM-3
MODEL JM-4

TURNTABLE

MOTOR

PICK-UP

VOLUME CONTROL

GREEN

BLACK

JACK PLUG

POWER PLUG

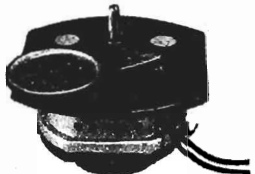

POWER SWITCH

The diagram illustrates the electrical wiring for the HM-3/JM-4 turntable assembly. A power plug is connected to a power switch, which then splits into two lines: one leading to the motor and the other to the volume control. The volume control is represented by a zigzag line with a green wire connected to its slider and a black wire connected to its other end. The green wire continues to a jack plug, while the black wire is shown as a separate line. A turntable is mounted on a motor, and a pick-up is positioned to read the turntable's output.

Fig. 2. Schematic Diagram

REPLACEMENT PARTS LIST

Model JM-4

Stock No.	Description	List Price	Stock No.	Description	List Price
	CHASSIS ASSEMBLY				
RB-944	BOTTOM COVER—Cabinet bottom cover	\$0.30	RX-074	ASSEMBLY—Motor plate mounting bushing, washers and screws	\$0.15
*RC-2002	CLAMP—Crystal clamp	.10	RX-075	ASSEMBLY—Motor field and winding assembly	2.00
RC-2017	CATCH—Tone arm catch for securing to rest	.10	RX-076	ASSEMBLY—Movable-plate-guide spacer, washer screw assembly (Pkg. 5)	.10
RC-8174	CORD—Power cord	.40	RX-077	ASSEMBLY—Propeller, cotter, washer assembly	.15
*RF-016	FOOT—Rubber foot for cabinet (Pkg. 3)	.05	RX-078	ASSEMBLY—Rotor assembly	1.35
*RH-114	HAIRPIN COTTER—Swivel retaining cotter	.10			
*RK-063	KNOB—Power switch and volume control knob	.10			
RN-007	NUT—Speed nut for mounting motor assembly (Pkg. 3)	.10		MOTOR TURNTABLE ASSEMBLY MODEL NO. 3	
RN-008	NUT—Power switch clamping nut (Pkg. 5)	.10	RB-184	BRACKET—Turntable drive wheel bracket assembly	.15
*RN-102	NEEDLE CUP—Rubber needle cup	.10	RB-185	BRACKET—Lower motor bearing bracket assembly complete	.40
*RP-145	PLUG—Phono plug (Pkg. 5)	.25	RF-502	FIELD—60-cycle field stator assembly complete	3.60
*RP-506	PICK-UP—Crystal pick-up	4.75	RF-503	FIELD—50-cycle field stator assembly complete	3.60
*RP-801	POST—Tone arm swivel post	.15	RF-504	FRAME—Upper motor frame assembly	.60
*RR-940	REST—Tone arm rest	.15	RM-139	MOTOR—60-cycle motor assembly complete less turntable	6.00
*RS-888	SCREW—Needle clamping screw	.10	RM-140	MOTOR—50-cycle motor assembly complete less turntable	6.40
RS-896	SCREW—Crystal clamp and catch screw (Pkg. 5)	.05	RP-164	PLATE—Motor mounting plate and bearing assembly	.90
*RS-938	SWIVEL—Tone arm swivel assembly	.15	RP-311	PULLEY—60-cycle motor pulley and set screw	.20
*RT-912	TONE ARM—Crystal tone arm	.65	RP-312	PULLEY—50-cycle motor pulley and set screw	.25
RV-073	VOLUME CONTROL—Volume control and power switch	.70	RR-406	ROTOR—Rotor complete	1.55
*RW-114	WEIGHT—Tone arm weight	.05	RS-4008	SPRING—Turntable drive tension spring (Pkg. 2)	.05
			RS-875	SETSCREW—Motor pulley setscrew (Pkg. 12)	.25
	MOTOR TURNTABLE ASSEMBLY MODEL NO. 2		RS-932	SPINDLE—Turntable spindle and cotter	.30
RM-133	MOTOR—60-cycle motor assembly complete	6.25	RT-923	TURNTABLE—8-inch brown flocked turntable	1.60
RP-165	PLATE—Main plate and turntable shaft bearing assembly	.90	RW-909	WHEEL—Rubber-edged drive wheel	.50
RP-166	PLATE—Motor mounting plate	.30	RX-065	ASSEMBLY—Turntable drive wheel bracket mounting washer, screw and nut assembly (Pkg. 5)	.20
RP-167	PLATE—Rubber-edged-wheel movable plate and bearing assembly	.70	RX-066	ASSEMBLY—Lower bearing bracket screw and nut assembly (Pkg. 3)	.05
RP-316	PULLEY—60-cycle drive pulley and oil throw washer (Pkg. 2)	.25	RX-067	ASSEMBLY—Motor mounting screw, washer and grommet assembly (Pkg. 3)	.25
RS-493	SPRING—Movable plate tension spring (Pkg. 2)	.10	RX-068	ASSEMBLY—Drive wheel oil retainer, cotter and thrust washer assembly (Pkg. 5)	.10
RS-943	SPINDLE—Turntable spindle and cotter	.20			
RS-953	SPACERS—Rotor spacers between bearings (Pkg. 5)	.15			
RT-924	TURNTABLE—8-inch brown flocked turntable	1.60			
RW-912	WHEEL—Rubber-edged wheel, washer, oil felt and cotter	1.00			
RX-073	ASSEMBLY—Rotor bearing brackets, felts, bearing assembly	.35			

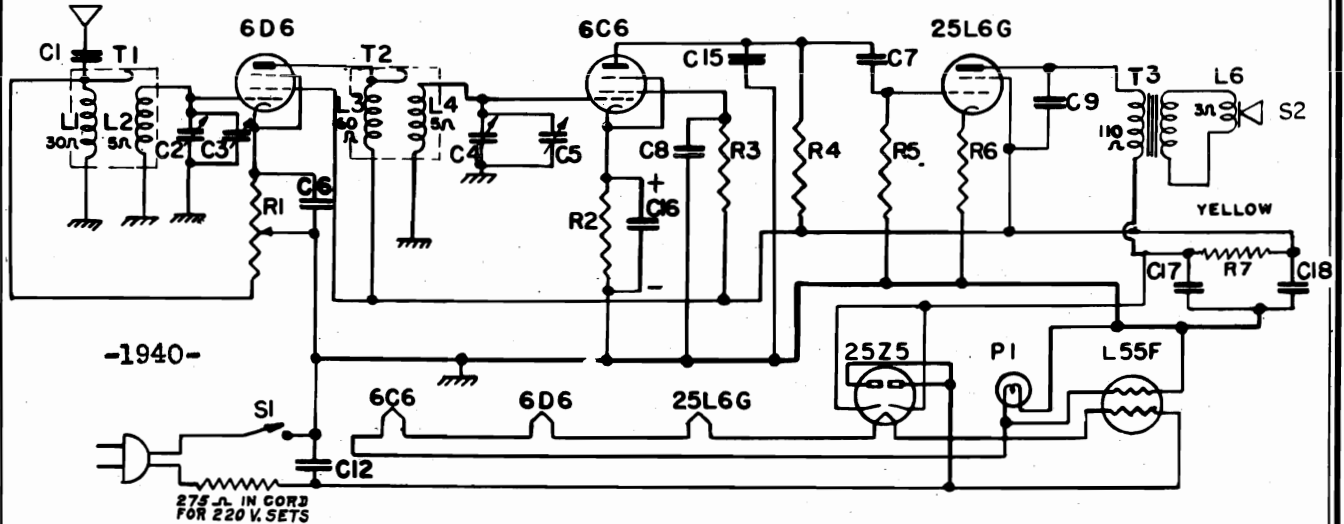
* Used on previous receivers.

(Prices subject to change without notice)

GENERAL ELECTRIC CO.

MODELS GDE-41A, GDE-41V

MODELS FE-82, FE-87



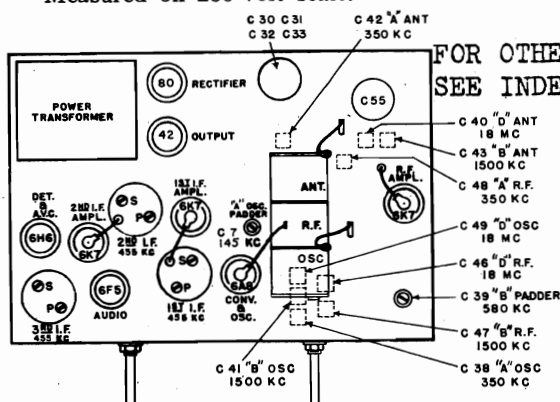
Symbol	Description	Symbol	Description	Symbol	Description
C-1	.01 Mfd. Paper Capacitor	C-16	10 Mfd. Dry Electrolytic	R-4, 5	1.0 Megohm Carbon Resistor
C-2, 3, 4, 5	Tuning Condenser and Trimmers	C-17	30 Mfd. Dry Electrolytic	R-6	150 Ohm Carbon Resistor
C-6	.05 Mfd. Paper Capacitor	C-18	20 Mfd. Dry Electrolytic	R-7	5700 Ohm Carbon Resistor
C-7, 8	.01 Mfd. Paper Capacitor	R-1	25,000 Ohm Volume Control	T-1	Antenna Transformer
C-9	.02 Mfd. Paper Capacitor	R-2	35,000 Ohm Carbon Resistor	T-2	R.F. Transformer
C-12	.05 Mfd. Paper Capacitor	R-3	3.0 Megohm Carbon Resistor	T-3	Output Transformer
C-15	100 Mmf. Mica Capacitor				

POWER CONSUMPTION GDE-41A 48 WATTS, GDE-41V 90 WATTS

SOCKET VOLTAGES

Tube No.	Plate to -B Volts D.C.		Screen to -B Volts D.C.		Cathode to -B Volts D.C.		Cathode Current M.A. D.C.		Heater Volts	
	"A" Rating A.C. or D.C.	"V" Rating A.C. or D.C.	"A" Rating A.C. or D.C.	"V" Rating A.C. or D.C.	"A" Rating A.C. or D.C.	"V" Rating A.C. or D.C.	"A" Rating A.C. or D.C.	"V" Rating A.C. or D.C.	"A" Rating A.C. or D.C.	"V" Rating A.C. or D.C.
6D6	112	104	112	104	15	14.5	0.8	0.75	6.2	6.4
6C6	33*	28*	28	26	2.1	2.0	.05	.05	6.2	6.4
25L6G	126	118	112	104	7.9	7.8	44	43	25.5	26
25Z5	....	....	....	....	135	130	48	47	24	24

Line Voltage "A" rating—115. Line Voltage "V" rating—220.
 No signal input—Dial pointer at 540.—Volume control at minimum.
 * Measured on 250-volt scale.



CHASSIS LAYOUT-FE-82, FE-87

Tuning Frequency Range

Band "B" 540-1800 kc.
 Alignment Frequency 1500 kc.

ALIGNMENT

Connect the high side of the signal generator through a 250 mmf. condenser to the antenna lead. The low side of the signal generator output should be connected to the receiver chassis through a .05 mfd. condenser. Connect a suitable output meter across the voice coil leads; then proceed as follows:

1. With gang condenser plates completely closed, the dial pointer should coincide with the horizontal dial line.
2. Tune receiver to the 1500 kc. point on the dial; then align trimmers (C-3 and C-5) on the gang condenser at 1500 kc. for a maximum output meter reading.

Precaution—One side of the power supply is connected to the chassis—Do not connect chassis to any external ground.

MODEL HE-74
MODEL J-629

GENERAL ELECTRIC CO.

ALIGNMENT PROCEDURE

Alignment Frequencies

I.F. 455 KC R.F. 1500 and 580 KC
The location of all trimmers is shown in Fig. 1.

I.F. Alignment

Connect an output meter across the voice coil. Turn the volume control to maximum. Set test oscillator to 455 KC and keep the oscillator output as low as a readable meter reading will permit.

Apply signal to the grid of the 6SK7GT through a .05 mfd. capacitor and align the 2nd I.F. transformer. Repeat the procedure, applying the 455 KC signal to the control grid of the 6SA7GT and aligning the 1st I.F. transformer. Finish by over-all adjustments.

R.F. Alignment

With gang condenser plates completely closed, set dial pointer to the first mark at the left end of the scale. Apply a 1500-KC signal either through a standard I.R.E. dummy to the antenna terminal or through an additional loop connected to the generator output which can be magnetically coupled

to the receiver Beam-a-Scope. Align (C-2) at 1500 KC and peak (C-1) for maximum output. Peak (C-3) on 580 KC while rocking the gang condenser. Retrim at 1500 KC.

Special Service Information

The following data will be very useful to servicemen equipped with vacuum-tube voltmeters or similar voltage-measuring instruments.

- (1) Stage Gains
Antenna Post to Converter Grid—6 at 1000 KC†
Converter Grid to 6SK7GT Grid—30 at 455 KC†
6SK7GT Grid to 6Q7GT Det. Plate—100 at 455 KC†
- (2) Audio Gains
.06 volts, 400 cycles signal across volume control with control set to maximum will give approximately ½-watt speaker output.
- (3) DC voltage developed across oscillator grid resistor (R-1) averages 12 volts.

† Variations of +10, -20% permissible.

FOR OTHER DATA IN VOL. XII SEE INDEX

ALIGNMENT PROCEDURE

I.F. ALIGNMENT WITH OSCILLOSCOPE

Band Switch Setting	Input Freq.	Point of Input	Dummy Antenna	Trimmer	Comments
1. Band "D"	455 K.C. Sweep	I.F. Grid	.05 Mfd. or Larger	2nd I.F. Sec. (Bottom of Shield Can) 2nd I.F. Pri. (Top of Shield Can)	Gang condenser plates closed—connect audio input of oscilloscope to ground and to the junction of R-10 and R-12. Adjust trimmers in order mentioned for a single symmetrical curve of maximum amplitude. The resulting curve with input at converter grid is shown in Fig. 3.
2. Band "D"	455 K.C. Sweep	Converter Grid	.05 Mfd. or Larger	1st I.F. Sec. (Top of Shield Can) 1st I.F. Pri. (Bottom of Shield Can)	

I.F. ALIGNMENT WITH OUTPUT METER

1. Band "D"	455 K.C. with Modulation	I.F. Grid	.05 Mfd. or Larger	2nd I.F. Sec. (Bottom of Shield Can) 2nd I.F. Pri. (Top of Shield Can)	Gang condenser plates closed—connect output meter across voice coil—keep signal low and volume control on as far as possible. Adjust all trimmers for maximum output.
2. Band "D"	455 K.C. with Modulation	Converter Grid	.05 Mfd. or Larger	1st I.F. Sec. (Top of Shield Can) 1st I.F. Pri. (Bottom of Shield Can)	

R.F. ALIGNMENT

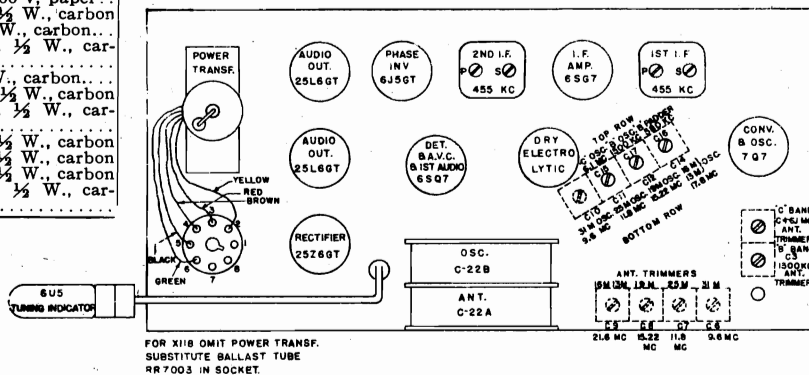
Models HE-74 and HE-740

1. Band "B"	.....	.....	.....	.....	Close gang condenser plates. Adjust pointer to first line at left end of tuning scale.
2. Band "D"	21 M.C. with Modulation	Antenna Post	I.R.E.	Osc. (C-9) R.F. (C-6) Ant. (C-3)	Connect output meter across voice coil—peak trimmers for maximum output. The image of any "D" band signal should be heard 910 K.C. below the input signal. Example: 18 M.C. image is at 17.09 M.C. Peak (C-6) while rocking the gang condenser.
3. Band "C"	6 M.C. with Modulation	Antenna Post	I.R.E.	Osc. (C-10) R.F. (C-7) Ant. (C-4)	Peak trimmers for maximum output using a low input signal. Peak (C-7) while rocking the gang condenser. Image—910 K.C. below signal.
4. Band "B"	1500 K.C. with Modulation	Antenna Post	I.R.E.	Osc. (C-11) R.F. (C-8) Ant. (C-5)	Peak trimmers for maximum output with a low input signal.
5. Band "B"	580 K.C. with Modulation	Antenna Post	I.R.E.	Osc. padder (C-12)	Adjust padder for maximum output in the vicinity of 580 K.C. while rocking the gang condenser.
6. Band "B"	Repeat Operation 4				

FOR OTHER DATA IN RIDER'S VOL. XII SEE INDEX



PRICES SUBJECT TO CHANGE WITHOUT NOTICE



GENERAL ELECTRIC CO.

TONE CONTROL SWITCH CONNECTIONS

Position in Use	Section "C" Back Side	Section "C" Front Side
Radio-Brilliant	Open	3-7
Radio-Bass	1-12	3-7
Radio-Treble	4-6	3-7
Radio-Mellow	1-12 4-6	3-7
Phono-Brilliant	Open	7-11 2-3
Phono-Bass	1-12	7-11 2-3
Phono-Treble	4-6	7-11 2-3
Phono-Mellow	1-12 4-6	7-11 3-4

SPECIAL SERVICE INFORMATION

The following information will be very useful in servicing receivers if a vacuum tube voltmeter or similar voltage measuring instrument is available.

NOTE—Connection to converter grid must be made directly to tube grid and not to gang condenser on spread bands.

(1) Stage gains

(a) Antenna Post to Converter Grid, three 400 ohms and 200 mmfd. in series, at

Stand.	1000 KC....5.4	31 M.....9.6 MC....1.8
SW1	4000 KC....3.7	25 M.....11.8 MC....1.6
SW2	18000 KC....1.1	19 M.....15.22 MC....1.4
		16-13 M.....17.8 MC....1.0

BAND CHANGE AND TONE CONTROL SWITCHING

The following charts show the switch points connected for any one position of either the wave change or tone control switches. The numbers shown in each box indicate the switch points connected together in the section of the switch for each position of the switch. As for example: the numbers 5-9-10 indicate these switch points are all connected together for this particular position of the switch.

BAND SWITCH CONNECTIONS

Band in Use	Section "A" Front side	Section "A" Back Side	Section "B" Front Side	Section "B" Back Side
BC	4-8-9	5-9-10	5-9-10	1-10 6-8
SW1	4-8-10	5-9-11	5-9-11	1-2-10 7-8
SW2	4-8-11	5-9-12	5-9-12	1-2-3 8-10
31 METER	8-11	9-12-1	9-12-1	1-2-3-4 8-10
25 METER	8-11	9-12-2	9-12-2	1-2-3-4-5 8-10
19 METER	8-11	9-12-3	9-12-3	2-3-4-5-6 8-10
16 and 13 METER	8-11	9-12	9-12	3-4-5-6-7 8-10

Tubes

Converter-Oscillator.....	GE-7Q7
IF Amplifier.....	GE-6SG7
Detector, AVC, 1st Audio.....	GE-6SQ7
Phase Inverter.....	GE-6J5GT
Power Output.....(2)	GE-25L6GT
Rectifier.....	GE-25Z6GT
Tuning Indicator.....	GE-6U5
Pilot Lamps.....(2)	MAZDA No. 44

(b) RF on Converter Grid to IF on 6SG7 grid at
Stand. 1000 KC.....61 31 M.....9.6 MC.....65
SW1 4000 KC.....63 25 M.....11.8 MC.....68
SW2 18000 KC.....71 19 M.....15.22 MC.....71
16-13 M.....17.8 MC.....71

(c) IF on Converter Grid to IF on 6SG7 grid at
455 KC—85

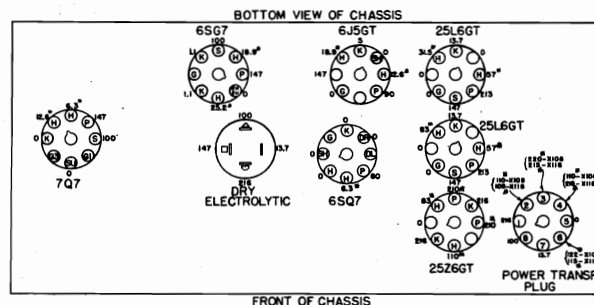
(d) IF Grid to diode plate at
455 KC—160

(2) Voltage across the diode load to give ½-watt speaker output at 400 cycles—.046 V.

(3) DC voltage developed across oscillator grid resistor (R1) at

Stand.	1000 KC.8.3 V.	31 M.....4.4 V.
SW1	4000 KC.7.7 V.	25 M.....4.8 V.
SW2	18000 KC.5.0 V.	19 M.....4.4 V.
		16-13 M.....3.7 V.

Variations of ±20% permissible. All measurements taken with R-26 shorted across.



VOLTAGES INDICATED BY ASTERISK (*) ARE AC VOLTAGES.
VOLTAGES READ WITH 1000 OHMS/VOLT METER
ON 250-VOLT SCALE

CONVERSION FOR SPECIAL LINE VOLTAGES

The Models X-108 and X-118 can be converted for operation on the following line voltages. In all cases where the power transformer is replaced with a ballast resistor, the power transformer must be removed from the chassis as the radiant heat from the ballast resistor is likely to injure the transformer insulation. When operated with these special resistors and lower power supplies than 220 volts, the audio power output and socket voltages will be reduced.

220 Volts AC/DC—(Range 200-240 Volts)

Remove transformer from chassis of X-108, insert ballast tube resistor RR-7003, and change label to read X-118.

180 Volts DC—(Range 160-200 volts)

Remove transformer from chassis of X-108 or ballast RR-7003 from X-118; insert the ballast tube resistor RR-7004 and change the label on the receiver so that it reads Model X-118Y.

NOTE—The 8200 ohm, 1 watt resistor (R-35) shown in dotted lines for the RR-7004 ballast tube schematic is not a part of the ballast tube. In order to increase the sensitivity and power output of this receiver when operating in this voltage range, this resistor may be installed externally across the terminals 1 and 8 of the ballast tube socket.

117 Volts DC—(Range 105-129 Volts)

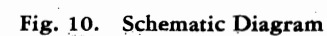
Remove transformer from chassis of X-108 or ballast RR-7003 from X-118; insert the ballast tube resistor RR-7005 and change the label on the receiver so that it reads Model X-118Z.

NOTE—The power output on this receiver can be raised if the resistors R-18, R-24 and R-25 are shorted across.

Two other transformers are available for AC operation. The transformer T5 can be substituted in the Model X-108 receiver for operation on 25-cycle circuits. Remark the label so that it reads Model X-108C. The special duty transformer T6 can be used in the Model X-108 receiver for operation on 50/60 cycle circuits where a 145-volt tap is required. Remark the label on the receiver so that it reads Model X-108X.

The cold resistance of all ballast tubes is shown directly on the schematic diagram, Fig. 2.

GENERAL ELECTRIC CO.



GENERAL ELECTRIC CO. SOCKET VOLTAGES

MODEL F-109

Tube No.	Plate to Ground Volts D-c	Screen Grid to Ground Volts D-c	Cathode to Ground Volts D-c	Cathode Current M.A.	Heater Volts A-c
6K7 R.F. Amplifier	220	95	....	6.0	6.3
Oscillator	150	....	....	10	6.3
6A8 Converter	220	90	....	10	6.3
6J5-G A.F.C. Control	150	....	6.1	3.5	6.3
6K7 1st I.F. Amplifier	236	92	....	7.0	6.3
6K7 2nd I.F. Amplifier	225	102	3.0	8.6	6.3
6J5-G Audio	130	....	5.5	1.3	6.3
6L6-G Output	280	234	13.5	57	6.3
5Z3 Rectifier	600/330 RMS	....	360 d-c	110	5.0

A-C line voltage—120 volts with fuse clipped in the 125-volt tap—no signal input—1000 ohms per-volt-meter—dial pointer at 530 kc. on broadcast band.

GENERAL INFORMATION

The Model F-109 is a three-band a-c operated receiver employing ten General Electric Pretested Tubes in a super-heterodyne circuit. This receiver incorporates automatic "Touch Tuning" with thirteen station buttons, electric finger-tip dial drive control, R.F. amplifier, two stages of I.F. amplification, four-point tone control and other features of design as described in the following paragraphs. The phonograph equipment is designed to play records on one side automatically.

Receiver Operation

The antenna transformer T-6 used in conjunction with a 6K7 tube and the R.F. transformer T-4 are the essential elements of the R.F. amplifier. After the conversion to 465 kc. by means of the combination oscillator converter tube 6A8, the signal is amplified by the I.F. amplifier which consists of three tuned transformers and two 6K7 tubes. The primary and secondary coils of these transformers are carefully adjusted midway between the points of critical and over-coupling so as to give the I.F. amplifier a broadened band width with a subsequent better fidelity of the received program.

The output of the I.F. amplifier is applied to a 6H6 diode rectifier, which is a combination detector, automatic volume control, and bias source for the automatic frequency control tube. A detailed explanation of the A.F.C. will be found in a following paragraph. A second 6H6 diode is used to supply minimum bias to all tubes controlled by the avc. One of the plates (16) of this diode supplies initial bias to the R.F. stage, while the other plate (17) supplies the 6A8 converter and 1st I.F. amplifier with the proper bias. Since the cathodes of the 6H6 are connected to a 2.8-volt point on the bleeder resistance R-35, this allows the avc controlled tubes to have a constant -2.8-volt bias with no signal input. This bias will remain constant until the point at which the avc voltage developed, becomes greater than this -2.8 volts, at which time the bias on these tubes will then be dependent upon the avc developed by the strength of the carrier. When operating in the "B" band, the minimum bias is automatically raised on the 6A8 converter and 6K7 1st I.F. tubes by means of a section of the wave change switch (S-1, terminal 4). This places R-31 in parallel with R-32 and the lower section of the bleeder resistance (R-5), which increases the fixed bias source applied to this avc controlled circuit through a section of the 6H6 diode. This reduces between station noise considerably on the "B" band but does not effect a reduction of sensitivity when a station carrier is tuned in.

Volume is controlled by the variable potentiometer (R-34) in the grid circuit of the 6J5-G audio amplifier tube. The output of the 6J5-G is resistance coupled to the 6L6-G Beam Power Output tube which gives ample undistorted power output to a 12-inch dynamic speaker.

TOPE CONTROL

Negative feed back is used to control the quality and tone of reproduction. The frequency response of the audio circuit is varied by the tone control switch and its associated network as follows:

In the "normal" position, voltage from the voice coil is fed back through R-23, R-2, and C-49 to a tap on the volume control. C-31 serves to inject high frequencies into a tap higher up on the volume control. This arrangement gives an extended high frequency response, holds down the "boom" caused by pentode output and speaker resonance, and at the same time improves the quality and response to an extended range of both high and low frequencies.

In the "bass" position, the high frequency input to the audio system is limited by the addition of C-41 across the

volume control and its coupling condenser; and, also, by the omission of the high frequency injector capacitor C-31. This permits the true reproduction of a wide range of low frequencies without the "boom" at speaker resonance.

In the "foreign" position R-2 and C-49 are shorted out of the network used for "bass." This permits more degeneration of the lower frequencies, and provides a tone range most suited for foreign reception. This position may be used to reduce noise and also to reduce bass on programs which predominate in low frequency tones.

C-41 is removed from the circuit in the "speech" position, R-2 and C-49 are shorted out leaving only R-23 in the circuit thus allowing flat degeneration of all frequencies. This arrangement has been found to give the best response for programs predominating in speech.

COIL SYSTEM

The coils for the three bands are wound a single form. The antenna transformer is designated as T-6, the R.F. transformer as T-4 and the oscillator transformer is marked T-3. All contacts on the band switch are numbered in Fig. 10 and Fig. 11 to facilitate tracing the coil circuits.

The band switch connects the coils to operate as follows:

Ant.	Primary	Secondary	Remarks
"B"	L-6	L-4 & L-5	
"C"	L-3	L-4	L-5 shorted
"D"	L-2 & L-3	L-1	L-4 & L-5 shorted
RF			
"B"	L-13	L-11 & L-12	
"C"	L-10	L-11	L-12 shorted
"D"	L-9 & L-10	L-8	L-11 & L-12 shorted
Osc.			
"B"	L-19	L-18	
"C"	L-17	L-16	Connects C-30 across L-18
"D"	L-15	L-14	Connects C-30 across L-16

On "D" band contact No. 9 is used to provide a ground for the General Electric noise reducing antenna systems, KV-300 and FT-40.

RESISTANCE MEASUREMENTS

No.	Resis. to Ground	Tube	Socket Prong
6	3 megs.	RF Grid	Cap
7	2.8 megs.	6A8 Conv.	Cap
8	2.8 megs.	1st IF Grid	Cap
9	3 ohms	2nd IF Grid	Cap
10	340,000 ohms	Diode Plate	Prong 3 AFC sw. closed
11	340,000 ohms	Diode Plate	Prong 5 AFC sw. closed
12	Grounded	Diode Cath.	Prong 4
13	1 meg. AFC sw. open 47,000 ohms		
	AFC sw. closed	Diode Cath.	Prong 8
14	0-2 megs. vol.con.	1st Audio Grid	" 5
15	100,000 ohms	6L6 Grid	Prong 5
16	2.5 megs.	Diode Plate	Prong 3
17	2.7 megs.	Diode Plate	Prong 5
18	10,000 ohms	Diode Cath.	Prong 8
19	27 ohms	Diode Cath.	Prong 4
20	2.2 ohms pin on cantactor (Corresponding button pressed)		

GENERAL ELECTRIC CO.

AUTOMATIC FREQUENCY CONTROL

The Automatic Frequency Control used in this receiver shifts the oscillator frequency so that the correct intermediate frequency is very closely produced even when the receiver is mistuned several kilocycles.

The essential elements are the discriminator transformer T-9, the twin diode 6H6 with its balanced discriminator network, and the 6J5-G control tube connected across the broadcast oscillator plate coil.

The discriminator transformer is designed to deliver (when properly tuned to 465 kc.) equal voltages to each section of the 6H6 when the receiver is correctly tuned to give an I.F. frequency of 465 kc. Under this condition the voltage drop across R-21 is equal and opposite to the voltage across the total resistance of R-19, R-22 and R-17; thus no discriminator voltage is produced to control the 6J5-G tube.

However, if the signal frequency is increased above 465 kc., unequal voltages are applied to the diodes and the voltage over R-21 is greater than the voltage over the combined resistance of R-19, R-22 and R-17. The difference of these two voltages is positive and is applied to the 6J5-G control tube.

When the signal frequency is decreased below 465 kc., the result is less voltage over R-21 and a greater voltage over the combined resistances R-19, R-22 and R-17. The difference of these two voltages, as applied to the 6J5-G control tube, is negative.

Thus three conditions arise:

On resonance: no discriminator voltage developed
Above 465 kc.: a positive control voltage
Below 465 kc.: a negative control voltage

The 6J5-G A.F.C. control tube has a combination of self and fixed bias, the latter being the result of the current supplied through R-8 to the cathode resistor R-4. The R.F. voltage applied to the control grid of the 6J5-G is obtained from the drop across the C-6 series padder and C-30. The vector sum of these two voltages is applied to the phase shifting network C-25 and R-3 and, in turn, to the control grid. This phase shifting network causes the control tube to appear as a reactance in parallel with the oscillator coil. The value of the apparent reactance depends upon the control voltage produced by the discriminator.

When the set is mistuned above the incoming signal, the converter output is above the 465 kc. required. A positive discriminator voltage is produced as explained above. This causes the 6J5-G tube to act as more capacitive reactance and thus lower the oscillator frequency; this gives a lower converter output frequency, approximately 465 kc.

When the set is mistuned below the incoming signal, the converter output is below the 465 kc. required. A negative discriminator voltage is produced as explained above. This

causes the 6J5-G to act as less capacitive reactance thus increasing the oscillator frequency. This in turn gives a higher converter output frequency, approximately 465 kc.

A decided A.F.C. action is apparent on short waves. The discriminator voltage is produced in the same manner as above. However, the action of the 6J5-G tube is different. The 6A8 oscillator plate voltage and 6J5-G plate voltage are supplied through the same resistor (R-5). A positive discriminator voltage allows the 6J5-G plate current to increase, thus reducing the 6A8 oscillator plate voltage. This causes a lower oscillator frequency with the resultant lower converter output frequency, approximately 465 kc.

With a negative discriminator voltage the 6J5-G plate current is less, thus increasing the 6A8 oscillator plate voltage. This causes a higher oscillator frequency with the resultant higher converter output frequency, approximately 465 kc.

DIAL MECHANISM

- (A) Manual drive leather-faced bevel gear
- (B) Beveled idler gear
- (C) Tuning shaft gear
- (D) Volume control drive cord pulley
- (E) Band switch drive cord pulley
- (F) Tone control drive cord pulley
- (G) Belt driven spiral rod drive pulley
- (1) Spiral drive rod rider
- (2) Pointer slider guide rod
- (3) Tuning pointer spiral drive rod
- (4) Motor belt
- (5) Spiral rod bracket with bearing
- (6) Motor shaft collar
- (7) Clutch tension spring
- (8) Pulley dog
- (9) Motor shaft collar
- (10) Tone control pointer
- (11) Tone control cord pulley stud
- (12) Band switch indicator
- (13) Band switch indicator cord pulley stud
- (14) Long dial drive cord
- (15) Dial scale pointer
- (16) Volume control pointer
- (17) Short dial drive cord
- (18) Stationary spring support
- (19) Relay armature extension
- (20) Armature back stop

Fig. 7

Tuning mechanism diagram (Fig. 1) is self-explanatory. The tuning condenser drive cord can be easily replaced without removing any part of the chassis while all dial indicating control cords are made readily accessible for servicing by merely removing the seven small screws holding the dial reflector assembly.

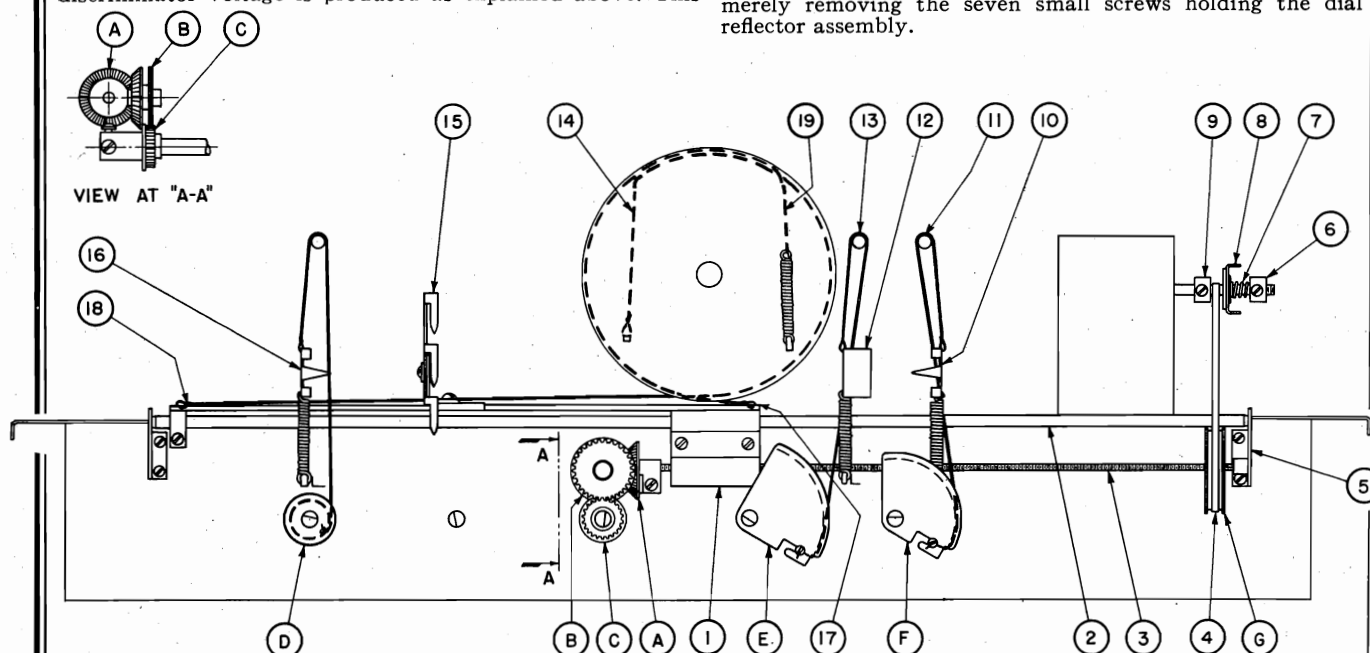


Fig. 1. Dial Mechanism

GENERAL ELECTRIC CO.

RELAY ADJUSTMENTS

The following adjustments should be made with relay assembled on the motor bracket, Fig. 7.

(1) Make sure contacts are adjusted to open in correct sequence: center contacts (motor) first, contacts farthest from armature (AFC) second, contacts nearest armature (silent tuning) last. *It is very important that the silent tuning switch open last.*

(2) Adjust backstop (24), so that the armature snaps closed when the relay coil is energized with 4.5 volts A.C. The backstop must make a positive contact with the back of the armature in the open position; otherwise sluggish operation of the relay will result which will cause the motor drive to skip buttons. If the relay will not close at 4.5 volts and still maintain proper travel and sequence, weaken the spring on the rear of the armature plate by bending the stationary spring support (20).

(3) Loosen the setscrew on the motor shaft collar nearest motor (9) and adjust collar so that the pulley dog (8) misses the relay armature extension by .001 in. (relay not energized). All contacts must be closed when the relay armature touches the end of the motor dog; if the motor contacts open in this position the armature will chatter.

(4) Spring adjustment (7) on slip clutch should be just tight enough so as not to allow slippage of motor when driving the dial mechanism. Loosen setscrew on outside shaft collar (6) and screw the collar on the shaft to tighten slip clutch.

(5) The pole piece of the relay coil is divided in two semi-circles. The relay armature should only touch the pole segments toward the motor shaft. There should be a .001 in. clearance between the back segment (21) and the armature when closed; otherwise a buzzing will be heard. Sometimes a front pole segment that is not perfectly flat will cause the same trouble. File off the offending bump.

(6) Backstop setting should be such that the distance (22) is $26/32$ in. with the relay closed and $29/32$ in. with the relay open.

(7) Spacing between relay contact points when open should be .015 to .018 inches for contact No. 1 and .008 to .010 inches for contact No. 2 and No. 3.

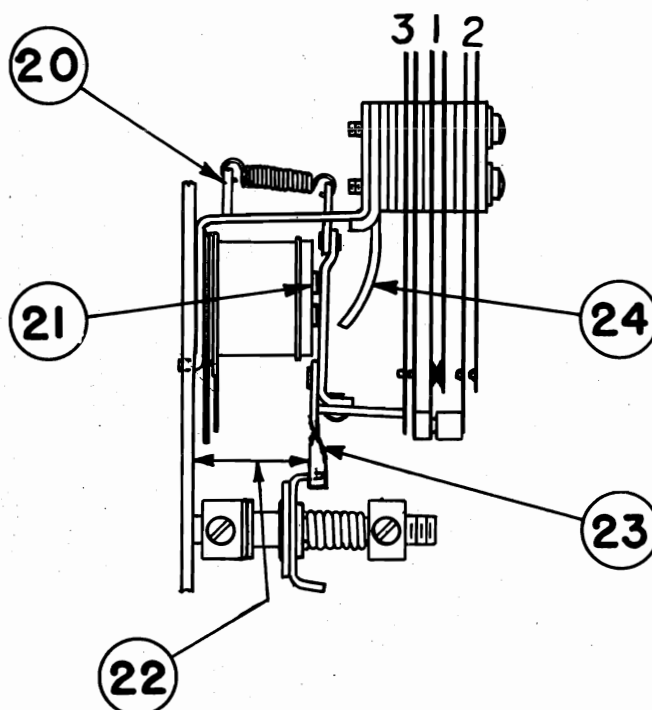


Fig. 7. Relay

INCORRECT OPERATION AND SUGGESTED REMEDIES

Skipping of Stations

(a) "Touch Tuning" button leads not making good contact to adjustable contact pins. Clean contacts and re-insert.

(b) Sliding contactor blade either covered by thin piece of bakelite or dirty. Carefully run fine file over top of sliding contactor, making sure not to leave any sharp corners. Sliding contactor should have a small amount of vaseline on beveled surface to prevent chattering.

(c) Nipple too sharp on adjustable contacts will cause sliding contactor blade to jump across. Smooth off with fine sandpaper.

(d) Relay armature out of adjustment causing sluggish operation of relay switch. See paragraph 2 under Relay Adjustments.

(e) Excessive side play in sliding contactor. Loosen the setscrew on the back of the sliding contactor and slide holder together. Final adjustment should allow sliding contactor to rock freely.

(f) Not enough tension on sliding contactor arm. Loosen collar on shaft in rear of contact segment and move sliding contactor arm towards the contact segment; then tighten collar on shaft.

(g) If the contacts at the rear of the "Touch Tuning" button assembly shafts do not close or make good contact, the motor will continue to scan the dial without stopping at the desired station.

(h) Contact segment may be bent out of shape. This should be perpendicular to chassis deck and parallel to rear chassis apron in order to allow the contactor arm to wipe the adjustable contacts evenly.

No Action When Station Button Is Pressed

(a) Relay remains energized and audio continues to function—push button escutcheon grounded. Be sure dial and push button escutcheons are insulated from each other or from the control shafts.

(b) "Off" switch contacts do not close.

(c) If set does not tune automatically unless scan button is also depressed, contacts No. 6, Fig. 5, require closer spacing.

(d) Open or shorted motor capacitor—Characterized by motor armature humming but no torque. Replace 1000 mfd. capacitor C58.

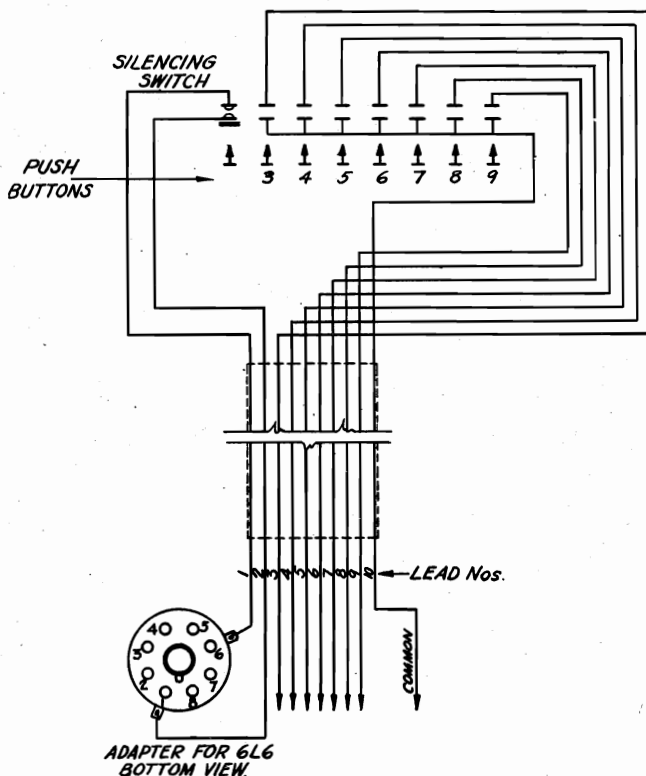


Fig. 6. Schematic of Remote Control

MODEL F-109

GENERAL ELECTRIC CO.

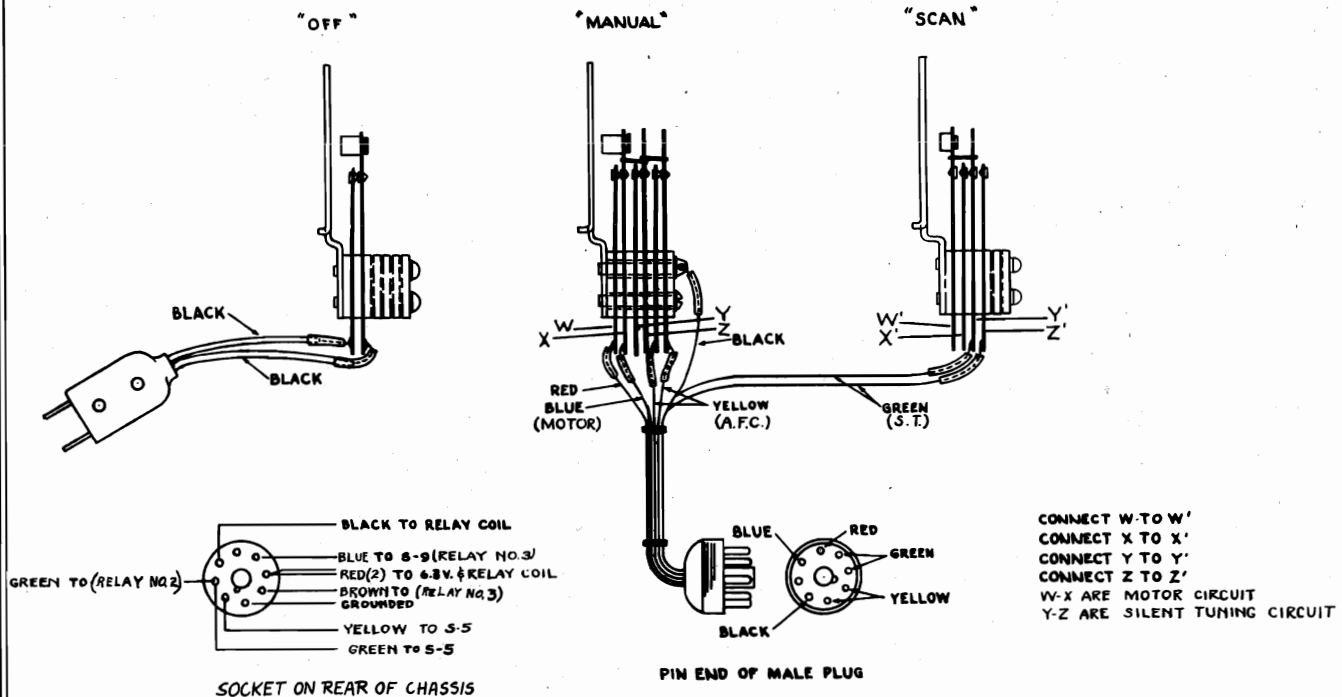


Fig. 8. Wiring Diagram of "Off," "Manual" and "Scan"

(e) Open or shorted coil in motor—Characterized by no torque or low torque in one direction. Replace motor or repair coil.

(f) Drive mechanism bound, or too tight for motor to drive.

(g) Not enough friction in slip pulley—The friction of the slip pulley is adjusted by tightening the collar on the end of the motor shaft. Care should be exercised that the setscrew does not hit the relay armature.

(h) Belt slippage—The tension of the belt may be increased by raising the motor on the relay bracket. If the belt still slips, reverse belt and use other surface or use belt dressing.

Noise in Audio Output While "Touch Tuning"

(a) Improper sequence—If the relay switch contacts open in improper sequence, audio output will be available too soon, and the break in the motor switch will be heard in the speaker. Correct as described in (1) under Relay Adjustments.

(b) Dressing of silent tuning lead—Early production receivers had silencing lead from 6L6 grid run to connector socket on rear apron, up to "Push Button" switch, and return through socket connector to the relay switch where the ground wires of AFC, motor and silent tuning contacts were connected together and grounded to chassis. Reconnect as follows: Ground A.F.C. and motor contacts to a point of the chassis directly underneath the motor. The green grid lead from the 6L6 should be rewired over the top of the chassis deck to the silencing contact, Fig. 9, of the relay switch; the lead from the other relay silencing contact should be connected to a prong of the connector plug, Fig. 8, from this point, connection is made to the silencing portion of the "Touch Tuning" switch, and a return to ground from this point is made through the connector plug to the chassis near the connector plug socket.

(c) Noise through filter circuit—The "blurr" in the speaker on early production due to the sudden application of audio may be reduced by placing a .05 mfd., 600-volt capacitor (RC-092) across the output filter capacitor (C-61).

Miscellaneous Adjustments

(a) When a "Touch Tuning" button will not remain in a locked position, it usually indicates that the springs at each end of the latch bar are not in proper adjustment. They should exert an equal pull on each end.

(b) The fork on the tuning condenser should be adjusted so that the motor reversing switch clicks over when the pointer approximately reaches the 540 and 1620 kc. markings on the dial scale. With the pointer at the extreme end of calibrations when tuning manually, the reversing switch lever should be set so there is not more than 1/16 in. nor less than 1/32 in. clearance between the lever and the switch trigger after the switch has snapped.

(c) The motor and relay mounting plate should rest parallel to the chassis deck. Do not adjust the spring tension foot; raise or lower motor on bracket, as required. Make sure that there is no electrical connection between the motor frame and the chassis.

(d) The "Off" switch on the "Touch Tuning" assembly should stay closed for at least one-half the movement of the key, opening only on the final click. If firm contact does not exist between the points, vibration of the set may cause an intermittent noise.

(e) The silent tuning contacts of the "Manual" and "Scan" switches should open last to permit quiet operation.

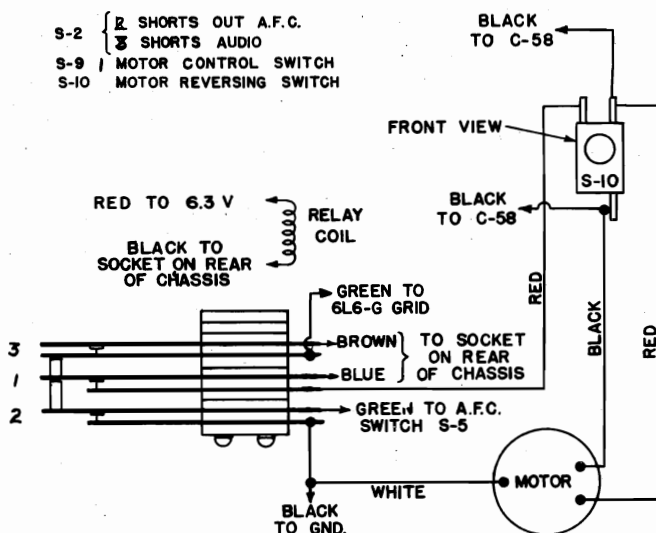
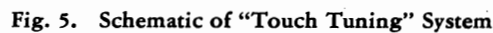


Fig. 9. Motor Relay Wiring Diagram

MODEL F-109



When the "Remote Touch Tuning Control" unit is connected, as explained above, the action is identical with that of the regular station selection circuit. The remote button unit is in series with the "Remote" button lead on the receiver through lead No. 10 of the remote unit cable. The relay field coil circuit is completed through the set "Remote" button (S-7); the common (No. 10) lead; the depressed control button; its lead to a pin on the contact segment, and to ground through the sliding contactor. *The "Silent" button must be in the released position when operating the receiver from either the remote control unit or from the receiver controls otherwise no audio output will be obtained.*

MODELS FE-112,
FE-116, FE-119

GENERAL ELECTRIC CO.

ALIGNMENT PROCEDURE

I.F. Alignment with Oscilloscope

Band Switch Setting	Input Frequency	Point of Input	Dummy Ant.	Trimmer	Remarks
1. Band "B"	455 kc. Sweep	2nd I.F. Grid	.05 Mfd.	3rd I.F. Sec. (C-30) Pri. (C-29)	Gang condenser plates wide open—connect vertical input of oscilloscope to ground and the junction of R-18 and R-36 and 3rd I.F. transformer. Adjust trimmers for a single symmetrical curve of maximum amplitude. The resulting curve with input at converter grid is shown in Fig. 1.
2. Band "B"	455 kc. Sweep	1st I.F. Grid	.05 Mfd.	2nd I.F. Sec. (C-28) Pri. (C-27)	
3. Band "B"	455 kc. Sweep	Converter Grid	.05 Mfd.	1st I.F. Sec. (C-26) Pri. (C-25)	
4. Band "B"	455 kc. Sweep	Antenna Post	250 Mmf. 400 ohms	Wave trap Trimmer C-31	Adjust trimmer for minimum amplitude.

I.F. Alignment with Output Meter

1. Band "B"	455 kc. with Modulation	2nd I.F. Grid	.05 Mfd.	3rd I.F. Sec. (C-30) Pri. (C-29)	Gang condenser plates wide open—connect output meter across voice coil—keep input signal low and volume control at maximum. Adjust all trimmers in order mentioned for maximum output. Do not attempt an overall realignment after stage by stage alignment has been accomplished.
2. Band "B"	455 kc. with Modulation	1st I.F. Grid	.05 Mfd.	2nd I.F. Sec. (C-28) Pri. (C-27)	
3. Band "B"	455 kc. with Modulation	Converter Grid	.05 Mfd.	1st I.F. Sec. (C-26) Pri. (C-27)	
4. Band "B"	455 kc. with Modulation	Antenna Post	250 Mmf. 400 ohms	Wave trap Trimmer C-31	Adjust trimmer for minimum output.

R.F. Alignment

1. Band "B"					Close gang plates. Adjust pointer to first mark at left end of tuning scale.
2. Band "A"	350 kc. with Modulation	Antenna Post	250 Mmf. 400 ohms	Osc. (C-14) R.F. (C-8) Ant. (C-23)	Connect output meter across voice coil. Set tone control to "Bass" position. Volume control maximum. Adjust trimmers for maximum output with a low input signal.
3. Band "A"	145 kc. with Modulation	Antenna Post	250 Mmf. 400 ohms	Osc. Padder (C-18)	Adjust padder for maximum output in the vicinity of 145 kc. while rocking the gang condenser.
4. Band "A"	Repeat operation 2				
5. Band "B"	1500 kc. with Modulation	Antenna Post	250 Mmf. 400 ohms	Osc. (C-13) R.F. (C-7) Ant. (C-22)	Adjust trimmers for maximum output with a low input signal.
6. Band "B"	580 kc. with Modulation	Antenna Post	250 Mmf. 400 ohms	Osc. Padder (C-17)	Adjust padder for maximum output in the vicinity of 580 kc. while rocking the gang condenser.
7. Band "B"	Repeat operation 4				
8. Band "D-1"	12 Mc. with Modulation	Antenna Post	250 Mmf. 400 ohms	Osc. (C-16) R.F. (C-10) Ant. (C-4)	Peak C-10 for maximum output while rocking the gang. Peak C-4 for maximum output. The image of any signal on "D-1" band should be heard 910 kc. below the input signal when osc. trimmer C-16 is set properly. Example: 12 Mc. image is at 11.09 Mc.
9. Band "D-2"	15 Mc. with Modulation	Antenna Post	250 Mmf. 400 ohms	Osc. (C-19) R.F. (C-11) Ant. (C-5)	Set these padders for maximum output. The image of any signal on "D-2" band should be heard 910 kc. above the input signal. Example: 21 Mc. image is at 21.91 Mc.
10. Band "D-2"	21 Mc. with Modulation	Antenna Post	250 Mmf. 400 ohms	Osc. (C-15) R.F. (C-9) Ant. (C-3)	Peak C-9 for maximum output while rocking the gang condenser peak C-3 for maximum output.
11. Band "D-2"	Repeat operation 8				
12. Band "D-2"	Repeat operation 9				

FOR OTHER DATA SEE INDEX

GENERAL ELECTRIC CO.

MODELS LF-115, LF-116, LFC-1118,
LFC-1128, LFC-1228

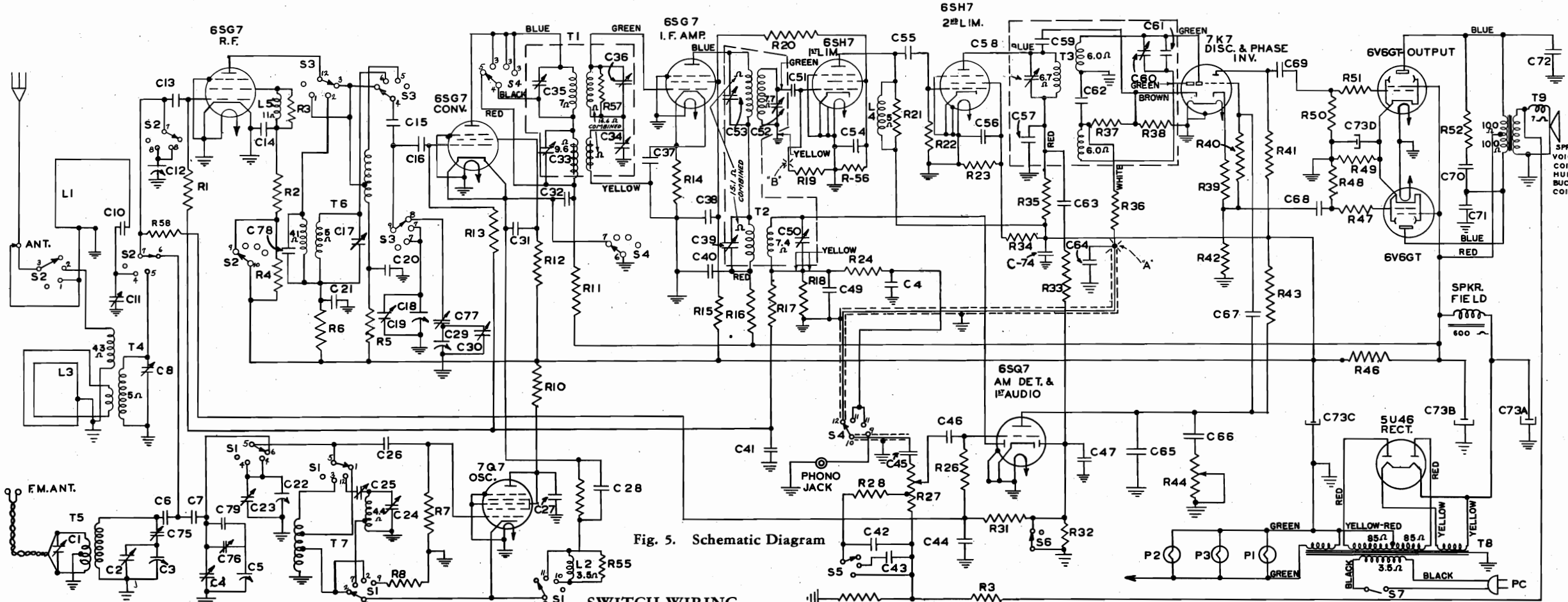


Fig. 5. Schematic Diagram

SWITCH WIRING

The band switch terminals are numbered in the Switch Wiring Diagram, Fig. 6, to assist in locating the corresponding numbered points on the Schematic Diagram, Fig. 5. Switch section 1 in Fig. 6 is represented as S1, section 2 is represented as S2, etc. on the Schematic Diagram, Fig. 5.

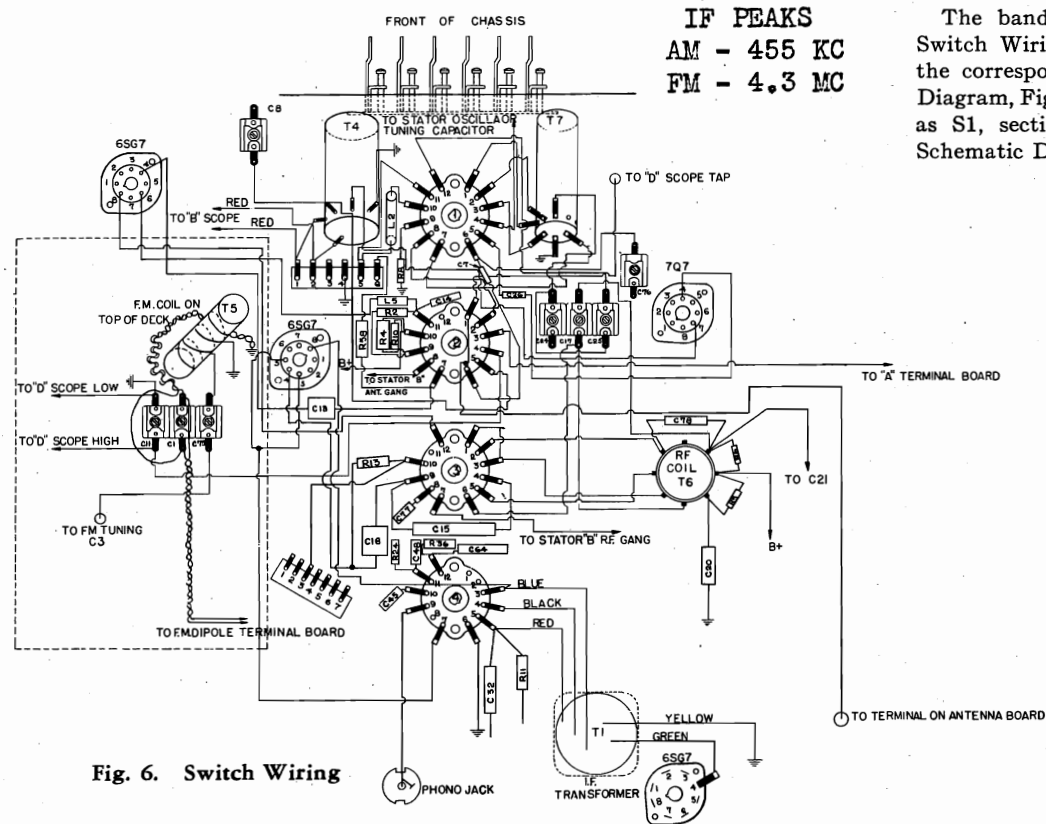


Fig. 6. Switch Wiring

Symbol	Description	Symbol	Description
C-1	"FM" antenna trimmer	R-26	6.8 megohm, carbon resistor
C-2	"FM" RF trimmer	R-27	2 megohm, volume control
C-3	"FM" tuning condenser—RF	R-28	68,000 ohm, carbon resistor
C-4	"FM" oscillator trimmer	R-29	22 ohm, carbon resistor
C-5	"FM" tuning condenser—oscillator	R-30	470 ohm, carbon resistor
C-6	47 mmf., mica capacitor	R-31	2.2 megohm, carbon resistor
C-7	10 mmf., compensating capacitor	R-32	1.0 megohm, carbon resistor
C-8	"BC" band mmf., RF trimmer	R-33	10,000 ohm, carbon resistor
C-10	3000 mmf., mica capacitor	R-34	68,000 ohm, carbon resistor
C-11	"SW" band RF trimmer	R-35	22,000 ohm, carbon resistor
C-12	"AM" tuning condenser—RF	R-36	68,000 ohm, carbon resistor
C-13	220 mmf., mica capacitor	R-37, -38	100,000 ohm, carbon resistor
C-14	.02 mfd., paper capacitor	R-39	3,300 ohm, carbon resistor
C-15	.05 mfd., paper capacitor	R-40	470,000 ohm, carbon resistor
C-16	47 mmf., mica capacitor	R-41, -42	82,000 ohm, carbon resistor
C-17	"B" band trimmer	R-43	220,000 ohm, carbon resistor
C-18	"AM" tuning condenser—converter	R-44	0.5 megohm treble-tone control
C-19	"D" band trimmer	R-46	2,500 ohm, wire wound resistor
C-20	3600 mmf., mica capacitor	R-47	1,000 ohm, carbon resistor
C-21	.05 mfd., paper capacitor	R-48	220,000 ohm, carbon resistor
C-22	"AM" tuning condenser—oscillator	R-49	270 ohm, carbon resistor
C-23	"B" band trimmer	R-50	220,000 ohm, carbon resistor
C-24	"B" band trimmer	R-51	1,000 ohm, carbon resistor
C-25	560 mmf., padder	R-52	8,200 ohm, carbon resistor
C-26	65 mmf., compensating capacitor	R-55	100,000 ohm, carbon resistor
C-27	.05 mfd., paper capacitor	R-56	47,000 ohm, carbon resistor
C-28	.005 mfd., paper capacitor	R-57	220,000 ohm, carbon resistor
C-29	"FM" tuning condenser—converter	R-58	820,000 ohm, carbon resistor
C-30	"FM" converter trimmer	S-1, -2, -3, -4	Band switch
C-31, -32	.02 mfd., paper capacitor	S-5	Bass tone switch
C-37, -38	.05 mfd., paper capacitor	S-6	Squelch switch
C-40	.02 mfd., paper capacitor	S-7	Power switch (combined R-44)
C-41	.05 mfd., paper capacitor	T-1	1st IF transformer
C-42	.004 mfd., paper capacitor	T-2	2nd IF transformer
C-43, -44, -45	.01 mfd., paper capacitor	T-3	Discriminator IF transformer
C-46	.005 mfd., paper capacitor	T-4	"BC" Band antenna transformer
C-47, -48, -49	100 mmf., mica capacitor	T-5	"FM" band antenna transformer
		T-6	"BC," "SW" and "FM" converter transformer
		T-7	"BC," "SW" and "FM" oscillator transformer
		T-8	Power transformer
		T-9	Output transformer
		L-1	"SW" Beam-a-Scope
		L-2	Cathode choke
		L-3	"BC" Beam-a-Scope
		L-4	Limiter plate choke
		L-5	Screen choke

GENERAL ELECTRIC CO.

MODELS LF-115, LF-116,

SEE RIDER'S "AUTOMATIC RECORD CHANGERS AND RECORDERS" FOR
DATA COVERING THE RECORD CHANGERS INCORPORATED IN THE FOLLOWING G.E. COMBINATIONS:

MODEL LFC-1118 HAS THE RCA RP-162 RECORD CHANGER

MODEL LFC-1128 " " " RP-158 " "

MODEL LFC-1228 " " " RP-160 " "

GENERAL INFORMATION

Models LF-115 and LF-116 are combination AM and FM superheterodyne receivers using eleven tubes. The LF-116 differs from the LF-115 by the use of a special 10-inch speaker and an enclosed and lined tone chamber which provide superior acoustic qualities.

The Model LFC-1118 uses the Model LF-115 AM and FM chassis in conjunction with an automatic record changer.

The Model LFC-1228 is a deluxe phonograph and A-FM receiver using the LF-115 chassis and the 10-inch speaker and padded sound chamber as used in Model LF-116 receiver. The

The Model LFC-1128 is very similar to the Model LFC-1118 phono combination except for the automatic record player.

A detailed description of the FM portion of these receivers is given in the following paragraphs.

Oscillator-converter Circuit

The first 6SG7 tube acts as a conventional RF amplifier when operating in the Short-wave or Broadcast bands. However, in order to obtain optimum gain, the above tube becomes the first converter of a double or cascade converter system when operating in the FM band.

This cascade converter system consists of the two 6SG7 converter tubes and an oscillator tube 7Q7 with their associated circuits. The tuning condensers for the two converters and oscillator are low capacity sections and ganged together as usual. The antenna tuning circuit consisting of T5 and C3 tunes the FM band from 42 to 50 megacycles; the second converter tuned circuit consisting of a portion of T6 and C29 tunes from 23.15 to 27.15 megacycles; while the oscillator tuned circuit consisting of C5 and a portion of T7 tunes from 18.85 to 22.85 megacycles. The oscillator voltage is capacity coupled to the grid of the first converter tube through C-7. This produces, by heterodyne action, a signal to which the plate circuit of this first converter is tuned. The first converter tube also provides a gain of unity for the oscillator frequency. Accordingly, oscillator voltage is also applied to the grid of the second 6SG7 converter tube which produces in its plate circuit the IF frequency of 4.3 megacycles.

To illustrate the action consider an FM signal of 42 MC to which the receiver is tuned. The oscillator frequency for this setting of the tuning control is 18.85 MC and it heterodynes in the 1st converter tube with the 42 MC signal to

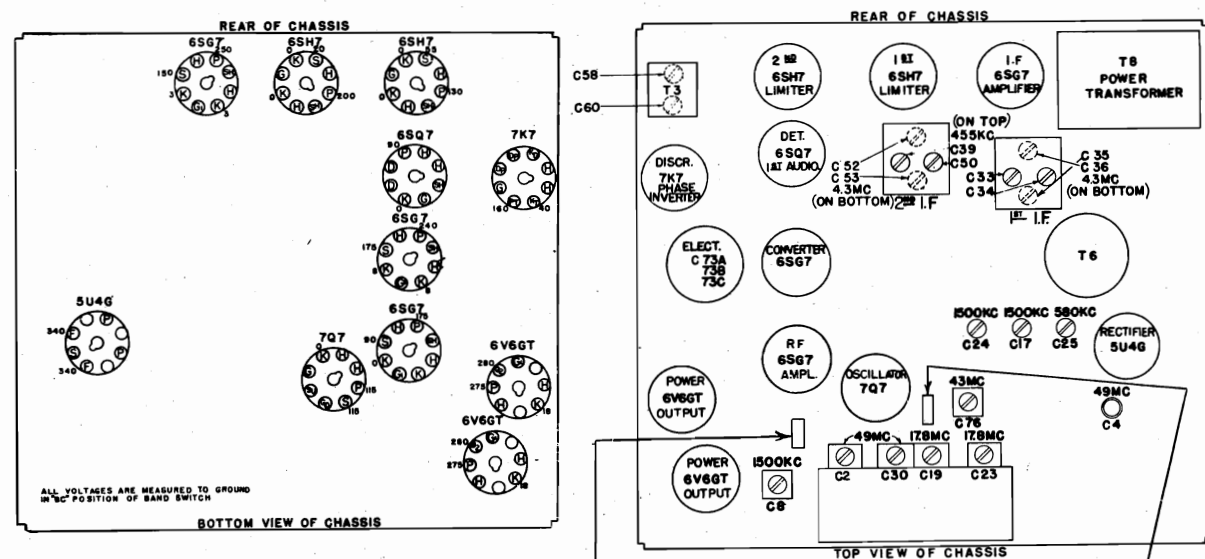


Fig. 2. Trimmer Location

MODELS LF-115, LF-116, LFC-1118

LFC-1128 LFC-1228

GENERAL ELECTRIC CO.

form 23.15 MC (42-18.85). The 23.15 MC signal, in turn, beats with oscillator signal in the 2nd converter to produce the 4.3 MC intermediate frequency.

IF Amplifier

The IF amplifier operates as a dual amplifier in that it will operate either at the 455 KC required for the Broadcast and SW bands or at 4.3 MC required for the FM band, without the need of switching transformers except at the primary of the 1st IF. When the IF is operating at 455 KC, the primary and secondary coils of the 4.3 MC section of T1 and T2 are such a low impedance that they can be considered as shorted across; while when operating at 4.3 MC, the primary and secondary trimmers of the 455 KC section of T1 and T2 are such a low impedance that they effectively short out this portion of the transformer. Thus the frequency at which the IF is operating is applied across the proper section of the dual transformers and is amplified by the IF tubes.

Cascade Limiter Circuit

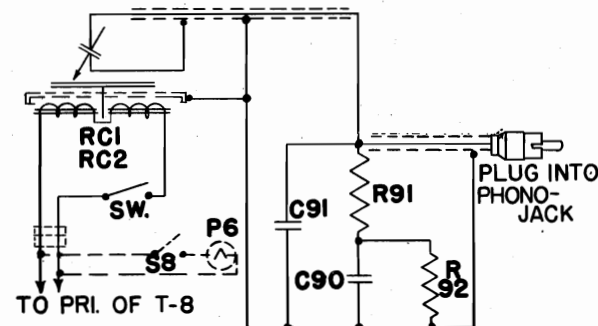
The limiter circuit consists of two resistance coupled 6SH7 tubes in series. Each limiter operates at zero initial bias and low screen voltage. Both grid circuits are designed for self-biasing and the use of capacity-resistance networks provides enough time delay to retain the grid bias between signal peaks. The action of the limiter is such that as soon as a signal is applied to the grid of the tube the grid draws current. This grid current charges up the capacitor across the grid resistor and at the same time establishes a bias through current drain in the resistor. The circuit is so designed that negative signal swings are all beyond plate current cutoff and positive signal peaks are cut off by plate current saturation. The value of the 1st limiter capacity-resistance network is so chosen as to limit noise amplitudes. This arrangement leaves the 2nd limiter with the very much simplified task of reducing the remaining noise to the desired level.

FM Station Silencer

This circuit operates on amplitude modulated signals to produce squelch or quieting of the audio amplifier. Since the noise limiter circuits only operate when an FM carrier is present, noise between stations will ride through with undiminished amplitude. This amplitude modulation appears in the last noise limiter plate circuit and develops a voltage across R35. This voltage is rectified by one diode of the 6SQ7 tube and then applied to the 1st audio grid circuit of this tube provided the switch S6 is open. This rectified DC voltage is sufficient to completely bias off this audio tube so that no signal is passed. When a sufficiently strong FM signal is received so that the noise limiters operate with satisfactory signal strength, the noise or amplitude signal is reduced so low that the proper bias is restored to the 6SQ7 audio amplifier and the audio signal is then passed through to the output and phase inverter circuits. This squelch voltage can be manually removed by closing switch S6 so that weak FM stations that have considerable noise present can be received if desired.

FM CHANNEL ALIGNMENT

Due to good stability of components and the wide band characteristics of the IF amplifier circuits, alignment should

Fig. 9. Phono Compensation Circuit
(Models LFC-1118 and LFC-1128)

be unnecessary under normal conditions. However, if alignment is necessary, the procedure is given in table form on page 3 with the location of all trimmers shown in Fig. 2.

IF Alignment

It is preferable to align the IF amplifier by means of a cathode ray oscilloscope and a 4.3 megacycle signal generator with a superimposed 200 KC sweep frequency. Many signal generators and mechanical frequency wobblers are available wherein the above requirements are fulfilled. As for example: G-E Model TMV-97-C Test Oscillator used in conjunction with the G-E Frequency Modulator TMV-128A will give a sufficient sweep of 200 KC when operated in the "Hi" position in conjunction with the 3100-6800 KC band of the Test Oscillator. When the Frequency Modulator is added to the Test Oscillator, the Test Oscillator calibration no longer is accurate, thus making necessary a recalibration. The following procedure may be followed. With a factory aligned receiver where the IF alignment can be assumed to be accurate, connect the above equipment to show the IF selectivity curve as described in Table I. When the two curves are brought together (by tuning Test Oscillator rather than receiver IF trimmers) so that they coincide, take the reading of the signal generator as being the proper point for 4.3 MC with 200 KC sweep alignment. As a further check on the accuracy, another signal generator where the 4.3 MC calibration is accurately known can be coupled to the same point of input as the Test Oscillator and Modulator are coupled and then when the 2nd single frequency generator (4.3 MC) is turned ON, a beat note should be observed at the peak of the resonance curve on the oscilloscope. If this beat note is not at the peak retune the Test Oscillator-Modulator until it does appear at this point.

Where the above equipment is not available, satisfactory alignment can be accomplished by using the equipment and procedure given in Table II. This makes use of an unmodulated RF signal of 4.3 MC and a high resistance (20,000 ohm per volt) voltmeter. The calibration of the signal generator must be accurately known.

A dummy antenna of 50 mmf. or less should be used in series with the signal generator input to the receiver when all IF alignments are made.

RF Alignment

Make all Frequency Modulation RF alignments with the chassis in the cabinet. The alignment procedure is given in Table III on page 3. The image signal should be below 46 MC when the oscillator is properly set.

AM CHANNEL ALIGNMENT

The Amplitude Modulation Channel of the receiver is aligned by following the procedure as outlined in Table IV. All IF alignment may be made with the chassis either installed in or removed from the cabinet. The RF alignment, however, must be made with the chassis and loop antennas securely fastened into their respective places in the cabinet as their relative position in respect to each other affects the alignment. The RF signal should be capacity coupled to the loop antennas by placing a two-foot wire for an antenna on the test-oscillator output post (high side). Keeping this antenna two feet or more from the receiver loops will generally insure freedom from too much coupling.

Symbol	Description
C90	.0025 mfd. paper capacitor
C91	180 mmf. mica capacitor
R91	130,000 ohm carbon resistor
R92	430,000 ohm carbon resistor
S8	Compartment lamp switch
P6	Compartment lamp

GENERAL ELECTRIC CO MODELS LF-115, LF-116, LFC-1218, LFC-1128, LFC-1228

Table I IF ALIGNMENT WITH OSCILLOSCOPE—"FM" CHANNEL

Step	Input Signal Connected to	Input Frequency	Band and Pointer Setting	Trimmer Adjustment	Comments
1	6SG7 converter grid in series with 22 mmf.	4.3 MC & ± 200 KC Sweep	"FM" Band 42 MC	C52 C53	Connect high side of oscilloscope in series with 470,000 ohm resistor to R19 at point "B." Connect low side to chassis ground. Peak trimmers for resultant curve shown in Fig. 3.
2	6SG7 converter grid in series with 22 mmf.	4.3 KC & ± 200 KC Sweep	"FM" Band 42 MC	C35 C36	
3	Repeat Step 1				
4	Repeat Step 2				Connect high side of oscilloscope in series with 470,000 ohm resistor to R36, point "A." Connect low side to chassis ground. Peak trimmers for resultant curve shown in Fig. 4. C60 is aligned when curve crosses midway in vertical plane. Proper alignment of C58 gives straightest sides to curve near crossover point.
5	6SG7 converter grid in series with 22 mmf.	4.3 MC & ± 200 KC Sweep	"FM" Band 42 MC	C60 C58	

Table II IF ALIGNMENT WITH METER—"FM" CHANNEL

Step	Input Signal Connected to	Input Frequency	Band and Pointer Setting	Trimmer Adjustment	Comments
1	6SG7 converter grid in series with 22 mmf.	Unmodulated 4.3 MC signal	"FM" Band 42 MC	C52 C53 C35 C36	Connect the 10-volt scale of a 20,000 ohm per volt voltmeter in series with a 470,000 ohm resistor between point "B" and ground. Peak all trimmers for maximum output using just enough input signal to give a satisfactory output reading.
2	Repeat Step 1				Connect the 10-volt scale of a 20,000 ohm per volt voltmeter in series with a 470,000-ohm resistor between points "A" and ground. <i>With C60 purposely detuned</i> , peak C58 for maximum meter reading. Align C60 for the 0 voltage point where the meter reading changes from a positive to negative value. Use as low a signal input as necessary to give a satisfactory meter reading.
3	6SG7 converter grid in series with 22 mmf.	Unmodulated 4.3 MC signal	"FM" Band 42 MC	C60 C58	

Table III RF ALIGNMENT—"FM" CHANNEL

Step	Input Signal Connected to	Input Frequency	Band and Pointer Setting	Trimmer Adjustment	Comments
1	Direct to "FM" Antenna Post	Unmodulated 49 MC signal	"FM" Band 49 MC	C4 (Osc.)	Connect the 10-volt range of a 20,000 ohm per volt voltmeter in series with a 470,000-ohm resistor to point "B." The other side of the voltmeter lead connects to chassis ground. Peak trimmers for maximum meter reading using just enough signal input to give satisfactory meter reading.
2	Direct to "FM" Antenna Post	Unmodulated 49 MC Signal	"FM" Band 49 MC	C2 C30	
3	Direct to "FM" Antenna Post	Unmodulated 43 MC Signal	"FM" Band 43 MC	C76 (Osc.)	
4	Direct to "FM" Antenna Post	Unmodulated 43 MC Signal	"FM" Band 43 MC	C75 C77	
5	Direct to "FM" Antenna Post	Unmodulated 46 MC Signal	"FM" Band 46 MC	C1	
6	Repeat Step 1				
7	Repeat Step 2				

Table IV IF, "BC," and "SW" ALIGNMENT—"AM" CHANNEL

Step	Input Signal Connected to	Input Frequency	Band and Pointer Setting	Trimmer Adjustment	Comments
1	6SG7 converter grid in series with .05 mfd.	455 KC Modulated	"BC" Band 550 KC	C50 C39 C34 C33	Connect 5.0-volt AC voltmeter across the voice coil of the speaker. Peak all trimmers for maximum output. All RF alignments must be made with the chassis in the cabinet.
2	Capacity Coupled	17.8 MC Modulated	"SW" Band 17.8 MC	C23*	
3	Capacity Coupled	17.8 MC Modulated	"SW" Band 17.8 MC	C19** C11	*When aligning the SW oscillator trimmer, use maximum capacity peak. The image frequency should appear at 18,710 KC. **Rock gang condenser when making alignment.
4	Capacity Coupled	1500 KC Modulated	"BC" Band 1500 KC	C24	
5	Capacity Coupled	1500 KC Modulated	"BC" Band 1500 KC	C17 C8	
6	Capacity Coupled	580 KC Modulated	"BC" Band 580 KC	C25**	
7	Repeat Steps 4 and 5				

Fig. 3

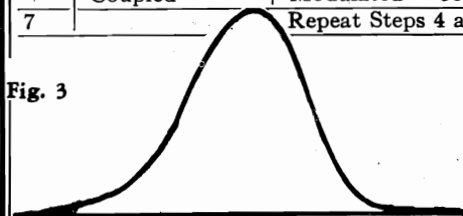
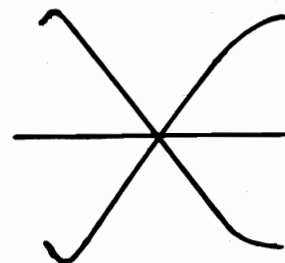


Fig. 4



**MODELS LF-115, LF-116,
LFC-1118, LFC-1128,
LFC-1228**

Tuning Frequency Range

"BC" Band.....	550-1700 KC
"SW" Band.....	5.8-18.0 MC
"FM" Band.....	42-50 MC

Intermediate Frequency

FM Channel.....	4.3 MC
AM Channel.....	455 KC

Electrical Power Output

Undistorted.....	10 watts
Maximum.....	12 watts

Loud-speaker—Electrodynamic**Over-all Dimensions (inches)**

Model	LF-115	LF-116	LFC-1118	LFC-1128	LFC-1228
Height.....	40¼	41	37	35½	36½
Width.....	31	31	32¼	35	35½
Depth.....	15¼	15¼	16¼	16¼	16¼

SERVICE HINTS**Replacement of Components**

When servicing the FM portion of this receiver and especially when replacing parts, care should be exercised to return all components including wiring to the original position occupied in the chassis. The positioning of parts and wiring is very critical. When replacing coils or IF transformers, maintain the lead lengths provided and use the same terminals to which the original coil or transformer was connected.

Pointer Focusing

The focusing of the pointer on the dial scale is accomplished by increasing or decreasing the pointer distance from the dial scale. This is a rather critical adjustment and can be varied enough by loosening the mounting bolts and moving the chassis either back or forward in the cabinet until properly focused and then tightening mounting bolts.

Rotor Balance Spring

On the right-hand side of the tuning condenser assembly is a wire bracket from which a spring is suspended that connects to the drive drum of the tuning condenser. The proper adjustment of this spring counterbalances the weight of the condenser drive assembly and prevents backlash. For chassis mounted horizontally, as in Models LFC-1118, LFC-1128 and LFC-1228, the spring must be in the rear notch of wire bracket. For the Model LF-115 which has a 20° slope mounting, the spring is fastened in the center notch of the bracket while on LF-116 mounting (30° slope) the spring is in the bracket notch nearest front of chassis.

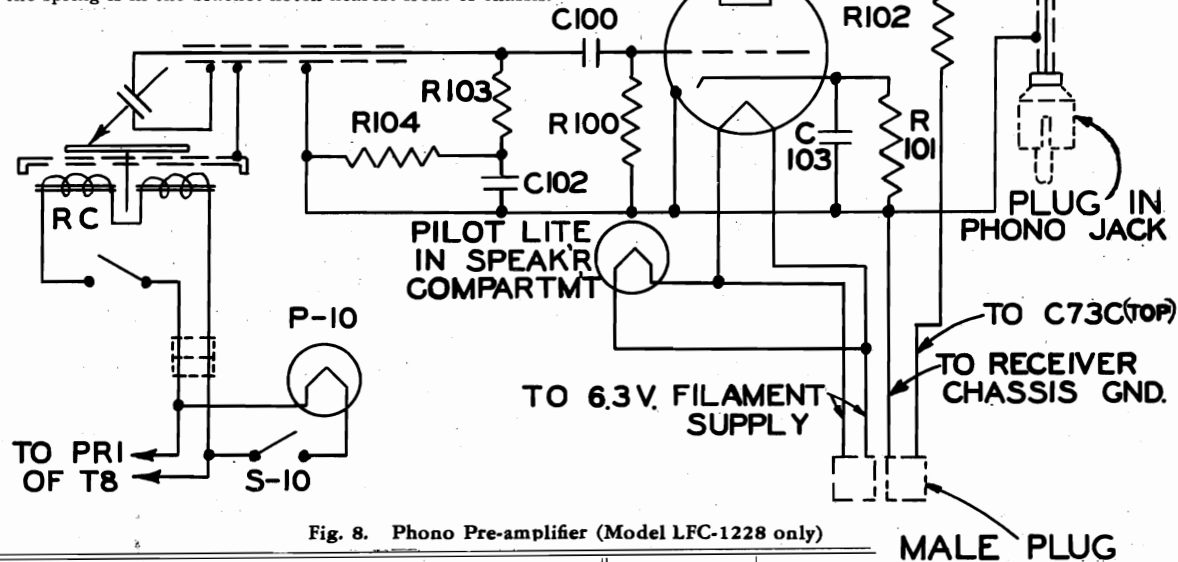


Fig. 8. Phono Pre-amplifier (Model LFC-1228 only)

Loudspeaker - Electrodynamic

Model.....	LF-115	LF-116
Cone Diameter.....	12-inch	10-inch
Voice Coil Impedance (400 cycles).....	7.8	8.4 ohms
Field Resistance.....	600 ohms	600 ohms
Model.....	LFC-1118, LFC-1128	LFC-1228
Cone Diameter.....	12-inch	10-inch
Voice Coil Impedance (400 cycles).....	7.8	8.4 ohms
Field Resistance.....	600 ohms	600 ohms

Electrical Rating

Rating	Power Supply (Volts)	Frequency (Cycles per Second)	Power Consumption (Watts)
A	(Models LF-115, LF-116) 105-125	50-60	115
C	(Models LFC-1118, LFC-1128, LFC-1228) 105-125	25 60	120 130

Drive Control Stringing

When replacing a drive cord, the stringing is accomplished as shown in Fig. 7. Before soldering the cord to the two drums as shown, check the pointer location as being at the last mark on the left-hand end of the scale when the gang condenser plates are completely closed; then solder.

CORD MAKES 1½ TURNS AROUND PULLEY

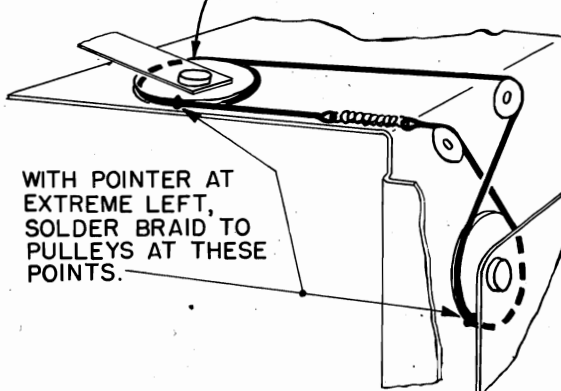
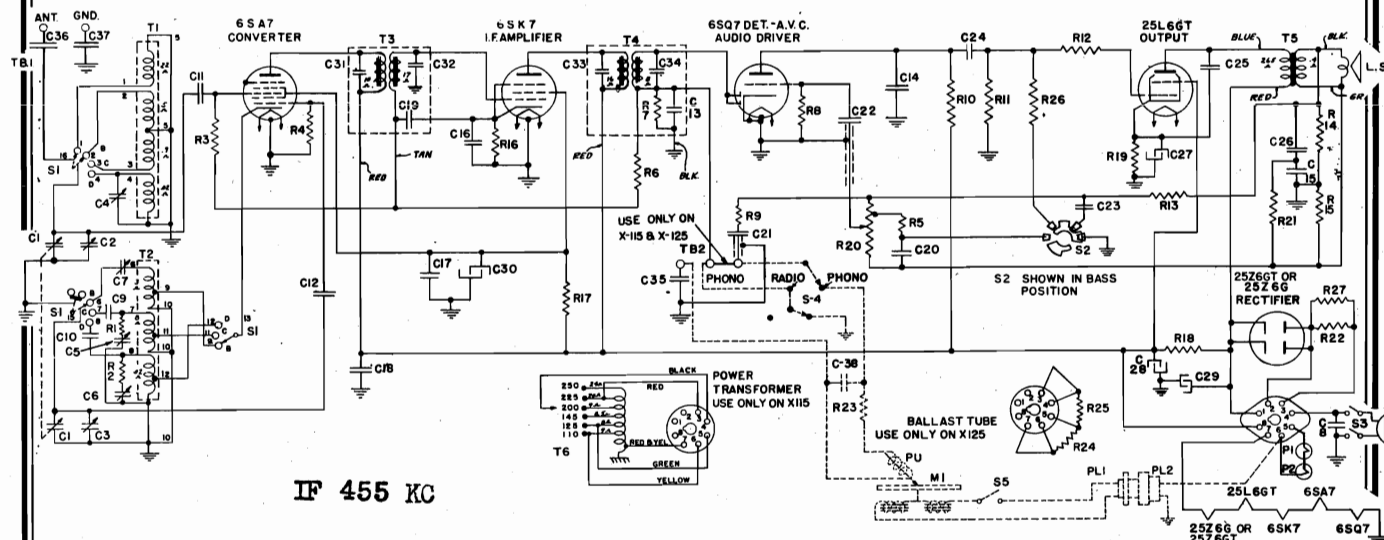


Fig. 7. Drive Cord Stringing

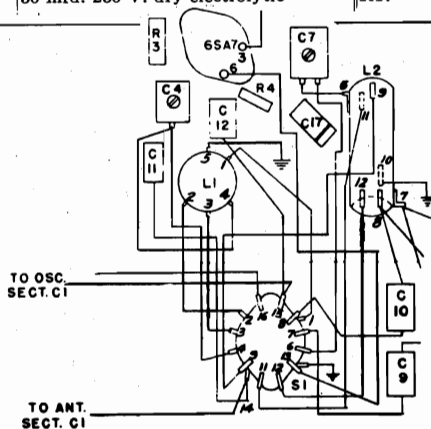
MODELS X-115, X-125,
X-145

GENERAL ELECTRIC CO.



NOTE—PARTS AND WIRING SHOWN DOTTED FOR MODEL X-145 ONLY

Symbol	Description	Symbol	Description	Symbol	Description
C1, 2, 3	Tuning condenser and trimmers	C29	40 mfd 300 V dry electrolytic	R18	3,300 ohm carbon resistor
C4	3-30 mmf "SW2" ant. trimmer	C30	20 mfd. 250 V dry electrolytic	R19	220 ohm carbon resistor
C5	3-30 mmf "SW1" osc. trimmer	C35	.25 mfd paper capacitor	R20, S3	2.0 megohm volume control
C6	3-30 mmf "SW2" osc. trimmer	C36, 37, 38	.01 mfd paper capacitor	R21	220 ohm carbon resistor
C7	435-535 mmf "BC" padder	R1	330 ohm carbon resistor	R22	330 ohm carbon resistor
C8	.02 mfd paper capacitor	R2	39 ohm carbon resistor	R23	15,000 ohm carbon resistor
C9	1800 mmf mica capacitor	R3	680,000 ohm carbon resistor	R24, 25	Ballast resistor RR-783
C10	5600 mmf mica capacitor	R4	22,000 ohm carbon resistor	R26	390,000 ohm carbon resistor
C11	470 mmf mica capacitor	R5	180,000 ohm carbon resistor	R27	330 ohm carbon resistor
C12	47 mmf mica capacitor	R6	2.2 megohm carbon resistor	T1	Antenna transformer
C13	100 mmf mica capacitor	R7	330,000 ohm carbon resistor	T2	Oscillator transformer
C14	220 mmf mica capacitor	R8	4.7 megohm carbon resistor	T3	1st IF transformer
C15-C19	.05 mfd paper capacitor	R9	47,000 ohm carbon resistor	T4	2nd IF transformer
C20, 21	.002 mfd paper capacitor	R10	330,000 ohm carbon resistor	T5	Output transformer
C22	.02 mfd paper capacitor	R11	470,000 ohm carbon resistor	T6	Power transformer
C23	.0015 mfd paper capacitor	R12	1,000 ohm carbon resistor	S1	Band switch
C24	.05 mfd paper capacitor	R13	5.6 megohm carbon resistor	S2	Tone control switch
C25	.008 mfd paper capacitor	R14	1,500 ohm carbon resistor	S3	Power switch on R20
C26	.1 mfd paper capacitor	R15	270 ohm carbon resistor	S4	Phono-Radio switch
C27	20 mfd 25 V. dry electrolytic	R16	330 ohm carbon resistor	S5	Automatic stop switch
C28	50 mfd. 250 V. dry electrolytic	R17	3,900 ohm carbon resistor		



MODELS X-115, X-125
X-145

GENERAL ELECTRIC CO.

PHONOGRAPH OR TELEVISION SOUND
CONNECTION

Fig. 1 shows a simple method for connecting a crystal or high impedance magnetic pick-up into the receiver circuit of the Models X-115 and X-125. The phono switch is a double-pole, double-throw type with a phono motor power switch attached such as General Electric Stock No. RS-366. This should be mounted in close proximity to the rear chassis terminal board. It is important that the pick-up leads be shielded with copper braid to prevent hum interference. Connect the shield braid to the chassis ground.

When making the connections in Fig. 1, remove the jumper between terminals 1 and 2.

A television sound channel or FM converter may be connected in place of the pick-up.

When the connections are made as shown the regular radio volume and tone controls control the external unit the same as when operating the radio.

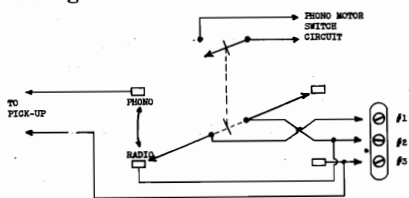


Fig. 1. Pick-up Connections
SPECIAL SERVICE INFORMATION

The following information will be very useful in servicing receivers if a vacuum tube voltmeter or similar voltage measuring instrument is available.

- (1) Stage gains.
 - (a) Antenna Post to Converter Grid at

1000 KC.....	4.0
4000 KC.....	3.2
18,000 KC.....	2.4
 - (b) R.F. on Converter Grid to I.F. on 6SK7 Grid at

1000 KC.....	36
4000 KC.....	30
18,000 KC.....	28
 - (c) I.F. on Converter Grid to I.F. on 6SK7 Grid at

455 KC.....	55
-------------	----
- (2) Voltage across the diode load to give 1/2-watt speaker output at 400 cycles.....07 volts.
- (3) DC voltage developed across oscillator grid resistor (R4) at

1000 KC.....	8.6
4000 KC.....	9.7
18,000 KC.....	7.7

Variations of +10, -20% are permissible.

ALIGNMENT PROCEDURE

The alignment procedure, shown in table form, is made with the chassis removed from the cabinet.

Since the dial scale and pointer are not a part of the main chassis, it is necessary to use the special alignment scale glued to the back side of the pulley frame adjacent to the pointer cord and make a temporary pointer. To make the pointer, close the gang condenser plates, then with paper clip or drop of paint mark point on cord which is in line with last thin line on right side of scale (viewed from rear of chassis). The selected edge of the paper clip or the drop of paint then will serve as a pointer for performing the R.F. alignment.

Output meter alignment is preferable and the meter may be connected across the voice coil leads, then turn volume control partially up. Keep the signal input as low as possible to avoid AVC action.

I.F. transformers are double, permeability-tuned with adjusting shafts at top and bottom of shield cans.

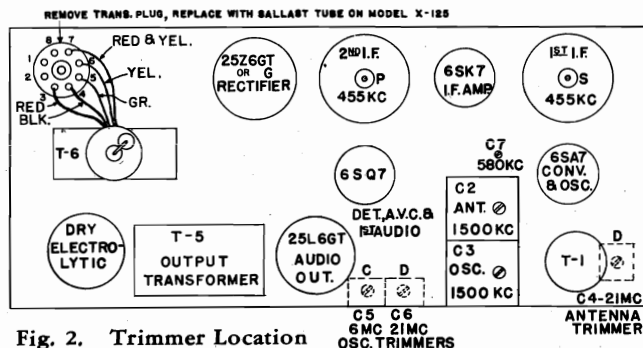


Fig. 2. Trimmer Location

ALIGNMENT CHART

Step	Test-Osc. Connect to	Test-Osc. Setting	Pointer Setting	Tune Trimmer for Max. Output
1	6SK7 IF grid in series with .05 mfd.	455 KC	"BC" Band 550 KC	2nd IF trans. inductors
2	6SA7 Conv. grid in series with .05 mfd.	455 KC	"BC" Band 550 KC	1st IF trans. inductors
3	Ant. post in series with 200 mmf and 400 ohms	580 KC	"BC" Band 580 KC	C7**
4	Ant. post in series with 200 mmf and 400 ohms	1500 KC	"BC" Band 1500 KC	(C3) osc. (C2) ant.
5	REPEAT STEP NO. 3			
6	Ant. post in series with 200 mmf and 400 ohms	6.0 MC	"SW1" Band 6.0 MC	(C5) osc.**
7	Ant. post in series with 200 mmf and 400 ohms	21.0 MC	"SW2" Band 21 MC	(C6) osc.* (C4) ant.**

* Use minimum capacity peak.

** Rock gang condenser for optimum peak.

PHONO MOTOR FREQUENCY
CONVERSION (MODEL X-145)

The Model X-145 can be operated from either a 50- or 60-cycle source of power by a slight alteration in the phono motor.

The phono motor leaves the factory for operation on 50 cycles. To convert to 60-cycle operation, it is merely necessary to remove the conversion spring from the rotor drive pulley, shown in Fig. 3. This can be easily accomplished by grasping the end of the spring with a pair of pointed pliers and pulling, using an unwinding motion to aid in loosening.

If at any time the motor is desired to be reconverted for 50-cycle operation, a new conversion spring, Stock No. RS-4037, may be put on the motor drive pulley by hand in the following manner. Hold the conversion spring in the right hand with the extension on the top side, then hook spring over the edge of drive pulley pressing down over same with a twisting effort in the direction to unwind or enlarge the inside diameter of the spring. The rotor should be held stationary during this procedure with fingers of left hand. After completely seating the spring over the pulley, the extension which is provided to facilitate assembly should be sprung out away from pulley sufficiently so that it may be clipped off, allowing no protrusion to remain.

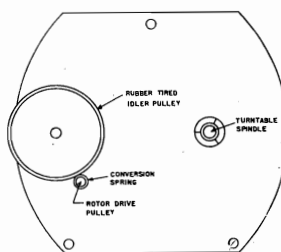


Fig. 3

GENERAL ELECTRIC CO.

MODELS X-115, X-125

X-145

MODEL X-127

MODEL X-127

BAND SWITCH CONNECTIONS

Band in Use	Section "A" Front Side	Section "A" Back Side	Section "B" Front Side	Section "B" Back Side
BC	4-8-9	5-9-10	5-9-10	1-10 6-8
SW1	4-8-10	5-9-11	5-9-11	1-2-10 7-8
SW2	4-8-11	5-9-12	5-9-12	1-2-3 8-10
31 METER	8-11	9-12-1	9-12-1	1-2-3-4 8-10
25 METER	8-11	9-12-2	9-12-2	1-2-3-4-5 8-10
19 METER	8-11	9-12-3	9-12-3	2-3-4-5-6 8-10
16 and 13 METER	8-11	9-12	9-12	3-4-5-6-7 8-10

MODEL X-127

TONE CONTROL SWITCH CONNECTIONS

Position in Use	Section "C" Back Side	Section "C" Front Side
Radio-Brilliant	Open	3-7
Radio-Bass	1-12	3-7
Radio-Treble	4-6	3-7
Radio-Mellow	1-12 4-6	3-7
Phono-Brilliant	Open	7-11 2-3
Phono-Bass	1-12	7-11 2-3
Phono-Treble	4-6	7-11 2-3
Phono-Mellow	1-12 4-6	7-11 3-4

CONVERSION FOR SPECIAL LINE VOLTAGES MODELS X-115, X-125, X-145

The Models X-115 and X-125 can be converted for operation on the following line voltages. In all cases where the power transformer is replaced with a ballast resistor, the power transformer must be removed from the chassis as the radiant heat from the ballast resistor is likely to injure the transformer insulation. When operated with these special resistors and lower power supplies than 220 volts the audio power output and socket voltages will be reduced.

220 Volts AC/DC—(Range 200-240 volts)

Remove transformer from chassis of X-115 and substitute ballast resistor RR-783 in socket previously occupied by transformer plug. Change label so that it reads Model X-125.

115 Volts DC—(range 105-129 volts)

Remove transformer from chassis of X-115 or ballast RR-783 from X-125; insert the ballast tube resistor RR-785 and change label so that it reads Model X-125Z.

180 Volts DC (range 145-215 volts)

Remove transformer from chassis of X-115 or ballast RR-783 from X-125; insert the ballast tube resistor RR-784 and change the label on the receiver so that it reads Model X-125Y.

Loud-speaker

The voice coil is accurately and permanently centered at the factory and should seldom give trouble. In case a voice coil needs recentering, it will be necessary to replace the entire cone and voice coil assembly. Assembly instructions accompany each replacement cone.

NOTE: In no case should the magnet be removed from the assembly position as it will lose magnetism.

Electrical Rating

Model	Rating	Power Supply		Frequency Cycles AC	Power Consumption (Watts)
		Voltage Tap	Voltage Range		
X-115	V	110	103-117	50-60	65
		125	118-133		
		145	134-156		
X-145		200	188-212		
		225	213-237		
		250	238-262		
X-125			200-240 AC or DC	25-100	100

MODELS X-115, X-125, X-145

Tuning Frequency Range

Band "BC"	540-1600 KC
Band "SW1"	2200-7000 KC
Band "SW2"	7000-22000 KC

Electrical Power Output

Undistorted	2.7 watts
Maximum	5.0 watts

Loud-speaker—PM Dynamic

Cone Diameter	6½ inches
Voice Coil Impedance (400 cycles)	3.5 ohms

Phonograph Mechanism

Type Mechanism	Manual
Type Pick-up	Magnetic
Turntable Speed	78 RPM

Tubes

Converter-Oscillator	GE-6SA7
IF Amplifier	GE-6SK7
Detector, Audio, AVC	GE-6SQ7
Power Output	GE-25L6GT
Rectifier	GE-25Z6G or GT
Dial Lamp	(2) MAZDA No. 44

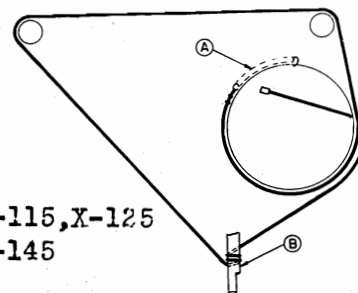
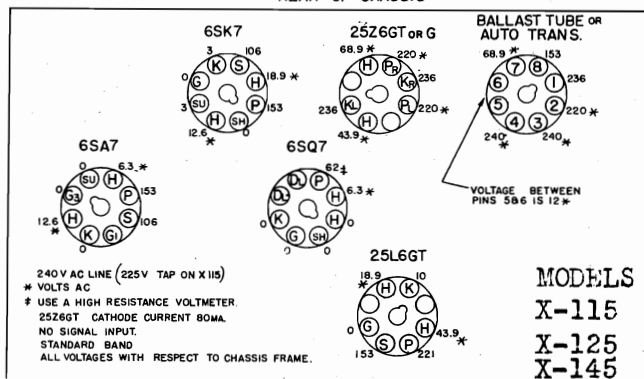
MODELS X-115, X-125
X-145

Fig. 7. Drive Arrangement

REAR OF CHASSIS



BOTTOM VIEW OF CHASSIS

MODELS
X-115
X-125
X-145

MODEL X-127

GENERAL ELECTRIC CO.

REPLACEMENT PARTS LIST

Our Cat. No.	Symbol	Description	List Price	Our Cat. No.	Symbol	Description	List Price
*RC-039	C-1	CAPACITOR—.01 mfd., 600-V paper	\$0.25	*RO-1295	R-1	RESISTOR—33,000 ohm $\frac{1}{2}$ watt carbon	\$0.70-5
*RC-009	C-2	CAPACITOR—.001 mfd. 600-V paper	.30	*RO-1235	R-2	RESISTOR—100 ohm $\frac{1}{2}$ watt carbon	.70-5
*RC-6554	C-3, 4	CAPACITOR—"B" and "C" antenna trimmer	.35	*RO-1321	R-3	RESISTOR—390,000 ohm $\frac{1}{2}$ watt carbon	.70-5
*RC-092	C-5	CAPACITOR—.05 mfd. 600-V	.30	*RO-1219	R-4	RESISTOR—22 ohm $\frac{1}{2}$ watt carbon	.70-5
*RT-883	C-6, 7, 8, 9	TRIMMER—Antenna trimmer strap	.70	*RO-1339	R-5	RESISTOR—2.2 megohm $\frac{1}{2}$ watt carbon	.70-5
*RT-884	C-10, 11, 12, 14, 15, 16, 17	TRIMMER STRIP—Oscillator trimmer strip	1.25	*RO-1323	R-6	RESISTOR—470,000 ohm $\frac{1}{2}$ watt carbon	.70-5
*RC-396	C-18	CAPACITOR—5600 mmf., mica	.45	*RO-1299	R-7	RESISTOR—47,000 ohm $\frac{1}{2}$ watt carbon	.70-5
*RC-347	C-19	CAPACITOR—1800 mmf., mica	.35	*RO-1305	R-8	RESISTOR—82,000 ohm $\frac{1}{2}$ watt carbon	.70-5
*RC-325	C-20, 21	CAPACITOR—.15 mmf., compensating cap.	.40	*RO-1355	R-9	RESISTOR—10 megohm $\frac{1}{2}$ watt carbon	.70-5
*RC-7062	C-22a, 22b	CONDENSER—2 gang tuning condenser	1.10	*RO-1323	R-10	RESISTOR—470,000 ohm $\frac{1}{2}$ watt carbon	.70-5
*RC-326	C-23	CAPACITOR—40 mmf., compensating cap.	.25	*RV-136	R-11	RESISTOR—4,700 ohm $\frac{1}{2}$ watt carbon	.70-5
*RC-252	C-28	CAPACITOR—200 mmf., mica	.30		R-12	VOLUME CONTROL—2 meg. volume control	.95
*RC-072	C-29	CAPACITOR—.05 mfd., 200-V paper	.25	*RO-1331	R-13	RESISTOR—1 megohm $\frac{1}{2}$ watt carbon	.70-5
	C-30a	CAPACITOR—40 mfd., 300-V dry electrolytic	2.10	*RO-1347	R-14	RESISTOR—4.7 meg. $\frac{1}{2}$ watt carbon	.70-5
*RC-5132	C-30b	CAPACITOR—50 mfd., 250-V dry electrolytic		*RO-1257	R-15	RESISTOR—820 ohm $\frac{1}{2}$ watt carbon	.70-5
	C-30c	CAPACITOR—20 mfd., 250-V dry electrolytic		*RO-1323	R-16	RESISTOR—470,000 ohm $\frac{1}{2}$ watt carbon	.70-5
	C-30d	CAPACITOR—20 mfd., 25-V dry electrolytic		*RO-1483	R-17	RESISTOR—10,000 ohm $\frac{1}{2}$ watt carbon	.20
*RC-039	C-32	CAPACITOR—.01 mfd., 600-V paper	.25	*RO-1235	R-18	RESISTOR—100 ohm $\frac{1}{2}$ watt carbon	.70-5
*RC-048	C-33	CAPACITOR—.02 mfd., 600 V paper	.30	*RO-1259	R-19	RESISTOR—1000 ohm $\frac{1}{2}$ watt carbon	.70-5
*RC-092	C-34	CAPACITOR—.05 mfd., 600 V paper	.30	*RO-1317	R-20	RESISTOR—270,000 ohm $\frac{1}{2}$ watt carbon	.70-5
*RC-249	C-35	CAPACITOR—220 mmf., mica	.25	*RO-1293	R-21	RESISTOR—27,000 ohm $\frac{1}{2}$ watt carbon	.70-5
*RC-049	C-36	CAPACITOR—.004 mfd., 600-V paper	.35	*RO-1323	R-22	RESISTOR—470,000 ohm $\frac{1}{2}$ watt carbon	.70-5
*RC-023	C-37	CAPACITOR—.005 mfd., 600-V paper	.25	*RO-1259	R-23	RESISTOR—1000 ohm $\frac{1}{2}$ watt carbon	.70-5
*RC-060	C-38	CAPACITOR—.03 mfd., 600-V paper	.25	*RO-1251	R-24	RESISTOR—470 ohm $\frac{1}{2}$ watt carbon	.70-5
*RC-092	C-39	CAPACITOR—.05 mfd., 600-V paper	.30	*RO-1347	R-26	RESISTOR—4.7 meg. $\frac{1}{2}$ watt carbon	.70-5
*RC-072	C-40	CAPACITOR—.05 mfd., 200-V paper	.25	*RO-1325	R-27	RESISTOR—560,000 ohm $\frac{1}{2}$ watt carbon	.70-5
*RC-060	C-41	CAPACITOR—.03 mfd., 600-V paper	.25	*RO-1261	R-28	RESISTOR—1,200 ohm $\frac{1}{2}$ watt carbon	.70-5
*RC-055	C-42	CAPACITOR—.003 mfd., 600-V paper	.25	*RO-1295	R-29	RESISTOR—33,000 ohm $\frac{1}{2}$ watt carbon	.70-5
*RC-104	C-43	CAPACITOR—.1 mfd., 600-V paper	.30	*RL-1211	R-30	RESISTOR—10 ohm $\frac{1}{2}$ watt carbon	.70-5
*RC-092	C-44	CAPACITOR—.05 mfd., 600-V paper	.25	*RL-1016	L-1	ANTENNA COIL—Antenna coil	1.10
*RC-263	C-45	CAPACITOR—270 mmf., mica	.25	*RL-2064	L-2	COIL—Oscillator coil	1.10
*RC-124	C-46	CAPACITOR—.0055 mfd. 1500 V paper	.25	*RL-371	L-3	COIL—I.F. Neutralizing coil	.25
*RC-156A	C-47, 48	CAPACITOR—.05 mfd. 120 V paper	.45	*RL-376	L-4	CHOKE—RF Choke	.50
*RC-095	C-49	CAPACITOR—.05 mfd. 200 V paper	.20	*RL-377	L-5	CHOKE—B+ and RF Choke	.25
*RC-293	C-50	CAPACITOR—470 mmf., mica	.30	*RS-3127	S-1	SWITCH—Band change switch	1.25
				*RS-3128	S-2a, 2b	SWITCH—Tone control and power switch	1.45
				*RS-3145	S-3	SWITCH—Current saver switch	.45
				*RS-1082	SPKR	SPEAKER—9" oval speaker	4.20
				*RT-3007	T-1	TRANSFORMER—First IF transformer	1.15
				*RT-3008	T-2	TRANSFORMER—Second IF transformer	1.15
				*RT-4021	T-3	TRANSFORMER—Output transformer	1.55
				*RT-0822	T-4	TRANSFORMER—Power transformer	3.45
				*RV-205	V	VIBRATOR—6-volt vibrator, power supply	3.80

* Used on previous receivers.

ALIGNMENT PROCEDURE

Prices subject to change without notice

There are two 17.8 reference points on the paper scale on the rear of the dial reflector plate. The one towards the lower frequency end of the dial is the proper one to use for the 16-meter spread-band alignment; while the other is used for a reference point on the SW2 band.

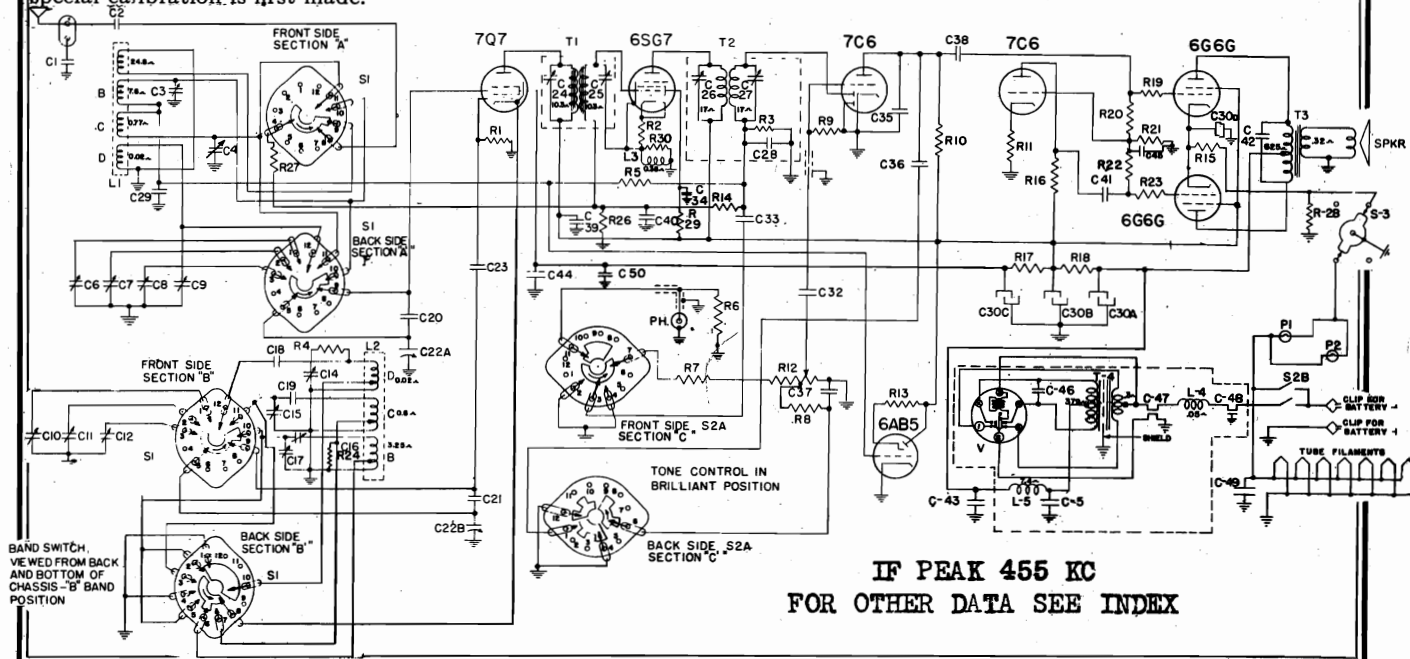
The SW2 band does not require alignment. This band is taken care of when the 16-meter spread band is aligned.

Spread-band Alignment

Since accuracy in frequency calibration is very essential for proper alignment of the spread bands, it is impractical to use the standard test oscillator for this purpose unless a special calibration is first made.

The actual reception of short-wave stations of known frequency in the band to be checked is probably the most satisfactory method for determining the proper setting of the oscillator trimmers in these bands. The oscillator trimmer should be adjusted so that the station appears at the correct position on the dial. RF alignment can be made with the test oscillator.

The calibration of the test oscillator may be checked by zero beating the test oscillator with a short-wave station of known frequency. By taking several of these calibration points, it will afford a calibration of a high degree of accuracy in case you wish to use the test oscillator for alignment in these bands.



IF PEAK 455 KC
FOR OTHER DATA SEE INDEX

GENERAL ELECTRIC CO.

SPECIAL SERVICE INFORMATION

The following information will be very useful in servicing receivers if a vacuum tube voltmeter or similar voltage measuring instrument is available.

NOTE—Connection to converter grid must be made directly to tube grid and not to gang condenser on spread bands.

(1) Stage gains

(a) Antenna Post to Converter Grid, through 400 ohms and 200 mmfd. in series, at

Stand.	1000 KC...5.4	31 M....9.6 MC...1.8
SW-1	4000 KC...3.7	25 M....11.8 MC...1.6
SW-2	18000 KC...1.1	19 M....15.22 MC...1.4
		16-13 M....17.8 MC...1.0

(b) RF on Converter Grid to IF on 6SG7 grid at

Stand.	1000 KC...61	31 M....9.6 MC...65
SW-1	4000 KC...63	25 M....11.8 MC...68
SW-2	18000 KC...71	19 M....15.22 MC...71
		16-13 M....17.8 MC...71

(c) IF on Converter Grid to IF on 6SG7 grid at 455 KC—85

(d) IF Grid to diode plate at 455 KC—160

(2) Voltage across the diode load to give ½-watt speaker output at 400 cycles—.08 V.

(3) DC voltage developed across oscillator grid resistor (R1) at

Stand.	1000 KC.8.3 V.	31 M....4.4 V.
SW1	4000 KC.7.7 V.	25 M....4.8 V.
SW2	18000 KC.5.0 V.	19 M....4.4 V.
		16-13 M....3.7 V.

Variations of ±20% permissible. All measurements taken with R-26 shorted across.

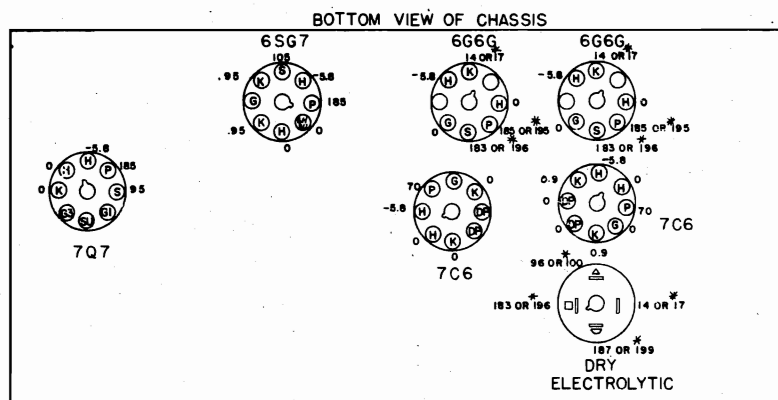
ALIGNMENT CHART

Step	Test Osc. Connected to	Test-osc. Setting	Band and Pointer Setting	Tune Trimmer for Max. Output
1	6SG7 I.F. grid in series with .05 mfd. cap.	455 KC	"BC" BAND 550 KC	C26 and C27
2	7Q7 CONV. grid in series with .05 mfd. cap.	455 KC	"BC" BAND 550 KC	C24 and C25
3	ANT. POST in series with 200 mmf. and 400 ohms	580 KC	"BC" BAND 580 KC	C16**
4	ANT. POST in series with 200 mmf. and 400 ohms	1500 KC	"BC" BAND 1500 KC	C17 (osc.) C3 (ant.)
5	REPEAT STEP 3			
6	ANT. POST in series with 200 mmf. and 400 ohms	6.1 MC	"SW-1" BAND 6.1 MC	C15 (osc.) C4 (ant.)
7	ANT. POST in series with 200 mmf. and 400 ohms	17.8 MC	16 METER 17.8 MC	C14* (osc.)
8	ANT. POST in series with 200 mmf. and 400 ohms	21.6 MC	16 METER 21.6 MC	C9*** (ant.)
9	ANT. POST in series with 200 mmf. and 400 ohms	15.22 MC	19 METER 15.22 MC	C10* (osc.) C6*** (ant.)
10	ANT. POST in series with 200 mmf. and 400 ohms	11.8 MC	25 METER 11.8 MC	C11* (osc.) C7*** (ant.)
11	ANT. POST in series with 200 mmf. and 400 ohms	9.6 MC	31 METER 9.6 MC	C12* (osc.) C8*** (ant.)

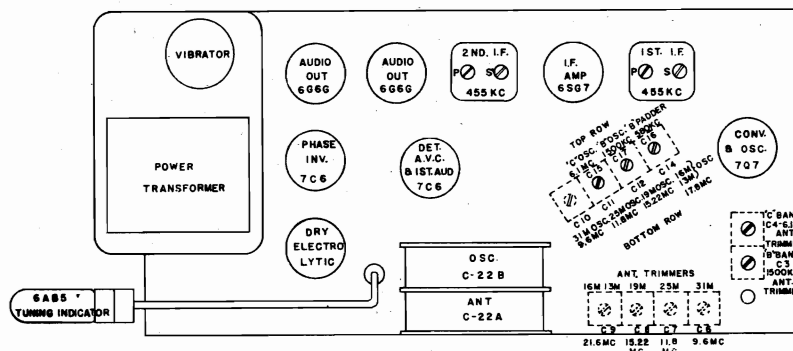
*Use minimum capacity peak if two are obtainable.

**Rock gang condenser for optimum peak.

***Use maximum capacity peak if two are obtainable.



VOLTAGES READ WITH 1000 OHMS VOLT VOLTMMETER ON 250VOLT SCALE
BATTERY SAVER SWITCH IN NORMAL POSITION
6.0 VOLTS AT BATTERY



MODELS X-156, X-166

GENERAL ELECTRIC CO.

SPECIAL SERVICE INFORMATION

The following information will be very useful in servicing receivers if a vacuum tube voltmeter or similar voltage measuring instrument is available.

NOTE—Connection to converter grid must be made directly to tube grid and not to gang condenser on spread bands.

(1) Stage gains

(a) Antenna Post to Converter Grid, through 400 ohms and 200 mmfd. in series, at

Stand.	1000 KC....5.4	31 M....9.6 MC....1.8
SW1	4000 KC....3.7	25 M....11.8 MC....1.6
SW2	18000 KC....1.1	19 M....15.22 MC....1.4
		16-13 M....17.8 MC....1.0

(b) RF on Converter Grid to IF on 6SG7 grid at

Stand.	1000 KC....61	31 M....9.6 MC....65
SW1	4000 KC....63	25 M....11.8 MC....68
SW2	18000 KC....71	19 M....15.22 MC....71
		16-13 M....17.8 MC....71

(c) IF on Converter Grid to IF on 6SG7 grid at 455 KC—85

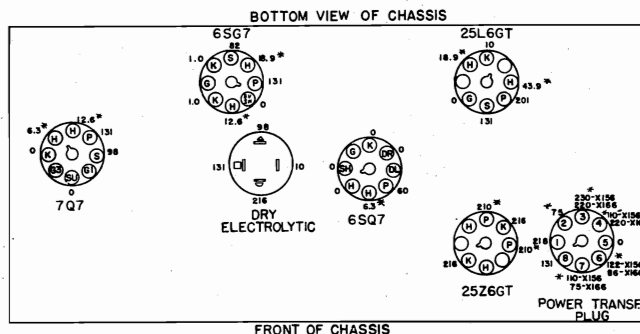
(d) IF Grid to diode plate at 455 KC—160

(2) Voltage across the diode load to give 1/2-watt speaker output at 400 cycles—.046 V.

(3) DC voltage developed across oscillator grid resistor (R1) at

Stand.	1000 KC.8.3 V.	31 M....4.4 V.
SW1	4000 KC..7.7 V.	25 M....4.8 V.
SW2	18000 KC..5.0 V.	19 M....4.4 V.
		16-13 M....3.7 V.

Variations of $\pm 20\%$ permissible. All measurements taken with R-26 shorted across.



VOLTAGES READ WITH 1000 OHM/VOLT VOLTMMETER ON 250 VOLT SCALE
VOLTAGES INDICATED BY ASTERISK (*) ARE AC VOLTAGES
110 VOLTS ON 110 VOLT TAP X156
220 VOLTS AC X166

Fig. 3 Socket Voltages

Electrical Rating

Model	Rating	POWER SUPPLY		Frequency Cycles AC	Power Con- sumption (Watts)
		Tap	Voltage Range		
X-156	C	110	103-117	25-60	60
		125	117-133		
	V	110	103-117	50-60	60
		125 200 230	117-133 185-215 215-250		
X-166			200-240 V AC or DC	25-100	100

Tuning Frequency Range

"BC" Band.....	540-1700 KC
"SW1" Band.....	2.2-6.8 MC
"SW2" Band.....	6.8-21.0 MC
31 Meter Band.....	9.36-9.8 MC
25 Meter Band.....	11.6-12.5 MC
19 Meter Band.....	14.9-17.3 MC
16 and 13 Meter Band.....	17.7-22.2 MC

Electrical Power Output

Undistorted with proper voltage at tap on power transformer—3 watts.
Maximum with proper voltage at tap on power transformer—5 watts.

Loud-speaker—DM Dynamic

Cone Diameter.....6 1/2 inches
Voice Coil Impedance (400 cycles).....3.5 ohms

Tubes

Converter-Oscillator.....	GE-7Q7
IF Amplifier.....	GE-6SG7
Detector, AVC, 1st Audio.....	GE-6SQ7
Power Output.....	GE-25L6GT
Rectifier.....	GE-25Z6GT
Tuning Indicator.....	GE-6U5
Pilot Lamps.....	(2) MAZDA No. 44

Power Supply

The Model X-156 is equipped with a plug-in type power supply which permits practically instantaneous conversion to DC operation. Simply remove the power transformer and replace with a plug-in type ballast resistor. Refer to the data given under "Conversion for Special Line Voltages."

The power transformer in the Model X-156 is provided with four voltage taps. Instant tap switching is made by a simple pin plug and jack device. For correct operation, measure the power supply voltage. Note which voltage range covers this voltage (see Electrical Specifications) and using the corresponding tap, insert the plug in the jack.

CONVERSION FOR SPECIAL LINE VOLTAGES

The Models X-156 and X-166 can be converted for operation on the following line voltages. In all cases where the power transformer is replaced with a ballast resistor, the power transformer must be removed from the chassis as the radiant heat from the ballast resistor is likely to injure the transformer insulation. When operated with these special resistors and lower power supplies than 220 volts, the audio power output and socket voltages will be reduced.

220 Volts AC/DC—(Range 200-240 Volts)

Remove transformer from chassis of X-156; insert ballast tube resistor RR-7007, and change label to read X-166.

180 Volts DC—(Range 160-200 Volts)

Remove transformer from chassis of X-156 or ballast RR-7007 from X-166; insert the ballast tube resistor RR-7008 and change the label on the receiver so that it reads Model X-166Y.

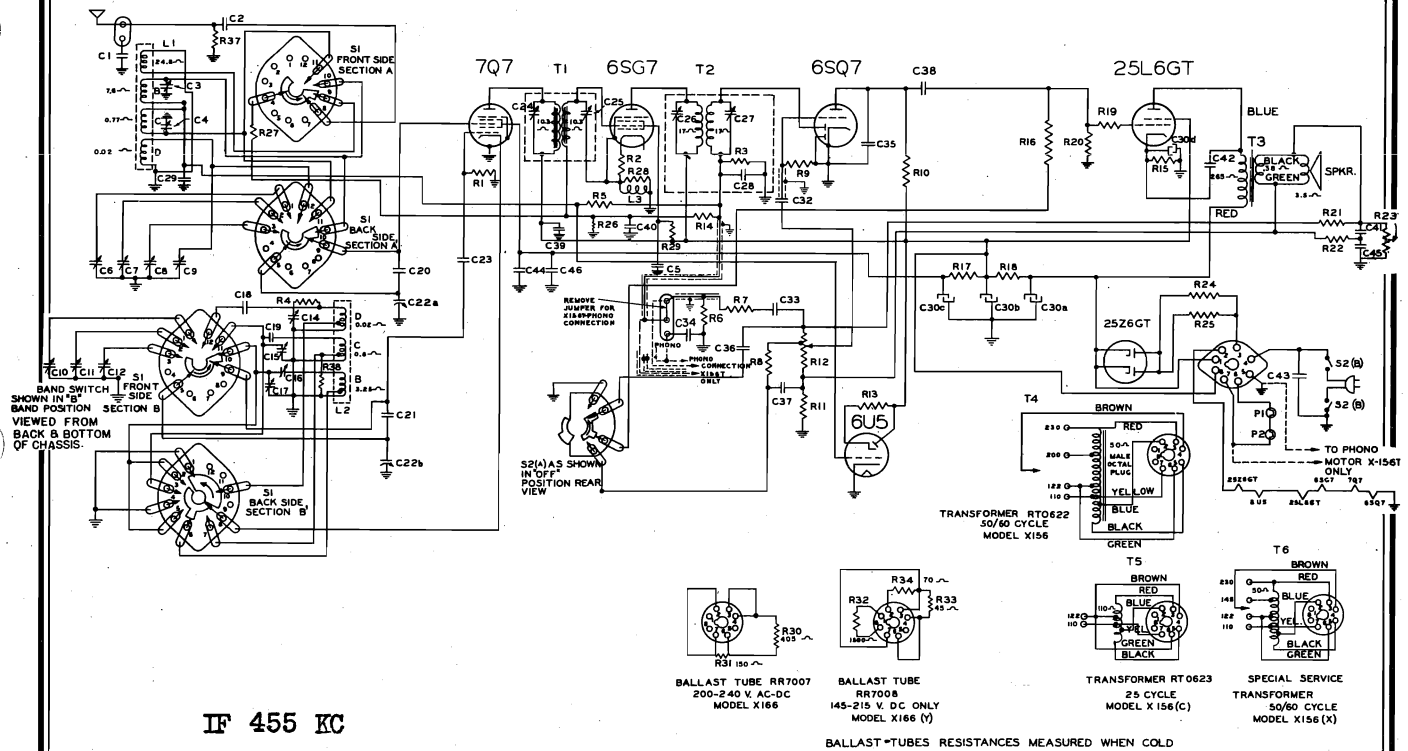
Miscellaneous

The transformer T5 can be substituted in the Model X-156 receiver for operation on 25-cycle circuits. Remark the label so that it reads Model X-156C.

The cold resistance of all ballast tubes is shown directly on the schematic diagram, Fig. 2.

GENERAL ELECTRIC CO.

MODELS X-156, X-166



Stock No.	Symbol	Description	List Price	Stock No.	Symbol	Description	List Price
*RC-039	C-1	CAPACITOR—.01 mfd., 600-V paper...	\$0.25	*RQ-1299	R-7	RESISTOR—47,000 ohm, $\frac{1}{2}$ W carbon...	\$0.70-5
*RC-009	C-2	CAPACITOR—.001 mfd., 600-V paper...	.30	*RQ-1313	R-8	RESISTOR—180,000 ohm, $\frac{1}{2}$ W carbon...	.70-5
*RC-6554	C-3, 4	CAPACITOR—"B" and "C" antenna trimmer...	.35	*RQ-1355	R-9	RESISTOR—10 megohm, $\frac{1}{2}$ W carbon...	.70-5
*RC-092	C-5	CAPACITOR—.05 mfd. 600-V...	.30	*RQ-1321	R-10	RESISTOR—330,000 ohm, $\frac{1}{2}$ W carbon...	.70-5
*RT-883	C-6, 7, 8 & 9	TRIMMER—Antenna trimmer strip...	.70	*RQ-1245	R-11	RESISTOR—270 ohm, $\frac{1}{2}$ W carbon...	.70-5
*RT-884	C-10, 11, 12	TRIMMER STRIP—Oscillator trimmer strip...	1.25	RV-140	R-12	VOL. CONTROL—2 meg. volume control...	.95
*RC-396	C-18	CAPACITOR—5600 mmf., mica...	.45	*RQ-1331	R-13	RESISTOR—1 megohm, $\frac{1}{2}$ W carbon...	.70-5
*RC-347	C-19	CAPACITOR—1800 mmf., mica...	.35	*RQ-1347	R-14	RESISTOR—4.7 meg., $\frac{1}{2}$ W carbon...	.70-5
*RC-325	C-20, 21	CAPACITOR—45 mmf., compensating capacitor...	.40	*RQ-1433	R-15	RESISTOR—180 ohm 1-W carbon...	.20
*RC-7062	C-22a, 22b	CONDENSER—2-gang tuning condenser...	1.10	*RQ-1321	R-16	RESISTOR—390,000 ohm, $\frac{1}{2}$ W carbon...	.70-5
*RC-326	C-23	CAPACITOR—40 mmf., compensating capacitor...	.25	*RQ-1473	R-17	RESISTOR—3,900 ohm, 1-W carbon...	.20
*RC-072	C-29	CAPACITOR—.05 mfd., 200-V paper...	.25	*RQ-670	R-18	RESISTOR—3,300 ohm, 2-W carbon...	.35
	C-30a	CAPACITOR—40 mfd., 300-V dry electrolytic...		*RQ-1259	R-19	RESISTOR—1,000 ohm, $\frac{1}{2}$ W carbon...	.70-5
	C-30b	CAPACITOR—50 mfd., 250-V dry electrolytic...		*RQ-1323	R-20	RESISTOR—470,000 ohm, $\frac{1}{2}$ W carbon...	.70-5
*RC-5132	C-30c	CAPACITOR—20 mfd., 250-V dry electrolytic...	2.10	*RQ-1353	R-21	RESISTOR—8.2 megohm, $\frac{1}{2}$ W carbon...	.70-5
	C-30d	CAPACITOR—20 mfd., 25-V dry electrolytic...		*RQ-1243	R-22	RESISTOR—220 ohm, $\frac{1}{2}$ W carbon...	.70-5
*RC-039	C-32	CAPACITOR—.01 mfd., 600-V paper...	.25	*RQ-1263	R-23	RESISTOR—1,500 ohm, $\frac{1}{2}$ W carbon...	.70-5
*RC-023	C-33	CAPACITOR—.005 mfd., 600-V paper...	.25	*RQ-646	R-24	RESISTOR—330 ohm, 2-W carbon...	.20
*RC-130	C-34	CAPACITOR—.2 mfd., 400-V paper...	.30	*RQ-643	R-25	RESISTOR—270 ohm, 2-W carbon...	.30
*RC-249	C-35	CAPACITOR—220 mmf., mica...	.25	*RQ-1345	R-26	RESISTOR—3.9 meg., $\frac{1}{2}$ W carbon...	.70-5
*RC-006	C-36	CAPACITOR—.0015 mfd., 600-V paper...	.25	*RQ-1331	R-27	RESISTOR—1 megohm, $\frac{1}{2}$ W carbon...	.70-5
*RC-016	C-37	CAPACITOR—.002 mfd. 600 V paper...	.25	*RQ-1211	R-28	RESISTOR—10 ohm, $\frac{1}{2}$ W carbon...	.70-5
*RC-092	C-38, 39	CAPACITOR—.05 mfd 600-V paper...	.30	*RQ-1291	R-29	RESISTOR—22,000 ohm $\frac{1}{2}$ W carbon...	.70-5
*RC-072	C-40	CAPACITOR—.05 mfd. 200-V paper...	.25	RR-7007	R-30, 31	RESISTOR—200-240 volt ballast...	2.00
*RC-096	C-41	CAPACITOR—.1 mfd. 200 V paper...	.30	RR-7008	R-32, 33, 34	RESISTOR—145-215-volt ballast...	3.00
*RC-031	C-42	CAPACITOR—.008 mfd. 1600-V paper...	.25	*RQ-1307	R-37	RESISTOR—100,000 ohm, $\frac{1}{2}$ W carbon...	.70-5
*RC-117	C-43	CAPACITOR—.02 mfd. 600 V.—AC...	.30	*RQ-1251	R-38	RESISTOR—470 ohm, $\frac{1}{2}$ W carbon...	.70-5
*RC-092	C-44	CAPACITOR—.05 mfd., 600-V paper...	.30	RS-3143	S-1	SWITCH—Band change switch...	1.40
*RC-095	C-45	CAPACITOR—.05 mfd. 200-V paper...	.20	RS-3144	S-2a, 2b	SWITCH—Tone control and power switch...	1.45
*RC-293	C-46	CAPACITOR—470 mmf., mica...	.30	*RL-1016	L-1	COIL—Antenna coil (all bands)...	1.10
*RQ-1295	R-1	RESISTOR—33,000 ohm, $\frac{1}{2}$ W carbon...	.70-5	*RL-2064	L-2	COIL—Oscillator coil (all bands)...	1.10
*RQ-1235	R-2	RESISTOR—100 ohm, $\frac{1}{2}$ W carbon...	.70-5	*RL-371	L-3	COIL—IF neutralizing coil...	.25
*RQ-1321	R-3	RESISTOR—390,000 ohm, $\frac{1}{2}$ W carbon...	.70-5	RL-380	L-3	COIL—IF neutralizing coil (used with chassis stamped Rev. 1 only)...	.25
*RQ-1219	R-4	RESISTOR—22 ohm, $\frac{1}{2}$ W carbon...	.70-5	*RT-3007	T-1	TRANSFORMER—1st I.F. transformer...	1.15
*RQ-1339	R-5	RESISTOR—2.2 megohm, $\frac{1}{2}$ W carbon...	.70-5	*RT-3008	T-2	TRANSFORMER—2nd I.F. transformer...	1.15
*RQ-1323	R-6	RESISTOR—470,000 ohm, $\frac{1}{2}$ W carbon...	.70-5	RT-4020	T-3	TRANSFORMER—Output transformer...	1.30
				RT-0622	T-4	TRANSFORMER—50/60 cycle power transformer (Model X-156)...	4.20
				RT-0623	T-5	TRANSFORMER—25-cycle power transformer (Model X-156C)...	4.75
				*RS-1061		SPEAKER—6 $\frac{1}{2}$ " P.M. speaker...	2.70

* Used on previous receivers.

Prices subject to change without notice

MODELS X-156, X-166

GENERAL ELECTRIC CO.

PRODUCTION CHANGE

During the production of these receivers, the Type 6SG7 tube was altered so that its suppressor grid element which formerly was connected directly to the shield, now connects to the cathode element of the tube instead.

Due to circuit usage, this new type will cause oscillation if used in a chassis that was designed for the early style tube, and vice versa, without first changing the neutralizing coil, L-3. The early type 6SG7 tube must be used with neutralizing coil RL-371; while the late production tube must be used in conjunction with neutralizing coil RL-380.

For identification, the early production 6SG7 has either a X marked on the tube or tube carton while the late production tube is unmarked except for the tube symbol. All chassis with the new neutralizing coils (RL-380) and new production 6SG7 tubes are serial numbered 8750 and over and are stamped as REV. 1.

The schematic diagram, Fig. 2, illustrates the connections to the earlier type 6SG7 tube.

PHONOGRAPH INSTALLATION

This receiver is provided with a phonograph terminal board on the rear of the back cover of the receiver for the connection of a record player. The following connection procedure should be observed.

1. Remove the link from terminals 1 and 2, and replace it between terminals 2 and 3.
2. Connect the record player to terminals 1 and 3. If the record player does not have a high-impedance pick-up a matching transformer may have to be used. It is very important that the high side pick-up lead has a shield to prevent hum interference. This shield should be connected to terminal No. 3 and the high side pick-up lead to terminal No. 1.

If, on operating the record player, external radio signals leak through, turn the tuning control to a position where no radio signals would be received. Complete silencing of the external radio signals can be obtained by grounding the antenna terminal while operating the record player.

If, in operating the record player, there is appreciable hum interference, reverse the record player phono motor power cord plug in the power supply outlet.

Alignment Procedure

The alignment procedure shown in table form is made either with the chassis in or removed from the cabinet.

If the chassis is removed from the cabinet to make the RF alignment, the dial which is fastened to the cabinet cannot be used for calibration reference. Use must be made, therefore, of the paper scale fastened on the rear of the dial reflector plate. With the gang condenser completely closed, one of the edges of the pointer rider should be lined up with the first marking to the right of the scale on the rear of the dial reflector plate. This can be accomplished by sliding the pointer on the cord until it does. The selected edge of the pointer rider may now serve as a pointer for the RF alignment. There are two 17.8 reference points on the paper scale on the rear of the dial reflector plate. The one towards the lower frequency end of the dial is the proper one to use for the 16-meter spread-band alignment; while the other is used for a reference point on the SW2 band.

The SW2 band does not require alignment. This band is taken care of when the 16 meter spread-band is aligned.

Spread-band Alignment

Since accuracy in frequency calibration is very essential for proper alignment of the spread-bands, it is impractical to use the standard test oscillator for this purpose unless a special calibration is first made.

The actual reception of short-wave stations of known frequency in the band to be checked is probably the most satisfactory method of determining the proper setting of the oscillator trimmers in these bands. The oscillator trimmer should be adjusted so that the station appears at the correct position on the dial. R.F. alignment can be made with the test oscillator.

The calibration of the test oscillator may be checked by zero beating the test oscillator with a short-wave station of known frequency. By taking several of these calibration points, it will afford a calibration of a high degree of accuracy in case you wish to use the test oscillator for alignment in these bands.

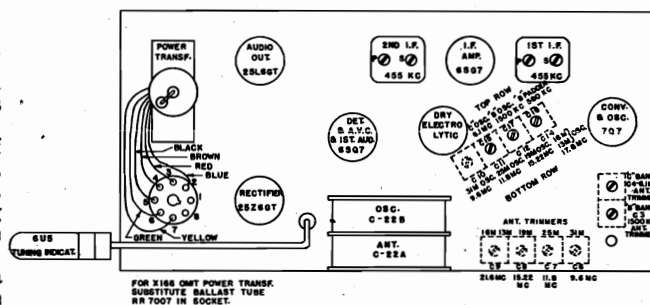


Fig. 1. Trimmer Location
ALIGNMENT CHART

Step	Test Osc. Connected to	Test-osc. Setting	Band and Pointer Setting	Tune Trimmer for Max. Output
1	6SG7 I.F. grid in series with .05 mfd. cap.	455 KC	"BC" BAND 550 KC	C26 and C27
2	7Q7 CONV. grid in series with .05 mfd. cap.	455 KC	"BC" BAND 550 KC	C24 and C25
3	ANT. POST in series with 200 mmf. and 400 ohms	580 KC	"BC" BAND 580 KC	C16**
4	ANT. POST in series with 200 mmf. and 400 ohms	1500 KC	"BC" BAND 1500 KC	C17 (osc.) C3 (ant.)
5	REPEAT STEP 3			
6	ANT. POST in series with 200 mmf. and 400 ohms	6.1 MC	"SW-1" BAND 6.1 MC	C15 (osc.) C4 (ant.)
7	ANT. POST in series with 200 mmf. and 400 ohms	17.8 MC	16 METER 17.8 MC	C14* (osc.)
8	ANT. POST in series with 200 mmf. and 400 ohms	21.6 MC	16 METER 21.6 MC	C9*** (ant.)
9	ANT. POST in series with 200 mmf. and 400 ohms	15.22 MC	19 METER 15.22 MC	C10* (osc.) C6*** (ant.)
10	ANT. POST in series with 200 mmf. and 400 ohms	11.8 MC	25 METER 11.8 MC	C11* (osc.) C7*** (ant.)
11	ANT. POST in series with 200 mmf. and 400 ohms	9.6 MC	31 METER 9.6 MC	C12* (osc.) C8*** (ant.)

*Use minimum capacity peak if two are obtainable.

**Rock gang condenser for optimum peak.

***Use maximum capacity peak if two are obtainable.

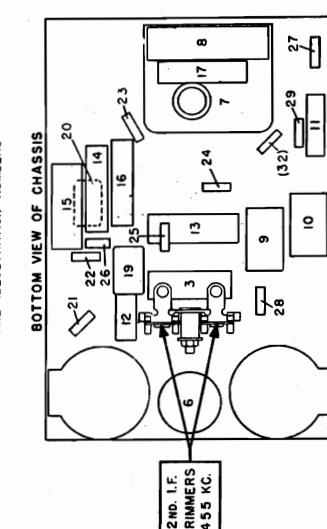
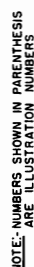
BAND CHANGE SWITCHING

The following charts show the switch points connected for any one position of the wave change switch. The numbers shown in each box indicate the switch points connected together in the section of the switch for each position of the switch. As for example: the numbers 5-9-10 indicate these switch points are all connected together for this particular position of the switch.

BAND SWITCH CONNECTIONS

Band in Use	Section "A" Front Side	Section "A" Back Side	Section "B" Front Side	Section "B" Back Side
BC	4-8-9	5-9-10	5-9-10	1-10 6-8
SW1	4-8-10	5-9-11	5-9-11	1-2-10 7-8
SW2	4-8-11	5-9-12	5-9-12	1-2-3 8-10
31 METER	8-11	9-12-1	9-12-1	1-2-3-4 8-10
25 METER	8-11	9-12-2	9-12-2	1-2-3-4-5 8-10
19 METER	8-11	9-12-3	9-12-3	2-3-4-5-6 8-10
16 and 13 METER	8-11	9-12	9-12	3-4-5-6-7 8-10

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ALIGNMENT PROCEDURE

Alignment Frequencies

I.F.	455 K.C.
R.F.	1600 & 1400 K.C.

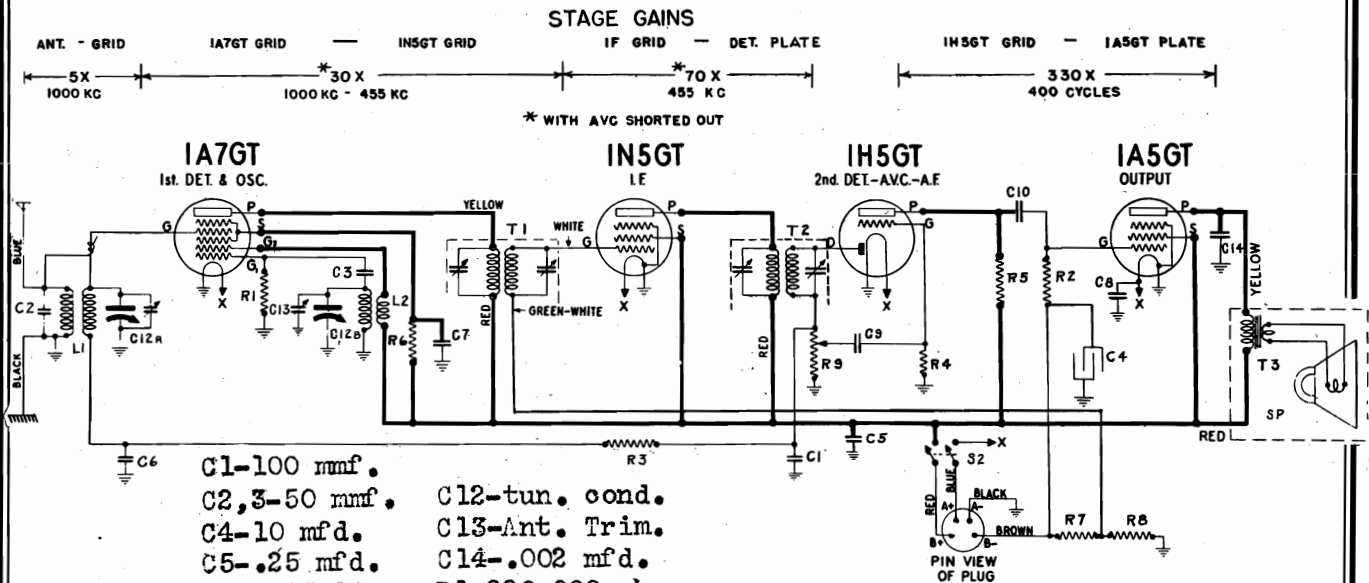
I.F. Alignment Connect an output meter across the voice coil. Rotate the volume to maximum. Set test oscillator to 455 K.C. and apply signal to lug on stator of gang condenser to which loop is connected through a .05 Mfd. capacitor. Align the second I.F. transformer trimmers, next adjust the first I.F. transformer trimmers. Keep test oscillator

R.F. Alignment Couple test oscillator output to loop in case cover. Adjust test oscillator and receiver dial to exactly 1600 K.C. Peak 1600 K.C. oscillator trimmer for maximum output. Change test oscillator signal and receiver dial to approximately 1400 K.C. Then while rocking gang condenser trim 1400 K.C. antenna trimmer for maximum output.

output as low as a readable meter reading will permit.

MODEL LB-424

GENERAL ELECTRIC CO.



- REPLACEMENT PARTS LIST**
- | | |
|--------------|------------------|
| C1-100 mmf. | C12-tun. cond. |
| C2,3-50 mmf. | C13-Ant. Trim. |
| C4-10 mfd. | C14-.002 mfd. |
| C5-.25 mfd. | R1-220,000 ohm. |
| C6,7-.05mfd. | R2-1 megohm. |
| C8-.25 mfd. | R3,4-3.3 megohm. |
| C9-.004 mfd. | R5-680,000 ohm. |
| C10-.01 mfd. | |

R6-15,000 ohm.

R7-560 ohm.

R8-47 ohm.

RV143S-Vol. Cont.

L1-Ant. Coil

L2-Osc. Coil

T1-1st IF Trans.

T2-2nd. IF Trans.

T3-Out.Sp. Trans.

SP-6in. PM Spk.

Stock Number	Description	List Price
ELECTRICAL PARTS		
*RC-235	CAPACITOR—100 mmf., mica	\$0.25
*RC-206	CAPACITOR—50 mmf., mica	.35
*RC-5105	CAPACITOR—10 mfd., 35 V, electrolytic	.60
*RC-148	CAPACITOR—.25 mfd., 600 V, paper	.35
*RC-092	CAPACITOR—.05 mfd., 600 V, paper	.30
*RC-136	CAPACITOR—.25 mfd., 200 V, paper	.30
*RC-025	CAPACITOR—.004 mfd., 600 V, paper	.20
*RC-039	CAPACITOR—.01 mfd., 600 V, paper	.25
RC-7068-S	CONDENSER—Tuning condenser (with drum)	3.30
RC-6561-S	CAPACITOR—Antenna trimmer	.20
*RC-016	CAPACITOR—.002 mfd., 600 V, paper	.25
*RQ-1315	RESISTOR—220,000 ohm, 1/2-W carbon	.70-5
*RQ-1331	RESISTOR—1 megohm, 1/2-W carbon	.70-5
*RQ-1343	RESISTOR—3.3 megohm, 1/2-W carbon	.70-5
*RQ-1327	RESISTOR—680,000 ohm, 1/2-W carbon	.70-5
*RQ-1287	RESISTOR—15,000 ohm, 1/2-W carbon	.70-5
*RQ-1253	RESISTOR—560 ohm, 1/2-W carbon	.70-5
*RQ-1227	RESISTOR—47 ohm, 1/2-W carbon	.70-5
RV-143-S	VOLUME CONTROL—Volume control and power switch	1.45
RL-169-S	COIL—Antenna coil	\$1.20
RL-2079-S	COIL—Oscillator coil	.45
RT-3023-S	TRANSFORMER—1st IF transformer	1.20
RT-3026-S	TRANSFORMER—2nd IF transformer	1.20
RT-4027-S	TRANSFORMER—Output speaker transformer	1.80
RS-1091-S	SPEAKER—6-inch PM speaker	8.75

Prices Subject to Change without Notice.

Electrical Specifications

- Battery Power Supply
1.5 Volt "A" supply, 90 volts "B" supply.
Eveready No. 748, Burgess No. 17G-D60 or equivalent.
- Battery drain
"A" Supply—approximately .2 amp.
"B" supply—approximately 7.8 ma.

Alignment Frequencies

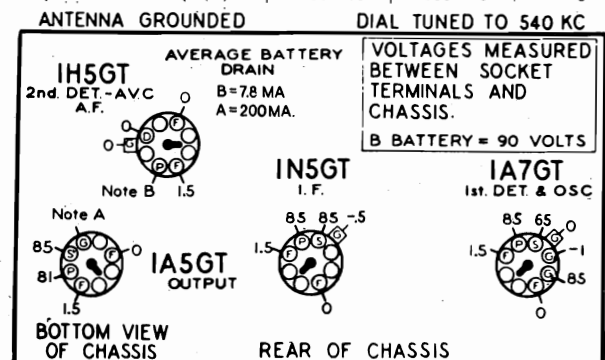
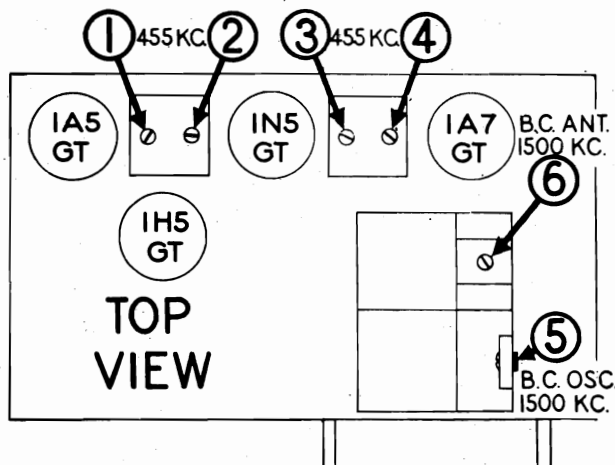
IF 455 KC
RF 1500 KC

The location of all trimmers is shown in Fig. 2.

Alignment Procedure

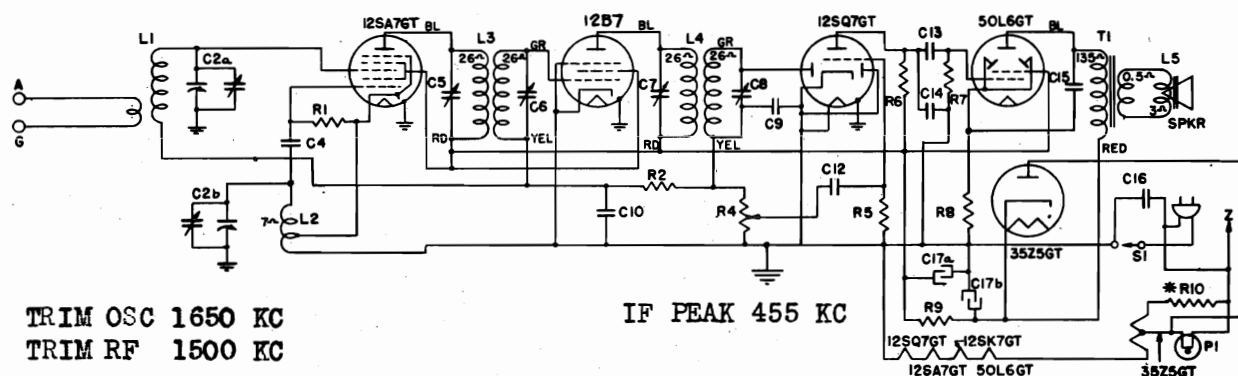
Connect an output meter across the speaker voice coil. Turn volume control to maximum and in all cases keep test-oscillator output as low as a readable output meter reading will permit. Proceed with alignment as given in the following table.

Step	Connect Test-osc. to	Test-osc. Setting	Pointer Setting	Adjust Trimmers for Max. Output
1	1A7GT conv. grid in series with .05 mfd.	455 KC	540 KC	1, 2, 3 and 4
2	Antenna lead (blue)	1500 KC	1500 KC	5
3	Antenna lead (blue)	1500 KC	1500 KC	6



MODEL J-512

GENERAL ELECTRIC CO.



"A" rated receivers have "X" connected to "Y" and R-10 is shorted out
"C" rated receivers have "X" connected to "Z"

-1940-

Parts Description List

Sym.	Description	Sym.	Description	Sym.	Description
C-2a	Antenna Section Tuning Condenser	C-13	.005 mfd. paper capacitor	P-1	Dial lamp, MAZDA No. 47
C-2b	Oscillator Section Tuning Condenser	C-14	330 mmf. mica capacitor	R-1	33,000 ohms carbon resistor
C-4	47 mmf. mica capacitor	C-15	.01 mfd. paper capacitor	R-2	2.2 megohms carbon resistor
C-5	60-140 mmf. I.F. trimmer	C-16	.05 mfd. paper capacitor	R-4	0.5 megohm volume control
C-6	60-140 mmf. I.F. trimmer	C-17a	30 mfd. 150 V. dry electrolytic	R-5	4.7 megohm volume control
C-7	60-140 mmf. I.F. trimmer	C-17b	40 mfd. 150 V. dry electrolytic	R-6	470,000 ohms carbon resistor
C-8	60-140 mmf. I.F. trimmer	L-1	Beam-a-Scope	R-7	470,000 ohms carbon resistor
C-9	470 mmf. mica capacitor	L-2	Oscillator coil	R-8	150 ohms carbon resistor
C-10	.05 mfd. paper capacitor	L-3	1st I.F. transformer	R-9	1200 ohms 1 W. carbon resistor
C-12	.005 mfd. paper capacitor	L-4	2nd I.F. transformer	R-10	13 ohms carbon resistor $\pm 5\%$

Electrical Specifications

Rating	Power Supply (Volts)	Frequency (Cycles on AC)	Power Consumption (Watts)
A	115—AC or DC	40-60	30
C	115—AC or DC	25	30

Special Service Information

The following information will be found very useful in servicing receivers if a vacuum tube voltmeter or similar voltage measuring instrument is available.

- Stage Gains
 - Antenna to 12SA7GT grid... 3 to 3.5 at 1000 KC†
 - 12SA7GT grid to 12B7 grid... .50 at 455 KC †
 - 12B7 grid to 12SQ7GT detector plate... .50 at 455 KC †
 - Gains shown in the first two stages do not contain the conversion gain which amounts to 1.1 at 1000 KC.
 - 0.15 volt, 400 cycle signal across the volume control will give $\frac{1}{2}$ watt speaker output. (Volume control turned to maximum.)
 - Average DC voltage developed across oscillator grid leak... 15 volts
- † Variations of $\pm 10\%$, -20% permissible.

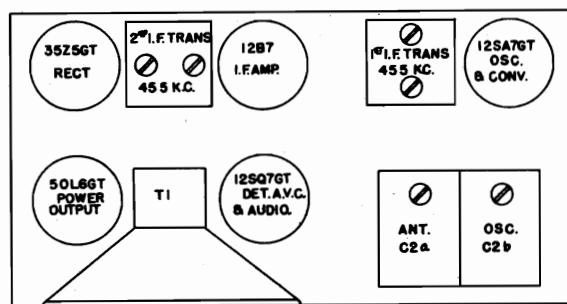


Fig. 1. Trimmer Location

ALIGNMENT CONVENTIONAL
SEE SPECIAL SECTION VOL. VIII

Intermediate Frequency.....455 KC

Electrical Power Output (117-line volts)

Undistorted.....1.3 watts
Maximum.....1.9 watts

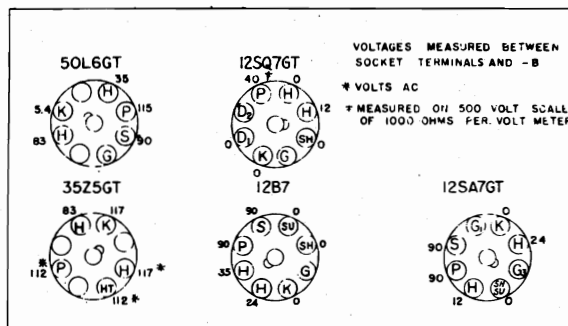
Loud-speaker—"Alnico" Magnetic Dynamic

Outside Cone Diameter.....4 inches
Voice Coil Impedance (400 cycles).....3.5 ohms

Tubes

Converter-Oscillator.....GE-12SA7GT
I.F. Amplifier.....GE-12B7
Det., Aud., AVC.....GE-12SQ7GT
Power Output.....GE-50L6GT
Rectifier.....GE-35Z5GT

FRONT OF CHASSIS



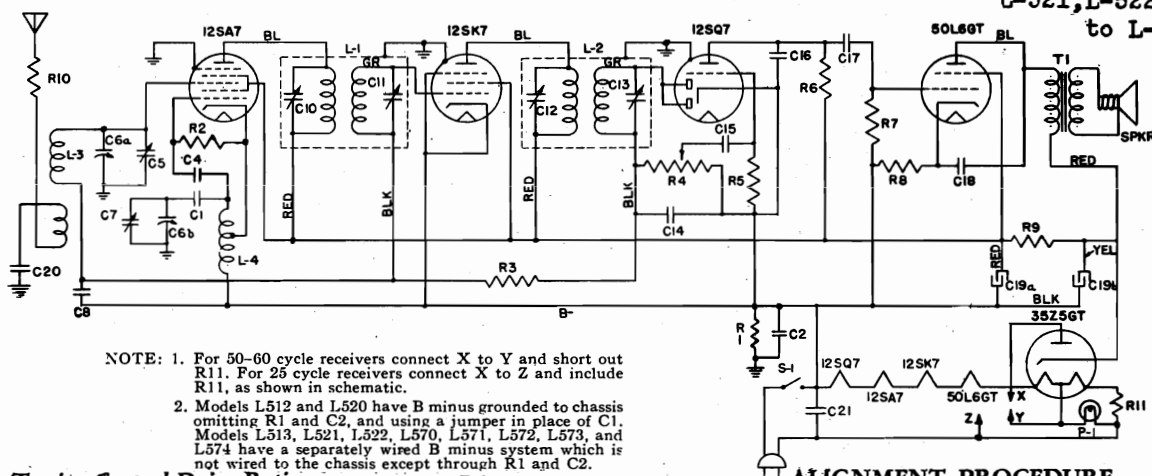
BOTTOM VIEW OF CHASSIS

AC LINE VOLTS - 117 MAX VOLUME GANG CLOSED NO SIGNAL

Socket Voltages

GENERAL ELECTRIC CO.

MODELS L-512, L-513, L-520,
L-521, L-522, L-570
to L-574 inc



NOTE: 1. For 50-60 cycle receivers connect X to Y and short out R11. For 25 cycle receivers connect X to Z and include R11, as shown in schematic.

2. Models L512 and L520 have B minus grounded to chassis omitting R1 and C2, and using a jumper in place of C1. Models L513, L521, L522, L570, L571, L572, L573, and L574 have a separately wired B minus system which is not wired to the chassis except through R1 and C2.

Tuning Control Drive Ratio 7:1

Electrical Specifications

Rating A-6....105-117 volts, 50-60 cycles or 105-117 volts D-C; 30 watts
Rating C-2....105-117 volts, 25 cycles or 105-117 volts D-C; 30 watts

Tuning Frequency Range 550-1720 KC

Intermediate Frequency 455 KC

Maximum Power Output 1.5 watts

Loud-speaker—PM Dynamic

Outside Cone Diameter..... 4 inches
Voice Coil Impedance (400 Cycles)..... 3.5 ohms

Tubes

Converter and Oscillator..... GE-12SA7
I.F. Amplifier..... GE-12SK7
Detector, AVC, Audio..... GE-12SQ7
Power Output..... GE-50L6GT
Rectifier..... GE-35Z5GT
Dial Lamp..... MAZDA No.47

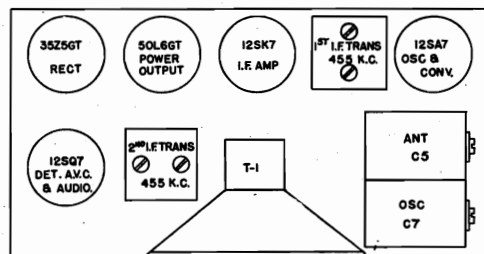


Fig. 1. Tube and Trimmer Location

Alignment Frequencies

I.F. 455 KC

R.F. 1500 KC

The location of all trimmers is shown in Fig. 1.

I.F. Alignment

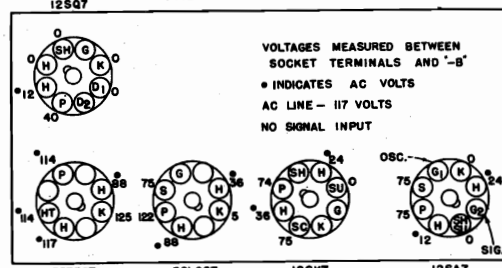
Connect an output meter across the voice coil. Turn the volume control to maximum. Set test oscillator to 455 KC and keep the oscillator output as low as a readable meter reading will permit.

Apply signal to the converter grid through a .05 mfd. capacitor and align progressively the trimmers in the 2nd and 1st I.F. transformer cans.

R.F. Alignment

Close the gang condenser by rotating the tuning control. Slide the pointer along the cord until it lines up with the first dial marking on the left. Now rotate the tuning control until the pointer is over the 1500 KC dial mark. Apply a 1500 KC signal to the receiver by means of a standard loop antenna. Align the oscillator trimmer (C-7) to bring in the signal and peak the signal by adjusting the antenna trimmer (C-5). (See Fig. 1 for trimmer locations.)

FRONT OF CHASSIS



BOTTOM VIEW OF CHASSIS

Fig. 2. Socket Voltages

REPLACEMENT PARTS LIST

Stock No.	Symbol	Description	List Price
*RC-072	C-1	CAPACITOR—.05 mfd., 200-V. paper.....	\$0.25
*RC-130	C-2	CAPACITOR—.02 mfd., 400-V. paper.....	.30
*RC-235	C-4	CAPACITOR—100 mmf. mica.....	.25
*RC-7039	C-6a, b	CONDENSER—Tuning condenser (includes trimmers C-5, C-7).....	1.70
*RC-072	C-8	CAPACITOR—.05 mfd., 200-V. paper.....	.25
*RC-274	C-14	CAPACITOR—330 mmf. mica.....	.30
*RC-023	C-15	CAPACITOR—.005 mfd., 600 V. paper.....	.25
*RC-274	C-16	CAPACITOR—330 mmf. mica.....	.30
*RC-039	C-17	CAPACITOR—.01 mfd., 600 V. paper.....	.25
*RC-048	C-18	CAPACITOR—.02 mfd., 600 V. paper.....	.30
	C-19a	CAPACITOR—20 mfd., 150 V. dry electrolytic.....	
*RC-5174	C19-b	CAPACITOR—30 mfd., 150 V. dry electrolytic.....	.60
*RC-039	C-20	CAPACITOR—.01 mfd., 600 V. paper.....	.25
*RC-092	C-21	CAPACITOR—.05 mfd., 600 V. paper.....	.30
*RQ-1319	R-1	RESISTOR—330,000 ohms, 1/2 W. carbon.....	.70-5
*RQ-1291	R-2	RESISTOR—22,000 ohms, 1/2 W. carbon.....	.70-5
*RQ-1339	R-3	RESISTOR—2.2 megohms, 1/2 W. carbon.....	.70-5
*RV-108	R-4, S-1	VOL. CONTROL—.5 megohm volume control and power switch.....	.95
*RQ-1347	R-5	RESISTOR—4.7 megohms, 1/2 W. carbon.....	.70-5
*RQ-1317	R-6	RESISTOR—270,000 ohms, 1/2 W. carbon.....	.70-5
*RQ-1323	R-7	RESISTOR—470,000 ohms, 1/2 W. carbon.....	.70-5
*RQ-1239	R-8	RESISTOR—150 ohms, 1/2 W. carbon.....	.70-5
*RQ-1469	R-9	RESISTOR—2700 ohms, 1 W. carbon.....	.20
*RQ-1255	R-10	RESISTOR—680 ohm, 1/2 W. carbon.....	.70-5
*RQ-1214	R-11	RESISTOR—13 ohms, 1/2 W. carbon.....	.70-5

Precaution

If the signal generator is AC operated, use an isolating transformer between the power supply and the radio receiver power input. The use of an isolating capacitor is not recommended as AC current through the capacitor will introduce hum modulation and/or create the possibility of a burned-out signal generator attenuator.

Special Service Information

The following information will be very useful in servicing receivers if a vacuum tube voltmeter or similar voltage measuring instrument is available.

- Stage Gains*
Antenna Post to Converter Grid.... 3.0 at 1000 KC
I.F. on Converter Grid to I.F. on I.F. Amplifier Grid..... 60 at 455 KC
I.F. Amplifier Grid to Diode Plate.... 45 at 455 KC
- 0.20-volt, 400-cycle signal across the volume control will give 1/2-watt speaker output.* (Volume control turned to maximum.)
- Average DC voltage developed across oscillator grid leak..... 6 volts

*Variations of ±20% permissible. All readings obtained with enough signal input to give 1/2-watt speaker output.

GENERAL ELECTRIC CO.

To Charge Battery

The battery is charged by merely plugging the receiver power cord in the rated AC power outlet and turning the selector switch to "charge." Frequent check should be taken of the charge indicator and when all indicator balls are visible, the battery is fully charged. Charging the battery after all indicator balls are visible will not harm the battery except that it will evaporate the water faster. A completely discharged battery will be restored usually within 20 to 30 hours.

When operating the receiver from the AC house current, the battery is being charged at a slow rate. Thus if you wish to operate the receiver at the same time that you are charging even a fully discharged battery, plug the power cord in the AC receptacle and turn the power selector switch to the AC position. Prolonged and repeated operation on this position will assure that the battery is always maintained in a nearly fully charged condition.

Battery Operating Instructions

1. Add distilled or tap water in the filter cap at sufficiently frequent intervals to keep liquid level at indicator mark as viewed through opening in a battery case. DO NOT OVERFILL. The battery is available by removing the thumb screw on the left side of the battery case and removing the cover of the case. If any water is spilled in receiver when filling battery, remove with absorbent tissue.

Tap or drinking water is satisfactory as long as it does not contain large quantities of iron or chlorine dissolved in it.

2. If battery is discharged (only one or two indicators showing), water should be added to the level line before starting the recharge.

3. A fully charged battery will operate the radio in "Battery" position about 15 hours before recharging is required. Whenever possible, it is best not to allow the battery to become discharged to the extent that all three indicators disappear.

However, if all three indicators have sunk, the battery should be recharged immediately or within 24 hours.

4. A battery will continually discharge at a slow rate even when not in use. For this reason, monthly checks should be made of the charge condition and the battery placed on charge when necessary. This will prevent damage to the battery such as freezing during cold weather.

BATTERY INSTALLATION

The following instructions should be carefully followed in installing battery:

1. Remove battery from packing carton.
2. If needed, add water to bring liquid level to indicator mark on battery container. Do not overfill.
3. Remove back cover from radio, also battery case cover. The latter is removed by taking out the thumb screw and pulling the left side of the cover away from the battery case.
4. Turn battery with ball indicators faced to left, and then connect the two black leads with spade terminals onto the extreme right or negative (-) terminal of the battery. Note that the leads when connected to the terminal come away from the terminal on the side of battery toward you.
5. Turn battery so that the indicators face the front, then slide the battery part way into the case. Connect the two yellow leads with the spade terminals to the front or positive (+) terminal of the battery. The leads when connected will come away from the terminal on the right-hand side of the battery.
6. Connect the rubber vent tube over the vent located in middle of battery.
7. Slide battery as far as it will go into battery case.
8. Replace battery case cover.
9. Place battery on charge, if necessary, as described in a previous paragraph, until all three indicators are showing in the opening in the case cover.

Charger Characteristics

A ¼-ampere fuse is used in series with the primary of the charger transformer. If the battery, after being placed on charge, does not show any signs of becoming charged after a reasonable length of time, the fuse should be checked. Replace only with a ¼-amp GE Cat. No. 2548 fuse or its equivalent.

If one or more of the copper oxide discs of the rectifier unit are defective, the charger will not operate properly. To test the rectifier unit operation, proceed as follows: Remove the two black leads from the negative terminal of the battery and connect a DC ammeter which will read two amperes, in series with these leads to the negative terminal of the battery. Plug the power cord into an AC supply and turn the power selector switch to the "Charge" position. With the AC line voltage at 117 volts, the average charging current should read about 1.35 amperes at 2.1 volts battery. If line voltage is greater or battery voltage is lower than 2.1 volts the charging current will be greater. If the current is much less than this value at the rated line of 117 volts, one or more of the copper oxide discs may be defective.

To check individual discs, the following tests are suggested. In the conducting direction, the rectifier disc should pass 0.5 ampere or more when ½ volt is impressed across the disc. Note: The copper oxide rectifier disc conducts when the positive potential is applied to the copper oxide surface. The copper oxide is a dark blue coating and is plated with nickel to afford a good surface contact to the oxide. If a DC ammeter is not available for measuring currents as high as 0.5 ampere, the circuit shown in Fig. 2 can be used for this check. This method requires that the resistance of 2.75 ohms be made fairly accurate and is placed in series with the rectifier disc and placed across the two volt storage battery. The voltage should always read 0.5 volt or less; if the voltage exceeds 0.5 volt across the disc in this circuit, it indicates a defective disc.

The reverse current flow is as important as the above test and is made as follows: Reverse the battery polarity in the above test circuit and place a milliammeter that will read 10 milliamps in series with a lead to one of the battery terminals. This reverse current should not exceed 2½ milliampers at the applied voltage of 2.0 volts. If the current is considerably above this value the disc should be discarded. Precaution—A suitable meter fuse should be used in series with the milliammeter to prevent damage to the meter in case the disc under test is shorted. A rough check, if a milliammeter is not available, is to measure the resistance of the disc in the non-conducting direction on the low-resistance tap (1½ volt) of the ohmmeter. The resistance should measure at least 750 ohms.

BATTERY INFORMATION

The receiver uses a 2-volt Willard Radio Battery No. 20-2 or equivalent. It has a twenty ampere-hour capacity and should be cared for in the same manner as any other storage battery.

Charge Indicator

The degree of charge of the battery can be determined by removing the back cover of the radio and referring to the charge ball indicator visible through the hole in the metal battery case.

If the battery is fully charged, three indicator balls will be visible at the surface of the liquid in the battery. When the battery discharges, these ball indicators will sink and disappear in the following order:

1. Green indicator sinks when approximately 10 per cent of battery capacity has been discharged.
2. White ball sinks when 50 per cent capacity has been discharged.
3. The red ball sinks when battery is 90 per cent discharged.

On charge, the balls rise or float in the reverse order and the charge is complete and may be stopped when all three balls appear in the opening.

GENERAL ELECTRIC CO.

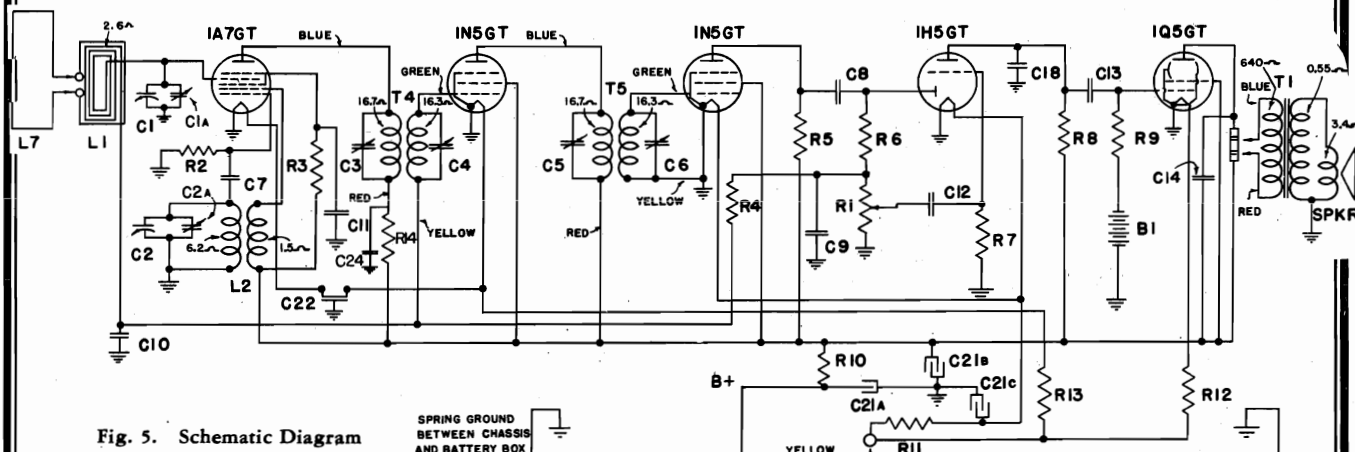


Fig. 5. Schematic Diagram

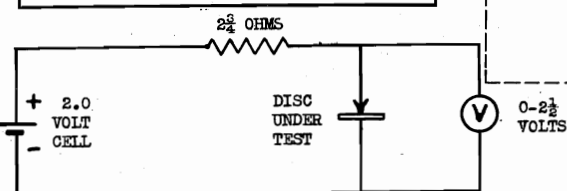
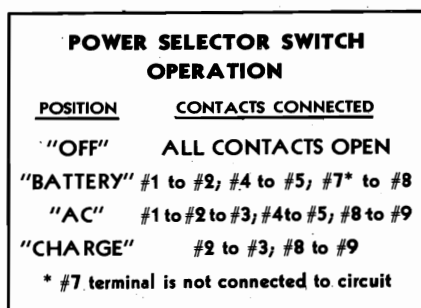


Fig. 2. Charger Disc Test

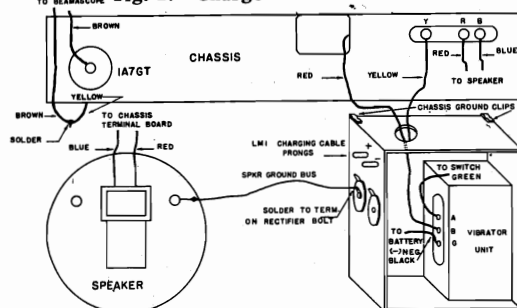


Fig. 3. Assembly Wiring

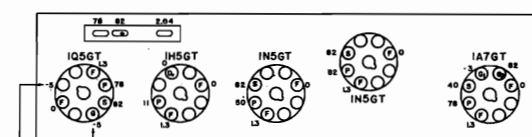
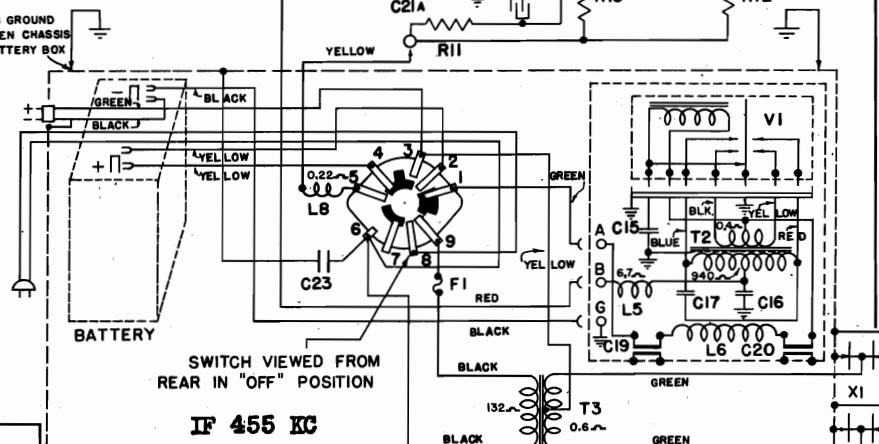


Fig. 4. Trimmer Location

Prices subject to change without notice.

Stock No.	Symbol	Description	List Price	Stock No.	Symbol	Description	List Price
RC-7054	C-1, 2	CONDENSER—Tuning condenser and trimmers	\$1.55	*RQ-1331	R-8	RESISTOR—1.0 megohm, 1/4 W. carbon	\$0.70-5
*RC-216	C-7	CAPACITOR—47 mmf. mica	.25	*RQ-1339	R-9	RESISTOR—2.2 megohm, 1/4 W. carbon	.70-5
*RC-235	C-8, 9	CAPACITOR—100 mmf. mica	.25	*RQ-1259	R-10	RESISTOR—1,000 ohm, 1/4 W. carbon	.70-5
*RC-072	C-10	CAPACITOR—.05 Mfd., 200 V. paper	.25	RQ-1208	R-11, 12, 13	RESISTOR—8.2 ohm, 1/4 W. carbon	.70-5
*RC-096	C-11	CAPACITOR—.01 Mfd., 200 V. paper	.30	B-1		CELL—5.0 V. bias cell assembly	.55
*RC-023	C-12, 13	CAPACITOR—.005 Mfd., 600 V. paper	.25	RL-568	L-1	BEAM-A-SCOPE—Loop antenna assembly (inside cover)	.90
*RC-039	C-14	CAPACITOR—.01 Mfd., 600 V. paper	.25	RL-2055	L-2	COIL—Oscillator coil	.30
*RC-096	C-15	CAPACITOR—.01 Mfd., 200 V. paper	.30	RL-367	L-5	CHOKE—B choke	.20
*RC-072	C-16	CAPACITOR—.05 Mfd., 200 V. paper	.25	RL-366	L-6	CHOKE—Vibrator choke	.55
*RC-027	C-17	CAPACITOR—.006 Mfd., 100 V. paper	.30	RL-367	L-7	BEAM-A-SCOPE—External loop antenna	.45
*RC-235	C-18	CAPACITOR—100 mmf. mica	.25	RL-365	L-8	CHOKE—Filament supply choke	.20
*RC-156A	C-19, 20	CAPACITOR—.05 Mfd., 120 V.	.45	RS-3115	SW1	SWITCH—Power selector switch	.70
	C-21A, 21B	CAPACITOR—15 Mfd., 150 V. dry electrolytic	.75	RT-4010	T-1	TRANSFORMER—Output transformer	.90
RC-5189	C-21C	CAPACITOR—1200 Mfd., 2 V. dry electrolytic	.45	RT-0525	T-2	VIBRATOR—Vibrator power transformer	1.80
*RC-156A	C-22	CAPACITOR—.05 Mfd., 120 V. paper	.45	RT-0524	T-3	TRANSFORMER—50-60 cycle rectifier step-down transformer	1.20
*RC-092	C-23	CAPACITOR—.05 Mfd., 600 V. paper	.30	RT-0527	T-3	TRANSFORMER—25 cycle rectifier step-down transformer	.90
RV-125	R-1	VOLUME CONTROL—0.5 megohm volume control	.95	RT-293	T-4	TRANSFORMER—1st I.F. transformer	.90
*RQ-1315	R-2	RESISTOR—220,000 ohm, 1/4 W. carbon	.70-5	RT-392	T-5	TRANSFORMER—2nd I.F. transformer	.90
*RQ-1299	R-3	RESISTOR—47,000 ohm, 1/4 W. carbon	.70-5	RV-204	V-1	VIBRATOR—Power supply synchronous vibrator	3.60
*RQ-1339	R-4	RESISTOR—2.2 megohm, 1/4 W. carbon	.70-5	RR-802	X-1	RECTIFIER—Copper oxide rectifier	.25
*RQ-1293	R-5	RESISTOR—27,000 ohm, 1/4 W. carbon	.70-5	RS-1066	Spkr	SPEAKER—PM speaker	4.60
*RQ-1299	R-6	RESISTOR—47,000 ohm, 1/4 W. carbon	.70-5				
*RQ-1347	R-7	RESISTOR—4.7 megohm, 1/4 W. carbon	.70-5				

MODEL LB-530

GENERAL ELECTRIC CO.

ALIGNMENT PROCEDURE

Alignment Frequencies

I.F. 455 KC
 R.F. 1500 KC

The location of all trimmers is shown in Fig. 4.

I.F. Alignment

Connect an output meter across the voice coil. Turn volume control to maximum. Set test oscillator to 455 KC and keep the oscillator output as low as a readable meter reading will permit.

Apply signal to 1A7GT converter grid through .05 Mfd. capacitor and align progressively the trimmers in the 2nd and 1st I.F. transformer cans.

R.F. Alignment

Adjust the signal generator to 1750 KC and loosely couple a wire from the output terminal of the signal generator so that the receiver loop will pick up the signal. Set the gang condenser to minimum capacity and adjust the oscillator trimmer (C2A) to receive the signal. After this has been done set the signal generator to 1500 KC and tune the receiver until this signal is tuned in. Adjust the R.F. trimmer (1A) for maximum output. In case of bent plates in the condenser, set the signal generator and the receiver to 600 KC and bend plates into the position for maximum output.

Tubes

Converter-Oscillator.....GE-1A7GT
 1st I.F. Amplifier.....GE-1N5GT
 2nd I.F. Amplifier.....GE-1N5GT
 Detector & 1st Audio.....GE-1H5GT
 Power Output.....GE-1Q5GT

SPECIFICATIONS

Physical Dimensions

Height.....13 inches
 Width.....13 inches
 Depth.....4 $\frac{3}{4}$ inches
 Weight (with Battery).....16 pounds

Special Service Information

The following service information will be very useful in servicing receivers if a vacuum tube voltmeter or similar voltage measuring instrument is available.

(1) Stage Gains

1A7GT grid to 1st IF grid.....40 at 1,000 KC
 1A7GT grid to 1st IF grid.....57 at 455 KC
 1st IF grid to 2nd IF grid.....95 at 455 KC
 2nd IF grid to 1H5GT diode
 plate.....8.5 at 455 KC

(2) Audio Gain

0.08 volts, 400 cycle signal across volume control with control set at maximum, will give approximately 50 milliwatts speaker output.

(3) DC voltage developed across oscillator grid resistor (R2) averages 6.5 volts at 1,000 KC.

Variations of 20 per cent permissible. All readings obtained are with AVC shorted to chassis ground.

Electrical Rating

Charging from AC line:

110-125 volts AC.....50-60 cycles.....6 watts
 110-125 volts AC.....25-60 cycles.....10 watts

Charging from storage battery (using LM-1 Charging Cable):

6.3 volts DC.....1.4 amperes

Receiver power consumption:

2.1 volts DC.....1.3 amperes.....2.7 watts

Receiver battery requirement:

Willard 2.0 volts No. 20-2 or equivalent rechargeable battery.

Fuse: G-E No. 2548 $\frac{1}{4}$ -ampere rating.

Tuning Frequency Range

Broadcast Band.....550-1750 KC

Electrical Power Output

Maximum.....225 milliwatts

Loudspeaker—PM Dynamic

Cone Diameter.....5 inches
 Voice Coil Impedance.....3.5 ohms
 (400 cycles)

GENERAL INFORMATION

Power Supply

All power necessary for the operation of the receiver is supplied by the 2-volt built-in rechargeable battery. The tube filaments are heated directly by the two volts from the battery while the necessary high voltage for the screen and plates of the tubes is furnished by a synchronous vibrator used in conjunction with a step-up power transformer and its associated filter circuit. The synchronous vibrator operates on the two volts from the battery.

Provision has been made to charge the battery directly from the house current without removing the battery from the receiver circuit. Two charging positions are provided on the four-position power selector switch. The "Charge" position of this switch allows the battery to be charged at the rate of approximately 1.35 amperes from the house current during the period that the receiver is not being operated. The "AC" position of the switch allows the receiver to be operated at the same time that the battery is being charged. Under this condition, however, it takes a considerably longer period for a partially discharged battery to be fully restored due to the fact that current is taken from the battery to operate the receiver.

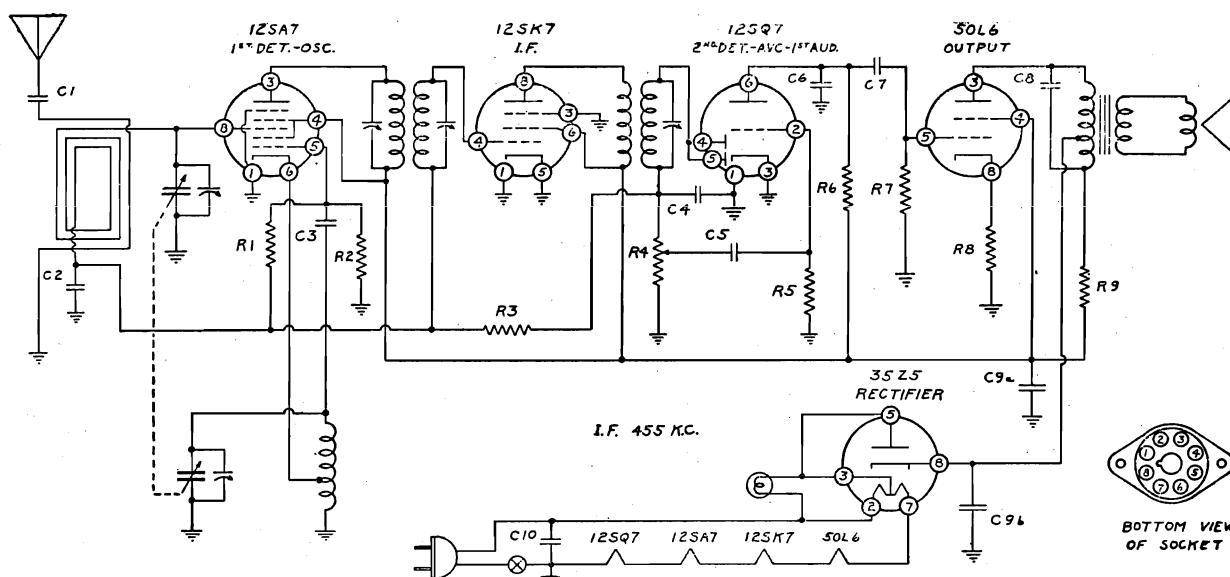
The battery charging unit consists of a step-down transformer which converts the house current to approximately 5.5 volts on 50-60 cycle models; on 25-60 cycle models the voltage is 6.6 volts. This low voltage is then applied to a copper oxide rectifier in a full wave rectifier circuit which supplies the battery with a DC charging current.

A charging cable, Stock LM-1, is available, which provides a convenient means of charging the radio battery from an automobile or 6-volt storage battery. The cable plug is inserted over the two prongs on the left side of the metal battery case and the plug and socket on the other end of the cable is provided with terminals for connection to a 6-volt supply. Full installation instructions are provided with each cable.

Before the receiver chassis can be removed from the cabinet, it is necessary to first remove the battery-vibrator case. The battery case is held in place by four screws available from the bottom of the cabinet. The radio chassis is held by two Phillips head screws located on the control panel. Fig. 3 shows the various connectors used to interconnect the units.

GENERAL ELECTRIC CO.

MODEL LCP-596



RESISTORS						CONDENSERS					
No.	Ohms	Watts	No.	Ohms	Watts	No.	Capacity (Mfd.)	Volts	No.	Capacity (Mfd.)	Volts
R1	10,000,000	1/4	R6	250,000	1/4	C1	.001	600	C7	.01	400
R2	25,000	1/4	R7	500,000	1/4	C2	.05	200	C8	.02	400
R3	2,000,000	1/4	R8	150-10%	1/4	C3	.00005	Mica	C9a	50. Elect.	150
R4	500,000	1/4	R9	1,000	1/2	C4	.00025	Mica	C9b	30. Elect.	150
R5	5,000,000	1/4				C5	.005	600	C10	.05	400
						C6	.0005	Mica			
Part No.	Part Name	Description	Price List	Part No.	Part Name	Description	Price List				
*RB-641R	Button	Snap button for back cover (Pkg. 6)	\$.10	*RQ-1317	Resistor	250,000-ohm, 1/2 W. carbon (R-6)	.70				
*RB-642R	Button	Snap button for dial scale	.05			(Pkg. 5)					
*RB-956R	Back	Cardboard back cover	.20	*RQ-1324	Resistor	500,000-ohm, 1/2 W. carbon (R-7)	.70				
*RC-009	Capacitor	.001 Mfd., 600 V. paper (C-1)	.30			(Pkg. 5)					
*RC-023	Capacitor	.005 Mfd., 600 V. paper (C-5)	.25	*RQ-1339	Resistor	2.0 megohm, 1/2 W. carbon (R-3)	.70				
*RC-047	Capacitor	.01 Mfd., 400 V. paper (C-7)	.20			(Pkg. 5)					
*RC-048	Capacitor	.02 Mfd., 600 V. paper (C-8)	.30	*RQ-1348	Resistor	5.0 megohm, 1/2 W. carbon (R-5)	.70				
*RC-072	Capacitor	.05 Mfd., 200 V. paper (C-2)	.25			(Pkg. 5)					
*RC-092	Capacitor	.05 Mfd., 600 V. paper (C-10)	.30	*RQ-1355	Resistor	10.0 megohm, 1/2 W. carbon (R-1)	.70				
*RC-216	Capacitor	50 Mmf. Mica (C-3)	.25			(Pkg. 5)					
*RC-259	Capacitor	250 Mmf. Mica (C-4)	.30	*RS-299R	Socket	Pilot lamp socket	.30				
*RC-296	Capacitor	500 Mmf. Mica (C-6)	.25	*RS-488R	Spring	Dial drive cord spring	.05				
RC-5184R	Capacitor	30 Mfd., 50 Mfd., 150 Volt Electrolytic (C-9A), (C-9B)	1.50	RS-1062R	Speaker	5" PM speaker	3.20				
			2.30	RT-4007R	Transformer	Output transformer	1.00				
*RC-7046R	Condenser	2-gang tuning condenser		*RS-252	Socket	Tube socket	.15				
*RC-863	Cord	Power line cord	.65	*RS-8018R	Screws	Chassis mounting screws (Pkg. 6)	.10				
RD-194R	Dial	Dial scale	.40	*RS-9020R	Shaft	Drive Shaft	.10				
*RH-905R	Handle	Cabinet handle	.35	*RT-380R	Transformer	1st I. F. transformer	1.15				
*RK-1013R	Knob	Control knob	.15	*RT-381R	Transformer	2nd I. F. transformer	.80				
RL-562R	Antenna	Loop antenna assembly	1.75	*RV-113R	Volume Control	0.5 megohm volume control (R-4)	.95				
RL-2051R	Coil	Oscillator coil	.40	*RW-058R	Window	Dial window	.35				
RP-1015R	Pointer	Dial pointer	.15	*RW-129R	Washer	Horseshoe drive shaft washer	.05				
*RQ-1239	Resistor	150-ohm, 1/2 W. carbon (R-8)	.70	*RW-132R	Washer	Spring drive shaft washer	.05				
		(Pkg. 5)		RZ-203R	Cabinet	Model LCP-596 cabinet	4.20				
*RQ-1259	Resistor	1,000-ohm, 1/2 W. carbon (R-9)	.70								
		(Pkg. 5)									
*RQ-1292	Resistor	25,000-ohm, 1/2 W. carbon (R-2)	.70								
		(Pkg. 5)									

* Used on previous receivers.

(PRICES SUBJECT TO CHANGE WITHOUT NOTICE)

General Data

The alignment of this receiver requires the use of a signal generator that will cover the frequencies of 455, 600, 1400 and 1730 K.C., and an output meter to be connected across the primary or secondary of the output transformer. If possible, all alignments should be made with the volume control on maximum and the signal generator output as low as possible, to prevent the AVC from operating and giving false readings.

I.F. Alignment

Adjust the signal generator to 455 K.C. and connect the output to the grid of the first detector tube (12SA7) through a .05 or .1 mfd. condenser. Connect ground of signal generator to chassis ground through a .1 mfd. condenser. Align all I.F. trimmers to peak or maximum reading on the output meter.

Broadcast Band Alignment

Adjust the signal generator to 1730 K.C. and connect the output to the antenna lead, through a .0002 mfd. mica condenser. Set the gang condenser to minimum capacity and adjust the oscillator trimmer to receive this signal. After this has been carefully done, the next step is to set the signal generator to 1400 K.C. and after tuning in the signal adjust the B.C. antenna trimmer to peak. In case of bent plates, set the signal generator and the receiver to 600 K.C. and bend the plates into the position for maximum output.

(PRICES SUBJECT TO CHANGE WITHOUT NOTICE)

Voltages—Line 117 Volts AC—Power Consumption 30 Watts. Volume Control maximum. Meter 1000 ohms per volt, 150 volt scale.

Plate (3) of 12SA7 tube to common ground..... 93 volts
Screen (4) of 12SA7 tube to common ground..... 95 volts
Plate (8) of 12SK7 tube to common ground..... 93 volts
Screen (6) of 12SK7 tube to common ground..... 95 volts
Plate (3) of 50L6 tube to common ground..... 118 volts
Screen (4) of 50L6 tube to common ground..... 95 volts
Cathode (8) of 50L6 tube to common ground..... 5.5 volts
Cathode (8) of 35Z5 tube to common ground.... 122 volts

Speaker—5" PM Type

Voice coil impedance at 400 cycles..... 3.8 ohms

Oscillator Coil

Looking at the connection end in a clockwise direction starting at the chassis the terminals are No. 1, end of winding; No. 2, start of winding; No. 3, tap.

No. 2 and No. 1—Resistance 4.9 ohms.

No. 3 and No. 1—Resistance 4.3 ohms.

First I.F. Transformer

Primary—Blue, plate, red, B+—Resistance 20.4 ohms.

Secondary—White, grid; Black, AVC—Resistance 20.3 ohms.

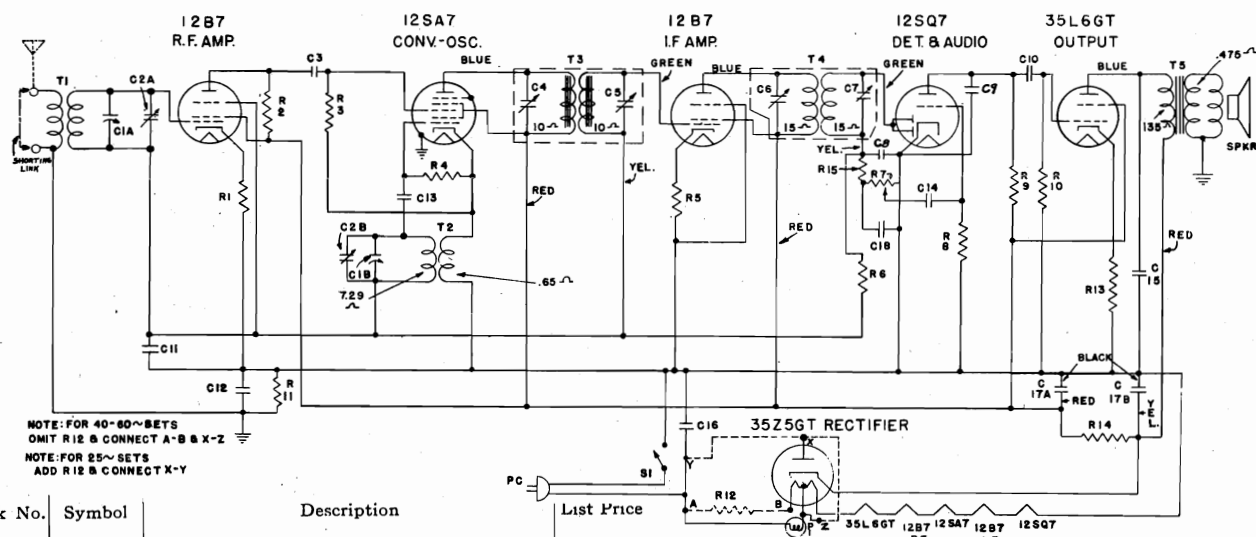
Second I.F. Transformer

Primary—Blue, plate; red B+—Resistance 22.2 ohms.

Secondary—White, diode; Black, AVC—Resistance 22.1 ohms.

MODELS L-600, L-601,
L-610, L-611

GENERAL ELECTRIC CO.



Stock No.	Symbol	Description	List Price
*RC-7049	C-1a, 1b, 2a, 2b	CONDENSER—Tuning condenser.....	\$1.70
*RC-235	C-3	CAPACITOR—100 Mmf., mica.....	.25
*RC-242	C-8	CAPACITOR—150 Mmf., mica.....	.25
*RC-274	C-9	CAPACITOR—330 Mmf., mica.....	.30
*RC-039	C-10	CAPACITOR—.01 Mfd., 600 V. paper.....	.25
*RC-072	C-11	CAPACITOR—.05 Mfd., 200 V. paper.....	.25
*RC-104	C-12	CAPACITOR—.01 Mfd., 600 V. paper.....	.25
*RC-216	C-13	CAPACITOR—.47 Mmf., mica.....	.25
*RC-023	C-14	CAPACITOR—.005 Mfd., 800 V. paper.....	.25
*RC-048	C-15	CAPACITOR—.02 Mfd., 600 V. paper.....	.25
*RC-092	C-16	CAPACITOR—.05 Mfd., 600 V. paper.....	.30
*RC-5183	C-17a, 17b	CAPACITOR—50 Mfd., 60 Mfd., electrolytic.....	.80
*RC-235	C-18	CAPACITOR—100 Mmf., mica.....	.25
*RQ-1227	R-1	RESISTOR—47 ohm, 1/2 W. carbon.....	.70-5
*RQ-1275	R-2	RESISTOR—47,000 ohm, 1/2 W. carbon.....	.70-5
*RQ-1299	R-3	RESISTOR—47,000 ohm, 1/2 W. carbon.....	.70-5
*RQ-1295	R-4	RESISTOR—33,000 ohm, 1/2 W. carbon.....	.70-5
*RQ-1235	R-5	RESISTOR—100 ohm, 1/2 W. carbon.....	.70-5
*RQ-1339	R-6	RESISTOR—2.2 megohm, 1/2 W. carbon.....	.70-5
*RV-120	R-7, S-1	VOLUME CONTROL—.5 megohm, combined with power switch.....	1.45
*RQ-1349	R-8	RESISTOR—5.6 megohm, 1/2 W. carbon.....	.70-5
*RQ-1323	R-9, 10, 11	RESISTOR—470,000 ohm, 1/2 W. carbon.....	.70-5
*RQ-1213	R-12	RESISTOR—12 ohm, 1/2 W. carbon.....	.70-5
*RQ-1239	R-13	RESISTOR—150 ohm, 1/2 W. carbon.....	.70-5
*RQ-651	R-14	RESISTOR—1000 ohm, 1/2 W. carbon.....	.20
*RQ-1299	R-15	RESISTOR—47,000 ohm, 1/2 W. carbon.....	.70-5
*RQ-1255	R-16	RESISTOR—680 ohm, 1/2 W. carbon.....	.70-5

Electrical Power Output (117 line volts)

Undistorted.....1.0 watts
Maximum.....1.5 watts

ALIGNMENT PROCEDURE

Alignment Frequencies

RF.....1500 KC
IF.....455 KC

The chassis must be removed from the cabinet to make the following alignment. The location of all trimmers is shown in Fig. 2.

IF Alignment

Connect an output meter across the voice coil. Turn the volume control to maximum. Set test oscillator to 455 KC and keep the oscillator output as low as a readable meter reading will permit.

Apply signal to the 12SA7 converter grid through a .05 mfd. capacitor and align progressively the trimmers in the 2nd and 1st IF transformers.

RF Alignment

When making the following alignment the loop antenna must be bolted to the chassis by the screw and spacer mounting. The RF signal should be capacity coupled to the receiver loop by placing a two-foot piece of wire for an antenna on the test oscillator output post (high side). Keeping this antenna two feet or more from the receiver loop will generally insure freedom from too much coupling. Metal objects such as meters, tools, etc., should not be placed in close proximity to the loop when making this alignment.

With the gang condenser plates completely closed, the pointer should line up with the first mark on the left of the scale. Set the signal generator to 1500 KC. Align (C-1b) to the signal while the pointer is on the 1500 KC mark. Peak (C-1a) for maximum output.

Special Service Information

The following information will be very useful to service-men equipped with vacuum tube voltmeters or similar voltage measuring instruments.

(1) Stage Gains

Antenna post to RF grid—3.8 at 1000 KC
RF grid to converter grid—6.0 at 1000 KC
Converter grid to IF grid—46 at 455 KC
IF grid to 12SQ7 diode plate—75 at 455 KC

(2) Audio Gain

.14 volts, 400 cycles signal across volume control with control set at maximum, will give approximately 1/2-watt speaker output.

(3) DC voltage developed across oscillator grid resistor (R4) averages 10.0 volts at 1000 KC.

Variations of $\pm 20\%$ permissible. All readings obtained with enough signal input to give 1/2-watt speaker output.

(PRICES SUBJECT TO CHANGE WITHOUT NOTICE)

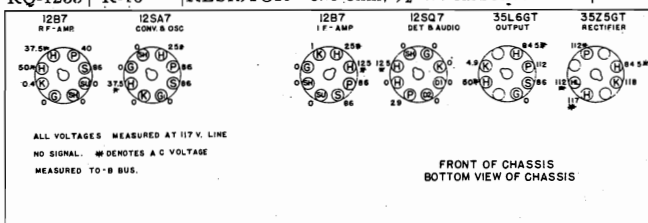
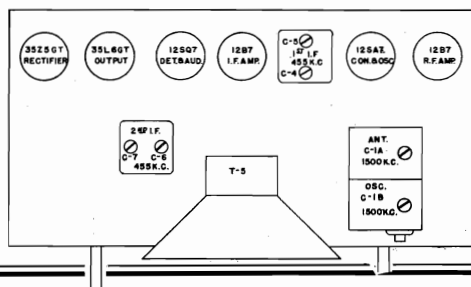
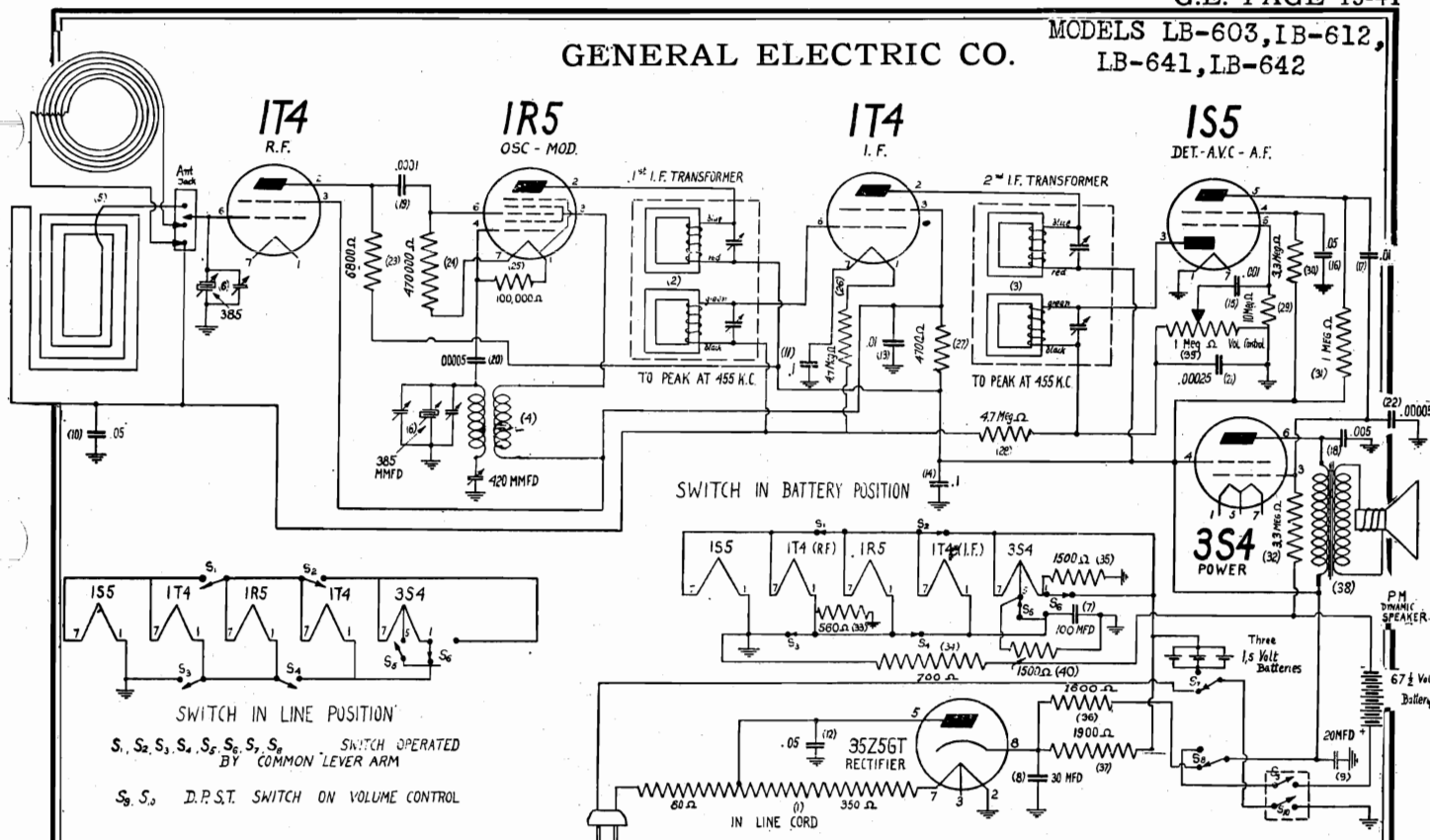


Fig. 1. Dial Stringing Diagram



GENERAL ELECTRIC CO.

MODELS LB-603, LB-612,
LB-641, LB-642

SERVICE NOTES

Battery Specifications.....Three Eveready No. 950,
Burgess No. 2 or equivalent. One Eveready No. 467
Burgess No. XX45 or equivalent.

Intermediate Frequency455 K.C.
Tuning Frequency range540-1700 K.C.
Maximum Power Output150 Milliwatts
Loud SpeakerCone Diameter-4 inches
Voice Coil Impedance(400 cycles) 3 1/2 ohms
Tubes: R. F. 1T4, Converter-Oscillator IR5,
I. F. 1T4, Detector, A. V. C. IS5, Power Output
3S4, Rectifier 35Z5GT

ALIGNMENT PROCEDURE

Alignment Frequencies R. F.600-1500-1700 K. C.
I. F.455 K. C.

I. F. Alignment

Connect an output meter across the voice coil. Rotate the volume control to maximum. Set test oscillator to 455 kilocycles and apply signal to control grid of 1T4 R. F. tube through a .05 mfd. capacitor. Align the second I. F. transformer trimmers, next adjust the first I. F. trimmers. Keep the test output to a level that will give a good meter reading.

R. F. Alignment

Place a one turn loop not closer than six inches from the receiver Beam-a-Scope which is located in the front cover. Apply a 1700 kilocycles signal to the coupling loop. Adjust the receiver to 1700 kilocycles by turning

the variable condenser until it is in the extreme clockwise position. Align the oscillator trimmer (C-1A). Set the signal generator to 1500 kilocycles. Turn the receiver tuning condenser until the generator signal is picked up. Peak (C-1B) for maximum output. Change the test signal

to 600 kilocycles and turn the condenser until signal is heard. Peak (C-2) while rocking the gang variable.

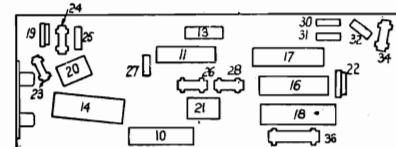
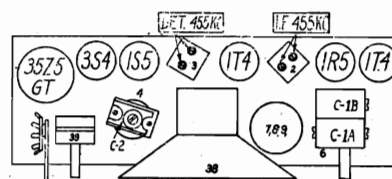
The Beam-a-Scope leads should be dressed the same after the components are mounted in the cabinet as during alignment.

2. The batteries are easily installed or replaced. When the back of the cabinet is opened, the battery compartment is accessible. Place the dry cell batteries on the right side with brass terminal toward the outside. Snap the red lead terminal to the positive (+) terminal of the "B" battery. The blue lead should be snapped to the negative (-) terminal. Place the "B" battery on the left side of the compartment with the terminals toward the center. The sketch inside the cabinet will be found an aid in connecting the batteries properly.

VOLTAGE TABLE

SYM.	DESCRIPTION	G	CONTROL GRID
F, F+	FILAMENTS	G ₀	OSCILLATOR GRID
P	PLATE	FT	FILAMENT TAP
DP	DIODE PLATE	K	CATHODE
S	SCREEN GRID	NC	NO CONNECTION

BOTTOM VIEW OF CHASSIS
ALL FILAMENT VOLTAGES MEASURED ACROSS SOCKET TERMINALS. OTHER VOLTAGES MEASURED FROM SOCKET TERMINAL TO GROUND WITH A 1000 Ω PER VOLT VOLTMETER

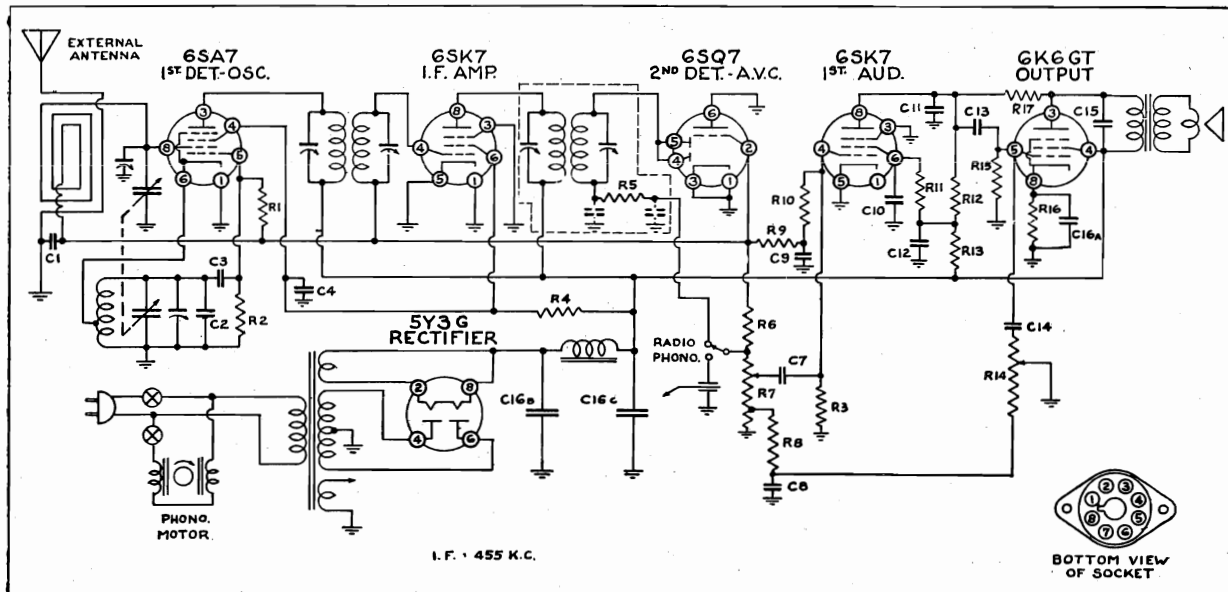


BOTTOM VIEW OF CHASSIS

PARTS 12 15 29 33 35 40 LOCATED ON TOP OF CHASSIS

MODEL LC-608

GENERAL ELECTRIC CO.



C5 and C6 are an integral part of RT-397R, the 2nd I.F. transformer.

RESISTORS				CONDENSERS			
No.	Ohms	Watts	No.	Ohms	Watts	No.	Capacity (Mfd.)
R1	10,000,000	1/2	R10	5,000,000	1/2	C1	.05
R2	20,000	1/2	R11	1,000,000	1/2	C2	.000025—10%
R3	5,000,000	1/2	R12	250,000	1/2	C3	.000005
R4	15,000—10%	2	R13	50,000	1/2	C4	.05
R5	70,000	1/2	R14	500,000	T.C.	C5	.0001
R6	2,000,000	1/2	R15	500,000	1/2	C6	.0001
R7	500,000	V.C.	R16	600—10%	1/2	C7	.01
R8	20,000	1/2	R17	3,000,000	1/2	C8	.02
R9	1,000,000	1/2				C9	.05

ALIGNMENT DATA

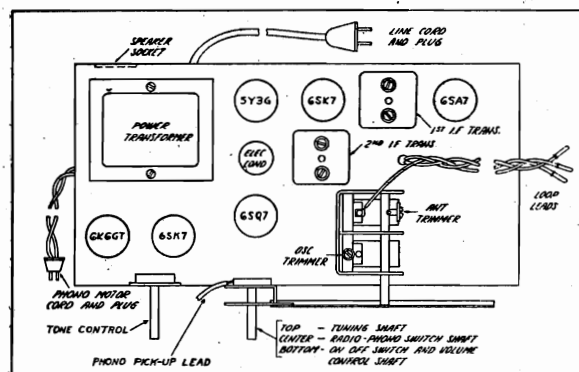


Fig. 2—Top View of Chassis

For Radio Products RC-50 Record Changer see Riders "Automatic Record Changers and Recorders."

SERVICE INFORMATION

Speaker (RS-1068R) 6 1/2" P.M. Type.

D.C. voice coil resistance.....2.8 ohms

Voice coil impedance at 400 cycles.....3.1 ohms

Oscillator Coil (RL-2058R)

Looking at the connection end in a clockwise direction starting at the chassis the terminals are: No. 1, end of winding; No. 2, start of winding; No. 3, top.

No. 1 and No. 2—Resistance.....4.5 ohms

No. 1 and No. 3—Resistance.....4.05 ohms

No. 2 and No. 3—Resistance......45 ohm

VOLTAGE CHART

All voltages measured with a 1,000 ohm per volt meter on the 300 volt scale. Line voltage 117 volts A.C. Volume control maximum and no signal tuned in. Power consumption 75 watts.

6SA7 TUBE

Plate (3) to ground.....255

Screen (4) to ground.....93

6SK7 (I.F.) TUBE

Plate (8) to ground.....255

First I.F. Transformer (RT-396R)

Primary—Blue, plate; red, B+

Resistance.....18.2 ohms

Secondary—White, grid; black, AVC

Resistance.....15.1 ohms

Second I.F. Transformer (RT-397R)

Primary—Blue, plate; red, B+

Resistance.....20.8 ohms

Secondary—White, diode; black, AVC

Resistance.....17.4 ohms

Screen (6) to ground.....93

6K6G TUBE

Plate (3) to ground.....240

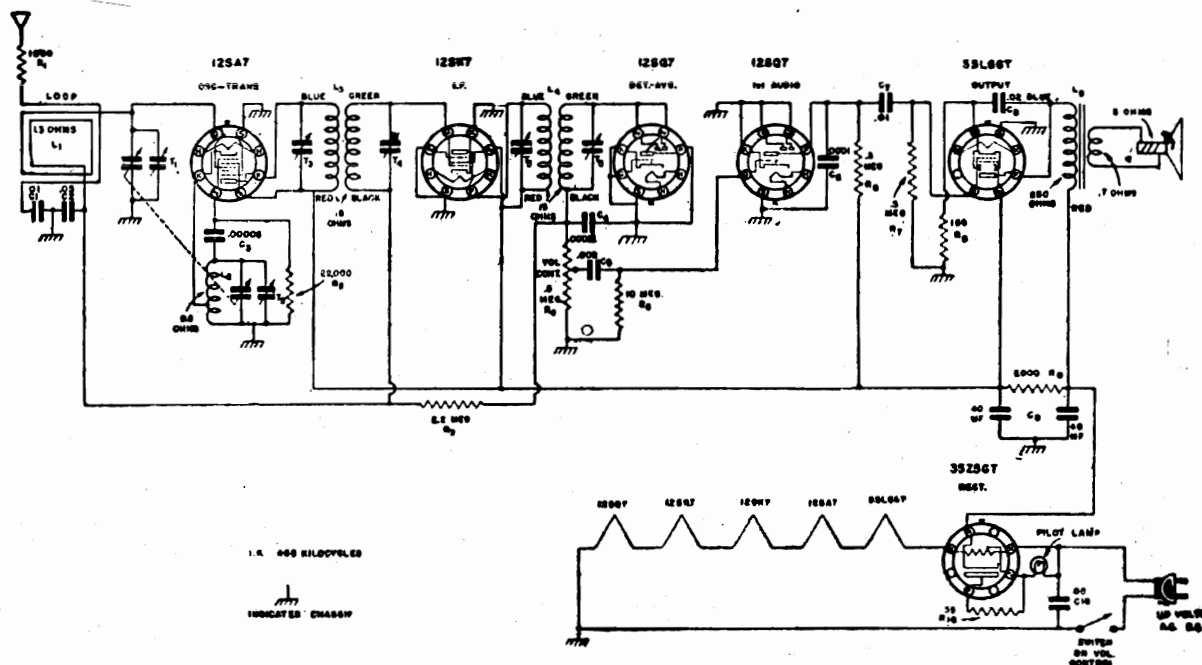
Screen (4) to ground.....258

Cathode (8) to ground.....18

5Y3G TUBE

Filament (8) to ground.....266

GENERAL ELECTRIC CO.



Intermediate Frequency.....	455 K.C.
Tuning Frequency Range.....	540-1720 K.C.
Audio, Power Output (Beam Power).....	1.7 Watts
P. M. Speaker.....	Cone Diameter—4 Inches
Voice Coil Impedance (400 cycles).....	3.5 Ohms

OPERATING VOLTAGES (Approximately)

(Measured with respect to chassis at 117 Volt Line)

TUBES		SCREEN VOLTS	PLATE VOLTS
12SA7	Converter Oscillator	75	75
12SK7	I-F	75	75
12SQ7	Detector - A. V. C.	—	—
12SQ7	1st Audio	—	30*
35L6GT	Output	75	108
35Z5GT	Rectifier	Voltage at Anode .115	

* 300 Volt Range of 1000 Ohm-per-Volt Meter

ALIGNMENT PROCEDURE

Alignment Frequencies:

I. F. 455 K.C.
R. F. 1500 K.C.

d. F. Alignment

Connect an output meter across the voice coil. Rotate the volume to maximum. Set test oscillator to 455 K.C. and apply signal to lug on stator of gang condenser to which loop is connected through a .05 Mfd. capacitor. Align the second I. F. transformer trimmers, next adjust the first I. F. transformer trimmers. Keep test oscillator output as low as a readable-meter reading will permit.

R. F. Alignment

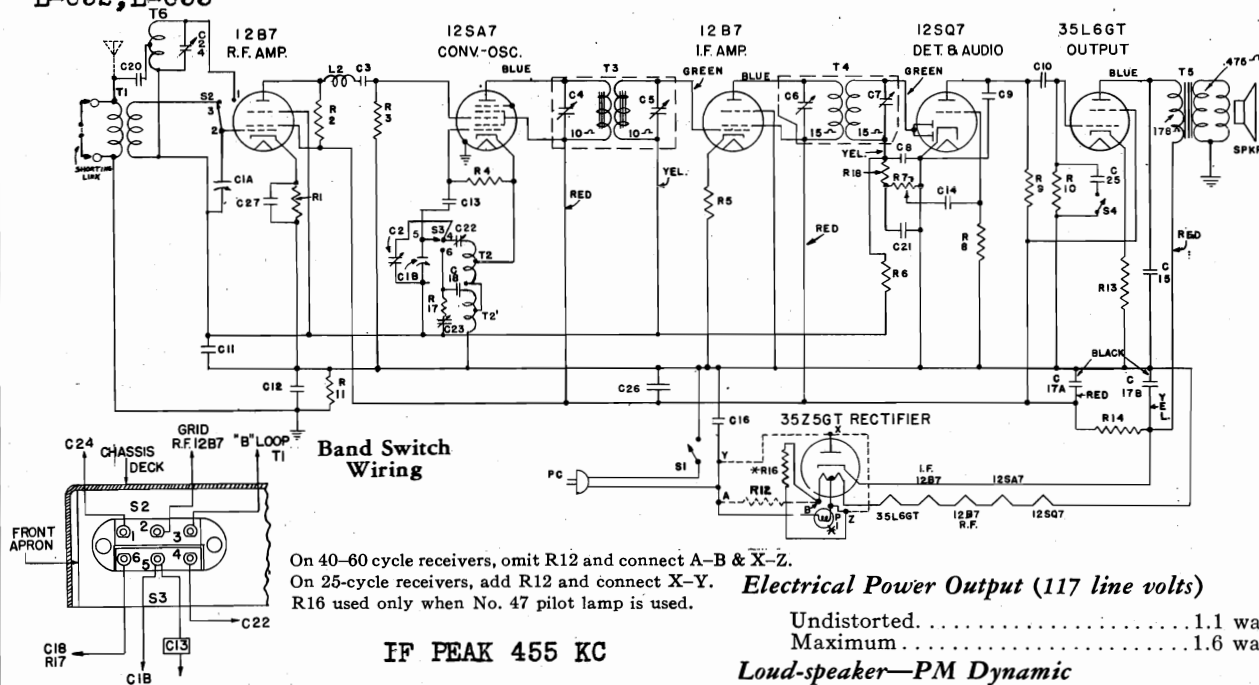
Set the dial pointer and generator at 1500 K.C. Run a wire from the output terminal of the generator, having it come near the receiver. However, no metallic connection is made between the signal generator and the receiver.

