

REALISTIC[®]

Service Manual

21-1517

TRC-477

CB 40-Channel Transceiver

Catalog Number: 21-1517

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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) and 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.	

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Receiver

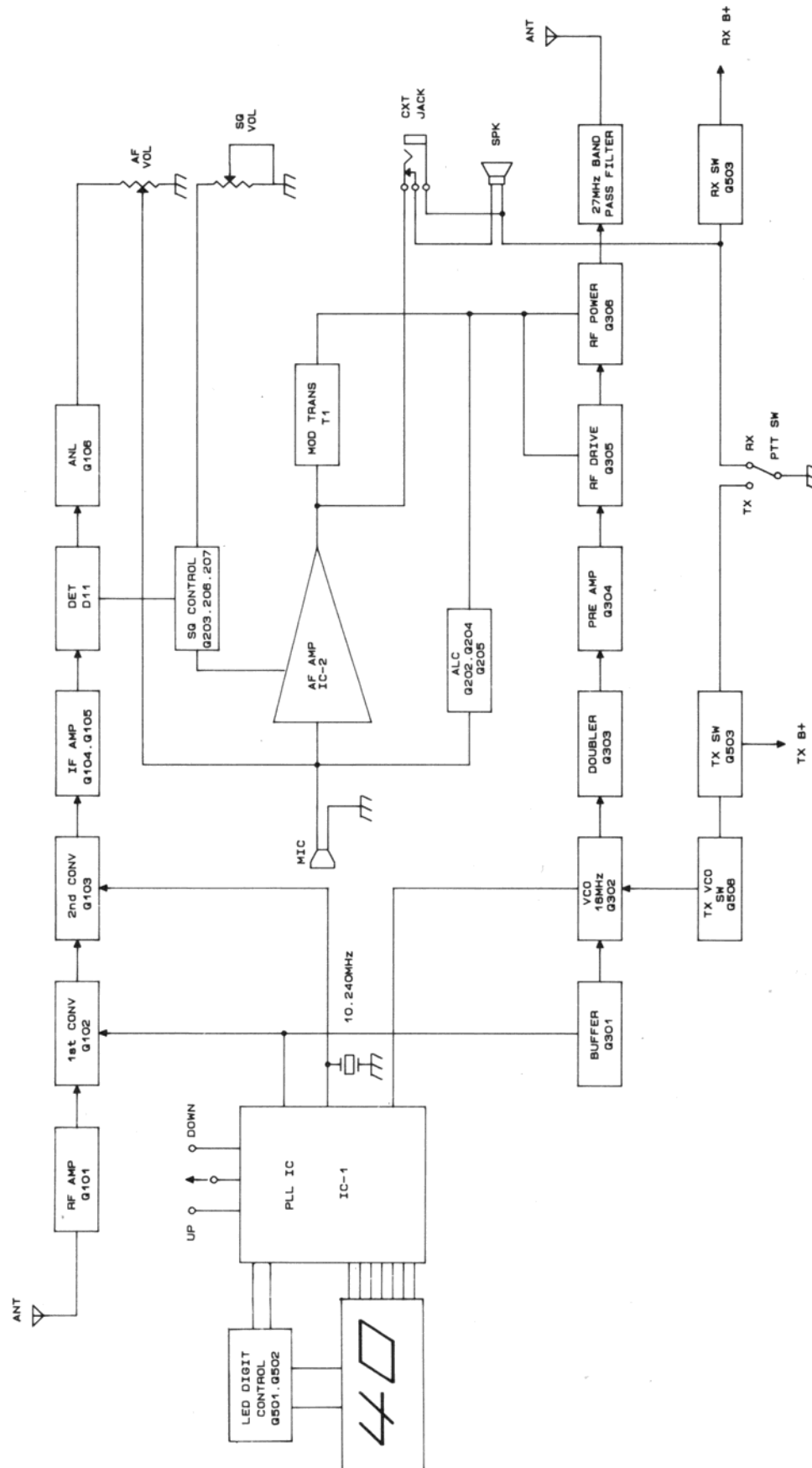
Description	Nominal	Limit
Intermediate frequency		
1st IF	10.695 MHz	
2nd IF	455 kHz	
Sensitivity for 500 mW output	0.3 μ V	1.0 μ V
Sensitivity at 10dB (S+N)/N	0.7 μ V	1.0 μ V
Adjacent channel rejection	65dB	55dB
Image rejection (1st IF/2nd IF)	70dB	60dB
IF rejection ratio (1st IF/2nd IF)	60dB	45dB
Signal-to-Noise 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 $\pm$ 3dB
2500 Hz	-6dB	-6 $\pm$ 3dB
Cross modulation	50dB	40dB
Squelch	60dB	60 $\pm$ 6dB
Current consumption at no signal	250mA	300mA

Other Items

Fuse	2 Amps/250V
General power requirement	12-16V DC
Dimensions	(W) 4 $\frac{1}{3}$ " (109mm) $\times$ (H) 1 $\frac{1}{3}$ " (33mm) $\times$ (D) 6 $\frac{1}{3}$ " (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 perform to less than any limit spec.

