REALISTIC®

Service Manual

21-1553

TRC-437

CB 40-Channel Transceiver

Catalog Number: 21-1553

CONTENTS

SPECIFICATIONS

General

Transmitter ..... Crystal controlled PLL synthesizer, amplitude modulation
Receiver ..... Crystal controlled double conversion, superheterodyne system
Communicating frequencies ..... 40 CB channels (26.965 to 27. 405 MHz)
Voltage operation ..... 12-16V DC (negative ground)
Temperature and Humidity range ..... −22°F ~ +140°F (−30°C ~ +60°C) at 10% ~ 90%
Transmitter/Receiver switching ..... Electrical

Standard Test Conditions

Battery supply voltage ..... 13.8V DC
Modulation ..... 1000 Hz, 30%
Receiver output power ..... 500mW at external SP
Receiver output impedance ..... 8 ohms, non-inductive
ANT. load impedance of transmitter ..... 50 ohms, non-inductive
Ambient conditions
  Temperature ..... 63°F ~ 73°F (17°C ~ 23°C)
  Humidity ..... 40% ~ 70%

Transmitter

Description	Nominal	Limit
RF power output	4.0 watts	3.6 ~ 4.4 watts
Antenna spurious emission	70 dB	50 dB
Modulation capability (positive/negative)	+90%/−90%	+80%/−80%
AMC Range at 1 kHz	40 dB	30 dB
Frequency accuracy	0.002%	0.005%
Spurious radiation & Harmonic		
Signal radiation ratio from fundamental	−65 dB	−60 dB
Current consumption		
at no modulation	1000 mA	1200 mA
at 80% modulation	1500 mA	1700 mA
Envelope distortion	10% max. 1000 Hz, 50% mod.	
Stability variation against antenna impedance	Satisfactory when dummy antenna is varied from 40 ohms to 200 ohms.	

Receiver

Description	Nominal	Limit
Intermediate frequency		
1st IF	10.695 MHz	
2nd IF	455 kHz	
Sensitivity for 500 mW output	0.3μV	1.0μV
Sensitivity at 10dB (S+N)/N	0.7μV	1.0μV
Adjacent channel rejection	65dB	55dB
Image rejection (1st IF/2nd IF)	70dB	60dB
IF rejection ratio (1st IF/2nd IF)	60dB	45dB
Signal-to-Noise ratio at 1mV input	40dB	35dB
Distortion at 1mV input, 30% mod. (500 mW output)	3%	5%
AGC figure of merit at 50mV input	80dB	70dB
Power output at 1mV input		
Undistorted (10% THD)	4.5W	4.0W
Maximum	5.0W	4.5W
Electrical fidelity compared to 1000 Hz		
450 Hz	−6dB	−6±3dB
2500 Hz	−6dB	−6±3dB
Cross modulation	50dB	40dB
Squelch	60dB	60±6dB
Current consumption at no signal	250mA	300mA

Other Items

Fuse 2 Amps/250V

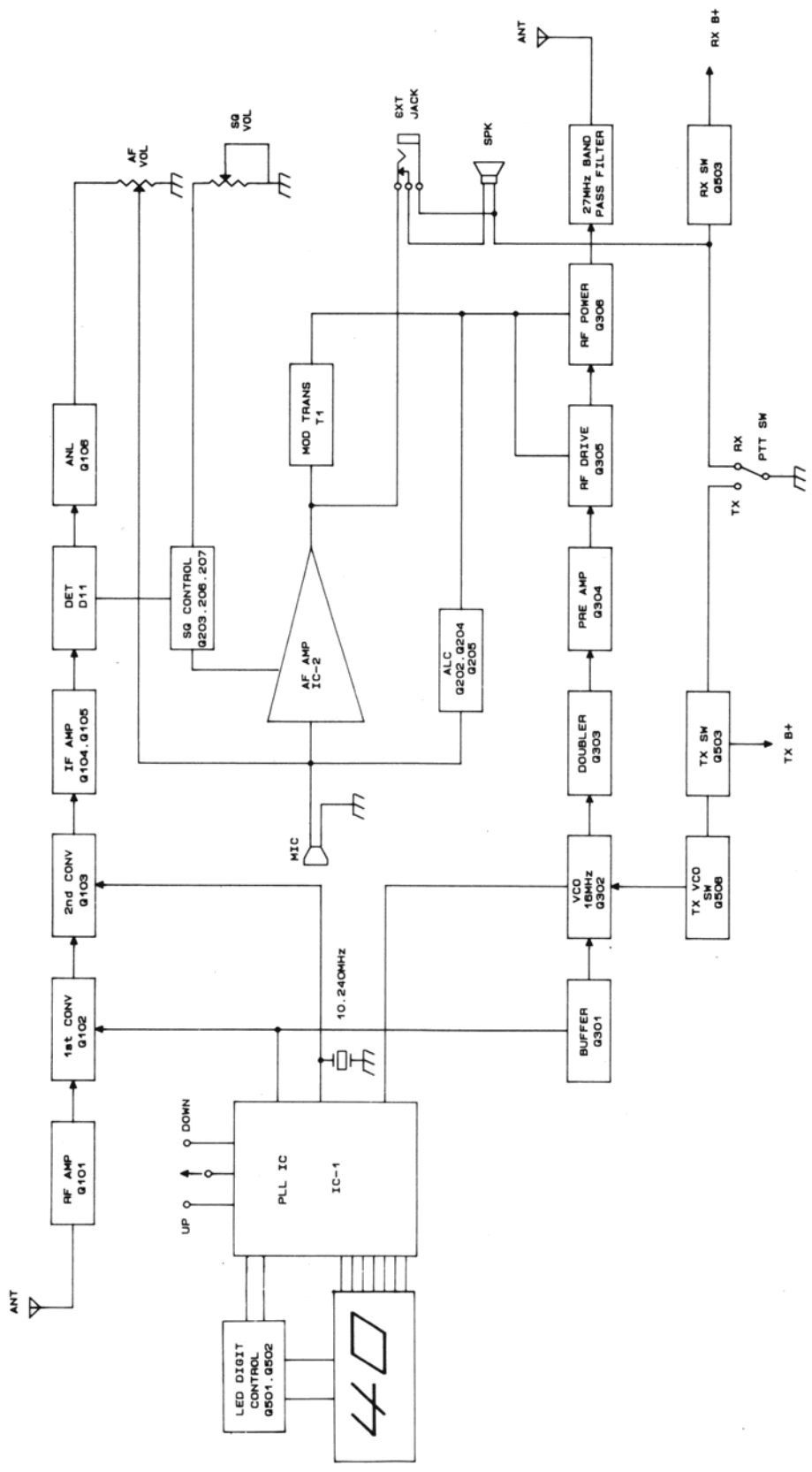
General power requirement ..... 12-16V DC

Dimensions ..... (W) 4 1/3" (109mm) x (H) 1 1/3" (33mm) x (D) 6 1/3" (162mm)

Weight ..... 1 lbs 7 ozs (0.65 kg)

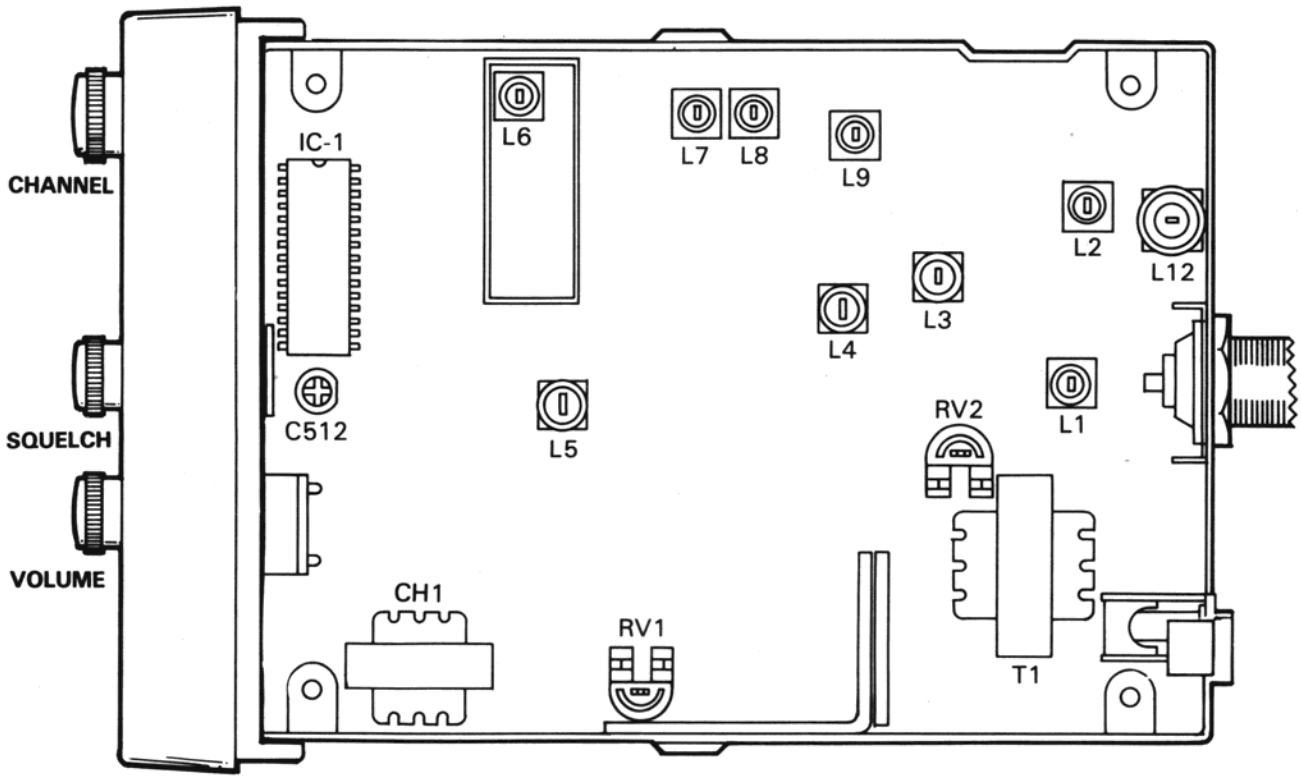
Note: Nominal specs represent the design specs. All units should be able to approximate these—some will exceed and some may drop slightly below these specs. Limit specs represent the absolute worst condition that still might be considered acceptable; in no case should a unit fail to meet limit specs.