Peak the oscillator trimmer for maximum output and then the antenna trimmer.

If the variable condenser plates have become bent or damaged, it may be necessary to adjust them for tracking, at 600 K.C. The oscillator plates are adjusted first, then the antenna plates are adjusted for maximum output at 600 K.C.

MODELS L-613, L-621, L-624,
L-632, L-633

GENERAL ELECTRIC CO.



ALIGNMENT CHART

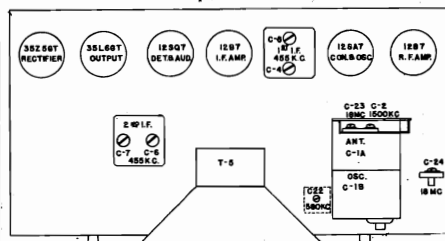
Step	Connect Test-Osc. to	Test-Osc. Setting	Pointer Setting	Adjust Trimmers for Max. Output
1	12B7 IF Grid in series with .05 mfd.	455 KC	"BC" Band 550 KC	C6 & C7
2	6SA7 Conv. grid in series with .05 mfd.	455 KC	"BC" Band 550 KC	C4 & C5
3	Capacity Coupled	580 KC	"BC" Band 580 KC	C22**
4	Capacity Coupled	1500 KC	"BC" Band 1500 KC	C2** (Osc.)
5	REPEAT STEP 3			
6	Capacity Coupled	18 MC	"SW" Band 18 MC	C23* (Osc.)
7	Capacity Coupled	18 MC	"SW" Band 18 MC	C24** (Ant.)

* Use minimum capacity peak.

** Rock gang condenser when making alignment.

Special Service Information

- Stage gains
Antenna post to RF grid—3.0 at 1000 KC
RF grid to converter grid—6.0 at 1000 KC
Converter grid to IF grid—50 at 455 KC
IF grid to 12SQ7 diode plate—75 at 455 KC
- Audio gains
.14 volts, 400 cycles signal across volume control with control set to maximum will give approximately $\frac{1}{2}$ -watt speaker output.
- DC voltage developed across oscillator grid resistor (R4) averages 9.0 volts at 1000 KC or 8.0 volts at 10,000 KC.

* Variations of $\pm 20\%$ permissible. All readings obtained with enough signal input to give $\frac{1}{2}$ -watt speaker output.PRICES SUBJECT
TO CHANGE
WITHOUT NOTICE

Electrical Power Output (117 line volts)

Undistorted.....1.1 watts
Maximum.....1.6 watts

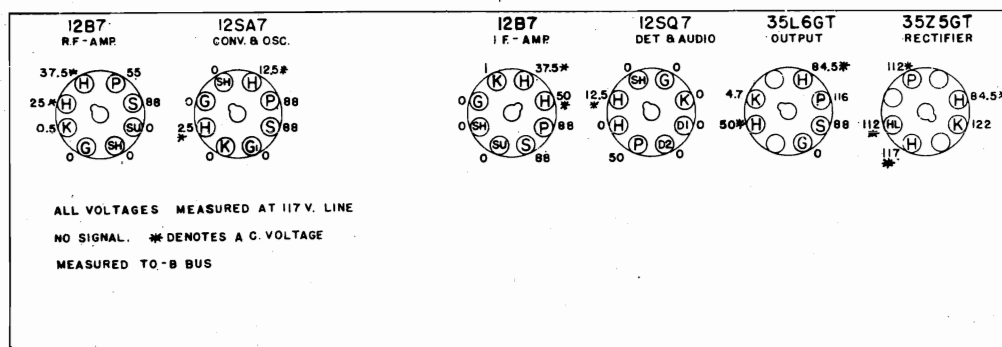
Loud-speaker—PM Dynamic

Outside Cone Diameter.....5 inches
Voice Coil Impedance (400 cycles)....3.5 ohms

REPLACEMENT PARTS LIST

Stock No.	Symbol	Description	List Price
*RC-7050	C1a, 1b	CONDENSER—Tuning condenser.	\$1.95
*RC-6547	C2	CAPACITOR—"BC" and "SW" Osc. trimmer assembly.	.30
*RC-235	C3	CAPACITOR—100 mmf. mica.	.25
*RC-274	C8	CAPACITOR—330 mmf. mica.	.30
*RC-242	C9	CAPACITOR—150 mmf. mica.	.25
*RC-039	C10	CAPACITOR—.01 mfd., 600 V paper.	.25
*RC-072	C11	CAPACITOR—.05 mfd. 260 V paper.	.25
*RC-104	C12	CAPACITOR—.01 mfd. 600 V paper.	.30
*RC-216	C13	CAPACITOR—47 mmf. mica.	.25
*RC-023	C14	CAPACITOR—.005 mfd. 600 V paper.	.25
*RC-039	C15	CAPACITOR—.01 mfd. 600 V paper.	.25
*RC-092	C16	CAPACITOR—.05 mfd. 600 V paper.	.30
*RC-5183	C17a, 17b	CAPACITOR—50 mfd. 60 mfd. 150 V. Electrolytic.	.80
*RC-391	C18	CAPACITOR—4300 mmf. mica.	.35
*RC-209	C20	CAPACITOR—39 mmf. mica.	.25
*RC-235	C21	CAPACITOR—100 mmf. mica.	.25
*RC-6548	C22	CAPACITOR—"B" padder.	.35
*RC-6547	C23	CAPACITOR—"SW" and "BC" Osc. Trimmer Assembly.	.30
*RC-6546	C24	CAPACITOR—"SW" band ant. trimmer.	.20
*RC-053	C25	CAPACITOR—.0032 mfd 600 V paper.	.25
*RC-039	C-26, 27	CAPACITOR—.01 mfd. 600-V paper.	.25
*RQ-1227	R-1	RESISTOR—47 ohm, $\frac{1}{2}$ -W. carbon.	.70-5
*RQ-1275	R-2	RESISTOR—4700 ohm, $\frac{1}{2}$ -W carbon.	.70-5
*RQ-1299	R-3	RESISTOR—47,000 ohm, $\frac{1}{2}$ -W carbon.	.70-5
*RQ-1295	R-4	RESISTOR—33,000 ohm, $\frac{1}{2}$ -W carbon.	.70-5
*RQ-1235	R-5	RESISTOR—100 ohm, $\frac{1}{2}$ -W carbon.	.70-5
*RQ-1339	R-6	RESISTOR—2.2 megohm, $\frac{1}{2}$ -W carbon.	.70-5
*RV-120	R-7, S-1	VOL. CONTROL—.05 megohm with power switch (Models L-621, 624, 632, 633)	1.45
RV-131	R-7, S-1	VOL. CONTROL—.05 megohm with power switch (Model L-613 only)	1.45
*RQ-1349	R-8	RESISTOR—5.6 megohm, $\frac{1}{2}$ -W. carbon.	.70-5
*RQ-1315	R-9	RESISTOR—220,000 ohm, $\frac{1}{2}$ -W carbon.	.70-5
*RQ-1323	R-10, 11	RESISTOR—470,000 ohm $\frac{1}{2}$ -W carbon.	.70-5
*RQ-1213	R-12	RESISTOR—12 ohm, $\frac{1}{2}$ -W. carbon	.70-5
*RQ-1239	R-13	RESISTOR—150 ohm, $\frac{1}{2}$ -W. carbon	.70-5
*RQ-651	R-14	RESISTOR—1000 ohm, 2-W. carbon.	.20
*RQ-1255	R-16	RESISTOR—680 ohm, $\frac{1}{2}$ -W. carbon	.70-5
*RQ-1231	R-17	RESISTOR—68 ohm, $\frac{1}{2}$ -W. carbon	.70-5
*RQ-1299	R-18	RESISTOR—47,000 ohm, $\frac{1}{2}$ -W. carbon.	.70-5
*RL-1012	L-2	COIL—R.F. Choke coil.	.20

MODEL LC-619

GENERAL ELECTRIC CO. MODELS L-613, L-621, L-624,
L-632, L-633FRONT OF CHASSIS
BOTTOM VIEW OF CHASSIS

G.E. Models L-613, L-621, L-624, L-632, L-633.

GENERAL INFORMATION

Two different types of record changers were used during the production of the Model LC-619 phonograph combination.

The Model LRP-170 record changer is identified by the single record post and the eccentric turntable spindle, whereas the LRP-162 changers make use of a two-post record holder. Different pickup compensation is used for the two changers as noted at the bottom of the schematic diagram and the change in value of resistors, R12 and R16, as given in the replacement parts list.

Special Service Information

The following data are taken with a vacuum tube voltmeter or similar voltage measuring device.

- (1) Stage Gains
Antenna Post to RF Grid 5 at 1000 KC
RF Grid to Converter Grid 5 at 1000 KC
- (2) Audio Gains
.14 volts, 400 cycles signal across volume control with control set to maximum will give approximately 1/2-watt speaker output.
- (3) DC voltage developed across oscillator grid resistor R4 averages 10 volts at 1000 KC or 8.0 volts at 10,000 KC.

Variations of $\pm 20\%$ permissible. All readings taken with AVC shorted out.

ALIGNMENT PROCEDURE

The location of trimmers is shown in Fig. 4. All oscillator and RF trimmers are accessible through a slot through the back cover of the cabinet.

The alignment procedure is given in table form. All IF alignments may be made with the chassis removed from the cabinet. However, the RF alignments are made with the chassis and loop antennas securely fastened in the cabinet, as the relative position of the loop antenna with respect to the chassis materially affects it. The RF signal should be capacity coupled by placing a two-foot wire for an antenna on the test-oscillator output post (high side). Keeping this antenna two feet or more from the receiver loop will generally insure freedom from too much coupling. Metal objects such as meters, tools, etc., should not be placed on top of the receiver cabinet.

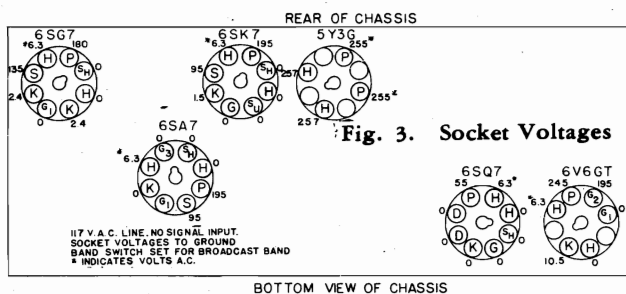


Fig. 3. Socket Voltages

BOTTOM VIEW OF CHASSIS

Model LC 619 ALIGNMENT CHART

Step	Connect Test-Osc. to	Test-Osc. Setting	Pointer Setting	Adjust Trimmers for Maximum Output
1	6SK7 IF Grid in series with .05 mfd.	455 KC	"BC" Band 550 KC	C6 & C7
2	6SA7 Conv. grid in series with .05 mfd.	455 KC	"BC" Band 550 KC	C4 & C5
3	Repeat Step 1			
4	Capacity Coupled	580 KC	"BC" Band 580 KC	C22**
5	Capacity Coupled	1500 KC	"BC" Band 1500 KC	C2** (Osc.)
6	Repeat Step 4			
7	Capacity Coupled	18 MC	"SW" Band 18 MC	C23* (Osc.)
8	Capacity Coupled	18 MC	"SW" Band 18 MC	C24** (Ant.)

* Use minimum capacity peak.

** Rock gang condenser when making alignment.

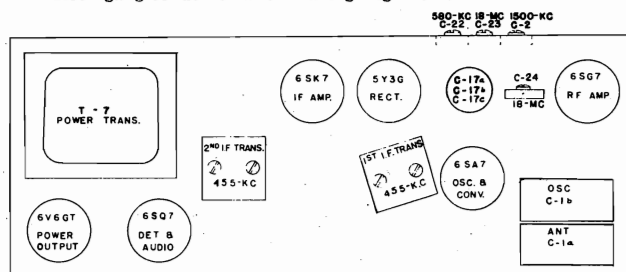


Fig. 4. Trimmer Location

Electrical Rating

Rating "A6"—110-125 volts, 60 cycles, 80 watts.
Rating "A5"—110-125 volts, 50 cycles, 80 watts.

Tuning Frequency Range

"BC" Band.....540-1720 KC
"SW" Band.....5.3-18.0 MC

Intermediate Frequency.....455 KC

Electrical Power Output

Undistorted.....2.5 watts
Maximum.....4.5 watts

Loud-speaker—PM Dynamic

Outside Cone diameter.....12 inches
Voice Coil Impedance (400 cycles).....3.5 ohms

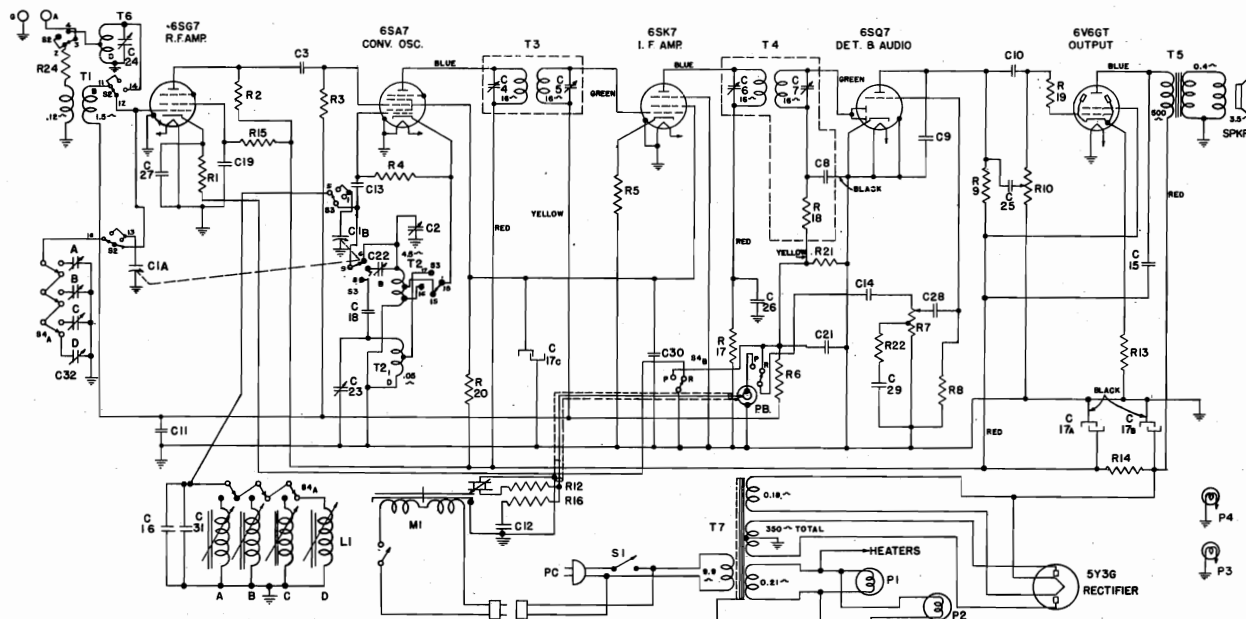
Phonograph Mechanism

Type changer.....Models LRP-162 or LRP-170
Type pickup.....Crystal
Turntable speed.....78 Rpm

MODEL LC-619

GENERAL ELECTRIC CO.

For Modified General Industries 201 Record Changer
or RCA RP-162 Record Changer see Riders "Automatic
Record Changers, and Recorders.



NOTE—C12 IS OMITTED WHEN RECORD CHANGER RP-162 IS USED IF PEAK 455 KC

Fig. 1. Schematic Diagram

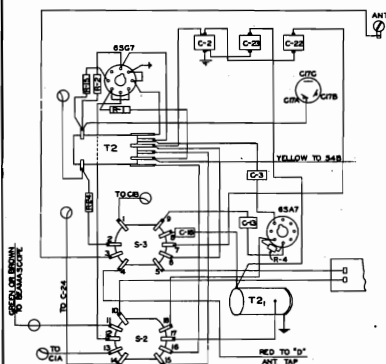


Fig. 2.
Switch Wiring

RADIO REPLACEMENT PARTS LIST

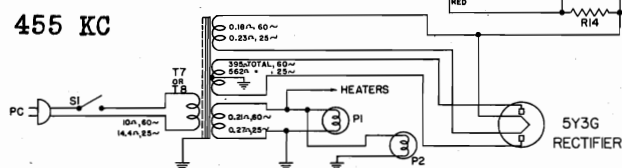
Our Cat. Number	Symbol	Description	List Price
*RC-7061	C1a, C1b	CONDENSER—2 gang tuning condenser.	\$2.00
*RC-6552	C-2	CAPACITOR—"B" band trimmer (Part of C22, 23)	.55
*RC-235	C-3	CAPACITOR—100 mmf., mica	.25
*RC-252	C-8	CAPACITOR—200 mmf., mica	.30
*RC-242	C-9	CAPACITOR—150 mmf., mica	.25
*RC-048	C-10	CAPACITOR—.02 mfd. 600-V paper	.30
*RC-072	C-11	CAPACITOR—.05 mfd. 200-V paper	.25
*RC-011	C-12	CAPACITOR—.002 mfd. 600-V paper (Used with Model LRP-170 record player only)	.25
*RC-216	C-13	CAPACITOR—47 mmf., mica	.25
*RC-023	C-14	CAPACITOR—.005 mfd. 600-V paper	.25
*RC-055	C-15	CAPACITOR—.003 mfd. 600-V paper	.25
*RC-329	C-16	CAPACITOR—150 mmf., compensating capacitor	.25
*RC-5201	C-17a	CAPACITOR—30 mfd. 250-V dry electrolytic	.95
	C-17b	CAPACITOR—30 mfd. 300 volt dry electrolytic	.95
	C-17c	CAPACITOR—10 mfd. 250 volt dry electrolytic	.95
*RC-390	C-18	CAPACITOR—3900 mmf. mica	.35
*RC-039	C-19	CAPACITOR—.01 mfd. 600-V paper	.25
*RC-235	C-21	CAPACITOR—100 mmf., mica	.25
*RC-6552	C-22	CAPACITOR—"B" padder (Part of C2, 23)	.55
*RC-6552	C-23	CAPACITOR—"D" Osc. trimmer (Part of C2, 22)	.55

* Used on previous receivers.

Our Cat. Number	Symbol	Description	List Price
*RC-6553	C-24	CAPACITOR—"D" antenna trimmer	\$0.25
*RC-023	C-25	CAPACITOR—.005 mfd. 600-V paper	.25
*RC-039	C-26, 27, 28	CAPACITOR—.01 mfd. 600-V paper	.25
*RC-049	C-29	CAPACITOR—.0042 mfd. 600-V paper	.35
*RC-039	C-30	CAPACITOR—.01 mfd. 600-V paper	.25
*RC-305	C-31	CAPACITOR—600 mmf., silvered mica	.25
*RT-885	C-32a, b, c	TRIMMER STRIP—Push button trimmer strip	.70
*RQ-1247	R-1	RESISTOR—330 ohm, 1/4-W carbon	.70-5
*RQ-1271	R-2	RESISTOR—3300 ohm, 1/4-W carbon	.70-5
*RQ-1299	R-3	RESISTOR—47,000 ohm, 1/4-W carbon	.70-5
*RQ-1291	R-4	RESISTOR—22,000 ohm, 1/4-W carbon	.70-5
*RQ-1239	R-5	RESISTOR—150 ohm, 1/4-W carbon	.70-5
*RQ-1339	R-6	RESISTOR—2.2 megohm, 1/4-W carbon	.70-5
*RV-135	R-7	VOL. CONTROL—2 meg. volume control	.95
*RQ-1355	R-8	RESISTOR—10 megohm, 1/4-W carbon	.95
*RQ-1323	R-9	RESISTOR—470,000 ohm, 1/4-W carbon	.70-5
*RT-722	R-10, S1	RESISTOR—47,000 ohm, 1/4-W carbon (Used only with Model LRP-170 record player)	1.45
*RQ-1299	R-12	RESISTOR—220,000 ohm, 1/4-W carbon (Used only with Model LRP-162 record player)	.70-5
*RQ-1315	R-12	RESISTOR—220,000 ohm, 1/4-W carbon (Used only with Model LRP-162 record player)	.70-5
*RQ-1247	R-13	RESISTOR—330 ohm, 1/4-W carbon	.70-5
*RQ-665	R-14	RESISTOR—1800 ohm, 2-W carbon	.20
*RQ-1293	R-15	RESISTOR—27,000 ohm, 1/4-W carbon	.70-5
*RQ-1299	R-16	RESISTOR—47,000 ohm, 1/4-W carbon (Used only with Model LRP-170 record player)	.70-5
*RQ-1313	R-16	RESISTOR—180,000 ohm, 1/4-W carbon (Used only with Model LRP-162 record player)	.70-5
*RQ-1259	R-17	RESISTOR—1000 ohm, 1/4-W carbon	.70-5
*RQ-1299	R-18	RESISTOR—47,000 ohm, 1/4-W carbon	.70-5
*RQ-1259	R-19	RESISTOR—1000 ohm, 1/4-W carbon	.70-5
*RQ-683	R-20	RESISTOR—10,000 ohm, 2-W carbon	.35
*RQ-1323	R-21	RESISTOR—47,000 ohm, 1/4-W carbon	.70-5
*RQ-1303	R-22	RESISTOR—68,000 ohm, 1/4-W carbon	.70-5
*RQ-1259	R-24	RESISTOR—1000 ohm, 1/4-W carbon	.70-5
*RL-9530	L1-a, b, c, and d	COIL—Push button coil assembly	.85
RS-3142	S-2, S-3	SWITCH—Band switch	1.10
*RS-3130	S4a, 4b	SWITCH—Touch tuning switch	4.00
RL-591	T-1	BEAM-A-SCOPE—"B" band loop	.50
RL-2073	T-2	COIL—"B" band oscillator coil	.30
RL-2074	T-2i	COIL—"D" band oscillator coil	.30
*RT-3005	T-3	TRANSFORMER—1st IF transformer	.90
RT-3010	T-4	TRANSFORMER—2nd IF transformer	1.20
RT-4013	T-5	TRANSFORMER—Output transformer	1.25
RL-592	T-6	BEAM-A-SCOPE—"D" band loop	.50
*RT-0621	T-7	TRANSFORMER—50 or 60 cycle power transformer	4.25
*RS-1081	SPKR	SPEAKER—12 inch PM speaker	5.50

Prices subject to change without notice.

GENERAL ELECTRIC CO.



ALIGNMENT CHART

Step	Connect Test-Osc. to	Test- Osc. Setting	Pointer Setting	Adjust Trimmers for Maximum Output
1	6SK7 IF Grid in series with .05 mfd.	455 KC	"BC" Band 550 KC	C6 & C7
2	6SA7 Conv. grid in series with .05 mfd.	455 KC	"BC" Band 550 KC	C4 & C5
3	Capacity Coupled	580 KC	"BC" Band 580 KC	C22**
4	Capacity Coupled	1500 KC	"BC" Band 1500 KC	C2** (Osc.)
5	Repeat Step 3			
6	Capacity Coupled	18 MC	"SW" Band 18 MC	C23* (Osc.)
7	Capacity Coupled	18 MC	"SW" Band 18 MC	C24** (Ant.)

**** Rock gang condenser when making alignment.**

Fig. 2. Socket Voltages

ALIGNMENT PROCEDURE

The alignment procedure is given in table form. All IF alignments may be made with the chassis removed from the cabinet. However, the RF alignments are made with the chassis and loop antennas securely fastened in the cabinet

as the relative position of the loop antenna with respect to the chassis materially affects it. The RF signal should be capacity coupled by placing a two-foot wire for an antenna on the test-oscillator output post (high side). Keeping this antenna two feet or more from the receiver loop will generally insure freedom from too much coupling. Metal objects such as meters, tools, etc., should not be placed on top of the receiver cabinet.

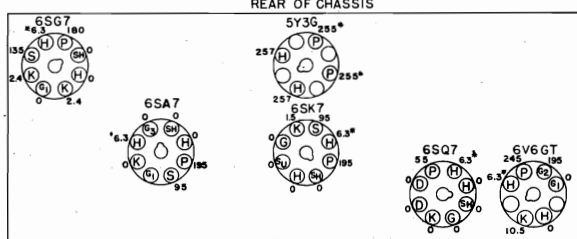
Special Service Information

The following data are taken with a vacuum tube voltmeter similar voltage measuring device.

- (1) Stage Gains
 - Antenna Post to RF Grid 5 at 1000 KC
 - RF Grid to Converter Grid 5 at 1000 KC
 - Converter Grid to IF Grid 40 at 1000 KC
 - Converter Grid to IF Grid 60 at 455 KC
 - IF Grid to 6SQ7 diode plates 90 at 455 KC
- (2) Audio Gains

.14 volts, 400 cycles signal across volume control with control set to maximum will give approximately ½-watt speaker output.
- (3) DC voltage developed across oscillator grid resistor R4 averages 10 volts at 1000 KC or 8.0 volts at 10,000 KC.

Variations of $\pm 20\%$ permissible. All readings taken with AVC shorted out.



BOTTOM VIEW OF CHASSIS

117 V A.C. LINE. NO SIGNAL INPUT
SOCKET VOLTAGES TO GROUND
BAND SWITCH SET FOR BROADCAST BAND
* INDICATES VOLTS A.C.

MODEL L-630
MODEL LC-648

GENERAL ELECTRIC CO.

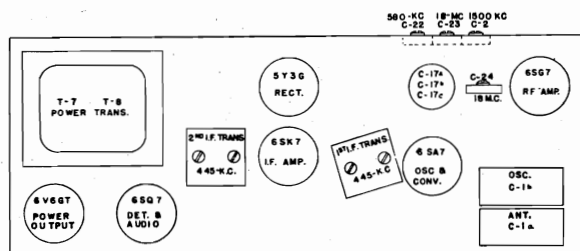


Fig. 1. Trimmer Location

Electrical Power Output

Undistorted.....2.5 watts
Maximum.....4.5 watts

Loudspeaker—PM Dynamic

Outside Cone Diameter.....5 inches
Voice Coil Impedance (400 cycles).....3.5 ohms

**REPLACEMENT PARTS LIST
MODEL L-630**

Our Stock No.	Symbol	Description	List Price
RC-7061 RC-6552	C1A, 1B C-2	CONDENSER—Tuning condenser..... CAPACITOR—"B" osc. trimmer strip (Combined with C22, 23).....	\$2.00 .55
*RC-235 *RC-232 *RC-242 *RC-048 *RC-072 *RC-216 *RC-023 *RC-055 *RC-5164	C-3 C-8 C-9 C-10 C-11 C-13 C-14 C-15 C17a, 17b, 17c	CAPACITOR—100 mmf., mica..... CAPACITOR—200 mmf., mica..... CAPACITOR—150 mmf., mica..... CAPACITOR—.02 mfd., 600 V. paper..... CAPACITOR—.05 mfd., 200 V. paper..... CAPACITOR—47 mmf., mica..... CAPACITOR—.005 mfd., 600 V. paper..... CAPACITOR—.003 mfd., 600 V. paper..... CAPACITOR—15 mfd., 250 V. 30 mfd., 300 V., 10 mfd., 250 V. dry electrolytic.....	.25 .30 .25 .30 .25 .25 .25 .25 1.00
*RC-390 *RC-039 *RC-235 RC-6552	C-18 C-19 C-21 C-22	CAPACITOR—3900 mmf., mica..... CAPACITOR—.01 mfd., 600 V. paper..... CAPACITOR—100 mmf., mica..... CAPACITOR—"B" band padder (Com- bined with C2, 23).....	.35 .25 .25 .55
RC-6552	C-23	CAPACITOR—"D" osc. trimmer (Com- bined with C2, 22).....	.55
RC-6553 *RC-092 *RC-023 *RC-092 *RC-017 *RC-039 *RC-1247 *RC-1271 *RC-1299 *RC-1291 *RC-1239 *RC-1339 RV-135	C-24 C-25 C-26 C-27, 28 C-29 C-30 R-1 R-2 R-3 R-4 R-5 R-6 R-7	CAPACITOR—"D" antenna trimmer..... CAPACITOR—.005 mfd., 600 V. paper..... CAPACITOR—.05 mfd., 600 V. paper..... CAPACITOR—.01 mfd., 400 V. paper..... CAPACITOR—.0042 mfd., 600 V. paper..... CAPACITOR—.01 mfd., 600 V. paper..... RESISTOR—330 ohm, 1/2-W. carbon..... RESISTOR—3300 ohm, 1/2-W. carbon..... RESISTOR—47,000 ohm, 1/2-W. carbon..... RESISTOR—22,000 ohm, 1/2-W. carbon..... RESISTOR—150 ohm, 1/2-W. carbon..... RESISTOR—2.2 megohm, 1/2-W. carbon..... VOLUME CONTROL—2 meg. volume control.....	.15 .25 .30 .20 .25 .25 .70-5 .70-5 .70-5 .70-5 .70-5 .70-5 .95
*RQ-1347	R-8	RESISTOR—4.7 megohms, 1/2-W., car- bon.....	.70-5
*RQ-1323	R-9	RESISTOR—470,000 ohm, 1/2-W., car- bon.....	.70-5
RT-722	R-10, S-1	TONE CONTROL—.05 meg. control and power switch.....	\$1.45
*RQ-1283 *RQ-1247 *RQ-665 *RQ-1293 *RQ-1259 *RQ-1299 *RQ-1259 *RQ-683 *RQ-1323	R-11 R-13 R-14 R-15 R-17 R-18 R-19 R-20 R-21	RESISTOR—10,000 ohm, 1/2-W., carbon..... RESISTOR—330 ohm, 1/2-W., carbon..... RESISTOR—1800 ohm, 2-W., carbon..... RESISTOR—27,000 ohm, 1/2-W., carbon..... RESISTOR—1000 ohm, 1/2-W., carbon..... RESISTOR—47,000 ohm, 1/2-W., carbon..... RESISTOR—1000 ohm, 1/2-W., carbon..... RESISTOR—10,000 ohm, 2-W., carbon..... RESISTOR—470,000 ohm, 1/2-W., car- bon.....	.70-5 .70-5 .20 .70-5 .70-5 .70-5 .70-5 .35 .70-5
*RQ-1308 *RQ-1251 RL-370 RL-577	R-22 R-24 L-2 T-1	RESISTOR—100,000 ohm, 1/2-W., carbon..... RESISTOR—470 ohm, 1/2-W., carbon..... CHOKE—R.F. interstage choke..... BEAM-A-SCOPE—"B" band loop and cabinet back assembly.....	.70-5 .70-5 .30 1.60
RL-2062 RL-2063 RT-3005 RT-3006	T-2 T-2 T-3 T-4	COIL—Osc. coil band "B"..... COIL—Osc. coil "D" band..... TRANSFORMER—1st I.F. transformer..... TRANSFORMER—2nd I.F. transform- er.....	.35 .30 .90 1.15
RT-4013 RL-578 RT-0619	T-5 T-6 T-7	TRANSFORMER—Output transformer..... BEAM-A-SCOPE—"D" band loop..... TRANSFORMER—60 cycle power trans- former.....	2.25 .60 4.00
RT-0620	T-8	TRANSFORMER—25 cycle power trans- former.....	6.80
RS-3126 RS-1071	S-2, S-3 SPKR.	SWITCH—Band change switch..... SPEAKER—5-in. PM speaker.....	.70 2.25

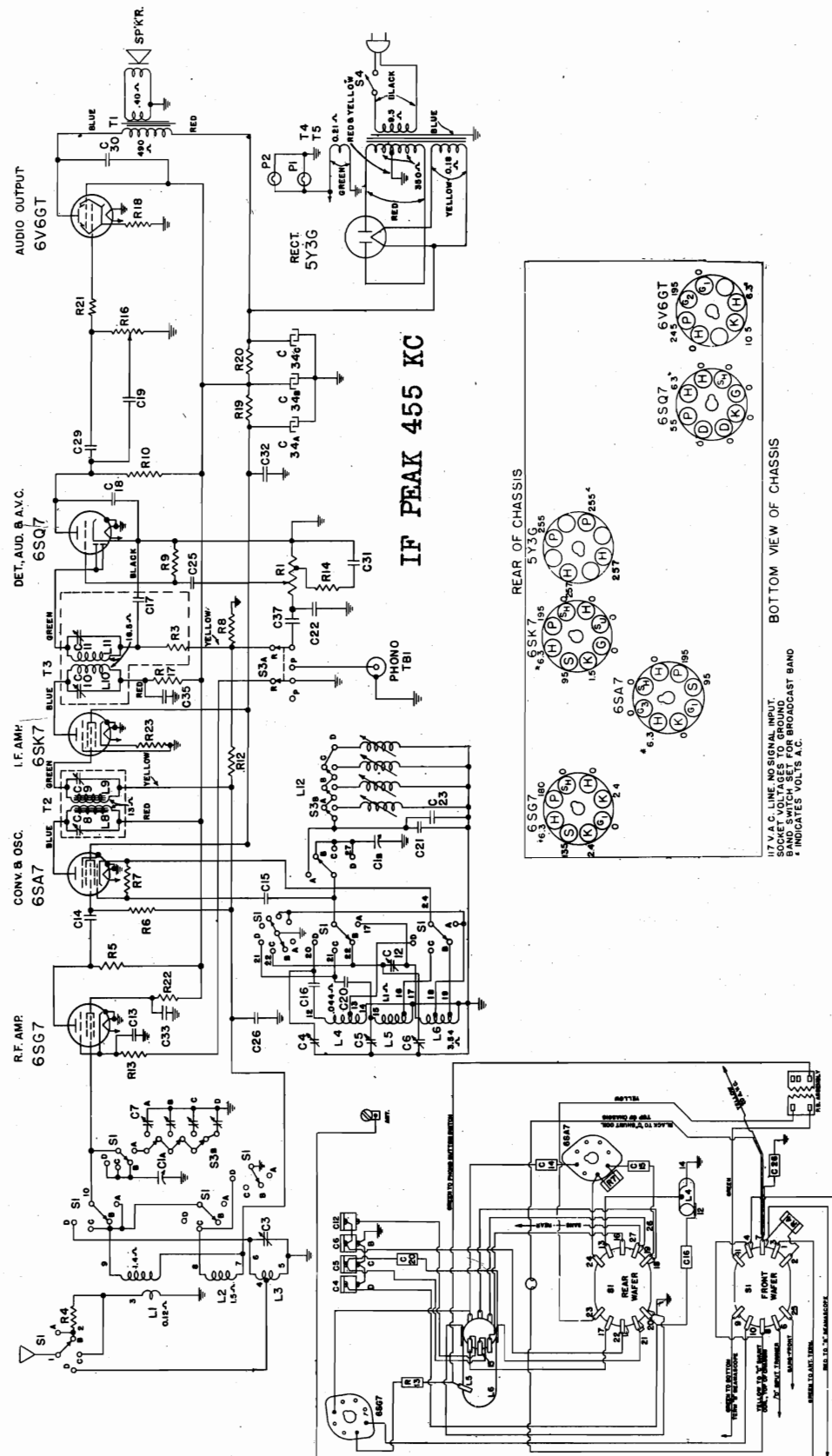
*Used on previous receivers.

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

REPLACEMENT PARTS LIST—MODEL LC-648

Our Cat. No.	Symbol	Description	List Price
*RC-7061 RT-891	C-1a, 1b C-2	CONDENSER—Tuning condenser..... TRIMMER STRIP—"B" Osc. Trimmer strip (combined with C-16, 22).....	\$2.00 .55
*RC-235 *RC-252 *RC-242 *RC-048 *RC-072 *RC-011	C-3 C-8 C-9 C-10 C-11 C-12	CAPACITOR—100 mmf., mica..... CAPACITOR—200 mmf., mica..... CAPACITOR—150 mmf., mica..... CAPACITOR—.02 mfd., 600 V. paper..... CAPACITOR—.05 mfd., 200 V. paper..... CAPACITOR—.002 mfd., 600 V. paper (Used only with RLP-170 record player).....	.25 .30 .25 .30 .25 .25
*RC-216 *RC-023 *RC-055 RT-891	C-13 C-14 C-15 C-16	CAPACITOR—47 mmf., mica..... CAPACITOR—.005 mfd., 600 V. paper..... CAPACITOR—.003 mfd., 600 V. paper..... TRIMMER STRIP—Ant. trimmer (Part of C-2, 22).....	.25 .25 .25 .55
RC-5201	C17a, 17b, 17C	CAPACITOR—30 mfd., 250 V., 30 mfd. 300 V., 10 mfd., 250 V. dry electrolytic.....	.95
*RC-039 *RC-235 RT-891	C-19 C-21 C-22	CAPACITOR—.01 mfd., 600 V. paper..... CAPACITOR—100 mmf., mica..... TRIMMER STRIP—"B" Band padder (Combined with C 2, C-18).....	.25 .25 .55
*RC-023 *RC-047	C-25 C-26, 27 28	CAPACITOR—.005 mfd., 600 V. paper..... CAPACITOR—.01 mfd., 400 V. paper.....	.25 .20
*RC-017 *RQ-1247 *RQ-1271 *RQ-1299 *RQ-1291 *RQ-1239 *RQ-1335 *RV-135 *RQ-1355 *RQ-1323 *RT-722	C-29 R-1 R-2 R-3 R-4 R-5 R-6 R-7 R-8 R-9 R-10, S1	CAPACITOR—.0042 mfd., 600 V. paper..... RESISTOR—330 ohm, 1/2-W. carbon..... RESISTOR—3300 ohm, 1/2-W. carbon..... RESISTOR—47,000 ohm, 1/2-W. carbon..... RESISTOR—22,000 ohm, 1/2-W. carbon..... RESISTOR—150 ohm, 1/2-W. carbon..... RESISTOR—2.2 megohm, 1/2-W. carbon..... VOL. CONTROL—2 meg. volume control..... RESISTOR—10.0 megohm, 1/2-W. carbon..... RESISTOR—470,000 ohm, 1/2-W. carbon..... TONE CONTROL—.05 meg. control and power switch.....	.25 .70-5 .70-5 .70-5 .70-5 .70-5 .70-5 .95 .70-5 .70-5 1.45
*RQ-1299	R-11, 12	RESISTOR—47,000 ohm, 1/2-W. carbon (Used only with record player LRP-170).....	.70-5
*RQ-1313	R-11	RESISTOR—180,000 ohm, 1/2-W. carbon (Used only with record player LRP-162).....	.70-5
*RQ-1315	R-12	RESISTOR—220,000 ohm, 1/2-W. carbon (Used only with record player LRP-162).....	.70-5
*RQ-1247 *RQ-665 *RQ-1293 *RQ-1259 *RQ-1299 *RQ-1259 *RQ-683 *RQ-1323	R-13 R-14 R-15 R-17 R-18 R-19 R-20 R-21	RESISTOR—330 ohm, 1/2-W. carbon..... RESISTOR—1800 ohm, 2-W. carbon..... RESISTOR—27,000 ohm, 1/2-W. carbon..... RESISTOR—1000 ohm, 1/2-W. carbon..... RESISTOR—47,000 ohm, 1/2-W. carbon..... RESISTOR—1000 ohm, 1/2-W. carbon..... RESISTOR—10,000 ohm, 2-W. carbon..... RESISTOR—470,000 ohm, 1/2-W. carbon.....	.70-5 .70-5 .20 .70-5 .70-5 .70-5 .35 .70-5
*RQ-1303 *RQ-1259 RL-590 RL-2072 RT-3005 RT-3006 RT-4013 RT-0621	R-22 R-24 T-1 T-2 T-3 T-4 T-5 T-7	RESISTOR—83,000 ohm 1/2-W. carbon..... RESISTOR—1000 ohm, 1/2-W. carbon..... BEAM-A-SCOPE—Built-in loop antenna..... COIL—Osc. coil, Band "B"..... TRANSFORMER—1st IF transformer..... TRANSFORMER—2nd IF transformer..... TRANSFORMER—Output transformer..... TRANSFORMER—60-cycle power trans- former.....	\$0.70-5 .70-5 1.25 .30 .90 1.15 1.25 4.25
RS-3141 RS 1081	S-3 SPKR	SWITCH—Phono-radio switch..... SPEAKER—12-in. PM-speaker.....	.55 5.50
MISCELLANEOUS PARTS			
*RB-009 *RB-013 *RB-026 *RB-093 *RB-636 *RB-1030 *RB-1046 *RC-865 *RC-1989	BOARD—Single lug terminal board..... BOARD—Two lug terminal board..... BOARD—Antenna terminal board..... BOARD—Six lug terminal board..... BEZEL—Pilot lamp bezel..... BOARD—Phono-jack board..... BOARD—3-lug terminal board..... CORD—Power cord..... CUSHION—Tuning condenser mtg. cush- ion.....	.15 .10 .10 .10 .15 .10 .10 .45	
*RC-2015 *RC-9009 RD-774 RG-448 RL-916 *RK-091 *RK-092 *RP-1031 *RS-238 *RS-257 *RS-266 *RS-292	CLAMP—Dial scale clamp..... CONE—Speaker cone..... DIAL—Dial scale assembly..... GRILLE CLOTH—Cabinet grille cloth..... LAMP—MAZDA No. 44 pilot lamp..... KNOB—Vol. or tuning control knob..... KNOB—Tone or phono-radio knob..... POINTER—Dial pointer assembly..... SOCKET—Octal tube socket..... SOCKET—Electrolytic mtg. socket..... SOCKET—Dial lamp socket..... SOCKET—Pilot lamp socket (bottom of cabinet).....	.05-5 .95 .80 1.20 1.50-10 .10 .10 .25 .15 .05 .15 .25	
*RS-298 *RS-444 *RS-463 *RS-511	SOCKET—Phono compartment lamp socket..... SPRING—Volume or tuning knob spring..... SPRING—Drive cord tension spring..... SPACER—Tuning condenser mounting spacer.....	.20 .10-10 .10-5 .15-10	
*RS-4012 *RS-9042 *RT-959	SPRING—Tone or phono knob spring..... SHAFT—Tuning shaft and clip..... TERMINAL—Speaker and loop lead ter- minal.....	.10-10 .10 .05-5	
RW-061 *RW-101	WINDOW—Phono-compartment lamp window..... WASHER—Felt washer for knobs.....	.15 .05-10	

GENERAL ELECTRIC CO.



MODEL L-640

GENERAL ELECTRIC CO.

Our Cat. No	Symbol	Description	List Price	*RQ-1339	R-12	RESISTOR—2.2 megohm, $\frac{1}{4}$ -W. carbon	\$0.70-5
RC-7061	C1a, C1b	CONDENSER—2-gang tuning condenser	\$2.00	*RQ-1247	R-13	RESISTOR—330 ohm, $\frac{1}{4}$ -W. carbon	.70-5
RC-6553	C-3	CAPACITOR—1.8-20 mmf., "D" band trimmer	.25	*RQ-1308	R-14	RESISTOR—100,000 ohm, $\frac{1}{4}$ -W. carbon	.70-5
RC-6555	C4, 5, 6	CAPACITOR STRIP—"B" "C" and "D" osc. trimmers	.65	*RT-722	R-16, S-4	TONE CONTROL—5 megohm tone control and power switch	1.45
RT-885	C7a, b, c, d	TRIMMER STRIP—Push button trimmer strip	.70	*RQ-1267	R-17	RESISTOR—2200 ohm, $\frac{1}{4}$ -W. carbon	.70-5
RC-6555	C-12	CAPACITOR—"B" padder (Part of C4, 5, 6)	.70	*RQ-1247	R-18	RESISTOR—330 ohm, $\frac{1}{4}$ -W. carbon	.70-5
*RC-039	C-13	CAPACITOR—.01 mfd., 600 V. paper	.25	*RQ-653	R-19	RESISTOR—10,000 ohm, 2-W. carbon	.35
*RC-235	C-14	CAPACITOR—100 mmf., mica	.25	*RQ-665	R-20	RESISTOR—1,800 ohm, 2-W. carbon	.20
*RC-216	C-15	CAPACITOR—47 mmf., mica	.25	*RQ-1259	R-21	RESISTOR—1,000 ohm, $\frac{1}{4}$ -W. carbon	.70-5
*RC-393	C-16	CAPACITOR—4700 mmf., mica	.50	*RQ-1293	R-22	RESISTOR—27,000 ohm, $\frac{1}{4}$ -W. carbon	.70-5
*RC-242	C-18	CAPACITOR—150 mmf., mica	.25	*RQ-1239	R-23	RESISTOR—150 ohm, $\frac{1}{4}$ -W. carbon	.70-5
*RC-023	C-19	CAPACITOR—.005 mfd., 600 V. paper	.25	RL-579	L-1	BEAM-A-SCOPE—"B" Band loop and cabinet back assembly	1.60
*RC-349	C-20	CAPACITOR—2000 mmf., mica	.30	RL-167	L-2	COIL—"C" band R.F. coil	.25
*RC-305	C-21	CAPACITOR—600 mmf., silvered mica	.25	*RL-578	L-3	BEAM-A-SCOPE—"D" band loop assembly	.60
*RC-235	C-22	CAPACITOR—100 mmf., mica	.25	RL-2065	L-4	COIL—"D" band oscillator coil	.25
RC-329	C-23	CAPACITOR—150 mmf., temp comp. cap.	.25	RL-2066	L5, 6	COIL—"B" and "C" band osc. coil	.85
*RC-039	C-25	CAPACITOR—.01 mfd., 600 V. paper	.25	RL-9530	L12a, b, c, d	COIL—Push button coil assembly	.85
*RC-072	C-26	CAPACITOR—.05 mfd., 200 V. paper	.25	RS-3129	S-1	SWITCH—Band change switch	1.30
*RC-048	C-29	CAPACITOR—.02 mfd., 600 V. paper	.30	RS-3130	S-3a, b	SWITCH—Push button switch	4.00
*RC-055	C-30	CAPACITOR—.003 mfd., 600 V. paper	.25	*RT-4013	T-1	TRANSFORMER—Output transformer	1.25
*RC-049	C-31	CAPACITOR—.004 mfd., 600 V. paper	.35	RT-3009	T-2	TRANSFORMER—1st I.F. transformer	1.20
*RC-039	C-32, 33	CAPACITOR—.01 mfd., 600 V. paper	.25	RT-3010	T-3	TRANSFORMER—2nd I.F. transformer	1.20
*RC-5164	C-34A	CAPACITOR—10 mfd., 250 V. dry electrolytic	1.00	*RT-0619	T-4	TRANSFORMER—60-cycle power transformer	4.00
	C-34B	CAPACITOR—15 mfd., 250 V. dry electrolytic		*RT-0620	T-5	TRANSFORMER—25-cycle power transformer	6.80
	C-34C	CAPACITOR—30 mfd., 300 V. dry electrolytic		RS-1073	SPKR	SPEAKER—5-inch PM speaker	2.40
*RC-039	C-35	CAPACITOR—.01 mfd., 600 V. paper	.25				
*RC-023	C-37	CAPACITOR—.005 mfd., 600 V. paper	.25				
*RV-135	R-1	VOLUME CONTROL—2 meg. volume control	.95				
*RQ-1299	R-3	RESISTOR—47,000 ohm, $\frac{1}{4}$ -W. carbon	.70-5				
*RQ-1251	R-4	RESISTOR—470 ohm, $\frac{1}{4}$ -W. carbon	.70-5				
*RQ-1275	R-5	RESISTOR—4,700 ohm, $\frac{1}{4}$ -W. carbon	.70-5				
*RQ-1299	R-6	RESISTOR—47,000 ohm, $\frac{1}{4}$ -W. carbon	.70-5				
*RQ-1291	R-7	RESISTOR—22,000 ohm, $\frac{1}{4}$ -W. carbon	.70-5				
*RQ-1323	R-8	RESISTOR—470,000 ohm, $\frac{1}{4}$ -W. carbon	.70-5				
*RQ-1355	R-9	RESISTOR—10 megohm, $\frac{1}{4}$ -W. carbon	.70-5				
*RQ-1331	R-10	RESISTOR—1 megohm, $\frac{1}{4}$ -W. carbon	.70-5				

Used on previous receivers.

Tuning Frequency Range

"BC" Band.....	550-1720 KC
"SW-1" Band.....	1.7-5.2 MC
"SW2" Band.....	5.2-18.1 MC

Intermediate Frequency.....455 KC

Electrical Power Output

Undistorted.....	2.7 watts
Maximum.....	4.6 watts

ALIGNMENT CHART

Step	Connect Test-Osc. to	Test-Osc. Setting	Pointer Setting	Adjust Trimmers for Maximum Output
1	6SK7 IF Grid in series with .05 mfd.	455 KC	"BC" Band 550 KC	C10 & C11
2	6SA7 Conv. grid in series with .05 mfd	455 KC	"BC" Band 550 KC	C8 & C9
3	Capacity Coupled	580 KC	"BC" Band 580 KC	C12**
4	Capacity Coupled	1500 KC	"BC" Band 1500 KC	C6** (Osc.)
5	Repeat Step 3			
6	Capacity Coupled	5 MC	"SW1" Band	C5 (Osc.)
7	Capacity Coupled	18 MC	"SW2" Band	C4* (Osc.)
8	Capacity Coupled	18 MC	"SW2" Band	C3** (Ant.)

Some production receivers have C-30 connected from the 6V6GT plate to chassis ground. Late production receivers have C-30 connected as shown in the schematic diagram.

ALIGNMENT PROCEDURE

The location of trimmers is shown in Fig. 1. All oscillator and RF trimmers are accessible through a slot through the back cover of the cabinet.

The alignment procedure is given in table form. All IF alignments may be made with the chassis removed from the cabinet. However, the RF alignments are made with the chassis and loop antennas securely fastened in the cabinet, as the relative position of the loop antenna with respect to

the chassis materially affects it. The RF signal should be capacity coupled by placing a two-foot wire for an antenna on the test-oscillator output post (high side). Keeping this antenna two feet or more from the receiver loop will generally insure freedom from too much coupling. Metal objects such as meters, tools, etc., should not be placed on top of the receiver cabinet.

*Use minimum capacity peak.

**Rock gang condenser when making alignment.

Special Service Information

The following data are taken with a vacuum tube voltmeter or similar voltage measuring device.

(1) Stage Gains

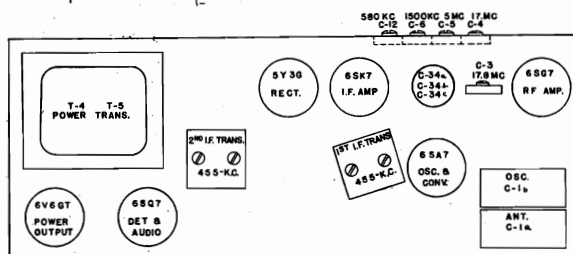
Antenna Post to RF Grid	6.5 at 1000 KC
RF Grid to Converter Grid	7.0 at 1000 KC
Converter Grid to IF Grid	45 at 1000 KC
Converter Grid to IF Grid	63 at 455 KC
IF Grid to 6SQ7 diode plates	70 at 455 KC

(2) Audio Gains

.14 volts, 400 cycles signal across volume control with control set to maximum will give approximately $\frac{1}{2}$ -watt speaker output.

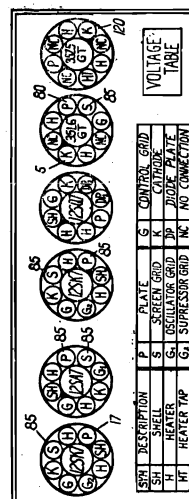
(3) DC voltage developed across oscillator grid resistor R7 averages 10 volts at 1000 KC or 8.0 volts, at 10,000 KC.

Variations of $\pm 20\%$ permissible. All readings taken with AVC shorted out.





The control on the extreme right is used to operate either the radio receiver or play phonograph disc recordings. When the knob is in the counterclockwise direction, the radio receiver will function. To play records, turn the knob clockwise. This will start the turntable, and adjust the instrument for phonograph operation. If a rise in hum level is noticed when handling the phonograph pickup, reverse the line cord plug in the electric outlet.



BOTTOM VIEW OF CHASSIS

All above voltages measured from socket terminal to chassis with a 1000 Ω per volt voltmeter.

SERVICE INFORMATION

Voltages—Line 117 Volts AC—Power Consumption 40 Watts including Phonograph Motor. Volume Control maximum. Meter 1000 ohms per volt, 250 volt scale.	
Plate (8) of 12SK7 R. F. tube to common ground	17 volts
Screen (6) of 12SK7 R. F. tube to common ground	85 volts
Plate (3) of 12SA7 tube to common ground	85 volts
Screen (4) of 12SA7 tube to common ground	85 volts
Plate (8) of 12SK7 I. F. tube to common ground	85 volts
Screen (6) of 12SK7 I. F. tube to common ground	85 volts
Plate (3) of 35L6GT tube to common ground	80 volts
Screen (4) 35L6GT tube to common ground	85 volts
Cathode (8) of 35L6GT tube to common ground	5.0 volts
Cathode (8) of 35Z5GT tube to common ground	120 volts
Heater (2) and (7) of 12SA7 tube	12.4 volts AC
Heater (2) and (7) of 12SK7 R. F. tube	12.4 volts AC
Heater (2) and (7) of 12SK7 I. F. tube	12.4 volts AC
Heater (2) and (7) of 12SQ7 tube	12.4 volts AC
Heater (2) and (7) of 35L6GT tube	35.0 volts AC
Heater (2) and (7) of 35Z5GT tube	35.0 volts AC

ALIGNMENT PROCEDURE

Alignment Frequencies

I. F. Alignment

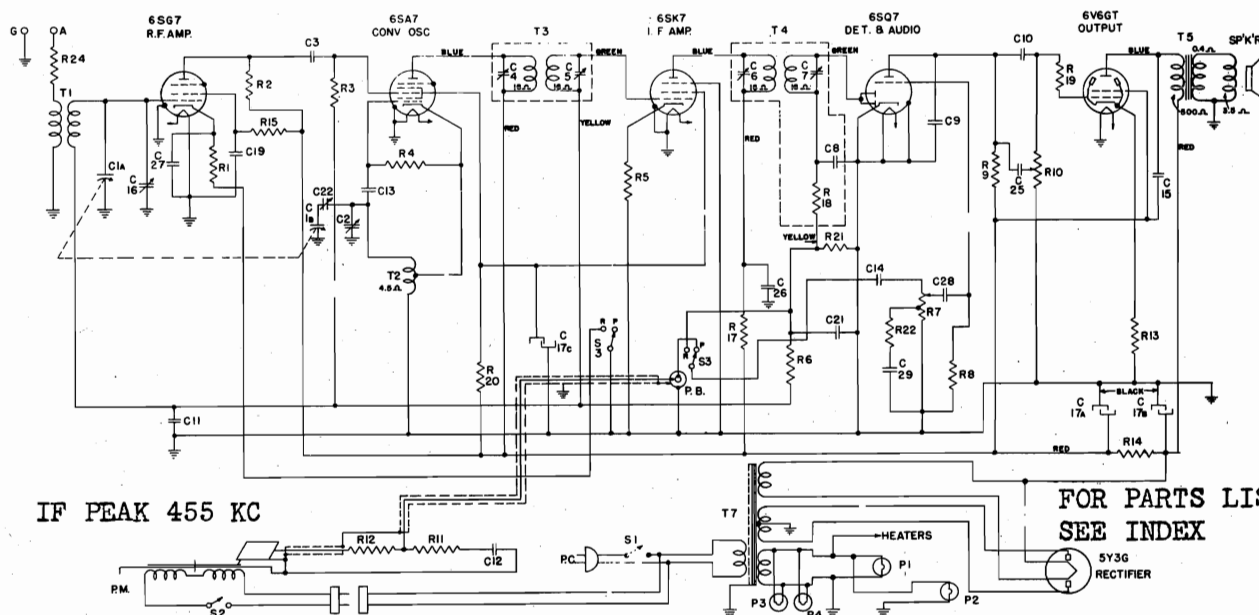
1. I. F. Amplifier
Connect an output meter across the voice coil. Rotate the volume control to maximum. Set test oscillator to 455 kilocycles and apply signal to control grid of 12SK7 I. F. through a .05 mfd. capacitor. Align the second I. F. transformer trimmers, next adjust the first I. F. transformer trimmers. Keep the test oscillator output to a level that will give a good meter reading.

R. F. Alignment

Attach high side of test oscillator to flexible lead extending from rear of chassis through a .00025 mfd. condenser. Connect the low side to the receiver chassis. Adjust the test oscillator and receiver to 1700 kilocycles. Peak 1700 kilocycles oscillator trimmer for maximum output. Change test oscillator signal and receiver dial to approximately 1400 kilocycles. Then while rocking gang condenser, trim 1400 kilocycles antenna trimmer for maximum output.

MODEL LC-648

GENERAL ELECTRIC CO.

**Electrical Rating**

Rating "A6"—110-125 volts, 60 cycles, 80 watts.
 Rating "A5"—110-125 volts, 50 cycles, 80 watts.

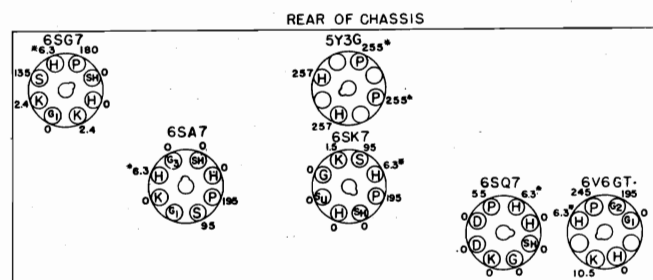
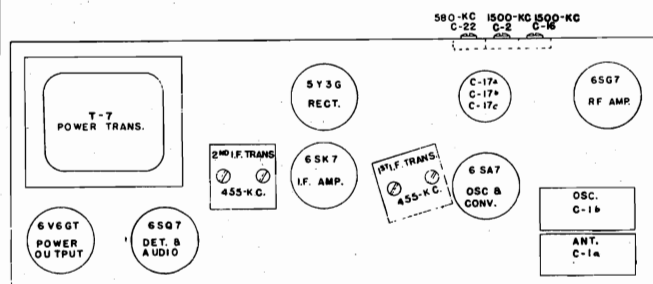
Electrical Power Output

Undistorted.....2.5 watts
 Maximum.....4.5 watts

ALIGNMENT PROCEDURE

The location of trimmers is shown in Fig. 1. All oscillator and RF trimmers are accessible through a slot through the back cover of the cabinet.

The alignment procedure is given in table form. All IF alignments may be made with the chassis removed from the cabinet. However, the RF alignments are made with the chassis and loop antennas securely fastened in the cabinet, as the relative position of the loop antenna with respect to the chassis materially affects it. The RF signal should be capacity-coupled by placing a two-foot wire for an antenna on the test-oscillator output post (high side). Keeping this antenna two feet or more from the receiver loop will generally insure freedom from too much coupling. Metal objects such as meters, tools, etc., should not be placed near the receiver loop.



BOTTOM VIEW OF CHASSIS

117 V.A.C. LINE, NO SIGNAL INPUT
 SOCKET VOLTAGES TO GROUND
 BAND SWITCH SET FOR BROADCAST BAND
 * INDICATES VOLTS A.C.

ALIGNMENT CHART

Step	Connect Test-Osc. to	Test-Osc. Setting	Pointer Setting	Adjust Trimmers for Maximum Output
1	6SK7 IF Grid in series with .05 mfd.	455 KC	"BC" Band 550 KC	C6 & C7
2	6SA7 Conv. grid in series with .05 mfd.	455 KC	"BC" Band 550 KC	C4 & C5
3	Repeat step 1.			
4	Capacity Coupled	580 KC	"BC" Band 580 KC	C22*
5	Capacity Coupled	1500 KC	"BC" Band 1500 KC	C2 (Osc.)
6	Capacity Coupled	1500 KC	"B" Band 1500 KC	C16 (RF)
7	Repeat step 4.			

* Rock gang condenser when making alignment.

Special Service Information

The following data are taken with a vacuum tube voltmeter or similar voltage measuring device.

- Stage Gains
 - Antenna Post to RF Grid 5 at 1000 KC
 - RF Grid to Converter Grid 5 at 1000 KC
 - Converter Grid to IF Grid 40 at 1000 KC
 - Converter Grid to IF Grid 60 at 455 KC
 - IF Grid to 6SQ7 diode plates 90 at 455 KC
- Audio Gains
 - .14 volts, 400 cycles signal across volume control with control set to maximum will give approximately 1/2-watt speaker output.
- DC voltage developed across oscillator grid resistor R4 averages 10 volts at 1000 KC.

Variations of $\pm 20\%$ permissible. All readings taken with AVC shorted out.

FOR RCA RP-162 or G.E. LRP-170
 RECORD CHANGERS, SEE RIDER'S
 "AUTOMATIC RECORD CHANGERS AND
 RECORDERS".

GENERAL ELECTRIC CO.

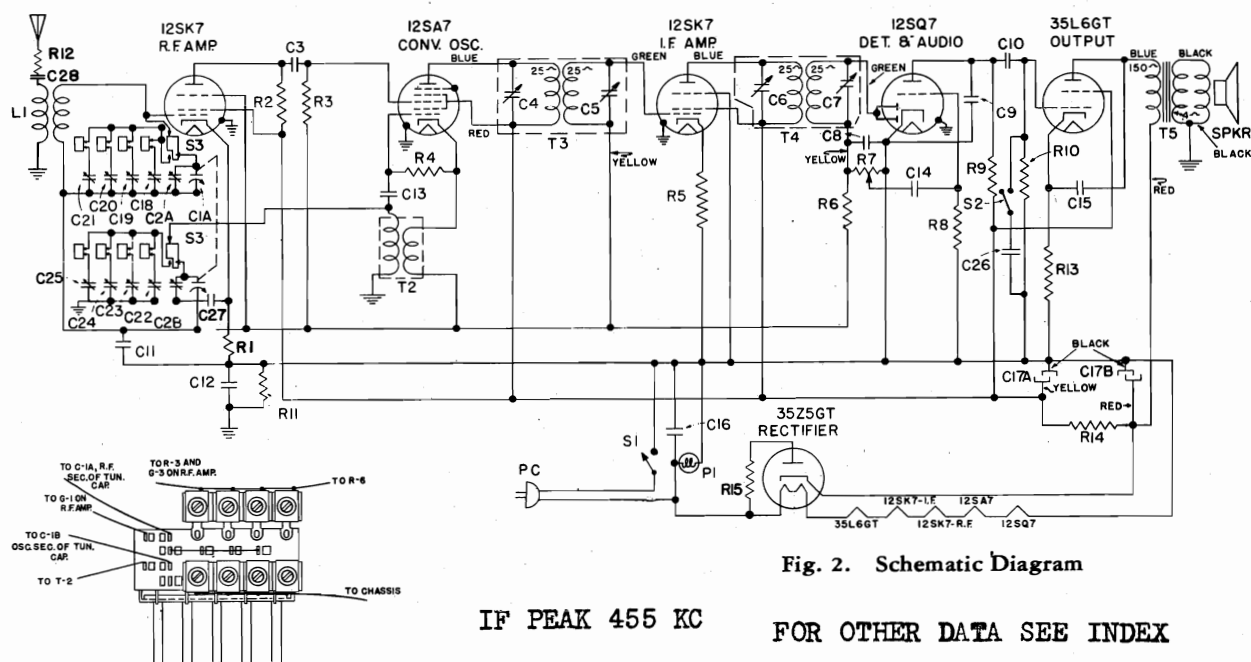


Fig. 2. Schematic Diagram

IF PEAK 455 KC

FOR OTHER DATA SEE INDEX

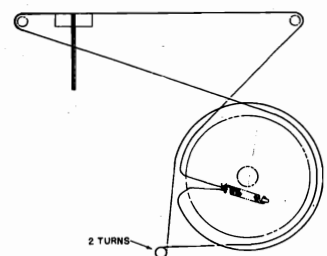
Selector Switch Wiring

REPLACEMENT PARTS LIST

Cat. No.	Symbol	Description	List Price
RC-7059	C1A, 1B	CONDENSER—Tuning condenser (with trimmers 2A, 2B mounted)	\$2.05
*RC-235	C3	CAPACITOR—100 mmf. mica	.25
*RC-274	C8	CAPACITOR—330 mmf. mica	.30
*RC-242	C9	CAPACITOR—150 mmf. mica	.25
*RC-039	C10	CAPACITOR—.01 mfd., 600 V., paper	.25
*RC-072	C11	CAPACITOR—.05 mfd., 200 V., paper	.25
*RC-092	C12	CAPACITOR—.05 mfd., 600 V., paper	.30
*RC-216	C13	CAPACITOR—47 mmf. mica	.25
*RC-039	C14	CAPACITOR—.01 mfd., 600 V., paper	.25
*RC-048	C15	CAPACITOR—.02 mfd., 600 V., paper	.30
*RC-092	C16	CAPACITOR—.05 mfd., 600 V., paper	.30
RC-5194	C17A	CAPACITOR—60 mfd., 150 V., dry electrolytic	.70
	C17B	CAPACITOR—50 mfd., 150 V., dry electrolytic	.70
*RT-881	C18-C21	TRIMMER STRIP—Station key adjustments (RF section)	.60
*RT-882	C22-C25	TRIMMER STRIP—Station key adjustments (Osc. section)	.25
*RC-016	C26	CAPACITOR—.002 mfd., 600 V., paper	.30
*RC-048	C27	CAPACITOR—.02 mfd., 600 V., paper	.25
*RC-039	C28	CAPACITOR—.01 mfd., 600 V., paper	.25
*RQ-1231	R1	RESISTOR—68 ohm, 1/2-W carbon	.70-5
*RQ-1279	R2	RESISTOR—6800 ohm, 1/2-W carbon	.70-5
*RQ-1299	R3	RESISTOR—47,000 ohm, 1/2-W carbon	.70-5
*RQ-1295	R4	RESISTOR—33,000 ohm, 1/2-W carbon	.70-5
*RQ-1227	R5	RESISTOR—47 ohm, 1/2-W carbon	.70-5
*RQ-1339	R6	RESISTOR—2.2 meg., 1/2-W carbon	.70-5
*RV-123	R7, S1	VOLUME CONTROL—.05 meg. control and power switch (Model L-652)	1.45
RV-132	R7, S1	VOLUME CONTROL—.05 meg. control and power switch (Model L-650)	1.45
*RQ-1349	R8	RESISTOR—5.6 meg., 1/2-W carbon	.70-5
*RQ-1323	R9, 10, 11	RESISTOR—470,000 ohm, 1/2-W carbon	.70-5
*RQ-1259	R12	RESISTOR—1000 ohm, 1/2-W carbon	.70-5
*RQ-1239	R13	RESISTOR—150 ohm, 1/2-W carbon	.70-5
*RQ-651	R14	RESISTOR—1000 ohm, 2-W carbon	.20
*RQ-1227	R15	RESISTOR—47 ohm, 2-watt carbon	.70-5
*RS-3108	S2	SWITCH—Tone control switch	.20
*RS-3114	S3	SWITCH—Automatic tuning switch (less trimmers) (Model L-652 only)	1.25
RS-3125	S3	SWITCH—Automatic tuning switch (less trimmers) (Model L-650)	1.25
RL-575	L1	BEAM-A-SCOPE—Cabinet back and loop assembly (Model L-650 only)	1.00
RL-576	L1	BEAM-A-SCOPE—Cabinet back and loop assembly (Model L-652 only)	1.00
*RL-2053	T2	COIL—Oscillator coil and clip	.35
RT-3002	T3	TRANSFORMER—1st I.F. transformer	.80
RT-3003	T4	TRANSFORMER—2nd I.F. transformer	.80
*RT-4008	T5	TRANSFORMER—Output transformer	.70

*Used on previous receivers.

(Prices Subject to Change without Notice)



Dial Stringing Diagram

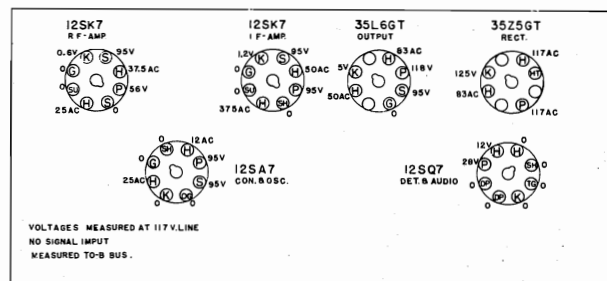
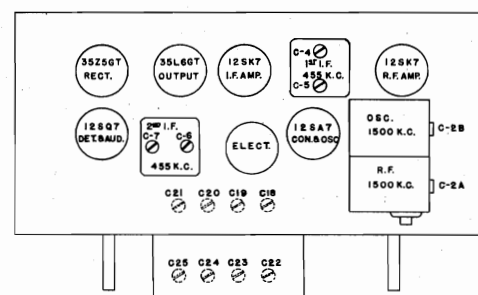
FRONT OF CHASSIS
BOTTOM VIEW OF CHASSIS

Fig. 1. Trimmer Location

MODELS L-650, L-652
MODELS X-108, X-118
GENERAL ELECTRIC CO.
MODELS L-650, L-652
Alignment Frequencies

 RF.....1500 KC
 IF.....455 KC

The chassis must be removed from the cabinet as described above to make the following alignments. The locations of all trimmers are shown in Fig. 1.

IF Alignment

Connect an output meter across the voice coil. Turn the volume control to maximum. Set test oscillator to 455 KC and keep the oscillator output as low as a readable meter reading will permit.

Apply signal to the 12SA7 converter grid through a .05 mfd. capacitor and align progressively the trimmers in the 2nd and 1st IF transformers.

RF Alignment

When making the following alignment the loop antenna must be bolted to the chassis by the two mounting screws. Since the glass dial scale is fastened to the cabinet, it cannot be used for reference during the alignment of the chassis outside the cabinet. Use must be made therefore of the four calibration marks at the bottom flange of the dial scale reflector plate (immediately below end of dial scale pointer). These marks referring from left to right are as follows: Reference point, 580 KC, 1000 KC, and 1500 KC.

The RF signal should be capacity coupled to the receiver loop by placing a two foot piece of wire for an antenna on the test oscillator output post (high side). Keeping this antenna two feet or more from the receiver loop will generally insure freedom from too much coupling. Metal objects such as meters, tools, etc. should not be placed in close proximity to the loop when making the alignment.

With the gang condenser plates completely closed, the end of the pointer should line up with the first mark to the left of the dial reflector plate. If it doesn't the pointer can be moved on the dial cord until it does. Set the signal generator to 1500 KC. Set pointer to the 1500 KC mark (extreme right flange mark) and align (C2B) to the signal. Peak (C2A) for maximum output.

Special Service Information

The following information will be useful to servicemen equipped with vacuum tube voltmeters or similar voltage measuring instruments. When making the Stage Gain measurements in (1), the AVC bus should be shorted to B—.

(1) Stage Gains

Antenna post to converter grid.....26 at 1000 KC
 RF grid to converter grid.....5.6 at 1000 KC
 Converter grid to IF grid.....25 at 455 KC
 IF grid to 12SQ7 diode plate.....53 at 455 KC

(2) Audio Gain

0.14 volts, 400 cycle signal across volume control with control set at maximum, will give approximately ½-watt speaker output.

(3) DC voltage developed across oscillator grid resistor (R4) averages 5.0 volts at 1000 KC.

Variations of 20 per cent permissible. All readings obtained with enough signal input to give ½-watt speaker output.

Alignment Procedure MODELS X-108, X-118

The alignment procedure shown in table form is made either with the chassis in or removed from the cabinet.

If the chassis is removed from the cabinet to make the RF alignment, the dial which is fastened to the cabinet cannot be used for calibration reference. Use must be made, therefore, of the paper scale fastened on the rear of the dial reflector plate. With the gang condenser completely closed, one of the edges of the pointer rider should be lined up with the first marking to the right of the scale on the rear of the dial reflector plate. This can be accomplished by sliding the pointer on the cord until it does. The selected edge of the pointer rider may now serve as a pointer for the RF alignment. There are two 17.8 reference points on the paper scale on the rear of the dial reflector plate. The one towards the lower frequency end of the dial is the proper one to use for the 16-meter spread-band alignment; while the other is used for a reference point on the SW2 band.

The SW2 band does not require alignment. This band is taken care of when the 16 meter spread-band is aligned.

Since accuracy in frequency calibration is very essential for proper alignment of the spread-bands, it is impractical to use the standard test oscillator for this purpose unless a special calibration is first made.

The actual reception of short-wave stations of known frequency in the band to be checked is probably the most

satisfactory method or determining the proper setting of the oscillator trimmers in these bands. The oscillator trimmer should be adjusted so that the station appears at the correct position on the dial. R.F. alignment can be made with the test oscillator.

The calibration of the test oscillator may be checked by zero beating the test oscillator with a short-wave station of known frequency. By taking several of these calibration points, it will afford a calibration of a high degree of accuracy in case you wish to use the test oscillator for alignment in these bands.

ALIGNMENT CHART MODELS X-108, X-118

Step	Test Osc. Connected to	Test-osc. Setting	Band and Pointer Setting	Tune Trimmer for Max. Output
1	6SG7 I.F. grid in series with .05 mfd. cap.	455 KC	"BC" BAND 550 KC	C26 and C27
2	7Q7 CONV. grid in series with .05 mfd. cap.	455 KC	"BC" BAND 550 KC	C24 and C25
3	ANT. POST in series with 200 mmf. and 400 ohms	580 KC	"BC" BAND 580 KC	C16**
4	ANT. POST in series with 200 mmf. and 400 ohms	1500 KC	"BC" BAND 1500 KC	C17 (osc.) C3 (ant.)
5	REPEAT STEP 3			
6	ANT. POST in series with 200 mmf. and 400 ohms	6.1 MC	"SW-1" BAND 6.1 MC	C15 (osc.) C4 (ant.)
7	ANT. POST in series with 200 mmf. and 400 ohms	17.8 MC	16 METER 17.8 MC	C14* (osc.)
8	ANT. POST in series with 200 mmf. and 400 ohms	21.6 MC	16 METER 21.6 MC	C9*** (ant.)
9	ANT. POST in series with 200 mmf. and 400 ohms	15.22 MC	19 METER 15.22 MC	C10* (osc.) C6*** (ant.)
10	ANT. POST in series with 200 mmf. and 400 ohms	11.8 MC	25 METER 11.8 MC	C11* (osc.) C7*** (ant.)
11	ANT. POST in series with 200 mmf. and 400 ohms	9.6 MC	31 METER 9.6 MC	C12* (osc.) C8*** (ant.)

*Use minimum capacity peak if two are obtainable.

**Rock gang condenser for optimum peak.

***Use maximum capacity peak if two are obtainable.

Electrical Rating

Model	Rating	POWER SUPPLY		Frequency Cycles AC	Power Consumption (Watts)
		Tap	Voltage Range		
X-108	C	110	103-117	25-60	70
		125	117-133		
	V	110	103-117	50-60	70
		125	117-133		
X-118		200	185-215	25-100	100
		230	215-250		
			200-240V AC or DC		

Tuning Frequency Range

"BC" Band.....540-1700 KC
 "SW1" Band.....2.2-6.8 MC
 "SW2" Band.....6.8-21.0 MC
 31 Meter Band.....9.36-9.8 MC
 25 Meter Band.....11.6-12.5 MC
 19 Meter Band.....14.9-17.3 MC
 16 and 13 Meter Band.....17.7-22.2 MC

Electrical Power Output

Undistorted with proper voltage at tap on power transformer—6 watts.

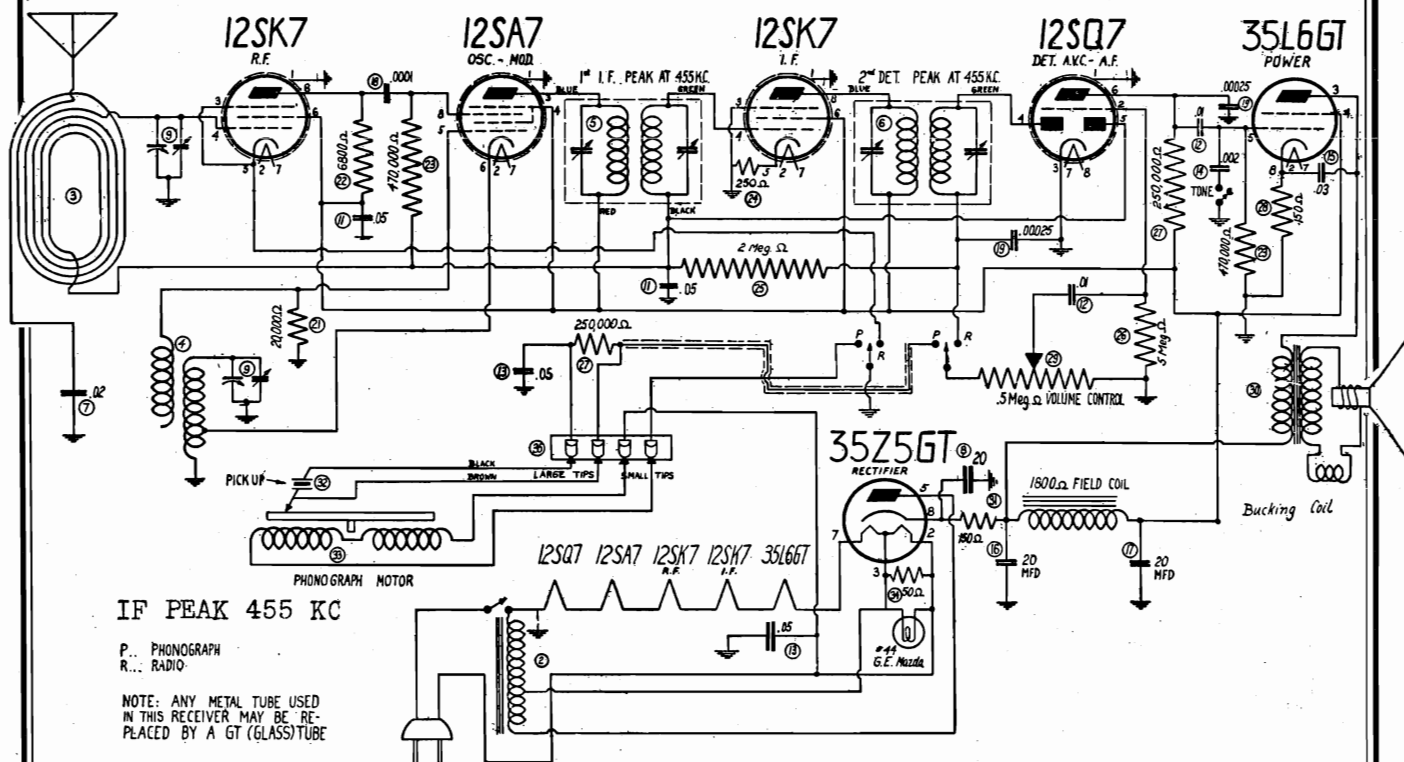
Maximum with proper voltage at tap on power transformer—6.5 watts.

Loud-speaker—PM Dynamic

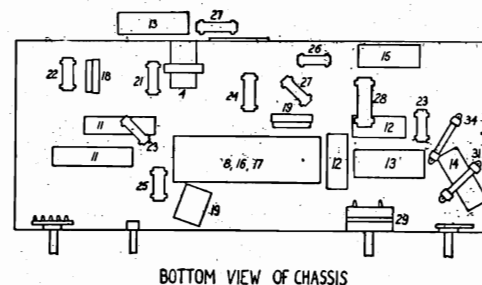
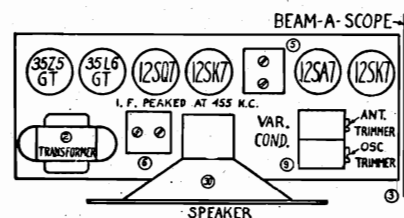
Cone Diameter.....8 inches

Voice Coil Impedance (400 cycles).....3.5 ohms

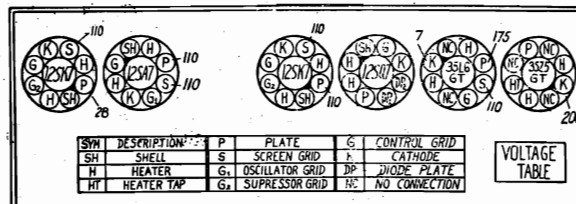
GENERAL ELECTRIC CO.



Part No.	Symbol	Description	Price List
RT-0625-W	2	Transformer Auto Transformer	\$3.00
*RT-367-W	5	Transformer 1st I. F. Transformer	1.10
*RT-3016-W	6	Transformer 2nd Detector	1.10
*RL-585-W	3	Beamscope	1.10
*RL-2069-W	4	Coil Oscillator	.50
*RC-7036-W	9	Condenser Tuning (2 gang) & drive pulley	2.50
RC5202W 8,16,17		Condenser 20+20+20 mfd. 250 v.	2.00
*RC-039	12	Condenser Tubular .01 mfd. 400v	.25
*RC-048	7	Condenser Tubular .02 mfd. 400v	.30
*RC-072	11	Condenser Tubular .05 mfd. 200v	.25
*RC-092	13	Condenser Tubular .05 mfd. 400v	.30
*RC-060	15	Condenser Tubular .03 mfd. 400v	.25
*RC-011	14	Condenser Tubular .002 mfd. 400v	.25
*RC-259	19	Condenser Mica 250 mmfd.	.30
*RC-235	18	Condenser Mica 100 mmfd.	.25
*RV-138-W	29	Volume Control & Switch	1.25
*RQ-1239	28	Resistor Carbon 150 Ohm 1/4 W. (Pkg.5)	.70
*RQ-1316-W	27	Resistor " 250,000 Ohm 1/4 W. (Pkg.5)	.70
*RQ-1339	25	Resistor " 2 Meg. Ohm 1/4 W. (Pkg.5)	.70
*RQ-1348	26	Resistor " 5 Meg. Ohm 1/4 W. (Pkg.5)	.70
*RQ-1291	21	Resistor " 20,000 Ohm 1/4 W. (Pkg.5)	.70
*RQ-1323	23	Resistor " 470,000 Ohm 1/4 W. (Pkg.5)	.70
*RQ-1279	22	Resistor " 6,800 Ohm 1/4 W. (Pkg.5)	.70
RQ-1245	24	Resistor " 250 Ohm 1/4 W. (Pkg.5)	.70
RR-7011-W	34	Resistor Wire Wound 50 Ohm	.50
RR-7012-W	31	Resistor Wire Wound 150 Ohm	.60
*RC-865	1	Line Cord	.45
RB-978-W		Cabinet Back Cover	.30
RX-110-W		Dial Frame & Pulley Assembly	1.00
RD-777-W		Glass Dial Scale	1.30
RS-1083-W	30	5" Electro-Dynamic with Trans.	5.00
*RS-238		Tube Socket 8 Prong Octal 1 5/16"	.15
*RS-2018-W		Pilot Lamp Socket	.35
*RK-1043-W		Knob (walnut) Pkg. 2	.40
*RK-1064-W		Knob (walnut with white dot)	.25
*RS-3133-W		Switch Tone Control Switch	.50
*RS-3134-W		Switch Phonograph Switch	1.00
RP-1033-W		Pointer Dial Pointer	.35
*RC-8062-W		Drive Spring & Cord	.25
*RF-208-W		Fastener for Cabinet back cover	.10
RT-4022-W		Output Transformer for Speaker	2.50
RC-9056-W		Cone for Speaker	1.75
*RC-2065-W	35	Contact strip for motor & pickup pin tips	.25



BOTTOM VIEW OF CHASSIS



BOTTOM VIEW OF CHASSIS

ALL ABOVE VOLTAGES MEASURED FROM SOCKET TERMINAL TO CHASSIS WITH A 1000 Ω PER VOLT VOLTMETER

FOR OTHER DATA SEE INDEX

MODEL LC-658
MODEL L-678

GENERAL ELECTRIC CO.

SPECIFICATIONS MODEL L-678

Over-all Dimensions

Height.....9 3/4 inches
Width.....16 1/16 inches
Depth.....11 1/8 inches

Electrical Rating

A-6 Rating.....115 volts, 60 cycles AC, 75 watts
A-5 Rating.....115 volts, 50 cycles AC, 75 watts

Tuning Frequency Range.....550-1600 KC.

Intermediate Frequency.....455 KC.

Electrical Power Output

Undistorted.....2.0 watts
Maximum.....2.5 watts

Loud-speaker—PM Dynamic

Outside cone diameter.....6.5 inches
Voice coil impedance (400 cycles).....3.5 ohms

Phonograph Mechanism

Type mechanism.....Manual
Type pick-up.....Crystal
Turntable speed.....78 R.P.M.

Tubes

Converter-oscillator.....GE-6SA7GT
I.F. Amplifier.....GE-6SK7GT
Det., A.V.C., 1st Audio.....GE-6Q7GT
2nd Audio.....GE-6J5GT
Power output.....GE-25L6GT
Rectifier.....GE-25Z6GT
Dial lamp.....MAZDA No. 44

TO SET-UP PUSH BUTTONS

1. Make a list of stations desired on push buttons and arrange in order, from low to highest frequency; insert tabs of the call letters of the stations in the keys in the order listed.
2. Allow the receiver to run five minutes before making the following adjustments. Manually tune in first station, lift key upward and loosen adjusting bolt. Hold the tuning control to the exact tune position and with a screwdriver push in the adjusting bolt as far as it will go; then tighten the adjusting bolt.
3. Adjust for each of the five remaining stations in a similar manner.

MODEL LC-658

SERVICE NOTES

Tuning Control Drive Ratio.....12:1
Power Consumption (with phono).....68 watts
Power Consumption (radio only).....46 watts
Intermediate Frequency.....455 K.C.
Tuning Frequency Range.....540-1700 K.C.
Maximum Power Output.....3 watts
Loud Speaker.....Cone diameter—5 inches
Voice Coil Impedance.....(at 400 Cycles) 3 ohms
Tubes: R. F. amplifier 12SK7 Converter—Oscillator 12SA7,
I. F. 12SK7, Detector, A. V. C. 12SQ7,
Power Output 35L6GT, Rectifier 35Z5GT.

SERVICE INFORMATION

Voltages—Line 117 Volts AC—Power Consumption 68 Watts including Phonograph Motor. Volume Control maximum. Meter 1000 ohms per volt, 250 volt scale.
Plate (8) of 12SK7 R. F. tube to common ground 28 volts
Screen (6) of 12SK7 R.F. tube to common ground 110 volts
Plate (3) of 12SA7 tube to common ground.....110 volts
Screen (4) of 12SA7 tube to common ground.....110 volts
Plate (8) of 12SK7 I. F. tube to common ground 110 volts
Screen (6) of 12SK7 I.F. tube to common ground 110 volts
Plate (3) of 35L6GT tube to common ground.....175 volts
Screen (4) of 35L6GT tube to common ground.....110 volts
Cathode (8) of 35L6GT tube to common ground 7 volts
Cathode (8) of 35Z5GT tube to common ground.....200 volts
Heater (2) and (7) of 12SA7 tube.....12.6 volts AC
Heater (2) and (7) of 12SK7 R. F. tube.....12.6 volts AC
Heater (2) and (7) of 12SK7 I. F. tube.....12.6 volts AC
Heater (2) and (7) of 12SQ7 tube.....12.6 volts AC
Heater (2) and (7) of 35L6GT tube.....35 volts AC
Heater (2) and (7) of 35Z5GT tube.....33 volts AC

MODEL L-678

ALIGNMENT PROCEDURE

Alignment Frequencies

I.F.....455 KC. R.F.....1500 and 580 KC
The location of all trimmers is shown in Fig. 1.

I.F. Alignment

Connect an output meter across the voice coil. Turn the volume control to maximum. Set test oscillator to 455 KC and keep the oscillator output as low as a readable meter reading will permit.

Apply signal to the grid of the 6SK7GT through a .05-mfd. capacitor and align the 2nd IF transformer. Repeat the procedure, applying the 455-Kc signal to the control grid of the 6SA7GT and aligning the 1st I.F. transformer. Finish by over-all adjustments.

R.F. Alignment

With gang condenser plates completely closed, set dial pointer to the first mark at the left end of the scale. Apply a 1500-Kc signal either through a standard I.R.E. dummy to the antenna terminal or through an additional loop connected to the generator output which can be magnetically coupled to the receiver Beam-a-Scope. Align (C-2) at 1500 KC and peak (C-1) for maximum output. Peak (C-3) on 580 KC while rocking the gang condenser. Retrim at 1500 KC.

Precaution

If the signal generator is AC operated, use an isolating transformer between the power supply and the radio receiver power input. The use of an isolating capacitor is not recommended as AC current through the capacitor will introduce hum modulation and/or create the possibility of a burned out signal generator attenuator.

Special Service Information

The following data will be very useful to servicemen equipped with vacuum tube voltmeters or similar voltage measuring instruments.

- (1) Stage Gains*
Antenna post to 6SA7GT grid.....4 at 1000 KC
6SA7GT grid to 6SK7GT grid.....30 at 455 KC
6SK7GT grid to 6Q7GT det. plate.....100 at 455 KC
- (2) Audio Gains
.06 volts, 400 cycles signal across volume control with control set to maximum will give approximately 3/4 watt speaker output.
- (3) DC voltage developed across oscillator grid resistor (R-1) averages 12 volts.

* Variations of +10%, -20% permissible.

Loud-speaker

The voice coil is accurately and permanently centered at the factory and should seldom give trouble. In case a voice coil needs recentering it will be necessary to replace the entire cone and voice-coil assembly.

NOTE.—In no case should the magnet be removed from the assembled position without remagnetizing after replacing it.

MODEL LC-658

ALIGNMENT PROCEDURE

Alignment Frequencies I. F.455 K.C.
R. F.1700 & 1400 K.C.

I. F. Alignment

Connect an output meter across the voice coil. Rotate the volume control to maximum. Set test oscillator to 455 kilocycles and apply signal to control grid of 12SK7 R. F. through a .05 mfd. capacitor. Align the second I. F. transformer trimmers, next adjust the first I. F. transformer trimmers. Keep the test oscillator output to a level that will give a good meter reading.

R. F. Alignment

Attach high side of test oscillator to flexible lead extending from rear of chassis through a .00025 mfd. condenser. Connect the low side to the receiver chassis. Adjust the test oscillator and receiver to 1700 kilocycles. Peak 1700 kilocycles oscillator trimmer for maximum output. Change test oscillator signal and receiver dial to approximately 1400 kilocycles. Then adjust 1400 kilocycles antenna trimmer for maximum output.

FOR OTHER DATA SEE INDEX

GENERAL ELECTRIC CO.

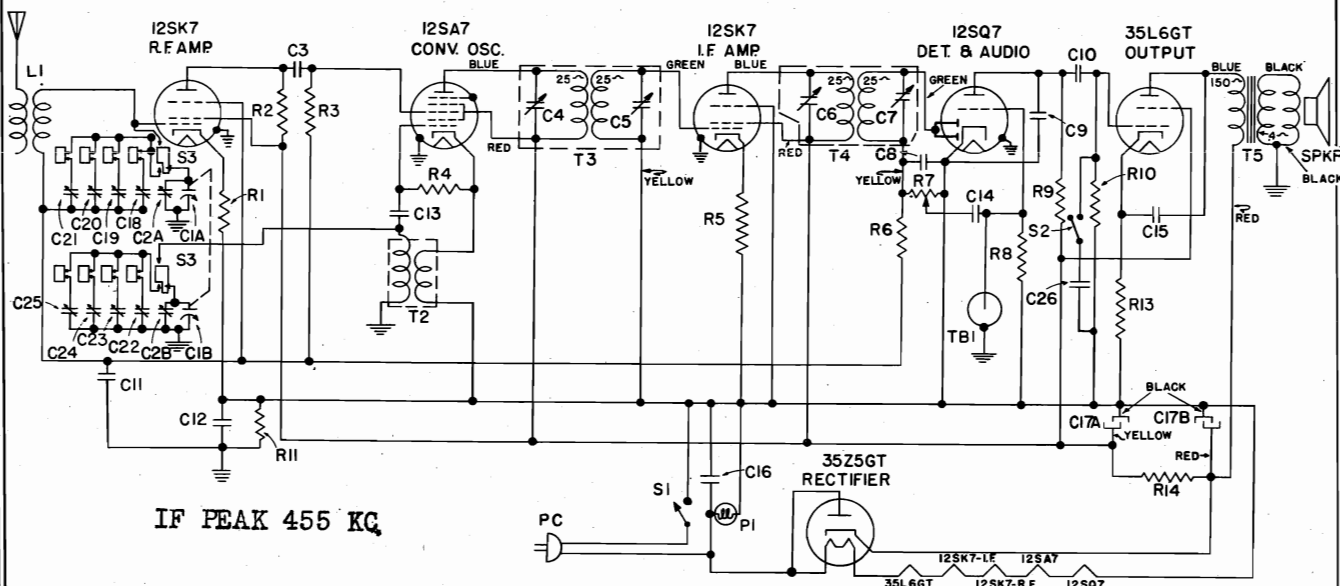
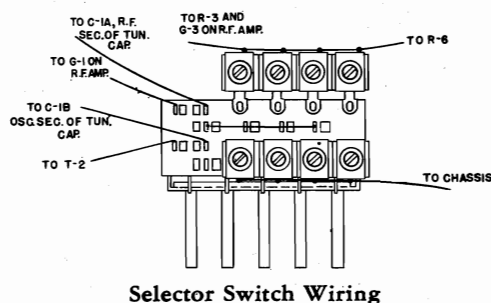


Fig. 2. Schematic Diagram



Selector Switch Wiring

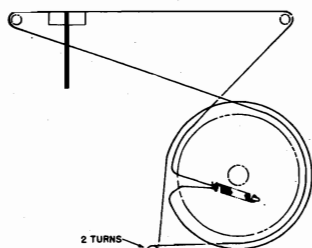


Fig. 3. Dial Stringing Diagram

Part No.	Symbol	Description	List Price
RC-7052	C1A, 1B	CONDENSER—Tuning Condenser (with trimmers 2A, 2B mounted)	\$1.60
*RC-235	C3	CAPACITOR—100 Mmf., mica	.25
*RC-274	C8	CAPACITOR—330 Mmf., mica	.30
*RC-242	C9	CAPACITOR—150 Mmf., mica	.25
*RC-039	C10	CAPACITOR—.01 Mfd., 600 V. paper	.25
*RC-072	C11	CAPACITOR—.05 Mfd., 200 V. paper	.25
*RC-130	C12	CAPACITOR—.02 Mfd., 400 V. paper	.30
*RC-216	C13	CAPACITOR—47 Mmf., mica	.25
*RC-039	C14, 15	CAPACITOR—.01 Mfd., 600 V. paper	.25
*RC-092	C16	CAPACITOR—.05 Mfd., 600 V. paper	.30
RC-5187	C17A	CAPACITOR—40 Mfd., 150 V. dry electrolytic	.60
	C17B	CAPACITOR—30 Mfd., 150 V. dry electrolytic	
RT-881	C18-C21	TRIMMER STRIP—Station key adjustments (R.F. section)	.70
RT-882	C22-C25	TRIMMER STRIP—Station key adjustments (Osc. section)	.60
*RC-016	C26	CAPACITOR—.002 Mfd., 600 V. paper	.25
*RQ-1219	R1	RESISTOR—22 ohm, 1/2 W. carbon	.70-5
*RQ-1281	R2	RESISTOR—8200 ohm, 1/2 W. carbon	.70-5
*RQ-1299	R3	RESISTOR—47,000 ohm, 1/2 W. carbon	.70-5
*RQ-1295	R4	RESISTOR—33,000 ohm, 1/2 W. carbon	.70-5
*RQ-1239	R5	RESISTOR—150 ohm, 1/2 W. carbon	.70-5
*RQ-1339	R6	RESISTOR—2.2 megohms, 1/2 W. carbon	.70-5
RV-123	R7, S1	VOLUME CONTROL—.05 megohm control and power switch	1.45
*RQ-1349	R8	RESISTOR—5.6 megohm, 1/2 W. carbon	.70-5
*RQ-1323	R9, 10, 11	RESISTOR—470,000 ohm, 1/2 W. carbon	.70-5
*RQ-1239	R13	RESISTOR—150 ohm, 1/2 W. carbon	.70-5
*RQ-651	R14	RESISTOR—1,000 ohm, 2 W. carbon	.20
*RS-3108	S2	SWITCH—Tone control switch	.20
RS-3114	S3	SWITCH—Automatic tuning switch (less trimmers)	1.25
RL-565	L1	BEAM-A-SCOPE—Loop antenna and cabinet back assembly	.90
RL-2053	T2	COIL—Oscillator coil and clip	.35
RT-388	T3	TRANSFORMER—1st I.F. transformer	\$0.65
RT-389	T4	TRANSFORMER—2nd I.F. transformer	.65
RT-4008	T5	TRANSFORMER—Output transformer	.70
RS-1064	Spkr.	SPEAKER—5-inch P.M. speaker	2.10

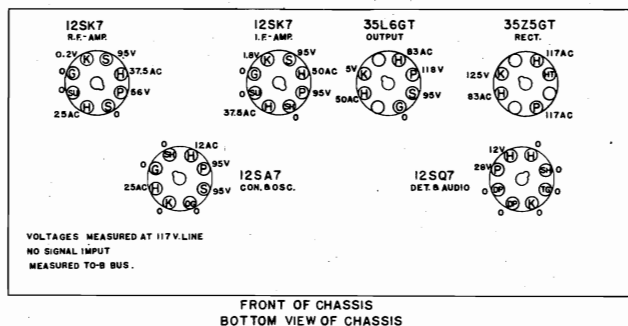


Fig. 4. Socket Voltages

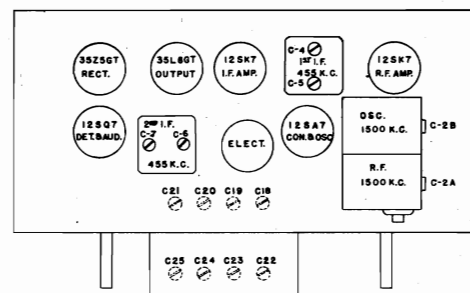


Fig. 1. Trimmer Location

MODEL L-660

GENERAL ELECTRIC CO.

MODELS J-644, J-644W,

MODEL 660

J-654, J-654W

ALIGNMENT PROCEDURE

Alignment Frequencies

RF.....	1500 KC
IF.....	455 KC

The chassis must be removed from the cabinet as described above to make the following alignments. The locations of all trimmers is shown in Fig. 1.

IF Alignment

Connect an output meter across the voice coil. Turn the volume control to maximum. Set test oscillator to 455 KC and keep the oscillator output as low as a readable meter reading will permit.

Apply signal to the 12SA7 converter grid through a .05 mfd. capacitor and align progressively the trimmers in the 2nd and 1st IF transformers.

RF Alignment

When making the following alignment the loop antenna must be bolted to the chassis by the two mounting screws. Since the glass dial scale is fastened to the cabinet, it cannot be used for reference during the alignment of the chassis outside the cabinet. Use must be made therefore of the four calibration marks at the bottom flange of the dial scale reflector plate (immediately below end of dial scale pointer). These marks referring from left to right are as follows: Reference point, 580 KC, 1000 KC, and 1500 KC.

The RF signal should be capacity coupled to the receiver loop by placing a two foot piece of wire for an antenna on the test oscillator output post (high side). Keeping this antenna two feet or more from the receiver loop will generally insure freedom from too much coupling. Metal objects such as meters, tools, etc. should not be placed in close proximity to the loop when making the alignment.

With the gang condenser plates completely closed, the end of the pointer should line up with the first mark to the left of the dial reflector plate. If it doesn't the pointer can be moved on the dial cord until it does. Set the signal generator to 1500 KC. Set pointer to the 1500 KC mark (extreme right flange mark) and align (C2B) to the signal. Peak (C2A) for maximum output.

Loudspeaker—PM DYNAMIC

Outside cone diameter.....	5 inches
Voice coil impedance (400 cycles).....	3.5 ohms

SPECIFICATIONS

Over-all Dimensions:

Height.....	8 $\frac{5}{8}$ inches
Width.....	13 inches
Depth.....	8 inches

J644, J644W, J654, J654W

These receivers incorporate the following features: Single-ended tubes, automatic volume control, built-in antenna, dynapower speaker and beam power output.

ALIGNMENT PROCEDURE

Alignment Frequencies

I.F.....	455 KC
R.F.....	1650 and 1500 KC

The location of all trimmers is shown in Fig. 1.

I.F. Alignment

Connect an output meter across the voice coil. Turn the volume control to maximum. Set test oscillator to 455 KC and keep the oscillator output as low as a readable meter reading will permit.

Apply signal to the converter grid through a .05 mfd. capacitor and align progressively the trimmers in the 2nd and 1st I.F. transformer cans.

R.F. Alignment

To insert the R.F. signal use either a standard I.R.E. dummy antenna between the signal generator and the receiver antenna post, or loop-couple the generator signal to the receiver Beam-a-Scope. A distance of two feet between generator loop and receiver Beam-a-Scope will insure freedom from over-coupling. When using an I.R.E. dummy antenna for R.F. alignment, do not connect the signal generator ground to the receiver chassis

Electrical Rating

105–125 volts AC/DC, 50–60 cycles AC.

Tuning Frequency Range..... 550–1720 KC

Intermediate Frequency..... 455 KC

Electrical Power Output (117 volts)

Undistorted.....	1.1 watts
Maximum.....	1.6 watts

GENERAL INFORMATION

Station Key Adjustments

The station key adjustments are located on the bottom of the cabinet through the slots designated as "Osc." and "RF." The extreme left trimmer in rows "Osc." and "RF" are corresponding adjustments for the first or extreme left station key. The second set of adjustment trimmers are for the No. 2 or second key from left; correspondingly the remaining sets of trimmers are for the station keys No. 3 and No. 4. All receivers to run for 15 minutes before making the following adjustments.

1. List desired station on key, then manually tune in station desired for this key.
2. Push station key to be set-up, to its depressed position.
3. Adjust its corresponding "Osc." adjustment for the station signal which you tuned manually above and which is listed for the key. Peak adjustment for clearest reception.
4. Adjust corresponding "RF" adjustment for maximum signal strength.
5. Proceed in like manner for adjustment of remaining keys.

NOTE.—Clockwise rotation of adjustment screws lowers the frequency.

Special Service Information

The following information will be useful to servicemen equipped with vacuum tube voltmeters or similar voltage measuring instruments. When making the Stage Gain measurements in (1), the AVC bus should be shorted to B—.

- (1) Stage Gains

Antenna post to converter grid.....	3.8 at 1000 KC
Converter grid to IF grid.....	30 at 455 KC
IF grid to 12SQ7 diode plate.....	53 at 455 KC
 - (2) Audio Gain

0.14 volts, 400 cycle signal across volume control with control set at maximum, will give approximately $\frac{1}{2}$ -watt speaker output.
 - (3) DC voltage developed across oscillator grid resistor (R4) averages 5.0 volts at 1000 KC.
- Variations of 20 per cent permissible. All readings obtained with enough signal input to give $\frac{1}{2}$ -watt speaker output.

With the gang condenser wide open, align oscillator trimmer (C-3b) to 1650 KC. Change generator signal to 1500 KC, tune receiver to the signal and peak antenna trimmer (C-3a) for maximum output.

Precaution

If the signal generator is AC operated use an isolating transformer between the power supply and the radio receiver power input. The use of an isolating capacitor is not recommended as AC current through the capacitor will introduce hum modulation and/or create the possibility of a burned-out signal generator attenuator.

Special Service Information

The following information will be very useful in servicing receivers if a vacuum tube voltmeter or similar voltage measuring instrument is available.

- (1) Stage Gains

Antenna Post to Converter Grid.....	4.0 at 1000 KC	Gain*
I.F. on Converter Grid to I.F. on I.F.		
Amplifier Grid.....	35 at 455 KC	
I.F. Amplifier Grid to Diode Plate.....	60 at 455 KC	
- (2) 0.05-volt, 400-cycle signal across the volume control will give $\frac{1}{2}$ -watt speaker output.* (Volume control turned to maximum.)
- (3) Average RF voltage developed from oscillator cathode to B —..... 1.5 volts

* Variations of \pm 20% permissible. All readings obtained with enough signal input to give $\frac{1}{2}$ -watt speaker output.

GENERAL ELECTRIC CO.

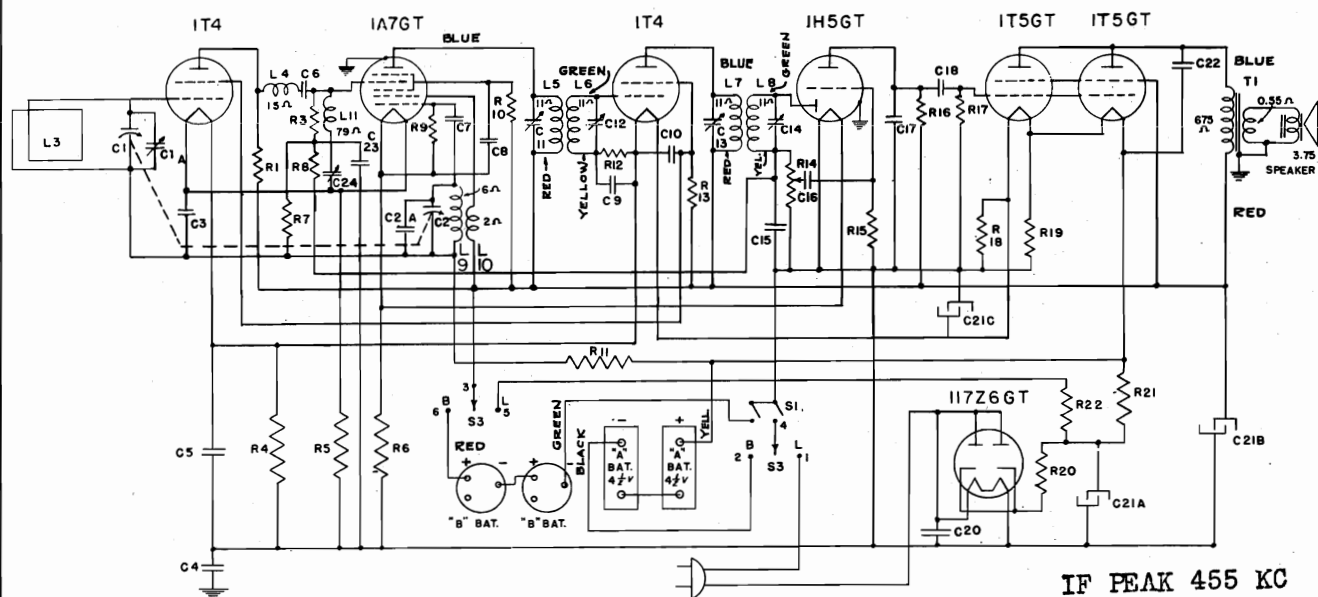
MODELS LB-700, LB-701
LB-702, LB-703

Fig. 2. Schematic Diagram Models LB-700 and LB-702

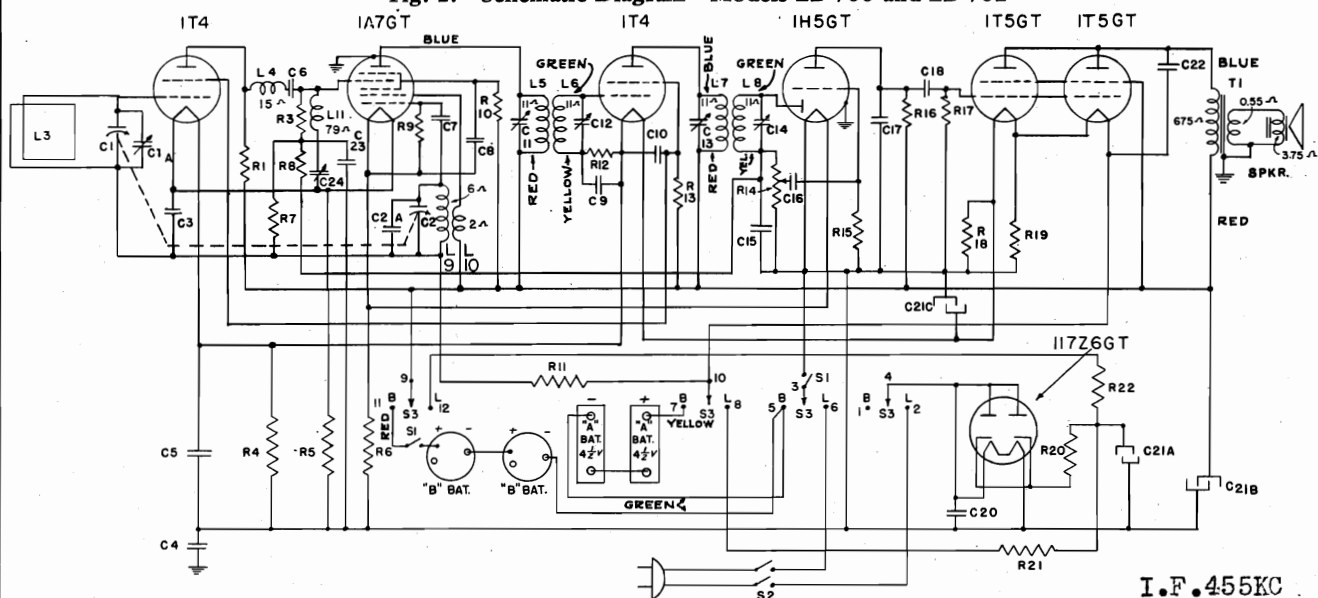
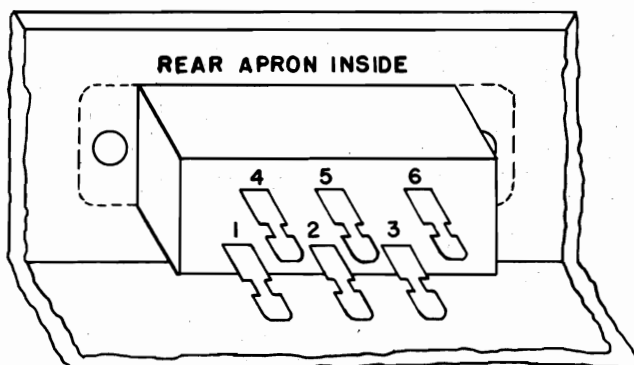
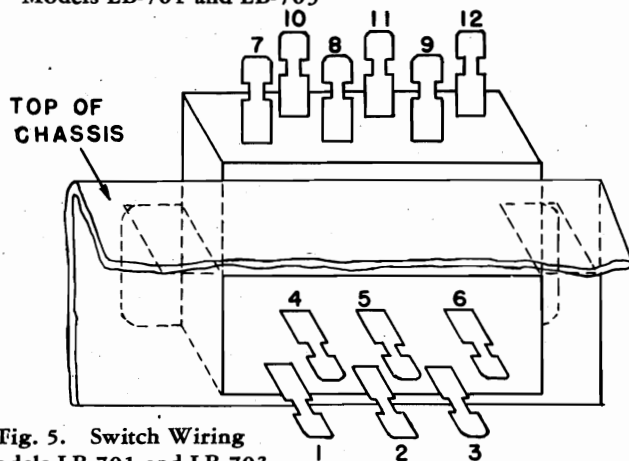


Fig. 3. Schematic Diagram Models LB-701 and LB-703

Fig. 4. Switch Wiring
Models LB-700 and LB-702Fig. 5. Switch Wiring
Models LB-701 and LB-703

MODELS LB-700, LB701,
LB-702, LB-703

GENERAL ELECTRIC CO.

Stock No.	Symbol	Description	List Price
RC-7058	C-1, 1A, C2 and C2A	CONDENSER—Tuning condenser & trimmers	\$1.80
*RC-071	C-3	CAPACITOR—.05 mfd., 120 V. paper	.25
*RC-092	C-4	CAPACITOR—.05 mfd., 600 V. paper	.30
*RC-130	C-5	CAPACITOR—.02 mfd., 200 V. paper	.30
*RC-293	C-6	CAPACITOR—470 mmf., mica	.30
*RC-216	C-7	CAPACITOR—47 mmf., mica	.25
*RC-107	C-8-9-10	CAPACITOR—.1 mfd., 120 V. paper	.25
*RC-249	C-15	CAPACITOR—220 mmf. mica	.25
*RC-023	C-16	CAPACITOR—.005 mfd., 600 V. paper	.25
*RC-235	C-17	CAPACITOR—100 mmf., mica	.25
*RC-039	C-18	CAPACITOR—.01 mfd., 600 V. paper	.25
*RC-092	C-20	CAPACITOR—.05 mfd., 600 V. paper	.30
RC-5196	C-21A	CAPACITOR—40 mfd., 150 V. electrolytic	.60
RC-5193	C-21B, C	CAPACITOR—60 mfd., 150 V.; 100 mfd., 15 V. electrolytic	.80
*RC-039	C-22	CAPACITOR—.01 mfd., 600 V. paper	.25
*RC-071	C-23	CAPACITOR—.05 mfd., 120 V. paper	.25
*RC-672	C-24	CAPACITOR—5-35 mmf., trimmer	.15
*RQ-1287	R-1	RESISTOR—15,000 ohm, $\frac{1}{2}$ W. carbon	.70-5
*RQ-1323	R-3	RESISTOR—470,000 ohm, $\frac{1}{2}$ W. carbon	.70-5
*RQ-1263	R-4	RESISTOR—1,500 ohm, $\frac{1}{2}$ W. carbon	.70-5
*RQ-1259	R-5	RESISTOR—1,000 ohm, $\frac{1}{2}$ W. carbon	.70-5
*RQ-1253	R-6	RESISTOR—560 ohm $\frac{1}{2}$ W. carbon	.70-5
*RQ-1341	R-7	RESISTOR—2.7 megohms, $\frac{1}{2}$ W. carbon	.70-5
*RQ-1339	R-8	RESISTOR—2.2 megohms, $\frac{1}{2}$ W. carbon	.70-5
*RQ-1315	R-9	RESISTOR—220,000 ohm, $\frac{1}{2}$ W. carbon	.70-5
*RQ-1299	R-10	RESISTOR—47,000 ohm, $\frac{1}{2}$ W. carbon	.70-5
*RQ-1355	R-11	RESISTOR—10 megohm, $\frac{1}{2}$ W. carbon	.70-5
*RQ-1323	R-12	RESISTOR—470,000 ohm, $\frac{1}{2}$ W. carbon	.70-5
*RQ-1295	R-13	RESISTOR—30,000 ohm, $\frac{1}{2}$ W. carbon	.70-5
RV-130	R-14, S-1	VOLUME CONTROL—1.0 meg. vol. control & power switch (Models LB702, LB703)	1.45
RV-134	R14, S-1	VOLUME CONTROL—1.0 meg. vol. control and power switch (Models LB700, LB701)	1.45
*RQ-1349	R-15	RESISTOR—5.6 megohm, $\frac{1}{2}$ W. carbon	.70-5
*RQ-1331	R-16, 17	RESISTOR—1.0 megohm, $\frac{1}{2}$ W. carbon	.70-5
*RQ-1257	R-18	RESISTOR—820 ohm, $\frac{1}{2}$ W. carbon	.20
*RQ-1261	R-19	RESISTOR—1200 ohm, $\frac{1}{2}$ W. carbon	.30
RR-621	R-20	RESISTOR—91 ohm, 2 watt	.70-5
RR-366	R-21	RESISTOR—2200 ohm, 7 watt "wire-wound"	.70-5
*RQ-1261	R-22	RESISTOR—1200 ohm, $\frac{1}{2}$ watt, carbon	.70-5

Electrical Rating

1. AC or DC Power Supply
105-125 volts, 25-60 cycles on AC, 25 watts
2. Battery Power Supply
9 volt "A" Supply
90 volt "B" Supply

Loudspeaker—"Alnico" Magnet Dynamic

Outside Cone Diameter..... 5 inches
Voice Coil Impedance (400 cycles)..... 3.5 ohms

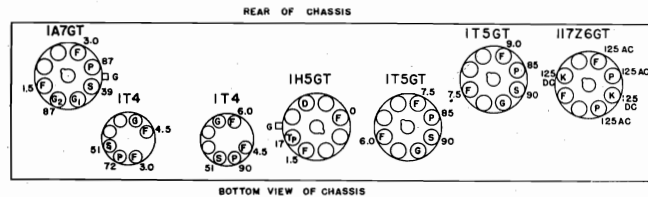
Maximum Power Output..... 440 milliwatts

Special Service Information

The following information will be very useful in servicing receivers if a vacuum tube voltmeter or similar voltage measuring instrument is available:

- (1) Stage Gains
RF Grid to Converter Grid 5.0 to 1000 KC
Converter Grid to 1F Grid 40 at 1000 KC
Converter Grid to 1F Grid 50 at 455 KC
1F Grid to 1H5GT diode plate 90 at 455 KC
- (2) 0.07 volts, 400 cycle signal across the volume control will give 50 milliwatts speaker output. With volume control set at maximum.
- (3) Average DC voltage developed across the oscillator grid resistor (R9)—10 volts

Variations of ± 20 o/o permissible. All readings are obtained with the AVC shorted out.

**Line-Battery Switch Wiring**

Figures 4 and 5 show the line-battery switch for the Models LB700-LB702 and LB701-LB703 respectively. The switch terminals are numbered from 1-6 and 1-12 to facilitate the tracing of the circuit when referring to the schematic diagram in changing or servicing a switch.

ALIGNMENT PROCEDURE**Alignment Frequencies**

IF—455 KC..... RF—1750 and 1500 KC

General Alignment Notes

The chassis must be removed from the carrying case in order to perform the alignment of the IF, wavetrap and oscillator trimmers. For alignment of the RF trimmer, the chassis should be assembled in the cabinet. Special care must be exercised in making alignments outside the cabinet so as to place the batteries, Beam-a-Scope and chassis in the same relative positions with respect to one another as these components occupy in the cabinet; otherwise alignment will not be satisfactory.

IF Alignment

Connect an output meter across the voice coil of speaker and rotate volume control to maximum. Tighten wave trap trimmer (C24), then loosen this trimmer screw about two turns. Set test oscillator to 455 KC and capacity couple this test oscillator signal to the loop antenna. This can be done by using a three foot piece of wire connected to the high side of the signal generator and bring this wire to within a foot or two of the receiver loop antenna. Keep oscillator signal as low as a readable meter reading will permit and align all IF trimmers (C14, 13, 12, 11) for maximum output.

Wave Trap Alignment

With test oscillator set at 455 KC and with same input as described under "IF Alignment," adjust wave trap trimmer (C24) for a minimum output-meter reading.

RF Alignment

Adjust test oscillator to 1750 KC and loosely couple a wire from the output terminal of the signal generator so that the receiver loop will pick up the signal. Set the gang condenser to minimum capacity and adjust the oscillator trimmer (C2A) to receive the signal. After this has been done return the chassis to the cabinet, replace the back cover and set test oscillator to 1500 KC. Tune the receiver until this signal is heard, then with a thin insulated screw driver, peak the RF trimmer C1A for maximum output. This trimmer is available through the hole in the side of the cabinet.

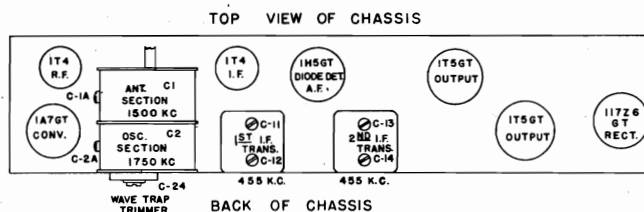
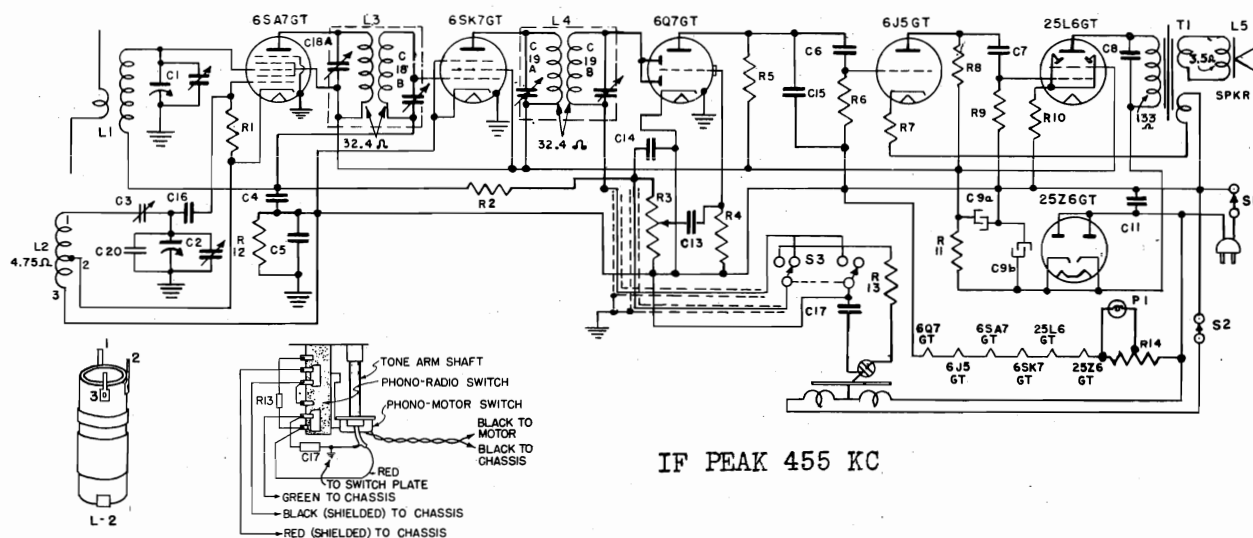


Fig. 1. Trimmer Location

GENERAL ELECTRIC CO.

MODEL L-678



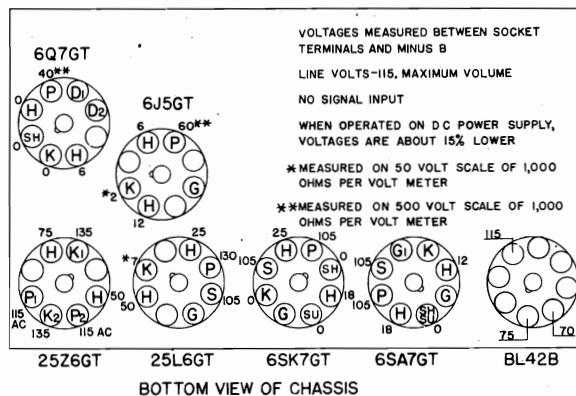
IF PEAK 455 KC

Stock No Symbol Description List Price

*RC-7017	C-1, -2	CONDENSER—Tuning Condenser.....	\$5.80
*RC-6515	C-3	CAPACITOR—Oscillator padder.....	.30
*RC-072	C-4	CAPACITOR—.05 Mfd., 200 V. paper.....	.25
*RC-130	C-5	CAPACITOR—.02 Mfd., 400 V. paper.....	.30
*RC-023	C-6, 7	CAPACITOR—.005 Mfd., 600 V. paper.....	.25
*RC-039	C-8	CAPACITOR—.01 Mfd., 600 V. paper.....	.25
*RC-5145	C-9a	CAPACITOR—.30 Mfd., 150 V.....	.75
*RC-5145	C-9b	CAPACITOR—.50 Mfd., 150 V.....	.75
*RC-092	C-11	CAPACITOR—.05 Mfd., 600 V. paper.....	.30
*RC-060	C-13	CAPACITOR—.03 Mfd., 600 V. paper.....	.25
*RC-293	C-14	CAPACITOR—.470 Mmf., mica.....	.30
*RC-250	C-15	CAPACITOR—.220 Mmf., mica.....	.25
*RC-216	C-16	CAPACITOR—.47 Mmf., mica.....	.25
*RC-104	C-17	CAPACITOR—.01 Mfd., 400 V. paper.....	.30
*RC-226	C-20	CAPACITOR—.10 Mmf., mica.....	.25
*RQ-1295	R-1	CAPACITOR—33,000 ohms, 1/2 W. carbon.....	.70-5
*RQ-1339	R-2	RESISTOR—2.2 megohm, 1/2 W. carbon.....	.70-5
RV-119	R-3, S-1	VOLUME CONTROL—.05 megohm potentiometer.....	1.45
*RQ-1365	R-4	RESISTOR—15 megohm, 1/2 W. carbon.....	.70-5
*RQ-1323	R-5	RESISTOR—470,000 ohms, 1/2 W. carbon.....	.70-5
*RQ-1331	R-6	RESISTOR—1.0 megohm, 1/2 W. carbon.....	.70-5
*RQ-1271	R-7	RESISTOR—3,300 ohms, 1/2 W. carbon.....	.70-5
*RQ-1297	R-8	RESISTOR—39,000 ohms, 1/2 W. carbon.....	.70-5
*RQ-1323	R-9	RESISTOR—470,000 ohms, 1/2 W. carbon.....	.70-5
*RQ-1239	R-10	RESISTOR—150 ohms, 1/2 W. carbon.....	.70-5
*RQ-1459	R-11	RESISTOR—1,000 ohms, 1 W. carbon.....	.20
*RQ-1323	R-12	RESISTOR—470,000 ohms, 1/2 W. carbon.....	.70-5
*RQ-1307	R-13	RESISTOR—100,000 ohms, 1/2 W. carbon.....	.70-5
*RR-773	R-14	RESISTOR—BL42B Ballast resistor.....	.40
*RL-528	L-1	LOOP—Built-in antenna and back cover assembly.....	1.00
*RL-2016	L-2	COIL—Oscillator coil.....	.25
*RT-341	L-3	TRANSFORMER—1st I.F. transformer.....	.80
*RT-342	L-4	TRANSFORMER—2nd I.F. transformer.....	.80
*RT-475	T-1	TRANSFORMER—Output transformer.....	1.00

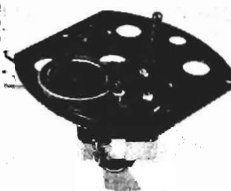
FOR OTHER DATA SEE INDEX

FRONT OF CHASSIS



MOTOR ASSEMBLY
MODEL 1 (60-cycle only)

- *RB-187 BRACKET—Rubber-edged drive wheel bracket assembly.....\$0.20
- *RB-188 BRACKET—Rubber edged idler wheel bracket assembly......20
- *RB-627 BUSHING—Motor mtg. rubber bushing......20-5
- *RC-5146 CAPACITOR—Motor capacitor..... 1.00
- *RH-112 HAIRPIN COTTER—Rubber wheel hairpin cotter......10-10
- *RM-129 MOTOR—60-cycle motor complete..... 4.50
- *RP-157 PLATE—Motor mounting plate and spindle bearing assembly......90
- *RS-471 SPRING—Idle wheel bracket tension spring......30-5
- *RS-934 SPINDLE—Turntable spindle and snap ring......30
- *RT-916 TURNABLE—8-inch flocked turntable..... 1.60
- *RW-910 WHEEL—Rubber-edged wheel......35



MOTOR ASSEMBLY—MODEL 2
(60-cycle and 50-cycle)

- *RM-133 MOTOR—60-cycle motor assembly complete...\$4.75
- *RM-152 MOTOR—50-cycle motor assembly complete... 5.25
- *RP-165 PLATE—Main plate and turntable shaft bearing assembly..... 1.00
- *RP-166 PLATE—Motor mounting plate......35
- *RP-167 PLATE—Rubber-edged wheel movable plate and bearing assembly......80
- *RP-316 PULLEY—60-cycle drive pulley......15
- *RP-333 PULLEY—50-cycle drive pulley......35-2
- *RS-493 SPRING—Movable plate tension spring......10
- *RS-943 SPINDLE—Turntable spindle and cotter......25
- *RS-953 SPACERS—Rotor spacers between bearings......15-5
- *RT-924 TURNABLE—8-inch turntable..... 1.50
- *RW-912 WHEEL—Rubber-edged wheel, washer, oil felt and cotter..... 1.50

(PRICES SUBJECT TO CHANGE WITHOUT NOTICE)

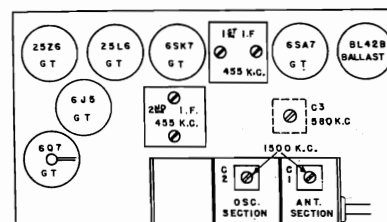


Fig. 1. Trimmer Location

MODELS HE-74, HE-74L,
HE-740, HE-740L

GENERAL ELECTRIC CO.

REPLACEMENT PARTS LIST

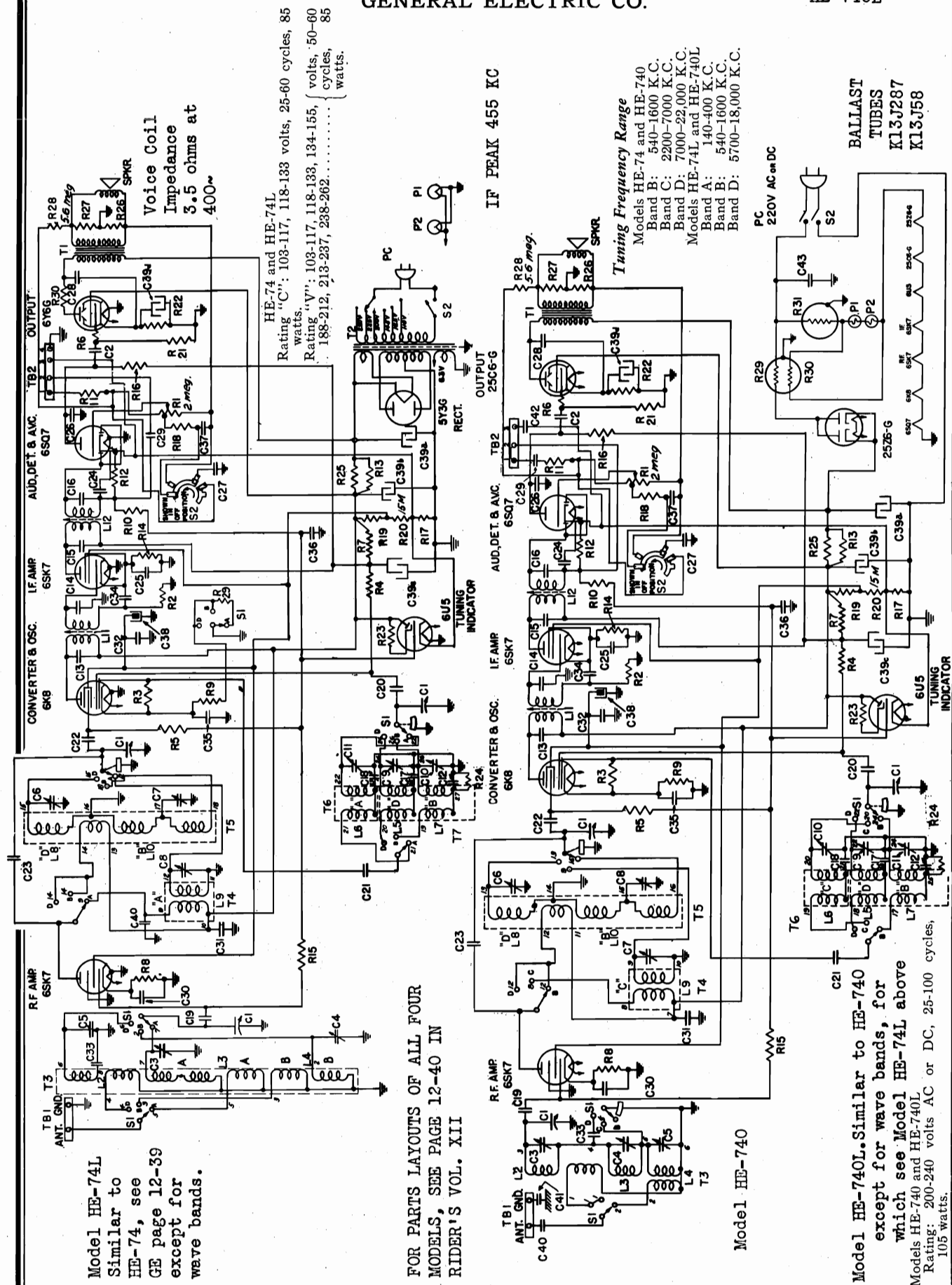
Models HE-74, HE-74L, HE-740, and HE-740L

Stock No.	Description	List Price	Stock No.	Description	List Price
*RB-095	BOARD—Terminal board (2 lugs).....	\$0.10	RC-8118	CABLE—Tuning indicator cable assembly (Model HE-74, 74L).....	\$0.50
RB-911	BACK COVER—Cabinet back cover (Model HE-740, 740L).....	.30	RC-8126	CORD—Power cord (Model HE-740, 740L).....	.40
RB-1002	BOARD—Ant-Gnd. terminal board (Model HE-74, 74L).....	.10	RD-106	DIAL—Dial scale (Model HE-74, 740)...	1.15
RB-1004	BOARD—Terminal board (2 lugs and mounting post).....	.10	RD-118	DIAL—Dial scale (Model HE-74L, 740L).....	1.35
RB-1005	BOARD—Terminal board (4 lugs).....	.10	RE-054	ESCUTCHEON—Dial scale escutcheon...	1.90
RB-1006	BOARD—Terminal board (5 lugs).....	.10	RE-055	ESCUTCHEON—Tuning indicator escutcheon.....	.20
RB-1007	BOARD—Terminal board (3 lugs) (Model HE-74, 740).....	.10	*RF-012	FOOT—Mounting foot assembly.....	.40
RB-1011	BOARD—Ant-Gnd. terminal board (Model HE-740, 740L).....	.10	*RG-016	GRID CLIP—Grid clip for metal tube (Pkg. 5).....	.10
RB-1012	BOARD—Phono-terminal board.....	.15	RK-045	KNOB—Control knobs (Pkg. 5) (Model HE-740, 740L).....	.60
RB-1023	BOARD—Terminal board (5 lugs) (Model HE-74L, 740L).....	.10	RK-047	KNOB—Control knobs (Model HE-74, 74L) (Pkg. 5).....	.40
RC-004	CAPACITOR—.00075 mfd. 600 V. paper (C-27).....	.25	RL-082	COIL—Ant. coil, band "D," "C" and "B" (L-2, 3, 4) (HE-74, 740).....	1.50
*RC-011	CAPACITOR—.002 mfd. 600 V. paper (C-29).....	.25	RL-091	COIL—Ant. coil, band "D," "A" and "B" (L-2, 3, 4) (Model HE-74L, 740L).....	2.50
RC-039	CAPACITOR—.01 mfd. 600 V. paper (C-40, 41).....	.25	RL-157	COIL—RF coil, band "D" and "B" (L-8, 10) (Model HE-74, 740).....	1.00
*RC-054	CAPACITOR—.03 mfd. 1500 V. paper (C-28).....	.35	RL-158	COIL—RF coil, band "C" (L-9) (HE-74, 740).....	.60
*RC-055	CAPACITOR—.003 mfd. 600 V. paper (C-37).....	.25	RL-160	COIL—RF coil, band "D" and "B" (L-8, 10) (Model HE-74L, 740L).....	1.00
RC-056	CAPACITOR—.006 mfd. 600 V. paper (C-33).....	.25	RL-161	COIL—RF coil, band "A" (L-9) (Model HE-74L, 740L).....	1.15
RC-072	CAPACITOR—.05 mfd. 200 V. paper (C-30, 34, 35, 36).....	.25	RL-284	COIL—Osc. coil, band "D" and "B" (L-5, 7) (Model HE-74, 740).....	.85
RC-074	CAPACITOR—.05 mfd. 600 V. AC line (C-43).....	.40	RL-285	COIL—Osc. coil, band "C" (L-6) (Model HE-74, 740).....	.50
RC-090	CAPACITOR—.04 mfd. 600 V. paper (C-25).....	.30	RL-298	COIL—Osc. coil, band "D" & "B" (L-5, 7) (Model HE-74L, 740L).....	.90
*RC-092	CAPACITOR—.05 mfd. 600 V. paper (C-2, 31, 32).....	.30	RL-299	COIL—Osc. coil, band "A" (L-6) (Model HE-74L, 740L).....	.75
RC-148	CAPACITOR—.25 mfd. 600 V. paper (C-42).....	.35	RQ-642	RESISTOR—220 ohms, 2-W. carbon (R-22).....	.20
*RC-206	CAPACITOR—50 mmf. mica (C-21).....	.35	RQ-669	RESISTOR—2700 ohms, 2-W. carbon (R-19).....	.20
RC-231	CAPACITOR—10 mmf. mica (C-23).....	.25	RQ-672	RESISTOR—3900 ohms, 2-W. carbon (R-13, 25).....	.20
RC-235	CAPACITOR—100 mmf. mica (C-24).....	.25	*RQ-1219	RESISTOR—22 ohms; ½-W. carbon (R-26) (Pkg. 5).....	.70
*RC-250	CAPACITOR—220 mmf. mica (C-26).....	.25	*RQ-1235	RESISTOR—100 ohms, ½-W. carbon (R-27) (Pkg. 5).....	.70
RC-293	CAPACITOR—470 mmf. mica (C-19, 20, 22).....	.30	*RQ-1239	RESISTOR—150 ohms, ½-W. carbon (R-17) (Pkg. 5).....	.70
*RC-348	CAPACITOR—1600 mmf. mica (C-18).....	.35	*RQ-1243	RESISTOR—220 ohms, ½-W. carbon (R-9) (Pkg. 5).....	.70
*RC-359	CAPACITOR—2800 mmf. mica (C-17).....	.50	*RQ-1247	RESISTOR—330 ohms, ½-W. carbon (R-14) (Pkg. 5).....	.70
*RC-676	CAPACITOR—300-650 mmf. "B" band padder (C-12).....	.35	*RQ-1253	RESISTOR—560 ohms, ½-W. carbon (R-8) (Pkg. 5).....	.70
*RC-684	CAPACITOR—5-40 mmf. 3-30 mmf. 2-20 mmf. "D," "C," "B" band antenna trimmer assembly (C-3, 4, 5).....	.45	*RQ-1259	RESISTOR—1000 ohms, ½-W. carbon (R-6, 7) (Pkg. 5).....	.70
*RC-685	CAPACITOR—3-30 mmf. 3-30 mmf. 3-30 mmf. "D," "C," "B" band R.F. trimmer assembly (C-6, 7, 8).....	.45	*RQ-1277	RESISTOR—5600 ohms, ½-W. carbon (R-24) (Pkg. 5).....	.70
*RC-686	CAPACITOR—3-30 mmf. 3-30 mmf. 5-45 mmf. "D," "C," "B" band oscillator trimmer assembly (C-9, 10, 11).....	.45	*RQ-1287	RESISTOR—15,000 ohms, ½-W. carbon (R-4) (Pkg. 5).....	.70
*RC-863	CORD—Power cord (Model HE-74, 74L).....	.65	*RQ-1295	RESISTOR—33,000 ohms, ½-W. carbon (R-3) (Pkg. 5).....	.70
*RC-1981	CLAMP—Tuning indicator clamp.....	.10	*RQ-1299	RESISTOR—47,000 ohms, ½-W. carbon (R-11) (Pkg. 5).....	.70
*RC-5100	CAPACITOR—8 mfd. 250 V. dry electrolytic (C-38).....	.50	*RQ-1315	RESISTOR—220,000 ohms, ½-W. carbon (R-18) (Pkg. 5).....	.70
RC-5130	CAPACITOR—40 mfd. 350 V.; 20 mfd. 300 V.; 20 mfd. 300 V.; 20 mfd. 25 V.; dry electrolytic (C-39a, 39b, 39c, 39d) (Model HE-74, 74L).....	2.10	*RQ-1319	RESISTOR—330,000 ohms, ½-W. carbon (R-2, 12, 16) (Pkg. 5).....	.70
RC-5132	CAPACITOR—40 mfd. 300 V.; 50 mfd. 250 V.; 20 mfd. 250 V.; 20 mfd. 25 V.; dry electrolytic (C-39a, 39b, 39c, 39d) (Model HE-740, 740L).....	2.10	*RQ-1323	RESISTOR—470,000 ohms, ½-W. carbon (R-21) (Pkg. 5).....	.70
RC-6518	CAPACITOR—75-175 mmf. "A" band padder.....	.25	*RQ-1325	RESISTOR—560,000 ohms, ½-W. carbon (R-5, 15) (Pkg. 5).....	.70
RC-7010	CONDENSER—Tuning condenser (C-1).....	4.95	*RQ-1339	RESISTOR—2.2 meg. ½-W. carbon (R-10) (Pkg. 5).....	.70
RC-8085	CABLE—Tuning indicator cable assembly (Model HE-740, 740L).....	.50			

*Used on previous receivers.

(Prices subject to change without notice)

IF PEAK 455 KC



MODEL L-740

GENERAL ELECTRIC CO.

SPECIFICATIONS

Over-all Dimensions

Height.....11 $\frac{3}{8}$ inches
 Width.....17 inches
 Depth.....11 inches

Electrical Rating

"A" rating, 110-125 volts, 50-60 cycles, 70 watts.
 "C" rating, 110-125 volts, 25 cycles, 70 watts.

Tuning Frequency Range

"BC" Band.....550-1720 KC
 "SW1" Band.....1.7-5.2 MC
 "SW2" Band.....5.2-18.1 MC

Intermediate Frequency.....455 KC

Electrical Power Output

Undistorted.....3.5 watts
 Maximum.....5.5 watts

Loud-speaker—PM Dynamic

Outside Cone Diameter.....6 $\frac{1}{2}$ inch
 Voice Coil Impedance.....3.5 ohms

Tubes

RF Amplifier.....GE-6SG7
 Converter, Oscillator.....GE-6SA7
 IF Amplifier, Detector, AVC.....GE-6SF7
 Audio Amplifier, Phase Inverter.....GE-6SC7
 Power Output.....(2) GE-6K6GT
 Rectifier.....GE-5W4GT
 Dial Lamps.....(2) MAZDA No. 44

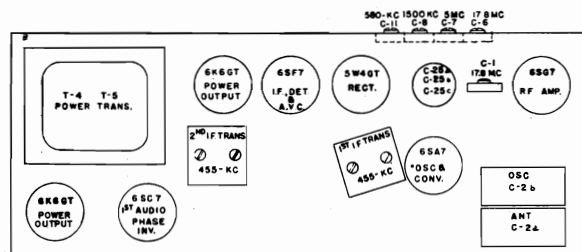


Fig. 1. Trimmer Location

ALIGNMENT PROCEDURE

The location of trimmers is shown in Fig. 1. All oscillator and RF trimmers are accessible through a slot through the back cover of the cabinet.

The alignment procedure is given in table form. All IF alignments may be made with the chassis removed from the cabinet. However, the RF alignments are made with the chassis and loop antennas securely fastened in the cabinet, as the relative position of the loop antenna with respect to the chassis materially affects it. The RF signal should be capacity coupled by placing a two-foot wire for an antenna on the test-oscillator output post (high side). Keeping this antenna two feet or more from the receiver loop will generally insure freedom from too much coupling. Metal objects such as meters, tools, etc., should not be placed on top of the receiver cabinet.

ALIGNMENT CHART

Step	Connect Test-Osc. to	Test-Osc. Setting	Pointer Setting	Adjust Trimmers for Maximum Output
1	6SF7 IF Grid in series with .05 mfd.	455 KC	"BC" Band 550 KC	C17 & C16
2	6SA7 Conv. grid in series with .05 mfd.	455 KC	"BC" Band 550 KC	C14 & C13
3	Capacity Coupled	580 KC	"BC" Band 580 KC	C11**
4	Capacity Coupled	1500 KC	"BC" Band 1500 KC	C8** (Osc.)
5	Repeat Step 3			
6	Capacity Coupled	5 MC	"SW1" Band	C7** (Osc.)
7	Capacity Coupled	18 MC	"SW2" Band 18 MC	C6* (Osc.)
8	Capacity Coupled	18 MC	"SW2" Band 18 MC	C1** (Ant.)

*Use minimum capacity peak.

**Rock gang condenser when making alignment.

Special Service Information

The following data are taken with a vacuum tube voltmeter or similar voltage measuring device.

- Stage Gains

Antenna Post to RF Grid	6.5 at 1000 KC
RF Grid to Converter Grid	10 at 1000 KC
Converter Grid to IF Grid	45 at 1000 KC
Converter Grid to IF Grid	60 at 455 KC
IF Grid to 6SF7 diode plates	110 at 455 KC
- Audio Gains
 .16 volts, 400 cycles signal across volume control with control set to maximum will give approximately $\frac{1}{2}$ -watt speaker output.
- DC voltage developed across oscillator grid resistor R4 averages 10 volts at 1000 KC or 8.0 volts at 10,000 KC.

Variations of $\pm 20\%$ permissible. All readings taken with $-1\frac{1}{2}$ -volt fixed bias on AVC bus.

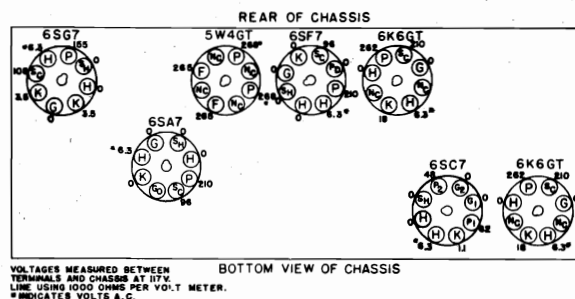
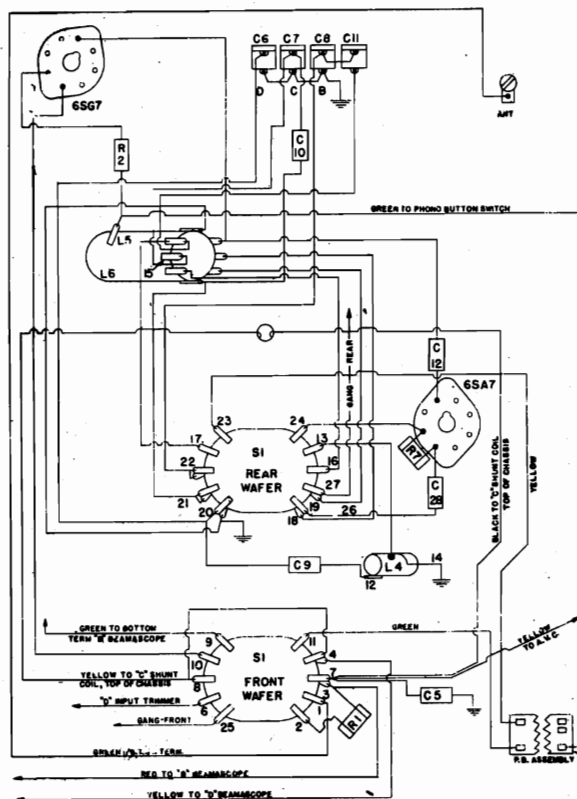
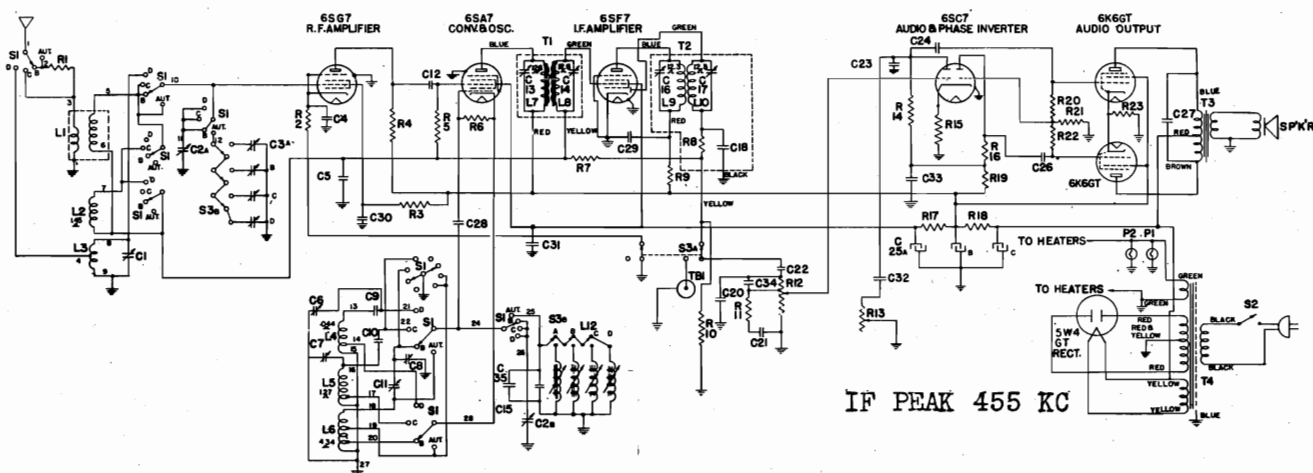


Fig. 2. Socket Voltages

GENERAL ELECTRIC CO.



Our Cat. Number	Symbol	Description	List Price
RC-6553	C-1	CAPACITOR—1.8-20 mmf., "D" band trimmer.	\$0.25
RC-7061	C-2a, C-2b	CONDENSER—2 gang condenser.	2.00
RT-885	C-3a, b, c, and d	TRIMMER STRIP—Push button trimmer strip.	.70
*RC-039	C-4	CAPACITOR—.01 mfd. 600 volt paper.	.25
*RC-072	C-5	CAPACITOR—.05 mfd. 200 volt paper.	.25
RC-6555	C-6, 7, 8	CAPACITOR STRIP—"B," "C," and "D" osc. trimmers.	.70
*RC-393	C-9	CAPACITOR—4700 mmf., mica.	.50
*RC-349	C-10	CAPACITOR—2000 mmf., mica.	.30
RC-6555	C-11	CAPACITOR—"B" padder (part of C-4, -5, -6).	.65

Our Cat. Number	Symbol	Description	List Price
*RC-235	C-12	CAPACITOR—100 mmf., mica.	.25
RC-305	C-15	CAPACITOR—600 mmf., silvered mica.	.25
*RC-252	C-18	CAPACITOR—200 mmf., mica.	.30
RC-20	C-20	CAPACITOR—100 mmf., mica.	.25
*RC-049	C-21	CAPACITOR—.004 mfd. 600 V. paper.	.35
*RC-023	C-22	CAPACITOR—.005 mfd. 600 V. paper.	.25
*RC-249	C-23	CAPACITOR—220 mmf., mica, 500 V.	.25
*RC-048	C-24	CAPACITOR—.02 mfd., 600 V. paper.	.30
	C-25a	CAPACITOR—10 mfd., 250 V, dry electrolytic.	
RC-5198	C-25b	CAPACITOR—15 mfd., 300 V, dry electrolytic.	1.10
	C-25c	CAPACITOR—30 mfd., 350 V, dry electrolytic.	
*RC-048	C-26	CAPACITOR—.02 mfd. 600 V. paper.	.30
*RC-011	C-27	CAPACITOR—.002 mfd. 600 V. paper.	.25
*RC-216	C-28	CAPACITOR—47 mmf., mica.	.25
*RC-039	C-29, 30, 31	CAPACITOR—.01 mfd. 600 V. paper.	.25
*RC-023	C-32	CAPACITOR—.005 mfd. 600 V. paper.	.25
*RC-104	C-33	CAPACITOR—.01 mfd. 600 V. paper.	.30
*RC-216	C-34	CAPACITOR—47 mmf., mica.	.25
*RC-329	C-35	CAPACITOR—150 mmf., compensating cap.	.25
*RQ-1251	R-1	RESISTOR—470 ohm, 1/2-W. carbon.	.70-5
*RQ-1243	R-2	RESISTOR—220 ohm, 1/2-W. carbon.	.70-5
*RQ-1275	R-5	RESISTOR—4700 ohm, 1/2-W. carbon.	.70-5
*RQ-1299	R-6	RESISTOR—47,000 ohm, 1/2-W. carbon.	.70-5
*RQ-1291	R-7	RESISTOR—22,000 ohm, 1/2-W. carbon.	.70-5
*RQ-1339	R-8	RESISTOR—2.2 megohm, 1/2-W. carbon.	.70-5
*RQ-1299	R-10	RESISTOR—47,000 ohm, 1/2-W. carbon.	.70-5
*RQ-1308	R-11	RESISTOR—100,000 ohm, 1/2-W. carbon.	\$0.70-5
*RV-135	R-12	VOLUME CONTROL—2 meg. volume control.	.95
*RQ-1323	R-14	RESISTOR—470,000 ohm, 1/2-W. carbon.	.70-5
*RQ-1273	R-15	RESISTOR—3900 ohm, 1/2-W. carbon.	.70-5
*RQ-1331	R-16	RESISTOR—1 megohm, 1/2-W. carbon.	.70-5
*RQ-683	R-17	RESISTOR—10,000 ohm 2-W. carbon.	.35
*RR-357	R-18	RESISTOR—12,000 ohm, 7.4 watt, W.	.30
*RQ-1293	R-19	RESISTOR—27,000 ohm, 1/2-W. carbon.	.70-5
*RQ-1319	R-20	RESISTOR—330,000 ohm, 1/2-W. carbon.	.70-5
*RQ-1308	R-21	RESISTOR—100,000 ohm, 1/2-W. carbon.	.70-5
*RQ-1319	R-22	RESISTOR—330,000 ohm, 1/2-W. carbon.	.70-5
*RQ-1451	R-25	RESISTOR—470 ohm, 1-W. carbon.	.20
*RQ-1323	R-26	RESISTOR—470,000 ohm, 1/2-Watt carbon.	.70-5
*RQ-1269	R-27	RESISTOR—2600 ohm, 1/2-Watt carbon.	.70-5
RT-723	R-28, S-2	TONE CONTROL—2 megohm tone control and power switch.	1.45
*RQ-1308	R-29	RESISTOR—100,000 ohm, 1/2-W. carbon.	.70-5
RL-580	L-1	BEAM-A-SCOPE—"B" band loop and cabinet back assembly.	1.60
*RL-167	L-2	COIL—"C" band R.F. coil.	.25
RL-581	L-3	BEAM-A-SCOPE—"D" band loop assembly.	.60
*RL-2065	L-4	COIL—"D" band oscillator coil.	.25
*RL-2066	L-5, -6	COIL—"B" and "C" band osc. coil.	.85
*RL-9530	L-12a, b, c, and d	COIL—Push button coil assembly.	.85
*RS-3129	S-1	SWITCH—Band change switch.	1.30
*RS-3130	S-3a, b	SWITCH—Push button switch.	4.00
RT-3011	T-1	TRANSFORMER—1st I.F. transformer.	1.20
RT-3012	T-2	TRANSFORMER—2nd I.F. transformer.	1.20
RT-4015	T-3	TRANSFORMER—Speaker output transformer.	1.40
RT-0724	T-4	TRANSFORMER—50/60 cycle power transformer.	4.15
RT-0725	T-5	TRANSFORMER—25-cycle power transformer.	9.90
*RS-1012	SPKR	SPEAKER—6 1/2 in. P.M. speaker.	3.25

* Used on previous receivers.

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

MODEL LC-758

GENERAL ELECTRIC CO.

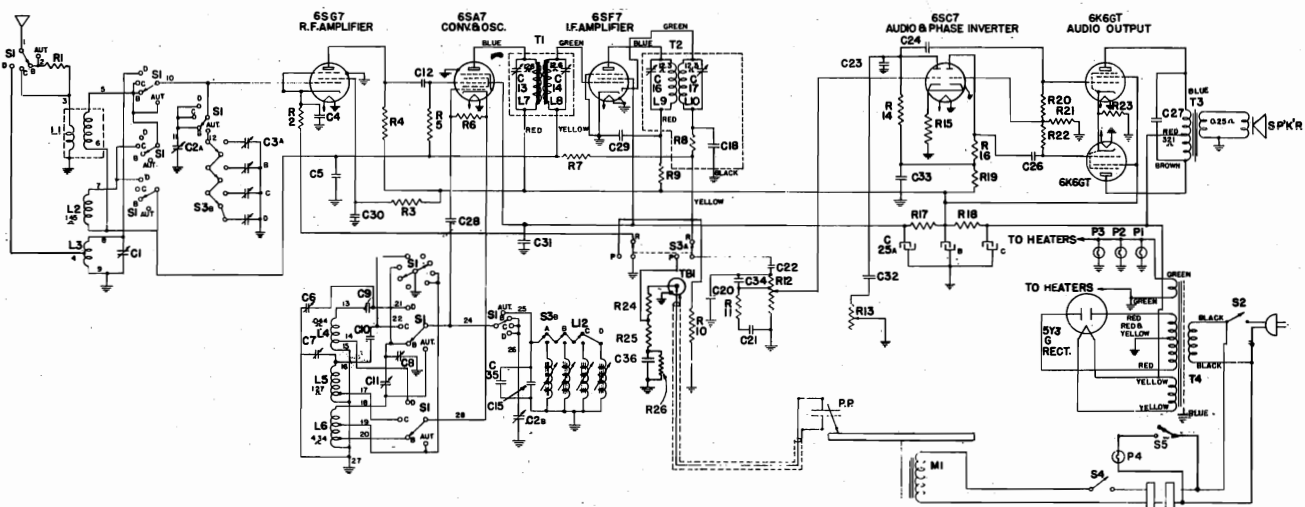


Fig. 1. Schematic Diagram

I.F. 455KC

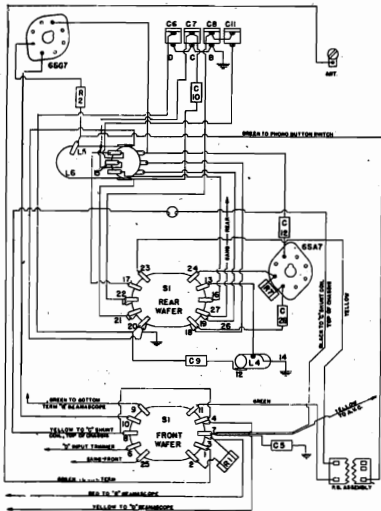


Fig. 2. Switch Wiring

RADIO REPLACEMENT PARTS LIST

RADIO REPLACEMENT PARTS LIST

Our Cat. Number	Symbol	Description	List Price
*RC-6537	C-1	CAPACITOR—1.8-20 mmf. "D" band trimmer.	\$0.25
*RC-7061	C-2a, 2b	CONDENSER—2-gang tuning condenser.	2.00
*RT-885	C-3a, b, c, d	TRIMMER STRIP—Push button trimmer strip.	.70
*RC-039	C-4	CAPACITOR—.01 mfd., 600 V paper.	.25
*RC-072	C-5	CAPACITOR—.05 mfd., 200 V paper.	.25
*RC-6555	C-6, 7, 8	CAPACITOR STRIP—"B," "C" and "D" osc. trimmers.	.65
*RC-393	C-9	CAPACITOR—4700 mmf., mica.	.50
*RC-349	C-10	CAPACITOR—2000 mmf., mica.	.30
*RC-6555	C-11	CAPACITOR—"B" padder (Part of C6, 7, 8).	.65
*RC-235	C-12	CAPACITOR—100 mmf., mica.	.25
*RC-305	C-15	CAPACITOR—600 mmf., silvered mica.	.25
*RC-252	C-18	CAPACITOR—200 mmf., mica.	.30
*RC-235	C-20	CAPACITOR—100 mmf., mica.	.25
*RC-049	C-21	CAPACITOR—.0042 mfd., 600 V paper.	.35
*RC-023	C-22	CAPACITOR—.005 mfd., 600 V paper.	.25
*RC-249	C-23	CAPACITOR—220 mmf., mica.	.25
*RC-048	C-24	CAPACITOR—.02 mfd., 600 V paper.	.30
RT-723	R-13, S-2	TONE CONTROL—2 meg. tone control.	1.45
*RQ-1323	R-14	RESISTOR—470,000 ohm, 1/2-W carbon.	.70-5
*RQ-1273	R-15	RESISTOR—3,900 ohm, 1/2-W carbon.	.70-5
*RQ-1331	R-16	RESISTOR—1 megohm, 1/2-W carbon.	.70-5
*RQ-687	R-17	RESISTOR—15,000 ohm, 2-W carbon.	.35
*RR-357	R-18	RESISTOR—1,200 ohm, 5.6 watt, w.w.	.30
*RQ-1308	R-19	RESISTOR—100,000 ohm, 1/2-W carbon.	.70-5
*RQ-1319	R-20	RESISTOR—330,000 ohm, 1/2-W carbon.	.70-5
*RQ-1308	R-21	RESISTOR—100,000 ohm, 1/2-W carbon.	.70-5
*RQ-1319	R-22	RESISTOR—330,000 ohm, 1/2-W carbon.	.70-5
*RQ-646	R-23	RESISTOR—330 ohm, 2-W carbon.	.20
*RQ-1315	R-24, 25, 26	RESISTOR—220,000 ohm, 1/2-W carbon.	.70-5
RL-586	L-1	BEAM-A-SCOPE—"B" band loop.	2.75
RL-167	L-2	COIL—"C" band R.F. coil.	.25
RL-587	L-3	BEAM-A-SCOPE—"D" band loop assembly.	.55
*RL-2065	L-4	COIL—"D" band oscillator coil.	.25
RL-2070	L-5-6	COIL—"B" and "C" band oscillator coil.	.80
*RL-9530	L-12a, b, c, d	COIL—Push-button coil assembly.	.85
*RS-3129	S-1	SWITCH—Band change switch.	1.30
*RS-3130	S-3a, b	SWITCH—Push-button switch.	4.00
*RS-3137	S-5	SWITCH—PHONO compartment lamp switch.	.40
RT-3017	T-1	TRANSFORMER—1st IF transformer.	1.20

* Used on previous receivers.

Prices subject to change without notice.

GENERAL ELECTRIC CO.

SPECIFICATIONS

Over-all Dimensions

Height.....	36 inches
Width.....	34 $\frac{1}{8}$ inches
Depth.....	16 $\frac{1}{8}$ inches

Electrical Rating

Rating "A6"—110–125 volts, 60 cycles, 85 watts
 Rating "A5"—110–125 volts, 50 cycles, 85 watts

Tuning Frequency Range

"BC" Band.....	550–1720 KC
"SW1" Band.....	1.7–5.2 MC
"SW2" Band.....	5.2–18.1 MC

Intermediate Frequency.....455 KC

For RCA RP 158 Record Changer,

see Rider's "Automatic Record

Changers and Recorders".

Special Service Information

The following data are taken with a vacuum tube voltmeter or similar voltage measuring device.

- (1) Stage Gains
 Antenna Post to RF Grid 6.5 at 1000 KC
 RF Grid to Converter Grid 10 at 1000 KC
 Converter Grid to IF Grid 45 at 1000 KC
 Converter Grid to IF Grid 60 at 455 KC
 IF Grid to 6SF7 diode plates 110 at 455 KC
- (2) Audio Gains
 .16 volts, 400 cycles signal across volume control with control set to maximum will give approximately $\frac{1}{2}$ -watt speaker output.
- (3) DC voltage developed across oscillator grid resistor R4 averages 10 volts at 1000 KC or 8.0 volts at 10,000 KC.

Variations of $\pm 20\%$ permissible. All readings taken with minus $1\frac{1}{2}$ -volt fixed bias on AVC bus.

ALIGNMENT PROCEDURE

The location of trimmers is shown in Fig. 4. All oscillator and RF trimmers are accessible through a slot through the back cover of the cabinet.

The alignment procedure is given in table form. All IF alignments may be made with the chassis removed from the cabinet. However, the RF alignments are made with the

ALIGNMENT CHART

Step	Connect Test-Osc. to	Test-Osc. Setting	Pointer Setting	Adjust Trimmers for Maximum Output
1	6SF7 IF Grid in series with .05 mfd.	455 KC	"BC" Band 550 KC	C17 & C16
2	6SA7 Conv. grid in series with .05 mfd.	455 KC	"BC" Band 550 KC	C14 & C13
3	Capacity Coupled	580 KC	"BC" Band 580 KC	C11**
4	Capacity Coupled	1500 KC	"BC" Band 1500 KC	C8** (Osc.)
5	Repeat Step 3			
6	Capacity Coupled	5 MC	"SW1" Band	C7** (Osc.)
7	Capacity Coupled	17.8 MC	"SW2" Band 18 MC	C6* (Osc.)
8	Capacity Coupled	17.8 MC	"SW2" Band 18 MC	C1** (Ant.)

* Use minimum capacity peak.

** Rock gang condenser when making alignment.

Electrical Power Output

Undistorted.....	8.5 watts
Maximum.....	14 watts

Loud-speaker—PM Dynamic

Outside Cone Diameter.....	12 inches
Voice Coil Impedance (400 cycles).....	3.5 ohms

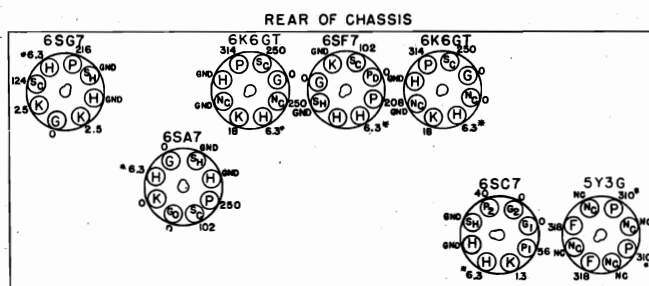
Phonograph Mechanism

Type Changer.....	Model LRP-158 or LRP-170
Type Pickup.....	Crystal
Turntable Speed.....	78 RPM

Tubes

RF Amplifier.....	GE-6SG7
Converter-Oscillator.....	GE-6SA7
IF Amplifier, AVC, Detector.....	GE-6SF7
Audio Amplifier, Phase Inverter.....	GE-6SC7
Audio Output.....	(2) GE-6K6GT
Rectifier.....	GE-5Y3G
Dial Lamps.....	(2) Mazda No. 44

chassis and loop antennas securely fastened in the cabinet, as the relative position of the loop antenna with respect to the chassis materially affects it. The RF signal should be capacity coupled by placing a two-foot wire for an antenna on the test-oscillator output post (high side). Keeping this antenna two feet or more from the receiver loop will generally insure freedom from too much coupling. Metal objects such as meters, tools, etc., should not be placed on top of the receiver cabinet.



VOLTAGES MEASURED BETWEEN TERMINALS AND CHASSIS AT 17V. LINE USING 1000 OHMS PER VOLT METER. * INDICATES VOLTS A.C.

Fig. 3. Socket Voltages

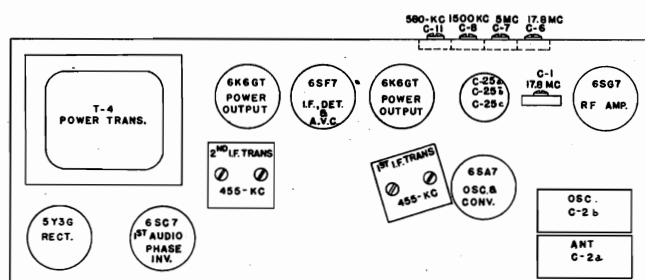
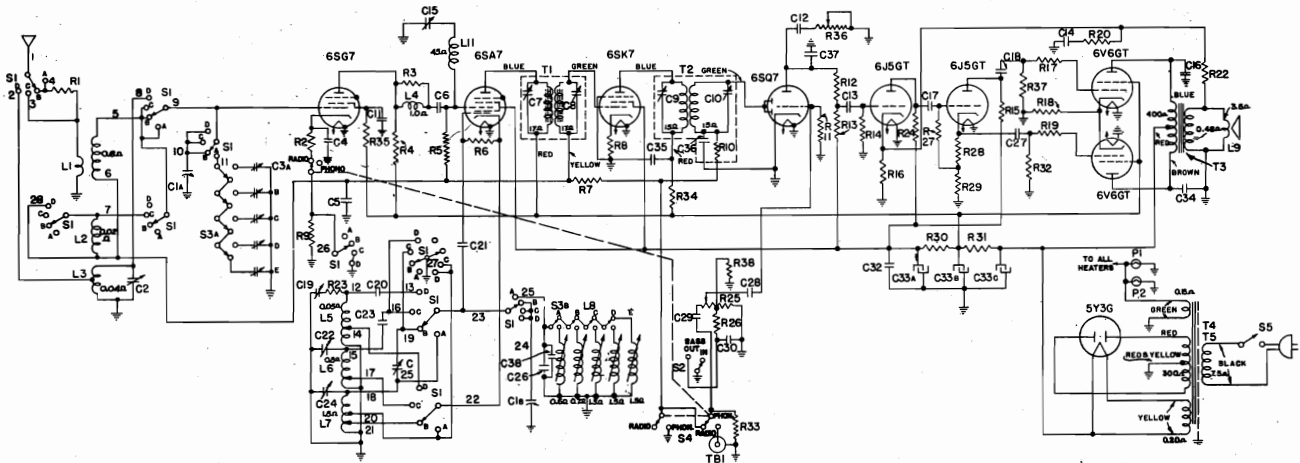


Fig. 4. Trimmer Location

MODEL L-915

GENERAL ELECTRIC CO.



RADIO REPLACEMENT PARTS LIST

Our Cat. Number	Symbol	Description	List Price
*RC-5165	C-33a	CAPACITOR—10 mfd. 300-V. dry electrolytic.	\$1.10
	C-33b	CAPACITOR—15 mfd. 300-V. dry electrolytic.	
	C-33c	CAPACITOR—300 mfd. 350-V dry electrolytic.	
*RC-191	C-34	CAPACITOR—.002 mfd. 1000-V paper.	.35
*RC-039	C-35	CAPACITOR—.01 mfd. 600-V paper.	.25
*RC-252	C-36	CAPACITOR—200 mmf., mica.	.30
*RC-249	C-37	CAPACITOR—220 mmf., mica.	.25
RC-327	C-38	CAPACITOR—82 mmf., compensating cap.	.25
*RQ-1259	R-1	RESISTOR—1000 ohm $\frac{1}{2}$ -W carbon.	.70-5
*RQ-1243	R-2	RESISTOR—220 ohm $\frac{1}{2}$ -W carbon.	.70-5
*RQ-1283	R-3	RESISTOR—10,000 ohm $\frac{1}{2}$ -W carbon.	.70-5
*RQ-1275	R-4	RESISTOR—4700 ohm $\frac{1}{2}$ -W carbon.	.70-5
*RQ-1299	R-5	RESISTOR—47,000 ohm $\frac{1}{2}$ -W carbon.	.70-5
*RQ-1291	R-6	RESISTOR—22,000 ohm $\frac{1}{2}$ -W carbon.	.70-5
*RQ-1339	R-7	RESISTOR—2.2 megohms $\frac{1}{2}$ -W carbon.	.70-5
*RQ-1239	R-8	RESISTOR—150 ohm $\frac{1}{2}$ -W carbon.	.70-5
*RQ-1251	R-9	RESISTOR—470 ohm $\frac{1}{2}$ -W carbon.	.70-5
*RQ-1299	R-10	RESISTOR—47,000 ohm $\frac{1}{2}$ -W carbon.	.70-5
*RQ-1355	R-11	RESISTOR—10 megohm $\frac{1}{2}$ -W carbon.	.70-5
*RQ-1308	R-12	RESISTOR—100,000 ohm $\frac{1}{2}$ -W carbon.	.70-5
*RQ-1317	R-13	RESISTOR—270,000 ohm $\frac{1}{2}$ -W carbon.	.70-5
*RQ-1323	R-14	RESISTOR—470,000 ohm $\frac{1}{2}$ -W carbon.	.70-5
*RQ-1295	R-15	RESISTOR—33,000 ohm $\frac{1}{2}$ -W carbon.	.70-5
*RQ-1283	R-16	RESISTOR—10,000 ohm $\frac{1}{2}$ -W carbon.	.70-5
*RQ-1259	R-17	RESISTOR—1000 ohm $\frac{1}{2}$ -W carbon.	.70-5
*RQ-1433	R-18	RESISTOR—180 ohm 1-W carbon.	.20
*RQ-1259	R-19	RESISTOR—1000 ohm $\frac{1}{2}$ -W carbon.	.70-5
*RQ-1265	R-20	RESISTOR—1800 ohm $\frac{1}{2}$ -W carbon.	.70-5
*RQ-1283	R-22	RESISTOR—10,000 ohm $\frac{1}{2}$ -W carbon.	.70-5
*RQ-1221	R-23	RESISTOR—27 ohm $\frac{1}{2}$ -W carbon.	.70-5
*RQ-1309	R-24	RESISTOR—120,000 ohm $\frac{1}{2}$ -W carbon.	.70-5
RV-137	R-25	VOLUME CONTROL—2 meg. volume control.	.95
*RQ-1311	R-26	RESISTOR—150,000 ohm $\frac{1}{2}$ -W carbon.	.70-5
*RQ-1323	R-27	RESISTOR—470,000 ohm $\frac{1}{2}$ -W carbon.	.70-5
*RQ-1269	R-28	RESISTOR—2700 ohm $\frac{1}{2}$ -W carbon.	.70-5
*RQ-1295	R-29	RESISTOR—30,000 ohm $\frac{1}{2}$ -W carbon.	.70-5
*RQ-673	R-30	RESISTOR—8200 ohm 2-W carbon.	.20
*RQ-765	R-31	RESISTOR—1800 ohm 3-W carbon.	.20
*RQ-1323	R-32	RESISTOR—470,000 ohm $\frac{1}{2}$ -W carbon.	.70-5
*RQ-1315	R-33	RESISTOR—220,000 ohm $\frac{1}{2}$ -W carbon.	.70-5
*RQ-1259	R-34	RESISTOR—1000 ohm $\frac{1}{2}$ -W carbon.	.70-5
*RQ-1293	R-35	RESISTOR—27,000 ohm $\frac{1}{2}$ -W carbon.	.70-5
RT-724	R-36, S5	ONE CONTROL—Treble tone control and power switch.	1.45
*RQ-1323	R-37, 38	RESISTOR—470,000 ohm $\frac{1}{2}$ -W carbon.	.70-5
RL-582	L-1	BEAM-A-SCOPE—"B" band loop assembly.	3.25
RL-1017	L-2	COIL—"C" band antenna coil.	.20
RL-583	L-3	BEAM-A-SCOPE—"D" band loop assembly.	.45
RL-372	L-4	CHOKER—RF interstage choke.	.20
RL-2067	L5, 6, 7	COIL—"D," "C" and "B" bands osc. coil.	1.05
*RL-9528	L-8a, b, c, d, e	COIL—Station selector trimmer coil assembly.	4.80
RS-3131	S-1	SWITCH—Band change switch.	1.35
*RS-3108	S-2	SWITCH—Bass-tone control switch.	.20

Prices subject to change without notice.

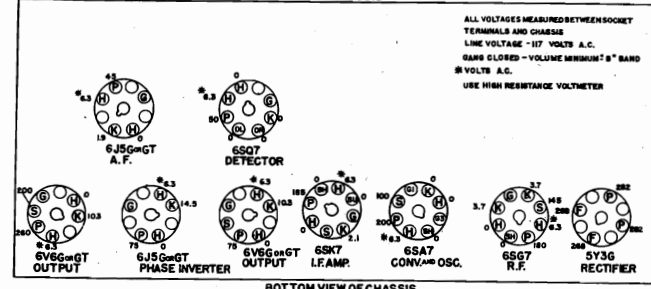
RADIO REPLACEMENT PARTS LIST

Our Cat. Number	Symbol	Description	List Price
RC-7063	C1a, 1b	CONDENSER—Tuning condenser.	\$2.00
*RC-6537	C2	CAPACITOR—"D" band trimmer.	.25
RT-886	C-3 a, b, c, d, e	TRIMMER STRIP—Station selector trimmer strip.	.95
*RC-072	C-4	CAPACITOR—.05 mfd. 200 V paper.	.25
*RC-096	C-5	CAPACITOR—.01 mfd. 200-V paper.	.30
*RC-235	C-6	CAPACITOR—100 mmf. mica.	.25
*RC-048	C-11	CAPACITOR—.02 mfd. 600-V paper.	.30
*RC-023	C-12	CAPACITOR—.005 mfd. 600-V paper.	.25
*RC-048	C-13, 14	CAPACITOR—.02 mfd. 600-V paper.	.30
*RC-191	C-16	CAPACITOR—.002 mfd. 1000-V paper.	.35
*RC-060	C-17, 18	CAPACITOR—.03 mfd. 600-V paper.	.25
RT-887	C-19	TRIMMER STRIP—"D" band osc. trimmer. (Part of C-22, 24).	.40
*RC-396	C-20	CAPACITOR—5600 mmf., mica.	.45
*RC-216	C-21	CAPACITOR—47 mmf. mica.	.25
RT-887	C-22	TRIMMER STRIP—"C" band osc. trimmer. (Part of C-19, 24).	.40
*RC-349	C-23	CAPACITOR—2000 mmf., mica.	.30
RT-887	C-24	TRIMMER STRIP—"B" band osc. trimmer. (Part of C-19, 22).	.40
RC-6556	C-25	CAPACITOR—"B" band padder.	.30
RC-304	C-26	CAPACITOR—720 mmf. silvered mica.	.30
*RC-060	C-27	CAPACITOR—.03 mfd. 600-V paper.	.25
*RC-048	C-28	CAPACITOR—.02 mfd. 600-V paper.	.30
*RC-023	C-29	CAPACITOR—.005 mfd. 600-V paper.	.25
*RC-011	C-30	CAPACITOR—.002 mfd. 600-V paper.	.25
*RC-039	C-32	CAPACITOR—.01 mfd. 600-V paper.	.25

* Used on previous receivers.

Our Cat. Number	Symbol	Description	List Price
RS-3132	S-3a, b, and c	SWITCH—Push button switch (switch only).	\$1.80
RT-3013	T-1	TRANSFORMER—1st I.F. transformer.	1.20
RT-3014	T-2	TRANSFORMER—2nd I.F. transformer.	1.25
*RT-485	T-3	TRANSFORMER—Output transformer.	1.10
*RT-0813	T-4	TRANSFORMER—50-60 cycle power transformer.	3.10
*RT-0815	T-5	TRANSFORMER—25-cycle power transformer.	7.80
RS-1075	L-9	SPEAKER—14 inch dynapower speaker.	5.30
RM-409	L-11, C-15	WAVE TRAP—Wave-trap assembly.	.50

FRONT OF CHASSIS



Loud-speaker-PM Dynamic

Outside Cone Diameter.....14 inches
Voice Coil Impedance (400 cycles).....3.5 ohms

Electrical Rating

Rating "A"—110-125 volts AC, 50-60 cycles, 90 watts
Rating "C"—110-125 volts AC, 25 cycles, 90 watts

GENERAL ELECTRIC CO.

MODEL L-915

MODELS L-915W, L-916

Stock No.	Symbol	Description	List Price
*RQ-1323	R-37, 38	RESISTOR—470,000 ohm $\frac{1}{2}$ -W carbon.	\$0.70-5
*RL-582	L-1	BEAM-A-SCOPE—"B" band loop assembly.	3.25
*RL-1017	L-2	COIL—"C" band antenna coil.	.20
*RL-583	L-3	BEAM-A-SCOPE—"D" band loop assembly.	.45
*RL-372	L-4	CHOKE—RF interstage choke.	.20
*RL-2067	L-5-6-7	COIL—"D" "C" and "B" bands oscillator coil.	1.05
*RL-9528	L-8a, b, c, d, e	COIL—Station selector trimmer coil.	4.80
*RS-3131	S-1	SWITCH—Band change switch.	1.35
*RS-3108	S-2	SWITCH—Bass-tone control switch.	.20
*RS-3132	S-3a, b, and c	SWITCH—Push button switch (switch only).	1.80
*RT 3013	T-1	TRANSFORMER—1st I.F. transformer.	1.20
*RT-3014	T-2	TRANSFORMER—2nd I.F. transformer.	1.25
RT-4023	T-3	TRANSFORMER—Output transformer.	1.50
RT-0911	T-4	TRANSFORMER—50-60 cycle power transformer.	5.25
RS-1085	L-10	SPEAKER—14 inch dynamic speaker.	6.50
RW-409	L-11	WAVE TRAP—Wave trap assembly.	.50
	C-15		

MISCELLANEOUS PARTS

*RB-026	BOARD—Antenna terminal board.	\$0.10
*RB-094	BOARD—7 lug terminal board.	.10
*RB-096	BOARD—3 lug terminal board.	.10
*RB-1030	BOARD—Phono terminal board.	.10
*RB-1046	BOARD—3 lug terminal board.	.10
*RC-863	CORD—Power cord.	.75
*RC-1987	CLAMP—Oscillator coil clamp.	.05-2
*RC-2015	CLAMP—Dial scale mtg. clamp.	.10-5
*RC-2021	CORE—Station coil tuning core.	.10

* Used on previous receivers.

Cabinet Dimensions

Model.....	L915W.....	L916
Height.....	40 in.....	40 in.
Width.....	29 $\frac{1}{4}$ in.....	29 $\frac{1}{4}$ in.
Depth.....	13 $\frac{7}{8}$ in.....	14 $\frac{1}{8}$ in.

Electrical Rating

Rating "A"—110-125 volts, a-c, 50-60 cycles, 100 watts.
 Rating "C"—110-125 volts, a-c, 25 cycles, 100 watts.

Tuning Frequency Range

"BC" Band.....	550-1700 KC
"SW1" Band.....	1.7-5.5 MC
"SW2" Band.....	5.5-18.0 MC

Intermediate Frequency..... 455 KC

Electrical Power Output

Undistorted.....	.6 watts
Maximum.....	.9 watts

Loudspeaker—Electrodynamic

Outside cone diameter.....	14 inches
Voice coil impedance (400 cycles).....	5.0 ohms

Tubes

RF Amplifier.....	GE-6SG7
Converter-Oscillator.....	GE-6SA7
IF Amplifier.....	GE-6SK7
Detector, AVC & 1st Audio.....	GE-6SQ7
2nd Audio.....	GE-6J5GT
Phase Inverter.....	GE-6J5GT
Power Output.....	(2) GE-6V6GT
Rectifier.....	GE-5Y3G
Pilot Lamp.....	(2) MA2DA No. 44

GENERAL INFORMATION

Models L915W and L916 are electrically identical and only vary in cabinet and dial scale treatment.

In Model L915W, electrodynamic speaker RS1092 (marked K33J371) was substituted for a portion of the production in place of the speaker listed in the parts list (marked K-33J365). Since this substitute speaker has a field coil resistance of 400 ohms instead of 500 ohms as shown on the schematic diagram, a 100 ohm resistor, RQ621, is added in series with the speaker field coil to maintain proper socket

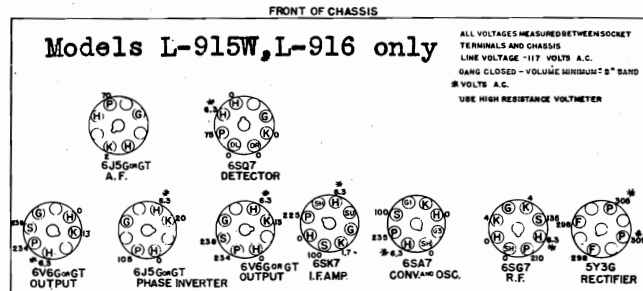


Fig. 3. Socket Voltages

voltages whenever this substitute speaker is used. When replacing the cone for either speaker, use Stock No. RC9045.

ALIGNMENT PROCEDURE

The location of all trimmers is shown in Fig. 4. All oscillator and RF trimmers are accessible from the back of the receiver.

The alignment procedure is given in table form. All IF alignment may be made with the chassis removed from the cabinet. However, the RF alignments are made with the chassis and loop antennas securely bolted in the cabinet, as the relative position of the loop antennas with respect to the chassis materially affects the alignment. The RF signal should be capacity coupled by placing a two-foot wire for an antenna on the test oscillator output post (high side). Keeping this antenna two feet or more from the receiver loop will generally assure freedom from too much coupling.

ALIGNMENT CHART

Step	Connect Test-Osc. To	Test Osc. Setting	Pointer Setting	Adjust Trimmers for Maximum Output
1	6SK7 IF grid in series with .05 mfd.	455 KC	"BC" Band 550 KC	C10 & C9
2	6SA7 converter grid in series with .05 mfd.	455 KC	"BC" Band 550 KC	C8 & C7
3	6SQ7 RF grid in series with .05 mfd.	455 KC	"BC" Band 550 KC	C15***
4	Capacity Coupled	580 KC	"BC" Band 580 KC	C25**
5	Capacity Coupled	1500 KC	"BC" Band 1500 KC	C24** (Osc.)
6	Repeat Step 4			
7	Capacity Coupled	5 MC	"SW1" Band 5.0 MC	C22** (Osc.)
8	Capacity Coupled	18 MC	"SW2" Band 18.0 MC	C19* (Osc.)
9	Capacity Coupled	18 MC	"SW2" Band 18.0 MC	C2** (Ant.)

* Use minimum capacity peak.

** Rock gang condenser when making alignment.

*** Peak for minimum output.

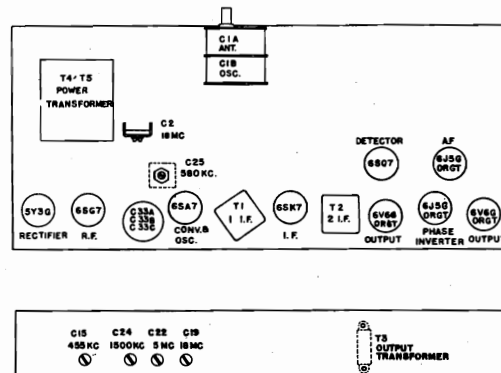


Fig. 4. Trimmer Location

GENERAL ELECTRIC CO.

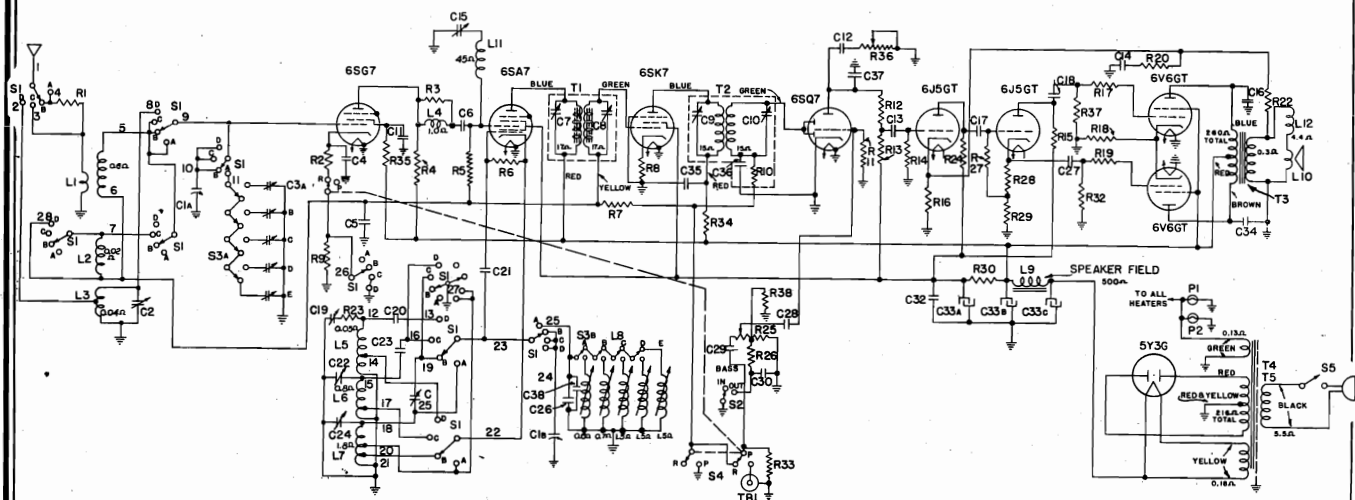


Fig. 1. Schematic Diagram

MODELS L-915W, L-916

IF 455 K.C.

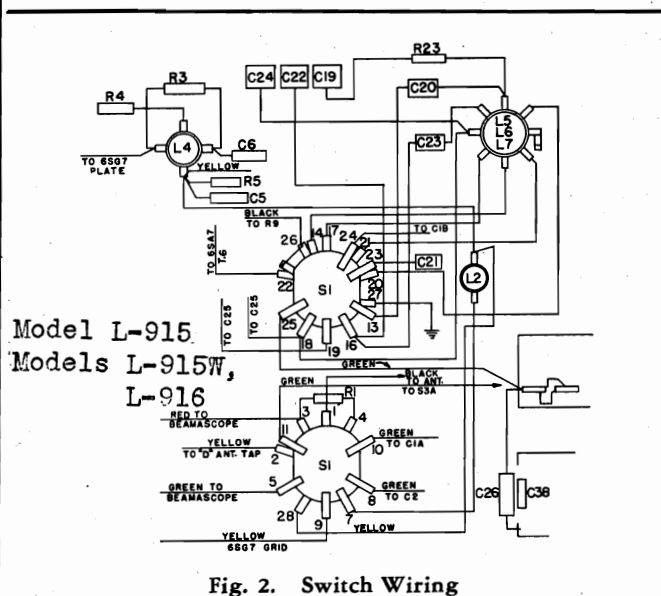


Fig. 2. Switch Wiring

Stock No.	Symbol	Description	List Price
*RC-7063	C1a, 1b	CONDENSER—Tuning condenser...	\$2.00
*RC-6537	C2	CAPACITOR—"D" band trimmer...	.25
*RT-886	C-3a, b, c, d, e	TRIMMER STRIP—Station selector trimmer strip...	.95
*RC-092	C-4	CAPACITOR—.05 mfd. 600V paper...	.30
*RC-096	C-5	CAPACITOR—.01 mfd. 200-V paper...	.30
*RC-235	C-6	CAPACITOR—100 mmf. mica...	.25
*RC-048	C-11	CAPACITOR—.02 mfd. 600-V paper...	.30
*RC-023	C-12	CAPACITOR—.005 mfd. 600-V paper...	.25
*RC-048	C-13, 14	CAPACITOR—.02 mfd. 600-V paper...	.30
*RC-191	C-16	CAPACITOR—.002 mfd. 1000-V paper...	.35
*RC-060	C-17, 18	CAPACITOR—.03 mfd. 600-V paper...	.25
*RT-887	C-19	TRIMMER STRIP—"D" band osc. trimmer (Part of C-22, 24)...	.40
*RC-396	C-20	CAPACITOR—5600 mmf., mica...	.45
*RC-216	C-21	CAPACITOR—47 mmf. mica...	.25
*RT-887	C-22	TRIMMER STRIP—"C" band osc. trimmer (Part of C-19, 24)...	.40
*RC-349	C-23	CAPACITOR—2000 mmf., mica...	.30
*RT-887	C-24	TRIMMER STRIP—"B" band osc. trimmer (Part of C-19, 22)...	.40
*RC-6556	C-25	CAPACITOR—"B" band padder...	.30
*RC-304	C-26	CAPACITOR—720 mmf., silvered mica...	.30
*RC-060	C-27	CAPACITOR—.03 mfd. 600-V paper...	.25
*RC-048	C-28	CAPACITOR—.02 mfd. 600-V paper...	.30

* Used on previous receivers.

Stock No.	Symbol	Description	List Price
*RC-023	C-29	CAPACITOR—.005 mfd. 600-V paper	\$0.25
*RC-011	C-30	CAPACITOR—.002 mfd. 600-V paper	.25
*RC-039	C-32	CAPACITOR—.01 mfd. 600-V paper...	.25
RC-5204	C-33a	CAPACITOR—10 mfd. 300 V dry electrolytic	1.30
	C-33b	CAPACITOR—15 mfd. 400 V dry electrolytic	
	C-33c	CAPACITOR—15 mfd. 400 V dry electrolytic	
*RC-191	C-34	CAPACITOR—.002 mfd. 1000-V paper	.35
*RC-039	C-35	CAPACITOR—.01 mfd. 600-V paper...	.25
*RC-252	C-36	CAPACITOR—200 mmf., mica...	.30
*RC-249	C-37	CAPACITOR—220 mmf., mica...	.25
*RC-327	C-38	CAPACITOR—82 mmf., compensating cap.	.25
*RQ-1259	R-1	RESISTOR—1000 ohm 1/2-W carbon	.70-5
*RQ-1243	R-2	RESISTOR—220 ohm 1/2-W carbon	.70-5
*RQ-1283	R-3	RESISTOR—10,000 ohm 1/2-W carbon	.70-5
*RQ-1275	R-4	RESISTOR—4700 ohm 1/2-W carbon...	.70-5
*RQ-1299	R-5	RESISTOR—47,000 ohm 1/2-W carbon	.70-5
*RQ-1291	R-6	RESISTOR—22,000 ohm 1/2-W carbon	.70-5
*RQ-1339	R-7	RESISTOR—2.2 megohms 1/2-W carbon	.70-5
*RQ-1239	R-8	RESISTOR—150 ohm 1/2-W carbon...	.70-5
*RQ-1251	R-9	RESISTOR—470 ohm 1/2-W carbon...	.70-5
*RQ-1299	R-10	RESISTOR—47,000 ohm 1/2-W carbon	.70-5
*RQ-1355	R-11	RESISTOR—10 megohm 1/2-W carbon	.70-5
*RQ-1308	R-12	RESISTOR—100,000 ohm 1/2-W carbon	.70-5
*RQ-1317	R-13	RESISTOR—270,000 ohm 1/2-W carbon	.70-5
*RQ-1323	R-14	RESISTOR—470,000 ohm 1/2-W carbon	.70-5
*RQ-1295	R-15	RESISTOR—33,000 ohm 1/2-W carbon	.70-5
*RQ-1283	R-16	RESISTOR—10,000 ohm 1/2-W carbon	.70-5
*RQ-1259	R-17	RESISTOR—1000 ohm 1/2-W carbon	.70-5
*RQ-1435	R-18	RESISTOR—200 ohm 1-W carbon...	.15
*RQ-1259	R-19	RESISTOR—1000 ohm 1/2-W carbon...	.70-5
*RQ-1265	R-20	RESISTOR—1800 ohm 1/2-W carbon...	.70-5
*RQ-1283	R-22	RESISTOR—10,000 ohm 1/2-W carbon	.70-5
*RQ-1221	R-23	RESISTOR—27 ohm 1/2-W carbon...	.70-5
*RQ-1309	R-24	RESISTOR—120,000 ohm 1/2-W carbon	.70-5
*RV-137	R-25	VOLUME CONTROL—2 meg. volume control	.95
*RQ-1311	R-26	RESISTOR—150,000 ohm 1/2-W carbon	.70-5
*RQ-1323	R-27	RESISTOR—470,000 ohm 1/2-W carbon	.70-5
*RQ-1269	R-28	RESISTOR—2700 ohm, 1/2-W carbon	.70-5
*RQ-1295	R-29	RESISTOR—30,000 ohm, 1/2-W carbon	.70-5
*RQ-685	R-30	RESISTOR—12,000 ohm 2-W carbon	.25
*RQ-1323	R-32	RESISTOR—470,000 ohm 1/2-W carbon	.70-5
*RQ-1315	R-33	RESISTOR—220,000 ohm 1/2-W carbon	.70-5
*RQ-1259	R-34	RESISTOR—1000 ohm 1/2-W carbon...	.70-5
*RQ-1299	R-35	RESISTOR—47,000 ohm 1/2-W carbon	.70-5
*RT-724	R-36, S5	TONE CONTROL—Treble tone control and power switch...	1.45

Prices subject to change without notice.

IF PEAK 455 KC

ELECTRICAL PARTS DESCRIPTION

Symbol	Description	Symbol	Description	Symbol	Description	Symbol	Description	Symbol	Description
CAPACITORS	.01 mfd. 400 V paper	C30c	20 mfd. 250 V dry electrolytic	R3	390,000 ohm, $\frac{1}{4}$ -W carbon	R26	3.9 meg, $\frac{1}{4}$ -W carbon	MISCELLANEOUS	Male photo plug
	.001 mfd. 600 V paper	C30d	20 mfd. 25 V dry electrolytic	R4	22 ohm, $\frac{1}{4}$ -W carbon	R27	560,000 ohm, $\frac{1}{4}$ -W carbon		Photo motor connector
	"B" and "C" antenna trimmer	C32	.01 mfd. 200 V paper	R5	2.2 megohm, $\frac{1}{4}$ -W carbon	R28	100,000 ohm, $\frac{1}{4}$ -W carbon		Band change switch
	Antenna trimmer strip	C33	.02 mfd. 200 V paper	R6	470,000 ohm, $\frac{1}{4}$ -W carbon	R29	15,000 ohm, $\frac{1}{4}$ -W carbon		Tone control and power switch
	Oscillator trimmer strip	C34	.05 mfd. 200 V paper	R7	47,000 ohm, $\frac{1}{4}$ -W carbon	R30	470 ohm, $\frac{1}{4}$ -W carbon		Antenna coil (all bands)
	5600 mfm., mica	C35	220 mfm. mica	R8	82,000 ohm, $\frac{1}{4}$ -W carbon				Oscillator coil (all bands)
	1800 mfm., mica	C36	.004 mfd. 600 V paper	R9	10 megohm, $\frac{1}{4}$ -W carbon				1.1:1 F. transformer
	45 mfm. compensating capacitor	C37	.005 mfd. 200 V paper	R10	470,000 ohm, $\frac{1}{4}$ -W carbon				Output transformer
	2-gang tuning condenser	C38	.03 mfd. 600 V paper	R11	3300 ohm, $\frac{1}{4}$ -W carbon				50/60-cycle power transformer
	40 mfm. compensating capacitor	C39	.05 mfd. 200 V paper	R12	2 meg. volume control	PL-2			12-inch PM speaker
RESISTORS	.05 mfd. 300 V paper	C40	.05 mfd. 200 V paper	R13	1 megohm, $\frac{1}{4}$ -W carbon	PL-1			
	40 mfd. 300 V dry electrolytic	C41	.03 mfd. 600 V paper	R14	220 ohm, 2-W carbon	S2a, 2b			
	50 mfd. 250 V dry electrolytic	C42	.005 mfd. 600 V paper	R15	4.7 meg., $\frac{1}{4}$ -W carbon				
		C43	.02 mfd. 600 V AC	R16	68,000 ohm, $\frac{1}{4}$ -W carbon	L1			
		C44	.05 mfd. 400 V paper	R17	3900 ohm, 1-W carbon	L2			
		C45	.01 mfd. 400 V paper	R18	2700 ohm, 2-W carbon	L3			
				R19	1000 ohm, $\frac{1}{4}$ -W carbon	T1			
				R20	150,000 ohm, $\frac{1}{4}$ -W carbon	T2			
				R21	56,000 ohm, $\frac{1}{4}$ -W carbon	T3			
				R22	270,000 ohm, $\frac{1}{4}$ -W carbon	T4			
		R1	33,000 ohm, $\frac{1}{4}$ -W carbon	R23	1000 ohm, $\frac{1}{4}$ -W carbon				
		R2	100 ohm, $\frac{1}{4}$ -W carbon	R24, 25	220 ohm, 2-W carbon	SPKR			

Fig. 3. Schematic Wiring Diagram

MODEL X-1708

GENERAL ELECTRIC CO.

FOR OAK RECORD CHANGER DATA
SEE RIDER'S "AUTOMATIC RECORD
CHANGERS AND RECORDERS".

Power Requirements

POWER SUPPLY		Frequency Cycles AC	Power Consumption (Watts)
Tap	Voltage Range		
110	103-117	50-60	90
125	117-133		
200	185-215		
230	215-240		
250	240-260		

The power transformer is provided with five voltage taps. Instant tap switching is made by a simple pin plug and jack device. For correct operation, measure the power supply voltage, note which voltage range covers this voltage and using the corresponding tap, insert the plug in the jack.

SPECIAL SERVICE INFORMATION

The following information will be very useful in servicing receivers if a vacuum tube voltmeter or similar voltage measuring instrument is available.

NOTE—Connection to converter grid must be made directly to tube grid and not to gang condenser on spread bands.

(1) Stage gains

- (a) Antenna Post to Converter Grid, through 400 ohms and 200 mmfd. in series, at

Stand.	1000 KC.....5.4	31 M.... 9.6 MC....1.8
SW1	4000 KC.....3.7	25 M....11.8 MC....1.6
SW2	18000 KC.....1.1	19 M....15.22 MC....1.4
		16-13 M....17.8 MC....1.0

- (b) RF on Converter Grid to IF on 6SG7 grid at

Stand.	1000 KC.... 61	31 M.... 9.6 MC....65
SW1	4000 KC.... 63	25 M....11.8 MC....68
SW2	18000 KC.... 71	19 M....15.22 MC....71
		16-13 M....17.8 MC....71

- (c) IF on Converter Grid to IF on 6SG7 grid at 455 KC—85

- (d) IF Grid to diode plate at 455 KC—160

- (2) Voltage across the diode load to give ½-watt speaker output at 400 cycles—.046 V.

- (3) DC voltage developed across oscillator grid resistor (R1) at

Stand.	1000 KC..8.3 V.	31 M....4.4 V.
SW1	4000 KC..7.7 V.	25 M....4.8 V.
SW2	18000 KC..5.0 V.	19 M....4.4 V.
		16-13 M....3.7 V.

Variations of ±20% permissible. All measurements taken with R-26 shorted across.

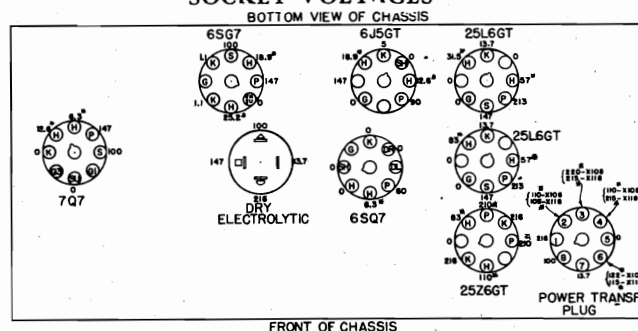
Electrical Power Output

Undistorted with proper voltage at tap on power transformer—6 watts.

Maximum with proper voltage at tap on power transformer—6.5 watts.

Loud-speaker

The voice coil is accurately and permanently centered at the factory and should seldom give trouble. In case a voice coil needs recentering, it will be necessary to replace the entire cone and voice coil assembly. In no case should you attempt to move the magnet in the assembly.

SOCKET VOLTAGES

Voltages indicated by asterisk (*) are AC voltages
DC voltages measured between socket terminals and chassis
Voltages measured on 1000 ohms/volt meter on 500 volt scale
Gang closed, no signal input
Band switch turned to standard broadcast band

Fig. 2

Loud-speaker—PM Dynamic

Cone Diameter..... 12 inches
Voice Coil Impedance (400 cycles)..... 3.5 ohms

Tubes

Converter-Oscillator..... GE-7Q7
IF Amplifier..... GE-6SG7
Detector, AVC, 1st Audio..... GE-6SQ7
Phase Inverter..... GE-6J5GT
Power Output..... (2) GE-25L6GT
Rectifier..... GE-25Z6GT
Tuning Indicator..... GE-6U5
Pilot Lamps..... (2) Mazda No. 44

GENERAL INFORMATION

The Model X-1708 is a seven-band receiver employing eight tubes in a superheterodyne circuit. Four of these bands are spread bands which allow taking the most important portions of the "SW2" band and expanding them for ease in tuning the short-wave stations.

It is designed for operation on 50 or 60 cycle AC sources ranging from 103 to 260 volts. See **Power Requirements**.

Automatic Record Changer

The record changer will automatically play seven 12-inch or eight 10-inch records at one loading. It is shipped for operation on a 110-volt 50-cycle power supply but can be converted for use on a 110-volt 60-cycle power supply by changing the motor spindle bushing. The 60-cycle bushing is slightly smaller in diameter than the 50-cycle bushing, and is tied to the underside of the record changer frame. To replace, unscrew the setscrew on the motor spindle bushing (which drives the turntable drive wheel), and replace with the bushing for 60-cycle operation. Be sure the setscrew matches with the depression on the motor shaft, and is securely tightened. When properly installed, the top of the bushing should be just a fraction below the top of the motor shaft.

NOTE: Regardless of choice of tap on the power transformer, the phonograph motor is fed 110 volts.

GENERAL ELECTRIC CO.

Alignment Procedure

The SW2 band does not require alignment. This band is taken care of when the 16-meter spread-band is aligned.

Spread-band Alignment

The calibration of the test oscillator may be checked by zero beating the test oscillator with a short-wave station of known frequency. By taking several of these calibration points, it will afford a calibration of a high degree of accuracy in case you wish to use the test oscillator for alignment in these bands.

ALIGNMENT CHART

* Use minimum capacity peak if two are obtainable.
 ** Rock gang condenser for optimum peak.
 *** Use maximum capacity peak if two are obtainable.

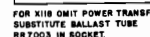


Fig. 1. Trimmer Locations

BAND CHANGE AND TONE CONTROL SWITCHING

BAND SWITCH CONNECTIONS

BAND SWITCH CONNECTIONS

TONE CONTROL SWITCH CONNECTIONS

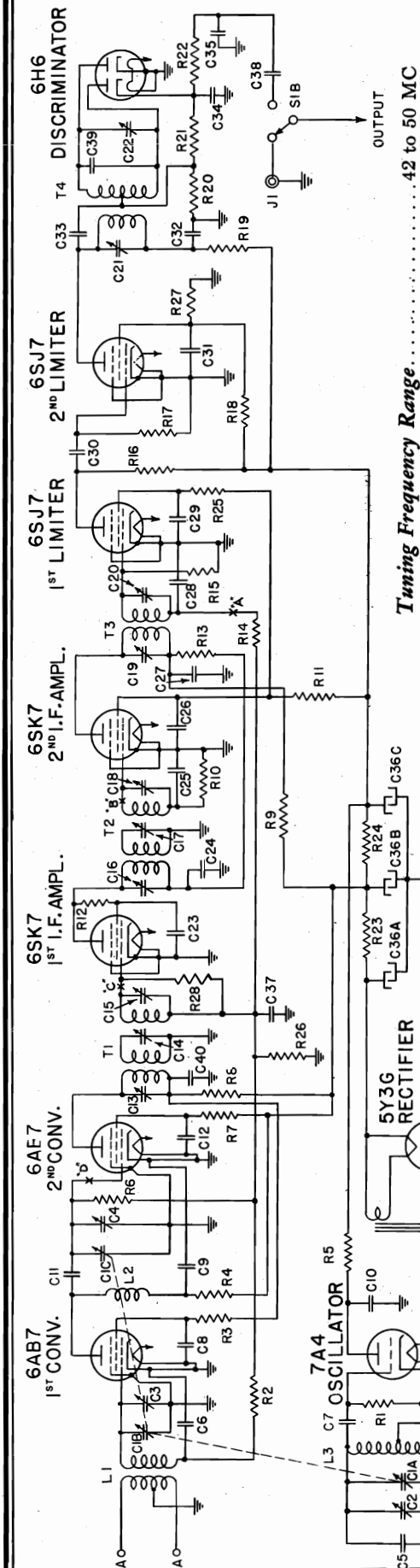
Intermediate Frequency..... 455 KC

Tuning Frequency Range

"BC" Band.....	540-1700 KC
"SW1" Band.....	2.2-6.8 MC
"SW2" Band.....	6.8-21.0 MC
31 Meter Band.....	9.36-9.8 MC
25 Meter Band.....	11.6-12.5 MC
19 Meter Band.....	14.9-17.3 MC
16 and 13 Meter Band.....	17.7-22.2 MC



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Tuning Frequency Range.....42 to 50 MC

Intermediate Frequency.....4.3 MC

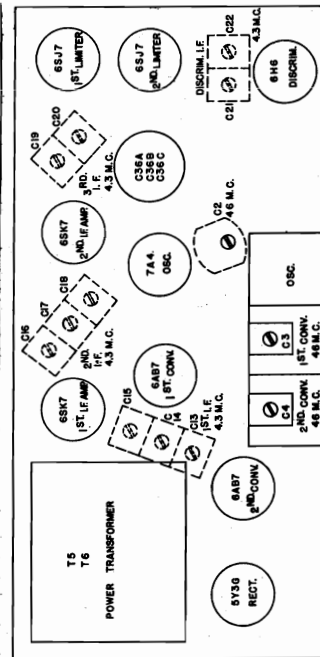


Fig. 1. Tube and Trimmer Location

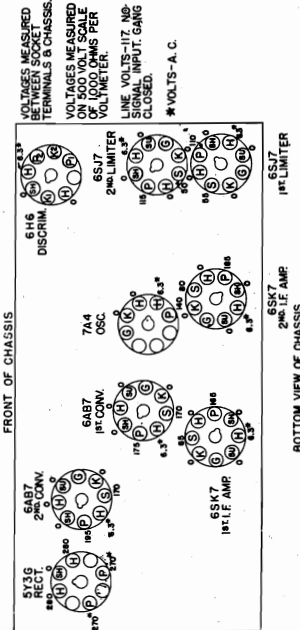


Fig. 2. Socket Voltages

0.02 mfd. paper capacitor
8. mfd. temperature compensating capacitor
0.01 mfd. paper capacitor
Antenna coil
Interconverter coil
Oscillator coil

Dial lamp, MAZDA No. 44
33,000 ohms carbon resistor
3.3 megohms carbon resistor
6800 ohms carbon resistor
2000 ohms carbon resistor
1000 ohms carbon resistor
3.3 megohms carbon resistor
12,000 ohms carbon resistor
1000 ohms carbon resistor
1000 ohms carbon resistor
47,000 ohms carbon resistor
15,000 ohms carbon resistor
22,000 ohms carbon resistor
2200 ohms carbon resistor
2.2 megohms carbon resistor
47,000 ohms carbon resistor
10,000 ohms carbon resistor
180,000 ohms carbon resistor
68,000 ohms carbon resistor
22,000 ohms carbon resistor
100,000 ohms carbon resistor
100,000 ohms carbon resistor
100,000 ohms carbon resistor
1200 ohms 7.4 W. wire wound resistor
3300 ohms 1 W. carbon resistor
47,000 ohms carbon resistor
470,000 ohms carbon resistor
47,000 ohms carbon resistor
47,000 ohms carbon resistor
Power switch
FM-Phono switch
1st I.F. transformer
2nd I.F. transformer
Discriminator I.F. transformer
Power transformer for 50-60 cycles
Power transformer for 25 cycles

C38
C39
C40
L1
L2
L3
P1
P2
P3
P4
P5
P6
P7
P8
P9
P10
P11
P12
P13
P14
P15
P16
P17
P18
P19
P20
P21
P22
P23
P24
P25
P26
P27
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P29
P30
P31
P32
P33
P34
P35
P36
P37

Symbol	Description
C1a	Oscillator section of tuning condenser
C1b	1st converter section of tuning condenser
C1c	2nd converter section of tuning condenser
C2	5-24 mmf. oscillator air trimmer
C3	2-20 mmf. 1st converter trimmer
C4	2-20 mmf. 2nd converter trimmer
C5	40 mmf. temperature compensating capacitor
C6	470 mmf. mica capacitor
C7	50 mmf. temperature compensating capacitor
C8	470 mmf. mica capacitor
C9	470 mmf. mica capacitor
C10	470 mmf. mica capacitor
C11	470 mmf. mica capacitor
C12	0.1 mfd. paper capacitor
C23	0.1 mfd. paper capacitor
C24	0.1 mfd. paper capacitor
C25	47 mmf. mica capacitor
C26	0.1 mfd. paper capacitor
C27	0.1 mfd. paper capacitor
C28	47 mmf. mica capacitor
C29	47 mmf. mica capacitor
C30	22 mmf. mica capacitor
C31	47 mmf. mica capacitor
C32	47 mmf. mica capacitor
C33	50 mmf. temperature compensating capacitor
C34	47 mmf. mica capacitor
C35	220 mmf. mica capacitor
C36a	15 mfd. dry electrolytic
C36b	30 mfd. dry electrolytic
C36c	10 mfd. dry electrolytic
C37	0.1 mfd. paper capacitor

GENERAL ELECTRIC CO.

Amplitude modulation, as the name implies, is a method of superimposing the audio frequencies on a constant amplitude radio frequency carrier so as to vary the carrier amplitude at the audio frequency rate. To illustrate: Suppose we amplitude-modulate a radio frequency carrier with a 400 cycle audio tone. When the audio tone is going through the positive portion of its cycle, its voltage will add to the carrier voltage. When the audio tone goes through the negative portion of its cycle, its voltage will subtract from the carrier voltage. The resultant voltage will be equal to the carrier voltage plus or minus the varying audio voltage and will swing from a maximum to a minimum and back to a maximum every 1/400 of a second. The frequency of the carrier remains fixed.

With frequency modulated signals the carrier amplitude remains fixed and the carrier frequency is varied—just the reverse of amplitude modulation. To illustrate: Suppose we frequency-modulate a 50 megacycle radio frequency carrier with a 400 cycle audio tone of one volt. The one volt audio tone, we shall assume, will vary the 50 megacycle carrier by 25 kilocycles. When the audio tone is going through the positive portion of its cycle, the carrier frequency will increase from 50 megacycles to 50 megacycles plus 25 kilocycles or 50.025 megacycles when the cycle is at a maximum. When the audio tone is going through the negative portion of its cycle, the carrier frequency will decrease from 50 megacycles to 50 megacycles minus 25 kilocycles or 49.975 megacycles when the cycle is at a minimum. The resultant carrier frequency will thus be varying back and forth between 49.975 and 50.025 megacycles at the rate of 400 times per second. Now if the voltage (volume) of the audio tone increases to two volts, the frequency swing will increase to 50 kilocycles above and below 50 megacycles. Thus, the audio tone is transmitted as the rate of the carrier frequency variations and audio volume is transmitted as the magnitude of the carrier frequency variations. It should be noted that the amplitude of the carrier remains constant during the modulation with audio.

Oscillator-Converter Circuit

If the full noise reducing properties of frequency modulation are to be realized the sensitivity of the Translator must be good enough to insure proper limiter operation. The gain through the intermediate frequency circuits is limited to that point beyond which lies instability. Hence, a considerable amount of gain must be realized through the R.F. amplifier and converter circuits in order to insure adequate receiver sensitivity.

To secure this required gain the double superheterodyne or cascade converter circuit is employed. It consists of two converter tubes, 6AB7's, and an oscillator tube, 7A4, with their associated circuits. The antenna circuit tunes the band from 42 to 50 MC. The circuit between the two converters tunes from 23.15 to 27.15 MC. The oscillator voltage is inductively coupled to the grid of the first converter tube. This produces by heterodyne action a signal to which the interconverter circuit is tuned. The first converter also conducts the oscillator signal through to the interconverter circuit. Accordingly, the oscillator signal heterodynes with the tuned signal in the interconverter circuit to produce an I.F. frequency of 4.3 MC at the output of the second converter.

To illustrate the action consider an FM signal of 42 MC to which the Translator is tuned. The oscillator frequency for this setting of the tuning control is 18.85 MC and it heterodynes in the 1st converter tube with the 42 MC signal to form 23.15 MC (42-18.85). This 23.15 MC signal, in turn, beats with oscillator signal in the 2nd converter to produce the 4.3 MC intermediate frequency.

Cascade Limiter Circuit

The limiter circuit consists of two resistance coupled 6SJ7 tubes in series. Each limiter operates at zero initial bias and low plate voltage. Both grid circuits are designed for self-biasing and the use of capacity-resistance networks provides enough time delay to retain the grid bias between signal peaks. The action of the limiter is such that as soon as a signal is applied to the grid of the tube the grid draws current. This grid current charges up the capacitor across the grid resistor and at the same time establishes a bias through current drain in the resistor. Between positive signal peaks the capacitor discharges through the resistor maintaining the grid bias. The circuit is so designed that negative signal swings are all beyond plate current cutoff and positive signal peaks are cut off by plate current saturation. The value of the 1st limiter capacity-resistance network is so chosen as to limit noise amplitudes. This arrangement leaves the 2nd limiter with the very much simplified task of reducing the remaining noise to the desired level.

Servicing

When servicing this Translator and especially when replacing parts care should be exercised to return all components including wiring to the original positions occupied. The positioning of parts and wiring is very critical. When replacing coils and I.F. transformers, maintain the lead lengths provided and use the same terminals to which the original coil or transformer was connected.

Stock No.	Description	List Price	Stock No.	Description	List Price
*RB-008	BOARD—Terminal board (2 lug)	\$0.10	RP-1005	POINTER—Dial pointer	\$0.10
*RB-060	BOARD—Antenna terminal board	.10	RP-2003	PLATE—Dial scale backplate	.10
*RB-096	BOARD—Terminal board (3 lug)	.10	*RQ-1259	RESISTOR—1000 ohms, $\frac{1}{4}$ W. carbon (R-5, 8, 9) (Pkg. 5)	.70
RB-1030	BOARD—Phono terminal jack	.10	*RQ-1267	RESISTOR—2200 ohms, $\frac{1}{4}$ W. carbon (R-4, 13) (Pkg. 5)	.70
*RC-039	CAPACITOR—.01 Mfd., 600 V. paper (C-12, 23, 24, 26, 27, 40)	.25	*RQ-1279	RESISTOR—6800 ohms, $\frac{1}{4}$ W. carbon (R-3) (Pkg. 5)	.70
*RC-048	CAPACITOR—.02 Mfd., 600 V. paper (C-38)	.30	*RQ-1283	RESISTOR—10,000 ohms, $\frac{1}{4}$ W. carbon (R-16) (Pkg. 5)	.70
*RC-096	CAPACITOR—.01 Mfd., 200 V. paper (C-37)	.30	*RQ-1285	RESISTOR—12,000 ohms, $\frac{1}{4}$ W. carbon (R-7) (Pkg. 5)	.70
*RC-216	CAPACITOR—47 Mmf. mica (C-25, 28, 29, 31, 32, 34)	.25	*RQ-1287	RESISTOR—15,000 ohms, $\frac{1}{4}$ W. carbon (R-11) (Pkg. 5)	.70
*RC-224	CAPACITOR—22 Mmf. mica (C-30)	.25	*RQ-1291	RESISTOR—22,000 ohms, $\frac{1}{4}$ W. carbon (R-19) (Pkg. 5)	.70
*RC-249	CAPACITOR—220 Mmf. mica (C-35)	.25	*RQ-1295	RESISTOR—33,000 ohms, $\frac{1}{4}$ W. carbon (R-1) (Pkg. 5)	.70
*RC-293	CAPACITOR—470 Mmf. mica (C-6, 8, 9, 10, 11)	.30	*RQ-1299	RESISTOR—47,000 ohms, $\frac{1}{4}$ W. carbon (R-10, 12, 15, 25, 27) (Pkg. 5)	.70
RC-322	CAPACITOR—40 Mmf. temperature compensating capacitor (C-5)	.30	*RQ-1303	RESISTOR—68,000 ohms, $\frac{1}{4}$ W. carbon (R-18) (Pkg. 5)	.70
RC-323	CAPACITOR—50 Mmf. temperature compensating capacitor (C-7, 33)	.25	*RQ-1307	RESISTOR—100,000 ohms, $\frac{1}{4}$ W. carbon (R-20, 21, 22) (Pkg. 5)	.70
RC-324	CAPACITOR—8 Mmf. temperature compensating capacitor (C-39)	.30	*RQ-1313	RESISTOR—180,000 ohms, $\frac{1}{4}$ W. carbon (R-17) (Pkg. 5)	.70
*RC-863	CORD—Power cord	.65	*RQ-1323	RESISTOR—470,000 ohms, $\frac{1}{4}$ W. carbon (R-26) (Pkg. 5)	.70
RC-5169	CAPACITOR—15 Mfd., 400 V.; 30 Mfd., 400 V.; 10 Mfd., 350 V. dry electrolytic (C-36a, 36b, 36c)	1.25	*RQ-1339	RESISTOR—2.2 megohms, $\frac{1}{4}$ W. carbon (R-14) (Pkg. 5)	.70
RC-6540	CAPACITOR—Air trimmer capacitor (C-2)	.95	*RQ-1343	RESISTOR—3.3 megohms, $\frac{1}{4}$ W. carbon (R-2, 6) (Pkg. 5)	.70
RC-6541	CAPACITOR—2-20 Mmf. converter trimmers (C-3, 4)	.25	*RQ-1471	RESISTOR—3300 ohms, $\frac{1}{4}$ W. carbon (R-24)	.20
RC-7041	CONDENSER—Tuning condenser and station selector assembly (C-1a, 1b, 1c)	5.00	RR-357	RESISTOR—1200 ohms, 7.4 W. wire wound (R-23)	.30
RC-8198	CABLE—Output connector cable and plug assembly	.55	*RS-223	SOCKET—Octal tube socket (Pkg. 5)	.80
RC-8199	CABLE—Condenser drive cable assembly	.10	*RS-265	SOCKET—Electrolytic mounting socket	.10
RC-8526	CARD—Station tab card set	.15	*RS-296	SOCKET—Dial lamp socket assembly	.15
RD-424	DRUM—Condenser drive drum assembly	.15	*RS-297	SOCKET—7A4 tube socket	.25
RE-096	ESCUTCHEON—Scale and escutcheon assembly	2.70	*RS-299	SOCKET—6H6 tube socket	.15
RG-306	GROMMET—Rubber grommet for protecting condenser leads (Pkg. 5)	.10	*RS-444	SPRING—Knob retaining spring (Pkg. 10)	.10
*RK-091	KNOB—Control knob	.10	RS-625	SUPPORT—Power switch support	.25
*RK-214	KEY—Left-hand station key	.10	RS-898	SUPPORT—Tuning shaft support	.40
*RK-223	KEY—All except left station keys	.15	RS-958	SCREW—Escutcheon mounting screw (Pkg. 10)	.10
RL-166	COIL—R.F. coil assembly (L-2)	.40	RS-1813	SPACER—Station key spacer on pin (Pkg. 3)	.10
RL-952	LOCK—Cam lock (adjusting screw and lug) (Pkg. 10)	.10	RS-3095	SHIELD—Dial lamp shield (Pkg. 3)	.10
RL-1010	COIL—Antenna and oscillator coil assembly (L1, L3)	.40	RS-9019	SWITCH—Power and FM-Phono switch (S-1)	1.00
RM-514	MASK—Dial back plate mask	.05	RT-0813	SHAFT—Tuning shaft assembly	.15
*RP-145	PLUG—Radio chassis connector plug (Pkg. 5)	.25	RT-0815	TRANSFORMER—50-60 cycle power transformer (T-5)	3.10
*RP-154	PIN—Station key mounting pin (Pkg. 10)	.10	RT-2007	TRANSFORMER—25 cycle power transformer (T-6)	.780
*RP-314	PULLEY—Pointer drive pulley and "C" washer	.15	RT-2008	TRANSFORMER—1st I.F. transformer (T-1)	1.55
RP-325	PULLEY—Drive cord wooden pulley (Pkg. 5)	.10	RT-2009	TRANSFORMER—2nd I.F. transformer (T-2)	1.60
			RT-2010	TRANSFORMER—3rd I.F. transformer (T-3)	1.30
			*RW-101	WASHER—Discriminator transformer (T-4)	1.60
			RW-124	WASHER—Control shaft felt washer (Pkg. 10)	.05
			*RX-079	WASHER—Tuning shaft retaining washer (Pkg. 10)	.05
				ASSEMBLY—Chassis mounting foot assembly	.40

*Used on previous receivers.