BLOCK DIAGRAM



CHANNEL FREQUENCY GENERATION CHART

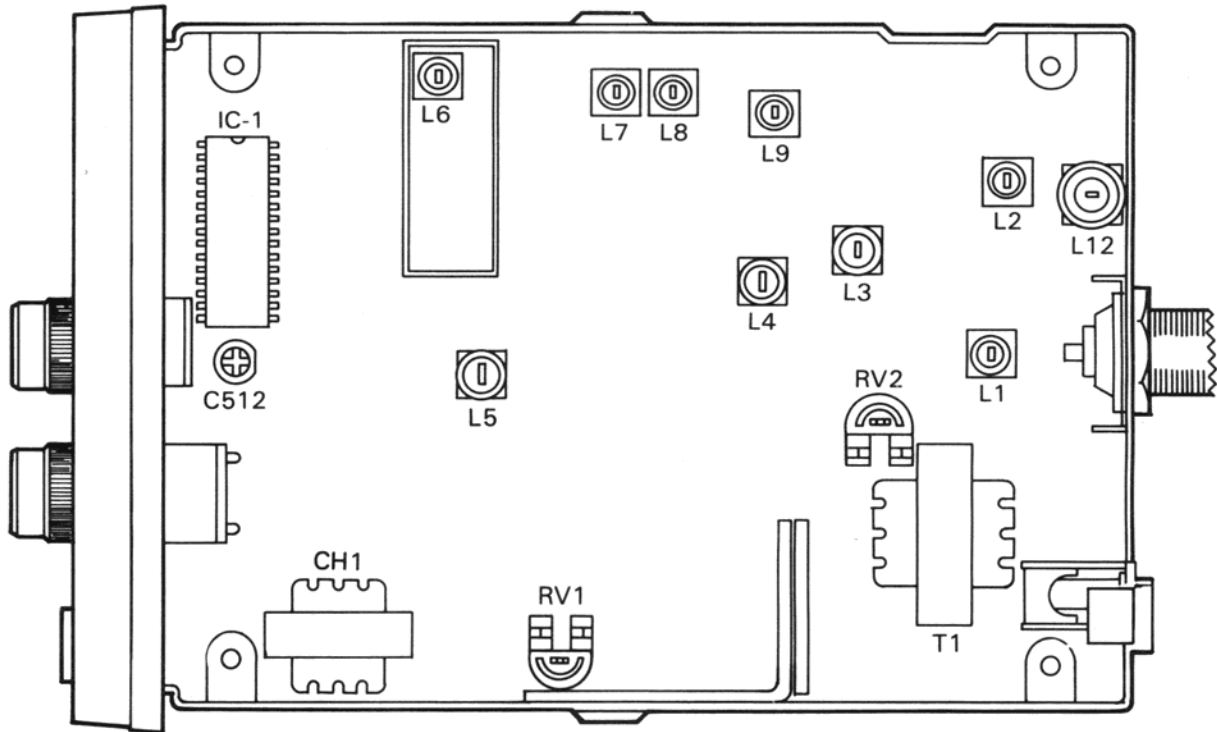
Receive VCO frequency = $N \times 2$ (KHz)

Transmit VCO frequency = $N \times 2.5$ (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

ALIGNMENT INSTRUCTIONS

1. Alignment Test Points and Parts Locations



2. Phase Locked Loop and CPU Section

A. Test Equipment Required

- Frequency Counter
- DC Power Supply
- DC Voltmeter
- 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 $\pm$ 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

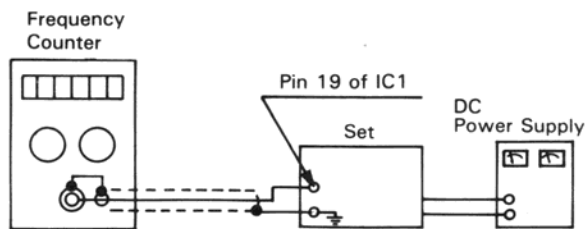


Figure 1

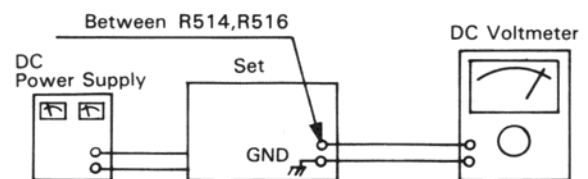


Figure 2

3. Transmitter Section

A. Test Equipment Required

- RF Power meter (RF SSVM)
- 50 ohm load (non-inductive)
- RF Attenuator
- Oscilloscope
- Audio Generator
- DC Power supply
- Spectrum Analyzer
- Frequency Counter
- 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 Channel 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	Make sure that the indication of the transmitter frequency is $27.185\text{MHz} \pm 300\text{Hz}$ on the frequency counter.