BLOCK DIAGRAM



ALIGNMENT AND ADJUSTMENT

1. Alignment Test Points and Parts Locations



2. Phase Locked Loop and CPU Section

A. Test Equipment Required

a. Frequency Counter
b. DC Power Supply
c. DC Voltmeter
d. Oscilloscope

B. Alignment Procedure

Step	Setting	Connection	Adjust	Adjust for
1	Frequency adjustment- MIC: Receive Volume: Optional Squelch: Optional CH Selector: Optional	Frequency counter to output pin 19 of IC1 (Figure 1).	C512	10.240MHz ± 100Hz
2	RX VCO voltage adjustment- MIC: Receive Volume: Optional Squelch: Turn Clockwise CH Selector: 1	Connect DC voltmeter between R514 and R516 (Figure 2).	L6	2.5V
3	TX VCO voltage adjustment- MIC: Transmit Volume: Optional Squelch: Optional CH Selector: 1	Connect DC voltmeter between R514 and R516 (Figure 2).	L6	Indication on DC voltmeter must be 2-2.5 Volt. If DC voltmeter does not indicate 2-2.5 volt, readjust L6

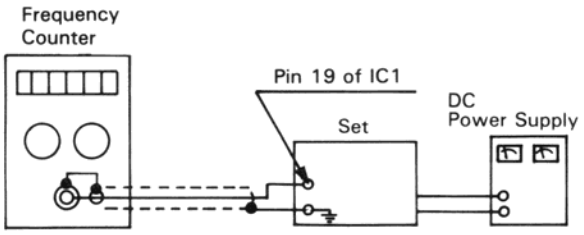


Figure 1

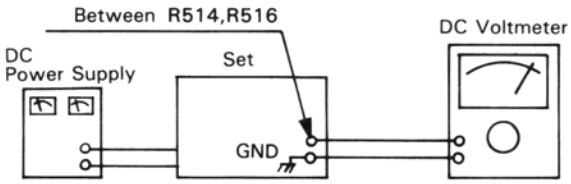


Figure 2

3. Transmitter Section

A. Test Equipment Required

a. RF Power Meter (RF SSVM)
b. 50 Ohm Load (non-inductive)
c. RF Attenuator
d. Oscilloscope
e. Audio Generator
f. DC Power Supply
g. Spectrum Analyzer
h. Frequency Counter
i. Coupler

B. Alignment Procedure

Step	Setting	Connection	Adjust	Adjust for
1	RF driver stage- MIC: Transmit Volume: Optional Squelch: Optional CH Selector: 19	Connect RF power meter to base of Q304 (Figure 3).	L7 L8	Maximum indication on the RF power meter.
2	RF power stage- MIC: Transmit Squelch: Optional Volume: Optional CH Selector: 19	Connect dummy load and RF power meter to the EXT-ANT jack on the set (Figure 4).	L9 L12	Maximum indication on the RF power meter (4 watts). If indication is not in 4 watts range, go back to step 1 and readjust L9, L12.
3	Modulation adjustment- MIC: Transmit Volume: Optional Squelch: Optional CH Selector: 19	Connect audio generator (1kHz) to pin 4 of microphone jack (Figure 5). Connect dummy load and oscilloscope through coupler to RF power meter. Connect RF power meter to EXT-ANT jack on the set. Adjust audio signal level to obtain 80% ~ 90% of the modulation level.	RV2	Proper modulation pattern on the oscilloscope.
4	Second harmonic check- MIC: Transmit Volume: Optional Squelch: Optional CH Selector: 19	Connect the input terminal of RF power meter to the EXT-ANT jack on the set through the −40dB attenuator and the output terminal to the spectrum analyzer through the dummy load/coupler (Figure 6).		At no modulation, compare the level of fundamental frequency to the level of harmonic frequency. Suppression of the 2nd harmonic frequency level must be lower than −60dB. Check for the other channels.

Step	Setting	Connection	Adjust	Adjust for
5	Frequency check- MIC: Transmit Volume: Optional Squelch: Optional CH Selector: 19	Connect dummy load and frequency counter through coupler to RF power meter. Connect RF power meter to EXT-ANT jack on the set (Figure 7).	C512	Be sure that the indication of the transmitter frequency is 27.185MHz ± 300Hz on the frequency counter.

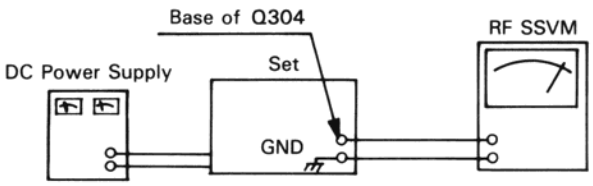


Figure 3

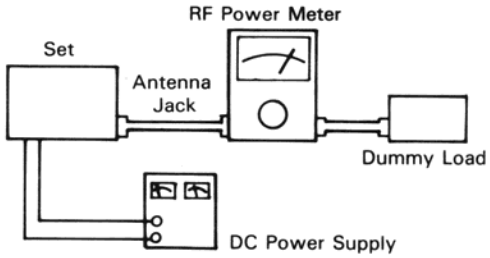


Figure 4

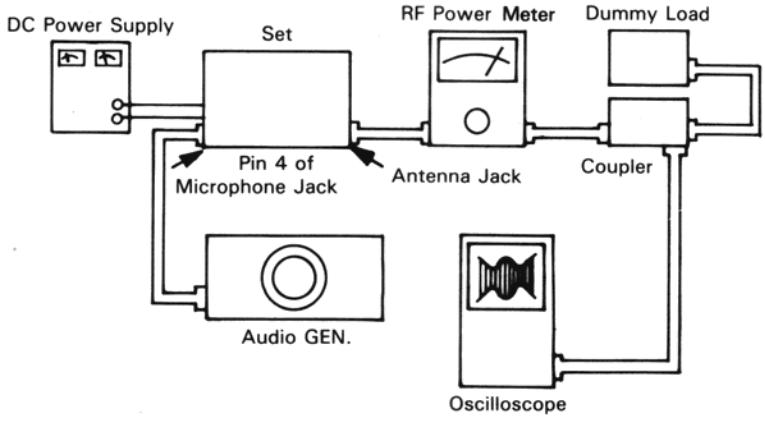


Figure 5

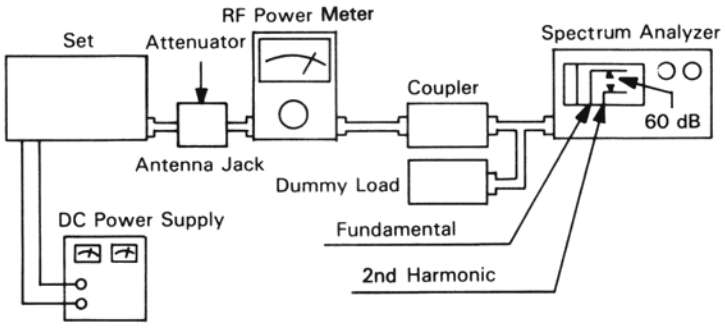


Figure 6

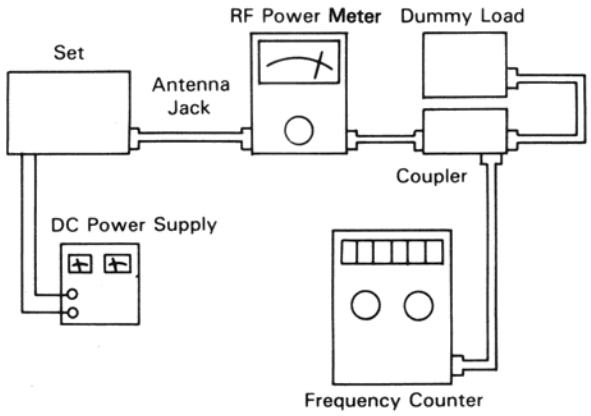


Figure 7

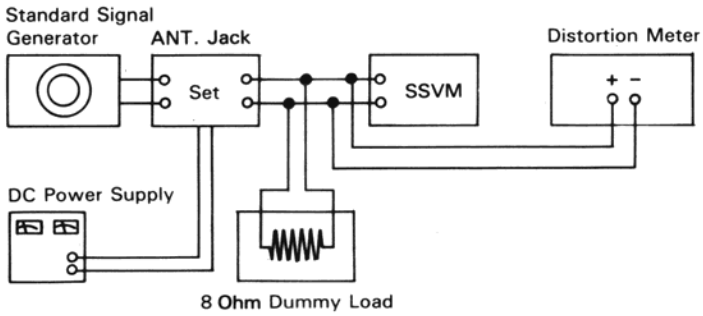


Figure 8

4. Receiver Section

A. Test Equipment Required

a. Standard Signal Generator (SSG)
b. SSVM
c. Distortion Meter
d. DC Power Supply