(PRICES SUBJECT TO CHANGE WITHOUT NOTICE)

GENERAL ELECTRIC CO.

MODEL JFM90
MODEL LC648W

MODEL JFM-90

MODEL LC-648W

Rating	Power Supply (Volts)	Frequency (Cycles Per Second)	Power Consumption (Watts)
A6	105-125	50-60	65
C2	105-125	25	65

ALIGNMENT PROCEDURE

Equipment

In order to perform the necessary alignment operations on this Translator the following equipment is recommended:

- (1) A good signal generator capable of giving a 46 MC signal with adjustable output voltage.
- (2) A wide band signal generator covering 4.3 MC with a sweep circuit of plus or minus 200 KC.
- (3) A cathode ray oscilloscope.
- (4) A 0-100 microammeter.

I.F. Alignment

Alignment of the I.F. transformers must be performed stage by stage and no over-all adjustments should be made after completing the stage by stage adjustments.

Connect the high side of the oscilloscope input through a 470,000 ohm carbon resistor to point "A" on the 1st limiter 6SJ7 load circuit. The ground side of the oscilloscope input connects to the chassis. Progressively apply a wide band signal generator output of 4.3 MC to points "B," "C" and "D" of the 2nd I.F., 1st I.F. and 2nd converter grids. Use a .05 mfd. capacitor between the generator output and points "B" and "C." Use a 22 mmf. capacitor between the generator output and point "D." Connect the ground lead of the wide band signal generator output to the chassis at the same point to which the oscilloscope ground is connected. Align the primary and secondary I.F. transformer trimmers for maximum vertical deflection of the oscilloscope curve. The third circuit trimmers (C14 and C17) of the 1st and 2nd I.F. transformers should be adjusted to give maximum broadness to the peak of the oscilloscope curve consistent with maximum vertical deflection. The I.F. curve should not be broadened beyond that point where the vertical deflection of the oscilloscope curve is reduced.

Discriminator Alignment

Remove the oscilloscope input connections from the limiter load and connect the high lead directly to the audio output. Connect the ground lead to the chassis using the same point to which the generator ground is connected. Apply the wide band generator signal of 4.3 MC through a 22 mmf. capacitor to point "D" on the 2nd converter grid. Adjust the discriminator transformer (T4) primary trimmer (C21) for maximum vertical deflection on the oscilloscope. Align the secondary trimmer (C22) for center crossover of the two curves. Retrim the primary trimmer (C21) for straight crossover lines if necessary.

R.F. Alignment

Connect a 0-100 microammeter in series with a 470,000 ohm resistor between chassis and point "A" on the load circuit of the 1st limiter tube, 6SJ7. The resistor should be between the meter and point "A." Apply a 46 MC generator signal to the antenna input terminals of the Translator. Set dial pointer to 46 MC and align oscillator trimmer (C2). The image signal should be below 46 MC when the oscillator is properly set. Peak the converter trimmers (C3 and C4) for maximum output.

NOTE: If oscillations develop in the I.F. circuits during alignment it is probably due to the generator and oscilloscope ground connections. Be sure these ground connections are made to the same point on the chassis. Changing ground points will generally assist in eliminating instability.

GENERAL INFORMATION

Two different types of record changers were used during the production of the Model LC648W phonograph combination.

The Model LRP-170 record changer is identified by the single record post and the eccentric turntable spindle; whereas the LRP-162 changers make use of a two-post record holder. Different pickup compensation is used for the two changers as noted at the bottom of the schematic diagram and the change in value of resistors R-11 and R-12 as given in the parts list.

ALIGNMENT PROCEDURE

The location of trimmers is shown in Fig. 1. All oscillator and RF trimmers are accessible through a slot through the back cover of the cabinet.

The alignment procedure is given in table form. All IF alignments may be made with the chassis removed from the cabinet. However, the RF alignments are made with the chassis and loop antennas securely fastened in the cabinet, as the relative position of the loop antenna with respect to the chassis materially affects it. The RF signal should be capacity-coupled by placing a two-foot wire for an antenna on the test-oscillator output post (high side). Keeping this antenna two feet or more from the receiver loop will generally insure freedom from too much coupling. Metal objects such as meters, tools, etc., should not be placed near the receiver loop.

ALIGNMENT CHART

Step	Connect Test-Osc. to	Test- Osc. Setting	Pointer Setting	Adjust Trimmers for Maximum Output
1	6SK7 IF Grid in series with .05 mfd.	455 KC	"BC" Band 550 KC	C6 & C7
2	6SA7 Conv. grid in series with .05 mfd.	455 KC	"BC" Band 550 KC	C4 & C5
3	With input on 6SA7 conv., repeat step 1.			
4	Capacity Coupled	580 KC	"BC" Band 580 KC	C22*
5	Capacity Coupled	1500 KC	"BC" Band 1500 KC	C2 (Osc.)
6	Capacity Coupled	1500 KC	"B" Band 1500 KC	C16 (RF)
7	Repeat step 4.			

* Rock gang condenser when making alignment.

Special Service Information

The following data are taken with a vacuum tube voltmeter or similar voltage measuring device.

- (1) Stage Gains

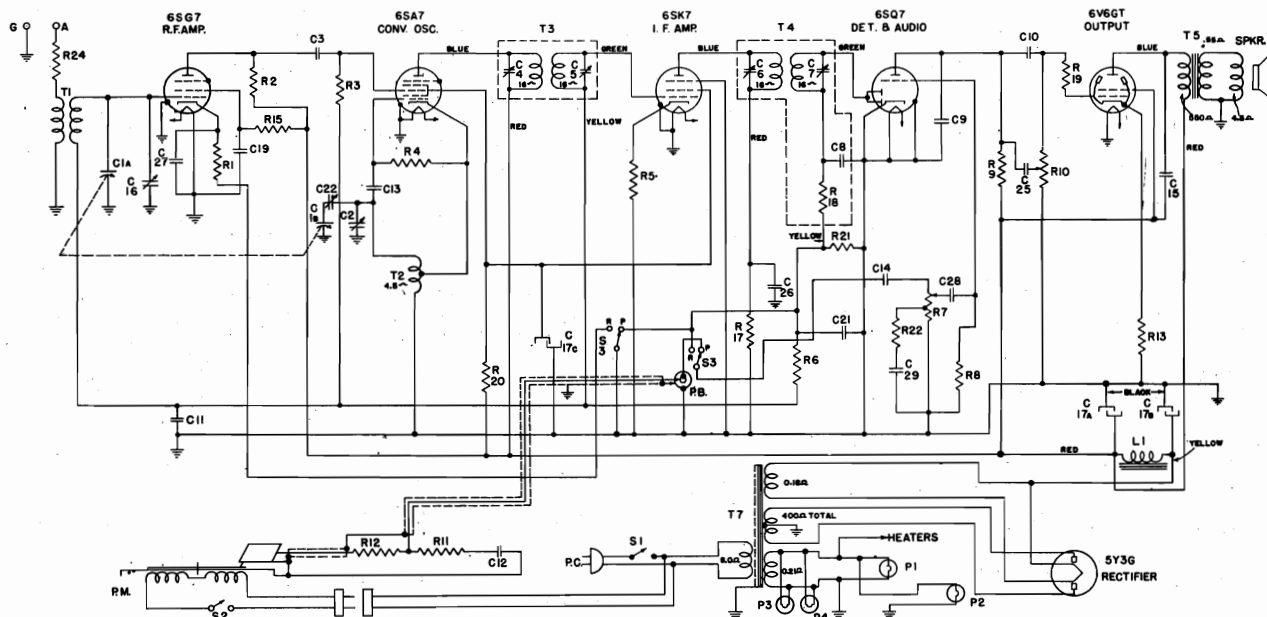
Antenna Post to RF Grid	5 at 1000 KC
RF Grid to Converter Grid	5 at 1000 KC
Converter Grid to IF Grid	40 at 1000 KC
Converter Grid to IF Grid	60 at 455 KC
IF Grid to 6SQ7 diode plates	90 at 455 KC
- (2) Audio Gains

.14 volts, 400 cycles signal across volume control with control set to maximum will give approximately 1/2-watt speaker output.
- (3) DC voltage developed across oscillator grid resistor R4 averages 10 volts at 1000 KC.

Variations of $\pm 20\%$ permissible. All readings taken with AVC shorted out.

MODEL LC648W

GENERAL ELECTRIC CO.



FOR G.E. LRP-162 and LRP-170 RECORD CHANGERS, SEE RIDER'S "AUTOMATIC RECORD CHANGERS AND RECORDERS"

Our Cat. No.	Symbol	Description	List Price
*RC-7061 RT-891	C-1a, 1b C-2	CONDENSER—Tuning condenser TRIMMER STRIP—"B" Osc. Trimmer strip (combined with C-16, 22)	\$2.00 .55
*RC-235	C-3	CAPACITOR—100 mmf. mica	.25
*RC-252	C-8	CAPACITOR—200 mmf. mica	.30
*RC-242	C-9	CAPACITOR—150 mmf. mica	.25
*RC-048	C-10	CAPACITOR—.02 mfd. 600 V paper	.30
*RC-072	C-11	CAPACITOR—.05 mfd. 200 V paper	.25
*RC-011	C-12	CAPACITOR—.002 mfd. 600 V paper (Used only with LRP-170 record player)	.25
*RC-216	C-13	CAPACITOR—47 mmf. mica	.25
*RC-023	C-14	CAPACITOR—.005 mfd. 600 V paper	.25
*RC-055	C-15	CAPACITOR—.003 mfd. 600 V paper	.25
*RT-891	C-16	TRIMMER STRIP—Ant. trimmer (Part of C-2, 22)	.55
RC-5212	C17a, 17b, 17c	CAPACITOR—10-15-10 mfd., electrolytic	1.10
*RC-039	C-19	CAPACITOR—.01 mfd. 600 V paper	.25
*RC-235	C-21	CAPACITOR—100 mmf. mica	.25
*RT-891	C-22	TRIMMER STRIP—"B" Band padder (Combined with C 2, C-16)	.55
*RC-023	C-25	CAPACITOR—.005 mfd. 600 V paper	.25
*RC-047	C-26, 27, 28	CAPACITOR—.01 mfd. 400 V paper	.20
*RC-017	C-29	CAPACITOR—.0042 mfd. 600 V paper	.25
*RQ-1247	R-1	RESISTOR—330 ohm, 1/2-W carbon	.70-5
*RQ-1271	R-2	RESISTOR—3300 ohm, 1/2-W carbon	.70-5
*RQ-1299	R-3	RESISTOR—47,000 ohm, 1/2-W carbon	.70-5
*RQ-1291	R-4	RESISTOR—22,000 ohm, 1/2-W carbon	.70-5
*RQ-1239	R-5	RESISTOR—150 ohm, 1/2-W carbon	.70-5
*RQ-1339	R-6	RESISTOR—2.2 megohm, 1/2-W carbon	.70-5
*RV-135	R-7	VOL. CONTROL—2 meg. volume control	.95
*RQ-1355	R-8	RESISTOR—10.0 megohm, 1/2-W carbon	.70-5
*RQ-1323	R-9	RESISTOR—470,000 ohm, 1/2-W carbon	.70-5
*RT-722	R-10, S1	TONE CONTROL—.05 meg. control and power switch	1.45
*RQ-1299	R-11, 12	RESISTOR—47,000 ohm, 1/2-W carbon (Used only with record player LRP-170)	.70-5
*RQ-1313	R-11	RESISTOR—180,000 ohm, 1/2-W carbon (Used only with record player LRP-162)	.70-5
*RQ-1315	R-12	RESISTOR—220,000 ohm, 1/2-W carbon (Used only with record player LRP-162)	.70-5
*RQ-1247	R-13	RESISTOR—330 ohm, 1/2-W carbon	.70-5
*RQ-1299	R-15	RESISTOR—47,000 ohm, 1/2-W carbon	.70-5
*RQ-1259	R-17	RESISTOR—1000 ohm, 1/2-W carbon	.70-5
*RQ-1299	R-18	RESISTOR—47,000 ohm, 1/2-W carbon	.70-5
*RQ-1259	R-19	RESISTOR—1000 ohm, 1/2-W carbon	.70-5
*RQ-687	R-20	RESISTOR—15,000 ohm, 2-W carbon	.35
*RQ-1323	R-21	RESISTOR—470,000 ohm, 1/2-W carbon	.70-5
*RQ-1303	R-22	RESISTOR—85,000 ohm, 1/2-W carbon	.70-5
*RQ-1259	R-24	RESISTOR—1000 ohm, 1/2-W carbon	\$0.70-5
*RL-590	T-1	BEAM-A-SCOPE—Built-in loop antenna	1.25
*RL-2072	T-2	COIL—Osc. coil, Band "B"	.30
*RT-3005	T-3	TRANSFORMER—1st IF transformer	.90
*RT-3006	T-4	TRANSFORMER—2nd IF transformer	1.15
*RT-4033	T-5	TRANSFORMER—Output transformer	1.25
RT-0629	T-7	TRANSFORMER—60-cycle power transformer	5.05
*RS-3141	S-3	SWITCH—Phono-radio switch	.55
RS-1096	SPKR	SPEAKER—12-in. EM speaker	8.05

* Used on previous receiver.

Prices subject to change without notice

Electrical Rating

Rating "A6"—110-125 volts, 60 cycles, 80 watts.
Rating "A5"—110-125 volts, 50 cycles, 80 watts.

Tuning Frequency Range

"BC" Band.....540-1720 KC

Intermediate Frequency

.....455 KC

Electrical Power Output

Undistorted.....2.5 watts
Maximum.....4.5 watts

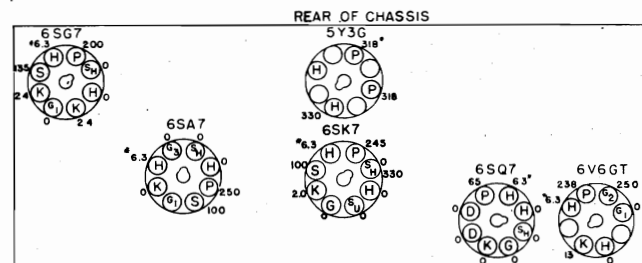
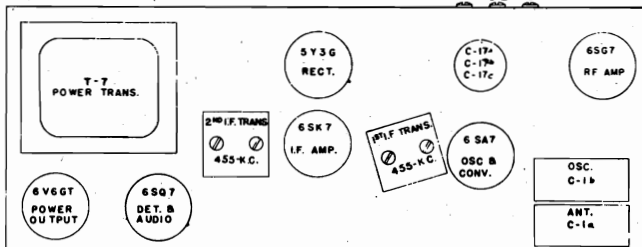
Loudspeaker—EM Dynamic

Outside cone diameter.....12 inches
Voice coil impedance (400 cycles).....5.0 ohms

Phonograph Mechanism

Type changer.....Models LRP-162 or LRP-170
Type pickup.....Crystal
Turntable speed.....78 R.P.M.

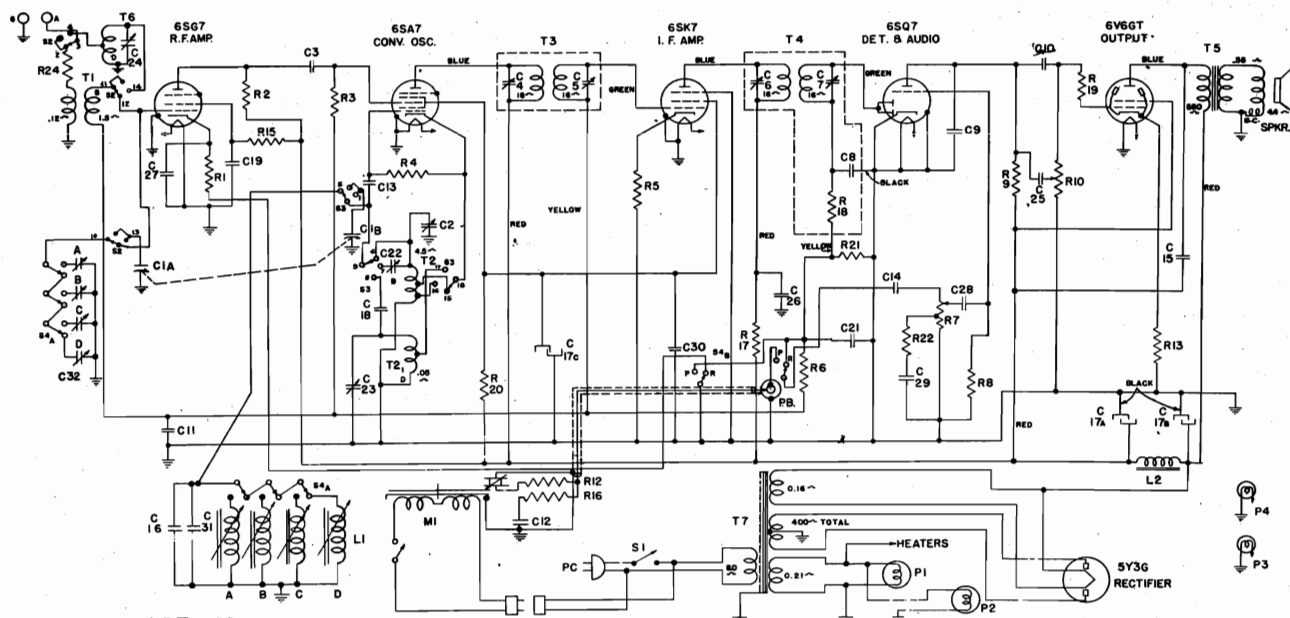
580-KC 1500-KC 1500-KC
C-22 C-2 C-2



117 V.A. C. LINE, NO SIGNAL INPUT.
SOCKET VOLTAGES TO GROUND.
BAND SWITCH SET FOR BROADCAST BAND.
* INDICATES VOLTS A.C.

BOTTOM VIEW OF CHASSIS

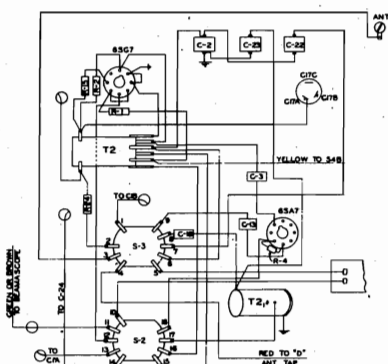
GENERAL ELECTRIC CO.



IF PEAK 455 KC

NOTE—C12 IS OMITTED WHEN RECORD CHANGER LRP-162 IS USED

FOR G.E. RECORD CHANGERS LRP-162 AND LRP-170, SEE RIDER'S "AUTOMATIC RECORD CHANGERS AND RECORDERS".

Fig. 2.
Switch Wiring

RADIO REPLACEMENT PARTS LIST

Our Cat. Number	Symbol	Description	List Price
*RC-7061	C1a, C1b	CONDENSER—2 gang tuning condenser	\$2.00
*RC-6552	C-2	CAPACITOR—"B" band trimmer (Part of C22, 23)	.55
*RC-235	C-3	CAPACITOR—100 mmf., mica	.25
*RC-242	C-9	CAPACITOR—150 mmf., mica	.25
*RC-048	C-10	CAPACITOR—.02 mfd. 600-V paper	.30
*RC-072	C-11	CAPACITOR—.05 mfd. 200-V paper	.25
*RC-011	C-12	CAPACITOR—.002 mfd. 600-V paper (Used with Model LRP-170 record player only)	.25
*RC-216	C-13	CAPACITOR—47 mmf., mica	.25
*RC-023	C-14	CAPACITOR—.005 mfd. 600-V paper	.25
*RC-055	C-15	CAPACITOR—.003 mfd. 600-V paper	.25
*RC-329	C-16	CAPACITOR—150 mmf., compensating capacitor	.25
RC-5212	C-17a, 17b, 17c	CAPACITOR—10-15-10 mfd., electrolytic	1.10
*RC-390	C-18	CAPACITOR—3900 mmf. mica	.35
*RC-039	C-19	CAPACITOR—.01 mfd. 600-V paper	.25
*RC-235	C-21	CAPACITOR—100 mmf., mica	.25
*RC-6552	C-22	CAPACITOR—"B" padder (Part of C2, 23)	.55
*RC-6552	C-23	CAPACITOR—"D" Osc. trimmer (Part of C2, 22)	.55

* Used on previous receivers.

Our Cat. Number	Symbol	Description	List Price
*RC-6553	C-24	CAPACITOR—"D" antenna trimmer	\$0.25
*RC-023	C-25	CAPACITOR—.005 mfd. 600-V paper	.25
*RC-039	C-26, 27, 28	CAPACITOR—.01 mfd. 600-V paper	.25
*RC-049	C-29	CAPACITOR—.0042 mfd. 600-V paper	.35
*RC-039	C-30	CAPACITOR—.01 mfd. 600-V paper	.25
*RC-305	C-31	CAPACITOR—600 mmf., silvered mica	.25
*RT-885	C-32a, b, c	TRIMMER STRIP—Push button trimmer strip	.70
*RQ-1247	R-1	RESISTOR—330 ohm, 1/4-W carbon	.70-5
*RQ-1291	R-2	RESISTOR—3300 ohm, 1/4-W carbon	.70-5
*RQ-1291	R-3	RESISTOR—47,000 ohm, 1/4-W carbon	.70-5
*RQ-1291	R-4	RESISTOR—22,000 ohm, 1/4-W carbon	.70-5
*RQ-1239	R-5	RESISTOR—150 ohm, 1/4-W carbon	.70-5
*RQ-1339	R-6	RESISTOR—2.2 megohm, 1/4-W carbon	.70-5
*RV-135	R-7	VOL. CONTROL—2 megohm, 1/4-W carbon	.95
*RQ-1355	R-8	RESISTOR—10 megohm, 1/4-W carbon	.70-5
*RQ-1323	R-9	RESISTOR—470,000 ohm, 1/4-W carbon	.70-5
*RT-722	R-10, S1	TONE CONTROL—.05 meg. tone control	1.45
*RQ-1299	R-12	RESISTOR—47,000 ohm, 1/4-W carbon (Used only with Model LRP-170 record player)	.70-5
*RQ-1315	R-12	RESISTOR—220,000 ohm, 1/4-W carbon (Used only with Model LRP-162 record player)	.70-5
*RQ-1247	R-13	RESISTOR—330 ohm, 1/4-W carbon	.70-5
*RQ-1299	R-15	RESISTOR—47,000 ohm, 1/4-W carbon	.70-5
*RQ-1299	R-16	RESISTOR—47,000 ohm, 1/4-W carbon (Used only with Model LRP-170 record player)	.70-5
*RQ-1313	R-16	RESISTOR—180,000 ohm, 1/4-W carbon (Used only with Model LRP-162 record player)	.70-5
*RQ-1259	R-17	RESISTOR—1000 ohm, 1/4-W carbon	.70-5
*RQ-1299	R-18	RESISTOR—47,000 ohm, 1/4-W carbon	.70-5
*RQ-1259	R-19	RESISTOR—1000 ohm, 1/4-W carbon	.70-5
*RQ-687	R-20	RESISTOR—15,000 ohm, 1/4-W carbon	.35
*RQ-1323	R-21	RESISTOR—470,000 ohm, 1/4-W carbon	.70-5
*RQ-1303	R-22	RESISTOR—68,000 ohm, 1/4-W carbon	.70-5
*RQ-1259	R-24	RESISTOR—1000 ohm, 1/4-W carbon	.70-5
*RL-9530	L1-a, b, c, and d	COIL—Push button coil assembly	.85
*RS-3142	S-2, S-3	SWITCH—Band switch	1.10
*RS-3130	S4a, 4b	SWITCH—Touch tuning switch	4.00
*RL-591	T-1	BEAM-A-SCOPE—"B" band loop	1.20
*RL-2073	T-2	COIL—"B" band oscillator coil	.50
*RL-2074	T-21	COIL—"D" band oscillator coil	.30
*RT-3005	T-3	TRANSFORMER—1st IF transformer	.90
*RT-3010	T-4	TRANSFORMER—2nd IF transformer	1.20
*RT-4033	T-5	TRANSFORMER—Output transformer	1.25
*RL-592	T-6	BEAM-A-SCOPE—"D" band loop	.50
*RT-0629	T-7	TRANSFORMER—50 or 60 cycle power transformer	5.05
KS-1096	SPKR	SPEAKER—12-inch EM speaker	8.05

Prices subject to change without notice.

MODEL LC619W

GENERAL ELECTRIC CO.

Our Cat. Number	Description	List Price	Our Cat. Number	Description	List Price
*RB-013	BOARD—2 lug terminal board	\$0.10	*RK-092	KNOB—Tone or band control knob	\$0.10
*RB-023	BOARD—4 lug terminal board	.10	*RK-229	KEY—Push button key	.20
*RB-093	BOARD—6 lug terminal board	.10	*RP-1032	POINTER—Dial pointer assembly	.25
*RB-026	BOARD—Antenna terminal board	.10	*RS-238	SOCKET—Octal base tube socket	.15
*RB-636	BEZEL—Pilot lamp bezel (bottom of cab.)	.15	*RS-257	SOCKET—Electrolytic mtg. socket	.05
*RB-646	BEZEL—Phono compartment lamp bezel	.20	*RS-266	SOCKET—Dial scale lamp socket	.15
*RB-1030	BOARD—Phono terminal board	.10	*RS-292	SOCKET—Pilot lamp socket (bottom of cabinet)	.25
*RC-1989	CUSHION—Tuning condenser mtg. cushion	.05-5	*RS-298	SOCKET—Phono compartment lamp socket	.20
*RC-8154	CORD—Power cord	.40	*RS-444	SPRING—Volume, tuning or push button control springs	.10-10
*RC-8500	CARDS—Station letter cards (set)	.20	*RS-463	SPRING—Drive cord tension spring	.10-5
*RC-9052	CONE—12 in. speaker cone	1.50	*RS-511	SLEEVE—Tuning condenser mtg. spacer sleeve	.15-10
*RC-8231	CABLE—Speaker cable and plug	.50	*RS-4012	SPRING—Tone or band control spring	.10-10
*RD-426	DRUM—Condenser drive drum assembly	.20	*RS-9042	SHAFT—Tuning shaft	.10
*RD-775	DIAL—Dial scale assembly	.85	*RT-959	TERMINAL—Speaker and loop lead terminal	.05-5
*RG-449	GRILLE—Cabinet grille cloth	1.05	*RW-101	WASHER—Felt washer for knobs	.05-10
*RK-091	KNOB—Volume and tuning control knob	.10			

* Used on previous receivers.

Prices subject to change without notice.

SPECIFICATIONS

Height.....36 inches
Width.....32 1/4 inches
Depth.....16 1/4 inches

Electrical Rating

Rating "A6"—110-125 volts, 60 cycles, 80 watts.
Rating "A5"—110-125 volts, 50 cycles, 80 watts.

Tuning Frequency Range

"BC" Band.....540-1720 KC
"SW" Band.....5.3-18.0 MC

Intermediate Frequency.....455 KC

Electrical Power Output

Undistorted.....2.5 watts
Maximum.....4.5 watts

Loud-speaker—EM Dynamic

Outside Cone-diameter.....12 inches
Voice Coil Impedance (400 cycles).....5.0 ohms

Phonograph Mechanism

Type changer.....Models LRP-162 or LRP-170
Type pickup.....Crystal
Turntable speed.....78 Rpm

Tubes

RF Amplifier.....GE-6SK7
Converter-Oscillator.....GE-6SA7
IF Amplifier.....GE-6SK7
Detector, 1st Audio, AVC.....GE-6SK7
Power Output.....GE-6V6GT
Rectifier.....GE-5Y3G
Dial Lamps.....(2) MAZDA No. 44

GENERAL INFORMATION

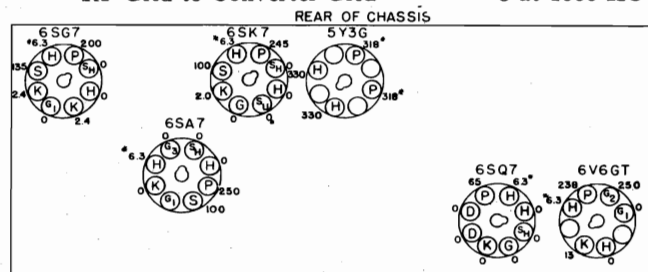
Two different types of record changers were used during the production of the Model LC-619W phonograph combination.

The Model LRP-170 record changer is identified by the single record post and the eccentric turntable spindle, whereas the LRP-162 changers make use of a two-post record holder. Different pickup compensation is used for the two changers as noted at the bottom of the schematic diagram and the change in value of resistors, R12 and R16, as given in the replacement parts list.

Special Service Information

The following data are taken with a vacuum tube voltmeter or similar voltage measuring device.

- (1) Stage Gains
Antenna Post to RF Grid 5 at 1000 KC
RF Grid to Converter Grid 5 at 1000 KC



BOTTOM VIEW OF CHASSIS

Fig. 3. Socket Voltages

Converter Grid to IF Grid 40 at 1000 KC
Converter Grid to IF Grid 60 at 455 KC
IF Grid to 6SQ7 diode plates 90 at 455 KC

(2) Audio Gains

.14 volts, 400 cycles signal across volume control with control set to maximum will give approximately 1/2-watt speaker output.

(3) DC voltage developed across oscillator grid resistor R4 averages 10 volts at 1000 KC or 8.0 volts at 10,000 KC.

Variations of $\pm 20\%$ permissible. All readings taken with AVC shorted out.

ALIGNMENT PROCEDURE

The location of trimmers is shown in Fig. 4. All oscillator and RF trimmers are accessible through a slot through the back cover of the cabinet.

The alignment procedure is given in table form. All IF alignments may be made with the chassis removed from the cabinet. However, the RF alignments are made with the chassis and loop antennas securely fastened in the cabinet, as the relative position of the loop antenna with respect to the chassis materially affects it. The RF signal should be capacity coupled by placing a two-foot wire for an antenna on the test-oscillator output post (high side). Keeping this antenna two feet or more from the receiver loop will generally insure freedom from too much coupling. Metal objects such as meters, tools, etc., should not be placed on top of the receiver cabinet.

ALIGNMENT CHART

Step	Connect Test-Osc. to	Test-Osc. Setting	Pointer Setting	Adjust Trimmers for Maximum Output
1	6SK7 IF Grid in series with .05 mfd.	455 KC	"BC" Band 550 KC	C6 & C7
2	6SA7 Conv. grid in series with .05 mfd.	455 KC	"BC" Band 550 KC	C4 & C5
3	With input on 6SA7 Conv., repeat step 1			
4	Capacity Coupled	580 KC	"BC" Band 580 KC	C22**
5	Capacity Coupled	1500 KC	"BC" Band 1500 KC	C2** (Osc.)
6	Repeat Step 4			
7	Capacity Coupled	18 MC	"SW" Band 18 MC	C23* (Osc.)
8	Capacity Coupled	18 MC	"SW" Band 18 MC	C24** (Ant.)

* Use minimum capacity peak.

** Rock gang condenser when making alignment.

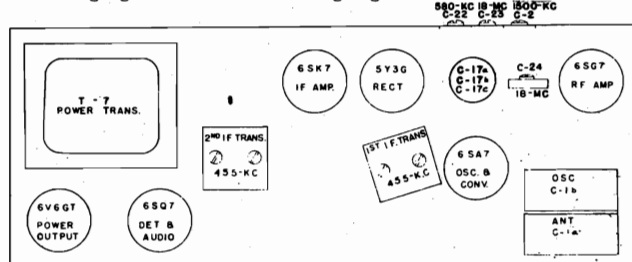
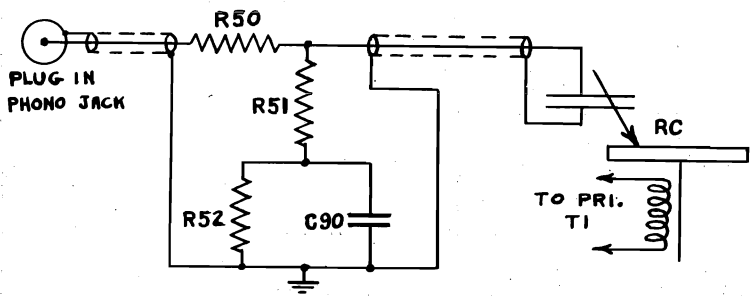


Fig. 4. Trimmer Location

GENERAL ELECTRIC CO.



Symbol	Description	Symbol	Description
R50	100,000 ohms, carbon	R52	220,000 ohms, carbon
R51	150,000 ohms, carbon	C90	.002 mfd., paper

Fig. 4. Phonograph Schematic

ALIGNMENT PROCEDURE

The location of trimmers is shown in Fig. 3 and alignment procedure is given in table form below.

Before making the R.F. alignment make sure the pointer is set to the line at the extreme low frequency end of the dial scale when the gang condenser plates are closed. Output meter alignment is preferable and the meter may be connected across the voice coil leads, then turn volume control partially up. Keep the signal input as low as possible to avoid AVC action. NOTE—the wave trap trimmer C-12 is aligned to give minimum output.

Alignment Chart

Step	Connect Test—Osc. to	Test—Osc. Setting	Pointer Setting	Adjust Trimmers for Max. Output
1	IF grid in series with .05 mfd.	455 KC	Band "B" 550 KC	2nd IF primary and secondary
2	Conv. grid in series with .05 mfd.	455 KC	Band "B" 550 KC	1st IF primary and secondary
3	Ant. post in series with 200 mmf.	455 KC	Band "B" 550 KC	C-12 *
4	Ant. post in series with 200 mmf.	21 MC	Band "D" 21 MC	Osc. (C-8)** RF. (C-5)*** Ant. (C-2)
5	Ant. post in series with 200 mmf.	6 MC	Band "C" 6 MC	Osc. (C-9)** RF. (C-6) Ant. (C-3)
6	Ant. post in series with 200 mmf.	1500 KC	Band "B" 1500 KC	Osc. (C-10) RF. (C-7) Ant. (C-4)
7	Ant. post in series with 200 mmf.	580 KC	Band "B" 580 KC	Osc. padder (C-11)***
8	Repeat operation 6.			

* Peak for minimum output.
** Use minimum capacity peak.
*** Rock gang condenser when making alignment.

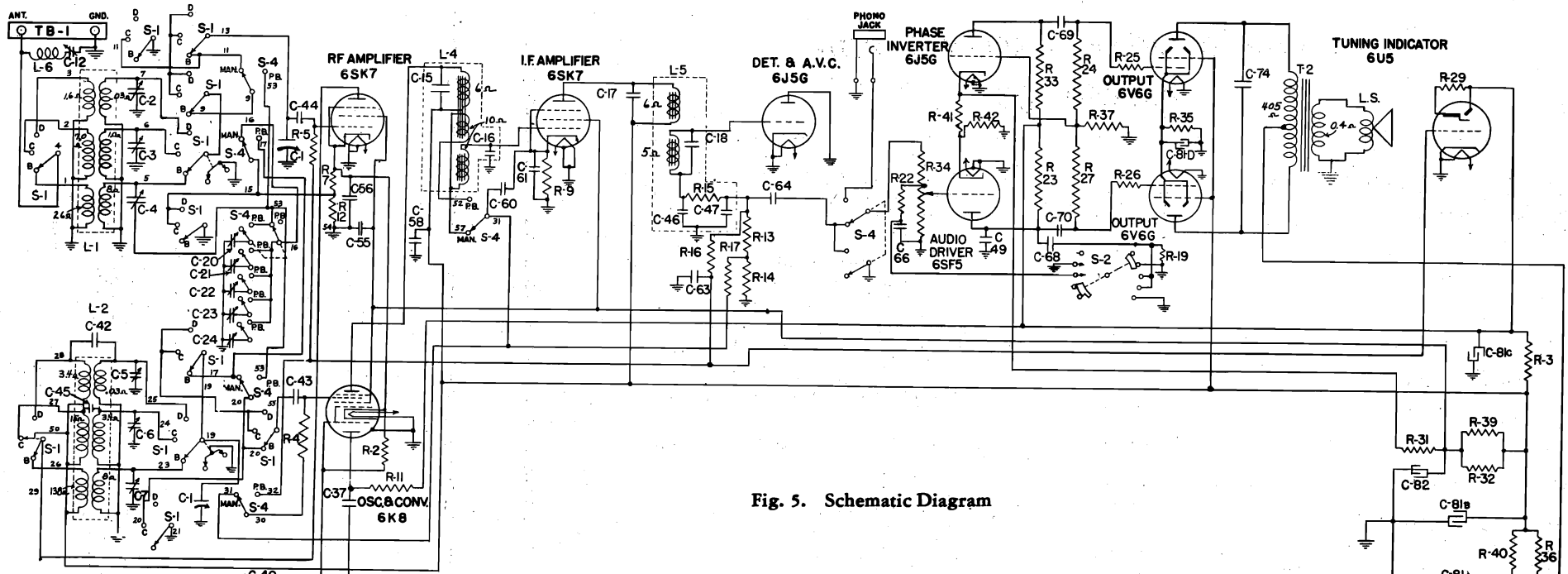


Fig. 5. Schematic Diagram

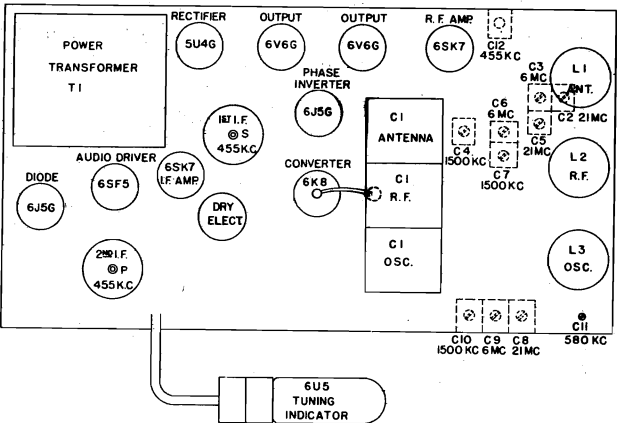
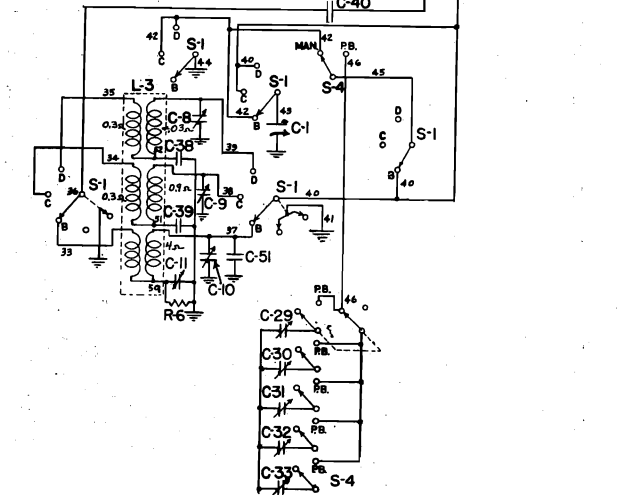


Fig. 3. Trimmer Location

Symbol	Description	Symbol	Description
C-1	Tuning Condenser	C-82	8 Mfd. Electrolytic Capacitor
C-2	"D" Band Antenna Trimmer	L-1	Antenna Coil
C-3	"C" Band Antenna Trimmer	L-2	R.F. Coil
C-4	"B" Band Antenna Trimmer	L-3	Oscillator Coil
C-5	"D" Band R.F. Trimmer	L-4	1st I.F. Transformer
C-6	"C" Band R.F. Trimmer	L-5	2nd I.F. Transformer
C-7	"B" Band R.F. Trimmer	L-6	I.F. Wave Trap Coil
C-8	"D" Band Oscillator Trimmer	P-1	Dial Lamp, MAZDA No. 44
C-9	"C" Band Oscillator Trimmer	P-2	Dial Lamp, MAZDA No. 44
C-10	"B" Band Oscillator Trimmer	P-3	Dial Lamp, MAZDA No. 44
C-11	"B" Band Oscillator Padder	R-2	33,000 Ohms Carbon Resistor
C-12	Wave Trap Trimmer	R-3	8200 Ohms 1 W Carbon Resistor
C-20	7-65 Mmf. Ant. Station Trimmer	R-4	560,000 Ohms Carbon Resistor
C-21	20-180 Mmf. Ant. Station Trimmer	R-5	560,000 Ohms Carbon Resistor
C-22	20-180 Mmf. Ant. Station Trimmer	R-6	3300 Ohms Carbon Resistor
C-23	100-490 Mmf. Ant. Station Trimmer	R-7	150 Ohms Carbon Resistor
C-24	100-490 Mmf. Ant. Station Trimmer	R-9	330 Ohms Carbon Resistor
C-29	7-65 Mmf. Osc. Station Selector	R-11	22,000 Ohms Carbon Resistor
C-30	20-180 Mmf. Osc. Station Selector	R-12	150 Ohms Carbon Resistor
C-31	20-180 Mmf. Osc. Station Selector	R-13	120,000 Ohms Carbon Resistor
C-32	100-490 Mmf. Osc. Station Selector	R-14	120,000 Ohms Carbon Resistor
C-33	100-490 Mmf. Osc. Station Selector	R-15	47,000 Ohms Carbon Resistor
C-37	470 Mmf. Mica Capacitor	R-16	2.2 Megohms Carbon Resistor
C-38	4300 Mmf. .5% Mica Capacitor	R-17	1.5 Megohms Carbon Resistor
C-39	1600 Mmf. .5% Mica Capacitor	R-19	1.0 Megohms Carbon Resistor
C-40	47 Mmf. Mica Capacitor	R-22	82,000 Ohms Carbon Resistor
C-42	22 Mmf. Mica Capacitor L.P.F.	R-23	100,000 Ohms Carbon Resistor
C-43	470 Mmf. Mica Capacitor	R-24	220,000 Ohms Carbon Resistor
C-44	470 Mmf. Mica Capacitor	R-25	1000 Ohms Carbon Resistor
C-45	6 Mmf. Mica Capacitor L.P.F.	R-26	1000 Ohms Carbon Resistor
C-46	100 Mmf. Mica Capacitor	R-27	150,000 Ohms Carbon Resistor
C-47	100 Mmf. Mica Capacitor	R-29	1.0 Megohm Carbon Resistor
C-49	330 Mmf. Mica Capacitor	R-31	10,000 Ohms 2 W Carbon Resistor
C-51	10 Mmf. Compensating Capacitor	R-32	15,000 Ohms 2 W Carbon Resistor
C-55	.05 Mfd. Paper Capacitor	R-33	68,000 Ohms Carbon Resistor
C-56	.05 Mfd. Paper Capacitor	R-34	2 Megohm Volume Control, 1/2 Meg-ohm Tap
C-58	.05 Mfd. Paper Capacitor	R-35	180 Ohms 2 W Carbon Resistor
C-60	.05 Mfd. Paper Capacitor	R-36	3300 Ohms 2 W Carbon Resistor
C-61	.05 Mfd. Paper Capacitor	R-37	56,000 Ohms Carbon Resistor
C-63	.05 Mfd. Paper Capacitor	R-39	15,000 Ohms 2 W Carbon Resistor
C-64	.02 Mfd. Paper Capacitor	R-40	3300 Ohms 2 W Carbon Resistor
C-66	.003 Mfd. Paper Capacitor	R-41	330 Ohms Carbon Resistor
C-68	.008 Mfd. Paper Capacitor	R-42	82 Ohms Carbon Resistor
C-69	.05 Mfd. Paper Capacitor	S-1	Band Change Switch
C-70	.05 Mfd. Paper Capacitor	S-2	Tone Control Switch
C-74	.001 Mfd. 1500 V. Paper Capacitor	S-3	Power Switch
C-81A	40 Mfd. Electrolytic Capacitor	S-4	Touch Tuning Switch
C-81B	20 Mfd. Electrolytic Capacitor	T-1	Power Transformer
C-81C	5 Mfd. Electrolytic Capacitor	T-2	Output Transformer
C-81D	40 Mfd. Electrolytic Capacitor		

IMPORTANT

Although the schematic diagram indicates that this model is adaptable to line-voltages up to 250 volts, do not attempt to operate it from any power source other than 105-125 volts, 60 cycles as so doing will result in damage to the record changer.

GENERAL ELECTRIC CO.

MODEL 35

*Musaphonic***RADIO-PHONOGRAPH COMBINATION****MODEL 35****SERVICE DATA****Cabinet Dimensions**

Height.....41 3/4 in.
Depth.....18 in.
Width.....23 1/2 in.

Electrical Rating

Rating "A-6"—105-125 volts, 60 cycles, AC, 125 watts

Tuning Frequency Range

Band "B".....540-1600 KC
Band "C".....2200-7000 KC
Band "D".....7000-22,000 KC

Intermediate Frequency.....455 KC

Electrical Power Output

Undistorted.....8 watts
Maximum.....12 watts

Loud-speaker—Permanent Magnet

Cone Diameter.....14 inches
Voice Coil Impedance (400 cycles).....3.5 ohms

Tubes

R.F. Amplifier.....GE-6SK7
Converter-Oscillator.....GE-6K8
I.F. Amplifier.....GE-6SK7
Detector-AVC.....GE-6J5G/6J5GT
Audio Driver.....GE-6SF5
Audio Phase Inverter.....GE-6J5G/6J5GT
Power Output.....(2) GE-6V6G
Rectifier.....GE-5U4G
Tuning Indicator.....GE-6U5
Dial Lamp.....(3) MAZDA No. 44

FOR DATA COVERING RECORD CHANGER SIMILAR TO G.E. LRP-158, SEE RIDER'S

"AUTOMATIC RECORD CHANGERS AND RECORDERS"

All antenna, R.F. and oscillator transformer switch terminals are numbered in the chassis parts layout drawing to facilitate the location of these common points on the schematic diagram.

Loud-speaker

The voice coil on the speaker is accurately and permanently centered at the factory and should seldom give trouble. In case a voice coil needs recentering it will be necessary to replace the entire cone and voice coil assembly. Assembly instructions accompany each replacement cone.

NOTE: In no case should the magnet be removed from the assembled position as it will lose magnetism.

SPECIAL SERVICE INFORMATION

The following information will be found very useful in servicing receivers if a vacuum tube voltmeter or similar voltage measuring instrument is available.

1. Stage Gains*

a. Antenna Post to R.F. Amplifier Grid at
1000 KC.....5.0
4000 KC.....3.7
18,000 KC.....2.6

b. R.F. Amplifier Grid to Converter Grid at
1000 KC.....14.0
4000 KC.....10.0
18,000 KC.....10.0 **

c. R.F. on Converter Grid to I.F. on 1st I.F. Grid at
1000 KC ("B" Manual).....16.0
4000 KC.....30.0
18,000 KC.....34.0

d. I.F. on Converter Grid to I.F. on 1st I.F. Grid at
455 KC ("B" Manual—Gang Closed) 24.0

e. I.F. Amplifier Grid to Detector Grid at
455 KC.....112.0

2. Voltage Across Volume Control to Give 1/2-watt Speaker Output at
400 Cycles.....0.05*

3. D.C. Voltage Developed Across Oscillator Grid Resistor (R-2) with gang closed
"B" Band.....6.2*
"C" Band.....7.8*
"D" Band.....4.8*

* Variations of +10%, -20% are permissible.
** On "D" band, stray oscillator voltage may upset reading.

VOLTAGE CHART

Tubes	Plate to Gnd. Volts	Screen to Gnd. Volts	Cathode to Gnd. Volts	Filament Volts
6SK7 (R.F.)	235	95	4.7	6.3
6K8	Con.-235 Osc.-105	95	4.7	6.3
6SK7 (I.F.)	235	95	3	6.3
6J5G (Det.)	0		0	6.3
6SF5	120		1	6.3
6J5G (Inverter)	90		4	6.3
6V6G	290	230	12.5	6.3
5U4G	277 a.c.		300	5.1
6U5	170			6.3

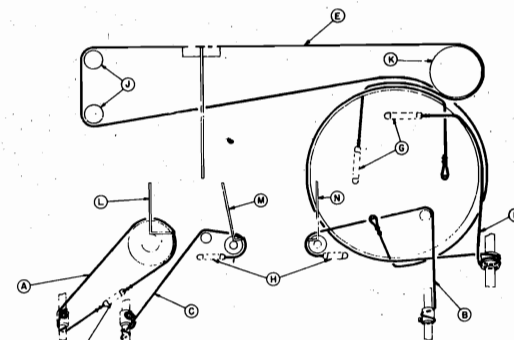


Fig. 1. Stringing Diagram

MODEL 35

GENERAL ELECTRIC CO.

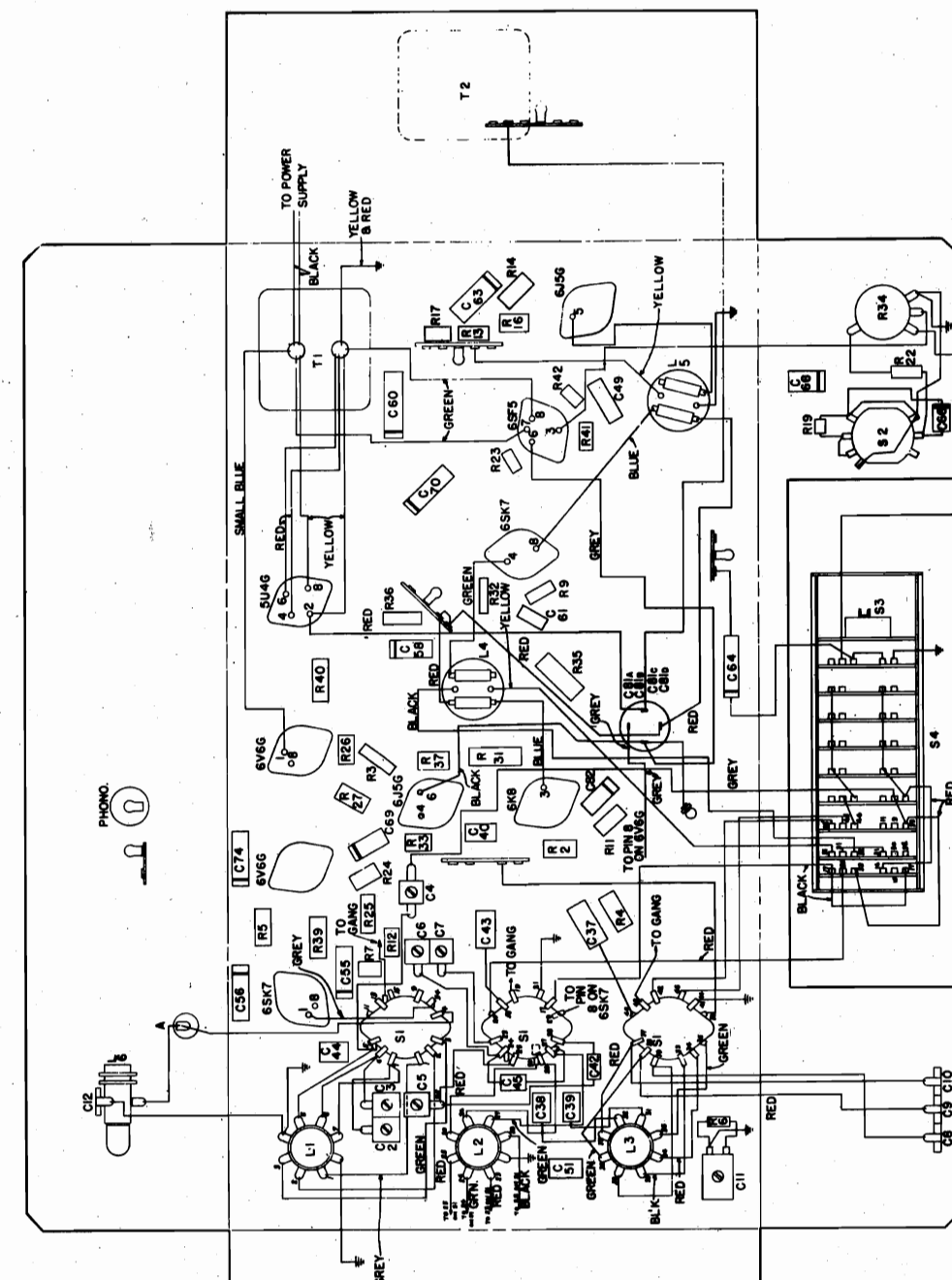


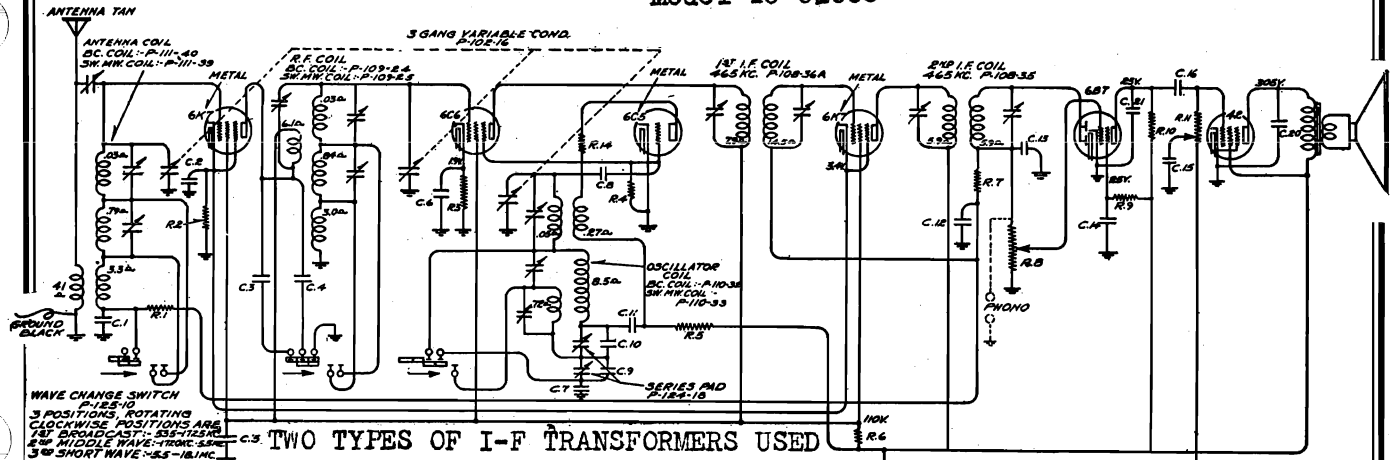
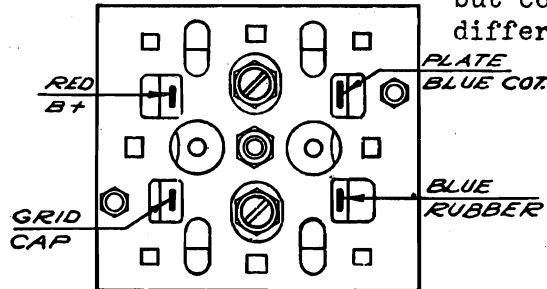
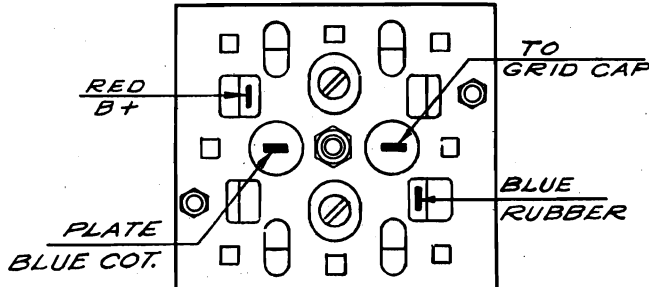
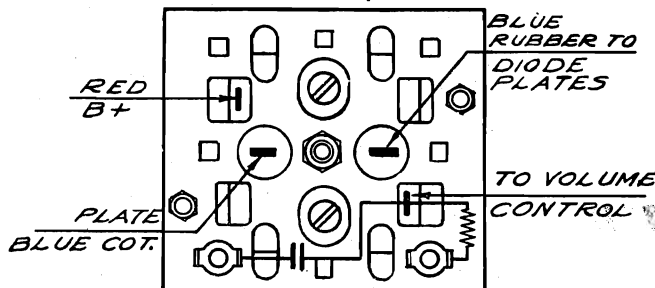
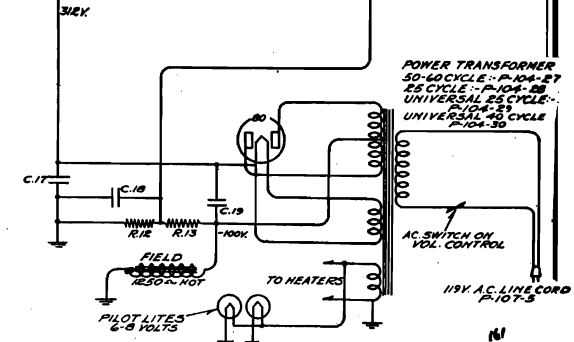
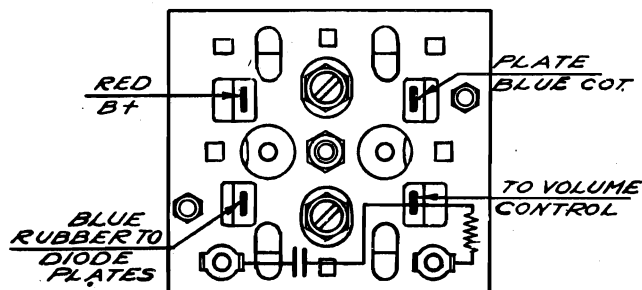
Fig. 2. Chassis Parts Layout

GOODYEAR TIRE & RUBBER CO., INC.

MODEL 45-01005

Series A.B

Model 45-01005

Input I.F.
Meissner Mfg. Co.Operation the same,
but connected
differently.Input I.F.
General Mfg. Co.Output I.F.
General Mfg. Co.Output I.F.
Meissner Mfg. Co.

No.	Part No.	Description
R1.	130-20	100M Ohms— $\frac{1}{2}$ Watt—20%—50 V.
R2.	130-53	180 Ohms— $\frac{1}{2}$ Watt—10%—10 V.
R3.	130-54	500 Ohms— $\frac{1}{2}$ Watt—20%—10 V.
R4.	130-52	50M Ohms— $\frac{1}{2}$ Watt—20%—10 V.
R5.	130-49	12M Ohms—1 Watt—20%—150 V.
R6.	130-61	15M Ohms—2 Watt—20%—180 V.
R7.	130-3	500M Ohms— $\frac{1}{2}$ Watt—20%—100 V.
R8.	101-23	1 meg ohm—Volume Control
R9.	130-19	1 meg ohm— $\frac{1}{2}$ Watt—20%—100 V.
R10.	130-62	250M Ohms— $\frac{1}{2}$ Watt—20%—50 V.
R11.	101-24	308M Ohms—Tone Control
R12.	130-11	250M Ohms— $\frac{1}{2}$ Watt—20%—50 V.
R13.	130-37	750M Ohms— $\frac{1}{2}$ Watt—20%—50 V.
R14.	130-60	100 Ohms— $\frac{1}{2}$ Watt—20%—10 V.

CONDENSERS		
C1.	100-9	.05 x 200 V.—25%
C2.	100-6	.25 x 200 V.—25%
C3.	129-30	.0014 Mica—MW.—20%
C4.	129-21	.0002 Mica—MT—20%
C5.	100-24	.25 x 400 V.—25%
C6.	100-20	.1 x 200 V.—25%
C7.	129-29	.0038 Mica—MW—2 $\frac{1}{2}$ %
C8.	129-31	.000025 Mica—MT—15%
C9.	129-25	.0012 Mica—MW—5%
C10.	129-28	.00084 Mica—MT—5%
C11.	100-13	.05 x 400 V.—25%
C12.	100-13	.05 x 400 V.—25%
C13.	129-32	.00003 Mica—MT—30%
C14.	113-12	.1 x 200 V.—25%
C15.	100-11	.01 x 400 V.—25%
C16.	100-13	.05 x 400 V.—25%
C17.	103-4	16 mfd. x 350 V. Electrolytic
C18.	118-12	.25 x 200 V.—20%
C19.	103-8	14 mfd. x 400 V.
C20.	100-19	.006 x 600 V.—25%
C21.	129-5	.0001 Mica—MT—20%

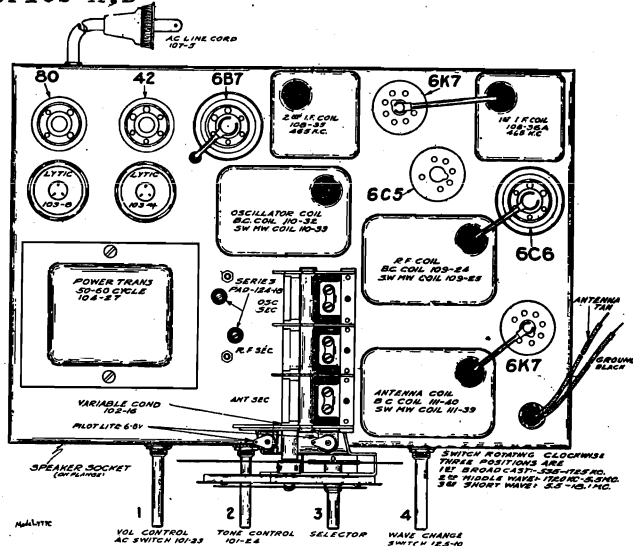
MISCELLANEOUS

111-40	B.C. Coil
111-39	S.W.—MW. Coil
109-24	R.F. Coil
109-25	B.C. Coil
110-32	S.W. M.W. Coil
110-33	Oscillator
108-36A	B. C. Coil
108-35	S.W. M.W. Coil
124-18	Input I.F. Coil 465 Kc.
125-10	Output I.F. Coil 465 Kc.
114-13	Dual Series Pad
114-27	Wave change switch
104-27	Speaker 6 in. Field 1250 ohms
104-28	Speaker 8 in. Field 1250 ohms
104-29	Power Transformer 50-60 Cycle
104-30	Power Transformer 25 Cycle Universal
104-31	Power Transformer 40 Cycle Universal

MODEL 45-01005

Series A,B

GOODYEAR TIRE & RUBBER CO., INC.



NOTE: IN SERIES B THE TYPE 75 WAS REPLACED BY TYPE 6B7, DUPLEX DIODE PENTODE AS A SECOND DETECTOR, A.V.C. AND AUDIO.

Series A and B chassis are serially numbered on the back flange of the chassis, series A beginning with number "5B104021A" and up, series B chassis beginning with number "5D114175B" and up. Series A and B may be identified by the letter "A" and "B" at the end of the serial numbers.

Transformers are available and chassis are sometimes equipped with universal transformers for operation on 40 and 60 cycles and with primary taps for 108, 125, 150, 220 and 250 volts (see instructions) and also sometimes equipped with 25 cycle transformers with 105-115 volt or 220 volt primaries, not universals.

ALIGNING INSTRUCTIONS

Dummy Antennas

The following dummy antennas are used in aligning both series A and B and are referred to in the following alignment instructions as "Dummy 1", "Dummy 2", and "Dummy 3".

Dummy 1: (I.F.)—Consists of a .1 mfd. condenser connected in series with the external oscillator.

Dummy 2: (Broadcast)—Consists of a 200 mmfd. condenser and a 20 ohm resistor connected in series with each other and in series with the external oscillator.

Dummy 3: (Intermediate and Short Wave)—Consists of a .1 mfd. condenser and a 400 ohm resistor connected in series with each other and in series with the external oscillator.

ALIGNMENT PROCEDURE SERIES A ONLY

The following adjustments to be made after the I.F.'s have been aligned as explained above.

BROADCAST BAND ALIGNMENT:

1. With wave changing switch in the broadcast position, extreme left of its rotation, and with external oscillator set at 550 kilocycles and connected in series with "Dummy 2" to the tan antenna and black ground lead, make the following adjustments:

- Adjust broadcast series pad to resonance with oscillator. Keep set in tune with oscillator by slowly rocking to and fro the variable condenser until maximum output is obtained. Note: This adjustment is accessible from the top of the chassis and is located between the variable condenser and the electrolytic condenser. See top view.
- Re-set external oscillator to 1500 K.C., move dial pointer to 1500 K.C. and adjust oscillator (adjustment number 3), R.F. (adjustment number 2) and antenna (adjustment number 1) to resonance. See bottom view for location of these adjustments.
- Repeat adjustments "a" and "b" until sensitivity is at its maximum.

NOTE: IT IS EXTREMELY NECESSARY IN MAKING ALL OF THESE ADJUSTMENTS THAT THE FUNDAMENTAL OSCILLATOR SIGNAL BE TUNED IN AND NOT THE IMAGE FREQUENCY WHICH WILL FALL BELOW THE FUNDAMENTAL.

SHORT WAVE BAND ALIGNMENT:

1. With wave changing switch in the short wave position, extreme right of its rotation, and with external oscillator set at 17 megacycles and connected in series with "Dummy 3" to the tan antenna and black ground lead, make the following adjustments:

- Move dial pointer to 17 megacycles and adjust short wave oscillator (adjustment number 8), short wave R.F. (adjustment number 7) and short wave antenna (adjustment number 6) to resonance.
- Re-set external oscillator to 6 megacycles and pick up signal by rotating variable condenser and check for sensitivity.

INTERMEDIATE BAND ALIGNMENT:

1. With wave changing switch in the intermediate position, center of its rotation, and with external oscillator set at 5 megacycles and connected in series with "Dummy 3" to the tan antenna and black ground lead, make the following adjustments:

- Move dial pointer to 5 megacycles and adjust intermediate wave oscillator (adjustment number 9), intermediate wave R.F. (adjustment number 5) and intermediate antenna (adjustment number 4) to resonance.
- Re-set external oscillator to 1800 K.C. and pick up signal by rotating variable condenser and check for sensitivity.
- Re-check broadcast sensitivity as outlined under "Broadcast Band Alignment".

Series "A" chassis have no intermediate band series oscillator pad adjustment.

ALIGNMENT PROCEDURE SERIES B ONLY

The following adjustments to be made after the I.F.'s have been aligned as explained above.

BROADCAST BAND ALIGNMENT:

1. With wave changing switch in the broadcast position, extreme left of its rotation, and with external oscillator set at 600 kilocycles and connected in series with "Dummy 2" to the tan antenna and black ground lead, make the following adjustments:

- Adjust broadcast series pad to resonance with oscillator. Keep set in tune with oscillator by slowly rocking to and fro the variable condenser until maximum output is obtained. Note: This adjustment is accessible from the top of the chassis and is located between the variable condenser and the electrolytic condenser. See top view.
- Re-set external oscillator to 1400 K.C., move dial pointer to 1400 K.C. and adjust oscillator (adjustment number 3), R.F. (adjustment number 2) and antenna (adjustment number 1) to resonance. See bottom view for location of these adjustments.
- Repeat adjustments "a" and "b" until sensitivity is at its maximum.

NOTE: IT IS EXTREMELY NECESSARY IN MAKING ALL OF THESE ADJUSTMENTS THAT THE FUNDAMENTAL OSCILLATOR SIGNAL BE TUNED IN AND NOT THE IMAGE FREQUENCY WHICH WILL FALL BELOW THE FUNDAMENTAL.

SHORT WAVE BAND ALIGNMENT:

1. With wave changing switch in the short wave position, extreme right of its rotation, and with external oscillator set at 17 megacycles and connected in series with "Dummy 3" to the tan antenna and black ground lead, make the following adjustments:

- Move dial pointer to 17 megacycles and adjust short wave oscillator (adjustment number 8), short wave R.F. (adjustment number 7) and short wave antenna (adjustment number 6) to resonance.
- Re-set external oscillator to 6 megacycles and pick up signal by rotating variable condenser and check for sensitivity.

INTERMEDIATE BAND ALIGNMENT:

1. With wave changing switch in the intermediate wave position, center of its rotation, and with external oscillator set at 1800 K.C. and connected in series with "Dummy 3" to the tan antenna and black ground lead, make the following adjustments:

- Rotate variable condenser to approximately 1800 K.C., tune in oscillator signal and adjust M.W. series pad (see top view) to resonance. Slowly rock condenser to and fro while making this adjustment to be sure maximum output is obtained.
- Set external oscillator at 5 M.C., rotate condenser, pick up signal and adjust intermediate wave R.F. (adjustment number 5), intermediate wave antenna (adjustment number 4) and intermediate wave oscillator (adjustment number 9) to resonance.
- Re-check broadcast alignment and if it is found necessary to re-adjust either R.F. or antenna trimmers, repeat the 17 M.C. short wave and 5 M.C. intermediate wave adjustments.

ALIGNING I.F. TRANSFORMERS (465 K.C.)

Series A and B.

Series A—Part No. 108-35 Output I.F. Transformer
Series A—Part No. 108-36 Input I.F. Transformer
Series B—Part No. 108-35 Output I.F. Transformer
Series B—Part No. 108-36 Input I.F. Transformer

These I.F. transformers have two adjustments, both of which are accessible from the underside of chassis (see bottom view).

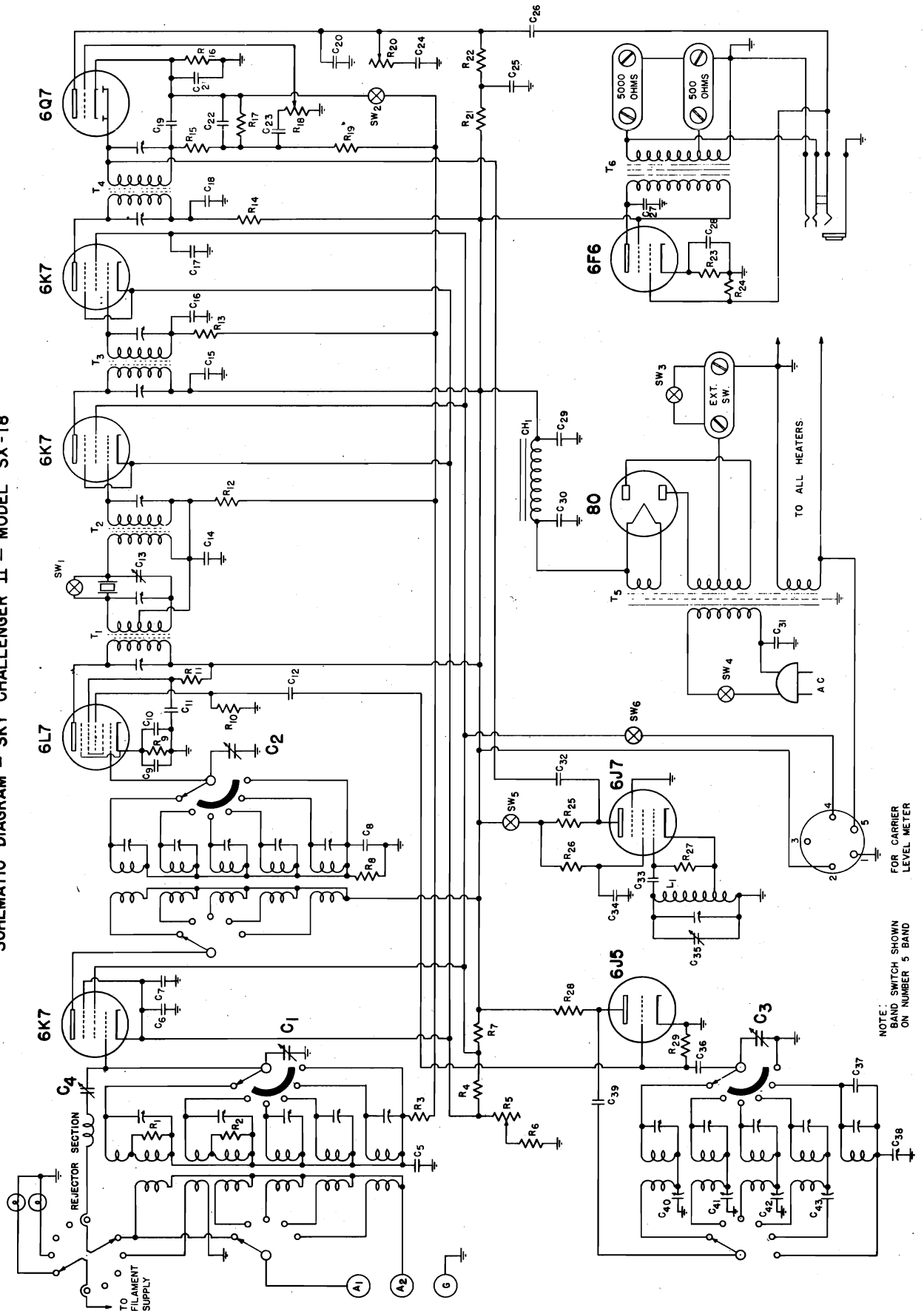
1. With volume control full on, the extreme right of its rotation, and with wave changing switch in the broadcast position, extreme left of its rotation, and with variable condenser set to approximately 1400 kilocycles, make the following adjustments:

- Connect external oscillator set at 465 kilocycles, in series with "Dummy 1", to the control grid cap of the type 6D6 tube, located between the two I.F. transformers, and adjust the output I.F. transformer to resonance.
- With "Dummy 1" still connected, move oscillator output clip from grid of 6D6 to grid cap to 6C6 and adjust input I.F. transformer to resonance.
- With oscillator still connected to 6C6, re-adjust output I.F. transformer.

THE HALLICRAFTERS INC.

MODELS S-18, SX-18
Sky Challenger II

SCHEMATIC DIAGRAM - SKY CHALLENGER II - MODEL SX-18


NOTE: BAND SWITCH SHOWN
ON NUMBER 5 BAND

MODELS S-18, SX-18
Sky Challenger II

THE HALLICRAFTERS INC.

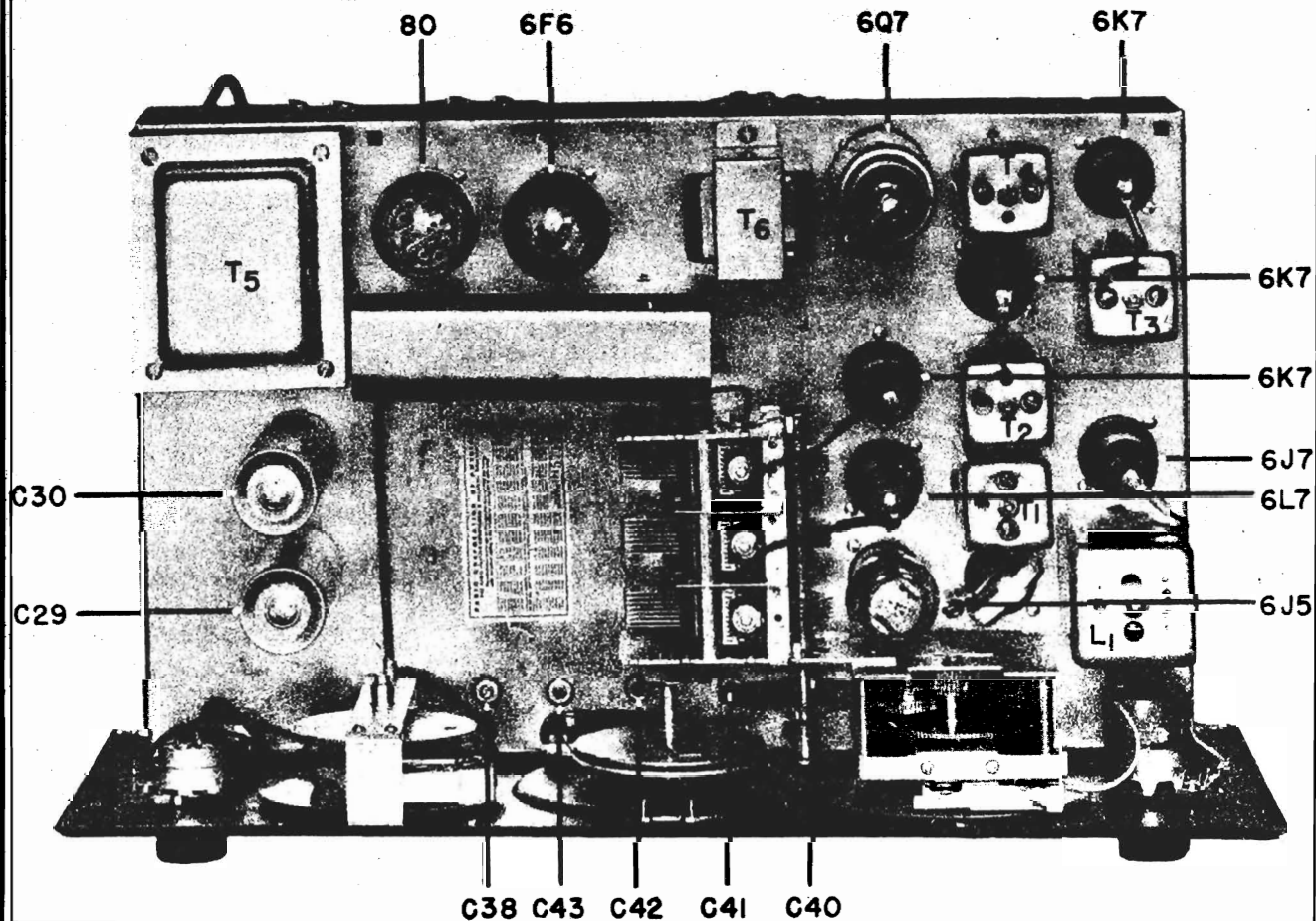
CONDENSERS

C1	250	MMFD		
C2	250	"		
C3	250	"		
C4	15	"	AIR VARIABLE	
C5	.002	MFD		
C6	.002	MFD	400 VOLT MICA	
C7	.25	"	200 "	
C8	.002	"	" "	
C9	.05	"	" "	
C10	.002	"	" "	
C11	.05	"	400 "	
C12	50	MMFD	" "	
C13	25	"	AIR VARIABLE	
C14	.02	MFD	200 VOLT	
C15	.25	"	400 "	
C16	.02	"	200 "	
C17	.1	"	400 "	
C18	.05	"	" "	
C19	250	MMFD	" "	
C20	500	"	" "	
C21	10	MFD	25 " ELECTROLYTIC	
C22	250	MMFD	" "	
C23	.05	MFD	200 "	
C24	.005	"	400 "	
C25	.1	"	" "	
C26	.05	"	" "	
C27	.003	"	" "	
C28	10	"	25 " "	
C29	16	"	400 " "	
C30	16	"	" " "	
C31	.01	"	" "	
C32	10	MMFD	" "	
C33	250	"	" "	
C34	.02	MFD	" "	
C35	25	MMFD	AIR VARIABLE	
C36	25	"	" "	
C37	10	"	" "	
C38	200	"	VARIABLE PAD	

C39	25	"	MICA	
C40	.0012	MFD	VARIABLE PAD	
C41	.0011	"	" "	
C42	.00093	"	" "	
C43	.00039	"	" "	

RESISTORS

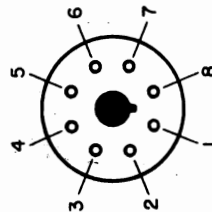
No.	OHMS.	
R1	250	
R2	125	
R3	100,000	
R4	30,000	
R5	10,000	R. F. GAIN CONTROL
R6	250	
R7	15,000	
R8	100,000	
R9	600	
R10	100,000	
R11	30,000	
R12	100,000	
R13	100,000	
R14	1,000	
R15	20,000	
R16	4,000	
R17	500,000	VOLUME CONTROL
R18	500,000	
R19	1,000,000	TONE CONTROL
R20	500,000	
R21	100,000	
R22	250,000	
R23	500	
R24	250,000	
R25	100,000	
R26	100,000	
R27	50,000	
R28	10,000	
R29	50,000	



THE HALLICRAFTERS INC.

MODELS S-18, SX-18
Sky Challenger II

THE FOLLOWING MEASUREMENTS MADE WITH 1000 OHMS PER VOLT METER AND TAKEN FROM THE POINT INDICATED TO GROUND WITH THE AVC SWITCH IN THE "ON" POSITION. ANTENNA AND GROUND DISCONNECTED AND R. F. AND A. F. GAIN CONTROLS SET AT MAXIMUM. LINE VOLTAGE OF 115 AT THE TIME THESE MEASUREMENTS WERE TAKEN. NORMAL TOLERANCE ALLOWS VARIATIONS OF PLUS OR MINUS 10% FROM THE VALUES INDICATED. "DL" INDICATES A DEAD LUG BUT WILL INDICATE VOLTAGE WHEN USED AS A TIE.



BOTTOM VIEW OF SOCKET

TUBE	FUNCTION	1	2	3	4	5	6	7	8
6K7	R. F. AMP.			260	125	5	DL	6.3	5
6L7	MIXER			260	105	-6	DL	6.3	4.5
6J5G	Osc.			168	DL	-19	DL	6.3	0
6K7	IF AMP (1)			265	125	5	DL	6.3	5
6K7	IF AMP (2)			250	125	5	260DL	6.3	5
6Q7G	2ND DET. A.V.C.			75	1	1		6.3	2
6F6G	1ST AUDIO 2ND AUDIO			245	260	0	16DL	6.3	16
6J7	BEAT OSG.			105	105	0	0DL	6.3	0

INTERMEDIATE FREQUENCY ALIGNMENT (465 KC)

HAVE THE CONTROLS SET IN THE FOLLOWING POSITIONS:

- B.F.O. SWITCH "OFF"
- A. F. AND R. F. GAIN CONTROLS ON FULL.
- CRYSTAL PHASING CONDENSER MIDWAY (POINTER STRAIGHT UP).
- A.V.C. SWITCH "OFF".
- CRYSTAL SWITCH "IN".
- BAND SWITCH ON #1 BAND - TUNING GANG OPEN (MINIMUM CAPACITY).
- REMOVE 6J5G OSCILLATOR TUBE FROM ITS SOCKET.
- REMOVE THE 6L7 GRID CAP.

ALIGNMENT USING A 465 KC CRYSTAL

SHOULD THE RECEIVER BE A CRYSTAL MODEL IT IS NECESSARY THAT THE CRYSTAL BE USED IN AN EXTERNAL OSCILLATOR IN PLACE OF A SIGNAL GENERATOR SUCH AS THE ABOVE. THE OUTPUT OF THIS CRYSTAL CONTROLLED OSCILLATOR IS THEN FED TO THE GRID OF THE 6L7 TUBE AND THE ABOVE PROCEDURE FOLLOWED. WHEN THE IF AMPLIFIER HAS BEEN ALIGNED, FROM THE CRYSTAL OSCILLATOR'S OUTPUT, RE-INSERTING THE CRYSTAL IN ITS SOCKET IN THE RECEIVER WILL SHOW LITTLE DIFFERENCE IN OUTPUT WHETHER THE CRYSTAL IS "IN" OR "OUT" OF THE CIRCUIT AS INDICATED BY THE CRYSTAL SWITCH.

R. F. ALIGNMENT PROCEDURE

ON BAND #1, OR BROADCAST, USE A .0002 MFD CONDENSER IN SERIES WITH THE OUTPUT LEAD FROM THE GENERATOR TO A1 ON THE RECEIVER. ON THE OTHER BANDS A 400 OHM RESISTOR SHOULD BE USED. BE SURE THE JUMPER FROM THE DOUBLET, OR A2 POST, TO GROUND REMAINS CONNECTED WHEN ALIGNING THE RECEIVER.

ALL PAD ADJUSTMENTS (LOCATED ON THE TOP OF THE CHASSIS) ARE FOR THE LOW FREQUENCY ENDS OF THE BANDS.

ALL TRIMMER ADJUSTMENTS (LOCATED ON THE BOTTOM OF THE CHASSIS) ARE FOR THE HIGH FREQUENCY ENDS OF THE BANDS.

REDUCE R.F. GAIN CONTROL BELOW THE POINT OF BLOCKING OR OVERLOADING; ALSO BE SURE THAT THE CRYSTAL SWITCH IS IN THE "OUT" POSITION AND THE AVC SWITCH IS IN THE "OFF" POSITION.

BE SURE TO CHECK IMAGES - IMAGES WILL FALL A LITTLE LESS THAN 1 MC LOWER IN FREQUENCY ON BANDS 1 TO 4 INCLUSIVE. ON BAND 5 THE IMAGE WILL FALL ABOUT 1 MC HIGHER IN FREQUENCY THAN THE FUNDAMENTAL.

REJECTOR ADJUSTMENT - ON BANDS 1, 2 AND 3 THE REJECTOR CIRCUIT SHOULD BE LEFT AT 34 MC. ON BANDS 4 AND 5 THE REJECTOR IS IN THE CIRCUIT. CARE SHOULD BE EXERCISED TO SEE THAT THE REJECTOR CIRCUIT IS NOT ADJUSTED SO THAT IT WILL REJECT THE SIGNAL FREQUENCY. IF THIS OCCURS VERY LOW SENSITIVITY WILL RESULT WHICH CAN BE CURED BY DETUNING THE REJECTOR ABOUT 1 MC.

WHEN ALIGNING THE R.F. END OF THE RECEIVER THE TUNING GANG SHOULD BE ROCKED BACK AND FORTH ACROSS THE SIGNAL SO THAT YOU ARE SURE YOUR ADJUSTMENTS ARE SUCH THAT YOU HAVE OBTAINED MAXIMUM GAIN AND ACCURATE TRACKING.

NOTE #1 HARMONICS OF SUITABLE FREQUENCIES MAY BE USED IF THE FOLLOWING FREQUENCIES SUGGESTED ARE NOT AVAILABLE.

NOTE #2 IT IS NECESSARY TO REPEAT EACH PAIR OF OPERATIONS SEVERAL TIMES UNTIL NO CHANGE IS NOTED.

MODELS S-18, SX-18
Sky Challenger II

THE HALLICRAFTERS INC.

OPR.	BAND	RECEIVER DIAL SETTING	SIGNAL GENERATOR FREQUENCY	ADJUST Osc. WITH	TRIMMERS R. F. & MIXER WITH	ADJUST Osc. PAD WITH	SET REJECTOR DIAL AT
1 2	1 1	600kc 1100kc	600kc 1100kc	----- CA	----- Cc - Cb	C38 -----	----- -----
3 4	2 2	1300kc 2600kc	1300kc 2600kc	----- Cd	----- Cf - Ce	C43 -----	----- -----
5 6	3 3	3000kc 6000kc	3000kc 6000kc	----- Ce	----- Ci - Ch	C42 -----	----- -----
7 8	4 4	7000kc 14000kc	7000kc 14000kc	----- Cj	----- Cl - Ck	C41 -----	9 mc 14mc
9 10	5 5	17000kc 34000kc	17000kc 34000kc	----- Cm	----- Co - Cn	C40 -----	24mc 34mc

IT IS HELPFUL TO REMEMBER THAT THE CARTRIDGE TYPE AIR TRIMMING CONDENSERS WILL SHOW AN INCREASE OF CAPACITY WHEN THE SCREW IS ROTATED COUNTER-CLOCKWISE.

WHEN MAKING ADJUSTMENTS ON THIS RECEIVER IT IS SUGGESTED THAT GAIN BE CONTROLLED BY USING THE R.F. GAIN CONTROL ONLY. LEAVE THE A.F. GAIN CONTROL ON FULL AT ALL TIMES.

TO MAKE A RAPID CHECK OF THE RECEIVER REMOVE THE GRID CAP OF THE 6Q7 TUBE AND TOUCH THE GRID OF THE TUBE WITH YOUR FINGER. IF A LOUD HUM IS HEARD THE AUDIO END OF THE RECEIVER IS OK.

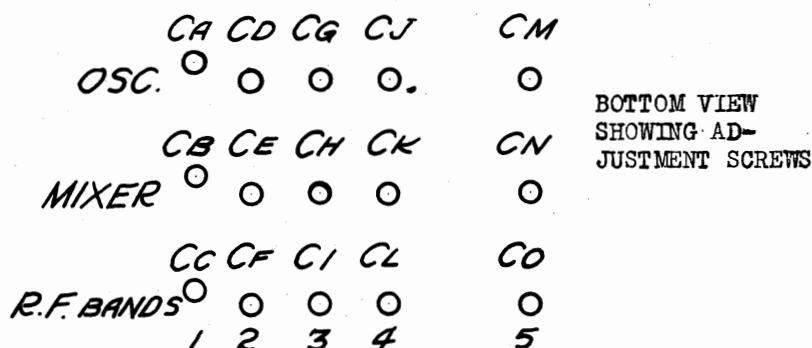
DEAD SET. CHECK BIAS ON THE R. F. TUBES. IF THIS BIAS IS TOO HIGH CHECK THE R.F. GAIN CONTROL FOR AN OPEN CIRCUIT. ADDITIONALLY, CHECK THE PLATE AND SCREEN VOLTAGE OF THE R.F. TUBES - (SEE CHART). CHECK B PLUS FOR A SHORT TO GROUND - IF SO CHECK ALL TUBES.

IF THE TUNING GANG IS NOISY WHEN THE SET IS JARRED, INCREASE THE TENSION ON THE GANG WIPERS.

NOISY COIL ASSEMBLY - CHECK SWITCH CONTACTS. ALSO CHECK THE TRIMMERS ON THE PARTICULAR BAND IN WHICH NOISE OCCURS. IT IS POSSIBLE THAT THE TRIMMER HAS DEVELOPED A PARTIAL SHORT.

IF LOW SIGNAL AND HIGH NOISE LEVEL DEVELOPS, REPLACE THE 6L7 TUBE.

DEAD BEAT OSCILLATOR - IF THE 6J7 SHOULD SHORT TO GROUND THE BEAT OSCILLATOR WILL BE DEFECTIVE. CHECK B PLUS TO B0 COIL FOR A GROUND. IN MOST CASES A NEW 6J7 WILL CORRECT A DEAD B0.



BOTTOM VIEW
SHOWING AD-
JUSTMENT SCREWS

THE HALLICRAFTERS INC.

MODELS S-18, SX-18
Sky Challenger II

THE IMAGE REJECTOR

THE REJECTOR CIRCUIT INCORPORATED IN THE SKY CHALLENGER II REPRESENTS A NOTEWORTHY CONTRIBUTION BY THE HALLICRAFTERS TO IMAGE-FREE HIGH-FREQUENCY RECEPTION. IT HAS LONG BEEN APPRECIATED THAT ADDITIONAL STAGES OF RADIO FREQUENCY AMPLIFICATION WAS NOT THE CORRECT ANSWER TO IMAGE SUPPRESSION. THROUGH THE USE OF THE "INFINITE IMAGE REJECTOR" IN THE SKY CHALLENGER II ALL PREVIOUS IMAGE RATIOS ARE OUT-MODED. IMAGE REJECTION OF INFINITY/1 IS NOW POSSIBLE.

THE REJECTOR IS UNIQUE. BECAUSE OF THAT YOUR ATTENTION IS CLOSELY DRAWN TO THE PROPER OPERATION OF THE CONTROL AS WELL AS WHAT TO EXPECT FROM ITS USE.

THE REJECTOR IS SWITCHED INTO THE CIRCUIT ONLY WHEN THE RECEIVER IS OPERATED ON BANDS #4 AND #5. YOU WILL NOTICE A LIGHT APPEAR BEHIND THE PARTICULAR CALIBRATED SCALE THAT SHOULD BE USED.

LET US OPERATE THE RECEIVER ON THE 14 MC. OR 20 METER AMATEUR BAND. IN TUNING ACROSS THE BAND YOU RUN ACROSS THE IMAGE OF SOME COMMERCIAL STATION. THE FUNDAMENTAL OF THIS STATION AS WE ALL KNOW IS REMOVED FROM THE 20 METER BAND BY DOUBLE THE FREQUENCY TO WHICH THE I. F. AMPLIFIER OF THE RECEIVER IS TUNED. NOW ADJUST THE REJECTOR CONTROL CAREFULLY IN THE VICINITY OF 14 MC ON THE CALIBRATED REJECTOR DIAL. WHEN PROPERLY ADJUSTED THE IMAGE WILL BE COMPLETELY ELIMINATED WITHOUT SERIOUSLY AFFECTING THE SENSITIVITY OF THE RECEIVER ON THE FREQUENCY TO WHICH IT HAD BEEN TUNED.

SHOULD YOU BE LISTENING AT A FREQUENCY NOT BEING BOTHERED WITH IMAGES, AND YOU DO NOT WISH TO USE THE REJECTOR LEAVE THE CONTROL AS FOLLOWS FOR THE TWO AMATEUR BANDS COVERED BY THE REJECTOR CIRCUIT.

20 METERS - LEAVE THE REJECTOR AT APPROXIMATELY 15 MC. (ON THIS BAND THE 14 MC HIGH FREQUENCY OSCILLATOR IS ON THE HIGH-FREQUENCY SIDE).

NOTE: THE 7 MC OR 40 METER BAND IS ALSO ON BAND #4 OF THE RECEIVER. WHEN RECEIVING ON 40 METERS THE REJECTOR CONTROL SHOULD BE LEFT 9 MC. USE OF THE REJECTOR CIRCUIT ON THIS BAND IS NOT NECESSARY.

10 METERS - LEAVE THE REJECTOR AT APPROXIMATELY 27 MC. (THE OSCILLATOR 28 MC IS ON THE LOW FREQUENCY SIDE ON THIS BAND).

CAUTION: SHOULD YOU NOT BE ABLE TO GET SIGNALS THROUGH AT ALL CHECK THE SETTING OF THE REJECTOR CONTROL. IT IS POSSIBLE THAT YOU HAVE THE REJECTOR CONTROL AT A POINT WHERE THE FREQUENCY TO WHICH YOU WISH TO LISTEN IS BEING REJECTED, OR "BEING DROPPED IN THE SLOT".

ALWAYS REMEMBER TO KEEP THE REJECTOR CONTROL SET AT APPROXIMATELY THE SAME FREQUENCY AS THAT TO WHICH YOU ARE LISTENING. WHEN YOU MOVE THE MAIN TUNING CONTROL FOLLOW UP WITH THE REJECTOR OR OTHERWISE YOU WILL RUN INTO THE POSSIBILITY OF LEAVING YOUR MAIN TUNING DIAL AT A GROUP OF FREQUENCIES BEING REJECTED.

THE TOTAL POWER CONSUMPTION OF THE SKY CHALLENGER II IS 75 WATTS AT 115 VOLTS 60 CYCLE ALTERNATING CURRENT.

SPEAKER - HEADPHONES ETC.

ON THE LOWER RIGHT HAND CORNER OF THE BACK OF THE CHASSIS YOU WILL FIND A TERMINAL STRIP MARKED 5000 OHMS. TO THIS STRIP SHOULD BE CONNECTED THE HALLICRAFTERS PERMANENT MAGNET DYNAMIC SPEAKER. THE TERMINAL STRIP DIRECTLY ABOVE THE 5000 OHM STRIP AND MARKED 500 OHMS CAN BE CONNECTED TO A LOAD OF THAT IMPEDANCE VALUE. THE OTHER TERMINAL STRIP TO THE RIGHT OF THESE TWO, AND MARKED "EXT SW", IS USED TO MAKE THE RECEIVER TEMPORARILY INOPERATIVE FOR STAND-BY DURING TRANSMISSION PERIODS. THESE TWO TERMINALS SHOULD BE CONNECTED TO AN EXTERNAL SWITCH WITHIN IN CONJUNCTION WITH THE POWER SWITCH ON YOUR TRANSMITTER OR A MANUALLY OPERATED SWITCH AT YOUR OPERATING POSITION. WHEN USING AN EXTERNAL SWITCH THE SEND RECEIVE SWITCH ON THE RECEIVER SHOULD BE IN THE SEND POSITION.

IN THIS RECEIVER THE SPEAKER IS NOT A PORTION OF THE FILTER SYSTEM. THIS ALLOWS THE RECEIVER TO BE OPERATED INDEPENDENTLY OF THE SPEAKER. FOR MOST SATISFACTORY RESULTS AN 8 INCH HALLICRAFTERS SPEAKER SHOULD BE USED WITH THE SKY CHALLENGER II.

THE HEADPHONE JACK IS CONNECTED TO THE PLATE OF THE 6Q7 TUBE THROUGH A CONDENSER. THE POSSIBILITY OF SHOCK TO THE OPERATOR IS ELIMINATED BY HAVING NO DIRECT CURRENT FLOWING THROUGH THE HEADPHONES. CRYSTAL TYPE HEADPHONES CAN BE USED WITH THIS RECEIVER WITHOUT USING A SPECIAL COUPLING TRANSFORMER.

CRYSTAL OPERATION

TO PROPERLY ADJUST THE CRYSTAL CIRCUIT FOR BEST PERFORMANCE THE FOLLOWING PROCEDURE SHOULD BE CAREFULLY FOLLOWED:

TUNE IN SOME STATION TRANSMITTING CONTINUOUSLY. BE VERY CAREFUL TO SET THE SIGNAL RIGHT ON THE NOSE. AFTER YOU ARE SURE THAT YOU HAVE THE SIGNAL RESONATED PERFECTLY, SNAP THE "BFO" SWITCH TO THE "ON" POSITION. YOU SHOULD HEAR A WHISTLE, OR BEAT NOTE. AFTER THE BFO IS ON ROTATION OF THE "PITCH CONTROL" WILL CHANGE THE TONE OF THE BEAT NOTE. PROPER OPERATION OF THIS CONTROL WILL BE INDICATED BY HEARING THE SIGNAL TWICE IN ONE COMPLETE ROTATION OF THE KNOB; THERE BEING TWO POSITIONS AT WHICH NO SIGNAL, OR WHISTLE, WILL BE HEARD. THESE TWO POSITIONS ARE KNOWN AS THE "ZERO BEAT" POSITIONS.

NOW SNAP THE "CRYSTAL SWITCH" TO THE "ON" POSITION. YOU WILL NOTICE A GREAT REDUCTION IN NOISE. CAREFULLY RETUNE THE SIGNAL ON THE BAND SPREAD DIAL. NOTICE HOW SHARPLY THE SIGNAL PEAKS. NOW TUNE THROUGH THE SIGNAL AND FIND WHICH SIDE OF THE SIGNAL IS THE WEAKER. TUNE IN THE WEAKER SIDE AND THEN CAREFULLY ADJUST THE "CRYSTAL PHASING" CONTROL UNTIL THE SIGNAL IS INAUDIBLE. GOING BACK TO THE OTHER SIDE OF THE SIGNAL SHOULD FIND NO CHANGE IN ITS VOLUME, AND KNIFE-LIKE SELECTIVITY RESULTING. USE WHICHEVER SIDE OF ZERO-BEAT ADJUSTMENT OF THE PITCH CONTROL, IN CONJUNCTION WITH CRITICAL ADJUSTMENT OF THE PHASING CONTROL GIVES THE GREATER REJECTION OF THE INTERFERING SIGNAL.

THE PHASING CONTROL AFFECTS THE SENSITIVITY AND SELECTIVITY OF THE RECEIVER WHETHER THE CRYSTAL IS IN THE CIRCUIT OR NOT. THE CRYSTAL MAY BE USED WHEN RECEIVING TELEPHONE SIGNALS WITH SOME SACRIFICE IN THEIR QUALITY DUE TO THE EXTREME SELECTIVITY DEVELOPED.

MODELS S-18, SX-18
Sky Challenger II

THE HALLICRAFTERS INC.

ADJUST THE "BANDS" SWITCH UNTIL THE POINTER ON THE KNOB INDICATES THAT YOU HAVE THE BAND YOU WISH TO TUNE IN THE CIRCUIT. WHEN LISTENING FOR DISTANT OR POSSIBLY WEAK STATIONS, IT IS RECOMMENDED THAT THE CONTROL MARKED "BFO" BE USED BY SNAPPING THE SWITCH TO THE "ON" POSITION. ONCE THE TELEPHONE SIGNALS HAVE BEEN LOCATED THE BFO SHOULD BE TURNED OFF OR A CONTINUOUS WHISTLE WILL RESULT. WHEN LISTENING FOR OR TO CW CODE TRANSMISSIONS THE BFO MUST BE LEFT ON. THE "PITCH CONTROL" WILL PROVE MOST HELPFUL IN CHANGING THE BEAT NOTE TO ONE MOST PLEASING TO THE OPERATOR. IT IS ADVISABLE TO HAVE THE "AVC" SWITCH IN THE OFF POSITION WHENEVER THE BFO SWITCH IS ON.

THE TUBE LINE-UP

- 6K7 PRE-SELECTOR, R.F. AMPLIFIER
- 6L7 1ST DETECTOR-MIXER
- 6J5 SIGNAL FREQUENCY OSCILLATOR
- 6K7 1ST I. F. AMPLIFIER
- 6K7 2ND I. F. AMPLIFIER
- 6Q7 2ND DETECTOR, AVC, 1ST STAGE OF AUDIO
- 6F6 2ND AUDIO STAGE
- 6J7 BEAT FREQUENCY OSCILLATOR
- 80 FULL WAVE RECTIFIER

THE 6K7 R. F. STAGE GIVES MAXIMUM GAIN IN INVERSE RELATION TO FREQUENCY AND PROVIDES INCREASED SELECTIVITY.

THE FIRST DETECTOR-MIXER IS A 6L7. THE OUTPUT OF THE 6J5 SIGNAL FREQUENCY OSCILLATOR IS ELECTRON COUPLED TO THE INJECTOR, OR #3 GRID, OF THE 6L7. BECAUSE NO OSCILLATOR PLATE CURRENT FLOWS IN THE 1ST DETECTOR THE RATIO OF SIGNAL TO NOISE IS MORE FAVORABLE THAN THAT OBTAINED IN A COMPOSITE TUBE, OR IN CIRCUITS WHERE THE CATHODES OF TWO TUBES ARE TIED TOGETHER.

THE 6J5 OSCILLATOR HAS SEPARATE COILS FOR EACH BAND. SUPERIOR OVER-ALL PERFORMANCE OF THE SKY CHALLENGER II IS IN PART DUE TO THE DESIGN OF THE SIGNAL FREQUENCY OSCILLATOR. NO HARMONICS OF THE OSCILLATOR ARE USED ON ANY OF THE BANDS COVERED BY THIS RECEIVER.

THE TWO 6K7 I. F. AMPLIFIER STAGES USE IRON-CORE TRANSFORMERS WHICH RESONATE AT 465 KC. THIS TYPE OF TRANSFORMER HAS SO DEFINITELY SHOWN ITS SUPERIORITY OVER THE AIR CORE TYPE AS TO WARRANT ITS USE IN THE SKY CHALLENGER II. TREMENDOUS GAIN, AND A BETTER SIGNAL TO NOISE RATIO ARE BUT TWO OF THE MANY ADVANTAGES OF THE IRON-CORE SYSTEM.

THE 6J7 BEAT OSCILLATOR OUTPUT IS COUPLED TO THE DIODE PLATES OF THE 6Q7 SECOND DETECTOR. THE 6J7 OSCILLATOR IS ELECTRON COUPLED.

THE 6F6 AUDIO OUTPUT STAGE IS CAPABLE OF DELIVERING 3.5 WATTS OF AUDIO.

OPERATING INSTRUCTIONS - SKY CHALLENGER II MODELS S-18, SX-18

THE SKY CHALLENGER II IS A 5 BAND 9 TUBE SUPERHETERODYNE RECEIVER COVERING THE FOLLOWING FREQUENCIES:

BANDS	COVERAGE	
1	545 TO 1230 KC	(550 TO 243 METERS)
2	1.18 TO 2.85 MC	(254 TO 105 METERS)
3	2.75 TO 6.82 MC	(109 TO 44 METERS)
4	6.75 TO 16.40 MC	(45 TO 18.3 METERS)
5	15.40 TO 38.10 MC	(19.5 TO 7.85 METERS)

SEPARATE COILS ARE USED TO COVER EACH BAND. INDUCTIVE COUPLING TO THE ANTENNA PERMITS THE MAXIMUM TRANSFER OF SIGNAL ENERGY FROM EACH SEPARATE PRIMARY TO THE PARTICULAR SECONDARY COIL IN THE CIRCUIT. THE UNUSED COILS ARE SHORTEd.

THE MAIN DIAL IS CALIBRATED IN KILOCYCLES ON BAND #1 AND IN MEGACYCLES ON THE REMAINING FOUR BANDS. THE CALIBRATION OF THE MAIN DIAL WILL HOLD ACCURACY ONLY WHEN THE BAND-SPREAD DIAL IS SET AT "0", WHICH IS THE POSITION OF MINIMUM CAPACITY OF THE BAND-SPREAD SECTION.

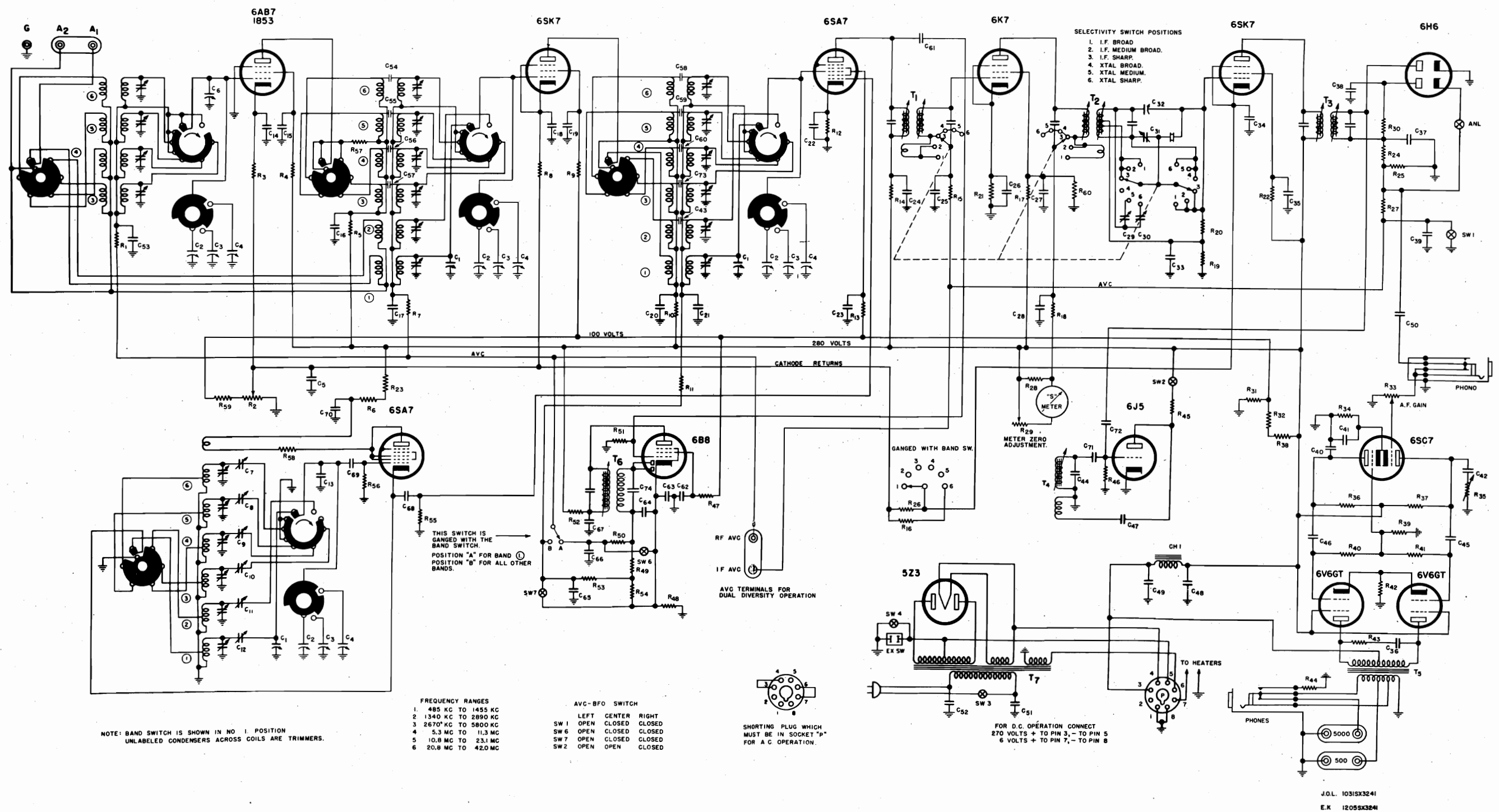
ANTENNA

IN THE BACK OF THE CHASSIS WILL BE FOUND THE ANTENNA, DOUBLET AND GROUND TERMINAL STRIP. WHEN A CONVENTIONAL ANTENNA IS USED IT SHOULD BE CONNECTED TO A1. WHEN USING THIS TYPE OF ANTENNA BE SURE THE JUMPER REMAINS CONNECTED TO A2 AND G. IF A DOUBLET ANTENNA IS USED THE JUMPER SHOULD BE REMOVED AND THE TWO WIRES OF THE DOUBLET LEAD-IN CONNECTED TO A1 AND A2 RESPECTIVELY. PLEASE REMEMBER THAT THE NORMAL SHORT WAVE DOUBLET ANTENNA IS DESIGNED TO WORK BEST ON THE SHORT WAVE BROADCAST FREQUENCIES. IT WILL NOT PERFORM EQUALLY WELL ON THE AMATEUR BANDS, OR FREQUENCIES IN BETWEEN THE SHORT WAVE BROADCAST CHANNELS. ANTENNA LOCATION, LENGTH AND TYPE PLAY A MOST IMPORTANT PART IN THE SUCCESSFUL OPERATION OF THE RECEIVER. ON THE HIGHER FREQUENCIES COVERED BY THIS UNIT IT IS PARTICULARLY IMPORTANT TO USE THE PROPER TYPE OF ANTENNA. FOR MOST EFFICIENT ANTENNA SYSTEMS YOU ARE REFERRED TO THE ANTENNA DESIGN SECTION OF THE A.R.R.L. HANDBOOK, AS WELL AS CURRENT RADIO PERIODICALS. IT IS SUGGESTED THAT A LITTLE EXPERIMENTING BE DONE WITH ANTENNAE SO THAT YOU WILL EXPERIENCE THE MAXIMUM IN PERFORMANCE FROM YOUR RECEIVER.

OPERATION

PLUG THE CORD ON THE RECEIVER INTO THE POWER SOCKET. (UNLESS OTHERWISE SPECIFIED THE RECEIVER OPERATES ON 60 CYCLE 110-120 VOLT ALTERNATING CURRENT.) TURN THE CONTROL MARKED "TONE" TO THE RIGHT. THIS WILL TURN THE RECEIVER ON. DURING THE TIME THE RECEIVER IS WARMING UP ALSO TURN THE "R.F. GAIN" AND "A.F. GAIN" KNOBS TO THE RIGHT. THE RECEIVER IS SHIPPED WITH THE BAND CHANGE SWITCH IN THE HIGHEST FREQUENCY POSITION.

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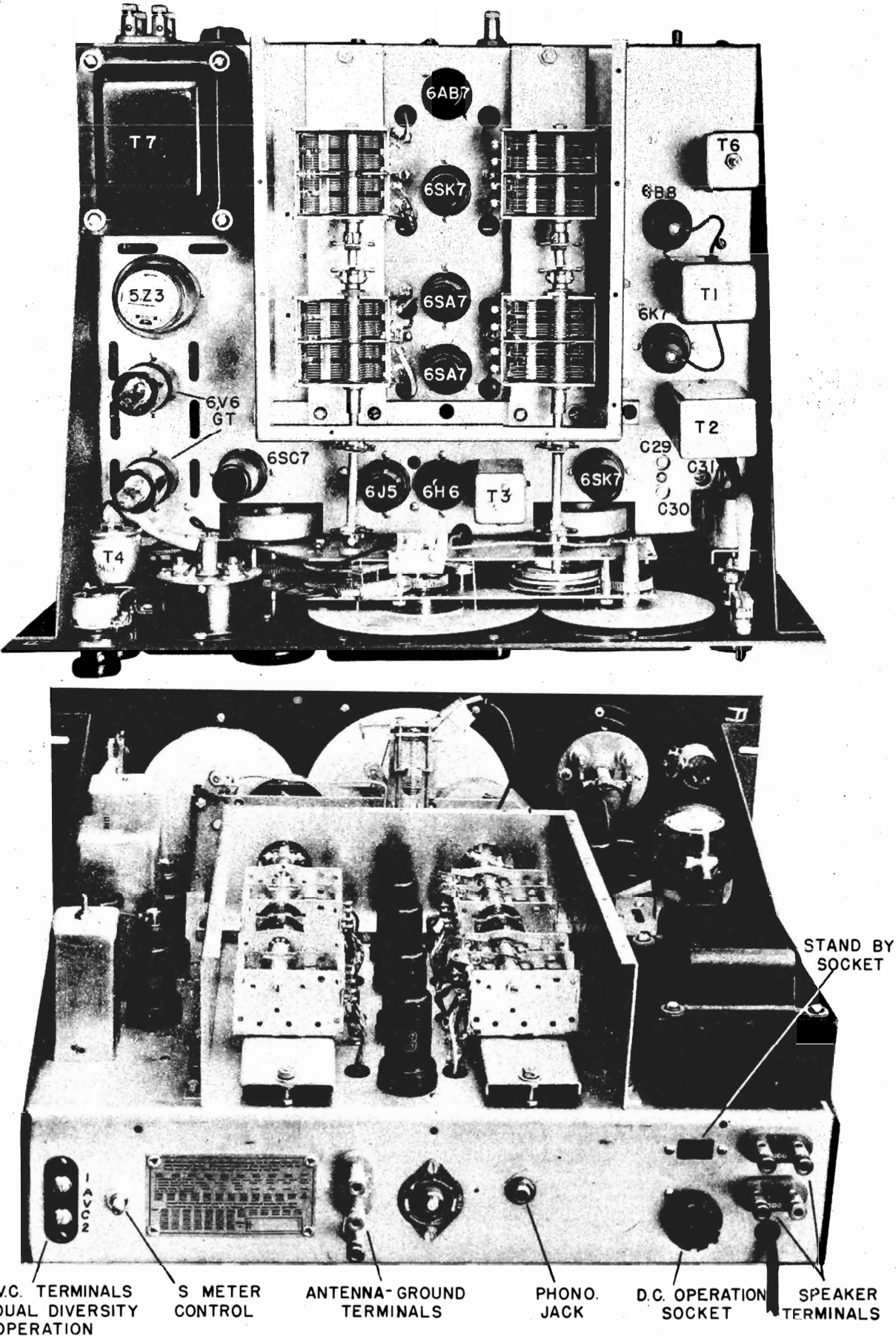
THE HALLICRAFTERS INC. MODEL SX-32, Sky Rider
MODEL SX-32 SKYRIDER CONDENSERS

No.	Value	Voltage or Purpose	Type	No.	Value	Voltage or Purpose	Type
C 1	Band No. 1	tuning condenser	....	C38	.05 mfd	200	tubular
C 2	Main	tuning condenser	....	C39	.01 mfd	400	tubular
C 3	3 plate	band spread cond.	....	C40	500 mmf	....	mica
C 4	5 plate	band spread cond.	....	C41	30 mfd	25	electrolytic
C 5	.25 mfd	200	tubular	C42	.02 mfd	400	tubular
C 6	50 mmf	condenser	Variable Air	C43	2 mmf	....	twisted leads
C 7	1550 mmf	Band No. 6 pad	mica	C44	500 mmf	10%	mica
C 8	3160 mmf	Band No. 5 pad	mica	C45	.05 mfd	400	tubular
C 9	2830 mmf	Band No. 4 pad	mica	C46	.05 mfd	400	tubular
C10	1430 mmf	Band No. 3 pad	mica	C47	2000 mmf	....	mica
C11	790 mmf	Band No. 2 pad	mica	C48	30 mfd	450	electrolytic
C12	380 mmf	Band No. 1 pad	mica	C49	30 mfd	450	electrolytic
C13	temperature	Compensated condenser	....	C50	.02 mfd	400	tubular
C14	.02 mfd	400	tubular	C51	.01 mfd	600	tubular
C15	.02 mfd	400	tubular	C52	.01 mfd	600	tubular
C16	.02 mfd	400	tubular	C53	.05 mfd	200	tubular
C17	.05 mfd	200	tubular	C54	10 mmf	....	ceramic
C18	.02 mfd	400	tubular	C55	5 mmf	....	ceramic
C19	.02 mfd	400	tubular	C56	5 mmf	....	ceramic
C20	.02 mfd	400	tubular	C57	2 mmf	twisted leads	....
C21	.05 mfd	200	tubular	C58	10 mmf	....	ceramic
C22	.02 mfd	400	tubular	C59	5 mmf	....	ceramic
C23	.02 mfd	400	tubular	C60	2 mmf	twisted leads	....
C24	.02 mfd	400	tubular	C61	250 mmf	....	mica IN-TI
C25	2000 mmf	....	mica	C62	.02 mfd	400	tubular
C26	.02 mfd	400	tubular	C63	.05 mfd	200	tubular
C27	.02 mfd	400	tubular	C64	100 mmf	....	mica
C28	.02 mfd	400	tubular	C65	.02 mfd	400	tubular
C29	20 mmf	trimming condenser	....	C66	.05 mfd	200	tubular
C30	20 mmf	trimming condenser	....	C67	.02 mfd	400	tubular
C31	20 mmf	trimming condenser	....	C68	50 mmf	....	mica
C32	20 mmf	crystal phasing	air	C69	50 mmf	....	mica
C33	.02 mfd	400	tubular	C70	2000 mmf	....	mica
C34	.02 mfd	400	tubular	C71	100 mmf	....	mica
C35	.05 mfd	200	tubular	C72	2 mmf	twisted leads	....
C36	2000 mmf	....	mica	C73	2 mmf	twisted leads	....
C37	50 mmf	....	mica	C74	25 mmf	....	mica

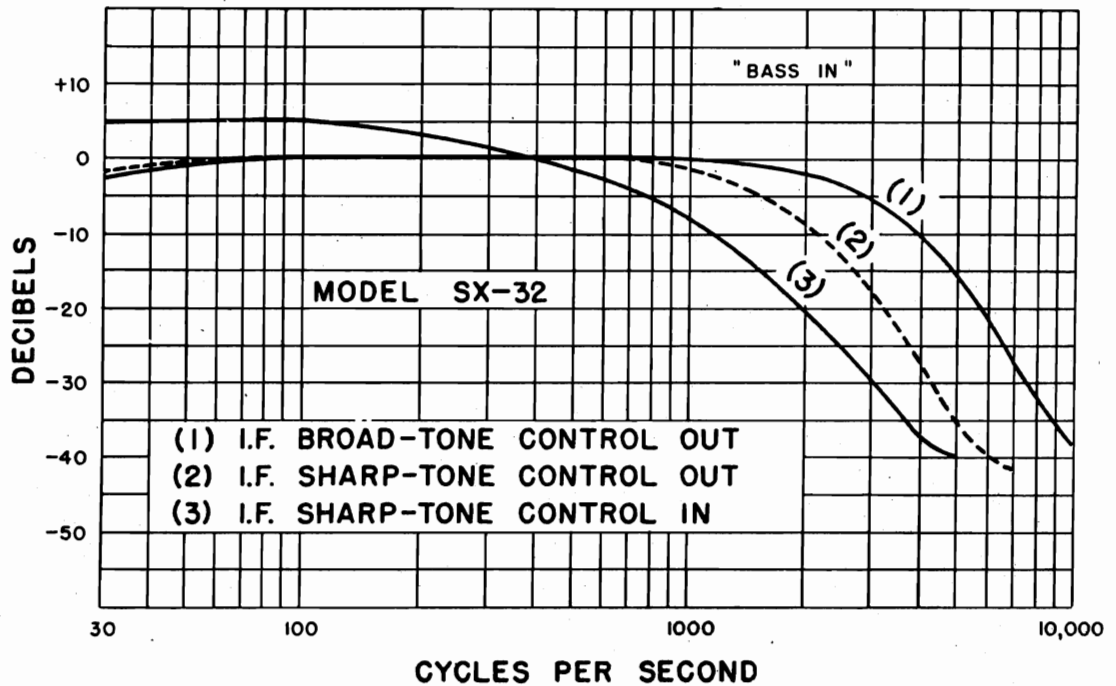
MODEL SX-32 SKYRIDER RESISTORS

No.	Value in Ohms	Wattage or Purpose	No.	Value in Ohms	Wattage or Purpose
R 1	100,000	1/3	R31	11,000	Candohm 1-1/2 Watts
R 2	10,000	RF Gain	R32	4,000	Candohm 7 Watts
R 3	300	1/3	R33	500,000	Audio Gain
R 4	25,000	1/2	R34	1,000	1/3
R 5	1,000	1/3	R35	500,000	Tone Control
R 6	7,000	2	R36	100,000	1/3
R 7	100,000	1/3	R37	100,000	1/3
R 8	300	1/3	R38	2,500	2
R 9	1,000	1/3	R39	200,000	1/3
R10	3,000	1/3	R40	250,000	1/3
R11	100,000	1/3	R41	250,000	1/3
R12	400	1/3	R42	200	2 10%
R13	1,000	1/3	R43	20,000	1
R14	3,000	1/3	R44	5,000	10
R15	100,000	1/3	R45	20,000	1
R16	3,000	1/3	R46	50,000	1/3
R17	30,000	-1 watt	R47	1,000	1/3
R18	3,000	1/3	R48	200	1/3
R19	100,000	1/3	R49	250,000	1/3
R20	500,000	1/3	R50	500,000	1/3
R21	250	1/3	R51	500,000	1/3 Inside of T1
R22	60,000	1/2	R52	3,000	1/3
R23	5,000	1/2	R53	500,000	1/3
R24	100,000	1/3	R54	50,000	1/3
R25	250,000	1/3	R55	50,000	1/3
R26	5,000	1/3	R56	50,000	1/3
R27	2. meg	1/3	R57	500	1/3
R28	100	1/3	R58	8	1/3
R29	500	S Meter Control	R59	15,000	1/2
R30	1. meg	1/3	R60	50,000	1/3

MODEL SX-32, Sky Rider THE HALLICRAFTERS INC.



THE HALLICRAFTERS INC. AUDIO FIDELITY CURVE



The following measurements made with a 20,000 ohms per volt meter and taken from the socket terminal indicated to ground or receiver chassis. Antenna and ground were disconnected from the receiver when these measurements were taken and the RF and AF gain controls set at maximum. "DL" means Dead Lug but will indicate voltage when used as a tie. Normal tolerance allows a variation of $\pm 10\%$ from the indicated values.

TUBE	FUNCTION	SOCKET TERMINALS								
		1	2	3	4	5	6	7	8	Cap.
6AB7	RF Amp. (1)	...	...	...	...	4.5	180	6.3	245	.....
6SK7	RF Amp. (2)	...	...	4.35	0.1	4.35	120	6.3	230	.....
6SA7	Mixer	...	...	250	100	...	3.7	6.3	...	.....
6SA7	HF Osc.	...	...	120	120	0.3	...	6.3	120	.....
6K7	IF Amp. (1)	...	...	280	120	...	...	6.3	4	-.075
6SK7	IF Amp. 2	...	...	4	...	4	120	6.3	280	.....
6B8	AVC Amp.	...	...	230	0.2	0.2	120	6.3	2	.....
6H6	ANL and DET.	...	...	...	...	...	...	6.3	...	.....
6J5	Beat Osc.	...	...	130	...	-7	...	6.3	...	BFO ON ONLY FOR TEST
6SC7	1st Audio Amp.	...	140	...	...	137	1.4	6.3	...	.....
6V6GT	P.P. Audio Amp.	...	...	290	265	...	...	6.3	17	.....
6V6GT	P.P. Audio Amp.	...	...	290	265	...	...	6.3	17	.....
5Z3	Rectifier	320	340 AC	340 AC	320	...	...	...	...	.....

MODEL SX-32, Sky Rider

THE HALLICRAFTERS INC.

Position. When these conditions have been complied with, remove the antenna from the Receiver and then adjust the S meter control until the S meter reads zero. Reconnecting the antenna to the receiver will then make the meter indicate the relative carrier strength of each incoming signal as various signals are tuned in.

The large calibrated main dial shows the frequencies covered throughout the 6 band, 500 KC to 42 mc. frequency range of the receiver. They are as follows:

Band 1—500 to 1400	kilocycles
Band 2—1.4 to 2.7	megacycles
Band 3—2.7 to 5.3	megacycles
Band 4—5.3 to 11	megacycles
Band 5—11 to 21	megacycles
Band 6—21 to 42	megacycles

MODEL SX-32 SKYRIDER

on T2 until the output reaches a minimum value between the two maximum values first noted. The frequency of the signal generator should be varied over a small range, while adjusting the top screw of T2. A swishing note, in contrast to the usual sharp crystal tone will be apparent when the correct adjustment has been reached.

Switch to "Xtal Sharp" and adjust C-10 for maximum output while varying signal generator frequency. Two points of maximum output will be noted corresponding to two adjustments of C-10. Either one of these points may be used at which to leave C-10. A sharply peaked tone will result at the correct adjustment.

Switch to "Xtal Medium" and adjust C-10 till the output is midway between the outputs reached while aligning the "Xtal Sharp" and "Xtal Broad" positions. The apparent sharpness of tone should be midway between the "Sharp" and "Broad" positions.

Switch again to "Xtal Sharp" and set the signal generator to exact crystal frequency. Set BFO front panel control to a tone of approximately 1000 cycles. Switch again to "Sharp IF" and carefully realign the IF transformers as earlier described in the first paragraph of these instructions.

Beat Frequency Oscillator Adjustment—In the center of the "Pitch Control" shaft, after the knob has been removed, you will find a recessed screw for the adjustment of the Beat Frequency Oscillator. Before rotating this screw with a suitable screw driver, loosen the set screw on this shaft. This set screw can be reached with a spintite wrench from the top. With the signal generator connected to the 6SA7 mixer terminal #8 as above, the generator set to the frequency of the crystal, and the BFO switch on, adjust the screw in the center of the pitch control till zero beat is heard. Tighten the set screw and assemble the knob so that this zero beat position will occur in the center of the total angular rotation of the pitch control knob.

AVC Amplifier Adjustment—Connect a high resistance voltmeter across resistors R-49 and R-54. With the signal generator tuned to the crystal frequency as above, adjust the trimming screw on top of T-6 till the voltmeter reads maximum.

A similar plug to the shorting plug should be wired as shown on the Schematic diagram and connected to the external source of DC power. The DC operation plug is then inserted in the socket and operation from batteries or a vibrapack is secured.

270 volts of plate voltage, or B supply, at 150 milliamperes current are necessary for successful operation of the receiver, should it be operated in this manner.

"S" METER ZERO SET

"S" METER CONTROL is obtained by varying the knurled knob appearing on the left hand chassis apron edge. This control enables you to properly set the "S" meter to zero. In order to make the adjustment correctly, the RF GAIN CONTROL must be advanced clockwise as far as it will go. In addition, the switch directly below the bandspeed hand-wheel must be in the AVC-ON position.

ALIGNMENT PROCEDURE

Equipment Needed for Aligning:

- 1—An all wave signal generator which will provide an accurately calibrated signal at the test frequencies indicated.
- 2—Output indicating meter connected to 5000 ohm output terminals.
- 3—Non-metallic screw driver.
- 4—Dummy antenna of 200 mmf and also 400 ohm carbon resistor.

Setting of controls prior to alignment—IF and RF.

Tone control at maximum high frequency position (B-5)—BFO at 0—AF Gain at #9—RF Gain at #9—Band switch—IF alignment position .5 to 1.4 band.—RF alignment depending on band aligned.

Selectivity control sharp IF, Send-Receive switch in Receive, Crystal phasing at #3 on left side, ANL—OFF, AVC OFF.

Important: Have bandspeed control so logging scale reads 100.

Antenna trimmer adjusted for Maximum gain at each RF alignment point on Bands 3-4-5-6.

Note: Antenna trimmer not in circuit on bands 1 and 2. 455 KC—IF Alignment: Tune main dial to 1400 kc on .5 to 1.4 mc. band. Connect the hot lead from the signal generator to 6SA7 mixer terminal #8—Ground to chassis. Roughly adjust the aligning screws of T1, the lower screw of which is accessible through hole in right mounting bracket, for maximum gain. Now adjust lower screw on T2 (do not adjust upper screw). Also adjust C31 and the trimmer screws at the top of T3 for maximum gain.

Switch to Crystal Broad Position—Turn on BFO and adjust to a tone of about 1000 cycles. Vary the frequency of the signal generator while adjusting the top screw on T2 until the output goes through a maximum, dips down and starts going up again. Adjust the phasing control for maximum selectivity and then back off the top screw

THE 1942 MODEL SX-32 SKYRIDER RECEIVER INSTRUCTIONS FOR INSTALLATION, OPERATION AND SERVICE

INSTALLATION

It is recommended that, upon receipt, the carton and then the receiver be carefully examined for any damage which might have occurred in transit. Should any sign of damage be apparent immediately file claim with the carrier stating the extent of the damage.

Important: Unless otherwise marked, this receiver is to be operated from 110-125 volts of 50/60 cycle alternating current. A universal 110-220 volt model is obtainable on order. This model can be operated at either of those two voltages with 25/60 cycle current. If the voltages are higher than indicated an external stepdown transformer must be used. A switch, mounted on the top of the universal transformer case, will allow convenient 110-220 voltage change.

The standard model SX-32 receiver comes equipped with a cabinet for table mounting. The standard 8 1/2" x 19" panel dimension with holes suitably spaced make it possible for the chassis to be mounted in a standard relay rack. Maximum overall chassis length is 17 1/2" and depth 13 1/2". When the model SX-32 is so mounted the table cabinet is replaced with a dust cover. The maximum over-all length of the receiver will then allow it to be mounted in a rack with eight channel clearance of 17 1/2".

TERMINALS AND CONNECTIONS ON REAR OF RECEIVER

SPEAKER

On the rear apron of the receiver's chassis appear two terminal strips for connecting either a 500 or 5000 ohm speaker to the receiver. Should a matching HALLICRAFTERS Bass-Reflex speaker be used with the receiver, it should be connected to the 5000 ohm terminals. The 500 ohm terminals can be connected to a speaker or other load of that impedance value.

ANTENNA

To the terminals marked A1-A2 and G should be connected the antenna you have chosen to use with the model SX-32 receiver.

Very satisfactory results throughout the tuning range of the SX-32 will be obtained with a conventional inverted "L" Marconi type of antenna 75 to 100 feet long including lead-in. This antenna should be erected as high as possible and removed from surrounding objects. Be sure that the antenna is insulated from the ground at all points. When this type of antenna is used it is connected to terminal A-1. The jumper between A-2 and G should remain connected.

In the event a doublet antenna is used with the model SX-32 SKYRIDER receiver, the two wires of the doublet lead-in should be connected to terminals A1 and A2. The jumper between A2 and G can remain connected or removed, depending upon its effect on favorable reception.

A ground can be used if desired and should be connected to the G terminal. Connecting the receiver to a good ground (cold water pipe or 6 foot rod driven in moist soil) might improve reception and reduce noise. Under normal conditions no noticeable difference will exist so a ground is suggested only if it aids reception.

Should you wish to have a separate antenna for some one short wave frequency or band, a half-wave antenna cut to the proper length for the desired frequency will prove very effective. The following formula will give the length of the 1/2 wavelength antenna depending on the desired frequency:

$$\text{Length in feet} = \frac{463}{\text{frequency in megacycles}}$$

or, for example, a half wave 40 meter antenna would be— $\frac{463}{7} = 66.14$ feet long.

The antenna should preferably be of solid soft drawn enameled copper wire for ease in handling. The center of the wire is cut and an insulator inserted at that point. The twisted pair, or open wire transmission line, is then soldered to each 33 foot length, after the enamel has been scraped off, directly on either side of this center insulator. The other end of the transmission line should be connected to A1 and A2 on the receiver. It should be remembered that such an antenna has directional properties broadside to its length and should be so oriented if maximum pickup from a certain direction is to be expected.

In designing transmission line systems for a more accurate match of the line to the antenna input circuit, it will be helpful to know that the approximate antenna input impedance of the receiver is 400 ohms.

STAND-BY SOCKET

The Send-Receive switch on the front panel makes the receiver inoperative by removing the plate voltage from the tubes when the switch is in the SEND position. Connected in parallel with this switch is the standard 110 volt receptacle on the rear chassis edge. Should you wish to make the receiver inoperative by using a remote relay or switch, connect the contacts of the relay to a standard plug, insert it in the STAND-BY switch socket and the external relay or switch will close and open the circuit so long as the SEND-RECEIVE switch on the front panel is in the SEND position.

PHONO-JACK

The Phono-Jack enables you to use the high fidelity audio amplifier of the receiver for phonograph record or transcription play-back purposes. A high fidelity crystal or magnetic pick-up arm should be used for this purpose and connected to the PHONO-JACK. This plug is then inserted in the PHONO-JACK when record playing is desired. The receiver is inoperative to radio signals, when the plug is in the phono-jack.

The volume of the audio amplifier is varied by rotating the AF Gain control until the proper level is obtained.

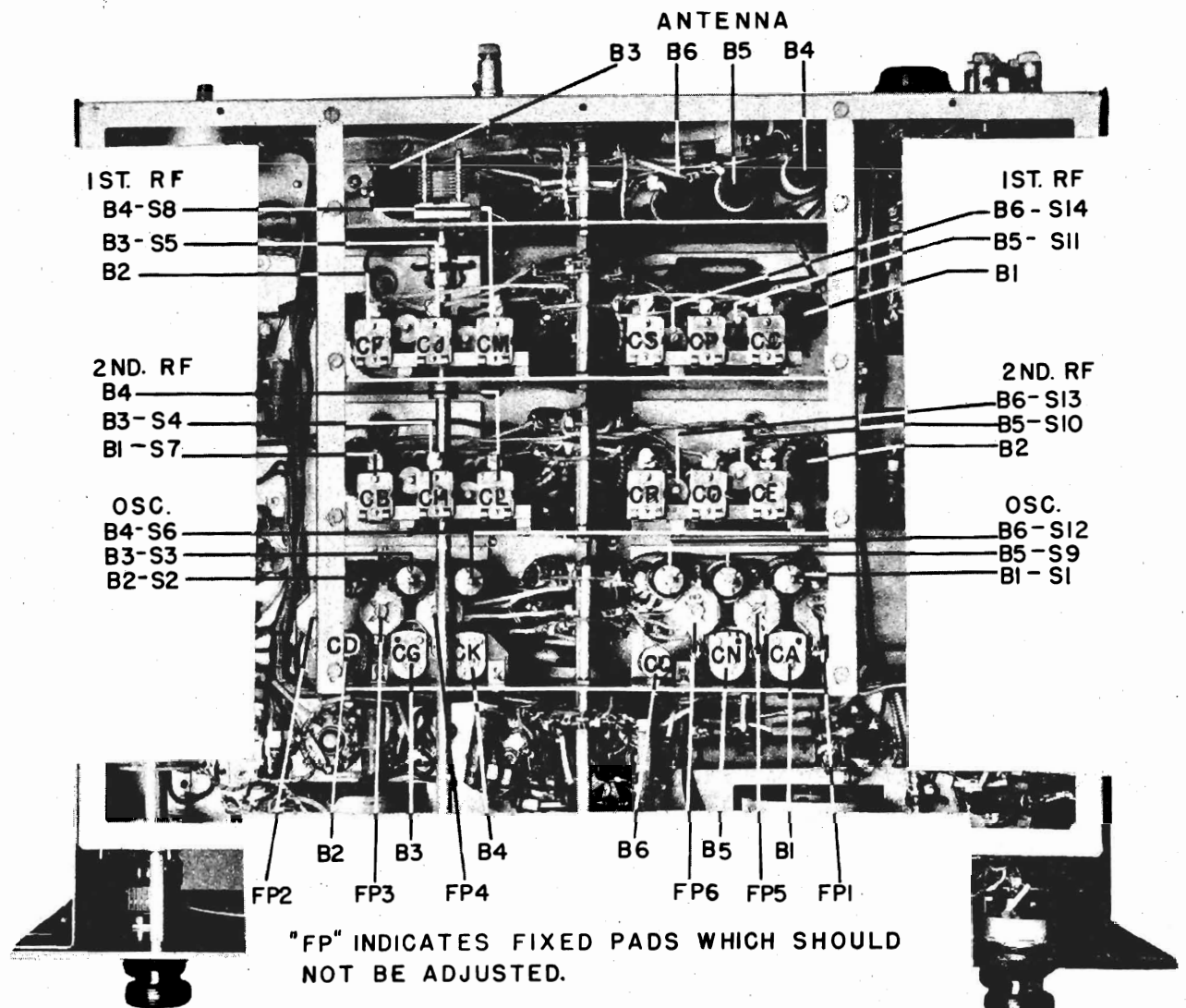
Removal of the plug from the Phono-Jack once more places the RF and IF portions of the receiver in operation.

6 VOLT DC SOCKET

The DC Operation Socket can be used when it is necessary to furnish power to the receiver from a direct current source. For conventional AC operation, the shorting plug must remain in the DC Operation socket. This plug should be removed for battery or vibrapack operation.

THE HALLICRAFTERS INC.

MODEL SX-32, Sky Rider



"FP" INDICATES FIXED PADS WHICH SHOULD NOT BE ADJUSTED.

B1, B2, B3, ETC. REFER TO ADJUSTMENTS ON BAND 1, BAND 2, BAND 3, ETC.

RF ALIGNMENT

Connect hot lead of signal generator to A₁—through dummy antenna shown in table. Leave jumper connected between A₂ and G. Ground of Generator to Chassis.

Band	Rec. Dial Setting	Sig. Gen. Freq.	Dummy Antenna	HIGH FREQUENCY END		LOW FREQUENCY END	
				Adjust Osc. With	Adjust Trimmers for Max. Gain	Adjust Osc. With	Permeability Tuned By
1	1.2 mc	1.2 mc	200 mmf	C _A	C _B C _C	....	.....
1	.6	.6	200 mmf	....	.....	S ₁	.....
2	2.6	2.6	400 ohms	C _D	C _E C _F	....	.....
2	1.5	1.5	400 ohms	....	.....	S ₂	.....
3	5	5	400 ohms	C _G	C _H C _J	....	.....
3	3.0	3	400 ohms	....	.....	S ₃	S ₄ S ₅
4	10	10	400 ohms	C _K	C _L C _M	....	.....
4	5.6	5.6	400 ohms	....	.....	S ₆	S ₇ S ₈
5	20	20	400 ohms	C _N	C _O C _P	....	.....
5	11	11	400 ohms	....	.....	S ₉	S ₁₀ S ₁₁
6	38	38	400 ohms	C _Q	C _R C _S	....	.....
6	22	22	400 ohms	....	.....	S ₁₂	S ₁₃ S ₁₄

MODEL SX-32, Sky Rider

THE HALLICRAFTERS INC.

triode is fed to the grid of the other 6SK7 triode section, thereby giving two output voltages in opposite phase suitable for exciting the push-pull 6V6GT output amplifier.

THE POWER SUPPLY

The power supply in the Model SX-32 is quite normal except that it supplies voltage for the 6V6GT output tubes directly from the rectifier or before the filter stage. Voltage fluctuations in the receiver are greatly reduced—increasing the audio output of the receiver and stabilizing the operation of all circuits.

The filter circuit consisting of a total of 60 mfd of capacity and a 12 henry choke keep the hum level of the receiver in excess of 60 DB below maximum output. The power transformer is built to withstand continuous operation at 250 degrees F but has been designed to run at approximately 160 degrees F under normal conditions.

SPECIFICATIONS

Tubes:	
1-6AB7	1st RF Amplifier
1-6SK7	2nd RF Amplifier
1-6SA7	Mixer
1-6SA7	HF Oscillator
1-6SK7	1st IF Amplifier
1-6SK7	2nd IF Amplifier
1-6B8	AVC Amplifier
1-6H6	2nd Detector and ANL Tube
1-6I5	Beat Oscillator
1-6SC7	1st Audio Amplifier
2-6V6GT	Push-Pull Output Amplifiers
1-5Z3	Rectifier

Power Consumption—at 117 volts—60 cycles—138 watts
Power Consumption—DC operation—18 amp. at 6 volts or 108 watts
Power Output—8 watts undistorted
Sensitivity (for 05 watt output) Bands 1 to 5—2 MV and under, 6th band 4 MV
Selectivity—IF broad (high fidelity) 12 kc 36 kc
IF Sharp 41 kc 22 kc
Frequency Range RF—Note: These are the actual frequencies covered corresponding to nominal figures indicated on the front panel.
500 to 1450 kilocycles
1.4 to 2.8 megacycles
2.7 to 5.4 megacycles
5.2 to 11 megacycles
10.5 to 22 megacycles
21 to 42 megacycles

Frequency response AF broad IF—tone control high-70 to 3000 cycles = 2 1/2 DB
Speaker Output Impedances—5000 and 500 ohms
Intermediate Frequency—455 kc
Table cabinet dimensions—20 1/2" long x 10" high x 14 1/2" deep
Relay Rack dust cover dimensions—14 1/2" deep x 17 1/2" long x 8 1/2" high
Panel dimensions—19" x 8 1/2"
Chassis dimensions—17 3/4" x 13 1/4"
Weight—(unpacked)—75 lbs.—packed 87 lbs.

AVC ACTION

A double AVC system is used. The RF and mixer tubes are operated by the broadly tuned carrier coming through only three tuned IF circuits. The final signal however passes through six-tuned IF circuits. As a result, when the signal is slightly detuned, the receiver output has dropped considerably while the AVC action has dropped but, very little. This results in a reduction of between-station noise and a more sharply defined aural tuning action.

"S" OR SIGNAL INTENSITY METER

The approximate DB per S unit equivalent is 6 DB's. As is known, a DB, or decibel, is a unit of change in signal level and is defined as being the least detectable change the average ear can appreciate when listening to a single pitched tone. 3DB is the least change the ear detects when listening to sounds varying in both amplitude and pitch. By comparison, a variation of one S unit on the meter will indicate a change of two detectable steps in signal level. Quantitatively, a DB gain or loss is equal to $20 \log \left(\frac{E_1}{E_2} \right)$ where E_1 = input voltage and E_2 = output voltage.

THE SECOND DETECTOR

As will be noted, a diode type of second detector is used in the Model SX-32. Its choice was prompted by the fact that such a detector is capable of handling large percentages of modulation with very little distortion. This is due to the output of the diode being easily filtered (IF removed). In addition, the rectified output contains a DC component which can be used for AVC purposes.

THE BEAT FREQUENCY OSCILLATOR

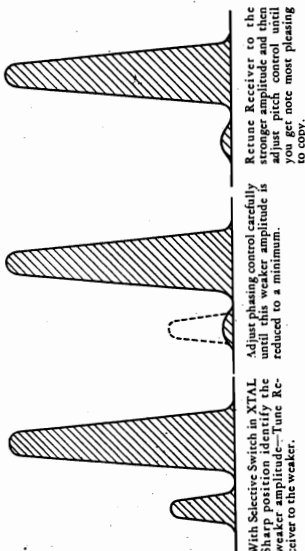
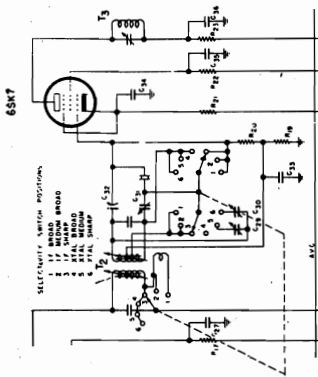
The BFO is tuned on with the switch below the band-spread handwheel and adjusted by the skirted knob directly below the control. The BFO circuit as will be seen by referring to the schematic, is the well known Hartley oscillator. It will be noticed that a plate voltage resistor is used to compensate for plate voltage variations. An increase in receiver voltage causes an increase in the plate current of the oscillator. This increase in turn causes the voltage drop across the resistor to increase, thus maintaining a more constant voltage at the plate of the beat oscillator tube. A favorable ratio of capacity to inductance is used. The fixed tank capacity has been artificially aged by alternately exposing it to very high and then low temperatures. In this manner any residual strains of the component parts are removed and the capacity of the condenser remains constant. The BFO coil is permeability tuned which further reduces the possibility of drift which would occur should a compression variable be used to resonate the circuit. Proper location of the Beat Oscillator tube and its associated components plus excellent shielding and mechanical rigidity do much to keep stray fields from being established. Little BFO leakage is to be expected in the Model SX-32 so "twitters" or BFO harmonics will not prove to be bothersome.

THE AUDIO AMPLIFIER

The second or output stage of the audio amplifier in the Model SX-32 receiver uses two 6V6GT tubes connected in push-pull. These tubes are driven by the 6SK7 double triode. One of the triode sections of the 6SK7 tube is used as the inverter to the 6V6GT tubes. A portion of the signal from the plate circuit of the first 6SK7

CRYSTAL FILTER CIRCUIT

In positions 1, 2, 3 the crystal is short circuited. In position 4 the short circuiting crystal is removed and the secondary of the transformer is accurately tuned to the crystal frequency. Due to the close coupling of the secondary to the crystal, the sharply rising resonance curve of the crystal causes, in contrast, a sharply falling resonance curve in the secondary. This is the reason for the use of the crystal in the output circuit. In the MEDIUM CRYSTAL No. 3 position, C_{50} is adjusted for selectivity midway between the BROAD and CRYSTAL SHARP settings. In position 6 or CRYSTAL SHARP, the trimmer C_{50} is adjusted for the Sharpest crystal action. Under this condition, the secondary is slightly detuned from the resonant crystal frequency sufficiently so that its resonance curve is not greatly affected by the crystal but still coupled tightly enough to that of the crystal to give the desired output. Two such points of increased output will normally occur—one for each adjustment of the secondary on either side of the resonant frequency of the crystal.

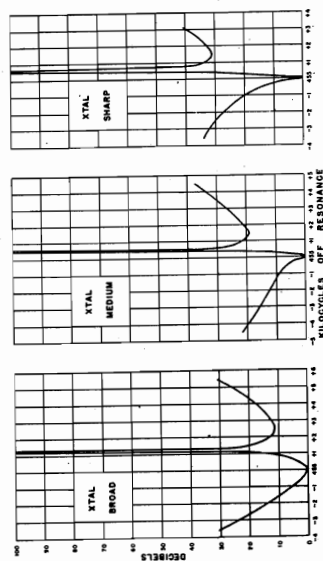


SINGLE SIGNAL ADJUSTMENT

It is extremely simple to strain single signal reception with the SX-32. First, turn on the BFO to the desired Beat Note. Next, turn the PHASING control to the XTAL SHARP position. Pick a good solid CW signal, preferably a commercial station because a commercial is likely to stay on long enough for you to complete the phasing adjustment. You will find on tuning across this signal that it has two amplitudes. Tune first to the weaker of these two amplitudes. Now, turn the PHASING control until the signal is reduced to a minimum. (If the weaker amplitude appears on the right the above procedure still holds.) Then tune to stronger of the two amplitudes and repeat the above adjustment for single signal selectivity. This will hold with no further adjustment unless you change the phasing control.

CRYSTAL FILTER CURVES

NOTE: The CRYSTAL FILTER and holder are wired directly into the receiver and do not plug in as heretofore. In this manner exceptional crystal filter action is obtained because of the elimination of the capacity and losses of a socket. So mounting the crystal prevents possible change in polarity which would occur if the crystal were improperly inserted in the circuit. The size of the crystal has been carefully determined to allow the BROAD CRYSTAL position to tune as broadly as possible. The capacity of the crystal holder has been reduced to a minimum through the use of a specially designed polystyrene holder.



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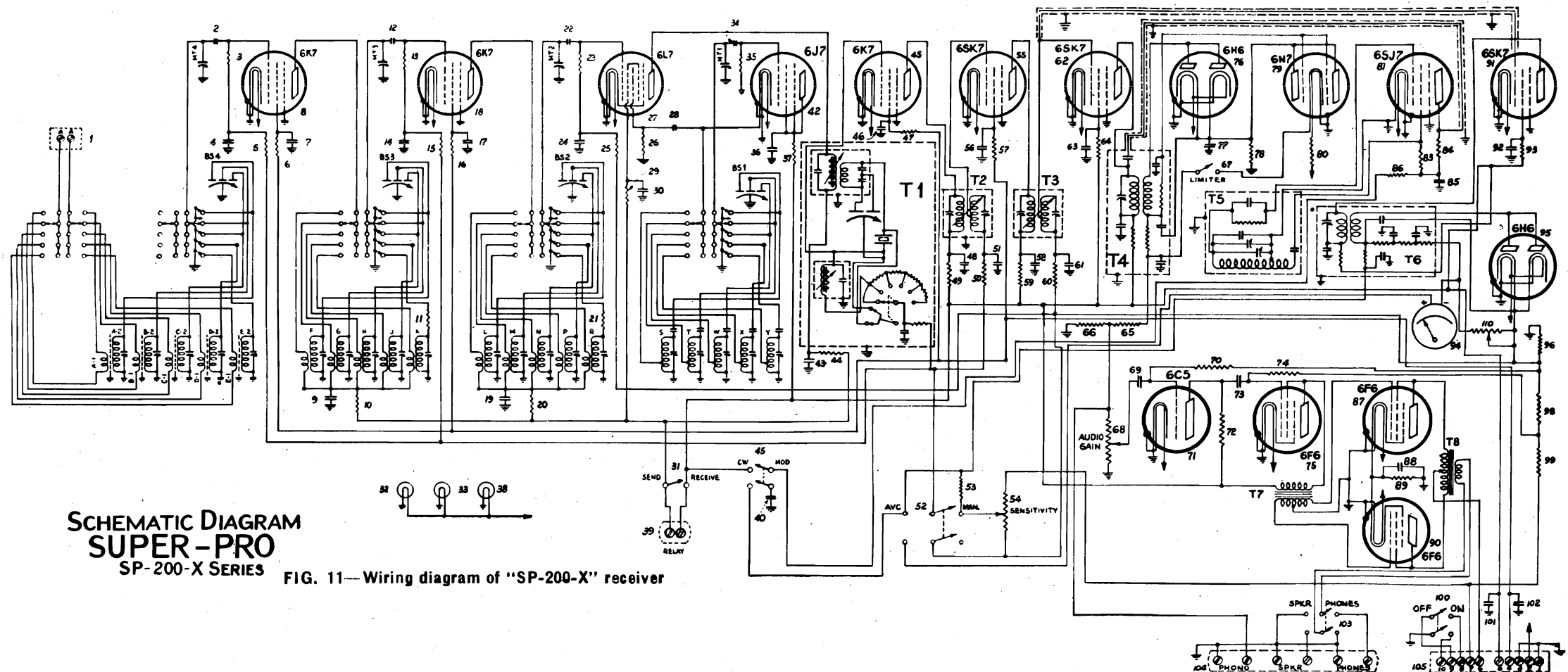
SCHEMATIC DIAGRAM
SUPER-PRO
SP-200-X SERIES

FIG. 11—Wiring diagram of "SP-200-X" receiver

FOR OTHER DATA SEE THAT OF MODEL SP-200X, Early, IN INDEX

"SUPER-PRO" MODEL SP-200-SX PARTS LIST
(This parts list should be used to identify parts shown in the illustrations)

Schematic Designation	DESCRIPTION — RECEIVER PARTS	Part No.
A1	Antenna Input Coil Assembly 10.0 to 20.0 m.c.	SA-46
A2	Antenna Output Coil Assembly 10.0 to 20.0 m.c.	SA-110
B1	Antenna Input Coil Assembly 5.0 to 10.0 m.c.	SA-47
B2	Antenna Output Coil Assembly 5.0 to 10.0 m.c.	SA-113
C1	Antenna Input Coil Assembly 20.0 to 40.0 m.c.	SA-46
C2	Antenna Output Coil Assembly 20.0 to 40.0 m.c.	SA-130
D1	Antenna Input Coil Assembly 2.5 to 5.0 m.c.	SA-48
D2	Antenna Output Coil Assembly 2.5 to 5.0 m.c.	SA-116
E1	Antenna Input Coil Assembly 1250 to 2500 k.c.	SA-49
E2	Antenna Output Coil Assembly 1250 to 2500 k.c.	SA-136
F	1st R.F. Coil Assembly 10.0 to 20.0 m.c.	SA-111
G	1st R.F. Coil Assembly 5.0 to 10.0 m.c.	SA-114
H	1st R.F. Coil Assembly 20.0 to 40.0 m.c.	SA-131
J	1st R.F. Coil Assembly 2.5 to 5.0 m.c.	SA-117
K	1st R.F. Coil Assembly 1250 to 1160 k.c.	SA-137
L	2nd R.F. Coil Assembly 10.0 to 20.0 m.c.	SA-111
M	2nd R.F. Coil Assembly 5.0 to 10.0 m.c.	SA-114
N	2nd R.F. Coil Assembly 20.0 to 40.0 m.c.	SA-131
P	2nd R.F. Coil Assembly 2.5 to 5.0 m.c.	SA-117
R	2nd R.F. Coil Assembly 1250 to 2500 k.c.	SA-137
S	High Frequency Osc. Coil Assembly 10.0 to 20.0 m.c.	SA-112
T	High Frequency Osc. Coil Assembly 5.0 to 10.0 m.c.	SA-115
W	High Frequency Osc. Coil Assembly 20.0 to 40.0 m.c.	SA-132
X	High Frequency Osc. Coil Assembly 2.5 to 5.0 m.c.	SA-118
Y	High Frequency Osc. Coil Assembly 1250 to 2500 k.c.	SA-138
T-1	Crystal filter assembly (465 kc.)	SA-178
T-2, T-3	1st and 2nd, I.F. Transformer Coil Assembly	SA-166
T-4	Detector plate coil assembly	SA-167

T-5	Beat oscillator coil assembly	SA-169
T-6	A.V.C. Plate coil assembly	SA-168
T-7	Push-Pull Input Transformer	4827
T-8	Push-Pull Output Transformer	4828
1	Antenna terminal strip	3842
2-12-22	Capacitor Fixed Mica type 600 mmf.	6073
28	Capacitor Fixed Silver type 95 mmf.	6195
34	Capacitor Fixed Silver type 50 mmf.	6074
77	Capacitor Fixed Mica type 50 mmf.	6199
69	Capacitor Fixed Tubular type .02 mf. 500 V.	6176
4-14-24	Capacitor Fixed Tubular type .01 mf. 500 V.	6175
7-17-30-36-43-46-48-51-56-58-61-63-73-85-92	Capacitor Fixed Tubular type .05 mf. 500 V.	6174
40-101-102	Capacitor Fixed Tubular type .25 mf. 400 V.	3820
88	Capacitor Dry Electrolytic 40 mf. 150 V.	6171
80	Resistor 4 ohms wire wound 5 watt	4921
89	Resistor 750 ohms wire wound 10 watt	3836
11-21	Resistor 20 ohms wire wound 1/2 watt	3987
96	Resistor 300 ohms metallized 1/2 watt	6169
98	Resistor 1,700 ohms metallized 1/2 watt	4947
10-20-44-6-47-49-57-59-16	Resistor 2,000 ohms metallized 1/2 watt	6160
99	Resistor 3,000 ohms metallized 1 watt	3809
86	Resistor 5,000 ohms metallized 1/2 watt	4814
5-15-25-50-60	Resistor 10,000 ohms metallized 1/2 watt	6165
37	Resistor 12,000 ohms metallized 2 watt	4840
29	Resistor 25,000 ohms metallized 2 watt	3999
35-26	Resistor 25,000 ohms metallized 1/3 watt	4960
66-84	Resistor 50,000 ohms metallized 1/2 watt	6075
64-72-93	Resistor 50,000 ohms metallized 1 watt	6166

32-33	Dial lamps 6.3 volt .15 amp.	3920
38	Meter lamp 6.3 volt .15 amp. Bayonet type	6036
94	Tuning meter	4903
100	Off-on Switch	2983
52-103	AVC-MANUAL and SPEAKER-PHONES Switch	2990
41	CW-MOD Switch	4915
31	Send-Receive Switch	4917
67	Limiter switch	4916
54	Sensitivity control 50,000 ohm	4918
68	Audio Gain Control 250,000 ohm	4919
39	Relay terminal strip	4904
104	Phono-Speaker-Phones terminal strip	4905
105	Connecting terminal strip	3838
110	Meter adjusting potentiometer 1,000 W wire wound	4932
1	POWER SUPPLY	
2	Power transformer 110 volts 60 cycle A.C.	4801
3	Filter choke	2981
4	A.C. input Cord and Plug	3900
5	Fuse Block for 2A. fuse	3859
6	Line Voltage Adjusting Strip	3858
7	Speaker Field Terminal Strip	3840
8-9-10	Connecting Terminal Strip	3838
11	Filter Condenser 16 mfd. electrolytic 450 volts	3832
12	Filter Condenser 8-8 mfd. electrolytic 450 volts	3834
13	Resistor 18,000 ohms (2 taps)	3997
14	Resistor 18,000 ohms (1 tap)	4946
15	Tube socket 80	4807
16	Tube socket 5Z3	3828
65	1 mf. paper filter condenser	4945
78	Resistor 75,000 ohms metallized 1/2 watt	4914
3-13-23	Resistor 250,000 ohms metallized 1/2 watt	4912
70-74-83	Resistor 250,000 ohms metallized 1/3 watt	4959
53	Resistor 500,000 ohms metallized 1/2 watt	6076
	Resistor 2,000,000 ohms metallized 1/2 watt	4920

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MODELS SP-200X,
SP-200SX

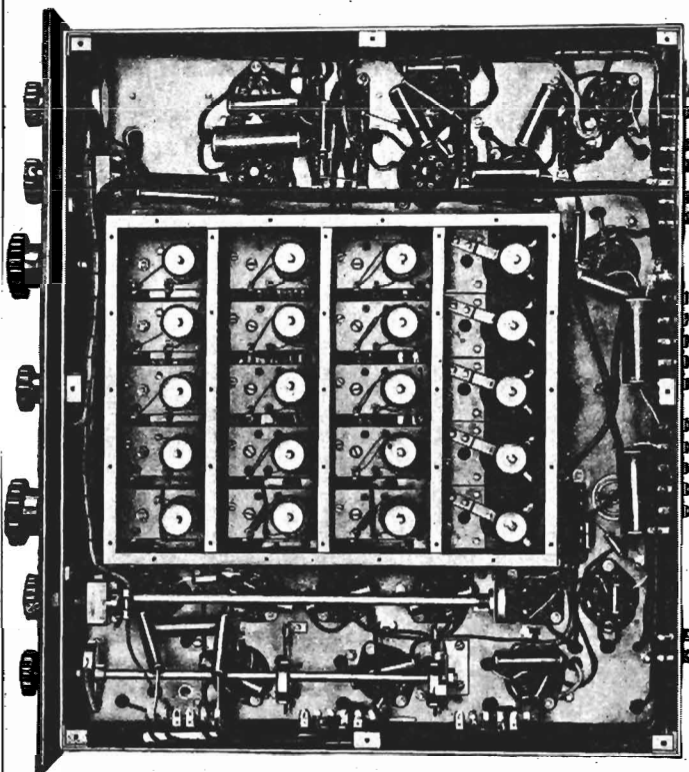


FIG. 9—Bottom view of the "SP-200-X" receiver showing the coil assembly and general layout of parts.

(MEGACYCLES)

TO	10.0	5.0	20.0	2.5	1.25
TO	20.0	10.0	40.0	5.0	2.50

H.F. OSCILLATOR

AND

R.F. ALIGNMENT

(FOR OTHER DATA
SEE INDEX)

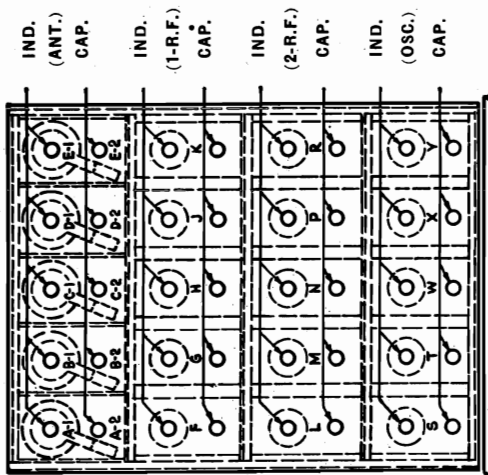


FIG. 10—Complete tuning unit used in all "Super-Pro" receivers. Includes all tuning condensers, coils, and band change switch. Each coil is mounted on an Isolantite base with its associated trimmer condenser.

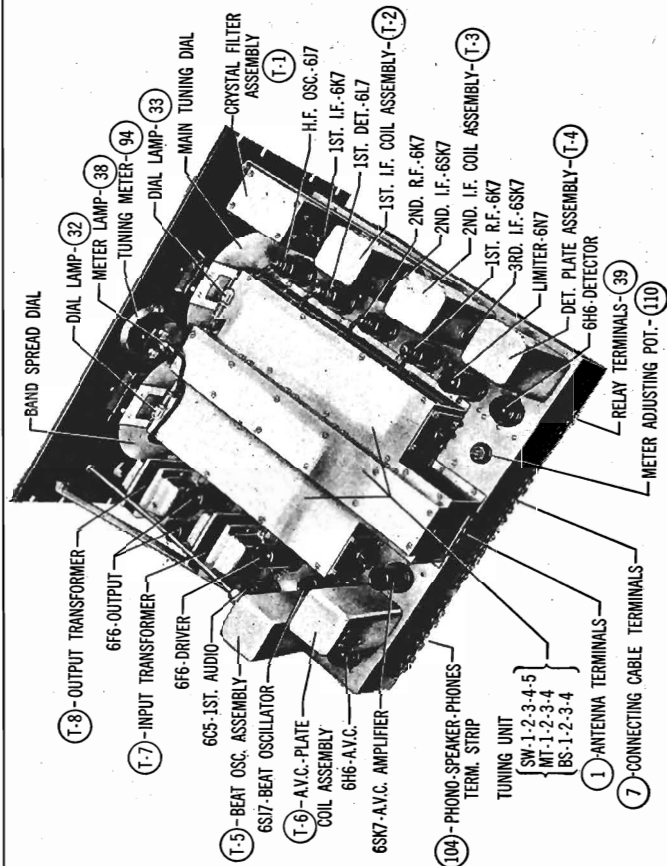
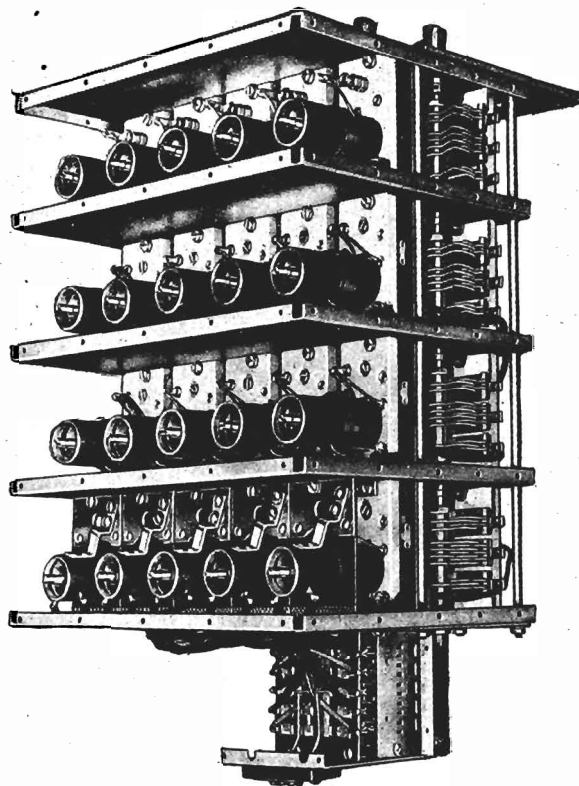


FIG. 7—Top view of "SP-200-X" receiver showing the general layout of parts. All important parts are labeled. Encircled numbers correspond to numbers appearing in the circuit diagram.



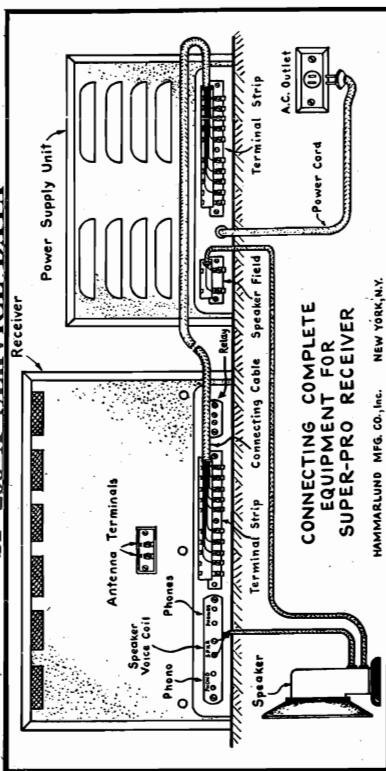
MODELS SP-200X,
SP-200SX

HAMMARLUND MFG. CO., INC.

ANTENNA REQUIREMENTS

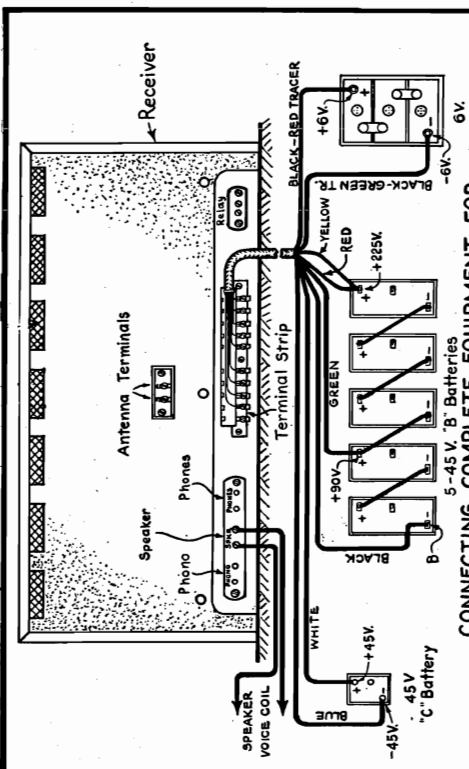
The input of the Series 200 "Super-Pro" is approximately 112 ohms. This means that for best results, the antenna should be coupled to the receiver by means of a low impedance transmission line. The doublet type antenna produces best results. Any well-known low impedance lead-in cable can be used with satisfaction. The use of low impedance lead-ins provides less chance for the lead-in itself to pick up extraneous noises. The low impedance lead-in, together with the electrostatic shield built into the antenna coil of the receiver, reduces noise to a minimum. It must be remembered that every antenna has a period of resonance and works best at that frequency. When erecting a doublet antenna, it is advisable to arrange its physical dimensions so that it will resonate in the band of frequencies where most sensitivity is desired. Care taken in designing and erecting an antenna will pay for itself many times in superior results.

SP-200-X SERVICE DATA



CONNECTING COMPLETE EQUIPMENT FOR SUPER-PRO RECEIVER

The two drawings on this page show the proper method of connecting the receiver, power supply, and speaker together. The drawing above shows a standard installation, while the diagram below indicates receiver connections when batteries furnish the power. Protective covers are furnished for all important terminal strips and they should always be in place.



CONNECTING COMPLETE EQUIPMENT FOR EMERGENCY BATTERY OPERATION SUPER-PRO RECEIVER

HAMMARLUND MFG. CO., INC. NEW YORK, N.Y.

The "Super-Pro" is available to cover several frequency ranges. Such information as is given will pertain to all models. The two standard models have the following tuning ranges:

SP-200	SP-200-S
540 - 1160 kc.	1250 - 2500 kc.
1160 - 2500 kc.	2.5 - 5 mc.
2.5 - 5 mc.	5 - 10 mc.
5 - 10 mc.	10 - 20 mc.
10 - 20 mc.	20 - 40 mc.

The sensitivity of the new "Super-Pro" is truly remarkable. By careful circuit design, the overall set noise has been held down to a minimum, thus making it possible to receive extremely weak signals with favorable signal-to-noise ratio. The variable selectivity feature of the "Super-Pro" permits the operator to make full use of the extreme sensitivity even under most severe conditions of interference. Selectivity can be adjusted to cut down interference within very close limits. The advantages of variable selectivity are tremendous when one considers that conditions of interference are not always the same. Under certain conditions, it may be possible to use quite a wide band width and thus enjoy improved tone, as well as easier tuning. Under other conditions, where interference is quite bad, the band width can be narrowed just enough to eliminate interference and in that case, the best possible fidelity that can be obtained without too much interference, is available. In a case where there is practically no interference from other stations, the band width can be adjusted to its widest point and high fidelity reception can be enjoyed.

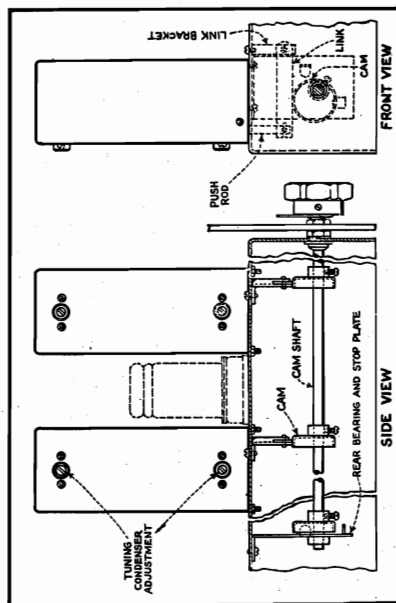


FIG. 1—Band width control which varies selectivity and permits the operator to adjust the receiver for best quality obtainable with minimum interference.

TUBE LINE-UP

- | | |
|------------------------------|------------------------------------------|
| 6K7 — First tuned R.F. | 6N7 — Noise limiter |
| 6K7 — Second tuned R.F. | 6SK7 — AVC driver |
| 6L7 — Mixer | 6H6 — AVC Diode |
| 6J7 — H.F. Oscillator | 6SJ7 — B.F. Oscillator |
| 6K7 — First I.F. Amplifier | 6C5 — First A.F. Amplifier |
| 6SK7 — Second I.F. Amplifier | 6F6 — Second A.F. Amplifier |
| 6SK7 — Third I.F. Amplifier | 2-6F6 — Third A.F. Amplifier (Push-Pull) |
| 6116 — Second Detector | 5Z3 — High Voltage Rectifier |
| | 80 — C-Bias Rectifier |

[illegible]

BAND MC	GENERATOR FREQUENCY	GENERATOR CONNECTION	TRIMMER LOCATION	TRIMMER ADJUSTMENTS	TRIMMER FUNCTION	APPROX. MICROVOLTS
IF	465 KC	Grid of 6K8G	See Fig. 6	C1, C2, C3, C4, C5, C6, C7	IF	15
42-16	32 MC	A and DG	See Fig. 5	T1, T2, T3	OSC. RF. ANT.	8
18- 5.5	17 MC	A and DG	See Fig. 5	T4, T5, T6	OSC. RF. ANT.	3
5.5- 1.7	5 MC	A and DG	See Fig. 6	T7, T8, T9	OSC. RF. ANT.	1
1.6- 5.5	1400 KC	A and DG	See Fig. 6	T10, T11, T12	OSC. RF. ANT.	1
1.6- 5.5	600 KC	A and DG	See Fig. 6	P13	OSC. PAD.	1

NOTE: If the "XTAL" switch should now be thrown to another position, an apparent rise in gain will be noticed, which is caused by the addition of higher frequencies and background noise, so it does not mean that the sensitivity of this set is impaired in any way by use of the crystal.

BAND SPREADING THE RELAY BANDS

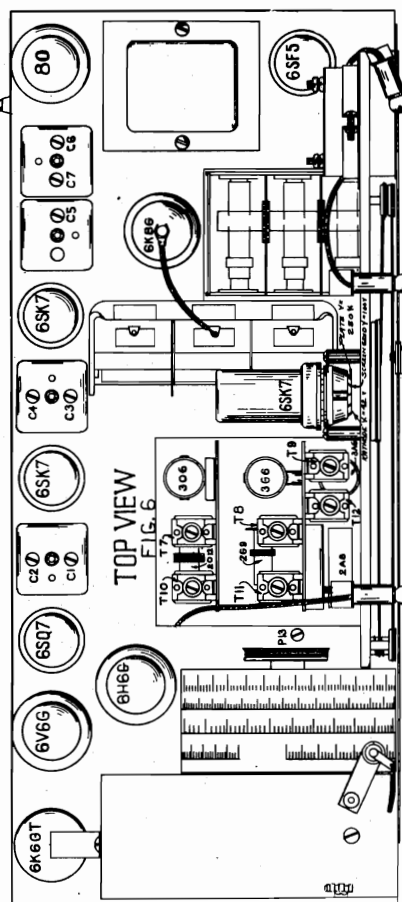
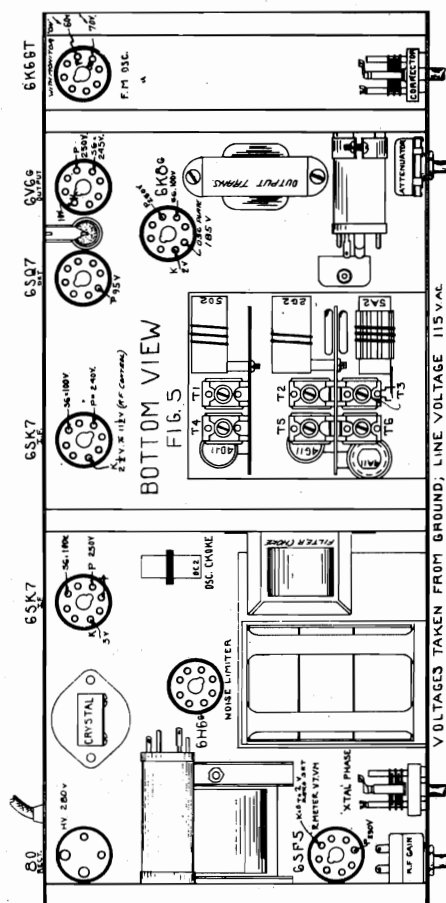
The following table shows the amount of spread obtained by the Band Spread Needle after the exact setting and re-setting of the main tuning band is made on the LOG SCALE in even divisions. Make the first settings at the left end of the band, further settings are towards the right since the Band Spread Needle is tuning to lower frequencies as it approaches zero.

The Band Spread of the regular amateur bands has been covered in the regular instructions in conjunction with the Frequency Monitor.

RELAY BANDS

MAIN TUNING HAND SET TO LOG SCALE	FREQ. MC	BAND SPREAD NEEDLE TRAVEL FROM	ACTUAL SPREAD TO
AT			
2	17.90	100 to 41	17.22
15	15.79	100 to 30	14.80
32	12.29	100 to 8	11.59
36	11.59	100 to 32	11.20
45	9.9	100 to 21	9.60
47	9.60	100 to 16	9.30
49	9.30	100 to 19	9.00
82	6.25	100 to 33	6.17
83	6.17	100 to 34	6.10
84	6.10	100 to 33	6.04
85	6.04	100 to 33	5.98
86	5.98	100 to 36	5.95
87	5.95	100 to 2	5.88
75	18.10	100 to 2	17.81
77	17.81	100 to 31	17.68
78	17.68	100 to 30	17.55
79	17.55	100 to 30	17.40
80	17.40	100 to 36	17.30
54	22.25	100 to 11	21.80
56	21.80	100 to 11	21.33
58	21.33	100 to 10	20.80

NOTE 5: Check for an image signal about .9 mc. lower in frequency. For example:- If a peak has been made at 6 mc. an image should be heard at about 5.1 mc. Otherwise the original setting was not correct.



NOTE 1: When aligning the I.F. channel, a condenser of .05 MFD may be used in series with the generator lead.

NOTE 2: When aligning the broadcast band, a 250 MMFD condenser may be used in series with the signal generator.

NOTE 3: When aligning the short wave bands, a 400 ohm resistor may be used in series with the signal generator.

NOTE 4: When using a CRYSTAL, set PHASING CONTROL to almost minimum capacity. See special alignment instructions below for Crystal.

HOWARD RADIO CO.

FOR USE WITH ALTERNATING CURRENT ONLY
105-120 V. 60 Cycles, Power consumption 80 W.
(Unless otherwise specified on set)

The Model 460 is designed as an efficient communications type receiver. Although it will cover the regular broadcast band, it is built primarily for Amateur short wave work and for those interested in short wave reception at its best.

The frequency coverage from .55 to 43 megacycles is divided into four bands. The left-hand pointer indicates the band in operation. For correct tuning calibration, the band spread pointer must be set at 100. The lower scale 0 to 100 is for additional help in logging. SEE INSTALLATION INSTRUCTIONS ON FOLLOWING PAGES, SEC. VII.

I - THE FREQUENCY MONITOR

For successful results with the HOWARD FREQUENCY MONITOR SYSTEM the following rules must be followed:

(1) Turn on the set but wait at least fifteen minutes until the circuits reach their normal operating conditions before using the Frequency Monitor. This will maintain uniformity in dial settings.

(2) Turn Monitor Switch to "ON" position, set the fundamental frequency calibration (the scale at the right side of the Monitor Dial), to the known frequency of a nearby broadcast station. (Between 850 & 1030 KC).

(3) With the BAND SWITCH in the broadcast band position and the BAND SPREAD HAND SET TO 100, tune in the same station as selected on the Monitor Dial to exact resonance.

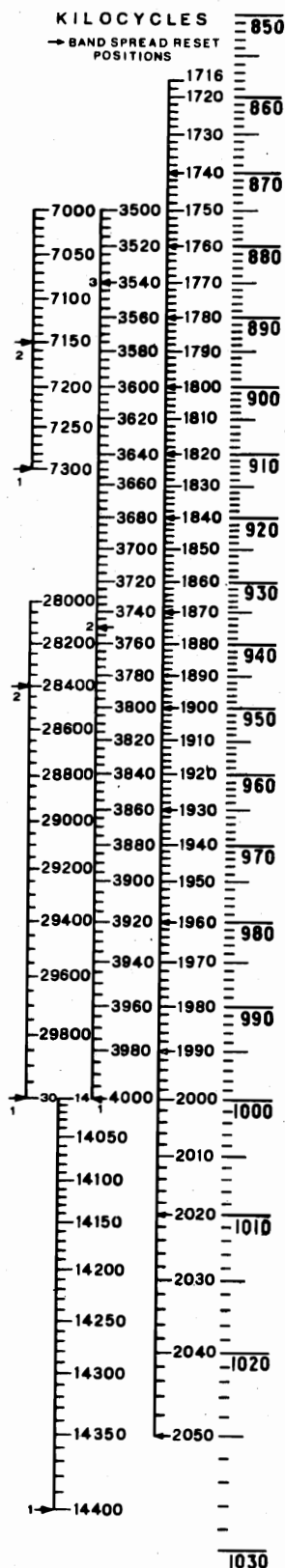
(4) Adjust the "CORRECTOR" to "Zero Beat" with the broadcast station, keeping the "ATTENUATOR" to as low an output as possible (with knob toward the left); otherwise spurious oscillations will be present, with the possibility of zero-beating to a wrong signal near the fundamental with confusing results.

"Zero Beat" refers to the position of the "Corrector" knob, causing the contained oscillator to beat against the incoming signal exactly. A movement of the knob in either direction from this point causes a frequency difference that falls in the Audio range.

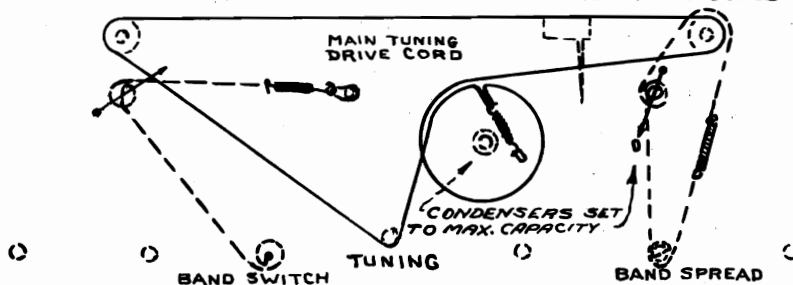
(5) The adjacent calibrated scales to the left of the fundamental scale just used are harmonics that fall in the amateur bands and therefore can be depended upon as an accurate means of pre-tuning, checking and logging the stations. Read Section II showing how these harmonics are derived and how other harmonics are possible which can be ignored. The accuracy of this system is without question.

(6) To determine the exact frequency of an incoming signal, merely set the monitor to zero beat with the station and read the frequency direct on the monitor scale. Take note of course the scale position of the band switch and read the correct harmonic scale.

CAUTION: TAKE SPECIAL CARE NOT TO MOVE THE "CORRECTOR" KNOB ACCIDENTALLY OR OTHERWISE AFTER IT HAS ONCE BEEN SET FOR A CERTAIN FREQUENCY.



FOLLOW DIAGRAM BELOW FOR REPLACEMENT OF DRIVE CORDS



MODEL 460

HOWARD RADIO CO.

II THEORY OF OPERATION

The Frequency Monitor in the Howard Model 460 receiver consists of a highly stabilized oscillator covering the fundamental frequency range of 850 to 1030 kilocycles. The RF output of this oscillator is loosely coupled to the antenna circuit of the receiver and the voltage applied to the receiver is controlled by a variable resistance attenuator.

The Oscillator is tuned by a precision ceramic insulated variable condenser carrying an extremely accurate frequency scale covering the 10, 20, 40, 80, and 160 meter amateur bands as well as the fundamental range. The range is so selected that harmonics cover the entire length of all amateur bands and these are calibrated so that frequency can be read within one kilocycle on the lower frequency bands and several kilocycles on the highest band.

The accuracy of the oscillator is established by setting its dial so that the fundamental frequency shown exactly corresponds to that of some known broadcast station within range. This station is then tuned in on the receiver and the frequency monitor corrector set to zero beat with this station. This establishes the oscillator frequency as exactly the same as that of the broadcast station. The Federal Communications Commission requires all broadcast stations to operate within 50 cycles of their assigned frequency and most of them are within a very few cycles. With the accuracy of the frequency monitor dial established at any one point, it may be depended on to be accurate throughout its range.

Harmonics of the oscillator may be tuned directly on the receiver and exact receiver frequency established in this way or the monitor can be set to zero beat with any station heard and that station's frequency read directly on the monitor dial. The 160 meter band is covered by the second harmonic of the oscillator fundamental; the 80 meter band the fourth harmonic; the 40 meter band the ninth harmonic; the 20 meter band the fourteenth harmonic; the 10 meter band the thirtieth harmonic. These harmonics bear a mathematical relationship of exactly 2, 4, 9, 14, and 30 times the fundamental frequency covered. There are of course other harmonic frequencies present in the oscillator output but the one desired is easily found by tuning the receiver to the approximate frequency as indicated by the receiver dial as this will always be approximately correct. The exactly correct frequency will be found near this point. Harmonics heard at frequencies not corresponding to monitor dial are ignored. Harmonics that fall outside the amateur bands may be used if there is any reason to use them.

THE ATTENUATOR

The Attenuator will be found of invaluable aid in controlling the Frequency Monitor Output. The circuits leading from the monitor

have been completely filtered and the shielding is complete, in order that the greatest percentage of output from monitor is controlled by attenuator.

Advancing attenuator to right increases the R.F. Output from monitor.

No fixed rules can be set down as to the proper use of the attenuator. The operator will find after practice just what positions give best results for the various applications of Frequency Monitor.

IN GENERAL THE ATTENUATOR SHOULD BE ADVANCED, MAKING MONITOR SIGNAL EASY TO LOCATE. AFTER SIGNAL HAS BEEN LOCATED THE ATTENUATOR SHOULD BE TURNED BACK TO LEFT AS FAR AS POSSIBLE, WITH THE SIGNAL JUST AUDIBLE. The practice of using as weak a monitor signal as possible will avoid making mistakes on "spurious" beats.

The attenuator will also be found very convenient in controlling voltage in BFO code reception. The perfect control afforded by the attenuator enables the injection voltage to be held very close to the threshold level, which makes for better CW reception.

III BAND SPREAD - USING FREQUENCY MONITOR FOR ESTABLISHING BAND SPREAD STARTING POSITIONS

The following procedure should be followed for band spreading, using frequency reference:

- (1) ESTABLISH FREQUENCY CORRECTION OF MONITOR AS OUTLINED IN SECTION I.
- (2) SET BAND SPREAD POINTER AT 100.
- (3) SET MONITOR DIAL TO POINT WHERE SPREAD IS TO START, CORRESPONDING TO THE POSITION OF THE MAIN DIAL HAND THAT HAS BEEN SET TO THE HIGH FREQUENCY END OF THE PARTICULAR ALLOTTED BAND. TUNE THIS SIGNAL FOR EXACT RESONANCE WITH MAIN TUNING CONTROL, WATCHING "R" METER. USE THE ATTENUATOR TO INCREASE MONITOR SIGNAL IF NECESSARY, DECREASE OUTPUT OF ATTENUATOR IF RESONANCE PEAK IS BEYOND "R" METER SCALE READING.

NOTE 2: The frequency monitor signal can be identified from other signals in that it is slightly modulated at 120 cycles per second. Only enough modulation is used (approximately five per cent) to make the signal easily identified, while the carrier is sufficiently clean to give good beat note performance.

Turn Monitor off and band spread over the limits of band spread for the particular step chosen.

Any one of the reset positions may be chosen at will. However, if band spreading the entire band is desired the steps should be chosen consecutively, as 1, 2, etc.

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It is good practice to get in the habit of following the operations as outlined above. By so doing, all records or logs of stations heard can be accurately logged BY FREQUENCY and CAN ALWAYS BE FOUND IN THE SAME POSITION.

STATION FREQUENCY MEASUREMENT

It is quite simple to measure the frequency of any signal being heard while covering the range with band spread. Turn Monitor on and zero beat signal by tuning monitor dial, using attenuator if necessary to get correct monitor signal strength for proper zero beating. READ STATION FREQUENCY DIRECTLY ON MONITOR SCALE. Special care must be taken in checking frequencies in 10 meter band in that the image frequency can be mistaken for the true signal frequency. In other words, it is possible to hear the monitor in two spots on signals in this band -- rotate monitor dial until the LOWEST frequency is heard. This is the true signal frequency.

FREQUENCY CHECK OF OWN TRANSMITTER as required by the FCC is possible by the method explained above providing a reasonable amount of isolation is maintained between the transmitter and the receiver.

The following explanation of band spread starting positions may be of help in a better understanding of BAND SPREADING BY FREQUENCY REFERENCE:

It has always been known that if the starting positions of band spread can be established to be exactly the same in FREQUENCY, each time band spreading is started the signal positions and logging can be repeated accurately.

In establishing these starting positions in the past it has been customary to set the main tuning indicator as close as possible to the original or logging position. This naturally leaves much to be desired in accuracy because a slight error, even smaller than the eye can detect, would make a tremendous difference in repeating the band spread dial reading. Also, the oscillator in any receiver drifts somewhat over a period of time. The visual mechanical methods of setting band spread of course never corrected for these things.

The frequency reference method as used in the Howard 460 does correct for these discrepancies and enables an accurate log to be kept either by frequency or by actual band spread indicator position.

It will be noticed that on the Frequency Monitor dial there are positions indicated by an arrow and in some cases these arrows are numbered as 1, 2, etc; these arrows indicate the limits of frequency span of band spread and should be used as the starting positions.

It is customary not to band spread the 160 meter band. However, it can be done quite accurately by using the starting positions as shown on monitor scale.

The positions for each of the amateur bands are as follows:

The 20 meter band starts at 14,000 KC. Band spread covers the entire band. Band spread scale will read from 100 to 50 for this band.

The 10 meter band starts at 30,000 KC and goes to 28,400 KC in first step; therefore, the second reset position is at 28,400 KC. The balance of the band is covered in the second setting of band spread.

The 40 meter band starts at 7,300 KC and goes to 7,150 KC in first step. 7,150 KC is start of second position. The balance of this band to 7,000 KC is covered in second setting.

The 80 meter band is covered in three steps, starting at 4,000 KC, going to 3,750 KC, then to 3,540 KC, and finish band to 3,500 in a short step.

The 160 meter band is covered in thirteen steps, starting at 2,050 and going to 2020, 1990, 1960, 1930, 1900, 1870, 1840, 1820, 1800, 1780, 1760, 1740, and finishes at 1716 KC.

IV C.W. RECEPTION

Use the Frequency Monitor to zero beat the received signal on its fundamental frequency. The customary intermediate frequency beat system is not used, thus eliminating certain unnecessary harmonics that would fall in the amateur band. Throw AVC Switch to "OFF" position.

V THE NOISE LIMITER

The Noise Limiter (with switch in the "ON" position) is so designed to help receive signals that might not come through certain types of interference such as automobile ignition noise, and a high percentage of static impulses from various sources. The noise limiter must not be considered as a "noise eliminator"; such an arrangement would impair the sensitivity of the receiver.

VI THE USE OF THE CRYSTAL

NOTE THAT THE "XTAL PHASE" CONTROL AFFECTS THE SELECTIVITY AND SENSITIVITY OF THE RECEIVER EVEN THOUGH THE CRYSTAL IS NOT BEING USED.

- (1) Set the BAND SPREAD to about 50 on its dial, tune in a station on the main dial to exact resonance, watching the meter deflection.
- (2) Turn Frequency Monitor "ON" and set to same frequency as incoming signal, beat to null point with "Corrector".
- (3) Snap XTAL Switch "IN" and rock Band Spread hand back and fourth, which will show two "sides" of the signal,

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one of which is weaker than the other. Set Band Spread hand to the weaker position.

- (4) Now "Phase Out" the weaker side with the XTAL phase control.
- (5) Retune back to the strong side, which will be found to be free from noise and very selective.

THE SUCCESS OF THE CRYSTAL OPERATION WILL DEPEND UPON TUNING THE SIGNAL TO EXACT RESONANCE.

VII EXTERNAL CONNECTIONS

From the SPEAKER UNIT extends a two lug cable which must be connected to the "5 Ohm" terminal strip on the back of the chassis. No other connections are necessary to the speaker.

The terminals A, D, and G are for antenna and ground connections. Connect the conventional antenna lead-in to terminal "A" and the ground lead to "G"; leave shorting jumper between "G" and "D" unless a Doublet system is used.

For a Doublet system, remove jumper between "G" and "D" and connect doublet wires to "D" and "A". The ground connection can remain.

Due to varied conditions in different localities, it is not possible to give definite recommendations regarding the antenna structure. It is suggested that a little experimenting be done and to follow information given by current radio periodicals, also the A.R.R.L. Handbook.

Special consideration must be taken for reception on the higher frequency bands. There will be periods within a short space of time when no reception is possible. Since the set is designed to meet the conditions for satisfactory short wave reception, there should be no question as to the sensitivity of the set itself, and the receiver should be given a fair chance to produce the required results.

THE MODEL 460 IS DESIGNED TO BE USED EITHER WITH OR WITHOUT THE CRYSTAL. IF THE SET IS NOT EQUIPPED WITH THE CRYSTAL BE SURE TO LEAVE XTAL SWITCH IN THE "OUT" POSITION.

TO LOCATE OR INSERT THE 465 KC CRYSTAL, TURN SET BOTTOM SIDE UP AND REMOVE THE TWO SCREWS HOLDING THE SMALL FLAT COVER.

METER ZERO SET With the Antenna terminal grounded (or the AVC switch in the "OFF" position) turn this control until the "R" Meter hand rests at the 0 point. This will establish accurate readings on this meter.

THE RF GAIN varies the sensitivity of the receiver and under certain conditions is used in conjunction with THE AF GAIN Control to obtain a suitable "signal to noise" ratio.

THE HEADPHONE JACK at the back of the chassis cuts out the regular speaker from the circuit when the plug is inserted.

THE SEND-RECEIVE SWITCH opens the cathode circuits of the RF and IF stages for "standing by".

THE AVC SWITCH should be in the OFF position for reception of C.W.

THE POWER OUTPUT will be about 4.2 watts, undistorted.

GENERAL INFORMATION

For each band there is a Radio Frequency stage with individual coils for the RF Oscillator and Mixer stages for each band.

Ceramic coil forms are used on the high frequency band. Ceramic trimmers are used throughout. The unused coil secondaries of the lower frequency bands are shorted as the band switch is shifted to the higher bands.

The tubes are accessible by removing two screws holding screen to back of cabinet.

The Intermediate Frequency is 465 KC. The Crystal input, Crystal output, and the 2nd IF consist of windings wound on iron cores.

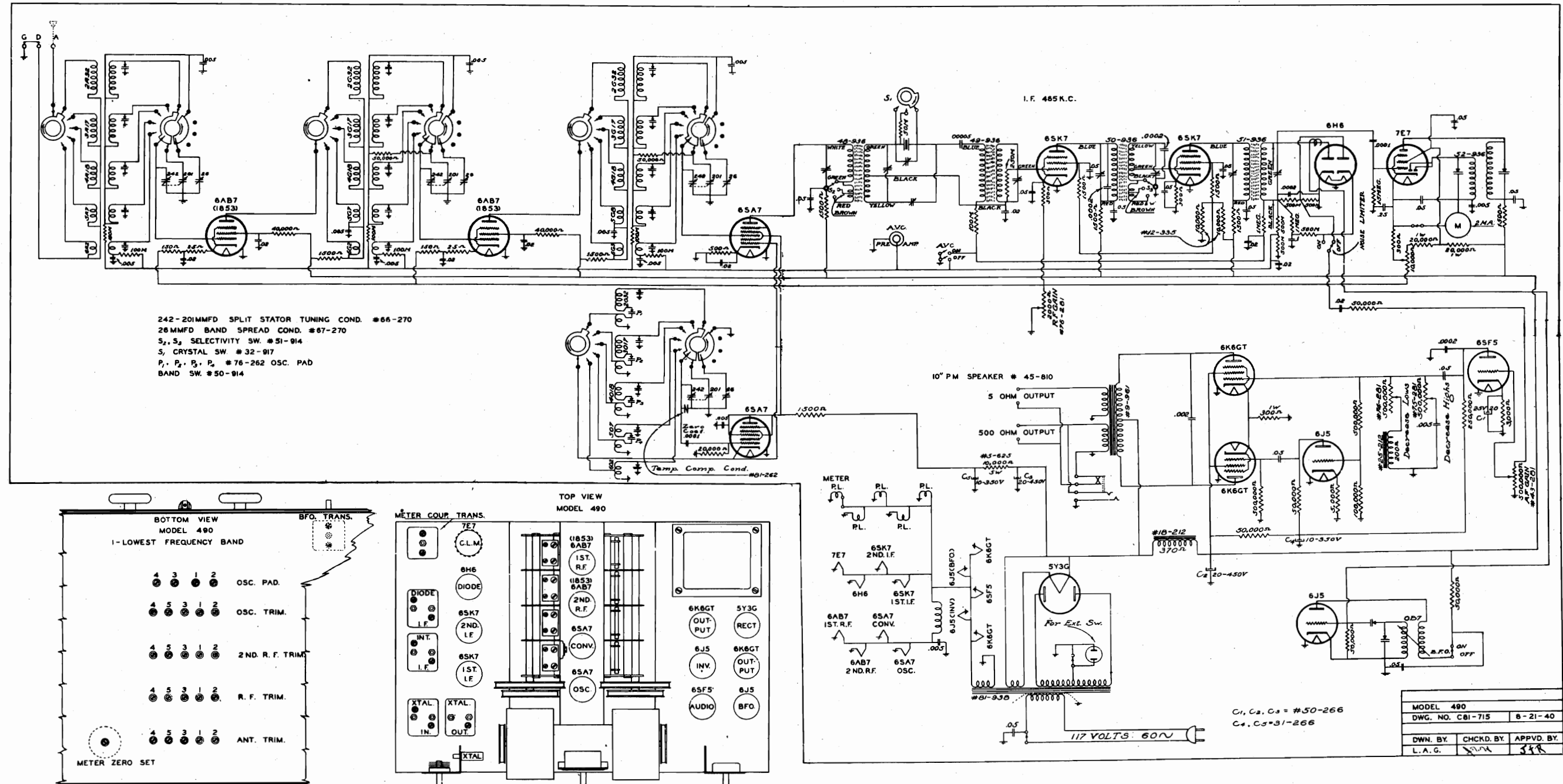
The chassis dimensions are such that the model is adaptable to a standard panel rack.

THE FREQUENCY MONITOR ADJUSTMENTS

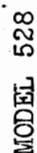
The electrical alignment of this circuit has been set at the factory and under no circumstances should any changes be attempted since there will be no necessity for any change.

For correct calibration see that the Frequency Monitor Dial, when rotated to the lower frequency, stops at the last line above 850 with the condenser at full capacity. If necessary, adjust scale by shifting drum on condenser shaft by loosening hub set screws.

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PRE-ADJUSTMENTS FOR PUSH BUTTON OPERATION

As will be noted, the adjustments consist of two screws, one with a large head (A) and one with a small head (B).

(1) Leave set turned on at least twenty minutes allowing receiver circuits to reach their normal operating condition before starting push button adjustment.

(2) Remove screws holding escutcheon plate for push buttons.

(3) Note the ranges shown on label above adjusting screws. For example: 700 to 540 KC means you should adjust this set of screws for any station having a frequency between 700 and 540 KC. This rule applies for the other five ranges. There is, of course, some overlapping of range coverage.

(4) Select a station by manual tuning in the regular way. Assuming it is within the 700 to 540 KC range, turn Band Switch to "Push Button" position and push in on button covering the range.

As will be noted, the adjustments consist of two screws, one with a large head (A) and one with a small head (B). With a small screw driver, turn screw "A" back and forth until you locate the station. It is suggested that you switch back to manual tuning if necessary to recognize the particular type program to help you find it when you again turn the adjusting screw.

After the "A" Screw has been set to exact resonance by watching the tuning eye deflection, turn the small screw "B" for the maximum deflection of the tuning eye. Now recheck screw "B". When all six buttons have been set, repeat the "trimming" process for accuracy.

process for accuracy. IT WILL BE OF IMPORTANCE TO NOTE THAT IF THE STATION CANNOT AT FIRST BE LOCATED BY MOVING SCREW "A" IN AND OUT, PERHAPS YOU WILL FIND ADJUSTMENT "B" TOO FAR IN OR TOO FAR OUT. In such a case, check its position by turning it in all the way (to the right) then reverse it about a turn or two and try screw "B" again.

Reach trimmer through top of shield cans.

No adjustment is required at the low frequency end of the dial other than the conventional bending of the split condenser plates.

The dual section filter condenser has a common negative, but note that it does not return to ground as the can is insulated from the chassis.

Voltage taken from ground with line voltage
at - 117 V. AC.

High voltage reading off rectifier = 115 V.

Drop across speaker field = 20 V.

Voltage taken with 1,000 Ohm per volt meter,
from cathode return to points as given.

TUBE	FUNCTION	CATH- ODE	SCR. GRID	PLATE	OSC. PLATE
12SA7	Mixer		95	95	95
12SK7	I.F.Amp.	3.5	95	95	
12SQ7	Det.			45	
50L6GT	Output	6	9	82	

POWER SUPPLY-- (Standard Models) = 105-125 V. AC-DC

CONSUMPTION 30 WATTS

SEE LABEL ON BACK OF CHASSIS

ANTENNA SYSTEM = Built-in loop on back of cabinet. Available connection (BROWN lead) for outside antenna.

TUNING RANGES = 540-1720 KC (178-550 Meters)

I.F. = 465 KC

TYPE = Conventional

POWER OUTPUT - (MAX.) = 1 W.

UPO .5 W.

CONTROLS - Tuning, Volume with Power Switch.

TUNING SYSTEM =

String Drive, Airplane dial

SPEAKER = Electro-dynamic

SIZE - 5"

V.C.IMP.(400CPS)	= 5 Ohms
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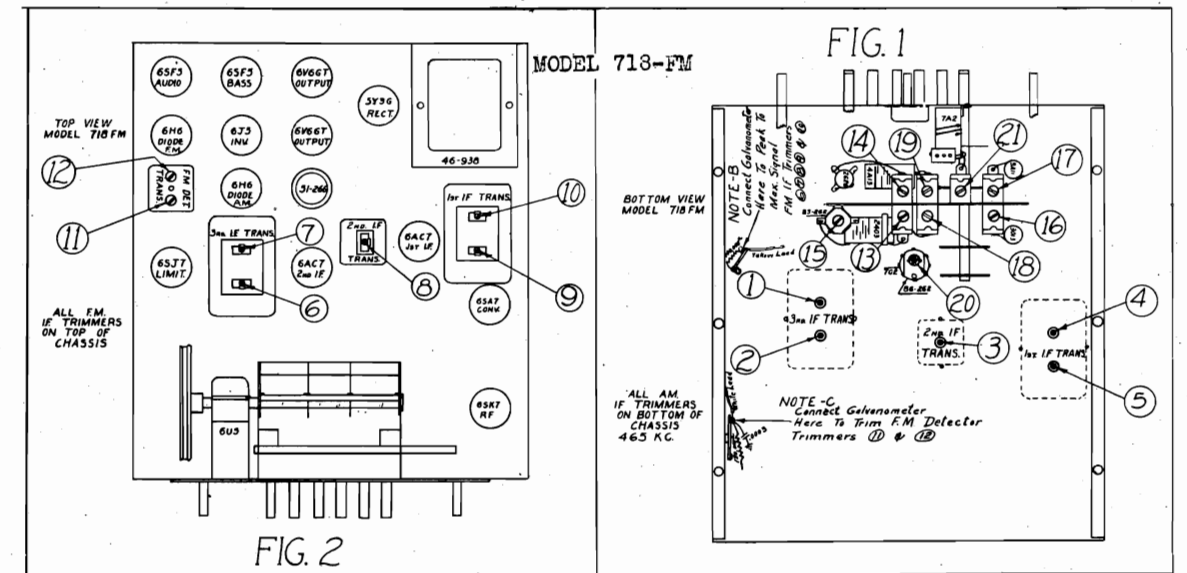
FIELD = 450 Ohms

REPLACEMENT PARTS LIST

Part No.	DESCRIPTION	Part No.	DESCRIPTION
69-281	CONTROLS		DIAL & CONTROL PARTS--Continued
	Volume	28-427	Dial Window
62-270	CONDENSERS	39-829	Spring for drive cord tension
47-266	Tuning	35-448	Tuning hand
	Filter, 20-30 mfd. 150, 150 Volt	60-720	Shaft - Tuning
	COIL ASSEMBLIES		KNOBS
L-21	Ant. Loop	48-490	Tuning Hand Control
2030	Osc. Coil 175-555 Meters		LINE CORDS
	(1700-540 KC)	1-290	Standard
22-936-3	1st I.F. Assembly Complete		MISCELLANEOUS
23-936	Last I.F. Assembly Complete	6-167	Rubber Drive Washers
	CABINETS		SOCKETS, JACKS, CONNECTORS
79-188	Plastic	23-771	Tube Sockets (Octal moulded)
	DIAL & CONTROL PARTS	18-768	Dial Lamp Socket-Bayonet type
129-310	Calibrated Dial Plate or		SPEAKERS (Specify Manufacturer)
	Scale	11-805	Table Model Speaker
1-288	Drive string	11-805T	Transformer for above
4-498	Dial Lamp-Bayonet type	11-805C	Cone for above

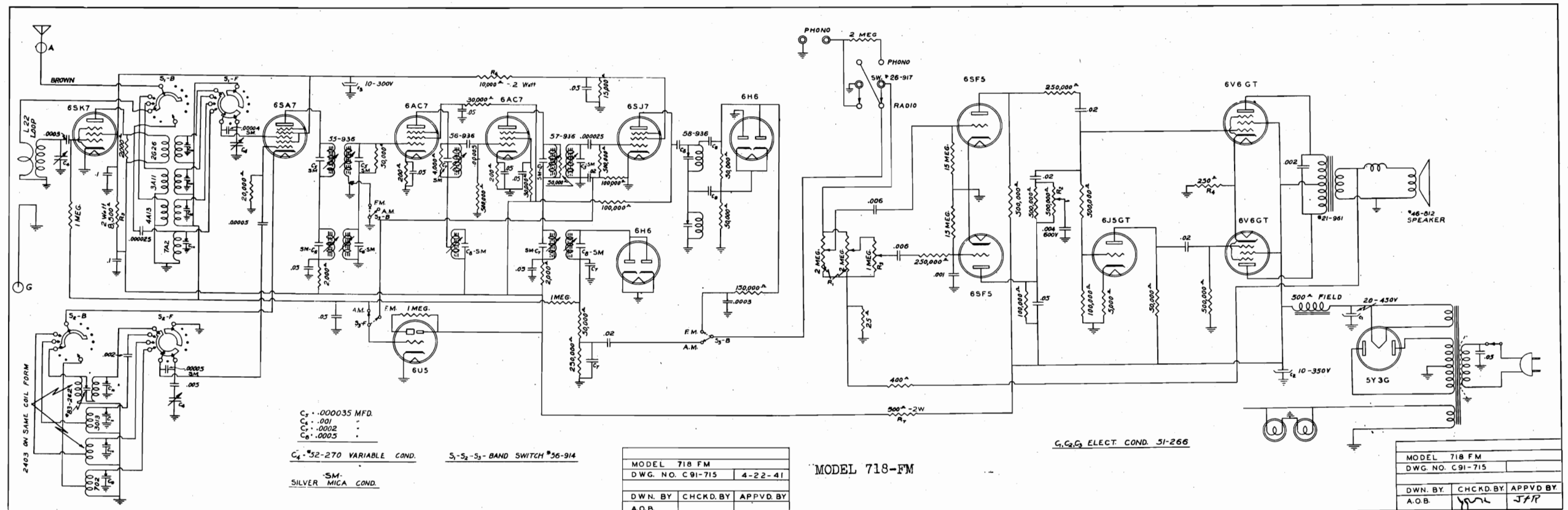
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DUMMY ANTENNA	SIG.GEN. CONNECTION TO	GEN. FREQ.	BAND SW. POSITION	DIAL SETTING	ORDER OF TRIMMER ADJUSTMENTS	TRIMMER FUNCTION	SEE NOTE
.05 Mfd.	Grid of 6SA7	465 KC	BC	Off Station	See Fig. 1 ①②③④⑤	AM I.F. peak to Max. Output	A
"	Grid of 6SA7 Remove tuned circuit	4.3 MC Unmod.	FM	"	See Fig. 2 ⑥⑦⑧⑨⑩	FM I.F. - See Fig. 1 Galvanometer Position	B
"	"	4.4 MC Unmod.	FM	"	Turn ⑪ down tight - then adjust ⑫	See Fig. 2 FM Detector	C
"	"	4.3 MC Unmod.	FM	"	After ⑫, adjust ⑪ for zero deflection	See Fig. 2 FM Detector	D
400 OHM Resistor	"A" Antenna Post	1400 KC	BC	1400 KC	See Fig. 1 ⑬ then ⑭	BC Osc. and RF	E
"	"	600 KC	BC	600 KC	⑮ Rock Dial	BC Osc. Pad	E
"	"	5 MC	Police	5 MC	⑯ then ⑰	Osc. - Ant. Check image at 4.1	E
"	"	16 MC	SW	16 MC	⑱ then ⑲	Osc. - Ant. Check image at 15.1	E
"	"	48 MC 8th Har. of 6 MC	FM	48 MC	⑳ then ㉑	FM Osc. - Ant.	E



Alignment for 718 FM series X same as for 718 FM except for these trimmer nos. 16 to 24.

400 ohm Res.	"A" Ant. Post	5 MC	Police	5 MC	(16) (17) (18)	Osc. - RF - Ant. Check image at 4.1	E
"	"	16 MC	S.W.	16 MC	(19) (20) (21)	Osc. - RF - Ant. Check image at 15.1	E
"	"	48 MC 8th Har. of 6 MC	FM	48 MC	(22) (23) (24)	FM Osc.- RF - Ant	E



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MODEL 718-FM
MODEL 718-FM Series X

GENERAL SPECIFICATIONS

14 Tube, 4 Band, Frequency Modulation, R.F. Stage and Loop for Broadcast band only, Mechanical Push-Button Tuning with declutching system, Built-in Phono Switch, Bass Boost, Treble Control, Beam Power Output, Inverse Feed-Back, 6 Ohm Voice Coil, Power Consumption 115 Watts, Alternating Current only.

THIS SHEET INCLUDES:

- Socket voltage chart (also indicates tube function).
- Alignment chart with pictorials showing trimmer and tube locations.
- Replacement parts list with list prices.
- Schematic diagram.
- SEE FORM 31-480 for dial mechanism.

SOCKET VOLTAGE READINGS FOR MODEL 718-FM
* Socket Terminal Number

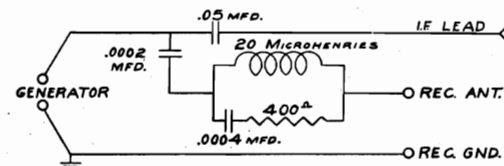
Voltage taken from ground with voltage at 117 Volts AC. Drop across speaker field 65 V. Use at least a 1000 Ohm per Volt Meter. High voltage reading off rectifier 315 V. DC.

TUBE	FUNCTION	CATH.	SG.	PLATE	TUBE	FUNCTION	CATH.	SG.	PLATE
6SK7	FOR 718 FM Series X only R. F. Amp.	2	5	92	6	230	8		
6SA7	Converter	6	92	4	220	3			
6AC7	1st I. F.	2	5	155	6	225	8		
6AC7	2nd I. F.	2	5	155	6	210	8		
6SJ7	Limiter	5	55	6	95	8			
6H6	FM Des-Det.								
6H6	AM Det.								
6SF5	A. F.				55	5			
6SF5	Bass Boost				115	5			
6U5	Tuning eye				230				
6J5	Inverter	8	8		160	3			
6V6GT	Output	16	8	250	4	245	3		
6V6GT	Output	16	8	250	4	245	3		
5Y3G	Rectifier								

ALIGNMENT PROCEDURE FOR 718 FM

EQUIPMENT REQUIRED:

1. SIGNAL GENERATOR to accurately cover the alignment frequencies as shown below.
2. GALVANOMETER 75 microamperes center "0" (Such as Simpson Type 25) USE SERIES RESISTOR of 100,000 Ohms in positive lead. Leads from meter to set to be as short as possible.
3. OUTPUT METER (0 to 3 V. AC if used in voice coil circuit).
4. DUMMY ANTENNA. Although the values as shown in below table for antenna load may be satisfactory, we urgently recommend the circuit as shown at the right to properly take care of the various frequencies to accomplish the correct alignment.



START ALIGNMENT WITH:

Treble and Bass controls turned toward left, Volume Control full ON to right and Band Switch in Broadcast position. After checking for pointer travel to last line above 550, set dial to point where there is no interference with generator signal and proceed with AM-IF alignment.

NOTE A: When a re-alignment is made of either the AM I.F. or FM I.F. it should not be necessary to turn the adjustments very far in either direction. The AM I.F. adjustments are reached through holes in the base from underside of chassis. Should the screws be turned too far in, they might fall out of position which would require that the coil be re-assembled. At the other extreme, if the screws are forced too far out, there is danger of breaking the iron cores.

NOTE B: Connect Galvanometer from tap of limiter grid load circuit to ground. See Fig. 1. Adjust for max. current. Normal gain should give deflection (with meter as specified) of 22 with 2,000 to 3,000 microvolt input. Now shift generator frequency each side of 4.3; that is, to 4.2 and 4.4. The drop-in meter deflection should be approximately proportional to change in frequency. If not, recheck alignment.

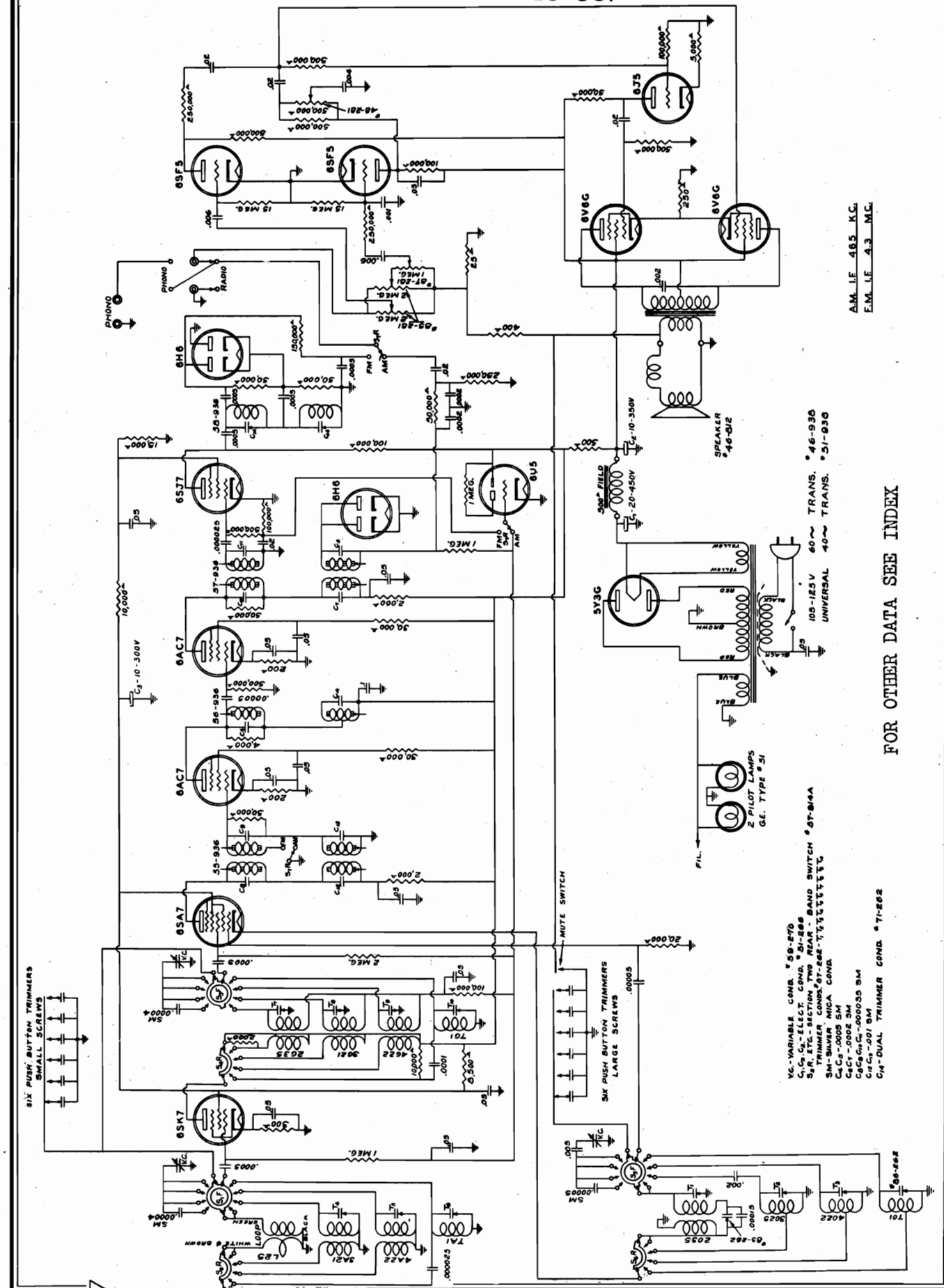
NOTE C: With Galvanometer connected to FM Detector output (See Fig.1) and Trimmer 11 turned all the way in temporarily, adjust Trimmer 12 for max. deflection at 4.4 M.C. Normal gain should give deflection of 9 with 2,000 to 3,000 microvolts input.

NOTE D: After Trimmer 12 is adjusted to 4.4, adjust Trimmer 11 to zero deflection at 4.3. Then shift generator to 4.2 MC. Meter should then show deflection approximately same as at 4.4 at reverse polarity. If the I.F. circuits are ever readjusted, always recheck detector afterwards.

NOTE E: Peak for greatest deflection of output meter.

MODEL 718-FM Series X

HOWARD RADIO CO.

AM IF 465 KC.
FM IF 4.3 MC.SPEAKER
#46-930TRANS. #46-930
UNIVERSAL 40~ TRANS. #51-9302 PILOT LAMPS
GE. TYPE # 51

MUTE SWITCH

SIX PUSH BUTTON TRIMMERS
SMALL SCREWSSIX PUSH BUTTON TRIMMERS
LARGE SCREWS

VC-VARIABLE COND. #38-270

C1, C2-ELECT. COND. #21-268

S, R, ETC.-SECTION TWO REAR - BAND SWITCH #51-844

TRIMMER COND. #7-262-T-55155555

S, R, ETC.-SECTION TWO REAR - BAND SWITCH #51-844

C1, C2-ELECT. COND. #21-268

C1, C2-ELECT. COND. #21-268

C1, C2-ELECT. COND. #21-268

C1, C2-ELECT. COND. #21-268

C1, C2-ELECT. COND. #21-268

C1, C2-ELECT. COND. #21-268

C1, C2-ELECT. COND. #21-268

C1, C2-ELECT. COND. #21-268

C1, C2-ELECT. COND. #21-268

C1, C2-ELECT. COND. #21-268

FOR OTHER DATA SEE INDEX

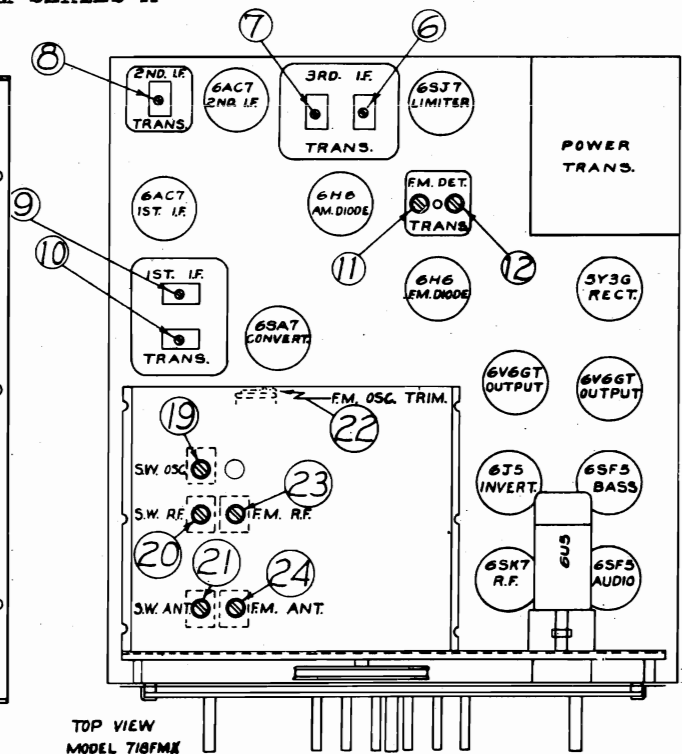
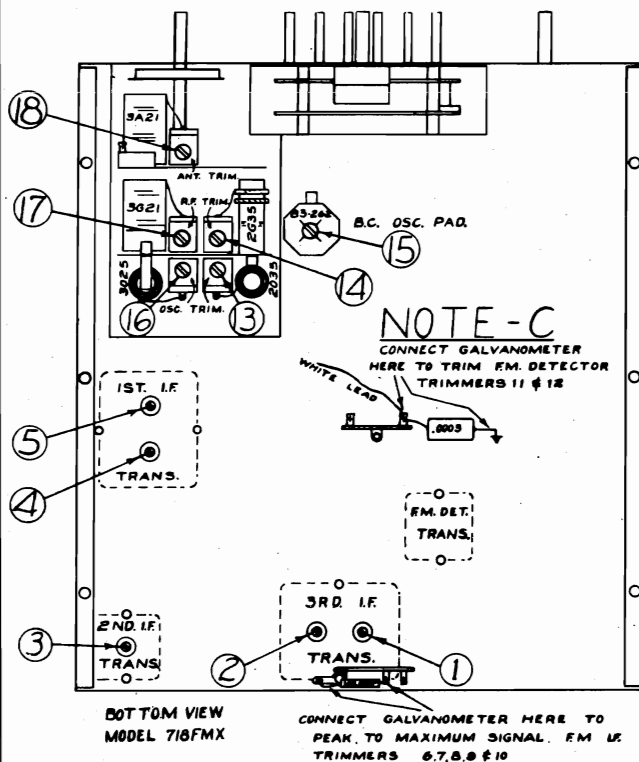
HOWARD RADIO CO.

MODEL 718-FM Series X

MODEL 806

MODEL 808 Spread Band

MODEL 718-FM SERIES X



MODEL 808 SPREAD BAND

Voltage taken at 117 Volts A.C. Drop across speaker field 55V. Use 100 ohms per Volt meter. High Voltage of rect. 320VDC.

