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Servicing Information



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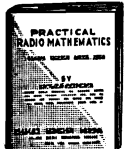
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	TV-17	1960
	TV-16	Late 1959
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	17	1957
	16	1956
	15	1955
	14	1954
	13	1953
	12	1952
	11	1951
	10	1950
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	6	1946
	5	1942
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	3	1940
	1	1926-1938

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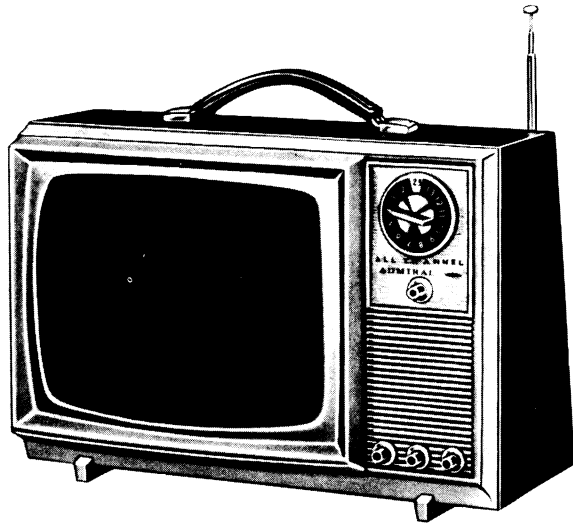
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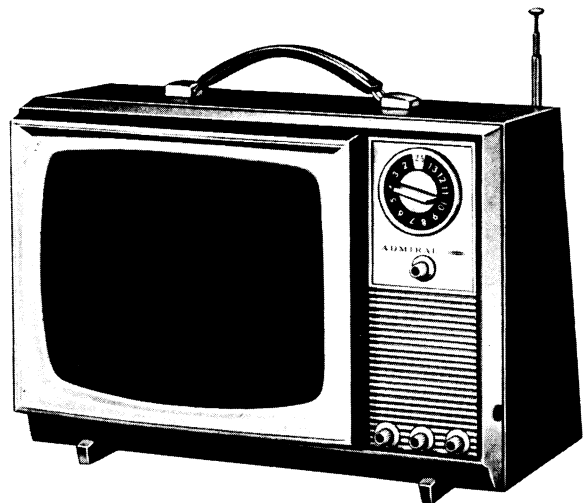
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Admiral.



PH900, PH900M SERIES



PG927M

MODEL CHART						
MODEL	COLOR	NAME	SIZE	VHF TUNER	UHF TUNER	CHASSIS
PH900	Black	Playmate	9"	94E281-8	94E272-3	G2-1
PH902	Red					
PH909	White					
PH900M	Black	Playmate	9"	2094E1-1	2094E2-1	MG2-1
PH902M	Red					
PH909M	White					
PG927M	Walnut					

Models PG910, PG912, PG919, PG927, use Chassis G2-1, and are practically identical to sets covered here.

HORIZONTAL LOCK ADJUSTMENT

The Horizontal Lock control is set at the factory and seldom requires readjustment. Adjustment need only be made if 8FQ7 tube (V403) has been replaced and the picture cannot be locked-in with slight adjustment of the Horizontal Lock control.

Before proceeding with adjustment, be sure that the picture will sync vertically, as lack of both vertical and horizontal sync generally indicates sync circuit trouble. Lack of only horizontal sync generally indicates trouble in the horizontal sync (phase detector) circuit.

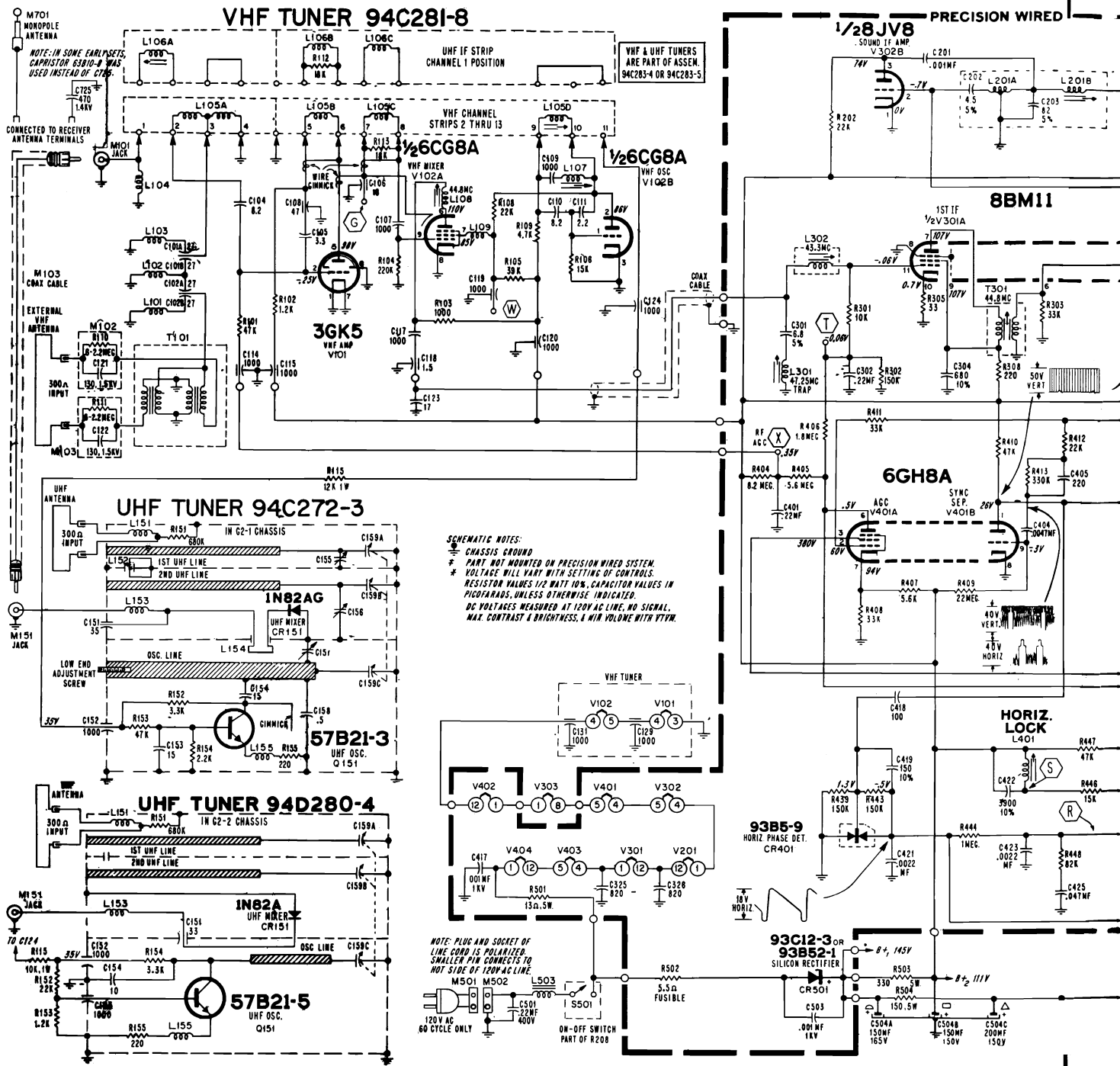
1. Remove cabinet back. Connect interlock cord.
2. Allow a few minutes for set to warm up. Tune in weakest station, set Brightness and Contrast controls for a normal picture.
3. Using a piece of hook-up wire, short pin 2 of V403, 8FQ7 tube, to chassis ground.
4. Adjust Horizontal Lock control at point where picture is in horizontal sync and almost remains stationary with tendency to shift to left or right.
5. Remove wire short from pin 2 of V403. Set Channel Selector to weakest station. Switch Channel Selector on and off channel, picture should remain in horizontal sync.

RESISTORS

R115	13K, 2 Watts, G2-1	61B24-252
R115	12K, 2 Watt, MG2-1	61C24-251
R208	1 meg. Volume Control with Switch	75C120-1
R319	3.3K, 2 Watt	61C24-237
R320	30K, Contrast Control	75C121-3
R322	100K, Brightness Control	75C121-2
R402A	Vertical Linearity Control	Dual 75C95-6
R402B		
R421	1 meg, Thermistor	60A64-2
R422	1.2 meg, Vertical Hold Control	75C121-1
R425	100K, 1 Watt	60C14-104
R427	68K, 1 Watt	60C14-683
R431	220 ohm, 1 Watt	60C14-221
R454	1.1K, 2 Watt, MG2-1	61C24-226
R454	1K, 2 Watt, G2-1	61C24-225
R460	1K, 5%, 1/2 Watt, Wire Wound	60B28-92
R461	1.5 ohm, Wire Wound	60B28-60
R501	13 ohm, 5 Watt	61C20-56
R502	5.5 ohm, Fuse type	61C48-1
R503	330 ohm, 5 Watt	61C20-66
R504	150 ohm, 5 Watt	61C20-44

Only special resistors and controls are listed above. All other resistors are standard and their resistance and wattage is indicated on the schematic diagram.

ADMIRAL Chassis G2-1 Schematic Diagram



G2-1 CHASSIS SCHEMATIC

(MG2-1 Chassis uses a different tuner)

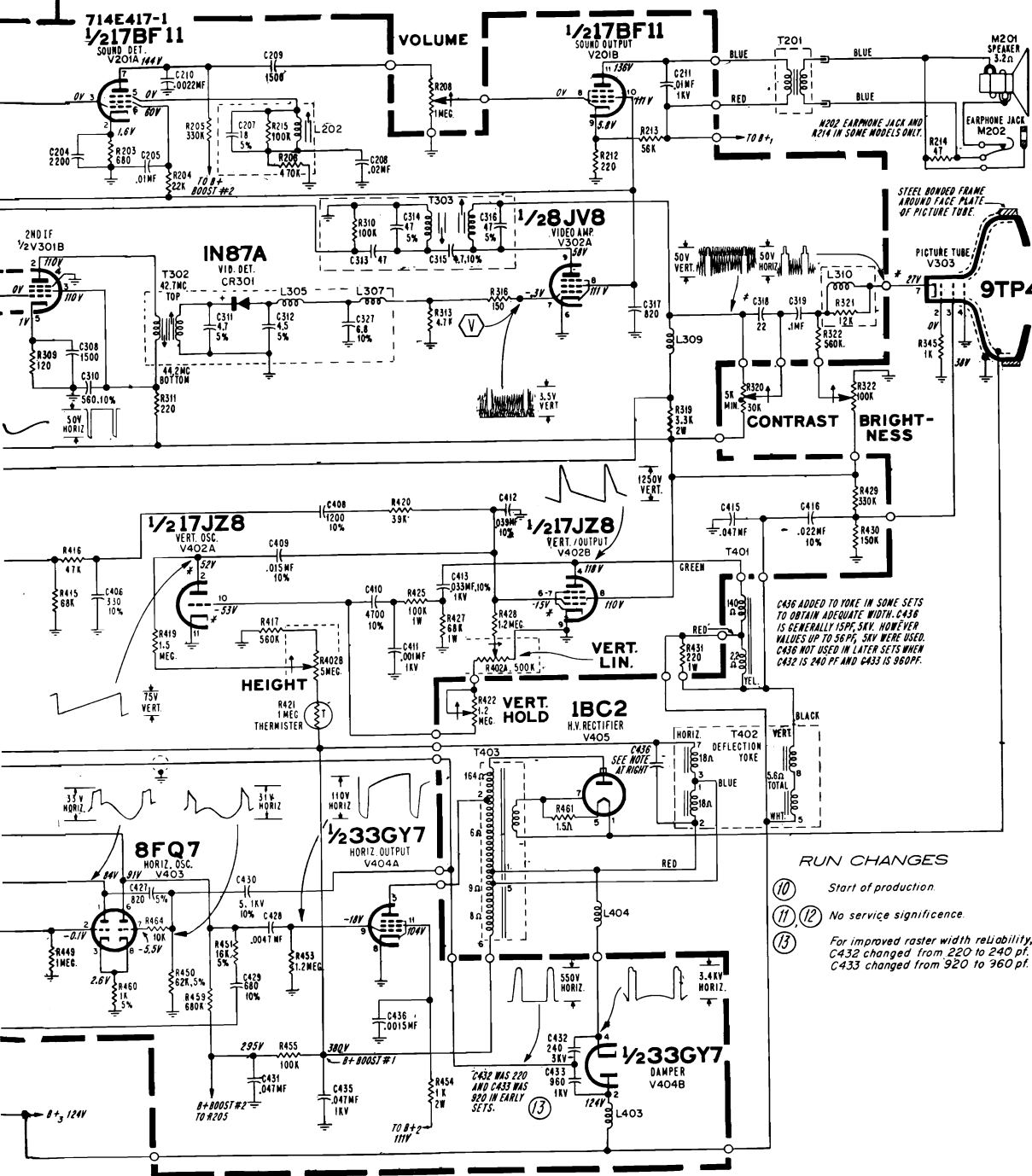
SERVICE HINT

Insufficient width can be corrected by connecting a 15-56 PF 5KV ceramic disc between terminals 2 and 7 of T402 deflection yoke. Use the smallest value possible to obtain sufficient width. Some sets will already be equipped with this capacitor.

HEIGHT AND VERTICAL LINEARITY ADJUSTMENT

If the picture is of incorrect height (vertical size), adjust the Height control. This adjustment may affect the vertical linearity of the picture. If necessary, alternately adjust the Vert. Lin. control and Height control. Note: Upper portion of the picture is affected mostly by the Vertical Linearity control; lower by the Height control.

ADMIRAL Chassis G2-1 Schematic Diagram, Continued



RUN CHANGES

- ⑩ Start of production
- ⑪ ⑫ No service significance
- ⑬ For improved raster width reliability, C432 changed from 220 to 240 pf. C433 changed from 920 to 360 pf.

RASTER TILT ADJUSTMENT

If raster is tilted, loosen deflection yoke clamping screw at rear of yoke. Rotate yoke until raster is straight. Tighten yoke clamping screw. Do not allow yoke to move back on neck of picture tube.

PICTURE CENTERING

The picture may be centered vertically and/or horizontally by moving the centering tabs, which are located on the back of the deflection yoke assembly.

VHF CHANNEL ADJUSTMENT

These sets are provided with a channel adjustment slug for each channel, see illustration. Adjust as follows:

1. Turn receiver on and allow 15 minutes warm up.
2. Set Channel Selector at highest channel to be adjusted. Set Fine Tuning control at center of tuning range, by rotating it one third turn counter-clockwise from full clockwise rotation. Set other tuning controls for normal picture and sound.
3. Remove Channel Selector knob and UHF indicator.
4. Using a non metallic alignment tool, carefully adjust channel slug for best picture. Note: Sound may not be loudest at this point. Repeat procedure for each channel to be adjusted.

ADMIRAL Chassis G2-1, MG2-1, Alignment Information

IF AMPLIFIER ALIGNMENT

Connect isolation transformer and polarized line cord between AC line and receiver. Connect negative of 6 volt bias supply to test points "T" and "X" (IF and RF AGC), positive to chassis. See figure 8 for test points and alignment locations.

Using needle nose alligator clip or looped end of hookup wire, connect signal generator high side to test point "G", low side directly to tuner, see figure 2.

Connect VTVM high side to test point "V" through a decoupling filter, see figure 5. Connect low side to chassis.

Set Channel Selector to channel 12. (Or other high end channel which does not affect indication). Turn fine tuning one third turn counterclockwise from full clockwise rotation. Connect jumper wire across antenna terminals.

Allow about 15 minutes for receiver and test equipment to warm up. Use a non-metallic alignment tool.

IMPORTANT: Before proceeding, check signal generator against frequency standard for calibration.

1. Set generator at 42.7MC and adjust T302 top core for maximum.
2. Set generator at 44.2MC and adjust T302 bottom core for maximum.

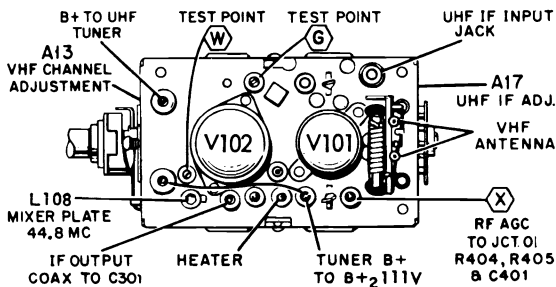


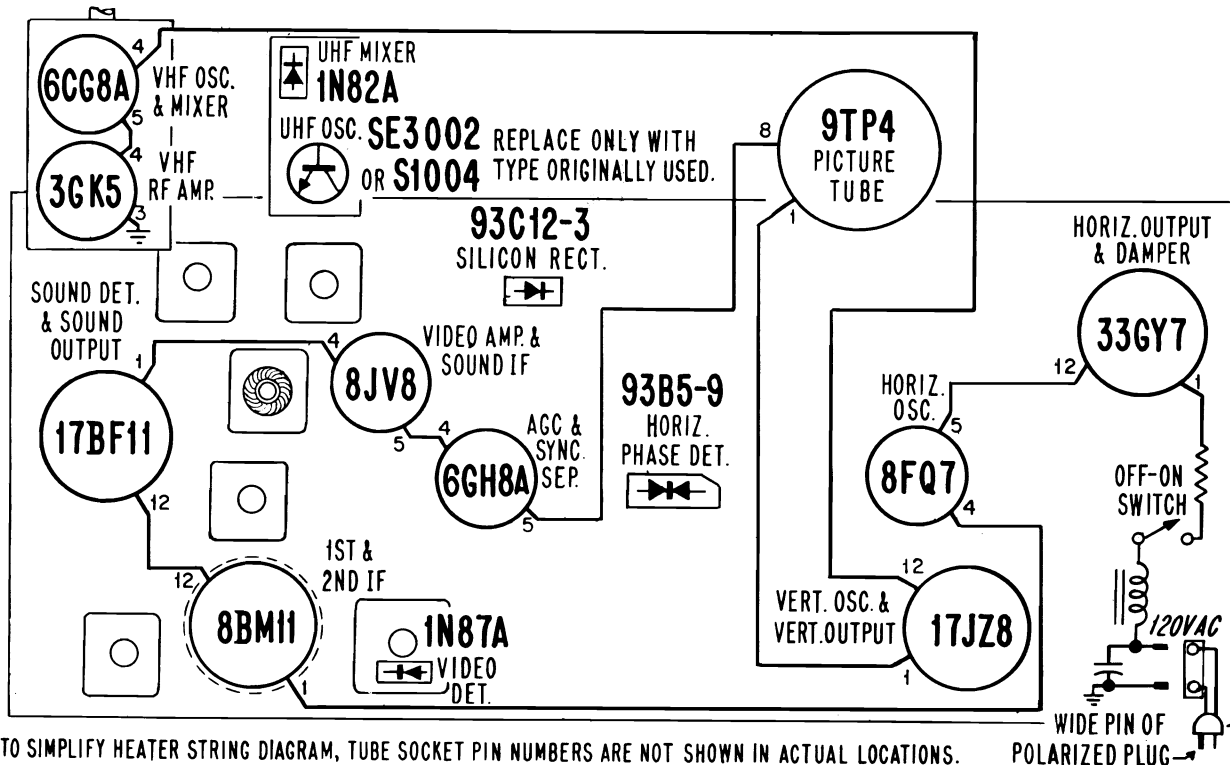
Fig. 2 TOP DRAWING OF VHF TUNER

3. Set generator at 44.8MC and adjust T301 for maximum.
4. Connect wire jumper across IF input coil L302.
5. Set generator at 44.8MC and adjust L108 on VHF tuner for maximum. (Accessible through bottom of etched board).
6. Remove wire jumper of step 4.
7. Set generator at 43.3MC and adjust L302 for maximum.
8. Reduce bias to zero volts.
9. Set generator at 47.25MC and adjust L301 for minimum.
10. Restore -6 volt bias.
11. Disconnect generator and connect sweep generator. Loosely couple marker to sweep connection.
12. Disconnect VTVM, and connect oscilloscope to network.
13. Set sweep frequency at 43MC, sweep width approximately 7MC. Keep marker and sweep outputs at low level to prevent over-loading. A reduction in sweep output should reduce curve amplitude without altering the shape of the response.
14. If 45.75MC marker is not within tolerance or markers not in proper location on curve, adjust T302 bottom core to position 45.75MC marker. Adjust T302 top core to correct shape of curve. Avoid reducing amplitude of curve as much as possible.

ALIGNMENT OF UHF IF INPUT USING A TRANSMITTED SIGNAL

Alignment of UHF IF input coil (part of VHF tuner), should be made if UHF reception is poor and after usual causes of poor UHF reception have been checked.

To align UHF IF input coil, tune in UHF channel with normal picture and sound. Using non-metallic alignment tool very carefully adjust slug L106A for best picture, consistent with good sound. For VHF tuner adjustment locations, see figure 2. It will be necessary to remove the bracket on the rear of the VHF tuner for access to L106A slug. Maintain the bracket ground through the grounding braided wire while making the adjustment.



TO SIMPLIFY HEATER STRING DIAGRAM, TUBE SOCKET PIN NUMBERS ARE NOT SHOWN IN ACTUAL LOCATIONS.

WIDE PIN OF POLARIZED PLUG

ADMIRAL Chassis G2-1, MG2-1, Alignment Information, Continued

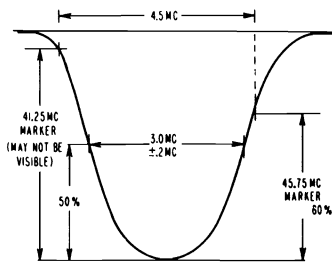


Fig. 3 IF CURVE

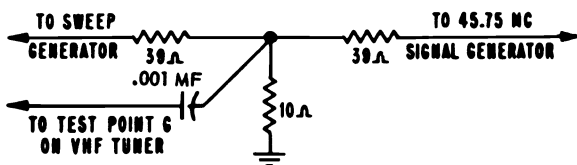


Fig. 4 MATCHING NETWORK

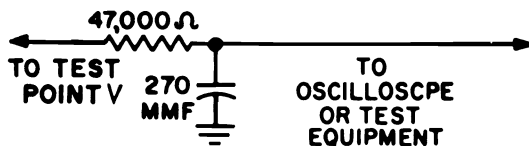


Fig. 5 DECOUPLING FILTER

OVER-ALL VHF AND IF RESPONSE CURVE CHECK

Set VHF Channel Selector on channel 12. Connect negative of -6 volt bias supply to test point "T" (IF AGC) and -1.75 volt to test point "X" (RF AGC) positive to chassis. See Fig. 8.

Connect isolation transformer between AC line and receiver. Allow about 15 minutes for receiver and test equipment to warm up.

Attach the sweep generator at the VHF tuner antenna terminals, high side through 1200 ohm resistor, low side through 1200 ohm resistor. Place a 330 ohm resistor across the antenna terminals and a 47 ohm resistor across the generator output.

Connect oscilloscope high side to test point "V" through decoupling filter, low side to chassis. Adjust sweep generator for 3 volt peak to peak at test point "V".

Compare response curve obtained against ideal curve shown in fig. 6. If the curve is not within tolerance, adjust the VHF fine tuning to position video marker; adjust T302 top core to correct shape of curve. It should never be necessary to turn slugs more than one turn in either direction. If curve is satisfactory on channel checked, all other channels should be satisfactory. **IMPORTANT:** When sweep output is reduced, response curve amplitude on scope should also decrease, but curve shape should remain the same.

VHF AMPLIFIER AND MIXER ALIGNMENT

VHF tuner used in these models features high stability and trouble-free operation. In general, RF and mixer alignment is permanent. However, individual channel oscillator screws or slugs are provided, should oscillator adjustment be required after replacement of VHF oscillator tube. For

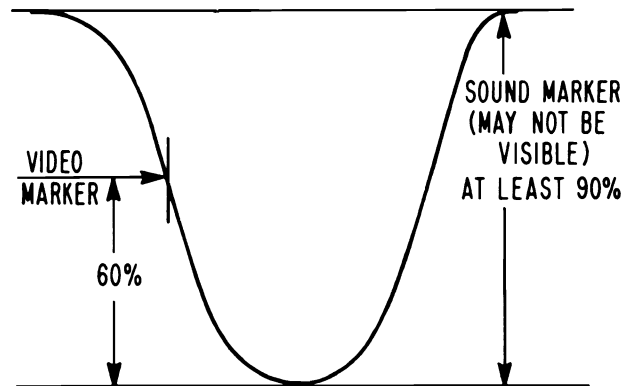


Fig. 6 Ideal Response Curve

tuner adjustment locations, see Figure 2. If it is definitely determined that complete tuner alignment is required, return tuner to your Admiral Distributor for repair or replacement. Note: VHF Channel Adjustment can be made from front of set after removing VHF Channel and Fine Tuning knobs.

ALIGNMENT OF 4.5MC TRAP

Alignment of 4.5MC (beat interference) trap T303 top slug requires use of a hexagonal non-metallic alignment tool.

To align 4.5MC trap T303 top slug, tune in television station with beat interference pattern in picture. While closely observing picture, adjust slug T303 top slug for minimum interference pattern.

Note that adjustment T303 top slug is slug farthest from bottom of coil. Use caution so as not to disturb bottom slug, slug nearest bottom of coil, as sound IF alignment will be affected.

4.5MC SOUND IF ALIGNMENT

1. Tune in normal picture on strongest TV station. Allow about 15 minutes for set to warm up. See figure 8 for adjustment locations.
2. Using non-metallic alignment tool, slowly turn slug L202 to several turns to left until a buzz is heard in sound. Then slowly turn slug L202 to the right for loudest and clearest sound. NOTE: There may be two points (approximately 1/2 turn apart) at which sound is loudest. The slug should be set at center of second point of loudest sound noted as slug is turned in (toward bottom of coil).
3. Reduce signal to antenna terminals until there is considerable hiss in sound. For best results, use a step attenuator, connected between antenna and antenna terminals. Signal can also be reduced by disconnecting antenna and placing it close to antenna terminals or leads.
4. Carefully adjust slug L201B for loudest and clearest sound with minimum hiss. If hiss disappears during alignment, reduce signal to maintain hiss level. Re-adjust slug L201B. NOTE: Slug L201B should be at end nearest bottom of coil.
5. Carefully adjust slug T303 bottom slug for loudest and clearest sound with minimum hiss. If hiss disappears during alignment, reduce signal to maintain hiss level. Re-adjust slug T303. Caution: Slug T303 is located nearest bottom of coil. Use care so as not to disturb slug nearest top of coil.
6. If above alignment is correctly made, no further adjustment is required. However, if sound remains distorted at normal volume level (when receiver is tuned for best sound) repeat entire procedure.

CAUTION: Do not re-adjust slug L202 unless sound is distorted. If L202 is re-adjusted, all steps in alignment procedure should be repeated exactly as instructed.

ADMIRAL Chassis G2-1, MG2-1, Service Information, Continued

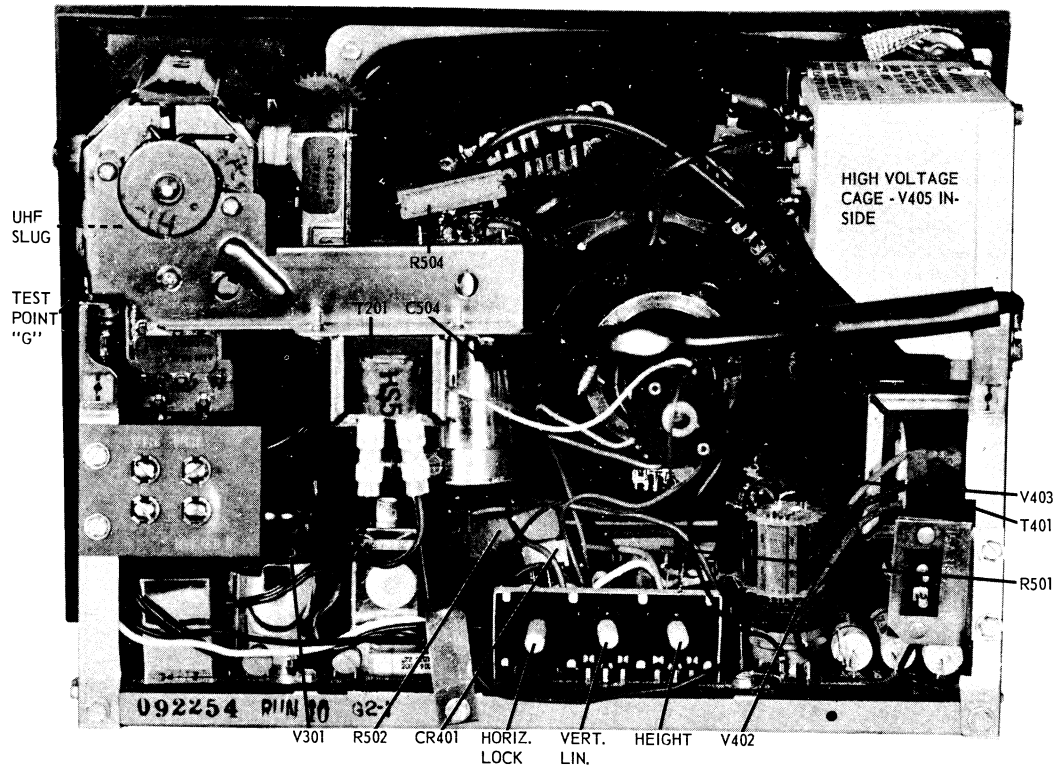


Fig. 7 BACK VIEW OF CHASSIS SHOWING IMPORTANT SERVICE LOCATIONS

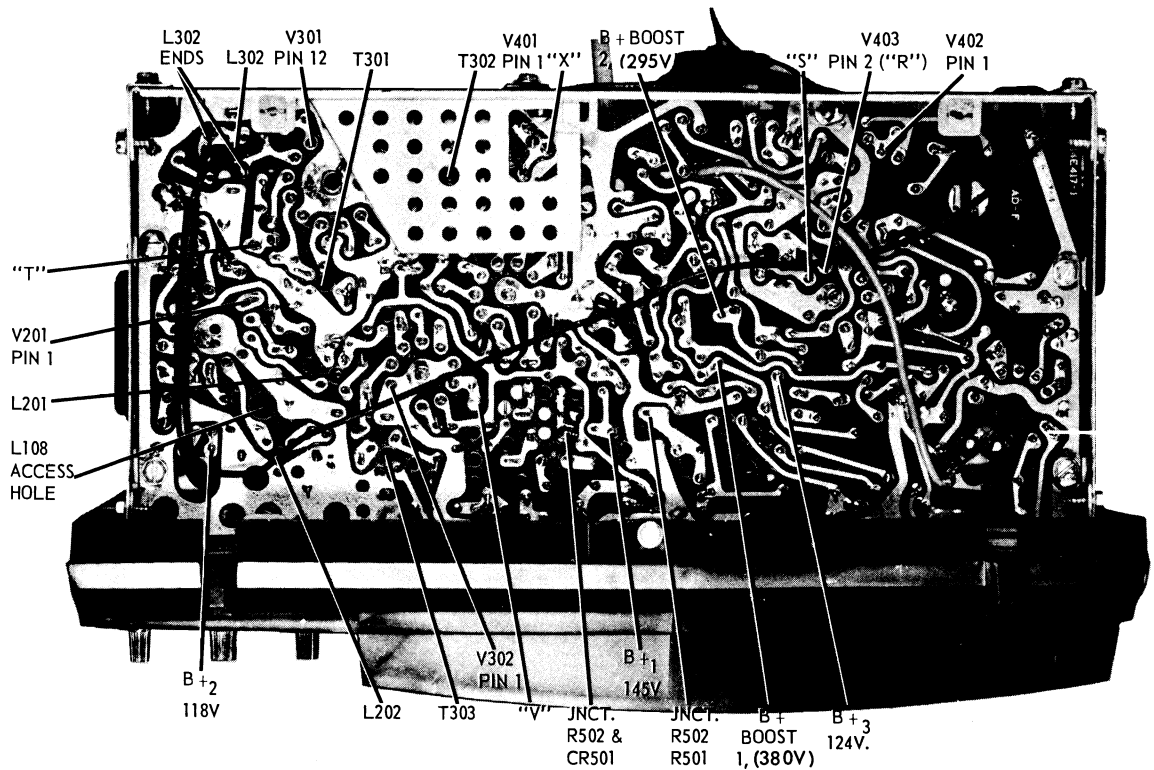


Fig. 8 BOTTOM VIEW OF CHASSIS SHOWING IMPORTANT SERVICE LOCATIONS

Admiral®

MODEL CHART

MODEL	NAME	COLOR	SIZE	VHF TUNER	UHF TUNER	CHASSIS
PN1304	Playmate	Beige	12"	94E281-7	94E296-4	H-1A
PN1310	Playmate	Black				1H1-1A
PN1319	Playmate	White				
PN1327	Playmate	Walnut				
PN1501	Premenade	Sandalwood	14"	94E281-7	94E296-4	1H2-1A
PN1510	Capri	Black				
PN1519	Capri	White				
PN1527	Jubilee	Walnut				
PK1360	Playmate	Black	12"	94C281-7	94C296-4	H1-1A
PK1369	Playmate	White				Run 12 & Up
PK1377	Playmate	Walnut				
PK1560	Vagabon	Black	14"	94C281-7	94E296-4	H2-1A
PK1569	Vagabon	White				Run 12 & Up
PK1577	Executive	Walnut				

Additional Models Released Later

MODEL	NAME	COLOR	SIZE	VHF TUNER	UHF TUNER	CHASSIS
P 1204	Personal Playmate	Beige	12"	94 E281-7	94E296-4	H1-1A
P 1210	Personal Playmate	Black				1H1-1A
P 1219	Personal Playmate	White				1H1-1A
P 1227	Personal Playmate	Walnut				1H1-1A
P 1401	Promenade	Beige	14"	94E281-7	94E296-4	1H2-1A
P 1410	Caravan	Black				
P 1419	Caravan	White				

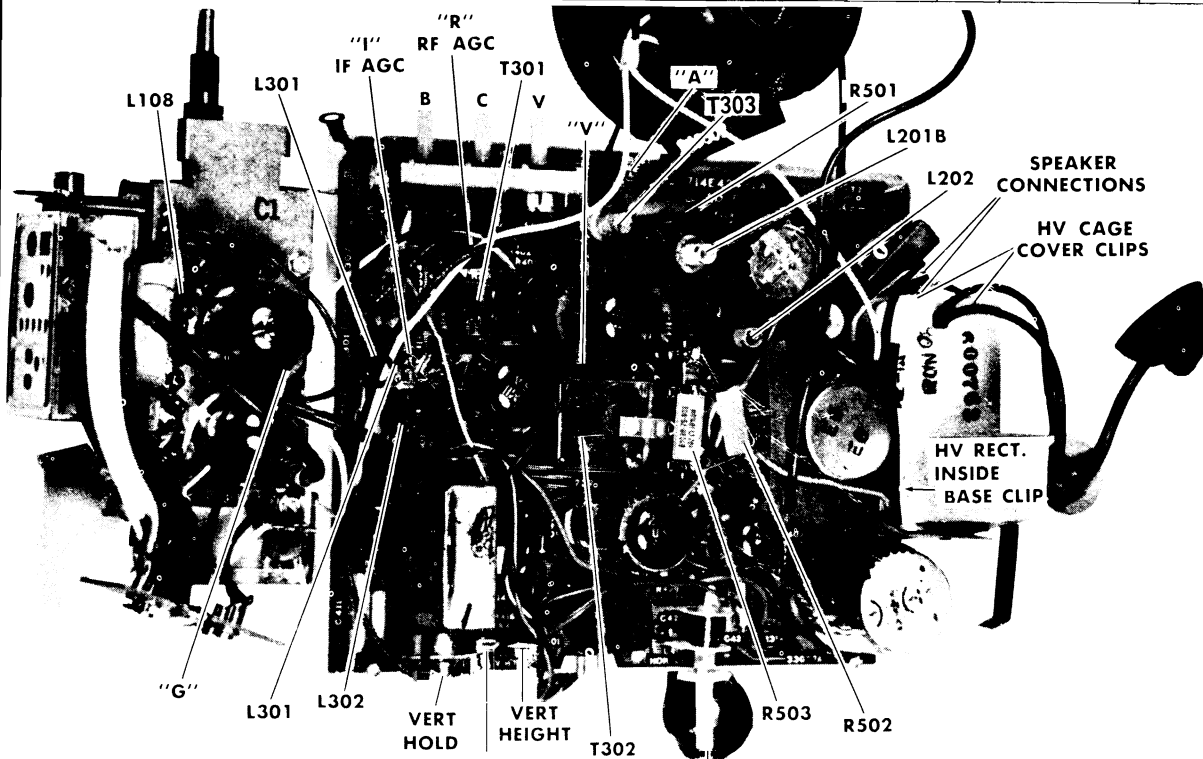
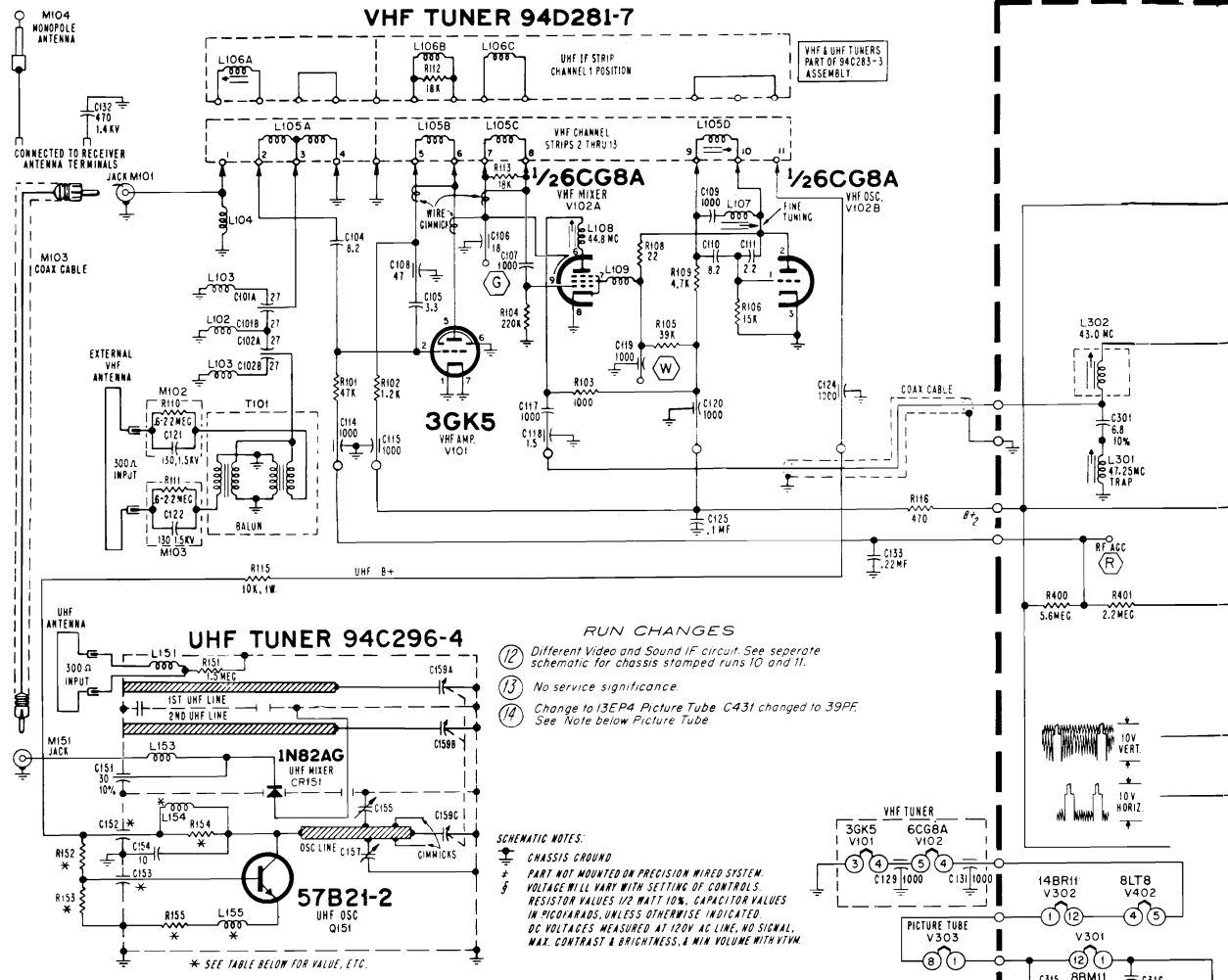


Fig. 1 TOP VIEW OF CHASSIS SHOWING ALIGNMENT ADJUSTMENT LOCATIONS

ADMIRAL Chassis H1-1A, H2-1A, Schematic Diagram



- RUN CHANGES**
- ⑫ Different Video and Sound IF circuit. See separate schematic for chassis stamped runs 10 and 11.
 - ⑬ No service significance.
 - ⑭ Change to 13EP4 Picture Tube. C431 changed to 39PF. See Note below Picture Tube.

SCHEMATIC NOTES:
 ⚡ CHASSIS GROUND
 # PART NOT MOUNTED ON PRECISION WIRED SYSTEM. VOLTAGE WILL VARY WITH SETTING OF CONTROLS.
 * RESISTOR VALUES 1/2 WATT 10%. CAPACITOR VALUES IN MICROFARADS, UNLESS OTHERWISE INDICATED.
 DC VOLTAGES MEASURED AT 120V AC LINE, NO SIGNAL, MAX. CONTRAST & BRIGHTNESS, & MIN VOLUME WITH TVM.

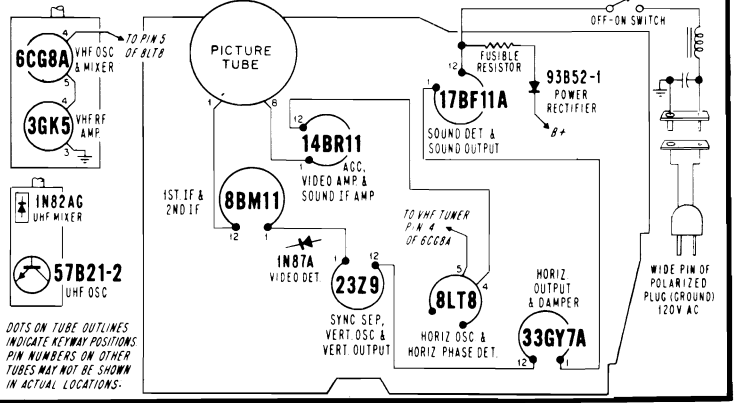
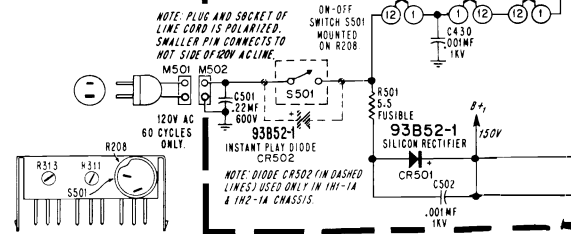
* SYM	EARLY UHF TUNER	LATER UHF TUNER
R152	22K	12K
R153	1.2K	2.2K
R154	3.3K	2.2K
R155	220	270
C152	1000	100
C153	1000	30
L154	USED	USED
L155	USED	NOT USED

HORIZONTAL LOCK ADJUSTMENT

The Horizontal Lock control is set at the factory and seldom requires readjustment. Adjustment need only be made if 8LT8 tube (V402) has been replaced and the picture cannot be locked in with slight adjustment of the Horizontal Lock control.

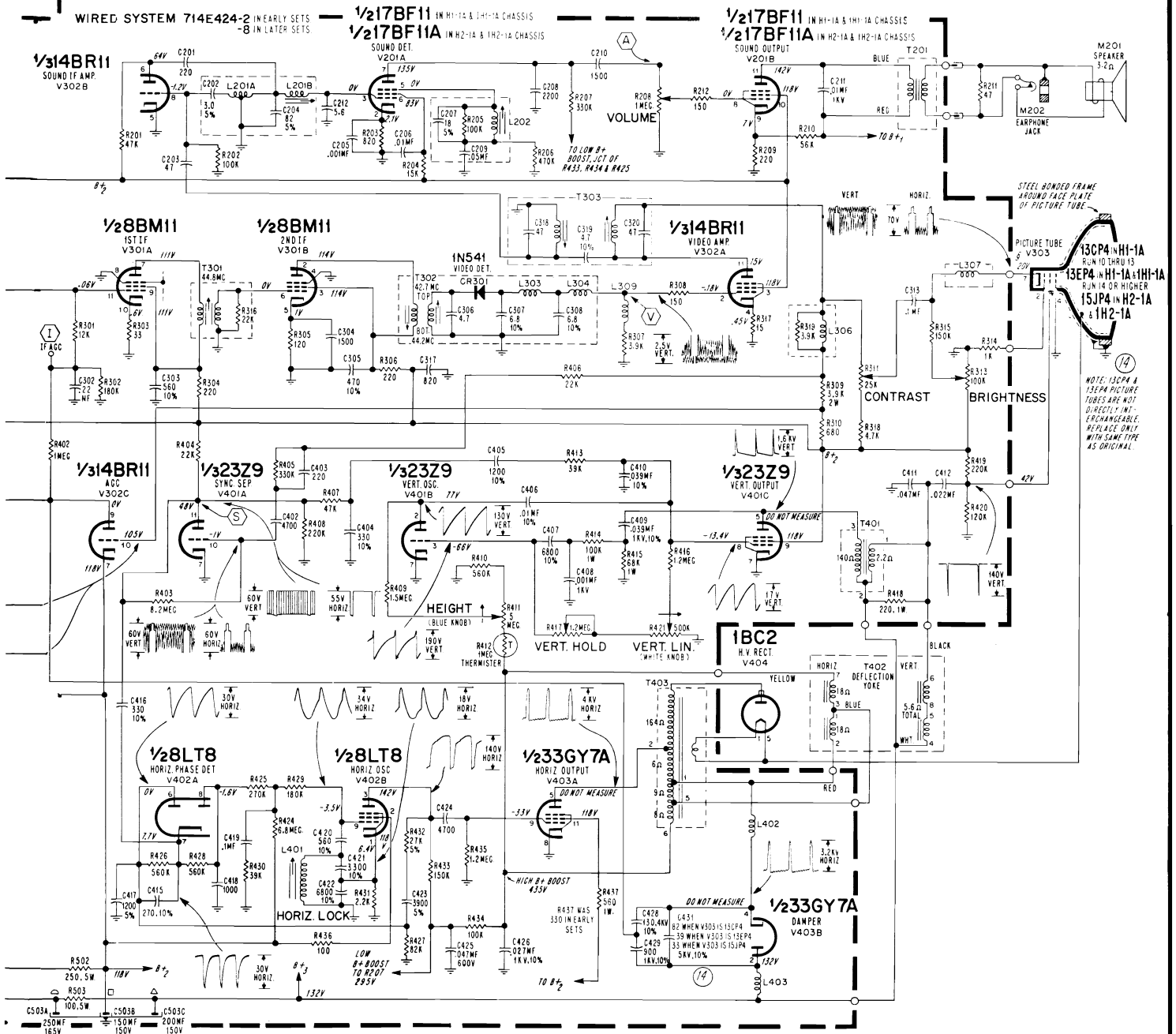
Before proceeding with adjustment, be sure that the picture will sync vertically, as lack of both vertical and horizontal sync generally indicates sync circuit trouble. Lack of only horizontal sync generally indicates trouble in the horizontal sync (Phase detector) circuit.

1. Remove cabinet back. Connect a polarized interlock cord.
2. Allow a few minutes for set to warm up. Tune in weakest stations, set brightness and contrast controls for a normal picture.
3. Using a piece of hook-up wire, ground test point "S" (pin 11 of V401A, 23Z9 tube) through a .12-.15, 600V capacitor to the metal tuner bracket or a metal shield.
4. Adjust horizontal lock control at point where picture is in horizontal sync and almost remains stationary with tendency to shift to left or right.
5. Remove wire short and capacitor from test point "S". Set channel selector to weakest station. Switch channel selector on and off channel, picture should remain in horizontal sync.



TUBE LOCATION CHART

ADMIRAL Chassis H1-1A, H2-1A, Schematic Diagram, Continued



H1-1A & H2-1A CHASSIS SCHEMATIC

CHASSIS REMOVAL & SERVICING

1. The chassis can be slid partially out for servicing by:
 - A. Pulling off all of the knobs except the tuner knobs.
 - B. Removing the cabinet back.
 - C. Sliding the chassis back.
2. VHF-UHF tuner assembly removal:
 - A. Remove the tuner knobs and one screw securing the front of the tuner to the front of the cabinet.
 - B. Pull the tuner assembly back and out.
4. High voltage cage access:
 - A. Pry forward on the plastic projections located on the top front of the high voltage cage.
 - B. Lift off the white plastic top.
 - C. Slide the plastic tube cover off.

IF AMPLIFIER ALIGNMENT

Connect negative of 6 volt bias supply to test point "I" (IF AGC), "R" (RF AGC) positive to chassis. See figure 1.

Using needle nose alligator clip or looped end of hookup wire, connect matching network shown in figure 2 to test point "G", low side directly to tuner, see figure 4. Connect signal generator to matching pad.

Connect VTVM high side to test point "V" through a decoupling filter, see figure 5. Connect low side to chassis.

Set Channel Selector to Channel 12, (or other high end channel which does not affect indication). Connect jumper wire across antenna terminals. Set RF generator output to give reading 1-2 volts over residual reading for all IF alignment adjustments.

1. Set generator to 47.25 MC and adjust L301 for minimum.

ADMIRAL Chassis H1-1A, etc., Alignment Information, Continued

2. Set generator 42.7 MC and adjust T302 top slug for maximum.
3. Set generator at 44.2 MC and adjust T302 bottom slug for maximum.
4. Set generator at 44.8 MC and adjust T301 for maximum.
5. Connect wire jumper across IF input coil L302.
6. Set generator at 44.8 MC and adjust L108 on tuner for maximum.
7. Remove wire jumper of step 5.
8. Set generator at 43 MC and adjust L302 for maximum.
9. Disconnect signal generator and connect sweep generator. Connect marker signals through matching pad connections to test point "G".
10. Disconnect VTVM from decoupling network and connect oscilloscope calibrated for 3 volts P to P to network.
11. Set sweep frequency at 43 MC, sweep width approximately 7 DB. Maintain 3 volts P to P sweep display by adjusting sweep R.F. Keep marker at low level to prevent over loading. A reduction in sweep output should reduce amplitude without altering the shape of the response curve.
12. If 45.75 MC marker is not within tolerance or markers not in proper location on curve, adjust L108 to position 45.75 MC marker. Adjust T302 top to correct shape of curve. Avoid reducing amplitude of curve as much as possible.

IF RESPONSE CURVE CHECK

1. Allow about 15 minutes for receiver and test equipment to warm up.
2. Set VHF tuner to Channel 12. Connect negative of 6 volts bias supply to test points "R" and "I"; positive to chassis.
3. Connect sweep generator to VHF tuner to test point "G" through the generator matching network of figure 4. Ground low side nearby.
4. Connect oscilloscope high side to test point "V" through decoupling filter of figure 5, low side to chassis.
5. The IF curve now obtained should be checked against the ideal response curve, see figure 3. Maintain sweep output at 3V PP as alignment progresses. Keep markers low. A reduction in sweep output should reduce curve amplitude without appreciably altering the shape of the response curve.
6. If the curve is not within tolerance or markers not in proper location, L108 VHF Tuner Mixer Plate Coil should be adjusted for 45.75M video marker and T302 Top for rounded curve nose.

OVER-ALL VHF-IF RESPONSE CURVE CHECK

1. Set VHF Channel Selector on channel 12. Connect negative of -6 volt bias supply to test point "R" (IF AGC) and -1.75 volt to test point "I" (RF AGC) positive to chassis. See figure 1.
2. Connect isolation transformer between AC line and receiver. Allow about 15 minutes for receiver and test equipment to warm up.
3. Attach the sweep generator at the VHF tuner antenna terminals, using VHF isolation network. See figure 7.

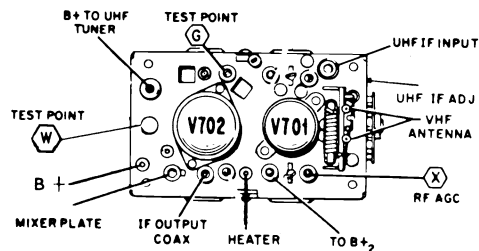


Fig. 2 TOP DRAWING OF VHF TUNER

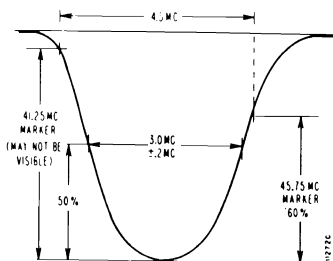


Fig. 3 IF CURVE

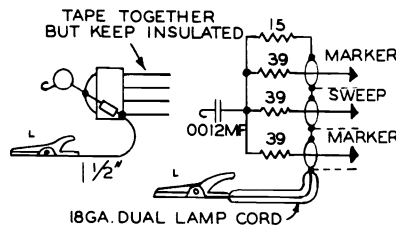


Fig. 4 MIXER GRID MATCHING PAD

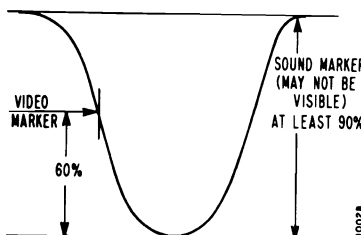


Fig. 6 IDEAL RESPONSE CURVE

4. Connect oscilloscope high side to test point "V" through decoupling filter, low side to chassis. Adjust sweep generator for 3 volt peak to peak at test point "V".
5. Compare response curve obtained against ideal curve shown in figure 6.

ALIGNMENT OF 4.5MC TRAP

Alignment of 4.5MC (beat interference) trap T303 top slug requires use of a hexagonal non-metallic alignment tool.

To align 4.5MC trap T303 top slug, tune in television station with beat interference pattern in picture. While closely observing picture, adjust slug T303 top slug for minimum interference pattern.

Note that adjustment T303 top slug is slug farthest from bottom of coil. Use caution so as not to disturb bottom slug, slug nearest bottom of coil, as sound IF alignment will be affected.

4.5MC SOUND IF ALIGNMENT

1. Tune in normal picture on strongest TV station. Allow about 15 minutes for set to warm up. See figure 1 for adjustment locations.
2. Using non-metallic alignment tool, slowly turn slug L202 to several turns to left until a buzz is heard in sound. Then slowly turn slug L202 to the right for loudest and clearest sound. NOTE: There may be two points (approximately 1/2 turn apart) at which sound is loudest. The slug should be set at center of second point of loudest sound noted as slug is turned in (toward bottom of coil).
3. Reduce signal to antenna terminals until there is considerable hiss in sound. For best results, use a step attenuator, connected between antenna and antenna terminals. Signal can also be reduced by disconnecting antenna and placing it close to antenna terminals or leads.
4. Carefully adjust slug L201B for loudest and clearest sound with minimum hiss. If hiss disappears during alignment, reduce signal to maintain hiss level. Re-adjust slug L201B. NOTE: Slug L201B should be at end nearest bottom of coil.
5. Carefully adjust slug T303 bottom slug for loudest and clearest sound with minimum hiss. If hiss disappears during alignment, reduce signal to maintain hiss level. Re-adjust slug T303. Caution: Slug T303 is located nearest bottom of coil. Use care so as not to disturb slug nearest top of coil.
6. If above alignment is correctly made, no further adjustment is required. However, if sound remains distorted at normal volume level (when receiver is tuned for best sound) repeat entire procedure.

CAUTION: Do not re-adjust slug L202 unless sound is distorted. If L202 is re-adjusted, all steps in alignment procedure should be repeated exactly as instructed.

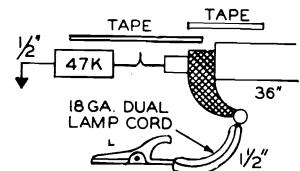


Fig. 5 DECOUPLING FILTER

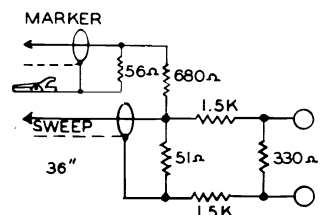


Fig. 7 VHF ISOLATION NETWORK

EMERSON

MODEL/CHASSIS/CRT CROSS-REFERENCE

Model No.	Chassis No.	CRT Tube
18P08	120842-A, B, F	19FJP4-A or 19GJP4-A
18P27	120846-B	
18P35	120876-A,B	
18P36		
18P37	120879-A, B	
18P37-A	120879-C	
18P40	120872-B	
18P41	120876-A, B	

TUNER AND CHASSIS CROSS-REFERENCE

Chassis No.	VHF Tuner	UHF Tuner
120842-A	471682	471674
120842-B		471670
120842-F	471737	471674
120846-B	471617	471647
120872-B	471682	471670
120876-A	471765	471674
120876-B		471670
120879-A		471674
120879-B		471670
120879-C	471737	471674

AUTOMATIC TIMER CONTROL

Models 18P37 and 18P37A are equipped with an automatic timer unit (part no. 471717) which can be set to turn the receiver off after a pre-determined interval ranging from ten minutes to three hours. If desired, the receiver may also be operated in a conventional manner, in which case it will remain in operation until the timer switch is returned to its OFF position.

QUICK-ON FEATURE

Each of the models described in this Service Note (except 18P08) are equipped with the "Quick-On" feature which, when set for operation by means of an auxiliary slide switch provided for this purpose, serves to eliminate the delay usually encountered by the normal warm-up period, by permitting a limited amount of current to flow in the filament circuit even when the set is not operating. An added benefit of this type of operation is that it can serve to prolong the life expectancy of the tubes, by removing the effects of surge currents from all points in the filament circuit. If desired (as may be the case if the receiver is not to be operated for an extended period of time), the "Quick-On" switch may be left in the OFF position, in which instance the normal amount of warm-up time will be required when the receiver is placed in operation.

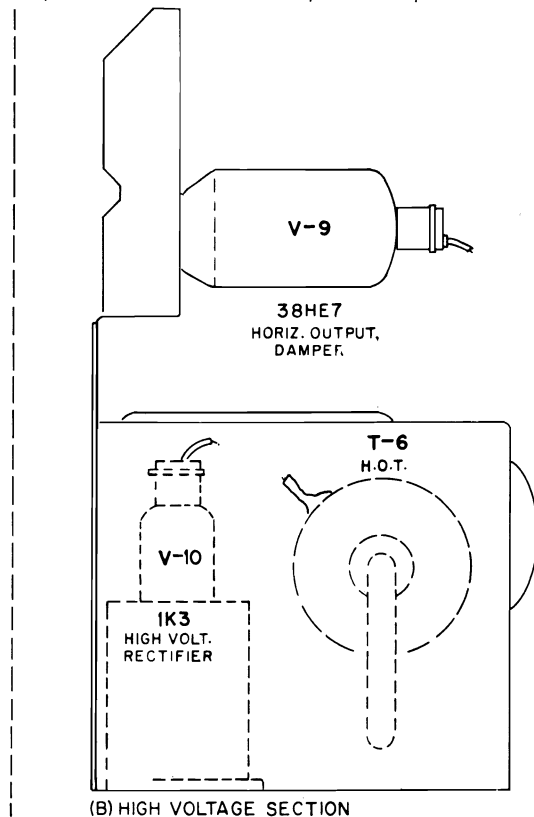
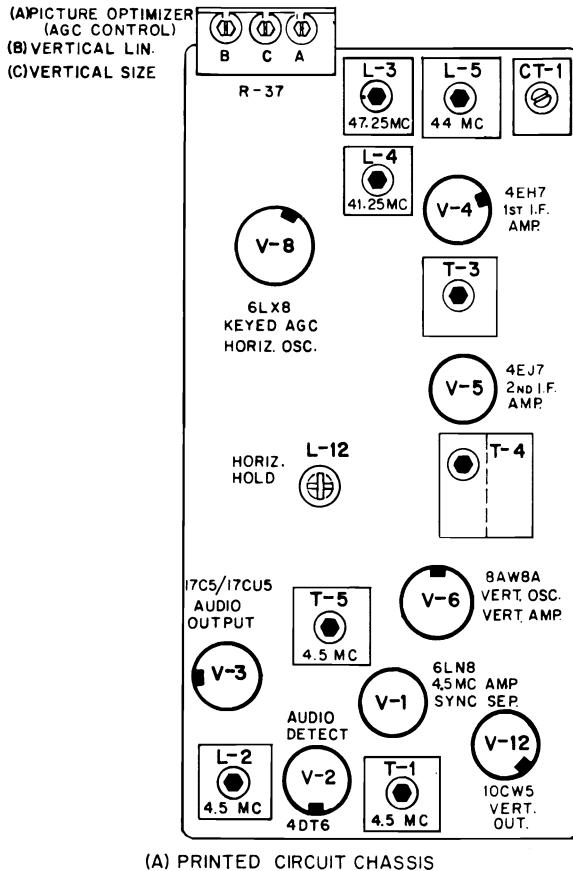


FIG. 10-TUBE LOCATION AND ALIGNMENT POINTS

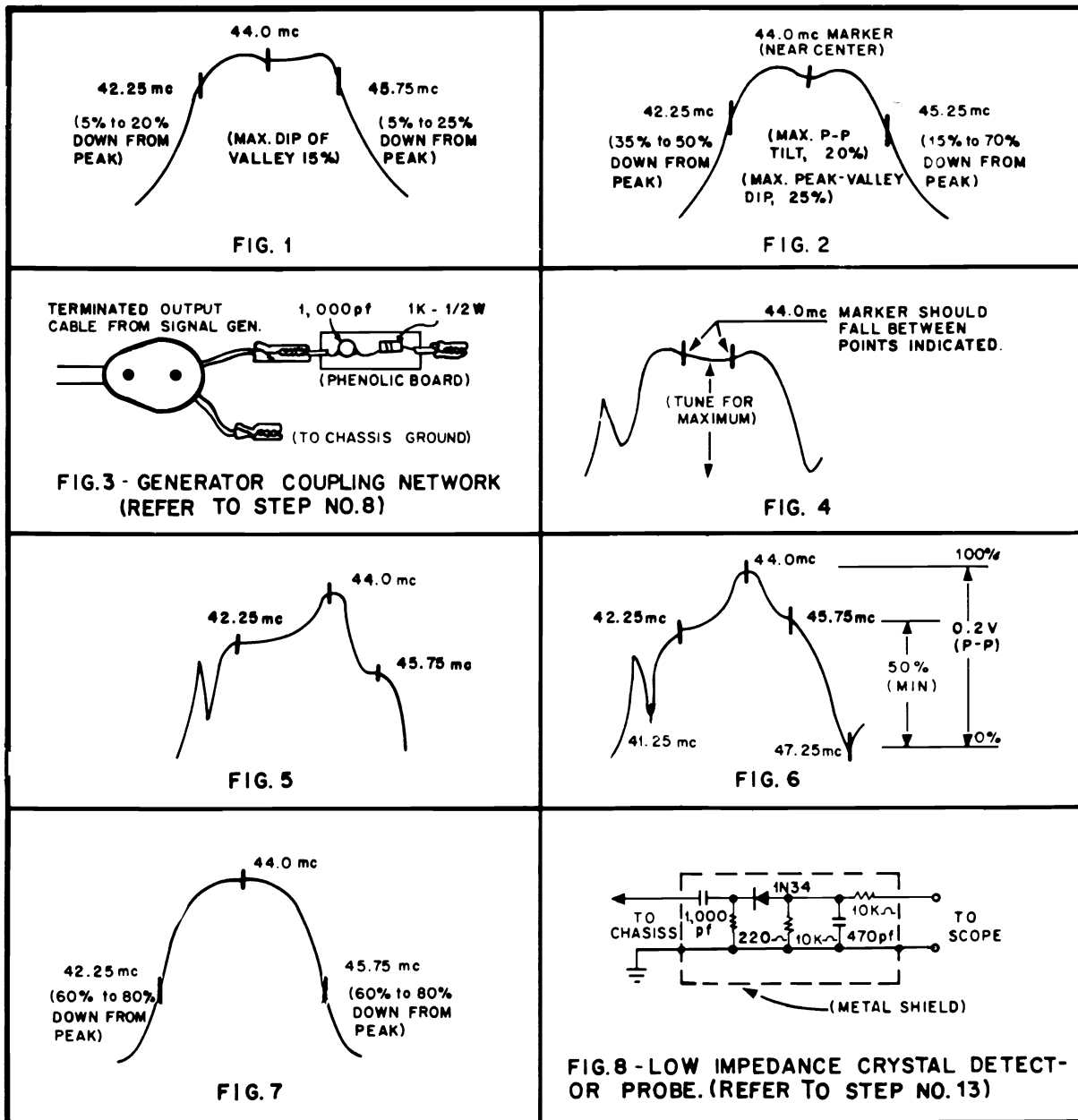
ALIGNMENT INFORMATION

ADJUSTMENT PROCEDURE – I-F STAGES, TRAPS AND TUNER OUTPUT COIL

1. Connect an oscilloscope (through a 10k isolation resistor) to pin 7 of V-6B (grid of video amplifier). Scope should be adjusted so that 2 inches of vertical deflection represents approximately 2 volts P-P output.
 2. Connect -4.5 volts bias to the I-F AGC test point (Test point "C"), the junction of C-11 and C-13.
 3. Connect a terminated sweep generator, adjusted to sweep between 40 and 50 mc, to pin 2 of V-5 (grid of second I-F amplifier) through a 1,000 pf isolation capacitor.
Note: If sweep generator does not have internal markers, a separate marker should be loosely coupled to the output of the sweep generator.
 4. Adjust T-4 top and bottom simultaneously for maximum gain and symmetry about the 44.0 mc marker as shown in Fig. 1. (Use core positions nearest outside ends of coil.) With input signal maintained to produce 2 volts P-P output during final adjustment, bandwidth markers should fall between the tolerances indicated.
 5. Disconnect generator output leads from grid of second I-F amplifier and connect them to pin 2 of V-4 (grid of first I-F amplifier).
 6. Adjust T-3 top and bottom simultaneously for over-coupled response as shown in Fig. 2. (Use core positions nearest outside ends of coil.) With input signal maintained to produce 2 volts P-P output during final adjustment, bandwidth markers should fall between the tolerances indicated.

Note: The correct overcoupled response is indicated when slight rocking of T-3 core settings do not change the amplitude of the 44.0 mc marker, but cause the response to rock or slide about this marker.
 7. Reduce the amount of bias applied to the I-F AGC test point (test point "C") to -1.5 volts.
 8. Disconnect generator output leads from grid of the first I-F amplifier and couple them to the mixer tube (V-14) of the VHF tuner, using the signal injection shim described below. If this is impractical, connect the generator output leads to the I-F mixer point on the tuner, using the coupling network shown in Fig. 3.

Note: A signal injection shim may be easily constructed by pasting a thin piece of metal foil (approx. ½" x 2") on a slightly larger piece of heavy paper. Insert this shim between the mixer tube and its shield in such a manner that the foil side faces the tube, and rotate for maximum signal coupling.
 9. Open trimmer CT-1 three turns from its fully closed position and adjust output of generator to produce approximately 2 volts P-P indication on scope.
 10. Adjust the tuner output coil (T-8) for maximum gain and symmetry about the 44.0 mc marker.
 11. Adjust the 41.25 mc trap (L-4) and the 47.25 mc trap (L-3) for minimum output at these frequencies (as indicated by their respective markers on the 'scope), increasing generator output as required to insure maximum effectiveness of the trap settings.
 12. Reduce output of generator to produce approximately 2 volts P-P deflection on 'scope and re-adjust the tuner output coil (T-8) for maximum gain and bandwidth about the 44.0 mc marker.
 13. Disconnect oscilloscope from pin 7 of V-6B and connect to pin 7 of V-4 (plate of first I-F amplifier), using a low impedance crystal detector probe as shown in Fig. 8. 'Scope should be calibrated so that 2 inches of vertical deflection now represents approximately 0.2 volts P-P.
 14. Reduce output of generator until a usable display is produced on the oscilloscope and again adjust the tuner output coil (T-8), this time tuning for maximum gain midway between the peaks of the band-pass as indicated in Fig. 4. The 44.0 mc marker should fall between the tolerances indicated.
 15. Maintain generator output to produce approximately 0.2 volts P-P indication on the oscilloscope (as above) and adjust the grid coil (L-5) to center the 44.0 mc marker on the peak of the response as indicated in Fig. 5, disregarding the tilt of the overall waveshape.
 16. Adjust the input trimmer (CT-1) to position the 42.25 and 45.75 mc markers at equal amplitudes and center the 44.0 mc marker with the tuner output coil (T-8), if necessary.
 17. With generator output increased to maximum, check the position of the 41.25 mc and 47.25 mc traps (L-4 and L-3), and re-adjust if necessary.
 18. Re-adjust generator output to produce a 0.2 volt P-P indication on the scope and observe the response. The curve obtained should conform to Fig. 6.
 19. Disconnect the crystal detector probe and connect the oscilloscope to pin 7 of V-6B (grid of the video amplifier) directly through a 10K isolation resistor.
 20. Increase bias voltage to -4.5 volts and adjust the oscilloscope so that 2 inches of vertical deflection is equivalent to approximately 2 volts P-P output. Adjust output of signal generator until a 2 volt P-P indication is obtained on the 'scope. Response curve and marker positions should conform to Fig. 7.
 21. Remove AGC bias from test point "C". Output signal as indicated on the 'scope should increase, and noise signal on baseline should have an amplitude of at least 1/8 inch.
- CAUTION – No attempt should be made to improve a response curve which conforms to that shown in Fig. 7. Minor deviations may be corrected by slight touch-up of specific coils to make response conform to Fig. 7, as indicated below:
- a) To position the 45.75 mc marker adjust T-3, bottom slug.
 - b) To position the 42.25 mc marker adjust T-4, bottom slug.
 - c) To correct tilt, adjust T-8, the tuner output coil.

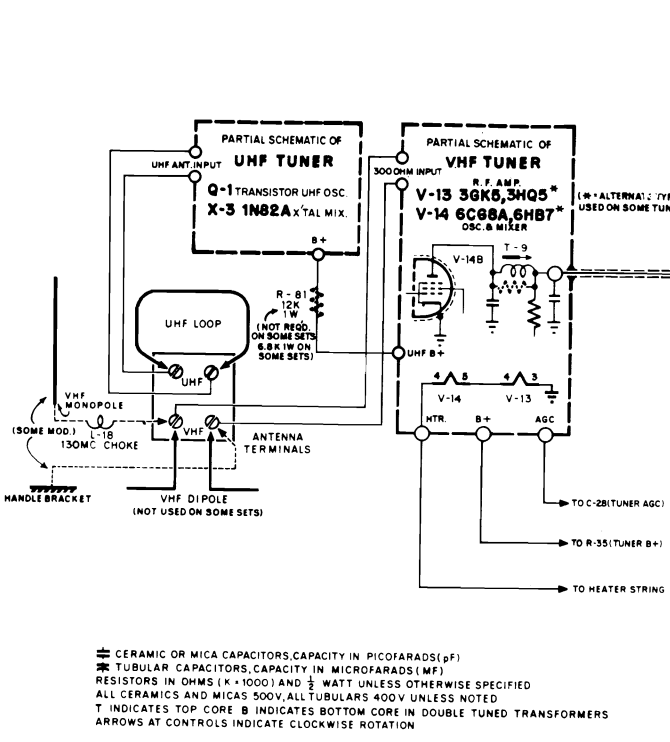
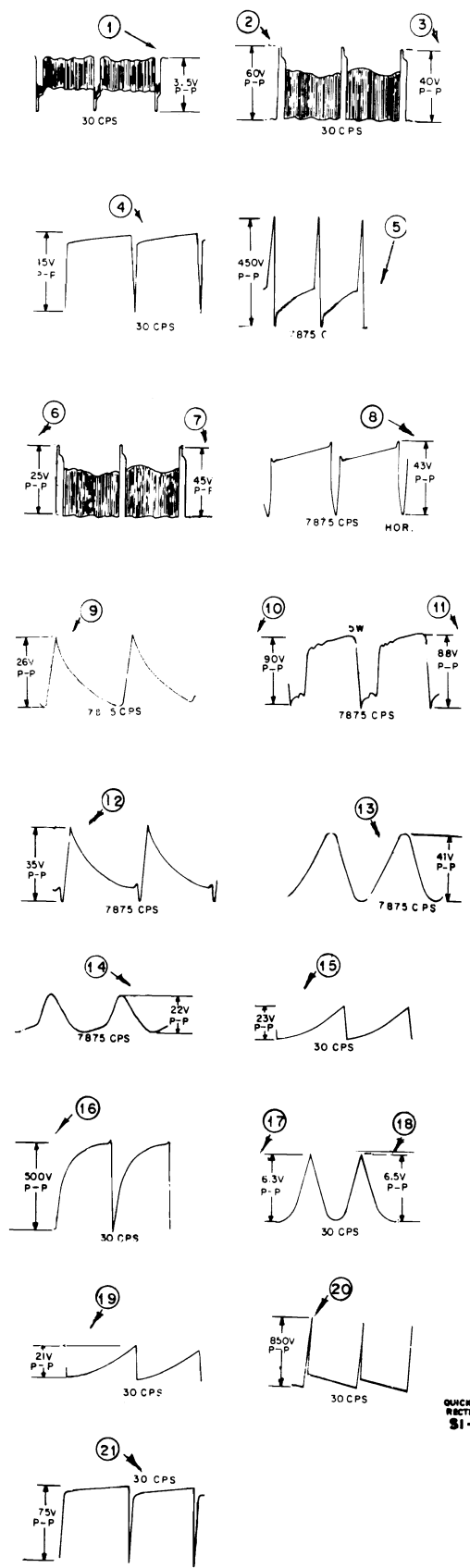


ADJUSTMENT PROCEDURE - SOUND TAKE-OFF, SOUND INTERSTAGE, SOUND DETECTOR & 4.5 MC TRAP

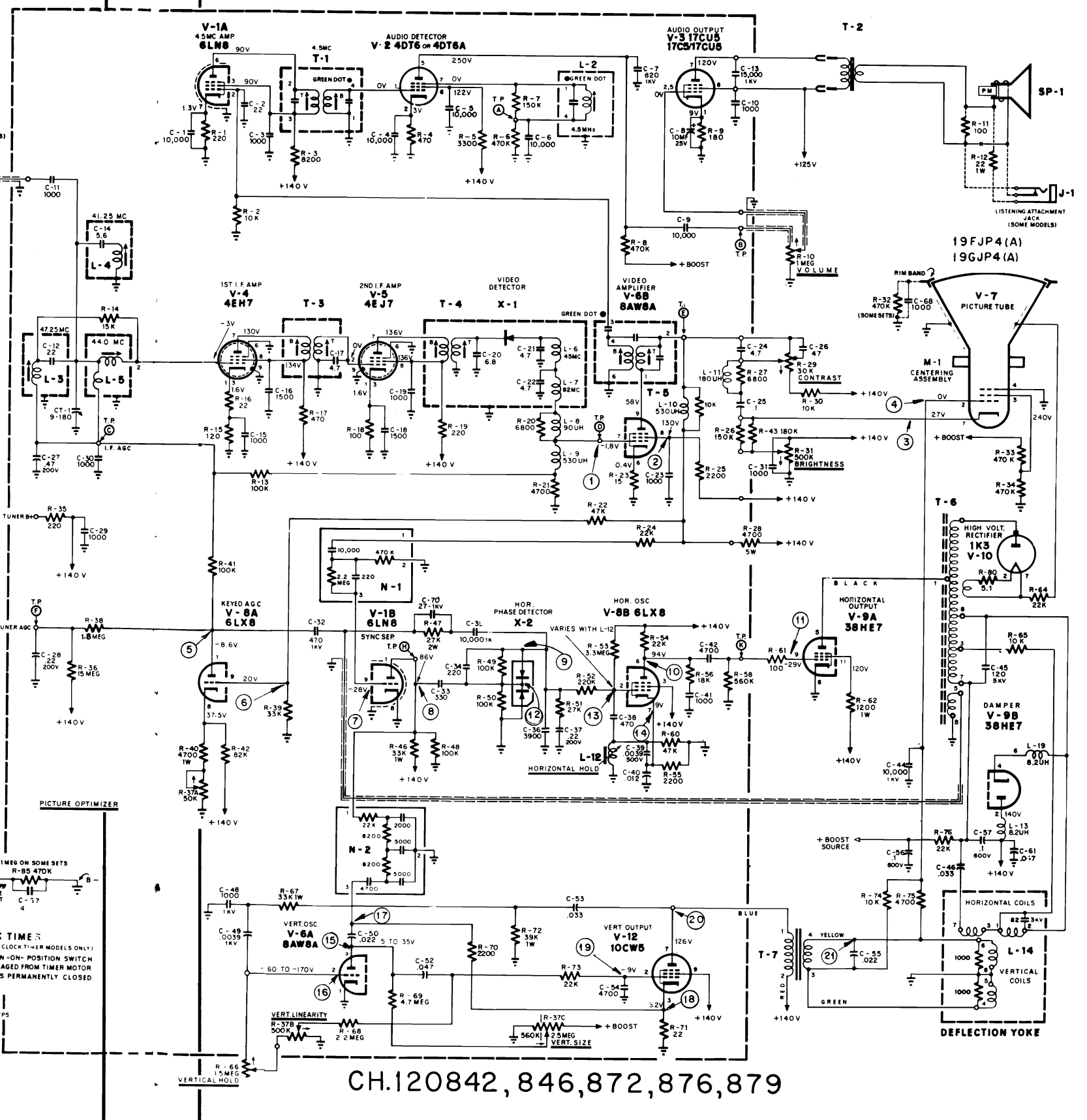
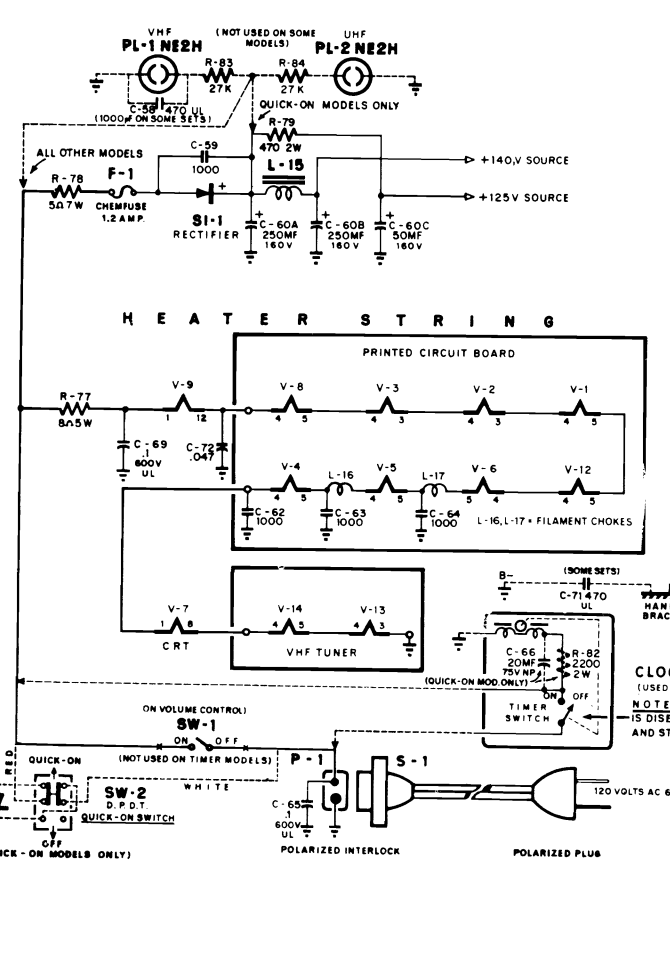
1. With antenna connected directly to VHF terminals of receiver, set the channel selector to a strong local station and adjust the fine-tuning control until a 4.5 mc beat is just visible in the picture being viewed.
2. Adjust the 4.5 mc sound trap (T-5, top slug) until the 4.5 mc beat in the picture is either at minimum or is completely eliminated.
3. Adjust the sound quadrature coil (L-2) for loudest sound consistent with minimum buzz, using the second peak from the top of the coil.
4. Using some form of attenuation between the antenna and the VHF input terminals, gradually reduce the level of the input signal until distortion is noticeable in the audio output.
5. Adjust the sound take-off transformer (T-5, bottom slug) and the sound interstage coil (T-1) for loudest and clearest sound.
6. Keep reducing the level of the input signal until sound distortion again occurs, and re-tune T-5 bottom slug and T-1 for loudest and clearest sound. Repeat this procedure until no further improvement can be noted.
7. Re-connect antenna directly to VHF terminals of receiver (attenuator removed) and touch-up quadrature coil (L-2) for minimum buzz in sound.

EMERSON Chassis 120842, 846, 872, 876, 879, Schematic Diagram

EMERSON Chassis 120842, 120846, etc., Schematic Diagram, Continued



☐ CERAMIC OR MICA CAPACITORS, CAPACITY IN PICOFARADS (PF)
 ☐ TUBULAR CAPACITORS, CAPACITY IN MICROFARADS (MF)
 ☐ RESISTORS IN OHMS (K=1000) AND ☐ WATT UNLESS OTHERWISE SPECIFIED
 ALL CERAMICS AND MICAS 500V, ALL TUBULARS 400V UNLESS NOTED
 T INDICATES TOP CORE B INDICATES BOTTOM CORE IN DOUBLE TUNED TRANSFORMERS
 ARROWS AT CONTROLS INDICATE CLOCKWISE ROTATION



CH.120842, 846, 872, 876, 879

CONDITIONS FOR CHASSIS READINGS

VOLTAGES AND WAVESHAPES were taken under actual operating conditions, with normal picture and sound being received. AGC voltage developed on the I-F AGC line (test point C) was minus nine volts. Input voltage to chassis under test was 120 volts, 60-cycle AC. Frequencies indicated for the waveshapes shown are approximate sweep settings for the oscilloscope being used (one-half actual frequency of signal being measured).

settings, both maximum and minimum values are shown.

ALL MEASUREMENTS were taken between points indicated and chassis ground (unless otherwise noted), using an RCA Voltomyst or equivalent VTVM. A low-capacity probe was used for all waveshapes shown in the schematic diagram. All readings obtained may vary $\pm 10\%$ due to normal component tolerances and strength of input signal to chassis under test.

RESISTANCE MEASUREMENTS were taken with no power. Where readings are affected by control

RESISTANCE READINGS CHART, TV CHASSIS

Ref. No.	Tube Type	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9	Pin 10	Pin 11	Pin 12
V-1	6LN8	*33k	10k	*8.2k	(filament)	*8.2k	220	0	2.7m				
V-2	4DT6A	10	470	(filament)	1.4m	*3.3k	470k						
V-3	17C5/CU5	180	20 to 1m	(filament)	20 to 1m	*540	*600						
V-4	4EH7	142	100k	142	(filament)	0	*470	*470	0				
V-5	4EJ7	100	0	100	(filament)	0	*220	*220	0				
V-6	8AW8A	0	.5m to 2m	5m to 6m	(filament)	15	90	*2.2k	*4.4k				
V-7	CRT	(fil.)	3.4k	440k	0	--	--	150k to 300k	(fil.)				
V-8	6LX8	205k	320k	*0	(filament)	*22k	2.2k	5 to 32k	33k				
V-9	38HE7	(fil.)	*22	--	500k	500k	--	--	0	560k	--	*1.2k (fil.)	
V-10	1K3	--	(inf.)	--	(inf.)	--	--	(inf.)				(Plate Cap: 500k)	
V-12	10CW5	--	2.2m to 2.7m	22	(filament)	--	*250	--	*0				

NOTES: All resistance readings are in ohms, unless otherwise specified.

"k" denotes kilohms; "m" denotes megohms.

* Asterisk indicates measurements made with common lead of meter connected to junction of L-15 and C-60B (B+ point).

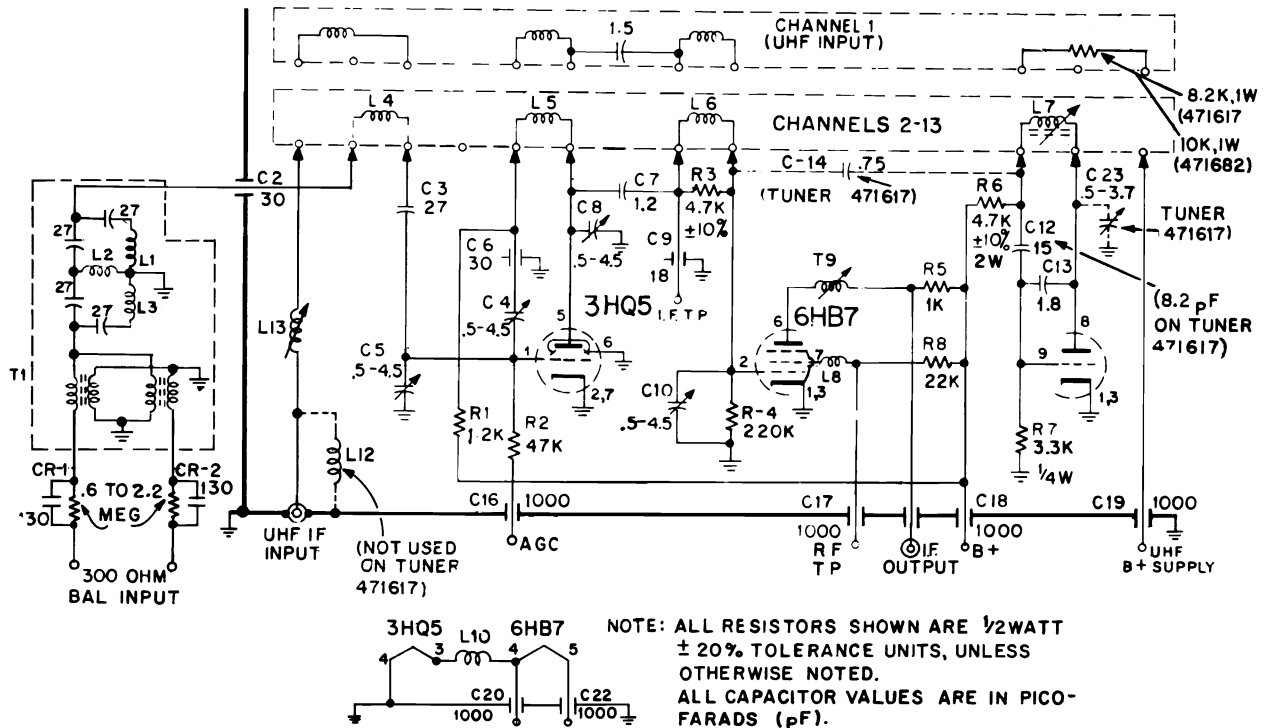


FIG. 13 - SCHEMATIC, VHF TUNERS 471617, 682

GENERAL ELECTRIC

A1 CHASSIS

MODELS
M719EWD
M719WD-A1
M730EWD
M730WD-A1
M732EMP
M732MP-A1
M760EWD
M760WD-A1

AGC CONTROL:

Field Adjustment: Tune in the strongest available signal and adjust R179 to the point where overloading is indicated by "tearing" of the picture. Then back off the AGC control to just beyond the point where the overload condition disappears.

Instrument Adjustment:

1. Tune in a broadcast signal, preferably a monoscope signal that is monitored to assure that the percentage of sync does not exceed 25 percent.
2. Connect an oscilloscope to the high side of the contrast control. Synchronize the scope to vertical rate.
3. Adjust the fine tuning for smear and the AGC control for 100 to 110 volts peak to peak with no sync compression.

PICTURE TILT: To correct picture tilt, loosen the YOKE clamp. Adjust yoke to correct tilt. Secure yoke with clamp.

PICTURE CENTERING: Rotate the two centering rings located at the rear of the yoke assembly until picture is properly centered.

HEIGHT AND VERTICAL LINEARITY: Adjust R208 and R214 simultaneously for proper vertical size and linearity. Picture should extend 1/8-inch beyond top and bottom edges of mask.

WIDTH CONTROL: Adjust this control for largest picture necessary to fill mask.

HORIZONTAL HOLD:

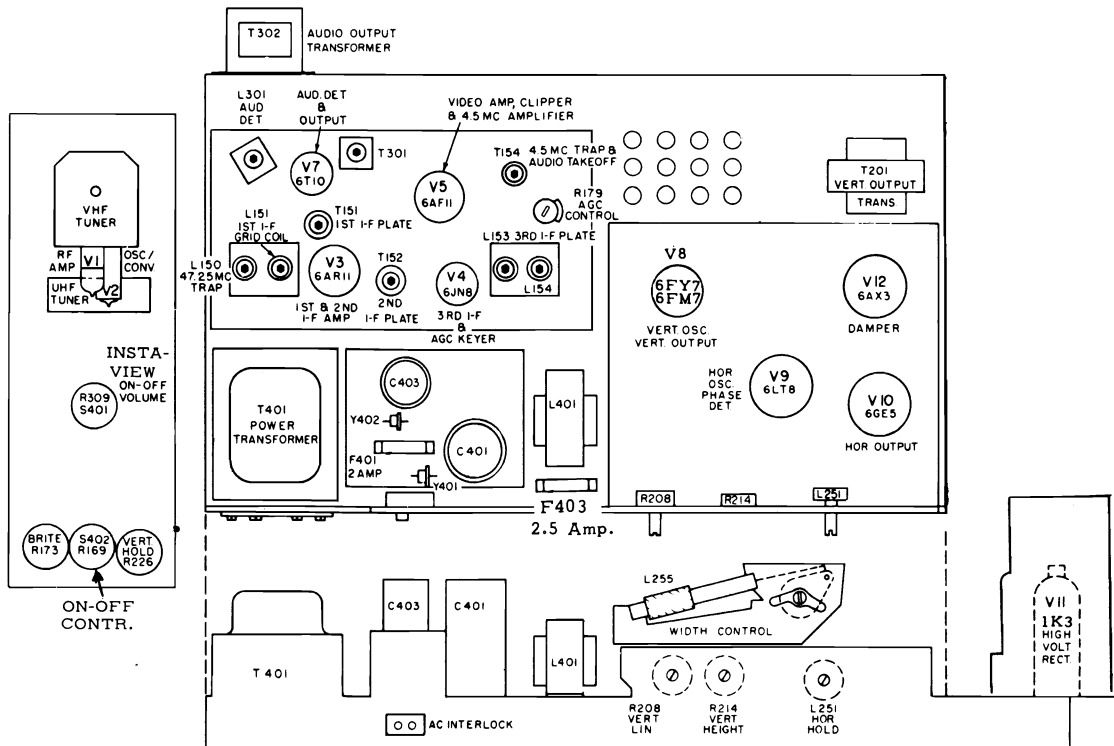
1. Tune the receiver controls for normal operation.
2. Short Test Point VI to the chassis with a jumper wire.
3. Adjust HORIZONTAL HOLD until picture just "floats" back and forth across the screen.
4. Remove the chassis jumper from Test Point VI.

DISASSEMBLY PROCEDURE

CABINET BACK: Disconnect any antenna wires. Then remove the screws securing the back to the cabinet and carefully detach the back.

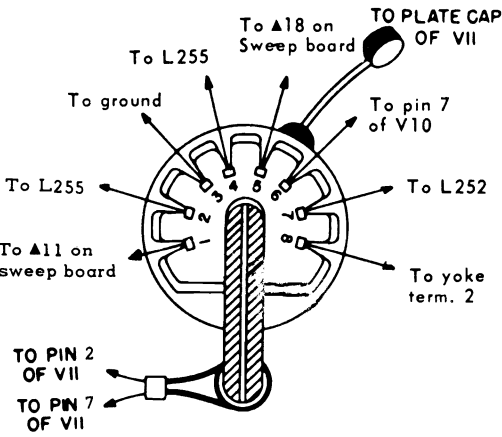
CHASSIS: First remove the back as described. Remove the chassis retaining screws. On table models the screws are removed from the bottom of the cabinet and for consoles the chassis retaining screws are removed from the top back corners of the chassis. The front lip of the chassis is retained by clips on console models. Remove the control knobs and the screws holding the control assembly to the escutcheon. Discharge and remove the picture tube anode; take off the picture tube socket; yoke; antenna board; disconnect the loudspeaker. The chassis and control assembly is now removed from the cabinet.

PICTURE TUBE: Remove the cabinet back and chassis as described; then place the cabinet face down on a soft cloth-covered surface. A wood block, two inches thick, is placed under the cloth where the top middle of the cabinet front will rest. Remove one 5/16-inch hex head screw from the tube sling. The picture tube is now removed from the cabinet.

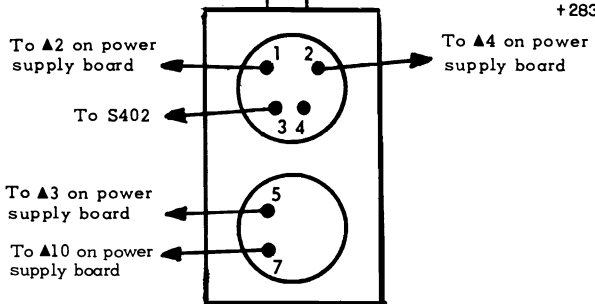
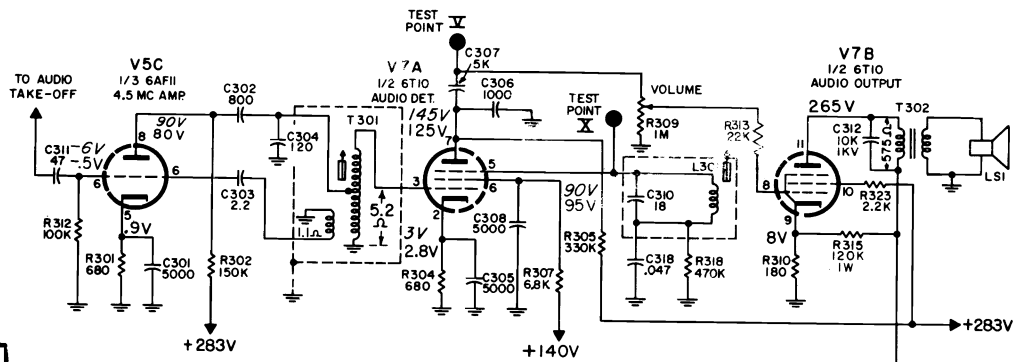
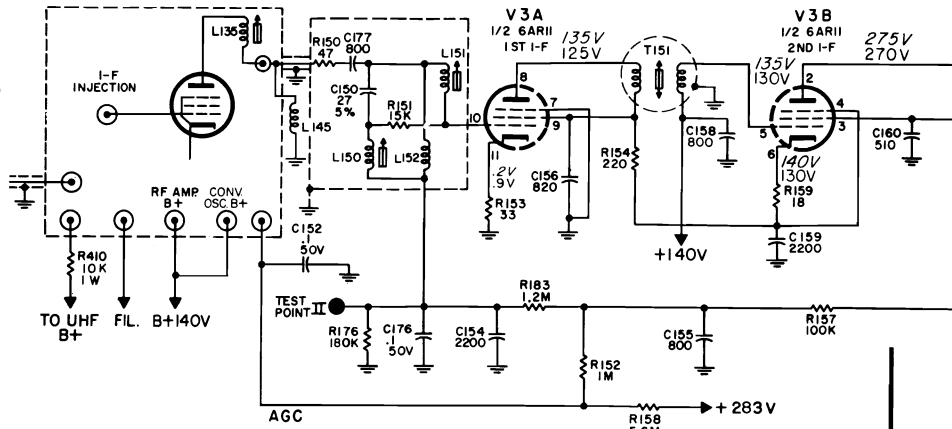


TUBE AND ADJUSTMENT LOCATIONS

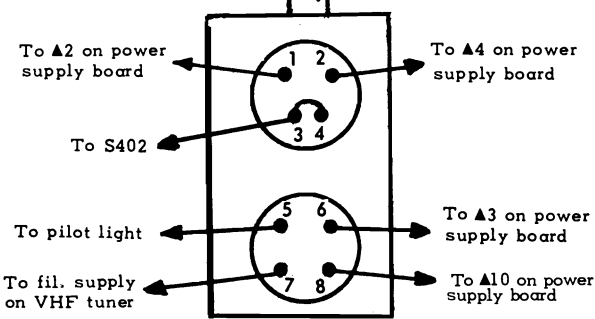
GENERAL ELECTRIC Chassis A1, Schematic Diagram



T251 WIRING

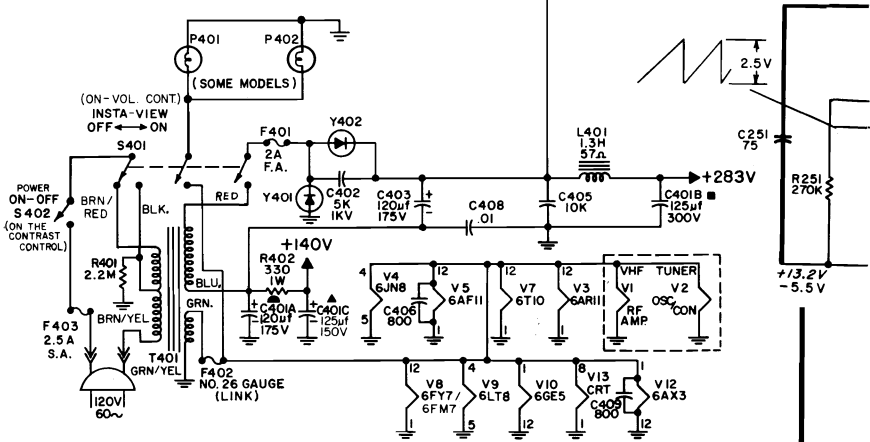


SETS WITHOUT PILOT LIGHT



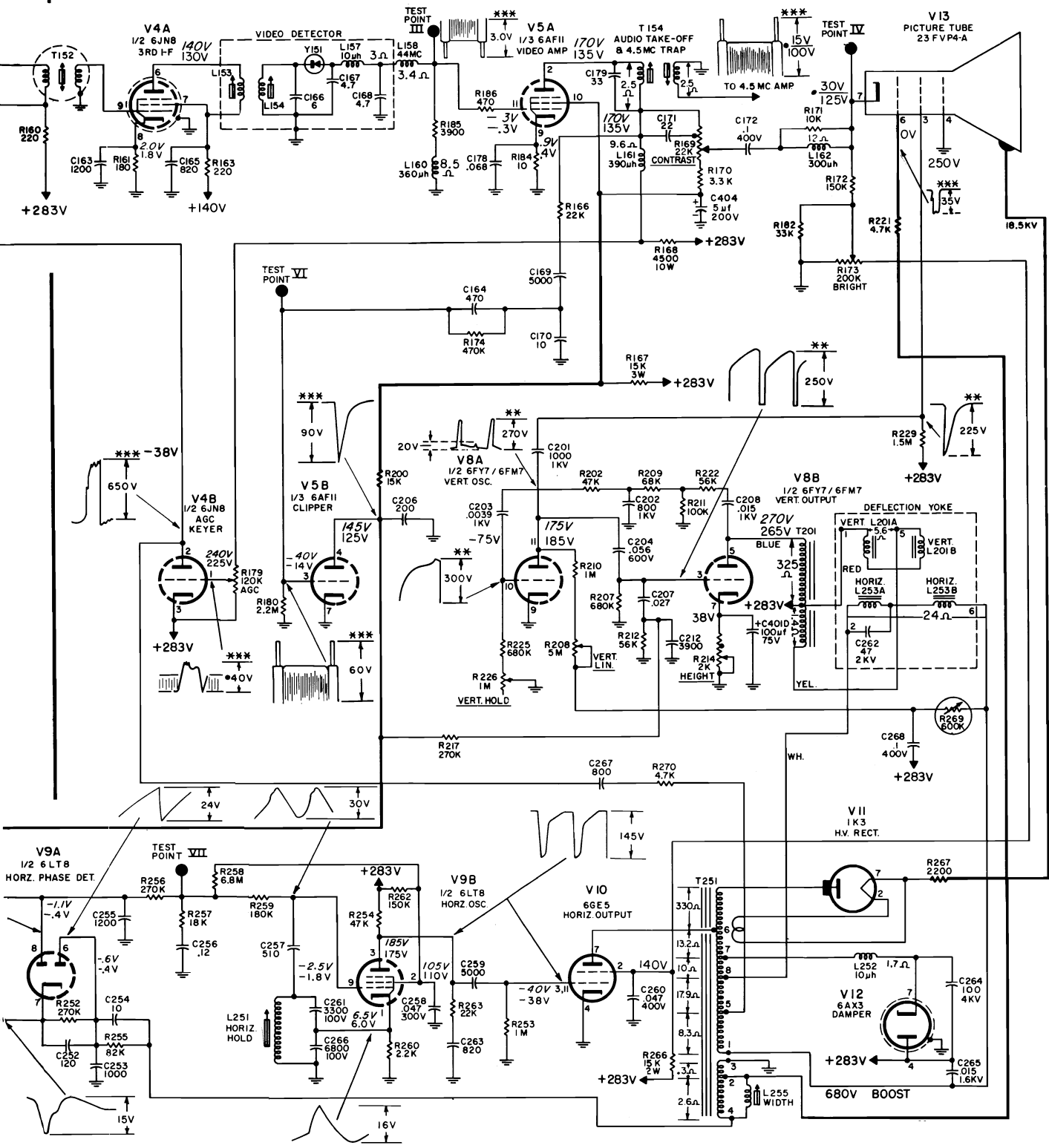
SETS WITH PILOT LIGHT

S401 WIRING



A1 CHASSIS SCHEMATIC DIAGRAM

GENERAL ELECTRIC Chassis A1, Schematic Diagram, Continued



1. ALL VOLTAGE MEASUREMENTS MADE WITH A VTVM WITH RESPECT TO CHASSIS GROUND. RECEIVER CONTROLS SET FOR NORMAL OPERATION. MEASUREMENTS MAY DEVIATE ± 10% AT 120V AC LINE VOLTAGE.

2. WHERE ON-SIGNAL AND OFF-SIGNAL MEASUREMENTS VARY, TWO VOLTAGES ARE SHOWN. ON-SIGNAL VOLTAGE APPEARS IN *ITALICS* OVER OFF-SIGNAL VOLTAGE.

ON-SIGNAL VOLTAGES & WAVE SHAPES TAKEN WITH A NOISE-FREE SIGNAL PRODUCING -2.5 TO -3.5 VOLTS AGC AT VHF TUNER.

OFF-SIGNAL VOLTAGES TAKEN WITH ANTENNA DISCONNECTED & ANTENNA TERMINALS SHORTED TOGETHER ON UNUSED CHANNEL.

— • INDICATES VARIATION WITH CONTROL SETTING

** - INDICATES SCOPE SYNCH'D AT 1/2 VERT. FREQ.

*** - INDICATES SCOPE SYNCH'D AT 1/2 HORIZ. FREQ.

UNLESS OTHERWISE NOTED
 K=1000 M=1,000,000
 CAPACITORS MORE THAN 1µF=µF
 RESISTORS ARE 1/2 WATT

GENERAL ELECTRIC Chassis A1, Alignment Information

RECEIVER ALIGNMENT

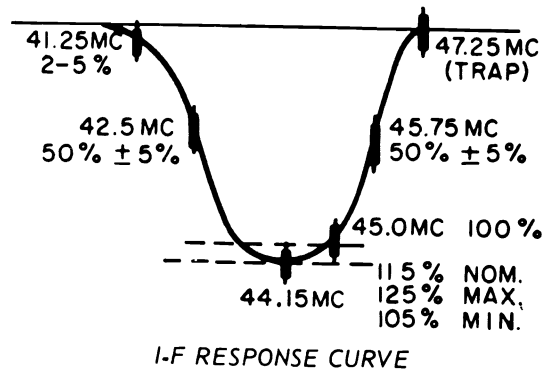
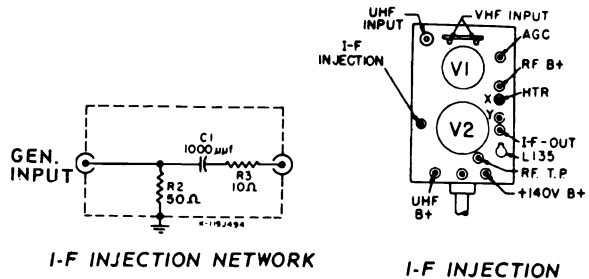
VIDEO I-F SYSTEM

AM PRE-PEAKING & TRAP FREQUENCIES

L150Min. 47.25 MC	T151Max. 43.0 MC
L135Max. 45.75 MC	T152Max. 45.2 MC
L151Max. 42.50 MC	L153, L154.Max. 44.15 MC

GENERAL: Allow receiver and test equipment at least 20 minutes warm-up.

1. Turn volume control to minimum and contrast control fully clockwise. Set channel selector to unused high VHF channel (9-13) and fine tuning fully counterclockwise.
2. Short antenna terminals together.
3. Connect oscilloscope to Test Point III thru 22,000 ohms resistor not more than 1.5 inches away from Test Point III. Connect -4.5V bias between Test Point II and chassis.
4. Inject signals from a properly terminated AM signal generator or sweep generator, through NETWORK shown, To the I F injection point on the VHF Tuner as shown in the illustration.
5. Align the receiver to produce the response curve illustrated.
6. All cores are positioned away from printed board.
7. Either a speaker or 3.2 ohm 5W load resistor must be connected to speaker terminals.



VIDEO I-F ALIGNMENT CHART

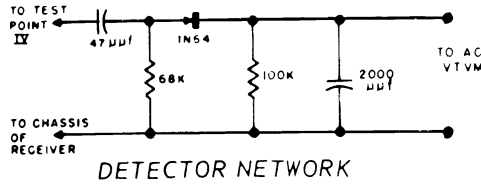
STEP	SIGNAL FREQUENCY	ADJUST	REMARKS
1	47.25 MC AM	Adjust L150 for minimum scope deflection	Use maximum scope sensitivity and smallest possible signal. Do not retouch this adjustment.
2		Adjust L154 and L153 in the following sequence: A. Tune L153 core so top of core is flush w/top of coil. B. Tune L154 for max. deflection of 44.15 MC marker. (Do not re-adjust scope) C. Tune L153 for max. deflection of 44.15 MC marker.	Do not retouch these adjustments.
3		L135 (converter plate) for max. deflection of the 45.75 MC marker.	
4		L151 (1st I-F grid) for maximum deflection of the 42.5 MC marker and proper nose shaping.		Symmetry of the nose is important. No portion of the nose should be out of symmetry by more than 3%. Repeat 5, 6, and 7 if necessary.
5	T152 (2nd I-F Plate) to place 45.75 MC marker properly on the curve.		
6	T151 (1st I-F Plate) to place 42.5 MC marker properly on the curve.		
7	L151 if necessary to shape the nose.		

GENERAL ELECTRIC Chassis A1, Alignment Information, Continued

4.5 MC TRAP ALIGNMENT

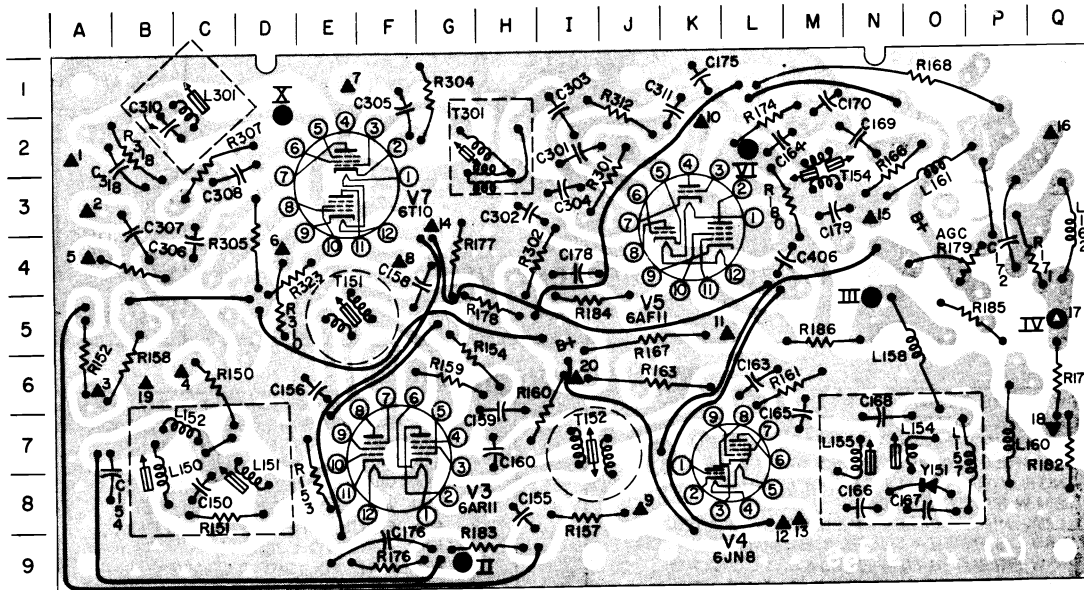
1. Connect a -7.5V bias to Test Point II, with the positive bias lead grounded to chassis.
2. Turn contrast control to maximum, volume to minimum.
3. Connect the DETECTOR NETWORK shown to Test Point IV and feed its output to an AC VTVM.
4. Apply a 4.5MC AM signal through a 5µF capacitor to Test Point III.
5. Adjust the top core of T154 for minimum reading on Test Point IV. Two core positions will give an apparent minimum indication, the correct one is the first reached while turning the core from the top end of the coil form toward the circuit board.

NOTE: Retouching of the trap adjustment may be necessary after alignment of the audio take-off.



IF BOARD COMPONENT LOCATION

TRIANGLE NUMBERS INDICATE CONNECTION POINTS FOR WIRES AS LISTED.	CAPACITORS	RESISTORS	COILS & TRANSFORMERS
▲1. T302 SECONDARY, SPEAKER WIRE, & AUDIO GROUND WIRE ▲2. YELLOW WIRE TO VOLUME CONTROL ▲3. GRAY TUNER AGC WIRE. ▲4. TUNER I.F. OUTPUT CABLE CENTER CONDUCTOR. ▲5. GREEN WIRE TO VOLUME CONTROL. ▲6. VIOLET WIRE TO ▲9 ON POWER SUPPLY BOARD. ▲7. T302 SECONDARY, & SPEAKER WIRE. ▲8. VIOLET WIRE TO ▲11 ON POWER SUPPLY BOARD & TO T302 ▲9. BLUE WIRE TO ▲15 ON SWEEP BOARD. ▲10. GREEN WIRE TO ▲6 ON SWEEP BOARD. ▲11. ORANGE WIRE TO ▲14 ON POWER SUPPLY BOARD. ▲12. NO. 26 GAUGE FUSE WIRE TO ▲13 ON POWER SUPPLY BOARD. ▲13. BROWN WIRE TO ▲1 ON SWEEP BOARD. ▲14. BROWN WIRE TO TUNER FILAMENT CONNECTION. ▲15. ORANGE/WHITE WIRE TO R169 CONTRAST CONTROL. ▲16. GREEN WIRE TO R169 CONTRAST CONTROL. ▲17. YELLOW WIRE TO PIN 7 OF PICTURE TUBE. ▲18. BLUE WIRE TO R173 BRIGHTNESS CONTROL. ▲19. TUNER SHIELDED CABLE GROUND CONNECTION. ▲20. ORANGE WIRE TO ▲14 ON POWER SUPPLY BOARD. ▲21. RED/YELLOW WIRE TO ▲12 ON POWER SUPPLY BOARD. ▲22. RED/YELLOW WIRE TO ▲12 ON POWER SUPPLY BOARD.	C150-C8 C154-A8 C155-H8 C156-E6 C159-Q4 C159-H6 C160-H7 C163-L6 C164-L2 C165-M7 C166-N8 C167-O8 C168-N7 C169-N2 C172-P4 C176-F9 C178-14 C179-M3 C303-12 C304-13 C305-F2 C306-C3 C307-A3 C308-C2 C311-K1 C318-B2	R151-C8 R152-A6 R153-E8 R154-H6 R157-I8 R158-E6 R159-G6 R160-H6 R161-M6 R163-J6 R166-O2 R167-J5 R168-M1 R171-Q4 R172-Q6 R174-L2 R176-F9 R179-O4 R180-L3 R182-O7 R183-H9 R184-15 R185-O5 R302-14 R304-G1 R305-C4 R307-D4 R310-D5 R312-J1 R318-B2	L150-B7 L151-D7 L152-B7 L153-N7 L154-O7 L157-P7 L160-P7 L161-O3 L162-Q4 L301-C1 T151-E5 T152-I7 T154-M3 T301-H2
			TEST POINTS
			II -G9 III-N5 VI-L2



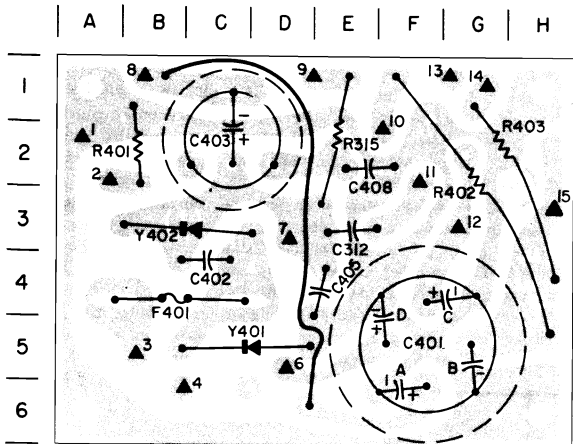
IF CIRCUIT BOARD COMPONENT VIEW

AUDIO ALIGNMENT WITH ON-THE-AIR SIGNALS

1. Tune in a strong local signal and set receiver volume to a low audible level.
2. Adjust L301 for maximum undistorted, buzz-free audio output. Start with the core at the outermost position away from the printed board and tune for the second "peak" encountered on the way into the coil form.
3. Connect a variable bias supply (3 to 15V) to the AGC test point with the positive lead to the chassis. Adjust bias until audio signal distorts on peaks slightly, then adjust core of T301 to curb distortion. Repeat this procedure several times at increased bias level until maximum clarity of audio is obtained.
4. Adjust the bottom core of T154, repeating the bias advances in step 3, to achieve the optimum setting for noise-free performance at low signal levels.

GENERAL ELECTRIC Chassis A1, Service Information, Continued

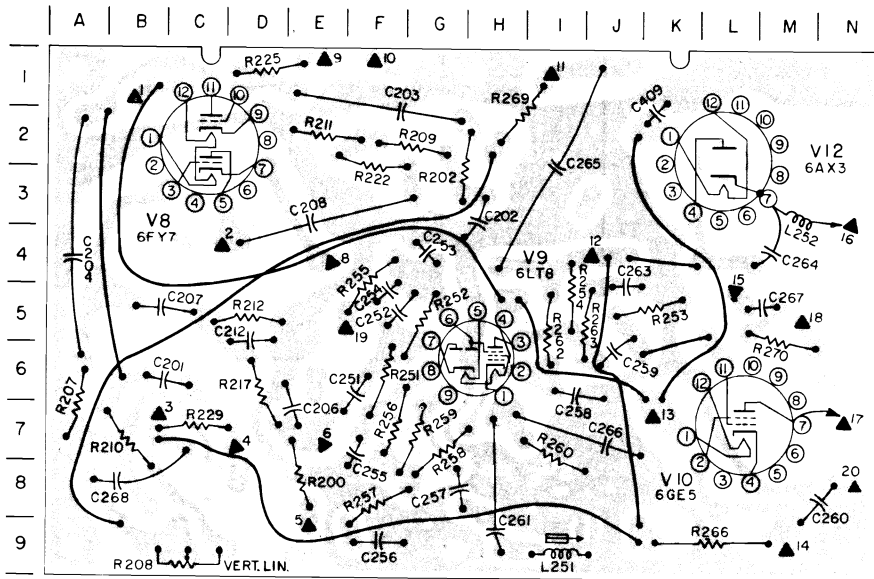
POWER SUPPLY BOARD WIRING



POWER SUPPLY CIRCUIT BOARD

TRIANGLE NUMBERS REPRESENT POINTS ON THE BOARD FOR INTERCONNECTING WIRES. WIRES ARE CONNECTED TO POINTS INDICATED.

- ▲1. Grn-yell. to T401
- ▲2. Blk. to T401 & S401
- ▲3. Red to S401
- ▲4. Red to T401 & Brn/Yel to S401
- ▲5. Brn/yell. to T401 & AC interlock
- ▲6. Yell. to ▲8 on Sweep board
- ▲7. Grn. to L401 & T302 red lead
- ▲8. Blue to T401
- ▲9. Violet to ▲6 on I.F. Board
- ▲10. Red to T401 & to S401
- ▲11. Violet to ▲8 on I.F. Board
- ▲12. Red/yell. to ▲21. on I.F. Board, to tuner B+ & to ▲22 on I.F. board.
- ▲13. Grn. to T401 & F402
- ▲14. Orange to ▲11 on I.F. Board, ▲5 on Sweep Board, & to R169 contrast control.
- ▲15. To L401 Red lead, To ▲20 on I.F. Board, & to ▲3 on sweep Board.