B. Alignment Procedure

Step	Setting	Connection	Adjust	Adjust for
1	RX output adjustment- MIC: Receive Volume: Fully clockwise Squelch: Turn to counterclockwise CH Selector: 19 SSG: 27.185MHz, 1kHz, 1μV, 30% Mod.	Connect standard signal generator to EXT-ANT jack. Connect SSVM and distortion meter across EXT speaker jack with 8 ohm dummy load (Figure 8).	L1 L2 L3 L4 L5	Maximum indication on SSVM. Reduce output from SSG until the audio output becomes about 500mW (2V).
2	Distortion adjustment- MIC: Receive SSG: 27.185MHz, 1kHz 1mV, 80% Mod. Squelch: Turn to counterclockwise CH Selector: 19 Volume: at 500mW (2V)	Connect standard signal generator to EXT-ANT jack. Connect SSVM and distortion meter across EXT speaker jack with 8 ohm dummy load (Figure 8).	L1	Minimum indication on distortion meter.
3	Squelch adjustment- MIC: Receive SSG: 27.185MHz, 1kHz, 1mV, 30% Mod. Squelch: Clockwise CH Selector: 19 Volume: at 500mW (2V)	Connect standard signal generator to EXT-ANT jack. Connect SSVM and distortion meter across EXT speaker jack with 8 ohm dummy load (Figure 8).	RV2	Adjust until the audio output just appeared.

CHANNEL FREQUENCY GENERATION TABLE

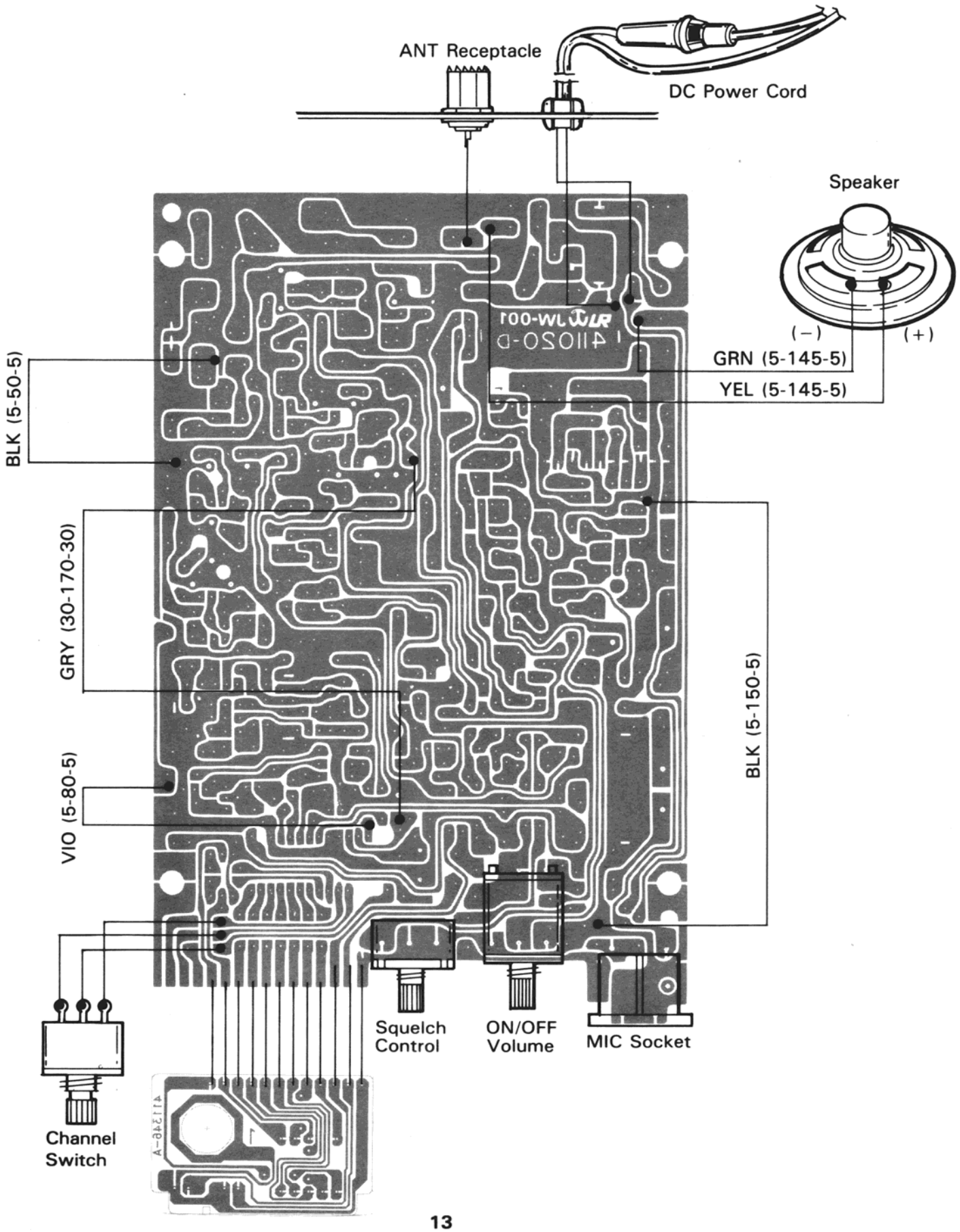
Receive Vco Frequency = N × 2 (KHz)
Transmit Vco Frequency = N × 2.5 (KHz)

Channel	Frequency (MHz)	RX (TX = 1)		TX (TX = 0)	
		N	VCO Frequency(MHz)	N	VCO Frequency(MHz)
1	26.965	6508	16.27	5393	13.4825
2	26.975	6512	16.28	5395	13.4875
3	26.985	6516	16.29	5397	13.4925
4	27.005	6524	16.31	5401	13.5025
5	27.015	6528	16.32	5403	13.5075
6	27.025	6532	16.33	5405	13.5125
7	27.035	6536	16.34	5407	13.5175
8	27.055	6544	16.36	5411	13.5275
9	27.065	6548	16.37	5413	13.5325
10	27.075	6552	16.38	5415	13.5375
11	27.085	6556	16.39	5417	13.5425
12	27.105	6564	16.41	5421	13.5525
13	27.115	6568	16.42	5423	13.5575
14	27.125	6572	16.43	5425	13.5625
15	27.135	6576	16.44	5427	13.5675
16	27.155	6584	16.46	5431	13.5775
17	27.165	6588	16.47	5433	13.5825
18	27.175	6592	16.48	5435	13.5875
19	27.185	6596	16.49	5437	13.5925
20	27.205	6604	16.51	5441	13.6025
21	27.215	6608	16.52	5443	13.6075
22	27.225	6612	16.53	5445	13.6125
23	27.255	6624	16.56	5451	13.6275
24	27.235	6616	16.54	5447	13.6175
25	27.245	6620	16.55	5449	13.6225
26	27.265	6628	16.57	5453	13.6325
27	27.275	6632	16.58	5455	13.6375
28	27.285	6636	16.59	5457	13.6425
29	27.295	6640	16.60	5459	13.6475
30	27.305	6644	16.61	5461	13.6525
31	27.315	6648	16.62	5463	13.6575
32	27.325	6652	16.63	5465	13.6625
33	27.335	6656	16.64	5467	13.6675
34	27.345	6660	16.65	5469	13.6725
35	27.355	6664	16.66	5471	13.6775
36	27.365	6668	16.67	5473	13.6825
37	27.375	6672	16.68	5475	13.6875
38	27.385	6676	16.69	5477	13.6925
39	27.395	6680	16.70	5479	13.6975
40	27.405	6684	16.71	5481	13.7025