TUBE	FUNCTION	CATH.	SG.	PLATE			
6SD7GT	R.F.	2 & 5	* 108	* 6	* 260	* 8	*
6SA7	Converter	6	108	4	260	3	
6SK7	I.F.	3 5	108	6	250	8	
6SQ7	Det.				92	6	

TUBE	FUNCTION	CATH.	SG.	PLATE			
6J5	Inverter	8 8	* *	170	* 3		*
6K6GT	Output	18 8	265 4	255	3		
6K6GT	Output	18 8	265 4	255	3		
5Y3GT	Rectifier						

LAYOUT SHOWING HOW
TO ASSEMBLE DIAL CABLE.
CONDENSER GANG IN
MAXIMUM POSITION

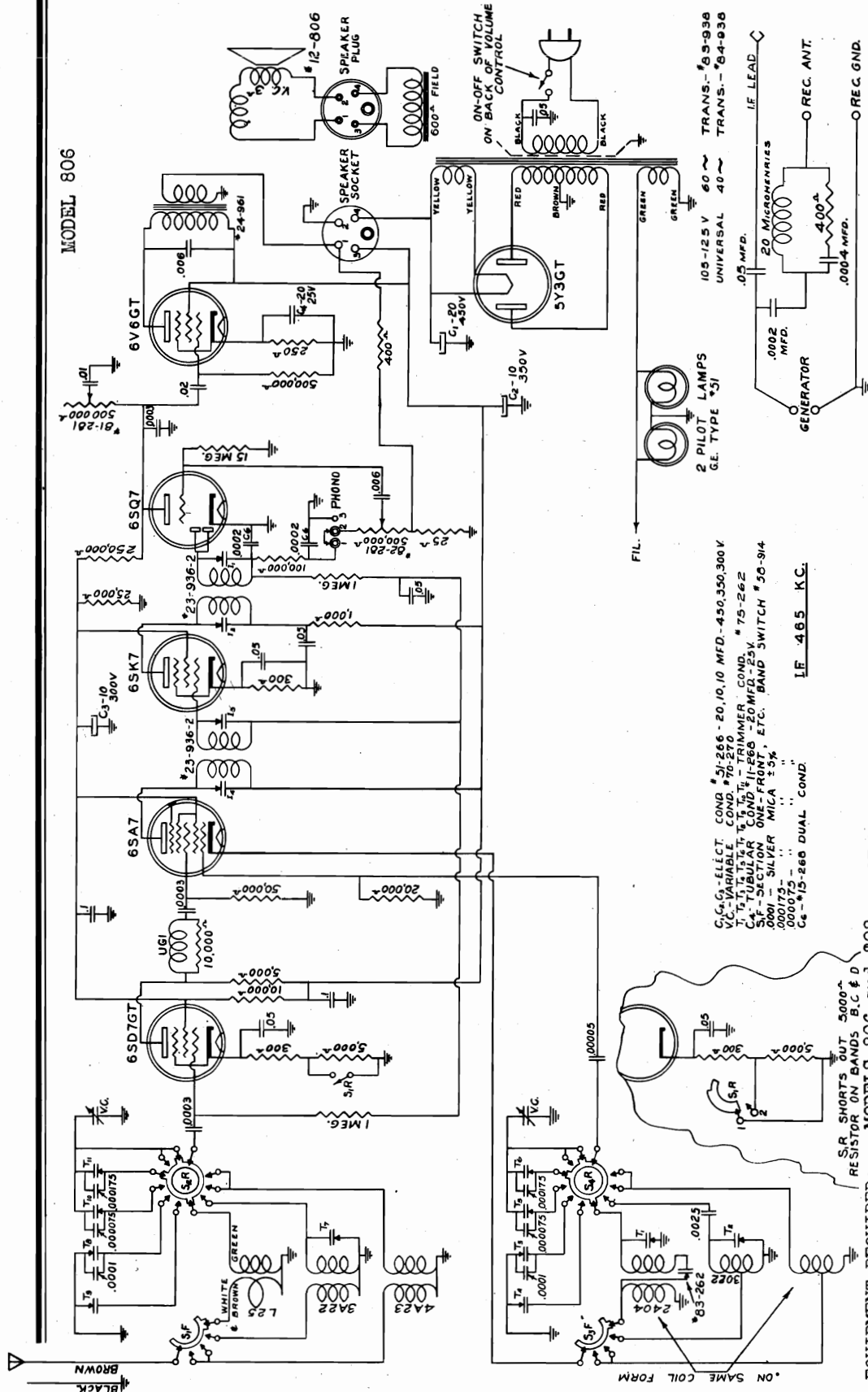
TUBE	FUNCTION	CATH.	SG.	PLATE			
6SD7	R.F.	2 & 4.2	* 5	* 90	* 6	* 235	* 8
6SA7	Converter	-	6	90	4	270	3
6SK7	I.F.	3	5	90	6	260	8
6SQ7	Det.		*		*	90	6
6V6GT	Output	13 8	270 4	258	3		
5Y3GT	Rectifier						

SOCKET VOLTAGE READINGS FOR MODEL 806

* Socket Terminal Number

Voltage taken from ground with voltage at 117 Volts AC. Drop across speaker field 44 V. Use at least a 1000 ohm per Volt Meter. High Voltage reading off rectifier 314 V. DC.

MODEL 806



START ALIGNMENT WITH:

Volume control full ON to right and Band Switch in "A" Band position. After checking for pointer travel to last line above 550, set dial to point where there is no interference with generator signal and proceed with I.F. alignment.

NOTE THAT THIS IS A SPREAD BAND RECEIVER, AND THE ALIGNMENT PROCEDURE IS NOT CONVENTIONAL. ONE SET OF COILS COVERS TWO SHORT WAVE BANDS WHICH ARE SPREAD BY MEANS OF PADDING CIRCUITS.

NOTE ALSO THAT A SETTING POINT FOR THE DIAL HAND POSITION IS GIVEN ON A DIFFERENT BAND OTHER THAN THE BAND BEING ALIGNED AND THE FREQUENCY SETTING OF THE GENERATOR. THIS IS NECESSARY TO OBTAIN THE PROPER BAND-SPREAD.

EQUIPMENT REQUIRED: MODELS 806 and 808

1. Signal Generator to accurately cover the alignment frequencies as shown below.
2. Output Meter (0 to 3 V. AC, if used in voice coil circuit).
3. Dummy Antenna. Although the values as shown in table below for antenna load may be satisfactory, we urgently recommend the circuit as shown at right to properly take care of the various frequencies for correct alignment.

HOWARD RADIO CO.

MODEL 806

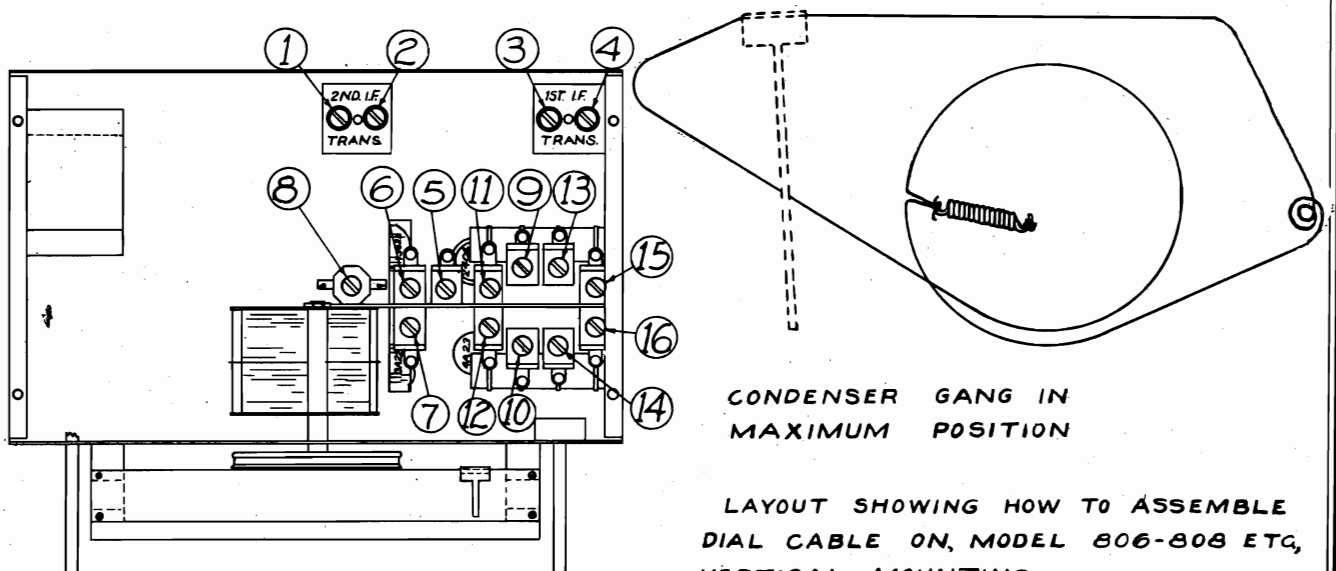
MODEL 808 Spread Band

DUMMY ANTENNA	SIG. GEN. CONNECTION TO	GEN. FREQ.	BAND SW. POSITION	DIAL SETTING	ORDER OF TRIMMER ADJUSTMENTS	TRIMMER FUNCTION	SEE NOTE
.05 Mfd.	Grid of 6SA7	465 KC	"A" Band	Off Station	See Pictorial ① ② ③ ④	I. F. peak to max. output	
400 Ohm Resistor	Ant.	1400 KC	"A" Band	1400 KC	See Pictorial ⑤	BC Osc.	
"	"	600 KC	"A" Band	600 KC	⑧ Rock Dial	BC Osc. Pad.	
"	"	5 MC	"B" Band	5 MC	⑥ then ⑦	Pol. Band Osc. - Ant. Check Image at 4.1	
"	"	10 MC	"C" Band	15.6 MC on "D" Band	⑨ then ⑩	⑨ Osc. Pad. ⑩ Ant. Pad.	
"	"	12 MC	"C" Band	12 MC	⑪ then ⑫	⑪ Osc. Trimmer ⑫ Ant. Trimmer	
"	"	16 MC	"D" Band	2.4 MC on "B" Band	⑬ then ⑭	⑬ Osc. Pad. ⑭ Ant. Pad.	
"	"	20 MC	"D" Band	20 MC	⑮ then ⑯	⑮ Osc. Trimmer ⑯ Ant. Trimmer	

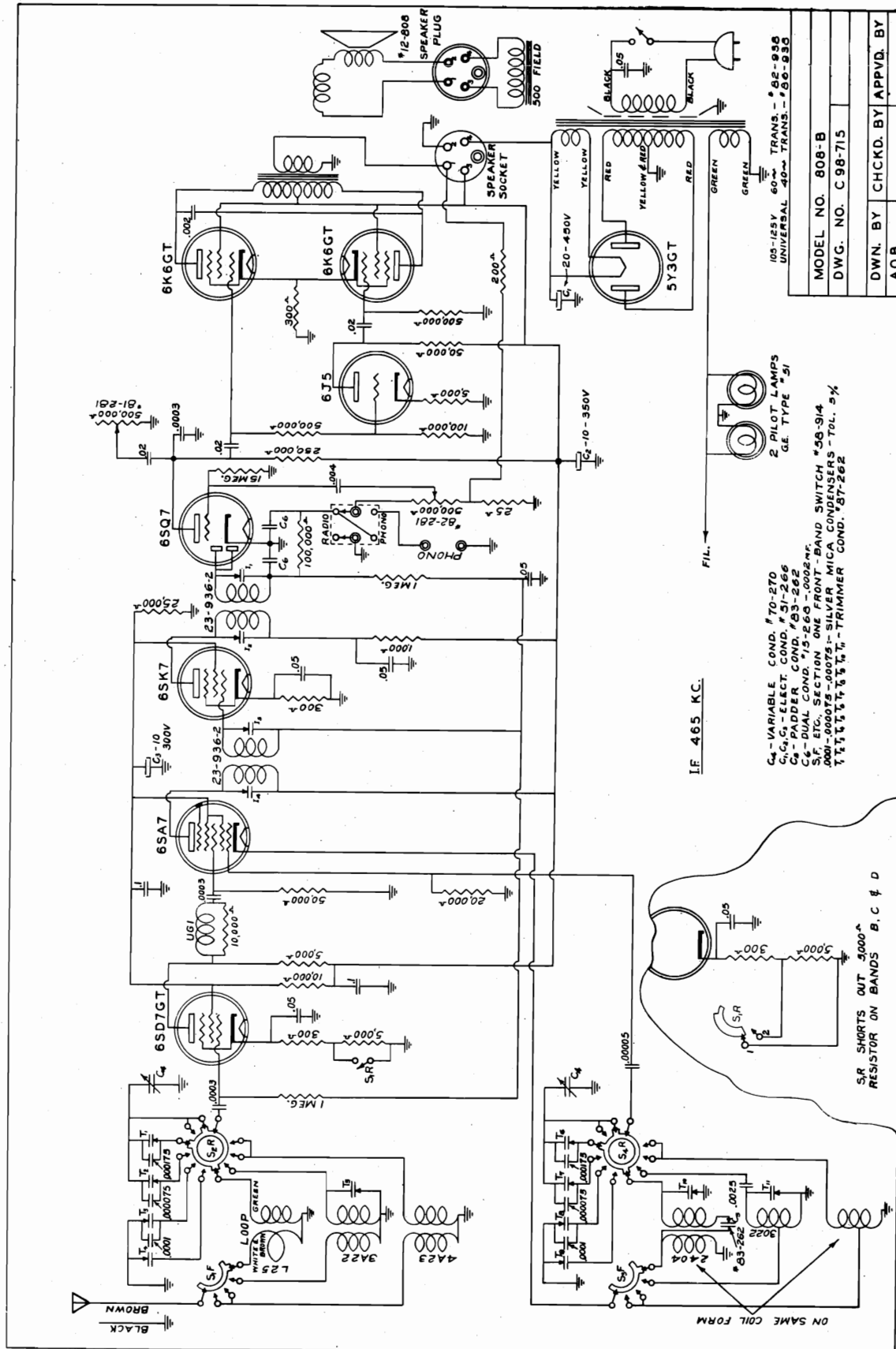
NOTE 1: The I.F. adjustments are reached through holes in top of cans on under side of chassis.

NOTE 2: Trimmers 11 and 12 set to minimum capacity temporarily; peak 9 and 10. Then peak 11 and 12. Check dial calibration at 9, 10, and 12 MC.

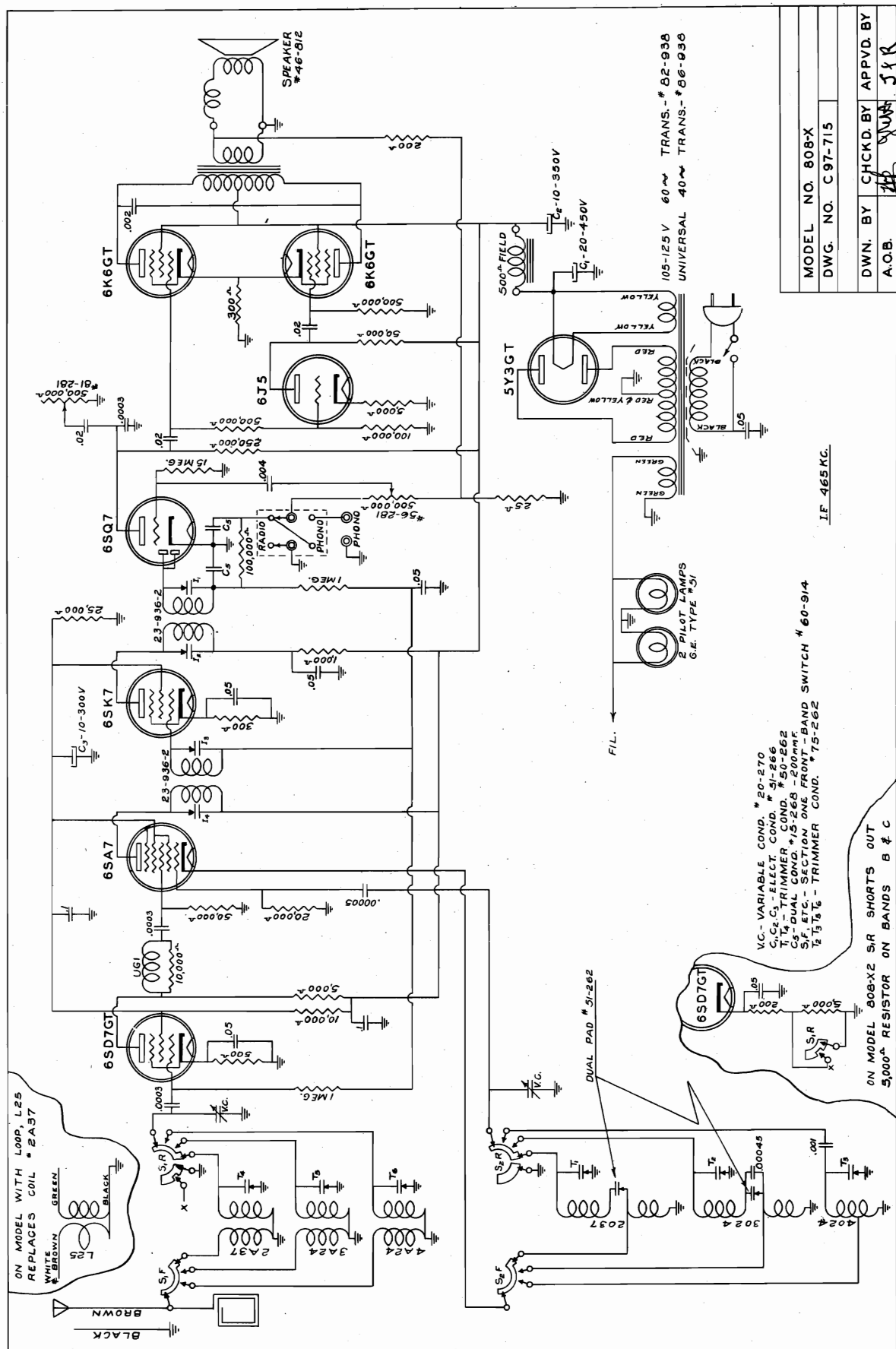
NOTE 3: Trimmers 15 and 16 set to minimum capacity temporarily; peak 13 and 14. Then peak 15 and 16. Check dial calibration at 15, 16, 18, and 20 MC.

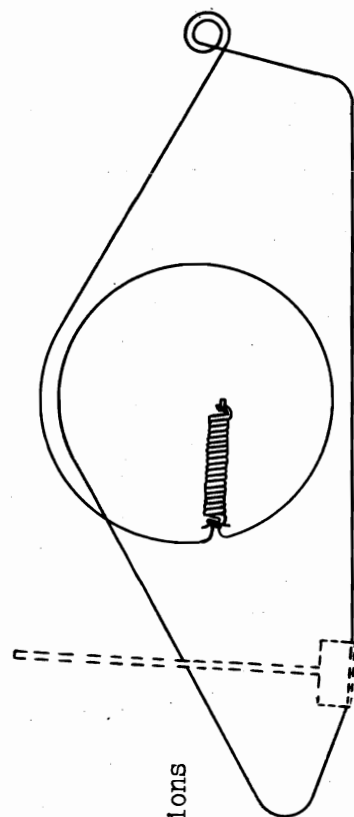


HOWARD RADIO CO.



MODEL 808 Series X





Condenser gang in maximum position.

Voltage taken from ground with voltage at 117 Volts AC. Drop across speaker field 50V. Use at least a 1000 Ohm per Volt Meter. High voltage reading off rectifier 310 V. DC.

SOCKET VOLTAGE READINGS FOR MODEL 808-X

*Socket Terminal Number

THIS SHEET INCLUDES:

- Socket voltage chart (also indicates tube function).
- Alignment chart with pictorials showing trimmer and tube locations
- Replacement Parts list with list prices.
- Schematic diagram.

Layout showing how to assemble dial cable on model 808-X-A horizontal mounting.

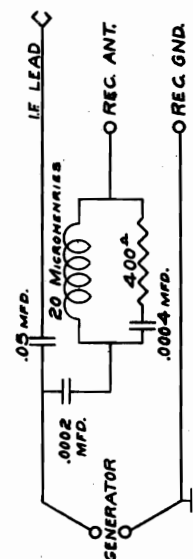
MODEL 808 SERIES X

TUBE	FUNCTION	CATH.	SG.	PLATE.	TUBE	FUNCTION	CATH.	SG.	PLATE.	...
6SD7GT	R.F.	2.5	5 110	6 250 8	6J5	Inverter	8 8	*	175 3	*
6SA7	Converter		6 110	4 260 3	6K6GT	Output	19 8 260	4 252 3		
6SK7	I.F.	2	5 110	6 255 8	6K6GT	Output	19 8 260	4 252 3		
6SQ7	Det.			85 6	5Y3GT	Rectifier				

ALIGNMENT PROCEDURE FOR 808-X SERIES

Before starting alignment see that the tuning hand falls exactly on the last line above 550 when the condenser is at full capacity.

DUMMY ANTENNA. Although the values as shown in below table for antenna load may be satisfactory, we urgently recommend the circuit as shown at the right to properly take care of the various frequencies to accomplish the correct alignment.

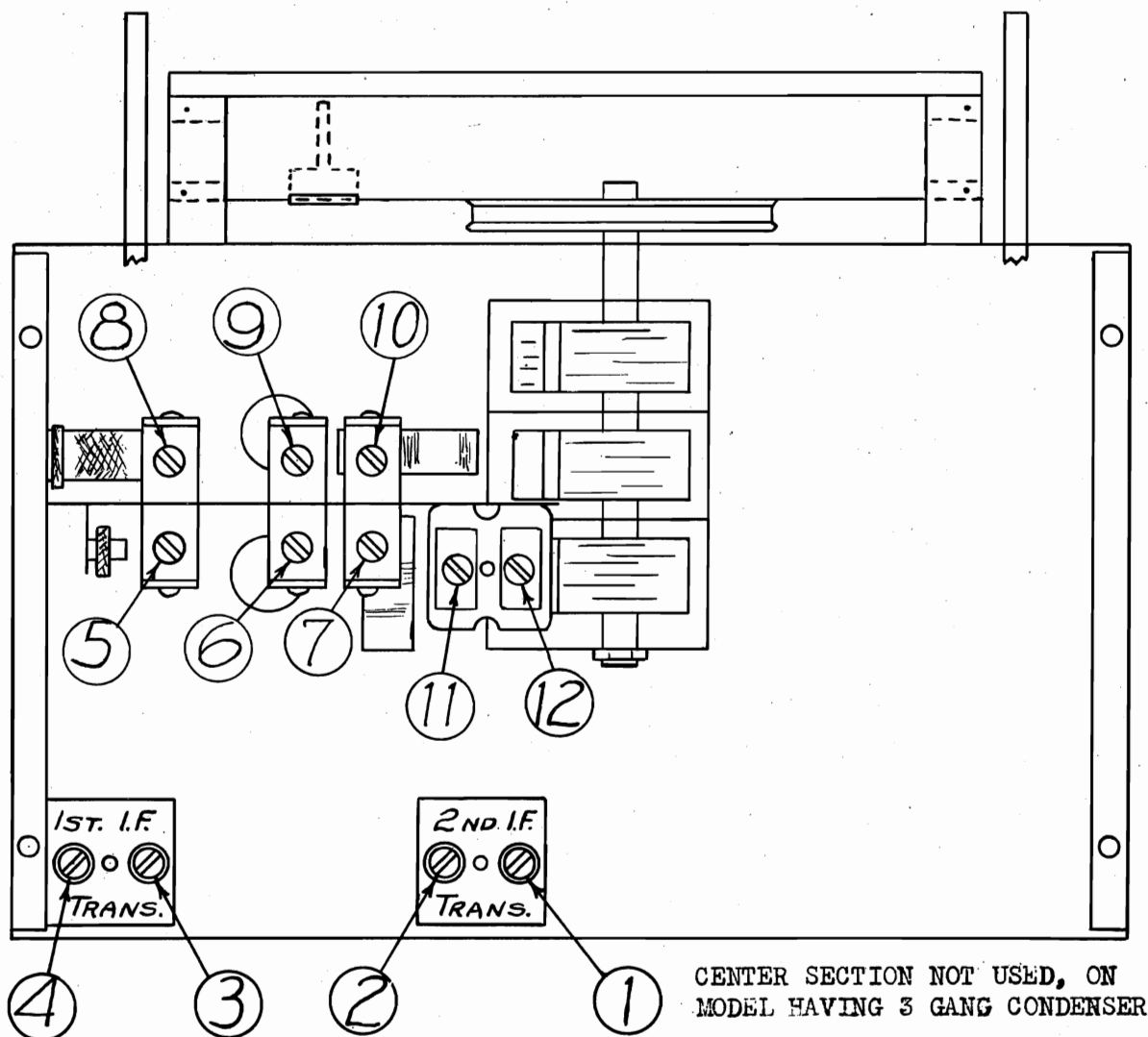


Note 1: The IF adjustments are reached through holes in top of cans on underside of chassis.

Note 2: Peak for greatest deflection of output meter

HOWARD RADIO CO.

DUMMY ANTENNA	SIG; GEN. CONNECTION TO	GEN. FREQ.	BAND SW. POSITION	DIAL SETTING	ORDER OF TRIMMER ADJUSTMENTS	TRIMMER FUNCTION	SEE NOTE
.05 Mfd.	Grid of 6SA7	465 KC	A	Off Station	See Pictorial ①②③④	I. F. Peak to Max. Output	1
400 Ohm Resistor	Brown Lead	1400 KC	A	1400 KC	See Pictorial ⑤ then ⑥	BC Osc. and Ant.	2
"	"	600 KC	A	600 KC	See Pictorial ⑪ Rock Dial	BC Osc. Pad.	2
"	"	6 MC	B	6 MC	See Pictorial ⑦ then ⑩	Pol. Band Osc. & Ant. Check Image at 5.1	2
"	"	3 MC	B	3 MC	See Pictorial ⑫ Rock Dial	Pol. Band. Osc. Pad	2
"	"	21 MC	C	21 MC	See Pictorial ⑥ then ⑨	SW Osc. and Ant. Check Image at 20.1	2



GENERAL SPECIFICATIONS

8 Tube, Three Band, Untuned R. F. Stage, Built-in Phono Switch, Treble Control, Inverse Feed-Back, 6 Ohm Voice Coil, 500 Ohm Field. Power Consumption, 80 Watts, Alternating Current Only.

MODEL 14 ACB

HOWARD RADIO CO.

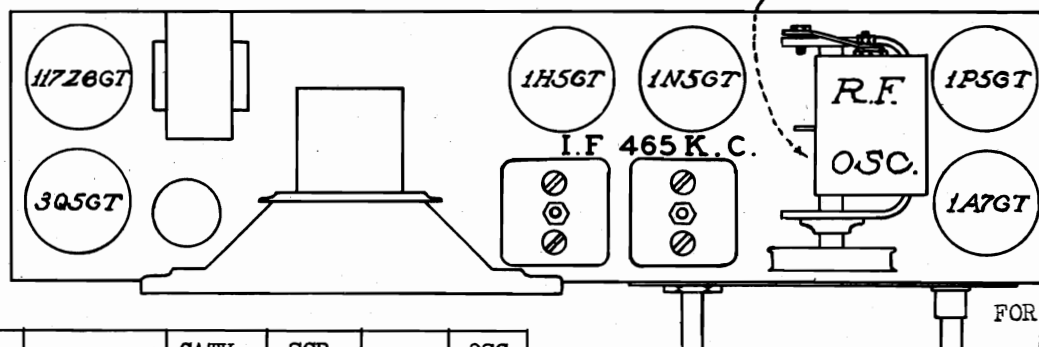
TUNING RANGES = 540 to 1700 KC		BATTERY OUTPUT = Max. = 300 MW. UPO = 260 MW.	
I. F. = 465 KC	TYPE = Conventional	POWER OUTPUT - (MAX.) = 500 MW. UPO = 300 MW.	
CONTROLS - Tuning, Volume with Power Switch, Line cord plugs in back of chassis to close circuit for battery operation.			
<u>TUNING SYSTEM</u> = Conventional string drive, airplane type dial.			
SPEAKER = Permanent Magnet	SIZE = 5"	V.C.IMP.(400CPS) = 3 OHMS	FIELD =

REPLACEMENT PARTS LIST

Part No.	DESCRIPTION	Part No.	DESCRIPTION
24-212	CHOKES "B" filter	35-448	DIAL & CONTROL PARTS Tuning hand
70-281	CONTROLS Volume	42-720	Shaft - Tuning
61-270	CONDENSERS Tuning	9-655	GRILL WORK Speaker Screen
50-262	Single trimmer	49-490	KNOBS Tuning Hand Control
47-266	Filter, 20-30 mfd. 150, 150 V.	1-290	LINE CORDS Standard
48-266	Tubular Electrolytic, 50 mfd. 25 V.	5-335	RESISTORS Candohm Type, 50 Ohm
L-20	COIL ASSEMBLIES Ant. Loop	23-771	SOCKETS, JACKS, CONNECTORS Tube sockets (Octal moulded)
2029	Osc. Coil 1700-540 KC.	22-602	Plug - 2 prong for "A" battery
2G29	R.F. Coil 1700-540 KC.	17-602	Plug - 3 prong for "B" battery
22-936	1st. I.F. Assembly Complete		SPEAKERS (Specify Manufacturer) Table Model Speaker
23-936	Last I.F. Assembly Complete	P9-805	Transformer for above
77-188	CABINET Portable	P9-805T	Cone for above
130-310	DIAL & CONTROL PARTS Calibrated Dial Plate	P9-805C	SWITCHES Change-Over AC-DC Battery
1-288	Drive string	29-917	TUBE SHIELDS
20-427	Dial Window	7-758	MISCELLANEOUS Rubber Drive Washers
39-829	Spring for drive cord tension	6-167	

14 - ACB

Trimmer On Lower Side



TUBE	FUNCTION	CATH-ODE	SCR. GRID	PLATE	OSC. PLATE
1P5GT	RF	--	98	98	
1A7GT	Mixer	--	54	98	98
1N5GT	IF	--	98	98	
1H5GT	2nd Det.	--		30	
3Q5GT	Output	--	98	94	

FOR OTHER DATA
SEE INDEX

High Voltage off Rect. - 114 V.
Drop across choke - 16 V.
Voltages taken from ground with
line voltage of 177 V. AC.

"B" drain at 90 Volts - .0125 A.
"A" drain at 9 Volts - .050 A.

All of the tube filaments are connected in series with the exception of the rectifier which has a 117 Volt filament.

A filament current equalizing system is employed using a 2,000 Ohm resistor from the power tube filament to ground and a 600 Ohm in the mixer tube filament circuit. See diagram.

The alignment of this receiver is conventional, the Intermediate Frequency being 465 KC. The Loop and Oscillator circuits are aligned at 1400 KC. If necessary, the condenser cut plates can be varied at the lower frequencies.

1942 HUDSON AUTOMOBILE RECEIVER

MODEL DB-42 **PART No. HA-204800**

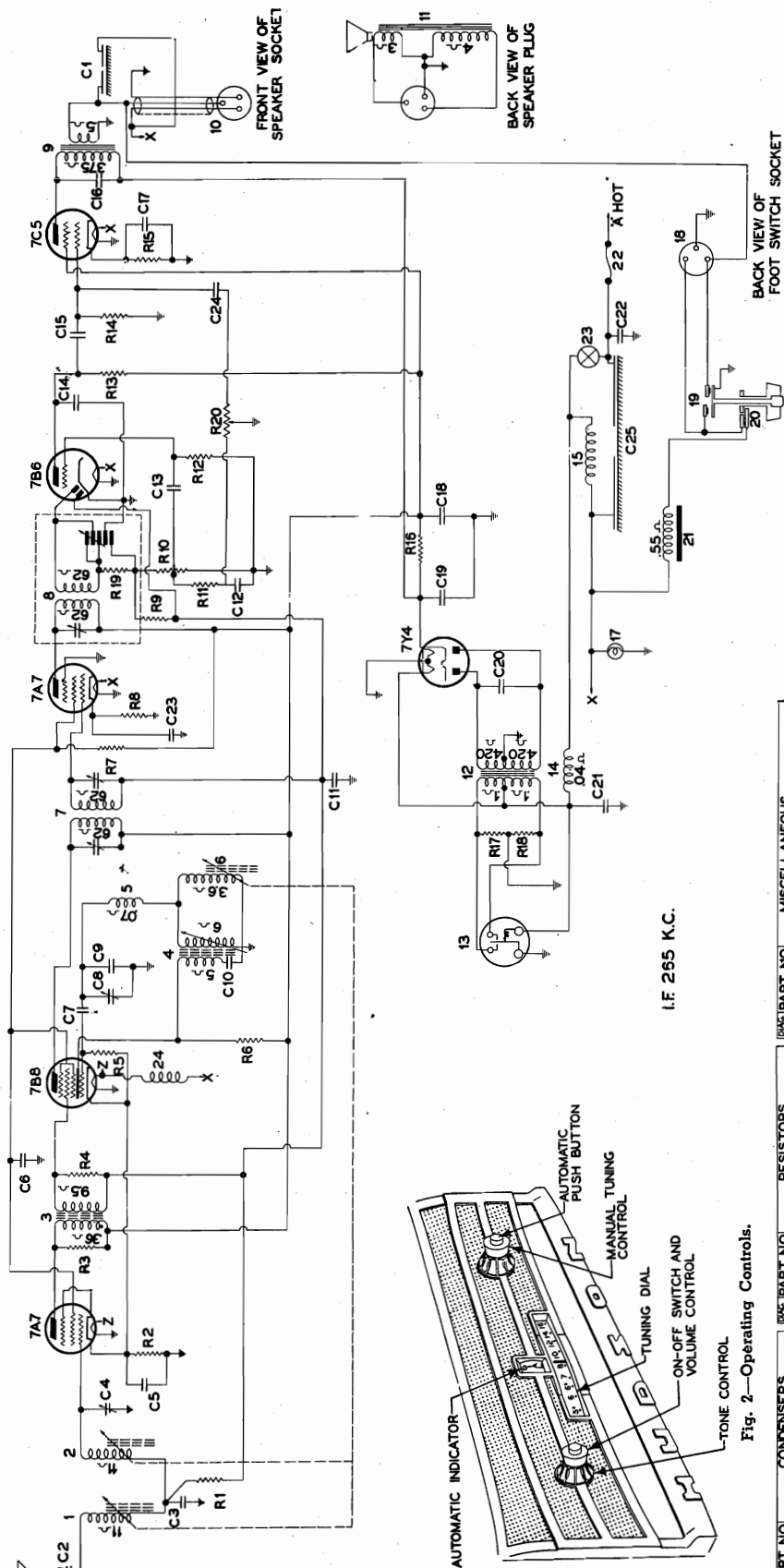


Fig. 2—Operating Controls.

%	PART NO	CONDENSERS	%	PART NO	RESISTORS	%	PART NO	MISCELLANEOUS
1	22-1076	LOW RESISTOR	R1	63-596	33000 OHMS 1/4W ±10%	1	S-10064	ANTENNA COIL
2	22-1078	ANT TRIMMING PLATE 250MMF	2	63-285	220 OHMS 1/4W ±10%	2	S-10084	R.F. GRID COIL
3	22-1244	RF TRIM. ±10% MICA	3	63-645	27000 OHMS 1/4W ±10%	3	S-9762	UNTUNED RF TRANSFORMER
4	22-1236	RF TRIM. 3PLATE 50MMF	4	63-548	33000 OHMS 1/4W ±10%	4	S-10095	OSC SHUNT COIL
5	22-1236	RF TRIM. 3PLATE 50MMF	5	63-548	33000 OHMS 1/4W ±10%	5	S-10095	OSC SHUNT COIL
6	22-1236	RF TRIM. 3PLATE 50MMF	6	63-607	15000 OHMS 1/2W ±10%	6	S-10095	OSC SHUNT COIL
7	22-1236	RF TRIM. 3PLATE 50MMF	7	63-957	33000 OHMS 1/2W ±10%	7	S-10095	OSC SHUNT COIL
8	22-1236	RF TRIM. 3PLATE 50MMF	8	63-294	100 OHMS 1/4W ±10%	8	S-95-820	DIODE TRANSFORMER
9	22-1236	RF TRIM. 3PLATE 50MMF	9	63-294	100 OHMS 1/4W ±10%	9	S-95-820	DIODE TRANSFORMER
10	22-1236	RF TRIM. 3PLATE 50MMF	10	63-1248	25000 OHMS 1/4W ±10%	10	S-95-820	DIODE TRANSFORMER
11	22-1236	RF TRIM. 3PLATE 50MMF	11	63-763	25000 OHMS 1/4W ±10%	11	S-95-820	DIODE TRANSFORMER
12	22-1236	RF TRIM. 3PLATE 50MMF	12	63-763	25000 OHMS 1/4W ±10%	12	S-95-820	DIODE TRANSFORMER
13	22-1236	RF TRIM. 3PLATE 50MMF	13	63-763	25000 OHMS 1/4W ±10%	13	S-95-820	DIODE TRANSFORMER
14	22-1236	RF TRIM. 3PLATE 50MMF	14	63-596	33000 OHMS 1/4W ±10%	14	S-95-820	DIODE TRANSFORMER
15	22-1236	RF TRIM. 3PLATE 50MMF	15	63-596	33000 OHMS 1/4W ±10%	15	S-95-820	DIODE TRANSFORMER
16	22-1236	RF TRIM. 3PLATE 50MMF	16	63-941	300 OHMS 1/2W ±10%	16	S-5644	MOTOR NOISE CHOKE
17	22-1236	RF TRIM. 3PLATE 50MMF	17	63-941	300 OHMS 1/2W ±10%	17	S-5644	MOTOR NOISE CHOKE
18	22-1236	RF TRIM. 3PLATE 50MMF	18	63-197	82 OHMS 1/2W ±10%	18	S-5644	MOTOR NOISE CHOKE
19	22-1236	RF TRIM. 3PLATE 50MMF	19	63-197	82 OHMS 1/2W ±10%	19	S-5644	MOTOR NOISE CHOKE
20	22-1236	RF TRIM. 3PLATE 50MMF	20	63-197	82 OHMS 1/2W ±10%	20	S-5644	MOTOR NOISE CHOKE
21	22-1236	RF TRIM. 3PLATE 50MMF	21	63-197	82 OHMS 1/2W ±10%	21	S-5644	MOTOR NOISE CHOKE
22	22-1236	RF TRIM. 3PLATE 50MMF	22	63-197	82 OHMS 1/2W ±10%	22	S-5644	MOTOR NOISE CHOKE
23	22-1236	RF TRIM. 3PLATE 50MMF	23	63-197	82 OHMS 1/2W ±10%	23	S-5644	MOTOR NOISE CHOKE
24	22-1236	RF TRIM. 3PLATE 50MMF	24	63-197	82 OHMS 1/2W ±10%	24	S-5644	MOTOR NOISE CHOKE
25	22-1236	RF TRIM. 3PLATE 50MMF	25	63-197	82 OHMS 1/2W ±10%	25	S-5644	MOTOR NOISE CHOKE
26	22-1236	RF TRIM. 3PLATE 50MMF	26	63-197	82 OHMS 1/2W ±10%	26	S-5644	MOTOR NOISE CHOKE
27	22-1236	RF TRIM. 3PLATE 50MMF	27	63-197	82 OHMS 1/2W ±10%	27	S-5644	MOTOR NOISE CHOKE
28	22-1236	RF TRIM. 3PLATE 50MMF	28	63-197	82 OHMS 1/2W ±10%	28	S-5644	MOTOR NOISE CHOKE
29	22-1236	RF TRIM. 3PLATE 50MMF	29	63-197	82 OHMS 1/2W ±10%	29	S-5644	MOTOR NOISE CHOKE
30	22-1236	RF TRIM. 3PLATE 50MMF	30	63-197	82 OHMS 1/2W ±10%	30	S-5644	MOTOR NOISE CHOKE
31	22-1236	RF TRIM. 3PLATE 50MMF	31	63-197	82 OHMS 1/2W ±10%	31	S-5644	MOTOR NOISE CHOKE
32	22-1236	RF TRIM. 3PLATE 50MMF	32	63-197	82 OHMS 1/2W ±10%	32	S-5644	MOTOR NOISE CHOKE
33	22-1236	RF TRIM. 3PLATE 50MMF	33	63-197	82 OHMS 1/2W ±10%	33	S-5644	MOTOR NOISE CHOKE
34	22-1236	RF TRIM. 3PLATE 50MMF	34	63-197	82 OHMS 1/2W ±10%	34	S-5644	MOTOR NOISE CHOKE
35	22-1236	RF TRIM. 3PLATE 50MMF	35	63-197	8			

HUDSON MOTOR CAR CO.

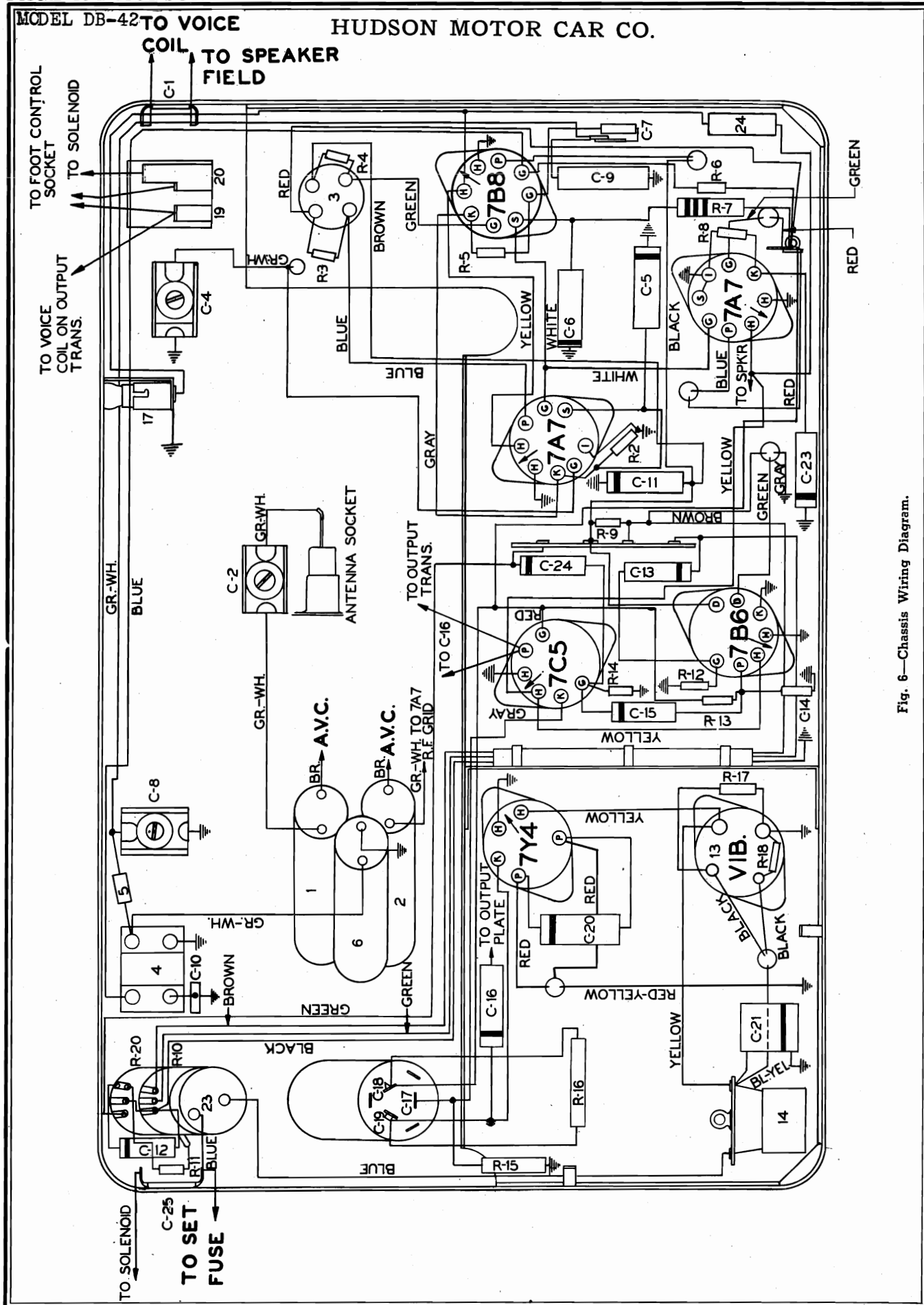


Fig. 6—Chassis Wiring Diagram.

HUDSON MOTOR CAR CO.

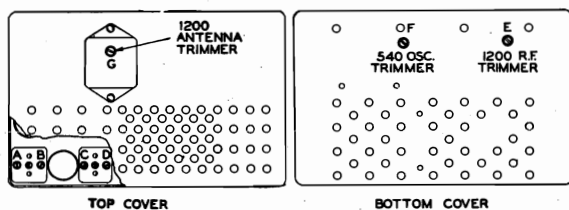


Fig. 4—Trimmer Positions.

ALIGNMENT

CAUTION—Care should be taken while making all adjustments on the receiver to have the volume control turned full on. The signal fed to the receiver through a 30 mmfd. series and 30 mmfd. shunt dummy to the antenna socket of the receiver. The intensity of the signal should be reduced only at the signal generator. Let receiver warm up a while before making adjustments.

I.F.

1. Set signal generator to 265 K.C.
2. Place set in manual tuning position and set dial pointer at 600 K.C.
3. Adjust screws D, C, B and A in sequence for maximum response on the output meter.

R.F.

1. Set signal generator to 540 K.C.
2. Place set in manual tuning position and tune set to the extremity of the dial scale at 540 K.C.
3. Adjust trimmer F, Fig. 4, for maximum response.
4. Set signal generator to 1200 K.C.
5. Tune set to 1200 K.C.
6. Adjust E, Fig. 4, for maximum response.

WARNING: The following adjustments are to be made only if a core or coil is replaced.

OSCILLATOR CORE OR COIL REPLACEMENT ONLY

On all adjustments give set sufficient time to warm up.

1. Replace coil or core.
2. Set signal generator to 540 K.C.
3. Tune the set to the 540 K.C. end of the dial scale.
4. Adjust core for maximum peak.
5. Back off trimmer F, Fig. 4, to $\frac{1}{3}$ of output reading.

6. Repeat operations 4 and 5 until no further gain can be reached by adjusting core.
7. Re-cement core screw with speaker cement.
8. Follow instructions given under general R.F. alignment.

R.F. CORE OR COIL REPLACEMENT ONLY

On all adjustments give set sufficient time to warm up.

1. Replace coil or core.
2. Set the signal generator to 540 K.C.
3. Tune set all the way to low end of 540 K.C. dial scale.
4. Adjust core for maximum response.
5. Back off trimmer (E if R.F. or trimmer G if antenna stage) until output is reduced by approximately one third.
6. Repeat 4 and 5 until no further gain is obtained from core adjustment.
7. Set signal generator to 600 K.C.
8. Tune set to 600 K.C.
9. Adjust trimmer (E if R.F.—G if antenna stage) Fig. 5 for maximum response.
10. Set signal generator to 1400 K.C.
11. Tune set to 1400 K.C.
12. Adjust core for maximum output.
13. Re-cement core screw with speaker cement.
14. Peak set following general instruction given under R.F., alignment.

SOCKET VOLTAGES AS MEASURED WITH 1000 OHM PER VOLT METER TO CHASSIS, VOLUME CONTROL AT MAXIMUM WITH NO SIGNAL. BATTERY 6.3 VOLTS.

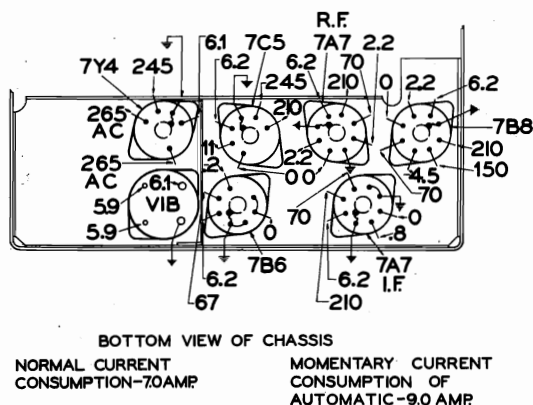


Fig. 5—Socket Voltages.

HUDSON MOTOR CAR CO.

CIRCUIT: 6 Tube Superheterodyne.

TUBE COMPLEMENT: 7A7 R.F., 7B8 Converter, 7A7 I.F., 7B6 Detector, A.V.C., 1st Audio, 7C5 Beam Power Output, 7Y4 Rectifier. Fig. 1.

TUNING RANGE: 540 to 1600 Kilocycles.

AUTOMATIC POSITIONS: 5 plus "Dial."

SPEAKER: 6" Dynamic externally mounted behind instrument panel. Voice coil impedance 3.2 ohms at 400 cycles. Field resistance 4 ohms cold.

tone CONTROL: Variable with bass, high fidelity and voice positions.

POWER OUTPUT: Maximum 4.5 watts. Undistorted 1.5 watts.

VIBRATOR: Non-synchronous.

POWER RATING: Current drain 7.5 amperes. Fuse—20 amperes.

TUNING RATIO: 15 to 1.

SENSITIVITY: 5 microvolts overall.

I. F. FREQUENCY: 265 K.C.

TUBE LAYOUT

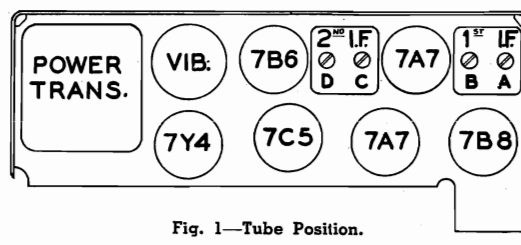


Fig. 1—Tube Position.

Turn receiver on and tune to a weak station near 1200 K.C. (see instruction card.) Adjust antenna trimmer on top of receiver through ash tray opening for maximum volume. Place ash tray back into instrument panel.

SUPPRESSION

Attach condenser, part No. 22-1262 to rear of generator with machine screw and lockwasher provided. Connect condenser lead to generator "A" terminal, Fig. 3-D.

Install suppressor in center hole of distributor cap being sure to make good contact. Place distributor lead in top of suppressor Fig. 3-E.

Mount ignition lock condenser part No. 22-1263 under rear left nut holding ventilator handle guide assembly. Connect the other lead to the "AM" terminal of the ignition lock Fig. 3.

Attach condenser part No. 22-1260 to the upper rear cap screw on the engine water manifold plate and attach the condenser lead to the heat indicator terminal, Fig. 3-F.

Install bonnet grounding spring under hood lacing 23½" to left of center line of car as shown, using no. 8 sheet metal screw Fig. 3-G.

Remove tape from special hole in dash and install flat ground strap from rear cylinder head stud to dash. Fasten it to dash with sheet metal screw and shake proof washer. The ground strap is mounted under the regular stud nut on the eight cylinder cars. The ground strap is placed on top of the regular stud nut on the six cylinder cars and held in place by special nut furnished in kit. Fig. 3-F.

1942 OPERATING INSTRUCTIONS

This radio incorporates the new Hudson Automatic Touch Tuning with Foot Control.

1. TO TURN RADIO ON—Rotate left control knob in a clockwise direction and allow receiver to reach operating temperature. (Approximately 60 seconds.)
2. Press the Automatic Push Button several times or until the word DIAL appears on the Automatic Indicator.
3. MANUAL TUNING — Turn right hand control knob to tune in stations on the tuning dial. Be sure to tune to point where tone is deepest.
4. TONE CONTROL — The tone control knob is located behind the volume control knob. Turn in either direction to most pleasing tone position.
5. VOLUME — Adjust volume control knob to desired level.

AUTOMATIC TUNING

If not previously set up for Automatic operation by the dealer, proceed as follows:

1. Press the Automatic button in the center of the right hand knob, until Number 1 position appears on the Automatic Indicator.
2. Pull the tuning knob OUT to engage the Automatic mechanism.
3. Select the station desired and tune to its corresponding frequency by rotating the tuning knob. Tune very carefully for deepest and clearest reception.
4. Push the tuning knob IN to its original position. Automatic push button and Foot Control will not operate if tuning knob is left in the OUT position.
5. Follow above procedure in setting automatic positions (i.e. 2, 3, 4 and 5.)

HUDSON MOTOR CAR CO.

When the five automatic positions have been adjusted to the five desired stations as instructed, it is only necessary to press the Automatic button to return to Dial tuning, or any one of the stations selected on the Automatic.

FOOT CONTROL

The foot control button provides a convenient means of automatically tuning the receiver from the floor

board, thus avoiding the necessity of removing the hands from the wheel, or the eyes from the road. Its function is identical to that of the automatic push button in the center of the right hand knob, and therefore requires no set-up or other adjustment.

Press the foot control button all the way down to change stations.

Press lightly to silence radio during conversation.

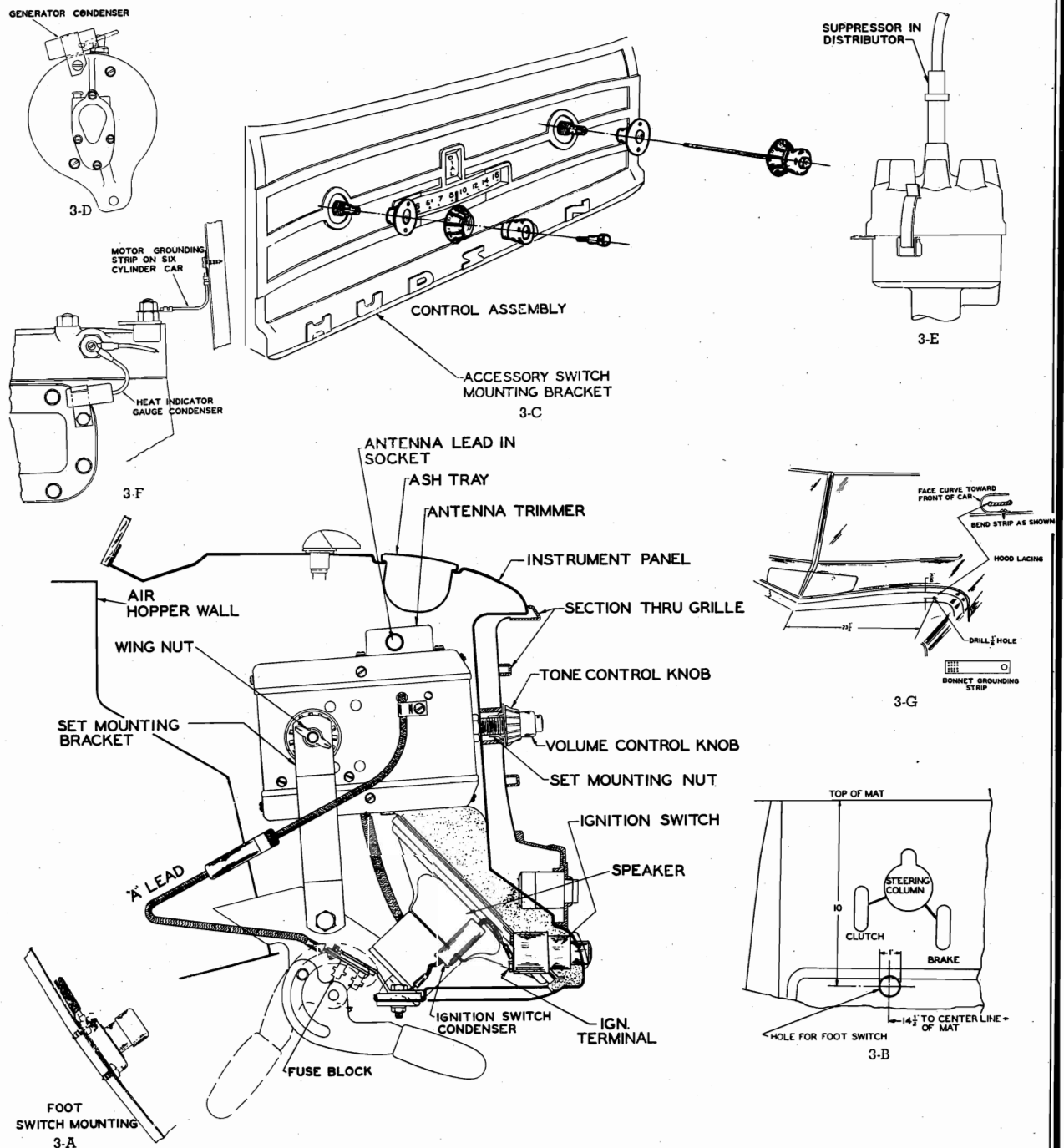


Fig. 3—Mounting Details and Connections.

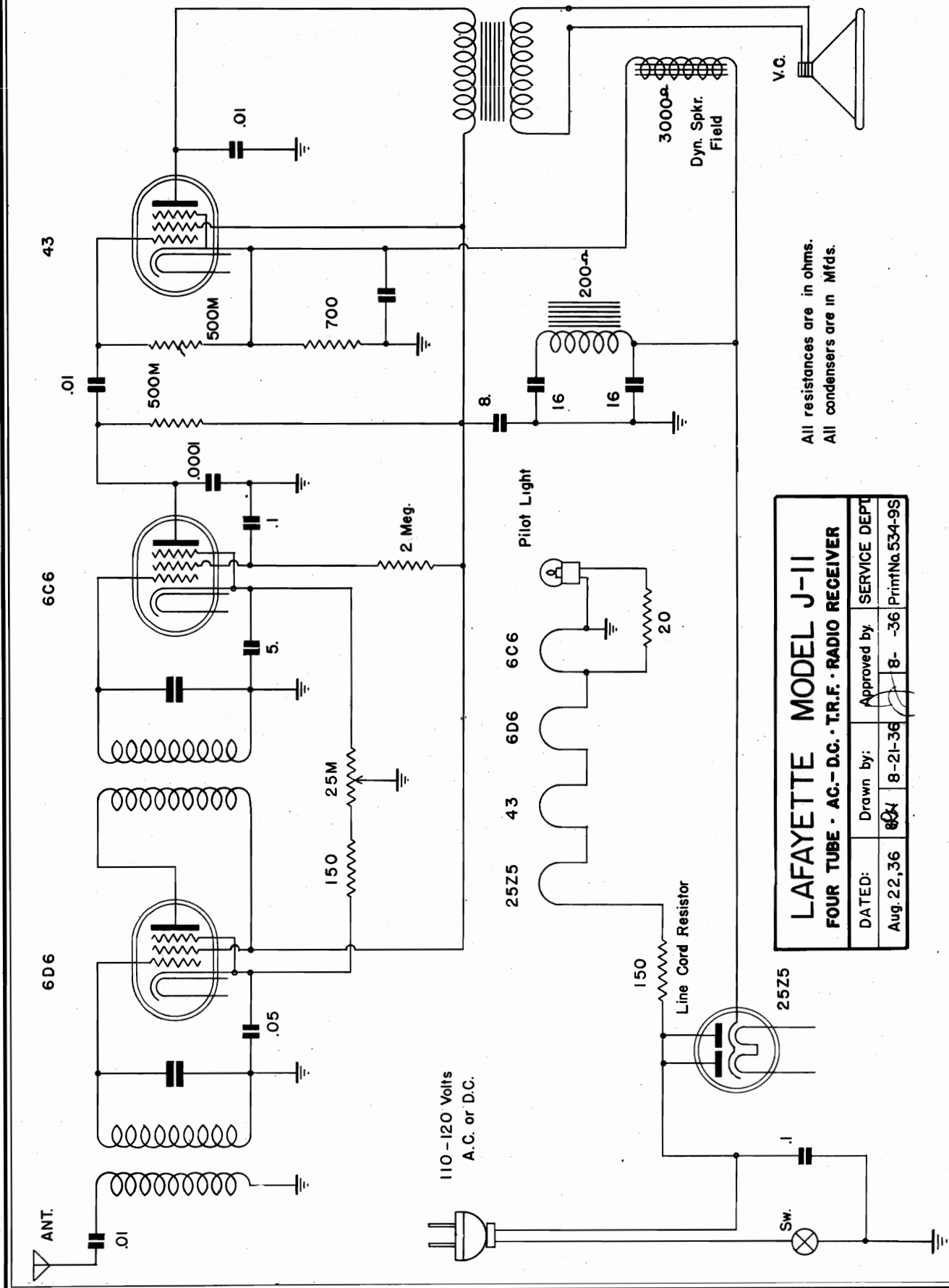


MODEL D-8



Compliments of www.nucow.com

LAFAYETTE RADIO MFG. CO.

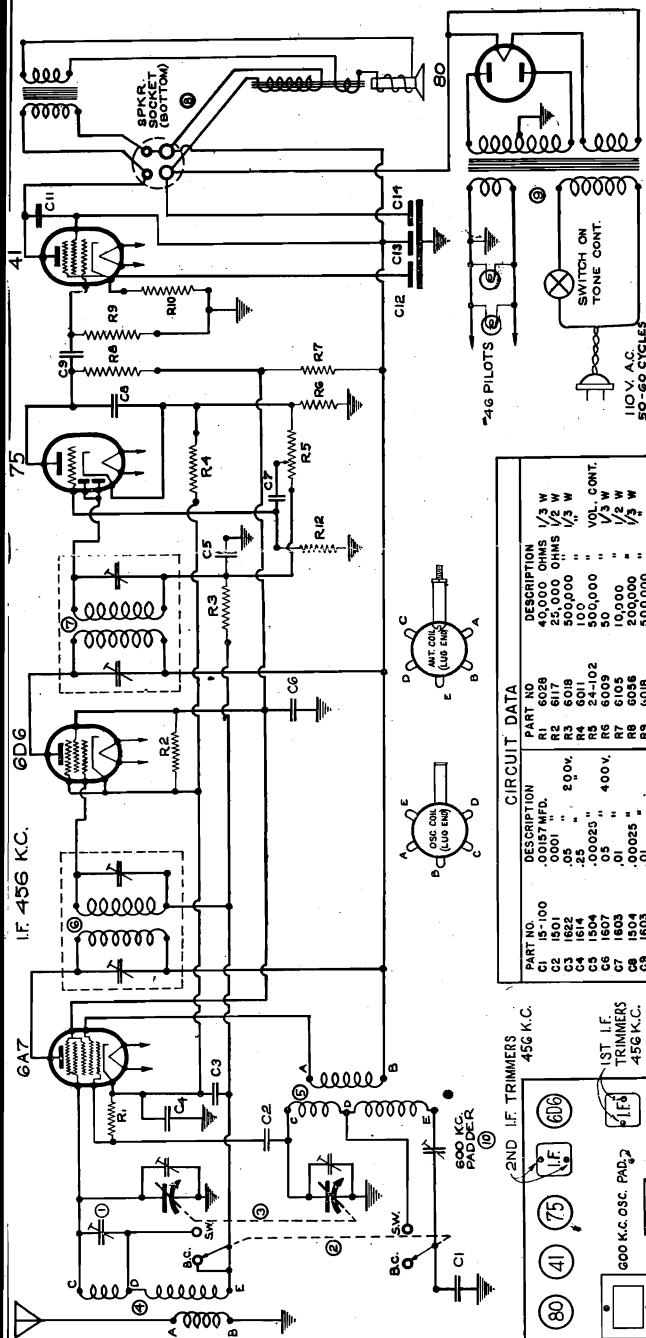


LAFAYETTE MODEL J-11			
FOUR TUBE - AC.-D.C. - T.R.F. - RADIO RECEIVER			
DATED:	Drawn by:	Approved by:	SERVICE DEPT.
Aug. 22, 36	8-21-36	8-36	Print No. 534-9S

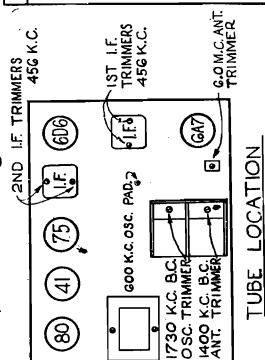
LAFAYETTE RADIO MFG. CO.

This receiver is a 5 tube Alternating Current operated superheterodyne. The tubes used are a 6A7 as oscillator modulator, a 6D6 as I.F. Amplifier, a 75 as AVC and Audio rectifier and audio voltage amplifier, a 41 as power audio amplifier and an 80 as a power rectifier.

The receiver is made to cover two tuning bands, the standard broadcast band which ranges from 1730 KC to 535 KC and the middle or police band which has a frequency range of from 6.4 MC to 21 MC.



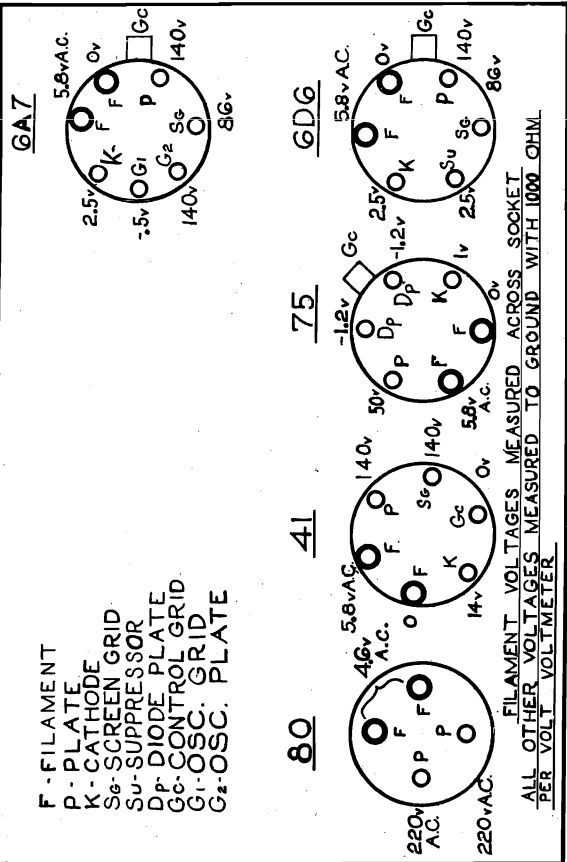
CIRCUIT DATA	
PART NO.	DESCRIPTION
C1 15-100	.0015 MFD.
C2 1501	.0001 "
C3 1502	.0001 "
C4 1503	.0001 "
C5 1504	.00025 "
C6 1507	.05 "
C7 1508	.01 "
C8 1509	.00025 "
C9 1510	.004 "
C10 1511	.004 "
C11 1512	.004 "
C12 1513	.004 "
C13 1514	.004 "
C14 1515	.004 "
R1 6028	40,000 OHMS
R2 6017	25,000 OHMS
R3 6018	100,000 "
R4 24-102	500,000 "
R5 6009	50 "
R6 6010	10,000 "
R7 6011	100,000 "
R8 6012	10,000 "
R9 6013	100,000 "
R10 6014	10,000 "
R11 6015	100,000 "
R12 6016	10,000 "
R13 6017	100,000 "
R14 6018	10,000 "
R15 6019	100,000 "
R16 6020	10,000 "
R17 6021	100,000 "
R18 6022	10,000 "
R19 6023	100,000 "
R20 6024	10,000 "
R21 6025	100,000 "
R22 6026	10,000 "
R23 6027	100,000 "
R24 6028	10,000 "
R25 6029	100,000 "
R26 6030	10,000 "
R27 6031	100,000 "
R28 6032	10,000 "
R29 6033	100,000 "
R30 6034	10,000 "
R31 6035	100,000 "
R32 6036	10,000 "
R33 6037	100,000 "
R34 6038	10,000 "
R35 6039	100,000 "
R36 6040	10,000 "
R37 6041	100,000 "
R38 6042	10,000 "
R39 6043	100,000 "
R40 6044	10,000 "
R41 6045	100,000 "
R42 6046	10,000 "
R43 6047	100,000 "
R44 6048	10,000 "
R45 6049	100,000 "
R46 6050	10,000 "
R47 6051	100,000 "
R48 6052	10,000 "
R49 6053	100,000 "
R50 6054	10,000 "
R51 6055	100,000 "
R52 6056	10,000 "
R53 6057	100,000 "
R54 6058	10,000 "
R55 6059	100,000 "
R56 6060	10,000 "
R57 6061	100,000 "
R58 6062	10,000 "
R59 6063	100,000 "
R60 6064	10,000 "
R61 6065	100,000 "
R62 6066	10,000 "
R63 6067	100,000 "
R64 6068	10,000 "
R65 6069	100,000 "
R66 6070	10,000 "
R67 6071	100,000 "
R68 6072	10,000 "
R69 6073	100,000 "
R70 6074	10,000 "
R71 6075	100,000 "
R72 6076	10,000 "
R73 6077	100,000 "
R74 6078	10,000 "
R75 6079	100,000 "
R76 6080	10,000 "
R77 6081	100,000 "
R78 6082	10,000 "
R79 6083	100,000 "
R80 6084	10,000 "
R81 6085	100,000 "
R82 6086	10,000 "
R83 6087	100,000 "
R84 6088	10,000 "
R85 6089	100,000 "
R86 6090	10,000 "
R87 6091	100,000 "
R88 6092	10,000 "
R89 6093	100,000 "
R90 6094	10,000 "
R91 6095	100,000 "
R92 6096	10,000 "
R93 6097	100,000 "
R94 6098	10,000 "
R95 6099	100,000 "
R96 6100	10,000 "
R97 6101	100,000 "
R98 6102	10,000 "
R99 6103	100,000 "
R100 6104	10,000 "

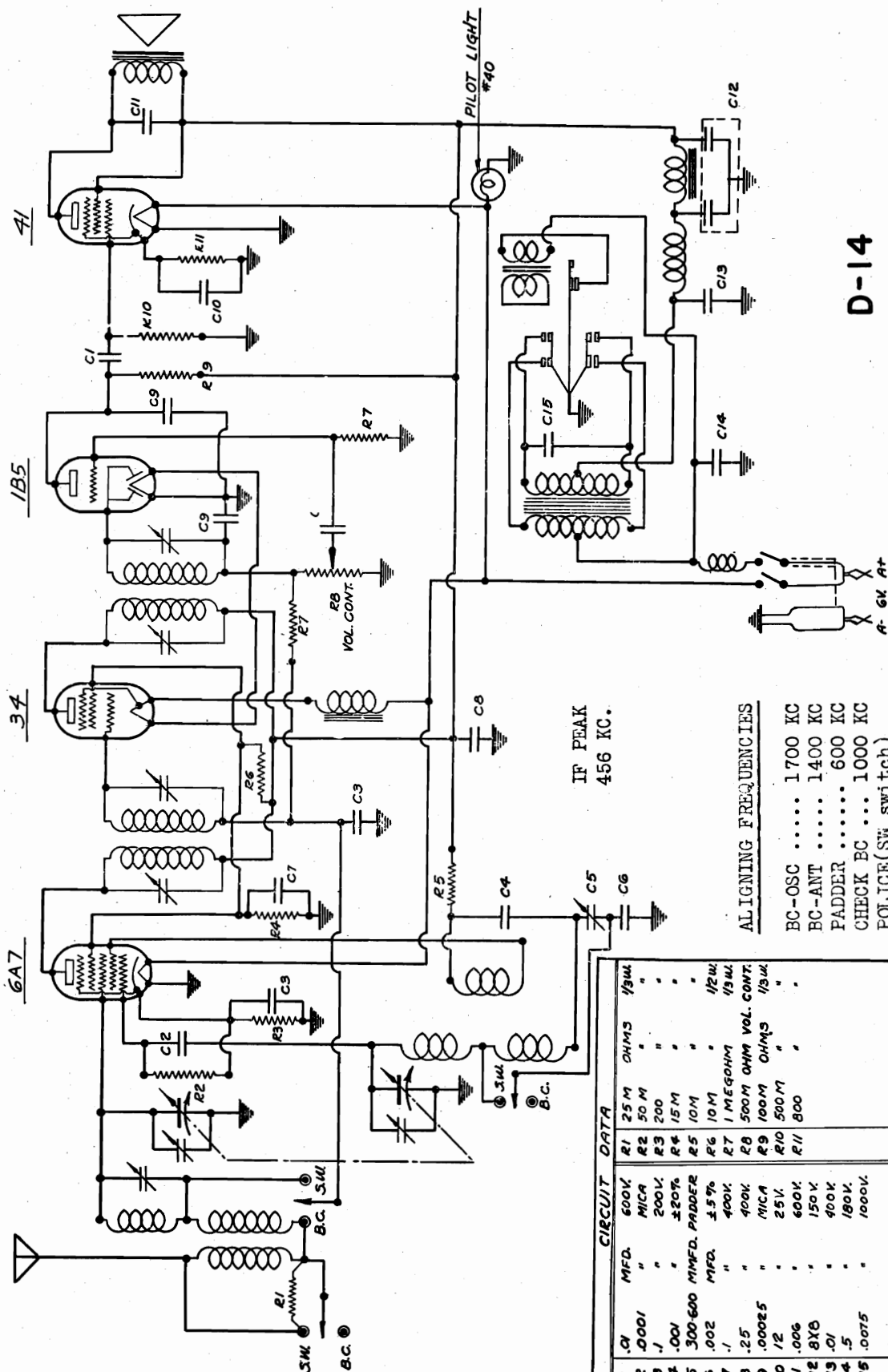


Connect the signal generator to the grid cap of the 6A7 tube through a .1 M.F. condenser. Connect the ground of the generator to the ground lead of the receiver. With the wave switch on broadcast position and the dial set to about 1000 K.C., feed in a 456 K.C. signal. Adjust the trimmers on top of the first and second I.F. transformers until the maximum output is obtained. Connect output meter thru a .5 mF dummy, total resistance 7000 ohms to speaker plug.

Leaving the wave switch on broadcast position turn the dial to the extreme high frequency end. Feed a 1730 K.C. signal to the receiver antenna lead through a .00025 M.F. mica condenser. Adjust the 1730 K.C. broadcast oscillator trimmer until maximum output is shown. Set the generator to 1400 K.C. and tune in this signal on the receiver. Then adjust the 1400 K.C. broadcast antenna trimmer to maximum output. Set the generator to 600 K.C. and adjust the 600 K.C. broadcast oscillator pad to maximum output while tuning the receiver back and forth across the signal from the generator. This completes the alignment of the broadcast band.

The short wave band is aligned while feeding a 6.0 M.C. signal to the receiver antenna lead through a .00025 M.F. mica condenser. Turn the wave switch to short wave position and tune in the 6.0 M.C. signal. Adjust the 6.0 M.C. short wave trimmer to maximum output.





D-14

ALIGNING FREQUENCIES

BC-OSC 1700 KC
 BC-ANT 1400 KC
 PADDER 600 KC
 CHECK BC ... 1000 KC
 POLICE(SW switch)
 6 MC

CIRCUIT DATA									
C1	.01	MFD.	600V.	R1	25 M	OHMS	1/32"		
C2	.0001	"	MICA	R2	50 M	"	"		
C3	.001	"	200V.	R3	200	"	"		
C4	.001	"	±20%	R4	15 M	"	"		
C5	300-600	MINFED. PADDER		R5	10 M	"	"		
C6	.002	MFD.	±5%	R6	10 M	"	1/2"		
C7	.1	"	400V.	R7	1 MEGOHM	"	1/32"		
C8	.25	"	400V.	R8	500 M OHM VOL. CONT.	"	1/32"		
C9	.0005	"	25V.	R9	100 M	OHMS	"		
C10	.12	"	600V.	R10	500 M	"	"		
C11	.006	"	150V.	R11	800	"	"		
C12	.8X8	"	400V.						
C13	.01	"	180V.						
C14	.5	"	1000V.						
C15	.0075	"							

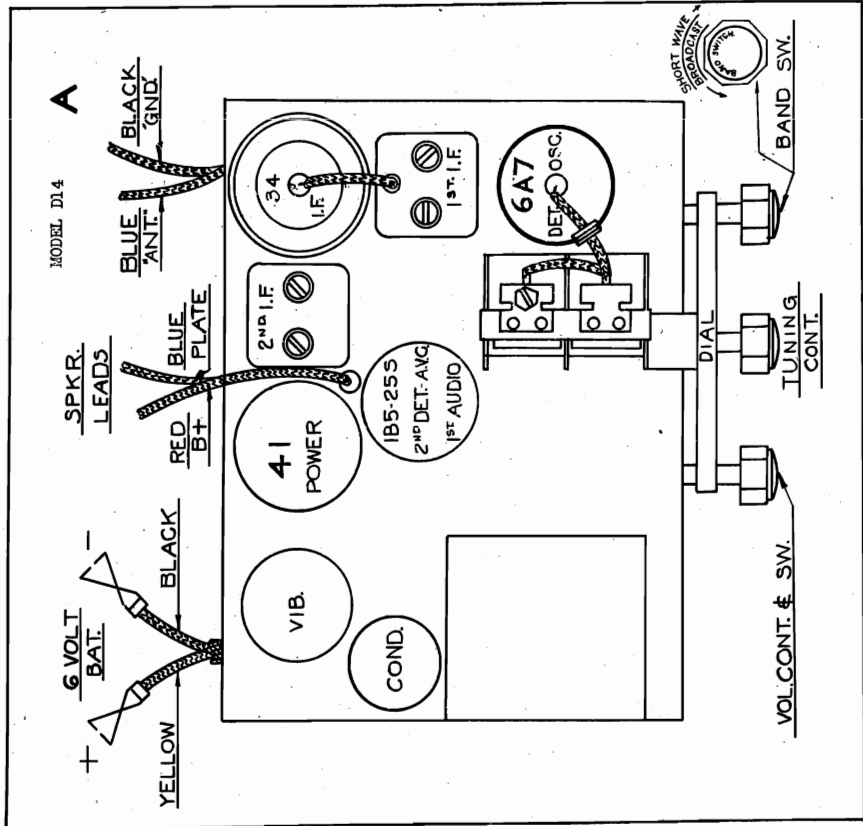
LAFAYETTE RADIO MFG. CO.

MODEL D-14

MODEL C-17

For aligning the police band, set test oscillator to 4.2 megacycles and switch to the police band position on the set. With the condenser rotated to this frequency setting as indicated on the dial, adjust oscillator trimmer located on the right side of the chassis, second position from the front. Set test oscillator to 4.0 megacycles and rotate condenser to the corresponding dial reading. Now adjust antenna trimmer located on the front of the chassis, center position to resonance. Then set oscillator to 2.0 megacycles and rotate the condenser to the 2 megacycle reading. Adjust padder located on top of chassis, first position from the front.

The short wave band is aligned by setting the condenser to 15 megacycles and adjust the oscillator trimmer located on the right side of the chassis, third position from the front to resonance with a 15 megacycle signal from the test oscillator. At the same time adjust the antenna trimmer located in front of the chassis, third position from the left.

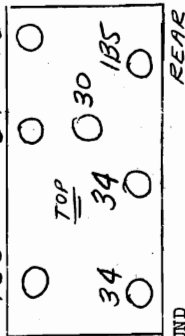


INSTRUCTIONS AND SERVICE NOTES FOR THE MODEL C-17 2 AND 3 VOLT BATTERY SUPERTHERODYNE

Frequency Range - 540 - 1500 Kilocycles, 1.5-4.2 Megacycles and 5.6-15 Megacycles.

TUBE COMPLEMENT

- 1 TYPE 106 Det.-Osc.
- 2 TYPE 34 I.F. Amplifier
- 1 TYPE 1B5 Diode Detector and Amp.
- 1 TYPE 30 Audio Amplifier
- 1 TYPE 19 Class B Twin Amplifier
- 1 TYPE 6-1 Ballast Tube



ANTENNA AND GROUND

For best reception, an antenna 75 to 100 feet long and erected high and clear of surrounding objects should be used.

A good ground connection is essential with this receiver, preferably to a water pipe with the ground wire as short as possible.

BATTERY CONNECTIONS

- Red Lead A+2 or 3 Volts
- Blue Lead B+135 Volts
- Black Lead B- (connected to A-)
- Black Lead A-

"C" BATTERY CONNECTIONS

A "C" battery should be connected to leads extending from the top of the chassis. Provision is made for mounting "C" battery within the cabinet.

On models using a tapped "9" volt "C" battery, three leads are connected as follows: Brown wire to C+, yellow wire -3 volts and the green wire to -9 volts. On models using a tapped 22½ volt battery, four leads from the chassis are connected as follows: Black wire to C+, green wire to -3 volts, orange wire to -4½ volts and red wire to -9 volts.

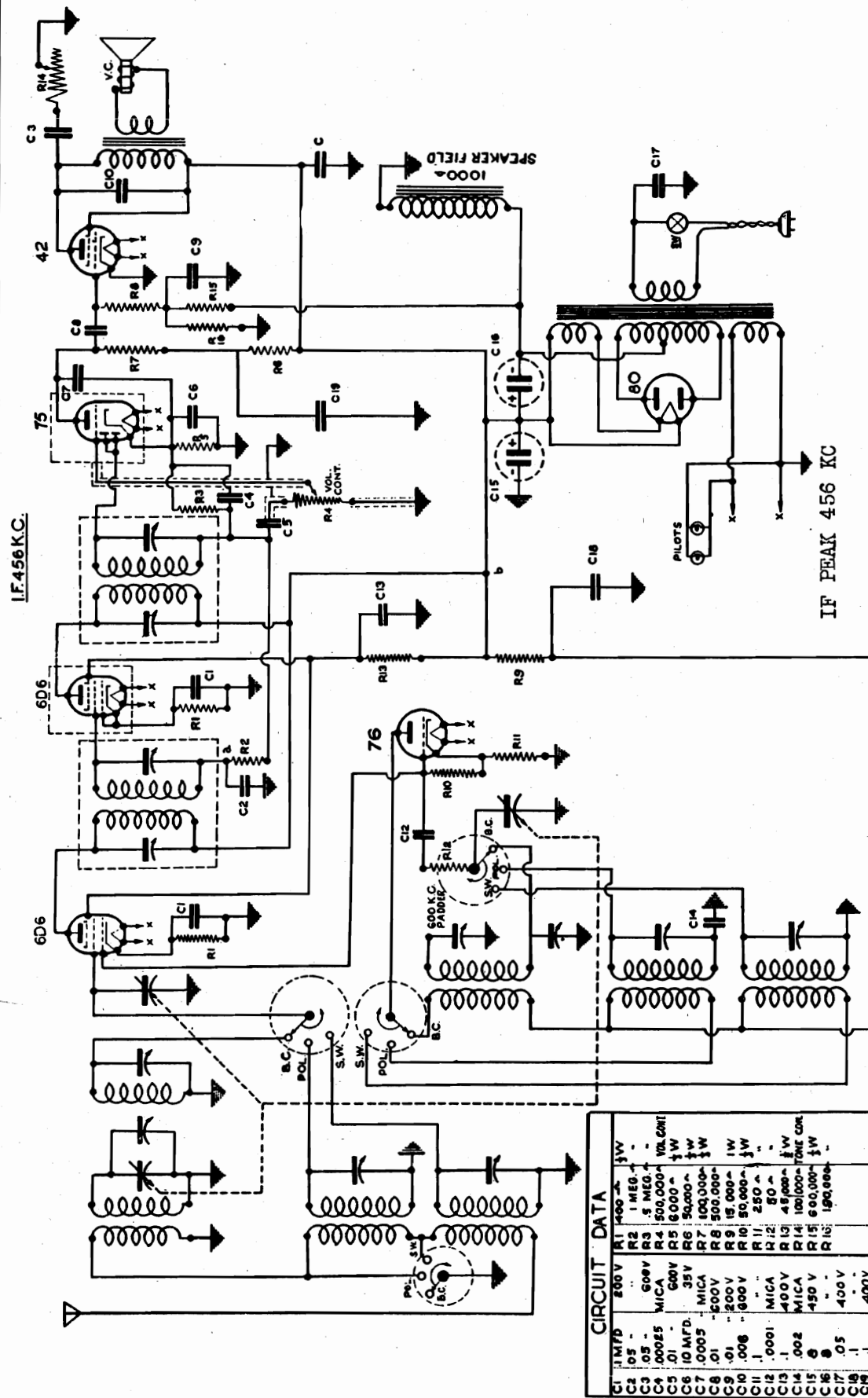
Use a test oscillator and connect an output meter from plate to plate of the 19 output tube.

I.F. ALIGNMENT - Connect the oscillator through a .00025 condenser to the grid of the 106 tube and set the oscillator to 456 kilocycles. Peak each I.F. stage to resonance as indicated by maximum output or the output meter.

R.F. ALIGNMENT - With the wave change switch in the broadcast position, set oscillator to 1500 kilocycles and connect in series with a .00025 condenser to the antenna of the receiver. Rotate the variable condenser to the 1500 setting of the dial and adjust the trimmer condenser of the broadcast oscillator to resonance. This trimmer is located on the right side of the chassis, third position from the front. Reset the test oscillator to 1400 kilocycles and adjust antenna trimmer located in front of the chassis, first position from the left. Now set oscillator to 600 kilocycles and adjust padder located on top of the chassis, second from the front. Check alignment at 1000 kilo.

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MODEL D-20

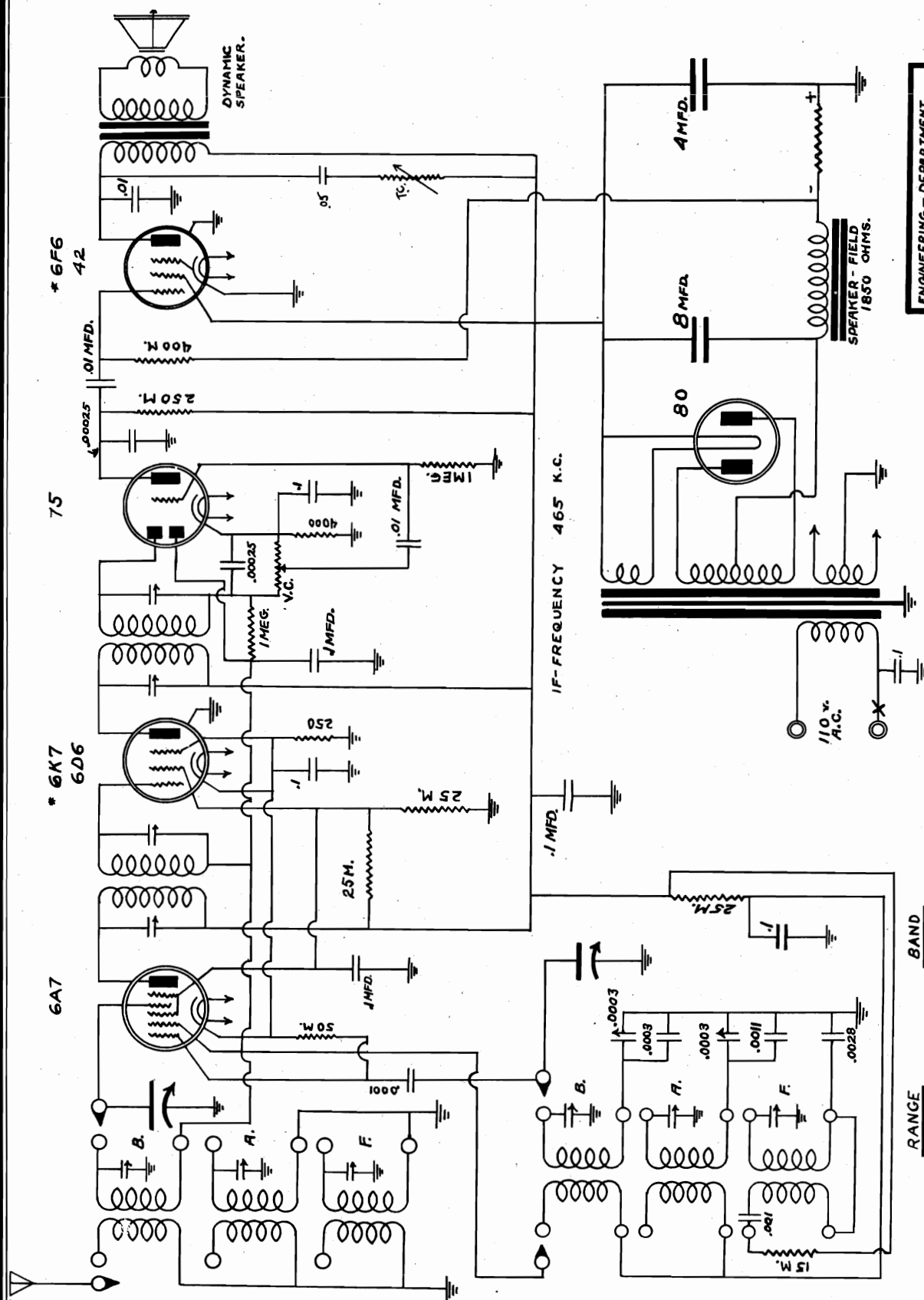


ALIGNMENT

- (1) IF 456 kc.
- (2) BC-Osc. & dial - 1400 kc. (Trim. (4) Adj. trim. on top of gang cond. chassis - 4000 kc. in front of range SW.)
- (3) Presetor trim. in center at (6) Middle Wave Band - 2 trims. on top of SW coils, on top of chassis - 4000 kc.
- (4) Adj. trim. on top of gang cond. chassis - 4000 kc.
- (5) Padder 600 kc (right end of chassis).
- (6) Middle Wave Band - 2 trims. on top of SW coils, on top of chassis - 4000 kc.
- (7) SW pos. - 2 trims. at bases of SW coils - 15 mc.

MODEL D-20P

LAFAYETTE RADIO MFG. CO.



ENGINEERING - DEPARTMENT
APR BY *July* 37-SERIES
321-

* NOTE:- IN CHASSIS OF SERIES M12
THE 6D6 AND 42 IS REPLACED BY
6K7 AND 6F6 RESPECTIVELY.

RANGE	BAND
540-1750 K.C.	B
1750-5800 K.C.	A
58 - 18.0 M.C.	F

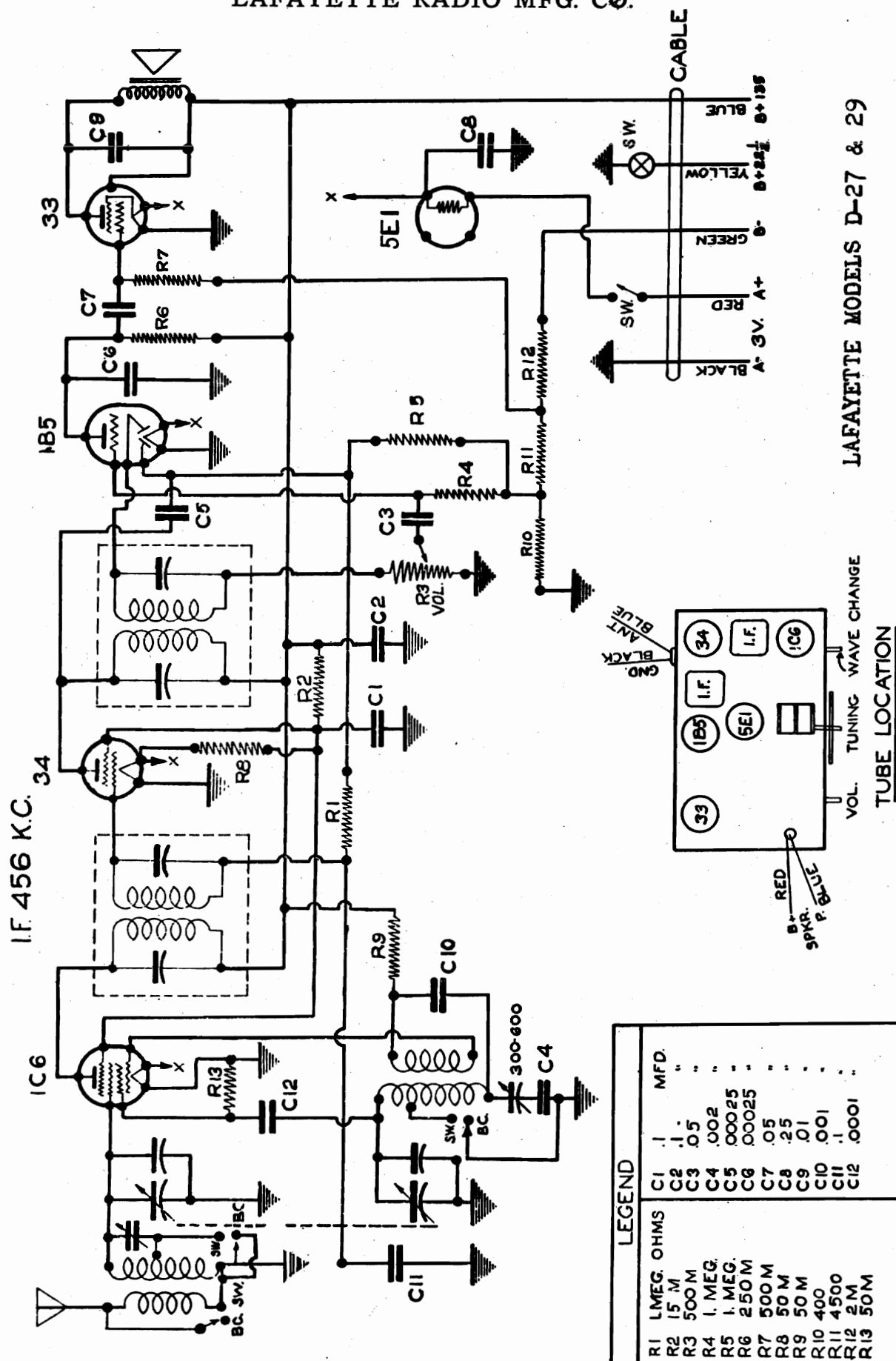
IN LONG-WAVE MODELS BAND 1750-5800 K.C.
IS REPLACED BY 750-2100 METERS.

TUBE	PLATE	SCREEN	K	FIL.
78	250	50	25	5.8
6A7 RF	250	50	23	5.8
6A7 OSC	250		GRID+9	5.8
6B7	250	50	12.5	5.8
77	100	130	7.5	5.8
42	225	250	0	5.8
80				4.85

LAFAYETTE - C22 F.D. 4-8-35

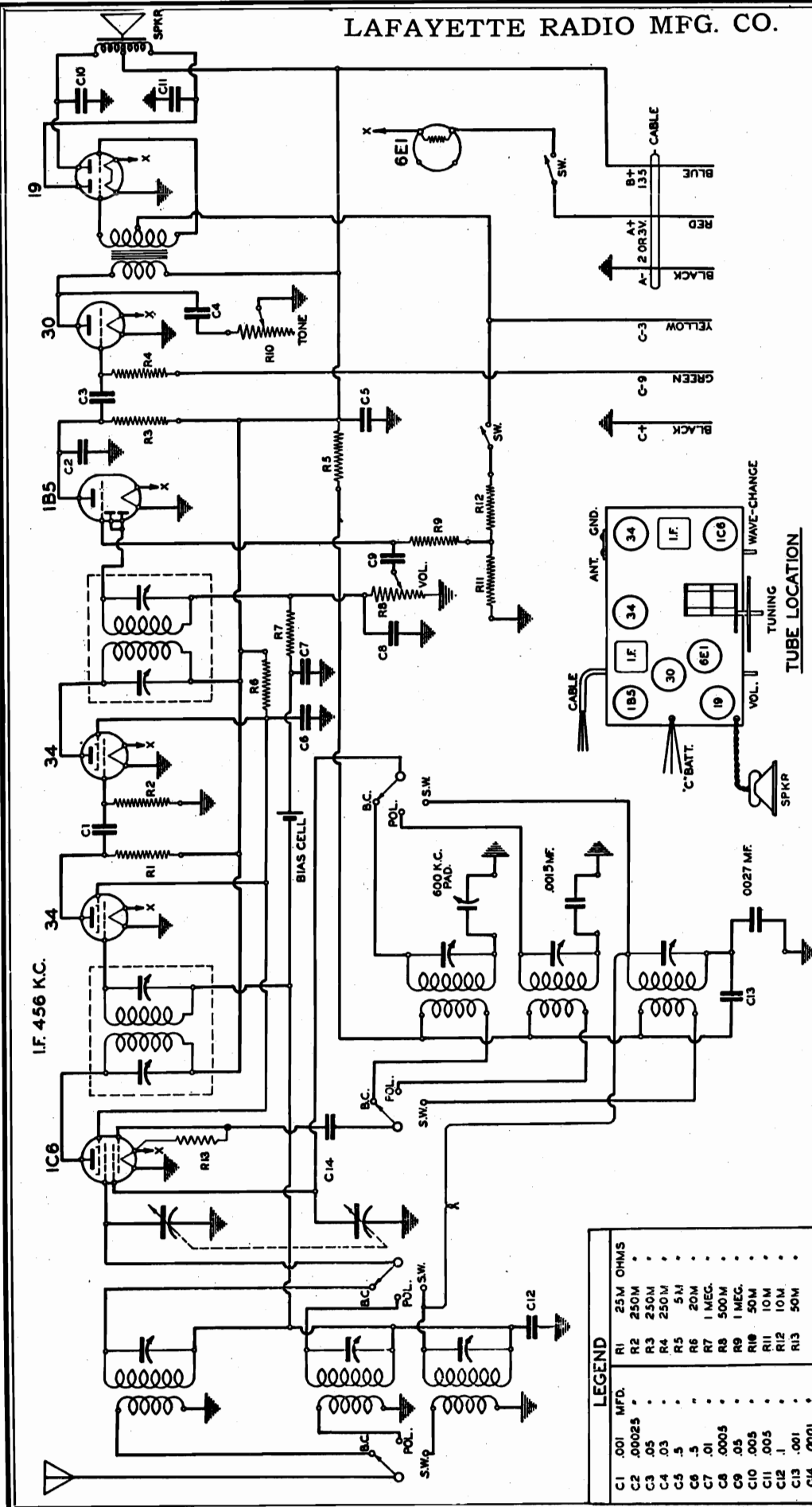
I, F. - 175 KC.

LAFAYETTE MODELS D-27 & 29



LAFAYETTE RADIO MFG. CO.

MODEL D-28



SW: Osc. trim. 18 mc, on right side of chassis, 3rd position from front.
 SW: Ant. trim 16 mc, thru right-hand hold in front of chassis.

PADDER: 600 kc. Located on top of chassis.
 CHECK BC at 1000 kc.
 POLICE: Osc. trim 5 mc., on right side of chassis, 1st position from front.
 Ant. trim. 5 mc, on front of chassis, left position.

ALIGNMENT

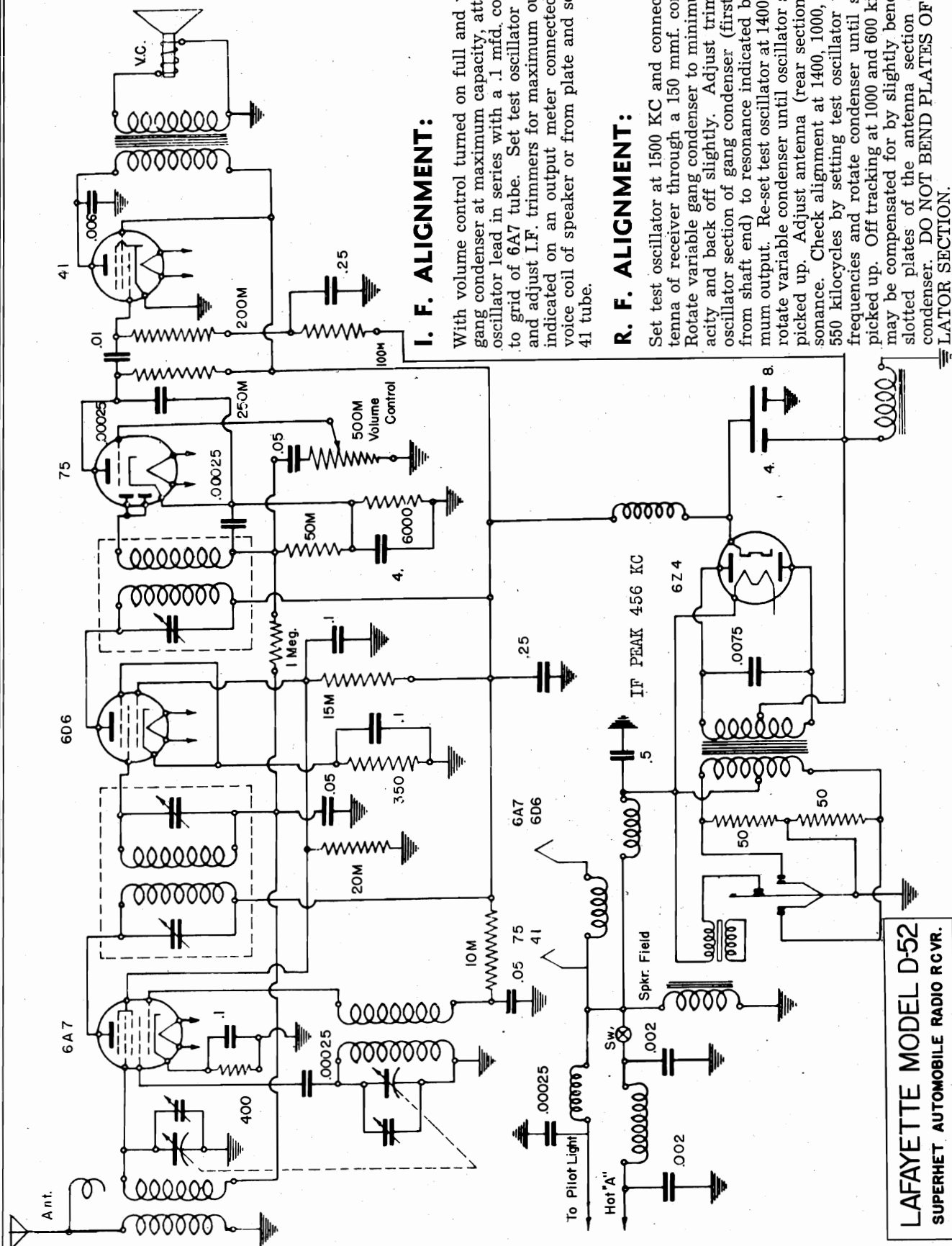
IF: 456 kc.
 BC-OSC: 1700 kc. Trimmer located on right side of chassis, 2nd pos. from front.
 BC-ANT: 1400 kc. Trimmer located under chassis.

I. F. ALIGNMENT:

With volume control turned on full and variable gang condenser at maximum capacity, attach test oscillator lead in series with a .1 mfd. condenser to grid of 6A7 tube. Set test oscillator 456 KC and adjust I.F. trimmers for maximum output as indicated on an output meter connected across voice coil of speaker or from plate and screen of 41 tube.

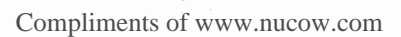
R. F. ALIGNMENT:

Set test oscillator at 1500 KC and connect to antenna of receiver through a 150 mmf. condenser. Rotate variable gang condenser to minimum capacity and back off slightly. Adjust trimmer on oscillator section of gang condenser (first section from shaft end) to resonance indicated by maximum output. Re-set test oscillator at 1400 KC and rotate variable condenser until oscillator signal is picked up. Adjust antenna (rear section) to resonance. Check alignment at 1400, 1000, 600 and 550 kilocycles by setting test oscillator to these frequencies and rotate condenser until signal is picked up. Off tracking at 1000 and 600 kilocycles may be compensated for by slightly bending the slotted plates of the antenna section of gang condenser. **DO NOT BEND PLATES OF OSCILLATOR SECTION.**

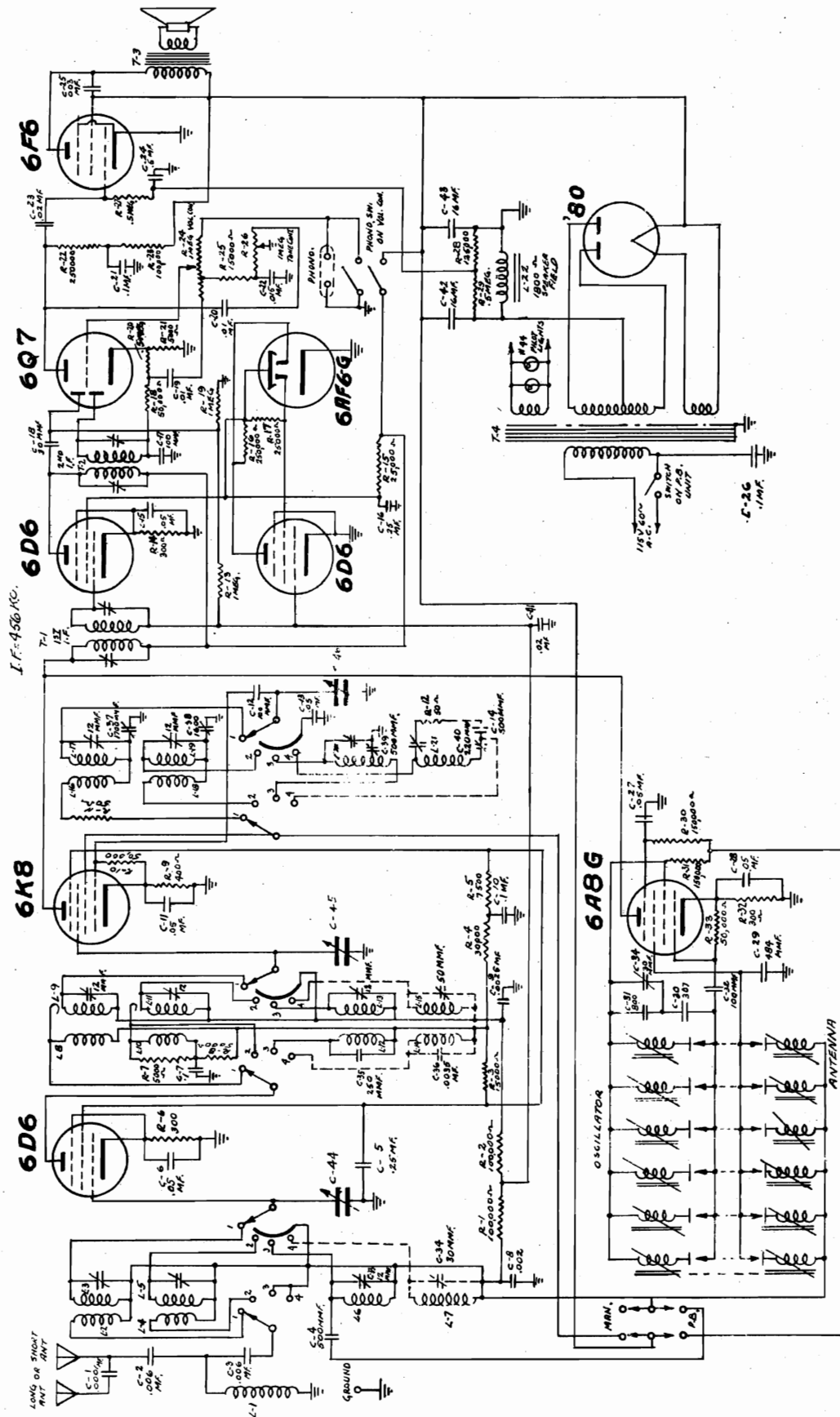


Lafayette Radio Corporation

Js 130			
ERAWN BY	CG	CHECKED BY	A H.
APPROVED BY			8-28-40



LAFAYETTE RADIO MFG. CO

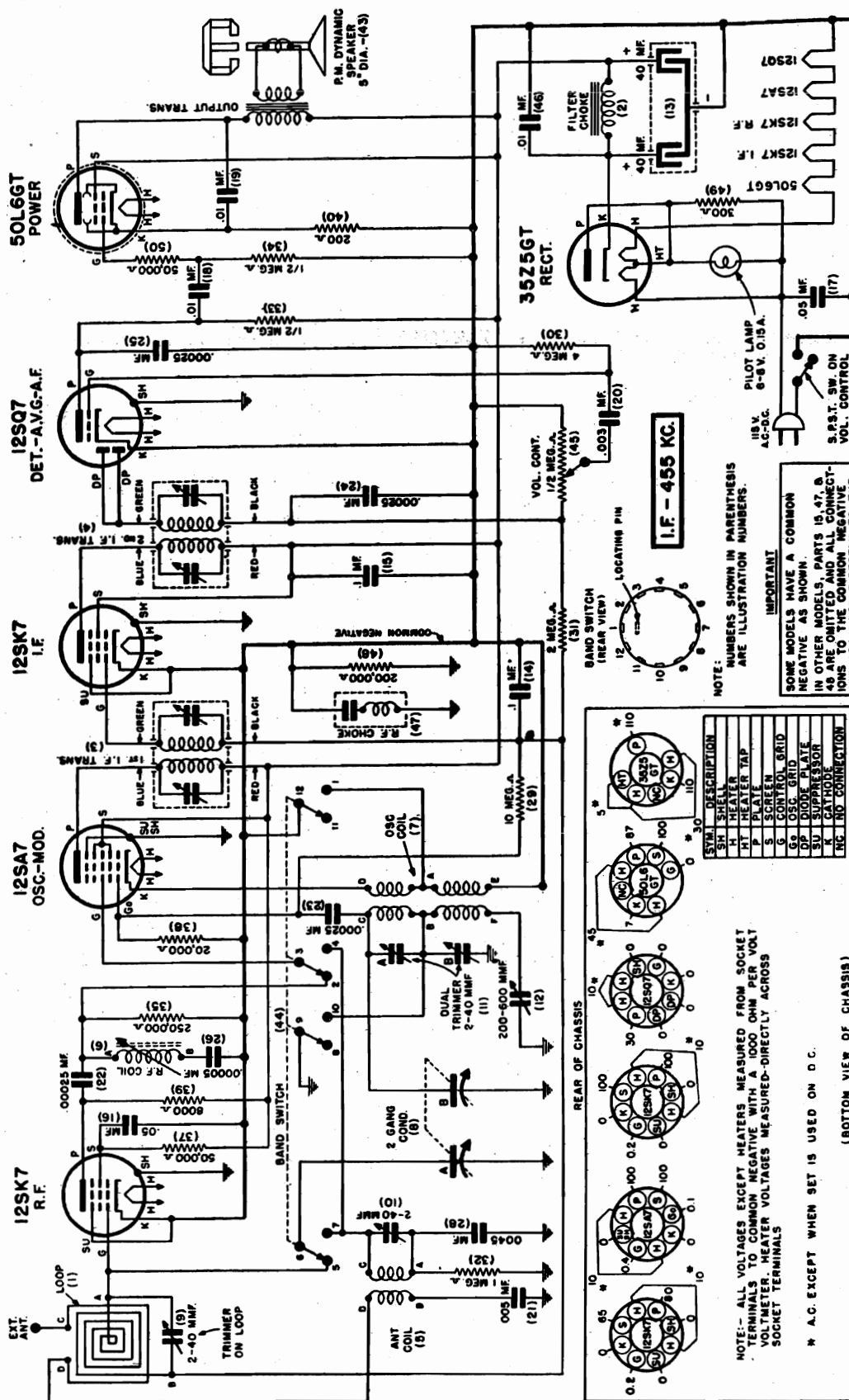


9 TUBE A.C. RECEIVER
USED ON:-
3 BAND 399-C31 4 BAND 4990
MAN. BY
DL

NOTE:-
BAND SWITCH SHORT CIRCUITS COILS OF LOWER FREQUENCY THAN THE ONE IN USE.

BAND 1- 234 KC. TO 7.2 MC. OR 13 METERS TO 41.75 METERS
BAND 2- 7.4 MC. TO 2.34 MC. OR 40.5 METERS TO 129.25 METERS
BAND 3- 1720 KC. TO 547.5 KC. OR 175 METERS TO 550 METERS
BAND 4- 375 KC. TO 137.5 KC. OR 800 METERS TO 2200 METERS-USE ON MODEL #4990 ONLY

LAFAYETTE RADIO MFG. CO.

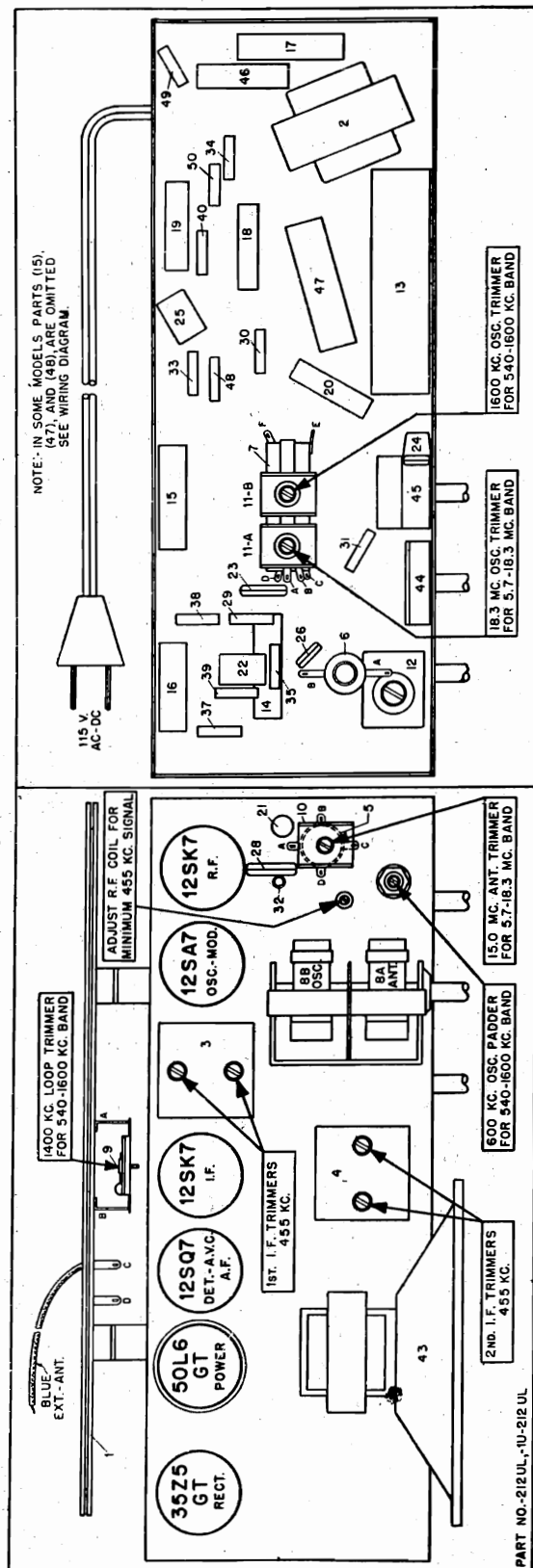


* A.C. EXCEPT WHEN SET IS USED ON D.C.

PART NO.- 1U-212 UL. 212 UL

Illus. No.	Part No.	Part Name	Description	List Price	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175	176	177	178	179	180	181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197	198	199	200	201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230	231	232	233	234	235	236	237	238	239	240	241	242	243	244	245	246	247	248	249	250	251	252	253	254	255	256	257	258	259	260	261	262	263	264	265	266	267	268	269	270	271	272	273	274	275	276	277	278	279	280	281	282	283	284	285	286	287	288	289	290	291	292	293	294	295	296	297	298	299	300	301	302	303	304	305	306	307	308	309	310	311	312	313	314	315	316	317	318	319	320	321	322	323	324	325	326	327	328	329	330	331	332	333	334	335	336	337	338	339	340	341	342	343	344	345	346	347	348	349	350	351	352	353	354	355	356	357	358	359	360	361	362	363	364	365	366	367	368	369	370	371	372	373	374	375	376	377	378	379	380	381	382	383	384	385	386	387	388	389	390	391	392	393	394	395	396	397	398	399	400	401	402	403	404	405	406	407	408	409	410	411	412	413	414	415	416	417	418	419	420	421	422	423	424	425	426	427	428	429	430	431	432	433	434	435	436	437	438	439	440	441	442	443	444	445	446	447	448	449	450	451	452	453	454	455	456	457	458	459	460	461	462	463	464	465	466	467	468	469	470	471	472	473	474	475	476	477	478	479	480	481	482	483	484	485	486	487	488	489	490	491	492	493	494	495	496	497	498	499	500	501	502	503	504	505	506	507	508	509	510	511	512	513	514	515	516	517	518	519	520	521	522	523	524	525	526	527	528	529	530
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LAFAYETTE RADIO MFG. CO.



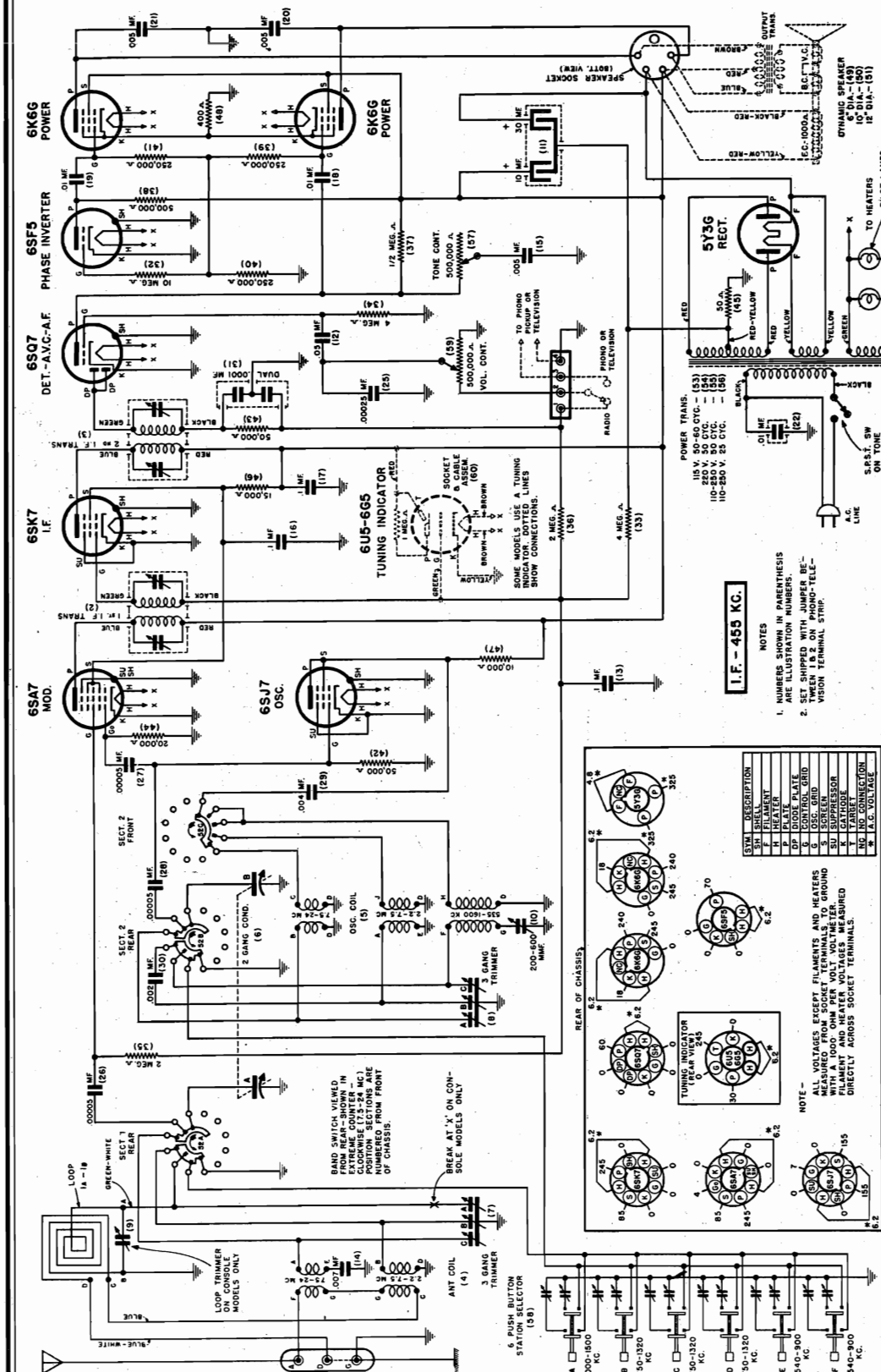
ALIGNMENT PROCEDURE

For alignment procedure read tabulations from left to right. If more than one adjustment is required on any one band, make the adjustment marked (1), first, (2) next, (3) third. IMPORTANT: BEFORE ALIGNING, PLACE LOOP ANTENNA IN THE SAME POSITION IT WILL BE IN WHEN THE SET IS IN THE CABINET.

When adjusting 1600 kilocycle oscillator trimmer 600 K.C. padder, 455 K.C. R.F. trimmer and 1400 K.C. antenna trimmer, do not connect test oscillator to loop. Couple test oscillator to receiver loop by: (a) Make a loop consisting of five to ten turns of No. 20 to 30 size wire wound on a three inch form and attach across output of test oscillator. (b) Place test oscillator loop near set loop—BE SURE THAT NEITHER MOVES WHILE ALIGNING.

Place band switch for operation on:	Set receiver dial to:	Adjust test oscillator frequency to:	Use dummy antenna in series with output of test oscillator consisting of:	Attach output of test oscillator to:	Refer to parts layout diagram for location of trimmers mentioned below:
I. F. alignment use any band position.	Any point where no interfering signal is received	Exactly 455 K.C.	0.2 Mfd. condenser	High side to grid cap of 12SA7 tube. Low side to frame of condenser through .01 Mfd. condenser.	Adjust each of the second I.F. transformer trimmer for maximum output, then adjust each of the first I.F. transformer trimmers for maximum output.
1600 to 540 K.C. Band	1 Rotate gang condenser to Maximum Capacity	Exactly 455 K.C.	None	Use Small Loop to couple test oscillator to receiver loop. Low side to frame of condenser through .01 Mfd. condenser.	Adjust R.F. coil for minimum 455 K.C. signal.
	2 Exactly 1600 K.C.	Exactly 1600 K.C.	None	Use Small Loop to couple test oscillator to receiver loop. Low side to frame of condenser through .01 Mfd. condenser.	Adjust 1600 K. C. oscillator trimmer for maximum output
	3 Approx. 1400 K.C.	Approx. 1400 K.C.	None	Use Small Loop to couple test oscillator to receiver loop. Low side to frame of condenser through .01 Mfd. condenser.	While rocking gang condenser adjust 1400 K. C. loop trimmer for maximum output.
	4 Approx. 600 K.C.	Approx. 600 K.C.	None	Use Small Loop to couple test oscillator to receiver loop. Low side to frame of condenser through .01 Mfd. condenser.	While rocking gang condenser adjust 600 K. C. oscillator padder for maximum output.
5.7 to 18.3 M.C. Band	1 Exactly 18.3 M.C.	Exactly 18.3 M.C.	400 Ohm carbon resistor	High side to Blue Ant. Lead, Low side to frame of Mfd. condenser.	Adjust 18.3 M.C. oscillator trimmer for maximum output—be sure to use proper peak. If more than one peak is noticed, back off trimmer to minimum capacity, then screw down trimmer (add capacity) until the second peak—which is the proper one to use is tuned in.
	2 Approx. 15 M.C.	Approx. 15 M.C.	400 Ohm	High side to Blue Ant. Lead, Low side to frame of gang condenser.	While rocking gang condenser adjust 15 M. C. antenna trimmer for maximum output.

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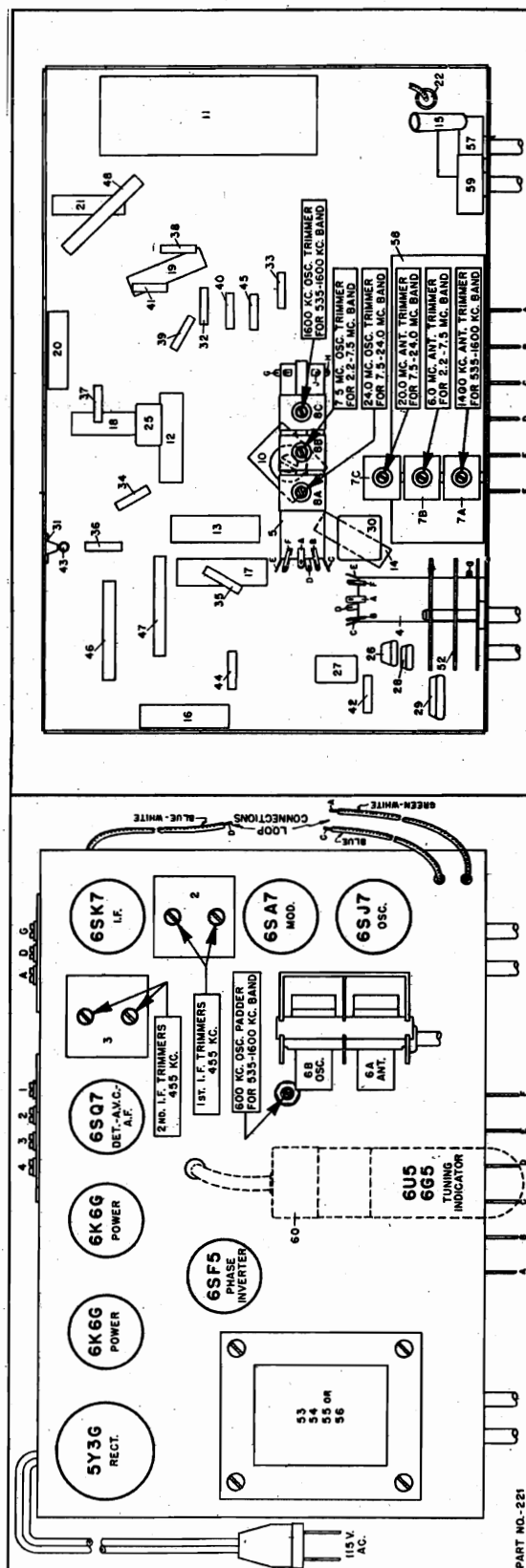
CONTROL		X - 6.0 V. G2A - 1		X - 6.0 V. G2A - 1		X - 6.0 V. G2A - 1	
Tubular	.1 Mfd. 400 Volt	-20	37	6984	Resistor	Carbon 500,000 Ohm	1/3 Watt
Tubular	.1 Mfd. 400 Volt	-17	38	6984	Resistor	Carbon 500,000 Ohm	1/3 Watt
Tubular	.01 Mfd. 400 Volt	-17	39	8906	Resistor	Carbon 250,000 Ohm	1/3 Watt
Tubular	.01 Mfd. 400 Volt	-18	40	8906	Resistor	Carbon 250,000 Ohm	1/3 Watt
Tubular	.005 Mfd. 600 Volt	-18	41	8906	Resistor	Carbon 250,000 Ohm	1/3 Watt
Tubular	.005 Mfd. 600 Volt	-18	42	8976	Resistor	Carbon 50,000 Ohm	1/3 Watt
Tubular	.01 Mfd. 220 Volt (Metal)	-30	43	6979	Resistor	Carbon 50,000 Ohm	1/3 Watt
Mica	.00025 Mfd	-21	44	1784	Resistor	Carbon 20,000 Ohm	1/3 Watt
Mica	.00005 Mfd	-21	45	3706	Resistor	Carbon 50 Ohm	1/3 Watt
Mica	.00005 Mfd	-21	46	4599	Resistor	Carbon 15,000 Ohm	1/2 Watt
Mica	.00005 Mfd	-21	47	8888	Resistor	Carbon 10,000 Ohm	1 Watt
Mica	.004 Mfd	-21	48	3549	Resistor	Carbon 40 Ohm 1"	Watt
Mica	.002 Mfd	-21	49	1447	Speaker	Electro-Dynamic 6"	4.00
Carbon	.00025 Mfd	-21	50	1448	Speaker	Electro-Dynamic 10"	7.00
Dual Micro	Neohgm 1/3 Watt	-19	51	1785	Switch	Wave	7.05
Carbon	4 Megohm 1/3 Watt	-19	52	12398	Transformer	Power 220 Volt 50 Cyl	3.50
Carbon	4 Megohm 1/3 Watt	-19	53	1437	Transformer	Power 220 Volt 50 Cyl	4.25
Carbon	4 Megohm 1/3 Watt	-19	54	1438	Transformer	Power 110-250 Volt 25 Cycle	6.75
Carbon	2 Megohm 1/3 Watt	-19	55	1439	Transformer	Power 110-250 Volt 25 Cycle	8.75

PART		VOLTAGE TABLE			
ILLUS.	PART NO.	Part Name	Description	Price	List
1A	12408	Antenna	Loop (Table)	.....	16 9203 Condenser
1B	12411	Antenna	Loop (Console)	.....	17 9203 Condenser
2	12388	Coil	1st I. F. Transformer	.....	18 9468 Condenser
3	12388	Coil	2nd I. F. Transformer	.....	19 9468 Condenser
4	12389	Coil	Antenna 2.2-7.6 & 7.5-24 M.C. Band	.....	20 2075 Condenser
5	12391	Coil	Oscillator 2.2-7.6 & 7.5-24 M.C. Band	.....	21 2305 Condenser
6	12392	Condenser	Tuning 10 Gang With Pulley	.....	22 4075 Condenser
7	12393	Condenser	Trimmer Three Gang	.....	23 9458 Condenser
8	12392	Condenser	Trimmer Three Gang	.....	25 1544 Condenser
9	1597	Condenser	Trimmer 3-35 Mm—For Console's Loop Only	.....	26 1544 Condenser
10	12408	Condenser	Padding 340-460 MmF	.....	27 1544 Condenser
11	12400	Condenser	Tubular Dry Electrolytic 1/-30 Mfd.	.....	28 1544 Condenser
12	1147	Condenser	Tubular .05 Mfd. 200 Volt	.....	29 1441 Condenser
13	1151	Condenser	Tubular .1 Mfd. 200 Volt	.....	30 1441 Condenser
14	10078	Condenser	Tubular .007 Mfd. 200 Volt	.....	31 10217 Condenser
15	10078	Condenser	Tubular .007 Mfd. 200 Volt	.....	32 4894 Resistor
16	10078	Condenser	Tubular .007 Mfd. 200 Volt	.....	33 1694 Resistor
17	10078	Condenser	Tubular .007 Mfd. 200 Volt	.....	34 1694 Resistor
18	10078	Condenser	Tubular .007 Mfd. 200 Volt	35 2705 Resistor
19	10078	Condenser	Tubular .007 Mfd. 200 Volt	36 2705 Resistor

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When adjusting 1600 kilocycle oscillator trimmer, 600 K.C. Padder and 1400 kilocycle antenna trimmer, do not connect test oscillator to loop. Couple test oscillator to receiver loop by: (a) Make a loop consisting of five to ten turns of No. 20 to 30 size wire wound on a three inch form and attach across output of test oscillator. (b) Place test oscillator loop near set loop—BE SURE THAT NEITHER MOVES WHILE ALIGNING.

TEST OSCILLATOR				
Place band switch for operation on:	Set receiver dial to:	Adjust test oscillator frequency to	Use dummy antenna in series with output of test oscillator consisting of:	Attach output of test oscillator to:
I. F. alignment use any band position	Any point where no interfering signal is received	Exactly 455 K.C.	0.2 Mfd. condenser	High side to grid cap of 6SA7 tube. Do not remove cap.
1000 to 535 K.C. Band Aerial	1 Exactly 1600 K.C.	Exactly 1600 K.C.	None	Adjust each of the second I.F. transformer trimmers for maximum output—then adjust each of the first I.F. transformer trimmers for maximum output.
	2 Approx. 1400 K.C.	Approx. 1400 K.C.	None	Adjust 1600 K.C. oscillator trimmer for maximum output.
	3 Approx. 600 K.C.	Approx. 600 K.C.	None	While rocking gang condenser adjust 1400 K.C. C. loop antenna trimmer for maximum output.
2.2 to 7.6 M.C. Band	1 Exactly 7.6 M.C.	Exactly 7.6 M.C.	400 Ohm carbon resistor	While rocking gang condenser adjust 600 K.C. C. loop oscillator padder for maximum output.
	2 Approx. 6 M.C.	Approx. 6 M.C.	400 Ohm carbon resistor	Adjust 7.6 M.C. oscillator trimmer for maximum output.
7.4 to 24 M.C. Band	1 Exactly 24 M.C.	Exactly 24 M.C.	400 Ohm carbon resistor	While rocking gang condenser adjust 6 M.C. C. antenna trimmer for maximum output.
	2 Approx. 20 M.C.	Approx. 20 M.C.	400 Ohm carbon resistor	Adjust 24 M.C. oscillator trimmer for maximum output—be sure to use proper technique. If more than one peak is noted, back off trimmer to minimum capacity, then screw down trimmer (add capacity) until the second peak—which is the proper one to use—is tuned in.
				While rocking gang condenser adjust 20 M.C. C. antenna trimmer for maximum output.



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R28	130172	250M	ohm- $\frac{1}{2}$ w.
R29	1303	500M	ohm- $\frac{1}{2}$ w.
R30	130172	250M	ohm- $\frac{1}{2}$ w.
R31	1307	40M	ohm- $\frac{1}{2}$ w.
R32	13080	150M	ohm- $\frac{1}{2}$ w.
R33	130309	150M	ohm- $\frac{1}{2}$ w.
R34	130172	250M	ohm- $\frac{1}{2}$ w.
R35	13020	100M	ohm- $\frac{1}{2}$ w.
R36	13080	150M	ohm- $\frac{1}{2}$ w.
R37	1303	500M	ohm- $\frac{1}{2}$ w.

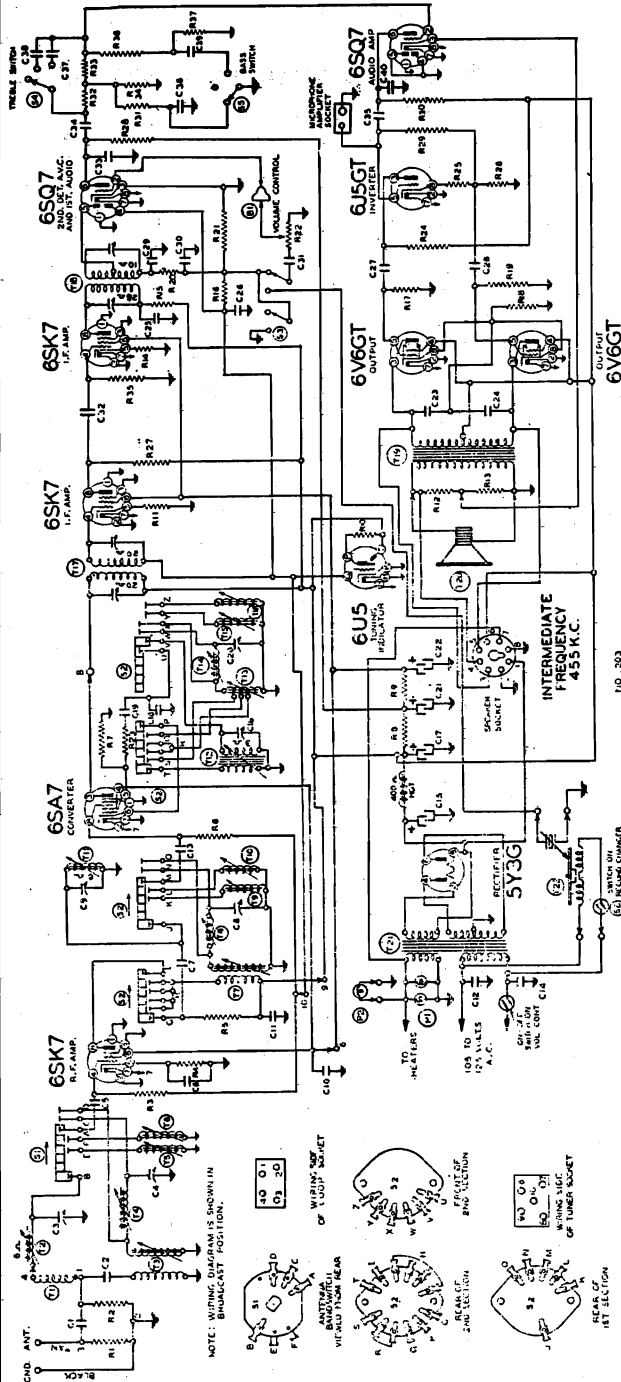
CONDENSERS

C1	1292	.0005 mica
C2	10047	.002 x 600 v.
C3	124143	B.C. antenna trimmer
C4	124143	9 mc. antenna trimmer
C5	1292	.0005 mica
C6	10020	.1 x 200 v. tubular
C7	129168	.00001 mica
C8	124138	9 mc. R.F. trimmer
C9	124139	B.C. R.F. trimmer
C10	10074	.1 x 400 v.
C11	10074	.1 x 400 v.
C12	10061	.02 x 600 v.
C13	1292	.0005 mica
C14	10061	.02 x 600 v.
C15	19112	30.0 mfd. lytic x 450 w.v.
C16	124144	B.C. oscillator trimmer
C17	19112	30.0 mfd. lytic x 450 w.v.
C18	129167	.0002 silver mica
C19	129165	.0005 mica
C20	124145	9 mc. oscillator trimmer
C21	19112	10.0 mfd. lytic
C22	19169	16 mfd. x 350 w.v.
C23	10065	.015 x 600 v.
C24	10065	.015 x 600 v.
C25	1001	.1 x 400 v.
C26	10022	.05 x 200 v.
C27	10013	.05 x 400 v.
C28	1009	.05 x 200 v.
C29	129161	.0001 mica
C30	129161	.0001 mica
C31	10020	.1 x 200 v.
C32	1292	.0005 mica
C33	12912	.00025 mica
C34	1001	.1 x 400 v.
C35	10013	.05 x 400 v.
C36	100118	.008 x 600 v.
C37	12936	.0003 mica
C38	129166	.00025 mica
C39	10037	.003 x 600 v.
C40	12912	.00025 mica

C4 and C3 in same unit
C15, C17 and C21 in same unit

PARTS

T1	111209	Loop antenna assembly
T2	111195	B.C. antenna coil
T3	111190	9 mc. antenna coil
T4	111189	6 mc. antenna coil
T5	111191	12 mc. antenna coil
T6	111192	15 mc. antenna coil
T7	10959	9 mc. R.F. coil
T8	10958	6 mc. R.F. coil
T9	10960	12 mc. R.F. coil
T10	10961	15 mc. R.F. coil
T11	10962	B.C. R.F. coil
T12	110161	B.C. Oscillator coil
T13	110157	9 mc. oscillator coil
T14	110156	6 mc. oscillator coil
T15	110158	12 mc. oscillator coil
T16	110159	15 mc. oscillator coil
T17	108177B	Input I.F. coil—455 kc.
T18	108130E	Output I.F. coil—455 kc.



RESISTORS

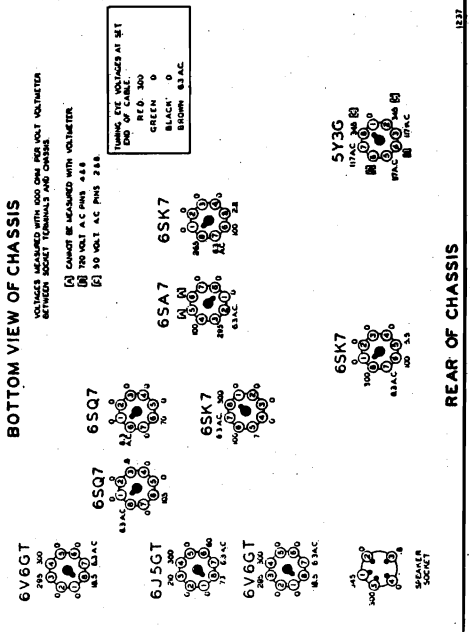
R1	130232	25M	ohm- $\frac{1}{2}$ w.
R2	130232	25M	ohm- $\frac{1}{2}$ w.
R3	13019	1 megohm	- $\frac{1}{2}$ w.
R4	130239	1 megohm	- $\frac{1}{2}$ w.
R5	130218	250 ohm	- $\frac{1}{2}$ w.
R6	13019	1 megohm	- $\frac{1}{2}$ w.
R7	130232	25M	ohm- $\frac{1}{2}$ w.
R8	130318	6M	ohm-2 watt
R9	130319	10M	ohm-2 watt
R10	130319	1 megohm	- $\frac{1}{2}$ w.
R11	130200	700 ohm	- $\frac{1}{2}$ w.
R12	13082	10M	ohm- $\frac{1}{2}$ w.
R13	130235	1500 ohm	- $\frac{1}{2}$ w.
R14	130235	1500 ohm	- $\frac{1}{2}$ w.
R15	130192	2M	ohm- $\frac{1}{2}$ w.
R16	13019	1 megohm	- $\frac{1}{2}$ w.
R17	1303	500M	ohm- $\frac{1}{2}$ w.

R18	130317	250 ohm	-2 watt
R19	1303	500M	ohm- $\frac{1}{2}$ w.
R20	13020	100M	ohm- $\frac{1}{2}$ w.
R21	130238	400M	ohm- $\frac{1}{2}$ w.
R22	101234	500M	ohm volume control and switch
R23	130174	50 ohm	- $\frac{1}{2}$ w.
R24	13094	50M	ohm- $\frac{1}{2}$ w.
R25	130218	5M	ohm- $\frac{1}{2}$ w.
R26	13094	50M	ohm- $\frac{1}{2}$ w.
R27	13073	15M	ohm- $\frac{1}{2}$ w.

BOTTOM VIEW OF CHASSIS

VOLAGES MEASURED WITH 500 OHM PER 100 OHM VOL. UNIT VOLTMETER
ATTENTION SOCKET TERMINALS AND CAPS.

(A) CHANGE BY MEASURING WITH VOLTMETER
(B) 100 OHM A.C. PHAS 2.5A
(C) 100 OHM A.C. PHAS 2.5A

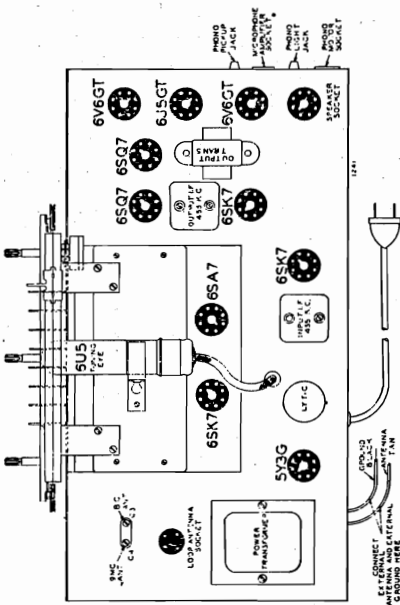


Power Consumption	Radio Only	- - - - -	120 Watts
Power Output	- - - - -	10 Watts	Undistorted
Sensitivity	for 500 Milliwatt Output:	10 Microvolts	Average
Selectivity	- 27 KC Broad at 1000 Times Signal at 1000 KC	- - - - -	- - - - -
Tuning Frequency Range	Broadcast Band - 540 to 1600 KC	- - - - -	- - - - -
	49M Band - - - - -	5.9 to 6.1 MC	- - - - -
	31M Band - - - - -	9.1 to 10 MC	- - - - -
	25M Band - - - - -	11.4 to 12.1 MC	- - - - -
	19M Band - - - - -	14.9 to 15.4 MC	- - - - -
Intermediate Frequency	- - - - -	- - - - -	455 KC
Specker	- - - - -	- - - - -	12 in. Electro Dynamic

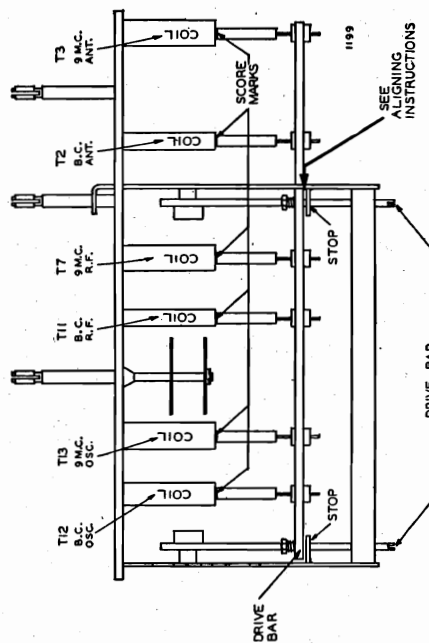
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BAND	SIGNAL GENERATOR Frequency Setting	Dummy Antenna	Connection to Radio	Position of Band Switch	Dial Pointer Setting	Trimmers Adjusted in Order Shown	Trimmer Function	Adjustment
I. F.	455 Kc.	.1 MFD.	Grid of 6SK7 (I.F.)	Broadcast	Set Dial at 1600 Kc.	Two Trimmers on Top	Output I. F.	Adjust to maximum output
	455 Kc.	.1 MFD.	Grid of 6SA7	Broadcast	Set Dial at 1600 Kc.	Two Trimmers on Top	Input I. F.	Adjust to maximum output
31 METER BAND	9.6 Mc.	400 ohms	Antenna lead	31M	Set Dial at 9.6 Mc.	(See Trimmer View) C20 (See Trimmer View) C8 (See Trimmer on Top) C4	Osc. R. F. Ant.	Adjust to maximum output
49 METER BAND	6.1 Mc.	400 ohms	Antenna lead	49M	Set Dial at 6.1 Mc.	(See Trimmer View) T14 (See Trimmer View) T8 (See Trimmer View) T4	Osc. R. F. Ant.	Adjust to maximum output
25 METER BAND	11.8 Mc.	400 ohms	Antenna lead	25M	Set Dial at 11.8 Mc.	(See Trimmer View) T15 (See Trimmer View) T9 (See Trimmer View) T5	Osc. R. F. Ant.	Adjust to maximum output
19 METER BAND	15.2 Mc.	400 ohms	Antenna lead	19M	Set Dial at 15.2 Mc.	(See Trimmer View) T16 (See Trimmer View) T10 (See Trimmer View) T6	Osc. R. F. Ant.	Adjust to maximum output
BROAD-CAST BAND	1600 Kc.	200 mmf.	Antenna lead	Broadcast	Set Dial at 1600 Kc.	(See Trimmer View) C16 (See Trimmer View) C9 (See Trimmer on Top) C3	Osc. R. F. Ant.	Adjust to maximum output
	1400 Kc.	200 mmf.	Antenna lead	Broadcast	Set Dial at 1400 Kc.	Rotate Core T11 Rotate Core T12 (See Iron Core Adjustment View)	R. F. Ant.	Adjust to maximum output

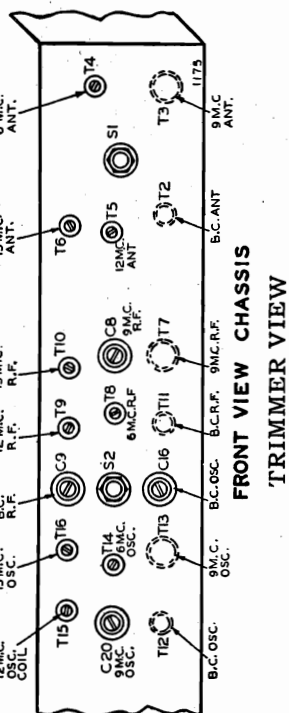
• Dummy antennas—1 mf., 200 mmf., and 400 ohms.



CHASSIS VIEW



IRON CORE ADJUSTMENT VIEW



FRONT VIEW CHASSIS TRIMMER VIEW

Aligning Instructions

First refer to the "Iron Core Adjustment View" now turn the tuning knob until the drive bar comes within 1/64 to 1/32 from the stops. (A piece of blotting paper is about the right thickness and will serve as a gauge). The clearance of the bar must be the same at both stops. If far off you can raise one drive screw gently and equalize them. Minor adjustments may be made with the drive bar adjustments.

Next rotate each iron core until the fine score marks are even with the edge of the coil forms.

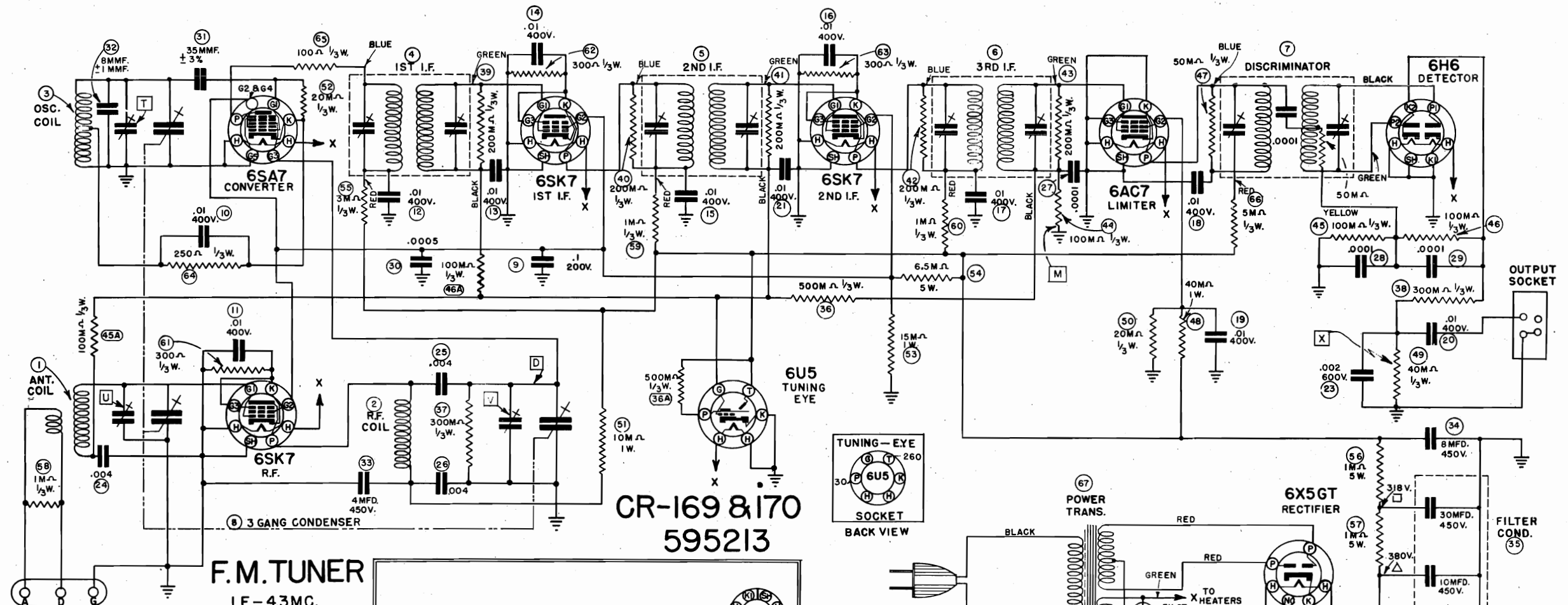
You are now ready to continue with the trimmer adjustments as shown on the alignment chart.

Replacing Pushbuttons

Should it ever be necessary to replace a broken or lost pushbutton you will notice they are made in two parts, a clear front and a brown body. To separate the two portions first take off the escutcheon. Push the button in—

Next push the brown body of the button back until it snaps free from the clear front. You can now lift the clear portion off and take out the brown body. To replace the pushbutton, reverse the procedure.

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CR-169 & CR-170
595213

F.M. TUNER

I.F. - 4.3 MC.

BAND RANGE - 41.7 - 50.4 MC.

VOLTAGE TABLE

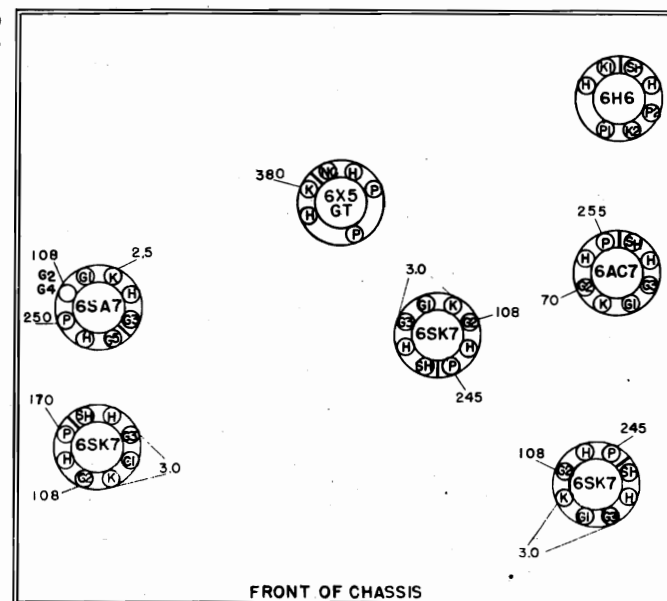
BOTTOM VIEW OF CHASSIS
ALL VOLTAGES MEASURED FROM SOCKET TERMINALS
TO GROUND WITH A 1000 OHM PER VOLT VOLTMETER
ALL HEATERS (H) 6.3V. A.C.
MEASURE CATHODES (K) EXCEPT 6X5GT, ON 30V. SCALE
ALL OTHERS ON 600V. SCALE
LINE VOLTAGE 117V. A.C.

PRIMARY VOLTAGE 117 v. 50-60 cycles

POWER CONSUMPTION 70 watts

TUNING RANGE 41.7 - 50.4 MC

IF PEAK 4.3 MC

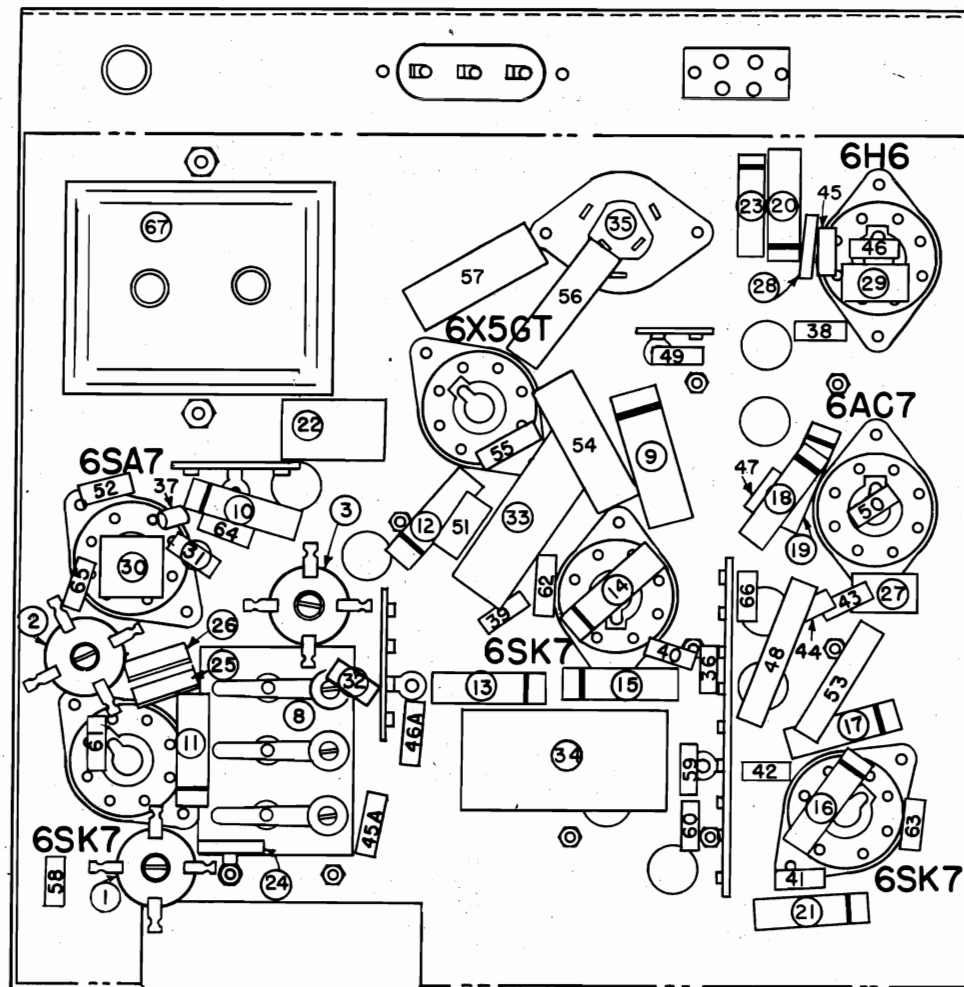


ALIGNMENT PROCEDURE

Although it is most convenient to align this receiver with a frequency-modulated oscillator, a satisfactory job can also be done with an accurately-calibrated signal generator or oscillator covering a range in the vicinity of 4.3 megacycles. The object of alignment is to adjust the I.F. trimmers so that the I.F. system has a pass band from 4.2 to 4.4 megacycles, and then to adjust the discriminator transformer to cover exactly the same band. Proceed as follows:

1. Connect the "high" side of the generator output to the grid (G3) of the 6SA7 converter, and the "low" side of the generator to the ground of the chassis. The connection to the grid is most easily made by connecting to the stator or middle condenser in the tuning gang. If it is found that the generator does not furnish enough signal, it will be necessary to make this connection directly to the control grid of the 6SA7 tube and to disconnect the R.F. coil from this grid. This point is indicated at "D" on the schematic diagram.
2. Connect a 0-50 or 0-200 microammeter in series with the "ground" end of the 100,000 ohm resistor (44). This is point "M" on the diagram. Connect the positive terminal of the meter to ground. This will measure the grid current of the 6AC7 tube. A reading of 30 to 100 microamperes is all that should be expected at this point. If an Analyst or a D.C. electronic voltmeter is available, it can be connected directly across this 100,000 ohm resistor (62) without disconnecting the resistor. This measures the limiter grid bias voltage. A reading of 3 to 10 volts should be considered normal.
3. Set the generator at 4300 kc. and align the I.F. Trimmers for maximum grid current in the 6AC7 tube as indicated by the microammeter or voltmeter.
4. The I.F. stages are now aligned. Remove the microammeter and re-connect the 100,000 ohm resistor (44) as it was before.

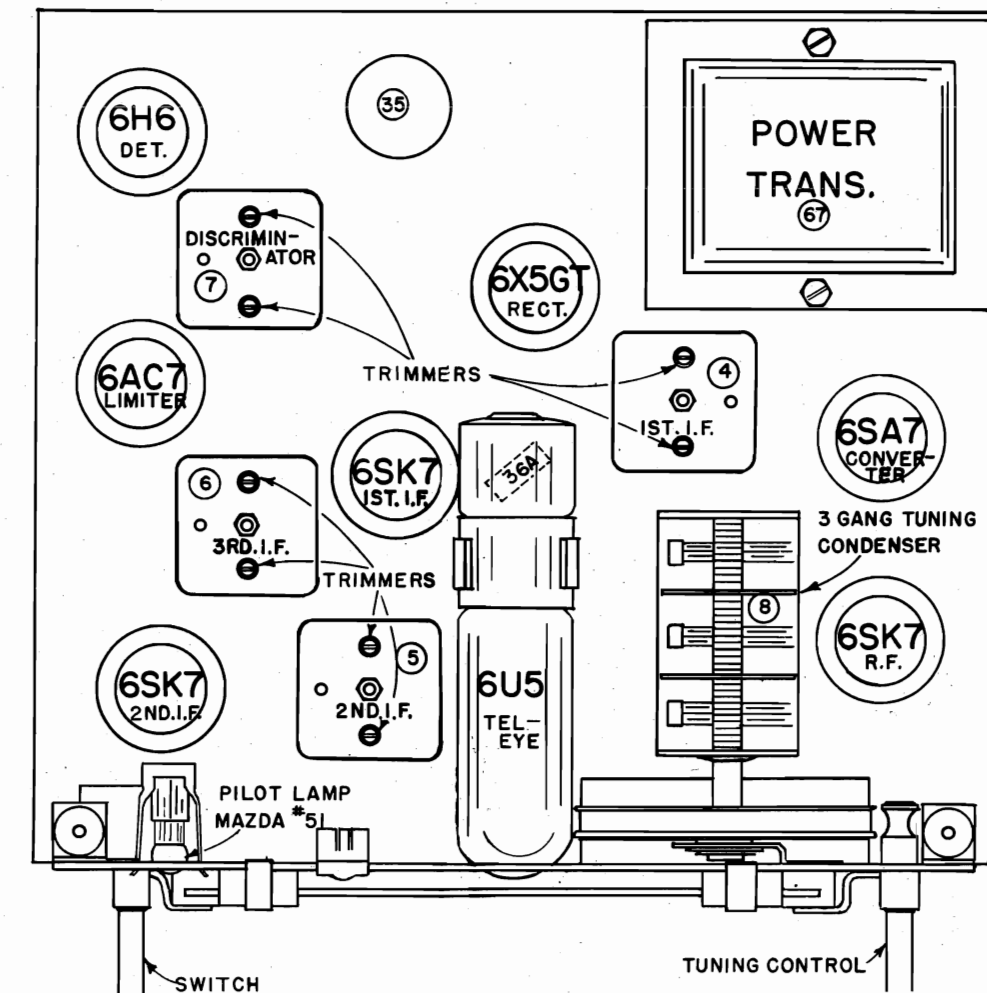
THE MAGNAVOX CO., INC.



5. The discriminator will be adjusted next. Connect the microammeter in parallel with the 40,000 ohm resistor (49). This is indicated as point "X" on the diagram. The positive side of the meter is connected to ground. Instead of this, a high impedance electronic voltmeter, such as an Analyst or similar device, can be connected across this resistor. This measures the detector output current or voltage.
6. Adjust the test generator to 4375 kc. Adjust both trimmers on the discriminator transformer (7) for a peak. Adjust the output of the generator so that the meter reads at least 60 microamperes or 2.4 volts. Readjust the oscillator to 4300 kc. Adjust the trimmer nearest the 6H6 tube until the current or voltage is zero. A non-metallic screwdriver is essential; this is an extremely important operation. Re-set the oscillator to 4375 kc. and note the meter reading.

Now reverse the meter connections so that the negative terminal is connected to ground. Set the generator to 4225 kc. and the meter reading should be within 10% of being the same. If not, the tuning of the discriminator transformer was not done carefully enough and must be repeated. This completes the adjustment of the discriminator. Remove the meter from the circuit.
7. Re-connect the control grid of the 6SA7 to the mixer coil if this connection had been removed and disconnect the generator from this point.

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8. The antenna, mixer, and oscillator coils are now ready to be aligned. Check to see that the dial pointer is at the end of the dial calibration (41.7 mc.) when the tuning gang is fully meshed.
9. Prepare to measure the limiter grid current by again connecting the microammeter as described in paragraph 2.
10. If an extremely accurate signal generator is available, it may be used for setting the oscillator to the dial calibration. The generator is connected to the antenna post through a 70 ohm resistor. Otherwise it will be necessary to connect an antenna to the receiver and use a F.M. transmitter for the frequency standard, preferably one between 47 mc. and 50 mc.
11. Set the dial to the known frequency of the transmitter and adjust the oscillator air trimmer "r" until the signal produces a maximum reading on the microammeter. Then adjust the trimmers "u" and "v" on the antenna and R.F. coils for maximum reading. If too much signal is fed to the receiver, it will appear at several settings of the dial and confuse the adjusting. These trimmers should align rather loosely. If they are tightened so that the frequency of the R.F. circuit equals the oscillator frequency, spurious oscillations and responses are produced. The oscillator frequency is normally 4300 kc. lower than the signal frequency. When the above adjustments are completed and the 100,000 ohm resistor (44) is again grounded, the receiver has been aligned.

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Intermediate frequency.....455 KC;
Tuning frequency range:

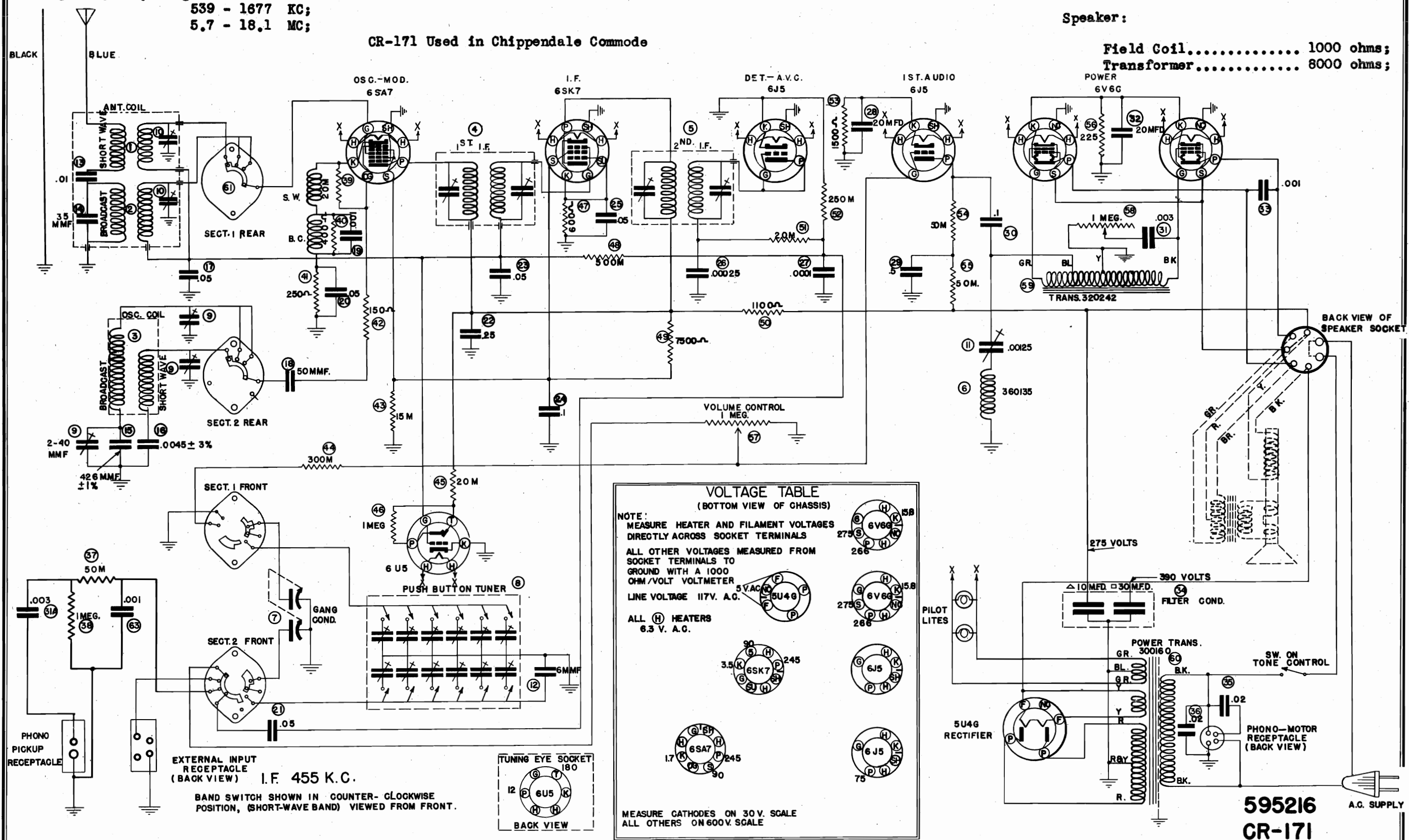
539 - 1677 KC;
5.7 - 18.1 MC;

CR-171 Used in Chippendale Commode

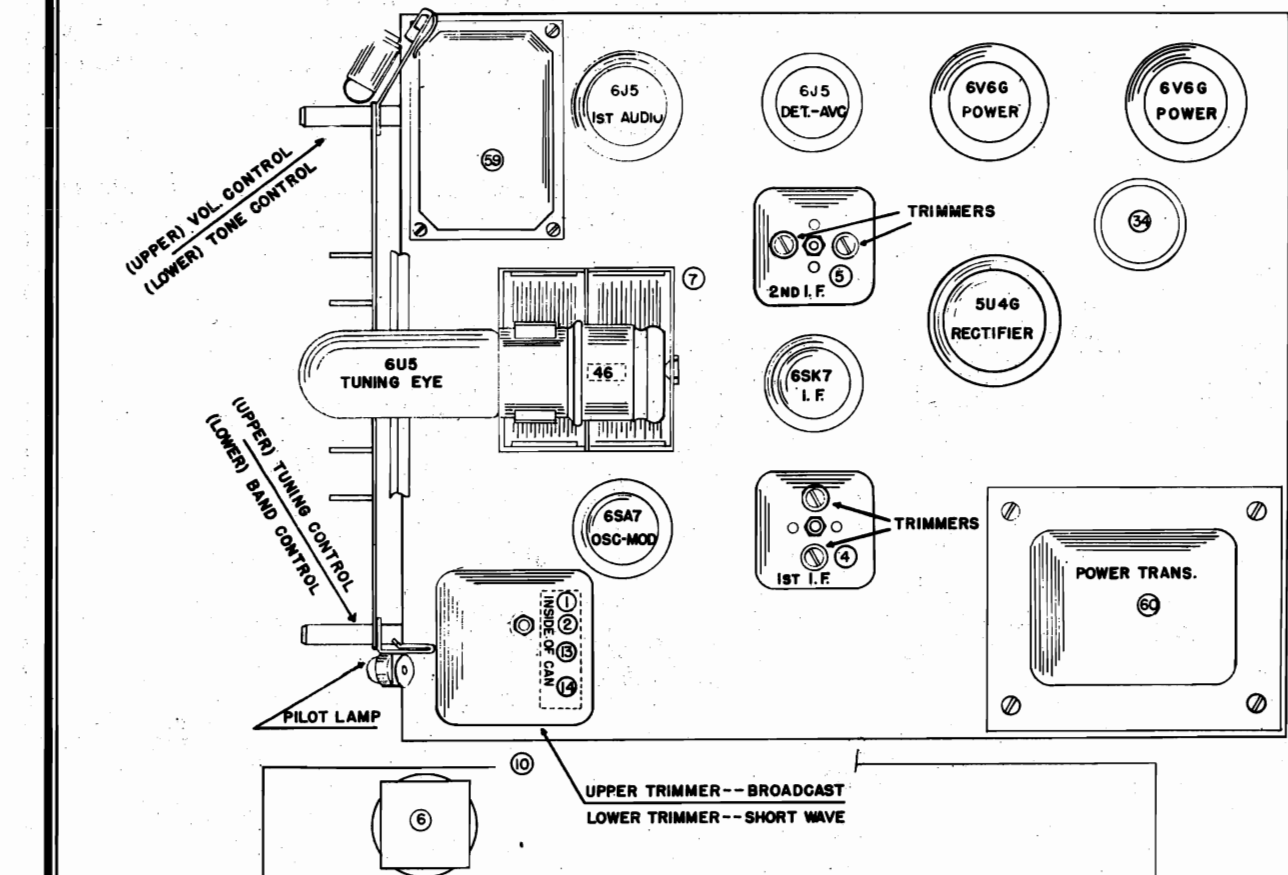
Primary voltage....117 V. 50-60 cycle AC;
Power consumption..... 100 watts;
Power output..... 12 watts;

Speaker :

Field Coil..... 1000 ohms;
Transformer..... 8000 ohms;



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CR-172, 178 ALIGNING THE I.F. AT 455 KILOCYCLES

1. Connect the ground lead of the test oscillator to the chassis or radio ground lead. Connect the other lead of the test oscillator to the oscillator grid of the 6SA7 tube through a .00025 mfd. series condenser.
 2. Set the test oscillator to EXACTLY 455 kilocycles and turn the receiver volume to its maximum setting.
 3. Peak each of the second I.F. transformer trimmer condensers.
 4. Peak each of the first I.F. transformer trimmer condensers.
- To insure most accurate trimmer setting, repeat the above adjustment several times, always using the lowest possible test oscillator output consistent with readable output meter scale deflection.

ALIGNING THE 541-1630 K.C. BAND

1. Remove the test oscillator lead from the grid of the 6SA7 tube and connect it to the receiver antenna lead (blue) through a .00025 mfd. series condenser.
2. Set the ANT-LOOP switch to the ANT position.
3. Check the tuning dial adjustment by turning the gang condenser until the plates are completely meshed, at which point the dial pointer must be exactly even with the last line at the low frequency end of the dial calibration.
4. Set the test oscillator frequency and receiver dial to EXACTLY 1400 kilocycles. Adjust the oscillator trimmer (on condenser gang) and the antenna trimmer (accessible through opening in top of chassis -- see layout diagram) to bring in the 1400 kilocycles test oscillator signal to maximum output.
5. Set the test oscillator frequency and receiver dial to EXACTLY 800 kilocycles. While rocking the gang condenser slightly to the right and to the left, adjust the 800 kc. oscillator padder (accessible through opening in top of chassis back of condenser gang) for maximum output.
6. The loop trimmer adjustment must now be made to provide for maximum possible signal pickup with the loop. This adjustment must be made while the chassis and loop are in the cabinet, or with the chassis and loop in the same relative positions as when they are mounted in the cabinet.
7. Connect the output of a signal generator that has been adjusted to 1400 kilocycles, to a loop of about five turns of wire, eight inches in diameter. Set the ANT-LOOP switch to the LOOP position.
8. Tune the receiver to 1400 kilocycles and adjust the loop trimmer (accessible through an opening in the top of chassis -- see layout diagram) for maximum output as indicated on an output meter connected across the voice coil while holding the smaller loop approximately 18 inches from the set loop and in the same plane.

10 K.C. FILTER ADJUSTMENT

With the treble control set for maximum treble response, tune the receiver to a point between two stations of about the same signal strength on adjacent channels. If a 10,000 cycle heterodyne is heard as the beat note between the two carriers, it may be eliminated by returning the 10 KC output filter by means of the 10 KC trimmer condenser at the top center of the chassis.

CR-171 ALIGNING THE I.F. AT 455 KILOCYCLES

1. Connect the ground lead of the test oscillator to the chassis or radio ground lead. Connect the other lead of the test oscillator to the oscillator grid of the 6SA7 tube through a .00025 mfd series condenser.
 2. Set the test oscillator to EXACTLY 455 kilocycles and turn the receiver volume to its maximum setting.
 3. Peak each of the second I.F. transformer trimmer condensers.
 4. Peak each of the first I.F. transformer trimmer condensers.
- To insure most accurate trimmer setting, repeat the above adjustment several times, always using the lowest possible test oscillator output consistent with readable output meter scale deflection.

ALIGNING THE 539-1677 K.C. BAND

1. Remove the test oscillator lead from the grid lead of the 6SA7 tube and connect it to the receiver antenna lead (blue) through a .00025 mfd. series condenser.
2. Check the tuning dial adjustment by turning the gang condenser until the plates are completely meshed, at which point the dial pointer must be exactly even with the last line at the low frequency end of the dial calibration.
3. Adjust the band selector switch for operation of the 539-1677 kilocycle BROADCAST band.
4. Set the test oscillator frequency and receiver dial to EXACTLY 1400 kilocycles. Adjust the BROADCAST oscillator trimmer and the antenna trimmer to bring in the 1400 kilocycle test oscillator signal to maximum output.
5. Set the test oscillator and receiver frequency to 800 kilocycles. While rocking the gang condenser slightly to the right and to the left, adjust the 800 kilocycle oscillator padder for maximum output.

ALIGNING THE 5.7-18.1 M.C. BAND

1. Substitute a 400 ohm resistor for the .00025 mfd. condenser in series with the test oscillator output feeding the antenna lead.
2. Adjust the band selector switch to the 5.7-18.1 megacycle SHORT-WAVE band. Tune the receiver and test oscillator frequency to EXACTLY 15 megacycles, and adjust the SHORT WAVE oscillator trimmer and antenna trimmer for maximum output consistent with readable output meter scale deflection.

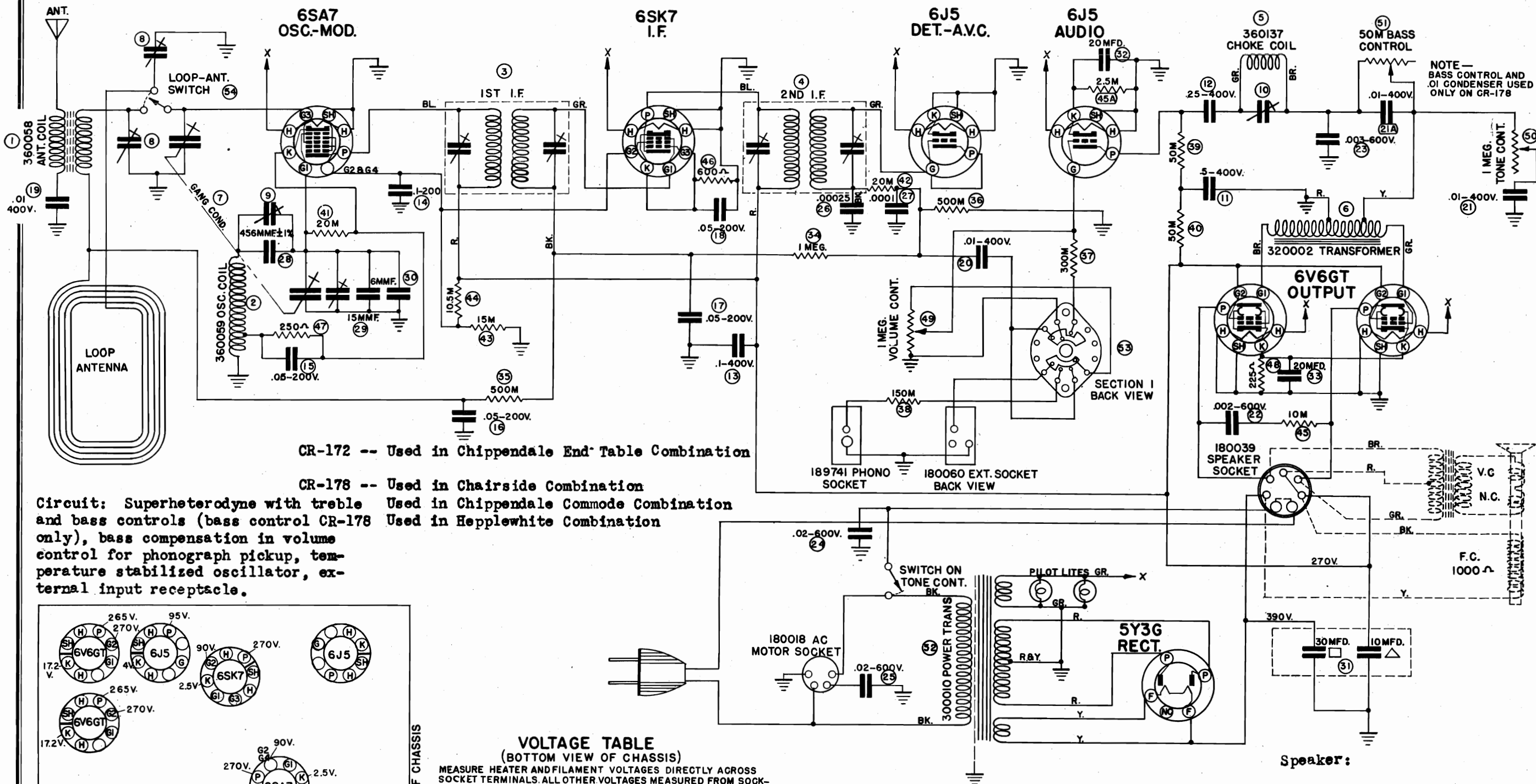
While adjusting the oscillator trimmer, two peaks may be noticed, in which case, care must be taken so that the proper peak is used for aligning the receiver at 15 megacycles. Always screw in the trimmer to maximum capacity, then back off the trimmer until the second peak (if more than one is noticed) which is the correct one, is tuned in.

NOTE: To assure most accurate trimmer setting, repeat all of the above adjustments several times, always using the lowest possible test oscillator output consistent with readable output meter scale deflection.

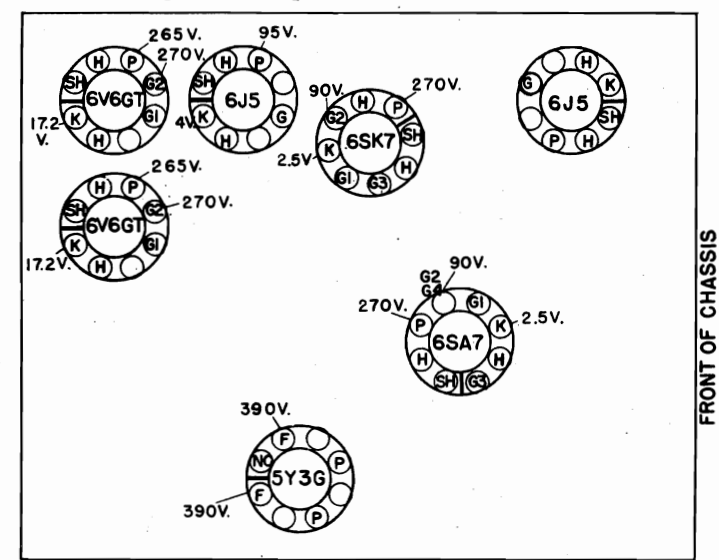
10 K.C. FILTER ADJUSTMENT

With the tone control set for maximum treble response, tune the receiver to a point between two stations of about the same signal strength on adjacent channels. If a 10,000 cycle heterodyne is heard as the beat note between the two carriers, it may be eliminated by returning the 10 KC output filter by means of the 10 KC trimmer condenser at the rear center of the chassis.

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CR-172 -- Used in Chippendale End Table Combination
CR-178 -- Used in Chairside Combination
Circuit: Superheterodyne with treble and bass controls (bass control CR-178 Used in Chippendale Commode Combination only), bass compensation in volume control for phonograph pickup, temperature stabilized oscillator, external input receptacle.



VOLTAGE TABLE
(BOTTOM VIEW OF CHASSIS)

MEASURE HEATER AND FILAMENT VOLTAGES DIRECTLY ACROSS SOCKET TERMINALS. ALL OTHER VOLTAGES MEASURED FROM SOCKET TERMINAL TO GROUND WITH A 1000 OHM PER VOLT VOLT-METER. MEASURE CATHODES (K) ON 30V. SCALE. ALL OTHERS ON 600V. SCALE WITH NO SIGNAL INPUT. LINE VOLTAGE 117 VOLTS. AC.

Component	Voltage
6V6GT	265V.
6J5	270V.
6SK7	270V.
6SA7	270V.
5Y3G	390V.

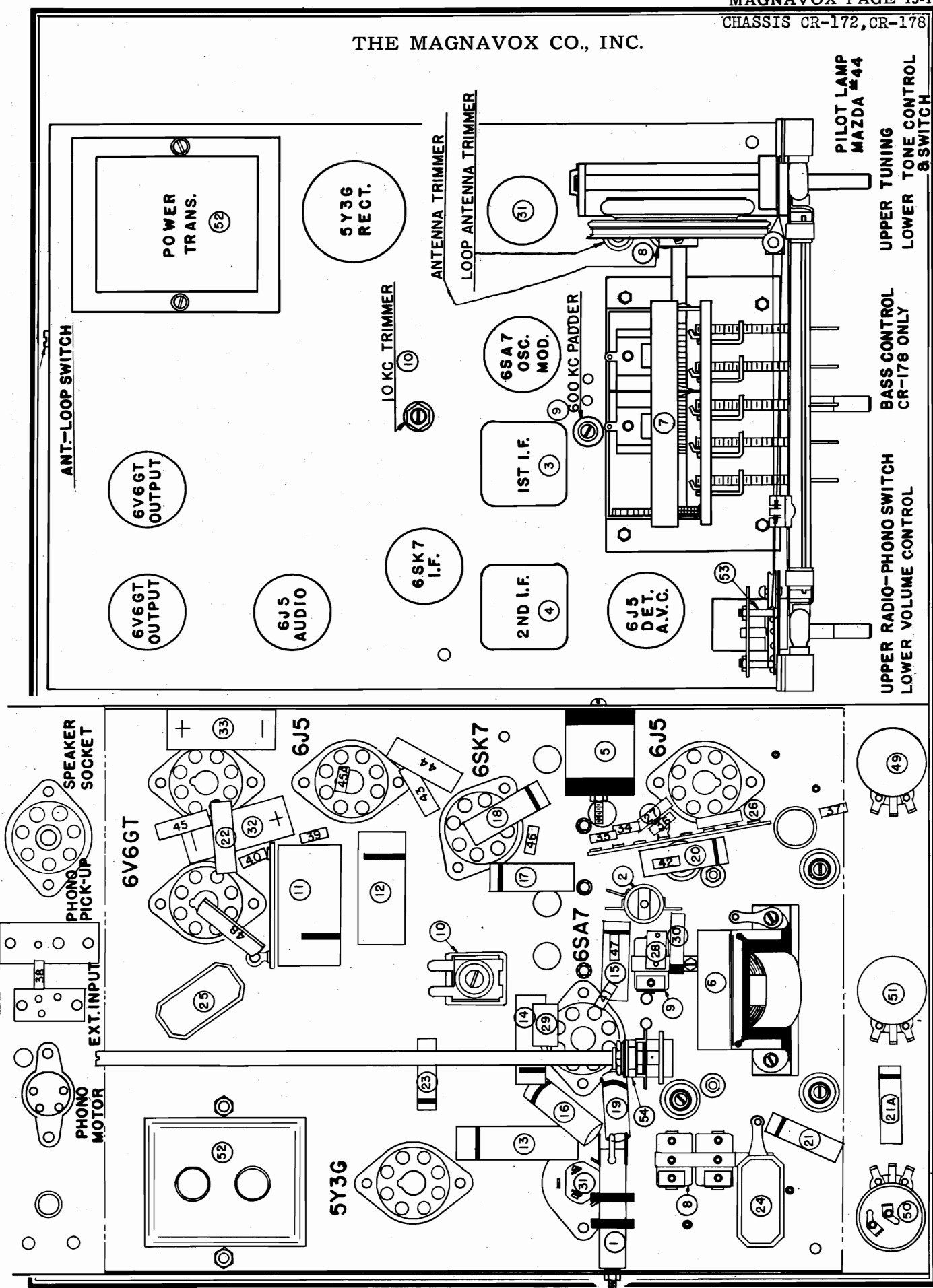
Primary voltage.....117 V. 50-60 cycle AC; Intermediate frequency.....455 KC;
Power consumption.....100 watts; Tuning frequency range:
Power output.....12 watts; 541 - 1630 KC;

I.F.-455 KC.
TUNING RANGE 540-1630 KC.
AUDIO SELECTIVE SWITCH IN EXTERNAL POSITION (EXTREME COUNTER CLOCKWISE) AS VIEWED FROM FRONT.

Field Coil.....1000 ohms;
Transformer.....8000 ohms;

CR-172 & 178
595226

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IO KC. FILTER ADJUSTMENT

With the tone control set for maximum treble response and the Band Expander set in the High-Fidelity position (accomplished by rotating the treble control to the right as far as possible), tune the receiver to a point between two stations of about the same signal strength on adjacent channels. If a 10,000 cycle heterodyne is heard as the beat note between the two carriers, it may be eliminated by returning the 10 KC output filter by means of the 10 KC trimmer condenser located on the top of the chassis between the two 6J5 tubes. In the absence of such a signal source in the daytime, an ACCURATE audio oscillator may be used to feed 10 KC into the phonograph input socket.

ALIGNING THE 540-1710 KC. BAND

1. Remove the test oscillator lead from the grid of the 6SA7 tube and connect it to the receiver antenna lead (blue) through a .00025 mfd. series condenser.
2. Check the tuning dial adjustment by turning the gang condenser until the plates are completely meshed, at which point the dial pointer must be exactly even with the last line at the low frequency end of the dial calibration.
3. Adjust the band selector switch for radio operation on the 540-1710 K. C. (broadcast) band.
4. Set the test oscillator and receiver frequency to 600 kilocycles. While rocking the gang condenser slightly to the right and to the left, adjust the 600 kilocycle oscillator padder for maximum output.
5. Loosen the adjustment screw on the preselector trimmer (indicated on the layout diagram) as far as possible.
6. Set the test oscillator frequency and receiver dial to EXACTLY 1400 kilocycles. Adjust the BROADCAST oscillator trimmer and the antenna trimmer to bring in the 1400 kilocycle test oscillator signal to maximum output.
7. Now adjust the preselector trimmer for maximum deflection on the output meter, after which the broadcast antenna trimmer should be returned for maximum output.

ALIGNING THE 57-18.3 MC. BAND

1. Substitute a 400 ohm resistor for the .00025 mfd. condenser in series with the test oscillator output feeding the antenna lead.
2. Adjust the band selector switch to the 5.7 - 18.3 megacycle (short-wave) band, tune the receiver and test oscillator frequency to EXACTLY 15 megacycles, and adjust the SHORT WAVE oscillator trimmer and antenna trimmer for maximum output as indicated on the output meter.

NOTE A
While adjusting the oscillator trimmer, two peaks may be noticed, in which case, care must be taken so that the proper peak is used for aligning the receiver at 15 megacycles. Always screw in the trimmer to maximum capacity, then back off the trimmer until the second peak (if more than one is noticed) which is the correct one, is tuned in.

NOTE: To assure most accurate trimmer setting, repeat all of the above adjustments several times, always using the lowest possible test oscillator output consistent with readable output meter scale deflection.

IO KC. FILTER ADJUSTMENT

With the tone control set for maximum treble response, tune the receiver to a point between two stations of about the same signal strength on adjacent channels. If a 10,000 cycle heterodyne is heard as the beat note between the two carriers, it may be eliminated by returning the 10 KC output filter by means of the 10 KC trimmer condenser at the top of the chassis, adjacent the spare fuse.

ALIGNING THE I.F. AT 455 KC.

1. Connect the ground lead of the test oscillator to the chassis or set times, always using the lowest possible test oscillator output consistent with readable output meter scale deflection.
 2. Set the test oscillator to EXACTLY 455 kilocycles and turn the receiver volume to its maximum setting.
 3. Peak both of the second I.F. transformer trimmers.
 4. Peak both of the first I.F. transformer trimmers.
- To assure most accurate trimmer setting, repeat the above adjustment several times, always using the lowest possible test oscillator output consistent with readable output meter scale deflection.

ALIGNING THE 535-1720 KILOCYCLE BAND

1. Check the tuning dial adjustment by turning the gang condenser until the condenser plates are completely meshed, at which point the dial pointer must coincide with the last line at the low-frequency end of the dial scale. If the pointer does not have this setting, move it to the correct position, holding the condensers in complete mesh. This is accomplished by loosening the two set-screws in the hub of the large pulley on the condenser shaft.
2. Remove the test oscillator lead from the grid on the 6SA7 tube and connect it to the receiver antenna lead (blue) through a .00025 mfd. series condenser.
3. Set the band selector switch for operation on the broadcast band.
4. Set the test oscillator frequency and receiver dial to EXACTLY 1400 kilocycles. Adjust the 1400 kilocycle oscillator trimmer, the R.F. trimmer and the antenna trimmer to bring in the test oscillator signal at maximum output as indicated on the output meter.
5. Set the test oscillator and receiver frequency to 600 kilocycles. While rocking the gang condenser slightly to the right and to the left, adjust the 600 kilocycle oscillator padder for maximum output. If this padder needs much adjusting, then finish up by repeating operation (4) above.

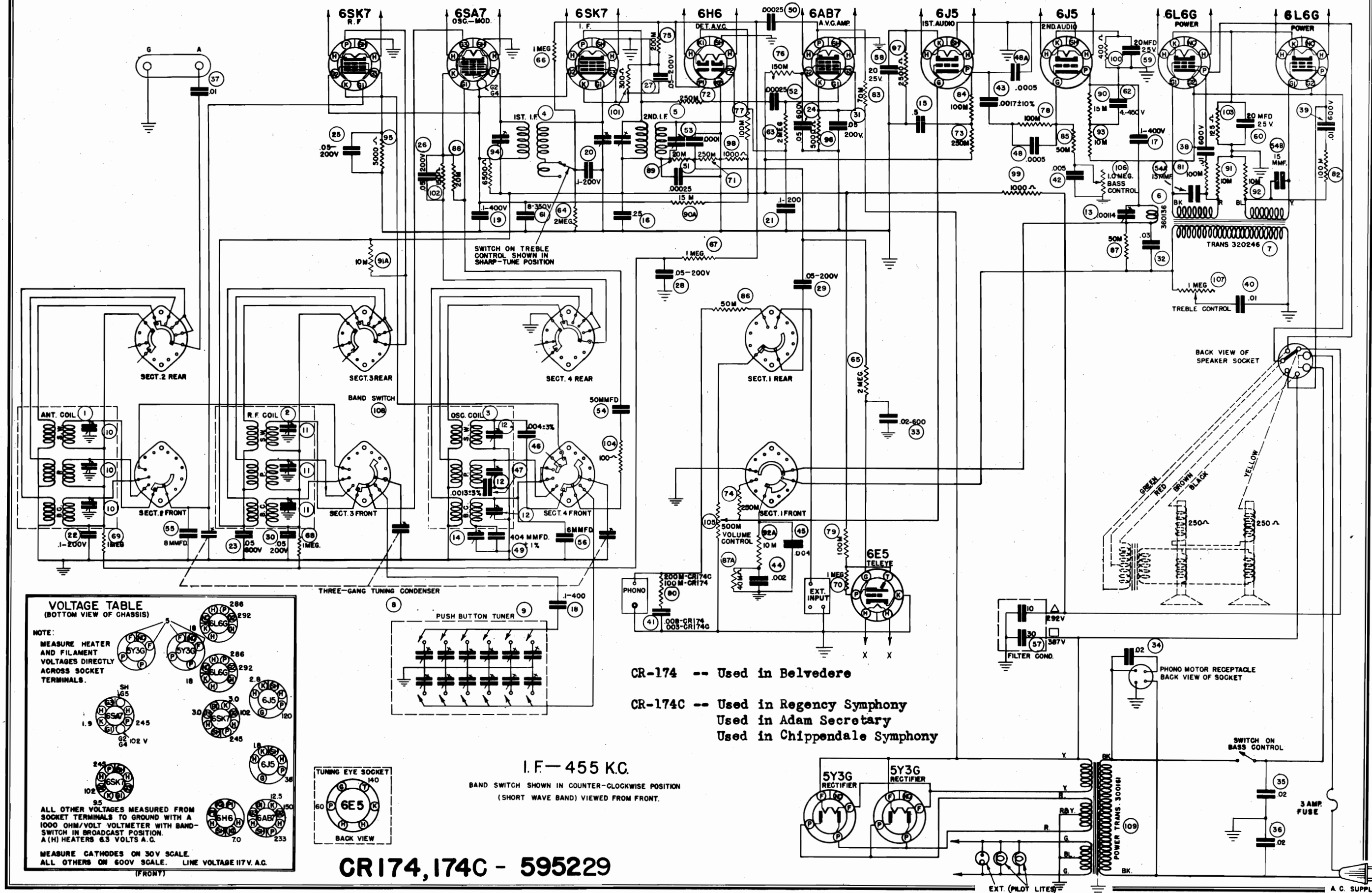
ALIGNING THE 1667-5680 KILOCYCLE BAND

1. Replace the .00025 mfd. test oscillator antenna lead series condenser with a 400 ohm resistor.
2. Adjust the band selector switch for operation on the Police band.
3. Set the radio and test oscillator frequency to EXACTLY 5000 kilocycles. Now adjust the 5000 kilocycle oscillator trimmer, the R.F. trimmer and the antenna trimmer to bring in the test oscillator signal to maximum output as indicated on the output meter.

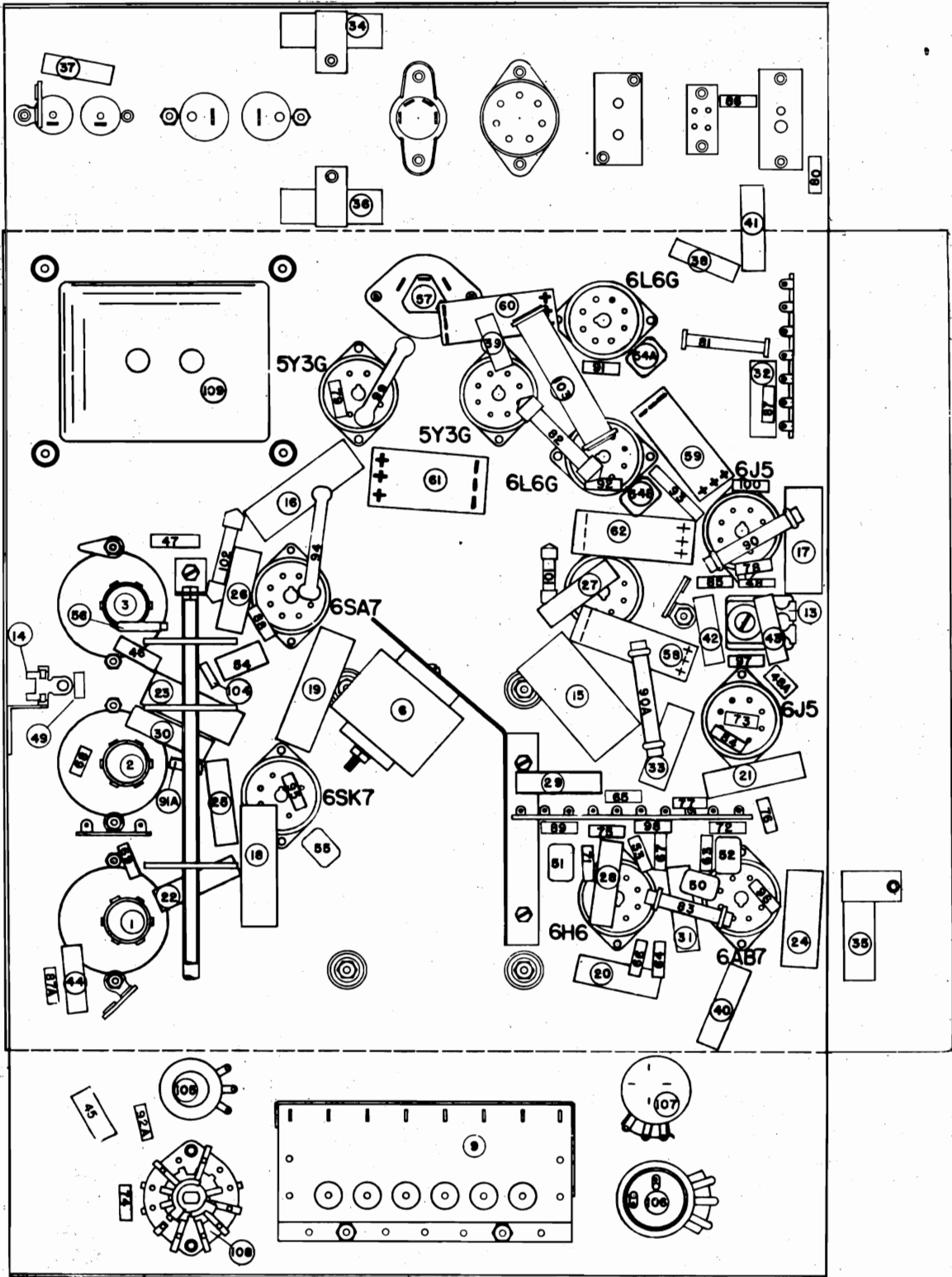
ALIGNING THE 5.6-18.4 MEGACYCLE BAND

1. With the 400 ohm resistor in series with the test oscillator lead to the antenna lead of the radio receiver, set the band selector switch to the Short Wave band.
2. Set the radio and test oscillator frequency to EXACTLY 15 megacycles and adjust the 15 megacycle oscillator trimmer, the R.F. trimmer and the antenna trimmer to bring the test oscillator signal in to maximum output as indicated on the output meter. SEE NOTE A (FOR ALL MODELS)

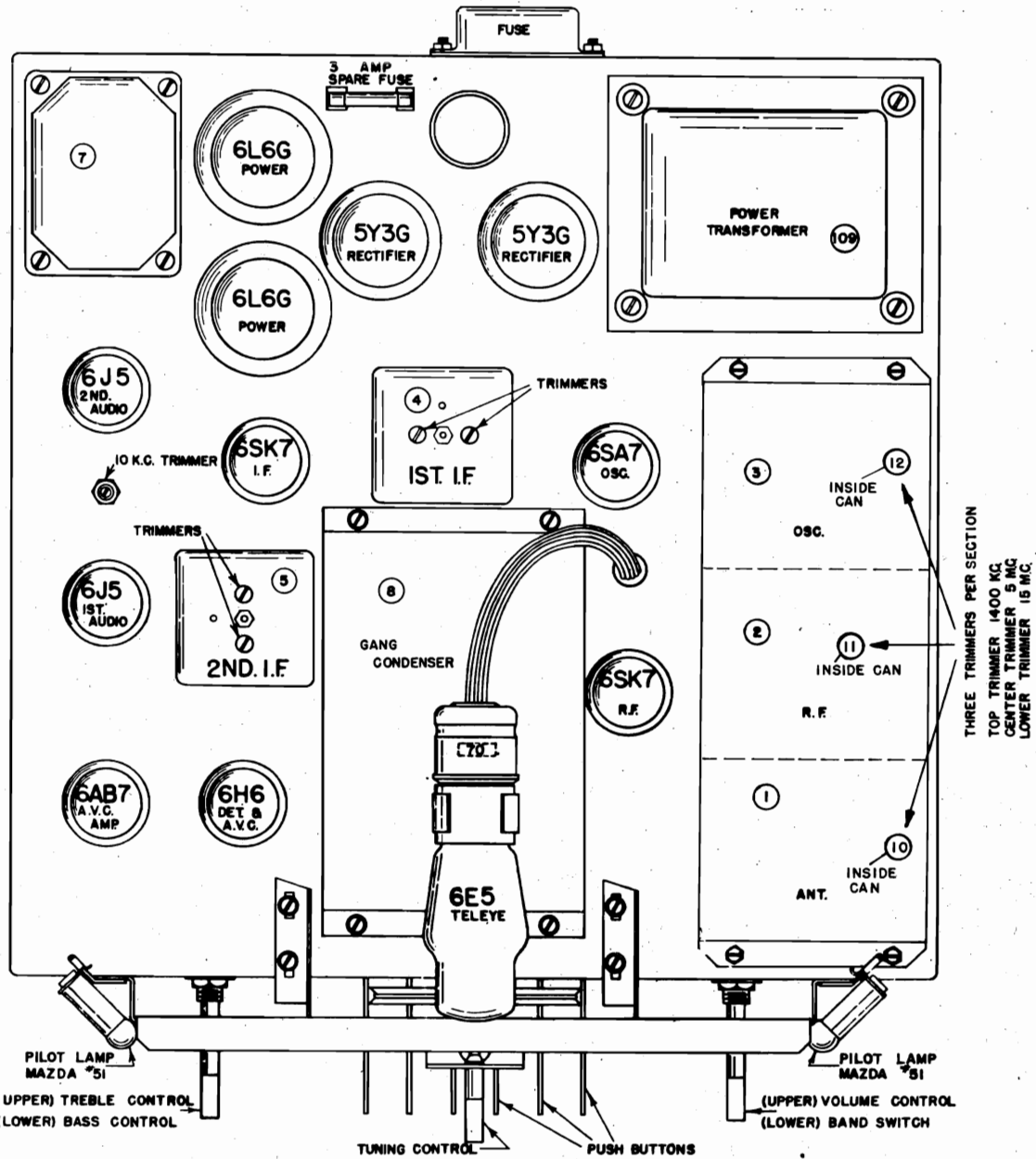
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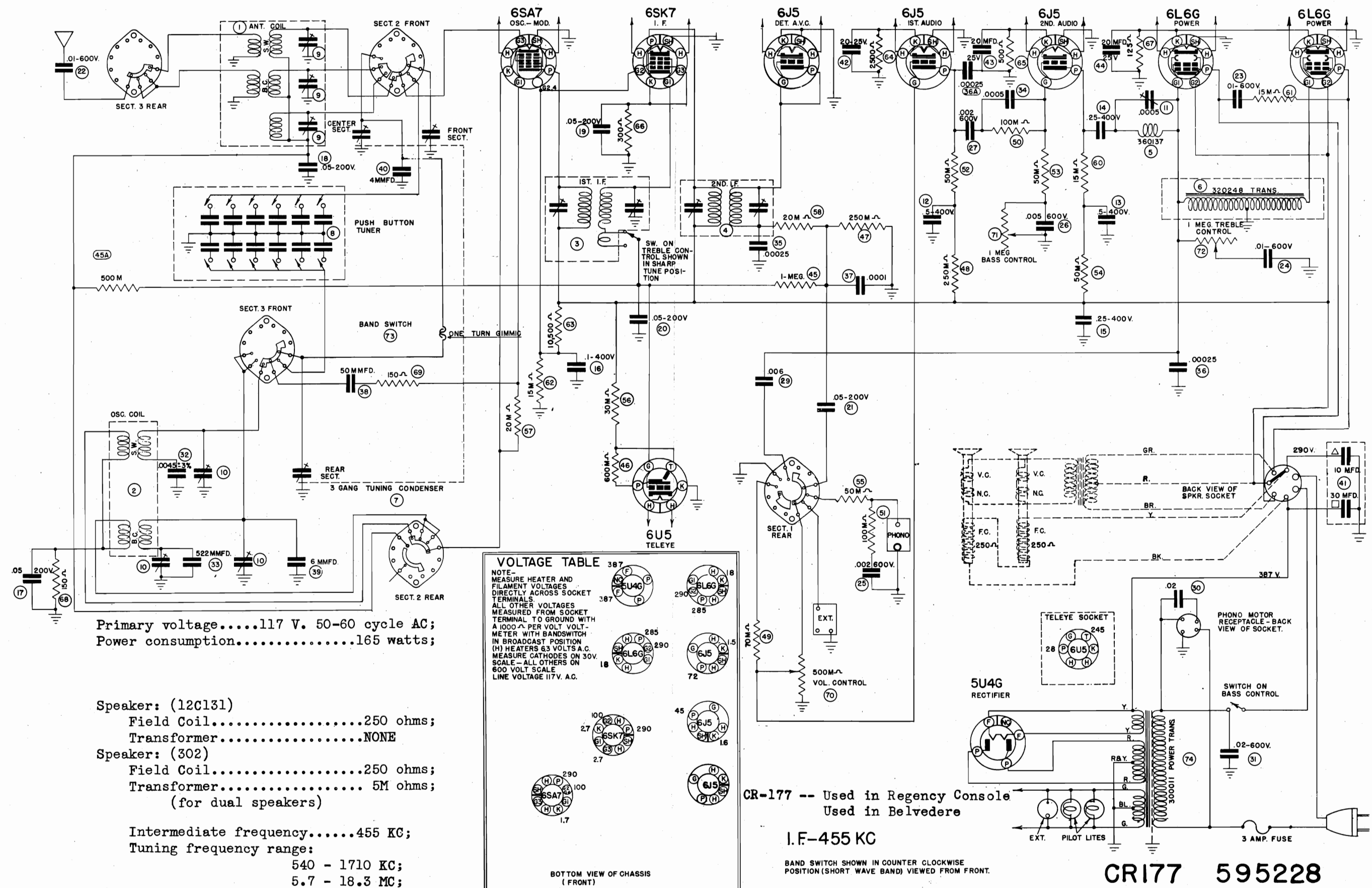
Primary voltage.....117 V. AC; Intermediate frequency.....455 KC;
Power consumption.....180 watts; Tuning frequency range: 535 - 1720 KC;
5.6 - 18.4 MC;
Speaker (12C131):
Field Coil.....250 ohms; Circuit: Superheterodyne with three tuning
Transformer.....NONE ranges, treble and bass controls, I.F. band
Speaker (302):
Field Coil.....250 ohms; expansion, amplified A.V.C., inverse feedback
Transformer.....5M ohms; circuit, bass compensation in volume control
(for dual speakers) for phonograph pickup, push button condenser-
type tuner temperature stabilized.

FOR ALIGNMENT SEE PAGE 13-12

6SK7 I. F. 6J5 DET. A.V.C. 6J5 1ST. AUDIO 6J5 2ND. AUDIO 6V6G POWER 6V6G POWER



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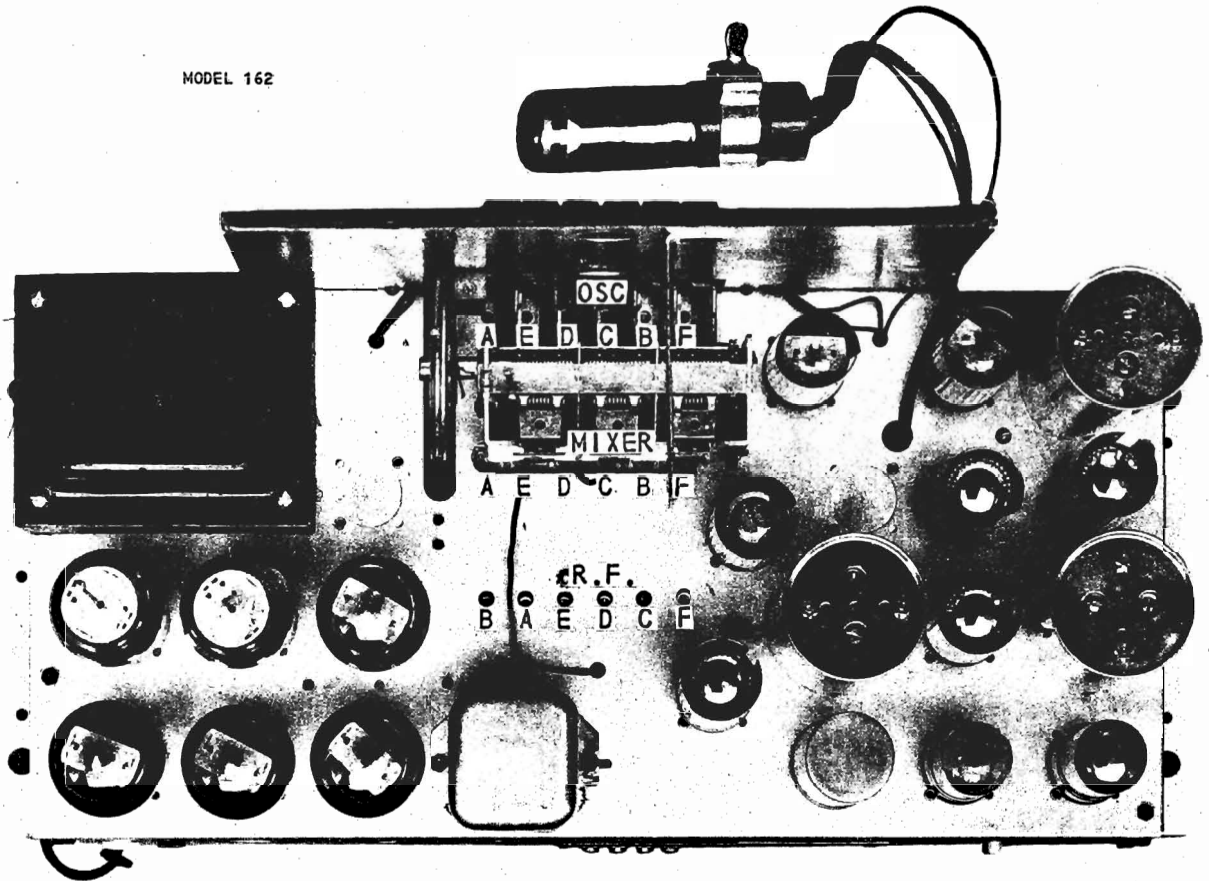
Primary voltage.....117 V. 50-60 cycle AC;
Power consumption.....165 watts;

Speaker: (12C131)
Field Coil.....250 ohms;
Transformer.....NONE
Speaker: (302)
Field Coil.....250 ohms;
Transformer.....5M ohms;
(for dual speakers)

Intermediate frequency.....455 KC;
Tuning frequency range:
540 - 1710 KC;
5.7 - 18.3 MC;

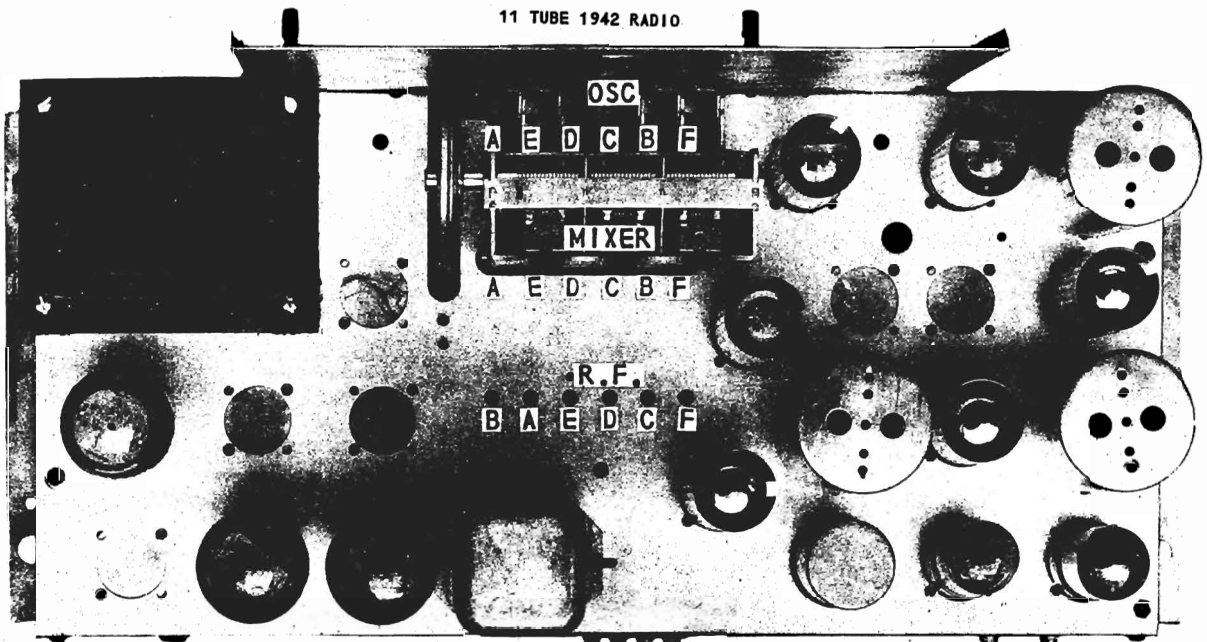
THE MAGNAVOX CO., INC. CHASSIS CR-176 and CR-177

MODEL 162



MODEL 112

11 TUBE 1942 RADIO

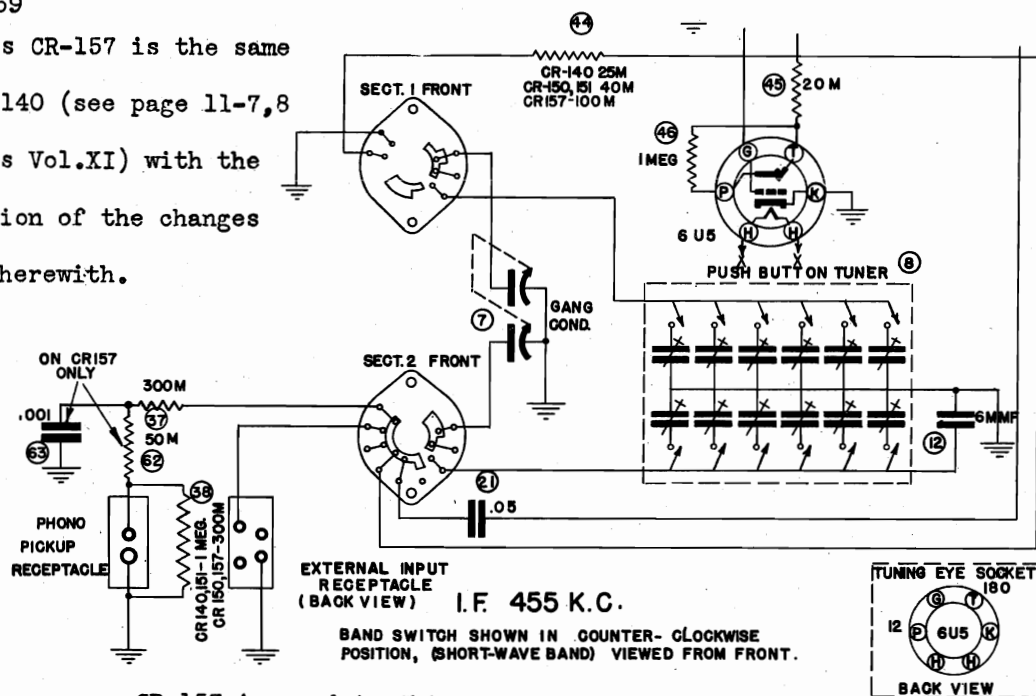


CHASSIS CR-157
CHASSIS CR-159

THE MAGNAVOX CO., INC.

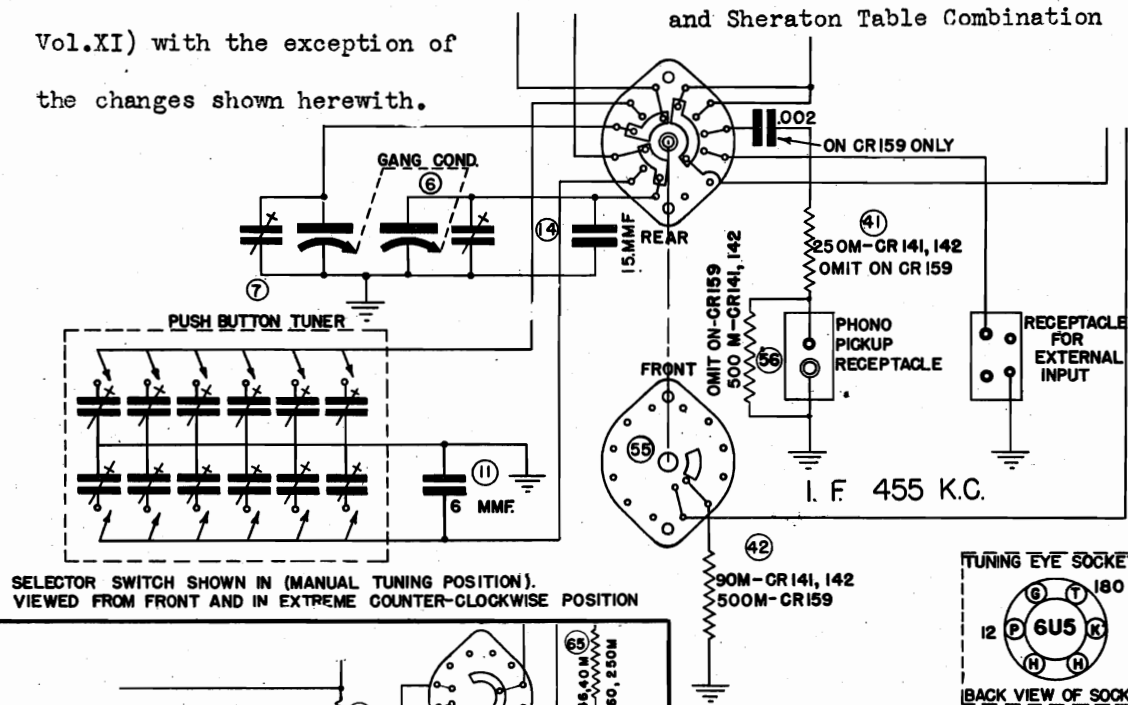
CHASSIS CR-160

Chassis CR-157 is the same as CR-140 (see page 11-7,8 Rider's Vol.XI) with the exception of the changes shown herewith.



Chassis CR-159 is the same as CR-141 (see page 11-13 Rider's Vol.XI) with the exception of the changes shown herewith.

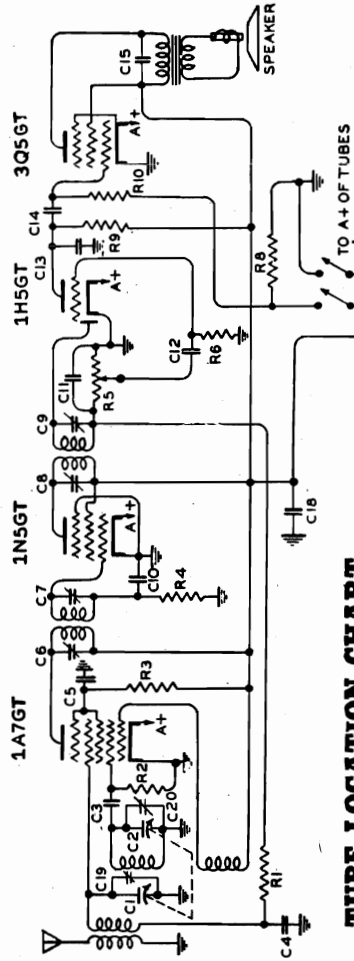
CR-159 is used in Concerto Combination and Sheraton Table Combination



MODELS T-081C, T-081D MAJESTIC RADIO & TELEV. CORP.