SWEEP CIRCUIT BOARD COMPONENT VIEW

SWEEP BOARD COMPONENT LOCATION

RESISTORS

R200-E8	R252-G5
R202-G2	R253-H5
R207-A6	R254-I4
R208-C9	R255-F4
R209-F4	R256-F7
R210-B7	R257-F8
R211-E2	R258-G7
R212-D5	R259-G7
R217-D5	R260-I7
R222-F2	R262-I5
R225-D1	R263-J5
R229-C7	R266-L9
R251-F6	R269-H2
	R270-M5

CAPACITORS

C201-B6	C256-F9
C202-H3	C257-G8
C203-F1	C258-I6
C204-A4	C259-J6
C206-E7	C260-N8
C207-B5	C261-H9
C208-E3	C263-J4
C212-D5	C264-M4
C251-F6	C265-I2
C252-F5	C266-J7
C253-G4	C267-M5
C254-F5	C268-A8
C255-F7	C409-K1

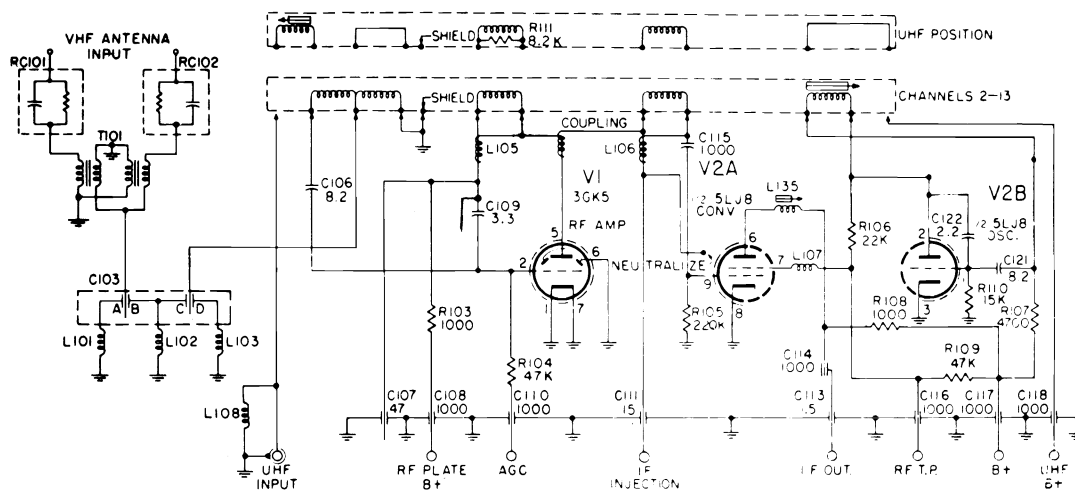
SWEEP BOARD WIRING

- | | |
|--|--|
| ▲1. BROWN WIRE TO ▲13 ON IF BOARD | ▲12. RED WIRE TO T201 & TO TERM 1 YOKE |
| ▲2. BLUE WIRE TO T201 | ▲13. BROWN WIRE TO PIN 8 OF CRT SOCKET |
| ▲3. RED WIRE TO ▲15 ON POWER SUPPLY BOARD | ▲14. ORANGE WIRE TO R173 BRITE CONTROL |
| ▲4. RED & GREEN WIRE TO CRT SOCKET PIN 3 | ▲15. BLUE WIRE TO ▲9 ON IF BOARD |
| ▲5. ORANGE WIRE TO ▲14 ON POWER SUPPLY BOARD | ▲16. WIRE TO T251 TERM 7 |
| ▲6. GREEN WIRE TO ▲10 ON IF BOARD | ▲17. WHITE WIRE TO T251 TERM 6 |
| ▲8. YELLOW WIRE TO R214 HEIGHT CONTROL & TO ▲6 ON POWER SUPPLY BOARD | ▲18. BLUE WIRE TO T251 TERM 5 |
| ▲9. GREY WIRE TO R226 VERT. HOLD CONTROL | ▲19. WIRE TO L255 |
| ▲10. YELLOW WIRE TO T201 & TERM 5 OF YOKE | ▲20. WIRE TO T251 TERM 3 |
| ▲11. RED & WHITE WIRE TO T251 TERM 1 & TO TERM 6 OF YOKE | |

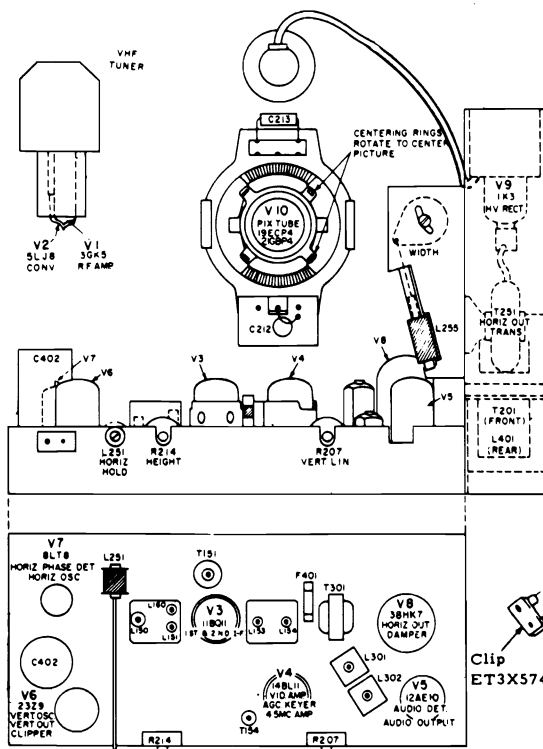
GENERAL ELECTRIC

D1 CHASSIS MODELS

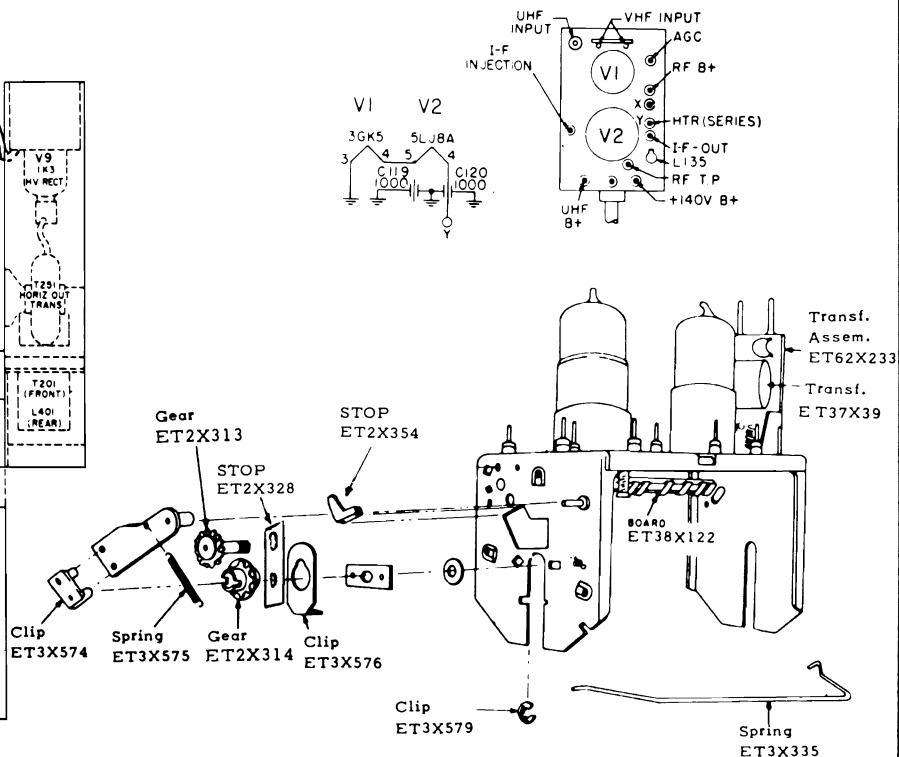
M401EWD	M403VY-D1	M407EWD	M452EWD
M401WD-D1	M403WD-D1	M407WD-D1	M452WD-D1
M403EYV	R403EWD		M454EWD
M403EWD	R403WD-D1		M454WD-D1



ET86X260 VHF TUNER SCHEMATIC DIAGRAM



TUBE AND ADJUSTMENT LOCATIONS



EXPLODED VIEW

GENERAL ELECTRIC Chassis D1, Alignment Information

RECEIVER ALIGNMENT

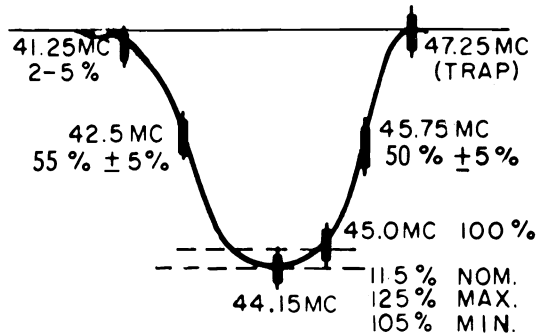
VIDEO I-F SYSTEM

GENERAL: Allow receiver and test equipment at least 20 minutes warm-up. Power the receiver from an isolation transformer.

1. Turn volume control and fine tuning counterclockwise, and contrast control fully clockwise. Set channel selector to Channel 11. Short antenna terminals together.
2. Connect oscilloscope to Test Point III thru 22,000 ohms resistor not more than 2.5 inches away from Test Point III. Connect a variable bias supply (0-20V) between Test Point II and chassis.
3. Inject signals from a properly terminated AM signal generator or sweep generator, through the I-F INJECTION NETWORK shown, to the I-F injection point. This point is accessible at the base of the Converter (V2) on the top deck of the VHF tuner.
4. Align the receiver to produce the response curve illustrated.
5. Position all cores at ends of coils away from circuit board.

AM PRE-PEAKING & TRAP FREQUENCIES

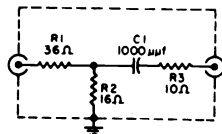
L150 Min. 47.25 MC	T151 Max. 42.8 MC
L160 Min. 41.25 MC	L151 Max. 42.50 MC
L135 Max. 45.00 MC	L154, L153 . Max. 44.15 MC



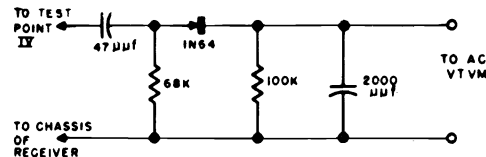
I-F RESPONSE CURVE

VIDEO I-F ALIGNMENT CHART

STEP	SIGNAL FREQUENCY	ADJUST	REMARKS
1	47.25 MC AM (Bias 0V)	Adjust L150 for minimum scope deflection	Use maximum scope sensitivity and smallest possible signal for the 47.25 MC AM and 41.25 MC AM adjustments.
2	41.25 MC AM (Bias 0V)	Adjust L160 for min. deflection	
3	42.8 MC AM (Bias 0V)	Adjust T151 for max. deflection	Position L153 core barely in the top of the coil, then peak L154. Next peak L153. Do not retouch these adjustments.
4	44.15 MC AM (Bias -3.5V)	Adjust L154, then L153 for max.	
5	44.15 MC AM (Bias -3.5V)	L135 for max. at 45 MC and placement of 45.75 MC marker	
6	38-48 MC sweep generator, with scope calibrated 3 volts peak to peak for 2 inch deflection; markers at 41.25, 42.5, 44.15, 45.0 MC & 45.75 MC	T151 for placement of 42.5 MC marker.	Symmetry of the nose is important. No portion of the nose should be out of symmetry by more than 3%.
7		L151 for max. at 42.5 MC and shaping of nose around 44.15 MC	
8		Knife the coil of L152 if the 42.5 MC marker is above 55% on the curve.	
			Repeat last four steps if necessary.



I-F INJECTION NETWORK



DETECTOR NETWORK

4.5 MC TRAP ALIGNMENT

1. Connect a -15V bias to Test Point II, with the positive bias lead grounded to chassis.
2. Detune L302 by placing the core at the top of the coil.
3. Turn contrast control to maximum, volume to minimum.
4. Connect the DETECTOR NETWORK shown to Test Point IV and feed its output to an AC VTVM.
5. Apply a 4.5 MC AM signal through a capacitor at Test Point III.
6. Adjust the top core of T154 for minimum reading on Test Point IV. Two core positions will give an apparent minimum indication, the correct one is nearer the top end of the coil form.

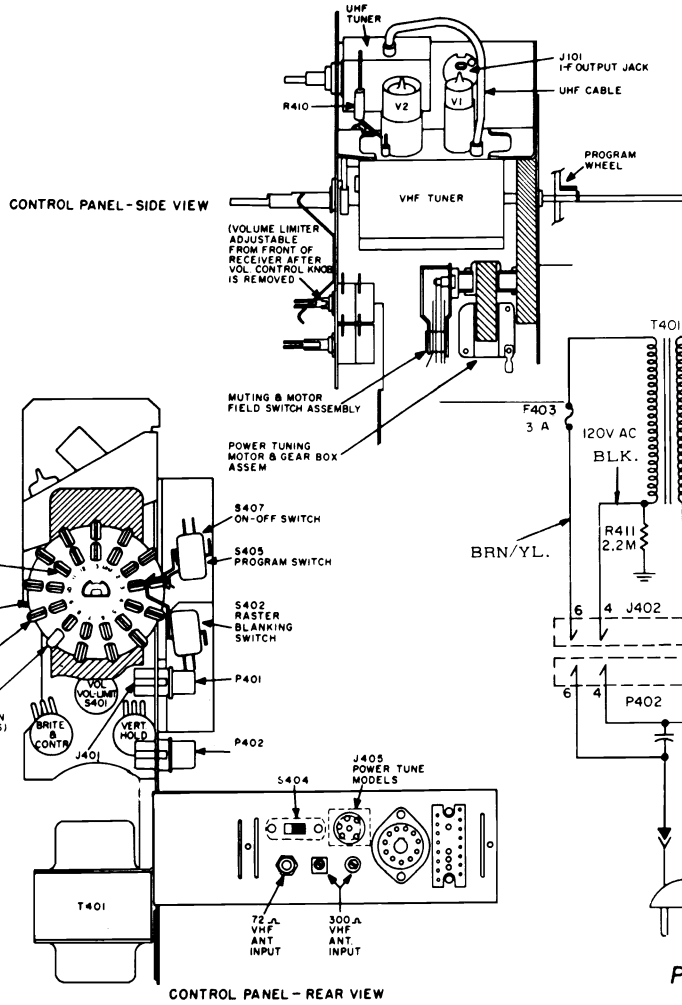
NOTE: Retouching of the trap adjustment may be necessary after alignment of the audio take-off.

AUDIO ALIGNMENT WITH ON-THE-AIR SIGNALS

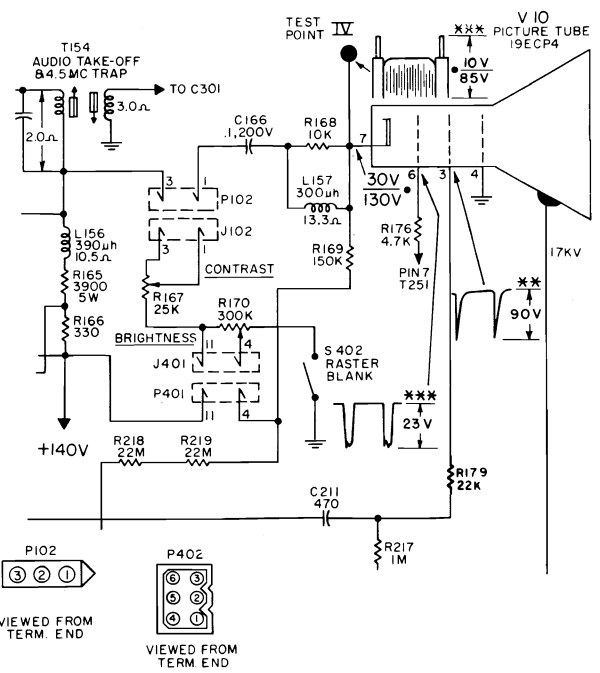
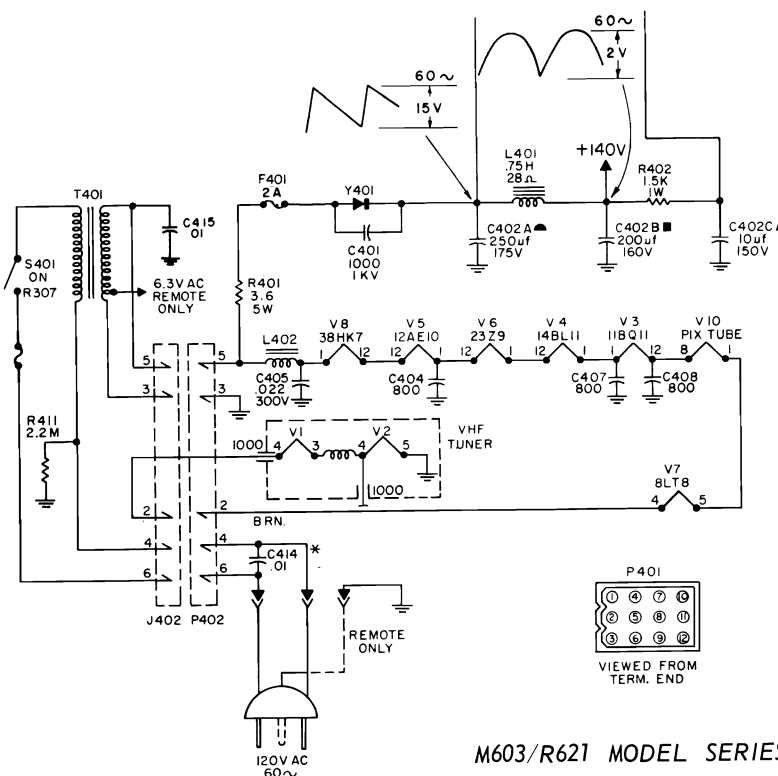
1. Tune in a strong local signal and set receiver volume to a low audible level.
2. Adjust L302 for maximum undistorted, buzz-free audio output. Start with the core at the outermost position away from the printed board and tune for the second "peak" encountered on the way into the coil form.
3. Connect a variable bias supply (3 to 15V) to the ACC test point with the positive lead to the chassis. Adjust bias until audio signal distorts on peaks slightly, then adjust core of L301 to curb distortion. Repeat this procedure several times at increased bias levels until maximum clarity of audio is obtained.
4. Adjust the bottom core of T154, repeating the bias advances in step 3, to achieve the optimum setting for noise-free performance at low signal levels.

GENERAL ELECTRIC Chassis D1

Data on Remote Control Models

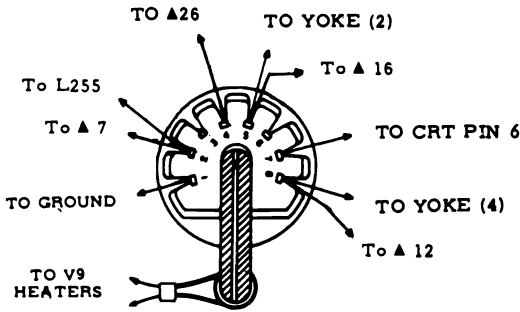


POWER TUNING SCHEMATIC DIAGRAM VARIATION

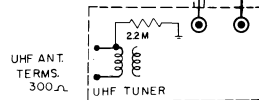
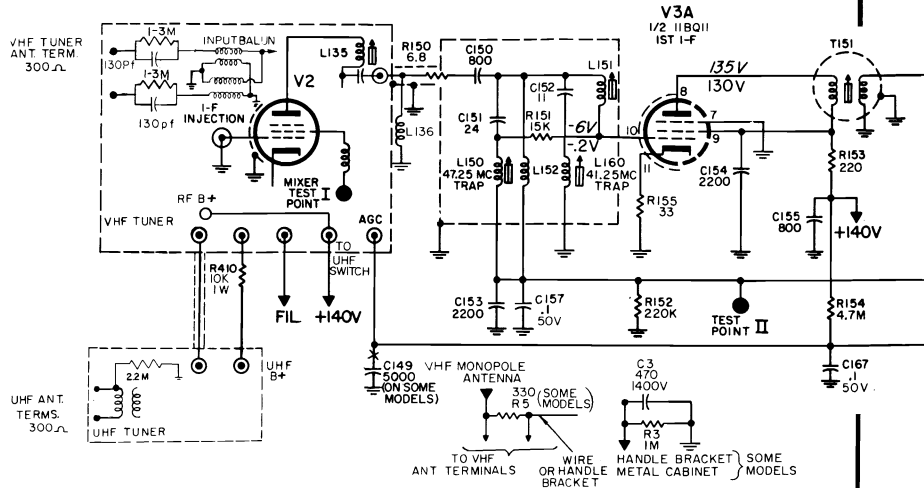


M603/R621 MODEL SERIES D1 CHASSIS

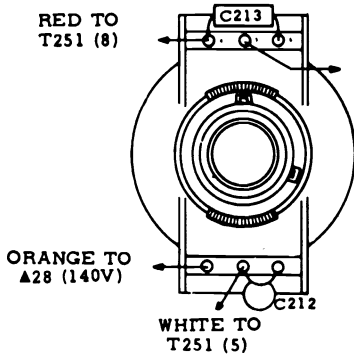
GENERAL ELECTRIC Chassis D1, Schematic Diagram



T251 WIRING



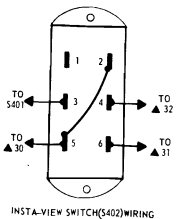
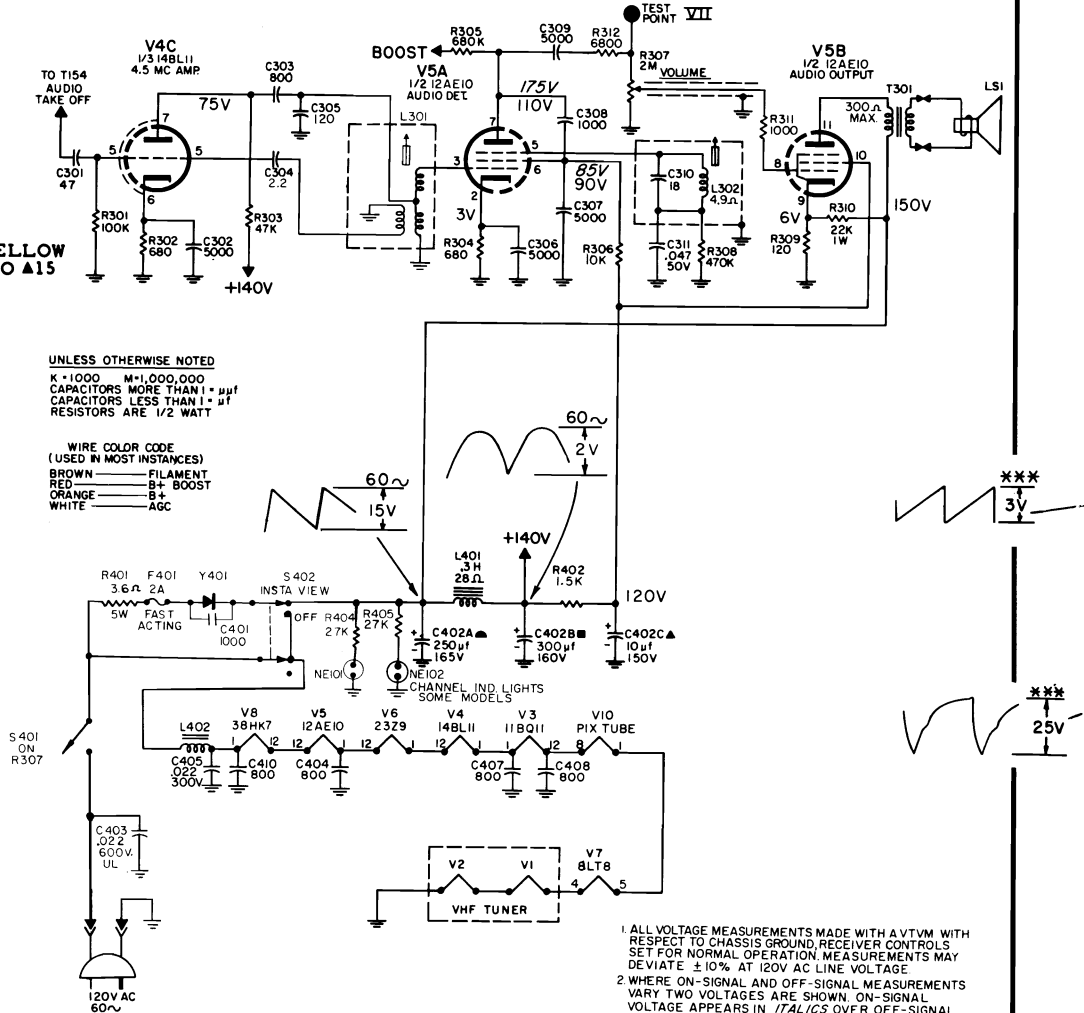
TO VHF ANT TERMINALS } SOME MODELS
WIRE OR HANDLE BRACKET }
HANDLE BRACKET }
METAL CABINET }
SOME MODELS



ET76X39 YOKE WIRING

UNLESS OTHERWISE NOTED
K = 1,000 M = 1,000,000
CAPACITORS MORE THAN 1 μf
CAPACITORS LESS THAN 1 μf
RESISTORS ARE 1/2 WATT

WIRE COLOR CODE
(USED IN MOST INSTANCES)
BROWN — FILAMENT
RED — B+ BOOST
ORANGE — B+
WHITE — AGC

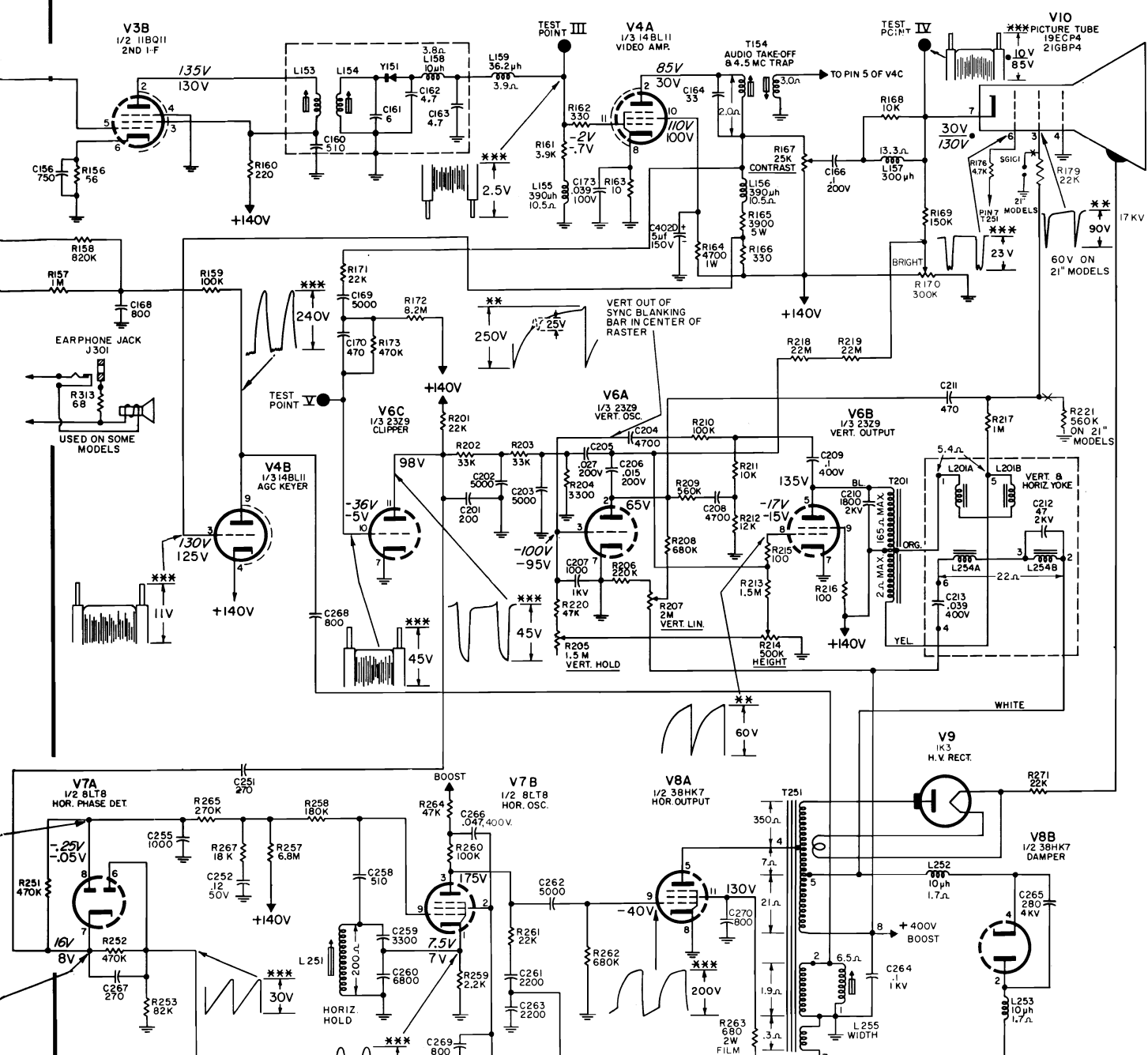


INSTA-VIEW SWITCH(S402) WIRING

For some differences on Remote Control sets, see previous page.

1. ALL VOLTAGE MEASUREMENTS MADE WITH A VTVM WITH RESPECT TO CHASSIS GROUND, RECEIVER CONTROLS SET FOR NORMAL OPERATION. MEASUREMENTS MAY DEVIATE ±10% AT 120V AC LINE VOLTAGE.
 2. WHERE ON-SIGNAL AND OFF-SIGNAL MEASUREMENTS VARY TWO VOLTAGES ARE SHOWN. ON-SIGNAL VOLTAGE APPEARS IN *ITALICS* OVER OFF-SIGNAL VOLTAGE.
- ON-SIGNAL VOLTAGES & WAVE SHAPES TAKEN WITH A NOISE FREE SIGNAL PRODUCING -2.5 TO -3.5 VOLTS AGC AT VHF TUNER.
- OFF-SIGNAL VOLTAGES TAKEN WITH ANTENNA DISCONNECTED & ANTENNA TERMINALS SHORTED TOGETHER ON UNUSED CHANNEL.
- ALL OTHER CONTROLS ARE ADJUSTED FOR NORMAL OPERATION.

GENERAL ELECTRIC Chassis D1, Schematic Diagram, Continued



ELECTRICAL ADJUSTMENTS

HEIGHT AND VERTICAL LINEARITY: Adjust R214 and R207 simultaneously for proper vertical-size and linearity. Picture should extend 1/8-inch beyond top and bottom edges of mask.

HORIZONTAL HOLD: With controls set for normal operation, adjust L251 to the point where the picture "locks in".

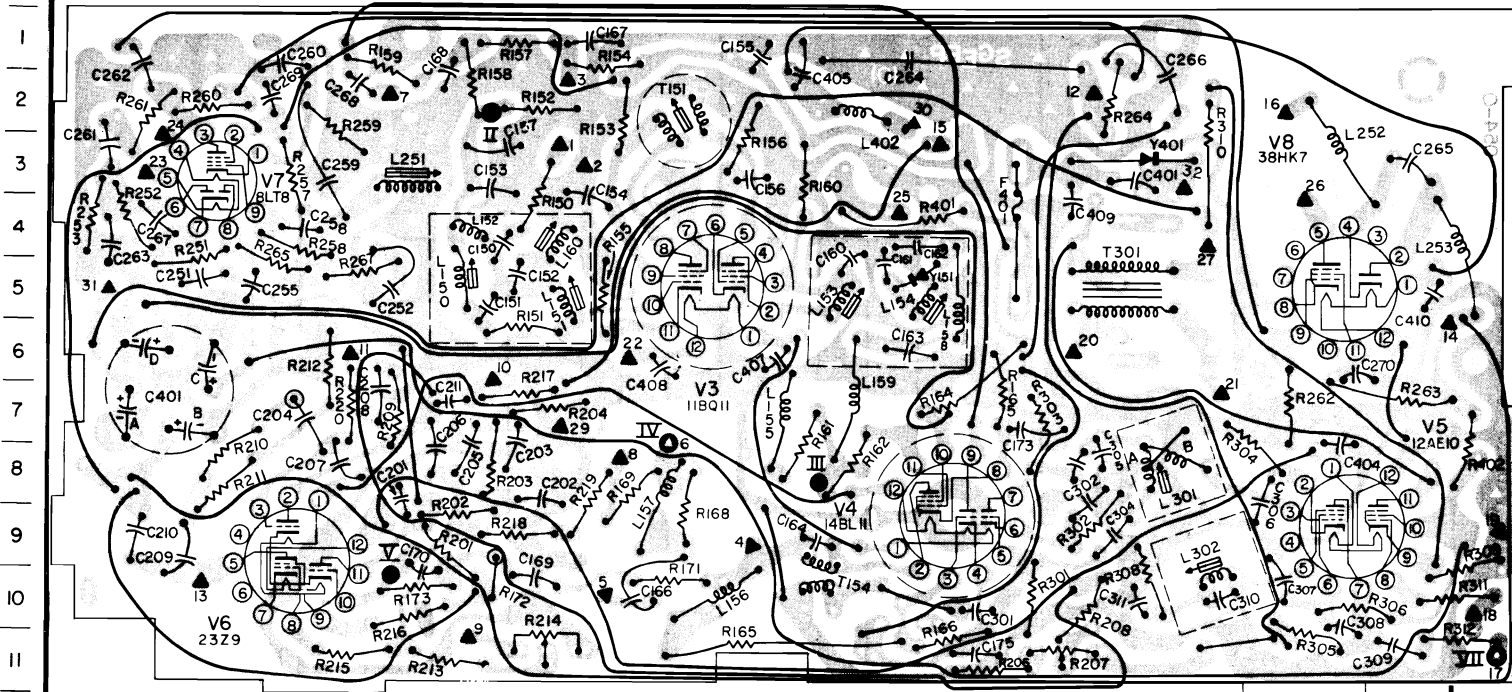
PICTURE TUBE ADJUSTMENTS

PICTURE TILT: To correct picture tilt, loosen the YOKE CLAMP. Adjust the yoke to correct the tilt. Secure the clamp.

PICTURE CENTERING: Rotate the two centering rings located at the rear of the yoke assembly until picture is properly centered.

GENERAL ELECTRIC Chassis D1, Circuit Board Information

A | B | C | D | E | F | G | H | I | J | K | L | M | N | O | P | Q | R | S | T | U | V | W | X



COMPONENT VIEW OF CIRCUIT BOARD

RESISTORS

R150-H4	R168-K9	R214-I11	R263-W7
R151-H6	R169-J8	R215-E11	R264-R2
R152-H2	R171-K10	R216-F11	R265-D4
R153-J2	R172-H10	R217-H7	R267-E5
R154-J1	R173-G10		
R155-J4	R201-G9	R218-H9	R301-Q10
R156-L3	R202-G9	R219-I8	R302-Q9
R157-H1	R203-H8	R220-E7	R303-Q7
R158-G2	R204-I7	†R221-H6	R304-T8
R159-F1	R206-F11	R251-C4	R305-U11
R160-M3	R207-Q11	R252-B4	R306-V10
R161-M8	R208-R10	R253-A4	R308-R10
R162-N8	R209-F7	R257-D3	R309-X9
R163-P7	R210-C8	R258-E4	R310-T3
R164-O7	R211-C9	R259-E2	R311-X10
R165-L11	R212-E6	R260-C2	R312-X11
R166-O11	R213-G11	R261-B2	R401-N4
		R262-I17	R402-X8

CAPACITORS

C150-H4	C169-H10	C255-D5	C305-R8
C151-H5	C170-G10	C258-E4	C306-T8
C152-H5	C173-P7	C259-E3	C307-U10
C153-H3	C175-I1D	C260-D1	C308-V11
C154-J5	C201-F8	C261-A2	C309-V11
C155-L1	C202-I8	C262-B1	C310-T10
C156-L3	C203-H8	C263-B5	C311-R10
C157-3H	C204-D7	C264-O1	C401-R3
C160-M2	C205-G8	C265-W3	C402-R3
C161-N5	C206-G8	C266-S2	C402-B7
C162-O4	C207-E8	C267-B4	C404-V8
C163-O6	C208-F7	C268-E2	C405-M2
C164-M9	C209-B9	C269-D2	C407-L6
C165-N11	C210-B9	C270-6V	C408-J6
C166-J10	C211-G7	C301-P10	C409-Q4
C167-J1	C251-C5	C302-Q8	C410-W5
C168-G1	C252-F5	C303-Q8	
		C304-R9	

COILS

L150-G5	L160-I4
L151-I5	L251-F3
L152-H4	L252-V2
L153-M5	L253-W4
L154-O5	L301-S8
L155-L7	L402-N3
L156-L10	
L157-J9	T151-K2
L158-O6	T154-M10
L159-N7	T301-R5

MISC.

F401-P4
Y151-O5
Y401-S3
V3 -K5
V4 -O9
V5 -V9
V6 -D10
V7 -C3
V8 -V5

TRIANGLE (▲-O) NUMBERS

REPRESENT INTERCONNECTING WIRES ON COMPONENT BOARD FOR CONNECTION TO POINTS INDICATED.

- ▲1. I-F INPUT LEAD
- ▲2. I-F SHIELD
- ▲3. TO TUNER AGC
- ▲4. TO R167 (CONTRAST)
- ▲5. TO R167 ARM
- ▲6. TO V10, PIN 7
- ▲7. TO T251, PIN 2
- ▲8. TO R170 (BRIGHT) ARM
- ▲9. TO R205 (V. HOLD) ARM
- ▲10. TO V10, PIN 3
- ▲11. TO R205 (V. HOLD)
- ▲12. TO T251, TERM. 8 & YOKE TERM. 4 (BOOST)
- ▲13. TO T201, (BLUE)
- ▲14. TO T201 (ORANGE) & L401
- ▲15. TO YOKE TERM. 5 & T201 (YELLOW)
- ▲16. TO YOKE TERM. 2 (WHITE) & T251 TERM. 5
- ▲17. TO R307 (VOLUME)
- ▲18. TO R307 ARM
- ▲19. AUDIO CABLE GROUND
- ▲20. TO SPEAKER

- ▲21. TO SPEAKER
- ▲22. TO V10 PIN 8
- ▲23. TO V10 PIN 1
- ▲24. TO TUNER FIL.
- ▲25. TO S401
- ▲26. TO T251 TERM. 4
- ▲27. YELLOW LEAD TO L401
- ▲28. ORANGE (+140V) TO VHF TUNER, R167 (CONTRAST) & YOKE TERM. 1
- ▲29. TO V10, pin 4 (21" Models only)
- ▲30. TO LUG 5 of S402
- ▲31. TO LUG 6 of S402
- ▲32. TO LUG 4 of S402

TEST POINTS

II - H2
III - M7
IV - K8
V - F10
VII - X11

Magnavox

T914 SERIES TELEVISION CHASSIS

ADJUSTMENTS

CENTERING--Rotate the two centering rings with respect to one another to obtain a raster of desired magnitude. Rotate the rings with respect to the deflection yoke to obtain the desired position.

FOCUSING--These chassis employ an electrostatic focus picture tube. Focus is determined by the voltage applied to the focusing anode (pin 4) of the picture tube. The voltage on one of three pins located on the deflection board (3N, 3R, or 3S) is jumpered to the focusing anode so as to provide the best overall focus.

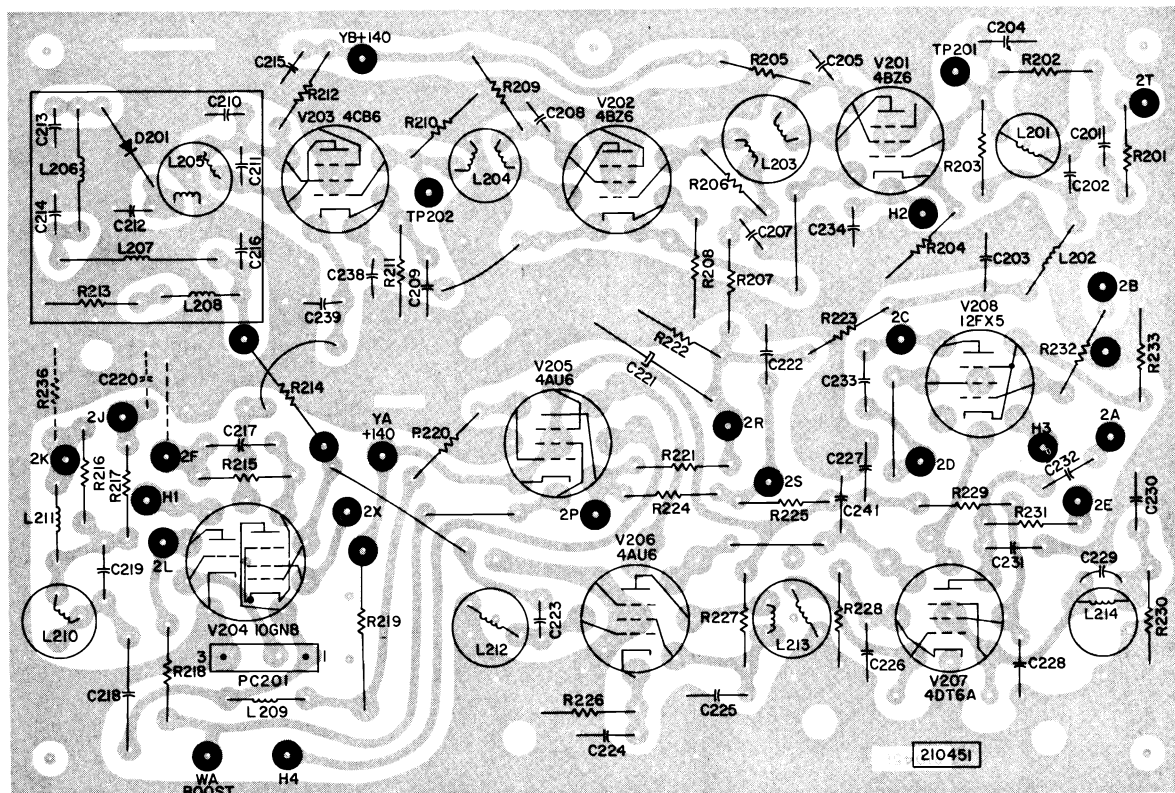
VERTICAL LINEARITY & HEIGHT--Adjust these controls until a picture of uniform linearity slightly overfills the mask vertically. Adjustment of either of these controls may necessitate adjustment of the Vertical Hold Control.

HORIZONTAL OSCILLATOR--Adjust the Horizontal Hold Control (L404) until the picture falls into horizontal sync.

LDR RANGE--This control is accessible through the hollow shaft of the Contrast Control. A small non-metallic screwdriver should be used. The procedure outlined assumes that the adjustment must be made under normal lighting conditions where it is not possible to darken the room.

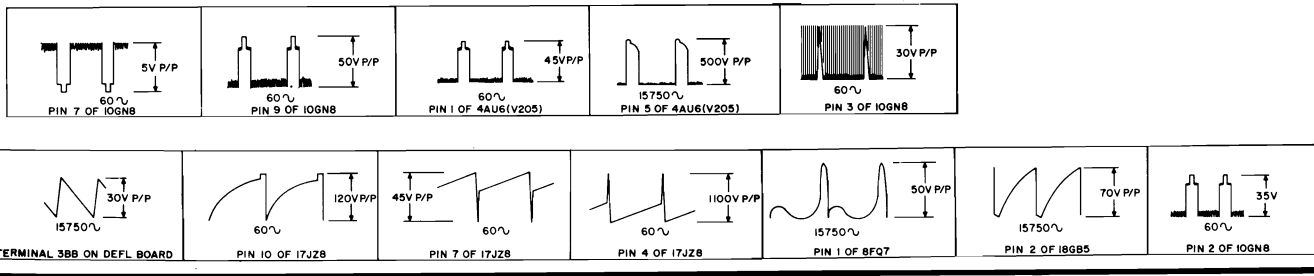
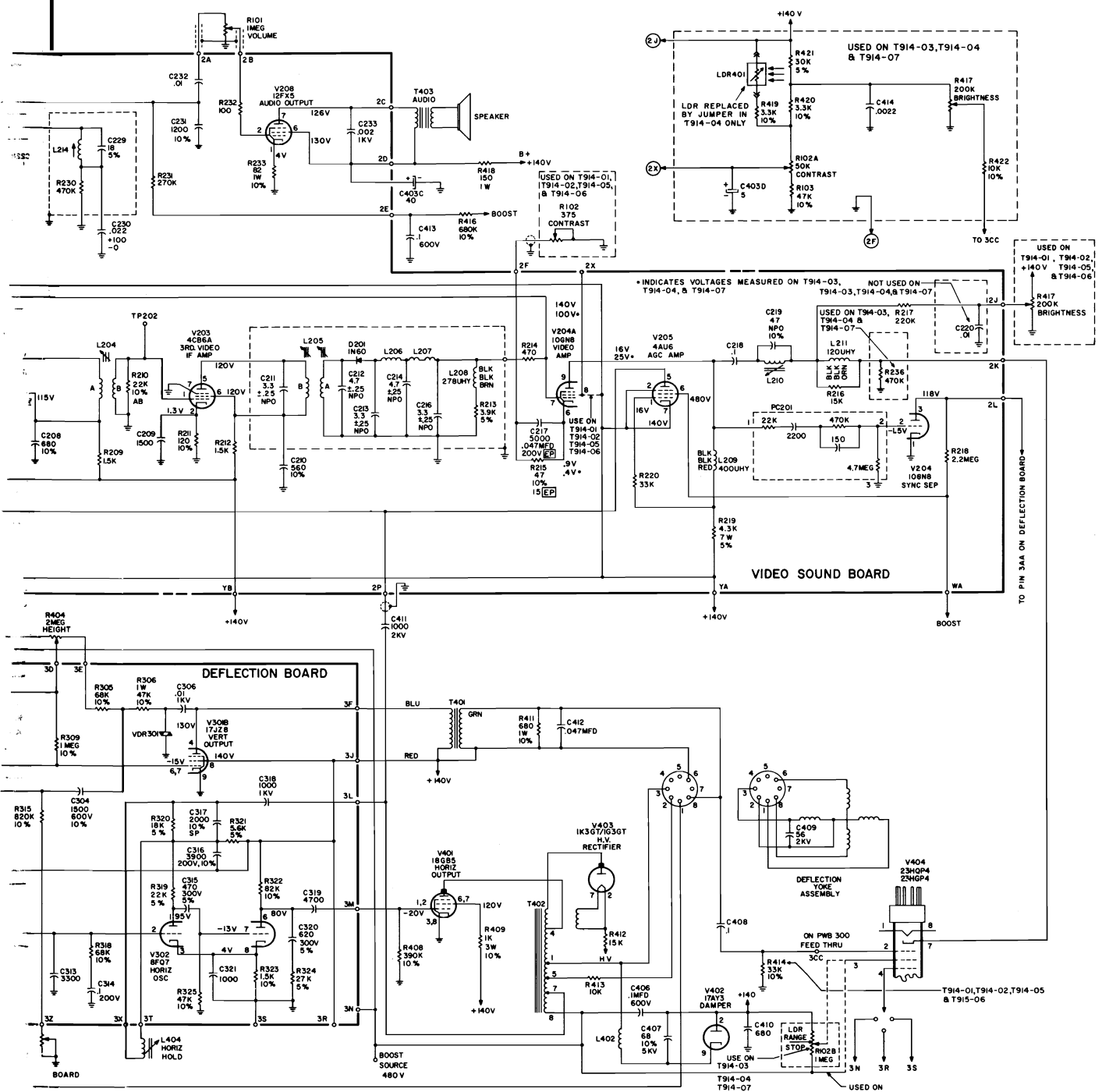
As a preliminary step, set the LDR Range Control to its maximum clockwise position. Adjust the Brightness and Contrast Controls for a normal picture in semidarkness. If the room lighting cannot be subdued, a semidarkness condition (for the LDR) can be simulated by placing a hand over the LDR window. Check the contrast to brightness ratio by slowly moving the hand away from the window. If the picture appears too bright under normal lighting conditions, rotate the LDR Range Control slightly counter-clockwise. Repeat this procedure until the contrast to brightness ratio remains the same throughout the range of actual or simulated lighting conditions.

CIRCUIT BOARD LAYOUT (VIEWED FROM COPPER SIDE)



VIDEO AND SOUND BOARD

MAGNAVOX T914 Series Schematic Diagram, Continued



MAGNAVOX T914 Series Alignment Information

VIDEO IF ALIGNMENT

1. Use an isolation transformer when aligning and allow approximately 20 minutes warm-up time. Remove the 18GB5 plate cap.
2. Using a low-impedance bias supply, apply a -2.0 volts to 2S and a -3.0 volts to 2R on the Video IF Board.
3. Connect an oscilloscope through a 10K isolation resistor to Pin 7 of V204.

CONNECT SWEEP AND MARKER GENERATOR	MARKER FREQUENCIES	ADJUST
TP-202	42.5 MC 45.75MC	Adjust L205, top and bottom, to obtain symmetrical curve with markers at equal amplitude. (See Fig. 1)
TP-201	41.25MC	Adjust L203 (Top Slug) until marker falls in center of trap suckout.
TP-201	42.5MC 45.0MC 45.75MC	Adjust L204 until 45.75 marker is at 50% response and L203 until 42.5MC marker is at 50% response. Repeat these adjustments. (See Fig. 2)
Tuner Converter Grid	42.5MC 45.75MC	Adjust Tuner Converter Plate Coil for maximum gain between markers.
Tuner Converter Grid	47.25MC	Reduce IF Bias to zero and adjust L202 until marker falls in center of trap suckout. Adjust L201 for maximum attenuation of 47.25MC marker.
Tuner Converter Grid	45.75MC 42.5MC	Reset IF Bias to -3.0 volts and adjust Tuner Converter Plate Coil and C206 for symmetrical curve. (See Fig. 3)

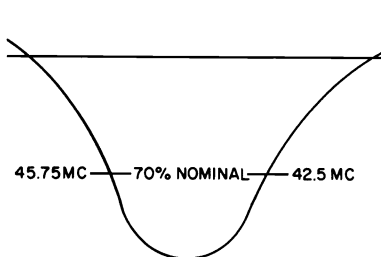


Figure 1

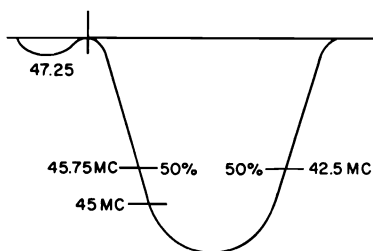


Figure 2

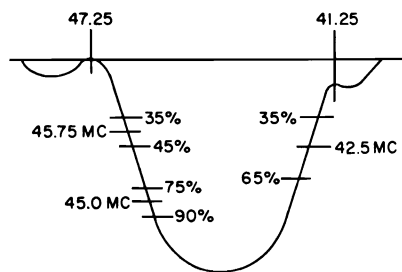


Figure 3

SOUND ALIGNMENT

1. Turn quadrature coil L214 to minimum inductance (core out).
2. Tune receiver to a strong local station (preferably a tone signal or music). Adjust quadrature coil L214 just past the point of maximum sound with minimum distortion.
3. Reduce signal input by removing antenna or placing an adjustable pad across the antenna terminals so that with Volume control set at near maximum, sound is at a low level. Tune the Fine Tuning control through undistorted sound. Set Fine Tuning control to the verge of distortion.
4. Adjust bottom core (grid tuning) of detector drive transformer L213 top core of L213 (plate tuning) and sound take-off coil L212 for minimum distortion.
5. Readjust Fine Tuning control as necessary during adjustment of L212 and L213 to maintain conditions as indicated in step 3 above.

Magnavox

T928 SERIES TELEVISION CHASSIS

(Material on pages 35 through 40)

ADJUSTMENTS

Focus

The Focus Adjustment Terminal Strip is located between tubes V401 and V403. Connect the green lead from the picture tube to the terminal (EB, PF or BB) providing sharpest picture tube focus.

Vertical Linearity (R402A) and Height (R402B)

Adjust these controls so the picture slightly overfills the mask with the linearity uniform from top to bottom. Adjustment of either control will necessitate readjustment of the Vertical Hold Control (R422).

Horizontal Width

If the picture is too wide, remove capacitor C438 from the circuit.

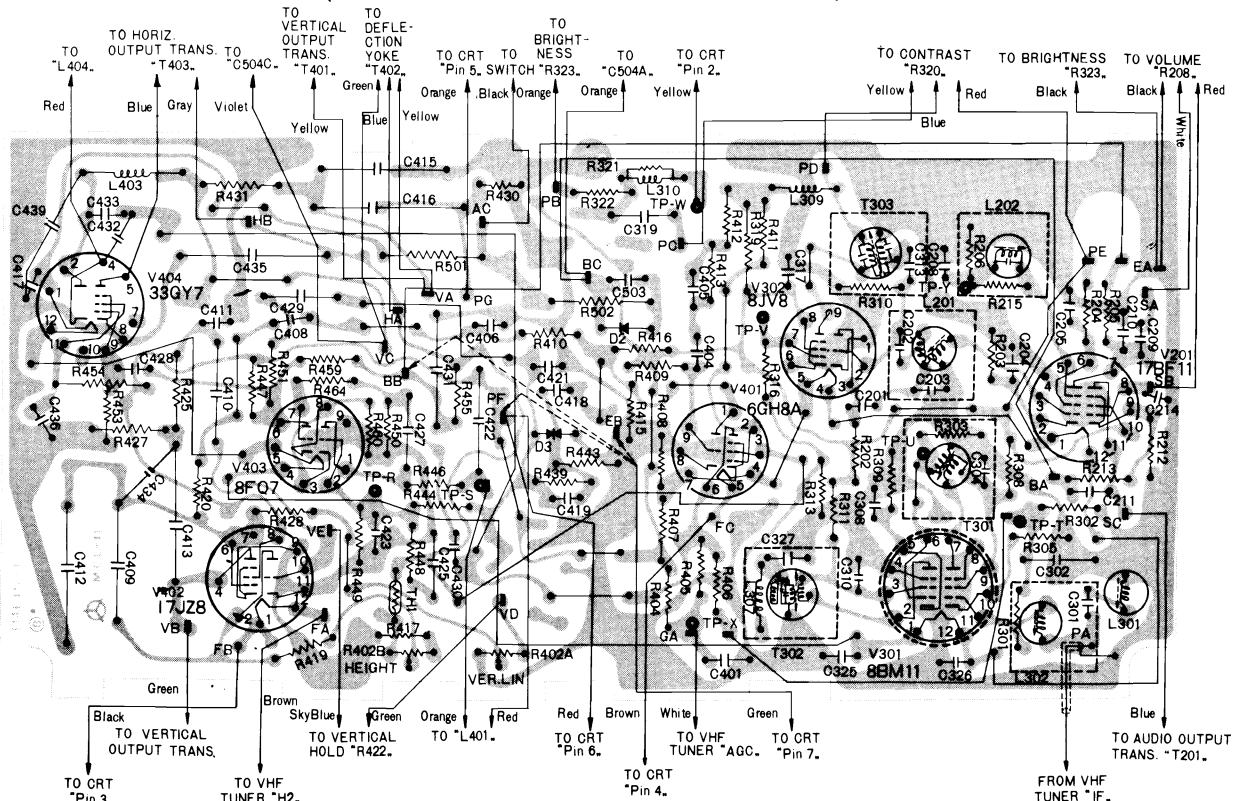
Centering

Center the raster horizontally and vertically by independently rotating the centering rings located on the rear of the yoke assembly.

VHF Tuner

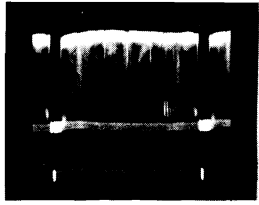
The VHF tuner is equipped with individual oscillator adjustment "slugs" for each channel. To adjust the "slug", select the highest channel to be received and set the Fine Tuning Knob to mid-range. Then remove the VHF Channel Selector Knob, the VHF Fine Tuning-UHF Tuning Knob and the UHF Channel Indicator. The selected channel "slug" is now accessible through a hole at the front (shaft end) of the tuner. Adjust the "slug" using a non-metallic adjustment tool. Repeat the adjustment for all channels to be received. Do not disturb the mid-range setting of the Fine Tuning Control while making the adjustment.

CIRCUIT BOARD LAYOUT (VIEWED FROM COPPER SIDE)

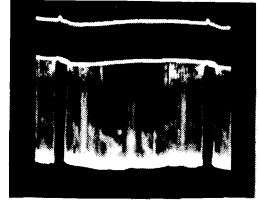


MAGNAVOX T928 Series Schematic Diagram

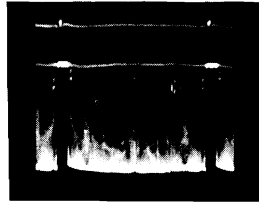
WAVEFORMS



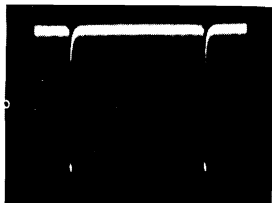
V302-7 (TPV) 3V P/P (V)



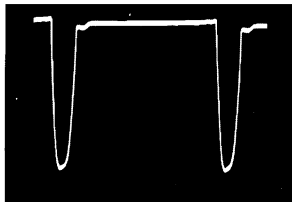
V303-2 (CRT) 50V P/P (V)



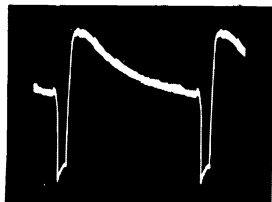
V401-2 70V P/P (V)



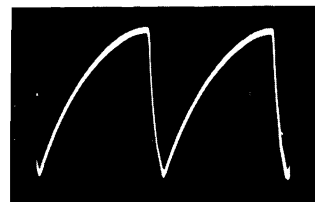
V401-1 50V P/P (V)



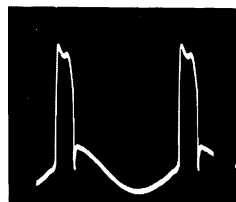
V401-1 50V P/P (H)



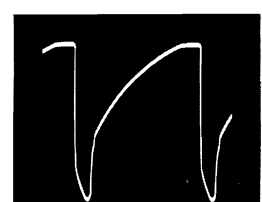
D3 Cathode 11V P/P (H)



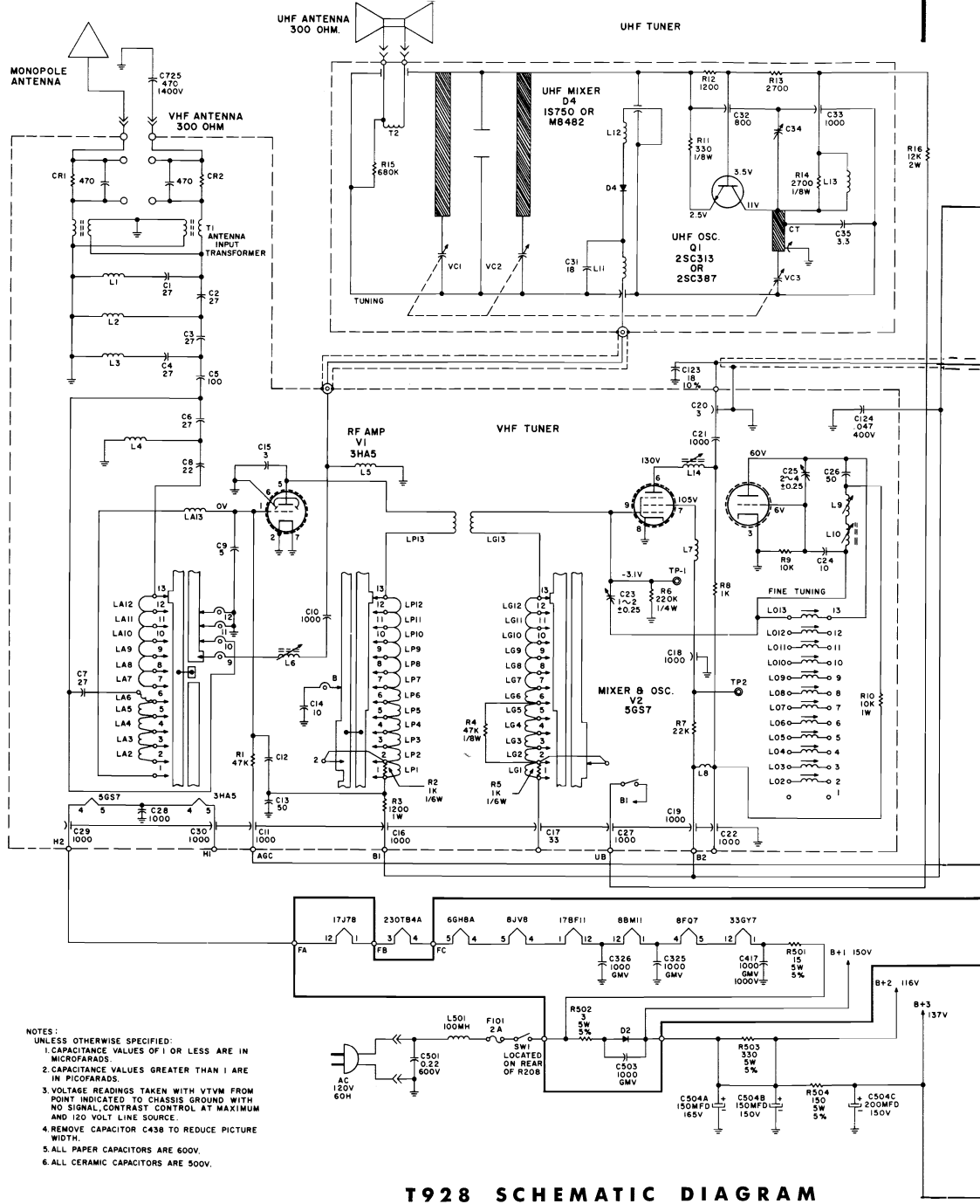
Junction R439 & R444 11V P/P (H)



V403-1 30V P/P (H)

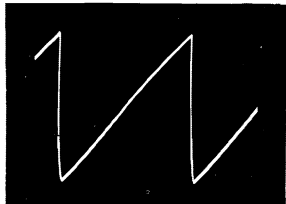
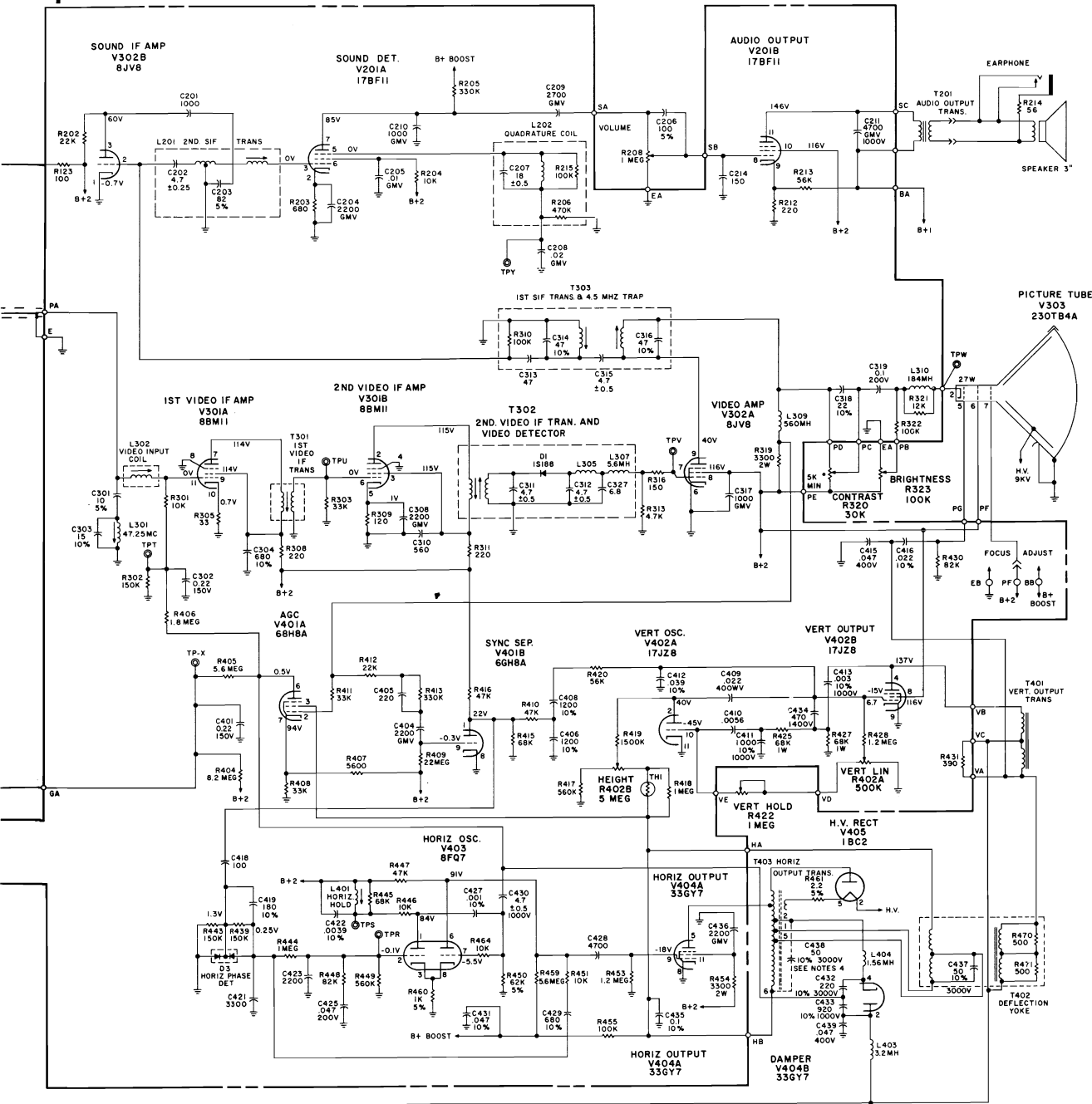


V404-9 80V P/P (H)

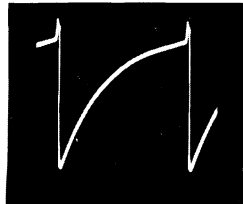


T928 SCHEMATIC DIAGRAM

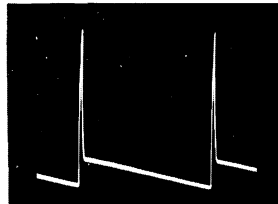
MAGNAVOX T928 Series Schematic Diagram, Continued



V402-6 18V P/P



V402-10 125V P/P



V402-4 600V P/P



MAGNAVOX T928 Series Alignment Information

ALIGNMENT INSTRUCTIONS

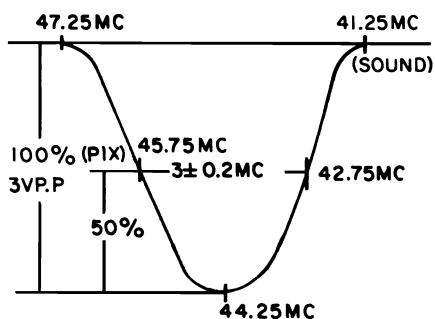
VIDEO ALIGNMENT

<ol style="list-style-type: none"> 1. Always use an isolation transformer and allow sufficient warm-up time. 2. Using a low impedance bias supply, apply -6 volts to TP-T and -1.5 volts to TP-X. 3. Connect a VTVM thru a 100K Resistor to TP-V. 4. Connect signal generator to TP-1 on VHF Tuner thru a 500 pf. capacitor. 5. Adjust generator output to maintain VTVM reading less than 1.5 volts. 			
STEP	SIGNAL GENERATOR	ADJUST	REMARKS
Adjust adjacent Channel Sound Trap	47.25MC	L301	Ground TP-X and TP-T. Adjust for minimum VTVM reading. Reconnect Bias supply.
Adjust 2nd Video IF Transformer	42.7MC	T302 Top Core	For maximum VTVM reading
Adjust 2nd Video IF Transformer	44.2MC	T302 Bottom Core	For maximum VTVM reading
Adjust 1st Video IF Transformer	44.8MC	T301	For maximum VTVM reading
Adjust IF Output Coil (Top of Tuner)	44.8MC	L14	For maximum VTVM reading
Adjust IF Input Coil	43.3MC	L302	For maximum VTVM reading

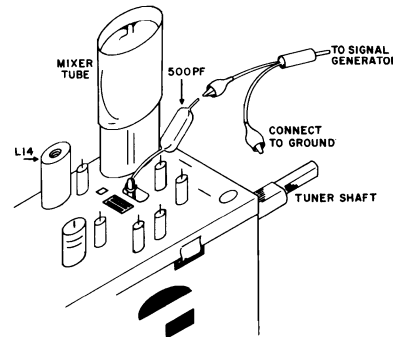
VIDEO IF SWEEP ALIGNMENT

<ol style="list-style-type: none"> 1. Using a low impedance bias supply, apply -6 volts to TP-T and -1.5 volts to TP-X. 2. Connect oscilloscope thru a 10K resistor to TP-V. 3. Connect Sweep and Marker Generators to TP-1 on VHF tuner. 4. Maintain generator output setting for oscilloscope waveform of not more than 3V P-P. 			
STEP	SIGNAL GENERATOR	ADJUST	REMARKS
Video IF Bandpass Adjustment	42.75MC 44.25MC 45.75MC 47.25MC	L14 L302 T301 T302	Adjust for waveshape and Marker position as shown in Figure 1.

WAVEFORM



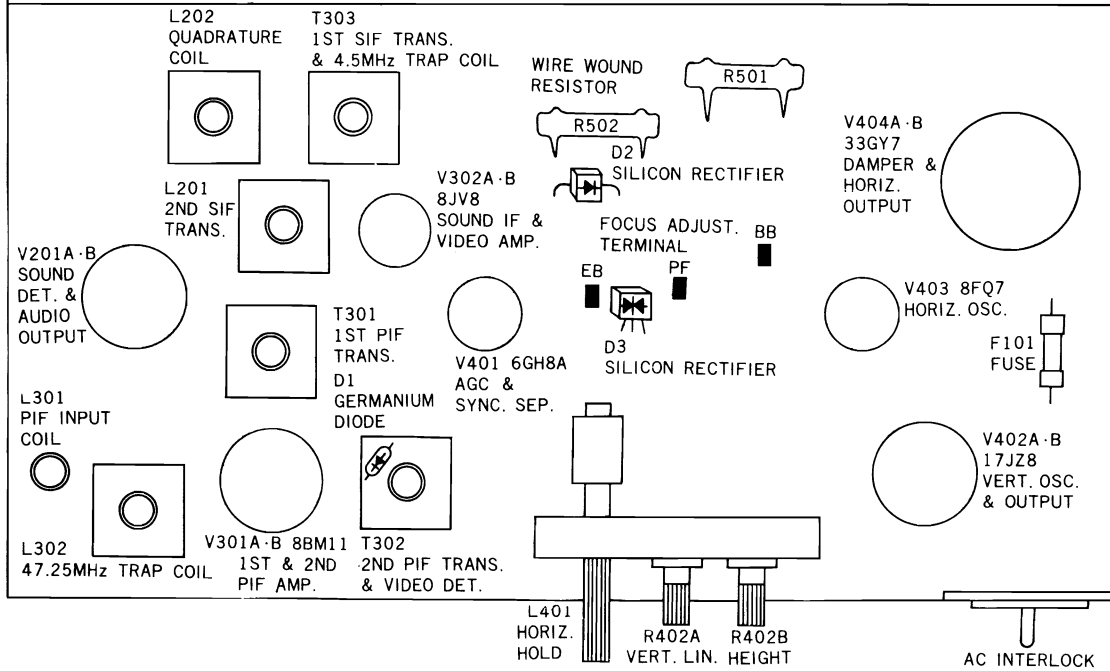
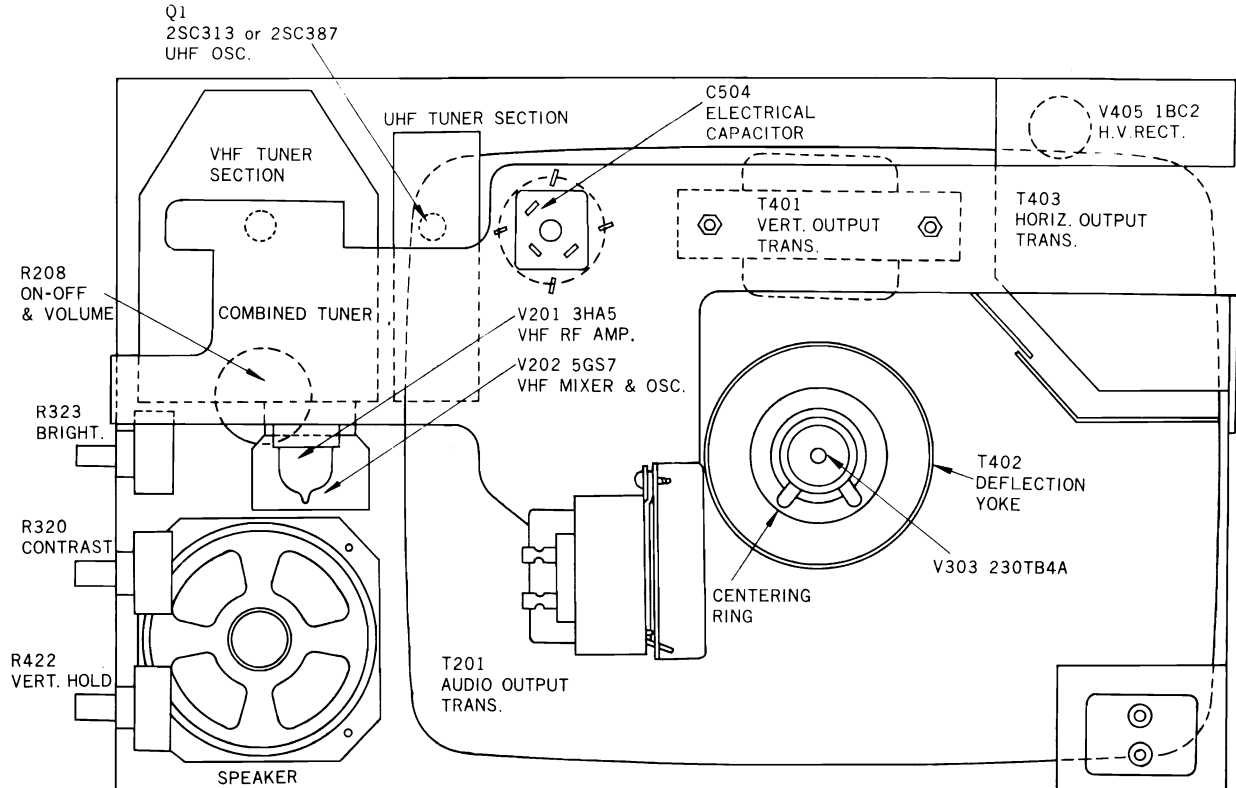
TUNER



SOUND ALIGNMENT

1. Turn the quadrature coil (L202) to minimum inductance (core out).
2. Tune the receiver to a strong local station (preferably a tone signal or music). Adjust the Quadrature Coil (L202) just past the point of maximum sound with minimum distortion.
3. Reduce the signal input by removing the Antenna (or placing an adjustable pad across the Antenna terminals) so that with the Volume control set near maximum, sound is at a low level. Tune the Fine Tuning control through undistorted sound. Set the Fine Tuning control to the verge of distortion.
4. Adjust L201 and bottom core of T303 for minimum distortion.
5. Readjust Fine Tuning as necessary during the adjustment of L201 and T303 to maintain the conditions indicated step 3 above.

CHASSIS LAYOUT



BOARD LAYOUT

MAGNAVOX T928 Series Parts List

REPLACEMENT PARTS LIST

REF. NO.	DESCRIPTION	PART NO.	REF. NO.	DESCRIPTION	PART NO.
TRANSFORMERS & COILS			RESISTORS		
T201	Audio Output Transformer	32B009-1	R16	12K, 10%, 2W	230146-75
T301	1st Video IF Transformer	36B034-1	R123	100, 10%, .5W	230144-50
T302	2nd Video IF Transformer & Video Detector	36B035-1	R202	22K, 10%, .5W	230144-78
T303	1st Sound IF Transformer & 4.5MC Trap	36B036-1	R203	680, 10%, .5W	230144-60
T401	Vertical Output Transformer	32B010-1	R204	10K, 10%, .5W	230144-74
T402	Deflection Yoke	36B041-1	R205	330K, 10%, .5W	230144-92
T403	Horizontal Output Transformer	36B029-1	R206	470K, 10%, .5W	230144-94
L201	2nd Sound IF Coil	36B030-1	R212	220, 10%, .5W	230144-54
L202	Quadrature Coil	36B031-1	R213	56K, 10%, .5W	230144-83
L301	47.25MC Trap	36B032-1	R214	56, 10%, 5W	230144-47
L302	Video IF Input Coil	36B033-1	R215	100K, 10%, .5W	230144-86
L305	Choke Coil (Enclosed by T302)	36B035-2	R301	10K, 10%, .5W	230144-74
L307	5.6 uhy Peaking Coil (Enclosed by T302)	36B035-3	R302	150K, 10%, .5W	230144-88
L309	560 uhy Peaking Coil	36B040-1	R303	33K, 10%, .5W	230144-80
L310	184 uhy Peaking Coil	36B040-2	R305	33, 10%, .5W	230144-44
L401	Horizontal Hold Coil	36B039-1	R308	220, 10%, .5W	230144-54
L403	3.2 uhy RF Choke	36B037-1	R309	120, 10%, .5W	230144-51
L404	Horizontal Width Coil	36B038-1	R310	100K, 10%, .5W	230144-86
L501	100 uhy AC Line Filter	32B008-1	R311	220, 10%, .5W	230144-54
CAPACITORS			R313	4.7K, 10%, .5W	230144-70
All capacitors are 20%, 500V unless specified otherwise			R316	150, 10%, .5W	230144-52
C123	Ceramic, 18 pf., ±10%	25B011-7	R319	3.3K, 10%, 2W Carbon Film	230192-3329
C124	Paper Tubular, .047 mfd., ±20%, 400V	25B016-10	R321	12K, 10%, .5W	230144-75
C201	Ceramic, 1000 pf., ±20%	25B014-5	R322	100K, 10%, .5W	230144-86
C202	Ceramic, 4.7 pf., ±0.25 pf.	25B011-1	R404	8.2 meg., 10%, .5W	230144-109
C203	Ceramic, 82 pf., ±5%	25B012-3	R405	5.6 meg., 10%, .5W	230144-107
C204	Ceramic, 2200 pf., GMV	25B014-9	R406	1.8 meg., 10%, .5W	230144-101
C205	Ceramic, .01 mfd., GMV	25B014-12	R407	5.6K, 10%, .5W	230144-71
C206	Ceramic, 100 pf., ±5%	25B014-19	R408	33K, 10%, .5W	230144-80
C207	Ceramic, 18 pf., ±0.5 pf.	25B011-6	R409	22 meg., 10%, .5W	230144-268
C208	Ceramic, .02 mfd., GMV	25B014-13	R410	47K, 10%, .5W	230144-82
C209	Ceramic, 2700 pf., GMV	25B014-16	R411	33K, 10%, .5W	230144-80
C210	Ceramic, 1000 pf., GMV	25B014-4	R412	22K, 10%, .5W	230144-78
C211	Ceramic, 4700 pf., GMV, 1000V	25B014-15	R413	330K, 10%, .5W	230144-92
C214	Ceramic, 150 pf., ±20%	25B012-5	R415	68K, 10%, .5W	230144-84
C301	Ceramic, 10 pf., ±5%	25B014-17	R416	47K, 10%, .5W	230144-82
C302	Metalized Paper, .22 mfd., 20%, 150V	25B018-1	R417	560K, 10%, .5W	230144-95
C303	Ceramic, 15 pf., ±10%	25B014-18	R418	1 meg., 10%, .5W	230144-98
C304	Ceramic, 680 pf., ±10%	25B014-3	R419	1.5 meg., 10%, .5W	230144-100
C308	Ceramic, 2200 pf., GMV	25B014-9	R420	56K, 10%, .5W	230144-83
C310	Ceramic, 560 pf., ±20%	25B014-2	R425	68K, 10%, 2W Carbon Film	230192-6839
C311	Ceramic, 4.7 pf., ±0.5 pf.	25B011-3	R427	68K, 10%, 2W Carbon Film	230192-6839
C312	Ceramic, 4.7 pf., ±0.5 pf.	25B011-2	R428	1.2 meg., 10%, .5W	230144-99
C313	Ceramic, 47 pf., ±20%	25B012-1	R430	82K, 10%, .5W	230144-85
C314	Ceramic, 47 pf., ±10%	25B012-2	R431	390, 10%, .5W	230144-57
C315	Ceramic, 4.7 pf., ±0.5 pf.	25B011-2	R439	150K, 10%, .5W	230144-88
C316	Ceramic, 47 pf., ±10%	25B012-2	R443	150K, 10%, .5W	230144-88
C317	Ceramic, 1000 pf., GMV	25B014-4	R444	1 meg., 10%, .5W	230144-98
C318	Ceramic, 22 pf., ±10%	25B011-8	R445	68K, 10%, .5W	230144-84
C319	Mylar, .1 mfd., ±20%, 200V	25B017-2	R446	10K, 10%, .5W	230144-74
C325	Ceramic, 1000 pf., GMV	25B014-4	R447	47K, 10%, .5W	230144-82
C326	Ceramic, 1000 pf., GMV	25B014-4	R448	82K, 10%, .5W	230144-85
C327	Ceramic, 6.8 pf., ±0.5 pf.	25B011-5	R449	560K, 10%, .5W	230144-95
C401	Metalized Paper, .22 mfd., ±20%, 150V	25B018-1	R450	62K, 5%, .5W	230144-202
C404	Ceramic, 2200 pf., GMV	25B014-9	R451	10K, 10%, .5W	230144-74
C405	Ceramic, 220 pf., ±20%	25B012-7	R453	1.2 meg., 10%, .5W	230144-99
C406	Ceramic, 1200 pf., ±10%	25B014-8	R454	3.3K, 10%, 2W Carbon Film	230192-3329
C408	Ceramic, 1200 pf., ±10%	25B014-8	R455	100K, 10%, .5W	230144-86
C409	Paper Tubular, .022 mfd., ±20%, 400V	25B016-11	R459	5.6 meg., 10%, .5W	230144-107
C410	Paper Tubular, .0056 mfd., ±10%, 600V	25B016-3	R460	1K, 5%, .5W	230144-159
C411	Ceramic, 1000 pf., ±10%, 1000V	25B014-6	R461	2.2, 5%, .5W	230174-143
C412	Paper Tubular, .039 mfd., ±10%, 600V	25B016-5	R464	10K, 10%, .5W	230144-74
C413	Paper Tubular, .033 mfd., ±10%, 1000V	25B016-9	R501	15, 5%, 5W (WW)	240080-129
C415	Paper Tubular, .047 mfd., ±20%, 400V	25B016-12	R502	3, 5%, 5W (WW)	240080-113
C416	Paper Tubular, .022 mfd., ±10%, 600V	25B016-4	R503	330, 5%, 5W (WW)	240080-161
C417	Ceramic, 1000 pf., GMV, 1000V	25B014-7	R504	150, 5%, 5W (WW)	240080-153
C418	Ceramic, 100 pf., ±20%	25B012-4	CONTROLS		
C419	Ceramic, 180 pf., ±10%	25B012-6	R208	1 meg., Off-On-Volume	22B014-1
C421	Ceramic, 3300 pf., ±20%	25B014-11	R320	30K, Contrast (5K Minimum)	22B015-3
C422	Paper Tubular, .0039 mfd., ±10%, 600V	25B016-2	R323	100K, Brightness	22B015-1
C423	Ceramic, 2200 pf., ±20%	25B014-10	R402A	500K, Vertical Linearity	22B013-1
C425	Mylar, .047 mfd., ±20%, 200V	25B017-1	R402B	5 meg., Vertical Height	22B013-1
C427	Paper Tubular, .001 mfd., ±10%, 600V	25B016-1	R422	1 meg., Vertical Hold	22B015-2
C428	Ceramic, 4700 pf., ±20%	25B014-14	MISCELLANEOUS		
C429	Polyester Film, 680 pf., ±10%, 500V	25B019-1	D1	Fuse, 2A, 125V	18B018-1
C430	Ceramic, 4.7 pf., ±0.5 pf., 1000V	25B011-4	D2	Video Detector (1S188)	53B001-1
C431	Paper Tubular, .047 mfd., ±10%, 600V	25B016-6	D3	Silicon B+ Rectifier (1S558)	53B006-1
C432	Ceramic, 220 pf., ±10%, 3000V	25B013-1	TH1	Horizontal AFC Dual Diode	53B007-1
C433	Ceramic, 920 pf., ±10%, 1000V	25B013-2		Thermistor, 1 meg.	23B003-1
C434	Ceramic, 470 pf., ±20%, 1.4KV, 150VAC	25B014-1		Earphone Jack	18B020-1
C435	Paper Tubular, .1 mfd., ±10%, 600V	25B016-7		VHF Tuner	34B002-1
C436	Ceramic, 2200 pf., GMV	25B014-9		UHF Tuner	34B003-1
C437	Ceramic, 50 pf., 10%, 3000V	25B015-1		UHF Drive Gear (Metal)	73B140-1
C438	Ceramic, 50 pf., ±10%, 3000V	25B015-1		UHF Intermediate Gear (Nylon)	14B058-1
C439	Paper Tubular, .047 mfd., ±20%, 400V	25B016-10		UHF Diode (1S750)	53B008-1
C501	Paper Tubular, .22 mfd., ±20%, 600V	25B016-8		9-Pin Molded Tube Socket	18B013-1
C503	Ceramic, 1000 pf., GMV	25B014-4		17B11 Tube Socket	18B014-1
C504A,B,C	Electrolytic, 150/150/200 mfd.; 165/150/150V	27B032-1		33GY7 Tube Socket	18B015-1
C725	Ceramic, 470 pf., ±20%, 1.4KV, 150 VAC	25B014-1		17JZ8 Tube Socket	18B015-2
				8BM11 Tube Socket	18B015-3
				Picture Tube Socket	18B017-1

M O N T G O M E R Y W A R D

MODEL GEN-13169A (Material on pages 41 through 46)

Deflection Yoke Adjustment

If the lines of the raster are not horizontal or squared with the picture mask, loosen the yoke clamp and rotate the deflection yoke until this condition is corrected. To obtain best results, the deflection yoke should be positioned as far forward on the neck of the picture tube as possible.

Centering Adjustment

Both horizontal and vertical centering are accomplished by rotating the centering rings mounted on the back of the deflection yoke assembly.

Focus Adjustment

The picture tube used in this receiver is electrostatically focused by means of a focus electrode in the gun assembly that is connected directly to the B+ (260V) BUSS. No adjustment is provided.

Vertical Size and Linearity Adjustment

Adjust vertical height and vertical linearity for the best overall linearity and desired picture size. After this adjustment, a slight readjustment of the centering rings may be necessary.

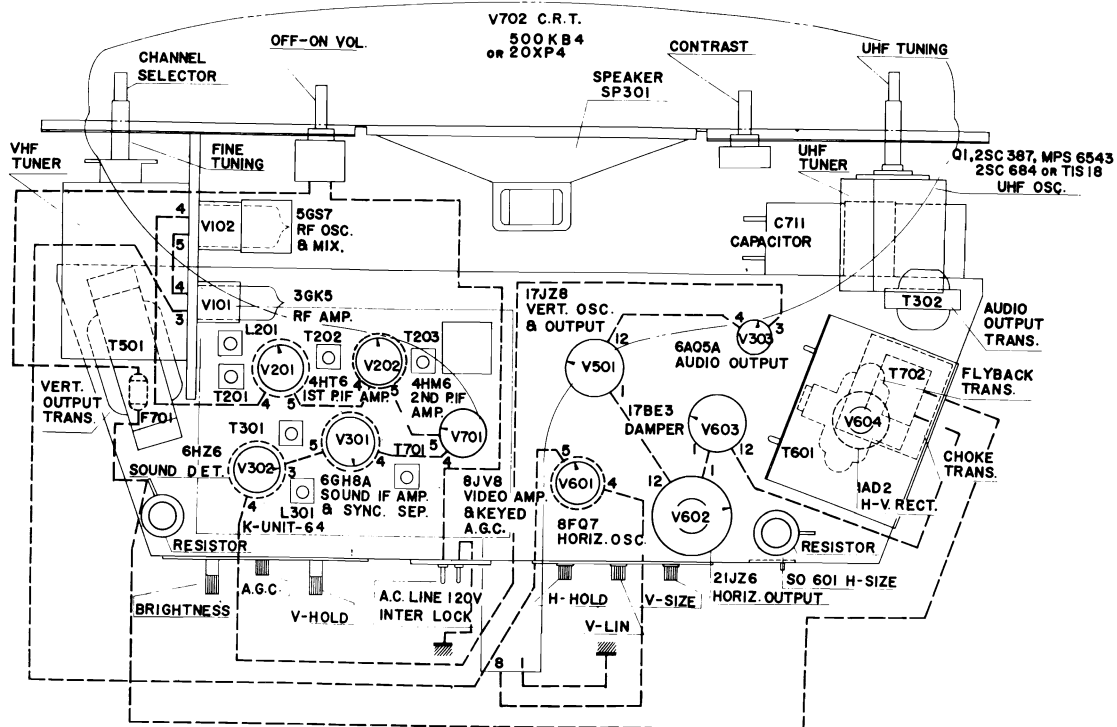


Figure 1 Chassis Tube Layout and Adjustments

MONTGOMERY WARD Model 13169A Service Information

Width Adjustment

With line voltage set at 108 volts, select the proper connection on the horizontal size adjustment socket SO601 so that the picture just fills the mask horizontally. Under normal operating condition and with the line voltage set at 120 volts, the picture should horizontally overscan the mask about 1/2 inch on each side.

Horizontal Hold Adjustment

1. With the receiver operating and a station properly tuned in, rotate the horizontal hold control clockwise and counter-clockwise to determine the points where the picture drops out of sync.
2. Set the horizontal hold control to a point midway between these drop-out points.
3. Switch to another channel and verify that the picture remains in sync. If not operating properly, refer to horizontal AFC alignment.

Check RF Oscillator Adjustment (VHF Tuner)

Tune in all available VHF stations to see if the receiver RF oscillator is adjusted to the proper frequency on all VHF channels. If adjustments are required, they can be made without removing the chassis from the cabinet. Access to the individual RF oscillator adjustments on the VHF tuner is obtained in the following manner.

1. Remove the channel selector knob, fine tuning knob and felt washer from the shaft.
2. Set the VHF channel selector to each of the locally received channels.
3. On each received channel, adjust the VHF fine tuning control so that the hole in the insulator is exposed to provide access to the oscillator screw.
4. Using an insulated screwdriver, adjust the oscillator screw to tune in best picture and sound.

Fuse

For overload protection, a 2.0A fuse has been installed in the AC input of this receiver. This fuse is connected directly to the "ON-OFF" switch and is mounted on a terminal strip that is located on the chassis. The chassis must be removed from the cabinet whenever replacement is required.

Chassis Removal

Whenever it becomes necessary to remove the chassis from the cabinet, proceed in the following manner:

1. Remove the ON-OFF Volume, Contrast, UHF Indicator, UHF Tuning, VHF Channel Selector and VHF Fine Tuning Knobs from the front of the cabinet.
2. Lay the cabinet face down on a soft pad so as not to mar the picture tube.
3. Remove the six cabinet back retaining screws.
4. Remove the cabinet back and disconnect the antenna leads.
5. Disconnect the deflection yoke plug, picture tube socket, CRT anode lead and speaker leads.
6. Remove the six chassis retaining screws.
7. Remove seven retaining screws and lift the UHF tuner and control bracket and VHF tuner and control bracket assemblies out of the cabinet.
8. The chassis may now be completely removed from the cabinet.

Removing and Installing Picture Tube

In order to remove or replace the picture tube, the chassis must first be removed.

Refer to CHASSIS REMOVAL procedure. When the chassis has been removed proceed as follows:

1. Disconnect the picture tube retaining strap.
2. Remove the picture tube from the cabinet.

CAUTION: Refer to the caution label on the high voltage compartment.

(Always avoid handling the neck of the picture tube.)

3. Place the picture tube in proper position in the cabinet.
4. Connect the picture tube retaining strap.
5. Reassemble the set.

MONTGOMERY WARD Model 13169A Alignment Information,

ALIGNMENT INSTRUCTIONS

Equipment

1. Television Sweep Generator (Item No. 21121C or equivalent)
2. Television Marker Generator (Item No. 21122C or equivalent)
3. Oscilloscope (Item No. 21123D or equivalent)
4. Bias Supply (Item No. 21453 or equivalent)
5. Output Meter (Item No. 21046 or equivalent)

Picture IF Sweep Alignment

1. Television receiver and test equipment should be turned on and allowed to warm up for 10 minutes before starting alignment procedure.
2. Set the VHF channel selector on the receiver to channel 10. (Antenna disconnected from tuner input.)
3. Set the sweep generator for a 44MHz IF output and adjust the sweep width for 10MHz.
4. Loosely couple the marker generator output lead to the output of the sweep generator.
5. Apply -3.5V bias to TP204.
6. Connect the vertical input of the oscilloscope through a 10K OHM resistor to TP203.
7. Connect the output of the sweep generator through a .0047 MFD capacitor to TP202. Adjust the output to maintain a level not exceeding 2~3V pp.
8. Set the marker generator to produce the desired marker frequencies and adjust T203 (Top and Bottom) to obtain a waveform on the oscilloscope equivalent to the pattern shown in Figure 2.
9. Reconnect the output of the sweep generator, in the manner specified in step 7, to TP201.
10. In the manner specified in step 8, adjust T202 (Top and Bottom) to obtain a waveform on the oscilloscope equivalent to the pattern shown in Figure 3.
11. Reconnect the output of the sweep generator to TP101 on the VHF tuner.
12. In the manner specified in step 8, adjust T201,(Top and Bottom), L201, T101 and T202 (Top and Bottom) to obtain a waveform on the oscilloscope equivalent to the pattern shown in Figure 4. Adjustment of the top slug of T201 should produce a dip at 41.25MHz and L201 should produce a dip at 47.25MHz.
13. Repeat steps 7 through 12 until best results are obtained.

Sound IF Alignment

1. With the receiver in normal operating condition, tune in a strong local station for best reception of picture and sound.
2. Adjust L301 for maximum sound without buzz and distortion.
3. Attenuate the received station signal either by disconnecting the antenna or detuning the fine tuning until audio distortion occurs.
4. Adjust T301 (Top and Bottom) for maximum sound with minimum buzz.
5. Adjust T701 (Top) for maximum sound.
6. Repeat steps 2, 3, 4 and 5 to obtain best results.

4.5 MHz Trap Alignment

1. Television receiver and test equipment should be turned on and allowed to warm up before starting alignment procedure.
2. Set the channel selector on the receiver to an unused channel, set the contrast control in maximum clockwise position and disconnect the antenna from the tuner input.
3. Connect 4.5MHz signal from the marker generator to TP203.
4. Adjust T701 (Bottom) to obtain minimum amount of pattern on the face of the picture tube.

Horizontal AFC Alignment

1. Television receiver should be turned on and allowed to warm up before starting alignment procedure.
2. Tune in a local station and adjust for normal picture.
3. Short-circuit both ends of horizontal ringing coil. (TP601 to TP602)
4. Connect 0.47 MFD capacitor between TP401 and the chassis to eliminate the synchronizing signal output.
5. Turn the horizontal hold control to synchronize the picture horizontally.
6. Open the short of horizontal ringing coil L601 and adjust its core to produce the same condition as in step 5.
7. Remove 0.47 MFD capacitor connected in step 4.
8. Repeat steps 4, 5 and 6 until the horizontal hold control is set near the mechanical center of its range.

MONTGOMERY WARD Model 13169A Schematic Diagram

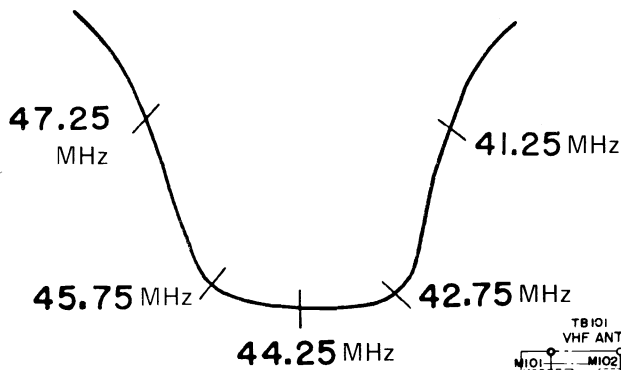


Figure 2

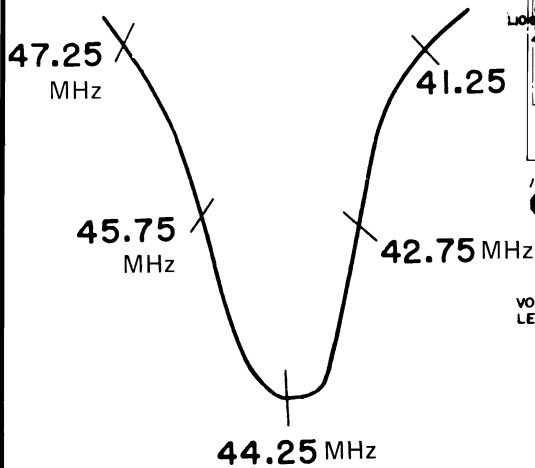


Figure 3

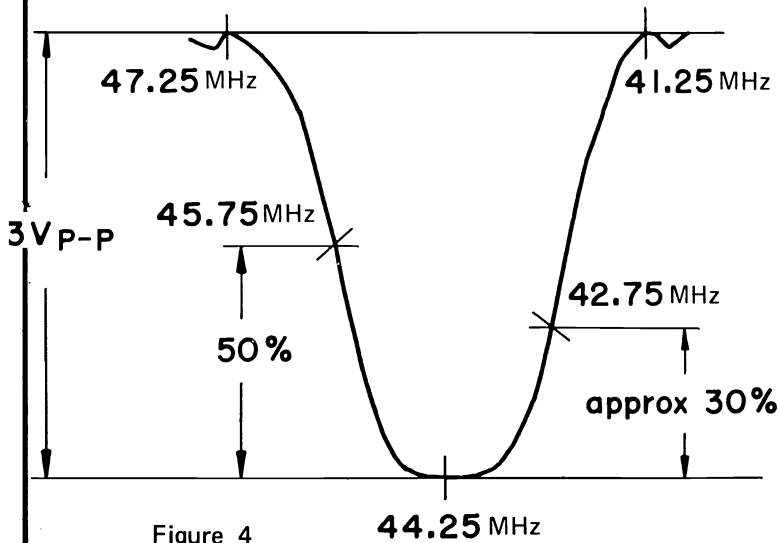
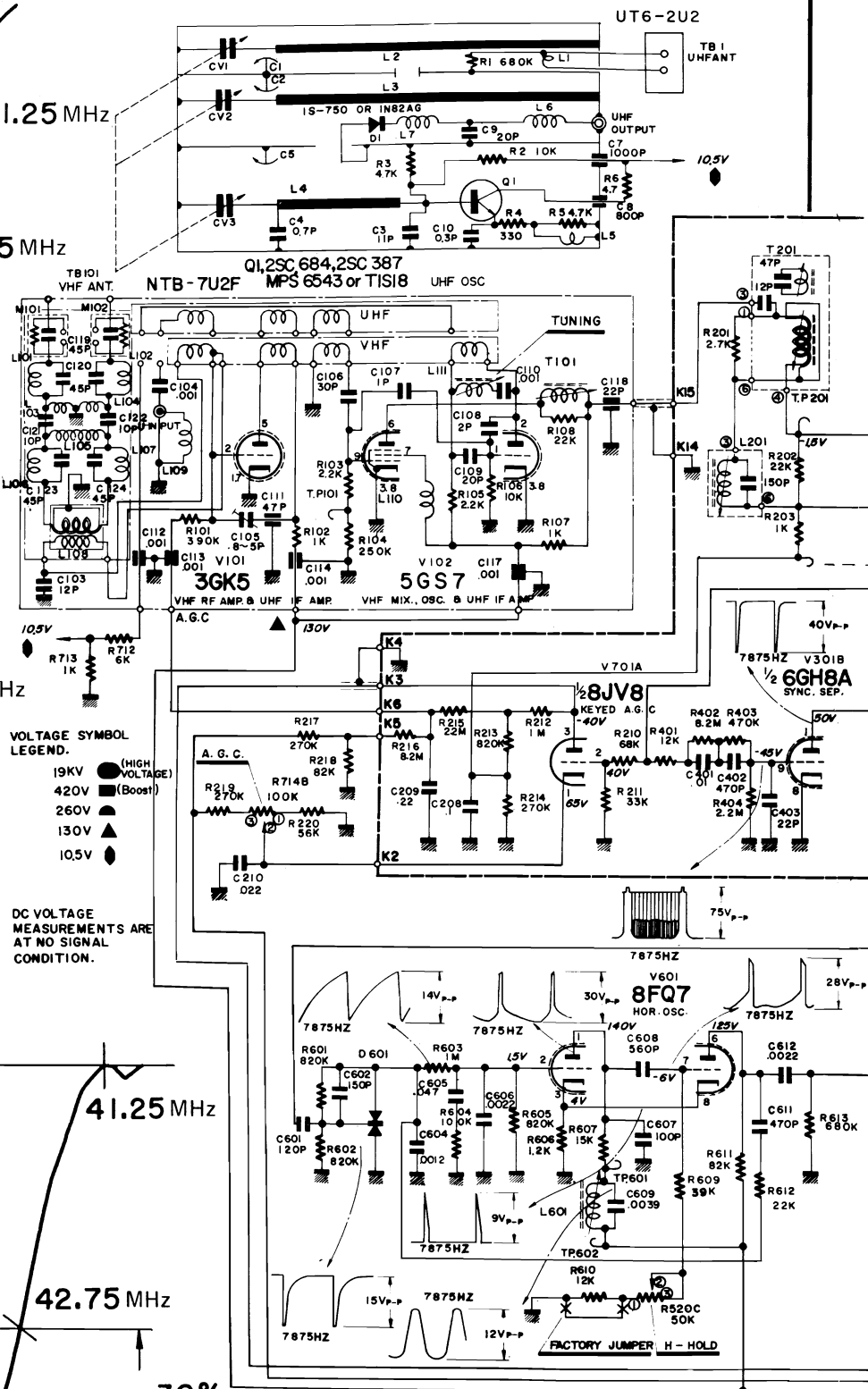
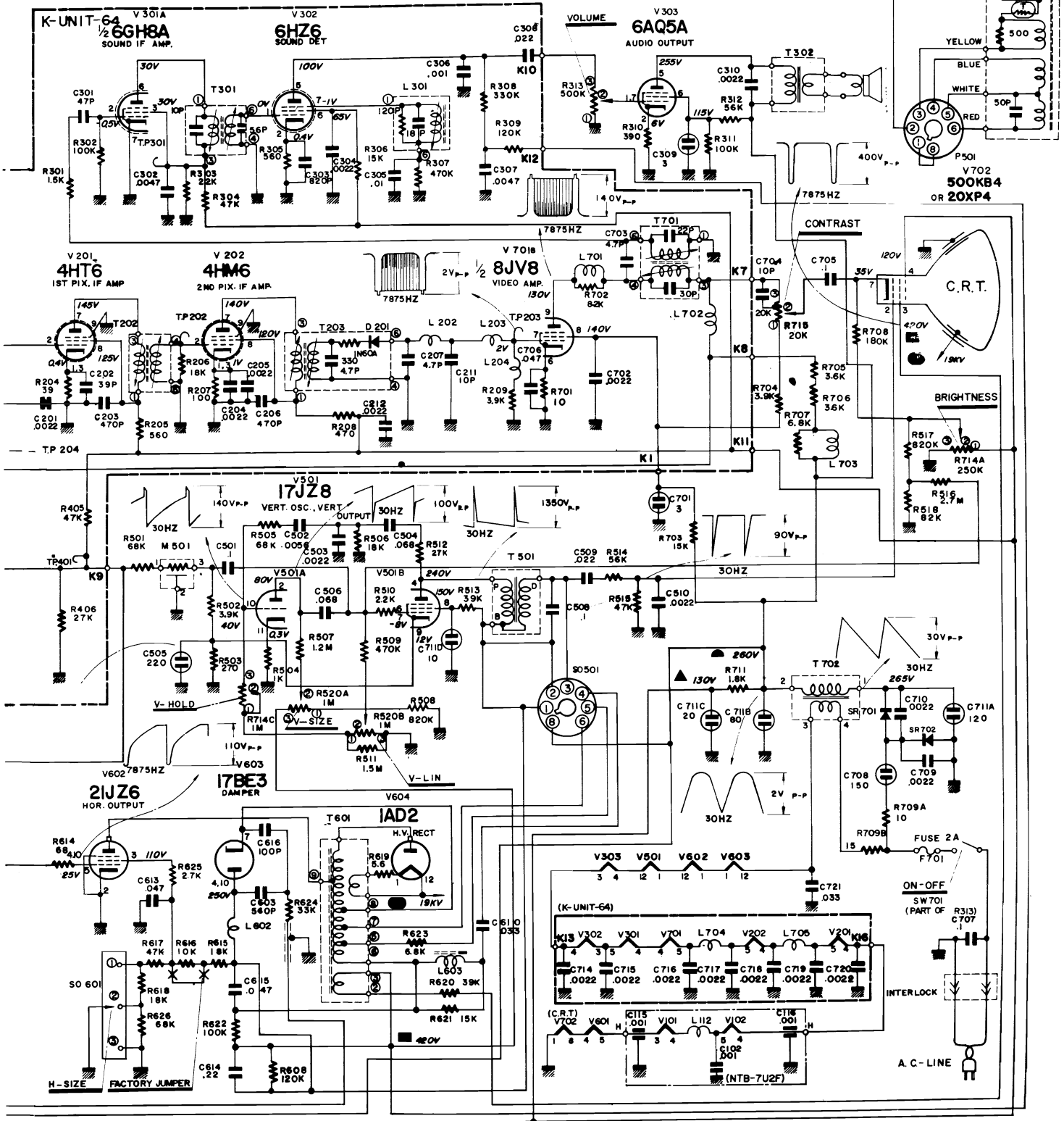


Figure 4

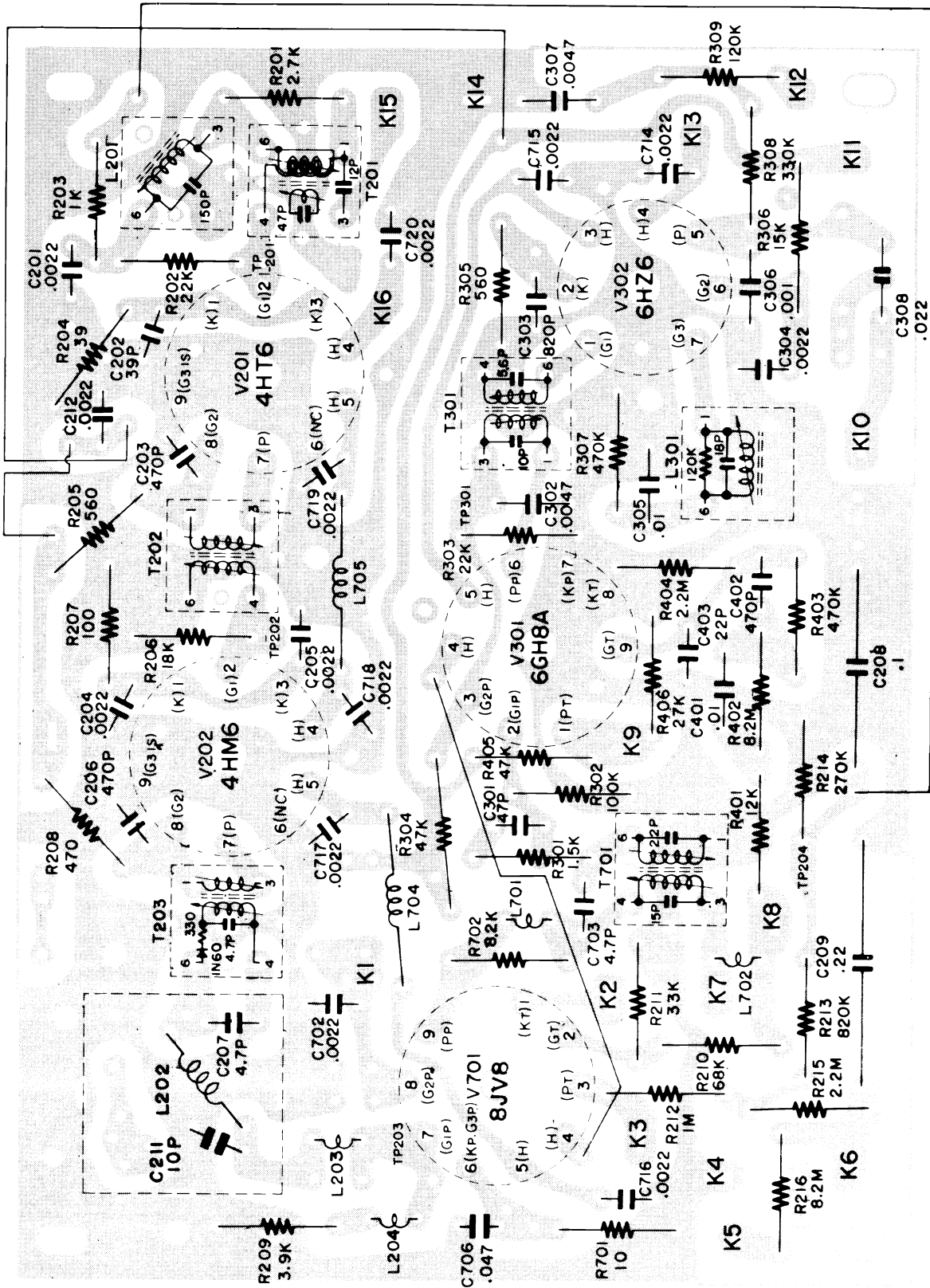


MONTGOMERY WARD Model 13169A Schematic Diagram, Continued

DC-169



MONTGOMERY WARD Model 13169A Printed Circuit Board



K-Unit-64 (Wiring Side)

MOTOROLA

CHASSIS 20, 22TS - 611A & B

MODELS BT614EN, BT734EN, BU737EW

MODEL	CHASSIS	VHF TUNER	UHF TUNER	CRT
BT614EN	20TS-611	OPTT-404 or OPTT-406	HTT-624 or HTT-627	21FZP4
BT734EN	22TS-611	↓	↓	23HLP4
BU737EW	22TS-611	↓	↓	23HLP4

INSTALLATION AND SERVICE ADJUSTMENTS

FOCUSING ADJUSTMENT

To provide for differences in the picture tube gun structure, a focus adjustment is provided by three (3) lugs located on the chassis. They provide a ground potential point, a B+ voltage point and a bootstrap voltage point. Connect the blue lead from the picture tube socket to the lug which provides the best over-all focus, center to edge of screen.

AGC CONTROL

The AGC control is set so as to prevent receiver overload on strong signals. Adjust the control as follows:

Tune in the strongest channel available for best picture and sound. Turn the AGC control clockwise (when viewed from rear of receiver) until picture becomes unstable (rolls or bends, etc.). Then turn control counter-clockwise until picture returns to normal. Check

all channels; if any are unstable, continue turning control counter-clockwise until the picture is normal on all channels.

CIRCUIT GUARD

The circuit guard is a thermal cut-out type of overload relay. It is in series with the power into the receiver for protection against shorts in the chassis.

The circuit guard will remain in the "closed circuit" state when the current requirements are normal. In the event of a continuous high current overload, the bi-metallic elements of the unit will become heated to the extent of "opening" the contacts and disconnecting the AC power. After the bi-metallic elements have cooled, the circuit guard may be re-set by depressing the plastic re-set button.

The circuit guard is designed to remain "closed" on the higher-than-normal

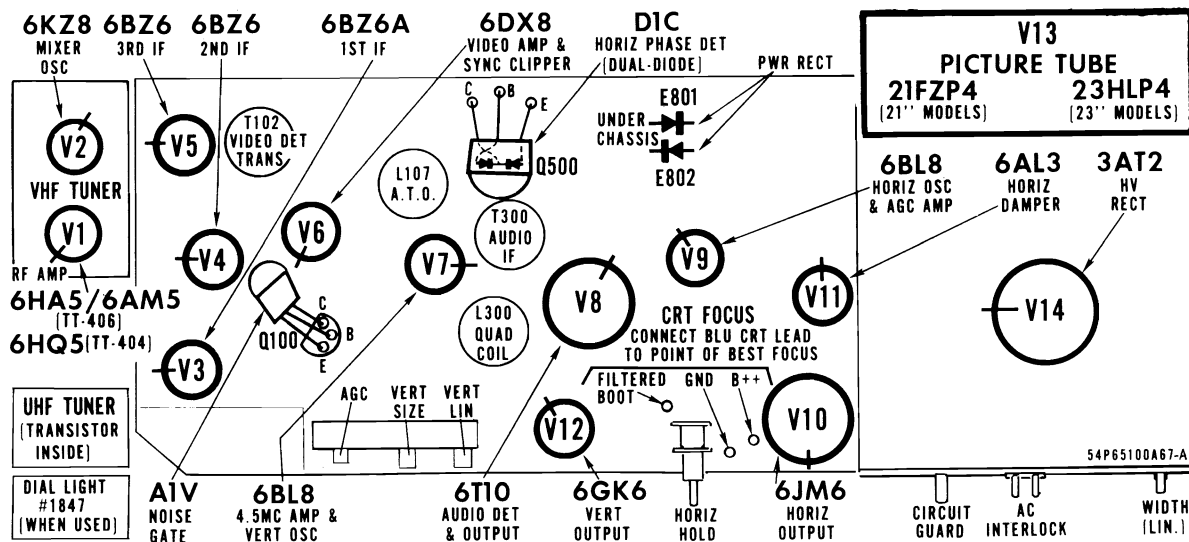
instantaneous surge currents encountered during the initial warm-up. The circuit guard is unique in the fact that when a short exists in the associated circuitry, power is not re-applied when the re-set button is held depressed.

HORIZONTAL SIZE CONTROL

Located at rear of set, this control will provide for differences in line voltages. Adjust until picture fills screen horizontally.

FINE TUNING ADJUSTMENT

These models contain a pre-set tuner. Only one initial adjustment is needed for each channel. Select any operative channel, turn fine tuning knob clockwise until picture disappears, then turn counter-clockwise until picture appears. Repeat this procedure for every station selected.