TROUBLESHOOTING

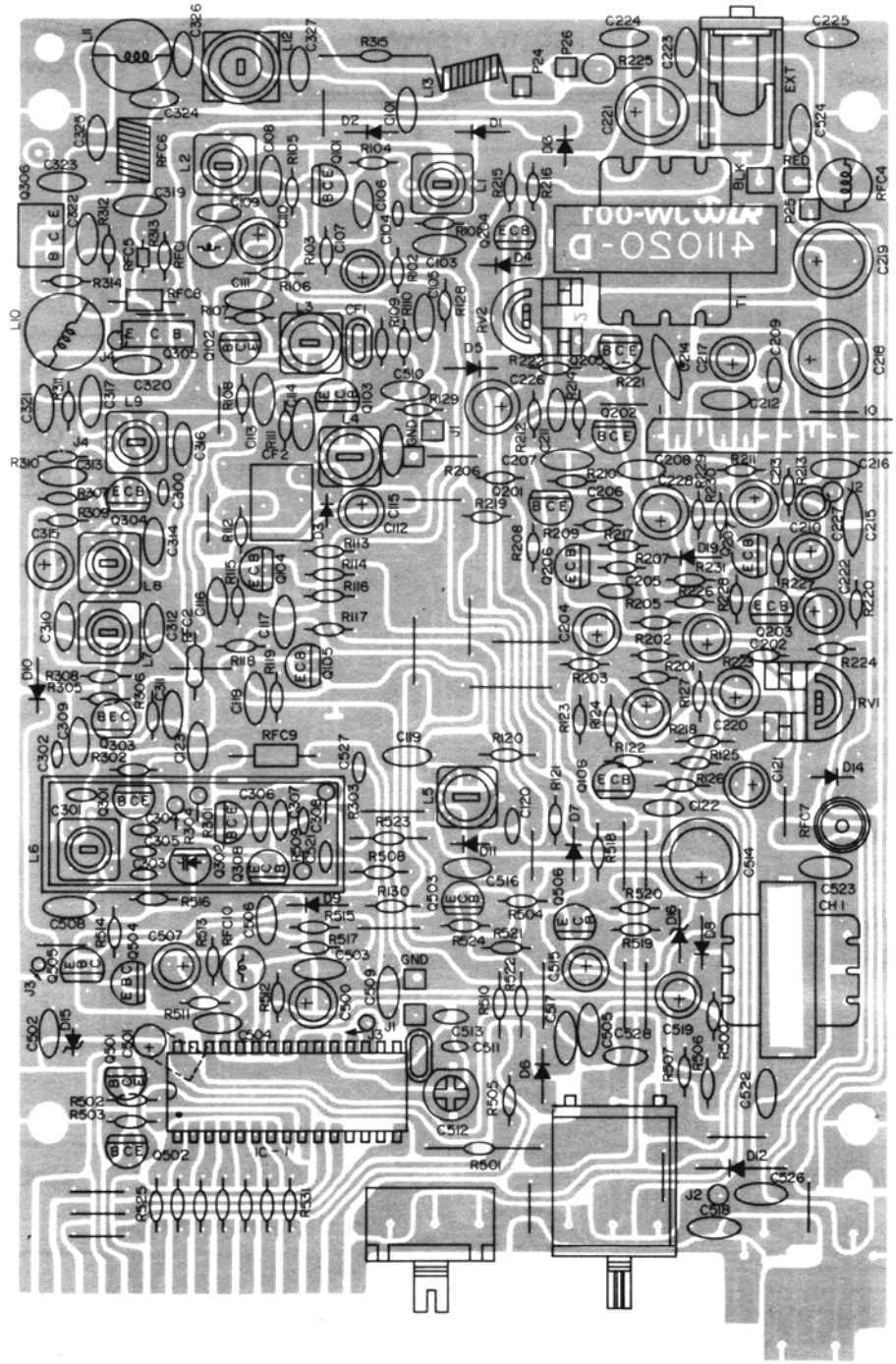
Symptom	Probable Cause	Remedy
Unit does not work at all	1. Defective power switch VR102 2. Blown fuse 3. Broken DC power cord	1. Replace 2. Replace 3. Replace
No output from speaker at all	1. Defective external speaker jack 2. Poor connection on microphone connector 3. Defective push switch on microphone 4. Defective internal speaker	1. Repair or Replace 2. Repair or Replace 3. Replace 4. Replace
No noise on speaker	1. Measure all the voltages of Q101, Q102, Q103, Q104, Q105, Q106, and IC2. Compare with the voltage chart on pages 30-31. 2. Defective squelch circuit components (RV1, VR2, IC2, Q203, Q206, Q207)	1. Replace defective component(s) 2. Replace if defective
Squelch does not work	1. Defective VR2, VR2, Q203, Q206 or Q207. 2. Improperly adjusted RV2	1. Replace defective component(s) 2. Readjust
No modulation	1. Defective microphone 2. Poor audio output and defective modulation microphone amplifier components (Q201, Q202, IC2) 3. Defective microphone connector component 4. Defective ALC/Circuit (Q202, Q204, Q205, D4)	1. Replace 2. Replace the defective component(s) 3. Replace 4. Replace the defective component(s)
LED display does not work	1. Defective orange wire fuse 2. Defective LED display IC1, Q501, Q502	1. Replace 2. Replace
Channel selector does not work	1. Defective IC1, SW1	1. Replace