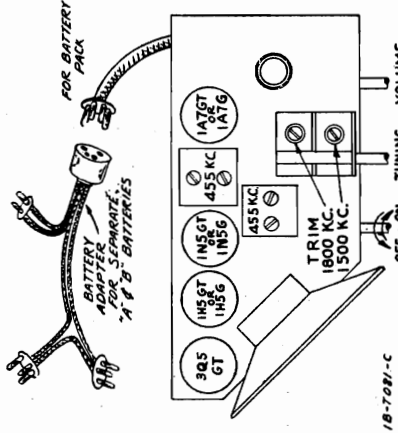
MODELS 5T10, 5T10W
MODELS T081A, T081B,
4B22, 410C, -D, -E

SCHEMATIC DIAGRAM



TUBE LOCATION CHART

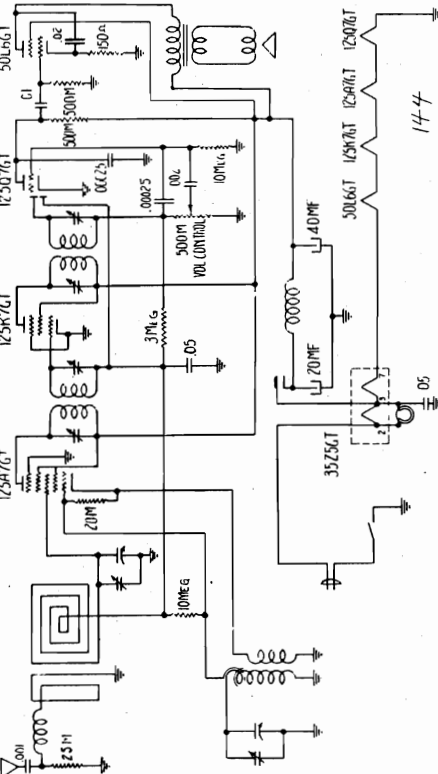
TUBE LAYOUT MODEL T-081-C-D



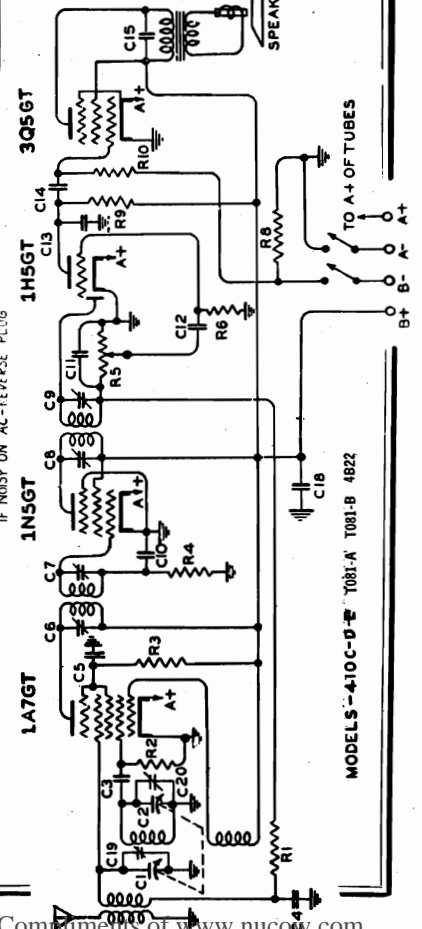
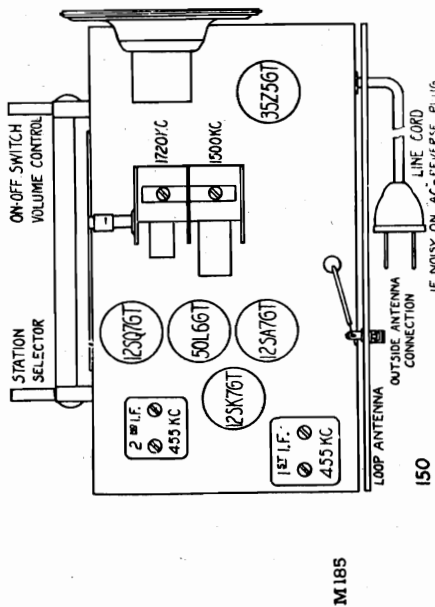
REPLACEMENT PARTS LIST

Schematic Location	Part No.	Description
R1, R4, R10	R-15500	2 Megohm 1/4 Watt Resistor 20%
R2	R-157	430 ohm 1/4 Watt Resistor 20%
R3	R-15523	200K ohm 1/4 Watt Resistor 20%
R4	R-15523	200K ohm 1/4 Watt Resistor 20%
R5	R-15523	200K ohm 1/4 Watt Resistor 20%
R6	R-15523	200K ohm 1/4 Watt Resistor 20%
R7	R-15523	200K ohm 1/4 Watt Resistor 20%
R8	R-15523	200K ohm 1/4 Watt Resistor 20%
R9	R-15523	200K ohm 1/4 Watt Resistor 20%
R10	R-15523	200K ohm 1/4 Watt Resistor 20%
R11	R-15523	200K ohm 1/4 Watt Resistor 20%
R12	R-15523	200K ohm 1/4 Watt Resistor 20%
R13	R-15523	200K ohm 1/4 Watt Resistor 20%
R14	R-15523	200K ohm 1/4 Watt Resistor 20%
R15	R-15523	200K ohm 1/4 Watt Resistor 20%
R16	R-15523	200K ohm 1/4 Watt Resistor 20%
R17	R-15523	200K ohm 1/4 Watt Resistor 20%
R18	R-15523	200K ohm 1/4 Watt Resistor 20%
R19	R-15523	200K ohm 1/4 Watt Resistor 20%
R20	R-15523	200K ohm 1/4 Watt Resistor 20%
R21	R-15523	200K ohm 1/4 Watt Resistor 20%
R22	R-15523	200K ohm 1/4 Watt Resistor 20%
R23	R-15523	200K ohm 1/4 Watt Resistor 20%
R24	R-15523	200K ohm 1/4 Watt Resistor 20%
R25	R-15523	200K ohm 1/4 Watt Resistor 20%
R26	R-15523	200K ohm 1/4 Watt Resistor 20%
R27	R-15523	200K ohm 1/4 Watt Resistor 20%
R28	R-15523	200K ohm 1/4 Watt Resistor 20%
R29	R-15523	200K ohm 1/4 Watt Resistor 20%
R30	R-15523	200K ohm 1/4 Watt Resistor 20%
R31	R-15523	200K ohm 1/4 Watt Resistor 20%
R32	R-15523	200K ohm 1/4 Watt Resistor 20%
R33	R-15523	200K ohm 1/4 Watt Resistor 20%
R34	R-15523	200K ohm 1/4 Watt Resistor 20%
R35	R-15523	200K ohm 1/4 Watt Resistor 20%
R36	R-15523	200K ohm 1/4 Watt Resistor 20%
R37	R-15523	200K ohm 1/4 Watt Resistor 20%
R38	R-15523	200K ohm 1/4 Watt Resistor 20%
R39	R-15523	200K ohm 1/4 Watt Resistor 20%
R40	R-15523	200K ohm 1/4 Watt Resistor 20%
R41	R-15523	200K ohm 1/4 Watt Resistor 20%
R42	R-15523	200K ohm 1/4 Watt Resistor 20%
R43	R-15523	200K ohm 1/4 Watt Resistor 20%
R44	R-15523	200K ohm 1/4 Watt Resistor 20%
R45	R-15523	200K ohm 1/4 Watt Resistor 20%
R46	R-15523	200K ohm 1/4 Watt Resistor 20%
R47	R-15523	200K ohm 1/4 Watt Resistor 20%
R48	R-15523	200K ohm 1/4 Watt Resistor 20%
R49	R-15523	200K ohm 1/4 Watt Resistor 20%
R50	R-15523	200K ohm 1/4 Watt Resistor 20%
R51	R-15523	200K ohm 1/4 Watt Resistor 20%
R52	R-15523	200K ohm 1/4 Watt Resistor 20%
R53	R-15523	200K ohm 1/4 Watt Resistor 20%
R54	R-15523	200K ohm 1/4 Watt Resistor 20%
R55	R-15523	200K ohm 1/4 Watt Resistor 20%
R56	R-15523	200K ohm 1/4 Watt Resistor 20%
R57	R-15523	200K ohm 1/4 Watt Resistor 20%
R58	R-15523	200K ohm 1/4 Watt Resistor 20%
R59	R-15523	200K ohm 1/4 Watt Resistor 20%
R60	R-15523	200K ohm 1/4 Watt Resistor 20%
R61	R-15523	200K ohm 1/4 Watt Resistor 20%
R62	R-15523	200K ohm 1/4 Watt Resistor 20%
R63	R-15523	200K ohm 1/4 Watt Resistor 20%
R64	R-15523	200K ohm 1/4 Watt Resistor 20%
R65	R-15523	200K ohm 1/4 Watt Resistor 20%
R66	R-15523	200K ohm 1/4 Watt Resistor 20%
R67	R-15523	200K ohm 1/4 Watt Resistor 20%
R68	R-15523	200K ohm 1/4 Watt Resistor 20%
R69	R-15523	200K ohm 1/4 Watt Resistor 20%
R70	R-15523	200K ohm 1/4 Watt Resistor 20%
R71	R-15523	200K ohm 1/4 Watt Resistor 20%
R72	R-15523	200K ohm 1/4 Watt Resistor 20%
R73	R-15523	200K ohm 1/4 Watt Resistor 20%
R74	R-15523	200K ohm 1/4 Watt Resistor 20%
R75	R-15523	200K ohm 1/4 Watt Resistor 20%
R76	R-15523	200K ohm 1/4 Watt Resistor 20%
R77	R-15523	200K ohm 1/4 Watt Resistor 20%
R78	R-15523	200K ohm 1/4 Watt Resistor 20%
R79	R-15523	200K ohm 1/4 Watt Resistor 20%
R80	R-15523	200K ohm 1/4 Watt Resistor 20%
R81	R-15523	200K ohm 1/4 Watt Resistor 20%
R82	R-15523	200K ohm 1/4 Watt Resistor 20%
R83	R-15523	200K ohm 1/4 Watt Resistor 20%
R84	R-15523	200K ohm 1/4 Watt Resistor 20%
R85	R-15523	200K ohm 1/4 Watt Resistor 20%
R86	R-15523	200K ohm 1/4 Watt Resistor 20%
R87	R-15523	200K ohm 1/4 Watt Resistor 20%
R88	R-15523	200K ohm 1/4 Watt Resistor 20%
R89	R-15523	200K ohm 1/4 Watt Resistor 20%
R90	R-15523	200K ohm 1/4 Watt Resistor 20%
R91	R-15523	200K ohm 1/4 Watt Resistor 20%
R92	R-15523	200K ohm 1/4 Watt Resistor 20%
R93	R-15523	200K ohm 1/4 Watt Resistor 20%
R94	R-15523	200K ohm 1/4 Watt Resistor 20%
R95	R-15523	200K ohm 1/4 Watt Resistor 20%
R96	R-15523	200K ohm 1/4 Watt Resistor 20%
R97	R-15523	200K ohm 1/4 Watt Resistor 20%
R98	R-15523	200K ohm 1/4 Watt Resistor 20%
R99	R-15523	200K ohm 1/4 Watt Resistor 20%
R100	R-15523	200K ohm 1/4 Watt Resistor 20%

SCHEMATIC DIAGRAM MODEL 5T10 & 5T10W



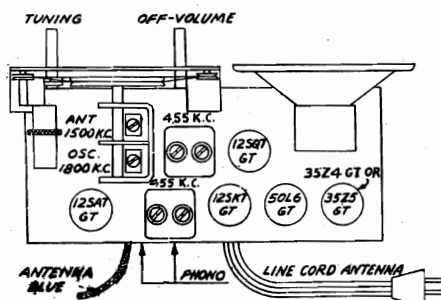
TUBE LAYOUT



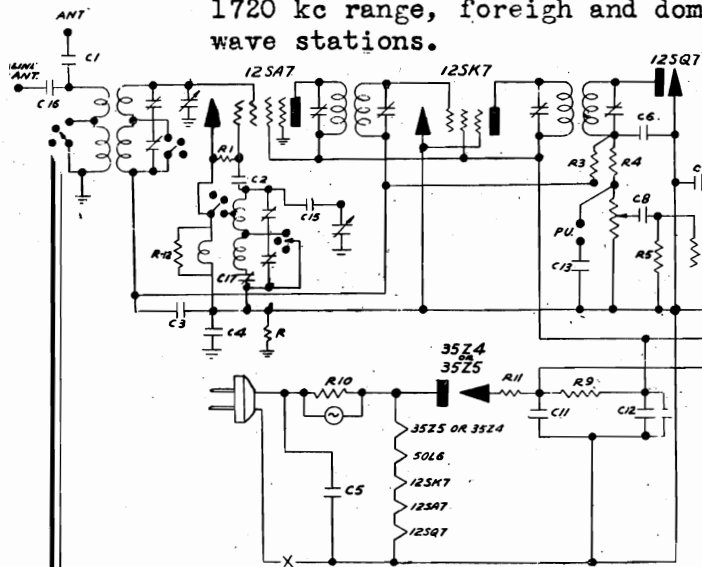
MODELS 410C-D-E T081-A 4B22

SCHEMATIC DIAGRAM MODEL T101L-A

Schematic Location	Part No.	Description
R1	R-15510	20K ohm 1/4 Watt Resistor 20%
R2,R5	R-63	10 Megohm 1/4 Watt Resistor 20%
R3	R-15500	2 Megohm 1/4 Watt Resistor 20%
R4	R-15504	150K ohm 1/4 Watt Resistor 20%
R6,R7	R-15520	500K ohm 1/4 Watt Resistor 20%
R8	R-59	110 ohm 1/2 Watt Resistor 10%
R9	R-138	1000 ohm 1 Watt Resistor 20%
R10	R-150	15 ohm 1 Watt Resistor 20%
R11	R-85	35 ohm 1 Watt Resistor 20%
R12	R-145	9K ohm 2 Watt Resistor 10%
R13	R-15512	250K ohm 1/4 Watt Resistor 20%
C1	C-18754	.01 mfd. 400 Volt Condenser
C2	CM-29	50 mmfd. Mica Condenser
C3	C-15752	.05 mfd. 200 Volt Condenser
C4	C-15770	.2 mfd. 200 Volt Condenser
C5	C-15756	.05 mfd. 400 Volt Condenser
C6	CM-30	250 mmfd. Mica Condenser
C7	CM-37	500 mmfd. Mica Condenser
C8	C-15774	.002 mfd. 400 Volt Condenser
C9	C-47	.004 mfd. 400 Volt Condenser
C10	C-25	.006 mfd. 400 Volt Condenser
C11,C12	Y-CE-66-1	40 mfd. & 75 mfd. Electr. Cond.



MODEL T102L-A, T102L-X: Tuning range from 540 to 1720 kc and 5,500 to 18,600 kc. This includes standard broadcast band, police calls 1600 to 1720 kc range, foreign and domestic short wave stations.



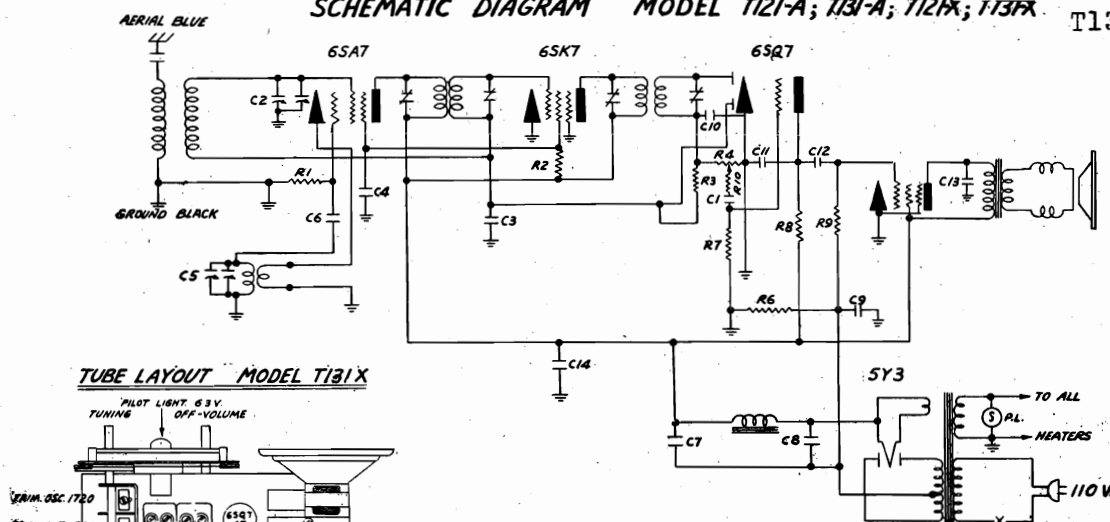
Schematic Location	Part No.	Description
C1,C16,C14	C-15754	.01 mfd. 400 Volt Condenser
C2	CM-31	100 mmfd. Mica Condenser
C3,C13	C-15752	.05 mfd. 200 Volt Condenser
C4	C-15770	.20 mfd. 200 Volt Condenser
C5	C-15756	.05 mfd. 400 Volt Condenser
C6,C7	CM-30	250 mmfd. Mica Condenser
C8	C-15774	.002 mfd. 400 Volt Condenser
C10	C-47	.004 mfd. 400 Volt Condenser
C9	C-25	.006 mfd. 400 Volt Condenser
C11	CE-66-1	75 mfd. Elec. Condenser
C12	CE-66-1	40 mfd. Elec. Condenser
C15	CM-2	4300 mmfd. Mica Condenser

Schematic Location	Part No.	Description
R1	R-15510	20K ohm 1/4 Watt Resistor 20%
R3	R-15500	2 Megohm 1/4 Watt Resistor 20%
R4	R-146	150K ohm 1/4 Watt Resistor 20%
R5	R-50	5 Megohm 1/4 Watt Resistor 20%
k6,R7	R-15520	250K ohm 1/4 Watt Resistor 20%
R8	R-59	110 ohm 1/4 Watt Resistor 20%
E9	R-138	1000 ohm 1/4 Watt Resistor 20%
R10	R-150	15 ohm 1/4 Watt Resistor 20%
R11	R-85	35 ohm 1/4 Watt Resistor 20%
R12	R-72	600 ohm 1/4 Watt Resistor 20%
R13	R-15512	250K ohm 1/4 Watt Resistor 20%

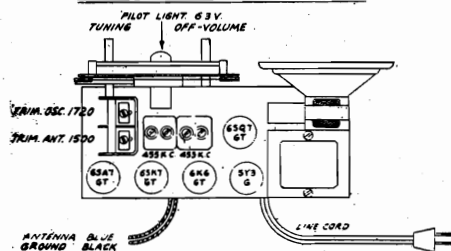
MAJESTIC RADIO & TELEV. CORP.

MODELS T121-A, T121-X,
T131-A, T131-X
MODELS T122-A, T122-X,
T132-A, T132-X

SCHEMATIC DIAGRAM MODEL T121-A; T131-A; T121-X; T131-X



TUBE LAYOUT MODEL T131X



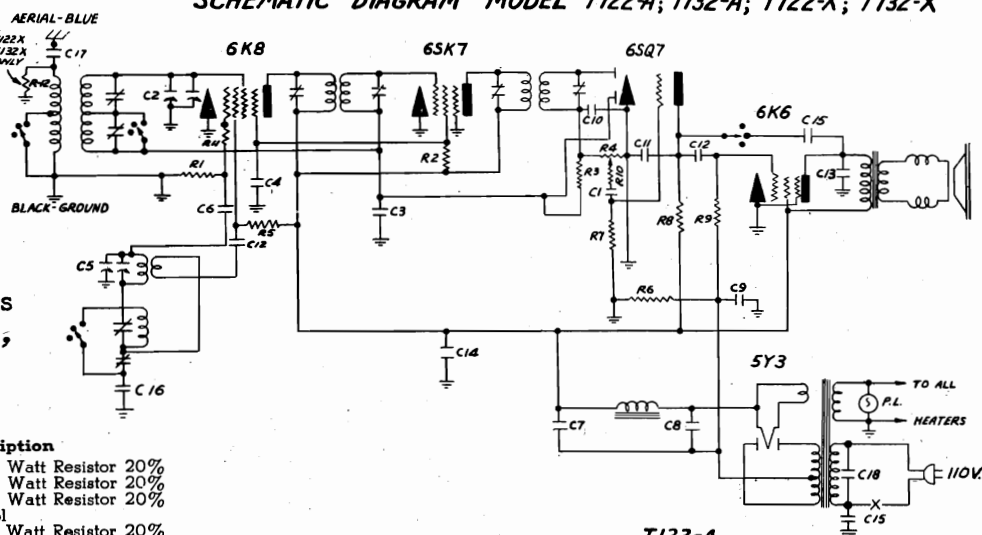
Schematic Location	Part No.	Description
R1	R-15510	20K ohm 1/4 Watt Resistor
R2	R-15526	10K ohm 1/4 Watt Resistor
R3	R-15500	2 Megohm 1/4 Watt Resistor
R4	Y-VC-21	Volume Control
R6	R-117	275 ohm 1/2 Watt Resistor
R7	R-63	10 Megohm 1/4 Watt Resistor
R8, R9	R-15520	500K ohm 1/4 Watt Resistor
R10	R-15515	100K ohm 1/4 Watt Resistor
R11	R-15559	3 Megohm 1/4 Watt Resistor

Schematic Location	Part No.	Description
C1	C-15774	.002 mfd. 400 Volt Condenser
C3	C-15752	.05 mfd. 200 Volt Condenser
C4	C-15754	.05 mfd. 400 Volt Condenser
C6	CM-29	50 mmfd. Mica Condenser
C7, C8, C9	Y-CE-43	Electrolytic
C10, C11	GM-30	250 mmfd. Mica Condenser
C12	C-15754	.01 mfd. 400 Volt Condenser
C13	C-25	.006 mfd. 400 Volt Condenser
C14	C-15757	.1 mfd. 400 Volt Condenser
C15	C-19	.05 mfd. Molded
C16	CM-15912	1000 mmfd. Mica Condenser

MODELS T121-A, T131-A, T121-X, T131-X: Tuning range from 540-1720 kc. Includes standard b.c. band and police calls in the 1600-1720 kc range.

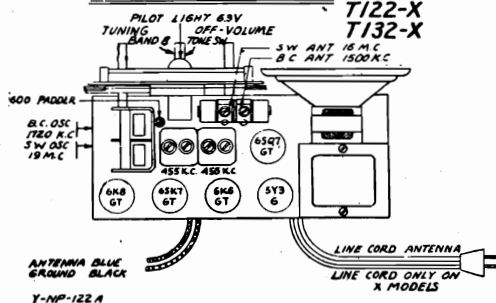
SCHEMATIC DIAGRAM MODEL T122-A; T132-A; T122-X; T132-X

MODELS T122-A, T122-X, T132-A, T132-X: Tuning range 540-1720 kc, & 5,500-18,600 kc; includes stand. b.c. bands and police calls in 1600-1720 kc range, foreign and domestic short wave stations.

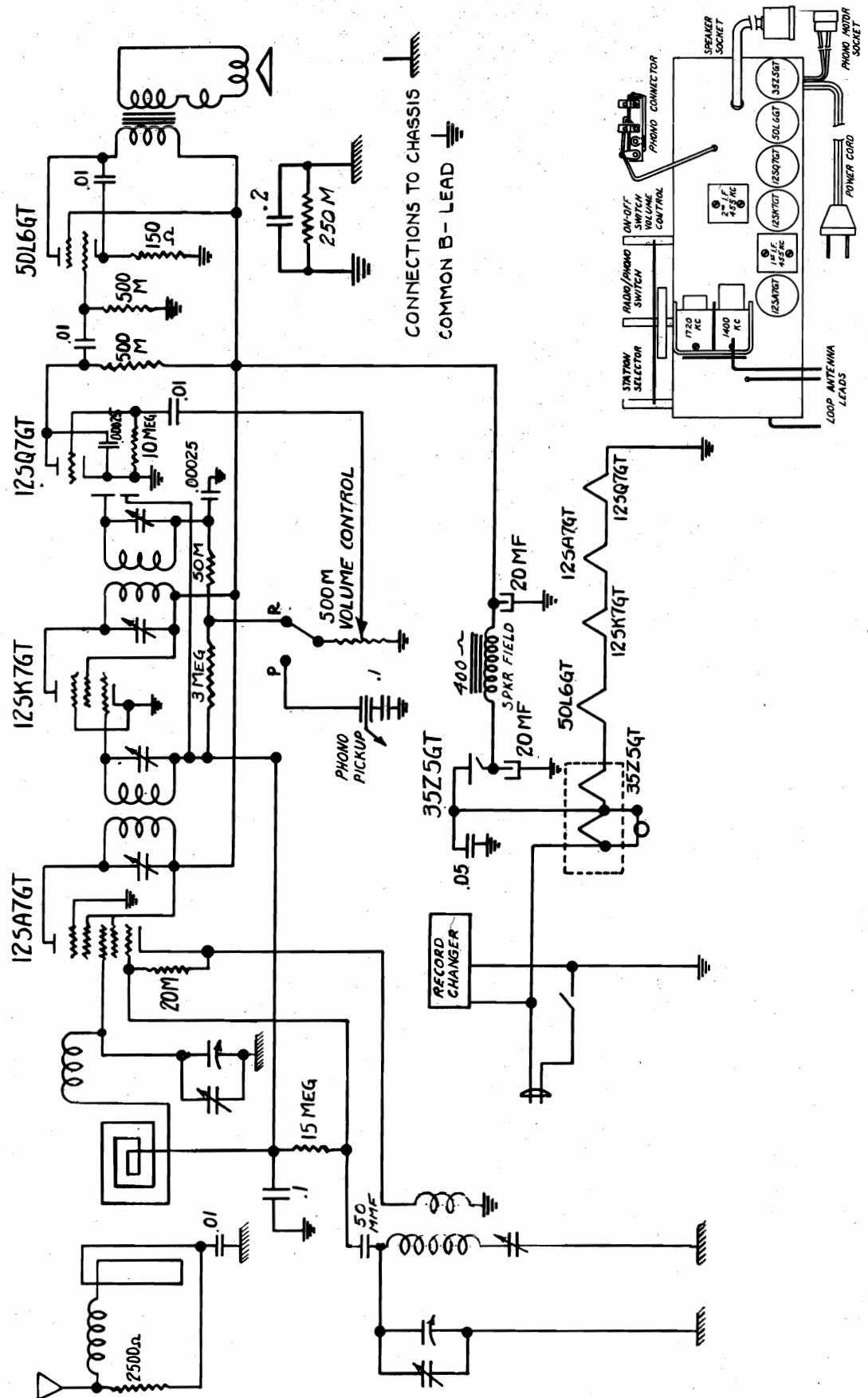


Schematic Location	Part No.	Description
R1	R-15511	50K ohm 1/4 Watt Resistor 20%
R2	R-15525	35K ohm 1/4 Watt Resistor 20%
R3	R-15500	2 Megohm 1/4 Watt Resistor 20%
R4	Y-VC-21	Volume Control
R5	R-15541	5K ohm 1/2 Watt Resistor 20%
R6	R-117	275 ohm 1/2 Watt Resistor 20%
R7	R-109	5 Megohm 1/4 Watt Resistor 20%
R8, R9	R-15520	500K ohm 1/4 Watt Resistor 20%
R10	R-15515	2 Megohm 1/4 Watt Resistor 20%
R11	R-15601	100 ohm 1/4 Watt Resistor 20%
R12	R-60	25K ohm 1/4 Watt Resistor 20%
C1	C-15774	.002 mfd. 400 Volt Condenser
C3	C-15752	.05 mfd. 200 Volt Condenser
C4	C-15756	.05 mfd. 400 Volt Condenser
C6	CM-29	50 mmfd. Mica Condenser
C7, C8, C9	CE-43-A	Electrolytic Condenser
C18	C-19	.05 mfd. 400 Volt mold. cond.
C10, C11	GM-30	250 mmfd. Mica Condenser
C12	C-15754	.01 mfd. 400 Volt Condenser
C13, C15	C-25	.006 mfd. 400 Volt Condenser
C14	C-15757	.1 mfd. 400 Volt Condenser
C16	CM-2	4330 mmfd. Mica Condenser
C17	C-18	.01 mfd. 400 Volt mold. cond.

TUBE LAYOUT MODEL T122-A T132-A T122-X T132-X

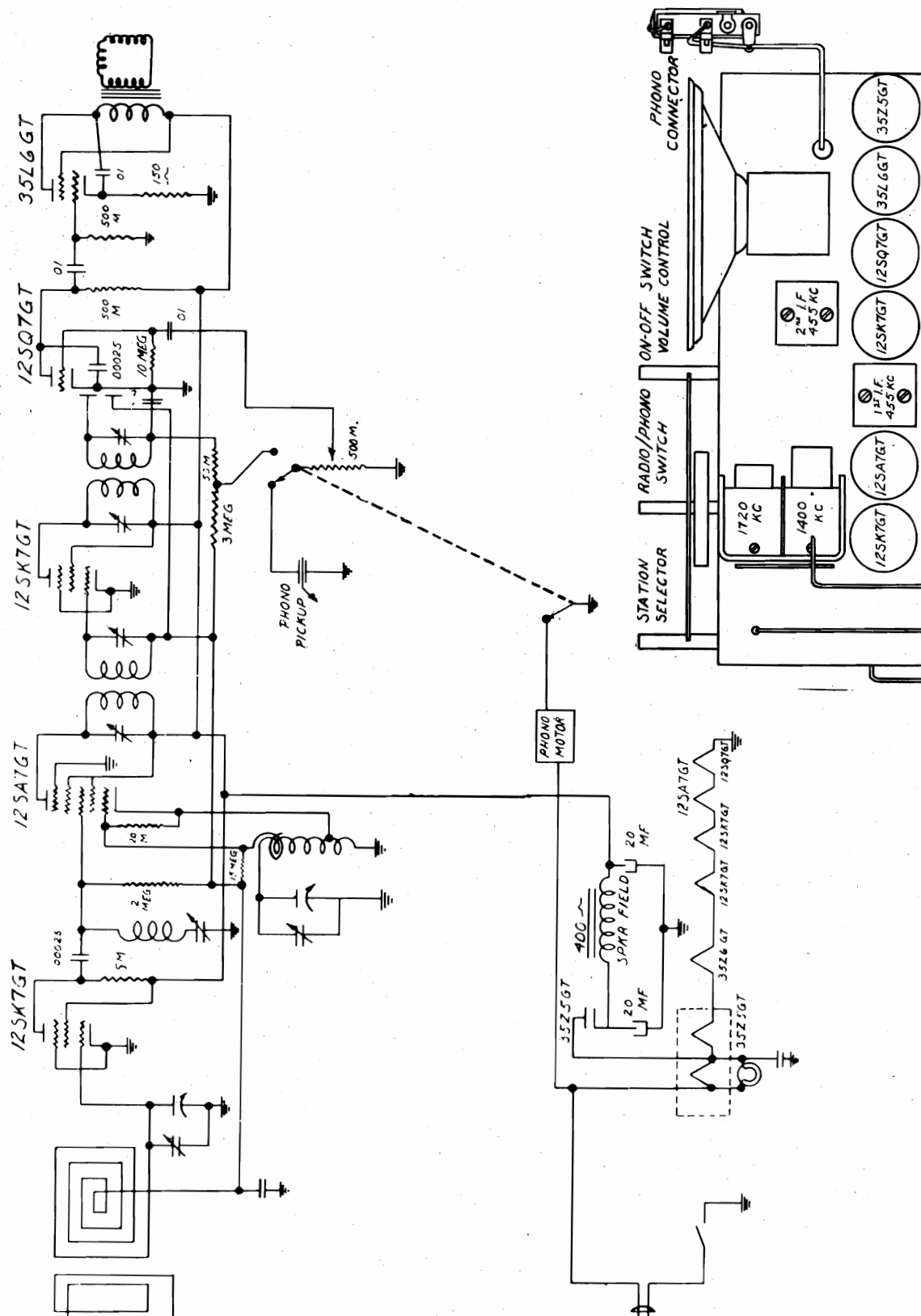


MAJESTIC RADIO & TELEV. CORP.

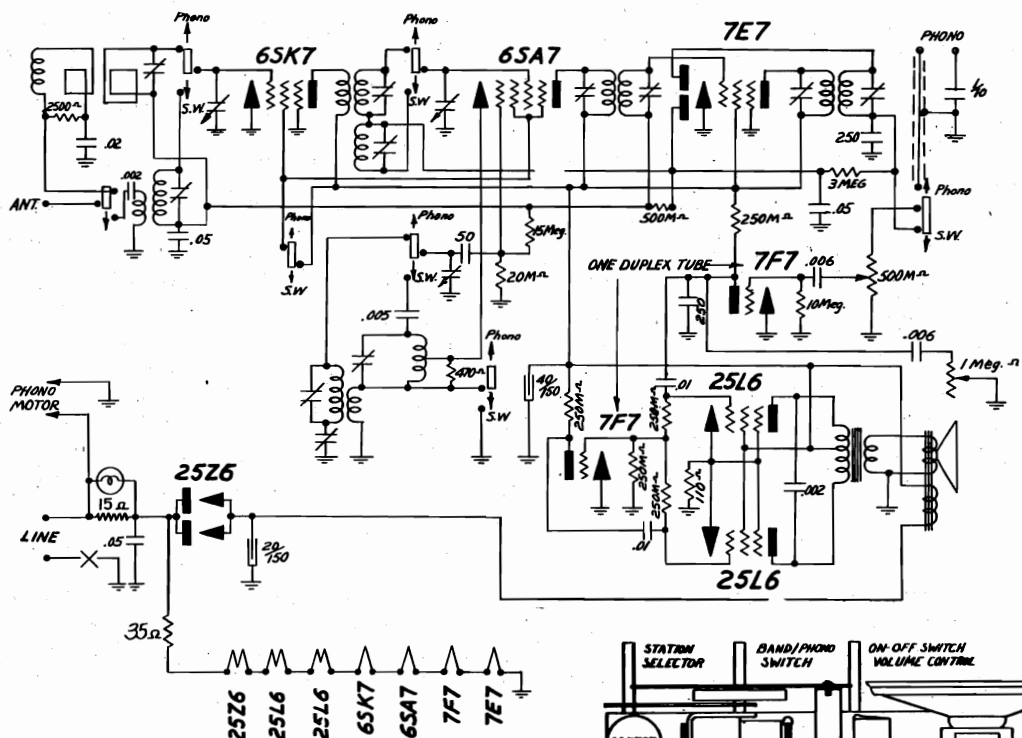
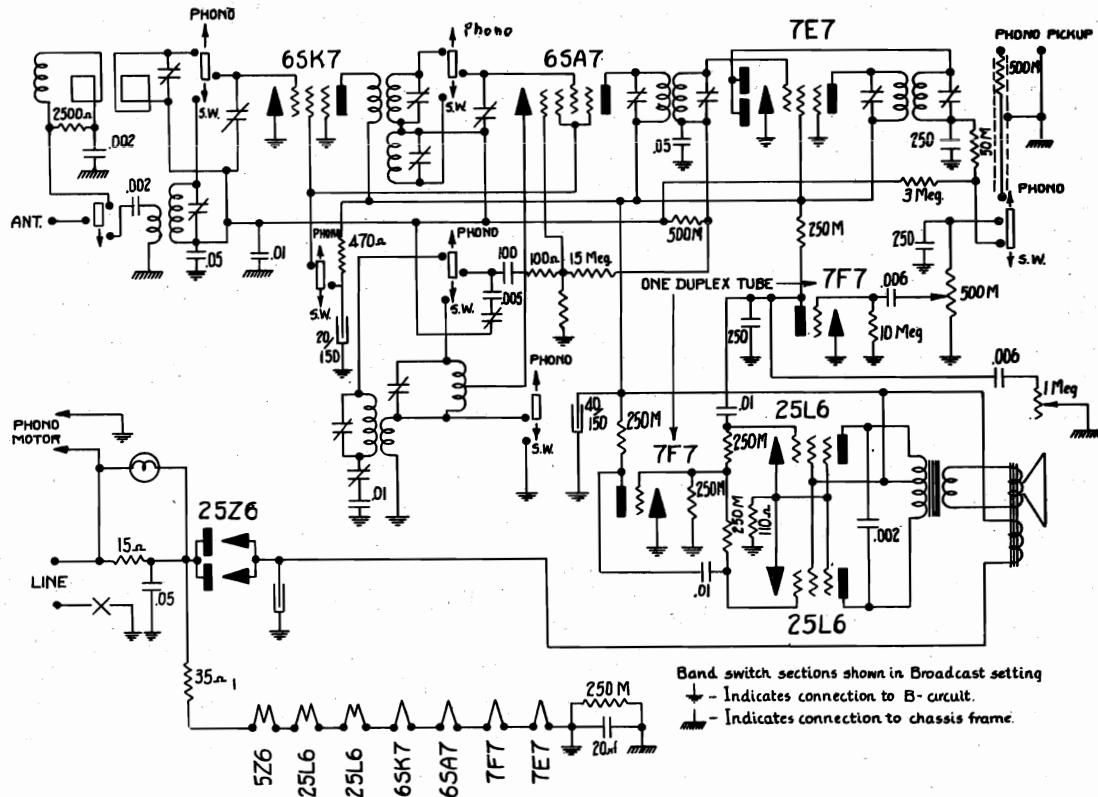


MODEL 5CU36

MAJESTIC RADIO & TELEV. CORP.

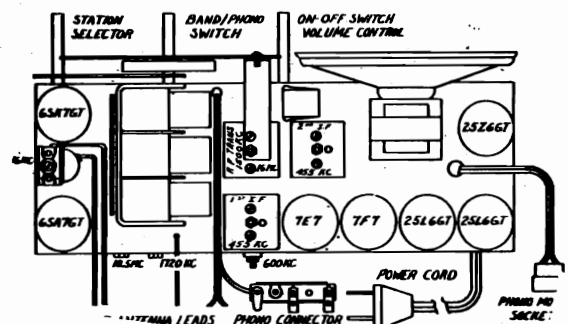


MAJESTIC RADIO & TELEV. CORP.

MODEL 7C40
MODEL 7CU40

Band switch sections shown in Broadcast setting.

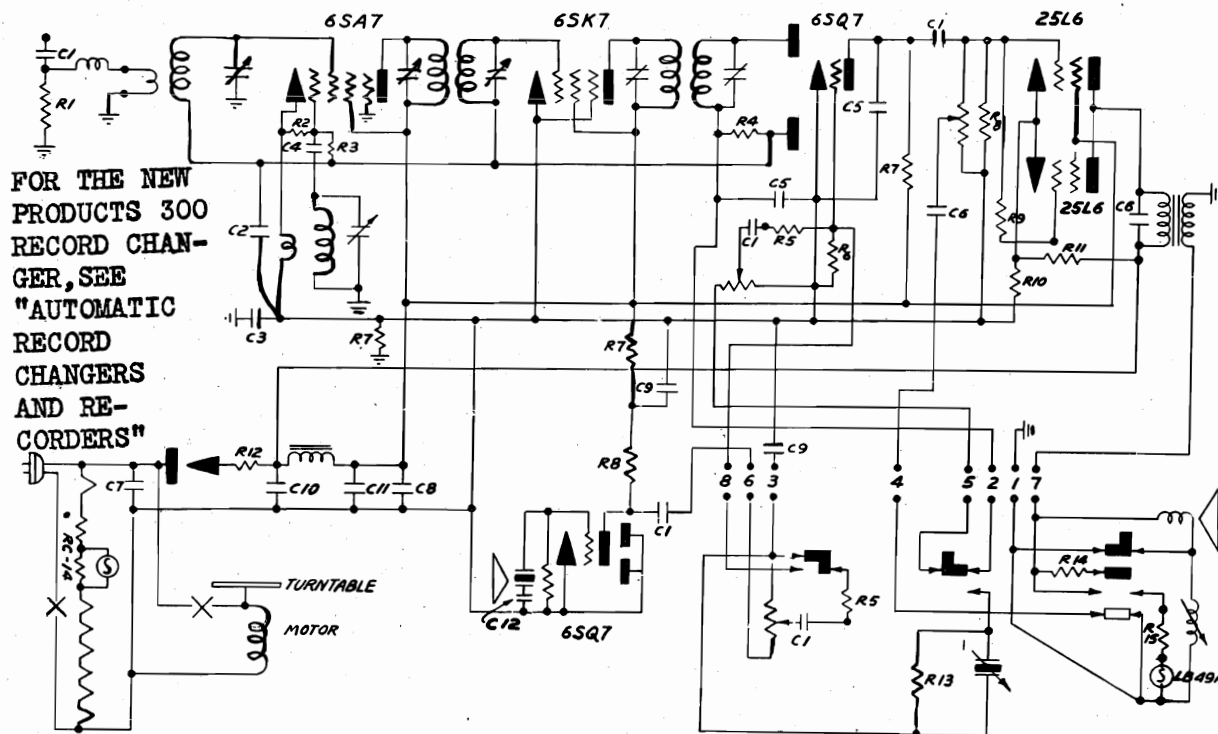
FOR NEW PRODUCTS 300 RECORD
CHANGER, SEE RIDER'S "AUTO-
MATIC RECORD CHANGERS AND
RECORDERS".



MODELS TR321A,
TR331A

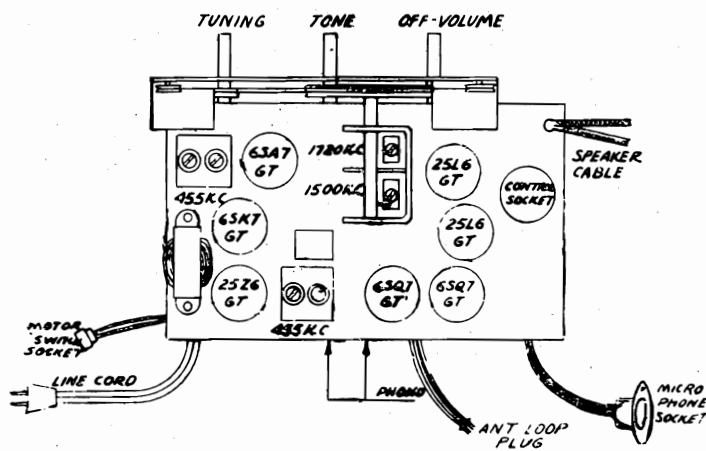
MAJESTIC RADIO & TELEV. CORP.

SCHEMATIC DIAGRAM MODEL TR321-A TR331-A



REPLACEMENT PARTS LIST

Schematic Location	Part No.	Description	
R1	R-15570	2K ohm	1/4 Watt Resistor 20%
R2	R-15510	20K ohm	1/4 Watt Resistor 20%
R3	R-79	15 Megohm	1/4 Watt Resistor 20%
R4	R-15500	2 Megohm	1/4 Watt Resistor 20%
R5	R-15504	150K ohm	1/4 Watt Resistor 20%
R6	R-149	4.7 Megohm	1/4 Watt Resistor 20%
R7	R-153	270K ohm	1/4 Watt Resistor 20%
R8	R-154	470K ohm	1/4 Watt Resistor 20%
R9	R-15601	100 ohm	1/4 Watt Resistor 20%
R10	R-155	68 ohm	1 Watt Resistor 20%
R11	R-147	4K ohm	3 Watt Resistor 20%
R12	R-85	35 ohm	1 Watt Resistor 20%
R13	R-100	300K ohm	1/4 Watt Resistor 20%
R14	R-152	4 ohm	1 Watt Resistor 20%
R15	R-151	7.5 ohm	1 Watt Resistor 20%
RC-14	RC-14	Condohm	
C1	C-15754	.01 mfd. 400 Volt	Condenser
C2	C-15752	.05 mfd. 200 Volt	Condenser
C3	C-15770	.2 mfd. 200 Volt	Condenser
C4	CM-29	50 mmfd. Mica	Condenser
C5	CM-30	250 mmfd. Mica	Condenser
C6	C-25	.006 mfd. 400 Volt	Condenser
C7	C-15756	.05 mfd. 400 Volt	Condenser
C8	C-15751	.25 mfd. 200 Volt	Condenser
C9, C12	C-15761	.10 mfd. 200 Volt	Condenser
C10	CE-66-2	100 mfd. Electrolytic	
C11	CE-66-2	40 mfd. Electrolytic	

TUBE LAYOUT MODEL TR 321-A
TR 331-A

This receiver is equipped with a built-in loop antenna and, under normal conditions, should not require an external antenna. Since reception of loops is directional, reception can be improved by orienting the set for best reception of preferred stations. In very difficult locations, an external antenna should be used. This should be connected to the clip on the back of the receiver. No ground should be used on this set.

Model TR321-A operates on 105-125 volts 60 cycles AC only.

Model TR331-A operates on 105-125 volts 50 cycles AC only.

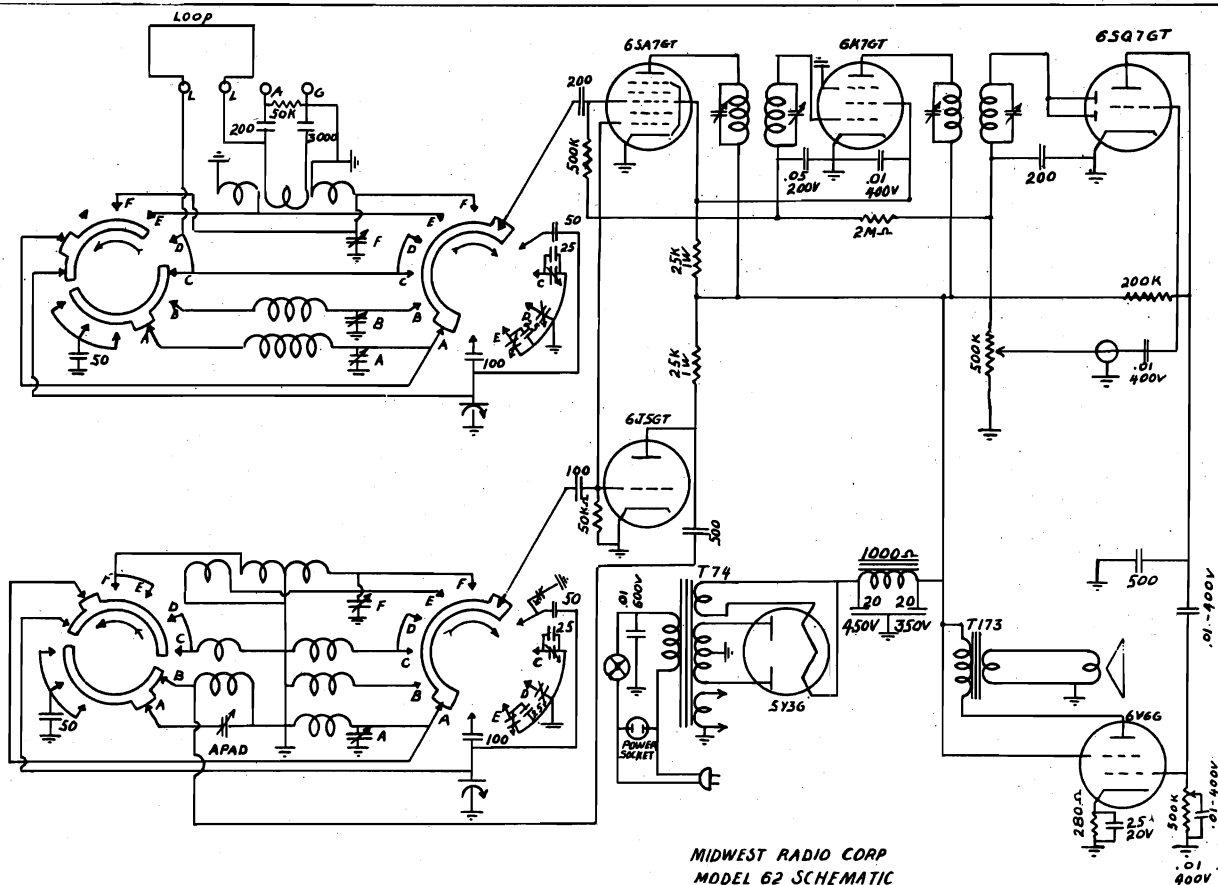
This is a seven tube combination superheterodyne radio receiver, home recorder, phonograph, and public address amplifier.

The tuning range is from 540 to 1720 kilocycles. This includes the standard broadcast band and police calls in 1600 to 1720 kilocycles range.

SETTING PUSH BUTTONS

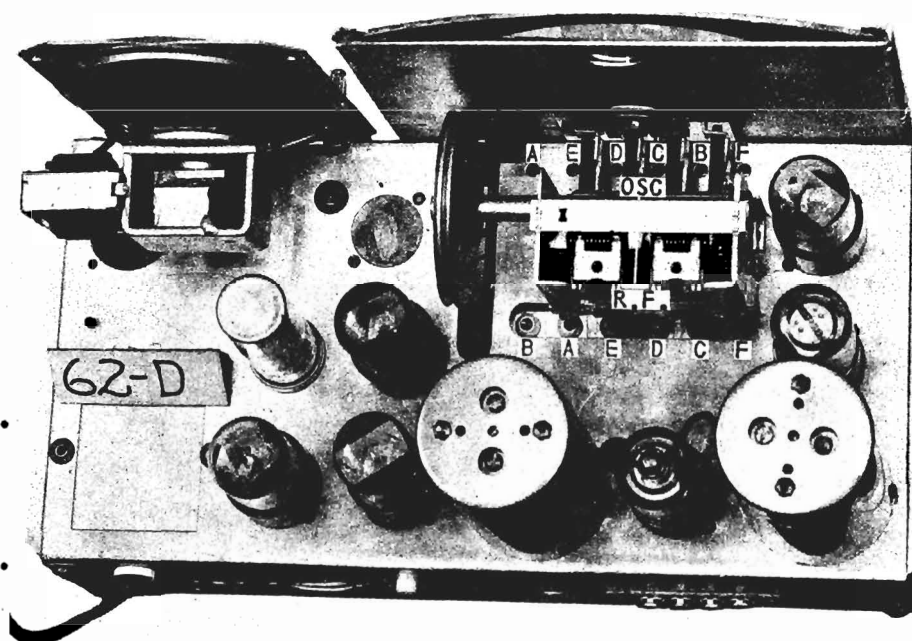
-

I.F. 456 KC. A_ 1400 KC. C_ 9.8 MC. E_ 15.7 MC.
B_ 6.6 MC. D_ 11.7 MC. F_ 24 MC.



SETTING PUSH BUTTONS

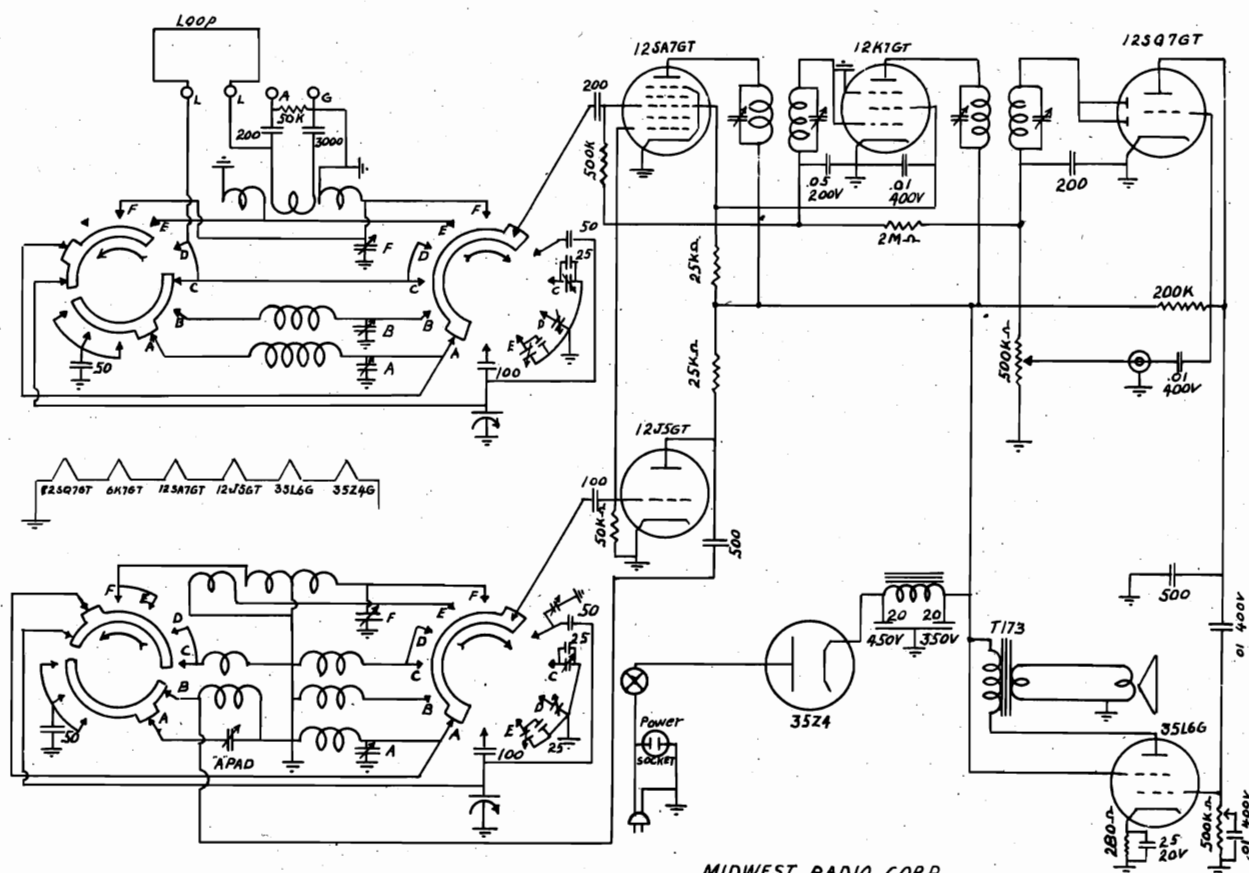
- DO NOT LOOSEN screw
more than 4 turns.
Screw may come out and
may be hard to replace.



IF - 456 KC

A - 1400 KC
B - 6.6 MC

C - 9.8 MC E - 15.7 MC
D - 11.7 MC F - 24 MC



MIDWEST RADIO CORP
MODEL 62D SCHEMATIC

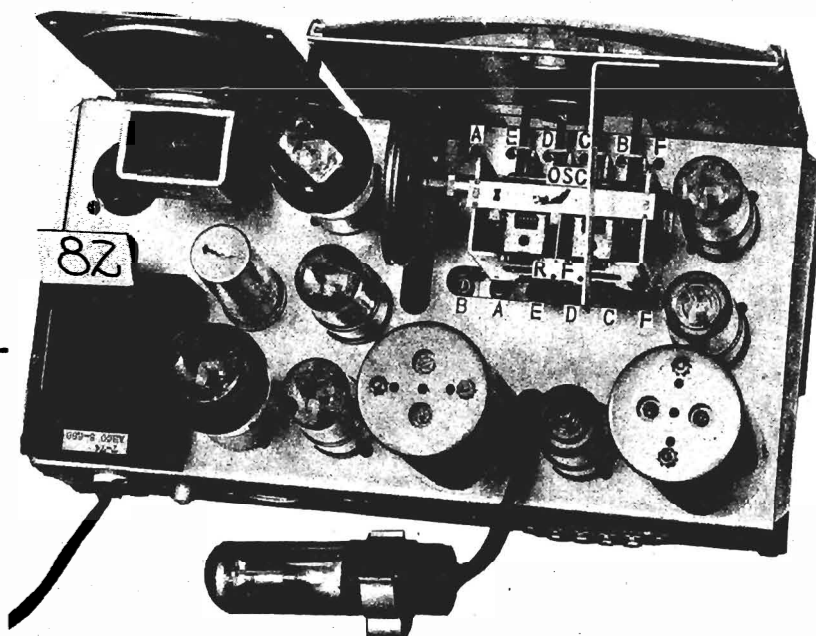
MODEL 82

MIDWEST RADIO CORP.

SETTING PUSH BUTTONS

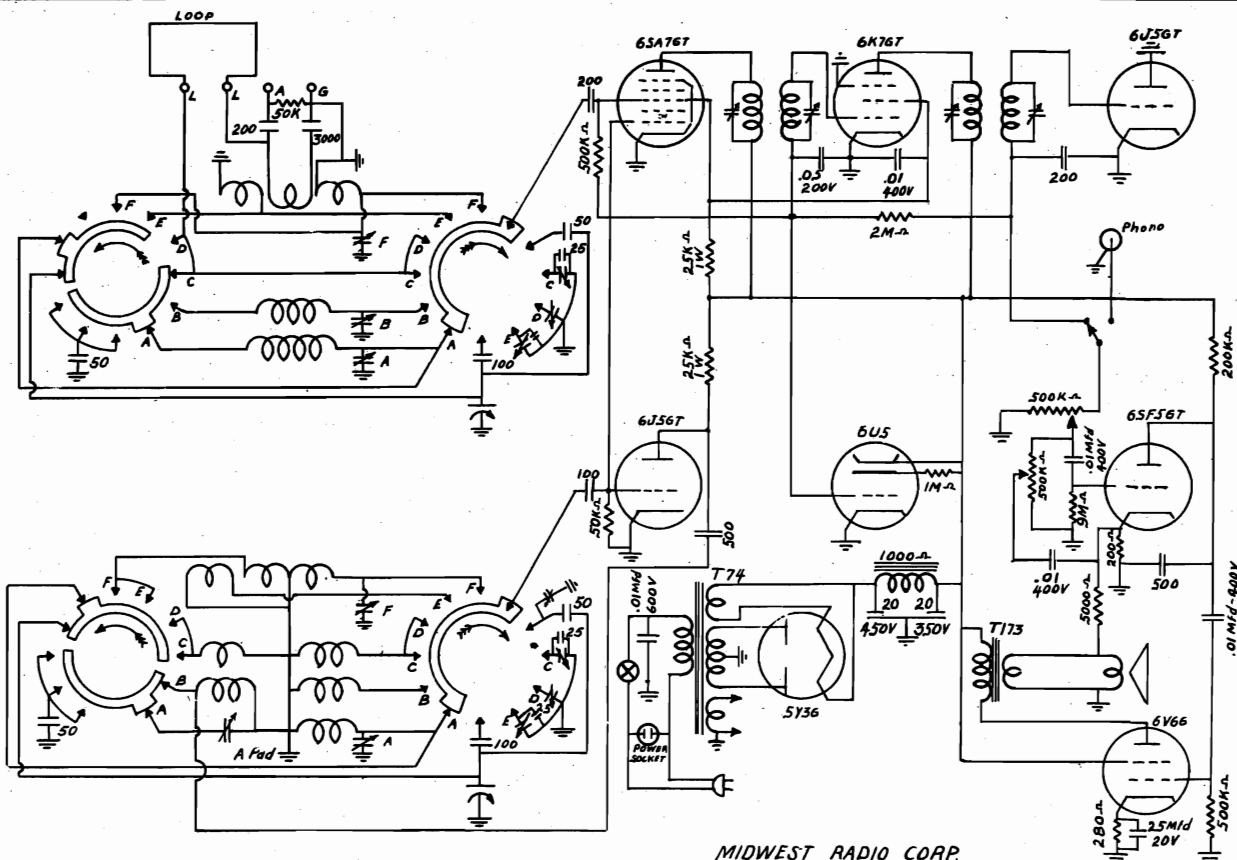
1. Expose locking screw by removing push button.
2. Loosen locking screw about one full turn.
3. With locking screw loose, and button depressed, tune in desired station accurately.
4. Tighten screw and replace moulded cap.

DO NOT LOOSEN screw more than 4 turns. Screw may come out and may be hard to replace.



ALIGNMENT FREQUENCIES

IF - 456 KC

A - 1400 KC
B - 6.6 MCC - 9.8 MC
D - 11.7 MCE - 15.7 MC
F - 24 MC

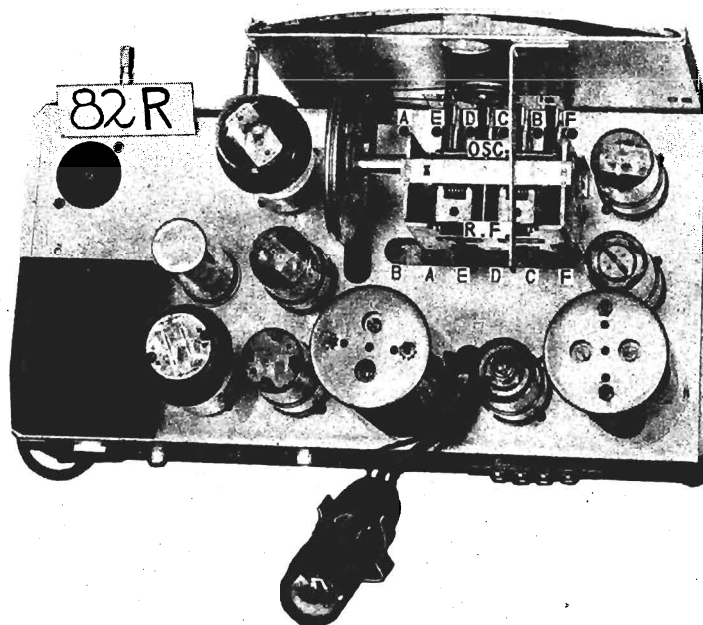
MIDWEST RADIO CORP.
MODEL 82 SCHEMATIC

MIDWEST RADIO CORP.

SETTING PUSH BUTTONS

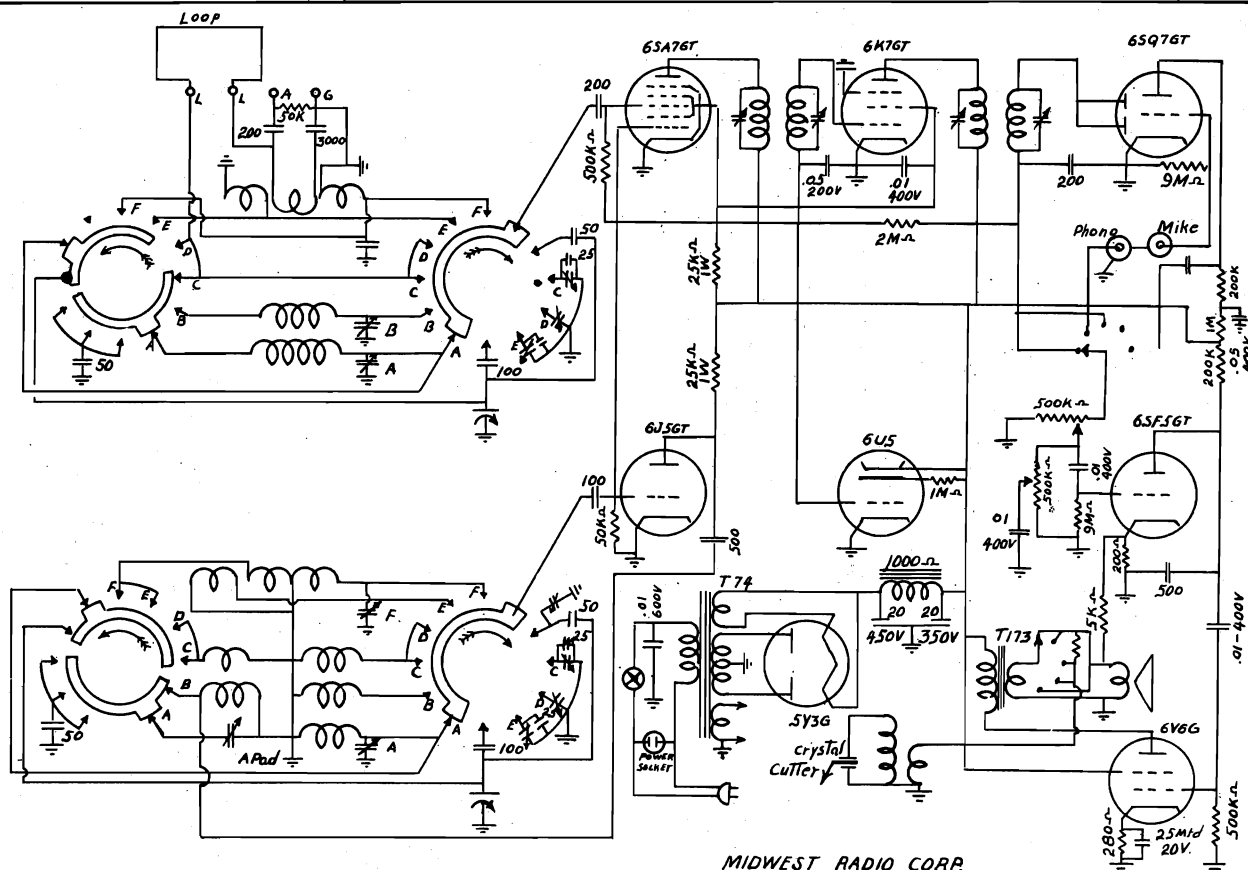
1. Expose locking screw by removing push button.
2. Loosen locking screw about one full turn.
3. With locking screw loose, and button depressed, tune in desired station accurately.
4. Tighten screw and replace moulded cap.

DO NOT LOOSEN screw more than 4 turns. Screw may come out and may be hard to replace.



ALIGNMENT FREQUENCIES

IF - 456 KC

A - 1400 KC
B - 6.6 MCC - 9.8 MC
D - 11.7 MCE - 15.7 MC
F - 24 MC

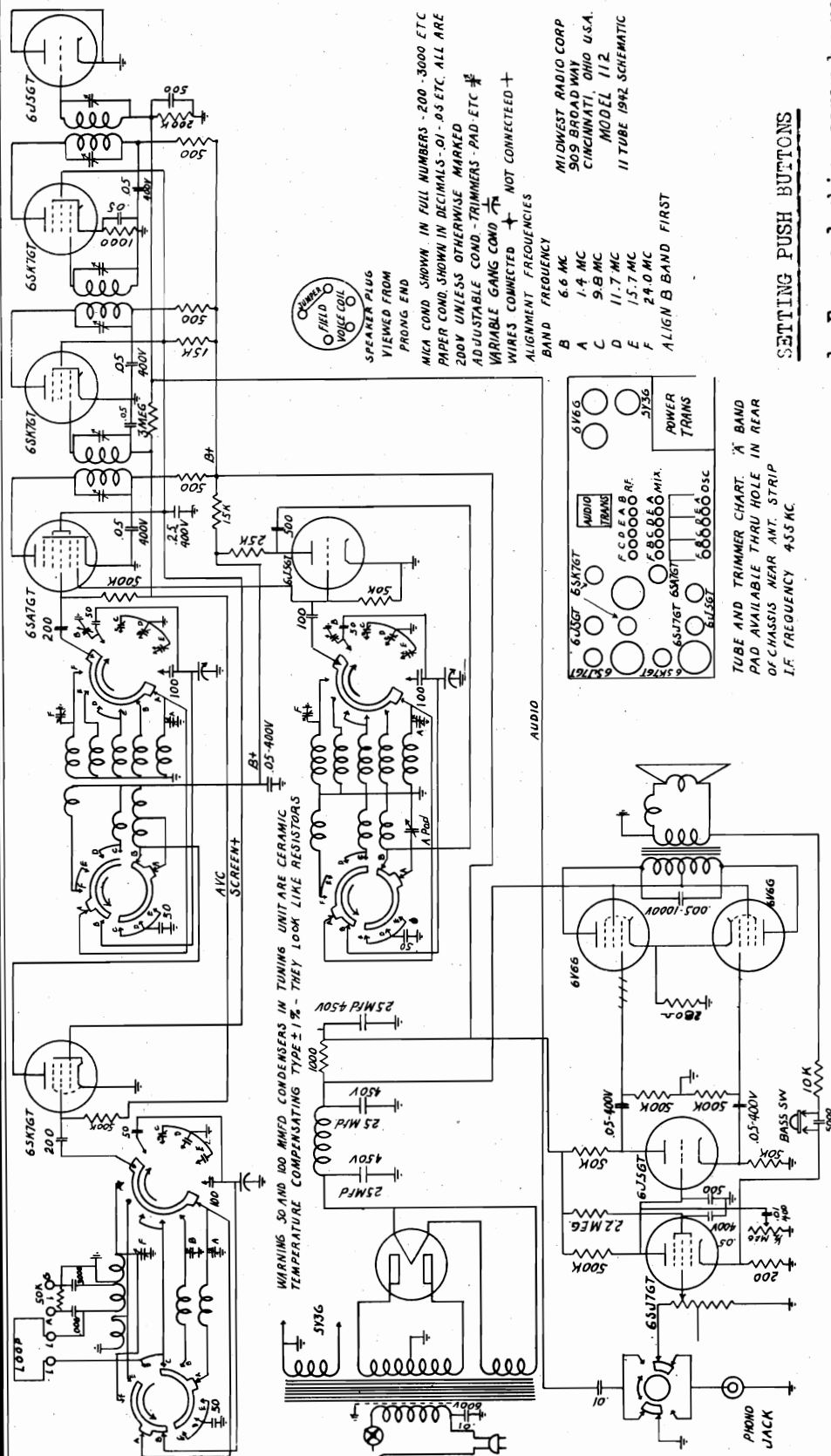
MIDWEST RADIO CORP.
MODEL 82R SCHEMATIC

BANDS

This receiver has six separate and distinct wave bands. It is designed so that you may easily receive all of the foreign and domestic stations now operating in the radio spectrum. Bands are lettered "A B C D E and F." The "A" band is the usual broadcast band and on it you will receive your favorite U.S. broadcast stations. The tuning range of the other five bands is so designed that you may tune in your favorite short wave stations during the day or night time. For example: In the early morning hours you will find most of the short wave stations on the "E" or "F" bands. As daylight increases you will find that these stations will disappear and reappear again on the "C" and "D" bands. At night you will find that these stations have again changed and will appear on the "B" and "C" bands.

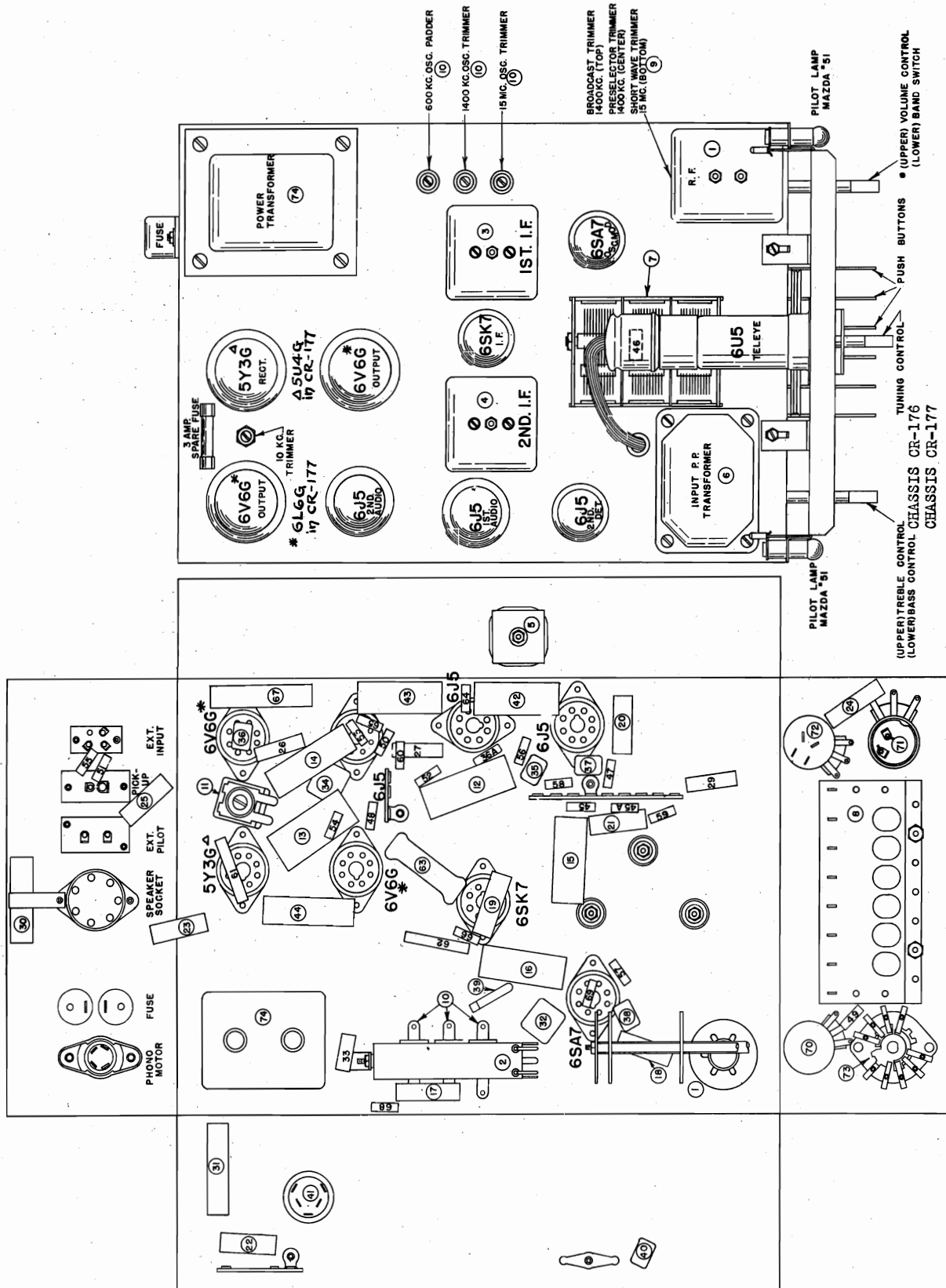
SETTING PUSH BUTTONS

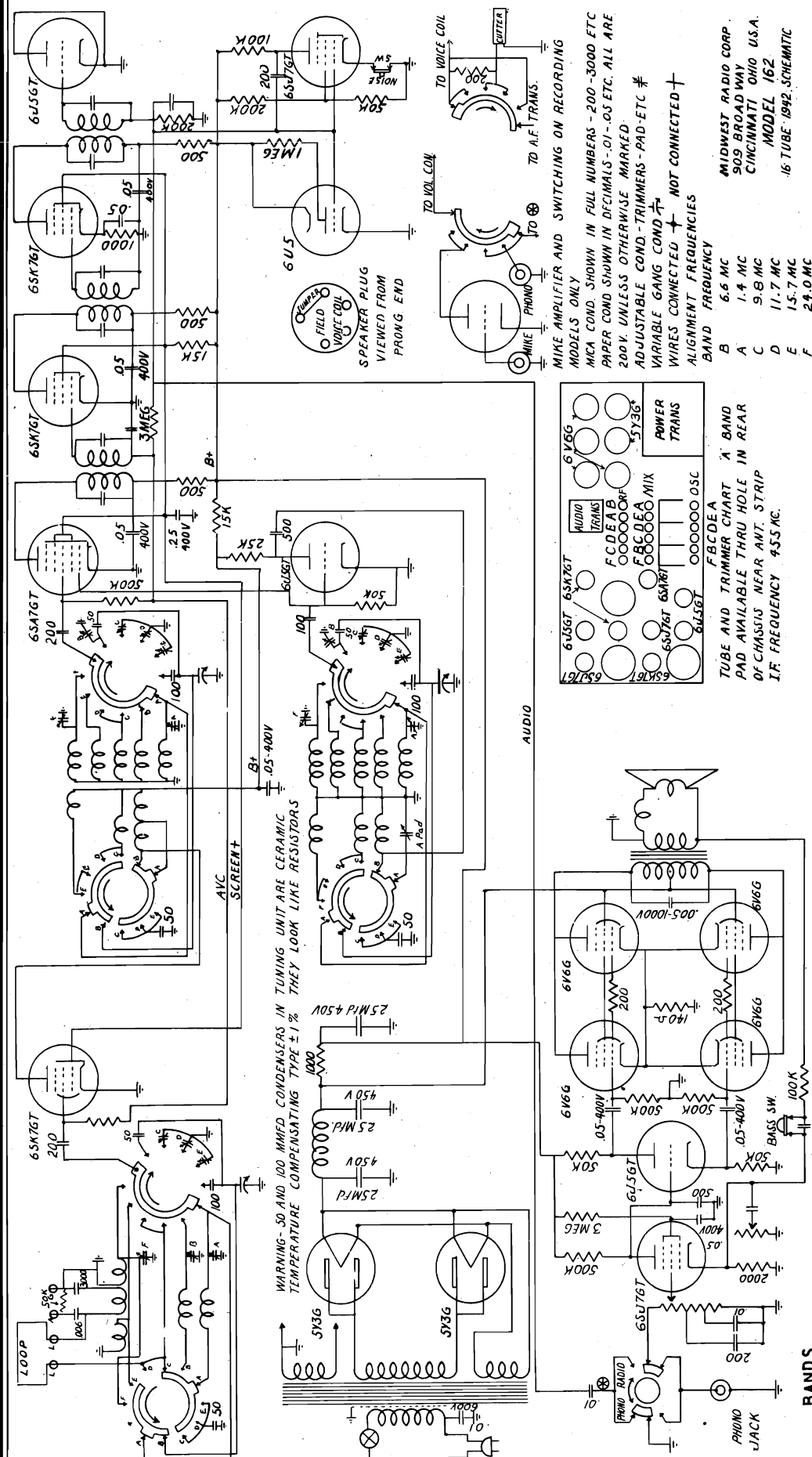
1. **Expose** locking screw by removing push button.
 2. Loosen locking screw about one full turn.
 3. With locking screw loose, and button depressed, tune in desired station accurately.
 4. Tighten screw and replace moulded cap.
- DO NOT LOOSEN screw more than 4 turns. Screw may come out and may be hard to replace.



MIDWEST RADIO CORP.

MODEL 112
MODEL 162





ALIGN B B

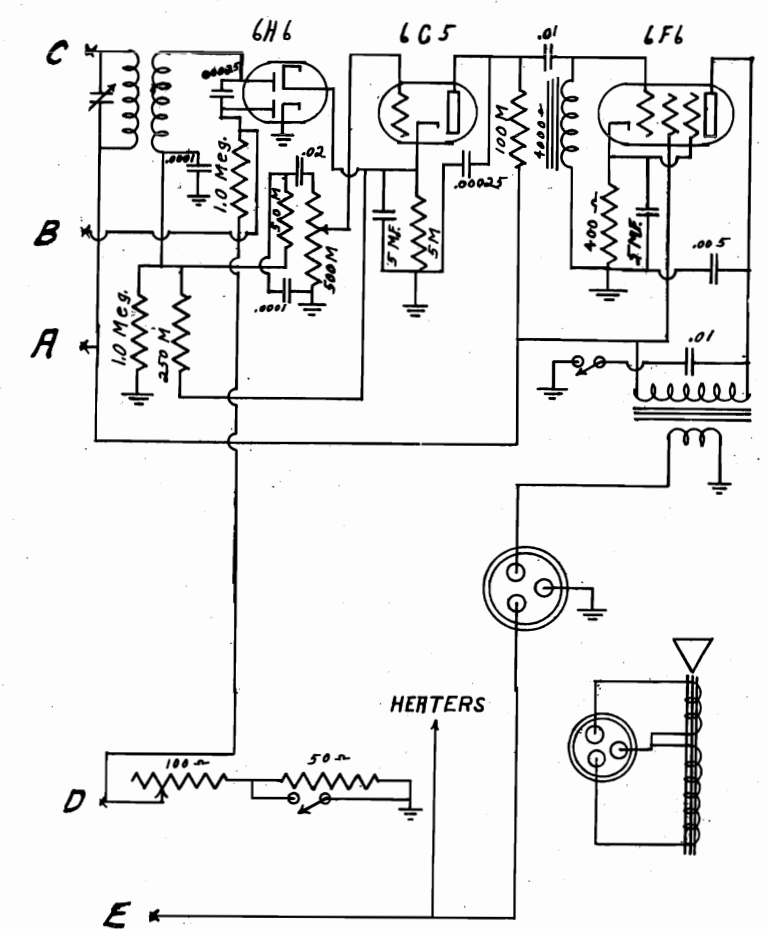
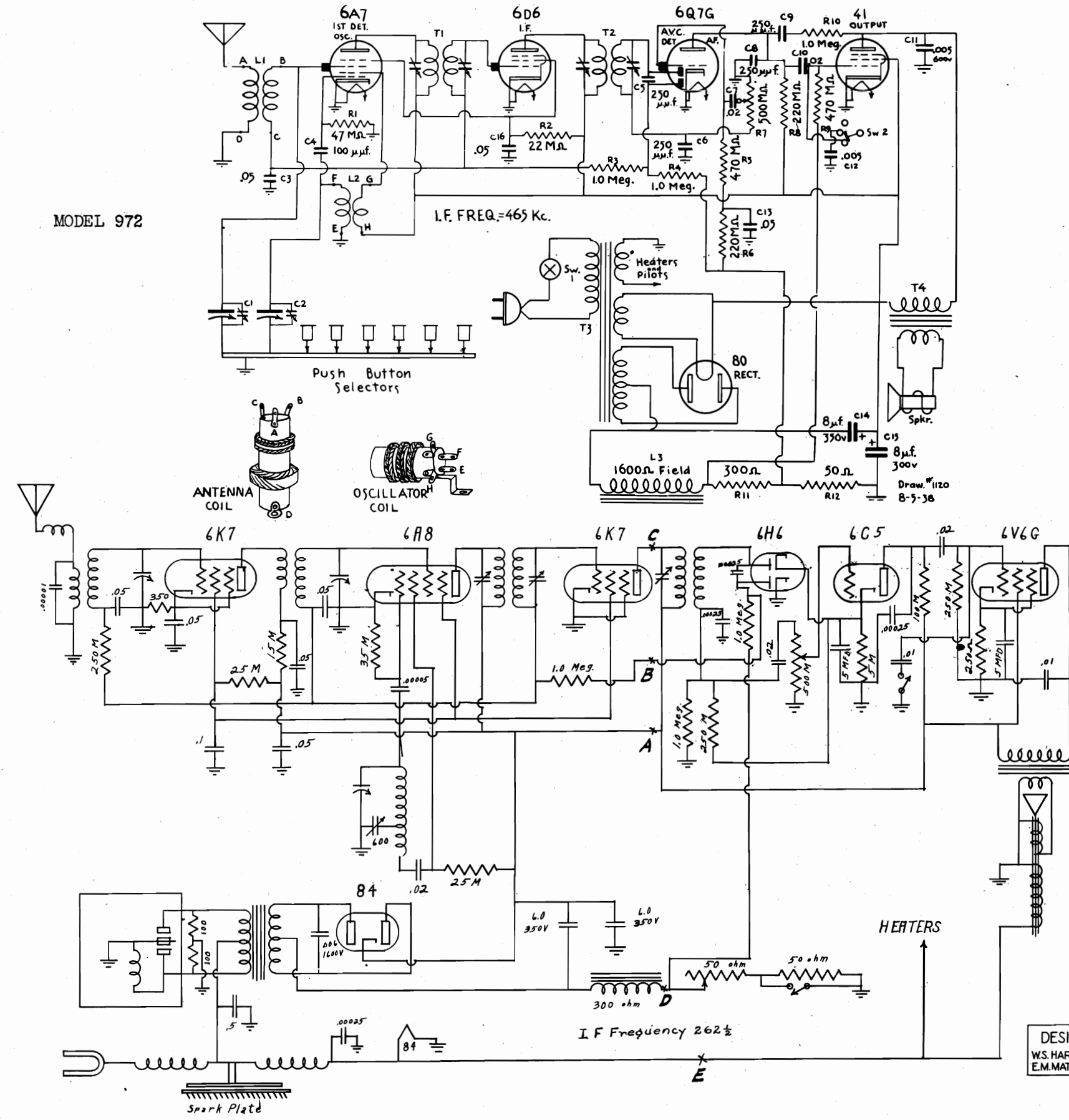
This receiver has six separate and distinct wave bands. It is designed so that you may easily receive all of the foreign and domestic stations now operating in the radio spectrum. Bands are lettered "A B C D E and F." The "A" band is the usual broadcast band and on it you will receive your favorite U.S. broadcast stations. The tuning range of the other five bands is so designed that you may tune in your favorite short wave stations during the day or night time. For example: In the early morning hours you will find most of the short wave stations on the "E" or "F" bands. As daylight increases you will find that these stations will disappear and reappear again on the "C" and "D" bands. At night you will find that these stations have again changed and will appear on the "B" and "C" bands.

Compliments of www.nucow.com



MODEL 972
MODEL 3818
MODEL 3820

MISSION BELL RADIO MFG. CO., INC.



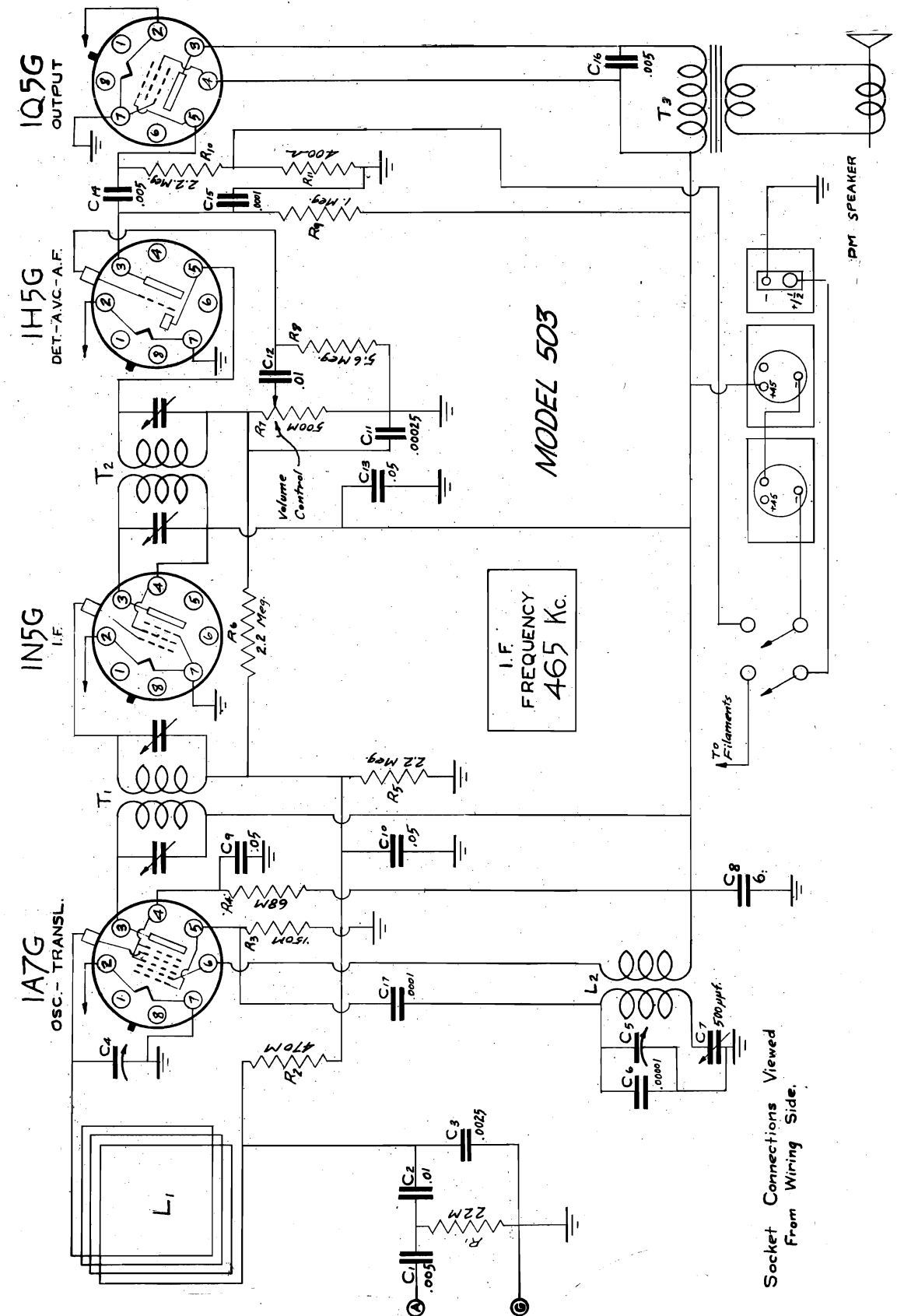
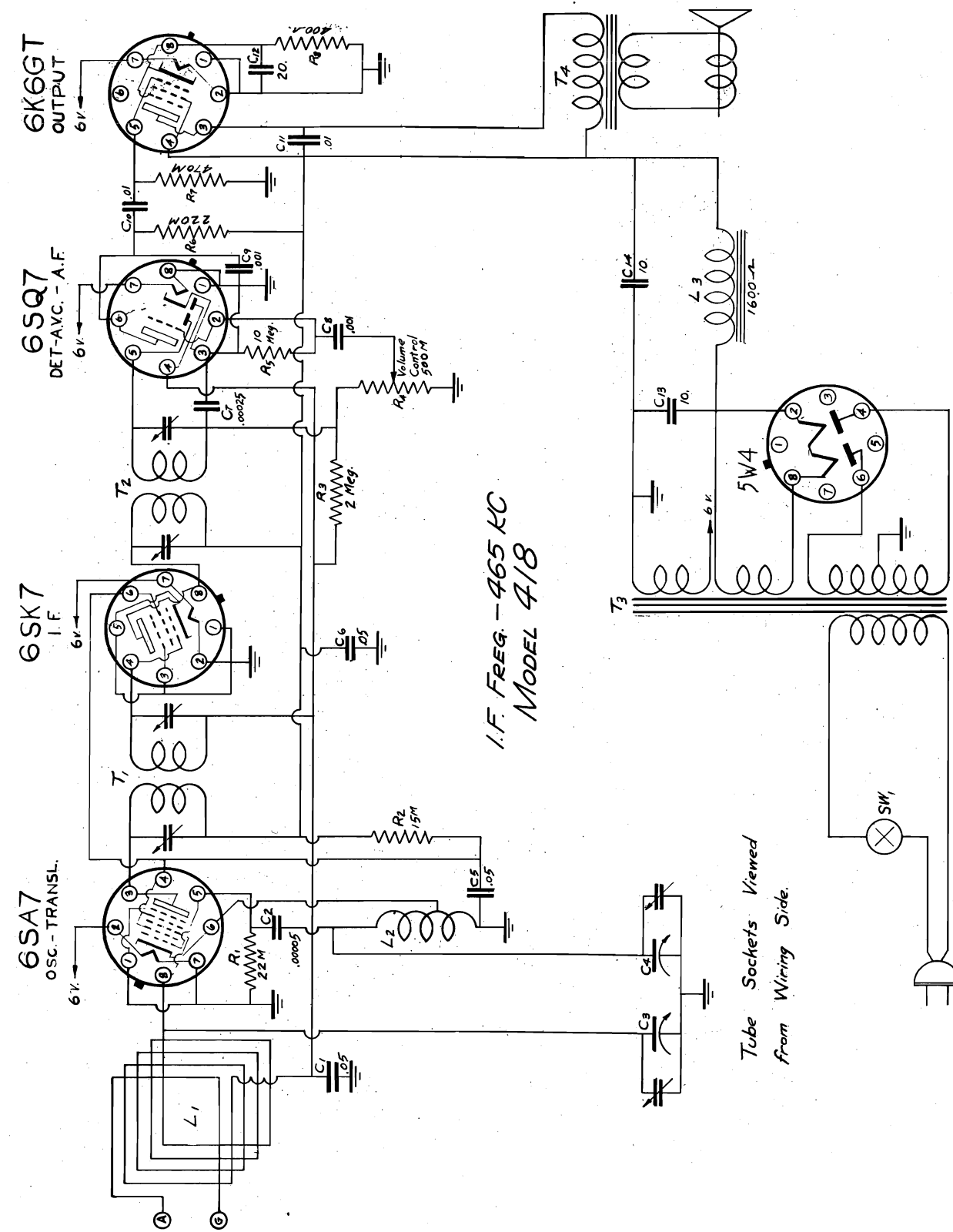
MODEL No. 3820.
APRIL 10-1937.

DESIGNED BY
W.S. HARMON Chief Engr.
E.M. MATSON Asst. Engr.

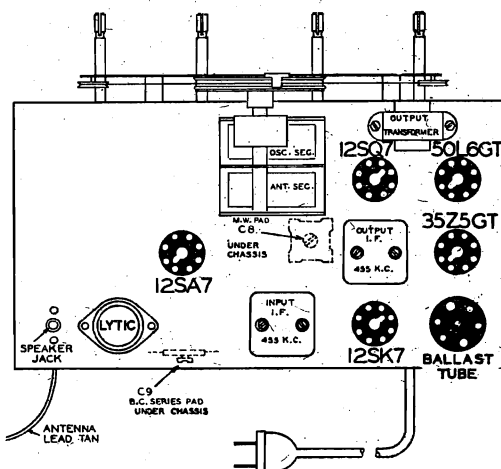
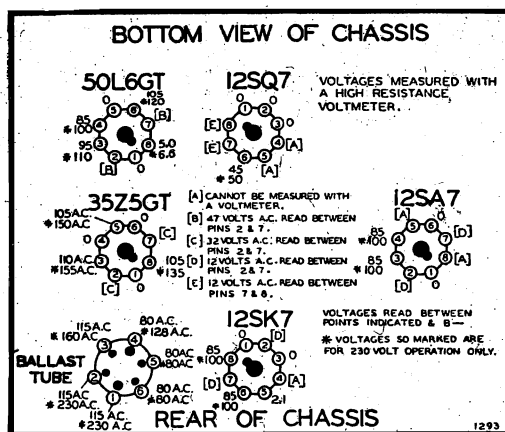
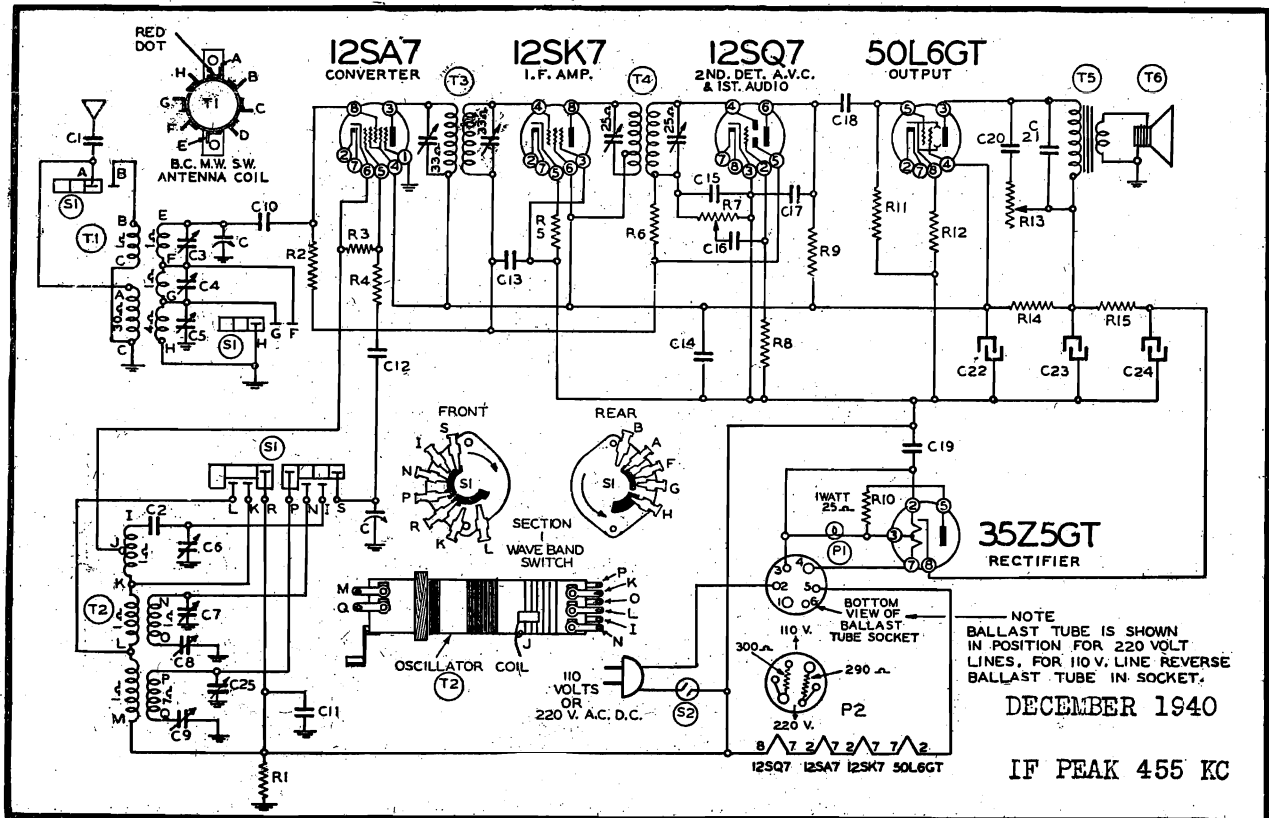
PARTIAL SCHEMATIC SHOWING DIFFERENCES BETWEEN
MODEL 3818 AND MODEL 3820; FOR BALANCE OF
CONNECTIONS FOR MODEL 3820, SEE MODEL 3818
ABOVE.

DESIGNED BY
W.S. HARMON Chief Engr.
E.M. MATSON Asst. Engr.

MODEL No. 3818.
APRIL 10-1937



MONTGOMERY WARD & CO.



Prices subject to change
without notice

Part No.	Circuit Diagram Reference	Description	No. Used In Set	List Price Each
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CONDENSERS

BE1001	C19	.1 x 400 Volt Tubular Condenser	1	.12
BE1009	C20	.05 x 200 Volt Tubular Condenser	1	.12
BE10020	C14	.1 x 200 Volt Tubular Condenser	1	.12
BE10024	C11	.25 x 400 Volt Tubular Condenser	1	.26
BE10025	C16	.002 x 600 Volt Tubular Condenser	1	.12
BE10026	C13, C18, C21	.02 x 400 Volt Tubular Condenser	3	.12
BE19101	C22, C23, C24	20 Mfd. x 20 Mfd. x 40 Mfd. Electrolytic Filter Condenser	1	2.26
BE124123	C6, C7, C25	Trimmer Condenser Strip—3 Gang S.W.—M.W.—B.C. Osc.	1	.40
BE124124	C3, C4, C5	Trimmer Condenser Strip—3 Gang S.W.—M.W.—B.C. Ant.	1	.40
BE1292	C1, C10, C17	.0005 Mica Type Condenser—20%	3	.12
BE1295	C12, C15	.0001 Mica Type Condenser—20%	2	.12
BE129153	C2	.006 Compression Type Mica Condenser	1	.40
BE129154	C8	.0025 Compression Type Mica Condenser	1	.28
BE129155	C9	.000483 Compression Type Mica Condenser—3%	1	.20

RESISTORS

BE13011	R1, R9, R11	250M Ohm— $\frac{1}{2}$ Watt Resistor—20%	3	.10
BE13019	R2	1 Megohm— $\frac{1}{2}$ Watt Resistor—20%	1	.10
BE13081	R5	250 Ohm— $\frac{1}{2}$ Watt Resistor—20%	1	.10
BE130166	R12	150 Ohm— $\frac{1}{2}$ Watt Resistor—10%	1	.10
BE130170	R6	3 Megohm— $\frac{1}{2}$ Watt Resistor—25%	1	.10
BE13057	R3	35M Ohm— $\frac{1}{2}$ Watt Resistor—20%	1	.10
BE130296	R15	200 Ohm—1 Watt Resistor—10%	1	.10
BE130287	R14	1200 Ohm—1 Watt Resistor—10%	1	.10
BE130295	R10	25 Ohm—1 Watt Resistor—10%	1	.10
BE130327	R4	10 Ohm— $\frac{1}{2}$ Watt Resistor—20%	1	.10
BE130223	R8	10 Megohm— $\frac{1}{2}$ Watt Resistor—20%	1	.10
BE10663	P2	Ballast Tube—110 and 220 Volts	1	.60

MODEL O4BR-397A

MONTGOMERY WARD & CO.

ALIGNMENT PROCEDURE

- Volume control—Maximum/ all adjustments.

- Connect radio chassis to ground post of signal generator with a short heavy lead.
- Connect dummy antenna value in series with generator output lead.
- Connect output meter across primary of output transformer.
- Allow chassis and signal generator to "heat up" for several minutes.

The following equipment is required for aligning:

- An all wave signal generator which will provide an accurately calibrated signal at the test frequencies as listed.
- Output indicating meter.
- Non-metallic screwdriver.
- Dummy antennas—1 Mf., 200 Mmf., 400 Ohms.

BAND	SIGNAL GENERATOR Frequency Setting	Dummy Antenna	Connection to Radio	Position of Band Switch	Variable Condenser Setting	Trimmers Adjusted (in Order Shown)	Trimmer Function	Adjustment
I. F.	455 Kc.	.1 MFD.	Grid of 12SK7 I. F. Tube	Broadcast	Rotor full open (Plates out of mesh)	Two trimmers on top (See Chassis View)	Output I. F.	Adjust to maximum output
	455 Kc.	.1 MFD.	Grid of 12SA7	Broadcast (Extreme Left Rotation)	Rotor full open (Plates out of mesh)	Two trimmers on top (See Chassis View)	Input I. F.	Adjust to maximum output
SHORT WAVE BAND	21 Mc.	400 ohms	Antenna lead	Short Wave (Extreme Right Rotation)	Set Dial at 21 MC	Trimmer (C6) (See Trimmer View)	Short wave oscillator	See Note "A" Adjust to maximum output
	21 Mc.	400 ohms	Antenna lead	Short Wave (Extreme Right Rotation)	Set Dial at 21 MC	Trimmer (C3) (See Trimmer View)	Short wave antenna	Adjust to maximum output
MEDIUM WAVE BAND	6 Mc.	400 ohms	Antenna lead	Medium Wave	Set Dial at 6 MC	Trimmers (C7 C4) (See Trimmer View)	Medium wave oscillator and antenna	Adjust to maximum output
	2.3 Mc.	400 ohms	Antenna lead	Medium Wave	Set Dial at 2.3 MC	Trimmer (C8) (See Chassis View)	Medium wave osc. series pad	Adjust to maximum rock dial. (See note "B")
BROADCAST BAND	1730 Kc.	200 mmf.	Antenna lead	Broadcast (Extreme Left Rotation)	Rotor full open (Plates out of mesh)	Trimmer (C25) (See Trimmer View)	Broadcast oscillator	Adjust to maximum output
	1500 Kc.	200 mmf.	Antenna lead	Broadcast	Set Dial at 1500 Kc.	Trimmer (C5) (See Trimmer View)	Broadcast antenna	Adjust to maximum output
	600 Kc.	200 mmf.	Antenna lead	Broadcast	Set Dial at 600 Kc.	Trimmer (C9) (See Chassis View)	Broadcast oscillator series pad	Adjust to maximum rock dial. (See note "B")

NOTE "A"—It is extremely necessary when making this adjustment that the fundamental oscillator signal be tuned in and not the image frequency which will fall below the fundamental.

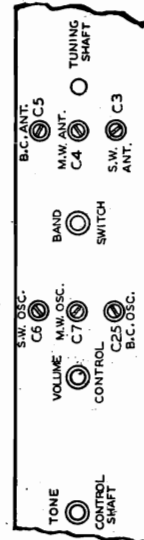
NOTE "B"—Turn the dial back and forth slightly (rock) and adjust trimmer until the peak of greatest intensity is obtained.

Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.

After each range is completed, repeat the procedure as a final check.

TECHNICAL DATA

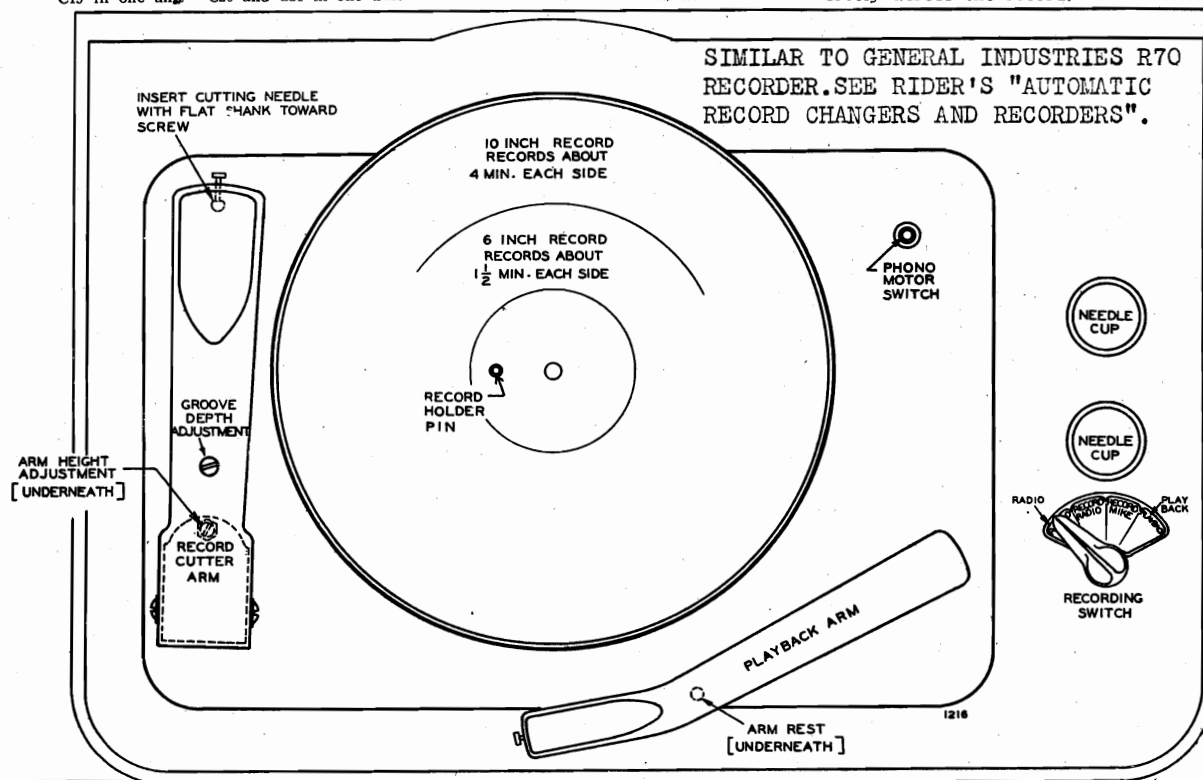
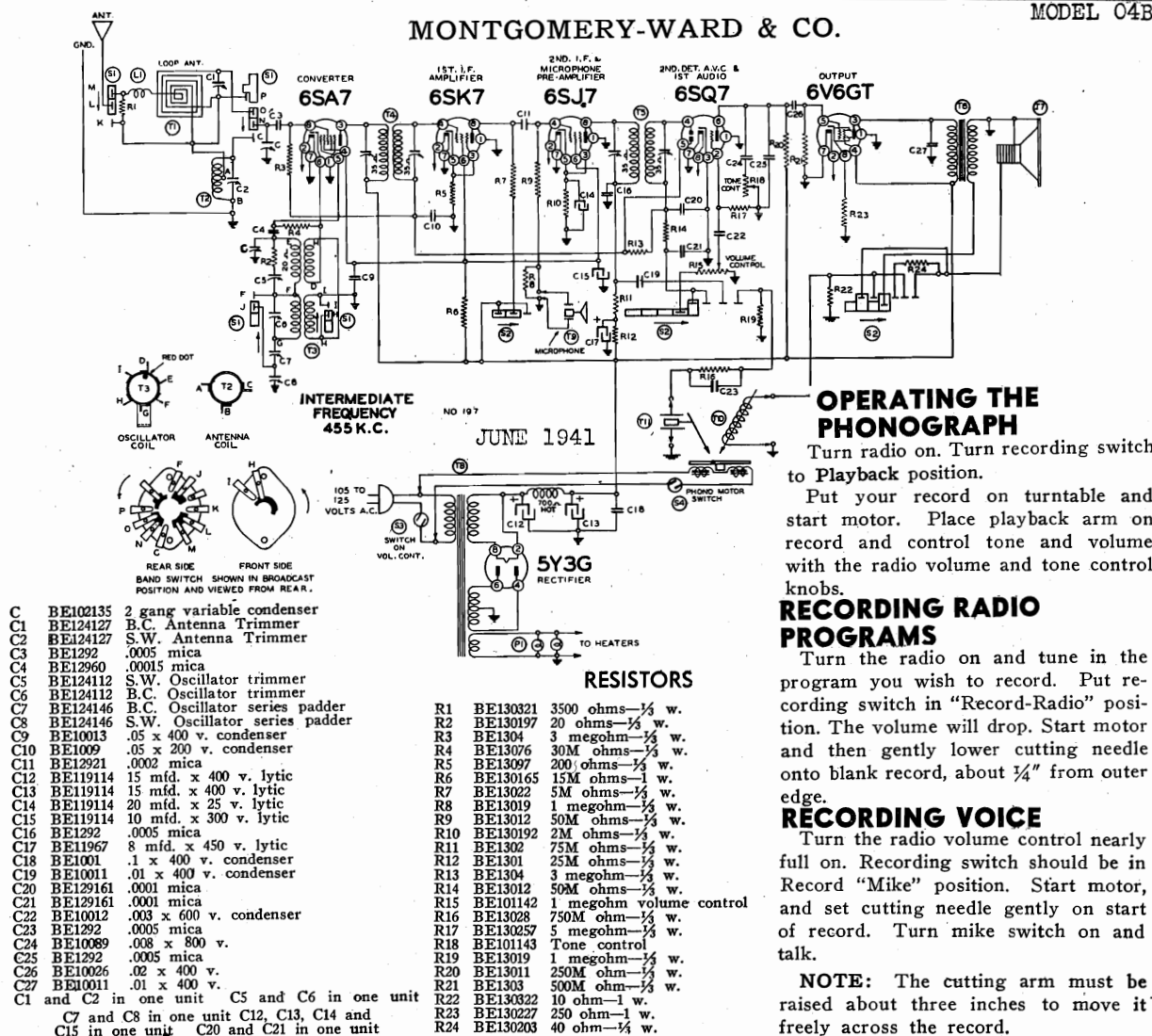
TEST FREQUENCIES USED		Power Consumption	
K.C.	Meters	110 V.	35 Watts
I. F.	455	220 V.	65 Watts
Short Wave	21000	Power Output	1 1/2 Watts Undistorted
Medium Wave	6000	Tuning Frequency Range	Broadcast Band - 540 to 1735 KC
Medium Wave	2300	Medium Band	- - - 2.2 to 7 MC
Broadcast	1730	Short Wave Band	- - - 6.6 to 23 MC
Broadcast	1500	Intermediate Frequency	- - - 455 KC
Broadcast	600	Speaker	- - - 6 in. Electro Dynamic



TRIMMER VIEW

MONTGOMERY-WARD & CO.

MODEL 04BR-615A



- The following equipment is required for aligning:
- An all wave signal generator which will provide an accurately calibrated signal at the test frequencies as listed.
 - Output indicating meter.
 - Non-metallic screwdriver.
 - Dummy antennas—1 mlf., 200 mmf., 400 ohms.

- Volume control—Maximum all adjustments.
- Connect radio ground to ground post of signal generator with a short heavy lead.
- Connect dummy antenna value in series with generator output lead.
- Connect output meter across primary of output transformer.
- Allow chassis and signal generator to "heat up" for several minutes.

SIGNAL GENERATOR				
BAND	Frequency Setting	Dummy Antenna	Connection to Radio	Position of Band Switch
I. F.	455 Kc.	.1 MFD.	Grid of 6S17	Broadcast
	455 Kc.	.1 MFD.	Grid of 6SA7 Mixer	Broadcast
SHORT WAVE BAND (See Note A)	17 Mc.	400 Ohms	External Antenna and Ground	Short Wave
	17 Mc.	400 Ohms	External Antenna and Ground	Short Wave
	6 Mc.	400 Ohms	External Antenna and Ground	Short Wave
BROADCAST BAND (See Note A)	1600 Kc.	200 mmf.	Grid of 6SA7	Broadcast
	535 Kc.	200 mmf.	Grid of 6SA7	Broadcast
LOOP ALIGNMENT (See Note B)	1400 Kc.	200 mmf.	External Antenna and Ground	Broadcast
	600 Kc.	200 mmf.	External Antenna and Ground	Broadcast

NOTE "A"—The signal generator is connected to the "ANT." and "GND." leads when aligning the Short Wave Band and to the grid of the 6SA7 tube and ground terminal when setting the Broadcast Band oscillator end frequencies, (1600 and 535 K. C.).

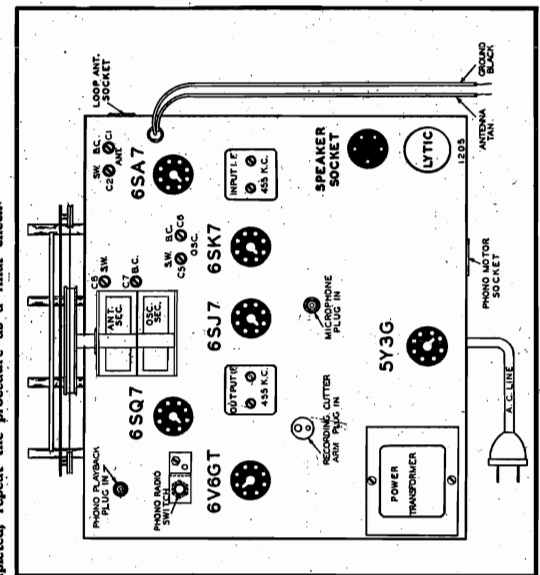
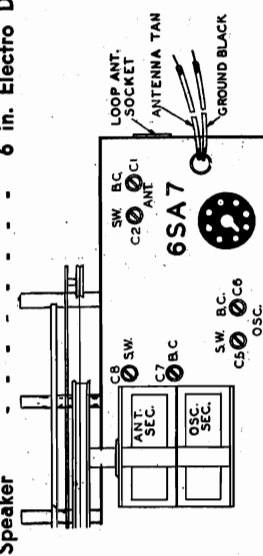
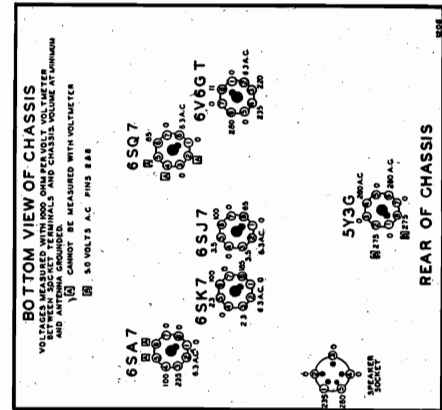
The loop antenna should be connected to the radio when making these adjustments.

NOTE "B"—Loop alignment is made with the chassis mounted in the cabinet and the loop antenna connected. The signal generator is connected to the "ANT." and "GND."

Power Consumption Radio Only - - - - - 70 Watts
 Motor Only - - - - - 40 Watts
 Power Output - - - - - 2.1 Watts Undistorted
 Sensitivity for 500 Milliwatt Output: 15 Microvolts Average
 Selectivity - 51 KC Broad at 1000 Times Signal at 1000 KC
 Tuning Frequency Range Broadcast Band - 535 to 1600 KC
 Shortwave Band - 5.46 to 18.3 MC
 Intermediate Frequency - - - - - 455 KC
 Speaker - - - - - 6 in. Electro Dynamic

NOTE "C"—Turn the dial back and forth slightly (rock) and adjust trimmer until the peak of greatest intensity is obtained. Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.

After each band is completed, repeat the procedure as a final check.



MONTGOMERY WARD & CO.

MODEL 04JP-399D

Phono-Recorder

P-A System

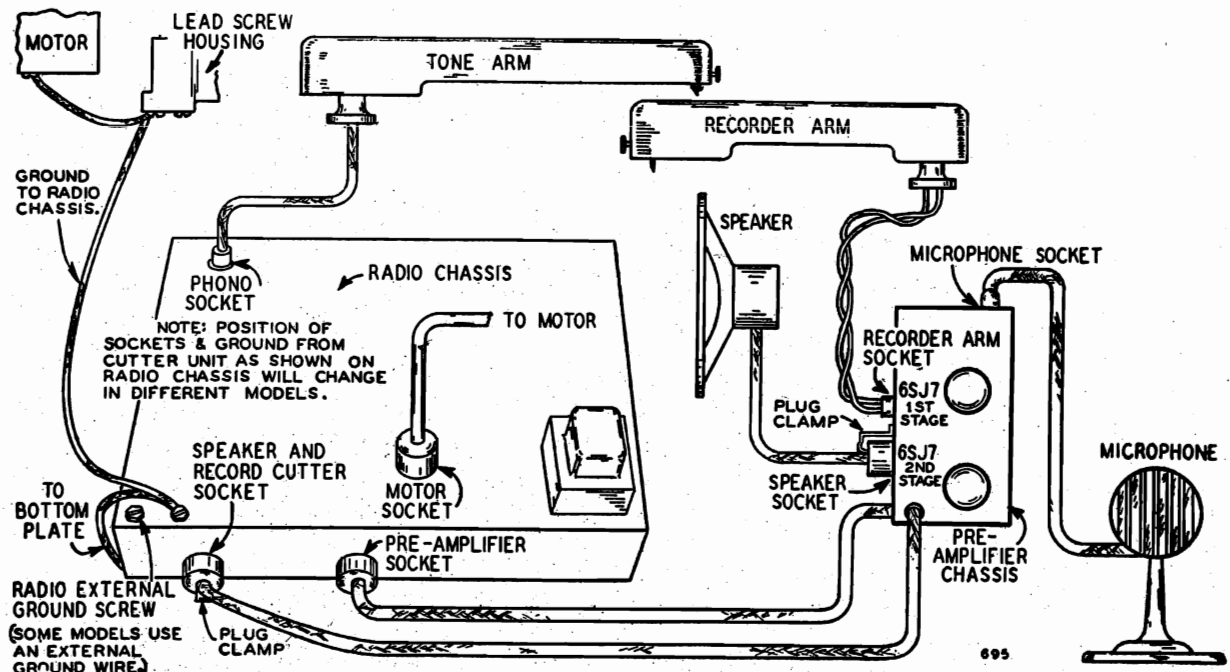


Fig. 13—Cable Interconnections

Model 04JP-399D can be used with the following model receivers:
 04WG-732 04BR-904 04BR-906 04BR-1106 14WG-732 14BR-904
 14BR-906 14BR-1106

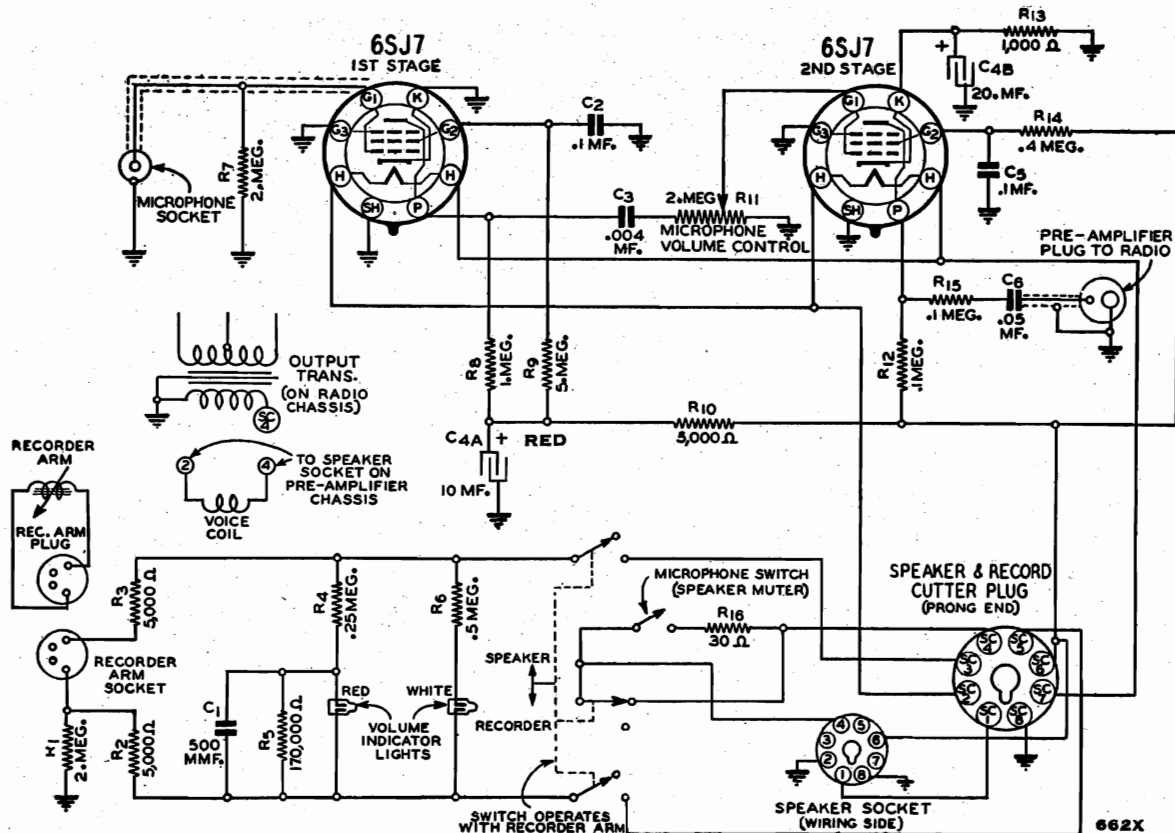


Fig. 14—Pre-Amplifier Unit Schematic Circuit Diagram

MODEL 04JP-399D

MONTGOMERY WARD & CO.

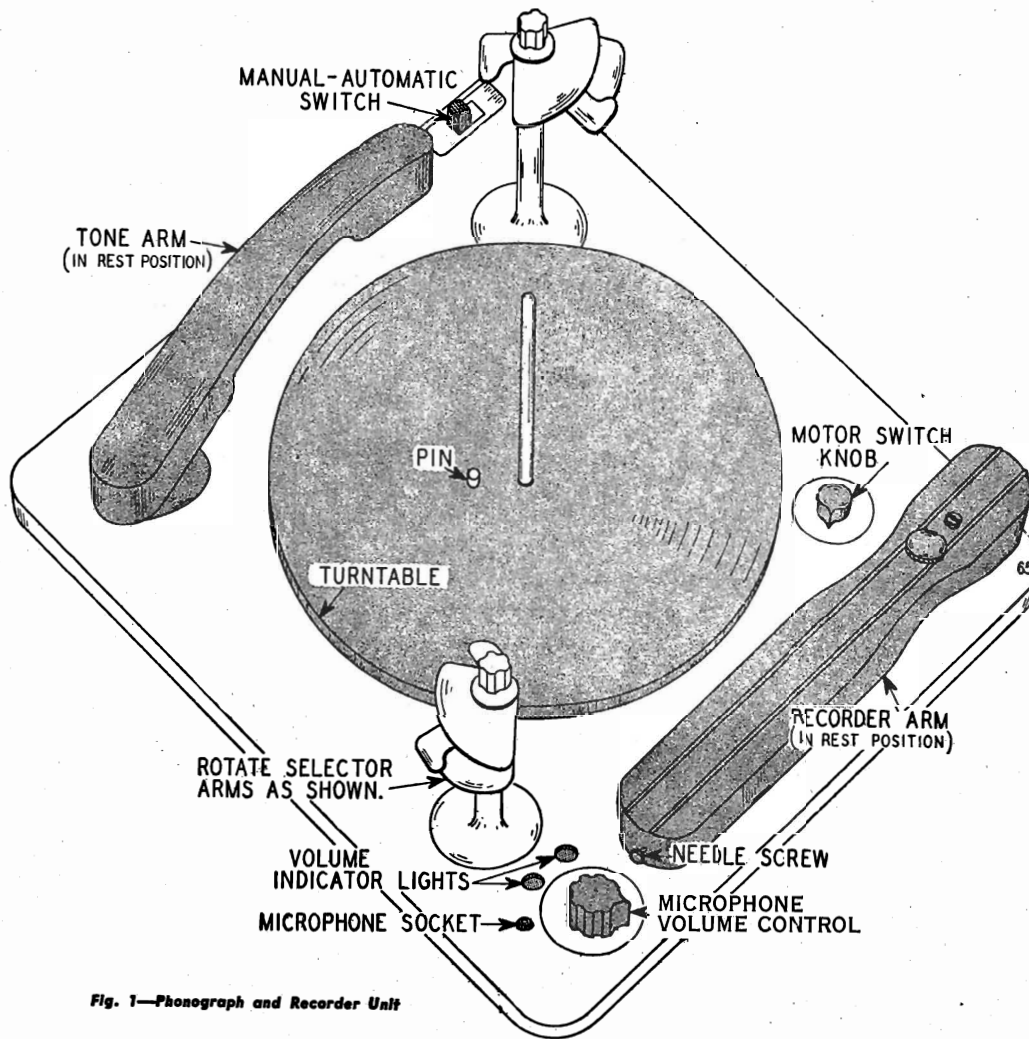


Fig. 1—Phonograph and Recorder Unit

SEE RIDER'S "AUTOMATIC RECORD CHANGERS AND RECORDERS" FOR COMPLETE DATA ON SEEBURG JR RECORD CHANGER AND THE MONTGOMERY-WARD SECTION FOR SIMILAR USE OF MICROPHONE AND RADIO FOR A PUBLIC-ADDRESS SYSTEM.

PRE-AMPLIFIER UNIT REPLACEMENT PARTS LIST

GENERAL

Bin No.	Part No.	Description	Selling Price	Bin No.	Part No.	Description	Selling Price
28A37		Recording Microphone complete with Stand and 12 Ft. Cable	\$9.70	11188	883254	R4	250,000 Ohm 0.5 Carbon..... .10
4X390		Escutcheon for Microphone Volume Control	.18		883174	R5	170,000 Ohm 0.5 Carbon..... .10
7A119		Neon Lamps for Red and White Volume Indicators	.22		884504	R6	500,000 Ohm 0.5 Carbon..... .08
15X175		Celluloid Indicator—Red	.12		885105	R8	1 Megohm 0.5 Carbon..... .06
15X176		Celluloid Indicator—White	.12		885505	R9	5 Megohm 0.5 Carbon..... .06
13X408		Power Cable with Molded Octal Plug	.54		885502	R10	5,000 Ohm 0.5 Carbon..... .06
13X410		Amplifier Output Cable with 2 Prong Plug	.18		36X292	R11	2 Megohm Volume Control and Microphone Switch. .42
3A303		Tubes and Speaker Sockets—Octal (8 prong)	.06	10968	884104	R12	100,000 Ohm 0.5 Carbon..... .08
3A305		Microphone Socket—Single Pin Tip	.06		884102	R13	1,000 Ohm 0.5 Carbon..... .08
3A308		Cutter Socket	.06		884404	R14	400,000 Ohm 0.5 Carbon..... .08
2A184		Record Cutter Changeover Switch	.30		885104	R15	100,000 Ohm 0.5 Carbon..... .06
37X194		Trip Arm and Hub Assembly for Changeover Switch	.16		885300	R16	30 Ohm 0.5 Carbon..... .06
10A314		Knob for Microphone Volume Control	.06				

RESISTORS

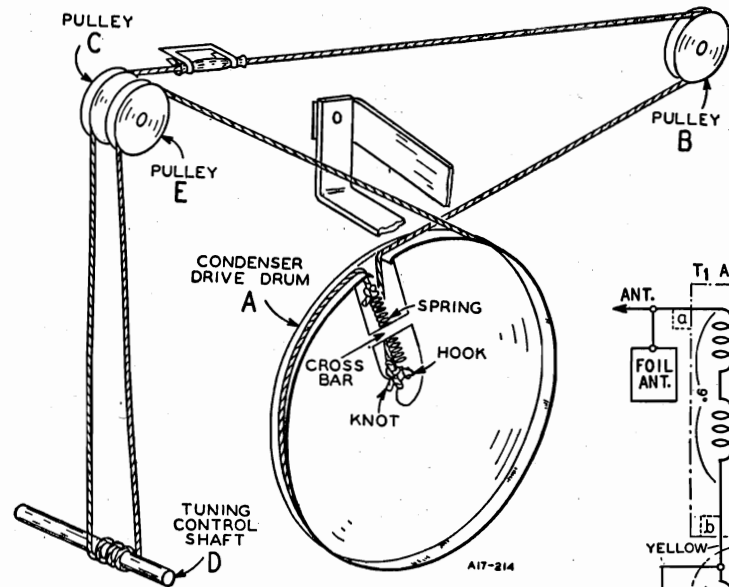
Bin No.	Part No.	Code	Resistance	Wattage	Selling Price	Bin No.	Part No.	Code	Capacitance	Voltage	Selling Price
B85205		R1,R7	2 Megohm	0.5	Carbon.....\$0.06	10508	47X61	C1	500 mmf.	Molded.....	\$0.10
D93502		R2,R3	5,000 Ohm	0.5	Carbon..... .20	10979	46X257	C2,C5	.10 mf.	240 Tubular.....	.06
						10888	46X284	C3	.004 mf.	180 Tubular.....	.06
							45X287	{C4A	10 mf.	300 Dry Electrolytic ...	.28
							46X311	C4B	20 mf.	25	
								C6	.05 mf.	240 Tubular.....	.06

CONDENSERS

Use only GENUINE factory tested parts to insure service jobs you can depend on and to obtain original set performance.

Prices Subject to Change Without Notice.

MONTGOMERY WARD & CO.



Drive Cord Replacement

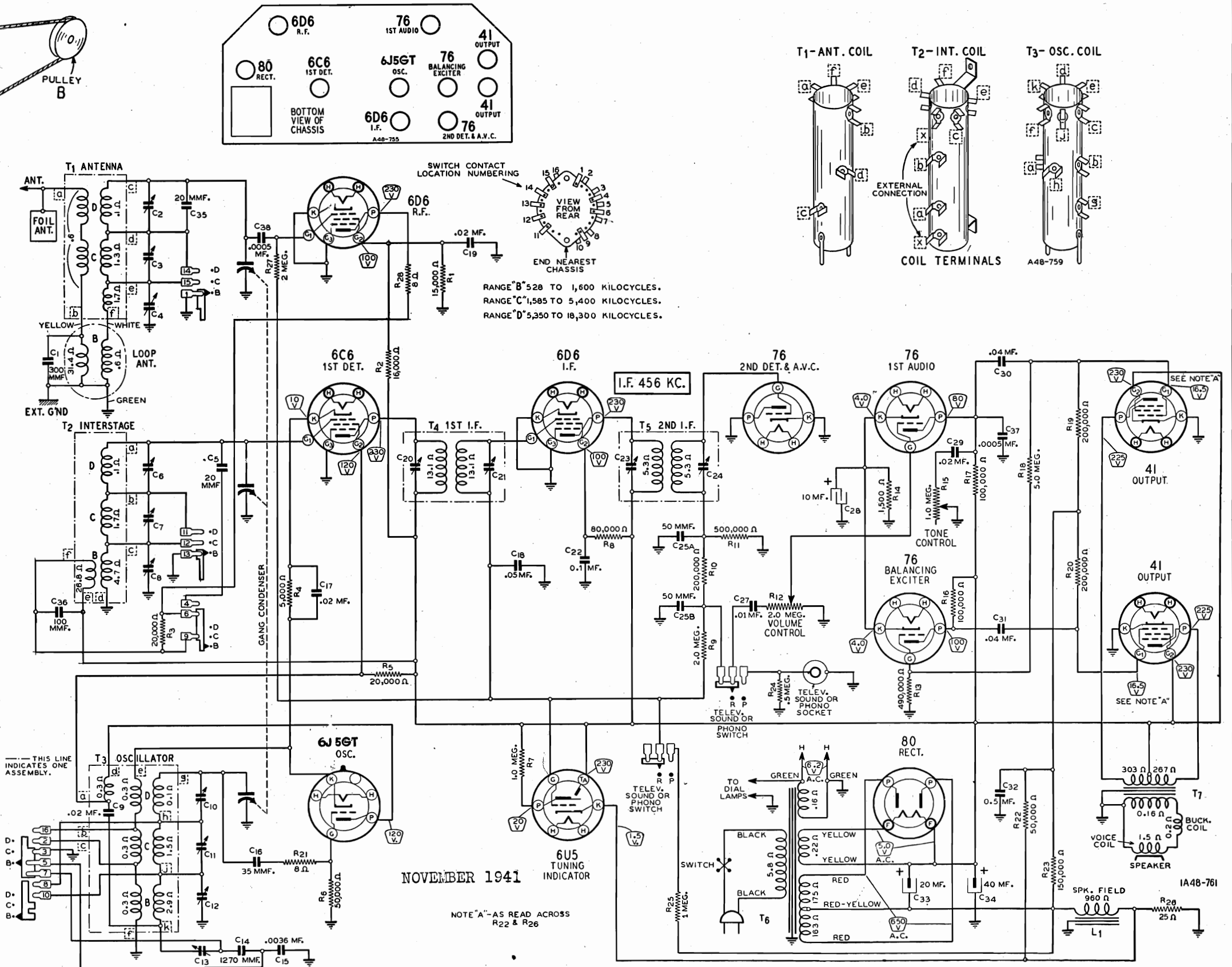
Tie a knot with a small loop at one end of the new drive cord. Slide a 1 3/4 inch length of fabric tubing on the cord. The free end of the drive cord should be tied to the tension spring in such a manner that there is a distance of 56 3/4 inches between the knots.

Turn the gang condenser to full open position.

Place the looped end of the drive cord over the hook on condenser drive drum A—See illustration. Bring the cord up through the slot in the drum rim and pass to the right (from back of chassis) and around pulley B. Then bring the cord to the left and over pulley C. See that the fabric tubing is now between pulleys B and C. Continue cord down to control shaft D and wind 3 1/2 turns counter-clockwise (from back of chassis) on shaft D. Bring cord up to and over pulley E. Bring cord down to top of drive drum A and wind one turn clockwise around the drum rim.

Pass the remaining drive cord and tension spring through the slot in the drum. Place free end of spring over the hook on the condenser drive drum.

ATTACHING DIAL POINTER—Tune in a 1500 KC signal. Move the pointer to the 1500 KC mark on the dial and clamp it tightly over the fabric tubing on the cord.



NOVEMBER 1941

NOTE "A"—AS READ ACROSS R22 & R26

MONTGOMERY WARD & CO.

MODEL 04WG-1108A

ALIGNMENT PROCEDURE

Volume Control—Maximum All Adjustments.

Connect Radio Chassis to Ground Post of Signal Generator with a Short Heavy Lead.

Allow Chassis and Signal Generator to "Heat Up" for several minutes.

IMPORTANT—Follow procedure in the order shown.

The following equipment is required for aligning:

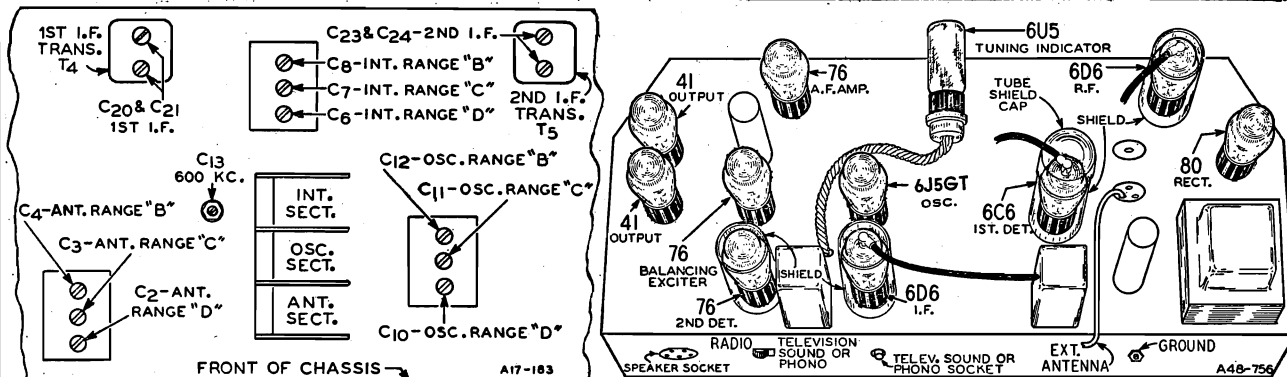
An All Wave Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.

Output Indicating Meter—Non-Metallic Screwdriver.

Dummy Antennas—.1 mf., 100 mmf., and 400 ohms.

SIGNAL GENERATOR FREQUENCY SETTING	CONNECTION AT RADIO	DUMMY ANTENNA	BAND SWITCH SETTING	CONDENSER SETTING	ADJUST TRIMMERS TO MAXIMUM
I. F. 456 KC	Grid of 1st Det.	.1 mf.	B Range	Turn Rotor to Full Open	2nd I.F. (C23) & (C24) 1st I.F. (C20) & (C21)
RANGE D 18,300 KC	Antenna Lead	400 Ohm	D Range	Turn Rotor to Full Open	Oscillator Range D (C10)
15,000 KC	Antenna Lead	400 Ohm	D Range	Turn Rotor to Max. Output	Ant. Range D (C2) Int. Range D (C6) Rock Rotor—See Note A
RANGE C 5400 KC	Antenna Lead	400 Ohm	C Range	Turn Rotor to Full Open	Oscillator Range C (C11)
5000 KC	Antenna Lead	400 Ohm	C Range	Turn Rotor to Max. Output	Antenna Range C (C3) Int. Range C (C7)
RANGE B 1600 KC	Antenna Lead	100 mmf.	B Range	Turn Rotor to Full Open	Oscillator Range B (C12)
1400 KC	Antenna Lead	100 mmf.	B Range	Turn Rotor to Max. Output Set Indicator to 1400 KC— See Note B	Ant. Range B (C4) Int. Range B (C8)
600 KC	Antenna Lead	100 mmf.	B Range	Turn Rotor to Max. Output	600 KC (C13) Rock Rotor—See Note A

LOOP RANGE B—If chassis has been aligned in the cabinet, no loop trimmer re-adjustment is required. If, however, chassis has been removed, re-assemble in cabinet and re-adjust Antenna Range B (C4) trimmer as covered in 1400 KC adjustment.



Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.

After each range is completed, repeat the procedure as a final check.

NOTE A—Turn the rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.

NOTE B—If the pointer is not at 1400 KC on the dial, loosen the 2 clamps which hold the pointer assembly on the cord, move the

pointer to the 1400 KC mark, and tighten the clamps.

CAUTION—When aligning the short wave bands, be sure NOT to adjust at the image frequency. This can be checked as follows: Let us say the signal generator is set for 5000 KC. The signal will then be heard at 5000 KC on the dial of the radio. The image signal, which is much weaker, will be heard at 5000 less 912 KC, or 4088 KC on the dial. It may be necessary to increase the input signal to hear the image.

Voltages at Sockets

These voltages are read under the following conditions:

Line Voltage—117.

Band Switch—Broadcast.

Volume Control—Maximum.

Antenna Shorted to Ground.

Readings taken with 1000 ohm-per-volt meter. Plate and screen voltages are read on 500 volt scale.

Tuning Frequency Range

B Range 528 to 1600 KC.

C Range 1585 to 5400 KC.

D Range 5350 to 18300 KC.

Sensitivity—External Antenna—(For 0.5 Watt Output)

B Range 5.0 Microvolts Average

C Range 3.0 Microvolts Average

D Range 8.0 Microvolts Average

Power Consumption - 80 Watts (At 117 volts 60 cycles)

Power Output - 5.0 Watts Undistorted
5.5 Watts Maximum

Selectivity - . . 32 KC Broad at 1000 times Signal

Intermediate Frequency - 456 KC.

Speaker - 10" Electro-Dynamic

MODEL 14JP-399D

Phono-Recorder

P-A System

MONTGOMERY-WARD & CO.

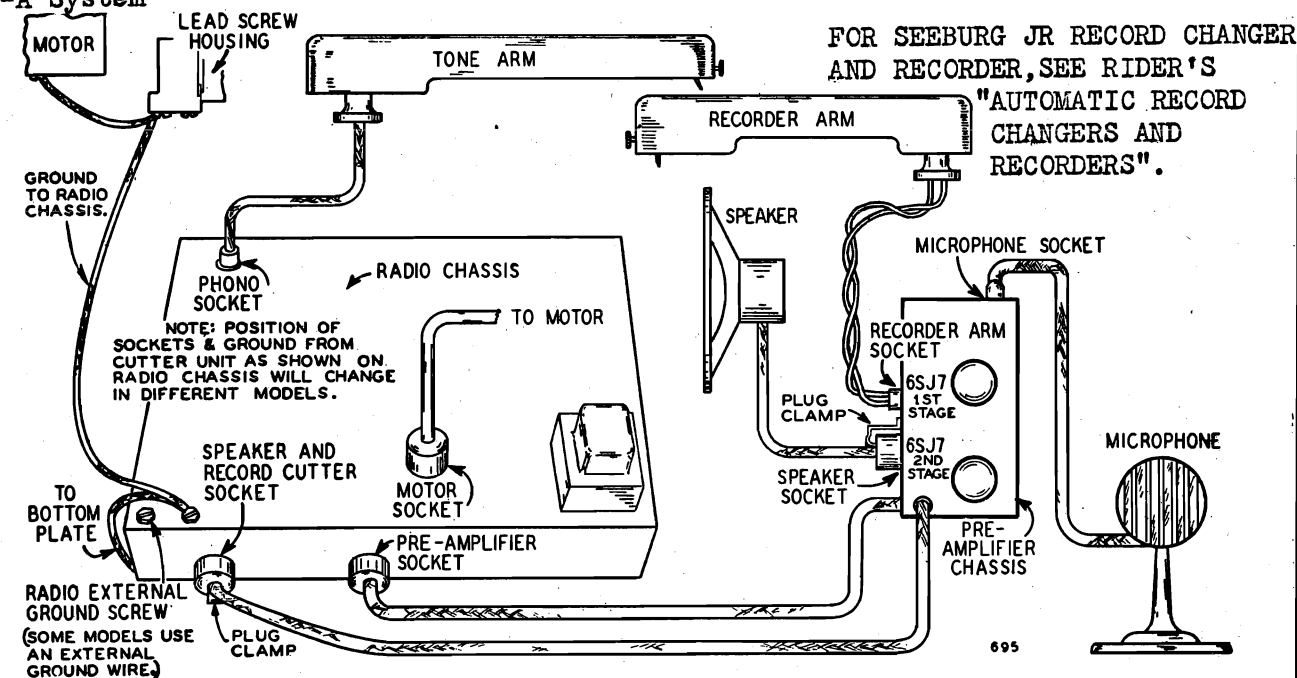
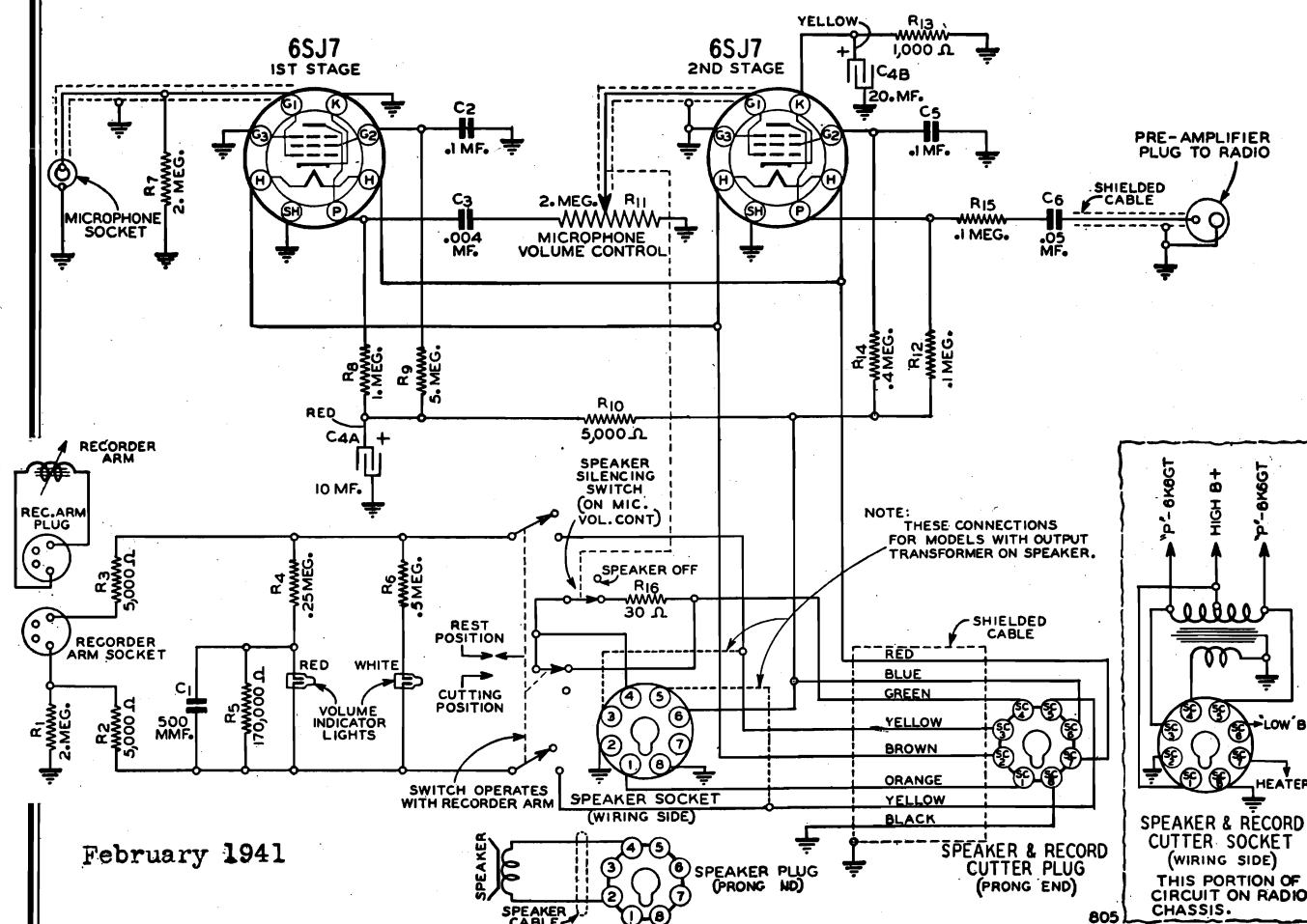


Fig. 13—Cable Interconnections

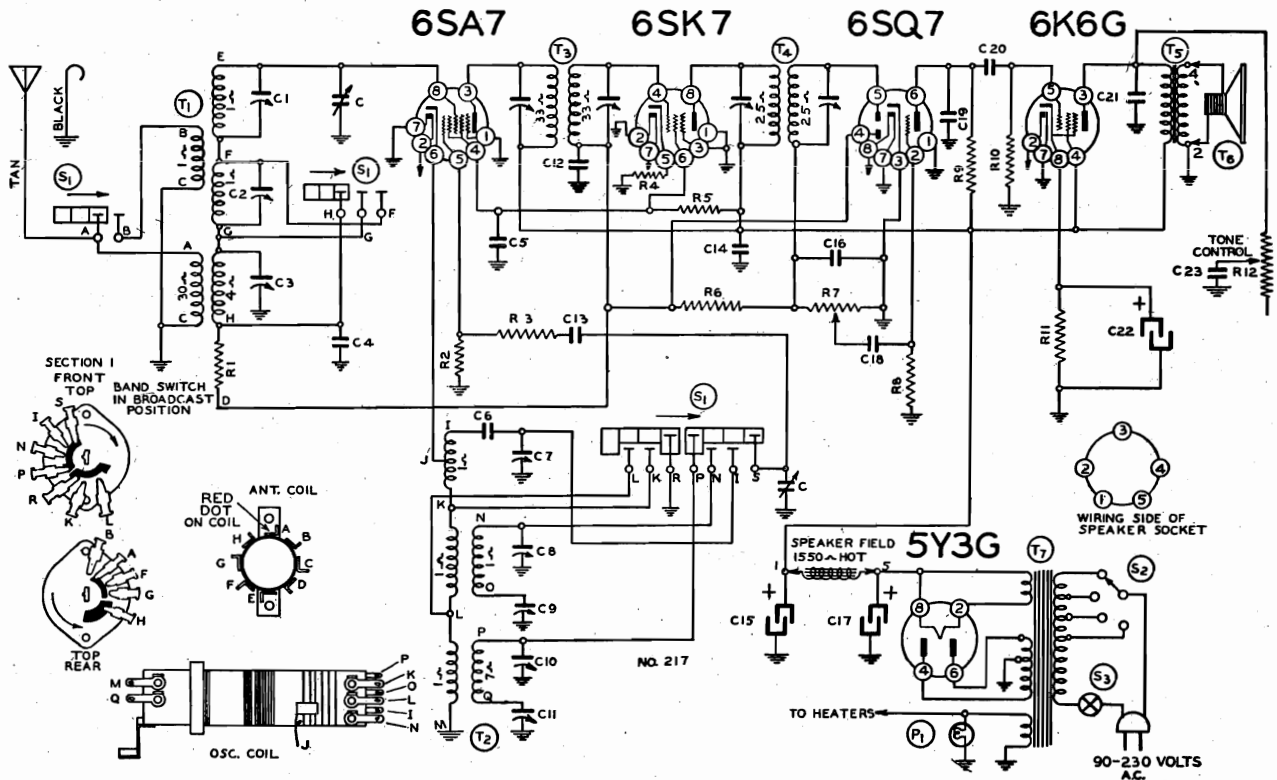


February 1941

FOR USE WITH MODELS 14WG-732, 14BR-904, 14BR-906, 14BR-1106

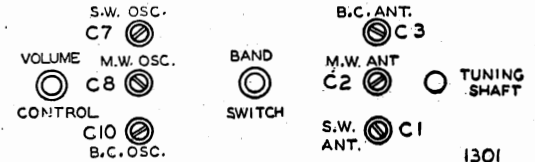
MONTGOMERY-WARD & CO.

MODEL 14BR-440A



TECHNICAL DATA

Power Consumption	55 Watts
Power Output	1 1/2 Watts Undistorted
Sensitivity Broadcast Band 540 to 1735 Kc.	25 M.V.
Medium Band 2.2 to 7 Mc.	35 M.V.
Short Wave Band 6.6 to 23 Mc.	40 M.V.
Intermediate Frequency	455 KC
Speaker	6 in. Electro Dynamic



TRIMMER VIEW

1301

Part No.	Schematic Diagram Reference	Description	No. Used	Selling Price Each		
BE10013	C23	.1 x 400 Volt Tubular Condenser	1	.12	BE10013	C23
BE1001	C5, C14	.1 x 400 Volt Tubular Condenser	2	.12	BE1001	C5, C14
BE1009	C4	.05 x 200 Volt Tubular Condenser	1	.12	BE1009	C4
BE10025	C18	.003 x 600 Volt Tubular Condenser	1	.12	BE10025	C18
BE10026	C12, C20	.02 x 400 Volt Tubular Condenser	2	.12	BE10026	C12, C20
BE10071	C21	.004 x 600 Volt Tubular Condenser	1	.12	BE10071	C21
BE119103	C15, C17, C22	40 Mfd.-10 Mfd.-20 Mfd. Electrolytic Condenser	1	.86	BE119103	C15, C17, C22
BE124123	C7, C8, C10	Trimmer Condenser Strip (3 Gang) (S.W. M.W.-Bc. Osc.)	1	.40	BE124123	C7, C8, C10
BE124124	C1, C2, C3	Trimmer Condenser Strip (3 Gang) (S.W.-M.W.-Bc. Ant.)	1	.40	BE124124	C1, C2, C3
BE1292	C19	.0005 Mica Type Condenser-20%	1	.12	BE1292	C19
BE1295	C13, C16	.0001 Mica Type Condenser-20%	2	.12	BE1295	C13, C16
BE129153	C6	.006 Compression Type Condenser-2% (S.W. Pad)	1	.40	BE129153	C6
BE129154	C9	.0025 Compression Type Condenser-3%	1	.28	BE129154	C9
BE129155	C11	.000483 Compression Type Condenser-3%	1	.20	BE129155	C11
BE1304	R6	3 Megohm-1/2 Watt Resistor-20%	1	.10	BE1304	R6
BE13011	R1, R9	250M Ohm-1/2 Watt Resistor-20%	2	.10	BE13011	R1, R9
BE13019	R10	1 Megohm-1/2 Watt Resistor-20%	1	.10	BE13019	R10
BE13070	R11	500 Ohm-1/2 Watt Resistor-10%	1	.10	BE13070	R11
BE130194	R2	35M Ohm-1/2 Watt Resistor-10%	1	.10	BE130194	R2
BE130223	R8	10. Megohm-1/2 Watt Resistor-20%	1	.10	BE130223	R8
BE130239	R4	250 Ohm-1/2 Watt Resistor-10%	1	.10	BE130239	R4
BE130242	R5	12M Ohm-1 Watt Resistor-10%	1	.10	BE130242	R5
BE130299	R3	10 Ohm-1/2 Watt Resistor-10%	1	.10	BE130299	R3
BE108169H	T3	Input I.F. Coil Complete in Can	1	.76	BE108169H	T3
BE108170C	T4	Output I.F. Coil Complete in Can	1	.76	BE108170C	T4
BE110143	T2	Bc.-M.W.-S.W. Oscillator Coil Complete	1	.76	BE110143	T2
BE111169	T1	Bc.-M.W.-S.W. Antenna Coil Complete	1	.80	BE111169	T1
BE1218		Five Prong Socket "SPKR"	1	.08	BE1218	
BE121245		Eight Prong Octal Socket "6SK7"	1	.10	BE121245	
BE121246		Eight Prong Octal Socket "6SQ7"	1	.10	BE121246	
BE121247		Eight Prong Octal Socket "6SA7"	1	.10	BE121247	
BE121250		Eight Prong Octal Socket "5Y3"	1	.10	BE121250	
BE121251		Eight Prong Octal Socket "6K6"	1	.15	BE121251	
BE104193B	T7, S2	Power Transformer Universal Primary Tapped (95 V.-110 V.-130 V.-230 V.) 40/60 Cycle	1	4.30	BE104193B	T7, S2
BE10575C	T5	Output Transformer for Speaker	1	.62	BE10575C	T5
BE114176	T6	Six Inch Dynamic Speaker (1550 Ohm Field)	1	3.10	BE114176	T6
BE10575C	T5	Output Transformer for Speaker	1	.62	BE10575C	T5

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

SEPTEMBER 1941

BOTTOM VIEW OF CHASSIS

VOLTAGES MEASURED BETWEEN
TERMINALS INDICATED AND CHASSIS
USING A 1000 OHM PER VOLT
VOLTMETER.

6K6GT

6SQ7

6SA7

[A] CANNOT BE MEASURED WITH VOLTMETER.
 [B] 560 VOLTS A.C. BETWEEN PINS 4 & 5.
 [C] 5.0 VOLTS A.C. BETWEEN PINS 2 & 8.

6SK7

5Y3G

REAR OF CHASSIS

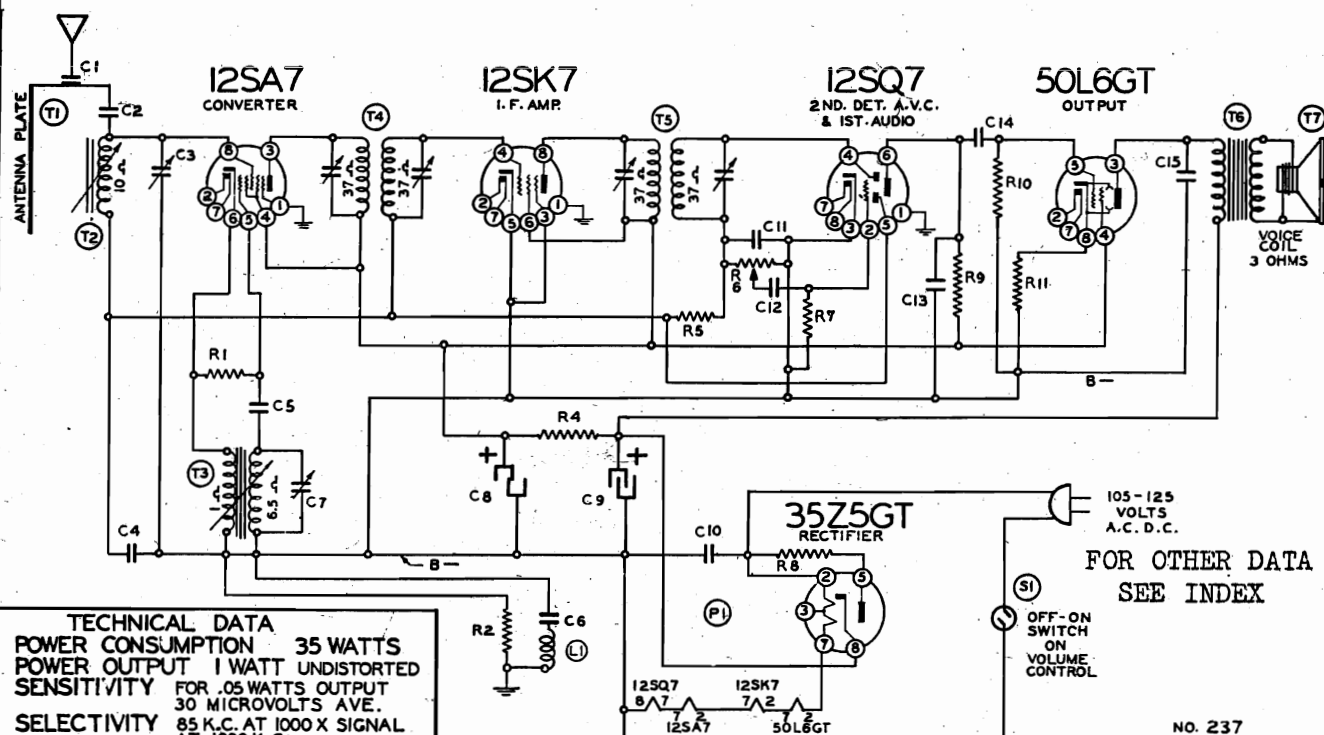
ALIGNMENT PROCEDURE

- Volume control—Maximum all adjustments.
- Connect radio chassis to ground post of signal generator.

BAND	Frequency Sett'ng	SIGNAL GENERATOR Dummy Antenna	Connection to Radio	Position of Band Switch	Variable Condenser Setting	Trimmers Adjusted to Maximum (in Order Shown)
I. F.	455 Kc.	.1 MFD.	Grid of 6SK7 I. F. Tube	Broadcast	Rotor full open (Plates out of mesh)	Two trimmers on top of Output I. F. (See Chassis View)
	455 Kc.	.1 MFD.	Grid of 6SA7	Broadcast (Extreme Left Rotation)	Rotor full open (Plates out of mesh)	Two trimmers on top of Input I. F. (See Chassis View)
SHORT WAVE BAND	21 Mc.	400 ohms	Antenna lead	Short Wave (Extreme Right Rotation)	Set Dial at 21 MC	Trimmer (C7) Short wave oscillator (See Trimmer View) See Note "A"
	21 Mc.	400 ohms	Antenna lead	Short Wave (Extreme Right Rotation)	Set Dial at 21 MC	Trimmer (C1) Short wave antenna (See Trimmer View)
MEDIUM WAVE BAND	6 Mc.	400 ohms	Antenna lead	Medium Wave	Set Dial at 6 MC	Trimmers (C8, C2) Medium- wave oscillator and antenna (See Trimmer View)
	2.3 Mc.	400 ohms	Antenna lead	Medium Wave	Set Dial at 2.3 MC	Trimmer (C9) Medium wave osc series pad (See Chassis View) See Note "B"
BROAD- CAST BAND	1730 Kc.	200 mmf.	Antenna lead	Broadcast (Extreme Left Rotation)	Rotor full open (Plates out of mesh)	Trimmer (C10) Broadcast osc. (See Trimmer View)
	1500 Kc.	200 mmf.	Antenna lead	Broadcast	Set Dial at 1500 Kc.	Trimmer (C3) Broadcast antenna (See Trimmer View)
	600 Kc.	200 mmf.	Antenna lead	Broadcast	Set Dial at 600 Kc.	Trimmer (C11) Broadcast osc. series pad (See Chassis View) See Note "B"

NOTE "B"—Turn the dial back and forth slightly (rock) and adjust trimmer until the peak of greatest intensity is obtained. After each range is completed, repeat the procedure as a final check.

MONTGOMERY-WARD & CO.

MODELS 14BR-521A,
14BR-522A

TECHNICAL DATA
POWER CONSUMPTION 35 WATTS
POWER OUTPUT 1 WATT UNDISTORTED
SENSITIVITY FOR .05 WATTS OUTPUT
 30 MICROVOLTS AVE.
SELECTIVITY 85 K.C. AT 1000 X SIGNAL
 AT 1000 K.C.
TUNING RANGE 535 TO 1720 K.C.
INTERMEDIATE FREQUENCY 455 K.C.

Code Part
No. No. Description

RESISTORS

R1 BE130176 20M ohm— $\frac{1}{2}$ w.
 R2 BE130100 150M ohm— $\frac{1}{2}$ w.
 R4 BE130279 1M-ohm—1 w.
 R5 BE1304 3 megohm— $\frac{1}{2}$ w.
 R6 BE101255 500M ohm—Volume
 control and switch
 R7 BE130257 5 megohm— $\frac{1}{2}$ w.
 R8 BE130240 30 ohm— $\frac{1}{2}$ w.
 R9 BE130100 150M ohm— $\frac{1}{2}$ w.
 R10 BE13011 250M ohm— $\frac{1}{2}$ w.
 R11 BE130166 150 ohm— $\frac{1}{2}$ w.

CONDENSERS

C1 BE131262 .00001 washer condenser
 (antenna clip on back plate)
 C2 BE129114 .0003 mica
 C3 BE124137 Trimmer on antenna coil
 C4 BE1009 .05 x 200 v.
 C5 BE12939 .00005 mica
 C6 BE10091 .15 x 400 v.
 C7 BE124137 Trimmer on oscillator coil
 C8 BE11992 20 Mfd. lytic x 150 w.v.
 C9 BE11992 40 mfd. lytic x 150 w. v.
 C10 BE10013 .05 x 400 v.
 C11 BE12912 .00025 mica
 C12 BE10025 .002 x 600 v.
 C13 BE1292 .0005 mica
 C14 BE10011 .01 x 400 v.

C15 BE10026 .02 x 400 v.

C3 and C7 are in same unit
 C8 and C9 are in same unit

PARTS

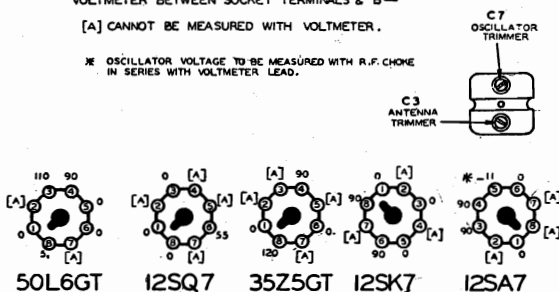
T1 BE115597-18 Antenna plate (Walnut)
 or BE115597-9 Antenna plate (Ivory)
 T2 BE111181 Antenna permeability coil
 T3 BE110153 Oscillator permeability coil
 T4 BE108157-H Input I.F. coil—455 kc.
 T5 BE108157-I Output I.F. coil—455 kc.
 T6 BE105128 Output transformer
 T7 BE114199 4" PM speaker
 or
 T7 BE114259 4" Electrodynamic speaker
 S1 Switch on Volume control
 L1 BE105138 R.F. choke

BOTTOM VIEW
OF CHASSIS

VOLTAGES, MEASURED WITH A HIGH RESISTANCE
 VOLT-METER BETWEEN SOCKET TERMINALS & B—

[A] CANNOT BE MEASURED WITH VOLT-METER.

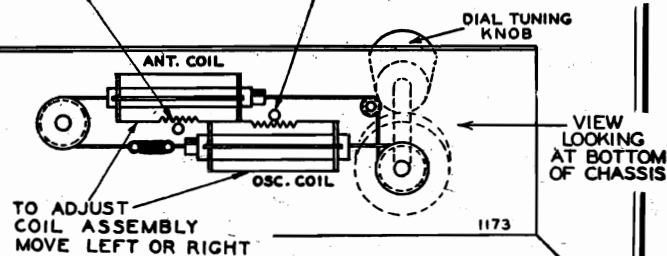
* OSCILLATOR VOLTAGE TO BE MEASURED WITH R.F. CHOKE
 IN SERIES WITH VOLT-METER LEAD.



REAR OF CHASSIS

VOLTAGE CHART

NOTE "A" THE ANTENNA COIL ASSEMBLY IS MADE SO THAT IT IS
 MOVABLE LEFT OR RIGHT. WHEN MAKING THE ADJUSTMENT AS
 GIVEN IN THE ALIGNMENT PROCEDURE MOVE THE COIL ASSEMBLY
 VERY SLOWLY. IT CAN BE MOVED BY HAND OR BY PIVOTING ONE
 EDGE OF THE BLADE OF A SCREWDRIVER IN THE HOLE AND
 ENGAGING THE BLADE IN THE GEAR TEETH OF THE COIL FORM.

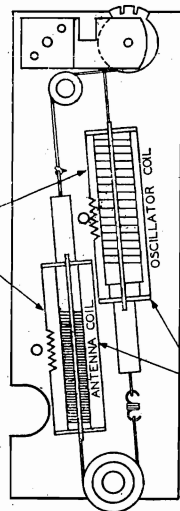
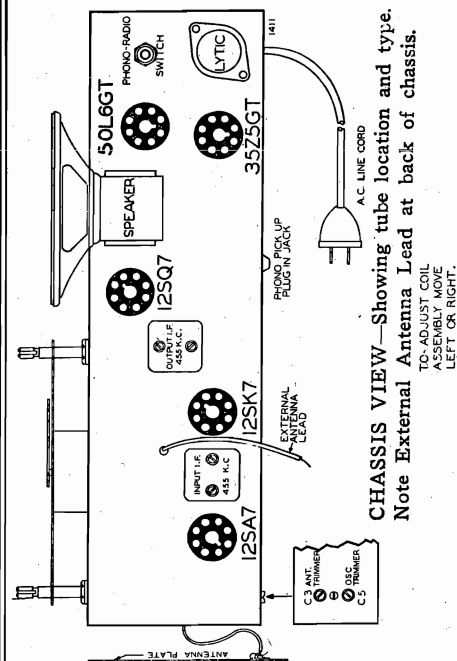


COIL ASSEMBLY VIEW

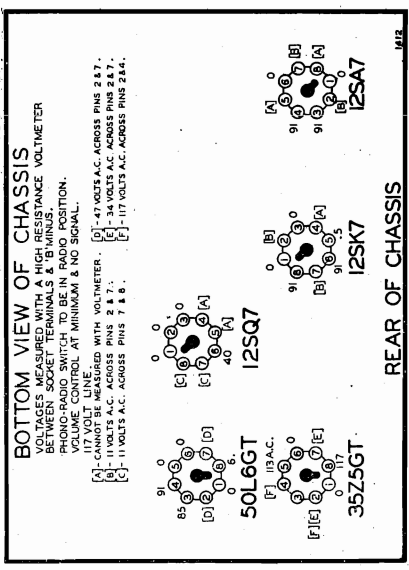
JULY 1941

MODEL 14BR-523A
MODEL 14BR-692A

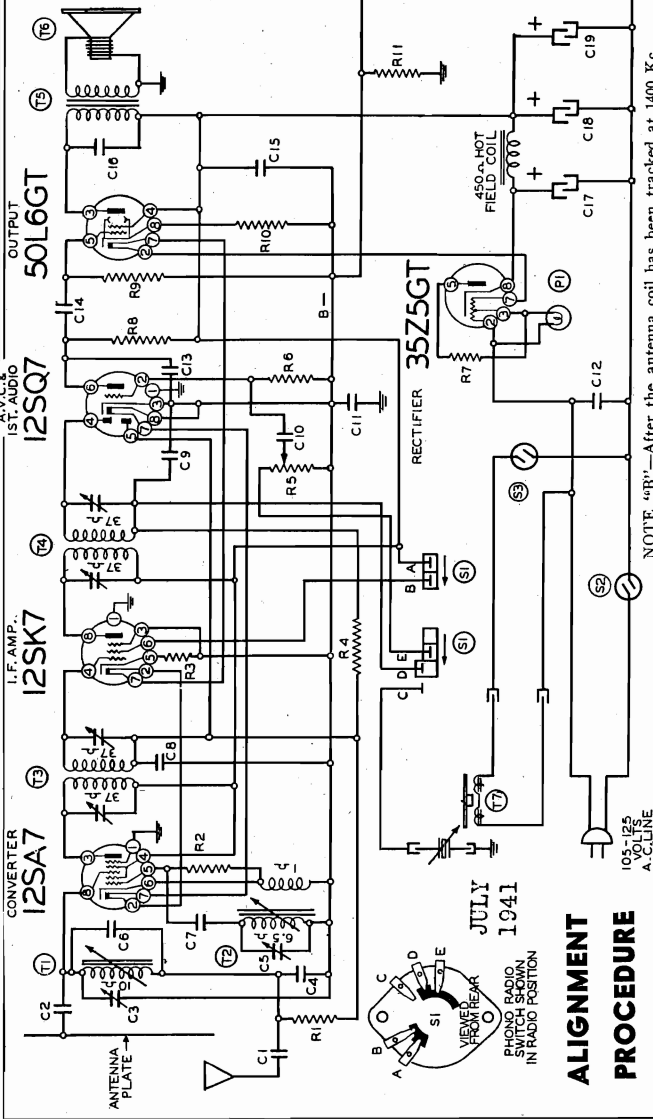
MONTGOMERY WARD & CO.



NOTE: THE ANTENNA COIL ASSEMBLY IS MADE SO THAT IT IS MOVABLE LEFT OR RIGHT. WHEN MAKING THE ADJUSTMENT, THE ALIGNMENT PROCEDURE MOVE COIL ASSEMBLY VERY SLOWLY.



RESISTORS	VALUES
BE1309	200M Ohm—1/4 Watt Resistor—20%
BE13076	200M Ohm—1/4 Watt Resistor—10%
BE130168	100 Ohm—1/4 Watt Resistor—10%
BE1304	3 Megohm—1/4 Watt Resistor—20%
BE13011	250M Ohm—1/4 Watt Resistor—20%
BE13025	5 Megohm—1/4 Watt Resistor—25%
BE130217	250M Ohm—1/4 Watt Resistor—10%
BE13037	750M Ohm—1/4 Watt Resistor—20%
BE130166	150 Ohm—1/4 Watt Resistor—10%
BE130293	30 Ohm—1/4 Watt Resistor—20%



NOTE "A"—The antenna coil has been tracked at 1400 Kc. it is necessary to check the antenna trimmer (C3) adjustment. If it is necessary to make an appreciable change in trimmer adjustment, it is made so that it is movable left or right. When making the adjustment, the coil assembly is moved very slowly. It can be moved by hand or by pivoting one edge of the blade of a screwdriver in the hole, and engaging the blade in the gear teeth of the coil form.

NOTE "B"—After the antenna coil has been tracked at 1400 Kc. it is necessary to check the antenna trimmer (C3) adjustment. If it is necessary to make an appreciable change in trimmer adjustment, it is made so that it is movable left or right. When making the adjustment, the coil assembly is moved very slowly. It can be moved by hand or by pivoting one edge of the blade of a screwdriver in the hole, and engaging the blade in the gear teeth of the coil form.

ALIGNMENT PROCEDURE

• Volume control—Maximum all adjustments.

• SIGNAL GENERATOR—Connect B— of radio chassis to ground post of signal generator through .1 Mfd. condenser.

BAND	Frequency Setting	Connection to Radio	Position of Iron Cores (Dial Setting)	Trimmers Adjusted to Maximum (in Order Shown)
I. F.	455 Kc.	Connect to Antenna Plate	Iron Cores All the way out	Two trimmers on top of output I.F. (See Chassis View)
	455 Kc.	Connect to Antenna Plate	Iron Cores All the way out	Two trimmers on top of input I.F. (See Chassis View)
BROAD-CAST BAND	1690 Kc.	Connect to Antenna Plate	Iron Cores All the way out	Oscillator trimmer (C5) (See Chassis View)
	1690 Kc.	Connect to Antenna Lead	Iron Cores All the way out	Antenna trimmer (C3) (See Chassis View)
	1400 Kc.	Connect to Antenna Lead	Turn Dial to 1400 Kc.	Adjust position of antenna coil right or left. (See Note "A")
	1690 Kc.	Connect to Antenna Lead	Turn Dial to 1690 Kc.	Adjust antenna trimmer (C3) (See Note "B")

FOR SEEBURG C RECORD CHANGER ALIGNMENT FOR MODEL 14BR-692A is the same as that for 14BR-523A except that oscillator trimmer number is C6

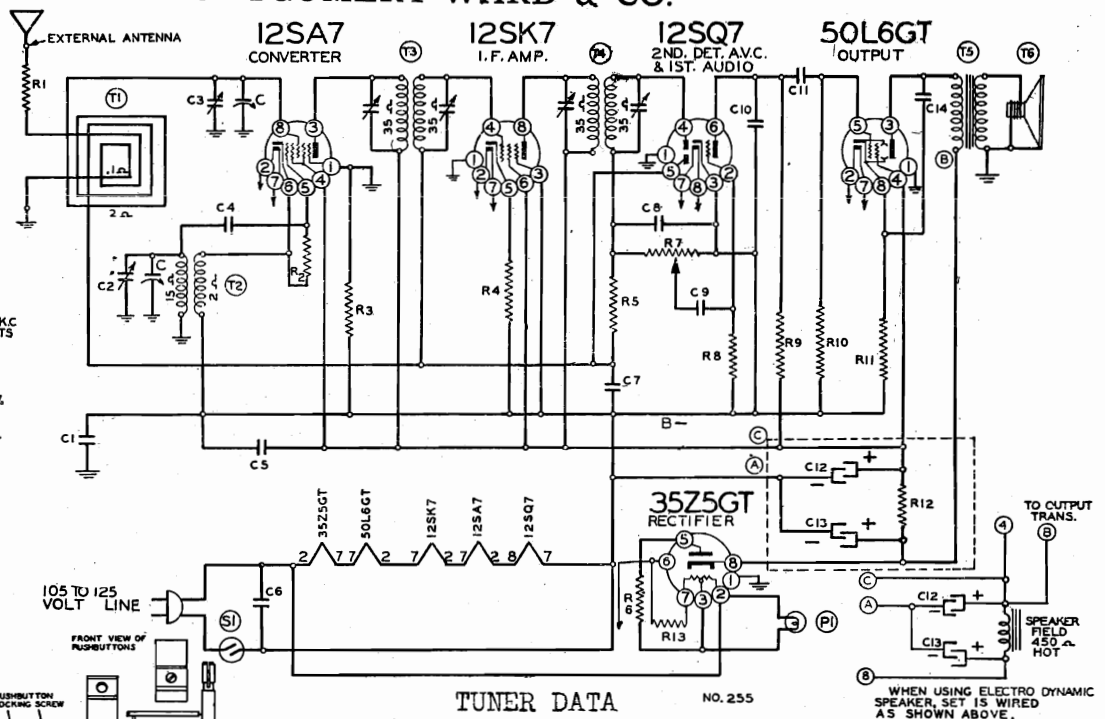
CONDENSERS

CONDENSERS	VALUES
BE1009	C8, C15 .05 x 200 Volt Tubular Condenser
BE100119	C11 .1 x 400 Volt Tubular Condenser
BE10025	C10 .005 x 600 Volt Tubular Condenser
BE10019	C14 .005 x 600 Volt Tubular Condenser
BE10011	C16 .01 x 400 Volt Tubular Condenser
BE1001	C12 .01 x 400 Volt Tubular Condenser
BE100194	C17, C18, C19 Electrolytic Filter Condenser 50 to 60 Volts
	C10, C11 Electrolytic Filter Condenser 25 Cycles
	BE11995 C17, C18, C19 Electrolytic Filter Condenser 25 Cycles
	BE124136 C3, C5 Antenna and Oscillator Dual Trimmer
	BE129114 C2 .0003 Mica Type Condenser—20%
	BE1295 C1, C7, C9 .0001 Mica Type Condenser—20%
	BE129162 C4 .0008 Mica Type Condenser—10%
	BE12912 C3 .00025 Mica Type Condenser—20%
	BE12913 C6 .00005 Ceramic Condenser—10%
	C10, C11 Electrolytic Filter Condenser 25 Cycles
	BE12913 C6 .00005 Ceramic Condenser—10%

MONTGOMERY-WARD & CO. MODELS 14BR-525A, 14BR-526A

JULY 1941

TECHNICAL DATA
TUNING RANGE—535 TO 1600 K.C.
SENSITIVITY—10 MICROVOLTS
AVERAGE.
SELECTIVITY—50 K.C. AT 1000 K.C.
1000 TIMES.
UNDISTORTED POWER
OUTPUT—8 WATT AT 10%
IN VOICE COIL.
MAXIMUM POWER OUTPUT
1.4 WATT IN VOICE COIL.
POWER CONSUMPTION
35 WATTS.
I.F. 455 K.C.



TUNER DATA

NO. 255

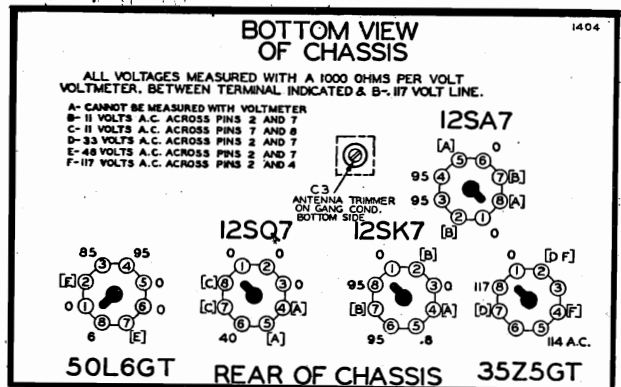
Make a list of your 5 favorite stations—push out the call letters of these stations from the call letter sheets supplied. Next insert a long slim screw driver into the hole in front of one of the pushbuttons and unscrew the pushbutton locking screw (to the left) several turns. Now with the screw driver still engaged in the locking screw slot push it all the way in. Hold it in this position and tune in the station you want with the tuning knob. Now tighten up the pushbutton locking screw by turning it to the right. Tighten firmly. Continue setting each button in the same way. When you have set your stations insert the call letter of each station in the front of the proper button and put one of the celluloid tabs over the station call letter.

To change stations simply repeat the above procedure.

BE10026	C14	.02 x 400 Volt Tubular Condenser	1	.12
BE100106	C11	.004 x 600 Volt Tubular Condenser	1	.12
BE1009	C5, C7	.05 x 200 Volt Tubular Condenser	2	.12
BE100110	C1	.2 x 400 Volt Tubular Condenser	1	.12
BE1001	C6	.1 x 400 Volt Tubular Condenser	1	.12
BE10025	C9	.002 x 600 Volt Tubular Condenser	1	.12
BE11992	C12, C13	Electrolytic Filter Condenser, 50 to 60 Cycles, 20 Mfd.-40 Mfd. x 150 Volts	1	.74
NOTE: BE11992 can be used on 25 to 60 cycles if set uses Electrodynamic Speaker.				
BE11993	C12, C13	Electrolytic Filter Condenser, 25 Cycles, 40 Mfd.-60 Mfd. x 150 Volts	1	1.24
BE1295	C8	.0001 Mica Type Condenser—20%	1	.12
BE12912	C10	.00025 Mica Type Condenser—20%	1	.12
BE12921	C4	.0002 Mica Type Condenser—20%	1	.12
BE13026	R1	1M Ohm—1/4 Watt Resistor—20%	1	.10
BE1303	R9	500M Ohm—1/4 Watt Resistor—20%	1	.10
BE130166	R11	150 Ohm—1/4 Watt Resistor—10%	1	.10
BE1309	R3	200M Ohm—1/4 Watt Resistor—20%	1	.10
BE130257	R8	5 Megohm—1/4 Watt Resistor—25%	1	.10
BE1304	R5	3 Megohm—1/4 Watt Resistor—20%	1	.10
BE130174	R4	50 Ohm—1/4 Watt Resistor—10%	1	.10
BE13094	R2	50M Ohm—1/4 Watt Resistor—10%	1	.10
BE130287	R12	1200 Ohm—1 Watt Resistor—10%	1	.10
BE130215	R6	25 Ohm—1/4 Watt Resistor—10%	1	.10
BE13037	R10	750M Ohm—1/4 Watt Resistor—20%	1	.10
BE130293	R13	30 Ohm—1 Watt Resistor—20%	1	.10

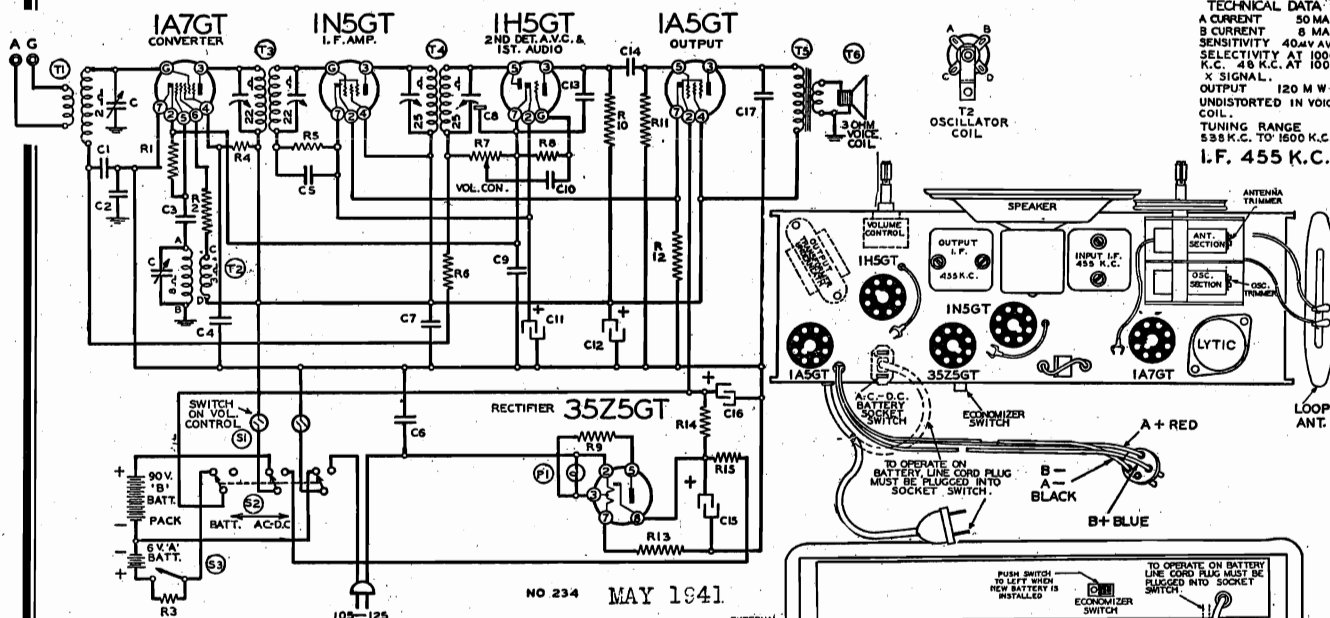
PRICES SUBJECT TO CHANGE WITHOUT NOTICE

- Volume control—Maximum all adjustments.
- Connect B—of radio chassis to ground post of signal generator through .1 Mfd. condenser.



BAND	SIGNAL GENERATOR		Connection to Radio	Variable Condenser Setting	Trimmers Adjusted to Maximum
	Frequency Setting	Dummy Antenna			
I. F.	455 Kc.	.1 MFD.	Grid of 12SK7 I. F.	Rotor full open (Plates out of mesh)	Two trimmers on top of Output I. F.
	455 Kc.	.1 MFD.	Grid of 12SA7 Mixer	Rotor full open (Plates out of mesh)	Two trimmers on top of Input I. F.
BROAD-CAST BAND	1600 Kc.	.1 mmf.	Grid of 12SA7	Rotor full open (Plates out of mesh)	B.C. Osc. trimmer C2 on Gang
	1400 Kc.	200 mmf.	External Antenna and B—	Set Dial at 1400 K. C.	B.C. Ant. trimmer C3 under Gang

The loop antenna should be connected to the radio and in its proper position when making all adjustments.

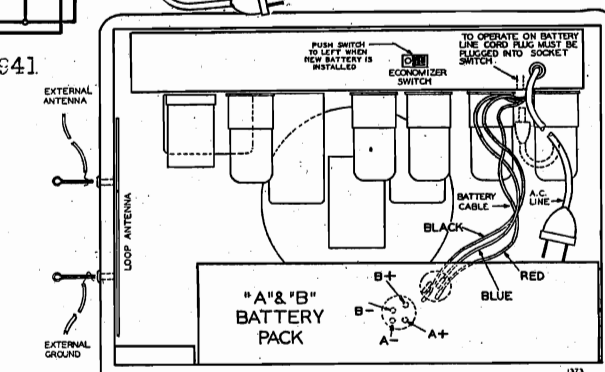


Part No.	Schematic Diagram Reference	Description	No. Used In Set	Selling Price Each
CONDENSERS				
BE10025	C17	.002 x 600 Volt Tubular Condenser	1	.12
BE10026	C6	.02 x 400 Volt Tubular Condenser	1	.12
BE100110	C2	.2 x 400 Volt Tubular Condenser	1	.12
BE100127	C4, C5	.01 x 120 Volt Tubular Condenser	2	.12
BE100128	C1	.05 x 120 Volt Tubular Condenser	1	.12
BE100133	C9	.1 x 120 Volt Tubular Condenser	1	.12
BE100134	C10	.006 x 120 Volt Tubular Condenser	1	.12
BE100135	C7	.25 x 120 Volt Tubular Condenser	1	.12
BE100137	C13, C14	.01 x 200 Volt-.0001 x 200 Volt Dual Tubular Condenser	1	.24
BE119126	C11, C12, C15	C16 Electrolytic Filter Condenser, 20 Mfd. x 150 V.; 40 Mfd. x 150 V.; 40 Mfd. x 150 V.; 200 Mfd. x 10 V. 50-60 Cycles	1	.74
BE1295	C3	.0001 Mica Type Condenser	1	.12

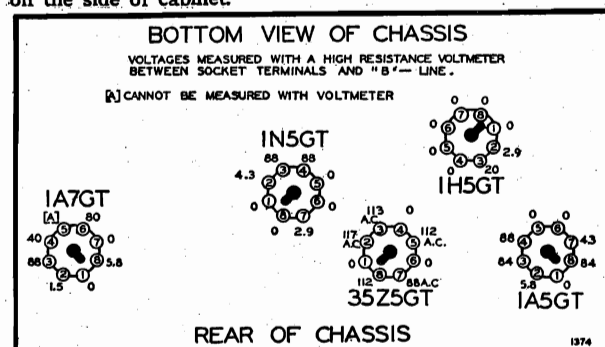
BE1304	R6, R11	3 Megohm- $\frac{1}{2}$ Watt Resistor-20%	2	.10
BE1309	R1	200M Ohm- $\frac{1}{2}$ Watt Resistor-20%	1	.10
BE13019	R10	1 Megohm- $\frac{1}{2}$ Watt Resistor-20%	1	.10
BE13085	R2	3M Ohm- $\frac{1}{2}$ Watt Resistor-20%	1	.10
BE130129	R15	2500 Ohm- $\frac{1}{2}$ Watt Resistor-10%	1	.10
BE130197	R3, R9	20 Ohm- $\frac{1}{2}$ Watt Resistor-10%	2	.10
BE130200	R12	700 Ohm- $\frac{1}{2}$ Watt Resistor-10%	1	.10
BE130223	R5, R8	10 Megohm- $\frac{1}{2}$ Watt Resistor-20%	2	.10
BE130305	R4	65M Ohm- $\frac{1}{2}$ Watt Resistor-10%	1	.10
BE130343	R13	545 Ohm- $\frac{1}{4}$ Watt Resistor-5%	1	.28
BE130344	R14	1975 Ohm-6 Watt Resistor-5%	1	.28

The following equipment is required for aligning.

- Dummy antenna .1 mfd. and 200 mmf.



BATTERY CONNECTIONS—When replacing battery, plug cable into battery socket as shown above. Note: Clips for connecting an external antenna and ground are shown on the side of cabinet.

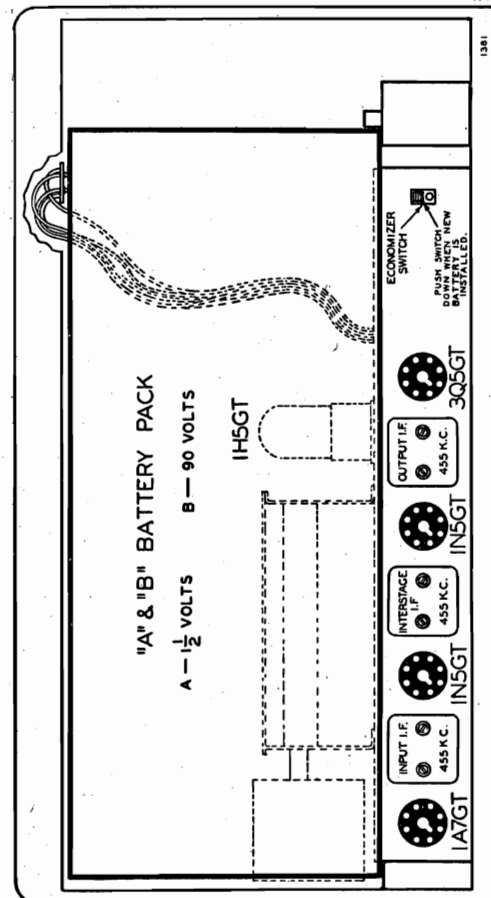


- Volume control—Maximum all adjustments.
- Connect B— of radio chassis to ground post of signal generator.

BAND	SIGNAL GENERATOR		Connection to Radio	Dial Setting	Trimmers Adjusted (in Order Shown)	Adjustment
	Frequency Setting	Dummy Antenna				
455 Kc. I. F.	455 Kc.	.1 MFD.	Connect to Grid of 1A7	Rotor full open (Plates out of mesh)	Input and Output Trimmers on Top of I. F. cans	Maximum output (See Note "A")
BROADCAST BAND	1600 Kc.	.1 MFD.	Connect to Grid of 1A7	Rotor full open (Plates out of mesh)	Osc. Trimmer on gang (See chassis view)	Maximum output (See Note "A")
	1400 Kc.	200 MMF.	Connect to Antenna Clip	Set dial at 1400 Kc.	Ant. Trimmer on gang (See chassis view)	Maximum output (See Note "B")

NOTE "A"—The loop antenna need not be connected to the radio when making these adjustments, but a 1. Meg. Resistor must be substituted across the loop clips. The ground of the signal generator is connected to the B-- and the other lead from the signal generator in series with .1 MFD. dummy to the grid of the 1A7GT tube.

NOTE "B"—This adjustment should be made with the ground lead of the signal generator connected to the external ground terminal. The other lead of the signal generator is connected in series with a 200 Mmf. dummy to the external antenna terminal.



MODEL 14BR-574A

MONTGOMERY WARD & CO.

ALIGNMENT PROCEDURE

- Volume control—Maximum all adjustments.
- Connect radio chassis to ground post of signal generator.

BAND	SIGNAL GENERATOR		Connection to Radio	Position of Band Switch	Variable Condenser Setting	Trimmers Adjusted to Max.
I. F.	Frequency Setting	Dummy Antenna				
	455 Kc.	.1 MFD.	Grid of 1N5G 2nd I. F.	Broadcast	Rotor full open (Plates out of mesh)	Two trimmers on top of Output I. F.
	455 Kc.	.1 MFD.	Grid of 1N5G 1st I. F.	Broadcast	Rotor full open (Plates out of mesh)	Two trimmers on top of Interstage I. F.
SHORT WAVE BAND	455 Kc.	.1 MFD.	Grid of 1A7G Mixer	Broadcast	Rotor full open (Plates out of mesh)	Two trimmers on top of Input I. F.
	16 Mc.	400 ohms	Antenna lead	Short Wave	Set Dial at 16 Mc.	Trimmer C6— S. W. osc. Top of front section of gang
	16 Mc.	400 ohms	Antenna lead	Short Wave	Set Dial at 16 Mc.	Trimmer C2 S. W. antenna
BROADCAST BAND	6 Mc.	400 ohms	Antenna lead	Short Wave	Set Dial at 6 Mc.	Trimmer C7 S. W. osc. series pad (See note "A")
	1720 Kc.	200 mmf.	Antenna lead	Broadcast	Rotor full open (Plates out of mesh)	Trimmer C8 B. C. osc.
	1500 Kc.	200 mmf.	Antenna lead	Broadcast	Set Dial at 1500 Kc.	Trimmer C3 B. C. antenna
	600 Kc.	200 mmf.	Antenna lead	Broadcast	Set Dial at 600 Kc.	Trimmer C9 B. C. osc. series pad (See note "A")

NOTE "A" Turn the dial back and forth slightly (rock) and adjust trimmer until the peak of greatest intensity is obtained.

ANTENNA

For best results, an outside antenna approximately 50 to 75 feet long including lead-in is recommended. It should be erected as high as possible and as far from surrounding objects as practical. For minimum interference it should be at right angles to street car lines,

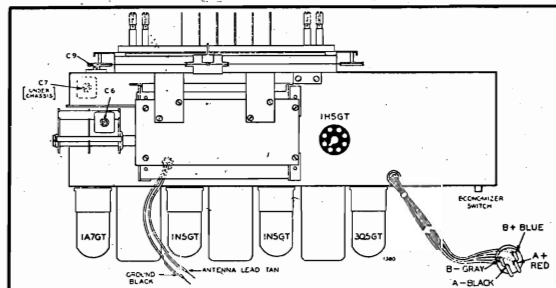
incoming power lines and other electrical apparatus which may be in the vicinity. A ground is advisable. A good ground will often reduce noise. The ground wire should be connected with a clamp to a well cleaned water pipe or to a piece of pipe driven several feet into damp earth.

SETTING THE PUSHBUTTONS

Make a list of your 6 favorite stations. Push out the call letters of these stations from the call letter sheets supplied. Insert a call letter in the slot on top of each pushbutton.

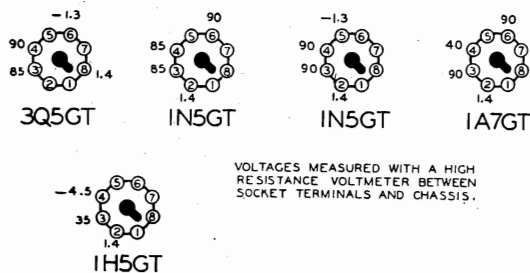
Next pull one of the pushbuttons all the way out as far as it will come (pull, with fingers on top and bottom of button). Now tune in the station you want with the tuning knob—Tune back and forth until the station is clear and distinct. Now push the button hard all the way in to lock the station in place. Continue setting each pushbutton in the same way. Pressing the proper button will now tune the station you want. If it does not do so you did not push the button hard enough to lock it in place when setting up the station.

To change stations simply repeat the procedure above.



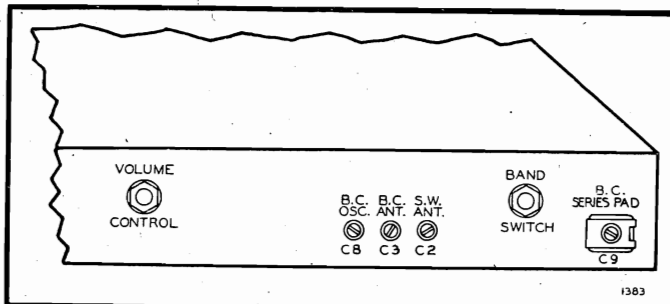
CHASSIS VIEW showing tube location and battery cable.
NOTE: Antenna and ground leads at back of chassis.

BOTTOM VIEW OF CHASSIS



VIEW LOOKING AT BOTTOM SIDE OF TUBE SOCKETS

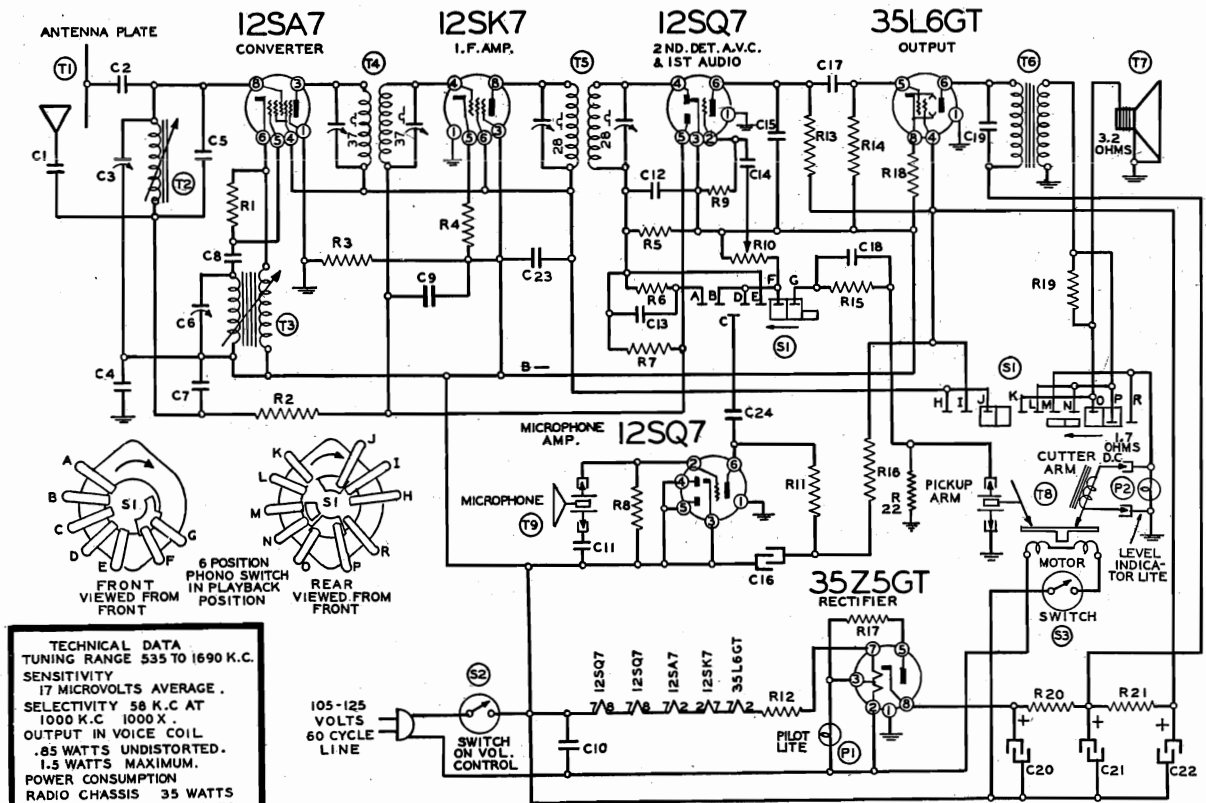
VOLTAGE CHART



TRIMMER VIEW—Looking at front of chassis.

MONTGOMERY-WARD & CO.

MODEL 14BR-629A

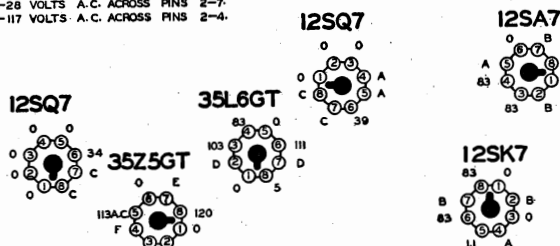


JULY 1941

BOTTOM VIEW OF CHASSIS
 ALL VOLTAGES MEASURED BETWEEN B- & TERMINAL INDICATED, WITH A 1000 OHMS PER VOLT VOLTMETER. 117 VOLT LINE, PHONO SWITCH IN RADIO POSITION, VOLUME CONTROL AT MINIMUM, & ANTENNA LEAD GROUND TO CHASSIS.

A—CANNOT BE MEASURED WITH VOLTMETER.
 B—11.5 VOLTS A.C. ACROSS PINS 2-7.
 C—11.5 VOLTS A.C. ACROSS PINS 7-8.
 D—35 VOLTS A.C. ACROSS PINS 2-7.
 E—28 VOLTS A.C. ACROSS PINS 2-7.
 F—117 VOLTS A.C. ACROSS PINS 2-4.

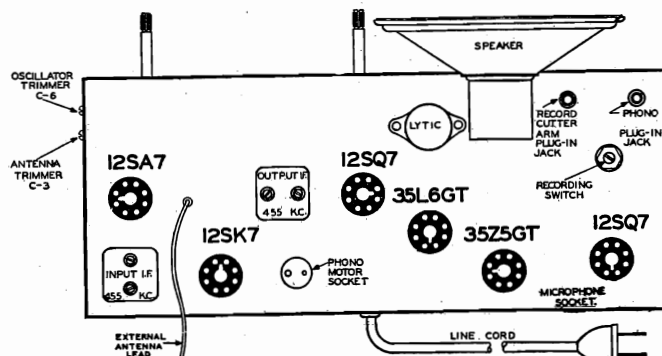
VOLTAGE CHART



REAR OF CHASSIS

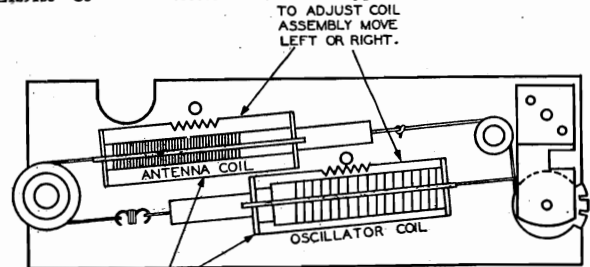
1433

PRICES SUBJECT TO CHANGE WITHOUT NOTICE



FOR GENERAL INDUSTRIES R70 RECORD CHANGER, SEE RIDER'S "AUTOMATIC RECORD CHANGERS AND RECORDERS".

BE101273	R10, S2	Volume Control and Switch (1 Megohm).....	1	.62
BE130176	R1	20M Ohm—1/4 Watt Resistor—10%.....	1	.10
BE130168	R4, R19	100 Ohm—1/4 Watt Resistor—10%.....	2	.10
BE1309	R2, R3	200M Ohm—1/4 Watt Resistor—20%.....	2	.10
BE1304	R7, R8	3 Megohm—1/4 Watt Resistor—20%.....	2	.10
BE130118	R5	600M Ohm—1/4 Watt Resistor—20%.....	1	.10
BE130257	R9	5 Megohm—1/4 Watt Resistor—25%.....	1	.10
BE1303	R11, R13	500M Ohm—1/4 Watt Resistor—20%.....	2	.10
BE130166	R18	150 Ohm—1/4 Watt Resistor—10%.....	1	.10
BE13037	R14	750M Ohm—1/4 Watt Resistor—20%.....	1	.10
BE13097	R20	200 Ohm—1/4 Watt Resistor—10%.....	1	.10
BE130287	R21	1200 Ohm—1 Watt Resistor—10%.....	1	.10
BE130215	R17	25 Ohm—1/2 Watt Resistor—10%.....	1	.10
BE13020	R16	100M Ohm—1/4 Watt Resistor—20%.....	1	.10
BE13019	R15, R22	1 Megohm—1/4 Watt Resistor—20%.....	1	.10
BE130288	R12	50 Ohm—1/4 Watt Resistor—20%.....	1	.10
BE13038	R6	2 Megohm—1/4 Watt Resistor—20%.....	1	.10
BE100119	C4	.1 x 400 Volt Tubular Capacitor.....	1	.12
BE1001	C10	.1 x 400 Volt Tubular Capacitor.....	1	.12
BE1009	C9, C23	.05 x 200 Volt Tubular Capacitor.....	2	.12
BE10019	C17	.006 x 600 Volt Tubular Capacitor.....	1	.12
BE10011	C19	.01 x 400 Volt Tubular Capacitor.....	1	.12
BE10025	C14	.002 x 600 Volt Tubular Capacitor.....	1	.12
BE100141	C11	.22 x 200 Volt Tubular Capacitor.....	1	.12
BE11994	C20, C21, C22	Electrolytic Filter Capacitor. 60 Cycles. 40 Mfd. x 150 V.; 20 Mfd. x 150 V.; 20 Mfd. x 150 V.....	1	.86
BE119117B	C16	Electrolytic Filter Capacitor. 10 Mfd. x 150 Volts.....	1	.26
BE124136	C3, C6	Ant. and Osc. Dual Adjustable Capacitor.....	1	.24
BE129114	C2, C15	.0003 Mica Type Capacitor—20%.....	2	.12
BE1295	C1, C8	.0001 Mica Type Capacitor—20%.....	2	.12
BE129162	C7	.0008 Mica Type Capacitor—10%.....	1	.12
BE12960	C12	.00015 Mica Type Capacitor—20%.....	1	.12
BE12921	C18	.0002 Mica Type Capacitor—20%.....	1	.12
BE1292	C13, C24	.0005 Mica Type Capacitor—20%.....	2	.12
BE129183	C5	.00005 Ceramicon Type Capacitor—10%.....	1	.16

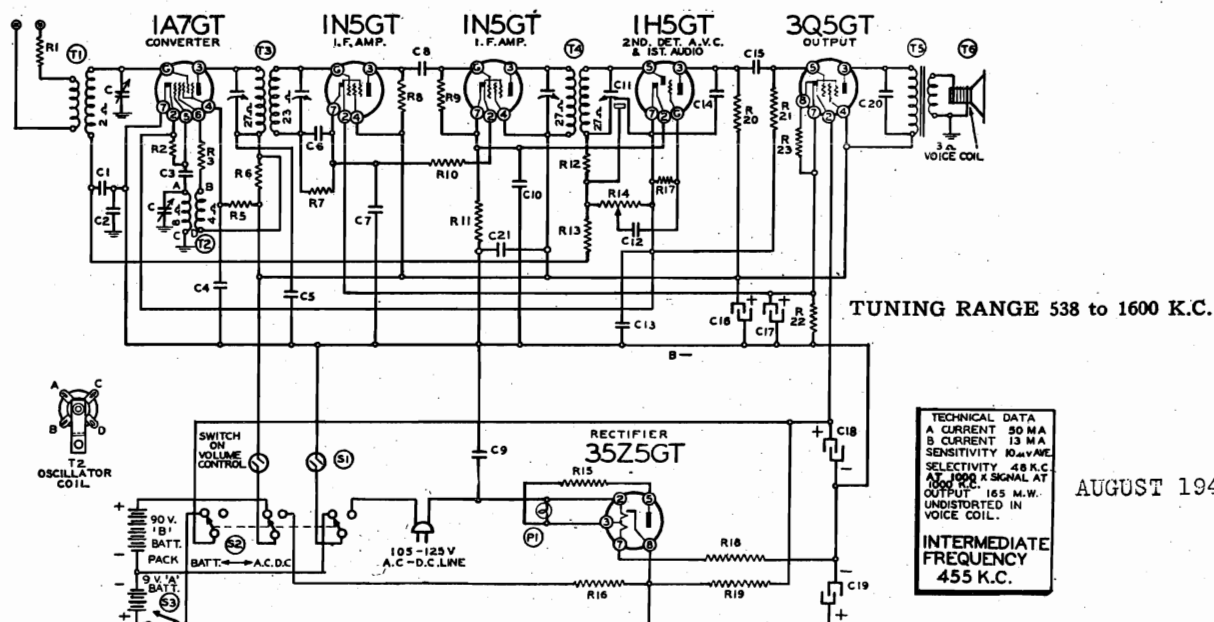


NOTE: THE ANTENNA COIL ASSEMBLY IS MADE SO THAT IT IS MOVABLE LEFT OR RIGHT. WHEN MAKING THE ADJUSTMENT AS GIVEN IN THE ALIGNMENT PROCEDURE MOVE COIL ASSEMBLY VERY SLOWLY

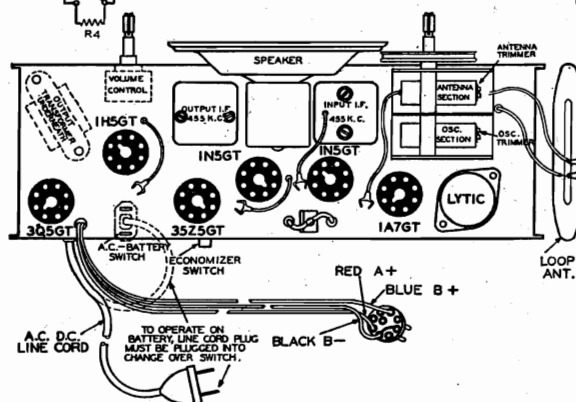
FOR ALIGNMENT SEE INDEX

MODEL 14BR-684A

MONTGOMERY-WARD & CO.



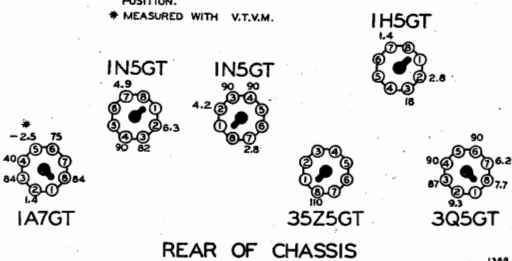
AUGUST 1941



BOTTOM VIEW OF CHASSIS

VOLTAGES MEASURED WITH A HIGH RESISTANCE VOLTMETER BETWEEN SOCKET TERMINALS AND "B" LINE WITH NEW BATTERY AND ECONOMIZER SWITCH IN SHORTED POSITION.

* MEASURED WITH V.T.V.M.



REAR OF CHASSIS

BE13019	R20	1 Megohm— $\frac{1}{2}$ Watt Resistor—20%	1	.10
BE1304	R13, R21	3 Megohm— $\frac{1}{2}$ Watt Resistor—20%	2	.10
BE130257	R7, R9, R17	5 Megohm— $\frac{1}{2}$ Watt Resistor—25%	3	.10
BE130197	R4, R15	20 Ohm— $\frac{1}{2}$ Watt Resistor—10%	2	.10
BE130129	R16	2500 Ohm— $\frac{1}{2}$ Watt Resistor—10%	1	.10
BE130192	R11	2M Ohm— $\frac{1}{2}$ Watt Resistor—10%	1	.10
BE130347	R10	15 Ohm— $\frac{1}{2}$ Watt Resistor—10%	1	.10
BE13022	R8	5M Ohm— $\frac{1}{2}$ Watt Resistor—20%	1	.10
BE13085	R3, R6	3M Ohm— $\frac{1}{2}$ Watt Resistor—20%	2	.10
BE130200	R22	700 Ohm— $\frac{1}{2}$ Watt Resistor—10%	1	.10
BE1309	R2	200M Ohm— $\frac{1}{2}$ Watt Resistor—20%	1	.10
BE130305	R5	65M Ohm— $\frac{1}{2}$ Watt Resistor—10%	1	.10
BE13026	R1	1M Ohm— $\frac{1}{2}$ Watt Resistor—20%	1	.10
BE130329	R12	47M Ohm— $\frac{1}{2}$ Watt Resistor—20%	1	.10
BE130343	R18	545 Ohm— $\frac{1}{2}$ Watt W.W. Resistor—5%	1	.28
BE130344	R19	1975 Ohm— $\frac{1}{2}$ Watt W.W. Resistor—5%	1	.22
BE130222	R23	350 Ohm— $\frac{1}{2}$ Watt Resistor—10%	1	.10
BE10071	C20	.004 x 600 V. Tubular Condenser	1	.12
BE100110	C2	.2 x 400 V. Tubular Condenser	1	.12
BE100127	C4, C6	.01 x 120 V. Tubular Condenser	2	.12
BE100128	C1	.05 x 120 V. Tubular Condenser	1	.12
BE100133	C5	.1 x 200 V. Tubular Condenser	1	.12
BE100134	C12	.006 x 120 V. Tubular Condenser	1	.12
BE100135	C7, C10, C13	.25 x 200 V. Tubular Condenser	3	.12
BE100137	C15, C14	.01 x 200 V.; .0001 x 200 V. Dual Tubular Condenser	1	.24
BE10020	C21	.1 x 200 V. Tubular Condenser	1	.12
BE119126	C16, C17, C18, C19	Electrolytic Filter Condenser 20 Mfd. x 50 V.; 40 Mfd. x 150 V.; 40 Mfd. x 150 V.; 200 Mfd. x 10 V. 50-60 Cycles	1	.74
BE1292	C8	.0005 Mica Type Condenser—20%	1	.12
BE1295	C3	.0001 Mica Type Condenser—20%	1	.12
BE10026	C9	.02 x 400 Volt Tubular Condenser	1	.12

PRICES SUBJECT TO CHANGE WITHOUT NOTICE.

The following equipment is required for aligning.

- Dummy antenna .1 mfd. and 200 mmf.

ALIGNMENT PROCEDURE

- Volume control—Maximum all adjustments.

- Connect B— of radio chassis to ground post of signal generator.

BAND	Frequency Setting	Dummy Antenna	Connection to Radio	Dial Setting	Trimmers Adjusted (in Order Shown)	Adjustment
455 Kc. I. F.	455 Kc.	.1 MFD.	Connect to Grid of 1A7	Rotor full open (Plates out of mesh)	Input and Output Trimmers on Top of I. F. cans	Maximum output (See Note "A")
BROAD-CAST BAND	1600 Kc.	.1 MFD.	Connect to Grid of 1A7	Rotor full open (Plates out of mesh)	Osc. Trimmer on gang (See chassis view)	Maximum output (See Note "A")
	1400 Kc.	200 MMF.	Connect to Antenna Clip	Set dial at 1400 Kc.	Ant. Trimmer on gang (See chassis view)	Maximum output (See Note "B")

NOTE "A"—The loop antenna need not be connected to the radio when making these adjustments, but a 1. Meg. Resistor must be substituted across the grid clips. The ground of the signal generator is connected to the B— and the other lead from the signal generator in series with .1 MFD. dummy to the grid of the 1A7GT tube.

NOTE "B"—This adjustment should be made with the ground lead of the signal generator connected to the external ground terminal. The other lead of the signal generator is connected in series with a 200 Mmf. dummy to the external antenna terminal.

MONTGOMERY WARD & CO.

MODEL 14BR-681A

Schematic
Diagram
Ref. No. Part No.

Description

RESISTORS

R1	BE130330	220M ohm— $\frac{1}{2}$ w.
R2	BE130333	1500 ohm— $\frac{1}{2}$ w.
R3	BE130334	25M ohm— $\frac{1}{2}$ w.
R4	BE130329	47M ohm— $\frac{1}{2}$ w.
R5	BE130192	2M ohm— $\frac{1}{2}$ w.
R6	BE130196	30M ohm—1 watt
R7	BE13019	1 Megohm— $\frac{1}{2}$ w.
R8	BE130329	47M ohm— $\frac{1}{2}$ w.
R9	BE101246	500M ohm volume control
R10	BE130257	5 megohm— $\frac{1}{2}$ w.
R11	BE13011	250M ohm— $\frac{1}{2}$ w.
R12	BE13019	1 Megohm— $\frac{1}{2}$ w.
R13	BE130267	550 ohm— $\frac{1}{2}$ w.
R14	BE130168	100 ohm— $\frac{1}{2}$ w.
R15	BE130168	100 ohm— $\frac{1}{2}$ w.
R16	BE130199	1500 ohm—1 watt
R17	BE130168	100 ohm— $\frac{1}{2}$ w.

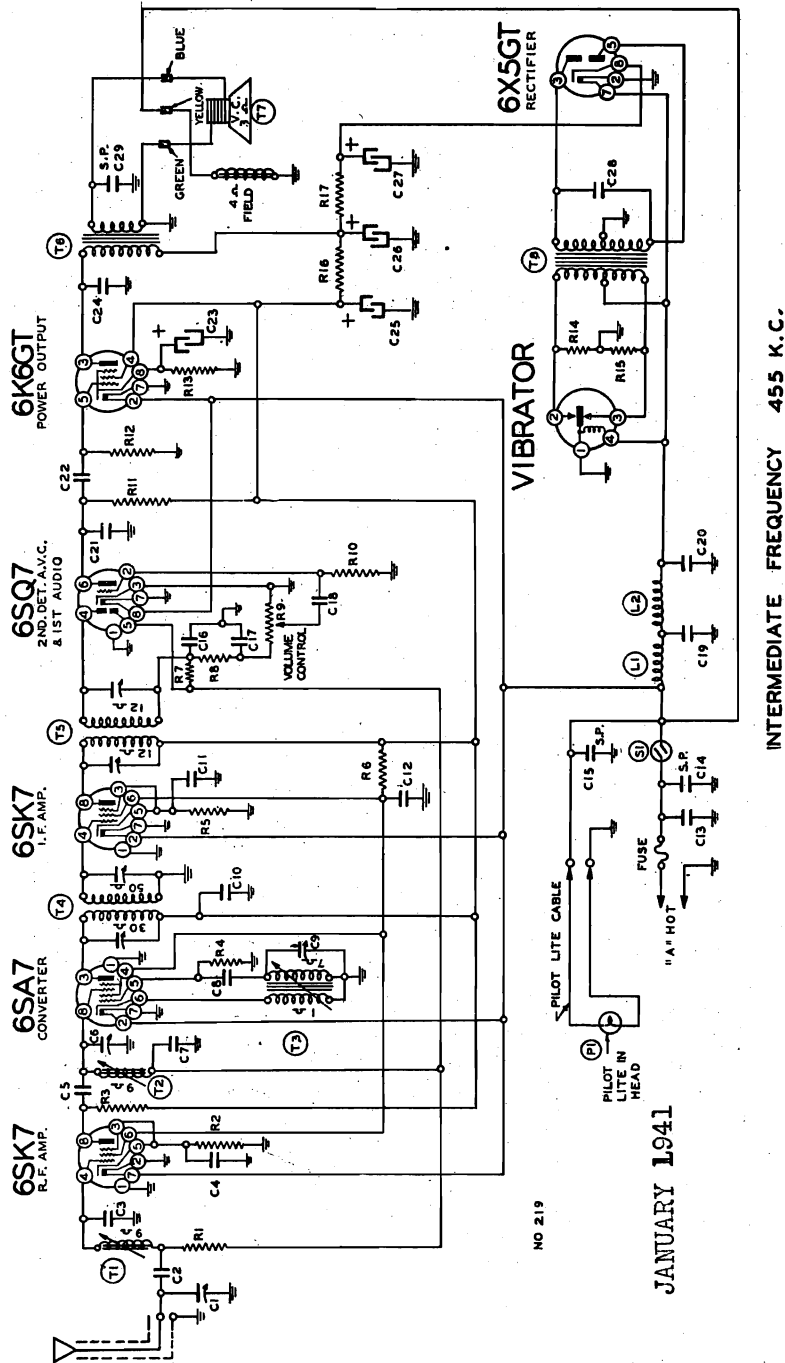
CONDENSERS

C1	BE124157	Antenna Trimmer
C2	BE100127	.01 x 120 v.
C3	BE129172	.0001 Ceramicon
C4	BE100128	.05 x 120 v.
C5	BE129141	.0001 Ceramicon
C6	BE124129	R.F. Trimmer
C7	BE100129	.02 x 120 v.
C8	BE100172	.0001 Ceramicon
C9	BE124158	Oscillator Trimmer
C10	BE1001	.1 x 400 v.
C11	BE100128	.05 x 120 v.
C12	BE10053	.25 x 120 v.
C13	BE10031	.5 x 120 v.
C14	BE115687	Spark Plate
C15	BE115710	Spark Plate
C16	BE129163B	.0005 Mica
C17	BE129163B	.0005 Mica
C18	BE100127	.01 x 120 v.
C19	BE10031	.5 x 120 v.
C20	BE10031	.5 x 120 v.
C21	BE100130	.0025 x 400 v.
C22	BE100130	.02 x 400 v.
C23	BE11975	10.0 mid. x 25 volt lytic
C24	BE10087	.01 x 600 v.
C25	BE119120	15.0 mid. x 350 v. lytic
C26	BE119120	15.0 mid. x 350 v. lytic
C27	BE119120	15.0 mid. x 350 v. lytic
C28	BE100100	.008 x 1600 v.
C29	BE115710	Spark Plate

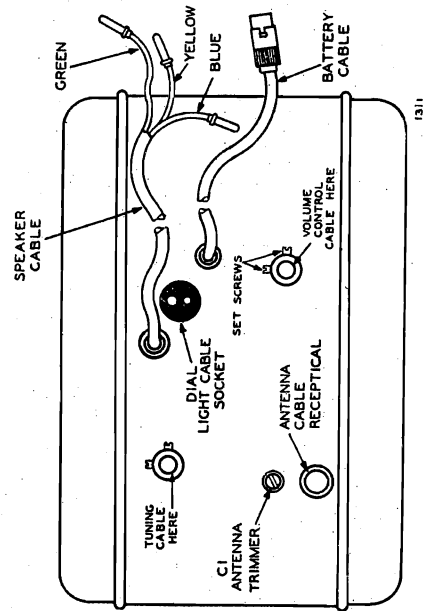
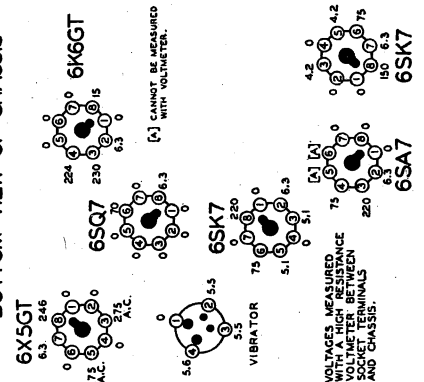
C16 and C17 are in same unit.
C21 and C22 are in same unit.
C25, C26, and C27 are in same unit.

PARTS

T1	BE11231	Antenna Coil Assembly
T2	BE10963	R.F. Coil Assembly
T3	BE110174	Oscillator Coil Assembly
T4	BE108194	Input I.F. Coil 455 Kc.
T5	BE108196	Output I.F. Coil 455 Kc.
T6	BE105125	Output Transformer
T7	BE114234	6" Dynamic Speaker
T8	BE104190C	Power Transformer
L1	BE10519	"A" Choke
L2	BE10519	"A" Choke
S1		on and off switch on volume control
F1	BE10797	Pilot Lite



BOTTOM VIEW OF CHASSIS



ALIGNMENT PROCEDURE

The following equipment is required for aligning:

- An all wave signal generator which will provide an accurately calibrated signal at the test frequencies as listed.
- Output indicating meter.
- Non-metallic screwdriver.
- Dummy antennas—1 ml., 35 mmf.

BAND	SIGNAL GENERATOR Frequency Setting	Dummy Antenna	Connection to Radio	Remote Tuner Dial Setting	Trimmers Adjusted (in Order Shown)	Trimmer Function	Adjustment
I. F.	455 Kc.	.1 MFD.	Grid of 6SK7 I. F. Tube	Set dial at 1400 Kc.	See Chassis View	Output I. F.	Adjust to maximum output
	455 Kc.	.1 MFD.	Grid of 6SA7 I. F. Tube	Set dial at 1400 Kc.	See Chassis View	Input I. F.	Adjust to maximum output
BROADCAST BAND	1600 Kc.	35 mmf.	Antenna lead	Set dial at 1600 Kc.	Trimmer C9, C6, C1 See Chassis View	Oscillator R. F. antenna	Adjust to maximum output
	1400 Kc.	35 mmf.	Antenna lead	Set dial at 1400 Kc.	Rotate cores of antenna and R. F. coils	Antenna and R. F.	Adjust to maximum output

HIGH AND LOW TENSION LEADS

In many cars the low tension battery leads, etc., are grouped together with the high tension wires. These leads will very often pick up motor noise and feed it into the receiver through the battery circuit. In cases such as these it will be necessary to separate the low tension from the high tension wires and run them through another hole if they run from the engine compartment up to the instrument panel. This condition is particularly true on the V-8 Ford as the battery and primary leads run through a special tube which also houses the high tension leads. Shield and ground

AMMETER CONDENSER

A .5 Mfd. by pass condenser should be connected from one ammeter terminal to a good ground on the instrument panel. Usually this condenser plus the generator condenser and distributor suppressor will remove all objectionable ignition noise.

GENERATOR CONDENSER

A Generator Condenser must be connected in all cases from the battery terminal of the generator to the Generator frame.

This condenser must not be connected across the field winding terminal on late cars which use Automatic Cutouts.

It is advisable that you find out from your local car dealers where the manufacturer recommends the condenser be connected for each make of car.

CALIBRATING THE DIAL

Tune set to some station of a known frequency (between 800 and 1200 K.C.), hold selector knob, then remove pilot light assembly from back of remote head and with a screw driver adjust the slotted screw through this opening and in this way adjust the dial pointer to the correct frequency setting.

otherwise it may prove difficult to eliminate ignition noise.

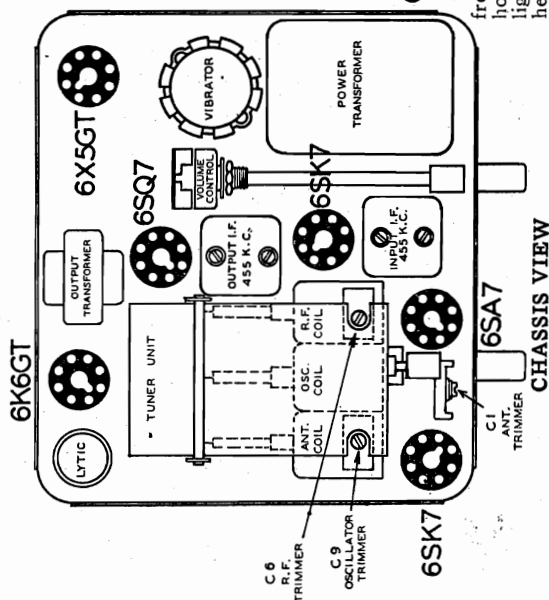
Tune in a station on the high frequency end of the dial and adjust the antenna trimmer for maximum volume. A weak station which does not fade is best for this adjustment.