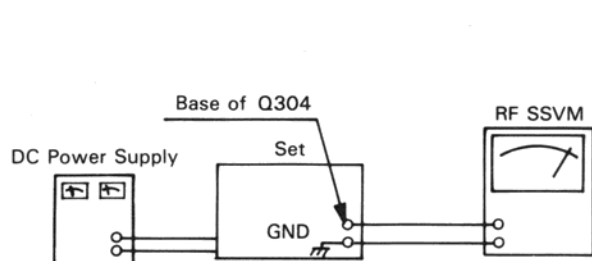


Figure 3

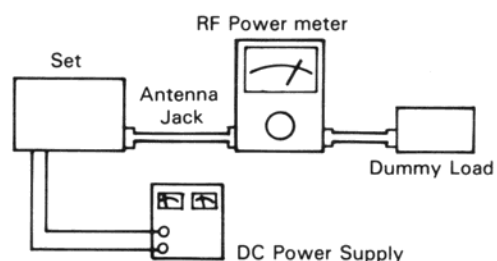


Figure 4

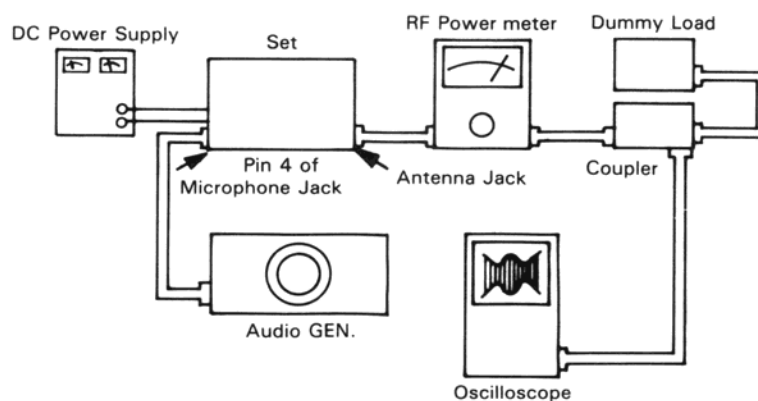


Figure 5

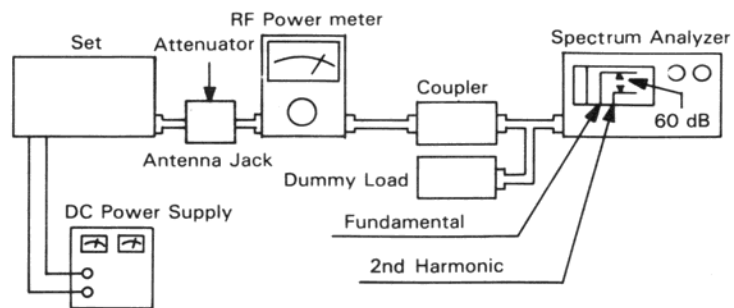


Figure 6

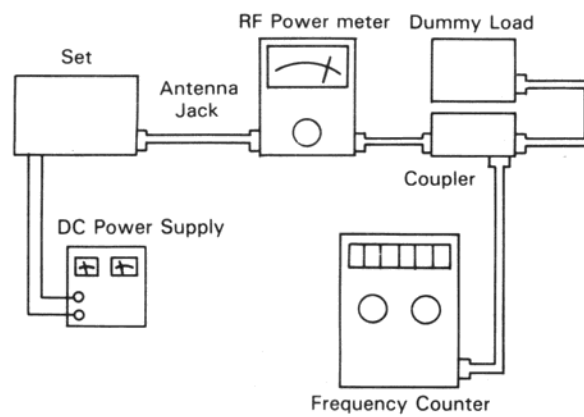


Figure 7

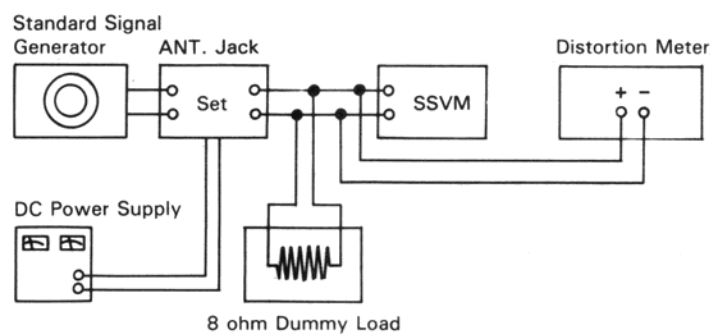


Figure 8

4. Receiver Section

A. Test Equipment Required

- Standard Signal Generator (SSG)
- SSVM
- Distortion Meter
- DC Power Supply

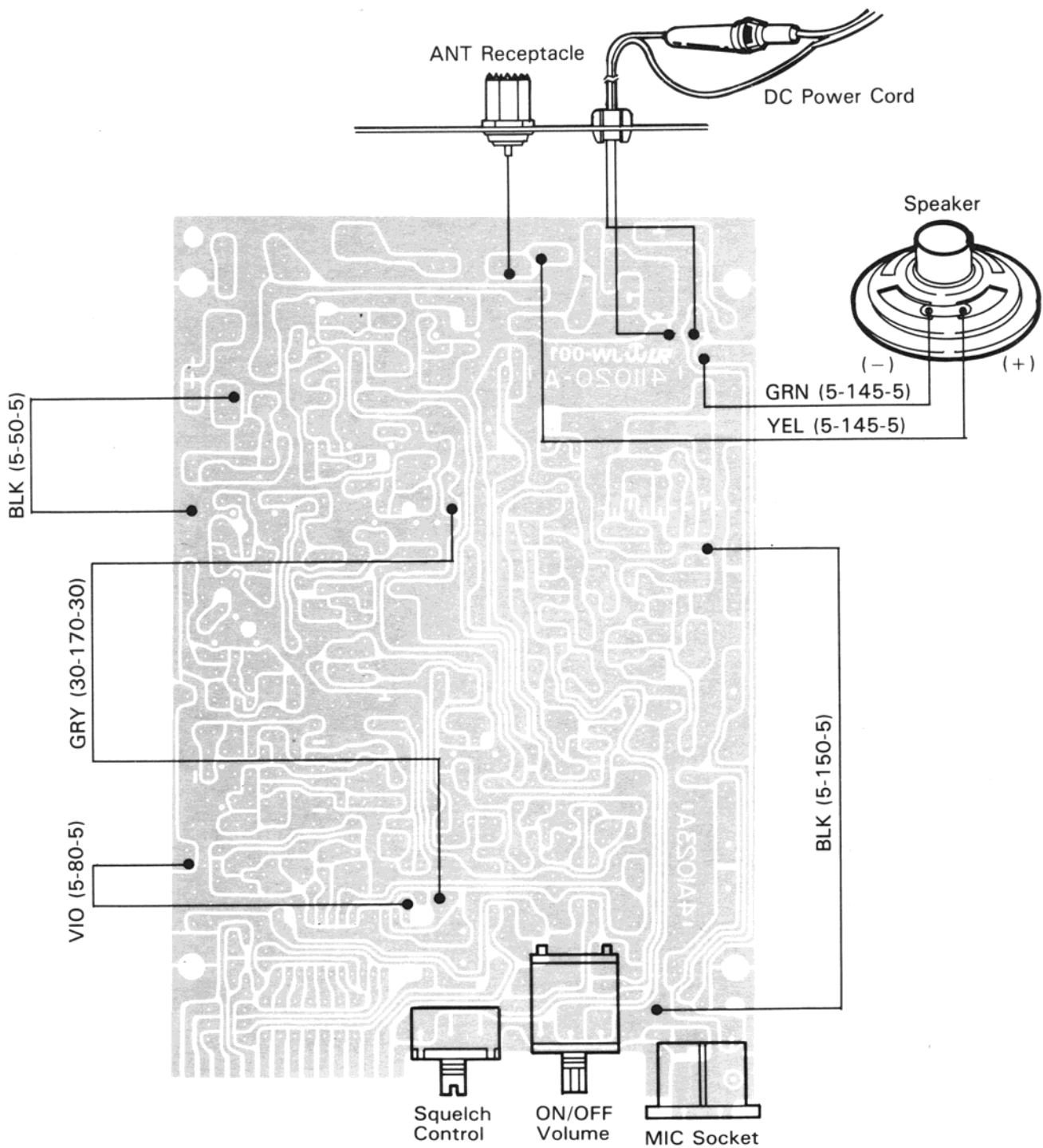
B. Alignment Procedure

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.

TROUBLESHOOTING HINTS

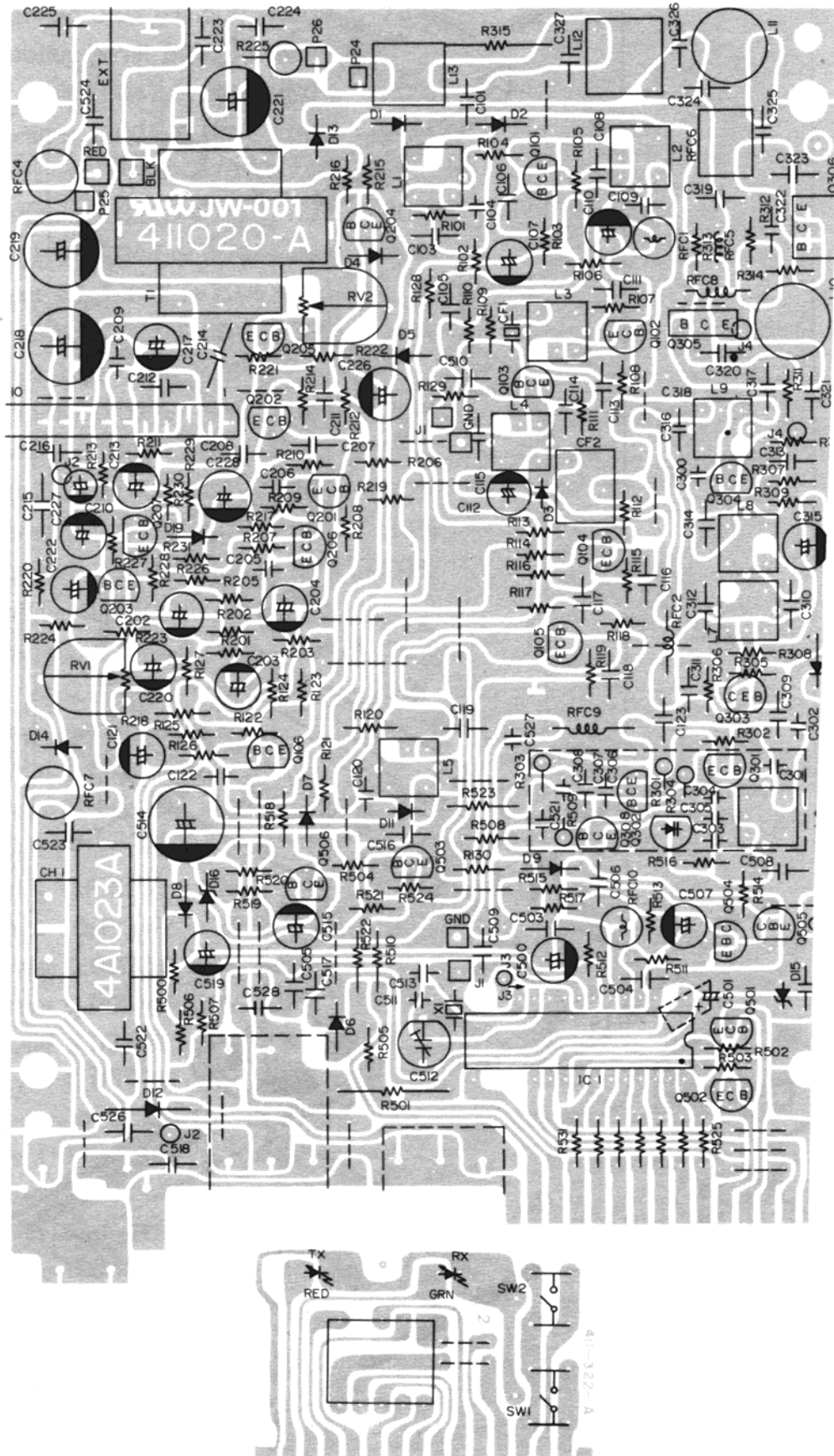
SYMPTOM	PROBABLE CAUSE	REMEDY
Unit does not work at all	1. Defective power switch VR102 2. Blown fuse 3. Broken DC power cord	1. Replace 2. Replace 3. Replace
No output from speaker at all	1. Defective external speaker jack 2. Poor connection on microphone connector 3. Defective push switch on microphone 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 the pages 29, 30. 2. Defective squelch circuit componets (RV1, VR2, IC2, Q203, Q206, Q207)	1. Replace defective component(s) 2. Replace if defective
Squelch does not work	1. Defective (VR2, RV2, Q203, Q206, 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, SW2	1. Replace