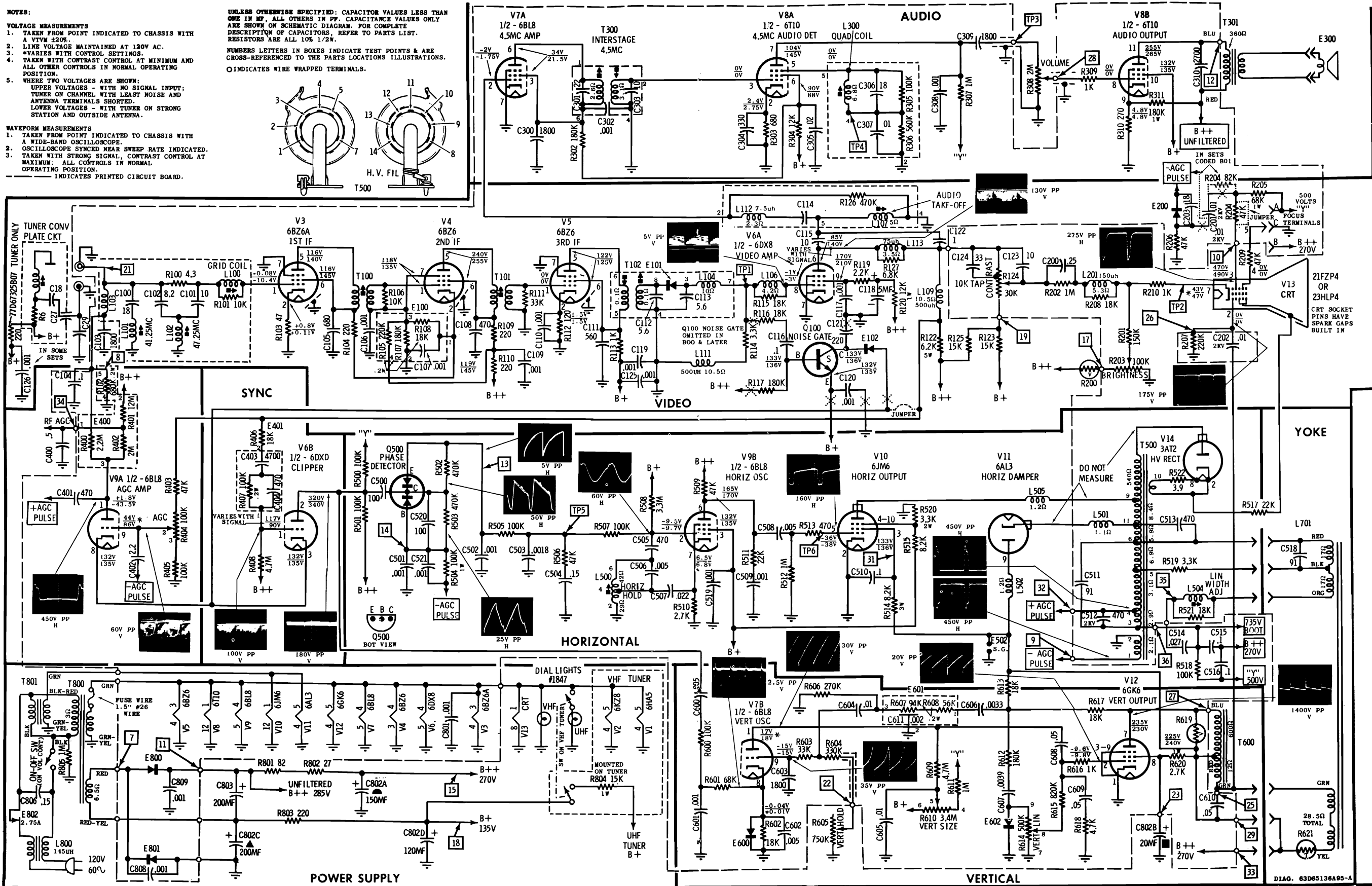
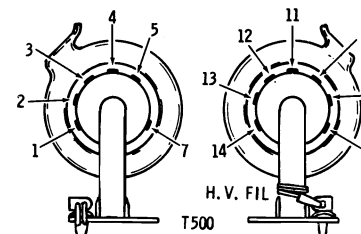
Tube Complement

- NOTES:**
- VOLTAGE MEASUREMENTS**
1. TAKEN FROM POINT INDICATED TO CHASSIS WITH A VTVM $\pm 20\%$.
 2. LINE VOLTAGE MAINTAINED AT 120V AC.
 3. *VARIES WITH CONTROL SETTINGS.
 4. TAKEN WITH CONTRAST CONTROL AT MINIMUM AND ALL OTHER CONTROLS IN NORMAL OPERATING POSITION.
 5. WHERE TWO VOLTAGES ARE SHOWN: UPPER VOLTAGES - WITH NO SIGNAL INPUT; TUNER ON CHANNEL WITH LEAST NOISE AND ANTENNA TERMINALS SHORTED. LOWER VOLTAGES - WITH TUNER ON STRONG STATION AND OUTSIDE ANTENNA.
- WAVEFORM MEASUREMENTS**
1. TAKEN FROM POINT INDICATED TO CHASSIS WITH A WIDE-BAND OSCILLOSCOPE.
 2. OSCILLOSCOPE SYNC'D NEAR SWEEP RATE INDICATED.
 3. TAKEN WITH STRONG SIGNAL, CONTRAST CONTROL AT MAXIMUM; ALL CONTROLS IN NORMAL OPERATING POSITION.
- INDICATES PRINTED CIRCUIT BOARD.

UNLESS OTHERWISE SPECIFIED: CAPACITOR VALUES LESS THAN ONE IN MP, ALL OTHERS IN PP. CAPACITANCE VALUES ONLY ARE SHOWN ON SCHEMATIC DIAGRAM. FOR COMPLETE DESCRIPTION OF CAPACITORS, REFER TO PARTS LIST. RESISTORS ARE ALL $10\% \frac{1}{2}W$.

NUMBERS LETTERS IN BOXES INDICATE TEST POINTS & ARE CROSS-REFERENCED TO THE PARTS LOCATIONS ILLUSTRATIONS.

O INDICATES WIRE WRAPPED TERMINALS.



CHASSIS SERVICE INFORMATION

CIRCUIT TRACING

The top (component side) of the chassis board contains a complete legend of the chassis circuit that appears on the bottom and identification of all components by reference numbers that are related to the reference numbers on the schematic diagram. The circuit may be traced from the top of the chassis board and all components can be identified eliminating the need of making any reference to the bottom of the chassis board.

The circuit side (bottom) of the chassis board also contains a complete legend which includes component reference numbers, tube identification, coil terminals and the wiring (jumper wires) is traced in to provide easy circuit tracing of the wiring that appears on the top side of the chassis board.

The tubes are identified by their function as well as the reference number. The first 2 pins are identified by number (i.e., 1, 2) and the tube elements are identified at their respective pins (i.e., K - Cathode, P - Plate, etc.).

RES-CAP REPLACEMENT AND REPAIR

If it is desirable to replace a defective res-cap and the replacement unit is not immediately available, it is possible to repair the existing unit in the following manner. Merely remove the defective component from the circuitry by cutting the appropriate lead(s) and then substitute conventional capacitors or resistors back into the circuitry. When this

method is used, it is always desirable to replace the circuitry in such a manner that the defective component is removed entirely from the system. In other words, do not bridge the defective component with the replacement unit. This is to avoid any detrimental effect that the defective component might inject into the system.

The tracing indicates where the wiring (jumper wires) on the top of the chassis board is connected.

Breaks appear in the wire tracing to facilitate the identification of components location. Each wire trace begins and ends with an arrow.

To further facilitate circuit tracing of the etched chassis board, a photograph of the chassis board with the pertinent test points identified and related to the schematic diagram is included in this manual.

The test points on the schematic diagram are identified descriptively and/or by number and are blocked in or circled for easy identification. These test points are also shown on the chassis board photographs and serve to pinpoint the physical location of the electrical junction or test point of interest.

All other test points may be easily located by circuit tracing from a tube, coil, etc. or any point that is readily identified.

PARTS REPLACEMENT

When repair indicates that components such as transistors, yokes, transformers, etc. need to be replaced,

it is recommended that Motorola parts be used for optimum performance quality.

COMPONENT REMOVAL

Removing components from the etched board is facilitated by the fact that the circuitry (plating) appears on one side of the board only and the component leads are inserted straight through the holes and are not bent or crimped.

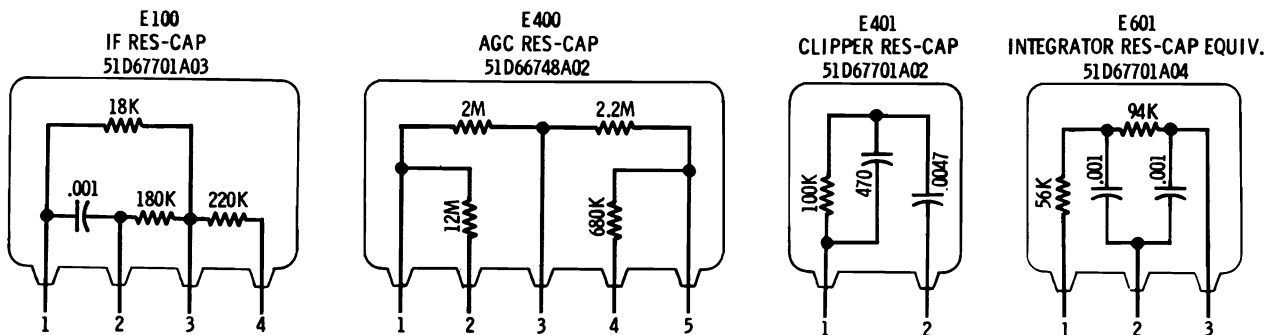
It is recommended that a solder extracting gun be used to aid in component removal. An iron with a temperature controlled heating element would be desirable since it would reduce the possibility of damaging the board due to over-heating.

The nozzle of the soldering gun is inserted directly over the component lead and when sufficiently heated, the solder is drawn away leaving the lead free from the copper plating. This method is particularly suitable in removing multi-terminal components.

**TRANSISTOR & DIODE REPLACE-
MENT**

When removing transistors or diodes, be sure to heat sink each connection with a pair of long-nose pliers, take caution not to bend or pull on these leads as damage can be done to these devices.

When replacing with new devices, use rosin core solder 60-40. **DO NOT OVERHEAT CONNECTIONS AS DAMAGE CAN BE DONE TO THE PRINTED CIRCUIT BOARD.**



Res-Cap Details

BOTTOM SERVICE PANEL

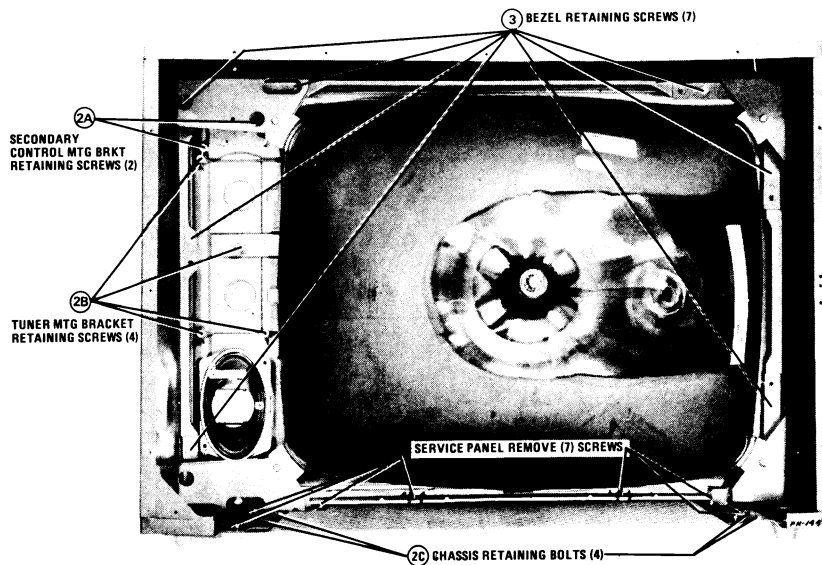
Remove 7 screws to expose bottom of chassis.

CHASSIS REMOVAL

1. Remove two (2) secondary control bracket mounting screws, 2A.
2. Remove front knobs and four (4) tuner bracket mounting screws, 2B.
3. Remove four (4) chassis retaining bolts from cabinet bottom, 2C.

BEZEL REMOVAL

Remove secondary control bracket and tuner mounting bracket as described in "Chassis Removal, Steps 1 and 2". Remove seven (7) bezel retaining screws. Chassis need not be removed.

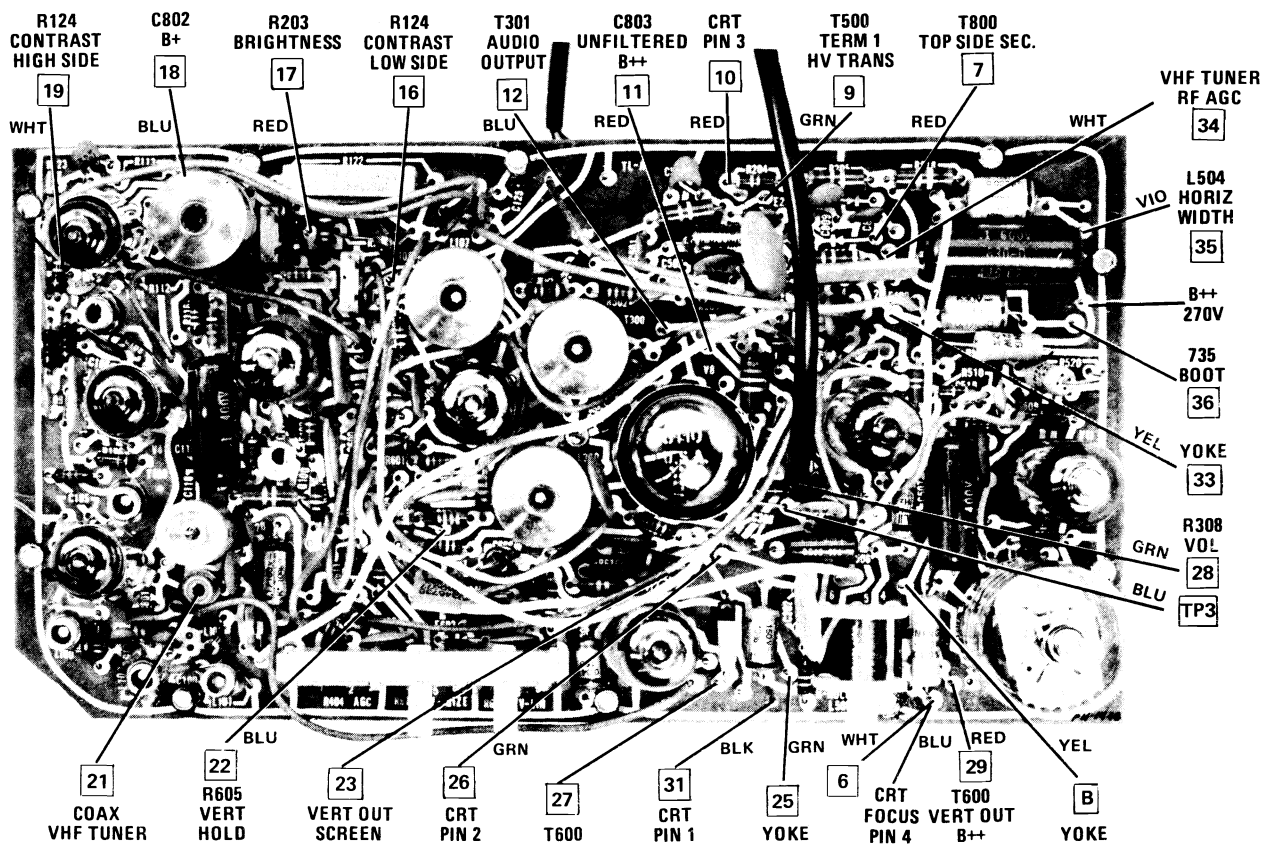


Bezel, CRT And Chassis Disassembly

CRT REMOVAL

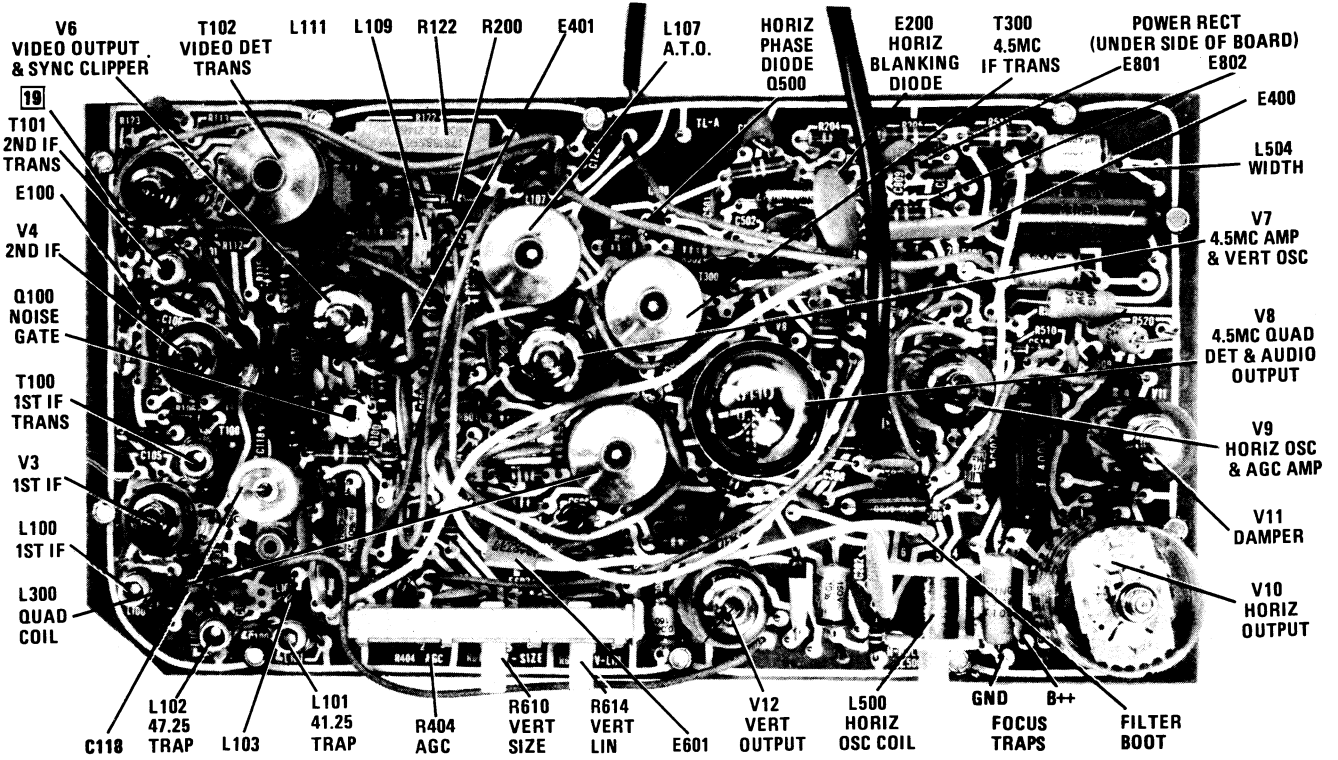
Remove bezel as instructed in "Bezel

Removal". Remove four (4) CRT retaining bolts and CRT from front of receiver.

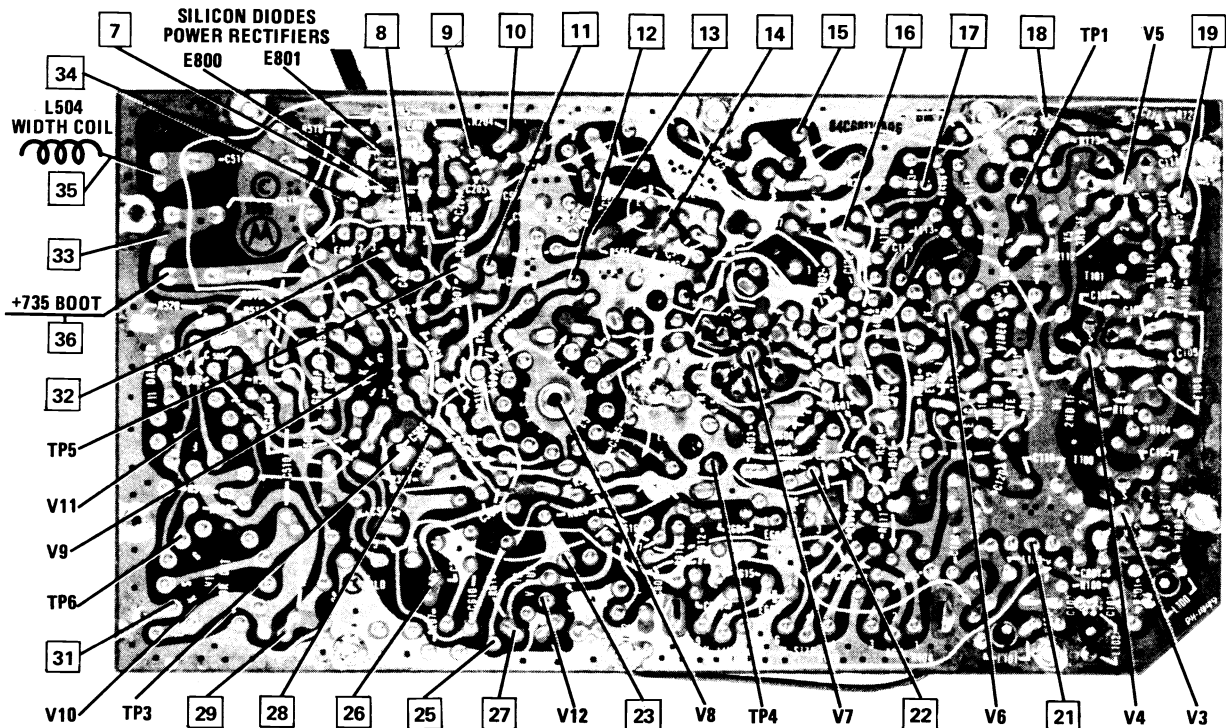


Component And Test Point Location - Top View

MOTOROLA Chassis 20TS-611, 22TS-611, Chassis Views, Continued



Chassis Component Location - Top View



Chassis Test Point Location - Bottom View

MOTOROLA Chassis 20TS-611, 22TS-611, Alignment Information

PRE-ALIGNMENT INSTRUCTIONS

Before alignment of the video I.F. section is attempted, it is advisable to thoroughly check the system. If alignment is attempted on an I.F. section in which a faulty component exists, successful alignment will probably be impossible and the entire procedure will have to be repeated when the real cause of the trouble is corrected. Preliminary tests of the system should include voltage and resistance measurements, routine checks for bad soldering connections and visual inspection of the circuits for overheated components as well as for obvious wiring defects.

VIDEO IF & MIXER ALIGNMENT

Preliminary Steps

1. Maintain line voltage at 120 with variac.
2. Disable horizontal oscillator by unplugging yoke lead(s), removing tube or using a dummy tube with cathode pin disconnected. Use whichever is applicable to eliminate horizontal radiation interference.
3. Disable local oscillator. On turret type tuners, set tuner between channels. On switch type tuners, short out grid of mixer oscillator tube with a fine piece of bare wire.
4. Apply the negative lead of a 6.0 volt bias supply to I.F. AGC buss and positive lead to chassis ground.
5. Connect a 1500 ohm, 60 watt voltage normalizing resistor from B+ to chassis.
6. Set the contrast control at minimum (extreme counter-clockwise position).
7. Short across tuner input terminals.
8. Maintain 2 to 5 volts peak-to-peak at the grid of video amp except when specific values are given in the procedure chart.
9. Refer to "Video I.F. and Sound Alignment" detail for component and test point locations.

NOTE: To reduce the possibility of inter-action between the two tuning cores in a double-tuned transformer or coil, each core should be adjusted for optimum response in the tuning position nearest its respective end of the coil form.

4.5MC TRAP ADJUSTMENT (L-107)

1. Carefully tune receiver to local station and advance contrast control.
2. Adjust local oscillator (with fine tuning control) to bring 4.5Mc interference strongly into the picture.
3. Adjust sound trap (L-107) to find the two points of adjustment at which the sound beat is just noticeable on the picture tube screen. Rotate the core toward the center of the two points. Use minimum amount of inductance (core out of coil) that will result in no apparent beat interference.

STEP	SWEEP GENERATOR AND MARKER	INDICATOR	ADJUST	ADJUST FOR AND/OR REMARKS
1.	To grid of 3rd I.F. thru .001mf capacitor. Set sweep approximately 44Mc, markers as required.	Scope to grid of video amp thru 47K ohm resistor.	Both cores of 3rd I.F. transformer (T-102).	Equal peaks and marker placement as shown in curve #1.
2.	To grid (pin #1) of 1st I.F. amp thru .001 mf capacitor. Set sweep to 44Mc, markers as required.	Same as Step #1.	1st I.F. transformer (T-100). 2nd I.F. transformer (T-101).	Proper 42.25Mc marker placement. See curve #2. Proper 45.75Mc marker placement. See curve #2.
3.	To mixer T. P. (M) thru .001mf capacitor. Set sweep at 44Mc, markers as required.	Same as Step #1.	47.25Mc trap, L-102 and 41.25Mc trap, L-101.	Minimum response at proper trap frequency. See curve #3. NOTE: Temporary removal of bias and an increase of generator output may be required to see traps clearly.
4.	Same as Step #3.	Same as Step #1.	Mixer plate coil (*T-1 on tuner) and 1st I.F. grid coil (L-100). *L-31 on tuner OPTT-406	To obtain curve #4. The mixer plate coil affects the center peak and the grid coil affects the two outside peaks. Tune coils simultaneously for proper tuning and bandwidth consistent with maximum gain. If necessary, the 1st and 2nd I.F. transformers can be touched-up to obtain proper response as shown in curve #4.

SOUND ALIGNMENT (STATION SIGNAL METHOD)

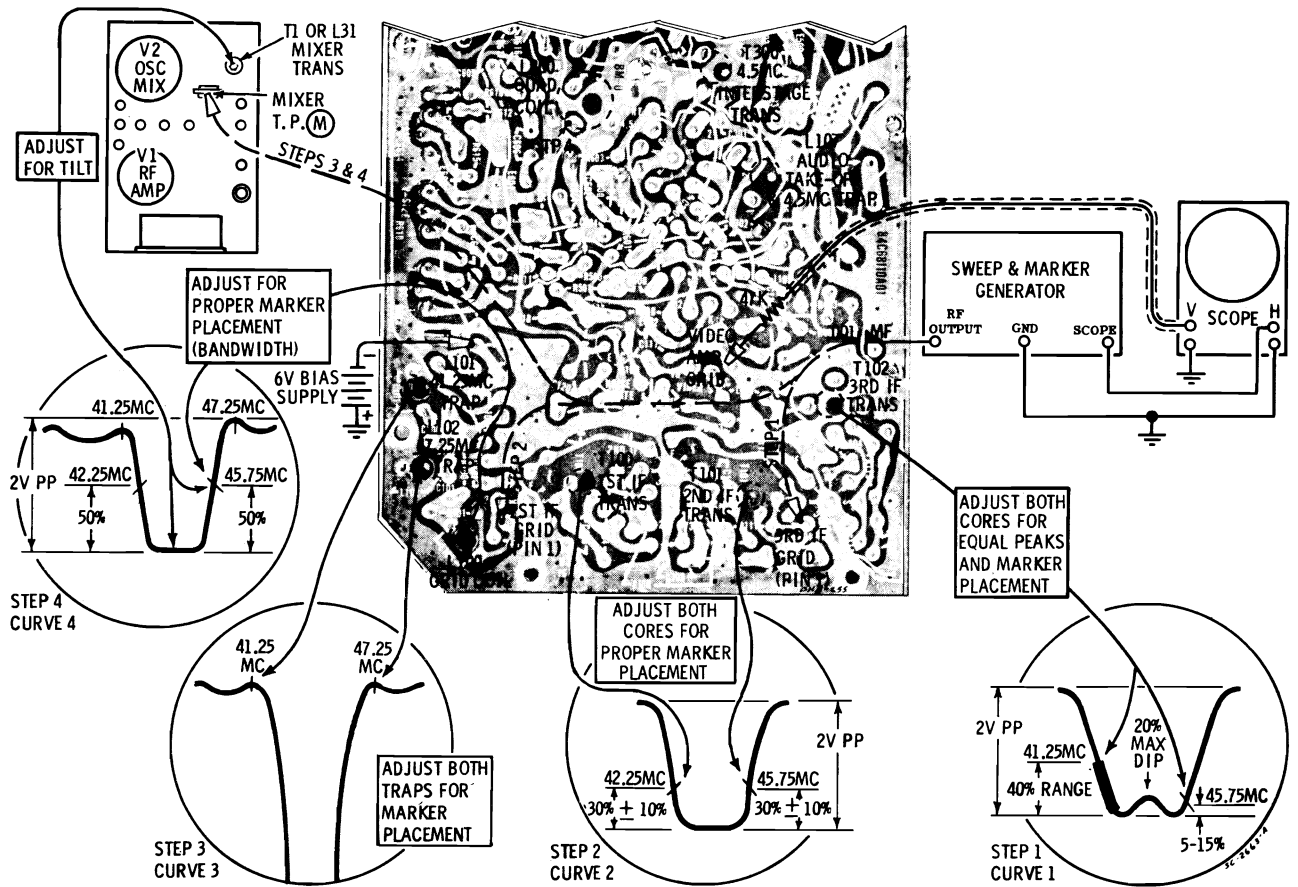
The sound system used in this receiver consists of an audio I.F. amplifier stage, a quadrature grid detector and an output stage. Since this type of sound system is extremely sensitive, relatively small input signal voltage will cause grid current to flow in both the I.F. amplifier and the detector stages. Grid current through the tuned coils will

load them down making the adjustment extremely broad and alignment impossible. For this reason, it is necessary to use a very weak signal when aligning the driver and the detector input coils. Actually, the signal should be well down into the noise level for proper tuning action.

Preliminary Steps

1. Tune in a strong TV station.
2. Adjust all controls for normal picture and sound.
3. Refer to "Video I.F. & Sound Alignment" detail for coil and test point locations.

MOTOROLA Chassis 20TS-611, 22TS-611, Alignment, Continued



VIDEO IF & SOUND ALIGNMENT DETAIL

SOUND ALIGNMENT PROCEDURE

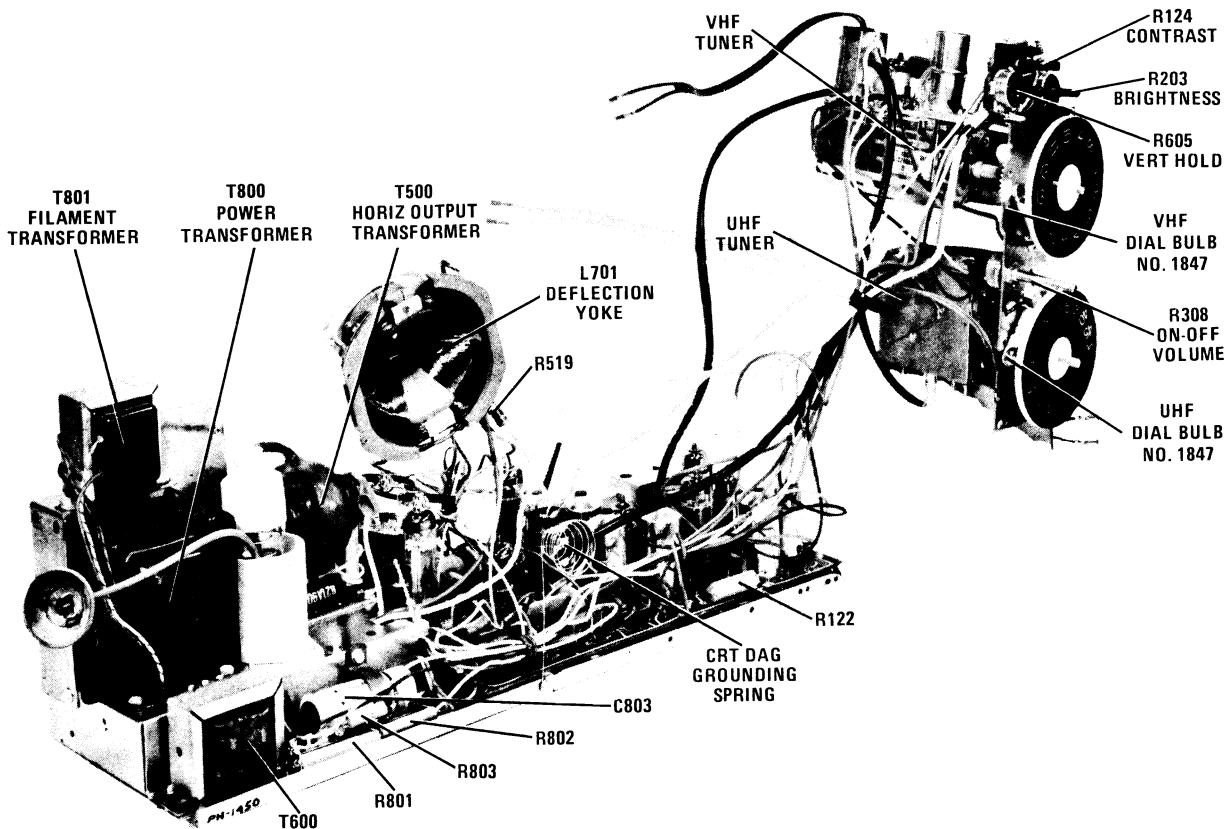
STEP	STATION	INDICATOR	ADJUST	ADJUST FOR AND/OR REMARKS
1.	Strong signal.	VTVM to TP 4 on quad. coil L-300 (see schematic diagram).	L-300 (quad. coil).	Maximum deflection (coarse adjustment) of two possible maximum tuning points, use that giving largest voltage reading.*
2.	Strong signal.	Listening test.	"	Maximum sound with minimum distortion (fine adjustment).
3.	Weak signal.	"	T-300 (inter-stage transformer).	Maximum sound with minimum distortion (maintain hiss level).**

If sound is not clear at this point, repeat the above procedure as necessary.

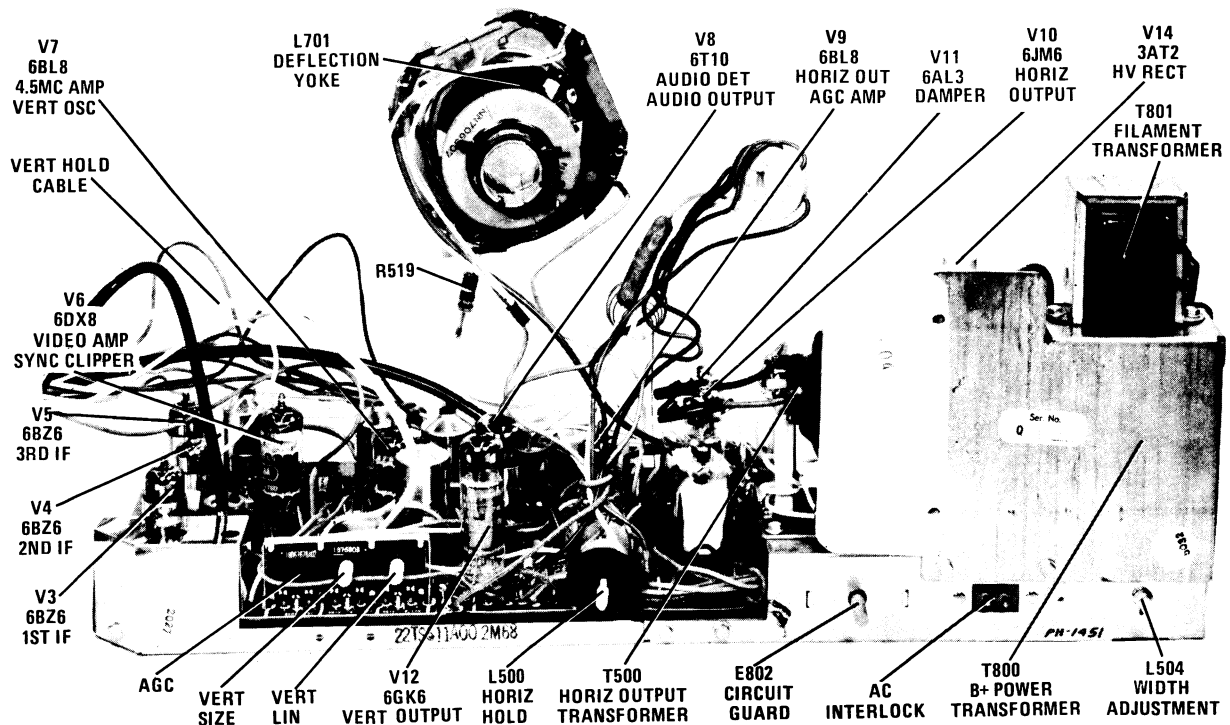
*The purpose of the top pre-set core is to enable the adjustable core to make the tuning range required while reducing the physical length. If the pre-set core should be mis-adjusted by previous service work, merely re-set near top end of coil and tune for maximum.

**The signal must be weakened considerably either by disconnecting one side of the antenna lead or connecting low value resistors across the antenna terminals until a pronounced hiss appears in the sound. The hiss level must be maintained for proper alignment.

MOTOROLA Chassis 20TS-611, 22TS-611, Parts Locations

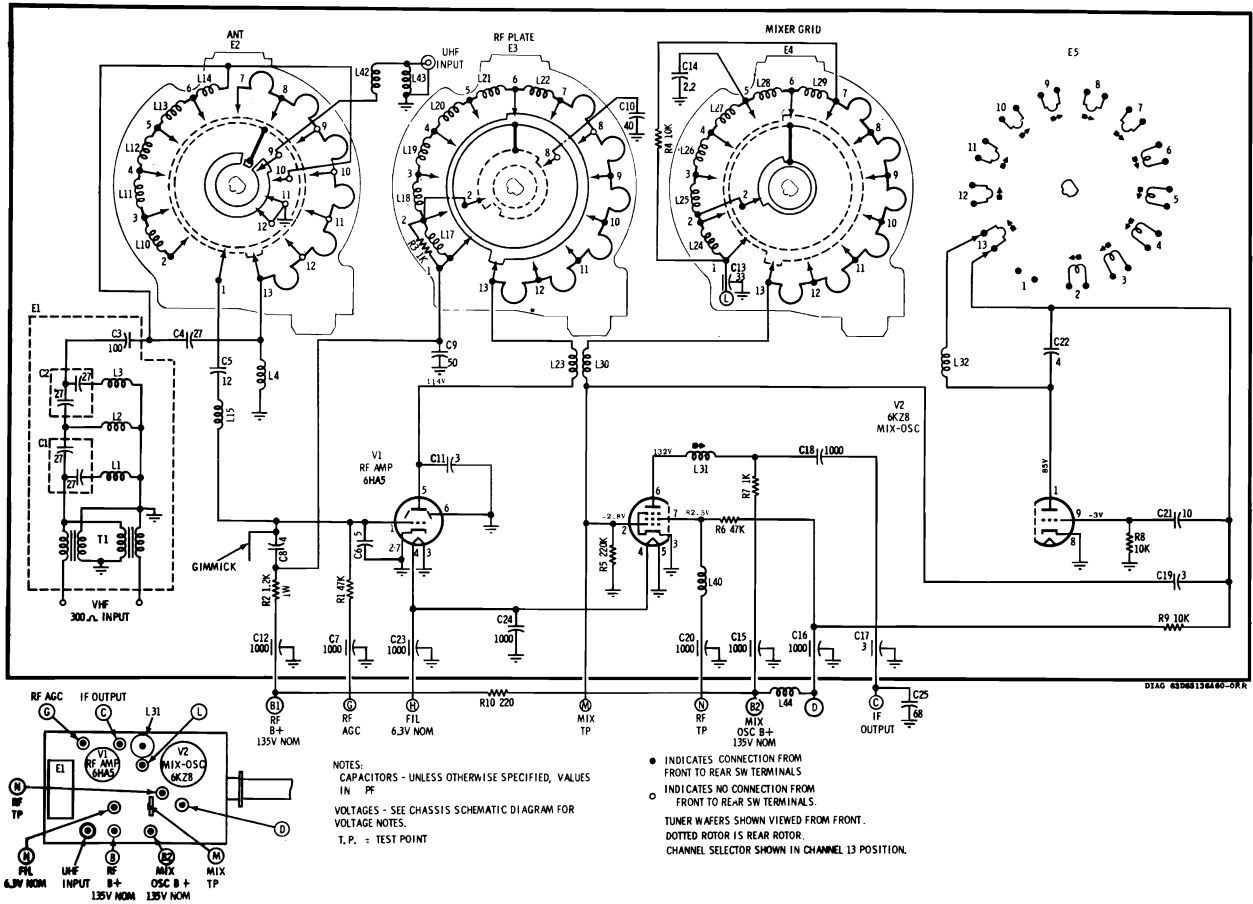


Chassis Component Location - Front View

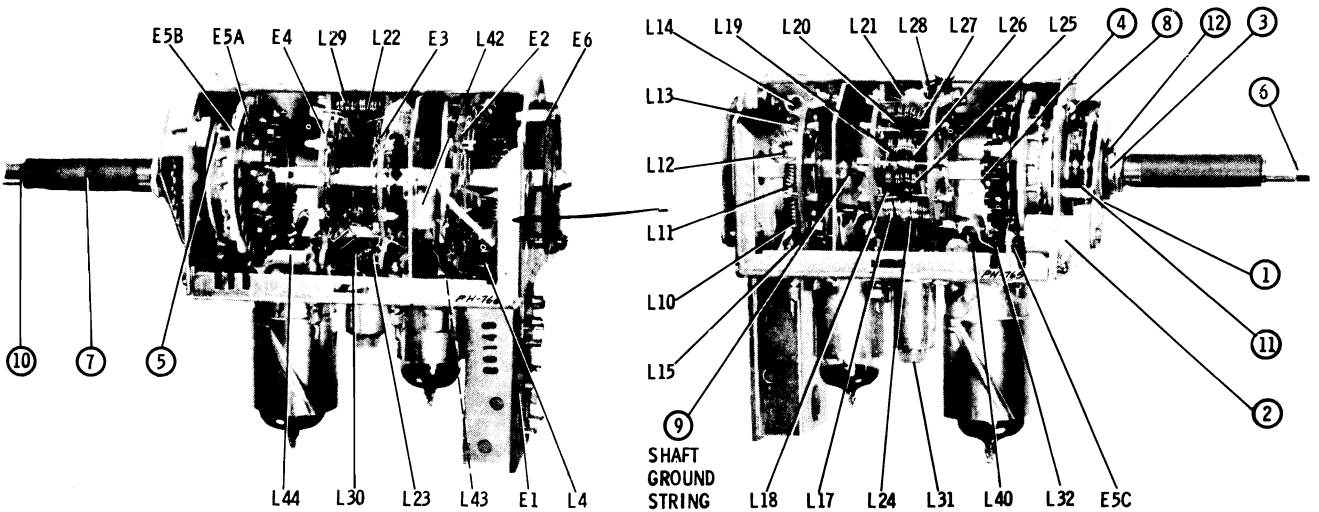


Chassis Component Location - Rear View

MOTOROLA Chassis 20TS-611, 22TS-611, Tuner OPTT-406

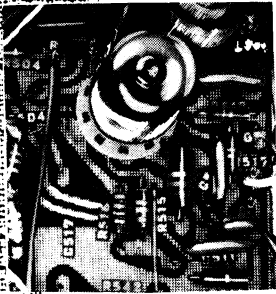
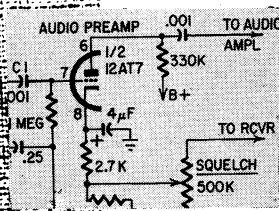


SCHEMATIC DIAGRAM - VHF TUNER-OPTT-406



HOW TO USE RADIO-TV DATA

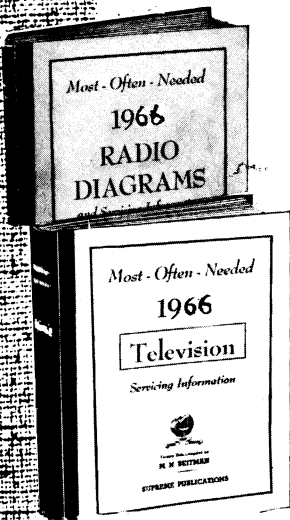
To be a repairman is to take on someone else's troubles. A completely dead radio set. Vertical sync bad, picture roll. Next job may be anything. Almost every fact needed for quick fault finding and adjustment can be presented in a diagram and additional service data. Here is help to permit you to know what is wrong, get promptly to the section at fault, test a couple of parts, finish the repair in minutes instead of wasting hours. Easy? Yes. Maybe you have never realized how to use factory released service data such as published by Supreme Publications.



Use service data to quickly disassemble and get at the chassis, find the section at fault with simple signal tracing tests (using the diagram, of course), and then a couple more measurements to diagnose the fault. Voltage values, scope patterns, pictures of printed boards included, all help. Use this material to select replacement parts needed. If alignment is required, you have instructions. Even factory recommended changes (used in later version of sets) included. This is the help you need for real speed-servicing, handling the tough dogs, breezing through usual repairs. This is the kind of service data you obtain from low-priced, factory authorized, SUPREME radio and TV manuals.

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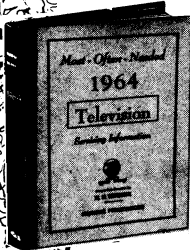
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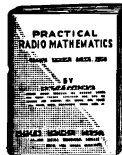
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	TV-17	1960
	TV-16	Late 1959
	TV-15	Early 1959
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	20	1960
	19	1959
	18	1958
	17	1957
	16	1956
	15	1955
	14	1954
	13	1953
	12	1952
	11	1951
	10	1950
	9	1949
	8	1948
	7	1947
	6	1946
	5	1942
	4	1941
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Chassis KCS 168 Series

Model and Chassis Cross Reference

MODEL	NAME	CHASSIS	TMA	TUNER	PICTURE TUBE	ANTENNAS VHF/UHF
AL-112E, G, L, EN5	"ENVOY"	KCS168B, C	None	KRK137B/122DJ	16CHP4	Monopole/Ring
AL-118F, W, Y	"SPORT"	KCS168B	None	KRK137B/122DJ	16CHP4	Monopole/Ring
AL-124WK	"THRIFTON"	KCS168B	None	KRK137B/122DJ	16CHP4	Monopole/Ring

The letter following the third numeral in model number designates the cabinet finish as follows: E—DARK MINERAL GRAY/SUEDE TAN METALLIC; F—FEDERAL FRUITWOOD ROLLER GRAIN VINYL/BLACK; G—PISTACHIO/SUEDE TAN METALLIC; L—SUGAR MAPLE/SUEDE TAN METALLIC; W—HARVEST WALNUT ROLLER GRAIN VINYL/BLACK; Y—DRIFTWOOD BLOND ROLLER GRAIN VINYL/BLACK; the letter K indicates Custom Model.

CENTERING

If the picture is not positioned correctly on the screen, it may be necessary to center the picture with the two disc magnets mounted behind the yoke cover. Both horizontal and vertical centering are accomplished at once by rotating the discs together or separately. Perform this adjustment along with vertical height, vertical linearity, and width, as they are all interdependent.

WIDTH ADJUSTMENT

The width adjustment of the KCS168 is a jumper wire with an attached insulated speed clip which fits onto one of five spade terminals. This terminal board assembly is mounted on top of the high voltage cage.

Turn the contrast and brightness controls to maximum (fully clockwise). Set the A.C. line voltage at 108 volts. Starting with the first terminal on the left (as viewed from the rear), move the width adjustment from one terminal to the next until the raster just fills the mask. NOTE: Roughly adjust vertical to full scan before adjusting the width.

HORIZONTAL SINE WAVE ADJUSTMENT

Remove the sync by placing a clip lead between PW200-H (Zone 2B) and chassis ground. Short out the sine wave coil, L207, by placing another clip lead between PW200-E (Zone 6C) and TP-4 (Zone 6B).

Adjust the horizontal hold control so that the free-running frequency of the oscillator is 15.750kc (picture sides vertical). Remove the shorting jumper from the sine wave coil (PW200-E to TP-4).

Adjust L207 (Zone 6C) until the picture sides are again vertical (15.750kc). Remove the short from the sync (PW200-H) to ground.

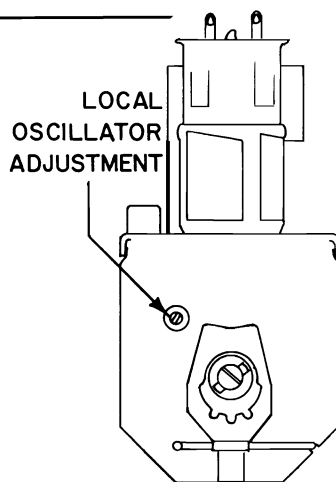
DEFLECTION YOKE

If the picture is tilted, loosen the yoke clamp screw and rotate the yoke to level the picture. Retighten the yoke clamp.

VHF LOCAL OSCILLATOR ADJUSTMENT

Rotate the VHF Channel selector to one of the stations to be received and set the fine tuning control at the approximate center of its range. Remove the channel Selector and Fine Tuning knobs. The local oscillator adjustment screw is accessible through a hole in the lower left side of the fishpaper protector. A small cut-out in the lower left side of the knob access hole is provided to facilitate the insertion of a slender flat bladed alignment tool (GC-8728A or equivalent).

Without disturbing the fine tuning, turn the channel Selector to each station available and adjust the local oscillator slugs for the best picture and sound. The slugs should be adjusted so that in changing from one channel to the next, a minimum of fine tuning readjustment is necessary.



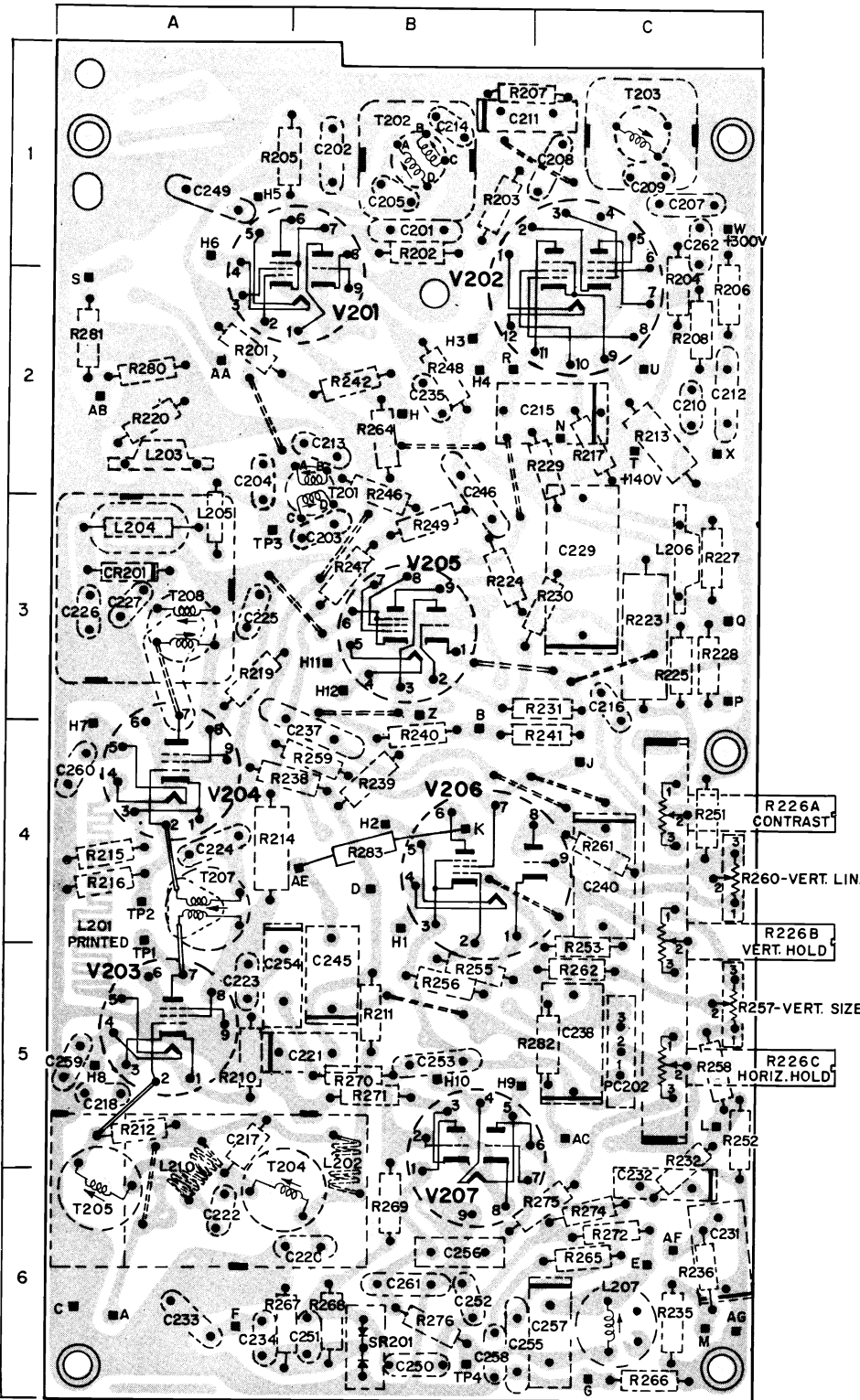
MISCELLANEOUS SERVICE NOTES

1. The D.C. Voltages at the tube pin connections shown on the schematic diagram were taken with a VTVM (RCA WV-98A) and with no signal input. All controls were set for normal operation and the B plus voltage (conveniently measured at PW200-T, Zone 2C) was maintained at 140 volts. The AC line voltage was adjusted with a tapped isolation transformer in order to maintain the B plus at that reading.
2. All tubes, the low voltage silicon rectifier, and circuit protector devices (F101 and RF101) are accessible when the instrument's back cover is removed. Use care in removing tubes from PW200 sockets to prevent damaging the solid copper circuit board. Apply reverse pressure with one hand while working the tube out of the socket with the other.
3. When replacing coils, transformers, controls, etc., mounted on PW200, it is recommended that a soldering iron with a suction bulb be used to facilitate removal of the component and to prevent damage to the copper pattern.
The copper pattern of PW200 is coated with a solder resist substance except at the component and terminal connections. This permits a minimum use of solder and reduces the possibility of solder shorts.
4. When replacing the chassis, make certain that the picture tube outer coating grounding spring (located on the tuner mounting bracket) is in place with adequate spring tension against the picture tube retainer ring.

RCA Victor Chassis KCS-168, Circuit Board Information

PW200 CIRCUIT BOARD PHANTOM VIEW

PW200 COMPONENT LOCATION GUIDE

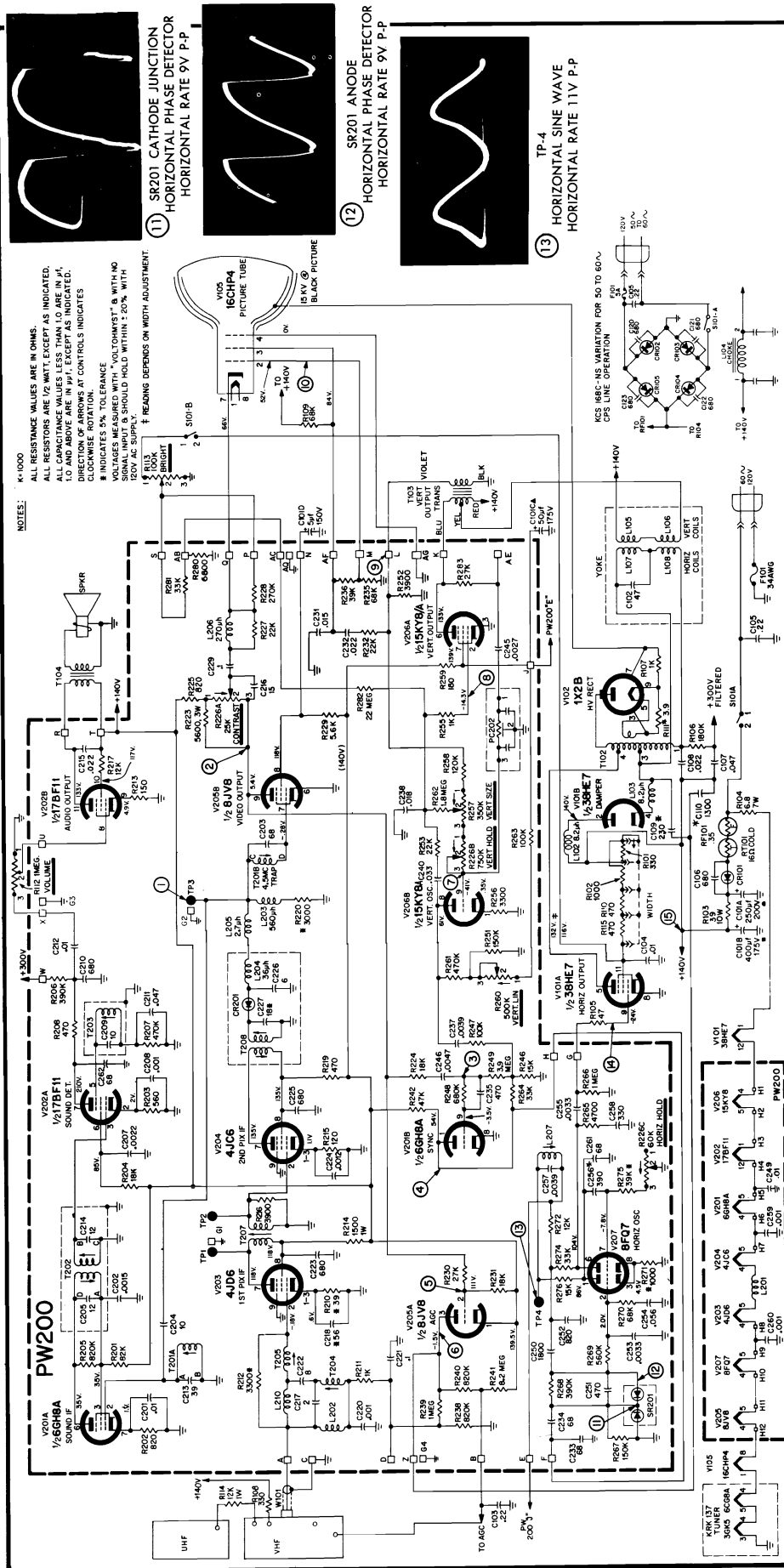


C201	.....	1B	R232	.....	5C
C202	.....	1B	R235	.....	6C
C203	.....	3B	R238	.....	4B
C204	.....	2A	R239	.....	4B
C205	.....	1B	R240	.....	4B
C207	.....	1C	R241	.....	4C
C208	.....	1C	R242	.....	2B
C209	.....	1C	R246	.....	2B
C210	.....	2C	R247	.....	3B
C211	.....	1B	R248	.....	2B
C212	.....	2C	R249	.....	3B
C213	.....	2B	R251	.....	4C
C214	.....	1B	R252	.....	5C
C215	.....	2C	R253	.....	5C
C216	.....	3C	R255	.....	5B
C217	.....	5A	R256	.....	5B
C218	.....	5A	R257	.....	5C
C220	.....	6B	R258	.....	5C
C221	.....	5B	R259	.....	4B
C222	.....	6A	R260	.....	4C
C223	.....	5A	R261	.....	4C
C224	.....	4A	R262	.....	5C
C225	.....	3A	R264	.....	2B
C226	.....	3A	R265	.....	6C
C227	.....	3A	R266	.....	6C
C229	.....	3C	R267	.....	6B
C231	.....	6C	R268	.....	6B
C232	.....	6C	R269	.....	6B
C233	.....	6A	R270	.....	5B
C234	.....	6A	R271	.....	5B
C235	.....	2B	R272	.....	6C
C237	.....	4B	R274	.....	6C
C238	.....	5C	R275	.....	6C
C240	.....	4C	R276	.....	6B
C245	.....	5B	R280	.....	2A
C246	.....	2B	R281	.....	2A
C249	.....	1A	R282	.....	5C
C250	.....	6B	R283	.....	4B
C251	.....	6B	SR201	.....	6B
C252	.....	1B	T201	.....	2B
C253	.....	5B	T202	.....	1B
C254	.....	5B	T203	.....	1C
C255	.....	6B	T204	.....	6B
C256	.....	6B	T205	.....	6A
C257	.....	6C	T207	.....	4A
C258	.....	6B	T208	.....	3A
C259	.....	5A	A	.....	6A
C260	.....	4A	AA	.....	2A
C261	.....	4B	AB	.....	2A
C262	.....	1C	AC	.....	5C
CR201	.....	3A	AE	.....	4B
L201	.....	4A	AG	.....	6C
L202	.....	5B	B	.....	4B
L203	.....	2A	C	.....	6A
L204	.....	3A	D	.....	4B
L205	.....	3A	E	.....	6C
L206	.....	3C	F	.....	6A
L207	.....	6C	G	.....	6C
L210	.....	6A	H	.....	2B
PC202	.....	5C	H1	.....	4B
R201	.....	2A	H2	.....	4B
R202	.....	1B	H3	.....	2B
R203	.....	1B	H4	.....	2B
R204	.....	2C	H5	.....	1A
R205	.....	1A	H6	.....	1A
R206	.....	2C	H7	.....	4A
R207	.....	1B	H8	.....	5A
R208	.....	2C	H9	.....	5B
R210	.....	5A	H10	.....	5B
R211	.....	5B	T11	.....	3B
R212	.....	5A	H12	.....	3B
R213	.....	2C	J	.....	4C
R214	.....	4A	K	.....	4B
R215	.....	4A	L	.....	5C
R216	.....	4A	M	.....	6C
R217	.....	2C	N	.....	2C
R219	.....	3A	P	.....	3C
R220	.....	2A	Q	.....	3C
R223	.....	3C	R	.....	2B
R224	.....	3B	S	.....	2A
R225	.....	3C	T	.....	2C
R226A	.....	3C	U	.....	2C
B	.....	4C	W	.....	1C
C	.....	5C	X	.....	2C
R227	.....	3C	Z	.....	3B
R228	.....	3C	TP1	.....	4A
R229	.....	2C	TP2	.....	4A
R230	.....	3C	TP3	.....	3A
R231	.....	3C	TP4	.....	6B

M303079

PW200 Circuit Assembly

KCS 168 CHASSIS SERIES SCHEMATIC DIAGRAM



NOTES:
 * - 1000
 ALL DISTANCE VALUES ARE IN OHMS
 ALL RESISTOR VALUES ARE IN OHMS UNLESS INDICATED OTHERWISE
 ALL CAPACITANCE VALUES LESS THAN 1.0 ARE IN P.F.
 1.0 AND ABOVE ARE IN M.F. EXCEPT AS INDICATED.
 DIRECTION OF ARROWS AT CONTROLS INDICATES CLOCKWISE ROTATION.
 # INDICATES 5% TOLERANCE
 @ INDICATES 10% TOLERANCE
 \$ WITH NO SIGNAL INPUT \$ SHOULD HOLD WITHIN ± 20% WITH 120V AC SUPPLY.
 F READING DEPENDS ON WIDTH ADJUSTMENT

1 SR201 CATHODE JUNCTION
HORIZONTAL PHASE DETECTOR
HORIZONTAL RATE 9V P-P

2 SR201 ANODE
HORIZONTAL PHASE DETECTOR
HORIZONTAL RATE 9V P-P

3 TP-4
HORIZONTAL SINE WAVE
HORIZONTAL RATE 11V P-P

4 V205 PIN 1
SYNC PLATE
HORIZONTAL RATE 48V P-P

5 V205 PIN 3
AGC PLATE
HORIZONTAL RATE 350V P-P

6 V206 PIN 2
VERTICAL OUTPUT GRID
VERTICAL RATE 28V P-P

7 V206 PIN 9
AGC GRID
HORIZONTAL RATE 28V P-P

8 V206 PIN 2
PICTURE TUBE GRID
VERTICAL RATE 28V P-P

9 PW-200 TERMINAL "L"
VERTICAL OUTPUT TRANSFORMER
VERTICAL RATE 350V P-P

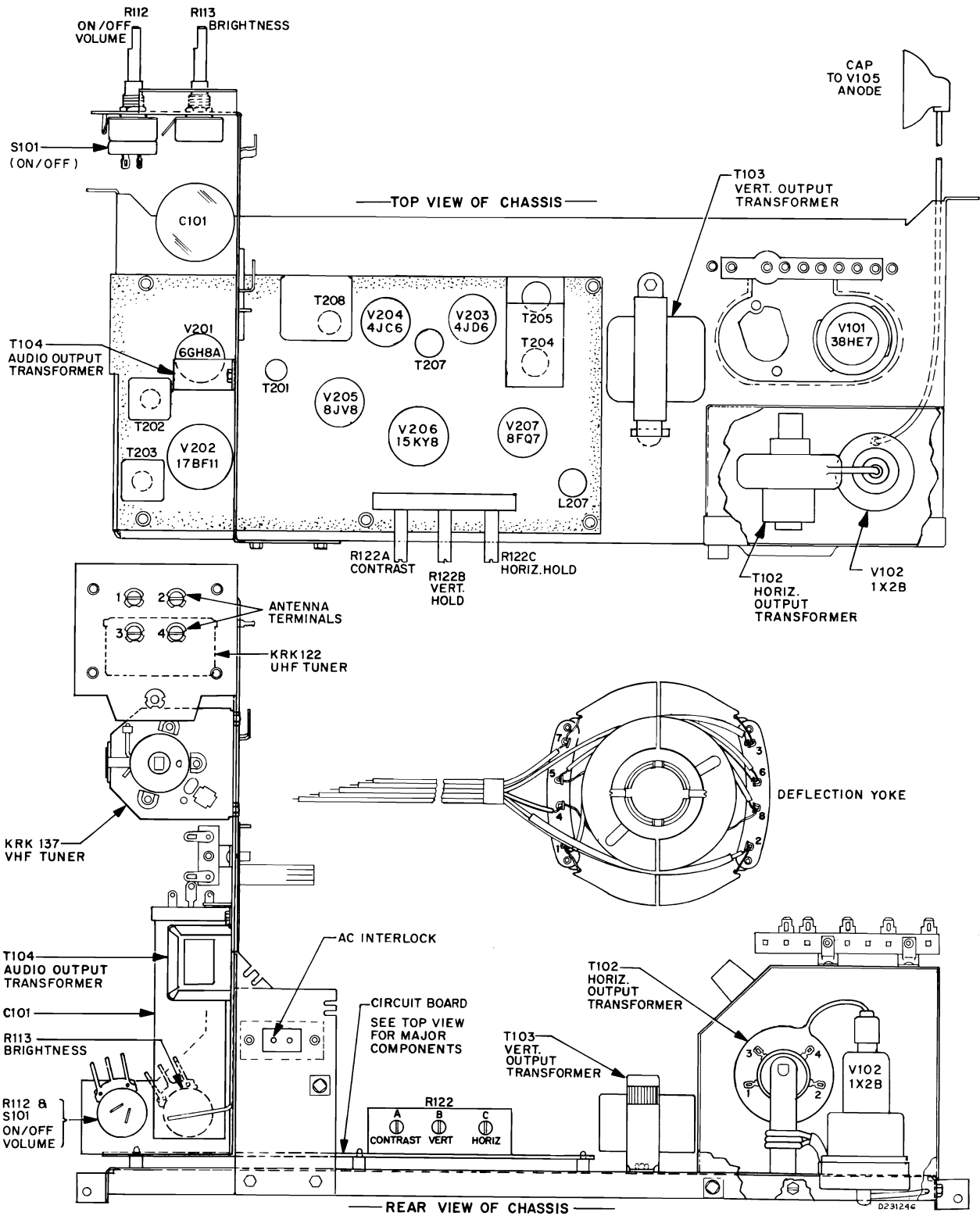
10 V105 PIN 2
PICTURE TUBE GRID
VERTICAL RATE 62V P-P

11 V101 PIN 9
HORIZONTAL OUTPUT GRID
HORIZONTAL RATE 85V P-P

12 PW-200 TERMINAL "T"
1.45V B+ RIPPLE
VERTICAL RATE 1.5V P-P

KCS168 SERIES VOLTAGE WAVEFORMS

KCS168 SERIES CHASSIS LAYOUT



KCS168 Chassis Layout Drawing



Chassis KCS173 Series KCS171 Series

Model and Chassis Cross Reference

MODEL	NAME	CHASSIS	TMA	TUNER	PICTURE TUBE	ANTENNAS VHF/UHF	REMOTE
AL-206B, E	"DEBONAIR"	KCS173B	151A	KRK127AB/122C	20SP4	Dipole/Ring	
AL-212W, Y	"STYLIST"	KCS173B	151A	KRK127AB/122C	20SP4	Dipole/Ring	
AL-248WK	"PARADER"	KCS173E	140C	KRK127AH/120M	20SP4	Dipole/Ring	
AL-270WR	"WAYFARER"	KCS173D	153A	KRK127AC/122C	20SP4	Dipole/Ring	KRT4B, KRS29B
AL-312WK	"MODERNETTE"	KCS173H	138B	KRK127AE/120B	21GAP4	Dipole/Ring	

The letter following the third numeral in the model number designates the cabinet finish as follows B—AUTUMN SMOKE/TARNISHED SILVER METALLIC LACQUER; E—EXECUTIVE GRAY/FROST ALUMINUM METALLIC LACQUER; W—HARVEST WALNUT ROLLER GRAIN VINYL/CASTILIAN GOLD METALLIC; Y—DRIFTWOOD BLOND ROLLER GRAIN VINYL/CASTILIAN GOLD METALLIC. The letter K indicates custom model. The letter R indicates remote instrument.

Models using Chassis KCS-171 are electrically very similar to material on KCS-173

MODEL	NAME	CHASSIS	TMA	TUNERS	PICTURE TUBE	ANTENNAS VHF/UHF
AL-156H	"TRIMETTE"	KCS171B	150A	KRK123D/122DC	19FEP4A	Monopole/Ring
AL-160W	"FASHIONETTE"	KCS171B	150A	KRK123D/122DC	19FEP4A/B	Dipole/Ring
AL-230BK,WK	"REVELER"	KCS171A	150A	KRK123D/122DC	20SP4	Dipole/Ring
AL-230WNS	"REVELER"	KCS 171C	150A	KRK 123D/122DC	20SP4	Dipole/Ring

DISASSEMBLY INSTRUCTIONS

1. Remove five cross-point screws holding back cover—two at the top, one at the antenna terminal board and two at the bottom.
2. Remove the UHF antenna and disconnect the VHF antenna terminals.
3. Remove the back cover. Most chassis test points and components are accessible when back cover is removed so that further disassembly is often unnecessary.
4. To remove the chassis, remove five push-on type knobs and the UHF tuning dial from the front control panel.
5. Remove four 1/4" hex head screws which secure the TMA to the cabinet front. Place the TMA in the service position. A tab and a slot on the left side of the chassis are provided for this purpose.
6. Disconnect the speaker cable, the picture tube socket and the yoke plug.
7. Remove three 1/4" hex head screws which secure the chassis to the cabinet—two at the bottom of the chassis and one holding the bracket at the cabinet front.
8. Slide the chassis back slightly and disconnect the second anode lead. Remove the chassis.

PICTURE TUBE REMOVAL

1. Place the cabinet face down on a foam rubber mat or other soft material.
2. Loosen the picture tube retaining wire bolt enough so that it can be slipped out of the four "S" shaped corner brackets.
3. Grasp the picture tube firmly on each side and lift it out.

HORIZONTAL SINE WAVE ADJUSTMENT

Remove sync by shorting Terminal "F" (Zone 1C, PW200) to chassis ground. Short sine wave coil L207 by connecting a jumper wire between TP4 (Zone 1B, PW200) and Terminal "E" (Zone 1A, PW200).

Adjust horizontal hold control until picture sides are vertical. Remove short from sine wave coil (TP4 and Terminal "E"), then adjust L207 sine wave coil so that the picture remains stationary with sides vertical. Remove short from sync (Terminal "F").

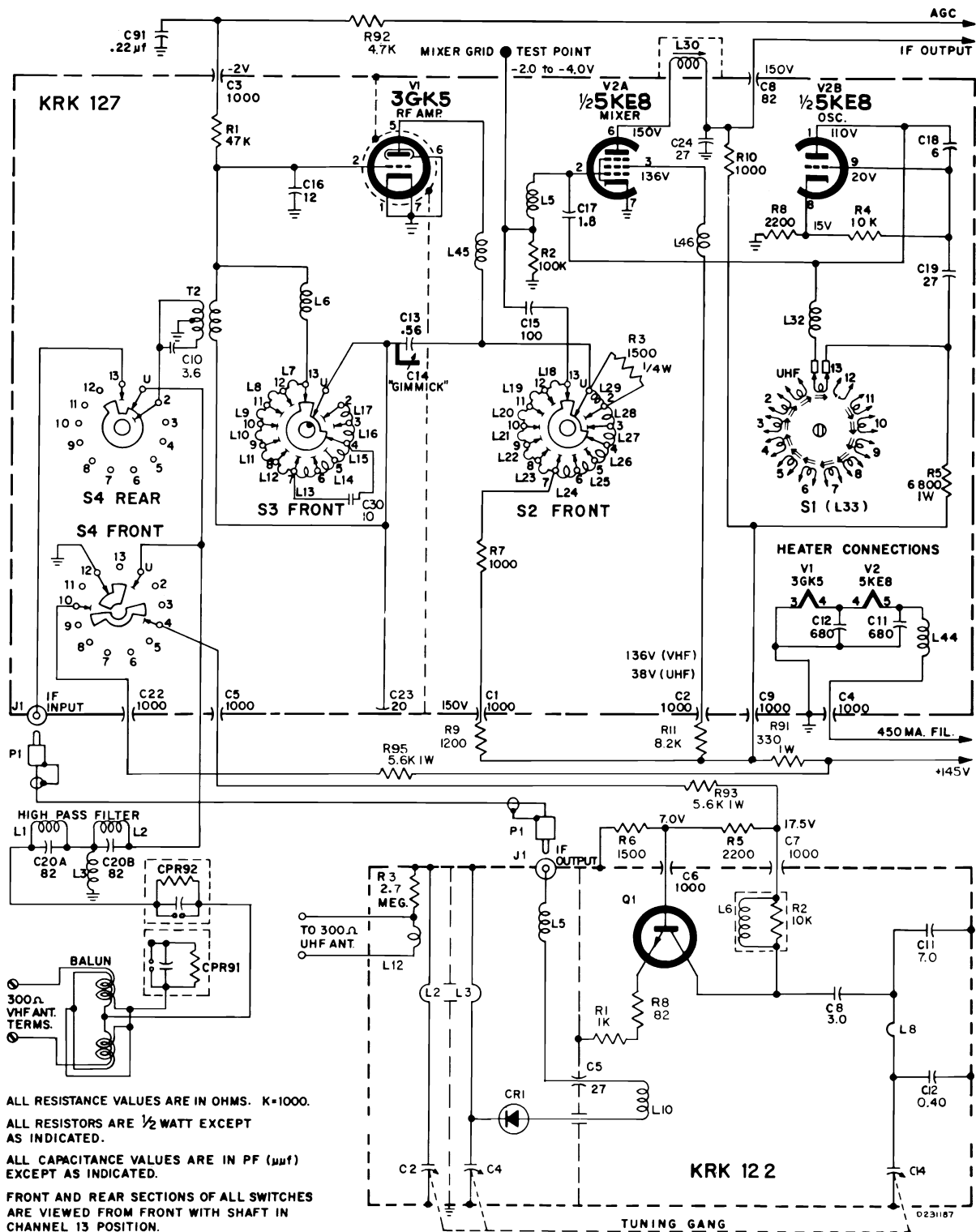
From CCW direction of horizontal hold control, pull in from out of sync condition should be from 1 to 3 bars; from the CW direction from 1 to 8 bars. There should be no loss of raster on either extreme of control rotation.

HORIZONTAL WIDTH AND CENTERING

Set the AC line voltage at 108 volts and adjust the horizontal hold control to the center of the horizontal oscillator pull-in range. Set the contrast and brightness controls fully clockwise (maximum).

The width adjustment is a terminal board and jumper assembly mounted on top of the high voltage box. This jumper, when moved from one to another of five available spade terminals, varies the resistance in series with horizontal output tube screen and the 145 volt B plus source. Place the jumper on a terminal which allows a small portion of black to be visible on the edge of the raster. With the centering magnet tabs located behind the yoke cover, center the raster horizontally by allowing an equal amount of black each side of the screen. As viewed from the rear of the chassis, choose the first spade terminal progressing from left to right which causes the raster to just fill the mask.

KRK127/122AC VHF/UHF TUNER SCHEMATIC DIAGRAM

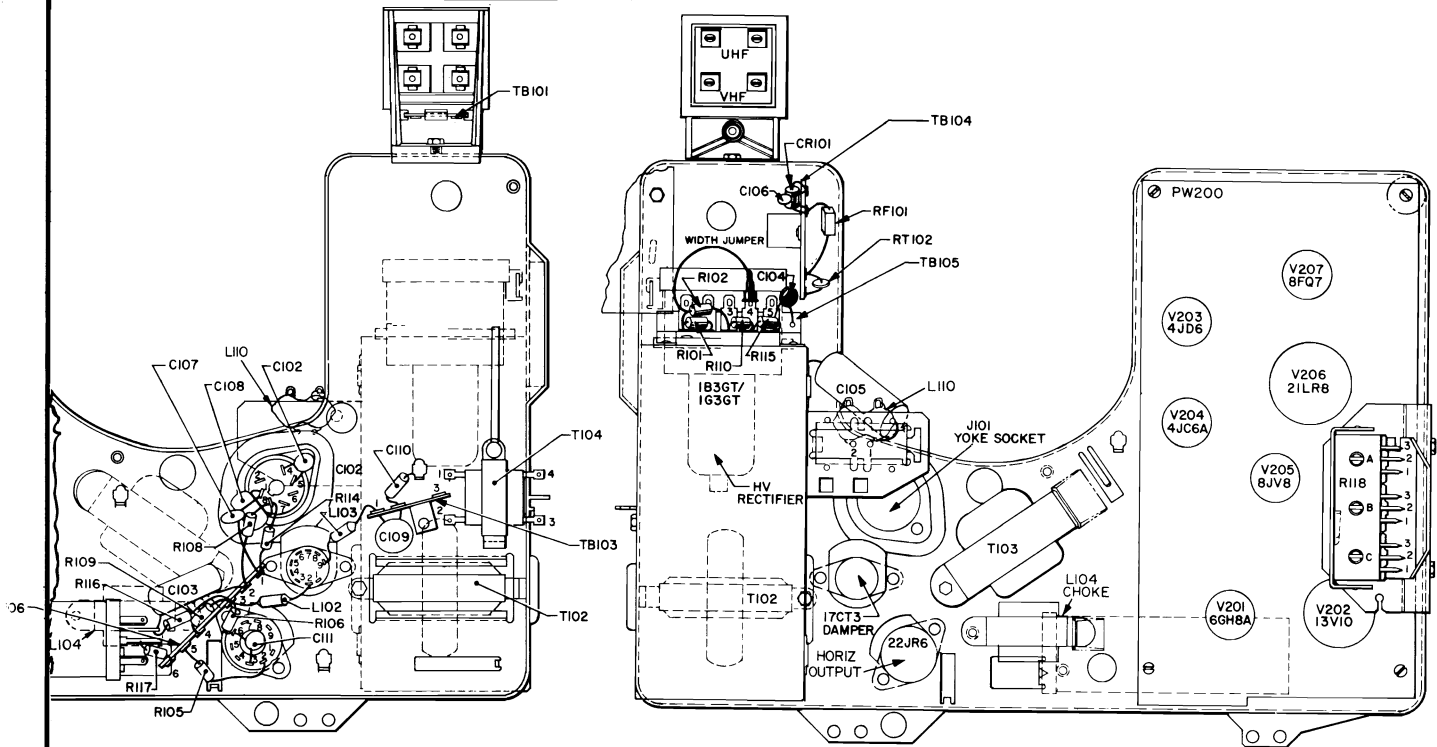


ALL RESISTANCE VALUES ARE IN OHMS. K=1000.
 ALL RESISTORS ARE 1/2 WATT EXCEPT AS INDICATED.
 ALL CAPACITANCE VALUES ARE IN PF (μmf) EXCEPT AS INDICATED.
 FRONT AND REAR SECTIONS OF ALL SWITCHES ARE VIEWED FROM FRONT WITH SHAFT IN CHANNEL 13 POSITION.
 VOLTAGES TAKEN AT -2.0V RF BIAS WITH NO SIGNAL PRESENT
 UHF VOLTAGES ARE PRESENT ONLY WHEN VHF TUNER IS IN THE UHF POSITION.

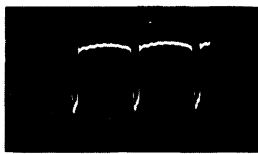
RCA Victor Chassis KCS-173, Service Information, Continued

KCS173 TRANSFORMER AND COIL D.C. RESISTANCE CHART

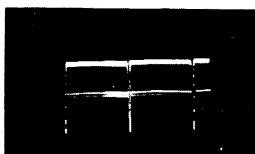
Symbol No.	Description	Winding	Lead	Terminal No. or color	D. C. Ohms Resistance	Notes
T102	High Voltage Transformer	Primary	Start	4	15.31 ±15%	Keep slack out of leads in high voltage box. Dress all leads away from transformer tire.
			Tap	1	3.32 ±15%	
			Tap	2	3.54 ±15%	
			Finish	3		
		High Voltage	Start	3	594 ±15%	
T103	Vertical Output Transformer	Primary	Start	Yellow	180	Preserve Original lead dress.
			Finish	Blue		
		Secondary	Start	Red	10.5	
			Finish	Yellow		
		Feed Back	Start	Violet	85	
T104	Audio Output Transformer	Primary	Start	1	250	Color dot indicates terminal No. 1
			Finish	2		
		Secondary	Start	3	.60	
			Finish	4		
L105	Deflection Yoke	Vertical	P101-2	Green 4	25.4 ±7%	P101 must be plugged in to complete B plus to deflection circuits.
P101-1			Yellow 6			
L106		Horizontal	P101-4	Red 2	40 ±10%	
L107			P101-5	Wh/Blue. 1-3		
L108	P101-8	Wh/Bik/Red 7				



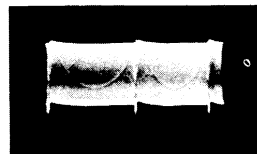
KCS173 CHASSIS LAYOUT



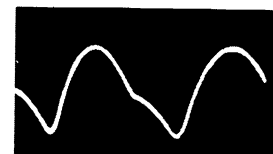
15 V105 PIN 3
KINESCOPE 1ST ANODE
HORIZONTAL RATE 33V P-P



16 V105 PIN 3
KINESCOPE 1ST ANODE
VERTICAL RATE 160V P-P

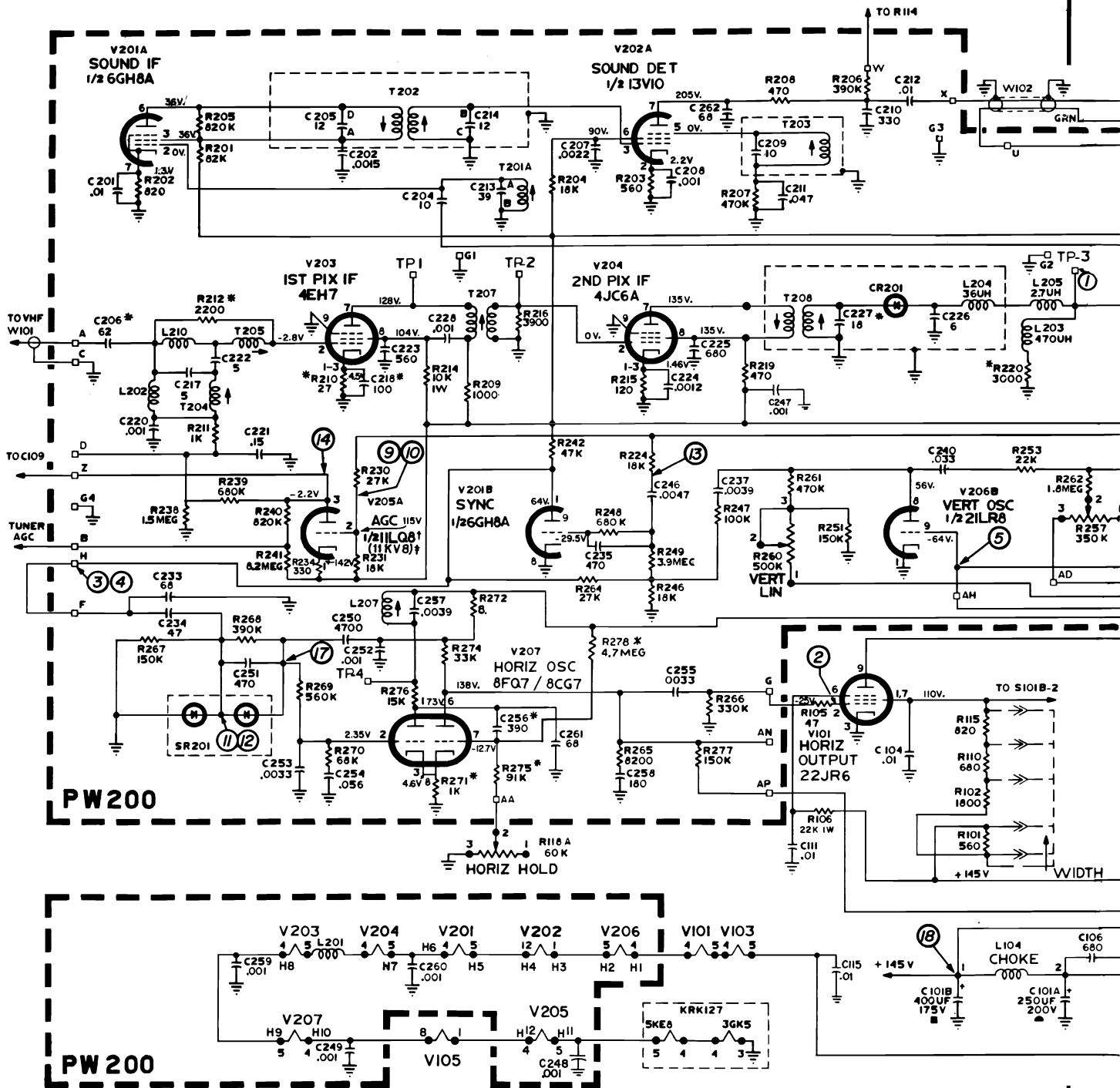


17 SR201 ANODE
HORIZONTAL PHASE DETECTOR
VERTICAL RATE 13V P-P

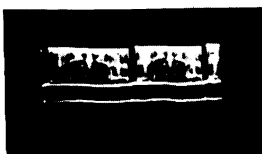


18 C101B
B+ RIPPLE
VERTICAL RATE .5V TO 1.7V P-P

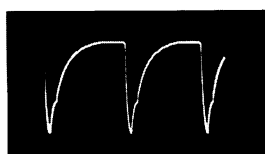
RCA Victor Chassis KCS-173, Schematic Diagram



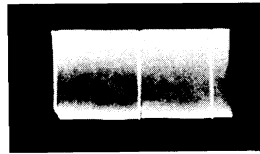
KCS173 VOLTAGE WAVEFORMS



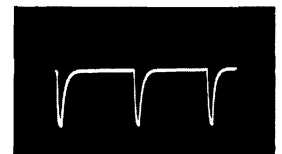
① TP-3
SECOND DETECTOR
VERTICAL RATE 1.6V P-P



② V101 PIN 2
HORIZONTAL OUTPUT GRID
HORIZONTAL RATE 134V P-P

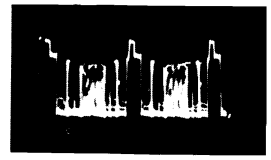
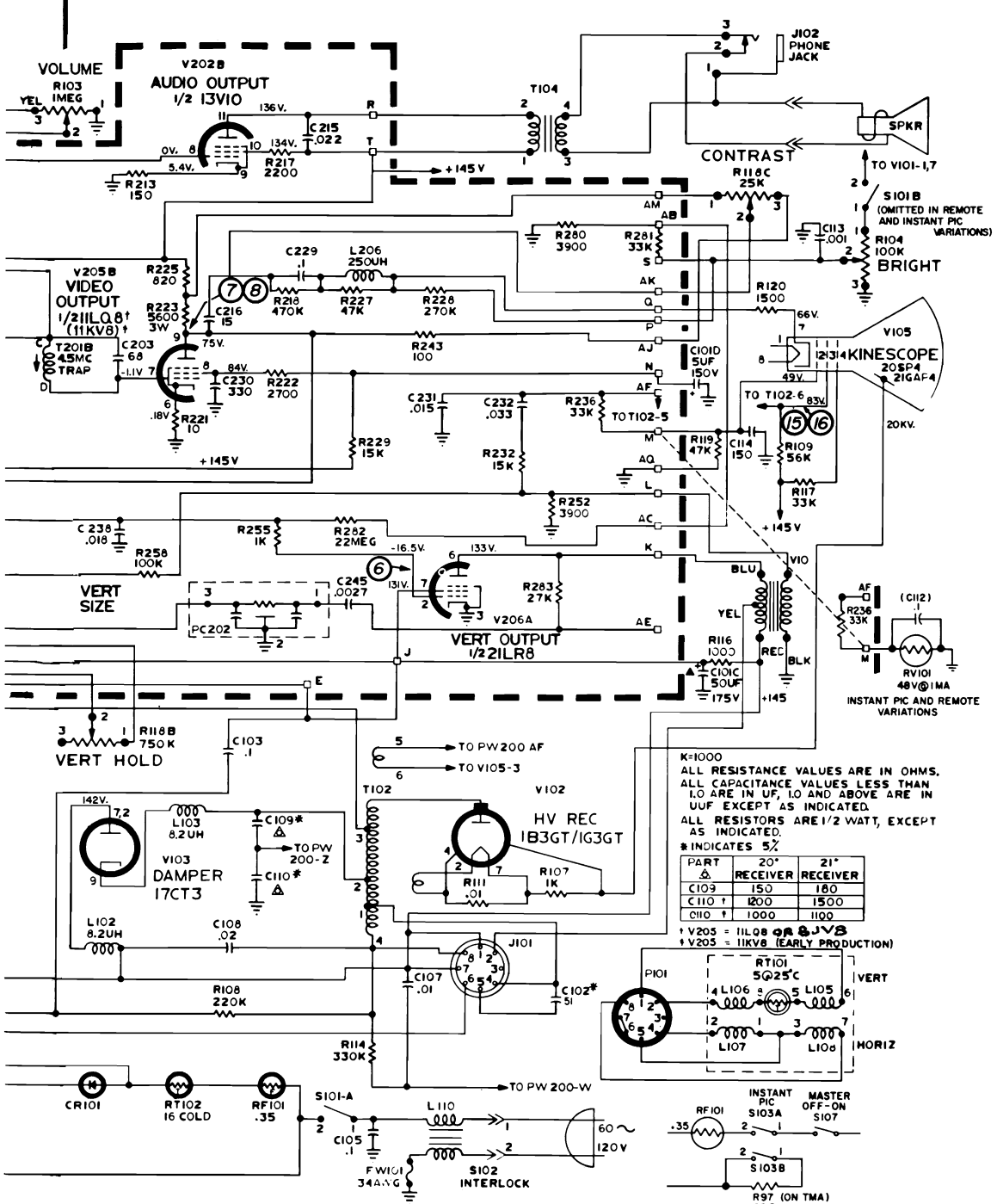


③ PW200 F OR H
SYNC PLATE
VERTICAL RATE 57V P-P



④ PW200 F OR H
SYNC PLATE
HORIZONTAL RATE 57V P-P

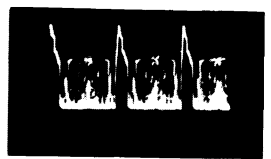
RCA Victor Chassis KCS-173, Schematic Diagram, Continued



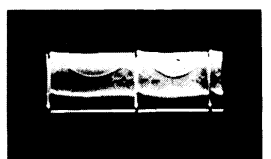
8 V205B PIN 9
VIDEO AMPLIFIER PLATE
HORIZONTAL RATE 92V P-P



9 205A PIN 2
AGC GRID
VERTICAL RATE 43V P-P



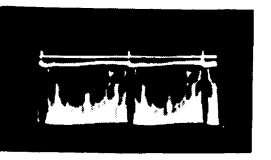
10 V205A PIN 2
AGC GRID
HORIZONTAL RATE 43V P-P



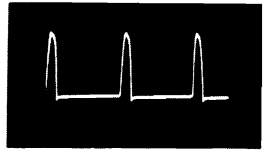
11 SR201 CATHODE JUNCTION
HORIZONTAL PHASE DETECTOR
VERTICAL RATE 12V P-P



12 SR201 CATHODE JUNCTION
HORIZONTAL PHASE DETECTOR
HORIZONTAL RATE 12V P-P



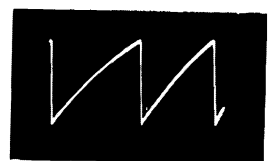
13 R224 & C246 JUNCTION
(ZONE 5B PW200 BOARD)
VERTICAL RATE 92V P-P



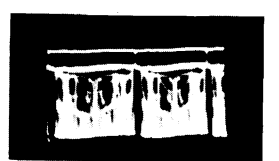
14 V205A PIN 3
AGC PLATE
HORIZONTAL RATE 420V P-P



5 V206B PIN 9
VERTICAL OSCILLATOR GRID
VERTICAL RATE 220V P-P



6 V206A PIN 2
VERTICAL OUTPUT GRID
VERTICAL RATE 28V P-P

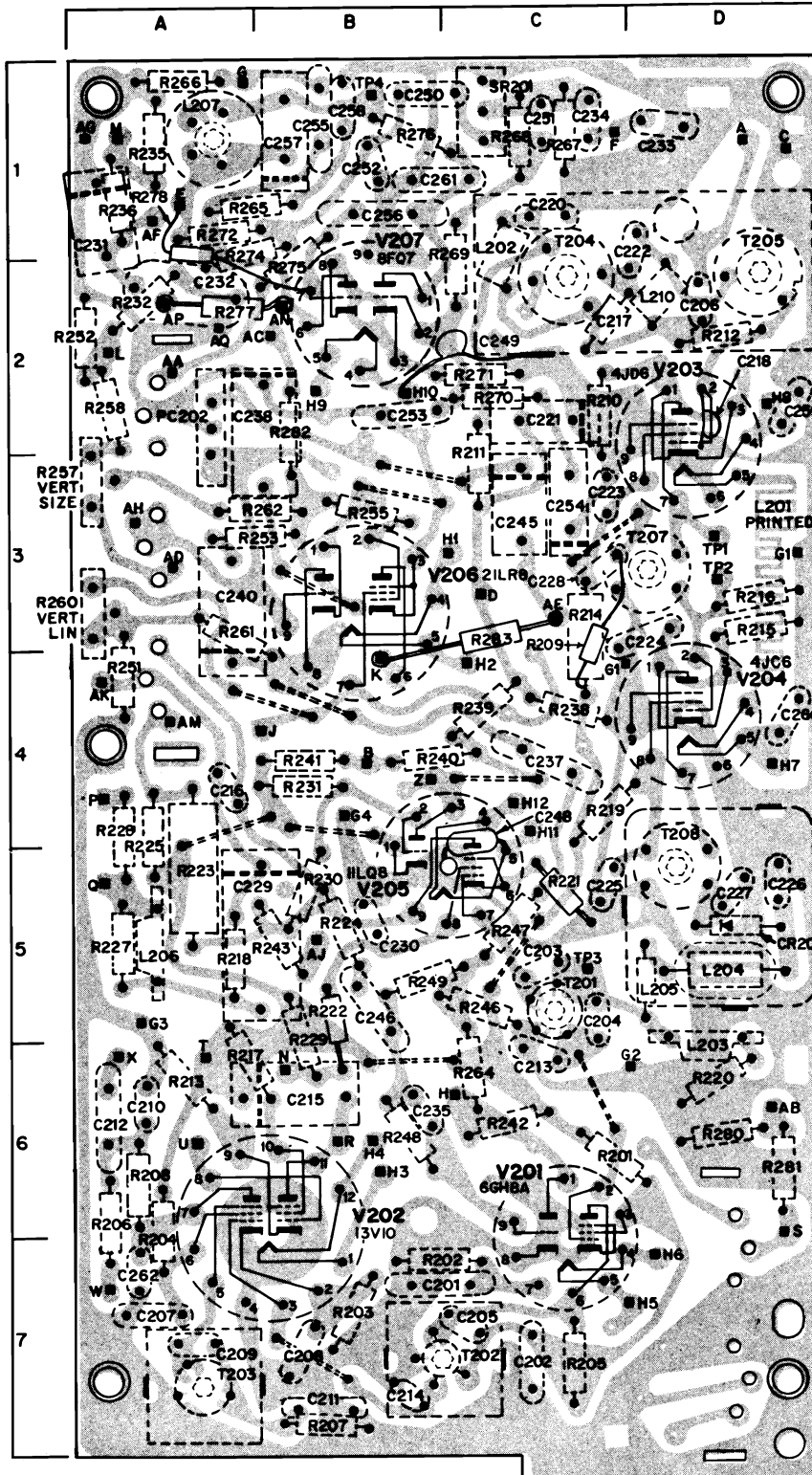


7 V205B PIN 9
VIDEO AMPLIFIER PLATE
VERTICAL RATE 92V P-P

RCA Victor Chassis KCS-173, Circuit Board Data, Continued

PW200 CIRCUIT BOARD ASSEMBLY

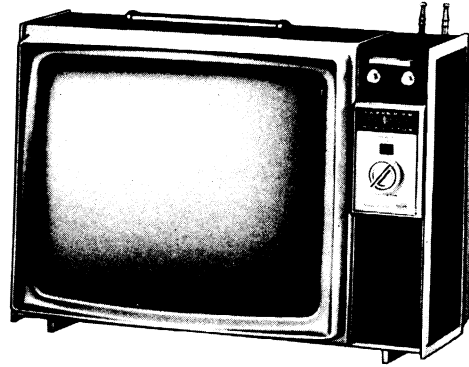
COMPONENT
LOCATION GUIDE



C201	7B	R246	5C
C202	7C	R247	5C
C203	5C	R248	5B
C204	5C	R249	5B
C205	7C	R251	4A
C206	2D	R252	2A
C207	7A	R253	3B
C208	7B	R255	3B
C209	7A	R257	3A
C210	6A	R258	2A
C211	7B	R260	3A
C212	6A	R261	3A
C213	6C	R262	3B
C214	7B	R264	6C
C215	6B	R265	1A
C216	4A	R266	1A
C217	2C	R267	1C
C218	2D	R268	1C
C220	1C	R269	2C
C221	2C	R270	2C
C222	1D	R271	2C
C223	3C	R272	1A
C224	3D	R274	1A
C225	5C	R275	2B
C226	5D	R276	1B
C227	5D	R277	2A
C228	3C	R278	2A
C229	5B	R280	6D
C230	5B	R281	6D
C231	1A	R282	2B
C232	2A	R283	3C
C233	1D		
C234	1C	SR201	1C
C235	6B		
C237	4C	T201	5C
C238	2B	T202	7B
C240	3A	T203	7A
C245	3C	T204	2C
C246	5B	T205	2D
C248	4C	T207	3D
C249	2C	T208	5D
C250	1B	A	1D
C251	1C	AA	2A
C252	1B	AB	6D
C253	2B	AC	2B
C254	3C	AD	3A
C255	1B	EA	3C
C256	1B	AF	1A
C257	1B	AG	1A
C258	1B	AH	3A
C259	2D	AJ	3B
C260	4D	AK	4A
C261	1B	AM	4A
C262	7A	AN	2B
		AP	2A
CR201	5D	AQ	2A
L201	3D	B	4B
L202	1C	C	1D
L203	6D	D	3C
L204	5D	E	1A
L205	5D	F	1C
L206	5A	G	1A
L207	1A	G1	3D
L210	2D	G2	6C
		G3	5A
		G4	4B
PC202	2A	H	6C
		H1	3C
R201	6C	H2	4C
R202	7B	H3	6B
R203	7B	H4	6B
R204	6A	H5	7C
R205	7C	H6	7D
R206	6A	H7	4D
R207	7B	H8	2D
R208	6A	H9	2B
R209	3C	H10	2B
R210	2C	H11	4C
R211	3C	H12	4C
R212	2D	J	4B
R213	6A	K	4B
R214	3C	L	2A
R215	3D	M	1A
R216	3D	N	6B
R217	6A	P	4A
R218	5A	Q	5A
R219	4C	R	6B
R220	6D	S	6D
R221	5C	T	6A
R222	5B	U	6A
R223	5A	W	7A
R224	5B	X	6A
R225	4A	Z	4B
R227	5A	TP1	3D
R228	4A	TP2	3D
R229	5B	TP3	5C
R230	5B	TP4	5B
R231	4B		
R232	2A		
R235	1A		
R236	1A		
R238	4C		
R239	4C		
R240	4B		
R241	4B		
R242	6C		
R243	5B		

TRCA

Chassis KCS 174 Series



"Roommate"

Model and Chassis Cross Reference

MODEL	NAME	CHASSIS	TUNERS	TMA	PICTURE TUBE	OTHER	ANTENNAS VHF/UHF
AL-218W, Y	"MODERNIST"	KCS174A	KRK133AA/122C	152A	20SP4	Earphone/ Pillow Speaker Jack	Dipole/Ring
AL-242M, W	"ROOMMATE"	KCS174C	KRK133BB/120M	139D	20SP4	Instant-Pic	Dipole/Ring
AL-306W	"CONTOUR"	KCS174B	KRK133BA/120B	137B	21GAP4		Dipole/Ring

The letter following the third numeral in the model number designates the cabinet finish as follows: W—HARVEST WALNUT ROLLER GRAIN VINYL LACQUER / CASTILIAN GOLD METALLIC LACQUER (AL-218W); M—CAMEO IRISH LINEN TEXTURED ROLLER GRAIN VINYL LACQUER / SUEDE TAN METALLIC LACQUER; W—HARVEST WALNUT ROLLER GRAIN VINYL LACQUER / SUEDE TAN METALLIC LACQUER (AL-242W); W—HARVEST WALNUT ROLLER GRAIN LACQUER / TARNISHED SILVER METALLIC LACQUER; Y—DRIFTWOOD BLONDE ROLLER GRAIN VINYL LACQUER / CASTILIAN GOLD METALLIC LACQUER.

INSTRUMENT DISASSEMBLY

The knobs must be removed from the Brightness Control, the Volume Control, and from the Tuner in order to remove the chassis.

The back cover is secured by 3 Phillips head screws at the top, two on the bottom, and one each at the AC interlock and the antenna terminal board. Before removing the rear cover, disconnect the UHF ring antenna and disconnect the dipole leads from the antenna terminal board.

The chassis and the tuner mounting assembly are removed as a unit. Remove the 5 hex head screws which secure the chassis at the top and the screw near the bottom at either side of the cabinet. Next disconnect the speaker leads, the kinescope socket, and the yoke plug. Pull the chassis away from the cabinet to disconnect the 2nd anode lead. Short the 2nd anode button to the chassis before handling the picture tube.

To remove the picture tube, loosen the compression bolt enough to slip the mounting wire over the retaining bracket. Remove the picture tube from the cabinet by grasping it firmly at opposite corners of the faceplate.

Reassemble in reverse order.

SERVICE CONTROL LOCATION

The VHF Tuner Control, the UHF Tuner Control, the Brightness Control and the combined Volume Control On/Off Switch are located on the control and speaker panel. The VHF fine tuning is preset and the push to tune knob is concentric with the channel selector knob.

The Vertical Hold Control, the Horizontal Hold Control, and the Contrast Control are adjusted by means of shafts that extend through the back cover. The Vertical Height and Vertical Linearity Controls are screw driver adjustable, accessible through holes provided in the cabinet back.

INSTANT-PIC

The KCS 174C Chassis Instant-Pic feature uses a dropping resistor (R97, 68 ohm 10w.) in series with the AC filament supply voltage. With the Master switch in the "ON" position and the Instant-Pic in the "OFF" position, a low AC potential is supplied to all tube filaments and B+ is cut off. When the Instant-Pic switch is turned "ON" full filament and B+ voltage is supplied the chassis. When the Master switch is off, no power is on the chassis.

The Master switch is mounted on the Stay-set Volume control and the Instant-Pic switch is a rocker switch mounted at the top of the primary control panel.

CIRCUIT PROTECTION

The B+ supply for this chassis is protected by a fusible resistor RF101, .35 ohm. In addition a number 34AWG wire is connected from one side of the AC input to chassis ground on the chassis side of the filter choke L110 to protect the entire power supply.

AGC AND SYNC

The Sync and AGC circuits are designed for optimum performance under varying signal conditions and no controls are provided.

CENTERING

If the picture is not positioned correctly on the screen, it may be necessary to center the picture with the two disc magnets mounted behind the yoke cover. Both horizontal and vertical centering are accomplished at once by rotating the discs together or separately. Perform this adjustment along with vertical height, vertical linearity and width, as they are all interdependent.

RCA Victor Chassis KCS-174, Service Information, Continued

TESTING PICTURE PROPORTIONS

Rotate the vertical hold control to roll picture slowly downward and study the blanking bar. If it is not level, or if the bar varies in thickness as it moves down the screen, make adjustments as prescribed in width and linearity and adjustments.

HORIZONTAL SINE WAVE ADJUSTMENT

Remove sync by shorting Terminal "AE" (zone 3C, PW200) to chassis ground. Short sine wave coil L207 by connecting a jumper wire between TP4 (zone 1B) and Terminal "W" (zone 6A) on PW200.

Adjust the Horizontal Hold control, R123, until the picture sides are vertical. Remove shorting wire from across the sine wave coil. Adjust L207 Sine Wave Coil until the picture remains stationary and the sides vertical. Remove short from sync grid (Terminal "AE").

From counterclockwise direction of the Horizontal Hold Control, the pull in from out of sync condition should be from 1 to 3 bars, and from the clockwise direction, 1 to 8 bars. There should be no loss of raster on either extreme of control rotation.

DEFLECTION YOKE

If the picture is tilted, loosen the yoke clamp screw and rotate the yoke to level the picture. Retighten the yoke clamp.

WIDTH AND LINEARITY ADJUSTMENTS

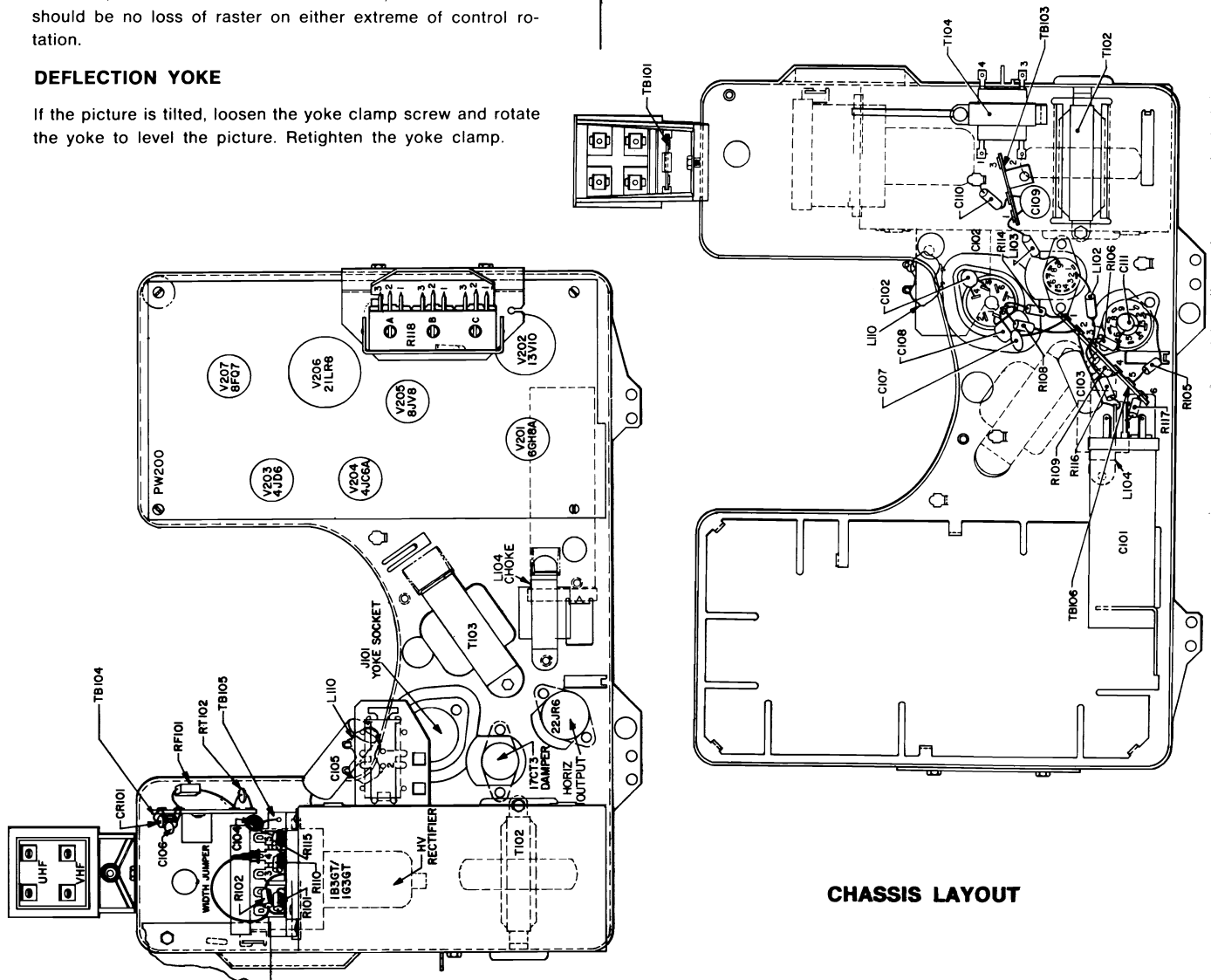
Adjust the Vertical Height and Linearity controls for an approximate symmetrical raster.

Note: Width adjustments are most accurate when made with low line, 108 VAC, supply voltage.

Set both Brightness and Contrast controls at maximum. (Fully clockwise.) Adjust width control, R111, until the raster just fills the screen horizontally $+0, -\frac{1}{8}$ ". Turn centering magnets together and individually to center the raster.

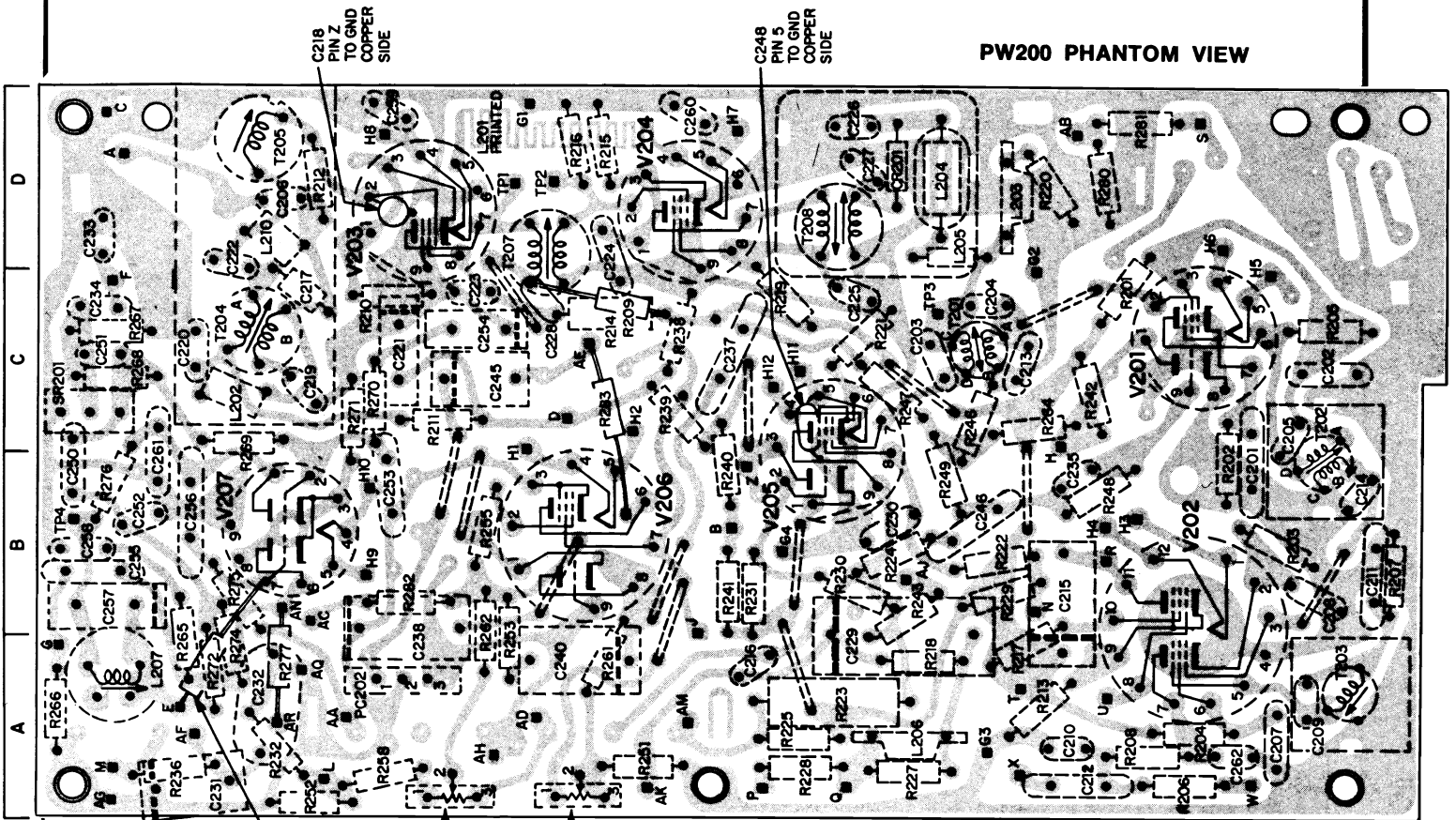
Turn contrast control to minimum, then center the raster vertically. After the Vertical Height and Linearity adjustments are completed at 108 VAC supply voltage, the raster should fill the screen $+0, -\frac{1}{4}$ " at the top and bottom.

If the vertical height and linearity controls are properly set the raster will fill the screen the proper amount at normal 120 VAC supply voltage, and the blanking bar will not change in width as the picture is rolled vertically.