The antenna lead supplied with the radio should not be shortened or otherwise altered.

It is important that the grounding lead on the end of the antenna cable be carefully grounded to the car body,

ADJUSTING THE ANTENNA TRIMMER

The input circuit has been especially designed to be used with a low capacity antenna of the fish pole or whip type.



**CLASSIS VIEW
SHOWING TRIMMER POSITIONS**

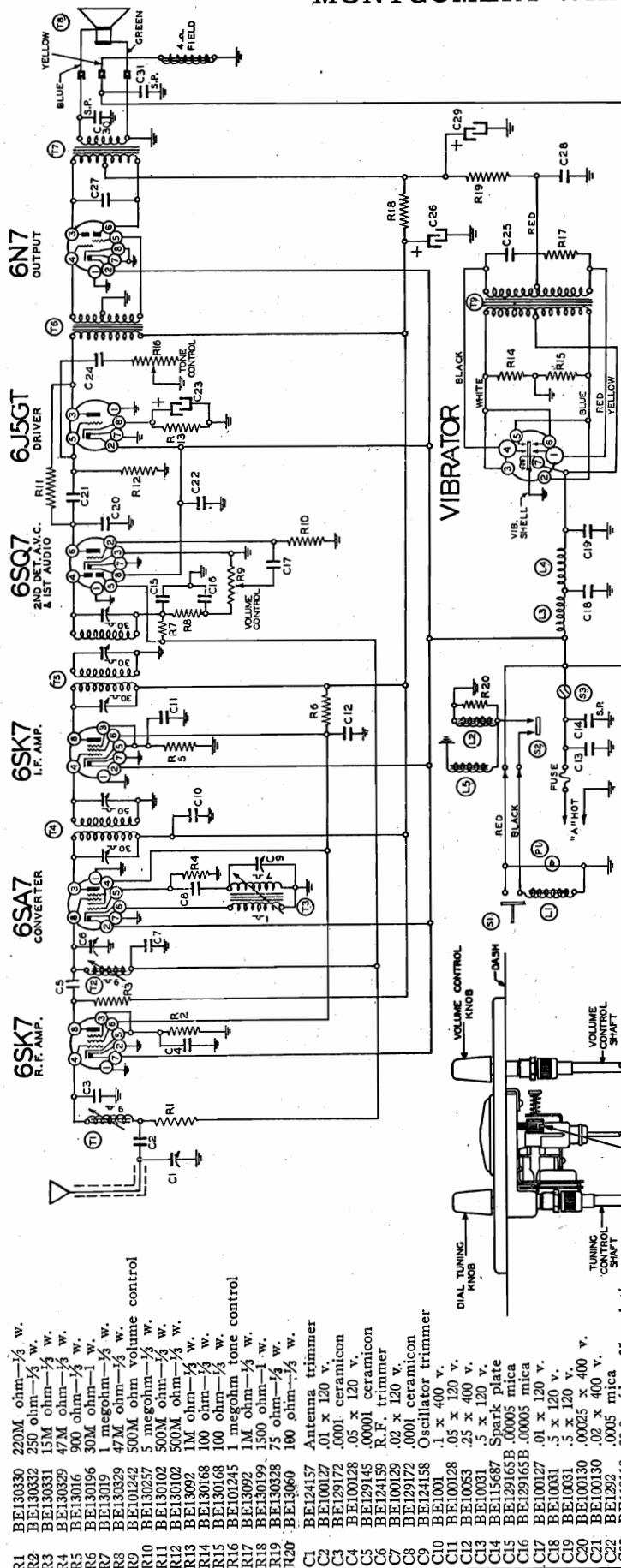
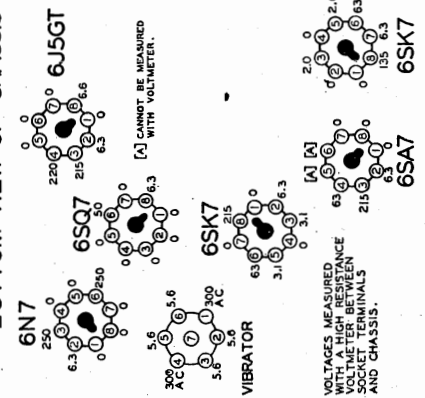
JANUARY 1941

CALIBRATING THE DIAL

Turn the manual tuning knob and set the dial at 540 KC or 1600 KC whichever end the dial scale will reach. Now tighten the pointer adjustment screw (see Dash Control Rear View) this will lock the dial scale in place.

Turn the manual tuning knob to the right until it stops if you have the dial scale set at 540 Kc. Turn it to the left if it is set at 1600 Kc. Next loosen the adjustment screw to unlock the dial scale.

BOTTOM VIEW OF CHASSIS



C15 and C16 are in same unit
C20 and C21 are in same unit
C23, C26 and C29 are in same unit

Battery Drain	-	-	-	-	-	7.8 Amps.
Power Output	-	-	-	-	5 1/2 Watts	Undistorted
Sensitivity for 1 Watt Output	-	-	-	-	1 Microvolt	Average
Selectivity - 38 KC Broad at 1000 Times Signal at 1000 KC	-	-	-	-	-	-
Tuning Frequency Range	-	-	-	-	540 to 1600 KC	-
Intermediate Frequency	-	-	-	-	-	455 KC
Speaker	-	-	-	-	6 in. Electro Dynamic	-

©John F. Rider

- Volume control—Maximum all adjustments.
- Connect radio chassis to ground post of signal generator with a short heavy lead.
- Connect dummy antenna value in series with generator output lead.
- Connect output meter across primary of output transformer.
- Allow chassis and signal generator to "heat up" for several minutes.

The following equipment is required for aligning:

- An all wave signal generator which will provide an accurately calibrated signal at the test frequencies as listed.
- Output indicating meter.
- Non-metallic screwdriver.
- Dummy antennas—1 mt., 35 mmf.

SIGNAL GENERATOR

BAND	Frequency Setting	Dummy Antenna	Connection to Radio	Remote Tuner Dial Setting	Trimmers Adjusted (in Order Shown)	Trimmer Function	Adjustment
I. F.	435 Kc.	.1 MFD.	Grid of 6SK7 I. F. Tube	Set dial at 1400 Kc.	See Chassis View	Output I. F.	Adjust to maximum output
	435 Kc.	.1 MFD.	Grid of 6SA7 I. F. Tube	Set dial at 1400 Kc.	See Chassis View	Input I. F.	Adjust to maximum output
BROAD-CAST BAND	1600 Kc.	35 mmf.	Antenna lead	Set dial at 1600 Kc.	Trimmer C9, C6, C1 Chassis View	Oscillator R. F. antenna	Adjust to maximum output
	1400 Kc.	35 mmf.	Antenna lead	Set dial at 1400 Kc.	Rotate cores of antenna and R. F. coils	Antenna and R. F.	Adjust to maximum output

SETTING UP THE AUTOMATIC TUNING

NOTE: Stations may be set up on the bench, before installing radio.

There are three major steps in setting up the automatic. Take these steps in order. After you become familiar with them, you may vary the routine, but you will then know the operations needed.

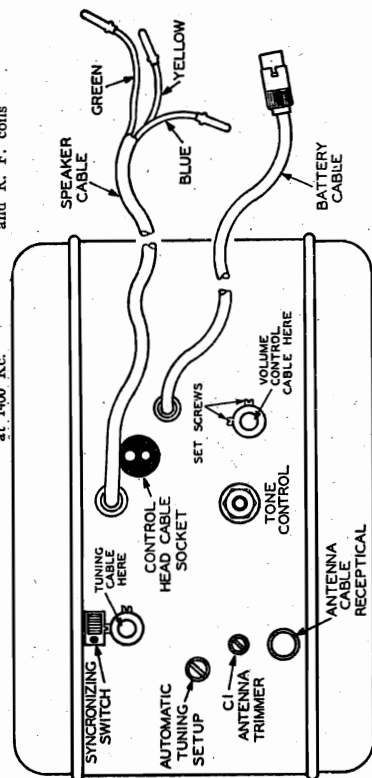
1st—To Synchronize the word "Dial" on the dial scale with the "Dial" position in the Chassis Tuner.

Note—The word "dial" is short for manual tuning.

2nd—To select one station and put it on the first automatic position.

3rd—To put the call letter on the dial.

The synchronizing must be done only once, but items two and three are repeated until 5 Automatic Positions are set up.



1305

ADJUSTING THE ANTENNA TRIMMER

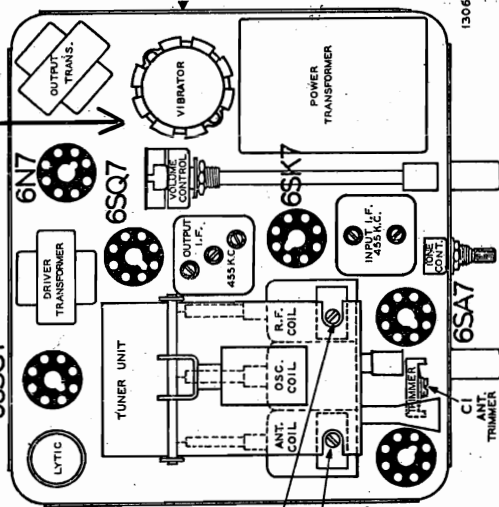
The input circuit has been especially designed to be used with a low capacity antenna of the fish pole or whip type.

The antenna lead supplied with the radio should not be shortened or otherwise altered.

It is important that the grounding lead on the end of the antenna cable be carefully grounded to the car body, otherwise it may prove difficult to eliminate ignition noise.

Tune in a station on the high frequency end of the dial and adjust the antenna trimmer for maximum volume. A weak station which does not fade is best for this adjustment.

NOTE: CHECK VIBRATOR POLARITY THRU OPENING ON THIS SIDE OF CASE.



CHASSIS VIEW

1306

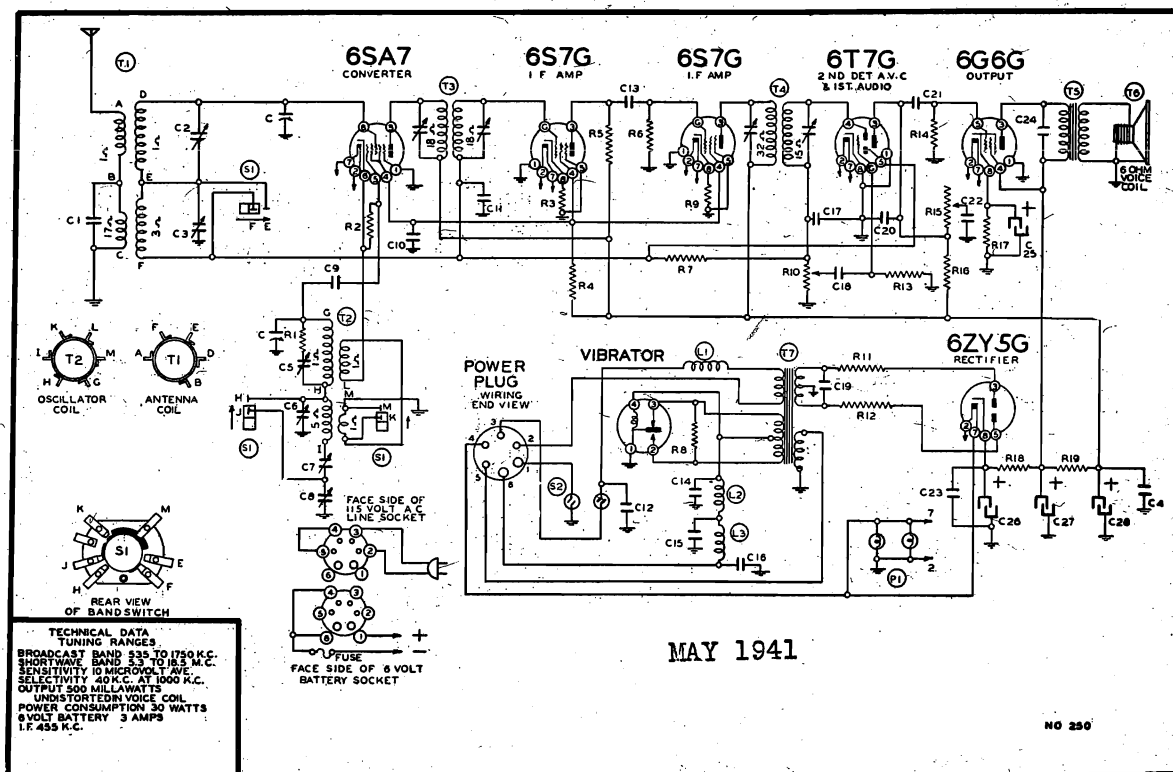
SYNCHRONIZING (Step 1) SELECT ONE STATION (Step 2) CALL LETTER ON THE DIAL (Step 3)

See that the Synchronizing Switch on the chassis case is closed (white dot showing). Press the tuning knob once. Position, press the tuning knob once and re-up on, paste the call letter on the dial. Let it come back—and then see if the lease. It is now in the first automatic before setting up another station. knob will tune in stations (Don't forget step. Insert a long screw driver in the to turn up the volume control). Repeat automatic tuner set up hole and turn. The dial crystal should be removed for this purpose and the proper station call pasted on the automatic scale at the top where it will show thru the Manual Tuning (Dial) Position.

Now open the "Synchronizer" Switch the station quickly. One—tune it in on Having set up the first station pro- (No white dot showing). This will dis-another radio (A portable if you set up need to repeat steps one and two except connect the tuner and keep it from shift-the station in the car) and then adjust that you will press the tuning knob into ing. Next, press the tuner knob several the screw for the same program; or the 2nd Automatic Position.

Continue the same operation thru the 3rd, 4th and 5th automatic positions.

MONTGOMERY-WARD & CO.

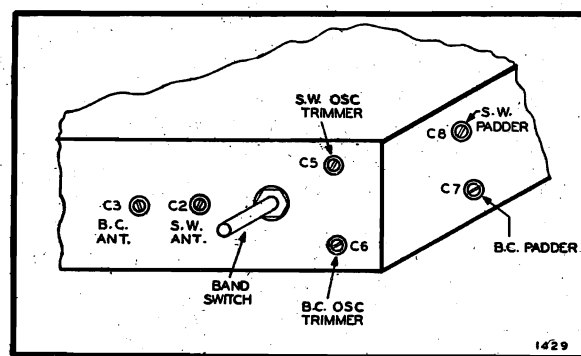
MODELS 14BR-688A,
14BR-689A

REPLACEMENT PARTS LIST

Part No.	Schematic Diagram Reference	Description	No. Used In Set	Selling Price Each
CONDENSERS				
BE102133	C	Two Gang Variable Condenser	1	1.88
BE10020	C4, C23	.1 x 200 Volt Tubular Condenser	2	.12
BE1009	C11	.05 x 200 Volt Tubular Condenser	1	.12
BE10019	C18	.006 x 600 Volt Tubular Condenser	1	.12
BE10026	C21	.02 x 400 Volt Tubular Condenser	1	.12
BE10025	C24	.002 x 600 Volt Tubular Condenser	1	.12
BE10013	C12	.05 x 400 Volt Tubular Condenser	1	.12
BE10031	C14, C15	.5 x 120 Volt Tubular Condenser	3	.36
BE100106	C22	.004 x 600 Volt Tubular Condenser	1	.12
BE10048	C10	.25 x 200 Volt Tubular Condenser	1	.20
BE10073	C19	.008 x 1200 Volt Tubular Condenser	1	.12
BE119111	C25, C26, C27, C28	Electrolytic Filter Condenser. 20 Mfd. x 20 V.; 40 Mfd. x 200 V.; 20 Mfd. x 200 V.; 20 Mfd. x 200 V.	1	1.30
BE124176	C2, C3	S.W. and B.C. Dual Antenna Trimmer	1	.24
BE124177	C5, C6	S.W. and B.C. Dual Oscillator Trimmer	1	.24
BE124178	C7, C8	B.C. and S.W. Dual Padder Condenser	1	.56
BE1292	C13, C20	.0005 Mica Type Condenser—20%	2	.12
BE1295	C1, C17	.0001 Mica Type Condenser—20%	2	.12
BE12938	C9	.00005 Mica Type Condenser—10%	1	.12
In some sets 124178 Dual Condenser is replaced by one each of the following:				
BE129186	C7	Compression Mica Cond. .004	1	.36
BE124184	C8	Adjustable Condenser	1	.24

**PRICES SUBJECT TO CHANGE
WITHOUT NOTICE**

POWER SUPPLY—Unless marked otherwise, this radio will operate on either a 6 volt storage battery or on 105 to 125 volts A.C. 50 to 60 cycle line. Two power cords are supplied one for battery and one for electric operation. Whichever cord is required should be plugged into the back of the chassis. When using a battery be sure A+ lead is connected to + battery terminal. Do not lengthen battery cable. Keep antenna lead away from battery cable.



TRIMMER VIEW—Looking at front of chassis.

RESISTORS

1.30	BE101268	R10, S2	Volume Control and Switch (1 Megohm)	1	.62
.24	BE101269	R15	Tone Control (2 Megohm)	1	.25
.24	BE10157	R5	12M Ohm— $\frac{1}{4}$ Watt Resistor—10%	1	.10
.56	BE13067	R4	9M Ohm— $\frac{1}{4}$ Watt Resistor—10%	1	.10
.12	BE130276	R1	10 Ohm— $\frac{1}{4}$ Watt Resistor—10%	1	.10
.12	BE130192	R9	2M Ohm— $\frac{1}{4}$ Watt Resistor—10%	1	.10
.12	BE13019	R6	1 Megohm— $\frac{1}{4}$ Watt Resistor—20%	1	.10
.12	BE130170	R7	3 Megohm— $\frac{1}{4}$ Watt Resistor—25%	1	.10
.12	BE130266	R16	200M Ohm— $\frac{1}{4}$ Watt Resistor—10%	1	.10
.12	BE130223	R13	10 Megohm— $\frac{1}{4}$ Watt Resistor—20%	1	.10
.12	BE1303	R14	500M Ohm— $\frac{1}{4}$ Watt Resistor—20%	1	.10
.12	BE13079	R17	400 Ohm— $\frac{1}{4}$ Watt Resistor—10%	1	.10
.12	BE130235	R19	1500 Ohm— $\frac{1}{4}$ Watt Resistor—10%	1	.10
.12	BE130222	R18	350 Ohm— $\frac{1}{4}$ Watt Resistor—10%	1	.10
.12	BE130233	R11, R12	60 Ohm— $\frac{1}{4}$ Watt Resistor—10%	2	.10
.12	BE13084	R8	200 Ohm— $\frac{1}{4}$ Watt Resistor—20%	1	.10
.12	BE130236	R2	30M Ohm— $\frac{1}{4}$ Watt Resistor—10%	1	.10
.12	BE13070	R3	500 Ohm— $\frac{1}{4}$ Watt Resistor—10%	1	.10

MODELS 14BR-688A,
14BR-689A

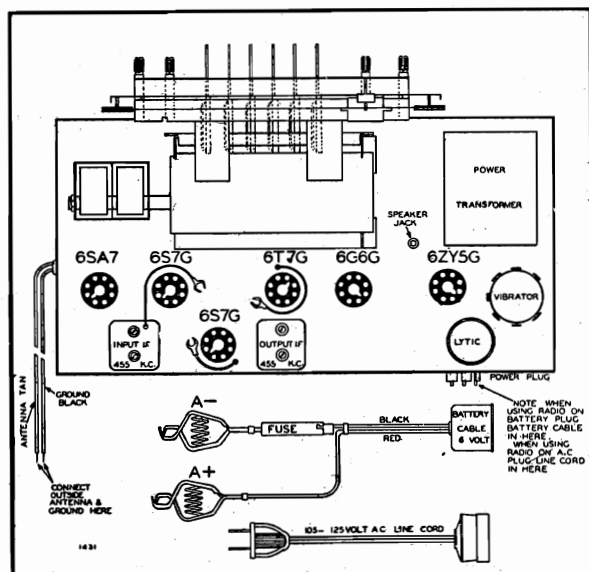
MONTGOMERY-WARD & CO.

ALIGNMENT PROCEDURE

- Volume control—Maximum all adjustments.
- Connect radio chassis to ground post of signal generator.

BAND	SIGNAL GENERATOR Frequency Setting	Dummy Antenna	Connection to Radio	Position of Band Switch	Variable Condenser Setting	Trimmers Adjusted to Max.
I. F.	455 Kc.	.1 MFD.	Grid of 6S7 I. F.	Broadcast	Rotor full open (Plates out of mesh)	Two trimmers on top of Output I. F.
	455 Kc.	.1 MFD.	Grid of 6SA7 Mixer	Broadcast	Rotor full open (Plates out of mesh)	Two trimmers on top of Input I. F.
SHORT WAVE BAND	17 Mc.	400 Ohms	Antenna lead	Short Wave	Set Dial at 17 Mc.	Trimmer C5— S. W. osc.
	17 Mc.	400 Ohms	Antenna lead	Short Wave	Set Dial at 17 Mc.	Trimmer C2 S. W. antenna
	6 Mc.	400 Ohms	Antenna lead	Short Wave	Set Dial at 6 Mc.	Trimmer C8 S. W. osc. series pad (See note "A")
BROADCAST BAND	1750 Kc.	200 mmf.	Antenna lead	Broadcast	Rotor full open (Plates out of mesh)	Trimmer C6 B. C. osc.
	1500 Kc.	200 mmf.	Antenna lead	Broadcast	Set Dial at 1500 Kc.	Trimmer C3 B. C. antenna
	600 Kc.	200 mmf.	Antenna lead	Broadcast	Set Dial at 600 Kc.	Trimmer C7 B. C. osc. series pad (See note "A")

NOTE "A" Turn the dial back and forth slightly (rock) and adjust trimmer until the peak of greatest intensity is obtained.



CHASSIS VIEW showing tube location and power cables.

NOTE: Antenna and ground leads at side of chassis.

ANTENNA

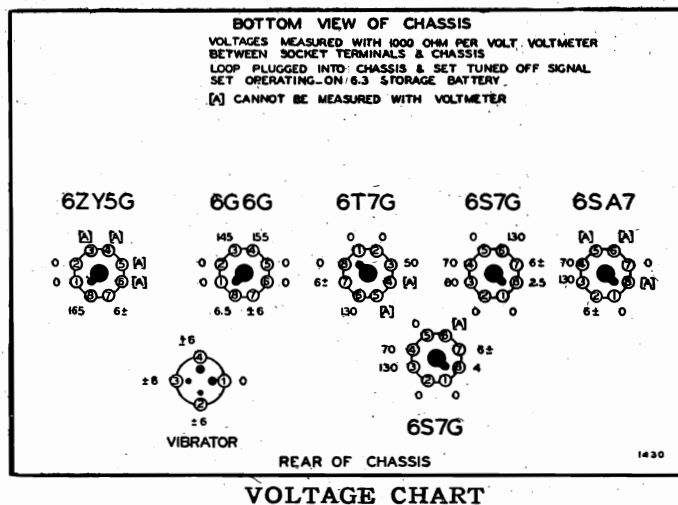
For best results, an outside antenna approximately 50 to 75 feet long including lead-in is recommended. It should be erected as high as possible and as far from surrounding objects as practical. For minimum interference it should be at right angles to street car lines, incoming power lines and other electrical apparatus which may be in the vicinity. A ground is necessary. The ground wire should be connected with a clamp to a well cleaned water pipe or to a piece of pipe driven several feet into damp earth.

SETTING THE PUSHBUTTONS

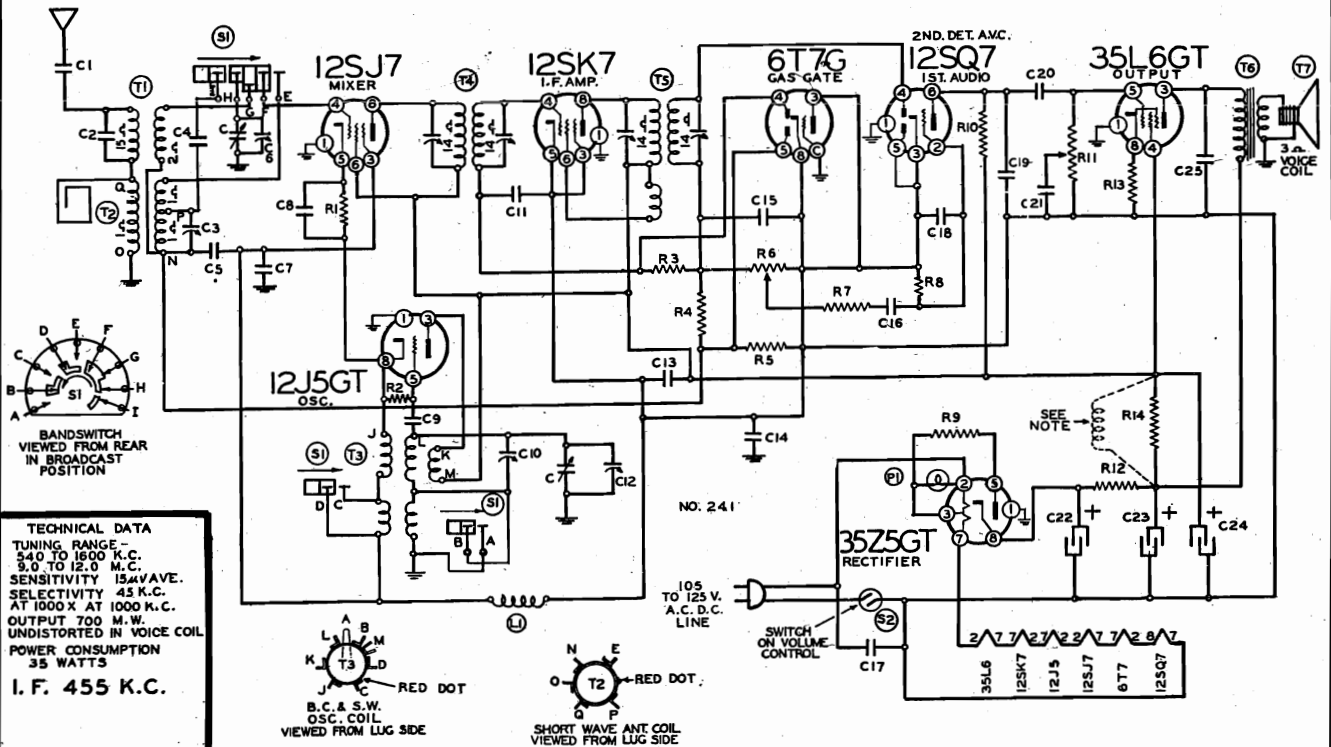
Make a list of your 6 favorite stations. Push out the call letters of these stations from the call letter sheets supplied. Insert a call letter in the slot on top of each pushbutton.

Next pull one of the pushbuttons all the way out as far as it will come. Now tune in the station you want with the tuning knob—Tune back and forth until the station is clear and distinct. Now push the button hard all the way in to lock the station in place. Continue setting each pushbutton in the same way. Pressing the proper button will now tune the station you want. If it does not do so you did not push the button hard enough to lock it in place when setting up the station.

To change stations simply repeat the procedure above.



MONTGOMERY-WARD & CO.

MODELS 14BR-734A,
14BR-735A

On sets which have an electrodynamic speaker, R12 is eliminated and the hot side of C22 is connected in parallel with C23. R14 is replaced by the speaker field.

IS YOUR LINE VOLTAGE CORRECT?

MAY 1941

Unless your radio is marked otherwise, it must be operated from 10. to 125 volts, 50 to 60 cycle current or the same D. C. Voltage. If in doubt, phone your electric light company. Receivers of this same model which are for use on special voltages are marked accordingly. When using your radio on A. C. current, reversing the plug may reduce station hum. If set does not operate in one minute on direct current reverse the plug.

ALIGNMENT PROCEDURE

- Volume control—Maximum all adjustments.
- Connect B—of radio chassis to ground post of signal generator through .1 Mfd. condenser.

BAND	SIGNAL GENERATOR Frequency Setting	Dummy Antenna	Connection to Radio	Position of Band Switch	Variable Condenser Setting	Trimmers Adjusted to Maximum
I. F.	455 Kc.	.1 MFD.	Grid of 12SK7 I. F.	Broadcast	Rotor full open (Plates out of mesh)	Two trimmers on top of Output I. F.
	455 Kc.	.1 MFD.	Grid of 12SJ7 Mixer	Broadcast	Rotor full open (Plates out of mesh)	Two trimmers on top of Input I. F.
SHORT WAVE BAND	12 Mc.	400 Ohms	External Antenna and B—	Short Wave	Set Dial at 12 Mc.	S.W. Osc. trimmer C10 S.W. Ant. trimmer C3
BROAD- CAST BAND	1600 Kc.	.1 mmf.	Grid of 12SJ7	Broadcast	Rotor full open (Plates out of mesh)	B.C. Osc. trimmer C12 on Gang
	1400 Kc.	200 mmf.	External Antenna and B—	Broadcast	Set Dial at 1400 K. C.	B.C. Ant. trimmer C6

NOTE: The Oscillator Frequency is lower than the signal frequency and should be aligned accordingly.

The loop antenna should be connected to the radio when making all adjustments.

MODELS 14BR-734A,
14BR-735A

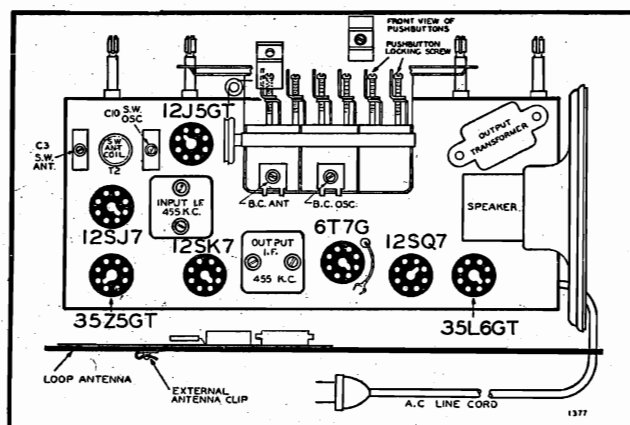
MONTGOMERY-WARD & CO.

SETTING THE PUSHBUTTONS

Make a list of your 6 favorite stations—push out the call letters of these stations from the call letter sheets supplied. Next insert a long slim screw driver into the hole in front of one of the pushbuttons and unscrew the pushbutton locking screw (to the left) several turns. Now with the screw driver still engaged in the locking screw slot push it all the way in. Hold it in this position and tune in the station you want with the tuning knob. Now tighten up the pushbutton locking screw by turning it to the right. Tighten firmly. Continue setting each button in the same way. When you have set your stations insert the call letter of each station in the front of the proper button and put one of the celluloid tabs over the station call letter.

To change stations simply repeat the above procedure.

If you are unable to set a station on any particular button it is probably because the pushbutton locking screw has not been fully unloosened (turned to the left).



Chassis View, showing Tube Location and the Outside Antenna Clip.

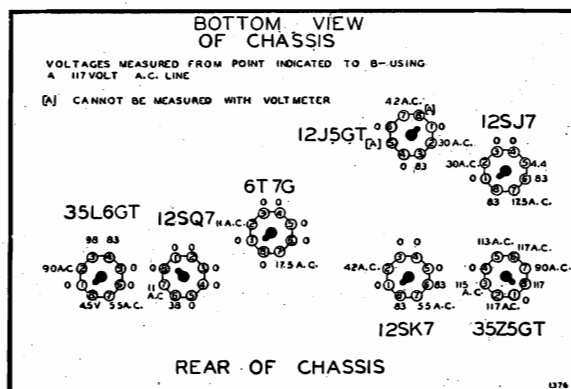
REPLACEMENT PARTS LIST

Part No.	Schematic Reference	Description	No. Used In Set	Selling Price Each
CONDENSERS				
BE1009	C11	.05 x 200 Volt Tubular Condenser	1	.12
BE10019	C16, C21	.006 x 600 Volt Tubular Condenser	2	.12
BE10020	C13	.1 x 200 Volt Tubular Condenser	1	.12
BE10026	C25, C20	.02 x 400 Volt Tubular Condenser	1	.12
BE10037	C1	.003 x 600 Volt Tubular Condenser	1	.12
BE100119	C7, C14	.1 x 400 Volt Tubular Condenser	2	.12
BE100127	C8	.01 x 120 Volt Tubular Condenser	1	.12
BE100128	C5	.05 x 120 Volt Tubular Condenser	1	.12
BE100138	C17	.03 x 400 Volt Tubular Condenser	1	.12
BE119129		Electrolytic Filter Cond. added for 25 cycle only. 40 mfd. x 150 Volts across C22 and 20 mfd. x 150 Volts across C23	1	.70
BE119128	C22, C23, C24	Electrolytic Filter Condenser—40 mfd.—20 mfd.—20 mfd. x 150 Volts.	1	.70
BE124139	C3, C10	S. W. Antenna and Oscillator Trimmer Condenser	2	.16
BE1295	C9, C18	.0001 Mica Type Condenser—20%	2	.12
BE12921	C15	.0002 Mica Type Condenser—20%	1	.12
BE12960	C2	.00015 Mica Type Condenser—10%	1	.12
BE129181	C4	.00045 Mica Type Condenser—3%	1	.18
BE12912	C19	.00025 Mica Type Condenser	1	.12
RESISTORS				
BE1309	R10	200M ohm— $\frac{1}{4}$ Watt Resistor—20%	1	.10
BE13012	R2, R7	50M ohm— $\frac{1}{4}$ Watt Resistor—20%	2	.10
BE13038	R4	2 Megohm— $\frac{1}{4}$ Watt Resistor—20%	1	.10
BE13084	R12	200 Ohm— $\frac{1}{4}$ Watt Resistor—20%	1	.10
BE130128	R9	20 Ohm— $\frac{1}{4}$ Watt Resistor—20%	1	.10
BE130166	R13	150 Ohm— $\frac{1}{4}$ Watt Resistor—10%	1	.10
BE130218	R1	5M Ohm— $\frac{1}{4}$ Watt Resistor—10%	1	.10
BE130257	R8	5 Megohm— $\frac{1}{4}$ Watt Resistor—25%	1	.10
BE130287	R14	1200 Ohm—1 Watt Resistor—10%	1	.10
BE130350	R3, R5	3, 2 Megohm— $\frac{1}{4}$ Watt Resistor—20%	2	.10
SOCKETS				
BE121210		Eight Prong Molded Octal Socket	6	.10
BE121273		Eight Prong Wafer Octal Socket—with Shield for Guide Pin	1	.10
SPEAKER				
BE114247	T7	Six inch P. M. Dynamic Speaker (less Output Transformer)	1	2.50
BE114264	T7	Six Inch Electro Dynamic Speaker. Less Output Transformer.	1	
BE105134	T6	Output Transformer for Speaker	1	.50
COILS				
BE108206	T4	Input I. F. Coil Complete in Can	1	.76
BE108205	T5	Output I. F. Coil Complete in Can	1	.76
BE110184	T3	B. C. - S. W. Oscillator Coil	1	.60
BE111249	T2	S. W. Antenna Coil	1	.30
BE111250	T1	Loop Antenna Assembly	1	.90
BE12316	L1	Choke Coil	1	.18

ANTENNA

This radio is designed to pick up strong local stations without requiring an outside antenna. For best results, however, an outside antenna approximately 50 to 75 feet long including lead-in is recommended. It should be erected as high as possible and as far from surrounding objects as practical. For minimum interference it should be at right angles to street car lines, incoming power lines and other electrical apparatus which may be in the vicinity. A ground is not required.

Periodic inspection of the antenna system is recommended to be sure that all connections are clean and tight, and that the antenna is well insulated from the ground at all points.



Voltage Chart

MONTGOMERY-WARD & CO.

SETTING THE PUSHBUTTONS

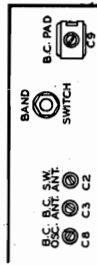
Make a list of your 6 favorite stations. Push out the call letters of these stations from the call letter sheets supplied. Insert a call letter in the slot on top of each pushbutton.

Next pull one of the pushbuttons all the way out as far as it will come. Now tune in the station you want with the tuning knob—Tune back and forth until the station is clear and distinct. Now push the button hard all the way in to lock the station in place. Continue setting each pushbutton in the same way. Pressing the proper button will now tune the station you want. If it does not do so you did not push the button hard enough to lock it in place when setting up the station.

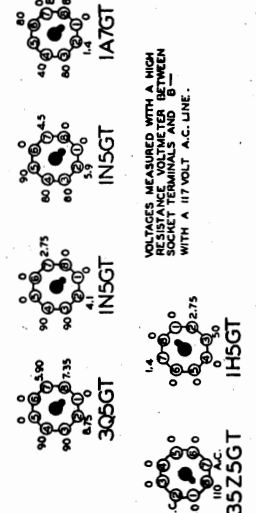
To change stations simply repeat the procedure above.

TRIMMER VIEW

Looking at front of chassis.



BOTTOM VIEW OF CHASSIS



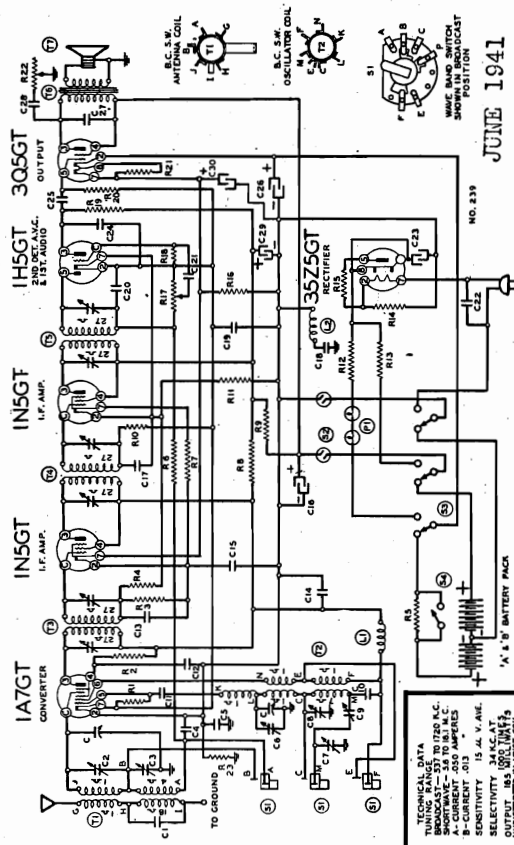
VIEW LOOKING AT BOTTOM SIDE OF TUBE SOCKETS

ALIGNMENT PROCEDURE

- Volume control—Maximum all adjustments.
- Connect radio chassis to ground post of signal generator.

BAND	Frequency Setting	Signal Generator Frequency	Connection to Radio	Position of Band Switch	Variable Condenser Setting	Trimmers Adjusted to Max.
I. F.	455 Kc.	.1 MFD.	Grid of 1N5G	Broadcast	Rotor full open (Plates out of mesh)	Two trimmers on top of Output I. F.
	455 Kc.	.1 MFD.	Grid of 1N5G	Broadcast	Rotor full open (Plates out of mesh)	Two trimmers on top of Interstage I. F.
	455 Kc.	.1 MFD.	Grid of 1A7G	Broadcast	Rotor full open (Plates out of mesh)	Two trimmers on top of Input I. F.
SHORT WAVE BAND	16 Mc.	400 ohms	Antenna lead	Short Wave	Set Dial at 16 Mc.	Trimmer C6—S. W. osc. Top of front section of gang
	16 Mc.	400 ohms	Antenna lead	Short Wave	Set Dial at 16 Mc.	Trimmer C2 S. W. antenna
	6 Mc.	400 ohms	Antenna lead	Short Wave	Set Dial at 6 Mc.	Trimmer C7 S. W. osc. series pad (See note "A")
BROAD-CAST BAND	1720 Kc.	200 mmf.	Antenna lead	Broadcast	Rotor full open (Plates out of mesh)	Trimmer C8 B. C. osc.
	1500 Kc.	200 mmf.	Antenna lead	Broadcast	Set Dial at 1500 Kc.	Trimmer C3 B. C. antenna
	600 Kc.	200 mmf.	Antenna lead	Broadcast	Set Dial at 600 Kc.	Trimmer C9 B. C. osc. series pad (See note "A")

NOTE "A" Turn the dial back and forth slightly (rock) and adjust trimmer until the peak of greatest intensity is obtained.



CONDENSERS

BE100133	C10, C14	1 x 120 Volt Tubular Condenser.
BE100135	C15, C19	.25 x 120 Volt Tubular Condenser.
BE100128	C16, C17	.05 x 40 Volt Tubular Condenser.
BE100105	C22	.02 x 120 Volt Tubular Condenser.
BE100127	C18	.02 x 120 Volt Tubular Condenser.
BE100171	C21	.04 x 600 Volt Tubular Condenser.
BE100191	C20	.04 x 600 Volt Tubular Condenser.
BE100126	C4	.02 x 400 Volt Tubular Condenser.
BE100109	C5	.05 x 200 Volt Tubular Condenser.
BE100140	C3	.2 x 400 Volt Tubular Condenser.
BE100132	C30	25 Volts Electrolytic Filter Cond. 50-60 Mfd. x 150 V.; 10 Mfd. x 150 V.; 200 Mfd. x 10 V.; 10 Mfd. x 150 V.
BE100131	C16, C23	35 Z5GT Rectifier
BE124171	C2, C3, C8	Triple Unit Trimmer Cond. C2, S.W. Ant. Trimmer, C3, B.C. Ant. Trimmer, C8, B.C. Osc. Trimmer
BE124173	C9	B.C. Series Pad. 580 Mmfd.
BE124195	C1	.0001 Mica Type Condenser—20%.
BE124192	C20	.00025 Mica Type Condenser—20%.
BE124193	C11	.0005 Mica Type Condenser—20%.
BE1241925	C7	S.W. Padder Condenser.

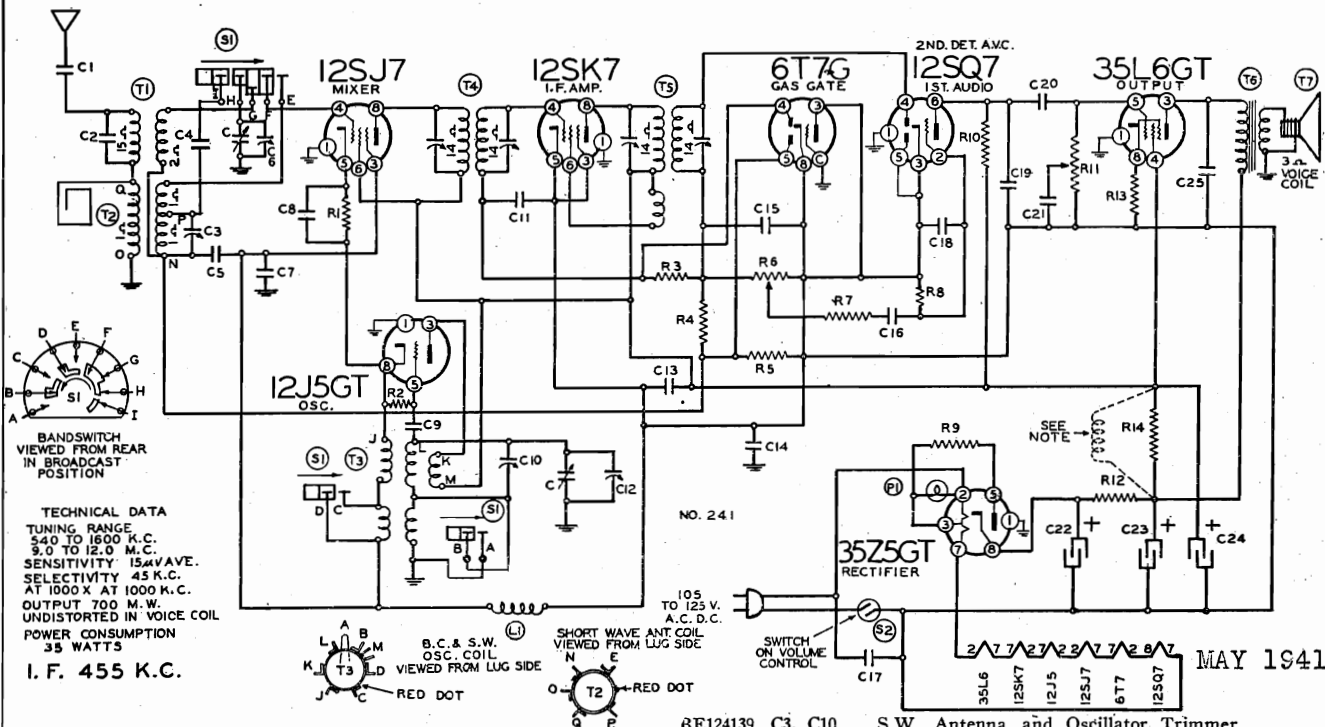
RESISTORS

BE130223	R3	10 Megohm—1/2 Watt Resistor—20%.
BE130235	R13	1500 Ohm—1/2 Watt Resistor—10%.
BE1309	R1	200M Ohm—1/2 Watt Resistor—20%.
BE13012	R2	50M Ohm—1/2 Watt Resistor—20%.
BE13017	R10, R18	5 Megohm—1/2 Watt Resistor—25%.
BE130347	R7	15 Ohm—1/2 Watt Resistor—10%.
BE130348	R23	200 Ohm—1/2 Watt Resistor—10%.
BE130349	R24	500 Ohm—1/2 Watt Resistor—10%.
BE130350	R25	500M Ohm—1/2 Watt Resistor—20%.
BE130351	R26	700 Ohm—1/2 Watt Resistor—10%.
BE130352	R27	1000 Ohm—1/2 Watt Resistor—10%.
BE130353	R28	1000 Ohm—1/2 Watt Resistor—10%.
BE130354	R29	1000 Ohm—1/2 Watt Resistor—10%.
BE130355	R30	1000 Ohm—1/2 Watt Resistor—10%.
BE130356	R31	1000 Ohm—1/2 Watt Resistor—10%.
BE130357	R32	1000 Ohm—1/2 Watt Resistor—10%.
BE130358	R33	1000 Ohm—1/2 Watt Resistor—10%.
BE130359	R34	1000 Ohm—1/2 Watt Resistor—10%.
BE130360	R35	1000 Ohm—1/2 Watt Resistor—10%.
BE130361	R36	1000 Ohm—1/2 Watt Resistor—10%.
BE130362	R37	1000 Ohm—1/2 Watt Resistor—10%.
BE130363	R38	1000 Ohm—1/2 Watt Resistor—10%.

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

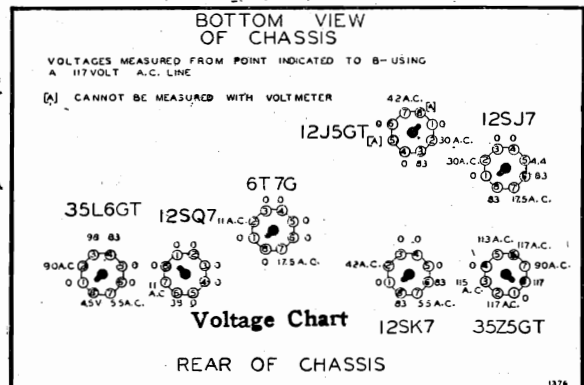
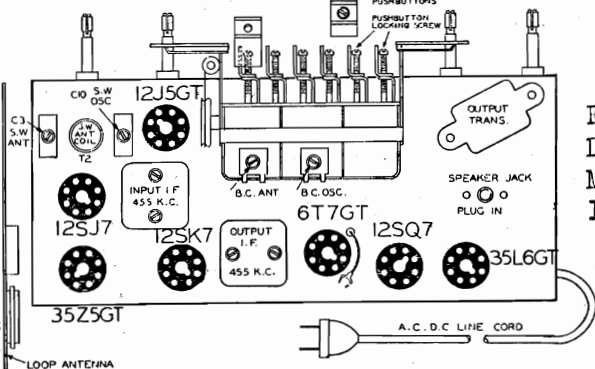
MODEL 14BR-736A

MONTGOMERY-WARD & CO.



BE100128	C5	.05 x 120 Volt Tubular Condenser	1
BE100119	C7, C14	.1 x 400 Volt Tubular Condenser	2
BE100127	C8	.01 x 120 Volt Tubular Condenser	1
BE10020	C13	.1 x 200 Volt Tubular Condenser	1
BE1009	C11	.05 x 200 Volt Tubular Condenser	1
BE100138	C17	.03 x 400 Volt Tubular Condenser	1
BE10026	C25, C20	.02 x 400 Volt Tubular Condenser	1
BE10019	C16, C21	.006 x 600 Volt Tubular Condenser	2
BE10037	C1	.003 x 600 Volt Tubular Condenser	1
BE119129		Electrolytic Filter Cond. Added for 25 Cycle Only. 40 Mfd x 150 Volts Across C22 and 20 Mfd. x 150 Volts Across C23	1
BE119128	C22, C23, C24	Electrolytic Filter Condenser. 40 Mfd.—20 Mfd.—20 Mfd. x 150 Volts	1

BE124139	C3, C10	S.W. Antenna and Oscillator Trimmer Condenser	2	.16
BE129181	C4	.000445 Mica Type Condenser—3%	1	.18
BE12921	C15	.0002 Mica Type Condenser—20%	1	.12
BE1295	C9, C18	.0001 Mica Type Condenser—20%	2	.12
BE12960	C2	.00015 Mica Type Condenser—20%	1	.12
BE12912	C19	.00025 Mica Type Condenser	1	.12
BE130218	R1	5M Ohm—1/2 Watt Resistor—10%	1	.10
BE130166	R13	150 Ohm—1/2 Watt Resistor—10%	1	.10
BE13084	R12	200 Ohm—1/2 Watt Resistor—20%	1	.10
BE130128	R9	20 Ohm—1/2 Watt Resistor—20%	1	.10
BE13012	R2, R7	50M Ohm—1/2 Watt Resistor—20%	2	.10
BE130287	R14	1200 Ohm—1 Watt Resistor—10%	1	.10
BE130350	R3, R5	3.2 Megohm—1/2 Watt Resistor—20%	2	.10
BE13038	R4	2 Megohm—1/2 Watt Resistor—20%	1	.10
BE130257	R8	5 Megohm—1/2 Watt Resistor—25%	1	.10
BE1309	R10	200M Ohm—1/2 Watt Resistor—20%	1	.10

**ALIGNMENT PROCEDURE**

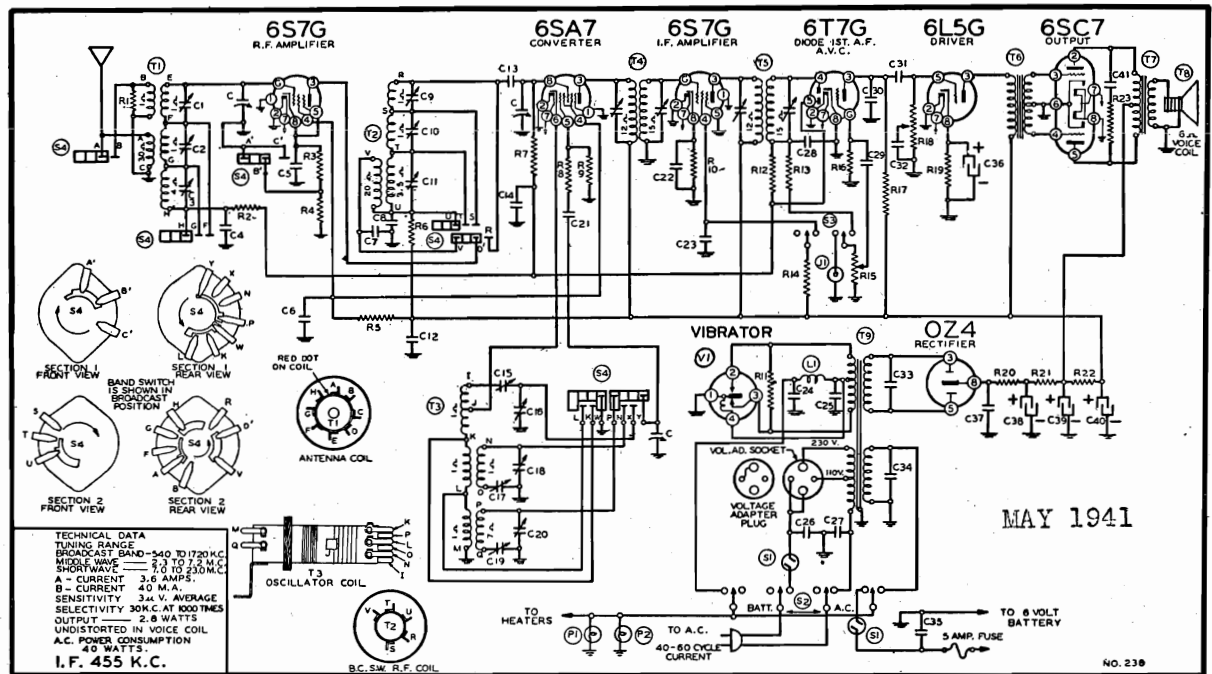
Connect B—of radio chassis to ground post of signal generator through .1 Mfd. condenser.

BAND	Frequency Setting	Dummy Antenna	Connection to Radio	Position of Band Switch	Variable Condenser Setting	Trimmers Adjusted to Maximum
I. F.	455 Kc.	.1 MFD.	Grid of 12SK7 I. F.	Broadcast	Rotor full open (Plates out of mesh)	Two trimmers on top of Output I. F.
	455 Kc.	.1 MFD.	Grid of 12SJ7 Mixer	Broadcast	Rotor full open (Plates out of mesh)	Two trimmers on top of Input I. F.
SHORT WAVE BAND	12 Mc.	400 Ohms	External Antenna and B—	Short Wave	Set Dial at 12 Mc.	S.W. Osc. trimmer C10 S.W. Ant. trimmer C3
BROADCAST BAND	1600 Kc.	.1 mmf.	Grid of 12SJ7	Broadcast	Rotor full open (Plates out of mesh)	B.C. Osc. trimmer C12 on Gang
	1400 Kc.	200 mmf.	External Antenna and B—	Broadcast	Set Dial at 1400 Kc.	B.C. Ant. trimmer C6

NOTE: The Oscillator Frequency is lower than the signal frequency and should be aligned accordingly.

The loop antenna should be connected to the radio when making all adjustments.

MONTGOMERY-WARD & CO.



REPLACEMENT PARTS LIST

Part No.	Schematic Diagram Reference	Description	In Set	Selling Price Each
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CONDENSERS

BE1001	C6, C37	.1 x 400 Volt Tubular Condenser.....	2	.12
BE10011	C26, C27, C31, C32, C34	.01 x 400 Volt Tubular Con- denser.....	5	.12
BE10013	C8, C23	.05 x 400 Volt Tubular Condenser.....	2	.12
BE10020	C5	.1 x 200 Volt Tubular Condenser.....	1	.12
BE10022	C4, C22, C35	.05 x 200 Volt Tubular Condenser.....	3	.12
BE10025	C29	.002 x 600 Volt Tubular Condenser.....	1	.12
BE10026	C13, C14	.02 x 400 Volt Tubular Condenser.....	2	.12
BE10031	C24, C25	.5 x 120 Volt Tubular Condenser.....	2	.36
BE10071	C41	.004 x 600 Volt Tubular Condenser.....	1	.12
BE100100	C33	.008 x 1600 Volt Tubular Condenser.....	1	.12
BE100117	C12	.25 x 400 Volt Tubular Condenser with Bracket.....	1	.20
BE119127	C36, C38, C39	C40 Electrolytic Filter Condenser, 40 Mfd. x 25 V.; 40 Mfd. x 300 V.—20 Mfd. x 300 V.—20 Mfd. x 300 V.....	1	.90
BE124169	C9, C10, C11	S.W.—M.W.—B.C.—Triple Unit R. F. Trimmer Condenser Strip.....	1	.48
BE124170	C1, C2, C3	S.W.—M.W.—B.C.—Triple Unit Antenna Trimmer Strip.....	1	.48
BE124172	C16, C18, C20	S.W.—M.W.—B.C.—Triple Unit Antenna Trimmer Strip.....	1	.44
BE129178	C19	B.C. Osc. Series Pad Condenser.....	1	.16
BE129179	C17	M.W. Osc. Series Pad Condenser.....	1	.36
BE129180	C15	S.W. Osc. Series Pad Condenser.....	1	.44
BE1295	C21, C28	.0001 Mica Type Condenser—20%.....	2	.12
BE12912	C30	.00025 Mica Type Condenser—20%.....	1	.12
BE12940	C7	.0001 Mica Type Condenser—10%.....	1	.12

RESISTORS

BE1304	R12	3 Megohm— $\frac{1}{2}$ Watt Resistor—20%.....	1	.10
BE1309	R17	200M Ohm— $\frac{1}{2}$ Watt Resistor—20%.....	1	.10
BE13012	R13	50M Ohm— $\frac{1}{2}$ Watt Resistor—20%.....	1	.10
BE13019	R7	1 Megohm— $\frac{1}{2}$ Watt Resistor—20%.....	1	.10
BE13020	R2	100M Ohm— $\frac{1}{2}$ Watt Resistor—20%.....	1	.10
BE13027	R20	50 Ohm— $\frac{1}{2}$ Watt Resistor—20%.....	1	.10
BE13031	R6	1500 Ohm— $\frac{1}{2}$ Watt Resistor—20%.....	1	.10
BE13057	R9	35M Ohm— $\frac{1}{2}$ Watt Resistor—20%.....	1	.10
BE13064	R4	3500 Ohm— $\frac{1}{2}$ Watt Resistor—20%.....	1	.10
BE13066	R14	75M Ohm— $\frac{1}{2}$ Watt Resistor—10%.....	1	.10
BE13084	R11, R21	200 Ohm— $\frac{1}{2}$ Watt Resistor—20%.....	2	.10
BE13099	R3	300 Ohm— $\frac{1}{2}$ Watt Resistor—20%.....	1	.10
BE130199	R22	1500 Ohm—1 Watt Resistor—10%.....	1	.10
BE130235	R19	1500 Ohm— $\frac{1}{2}$ Watt Resistor—10%.....	1	.10
BE130257	R16	5 Megohm— $\frac{1}{2}$ Watt Resistor—25%.....	1	.10
BE130304	R5	12M Ohm—2 Watt Resistor—10%.....	1	.10
BE130345	R10	1M Ohm— $\frac{1}{2}$ Watt Resistor—10%.....	1	.10
BE13023	R1	2M Ohm— $\frac{1}{2}$ Watt Resistor—20%.....	1	.10
BE130149	R23	15M Ohm— $\frac{1}{2}$ Watt Resistor—20%.....	1	.10
BE130327	R8	10 Ohm— $\frac{1}{2}$ Watt Resistor—20%.....	1	.10

PRICES SUBJECT TO CHANGE WITHOUT NOTICE



TRIMMER VIEW—Looking at front of chassis.

ANTENNA

For best results, an outside antenna approximately 50 to 75 feet long including lead-in is recommended. It should be erected as high as possible and as far from surrounding objects as practical. For minimum interference it should be at right angles to street car lines,

incoming power lines and other electrical apparatus which may be in the vicinity. A ground is advisable. A good ground will often reduce noise. The ground wire should be connected with a clamp to a well cleaned water pipe or to a piece of pipe driven several feet into damp earth.

SPEAKER

BE114250	T8	Eight Inch P.M. Dynamic Speaker Less Output Transformer.....	1	4.00
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COILS

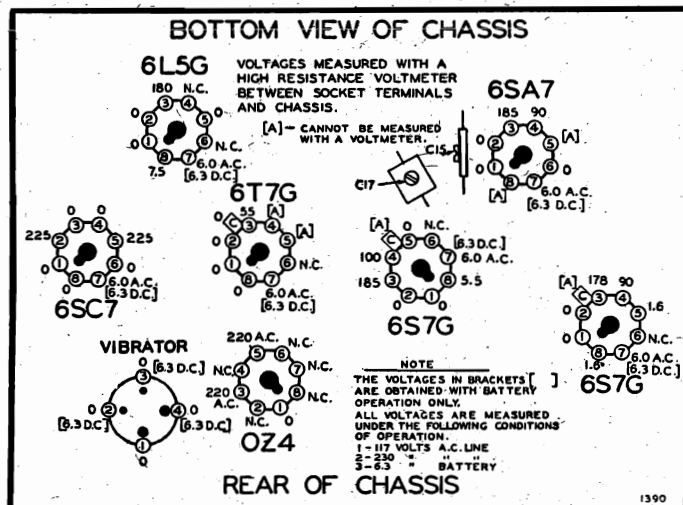
BE108207	T4	Input I.F. Coil Complete in Can.....	1	1.00
BE108208	T5	Output I.F. Coil Complete in Can.....	1	1.00
BE10968	T2	B.C. R.F. Coil Complete in Can.....	1	.80
BE110181	T3	B.C.—M.W.—S.W. Oscillator Coil in Can.....	1	.60
BE111246	T1	B.C.—M.W.—S.W. Antenna Coil in Can.....	1	.72

TRANSFORMERS

BE104265	T9	Power Transformer.....	1	2.50
BE105101B	T6	Input Audio Transformer.....	1	1.12
BE105133	T7	Output Transformer for Speaker.....	1	1.00

MODEL 14BR-742A

MONTGOMERY-WARD & CO.



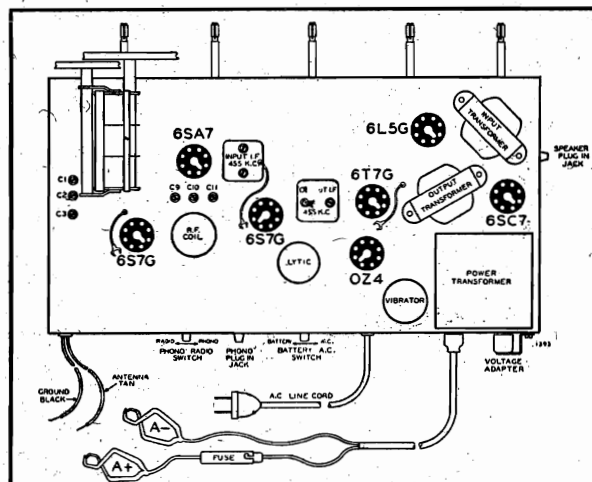
VOLTAGE CHART

POWER SUPPLY

Unless your radio is marked otherwise it is designed to operate on the following power supplies:

- 6 volt storage battery
- 105 to 125 volts 40 to 60 cycles (A.C.)
- 200 to 250 volts 40 to 60 cycles (A.C.)

For 6 Volt Battery Operation—The Batt-A.C. switch (see chassis view) must be in battery position and battery cables connected to battery.



CHASSIS VIEW showing tube location.

NOTE: Antenna and ground leads at back of chassis.

For 105 to 125 Volt Operation—The red dot on "Adapter Plug" (see chassis view) must point to 110 V.

For 200 to 250 Volt Operation—The red dot on "Adapter Plug" must point to 230 V.

To Change "Adapter Plug" loosen the bracket, pull the plug out and replace it in the desired position.

Caution: The Batt-A.C. switch must be in the proper position before connecting receiver to the electrical supply.

ALIGNMENT PROCEDURE

● Volume control—Maximum all adjustments.

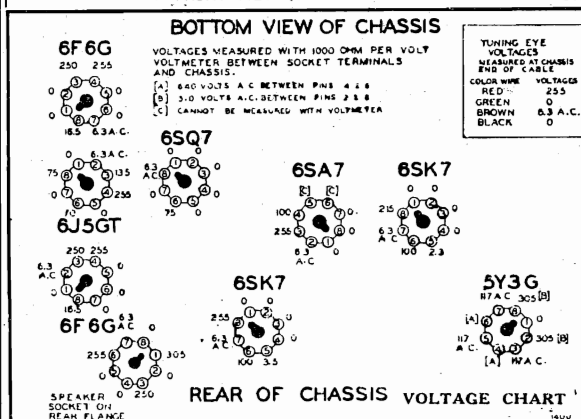
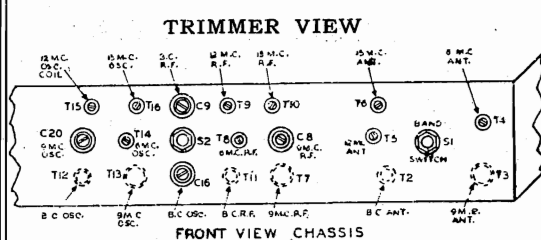
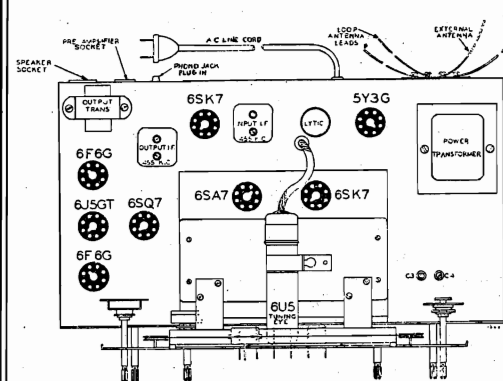
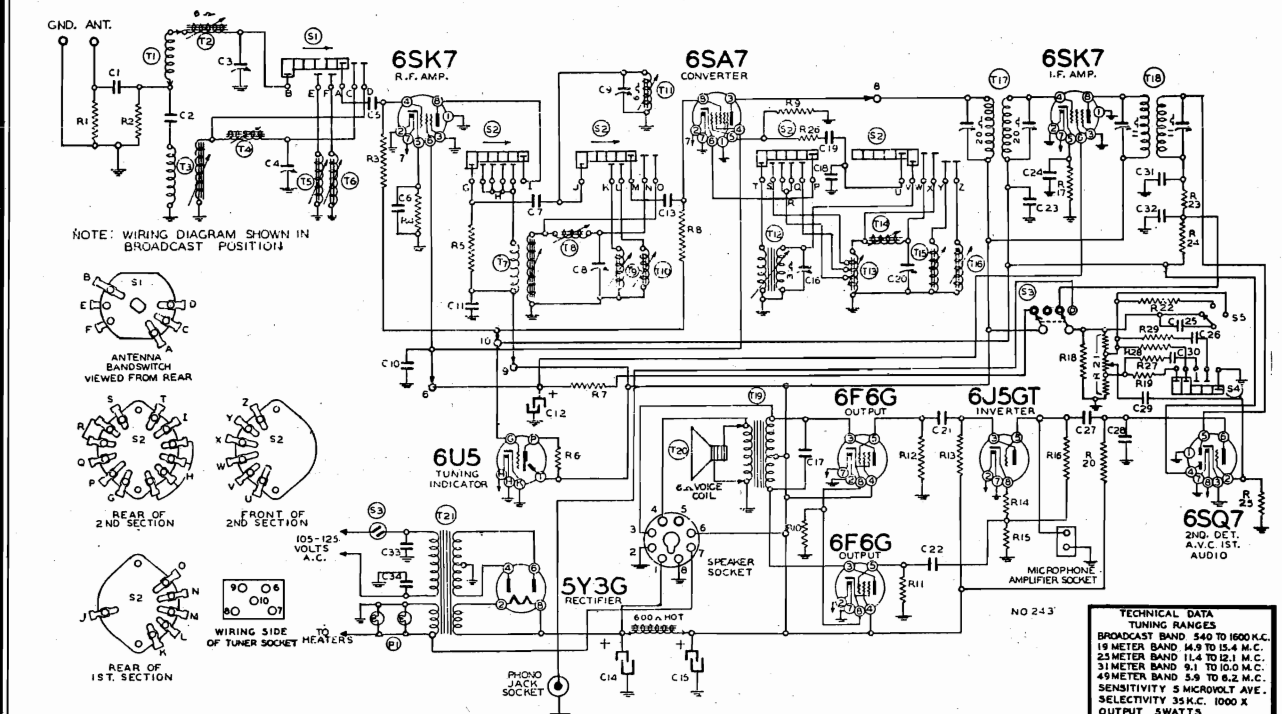
● Connect radio chassis to ground post of signal generator.

SIGNAL GENERATOR						
BAND	Frequency Setting	Dummy Antenna	Connection to Radio	Position of Band Switch	Variable Condenser Setting	Trimmers Adjusted to Max.
I. F.	455 Kc.	.1 MFD.	Grid of 6S7 I. F.	Broadcast	Tuning & Bandsread Plates out of mesh	Two trimmers on top of Output I. F.
	455 Kc.	.1 MFD.	Grid of 6SA7 I. F.	Broadcast	Tuning & Bandsread Plates out of mesh	Two trimmers on top of Input I. F.
SHORT WAVE BAND	17 Mc.	400 ohms	Antenna lead	Short Wave	Set Dial at 17 Mc.	Trimmer C16—S. W. osc. (See Note A)
	17 Mc.	400 ohms	Antenna lead	Short Wave	Set Dial at 17 Mc.	Trimmer C1-C9 S. W. ant. and R. F.
	8 Mc.	400 ohms	Antenna lead	Short Wave	Set Dial at 8 Mc.	Trimmer C15 S. W. osc. series pad (See note "B")
MEDIUM WAVE BAND	6 Mc.	400 ohms	Antenna lead	Medium Wave	Set Dial at 6 Mc.	Trimmer C18 M. W. osc.
	6 Mc.	400 ohms	Antenna lead	Medium Wave	Set Dial at 6 Mc.	Trimmer C2-C10 ant. and R. F.
	2.5 Mc.	400 ohms	Antenna lead	Medium Wave	Set Dial at 2.5 Mc.	Trimmer C17 osc. series pad (See note "B")
BROADCAST BAND	1720 Kc.	200 mmf.	Antenna lead	Broadcast	Tuning & Bandsread Plates out of mesh	Trimmer C20 B. C. osc.
	1400 Kc.	200 mmf.	Antenna lead	Broadcast	Set Dial at 1400 Kc.	Trimmer C3-C11 B. C. ant. R. F.
	600 Kc.	200 mmf.	Antenna lead	Broadcast	Set Dial at 600 Kc.	Trimmer C19 B. C. osc. series pad (See note "B")

NOTE "A"—It is extremely necessary that the fundamental oscillator signal be tuned in and not the image frequency which will fall below the fundamental.

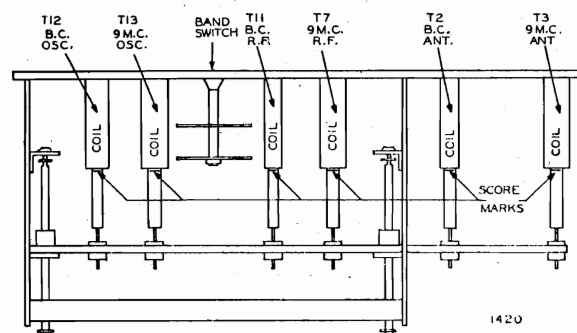
NOTE "B"—Turn the dial back and forth slightly (rock) and adjust trimmer until the peak of greatest intensity is obtained. After each range is completed, repeat the procedure as a final check.

MONTGOMERY-WARD & CO.



- | | | |
|-----|----------|-------------------------------------|
| R1 | BE1301 | 25M ohm— $\frac{1}{2}$ w. |
| R2 | BE1301 | 25M ohm— $\frac{1}{2}$ w. |
| R3 | BE13019 | 1 Megohm— $\frac{1}{2}$ w. |
| R4 | BE130239 | 250 ohm— $\frac{1}{2}$ w. |
| R5 | BE130218 | 5M ohm— $\frac{1}{2}$ w. |
| R6 | | 1 megohm in tuning indicator cable. |
| R7 | BE10662 | 12,500 ohm— $\frac{1}{2}$ w. |
| R8 | BE13019 | 1 megohm— $\frac{1}{2}$ w. |
| R9 | BE130232 | 25M ohm— $\frac{1}{2}$ w. |
| R10 | BE130220 | 300 ohm—1 w. |
| R11 | BE1303 | 500M ohm— $\frac{1}{2}$ w. |
| R12 | BE1303 | 500M ohm— $\frac{1}{2}$ w. |
| R13 | BE130103 | 100M ohm— $\frac{1}{2}$ w. |
| R14 | BE130218 | 5M ohm— $\frac{1}{2}$ w. |
| R15 | BE130103 | 100M ohm— $\frac{1}{2}$ w. |
| R16 | BE13019 | 1 megohm— $\frac{1}{2}$ w. |
| R17 | BE13070 | 500 ohm— $\frac{1}{2}$ w. |
| R18 | BE1303 | 500M ohm— $\frac{1}{2}$ w. |
| R19 | BE1303 | 500M ohm— $\frac{1}{2}$ w. |
| R20 | BE13011 | 250M ohm— $\frac{1}{2}$ w. |
| R21 | BE101267 | 2.8 megohm—Volume control |
| R22 | BE130191 | 1.5 megohm— $\frac{1}{2}$ w. |
| R23 | BE13012 | 50M ohm— $\frac{1}{2}$ w. |
| R24 | BE1304 | 3 megohm— $\frac{1}{2}$ w. |
| R25 | BE130257 | 5 megohm— $\frac{1}{2}$ w. |
| R26 | BE130174 | 50 ohm— $\frac{1}{2}$ w. |
| R27 | BE1307 | 40M ohm— $\frac{1}{2}$ w. |
| R28 | BE130352 | 150M ohm— $\frac{1}{2}$ w. |
| R29 | BE130351 | 80M ohm— $\frac{1}{2}$ w. |
| C1 | BE1292 | .0005 mica |
| C2 | BE10047 | .002 x 600 v. |
| C3 | BE124143 | B.C. antenna trimmer |
| C4 | BE124143 | 9 mc. antenna trimmer |
| C5 | BE1292 | .0005 mica |
| C6 | BE10020 | .1 x 200 v. tubular condenser |
| C7 | BE129168 | .00001 mica |
| C8 | BE124138 | 9 mc. R.F. trimmer |
| C9 | BE124139 | B.C. R.F. trimmer |
| C10 | BE10074 | .1 x 400 v. |
| C11 | BE10074 | .1 x 400 v. |
| C12 | BE119109 | 10.0 mfd. x 350 v. v. lytic |
| C13 | BE12922 | .0005 mica |
| C14 | BE119109 | 15.0 mfd. x 450 w. v. lytic |
| C15 | BE119109 | 15.0 mfd. x 450 w. v. lytic |
| C16 | BE124144 | B.C. oscillator trimmer |
| C17 | BE10071 | .004 x 600 v. |
| C18 | BE129167 | .0002 silver mica |
| C19 | BE129165 | .00005 mica |
| C20 | BE124145 | 9 mc. oscillator trimmer |
| C21 | BE10013 | .05 x 400 v. |
| C22 | BE1009 | .05 x 200 v. |
| C23 | BE10026 | .02 x 400 v. |
| C24 | BE10020 | .1 x 200 v. |
| C25 | BE12951 | .000125 mica |
| C26 | BE1002 | .003 x 300 v. |
| C27 | BE10026 | .02 x 400 v. |
| C28 | BE12921 | .0002 mica |
| C29 | BE10019 | .006 x 600 v. |
| C30 | BE100139 | .0015 x 200 v. |
| C31 | BE129165 | .00005 mica |
| C32 | BE129165 | .00005 mica |
| C33 | BE10061 | .02 x 600 v. Bakelite |
| C34 | BE10061 | .02 x 600 v. Bakelite |

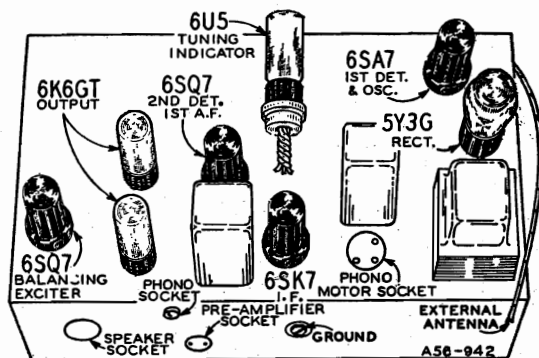
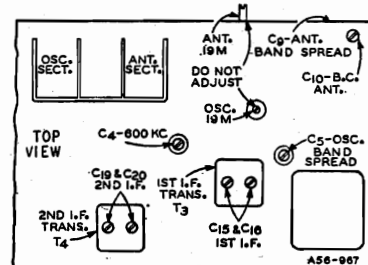
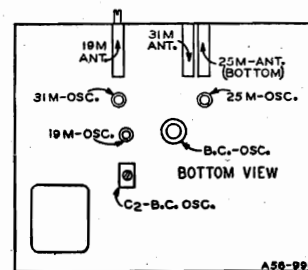
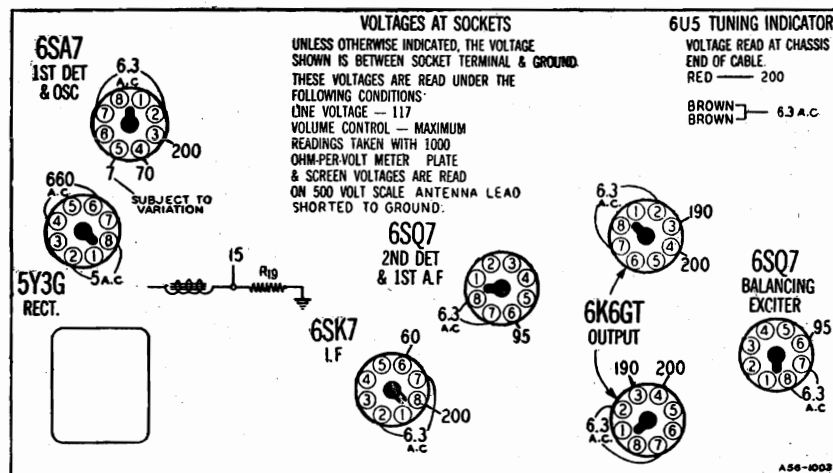
JUNE 1941



MODEL 14BR-911A

MONTGOMERY-WARD & CO.

MODELS 14WG-808M, 14WG-808W



ALIGNMENT FOR MODELS 14WG-808M, 14WG-808W IS THE SAME AS THAT FOR MODEL 14WG-807

FOR SEEBURG C RECORD CHANGER SEE RIDER'S "AUTOMATIC RECORD CHANGERS AND RECORDERS".

SPECIFICATIONS

Power Consumption - 57 Watts (at 117 volts 60 cycles)
77 Watts (Phonograph Operating)
Power Output - 3.0 Watts Undistorted
4.5 Watts Maximum
Selectivity - 38 KC Broad at 1000 times Signal
Intermediate Frequency - 456 KC
Speaker - 10" Electro-Dynamic

Tuning Frequency Range
Band B Range...535 to 1610 KC...15 Microvolts Aver.
19 Meter...14.6 to 15.8 MC...26 Microvolts Aver.
25 Meter...11.1 to 12.0 MC...25 Microvolts Aver.
31 Meter...9.3 to 10.05 MC...22 Microvolts Aver.

Sensitivity External Antenna (For 0.5 Watt Output)
19 Meter...14.6 to 15.8 MC...26 Microvolts Aver.
25 Meter...11.1 to 12.0 MC...25 Microvolts Aver.
31 Meter...9.3 to 10.05 MC...22 Microvolts Aver.

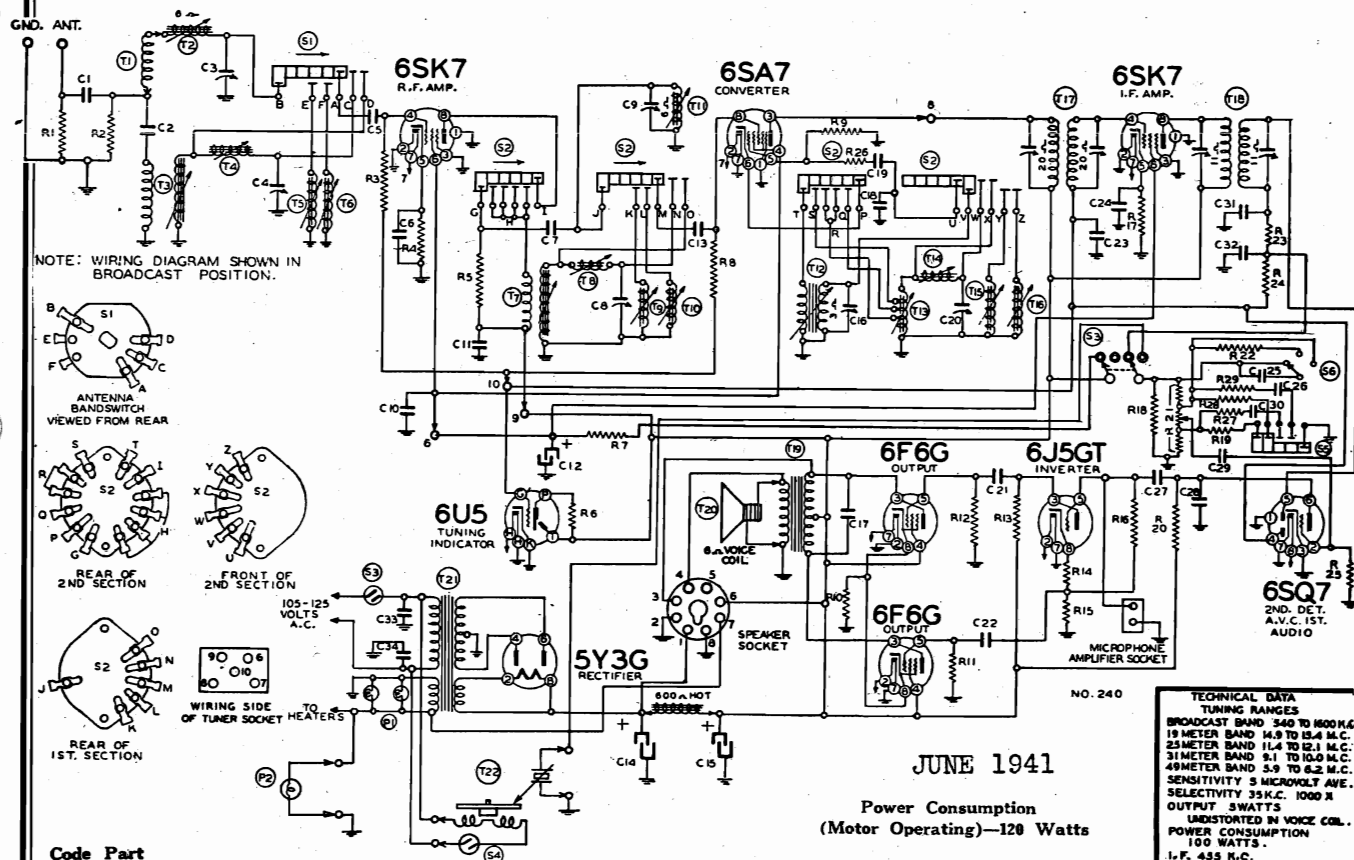
- Tone control—Treble
- Volume control—Maximum all adjustments.
- Use an all wave signal generator which will provide an accurately calibrated signal at the test frequencies as listed.

MODEL 14BR-911A

ALIGNMENT PROCEDURE

BAND	Frequency Setting	Dummy Antenna	Connection to Radio	Position of Band Switch	Dial Pointer Setting	Trimmers Adjusted To Maximum
I. F.	455 Kc.	.1 MFD.	Grid of 6SK7 (I.F.)	Broadcast	Set Dial at 1600 Kc.	On Top of Output I.F.
	455 Kc.	.1 MFD.	Grid of 6SA7	Broadcast	Set Dial at 1600 Kc.	On Top of Input I.F.
31 METER BAND	9.6 Mc.	400 ohms	Antenna lead	31M	Set Dial at 9.6 Mc.	(See Trimmer View) C20—Osc. (See Trimmer View) C8—R.F. (See Chassis View) C4—Ant.
49 METER BAND	6.1 Mc.	400 ohms	Antenna lead	49M	Set Dial at 6.1 Mc.	(See Trimmer View) T14—Osc. (See Trimmer View) T8—R.F. (See Trimmer View) T4—Ant.
25 METER BAND	11.8 Mc.	400 ohms	Antenna lead	25M	Set Dial at 11.8 Mc.	(See Trimmer View) T15—Osc. (See Trimmer View) T9—R.F. (See Trimmer View) T5—Ant.
19 METER BAND	15.2 Mc.	400 ohms	Antenna lead	19M	Set Dial at 15.2 Mc.	(See Trimmer View) T16—Osc. (See Trimmer View) T10—R.F. (See Trimmer View) T6—Ant.
BROAD-CAST BAND	1600 Kc.	200 mmf.	Antenna lead	Broadcast	Set Dial at 1600 Kc.	(See Trimmer View) C16—Osc. (See Trimmer View) C9—R.F. (See Chassis View) C3—Ant.
	1400 Kc.	200 mmf.	Antenna lead	Broadcast	Set Dial at 1400 Kc.	Rotate Core T11—R.F. Rotate Core T2—Ant. (See Iron Core Adjustment View)

MONTGOMERY-WARD & CO.

Code Part
No. No.

RESISTORS

R1	BE1301	25M ohm— $\frac{1}{4}$ w.
R2	BE1301	25M ohm— $\frac{1}{4}$ w.
R3	BE13019	1 megohm— $\frac{1}{4}$ w.
R4	BE130239	250 ohm— $\frac{1}{4}$ w.
R5	BE130218	5M ohm— $\frac{1}{4}$ w.
R6		1 megohm in tuning indicator cable
R7	BE10662	12,500 ohm—3 w.
R8	BE13019	1 megohm— $\frac{1}{4}$ w.
R9	BE130232	25M ohm— $\frac{1}{4}$ w.
R10	BE130220	300 ohm—1 w.
R11	BE1303	500M ohm— $\frac{1}{4}$ w.
R12	BE1303	500M ohm— $\frac{1}{4}$ w.
R13	BE130103	100M ohm— $\frac{1}{4}$ w.
R14	BE130218	5M ohm— $\frac{1}{4}$ w.
R15	BE130103	100M ohm— $\frac{1}{4}$ w.
R16	BE13019	1 megohm— $\frac{1}{4}$ w.
R17	BE13070	500 ohm— $\frac{1}{4}$ w.
R18	BE1303	500M ohm— $\frac{1}{4}$ w.
R19	BE1303	500M ohm— $\frac{1}{4}$ w.
R20	BE13011	250M ohm— $\frac{1}{4}$ w.
R21	BE101267	2.8 megohm—volume control
R22	BE130191	1.5 megohm— $\frac{1}{4}$ w.
R23	BE13012	50M ohm— $\frac{1}{4}$ w.
R24	BE1304	3 megohm— $\frac{1}{4}$ w.
R25	BE130257	5 megohm— $\frac{1}{4}$ w.
R26	BE130174	50 ohm— $\frac{1}{4}$ w.
R27	BE1307	40M ohm— $\frac{1}{4}$ w.
R28	BE130352	150M ohm— $\frac{1}{4}$ w.
R29	BE130351	80M ohm— $\frac{1}{4}$ w.

CONDENSERS

C1	BE1292	.0005 mica
C2	BE10047	.002 x 600 v.
C3	BE124143	B.C. antenna trimmer
C4	BE124143	9 mc. antenna trimmer
C5	BE1292	.0005 mica
C6	BE10020	.1 x 200 v. tubular condenser
C7	BE129168	.00001 mica
C8	BE124138	9 mc. R.F. trimmer
C9	BE124139	B.C. R.F. trimmer
C10	BE10074	.1 x 400 v.
C11	BE10074	.1 x 400 v.
C12	BE119109	10.0 mfd. x 350 w. v. lytic
C12	BE119109B	10.0 mfd. x 350 w. v. lytic
C13	BE1292	.0005 mica
C14	BE119109	15.0 mfd. x 450 w. v. lytic
C14	BE119109B	15.0 mfd. x 450 w. v. lytic
C15	BE119109	15.0 mfd. x 450 w. v. lytic
C15	BE119109B	15.0 mfd. x 450 w. v. lytic
C16	BE124144	B.C. oscillator trimmer

Code Part
No. No.

Description

C17	BE10071	.004 x 600 v.
C18	BE129167	.0002 silver mica
C19	BE129165	.00005 mica
C20	BE124145	9 mc. oscillator trimmer
C21	BE10013	.05 x 400 v.
C22	BE1009	.05 x 200 v.
C23	BE10026	.02 x 400 v.
C24	BE10020	.1 x 200 v.
C25	BE12951	.000125 mica

C26 BE1002 .003 x 300 v.

C27 BE10026 .02 x 400 v.

C28 BE12921 .0002 mica

C29 BE10019 .006 x 600 v.

C30 BE100139 .0015 x 200 v.

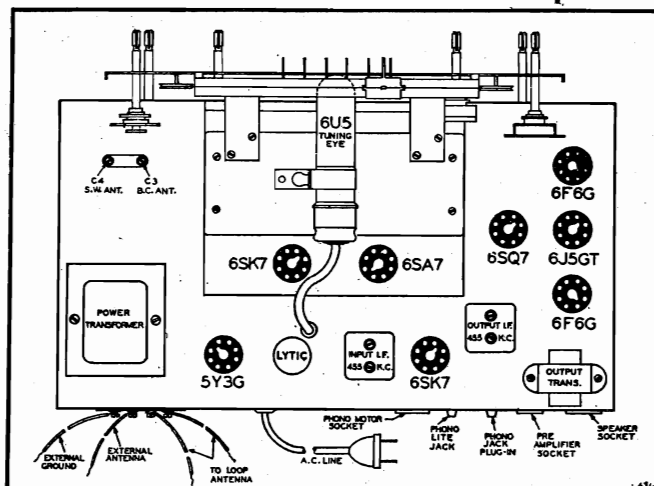
C31 BE129165 .00005 mica

C32 BE129165 .00005 mica

C33 BE10061 .02 x 600 v. Bakelite

C34 BE10061 .02 x 600 v. Bakelite

C12, C14 and C15 are in same unit

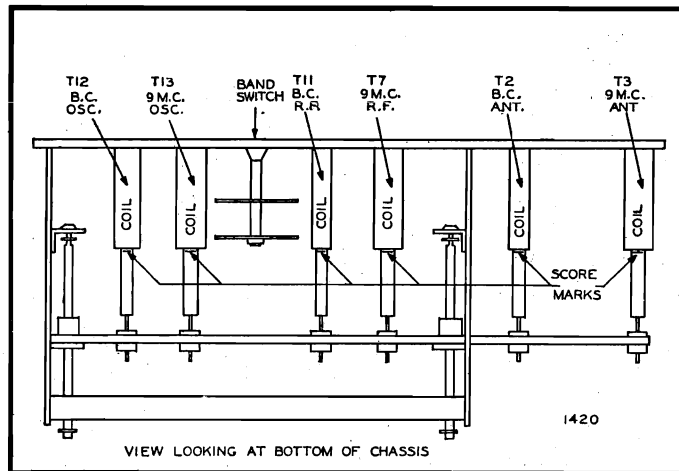


FOR PUSH-BUTTON DATA SEE THAT OF MODEL 14BR-688A

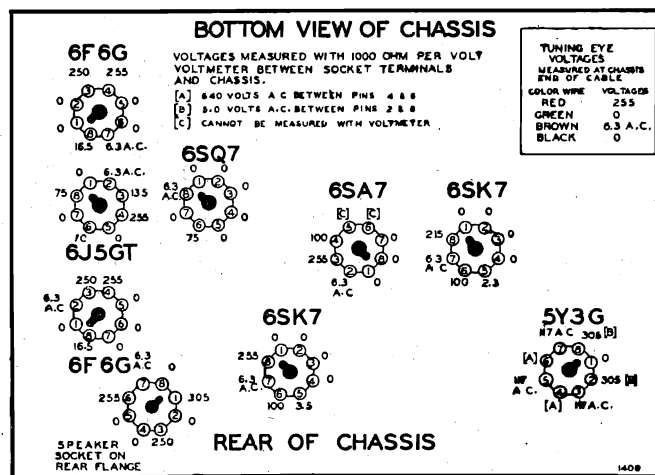
FOR SEEBURG B RECORD CHANGER SEE RIDER'S
"AUTOMATIC RECORD CHANGERS AND RECORDERS".

MODEL 14BR-912A

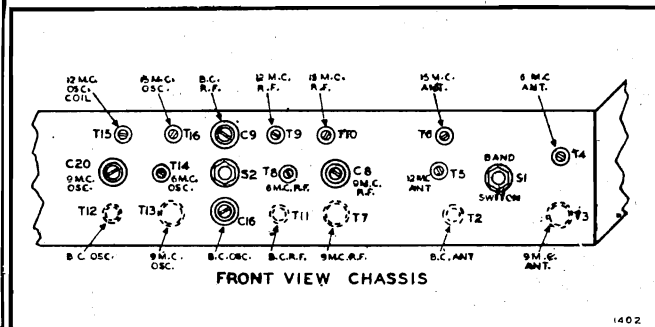
MONTGOMERY-WARD & CO.



IRON CORE ADJUSTMENT VIEW



VOLTAGE CHART



TRIMMER VIEW

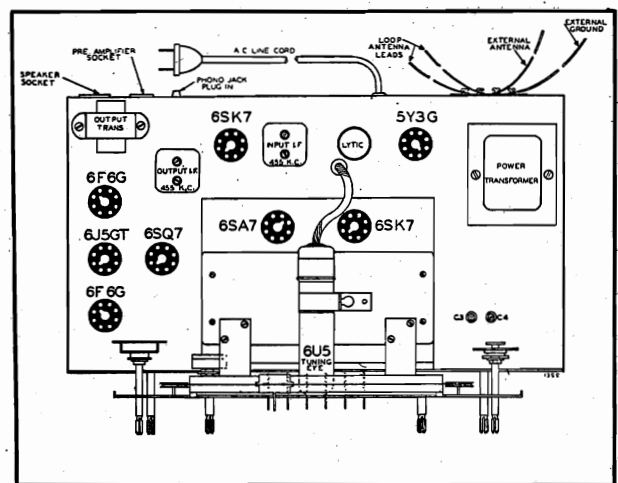
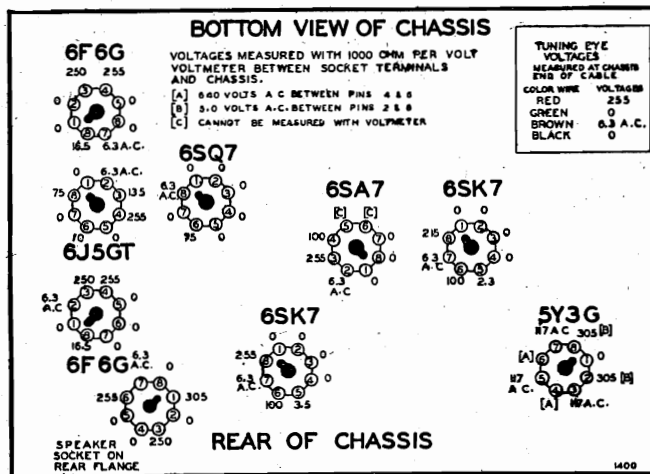
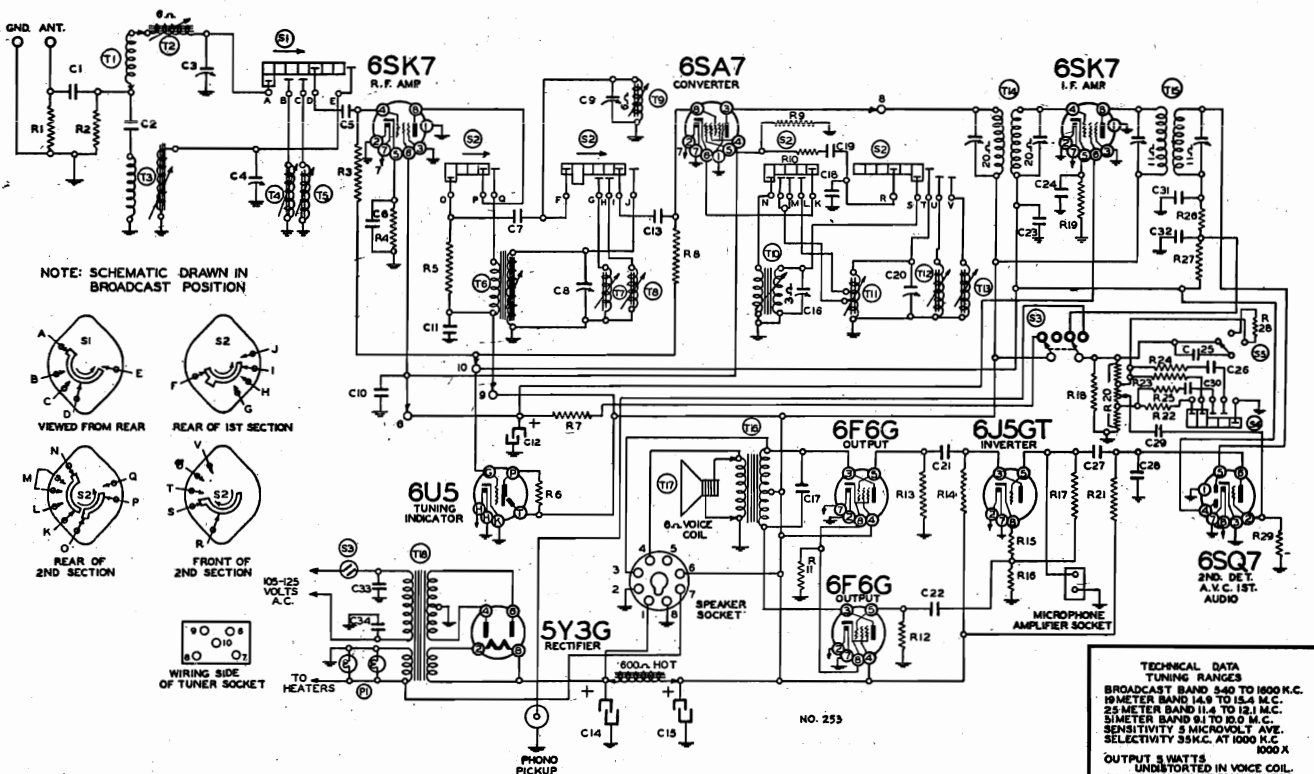
ALIGNMENT PROCEDURE

- Tone control—Treble.
- Volume control—Maximum all adjustments.
- Connect dummy antenna value in series with generator output lead.

- Use an all wave signal generator which will provide an accurately calibrated signal at the test frequencies as listed.

BAND	SIGNAL GENERATOR Frequency Setting	Dummy Antenna	Connection to Radio	Position of Band Switch	Dial Pointer Setting	Trimmers Adjusted To Maximum in Order Shown
I. F.	455 Kc.	.1 MFD.	Grid of 6SK7 (I.F.)	Broadcast	Set Dial at 1600 Kc.	On Top of Output I.F.
	455 Kc.	.1 MFD.	Grid of 6SA7	Broadcast	Set Dial at 1600 Kc.	On Top of Input I.F.
31 METER BAND	9.6 Mc.	400 ohms	Antenna lead	31M	Set Dial at 9.6 Mc.	(See Trimmer View) C20—Osc. (See Trimmer View) C3—R.F. (See Chassis View) C4—Ant.
49 METER BAND	6.1 Mc.	400 ohms	Antenna lead	49M	Set Dial at 6.1 Mc.	(See Trimmer View) T14—Osc. (See Trimmer View) T8—R.F. (See Trimmer View) T4—Ant.
25 METER BAND	11.8 Mc.	400 ohms	Antenna lead	25M	Set Dial at 11.8 Mc.	(See Trimmer View) T15—Osc. (See Trimmer View) T9—R.F. (See Trimmer View) T5—Ant.
19 METER BAND	15.2 Mc.	400 ohms	Antenna lead	19M	Set Dial at 15.2 Mc.	(See Trimmer View) T16—Osc. (See Trimmer View) T10—R.F. (See Trimmer View) T6—Ant.
BROAD- CAST BAND	1600 Kc.	200 mmf.	Antenna lead	Broadcast	Set Dial at 1600 Kc.	(See Trimmer View) C16—Osc. (See Trimmer View) C9—R.F. (See Chassis View) C3—Ant.
	1400 Kc.	200 mmf.	Antenna lead	Broadcast	Set Dial at 1400 Kc.	Rotate Core T11—R.F. Rotate Core T2—Ant. (See Iron Core Adjustment View)

MONTGOMERY-WARD & CO.



VOLTAGE CHART

R1	BE1301	25M ohm— $\frac{1}{2}$ w.
R2	BE1301	25M ohm— $\frac{1}{2}$ w.
R3	BE13019	1 megohm— $\frac{1}{2}$ w.
R4	BE130239	250 ohm— $\frac{1}{2}$ w.
R5	BE130218	5M ohm— $\frac{1}{2}$ w.
R6		1 megohm—in tuning indicator cable
R7	BE10662	12,500 ohm—3 w.
R8	BE13019	1 megohm— $\frac{1}{2}$ w.
R9	BE130232	25M ohm— $\frac{1}{2}$ w.
R10	BE130174	50 ohm— $\frac{1}{2}$ w.
R11	BE130220	300 ohm—1 w.
R12	BE1303	500M ohm— $\frac{1}{2}$ w.
R13	BE1303	500M ohm— $\frac{1}{2}$ w.
R14	BE130103	100M ohm— $\frac{1}{2}$ w.
R15	BE130218	5M ohm— $\frac{1}{2}$ w.
R16	BE130103	100M ohm— $\frac{1}{2}$ w.
R17	BE13019	1 megohm— $\frac{1}{2}$ w.
R18	BE1303	500M ohm— $\frac{1}{2}$ w.
R19	BE13070	500 ohm— $\frac{1}{2}$ w.
R20	BE101267	2.8 megohm volume control
R21	BE13011	250M ohm— $\frac{1}{2}$ w.
R22	BE1303	500M ohm— $\frac{1}{2}$ w.
R23	BE130352	150M ohm— $\frac{1}{2}$ w.
R24	BE130351	80M ohm— $\frac{1}{2}$ w.
R25	BE1307	40M ohm— $\frac{1}{2}$ w.
R26	BE13012	50M ohm— $\frac{1}{2}$ w.
R27	BE1304	3 megohm— $\frac{1}{2}$ w.
R28	BE139191	1.5 megohm— $\frac{1}{2}$ w.
R29	BE130257	5 megohm— $\frac{1}{2}$ w.

C14	BE119109	15.0 x 450 w. v.
C14	BE119109B	15.0 x 450 w. v.
C15	BE119109	15.0 x 450 w. v.
C15	BE119109B	15.0 x 450 w. v.
C16	BE124144	B.C. oscillator trimmer
C17	BE10071	.004 x 600 v.
C18	BE129167	.0002 silver mica
C19	BE129165	.00005 mica
C20	BE124145	9 mc. osc. trimmer
C21	BE10013	.05 x 400 v.
C22	BE1009	.05 x 200 v.
C23	BE10026	.02 x 400 v.
C24	BE10020	.1 x 200 v.
C25	BE12951	.000125 mica
C26	BE1002	.03 x 300 v.
C27	BE10026	.02 x 400 v.
C28	BE12921	.0002 mica
C29	BE10019	.006 x 600 v.
C30	BE100139	.0015 x 200 v.
C31	BE129165	.00005 mica
C32	BE129165	.00005 mica
C33	BE10061	.02 x 600 v. bakelite
C34	BE10061	.02 x 600 v. bakelite

C14 and C15 are in same unit
C31 and C32 are in same unit

JUNE 1941

C1	BE1292	.0005 mica
C2	BE10047	.002 x 600 v.—10%
C3	BE124143	B.C. antenna trimmer
C4	BE124143	9 mc. antenna trimmer
C5	BE1292	.0005 mica
C6	BE10020	.1 x 200 v. tubular
C7	BE129168	.00001 mica
C8	BE124138	9 mc. R.F. trimmer
C9	BE124139	B.C. R.F. trimmer
C10	BE10074	.1 x 400 v.
C11	BE10074	.1 x 400 v.
C12	BE119109	10.0 x 350 w. v.
C12	BE119109B	10.0 x 350 w. v.
C13	BE1292	.0005 mica

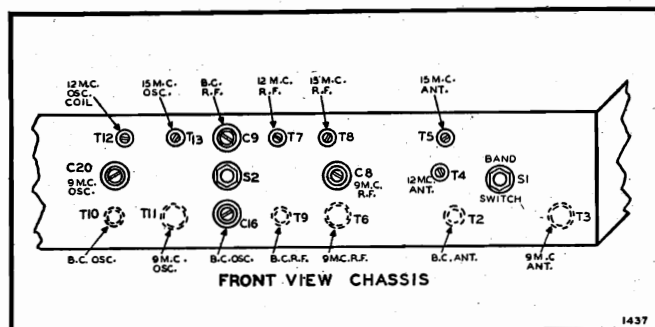
MODEL 14BR-913A

MONTGOMERY-WARD & CO.

ALIGNMENT PROCEDURE

- Tone control—Treble
- Volume control—Maximum all adjustments.

BAND	SIGNAL GENERATOR Frequency Setting	Dummy Antenna Value	Connection to Radio	Position of Band Switch	Dial Pointer Setting	Trimmers Adjusted To Maximum
I. F.	455 Kc.	.1 MFD.	Grid of 6SK7 (I.F.)	Broadcast	Set Dial at 1600 Kc.	On Top of Output I.F.
	455 Kc.	.1 MFD.	Grid of 6SA7	Broadcast	Set Dial at 1600 Kc.	On Top of Input I.F.
31 METER BAND	9.6 Mc.	400 ohms	Antenna lead	31M	Set Dial at 9.6 Mc.	(See Trimmer View) C20—Osc. (See Trimmer View) C8—R.F. (See Chassis View) C4—Ant.
25 METER BAND	11.8 Mc.	400 ohms	Antenna lead	25M	Set Dial at 11.8 Mc.	(See Trimmer View) T12—Osc. (See Trimmer View) T7—R.F. (See Trimmer View) T4—Ant.
19 METER BAND	15.2 Mc.	400 ohms	Antenna lead	19M	Set Dial at 15.2 Mc.	(See Trimmer View) T13—Osc. (See Trimmer View) T8—R.F. (See Trimmer View) T5—Ant.
BROAD-CAST BAND	1600 Kc.	200 mmf.	Antenna lead	Broadcast	Set Dial at 1600 Kc.	(See Trimmer View) C16—Osc. (See Trimmer View) C9—R.F. (See Chassis View) C3—Ant.
	1400 Kc.	200 mmf.	Antenna lead	Broadcast	Set Dial at 1400 Kc.	Rotate Core T9—R.F. Rotate Core T2—Ant. (See Iron Core Adjustment View)

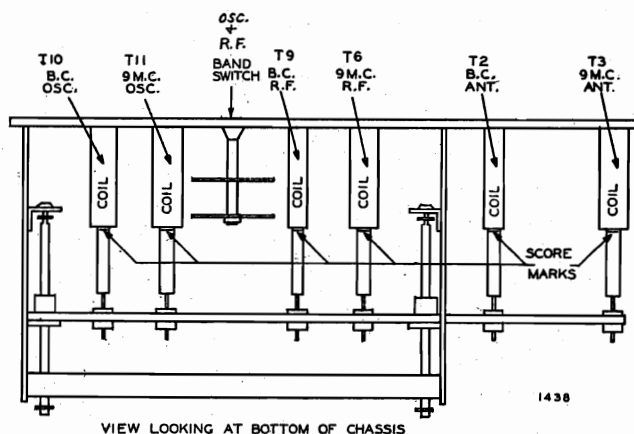


TRIMMER VIEW

ANTENNA

This radio is designed to pick up strong local stations without requiring an outside antenna. The built-in aerial may be slightly directional therefore try the radio in several positions. For best results, however, an outside antenna approximately 50 to 75 feet long including lead-in is recommended. It should be erected as high as possible and as far from surrounding objects as practical. For minimum interference it should be at right angles to street car lines, incoming power lines and other electrical apparatus which may be in the vicinity. A ground is advisable. A good ground will often reduce noise. The ground wire should be connected with a clamp to a well cleaned water pipe or to a piece of pipe driven several feet into damp earth.

Periodic inspection of the antenna system is recommended to be sure that all connections are clean and tight, and that the antenna is well insulated from the ground at all points.



IRON CORE ADJUSTMENT VIEW

PHONOGRAPH-TELEVISION AND FM. JACK

Should you wish to use an external phonograph it should be plugged into the phono jack shown in the chassis view. The radio-phono-on-off knob on the front panel will then switch from radio to phono operation.

If television or frequency modulation (FM) programs ever become available in your community this radio may still be used in conjunction with the necessary converters.

The jack marked phono-jack plug in the chassis view will accommodate either the Phono or a television or FM converter.

MONTGOMERY-WARD & CO.

Part Reference	Schematic Diagram No.	Description	No. Used In Set	Selling Price Each
CONDENSERS				
BE102152	C	Three Gang Variable Condenser	1	3.00
BE102000	C4	1 x 200 Volt Tubular Condenser	1	.10
BE102006	C10, C16,	25 x 400 Volt Tubular Condenser	3	.10
BE102005	C23	.02 x 500 Volt Tubular Condenser	1	.10
BE102003	C28	.05 x 200 Volt Tubular Condenser	1	.10
BE102001	C28	.05 x 400 Volt Tubular Condenser	1	.10
BE102001	C29	.04 x 600 Volt Tubular Condenser	1	.10
BE102017	C7	.25 x 400 Volt Tubular Condenser	2	.20
BE102014	C6, C19,	C20 Electrolytic Filter Condenser—10 Mfd. x 350 V.; 25 Mfd. x 450 V.; 25 Mfd. x 450 V.	1	.90
BE124180	C2	S.W. Antenna Trimmer	1	.44
BE124179	C3, C14	S.W. and B.C. Trimmer—Dual	1	.36
BE124181	C1	S.W. and B.C. Osc. Trimmer—Dual	1	.24
BE124182	C1	B.C. Antenna Trimmer	1	.12
BE129157	C3, C18	.00025 Compression Cond.—B.C. Pad	2	.22
BE129160	C3	.0005 Mica Type Condenser—20%	2	.12
BE129139	C15	.0004 Mica Type Condenser—20%	1	.12
BE129135	C21, C22	.0005 Mica Type Condenser—20%	2	.12
BE129156	C11	.0001 Mica Type Condenser—20%	2	.12
BE129162	C4	.0024 Compression Mica Condenser	1	.30
BE129162	C4	.00025 Mica Type Condenser—20%	1	.12

RESISTORS

BE101270	R13, S2	Volume Control and Switch (500M Ohms)	1	.62
BE101271	R17	Tone Control (1 Megohm)	1	.50
BE13019	R2, R18	1 Megohm— $\frac{1}{2}$ Watt Resistor—20%	2	.10
BE1305	R4	300M Ohm— $\frac{1}{2}$ Watt Resistor—20%	1	.12
BE130208	R5	400M Ohm— $\frac{1}{2}$ Watt Resistor—20%	1	.10
BE13054	R6, R11	50M Ohm— $\frac{1}{2}$ Watt Resistor—20%	2	.10
BE130263	R8	12M Ohm— $\frac{1}{2}$ Watt Resistor—20%	1	.10
BE13020	R9, R19,	R22 100M Ohm— $\frac{1}{2}$ Watt Resistor—20%	3	.10
BE13020	R7	12M Ohm—2 Watt Resistor—10%	1	.10
BE13012	R15	50M Ohm— $\frac{1}{2}$ Watt Resistor—20%	1	.10
BE130170	R14	3 Megohm— $\frac{1}{2}$ Watt Resistor—25%	1	.10
BE130225	R12	15 Megohm— $\frac{1}{2}$ Watt Resistor—30%	1	.10
BE13043	R20, R23	250M Ohm— $\frac{1}{2}$ Watt Resistor—20%	2	.10
BE13011	R16	500M Ohm— $\frac{1}{2}$ Watt Resistor—20%	1	.10
BE130311	R24	300 Ohm—1 Watt Resistor—20%	1	.10
BE13099	R1	400 Ohm— $\frac{1}{2}$ Watt Resistor—20%	1	.10
BE13024	R10	1 Megohm—In Eye Socket	1	.10

COILS

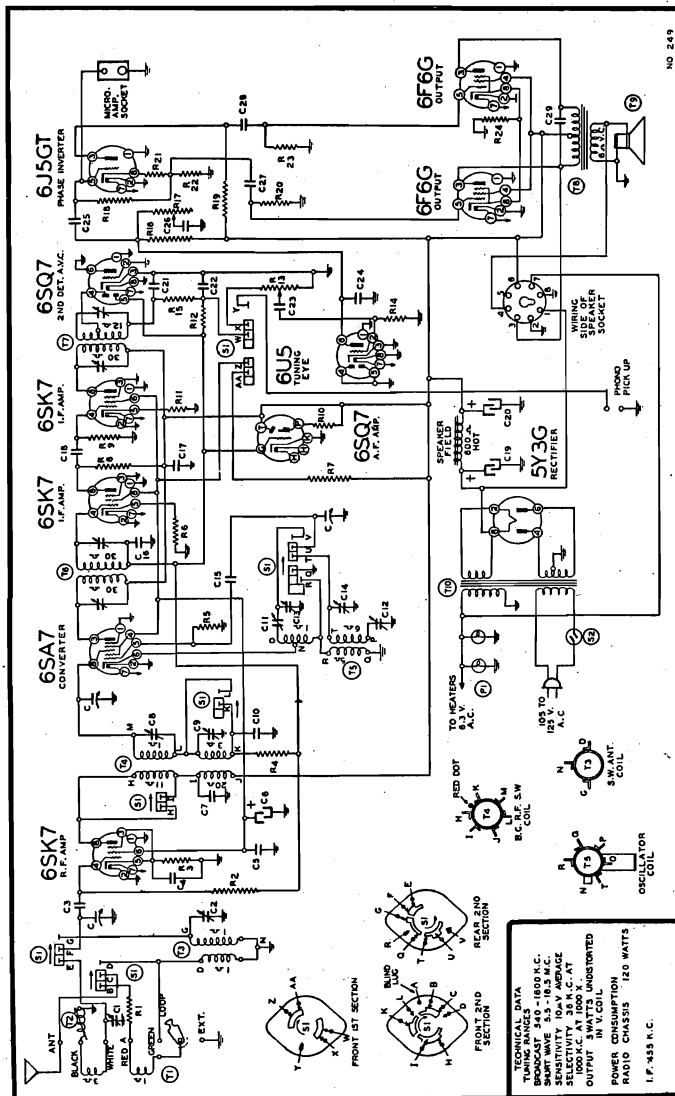
BE108169J	T6	Input I.F. Coil Complete in Can	1	.76
BE108130C	T7	Output I.F. Coil Complete in Can	1	.76
BE10957	T4	B.C.—S.W. R.F. Coil Complete in Can	1	.70
BE110149	T5	S.W.—S.W. Oscillator Coil	1	.50
BE111176	T2	S.W. Antenna Coil	1	.30
BE111153	T3	Loop Adjusting Coil With Iron Slug	1	.30
BE111257	T1	Loop Antenna Assembly	1	1.20

SPEAKER

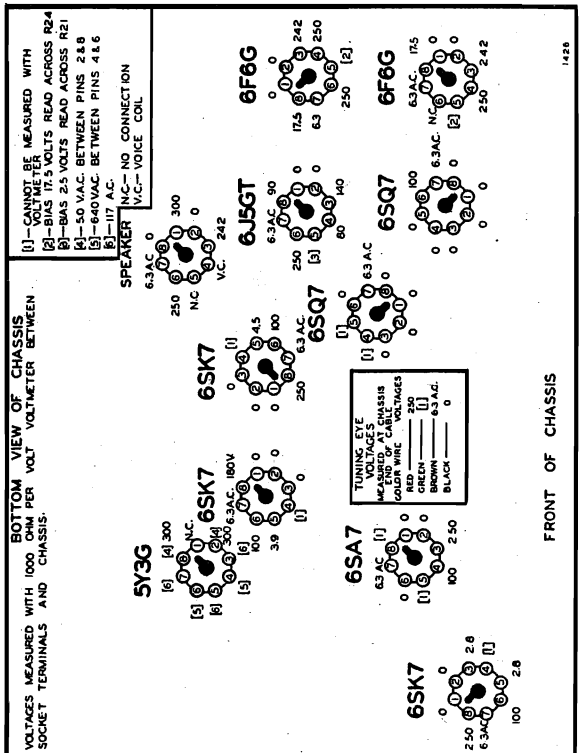
BE114261	T9	Ten Inch Electrodynamic Speaker (Less Output Transformer)	1	4.00
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TRANSFORMERS

BE10554F	T8	Output Transformer for Speaker	1	1.00
BE104202C	T10	Power Transformer, 50 to 60 Cycles 105-125 Volt Primary	1	3.00
BE104203C		Power Transformer 25 to 60 Cycles 105-125 Volt Primary	1	



PRICES SUBJECT
TO CHANGE
WITHOUT
NOTICE



MODEL 14BR-1109A

MONTGOMERY-WARD & CO.

ALIGNMENT PROCEDURE

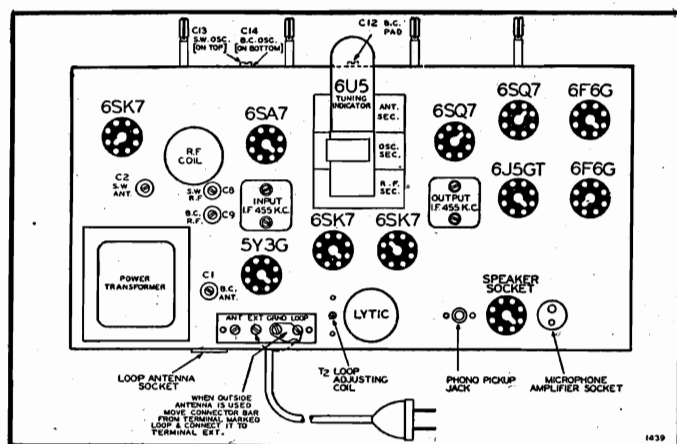
- Volume control—Maximum all adjustments.
- Connect dummy antenna value in series with generator output lead.

BAND	Frequency Setting	Dummy Antenna	Connection to Radio	Position of Band Switch	Variable Condenser Setting	Trimmers Adjusted (in Order Shown)
I. F.	455 Kc.	.1 MFD.	Grid of 6SK7 I. F.	Broadcast	Rotor full open (Plates out of mesh)	Two trimmers on top Output I. F.
	455 Kc.	.1 MFD.	Grid of 6SA7 Mixer	Broadcast	Rotor full open (Plates out of mesh)	Two trimmers on top Input I. F.
SHORT WAVE BAND	17 Mc.	400 Ohms	External Antenna and Ground	Short Wave	Set Dial at 17 Mc.	C13, S.W. Osc.
	17 Mc.	400 Ohms	External Antenna and Ground	Short Wave	Set Dial at 17 Mc.	C8, S.W. R.F., C2 S.W. Antenna
	6 Mc.	400 Ohms	External Antenna and Ground	Short Wave	Set Dial at 6 Mc.	C11 S.W. Osc. Series Pad See Note "A"
BROADCAST BAND	1600 Kc.	200 mmf.	Grid of 6SK7 R. F. Tube	Broadcast	Rotor full open (Plates out of mesh)	C14 B.C. Osc.
	540 Kc.	200 mmf.	Grid of 6SK7 R. F. Tube	Broadcast	Set Dial at 540 Kc. (Plates in Mesh)	C12 B.C. Osc. Series Pad
	1400 Kc.	200 mmf.	Grid of 6SK7 R. F. Tube	Broadcast	Set Dial at 1400 Kc.	C9 B.C. R.F.
LOOP ALIGNMENT	1400 Kc.	200 mmf.	External Antenna and Ground	Broadcast	Set Dial at 1400 Kc.	C1 B.C. Ant.
	600 Kc.	200 mmf.	External Antenna and Ground	Broadcast	Set Dial at 600 Kc.	T2 Iron Core Tracking Coil

NOTE "A"—Turn the dial back and forth slightly (rock) and adjust trimmer until the peak of greatest intensity is obtained.

After each band is completed, repeat the procedure as a final check.

JUNE 1941



CHASSIS VIEW

ANTENNA AND GROUND TERMINALS

When using an external antenna and ground, move the metal strap (connector bar) from terminal marked LOOP and connect it to terminal marked EXT.

The antenna and ground wires should then be connected to the terminals marked "Ant."—"Gnd."

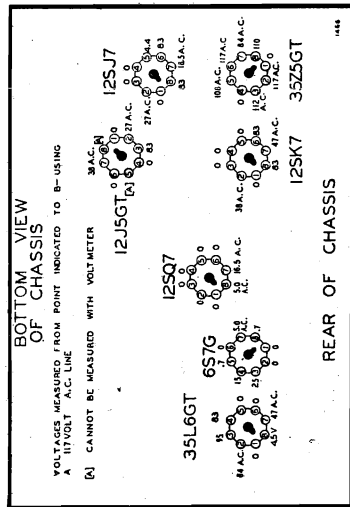
POWER SUPPLY—Unless your radio is marked otherwise, it must be operated from 105 to 125 volts, 50 to 60 cycle A.C. If in doubt, phone your electric light company. Receivers of this same model which are for use on special voltages are marked accordingly.

ANTENNA

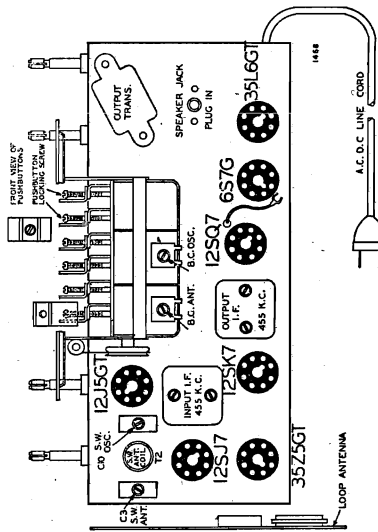
This radio is designed to pick up strong local stations without requiring an outside antenna. The built-in aerial may be slightly directional therefore try the radio in several positions. For best results, however, an outside antenna approximately 50 to 75 feet long including lead-in is recommended. It should be erected as high as possible and as far from surrounding objects as practical. For minimum interference it should be at right angles to street car lines, incoming power lines and other electrical apparatus which may be in the vicinity. A ground is advisable. A good ground will often reduce noise. The ground wire should be connected with a clamp to a well cleaned water pipe or to a piece of pipe driven several feet into damp earth.

Periodic inspection of the antenna system is recommended to be sure that all connections are clean and tight, and that the antenna is well insulated from the ground at all points.

MONTGOMERY-WARD & CO.



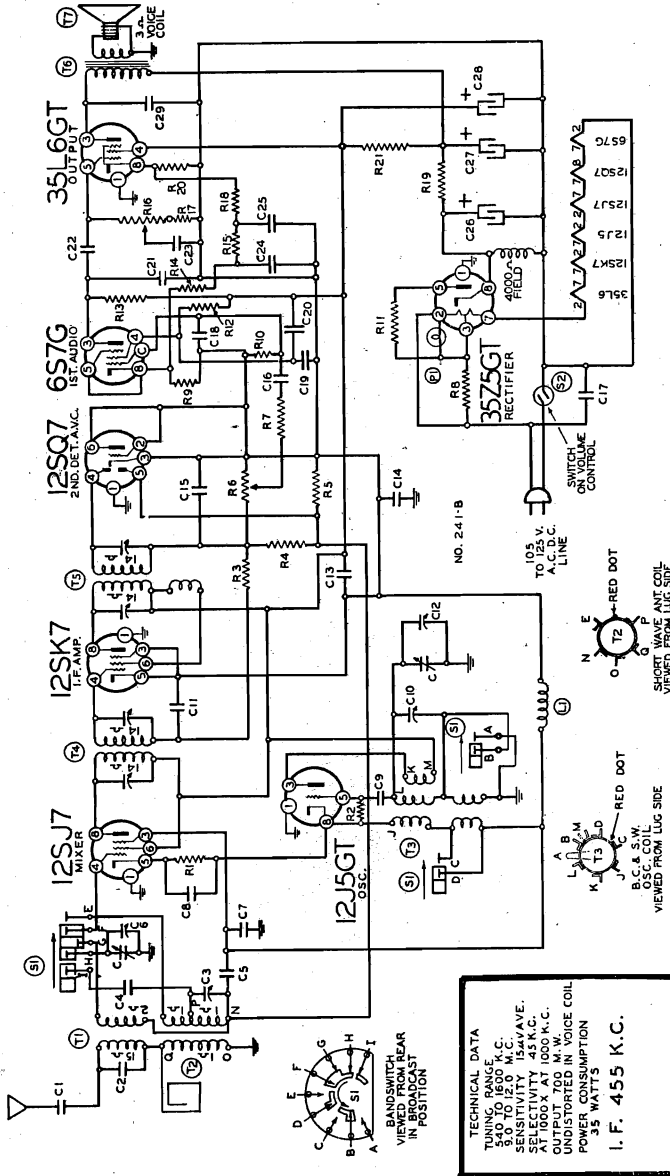
Voltage Chart



ALIGNMENT PROCEDURE

- Volume control—Maximum all adjustments.
- Connect B—of radio chassis to ground post of signal generator through .1 Mfd. condenser.

OCTOBER 1941



BAND	SIGNAL GENERATOR Frequency Setting	Dummy Antenna	Connection to Radio	Position of Band Switch	Variable Condenser Setting	Trimmers Adjusted to Maximum
I. F.	455 Kc.	.1 MFD.	Grid of 12SK7	Broadcast	Rotor full open (Plates out of mesh)	Two trimmers on top of Output I. F.
	455 Kc.	.1 MFD.	Grid of 12SJ7	Broadcast	Rotor full open (Plates out of mesh)	Two trimmers on top of Input I. F.
SHORT WAVE BAND	12 Mc.	400 Ohms	External Antenna and B—	Short Wave	Set Dial at 12 Mc.	S.W. Osc. trimmer C10 S.W. Ant. trimmer C3
BROAD-CAST BAND	1600 Kc.	.1 mmf.	Grid of 12SJ7	Broadcast	Rotor full open (Plates out of mesh)	B.C. Osc. trimmer C12 on Gang
	1400 Kc.	200 mmf.	External Antenna and B—	Broadcast	Set Dial at 1400 Kc.	B.C. Ant. trimmer C6

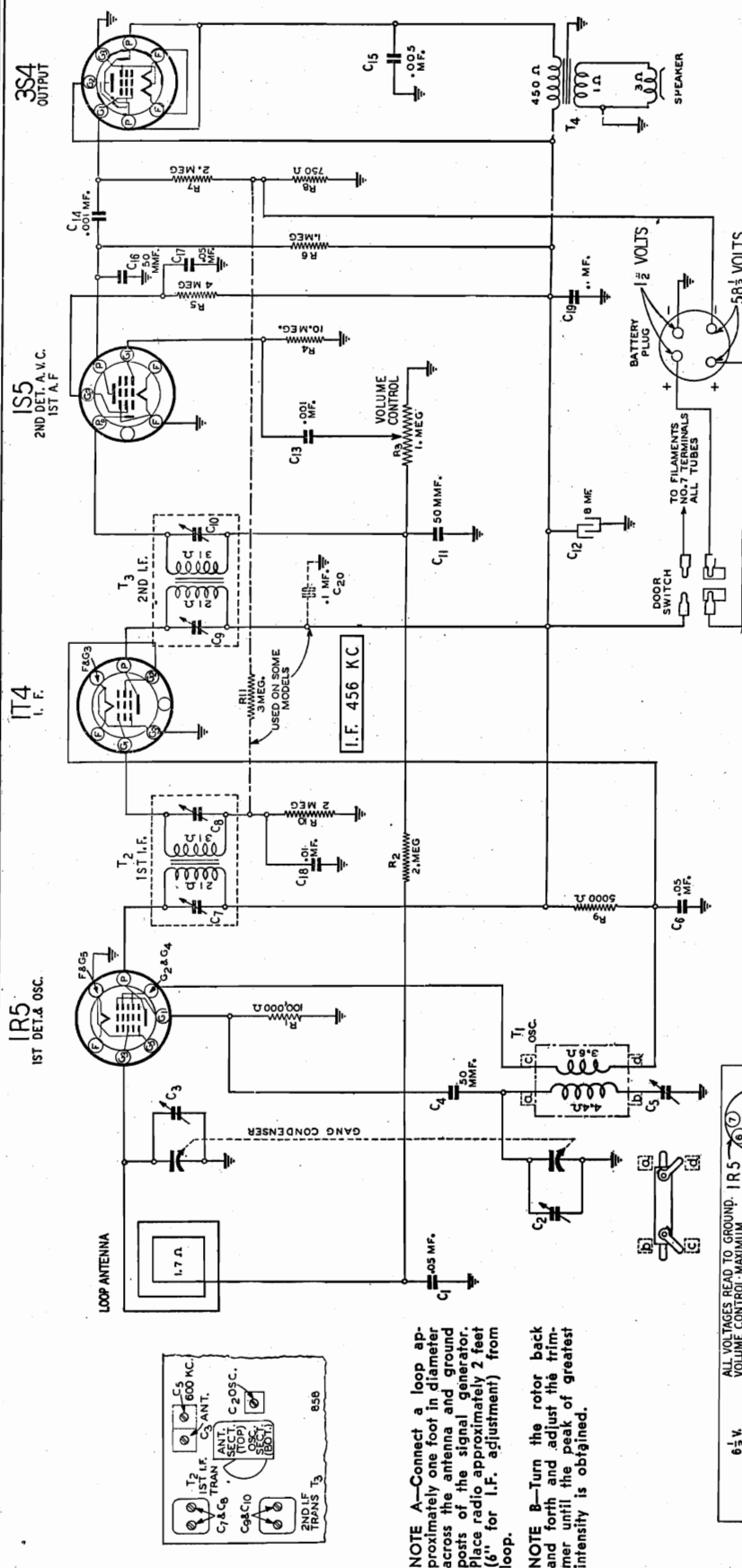
NOTE: The Oscillator Frequency is lower than the signal frequency and should be aligned accordingly.

The loop antenna should be connected to the radio when making all adjustments.

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

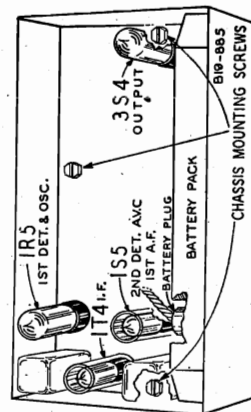
MODEL 14WG-438

MONTGOMERY WARD & CO.



TUBES

The tube types and position of the tubes and tube shields are shown in the illustration below.



ALIGNMENT PROCEDURE

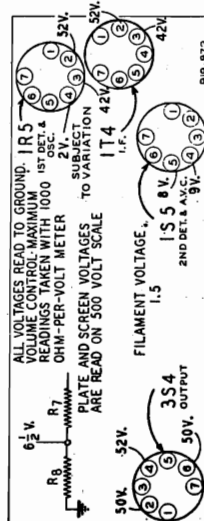
Volume Control—Maximum All Adjustments.
Allow Chassis and Signal Generator to "Heat Up" for several minutes.
The following equipment is required for aligning:
A Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.
Output Indicating Meter—Non-Metallic Screwdriver.

Use Loop for All Adjustments—See Note "A"

Signal Gen. FREQUENCY SETTING	CONDENSER SETTING	ADJUST TRIMMERS TO MAXIMUM (See Trimmer Illustration)
456 KC	Turn Rotor to Full Open	1st I.F. (C7) & (C8)
1610 KC	Turn Rotor to Full Open	2nd I.F. (C9) & (C10)
1500 KC	Turn Rotor to Full Open	Oscillator (C2)
	Turn Rotor to Max. Output	Antenna (C3)
600 KC	Turn Rotor to Max. Output	600 KC (C5)
1500 KC	Turn Rotor to Max. Output	Antenna (C3)

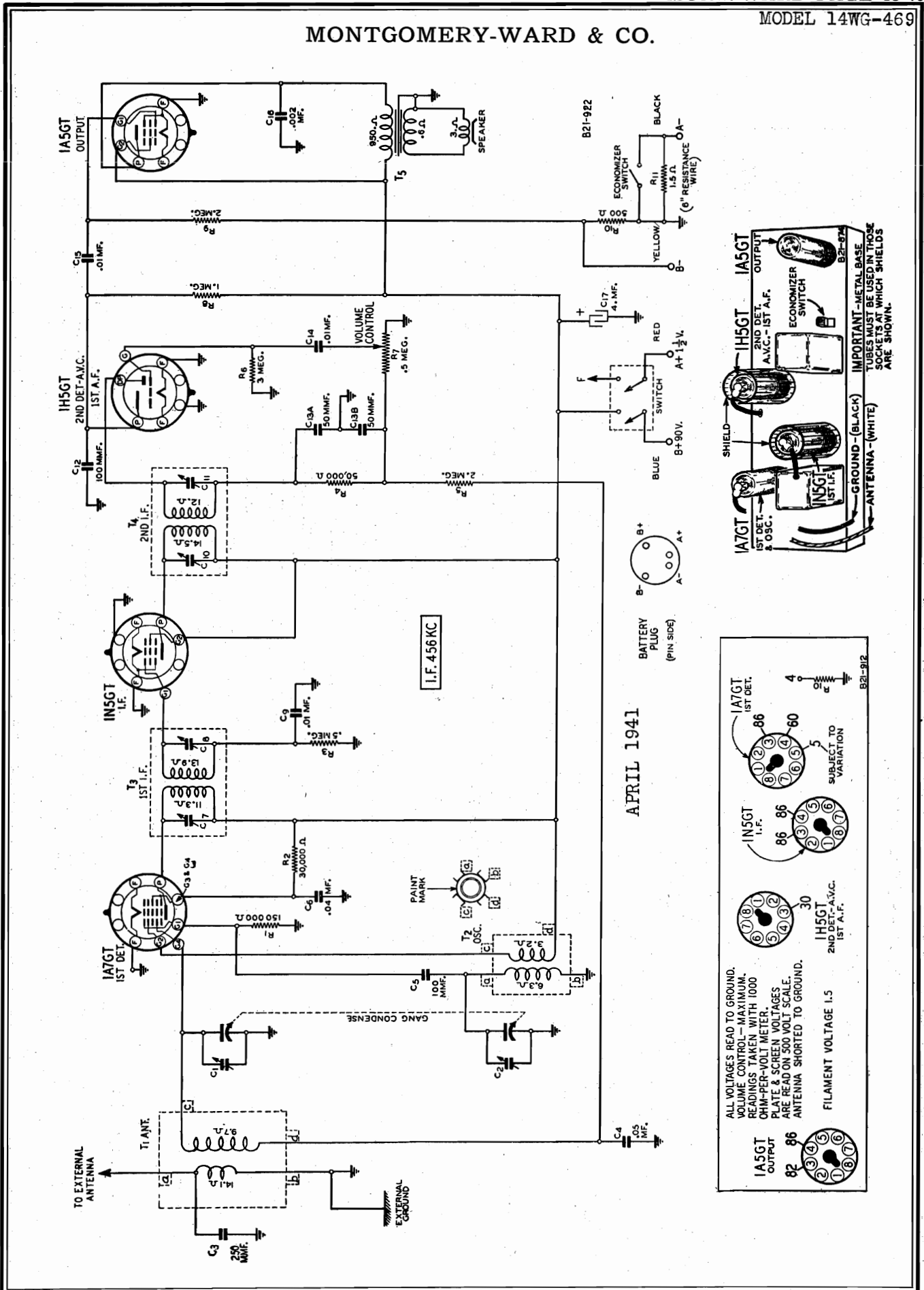
SPECIFICATIONS

Input Voltages and Currents
 "A" Battery - - - 1.5 Volts—25 Amperes
 "B" Battery - - - 58½ Volts—8 Ma.
 Power Output - - - 55 Milliwatts Undistorted
 Selectivity - 40 KC Broad at 1000 Times Signal
 Intermediate Frequency - - - 456 KC
 Speaker - - - - - 4" P.M. Dynamic
 Tuning Frequency Range - 528 to 1610 KC
 Sensitivity - 400 Microvolts per Meter Average
 (For .05 Watt Output)



APRIL 1941

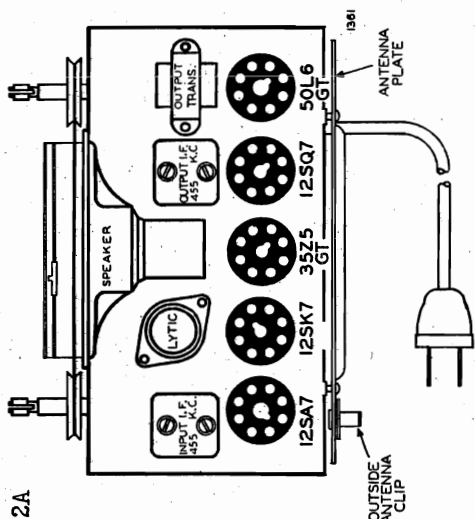
MONTGOMERY-WARD & CO.



MODEL 14WG-469

MODELS 14BR-521A, 14BR-522A

MONTGOMERY-WARD & CO.



ALIGNMENT PROCEDURE, MODELS 14BR-521A, 14BR-522A

- Volume control—Maximum all adjustments.
- Connect B-of radio chassis to ground post of signal generator through .1 Mfd. condenser.

BAND	SIGNAL GENERATOR Frequency Setting	Connection to Radio	Position of Iron Cores (Dial Setting)	Adjust Trimmers to Maximum (in Order Shown)
I. F.	455 Kc.	Connect to Metal Antenna Backplate	Iron Cores All the way out	Two trimmers on top of output I. F. can
	455 Kc.	Connect to Metal Antenna Backplate	Iron Cores All the way out	Two trimmers on top of input I. F. can
	1720 Kc.	Connect to Metal Antenna Backplate	Iron Cores All the way out	Osc. Trimmer (C7)
BROAD-CAST BAND	1720 Kc.	Connect to Outside Antenna Clip	Iron Cores All the way out	Ant. Trimmer (C3)
	1400 Kc.	Connect to Outside Antenna Clip	Turn Dial to 1400 Kc.	Adjust position of antenna coil (See coil assembly view)
	1720 Kc.	Connect to Outside Antenna Clip	Turn Dial to 1720 Kc.	Adjust trimmer (C3)
				(See voltage chart)

NOTE "A"—The antenna coil assembly is made so that it is movable. When making the adjustment as given in the alignment procedure, move the coil assembly only. It can be moved by the use of a screwdriver in the hole and engaging the blade in the gear teeth of the coil form.

NOTE "B"—After the antenna coil has been tracked at 1400 Kc. it is necessary to check the change in trimmer (C3) adjustment again at 1720 Kc. If the change in trimmer (C3) adjustment is made the coil is in track, if the trimmer requires considerable change it will be necessary to again adjust the position of the antenna coil at 1400 Kc. These two adjustments should be tried several times until no change of trimmer adjustment is required at 1720 Kc.

SPECIFICATIONS

Input Voltages and Currents

"A" Battery - - 1.5 Volts—2 Amperes

"B" Battery - - - 90 Volts—0.5 Ma.

Power Output - - 70 Milliwatts Undistorted
160 Milliwatts Maximum

Selectivity - 40 KC Broad at 1000 Times Signal

Intermediate Frequency - - - 455 KC

Speaker - - - - - 5" P.M. Dynamic

Tuning Frequency Range - 528 to 1730 KC

Sensitivity - - - - 50 Microvolts Average
(For .05 Watt Output)

ALIGNMENT PROCEDURE

Volume Control—Maximum All Adjustments.
Connect Radio Chassis to Ground Post of Signal Generator with a Short Heavy Lead.
Allow Chassis and Signal Generator to "Heat Up" for several minutes.

The following equipment is required for aligning:
A Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.
Output Indicating Meter—Non-Metallic Screwdriver.
Dummy Antennas—.1 mf. & 200 mmf.

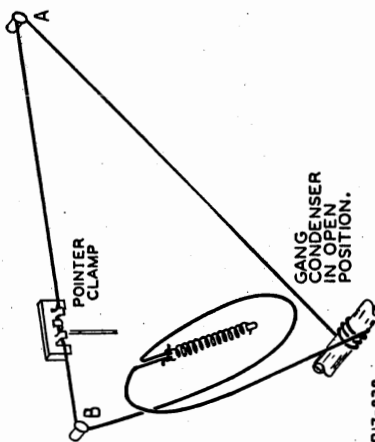
SIGNAL GENERATOR FREQUENCY SETTING	DUMMY ANTENNA	CONDENSER SETTING	ADJUST TRIMMERS TO MAXIMUM (See Trimmer Illustration)
455 KC	Signal Grid of 1st Det. (Top Cap)	Turn rotor to full open	1st I.F. (C7) & (C9) 2nd I.F. (C10) & (C11)
1730 KC	Signal Grid of 1st Det.	Turn rotor to full open	Oscillator (C2)
1400 KC	Antenna Lead	Turn Rotor to Max. Output Set Indicator to 1400 KC— See Note A	Antenna (C1)

NOTE A—If the pointer is not at 1400 KC on the dial, remove pointer from drive cord. Set pointer at the 1400 KC mark on the dial scale. Attach pointer to drive cord.

DRIVE CORD REPLACEMENT

Use a new drive cord approximately 38 inches in length. Tie one end to tension spring. Secure other end of spring to hook on gang condenser drive pulley. Thread free end of cord through hole in pulley rim. Turn gang condenser to full open position—See illustration.

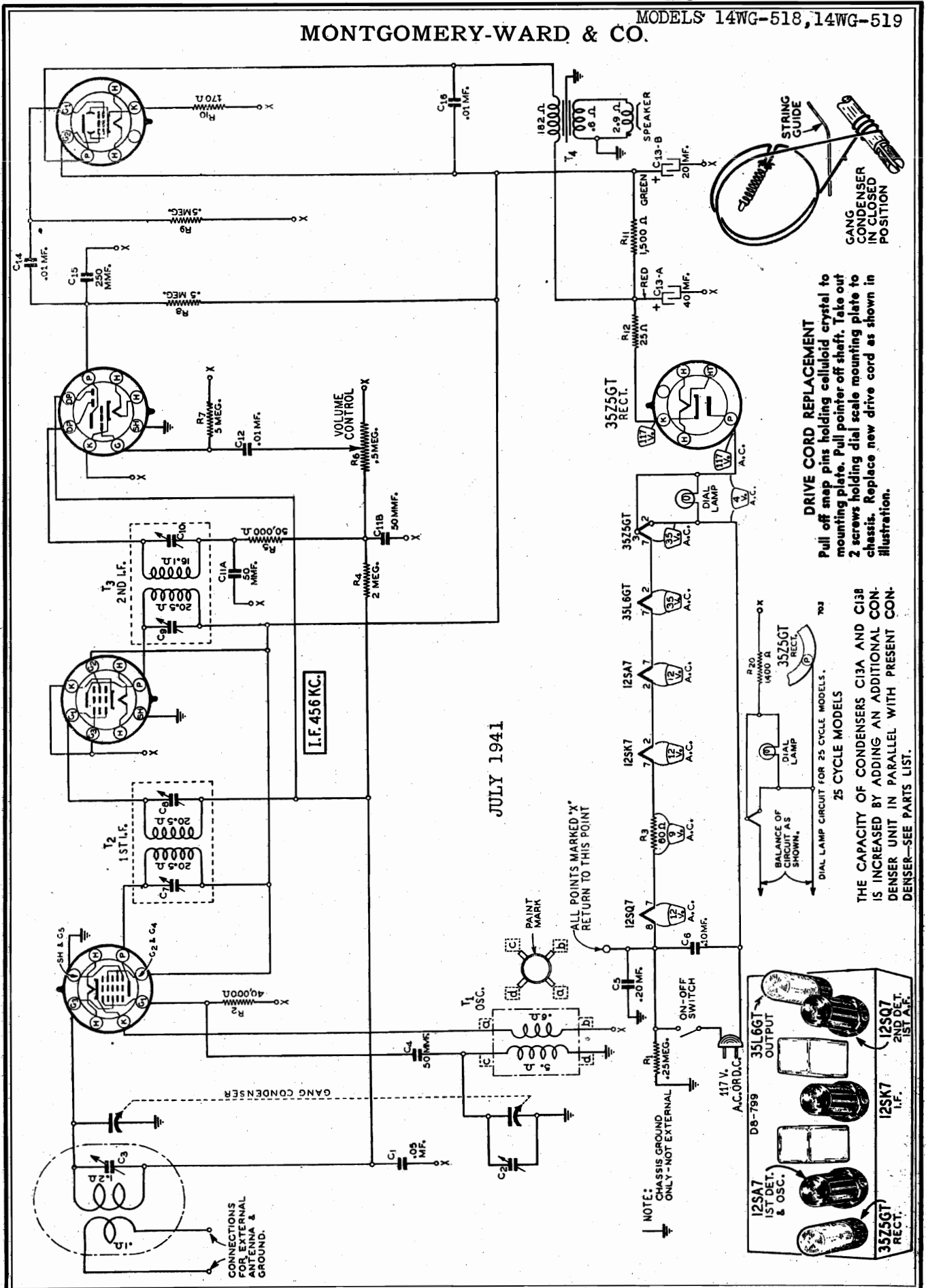
Wind cord $\frac{1}{4}$ turn counter-clockwise (from gang condenser and of chassis) around drive pulley. Wind cord $\frac{3}{4}$ turns counter-clockwise (from rear of chassis) around tuning control shaft. Turns should progress toward front of chassis. Pass cord over idler studs A and B as shown in illustration. Wind cord $\frac{1}{4}$ turn counter-clockwise (from gang condenser side of chassis) around drive pulley. Turn should be on right side (from rear of chassis) of pulley groove.



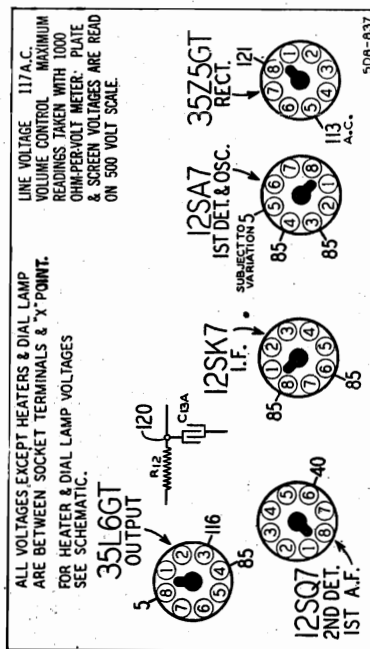
MODEL 14WG-469

MONTGOMERY-WARD & CO.

MODELS 14WG-518, 14WG-519

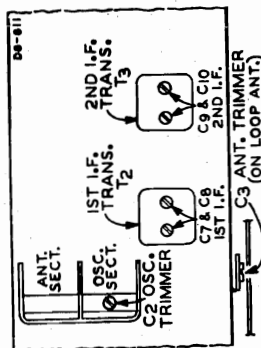


JULY 1941



SPECIFICATIONS

Power Consumption - 28 Watts (At 117 volts AC Supply)
 Power Output - .8 Watt Undistorted
 Selectivity - 55 KC Broad at 1000 times Signal
 Intermediate Frequency - 456 KC
 Speaker - 4" P.M. Dynamic
 Tuning Frequency Range - 528 to 1600 KC
 Sensitivity (For .05 Watt Output)
 External Antenna - 20 Microvolts Average



NOTE A—Re-assemble chassis in cabinet.
 Replace back on cabinet.

NOTE B—Tune in a 1400 KC signal. If pointer is not at the 1400 KC mark on the dial scale, remove chassis and pull pointer off shaft. Set pointer at the 1400 KC mark and push back on shaft.

When the 4" Electro-Dynamic Speaker replaces the 4" P.M. Speaker on the above chassis, the issue letter advances to "C". The speaker field replaces the 1500 ohm B+ filter resistor with additional changes in the B+ circuit connections to the 35L6GT output tube. A 20 mf. 25 volt electrolytic condenser is placed across the 170 ohm 35L6GT cathode resistor. A 60 ohm 1.5 watt resistor is inserted in the heater circuit between the 12SK7 and 12SA7 tube heaters.

Part No. Description

The following NEW PARTS are used on the issue "C" chassis:

12A408 4" Electro-Dynamic Speaker..... \$ 1.76
 45X317 C17 20 mf. 25 Volt Dry Electrolytic.... .24
 D95600 R13 60 ohm 1.5 Watt Carbon Resistor.... .12

The following parts are used on issues "A" and "B" chassis only:

12A380 4" P.M. Speaker..... 1.46
 C95152 R11 1500 Ohm 1.0 Watt Carbon Resistor.. .06

Issues "A," "B" and "C" chassis of the above models used an antenna trimmer (C3) mounted on the loop aerial assembly. On issue "D" chassis, the antenna trimmer (C3) has been replaced by a "Gimmick" fixed capacitance, consisting of 2 wires, one wrapped around the other. The 1400 KC adjustment is made at the factory and need not be made in the field.

The following part is used on issues "A," "B" and "C" chassis only:

17A116 C3 2.5-23 mmf. antenna trimmer \$0.06

ALIGNMENT PROCEDURE

Volume Control—Maximum All Adjustments.
 Allow Chassis and Signal Generator to "Heat Up" for several Minutes.

The equipment in column at right is required for aligning:

Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.

Output Indicating Meter; Non-Metallic Screwdriver.

Dummy Antennas—.1 mf., 50 mmf.

FREQUENCY SETTING	SIGNAL GENERATOR ANTENNA CONNECTION	GROUND CONNECTION	DUMMY ANTENNA	CONDENSER SETTING	ADJUST TRIMMERS TO MAXIMUM (See Trimmer Illustration)
456 KC	Control Grid 12SK7—I.F.	Point "X" (12SK7—I.F. Prong No. 3)	.1 mf.	Turn Rotor to full open	2nd I.F. (C9) & (C10)
456 KC	Control Grid 12SA7—1st Det.	Same As Above	.1 mf.	Turn Rotor to full open	1st I.F. (C7) & (C8)
1600 KC	Control Grid 12SA7—1st Det.	Same As Above	.1 mf.	Turn Rotor to full open	Oscillator (C2)
1400 KC	External Antenna Clip On Loop —See Note A	External Ground Clip On Loop	50 mmf.	Turn Rotor to Max. Output Set Indicator to 1400 KC—See Note B	Antenna (C3)

.B20-886

MODEL 14WG-538

MONTGOMERY WARD & CO.

PERSONAL PORTABLE RADIO WITH BUILT-IN AIR WAVE LOOP AERIAL

SPECIFICATIONS

Input Voltages and Currents—Battery Operation

"A" Battery - - - 1½ Volts—25 Amp.

"B" Battery - - - 58½ Volts—4 Ma.

Power Consumption - - - 30 Watts
(At 117 Volts AC Supply)

Power Output

Battery Operation - 55 Mw. Undistorted
110 Mw. Maximum

AC Operation - 80 Mw. Undistorted
170 Mw. Maximum

Selectivity - 40 KC Broad at 1000 Times Signal

Intermediate Frequency - - - 456 KC

Speaker - - - - - 4" P.M. Dynamic

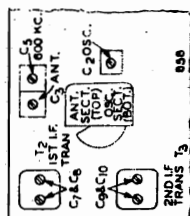
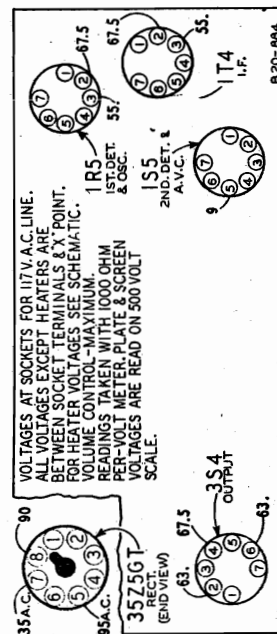
Tuning Frequency Range - 528 to 1610 KC

Sensitivity - 400 Microvolts per Meter Average
(For .05 Watt Output)

TUBES

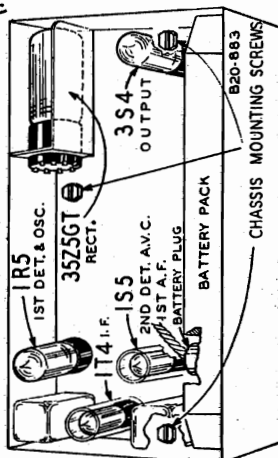
The tube types and position of the tubes and tube shields are shown in the illustration.

To replace the 35Z5GT rectifier tube, pull line cord plug out of case. Carefully pry off the 2 control knobs. Then take out the 3 chassis screws (shown in illustration) with a ¼ inch socket wrench. Carefully lift chassis, tilting it at the same time, as far as connecting wires permit. Insert a screwdriver between rectifier tube and socket and pry tube out of socket.



NOTE A—Connect a loop approximately one foot in diameter across the antenna and ground posts of the signal generator. Place radio approximately 2 feet (6" for I.F. adjustment) from loop.

NOTE B—Turn the rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.



Check Your Line Voltage—Unless otherwise marked, this radio must be operated on a power supply of 105-125 volts AC, 50 to 60 cycles only, or 105-125 volts DC.

Radios for 25 cycle AC operation are so marked.

When using the radio on AC, if there appears to be excessive hum, reverse the plug. Leave the plug inserted the way which gives the least hum.

110 Volt DC Operation—Insert plug so that red mark is on positive side of the line.

CAUTION—If polarity of line is not known, insert plug; if set does not operate after one minute, reverse plug.

ALIGNMENT PROCEDURE

Volume Control—Maximum All Adjustments. Allow Chassis and Signal Generator to "Heat Up" for several minutes.

The following equipment is required for aligning:

A Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed. Output Indicating Meter—Non-Metallic Screwdriver.

Use Loop for All Adjustments—See Note "A"		
SIGNAL GEN. FREQUENCY SETTING	CONDENSER SETTING	ADJUST TRIMMERS TO MAXIMUM (See Trimmer Illustration)
456 KC	Turn Rotor to Full Open	1st I.F. (C7) & (C8)
1610 KC	Turn Rotor to Full Open	2nd I.F. (C9) & (C10)
1500 KC	Turn Rotor to Max. Output	Oscillator (C2)
1500 KC	Set Knob to 1500 KC	Antenna (C3)
600 KC	Turn Rotor to Max. Output	600 KC (C5)
1500 KC	Turn Rotor to Max. Output	Rock Rotor—See Note B
1500 KC	Turn Rotor to Max. Output	Antenna (C3)

ANTENNA

An Airwave Loop Aerial is built inside the front cover of this radio.

With the built-in loop aerial, directional effects are obtained. The signal pickup may be increased and interference from nearby stations can be reduced by rotating the radio until the signal is at a maximum.

BATTERY OPERATION

The following battery pack is required:

Battery Pack Catalog No. 62-5032.

To install battery pack, grasp case handle and pull open back cover at handle side of case. Note position of prongs on battery cable plug and holes in socket on battery. Then insert plug in socket. Illustration on page 2. Close back cover tightly, first getting bottom hooks in place in slots.

AC-DC OPERATION

Line Cord—Plug 3 hole socket on line cord into 3 prong plug which can be seen through a hole in the side of the case.



MODEL 14WG-572
MODEL 14WG-575
MODEL 14WG-572

MONTGOMERY-WARD & CO.

ALIGNMENT PROCEDURE

Volume Control—Maximum All Adjustments.

Connect Radio Chassis to Ground Post of Signal Generator with a Short Heavy Lead.

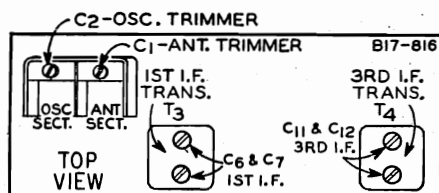
Allow Chassis and Signal Generator to "Heat Up" for several minutes.

The following equipment is required for aligning:

A Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.

Output Indicating Meter — Non-Metallic Screwdriver.

Dummy Antennas—.1 mf. & 200 mmf.



SIGNAL GENERATOR		DUMMY ANTENNA	CONDENSER SETTING	ADJUST TRIMMERS TO MAXIMUM
FREQUENCY SETTING	CONNECTION AT RADIO			(See Trimmer Illustration)
456 KC	Signal Grid of 1st Det. (Top Cap)	.1 mf.	Turn rotor to full open	1st I.F. (C6) & (C7)
1730 KC	Signal Grid of 1st Det.	.1 mf	Turn rotor to full open	3rd I.F. (C11) & (C12)
1400 KC	Antenna Lead	200 mmf.	Turn Rotor to Max. Output	Oscillator (C2)
			Set Indicator to 1400 KC— See Note A	Antenna (C1)

Models having a new drive cord stringing arrangement in which the drive cord has been shortened to 23 1/8 inches and the drive drum has been rotated 90 degrees from its previous position, should have the issue letter advanced to "D".

SPECIFICATIONS**Input Voltages and Currents**

"A" Battery.....1.5 Volts—25 Amperes

"B" Battery.....90 Volts—11 Ma.

Power Output.....
 { 70 Milliwatts Undistorted
 { 160 Milliwatts Maximum

Selectivity.....40 KC Broad at 1000 Times Signal

Intermediate Frequency.....456 KC

Speaker.....5" P.M. Dynamic

Tuning Frequency Range.....528 to 1730 KC

Sensitivity (For .05 Watt Output)...14 Microvolts Average

MODEL 14WG-575

ALIGNMENT PROCEDURE

Volume Control—Maximum All Adjustments. Allow Chassis and Signal Generator to "Heat Up" for several Minutes.

SPECIFICATIONS**Power Consumption**

Battery Operation - 2.2 Amp. at 6.3 Volts

AC Operation - 32 Watts at 117 Volts AC

Power Output - - - .5 Watt Undistorted
 1.0 Watt Maximum

Selectivity - 41 KC Broad at 1000 times Signal

Intermediate Frequency - - - 456 KC.

Speaker - - - 5" P.M. Dynamic

Tuning Frequency Range - 528 to 1730 KC.

Sensitivity
 (For .05 Watt Output) - 10 Microvolts Aver.

SIGNAL GENERATOR		DUMMY ANTENNA	CONDENSER SETTING	ADJUST TRIMMERS TO MAXIMUM
FREQUENCY SETTING	CONNECTION AT RADIO			(See Trimmer Illustration)
456 KC	Signal Grid of 1st Det.	.1 mf.	Turn rotor to full open	1st I.F. (C6) & (C7)
1730 KC	Grid of 1st Det.	.1 mf.	Turn rotor to full open	2nd I.F. (C11) & (C12)
1500 KC	Antenna Lead	200 mmf.	Turn rotor to max. output	Oscillator (C4)
				Antenna (C3)

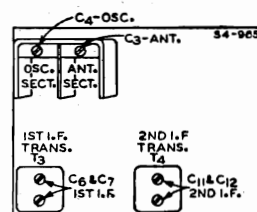
The following equipment is required for aligning:

Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.

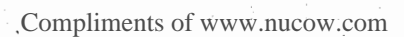
Output Indicating Meter; Non-Metallic Screwdriver.

Dummy Antennas—.1 mf. and 200 mmf.

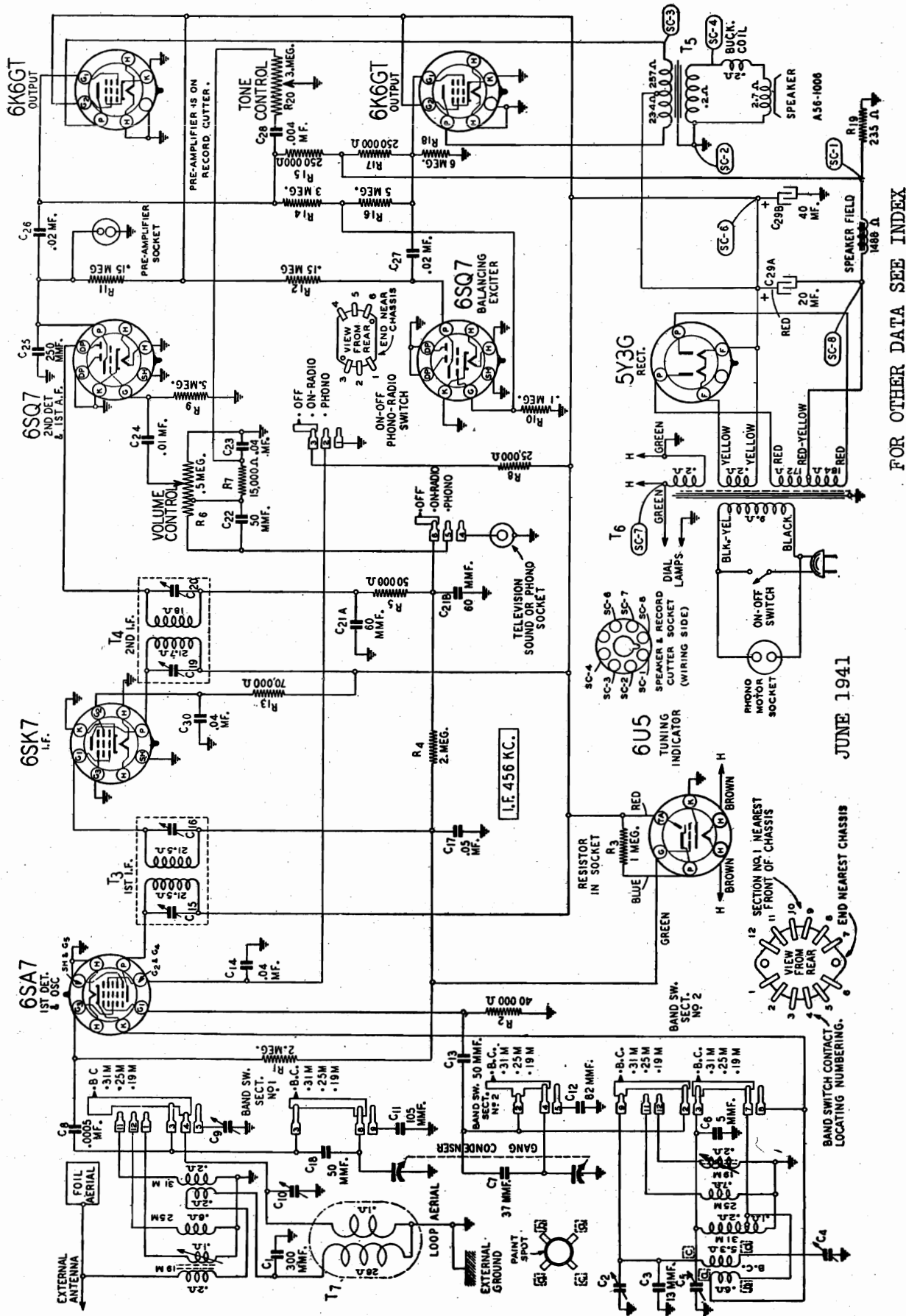
CALIBRATION—If it is necessary to calibrate the radio, tune in an 800 KC signal. If the pointer is not at the 800 KC mark on the dial, remove it from drive cord and set it at the 800 KC mark.



MODEL 14WG-575

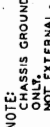


MONTGOMERY-WARD & CO.



FOR OTHER DATA SEE INDEX

JUNE 1941



MODELS 14WG-624A, 14WG-625A,
14WG-628A

MONTGOMERY-WARD & CO.

ALIGNMENT PROCEDURE

Volume Control—Maximum All Adjustments.

Allow Chassis and Signal Generator to "Heat Up" for several Minutes.

The equipment in column at right is required for aligning:

Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.

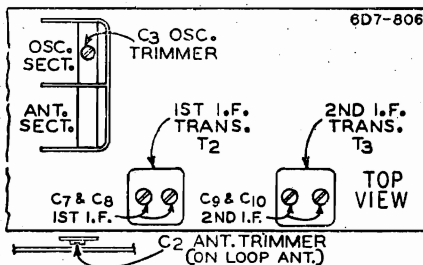
Output Indicating Meter; Non-Metallic Screwdriver.

Dummy Antennas—.1 mf., 50 mmf.

SIGNAL GENERATOR			DUMMY ANTENNA	CONDENSER SETTING	ADJUST TRIMMERS TO MAXIMUM (See Trimmer Illustration)
FREQUENCY SETTING	ANTENNA CONNECTION	GROUND CONNECTION			
456 KC	Control Grid 12SK7—I.F.	Point "X" 12SK7—R.F. Prong No. 3	.1 mf.	Turn Rotor to full open	2nd I.F. (C9) & (C10)
456 KC	Control Grid 12SA7—1st Det.	Same As Above	.1 mf.	Turn Rotor to full open	1st I.F. (C7) & (C8)
1600 KC	Control Grid 12SA7—1st Det.	Same As Above	.1 mf.	Turn Rotor to full open	Oscillator (C3)
1400 KC	External Antenna Clip On Loop —See Note A	External Ground Clip On Loop	50 mmf.	Turn Rotor to Max. Output Set Indicator to 1400 KC See Note B	Antenna (C2)

SPECIFICATIONS

Power Consumption - 28 Watts (At 117 volts AC Supply) Speaker - - - - - 5" Electro Dynamic
Power Output - - - - - .8 Watt Undistorted Tuning Frequency Range - - - 528 to 1600 KC
Selectivity - - 50 KC Broad at 1000 times Signal Sensitivity (For .05 Watt Output)
Intermediate Frequency - - - - - 456 KC External Antenna - - - - - 10 Microvolts Average



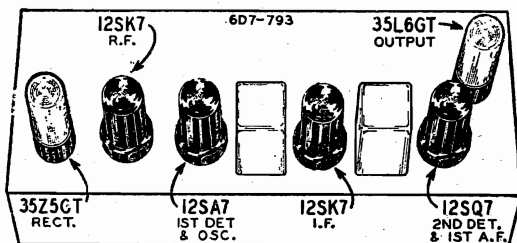
NOTE A—Re-assemble chassis in cabinet. pointer is not at the 1400 KC mark on the Fasten loop assembly to back of cabinet. dial scale, pull pointer off shaft. Set pointer

NOTE B—Tune in a 1400 KC signal. If at the 1400 KC mark and push back on shaft.

ANTENNA

An Air Wave Loop Aerial is built on the inside of the back cover of the cabinet of this radio. For reception of local or powerful nearby stations no other antenna or ground is usually required.

However, more stations will be heard and noise will often be reduced by using an outside antenna and a good ground. For locations in the city or close to the broadcasting stations, the antenna should be 20 to 35 feet in length while for locations in the country or at a distance from the broadcasting stations, use a 35 to 60 foot antenna.



When using the radio on AC, if there appears to be excessive hum, reverse the plug. Leave the plug inserted the way which gives the least hum.

Radios for 25 cycle AC operation are so marked.

110 Volt D.C. Operation—Insert plug so that prong on same side as ribbed side of cord is on the positive side of the line. **CAUTION**—If polarity of line is not known, insert plug. If set does not operate after one minute, reverse plug.

CHECK YOUR LINE VOLTAGE

Unless otherwise marked, this radio must be operated on a power supply of 105-125 Volts AC, 50 to 60 cycles only, or 105-125 Volts DC.

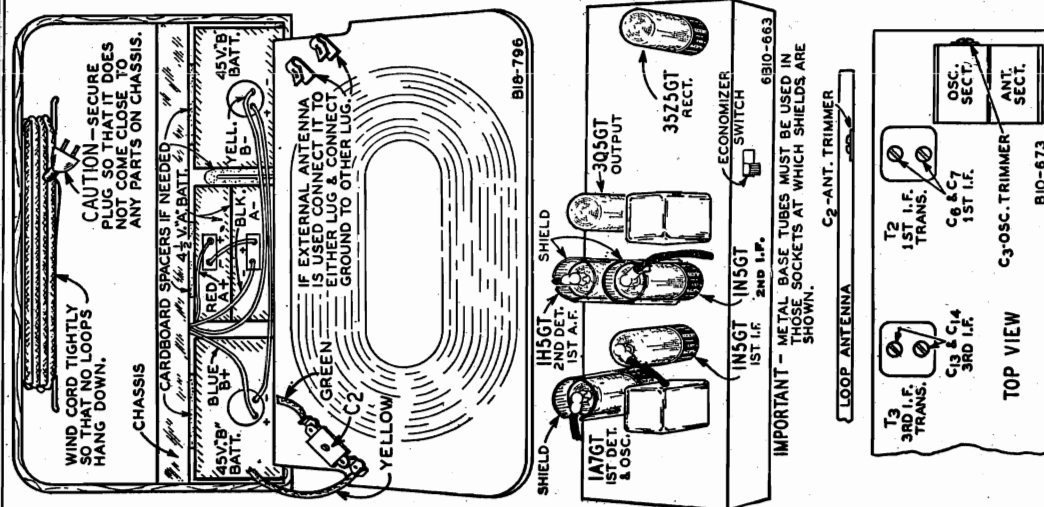
A GROUND CONNECTION IS REQUIRED if an external antenna is used. A ground connection may be obtained by connecting to a water pipe, radiator, or a pipe driven into the ground.

The antenna and ground connections are made at the clips marked "External Antenna" and "External Ground" on the cabinet back.



MODEL 14WG-672C

MONTGOMERY-WARD & CO.



Selectivity - 50 KC Broad at 1000 Times Signal
Intermediate Frequency - - - - - 456 KC
Speaker - - - - - 6" P.M. Dynamic
Tuning Frequency Range - - 540 to 1600 KC
Sensitivity (For .05 Watt Output)
External Antenna - - - - - 10 Microvolts Average

CHANGES MADE FOR ISSUE "D"

Starting with Issue "D", chassis of the above series will use a plug-in resistor to replace the former dual wire wound type. In addition a new oscillator coil and 2 section dry electrolytic are used with this issue chassis. Listed below are the parts changes:

Part No.	Description	Selling Price
9A1396	T1 Oscillator Coil Assembly.....	.76
45X301	(C12A 40 mf. 35 V.) Dry Electrolytic...	.34
43X106	(R12 2200 Ohm 5 Watts) Plug-in Resistor	.34
	(R13 515 Ohm 12 Watts)	

The following Parts are used on "C" Issue Chassis only:

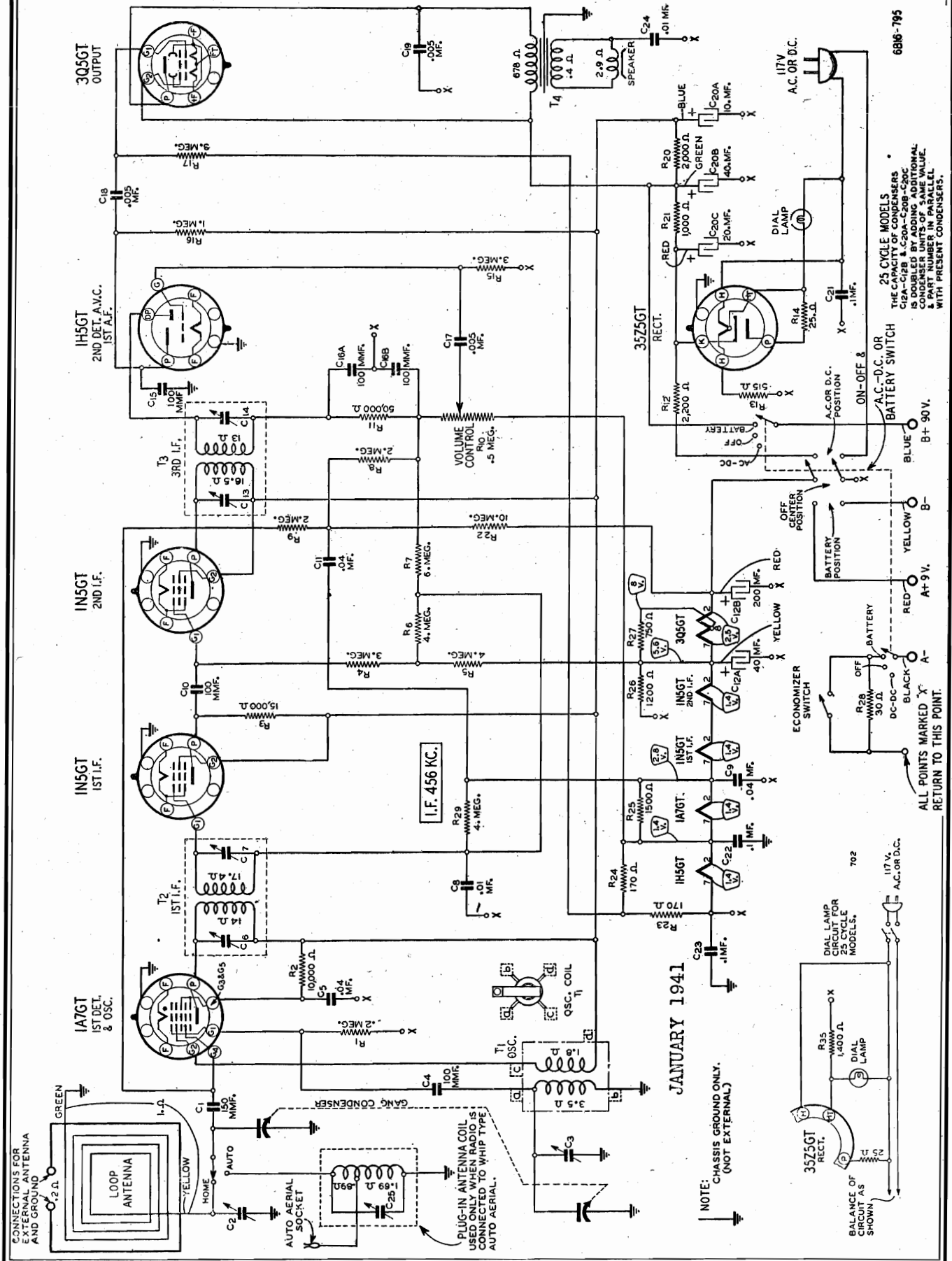
Part No.	Description	Selling Price
32X217	Tubular Shield for Wire Wound Resistor....	.12
9A1375	T1 Oscillator Coil Assembly.....	.22
45X284	(C12A 40 mf. 35 V.) Dry Electrolytic....	.36
	(C12B 200 mf. 35 V.)	
43X105	(R12 2200 Ohm 5 Watts) Wire Wound Resistor	.42
	(R13 515 Ohm 12 Watts)	

ALIGNMENT PROCEDURE

FREQUENCY SETTING	SIGNAL GENERATOR ANTENNA CONNECTION	GROUND CONNECTION	DUMMY ANTENNA	CONDENSER SETTING	ADJUST TRIMMERS TO MAXIMUM (See Trimmer Illustration below)
456 KC	External Antenna Clip on Loop	External Ground Clip on Loop	.1 mf.	Turn Rotor to full open	1st I.F. (C6) & (C7) 3rd I.F. (C13) & (C14)
1600 KC	External Antenna Clip	External Ground Clip	.1 mf.	Turn Rotor to full open	Oscillator (C3)
1400 KC	External Antenna Clip See Note A	External Ground Clip	50 mmf.	Turn Rotor to max. output	Antenna (C2)

MONTGOMERY WARD & CO.

MODEL 14WG-680



SPECIFICATIONS

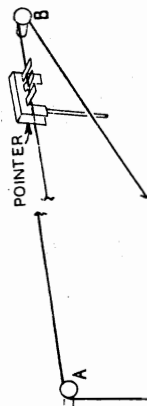
Input Voltages and Currents—Battery Operation		Selectivity - 50 KC Broad at 1000 Times Signal
"A" Battery	9 Volts—50 Ma.	Intermediate Frequency - - - - 456 KC
"B" Battery	90 Volts—11.5 Ma.	Speaker - - - - - 6" P.M. Dynamic
Power Consumption (At 117 volts AC Supply) 28 Watts		Tuning Frequency Range - - - 540 to 1600 KC
Power Output		Sensitivity (For .05 Watt Output)
Battery Operation	150 Mw. Undistorted 350 Mw. Maximum	External Antenna - - - 10 Microvolts Average
AC Operation	200 Mw. Undistorted 400 Mw. Maximum	

ALIGNMENT PROCEDURE

Volume Control—Maximum All Adjustments.
 The following equipment is required for aligning:
 A Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.
 Output Indicating Meter—Non-Metallic Screwdriver.
 Dummy Antennas—.1 mf., 50 mmf.

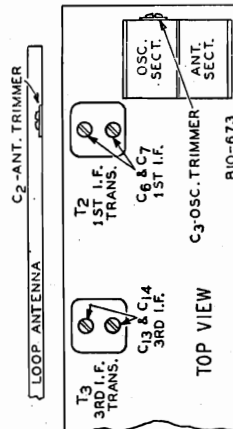
SIGNAL GENERATOR		ADJUST TRIMMERS TO MAXIMUM	
FREQUENCY SETTING	ANTENNA CONNECTION	DUMMY ANTENNA	CONDENSER SETTING
456 KC	External Antenna Clip on Loop	.1 mf.	Turn Rotor to full open
1600 KC	External Antenna Clip on Loop	.1 mf.	Turn Rotor to full open
1400 KC	External Antenna Clip on Loop	50 mmf.	Turn Rotor to max. output

Car Antenna Adjustment—Tune in weak signal near 1400 KC—Adjust Car Antenna Trimmer C25 for maximum output. This trimmer is in special antenna coil can at left side of chassis (See illustration in Auto Installation Sheet).



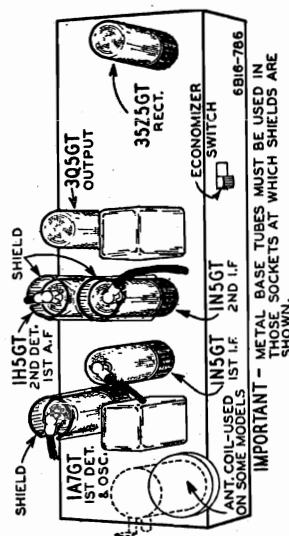
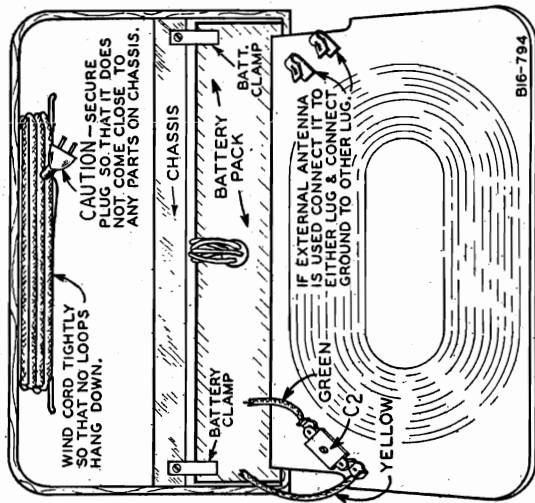
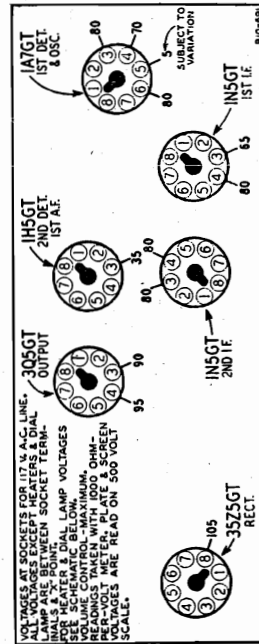
NOTE A—Re-assemble chassis in cabinet. Close back on cabinet.

CALIBRATION—To obtain dial scale calibration, tune in an 800 KC signal. The pointer should be at the 800 KC mark on the dial. If it is not, set the pointer at the 800 KC mark.



Dial Pointer Attachment—Tune in a signal of known frequency. Set pointer to this frequency mark on dial scale. Attach pointer to drive cord—See illustration.

If radio is equipped with special antenna coil for use in car, make the following additional adjustment after the radio is installed in the car and the car antenna is connected.





MODEL 14WG-683B

MONTGOMERY-WARD & CO.

SERVICE DATA (For Professional Service Men)**ALIGNMENT PROCEDURE MAY 1941**

Volume Control—Maximum All Adjustments.

Allow Chassis and Signal Generator to "Heat Up" for several minutes.

The equipment in column at right is required for aligning:

An All Wave Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.

Output Indicating Meter—Non-Metallic Screwdriver.

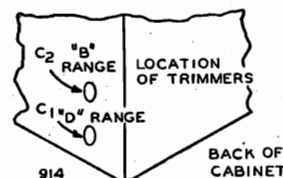
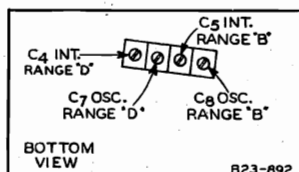
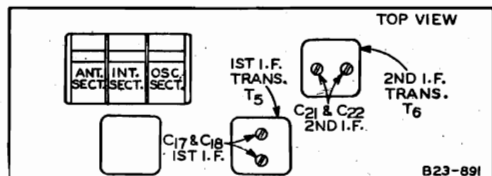
Dummy Antennas—.1 mf., 100 mmf., and 400 ohms.

After each range is completed, repeat the procedure as a final check.

NOTE A—If the pointer is not at 1400 KC. set it at the 1400 KC mark on the dial scale.

NOTE B—Turn the rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.

SIGNAL GENERATOR						
FREQUENCY SETTING	ANTENNA CONNECTION	GROUND CONNECTION	DUMMY ANTENNA	BAND SWITCH SETTING	CONDENSER OR DIAL SETTING	ADJUST TRIMMERS TO MAXIMUM
Remove chassis from cabinet—disconnect the 3 loop leads at terminal strip on chassis.						
I.F. 456 KC	Top Grid 1A7GT 1st Det.	Point "X" {1H5GT—2nd Det. Prong No. 7}	.1 mf.	B Range	Turn Rotor to Full Open	2nd I.F. (C21) & (C22) 1st I.F. (C17) & (C18)
RANGE B 1610 KC	Top Grid 1N5GT RF Tube	Same as Above	.1 mf.	B Range	Turn Rotor to Full Open	Oscillator Range B (C8)
1400 KC	Same as Above	Same as Above	.1 mf.	B Range	Turn Rotor to Max. Output Set Indicator to 1400 KC— See Note A	Int. Range B (C5)
RANGE D 18,300 KC	Same as Above	Same as Above	.1 mf.	D Range	Turn Rotor to Full Open	Oscillator Range D (C7)
17,500 KC	Same as Above	Same as Above	.1 mf.	D Range	Turn Rotor to Max. Output	Int. Range D (C4) Rock Rotor—See Note B
Reassemble chassis in the cabinet. Resolder loop leads. Both antenna terminals are reached through openings in the side of cabinet.						
LOOP RANGE B 1400 KC	External Antenna Clip	External Ground Clip	100 mmf.	B Range	Turn Rotor to Max. Output	Ant. Range B (C2)
LOOP RANGE D 17,500 KC	External Antenna Clip	External Ground Clip	400 Ohm	D Range	Turn Rotor to Max. Output	Ant. Range D (C1)

**Issue "B" Service Manual Supplement**

JUNE 1941

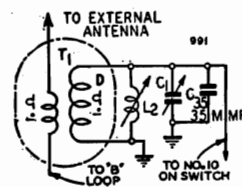
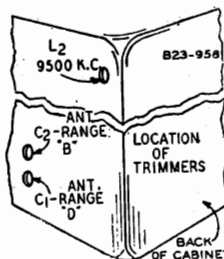
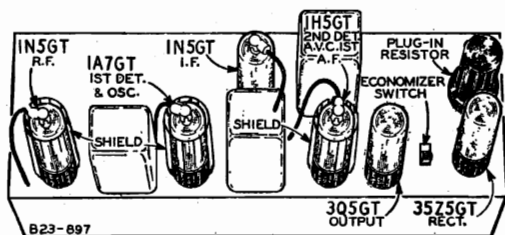
ADDITIONAL ALIGNMENT PROCEDURE

In the issue "B" chassis, a loading coil with an adjustable iron core is connected across the secondary winding of the shortwave loop aerial—See partial schematic circuit diagram below.

The interstage range "D" and interstage range "B" trimmers have been relocated—See trimmer illustrations below.

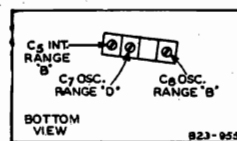
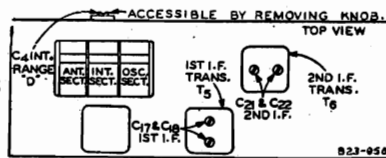
First complete the alignment procedure through Loop Range "B" as given in the instruction manual. Then make the following adjustment:

SIGNAL GENERATOR						
FREQUENCY SETTING	ANTENNA CONNECTION	GROUND CONNECTION	DUMMY ANTENNA	BAND SWITCH SETTING	CONDENSER OR DIAL SETTING	ADJUST TRIMMERS TO MAXIMUM
LOOP RANGE D 17,500 KC	External Antenna Clip	External Ground Clip	400 Ohm	D Range	Turn Rotor to Max. Output	Ant. Range D (C1) Int. Range D (C4) Rock Rotor—See Note B
9,500 KC	Same as Above	Same as Above	400 Ohm	D Range	Turn Rotor to Max. Output	Ant. Range D Loading Coil



The following NEW PARTS are used in issue "B" models:

Part No.	Description	Selling Price
9A1437	L2 Loading Coil Assembly	\$0.36
17A116	C4 Trimmer Condenser	.10



[illegible]

ANTENNA

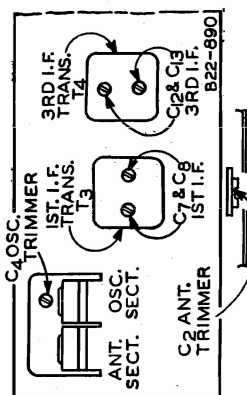
This radio is equipped with a built-in Airwave Loop Aerial. For reception of local or powerful nearby stations, no other antenna or ground is usually required. Directional effects are obtained when using the loop aerial. Rotate the radio until signal pickup is at a maximum and there is least interference from nearby stations.

More stations will be heard and noise will often be reduced by using an outside antenna and a good ground.

For locations in the city or close to broadcasting stations, the antenna should be 20 to 35 feet in length while for locations in the country or at a distance from the broadcasting stations, use a 35 to 60 foot antenna.

A GROUND CONNECTION IS REQUIRED if an external antenna is used. A ground connection may be obtained by connecting to a water pipe, radiator, or pipe driven into the ground.

The antenna and ground connections are made at the clips on the loop aerial. Open the cabinet back and pass the antenna and ground leads through the holes in the cabinet back—See illustration. Connect the antenna lead to either clip and the ground lead to the other clip.



ALIGNMENT PROCEDURE

**Volume Control—Maximum All Adjustments.
Allow Chassis and Signal Generator to "Heat Up" for
several minutes.**

The following equipment is required for aligning:

A. Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.

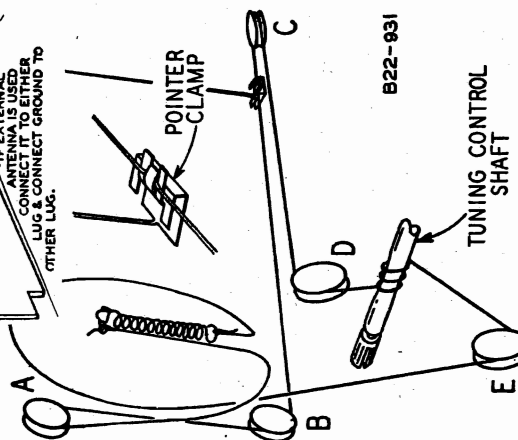
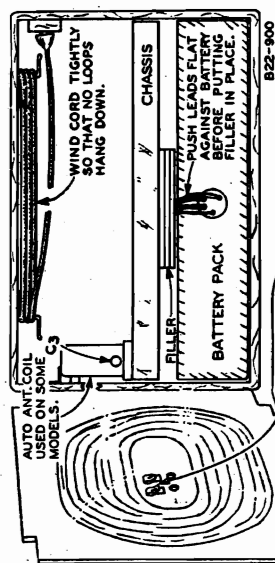
Output Indicating Meter—Non-Metallic Screwdriver.

Dummy Antennas—1 mf., 50 mmf.

FREQUENCY SETTING	Signal Gen.		CONDENSER SETTING	ADJUST TRIMMERS TO MAXIMUM (See Trimmer Illustration)
	ANTENNA CONNECTION	GROUND CONNECTION		
455 KC	External Antenna Clip on Loop	External Ground Clip on Loop	.1 mf.	Turn Rotor to full open
1600 KC	External Antenna Clip	External Ground Clip	.1 mf.	Turn Rotor to full open
<p>if radio is equipped with special antenna coil for use in car, make the following additional adjustment after the radio is installed in the car and the car antenna is connected.</p> <p>Car Antenna Adjustment—Tune in weak signal near 1400 KC—Adjust Car Antenna Trimmer C3 for maximum output. This trimmer is in special antenna coil can at left side of chassis (See illustration in Auto Installation Sheet).</p>				
			1st I.F. (C7) & (C8) 3rd I.F. (C12) & (C13)	Oscillator (C4)

NOTE A—Reassemble chassis in Cabinet. Close back on cabinet.

CALIBRATION—To obtain dial scale calibration, tune in an 800 KC signal. The pointer should be at the 800 KC mark on the dial. If it is not, set the pointer at the 800 KC mark.



SPECIFICATIONS

Input Voltages and Currents—Battery Operation

"A" Battery . . . 9 Volts—50 Ma.

"B" Battery - - - 90 Volts—11.5 Ma.

Power Consumption 28 Watts
(At 117 volts AC Supply)

Power Output

**Battery Operation - 150 Mw. Undistorted
350 Mw. Maximum**

AC Operation - - 200 Mw. Undistorted
- - 400 Mw. Maximum

Selectivity - 50 KC Broad at 1000 Times Signal

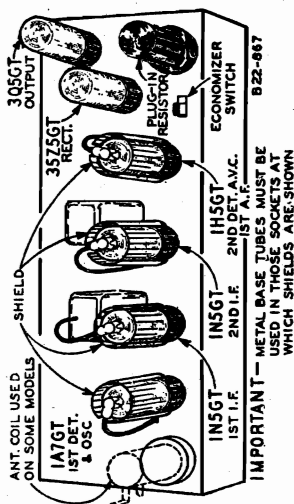
Intermediate Frequency - - - - 456 KC

Speaker - - - - 5 1/4" P.M. Dynamic

Tuning Frequency Range : - 540 to 1600 KC

Tuning Frequency Range 1.2 GHz to 1000 MHz

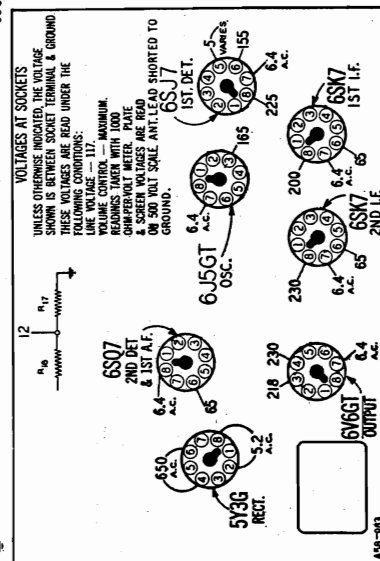
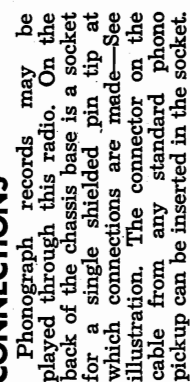
External Antenna - 10 Microvolts Average



DRIVE CORD REPLACEMENT

Turn gang condenser to completely closed position—See illustration. Use a new drive cord 35 inches in length. Tie a knot with small loop at one end of drive cord. Secure loop to hook on drive pulley. Thread cord through hole in rim of drive pulley. Pass cord clockwise (from pulley side of chassis) around drive pulley and around pulleys A, B, C, and D as shown.

Wind cord $3\frac{1}{2}$ turns clockwise (from rear of chassis) around tuning control shaft. Turns should progress toward back of chassis. Continue cord around pulley E and around gang condenser drive pulley as shown. Thread cord through hole in pulley rim and tie to tension spring. Fasten other end of spring to hook on pulley.



ALIGNMENT PROCEDURE

Volume Control—Maximum All Adjustments.
Connect Radio Chassis to Ground Post of Signal Generator with a Short Heavy Lead.
Allow Chassis and Signal Generator to "Heat Up" for several minutes.
Output Indicating Meter—Non-Metallic Screwdriver.
Dummy Antennas—.1 mf., 100 mmf., and 400 ohms.

FREQUENCY SETTING	CONNECTION AT RADIO	BAND SWITCH	CONDENSER SETTING	ADJUST TRIMMERS TO MAXIMUM	
				1st I.F. (C12) & (C13)	3rd I.F. (C17) & (C18)
I.F. RANGE	455 KC	Grid of 1st Def.	.1 mf.	B Range	Turn Rotor to Full Open
1600 KC	Antenna Lead	100 mmf.	B Range	Turn Rotor to Full Open	Oscillator Range B (C10)
1400 KC	Antenna Lead	100 mmf.	B Range	Turn Rotor to Max. Output	Set Indicator to 1400 KC
600 KC	Antenna Lead	100 mmf.	B Range	See Note A	Ant. Range B (C2)
18,300 KC	Antenna Lead	400 Ohm	D Range	Turn Rotor to Full Open	Oscillator Range D (C3)
17,000 KC	Antenna Lead	400 Ohm	D Range	Turn Rotor to Max. Output	Output Rock Rotor—See Note B
LOOP RANGE	Reassemble chassis in cabinet.				
1400 KC	Antenna Lead	100 mmf.	B Range	Turn Rotor to Max. Output	Ant. Range B (C2)

DIAL AND DRIVE ASSEMBLY

26A317	Pulley Mounting Plate Assembly complete with Idler Pulleys, Idler Studs, and Brace Bracket.	.28
58X539	Dial Scale Glass	.04
58X541	Cardboard Background for Dial Scale Glass	.06
28X56	Snap Pins (To hold Background to Mounting Plate)	Doz.
30X184	Clamps for Dial Scale Glass	Ea.
4X627	Escutcheon for Dial Scale Glass	.06
41X62	6 Escutcheon Screws—No. 2 x 3/4" Phillips Fr. Oval Hd.	.06
15X190	Lucite Light Intensifier (on Escutcheon)	Doz.
28X44	Pointer for Dial Scale	.06
25X580	Drive Cord (18 lb. Test)	.02
19X192	Tension Spring for Drive Cord	.04
7A142	"C" Washers for Above Shaft	Doz.
7A32	Dial Lamp Socket and Cable Assembly	.10
	Dial Lamp (No. 51)	.10

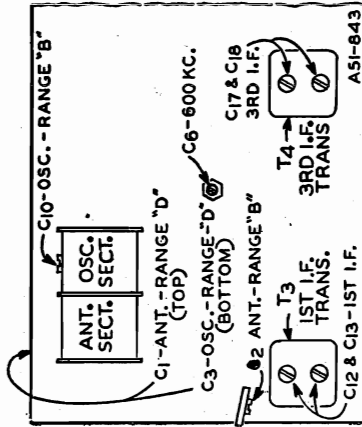
SPECIFICATIONS

Power Consumption	60 Watts (At 117 volts 60 cycles)
80 Watts (Phonograph Operating)	
Power Output	2.5 Watts Undistorted
	3.5 Watts Maximum
Selectivity	40 KC Broad at 1000 times Signal
Intermediate Frequency	455 KC
Speaker	8" Electro-Dynamic
Tuning Frequency Range	
B Range	528 to 1600 KC
D Range	5750 to 18300 KC
Sensitivity—External Antenna (For 0.5 Watt output)	
B Range	3 Microvolts Average
D Range	5 Microvolts Average

TELEVISION SOUND AND FREQUENCY MODULATION CONNECTIONS

If Television or Frequency Modulation programs become available in your community, this radio may be used in conjunction with a Television Picture Receiver and Sound Converter, or a Frequency Modulation Converter to reproduce these programs.

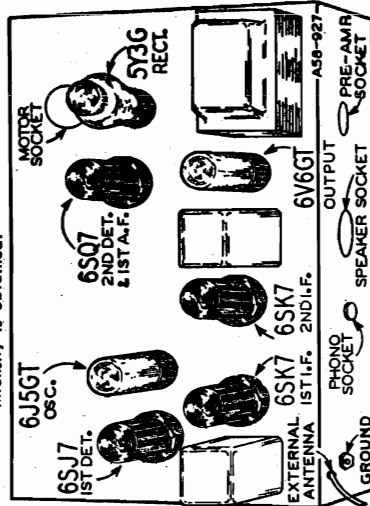
On the back of the chassis base is a single pin tip socket. The connector on the cable from a television receiver or a frequency modulation converter can be inserted in this socket.



After each range is completed, repeat the procedure as a final check.

NOTE A—If the pointer is not at 1400 KC on the dial, remove pointer from drive cord. Set pointer at the 1400 KC mark on the dial scale. Attach pointer to drive cord.

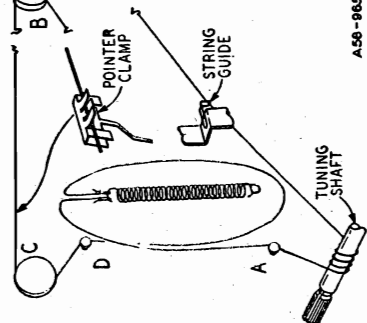
NOTE B—Turn the rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.



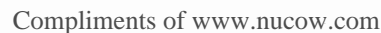
DRIVE CORD REPLACEMENT

Turn gang condenser to full open position. Using a new drive cord 43" in length, tie one end to tension spring. Fasten other end of tension spring to hook on drive pulley. Pass cord through slot in drive pulley rim and continue 3/4 turn around drive pulley forward front of chassis. Continue cord around idler stud "A." Wind 3 1/2 turns clockwise (from front of chassis) around tuning shaft. Turns should progress toward rear of chassis.

Pass cord through string guide, around idler pulleys "B" and "C" and idler stud "D"—See illustration. Continue cord 3/4 turn counter-clockwise (from gang end of chassis) around drive pulley. Cord should be on left side of pulley groove (from front of chassis). Pass cord through slot in pulley rim. Stretch tension spring and tie free end of cord to spring.



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MODEL 14WG-739

MONTGOMERY-WARD & CO.

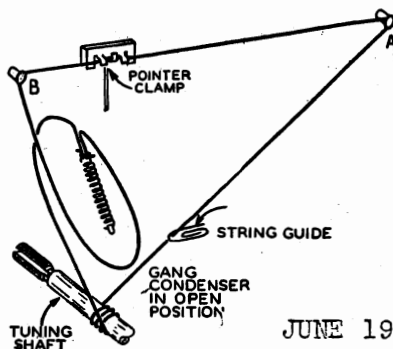
DRIVE CORD REPLACEMENT

Turn gang condenser to full open position—See illustration. Use a new drive cord 37 inches in length.

Tie one end of cord to tension spring. Pass other end of cord up through hole in groove of drive pulley. Pull cord through hole until spring is flush against inside of pulley rim.

Wind cord $\frac{3}{4}$ turn counter-clockwise (from gang end of chassis) around drive pulley.* Then wind $3\frac{1}{2}$ turns clockwise (from front of chassis) around tuning control shaft. These turns should progress away from chassis. Pass cord through wire string guide and over idler studs A and B as shown, then wind cord $\frac{3}{4}$ turn counter-clockwise (from gang end of chassis) around drive pulley. This turn should be on right side (from front of chassis) of pulley groove.

Pass cord through hole in groove of drive pulley. Tie cord to tension spring. Fasten other end of spring to hook on drive pulley.



JUNE 1941

ALIGNMENT PROCEDURE

Volume Control—Maximum All Adjustments.

Connect Radio Chassis to Ground Post of Signal Generator with a Short Heavy Lead.

Allow Chassis and Signal Generator to "Heat Up" for several minutes.

The following equipment is required for aligning: An All Wave Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.

Output Indicating Meter—Non-Metallic Screwdriver. Dummy Antennas—1 mf., 100 mmf., and 400 ohms.

SIGNAL GENERATOR		BAND		CONDENSER SETTING	ADJUST TRIMMERS TO MAXIMUM	
FREQUENCY SETTING	CONNECTION AT RADIO	DUMMY SWITCH ANTENNA SETTING				
I.F.	456 KC	Grid of 1st Det.	.1 mf.	B Range	Turn Rotor to Full Open	1st I.F. (C12) & (C13) 3rd I.F. (C17) & (C18)
RANGE B	1600 KC	Antenna Lead	100 mmf.	B Range	Turn Rotor to Full Open	Oscillator Range B (C10)
	1400 KC	Antenna Lead	100 mmf.	B Range	Turn Rotor to Max. Output Set Indicator to 1400 KC See Note A	Ant. Range B (C2)
	600 KC	Antenna Lead	100 mmf.	B Range	Turn Rotor to Max. Output	600 KC (C6) Rock Rotor—See Note B
RANGE D	18,300 KC	Antenna Lead	400 Ohm	D Range	Turn Rotor to Full Open	Oscillator Range D (C3) Ant. Range D (C1)
	17,000 KC	Antenna Lead	400 Ohm	D Range	Turn Rotor to Max. Output	Rock Rotor—See Note B
LOOP Reassemble chassis in cabinet.						
RANGE B	1400 KC	Antenna Lead	100 mmf.	B Range	Turn Rotor to Max. Output	Ant. Range B (C2)

SPECIFICATIONS

Power Consumption—60 Watts (At 117 volts 60 cycles)
80 Watts (Phonograph Operating)

Power Output - - - 2.5 Watts Undistorted
3.5 Watts Maximum

Selectivity - 40 KC Broad at 1000 times Signal

Intermediate Frequency - - - - - 456 KC

Speaker - - - - - 6" Electro-Dynamic

Tuning Frequency Range

B Range - - - - - 528 to 1600 KC

D Range - - - - - 5750 to 18300 KC

Sensitivity—External Antenna—
(For 0.5 Watt output)

B Range - - - - - 3 Microvolts Average

D Range - - - - - 5 Microvolts Average

ANTENNA AND GROUND

Two built-in Air Wave Aerials are incorporated in the cabinet.

One of these, the loop aerial, is used for broadcast band reception. The other, a counterpoise foil aerial, is used for reception on the short wave band. For the reception of local or nearby stations, an outside antenna and ground are usually not required.

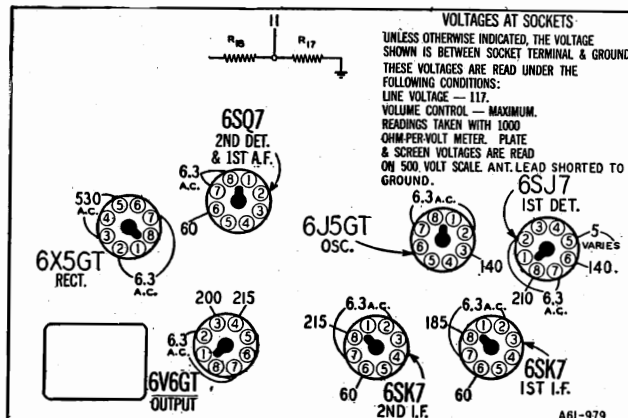
In general, however, more stations will be heard by using an outside antenna and ground. To receive distant short wave stations, an outside antenna is essential.

If an outside antenna is used, it should be 50 to 60 feet long, including the lead-in.

A good ground connection is recommended if an outside antenna is used. A ground connection may be obtained by connecting to a water pipe, radiator, or a pipe driven into the ground.

Avoid using gas pipes or electrical conduits for grounds.

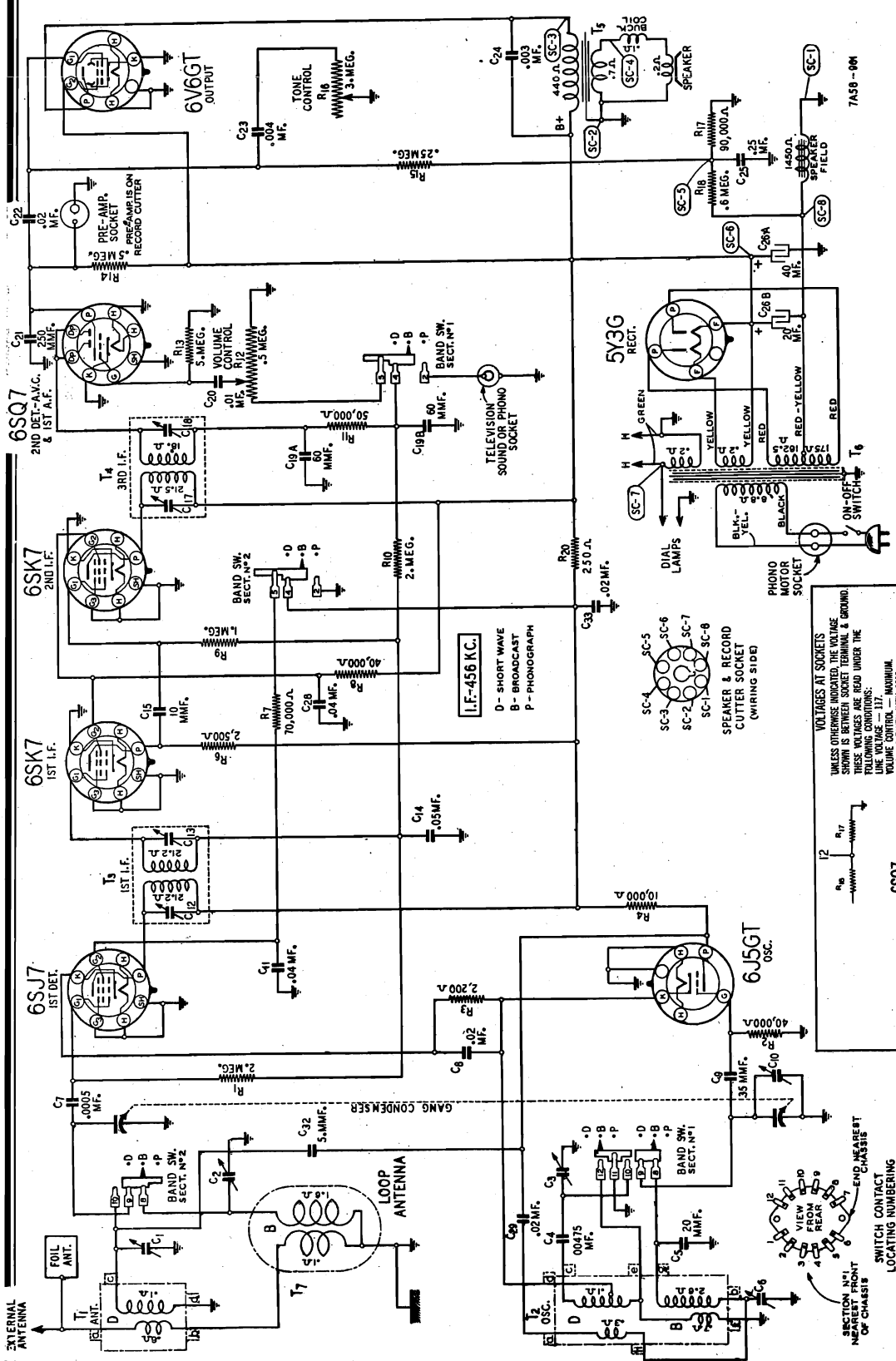
The ground connection is made under the screw (marked GND) on the back panel of the chassis base.



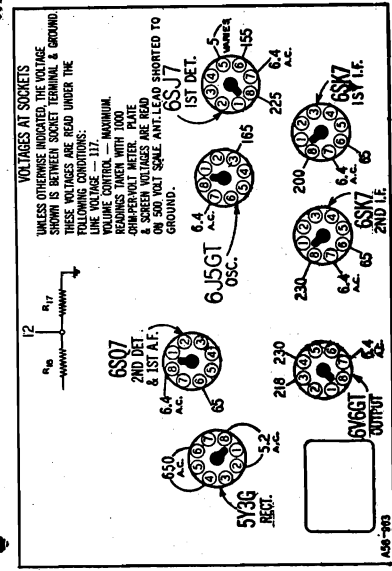
Unless otherwise marked, this radio must be operated on 105 to 125 volt, 60 cycle AC supply only. If there is any doubt, consult the local power company before inserting the plug. Radios of this model which are to be used on 25 cycle, 230 volt, or other service are so marked.

MONTGOMERY-WARD & CO.

MODEL 14WG-740
Series A,B



FOR OAK RECORD CHANGER SEE RIDER'S "AUTOMATIC RECORD CHANGERS AND RECORDERS".
ON ISSUE "B" MODEL, THE 10" TURNTABLE IS REPLACED BY ONE 9" IN DIAMETER. THESE TWO ASSEMBLIES ARE INTERCHANGEABLE EXCEPT FOR BASE PLATE, MOTOR PULLEYS AND TURNTABLES.



JUNE 1941

MODEL 14WG-740

Series A,B

MONTGOMERY-WARD & CO.

SPECIFICATIONS

Power Consumption	60 Watts (At 117 volts 40 cycles)
Power Output	80 Watts (Phonograph Operating)
Selectivity	40 KC Broad at 1000 times Signal
Intermediate Frequency	455 KC
Speaker	8" Electro-Dynamic
Tuning Frequency Range	
B Range	528 to 1600 KC
D Range	5750 to 18300 KC
Sensitivity—External Antenna— (For 0.5 "Watt output")	
B Range	3 Microvolts Average
D Range	5 Microvolts Average

ANTENNA AND GROUND

Two built-in Air Wave Aerials are incorporated in the cabinet.

A white wire with black tracer and an antenna marker will be found coming out of the chassis. If it is desired to operate the radio using the loop and counterpoise foil antennas, do not connect this wire to anything. If it is desired to operate the radio using an outside antenna, connect this wire to the lead from the outside antenna.

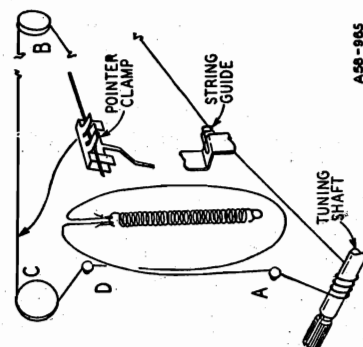
The wire which is connected to the counterpoise foil antenna should never be disconnected.

If an outside antenna is used, it should be 50 to 60 feet long, including the lead-in.

A good ground connection is recommended if an outside antenna is used. A ground connection may be obtained by connecting to a water pipe, radiator, or a pipe driven in to the ground.

Avoid using gas pipes or electrical conduits for grounds. The ground connection is made under the screw (marked GND) on the back panel of the chassis base.

One of these, the loop aerial, is used for broadcast band reception. The other, a counterpoise foil aerial, is used for reception on the short wave band. For the reception of local or nearby stations, an outside antenna and ground are usually not required.

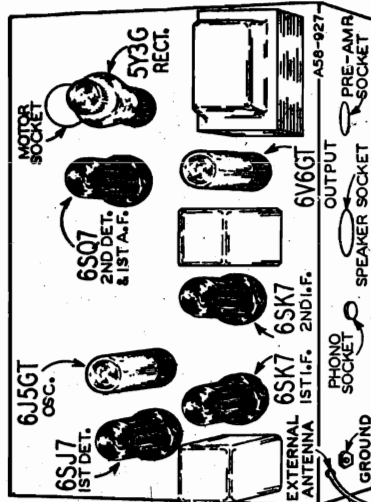


DRIVE CORD REPLACEMENT

Turn gang condenser to full open position. Using a new drive cord 43" in length, tie one end to tension spring. Fasten other end of tension spring to hook on drive pulley. Pass cord through slot in drive pulley rim and continue 3/4 turn around drive pulley toward front of chassis. Continue cord around idler stud "A." Wind 3 1/2 turns clockwise (from front of chassis) around tuning shaft. Turns should progress toward rear of chassis.

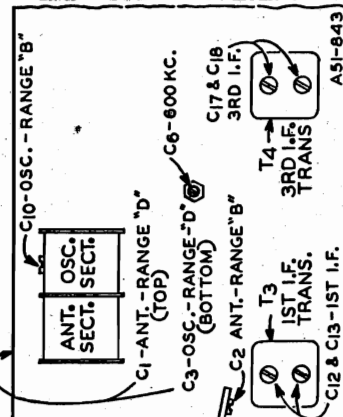
Pass cord through string guide, around idler pulleys "g" and "C" and idler stud "D"—See illustration. Continue cord 3/4 turn counter-clockwise (from gang end of chassis) around drive pulley. Cord should be on left side of pulley groove (from front of chassis). Pass cord through slot in pulley rim. Stretch tension spring and tie free end of cord to spring.

A50-965



On the back of the chassis base is a socket to which is connected the phono cable shielded pin tip. Upon removal of this pin tip, the connector on the cable from a television receiver or a frequency modulation converter can be inserted in the socket.

TELEVISION SOUND AND FREQUENCY MODULATION CONNECTIONS



After each range is completed, repeat the procedure as a final check.

NOTE A—If the pointer is not at 1400 KC on the dial, remove pointer from drive cord. Set pointer at the 1400 KC mark on the dial scale. Attach pointer to drive cord.

NOTE B—Turn the rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.

ALIGNMENT PROCEDURE

Volume Control—Maximum All Adjustments.
Connect Radio Chassis to Ground Post of Signal Generator with a Short Heavy Lead.
Allow Chassis and Signal Generator to "Heat Up" for several minutes.

SIGNAL GENERATOR FREQUENCY SETTING	BAND CONNECTION AT RADIO	DUMMY SWITCH ANTENNA SETTING	CONDENSER SETTING	ADJUST TRIMMERS TO MAXIMUM
I.F. 455 KC	Grid of 1st Det.	.1 mf.	B Range	Turn Rotor to Full Open
B 1600 KC	Antenna Lead	100 mmf.	B Range	Turn Rotor to Full Open
B 1400 KC	Antenna Lead	100 mmf.	B Range	Turn Rotor to Max. Output Set Indicator to 1400 KC See Note A
B 600 KC	Antenna Lead	100 mmf.	B Range	Turn Rotor to Max. Output Rock Rotor—See Note B
D 18,300 KC	Antenna Lead	400 Ohm	D Range	Turn Rotor to Full Open
D 17,000 KC	Antenna Lead	400 Ohm	D Range	Turn Rotor to Max. Output Rock Rotor—See Note B
LOOP 1400 KC	Antenna Lead	100 mmf.	B Range	Turn Rotor to Max. Output Ant. Range D (C1) Ant. Range B (C2)



MODEL 14WG-741

MONTGOMERY-WARD & CO.

ALIGNMENT PROCEDURE

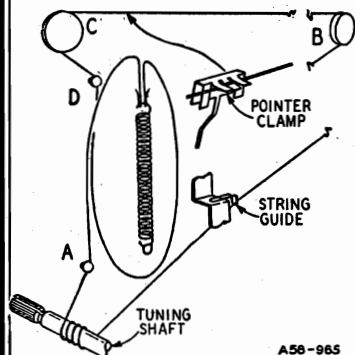
Volume Control—Maximum All Adjustments.

Connect Radio Chassis to Ground Post of Signal Generator with a Short Heavy Lead.

Allow Chassis and Signal Generator to "Heat Up" for several minutes.

The following equipment is required for aligning:
 An All Wave Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.
 Output Indicating Meter—Non-Metallic Screwdriver.
 Dummy Antennas—.1 mf., 100 mmf., and 400 ohms.

	SIGNAL GENERATOR FREQUENCY SETTING	CONNECTION AT RADIO	DUMMY ANTENNA	BAND SWITCH SETTING	CONDENSER SETTING	ADJUST TRIMMERS TO MAXIMUM
I.F.	456 KC	Grid of 1st Det.	.1 mf.	B Range	Turn Rotor to Full Open	1st I.F. (C12) & (C13) 3rd I.F. (C17) & (C18)
RANGE B	1600 KC	Antenna Lead	100 mmf.	B Range	Turn Rotor to Full Open	Oscillator Range B (C10)
	1400 KC	Antenna Lead	100 mmf.	B Range	Turn Rotor to Max. Output Set Indicator to 1400 KC See Note A	Ant. Range B (C2)
	600 KC	Antenna Lead	100 mmf.	B Range	Turn Rotor to Max. Output	600 KC (C6) Rock Rotor—See Note B
RANGE D	18,300 KC	Antenna Lead	400 Ohm	D Range	Turn Rotor to Full Open	Oscillator Range D (C3)
	17,000 KC	Antenna Lead	400 Ohm	D Range	Turn Rotor to Max. Output	Ant. Range D (C1) Rock Rotor—See Note B
LOOP RANGE B	1400 KC	Reassemble chassis in cabinet. Antenna Lead	100 mmf.	B Range	Turn Rotor to Max. Output	Ant. Range B (C2)



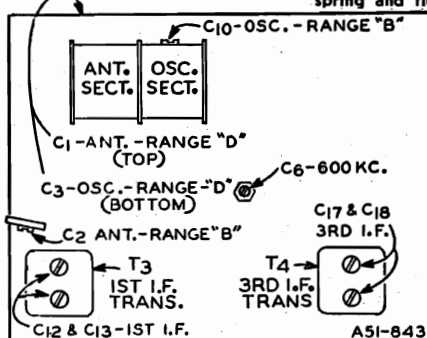
DRIVE CORD REPLACEMENT

Turn gang condenser to full open position. Using a new drive cord 43" in length, tie one end to tension spring. Fasten other end of tension spring to hook on drive pulley. Pass cord through slot in drive pulley rim and continue $\frac{1}{4}$ turn around drive pulley toward front of chassis. Continue cord around idler stud "A." Wind $3\frac{1}{2}$ turns clockwise (from front of chassis) around tuning shaft. Turns should progress toward rear of chassis.

Pass cord through string guide, around idler pulleys "B" and "C" and idler stud "D"—See Illustration. Continue cord $\frac{3}{4}$ turn counter-clockwise (from gang end of chassis) around drive pulley. Cord should be on left side of pulley groove (from front of chassis). Pass cord through slot in pulley rim. Stretch tension spring and tie free end of cord to spring.

A white wire with black tracer and an antenna marker will be found coming out of the chassis. If it is desired to operate the radio using the loop and counterpoise foil antennas, do not connect this wire to anything. If it is desired to operate the radio using an outside antenna, connect this wire to the lead from the outside antenna.

The wire which is connected to the counterpoise foil antenna should never be disconnected.



After each range is completed, repeat the procedure as a final check.

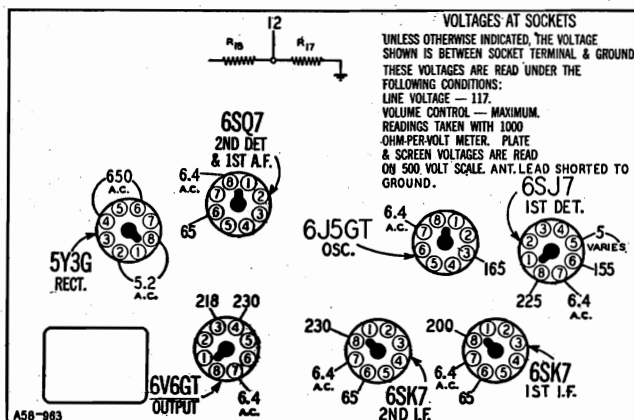
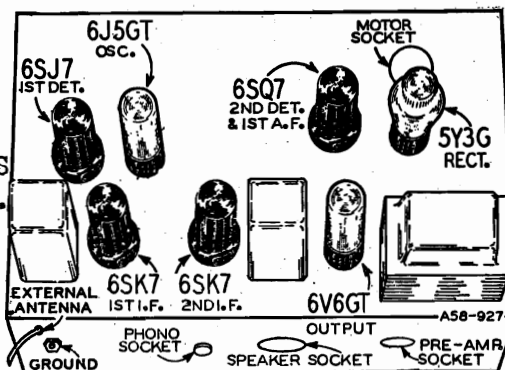
NOTE A—If the pointer is not at 1400 KC on the dial, remove pointer from drive cord. Set pointer at the 1400 KC mark on the dial scale. Attach pointer to drive cord.

NOTE B—Turn the rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.