WIRING DIAGRAM

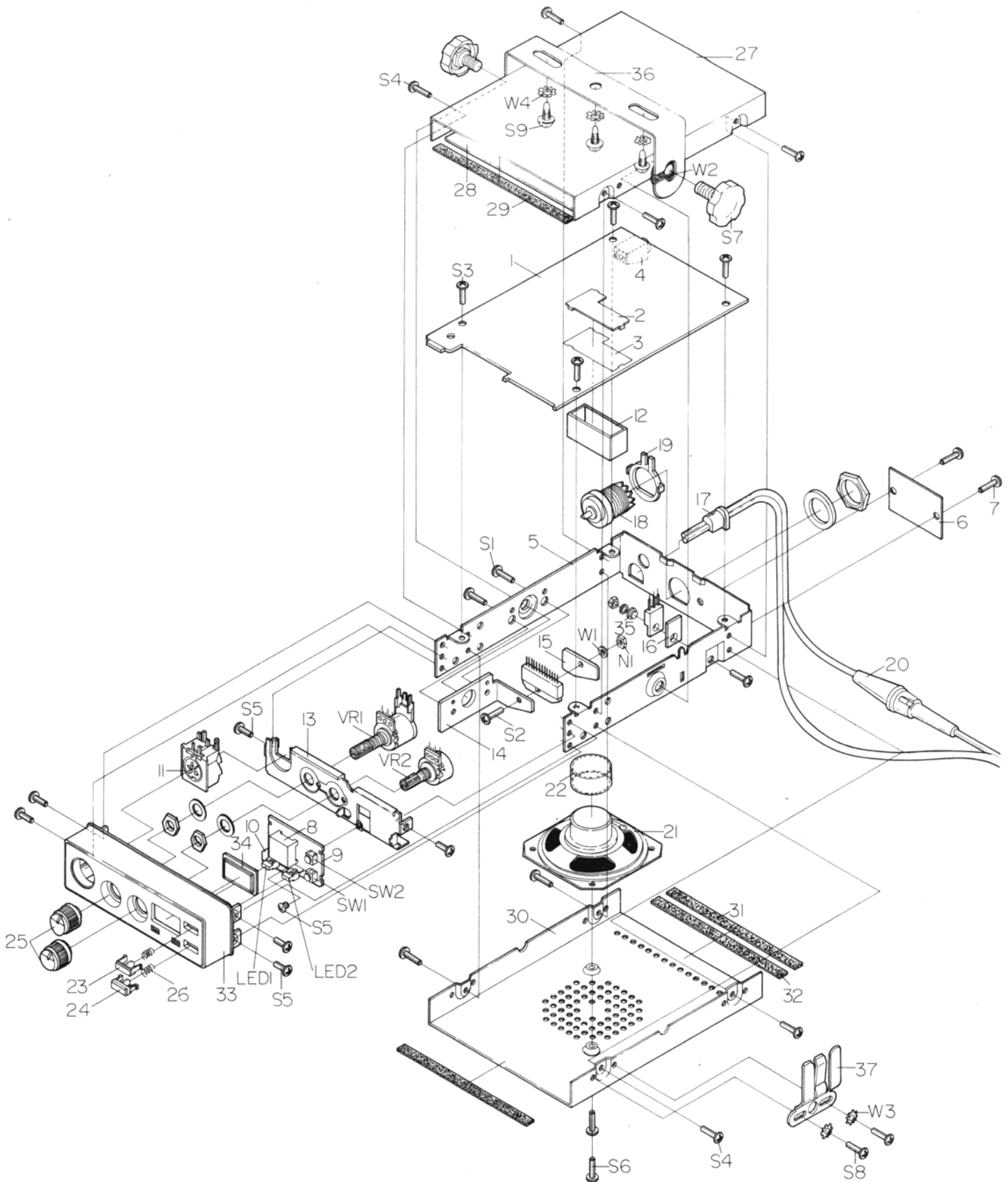


Main PCB/Display PCB

Bottom View



EXPLODED VIEW/DISASSEMBLY



ELECTRICAL PARTS LIST

Ref. No.	Description	RS Part No.	MFR. Part No.
Ass'y Main PCB			512-50M-P
C101	Ceramic 22pF 50V +80% -20%		130-201-5
C103	Ceramic 0.022 μ F 50V +80% -20%		130-207-1
C104	Ceramic 47pF 50V +80% -20%		134-701-0
C105	Ceramic 0.047 μ F 50V +80% -20%		130-405-3
C106	Ceramic 0.022 μ F 50V +80% -20%		130-207-1
C107	Elect 10 μ F 16V $\pm$ 20%		101-012-7
C108	Ceramic 0.022 μ F 50V +80% -20%		130-207-1
C109	Ceramic 0.047 μ F 50V +80% -20%		130-405-3
C110	Elect 22 μ F 16V $\pm$ 20%		102-250-0
C111	Ceramic 0.022 μ F 50V +80% -20%		130-207-1
C112	Elect 10 μ F 16V $\pm$ 20%		101-012-7
C113	Ceramic 0.022 μ F 50V +80% -20%		130-207-1
C114	Ceramic 1000P 50V +80% -20%		131-004-9
C115	Ceramic 0.022 μ F 50V +80% -20%		130-207-1
C116	Ceramic 0.047 μ F 50V +80% -20%		130-405-3
C117	Ceramic 0.001 μ F 50V +80% -20%		130-101-8
C118	*Mylar 0.047 μ F 50V $\pm$ 5%		194-702-9
C119	Ceramic 0.047 μ F 50V +80% -20%		130-405-3
C120	Mylar 0.0068 μ F 50V +80% -20%		196-802-6
C121	Elect 1 μ F 50V $\pm$ 5%		101-006-2
C122	Mylar 0.01 μ F 50V $\pm$ 5%		191-001-4
C123	Ceramic 5P 50V +80% -20%		135-005-0
C202	Elect 0.1 μ F 50V $\pm$ 20%		100-001-9
C203	Elect 1 μ F 50V $\pm$ 20%		101-006-2
C204	Elect 10 μ F 16V $\pm$ 20%		101-012-7
C205	Mylar 0.0082 μ F 50V $\pm$ 5%		198-201-3
C206	Mylar 0.0068 μ F 50V $\pm$ 5%		196-802-6
C207-208	Mylar 0.033 μ F 50V $\pm$ 5%		193-302-6
C209	Mylar 0.0047 μ F 50V $\pm$ 5%		194-701-8
C210	Tantalum 3.3 μ F 16V $\pm$ 20%		143-301-0
C211	Elect 0.1 μ F 50V $\pm$ 20%		100-001-9
C212	Ceramic 220pF 50V +80% -20%		132-204-8
C213	Elect 33 μ F 16V $\pm$ 20%		103-313-9
C214-215	Mylar 0.068 μ F 50V $\pm$ 5%		196-803-7
C216	Ceramic 220pF 50V +80% -20%		132-204-8
C217	Elect 47 μ F 16V $\pm$ 20%		104-712-1
C218	Elect 220 μ F 16V $\pm$ 20%		102-223-6