CHASSIS LAYOUT

RCA Victor Chassis KCS-174, Circuit Board Information

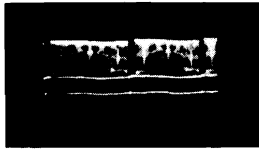


PW200 COMPONENT LOCATION GUIDE

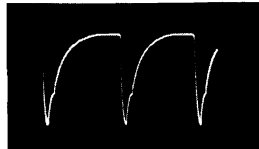
C201 6B	C230 4B	L201 2D	R219 4C	R258 2A	T205 2D	H 5C
C202 6C	C231 1A	L202 1C	R220 5D	R260 3A	T207 3D	H1 3C
C203 4C	C232 1A	L203 5D	R221 4C	R261 3A	T208 4D	H2 3C
C204 5C	C233 1D	L204 4D	R222 5B	R262 2B	A 1D	H3 5B
C205 6C	C234 1C	L205 4D	R223 4A	R264 5C	AA 2A	H4 5B
C206 2D	C235 53	L206 4A	R224 4B	R265 1A	AB 5D	H5 6C
C207 6A	C236 4C	L207 1A	R225 4A	R266 1A	AC 2B	H6 6D
C208 6B	C237 2B	L210 2D	R226 4A	R267 1C	AD 3A	H7 4D
C209 6A	C238 2B	PC202 2A	R227 4A	R268 1C	AE 3C	H8 2D
C210 5A	C239 2C	R201 5C	R228 4A	R269 1C	AF 1A	H9 2B
C211 6B	C240 3A	R202 6B	R229 5B	R270 2C	AG 1A	H10 2B
C212 5A	C241 2C	R203 6B	R230 4B	R271 2C	AH 1A	H11 4C
C213 5C	C242 4C	R204 6A	R231 4B	R272 1A	AJ 2A	J 3B
C214 6B	C243 2C	R205 6C	R232 2A	R273 1A	AK 3A	L 2A
C215 5B	C244 5B	R206 6A	R233 1A	R274 1A	AM 3A	M 1A
C216 4A	C245 4C	R207 6B	R234 3C	R275 1B	AN 2B	N 5B
C217 2C	C246 5B	R208 5A	R235 3C	R276 1B	AQ 2A	O 4A
C218 2D	C247 2C	R209 3C	R236 1A	R277 2A	AR 2A	R 5B
C219 2C	C248 2C	R210 2C	R237 3C	R278 1A	B 4B	S 6D
C220 1C	C249 2C	R211 2C	R238 3C	R279 1A	C 1D	T 5A
C221 2C	C250 1B	R212 2D	R239 3C	R280 5D	D 3C	U 5A
C222 1D	C251 1C	R213 5A	R240 4B	R281 5D	E 1A	W 6A
C223 2C	C252 1B	R214 3C	R241 4B	R282 2B	F 1C	X 5A
C224 3D	C253 2B	R215 3D	R242 5C	R283 3C	G 1A	Z 4B
C225 4C	C254 2C	R216 3D	R243 4B	T201 4C	G1 3D	TP1 3D
C226 4D	C255 1B	R217 5A	R244 5C	T202 6C	G2 5C	TP2 3D
C227 4D	C256 1B	R218 4A	R245 4B	T203 6A	G3 5A	TP3 4C
C228 3C	C257 1B		R246 5C	T204 1C	G4 4B	TP4 1B
C229 4B	C258 1B		R247 4C			
	C259 2D		R248 5B			
	C260 3D		R249 4B			
	C261 1B		R250 2A			
	C262 6A		R251 3A			
	CR201 4D		R252 2A			
			R253 3B			
			R254 2B			
			R255 2B			
			R256 3A			
			R257 3A			

RCA Victor Chassis KCS-174, Schematic Diagram

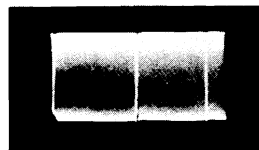
KCS174 CHASSIS VOLTAGE WAVEFORMS



① TP-3
SECOND DETECTOR
VERTICAL RATE 2V P-P



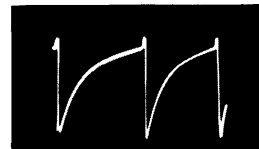
② V101 PINS 2 & 6
HORIZONTAL OUTPUT GRID
HORIZONTAL RATE 130V P-P



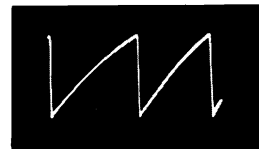
③ V201B PIN 1
SYNC PLATE
VERTICAL RATE 60V P-P



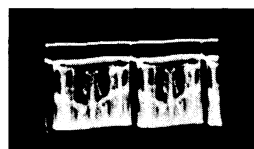
④ V201B PIN 1
SYNC PLATE
HORIZONTAL RATE 60V P-P



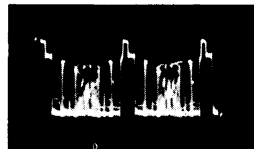
⑤ V206B PIN 9
VERTICAL OSCILLATOR GRID
VERTICAL RATE 180V P-P



⑥ V206A PIN 2
VERTICAL OUTPUT GRID
VERTICAL RATE 28V P-P



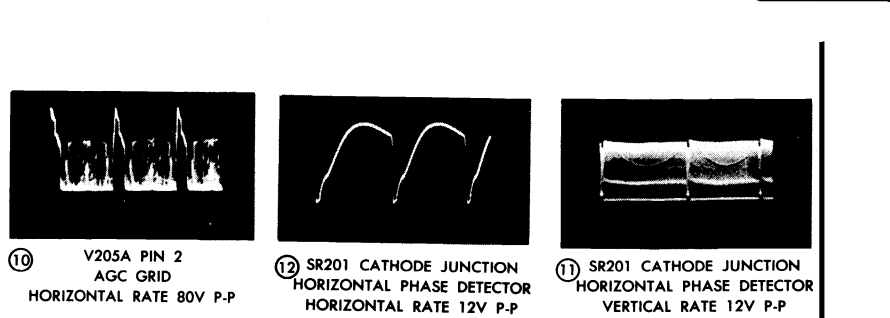
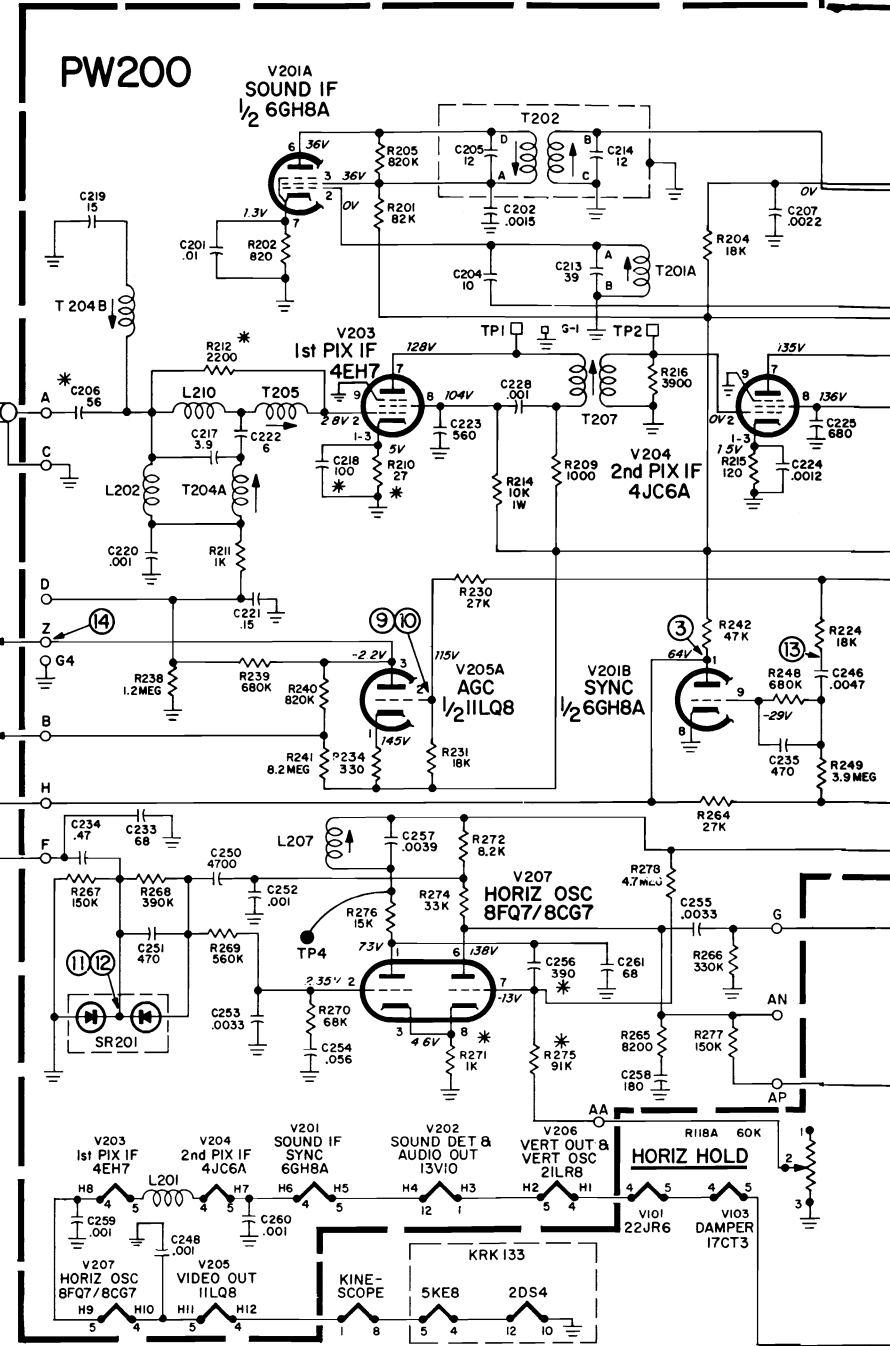
⑦ V205B PIN 9
VIDEO AMPLIFIER PLATE
VERTICAL RATE 110V P-P



⑧ V205B PIN 9
VIDEO AMPLIFIER PLATE
HORIZONTAL RATE 110V P-P

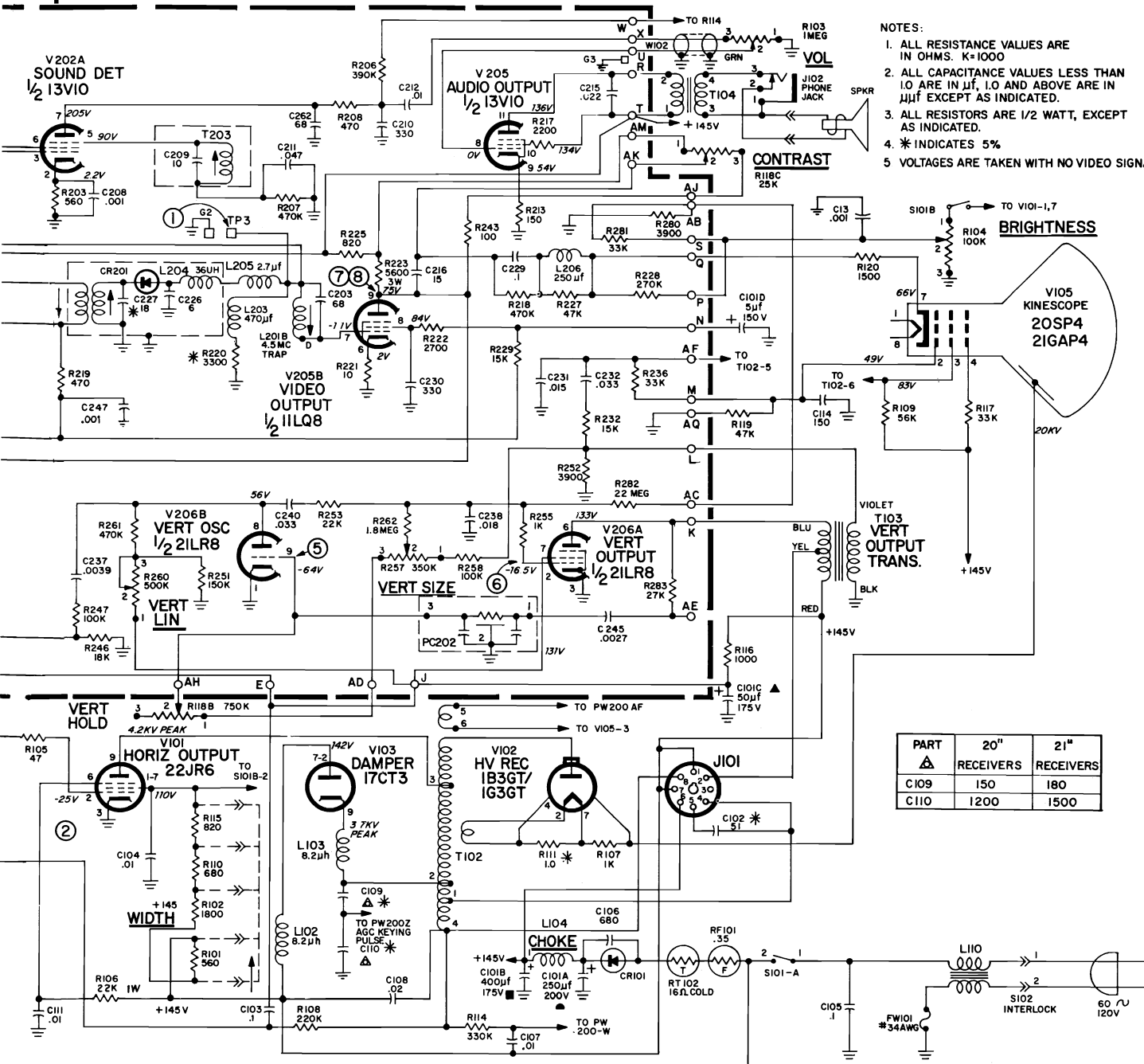


⑨ V205A PIN 2
AGC GRID
VERTICAL RATE 80V P-P



⑩ V205A PIN 2 AGC GRID HORIZONTAL RATE 80V P-P
⑪ SR201 CATHODE JUNCTION HORIZONTAL PHASE DETECTOR HORIZONTAL RATE 12V P-P
⑫ SR201 CATHODE JUNCTION HORIZONTAL PHASE DETECTOR VERTICAL RATE 12V P-P

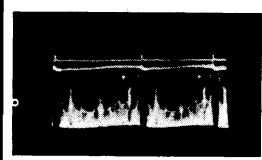
RCA Victor Chassis KCS-174, Schematic Diagram, Continued



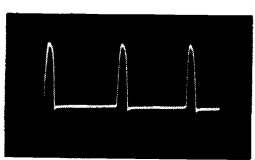
- NOTES:
1. ALL RESISTANCE VALUES ARE IN OHMS. K=1000
 2. ALL CAPACITANCE VALUES LESS THAN 1.0 ARE IN μf , 1.0 AND ABOVE ARE IN μMf EXCEPT AS INDICATED.
 3. ALL RESISTORS ARE 1/2 WATT, EXCEPT AS INDICATED.
 4. * INDICATES 5%
 5. VOLTAGES ARE TAKEN WITH NO VIDEO SIGNAL.

PART	20" RECEIVERS	21" RECEIVERS
C109	150	180
C110	1200	1500

KCS174 CHASSIS SCHEMATIC



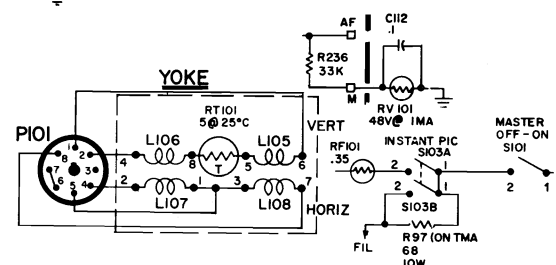
13 R224 & C246 JUNCTION (ZONE 4A PW200 BOARD) VERTICAL RATE 110V P-P



14 V205A PIN 3 AGC PLATE HORIZONTAL RATE 420V P-P

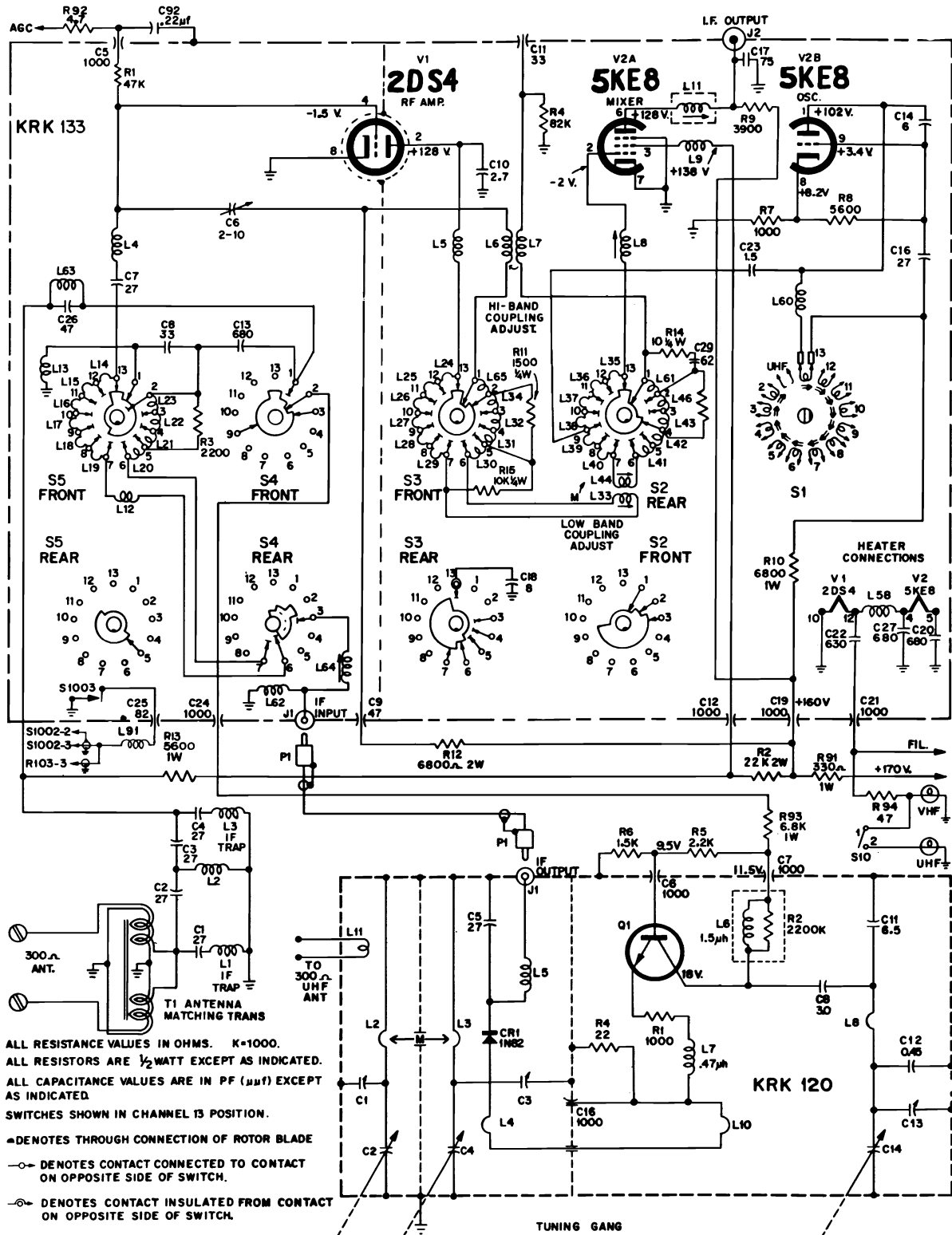


15 V105 PIN 2 KINESCOPE GRID HORIZONTAL RATE 40V P-P



KCS 174C SAME AS KCS 174A EXCEPT AS SHOWN

KRK133/120U TUNER SCHEMATIC





Chassis KCS 175 Series

Model AL-266W, Chassis KCS-175A

INSTRUMENT DISASSEMBLY

Remove the four knobs on the front control panel. Brightness, On-Off/Volume, Channel selector and the combined VHF fine tuning/UHF Tuning. Remove the UHF ring antenna then disconnect the 300 ohm dipole leads. Remove 3 screws at the top of the back cover, the screw at the Antenna board and the three screws along the bottom of the back cover. Loosen the four hex nuts which retain the TMA. Then lift the TMA from its position. Disconnect the antenna leads from the tuners and mount the TMA in the service position on the Chassis left rear, securing with the two screws provided. Disconnect the picture tube socket, 2nd anode lead, the yoke plug, and the speaker leads. Short 2nd anode button to chassis. Remove the two screws, one on each side, then remove the chassis from the cabinet.

To remove the picture tube, loosen the compression bolt, then left the retain spring over the holding brackets. Lift out picture tube by grasping it firmly at opposite corners of the face plate.

SERVICE CONTROL LOCATION

The VHF Tuner Control, the UHF Tuner Control, the Instant-Pic Control, the Brightness Control and the combined Volume Control Master On/Off Switch are located on the control and speaker panel. The VHF fine tuning is preset and the push to tune knob is concentric with the channel selector knob.

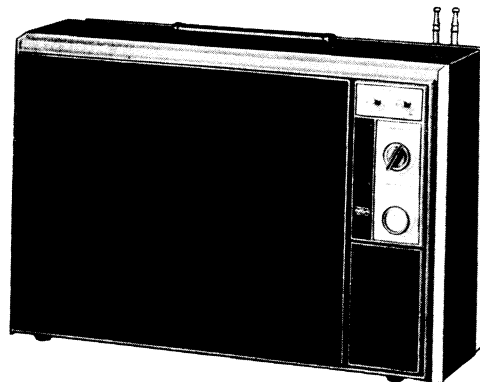
The Vertical Hold Control, the Horizontal Hold Control, and the Contrast Control are adjusted by means of shafts that extend through the back cover. The Vertical Height and Vertical Linearity Controls are screw driver adjustable, accessible through holes provided in the cabinet back.

AGC AND SYNC

The Sync and AGC circuits are designed for optimum performance under varying signal conditions and no controls are provided.

CENTERING

If the picture is not positioned correctly on the screen, it may be necessary to center the picture with the two disc magnets mounted behind the yoke cover. Both horizontal and vertical centering are accomplished at once by rotating the discs together or separately. Perform this adjustment along with vertical height, vertical linearity, and width, as they are all interdependent.



TESTING PICTURE PROPORTIONS

Rotate the vertical hold control to roll picture slowly downward and study the blanking bar. If it is not level, or if the bar varies in thickness as it moves down the screen, make adjustments as prescribed in width and linearity adjustments.

DEFLECTION YOKE

If the picture is tilted, loosen the yoke clamp screw and rotate the yoke to level the picture. Retighten the yoke clamp.

HORIZONTAL SINE WAVE ADJUSTMENT

Remove sync by shorting Terminal "AE" (zone 1A, PW200) to chassis ground. Short sine wave coil L207 by connecting a jumper wire between TP4 (zone 1D) and Terminal "W" (zone 1C) on PW200.

Adjust the Horizontal Hold control, R123, until the picture sides are vertical. Remove shorting wire from across the sine wave coil. Adjust L207 Sine Wave Coil until the picture remains stationary and the sides vertical. Remove short from sync grid (Terminal "AE").

From counterclockwise direction of the Horizontal Hold Control, the pull in from out of sync condition should be from 1 to 3 bars, and from the clockwise direction, 1 to 8 bars. There should be no loss of raster on either extreme of control rotation.

WIDTH AND LINEARITY ADJUSTMENTS

Adjust the Vertical Height and Linearity controls for an approximately symmetrical raster.

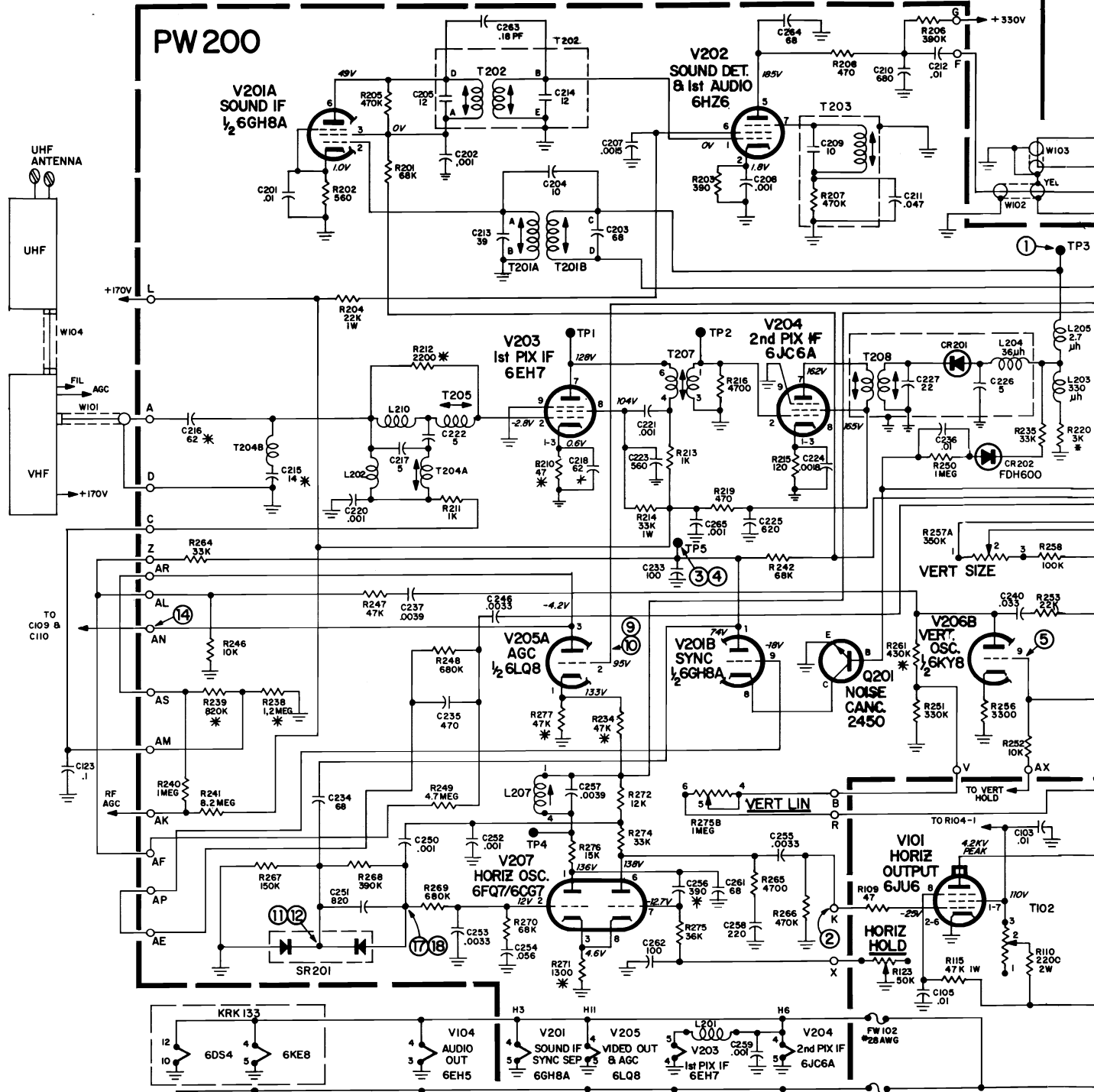
Note: Width adjustments are most accurate when made with low line, 108 VAC, supply voltage.

Set both Brightness and Contrast controls at maximum. (Fully clockwise). Adjust width control, R111, until the raster just fills the screen horizontally $+0, -1/8$ ". Turn centering magnets together and individually to center the raster.

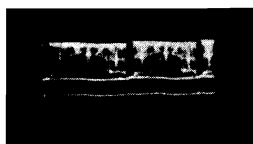
Turn contrast control to minimum, then center the raster vertically. After the Vertical Height and Linearity adjustments are completed at 108 VAC supply voltage, the raster should fill the screen $+0, -1/4$ " at the top and bottom.

If the vertical height and linearity controls are properly set the raster will fill the screen the proper amount at normal 120 VAC supply voltage, and the blanking bar will not change in width as the picture is rolled vertically.

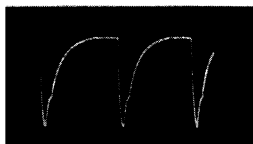
RCA Victor Chassis KCS-175, Schematic Diagram



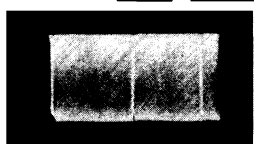
WAVEFORMS



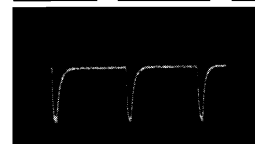
① TP-3
SECOND DETECTOR
VERTICAL RATE 2V P-P



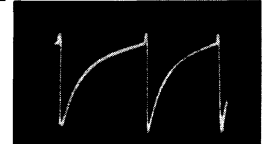
② V101 PINS 2 & 6
HORIZONTAL OUTPUT GRID
HORIZONTAL RATE 130V P-P



③ V201B PIN 1
SYNC PLATE
VERTICAL RATE 60V P-P



④ V201B PIN 1
SYNC PLATE
HORIZONTAL RATE 60V P-P

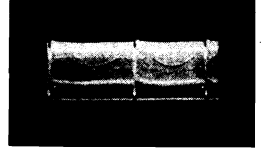
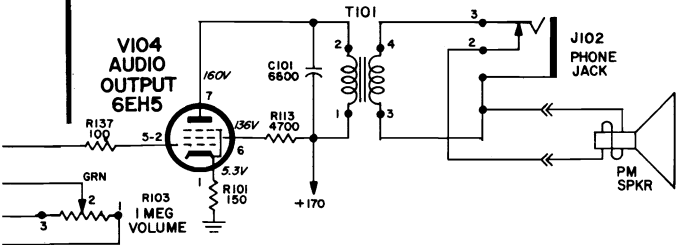


⑤ V206B PIN 9
VERTICAL OSCILLATOR GRID
VERTICAL RATE 180V P-P

RCA Victor Chassis KCS-175, Schematic Diagram, Continued

NOTES:

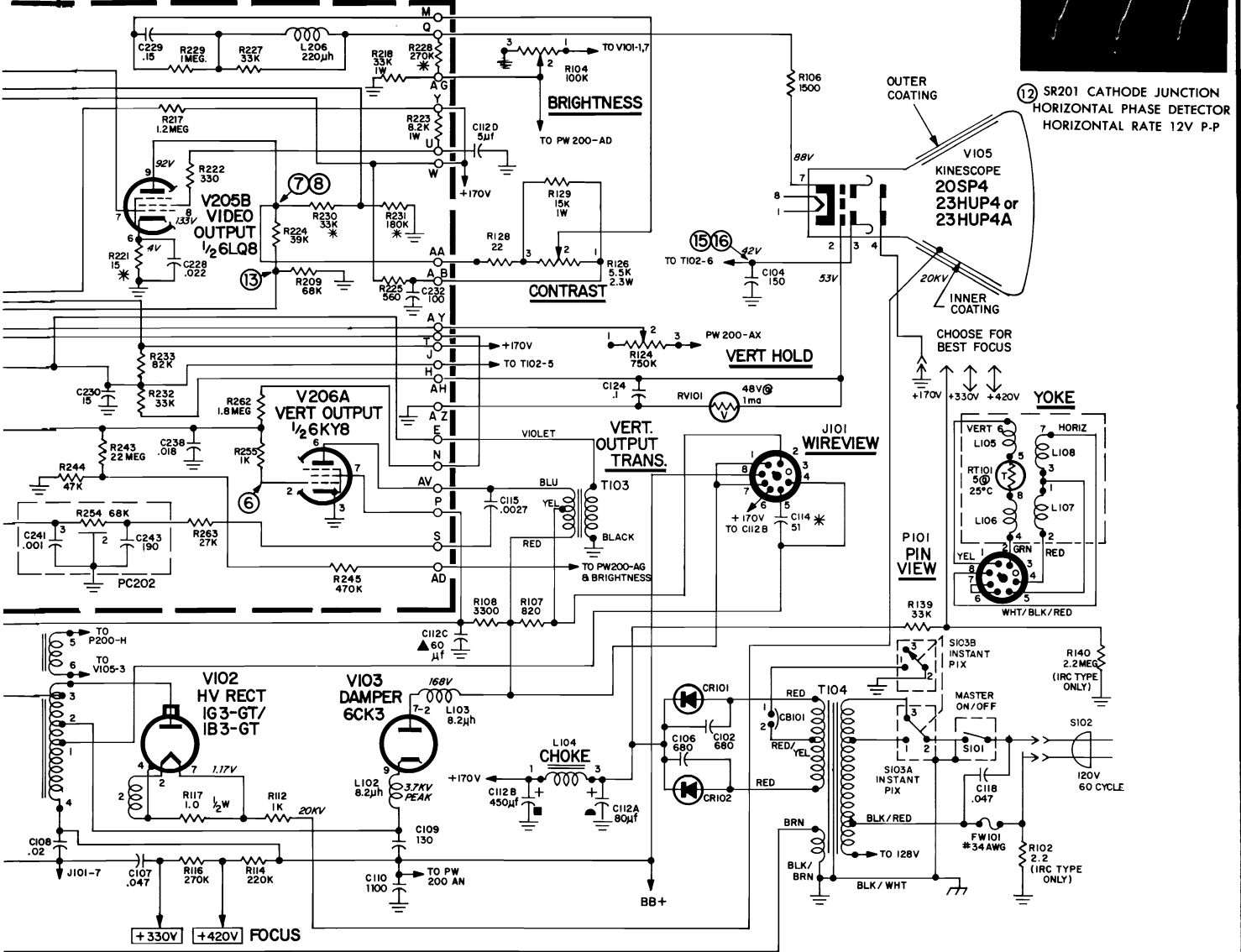
1. K= 1000
2. ALL RESISTANCE VALUES ARE IN OHMS.
3. ALL CAPACITANCE VALUES LESS THAN 1.0 ARE IN μ F. 1.0 AND ABOVE ARE IN μ MF, EXCEPT AS INDICATED.
4. ALL RESISTORS ARE 1/2 WATT, EXCEPT AS INDICATED.
5. * DENOTES 5% TOLERANCE.
6. Δ USED WITH 23HUP4/A ONLY.



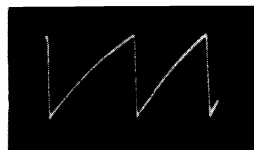
⑪ SR201 CATHODE JUNCTION HORIZONTAL PHASE DETECTOR HORIZONTAL RATE 12V P-P



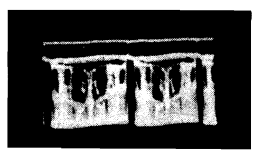
⑫ SR201 CATHODE JUNCTION HORIZONTAL PHASE DETECTOR HORIZONTAL RATE 12V P-P



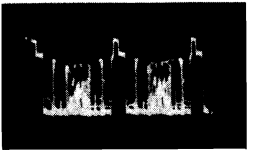
KCS175 CHASSIS CIRCUIT SCHEMATIC



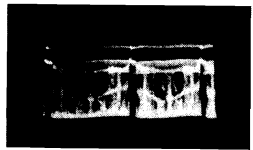
⑥ V206A PIN 2 VERTICAL OUTPUT GRID VERTICAL RATE 28V P-P



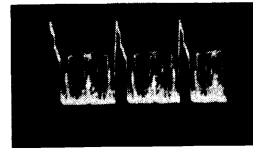
⑦ V205B PIN 9 VIDEO AMPLIFIER PLATE VERTICAL RATE 110V P-P



⑧ V205B PIN 9 VIDEO AMPLIFIER PLATE HORIZONTAL RATE 110V P-P

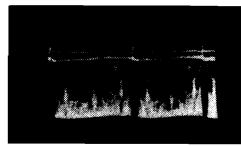


⑨ V205A PIN 2 AGC GRID VERTICAL RATE 80V P-P

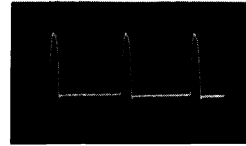


⑩ V205A PIN 2 AGC GRID HORIZONTAL RATE 80V P-P

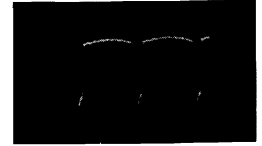
RCA Victor Chassis KCS-175, Service Information, Continued



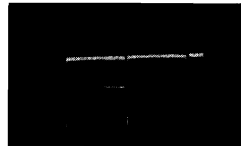
13 R224 & C246 JUNCTION
(ZONE 4A PW200 BOARD)
VERTICAL RATE 110V P-P



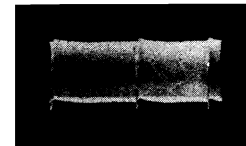
14 V205A PIN 3
AGC PLATE
HORIZONTAL RATE 420V P-P



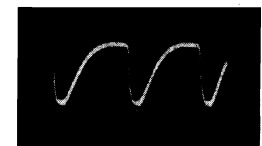
15 V105 PIN 2
KINESCOPE GRID
HORIZONTAL RATE 40V P-P



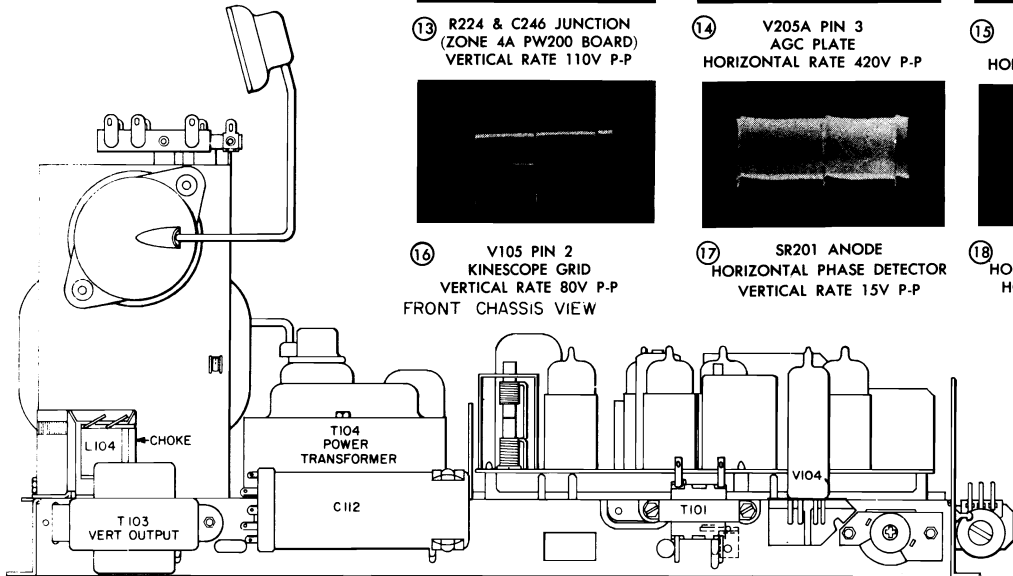
16 V105 PIN 2
KINESCOPE GRID
VERTICAL RATE 80V P-P
FRONT CHASSIS VIEW



17 SR201 ANODE
HORIZONTAL PHASE DETECTOR
VERTICAL RATE 15V P-P

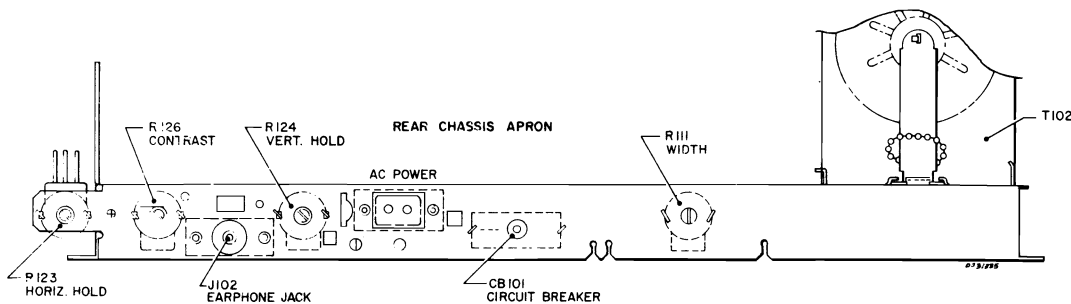
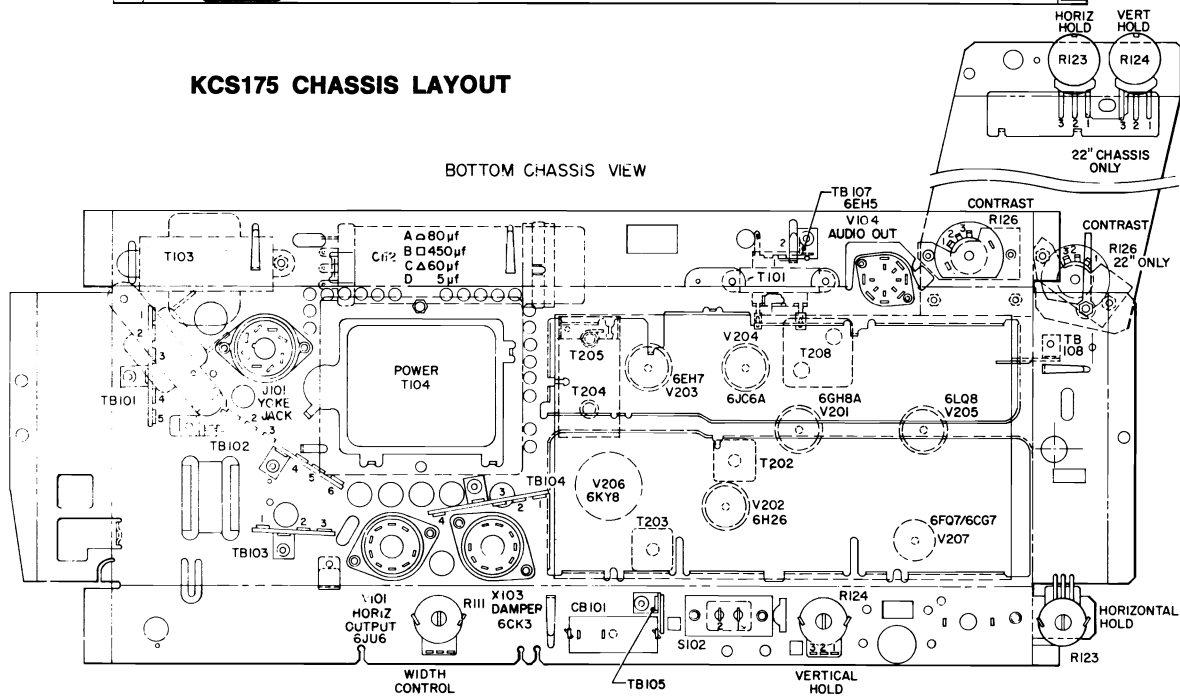


18 SR201 ANODE
HORIZONTAL PHASE DETECTOR
HORIZONTAL RATE 15V P-P



KCS175 CHASSIS LAYOUT

BOTTOM CHASSIS VIEW





Chassis KCS 169 Series

Model and Chassis Cross Reference

MODEL	NAME	CHASSIS	TMA	TUNERS	PICTURE TUBE	ANTENNAS VHF/UHF
AL-060A, B, E, H, J	"NIMBLE"	KCS 169B	155A	KRK 146A / 147A	12DFP4	Earphone/Pillow Speaker Jack Dipole/Ring
AL-066G, W, Y	"GYPSY"	KCS 169B	155A	KRK 146A / 147A	12DFP4	Earphone/Pillow Speaker Jack Dipole/Ring
AL-078WK	"BON TON"	KCS 169B	155A	KRK 146A / 147A	12DFP4	Earphone/Pillow Speaker Jack Monopole/Ring

The letter following the third numeral in the model number designates the cabinet finish as follows: A—CANDY APPLE RED/FOG WHITE. B—LIGHT BLUE/FOG WHITE. E—DARK MINERAL GRAY/FOG WHITE. H—CHAMOIS/FOG WHITE. J—NEWARK GRAY/ALABASTER. G—PINEHURST GREEN ANTIQUE GLAZE ROLLER GRAIN VINYL/BLACK. W—HARVEST WALNUT ROLLER GRAIN VINYL/FOG WHITE (AL-060W) W—HARVEST WALNUT ROLLER GRAIN VINYL/BLACK (AL-066W) W—HARVEST WALNUT ROLLER GRAIN VINYL/CAMEO TAN METALLIC LACQUER (AL-078WK). Y—TAUPE IRISH LINEN ROLLER GRAIN TEXTURED VINYL/BLACK. The letter K indicates custom model.

INSTRUMENT DISASSEMBLY

The back cover is secured by four hex-head self tapping screws, two at the top in the hand-hold recess and two on the bottom. After the four screws are removed, move the back cover away from the chassis far enough to disconnect both antennas at the tuners. Remove back cover.

The TMA is held to the front panel by three 1/4" hex-head screws, one of which also retains the picture tube ground strap. It is necessary to remove the tuner knobs to pull the TMA.

The chassis fits into channels molded into the chassis support and is held in place by the back cover and spring pressure. The On-off volume control, brightness and contrast knobs come out with the chassis and cannot be removed from the cabinet front.

To remove the picture tube, loosen the compression bolt enough to slip the retaining wire over the clip on flat spring retainers at each corner. Discharge the 2nd anode before handling the picture tube.

The high voltage rectifier tube can be removed by first unplugging the plate cap, then lifting the tube and socket out by means of the filament and high voltage leads.

A mounting bracket for the yoke is provided on the high voltage radiation shield.

HORIZONTAL WIDTH AND CENTERING

All adjustments should be made at 108VAC line.

Adjust the horizontal hold control to the center of the horizontal oscillator pull-in range. Vertical height and linearity should be approximately correct. Set the brightness and the contrast control to maximum (Full Clockwise).

The width control, physically, consists of an insulated jack which can be connected to one of three terminals at points Y, T and S. Greatest width is with the jumper connected to "Y", and least at Terminal "S". Connect the jumper to the terminal that leaves a small amount of black showing. Then center the raster by moving the centering magnets on the yoke housing. Incorrect centering will affect the horizontal linearity.

The width control operates by varying the screen voltage on the horizontal output tube (Pin 11 33GY7). If width is not set correctly, high voltage will be affected adversely.

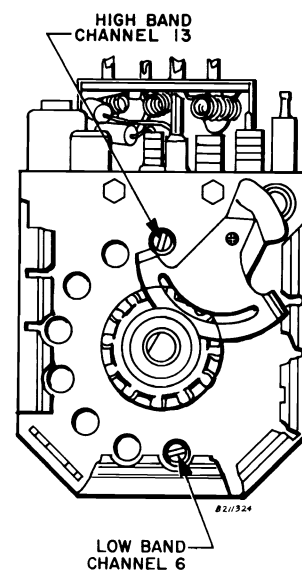
Width should be adjusted before any other horizontal or vertical adjustments are performed.

VHF OSCILLATOR ADJUSTMENT

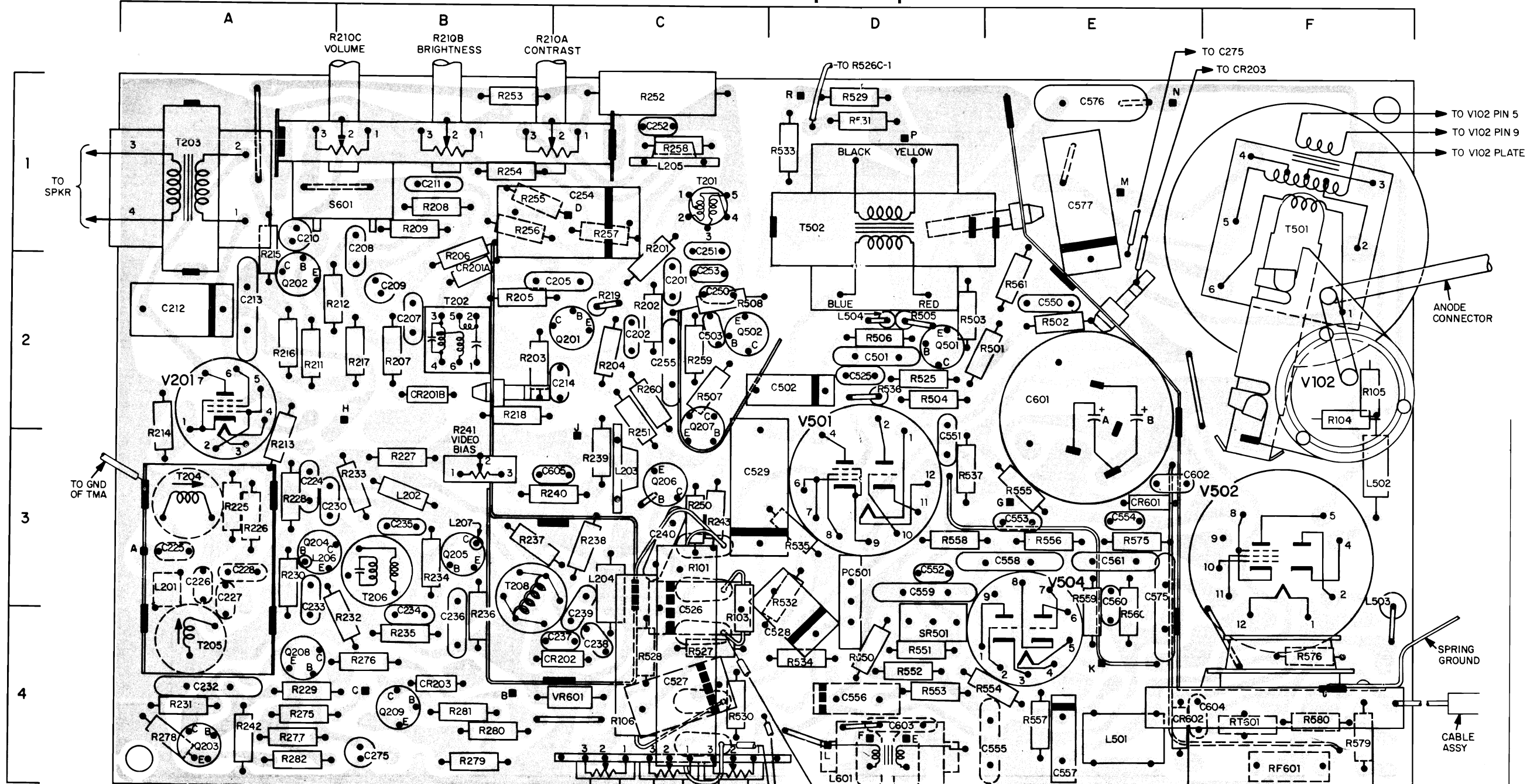
Two adjustments are provided to set the local oscillator near the center of the fine tuning range. At Channel 13 for the high band and at Channel 6 for the low band. Both these adjustments can be made without instrument disassembly.

To adjust the local oscillator, tune to highest channel available on that band and set the fine tuning control to the mechanical center of its range. Then remove the concentric VHF knobs. Use small plastic or brass screwdriver type alignment tool. The access hole at the bottom leads to the low Channel adjustment (Channels 2-6) and the upper one to the high channel adjustment (Channels 7-13).

Set the oscillator to crossover—i.e. best picture with clear sound. Then check that other channels on that band are within the fine tuning range.



VHF Local Oscillator Adjustments



CIRCUIT BOARD PHANTOM VIEW (COMPONENT SIDE)

BOARD COMPONENT LOCATION GUIDE

C201 2C	C213 2A	C233 3A	C251 1C	C525 2D	C554 3E	C576 1E	CR201A 2B
C202 2C	C214 2C	C234 4B	C252 1C	C526 3C	C555 4E	C577 1E	CR201B 2B
C205 2C	C224 3A	C235 3B	C253 2C	C527 4D	C556 4D	C601 2E	CR202 4C
C207 2B	C225 3A	C236 4B	C254 1C	C528 4C	C557 4E	C602 3E	CR203 4B
C208 1B	C226 3A	C237 4C	C255 2C	C529 3C	C558 3E	C603 4D	CR601 3E
C209 2B	C227 3A	C238 4C	C275 4B	C550 2E	C559 3D	C604 4F	CR602 4E
C210 1A	C228 3A	C239 3C	C501 2D	C551 2D	C560 3E	C606 3C	
C211 1B	C230 3A	C240 3C	C502 2D	C552 3D	C561 3E		
C212 2A	C232 4A	C250 2C	C503 2C	C553 3E	C575 3E		

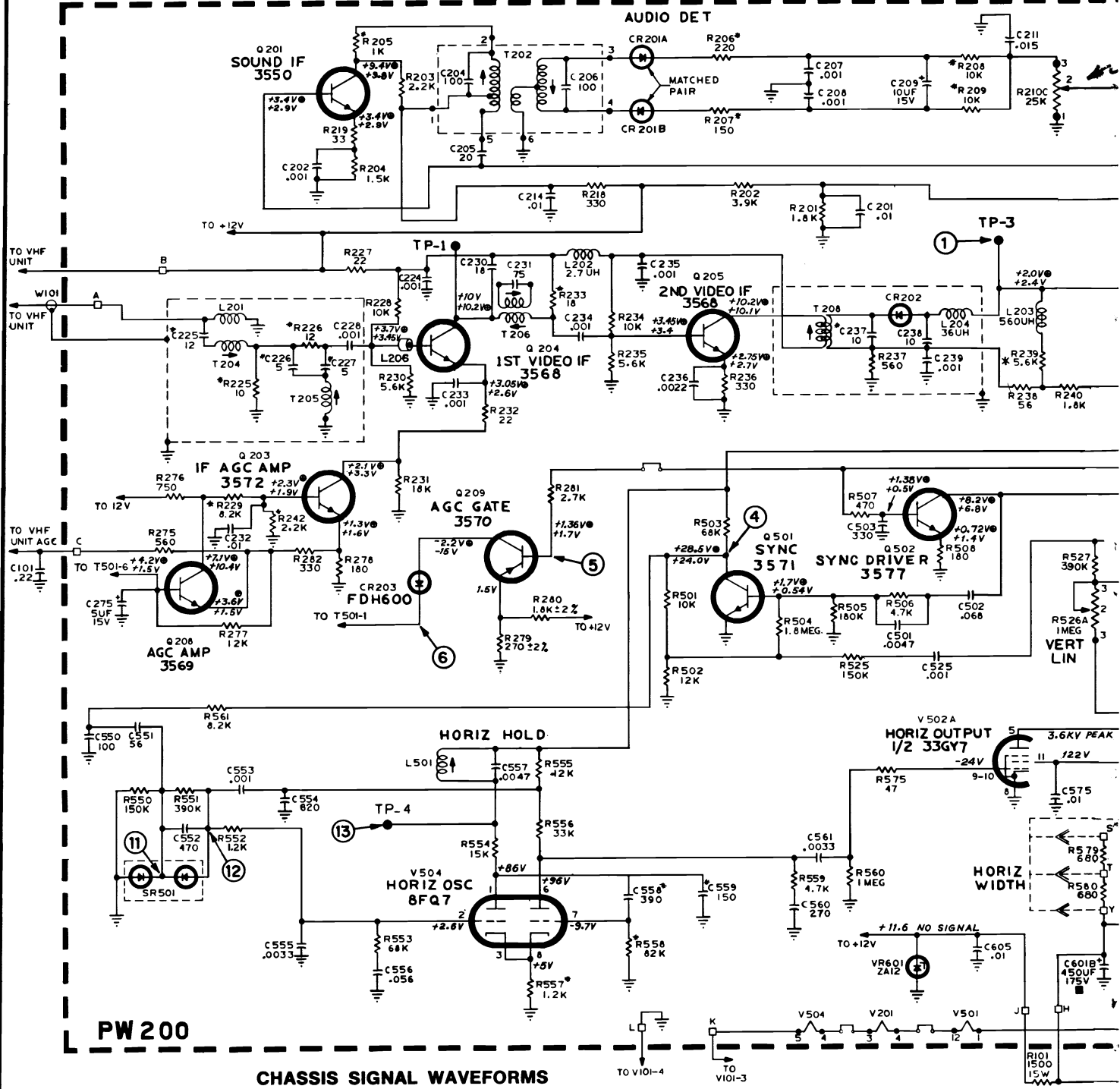
L201 3A	PC501 3D	R101 3C	R203 2C	R210A 1C	R215 1A
L202 3B	Q201 2C	R103 3C	Q202 2A	R210B 1B	R216 2A
L203 3C	Q202 2A	R104 2F	Q203 4A	R210C 1B	R217 2B
L204 3C	Q203 4A	R105 2F	Q204 3A	R205 2C	R218 2C
L205 1C	Q204 3A	R106 4C	Q205 3B	R206 1B	R219 2C
L206 3A	Q205 3B	R201 1C	Q206 3C	R207 2B	R225 3A
L207 3B	Q206 3C	R202 2C	Q207 2C	R208 1B	R226 3A
L501 4E	Q207 2C	R209 1B	Q208 4A	R211 2A	
L502 3F	Q208 4A		Q209 4B	R212 2B	
L503 3F	Q209 4B		Q501 2D	R213 3A	
L504 2D	Q501 2D		Q502 2C	R214 3A	
L601 4D					

R526C 4C	R240 3C	R556 3E	R579 4F
R527 4C	R241 3B	R557 4E	R580 4F
R528 4C	R242 4A	R558 3D	
R529 1D	R243 3C	R559 3E	
R530 4C	R250 3C	R560 3E	
R531 1D	R251 2C	R561 2E	
R532 3D	R252 1C	R575 3E	
R533 1D	R253 1B	R576 4F	
R534 4D	R254 1B	R579 4F	
R535 3D	R255 1B		
R536 2D	R256 1B		
R537 3D	R257 1C		
R550 4D	R258 1C		
R551 4D	R259 2C		
R552 4D	R260 2C		
R553 4D	R275 4A		
R554 4E	R276 4B		
R555 3E	R277 4A		
R556 3E	R278 4A		
R557 4E	R279 4B		
R558 3D	R280 4B		
R559 3E	R281 4B		
R560 3E	R282 4A		
R561 2E	R283 4A		
R575 3E	R501 2E		
R576 4F	R502 2E		
R579 4F	R503 2D		
R580 4F	R504 2D		
	R505 2D		
	R506 2D		
	R507 2C		
	R508 2C		
	R525 2B		
	R526A 4C		
	R526B 4C		
	R527 3B		
	R228 3A		
	R229 4A		
	R230 3A		
	R231 4A		
	R232 3B		
	R233 3Γ		
	R234 3B		
	R235 4B		
	R236 4B		
	R237 3B		
	R238 3C		
	R239 3C		

Terminals

B 4B
C 4B
D 1C
E 4D
F 4D
G 3E
H 2B
K 4E
M 1E
N 1E
P 1D
R 1D

RCA Victor Chassis KCS-169, Schematic Diagram, Continued

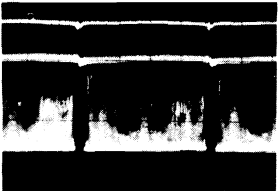


PW 200

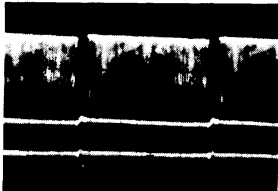
CHASSIS SIGNAL WAVEFORMS



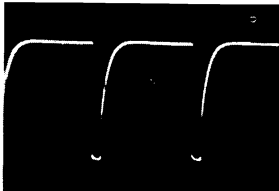
1. TP-3
Second Detector
Vert. Rate 0.9V P-P



2. Q207 Collector
Video Output
Horiz. Rate 70V P-P

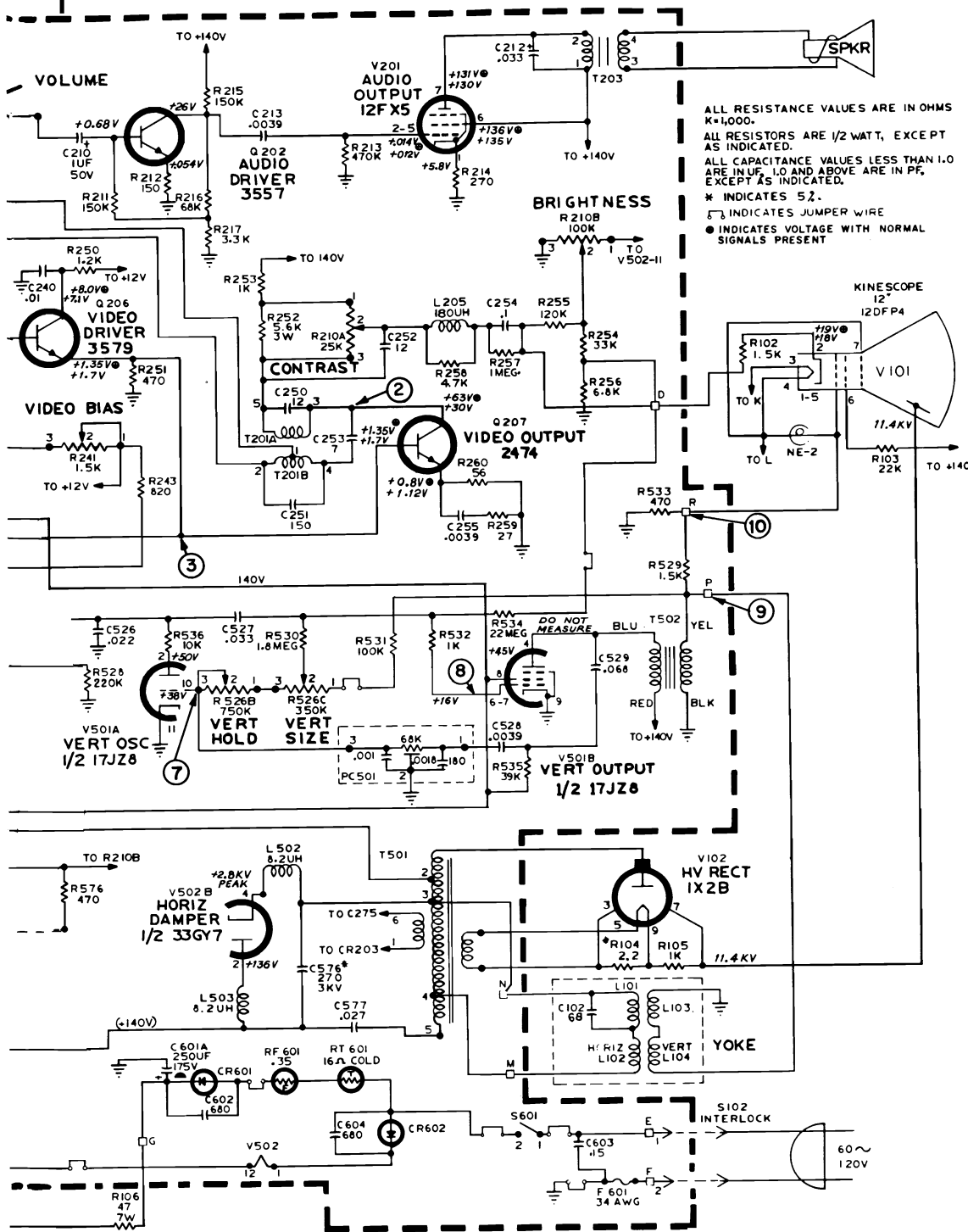


3. Q206-Q207
Emitter-Base Junction
Vert. Rate 0.85V P-P

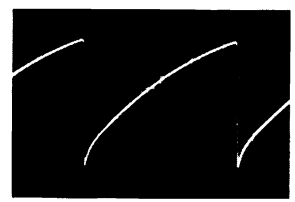


4. Q501 Collector
Sync Amplifier
Horiz. Rate 36V P-P

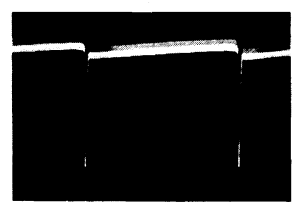
RCA Victor Chassis KCS-169, Schematic Diagram, Continued



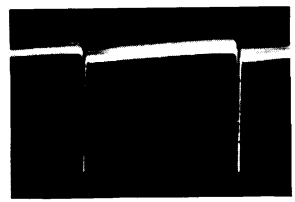
ALL RESISTANCE VALUES ARE IN OHMS
K=1,000.
ALL RESISTORS ARE 1/2 WATT, EXCEPT
AS INDICATED.
ALL CAPACITANCE VALUES LESS THAN 1.0
ARE IN UF, 1.0 AND ABOVE ARE IN PF,
EXCEPT AS INDICATED.
* INDICATES 5%.
⌋ INDICATES JUMPER WIRE
● INDICATES VOLTAGE WITH NORMAL
SIGNALS PRESENT



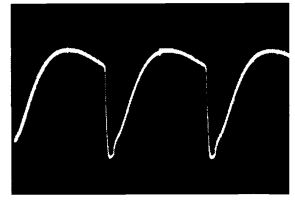
8. 17J78 Pin 6-7
Vertical Output Grid
Vert. Rate 31V P-P



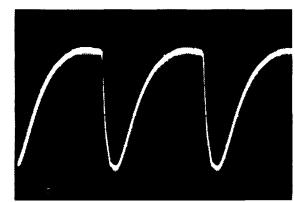
9. PW200-P
Vertical Output Transf.
Vert. Rate 160V P-P



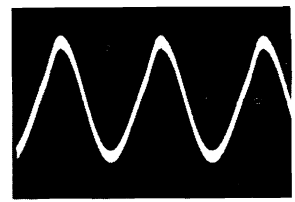
10. PW200-R
Vertical Blanking
Vert. Rate 38V P-P



11. SR501 Cathode Junction
Horiz. Phase Detector
Horiz. Rate 13V P-P



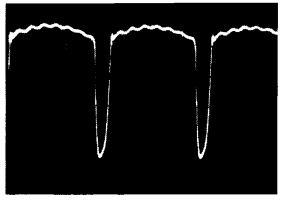
12. SR501 Anode
Horiz. Phase Detector
Horiz. Rate 15V P-P



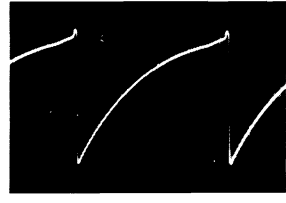
13. TP-4
Horizontal Sine Wave
Horiz. Rate 20V P-P



5. Q209 Base
AGC Gate
Horiz. Rate 9V P-P



6. CR203 Cathode
AGC Gating Pulse
Horiz. Rate 21V P-P



7. 17JZ8 Pin 10
Vertical Osc. Grid
Vert. Rate 170V P-P

RCA Victor Chassis KCS-169, Service Information, Continued

SERVICE CONTROL LOCATION

The combined on/off switch-volume control, contrast, and brightness controls are located at the lower right side of the cabinet front. Above them at the top front are the UHF and VHF tuning controls. The shafts of the remaining customer controls—vertical hold, and horizontal hold-extend (in that order from left to right) through the lower side of the rear cover. On either side of the vertical hold control are two small access holes to permit screwdriver adjustment of the vertical linearity and vertical size controls.

VERTICAL LINEARITY HEIGHT AND CENTERING

Width must be correct before adjusting Vertical.

With 108VAC line, set the contrast to minimum and the Brightness control for low brightness. Use station signal or test pattern.

Adjust the Height and Linearity controls for a symmetrical picture. The height and centering should be such that the raster barely fills the screen at the top and bottom.

Check linearity at 120VAC line.

NOTE: Care should be taken when centering the raster vertically to maintain the previously adjusted horizontal centering.

VIDEO BIAS ADJUSTMENT

With high voltage circuits operating, bias off the picture I F Amplifiers by grounding PW 200-C.

Adjust video bias control, R241 for +30V DC $\pm 2V$ at collector of Q207 (Video output transistor).

DEFLECTION YOKE

If the picture is tilted, loosen the yoke clamp screw and rotate the yoke to level the picture. Retighten the yoke clamp.

HORIZONTAL HOLD

Turning the Horizontal hold CW toward pull-in from the high frequency side, the picture should pull into sync from a minimum of one bar and a maximum of three bars. Turning the hold control ccw toward pull-in from the low frequency side, the picture should pull in from one to three bars.

CIRCUIT DESCRIPTION

In this hybrid chassis the audio output and deflection circuits are powered by tubes, and the remaining circuits by solid state devices. All transistors are the NPN type except the AGC Gate which is PNP.

The composite signal from the tuner is amplified by two I F stages. CR202 is the video detector and sound mixer. In a properly operating receiver the video signal at TP3 should be approximately 0.9 volts. This composite signal is fed to the emitter follower video driver stage which is directly coupled to the video output transistor base. The video and the 4.5MC sound signals are separated at the collector of the video output transistor. The video is fed to the picture tube cathode through the contrast control.

The secondary of the sound take-off coil, T201B, is in series with the sound I F transistor base bias supply line, while the primary, T201A, traps 4.5MC from the video and couples 4.5MC to the audio stages. After amplification, the audio is detected by the matched ratio detector diodes, CR201A and B. After detection, the audio is fed to the base of the audio driver transistor, which in turn drives the audio output tube.

TRANSFORMER AND COIL CHART

Symbol No.	Description	Winding	Lead	Terminal # or color	D.C. Ohms Resistance	Notes	
T501	High Voltage Transformer	Primary	start	5	25.8 \pm 15%	Do not leave slack in leads. Dress all leads away from the transformer tire. Transformer mounts only one way.	
			tap	4			
			tap	3			7.2 \pm 15%
			finish	2			11 \pm 15%
		High Voltage	start	2	485 \pm 15%		
			finish	cap			
T502	Vertical Output Transformer	Primary	start	red	450	Transformer mounts only one way.	
			finish	blue			
		Secondary	start	yellow	9.5		
			finish	black			
T203	Audio Output Transformer	Primary	start	blue	250	Transformer mounts only one way.	
			finish	red			
		Secondary	start	black	.6		
			finish	green			
L103 L104 L101 L102	Deflection Yoke	Vertical	green	2	25.2 \pm 7%	When replacing, leads may be disconnected at yoke terminals. Use minimum heat.	
			yellow	5			
		Horizontal	red	1	30.7 \pm 10%		
			white/red/blk	4			
L501	Horizontal Stabilizer Coil		start	4	75 \pm 12%	Coil mounts only one way.	
			finish	1			

SEARS, ROEBUCK and CO.

CHASSIS NO. 528.70450

USED IN TELEVISION MODELS: 81271 81291 81321 81401 81411 81421

FOCUS ADJUSTMENT

Connect pin No. 4 of CRT to either J53, J90 or J72 for well defined scanning lines.

DEFLECTION YOKE AND CENTERING RINGS ADJUSTMENTS

Follow this procedure to adjust the Deflection Yoke and Centering Rings.

1. Turn the receiver on and disconnect the antenna.
2. The deflection yoke is held on the neck of the picture tube by a clamp device. Loosen the clamp, by unscrewing the screw on the clamp, and carefully move the yoke as far forward as possible on the neck of the picture tube. Rotate the yoke until the top and bottom edges of the raster are squared with the chassis. Tighten the screw.

NOTE: A Width Device is located between the Deflection Yoke and the neck of the picture tube. This must be adjusted before the Yoke clamp is tightened.

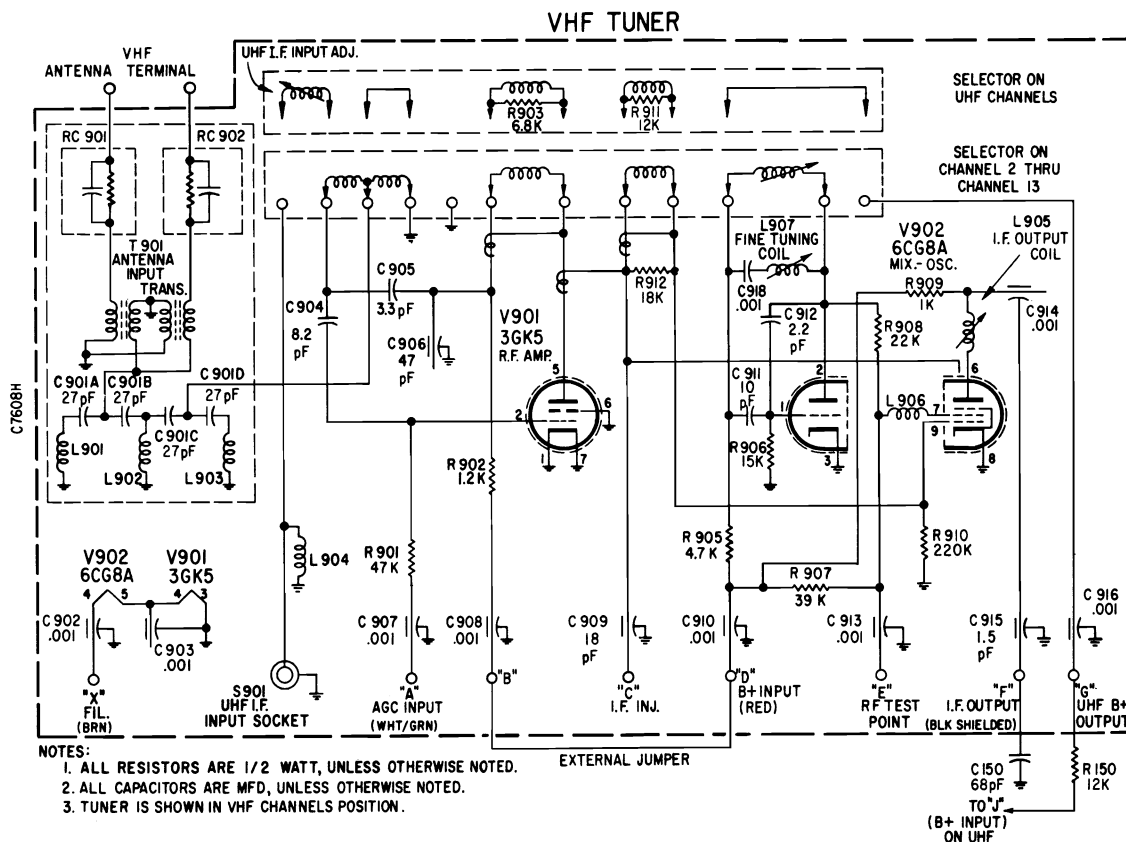
3. Center the raster horizontally and vertically, and eliminate shaded corners by simultaneously, but independently, rotating the centering rings until the best effect is obtained.
4. Turn the brightness control to the point giving normal picture brilliance. Maintain brightness at this level during the following adjustments. Center the contrast control.

WIDTH DEVICE ADJUSTMENT

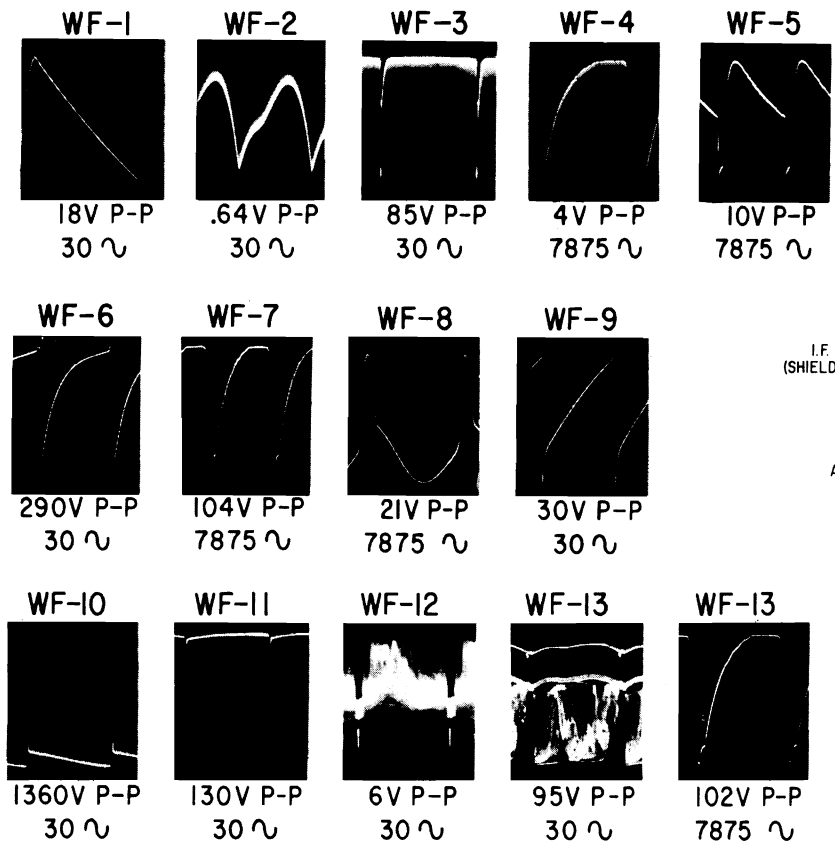
The Width Device is a piece of metallic foil attached to a sheet of plastic; it should be placed so that the identification notch is centered on top of the picture tube neck. (The identification notch must remain centered on the top half of the picture tube neck). Be sure that the Width Device is pulled as far toward the base of the picture tube as possible. The Width Device should be left in this position unless further adjustment is necessary. For further adjustment follow steps given below:

1. Loosen the screw on clamp which secures the Deflection Yoke to the picture tube.
2. During the following adjustment hold the Deflection Yoke in position and do not disturb the relative position between the Deflection Yoke and the picture tube. Slide the Width Device forward or backward until the picture has proper width. The plastic corners can be bent to ease moving.

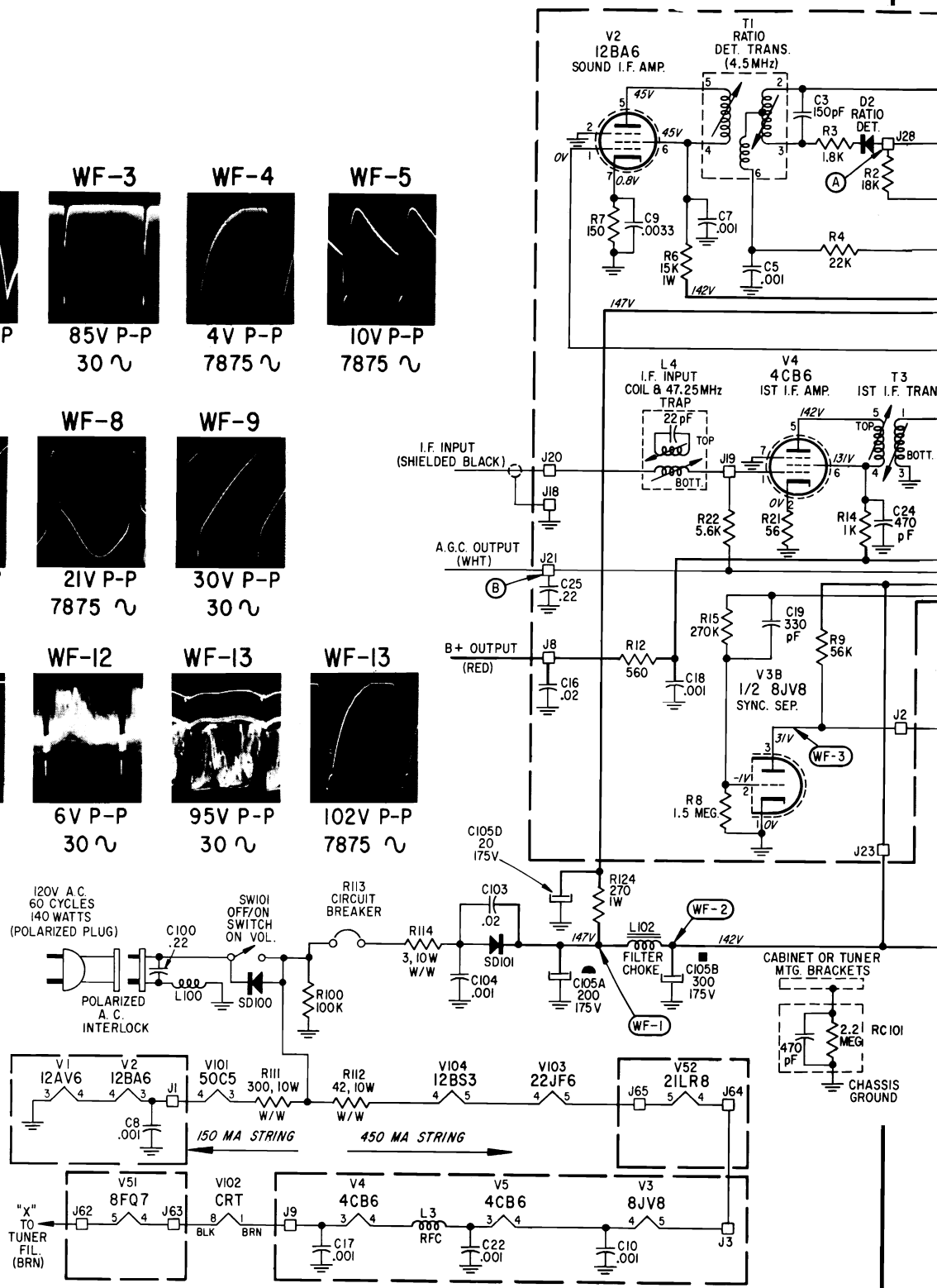
NOTE: The Width Device may affect the vertical sweep, in which case, the Vertical Height and Vertical Linearity controls may have to be readjusted when the width adjustment has been completed.



SEARS Chassis No. 528.70450, Schematic Diagram



**CHASSIS NO.
528.70450**

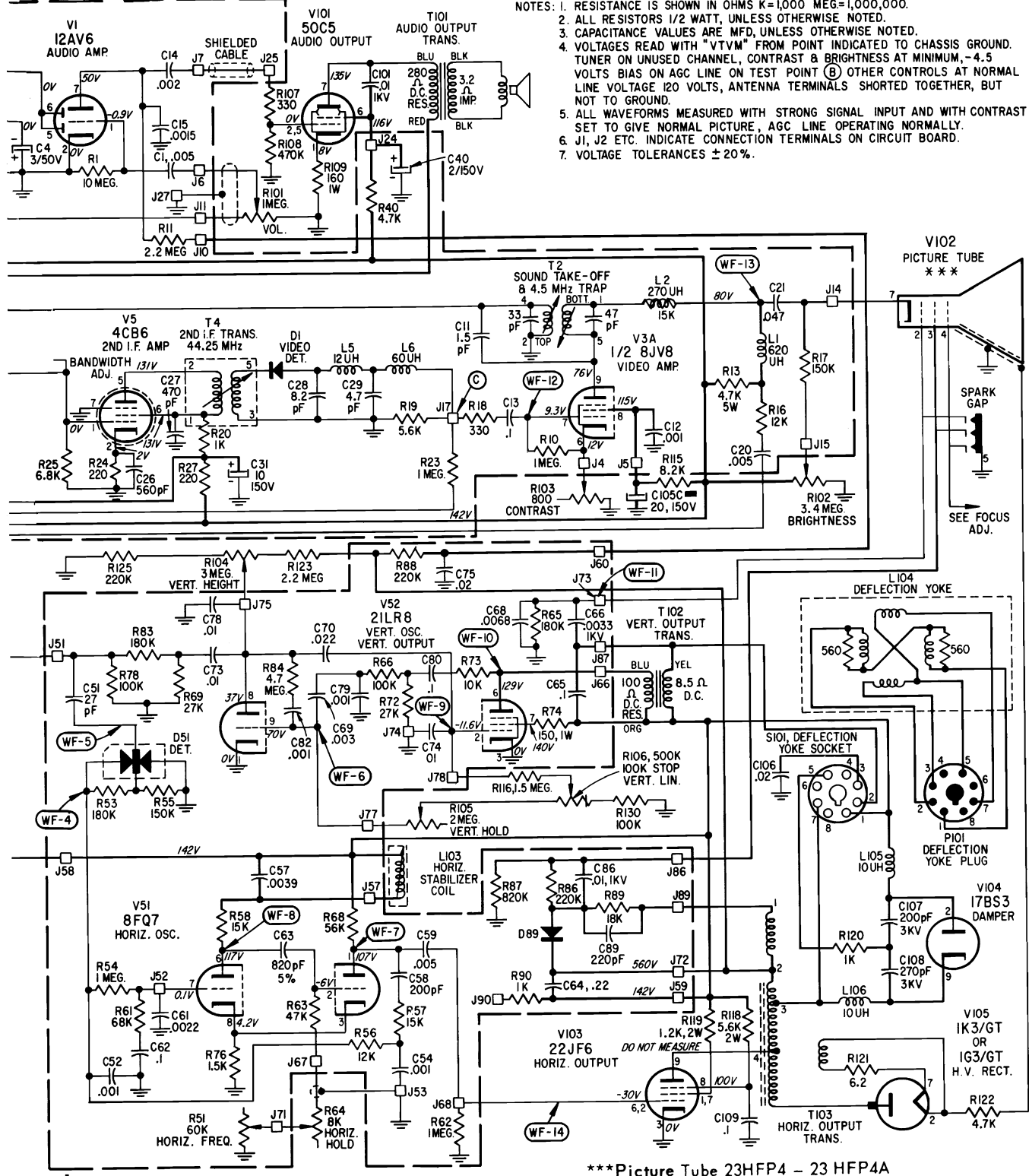


HORIZONTAL FREQUENCY AND HORIZONTAL STABILIZER CONTROL ADJUSTMENT (Field Shop)

1. Turn set to an active channel. Set Horiz. Hold Control (R64) in center of its range.
2. Short L103 (Horizontal Stabilizer Coil) by connecting a jumper across J57 and J58, also short J52 to ground with a jumper lead.
3. Turn variable cathode resistor (R51) completely counter-clockwise.
4. Advance R51 SLOWLY clockwise until picture just locks in.
5. Remove jumper from horizontal stabilizer coil.
6. Lock in picture by adjusting the horizontal stabilizer coil, which in effect is the Horizontal Hold Control, finally, remove J52 ground jumper lead.

SEARS Chassis No. 528.70450, Schematic Diagram, Continued

- NOTES: 1. RESISTANCE IS SHOWN IN OHMS K=1,000 MEG=1,000,000.
 2. ALL RESISTORS 1/2 WATT, UNLESS OTHERWISE NOTED.
 3. CAPACITANCE VALUES ARE MFD, UNLESS OTHERWISE NOTED.
 4. VOLTAGES READ WITH "VTVM" FROM POINT INDICATED TO CHASSIS GROUND. TUNER ON UNUSED CHANNEL, CONTRAST & BRIGHTNESS AT MINIMUM, -4.5 VOLTS BIAS ON AGC LINE ON TEST POINT (B) OTHER CONTROLS AT NORMAL LINE VOLTAGE 120 VOLTS, ANTENNA TERMINALS SHORTED TOGETHER, BUT NOT TO GROUND.
 5. ALL WAVEFORMS MEASURED WITH STRONG SIGNAL INPUT AND WITH CONTRAST SET TO GIVE NORMAL PICTURE, AGC LINE OPERATING NORMALLY.
 6. J1, J2 ETC. INDICATE CONNECTION TERMINALS ON CIRCUIT BOARD.
 7. VOLTAGE TOLERANCES ± 20%.



***Picture Tube 23HFP4 - 23 HFP4A

TUNER RF OSCILLATOR ADJUSTMENT

If the range of the fine tuning control is not adequate to tune in a clear picture on one or more channels, the respective channel oscillator range slug requires adjustment. This can be done in the following manner:

- (1) Set the fine tuning control to the center of its range. The fine tuning control is approximately at the center of its range when the flat portion on the fine tuning shaft is parallel to the top of the tuner.
- (2) Adjust - with a non-metallic blade screwdriver for clearest picture. Extreme care should be taken not to exert undue pressure on the slug.

SEARS Chassis No. 528.70450, Alignment Procedure

TELEVISION ALIGNMENT PROCEDURE

PRELIMINARY:

Alignment is an exacting procedure and should be undertaken only when necessary. The following equipment is required for alignment work.

1. Hickok 610, 610A Signal Generator or equivalent where a 4.5 MHz Crystal controlled frequency (CW) is available. The following I.F. Carriers are necessary.

4.5 MHz Inter-carrier Sound I.F.
42.75 MHz Video I.F. Bandwidth Marker

44.25 MHz Video I.F. Center Frequency
45.75 MHz Video I.F. Picture Carrier Frequency
47.25 MHz Adj. Sound Carrier Frequency

2. Electronic voltmeter (VTVM)
3. RF Sweep generator with a frequency range of 40 to 50 MHz with a sweep width of at least 10 MHz, having an adjustable output of at least 0.1 volts.
4. Cathode ray oscilloscope, preferably with a wide band vertical amplifier and an input calibrating source.
5. Isolation transformer.

PRELIMINARY ALIGNMENT NOTES:

- a. It is recommended that the receiver be connected to an isolation transformer during alignment. Allow at least 5 minutes for set to warm up before any alignment is attempted.
- b. Connect oscilloscope hot lead through 10K ohm isolation resistor to Point (C) Connect ground lead of oscilloscope directly to main chassis.
- c. Adjust signal input to maintain 2V P-P at Point (C)
- d. Apply -3 volts bias to AGC line, -side to Point (B) +side to chassis.
- e. Connect to correct signal generator as shown in chart below.
- f. Clip hot lead of marker generator to the insulation of RF sweep generator hot lead. Connect ground lead to chassis.

NOTE: Before hooking up to Point "C" I.F. INJ, rotate Tuner to Channel 13.

VIDEO I.F. ALIGNMENT

Step	Sweep Generator (40-50MHz) Connect To	Marker Generator See Note Above	Output Waveform	Adjust	Remarks
1.	Pin 1 of 4CB6 (V4 thru .001 mfd. Cap	44.25MHz	Figure 1	T4	Adjust T4 for maximum response at 44.25MHz.
2.	Same	Same	Same	T3 (Bottom)	Turn top core of T3 to top of coil form before adjusting T3 bottom. Adjust T3 bottom for maximum response at 44.25MHz.
3.	Same	45.75MHz	Same	T3 (Top)	Adjust T3 top to position the 45.75MHz marker at the 3 db point of the response curve.
4.	Same	45.75MHz 42.75MHz	Same	T3 (Bottom)	Readjust T3 (Bottom) for symmetry of response shown in Figure 1.
5.	If necessary, repeat Steps 1 through 4 to obtain proper response. NOTE: If proper 3 db bandwidth is not obtained (3.0MHz ±.2MHz), refer to Bandwidth Loop Adjustment.				
6.	Point "C" (I.F. injection Point) See Figure 3.	47.25MHz	Figure 2	L4 (Top)	Adjust L4 top for minimum response at 47.25 MHz.
7.	Same	45.75MHz	Same	L905 Tuner I.F. Output Coil	Adjust L905 to position the 45.75MHz marker at the 6 db point of response curve.
8.	Same	42.90 MHz 45.75 MHz	Same	L4 (Bottom)	Adjust L4 (bottom for symmetry of response in Figure 2.
9.	If necessary, repeat Steps 6 through 8 to obtain response curve of Figure 2.				

BANDWIDTH LOOP ADJUSTMENT

The first I.F. transformer has long vertical lead adjacent to the primary and secondary windings. This wire must not be touched unless the bandwidth specifications (2.85MHz ±.2MHz) are incorrect. Adjust as follows:

1. To narrow the I.F. response curve, pull the wire away from the 1st I.F. coils of T3 (top). Repeat Steps 2 through 5 of the Video I.F. Alignment. See Figure 4.
2. To broaden the I.F. response curve, press the wire toward the 1st I.F. coils of T3 (top). Repeat Steps 2 through 5 of the Video I.F. Alignment. See Figure 4.

SOUND ALIGNMENT

PRELIMINARY:

- A. Apply -9V bias to Point B
- B. Set channel selector to unused channel.

Step	Signal Generator Frequency	Connect to	Output Indicator	Connect to	Adjust	Remarks
1.	4.5MHz	J17 (Test Point (C))	VTVM	Junction of two 100K ohm resistors. See NOTE 1	T1 top for zero (mid-scale)	Sig. Gen. Output 20Kwv.
2.	4.5MHz	Same	VTVM	Test Point (A)	T1 bottom for max.	Sig. Gen. output less than 10K uv (to avoid limiting)
3.	4.5MHz	Same	VTVM	Same	T2 bottom for max.	Same
4.	4.5MHz	Same	VTVM	Same	T2 top for max.	Same
5.	Remove meter, bias voltage, generator; tune set to station. Set fine tune for best picture and touch-up 4.5MHz reject trap (T2) for minimum sound beat in picture.					

NOTE 1 — Connect two 100K ohm resistors (Matched Pair) in series between test point (A) and ground. Connect negative lead of VTVM to junction of two resistors and the positive lead to J11. VTVM should be on low range with Zero volts at mid-scale.

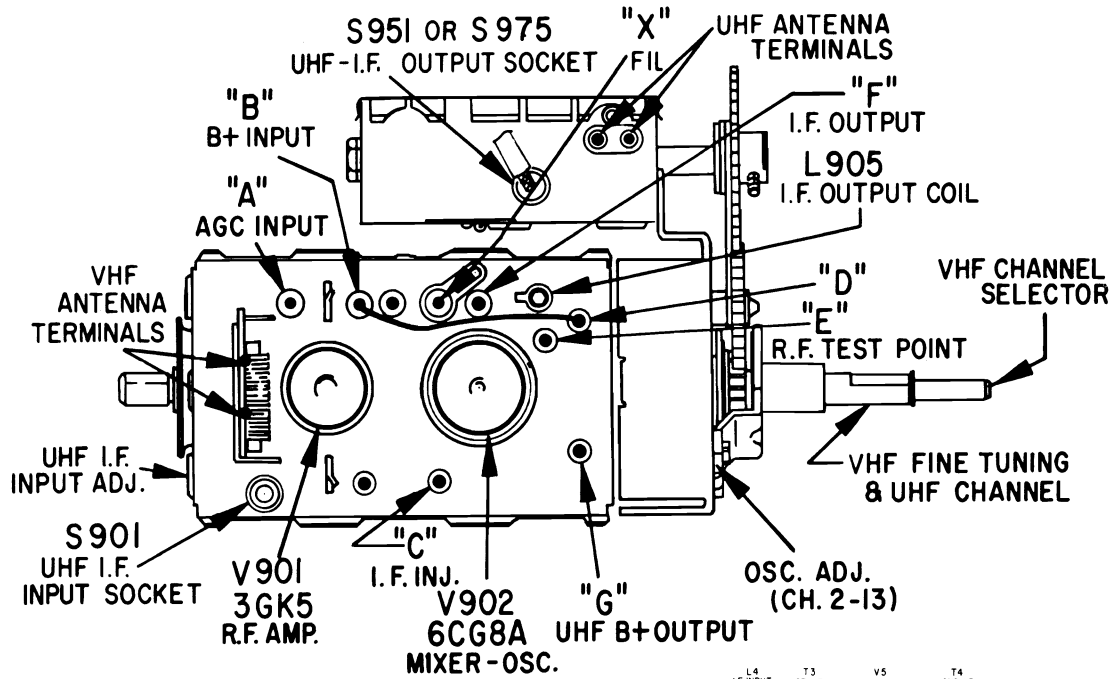
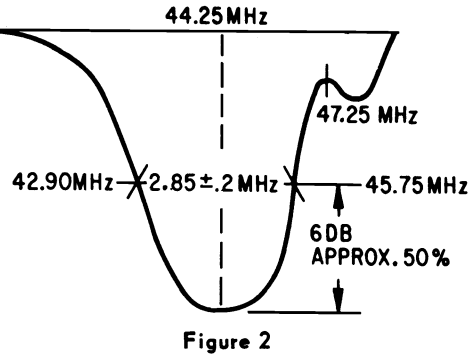
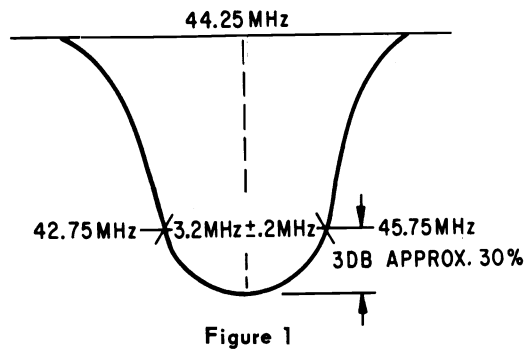


FIGURE 3 - UHF-VHF TUNER VIEW

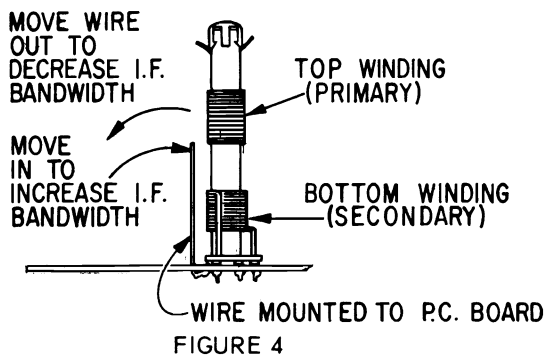
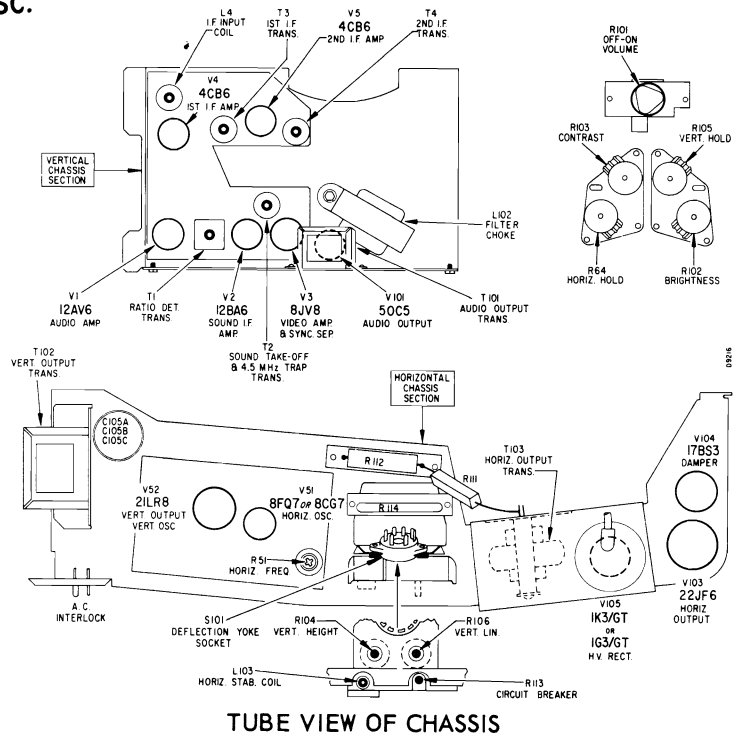
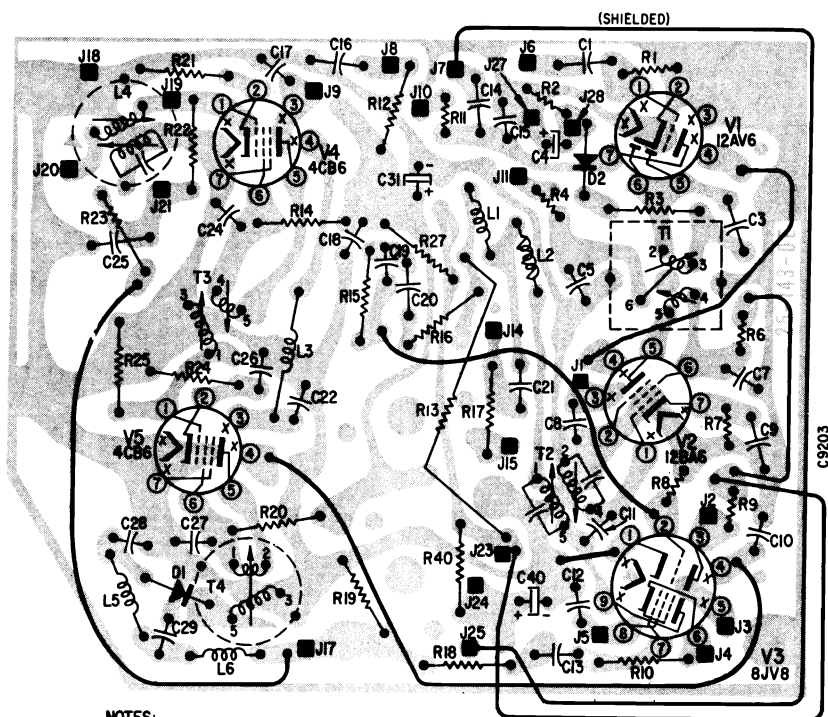


FIGURE 4



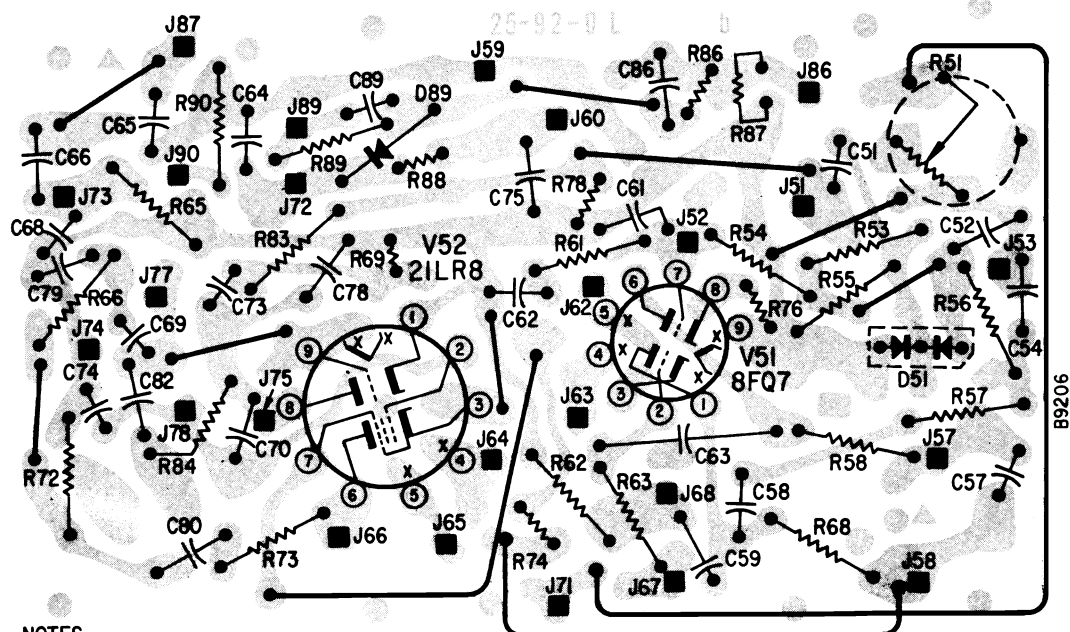
TUBE VIEW OF CHASSIS

SEARS Chassis No. 528.70450, Printed Circuit Boards



- NOTES:
 1. WIRING DIAGRAM SHOWN FROM CIRCUIT SIDE OF BOARD.
 2. SOLID LINES INDICATE WIRE JUMPERS.

WIRING DIAGRAM I.F. SYNC, SOUND BOARD



- NOTES:
 1. WIRING DIAGRAM IS SHOWN FROM CIRCUIT SIDE OF BOARD.
 2. SOLID LINES INDICATE WIRE JUMPERS.

Wiring Diagram IF Sync Sound, Horizontal Vertical Board

TELEVISION CHASSIS NO. 528. }
 { 70520
 { 70521
 { 70522

USED IN TELEVISION MODEL:

5176 5177 5178

FOCUS ADJUSTMENT

Connect pin No. 4 of CRT to either J53, J90 or J72 for well defined scanning lines.

DEFLECTION YOKE AND CENTERING RINGS ADJUSTMENTS

Follow this procedure to adjust the Deflection Yoke and Centering Rings.

1. Turn the receiver on and disconnect the antenna.
2. The deflection yoke is held on the neck of the picture tube by a clamp device. Loosen the clamp, by unscrewing the screw on the clamp, and carefully move the yoke as far forward as possible on the neck of the picture tube. Rotate the yoke until the top and bottom edges of the raster are squared with the chassis. Tighten the screw.

NOTE: A Width Device is located between the Deflection Yoke and the neck of the picture tube. This must be adjusted before the Yoke clamp is tightened.

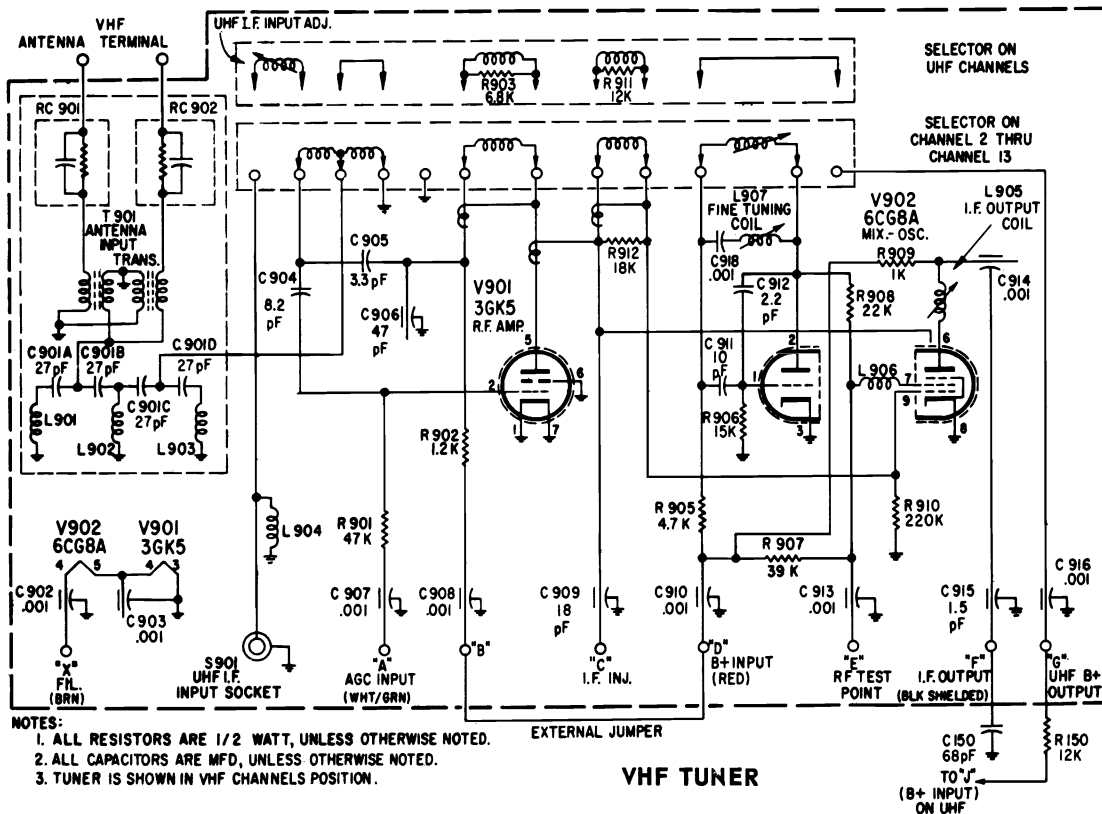
3. Center the raster horizontally and vertically, and eliminate shaded corners by simultaneously, but independently, rotating the centering rings until the best effect is obtained.
4. Turn the brightness control to the point giving normal picture brilliance. Maintain brightness at this level during the following adjustments. Center the contrast control.

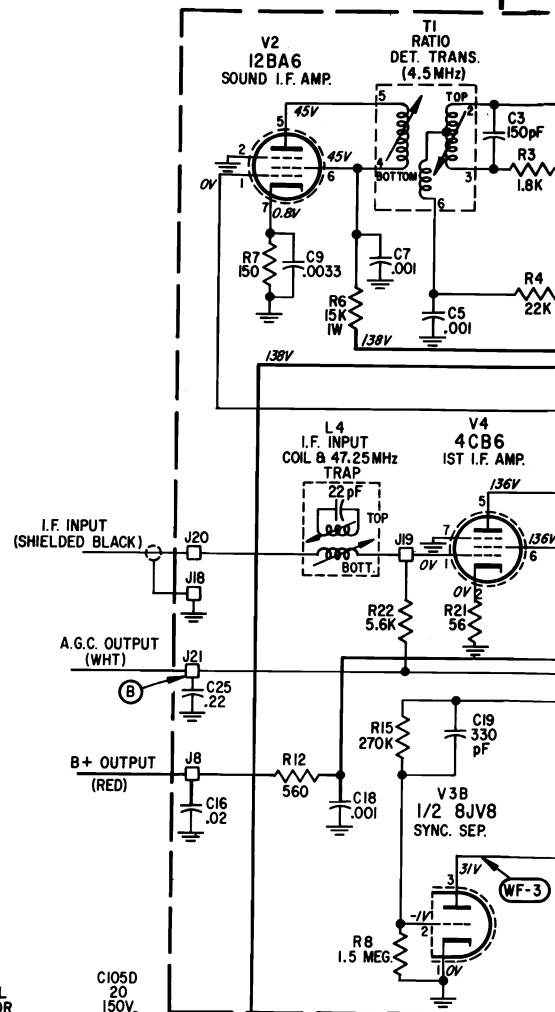
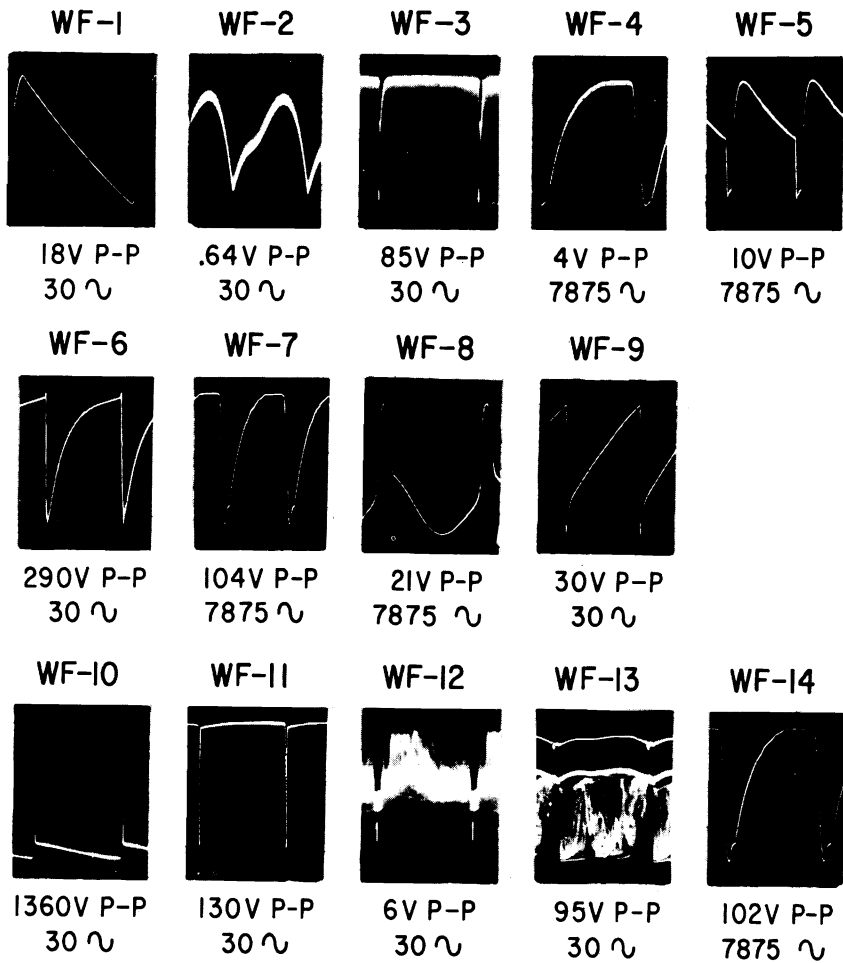
WIDTH DEVICE ADJUSTMENT

The Width Device is a piece of metallic foil attached to a sheet of plastic; it should be placed so that the identification notch is centered on top of the picture tube neck. (The identification notch must remain centered on the top half of the picture tube neck). Be sure that the Width Device is pulled as far toward the base of the picture tube as possible. The Width Device should be left in this position unless further adjustment is necessary. For further adjustment follow steps given below:

1. Loosen the screw on clamp which secures the Deflection Yoke to the picture tube.
2. During the following adjustment hold the Deflection Yoke in position and do not disturb the relative position between the Deflection Yoke and the picture tube. Slide the Width Device forward or backward until the picture has proper width. The plastic corners can be bent to ease moving.

NOTE: The Width Device may affect the vertical sweep, in which case, the Vertical Height and Vertical Linearity controls may have to be readjusted when the width adjustment has been completed.

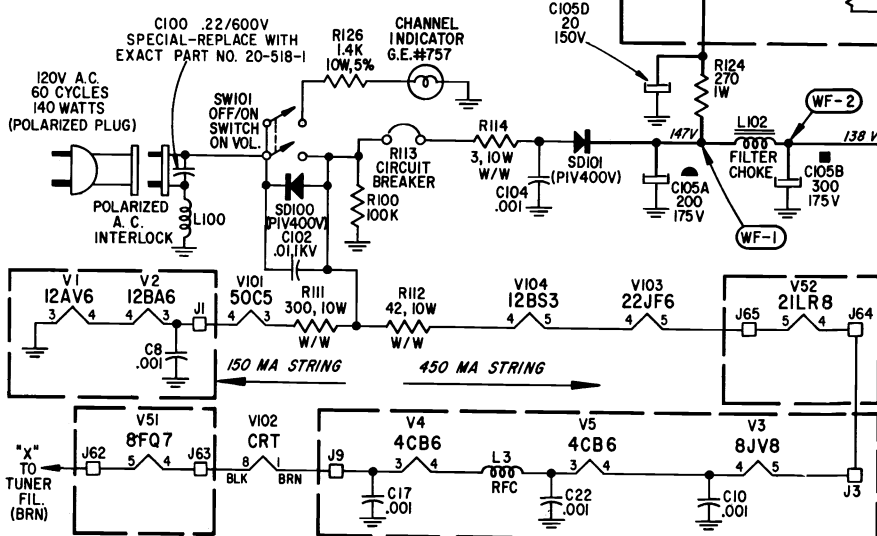




CHASSIS DIFFERENCES

Chassis 70521
 R137 Replaced by R64 (Same Value)
 R64 Replaced by R110 (Same Value)
 L1 from 620 uh to 774 uh
 Add R28 6.8 Meg. ohm
 Reason: To increase frequency response

Chassis 70522
 From #95-570-4 to 95-585-3 UHF Tuner
 Reason: Alternate UHF Tuner



TUNER RF OSCILLATOR ADJUSTMENT

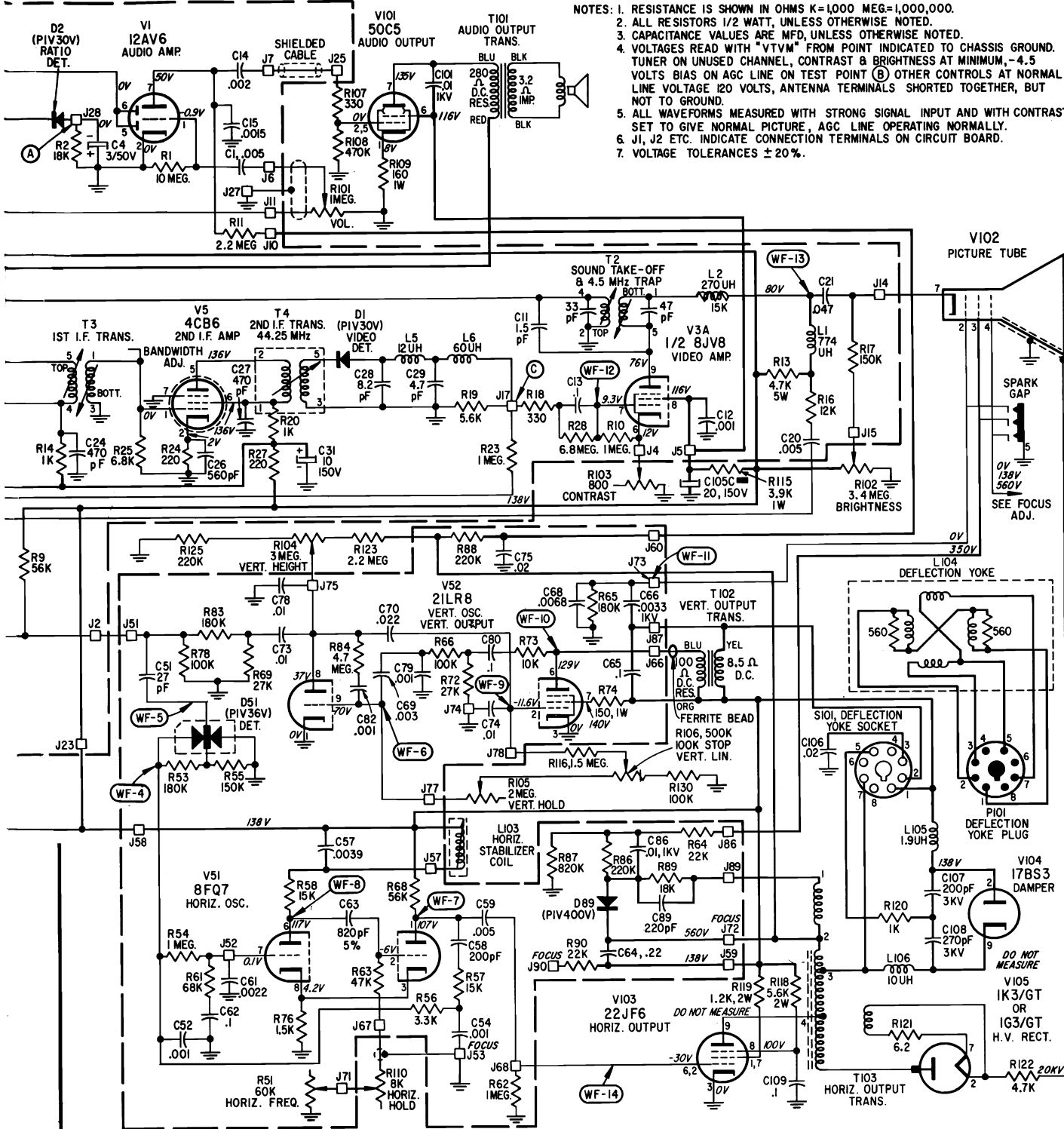
If the range of the fine tuning control is not adequate to tune in a clear picture on one or more channels, the respective channel oscillator range slug requires adjustment. This can be done in the following manner:

- (1) Set the fine tuning control to the center of its range. The fine tuning control is approximately at the center of its range when the flat portion on the fine tuning shaft is parallel to the top of the tuner.
- (2) *Adjust - with a non-metallic blade screwdriver for clearest picture. Extreme care should be taken not to exert undue pressure on the slug.

*If more than one channel requires the above adjustment, the order of channel adjustment is unimportant since each oscillator range adjustment is independent of the other.

SEARS Chassis No. 528.70520/22, Circuit Diagram, Continued

- NOTES: 1. RESISTANCE IS SHOWN IN OHMS K=1,000 MEG=1,000,000.
 2. ALL RESISTORS 1/2 WATT, UNLESS OTHERWISE NOTED.
 3. CAPACITANCE VALUES ARE MFD, UNLESS OTHERWISE NOTED.
 4. VOLTAGES READ WITH "VTVM" FROM POINT INDICATED TO CHASSIS GROUND. TUNER ON UNUSED CHANNEL, CONTRAST & BRIGHTNESS AT MINIMUM, -4.5 VOLTS BIAS ON AGC LINE ON TEST POINT (B) OTHER CONTROLS AT NORMAL LINE VOLTAGE 120 VOLTS, ANTENNA TERMINALS SHORTED TOGETHER, BUT NOT TO GROUND.
 5. ALL WAVEFORMS MEASURED WITH STRONG SIGNAL INPUT AND WITH CONTRAST SET TO GIVE NORMAL PICTURE, AGC LINE OPERATING NORMALLY.
 6. J1, J2 ETC. INDICATE CONNECTION TERMINALS ON CIRCUIT BOARD.
 7. VOLTAGE TOLERANCES $\pm 20\%$.



HORIZONTAL FREQUENCY AND HORIZONTAL STABILIZER CONTROL ADJUSTMENT (Field & Shop)

1. Turn set to an active channel. Set Horiz. Hold Control (R110) in center of its range.
2. Short L103 (Horizontal Stabilizer Coil) by connecting a jumper across J57 and J58, also short J52 to ground with a jumper lead.
3. Turn variable cathode resistor (R51) completely counter-clockwise.
4. Advance R51 SLOWLY clockwise until picture just locks in.
5. Remove jumper from horizontal stabilizer coil.
6. Lock in picture by adjusting the horizontal stabilizer coil, which in effect is the Horizontal Hold Control, finally, remove J52 ground jumper lead.

SEARS Chassis No. 528.70520/22, Alignment Information

PRELIMINARY:

Alignment is an exacting procedure and should be undertaken only when necessary. The following equipment is required for alignment work.

1. Hickok 610, 610A Signal Generator or equivalent where a 4.5 MHz Crystal controlled frequency (CW) is available. The following I.F. Carriers are necessary.

4.5 MHz Inter-carrier Sound I.F.	44.25 MHz Video I.F. Center Frequency
42.75 MHz Video I.F. Bandwidth Marker	45.75 MHz Video I.F. Picture Carrier Frequency
	47.25 MHz Adj. Sound Carrier Frequency

2. Electronic voltmeter (VTVM)
3. RF Sweep generator with a frequency range of 40 to 50 MHz with a sweep width of at least 10 MHz, having an adjustable output of at least 0.1 volts.
4. Cathode ray oscilloscope, preferably with a wide band vertical amplifier and an input calibrating source.
5. Isolation transformer.

PRELIMINARY ALIGNMENT NOTES:

- a. It is recommended that the receiver be connected to an isolation transformer during alignment. Allow at least 5 minutes for set to warm up before any alignment is attempted.
 - b. Connect oscilloscope hot lead through 10K ohm isolation resistor to Point (C) Connect ground lead of oscilloscope directly to main chassis.
 - c. Adjust signal input to maintain 2V P-P at Point (C)
 - d. Apply -3 volts bias to AGC line, -side to Point (B) +side to chassis.
 - e. Connect to correct signal generator as shown in chart below.
 - f. Clip hot lead of marker generator to the insulation of RF sweep generator hot lead. Connect ground lead to chassis.
- NOTE: Before hooking up to Point "C" I.F. INJ, rotate Tuner to Channel 13.