SPECIFICATIONS

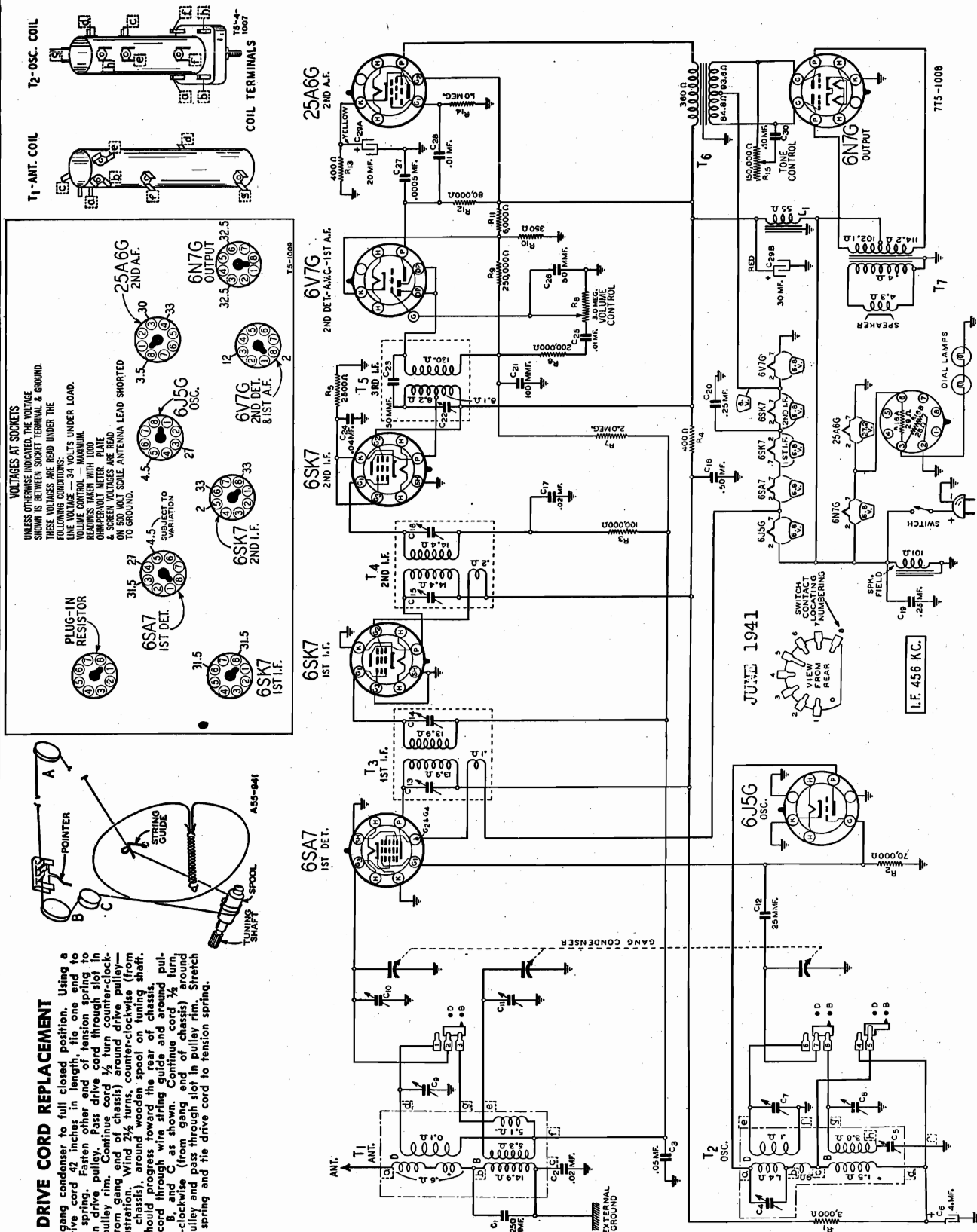
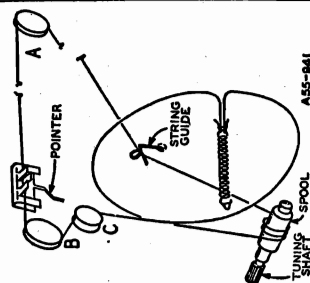
Power Consumption	60 Watts (At 117 volts 60 cycles)
	80 Watts (Phonograph Operating)
Power Output	2.5 Watts Undistorted 3.5 Watts Maximum
Selectivity	40 KC Broad at 1000 times Signal
Intermediate Frequency	456 KC
Speaker	8" Electro-Dynamic
Tuning Frequency Range	
B Range	528 to 1600 KC
D Range	5750 to 18300 KC
Sensitivity—External Antenna— (For 0.5 Watt output)	
B Range	3 Microvolts Average
D Range	5 Microvolts Average

FOR SEEBURG
 MODEL J RE-
 CORD CHANGER
 SEE RIDER'S
 "AUTOMATIC
 RECORD CHANGERS
 AND RECORDERS"



DRIVE CORD REPLACEMENT

Turn gang condenser to full closed position. Using a new drive cord 42 inches in length, tie one end to the tension spring. Fasten other end of tension spring to pulley $\frac{1}{2}$ inch from center of pulley ring. Pass cord through slot in pulley ring and around counter-clockwise (from gang end of chassis) around drive pulley ring and pass through slot in pulley ring. See illustration. Wind 2½ turns, counter-clockwise (from rear of chassis), around wooden spool on tuning shaft. Turns should progress toward the rear of chassis. Pass cord through wire string guide and around pulleys A, B, and C as shown. Continue cord $\frac{1}{2}$ turn, counter-clockwise (from gang end of chassis) around drive pulley and pass through slot in pulley ring. Stretch tension spring and tie drive cord to tension spring.



ANTENNA AND GROUND

For best results, an outside antenna 50 to 60 feet long, including the lead-in, should be used. An inside antenna is not satisfactory for this radio. The antenna should be as high and as far from surrounding objects as possible.

Run the antenna at right angles to any 32 volt lines and keep it as far away from these lines as possible in order to avoid line noise being carried into the radio via the antenna.

A good ground connection is required. A ground connection may be obtained by connecting to a water pipe, a pipe driven into the ground, or to the metal jacket of a water pump. Do not ground the radio to the 32 volt system conduit or fittings at any point.

Two wires will be found coming out of the chassis. Connect the wire with the antenna marker to the antenna lead and the wire with the ground marker to the ground lead.

32 VOLT POWER SUPPLY

This radio is designed for use on farms and in those places where the power supply consists of a 32 volt direct current generating plant. The radio may not be satisfactory on plants which do not use storage batteries.

Polarity of 32 Volt Power Supply—Insert plug so that prong on same side as ribbed side of cord is on the positive side of the line.

If the polarity of the line is not known, insert plug. If the tubes light but no sounds are heard from the speaker after the plug has been in one minute, reverse the plug.

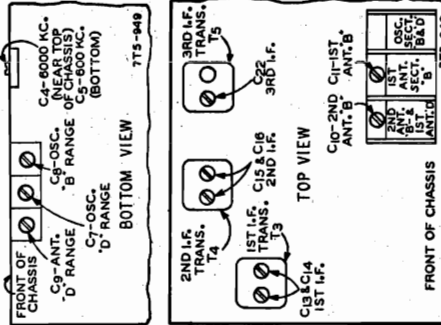
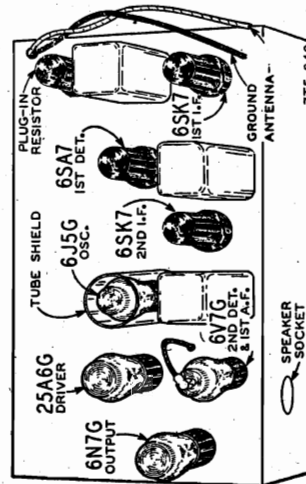
ALIGNMENT PROCEDURE

Volume Control—Maximum All Adjustments.
Connect Radio Chassis to Ground Post of Signal Generator with a Short Heavy Lead.
Allow Chassis and Signal Generator to "Heat Up" for several minutes.

I. F.	SIGNAL GENERATOR		CONDENSER		ADJUST TRIMMERS
	FREQUENCY SETTING	CONNECTION AT RADIO	DUMMY BAND ANTENNA SWITCH	SETTING	TO MAXIMUM
RANGE B	455 KC	Grid of 1st Det.	.1 mf.	B Range	Turn Rotor to Full Open
	1610 KC	Antenna Lead	200 mmf.	B Range	Turn Rotor to Full Open
	1500 KC	Antenna Lead	200 mmf.	B Range	Turn Rotor to Max. Output
RANGE D	600 KC	Antenna Lead	200 mmf.	B Range	Turn Rotor to Max. Output
	18,300 KC	Antenna Lead	400 Ohm	D Range	Turn Rotor to Full Open
	16,000 KC	Antenna Lead	400 Ohm	D Range	Turn Rotor to Max. Output
	6000 KC	Antenna Lead	400 Ohm	D Range	Turn Rotor to Max. Output

LINE VOLTAGE RANGE

The radio will operate satisfactorily within a line voltage range of 25 to 42 volts. If the line voltage is higher than 42, it will be necessary to use a series resistor to cut it down. If the voltage varies, a variable resistor may be required.



SPECIFICATIONS

Power Consumption	-	-	-	1.60 Amperes at 36 Volts DC	-	-	-	455 KC
Power Output	-	-	-	.17 Watt Undistorted	-	-	-	6" or 8" Electro-Dynamic
Selectivity	-	-	-	.40 Watt Maximum	-	-	-	
Sensitivity (For .05 watt output)	-	-	-	30 KC Broad at 1000 times Signal	-	-	-	
B Range	-	-	-	-	-	-	-	535 to 1610 KC (Kilocycles)
D Range	-	-	-	-	-	-	-	5750 to 18300 KC (Kilocycles)

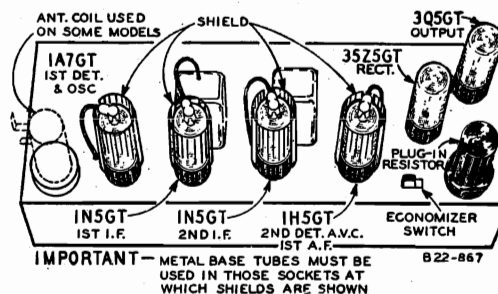
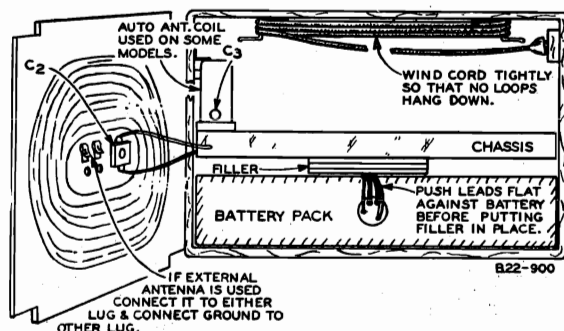
After each range is completed, repeat the procedure as a final check.
NOTE A—If the pointer is not at 1500 KC on the dial, remove pointer from drive cord. Set pointer at the 1500 KC mark on the dial scale. Attach pointer to drive cord.
NOTE B—Turn the rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.

©John F. Rider



MODEL 14WG-690
MODEL 14WG-806

MONTGOMERY-WARD & CO.



MODEL 14WG-690

Input Voltages and Currents—Battery Operation

"A" Battery 9 Volts—50 Ma.
"B" Battery 90 Volts—11.5 Ma.

Power Consumption 28 Watts
(At 117 volts AC Supply)

Power Output

Battery Operation - 150 Mw. Undistorted
350 Mw. Maximum
AC Operation 200 Mw. Undistorted
400 Mw. Maximum

Selectivity - 50 KC Broad at 1000 Times Signal

Intermediate Frequency 456 KC

Speaker - 5 1/4" P.M. Dynamic

Tuning Frequency Range - . . 540 to 1600 KC

Sensitivity (For .05 Watt Output)

External Antenna - 10 Microvolts Average

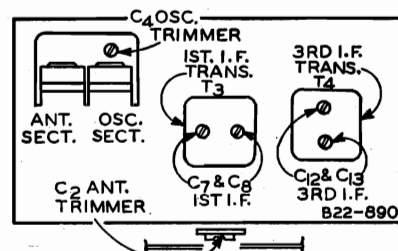
ALIGNMENT PROCEDURE

Volume Control—Maximum All Adjustments.
Allow Chassis and Signal Generator to "Heat Up" for several minutes.

The following equipment is required for aligning:
A Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.

Output Indicating Meter—Non-Metallic Screwdriver.

Dummy Antennas—.1 mf., 50 mmf.



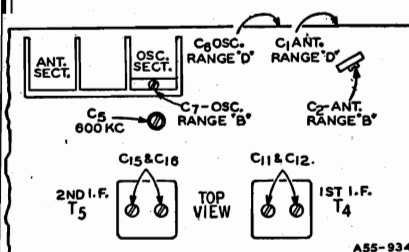
	SIGNAL GEN. FREQUENCY SETTING	ANTENNA CONNECTION	GROUND CONNECTION	DUMMY ANTENNA	CONDENSER SETTING	ADJUST TRIMMERS TO MAXIMUM (See Trimmer Illustration)
	456 KC	External Antenna Clip on Loop	External Ground Clip on Loop	.1 mf.	Turn Rotor to full open	1st I.F. (C7) & (C8) 3rd I.F. (C12) & (C13)
	1600 KC	External Antenna Clip	External Ground Clip	.1 mf.	Turn Rotor to full open	Oscillator (C4)
	1400 KC	External Antenna Clip See Note A	External Ground Clip	50 mmf.	Turn Rotor to max. output	Antenna (C2)

If radio is equipped with special antenna coil for use in car, make the following additional adjustment after the radio is installed in the car and the car antenna is connected.
Car Antenna Adjustment—Tune in weak signal near 1400 KC—Adjust Car Antenna Trimmer C3 for maximum output. This trimmer is in special antenna coil can at left side of chassis (See illustration in Auto Installation Sheet).

NOTE A—Reassemble chassis in Cabinet. Close back on cabinet.

CALIBRATION—To obtain dial scale calibration, tune in an 800 KC signal. The pointer should be at the 800 KC mark on the dial. If it is not, set the pointer at the 800 KC mark.

MODEL 14WG-806



After each range is completed, repeat the procedure as a final check.

NOTE A—Turn the rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.

NOTE B—If the pointer is not at 1400 KC on the dial, remove pointer from drive cord. Set pointer at the 1400 KC mark on the dial scale. Attach pointer to drive cord.

SPECIFICATIONS

Tuning Frequency Range

B Range 528 to 1600 KC
D Range 5750 to 18300 KC

Sensitivity—External Antenna—(For 0.5 Watt output)

B Range 15 Microvolts Average
D Range 25 Microvolts Average

Power Consumption 57 Watts (At 117 volts 60 cycles)

Power Output 3.0 Watts Undistorted
4.0 Watts Maximum

Selectivity 40 KC Broad at 1000 times Signal

Intermediate Frequency 456 KC

Speaker 6" Electro-Dynamic

ALIGNMENT PROCEDURE

Volume Control—Maximum All Adjustments.
Connect Radio Chassis to Ground Post of Signal Generator with a Short Heavy Lead.
Allow Chassis and Signal Generator to "Heat Up" for several minutes.

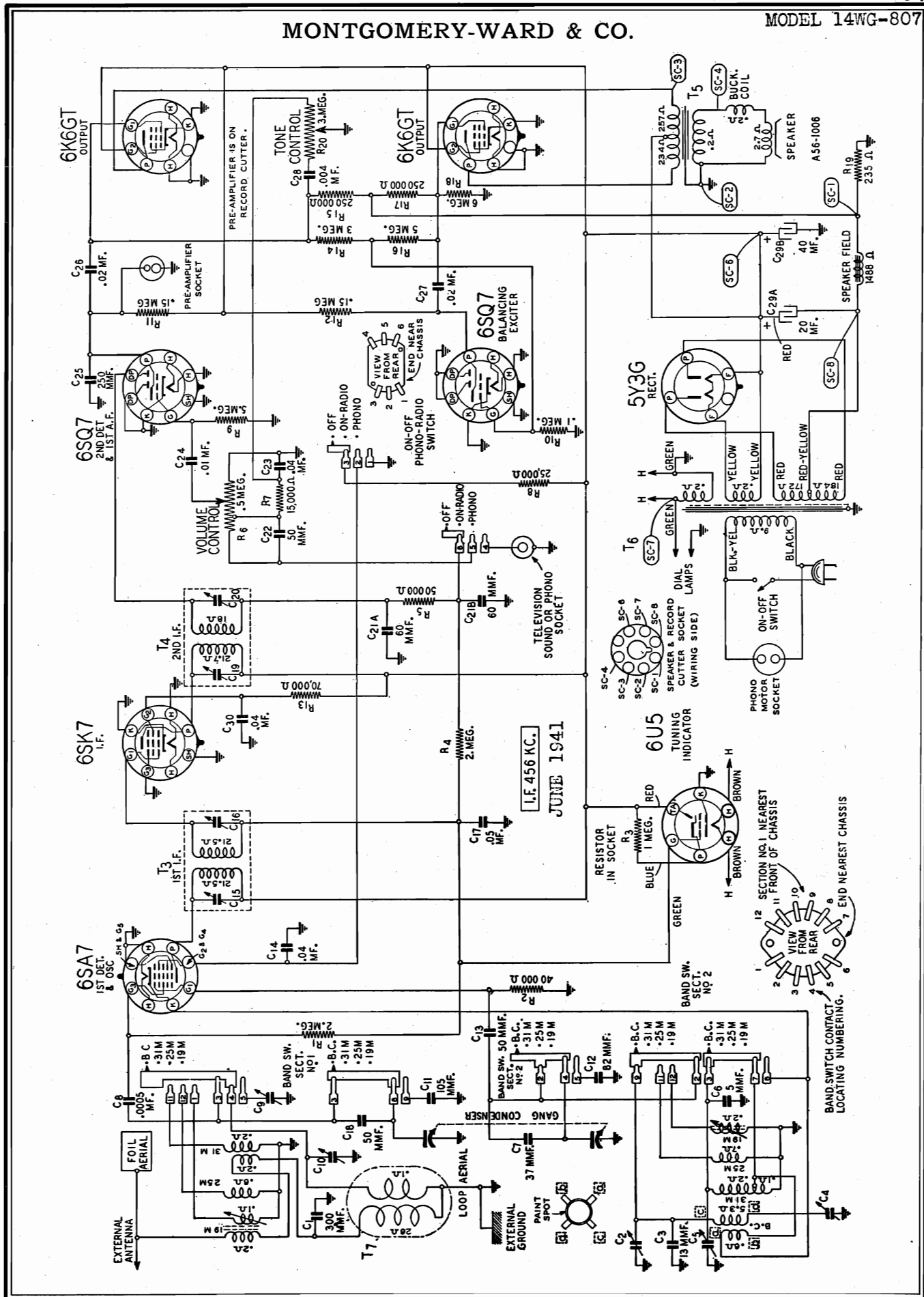
The following equipment is required for aligning:

An All Wave Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.

Output Indicating Meter—Non-Metallic Screwdriver.
Dummy Antennas—.1 mf., 100 mmf., and 400 ohms.

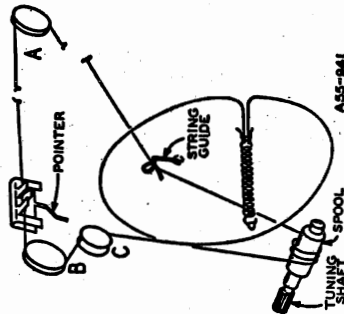
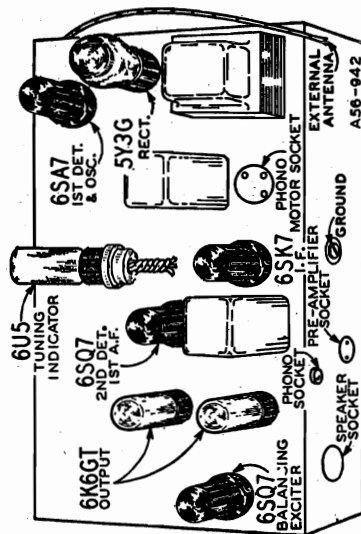
SIGNAL GENERATOR FREQUENCY SETTING	CONNECTION AT RADIO	DUMMY ANTENNA	BAND SWITCH SETTING	CONDENSER SETTING	ADJUST TRIMMERS TO MAXIMUM
Loosen chassis mounting bolts and swing chassis back a sufficient amount to get at the trimmers.					
I.F.					
456 KC	Grid of 1st Det.	.1 mf.	B Range	Turn Rotor to Full Open	1st I.F. (C11) & (C12) 2nd I.F. (C15) & (C16)
RANGE D					
18,300 KC	External Antenna Clip or Lead	400 Ohm	D Range	Turn Rotor to Full Open	Oscillator Range D (C6)
17,000 KC	External Antenna Clip or Lead	400 Ohm	D Range	Turn Rotor to Max. Output	Ant. Range D (C1) Rock Rotor—See Note A
Reassemble chassis in cabinet.					
RANGE B					
1600 KC	External Antenna Clip or Lead	100 mmf.	B Range	Turn Rotor to Full Open	Oscillator Range B (C7)
1400 KC	External Antenna Clip or Lead	100 mmf.	B Range	Turn Rotor to Max. Output Set Indicator to 1400 KC— See Note B	Ant. Range B (C2)
600 KC	External Antenna Clip or Lead	100 mmf.	B Range	Turn Rotor to Max. Output	600 KC (C5) Rock Rotor—See Note A

MONTGOMERY-WARD & CO.



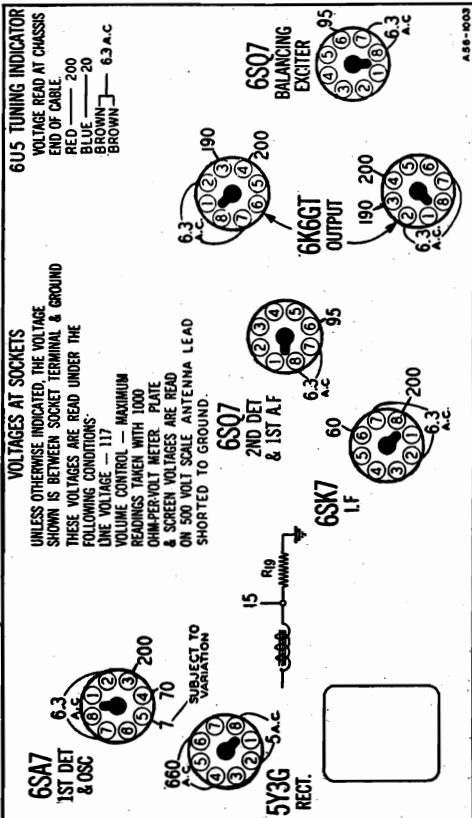
MODEL 14WG-807
MODELS 14WG-808M,
14WG-808W

MONTGOMERY-WARD & CO.



SPECIFICATIONS

Consumption	57 Watts (At 117 volts 60 cycles)
Power Output	2.0 Watts Undistorted 2.5 Watts Maximum
Frequency Range	38 KC Broad at 1000 Times Signal Intermediate Frequency - 455 KC
Sensitivity	10" Electro-Dynamic Speaker
Tuning Frequency Range	535 to 1610 KC...15 Microvolts Aver. 19 Meter...14.6 to 15.8 MC...25 Microvolts Aver. 25 Meter...11.1 to 12.0 MC...25 Microvolts Aver. 31 Meter...9.3 to 10.05 MC...22 Microvolts Aver.



ALIGNMENT PROCEDURE

The following equipment is required for aligning:
An All Wave Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.
Output Indicating Meter—Non-Metallic Screwdriver.
Dummy Antennas—1 mfh., 100 mfh., and 400 ohms.

SIGNAL GENERATOR	DUMMY SWITCH	BAND	CONDENSER	ADJUST TRIMMERS TO
FREQUENCY CONNECTION	AT RADIO	ANTENNA SETTING	SETTING	MAXIMUM
Remove chassis from cabinet but do not disconnect leads to loop aerial.				
L.F. RANGE	455 KC Grid of 1st Det.	.1 mfh.	B Range Turn Rotor to Full Open	1st I.F. (C15) & (C16) 2nd I.F. (C19) & (C20)
B	1610 KC Antenna Lead	100 mfh.	B Range Turn Rotor to Full Open	Oscillator Range B (C2)
	1400 KC Antenna Lead	100 mfh.	B Range Turn Rotor to Max. Output	Set Indicator to 1400 KC—See Note A
	600 KC Antenna Lead	100 mfh.	B Range Turn Rotor to Max. Output	Ant. Range B (C10) 600 KC (C4) Rock Rotor—See Note B
SHORT WAVE BANDS	9700 KC Antenna Lead	400 Ohm	31 Meter at 9.7 MC	Oscillator Band Spread (C5)
	9700 KC Antenna Lead	400 Ohm	31 Meter at 9.7 MC	Antenna Band Spread (C9)
LOOP RANGE	1400 KC Antenna Lead	100 mfh.	B Range Turn Rotor to Max. Output	Ant. Range B (C10)

CAUTION—Two of the coils in the band spread coil assembly, the 19 Meter Antenna and Oscillator coils, have adjustable iron cores. One of the adjusting screws extends out from the front panel of the chassis base at the left of the band switch. The other adjusting screw extends up from the chassis base in front of the 1st I.F. Transformer.

REPLACING BAND SPREAD COILS
It is not practicable to make field replacements of the individual antenna and oscillator coils in the Band Spread Assembly Unit.
Should one of these coils be damaged in any way, remove the Band Spread Assembly Unit (consisting of the 3 antenna and 4 oscillator coils, the right-angle mounting plate, and the band switch) from the chassis and return to the factory for replacement.

DO NOT CHANGE THE POSITION OF THESE ADJUSTING SCREWS as they have been properly set at the factory and cannot be satisfactorily re-adjusted in the field.

NOTE A—If the pointer is not at 1400 KC Power Output on the dial, remove pointer from drive cord. Selectivity - 38 KC Broad at 1000 Times Signal Intermediate Frequency - 455 KC Speaker - 10" Electro-Dynamic

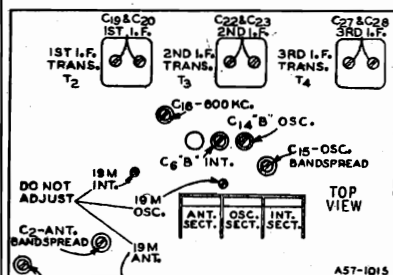
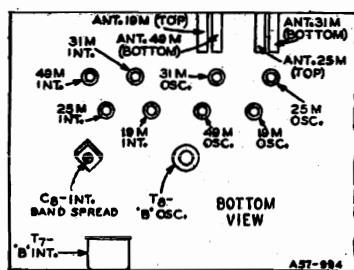
NOTE B—Turn the rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.

NOTE C—Reassemble chassis in cabinet.



MODELS 14WG-1202B, 14WG-1203B,
14WG-1203M, 14WG-1203W

MONTGOMERY-WARD & CO.

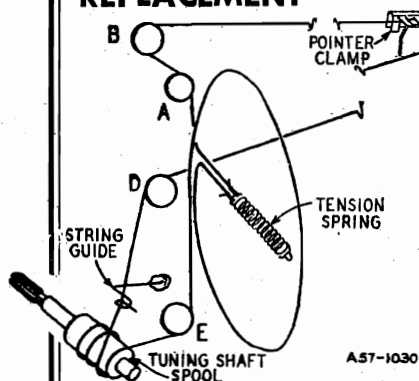


REPLACING BAND SPREAD COILS

It is not practicable to make field replacements of the individual Antenna, R.F. Interstage or Oscillator coils in the Band Spread Assembly Unit.

Should one of these coils be damaged in any way, remove the Band Spread Assembly Unit (consisting of the Antenna, R.F. Interstage and Oscillator Coils, the right-angle mounting plate, and the band switch) from the chassis and return to the factory for replacement.

DRIVE CORD REPLACEMENT



Tie 57" drive cord to spring. Thread other end thru hole in drive pulley, pull flush with inside pulley rim. Gang cord in open pos.—pass cord around idler pulley A, B, C, and D, and thru string guide. Wind $2\frac{1}{2}$ turns counterclockwise around tuning shaft spool, around E. Wind 1 turn clockwise around drive pulley.

PROCEDURE FOR SETTING THE STATION BUTTONS

Make a list of your six favorite stations, those which you tune in regularly. It is better to list the station with the highest kilocycle number first, the station with the next lower kilocycle number next, and so on.

The selectivity control should be in the Sharp Position.

Grasp the left-hand button at the sides (depress the adjacent button) and pull it out as far as it will go. A click will be heard. If it is impossible to depress the button which is adjacent to the button you are

ALIGNMENT PROCEDURE

Volume Control—Maximum All Adjustments.

Connect Radio Chassis to Ground Post of Signal Generator with a Short Heavy Lead.

Allow Chassis and Signal Generator to "Heat Up" for several minutes.

Selectivity Control—In Sharp Position.

The following equipment is required for aligning: An All Wave Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.

Output Indicating Meter—Non-Metallic Screw-driver.

Dummy Antennas—1 mf., 100 mmf., and 400 ohms.

SIGNAL GENERATOR FREQUENCY SETTING	CONNECTION AT RADIO	DUMMY ANTENNA SETTING	BAND SWITCH SETTING	CONDENSER SETTING	ADJUST TRIMMERS TO MAXIMUM
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Remove chassis from cabinet but do not disconnect leads to loop aerial.

I. F.					
456 KC	Grid of 2nd I.F. Tube	.1 mf.	B Range	Turn Rotor to Full Open	3rd I.F. (C27) & (C28)
456 KC	Grid of 1st I.F. Tube	.1 mf.	B Range	Turn Rotor to Full Open	2nd I.F. (C22) & (C23)
456 KC	Grid of 1st Det.	.1 mf.	B Range	Turn Rotor to Full Open	1st I.F. (C19) & (C20)
RANGE B					
1610 KC	Antenna Lead	100 mmf.	B Range	Turn Rotor to Full Open	Oscillator Range B (C14)
1400 KC	Antenna Lead	100 mmf.	B Range	Turn Rotor to Max. Output Set Indicator to 1400 KC— See Note A	Ant. Range B (C3) Int. Range B (C6)
600 KC	Antenna Lead	100 mmf.	B Range	Turn Rotor to Max. Output	600 KC (C16) Rock Rotor—See Note B
SHORT WAVE BANDS					
6300 KC	Antenna Lead	400 Ohm	49 Meter	Turn Tuning Knob until Pointer is at 6.3 MC	Ant. Band Spread (C2) Int. Band Spread (C8) Rock Rotor—See Note B
6300 KC	Antenna Lead	400 Ohm	49 Meter	Leave Setting as above	Antenna Band Spread (C2)
LOOP RANGE B—Reassemble chassis in cabinet.					
1400 KC	Antenna Lead	100 mmf.	B Range	Turn Rotor to Max. Output	Ant. Range B (C3)

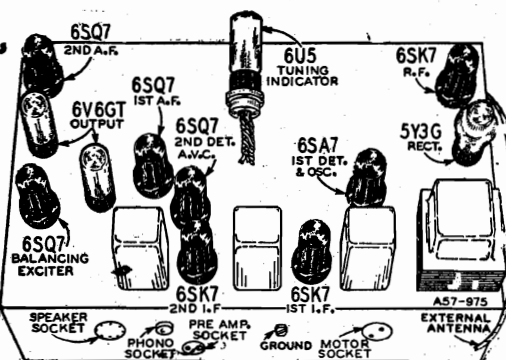
CAUTION—Three of the coils in the band spread coil assembly, the 19 Meter Antenna, R.F. Interstage, and Oscillator Coils, have adjustable iron cores. One of the adjusting screws extends out from the front panel of the chassis base at the right of the band switch. The other two adjusting screws extend up from the chassis base.

DO NOT CHANGE THE POSITION OF THESE ADJUSTING SCREWS as they have been properly set at the factory and cannot be satisfactorily re-adjusted in the field.

After each range is completed, repeat the procedure as a final check.

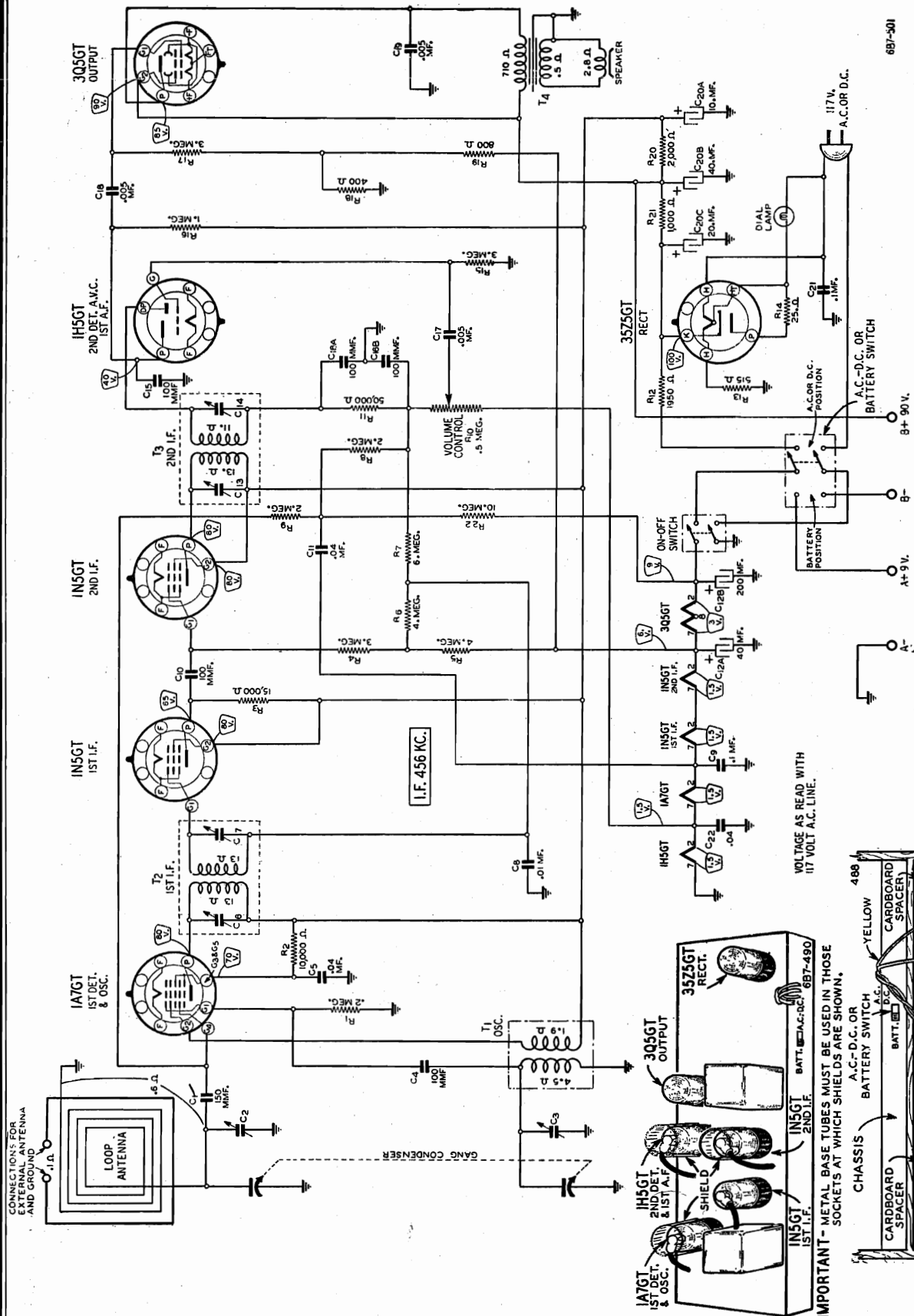
NOTE A—If the pointer is not at 1400 KC on the dial, remove pointer from drive cord. Set pointer at the 1400 KC mark on the dial scale. Attach pointer to drive cord.

NOTE B—Turn the rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.



EACH MODEL EXCEPT 14WG-1202B, HAS A SEEBURG B-3A RECORD CHANGER INCORPORATED. FOR DATA ON THIS SEE RIDER'S "AUTOMATIC RECORD CHANGERS AND RECORDERS".

MONTGOMERY-WARD & CO.



MODELS 93WG-663, 93WG-668

MONTGOMERY-WARD & CO.

Input Voltages and Currents—Battery Operation

"A" Battery..... 9 Volts—50 Ma.
 "B" Battery..... 90 Volts—11.5 Ma.

Power Consumption (At 117 volts AC Supply) 28 Watts
 Power Output

Battery Operation - - - 150 Mw. Undistorted
 350 Mw. Maximum
 200 Mw. Undistorted
 AC Operation - - - 400 Mw. Maximum

Selectivity - 50 KC Broad at 1000 Times Signal

Intermediate Frequency - - - - - 456 KC

Speaker - - - - - 6" P.M. Dynamic

Tuning Frequency Range - - 540 to 1600 KC

Sensitivity (For .05 Watt Output)

External Antenna - - - 10 Microvolts Average

Removing Chassis from Cabinet

Take out the 2 screws, one at each rear corner of the chassis shelf. To remove the shelf from the Grasp the chassis shelf at each rear corner, take out the bolt and the corner and edge it away from the 2 screws at the bottom of the shelf.

cabinet front until the chassis shelf and chassis slide easily out of the cabinet.

CAUTION—When Operated on AC or DC Power. As the chassis is connected to one side of the line, in any service work, keep the chassis on a wood or other insulated surface to avoid contacts with ground.

ALIGNMENT PROCEDURE

Volume Control—Maximum All Adjustments.

Connect Radio Chassis to Ground Post of Signal Generator with a Short Heavy Lead.

Allow Chassis and Signal Generator to "Heat Up" for several minutes.

The following equipment is required for aligning:

A Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.

Output Indicating Meter—Non-Metallic Screwdriver.

Dummy Antenna—.1 mf.

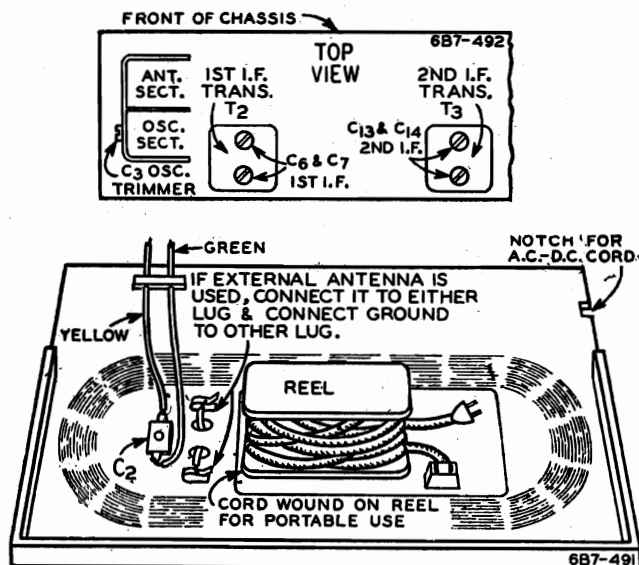
The chassis may be aligned on either AC-DC or Battery power. If AC-DC power is used, see precaution above about avoiding external grounds. Also do not connect the signal generator to any outside ground as the ground terminal of the generator will be connected to the chassis.

SIGNAL GENERATOR			ADJUST TRIMMERS TO MAXIMUM	
FREQUENCY SETTING	CONNECTION AT RADIO	DUMMY ANTENNA	CONDENSER SETTING	(See Trimmer Illustration below and Illustration of Back—Page 1)
456 KC	Signal Grid of 1st Det. (Top Cap)	.1 mf.	Turn Rotor to full open	1st I.F. (C6) & (C7) 2nd I.F. (C13) & (C14)
1600 KC	Signal Grid of 1st Det.	.1 mf.	Turn Rotor to full open	Oscillator (C3)
1500 KC	None—See Note A		Turn Rotor to max. output	Antenna (C2)

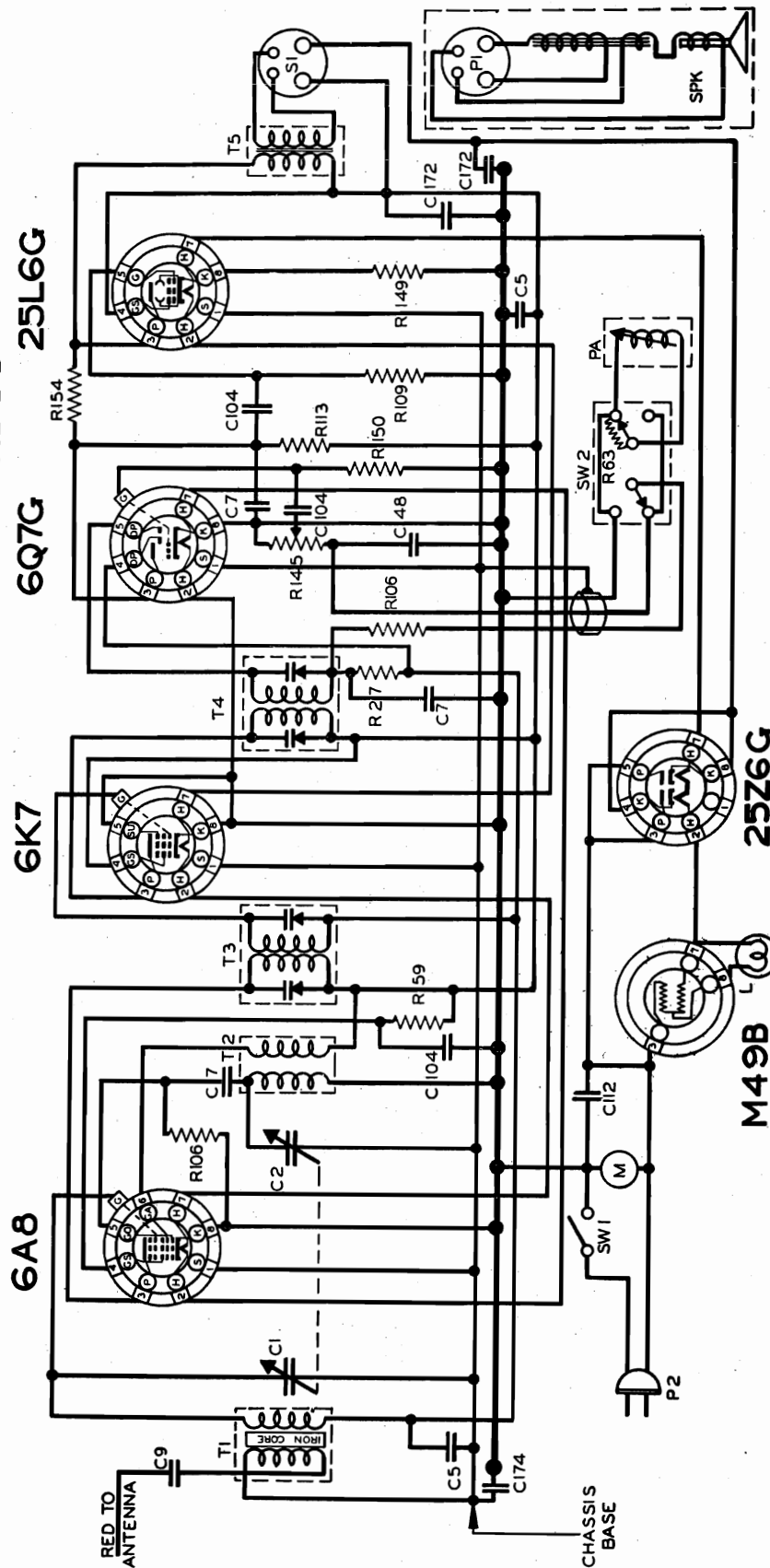
NOTE A—Chassis must be in cabinet. Connect a loop approximately one foot in diameter across the antenna and ground posts of the signal generator. The back of the cabinet must be in place. Place radio approximately 3 feet from loop so as to pick up signal. Radio should not be in proximity to any metal (metal bench, etc.).

CALIBRATION (For models with pointer in front of dial scale)—To obtain dial scale calibration, tune in an 800 KC signal. The pointer should be at the 800 KC mark on the dial. If it is not, hold the pulley at the back of the dial and loosen the pointer screw. Set the pointer at the 800 KC mark. Hold the pointer and retighten the pointer screw.

INSIDE VIEW OF BACK COVER



NOBLITT-SPARKS INDUSTRIES, INC.

MODEL 88
Chassis RE35SCHEMATIC CIRCUIT DIAGRAM
ARVIN HOME RADIO CHASSIS RE35

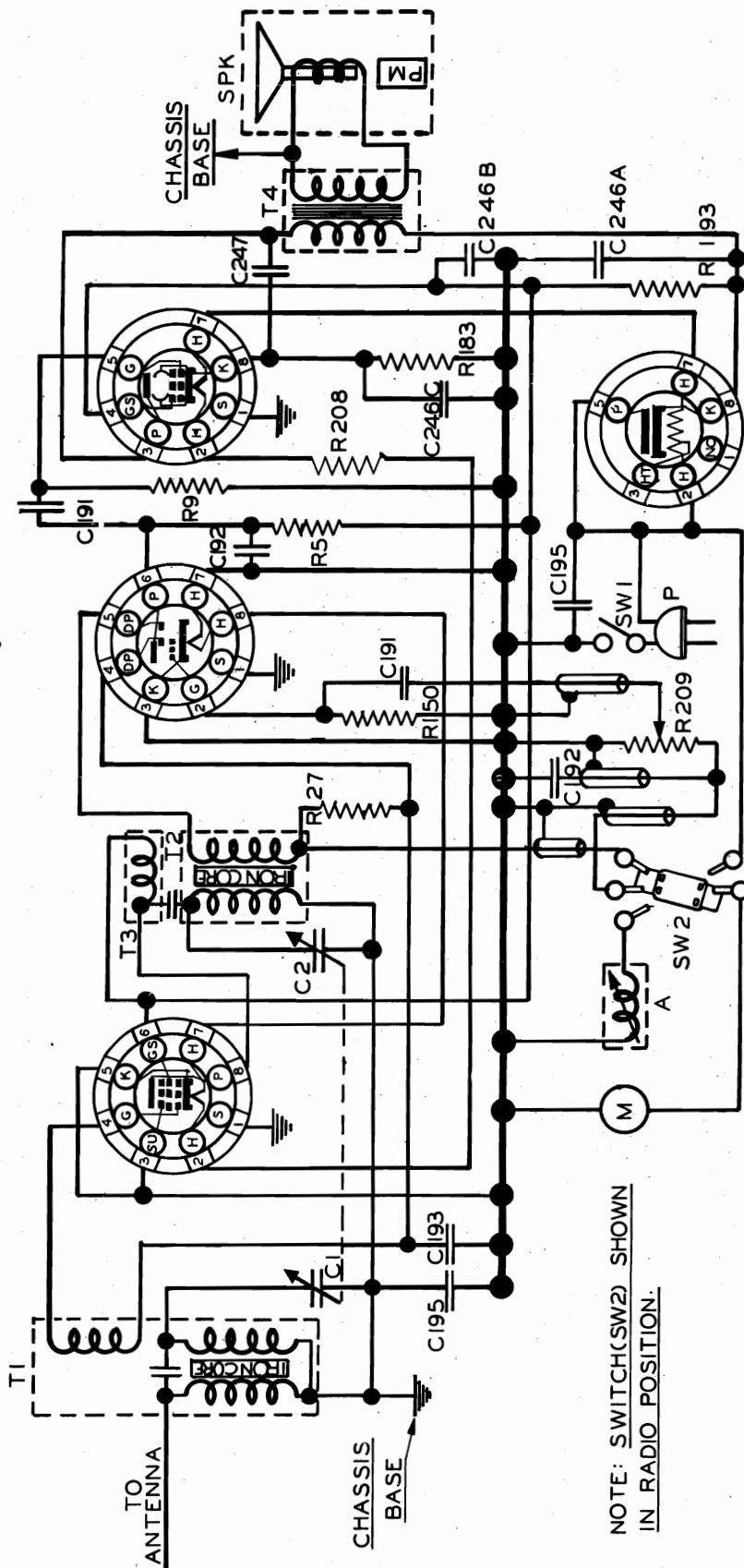
RESISTORS			CONDENSERS			TRANSFORMERS			MISCELLANEOUS UNITS		
R	OHM	W	C	CAPACITY	VOLT	T	TYPE	PART NO.	SYMBOL	DESCRIPTION	PART NO.
27	2M	1/4	1	TWO-GANG	17-15900	1	ANTENNA COIL	00-18083	L	DIAL LIGHT BULB - MAZDA 51	17-13904
50	15K	1/4	2	VARIABLE	17-14015	2	OSCILLATOR COIL	00-15978	M	PHONOGRAPH MOTOR & TURNTABLE	17-18022
83	23K	1/4	3	0.05	400	3	FIRST I.F. COIL	00-18080	PN	PHONOGRAPH PICK-UP ARM	17-18021
100	50K	1/4	4	0.001	400	4	SECOND I.F. COIL	00-18081	PI	SPEAKER PLUG	17-15791C
100	50K	1/4	5	0.001	400	5	OUTPUT TRANS	00-18078	S1	SPEAKER SOCKET	17-13249
113	250K	1/4	6	0.0025	600				SPK	SPEAKER ASSEMBLY	17-15989
143	500K	1/4	7	0.01	200				SW1	LINE SWITCH	17-15988A
149	150	1/2	8	0.05	400				SW2	PHONOGRAPH-RADIO SWITCH	17-18085
150	2M	1/2	9	20 MFD	150						
154	1.5M	1/2	10	20 MFD	150						
			11	0.2	400						
			12	0.2	400						
			13	0.2	400						
			14	0.2	400						
			15	0.2	400						
			16	0.2	400						
			17	0.2	400						
			18	0.2	400						
			19	0.2	400						
			20	0.2	400						
			21	0.2	400						
			22	0.2	400						
			23	0.2	400						
			24	0.2	400						
			25	0.2	400						
			26	0.2	400						
			27	0.2	400						
			28	0.2	400						
			29	0.2	400						
			30	0.2	400						
			31	0.2	400						
			32	0.2	400						
			33	0.2	400						
			34	0.2	400						
			35	0.2	400						
			36	0.2	400						
			37	0.2	400						
			38	0.2	400						
			39	0.2	400						
			40	0.2	400						
			41	0.2	400						
			42	0.2	400						
			43	0.2	400						
			44	0.2	400						
			45	0.2	400						
			46	0.2	400						
			47	0.2	400						
			48	0.2	400						
			49	0.2	400						
			50	0.2	400						
			51	0.2	400						
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			57	0.2	400						
			58	0.2	400						
			59	0.2	400						
			60	0.2	400						
			61	0.2	400						
			62	0.2	400						
			63	0.2	400						
			64	0.2	400						
			65	0.2	400						
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			67	0.2	400						
			68	0.2	400						
			69	0.2	400						
			70	0.2	400						
			71	0.2	400						
			72	0.2	400						
			73	0.2	400						
			74	0.2	400						
			75	0.2	400						
			76	0.2	400						
			77	0.2	400						
			78	0.2	400						
			79	0.2	400						
			80	0.2	400						
			81	0.2	400						
			82	0.2	400						
			83	0.2	400						
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			89	0.2	400						
			90	0.2	400						
			91	0.2	400						
			92	0.2	400						
			93	0.2	400						
			94	0.2	400						
			95	0.2	400						
			96	0.2	400						
			97	0.2	400						
			98	0.2	400						
			99	0.2	400						
			100	0.2	400						

I.F. PEAK 455 K.C.
BROADCAST BAND: BALANCE 1400 K.C.
CHECK AT 600 K.C.
NOBLITT-SPARKS INDUSTRIES, INC.,
COLUMBUS, INDIANA.

MODELS 302, 302A

Chassis RE64

NOBLITT-SPARKS INDUSTRIES, INC.

ARVIN HOME RADIO CHASSIS RE-64
12SK7 12SQ7 50L6GTNOTE: SWITCH (SW2) SHOWN
IN RADIO POSITION.

RESISTORS			CONDENSERS			MISCELLANEOUS UNITS		
R	OHM	W	C	CAPACITY	VOLT	SYMBOL	DESCRIPTION	PART NO.
5	500K	1/4	1	TWO GANG	17 16619	A	PHONO PICK-UP ARM	17 16597
9	1M	1/4	2	VARIABLE	17 16619	M	PHONO TURNABLE MOTOR	17 16611
27	2M	1/4	191	.01	400 17 14272	P	LINE CORD & PLUG ASSEMBLY	17 16632
150	5M	1/4	192	.00025	600 17 14273	SPK	SPEAKER 4" P.M.	17 16621
183	150	1/4	193	.05	200 17 14274	SW1	LINE SWITCH	17 16650
193	2K	1/4	195	.05	400 17 14276	SW2	CHANGE OVER SWITCH	17 16651
208	75	13/4	246A	40 MFD	150 17 16637	T1	ANTENNA COIL	00 16634
209	250 K V C	17	246B	20 MFD	150 17 16637	T2	R F COIL	00 16635
			246C	20 MFD	25	T3	PLATE CHOKE	00 16507
			247	.04	400 17 14363	T4	OUTPUT TRANSFORMER	00 16636

FREQUENCY RANGE 1700 K.C. TO 540 K.C.

NOBLITT SPARKS INDUSTRIES, INC.,
COLUMBUS, INDIANA.

NOBLITT-SPARKS INDUSTRIES, INC.

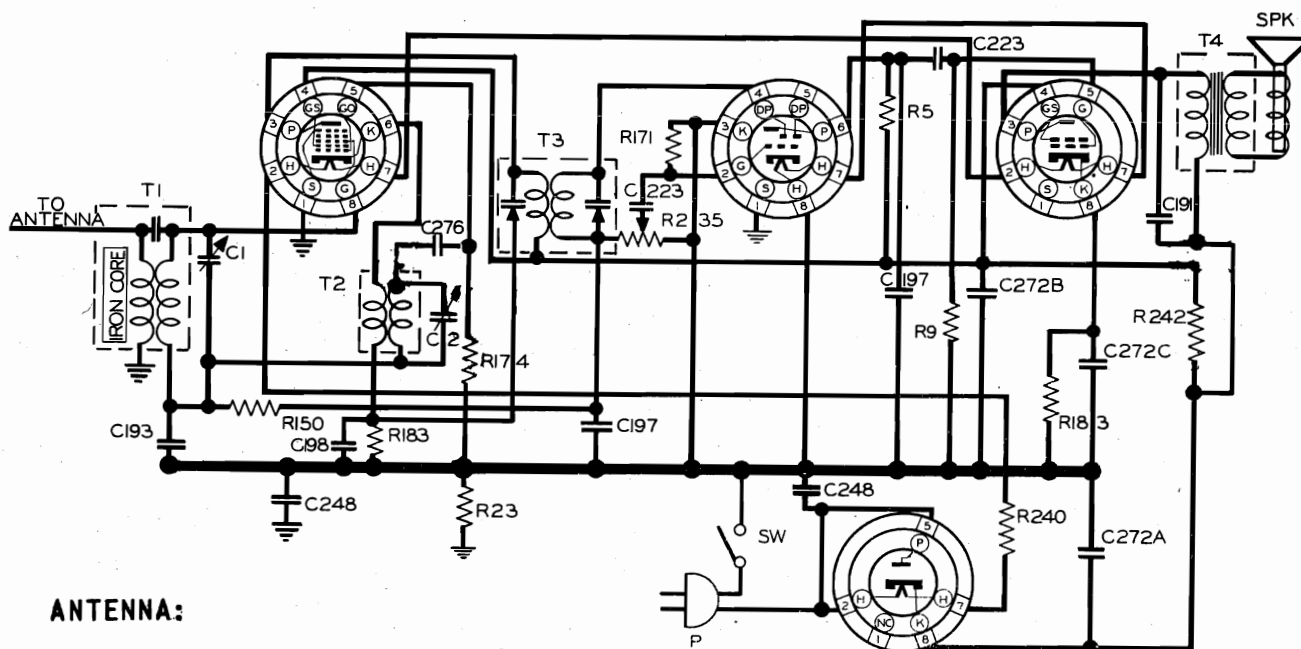
MODELS 422, 422A

Chassis RE-91

12SA7

12SQ7

50L6GT

**ANTENNA:**

The receiver is supplied with 30 ft. of aerial wire fixed to the chassis. This wire is in the form of a tightly wrapped bundle and should be stretched out full length under a rug or around the edge of the room for best operation of the receiver. When practical, although not necessary, even better results will be obtained if a small outside aerial is used.

In rural areas, or in areas where signal strengths are low, use of a small outside antenna will result in better reception.

GENERAL: 35Z4GT OR 35Z5GT

This carton contains one superheterodyne radio receiver.

It is designed for operation on 115 volts AC or DC. Power consumption is 30 watts.

This receiver is complete and ready to operate when installed as described in the following paragraphs.

RESISTORS				CONDENSERS				MISCELLANEOUS UNITS		
R	OHM	W	PART NO.	C	CAPACITY	VOLT	PART NO.	SYMBOL	DESCRIPTION	PART NO.
174	20K	1/4	17-14291	193	.05	200	17-14274	T1	ANTENNA COIL	00-17130
9	1M	1/4	17-2080	248	.05	400	17-14366	T2	OSCILLATOR COIL	00-17223
171	15M	1/4	17-14288	198	.005	400	17-14279	T3	I.F. COIL	00-17210
5	500K	1/4	17-2070	223	.002	400	17-14318	T4	OUTPUT TRANSFORMER	00-17131
183	150	1/4	17-14316	191	.01	400	17-14272	SPK.	SPEAKER	17-17209
235	2M	V.C.	17-17117	1	TWO GANG		17-17115	FREQUENCY RANGE 1750 TO 540 KC. NOBLITT-SPARKS INDUSTRIES, INC. COLUMBUS, INDIANA		
23	250K	1/4	17-3011	2	VARIABLE					
240	47	1	17-14397	272A	40 MFD.	150				
150	5M	1/4	17-14242	272B	20 MFD.	150	17-14398			
242	2000	1	17-14399	272C	20 MFD.	25				
				197	.0001	500	17-14278			
				276	.00005	500	17-14404			

RESISTORS

Schematic Location	Part No.	Description	Price
R-235	17-17117	Volume Control 2 meg.	\$1.00
R-183	17-14316	150 ohm 1/4 watt	.20
R-174	17-14291	20,000 ohm 1/4 watt	.20
R-5	17-2070	500,000 ohm 1/4 watt	.20
R-9	17-2080	1 megohm 1/4 watt	.20
R-171	17-14288	15 megohm 1/4 watt	.20
R-240	17-14397	47 ohm 1 watt	.40
R-23	17-3011	250,000 ohm 1/4 watt	.20
R-150	17-14242	5 megohm 1/4 watt	.20
R-242	17-14399	2000 ohm 1 watt	.30

CONDENSERS

Schematic Location	Part No.	Description	Price
C-1 & 2	17-17115	Variable Condenser	1.75
C-272	17-14398	Electrolytic Condenser 40-20 uf. 150 V	.75
		20 uf. 25 V	.30
C-223	17-14318	.002 uf. 400 V	.75
C-248	17-14366	.05 uf. 400 V	.30
C-193	17-14274	.05 uf. 200 V	.30
C-198	17-14279	.005 uf. 400 V	.30
C-197	17-14278	.0001 uf. 500 V	.30
C-191	17-14272	.01 uf. 400 V	.30

COILS & TRANSFORMERS

Schematic Location	Part No.	Description	Price
T-1	00-17130	Antenna Coil	.50
T-2	00-17223	Oscillator Coil	.40
T-3	00-17210	I.F. Coil	.75
T-4	00-17131	Output Transformer	1.25

MISCELLANEOUS

Part No.	Description	Price
17-17118	Line Cord and Plug Assembly	.40
17-17209	Speaker 4"	2.50
31-16511	Cabinet (mahogany)	1.00
31-16511-A	Cabinet (ivory)	1.00
29-16545	Knob (dial)	.20
29-16281	Knob (volume)	.15
29-17116	Dial Emblem	.15
31-16361	Cabinet rear cover (mahogany)	.25
31-16361-A	Cabinet rear cover (ivory)	.25

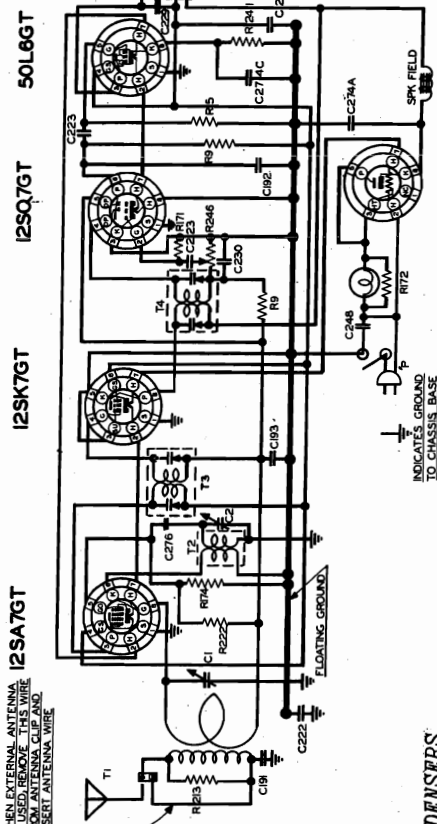
MODEL 520,
Chassis RE-84

NOBLITT-SPARKS INDUSTRIES, INC.

MODELS 532, 532A
Chassis-92

ARVIN HOME RADIO — CHASSIS RE-92

WHEN EXTERNAL ANTENNA
IS USED, REMOVE THIS WIRE
FROM ANTENNA CLIP AND
INSERT ANTENNA WIRE



Variable Electrolytic Condenser 20-10 mfd. 150V
20 mfd. 25V

Condenser .002 mfd. 400 V
Condenser .02 mfd. 400 V
Condenser .0005 mfd. 400 V
Condenser .2 mfd. 400 V
Condenser .05 mfd. 200 V
Condenser .05 mfd. 400 V
Condenser .01 mfd. 400 V

Volume control and switch 1 megohm
Resistor 1 megohm 1/4 watt
Resistor 175 ohm 1/4 watt
Resistor 500,000 ohm 1/4 watt
Resistor 15 megohm 1/4 watt
Resistor 20,000 ohm 1/4 watt
Resistor 100 ohm 1/4 watt
Resistor 10 megohm 1/4 watt

The power consumption of this radio is
30 watts.

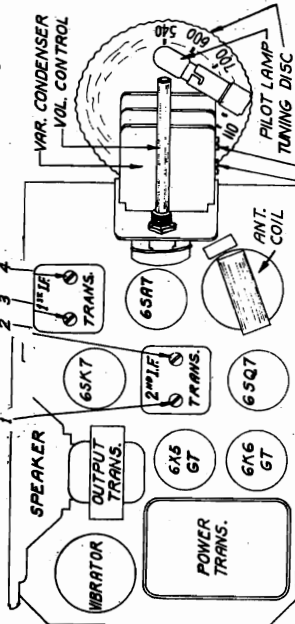
CONDENSERS

C-1 & 2
C-274-A, B, C
C-223
C-229
C-230
C-222
C-193
C-248
C-191

RESISTORS

R-246
R-9
R-241
R-5
R-171
R-174
R-172
R-222

CHASSIS RE-84



CONDENSERS

Ref. No. Part No. Description Prices
C1-2 17-16421 Tuning Condenser 2.50
C155 17-14217 .0002 mfd. 200 V .25
C237 17-14345 .005 mfd. 1200 V .50
C206 17-14297 10-10 mfd. 300 V, 1.25
C191 17-14272 .01 mfd. 400 V .35
C192 17-14273 .00025 mfd. 600V .25
C195 17-14276 .05 mfd. 400 V .35
C196 17-14277 .1 mfd. 200 V .35
C197 17-14278 .0001 mfd. 600 V .25
C238 17-14346 .5 mfd. 150 V .40
C227 17-14323 .05 mfd. 200 V .30
C258 17-14381 .004 mfd. 600 V .30

RESISTORS

Ref. No. Part No. Description Prices
R5 17-2070 500,000 ohm 1/2W
R9 17-2080 1,000,000 ohm 1/2W
R171 17-14288 15,000,000 ohm 1/2W
R172 17-14289 100 ohm 1/2W
R177 17-14291 20,000 ohm 1/2W
R228 17-14296 650 ohm 1/2W
R196 17-17006 1,000,000 ohm Vol. Con. 1.00
R196 17-14340 500 ohm 1W
R207 17-14361 300 ohm 1/2W

Balancing Instructions

All sensitivities given for 1/2 watt output = 1.4 across Voice Coil

Bal. Oscillator Frequency	Adjust Padder No. 1, 2, 3 & 5	Dial Setting 550 KC 1400	Sensitivity 50uv 10uv
455	6	1400	10uv

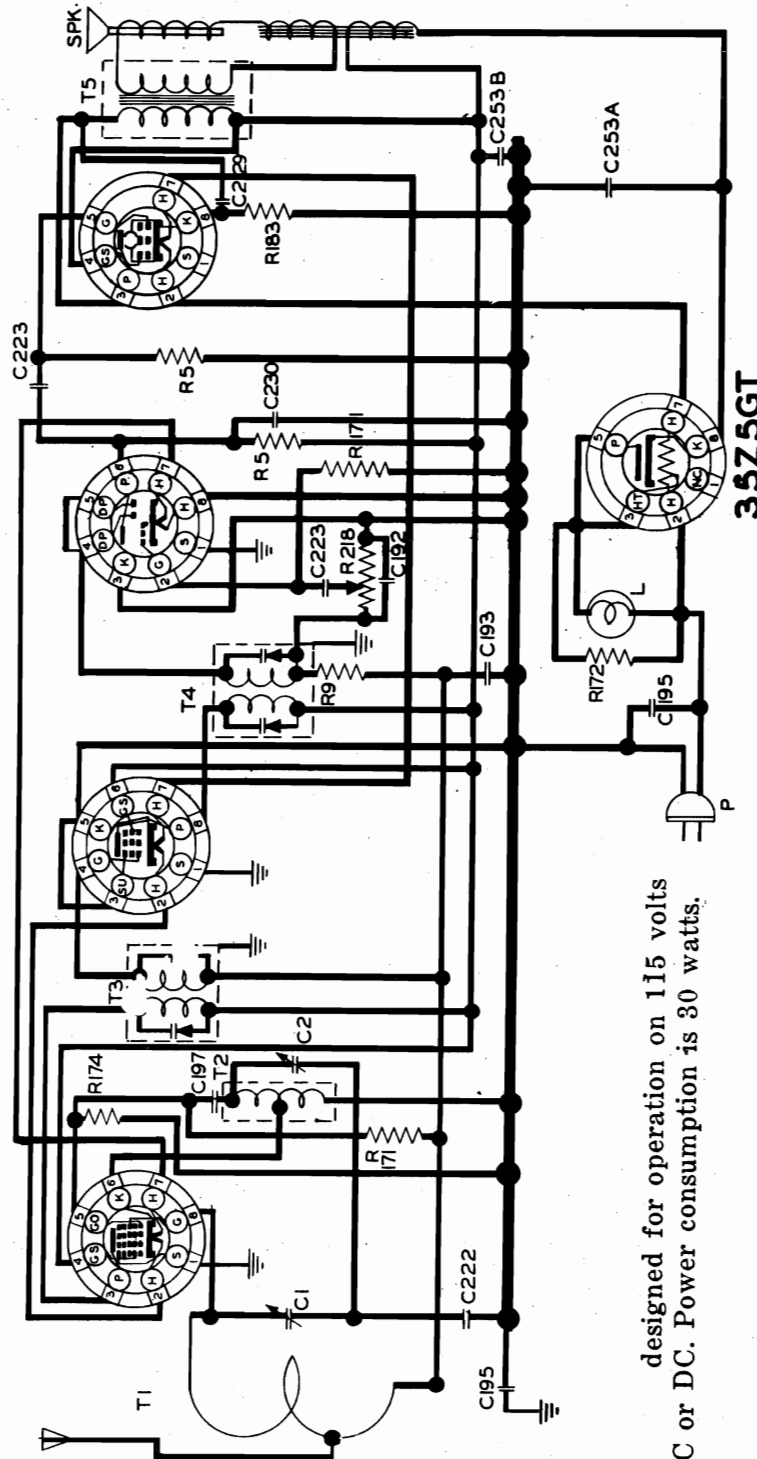
NOBLITT-SPARKS INDUSTRIES, INC.

MODELS 522, 522A

Chassis RE-76

ARVIN HOME RADIO CHASSIS RE-76

12SA7 12SK7 12SQ7 50L6GT



designed for operation on 115 volts
AC or DC. Power consumption is 30 watts.

RESISTORS		CONDENSERS		TRANSFORMERS		MISCELLANEOUS UNITS	
R OHM/W PART NO		C CAPACITY/VOLT PART NO		T TYPE	PART NO	SYMBOL	DESCRIPTION PART NO
28 1M /417-16857		1 TWO GANG 7 6841		1 ANTENNA LOOF 00-6851		P	DIAL LIGHT BULB MAZDA #47 7-6378
5 500K /417-2070		2 VARIABLE 7 6841		2 OSCILLATOR COIL 00-6852		P	LINE CORD & PLUG ASSY 7-6842
193 150 /417-14316		253A 20MFD 50 7 14375		3 FIRST IF COIL 29-6853		SPK	SPEAKER ASSY 7-6843
74 20K /417-14291		253B 10MFD 50 7 14375		4 SECOND IF COIL 29-6854			
72 100 /417-14289		92 .00025 60017-14273		5 OUTPUT TRANSF 00-6859			
71 15M /417-14288		95 .05 40017-14276					
9 1M /417-2080		222 .2 40017-14317					
		223 .02 40017-14327					
		223 .002 40017-14318					
		193 .05 20017-14274					
		197 .0001 60017-14278					
		230 .0005 40017-14328					

IF PEAK 455 KC.
BALANCE 1400 KC. - CHECK AT 600 KC.
NOBLITT-SPARKS INDUSTRIES, INC.
COLUMBUS, INDIANA

MODELS 524, 524A

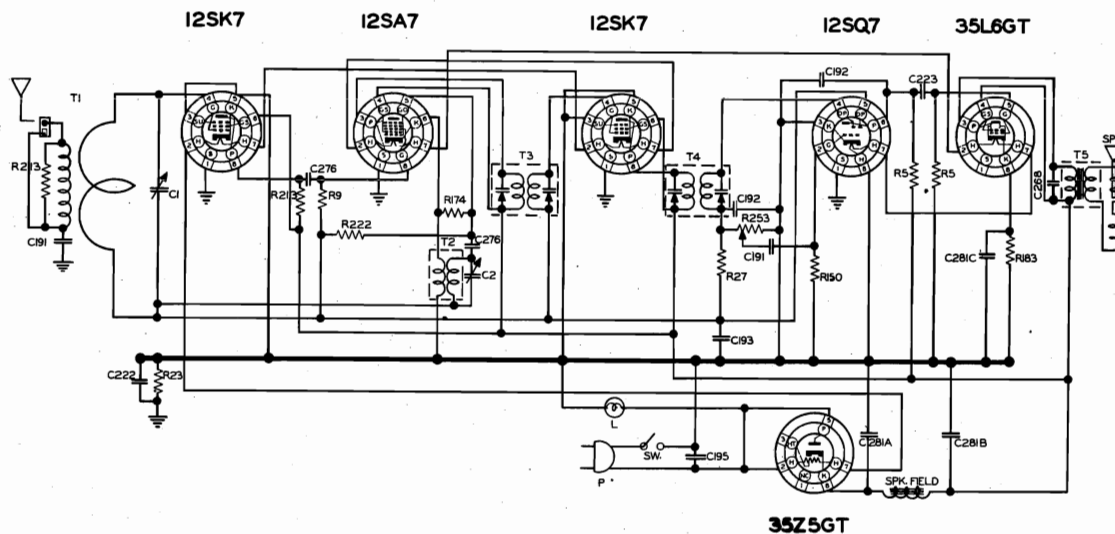
Chassis RE-99

MODELS 616, 616A

Chassis RE-98

NOBLITT-SPARKS INDUSTRIES, INC.

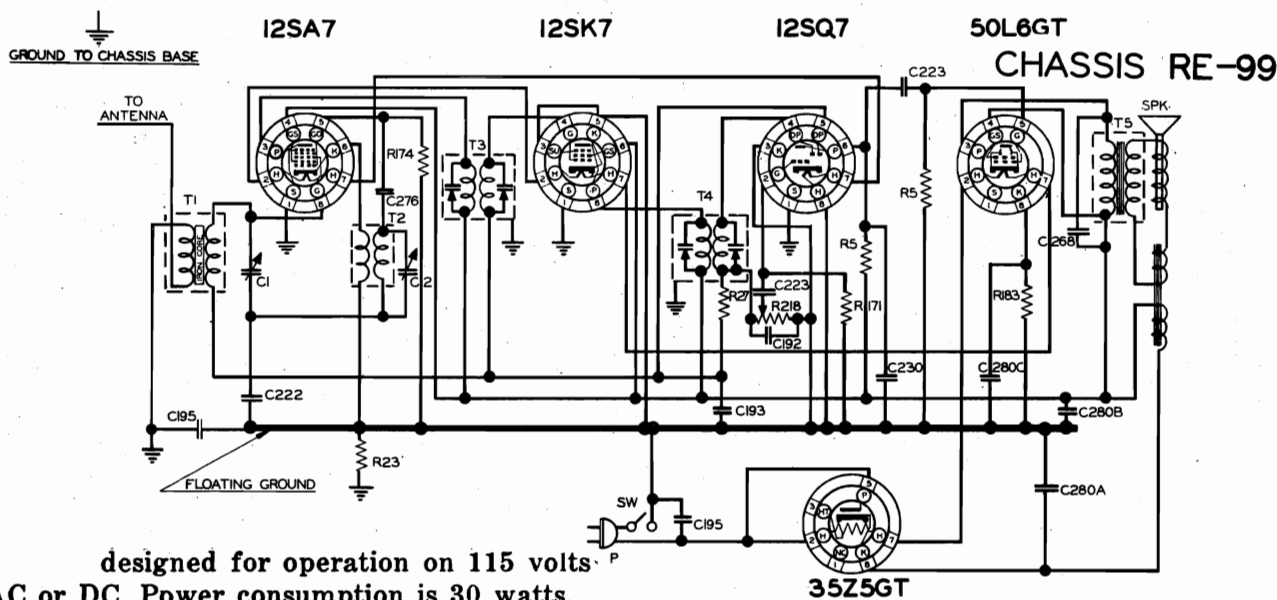
ARVIN HOME RADIO - CHASSIS RE-98



RESISTORS				CONDENSERS				COILS & TRANSFORMERS				MISCELLANEOUS UNITS			
R	OHM	W	PART NO.	C	CAPACITY	VOLT	PART NO.	T	DESCRIPTION	PART NO.		SYMBOL	DESCRIPTION	PART NO.	
222	10 MEG.	1/4	7-14377	222	.2	400	7-14317	1	ANTENNA LOOP ASSY.	00-17298		SPK.	SPEAKER 5 INCH E.M.	7-17251	
174	20 K.	1/4	7-14291	191	.01	400	7-14272	2	OSCILLATOR COIL	00-17299		P	LINE CORD & PLUG ASSY.	7-17303	
27	2 MEG.	1/4	7-4788	193	.05	200	7-14274	3	FIRST I.F. COIL	00-17300		L	DIAL LIGHT - MAZDA C-7 7WAT TS	7-18701	
150	5 MEG.	1/4	7-14242	223	.002	400	7-14318	4	SECOND I.F. COIL	00-17301		SW	VOLUME CONTROL & SW.	7-17291	
5	500K.	1/4	7-2070	288	.03	400	7-14392	5	OUTPUT TRANSF.	00-17302					
183	150	1/4	7-14318	195	.05	400	7-14276								
213	10K	1/4	7-14369	278	.00005	600	7-14404								
23	250K.	1/4	7-3011												
253	1 MEG.	V.C.	7-17291												
				1	TWO GANG		7-17248								
				2	VARIABLE										
				281A	40 MFD.	150									
				281B	20 MFD.	150	7-14417								
				281C	20 MFD.	25									

I.F. PEAK 455 K.C.
BALANCE 1400 K.C. - CHECK AT 600 K.C.

NOBLITT-SPARKS INDUSTRIES, INC.
COLUMBUS, INDIANA

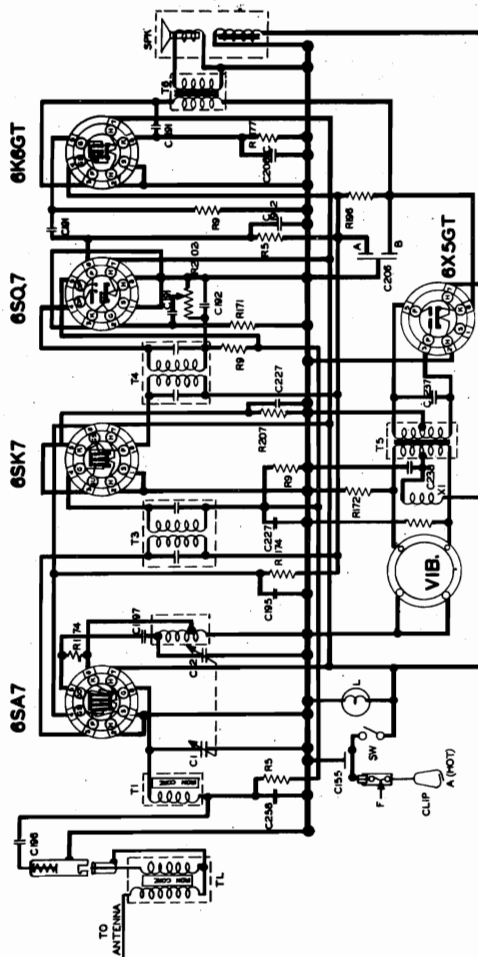


designed for operation on 115 volts.
AC or DC. Power consumption is 30 watts.

RESISTORS				CONDENSERS				TRANSFORMERS				MISCELLANEOUS UNITS			
R	OHM	W	PART NO.	C	CAPACITY	VOLT	PART NO.	T	TYPE	PART NO.		SYMBOL	DESCRIPTION	PART NO.	
218	1M.	V.C.	7-18857	1	TWO GANG		7-17279	1	ANTENNA COIL	00-17284		SW	LINE SWITCH	7-18857	
5	500K.	1/4	7-2070	2	VARIABLE			2	OSCILLATOR COIL	00-17285		P	LINE CORD & PLUG ASSEMBLY	7-18844	
183	150	1/4	7-14318	280A	40 MFD.	150		3	FIRST I.F. COIL	29-18853		SPK	SPEAKER ASSEMBLY	7-18843	
174	20K.	1/4	7-14291	280B	20 MFD.	150	7-14415	4	SECOND I.F. COIL	29-18852					
171	15M.	1/4	7-14288	280C	20 MFD.	25		5	OUTPUT TRANSF.	00-18869					
23	250K.	1/4	7-3011	183	.05	400	7-14276								
27	2M.	1/4	7-4788	222	.2	400	7-14317								
				192	.00025	800	7-14273								
				223	.002	400	7-14318								
				193	.05	200	7-14274								
				288	.03	400	7-14392								
				230	.0005	400	7-14328								
				278	.00005	600	7-14404								

I.F. PEAK 455 K.C.
BALANCE 1400 K.C. - CHECK AT 600 K.C.
NOBLITT-SPARKS INDUSTRIES, INC.
COLUMBUS, INDIANA

NOBLITT-SPARKS INDUSTRIES, INC.

MODEL 620
Chassis RE-85SCHEMATIC CIRCUIT DIAGRAM
ARVIN CAR RADIO CHASSIS RE-85

DESCRIPTION:

The Arvin Model 620 is a five tube combination dial and push button single unit Car Radio Receiver. This receiver is designed to mount under the lower edge of the instrument panel on most models of cars.

The radio may be tuned either by rotating the calibrated thumb wheel on the lower front of the radio, or by pressing any one of the four push buttons which are disposed vertically along the left front of the radio.

BALANCING INSTRUCTIONS:

All sensitivities given for $\frac{1}{2}$ watt output = 1.4 across Voice Coil

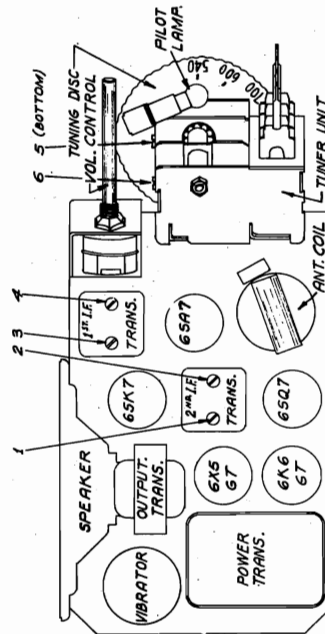
Operation No.	Connect Bal. Oscillator To	Bal. Oscillator Frequency	Adjust Padder No.	Dial Setting	Sensitivity
1	6SA7 Grid	455	1, 2, 3 & 4	550 KC	50 uV
2	Ant. Coupler	1400	5	1400	
3	Through 20 uuf	1400	6	1400	10 uV

RESISTORS

Ref. No.	Part No.	Description	Price
R5	17-2070	500,000 ohm $\frac{1}{2}$ W	.20
R9	17-2080	1,000,000 ohm $\frac{1}{2}$ W	.20
R171	17-14288	15,000,000 ohm $\frac{1}{2}$ W	.20
R172	17-14289	100 ohm $\frac{1}{2}$ W	.20
R174	17-14291	20,000 ohm $\frac{1}{2}$ W	.20
R177	17-14296	650 ohm $\frac{1}{2}$ W	.20
R202	17-16488	1,000,000 Vol. Con.	1.00
R196	17-14340	500 ohm 1W	.30
R207	17-14361	300 ohm $\frac{1}{2}$ W	.20

CONDENSERS

Ref. No.	Part No.	Description	Price
C1-2	17-16471	Tuner Unit	4.00
C155	17-14217	.0002 mfd. 200V	.25
C237	17-14345	.005 mfd. 1200V.	.50
C206	17-14297	10-10 mfd. 300V.,	1.25
		20 mfd. 25V	.35
C191	17-14272	.01 mfd 400V	.25
C192	17-14273	.00025 mfd. 600V	.35
C195	17-14276	.05 mfd. 400V	.35
C196	17-14277	.1 mfd. 200V	.25
C197	17-14278	.0001 mfd. 600V	.25
C238	17-14346	.5 mfd. 150V	.40
C227	17-14323	.05 mfd. 200V	.30
C258	17-14381	.004 mfd. 600V	.30



PUSH BUTTON ADJUSTMENT:

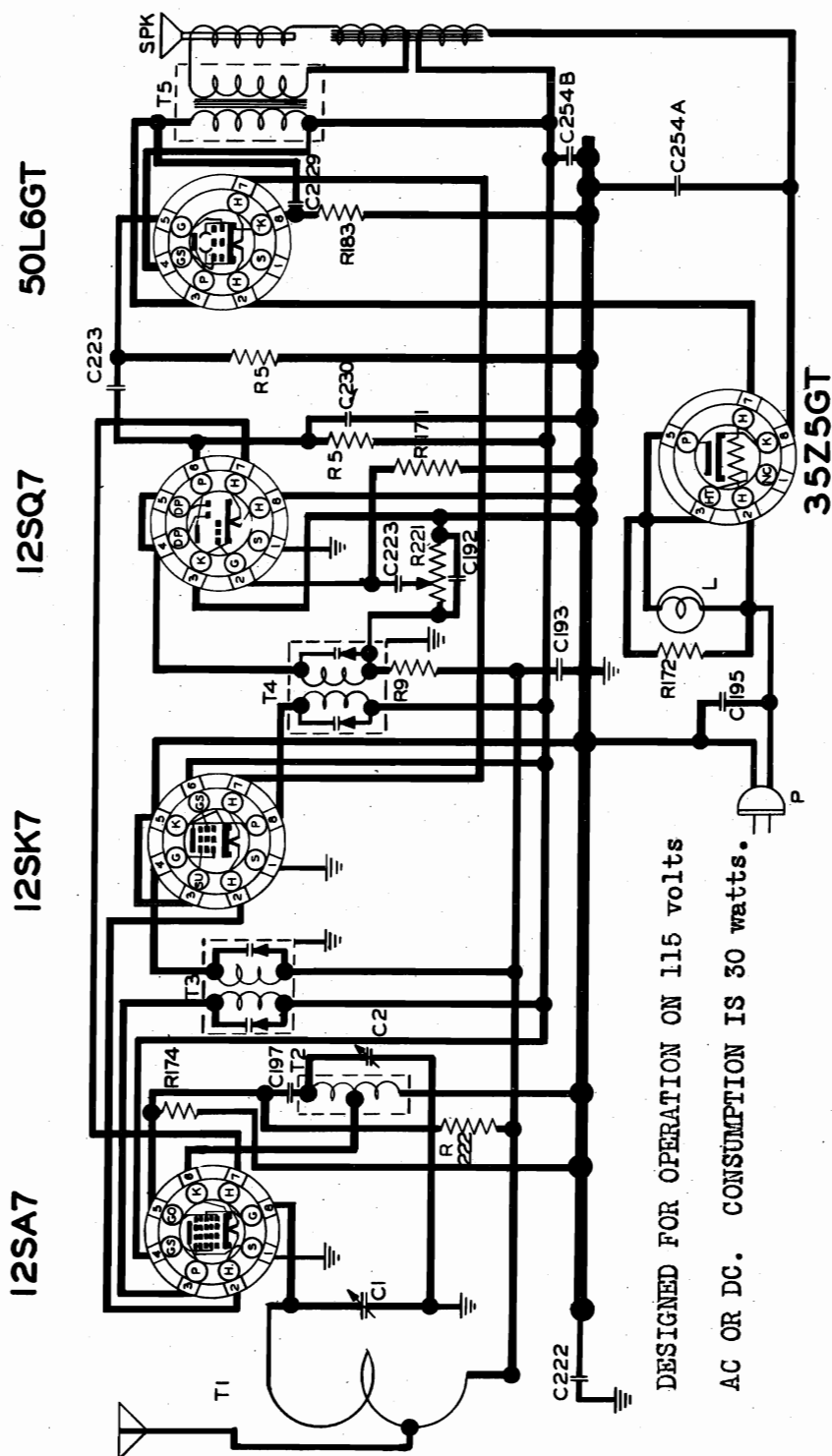
Any button may be set to any station desired. First, tune in the desired station by means of the thumb wheel. Second, turn the push button counter-clockwise two full turns. Then depress this button to the full length of its stroke, and while depressed, tighten the button again by turning it clockwise.

The button may now be released. To check the correct setting for this button, turn the thumb wheel to some other point and depress the push button. This will return the tuning mechanism to the station just set up. If it does not, repeat the foregoing sequence of operations more carefully. Each of the remaining buttons may be set to other stations in a like manner.

MODEL 632
Chassis RE-79

NOBLITT-SPARKS INDUSTRIES, INC.

ARVIN HOME RADIO - CHASSIS RE-79



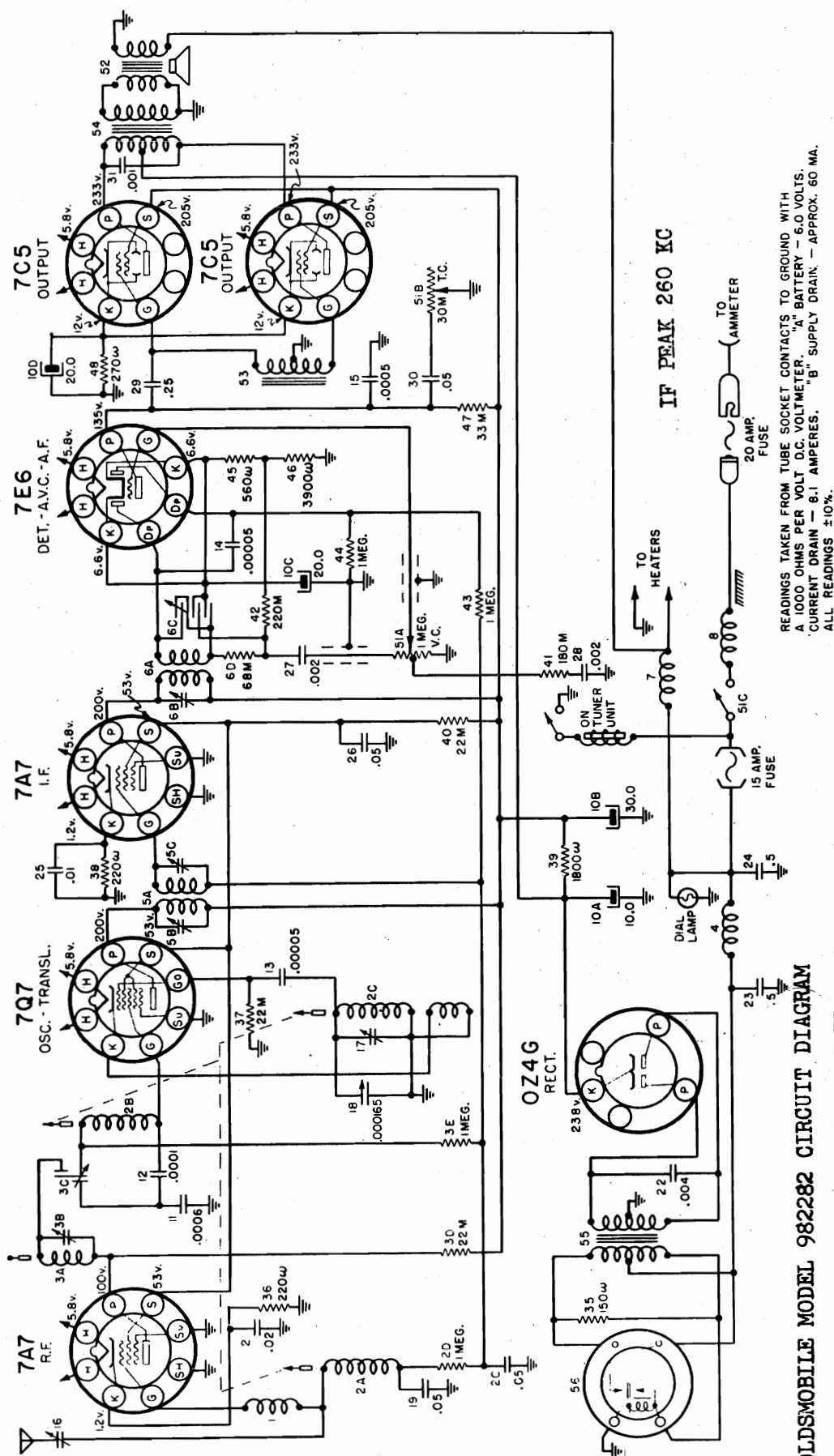
DESIGNED FOR OPERATION ON 115 volts

AC OR DC. CONSUMPTION IS 30 watts.

RESISTORS			CONDENSERS			TRANSFORMERS			MISCELLANEOUS		
R	OHM	W	C	CAPACITANCE	VOLT	T	TYPE	PART NO	SYMBOL	DESCRIPTION	PART NO
221	1 M	1/4	1	TWO GANG	17-16841	1	ANTENNA LOOP	00-16900	L	DIAL LIGHT BULB	MAZDA #47
5	300K	1/4	2	VARIABLE	17-16841	2	OSCILLATOR COIL	00-16891	P	LINE CORD & PLUG ASSY	17-16874
163	150	1/4	254A	20 MFD.	150	3	FIRST I.F. COIL	00-16885	SPK	SPEAKER ASSY.	17-16867
174	20 K	1/4	254B	10 MFD.	150	4	SECOND I.F. COIL	00-16886			
172	100	1/4	192	.00025	600	5	OUTPUT TRANSF.	00-16883			
222	10 M	1/4	195	.05	400						
9	1 M	1/4	222	.2	400						
			223	.02	400						
			223	.002	400						
			193	.05	200						
			197	.0001	600						
			230	.0005	400						

IF PEAK 455 K.C.
BALANCE 1400 K.C. - CHECK AT 600 K.C.
NOBLITT-SPARKS INDUSTRIES, INC.
COLUMBUS, INDIANA

OLDSMOBILE DIV.—GEN. MOTORS

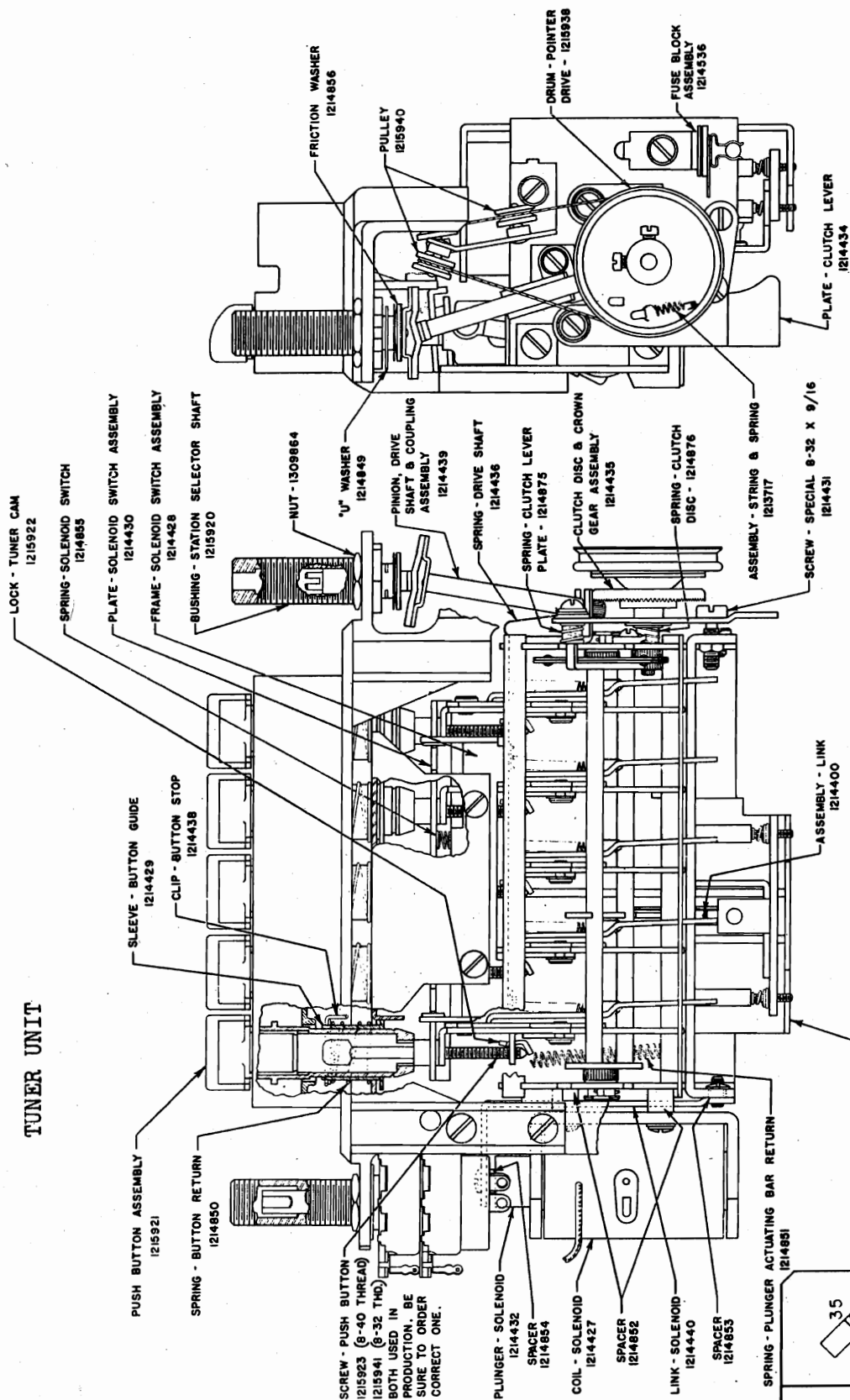


OLDSMOBILE MODEL 982282 CIRCUIT DIAGRAM

PUSH BUTTON SET UP

Pull button out - turn counter-clockwise until definite latching is observed -
 Loosen two turns - Tune in desired station manually - Depress loosened
 button - Pull button out again and tighten by turning clockwise - Return to
 normal position

OLDSMOBILE DIV.—GEN. MOTORS



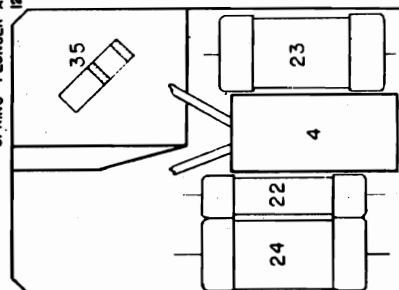
TUNING - Manual & 5 P.B. - Solenoid

TUNING RANGE - 540 KC - 1610 KC

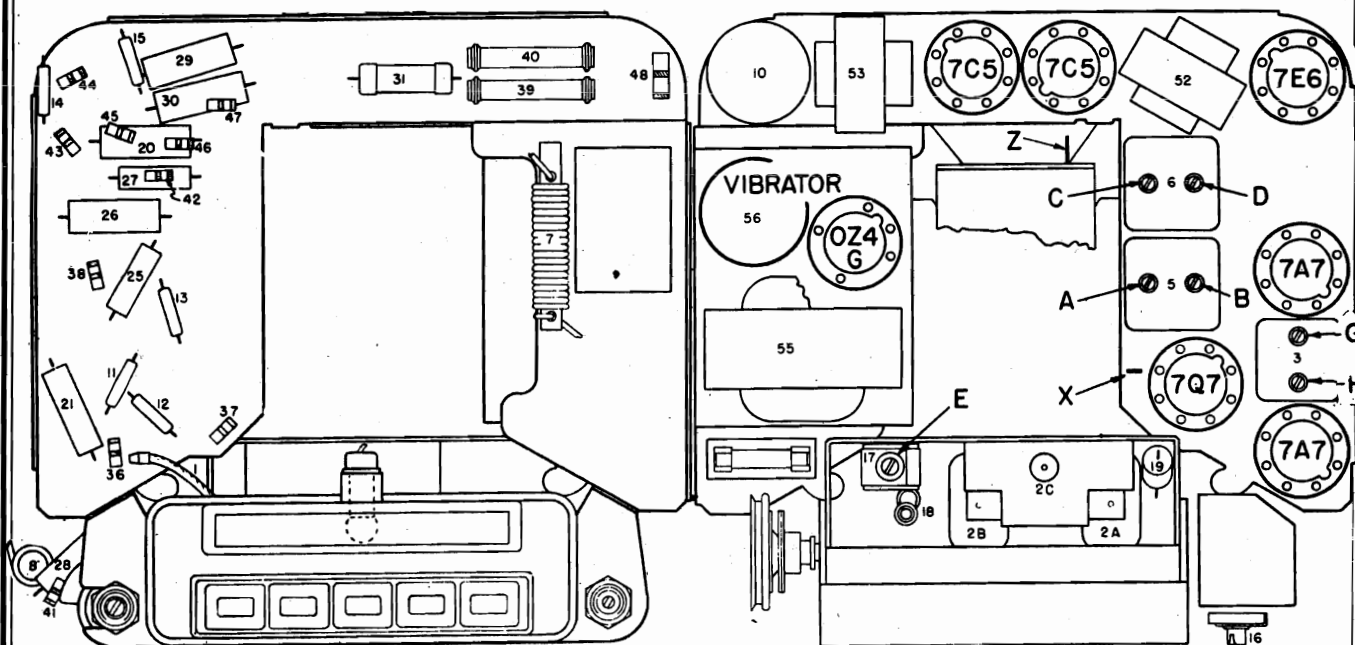
TUBES - Seven

SPEAKER - 8" Electro Dynamic

Power Supply



OLDSMOBILE DIV.—GEN. MOTORS



Chassis View

Tube View

CAR ANTENNA CAPACITY - 75 mmfd.

FOR COMPLETE ALIGNMENT PROCEDURE
SEE UNITED MOTORS SERVICE
MODEL R-698

ALIGNMENT PROCEDURE

Volume Control Maximum

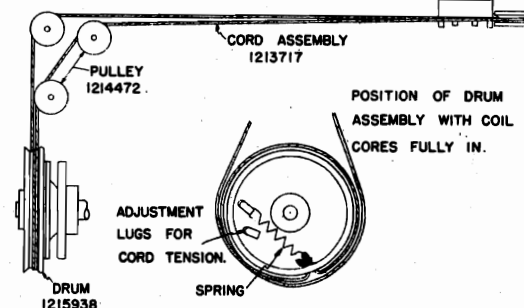
Signal Generator Output minimum for satisfactory output indication

Series Condenser Or Dummy Antenna	Connect To	Signal Generator Frequency	Adjust, Screws In Order
0.1 mfd.	Terminal X	260 KC	A-B-C-D
.000075 mfd.	Antenna Terminal	1610 KC	E-F-H
.000075 mfd.	Antenna Terminal	260 KC	G *

* Adjust for minimum output indication.

Low frequency alignment not required.

Adjust Trimmer E to match car antenna (1400 KC) when radio is installed.



Pointer and Tuner Drive String Hookup

ALIGNMENT PROCEDURE

Signal Generator minimum for satisfactory output indication.

Series Condenser Or Dummy Antenna	Connect To	Signal Generator Frequency	Adjust Screws In Order
0.1 MFD	Grid side of Trimmer F	262 KC	A B C D
.000070 MFD	Antenna Terminal	1615 KC	E
.000070 MFD	Antenna Terminal	1400 KC	F G

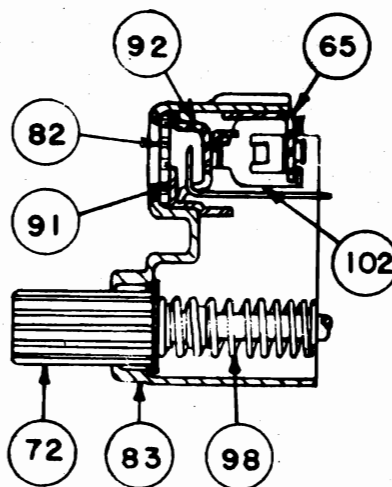
SPECIAL INSTRUCTIONS

Mechanical alignment of iron cores. Tune to stop at H.F. end of dial. Adjust cores H, J, & K to extend 1-5/32" out from end of coil form. Adjust trimmer E, F, & G, (1615 KC). Adjust cores H & J for maximum output at 1400 KC. Repeat alignment of trimmers E, F, & G at 1615 KC. Repeat alignment of cores H & J at 1400 KC. Align trimmers F & G at 1400 KC.

TUNER MECHANICAL PARTS

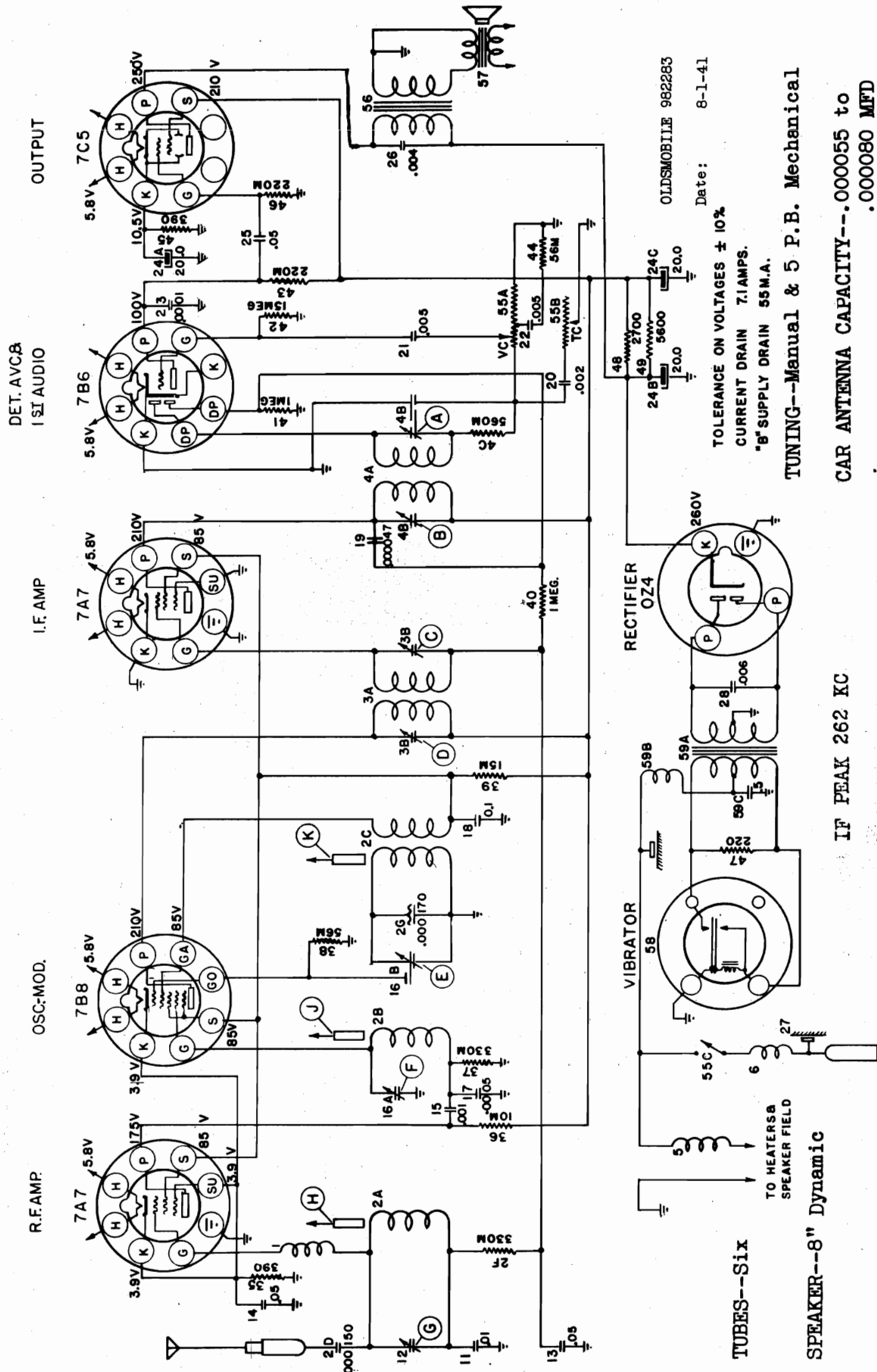
<u>No.</u>	<u>Part No.</u>	<u>Part Name</u>	<u>Description</u>
65	7241046	Baffle	Light Shield
66	7241029	Bar	Parallel Guide
67	7241957	Bearing	Face Worm
68	7242033	Bracket	Outtrigger Assy.
69	7241265	Bracket	Slide Assy.
70	7242420	Bumper	Button Shock Absorber
71	7240998	Bushing	Man Drive
72	7242436	Button	P.B. Assy.
74	7242847	Clamp	Core
75	7240893	Clutch	Assy.
76	7241267	Collar	Man. Shaft
77	7241675	Cord	Pointer
78	7242138	Core	Antenna, & Oscillator Coil Tuning
79	7242139	Core	R.F. Coil Tuning
80	7240921	Coupling	Core
82	7242340	Dial	Calibrated
83	7240774	Escutcheon	
84	7241658	Extension	Control Shafts
86	7241370	Lever	String Drive
87	7240922	Link	Connecting
88	7242516	Nut	Spacer
90	7241956	Plate	Tuner Mounting
91	7242441	Plate	Dial Back Plate
92	7242545	Plate	Pointer Back Plate
93	7242214	Pointer	Assy. Comp.
95	7241657	Screw	Shaft Extension
96	7241276	Shaft	Man. Drive Assy.
97	7240882	Spacer	Shoulder Spacing Slide Bracket
98	7241044	Spring	Button Return
99	7240915	Spring	Clutch Shaft Tension
100	7241042	Spring	Connecting Link-Also Slide Bracket Return
	7241045	Spring	Core Coupling
	7240947	Spring	Dial Retainer
	7241178	Spring	Pointer Return
	7242475	Tuner	Assy. Includes items 106-111
	7241037	Screw	Push Button Screws
	7241039	Spring	Latch Bar
	7241169	Spring	P.B. Screw Return
	7241835	Spring	Tuning Nut Yoke
	7242426	Tip	Latching Button
	7240548	Yoke	Tuning Nut

ESCUTCHEON CROSS SECTION



ESCUTCHEON CROSS SECTION

DET. AVC&	ISI AUDIO	OUTPUT
0.00	0.00	0.00
0.01	0.01	0.01
0.02	0.02	0.02
0.03	0.03	0.03
0.04	0.04	0.04
0.05	0.05	0.05
0.06	0.06	0.06
0.07	0.07	0.07
0.08	0.08	0.08
0.09	0.09	0.09
0.10	0.10	0.10
0.11	0.11	0.11
0.12	0.12	0.12
0.13	0.13	0.13
0.14	0.14	0.14
0.15	0.15	0.15
0.16	0.16	0.16
0.17	0.17	0.17
0.18	0.18	0.18
0.19	0.19	0.19
0.20	0.20	0.20
0.21	0.21	0.21
0.22	0.22	0.22
0.23	0.23	0.23
0.24	0.24	0.24
0.25	0.25	0.25
0.26	0.26	0.26
0.27	0.27	0.27
0.28	0.28	0.28
0.29	0.29	0.29
0.30	0.30	0.30
0.31	0.31	0.31
0.32	0.32	0.32
0.33	0.33	0.33
0.34	0.34	0.34
0.35	0.35	0.35
0.36	0.36	0.36
0.37	0.37	0.37
0.38	0.38	0.38
0.39	0.39	0.39
0.40	0.40	0.40
0.41	0.41	0.41
0.42	0.42	0.42
0.43	0.43	0.43
0.44	0.44	0.44
0.45	0.45	0.45
0.46	0.46	0.46
0.47	0.47	0.47
0.48	0.48	0.48
0.49	0.49	0.49
0.50	0.50	0.50
0.51	0.51	0.51
0.52	0.52	0.52
0.53	0.53	0.53
0.54	0.54	0.54
0.55	0.55	0.55
0.56	0.56	0.56
0.57	0.57	0.57
0.58	0.58	0.58
0.59	0.59	0.59
0.60	0.60	0.60
0.61	0.61	0.61
0.62	0.62	0.62
0.63	0.63	0.63
0.64	0.64	0.64
0.65	0.65	0.65
0.66	0.66	0.66
0.67	0.67	0.67
0.68	0.68	0.68
0.69	0.69	0.69
0.70	0.70	0.70
0.71	0.71	0.71
0.72	0.72	0.72
0.73	0.73	0.73
0.74	0.74	0.74
0.75	0.75	0.75
0.76	0.76	0.76
0.77	0.77	0.77
0.78	0.78	0.78
0.79	0.79	0.79
0.80	0.80	0.80
0.81	0.81	0.81
0.82	0.82	0.82
0.83	0.83	0.83
0.84	0.84	0.84
0.85	0.85	0.85
0.86	0.86	0.86
0.87	0.87	0.87
0.88	0.88	0.88
0.89	0.89	0.89
0.90	0.90	0.90
0.91	0.91	0.91
0.92	0.92	0.92
0.93	0.93	0.93
0.94	0.94	0.94
0.95	0.95	0.95
0.96	0.96	0.96
0.97	0.97	0.97
0.98	0.98	0.98
0.99	0.99	0.99
1.00	1.00	1.00



CAR ANTENNA CAPACITY--.000055 to
.000080 MFD

TUNING RANGE--540-1600 K. C.

Push button in and latch. Allow to return to normal position. Turn button until desired station is brought in. Do not hold button in while adjusting.

OLDSMOBILE MODEL 982283

"A" FUSE CONNECTOR

PUSH BUTTON SET-UP

©John F. Rider

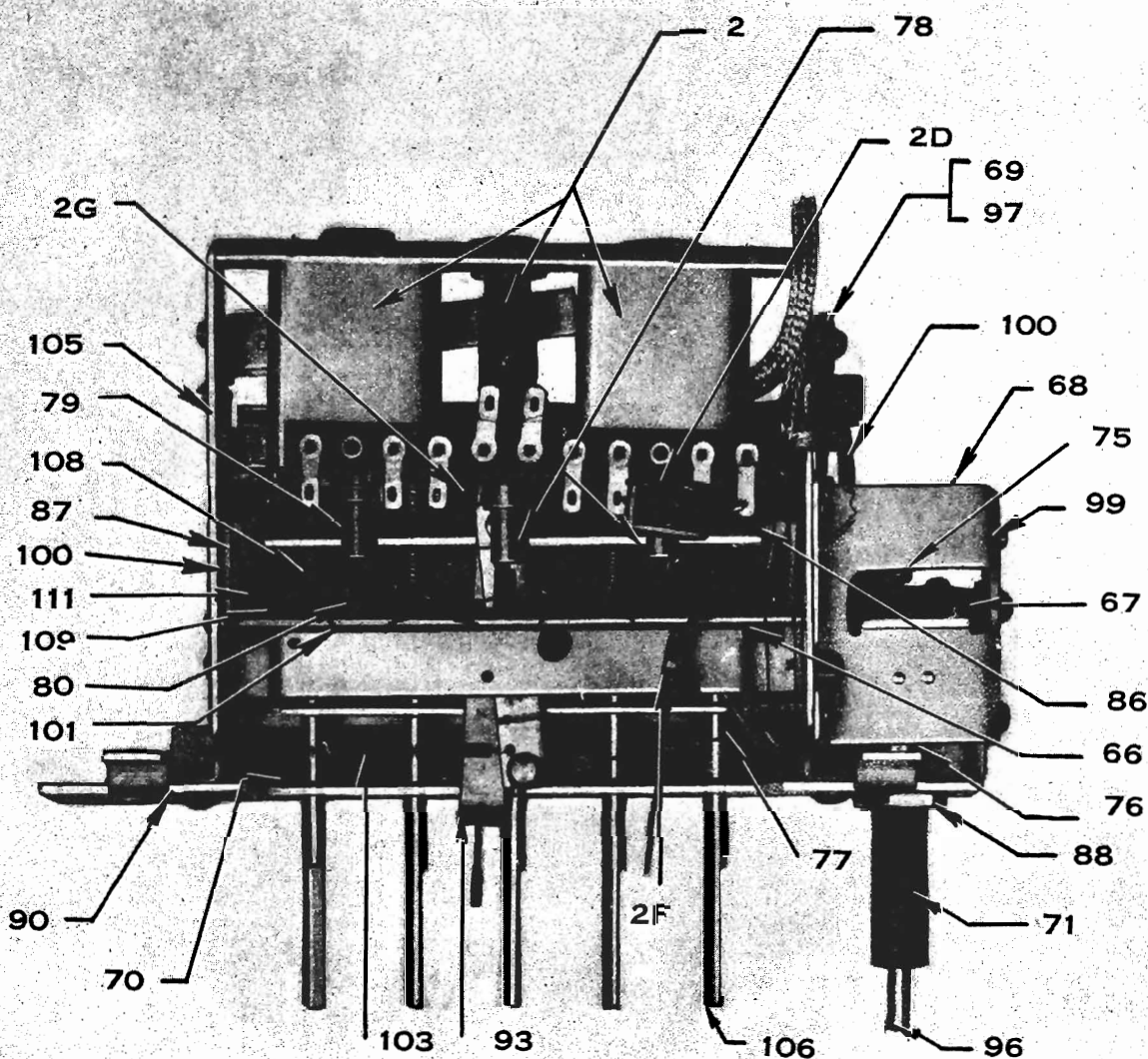
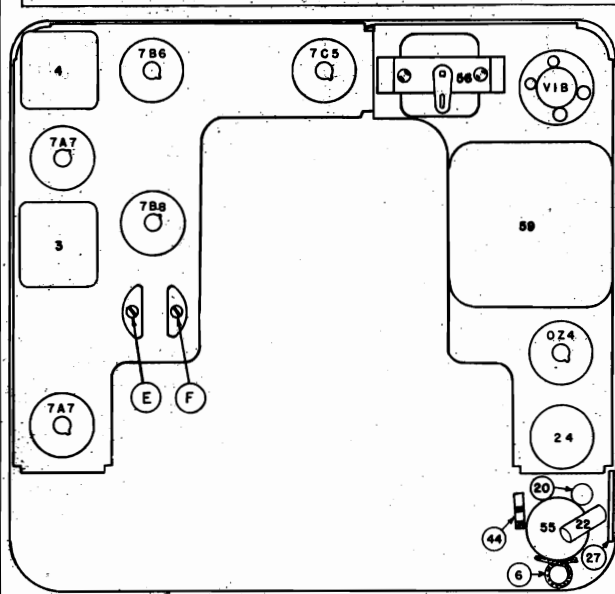
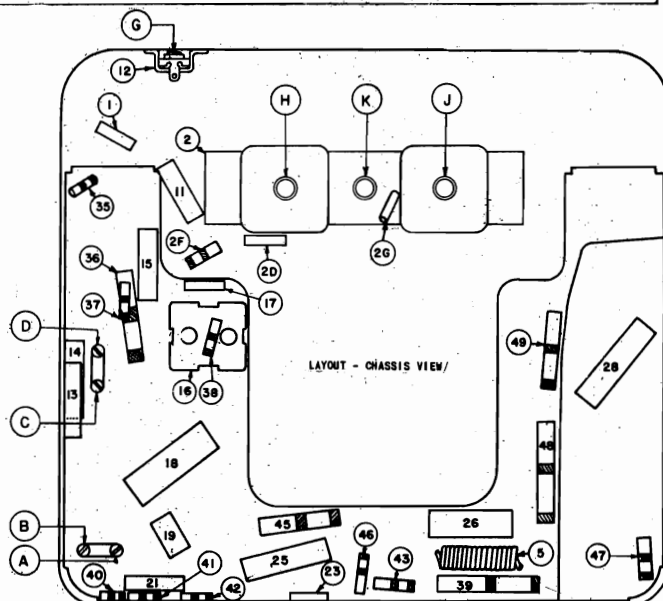


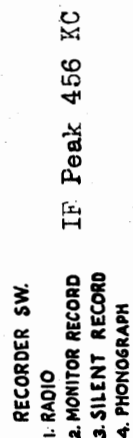
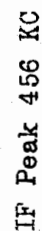
Fig. 5 - Tuning Control Unit - 982283



LAYOUT - TUBE VIEW



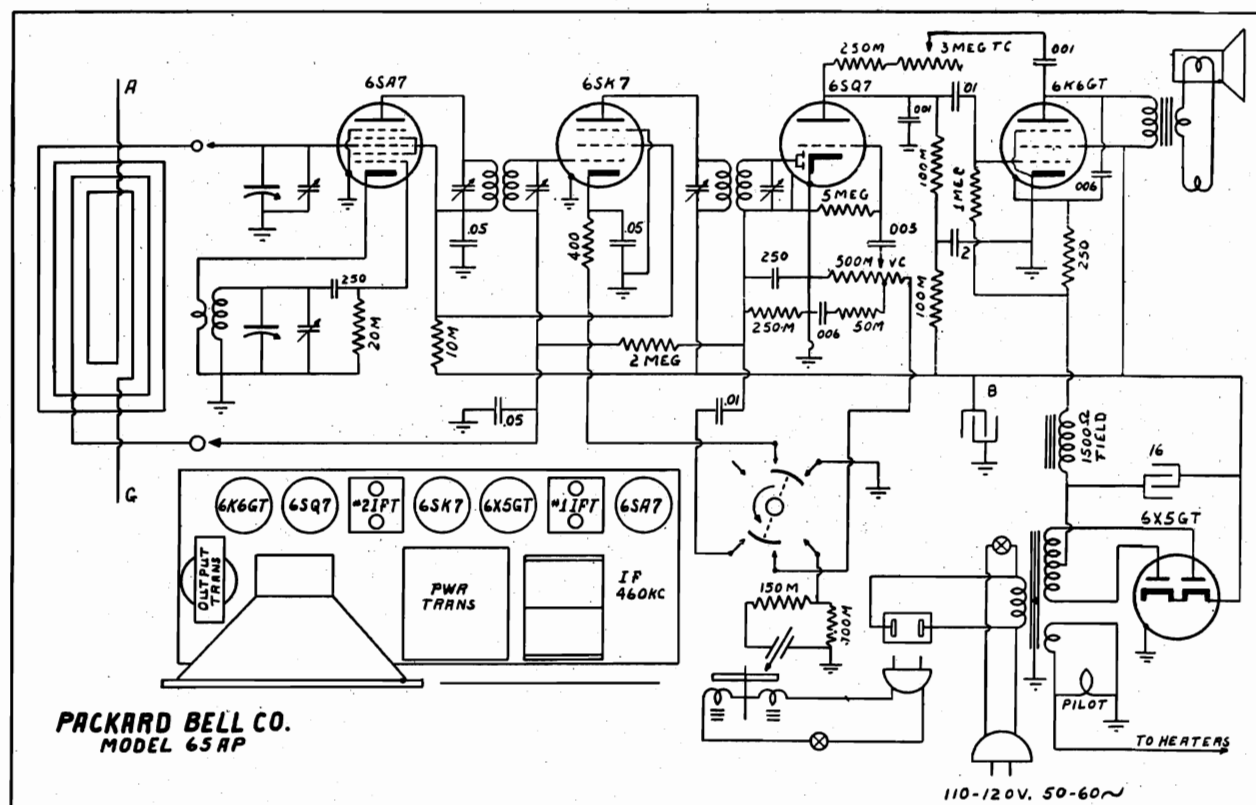
LAYOUT - CHASSIS VIEW



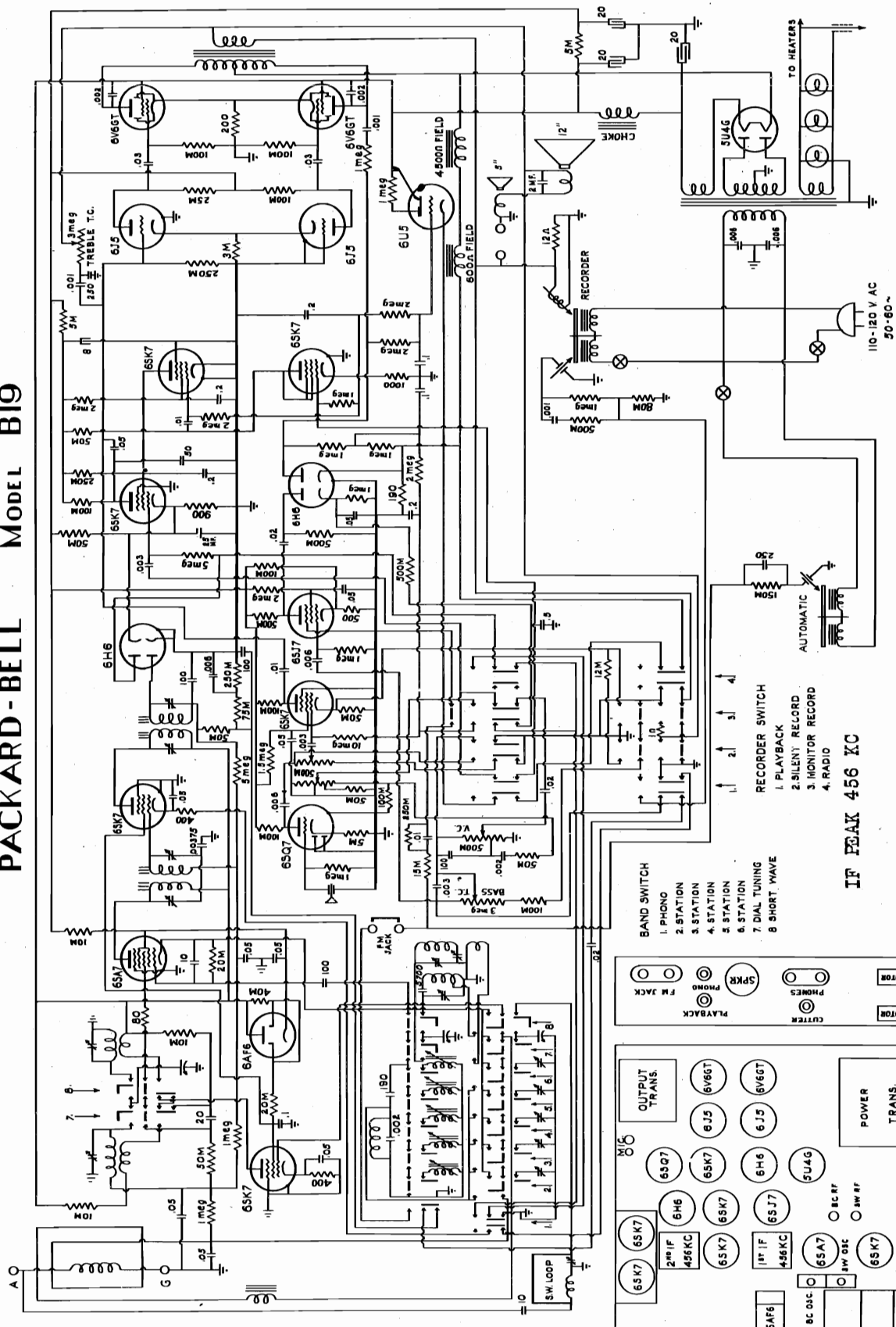
PACKARD - BELL CO.
MODEL 6B

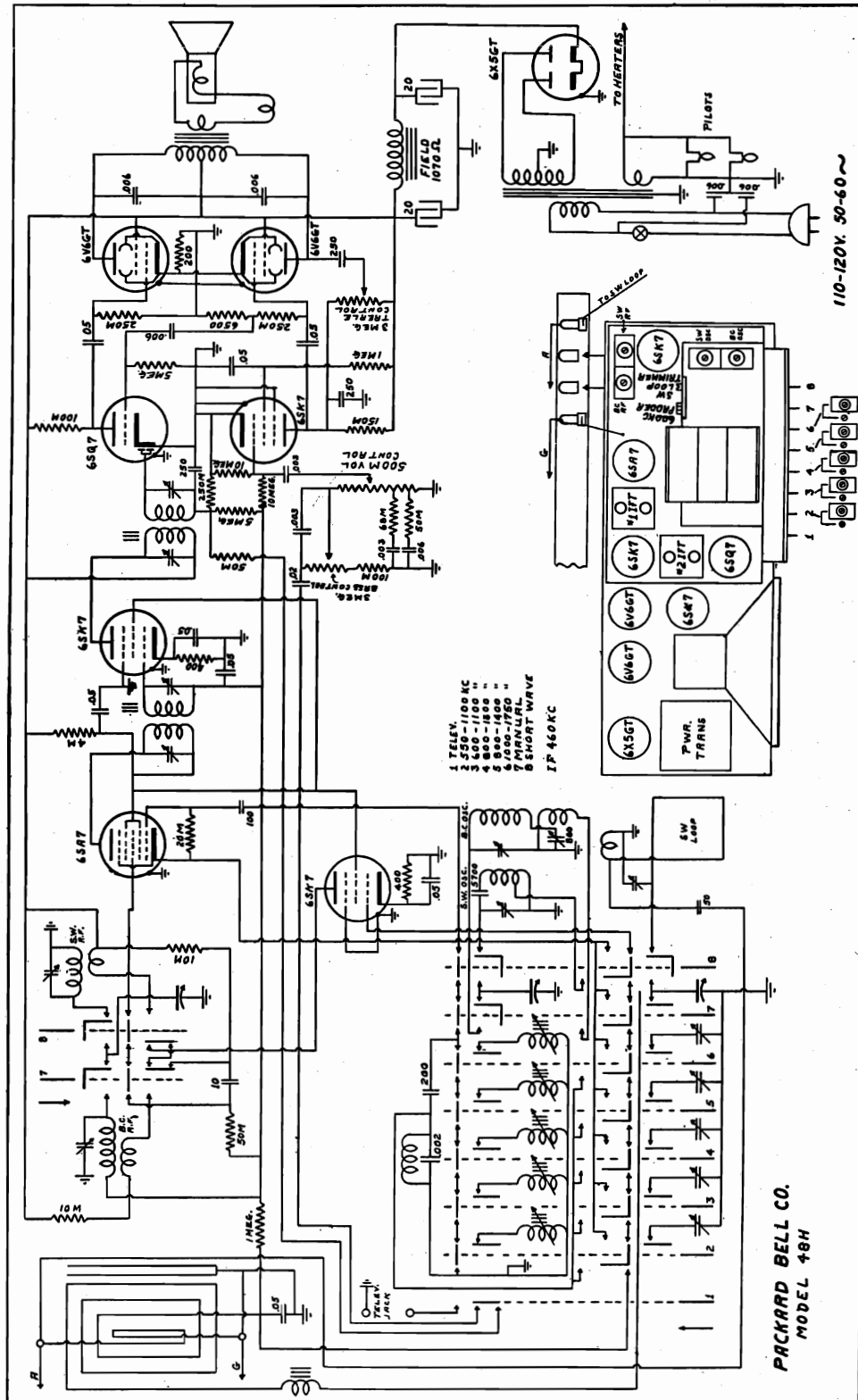
110-120 V AC-DC

125K7	
125A7	
125K7	1st IF 456 KC
125F7	2nd IF 456 KC
35L6GT	
35Z5GT	

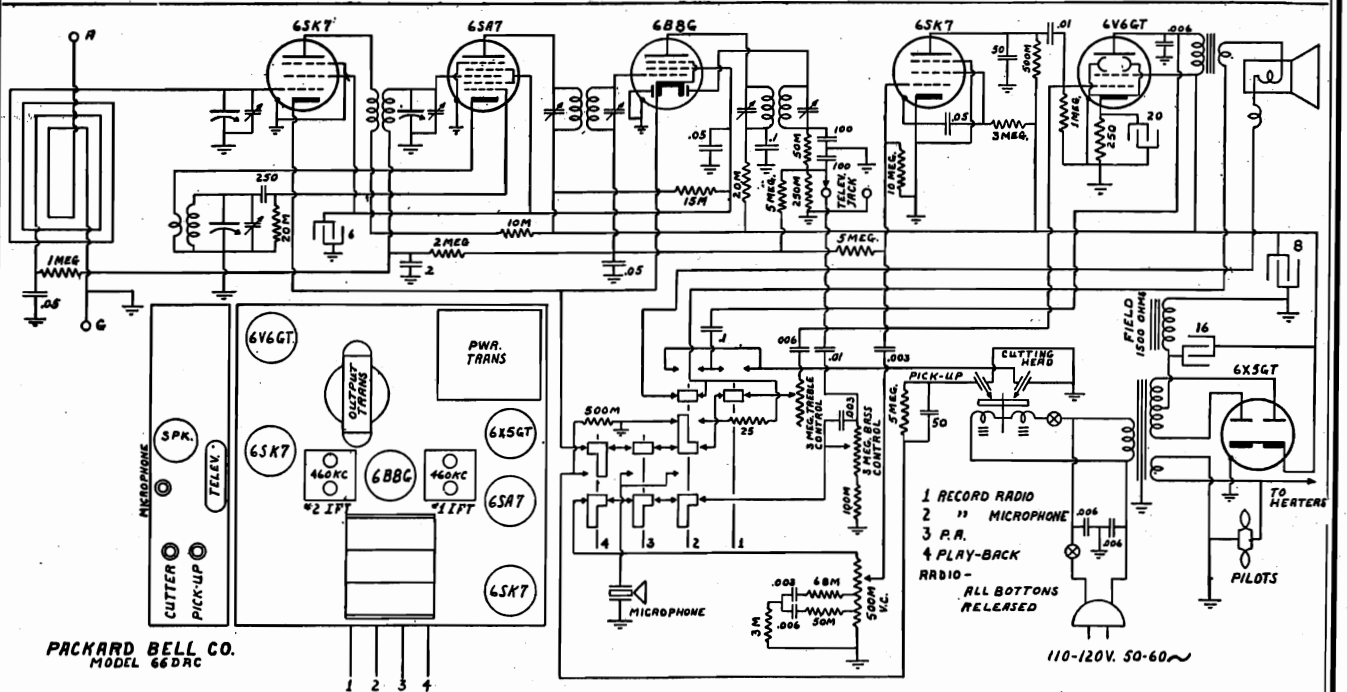


PACKARD-BELL



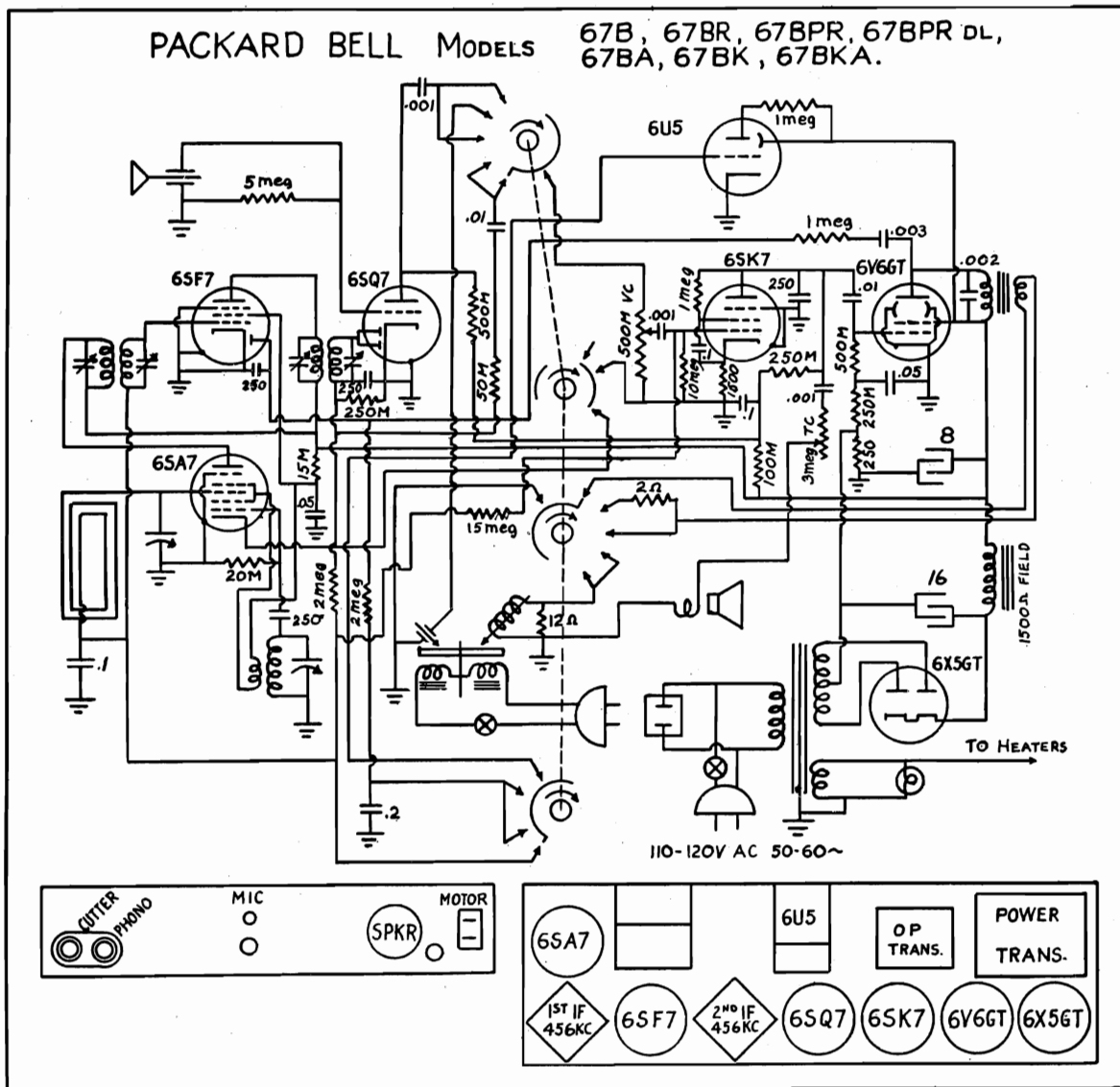
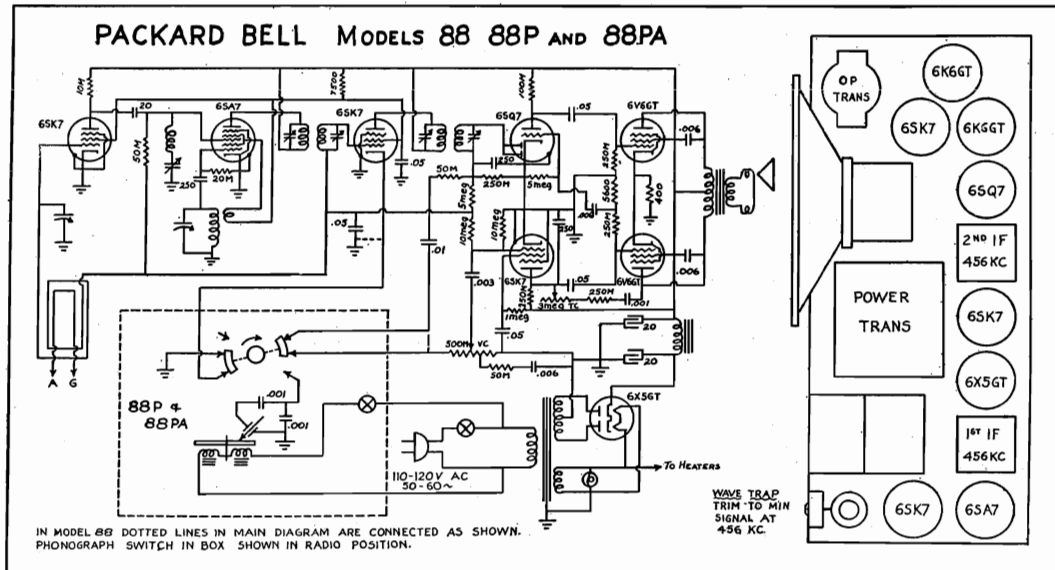


IF PEAK 460 KC



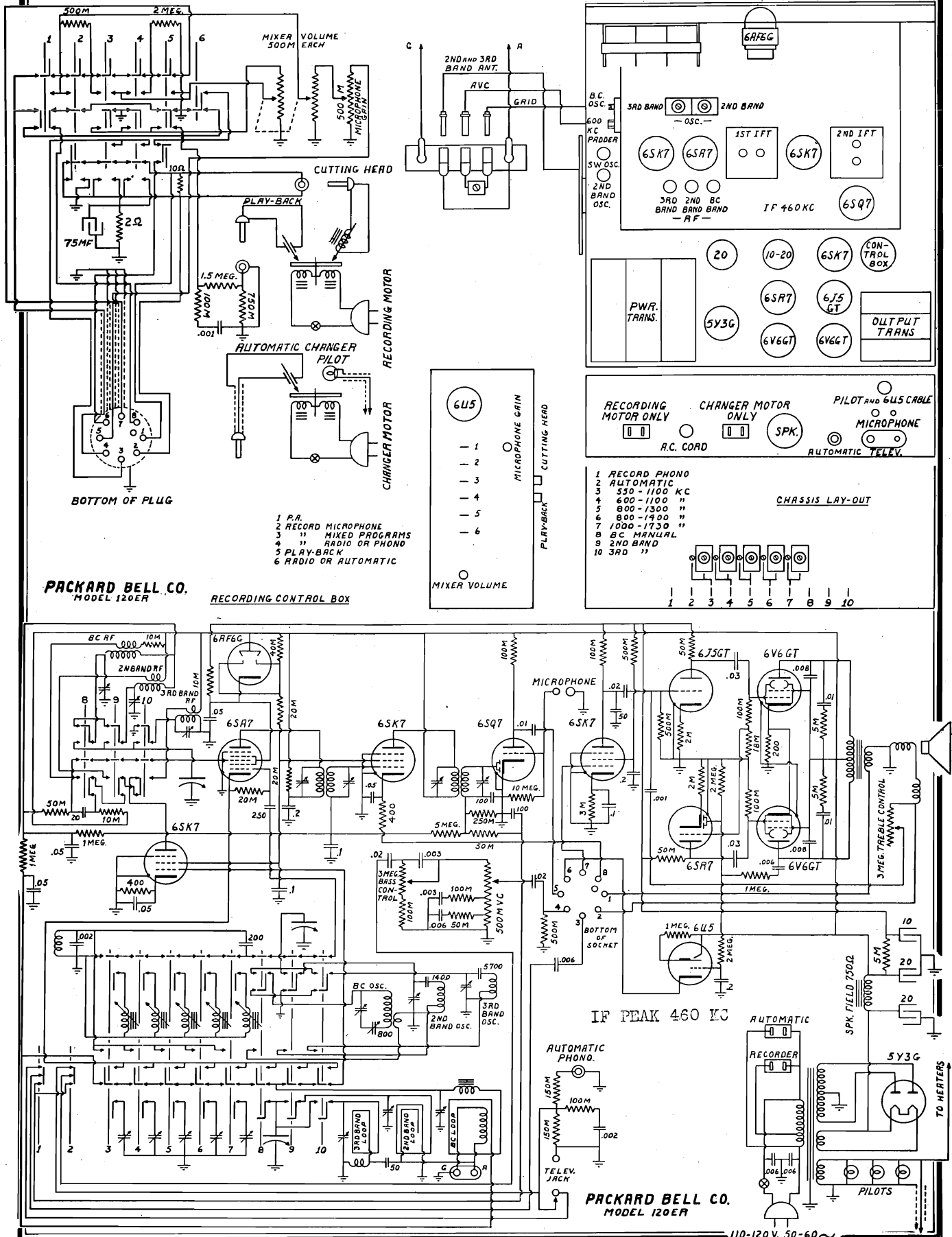
MODELS 67B, 67BA, 67BK, 67BKA,
67BPR, 67BPRDL, 67BR
MODELS 88, 88P, 88PA

PACKARD BELL CO.

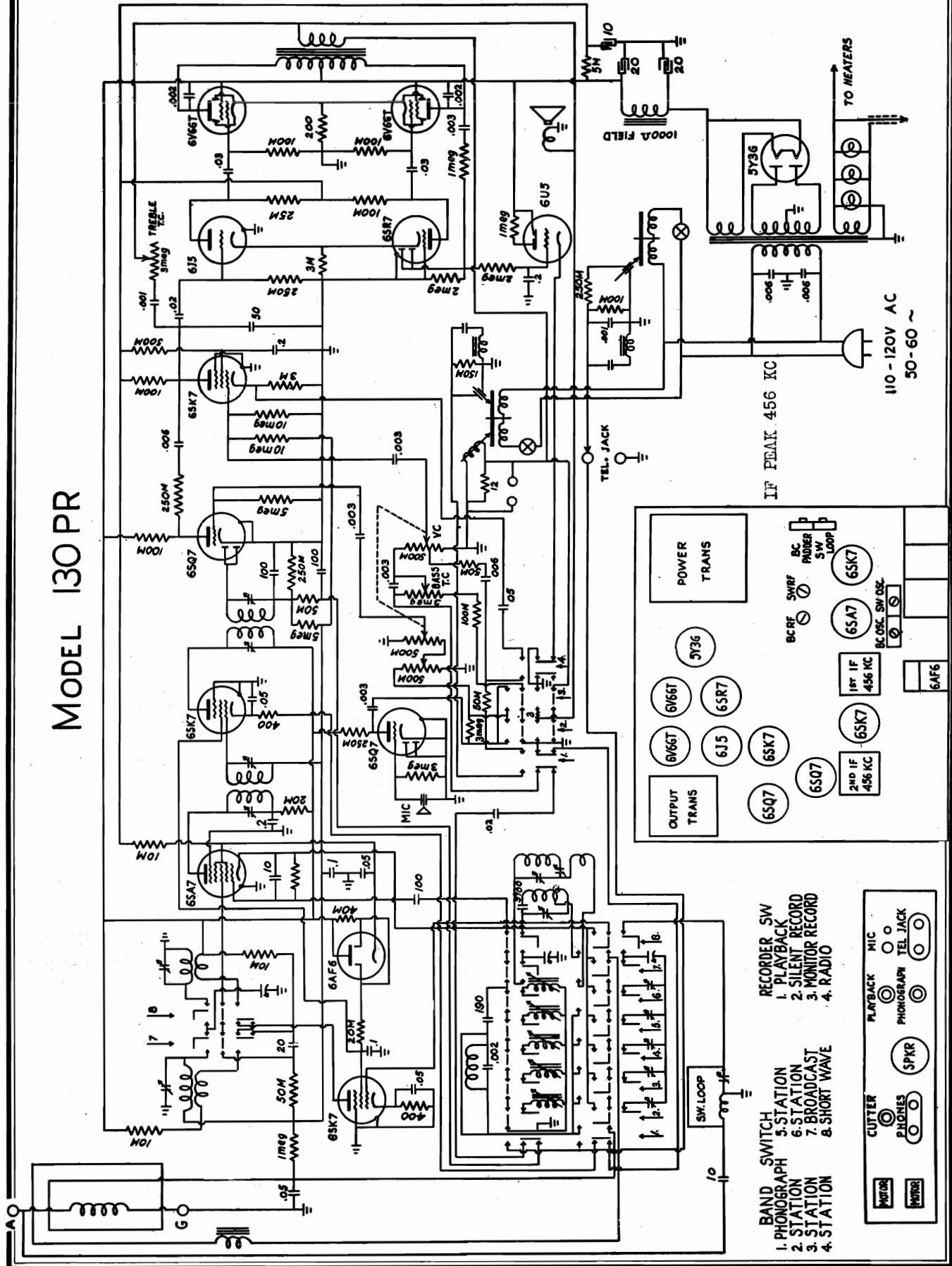


PACKARD BELL CO.

MODEL 120ER



MODEL 130 PR

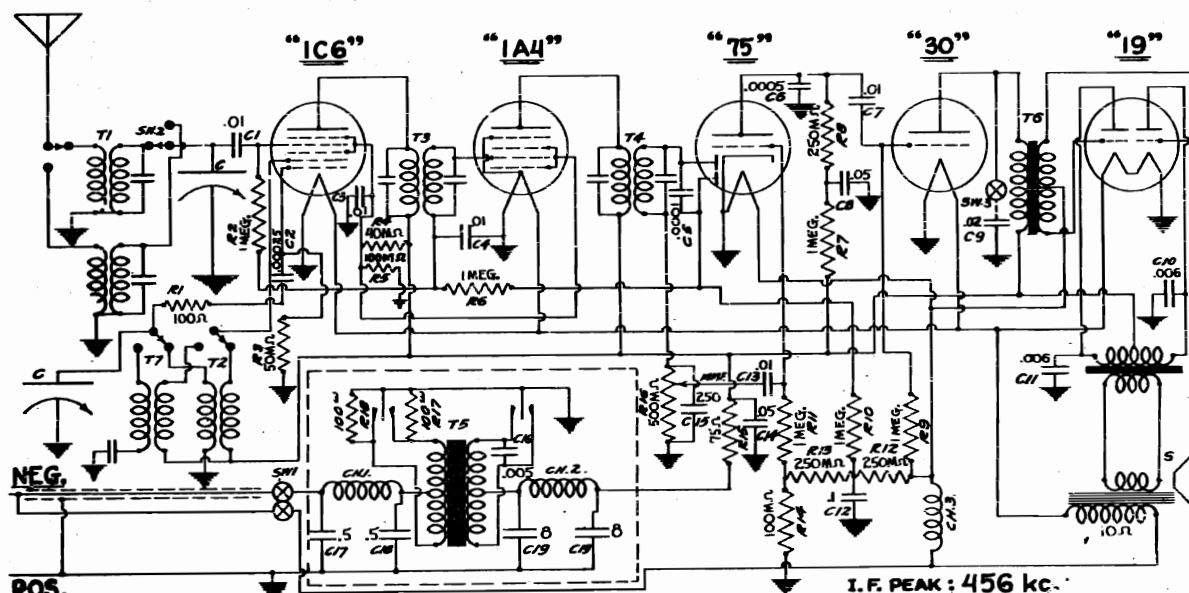




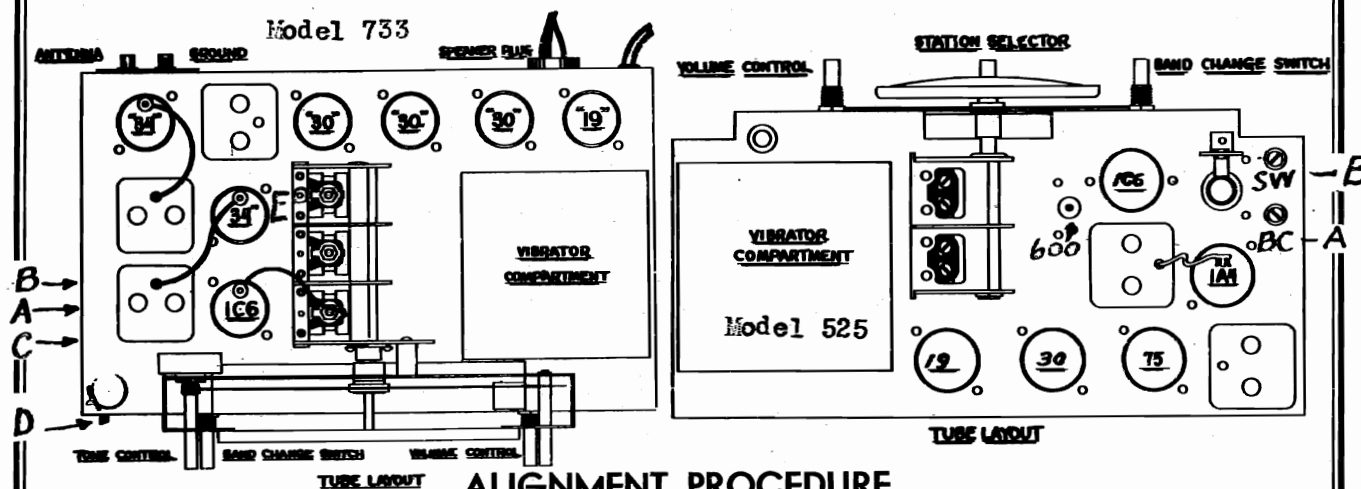
MODEL 525 1937 DeLuxe

MODEL 733 1937 Masterpiece

PARKER McCrORY MFG. CO.



1937 DELUXE MODEL 525



ALIGNMENT PROCEDURE

1937 Masterpiece Model 733

WARNING: The following information is to be used only by an experienced serviceman with the proper equipment. In most cases it is necessary only when set has been tampered with or damaged by accident.

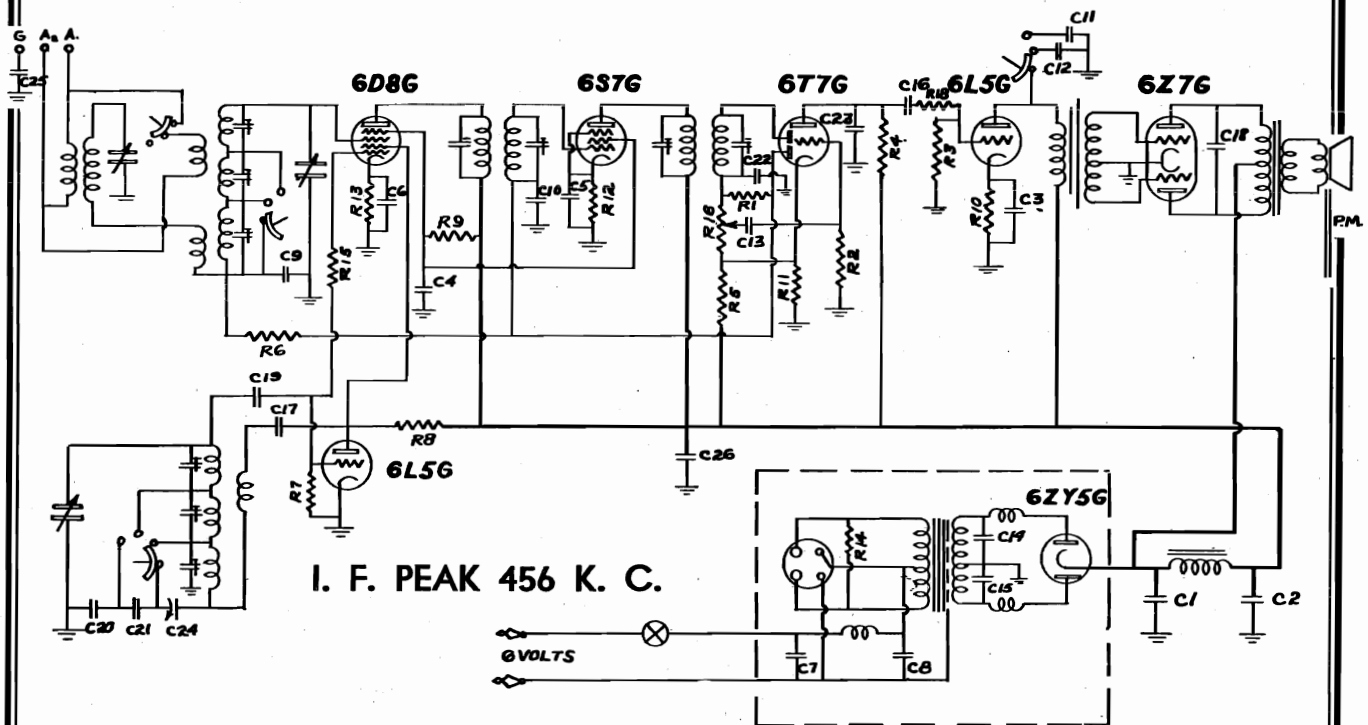
I.F. ALIGNMENT: Connect signal generator, through .00025 cond., to grid cap of 1C6 tube. Set signal generator at 456 K.C. (this must be accurate), dial pointer at 1700 K.C. Short out oscillator section (center section) of variable cond. gang. Connect suitable output meter across voice coil of loud speaker. (If output meter is not available it will be necessary to adjust by ear, using the loudest note from signal generator.) Increase attenuator until output meter shows deflection or a note is heard from signal generator. Carefully adjust I.F. transformer trimmers for greatest deflection of meter or loudest note from generator. Reduce generator output as intensity of signal increases as I.F.s are tuned nearer their original 456 K.C. setting. Signal should be just audible by ear. Go back over the adjustments to be sure they are correct. Remove short from oscillator section of variable cond. and adjustment is complete.

B.C.—R.F. ALIGNMENT: (1) Connect signal generator, through .00025 cond., to antenna post A1. Short wave switch in broadcast position. (2) Set signal generator and dial pointer to 1400 K.C. (3) Adjust osc. B.C. trimmer "A" (see diagram) for greatest deflection of meter or loudest note. (4) Set generator and dial pointer to 1400 K.C. Adjust antenna B.C. trimmer and trimmer "E" for greatest deflection of meter or loudest note. (5) Set generator and dial pointer to 600 K.C. Adjust trimmer "D" for greatest deflection or loudest note. (This adjustment is critical and must be accurate.) Rock cond. gang across 600 K.C. note while adjusting trimmer "D." Repeat adjustment at least twice to be sure it is correct.

POLICE AND AMATEUR BAND ADJUSTMENT: (1) Set switch in Police-Amateur position. Connect signal gen. to ant. post A1 through 400 ohm resistor. (2) Set gen. and dial pointer to 6 meg. (6000 K.C.). Carefully adjust trimmer "B" for greatest deflection or loudest note. Check adjustment with gen. and dial pointer at 2 meg. (2000 K.C.).

FOREIGN BAND ADJUSTMENT: (1) Set switch in Foreign position. Connect gen. to ant. post A1 through 400 ohm resistor. (2) Set generator and dial pointer to 18 meg. (18000 K.C.). This must be accurate. (3) Carefully adjust trimmer "C" and ant. S.W. trimmer for greatest deflection or loudest note. Check adjustment with gen. and dial pointer at 7 meg. (7000 K.C.). This completes all R.F. adjustments.

PARKER & McCORRY MFG. CO. MODEL 680 1938 Masterpiece



I. F. PEAK 456 K. C.

Top—Ant. B.C. Trim.
Center—Ant. Pol. Trim.
Bottom—Ant. SW. Trim.

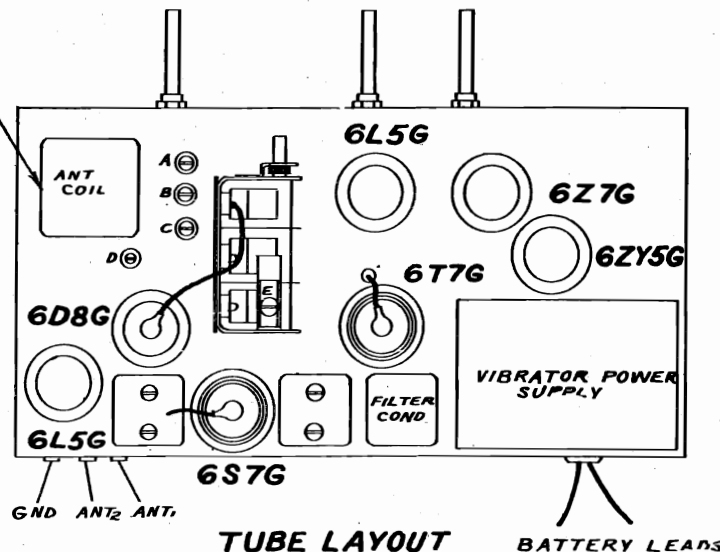
A—Osc. B.C. Trim.
B—Osc. Pol. Trim.
C—Osc. SW. Trim.
D—Osc. B.C. Pad.
E—Pres. B.C. Trim.

C1, C2-8.
C3-5.
C4, C5, C6-1-200V.
C7, C8-5-150V.
C9, C10-.05-200V.
C11-.03-400V.

C12, C13, C16-.01-400V.
C14, C15-.01-100V.
C17, C18-.003-400V.
C19-.0005 Ceramicon
C20-.004 Mica.
C21-.0018 Mica.

C22-.0001 Mica.
C23-.00025 Mica.
C24-.0006 Paddler.
C25-.05-200V.
C26-.1-400V

R1- 3 Megohms ¼W.
R2- 1 Megohms ¼W.
R3- ½ Megohms ¼W.
R4, R18- 150,000 ¼W.
R5, R6- 100,000 ¼W.
R15- 75 ¼W.
R7- 50,000 ¼W.
R8- 20,000 ¼W.
R9- 12,000 ¼W.
R10- 2,000 ¼W.
R16- 500,000 VC.
R11- 1,000 ¼W.
R12- 750 ¼W.
R13- 500 ¼W.
R14- 200 ¼W.
R17- 500,000 1-10W.



ALIGNMENT PROCEDURE

WARNING: The following information is to be used only by an experienced serviceman with the proper equipment. In most cases it is necessary only when set has been tampered with or damaged by accident.

I.F. ALIGNMENT: Connect signal generator, through .00025 cond., to grid cap of 6D8 tube. Set signal generator at 456 K.C. (this must be accurate), dial pointer at 1700 K.C. Short out oscillator section (center section) of variable cond. gang. Connect suitable output meter across voice coil of loud speaker. (If output meter is not available it will be necessary to adjust by ear, using the loudest note from signal generator.) Increase attenuator until output meter shows deflection or a note is heard from signal generator. Carefully adjust I.F. transformer trimmers for greatest deflection of meter or loudest note from generator. Reduce generator output as intensity of signal increases as I.F.s are tuned nearer their original 456 K.C. setting. Signal should be just audible by ear. Go back over the adjustments to be sure they are correct. Remove short from oscillator section of variable cond. and adjustment is complete.

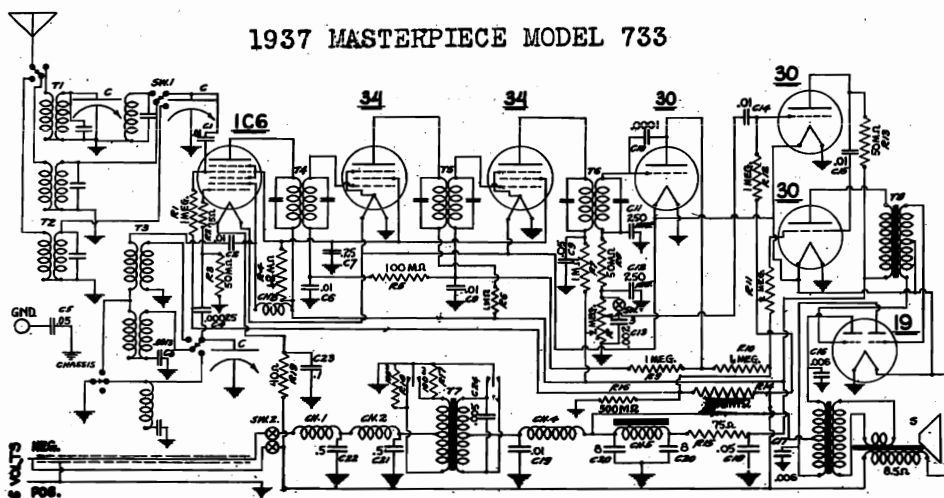
B.C.—R.F. ALIGNMENT: (1) Connect signal generator, through .00025 cond., to antenna post A1. Short wave switch in broadcast position. (2) Set signal generator and dial pointer to 1700 K.C. (3) Adjust osc. B.C. trimmer "A" (see diagram) for greatest deflection of meter or loudest note. (4) Set generator and dial pointer to 1400 K.C. Adjust antenna B.C. trimmer and trimmer "E" for greatest deflection of meter or loudest note. (5) Set generator and dial pointer to 600 K.C. Adjust trimmer "D" for greatest deflection or loudest note. (This adjustment is critical and must be accurate.) Rock cond. gang across 600 K.C. note while adjusting trimmer "D." Repeat adjustment at least twice to be sure it is correct.

POLICE AND AMATEUR BAND ADJUSTMENT: (1) Set switch in Police-Amateur position. Connect signal gen. to ant. post A1 through 400 ohm resistor. (2) Set gen. and dial pointer to 6 meg. (6000 K.C.). Carefully adjust trimmer "B" for greatest deflection or loudest note. Check adjustment with gen. and dial pointer at 2 meg. (2000 K.C.).

FOREIGN BAND ADJUSTMENT: (1) Set switch in Foreign position. Connect gen. to ant. post A1 through 400 ohm resistor. (2) Set generator and dial pointer to 18 meg. (18000 K.C.). This must be accurate. (3) Carefully adjust trimmer "C" and ant. S.W. trimmer for greatest deflection or loudest note. Check adjustment with gen. and dial pointer at 7 meg. (7000 K.C.). This completes all R.F. adjustments.

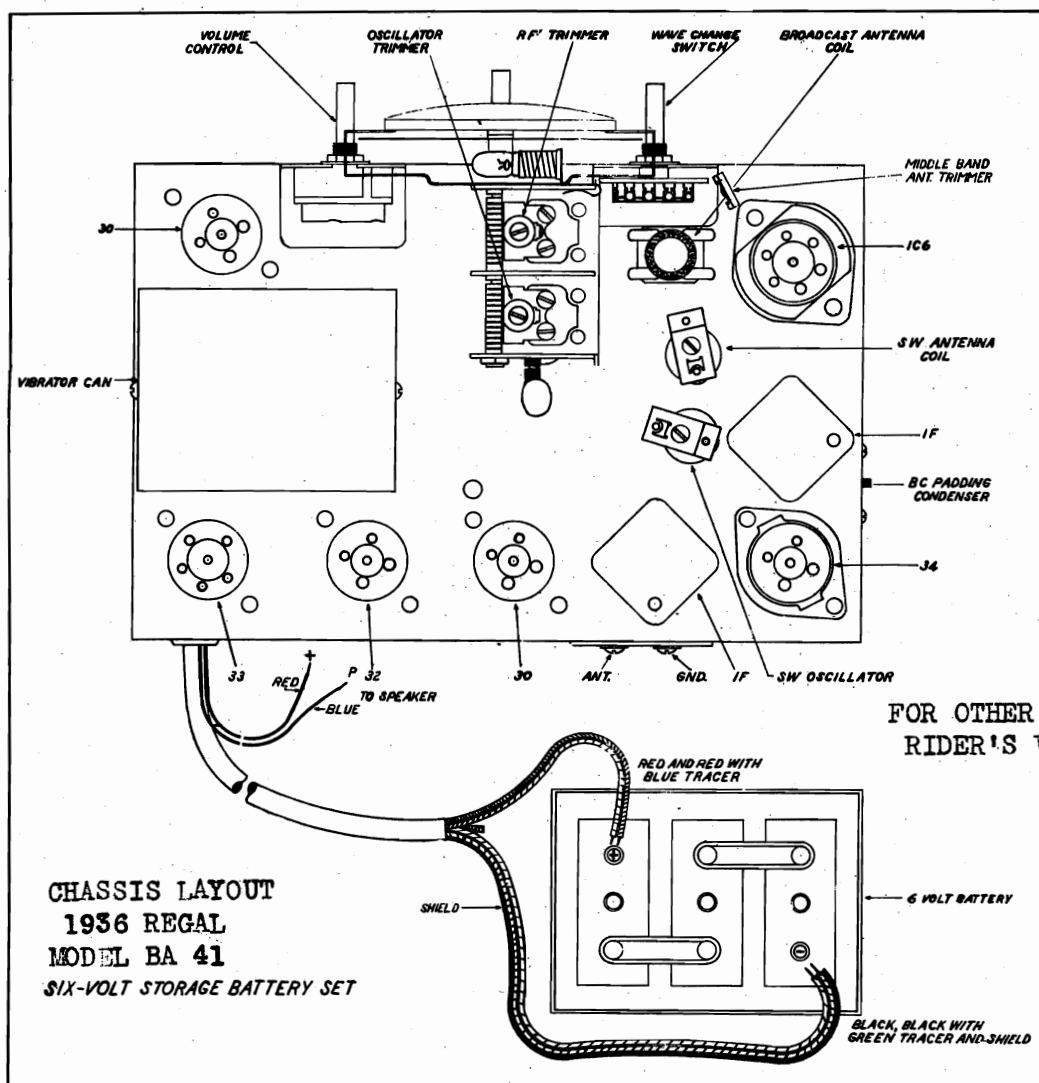
MODEL 733 1937 Masterpiece
MODEL BA41 1936 Regal

PARKER McCRORY MFG. CO.



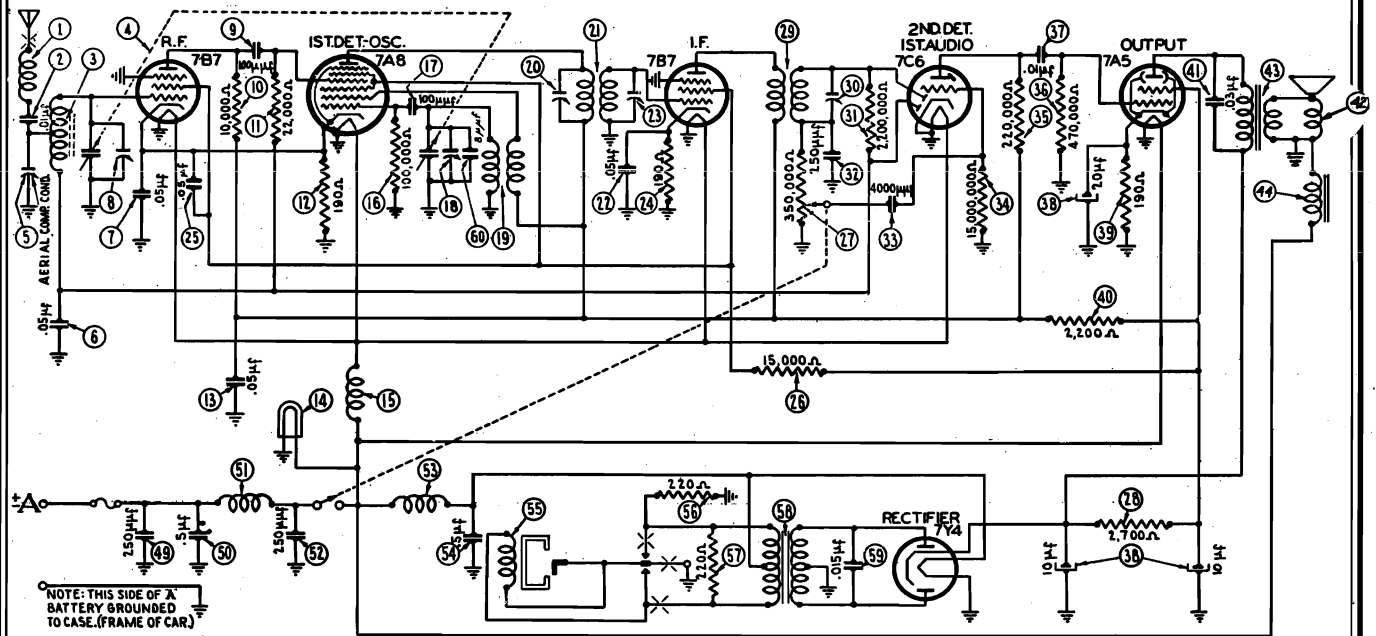
I.F. 456 KC

FOR OTHER DATA SEE INDEX



FOR OTHER DATA SEE
RIDER'S VOL.XII

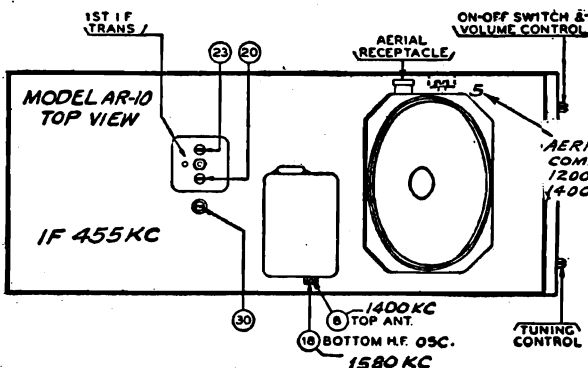
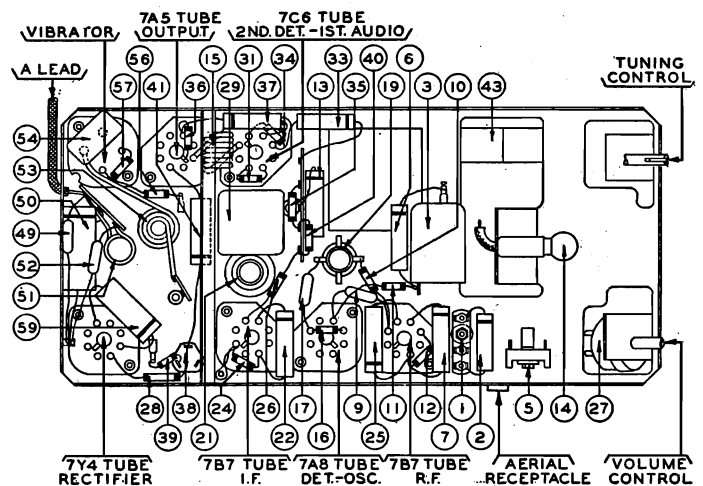
PHILCO RADIO & TELEVISION CORP.



PARTS LIST — AR-10

No.	Description	Part No.	Description	Part No.
1	Antenna Choke	65-0102	Condenser (.03 Mfd.)	61-0119
2	Condenser (.01 Mfd.)	61-0114	Replacement Cone	
3	Antenna Transformer	65-0196	(For 73-0027-1)	91-0076
4	Tuning Condenser	63-0028	(For 73-0027-2)	91-0077
5	Aerial Compensator	63-0030	Output Transformer	65-0258
6	Condenser (.05 Mfd.)	61-0101	Field Coil (Not Replaceable)	
7	Condenser (.05 Mfd.)	61-0111	Condenser (250 Mmfd.)	60-125157
8	Antenna Padder (on Tun. Cond.)	61-0111	Condenser (.5 Mfd.)	61-0106
9	Condenser (100 Mmfd.)	60-110157	"A" Choke	32-2477
10	Resistor (10,000 ohms)	33-310154	Condenser (250 Mmfd.)	60-125157
11	Resistor (22,000 ohms)	33-322154	Vibrator Choke	65-0204
12	Resistor (190 ohms)	33-119336	Condenser (.5 Mfd.)	61-0137
13	Condenser (.05 Mfd.)	61-0111	Vibrator	83-0025
14	Pilot Lamp	69-0004	Resistor (220 ohms)	33-122334
15	Filament Choke	65-0158	Resistor (220 ohms)	33-122334
16	Resistor (100,000 ohms)	33-410154	Power Transformer	65-0183
17	Condenser (100 Mmfd.)	60-110157	Condenser (.015 Mfd.)	61-0138
18	Oscillator Padder (on Tun. Cond.)	61-0111	Condenser (8 Mmfd.)	60-008337
19	Oscillator Transformer	65-0194	Tuning & Volume Knob	77-0765
20	Padder (Pri. 1st I. F. Trans.)	65-0191	Dial	55-1200
21	First I. F. Transformer	65-0191	Dial Cord (16 1/2")	55-0588
22	Condenser (.05 Mfd.)	61-0111	(5 3/4")	55-0589
23	Padder (Sec. 1st I. F. Trans.)	61-0111	(13 3/4")	55-0652
24	Resistor (190 ohms)	33-119336	(7 3/4")	55-0653
25	Condenser (.05 Mfd.)	61-0111	Pointer	57-1940
26	Resistor (15,000 ohms)	33-315334	Tuning Shaft	57-1802
27	Volume Control (350,000 ohms)	33-227434	Window Crystal	55-0501
28	& On-Off Switch	67-0020	Speaker Unit	73-0027
29	Resistor (2,700 ohms)	33-227434	Tube Side Cover	57-0791FC59
30	Second I. F. Transformer	65-0192	Wiring Side Cover	77-0561FC59
31	Padder (Sec. 1st I. F. Trans.)	61-0111	Back Strap	28-5998FA3
32	Resistor (2,200,000 ohms)	33-522154	Mounting Bracket	57-0812FC59
33	Condenser (250 Mmfd.)	60-125157	Cover Screws	W1586FA3
34	Condenser (4,000 Mmfd.)	61-0128	Front Screws	97-0111FA3
35	Resistor		Fuse Lead	77-0235
36	(15,000,000 ohms)	33-615154	Fuse	45-2559
37	Resistor (220,000 ohms)	33-422154	Vibrator Socket	27-6044
38	Resistor (470,000 ohms)	33-447154	Loktal Socket	55-0575
39	Condenser (.01 Mfd.)	61-0120	Pilot Lamp Assembly	77-0342
40	Filter Condenser		"A" Lead	77-0217
41	(10-10-20 Mfd.)	61-0068	Interference Condenser	30-4007
42	Resistor (190 ohms)	33-119336	Distributor Resistor	33-1196
43	Resistor (2,200 ohms)	33-222334	Bolt (Radio Mtg.)	W1318FA3

I.F. = 455KC



Signal Generator Connection	Dummy Antenna	Signal Generator Frequency	Receiver Wave-band Switch	Receiver Dial Setting	Trimmer Number
Ant. recept.	0.1 mf	455 kc	...	Note 2	Note 1
"	"	"	...	"	30
"	"	"	...	"	23
"	"	"	...	"	20
"	"	"	...	"	30
"	"	"	...	"	23
"	"	"	...	"	20
Note 3	30 mmf	1580 kc	...	"	18
"	"	1400 kc	...	1400 kc	8 4
"	...	...	...	1200-1400 kc	5 5

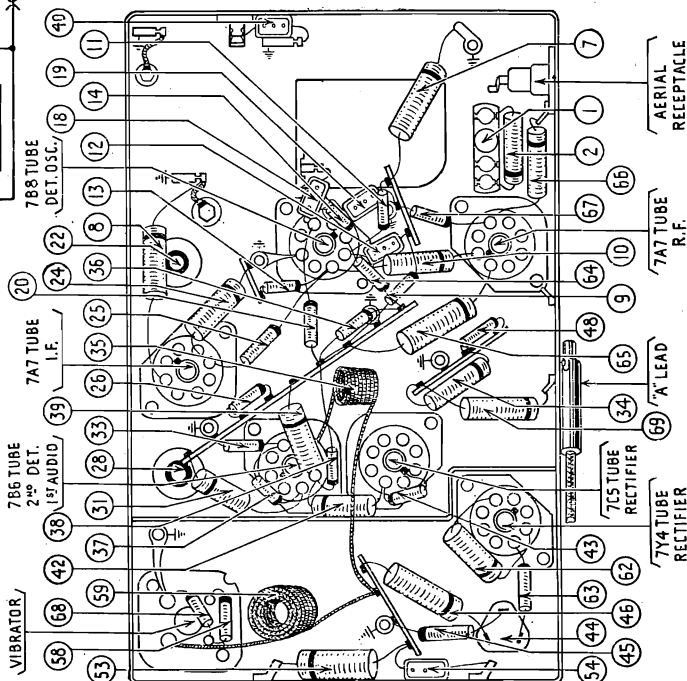
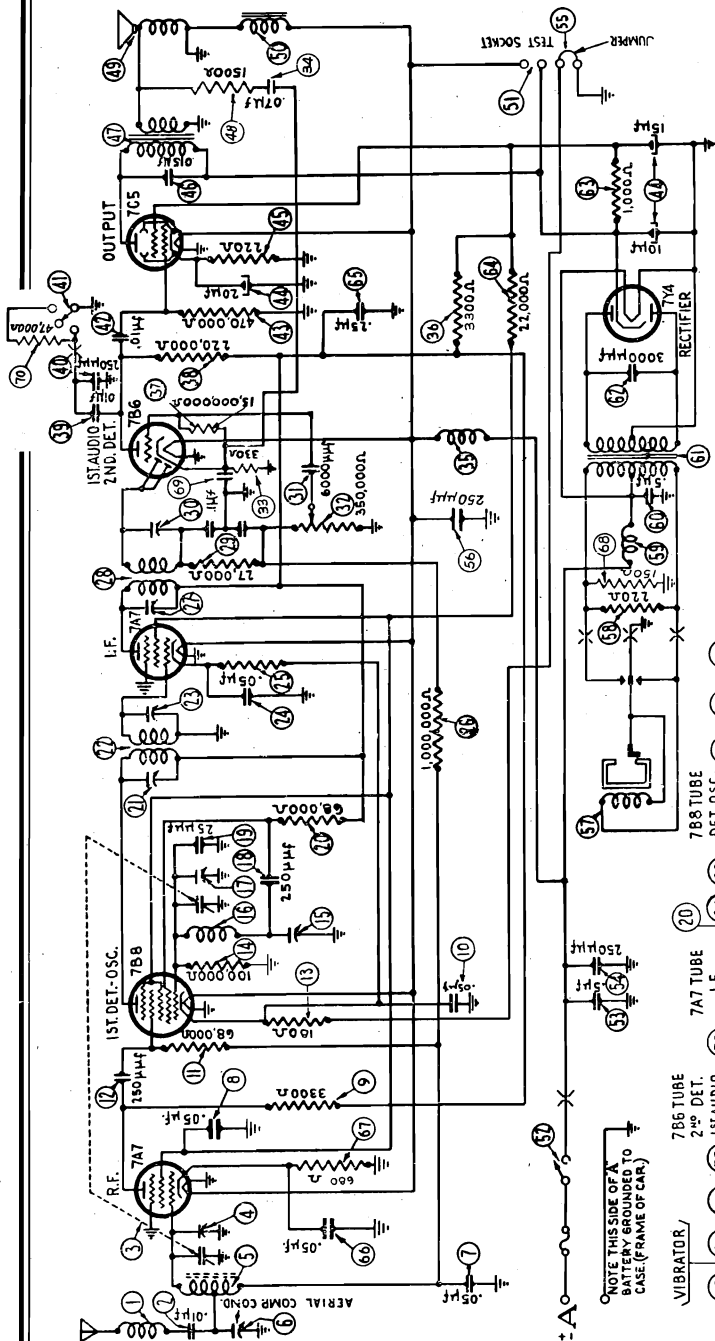
- Note 1.—Adjust antenna compensator (5) two turns from tight position.
- Note 2.—Turn condenser rotor plates completely out of mesh as far as they will go.
- Note 3.—Connect antenna lead, Part No. 95-0185, to antenna receptacle in the radio. Connect a 30 mmf condenser in series between signal generator and antenna lead.
- Note 4.—When antenna stage adjustment is made with radio installed in car, the radio antenna lead must be connected to car antenna in usual manner. Connect signal generator output lead to a wire placed near car antenna but not connected to it.
- Note 5.—After installing radio in car, tune in a weak broadcast signal between 1200 and 1400 kc. Remove plug button on side of radio and adjust antenna compensator (5) for maximum signal.

PHILCO RADIO & TELEVISION CORP.

SCHEMATIC MODEL

AR-40

I.F. = 455 KC



- Resistor (470 ohms) 33-147536
- Resistor (1,000,000 ohms) 33-510154
- Padder (Pri. 2nd I. F. Trans.) 33-510154
- Second I. F. Transformer 85-0320
- Resistor (27,000 ohms) 33-327154
- Padder (Sec. 2nd I. F. Trans.) 33-510155
- Condenser (8000 Mmfd.) 61-0155
- Volume Control (350,000 ohms) 67-0043
- Resistor (330 ohms) 33-133334
- Condenser (.07 Mfd.) 61-0152
- Filament Choke 32-2729
- Resistor (3300 ohms) 33-233334
- Resistor (15,000,000 ohms) 33-615154
- Condenser (220,000 ohms) 33-423334
- Condenser (.01 Mfd.) 61-0114
- Condenser (250 Mmfd.) 60-125157
- Tone Control Switch Wafer 77-0733
- Condenser (.01 Mfd.) 61-0120
- Resistor (470,000 ohms) 33-447154
- Filter Condenser (10-15-20 Mfd.) 61-0089
- Resistor (220 ohms) 33-122436
- Condenser (.015 Mfd.) 61-0104
- Output Transformer 65-0419
- Resistor (1500 ohms) 33-215334
- Replacement Cone (For 73-0059-4 Speaker) 91-0209
- Field Coil (For 73-0059-9 Speaker) 91-0213
- Test Socket Not Replaceable
- On-Off Switch 55-1118
- Condenser (.5 Mfd.) 61-0106
- Condenser (250 Mmfd.) 60-125157
- Test Link 57-1121
- Condenser (250 Mmfd.) 60-125157
- Vibrator 33-0025
- Resistor (220 ohms) 33-122434
- Vibrator Choke 65-0075
- Condenser (.5 Mfd.) 61-0137
- Power Transformer 65-0318
- Condenser (3000 Mmfd.) 61-0115
- Resistor (1000 ohms) 33-210434
- Resistor (22,000 ohms) 33-324334
- Condenser (.25 Mfd.) 61-0125
- Condenser (.05 Mfd.) 61-0101
- Resistor (800 ohms) 33-168336
- Resistor (150 ohms) 33-105334
- Condenser (.1 Mfd.) 61-0152
- Resistor (47,000 ohms) 33-347334
- Radio Housing 77-0731FC31
- Control Assembly 85-0134
- Dial 55-1194
- Drive Cord 55-0935
- Drive Cord Spring 57-1423FA3
- Tuning Shaft 57-1385
- Volume Shaft 57-1384
- Pointer 57-1899FCP
- Tone Control Lead 95-0135
- Hook Bolt (Radio Mtg.) 57-1340FA3
- Lockwasher (Radio Mtg.) W166FE7
- Nut (Radio Mtg.) W98FA3
- Speaker Unit 73-0059
- Speaker Cover 57-1943FC51
- Wiring Side Cover 57-1345FC51
- Interference Condenser 30-4007
- Distributor Resistor 33-1196
- Lokalt Socket 55-0575
- Vibrator Socket 27-6153
- Control Shaft Clamp 57-1429FA38

- | No. | Description | Part No. |
|-----|-------------------------------------|-------------|
| 1 | Antenna Choke | 65-0102 |
| 2 | Condenser (.01 Mfd.) | 61-0114 |
| 3 | Tuning Condenser | 63-0047 |
| 4 | Antenna Transformer (on Tun. Cond.) | 65-0420 |
| 5 | Oscillator Padder (on Tun. Cond.) | 60-125157 |
| 6 | Condenser (250 Mmfd.) | 60-025337 |
| 7 | Resistor (68,000 ohms) | 33-368334 |
| 8 | Padder (Pri. 1st I. F. Trans.) | 33-510155 |
| 9 | Resistor (3300 ohms) | 33-233334 |
| 10 | Condenser (.05 Mfd.) | 61-0101 |
| 11 | Resistor (800 ohms) | 33-168336 |
| 12 | Condenser (.1 Mfd.) | 61-0152 |
| 13 | Resistor (47,000 ohms) | 33-347334 |
| 14 | Radio Housing | 77-0731FC31 |
| 15 | Control Assembly | 85-0134 |
| 16 | Dial | 55-1194 |
| 17 | Drive Cord | 55-0935 |
| 18 | Drive Cord Spring | 57-1423FA3 |
| 19 | Tuning Shaft | 57-1385 |
| 20 | Volume Shaft | 57-1384 |
| 21 | Pointer | 57-1899FCP |
| 22 | Tone Control Lead | 95-0135 |
| 23 | Hook Bolt | 57-1340FA3 |
| 24 | Lockwasher (Radio Mtg.) | W166FE7 |
| 25 | Nut (Radio Mtg.) | W98FA3 |
| 26 | Speaker Unit | 73-0059 |
| 27 | Speaker Cover | 57-1943FC51 |
| 28 | Wiring Side Cover | 57-1345FC51 |
| 29 | Interference Condenser | 30-4007 |
| 30 | Distributor Resistor | 33-1196 |
| 31 | Lokalt Socket | 55-0575 |
| 32 | Vibrator Socket | 27-6153 |
| 33 | Control Shaft Clamp | 57-1429FA38 |

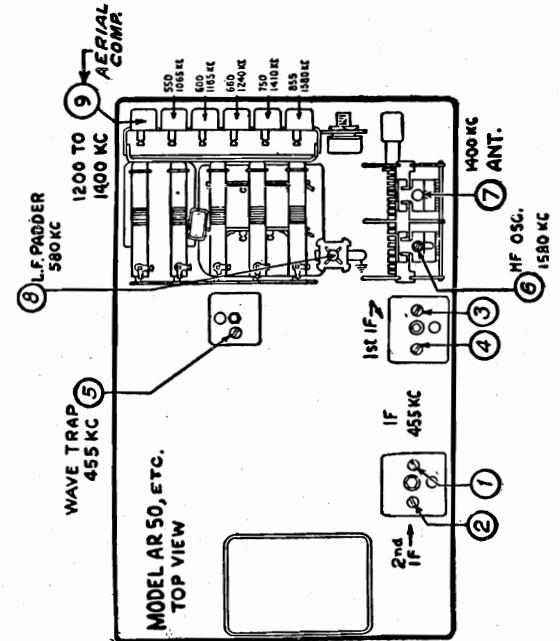
PHILCO RADIO & TELEVISION CORP.

MODEL AR-40
MODEL AR-45
MODEL AR-50
MODEL AR-55
MODEL AR-75

MODELS AR-50, AR-55, AR-75

Signal Generator Connection	Dummy Antenna	Signal Generator Frequency	Receiver Wave-band Switch	Receiver Dial Setting	Trimmer Number
Ant. recept.	0.1 mf	455 kc	...	Note 1	Note 2
"	"	"	...	"	1
"	"	"	...	"	2
"	"	"	...	"	3
"	"	"	...	"	4
"	"	"	...	"	1
"	"	"	...	"	2
"	"	"	...	"	3
"	"	"	...	"	4
"	"	"	...	"	5 ⁴
"	"	"	...	"	6
"	"	"	...	"	7 ⁶
"	"	"	...	"	8*
"	"	"	...	"	Note 3
"	"	"	...	"	1400 kc
"	"	"	...	"	1400 kc
"	"	"	...	"	580 kc
"	"	"	...	"	1200-1400 kc
"	"	"	...	"	9 ⁷

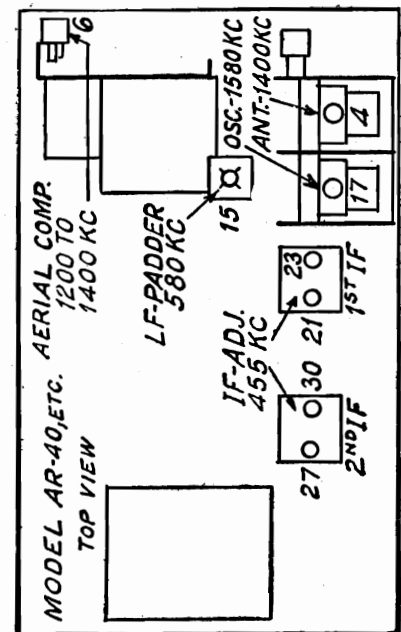
Note 1.—Push in right knob on the control until "D" appears in station indicator window so stations can be tuned in by manual tuning.
Note 2.—Adjust antenna compensator (9) two turns from tight position.
Note 3.—Turn condenser rotor plates completely out of mesh as far as they will go.
Note 4.—Adjust (5) for minimum output signal.
Note 5.—Connect antenna lead, Part No. 95-0185, to antenna receptacle in radio.
Note 6.—When antenna stage adjustment is made with radio installed in car, the radio antenna lead must be connected to car antenna in usual manner.



MODELS AR-40, AR-45

Signal Generator Connection	Dummy Antenna	Signal Generator Frequency	Receiver Wave-band Switch	Receiver Dial Setting	Trimmer Number
Ant. recept.	0.1 mf	455 kc	...	Note 1	Note 2
"	"	"	...	"	30
"	"	"	...	"	27
"	"	"	...	"	23
"	"	"	...	"	21
"	"	"	...	"	30
"	"	"	...	"	27
"	"	"	...	"	23
"	"	"	...	"	21
"	"	"	...	"	17
"	"	"	...	"	4 ⁴
"	"	"	...	"	15*
"	"	"	...	"	Note 2
"	"	"	...	"	1400 kc
"	"	"	...	"	1400 kc
"	"	"	...	"	580 kc
"	"	"	...	"	1200-1400 kc
"	"	"	...	"	6 ⁵

Note 1.—Adjust aerial compensator (6) two turns from tight position.
Note 2.—Turn condenser rotor plates completely out of mesh as far as they will go.
Note 3.—Connect antenna lead, Part No. 95-0185, to antenna receptacle in radio.
Note 4.—When antenna stage adjustment is made with radio installed in car, the radio antenna lead must be connected to car antenna in usual manner.
Note 5.—After installing radio in the car, tune in a weak broadcast signal between 1200 and 1400 kc and adjust aerial compensator (6) for maximum signal.
* While rocking.

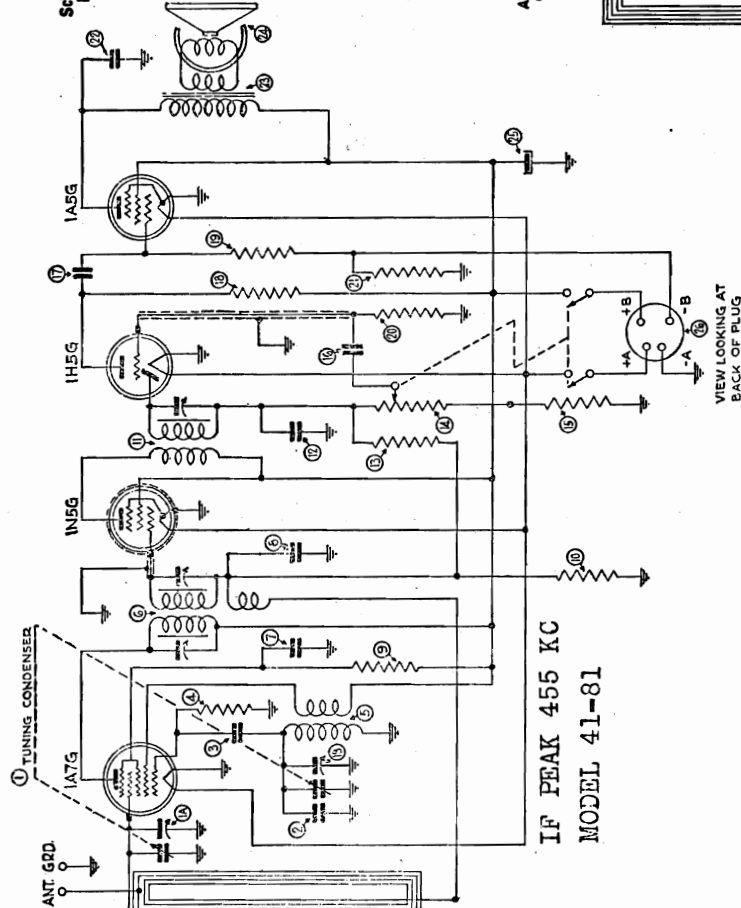


MODEL 41-81
MODEL 41-83

PHILCO RADIO & TELEVISION CORP.

REPLACEMENT PARTS PHILCO MODEL 41-83

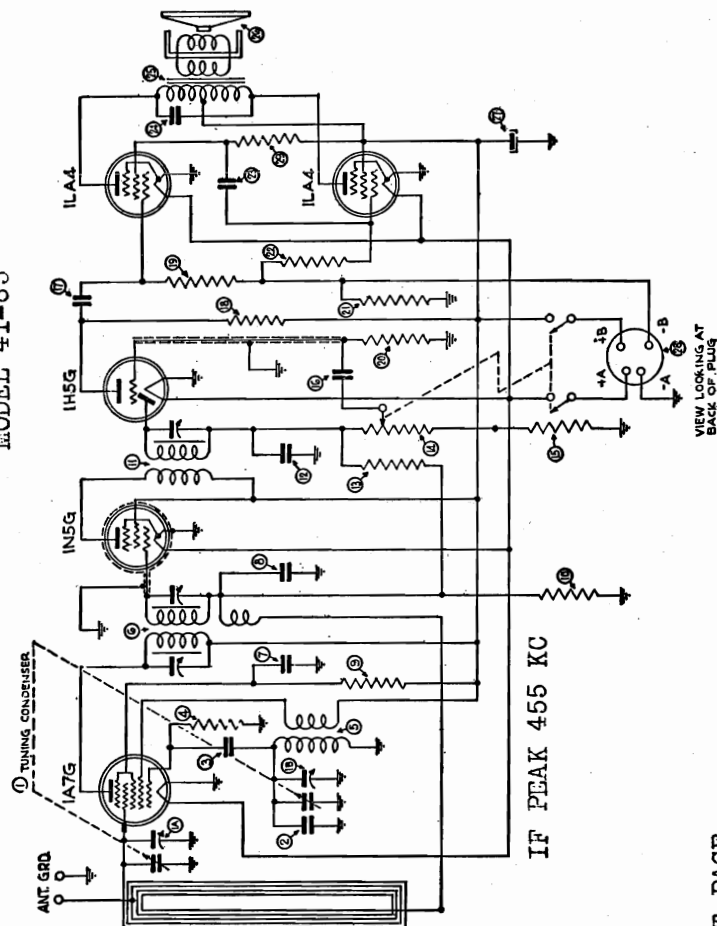
Schem. No.	Description	Philco Part No.
1	Tuning Condenser	31-2455 16
2	Mica Condenser	60-010157 17
3	Mica Condenser	60-111157 18
4	Resistor (220,000 ohms 1/4 watt)	33-422154 19
5	Oscillator Transformer	32-3425 20
6	1st I.F. Transformer	32-3265 21
7	Tubular Condenser (.01 mf. 400v)	30-4572 22
8	Tubular Condenser (.05 mf. 200v)	30-4519 23
9	Resistor (33,000 ohms 1/4 watt)	33-333154 24
10	Resistor (4.7 meg. 1/4 watt)	33-547154 25
11	2nd I.F. Transformer	32-3266 26
12	Mica Condenser (250 mmf.)	60-125157 27
13	Resistor (10 meg. 1/4 watt)	33-610154 28
14	Volume Control (1 meg.)	33-5389 29
15	Resistor (6800 ohms 1/4 watt)	33-268344



REPLACEMENT PARTS PHILCO MODEL 41-81

Schem. No.	Description	Philco Part No.
1	Tuning Condenser	31-2455 14
2	Mica Condenser (10 mmf.)	60-010157 15
3	Mica Condenser (110 mmf.)	60-111157 16
4	Resistor (220,000 ohms 1/4 watt)	33-422154 17
5	Oscillator Transformer	32-3425 18
6	1st I.F. Transformer	32-3265 19
7	Tubular Condenser (.01 mf. 400v)	30-4572 20
8	Tubular Condenser (.05 mf. 200v)	30-4519 21
9	Resistor (33,000 ohms 1/4 watt)	33-333154 22
10	Resistor (4.7 meg. 1/4 watt)	33-547154 23
11	2nd I.F. Transformer	32-3266 24
12	Mica Condenser (250 mmf.)	60-125157 25
13	Resistor (10 meg. 1/4 watt)	33-610154 26

MODEL 41-83



FOR OTHER DATA SEE NEXT PAGE

REPLACEMENT PARTS PHILCO MODEL 41-84

MODEL 41-81
MODEL 41-83
MODEL 41-84

REPLACEMENT PARTS PHILCO MODEL 41-84

Schem. No.	Description	Philco Part No.
1	Tuning Condenser	31-2438
2	Padder	31-6846
3	Mica Condenser (.110 mmf.)	60-11157
4	Mica Condenser (.110 mmf.)	60-11157
5	Resistor (220,000 ohms 1/2 watt)	33-422154
6	Resistor (1 meg. 1/2 watt)	33-510154
7	Tubular Condenser (.05 mf. 400 V)	30-4518
8	Resistor (3300 ohms 1/2 watt)	33-333334
9	Oscillator Transformer	32-3424
10	Tubular Condenser (.0015 mf. 200 V)	30-4555
11	Tubular Condenser (.1 mf. 400 V)	30-4455
12	1st I. F. Transformer	32-3384
13	2nd I. F. Transformer	32-3266
14	Mica Condenser (.110 mmf.)	30-11157
15	Resistor (4.7 meg. 1/2 watt)	33-547154
16	Tubular Condenser (.1 mf. 400 V)	30-4455
17	Tubular Condenser (.05 mf. 400 V)	30-4518
18	Resistor (3300 ohms 1/2 watt)	33-233334
19	Tubular Condenser (.25 mf. 400 V)	30-4604
20	Tubular Condenser (.01 mf. 400 V)	30-4572
21	Resistor (3300 ohms 1/2 watt)	33-233334

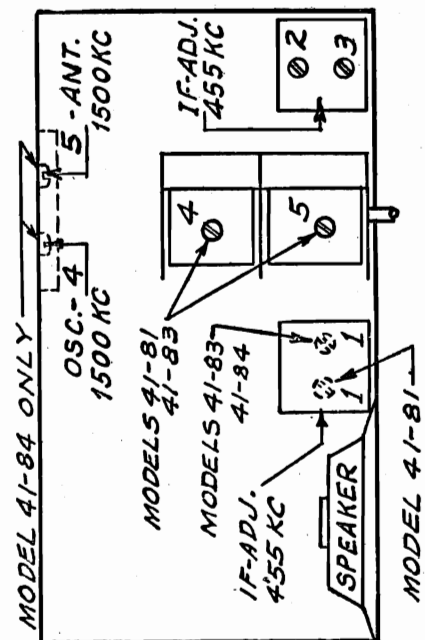
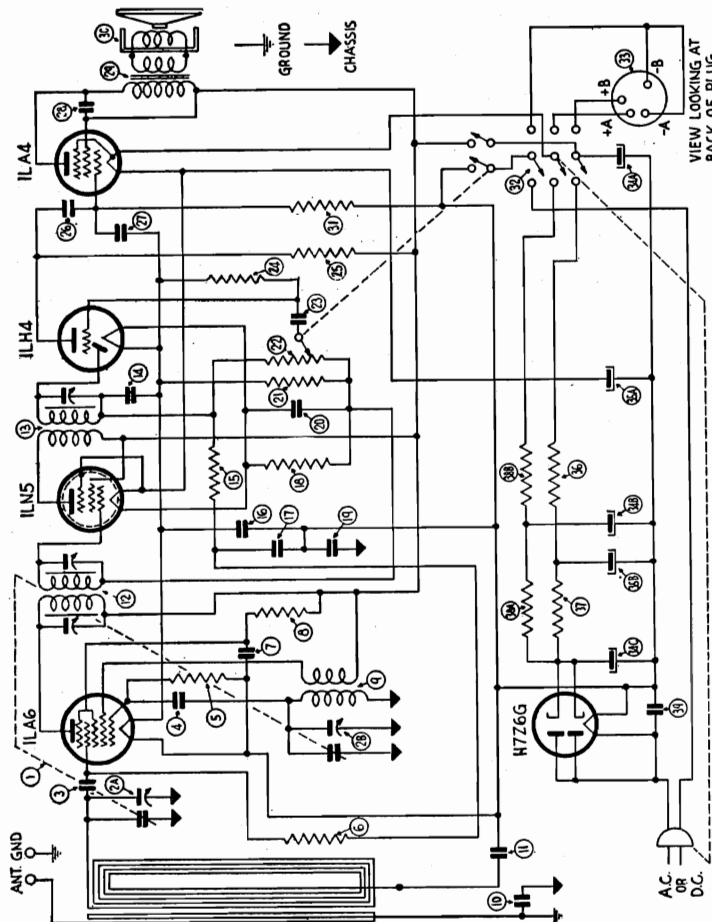
Schem. No.	Description	Philco Part No.
22	Volume Control (1 meg.)	33-5390
23	Tubular Condenser (.05 mf. 400 V)	30-4572
24	Resistor (4.7 meg. 1/2 watt)	33-547154
25	Resistor (1 meg. 1/2 watt)	33-510154
26	Tubular Condenser (.01 mf. 400 V)	30-4572
27	Mica Condenser (.110 mmf.)	60-11157
28	Mica Condenser (.660 mmf.)	60-166127
29	Output Transformer	32-8100
30	Speaker	36-1506
31	Resistor (2.2 meg. 1/2 watt)	33-522154
32	Automatic Switch	42-1553
33	Battery Cable	41-3526
34	Electrolytic Condenser (20 mf. 10 mf. 150 V)	30-2452
35	Electrolytic Condenser (20 mf. 25 V 10 mf. 150 V)	30-2453
36	Resistor (1500 ohms 1/2 watt)	33-215334
37	Resistor (1500 ohms 1/2 watt)	33-215334
38	Filament Resistors (1500 ohms 1000 ohms)	33-3387
39	Tubular Condenser (.05 mf. 400 V)	30-4518

MODELS 41-81, 41-83, 41-84,

Signal Generator Connection	Dummy Antenna	Signal Generator Frequency	Receiver Wave-band Switch	Receiver Dial Setting	Trimmer Number
Control grid of 1A7G	0.1 mf	455 kc	...	fully closed	1
"	"	"	...	"	2
"	"	"	...	"	3
"	"	1500 kc	...	1500 kc	4
"	"	"	...	"	5

Note 1.—DIAL CALIBRATION: With tuning-condenser at maximum-capacity position (fully closed), set tuning pointer on small dot at low-frequency end of scale.

Note 2.—Construct loop aerial of several turns of wire, and connect to signal-generator output terminals—place near receiver loop.



MODEL 41-85

PHILCO RADIO & TELEVISION CORP.

MODELS 41-85

Signal Generator Connection	Dummy Antenna	Signal Generator Frequency	Receiver Wave-band Switch	Receiver Dial Setting	Trimmer Number
Note 1	0.1 mf	455 kc	B.C.	540 ^a	1
"	"	"	"	"	2
..... Note 3	"	1500 kc	"	"	3
"	"	"	"	"	Note 4
"	"	580 kc	"	"	Note 5
"	"	1500 kc	"	"	6, *
"	"	"	"	"	Note 4
"	"	6 mc	S.W.	"	Note 5
"	"	15 mc	"	"	7, *
"	"	"	"	"	8
"	"	"	"	"	14,090 mc Image check
"	"	"	"	"	9

Note 1.—When adjusting i-f trimmers, the high side of signal-generator is connected through 0.1 mf condenser to loop-section stator lug of tuning-condenser.

Note 2.—DIAL CALIBRATION: With tuning-condenser fully closed (maximum capacity), set dial pointer on small dot below 880 kc.

Note 3.—When aligning r-f trimmers, a loop antenna is made from a few turns of wire and connected to signal-generator output terminals; this loop being placed a few feet from receiver loop.

Note 4.—Trimmer (4) on Model 41-85 or (5) on Model 41-861.

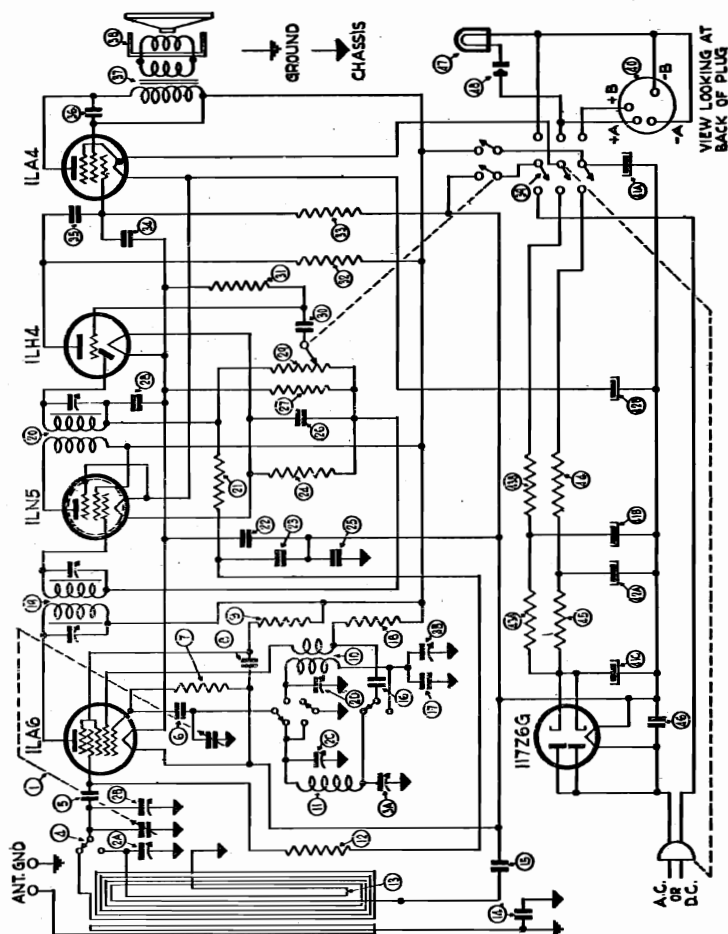
Note 5.—Trimmer (5) on Model 41-85 or (4) on Model 41-861.

Note 6.—Trimmer (6) is nut adjustment.

Note 7.—Trimmer (7) is screw adjustment.

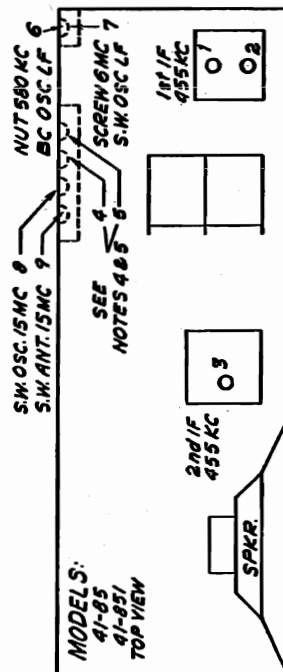
Note 8.—Adjust to maximum on fundamental-signal peak.

* While rocking.

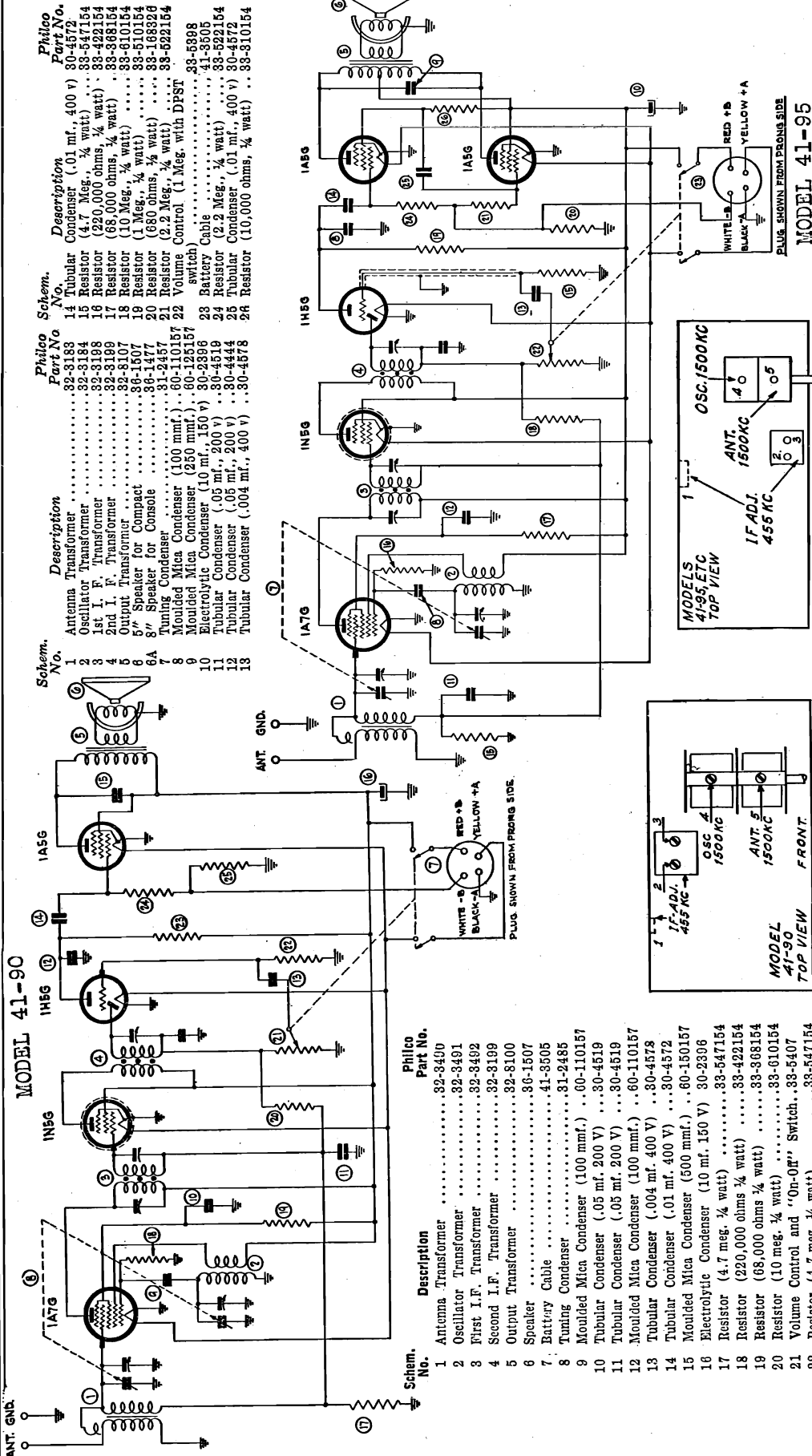


IF PEAK 455 KC REPLACEMENT PARTS
PHILCO MODEL 41-85

Schem. No.	Description	Part No.	Philco
1	Tuning Condenser	31-2459	30-4573
2	Padder	31-8347	33-283834
3	Wave Switch	31-8100	33-125187
4	Mica Condenser (110 mmf.)	49-1570	33-4380
5	Mica Condenser (110 mmf.)	60-111157	33-4572
6	Mica Condenser (110 mmf.)	38-421154	33-47154
7	Resistor (220,000 ohms, 1/4 watt)	38-421154	33-510154
8	Tubular Condenser (110 mmf.)	38-421154	33-510154
9	Resistor (33,000 ohms, 1/4 watt)	38-421154	33-510154
10	Tubular Condenser (110 mmf.)	38-421154	33-510154
11	S. W. Oscillator Transformer	32-3432	30-4572
12	B. C. Oscillator Transformer	32-3432	30-4572
13	Resistor (1 meg., 1/4 watt)	33-510154	30-168127
14	S. W. Loop	78-1042	32-8100
15	Tubular Condenser (.0015 mf., 200 V.)	30-4555	38-1508
16	Tubular Condenser (.1 mf., 400 V.)	30-4455	42-1553
17	Mica Condenser (500 mmf.)	80-150137	41-3528
18	Resistor (4700 ohms, 1/2 watt)	80-230334	30-2452
19	1st I. F. Transformer	32-3884	30-2453
20	2nd I. F. Transformer	32-3884	33-3887
21	Resistor (4.7 meg., 1/2 watt)	33-47154	33-215834
22	Tubular Condenser (.1 mf., 400 V.)	30-4455	33-215834
23	Tubular Condenser (.05 mf., 400 V.)	30-4518	33-215834
24	Resistor (3300 ohms, 1/2 watt)	33-233334	30-4518
25	Tubular Condenser (.25 mf., 400 V.)	30-4604	78-1074



PHILCO RADIO & TELEVISION CORP.



MODELS 41-95, 41-100

Signal Generator Connection	Dummy Antenna	Signal Generator Frequency	Receiver Wave-Band Switch	Receiver Dial Setting	Trimmer Number
Control grid of 1A7G	0.1 mf	455 kc	...	540 kc ¹	1
"	"	"	...	"	2
"	"	"	...	"	3
Ant. term.	225 mmf	1500 kc	...	1500 kc	4
"	"	"	...	"	5

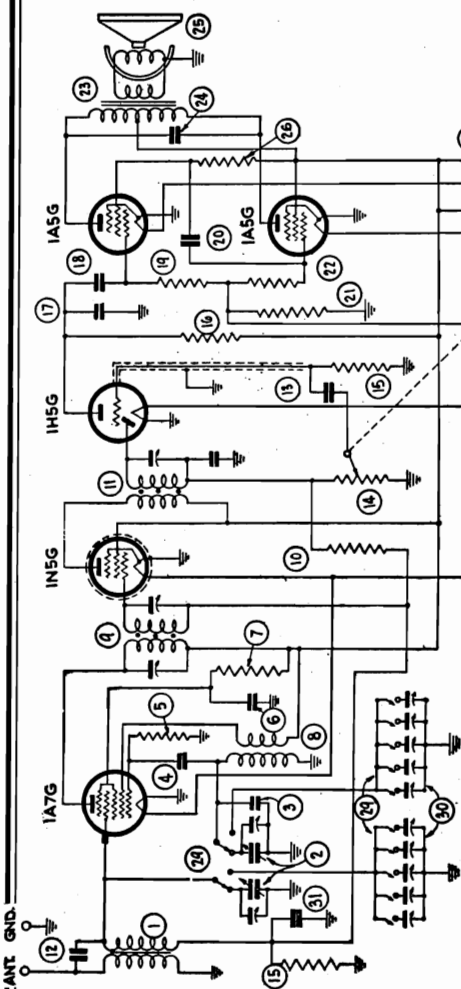
Note 1.—DIAL CALIBRATION: With tuning-condenser in closed position (maximum capacity) set dial pointer on small dash below 540 kc.

MODEL 41-100
MODEL 41-105

PHILCO RADIO & TELEVISION CORP.

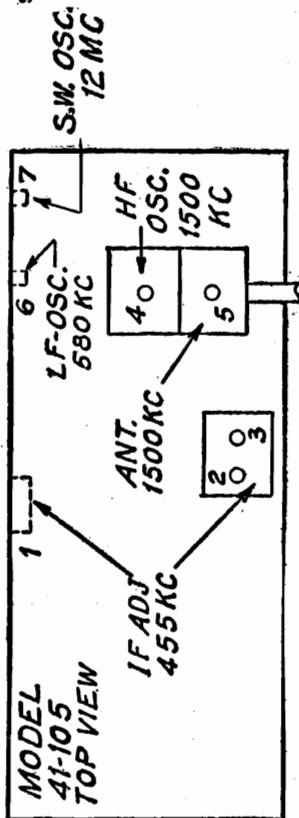
MODEL 41-105			
Signal Generator Connection	Dummy Antenna	Signal Generator Frequency	Receiver Wave-band Switch
Control grid of 1A7G	0.1 mf	455 kc	B.C.
"	"	"	"
"	"	"	"
Ant. term.	225 mmf	1500 kc	"
"	"	580 kc	"
"	"	1500 kc	"
"	"	"	"
"	400 ohms	12 mc	S.W.
"	"	12.910 mc	"
* While rocking.			
Receiver Dial Setting			
540 kc 1			
" 2			
" 3			
" 4			
" 5			
" 6			
" 7			
Image check			

Note 1.—DIAL CALIBRATION: With tuning-condenser in closed position (maximum capacity) set dial pointer on small dash below 340 kc.
Note 2.—When adjusting trimmer (7) be sure to tune in fundamental signal (12 mc) instead of image signal. If trimmer is correctly adjusted, the image will be found by turning generator 910 kc above fundamental signal which will be 12.910 mc.



REPLACEMENT PARTS PHILCO 41-100

Description	Part No.	Description	Part No.
1 Antenna Transformer	32-3248	16 Resistor (1 Meg. 1/4 watt)	33-510154
2 Tuning Condenser	31-2461	17 Molded Mica Condenser (100 mmf.)	60-110157
3 Silver Mica Condenser	30-1113	18 Tubular Condenser (.01 mf., 400 V)	30-4572
4 Molded Mica Condenser (100 mmf.)	60-110157	19 Resistor (2.2 Meg. 1/4 watt)	33-522154
5 Resistor (220,000 ohms 1/4 watt)	33-422154	20 Tubular Condenser (.01 mf. 400 V)	30-4572
6 Tubular Condenser (.05 mf. 200 V)	30-4444	21 Resistor (680 ohms 1/4 watt)	33-168326
7 Resistor (68,000 ohms 1/4 watt)	33-368154	22 Resistor (2.2 Meg. 1/4 watt)	33-522154
8 Oscillator Transformer	32-3214	23 Output Transformer	32-8107
9 1st I. F. Transformer	32-3198	24 Molded Mica Cond. (250 mmf.)	60-125157
10 Resistor (10 Meg. 1/4 watt)	33-610154	25 5" Speaker for Console	36-1507
11 2nd I. F. Transformer	32-3199	26 Resistor (10,000 ohms 1/4 watt)	33-310154
12 Molded Mica Condenser (5 mmf. Included in Ant. Trans. Assy.)		27 Electrolytic Condenser (10 mf. 150 V)	30-3396
13 Tubular Condenser (.004 mf. 400 V)	30-4578	28 Battery Cable	41-3505
14 Volume Control (1 Meg. & DPST Switch)	33-5398	29 Push Button Switch	42-1528
15 Resistor (4.7 Meg. 1/4 watt)	33-547154	30 Push Button Padder Strip	31-6349
		31 Tubular Condenser (.05 mf. 200 V)	30-4519



MODEL 41-105
TOP VIEW

1 LF-OSC. 580 KC
2 HF OSC. 1500 KC
3 ANT. 1500 KC
4 IF ADJ. 455 KC

5 S.W. OSC. 12 MC

6 1A7G

7 1A5G

8 1A5G

9 1A5G

10 1A5G

11 1A5G

12 1A5G

13 1A5G

14 1A5G

15 1A5G

16 1A5G

17 1A5G

18 1A5G

19 1A5G

20 1A5G

21 1A5G

22 1A5G

23 1A5G

24 1A5G

25 1A5G

26 1A5G

27 1A5G

28 1A5G

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208 1A5G

209 1A5G

210 1A5G

211 1A5G

212 1A5G

213 1A5G

214 1A5G

215 1A5G

216 1A5G

217 1A5G

218 1A5G

219 1A5G

220 1A5G

MODELS 42-1008, 42-1009M,
42-1009W

PHILCO RADIO & TELEVISION CORP

76.	Electrolyte Condenser (12 mfd., 475 v.)	30-2481
77.	Blas Resistor (4, 15, 146 ohms)	33-3395
78.	Power Transformer (115 v., 60 cycles)	32-8129
79.	Line Filter Condenser (.01 mfd.)	33-3395
80.	Rectifier (500 v., 100 ma.)	30-2481
81.	Rectifier (500 v., 100 ma.)	30-2481
82.	Rectifier (500 v., 100 ma.)	30-2481
83.	Rectifier (500 v., 100 ma.)	30-2481
84.	Rectifier (500 v., 100 ma.)	30-2481
85.	Rectifier (500 v., 100 ma.)	30-2481
86.	Rectifier (500 v., 100 ma.)	30-2481
87.	Rectifier (500 v., 100 ma.)	30-2481
88.	Rectifier (500 v., 100 ma.)	30-2481
89.	Rectifier (500 v., 100 ma.)	30-2481
90.	Rectifier (500 v., 100 ma.)	30-2481
91.	Rectifier (500 v., 100 ma.)	30-2481
92.	Rectifier (500 v., 100 ma.)	30-2481

MISCELLANEOUS PARTS

33-1285	Automatic Record Changer, Complete
10577-A	Cabinet (Walnut—42-1009)
10577-B	Cabinet (Mahogany—42-1009)
10577-C	Cabinet (Power)
27-3732	Dial Background Card
56-1516	Dial Pointer
56-1517	Mtg. Clamp
28-8909	Mtg. Spring (Background Card)
W-1974	Mtg. Screw (Dial Clamp)
W-2075	Electrically-Operated Buttons
W-2075	Knob (Tuning-Volume-Tone)
54-4105	Knob (Push-Buttons)
54-4106	Knob (Tuning-Volume-Tone)
54-4154	Knob (Push-Button—42-1009-M)
54-4175	Rubber Grommet (Mtg. Chassis)
27-6129	Socket (Rubber—7CS Tube)
27-6158	Socket (Lokalt Tubes)
27-6168	Socket (4 Tubes)
27-6173	Socket (6X5G Tube)
W-1650	Socket Assembly (P. B. Indicator)
38-9607	Socket Assembly (Pilot Light)
76-1212	Screw (Mtg. Chassis)
W-1345	Tab (OFF-ON)
40-6660	Tab (OFF-ON)
27-5738	Tab (Television)
27-5737	Washer (Chassis Mfg.)
28-3114	Wiring Panel (3 lug)
38-3309	Wiring Panel (4 lug)
38-3117	Wiring Panel (5 lug)
38-3177	Wiring Panel (5 lug)
38-3579	Wiring Panel (5 lug)
38-3579	Wiring Panel (5 lug)
76-1322	Wiring Panel (7 lug)

* Condenser changed to .01 mfd., part No. 30-4572 in run 2nd chassis.
† Two types of speakers are used on these models. These speakers are interchangeable and will have the same part number with the exception of a suffix number -4, -9 added to the part number. These speakers are not interchangeable.

REPLACEMENT PARTS — MODELS 42-1008, 42-1009

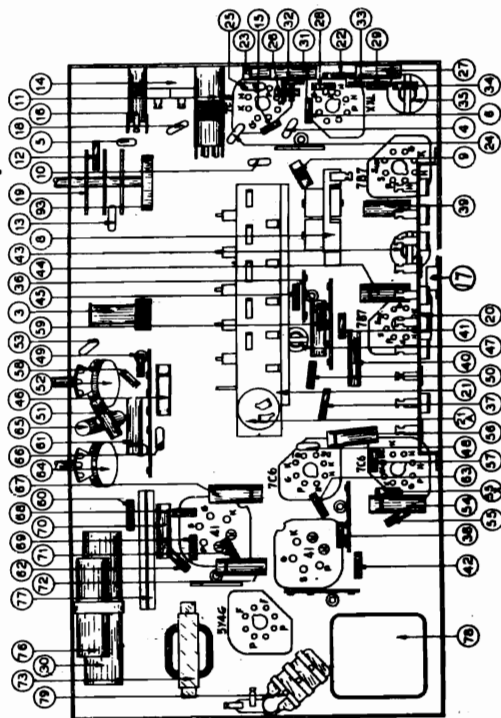


Fig. 2. Locations of Parts—Under Chassis Model 42-1008, 42-1009

58.	Resistor (100,000 ohms)	33-10339
59.	Resistor (100,000 ohms)	33-10339
60.	Resistor (100,000 ohms)	33-10339
61.	Resistor (100,000 ohms)	33-10339
62.	Resistor (100,000 ohms)	33-10339
63.	Resistor (100,000 ohms)	33-10339
64.	Resistor (100,000 ohms)	33-10339
65.	Resistor (100,000 ohms)	33-10339
66.	Resistor (100,000 ohms)	33-10339
67.	Resistor (100,000 ohms)	33-10339
68.	Resistor (100,000 ohms)	33-10339
69.	Resistor (100,000 ohms)	33-10339
70.	Resistor (100,000 ohms)	33-10339
71.	Resistor (100,000 ohms)	33-10339
72.	Resistor (100,000 ohms)	33-10339
73.	Resistor (100,000 ohms)	33-10339
74.	Resistor (100,000 ohms)	33-10339
75.	Resistor (100,000 ohms)	33-10339
76.	Resistor (100,000 ohms)	33-10339

D.C. indicated at the tube elements in the diagram were measured with a 1000 ohms per voltmeter, Philco Model 027, using the 300-volt scale line voltage 117 volts A.C. no signal being received-range switch broadcast.