C219	Elect 1000 μ F 16V $\pm$ 20%		101-048-0
C220	Elect 22 μ F 16V $\pm$ 20%		102-250-0
C221	Elect 100 μ F 16V $\pm$ 20%		101-022-6

Note: 1. *Mylar is a registered trademark of E.I. Du Pont de Nemours and Company
2. Ref. Nos not used: C102/C124-C199

Ref. No.	Description	RS Part No.	MFR. Part No.
C222	Elect 33 μ F 16V $\pm$ 20%		103-313-9
C223	Ceramic 0.01 μ F 50V +80% -20%		130-102-9
C224-225	Ceramic 0.001 μ F 50V +80% -20%		130-101-8
C226	Elect 47 μ F 16V $\pm$ 20%		104-712-1
C227	Elect 10 μ F 16V $\pm$ 20%		101-012-7
C228	Elect 47 μ F 16V $\pm$ 20%		104-712-1
C300	Ceramic 68P 50V $\pm$ 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 $\pm$ 50%		164-701-9
C304	Ceramic 33P 50V +80% -20%		133-301-7
C305	Ceramic 27P (NPO) 50V $\pm$ 10%		132-705-4
C306	Ceramic 220P 50V +80% -20%		132-204-8
C307	Ceramic 120P 50V +80% -20%		131-202-1
C308	Ceramic 0.01 μ F 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 0.022 μ F 50V +80% -20%		130-207-1
C312-313	Ceramic 0.01 μ F 50V +80% -20%		130-102-9
C314	Ceramic 100P (NPO) 50V $\pm$ 10%		131-020-3
C315	Elect 2.2 μ F 16V $\pm$ 20%		102-204-9
C316	Ceramic 0.047 μ F 50V +80% -20%		130-405-3
C317	Ceramic 100P (NPO) 50V $\pm$ 10%		131-020-3
C319	Ceramic 0.022 μ F 50V +80% -20%		130-207-1
C320	Ceramic 82P (NPO) 50V $\pm$ 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 (NPO) 50V $\pm$ 10%		136-002-2
C324	Ceramic 47pF 50V +80% -20%		134-701-0
C325	Ceramic 100P (NPO) 50V $\pm$ 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 1 μ F 50V $\pm$ 20%		101-006-2
C501	Elect 470 μ F 16V $\pm$ 20%		104-723-1
C502-506	Ceramic 0.01 μ F 50V +80% -20%		130-102-9
C507	Elect 0.47 μ F 50V $\pm$ 20%		100-405-4
C508	Mylar 0.047 μ F 50V $\pm$ 5%		194-702-9
C509	Ceramic 4P 50V +80% -20%		134-003-3
C510	Ceramic 10P 50V +80% -20%		131-002-7
C511	Mica 39P 50V $\pm$ 5%		163-901-8
C512	Trimer 20P		172-002-4