WIRING DIAGRAM

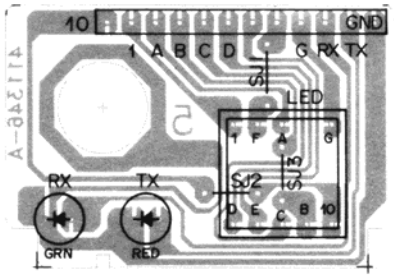


PRINTED CIRCUIT BOARDS

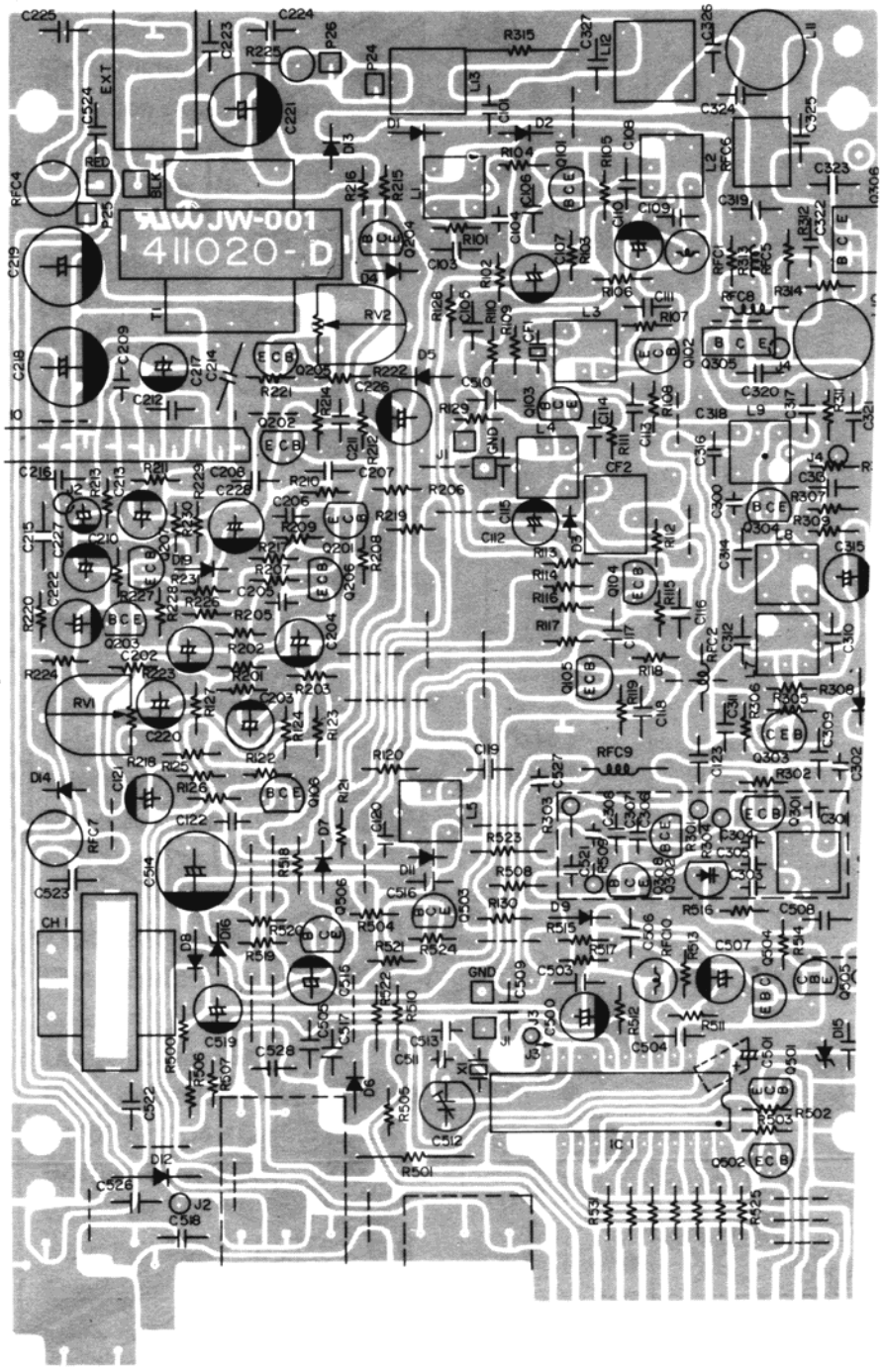
Main PCB-Top View



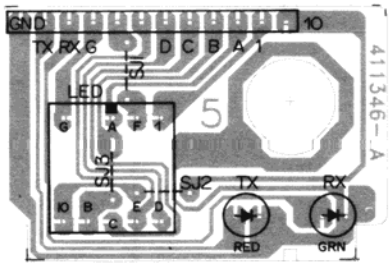
Display PCB-Top View



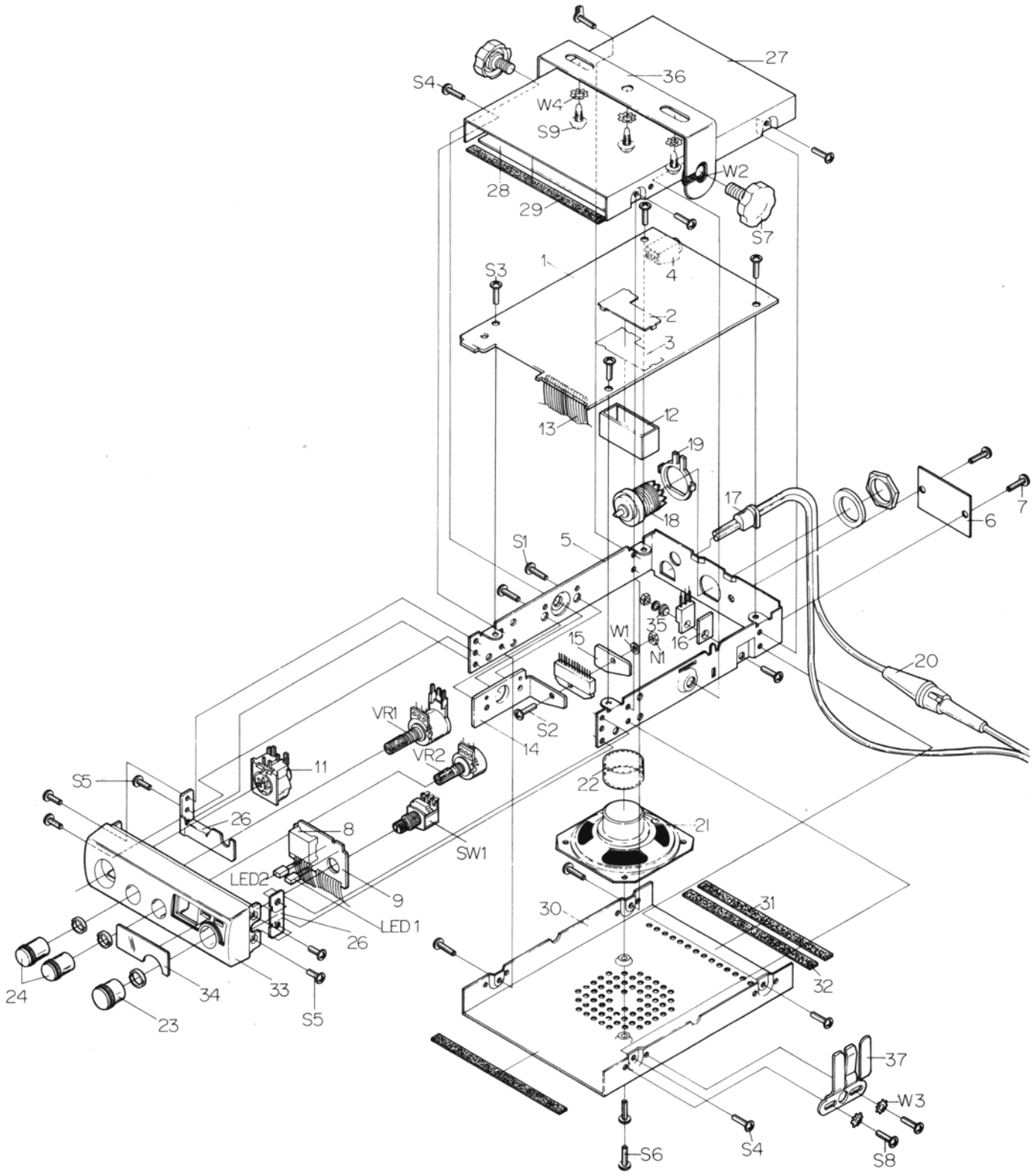
Main PCB-Bottom View



Display PCB-Bottom View



EXPLODED VIEW/DISASSEMBLY



EXPLODED VIEW PARTS LIST

Ref. No.	Description	RS Part No.	Mfr's Part No.
1	P.C.B., Main		411-020-D
2	Shield Plate, Vco Bottom, SPTE		771-460
3	Insulation Plate, Vco Bottom, Fiber		906-025
4	EXT Jack		420-705-1
5	Body, Main		702-225-A
6	Plate, Name		795-497
7	Rivet, Blind		670-025
8	LED Display, LTD 323L		252-050-2
9	P.C.B., SUB		411-346-A
10	Strip-Felt, Light Cutter, 31×8.5×1T, BLK		906-136
11	Socket, 5-Pin, DIN, Lock Type, BLK		421-513-2
12	Can Shield 90×25×03T, SPTE		770-336
13	Flat Wire, 6-Pin		429-211-9
14	Heatsink (For IC KIA 7217), Large		761-640
15	Heatsink (For IC KIA 7217), Small		760-704
16	Mica (For TR 2SC 2078)		440-004-0
17	Cord Stopper		750-039
18	Receptacle ANT, W/Nut, Washer		421-046-7
19	Holder ANT, SPTE, 29×35×0.3T, Ni-Plate		731-791
20	Assembly, Cord, Power, W/Fuse, 250V 2A		504-055
21	Speaker C065A20-G0062 65M 8ohm		420-121-6
22	Cap, Speaker PE, Clear		830-043
23	Knob, Channel, BLK		825-986
24	Knob, Volume, BLK		825-987
25	Fiber (Escutcheon)		906-389
26	Bracket		723-768
27	Upper Cover, BLK		717-885
28	Fiber, Insulation Plate 135×100×0.3T		906-025
29	Strip Felt 104×6×0.5T, BLK		906-020
30	Bottom Cover, BLK		717-890
31	Strip Felt 104×6×0.5T, BLK		906-020
32	Strip Felt 100×10×0.3T, BLK		906-105
33	Escutcheon, ABS, BLK		801-268
34	Lens, Acryl		813-831
35	Bushing For TR 2SC2078		441-004-5
36	Bracket-Set Mounting, BLK		723-495
37	Bracket-Microphone		720-095
LED1	LED Lamp, Green, 3V 20mA		251-088-2
LED2	LED Lamp, Red, 3V 20mA		251-090-3
SW 1	Switch-Self, RK 124112HN04ZZZ		439-032-7
VR1	Resistor Variable, W/Nut, Washer 50KA, Volume		450-622-1
VR2	Resistor Variable, W/Nut, Washer 10KB, Squelch		450-424-9

Ref. No.	Description	RS Part No.	Mfr's Part No.
N1	Nut, M3		651-024
S1	Screw, Machine (F.H), 3×6−2S, Zn		623-168
S2	Screw, Machine (B.H), 3×10, Zn		613-332
S3	Screw, Tapping (B.H), 3×6−2S, Zn		623-265
S4	Screw, Tap Tite (B.H), 3×6, BLK		633-082
S5	Screw, Machine (F.H), M2.6×5, Zn		611-095
S6	Screw, Tap Tite (B.H), 3×6, BLK		633-082
S7	Screw, Securing, BLK		600-718
S8	Screw, Tapping, 3.5×6−2S, Ni		620-084
S9	Screw, Tapping, 5×12−1S, Zn		625-007
W1	Washer, Spring, M3, Zn		662-305
W2	Washer, Rubber, 0.7×0.25×t15, BLK		660-138
W3	Washer, M3.5, Zn		664-703
W4	Washer, M5, Zn		664-518

ELECTRICAL PARTS LIST

Ref. No.	Description	RS Part No.	Mfr. Part No.
Main PCB Assembly			**514-32M-P**
	Capacitors		
C101	Ceramic 22P 50V +80% / −20%		130-201-5
C102	Not Used		
C103	Ceramic 0.022μF 50V +80% / −20%		130-207-1
C104	Ceramic 47P 50V +80% / −20%		134-716-4
C105	Ceramic 0.047μF 50V +80% / −20%		130-405-3
C106	Ceramic 0.022μF 50V +80% / −20%		130-207-1
C107	Elect 10μF 16V ±20%		101-012-7
C108	Ceramic 0.022μF 50V +80% / −20%		130-207-1
C109	Ceramic 0.047μF 50V +80% / −20%		130-405-3
C110	Elect 22μF 16V ±20%		102-250-0
C111	Ceramic 0.022μF 50V +80% / −20%		130-207-1
C112	Elect 10μF 16V ±20%		101-012-7
C113	Ceramic 0.022μF 50V +80% / −20%		130-207-1
C114	Ceramic 100P 50V +80% / −20%		131-004-9
C115	Ceramic 0.022μF 50V +80% / −20%		130-207-1
C116	Ceramic 0.047μF 50V +80% / −20%		130-405-3
C117	Ceramic 0.001μF 50V +80% / −20%		130-101-8
C118	*Mylar 0.047μF 50V ±5%		194-702-9
C119	Ceramic 0.047μF 50V +80% / −20%		130-405-3
C120	Mylar 0.0068μF 50V +80% / −20%		196-802-6
C121	Elect 1μF 50V ±5%		101-006-2
C122	Mylar 0.01μF 50V ±5%		191-001-4
C123	Ceramic 5P 50V +80% / −20%		135-005-0
C202	Elect 0.1μF 50V ±20%		100-102-0
C203	Elect 1μF 50V ±20%		101-006-2
C204	Elect 10μF 16V ±20%		101-012-7
C205	Mylar 0.0082μF 50V ±5%		198-201-3
C206	Mylar 0.0068μF 50V ±5%		196-802-6
C207-C208	Mylar 0.033μF 50V ±5%		193-302-6
C209	Mylar 0.0047μF 50V ±5%		194-701-8
C210	Tantalum 3.3μF 16V ±20%		143-301-0
C211	Elect 0.1μF 50V ±20%		100-102-0
C212	Ceramic 220PF 50V +80% / −20%		132-204-8
C213	Elect 33μF 16V ±20%		103-313-9
C214-C215	Mylar 0.068μF 50V ±50%		196-803-7
C216	Ceramic 220PF 50V +80% / −20%		132-204-8
C217	Elect 47μF 16V ±20%		104-712-1
C218	Elect 220μF 16V ±20%		102-223-6
C219	Elect 1000μF 16V ±20%		101-048-0
C220	Elect 22μF 16V ±20%		102-210-4

*Mylar is a registered trademark of E. I. DuPont de Nemours and Company, Inc.