VIDEO I.F. ALIGNMENT

Step	Sweep Generator (40-50MHz) Connect To	Marker Generator See Note Above	Output Waveform	Adjust	Remarks
1.	Pin 1 of 4CB6 (V4 thru .001 mfd. Cap	44.25MHz	Figure 1	T4	Adjust T4 for maximum response at 44.25MHz.
2.	Same	Same	Same	T3 (Bottom)	Turn top core of T3 to top of coil form before adjusting T3 bottom. Adjust T3 bottom for maximum response at 44.25MHz.
3.	Same	45.75MHz	Same	T3 (Top)	Adjust T3 top to position the 45.75MHz marker at the 3 db point of the response curve.
4.	Same	45.75MHz 42.75MHz	Same	T3 (Bottom)	Readjust T3 (Bottom) for symmetry of response shown in Figure 1.
5.	If necessary, repeat Steps 1 through 4 to obtain proper response. NOTE: If proper 3 db bandwidth is not obtained (3.0MHz \pm .2MHz), refer to Bandwidth Loop Adjustment.				
6.	Point "C" (I.F. injection Point) See Figure 3.	47.25MHz	Figure 2	L4 (Top)	Adjust L4 top for minimum response at 47.25 MHz.
7.	Same	45.75MHz	Same	L905 Tuner I.F. Output Coil	Adjust L905 to position the 45.75MHz marker at the 6 db point of response curve.
8.	Same	42.90 MHz 45.75 MHz	Same	L4 (Bottom)	Adjust L4 (bottom for symmetry of response in Figure 2.
9.	If necessary, repeat Steps 6 through 8 to obtain response curve of Figure 2.				

BANDWIDTH LOOP ADJUSTMENT

The first I.F. transformer has long vertical lead adjacent to the primary and secondary windings. This wire must not be touched unless the bandwidth specifications (2.85MHz \pm .2MHz) are incorrect. Adjust as follows:

1. To narrow the I.F. response curve, pull the wire away from the 1st I.F. coils of T3 (top). Repeat Steps 2 through 5 of the Video I.F. Alignment. See Figure 4.
2. To broaden the I.F. response curve, press the wire toward the 1st I.F. coils of T3 (top). Repeat Steps 2 through 5 of the Video I.F. Alignment. See Figure 4.

SOUND ALIGNMENT

PRELIMINARY:

- A. Apply -9V bias to Point B
- B. Set channel selector to unused channel.

Step	Signal Generator Frequency	Connect to	Output Indicator	Connect to	Adjust	Remarks
1.	4.5MHz	J17 (Test Point (C))	VTVM	Junction of two 100K ohm resistors. See NOTE 1	T1 top for zero (mid-scale)	Sig. Gen. Output 20 mv.
2.	4.5MHz	Same	VTVM	Test Point (A)	T1 bottom for max.	Sig. Gen. output less than 10 mv (to avoid limiting)
3.	4.5MHz	Same	VTVM	Same	T2 bottom for max.	Same
4.	4.5MHz	Same	VTVM	Same	T2 top for max.	Same
5.	Remove meter, bias voltage, generator; tune set to station. Set fine tune for best picture and touch-up 4.5MHz reject trap (T2) for minimum sound beat in picture.					

NOTE 1 - Connect two 100K ohm resistors (Matched Pair) in series between test point (A) and ground. Connect negative lead of VTVM to junction of two resistors and the positive lead to J11. VTVM should be on low range with Zero volts at mid-scale.

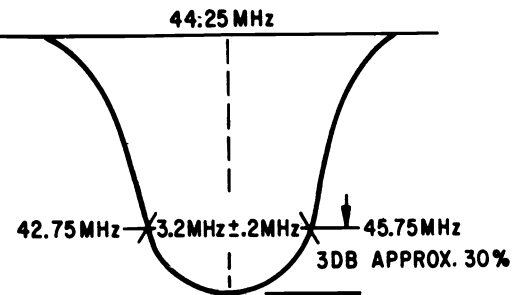


Figure 1

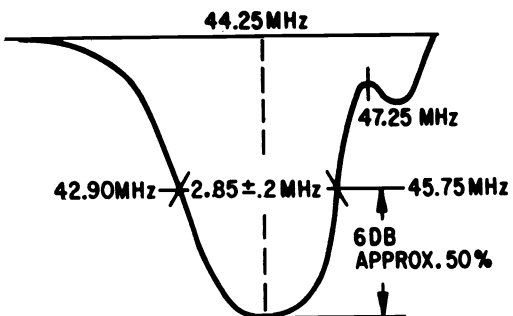
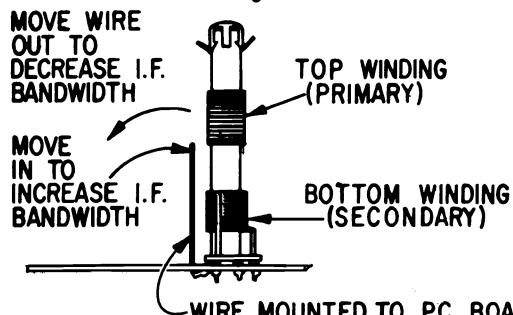


Figure 2



WIRE MOUNTED TO P.C. BOARD
FIGURE 4 - Bandwidth Adjustment

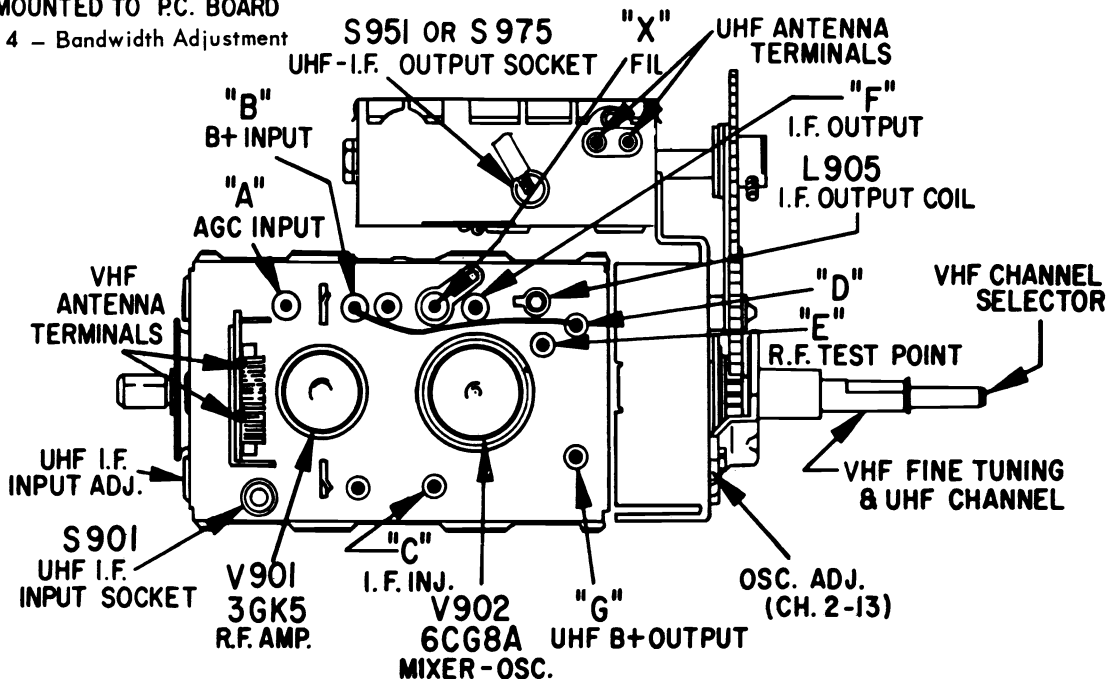
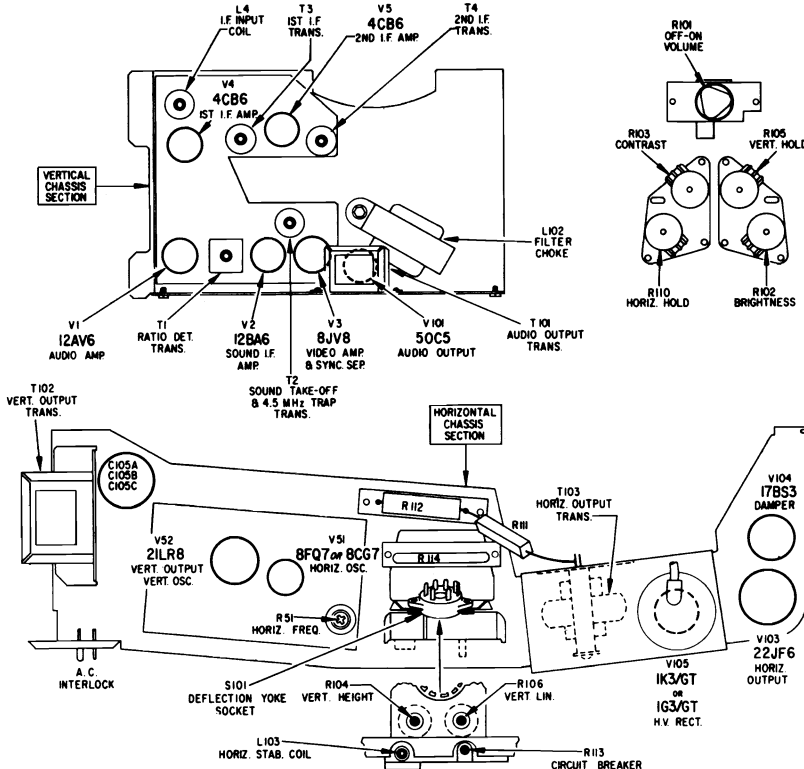
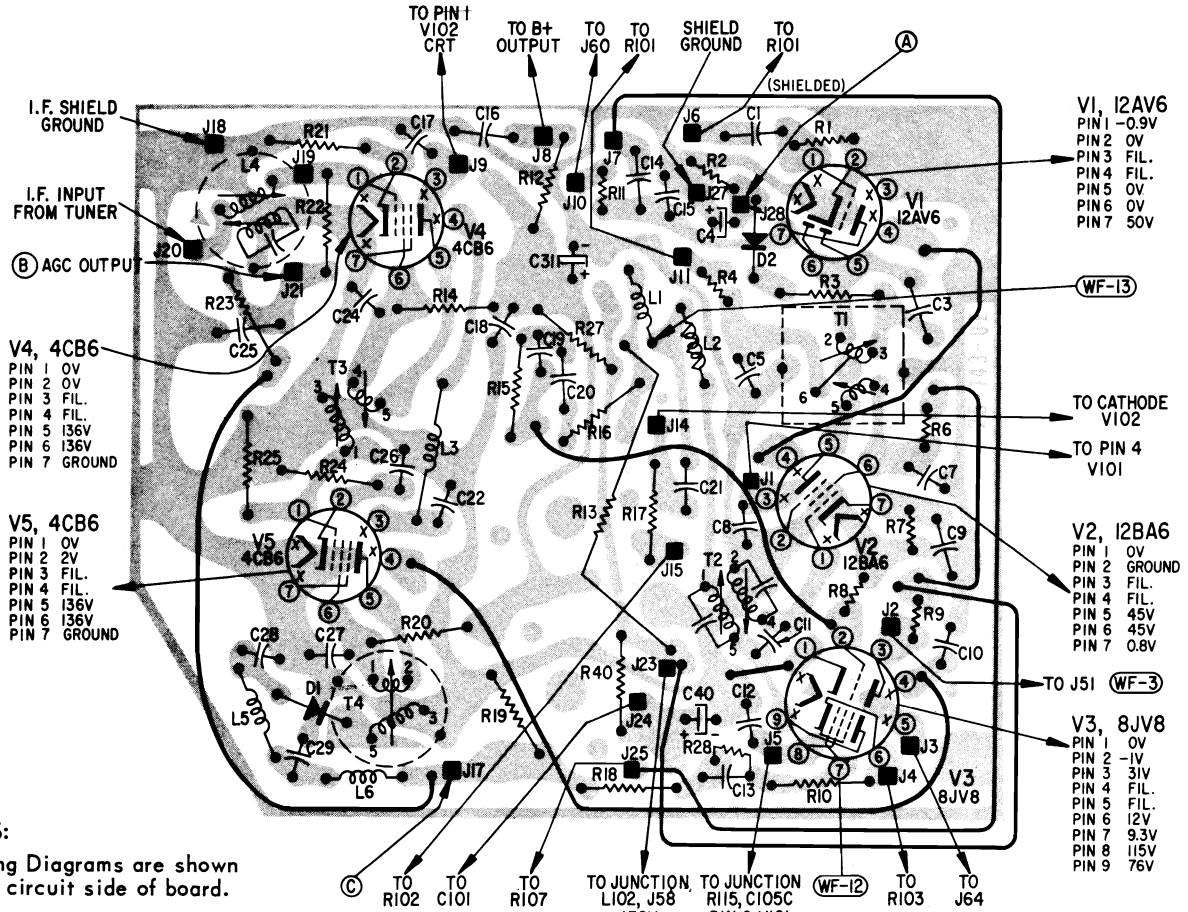


FIGURE 3 - UHF-VHF TUNER VIEW

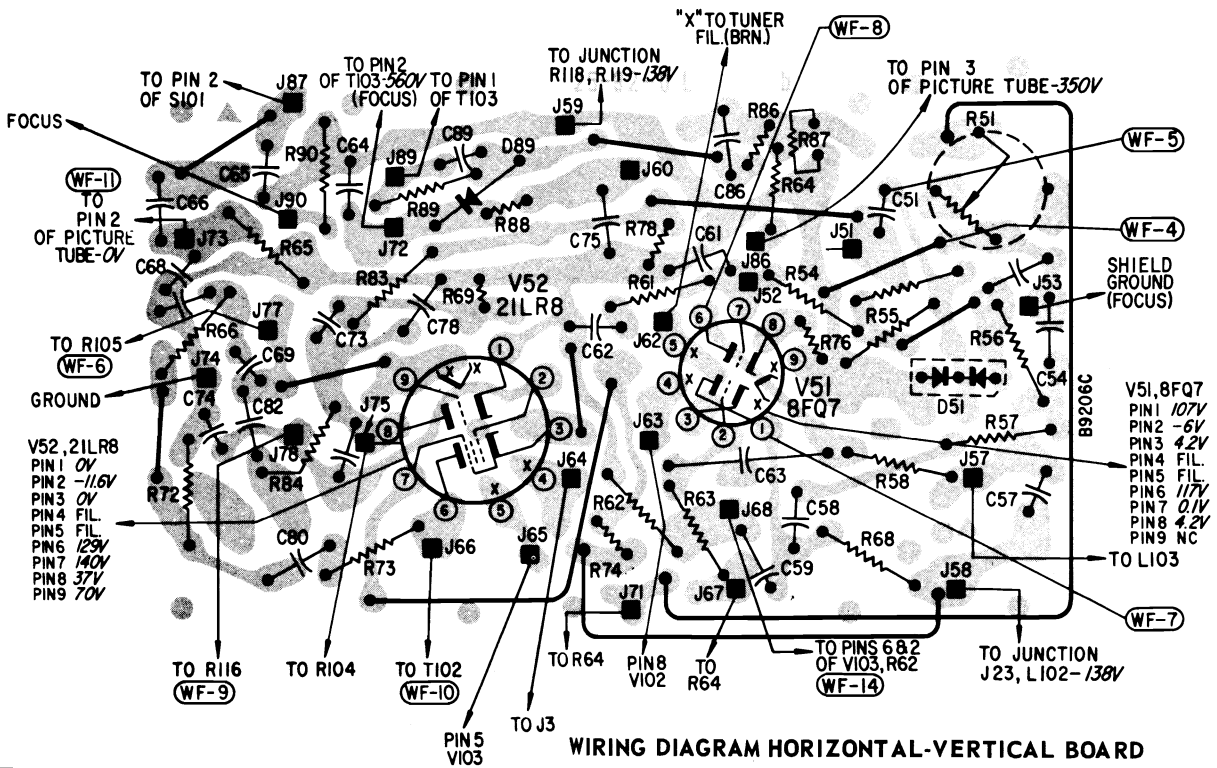
SEARS Chassis No. 528.70520/22, Printed Circuit Boards



NOTES:

1. Wiring Diagrams are shown from circuit side of board.
2. Solid lines indicate wire jumpers.

WIRING DIAGRAM I.F. SYNC, SOUND BOARD



WIRING DIAGRAM HORIZONTAL-VERTICAL BOARD

CHASSIS NO. 528.71270

DEFLECTION YOKE AND CENTERING RING

Follow this procedure in adjusting the Deflection Yoke and Centering Rings:

1. Turn the receiver on and disconnect the antenna.
2. The deflection yoke is held on the neck of the picture tube by a clamp device. Loosen the clamp, by unscrewing the screw on the clamp, and carefully move the yoke as far forward as possible on the neck of the picture tube. Rotate the yoke until the top and bottom edges of the raster are squared with the chassis. Tighten the screw.

NOTE: A width Device is located between the Deflection Yoke and the neck of the picture tube. This must be adjusted before the Yoke clamp is tightened.

3. Center the raster horizontally and vertically, and eliminate shaded corners by simultaneously, but independently, rotating the centering rings until the best effect is obtained.
4. Turn the brightness control to the point giving normal picture brilliance. Maintain brightness at this level during the following adjustments.

WIDTH DEVICE ADJUSTMENT

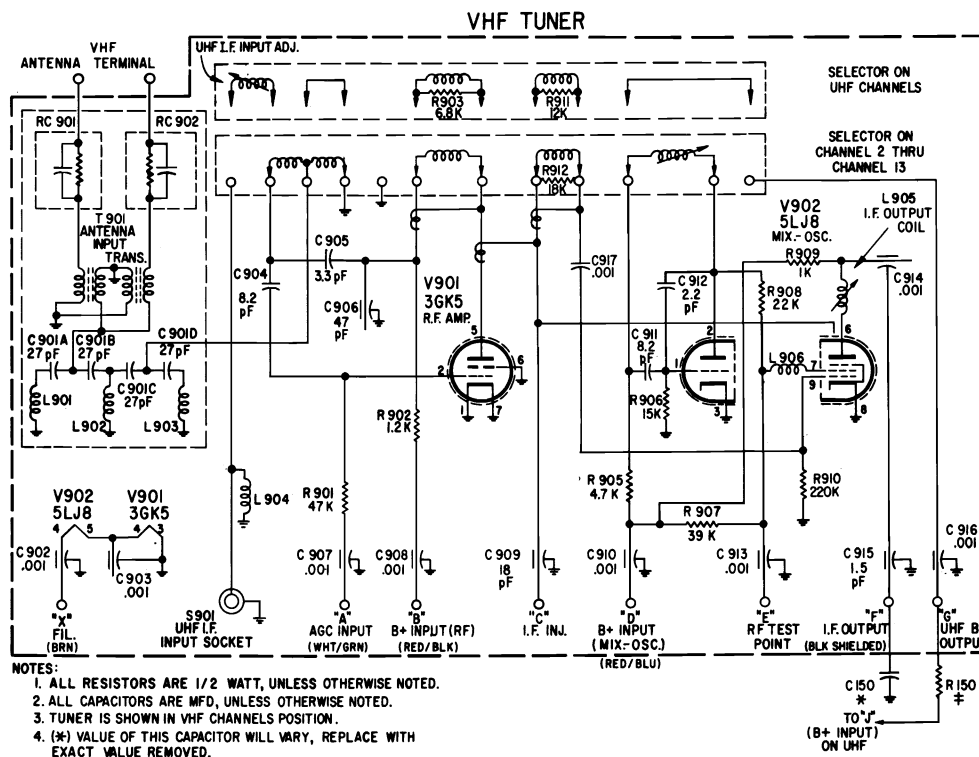
The Width Device is a piece of metallic foil attached to a sheet of plastic; it forms a half circle around the top half of the picture tube neck. (During all adjustments, the Width Device must remain centered on the top half of the picture tube neck.) Be sure that the Width Device is pulled as far toward the base of the picture as possible. The Width Device should be left in this position unless further adjustment is necessary. For further adjustment, follow steps given below:

1. Loosen the screw on clamp which secures the Deflection Yoke to the picture tube.
2. During the following adjustment hold the Deflection Yoke in position and do not disturb the relative position between the Deflection Yoke and the picture tube. Slide the Width Device forward or backward until the picture has proper width. The plastic corners can be bent to ease moving.

NOTE: The Width Device may affect the vertical sweep, in which case, the Vertical Height and Vertical Linearity controls may have to be re-adjusted when the width adjustment has been completed.

HORIZONTAL FREQUENCY AND HORIZONTAL STABILIZER CONTROL ADJUSTMENT (Field & Shop)

1. Tune set to an active channel.
2. Short out L104 (Horizontal Stabilizer Coil) by connecting a jumper across J57 and J58, also short J52 to ground with jumper lead.
3. Turn variable Horizontal Frequency control (R51) completely counter-clockwise.
4. Advance R51 SLOWLY clockwise until picture just locks in.
5. Remove jumper from horizontal stabilizer coil.
6. Lock in picture by adjusting the Horizontal Hold Control, finally remove J52 ground jumper lead.



CHASSIS REMOVAL

1. Remove the Channel Selector Knob from the front of the set.
2. Lay set face down between two firm supports so that no pressure is placed on the implosion shield.
NOTE: These supports should be covered with a soft cloth to prevent marring the finish.
3. Remove picture tube socket deflection yoke plug, anode lead at picture tube and speaker terminals.
4. Loosen chassis mounting screws on bottom of cabinet. (See Figure 1).
5. Remove Chassis and tuner mounting screws.

PICTURE TUBE REMOVAL

1. Lay cabinet face down on supports so that picture tube does not touch surface.
2. Place a piece of cardboard between harness spring and tube.
3. Using long nose pliers, remove the hook of the spring from the eye of the harness.
4. Remove the harness Wire.
5. Carefully remove tube from cabinet. NOTE: Tube should be inspected at point of dag grounding contact. If dag coating is worn, a new coating should be applied to insure proper grounding.
6. Loosen screw securing deflection yoke, slide yoke off and on new tube. To secure, tighten screw until yoke will not slide or rotate on neck of tube.

CAUTION: Do not overtighten.

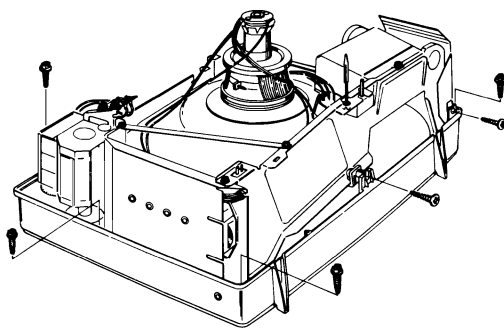
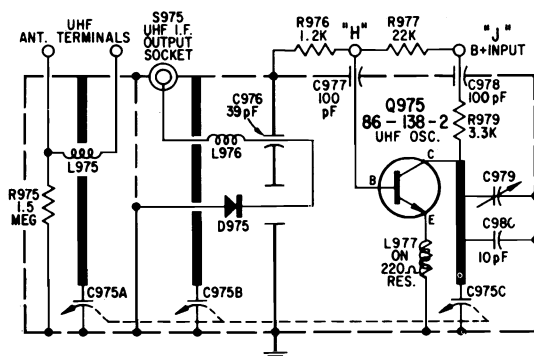


FIGURE 1



UHF TUNER

ANTENNA REMOVAL

1. Extend bottom portion of antenna rod until the base of the rod is directly behind the lip of the antenna bracket.
2. Using the antenna rod as a lever, pry upward and outward on the antenna bracket until it springs loose.
3. Remove the antenna bracket from the antenna rod.
4. Withdraw the antenna rod downward through the hole in the cabinet.

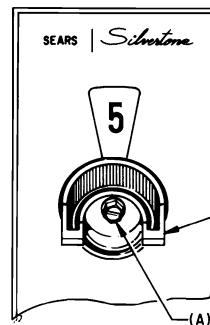


FIGURE 2

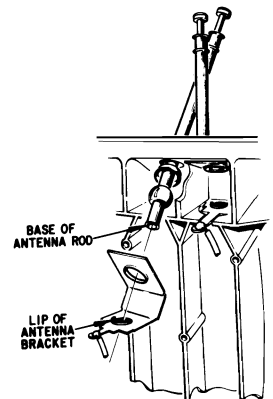
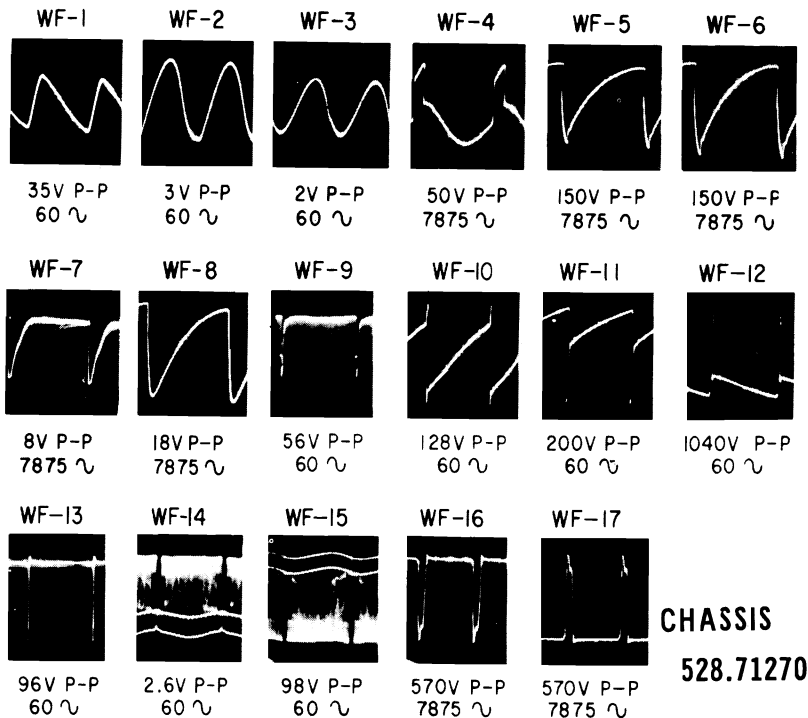


FIGURE 3

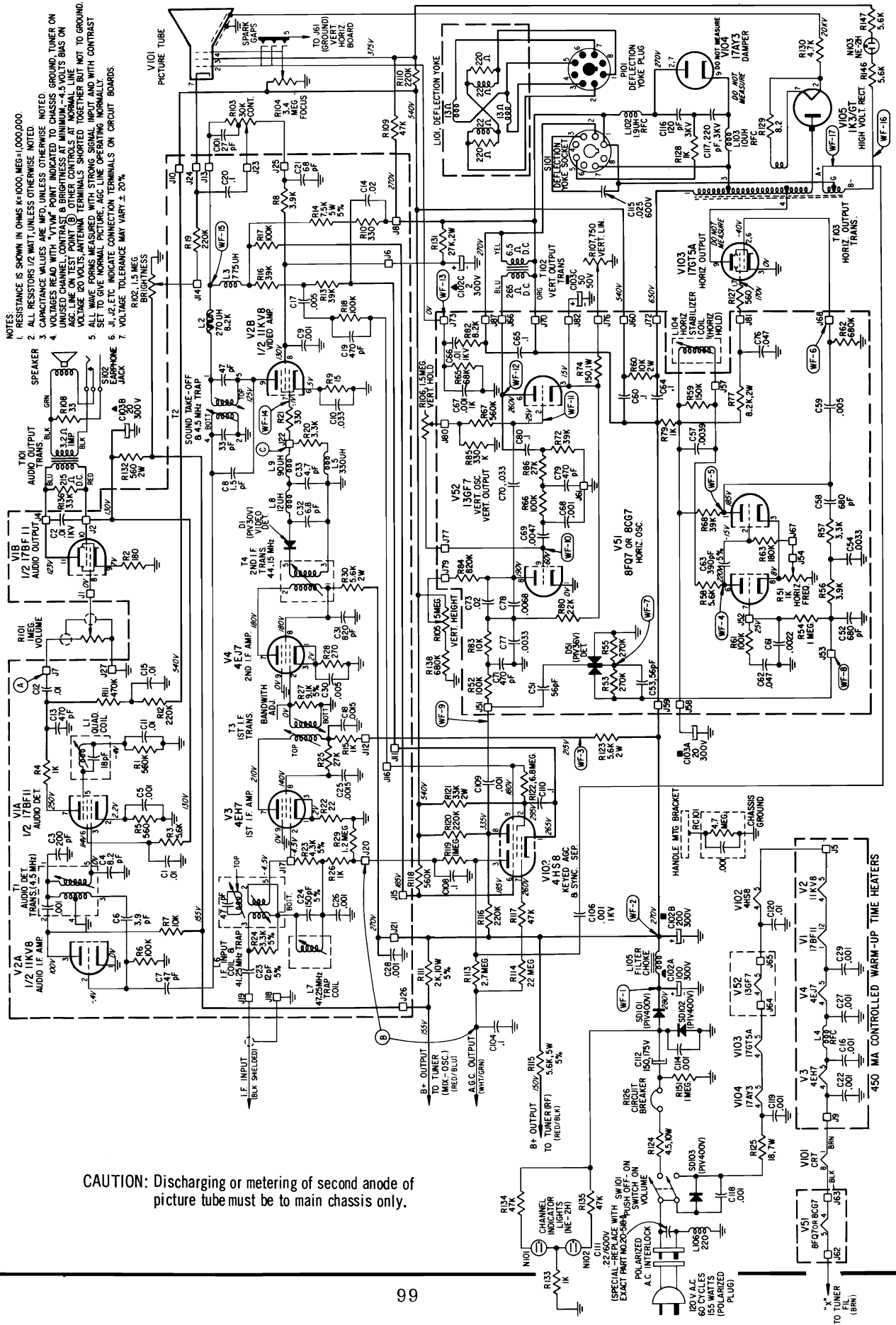
VHF TUNER CALIBRATION

1. Pull off outer knob.
2. Loosen 1/4" hex head screw (A). (See Figure 2)
3. Center channel number within given area and tighten 1/4" hex head screw (A).



CHASSIS
528.71270

SEARS Chassis No. 528.71270, Schematic Diagram



- NOTES:
- RESISTANCE IS SHOWN IN OHMS K=1000 MEG=1000000.
 - ALL RESISTORS 1/2 WATT UNLESS OTHERWISE NOTED.
 - CAPACITANCE VALUES ARE WF UNLESS OTHERWISE NOTED.
 - VOLTAGES READ WITH "VTVM" POINT INDICATED TO CHASSIS GROUND. TUNER ON UNSELECTED CHANNEL. CONTRAST & BRIGHTNESS AT MINIMUM. -4.5 VOLTS BIAS ON A.C. LINE ON TEST POINT (B) OTHER CONTROLS AT NORMAL LINE VOLTAGE 80 VOLTS. ANTENNA TERMINALS SHORTED TOGETHER BUT NOT TO GROUND.
 - ALL WAVE FORMS MEASURED WITH STRONG SIGNAL INPUT AND WITH CONTRAST SET TO GIVE NORMAL PICTURE. A.C. LINE OPERATING NORMALLY.
 - J1, J2, ETC. INDICATE CONNECTION TERMINALS ON CIRCUIT BOARDS.
 - VOLTAGE TOLERANCE MAY VARY ± 20%.

CAUTION: Discharging or metering of second anode of picture tube must be to main chassis only.

TELEVISION ALIGNMENT PROCEDURE**PRELIMINARY**

Alignment is an exacting procedure and should be undertaken only when necessary. The following equipment is required for alignment work.

- Hickok 610, 610A Signal Generator or equivalent where a 4.5 Mc Crystal controlled frequency (CW) is available.
The following I.F. Carriers are necessary. Diode Detector Probe (See Figure 4)

4.5 MHz Inter-carrier Sound IF	44.15 MHz Video IF Center Frequency
41.25 MHz Video IF Sound Carrier Frequency	45.75 MHz Video IF Picture Carrier Frequency
42.55 MHz Video IF Bandwidth Marker	47.25 MHz Marker
- Electronic voltmeter (VTVM)
- RF Sweep generator with a frequency range of 40 to 50 MHz with a sweep width of at least 10 MHz, having an adjustable output of at least 0.1 volts.
- Cathode ray oscilloscope, preferably with a wide band vertical amplifier and an input calibrating source.
- Isolation transformer.
- Diode Detector Probe (See Figure 4)

PRELIMINARY ALIGNMENT NOTES

- It is recommended that the receiver be connected to an isolation transformer during alignment. Allow at least 5 minutes for set to warm up before any alignment is attempted.
 - Connect oscilloscope hot lead through 10K ohm isolation resistor to Point (C). Connect ground lead of oscilloscope directly to main chassis. (Adjust signal input to maintain 2 volts peak to peak).
 - Apply -6 volts bias to AGC IF line, -side to Point (E) +side to chassis.
 - Connect correct signal generator as shown in chart below.
 - Clip hot lead of marker generator to the insulation of RF sweep generator hot lead. Connect ground lead to chassis.
- NOTE: Before hooking up to Point "C" I.F. INJ. Rotate Tuner To Channel 13.

VIDEO I.F. ALIGNMENT

Step	Sweep Generator (40-50 MHz) Connect To	Marker Generator See Note Above	Output Waveform	Adjust	Remarks
1	Pin 2 of 4EH7 (V3) thru .001 mfd. Cap.	44.15 MHz	Figure 1	T4	Adjust T4 for maximum response at 44.15 MHz
2	Same	Same	Same	T3 (Top)	Turn bottom core of T3 to bottom of coil form before adjusting T3 top. Adjust T3 top for maximum response at 44.15 MHz.
3	Same	45.75 MHz 42.55 MHz	Same	T3	Adjust T3 (Bottom) for symmetry of response shown in Figure 5.
4	Same	45.75 MHz	Same	T3 (Top)	Readjust T3 top to position the 45.75 MHz Marker at the 3 db point of the response curve
5	If necessary, repeat steps 1 through 4 to obtain proper response. NOTE: If proper 3.2 MHz bandwidth is not obtained. (3.2 Mc \pm 2 MHz, refer to Bandwidth Loop Adjustment.)				
6	Point "C" IF INJ. See Fig. 3	41.25 MHz	Figure 2	L6	Adjust L6 top for minimum response at 41.25 MHz.
7	Same	47.25 MHz	Same	L7	Adjust 47.25 trap for minimum response at 47.25 MHz.
8	Same	45.75 MHz	Same	L207 Tuner IF Output Coil	Adjust L207 to position the 45.75 MHz marker at the 6 db point of response curve.
9	Same	42.55 MHz 45.75 MHz	Same	L6 (Bottom)	Adjust L6 (bottom) for symmetry of response in Figure 6.
10	If necessary, repeat steps 6 through 8 to obtain response curve of Figure 6.				

SOUND ALIGNMENT**PRELIMINARY**

Connect -10 volts bias to point (E). This will disable the Video I.F. circuits.

Step	SIGNAL GENERATOR		METER CONNECTION VTVM	ADJUST
	FREQUENCY	CONNECT TO		
1	4.5 MHz Xtal Controlled	Pin 7 of 11KV8 (V2B)	Pin 3 of V1A thru a diode detector probe. See Fig. 8.	T1 (single core) T2 (top & bottom) for maximum output on VTVM.
2	Same - Output should be greater than 10MV.	Same	Point "D"	L1 (single core) for maximum. NOTE: Two peaks may be observed, tune to the highest peak. This is a sharp peak and must be adjusted carefully.
3	Remove all equipment.			
4	Set fine tuning for a normal picture and if necessary touch up quadrature coil (L1) for best sound.			
5	Touch up the 4.5 MHz trap (top of T2) Top Core only for minimum sound beat in picture.			

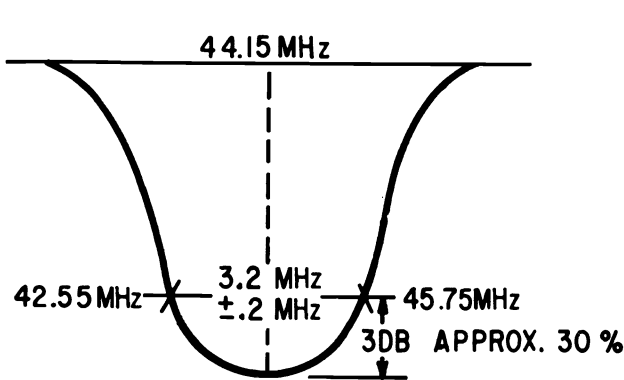


FIGURE 5

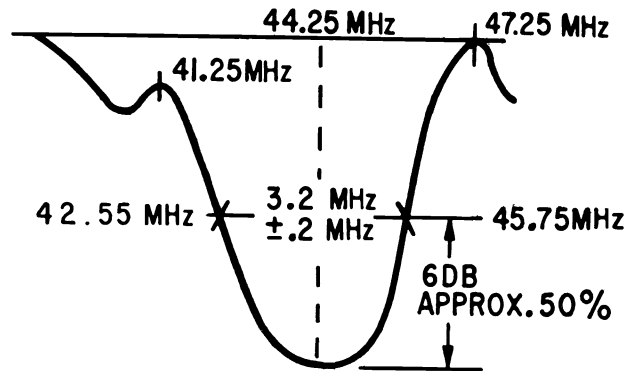


FIGURE 6

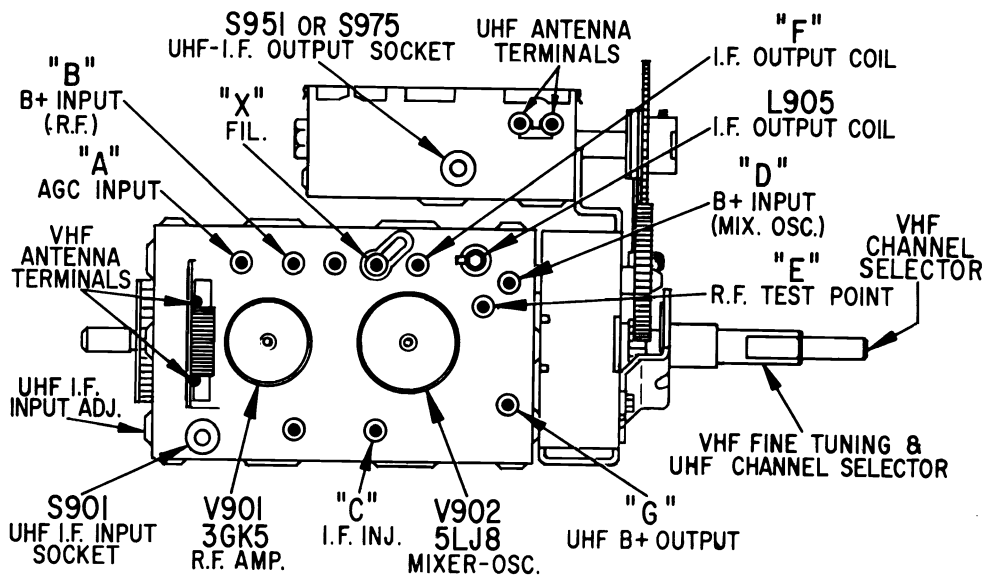


FIGURE 7 - UHF-VHF TUNER VIEW

BANDWIDTH LOOP ADJUSTMENT

The first I.F. transformer has a vertical hairpin loop in the secondary winding. This loop must not be touched unless the bandwidth specifications ($3 \text{ MHz} \pm .2 \text{ MHz}$) are incorrect. Adjust as follows:

1. To narrow the I.F. response curve, pull the loop away from the primary of T3 (top). Repeat steps 2 through 5 of the Video I.F. Alignment. See Figure 9.
2. To broaden the I.F. response curve, press the loop toward the primary of T3 (top). Repeat steps 2 through 5 of the Video I.F. Alignment. See Figure 9.

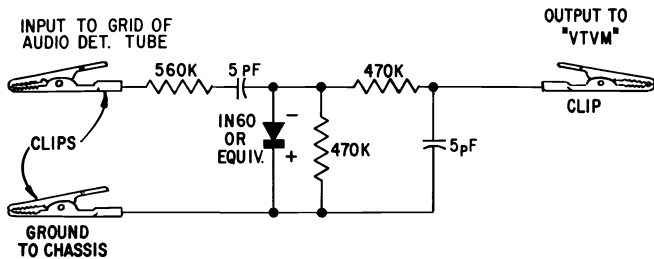


FIGURE 8

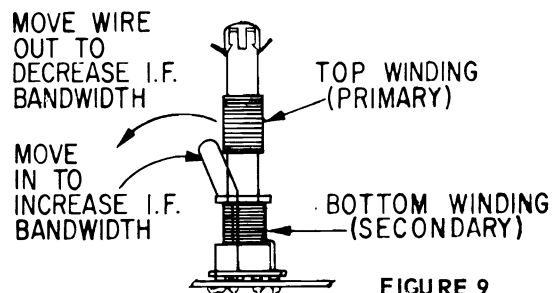


FIGURE 9



SHARP ELECTRONICS CORPORATION

MODEL TU-40P/TU-43P

Deflection Yoke Adjustment

If the lines of the raster are not horizontal or squared with the picture mask, loosen the yoke clamp and rotate the deflection yoke until this condition is corrected. To obtain best results, the deflection yoke should be positioned as far forward on the neck of the picture tube as possible.

Centering Adjustment

Both horizontal and vertical centering are accomplished by rotating the centering rings mounted on the back of the deflection yoke assembly.

Width Adjustment

With line voltage set at 108 volts, select the proper connection on the horizontal size adjustment so that the picture just fills the mask horizontally. Under normal operating conditions and with the line voltage set at 120 volts, the picture should horizontally overscan the mask about 1/2 inch on each side.

Check RF Oscillator Adjustment (VHF Tuner)

Tune in all available VHF stations to see if the receiver RF oscillator is adjusted to the proper frequency on all VHF channels. If adjustments are required, they can be made without removing the chassis from the cabinet. Access to the individual RF oscillator adjustments on the VHF tuner is obtained in the following manner.

1. Remove the channel selector knob, fine tuning knob and felt washer from the shaft.
2. Set the channel to be adjusted.
3. Adjust RF oscillator by turning the screw from the large hole on the insulator fiber.

Fuse

For overload protection, a 1.6A fuse has been installed in the AC input of this receiver. This fuse is connected directly to the "ON-OFF" switch and is mounted on a terminal strip that is located at the back of high voltage cage.

High voltage assembly must be removed from the cabinet whenever replacement is required.

Chassis Assembly Removal

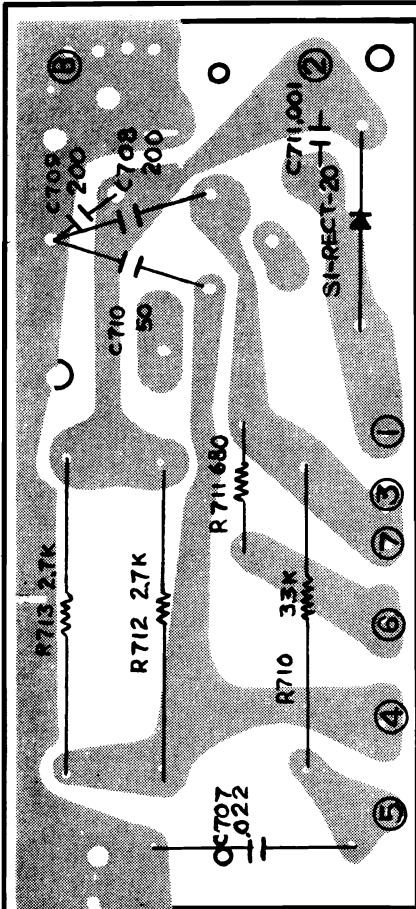
This set chiefly consists of the tuner assembly, P.W.B. assembly, high voltage and power source assembly and they can be removed separately.

Whenever it becomes necessary to remove the assemblies from the cabinet, proceed in the following manner:

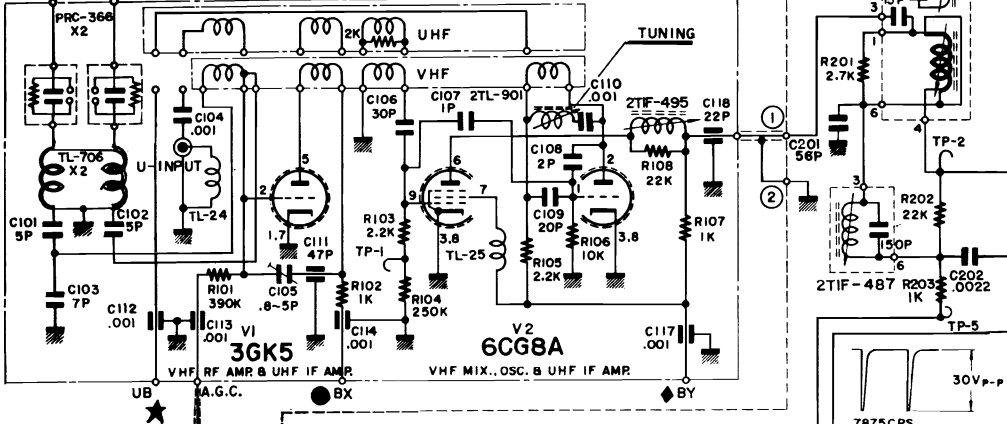
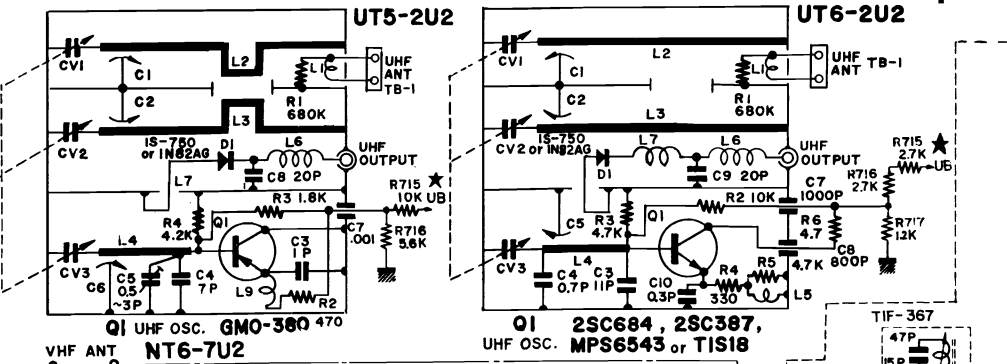
1. Lay the cabinet face down on a soft pad so as not to mar the picture tube.
2. Remove the five back cover retaining screws.
3. Remove the back cover and disconnect the antenna leads.
4. When removing the tuner assembly
 - a. Remove the ON-OFF Volume, VHF channel Selector, VHF Fine Tuning, UHF dial knobs from the front of the cabinet.
 - b. Remove the five screws retaining the tuner mounting bracket and the tuner assembly from the cabinet.
5. When removing the P.W.B. assembly

Remove the speaker leads at the picture tube socket and P.W.B. Pull out the P.W.B. along the guide rail by removing one screw retaining the P.W.B.
6. When pulling the high voltage and power source assembly.
 - a. Remove the anode lead and loosen the deflection yoke clamp. Remove the deflection yoke from the neck.
 - b. Remove two screws retaining the side of high voltage cage and one screw retaining the lower part.
7. The chassis may now be completely removed from the cabinet.

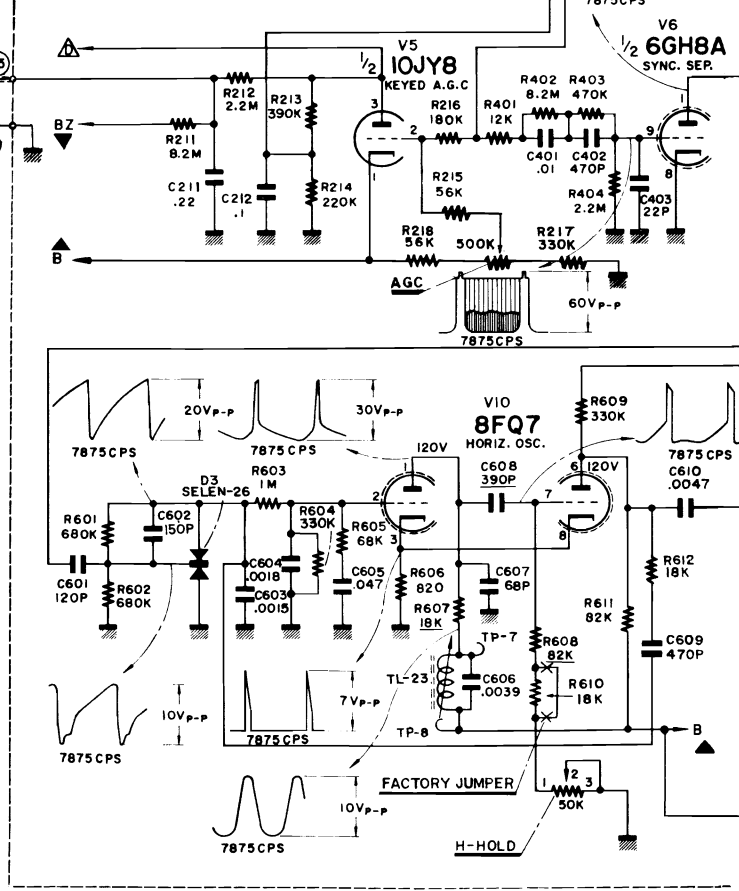
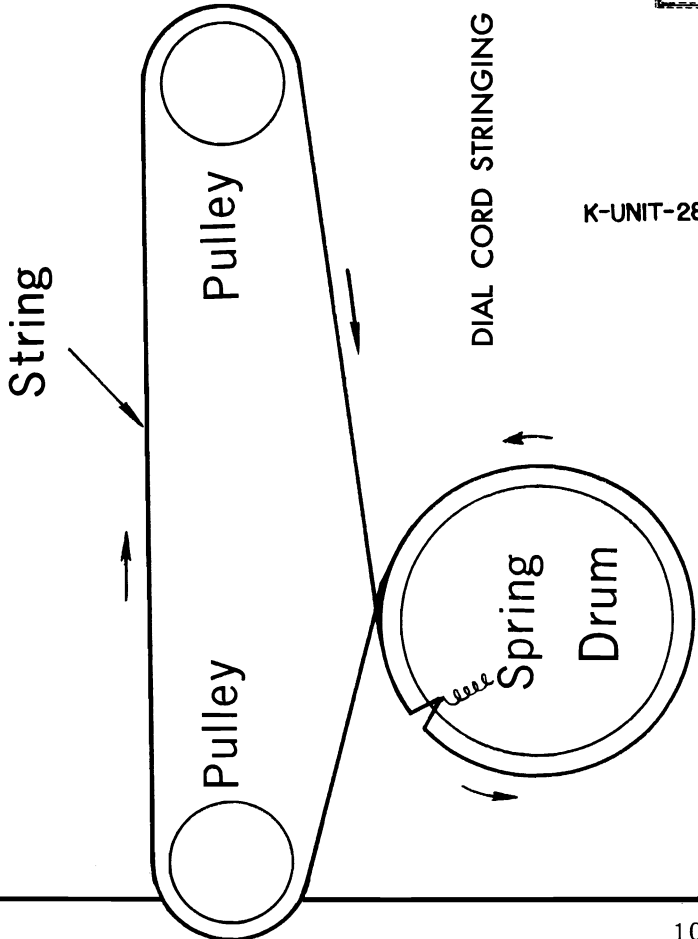
SHARP Models TU-40P/TU-43P Schematic



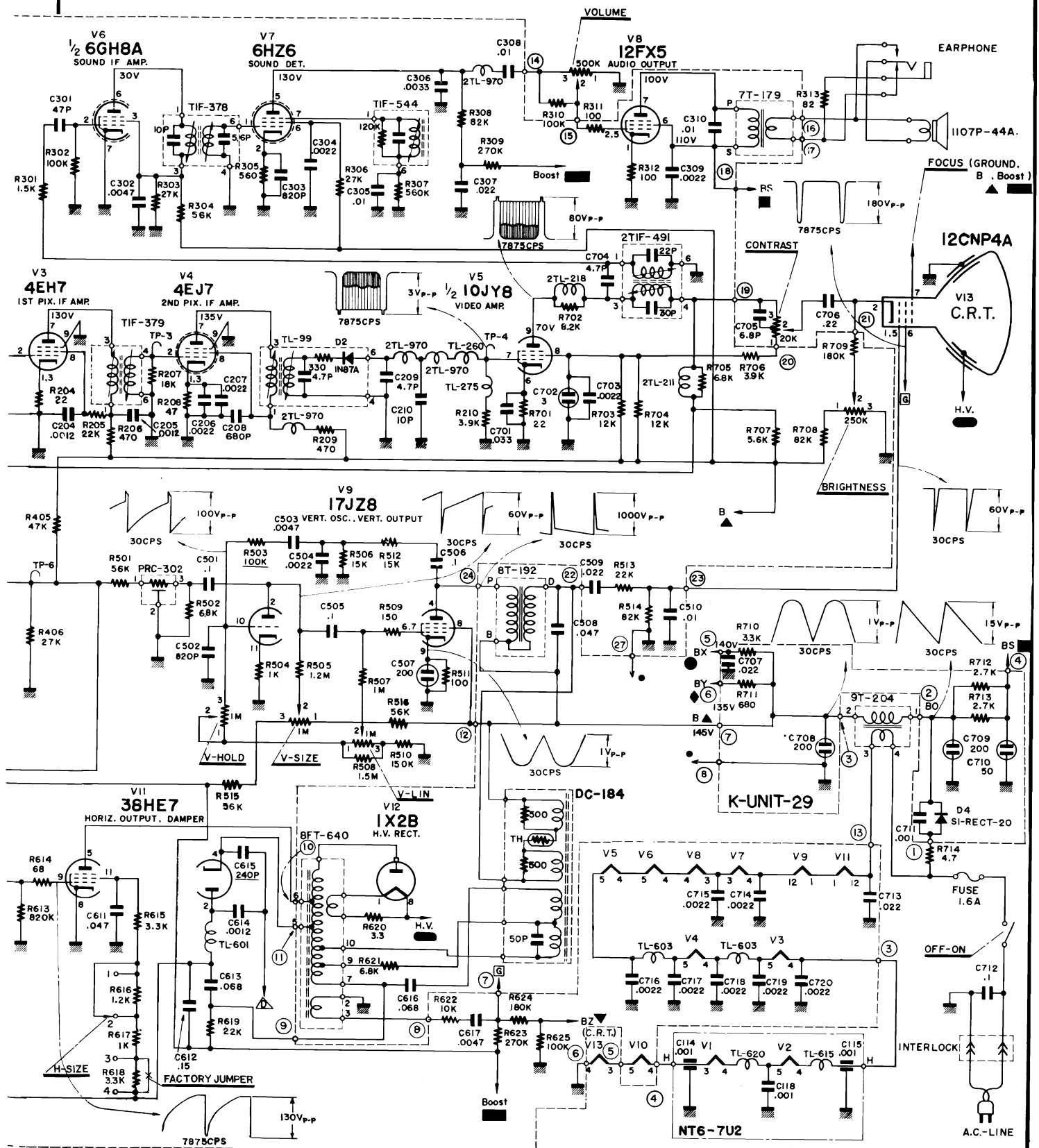
BOTTOM VIEW OF P.C. BOARD (K-UNIT-29)



K-UNIT-28



SHARP Models TU-40P/TU-43P Schematic Diagram, Continued



MODEL TU-40P/TU-43P

SHARP Models TU-40P/TU-43P

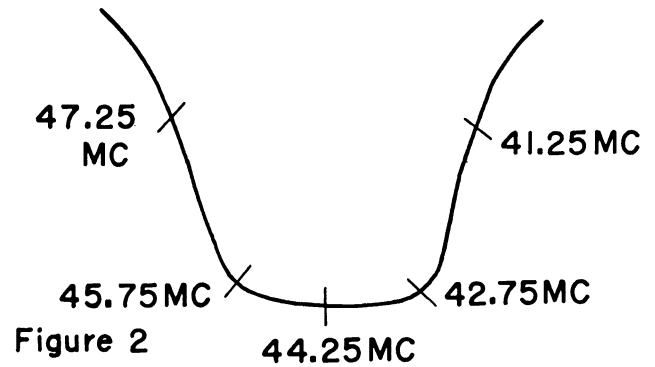
ALIGNMENT INSTRUCTIONS

Equipment

1. Television Sweep Generator
2. Television Marker Generator
3. Oscilloscope
4. Bias Supply
5. Output Meter

Picture IF Sweep Alignment

1. Television receiver and test equipment should be turned on and allowed to warm up for 10 minutes before starting alignment procedure.
2. Set the VHF channel selector to channel 10. (Antenna disconnected from tuner input.)
3. Set the sweep generator for a 44MC IF output and adjust the sweep width for 10 MC.
4. Loosely couple the marker generator output lead to the output cable of the sweep generator.
5. Apply $-3.5V$ bias to TP-5.
6. Connect the vertical input of the oscilloscope through a 10K OHM resistor to TP-4.
7. Connect the output of the sweep generator through a .005 MFD capacitor to TP-3. Adjust the output of sweep generator to maintain a level not exceeding 2~3V pp at the oscilloscope reading.
8. Set the marker generator to produce the desired marker frequencies and adjust TL-99 (Top and Bottom) to obtain a waveform on the oscilloscope equivalent to the pattern shown in Figure 2.
9. Reconnect the output of the sweep generator in the manner specified in step 7 to TP-2.
10. In the manner specified in step 8, adjust TIF-379 (Top & Bottom) to obtain a waveform on the oscilloscope equivalent to the pattern in Figure 3.
11. Reconnect the output of the sweep generator to TP-1 on the VHF tuner.
12. In the manner specified in step 8, adjust TIF-367 (Top & Bottom), 2TIF-487, 2TIF-495 and TIF-379 (Top & Bottom) to obtain a waveform on the oscilloscope equivalent to the pattern shown in Figure 4. (Top slug of TIF-367 is to dip 41.25 MC and 2TIF-487 is to dip 47.25 MC)
13. Repeat steps 7 through 12 until best results are obtained.



Sound IF Alignment

1. With the receiver in normal operating condition, tune in a strong local station for best reception of picture and sound.
2. Adjust TIF-544 for maximum sound without buzz and distortion.
3. Attenuate the received station signal by disconnecting the antenna.
4. Adjust TIF-378 for maximum sound with minimum buzz.
5. Adjust 2TIF-491 (Top) for maximum sound.
6. Repeat steps 2, 3, 4 and 5 to obtain best results.

4.5 MC Trap Alignment

1. Television receiver and test equipment should be turned on and allowed to warm up before starting alignment procedure.
2. Set the channel selector on the receiver to an unused channel, set the contrast control in fully clockwise position and disconnect the antenna from the tuner input.
3. Connect 4.5MC signal from the marker generator to TP-4.
4. Adjust 2TIF-491 (Bottom) to obtain minimum contrast on the face of the picture tube.

Horizontal AFC Alignment

1. Television receiver and test equipment should be turned on and allowed to warm up before starting alignment procedure.
2. Tune in a local station and adjust for normal picture.
3. Short-circuit both ends of horizontal ringing coil TL-23 (TP-7 and TP-8).
4. Connect 0.5 MFD capacitor between TP-6 and the chassis to eliminate the synchronizing signal output.
5. Turn the Horizontal Hold control to bring the picture moving slowly to the right or left, disregard vertical movement of the picture.
6. Open the short of Horizontal Ringing Coil TL-23 and adjust its core to produce the same condition as in step 5.
7. Remove the 0.5 MFD capacitor connected at step 4.
8. Repeat steps 4, 5 and 6 until the Horizontal Hold control is set at the mechanical center of its range.

SHARP Models TU-40P/TU-43P Alignment Information, Continued

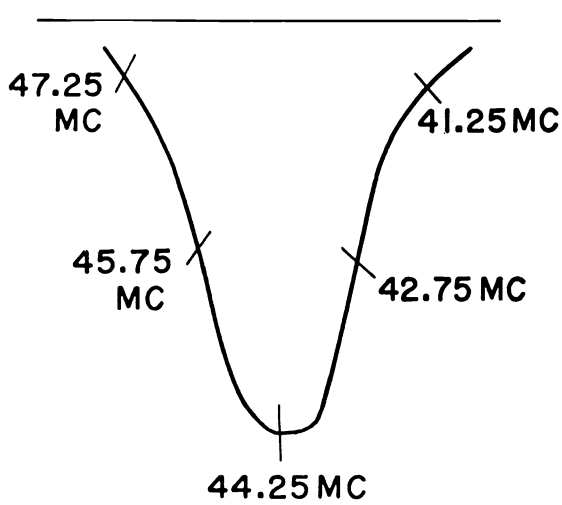


Figure 3

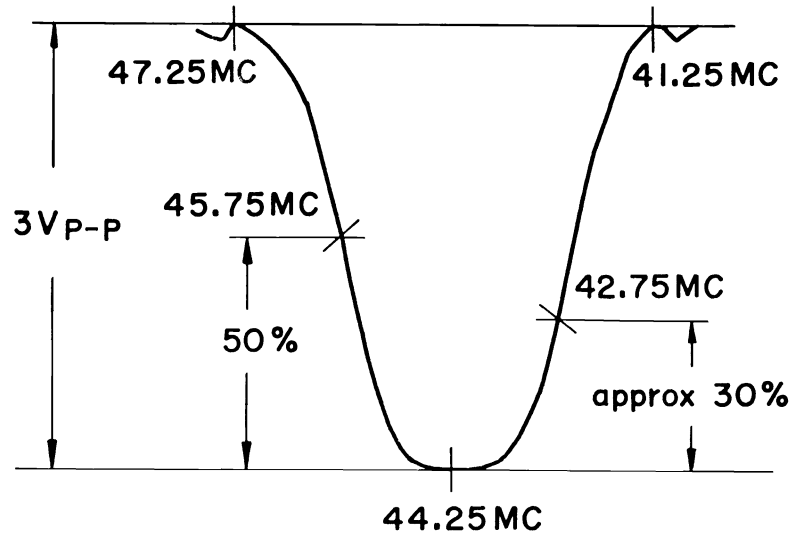
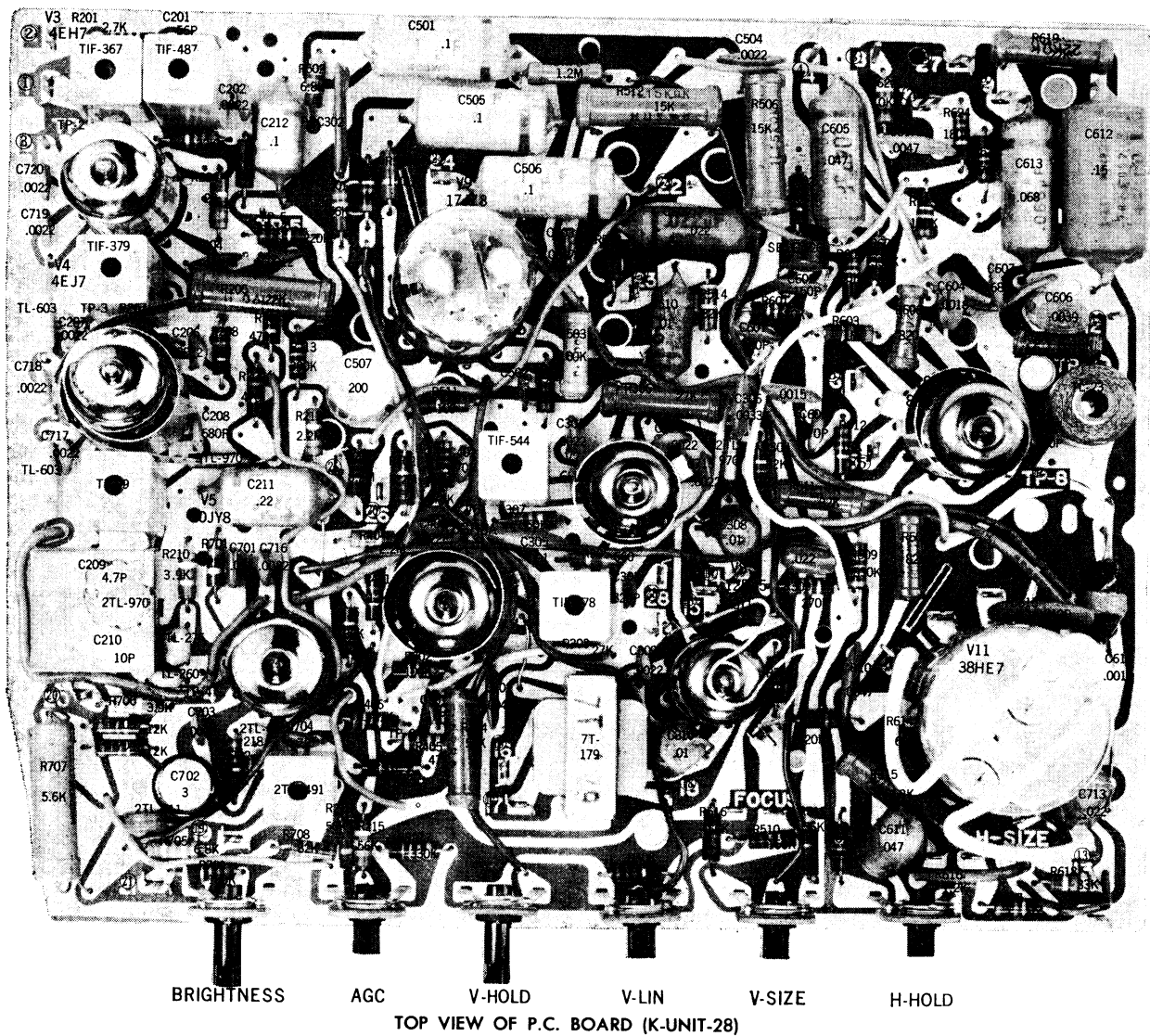


Figure 4

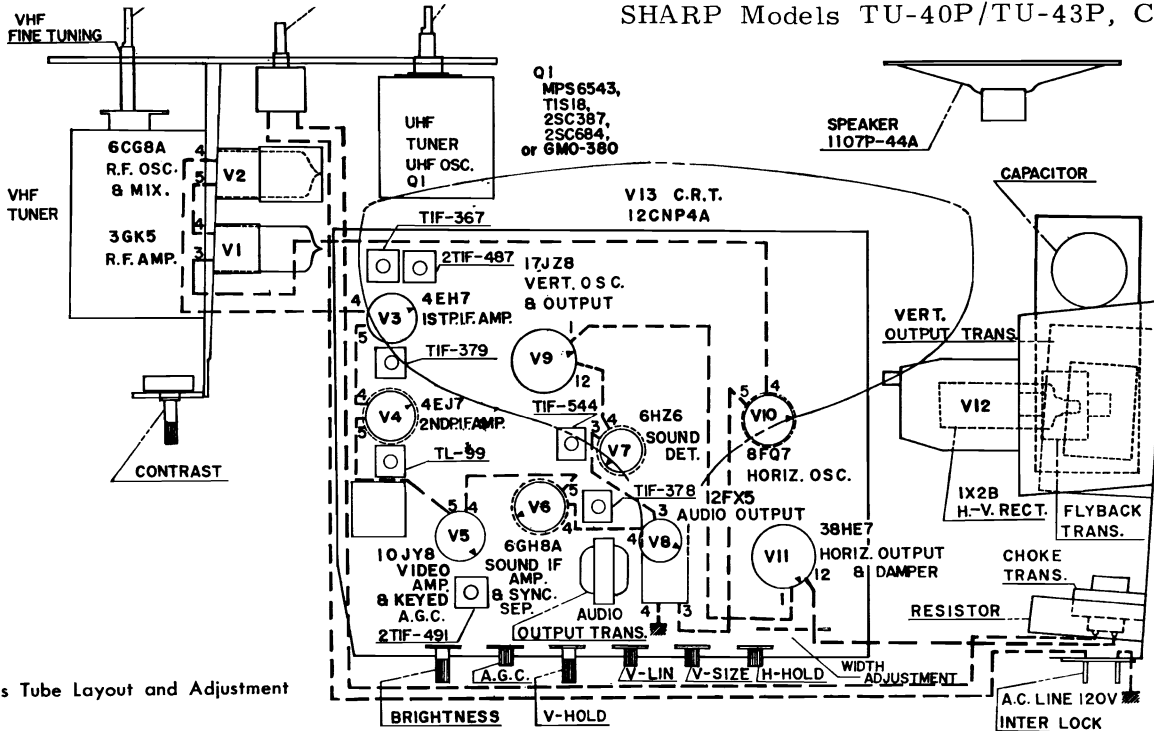


VHF CHANNEL SELECTOR

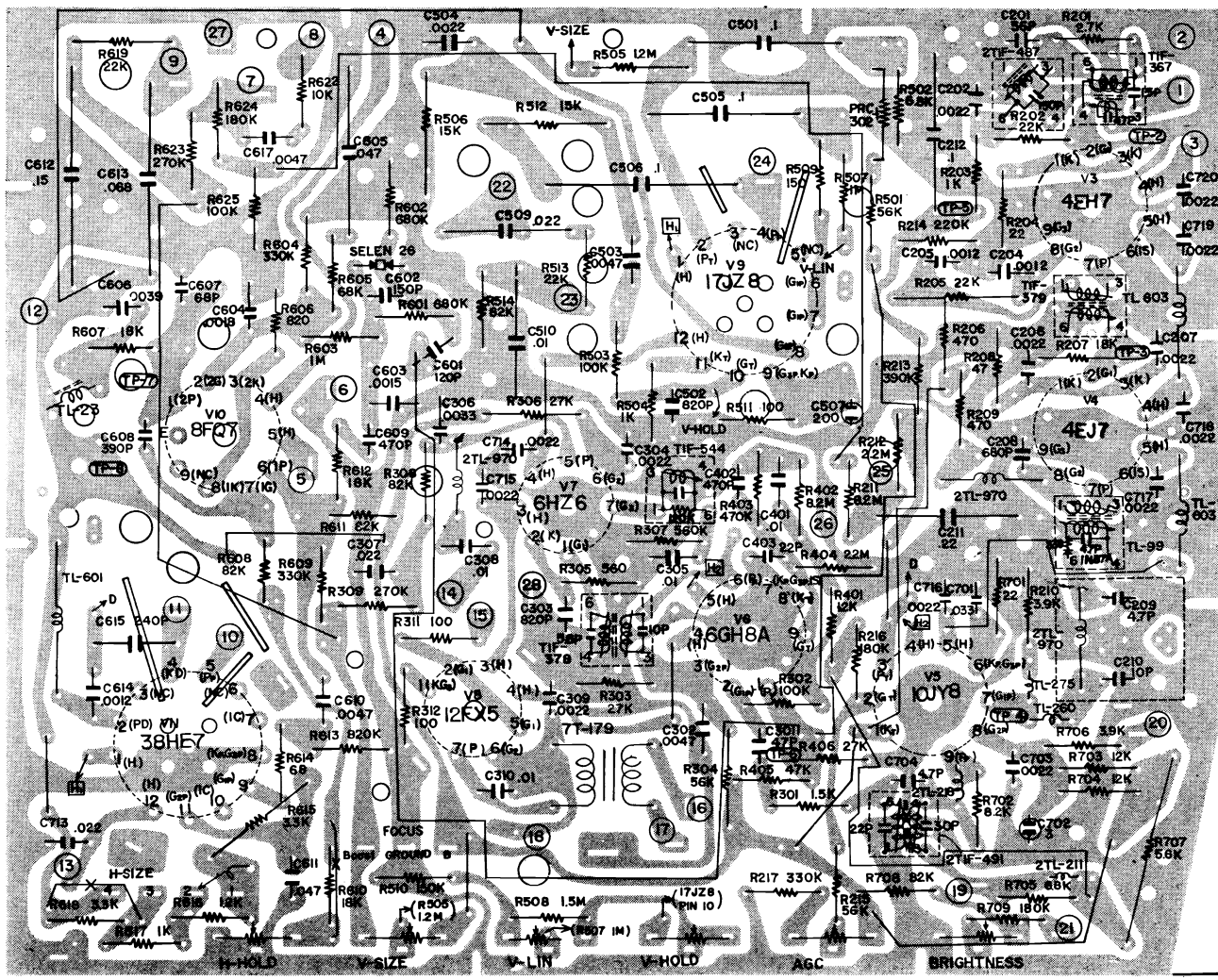
OFF-ON VOLUME

UHF TUNING

SHARP Models TU-40P/TU-43P, Continued



Chassis Tube Layout and Adjustment



SHARP ELECTRONICS CORPORATION



MODEL UT-Q3B

ADJUSTMENTS

Deflection Yoke Adjustment

The deflection yoke should be as far forward as possible on the neck of the CRT. Rotate the deflection yoke if needed.

Centering Adjustment

The two centering rings located at the rear of the deflection yoke should be rotated to center the raster.

Focus Adjustment

The Picture tube used in this receiver is electrostatically focused by means of a focus electrode in the gun assembly.

Adjustment of the focus is done by changing the voltage applied to this electrode.

Adjust focus control to get the point where best focus is obtained.

Vertical Size, Linearity and Bias Adjustment

Adjust vertical height, vertical linearity and vertical bias for the best overall linearity and desired picture size.

After this adjustment, a slight readjustment of the centering rings may be necessary.

AGC Adjustment

Select and tune in the strongest station in the area. Set the contrast and brightness controls at maximum clockwise position. Rotate the AGC control A (on the PCB-A Fig. 13) until distortion occurs in the picture and or noise occurs in the sound. Then rotate the AGC control counter-clockwise until the distortion and/or noise disappears.

The AGC control B (on the PCB-B) is made Factory Alignment Only.

Horizontal Hold Adjustment

If the picture falls out of horizontal sync, lock-in can be attained normally by adjusting the horizontal hold control.

Check RF Oscillator Adjustment (VHF Tuner)

Tune in all available VHF stations to see if the receiver RF oscillator is adjusted to the proper frequency on all VHF channels. If adjustments are required, remove the channel selector and fine tuning knobs.

Access to the individual RF oscillator adjustments on the VHF tuner.

Vertical Hold Adjustment

Adjust the vertical hold to synchronize the picture vertically.

Fuse

The power supply fuse 1.6A is pigtail type and wired at the rear of the chassis.

DISASSEMBLY INSTRUCTIONS

Chassis Removal

Whenever it becomes necessary to remove the chassis from the cabinet, proceed in the following manner :

1. Remove all the control knobs from the front of the cabinet.
2. Remove the five cabinet back retaining screws. Three of these screws are located on the top of back cover and the remaining two on the bottom of the cover.
3. Remove the back cover and disconnect the antenna leads.
4. Remove the four sub-bracket (at the rear of the UHF tuner) retaining screws.
5. Remove the two retaining screws at the bottom of the chassis and two retaining screws at the top of the chassis (near the volume control and VHF tuner).
6. Disconnect the picture tube socket. Lift up the chassis and disconnect the speaker and anode leads.

Removing and Installing Picture Tube

When the chassis has been removed, proceed as follows :

1. Disconnect the picture tube retaining strap.
2. Pull the picture tube straight out rear of the cabinet (CAUTION: Always avoid handling the neck of the picture tube.)
3. Place the picture tube in proper position in the cabinet.
4. Put the picture tube retaining bracket.
5. Reassemble the set.

SHARP Model UT-Q3B Alignment Information

ALIGNMENT INSTRUCTIONS

Equipment

1. Television Sweep Generator
2. Television Marker Generator
3. Oscilloscope
4. Vacuum Tube Voltmeter. (V.T.V.M.)

Picture IF Alignment

1. Equipment should be turned on and allowed to warm up for 10 minutes before starting alignment procedure.
2. Connect a 50 MFD (12V) electrolytic capacitor between test point ① and ground ② (Fig. 3). Negative side of electrolytic capacitor should be connected to ground.
3. Connect a 100K OHM variable resistor between test point ③ and ④ (Fig. 3).
4. Set the VHF channel selector on the receiver to channel 9. (Antenna disconnected from tuner input.)
5. Connect the output of the sweep generator through a .005 MFD discap capacitor to the test point on the VHF tuner.
6. Connect the input of the oscilloscope to test point ⑤ (Fig. 2).
7. Adjust the variable resistor specified in step 3 to obtain .5V on the VTVM, between test point ⑥ and point ⑦.
8. Adjust IFT (in the tuner) 9IF-481, 9IF-489, 9IF-483, 9IF-484, 9IF-485, 9IF-490 (ADJ. CH. TRAP 47.25MHz) and 9IF-490 (S-TRAP 41.25MHz) to obtain a waveform on the oscilloscope equivalent to the pattern shown in Figure 5. In order to prevent, the output of the sweep generator must be regulated to maintain a waveform amplitude of .5Vpp on the oscilloscope.
9. Make sure the waveform on the oscilloscope is not greatly affected by turning the variable resistor specified in step 3.

Sound IF Alignment

1. The VTVM should be turned on and allowed warm up for 10 minutes before starting alignment procedure.
2. Turn on the receiver and tune in a weak TV signal available. Detune the secondary core of 9IF-436.
3. Connect the VTVM between test point ① and chassis ground ② (Fig. 4).
4. Adjust 9IF-434, 9IF-435 and the primary core of 9IF-436 for maximum D.C. indication of the VTVM.
5. Disconnect one lead of the VTVM from test point ① and reconnect to test point ③ (Fig. 4).
6. Using the zero center scale on the VTVM, adjust the secondary core of 9IF-436 for zero indication.
7. Check the sound reception, if there is any audible hiss present in sound, touch up the adjustment of 9IF-436 secondary core for maximum rejection of hiss.

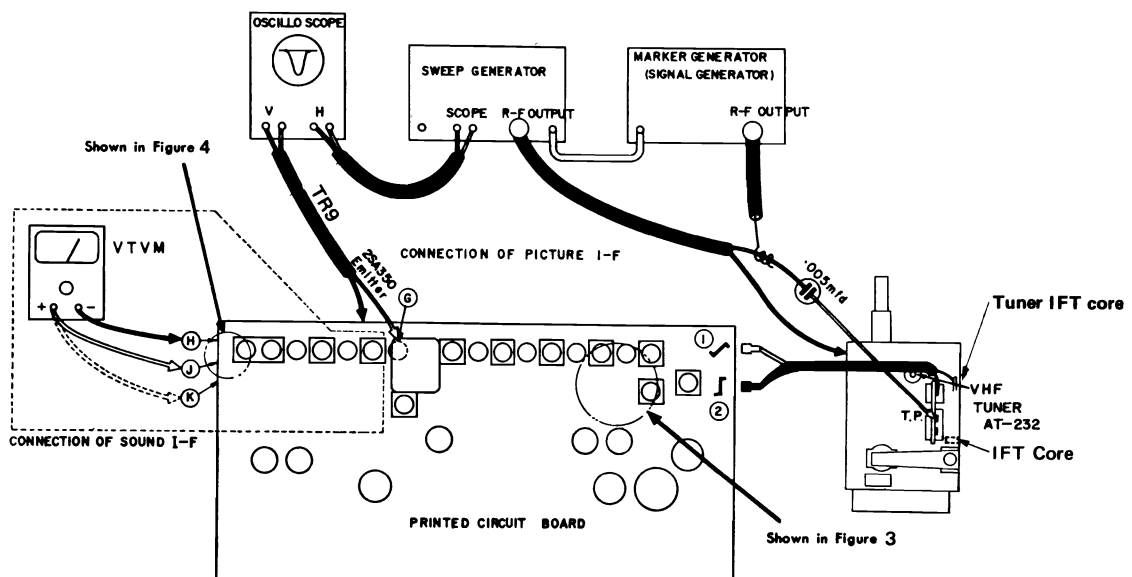


Figure 2 CONNECTION OF IF ALIGNMENT

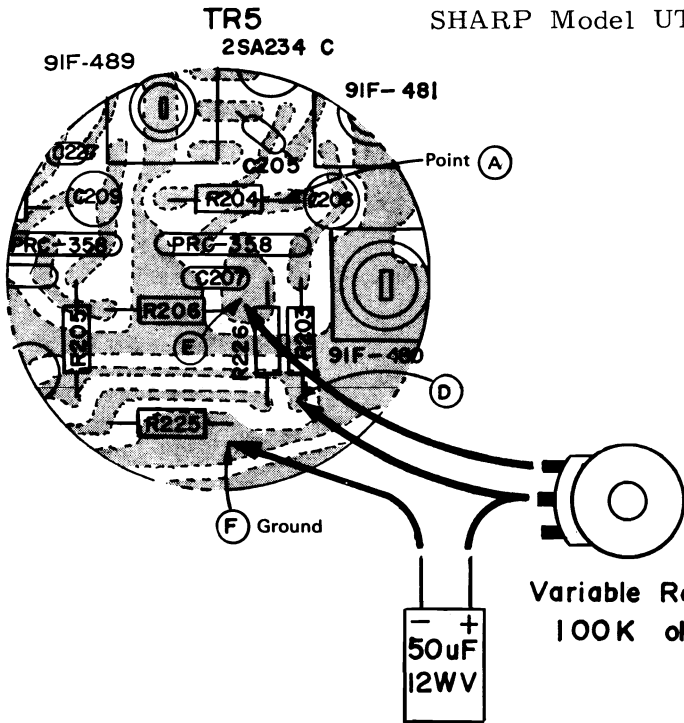


Figure 3 TEST POINTS ON P.C. BOARD

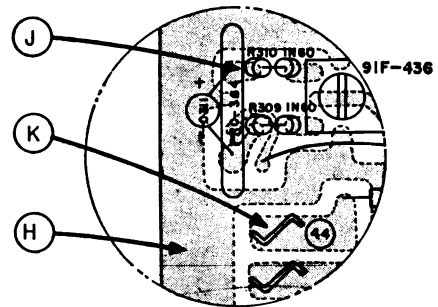


Figure 4 TEST POINTS ON P.C. BOARD

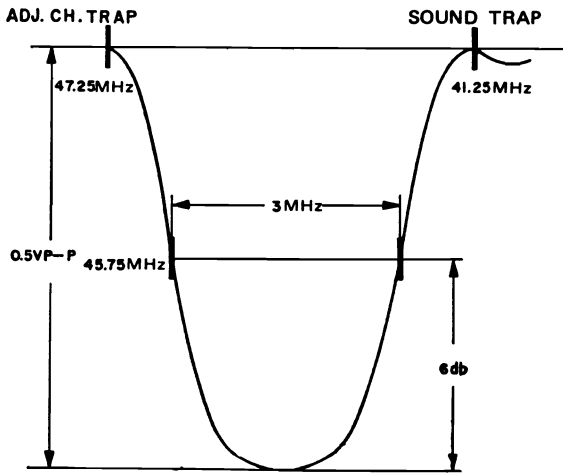
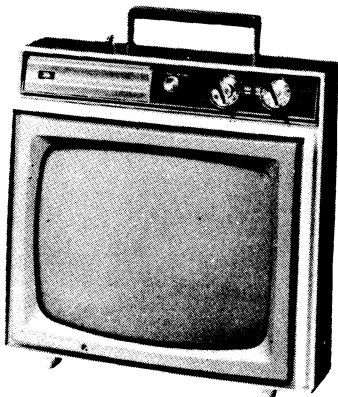


Figure 5 PICTURE I-F WAVEFORM



CHASSIS LAYOUT

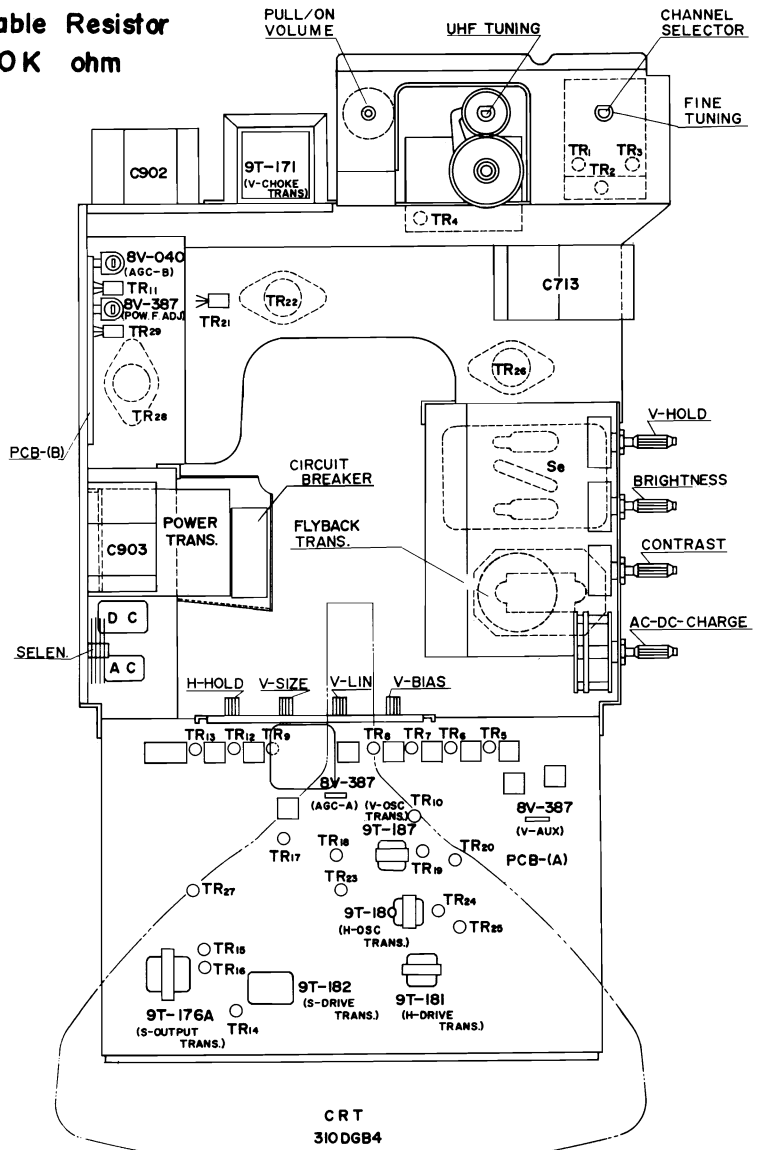


Fig. 1 CHASSIS LAYOUT

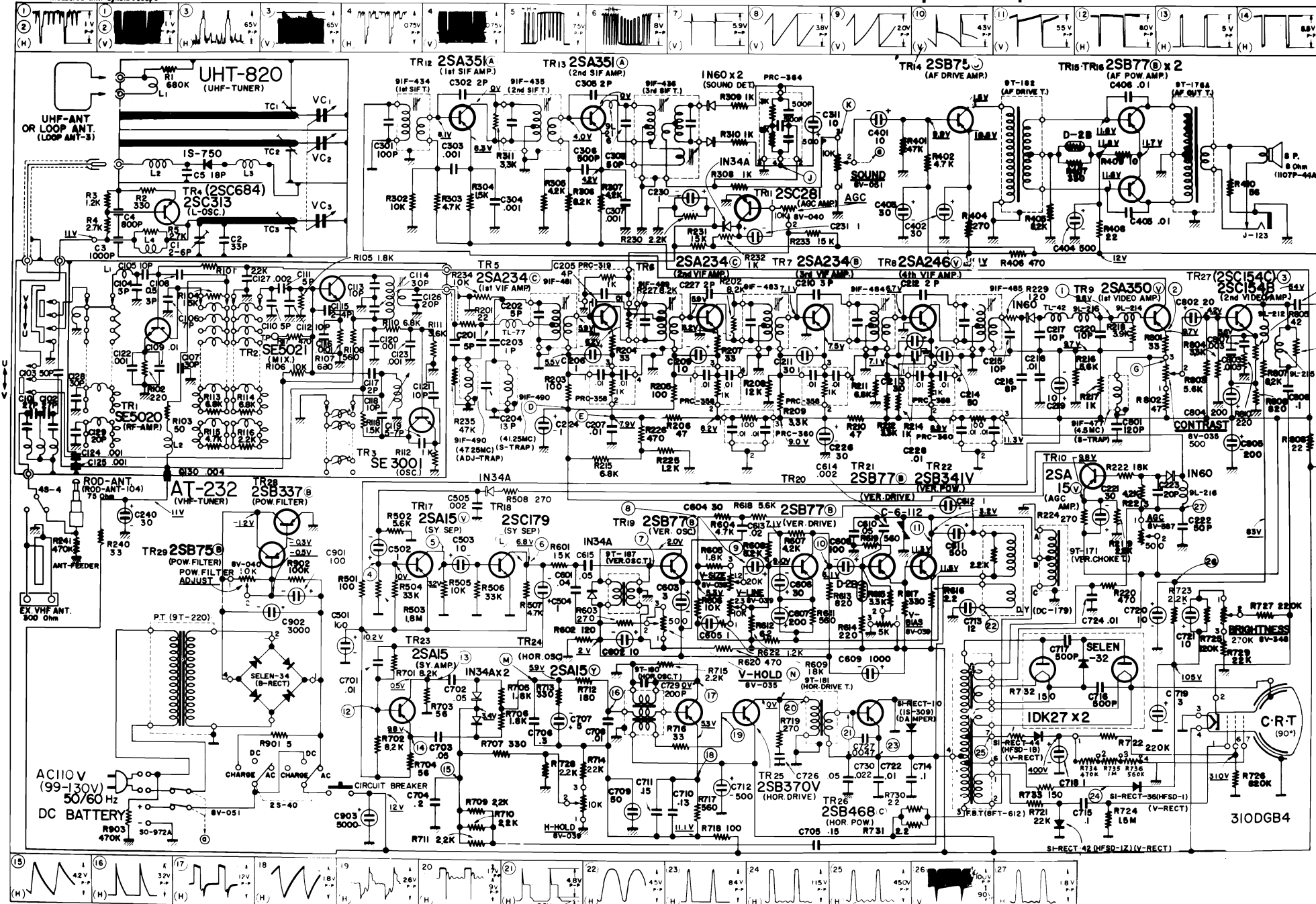
SHARP Model UT-Q3B Schematic Diagram

SHARP Model UT-Q3B Schematic Diagram, Continued

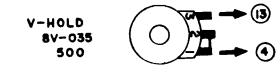
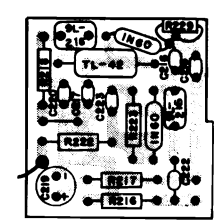
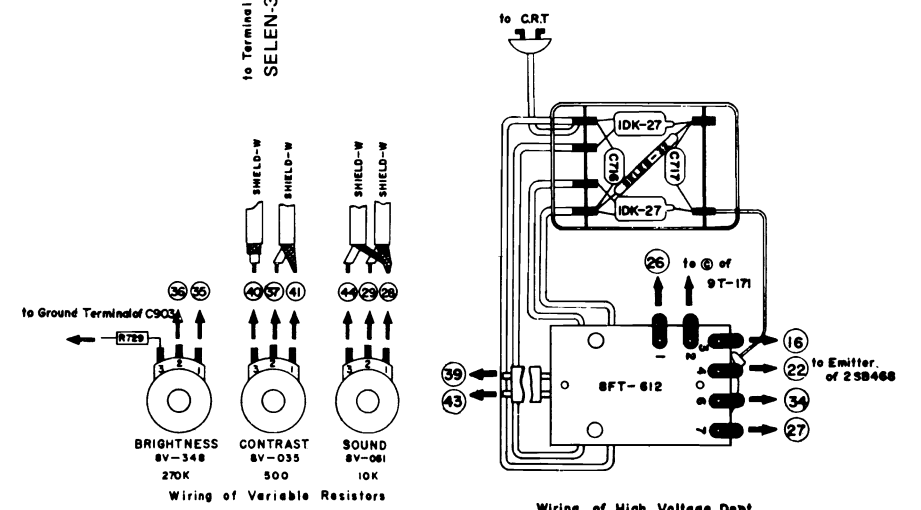
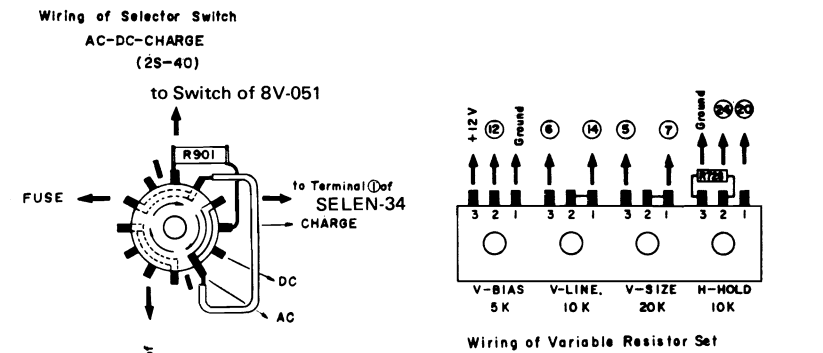
NOTE
 (1) All the voltages in each point are measured with vacuum tube voltmeter. (No. Input Signal)
 (2) All the voltages and current waveform values are measured with synchroscope.

This circuit diagram is original one.
 Therefore there may be a slight difference from your set.

CAUTION
 This circuit diagram is fundamental.
 So some difference depends upon each set.



WIRING MANNER OF MAIN PARTS



PRINTED CIRCUIT BOARD

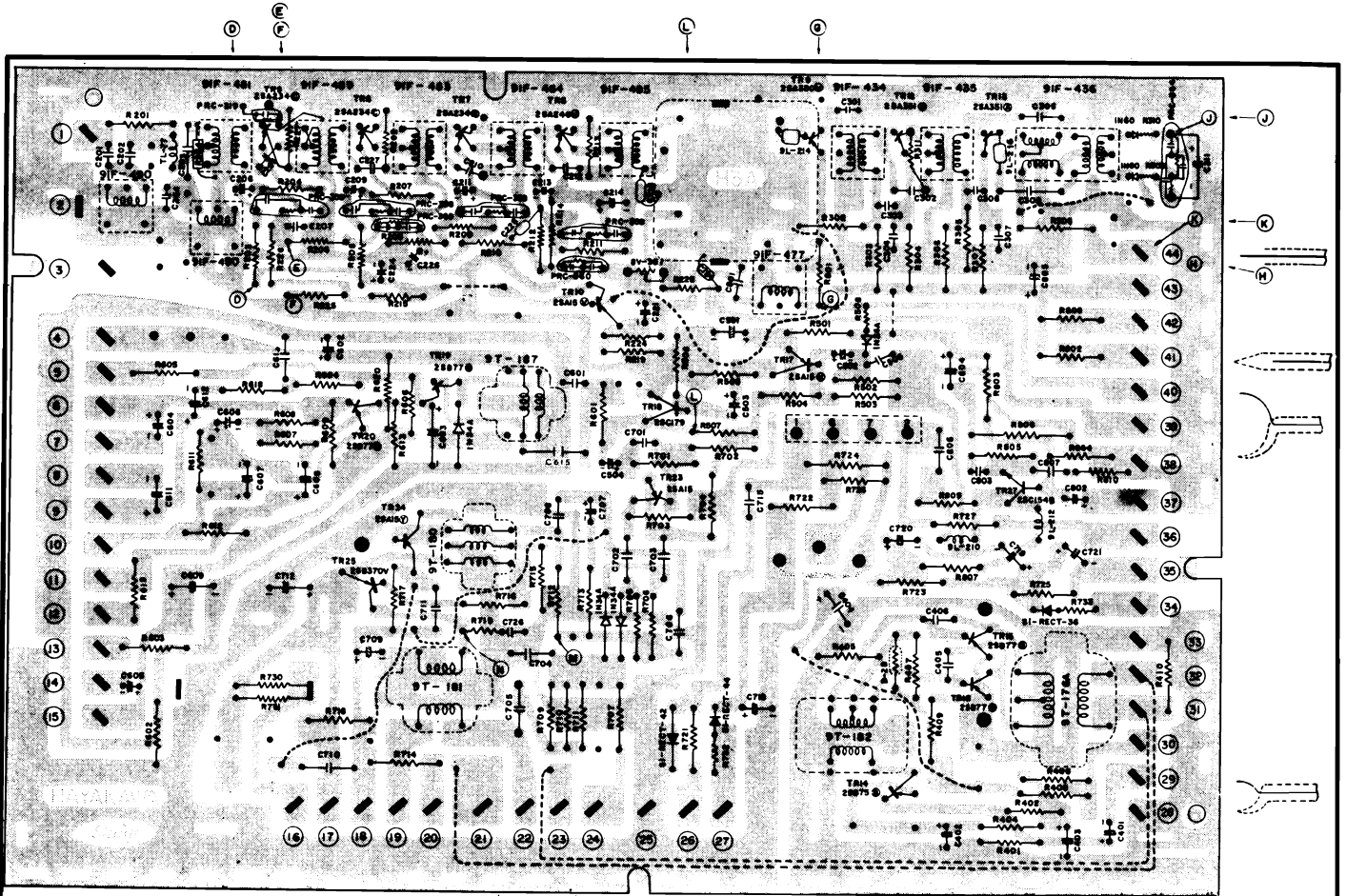


Fig. 12

P.C.B. TOP

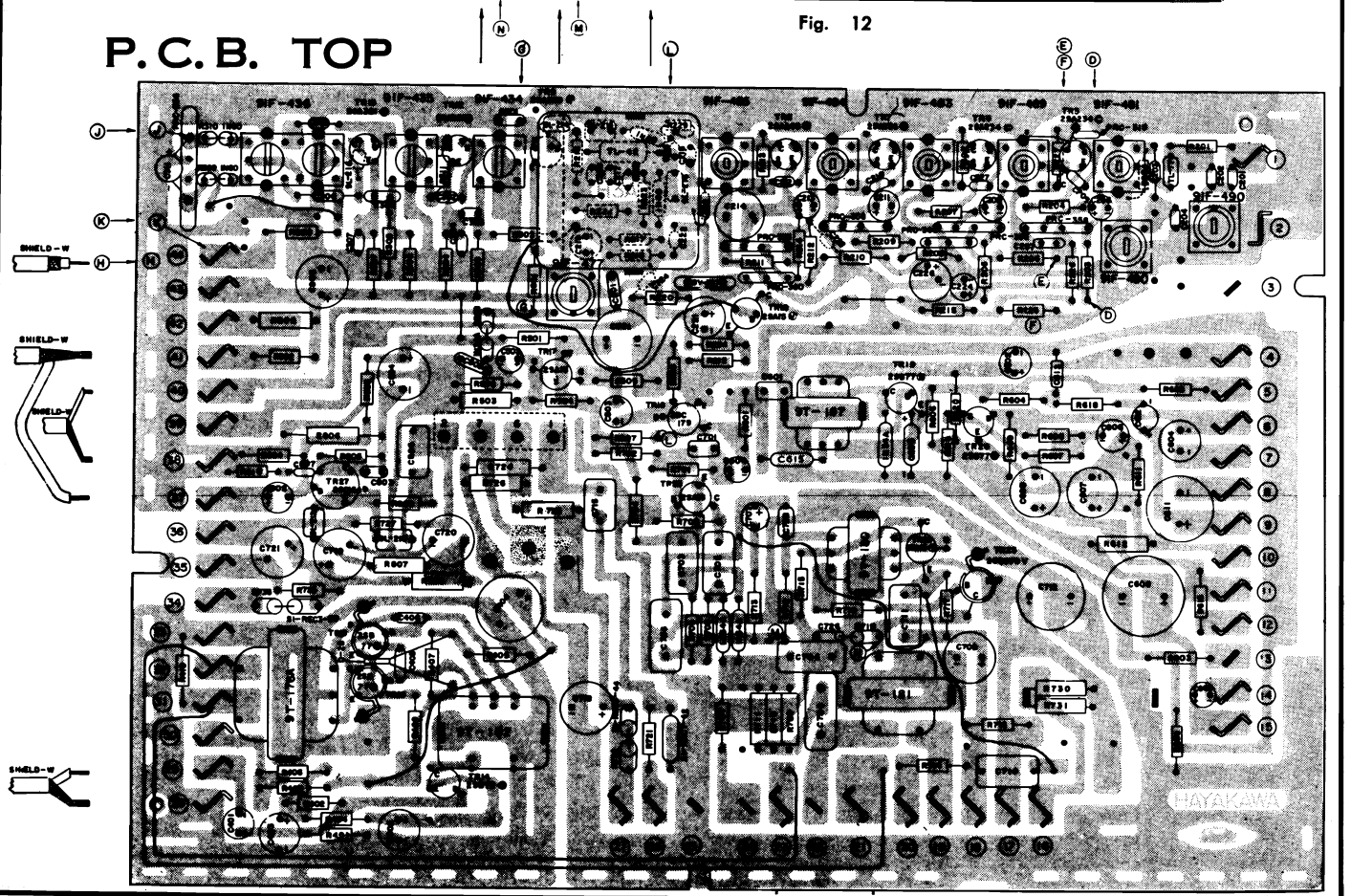
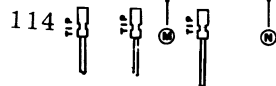


Fig. 13



SHARP Model UT-Q3B



SHARP ELECTRONICS CORPORATION

MODEL TW-49P/TW-56P

Deflection Yoke Adjustment

If the lines of the raster are not horizontal or squared with the picture mask, loosen the yoke clamp and rotate the deflection yoke until this condition is corrected. To obtain best results, the deflection yoke should be positioned as far forward on the neck of the picture tube as possible.

Centering Adjustment

Both horizontal and vertical centerings are accomplished by rotating the centering rings mounted on the back of the deflection yoke assembly.

Vertical Size and Linearity Adjustment

Adjust vertical height and vertical linearity for the best overall linearity and desired picture height. After this adjustment, a slight readjustment of the centering rings may be necessary.

Width Adjustment

With line voltage set at 108 volts, select the proper connection on the horizontal size adjustment (H-SIZE 1, 2, 3, 4) so that both sides of the picture just fills the mask horizontally. Under normal operating conditions and with the line voltage set at 120 volts, the picture should overscan the mask about 1/2 inch on each side.

Check RF Oscillator Adjustment (VHF Tuner)

Tune in all available VHF stations to see if the receiver local oscillator is adjusted to the proper frequency on all VHF channels. If adjustments are required, they can be made without removing the chassis from the cabinet. Access to the individual local oscillator adjustments on the VHF tuner is obtained in the following manner.

1. Remove the channel selector knob, fine tuning knob and felt washer from the shaft.
2. Set the channel to be adjusted.
3. Adjust local oscillator by turning the screw from the large hole on the insulator fiber.

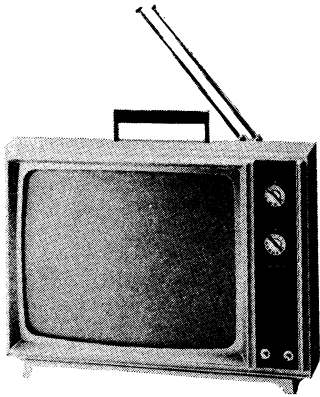
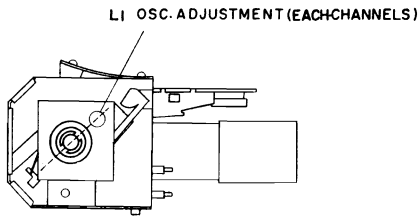
Chassis Assembly Removal

Whenever it becomes necessary to remove the chassis from the cabinet, proceed in the following manner:

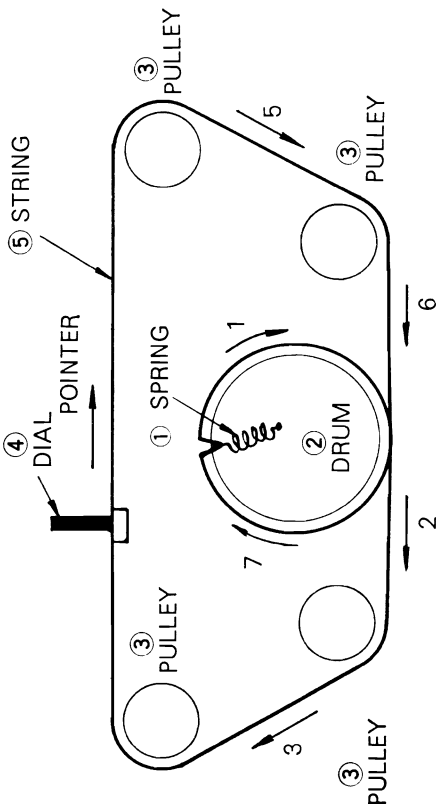
1. Lay the cabinet face down on a soft pad so as not to mar the picture tube.
2. Remove the six back cover retaining screws.
3. Remove the back cover and disconnect the VHF and UHF antenna feeders.
4. When removing the tuner assembly
 - a) Remove the VHF Channel Selector, VHF Fine Tuning and UHF Dial knobs from the front of the cabinet.
 - b) Remove the speaker leads.
 - c) Remove the four screws retaining the tuner mounting bracket and the tuner assembly from the cabinet.
5. When removing the control bracket
 - a) Remove the OFF-ON Volume and Contrast knobs from the front of the cabinet.
 - b) Remove the two screws retaining the control bracket.
6. When removing the chassis from the cabinet
 - a) Remove the three screws retaining the chassis to the cabinet.
 - b) Remove the anode lead and picture tube socket and the deflection yoke after loosening its clamp ring.

The chassis may now be completely removed from the cabinet.

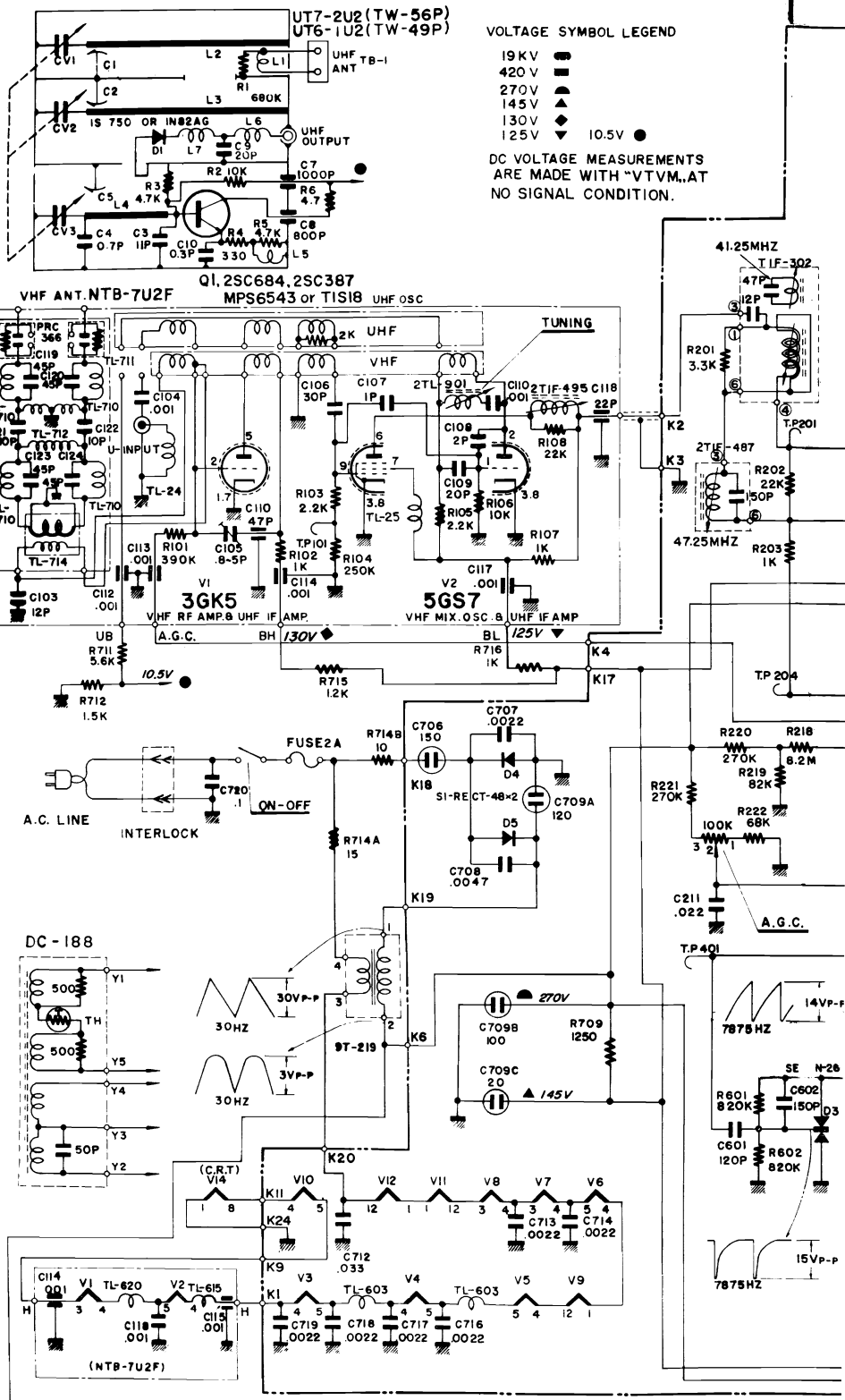
SHARP Model TW-49P/TW56P Schematic Diagram



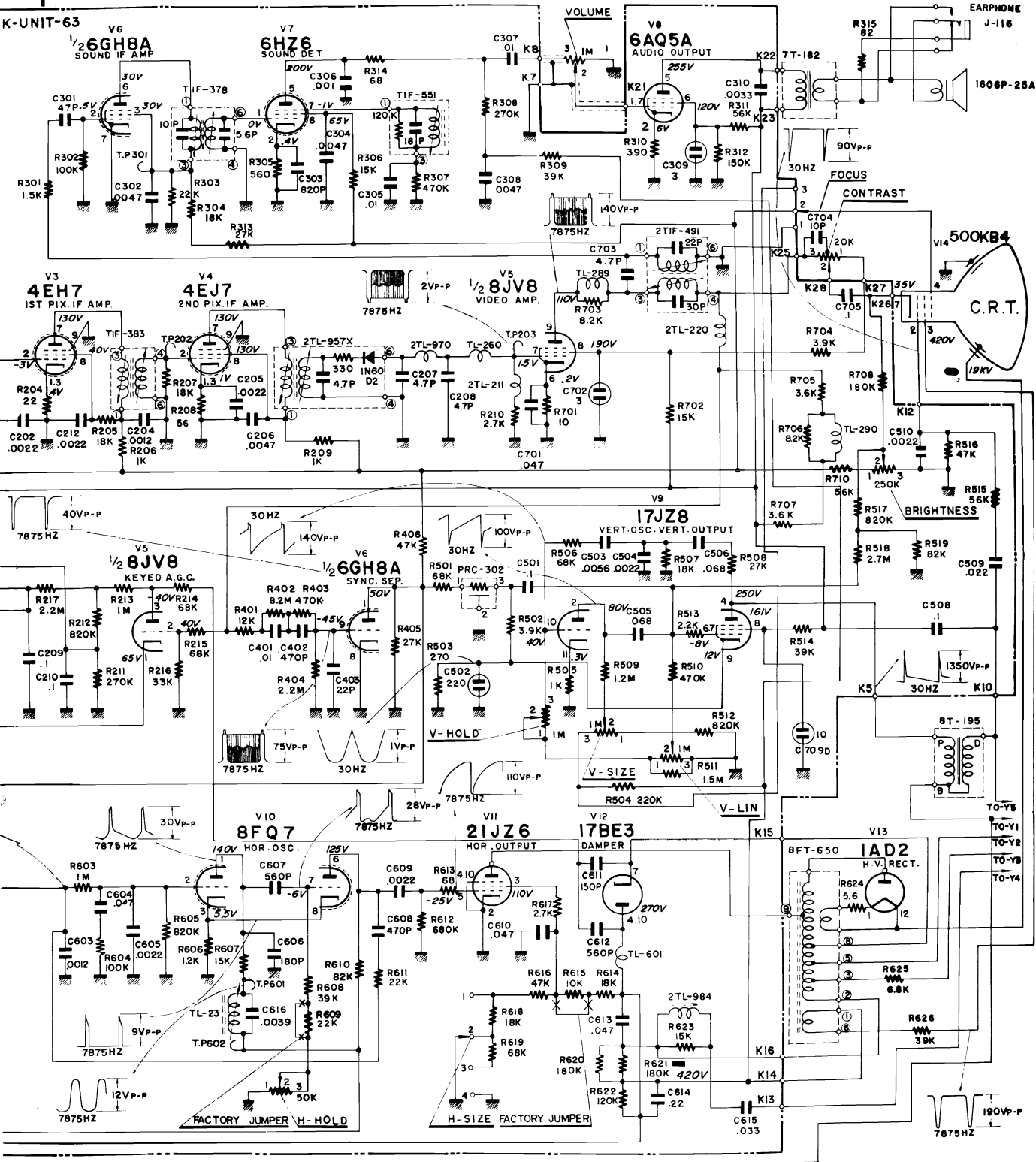
TW-49P



DIAL CORD STRINGING



SHARP Model TW-49P/TW56P Schematic Diagram, Continued



MODEL TW-49P/TW-56P

SHARP Model TW-49P/TW56P Alignment Information

ALIGNMENT INSTRUCTIONS

Equipment

1. Television Sweep Generator
2. Television Marker Generator
3. Oscilloscope
4. Bias Supply
5. Output Meter

Picture IF Alignment

1. The receiver and test equipment should be turned on and allowed to warm up for 10 minutes before starting alignment procedure.
2. Set the VHF channel selector to channel 10. (Antenna disconnected from tuner input.)
3. Set the sweep generator for 44MHz IF output and adjust the sweep width for 10 MHz.
4. Loosely couple the marker generator output lead to the output cable of the sweep generator.
5. Apply -2.5V bias to TP-204.
6. Connect the vertical input of the oscilloscope through a 10K OHM resistor to TP-203.
7. Connect the output of the sweep generator through a .005 MFD capacitor to TP-202. Adjust the output of sweep generator to maintain a level not exceeding 2~3V pp at the oscilloscope reading.
8. Set the marker generator to produce the desired marker frequencies and adjust 2TL-957X (Top and Bottom core) to obtain a waveform on the oscilloscope equivalent to the pattern shown in Figure 2.
9. Reconnect the output of the sweep generator in the manner specified in step 7 to TP-201.
10. In the manner specified in step 8, adjust TIF-383 (Top & Bottom core) to obtain a waveform on the oscilloscope equivalent to the pattern in Figure 3.
11. Reconnect the output of the sweep generator to TP-101 on the VHF tuner.
12. In the manner specified in step 8, adjust TIF-302 (Top & Bottom core), 2TIF-487 and 2TIF-495 to obtain a waveform on the oscilloscope equivalent to the pattern shown in Figure 4. (Top slug of TIF-302 is to dip 41.25 MHz and 2TIF-487 is to dip 47.25 MHz). Slight retouch of TIF-383 and 2TL-957X may be necessary.
13. Repeat steps 7 through 12 until best results are obtained.

Sound IF Alignment

1. With the receiver in normal operating condition, tune in a strong local station for best reception of picture and sound.
2. Adjust TIF-551 for maximum sound without buzz and distortion.
3. Attenuate the received station signal by disconnecting the antenna.
4. Adjust TIF-378 (Top & Bottom core) for maximum sound with minimum buzz. Detune to optimize the alignment.
5. Adjust 2TIF-491 (Top core) for maximum sound.
6. Repeat steps 2, 3, 4 and 5 to obtain best results.

4.5 MHz Trap Alignment

1. The receiver and the marker generator should be turned on and allowed to warm up before starting alignment procedure.
2. Set the channel selector on the receiver to an unused channel, set the contrast control in fully clockwise position and disconnect the antenna from the tuner input.
3. Connect 4.5MHz signal from the marker generator to TP-203.
4. Adjust 2TIF-491 (Bottom core) to obtain minimum contrast on the face of the picture tube.

Horizontal AFC Alignment

1. The receiver should be turned on and allowed to warm up before starting alignment procedure.
2. Tune in a local station and adjust for normal picture.
3. Short-circuit both ends of horizontal ringing coil TL-23 (between TP-601 and TP-602).
4. Connect 0.5 MFD capacitor between TP-401 and the chassis to eliminate the synchronizing signal output.
5. Turn the Horizontal Hold control to bring the picture moving slowly to the right or left, disregard vertical movement of the picture.
6. Open the short of Horizontal Ringing Coil TL-23 and adjust its core to produce the same condition as in step 5.
7. Remove the 0.5 MFD capacitor connected at step 4.
8. Repeat steps 4, 5 and 6 until the Horizontal Sync is obtained at the mechanical center of control range.