Ref. Nos not used: C229-C299/C329-C499

Ref. No.	Description	RS Part No.	MFR. Part No.
C513	Mica 39P 50V $\pm 5\%$		163-901-8
C514	Elect 220 μ F 16V $\pm 20\%$		102-223-6
C515	Elect 47 μ F 16V $\pm 20\%$		104-712-1
C516-517	Ceramic 0.01 μ F 50V +80% -20%		130-102-9
C518	Ceramic 0.001 μ F 50V +80% -20%		130-101-8
C519	Elect 10 μ F 16V $\pm 20\%$		101-012-7
C521-524	Ceramic 0.01 μ F 50V +80% -20%		130-103-0
C526	Ceramic 0.01 μ F 50V +80% -20%		130-103-0
C527	Ceramic 6P 50V +80% -20%		136-001-1
C528	Ceramic 0.01 μ F 50V +80% -20%		130-102-9
C529	Ceramic 0.001 μ F 50V +80% -20%		130-101-8
Coils			
L 1	27MHz RX ANT		320-314-3
L 2	27MHz RF AMP (RX)		320-315-4
L 3	10.6MHz RF 1st Mixer		320-316-5
L 4	IFT 455MHz-A		320-154-5
L 5	IFT 455MHz-B		320-155-6
L 6	VCO		320-317-6
L 7-8	27MHz RF PRE AMP A		320-318-7
L 9	27MHz RF PRE AMP B		320-319-8
L10	0.25 μ H		310-047-9
L11	0.65 μ H		310-068-8
L12	27MHz TX ANT Tuning		320-034-0
L13	0.32 μ H		310-054-5
RFC1	100 μ H		310-096-3
RFC2-3	6.8 μ H		310-121-2
RFC4	0.8 μ H		310-072-1
RFC5	2.2 μ H		310-039-2
RFC6	0.5 μ H		310-065-5
RFC7	20 μ H		310-034-7
RFC8	6.8 μ H		310-121-2
RFC9	4 μ H		310-100-3
RFC10	22 μ H		310-114-6
X1	Crystal, 10.240MHz HC-18/U		260-003-3
Diodes			
D 1-10	IS2473		243-004-3
D11-12	OA90		244-003-7
D13-14	IN4002		245-004-3
D15	8.2B 1W		241-050-4
D16	9.1B		241-020-7

Ref. No.	Description	RS Part No.	MFR. Part No.
D18	Varocap MV2209		242-006-0
D19	IS2473		243-004-3
D20	OA90		244-003-7
Filters			
CF1	Ceramic 10.7MJ		270-010-2
CF2	Ceramic CFU 455HT –or– Ceramic CFU 455P		270-006-9 270-064-1
IC's			
IC1	LC 7185, P.L.L		224-063-5
IC2	KIA 7217AP, Audio		222-006-4
Resistors Carbonfilms		Note: Unless otherwise specified, all the resistors are carbonfilm, 1/16W, $\pm 5\%$.	
R101	330 ohm "S"		002-331-9
R102	33k ohm "S"		002-333-1
R103	680 ohm "S"		002-681-5
R104	18 ohm "S"		002-180-9
R105	100 ohm "S"		002-101-8
R106	2.7k ohm "S"		002-272-9
R107	220 ohm "S"		002-221-3
R108	470 ohm "S"		002-471-2
R109	560 ohm "S"		002-561-0
R110	3.9k ohm "S"		002-392-4
R111	100 ohm "S"		002-101-8
R112	1.8k ohm "S"		002-182-1
R113	10k ohm "S"		002-103-0
R114	150k ohm "S"		002-154-6
R115	470 ohm "S"		002-471-2
R116	1k ohm "S"		002-102-9
R117	12k ohm "S"		002-123-8
R118	3.3k ohm "S"		002-332-0
R119	220 ohm "S"		002-221-3
R120	47 ohm "S"		002-470-1
R121	22k ohm "S"		002-223-5
R122	47k ohm "S"		002-473-4
R123	330k ohm "S"		002-334-2
R124	82k ohm "S"		002-823-7
R125	33k ohm "S"		002-333-1
R126	47k ohm "S"		002-473-4
R127	15k ohm "S"		002-153-5