Ref. No.	Description	RS Part No.	Mfr. Part No.
C221	Elect 100μF 16V ±20%		101-022-6
C222	Elect 33μF 16V ±20%		103-313-9
C223	Ceramic 0.01μF 50V +80% / −20%		130-102-9
C224-C225	Ceramic 0.001μF 50V +80% / −20%		130-101-8
C226	Elect 47μF 16V +80% / −20%		104-712-1
C227	Elect 10μF 16V +80% / −20%		101-012-7
C228	Elect 47μF 16V +80% / −20%		104-712-1
C300	Ceramic 68P 50V +80% / −20%		136-801-7
C301	Ceramic 18P 50V +80% / −20%		131-801-2
C302	Ceramic 22P 50V +80% / −20%		132-201-5
C303	Mica 47P 50V ±5%		164-701-9
C304	Ceramic 33P 50V +80% / −20%		133-301-7
C305	Ceramic 27P(NPO) 50V ±10%		132-705-4
C306	Ceramic 220P 50V +80% / −20%		132-204-8
C307	Ceramic 120P 50V +80% / −20%		131-202-1
C308	Ceramic 0.01μF 50V +80% / −20%		130-102-9
C309	Ceramic 39P 50V +80% / −20%		133-904-2
C310	Ceramic 4P 50V +80% / −20%		134-003-3
C311	Ceramic 0.022μF 50V +80% / −20%		130-207-1
C312-C313	Ceramic 0.01μF 50V +80% / −20%		130-020-3
C314	Ceramic 100P(NPO) 50V ±10%		131-020-3
C315	Elect 2.2μF 16V ±20%		102-204-9
C316	Ceramic 0.047μF 50V +80% / −20%		130-405-3
C317	Ceramic 100P(NPO) 50V ±10%		131-020-3
C318	Not Used		
C319	Ceramic 0.022μF 50V +80% / −20%		130-207-1
C320	Ceramic 82P(NPO) 50V ±10%		138-204-8
C321	Ceramic 220P 50V +80% / −20%		132-204-8
C322	Ceramic 330P 50V +80% / −20%		133-302-8
C323	Ceramic 60P(MPO) 50V ±10%		136-002-2
C324	Ceramic 47P 50V +80% / −20%		134-701-0
C325	Ceramic 100P(NPO) 50V ±10%		131-020-3
C326	Ceramic 390P 50V +80% / −20%		133-904-2
C327	Ceramic 470P 50V +80% / −20%		134-702-1
C328	Ceramic 150P(NPO) 50V +80% / −20%		131-510-9
C500	Elect 1μF 50V ±20%		101-006-2
C501	Elect 470μF 16V ±20%		104-723-1
C502-C506	Ceramic 0.01μF 50V +80% / −20%		130-102-9
C507	Elect 0.47μF 50V ±20%		100-405-4
C508	Mylar 0.047μF 50V ±5%		194-702-9
C509	Ceramic 4P 50V +80% / −20%		134-003-3

Ref. No.	Description	RS Part No.	Mfr. Part No.
C510	Ceramic 10P 50V +80% / −20%		131-002-7
C511	Mica 39P 50V ±5%		163-901-8
C512	Trimmer 20P		172-002-4
C513	Mica 39P 50V ±5%		163-901-8
C514	Elect 220μF 16V ±20%		102-223-6
C515	Elect 47μF 16V ±20%		104-712-1
C516-C517	Ceramic 0.01μF 50V +80 −20%		130-102-9
C518	Ceramic 0.001μF 50V +80 −20%		130-101-8
C519	Elect 10μF 16V ±20%		101-012-7
C520	Not Used		
C521-C524	Ceramic 0.01μF 50V +80% / −20%		130-101-8
C525	Not Used		
C526	Ceramic 0.01μF 50V +80% / −20%		130-101-8
C527	Ceramic 6P 50V +80% / −20%		136-001-1
C528	Ceramic 0.01μF 50V +80% / −20%		130-102-9
C529	Ceramic 0.001μF 50V +80% / −20%		130-101-8
	Coils		
L1	27MHz RX ANT., Can Type		320-314-3
L2	27MHz RF AMP(RX), Can Type		320-315-4
L3	10.6MHz RF 1'st Mixer, Can Type		320-316-5
L4	IFT 455MHz-A, Can Type		320-154-5
L5	IFT 455MHz-B, Can Type		320-155-6
L6	VCO Can Type		320-317-6
L7-L8	27MHz RF AMP A, Can Type		320-318-7
L9	27MHz RF AMP B, Can Type		320-319-8
L10	0.25μH, Spring Type		310-047-9
L11	0.65μH, Spring Type		310-068-8
L12	27MHz TX ANT Tuning, Bobbin Type		320-034-0
L13	0.32μH, Spring Type		310-054-5
RFC1	100μH, Mold Type		310-096-3
RFC2	6.8μH, Resistor Type		310-291-2
RFC3	Not Used		
RFC4	0.8μH, Spring Type		310-072-1
RFC5	2.2μH, Resistor Type		310-289-1
RFC6	0.5μF, Spring Type		310-065-5
RFC7	20μF, Core Type		310-034-7
RFC8	6.8μH, Resistor Type		310-291-2
RFC9	4μH, Bobbin Type		310-100-3
RFC10	22μH, Mold Type		310-114-6

Ref. No.	Description	RS Part No.	Mfr. Part No.
	Crystals		
X1	**Crystal 10.240MHz HC-18/U**		**260-485-5**
	Diodes		
D1-D10	IS 2473		243-004-3
D11-D12	OA90		244-003-7
D13-D14	In 4002		245-004-3
D15	8.2B 1W		241-050-4
D16-D17	9.1B		241-020-7
D18	Varicap MV2209		240-006-0
D19	IS 2473		243-004-3
D20	OA90		244-003-7
	Filters		
CF1	Ceramic 10.7MJ		270-010-2
CF2	Ceramic CFU 455HT or		270-006-9
	Ceramic CFU 455P		270-064-1
	Integrated Circuits		
IC1	LC 7185, PLL		224-063-5
IC2	KIA 7217AP Audio		222-006-4
	Resistors	**Note** : Unless otherwise specified, all resistors are carbonfilm, 1/8W ±5%.	
R101	330 ohm		001-331-9
R102	33K ohm		002-333-1
R103	680 ohm		002-681-5
R104	18 ohm		002-180-9
R105	100 ohm		002-101-8
R106	2.7K ohm		002-272-9
R107	220 ohm		002-221-3
R108	470 ohm		002-471-2
R109	560 ohm		002-561-0
R110	3.9K ohm		002-392-4
R111	100 ohm		002-101-8
R112	1.8K ohm		002-182-1
R113	10K ohm		002-103-0
R114	150K ohm		002-154-6
R115	470 ohm		002-471-2
R116	1K ohm		002-102-9
R117	12K ohm		002-123-8
R118	3.3K ohm		002-332-0
R119	220 ohm		002-221-3
R120	47 ohm		002-470-1

Ref. No.	Description	RS Part No.	Mfr. Part No.
R121	22K ohm		002-223-5
R122	47K ohm		002-473-4
R123	330K ohm		002-334-2
R124	82K ohm		002-823-7
R125	33K ohm		002-333-1
R126	47K ohm		002-473-4
R127	15K ohm		002-153-5
R128	27K ohm		002-273-0
R129	470 ohm		002-471-2
R130	330 ohm		002-331-9
R201-R202	2.2K ohm		202-222-4
R203-R204	4.7K ohm		002-472-3
R205	3.3K ohm		002-332-0
R206	100K ohm		002-104-1
R207	27K ohm		002-273-0
R208	470K ohm		002-474-5
R209	22K ohm		002-223-5
R210	3.3K ohm		002-332-0
R211-R212	2.2K ohm		002-222-4
R213	56 ohm		002-560-9
R214	33K ohm		002-333-1
R215	470 ohm		002-471-2
R216	10K ohm		002-103-0
R217	1K ohm		002-102-9
R218	10K ohm		002-103-0
R219	47 ohm		002-470-1
R220	1 ohm		002-109-6
R221	4.7K ohm		002-473-2
R222	8.2K ohm		002-472-3
R223	5.6K ohm		002-562-1
R224	1.8K ohm		002-182-1
R225	15 ohm 2W ±5% Metal Oxide		019-150-0
R226	10 ohm		002-100-7
R227	2.7K ohm		002-272-9
R228	100 ohm		002-101-8
R229	100K ohm		002-104-1
R230	3.9K ohm		002-392-4
R231	1K ohm		002-109-2
R232	33K ohm		002-331-1
R301	820 ohm		002-821-5
R302	120K ohm		002-124-9