SHARP Model TW-49P/TW-56P Alignment Information, Continued

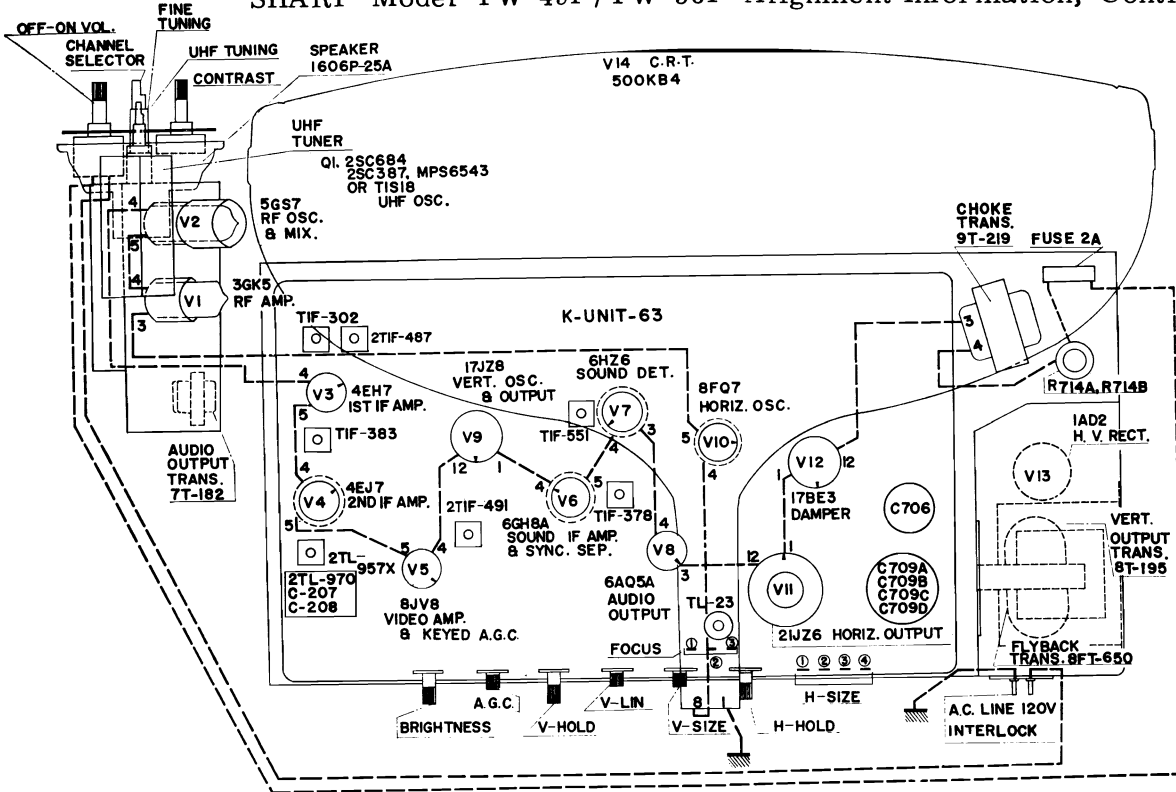


Figure 1 Chassis Tube Layout and Adjustment

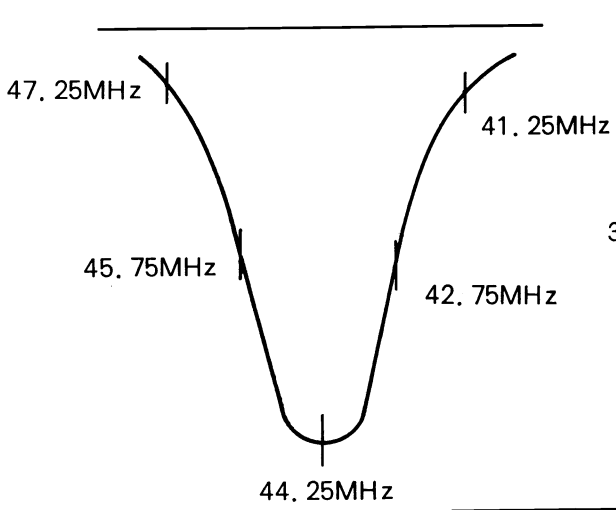


Figure 3

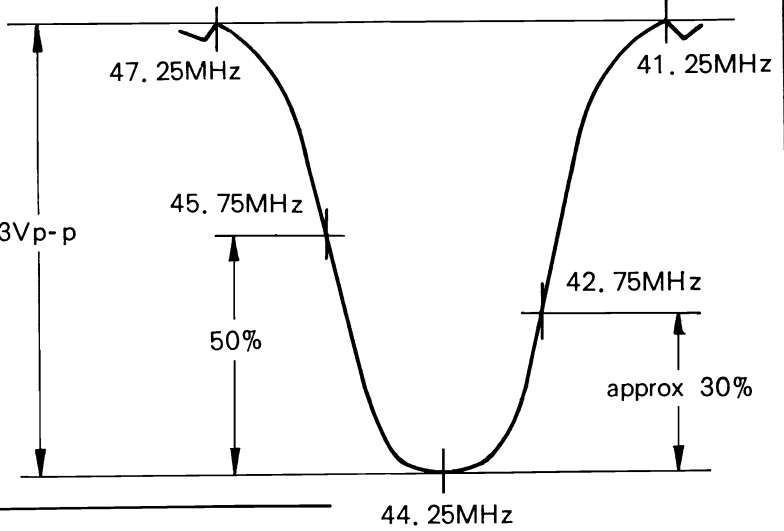
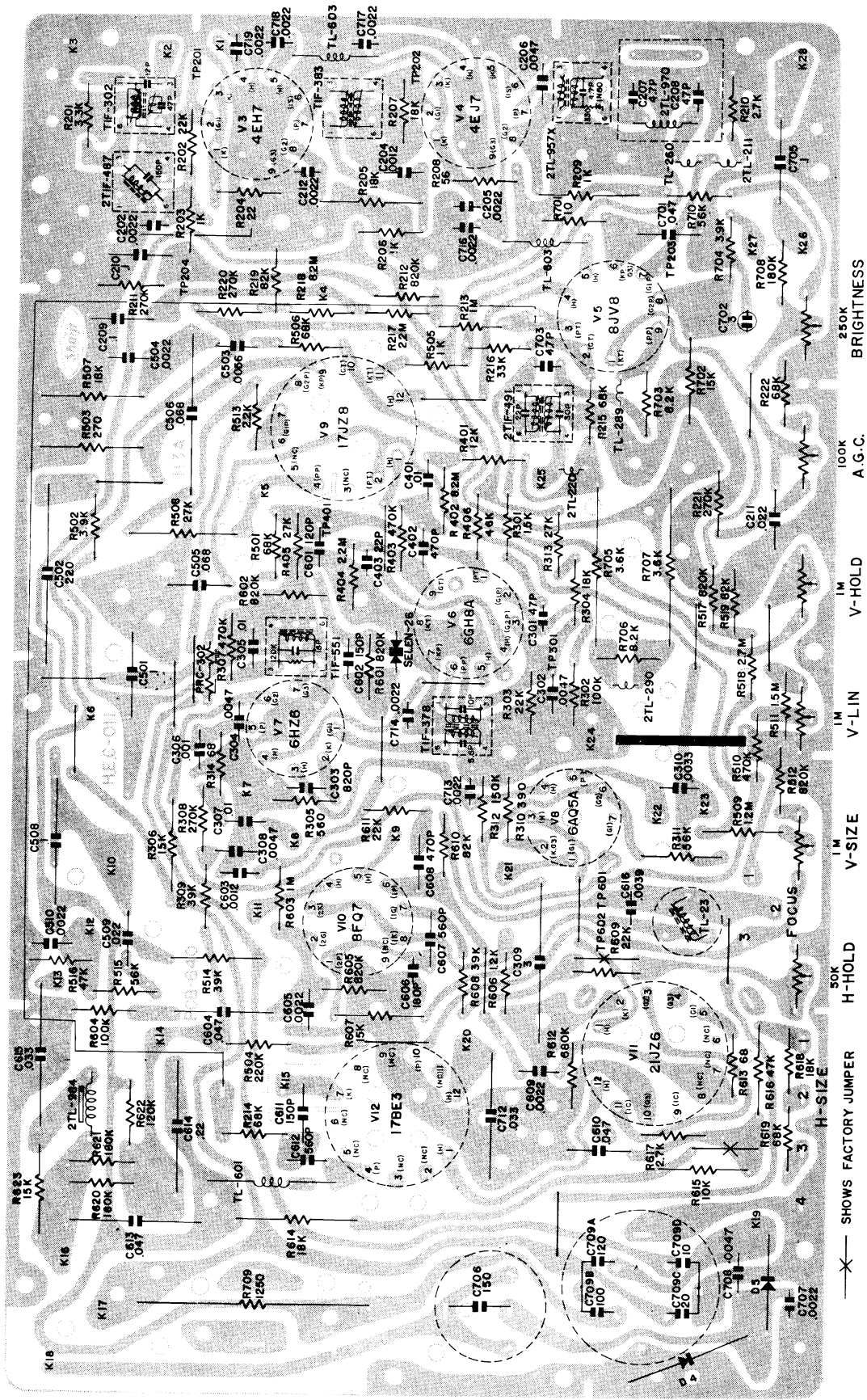


Figure 4



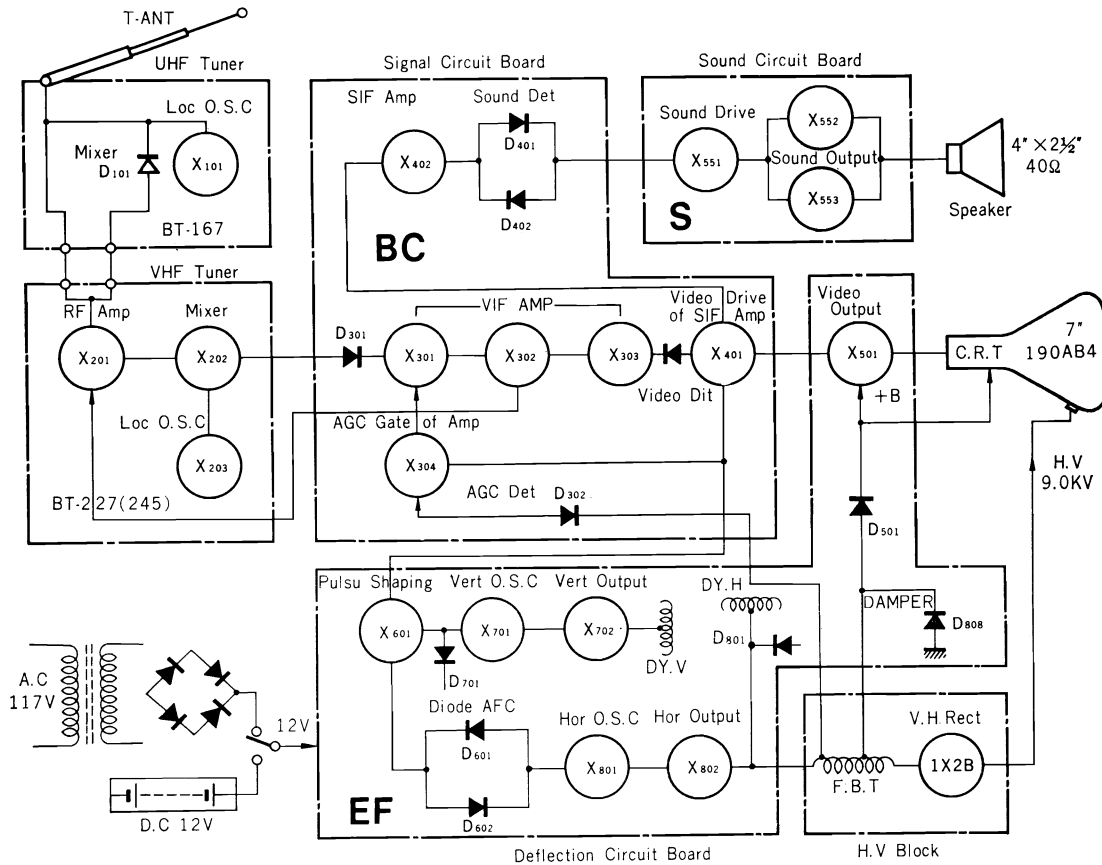
Figure 2

SHARP Model TW-49P/TW56P Service Information, Continued



SONY

TV-700U

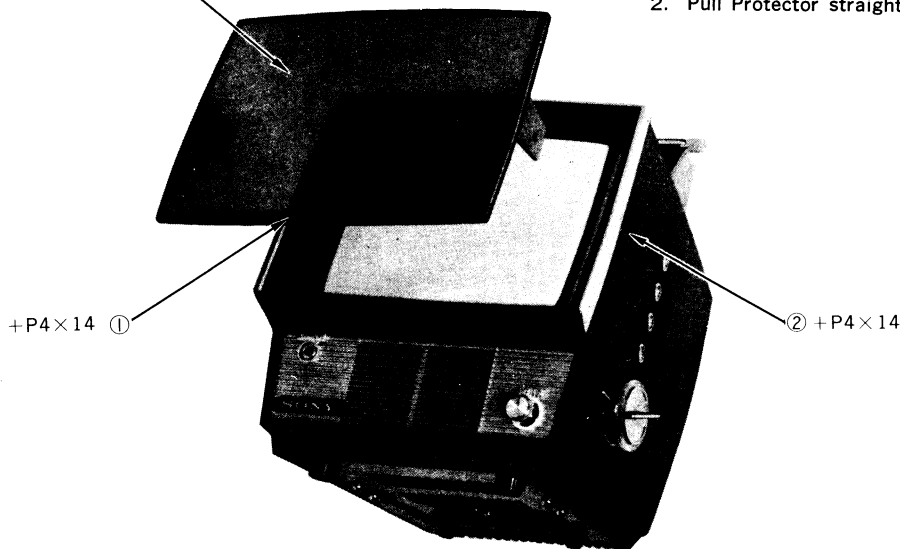


Block Diagram

Picture Tube Protector
4-006-237

To Remove the Protector

1. Remove the two screws (①, ②, in Fig. 1).
2. Pull Protector straight out (③ in Fig. 1).

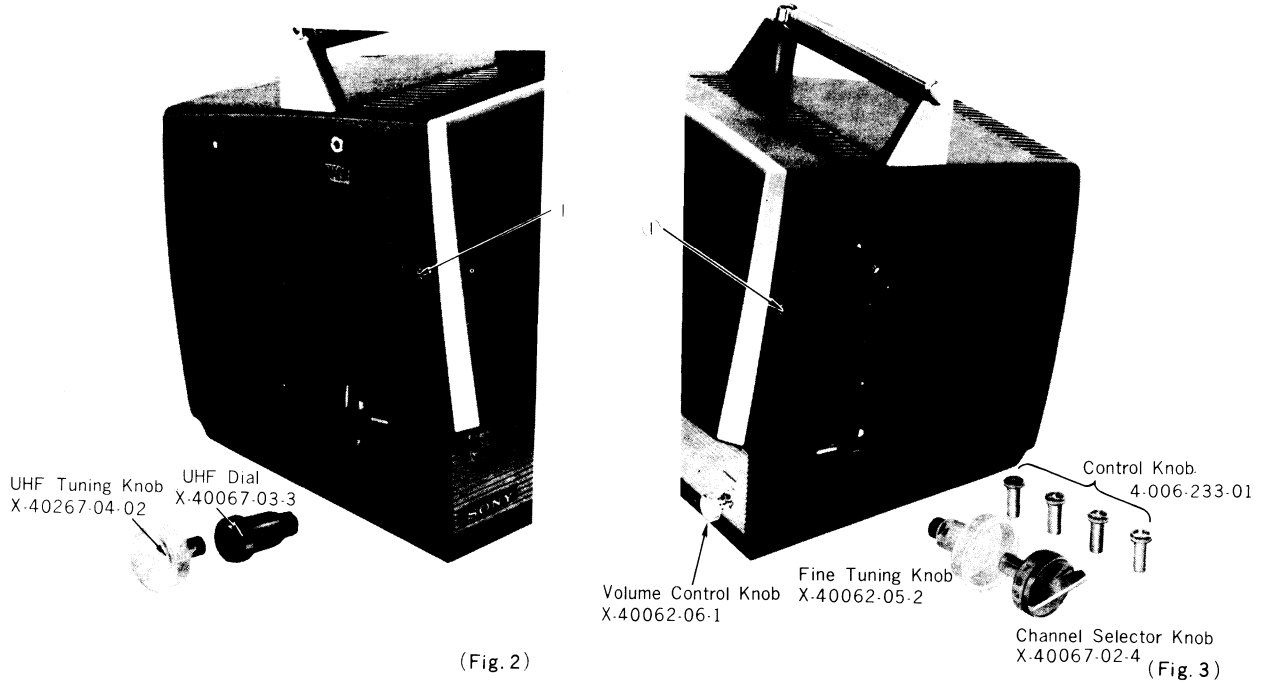


(Fig. 1)

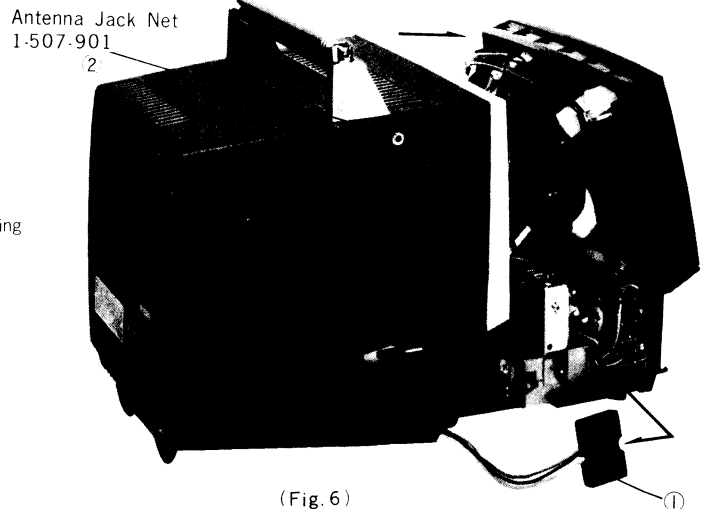
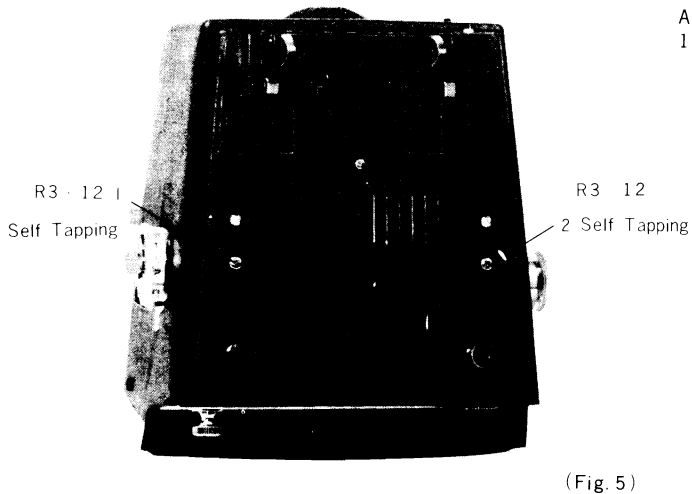
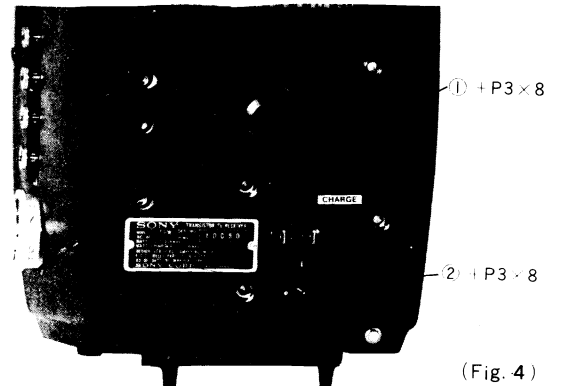
SONY Model TV-700U Disassembly Instructions, Continued

To Remove the Back Cabinet Cover

1. Pull UHF Tuning Knob and UHF Dial straight out (Fig. 2).
2. Pull Control Knobs, Channel Selector Knob and Fine Tuning Knob straight out (Fig. 3).
3. Remove the two screws (in Fig. 2 and Fig. 3).

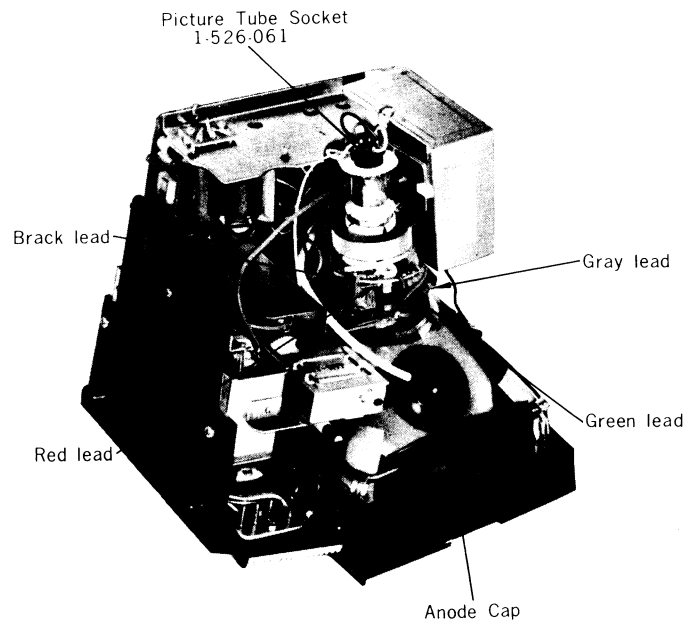


4. Remove the screws (, in Fig. 4).
5. Remove the screws (, in Fig. 5).
6. Pull off the 4P Connector (in Fig. 6).
7. Remove the Antenna Jack Nut (in Fig. 6).

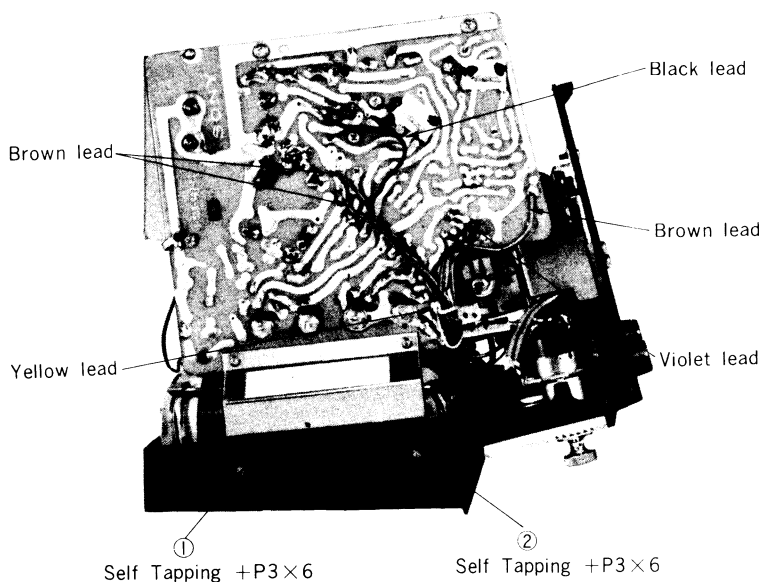


SONY Model TV-700U Disassembly Instructions, Continued

1. Remove the High Voltage Anode Cap from the Picture Tube (Fig. 7).
2. Unsolder the four leads (black, red, gray, and green in Fig. 7).
3. Remove the Picture Tube Socket (Fig. 7).
4. Remove the two screws (in Fig. 8).
5. Unsolder the violet lead, yellow lead, black lead and six brown leads (Fig. 8).
6. Unsolder the gray shielded lead from AGC Pin Terminal on the Signal Circuit Board (Fig. 9).



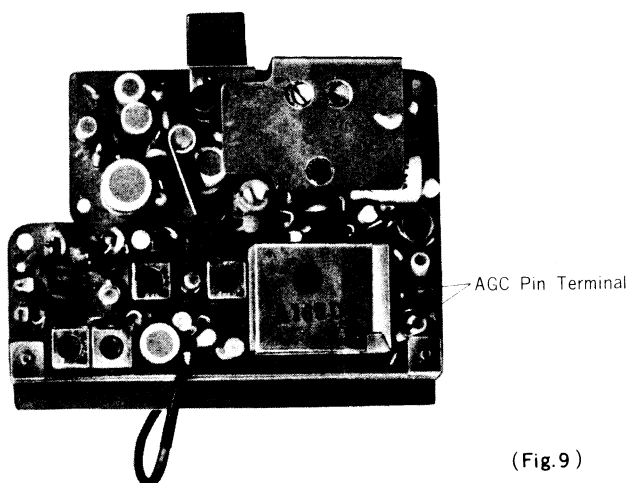
(Fig. 7)



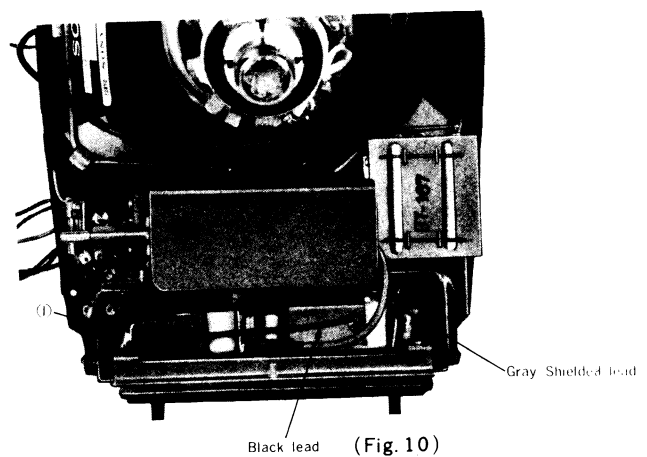
To Remove the Signal Circuit Board

1. Pull out the Connector (in Fig. 10).
2. Unsolder the gray shielded lead from Tuner Block Terminal (Fig. 10).
3. Unsolder the black lead from Tuner Mounting Bracket (Fig. 10).

(Fig. 8)



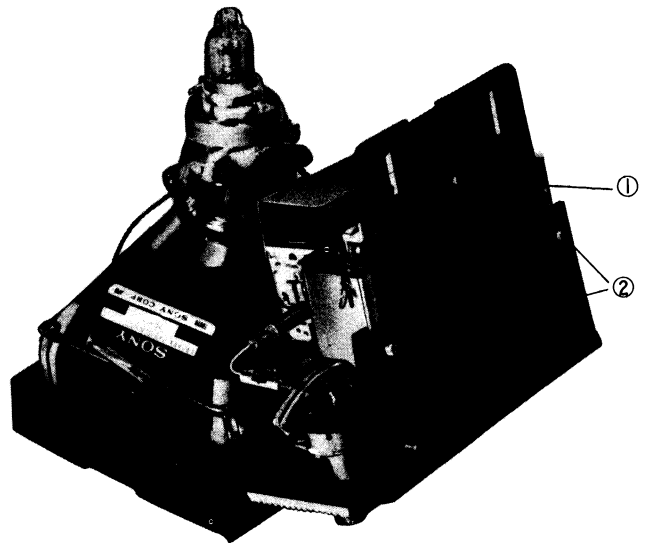
(Fig. 9)



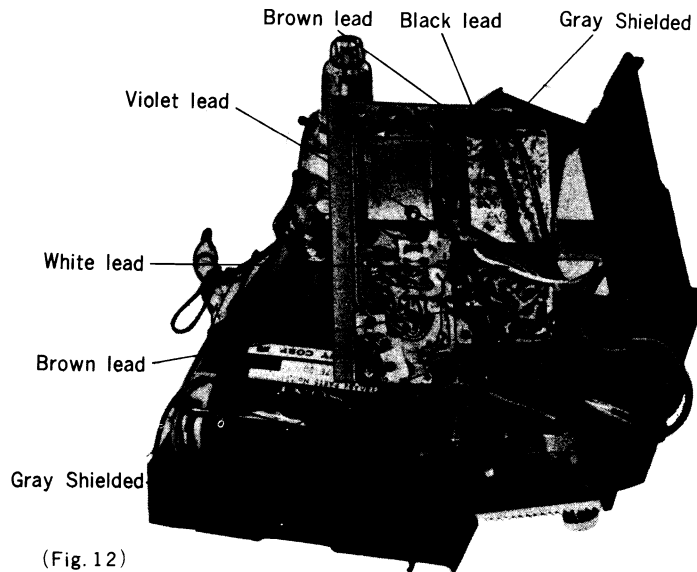
(Fig. 10)

SONY Model TV-700U Disassembly Instructions, Continued

4. Remove the Screw (①, ② in Fig. 11).
5. Pull out Signal Circuit Board from Tuner Mounting Bracket (Fig. 12).
6. Unsolder the two shielded leads and five leads (one each black, white, violet and two brown in Fig. 12).



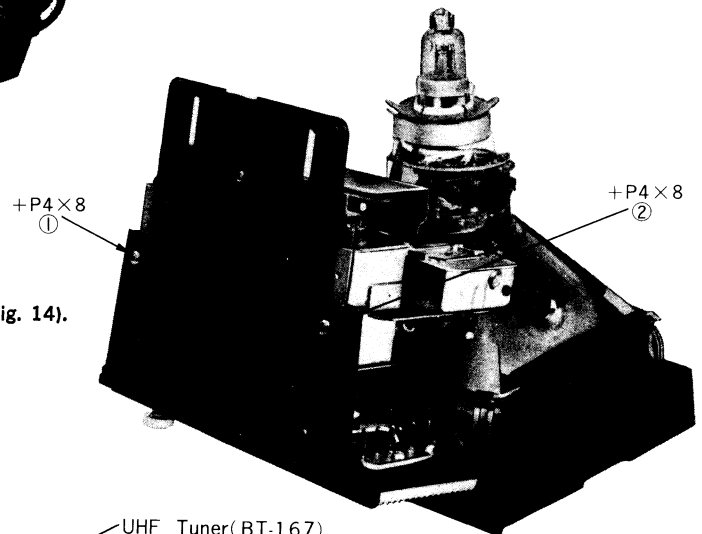
(Fig. 11)



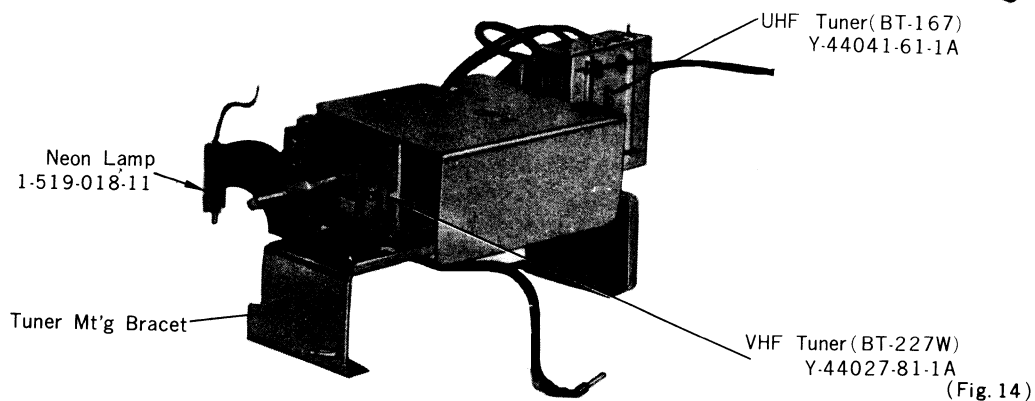
(Fig. 12)

To Remove the Tuner Block Ass'y

1. Remove the two screws (①, ② in Fig. 13).
2. Unsolder all the corresponding leads on the Tuner Block (Fig. 14).



(Fig. 13)



(Fig. 14)

SONY Model TV-700U Alignment Information

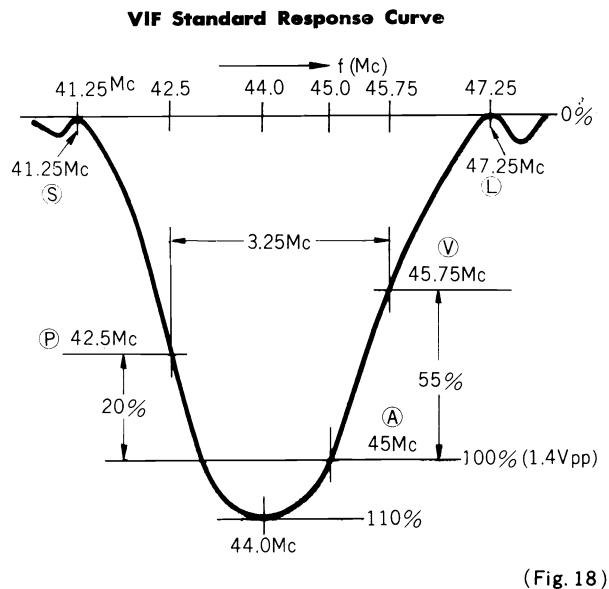
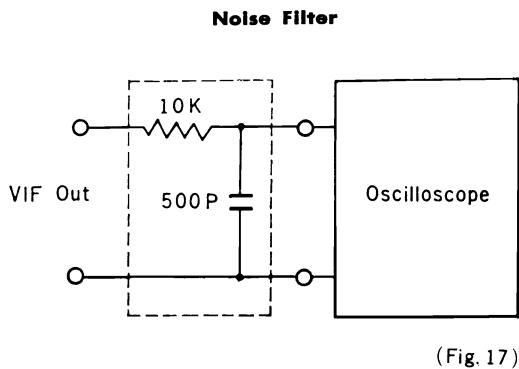
A. VIF Response Curve Adjustments

Pre-Alignment Steps

1. Unsolder the Keying Pulse Lead.
2. Connect an Oscilloscope to VIF output terminals (across R_{402}) through a Noise Filter, which consists of a $10K\Omega$ resistor and a $500\mu F$ Capacitor as shown in Fig. 17.
3. Connect a Sweep Generator and a Marker Generator to the Test Point (TP) of the Tuner through a $0.02\mu F$ capacitor.
4. Set the Tuner to a free channel in area.
5. Connect a Voltmeter across R_{308} (390Ω) and connect a Potentiometer ($2K\Omega$) across R_{322} (330Ω).
6. Adjust the Potentiometer so that the Voltmeter reads $0.05V$.

Step	Marker Gen. Freq.	Adjust	Correct Marker position on the response curve	Remarks
1	41.25 Mc	TRAP-301	Ⓢ (dip)	VIF Standard Response Curve. See Fig. 18.
2	47.25 Mc	TRAP-302	Ⓛ (dip)	
3	42.5 Mc	VIFT-2	Ⓟ (50%)	
4	45.75 Mc	VIFT-3 VIFT-4	Ⓥ (45%)	
5	45 Mc	VIFT-3 VIFT-4	Ⓐ (100%—1.4 Vpp)	

Note: If a proper response curve similar to Fig. 18 is not obtained by the adjustment procedures described above, replace the damping resistor (R_{309} or R_{318}) with proper one for best result.



SONY Model TV-700U Alignment Information, Continued

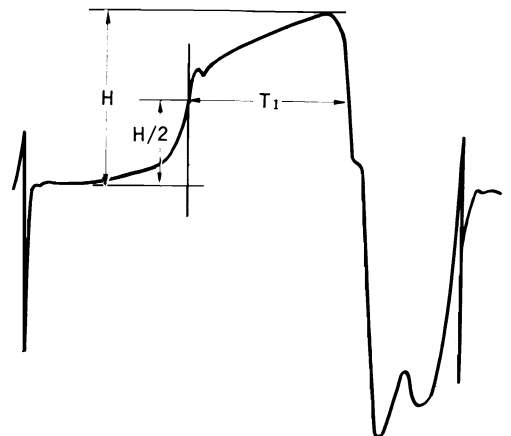
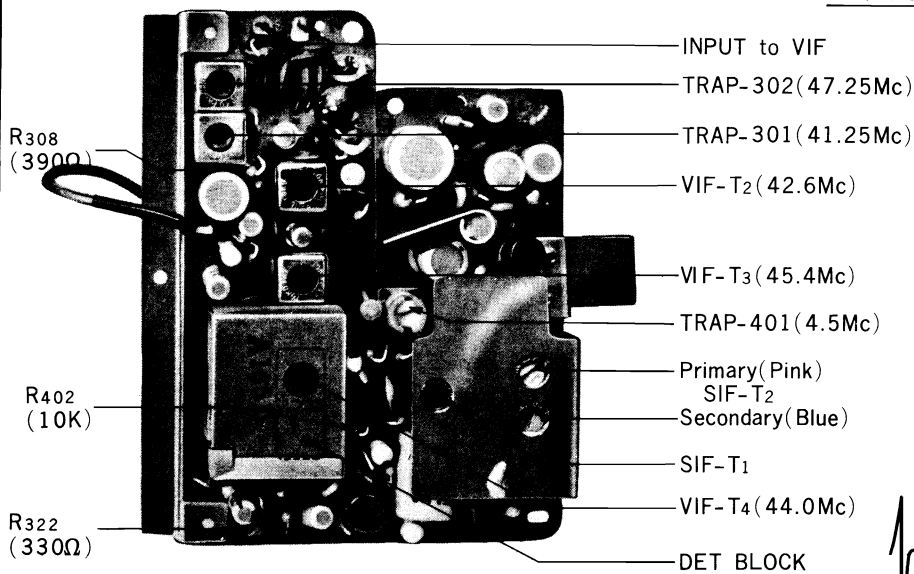
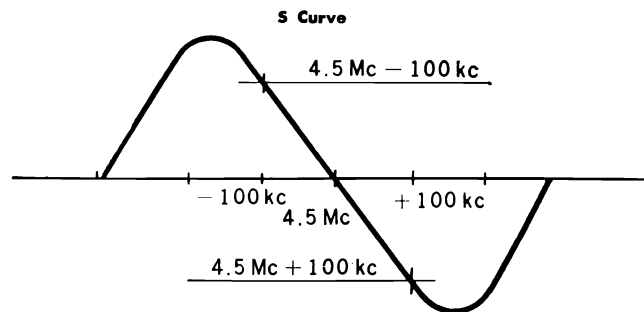
B. SIF Adjustments

Pre-Alignment Steps

1. Set the Brightness Control to the optimum and the Contrast Control to the maximum positions.
2. Remove the Tuner Output Leads.

Step	Equipment	Connection	Freq.	Adjust	
1	Test Oscillator	VIDEO DET OUT	4.5 Mc	TRAP-401	for minimum stripes on the picture.
2	Same Voltmeter	Same Across R ₄₁₄	4.5 Mc	SIFT ₁ & Pri. of SIFT ₂ (Pink)	for maximum reading on the Voltmeter.
3	Sweep Gen. Standard Signal Gen. Oscilloscope	VIDEO DET OUT Same Same Across C ₄₁₅	4.5 Mc (AM)	Sec. of SIFT ₂	for minimum modulated waveform.

- Note:**
1. Repeat the above procedures two or three times.
 2. If S curve is not symmetrical with respect to the intersection of the S curve and return line, adjust primary of SIFT₂ for optimum result.



SONY Model TV-700U, Continued

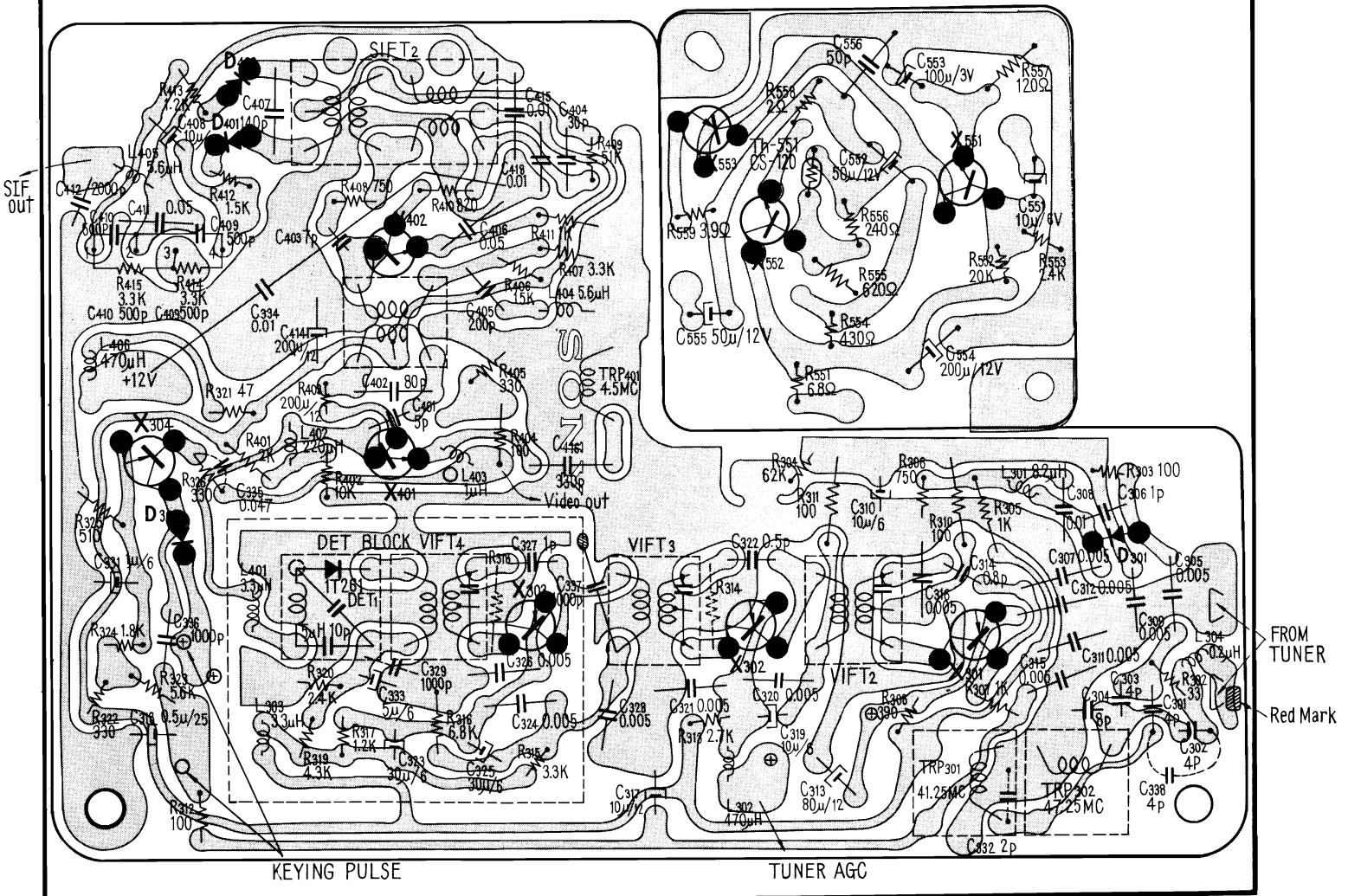
C. Deflection Circuit Adjustments

Step	Adjustment for	Preliminary Instruction	Adjust by adding a resistor of	In parallel with	
1	Ic of X ₅₀₁ (VID. Out)	1. Set to free channel. 2. Check 12V and 84V Power Supply. 3. Connect a Voltmeter across R ₅₀₅ .	more than 500KΩ (for higher voltage reading than 29V) more than 50KΩ (for lower voltage reading than 29V)	R ₅₀₁ R ₅₀₂	for approx. 29V reading.

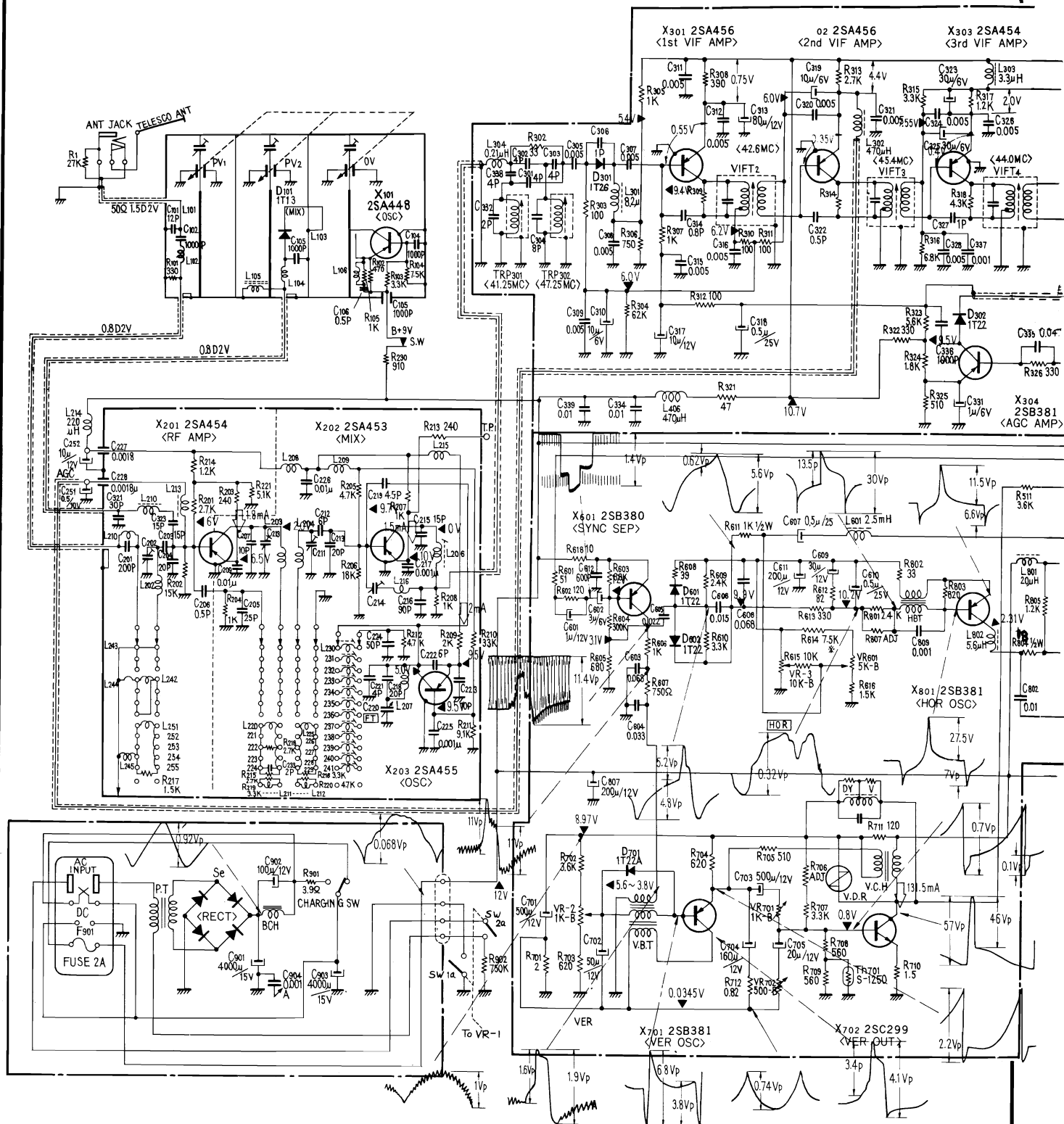
Step	Adjustment for	Preliminary Instruction	Equipment	Connection	Adjust	
2	Vert. Height and Linearity	Receive a Test Pattern.			VR ₇₀₁ (Vert. Height) VR ₇₀₂	For Optimum Vertical Height and Linearity on the Pattern.
3	Ic of X ₇₀₁ (Vert. Out)	Lock in Sync. Check 12V Power Supply.	Voltmeter	Across R ₇₁₀	R ₇₀₆ (100Ω ~ 2.4KΩ)	For approx. 0.19V ~ 0.21V reading.
4	Pulse Width (X ₈₀₁)	Lock in Sync.	Synchroscope	Collector of X ₈₀₁ and ground	R ₃₀₇ (330Ω ~ 12KΩ)	For pulse width, T ₁ ---

Signal Circuit Board

—Printed Side—



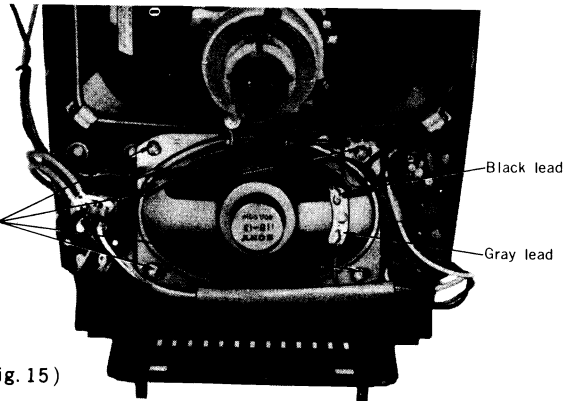
SONY Model TV-700U Schematic Diagram



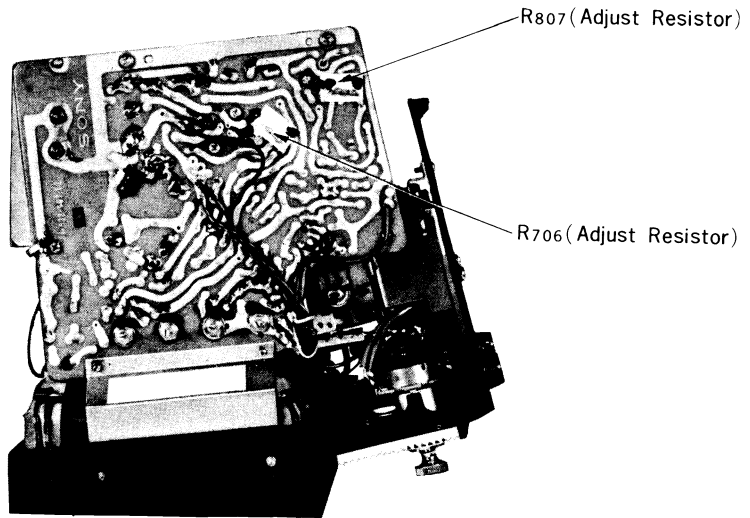
SONY Model TV-700U Schematic Diagram

To Remove the Speaker

1. Remove the four screws (ⓐ in Fig. 15).
2. Unsolder the two leads (gray, black in Fig. 15).

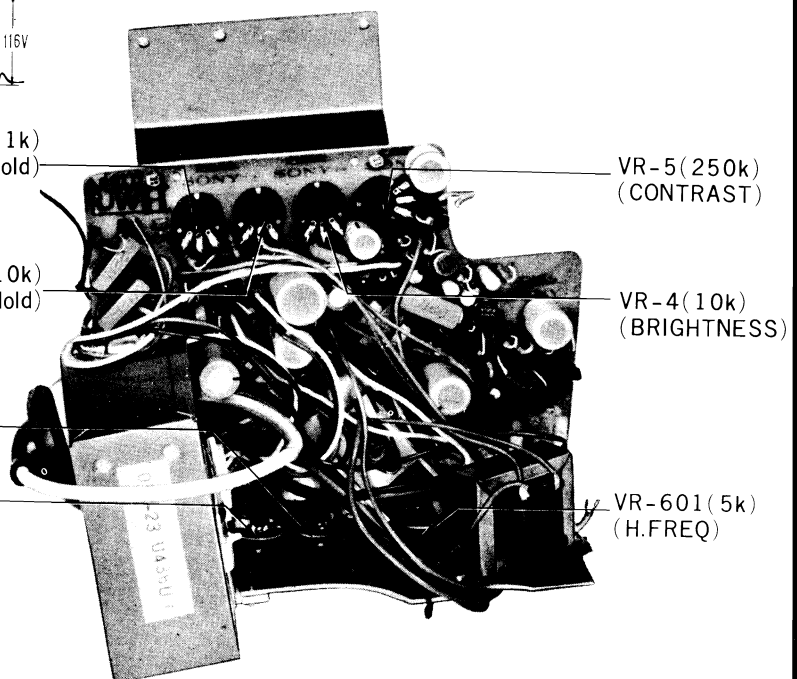


(Fig. 15)



R807 (Adjust Resistor)

R706 (Adjust Resistor)



VR-5 (250k)
(CONTRAST)

VR-4 (10k)
(BRIGHTNESS)

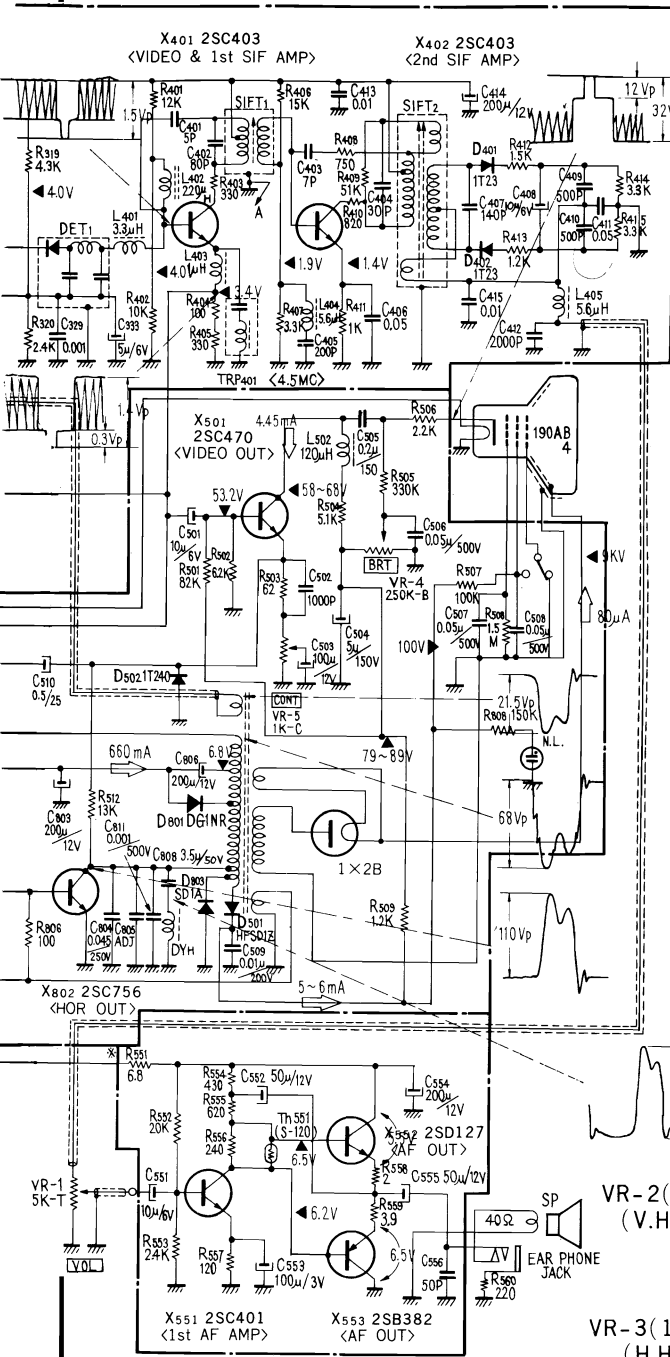
VR-601 (5k)
(H.FREQ)

VR-2 (1k)
(V.Hold)

VR-3 (10k)
(H.Hold)

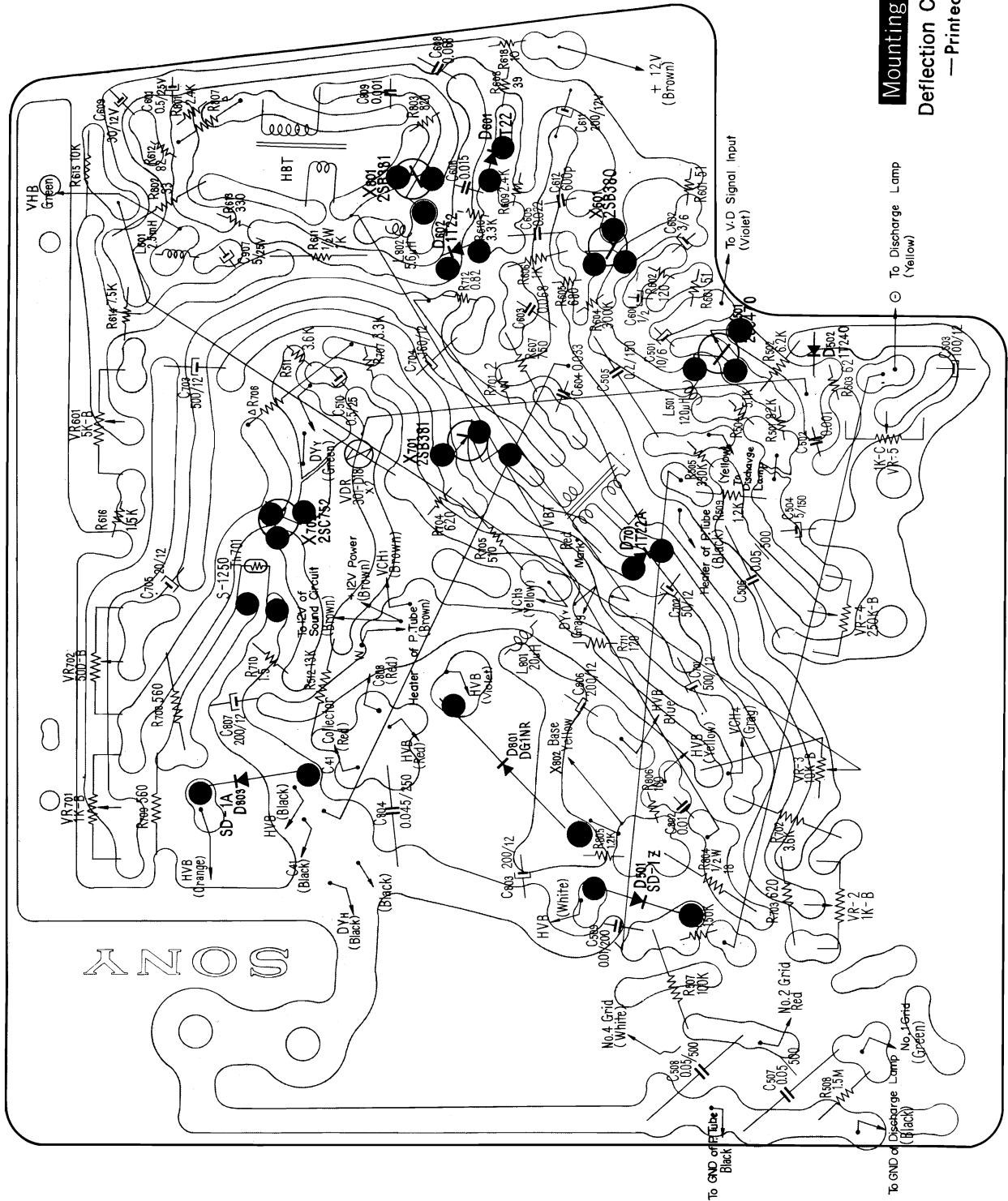
VR-702 (500Ω)
(VER. LEN)

VR-701 (1k)
(VER. HEIGHT)



SONY CORPORATION

SONY Model TV-700U Printed Board Information



Mounting Diagram
Deflection Circuit Board
— Printed Side —

○ To Discharge Lamp
(Yellow)

To GND of P.Tube
Black

To GND of Discharge Lamp
(Black)

SONY

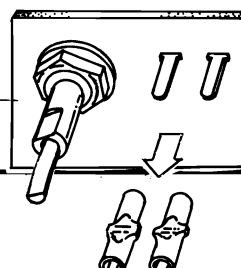
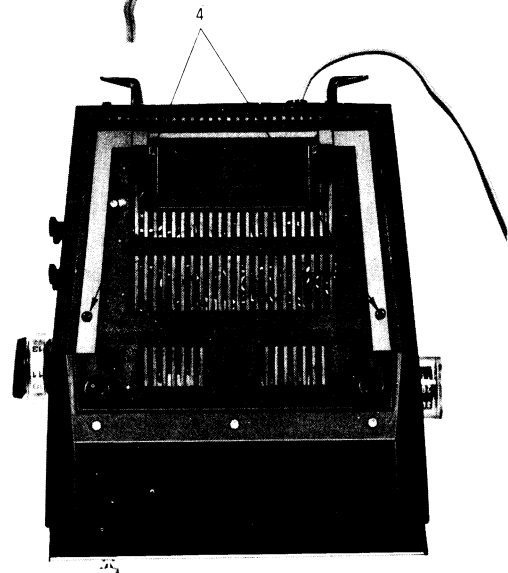
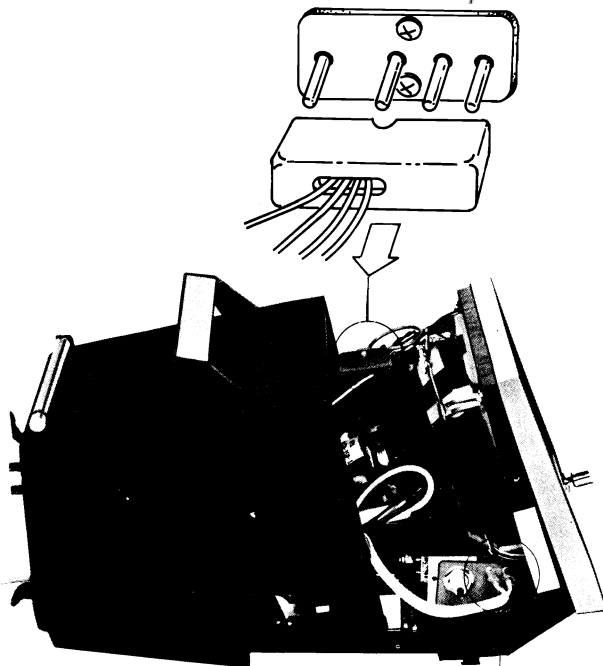
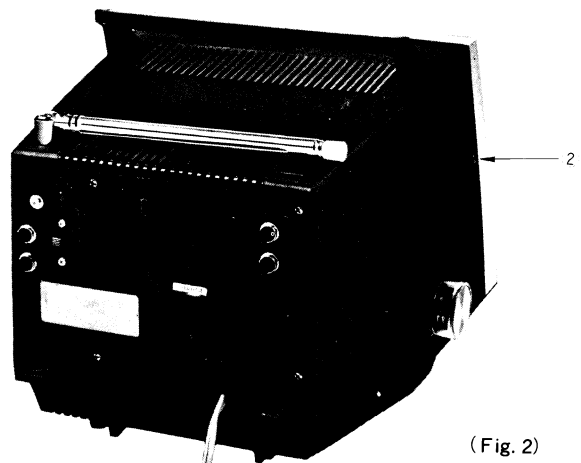
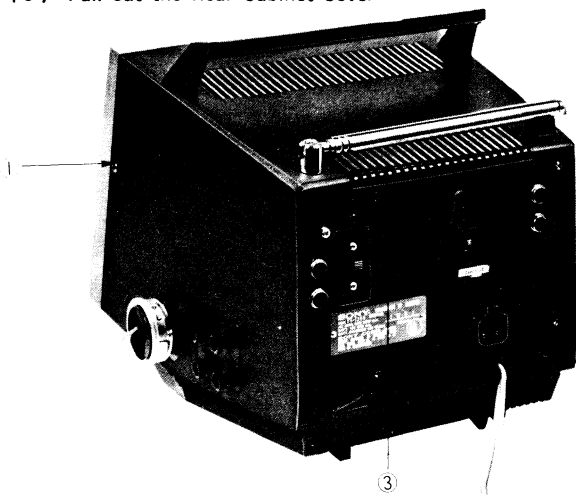
TV-720U

Model TV-710U is similar to TV-720U described.

Method of Disassembling the Set

To Remove the Rear Cabinet Cover

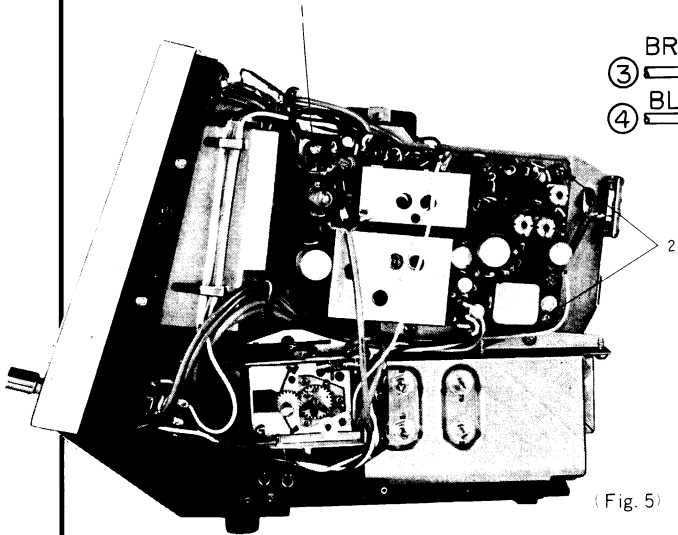
- (1) Pull out the VHF Channel Selector Knob, Fine Tuning Knob, UHF Tuning Knob and UHF Dial .
- (2) Pull out the four Control Knobs.
- (3) Remove the six screws (①, ②, ③, ④ in Fig. 1, 2, 3).
- (4) Disconnect the 4-Pole Connector and Antenna Cable Connector (Fig. 4).
- (5) Pull out the Rear Cabinet Cover .



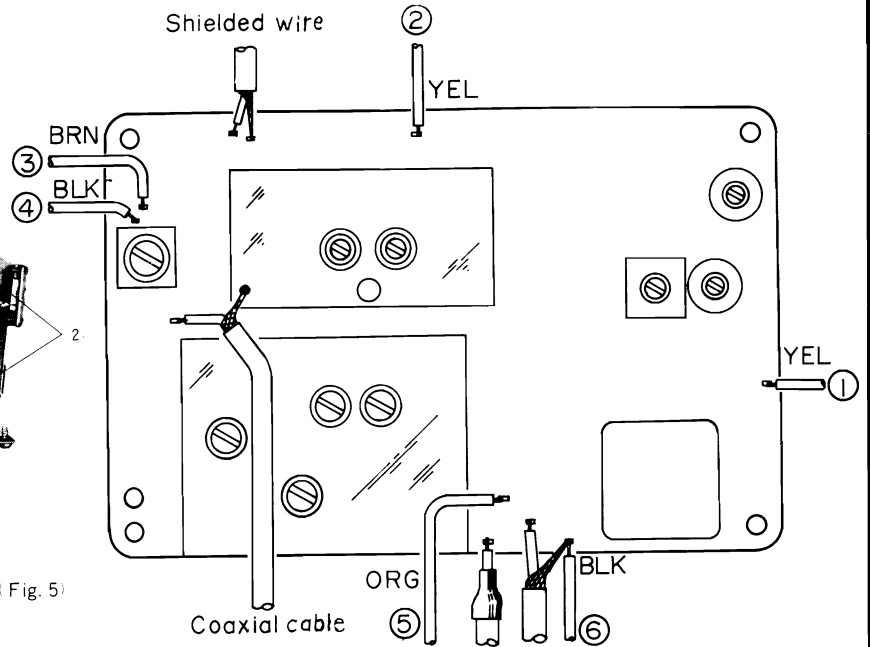
SONY Model TV-720U Disassembly Instructions, Continued

To Remove the Signal Circuit Board

- (1) Remove the Rear Cabinet Cover.
- (2) Remove the three screws (①, ② in Fig. 5).
- (3) Unsolder the three Shielded wires, one Coaxial Cable and six Leads (①~⑥ in Fig. 6).



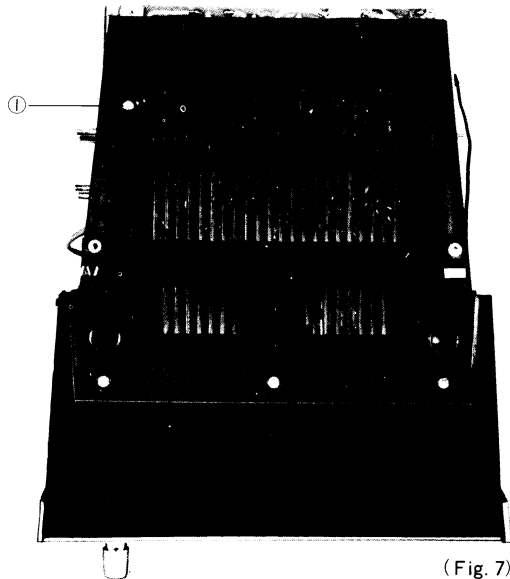
(Fig. 5)



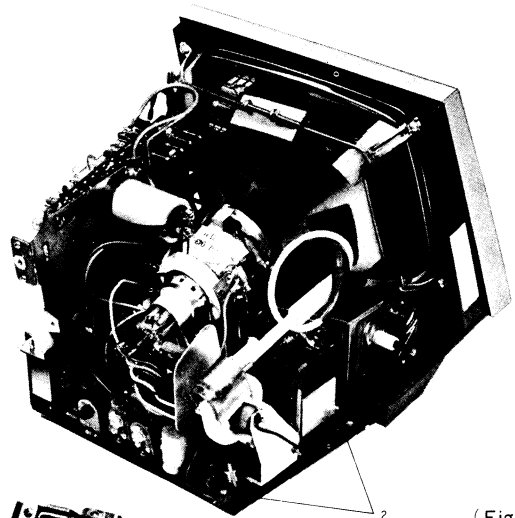
(Fig. 6)

To Open the Bottom Cover

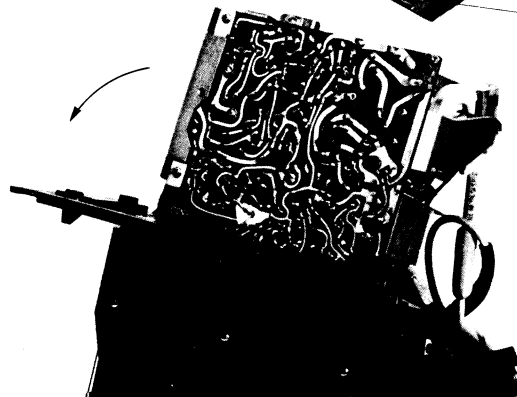
- (1) Remove the Rear Cabinet Cover.
- (2) Remove the three screws (①, ② in Fig. 7, 8).
- (3) Open the Bottom Cover.



(Fig. 7)



(Fig. 8)

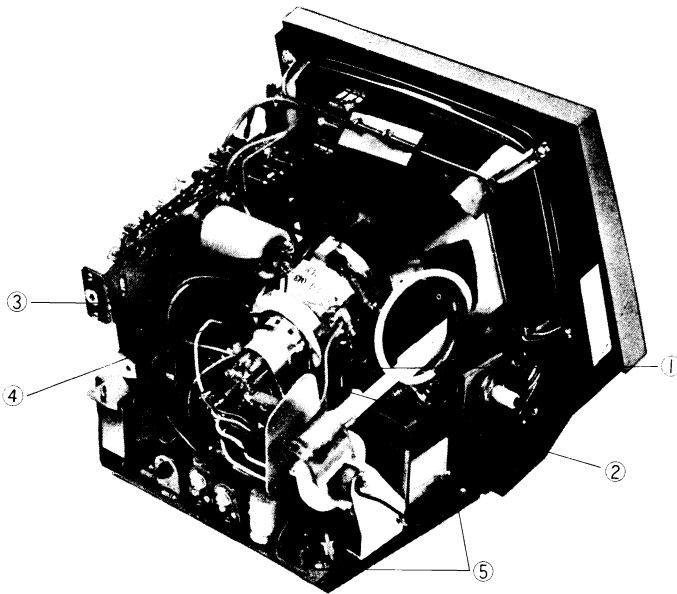


(Fig. 9)

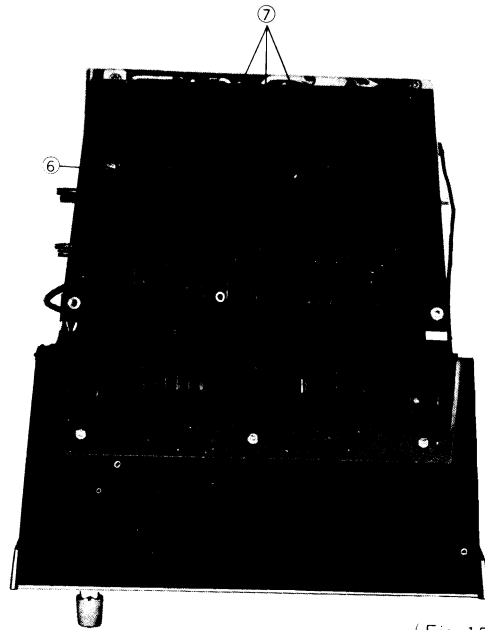
SONY Model TV-720U Disassembly Instructions, Continued

To Remove the Deflection Circuit Board

- (1) Remove the Rear Cabinet Cover.
- (2) Unsolder the four Leads from Deflection Yoke.
(①, ②, ③, ④ in Fig. 14).
- (3) Remove the Anode Cap.
- (4) Remove the five screws (⑤, ⑥, ⑧, ⑨ in Fig. 14, 15, 16).
- (5) Unsolder all the corresponding leads on the Chassis.



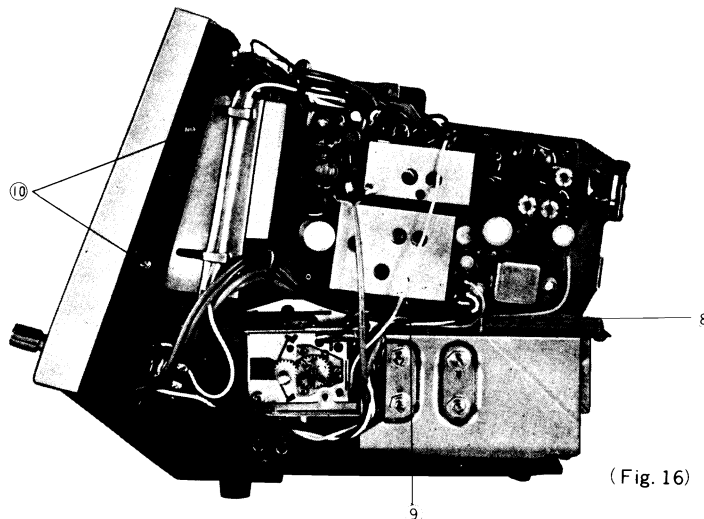
(Fig. 14)



(Fig. 15)

To Remove the Chassis

- (1) Remove the Rear Cabinet.
- (2) Loosen the Deflection Yoke Holding screw.
- (3) Remove the Anode Cap.
- (4) Remove the five screws (⑦, ⑩ in Fig. 15, 16).
- (5) Unsolder all the corresponding leads of the Front Cabinet.



(Fig. 16)

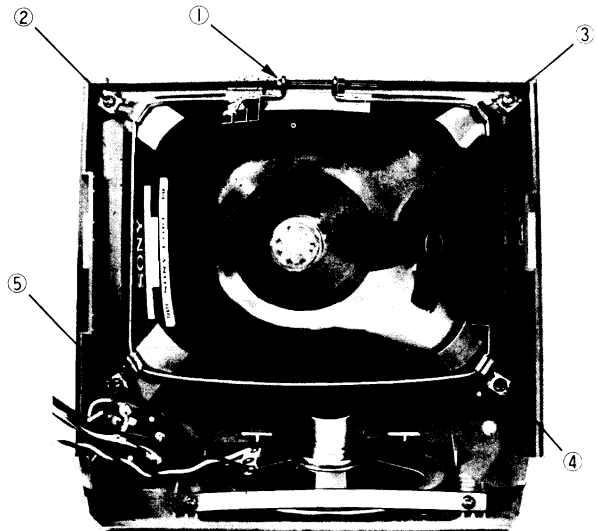


(Fig. 17)

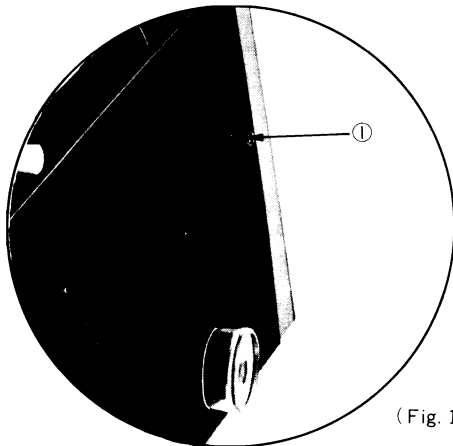
①

To Remove the Picture Tube

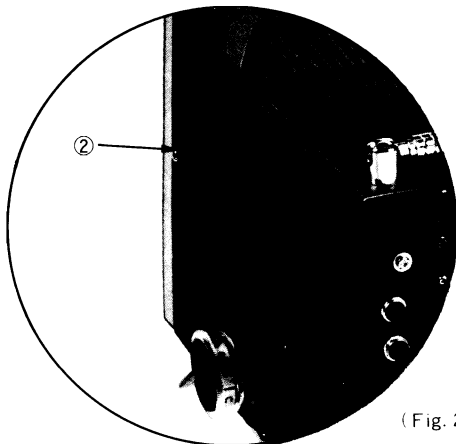
- (1) Remove the Rear Cabinet Cover.
- (2) Remove the Chassis.
- (3) Remove the Tuner Block.
- (4) Loosen the screw (① in Fig. 18).
- (5) Remove the four screws (②, ③, ④, ⑤ in Fig. 18).



(Fig. 18)



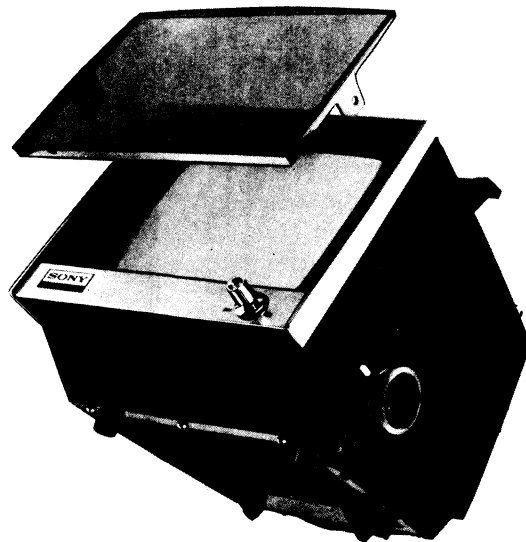
(Fig. 19)



(Fig. 20)

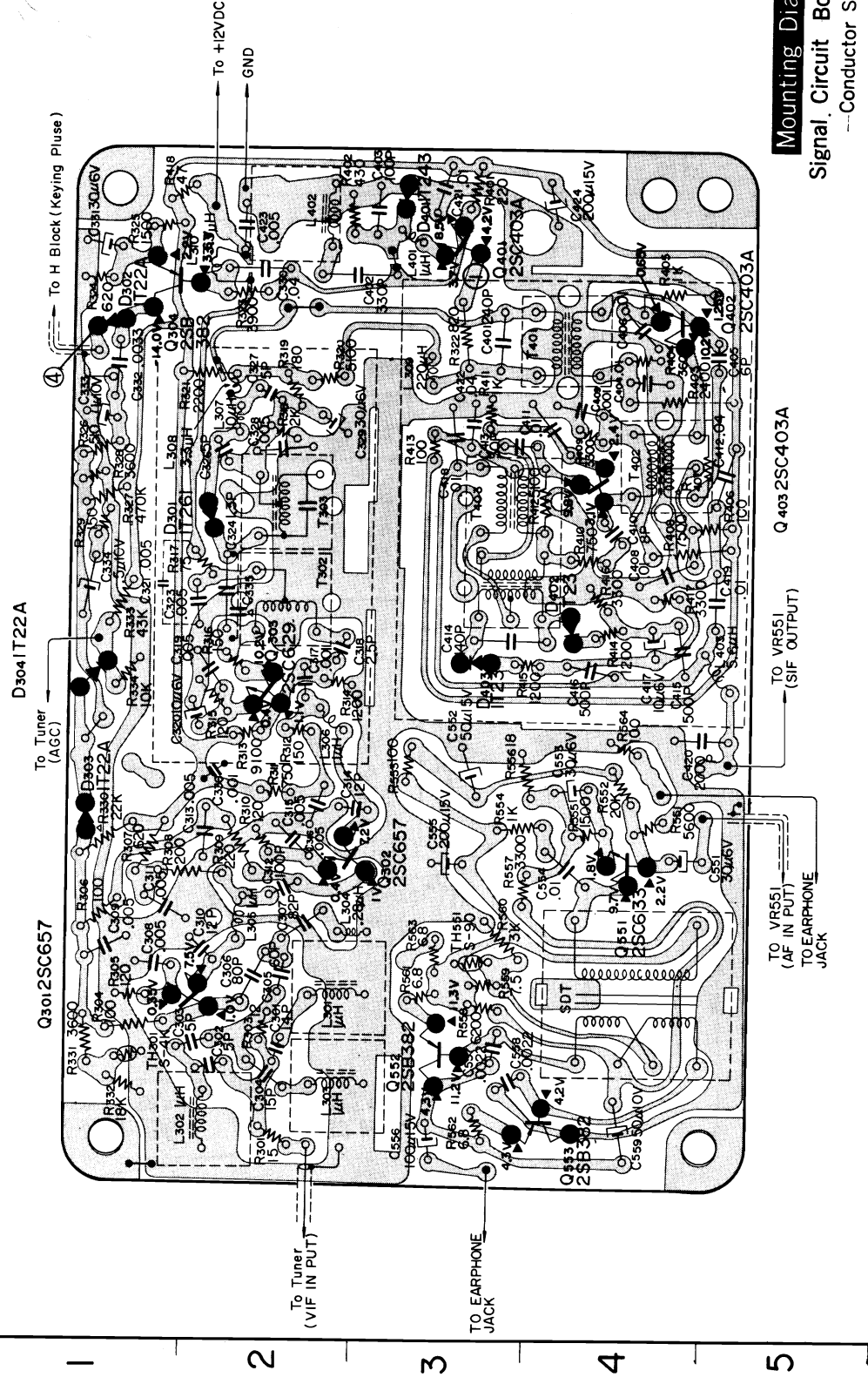
To Remove the Protector

- (1) Remove the two screws (①, ② in Fig. 18, 19).
- (2) Pull out the Protector.



SONY Model TV-720U Printed Circuit Board Information

A B C D E F G



Mounting Diagram
Signal Circuit Board (BC)
---Conductor Side---

Parts Location Index

Ref. No.	Location	Ref. No.	Location	Ref. No.	Location
Q ₃₀₁	B ₂	Q ₄₀₃	E ₁	D ₃₀₃	C ₁
Q ₃₀₂	C ₂	Q ₄₀₂	F ₁	D ₃₀₄	D ₁
Q ₃₀₃	D ₂	D ₄₀₁	B ₄	D ₄₀₁	G ₃
Q ₃₀₄	F ₁	D ₄₀₂	E ₂	D ₄₀₂	D ₄
Q ₄₀₁	G ₃	D ₄₀₃	F ₁	D ₄₀₃	D ₃
Q ₄₀₂	F ₄				

- ☆C₃₂₃, C₃₃₅, R₃₃₉, R₄₀₇ and R₄₁₂ are mounted on the conductor side.
- ☆Resistance and Capacitance value marked with Δ are to be selected.
- ☆Measured with a Multimeter (20 K ohm V).
- ☆Measured from ground to point indicated.
- ☆The above numbers (⊙-⊙) are common with numbers (⊙, ⊙) shown in the Schematic Diagram

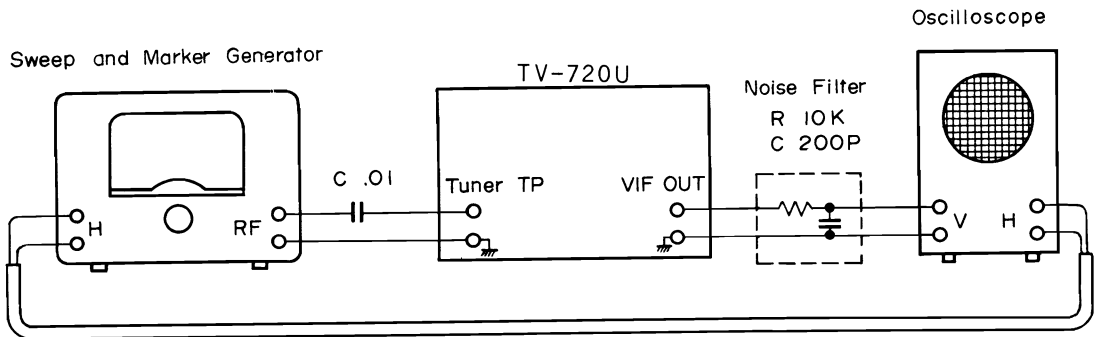
SONY Model TV-720U Alignment Information

A. VIF Response Curve Adjustments

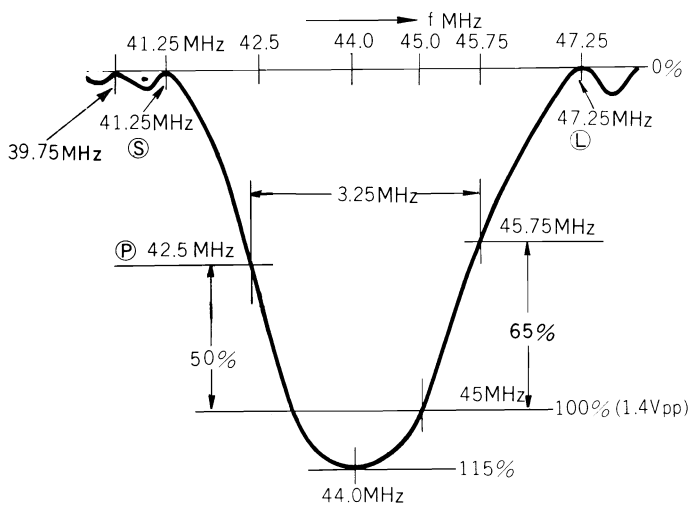
Pre-Alignment Steps

- (1) Unsolder the Keying Pulse Lead.
- (2) Connect an Oscilloscope to the VIF output terminal (across D_{01}) through a Noise Filter, which consists of a 10K ohms resistor and a 200 PF Capacitor as shown in Fig. 21.
- (3) Connect a Sweep Generator and a Marker Generator to the Test Point (TP) of the Tuner through a 0.01 μ F Capacitor as shown in Fig. 21.
- (4) Set the Tuner to a free Channel in area.

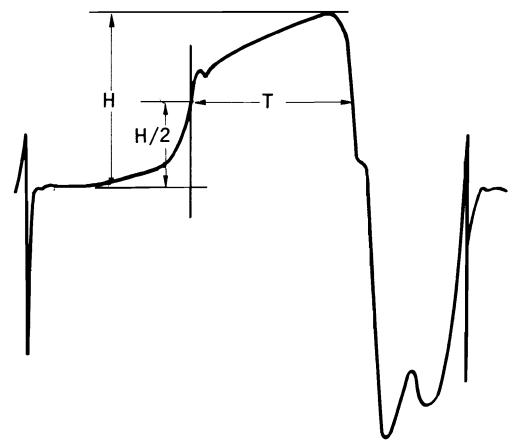
Step	Marker Gen. Freq.	Adjust	Correct Marker position on the response curve	Remarks
2	41.25 MHz	L_{301}	Ⓢ (dip)	VIF Standard Response Curve. See Fig. 22
3	47.25 MHz	L_{302}	Ⓛ (dip)	
4	39.75 MHz	L_{303}	Ⓟ (dip)	
5	45.75 MHz	T_{302}		
	45 MHz	T_{303}		



(Fig. 21)



(Fig. 22)



(Fig. 25)

SONY Model TV-720U Alignment Information, Continued

B. SIF Adjustments

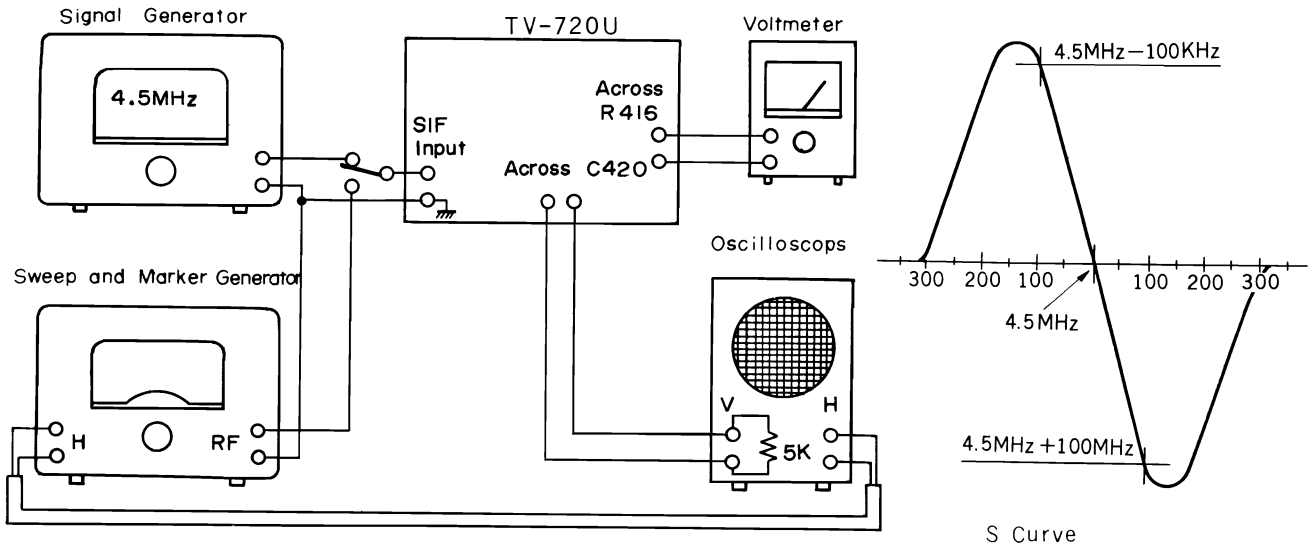
Pre-Alignment Step

- (1) Set the Brightness Control to the optimum and the Contrast Control to the maximum positions.
- (2) Remove the tuner output leads.
- (3) Connect a 5K ohms resistor across SIF output terminal and ground.

Step	Equipment	Connection	Freq.	Adjust	
1	Test Oscillator	VIDEO DET OUT	4.5 MHz	L ₄₀₂	for minimum stripes on the picture.
2	Same	Same	4.5 MHz	T ₄₀₁ , T ₄₀₂ and Pri. of T ₄₀₃	for maximum reading on the Voltmeter.
3	Voltmeter	Across R ₄₁₆		Sec. of T ₄₀₃	
	Signal Gen.	VIDEO DET OUT	4.5 MHz		for minimum modulated waveform.
	Sweep Gen.	Same	(AM)		standard S curve see Fig. 23.
	Oscilloscope	SIF output terminals (C ₄₂₀) across a Dummy resistor of 5K Ω			

Note: (1) Repeat the above procedures two or three time

- (2) If S curve is not symmetrical with respect to the intersection of the S curve and return line, adjust primary of T₄₀₃ for optimum result.



(Fig. 24)

(Fig. 23)

C. Deflection Circuit Adjustments

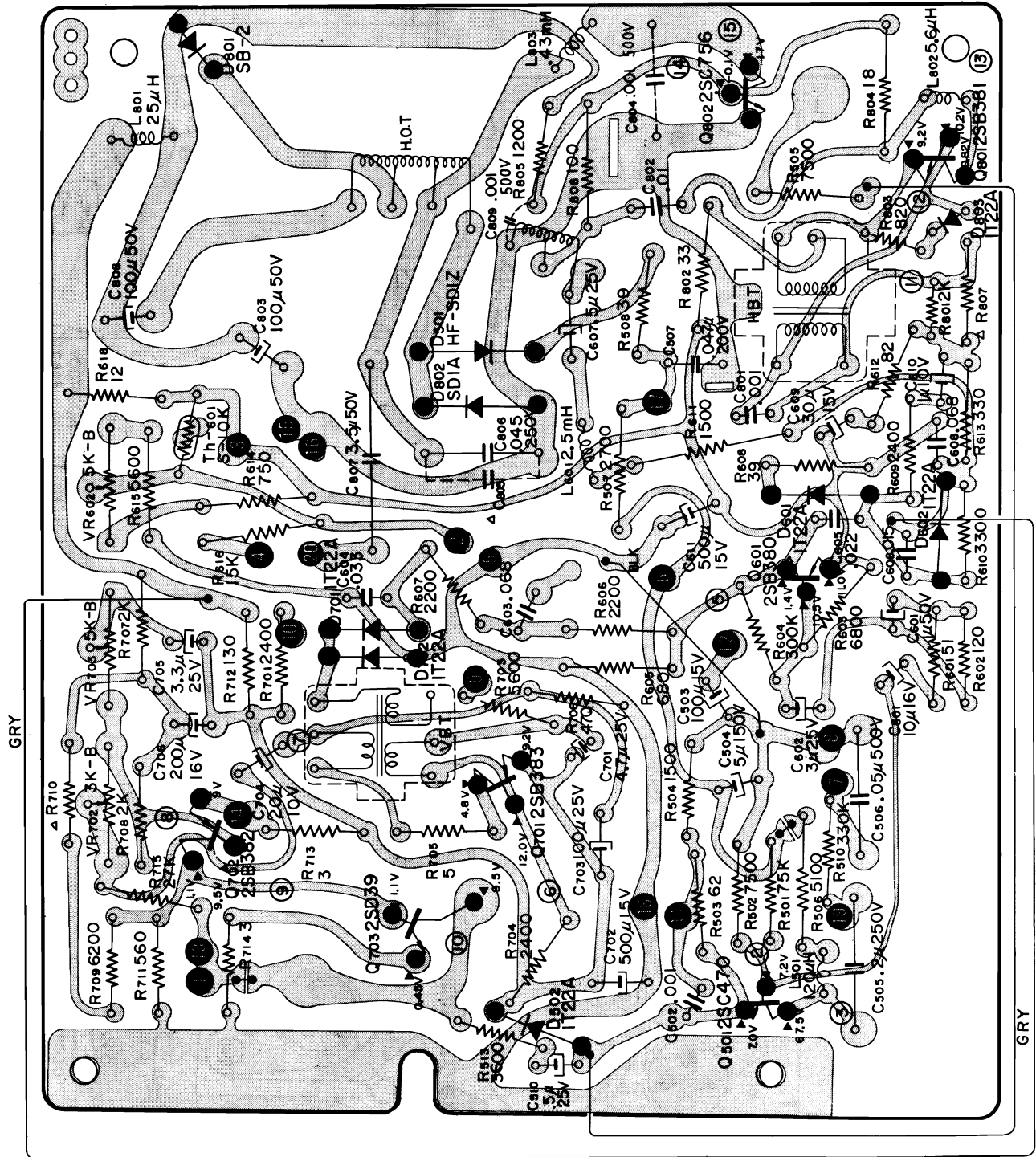
Step	Adjustment for	Preliminary Instruction	Equipment	Connection	Adjust	
1	IC of Q ₅₀₁ (VID. OUT)	Set the free channel check 12V and 84V Power Supply	Voltmeter	Across R ₅₀₆	R ₅₀₁	For approx. 21.5V reading
2	Vert. Height and Linearity	Receive a Test Pattern			VR ₇₀₂ (Vert. Height) VR ₇₀₃ (Vert. Lin.)	For Optimum Vertical Height and Linearity on the Pattern
3	IC of Q ₇₀₃ (Vert. Out.)	Lock in Sync. Check 12V Power Supply.	Voltmeter	Across R ₇₁₄	R ₇₁₀	For approx. 0.4V reading
4	Pulse Width	Lock in Sync.	Oscillo- scope	Collector of Q ₈₀₁ and ground	R ₈₀₇ (330 Ω ~ 12K Ω)	For Pulse Width of 24.5 \pm 1 μ Sec. (T—See Note below)

Note: Pulse Width Adjustment needs Oscilloscope and it is a little complicated. Observe the Oscilloscope. A similar waveform to Fig. 25 will appear.

SONY Model TV-720U Printed Circuit Board

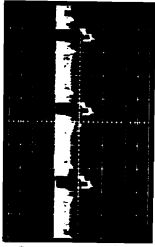
A | B | C | D | E | F | G | H

1 | 2 | 3 | 4 | 5 | 6 | 7



Deflection Circuit Board (EF) — Conductor Side —

Ref. No.	Location	Ref. No.	Location	Ref. No.	Location
Q ₅₀₁	B ₆	D ₅₀₁	F ₅	D ₆₀₂	F ₅
Q ₆₀₁	E ₄	D ₆₀₂	B ₄	D ₆₀₃	G ₇
Q ₇₀₁	C ₄	D ₈₀₁	E ₄	VR ₆₀₂	E ₂
Q ₇₀₂	C ₂	D ₈₀₂	E ₇	VR ₇₀₂	C ₂
Q ₇₀₃	B ₄	D ₇₀₁	D ₃	VR ₇₀₃	D ₂
Q ₈₀₁	G ₇	D ₇₀₂	D ₃		
Q ₈₀₂	H ₆	D ₈₀₁	H ₂		



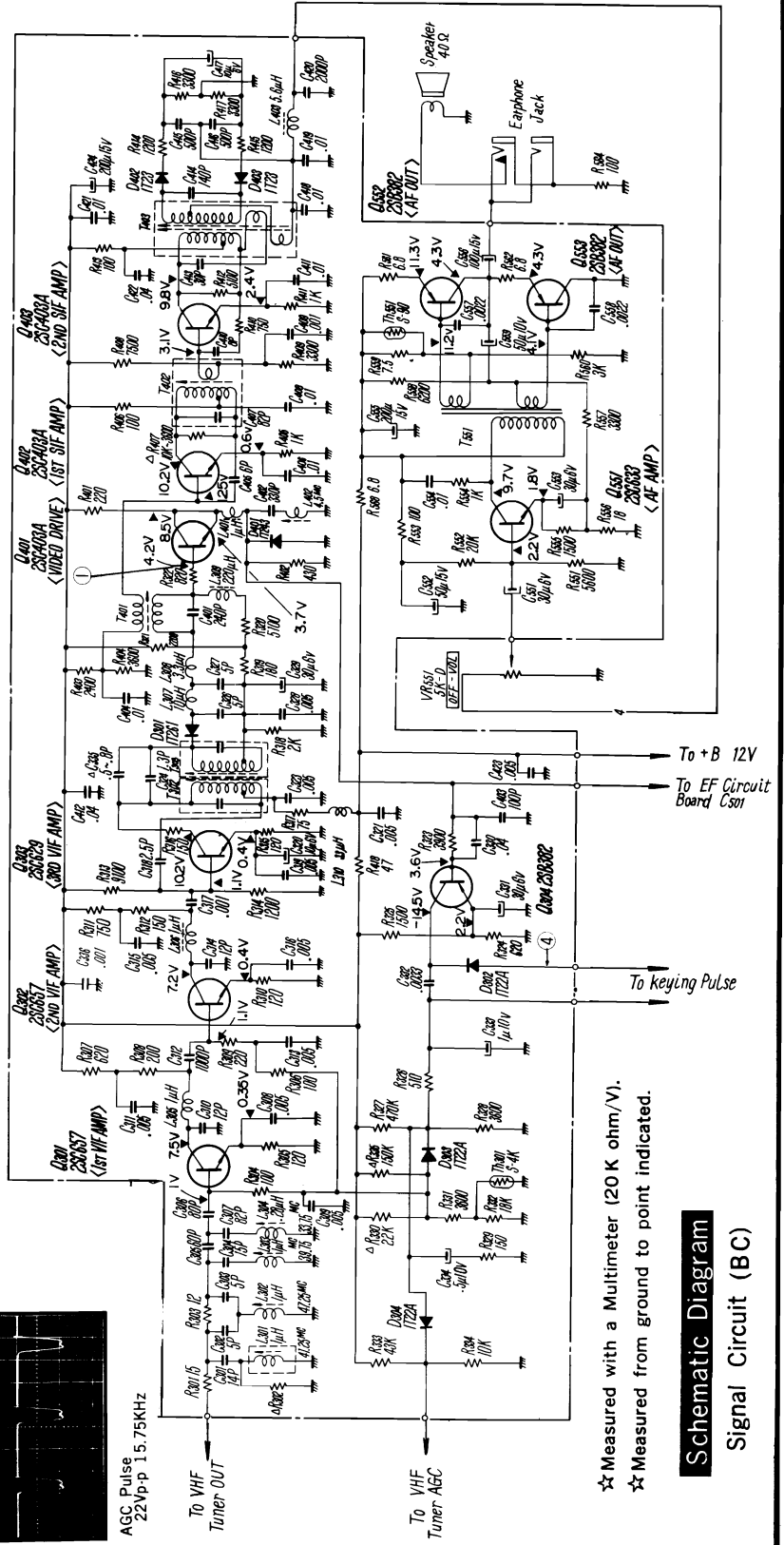
Q401 Base
1.8Vp-p 15.75KHz

- ① RED To VCH
- ② BRN To VCH
- ③ BRN To VR601 NO.1
- ④ YEL To VR601 NO.2
- ⑤ BLK&WHT To VR601 NO.3
- ⑥ GRN To VR502 NO.1
- ⑦ ORG To VR502 NO.2
- ⑧ BLK To VR502 NO.3
- ⑨ VLT To VR701 NO.1
- ⑩ BLU To VR701 NO.2
- ⑪ GRY To VCH
- ⑫ WHIT To VCH
- ⑬ GRN To DYV
- ⑭ GRY To DYV
- ⑮ BLK To DYH
- ⑯ BLK To GND
- ⑰ RED To 3L-2 (CRT Socket)
- ⑱ BLK To GND
- ⑳ YEL To CRT (Cathode)
- ㉑ RED To DYH



AGC Pulse
22Vp-p 15.75KHz

- ☆ C₁₀₄, C₁₀₅ and C₄₁₅ mounted on the conductor side.
- ☆ Resistance and Capacitance value marked with Δ are to be selected.
- ☆ Measured with a Multimeter (20K ohm/V).
- ☆ Measured from ground to point indicated.
- ☆ The above numbers (①, ②, ③, ④, ⑤, ⑥, ⑦, ⑧, ⑨, ⑩, ⑪, ⑫, ⑬, ⑭, ⑮, ⑯, ⑰, ⑱, ⑲, ⑳, ㉑) are common with numbers (㉒, ㉓, ㉔, ㉕, ㉖, ㉗) shown in the Schematic Diagram



- ☆ Measured with a Multimeter (20K ohm/V).
- ☆ Measured from ground to point indicated.

Schematic Diagram
Signal Circuit (BC)

SONY Model TV-720U Schematic Diagram

A

B

C

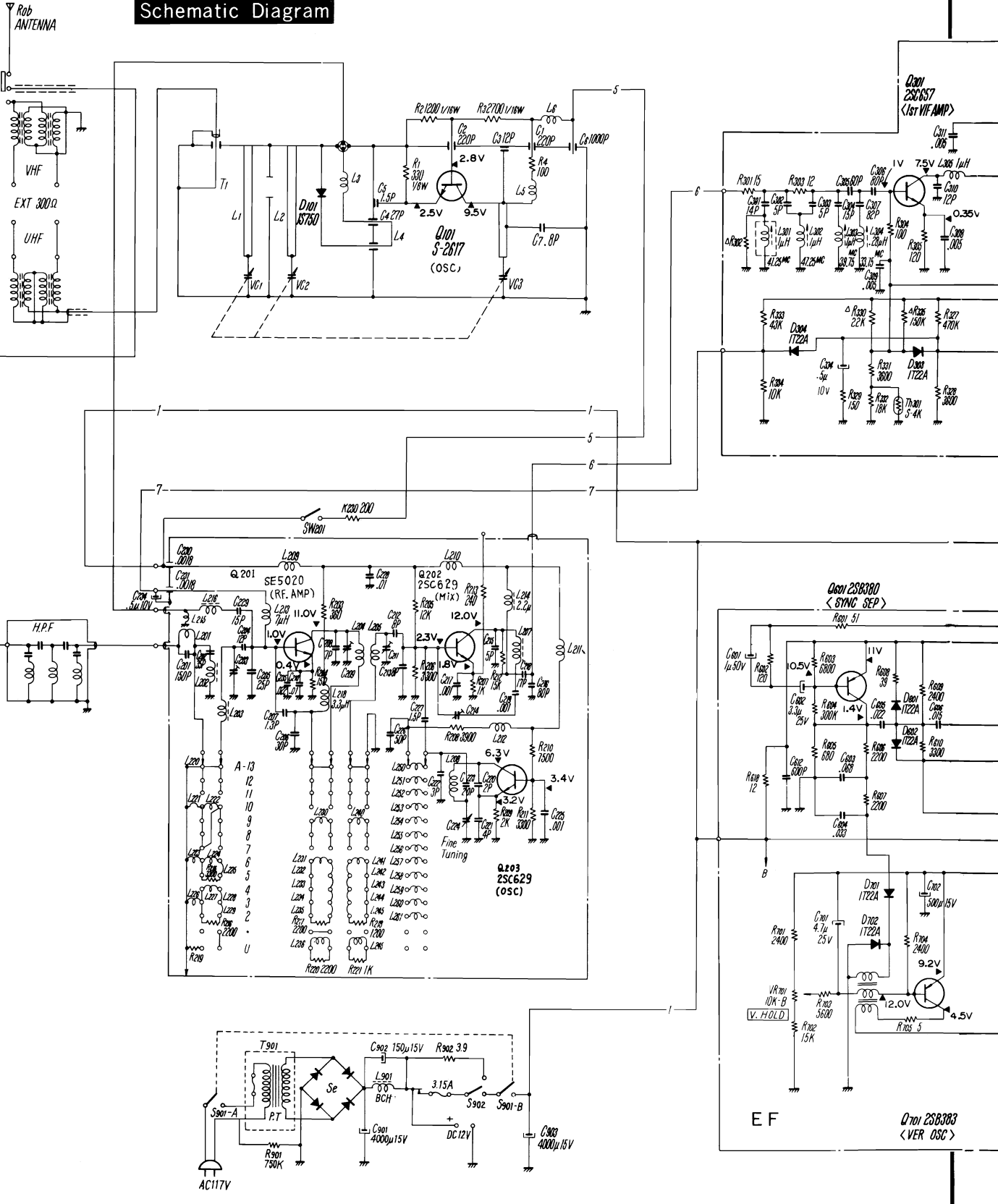
D

E

F

Schematic Diagram

1
2
3
4
5
6
7
8



SONY Model TV-720U Schematic Diagram, Continued

G

H

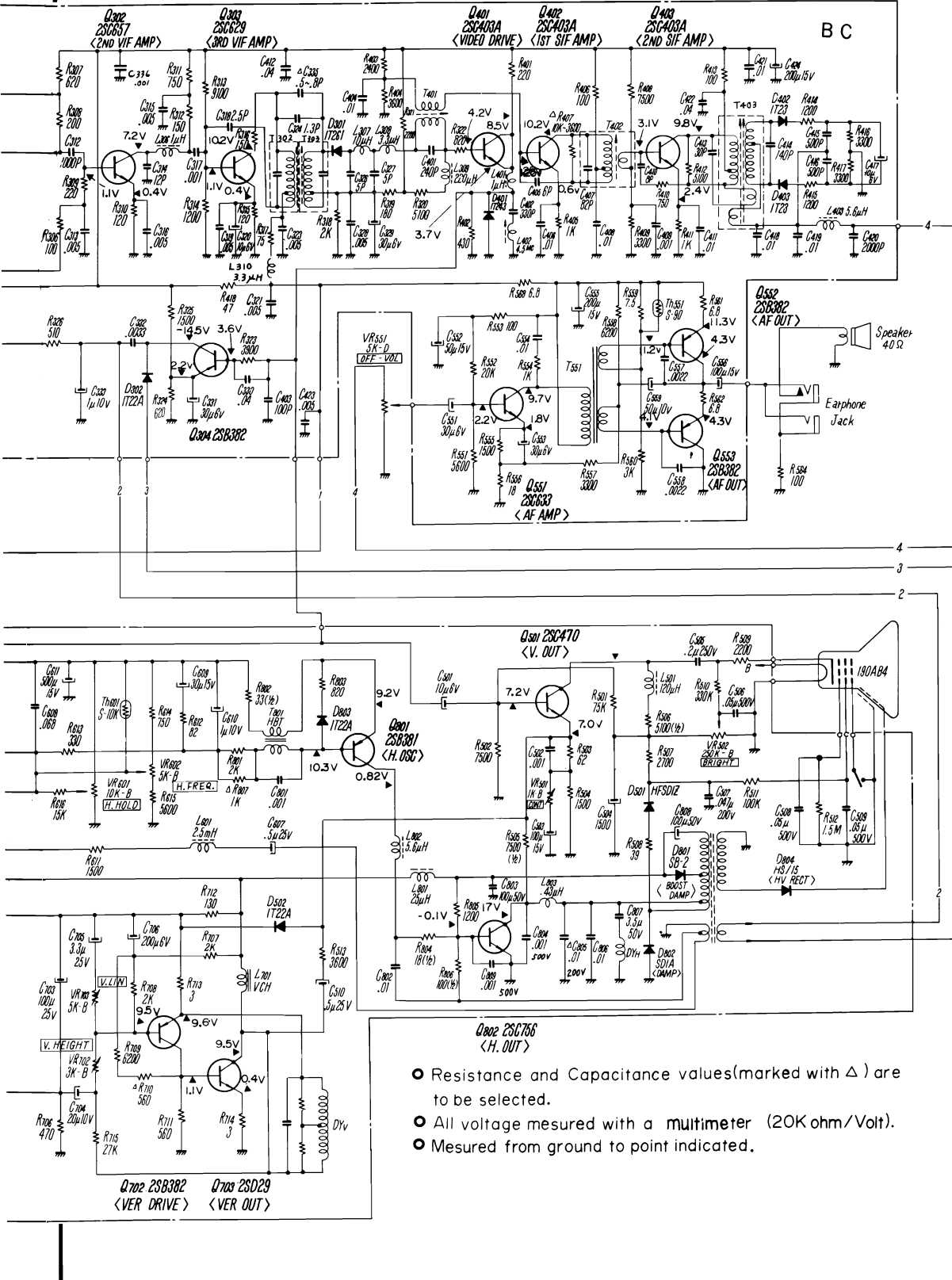
J

K

L

M

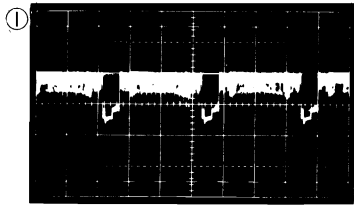
Parts Location Index



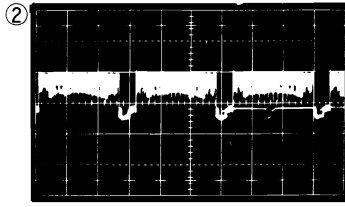
Ref. No.	Location
Q101	C ₂
Q201	B ₅
Q202	C ₅
Q203	D ₅
Q301	F ₂
Q302	G ₂
Q303	H ₂
Q304	G ₃
Q401	J ₂
Q402	J ₂
Q403	K ₂
Q501	J ₅
Q551	K ₃
Q552	K ₃
Q553	K ₅
Q601	F ₅
Q701	F ₇
Q702	G ₇
Q703	H ₇
Q801	H ₅
Q802	J ₇
D101	C ₂
D301	H ₂
D302	G ₃
D303	F ₃
D401	J ₂
D402	L ₂
D403	L ₂
D501	K ₅
D502	H ₅
D601	F ₅
D602	F ₅
D701	F ₆
D702	F ₆
D801	K ₆
D802	K ₆
D803	H ₅
D804	L ₆
SE	C ₇
VR501 (CONT)	J ₅
VR502 (BRIGHT)	K ₅
VR551 (VOLUME)	H ₃
VR601 (H. HOLD)	G ₅
VR602 (H. FREQ.)	G ₅
VR701 (V. HOLD)	E ₇
VR702 (V. HEIGHT)	G ₇
VR703 (V. LIN)	G ₇
R302	E ₂
R330	F ₃
R402	K ₂
R710	G ₇
R807	H ₅
C335	H ₁
C805	K ₆

SONY Model TV-720U Waveform Information, Continued

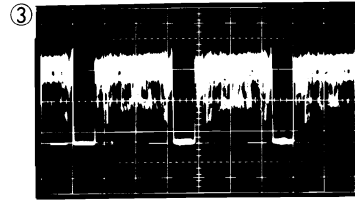
Waveforms



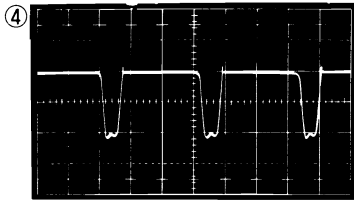
Q401 Base
1.8Vp-p 15.75KHz



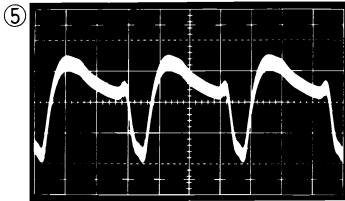
Q501 Base
1.5Vp-p 15.75KHz



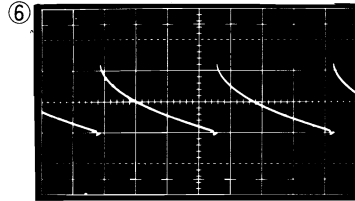
Q501 Collector
30Vp-p 15.75KHz



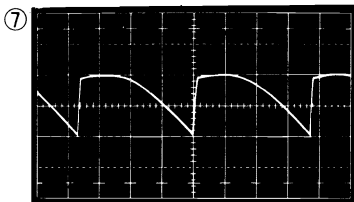
AGC Pulse
22Vp-p 15.75KHz



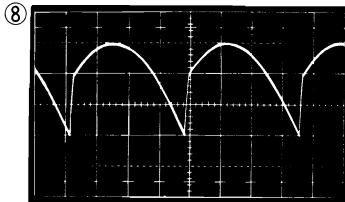
Q601 Collector
3.5Vp-p 15.75KHz



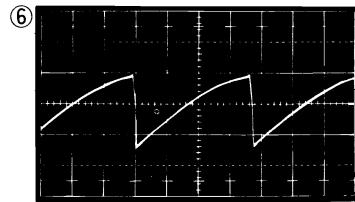
Q701 Base
12Vp-p 60Hz



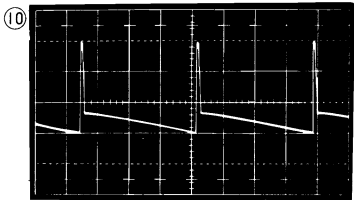
V.B.T C704 Side
2Vp-p 60Hz



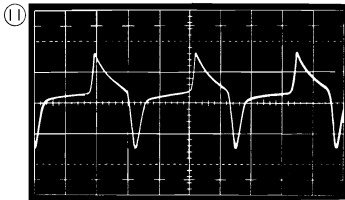
Q702 Base
1.5Vp-p 60Hz



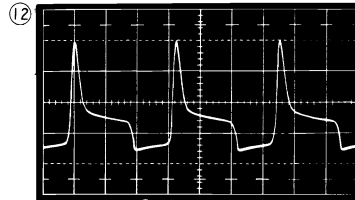
Q703 Base
1.1Vp-p 60Hz



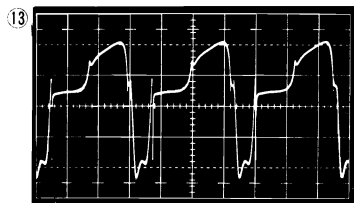
Q703 Collector
60Vp-p 60Hz



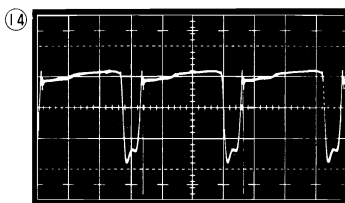
H.BT input side
30Vp-p 15.75KHz



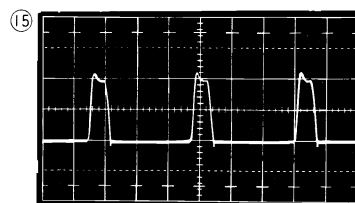
Q801 Base
35Vp-p 15.75KHz



Q801 Collector
9Vp-p 15.75KHz



Q802 Base
6Vp-p 15.75KHz



Q802 Collector
110Vp-p 15.75KHz

☆Waveform are measured by receiving the test pattern.