Part No.	Description	Part No.
76-1345	Loop Aerial (42-1008)	33-33339
76-1397	Loop Aerial (42-1009)	33-33339
28-3806	Sleeve (Loop Mfg.)	33-33339
28-4106	Spring Washer (Loop Mfg.)	33-33339
W-151	Washer (Loop Mfg.)	33-33339
W-225	Screw (Loop Mfg.)	33-33339
38-9870	External Aerial Socket	33-33339
27-6145	External Aerial (Broadcast)	33-33339
32-3784	Mtg. Clip	33-33339
68-125157	Mica Condenser (250 mmfd.)	33-33339
30-1211	Mica Condenser (350 mmfd.)	33-33339
33-322339	Resistor (2.2 megohms)	33-33339
31-5502	Tuning Condenser (Dial)	33-33339
28-8913	Spring (Pointer)	33-33339
38-9856	Drive Drum	33-33339
28-5685	Mtg. Screw (Tuning Cond.)	33-33339
W-2002	Tuning Shaft	33-33339
31-5502	Spring Washer	33-33339
31-6401	Compensator (Oscillator—800 K.C.)	33-33339
32-3786	Aerial Transformer (S.W.—)	33-33339
60-010137	Oscillator Transformer (Brdst.—S.W.)	33-33339
32-3782	Mtg. Clip (800 ohms)	33-33339
33-10336	Mica Condenser (325 mmfd.)	33-33339
30-1212	Compensator (Broadcast Oscillator)	33-33339
31-6440	Part of 14	33-33339
33-33339	Light-Beam Oscillator Transformer	33-33339
32-3785	Mtg. Clip (Oscillator Control)	33-33339
33-33339	Light-Beam Oscillator Control	33-33339
60-130127	Band Switch	33-33339
42-1688	Mtg. Nut	33-33339
W-2157	Drive Cord (Indicator)	33-33339
28-8953	Spring	33-33339
31-6446	Push-Button and Power Switch Assem.	33-33339
42-1693	Push-Button Power Switch (Part of 21)	33-33339
46-1714	Mtg. Screw	33-33339
56-1505	Mtg. Nut	33-33339
W-223	Resistor (10,000 ohms)	33-33339
33-310339	Condenser (.01 mfd., 400 volts)	33-33339
30-4572	Mica Condenser (250 mmfd.)	33-33339
30-125157	Oscillator Transformer	33-33339
30-3157	Condenser (.01 mfd., 400 volts)	33-33339
30-4572	Resistor (10,000 ohms)	33-33339
33-322339	Resistor (15,000 ohms)	33-33339
33-315339	Electrolytic Condenser (8-16 mfd.)	33-33339
30-2480	Mtg. Clamp	33-33339
56-1848	Resistor (.05 mfd., 200 volts)	33-33339
30-4510	Resistor (4700 ohms)	33-33339
33-247339	Resistor (.05 mfd., 400 volts)	33-33339
30-4518	Resistor (4700 ohms)	33-33339
33-247339	1st I. F. Transformer	33-33339
32-5623	Mtg. Nut	33-33339
W-1949	Primary Compensator (Iron Core)	33-33339
33-33339	Secondary Compensator (Part of 35)	33-33339
33-33339	Condenser (3000 mmfd., Part of 35)	33-33339
33-510339	Condenser (.05 mfd., 200 volts)	33-33339
33-4519	Resistor (1 megohm)	33-33339
33-4527	Resistor (4700 ohms)	33-33339
33-4527	Condenser (.05 mfd., 200 volts)	33-33339
33-4519	Condenser (.05 mfd., 200 volts)	33-33339

Tube	Location	Radio Position D.C.	Photo. Position D.C.
7C5 Osc.	Plate	50	200
7C5 Osc.	Screen	8	110
7C5 Osc.	Bias (Grid Leak)	3	2 1/2
XXL 1st Det.	Plate	80	180
XXL 1st Det.	Bias (Cathode)	2	19
7B7 1st & 2nd I.F.	Plate	215	190
7B7 1st & 2nd I.F.	Screen	75	175
7B7 1st & 2nd I.F.	Bias (Cathode)	2 1/2	45
7C6 2nd Det.	Plate	95	90
1st Audio	Plate	210	190
	Screen	215	195

PHILCO RADIO & TELEVISION CORP.

MODELS 42-1008, 42-1009M,
42-1009W

ALIGNING R. F. AND I. F. COMPENSATORS MODEL 42-1008, CODE 121; 42-1009W, AND 42-1009M, CODE 121

The following procedure is the same for both models.

EQUIPMENT REQUIRED

- 1. SIGNAL GENERATOR:** Covering the frequency range of the receiver, such as Philco Model 070.
- 2. ALIGNING INDICATOR:** Either a vacuum tube voltmeter or an audio output meter may be used as an aligning indicator. Philco Models 027 and 028. Circuit testers contain both these meters.
- 3. TOOLS:** Philco Fiber Screw Driver, Part No. 45-2610.

CONNECTING ALIGNING INSTRUMENTS

VACUUM TUBE VOLTMETER: To use the vacuum tube voltmeter as an aligning indicator, make the following connections: Attach the negative (—) terminal of the voltmeter to any point in the circuit where the A.V.C. voltage can be obtained. Connect the positive (+) terminal of the vacuum tube voltmeter to the chassis.

AUDIO OUTPUT METER: Terminal No. 1 is provided on the loop aerial panel for connecting one lead of the audio output meter to the voice coil of the speaker. The other lead of the meter is connected to the chassis. When using these connections, the lowest A.C. scale of the meter must be used. (0 to 10 volts).

The audio output meter can also be connected between the plate of the output tube and the ground of the chassis.

SIGNAL GENERATOR: When adjusting the "I. F." padders, the high side of the signal generator is connected through a .1 mfd. condenser to the antenna

section of the tuning condenser. Connect the ground or low side of the generator to the chassis.

When aligning the R. F. padders a loop is made from a few turns of wire and connected to the signal generator output terminals; the signal generator is then placed close to the loop of the radio.

When adjusting the radio outside the cabinet the loop aerial should be placed in approximately the same position around or near the chassis as when assembled.

After connecting the aligning instruments, adjust the compensators as shown in the tabulation below. Locations of the compensators are shown in the figure 3. If the indicating meter pointer goes off scale when adjusting the compensator, reduce the strength of the signal from the generator. Keep volume control of radio at maximum position.

Operations in Order	SIGNAL GENERATOR		RECEIVER			Special Instructions
	Output Connections to Receiver	Dial Setting	Dial Setting	Control Settings	Adjust Compensators in Order	
1	Amt. Section of Tuning Cond. with .1 mfd. Cond.	455 K.C.	Tuning Cond. Closed	Vol. Max. Bands Switch S. W.	35, 35B 43A, 47A	
2	Loop Signal Generator	1720 K.C.	1720 K.C.	Bands Switch "Brdcst"	14	Note A
3	Loop Signal Generator	1500 K.C.	1500 K.C.	Bands Switch "Brdcst"	7A	
4	Loop Signal Generator	580 K.C.	580 K.C.	Bands Switch "Brdcst"	8A	Roll comp. (8A) to "max." Recheck Operation No. 2
5	Loop Signal Generator	1720 K.C.	1720 K.C.	Bands Switch "Brdcst"	14	
6	Loop Signal Generator	15 M.C.	15 M.C.	Bands Switch S. W.	14A, 8	Note B

AERIAL CONNECTIONS: The built-in loop aerial system is designed to operate without an outside aerial or ground and to give exceptionally sensitive receiving performance of stations on the standard and short wave frequencies. When operating the radio, however, in steel reinforced buildings and other shielded locations, the PHILCO Outdoor Aerial Part No. 45-2817 is recommended for maximum receiving performance. The outdoor aerial can be easily connected to the radio by inserting the plug attached to the transformer unit into the socket provided at the rear of the chassis. This aerial can be obtained from your local PHILCO distributors. A ground connection is not required with either type of installation.

NOTE A.—Dial calibration: In order to adjust the receiver correctly, the dial must be aligned to track properly with the tuning condenser. To do this, proceed as follows: Turn the tuning condenser to the maximum capacity position (plates fully meshed). With the condenser in this position, set the tuning pointer on the extreme left index line at the low frequency end of the broadcast scale.

NOTE B.—Adjust padder (14A) to the second signal peak from the tight position. Roll padder (8) slowly to maximum on the first peak from tight position.

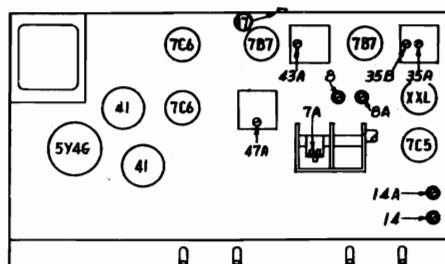


FIG. 3. LOCATIONS OF COMPENSATORS—TOP OF CHASSIS
MODELS 42-1008, 42-1009

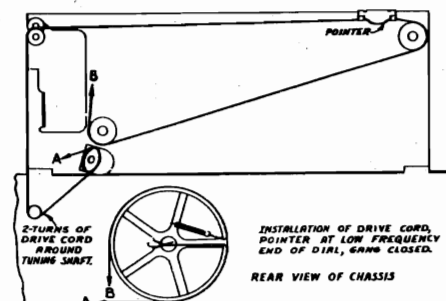


FIG. 4. INSTALLATION OF DRIVE CORDS POINTER AT LOW FREQUENCY END OF DIAL TUNING CONDENSER CLOSED.

INTERMEDIATE FREQUENCY: 455 K.C.

TUNING BAND FREQUENCIES: 540 to 1720 K.C.; 9 to 15.5 M.C.

POWER SUPPLY: 115 volts, 50 or 60 cycle A.C., Consumption Watts. These models are shipped for operation on a 115-volt, 60-cycle, A.C.

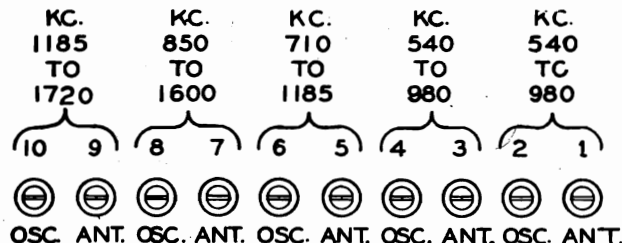
power supply. To operate on a 115-volt, 50-cycle current, the phonograph motor must be changed to

PHILCO TUBES USED: Nine; one 7C5, oscillator; one XXL, converter; two 7B7, I.F. amplifiers; 7C6, 2nd detector, 1st audio; 7C6, Phonograph pre-amplifier; two, 41 audio output, and a 6X5G, Rectifier.

MODELS 42-1008, 42-1009M, 42-1009W, PHILCO RADIO & TELEVISION CORP.
MODELS 42-1010, 42-1011M

ADJUSTING ELECTRIC PUSH-BUTTON TUNING

Select five of the most popular stations received in the locality. Insert the station call letters into the spaces on the buttons. The station with the lowest frequency is placed in the second button from the left and the highest frequency is placed in the sixth push button on the right. Each push button is adjusted by two adjusting screws located on the rear of the chassis. Each set of screws is numbered and labeled "Ant." and "Osc." and covers a frequency range as follows:



Looking at the front of the cabinet, the second button on the left is adjusted by adjusting screws No. 1 and 2. The next push button by adjusting screws No. 3 and 4, and the remaining push buttons in order.

1. Press in "Off-On" push button, turn "Bands" knob to "Broadcast."
2. Set up a Model 070 Signal Generator near the receiver and connect a loop aerial (made from a few turns of wire 12 inches in

diameter) to the high and ground output jacks of the signal generator. Turn the output controls to maximum and set the modulation control to "MOD. ON."

3. Manually tune in the station to be set up on the first push button. After doing this set the indicator of the 070 Signal Generator to the frequency of the station being received. As the indicator approaches the frequency of the station a whistle will be heard; leave the indicator at this point.

4. Turn "Bands" knob to "Push button" position. Using the insulated screw driver, turn the No. 2 "Osc." screw until the broadcast station identified by the signal generator is heard; at this point, turn the indicator of the signal generator away from the frequency of the station. Readjust No. 2 "Osc." and No. 1 "Ant." screws until the station is clearly and distinctly heard. The push button should then be adjusted properly to the station.

After setting up the first station the same procedure as outlined above is used for the remaining stations. When these models are set up to receive the sound of a television program tuned in by the special type Philco Television Sets or if it is to be used in conjunction with a Philco Record Player, the lowest frequency push button should be used. To tune in these programs, the same procedure as given for broadcast stations above is used.

Further details for setting up these Radios for operation with Philco Television Sets or Record Players are supplied with the instruments.

ADJUSTING ELECTRIC PUSH BUTTON TUNING

The Electric push button tuning mechanism consists of ten push buttons. Five push buttons control and select power supply, Broadcast, Police and Shortwave Bands and Phonograph Operation. The remaining five push buttons are used for automatically selecting five standard broadcast stations.

Select five of the most popular stations received in the locality. Insert the station call letters into the spaces above the buttons. The station with the lowest frequency is placed in the second button from the left and the highest frequency is placed in the sixth push button from the left. Each push button is adjusted by two adjusting screws located on the rear of the chassis. Each set of screws is numbered and labeled "Ant." and "Osc." and covers a frequency range as shown in Fig. 1.

Looking at the front of the cabinet, the second button from the left is adjusted by adjusting screws No. 1. The next push button by adjusting screws No. 2, and the remaining push buttons in order.

1. Press in "Broadcast" push button.
2. Set up a Model 070 Signal Generator near the receiver and connect a loop aerial (made from a few turns of wire 12 inches in diameter) to the high and ground output jacks of the signal generator. Turn the output controls to maximum and set the modulation control to "MOD. ON."
3. Manually tune in the station to be set up on the first station push button. After doing this set the indicator of the 070 Signal Generator to the frequency of the station being received. As the indicator approaches the frequency of the station a whistle will be heard; leave the indicator at this point.

4. Press "in" the second push button from the left of cabinet. Using the insulated screw driver, turn the No. 1 "Osc." screw until the broadcast station identified by the signal generator is heard; at this point, turn the indicator of the signal generator away from the frequency of the station. Readjust No. 1 "Osc." and "Ant." screws until the station is clearly and distinctly heard. The push button should then be adjusted properly to the station.

After setting up the first station the same procedure as outlined above is used for the remaining stations. When these models are set up to receive the sound of a television program tuned in by the special type Philco Television Sets or if it is to be used in conjunction with a Philco Record Player, the lowest frequency push button should be used. To tune in these programs, the same procedure as given for broadcast stations above is used.

Further details for setting up these Radios for operation with Philco Television Sets or Record Players are supplied with the instruments.

MODELS 42-1010, 42-1011M

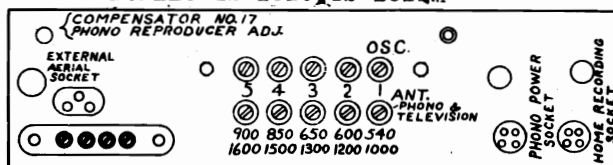


FIG. 1.—PUSH BUTTON COMPENSATOR LOCATIONS

LIGHT-BEAM REPRODUCER ADJUSTMENTS

To reproduce the sound from a record, the light beam of the reproducer must be carefully positioned on the light sensitive cell. If the light beam is not carefully set, the sound reproduction will be distorted, weak or, if the light beam is completely on or off the cell, the phonograph will be silent.

If any of these conditions exist, the following adjustment procedure should be made:

NOTE—These adjustments should be made with the power line voltage at 117 volts A.C.

A. ADJUSTING WIDTH OF LIGHT BEAM

To make this adjustment push the lamp socket assembly into its holder until a clear image of the lamp filament appears on the light cell. The socket should then be slightly pushed in beyond this point until the rectangular spot of light is 5/32" in width. The socket assembly is now rotated so that the spotlight is vertical.

B. POSITIONING THE LIGHT BEAM

To position the light beam on the light cell, turn the adjusting screw at the lower left side of the reproducer until the spot is half on the cell and half on the metal frame surrounding the cell.

C. ADJUSTING INTENSITY OF LAMP

When shipped from the factory, the lamp of the reproducer is adjusted for best operating efficiency. The intensity of the light from the lamp is adjusted by Compensator No. 17 located on the radio chassis. Under ordinary circumstances, an adjustment will not be necessary. When replacing the reproducer or lamp, however, it may be necessary to readjust the light intensity. In this case the compensator is adjusted as follows:

1. Turn volume control on full and play a record.
2. While the record is playing, turn compensator 17 in the direction necessary to obtain the best operating point without distortion. By turning the compensator the strength of the pick-up output is increased or decreased.

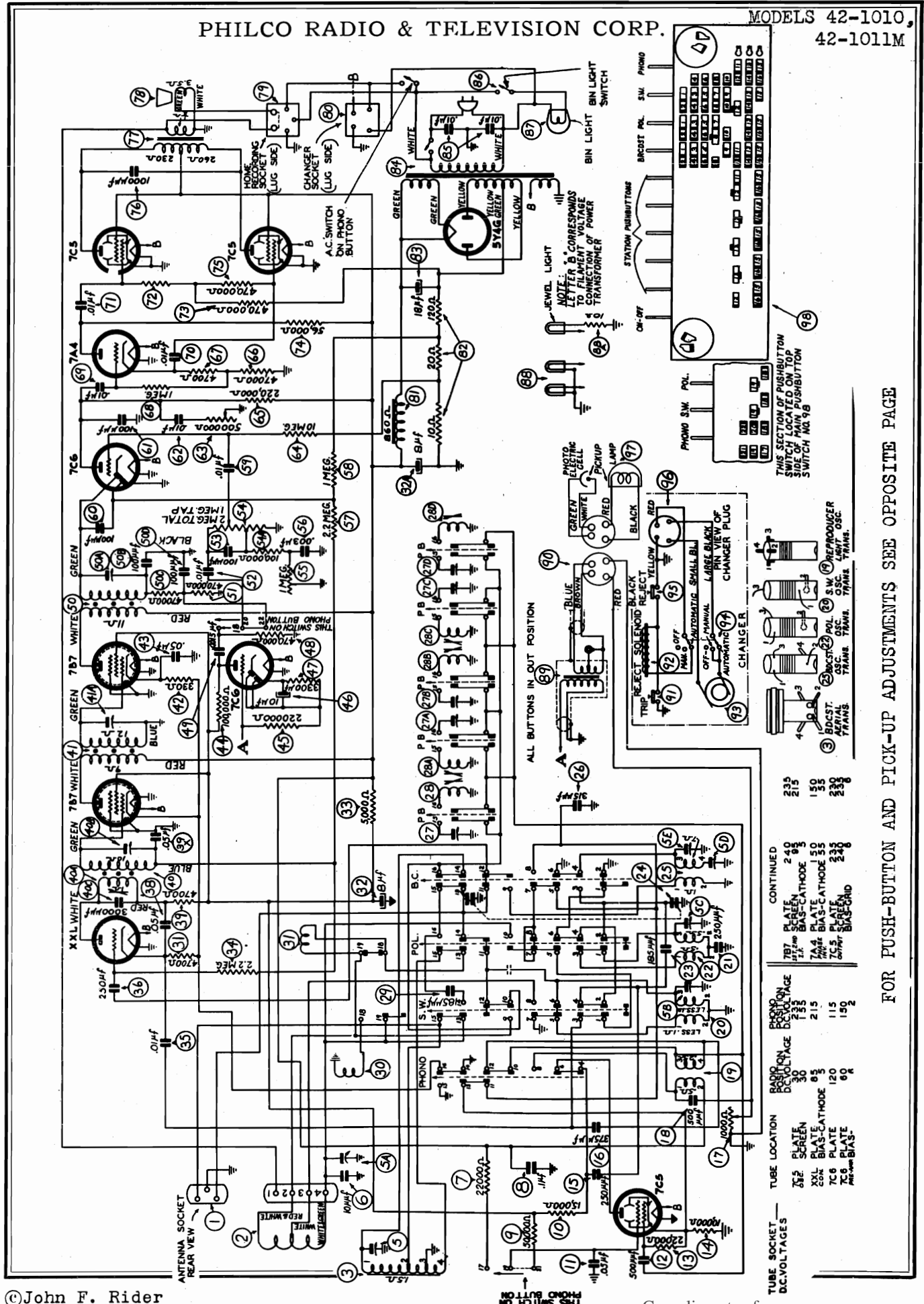
D. INSTALLING NEW LAMP

When installing a new lamp in the socket, there are two positions in which the lamp can be inserted. Ordinarily, either of these positions can be used. In some cases, however, due to the lamp filament being off center, the lamp must be inserted in the position that gives the best centering of the spot of light on the vibrating mirror.

FOR BOTH CHASSIS

PHILCO RADIO & TELEVISION CORP.

MODELS 42-1010,
42-1011M



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FOR PUSH-BUTTON AND PICK-UP ADJUSTMENTS SEE OPPOSITE PAGE

TUBE SOCKET — DC VOLTAGES	TUBE LOCATION	BASS ON DC VOLTAGE	TUNING PAGE	CONTINUED
7A4	7A4	30	235	7B7 PLATE 240
7C5	7C5	30	235	7C5 PLATE 240
7C6	7C6	30	235	7C6 PLATE 240
7C7	7C7	30	235	7C7 PLATE 240
7C8	7C8	30	235	7C8 PLATE 240
7C9	7C9	30	235	7C9 PLATE 240
7D1	7D1	30	235	7D1 PLATE 240
7D2	7D2	30	235	7D2 PLATE 240
7D3	7D3	30	235	7D3 PLATE 240
7D4	7D4	30	235	7D4 PLATE 240
7D5	7D5	30	235	7D5 PLATE 240
7D6	7D6	30	235	7D6 PLATE 240
7D7	7D7	30	235	7D7 PLATE 240
7D8	7D8	30	235	7D8 PLATE 240
7D9	7D9	30	235	7D9 PLATE 240
7D10	7D10	30	235	7D10 PLATE 240
7D11	7D11	30	235	7D11 PLATE 240
7D12	7D12	30	235	7D12 PLATE 240
7D13	7D13	30	235	7D13 PLATE 240
7D14	7D14	30	235	7D14 PLATE 240
7D15	7D15	30	235	7D15 PLATE 240
7D16	7D16	30	235	7D16 PLATE 240
7D17	7D17	30	235	7D17 PLATE 240
7D18	7D18	30	235	7D18 PLATE 240
7D19	7D19	30	235	7D19 PLATE 240
7D20	7D20	30	235	7D20 PLATE 240
7D21	7D21	30	235	7D21 PLATE 240
7D22	7D22	30	235	7D22 PLATE 240
7D23	7D23	30	235	7D23 PLATE 240
7D24	7D24	30	235	7D24 PLATE 240
7D25	7D25	30	235	7D25 PLATE 240
7D26	7D26	30	235	7D26 PLATE 240
7D27	7D27	30	235	7D27 PLATE 240
7D28	7D28	30	235	7D28 PLATE 240
7D29	7D29	30	235	7D29 PLATE 240
7D30	7D30	30	235	7D30 PLATE 240
7D31	7D31	30	235	7D31 PLATE 240
7D32	7D32	30	235	7D32 PLATE 240
7D33	7D33	30	235	7D33 PLATE 240
7D34	7D34	30	235	7D34 PLATE 240
7D35	7D35	30	235	7D35 PLATE 240
7D36	7D36	30	235	7D36 PLATE 240
7D37	7D37	30	235	7D37 PLATE 240
7D38	7D38	30	235	7D38 PLATE 240
7D39	7D39	30	235	7D39 PLATE 240
7D40	7D40	30	235	7D40 PLATE 240
7D41	7D41	30	235	7D41 PLATE 240
7D42	7D42	30	235	7D42 PLATE 240
7D43	7D43	30	235	7D43 PLATE 240
7D44	7D44	30	235	7D44 PLATE 240
7D45	7D45	30	235	7D45 PLATE 240
7D46	7D46	30	235	7D46 PLATE 240
7D47	7D47	30	235	7D47 PLATE 240
7D48	7D48	30	235	7D48 PLATE 240
7D49	7D49	30	235	7D49 PLATE 240
7D50	7D50	30	235	7D50 PLATE 240
7D51	7D51	30	235	7D51 PLATE 240
7D52	7D52	30	235	7D52 PLATE 240
7D53	7D53	30	235	7D53 PLATE 240
7D54	7D54	30	235	7D54 PLATE 240
7D55	7D55	30	235	7D55 PLATE 240
7D56	7D56	30	235	7D56 PLATE 240
7D57	7D57	30	235	7D57 PLATE 240
7D58	7D58	30	235	7D58 PLATE 240
7D59	7D59	30	235	7D59 PLATE 240
7D60	7D60	30	235	7D60 PLATE 240
7D61	7D61	30	235	7D61 PLATE 240
7D62	7D62	30	235	7D62 PLATE 240
7D63	7D63	30	235	7D63 PLATE 240
7D64	7D64	30	235	7D64 PLATE 240
7D65	7D65	30	235	7D65 PLATE 240
7D66	7D66	30	235	7D66 PLATE 240
7D67	7D67	30	235	7D67 PLATE 240
7D68	7D68	30	235	7D68 PLATE 240
7D69	7D69	30	235	7D69 PLATE 240
7D70	7D70	30	235	7D70 PLATE 240
7D71	7D71	30	235	7D71 PLATE 240
7D72	7D72	30	235	7D72 PLATE 240
7D73	7D73	30	235	7D73 PLATE 240
7D74	7D74	30	235	7D74 PLATE 240
7D75	7D75	30	235	7D75 PLATE 240
7D76	7D76	30	235	7D76 PLATE 240
7D77	7D77	30	235	7D77 PLATE 240
7D78	7D78	30	235	7D78 PLATE 240
7D79	7D79	30	235	7D79 PLATE 240
7D80	7D80	30	235	7D80 PLATE 240
7D81	7D81	30	235	7D81 PLATE 240
7D82	7D82	30	235	7D82 PLATE 240
7D83	7D83	30	235	7D83 PLATE 240
7D84	7D84	30	235	7D84 PLATE 240
7D85	7D85	30	235	7D85 PLATE 240
7D86	7D86	30	235	7D86 PLATE 240
7D87	7D87	30	235	7D87 PLATE 240
7D88	7D88	30	235	7D88 PLATE 240
7D89	7D89	30	235	7D89 PLATE 240
7D90	7D90	30	235	7D90 PLATE 240
7D91	7D91	30	235	7D91 PLATE 240
7D92	7D92	30	235	7D92 PLATE 240
7D93	7D93	30	235	7D93 PLATE 240
7D94	7D94	30	235	7D94 PLATE 240
7D95	7D95	30	235	7D95 PLATE 240
7D96	7D96	30	235	7D96 PLATE 240
7D97	7D97	30	235	7D97 PLATE 240
7D98	7D98	30	235	7D98 PLATE 240
7D99	7D99	30	235	7D99 PLATE 240
7D100	7D100	30	235	7D100 PLATE 240

MODELS 42-1010,
42-1011M

PHILCO RADIO & TELEVISION CORP.

Schem. No.	Description	Part No.	32-3742	72.	Resistor (470,000 ohms)	33-447339	96.	Record Changer Power Cable and Plug
1.	External Aerial Socket.	27-6145	30-1028	73.	Resistor (470,000 ohms) <td>33-447339<td>97.</td><td>Phono Tone Arm (Light Beam Re-Producer complete)</td></td>	33-447339 <td>97.</td> <td>Phono Tone Arm (Light Beam Re-Producer complete)</td>	97.	Phono Tone Arm (Light Beam Re-Producer complete)
2.	Loop Aerial Panel	26-9350	30-1028	74.	Resistor (470,000 ohms) <td>33-447339<td>98.</td><td>Push-button Switch and AC Switch Assembly</td></td>	33-447339 <td>98.</td> <td>Push-button Switch and AC Switch Assembly</td>	98.	Push-button Switch and AC Switch Assembly
3.	Terminal Strip	26-3006FA3	32-3850	75.	Condenser (.001 mfd., 1000 volts)	30-4801		Mts. Screw
4.	Mts. Screw	26-1187FE7	32-3850	76.	Audio Output Transformer	36-1524		Bezel (Dial—Models 42-1010, 42-1011M)
5.	Spring Washer	26-1187FE7	32-3850	77.	Speaker—Early Production	36-1524		Mts. Screw
6.	Aerial Transformer (Police)	31-6433	32-3850	78.	Cone Assembly (For Speaker 36-1524)	36-1524		Bezel (Dial—Models 42-1010, 42-1011M)
7.	Compensator (S.W. Band—Aerial)	31-6433	32-3850	79.	Home Recording Socket	36-1524		Mts. Screw
8.	Compensator (S.W. Band—Aerial)	31-6433	32-3850	80.	Field Coil (Replace Speaker 36-1524)	36-1524		Bezel (Dial—Models 42-1010, 42-1011M)
9.	Compensator (Police Band—Aerial)	31-6433	32-3850	81.	Electrolytic Condenser (18 mfd., 475 volts)	33-3417		Background Reflector
10.	Compensator (Police Band—Aerial)	31-6433	32-3850	82.	Power Transformer (115 volts, 60 cycles)	30-2517		Mts. Clamp
11.	Compensator (Broadcast Band—Aerial)	31-6433	32-3850	83.	Condenser (.01-.01 mfd., 500 volts)	32-8204		Jewel (42-1011M Cabinet)
12.	Compensator (Broadcast Band—Aerial)	31-6433	32-3850	84.	Bl. Lamp	76-1390		Knob (Tuning, Volume, Tone—Model 42-1011M)
13.	Resistor (33,000 ohms)	33-333339	33-347339	85.	Bl. Lamp	76-1390		Knob (Tuning, Volume, Tone—Model 42-1011M)
14.	Resistor (15,000 ohms)	33-333339	33-347339	86.	Bl. Lamp	76-1390		Knob (Tuning, Volume, Tone—Model 42-1011M)
15.	Resistor (15,000 ohms)	33-333339	33-347339	87.	Bl. Lamp	76-1390		Knob (Tuning, Volume, Tone—Model 42-1011M)
16.	Resistor (15,000 ohms)	33-333339	33-347339	88.	Bl. Lamp	76-1390		Knob (Tuning, Volume, Tone—Model 42-1011M)
17.	Resistor (15,000 ohms)	33-333339	33-347339	89.	Bl. Lamp	76-1390		Knob (Tuning, Volume, Tone—Model 42-1011M)
18.	Resistor (15,000 ohms)	33-333339	33-347339	90.	Bl. Lamp	76-1390		Knob (Tuning, Volume, Tone—Model 42-1011M)
19.	Resistor (15,000 ohms)	33-333339	33-347339	91.	Bl. Lamp	76-1390		Knob (Tuning, Volume, Tone—Model 42-1011M)
20.	Resistor (15,000 ohms)	33-333339	33-347339	92.	Bl. Lamp	76-1390		Knob (Tuning, Volume, Tone—Model 42-1011M)
21.	Resistor (15,000 ohms)	33-333339	33-347339	93.	Bl. Lamp	76-1390		Knob (Tuning, Volume, Tone—Model 42-1011M)
22.	Resistor (15,000 ohms)	33-333339	33-347339	94.	Bl. Lamp	76-1390		Knob (Tuning, Volume, Tone—Model 42-1011M)
23.	Resistor (15,000 ohms)	33-333339	33-347339	95.	Bl. Lamp	76-1390		Knob (Tuning, Volume, Tone—Model 42-1011M)
24.	Resistor (15,000 ohms)	33-333339	33-347339					Knob (Tuning, Volume, Tone—Model 42-1011M)

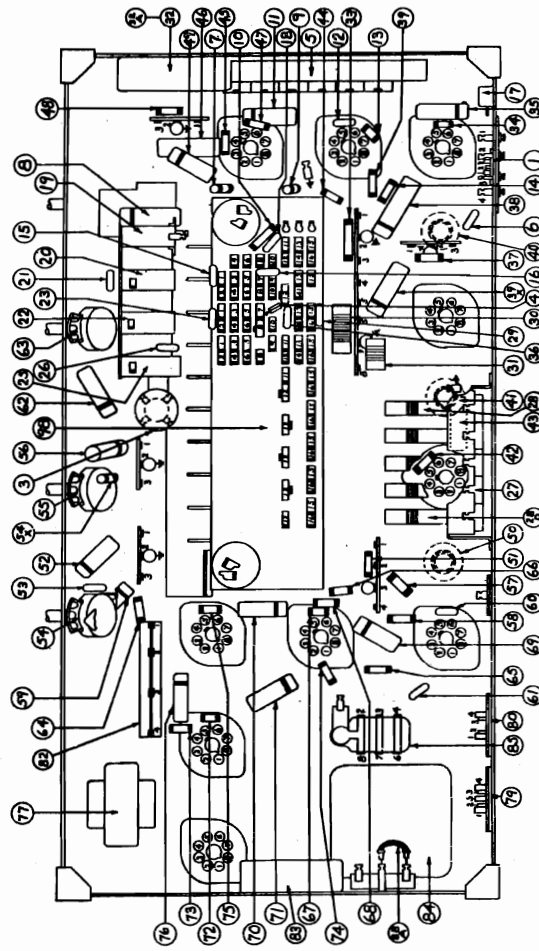


FIG. 3.—LOCATIONS OF PARTS—UNDER CHASSIS.

PHILCO RADIO & TELEVISION CORP.

ALIGNING R. F. AND I. F. COMPENSATORS

The following procedure is the same for both models:

EQUIPMENT REQUIRED

1. **SIGNAL GENERATOR:** Covering the frequency range of the receiver, such as Philco Model 070.
2. **ALIGNING INDICATOR:** Either a vacuum tube voltmeter or an

audio output meter may be used as an aligning indicator. Philco Models 027 and 028 circuit testers contain both these meters.

3. **TOOLS:** Philco Fiber Screw Driver, Part No. 45-2610.

CONNECTING ALIGNING INSTRUMENTS

Either a vacuum tube voltmeter or an audio output meter may be used as a signal indicator when adjusting the receiver.

Vacuum Tube Voltmeter: To use the vacuum tube voltmeter as an aligning indicator, make the following connections: Attach the negative (—) terminal of the voltmeter to any point in the circuit where the A.V.C. voltage can be obtained. Connect the positive (+) terminal of the vacuum tube voltmeter to the chassis.

Audio Output Meter: Terminal No. 1 is provided on the loop aerial panel for connecting one lead of the audio output meter to the voice coil of the speaker. The other lead of the meter is connected to the chassis. When using these connections, the lowest A.C. scale of the meter must be used. (0 to 10 volts).

The audio output meter can also be connected between the plate of the output tube and the ground of the chassis.

Signal Generator: The radio can be aligned in the cabinet or removed from the cabinet. When adjusting the "I.F." padders, the high side

of the signal generator is connected through a .1 mfd. condenser to the lug on the aerial section of the tuning condenser. The ground or low side of the signal generator is connected to the ground of the receiver.

When aligning the R.F. padders with the radio in the cabinet, a loop is made from a few turns of wire and connected to the signal generator output terminals; the loop is then placed two or three feet from the loop in the cabinet. If the radio is aligned outside of the cabinet without the loop connected an aerial input transformer, Part No. 76-1134, will be required. Insert the transformer into the external aerial socket on the rear of the chassis. Connect the high output terminal of the signal generator to the terminal on the transformer. Connect the ground terminal to the chassis.

After connecting the aligning indicator, adjust the compensators in the order shown in the tabulation below. Locations of the compensators are shown below. If the output meter pointer goes off scale when adjusting the compensators, reduce the strength of the signal from the generator.

Operations in Order	SIGNAL GENERATOR		RECEIVER			SPECIAL INSTRUCTIONS
	Output Connections to Receiver	Dial Setting	Dial Setting	Control Setting	Adjust Compensators in Order	
1	Lug Aerial Section of Tuning Condenser	455 KC	580 KC	Vol. Max. "Brdcst" Push-button IN	50A, 41A 40B, 40A	
2	Use Loop on Generator or Aerial Trans.	1500 KC	1500 KC	Vol. Max. "Brdcst" Push-button IN	5E, 5	Note A
3	Use Loop on Generator or Aerial Trans.	580 KC	580 KC	Vol. Max. "Brdcst" Push-button IN	5D	Roll Tuning Condenser Note B
4	Use Loop on Generator	Repeat Operation No. 2				
5	Use Loop on Generator	6 MC	6 MC	Vol. Max. "Police" Push-button IN	5C	
6	Use Loop on Generator	15 MC	15 MC	Vol. Max. "S.W." Push-button IN	5B, 5A	Note C

NOTE A—DIAL CALIBRATION: In order to adjust the receiver correctly, the dial must be aligned to track properly with the tuning condenser. To adjust the dial, proceed as follows: With the tuning condenser closed (maximum capacity), set the dial pointer on the extreme left index line at the low frequency end of the broadcast scale. The arrangement of the drive cable in this position is shown in the schematic.

NOTE B—When adjusting the low frequency compensator of Range One (Broadcast) or the aerial padders of the high frequency tuning range; the receiver Tuning Condenser must be adjusted (rolled) as follows: First, tune the compensator for maximum output, then vary the tuning condenser of the receiver for maximum output. Now turn the compensator slightly to the right or left and again vary the receiver tuning condenser for maximum output. This procedure of first setting the compensator and then varying the tuning condenser is continued until maximum output reading is obtained.

NOTE C—To accurately adjust the high frequency oscillator compensator to the fundamental instead of the image signal, turn the oscillator compensator (5B) to the maximum capacity position (clockwise). From this position slowly turn the compensator counter-clockwise until a second peak is obtained on the output meter. Adjust the compensator for maximum output at this second peak.

If the above procedure is correctly performed, the image signal will be found (much weaker) by turning the signal generator dial 910 KC above the frequency being used on any high frequency range.

The aerial padder (5A) must be adjusted to maximum by rolling the tuning condenser. If two signal peaks occur when turning the padder, adjust the

maximum output on the first signal peak from the tight position (screw all the way down) of the padder.

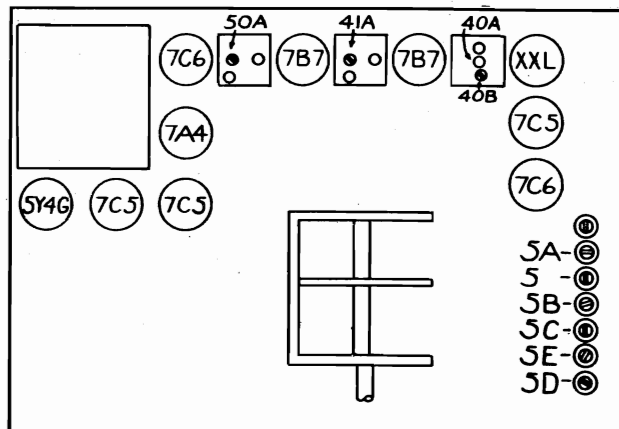


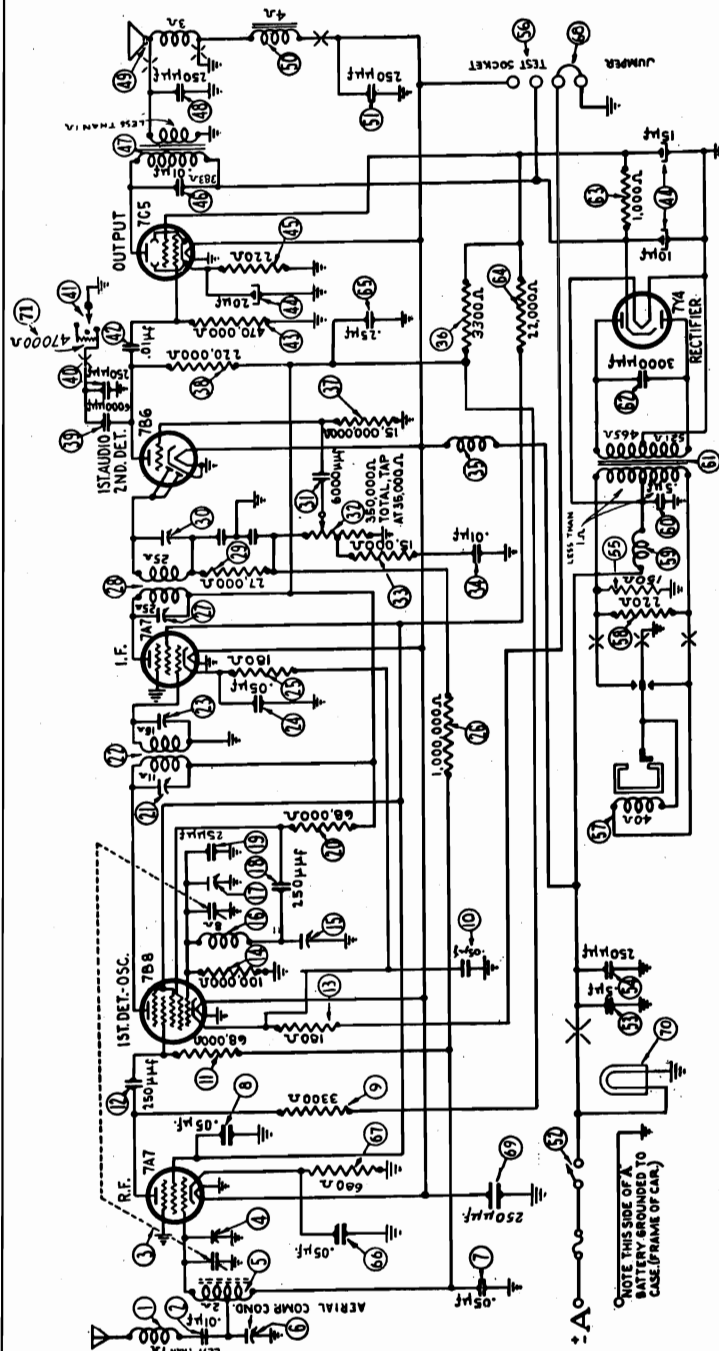
FIG. 4.—LOCATIONS OF COMPENSATORS
TOP OF CHASSIS 42-1010, 42-1011

MODEL AR-45

PHILCO RADIO & TELEVISION CORP.

- Condenser (250 Mmfd.) ... 60-125157
 Replacement Cone
 (For 73-0047-2 Speaker) 91-0086
 (For 73-0047-3 Speaker) 91-0126
 (For 73-0048-2 Speaker) 91-0086
 (For 73-0048-3 Speaker) 91-0126
 Field Coil (Not Replaceable)
 Condenser (250 Mmfd.) ... 60-125157
 "On-Off" Switch ... 61-0137
 Condenser (.5 Mfd.) ... 61-0137
 Condenser (250 Mmfd.) ... 60-125157
 Resistor (150 ohms) ... 33-115334
 Test Socket ... 55-1118
 Vibrator ... 33-0023
 Resistor (250 ohms) ... 33-122334
 Vibrator Choke ... 65-0075
 Condenser (.5 Mfd.) ... 61-0137
 Power Transformer ... 65-0318
 Condenser (3,000 Mmfd.) ... 61-0115
 Resistor (1,000 ohms) ... 33-210434
 Resistor (22,000 ohms) ... 33-322434
 Condenser (.25 Mfd.) ... 61-0135
 Condenser (.05 Mfd.) ... 61-0111
 Resistor (680 ohms) ... 33-168336
 Test Link ... 57-1121
 Condenser (250 Mmfd.) ... 60-125157
 Pilot Lamp ... 69-0004
 Resistor (47,000 ohms) ... 33-347334
 Receiver Housing ... 77-0695FC51
 Control Assembly ... 85-0134
 Dial ... 55-1194
 Drive Cord ... 57-1223FA3
 Tuning Shaft ... 57-1384
 Volume Shaft ... 57-1889FCP
 Pointer ... 95-0135
 Tone Control Lead ... 57-1340FA3
 Hook Bolt (Radio Mfg.) ... W166SFE7
 Lockwasher (Radio Mfg.) ... W98FA3
 Nut (Radio Mfg.) ... 57-1403FA3
 Cable Clamps ... 30-4007
 Interference Condenser ... 33-1106
 Distributor Resistor ... 33-1106
 Tube Side Cover ... 318-2388
 Wiring Slide Cover ... 57-1345FC51
 Speaker Socket ... 55-0445
 Loktal Socket ... 55-0575
 Vibrator Socket ... 27-6153
 Volume Control Nut ... W684FA3
 Tone Control Switch
 Shaft ... 57-1839FA3

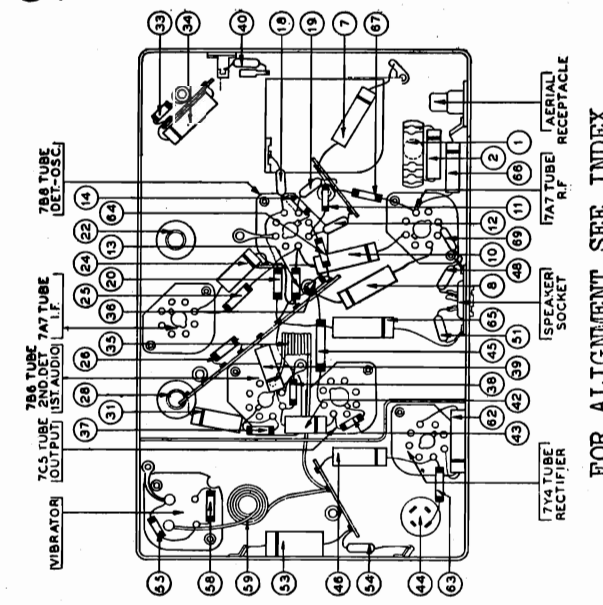
- The following parts are for the Dash
 Speaker:
 Speaker & Housing
 Complete ... 318-2393
 Speaker Unit ... 73-0058
 Stud (Speaker Mfg.) ... 57-0892
 Washer (Speaker Mfg.) ... 2702FA3
 Lockwasher (Speaker Mfg.) ... W338
 Nut (Speaker Mfg.) ... W55FA3
 Wood Spacer (Speaker Mfg.) 55-0642
 The following parts are for the Instru-
 ment Board Speaker:
 Speaker Unit ... 73-0047
 "U" Bracket ... 57-0720FA3
 Rubber Gasket & Screen ... 55-0958
 Side Brackets ... 57-1461
 Cardboard Baffle ... 55-0957
 Cardboard Spacers ... 55-0449
 Nuts (Speaker Mfg.) ... W124FA3
 Screw (Speaker Mfg.) ... W152FA4
 Lockwasher (Speaker Mfg.) ... W291
 Lockwasher (Speaker Mfg.) ... W286
 Carriage Bolt ... 97-0061FA3
 Carriage Bolt Nut ... W98FA3
 Bolt (Bracket Mfg.) ... 97-0120FA34



SCHEMATIC MODEL AR-45

I.F. = 455 KC

- | No. | Description | Part No. |
|-----|-------------------------------------|-----------|
| 1 | Antenna Choke | 65-0109 |
| 2 | Condenser (.01 Mfd.) | 61-0114 |
| 3 | Tuning Condenser | 63-0047 |
| 4 | Antenna Transformer (on Tun. Cond.) | 63-0047 |
| 5 | Antenna Transformer | 63-0047 |
| 6 | Aerial Transformer | 63-0047 |
| 7 | Condenser (.05 Mfd.) | 61-0101 |
| 8 | Condenser (.05 Mfd.) | 61-0101 |
| 9 | Condenser (3,300 ohms) | 33-233334 |
| 10 | Resistor (68,000 ohms) | 33-368154 |
| 11 | Condenser (250 Mmfd.) | 60-125157 |
| 12 | Resistor (180 ohms) | 33-118336 |
| 13 | Resistor (180 ohms) | 33-118336 |
| 14 | Low Frequency Pad | 63-0048 |
| 15 | High Frequency Pad | 63-0048 |
| 16 | Condenser (250 Mmfd.) | 60-125157 |
| 17 | Resistor (25 Mmfd.) | 60-025337 |
| 18 | Resistor (68,000 ohms) | 33-368334 |
| 19 | First I. F. Transformer | 65-0319 |
| 20 | First I. F. Transformer | 65-0319 |
| 21 | Condenser (.05 Mfd.) | 61-0101 |
| 22 | Resistor (180 ohms) | 33-118336 |



NOTE: TOP VIEWS OF SWITCH WAFERS ARE SHOWN CONNECTED FOR OPERATION ON DIAL TUNING. SHADED ROTORS ARE LOCATED ON UNDERSIDE OF WAFERS.

NOTE: THIS SIDE OF A BATTERY GROUNDED TO CASE. (FRAME OF CAR.)

PART No. 79-0853

7B8 TUBE 2ND DET.

7A7 TUBE 1ST AUDIO

7B8 TUBE DET. OSC.

VIBRATOR

7Y4 TUBE RECTIFIER

7C5 TUBE OUTPUT

7A7 TUBE R.F.

AERIAL RECEPTOR

FOR OTHER DATA SEE INDEX

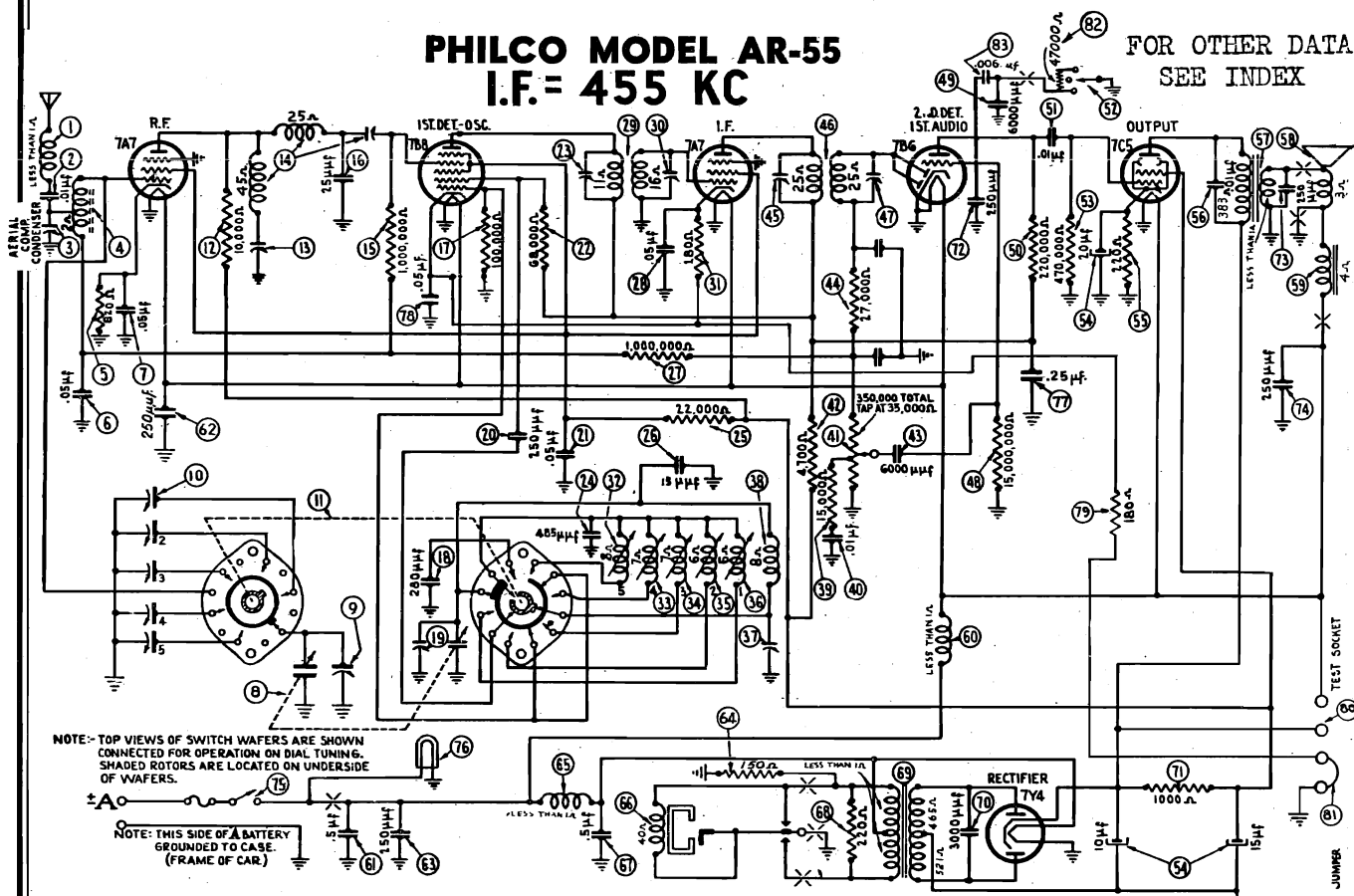
No.	Description	Part No.
1	Antenna Choke	65-0102
2	Condenser (.01 Mfd.)	61-0114
3	Aerial Compensator	Part of 3
4	Antenna Transformer	65-0323
5	Resistor (820 ohms)	33-182336
6	Condenser (.05 Mfd.)	61-0101
7	Condenser (.05 Mfd.)	61-0101
8	Tuning Condenser	63-0047
9	Antenna Padder (on Tun. Cond.)	
10	Antenna Padder Assembly	77-0512
11	Wafer Switch	77-0506
12	Resistor (10,000 ohms)	33-310334
13	Wave Trap Padder	Part of 13
14	R. F. Transformer	65-0321
15	Resistor (1,000,000 ohms)	33-510154
16	Condenser (25 Mmfd.)	30-1987
17	Resistor (100,000 ohms)	33-410154
18	Silver Mica Condenser (280 Mmfd.)	61-0043
19	Oscillator Padder (on Tun. Cond.)	
20	Condenser (250 Mmfd.)	60-125157
21	Condenser (.05 Mfd.)	61-0101
22	Resistor (68,000 ohms)	33-368334
23	Padder (Pri. 1st I. F. Trans.)	
24	Silver Mica Condenser (485 Mmfd.)	61-0144
25	Resistor (22,000 ohms)	33-322434
26	Condenser (15 Mmfd.)	60-015337
27	Resistor	
28	(1,000,000 ohms)	33-510154
29	Condenser (.05 Mfd.)	61-0101
30	First I. F. Transformer	65-0319
31	Padder (Sec. 1st I. F. Trans.)	
32	Resistor (470 ohms)	33-147336
33	Oscillator Transformer (550-1065 KC)	65-0173
34	Oscillator Transformer (600-1185 KC)	65-0172
35	Oscillator Transformer (660-1240 KC)	65-0171
36	Oscillator Transformer (750-1410 KC)	65-0170
37	Oscillator Transformer (855-1580 KC)	65-0169
38	Low Frequency Padder	63-0048
39	Manual Oscillator Transformer	65-0420
40	Resistor (330 ohms)	33-133334
41	Condenser (.1 Mfd.)	61-0104
42	Volume Control (350,000 ohms)	67-0043
43	Resistor (4700 ohms)	33-247334
44	Condenser (6000 Mmfd.)	61-0155
45	Resistor (27,000 ohms)	33-327154
46	Padder (Pri. 2nd I. F. Trans.)	
47	Second I. F. Transformer	65-0320
48	Padder (Sec. 2nd I. F. Trans.)	
49	Resistor (15,000,000 ohms)	33-615154
50	Condenser (.01 Mfd.)	61-0114
51	Resistor (220,000 ohms)	33-422334
52	Condenser (.01 Mfd.)	61-0120
53	Tone Control Switch Wafer	77-0733
54	Resistor (470,000 ohms)	33-447154
55	Filter Condenser (10-15-20 Mfd.)	61-0089
56	Resistor (220 ohms)	33-122434
57	Condenser (.015 Mfd.)	61-0138
58	Output Transformer	65-0419
59	Replacement Cone (For 73-0059-4 Speaker)	91-0209
60	Field Coil (For 73-0059-9 Speaker)	91-0213
61	Filament Choke	32-2729
62	Condenser (.5 Mfd.)	61-0106
63	Condenser (250 Mmfd.)	60-125157
64	Condenser (250 Mmfd.)	60-125157
65	Resistor (180 ohms)	33-118336
66	Vibrator Choke	65-0075
67	Vibrator	83-0025
68	Condenser (.5 Mfd.)	61-0187
69	Resistor (220 ohms)	33-122334
70	Power Transformer	65-0318
71	Condenser (3000 Mmfd.)	61-0115
72	Resistor (1000 ohms)	33-210434
73	Condenser (250 Mmfd.)	60-125157
74	Test Socket	55-1118
75	Test Link	57-1121
76	On-Off Switch	61-0125
77	Pilot Lamp	34-2039
78	Condenser (.25 Mfd.)	61-0125
79	Condenser (.05 Mfd.)	61-0101
80	Resistor (150 ohms)	33-115334
81	Resistor (1500 ohms)	33-215334
82	Condenser (.07 Mfd.)	61-0152
83	Resistor (47,000 ohms)	33-347334
84	Condenser (6000 Mmfd.)	61-0155
85	Radio Housing	77-0752FC59
8		

MODEL AR-55

PHILCO RADIO & TELEVISION CORP

PHILCO MODEL AR-55 I.F. = 455 KC

FOR OTHER DATA
SEE INDEX



No.	Description	Part No.
1	Antenna Choke	65-0102
2	Condenser (.01 Mfd.)	61-0114
3	Aerial Compensator	Part of 10
4	Antenna Transformer	65-0323
5	Resistor (820 ohms)	33-182336
6	Condenser (.05 Mfd.)	61-0101
7	Condenser (.05 Mfd.)	61-0101
8	Tuning Condenser	63-0047
9	Antenna Padder (on Tun. Cond.)	77-0512
10	Antenna Padder Assembly (For Push Buttons)	77-0506
11	Wafer Switch	33-310334
12	Resistor (10,000 ohms)	33-310334
13	Wave Trap Padder	Part of 10
14	R. F. Transformer	65-0321
15	Resistor (1,000,000 ohms)	33-510154
16	Condenser (.05 Mfd.)	33-1067
17	Resistor (100,000 ohms)	33-410154
18	Condenser (.280 Mfd.)	61-0043
19	High Frequency Padder (on Tun. Cond.)	60-125157
20	Condenser (.05 Mfd.)	61-0101
21	Resistor (68,000 ohms)	33-368334
22	Padder (Pri. 1st I. F. Trans.)	61-0144
23	Condenser (.485 Mfd.)	33-322434
24	Resistor (22,000 ohms)	60-015327
25	Condenser (.15 Mfd.)	33-510154
26	Condenser (.05 Mfd.)	61-0101
27	First I. F. Transformer	65-0319
28	Padder (Sec. 1st I. F. Trans.)	33-118336
29	Resistor (180 ohms)	65-0173
30	Oscillator Transformer (550-1065 KC)	65-0172
31	Oscillator Transformer (600-1165 KC)	65-0171
32	Oscillator Transformer (680-1240 KC)	65-0170
33	Oscillator Transformer (750-1410 KC)	65-0169
34	Oscillator Transformer (855-1580 KC)	63-0048
35	Low Frequency Padder	65-0420
36	Manual Oscillator Trans.	33-315154
37	Resistor (15,000 ohms)	61-0114
38	Condenser (.01 Mfd.)	67-0082
39	Volume Control (350,000 ohms)	33-247334
40	Resistor (4,700 ohms)	61-0155
41	Condenser (6,000 Mmfd.)	33-327154
42	Resistor (27,000 ohms)	33-327154
43	Padder (Pri. 2nd I. F. Trans.)	65-0320

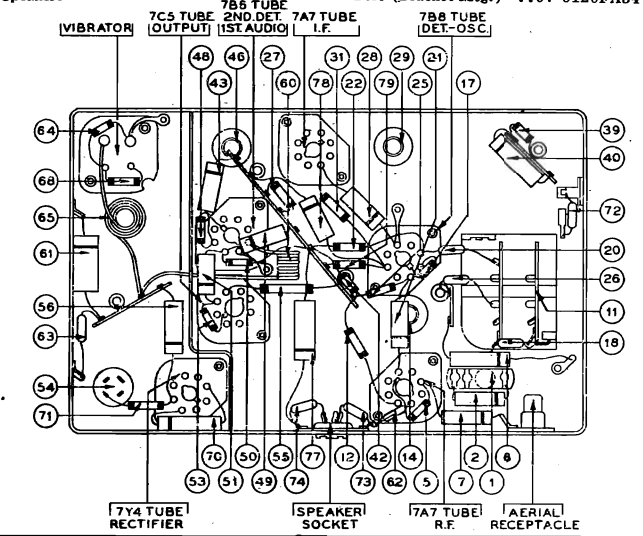
No.	Description	Part No.
44	Second I. F. Transformer	65-0320
45	Padder (Sec. 2nd I. F. Trans.)	33-615154
46	Resistor (15,000,000 ohms)	61-0155
47	Condenser (6,000 Mmfd.)	33-422334
48	Resistor (220,000 ohms)	61-0120
49	Condenser (.01 Mfd.)	61-0120
50	Tone Control Switch Wafer	77-0733
51	Resistor (470,000 ohms)	33-447154
52	Filter Condenser (10-15-20 Mfd.)	61-0089
53	Resistor (220 ohms)	33-122436
54	Condenser (.01 Mfd.)	61-0124
55	Output Transformer	65-0408
56	Replacement Cone (For 73-0047-2 Speaker)	91-0086
57	Resistor (220 ohms)	91-0126
58	Condenser (.01 Mfd.)	91-0086
59	Field Coil Assembly (Not Replaceable)	91-0126
60	Filament Choke	32-2729
61	Condenser (.5 Mfd.)	61-0106
62	Condenser (250 Mmfd.)	60-125157
63	Condenser (250 Mmfd.)	60-125157
64	Resistor (150 ohms)	33-115334
65	Vibrator Choke	65-0075
66	Vibrator	83-0025
67	Condenser (.5 Mfd.)	61-0137
68	Resistor (220 ohms)	33-122334
69	Power Transformer	65-0318
70	Condenser (3,000 Mmfd.)	61-0115
71	Resistor (1,000 ohms)	33-210434
72	Condenser (250 Mmfd.)	60-125157
73	Condenser (250 Mmfd.)	60-125157
74	Condenser (250 Mmfd.)	60-125157
75	"On-Off" Switch	85-0112
76	Pilot Lamp	34-2039
77	Condenser (.25 Mfd.)	61-0125
78	Condenser (.05 Mfd.)	61-0101
79	Resistor (180 ohms)	33-118336
80	Test Socket	55-1118
81	Test Link	57-1121
82	Resistor (47,000 ohms)	33-347334
83	Condenser (6,000 Mmfd.)	61-0155
84	Receiver Housing	77-0694FC59
85	Control Assembly	85-0133
86	Dial	55-1194
87	Drive Cord	55-0935
88	Drive Cord Spring	57-1425FA3
89	Tuning Shaft	57-1385
90	Volume Shaft	57-1384
91	Push Button Shaft	57-1386
92	Pointer	57-1889FCP
93	Station Indicator Drum	77-0755
94	Tone Control Lead	95-0135

No.	Description	Part No.
95	Hook Bolt (Receiver Mtg.)	57-1340FA3
96	Lockwasher (Receiver Mtg.)	W1663FE7
97	Nut (Receiver Mtg.)	W98FA3
98	Cable Clamps	57-1429FA38
99	Interference Condenser	30-4007
100	Distributor Resistor	33-1196
101	Tube Side Cover	318-2382
102	Wiring Side Cover	57-1345FC59
103	Padder Cover	57-1348FC59
104	Speaker Socket	55-0443
105	Loktal Socket	55-1075
106	Vibrator Socket	27-6153
107	Screw & Core Assembly	57-1363
108	Coil Caps (Brass)	W-2032
109	Volume Control Nut	W684FA3
110	Tone Control Switch	57-1839FA3

The following parts are for the Dash

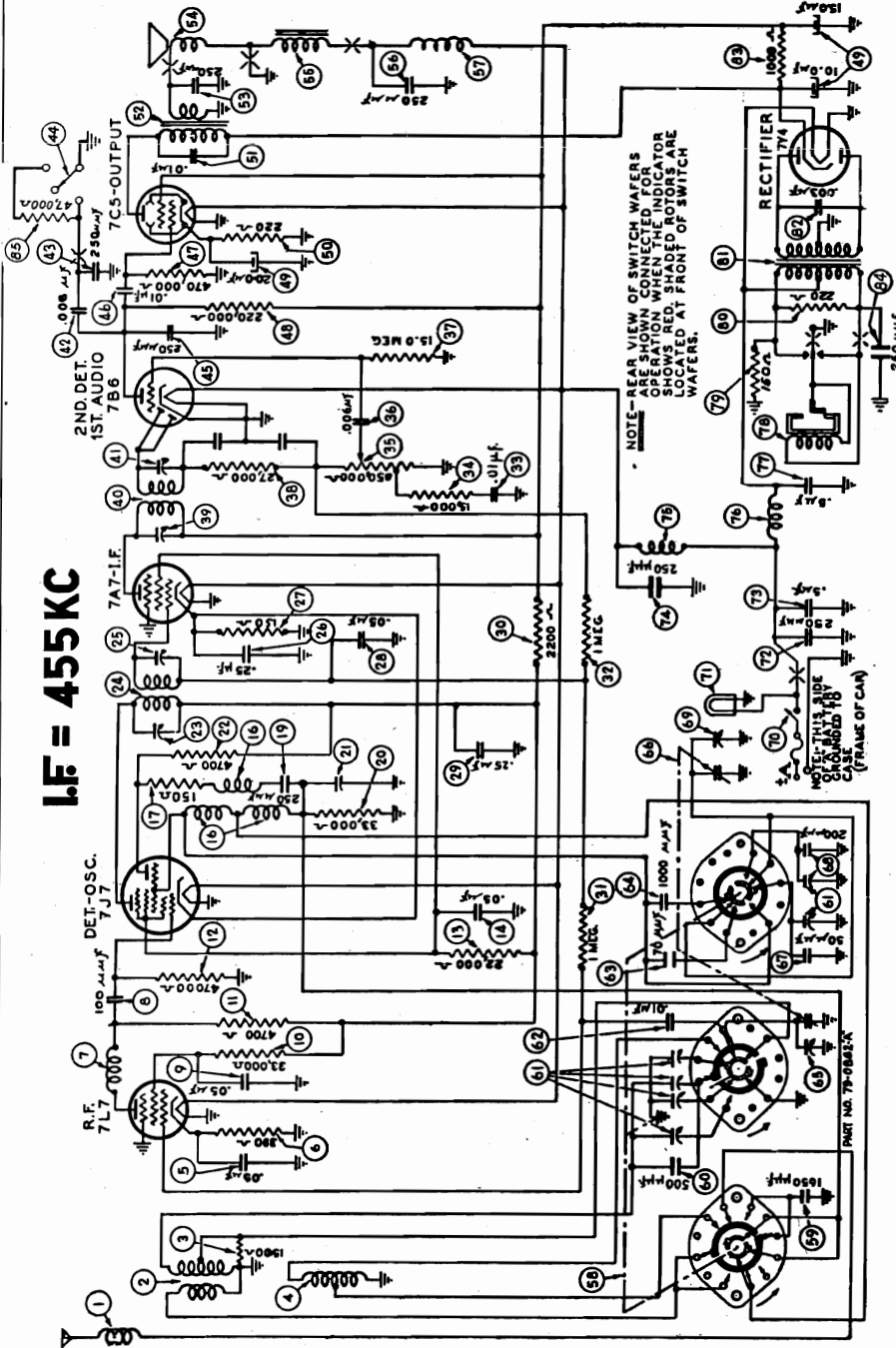
Speaker:

7C5 TUBE	7B6 TUBE	7A7 TUBE	7B6 TUBE
OUTPUT	2ND DET.	1ST AUDIO	DET.-OSC.



PHILCO RADIO & TELEVISION CORP.

LF = 455 KC



No.	Description	Part No.
1	Antenna Choke	65-0341
2	Short Wave Antenna	65-0340
3	Transformer	33-215334
4	Resistor (1500 ohms)	65-0085
5	Resistor (350 ohms)	61-0101
6	Choke	33-130436
7	Condenser (.05 Mfd.)	65-0037
8	Condenser (.05 Mfd.)	61-0117
9	Resistor (33,000 ohms)	33-232334
10	Resistor (17,000 ohms)	33-243334
11	Resistor (47,000 ohms)	33-324334
12	Resistor (22,000 ohms)	33-324334
13	Condenser (.05 Mfd.)	61-0101
14	Oscillator Transformer	65-0339
15	Resistor (150 ohms)	33-113334
16	Condenser (250 Mmfd.)	60-125137
17	Resistor (33,000 ohms)	33-333334
18	Low Frequency Padder	65-0048
19	Resistor (4,000 ohms)	33-247344
20	Padder (Pri. 1st I. F. Trans.)	65-0338
21	Padder (Sec. 1st I. F. Trans.)	61-0112
22	Condenser (.25 Mfd.)	33-115336
23	Resistor (150 ohms)	61-0101
24	Condenser (.05 Mfd.)	61-0125
25	Resistor (22,000 ohms)	33-222434
26	Resistor (1,000,000 ohms)	33-510154
27	Resistor (1,000,000 ohms)	33-510154
28	Condenser (.01 Mfd.)	61-0114
29	Resistor (15,000 ohms)	33-315154
30	Volume Control	67-0032-2
31	Condenser (1000 Mmfd.)	61-0103
32	Resistor (15,000,000 ohms)	33-615154
33	Resistor (37,000 ohms)	33-327154
34	Padder (Pri. 2nd I. F. Trans.)	65-0920
35	Second I. F. Transformer	61-0155
36	Padder (Sec. 2nd I. F. Trans.)	60-125137
37	Condenser (250 Mmfd.)	60-125137
38	Tune Control Switch Wafer	77-0733
39	Condenser (250 Mmfd.)	60-125137
40	Condenser (.01 Mfd.)	61-0120
41	Resistor (470,000 ohms)	33-447154

No.	Description	Part No.
42	Resistor (220,000 ohms)	33-423334
43	Filter Condenser	61-0089
44	Condenser (220 ohms)	33-122436
45	Condenser (.01 Mfd.)	61-0125
46	Output Transformer	65-0408
47	Condenser (250 Mmfd.)	60-125137
48	Replacement (one)	91-0088
49	(For 73-0047-3 Speaker)	91-0126
50	(For 73-0047-3 Speaker)	91-0126
51	(For 73-0058-3 Speaker)	91-0126
52	Field Coil	Not Replaceable
53	Condenser (250 Mmfd.)	60-125137
54	"A" Choke	32-1614
55	Wafer Switch	77-0367
56	Alca Condenser (1650 Mmfd.)	5877

57	Condenser (.5 Mfd.)	61-0137
58	Condenser (250 Mmfd.)	60-125137
59	"A" Choke	32-1604
60	Vibrator Choke	65-0075
61	Condenser (.5 Mfd.)	61-0106
62	Vibrator	61-0106
63	Resistor (150 ohms)	33-115334
64	Resistor (300 ohms)	33-122334
65	Power Transformer	65-0318
66	Condenser (3000 Mmfd.)	61-0115
67	Resistor (1000 ohms)	33-210434
68	Condenser (250 Mmfd.)	60-125137
69	Re-sistor (47,000 ohms)	33-317334
70	Receiver Housing	77-0090F35
71	Speaker Socket	55-0443
72	Lokalt Socket	55-0575
73	Antenna Connector	57-0361

74	Tube Side Cover	57-1358F355
75	Wiring Side Cover	57-1343F355
76	Indicator Plate	57-1343F355
77	Hook Bolt	65-0075
78	Nut (Radio Mtg.)	57-1340F355
79	Lockwasher (Radio Mtg.)	W08F355
80	Cable Clamps	57-1420F358
81	Interference Condenser	30-4007
82	Generator	30-4490
83	Spark Plug Suppressor	33-1015
84	Distributor Resistor	33-1196
85	Hood Grounding Screws	97-0125F353
86	Control Assembly	85-0132
87	Pointer	57-1388
88	Tone Switch Shaft	57-1889F353
89	Tone Switch Spring	57-1840
90	Dial	55-1198
91	Station Indicator Drum	57-0721
92	Slide & Pawl Assembly	57-0721

Copper Braid
(% wide, 24" long) . . . 55-0145
Drive Cord . . . 55-0885
Drive Cord Spring . . . 57-1887F353
Dial Background Plate . . . 57-1887F353
Volume Flexible Shaft . . . 57-1384
Tuning Flexible Shaft . . . 57-1385
Station Indicator Flexible
Shaft . . . 57-1388
Pointer . . . 57-1889F353
Tone Switch Shaft . . . 57-1840
Tone Switch Spring . . . 55-1198
Dial . . . 55-1198
Station Indicator Drum . . . 57-0721
Slide & Pawl Assembly . . . 57-0721

MODEL AR-65

PHILCO RADIO & TELEVISION CORP.

INSTRUCTIONS FOR ADJUSTING SHORT WAVE PADDERS
(FIGURE 3)

OPERATION	SIGNAL GENERATOR		DUMMY CAPACITY	SPECIAL INSTRUCTIONS	ADJUST PADDER
	FREQUENCY	CONNECTION			
	PUSH IN THE RIGHT HAND KNOB ON THE CONTROL UNTIL THE "RED" DOT APPEARS IN THE BAND INDICATOR WINDOW				
1	10 M.C.	To Aerial Receptacle on Radio	Note 1	Note 2	OSC. 10 M.C. Pad to Outer Peak ANT. 9.5 M.C. ANT. 6 M.C.
2	9.5 M.C.	To Aerial Receptacle on Radio	Note 1	Rotate Tuning Condenser to 9.5 M.C. Signal	
3	6 M.C.	To Aerial Receptacle on Radio	Note 1	Rotate Tuning Condenser to 6 M.C. Signal	
	PUSH IN THE RIGHT HAND KNOB ON THE CONTROL UNTIL THE "WHITE" DOT APPEARS IN THE BAND INDICATOR WINDOW				
1	12.1 M.C.	To Aerial Receptacle on Radio	Note 1	Note 2	OSC. 12.1 M.C. ANT. 11.9 M.C. ANT. 11.7 M.C.
2	11.9 M.C.	To Aerial Receptacle on Radio	Note 1	Rotate Tuning Condenser to 11.9 M.C. Signal	
3	11.7 M.C.	To Aerial Receptacle on Radio	Note 1	Rotate Tuning Condenser to 11.7 M.C. Signal	
4	OPERATIONS 2 AND 3 ARE IMPORTANT AND MUST BE REPEATED UNTIL MAXIMUM SIGNAL IS RECEIVED				

OPERATION	SIGNAL GENERATOR		DUMMY CAPACITY	SPECIAL INSTRUCTIONS	ADJUST PADDER
	FREQUENCY	CONNECTION			
1	PUSH IN THE RIGHT HAND KNOB ON THE CONTROL UNTIL THE BLACK DOT APPEARS IN THE BAND INDICATOR WINDOW AND STATIONS CAN BE TUNED IN BY MANUAL TUNING				
2	455 K.C.	To Aerial Receptacle on Radio	.1 Mfd.	Note 2	(11) (38) (24) (25)
3	1580 K.C.	To Aerial Receptacle on Radio	See Note 1	Note 2	(41) (39) (24) (25)
4	1400 K.C.	To Aerial Receptacle on Radio	See Note 1	Set Tuning Condenser at 1400 K.C.	(15)
5	580 K.C.	To Aerial Receptacle on Radio	See Note 1	Set Tuning Condenser at 580 K.C.	(15) Note 4
6	1580 K.C.	To Aerial Receptacle on Radio	See Note 1	Note 2	(21)
7	1400 K.C.	To Aerial Receptacle on Radio	See Note 1	Set Tuning Condenser at 1400 K.C.	(15) Note 3
8	580 K.C.	To Aerial Receptacle on Radio	See Note 1	Set Tuning Condenser at 580 K.C.	(15) Note 4
					(21) Note 3

Make all adjustments for maximum reading on the output meter.

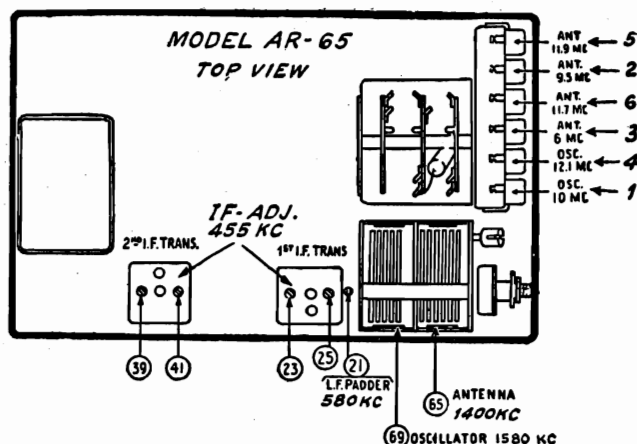
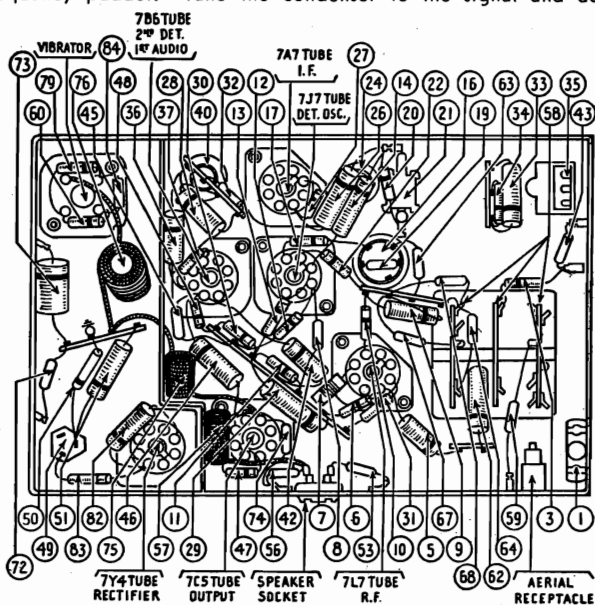
NOTE 1—Connect the aerial lead, Part No. 95-0185, to the aerial receptacle in the radio. Connect a 10 mmfd. Condenser in series between the signal generator and the aerial lead.

NOTE 2—Turn the condenser rotor plates completely out of mesh as far as they will go.

NOTE 3—Rock the tuning condenser while adjusting the low frequency padder. Tune the condenser to the signal and adjust

the padder for maximum output. Rotate the tuning condenser back and forth slightly for maximum output. Then readjust the padder for maximum output. Repeat this procedure until no further improvement is noticed.

NOTE 4—When the aerial stage adjustment is made with the Radio installed in the car, the Radio aerial lead must be connected to the car aerial in the usual manner. Connect the signal generator output lead to a wire placed near the car aerial but not connected to it.

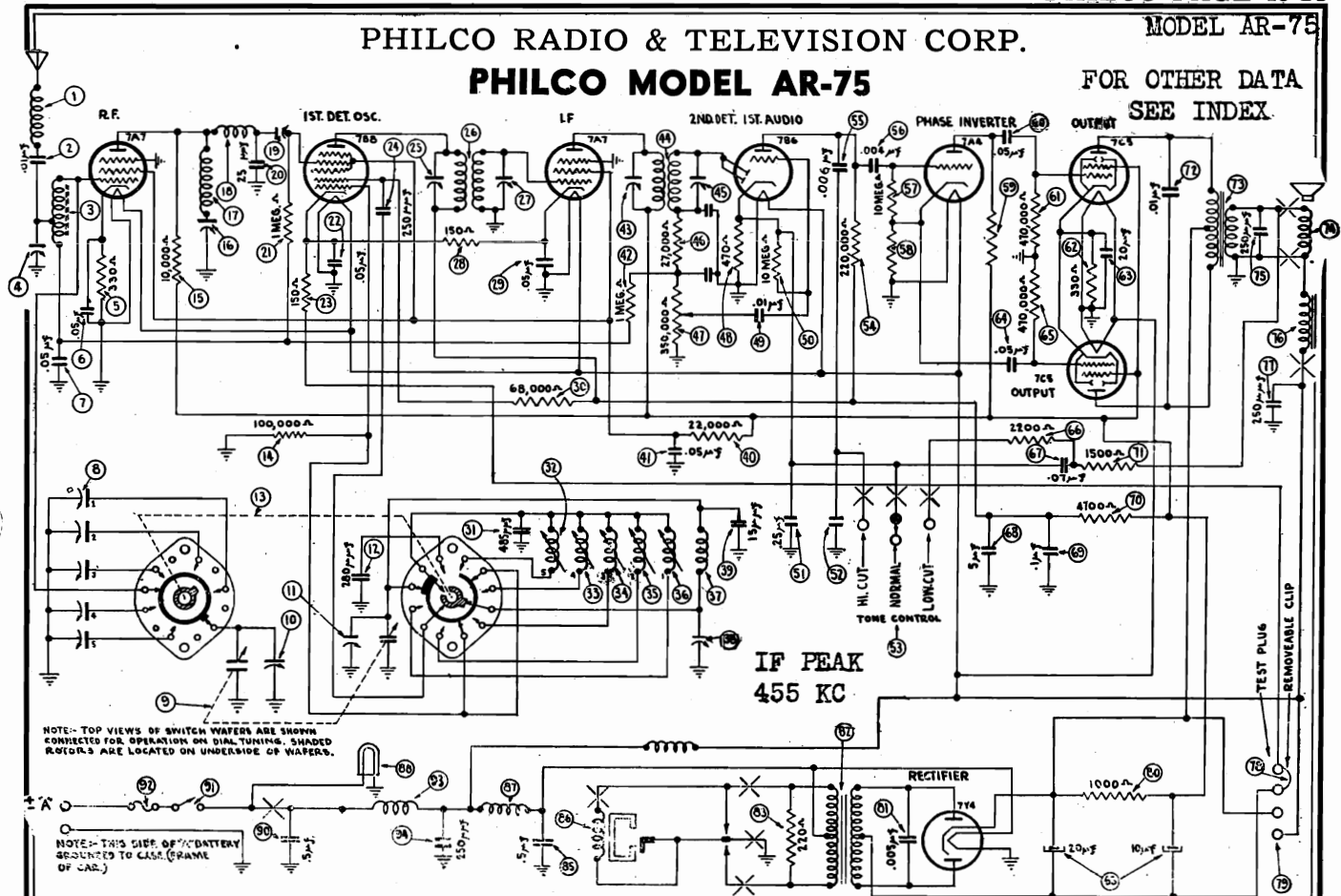


PHILCO RADIO & TELEVISION CORP.

MODEL AR-75

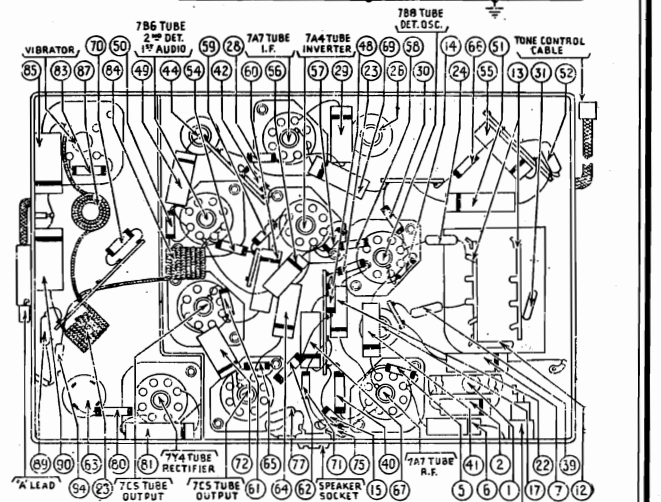
PHILCO MODEL AR-75

FOR OTHER DATA
SEE INDEX



No.	Description	Part No.
1	Antenna Choke	65-0102
2	Condenser (.01 Mfd.)	61-0014
3	Antenna Transformer	65-0323
4	Aerial Compensator	Part of 3
5	Resistor (330 ohms)	33-133336
6	Condenser (.05 Mfd.)	61-0111
7	Condenser (.05 Mfd.)	61-0101
8	Antenna Padder Assembly	77-0512
9	Tuning Condenser	63-0047
10	R. F. Padder (on Tun. Cond.)	
11	Oscillator Padder (on Tun. Cond.)	
12	Silver Mica Condenser (280 Mmfd.)	61-0043
13	Wafer Switch Assembly	77-0506
14	Resistor (100,000 ohms)	33-410154
15	Resistor (10,000 ohms)	33-103334
16	I. F. Wave Trap Padder	Part of 10
17	R. F. Transformer	65-0321
18	Coil	Part of 10
19	Padder	Part of 10
20	Condenser (25 Mmfd.)	30-1067
21	Resistor (1,000,000 ohms)	33-510154
22	Condenser (.05 Mfd.)	61-0101
23	Resistor (150 ohms)	33-115336
24	Condenser (250 Mmfd.)	60-125157
25	Padder (Pri. 1st I. F. Trans.)	
26	First I. F. Transformer	65-0319
27	Padder (Sec. 1st I. F. Trans.)	
28	Resistor (150 ohms)	33-115336
29	Condenser (.05 Mfd.)	61-0111
30	Resistor (68,000 ohms)	33-368334
31	Silver Mica Condenser (485 Mmfd.)	61-0144
32	Oscillator Transformer (550-1065 K.C.)	65-0173
33	Oscillator Transformer (600-1165 K.C.)	65-0172
34	Oscillator Transformer (660-1240 K.C.)	65-0171
35	Oscillator Transformer (750-1410 K.C.)	65-0170
36	Oscillator Transformer (855-1580 K.C.)	65-0169
37	Manual Oscillator Transformer	65-0420
38	Low Frequency Padder	63-0048
39	Condenser (15 Mmfd.)	61-015327
40	Resistor (22,000 ohms)	33-322434
41	Condenser (.05 Mfd.)	61-0101
42	Resistor (1,000,000 ohms)	33-510154
43	Padder (Pri. 2nd I. F. Trans.)	
44	Second I. F. Transformer	65-0320
45	Padder (Sec. 2nd I. F. Trans.)	
46	Resistor (27,000 ohms)	33-327154
47	Volume Control	

No.	Description	Part No.
48	Resistor (470 ohms)	33-147336
49	Condenser (.01 Mfd.)	61-0110
50	Resistor (10,000,000 ohms)	33-610154
51	Condenser (.25 Mfd.)	61-0112
52	Condenser (100 Mmfd.)	60-11015
53	Tone Control Switch	77-0733
54	Resistor (220,000 ohms)	33-422334
55	Condenser (6,000 Mmfd.)	61-006211
56	Condenser (4,000 Mmfd.)	61-0129
57	Resistor (10,000,000 ohms)	33-610154
58	Resistor (47,000 ohms)	33-347334
59	Resistor (47,000 ohms)	33-347334
60	Condenser (.05 Mfd.)	61-0122
61	Resistor (470,000 ohms)	33-447154
62	Resistor (330 ohms)	33-133436
63	Filter Condenser (5-10-20-20 Mfd.)	61-0150
64	Condenser (.05 Mfd.)	61-0101
65	Resistor (470,000 ohms)	33-447154
66	Resistor (2,200 ohms)	33-222334
67	Condenser (.07 Mfd.)	61-0152
68	Condenser (.1 Mfd.)	61-0113
69	Resistor (4,700 ohms)	33-247334
70	Resistor (1,500 ohms)	33-215334
71	Condenser (.01 Mfd.)	61-0124
72	Output Transformer	65-0402
73	Cone & Voice Coil (For 73-0056-2 Speaker)	91-0164
74	Cone & Voice Coil (For 73-0056-3 Speaker)	91-0165
75	Condenser (250 Mmfd.)	60-125157
76	Field Coil	Not Replaceable
77	Condenser (250 Mmfd.)	60-125157
78	Test Plug Link	57-1121
79	Test Socket	55-1118
80	Resistor (1,000 ohms)	33-210434
81	Condenser (5,000 Mmfd.)	61-0152
82	Power Transformer	65-0403
83	Resistor (220 ohms)	33-122334
84	Condenser (.5 Mfd.)	61-0134
85	Vibrator	83-0025
86	Vibrator Choke	65-0075
87	Pilot Lamp	34-2039
88	Condenser (.5 Mfd.)	61-0134
89	On-Off Switch	85-0112
90	Fuse	45-2559
91	"A" Choke	32-1561
92	Condenser (250 Mmfd.)	60-125157
93	Housing	77-0694FC54
94	Control Assembly	85-0129
95	Dial	55-1194
96	Cord	55-0935
97	Tuning Shaft	57-1385
98	Volume Shaft	57-1384
99	Push Button Shaft	57-1386



No.	Description	Part No.
1	Rubber Gasket and Screen	55-1320
2	"U" Bracket	57-2162FA3
3	Side Brackets	57-1461FA3
4	Bolt (Bracket Mtg.)	97-0120FA3
5	Cardboard Spacers	55-0449
6	Nut (Speaker Mtg.)	W124FA3
7	Screw (Speaker Mtg.)	W1582FA4
8	Lockwasher (Speaker Mtg.)	W291
9	Lockwasher (Speaker Mtg.)	W286
10	Carriage Bolt	97-C061FA3
11	Carriage Bolt Nut	W98FA3
The following parts are used for dash speaker mounting:		
12	Speaker & Housing Complete	77-0748
13	Speaker Unit	73-0056
14	Speaker Housing	57-0642FC54
15	Stud (Speaker Mtg.)	6122
16	Washer (Speaker Mtg.)	4488
17	Washer (Speaker Mtg.)	W679
18	Nut (Speaker Mtg.)	W55A
19	Back Cover	77-0220
20	Screen & Cloth Assembly	77-0749
21	Ornament	57-0607FA3
22	Speaker Cable	95-0171

MODEL Studebaker Tuner

Part 77-0588

MODEL Packard Tuner

Part 77-0636

PHILCO RADIO & TELEVISION CORP.

- (b) Set up the signal generator to 1600 K.C. and adjust padder (1) (see Fig. 1) for maximum signal. **(3) FOR PACKARD**
- (c) Adjust the signal generator to 1400 K.C. and set the tuning control at 1400 K.C. Adjust the coil form by turning the mounting nut (B) until maximum signal is obtained. In case a peak cannot be obtained, it may be necessary to unsolder the piano wire and move the core slightly, either in or out.

4—ALIGNMENT WHEN ONLY THE OSCILLATOR TRACKING COIL OR CORE IS REPLACED

- (a) Set the signal generator to 600 K.C. and the tuning control at 600 K.C. Adjust screw (4) (see Fig. 1) for maximum signal. Rock the tuning control while making this adjustment. Tune the control to the signal and adjust the screw for maximum output. Rotate the tuning control back and forth slightly until maximum output is obtained. Then readjust the screw until no further improvement is noticed.

- (b) Check and readjust the aerial compensator (2) in the radio, and padders (1), (2), and (4) as described in 1.

5—ALIGNMENT WHEN ONLY THE OSCILLATOR COIL OR CORE IS REPLACED

- (a) Set the piano wire end of the core $1\frac{1}{4}$ " from the end of the coil form when the core draw bar is in the extreme "out" position, and solder the wire to the lug.
- (b) Set up the signal generator to 1600 K.C. and adjust padder (3) (see Fig. 1) for maximum signal. **(1) FOR PACKARD**
- (c) Follow the same procedure as outlined under "1—Complete Alignment Procedure".

- (g) In case a great adjustment was necessary in (f) the adjustments (c) and (d) should be repeated.
- (h) In case the dial calibration is off frequency, it can be corrected by changing the starting position of the oscillator core. This is done by unsoldering the piano wire from the lug and moving the core slightly. A change of $1/64$ " in the position of the core is equivalent to approximately 20 K.C. on the dial. If the dial reads low, it can be corrected by starting the oscillator core further in the coil form. If it reads high, the core should be pulled out. If this position is changed, it will be necessary to realign the radio as described above.

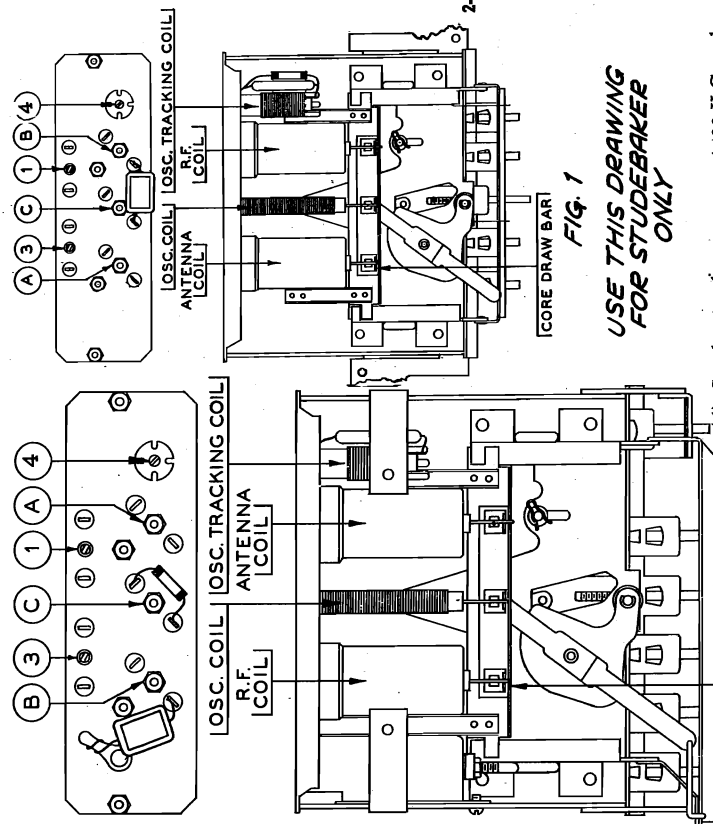
2—ALIGNMENT WHEN ONLY THE ANTENNA COIL OR CORE IS REPLACED

- (a) Set the piano wire end of the core $1\frac{1}{4}$ " from the end of the coil form when the core draw bar is in the extreme "out" position, and solder the wire to the lug.
- (b) Set up the signal generator to 1600 K.C., and adjust the aerial compensator (2) in the radio for maximum signal.

- (c) Adjust the signal generator to 1400 K.C. and set the tuning control at 1400 K.C. Adjust the coil for maximum signal by turning the mounting nut (A) until maximum signal is obtained. In case a peak cannot be obtained, it may be necessary to unsolder the piano wire and move the core slightly, either in or out.
- (d) Repeat (b) and (c).

3—ALIGNMENT WHEN ONLY THE R.F. TRANSFORMER OR CORE IS REPLACED

- (a) Set the piano wire end of core $1\frac{1}{4}$ " from the end of the coil form when the core draw bar is in the extreme "out" position and solder the wire to the lug.



**FIG. 1
USE THIS DRAWING
FOR STUDEBAKER
ONLY**

- (d) Set the signal generator at 1400 K.C. and tune the manual control to 1400 K.C. Adjust the R.F. and antenna coil for maximum signal by turning the mounting nuts (A) and (B).

- (e) Repeat (c) and (d) until no further improvement is noticed.

- (f) Set the signal generator at 600 K.C. and the tuning control at 600 K.C. Adjust the screw (4) (see Fig. 1) for maximum signal. Rock the tuning control when making this adjustment. Tune the control to the signal and adjust the screw for maximum output. Rotate the tuning control back and forth slightly until maximum output is obtained. Then readjust the screw until no further improvement is noticed.

1—COMPLETE ALIGNMENT PROCEDURE

- (a) Push in the tuning control knob so that stations can be tuned in by manual tuning.
- (b) Turn the tuning control knob clockwise as far as it will go so that the cores will be in the extreme "out" position. Set the signal generator to 1600 K.C. and adjust padder (3) (Fig. 1) for maximum signal. **(1) FOR PACKARD**
- (c) Adjust padder (2) aerial compensator in radio and padder (1) (see Fig. 1) for maximum signal. **(3) FOR PACKARD**

PHILCO RADIO & TELEVISION CORP.

MODEL S-1616

INSTALLING CALL LETTERS IN AUTOMATIC TUNING DIAL

One of the "A" leads on the back of the control head must be connected so that the current is supplied to operate the automatic control dial. Insert the fuse in the fuse housing in the separate "A" lead (supplied in the radio package), and connect to the "A" lead on the control. The eyelet end of this lead should be connected to the terminal of the Gas Gauge nearest the center of the car.

1—Select and remove from the Call Letter Sheets, the Call Letters of five popular stations in the area in which the radio is to be operated and that comes within the frequency range of the positions on the dial as shown in Illustration for Model S-1616.

2—If the section of the dial in which the tab marked "DIAL" is not at the indicator window, push the Automatic Station Selector until it is in position in the indicator window. The control must be held against the edge of the instrument panel in order to complete the electrical circuit.

3—Push the Automatic Station Selector once more and No. 1 section of the dial will rotate to the front. Insert in this position the call letter tab of the station having the highest kilocycle frequency.

EXAMPLE: The No. 1 position may have the call letters of a station operating on 1400 kilocycles; the No. 2 position, a station operating on 1050 kilocycles, etc.

4—Repeat this procedure until all five call letter tabs selected are inserted in the dial in the order of their frequency. Be sure and record the call letters with respect to their position on the dial for use in setting up the adjusting screws.

5—The control unit should now be completely installed. Remove the trim panel covering the control openings and place the control unit in position in the back of the instrument panel. Insert the bezel windows in the bezel plate, and apply the bezel plate to the front of the panel. The control and bezel are assembled to the instrument with gland nuts. Using the special gland nut wrench provided, tighten the nuts and then apply the two knobs.

SETTING UP THE RECEIVER FOR AUTOMATIC TUNING

Before setting up the Receiver for automatic tuning, it is necessary to synchronize the automatic dial to the Receiver as follows:

Try to tune in a station with the tuning control knob. If no station can be picked up, push the automatic station selector button until the position is found where stations can be tuned in. This is the "DIAL" position. Remove the automatic control cable from the Receiver and again push the automatic station selector button until the word "DIAL" appears in the dial window. The automatic control cable should then be replaced in its socket on the Receiver and secured with the two self threading screws supplied.

1—Turn the Receiver on and allow it to operate for TWENTY minutes. Remove the cover plate over the automatic tuning adjusting screws. This plate is on the control end of the Receiver and can easily be pried off.

2—Push the automatic station selector button until the word "DIAL" is at the indicator window. Tune in the station whose call letters are in the No. 5 position on the dial (the lowest frequency station) and note the program. Push the automatic selector button five times and this station's call letters will appear at the indicator window.

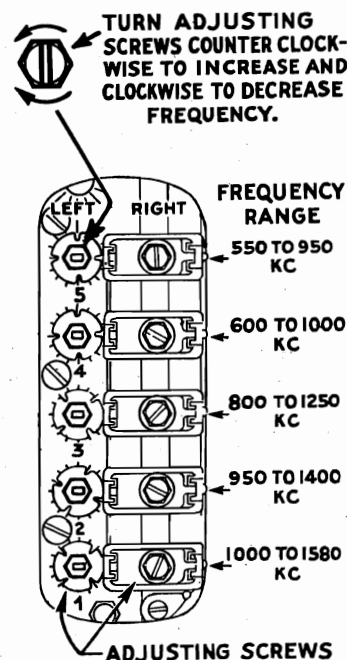
IMPORTANT—Start adjustments with low frequency screws.

3—With a small screwdriver, turn the No. 5 adjusting screw (See Illustration for Model S-1616) in the left column to the right or left until the station is tuned in. Now adjust the corresponding screw in the right column until maximum volume is obtained. Make these adjustments carefully, as it may be easy to pass by the loudest point on some stations.

4—Press the automatic station selector button until "DIAL" again is at the indicator window and tune in the station whose call letters are in the No. 4 position on the automatic dial (the next higher frequency). Press the automatic button four times and adjust the number 4 set of adjusting screws to this station.

Repeat this procedure until each of the five pairs of adjusting screws has been tuned to its respective station.

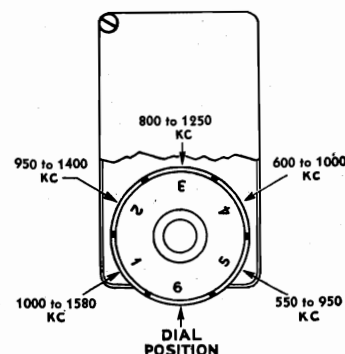
It is **NECESSARY** that the setting of the adjusting screws be repeated to be sure they are properly set so that maximum performance may be had.



VIEW OF AUTOMATIC ADJUSTING SCREWS

Be sure and save the unused call letters giving them to the owner as they may be needed at some future time if the radio is to be operated in a different area where the local stations are not the same.

If the Stations set up on the Automatic Tuning Dial should at some time tune in at the wrong position, the dial can be easily synchronized to the radio as follows:



PHANTOM VIEW OF THE AUTOMATIC-DIAL SHOWING POSITIONS ON DIAL AND FREQUENCY RANGE OF EACH

1—Find "DIAL" position as explained in the second Paragraph under "Setting up the Receiver for Automatic Tuning."
2—Remove the automatic cable from the socket on the end of the Receiver.

3—Press the automatic station selector button until "DIAL" appears in the Automatic Window.

4—Replace automatic cable.

FOR OTHER DATA
SEE INDEX

MODEL P-1617
MODEL C-1708

PHILCO RADIO & TELEVISION CORP.

MODEL P-1617

PREPARING FOR AUTOMATIC TUNING ADJUSTMENTS
Turn on the Receiver and allow it to operate for TWENTY minutes before starting this procedure.

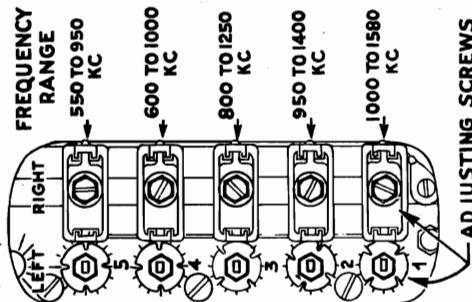
- 1—Try to tune in a station with the manual tuning control knob. If no station is received, press the Automatic Station Selector button and again try to tune in a station. Repeat if necessary until the Automatic Station Dial has rotated to a point where stations may be tuned in with the manual tuning knob. This point will be the "DIAL" position of the Automatic Station Selector and call letters may now be inserted in the dial.
- 2—Remove the right knob, gland nut cover, gland nut and bezel.

Remove the pilot lamp assembly from the automatic dial housing.
Remove the two screws in the front right side of the automatic dial housing. (These screws can be seen thru the opening in the instrument panel when the bezel is removed.)

- 3—Remove the Automatic Control Dial and assembly from the control units and drop it down below the edge of the instrument panel so that the dial is accessible.

4—Select and remove from the call letter sheets, the call letters of five popular stations received in the area in which the radio is to be operated, and that come within the frequency range of the adjusting screws as shown in Illustration for Model P-1617. Also remove the tab marked "DIAL."

- 5—Insert the "DIAL" tab in the slot in the dial which is now at the front. (The position just located by being able to tune in a station).



ADJUSTING SCREWS

FOR OTHER DATA ON THESE MODELS SEE INDEX

MODEL C-1708

1. With the antenna installed and connected, turn on the radio and allow it to operate for TWENTY minutes before making adjustments.

The Receiver must be adjusted with the Skyway antenna fully extended and it is recommended that adjustments be made with the car in a shielded area such as under a viaduct or in a steel constructed building. However best results may be obtained using the new signal Antennator. This permits setting up nearby local stations on the buttons without having the car in a shielded area.

2. Push in the dial button and tune with manual control a weak station between 1350 and 1500 kilocycles. Pull push buttons off. Adjust the antenna compensator with a screw driver by turning the adjusting screw either to the left or right until maximum volume is reached. See illustration.

3. If numbers on buttons are not desired, select and remove from the call letter sheet, five call letter tabs of popular stations received in the area in which the receiver is to be operated, selecting stations within the range of each button as shown in illustration, Model C-1708. Reference to programs published in your local newspaper aids in quick selection of stations. Remove metal caps to install the tabs in push buttons.

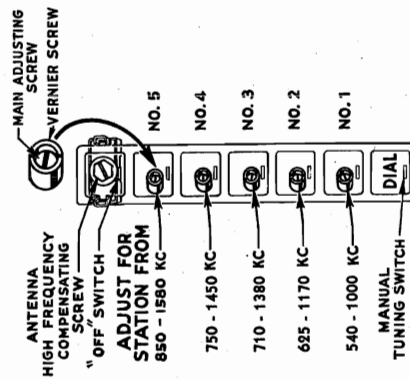
4. Push dial button and tune in the station you have selected for the No. 1 button, identify the program and push in the No. 1 push button shaft. Using a small screw driver, turn the No. 1 adjusting screw (inner screw) and tune in the station selected for this position by turning the screw driver counter-clockwise to increase frequency and clockwise to decrease frequency.

After the station has been tuned in accurately, (see illustration) a finer adjustment can be made by adjusting the vernier screw, which is the outside shell of the adjusting screw. Use a larger screw driver for this operation. Careful adjustment of this screw will insure maximum performance in areas where broadcasting reception is poor.

5. The push buttons may now be replaced on their respective shafts.

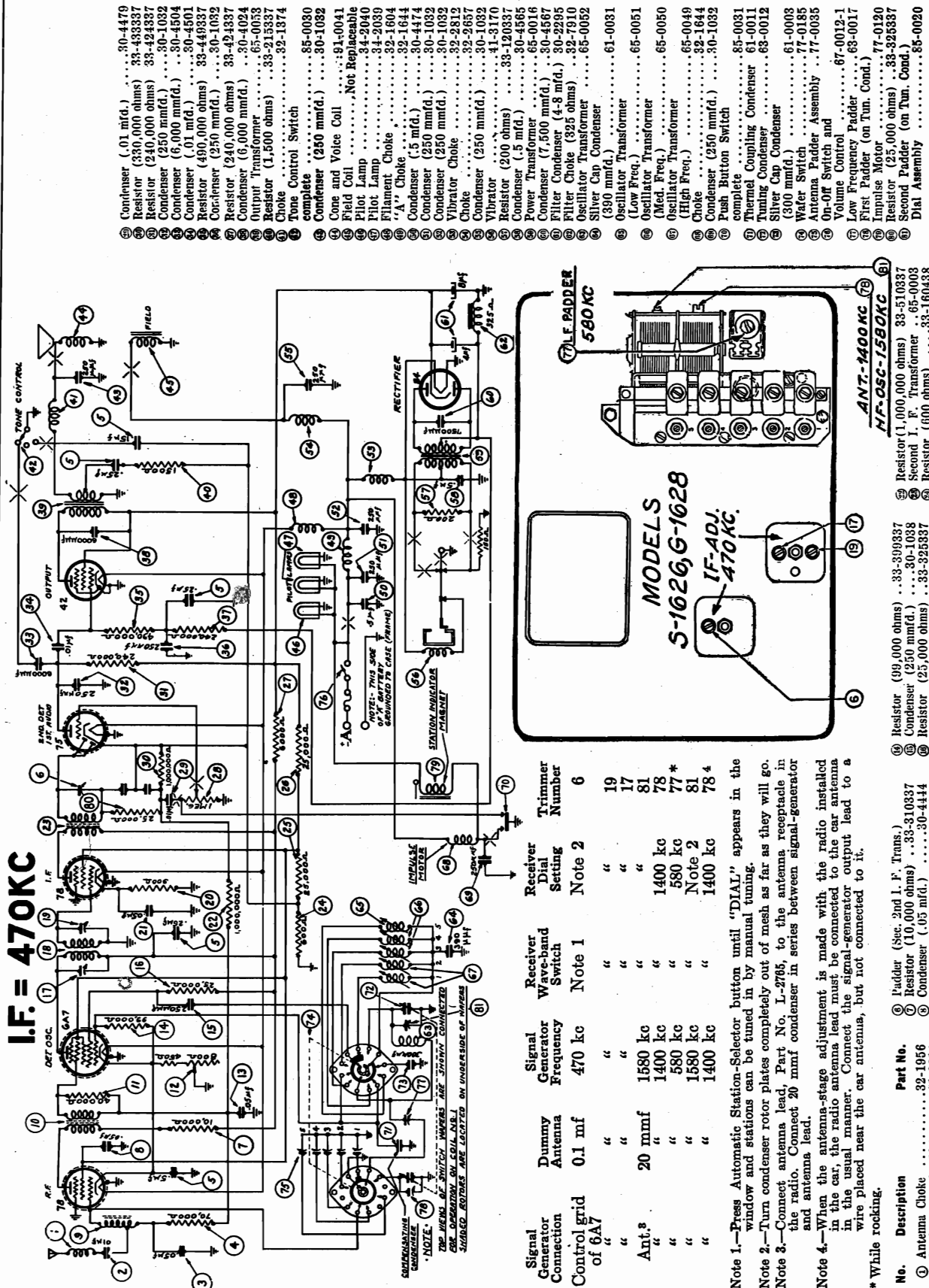
The Receiver may be set up before installing in the car, but FINAL adjustments must be made with the radio operating on the antenna in the car. Eight hundred call letter tabs in sheet form are furnished so that at least five popular radio broadcasting stations can be selected.

BE SURE AND SAVE THE UNUSED CALL LETTERS, GIVING THEM TO THE OWNER AS THEY MAY BE NEEDED AT SOME FUTURE TIME IF THE RADIO IS TO BE OPERATED IN A DIFFERENT AREA WHERE THE LOCAL STATIONS ARE NOT THE SAME.



AUTOMATIC ADJUSTING SCREWS

PHILCO RADIO & TELEVISION CORP.



MODELS S-1626
G-1628

PHILCO RADIO & TELEVISION CORP.

MODELS S-1626 and G-1628

SETTING UP THE RECEIVER FOR AUTOMATIC TUNING

Select and remove from the Call Letter Sheets, the Call Letters of five popular stations received in the area in which the radio is to be operated and that come within the frequency range of the adjusting screws as shown in Illustration for Models S-1626, G-1628. Also remove the tab marked "DIAL."

Insert the "DIAL" tab in the slot in the dial which is at the front.

Hold the control against the edge of the instrument panel in order to complete the electrical circuit and push the automatic selector button. The dial will rotate one position. Insert in the dial, the call letter tab of the station having the highest frequency in kilocycles. Press the selector button once more and insert the call letters of the station with the next highest frequency in kilocycles.

EXAMPLE—The first position may have the call letters of a station operating on 1400 kilocycles; the second position, a station operating on 1050 kilocycles, etc. Repeat this procedure until all five call letter tabs selected are inserted in the dial in the order of their frequency. Be sure and record the call letters with respect to their position on the dial for use in setting up the adjusting screws.

Before setting up the Receiver for automatic tuning, it is necessary to synchronize the automatic dial to the Receiver as follows:

Try to tune in a station with the tuning control knob. If no station can be picked up, push the automatic station selector button until the position is found where stations can be tuned in. This is the "DIAL" position. Remove the automatic control cable from the Receiver and again push the automatic station selector button until the word "DIAL" appears in the dial window. The automatic control cable should then be replaced in its socket on the Receiver and secured with the two self threading screws supplied.

1—Turn the Receiver on and allow it to operate for TWENTY minutes. Remove the cover plate over the automatic tuning adjusting screws. This plate is on the front of the Receiver and can easily be pried off.

2—Push the automatic station selector button until the word "DIAL" is at the indicator window. Tune in the station whose call letters are in No. 5 position on the dial (the lowest frequency station) and note the program. Push the automatic selector button five times and this station's call letters will appear at the indicator window.

3—With a small screwdriver, turn the No. 5 adjusting screw (See Illustration for Models S-1626, S-1628) in the left column to the right or left until the station is tuned in. Now adjust the corresponding screw in the right column until maximum volume is obtained. Make these adjustments carefully, as it may be easy to pass by the loudest point on some stations.

4—Press the automatic station selector button until "DIAL" again is at the indicator window and tune in the station whose call letters are in the No. 4 position on the automatic dial (the next higher frequency). Press the automatic button four times and adjust the number 4 set of adjusting screws.

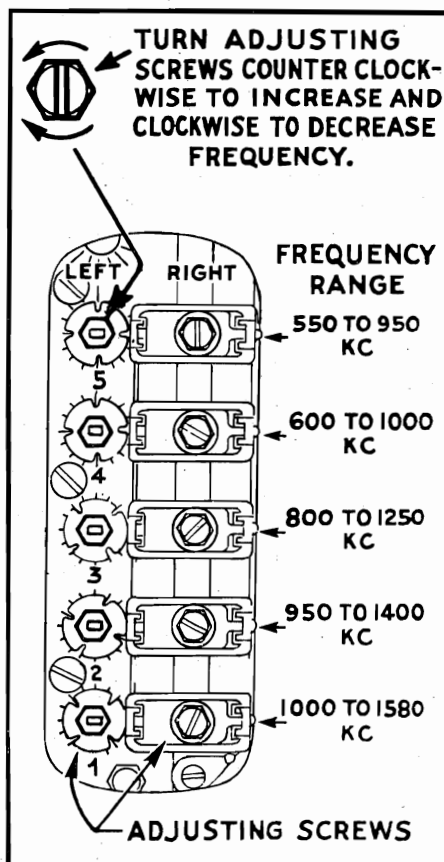
Repeat this procedure until each of the five pairs of adjusting screws has been tuned to its respective station.

It is **NECESSARY** that the setting of the adjusting screws be repeated to be sure they are properly set so that maximum performance may be had.

Be sure and save the unused call letters, giving them to the owner as they may be needed at some future time if the radio is to be operated in a different area where the local stations are not the same.

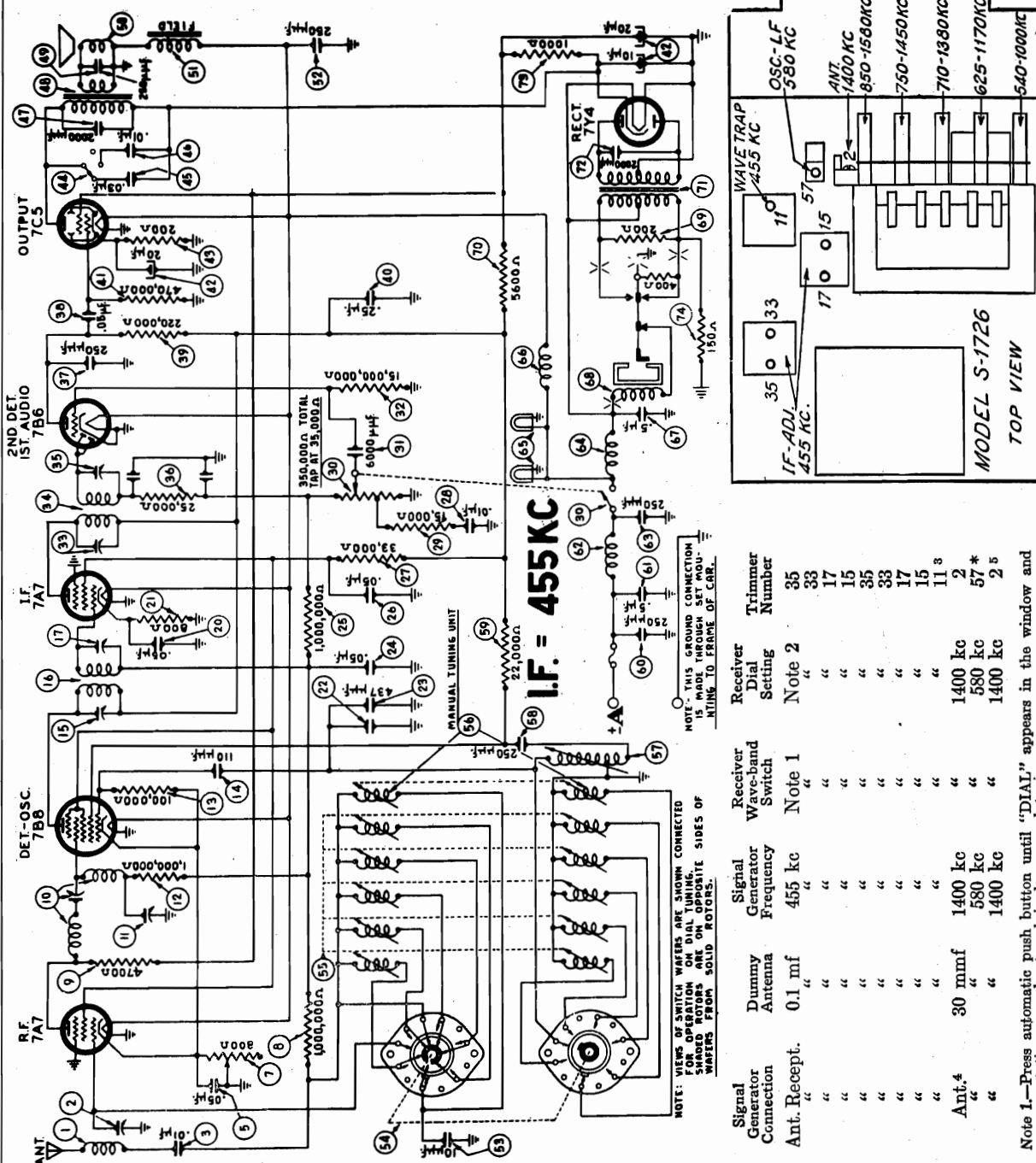
If the Stations set up on the Automatic Tuning Dial should at some time tune in at the wrong position, the dial can be easily synchronized to the radio as follows:

- 1—Find "DIAL" position as explained in the second Paragraph under "Setting up the Receiver for Automatic Tuning."
- 2—Remove the automatic cable from the socket on the end of the Receiver.
- 3—Press the automatic station selector button until "DIAL" appears in the Automatic Window.
- 4—Replace automatic cable.



VIEW OF AUTOMATIC ADJUSTING SCREWS

No.	Description	Part No.
①	Antenna Choke	65-0102
②	Antenna Padder	63-0035
③	Condenser (.01 mfd.)	61-0014
④	Condenser (.05 mfd.)	61-0101
⑤	Sensitivity Control	67-0025
⑥	Resistor (1,000,000 ohms)	33-510154
⑦	Resistor (4700 ohms)	33-247154
⑧	R. F. Transformer	65-0276
⑨	I. F. Wave Trap Padder	33-510154
⑩	Resistor (1,000,000 ohms)	33-510154
⑪	Resistor (100,000 ohms)	33-101154
⑫	Condenser (.110 mfd.)	30-1031
⑬	Padder (Pri. 1st I. F. Trans.)	65-0274
⑭	First I. F. Transformer	65-0274
⑮	Padder (Sec. 1st I. F. Trans.)	61-0101
⑯	Condenser (.05 mfd.)	61-0014
⑰	Resistor (300 ohms)	33-100334
⑱	Thermal Compensator	61-00071
⑲	Sil. Mica Cond. (437 mmfd.)	61-0071
⑳	Condenser (.05 mfd.)	61-0101
㉑	Resistor (1,000,000 ohms)	33-510154
㉒	Condenser (.05 mfd.)	61-0101
㉓	Condenser (.05 mfd.)	61-0101
㉔	Resistor (33,000 ohms)	33-333434
㉕	Condenser (.01 mfd.)	61-0110
㉖	Resistor (15,000 ohms)	33-315154
㉗	Volume Control (350,000 ohms) and On-Off Switch	67-00728
㉘	Condenser (4000 mmfd.)	61-0154
㉙	Resistor (15,000,000 ohms)	33-415154
㉚	Padder (Pri. 2nd I. F. Trans.)	65-0275
㉛	Second I. F. Transformer	65-0275
㉜	Padder (Sec. 2nd I. F. Trans.)	33-325334
㉝	Resistor (25,000 ohms)	33-325334
㉞	Condenser (.250 mfd.)	61-0033
㉟	Condenser (.05 mfd.)	61-0122
㊱	Resistor (220,000 ohms)	33-422334
㊲	Condenser (.25 mfd.)	61-0125
㊳	Resistor (470,000 ohms)	33-471514
㊴	Filter Cond. (10-20-20 mfd.)	61-0089
㊵	Resistor (200 ohms)	33-120334
㊶	Tone Control Switch	85-0104
㊷	Condenser (.03 mfd.)	61-0126
㊸	Condenser (.01 mfd.)	61-0124
㊹	Condenser (2000 mmfd.)	61-0123
㊺	Output Transformer	65-0277
㊻	Condenser (250 mmfd.)	61-0033
㊼	Replacement Cone	91-0101
㊽	(For 73-0038-A Speaker)	91-0102
㊾	Field Coil	Not Replaceable
㊿	Condenser (250 mmfd.)	61-0033
1	Condenser (10 mmfd.)	61-0045
2	Waxer Switch	318-1782
3	Push-Button Trans. Assy.	77-0412
4	Inductive Tuning Unit	65-0279
5	Oscill. Tracking Coil	61-0033
6	Condenser (250 mmfd.)	33-322334
7	Resistor (22,000 ohms)	61-0033
8	Condenser (250 mmfd.)	61-0106
9	Condenser (.5 mfd.)	32-1644
10	"A" Choke	61-0033
11	Condenser 250 mmfd.	65-0075
12	Vibrator Choke	34-2064
13	Pilot Lamps	32-1374
14	Filament Choke	61-0107
15	Condenser (.5 mfd.)	61-0017
16	Vibrator	33-0017
17	Resistor (200 ohms)	33-120334
18	Resistor (5400 ohms)	33-256154
19	Power Transformer	65-0272
20	Condenser (2000 mmfd.)	61-0074
21	Resistor (100,000 ohms)	33-104334
22	Resistor (150 ohms)	33-151334
23	Push-Button	55-0729



Note 5.—When the antenna-stage adjustment is made with the radio installed in the car, the radio antenna lead must be connected to the cow! antenna in the usual manner. Connect the signal-generator output lead to a wire placed near the car antenna lead, but not connected to it; and adjust trimmer (2) for maximum signal at 1400 kc.

Note 1.—Press automatic push button until "DIAL" appears in the window and stations can be tuned in by manual tuning.
Note 2.—Turn tuning-control knob clockwise as far as it will go.
Note 3.—Adjust (11) to obtain minimum output.
Note 4.—Connect antenna lead, Part No. 95-0120, to the antenna receptacle on the radio. Connect 30 mmf condenser in series between signal-generator and antenna lead. Ground the shield pigtail to the signal-generator.

* While rocking.

PHILCO RADIO & TELEVISION CORP.

MODEL S-1726

The antenna and touch tuning station adjustments are accessible from the front of the receiver when the two screws holding the cover plate are removed. On cars equipped with the "Climatizer", it will be necessary to remove the screws holding the "Climatizer" control assembly to the lower edge of the instrument panel and drop it down out of the way while making the adjustments.

1—Turn on the radio set and allow it to heat for at least twenty minutes before starting any adjustments.

2—Press the touch control button until the word "DIAL" appears in the "DIAL" window. Tune in a weak station on the manual dial between 1350 and 1500 kilocycles. Now adjust the antenna high frequency compensating screw (See Illustration) until maximum volume is obtained.

3—Select five stations within the frequency range shown over each set of adjusting screws (See Illustration). Remove the call letters for these stations from the call letter tab sheet. Remove the top cover of the set; this exposes the plastic drum into which the tabs should be inserted. It is important to insert these tabs in a definite relationship with respect to frequency in order that tuning adjustments can be made properly. Arrange the tabs in the order of frequency from high to low, placing the highest frequency on the drum immediately next to the dial tab in a counter clockwise direction. Insert the remaining tabs in the order of frequency in this same counter clockwise direction. If the tabs have been inserted correctly, it will be found that when the word "DIAL" shows in the window, the next push of the button will place the call letter for the highest frequency station in the window. Each successive push of the control button will place a next lower frequency station in the window until the series is repeated.

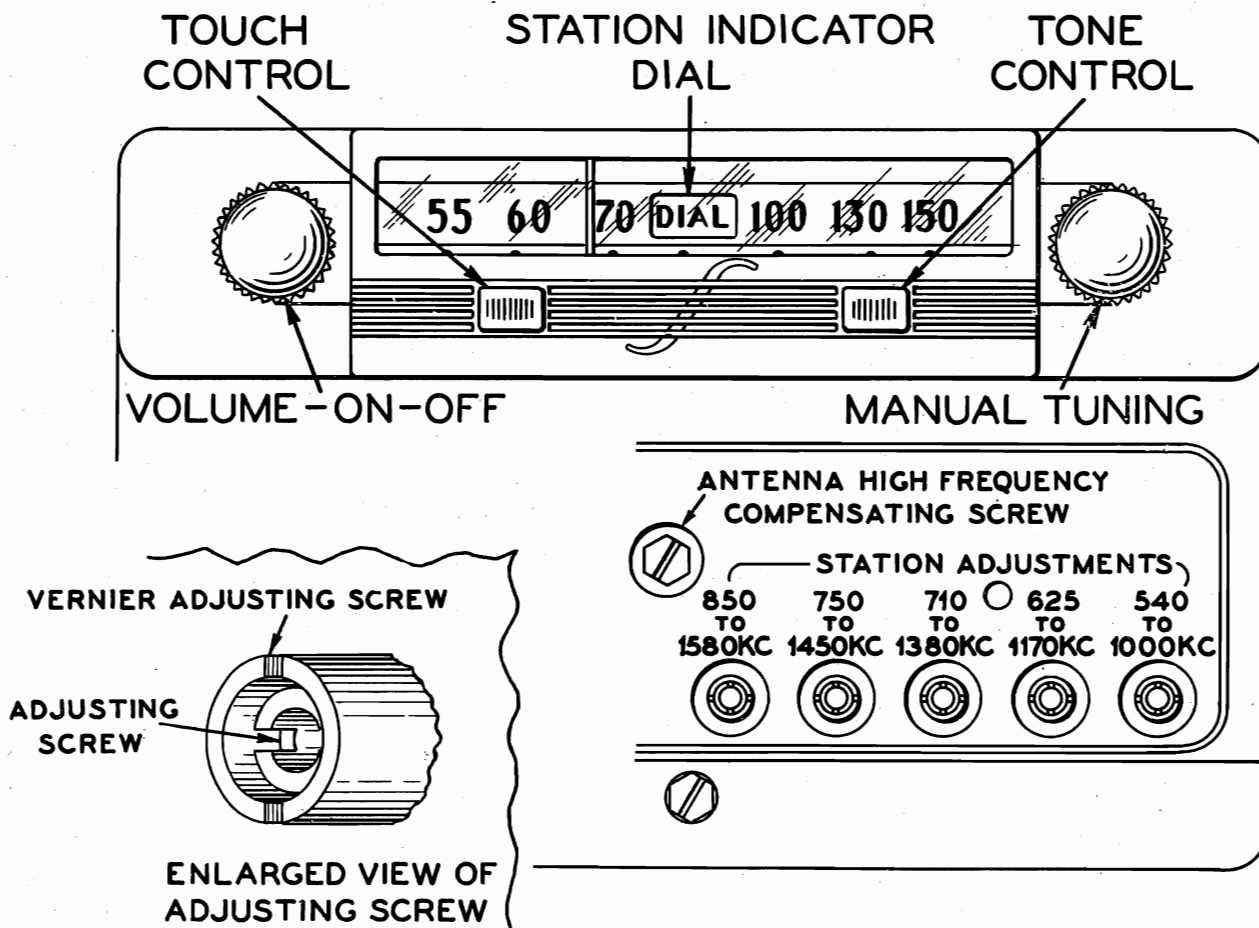
4—With "DIAL" showing in the dial window, manually tune in the station to be set up on push button number 1 and identify the program.

5—Press the touch control button once and adjust the left hand screw using the small end of the special screw driver, until the station identified has been tuned in as accurately as possible. A final adjustment can be made by inserting the large end of the screw driver into the vernier adjusting screw. Careful adjustment of this screw will insure maximum performance in areas where reception is poor. **NOTE:** Stations of the higher frequencies are tuned in by turning the screws to the left or counter clockwise. Lower frequency stations are tuned by turning to the right or clockwise. Proceed in like manner with the adjustment of each of the remaining stations in the order of frequency until all five stations selected have been tuned in. Because there is some detuning of the coils due to the movements of the cores in adjacent coils, it is necessary to re-check the adjustments again going back from right to left and again re-checking from left to right. This is important for accurate reception while driving at a distance from the broadcasting stations.

6—This final re-checking of adjustments should be made in an area of low signal strength in your service station or in some known "dead" spot where signals can just barely be heard.

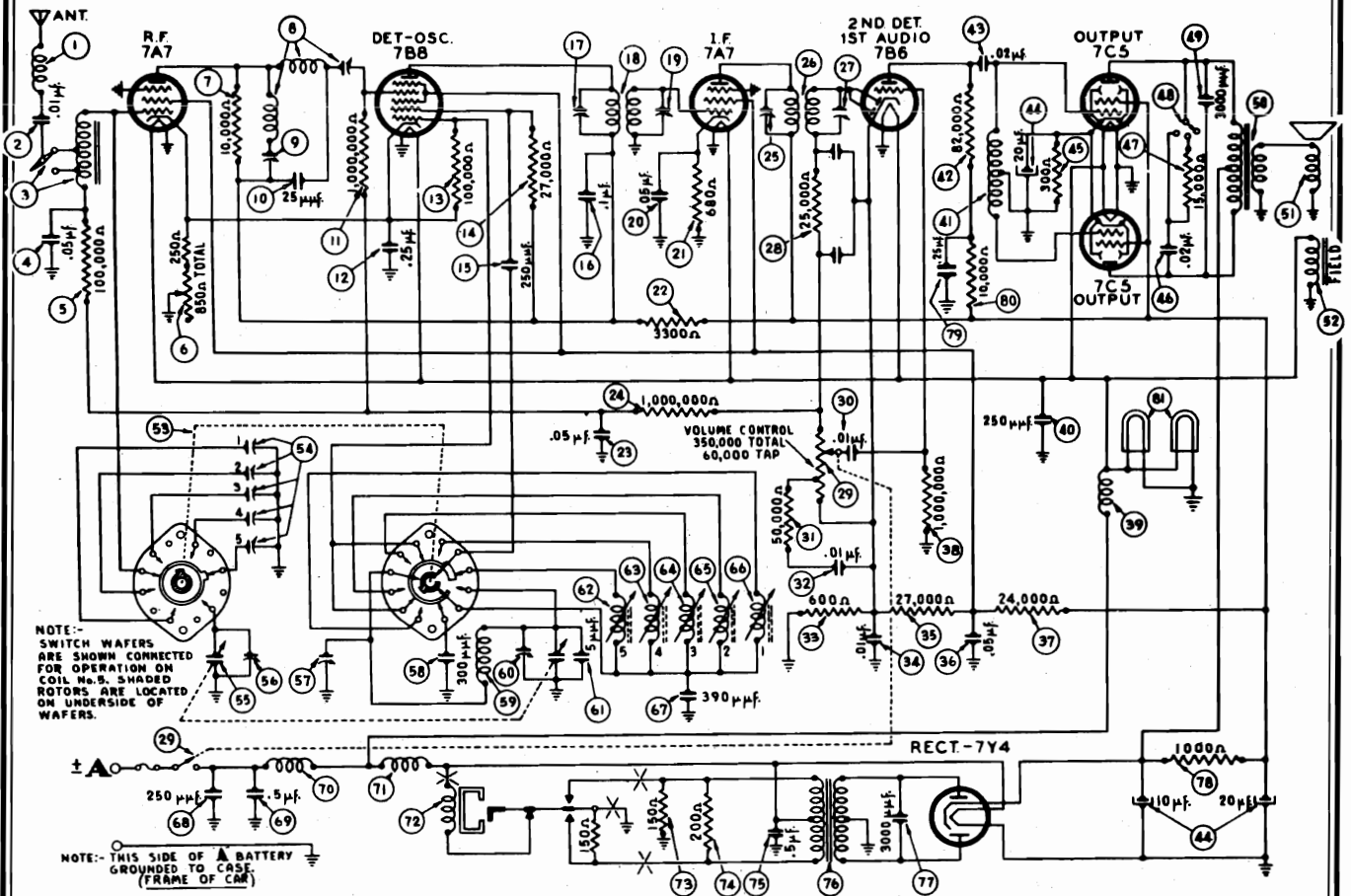
7—Replace the cover plate over the adjusting screws and replace the "Climatizer" controls.

BE SURE AND SAVE THE UNUSED CALL LETTERS, GIVING THEM TO THE OWNER AS THEY MAY BE NEEDED AT SOME FUTURE TIME IF THE RADIO IS TO BE OPERATED IN A DIFFERENT AREA WHERE THE LOCAL STATIONS ARE NOT THE SAME.



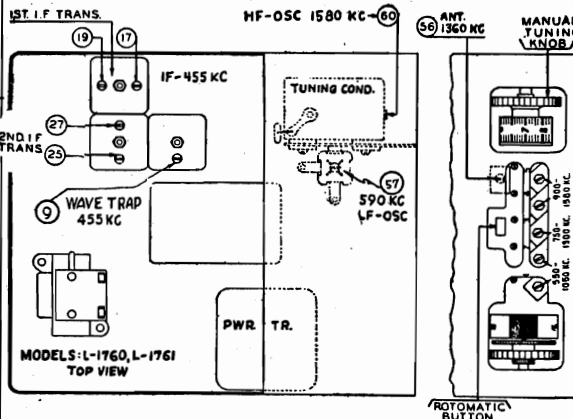
MODELS L-1760,
L-1761

PHILCO RADIO & TELEVISION CORP.



NOTE:-
SWITCH WAFERS
ARE SHOWN CONNECTED
FOR OPERATION ON
COIL No. 9. SHADED
ROTORS ARE LOCATED
ON UNDERSIDE OF
WAFERS.

NOTE:- THIS SIDE OF A BATTERY
GROUNDED TO CASE
(FRAME OF CAR)



MODELS L-1760, L-1761
TOP VIEW

No.	Description	Part No.
1	Tone Control Knob	57-0922FA8
2	Push-Button	55-0743
3	Indicator Dial Strip	55-0792
4	Drive Cord	55-0793
5	Dial Scale	55-0844
6	Bezel Plate	77-0430
7	Distributor Condenser	30-4404
8	Gas Gauge Condenser	30-4463
9	Generator Condenser	61-0040
10	Water and Oil Gauge Cond.	61-0087
11	Mounting Bracket	57-1107
12	Bolt	97-0102
13	Bolt	57-1154FA3
14	Wing Nut	97-0103FA3
15	Speaker	73-0039
16	Pilot Lamp	34-2044
17	Antenna Lead	95-0110
18	Upper Insulator	55-0732
19	Lower Insulator	55-0733
20	Gland Nut	57-1072
21	Mounting Bracket	57-1073
22	Gland Nut Wrench	57-1074

I.F. = 455 KC.

Signal Generator Connection	Dummy Antenna	Signal Generator Frequency	Receiver Wave-band Switch	Receiver Dial Setting	Trimmer Number
Ant. Recept.	0.1 mf	455 kc	Note 1	Note 2	27
"	"	"	"	"	25
"	"	"	"	"	19
"	"	"	"	"	17
"	"	"	"	"	27
"	"	"	"	"	25
"	"	"	"	"	19
"	"	"	"	"	17
"	"	"	"	"	9 ³
Ant. 4	Note 4	1580 kc	"	"	60
"	"	1360 kc	"	1360 kc	56
"	"	590 kc	"	590 kc	57*
"	"	1580 kc	"	Note 2	60
"	"	1360 kc	"	1360 kc	56 ⁵

Note 1.—Press "Rotomatic" Station-Selector button until "DIAL" appears in the window and stations can be tuned in by manual tuning.

Note 2.—Turn condenser rotor plates completely out of mesh as far as they will go.

Note 3.—Adjust (9) for minimum output.

Note 4.—When **TIRE-COMPARTMENT DOOR** antenna is used; connect antenna lead, part number 95-0120, to the antenna receptacle on the radio. Connect an 830 mmf condenser in series between antenna lead and signal-generator. Ground the shield pigtail on the antenna lead to the signal-generator. Be sure antenna switch (3) is turned clockwise.

When **COWL** antenna is used; connect the antenna lead, part number 95-0120, to the antenna receptacle in the radio. Connect a 45 mmf condenser in series between antenna lead and signal-generator. Ground the shield pigtail on the antenna lead to the signal-generator. Be sure antenna switch (3) is turned counter-clockwise.

Note 5.—When the antenna-stage adjustment is made with the radio installed in the car, the radio antenna lead must be connected to the car antenna in the usual manner. Connect the signal-generator output lead to a wire placed near the car antenna, but not connected to it.

* While rocking.

MODELS L-1760,
L-1761

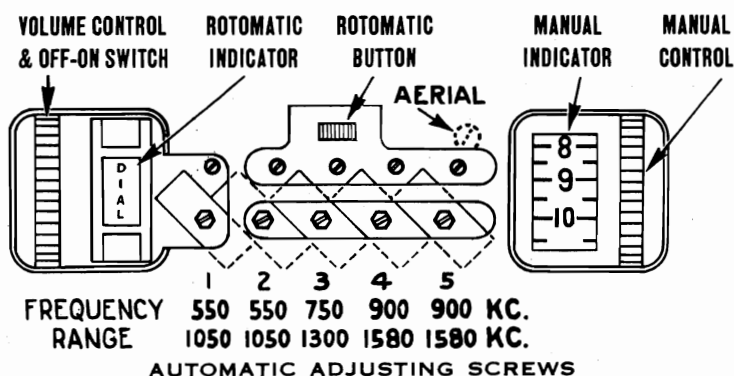
PHILCO RADIO & TELEVISION CORP.

MODELS L-1760 and L-1761

The Aerial and Rotomatic adjustments are easily accessible through the openings in the instrument panel. (See Illustration).

1—Turn the radio set on and allow it to heat for at least **TWENTY** minutes before starting any adjustments.

2—Press the Rotomatic button until the word "DIAL" appears in the Rotomatic indicator. Tune in a weak station on the manual dial between 1400 and 1500 kilocycles. Now adjust the aerial screw until maximum volume is obtained. (When the special concealed cowl aerial is used, adjustment should be made with the aerial fully extended.)



3—Select five stations within the frequency range shown under each set of adjustment screws shown in Illustration.

4—With "DIAL" showing on the Rotomatic indicator, manually tune in the station to be set up on position No. 1 and identify the program.

5—Press the Rotomatic button until No. 1 appears on the Rotomatic indicator. Now adjust the top screw at position No. 1 until the station selected is brought in with loudest volume. Then adjust the slotted hex screw at the bottom until maximum volume is obtained. **NOTE:** Stations of the higher frequencies are tuned in by turning the screws to the left or counter clockwise. Lower frequency stations are tuned by turning to the right or clockwise.

6—Proceed with setting up the remaining four stations in the same manner as described under Paragraphs 4 and 5.

7—Because there is some detuning of the coils due to the movements of the cores in adjacent coils, it is necessary to recheck the adjustments again going back from Position No. 5 to No. 1 and again rechecking from No. 1 to No. 5. This is important for accurate reception while driving at a distance from the broadcasting stations.

8—This final rechecking of adjustments should be made in an area of low signal strength in your service station or in some known "dead" spot where signals can just barely be heard.

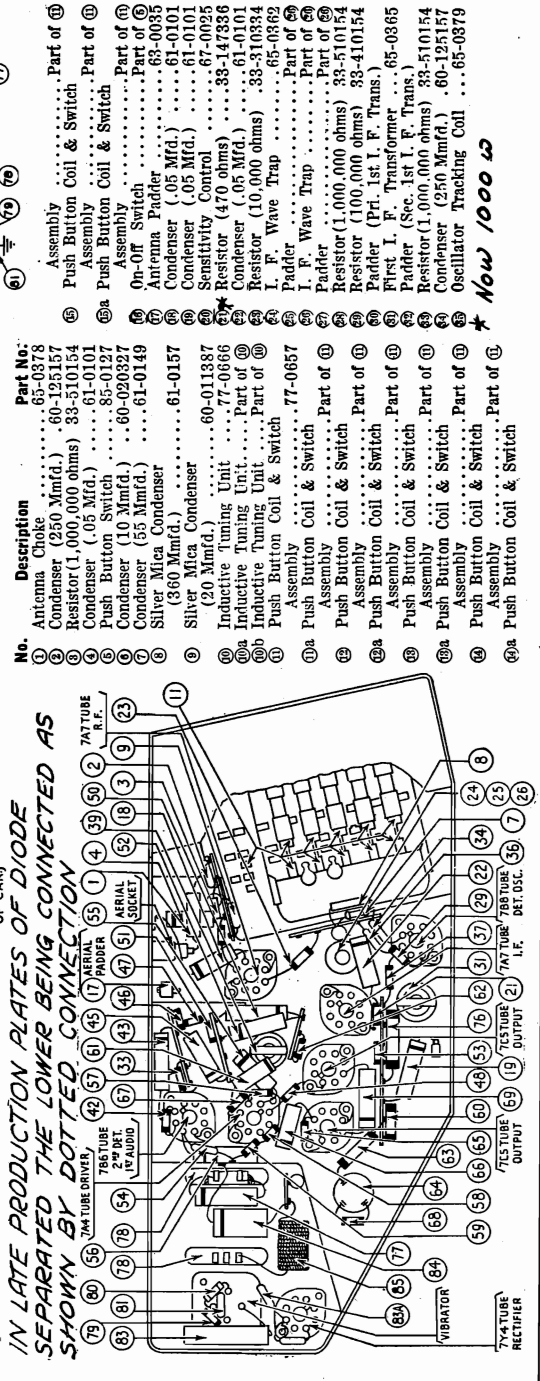
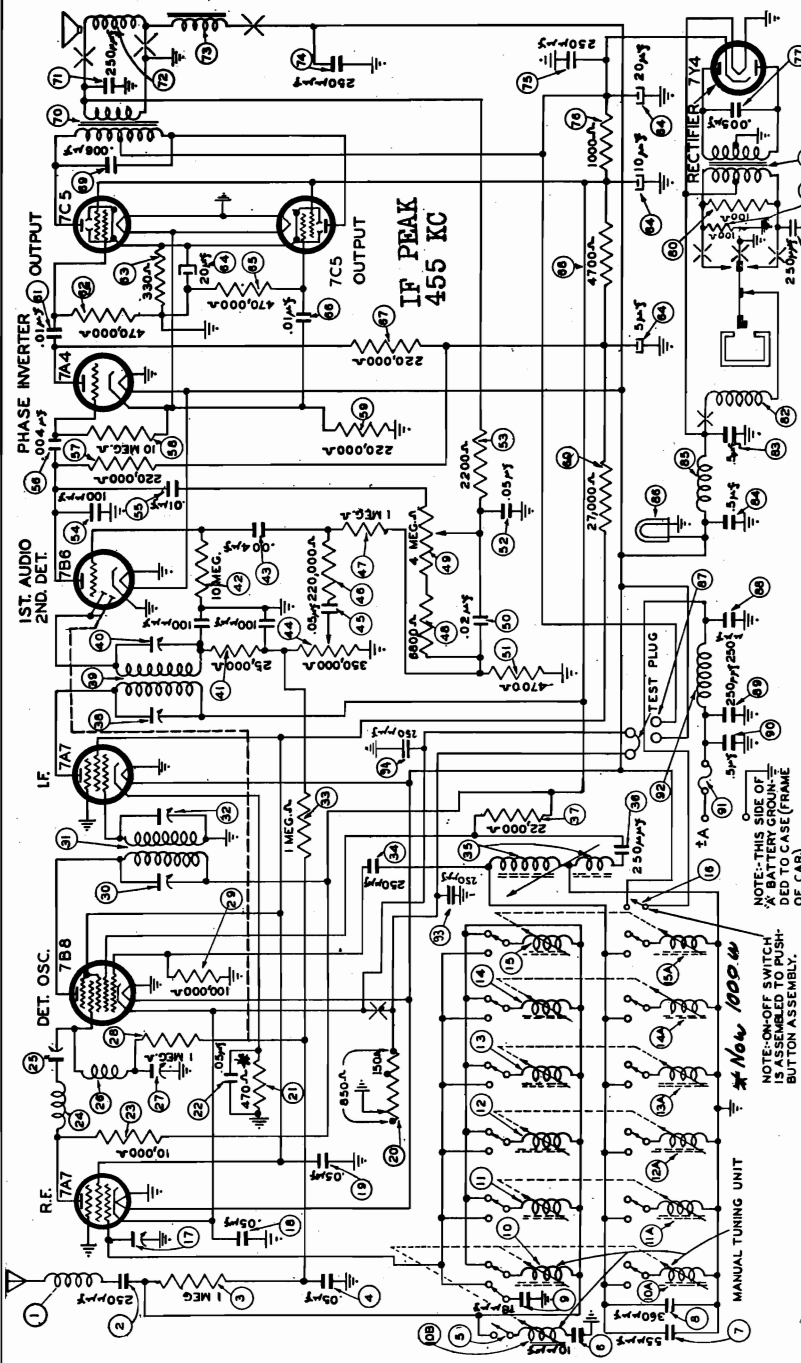
9—Should the Special Concealed Cowl Aerial be installed after the original installation, it is absolutely essential that the aerial change-over switch be shifted counter-clockwise and also that all automatic adjustments be made again as described in Paragraphs Nos. 1 to 8 inclusive.

PARTS LIST

No.	Description	Part No.
①	Antenna Choke	65-0168
②	Condenser (.01 mfd.)	61-0014
③	Antenna Transformer	65-0306
④	Condenser (.05 mfd.)	30-4569
⑤	Resistor (100,000 ohms)	33-410334
⑥	Sensitivity Control	67-0029
⑦	Resistor (10,000 ohms)	33-310334
⑧	R. F. Transformer	65-0305
⑨	I. F. Wave Trap Padder	33-1108
⑩	Condenser (25 mmfd.)	33-510234
⑪	Resistor (1,000,000 ohms)	61-0088
⑫	Condenser (.25 mfd.)	33-410334
⑬	Resistor (100,000 ohms)	33-327334
⑭	Resistor (27,000 ohms)	61-0034
⑮	Condenser (250 mmfd.)	30-4455
⑯	Condenser (.1 mfd.)	65-0303
⑰	Padder (Pri. 1st I. F. Trans.)	30-4444
⑱	First I. F. Transformer	33-168334
⑲	Padder (Sec. 1st I. F. Trans.)	33-23354
⑳	Condenser (.05 mfd.)	30-4569
㉑	Resistor (680 ohms)	33-510154
㉒	Resistor (3300 ohms)	65-0304
㉓	Condenser (.05 mfd.)	33-327334
㉔	Resistor (1,000,000 ohms)	30-4444
㉕	Padder (Pri. 2nd I. F. Trans.)	33-324434
㉖	Second I. F. Transformer	33-510154
㉗	Padder (Sec. 2nd I. F. Trans.)	65-0300
㉘	Resistor (25,000 ohms)	61-0033
㉙	Resistor (350,000 ohms)	65-0293
㉚	Volume Control (350,000 ohms) and On-Off Switch	33-382334
㉛	Condenser (.01 mfd.)	30-4481
㉜	Resistor (50,000 ohms)	61-0086
㉝	Condenser (.01 mfd.)	33-130436
㉞	Resistor (600 ohms)	30-4419
㉟	Condenser (.01 mfd.)	33-315354
㊱	Resistor (27,000 ohms)	85-0106
㊲	Condenser (.05 mfd.)	30-4469
㊳	Resistor (24,000 ohms)	65-0295
㊴	Resistor (1,000,000 ohms)	91-0113
㊵	Choke	91-0114
㊶	Condenser (250 mmfd.)	Not Replaceable
㊷	Input Transformer	77-0408
㊸	Resistor (82,000 ohms)	77-0391
㊹	Condenser (.02 mfd.)	63-0036
㊺	Filter Cond. (10-20-20 mfd.)	63-0037
㊻	Resistor (300 ohms)	61-0003
㊼	Condenser (.02 mfd.)	65-0301
㊽	Resistor (15,000 ohms)	61-0038
㊾	Tone Control Switch	65-0255
㊿	Condenser (3000 mmfd.)	65-0255
1	Output Transformer	65-0256
2	Replacement Cone	65-0257
3	(For 73-0039-2 Speaker)	61-0031
4	(For 73-0039-4 Speaker)	61-0033
5	Field Coil	61-0083
6	Wafer Switch	32-1644
7	Antenna Padder Assembly	Part of ⑩
8	Tuning Condenser	83-0017
9	First Padder (On Tuning Cond.)	33-115354
10	Low Frequency Padder	33-120354
11	Sil. Mica Cond. (300 mmfd.)	61-0083
12	Manual Oscil. Transformer	65-0294
13	Second Padder (On Tun. Cond.)	61-0059
14	Condenser (15 mmfd.)	33-210554
15	Oscil. Trans. (900-1580 K.C.)	61-0125
16	Oscil. Trans. (900-1580 K.C.)	33-310334
17	Oscil. Trans. (750-1300 K.C.)	34-2064
18	Oscil. Trans. (550-1050 K.C.)	55-0748
19	Oscil. Trans. (550-1050 K.C.)	55-0750
20	Sil. Mica Cond. (390 mmfd.)	
21	Condenser (250 mmfd.)	
22	Condenser (.5 mfd.)	
23	"A" Choke	
24	Vibrator Choke	
25	Vibrator	
26	Resistor (150 ohms)	
27	Resistor (200 ohms)	
28	Condenser (.5 mfd.)	
29	Power Transformer	
30	Condenser (3000 mmfd.)	
31	Resistor (1000 ohms)	
32	Condenser (.25 mfd.)	
33	Resistor (10,000 ohms)	
34	Pilot Lamps	
35	Volume Control Knob	
36	Manual Control Knob	

PHILCO RADIO & TELEVISION CORP.

No.	Description	Part No.
50	Condenser (250 Mmfd.)	60-125157
51	Resistor (22,000 ohms)	33-322334
52	Padder (Pri. 2nd I. F. Trans.)	33-322334
53	Second I. F. Transformer	65-0366
54	Padder (Sec. 2nd I. F. Trans.)	33-325154
55	Resistor (25,000 ohms)	33-325154
56	Condenser (10,000,000 ohms)	33-610154
57	Volume Control	61-0128
58	Condenser (350,000 ohms)	67-0040
59	Resistor (220,000 ohms)	33-422154
60	Resistor (1,000,000 ohms)	33-510154
61	Resistor (6,800 ohms)	33-268154
62	Tone Control	Part of 60
63	Condenser (4,000,000 ohms)	61-0154
64	Resistor (4,700 ohms)	33-247334
65	Condenser (.05 Mfd.)	61-0111
66	Resistor (2,200 ohms)	33-222154
67	Condenser (100 Mmfd.)	60-110157
68	Condenser (.01 Mfd.)	61-0110
69	Condenser (4,000 Mmfd.)	61-0128
70	Resistor (220,000 ohms)	33-422154
71	Resistor (10,000,000 ohms)	33-610154
72	Resistor (220,000 ohms)	33-422154
73	Resistor (27,000 ohms)	33-327434
74	Condenser (.01 Mfd.)	61-0100
75	Resistor (470,000 ohms)	33-447154
76	Resistor (330 ohms)	33-133436
77	Filter Condenser (10-20 Mfd.)	61-0159
78	Resistor (470,000 ohms)	33-447154
79	Condenser (.01 Mfd.)	61-0114
80	Resistor (220,000 ohms)	33-422154
81	Resistor (4,700 ohms)	33-247334
82	Condenser (6,000 Mmfd.)	61-0105
83	Output Transformer	65-0363
84	Condenser (250 Mmfd.)	60-125157
85	Cone & Voice Coil (For 73-0051-2 Speaker)	91-0164
86	Field Coil (For 73-0051-3 Speaker)	91-0165
87	Condenser (250 Mmfd.)	60-125157
88	Resistor (250 ohms)	33-210157
89	Resistor (1,000 ohms)	33-210154
90	Condenser (5,000 Mmfd.)	61-0153
91	Power Transformer	65-0347
92	Resistor (100 ohms)	33-110334
93	Condenser (250 Mmfd.)	60-125157
94	Vibrator	33-0027
95	Condenser (.5 Mfd.)	61-0137
96	Condenser (.5 Mfd.)	61-0106
97	Vibrator Choke	65-0389
98	Test Lamp	34-2064
99	Condenser (250 Mmfd.)	60-125157
100	Condenser (250 Mmfd.)	60-125157
101	Condenser (.5 Mfd.)	61-0134
102	Fuse	65-2559
103	'A' Choke	33-1644
104	Condenser (250 Mmfd.)	60-125157
105	Condenser (250 Mmfd.)	60-125157
106	Speaker Unit	73-0051
107	Fuel Gauge Resistor	67-0041
108	Call Letter Kit	81-0256
109	Radio Mfg. Bracket	57-1712FA3
110	Tube Socket	27-6151
111	Pointer Drive Cord	55-1071
112	Tone Drive Cord	55-1072



No.	Description	Part No.
1	Antenna Choke	65-0378
2	Condenser (250 Mmfd.)	60-125157
3	Resistor (1,000,000 ohms)	33-510154
4	Condenser (.05 Mfd.)	61-0101
5	Push Button Switch	85-0127
6	Condenser (10 Mmfd.)	60-020327
7	Condenser (55 Mmfd.)	61-0149
8	Silver Mica Condenser (360 Mmfd.)	61-0157
9	Silver Mica Condenser (20 Mmfd.)	60-011387
10	Inductive Tuning Unit	77-0666
11	Inductive Tuning Unit	Part of 10
12	Push Button Coil & Switch	Part of 10
13	Push Button Coil & Switch	Part of 10
14	Push Button Coil & Switch	Part of 10
15	Push Button Coil & Switch	Part of 10
16	Push Button Coil & Switch	Part of 10
17	Push Button Coil & Switch	Part of 10
18	Push Button Coil & Switch	Part of 10
19	Push Button Coil & Switch	Part of 10
20	Push Button Coil & Switch	Part of 10
21	Push Button Coil & Switch	Part of 10
22	Push Button Coil & Switch	Part of 10
23	Push Button Coil & Switch	Part of 10
24	Push Button Coil & Switch	Part of 10
25	Push Button Coil & Switch	Part of 10
26	Push Button Coil & Switch	Part of 10

MODEL C-1808

PHILCO RADIO & TELEVISION CORP.

MODEL C-1808 — ADJUSTMENTS

All padding adjustments are carefully made at the factory and ordinarily no readjustments are necessary. However, when readjustments are required, the procedure given below must be followed in detail.

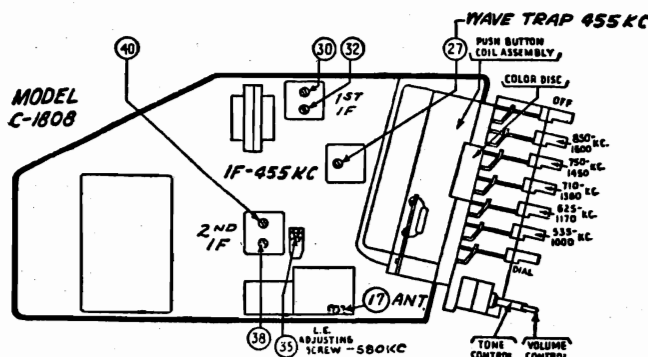
EQUIPMENT — Fully charged heavy duty storage battery or 6 volt power pack, 077 or 177 Philco Signal generator, 027 Philco Vacuum tube voltmeter and set tester or audio output meter, 45-2610 Padding screw driver.

GENERAL — VACUUM TUBE VOLTMETER. The model 027 Vacuum tube voltmeter is an extremely sensitive and accurate test instrument and is recommended for use when aligning and adjusting auto radios. Connect the negative (—) terminal of the Vacuum Tube Voltmeter to the high side (ungrounded side) of the volume control. Connect the positive (+) terminal to the radio housing. Connect the "AC" cord to a 110 volt AC socket. Press the VTVM button and the 10 volt button. Turn the "Set Zero Ohms — VTVM" control clockwise until a click is heard. Allow the tubes to heat up for a few minutes. Short the 150 meg. VTVM terminals and adjust the "Set Zero 150 meg." control until the meter reads zero on the 0-10 range scale (bottom scale). The needle will deflect from left to right.

AUDIO OUTPUT METER. If an audio output meter is used, connect the leads across the voice coil of the speaker. Use the 0-30 volt scale.

the prescribed frequency, turn the Radio volume control on full and set the signal generator attenuator so that a half scale reading is obtained on the meter. The signal in the speaker should be audible but not loud.

The shielding on the generator output lead must be connected to the Radio housing.



OPERATION	SIGNAL GENERATOR		DUMMY CAPACITY	SPECIAL INSTRUCTIONS	ADJUST PADDER
	FREQUENCY	CONNECTION			
1	PRESS THE "DIAL" BUTTON AND STATIONS CAN BE TUNED IN BY "DIAL" TUNING				
2	455 K.C.	To Aerial Receptacle on Radio	.1 Mfd.	Note 2	<div>38 40 30 32</div> <div>38 40 30 32</div>
3	455 K.C.	To Aerial Receptacle on Radio	.1 Mfd.	Note 2	<div>27 Min.</div>
4	1400 K.C.	To Aerial Receptacle on Radio	See Note 1	Set Tuning Control at 1400 K.C.	<div>17</div> <div>Note 4</div>
5	580 K.C.	To Aerial Receptacle on Radio	See Note 1	Set Tuning Control at 580 K.C.	<div>25</div> <div>Note 3</div>
6	1400 K.C.	To Aerial Receptacle on Radio	See Note 1	Set Tuning Control at 1400 K.C.	<div>17</div> <div>Note 4</div>
7	580 K.C.	To Aerial Receptacle on Radio	See Note 1	Set Tuning Control at 580 K.C.	<div>25</div> <div>Note 3</div>

Make all adjustments for maximum reading on the meter.

NOTE 1 — Connect the aerial lead, Part No. 95-0111, to the aerial receptacle in the radio. Connect a 25 Mmfd. Condenser in series between the signal generator and the aerial lead.

NOTE 2 — Turn the tuning control clockwise as far as it will go.

NOTE 3 — Rock the tuning control while adjusting the low frequency screw. Tune the control to the signal and adjust the

screw for maximum output. Rotate the tuning control back and forth slightly for maximum output. Then readjust the screw for maximum output. Repeat this procedure until no further improvement is noticed.

NOTE 4 — When the aerial stage adjustment is made with the Radio installed in the car, the Radio aerial lead must be connected to the car aerial in the usual manner. Connect the signal generator output lead to a wire placed near the car aerial but not connected to it.

INSTRUCTIONS FOR SETTING UP ELECTRIC PUSH BUTTONS

1. Turn on the radio and allow it to operate for twenty minutes or longer if possible. All adjustments MUST be made with the aerial fully extended. Turn the volume control on full and set the tone control on voice. In metropolitan areas it is best to adjust the push buttons in a shielded building or under a viaduct.

2. Push in the DIAL button so that stations can be tuned in by manual tuning and tune in a weak station around 1400 K.C. on the dial. Then adjust the aerial padder (17) for maximum signal.

3. Select the five stations which you desire to use on push button tuning. Tune in a station between 535 and 1000 Kilocycles.

Remove the No. 1 push button cover and push in the No. 1 button. Using a coin or a small screw driver, adjust the button until the station selected is tuned in with the loudest volume. Turning the button counter-clockwise will increase the frequency, and clockwise will decrease the frequency. Check the station by pushing in the DIAL button again to identify the program.

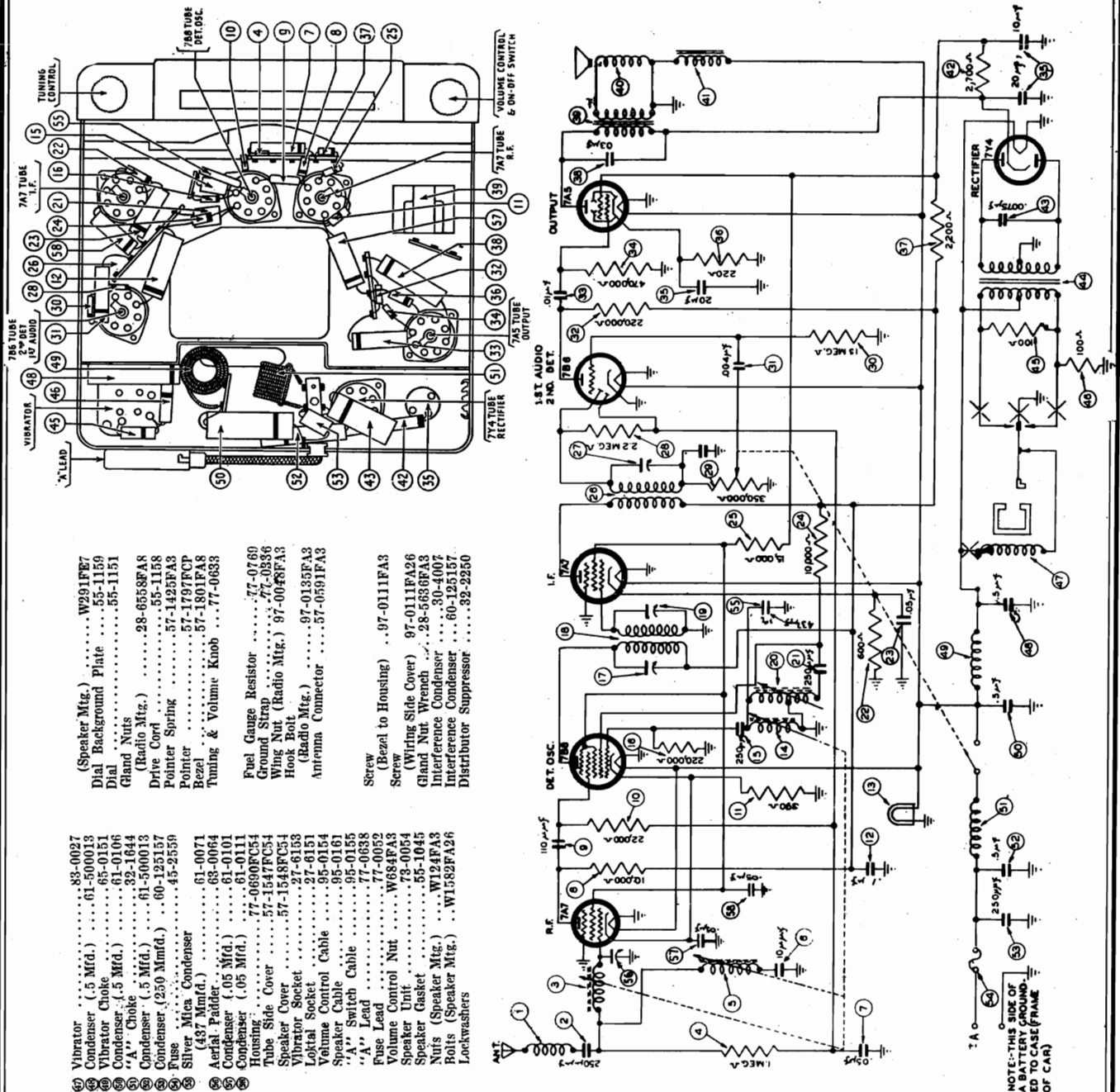
4. Proceed in the same manner for adjusting No. 2, No. 3, No. 4 and No. 5 buttons.

The stations may be set up before installing the radio in the car, but the final adjustments must be made after installation of the radio and connected to the aerial in the car.

MODEL S-1824

SCHEMATIC

L.F. = 455KC



No.	Description	Part No.
①	Antenna Choke	65-05878
②	Condenser (250 Mmfd.)	60-125137
③	Inductive Tuning Unit	77-0709
④	Resistor	33-510154
	(1,000,000 ohms)	(Part of ③)
⑤	Image Trap Coil	33-510154
⑥	Condenser (10 Mmfd.)	(Part of ③)
⑦	Condenser (.05 Mfd.)	61-0111
⑧	Resistor (10,000 ohms)	33-310834
⑨	Condenser (110 Mmfd.)	60-110157
⑩	Resistor (220,000 ohms)	33-329154
⑪	Resistor (380 ohms)	33-139836
⑫	Condenser (1 Mfd.)	61-0110
⑬	Pilot Lamp	34-2064
⑭	Oscillator Coil	(Part of ③)
⑮	Condenser (250 Mmfd.)	60-125157
⑯	Resistor (220,000 ohms)	33-422154
⑰	Padder (Pr1 1st I. F. Trans.)	65-0399
⑱	First I. F. Transformer	65-0399
⑲	Padder (Sec. 1st I. F. Trans.)	65-0401
⑳	Oscillator Tracking Coil	60-125157
㉑	Condenser (250 Mmfd.)	33-160336
㉒	Resistor (600 ohms)	61-0111
㉓	Condenser (.05 Mfd.)	33-310834
㉔	Resistor (10,000 ohms)	33-315334
㉕	Resistor (15,000 ohms)	33-315334
㉖	Second I. F. Transformer	65-0400
㉗	Padder (Sec. 2nd I. F. Trans.)	65-0400
㉘	Resistor	33-522154
	(12,000,000 ohms)	
㉙	Volume Control (350,000 ohms)	67-0037
㉚	On-Off Switch	33-522154
㉛	Resistor	33-615154
	(15,000 ohms)	
㉜	Condenser (4,000 Mmfd.)	61-004311
㉝	Resistor (220,000 ohms)	33-422334
㉞	Condenser (.01 Mfd.)	61-010311
㉟	Resistor (470,000 ohms)	33-447154
㊱	Filter Capacitor	
	(10-20-20 Mfd.)	61-0072
㊲	Resistor (220 ohms)	33-122336
㊳	Resistor (2,200 ohms)	33-222334
㊴	Condenser (.03 Mfd.)	61-0119
㊵	Output Transformer	65-0395
㊶	Replacement Cone	
	(For 73-0054-2)	91-0166
㊷	Field Coil	(Not Replaceable)
㊸	Resistor (2,700 ohms)	33-227434
㊹	Condenser (7,500 Mmfd.)	61-075154
㊺	Power Transformer	65-0401
㊻	Resistor (100 ohms)	33-110434
㊼	Resistor (100 ohms)	33-110434

MODEL S-1824

Studebaker "Custom"

PHILCO RADIO & TELEVISION CORP.

MODEL S-1824 — ADJUSTMENTS

All padding adjustments are carefully made at the factory and ordinarily no readjustments are necessary. However, when readjustments are required, the procedure given below must be followed in detail.

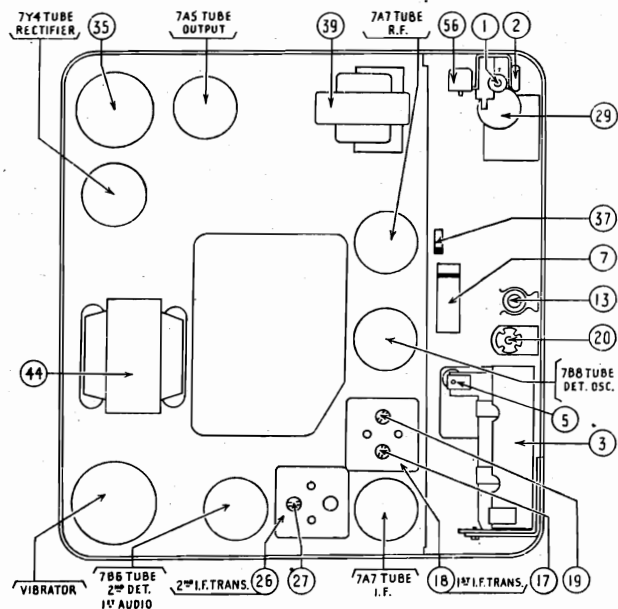
EQUIPMENT — Fully charged heavy duty storage battery or 6 volt power pack, 077 or 177 Philco Signal generator, 027 Philco Vacuum tube voltmeter and set tester or audio output meter, 45-2610 Padding screw driver.

GENERAL — VACUUM TUBE VOLTMETER. The model 027 Vacuum tube voltmeter is an extremely sensitive and accurate test instrument and is recommended for use when aligning and adjusting auto radios. Connect the negative (—) terminal of the Vacuum Tube Voltmeter to the high side (ungrounded side) of the volume control. Connect the positive (+) terminal to the radio housing. Connect the "AC" cord to a 110 volt AC socket. Press the VTVM button and the 10 volt button. Turn the "Set Zero Ohms — VTVM" control clockwise until a click is heard. Allow the tubes to heat up for a few minutes. Short the 150 meg. VTVM terminals and adjust the "Set Zero 150 meg." control until the meter reads zero on the 0-10 range scale (bottom scale). The needle will deflect from left to right.

AUDIO OUTPUT METER. If an audio output meter is used, connect the leads across the voice coil of the speaker. Use the 0-30 volt scale.

With the Radio and signal generator set up for operation at the prescribed frequency, turn the Radio volume control on full and set the signal generator attenuator so that a half scale reading is obtained on the meter. The signal in the speaker should be audible but not loud.

The shielding on the generator output lead must be connected to the Radio housing.



OPERATION	SIGNAL GENERATOR		DUMMY CAPACITY	SPECIAL INSTRUCTIONS	ADJUST PADDER
	FREQUENCY	CONNECTION			
1	455 K.C.	To Aerial Receptacle on Radio.	See Note 1	Note 2	27 19 17
2	1360 K.C.	To Aerial Receptacle on Radio	See Note 1	Set Tuning Control at 1360 K.C.	56
3	590 K.C.	To Aerial Receptacle on Radio	See Note 1	Set Tuning Control at 590 K.C.	20 Note 3
4	1360 K.C.	To Aerial Receptacle on Radio	See Note 1	Set Tuning Control at 1360 K.C.	56
5	1200 to 1400 K.C.	Note 5	Note 5	Note 5	56 Note 4

Make all adjustments for maximum reading on the meter.

NOTE 1 — Connect the aerial lead, Part No. 95-0111, to the aerial receptacle in the radio. Connect a 35 Mmfd. Condenser in series between the signal generator and the aerial lead.

NOTE 2 — Turn the tuning control clockwise as far as it will go.

NOTE 3 — Rock the tuning control while adjusting the low frequency screw. Tune the control to the signal and adjust the screw for maximum output. Rotate the tuning control back and forth slightly for maximum output. Then readjust the screw for

maximum output. Repeat this procedure until no further improvement is noticed.

NOTE 4 — When the aerial stage adjustment is made with the Radio installed in the car, the Radio aerial lead must be connected to the car aerial in the usual manner. Connect the signal generator output lead to a wire placed near the car aerial but not connected to it.

NOTE 5 — When installing the radio in the car, follow the installation instructions carefully. Tune in a weak broadcast signal between 1200 and 1400 Kilocycles on the control scale. Remove the plug button on the end of the radio and adjust the aerial compensator 56 (see Figure 3) for maximum signal.

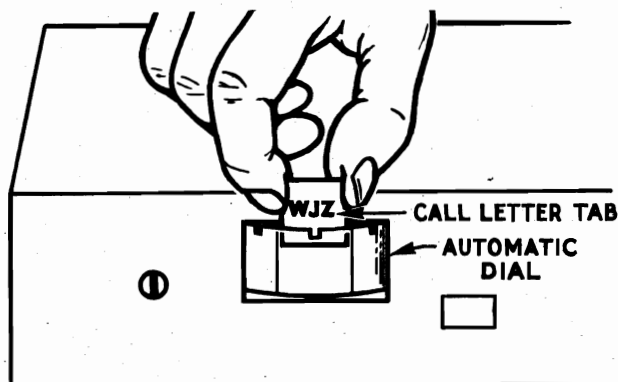
PHILCO RADIO & TELEVISION CORP.

S-1722

INSTALLING CALL LETTERS

Before installing the Receiver, the Call Letters of the stations which are to be tuned in automatically must be inserted in the Automatic Dial. See Illustration, Models S-1622, S-1722. Select and remove from the Call Letter Sheets, the Call Letters of five popular stations received in the area in which the radio is to be operated and that come within the frequency range of the adjusting screws as shown in Illustration Models S-1622, S-1722. Each of the adjusting screws cover the portion of the broadcast band as indicated in Illustration, Models S-1622, S-1722. It is important, therefore, that only such stations be selected as can be tuned in in the range as covered by each screw.

Push the Automatic Station Selector until the word "DIAL" is at the front. This is the starting point. Push the Automatic Station Selector once more and the first position of the dial will be at the front. Insert in this position the call letter tab of the station having the highest frequency in kilocycles. Insert in back of each tab one of the clear celluloid tabs. Press the Automatic Station Selector button once more and insert the call letters of the station with the next highest frequency in kilocycles in the second position.

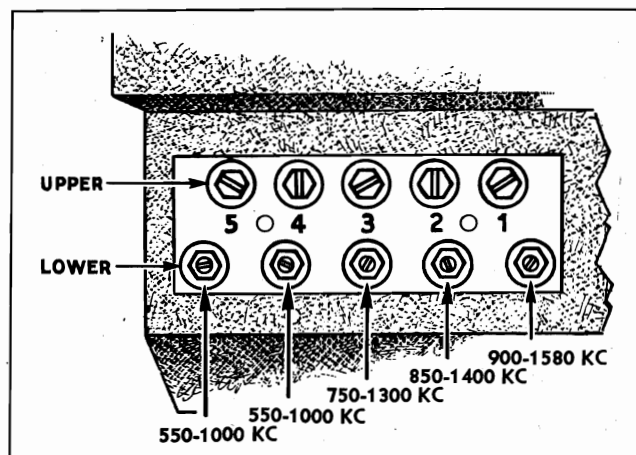


Installing Call Letter Tabs

EXAMPLE—The first position may have the call letters of a station operating on 1400 kilocycles; the second position, a station operating on 1050 kilocycles, etc. Repeat this procedure until all five call letter tabs selected are inserted in the dial in the order of their frequency. Be sure and record the call letters with respect to their position on the dial for use in setting up the adjusting screws.

1—Turn the Receiver on and allow it to operate for **TWENTY** minutes. Remove the cover plate over the automatic tuning adjusting screws. This plate is on the front of the Receiver and is removed by removing two screws.

2—Push the Automatic Station Selector button until the word "DIAL" is at the indicator window. Tune in the station whose call letters are in the first position on the dial (the highest frequency station) and note the program. Push the Automatic Selector button once and this station's call letters will appear at the indicator window.



3—With a small screwdriver, turn the No. 1 adjusting screw (See Illustration, Models S-1622, S-1722) in the lower column, to the right or left until this station is tuned in. Now adjust the corresponding screw in the upper column until maximum volume is obtained. Make these adjustments carefully, as it may be easy to pass by the loudest point on some stations.

When adjusting for Automatic Tuning on strong local stations the antenna rod should be all the way down and the adjustments made with the car in a shielded area, such as in a steel constructed building or under a viaduct. This is necessary in order to obtain a weak signal so the adjustments can be accurately made.

4—Press the Automatic Station Selector button until "DIAL" again is at the indicator window and tune in the station whose call letters are in the second position on the automatic dial (the next lowest frequency). Press the automatic button two times and adjust the number 2 set of adjusting screws.

Repeat this procedure until each pair of the five pairs of adjusting screws has been tuned to its respective station.

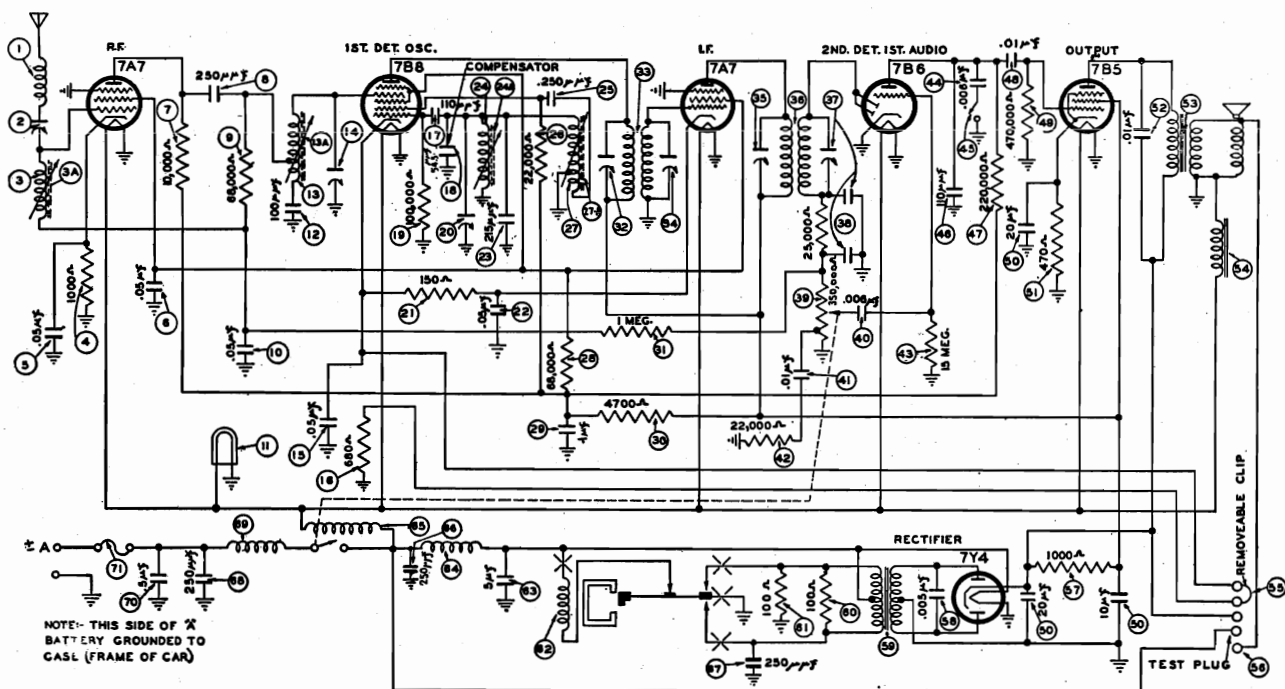
IT IS NECESSARY THAT THE SETTING OF THE ADJUSTING SCREWS BE REPEATED TO BE SURE THEY ARE PROPERLY SET SO THAT MAXIMUM PERFORMANCE MAY BE HAD.

Be sure and save the unused call letters giving them to the owner as they may be needed at some future time if the radio is to be operated in a different area where the local stations are not the same.

MODEL S-1825

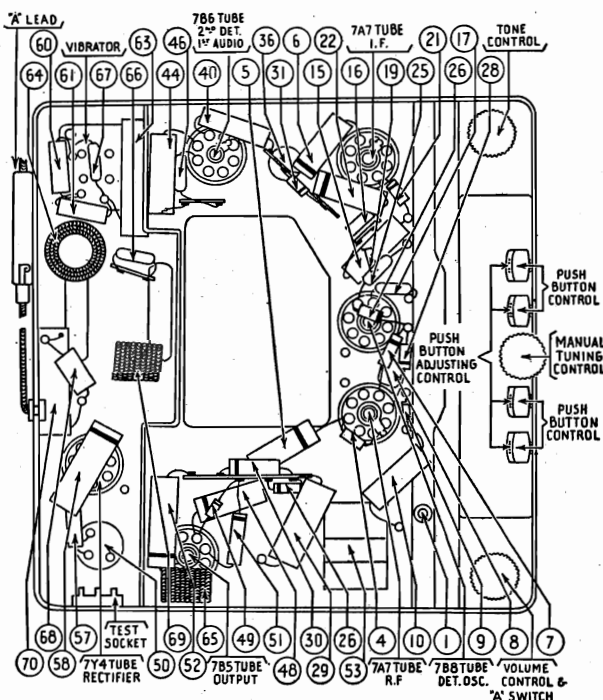
Studebaker "Custom"

PHILCO RADIO & TELEVISION CORP.

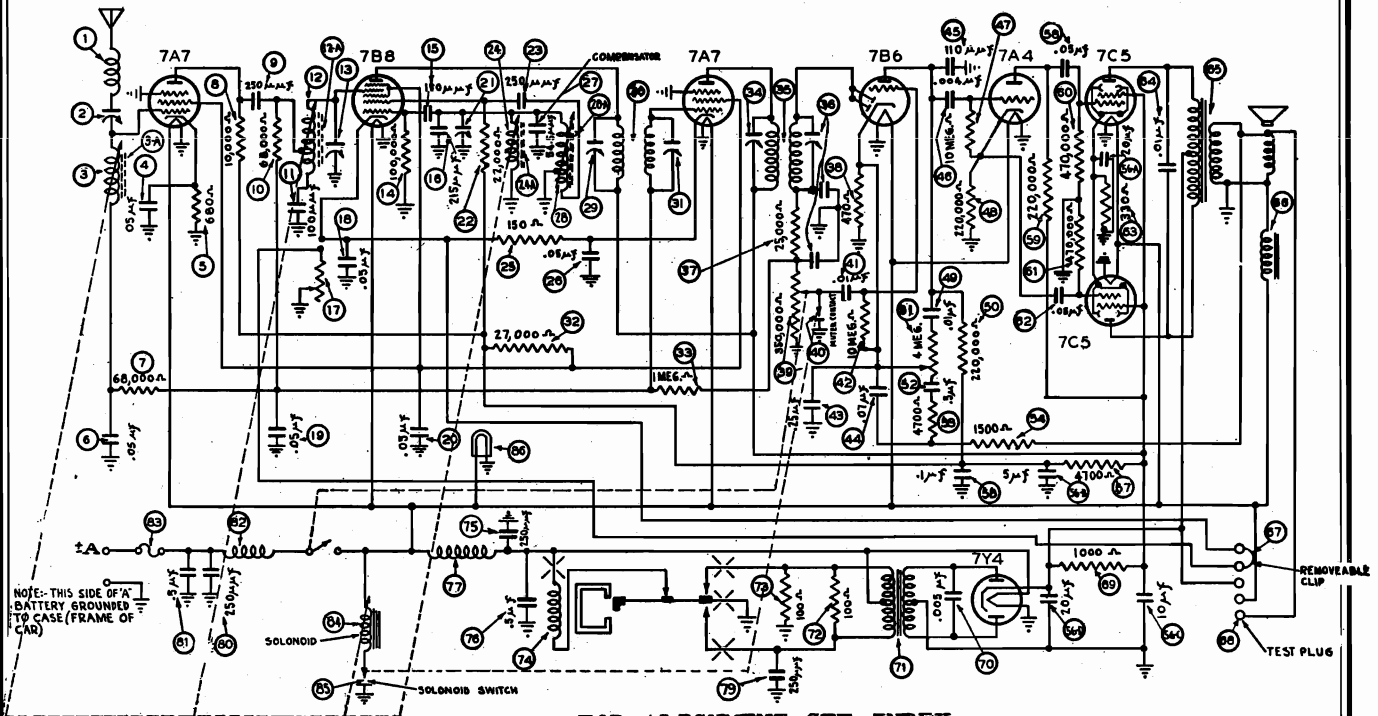


PARTS LIST — S-1825

No.	Description	Part No.	No.	Description	Part No.	No.	Description	Part No.
1	Antenna Choke	65-0378	21	Resistor (220,000 ohms)	33-422334	60	VIBRATOR	63
2	Antenna Padder	63-0053	22	Condenser (.01 Mfd.)	61-0100	61	7B6 TUBE	63
3	Antenna Transformer	65-0349	23	Resistor (470,000 ohms)	33-447154	62	2ND DET. 1ST. AUDIO	63
4	Iron Core	57-1541	24	Filter Condenser		63	7A7 TUBE	63
5	Resistor (1,000 ohms)	33-210334	25	(10-20-20 Mfd.)	61-0072	64	L.F.	63
6	Condenser (.05 Mfd.)	61-0101	26	Resistor (470 ohms)	33-147436	65	2ND DET. 1ST. AUDIO	63
7	Condenser (.05 Mfd.)	61-0111	27	Condenser (.01 Mfd.)	61-0124	66	OUTPUT	63
8	Resistor (10,000 ohms)	33-310334	28	Output Transformer	65-0364	67	7B5 TUBE	63
9	Condenser (250 Mmfd.)	60-125157	29	Field Coil	Not Replaceable	68	REMOVABLE CLIP	63
10	Resistor (68,000 ohms)	33-368154	30	Cone & Voice Coil	91-0166	69	TEST PLUG	63
11	Condenser (.05 Mfd.)	61-0101	31	Jumper	57-1121	70		
12	Pilot Lamp	34-2064	32	Test Socket	55-1078			
13	Condenser (100 Mmfd.)	60-110327	33	Resistor (1,000 ohms)	33-210434			
14	R. F. Transformer	65-0359	34	Condenser (5,000 Mmfd.)	61-0153			
15	Iron Core	57-1541	35	Power Transformer	65-0347			
16	Padder	63-0055	36	Resistor (100 ohms)	33-110434			
17	Condenser (.05 Mfd.)	61-0111	37	Resistor (100 ohms)	33-110434			
18	Resistor (680 ohms)	33-163336	38	Vibrator	83-0027			
19	Condenser (110 Mmfd.)	60-110157	39	Condenser (.5 Mfd.)	61-0137			
20	Condenser (54.5 Mmfd.)	61-0149	40	Vibrator Choke	65-0151			
21	Resistor (100,000 ohms)	33-410154	41	Filament Choke	32-1604			
22	Padder	63-0052	42	Condenser (250 Mmfd.)	60-125157			
23	Resistor (150 ohms)	33-115336	43	Condenser (250 Mmfd.)	60-125157			
24	Condenser (.05 Mfd.)	61-0111	44	Condenser (250 Mmfd.)	60-125157			
25	Condenser (215 Mmfd.)	61-0148	45	"A" Choke	32-1644			
26	Oscillator Transformer	65-0350	46	Condenser (.5 Mfd.)	61-0137			
27	Iron Core	57-1542	47	Fuse	45-2559			
28	Condenser (250 Mmfd.)	60-125157	48	Manual Knob Sleeve	57-1623			
29	Resistor (22,000 ohms)	33-322334	49	Manual Knob Spacer	57-1669			
30	Series Tracking Transformer	65-0351	50	Manual Knob Spring	57-1628FA3			
31	Series Tracking Core	57-1650	51	Manual Knob Skirt	55-1061			
32	Resistor (68,000 ohms)	33-368334	52	Manual Knob	55-1067			
33	Condenser (.1 Mfd.)	61-0113	53	Tone & Volume Knob	77-0633			
34	Resistor (4,700 ohms)	33-247434	54	Sneaker Cable	95-0161			
35	Resistor (1,000,000 ohms)	33-510154	55	Screw (Cover Mtg.)	W-2212FA35			
36	Padder (Pri. 1st I. F. Trans.)		56	Tube Slide Cover	57-1547FC54			
37	First I. F. Transformer	65-0352	57	Wiring Slide Cover	57-1548FC54			
38	Padder (Sec. 1st I. F. Trans.)		58	Sneaker Unit	73-0053			
39	Padder (Pri. 2nd I. F. Trans.)		59	Sneaker Gasket	55-1045			
40	Second I. F. Transformer	65-0353	60	Bezel Front	57-1582FA8			
41	Padder (Sec. 2nd I. F. Trans.)		61	Snead Nut	97-0136FE7			
42	Resistor (25,000 ohms)	33-325154	62	Dial	55-1012			
43	Volume Control (350,000 ohms)		63	Gland Nuts	28-655FA8			
44	& On-Off Switch	67-0039	64	Housing	77-0660FC54			
45	Condenser (6,000 Mmfd.)	61-0103	65	Vibrator Socket	27-6153			
46	Condenser (.01 Mfd.)	61-0110	66	Tube Socket	27-6151			
47	Resistor (22,000 ohms)	33-322154	67	Push Button Knob	77-0612			
48	Resistor		68	Tuning Switch	77-0640			
49	(15,000,000 ohms)	33-615154	69	Coil Form Spring	57-1538			
50	Condenser (6,000 Mmfd.)	61-0153	70	Coil Form Screw	97-0126			
51	Tone Control Switch	85-0126		Core Draw Bar Spring	57-1649			
52	Condenser (110 Mmfd.)	60-110157						



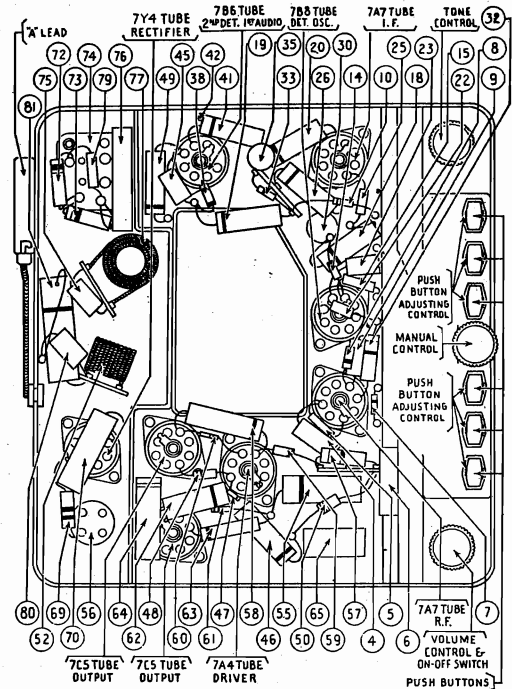
MODEL S-1826 PHILCO RADIO & TELEVISION CORP. Studebaker "Custom"



FOR ALIGNMENT SEE INDEX

PARTS LIST — S-1826

No.	Description	Part No.	Description	Part No.
1	Antenna Choke	65-0378	Resistor (220,000 ohms)	33-422334
2	Antenna Padder	63-0053	Tone Control	
3	Antenna Transformer	65-0349	(4,000,000 ohms)	67-0038
4	Iron Core	57-1541	Condenser (.5 Mfd.)	61-0134
5	Condenser (.05 Mfd.)	61-0111	Resistor (4,700 ohms)	33-247154
6	Resistor (680 ohms)	33-168334	Resistor (1,500 ohms)	33-215154
7	Condenser (.05 Mfd.)	61-0111	Condenser (.1 Mfd.)	61-0113
8	Resistor (68,000 ohms)	33-368154	Filter Condenser	
9	Resistor (10,000 ohms)	33-310334	(5-10-20-20 Mfd.)	61-0150
10	Condenser (250 Mmfd.)	60-125157	Resistor (4,700 ohms)	33-247434
11	Resistor (68,000 ohms)	33-368154	Condenser (.05 Mfd.)	61-0122
12	Condenser (100 Mmfd.)	60-110157	Resistor (220,000 ohms)	33-422334
13	R. F. Transformer	65-0359	Resistor (470,000 ohms)	33-447154
14	Iron Core	57-1541	Resistor (470,000 ohms)	33-447154
15	Padder	63-0052	Condenser (.05 Mfd.)	61-0101
16	Resistor (100,000 ohms)	33-410154	Resistor (330 ohms)	33-133436
17	Condenser (110 Mmfd.)	60-110157	Condenser (.01 Mfd.)	61-0124
18	Condenser (215 Mmfd.)	61-0148	Output Transformer	65-0409
19	Sensitivity Control	67-0036	Field Coil	Not Replaceable
20	Condenser (.05 Mfd.)	61-0111	Cone & Voice Coil	
21	Condenser (.05 Mfd.)	61-0111	(For 73-0052-2 Speaker)	91-0164
22	Condenser (.05 Mfd.)	61-0101	(For 73-0052-3 Speaker)	91-0165
23	Padder	63-0055	Jumper	57-1121
24	Resistor (22,000 ohms)	33-322334	Test Socket	55-1078
25	Condenser (250 Mmfd.)	60-125157	Resistor (1,000 ohms)	33-210434
26	Oscillator Transformer	65-0350	Condenser (5,000 Mmfd.)	61-0153
27	Iron Core	57-1542	Power Transformer	65-0358
28	Resistor (150 ohms)	33-115336	Resistor (100 ohms)	33-110434
29	Condenser (.05 Mfd.)	61-0111	Resistor (100 ohms)	33-110434
30	Condenser (54.5 Mmfd.)	61-0149	Vibrator	83-0027
31	Oscillator Tracking Trans.	65-0351	Condenser (250 Mmfd.)	60-125157
32	Oscillator Tracking Core	57-1659	Condenser (.5 Mfd.)	61-0137
33	Padder (Pri. 1st I. F. Trans.)		Vibrator Choke	65-0151
34	First I. F. Transformer	65-0352	Condenser (250 Mmfd.)	60-125157
35	Padder (Sec. 1st I. F. Trans.)		Condenser (250 Mmfd.)	60-125157
36	Resistor (27,000 ohms)	33-327434	Condenser (.5 Mfd.)	61-0137
37	Resistor (1,000,000 ohms)	33-510154	"A" Choke	32-1644
38	Padder (Pri. 2nd I. F. Trans.)		Fuse	45-2559
39	Second I. F. Transformer	65-0410	Solenoid	65-0360
40	Padder (Sec. 2nd I. F. Trans.)		Solenoid Switch	Part of 85-0125
41	Resistor (25,000 ohms)	33-325154	Pilot Lamp	34-2064
42	Resistor (470 ohms)	33-147336	Tuning & Volume Knob	77-0633
43	Volume Control (350,000 ohms)		Hook Bolt (Radio Mtg.)	97-0135FA3
44	& On-Off Switch	67-0037	Wing Nut (Radio Mtg.)	97-0048FA3
45	Muter Switch	85-0125	Gland Nut Wrench	28-5636FA3
46	Condenser (.01 Mfd.)	61-0100	Condenser (Generator)	30-4007
47	Resistor		Condenser (Distributor)	60-125157
48	(10,000,000 ohms)	33-610154	Distributor Suppressor	33-2250
49	Condenser (.25 Mfd.)	61-0151	Ground Strap	77-0336
50	Condenser (.07 Mfd.)	61-0152	Fuel Gauge Resistor	67-0041
51	Condenser (110 Mmfd.)	60-110157	Front Bezel	57-1540FA8
52	Resistor (4,000 Mmfd.)	61-0129	Speed Nut (Bezel Mtg.)	97-0136FEB7
53	Resistor		Color Disc Assembly	77-0646
54	(10,000,000 ohms)	33-610154	Tuning Switch	77-0600
55	Resistor (220,000 ohms)	33-422334	Dial	55-1012
56	Condenser (.01 Mfd.)	61-0100	Push Button Knob	77-0612



Description	Part No.
Speaker Gasket	55-1045
Speaker Cable	95-0161
Speaker Unit	73-0052
Vibrator Socket	27-6153
Tube Socket	27-6151
Manual Knob Spacer	57-1669
Manual Knob	55-1067
Manual Knob Sleeve	57-1623
Manual Knob Spring	57-1628FA3
Manual Knob Skirt	55-1061
Gland Nut	28-6558FA8
R. F. Coil Spring	57-1538
Core Draw Bar Spring	57-1649
Latch Bar Spring	57-1650
Push Button Spring	57-1651
Muter Spring	57-1652

No.	Description	Part No.
	Pointer Spring	57-1653
	Pointer & Cam Assembly	77-0647
	Screws (Bezel Mtg.)	97-0111FA26
	Screw (Cover Mtg.)	W2212FA26
	Housing & Bracket Assembly	
	(Ludington Green)	77-0660FC54
	Housing & Bracket Assembly	
	(English Grey)	77-0660FC55
	Wiring Side Cover	
	(Ludington Green)	57-1548FC54
	Wiring Side Cover	
	(English Grey)	57-1548FC55
	Tube Side Cover	
	(Ludington Green)	57-1547FC54
	Tube Side Cover	
	(English Grey)	57-1547FC55

MODEL S-1825

PHILCO RADIO & TELEVISION CORP.

MODEL S-1826 MODEL P-1835

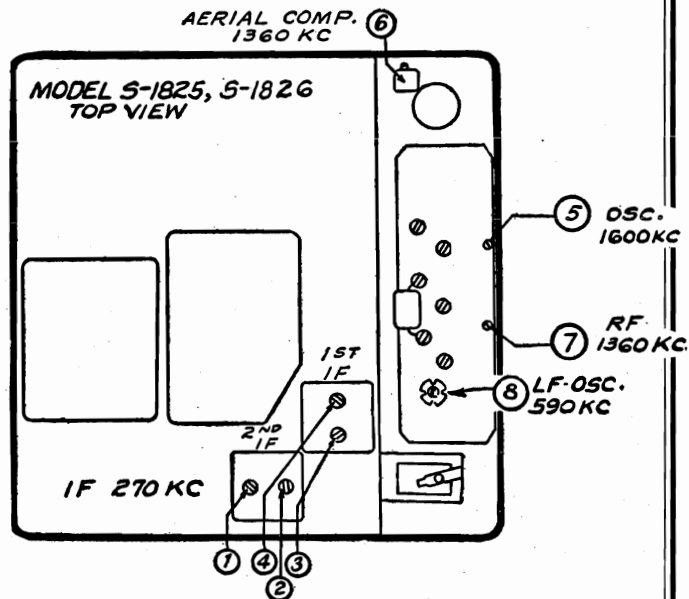
EQUIPMENT—Fully charged heavy duty storage battery or 6 volt power pack, 077 or 177 Philco Signal generator, 027 Philco Vacuum tube voltmeter and set tester or audio output meter, 45-2610 Padding screw driver.

GENERAL—VACUUM TUBE VOLTMETER. The model 027 Vacuum tube voltmeter is an extremely sensitive and accurate test instrument and is recommended for use when aligning and adjusting auto radios. Connect the negative (—) terminal of the Vacuum Tube Voltmeter to the high side (ungrounded side) of the volume control. Connect the positive (+) terminal to the radio housing. Connect the "AC" cord to a 110 volt AC socket. Press the VTVM button and the 10 volt button. Turn the "Set Zero Ohms—VTVM" control clockwise until a click is heard. Allow the tubes to heat up for a few minutes. Short the 150 meg. VTVM terminals and adjust the "Set Zero 150 meg." control until the meter reads zero on the 0-10 range scale (bottom scale). The needle will deflect from left to right.

AUDIO OUTPUT METER. If an audio output meter is used, connect the leads across the voice coil of the speaker. Use the 0-30 volt scale.

With the Radio and signal generator set up for operation at the prescribed frequency, turn the Radio volume control on full and set the signal generator attenuator so that a half scale reading is obtained on the meter. The signal in the speaker should be audible but not loud.

The shielding on the generator output lead must be connected to the Radio housing.



OPERATION	SIGNAL GENERATOR		DUMMY CAPACITY	SPECIAL INSTRUCTIONS	ADJUST PADDER
	FREQUENCY	CONNECTION			
1	PUSH IN THE TUNING CONTROL KNOB UNTIL STATIONS CAN BE TUNED IN BY MANUAL TUNING				
2	270 K.C.	To Aerial Receptacle on Radio	See Note 1	Note 2	<div>24 26 29 31</div> <div>34 36 39 41</div>
3	1600 K.C.	To Aerial Receptacle on Radio	See Note 1	Set Tuning Control at 1600 K.C.	<div>21</div>
4	1360 K.C.	To Aerial Receptacle on Radio	See Note 1	Set Tuning Control at 1360 K.C.	<div>2 13</div> <div>Note 4</div>
5	590 K.C.	To Aerial Receptacle on Radio	See Note 1	Set Tuning Control at 590 K.C.	<div>28</div> <div>Note 3</div>
6	1600 K.C.	To Aerial Receptacle on Radio	See Note 1	Set Tuning Control at 1600 K.C.	<div>21</div>
7	1360 K.C.	To Aerial Receptacle on Radio	See Note 1	Set Tuning Control at 1360 K.C.	<div>2 13</div> <div>Note 4</div>
8	1200 to 1400 K.C.	Note 5	Note 5	Note 5	<div>2</div> <div>Note 4</div>

Make all adjustments for maximum reading on the meter.

NOTE 1—Connect the aerial lead. Part No. 95-0111, to the aerial receptacle in the radio. Connect a 35 Mmfd. Condenser in series between the signal generator and the aerial lead.

NOTE 2—Turn the tuning control clockwise as far as it will go.

NOTE 3—Rock the tuning control while adjusting the low frequency screw. Tune the control to the signal and adjust the screw for maximum output. Rotate the tuning control back and forth slightly for maximum output. Then readjust the screw for

maximum output. Repeat this procedure until no further improvement is noticed.

NOTE 4—When the aerial stage adjustment is made with the Radio installed in the car, the Radio aerial lead must be connected to the car aerial in the usual manner. Connect the signal generator output lead to a wire placed near the car aerial but not connected to it.

NOTE 5—When installing the radio in the car, follow the installation instructions carefully. Tune in a weak broadcast signal between 1200 and 1400 Kilocycles on the control scale. Remove the plug button on the end of the radio and adjust the aerial compensator Ⓐ (see Figure 3) for maximum signal.

INSTRUCTIONS FOR SETTING UP THE AUTOMATIC TUNING BUTTONS

Turn on the radio and allow it to operate for twenty minutes or longer if possible.

Press in any automatic button so that it remains engaged. Then tune in the station desired by turning the small wheel in the button. The station can be identified by the pointer, which indicates the frequency of the station in Kilocycles. The automatic buttons may be readjusted to any station within the range of the broadcast band. The automatic buttons may be readjusted to

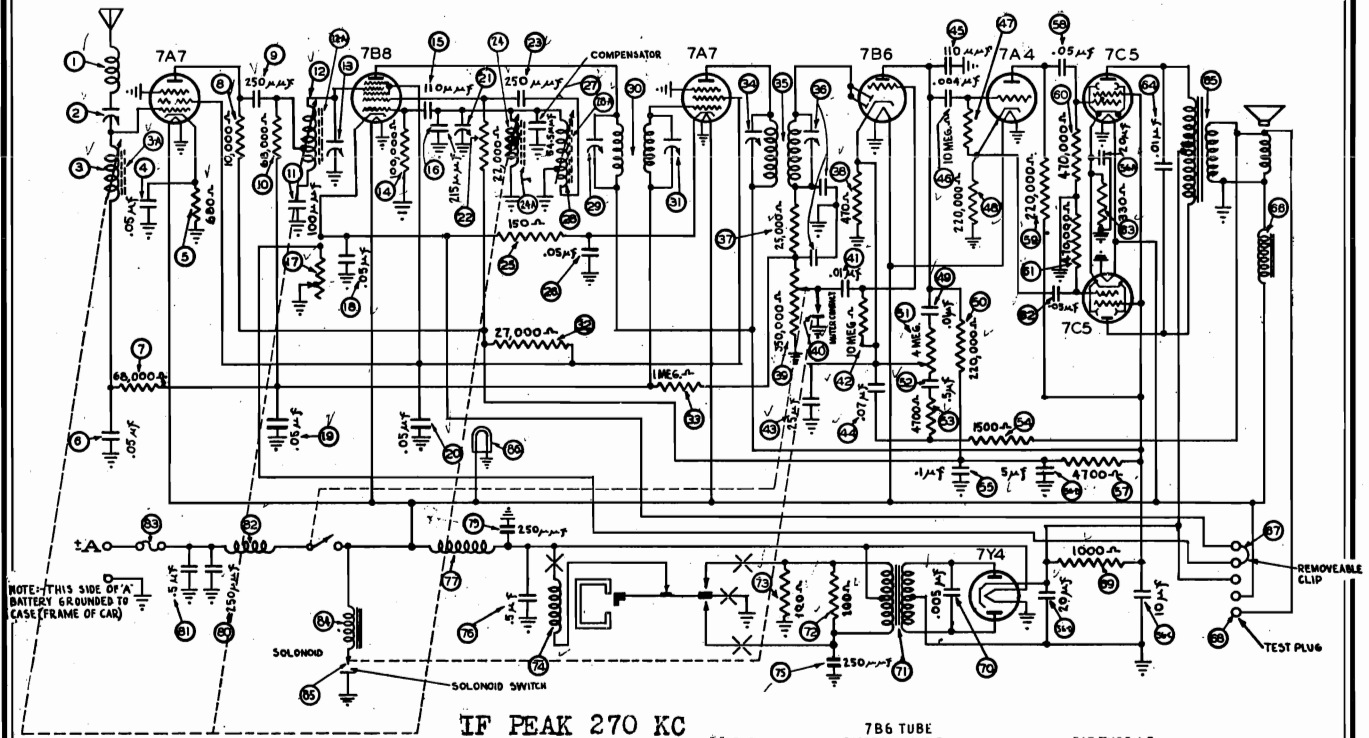
stations in any sequence desired. However, for convenience in remembering stations, it is recommended that the buttons be set up in the same order that the stations appear across the dial.

CAUTION—All adjustments must be carefully made so that reception can be received best when remote from the broadcasting station. Careless tuning off to one side, even though the signal is heard, will result in distorted reception.

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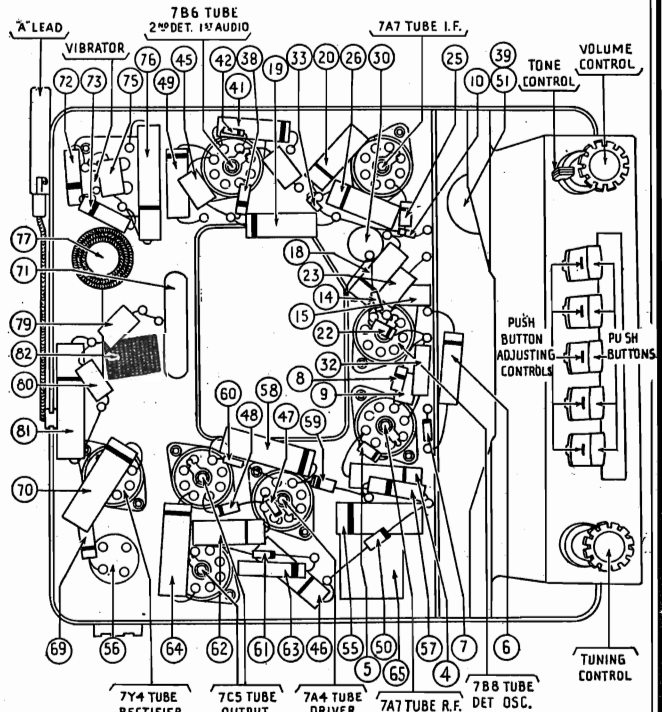
MODEL P-1835

Packard



PARTS LIST — P-1835

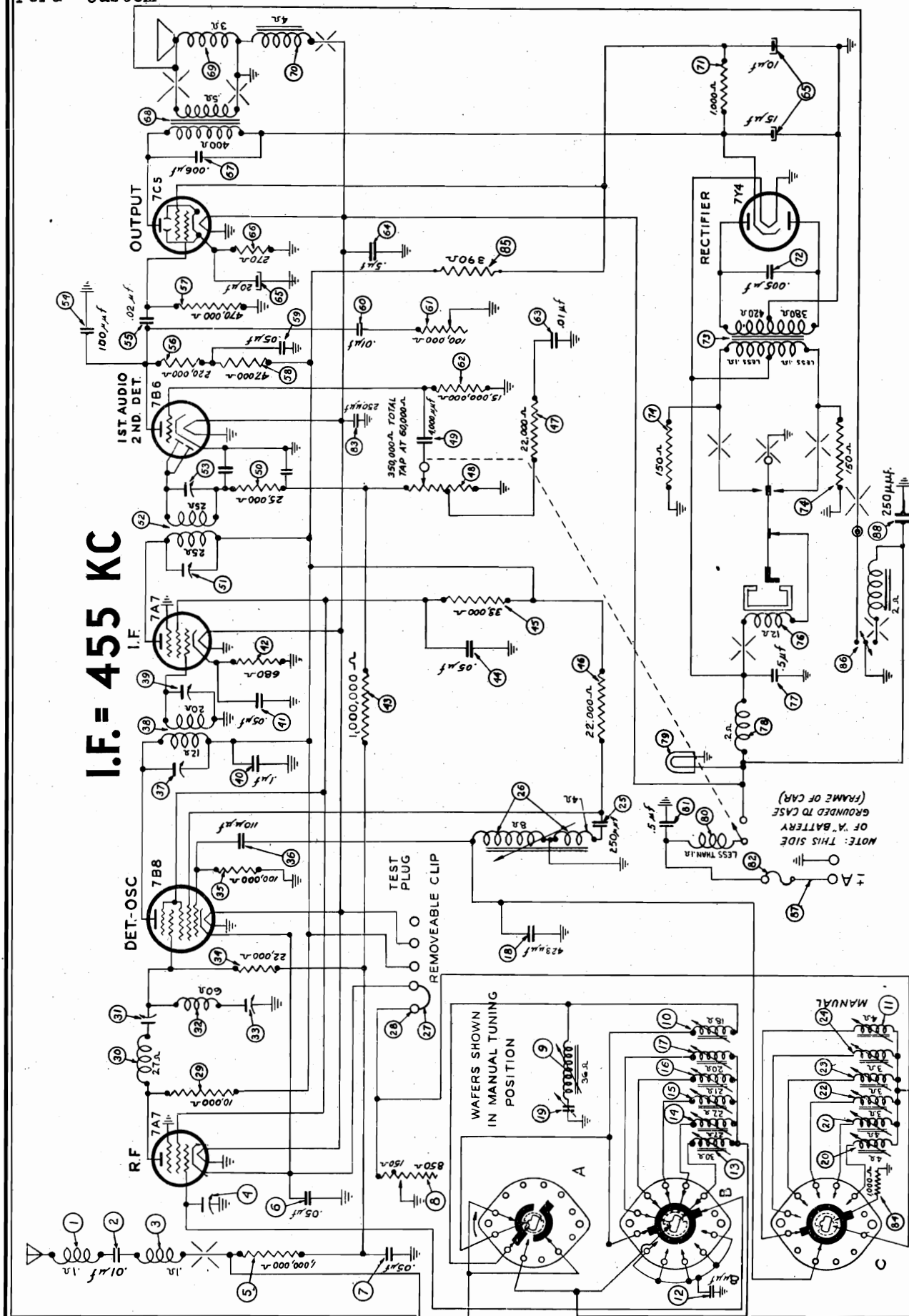
No.	Description	Part No.	No.	Description	Part No.
1	Antenna Choke	65-0378	47	Resistor	
2	Antenna Padder	63-0054		(10,000,000 ohms)	33-610154
3	Antenna Transformer	65-0349	48	Resistor (220,000 ohms)	33-422334
4	Iron Core	57-1541	49	Condenser (.01 Mfd.)	61-0100
5	Condenser (.05 Mfd.)	61-0111	50	Resistor (220,000 ohms)	33-422334
6	Resistor (680 ohms)	33-168334	51	Tone Control	
7	Condenser (.05 Mfd.)	61-0111		(4,000,000 ohms)	Part of 50
8	Resistor (68,000 ohms)	33-368154	52	Condenser (.5 Mfd.)	65-0134
9	Resistor (10,000 ohms)	33-310334	53	Resistor (4,700 ohms)	33-247154
10	Condenser (250 Mmfd.)	60-125157	54	Resistor (1,500 ohms)	33-215154
11	Resistor (68,000 ohms)	33-368154	55	Condenser (.1 Mfd.)	61-0113
12	Condenser (100 Mmfd.)	60-110327	56	Filter Condenser	
13	R. F. Transformer	65-0359		(5-10-20-20 Mfd.)	61-0150
14	Iron Core	57-1541	57	Resistor (4,700 ohms)	33-247434
15	Padder	61-0055	58	Condenser (.05 Mfd.)	61-0122
16	Resistor (100,000 ohms)	33-410154	59	Resistor (220,000 ohms)	33-422334
17	Condenser (110 Mmfd.)	60-110157	60	Resistor (470,000 ohms)	33-447154
18	Condenser (215 Mmfd.)	61-0148	61	Resistor (470,000 ohms)	33-447154
19	Sensitivity Control	67-0036	62	Condenser (.05 Mfd.)	61-0111
20	Condenser (.05 Mfd.)	61-0111	63	Resistor (330 ohms)	33-133436
21	Condenser (.05 Mfd.)	61-0111	64	Condenser (.01 Mfd.)	61-0124
22	Condenser (.05 Mfd.)	61-0101	65	Output Transformer	65-0354
23	Padder	61-0052	66	Field Coil	Not Replaceable
24	Resistor (22,000 ohms)	33-322334	67	Cone & Voice Coil	
25	Condenser (250 Mmfd.)	60-125157		(For 73-0050-2 Speaker)	91-0167
26	Oscillator Transformer	65-0367		(For 73-0050-4 Speaker)	91-0168
27	Iron Core	57-1542	68	Jumper	57-1121
28	Resistor (150 ohms)	33-115336	69	Test Socket	55-1078
29	Condenser (.05 Mfd.)	61-0111	70	Resistor (1,000 ohms)	33-210434
30	Condenser (54.5 Mmfd.)	61-0149	71	Condenser (5,000 Mmfd.)	61-0153
31	Oscillator Tracking		72	Power Transformer	65-0347
32	Transformer	65-0351	73	Resistor (100 ohms)	33-110434
33	Oscillator Tracking Core	57-0996	74	Resistor (100 ohms)	33-110434
34	Padder (Pri. 1st I. F. Trans.)	65-0352	75	Vibrator	83-0027
35	First I. F. Transformer	65-0352	76	Condenser (250 Mmfd.)	60-125157
36	Padder (Sec. 1st I. F. Trans.)	33-327434	77	Condenser (.5 Mfd.)	61-0137
37	Resistor (27,000 ohms)	33-327434	78	Vibrator Choke	65-0151
38	Resistor (1,000,000 ohms)	33-510154	79	Condenser (250 Mmfd.)	60-125157
39	Padder (Pri. 2nd I. F. Trans.)	65-0353	80	Condenser (250 Mmfd.)	60-125157
40	Second I. F. Transformer	65-0353	81	Condenser (.5 Mfd.)	61-0137
41	Padder (Sec. 2nd I. F. Trans.)	33-325154	82	"A" Choke	32-1644
42	Resistor (25,000 ohms)	33-325154	83	Fuse	45-2559
43	Resistor (470 ohms)	33-147336	84	Solenoid	65-0360
44	Volume Control (350,000 ohms)		85	Solenoid Switch	Part of 85-0125
45	Switch & Tone Control & On-Off	67-0035	86	Pilot Lamp	34-2064
46	Muter Switch	85-0125	87	Front Bezel	57-1550FA8
47	Condenser (.01 Mfd.)	61-0100	88	Color Disc Assembly	77-0649
48	Resistor		89	Coupling & Key Assembly	77-0651
	(10,000,000 ohms)	33-610154	90	Tuning Switch only	77-0601
49	Condenser (.25 Mfd.)	61-0151	91	R. F. Transformer Spring	57-1538
50	Condenser (.07 Mfd.)	61-0152	92	R. F. Transformer Mtg.	
51	Condenser (110 Mmfd.)	60-110157		Screw	97-0126
52	Condenser (4,000 Mmfd.)	61-0129		Core Draw Bar Spring	57-1649



Description	Part No.	Description	Part No.
Latch Bar Spring	57-1650	Vibrator Socket	27-6153
Push Button Spring	57-1651	Tube Socket	27-6151
Push Button Knob	77-0613	Hook Bolt (Radio Mtg.)	57-1560FA3
Pointer Spring	57-1652	Wing Nut (Radio Mtg.)	W895FA3
Pointer Spring	57-1653	Ignition Switch Condenser	30-4007
Pointer & Cam Assembly	77-0650	Generator Condenser	30-4475
Dial	55-1034	Distributor Resistor	33-1196
Tuning & Volume Knob	77-0643	Screw (Bezel Mtg.)	97-0111FA4
Tone Lever	57-1559FA8	Speaker Cover & Bracket	77-0663
Manual Return Spring	57-1620FA3	Tube Side Cover	57-1554FC51
Speaker Gasket	55-1037	Speed Nut (Dial Mtg.)	97-0137FE7
Speaker Unit	73-0050	Housing & Bracket	77-0662FC51
Speaker Cable	95-0161	Screw (Cover Mtg.)	W-2212FA26

MODEL F-1841
Ford "Custom"

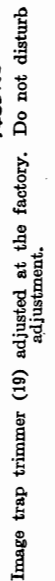
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PARTS LIST — F-1841

MODEL P-1841

Note 1.—Turn selector switch knob to "D" so that stations can be tuned in by manual tuning.
Note 2.—Turn tuning control clockwise as far as it will go.
Note 3.—Adjust (33) for minimum output response.
Note 4.—Connect antenna lead, Part No. 95-0111, to antenna receptacle in radio.
Note 5.—Connect a 20 mmf condenser in series between signal generator and antenna lead.
Note 6.—When antenna stage adjustment is made with radio installed in car, the radio antenna lead must be connected to car antenna in usual manner.
Note 7.—Connect signal generator output lead to a wire placed near car antenna but not connected to it.
* While rocking.



MODEL F-1841
Ford "Custom"

PHILCO RADIO & TELEVISION CORP.

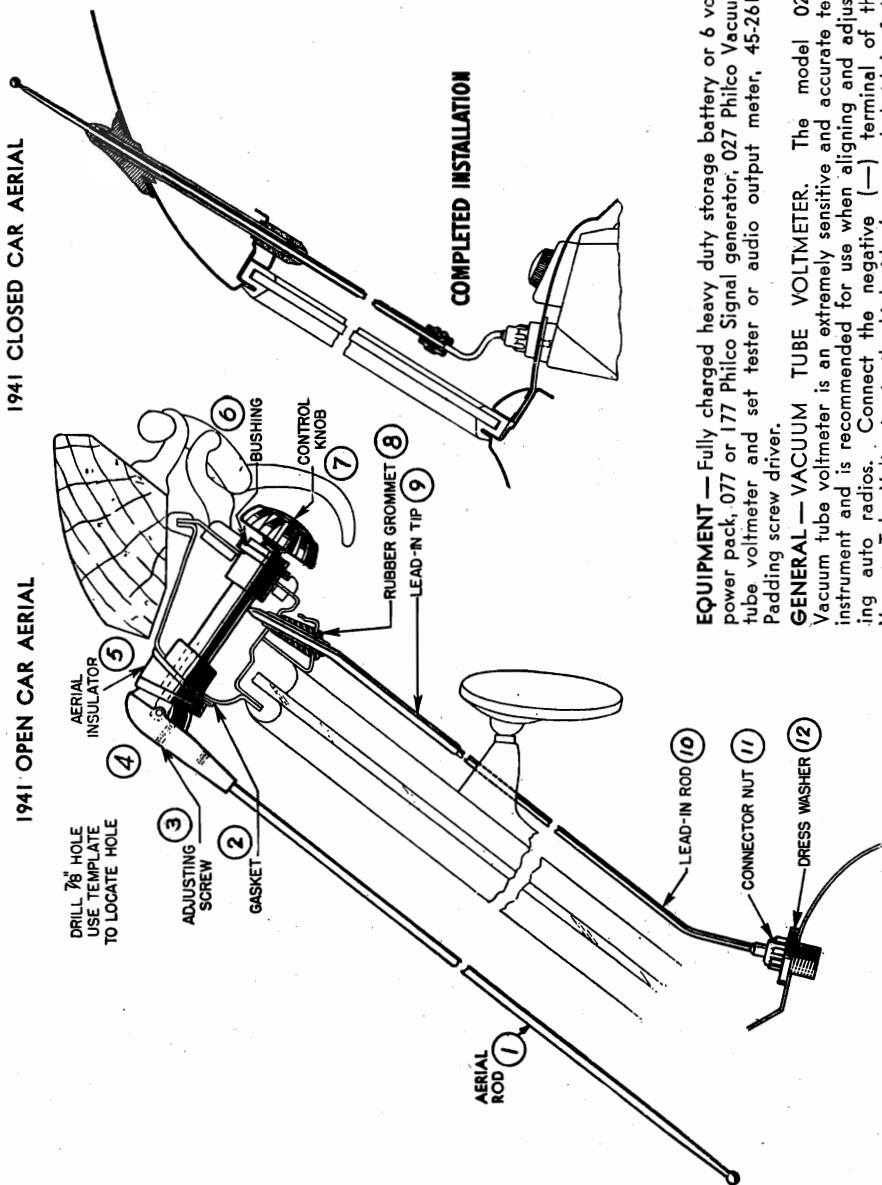


FIGURE 4

CLOSED CAR AERIAL PARTS LIST (Figure 4)

No.	Description	Part No.	List Price
①	Felt Washer (per 100)	55-0811	\$1.25
②	Dress Washer	57-1137FA8	.10
③	Stationary Tube	77-0726	.90
④	Connector Nut	55-1166	.15
⑤	Knob	77-0723	.40
⑥	Knob Set Screw	W2103FA4	.10
⑦	Lower Roof Tube Nut	57-1131FA8	.15
⑧	Insulator	55-0783	.10
⑨	Sliding Tube	77-0725	.85
⑩	Roof Tube	77-0724	.50
⑪	Gasket	55-0785	.05
⑫	Stanchion	55-0781	.15
⑬	Felt Washer	55-0786	.02
⑭	Upper Roof Tube Nut	57-1135-FA8	.15
⑮	Part of ⑥		
	Set Screw Wrench	28-4696	.10
	Template	57-1828	.05
	Complete Aerial	91-0178	3.50

Prices subject to change without notice.

OPEN CAR AERIAL PARTS LIST (Figure 5)

No.	Description	Part No.	List Price
①	Aerial Rod	77-0866	\$1.25
②	Gasket	55-0285	.03
③	Adjusting Screw	57-1836	.06
④	Aerial Head & Shaft Assy.	91-0182	2.75
⑤	Aerial Insulator Assy.	55-1165	.45
⑥	Insulating Bushing	55-1300	.40
⑦	Control Knob	77-0736	.50
⑧	Rubber Grommet	77-0735	.25
⑨	Lead-in Tip	57-1838	.40
⑩	Lead-in Rod	77-0734	.45
⑪	Connector Nut	55-1166	.15
⑫	Dress Washer	57-1137	.10
⑬	Felt Washer (per 100)	55-0811	1.25
⑭	Lead-in Spring	57-1218	.10
⑮	Set Screw Wrench	28-4696	.10
⑯	Screw (Aerial Rod)	W1944	.10
	Complete Aerial	91-0179	4.50

Prices subject to change without notice.

EQUIPMENT — Fully charged heavy duty storage battery or 6 volt power pack, .077 or 177 Philco Signal generator, 027 Philco Vacuum tube voltmeter and set tester or audio output meter, 45-2610 Padding screw driver.

GENERAL — VACUUM TUBE VOLTMETER. The model 027 Vacuum tube voltmeter is an extremely sensitive and accurate test instrument and is recommended for use when aligning and adjusting auto radios. Connect the negative (—) terminal of the Vacuum Tube Voltmeter to the high side (ungrounded side) of the volume control. Connect the positive (+) terminal to the radio housing. Connect the "AC" cord to a 110 volt AC socket. Press the VTVM button and the 10 volt button. Turn the "Set Zero Ohms — VTVM" control clockwise until a click is heard. Allow the tubes to heat up for a few minutes. Short the 150 meg. VTVM terminals and adjust the "Set Zero 150 meg." control until the meter reads zero on the 0-10 range scale (bottom scale). The needle will deflect from left to right.

AUDIO OUTPUT METER. If an audio output meter is used, connect the leads across the voice coil of the speaker. Use the 0-30 volt scale.

With the Radio and signal generator set up for operation at the prescribed frequency, turn the Radio volume control on full and set the signal generator attenuator so that a half scale reading is obtained on the meter. The signal in the speaker should be audible but not loud.

The shielding on the generator output lead must be connected to the Radio housing.

FIGURE 5

MODEL F-1841

FORD CUSTOM

AUTO RADIO