Ref. No.	Description	RS Part No.	Mfr. Part No.
R303	2.7K ohm		002-272-9
R304	220K ohm		002-224-6
R305	150K ohm		002-154-6
R306	390 ohm		002-391-3
R307-R309	4.7K ohm		002-972-3
R310	68 ohm		002-680-4
R311-R312	100 ohm		002-101-8
R313	220 ohm		002-221-3
R314	2.2 ohm		002-229-1
R315	4.7K ohm 1/2W ±5%		030-472-2
R500	1K ohm		002-102-9
R501	100 ohm		030-101-7
R502-R503	3.3K ohm		002-332-0
R504	10K ohm		002-103-0
R505	220 ohm		002-221-3
R506	270K ohm		002-274-1
R507	390K ohm		002-394-6
R508-R509	10K ohm		002-103-0
R510	1K ohm		002-102-9
R511	2.2K ohm		002-222-4
R512	10K ohm		002-103-0
R513	33K ohm		002-333-1
R514	82K ohm		002-823-7
R515	4.7K ohm		012-472-3
R516	22K ohm		001-223-5
R517-R518	22 ohm		001-220-3
R519	100 ohm		001-101-8
R520-R521	470 ohm		001-471-2
R522	560 ohm		002-561-0
R523	47 ohm		002-470-1
R524	4.7K ohm		002-472-3
R525-R531	150 ohm		002-151-3
RV1	Semifixed 10KB 8Dia ±25%		061-103-1
RV2	Semifixed 5KB 8Dia ±25%		061-502-1
	Transistors		
Q101-Q103	MPS 1923(O) "NPN" or		203-017-8
	MPS 9426(C)		203-005-2
Q104-Q105	KTC 1923(Y) "NPN" or		202-060-7
	MPS 9623(O)		203-011-7
Q106	KTA 1015(GR) "PNP" or		202-036-5
	MPS 9681(T)		203-009-6

Ref. No.	Description	RS Part No.	Mfr. Part No.
Q201-Q203	KTC 1815(GR) "NPN" or		202-023-3
	MPS 9681(T)		203-009-6
Q204-Q205	KTA 1015(GR) "PNP" or		202-036-5
	MPS 9681(T)		203-009-6
Q206-Q207	KTC 1815(GR) "NPN" or		202-023-3
	MPS 9681(T)		203-009-6
Q301-Q302	KTC 1923(Y) "NPN" or		202-060-7
Q303	MPS 9426(C) "NPN"		203-005-2
Q304	KTC 1923(O) "NPN" or		202-017-8
	MPS 9426(C)		203-005-2
Q305	2SC 2314(F) TX PRE AMP		204-017-8
Q306	2SC 2078(D) TX Power AMP		204-010-1
Q501-Q503	KTA 1015(GR) "PNP" or		202-036-5
	MPS 9681(T)		203-009-6
Q504-Q505	MPS 9634(C) "NPN"		203-002-9
Q506	KTC 1959(O) "NPN" or		202-056-4
	MPS 9418(T)		202-010-6
Q507	Not Used		
Q508	KTC 1815(GR) "NPN"		202-023-3
	Transformers		
CT1	OPT		300-115-4
CH1	Choke		300-116-5
Main PCB			**514-32M-P**
1	P.C.B., Blank		411-020-D
2	Shield Plate, Vco Bottom, Spte		771-460
3	Insulation Plate, Vco Bottom, Fiber		906-025
4	EXT Jack		420-705-1
Main Body Assembly			**592-140**
5	Body, Main		702-225-A
6	Plate, Name		795-497
7	Rivet, Blind		670-025
PCB Subassembly			**514-32S-A**
LED1	LED Lamp, Green, 3V 20mA		251-088-2
LED2	LED Lamp, Red, 3V 20mA		251-090-3
8	LED Display, LTD323L		252-050-2
SW1	Self Switch RK124112HN04ZZZ		439-032-7
9	P.C.B., Blank		411-346-A

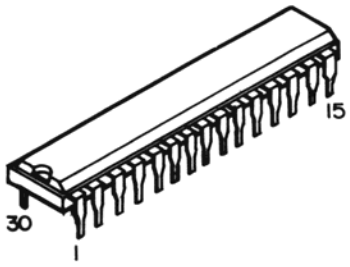
Ref. No.	Description	RS Part No.	Mfr. Part No.
	Miscellaneous		
C601	Ceramic 0.01μF 50V +80% / −20%		130-102-9
VR1	VR W/NUT, Washer 50KA, Volume		450-622-1
VR2	VR W/NUT, Washer 10KB, Squelch		450-424-9
11	5-Pin Socket, DIN Lock Type, Blk		421-513-2
12	Shield Can 90×25×0.3, Spte		770-336
13	Flat Wire, 6-Pin 70mm(2.5mm)		429-211-9
14	Heatsink (For IC KIA 7217) Large		761-640
15	Heatsink (For IC KIA 7217) Small		760-704
16	Mica (For TR 2SC 2078)		440-004-0
17	Cord Stopper		750-039
18	Receptacle, Ant W/NUT, Washer		421-046-7
19	ANT Holder Spte 29×35×0.3t Ni-Plat		731-791
20	Power Cord Assembly W/Fuse 250V 2A		504-055
21	Speaker C065A20-G0062 65M 8ohm		420-121-6
22	Cap, Speaker PE, Clear		830-043
23	Knob, Channel, Black		825-986
24	Knob, Volume, Squelch, Black		825-987
25	Fiber (Escutcheon)		906-389
26	Bracket		723-768
Upper Cover Assembly			**592-138**
27	Upper Cover, Black		717-885
28	Fiber, Insulation Plate 135×100×03t		906-025
29	Strip Felt 104×6×0.5t Black		906-020
Bottom Cover Assembly			**592-139**
30	Bottom Cover, Black		717-890
31	Strip Felt 104×6×0.5t Black		906-020
32	Strip Felt 100×10×0.3t Black		906-105
Escutcheon Assembly			**592-141**
33	Escutcheon, ABS, Black		801-268
34	Lens		813-831
Microphone Assembly			**514-32M-A**
M1	Bottom Cover, ABS 94HB BLK		716-630
M2	Upper Cover, ABS 94HB BLK		716-640-A
M3	Lever, ABS 94HB BLK		740-483-A
M4	Holder, ABS 94HB BLK		731-940
M5	Wire Clamp, Cord, Nylon		870-036
M6	Tapping Screw(F.H) 3×6−2S Zn-Plat		623-682

Ref. No.	Description	RS Part No.	Mfr. Part No.
M7	Tapping Screw(O.H) 3×16−2S Zn-Plat		623-830
M8	Condenser MIC., UM034CY		420-205-9
M9	Curled Cord		420-302-3
M10	5-Pin Plug		421-025-8
M11	Push Switch		432-058-3
M12	Name Plate		794-483
M13	Back Plate		794-880
M14	Holder, Rubber, BLK		892-890
M15	Polybag 150×250×0.05t		921-525-P
R601	Resistor, Carbonfilm 3.9K ohm 1/8W ±5%		002-392-4
Hardware Kit			**592-143**
N1	Nut, M3		651-024
S1	Machine Screw (F.H) 3×6−2S Zn		623-168
S2	Machine Screw (B.H) 3×10 Zn-Plat		613-332
S3	Tapping Screw (B.H) 3×6−2S Zn-Plat		623-265
W1	Washer (Spring) M3 Zn-Plat		662-305
35	Bushing (For TR 2SC2078)		441-004-5
S4	Tap Tite Screw (B.H) 3×6 BLK		633-082
S5	Machine Screw (F.H), M2.6×5, Zn		611-095
S6	Tap Tite Screw (B.H) 3×6 BLK		633-082
Installation Kit			**592-142**
36	Bracket, Set Mounting, BLK		723-495
S7	Screw, Securing, Black		600-718
W2	Washer Rubber 0.7×0.25×15t BLK		660-138
37	Bracket, Microphone		720-095
W3	Washer M3.5 Zn-Plat		664-703
W4	Washer M5.0 Zn-Plat		664-518
S8	Tapping Screw 3.5×6−2S Ni-Plat		620-084
S9	Tapping Screw 5×12−1S Zn-Plat		625-007