☆The above numbers (1~15) are common with numbers (1~15) shown in Schematic Diagram

SYLVANIA

Models MZ120, MZ121, MZ181, MZ182, MZ183, MZ184, MZ185,
using Chassis B04-7, B04-8

CHASSIS REMOVAL

1. Disconnect AC power cord and antenna connections. Remove interlock cover.
 2. Disconnect the following plug and socket connections.
 - A. Yoke - at chassis.
 - B. Tuner cluster - at chassis.
 - C. Picture Tube Cable - at picture tube.
 - D. High Voltage Lead - at picture tube
 - E. IF Input - at chassis.
 - F. Speaker Leads - at speaker
 3. Remove screw securing braided cable grounding tuner assembly to main chassis.
 4. Remove chassis mounting screw.
 5. Slide chassis to the left until clear of slots and then to the rear until clear of cabinet. **NOTE:** Lower front control knobs will automatically disconnect while chassis is being removed.
- NOTE:** To remove yoke loosen screw on deflection yoke retaining ring. Slide yoke back on neck of picture tube until clear from tube.
6. Remove tuner cluster knobs by pulling straight outward.
 7. Remove screws securing antenna board to cabinet.
 8. Remove tuner mounting screws securing tuner cluster to

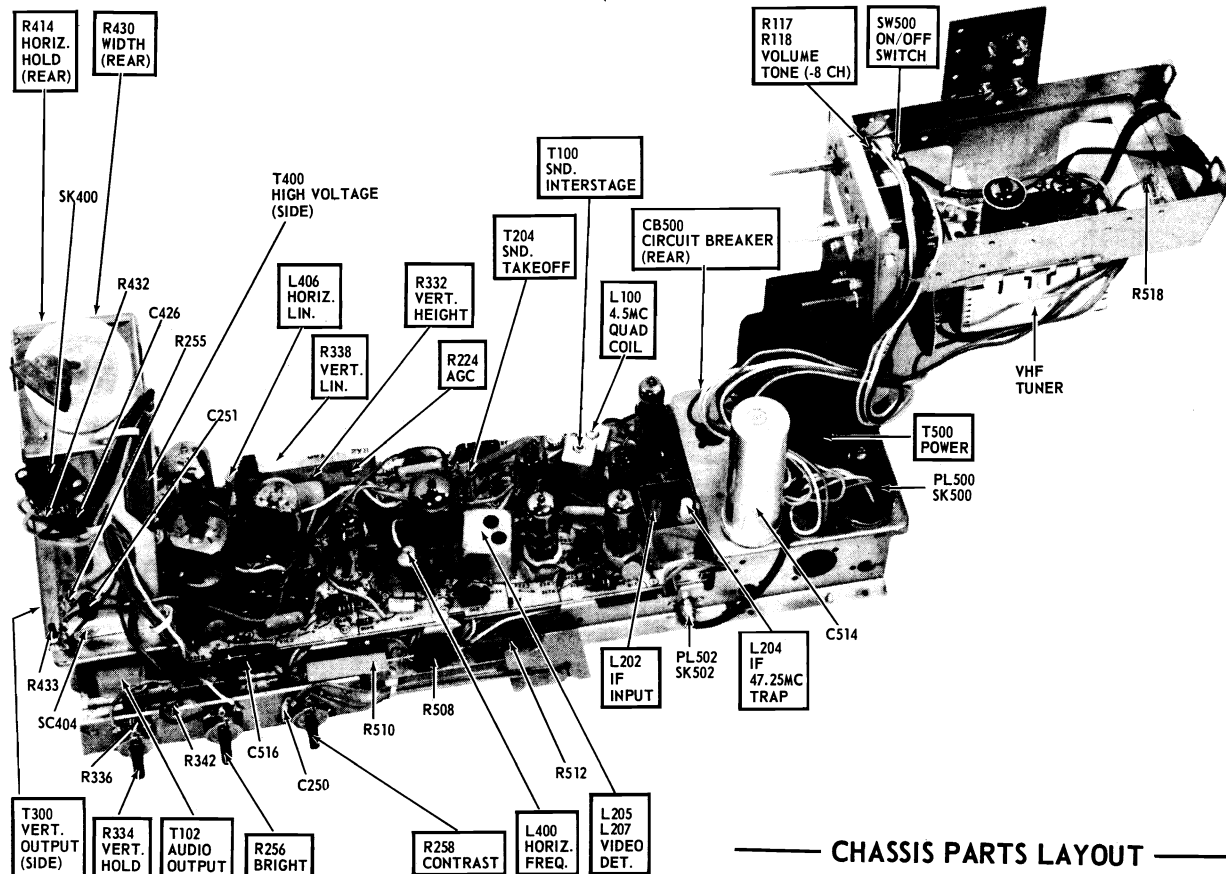
cabinet. (On some models remove screw securing tuner to mounting bracket.)

9. Lift tuner cluster upward slightly and then back. Remove tuner cluster.
10. To replace chassis, reverse the above procedure, engaging front controls by pressing ends of shaft assemblies over control shafts. Reconnect all plug and socket connections.

HEIGHT-VERTICAL LINEARITY - These two controls are interdependent. If the picture is out of proportion vertically, or compressed at top or bottom, adjust both controls until the picture assumes normal proportions. The Height Control especially affects the bottom of the picture. Linearity the top.

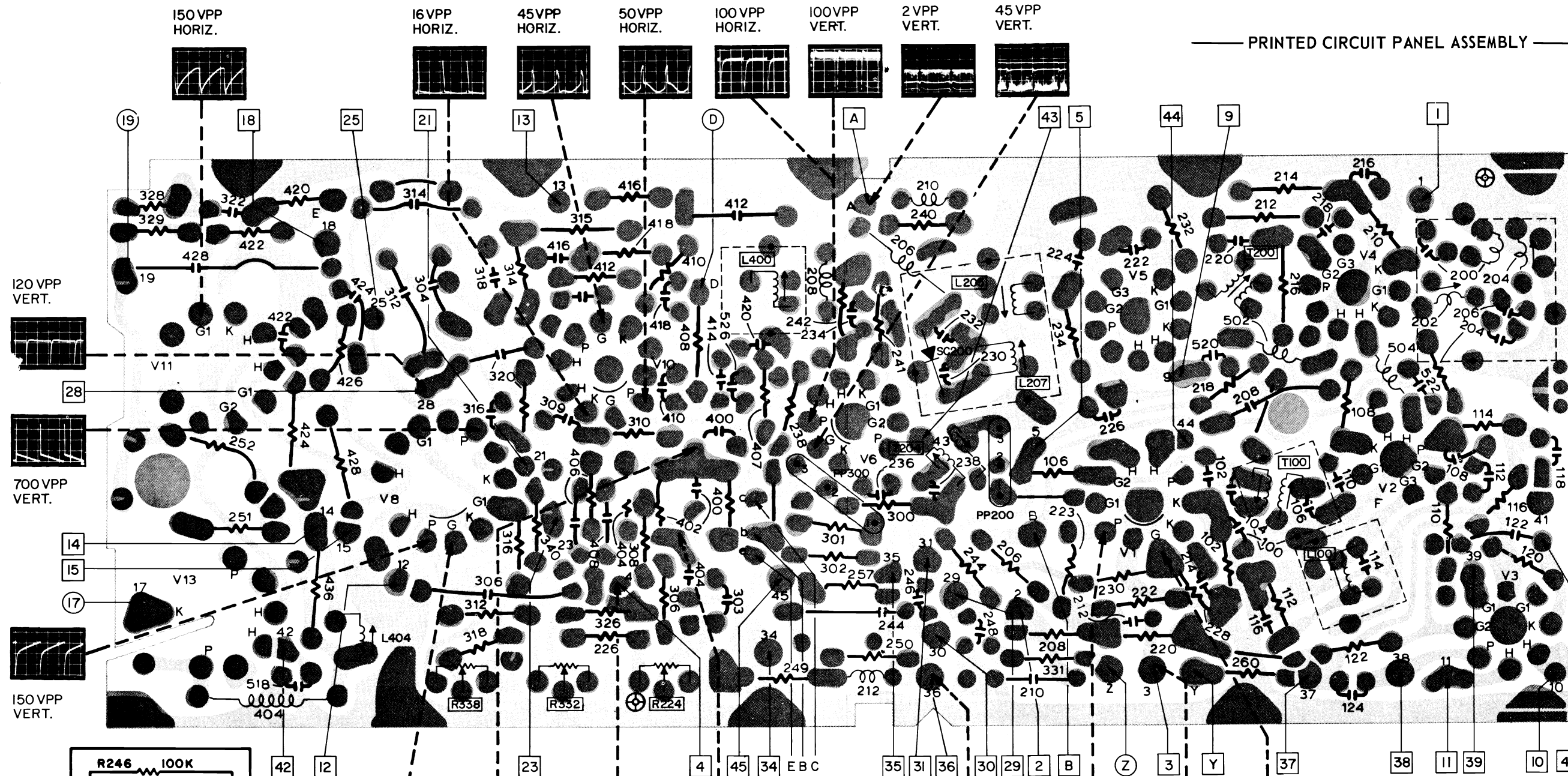
WIDTH - If the picture is out of proportion horizontally, adjust this control until the picture assumes normal proportion.

AGC - Use this control only if normal contrast cannot be obtained with **CONTRAST** Control, or if the picture is not steady. Tune in a strong channel and then rotate clockwise until the picture "jumps" or is unsteady, then back off until the picture becomes steady and normal.



CHASSIS PARTS LAYOUT

PRINTED CIRCUIT PANEL ASSEMBLY



CENTERING ADJUSTMENT

1. Position deflection yoke as far forward as possible on the neck (against the flare) of the picture tube.
2. Rotate centering adjustment rings (located on yoke cover) individually or together, until picture is centered. Turn brightness control to a low level and check that no corner cutting exists in the picture.

HORIZONTAL LINEARITY

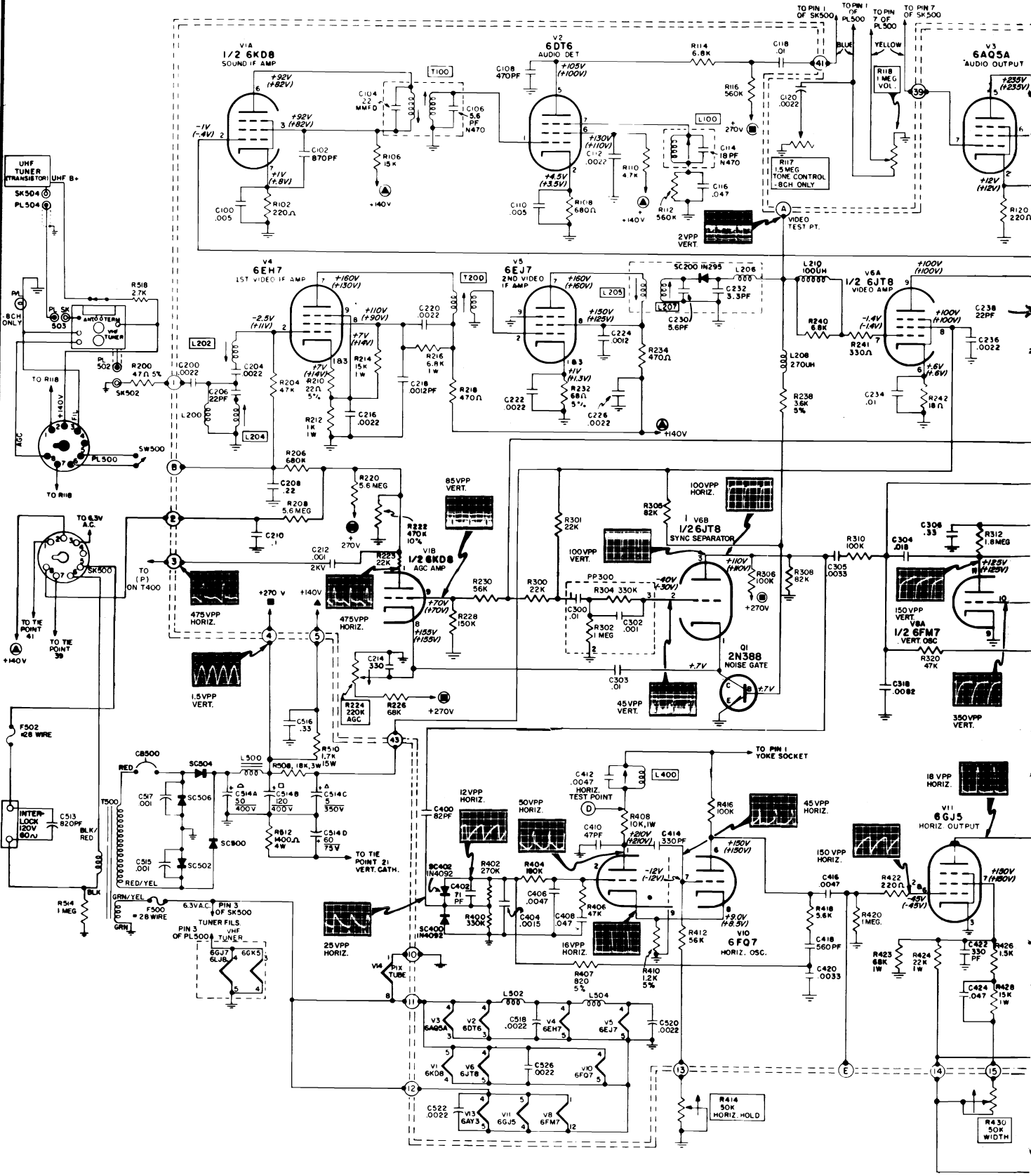
Before attempting to adjust Horizontal Linearity coil **L406**, make certain all other controls are adjusted for normal picture viewing. Using a test pattern, preferably a circle, rotate core of **L406** until it is all the way out. Then slowly turn core inward until the right hand side of test pattern (as viewed from the front) is pulled out to its maximum. When maximum is reached, reverse rotation of the core very slightly until both sides of the circle are linear.

HORIZONTAL AFC ADJUSTMENT

Before performing the following procedure, check AGC adjustment.

1. Set channel selector to strongest channel in area and adjust fine tuning control to correct tuning point.
2. Adjust Vertical Height, Vertical Linearity and Width control for normal picture.
3. Adjust **L400** Horizontal Stabilizing coil for 10 volt AC with hot lead of probe at horizontal test point **D**, ground lead to chassis, keeping picture locked in with **R414** Horizontal hold control as adjustment is being made.
4. Short pin 2 of V6 (6JT8) to ground and adjust **R414** until the picture becomes as stable as possible.
5. Remove short from V6, rotate channel selector to a position on which no signal is received; then return to the original station. The picture should immediately fall into sync. If not, repeat steps 3, 4 and 5.

SYLVANIA Chassis B04-7, -8, Schematic Diagram



SYLVANIA Chassis B04-7,-8, Schematic Diagram, Continued

SCHEMATIC DIAGRAM (B04-7,-8) (CODE 03)

SCHEMATIC NOTES

READ THESE INSTRUCTIONS CAREFULLY AND OBSERVE THE CONDITIONS NOTED WHEN TAKING VOLTAGE READINGS OR OBSERVING WAVEFORMS.

PICTURE TUBE HIGH VOLTAGE ANODE MAY HAVE A POTENTIAL OF 19KV.
OBSERVE ALL HIGH VOLTAGE PRECAUTIONS WHEN SERVICING THE CHASSIS. DO NOT OPERATE THE RECEIVER WITH THE HIGH VOLTAGE COVER REMOVED. USE SAFETY GOGGLES AND GLOVES WHEN HANDLING THE PICTURE TUBE.

VOLTAGE MEASUREMENT CONDITIONS UNLESS OTHERWISE SPECIFIED.

1. Voltages measured to chassis using VTVM.
2. AC power source 120 volt 60 cycle line.
3. Voltage readings in brackets taken with no input; channel selector set to a free channel, antenna disconnected, antenna terminals shorted together and grounded to chassis.
4. Voltage readings not in brackets taken with a strong signal input; tuner set to a strong local station developing approximately -7 volt on AGC Buss. NOTE: AGC VOLTAGE AT TEST POINT (B) WILL VARY FROM -7 VOLT ON A VERY STRONG SIGNAL TO A +20 VOLT ON A VERY WEAK SIGNAL.
5. Contrast control set to maximum. Brightness control set to minimum.
6. Voltage values shown are average readings. Variations may be observed due to normal production tolerances.

SPECIAL VOLTAGE MEASUREMENT CONDITIONS

- (B) Picture tube anode voltage measured with VTVM high voltage probe at line voltage of 120 volts under conditions of normal signal, no brightness and correct scan size.
- (▲) High peak voltage of short duration may damage meter used for this measurement.

WAVEFORM MEASUREMENT CONDITIONS

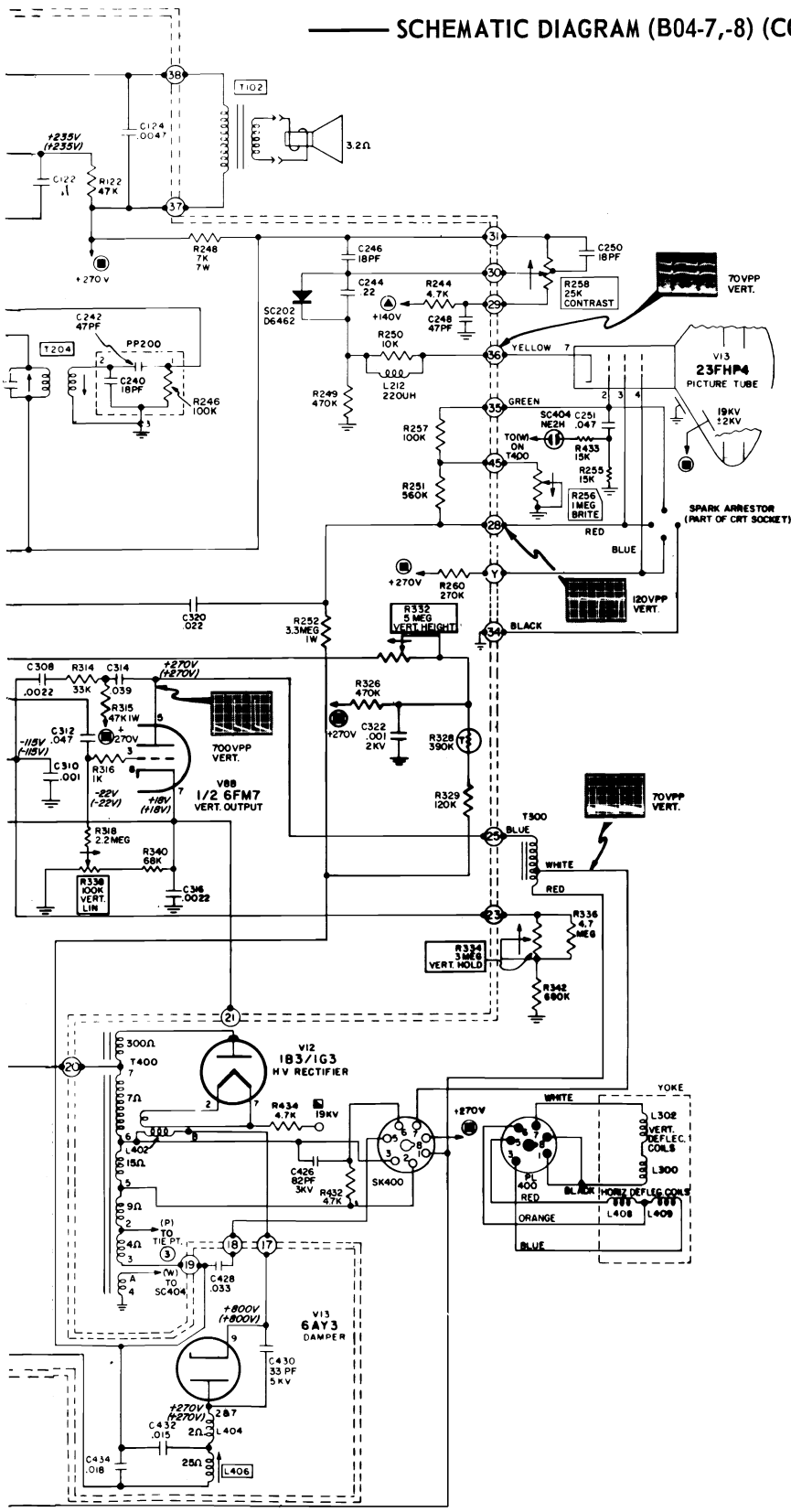
1. Channel selector set to strong channel.
2. Contrast control set for signal of 70 volt peak to peak at yellow lead of picture tube.
3. Waveforms measured with respect to chassis using a wide band oscilloscope. (Other type oscilloscopes may alter waveform shapes or amplitudes.)
4. The terms "VERT" or "HORIZ" refer to scope frequency.

GENERAL SCHEMATIC NOTES

1. Voltage sources are indicated by encircled symbols, corresponding symbols without circles indicate voltage tie points.
2. Average resistances of coils and transformers are shown and are measured with component connected in circuit.
3. Encircled numbers on edge of printed circuit indicate tie points, corresponding with those shown on parts layout of printed board.
4. All capacitors are in microfarads unless otherwise specified.
5. Coils, transformers, plugs and sockets are shown as viewed from the bottom.
6. Arrows on controls indicate direction of clockwise rotation.

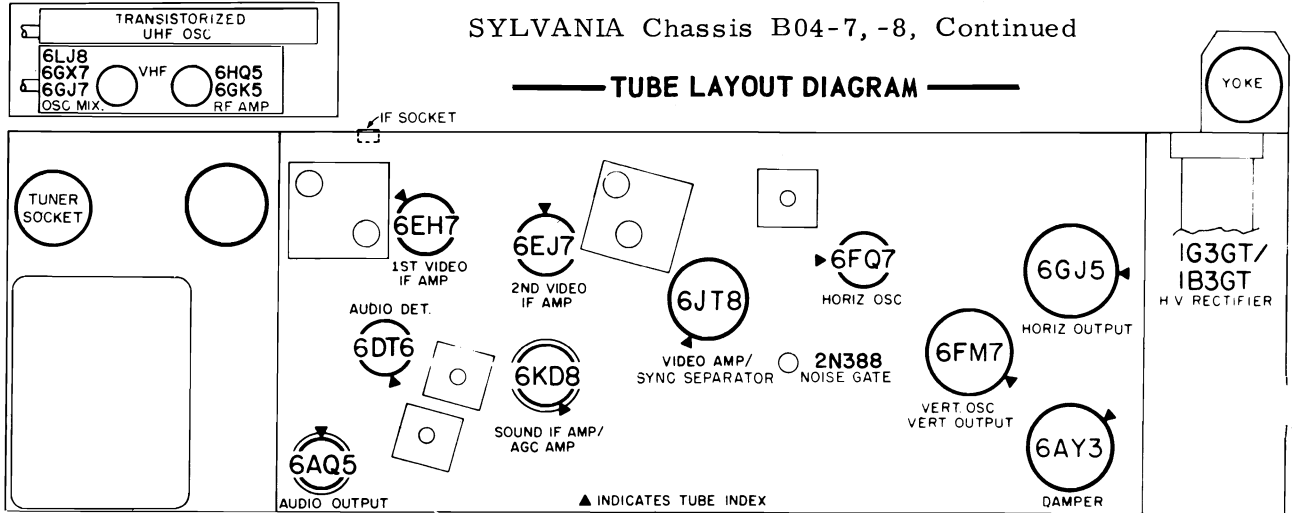
PARTS CODING

Sound Section	100-199
Video Section	200-299
Vert. and Sync Section	300-399
Horiz. and H. V. Section	400-499
L. V. Supply, Fil., Misc.	500-599



SYLVANIA Chassis B04-7, -8, Continued

TUBE LAYOUT DIAGRAM



PRELIMINARY INSTRUCTIONS

1. Line voltage should be maintained at 120 volts.
2. Keep marker generator coupling at a minimum to avoid distortion of the response curve.
3. Do not use tubular capacitors for coupling sweep into receiver. Disc ceramics are best.

4. For best results, solder the sweep generator ground to chassis, do not use clips.
5. Sweep generator "hot" lead must make good electrical contact at all points given under TEST EQUIPMENT HOOK -UP.
6. Adjust sweep generator output for maximum peak-to-peak response curve on the scope.
7. Receiver and test equipment should warm up for approximately 15 minutes before alignment.

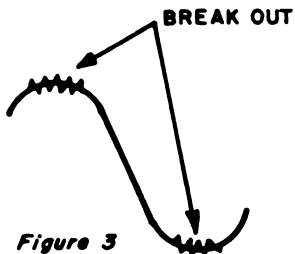
— VIDEO IF ALIGNMENT —

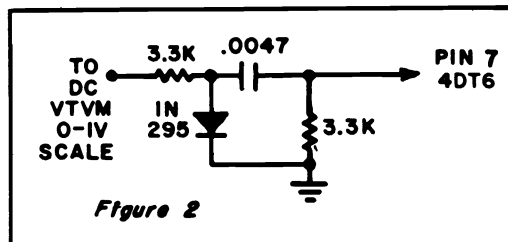
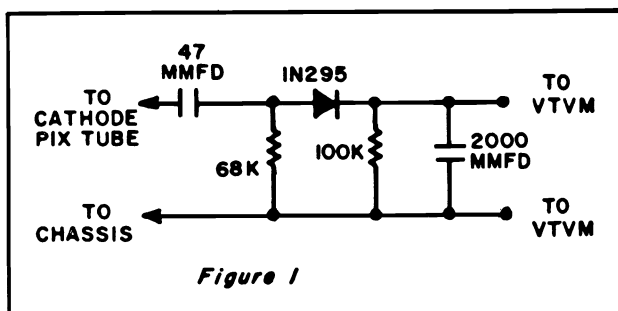
STEP	ALIGNMENT SET - UP NOTES	TEST EQUIPMENT HOOK - UP	ADJUST
1	<p>Set VHF tuner to a free channel that does not disturb the response curve.</p> <p>Short point (B) to ground and connect a -10V DC source to tie point (2).</p> <p>Connect - 30 volt DC source (-) terminal to pin 2 of V10 (+) terminal to chassis.</p>	<p>SWEEP GENERATOR - Through a .002 MFD capacitor to pin 2 of V5. Set generator to 43.5 MC with 10 MC sweep.</p> <p>SIGNAL GENERATOR - Loosely coupled as a marker to sweep generator lead.</p> <p>OSCILLOSCOPE - Through a 10K resistor connected to test point (A)</p>	<p>L205 and L207 so that the 42.6 MC marker and the 45.75 MC marker are of equal amplitude. See Figure 1.</p> <p>L205 Positions marker amplitude. L207 Adjusts for tilt.</p>
2	<p>Same as Step 1.</p> <p>Figure 2</p>	<p>SWEEP GENERATOR - Through a .002 MFD capacitor to IF test point on tuner. Set generator to 43.5 MC with 10 MC sweep.</p> <p>SIGNAL GENERATOR - Same as Step 1.</p> <p>OSCILLOSCOPE - Same as Step 1.</p>	<p>T200 so that both the 42.6 MC and 45.75 MC markers are of equal amplitude and at 55% of response curve. See Figure 2.</p>
3	<p>Same as Step 1.</p> <p>Figure 3</p>	<p>SWEEP GENERATOR - Same as Step 2.</p> <p>SIGNAL GENERATOR - Same as Step 1.</p> <p>OSCILLOSCOPE - Same as Step 1.</p>	<p>L204 for maximum dip at 47.25 MC</p> <p>TUNER MIXER COIL - To position 45.75 MC marker at 50% of response curve while 45 MC marker is maintained at 100%.</p> <p>L202 To obtain response as shown in Figure 3. Top of response curve should be smooth and rounded and should rise from 105% to 120%.</p>

SYLVANIA Chassis B04-7, -8, Alignment Information, Continued

— ALIGNMENT PROCEDURE (CONTINUED) —

— 4.5 MC TRAP AND SOUND IF ALIGNMENT —

STEP	ALIGNMENT SET - UP NOTES	TEST EQUIPMENT HOOK - UP	ADJUST
1	Set contrast control to maximum. Connect - 30 volts DC source (-) terminal to test point (B) and pin 2 of V10 (+) terminal to chassis.	SIGNAL GENERATOR - Through a .0047 MFD capacitor to test point (A). Set signal generator to 4.5 MC, preferably crystal calibrated or controlled, with at least 100 millivolts output. VTVM - Through detector network shown in Figure 1, to cathode of picture tube - tie point (36).	Separate cores of [T204] then Adjust top core of [T204] for minimum reading on meter.
2	Same as Step 1.	SIGNAL GENERATOR - Same as Step 1. VTVM - Through detector network shown in Figure 2, to pin 7 of 4DT6	[T100] Bottom core [T100] Top core [T204] Bottom core For maximum meter reading using weakest possible signal.
3	Same as Step 1.  <i>Figure 3</i>	SIGNAL GENERATOR - Same as Step 1. OSCILLOSCOPE - Through .0047 MFD capacitor to tie point (41).	With core of [L100] at the top of coil form, rotate core inward (clockwise). (NOTE: Coil has two (2) peaks of resonance). Tune through the first peak and adjust the core for maximum amplitude on the second peak. Decrease signal strength until break out occurs, then readjust top core of [T100] until break out occurs simultaneously on both peaks. See Figure 3.
4	Remove all test equipment leads etc. Connect antenna and check receiver on a strong local station.		

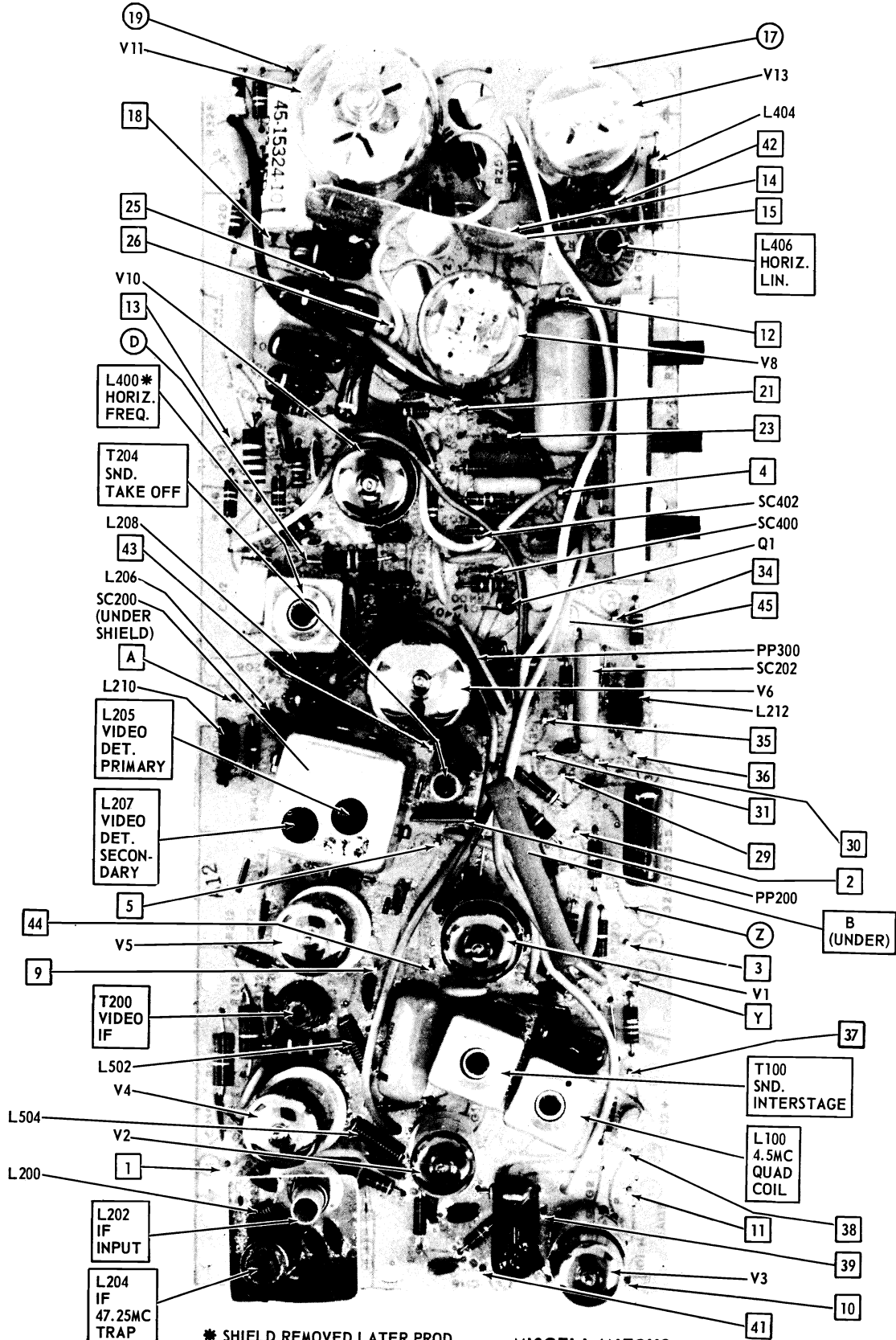


ALTERNATE SOUND ALIGNMENT USING TRANSMITTED SIGNAL

Tune in strongest available channel and adjust for best picture. Turn AGC control clockwise until picture begins to distort and adjust [L100] for best sound and minimum buzz. Use tuning point where core is closest to chassis board.

Turn AGC counterclockwise until sound gets weak and noisy. Adjust [T100] top and bottom core and [T204] bottom core for loudest and clearest sound and minimum hiss.

PRINTED CIRCUIT PANEL ASSEMBLY



* SHIELD REMOVED LATER PROD.

MISCELLANEOUS

Westinghouse

MODEL AND CHASSIS CHART

MODEL	CHASSIS	TUNERS	FEATURES	CRT
BP89A09A	V2660-1	VHF: 470V161D04 UHF: 472V060D01		20AEP4 114°
BP89A49A BP89B49A	V2660-2	VHF: 470V185D01 UHF: 472V060D01	INSTANT-ON	
BP89A59A BP89A69A	V2660-3	VHF: 470V185D01 UHF: 472V060D01	INSTANT-ON DIAL LIGHTS	

CHASSIS REMOVAL

The speaker and CRT remain in the cabinet.

1. Remove the control knobs.
2. Remove the back cover. The horizontal hold knob remains on the back cover. The antenna terminal board stays with the chassis.
3. Unsolder the speaker leads at the output transformer.
4. Remove the CRT socket, and loosen the yoke. The yoke is removed with the chassis.
5. Discharge and disconnect the anode lead at the CRT.
6. Remove the screws holding the chassis. Remove the chassis.
7. When replacing the back cover be sure the horizontal hold extension shaft engages the knob in the back cover.

PICTURE TUBE REMOVAL

1. Remove the chassis.
2. Place the cabinet face down on a soft cloth.
3. Loosen the screw which holds the wire retaining ring around the CRT.
4. Remove the four corner retainers from the cabinet.
5. Remove the retaining ring together with the four retainers.
6. Carefully remove the picture tube.

PC BOARD ACCESSIBILITY

To provide access to the underside of the PC board with the set operating:

1. Remove the chassis.
2. Turn the chassis around.
3. Connect the yoke, CRT socket, and high-voltage lead (use a jumper).

A test speaker may be connected to the audio output transformer.

CAUTION: To operate the set partially disassembled, connect a jumper from the aquadag CRT coating and CRT band to chassis ground. Be careful that the high-voltage lead does not short or arc to the frame.

HORIZONTAL RANGE AND HOLD ADJUSTMENT

1. Short out Horizontal Hold coil L401 with a jumper connected across 'G' - 'H'.
2. With the meter zero set at center scale, connect a VTVM (1.5V range) across 'F' and B-.
3. Tune the receiver to a station of normal signal strength and adjust Horizontal Range control R413 to lock the picture into sync. Then adjust R413 for -0.5 volts on the VTVM.
4. Remove the jumper across 'G' & 'H', and adjust Horizontal Hold control L401 to lock the picture into sync.
5. Adjust L401 for -0.5 volts on the VTVM, and disconnect the VTVM.
6. Verify the horizontal sync adjustment by switching channels.

DEFLECTION YOKE

The deflection yoke should be as far forward as possible (touching the bell of the CRT). Rotation of the deflection yoke is used to level the raster.

WIDTH

To increase width, ground the lead emerging from the left hand side of the high voltage enclosure to punch-out. To decrease width, unground the lead. (Refer to figure 1)

CENTERING

The centering rings, located at the rear of the deflection yoke, should be rotated to center the raster.

HEIGHT AND VERTICAL LINEARITY

The Height and Vertical Linearity controls are located on the PC board, and are accessible through the back cover.

With a narrow screwdriver, adjust these controls alternately until a picture of proper height and linearity is obtained.

AGC ADJUSTMENT

Tune in the strongest station. Adjust C420 with an insulated screwdriver until the picture bends at the top. Then turn the screw back slightly until the bend disappears. (Refer to figure 1)

DIAL LIGHT REPLACEMENT

In models that use a dial light, the chassis must be removed before the lamp can be replaced.

Cut out the old light. Wrap a piece of tape around the new light and the mounting board.

INSTANT ON

"Instant On" provides immediate operation when the set is on, because no tube warm-up time is necessary.

Silicon diode X402 is connected in series with the AC line and the tube filament string. With the line cord plugged into an AC receptacle and the OFF-ON switch in the OFF position, the AC line voltage is rectified by silicon diode X402. This permits a pulsating direct current to flow thru the tube filament string to keep the tubes warm. No B+ is present when the OFF-ON switch is in the OFF position.

Proper polarity of the Instant-On diode must be observed. Refer to schematic diagram. Figure 3.

In the ON position, this switch places a short across diode X402 and completed the AC input to R400 and R320.

P. C. BOARD LEGEND

1. R310, vertical hold, high end
2. Pin 1 of 21JZ6 filament
3. T300, vertical transformer, blue
4. Tuner filament
5. Pin 8 or CRT, filament
6. Tuner B+, 145 volts
7. R414, horizontal drive
8. B+ from VHF tuner
9. B+ to UHF tuner
10. 1F input from VHF tuner
11. Tuner filament
12. AGC to tuner
13. C403A, audio B+, 135 volts
14. C419 and C420, AGC pulse
15. R217, contrast, low end
16. R108, arm of volume control
17. C404A, B+ filter
18. L400 filter choke
19. R219, brightness control, B+
20. C402A, B+ filter
21. R217, contrast control, high end
22. SW400, AC switch
23. R108, volume control, high end
24. R219, brightness control, arm
25. Pin 4 of CRT
26. Pin 7 of CRT
27. R217, contrast control arm
28. T400, lug 7, B++
29. T300, vertical transformer ground
30. Z401, yoke, black
31. Z401, ground
32. Z401 and T300, vertical blanking
33. Pin 3 or CRT
34. Pin 2 of CRT
35. T400, lug 9
36. L400, B+ filter choke
37. L402, damper choke
38. C405A, B+
39. T300, vertical transformer, red

TEST POINTS

- A AGC for IF
- B Video detector
- C CRT cathode
- D 1st IF input
- E 2nd IF grid
- F Horizontal MV
- G Horiz adj coil
- H Horiz adj coil
- M Mixer grid (Tuner)
- S Quad coil
- T AGC for tuner

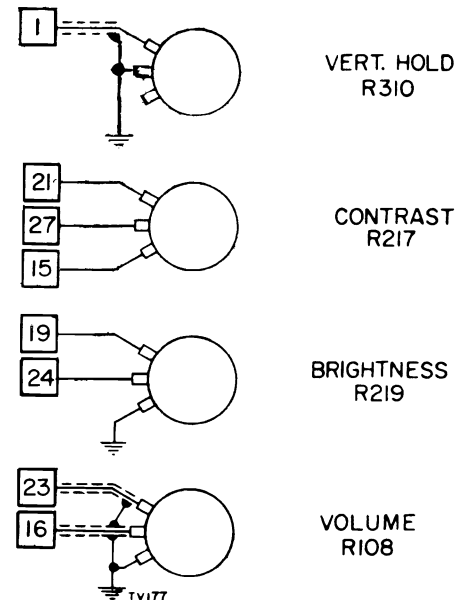


Figure 4 - Control Wiring Diagram
Square Numbers Refer to
PC Board Callouts

TUBE PIN RESISTANCE CHART

PART	TYPE	1	2	3	4	5	6	7	8	9	10	11	12
V1	17BE3	Fil		*10	*23			*5M			*10		Fil
V2	21JZ6	Fil	0		0	680K	*10		680K		0		Fil
V3A-B	17JZ8/A	Fil	*4M		*185		1.4M		*57	0	2M	0	Fil
V4A-B	10LZ8	0	2.2M	*10K	Fil	Fil	5.6	100	*57	*4K			
V5	4DT6A	3	820	Fil	Fil	*7M	*6.8K	560K					
V6A-B	6CL8A 6FV8A	*70K	4M	*57	Fil	Fil	15K	15K	0	100K			
V7	12FX5	100	0-500K	Fil	Fil		*1.5K	*980					
V8	4JC6	100	0	100	Fil	Fil	0	*740	*740	0			
V9	4JD6	55	1M	55	Fil	Fil	0	*740	*740	0			
V10	8FQ7	*41K	250K	910	Fil	Fil	*15K	1.2M	910	0			
■V11	3HQ5	3M	0	Fil	Fil	*1.8K	.2	0					
▲V11	3HQ5	3M	0	Fil	Fil	*2.2K	0	0					
■V12	6KZ8	*12K	150K	0	Fil	Fil	*1K	*22K	0	10K			
▲V12	6HD7	0	220K	0	Fil	Fil	*1.1K	*4.7K	*11.5K	47K			
V13	20AEP4	Fil	27K	27K	0			150K	Fil				
V14	1G3GT/1K3	INFINITE											

Resistance measured from tube pin indicated to circuit ground. *Resistance measured from tube pin indicated to junction of L400 and X400.

■ 470V161D04 Tuner

▲ 470V185D01 Tuner

WESTINGHOUSE Chassis V-2660-1, -2, -3, PC Board Information

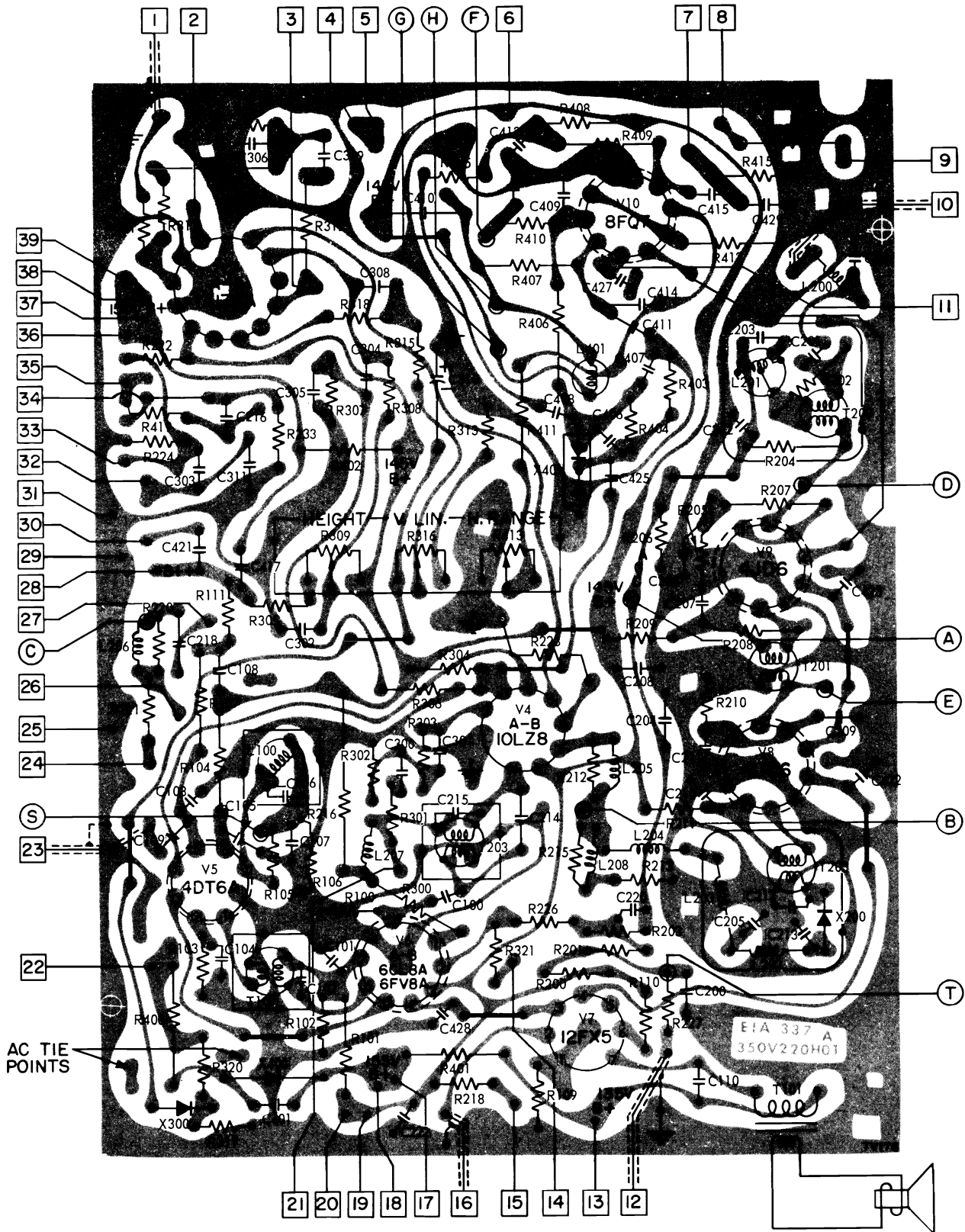
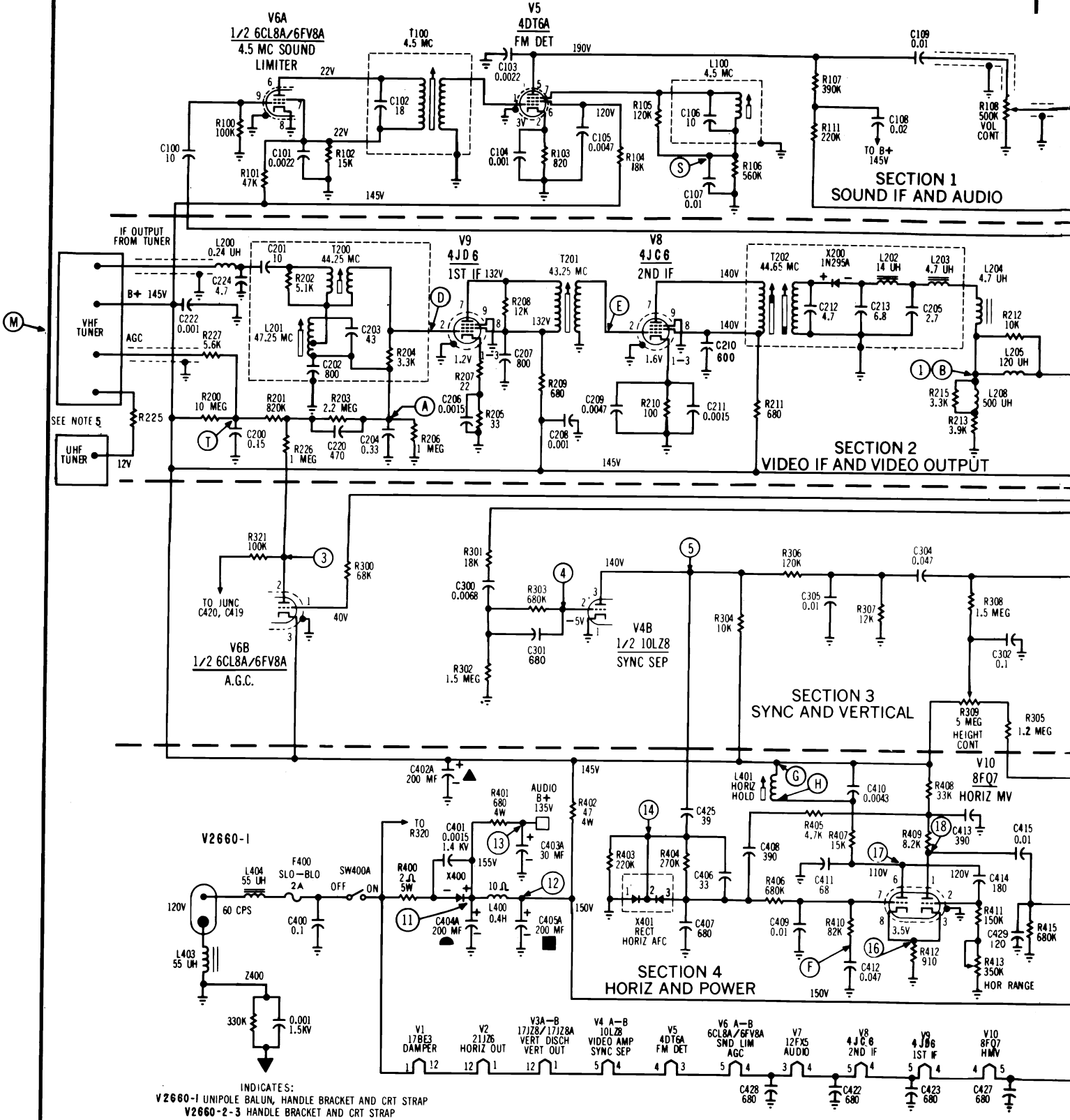
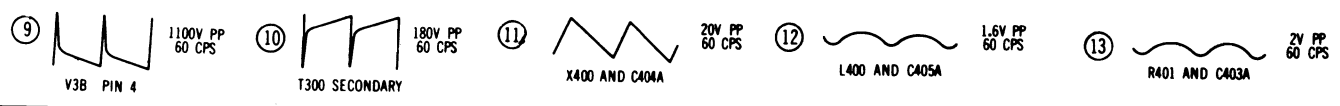


Figure 2 - Bottom view of PC board. Top components are shown in solid outline.
Tube pin numbering is for bottom of socket.

WESTINGHOUSE Chassis V-2660-1, -2, -3, Schematic Diagram



INDICATES:
V2660-1 UNIPOLE BALUN, HANDLE BRACKET AND CRT STRAP
V2660-2-3 HANDLE BRACKET AND CRT STRAP

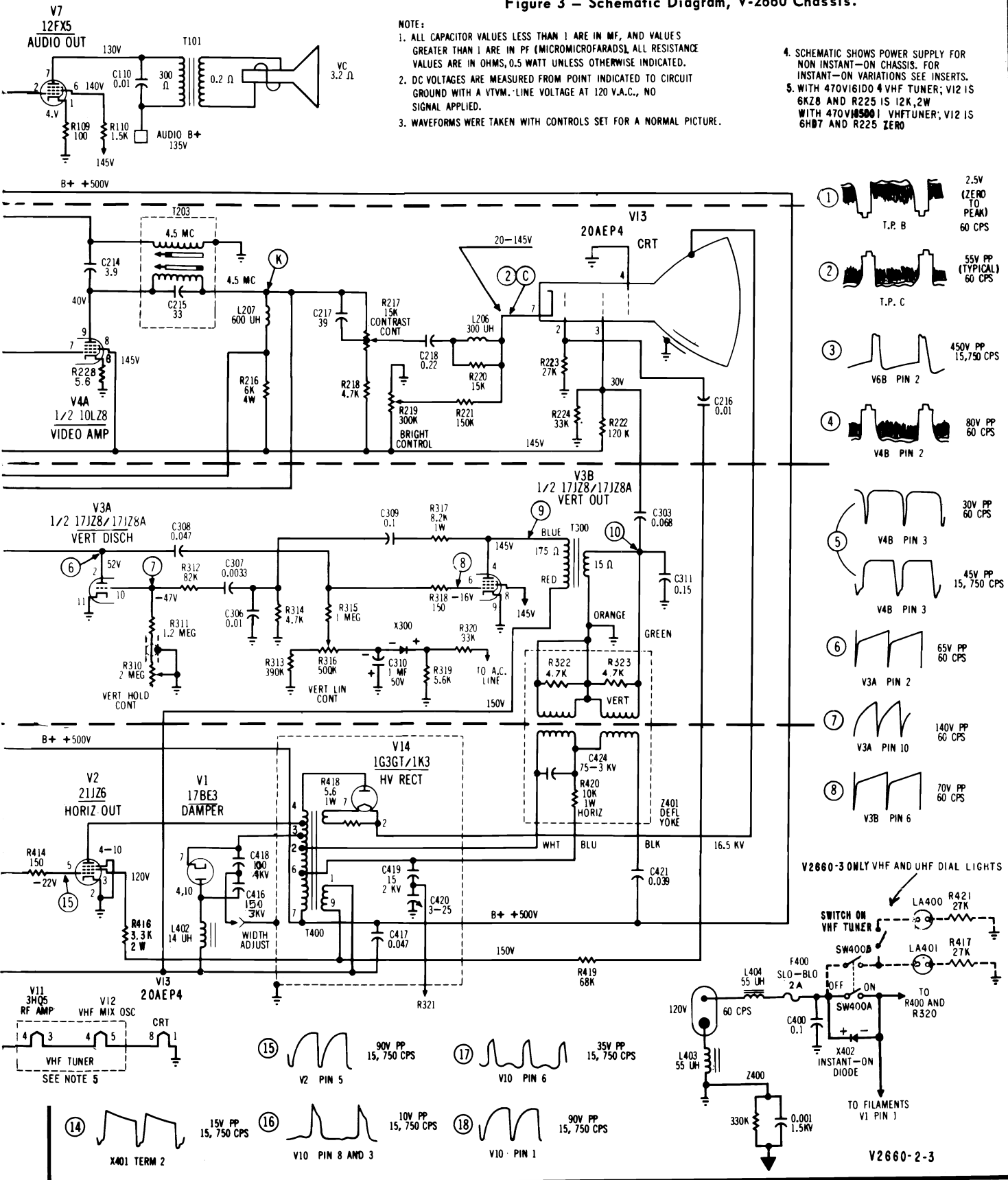


WESTINGHOUSE Chassis V-2660-1, -2, -3, Schematic Diagram, Continued

Figure 3 - Schematic Diagram, V-2660 Chassis.

NOTE:
 1. ALL CAPACITOR VALUES LESS THAN 1 ARE IN MF, AND VALUES GREATER THAN 1 ARE IN PF (MICROMICROFARADS). ALL RESISTANCE VALUES ARE IN OHMS, 0.5 WATT UNLESS OTHERWISE INDICATED.
 2. DC VOLTAGES ARE MEASURED FROM POINT INDICATED TO CIRCUIT GROUND WITH A VTVM. LINE VOLTAGE AT 120 V.A.C., NO SIGNAL APPLIED.
 3. WAVEFORMS WERE TAKEN WITH CONTROLS SET FOR A NORMAL PICTURE.

4. SCHEMATIC SHOWS POWER SUPPLY FOR NON INSTANT-ON CHASSIS. FOR INSTANT-ON VARIATIONS SEE INSERTS.
 5. WITH 470V1610 4 VHF TUNER; V12 IS 6KZ8 AND R225 IS 12K, 2W WITH 470V1850 1 VHF TUNER; V12 IS 6H07 AND R225 ZERO



WESTINGHOUSE Chassis V-2660-1, -2, -3, Alignment Information

SOUND ALIGNMENT

4.5 MC TRAP ALIGNMENT

STEP	PROCEDURE	ADJUSTMENT
1.	Disconnect antenna.	Contrast control to maximum. (clockwise)
2.	Inject 4.5 MC CW signal through a .001 mf capacitor to TP (R) .	--
3.	Connect demodulator probe to VTVM. Connect .001 mf capacitor to other end of probe and connect it to TP (C) .	--
4.	Set VTVM to 1.5-2 volt DC range Turn on set and allow 10 minute warm-up.	T203 bottom slug for minimum on the VTVM.

EQUIPMENT: VTVM

PROCEDURE:

1. Select the strongest station available (preferably with test pattern and test tone) and adjust the FINE TUNING for best reception. Adjust the VOLUME control so that the station sound is audible.
2. Adjust the quad coil (L100) for maximum sound from the speaker.
3. Disconnect the antenna. Use a jumper wire to short TP B to B-.
4. Connect the VTVM to TP (S)
5. Adjust interstage transformer T100 for maximum negative

voltage on the VTVM.

6. Remove the jumper wire used to short TP(B) to B-.

7. Place the antenna input close to the antenna terminals so that the signal is loosely coupled to the receiver and the picture is barely visible. A pronounced nosiness (hiss) should accompany the sound.

8. Adjust the limiter input coil (T203 top slug) for maximum negative voltage on the VTVM. If the VTVM indicates a broad response while making this adjustment, the receiver input signal is too strong. When the signal coupling described in step 7 is at the necessary low point, no limiting takes place and the VTVM will indicate a sharp response to the limiter input coil adjustment.

IF ALIGNMENT

EQUIPMENT

1. Sweep Generator with a 10 MC wide sweep at center frequencies from 10 MC to 90 MC and 170 MC to 216 MC.
2. CW (Marker) Generator which accurately produces the IF and RF frequencies from 4.5 MC to 216 MC.
3. Oscilloscope with good low frequency response characteristics.
4. VTVM
5. Bias Supply of -2V and -3V
6. Standard Alignment Tool with a 3/32" hexagonal tip (long enough to reach bottom slugs)

Generators — Except where otherwise noted, all signal generating equipment should be terminated as shown in Figure 6. Connect the signal cable ground near the ground of the stage where the signal is injected.

Adjust the CW generator output so that: (1) When the VTVM is being used its reading remains near the -1 volt point. (2) When the oscilloscope is being used the marker frequencies do not distort the response curve.

Oscilloscope and VTVM — Use a low-capacitance direct probe terminated with the decoupling network shown in Figure 7. Keep the oscilloscope calibrated for 2 volts peak to peak (P-P). Use a VTVM range suitable for measuring -1.5 volts.

TERMINATION AND ADJUSTMENT OF EQUIPMENT

These instructions on termination and adjustment of equipment will apply throughout the IF Alignment procedure.

All test equipment cables and leads should be as short and direct as possible.

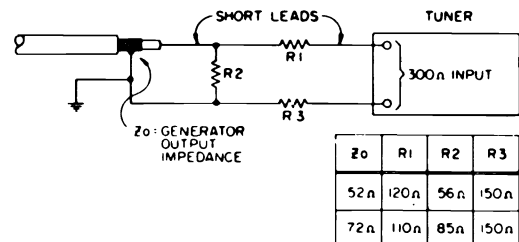


Figure 5 - Impedance Matching Network

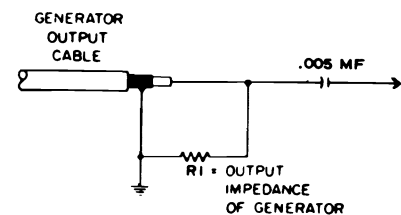


Figure 6 - Generator Cable Termination

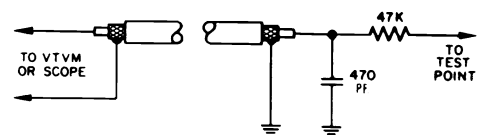


Figure 7 - Decoupling Network

WESTINGHOUSE Chassis V-2660-1, -2, -3, Alignment, Continued

IF ALIGNMENT

STEP	TEST EQUIPMENT AND CONNECTION	ADJUSTMENT
1.	-3V bias to TP (A) and -2V bias to TP (T) . Short antenna terminals. Channel selector to channel 10. Connect jumper from Pin 2 of V6B to B- to disable the AGC pulse.	
2.	Oscilloscope and VTVM to TP (B) IF sweep generator with CW marker to TP (E) . a. 44.65 MC. b. 45.75 MC.	a. T202 primary (top slug): Maximum amplitude on VTVM. T202 secondary (bottom slug): Rocking symmetrical response at 44.65 MC. b. Place 45.75 MC marker at 70% of peak response (see Figure 8 for waveshape and marker placement.
3.	CW generator to TP (D) . a. 43.25 MC.	a. T201: Maximum amplitude on VTVM.
4.	CW generator to TP (M) . a. 44.25 MC. b. 44.25 MC. c. 47.25 MC. It may be necessary to increase generator output and/or decrease bias.	a. Tuner mixer output coil: Maximum on VTVM. b. T200: Maximum on VTVM. c. L201: Minimum on VTVM.
5.	Connect sweep generator to TP (M) at 44.25 MC. Couple CW generator with marker at 44.25 MC to sweep generator cable. Keep marker amplitude low to avoid distorting response. Adjust scope for 2V PP.	Mixer output coil for maximum amplitude. T200 for "rocking symmetrical response with waveshape and markers" as shown in Figure 10.
6.	CW generator to TP (M) at 47.25 MC.	Repeat step 4c.
7.	Oscilloscope, 2V PP. Sweep generator thru impedance matching network (see Figure 5) to antenna terminals. Set pix marker at 211.25 MC, channel 13. Inject 45.75 MC marker into IF section by connecting CW output cable to outer shield of IF link cable.	Fine tuning to center of range Channel selector to channel 13. Oscillator slug setting: Picture carrier should fall at 45.75 MC (± 300 KC) marker on scope. (See Figure 11).
8.	Repeat step 7 for all channels in descending order.	

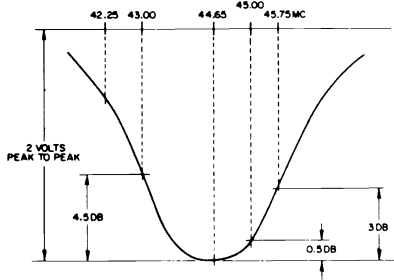


Figure 8 - Typical IF response, 2nd IF Amp Grid to 2nd Det.

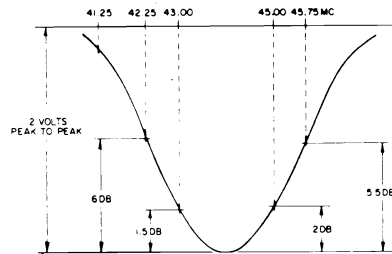


Figure 9 - Typical IF response, 1st IF Amp Grid to 2nd Det.

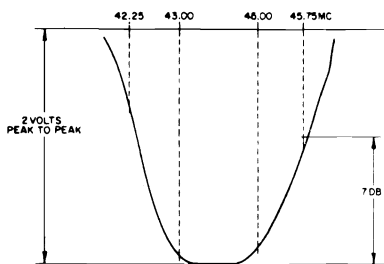


Figure 10 - Typical IF response, Mixer Amp Grid to 2nd Det.

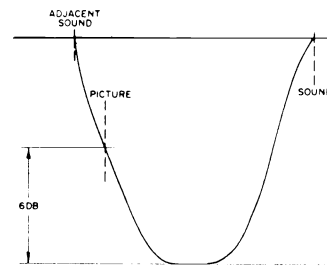


Figure 11 - Typical RF-IF response.

WESTINGHOUSE Chassis V-2660-1, -2, -3, Service Data, Continued

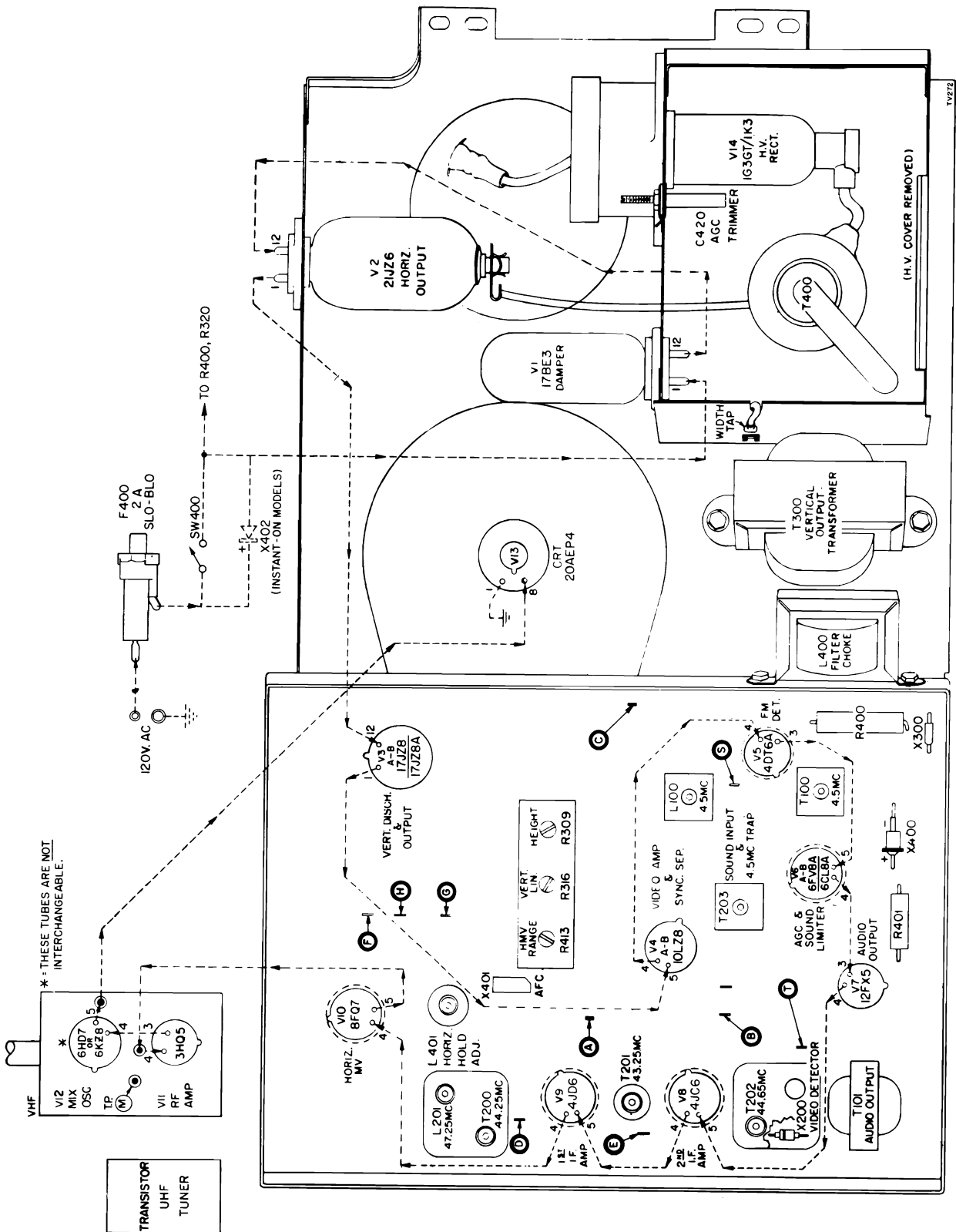


Figure 1 - Rear View Chassis V-2660

Westinghouse

Chassis V-2662-1, used in Model BP78A39A

REAR COVER REMOVAL

- (1) Remove the two screws from the two corners of the cabinet back.
- (2) The rear cover may easily be removed by disconnecting UHF feeder at UHF terminal on the rear cover.

CABINET FRONT REMOVAL, CLEANING CRT AND FRONT GLASS

- (1) Remove the rear cover.
- (2) Remove two screws on top of the chassis.
- (3) Remove two screws under front section of the cabinet.
- (4) Cabinet front may now easily be removed by pulling it forward.

PICTURE TUBE REMOVAL

- (1) Remove the cabinet front, by pulling the front forward.
- (2) Remove the four screws from the four corners of the picture tube.
- (3) Carefully slide the picture tube out of the cabinet.
- (4) Disconnect picture tube socket, deflection yoke and anode connector.

INSPECTION OR REMOVAL OF CIRCUIT BOARDS

(A) VIDEO AND SOUND IF SECTION

To inspect the conductor side, remove cabinet bottom metal plate by removing the six retaining screws. To inspect component side, remove the three PC Board retaining screws. To remove the entire board, unplug the two connecting wires and shielded cable on component side. Carefully pull board out of its multiple connector.

(B) SOUND OUTPUT SECTION

To inspect conductor side, remove the cabinet bottom metal plate. To inspect component side remove the three PC Board retaining screws. To remove entire board, unplug the two connecting wires on component side, unsolder four wires and one cable.

(C) DEFLECTION SECTION

To inspect component side remove the cabinet back. To inspect conductor side, remove the four PC Board retaining screws. To remove entire board, unplug the two wires on component side and carefully pull the board out of its multiple connector.

SPEAKER REMOVAL

- (1) Remove cabinet front, rear cover, and cabinet bottom plate.
- (2) Remove two screws from bottom side mtg. bracket (speaker side) two screws on the chassis (above the speaker) two CRT mounting screws (speaker side) one screw on the handle, one earphone jack nut, and one antenna jack nut.
- (3) The cabinet side board with a speaker may easily be removed by unsoldering the one wire attached to the antenna.

ROD ANTENNA REMOVAL

- (1) Remove the cabinet front and the rear cover.
- (2) Remove two screws on the antenna holder and unsolder the one wire attached to the antenna.

VHF TUNER REMOVAL

1. Remove VHF tuner knobs.
2. Remove two screws hidden under the tuner knobs, mounting front of tuner to cabinet side.
3. Remove back cover.
4. Disconnect deflection PC Board (Refer to Disassembly-Deflection Section).
5. Remove two screws mounting tuner to chassis.
6. Pull out tuner slightly and disconnect all wires. Mark down all wire connections.
7. Remove tuner.

UHF TUNER REMOVAL

1. Remove back cover.
2. Remove UHF tuner knobs.
3. Disconnect deflection PC Board (Refer to Disassembly-Deflection Section).
4. Remove three screws mounting UHF tuner to chassis.
5. Pull out UHF tuner slightly and disconnect all wires.
6. Remove UHF tuner.

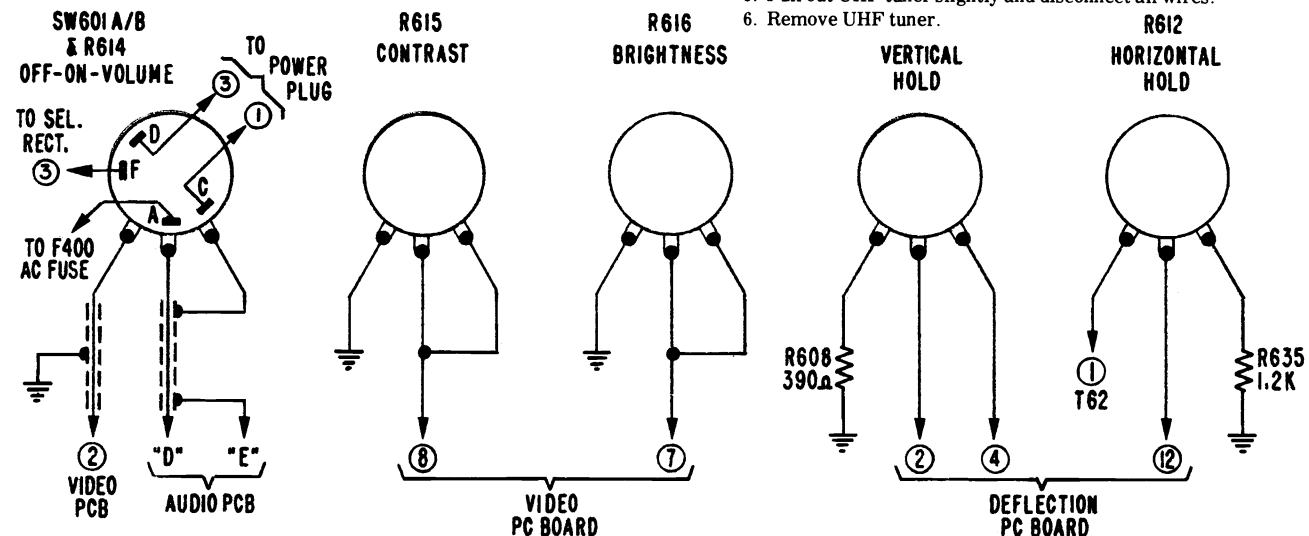


Figure 2 - Control Wiring Diagram

WESTINGHOUSE Chassis V-2662-1, Schematic Diagram

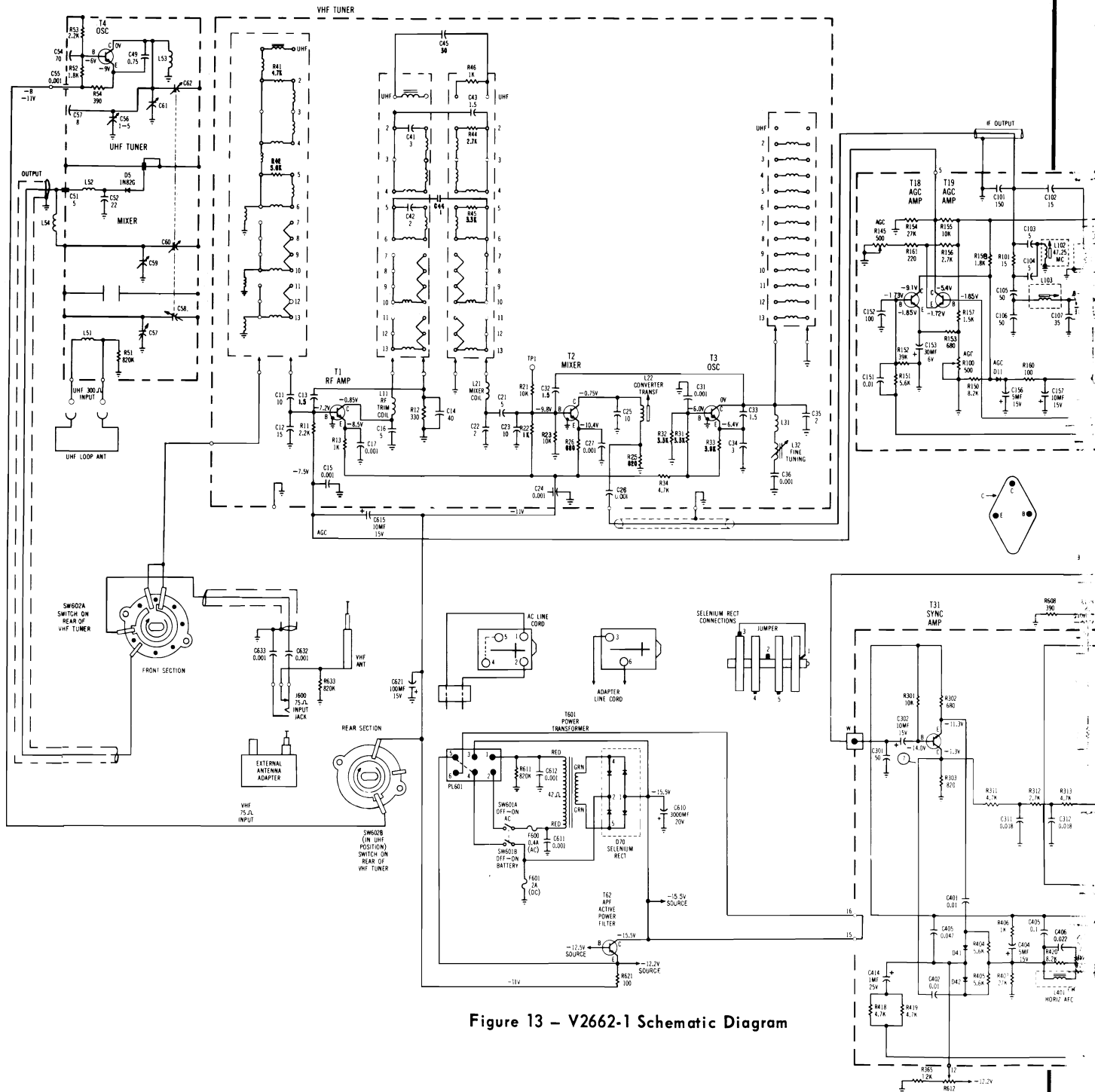
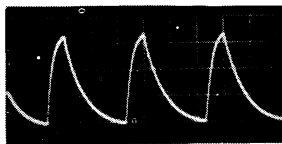
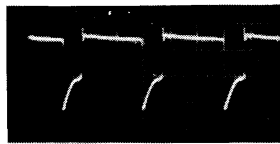


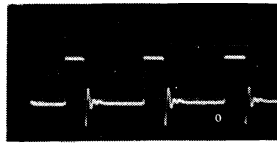
Figure 13 - V2662-1 Schematic Diagram



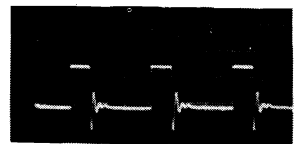
14 6.6V_{P-P}
EMITTER T41



15 16V_{P-P}
COLLECTOR T41

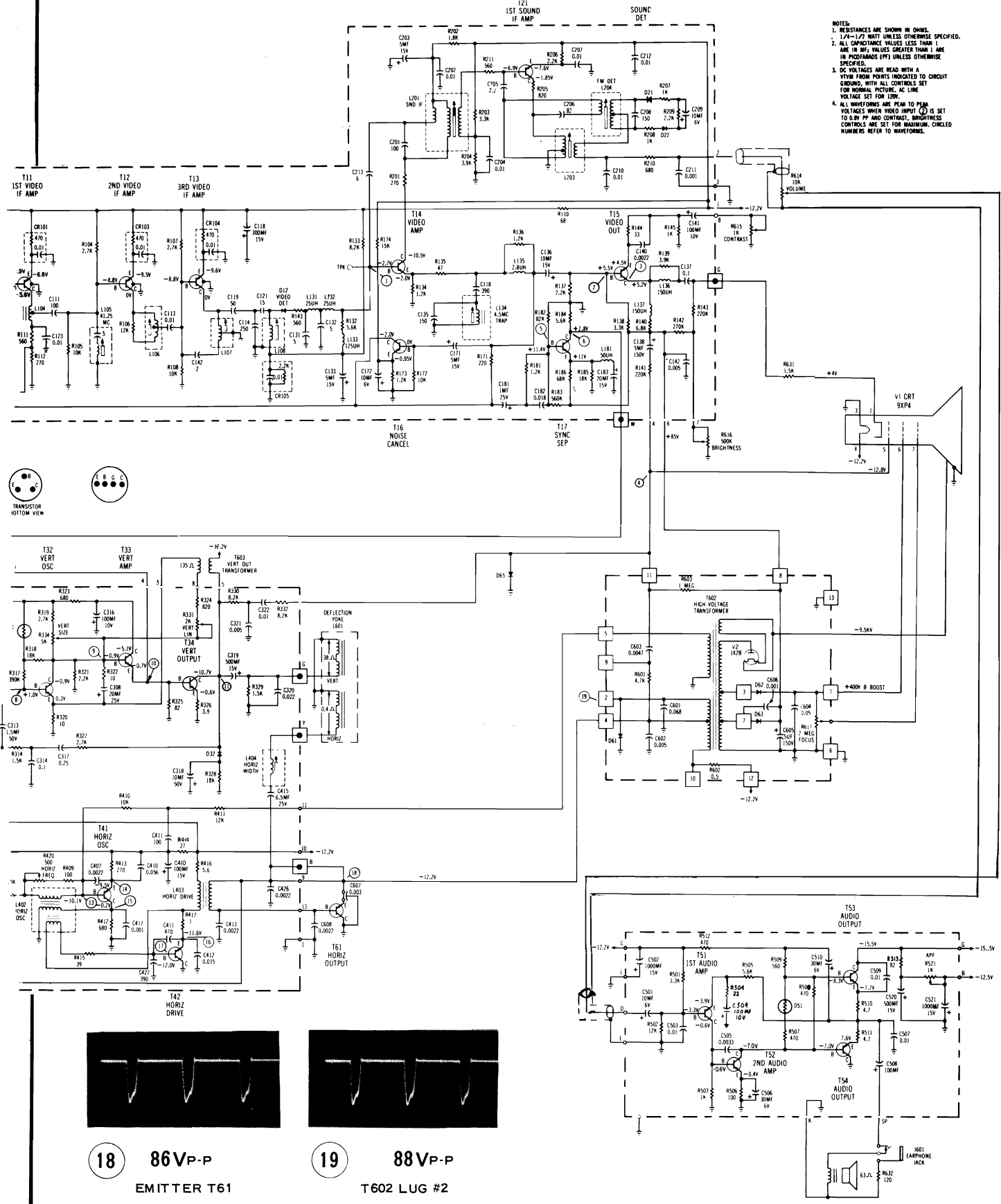


16 25V_{P-P}
EMITTER T42



17 24V_{P-P}
BASE T42

WESTINGHOUSE Chassis V-2662-1, Schematic Diagram, Continued



WESTINGHOUSE Chassis V-2662-1, Service Information

RECEIVER ADJUSTMENTS

1. TUNER OSCILLATOR ADJUSTMENT

Remove the channel selector and the fine tuning knobs. Set the "I" mark on the fine tuning cam plate so that it is visible from the front of the VHF tuner. Adjust the slug of the oscillator coil with a suitable non-metallic screwdriver.

HEIGHT AND VERTICAL LINEARITY

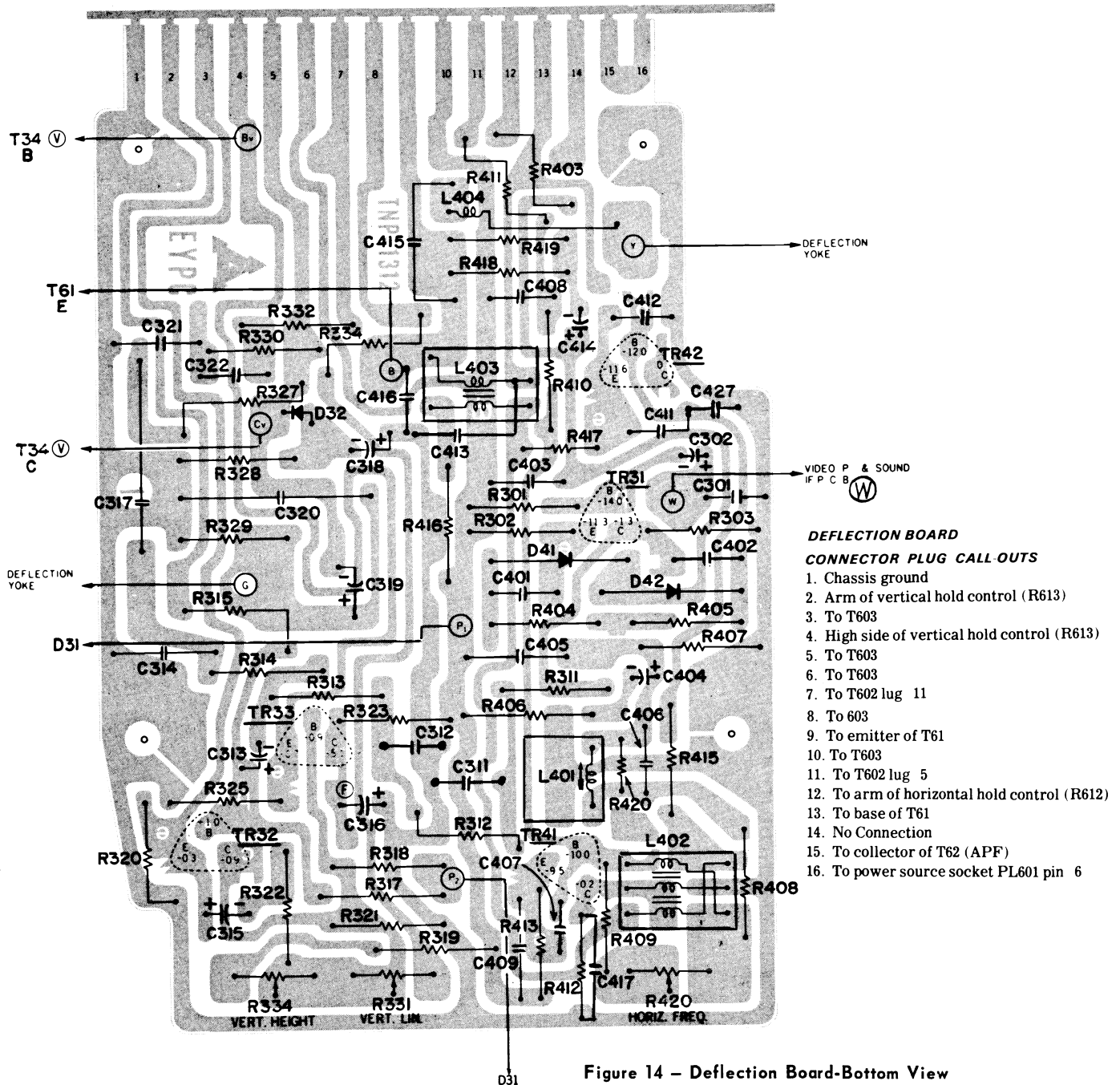
These controls should be adjusted simultaneously to give proper vertical size consist with good vertical linearity. Adjustment should be made to extend the picture limits approximately 3/16" beyond the top, and bottom edges of the mask.

4. AGC

The adjustment of the AGC control effectively changes the operating point of the AGC amplifier. Turned fully clockwise, the AGC control is set for maximum gain. In some areas this may cause clipping of the sync pulses, resulting in a "wobble" in the picture and unstable sync. Turning the AGC control in a counter-clockwise direction will decrease the gain of the receiver.

5. TO ADJUST THE AGC PROPERLY

1. Tune in the strongest signal being transmitted.
2. Adjust R145 to maximum sensitivity, fully clockwise.
3. Adjust R100 to the point where the pattern starts to overload.
4. Adjust R145 counter-clockwise to the point, just before noise appears on the pattern.



WESTINGHOUSE Chassis V-2662-1, Service Information, Continued

6. YOKE POSITION

The yoke is secured to the neck of the picture tube with an angular clamp and screw. To adjust the yoke and correct picture tilt, loosen this clamp. Correct tilt and retighten set.

7. CENTERING

The picture centering device consists of two rings located at the rear of the yoke assembly. Each ring has a tab for ease of adjustment. The tabs should be rotated and moved toward or away from each other until the picture is properly centered on the screen of the picture tube.

8. APF (ACTIVE POWER FILTER)

Connect a VTVM to T602 8 and chassis ground. Adjust APF control, R521, for -12.2 volts.

9. HORIZONTAL WIDTH

Adjust the slug of the width coil L404 to extend the picture about 1/2 inch beyond the mask with the brightness control R616 set to normal operation.

FUSES

Two fuses are used in this chassis — a 2 Amp fuse for battery operation and a .4 Amp fuse for AC operation. These are located under the cardboard cover above the CRT neck.

To replace a fuse:

1. Remove back cover.
2. Remove screw retaining cardboard cover.
3. Remove fuse (.4 Amp is the top fuse) (2 Amp is the bottom fuse.)

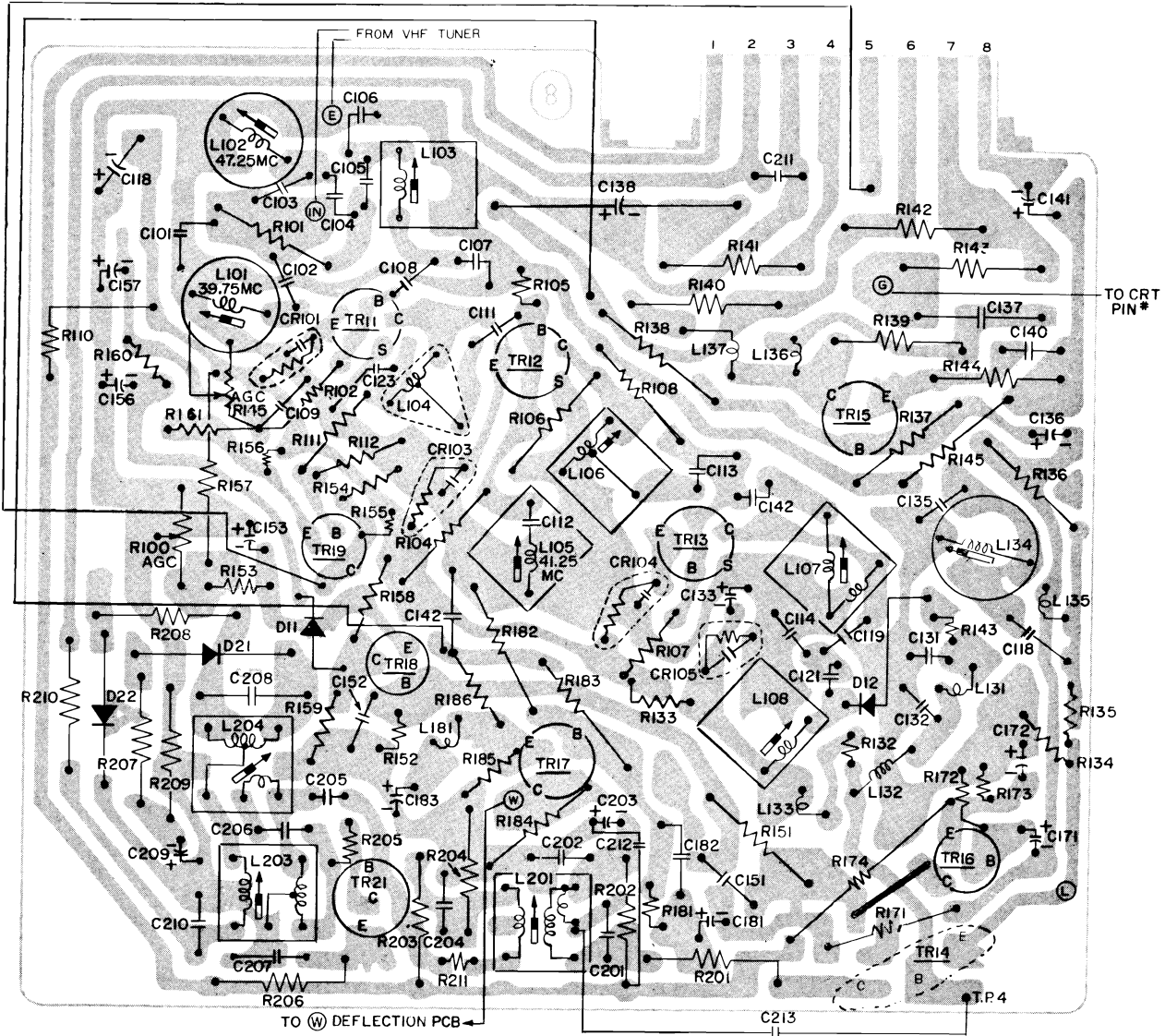


Figure 15 - Video and Sound IF PCB - Bottom View

**VIDEO IF BOARD
CONNECTOR PLUG CALL-OUTS**

- | | |
|---|---|
| <ol style="list-style-type: none"> 1. To B- 2. To high side of volume control (R614) 3. Chassis ground | <ol style="list-style-type: none"> 4. To T602 lug 11 5. AGC lead to tuner 6. To T602 lug 8 7. To arm of brightness control (R616) 8. To high side of contrast control (R615) |
|---|---|

WESTINGHOUSE Chassis V-2662-1, Service Information, Continued

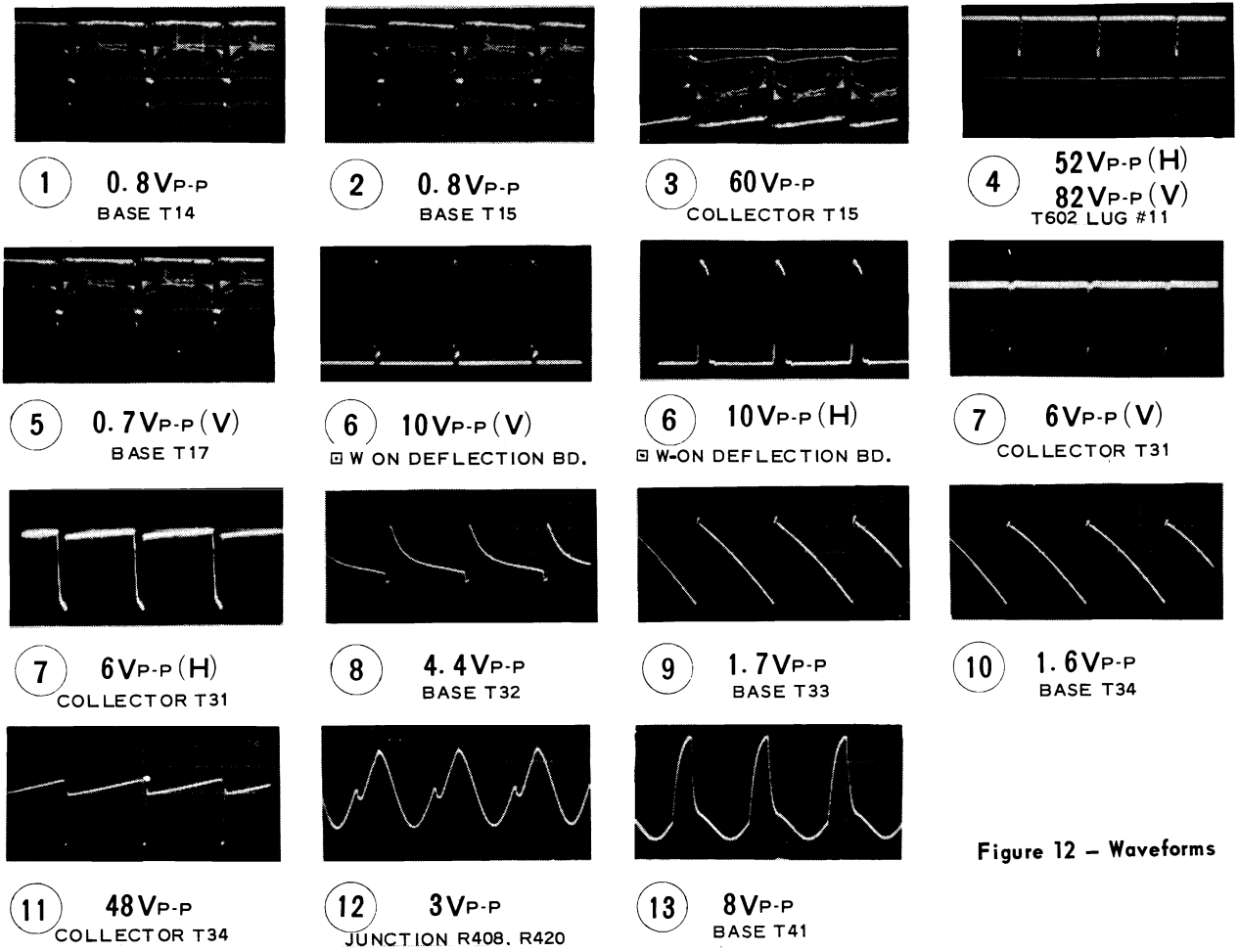


Figure 12 - Waveforms

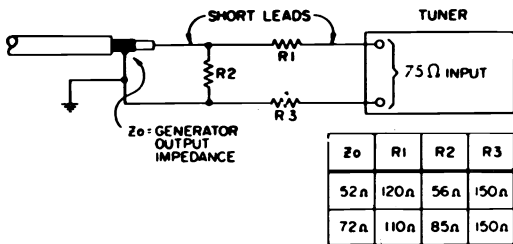


Figure 16 - Impedance Matching Network.

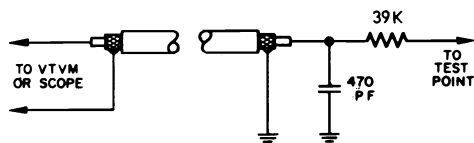


Figure 17 - VHF Decoupling Network.

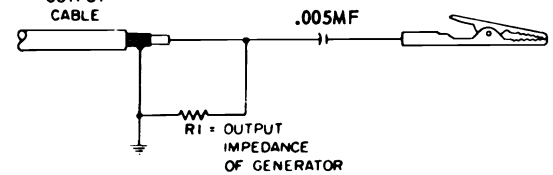


Figure 18 - Generator Cable Termination.

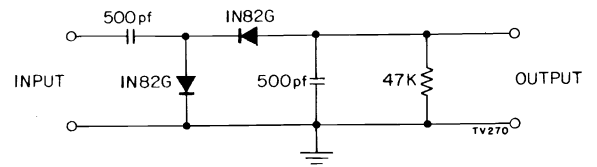


Figure 20 - Detector Circuit

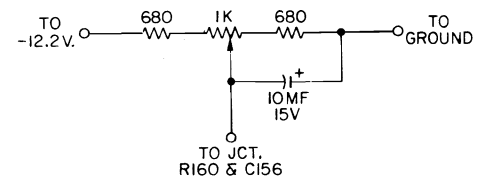


Figure 21 - AGC Bias Circuit

WESTINGHOUSE Chassis V-2662-1, Alignment Information, Continued

EQUIPMENT REQUIRED

1. Sweep Generator with a 10 MC wide sweep at center frequencies from 10 MC to 90 MC and 170 MC to 216 MC.
2. CW (Marker) Generator which accurately produces the IF and RF frequencies from 4.5 MC to 216 MC.
3. Oscilloscope with good low frequency response characteristics.
4. VTVM.
5. Insulated small-bladed screw-driver.

TERMINATION AND ADJUSTMENT OF EQUIPMENT

Oscilloscope and VTVM — Use a low-capacitance direct probe terminated with the decoupling network shown in Figure 17. Keep the oscilloscope calibrated for 1 volt peak to peak (P-P). Use a VTVM range suitable for measuring — 1.5 volts.

Generators — Except where stated otherwise, all signal generating equipment should be terminated as shown in Figure 18. Connect the signal cable ground near the ground of the state where the signal is injected.

Adjust the CW generator output so that: (1) When the VTVM is being used its reading remains near the -1 volt point. (2) When the oscilloscope is being used the marker frequencies do not distort the response curve.

ALIGNMENT INSTRUCTIONS

1. Remove back cover.
2. Remove cabinet bottom plate.
3. Short out antenna terminals.
4. Allow 20 minute warm-up period for the receiver and test equipment.
5. Connect test equipment as shown in figures 24, 26,
6. As the signal from the test point to the VHF tuner is very small, it may be necessary to connect a pre-amplifier to the vertical input of the oscilloscope.
7. All video IF alignment adjustments can be made from the video PC board side except for L101 and L 105 (top side only) and L22, located on the VHF tuner.

8. To expose L22 adjustment slug for alignment purposes, remove the deflection board retaining screws, move the board away from the tuner and remove tuner cover. L22 is located between front two wafers.

9. To adjust L101 and L105 remove IF PC board retaining screws and move board away from the chassis. Adjust L101 and L105 as may be necessary.

VIDEO IF ALIGNMENT

Allow a 20 minute warm up period for the receiver and test equipment.

Step 1.

- a. Set channel selector knob to channel 12 or 13 position.
- b. Connect synchronized sweep voltage from the sweep generator to the oscilloscope.
- c. Connect a VTVM and oscilloscope to TP4 (base of TR14). The center lead of the shielded cable is in series with a 39K resistor (Figure 24).
- d. Unsolder the junction of L103 and C108.
- e. Connect the sweep and CW generators to the disconnected side of C108 through a 10K resistor (Figure 24).
- f. Proceed with steps 1A thru 3A as indicated in the IF alignment chart.

Step 2.

- a. Connect the sweep and marker generator to the tuner (TP1).
- b. Apply AGC bias through the bias circuit (Figure 18) to the junction of R16- and C156 (Figure 18).
- c. Set AGC control R100 for maximum sensitivity (fully clockwise).
- d. Adjust the AGC bias circuit for 0.3V p-p response on the oscilloscope.
- e. Increase the vertical gain of the oscilloscope for a usable pattern.
- f. Proceed with steps 1B the 5B in IF alignment chart.

NOTE: After completing IF alignment, reset AGC controls as outlined in AGC adjust procedure.

STEP	IF SWEEP GEN. FREQ.	MARKER FREQ.	ADJUST	OSCILLOSCOPE	VTVM
1A	44.00Mc	41.25Mc	L105		Minimum reading
2A	"	44.00Mc	L107 and L108	Maximum amplitude	
3A	Resolder the junction of L103 and C108				
1B	44.00Mc	39.75Mc	L101	Set trap to coincide with 39.75Mc marker	
2B	"	47.25Mc	L102	Set trap to coincide with 47.25Mc marker	
3B	"	44.00Mc	L22 (on tuner) Figure	Maximum amplitude	
4B	"	"	L103	"	
5B	"	"	L106	"	

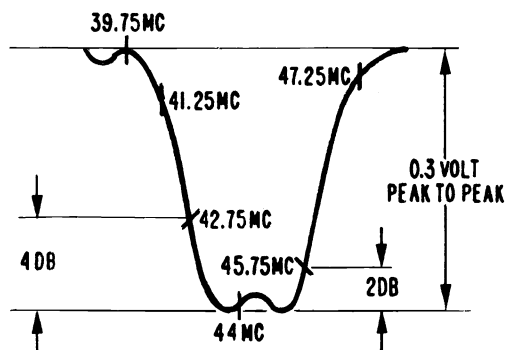


Figure 22 - Step 1

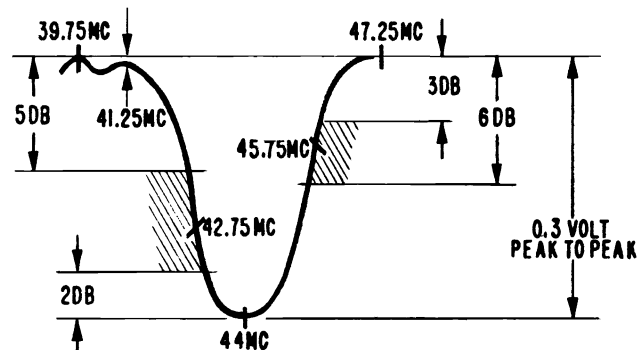


Figure 23 - Step 2

WESTINGHOUSE Chassis V-2662-1, Alignment Information, Continued

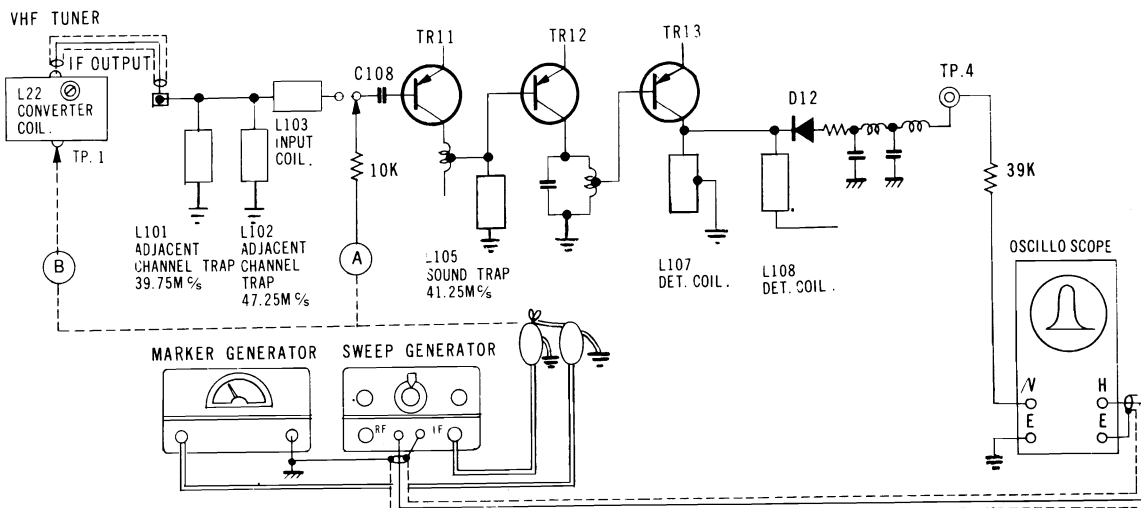


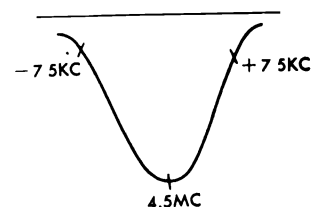
Figure 24 - Video I.F. Alignment

SOUND TRAP ALIGNMENT

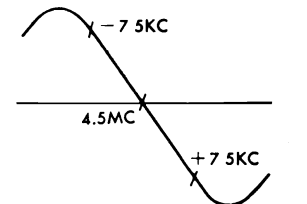
- (1) Tune in a strong television station set the contrast to maximum. Adjust Fine Tuning for best picture.
- (2) Adjust sound trap coil L134 for minimum interference, 4.5 MC.

SOUND IF AND DETECTOR ALIGNMENT

- (1) The sound trap alignment must be adjusted before SIF and FM detector alignment is attempted.
- (2) Connect the horizontal sweep voltage from sweep generator to the horizontal input of the oscilloscope to obtain horizontal deflection.
- (3) With a 10k Ω resistor in series with the center of shielded cable, inject the signal from the sweep generator to the video amplifier (t 14) base (TP 4). Loosely couple marker generator to the same point. (Figure 26) Turn AGC R100 control counter-clockwise.
- (4) Connect oscilloscope to the output of the sound detector (terminal No. 2 fig 26).
- (5) Adjust L201 for maximum scope vertical deflection.
- (6) Adjust L203 to place 4.5 MC marker at center of the slope on the response curve.
- (7) Adjust L202 to obtain the symmetrical linearity of an "S" shaped curve.



SOUND IF RESPONSE CURVE



SOUND DET. RESPONSE CURVE

Figure 25 - Sound Det. Response Curve

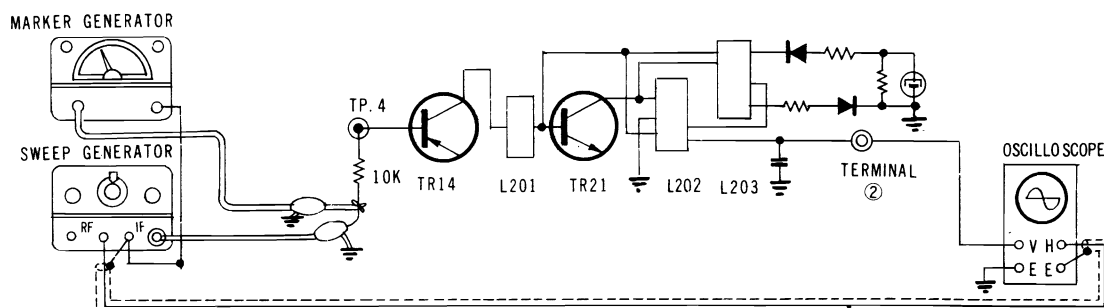


Figure 26 - Sound I.F. and Det. Alignment

Westinghouse

TRANSISTOR TV

BD88AH8A

WALNUT

BM88AH8A

CHASSIS V-2664

GENERAL INFORMATION

Westinghouse Models BM88AH88B and BD88AH8B Transistorized Television Monitor Receivers are designed to work with Westinghouse TG30C17A Video Tape Recorders and WAVE Systems but will function in any Closed Circuit Television Application. These monitors may also be used for normal off-the-air television reception. In addition the BD88AH8B monitor may be used to demodulate a received RF Television signal and provide both composite 75 ohm video, and low impedance audio signal outputs as received off-the-air. While these signals are particularly useful for video recording, they also may be used for any other normal closed circuit television purpose.

For use as a conventional monitor, composite video signals from a video tape recorder, camera, or other video source may be fed into coaxial cable connectors on the back of the monitor receiver.

CHASSIS REMOVAL

The picture tube is cabinet mounted and should remain with the cabinet.

Remove the following:

1. Three knobs from the right side of the cabinet, (Vert, Contrast, Brightness), VHF and UHF channel selector knobs. (the VHF dial remains with the chassis) and one knob from the back cover., (Horiz. Hold).
2. Four screws securing the back cover., (two top and two from the bottom).
3. Two screws located at bottom of the cabinet.
4. The Screw securing the support bracket (top of cabinet).
5. Three screws securing the control panel to the cabinet.
6. Two screws located right side of cabinet. Labelled C.
7. Disconnect the antenna leads from the antenna mounting bracket.
8. Unsolder the speaker leads from the audio output transformer.
9. Discharge and remove the CRT anode lead.
10. Remove the CRT socket.
11. Loosen the yoke clamp.
12. The chassis with the yoke and control panel can now be removed from the cabinet.

PRINTED BOARD ACCESSIBILITY

To provide access to the underside of the PC board with the set operating:

1. Remove the chassis.
2. Turn the chassis around.
3. Connect the yoke, CRT socket, and the high voltage lead (use a jumper).

A 3 Ohm resistor or a test speaker should be connected to the audio output transformer.

CAUTION: To operate the set partially disassembled, connect jumper from the aquadag CRT coating and CRT band to chassis ground. Be careful that the high-voltage lead does not short or arc to the frame.

PICTURE TUBE REMOVAL

1. Remove the chassis.
2. Place the cabinet face down on a soft cloth.
3. Loosen the screw that holds the wire retaining ring around the CRT.
4. Unhook the four corner retainers from the cabinet. "B"
5. Remove the retaining ring together with the four retainers.
6. Carefully remove the picture tube.

60 VOLT POWER SUPPLY REGULATOR

1. Tune in a medium strength station and fine tune for best picture and sound.
2. Check the AC line voltage and adjust for exactly 120 volts.
3. Connect a VTVM between chassis and the 60 volt supply (this can be reached at F401 or at the end of L401).
4. Adjust the REGULATOR ADJUST CONTROL, R415, for 60 volts DC on the VTVM.

HORIZONTAL OSCILLATOR AND HOLD

1. Connect a VTVM between test point "G" and chassis B minus.
2. Adjust the horizontal hold coil, L400, CCW so that the receiver is out of synchronization.
3. Set the AFC bias control, R418, for 3 volt positive on the VTVM.
4. Adjust the horizontal hold coil, L400, so that the receiver is in sync and the VTVM again reads a positive 3 volts. Check the horizontal hold by changing channels to see if receiver remains in sync.
5. The horizontal hold control should break sync if rotated in either direction. Don't move the control more than one full turn after sync is broken.

AGC CROSSOVER

1. Connect a good outdoor antenna.
2. Tune in the strongest TV signal available in the area.
3. Adjust the AGC crossover control, R305, to produce the best picture quality. (One extreme end of the control will cause excessive snow in the picture while the other extreme will produce tunable beats in the picture and sync instability).

VERTICAL LINEARITY AND SIZE

1. Connect an antenna and adjust for normal picture and sound. (using a test pattern or bar generator)
2. Decrease contrast and brightness controls until a picture is barely visible.
3. Adjust, R334, Height control for overall vertical deflection.
4. Adjust, R335, Vertical linearity control for best vertical linearity at the lower two-thirds portion of the picture.
5. Adjust R331, Top linearity control for best linearity at the top portion of the picture.
6. Readjust, R334, R335 and R331 if necessary to produce overall proper size and linearity.

NOISE CANCELLATION

1. Connect an antenna and tune for the strongest TV signal available in the area.
2. Adjust the noise cancellation control, R310, until signal distortion occurs and then back off on control until a normal picture is present.
3. An alternate method can be used for noise cancellation by coupling an appliance close to the antenna terminals such as a small motor or hair dryer. Adjustment of the noise cancellation control should be made to produce best sync stability. (One extreme end of the control will produce sync instability while the other extreme end will produce harsh white noise signals to appear in the picture).

WHITE LEVEL

1. Remove the antenna leads so no signal is present.
2. Ground test point "F" through a jumper to chassis B minus.
3. Connect a VTVM between test point "N" and chassis B minus.
4. Adjust R220, white level control, for a positive 40 volts DC.

WESTINGHOUSE Chassis V-2664, Service Information

PRINTED CIRCUIT BOARD LEGEND

- | | |
|---|---|
| <ol style="list-style-type: none"> 1. R404, 12V 2. R415, Regulator control, arm 3. T101, Red 4. T101, Blue 5. R111, Volume Control, arm 6. R323, Tuner B+, 12V 7. C408A, 12V Filter 7A. TP I to switch 600 #1 (Monitor Unit)
TP I to SW601B #2 (Monitor-Demod Unit)
TP K to SW600 #2 (Monitor Unit)
TP K to SW601A #2 (Monitor-Demod Unit) 8. R241, Contrast Control, bottom 9. R111, Volume Control, top 10. Q406, base 11. R415, Regulator control 12. Terminal 9 of T402, pulse 13. R425, pulse 14. I.F. Cable to tuner 15. Tuner AGC, to R344 15A. To R518 16A. To R515 16. R245, Brightness Control, ground 17. R245, Brightness control 18. R245, Brightness control, arm 19. R241, Contrast control, arm 20. Pin 7 of CRT 20A. C500 (+ side) | <ol style="list-style-type: none"> 21. R241, Contrast control, end 22. T301, Vertical output transformer, brown 23. Z300, yoke, orange 24. Q305, green 25. R327, Vertical hold control, end 26. R327, Vertical hold control, arm 27. T301, Vertical output transf. ground 28. Z300, Yoke, ground 29. Pin 1 of CRT 30. C314A, orange 31. T301, Vertical output transf. red 32. Q305, Collector, blue 33. T301, Vertical output transf. blue 34. C408A, 12V, white wire 35. C401C, 240V, filter 35A. Junction R528, C512 36. Pin 4 of CRT, ground 37. C400C, 240V, filter 38. R338, C120A, C314A, C408A, ground 38A. Q305, emitter 39. T400, 240V, AC supply 40. Pin 2 of CRT, green 41. R250, Tie point on T402 42. C405B, Regulator driver 43. Junction of X401 and X402, 75V 44. C120A, Filter, 60V 45. C411B, Filter, 60V 46. Q400, Base, green 47. R410 and Emitter of Q400 |
|---|---|

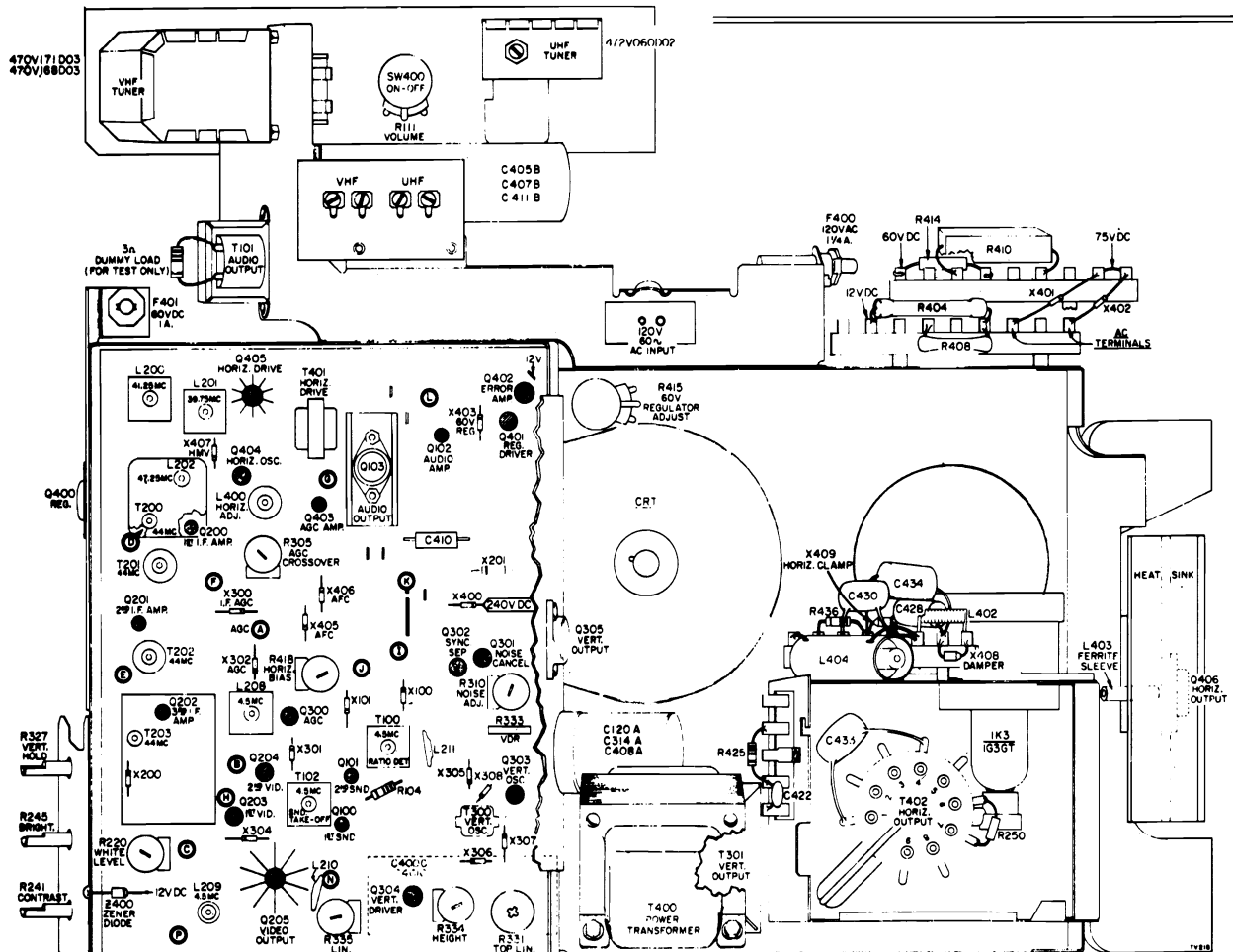
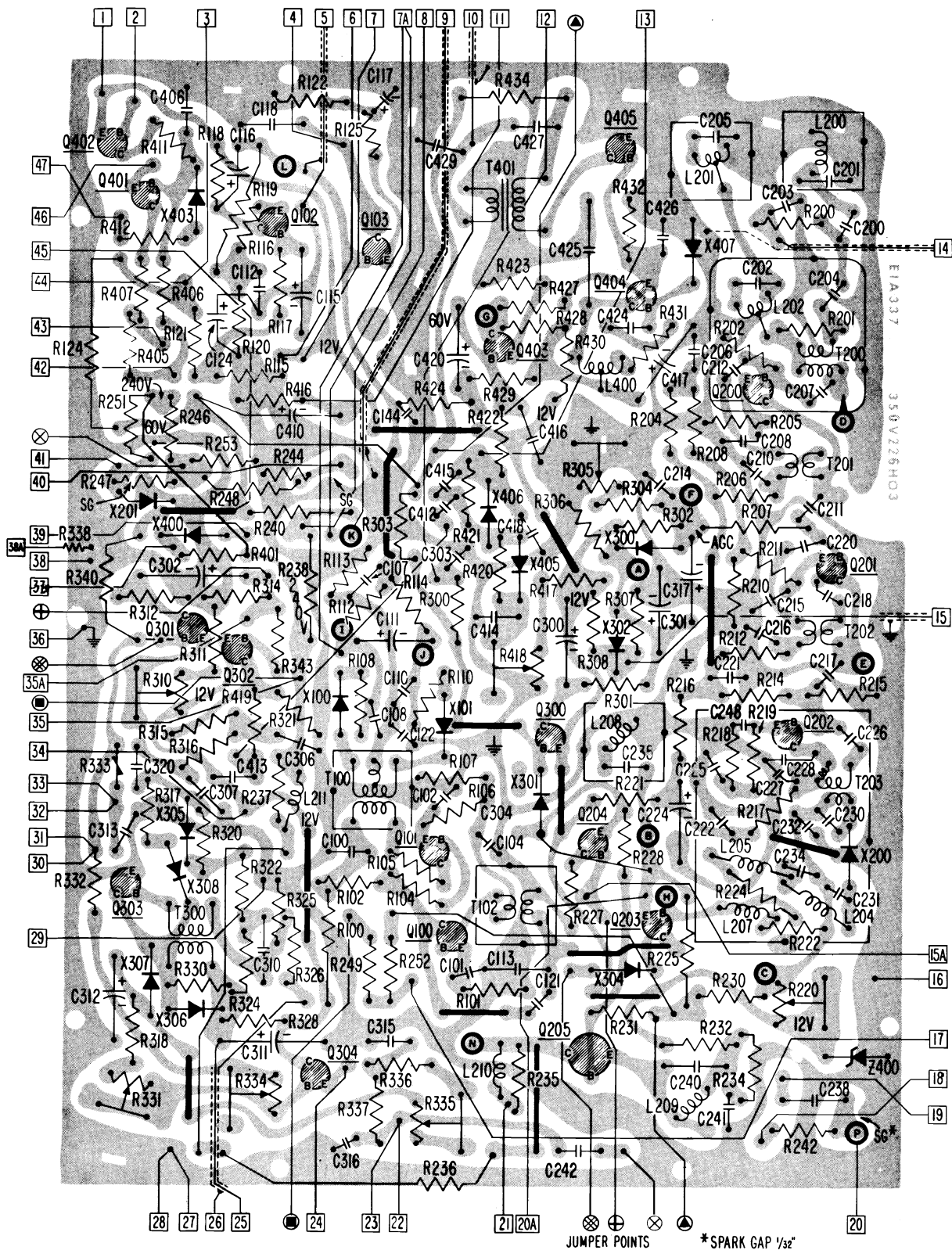


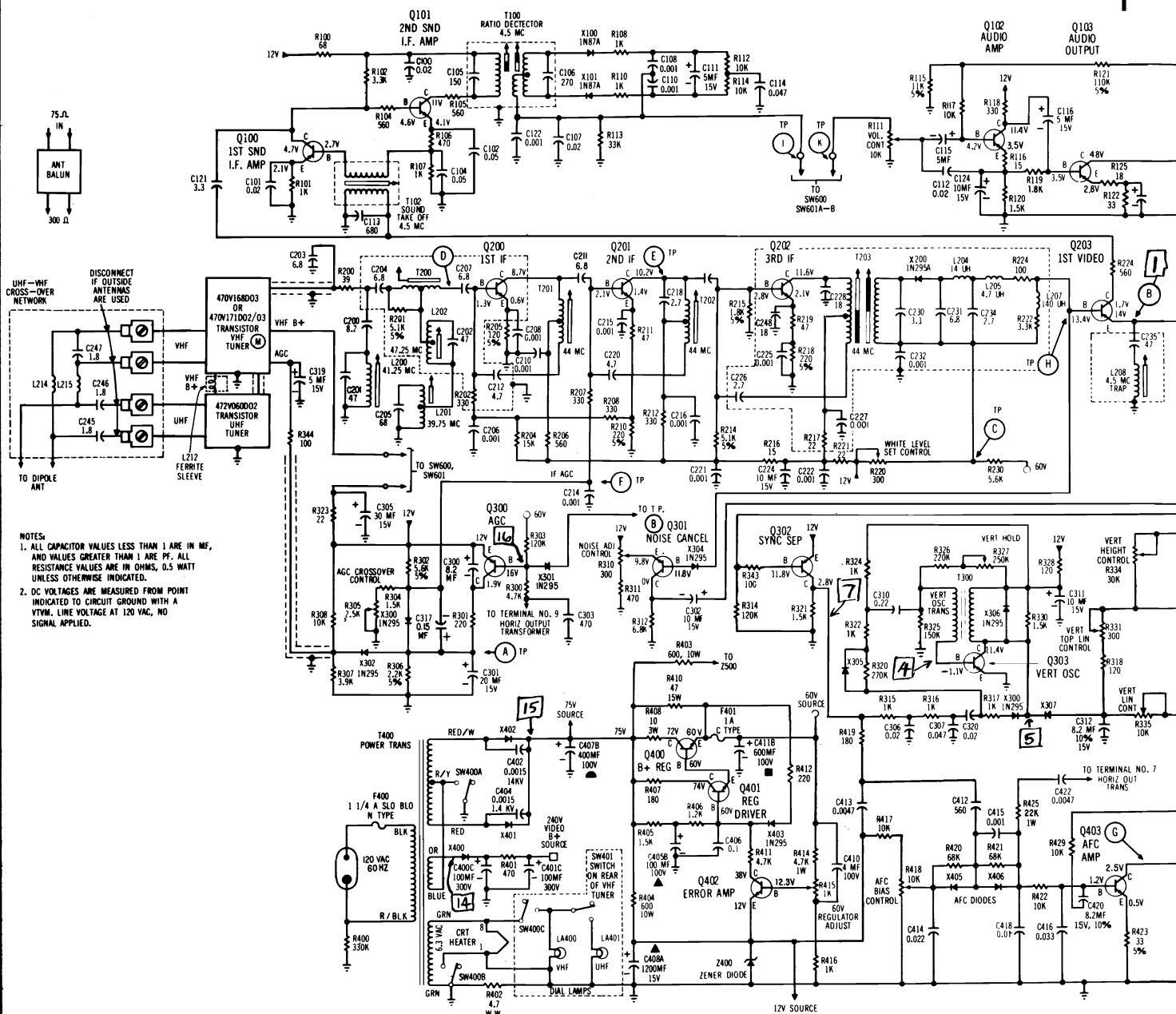
Figure 6 — Rear View Of Chassis

WESTINGHOUSE Chassis V-2664, PC Board Information, Continued



PC Board (Bottom View)

WESTINGHOUSE Chassis V-2664, Schematic Diagram



DEMODULATOR

1. Set the SELECTOR on the rear panel to "NORMAL".
2. Tune in a TV station
3. Set the SELECTOR on the rear panel to "DEMOD" (This opens the Video and Sound circuits).
4. With a TV station tuned in, the following output signals will be available:
VIDEO OUT, approx. 2 VPP Composite Video.
AUDIO OUT, approx. 300 millivolt of Audio.
5. In this DEMOD, position, "VIDEO IN" and "AUDIO IN" will monitor signals fed into them. If in the "Demod" position, the video signal from the auxiliary equipment is not being monitored, add a Tee Connector to the Video Out, and connect a jumper from the Video Out to the Terminated Video In connection.