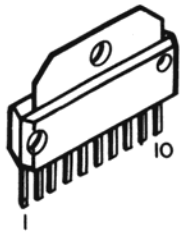
SEMICONDUCTOR LEAD IDENTIFICATION AND IC INTERNAL DIAGRAM

1. Integrated Circuits

IC-1 LC7185



IC-2 KIA 7217AP



2. Transistors

MPS 9623
MPS 9631
MPS 9634
MPS 9681
MPS 9418
MPS 9468

KTA 1015
KTC 1815
KTC 1959
KTC 1923

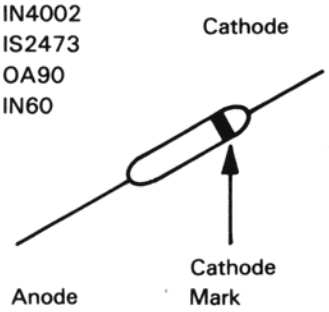
MPS 9426

2SC2314

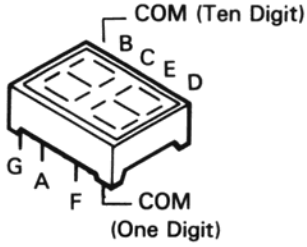
2SC2078

3. Diodes

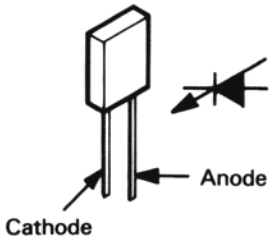
IN4002
IS2473
OA90
IN60



LED Display



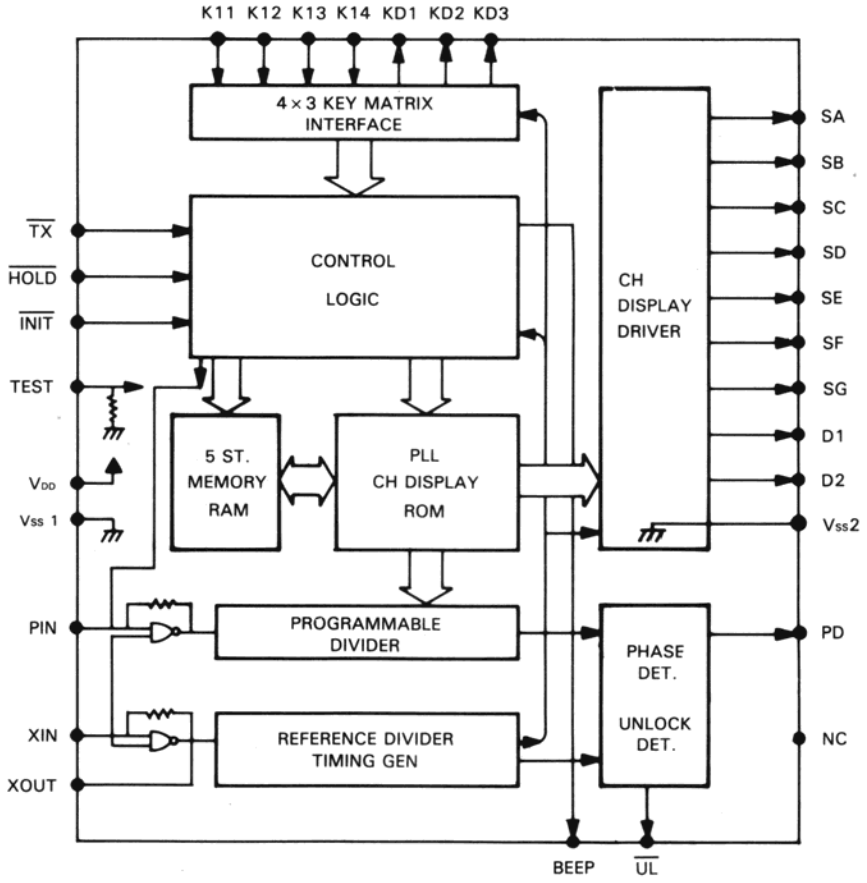
LED Lamp



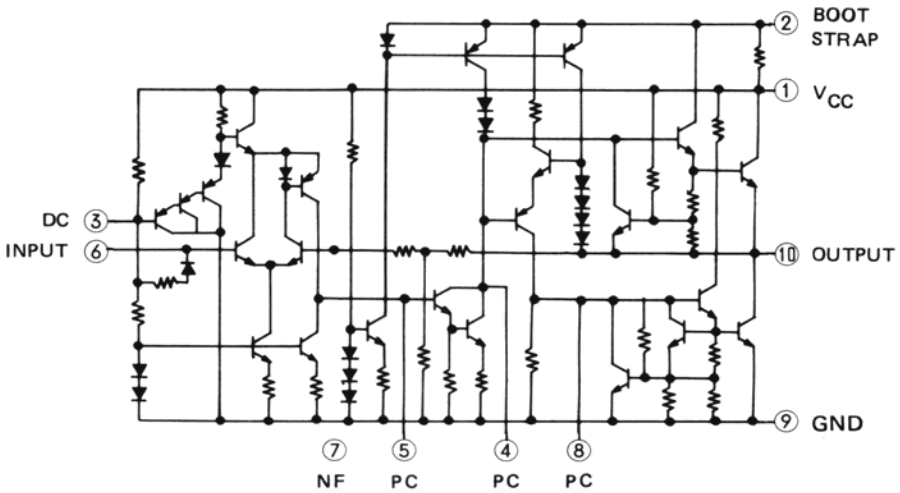
LTL-3213A RED
LTL-3233A GRN

MV2209

IC1 LC7185



IC2 KIA7217AP



DC: Decoupling
PC: Phase compensation
NF: Negative feedback

SCHEMATIC DIAGRAM

Cat No.: 21-1553

Note

1. RESISTANCE VALUES ARE INDICATED IN OHMS UNLESS OTHERWISE SPECIFIED. (K = 1,000, M = 1,000,000)
2. CAPACITANCE VALUES ARE SHOWN IN MICROFARADS UNLESS OTHERWISE NOTED. ($P = 10^{-12}$, $\mu = 10^{-6}$)
3. COMPONENT VALUES ARE SUBJECT TO CHANGE WITHOUT NOTICE.
4. ALL VOLTAGES ARE REFERENCED TO GROUND UNDER THE FOLLOWING CONDITIONS; DC : NO SIGNAL EXCEPT WHERE INDICATED.

SEMICONDUCTOR VOLTAGE CHART

Measured At
1. CH 9
2. No Signal
3. No Mod

1. Transistors

Unit : Volts

Pin / TRs	Emitter		Base		Collector	
	Receive	Transmit	Receive	Transmit	Receive	Transmit
Q101	0.82	0.07	1.65	0.36	4.78	0.79
Q102	0.84	0.00	1.57	0.38	11.83	12.78
Q103	0.05	0.00	0.62	0.09	4.77	0.82
Q104	0.97	0.00	1.66	0.39	3.03	0.82
Q105	0.34	0.00	1.07	0.17	13.54	12.80
Q106	0.12	0.09	0.48	0.12	0.32	0.00
Q201	0.08	0.00	0.60	0.13	0.08	0.00
Q202	0.00	0.00	0.00	0.00	0.00	0.00
Q203	0.02	0.02	0.20	0.12	1.07	1.05
Q204	0.58	3.53	1.21	4.15	0.00	0.00
Q205	13.76	13.40	13.75	12.63	0.58	13.36
Q206	0.00	0.00	0.01	0.01	0.08	0.00
Q207	0.37	0.37	1.06	1.05	0.44	0.43
Q301	0.00	0.00	0.74	0.74	3.03	2.86
Q302	4.60	4.54	5.04	5.07	8.14	8.07
Q303	0.00	1.46	0.00	2.18	0.06	8.39
Q304	0.00	1.06	0.00	1.74	13.51	12.14
Q305	0.00	0.00	0.00	0.32	13.53	11.91
Q306	0.00	0.00	0.00	0.11	13.53	11.91
Q501	6.71	6.56	6.04	5.91	4.44	4.36
Q502	6.71	6.56	6.03	5.90	4.08	4.02
Q503	8.58	8.51	8.58	7.78	0.00	8.44
Q504	0.59	0.59	1.01	1.01	3.60	2.42
Q505	0.00	0.00	0.59	0.60	3.60	2.42
Q506	8.58	8.51	9.24	9.20	13.03	12.12
Q508	0.00	0.00	0.00	0.68	1.34	0.00

2. ICs

IC	Pin No.	Voltage		IC	Pin No.	Voltage	
		Receiver	Transmitter			Receiver	Transmitter
IC1	1	2.58	2.49	IC1	21	0.00	0.00
	2	0.64	0.62		22	0.00	0.00
	3	0.64	0.62		23	2.87	2.88
	4	2.56	2.54		24	5.98	5.90
	5	4.24	4.12		25	5.97	5.90
	6	2.56	2.53		26	8.57	8.55
	7	2.56	2.54		27	1.02	1.03
	8	3.58	3.49		28	0.00	0.00
	9	3.56	3.49		29	0.00	0.00
	10	0.00	0.00		30	5.06	0.82
	11	0.00	0.00	IC2	1	13.79	13.41
	12	0.00	0.00		2	12.59	12.22
	13	0.00	0.00		3	3.98	3.88
	14	0.00	0.00		4	8.17	7.98
	15	1.52	1.47		5	1.50	1.50
	16	0.00	1.51		6	3.39	3.30
	17	0.00	0.01		7	3.40	3.31
	18	1.64	4.86		8	1.27	2.26
	19	3.00	2.96		9	0.00	0.00
	20	2.68	2.65		10	6.88	6.70