MONITOR OPERATION

1. Set the SELECTOR on the rear panel to "MONITOR".

2. Connect a 0.7 to 2.0 Volt P-P, 75 ohm, Composite Video Signal to "VIDEO IN".
3. Connect a 300 millivolt Audio Signal to "AUDIO IN".
4. Adjust volume and picture controls as needed.

75 OHM VHF ANTENNA INPUT

If the 75 ohm VHF antenna input is used, the 300 ohm output leads of the built-in balun must be connected to the VHF antenna terminals. The built-in VHF antenna should be disconnected by removing the leads as shown for EXTERNAL ANTENNA.

TERMINATION

Always terminate the Video In with a 75 ohm termination. If more than one monitor is used, terminate only the monitor at the end of the signal line, with the 75 ohm termination.

WESTINGHOUSE Chassis V-2664, Schematic Diagram, Continued

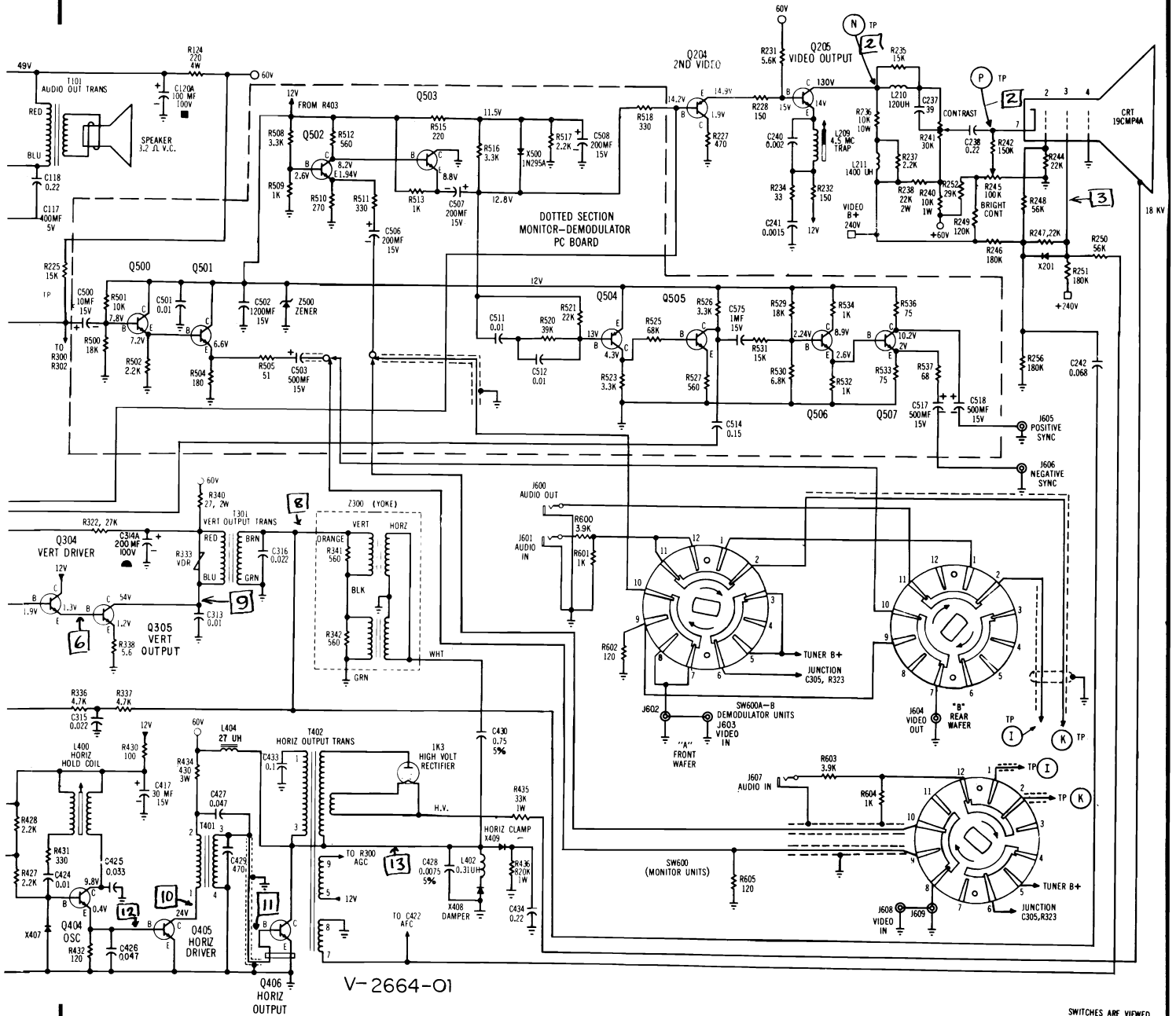


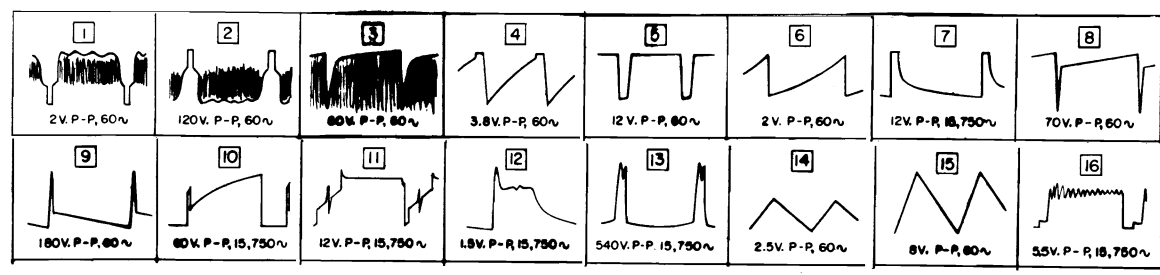
Figure 4. Chassis V2664 Schematic

SWITCHES ARE VIEWED FROM BACK END

SW601 A-B FUNCTION DEMODULATOR MONITOR NORMAL SWITCH SET IN DEMODULATOR POSITION

MONITOR NORMAL SWITCH SET IN DEMODULATOR POSITION

SW600 FUNCTION MONITOR NORMAL SWITCH SET IN MONITOR POSITION



WESTINGHOUSE Chassis V-2664, Service Information

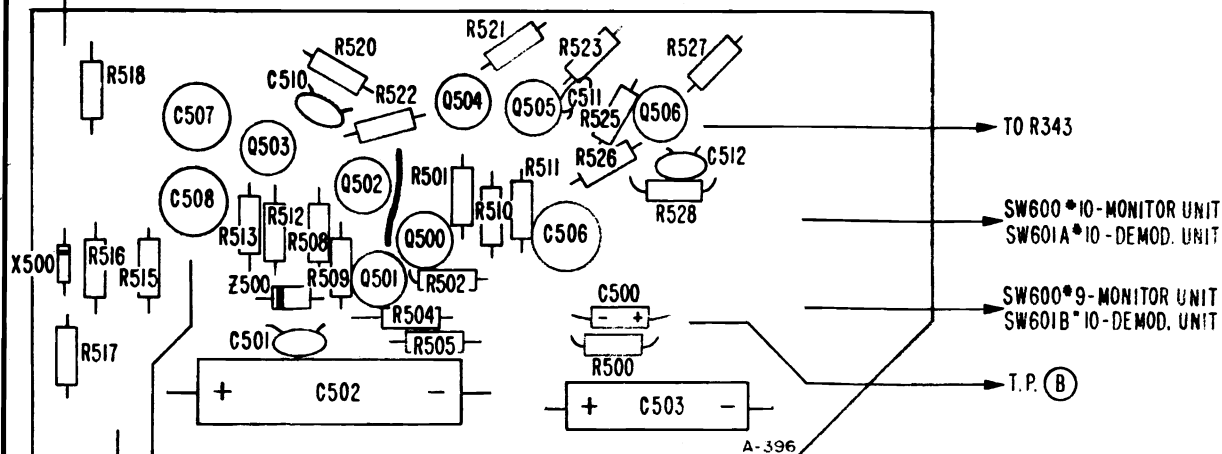


Figure 11 - Monitor Demodulator PC Board - Top View

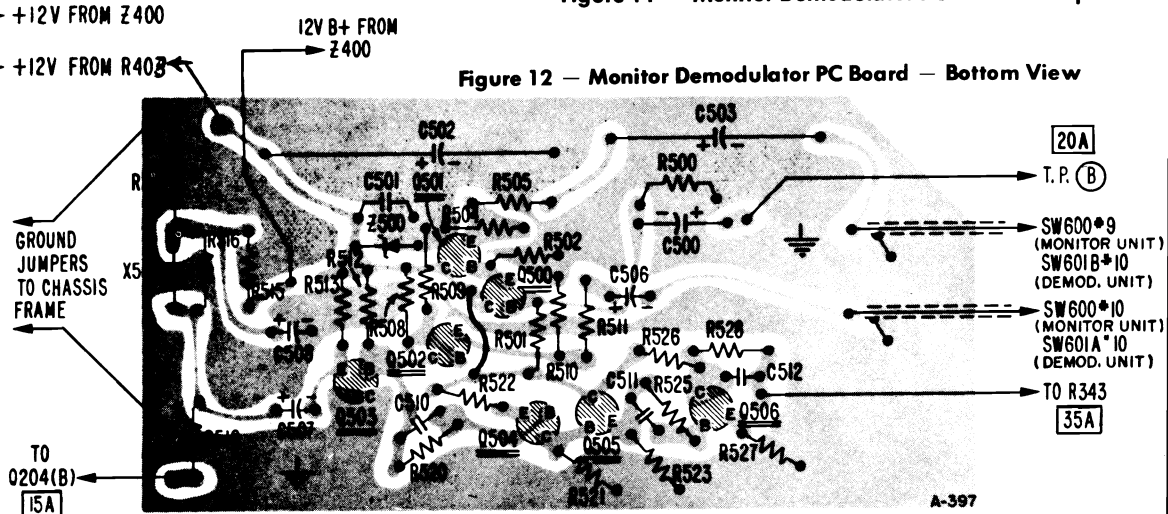


Figure 12 - Monitor Demodulator PC Board - Bottom View

SOUND ALIGNMENT

EQUIPMENT REQUIRED

1. C.W. Generator with termination.
2. Isolated VTVM (use a line isolation transformer between AC line and VTVM)

PROCEDURE

1. Disconnect antenna
2. Short TP "F" to chassis
3. Common lead of generator to chassis (B-)

STEP	CONNECT	ISOLATED VTVM	ADJUST
1.	4.5 Mc CW signal through a .05 mf capacitor to R104 at base of Q101	D.C. probe to TP "J" common to TP "L" VTVM center zero 5.V range	T100, primary (bottom core) maximum negative on VTVM (approximate -1.5V)
2.	Same as Step #1	D.C. probe to TP "K" common to TP "L" VTVM center zero 1.5V range	T100, secondary (top core) for zero reading on VTVM
3.	4.5 Mc CW signal through a .05 mf capacitor to "H" (generator output low enough for good meter indication)	D.C. probe to TP "J" common to TP "L" VTVM center zero 5.V range	L100, sound IF T100, sound take-off L208, trap, for maximum negative
4.	Same as Step #3	D.C. probe to TP "K" common to TP "L" VTVM center zero 1.5V range	T100 secondary (top core) for zero reading on VTVM

WESTINGHOUSE Chassis V-2664, Alignment Information, Continued

SOUND ALIGNMENT (AIR SIGNAL METHOD)

PROCEDURE:

1. Select the strongest station available (preferable with test pattern and test tone) and adjust the fine tuning for best reception. Adjust the volume control so that the station sound is audible.
2. Adjust T100 secondary (top core) and primary (bottom core), L100 and T102 for maximum sound from the speaker.
3. Place the antenna leads close to the antenna terminals so that the signal is loosely coupled to the receiver and picture is barely visible. A pronounced noisiness (hiss) should accompany the sound. Repeat the adjustments in step #2.
4. Connect the isolated VTVM, probe to TP "K", common lead to TP

"L". Use "zero center" 1.5V range on VTVM. Adjust T100 secondary (top core) for "zero" on VTVM.

4.5 MC TRAPS L208 AND L209 ALIGNMENT

1. Disconnect the antenna.
2. Turn contrast control to maximum.
3. Inject a strong 4.5 MC C.W. signal from the generator properly terminated, (see figure 11) to TP "H" through a .05mf. capacitor. Generator common lead to ground.
4. Connect a .05mf capacitor to the tip of a demodulator probe.
5. Connect the demodulator probe to a VTVM and the capacitor to TP "P". VTVM common lead to ground.
6. Set the VTVM to 1.5V volt D.C. range.
7. Adjust L208 and L209 for minimum 4.5 MC signal indication on the VTVM.

IF ALIGNMENT

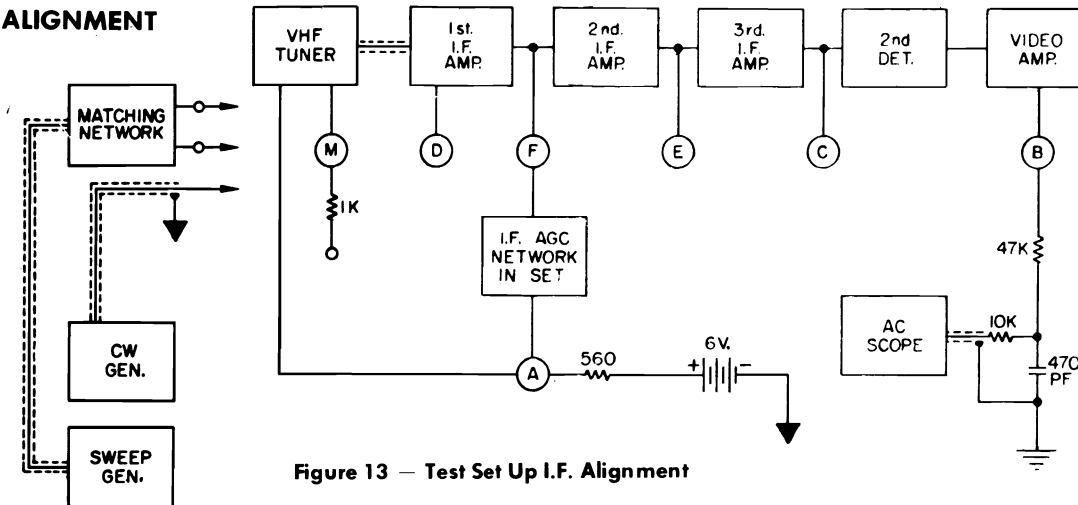


Figure 13 — Test Set Up I.F. Alignment

EQUIPMENT

1. Sweep Generator with a 10 MC wide sweep at center frequencies from 10 MC to 90 MC and 170 MC to 216 MC.
2. CW (Marker) Generator which accurately produces the IF and RF frequencies from 4.5 MC to 216 MC.
3. Oscilloscope with good low frequency response characteristics.
4. VTVM.
5. Bias Supply of 6 Volt and 560 ohm Resistor.
6. Standard Alignment Tools 3/32" (Tuner) and 7/64" (1.F)

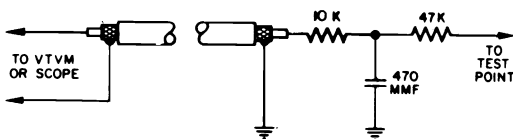


Figure 14 — Decoupling Network

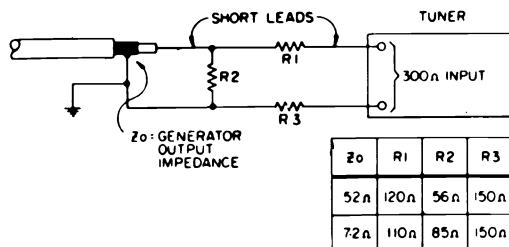


Figure 15 — Impedance Matching Net.

TERMINATION AND ADJUSTMENT OF EQUIPMENT

These instructions on termination and adjustment of equipment will apply throughout the IF Alignment procedure.

All test equipment cables and leads should be as short and direct as possible.

Oscilloscope — Use a low-capacitance direct probe terminated with the decoupling network shown in Figure 14. Keep the oscilloscope calibrated for 2 volts peak to peak (P-P).

Generators — Except where otherwise noted, all signal generating equipment should be terminated as shown in Figure 16. Connect the signal cable ground near the ground of the stage where the signal is injected.

Adjust the CW generator output so that the marker frequencies do not distort the response curve.

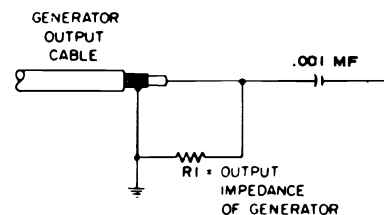


Figure 16 — Generator Cable Term.

WESTINGHOUSE Chassis V-2664, Alignment Information, Continued

IF ALIGNMENT

Step	Test Equipment and Connection	Adjustment
1.	Connect +6V bias to T.P. "A" through a 560 ohm resistor. Short antenna terminals. Channel selector to channel 10. VTVM between TP "F" and chassis.	Set R310, noise adjust, maximum CCW position. Set R305, AGC crossover control for +3 VDC at TP "F". Remove VTVM
2.	Connect I.F. sweep generator with 44 mc marker to TP "E". Oscilloscope between TP "B" and chassis, calibrate scope for 2 volts.	T203, primary, bottom core for maximum (not exceed 2 volts) T203, secondary, top core for rocking symmetrical response at 44mc. Fig 17 Remove generator from TP "E"
3.	Connect I.F. sweep generator with 44 mc marker to TP "D"	T202 T201 (See Fig. 18)
4.	Connect I.F. sweep generator to TP "M" on tuner, through 1K resistor. Markers at 41.25 mc, 42.25 mc, 43 mc 44 mc, 45 mc and 45.75 mc. (It may be necessary to increase generator output and/or decrease bias to maintain 2VPP at scope.	Detune T200 and L202 all the way in toward the P.C. board. L200 and L201 to take "suck-out" to left of passband. Tuner mixer coil ccw toward top of coil. Check I.F. response Fig. (19). Re-touch T203 top and bottom cores, if necessary. For symmetrical response.
5.	Connect I.F. sweep generator with 44 mc marker to TP "M" on tuner, through a 1K resistor. Keep marker low to avoid distortion.	Mixer output coil for 44 mc. T200 and mixer output coil for rocking symmetrical response as shown in Fig. 19 (less trap settings).
6.	Same as Step 5 with marker frequencies of: a. 41.25 mc. b. 47.25 mc. c. 39.75 mc.	Adjust the following traps for minimum at points shown in Fig. 17. a. L200 — 41.25 mc. b. L202 — 47.25 mc. c. L201 — 39.75 mc.
7.	Connect RF sweep generator set to sweep Chan. 10, through impedance matching network, Fig. 15, to ant. terminals. Loosely couple marker generator set to 193.25 mc (chan. 10 picture carrier). Loosely couple cw marker generator, at IF cable, set at 45.75 mc.	Fine tuning to center of range. Check Fig. 20, if necessary adjust F.T. oscillator adjustment on tuner for picture carrier to fall at 45.75 mc marker.
8.	Check over-all response of each channel (Fig. 20)	Set fine tuning for each channel.

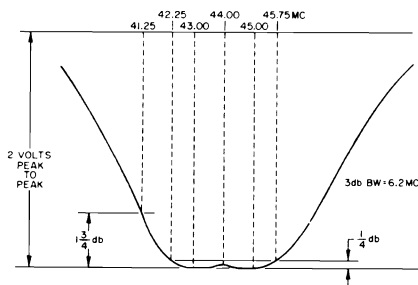


Figure 17 — Typical 3rd I.F. To T.P. "B"

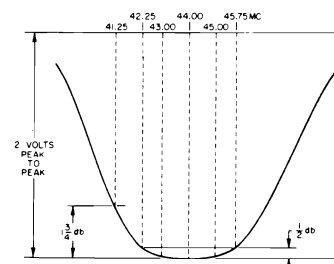


Figure 18 — Typical 1st I.F. To T.P. "B"

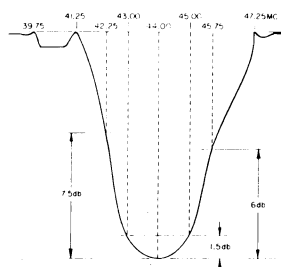


Figure 19 — Typical Mixer To T.P. "B"

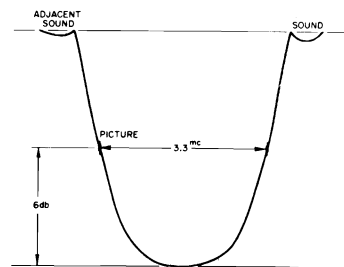
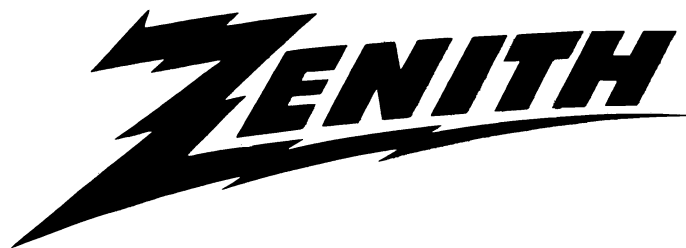


Figure 20 — Typical Antenna To T.P. "B"



ZENITH RADIO CORPORATION

Chassis 1Y22B55, 14Z21, 14Z26, 14Z27, 14Z33, 14Z34, 14Z43,
and earlier Chassis 14Y21, 14Y33, Z, 14Y34

MODEL AND CHASSIS INFORMATION

MODEL	TYPE	CHASSIS	CR TUBE	MODEL	TYPE	CHASSIS	CR TUBE
T2624W,W2	Portable	14Z21	17EQP4	T2651G6,G7, L6,L7	Portable	14Z33	20UP4
T2653C,L	Portable	14Z33	20UP4	T2651G8,L8	Portable	14Y33	20UP4
T6661W	Portable	14Z33	20UP4	T2659W6,W7	Portable	14Z33	20UP4
T2674W	Portable	14Z33	20UP4	T2659W8	Portable	14Y33	20UP4
T2694W1	Table	14Z26	22TP4	T2676W6	Portable (SC"300")	14Z33	20UP4
Y2213W5	Table	14Z26	22TP4	T2676W8	Portable (SC"300")	14Y33Z	20UP4
Z1810C,C2, X,X2	Portable	14Z21	17EOP4	T2693L6,L7	Table	14Z26	22TP4
Z1820H,H2,W2	Portable	14Z21	17EQP4	Y1810C6,X6	Portable	14Z21	17EQP4
Z1820H1	Portable	14Z21Z	17EOP4	Y1810C8,X8	Portable	14Y21	17EQP4
Z2011C	Portable	14Z43	19GAP4	Y1820H6,W6	Portable	14Z21	17EQP4
Z2014C,L	Portable	14Z33	20UP4	Y1820H8,W8	Portable	14Y21	17EQP4
Z2017G,W	Portable	14Z33	20UP4	Y2011C6,C7	Portable	14Z43	19GAP4
Z2022W2	Portable	14Z26	20UP4	Y2014C6,C7, L6,L7	Portable	14Z33	20UP4
Z2022P2	Portable	14Z26	20UP4	Y2014C8,L8	Portable	14Y33	20UP4
Z2030W2	Portable	14Z26	20UP4	Y2017H6,H7, W6,W7	Portable	14Z33	20UP4
Z2041W	Portable (SC"300")	14Z33	20UP4	Y2017H8,W8	Portable	14Y33	20UP4
Z2041W2	Portable	14Z33	20UP4	Y2022M6,M7, W6,W7	Portable	14Z26	20UP4
Z2042W2	Portable (SC"300")	14Z26	20UP4	Y2041W6	Portable (SC"300")	14Z33	20UP4
Z2213W2	Table	14Z26	22TP4	Y2041W8	Portable (SC"300")	14Y33Z	20UP4
Z2224W2	Table	14Z26	22TP4	Y2042W6	Table (SC"300")	14Z26	20UP4
S2698C6	Hotel-Motel (Portable)	14Z34	20UP4	Y2060L6,L7, X6,X7	Portable	1Y22B55	20UP4
S2698C8	Hotel-Motel (Portable)	14Y34	20UP4	Y2063W6,W7	Portable	1Y22B55	20UP4
S2700L6	Hospital (Table)	14Z27	20UP4	Y2213W6,W7	Table	14Z26	22TP4
T2625W6	Portable	14Z21	17EQP4	Y2224W6	Table	14Z26	22TP4
T2625W8	Portable	14Y21	17EQP4				

AGC ADJUSTMENT

Tune in a strong TV signal and slowly turn the AGC control until a point is reached where the picture distorts and buzz is heard in the sound. The control should then be backed down from this position and set at a point comfortably below the level of intercarrier buzz, picture distortion and improper sync. This setting corresponds in general to 3.5 volts peak-to-peak at the Video Detector stage in the 13Y16, 13Y16Z, 14Y26, 14Y27, 14Z26 and 14Z27 chassis and 2.5 volts peak-to-peak in all the others.

CAUTION: Misadjustment of the AGC control can result in a washed-out picture, distorted picture, buzz in the sound or complete loss of picture and sound.

HORIZONTAL HOLD CONTROL

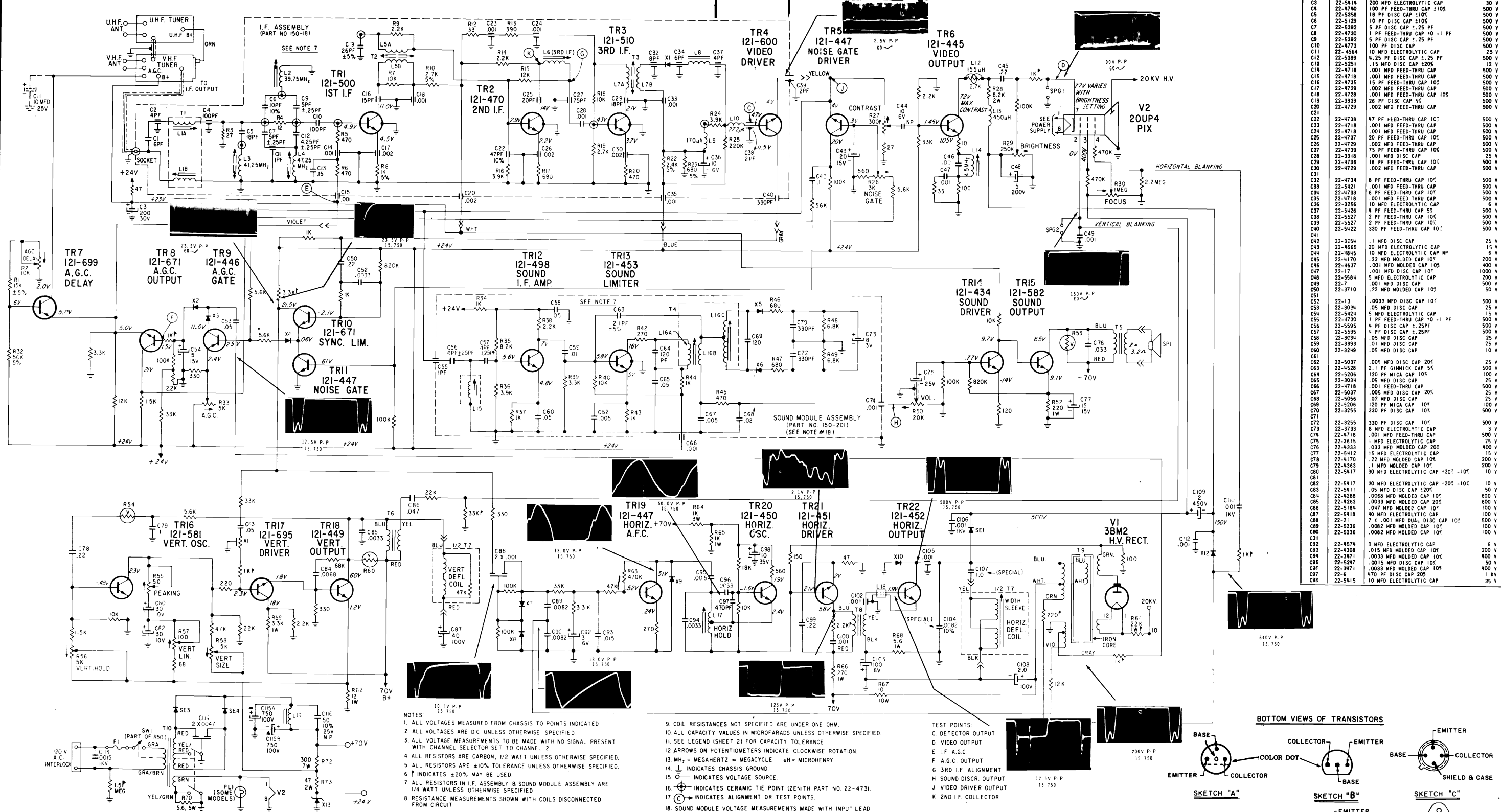
The horizontal hold control is equipped with a stop which limits knob rotation to approximately 270 degrees. To adjust the AFC, remove the knob and turn the shaft to a position where it is virtually impossible to disrupt horizontal synchronization when switching from channel to channel.

CENTERING ADJUSTMENT

The centering assembly is built into the yoke housing. This assembly is made of two magnetic rings which can be rotated by means of tabs. Centering is accomplished by gradually rotating each tab separately and/or rotating both tabs simultaneously until the picture is centered.

ZENITH Chassis 1Y22B55 Schematic Diagram (Continued)

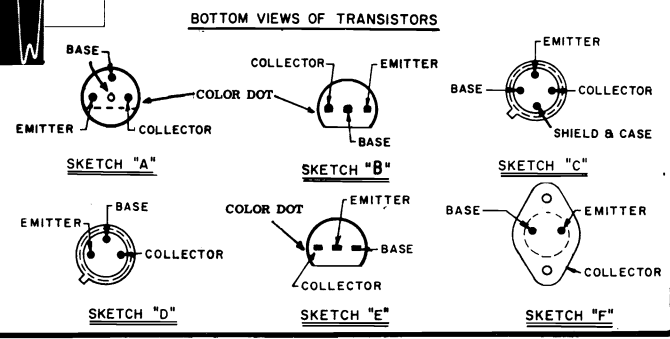
ZENITH Chassis 1Y22B55 Schematic Diagram



ITEM	PART NO.	DESCRIPTION	QTY
C1	22-2381	6 PF DISC CAP	500 V
C2	22-4732	4 PF FEED-THRU CAP -5%	500 V
C3	22-5414	200 MFD ELECTROLYTIC CAP	30 V
C4	22-4740	100 PF FEED-THRU CAP -10%	500 V
C5	22-5358	18 PF DISC CAP -10%	500 V
C6	22-5129	10 PF DISC CAP -10%	500 V
C7	22-5382	5 PF DISC CAP -1.25 PF	500 V
C8	22-4730	1 PF FEED-THRU CAP -10 -1 PF	500 V
C9	22-5392	5 PF DISC CAP -1.25 PF	500 V
C10	22-4773	100 PF DISC CAP	500 V
C11	22-4564	10 MFD ELECTROLYTIC CAP	500 V
C12	22-5389	1.25 PF DISC CAP -1.25 PF	500 V
C13	22-5251	15 MFD DISC CAP -20%	12 V
C14	22-4718	100 MFD FEED-THRU CAP	500 V
C15	22-4718	100 MFD FEED-THRU CAP	500 V
C16	22-4735	15 PF FEED-THRU CAP 10%	500 V
C17	22-4729	100 MFD FEED-THRU CAP	500 V
C18	22-4728	100 MFD FEED-THRU CAP 10%	500 V
C19	22-3939	26 PF DISC CAP 5%	500 V
C20	22-4729	100 MFD FEED-THRU CAP	500 V
C21	22-4738	47 PF FEED-THRU CAP 10%	500 V
C22	22-4718	100 MFD FEED-THRU CAP	500 V
C23	22-4718	100 MFD FEED-THRU CAP	500 V
C24	22-4718	100 MFD FEED-THRU CAP	500 V
C25	22-4737	20 PF FEED-THRU CAP 10%	500 V
C26	22-4729	100 MFD FEED-THRU CAP	500 V
C27	22-4739	75 PF FEED-THRU CAP 10%	500 V
C28	22-3318	100 MFD DISC CAP 10%	25 V
C29	22-4736	18 PF FEED-THRU CAP 10%	500 V
C30	22-4729	100 MFD FEED-THRU CAP	500 V
C31	22-4734	8 PF FEED-THRU CAP 10%	500 V
C32	22-5421	100 MFD FEED-THRU CAP	500 V
C33	22-4733	6 PF FEED-THRU CAP 10%	500 V
C34	22-4718	100 MFD FEED-THRU CAP	500 V
C35	22-3256	10 MFD ELECTROLYTIC CAP	6 V
C36	22-5426	4 PF FEED-THRU CAP 5%	500 V
C37	22-5527	2 PF FEED-THRU CAP 10%	500 V
C38	22-5527	2 PF FEED-THRU CAP 10%	500 V
C39	22-5527	2 PF FEED-THRU CAP 10%	500 V
C40	22-5422	330 PF FEED-THRU CAP 10%	500 V
C41	22-3254	1 MFD DISC CAP	25 V
C42	22-4565	20 MFD ELECTROLYTIC CAP	15 V
C43	22-4845	10 MFD ELECTROLYTIC CAP MP	6 V
C44	22-4170	1.22 MFD MOLDED CAP 10%	500 V
C45	22-4637	100 MFD MOLDED CAP 10%	400 V
C46	22-17	5 MFD DISC CAP 10%	1000 V
C47	22-5584	5 MFD ELECTROLYTIC CAP	200 V
C48	22-4733	100 MFD DISC CAP	500 V
C49	22-3710	100 MFD DISC CAP 10%	50 V
C50	22-3710	100 MFD DISC CAP 10%	50 V
C51	22-13	.0033 MFD DISC CAP 10%	500 V
C52	22-3034	.05 MFD DISC CAP	25 V
C53	22-5424	5 MFD ELECTROLYTIC CAP	15 V
C54	22-4730	1 PF FEED-THRU CAP -10 -1 PF	500 V
C55	22-5595	1 PF DISC CAP -1.25 PF	500 V
C56	22-5595	1 PF DISC CAP -1.25 PF	500 V
C57	22-3034	.05 MFD DISC CAP	25 V
C58	22-3939	.01 MFD DISC CAP	25 V
C59	22-3249	.05 MFD DISC CAP	10 V
C60	22-5037	.005 MFD DISC CAP 20%	25 V
C61	22-4528	2.1 PF GIMMICK CAP 5%	500 V
C62	22-5206	120 PF MICA CAP 10%	100 V
C63	22-3034	.05 MFD DISC CAP	25 V
C64	22-4718	.001 FEED-THRU CAP	500 V
C65	22-5037	.005 MFD DISC CAP 20%	25 V
C66	22-5056	.02 MFD DISC CAP	25 V
C67	22-5206	120 PF MICA CAP 10%	100 V
C68	22-3255	330 PF DISC CAP 10%	500 V
C69	22-3255	330 PF DISC CAP 10%	500 V
C70	22-3733	8 MFD ELECTROLYTIC CAP	3 V
C71	22-4718	.001 MFD FEED-THRU CAP	500 V
C72	22-3615	1 MFD ELECTROLYTIC CAP	25 V
C73	22-4533	.033 MFD MOLDED CAP 20%	400 V
C74	22-5412	15 MFD ELECTROLYTIC CAP	15 V
C75	22-4170	.22 MFD MOLDED CAP 10%	200 V
C76	22-4533	1 MFD MOLDED CAP 10%	200 V
C77	22-5417	30 MFD ELECTROLYTIC CAP +20% -10%	10 V
C78	22-5417	30 MFD ELECTROLYTIC CAP +20% -10%	10 V
C79	22-5417	30 MFD ELECTROLYTIC CAP +20% -10%	10 V
C80	22-5417	30 MFD ELECTROLYTIC CAP +20% -10%	10 V
C81	22-5417	30 MFD ELECTROLYTIC CAP +20% -10%	10 V
C82	22-5411	.05 MFD DISC CAP -20%	50 V
C83	22-4288	.0068 MFD MOLDED CAP 10%	600 V
C84	22-4283	.0033 MFD MOLDED CAP 20%	600 V
C85	22-5184	.047 MFD MOLDED CAP 10%	100 V
C86	22-5418	40 MFD ELECTROLYTIC CAP	400 V
C87	22-21	7.5 PF DISC CAP 10%	500 V
C88	22-5236	.0082 MFD MOLDED CAP 10%	100 V
C89	22-5236	.0082 MFD MOLDED CAP 10%	100 V
C90	22-5236	.0082 MFD MOLDED CAP 10%	100 V
C91	22-5474	3 MFD ELECTROLYTIC CAP	6 V
C92	22-4308	.015 MFD MOLDED CAP 10%	200 V
C93	22-3471	.0033 MFD MOLDED CAP 10%	400 V
C94	22-5247	.0015 MFD DISC CAP 10%	50 V
C95	22-3471	.0033 MFD MOLDED CAP 10%	400 V
C96	22-6	470 PF DISC CAP 20%	1 KV
C97	22-5415	10 MFD ELECTROLYTIC CAP	35 V

Schematic Diagram of 1Y22B55 chassis.

Schematic Diagram of 1Y22B55 chassis



- NOTES:
- ALL VOLTAGES MEASURED FROM CHASSIS TO POINTS INDICATED
 - ALL VOLTAGES ARE DC UNLESS OTHERWISE SPECIFIED.
 - ALL VOLTAGE MEASUREMENTS TO BE MADE WITH NO SIGNAL PRESENT WITH CHANNEL SELECTOR SET TO CHANNEL 2.
 - ALL VOLTAGE MEASUREMENTS TO BE MADE WITH CHANNEL SELECTOR SET TO CHANNEL 2.
 - ALL RESISTORS ARE CARBON, 1/2 WATT UNLESS OTHERWISE SPECIFIED.
 - ALL RESISTORS ARE .410% TOLERANCE UNLESS OTHERWISE SPECIFIED.
 - INDICATES 20% MAY BE USED.
 - ALL RESISTORS IN I.F. ASSEMBLY & SOUND MODULE ASSEMBLY ARE 1/4 WATT UNLESS OTHERWISE SPECIFIED.
 - RESISTANCE MEASUREMENTS SHOWN WITH COILS DISCONNECTED FROM CIRCUIT.
 - COIL RESISTANCES NOT SPECIFIED ARE UNDER ONE OHM.
 - ALL CAPACITY VALUES IN MICROFARADS UNLESS OTHERWISE SPECIFIED.
 - SEE LEGEND (SHEET 2) FOR CAPACITY TOLERANCE.
 - ARROWS ON POTENTIOMETERS INDICATE CLOCKWISE ROTATION.
 - MHz = MEGAHERTZ = MEGACYCLE μH = MICROHENRY
 - INDICATES CHASSIS GROUND.
 - INDICATES VOLTAGE SOURCE.
 - INDICATES CERAMIC TIE POINT (ZENITH PART NO. 22-4731).
 - INDICATES ALIGNMENT OR TEST POINTS.
 - SOUND MODULE VOLTAGE MEASUREMENTS MADE WITH INPUT LEAD DISCONNECTED.

- TEST POINTS
- DETECTOR OUTPUT
 - VIDEO OUTPUT
 - I.F. A.G.C.
 - A.G.C. OUTPUT
 - 3RD I.F. ALIGNMENT
 - SOUND DISCR. OUTPUT
 - VIDEO DRIVER OUTPUT
 - 2ND I.F. COLLECTOR

ALIGNMENT

SOUND ALIGNMENT 14Z21

Alignment of the 4.5 MHz intercarrier sound channel, employing the Locked Oscillator Sound Detector, requires the reduction of the signal to the receiver antenna terminals. Various methods may be used to reduce the signal level, however, a step attenuator is recommended for best results. Proceed as follows:

1. Connect the step attenuator between the antenna and the receiver antenna terminals.
2. With no attenuation, using a strong TV signal; adjust the quadrature coil for best quality sound.
3. Now adjust the sound take-off coil (top and bottom cores), for minimum 4.5 MHz on the screen. NOTE: Be sure the fine tuning is adjusted so the 4.5 MHz can be easily seen on the screen.
4. Reduce the signal to the receiver by adding some attenuation. Now adjust the intercarrier coil (top and bottom cores) for maximum sound with minimum background hiss.
5. Remove all attenuation from the signal. With a strong signal, adjust the quadrature coil for best quality sound (strongest and least distorted).

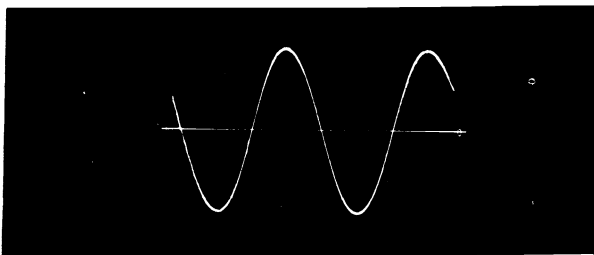
SOUND ALIGNMENT - 1Y22B55 ONLY

METHOD 1 Using a 4.5 MHz FM Signal Generator and an Oscilloscope with a DC input:

Connect the generator (FM modulated at dev. +20 KHz and 400 HZ tone) to the input terminal on the sound discriminator module.

Connect the scope to the output terminal of the module.

Using a strong signal input (approximately 100 Mv) adjust the secondary coil of the ratio detector (top core of T4) for maximum output and symmetry above and below the zero line on the scope. (See Fig. below) Reduce the input signal and adjust the primary coil of the ratio detector transformer (bottom core of T4) for maximum output.



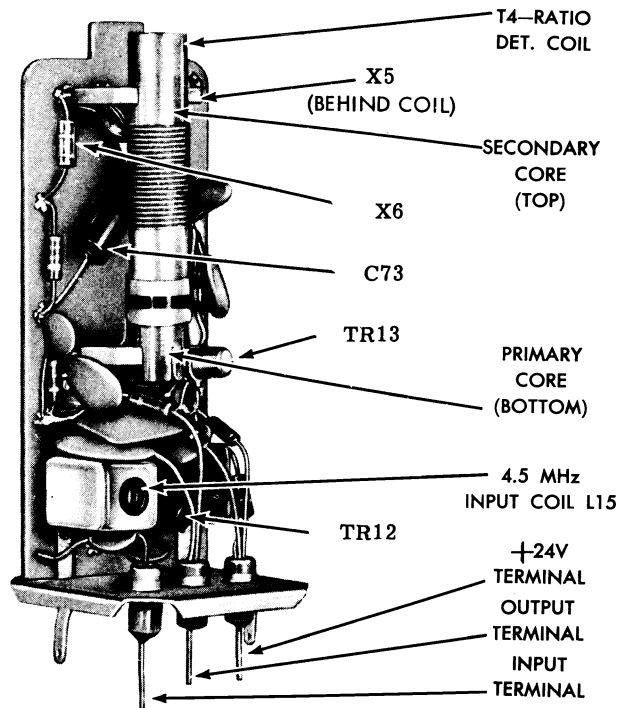
Output Waveform of Sound Discriminator Module.

Adjust the 4.5 MHz input coil, L15, for maximum output (initially there may be a loss in output as the coil is tuned.)

METHOD 2. USING A STRONG AIR SIGNAL:

Using a strong station tune the secondary core of the ratio detector T4 for best sound. Reduce signal until the sound becomes noisy then tune the input coil, L15, and the primary of T4 for best reception.

As the sound improves continue to reduce the signal and adjust the coils until no improvement in sound can be obtained.



Inside View of Sound Discriminator Module Showing Principal Components and Alignment Points.

SOUND ALIGNMENT - ALL OTHER CHASSIS

Proper alignment of the 4.5 MHz intercarrier sound channel can only be made if the signal to the receiver antenna terminals is reduced to a level below the limiting point of the Gated Beam Sound Detector. This level can be easily identified by the "hiss" that accompanies the sound. Various methods may be used to reduce the signal level, however, a step attenuator is recommended for most satisfactory results. Alignment is made as follows:

1. Connect the step attenuator between the antenna and the receiver antenna terminals.
2. Tune in a TV signal. Adjust the sound take-off coil (top and bottom cores), for minimum 4.5 MHz interference in the picture.
3. Adjust the step attenuator until the signal is attenuated to a level where a "hiss is heard with the audio".

ZENITH Alignment Information, Continued

4. Adjust the intercarrier transformer, quadrature coil and buzz control for the best quality sound and minimum buzz. It must be remembered, that any of these adjustments may cause the "hiss" to disappear and further reduction of the signal will be necessary to prevent the "hiss" from disappearing during alignment.

IF ALIGNMENT

A suitable VHF and UHF sweep generator in conjunction with an accurate marker must be used for IF and tuner

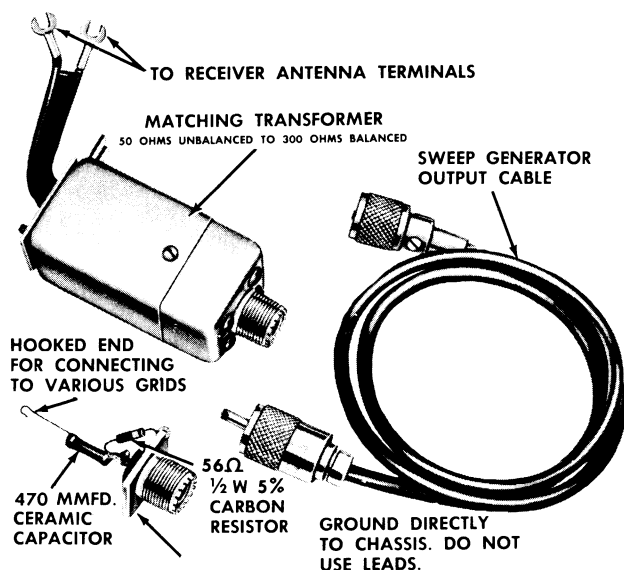


Fig. 1 Alignment Fixtures for RF-IF Alignment.

alignment work. It is extremely important to terminate the output cable properly and to check for a reactive attenuator. If the attenuator is reactive or if the output cable is improperly terminated, correct alignment cannot be made since the degree of attenuation may change the shape as well as the amplitude of the response curve. The attenuator should only vary the amplitude and not the shape of the response curve.

IF ALIGNMENT

14N22, 14Y26, 14Y27, 14Z26 and 14Z27 CHASSIS

Refer to the appropriate schematic diagram, tube and trimmer layout, and tuner drawings for reference test points.

1. On the 500 series tuners; turn the channel selector until it rests between any two channels.

On all other tuners; turn the selector until it rests on channel 13 or other unused high channel.

2. Connect an oscilloscope through a 10,000 ohm isolation resistor to terminal "C" (detector). Connect the ground lead to chassis. In the 14N22 chassis, set the Peak Pix control fully to the left.

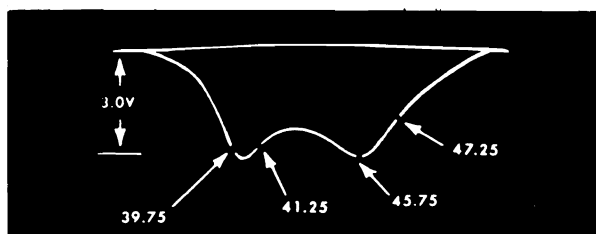


Fig. 2. 4th IF Response

3. Feed the sweep generator through a special terminating network as shown in Fig. 1. to Point "G" (Grid of the 3rd IF). Adjust generator to obtain a response similar to Fig. 2. with a detector output of 3 volts peak to peak. Do not exceed this level during any of the adjustments.

4. Set the marker generator to 45.75 MHz and alternately adjust the top and bottom cores of the 4th IF for maximum gain and symmetry with the 45.75 MHz marker positioned as shown in Fig. 2. The two peaks must be equal in height and the high frequency peak at 45.75 MHz. If the correct response cannot be obtained, check the position of the cores to see that they are not butted. The cores should be entering their respective windings from the opposite ends of the coils.

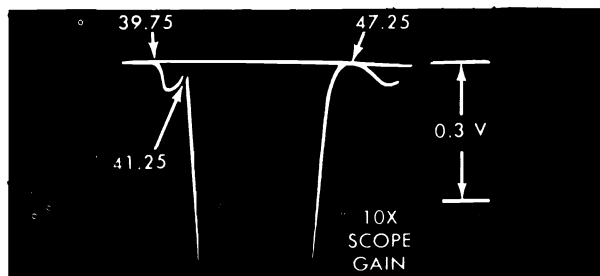


Fig. 3. Expanded View of Traps

5. Connect the sweep generator to terminal "A" (converter grid). Connect terminal "F" to chassis and connect a jumper between terminal "E" and chassis. Adjust the sweep to obtain a 3V. P.P. response similar to Fig. 5. Switch oscilloscope to 10X gain to "blow up" the traps (Fig 3).

6. Refer to Fig.3. and adjust the 39.75 MHz and the 41.25 MHz traps for minimum marker amplitude. Connect jumper between "E" and the junction of the 68 ohm and 1800 ohm resistors in the cathode circuit of the 1st I.F. This provides an additional "blow up" of the 47.25 MHz traps (Fig. 4). Adjust the 47.25 MHz trap for minimum marker amplitude.

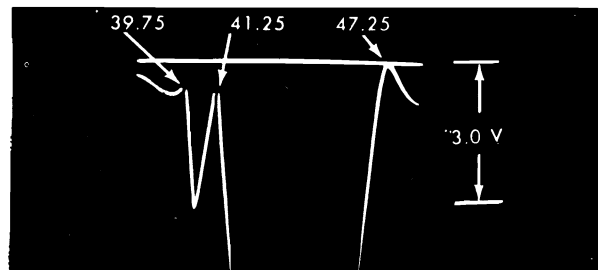


Fig. 4. Further Expansion of Fig. 3. for Detail View of the 39.75 and 47.25 MHz Traps.

ZENITH Alignment Information, Continued

7. Disconnect jumper between "E" and the 68 ohm and 1800 ohm cathode resistors. Connect this jumper between "E" and chassis. Adjust sweep generator for 3 volts peak to peak output at the second detector. Alternately, adjust the 2nd, 3rd, 1st IF and the converter plate coil until an overall response similar to Fig. 5. is obtained. It will be found that the 2nd IF affects the low side (42.75MH) and the 3rd IF, the high side of the response curve.

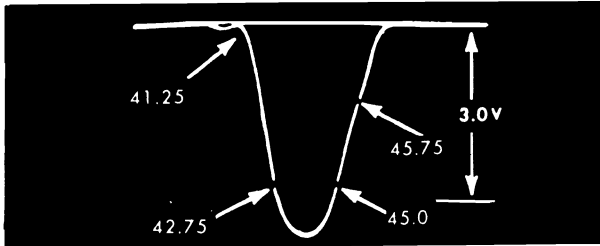


Fig. 5 Overall IF Response Curve.

IF ALIGNMENT

14Y33, 14Z21, 14Z33 AND 14Z43 CHASSIS:

Refer to the appropriate schematic diagram, chassis tube and trimmer layout, and tuner drawings for reference test points.

1. Slowly turn the channel selector until the tuner rotor is made to rest between two channels. This will prevent an erroneous response.
2. Connect an oscilloscope through a 10,000 ohm isolation resistor to terminal "C" (detector). Connect the ground lead to chassis.
3. Feed the sweep generator through a special terminating network as shown in Fig. 1. to Point "G" (Pin 1 of the 3rd IF). Adjust generator to obtain a response similar to Fig. 6. Do not exceed the 3 volt peak to peak detector output during any of the following adjustments.

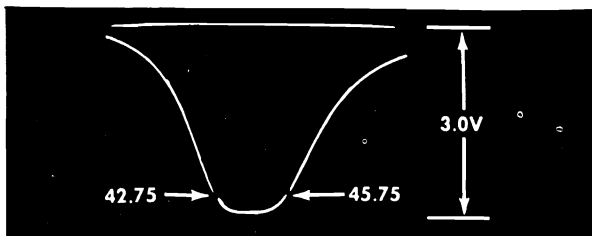


Fig. 6 4th IF Response Curve.

4. Set the marker generator to 45.75MH and alternately adjust the top and bottom cores of the 4th IF for maximum gain and symmetry with the 45.75 MH and the 42.75 Mc markers positioned as shown in Fig. 6. If the correct response cannot be obtained, check the cores to see that they are not butted but are entering their respective windings from the opposite ends of the coil.

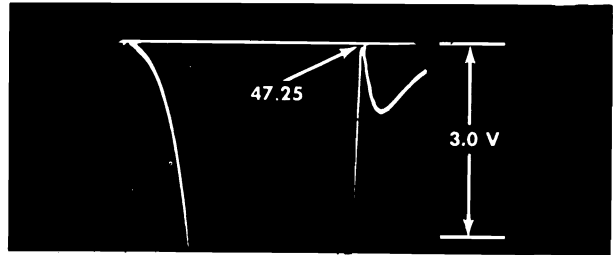


Fig. 7 Expanded View of the 47.25 MHz Trap Frequency.

5. Connect the sweep generator to terminal "A" converter grid (Refer to appropriate tuner tube and trimmer layout). Connect terminal "F" to chassis and connect a jumper between terminal "E" and the bottom end of the 68 ohm resistor in the cathode of the first IF. This provides a "blow up" of the 47.25 MH trap (Fig. 7). Adjust the 47.25 MH trap for minimum marker amplitude.

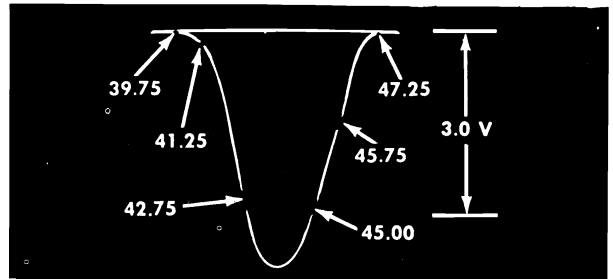
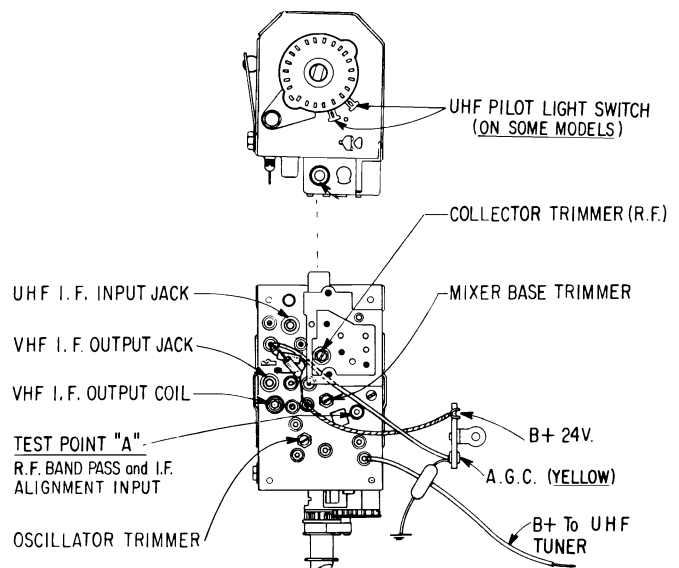


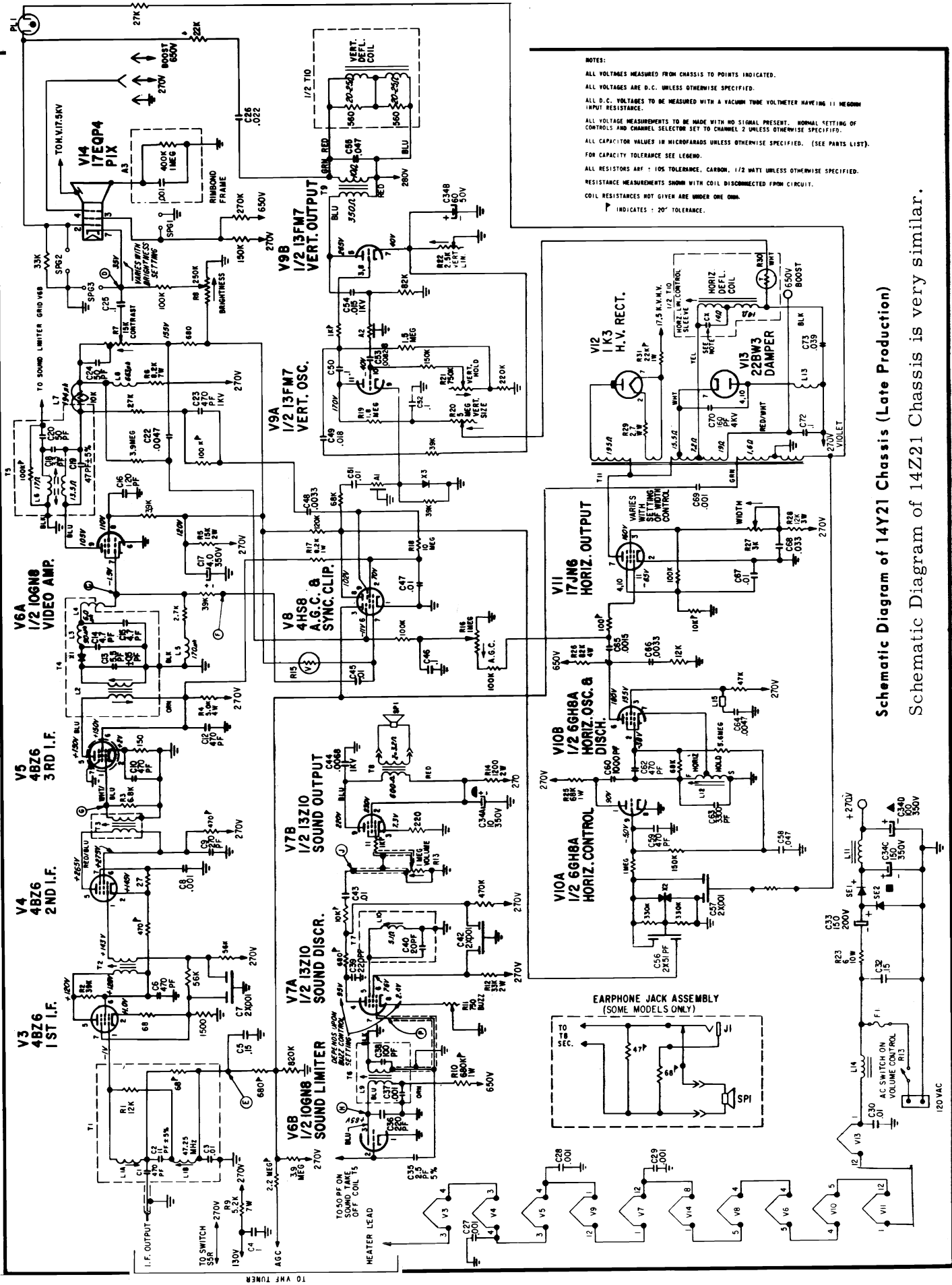
Fig. 8 Overall IF Response Curve.

6. Disconnect the jumper between "E" and the bottom end of the 68 ohm cathode resistor. Connect this jumper between "E" and the chassis. Adjust sweep generator for 3 volts peak to peak output at the second detector. Alternately, adjust the 2nd, 3rd, 1st IF and the converter plate coil until an overall response similar to Fig. 8. is obtained. It will be found that the 2nd IF affects the low side (42.75 MH) and the 3rd IF the high side of the response. Remove jumpers after alignment is completed.



Top View of VHF Tuner Nos. 1009 and 1010

Schematic Diagram of 14Y21 Chassis (Late Production)

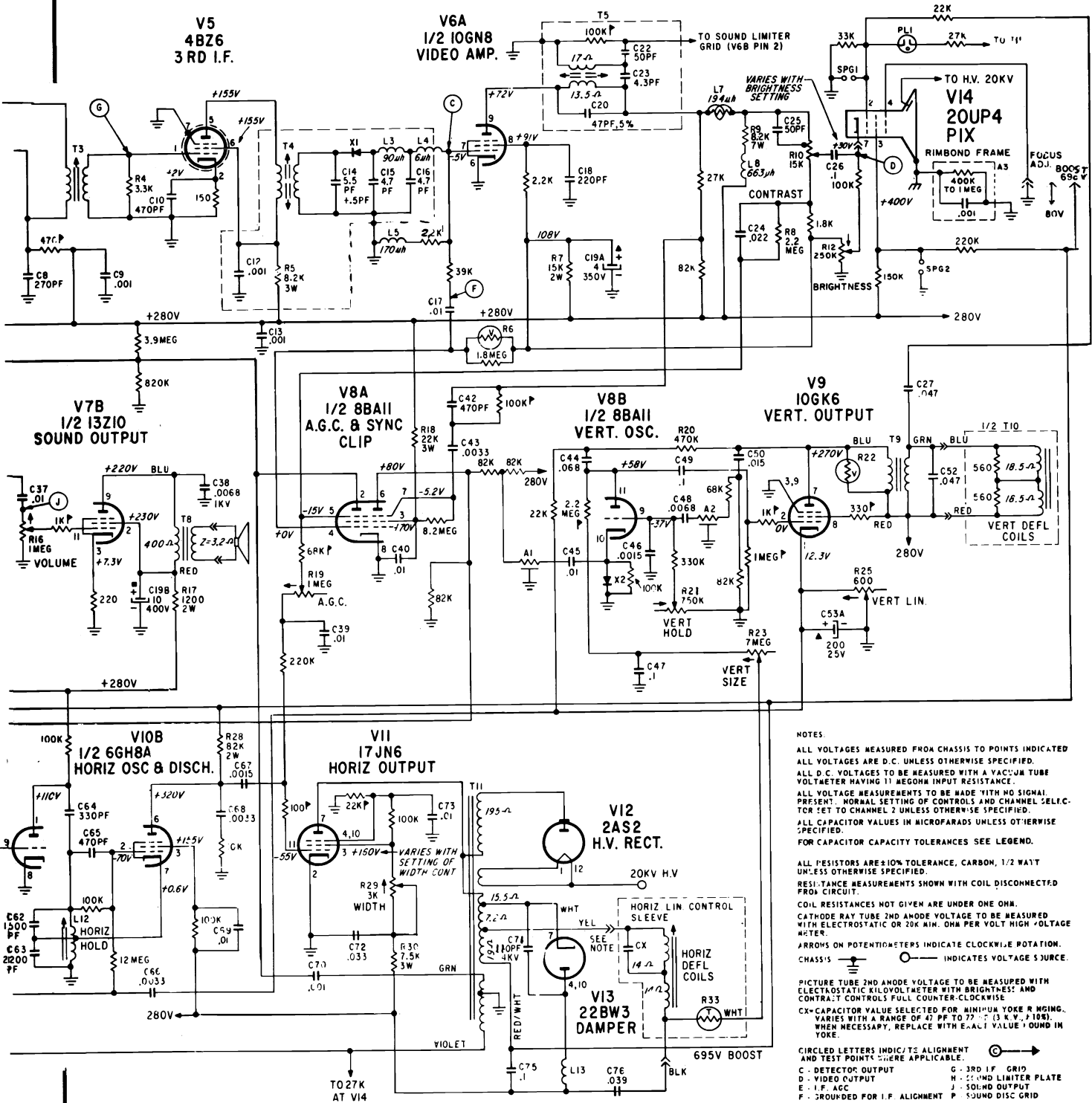


NOTES:
 ALL VOLTAGES MEASURED FROM CHASSIS TO POINTS INDICATED.
 ALL VOLTAGES ARE D.C. UNLESS OTHERWISE SPECIFIED.
 ALL D.C. VOLTAGES TO BE MEASURED WITH A VACUUM TUBE VOLTMETER HAVING 11 MEGOHM INPUT RESISTANCE.
 ALL VOLTAGE MEASUREMENTS TO BE MADE WITH NO SIGNAL PRESENT. NORMAL SETTING OF CONTROLS AND CHANNEL SELECTOR SET TO CHANNEL 2 UNLESS OTHERWISE SPECIFIED.
 ALL CAPACITORS VALUED IN MICROFARADS UNLESS OTHERWISE SPECIFIED. (SEE PARTS LIST).
 FOR CAPACITY TOLERANCE SEE LEGEND.
 ALL RESISTORS ARE: 10% TOLERANCE, CARBON, 1/2 WATT UNLESS OTHERWISE SPECIFIED.
 RESISTANCE MEASUREMENTS SHOWN WITH COIL DISCONNECTED FROM CIRCUIT.
 COIL RESISTANCES NOT GIVEN ARE UNDER ONE OHM.
 ▽ INDICATES: 20% TOLERANCE.

Schematic Diagram of 14Z21 Chassis (Late Production)

Schematic Diagram of 14Z21 Chassis is very similar.

ZENITH Chassis 14Y33, Z, 14Y34, Schematic Diagram, Continued



NOTES

ALL VOLTAGES MEASURED FROM CHASSIS TO POINTS INDICATED
 ALL VOLTAGES ARE D.C. UNLESS OTHERWISE SPECIFIED.
 ALL D.C. VOLTAGES TO BE MEASURED WITH A VACUUM TUBE
 VOLTMETER HAVING 11 MEGOHM INPUT RESISTANCE.
 ALL VOLTAGE MEASUREMENTS TO BE MADE WITH NO SIGNAL.
 PRESENT NORMAL SETTING OF CONTROLS AND CHANNEL SELECTOR
 SET TO CHANNEL 2 UNLESS OTHERWISE SPECIFIED.
 ALL CAPACITOR VALUES IN MICROFARADS UNLESS OTHERWISE
 SPECIFIED.
 FOR CAPACITOR CAPACITY TOLERANCES SEE LEGEND.

ALL RESISTORS ARE ±10% TOLERANCE, CARBON, 1/2 WATT
 UNLESS OTHERWISE SPECIFIED.
 RESISTANCE MEASUREMENTS SHOWN WITH COIL DISCONNECTED
 FROM CIRCUIT.
 COIL RESISTANCES NOT GIVEN ARE UNDER ONE OHM.
 CATHODE RAY TUBE 2ND ANODE VOLTAGE TO BE MEASURED
 WITH ELECTROSTATIC OR 20K MIN. OHM PER VOLT HIGH VOLTAGE
 METER.
 ARROWS ON POTENTIOMETERS INDICATE CLOCKWISE ROTATION.
 CHASSIS ——— INDICATES VOLTAGE SOURCE.
 ○ INDICATES POINTS TO BE MEASURED WITH ELECTROSTATIC
 KILOVOLTMETER WITH BRIGHTNESS AND CONTRAST CONTROLS FULL COUNTER-CLOCKWISE.
 CX—CAPACITOR VALUE SELECTED FOR MINIMUM YOKE RESONANCE.
 VARIES WITH A RANGE OF 47 PF TO 77 PF (3 K.V., J 108).
 WHEN NECESSARY, REPLACE WITH EXACT VALUE FOUND IN
 YOKE.

CIRCLED LETTERS INDICATE ALIGNMENT
 AND TEST POINTS WHERE APPLICABLE. Ⓢ →

C - DETECTOR OUTPUT G - 3RD I.F. GRID
 D - VIDEO OUTPUT H - SOUND LIMITER PLATE
 E - I.F. A.G.C. J - SOUND OUTPUT
 F - CIRCLED FOR I.F. ALIGNMENT P - SOUND DISC GRID

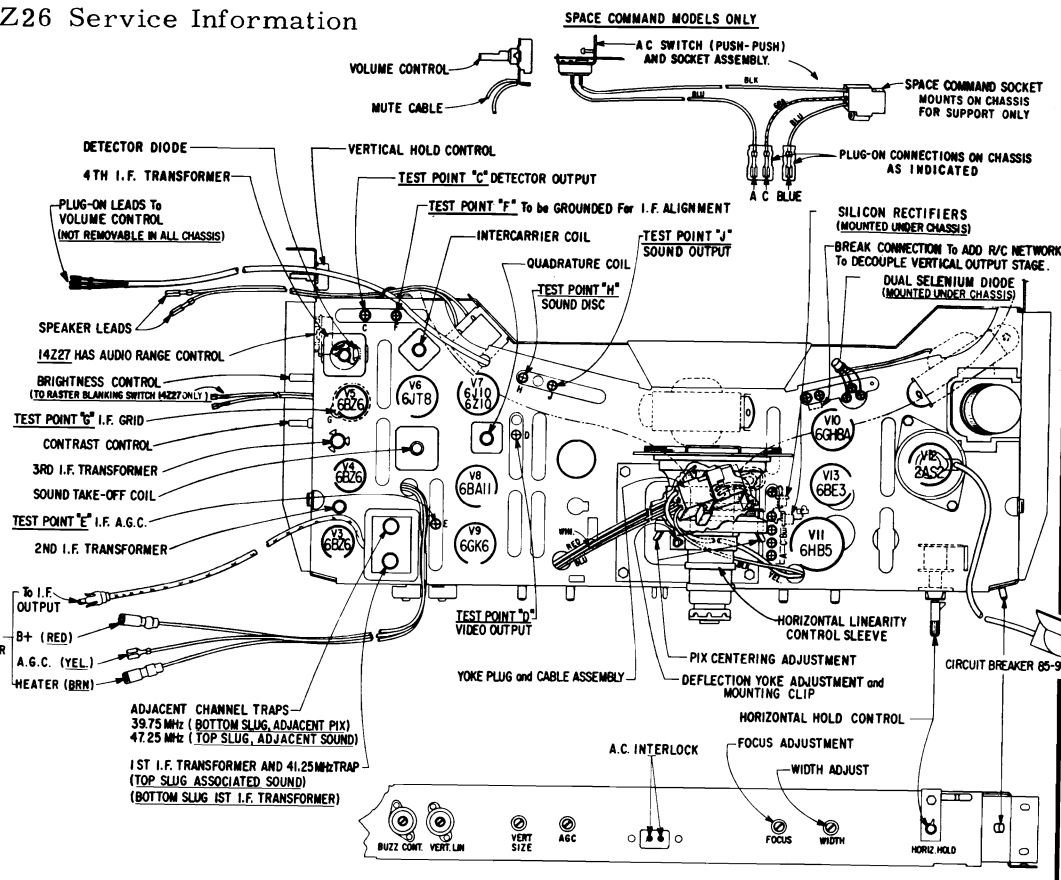
Ⓢ INDICATES ±20% TOLERANCE.
 * SEE LEGEND
 Ⓢ INDICATES INSULATED BRACKET AND GROUND PLANE
 (FOR MONOPOLE ANTENNA)

Schematic Diagram of 14Y33 (Late Production), 14Y33Z and 14Y34

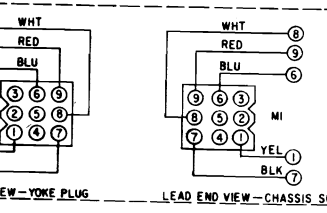
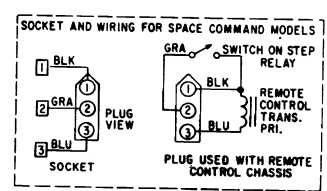
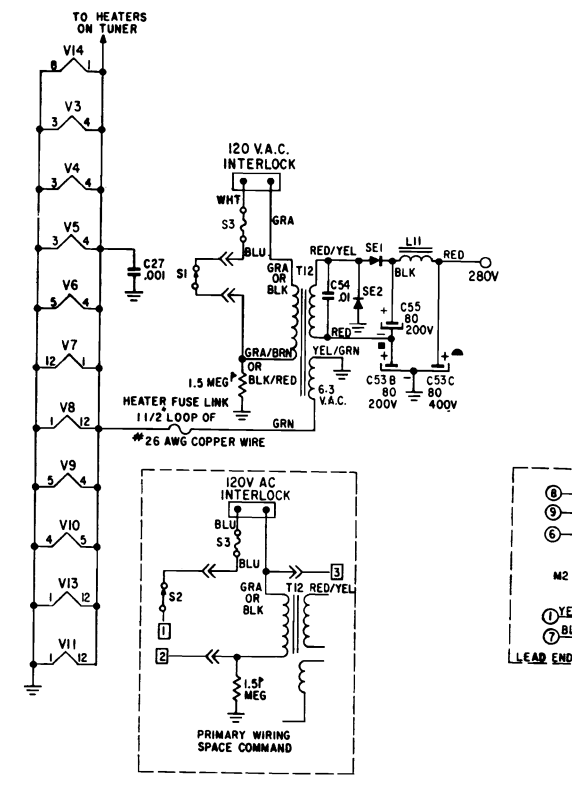
C75	22-3577	.1 MFD MOLDED ±20%	600 V	R12	63-6489	250K OHMS BRIGHTNESS CONTROL	1 W	R28	63-5750	82K OHMS	2 W
C76	22-4342	.039 MFD MOLDED ±10%	500 V	R13	63-6188	680K OHMS	1 W	R29	63-5031	3K OHMS WIDTH CONTROL	2 W
C77	22-7	.001 MFD DISC	500 V	R14	63-6487	750 OHMS BUZZ CONTROL	2 W	R30	63-4904	7.5K OHMS	3 W
C78	22-7	.001 MFD DISC	500 V	R15	63-5733	33K OHMS	2 W	R32	63-6125	22K OHMS	1 W
C79	22-5364	.001 MFD DISC	500 V	R16	63-6349	1 MEGOHM VOLUME CONTROL & A.C. SWITCH	2 W	R33	63-5187	THERMAL RESISTOR SUPPLIED WITH YOKE	1 W
C80	22-7	.001 MFD DISC	500 V	R17	63-5441	1200 OHMS	2 W	T2	20-857	2ND I.F. TRANSFORMER	
R1	63-4754	5.2K OHM RESISTOR	7 W	R18	63-5025	22K OHMS	3 W	T3	20-858	3RD I.F. TRANSFORMER	
R2	63-2847	18K OHMS A.B. ONLY	1/2 W	R19	63-4833	17 MEGOHM A.G.C.	1/2 W	T4	20-859	4TH I.F. TRANSFORMER	
R3	63-3992	68K OHMS A.B. ONLY	1/2 W	R20	63-4084	470K OHM RESISTOR A.B. ONLY	1/2 W	T5	S-74446	SOUND TAKE OFF COIL ASSEM.	
R4	64-5384	3.3K OHMS A.B. ONLY	1/2 W	R21	63-7185	750K OHM VERT. HOLD CONTROL	1/2 W	T6	S-72218	INTERCARRIER COIL	
R5	63-4098	8.2K OHMS	3 W	R22	63-4445	VARIABLE RESISTOR	10 W	T7	S-75409	QUADRATURE COIL	
R6	63-5494	VOLTAGE DEPENDENT RESISTOR	2 W	R23	63-6433	7 MEGOHMS VERT. SIZE CONTROL	1/2 W	T8	95-2396	AUDIO OUTPUT TRANSFORMER	
R7	63-5719	15K OHM	2 W	R25	63-6488	600 OHMS VERT. LINEARITY CONTROL	10 W				
R8	63-5158	2.2 MEGOHMS A.B. ONLY	1/2 W	R26	63-4450	6 OHMS	1/2 W				
R9	63-6805	8.2K OHMS	7 W	R27	63-5315	120K OHMS I.R.C. ONLY	1/2 W				
R10	63-6491	14K OHM CONTRAST CONTROL	7 W								

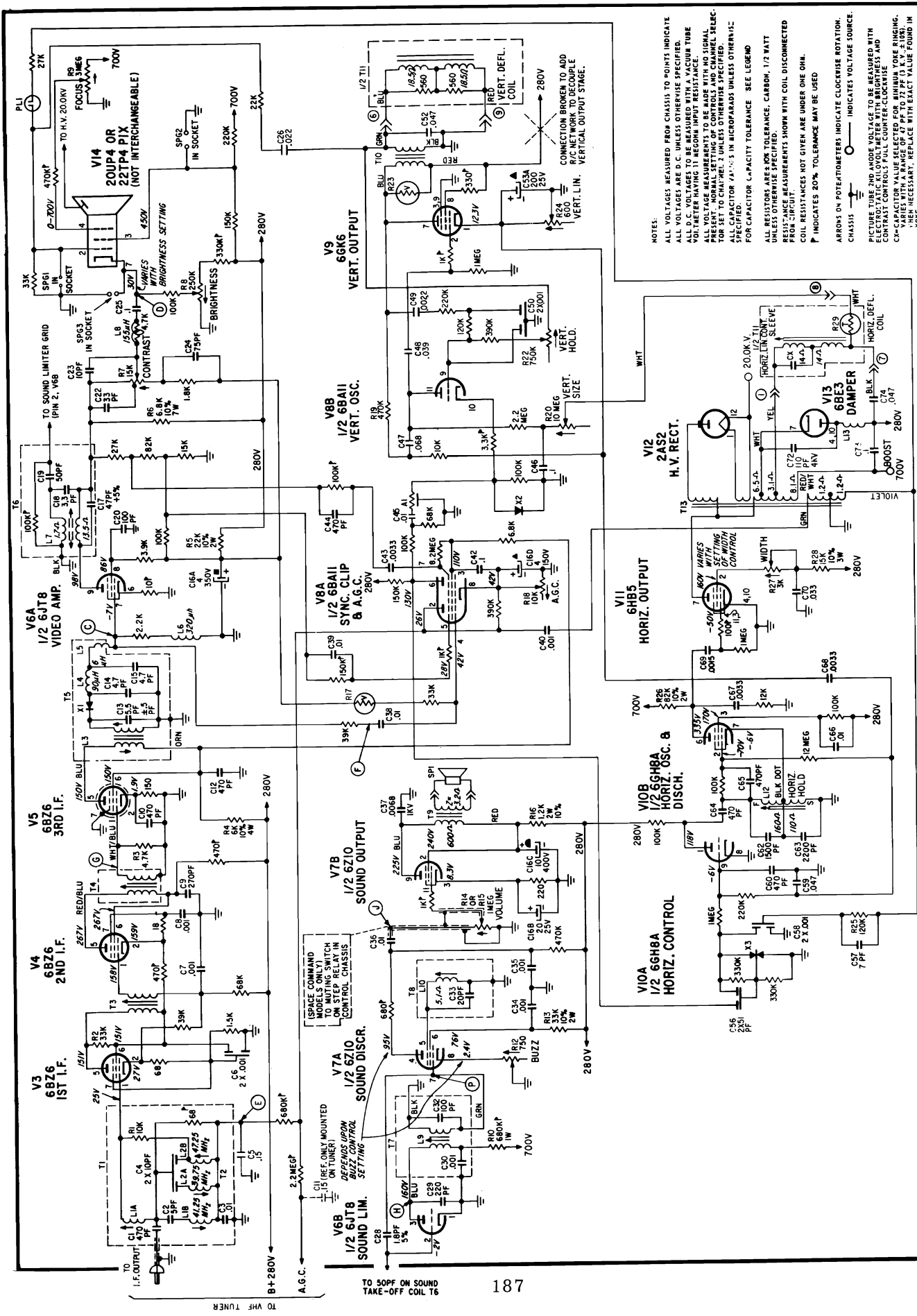
ZENITH Chassis 14Z26 Service Information

ITEM NO.	PART NUMBER	DESCRIPTION	QTY
C1	22-3217	.470 PF DISC CAP :100	500 Y
C2	22-3282	5 PF DISC CAP 1.25 PF	500 Y
C3	22-4817	.01 MFD DISC CAP	500 Y
C4	22-3940	2 X .01 PF MFD CAP :55	500 Y
C5	22-4107	.15 MFD MOLDED CAP :200	100 Y
C6	22-11	2 X .01 MFD DISC CAP :1105	500 Y
C7	22-17	.001 MFD DISC CAP :1105	1000 Y
C8	22-1	.001 MFD DISC CAP	500 Y
C9	22-3190	.270 PF DISC CAP :1105	500 Y
C10	22-14	.470 PF DISC CAP :1105	500 Y
C11	22-14	.15 MFD MOLDED CAP (REF. ONLY)	100 Y
C12	22-3363	.470 PF DISC CAP :1105	500 Y
C13	22-2221	5.5 PF CAP 1.5 PF	500 Y
C14	22-1516	4.7 PF GIMMICK CAP :200	500 Y
C15	22-1516	4.7 PF GIMMICK CAP :200	500 Y
C16A	22-3967	8 MFD ELECTROLYTIC CAP	350 Y
C16B	22-3967	20 MFD ELECTROLYTIC CAP	25 Y
C16C	22-3967	10 MFD ELECTROLYTIC CAP	400 Y
C17	22-2467	8 MFD ELECTROLYTIC CAP	150 Y
C18	22-3239	3.3 PF GIMMICK CAP :200	500 Y
C19	22-3515	50 PF DISC CAP :200	500 Y
C20	22-8	100 PF DISC CAP :1105	500 Y
C21	22-5165	33 PF GIMMICK CAP :1105	500 Y
C22	22-3250	10 PF DISC CAP :1105	500 Y
C23	22-5183	75 PF DISC CAP :200	500 Y
C24	22-4988	.1 MFD MOLDED CAP :200	500 Y
C25	22-4321	.027 MFD MOLDED CAP :200	400 Y
C26	22-4321	.001 MFD DISC CAP	300 Y
C27	22-4515	.1 MFD MOLDED CAP :55	500 Y
C28	22-2926	.220 PF MICA CAP :101	500 Y
C29	22-3786	.001 MFD DISC CAP :1105	1000 Y
C30	22-5106	100 PF MICA CAP :1105	500 Y
C31	22-5393	.001 MFD DISC CAP	500 Y
C32	22-7	.001 MFD DISC CAP	500 Y
C33	22-17	.001 MFD DISC CAP :1105	1000 Y
C34	22-4617	.01 MFD DISC CAP	800 Y
C35	22-4617	.01 MFD DISC CAP	800 Y
C36	22-4617	.01 MFD DISC CAP	800 Y
C37	22-5398	.0068 MFD DISC CAP :200	1000 Y
C38	22-4617	.01 MFD DISC CAP	500 Y
C39	22-4617	.01 MFD DISC CAP	500 Y
C40	22-17	.001 MFD DISC CAP :1105	1000 Y
C41	22-1147	.1 MFD MOLDED CAP :200	400 Y
C42	22-1147	.0033 MFD DISC CAP :200	1000 Y
C43	22-6	.870 PF DISC CAP :205	500 Y
C44	22-6	.870 PF DISC CAP :205	500 Y
C45	22-4617	.01 MFD DISC CAP	800 Y
C46	22-4617	.01 MFD DISC CAP	800 Y
C47	22-1138	.068 MFD MOLDED CAP :105	600 Y
C48	22-1138	.068 MFD MOLDED CAP :105	600 Y
C49	22-4617	.01 MFD DISC CAP	500 Y
C50	22-4617	.01 MFD DISC CAP	500 Y
C51	22-21	2 X .01 MFD DISC CAP :105	600 Y
C52	22-4393	.047 MFD MOLDED CAP :205	25 Y
C53	22-3863	200 MFD ELECTROLYTIC CAP	200 Y
C54	22-3863	80 MFD ELECTROLYTIC CAP	400 Y
C55	22-4617	.01 MFD DISC CAP	500 Y
C56	22-3865	30 MFD ELECTROLYTIC CAP	400 Y
C57	22-25	2 X .51 PF DISC CAP :155	500 Y
C58	22-5126	7 PF GIMMICK CAP :105	500 Y
C59	22-21	2 X .001 MFD DISC CAP :1105	500 Y
C60	22-3827	.047 MFD MOLDED CAP :205	100 Y
C61	22-4	.870 PF DISC CAP :1105	1000 Y
C62	22-3916	1500 PF POLYSTYRENE CAP :105	500 Y
C63	22-3960	.0033 MFD DISC CAP :200	500 Y
C64	22-3022	.870 PF MICA CAP :105	500 Y
C65	22-3938	.470 PF DISC CAP :205	500 Y
C66	22-4617	.01 MFD DISC CAP	500 Y
C67	22-13	.0033 MFD DISC CAP :1105	500 Y
C68	22-11	.0033 MFD DISC CAP :1105	500 Y
C69	22-12	.0015 MFD DISC CAP :1105	500 Y
C70	22-4394	.033 MFD MOLDED CAP :1105	400 Y
C71	22-2694	.110 PF :105 DISC CAP	4 V
C72	22-4271	.1 MFD MOLDED CAP :200	600 Y
C73	22-4398	.047 MFD MOLDED CAP :105	600 Y
R1	63-2894	10K OHM A.B. ONLY :105	1/2 W
R2	63-4008	33K OHM A.B. ONLY :105	1/2 W
R3	63-5026	4.7K OHM A.B. ONLY :105	1/2 W
R4	63-5979	6K OHM :105	4 W
R5	63-4808	22K OHM :105	2 W
R6	63-5338	6.8K OHM :105	7 W
R7	63-4956	15K OHM CONTRAST CONTROL	4 W
R8	63-5380	250K OHM BRIGHTNESS CONTROL	4 W
R9	63-4967	3 MEG OHM FOCUS CONTROL	1 W
R10	63-5166	680K OHM CODE	1 W
R11	63-3284	750 OHM BUZZ CONTROL	2 W
R12	63-5186	33K OHM :105	2 W
R13	63-6825	1 MEG OHM VOLUME CONTROL & SWITCH ON HIGH-SPACE COMMAND MODEL (Y2022M6)	2 W
R14	63-7542	VOLUME CONTROL & AC SWITCH (Y2030M6)	2 W
R15	63-7468	VOLUME CONTROL & AC SWITCH (Y2294M6)	2 W
R16	63-5126	VOLUME CONTROL & AC SWITCH (4450-20M)	2 W
R17	63-7186	VOLUME CONTROL ON SPACE COMMAND MODEL	2 W
R18	63-5941	1200 OHM :105	2 W
R19	63-5327	VOLTAGE DEPENDENT RESISTOR	2 W
R20	63-6332	10X OHM AGC CONTROL	1/2 W
R21	63-4984	870K OHM A.B. ONLY :105	1/2 W
R22	63-7110	10 MEG OHM VERTICAL SIZE CONTROL	1/2 W
R23	63-7185	750K OHM VERTICAL HOLD CONTROL	1/2 W
R24	63-7447	VOLTAGE DEPENDENT RESISTOR	2 W
R25	63-5312	600 OHM HORIZONTAL LINEARITY CONTROL	2 W
R26	63-5315	120K OHM I.B.C. ONLY :105	1/2 W
R27	63-6750	82K OHM :105	2 W
R28	63-5001	3K WTRH CONTROL	3 W
R29	63-4858	15K OHM :105	3 W
R30	63-5167	THERMAL RESISTOR MOUNTED IN YOKE	3 W
L1A	PART OF T1	1ST I.F. & TRAP COIL WINDING ASSEMBLY	
L1B	PART OF T1	ADJ. CHANNEL TRAP COIL WINDING ASSEMBLY	
L2A	PART OF T2	4TH I.F. WINDING ASSEMBLY	
L3	20-2013	DETECTOR SERIES PEAKING COIL	
L4	20-2004	CHORE COIL	
L5	20-2028	DETECTOR SHUNT PEAKING COIL	
L6	20-2501	SOUND TAKE-OFF COIL WINDING ASSY.	
L7	20-2501	VIDEO SERIES PEAKING COIL	
L8	PART OF T7	INTERCARRIER COIL WINDING ASSEMBLY	
L9	PART OF T7	QUADRATURE COIL WINDING ASSEMBLY	
L10	95-2185	FILTER CHOKES	
L11	5-5687A	HORIZONTAL OSCILLATOR COIL ASSEMBLY	
L12	20-2005	SPOOK COIL	
T1	5-7539A	1ST I.F. & 41.25 MHz TRAP COIL ASSEMBLY	
T2	5-72871	ADJ. CHANNEL TRAP COIL ASSEMBLY	
T3	5-74672	4TH I.F. TRANSFORMER ASSEMBLY	
T4	5-7676A	3RD I.F. TRANSFORMER ASSEMBLY	
T5	5-5682A	4TH I.F. TRANSFORMER ASSEMBLY	
T6	5-6552B	SOUND TAKE-OFF ASSEMBLY	
T7	5-67031	INTERCARRIER COIL ASSEMBLY	
T8	5-77435	QUADRATURE COIL ASSEMBLY	
T9	95-2185	AUDIO OUTPUT TRANSFORMER	
T10	95-2523	VERTICAL OUTPUT TRANSFORMER	
T11	95-2538	YOKE	
T12	95-2200	POWER TRANSFORMER	
T13	5-79039	HORIZONTAL SWEEP TRANSFORMER	
A1	87-4	INTEGRATOR	
CX		SUPPLIED WITH YOKE	
M1	5-79060	CABLE AND PLUG ASSEMBLY (CHASSIS)	
M2		CABLE AND PLUG ASSEMBLY (YOKE) SUPPLIED WITH YOKE	
PL1	100-397	REAR MUX (M2N)	
S1		USED ON VOLUME CONTROL, HIGH-SPACE COMMAND MODELS	
S2	86-1018	A.C. SWITCH ON SPACE COMMAND MODELS ONLY	
S3	86-972	CIRCUIT BREAKER	
BE1	212-71	SILICON RECTIFIER	
BE2	212-71	SILICON RECTIFIER	
SP1		SPEAKER	
X1	103-23	DIODE CRYSTAL	
X2	103-51	GERMANIUM DIODE	
X3	103-101	DUAL SILICON DIODE	



Parts Layout and Signal Path Diagram of 14Z26 Chassis



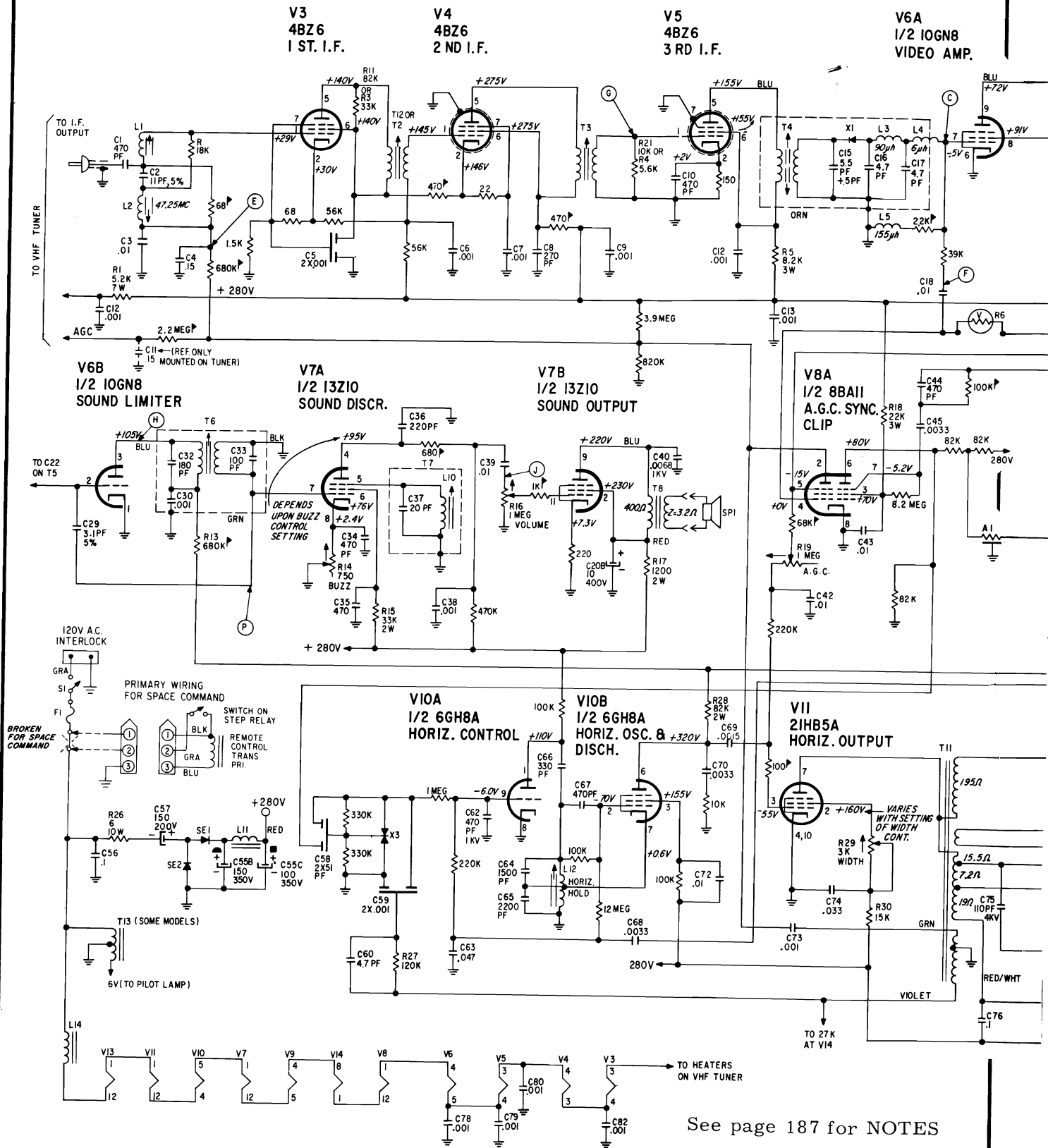


NOTES:
 ALL VOLTAGES MEASURED FROM CHASSIS TO POINTS INDICATE ALL VOLTAGES ARE D.C. UNLESS OTHERWISE SPECIFIED.
 ALL D.C. VOLTAGES TO BE MEASURED WITH A VACUUM TUBE VOLTMETER HAVING 11 MEGOHM INPUT RESISTANCE.
 ALL VOLTAGE MEASUREMENTS ARE TO BE MADE WITH THE TUBE SET TO CHANNEL 2 UNLESS OTHERWISE SPECIFIED.
 ALL CAPACITOR VALUES SELECTED FOR MINIMUM VOLTAGE FLICKERING. WHEN NECESSARY, REPLACE WITH EXACT VALUE FOUND IN YOKES.
 CIRCLED LETTERS INDICATE ALIGNMENT AND TEST POINTS WHERE APPLICABLE.
 S - SOUND LIMITER OUTPUT
 V - VIDEO OUTPUT
 E - I.F. ACC.
 F - GROUNDED FOR I.F. ALIGNMENT
 P - SOUND DISC. GRID

FOR CAPACITOR CAPACITY TOLERANCE, SEE LEGEND.
 ALL RESISTORS ARE 5% TOLERANCE, CARBON, 1/2 WATT UNLESS OTHERWISE SPECIFIED.
 RESISTANCE MEASUREMENTS SHOWN WITH COIL DISCONNECTED.
 COIL RESISTANCES NOT GIVEN ARE UNDER ONE OHM.
 P INDICATES 20% TOLERANCE MAY BE USED.
 ARROWS ON POTENTIOMETERS INDICATE CLOCKWISE ROTATION.
 CHASSIS - INDICATES VOLTAGE SOURCE.
 PICTURE TUBE PIN NO. ABOVE VOLTAGE TO BE MEASURED WITH ELECTROSTATIC KILOVOLTMETER WITH BRIGHTNESS AND CONTRAST CONTROLS FULL COUNTER-CLOCKWISE.
 CK - CAPACITOR VALUE SELECTED FOR MINIMUM VOLTAGE FLICKERING. WHEN NECESSARY, REPLACE WITH EXACT VALUE FOUND IN YOKES.

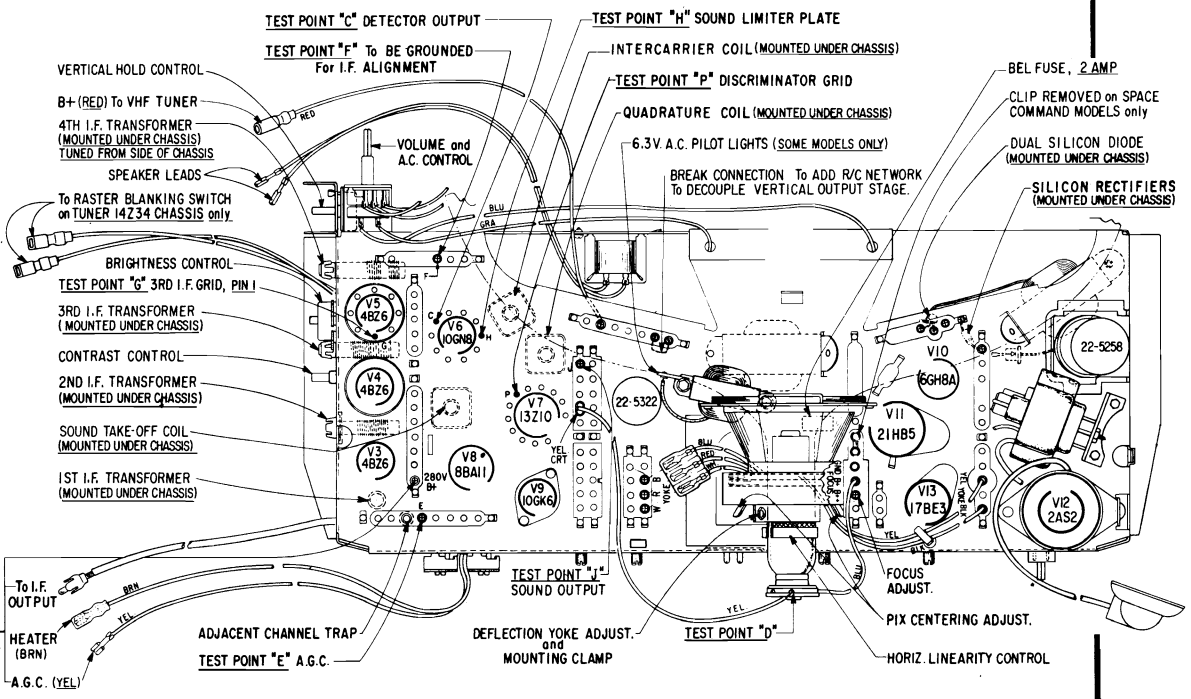
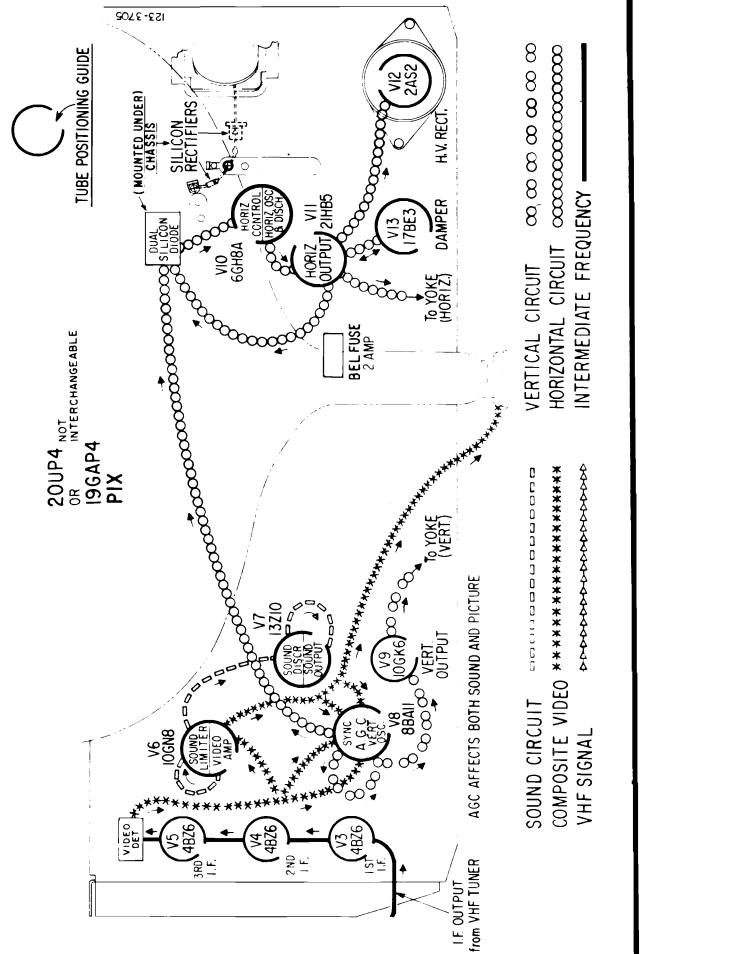
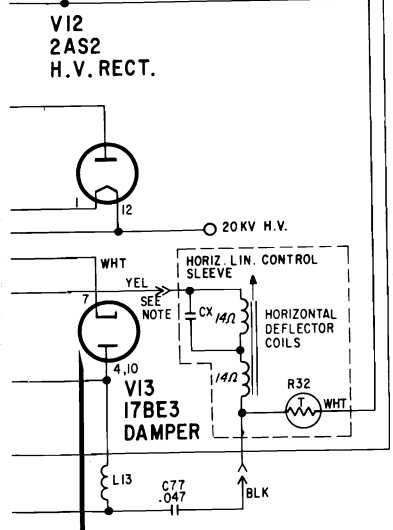
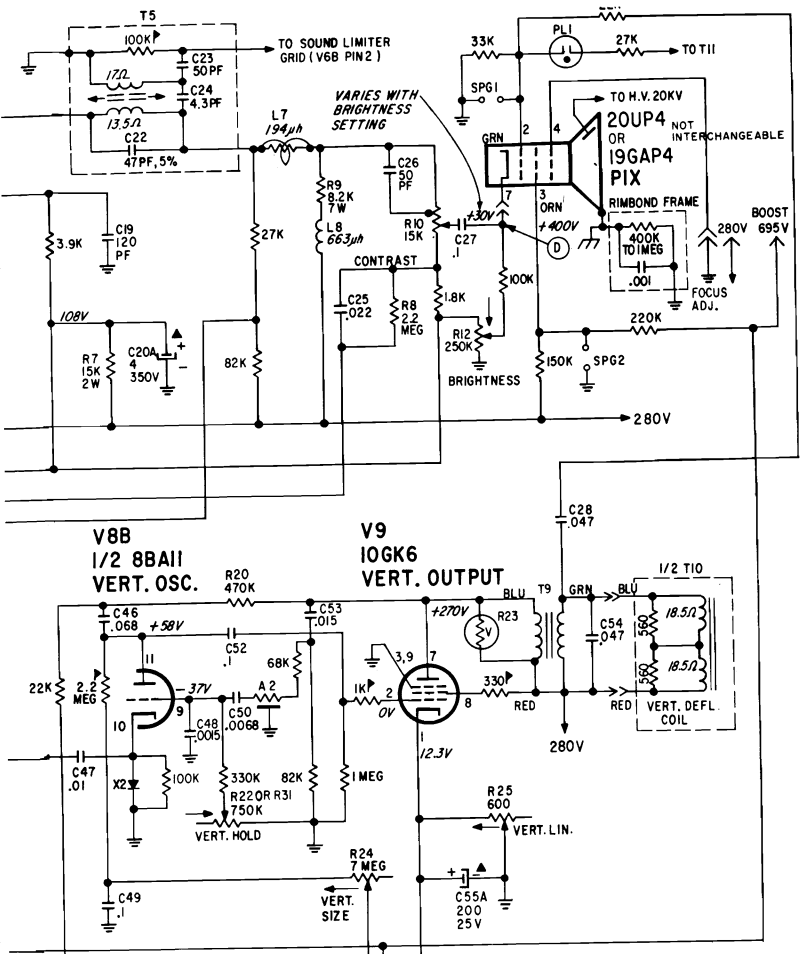
ZENITH Schematic Diagram 14Z26 (14Z27 is very similar)

ZENITH Chassis 14Z33, 14Z34, 14Z43, Schematic Diagram



Schematic Diagram of Chassis 14Z33, 14Z34 and 14Z43

ZENITH Chassis 14Z33, 14Z34, 14Z43, Service Information



Parts Layout and Signal Path of Chassis 14Z33, 14Z34 and 14Z43

ZENITH Tuners 175-680, 175-691, 175-857, and 175-1101 to -1163

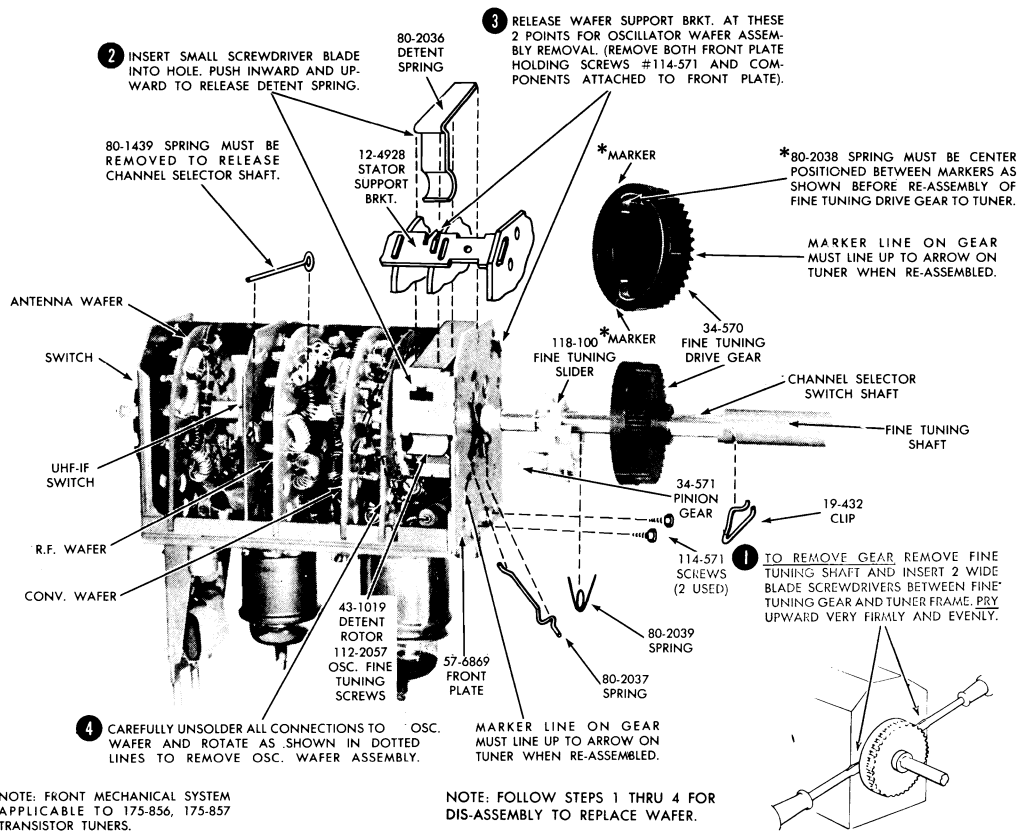
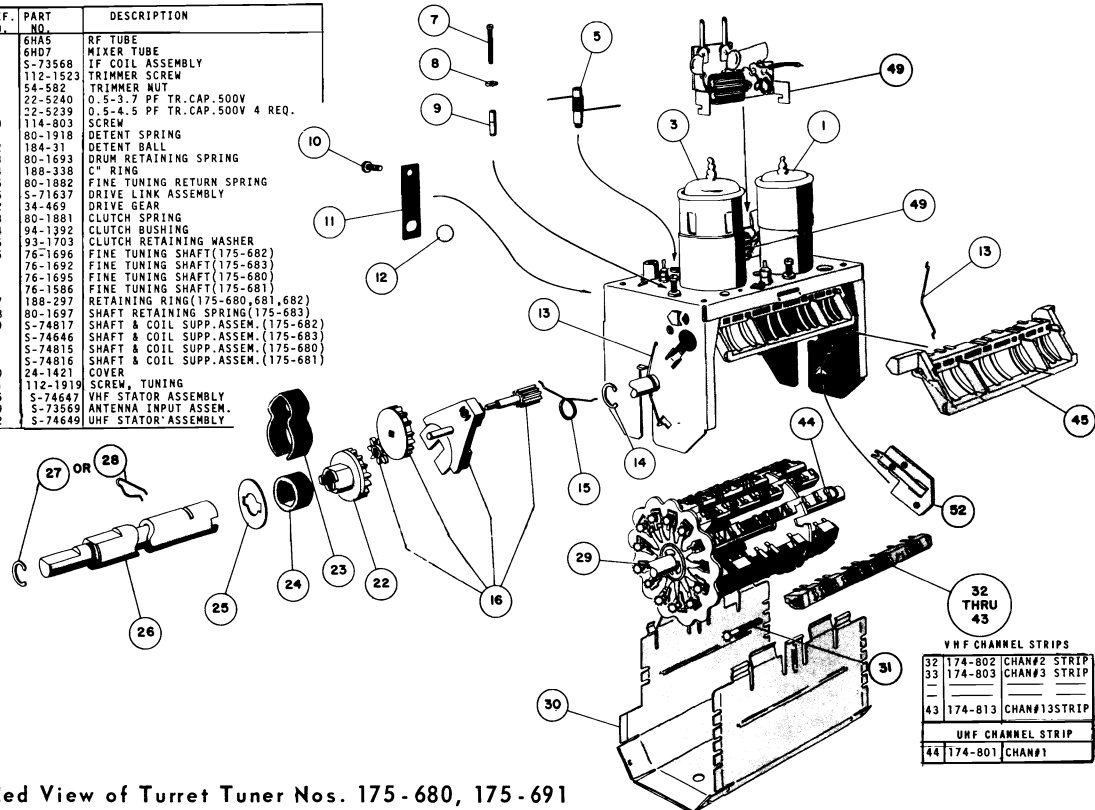


Photo Of VHF Tuners 175-857 and 175-1101 to 1163, Showing Dis-Assembly Of Tuner Shaft and Fine Tuning Mechanism.

REF. NO.	PART NO.	DESCRIPTION
1	6HA5	RF TUBE
3	6HD7	MIXER TUBE
5	S-73568	IF COIL ASSEMBLY
7	112-1523	TRIMMER SCREW
8	54-582	TRIMMER NUT
9	22-5240	0.5-3.7 PF TR. CAP. 500V
9	22-5239	0.5-4.5 PF TR. CAP. 500V 4 REQ.
10	114-803	SCREW
11	80-1918	DETENT SPRING
12	184-31	DETENT BALL
13	80-1693	DRUM RETAINING SPRING
14	188-338	C" RING
15	80-1882	FINE TUNING RETURN SPRING
16	S-71637	DRIVE LINK ASSEMBLY
16	34-469	DRIVE GEAR
23	80-1881	CLUTCH SPRING
24	94-1392	CLUTCH BUSHING
25	93-1703	CLUTCH RETAINING WASHER
26	76-1696	FINE TUNING SHAFT(175-682)
26	76-1692	FINE TUNING SHAFT(175-683)
26	76-1695	FINE TUNING SHAFT(175-680)
26	76-1586	FINE TUNING SHAFT(175-681)
27	188-297	RETAINING RING(175-680,681,682)
28	80-1697	SHAFT RETAINING SPRING(175-683)
29	S-74817	SHAFT & COIL SUPP. ASSEM. (175-682)
29	S-74646	SHAFT & COIL SUPP. ASSEM. (175-683)
29	S-74815	SHAFT & COIL SUPP. ASSEM. (175-680)
29	S-74816	SHAFT & COIL SUPP. ASSEM. (175-681)
30	24-1421	COVER
31	112-1919	SCREW, TUNING
45	S-74647	VHF STATOR ASSEMBLY
49	S-73569	ANTENNA INPUT ASSEM.
52	S-74649	UHF STATOR ASSEMBLY



VHF CHANNEL STRIPS		
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33	174-803	CHAN#3 STRIP
43	174-813	CHAN#13 STRIP
UHF CHANNEL STRIP		
44	174-801	CHAN#1

Exploded View of Turret Tuner Nos. 175-680, 175-691

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