Ref. No.	Description	RS Part No.	MFR. Part No.
R128	27k ohm "S"		002-273-0
R129	470 ohm "S"		002-471-2
R130	330 ohm "S"		002-331-9
R201-202	2.2k ohm "S"		202-222-4
R203	4.7k ohm "S"		002-472-3
R205	3.3k ohm "S"		002-332-0
R206	100k ohm "S"		002-104-1
R207	27k ohm "S"		002-273-0
R208	470k ohm "S"		002-474-5
R209	22k ohm "S"		002-223-5
R210	3.3k ohm "S"		002-332-0
R211-212	2.2k ohm "S"		002-222-4
R213	56 ohm "S"		002-560-9
R214	33k ohm "S"		002-333-1
R215	470 ohm "S"		002-471-2
R216	10k ohm "S"		002-103-0
R217	1k ohm "S"		002-102-9
R218	10k ohm "S"		002-103-0
R219	47 ohm "S"		002-470-1
R220	1 ohm "S"		002-109-6
R221	4.7k ohm "S"		002-473-2
R222	8.2k ohm "S"		002-472-3
R223	5.6k ohm "S"		002-562-1
R224	1.8k ohm "S"		002-182-1
R225	15 ohm 2W $\pm$ 5% Metal Oxide		019-150-0
R226	10 ohm "S"		002-100-7
R227	2.7k ohm "S"		002-272-9
R228	100 ohm "S"		002-101-8
R229	100k ohm "S"		002-104-1
R230	3.9k ohm "S"		002-392-4
R231	1k ohm "S"		002-109-2
R232	39k ohm "S"		002-393-5
R301	820 ohm "S"		002-821-5
R302	120k ohm "S"		002-124-9
R303	2.7k ohm "S"		002-272-9
R304	220k ohm "S"		002-224-6
R305	150k ohm "S"		002-154-6
R306	390 ohm "S"		002-391-3
R307-309	4.7k ohm "S"		002-472-3
R310	68 ohm "S"		002-680-4
R311-312	100 ohm "S"		002-101-8
R313	220 ohm "S"		002-221-3
R314	2.2 ohm "S"		002-229-1

Ref. Nos not used: R204/R233-R300

Ref. No.	Description	RS Part No.	MFR. Part No.
R315	1/2W $\pm 5\%$ Metal Oxide		030-472-2
R500	1k ohm "S"		002-102-9
R501	1/2W $\pm 5\%$ Metal Oxide		030-101-7
R502-503	3.3k ohm "S"		002-332-0
R504	10k ohm "S"		002-103-0
R505	220 ohm "S"		002-221-3
R506	270k ohm "S"		002-274-1
R507	390k ohm "S"		002-394-6
R508-509	10k ohm "S"		002-103-0
R510	1k ohm "S"		002-102-9
R511	2.2k ohm "S"		002-222-4
R512	10k ohm "S"		002-103-0
R513	33k ohm "S"		002-333-1
R514	82k ohm "S"		002-823-7
R515	4.7k ohm "S"		012-472-3
R516	22k ohm "S"		001-223-5
R517-518	22 ohm "S"		001-220-3
R519	100 ohm "S"		001-101-8
R520-521	470 ohm "S"		001-471-2
R522	560 ohm "S"		002-561-0
R523	47 ohm "S"		002-470-1
R524	4.7k ohm "S"		002-472-3
R525-531	150 ohm "S"		002-151-3
RV1	Semifixed 10kB 8Dia $\pm 25\%$		061-103-1
RV2	Semifixed 5kB 8Dia $\pm 25\%$		061-502-1
Transistors			
Q101-103	MPS1923(O), NPN -or- MPS9426(C), NPN		203-017-8 203-005-2
Q104-105	KTC1923(Y), NPN -or- MPS9623(O), NPN		202-060-7 203-011-7
Q106	KTA1015(GR), PNP -or- MPS9681(T), PNP		202-036-5 203-009-6
Q201-203	KTC1815(GR), NPN -or- MPS9681(T), NPN		202-023-3 203-009-6
Q204-205	KTA1015(GR), PNP -or- MPS9681(T), PNP		202-036-5 203-009-6
Q206-207	KTC1815(GR), NPN -or- MPS9681(T), NPN		202-023-3 203-009-6
Q301-302	KTC1923(Y), NPN		202-060-7
Q303	MPS9426(C), NPN		203-005-2

Ref. Nos not used: R316-R499

Ref. No.	Description	RS Part No.	MFR. Part No.
Q304	KTC1923(O), NPN –or– MPS9426(C), NPN		202-017-8 203-005-2
Q305	2SC2314(F), NPN, TX PRE AMP		204-016-7
Q306	2SC2078(D), NPN, TX Power AMP		204-010-1
Q501-503	KTA1015(GR) PNP –or– MPS9681(T), NPN		202-036-5 203-009-6
Q504-505	MPS9634(C), NPN		203-002-9
Q506	KTC1959(O), NPN –or– MPS9418(T), NPN		202-056-4 202-010-6
Q508	KTC1815(GR), NPN		202-023-3
Transformers			
T1	Output Transformer (OPT)		300-115-4
CH1	Choke		300-045-4
1	P.C.B, Main		411-020-B
2	Shield Plate, VCO Bottom, SPTE		771-460
3	Insulation Plate VCO Bottom, Fiber		905-625
4	EXT Jack		420-707-6
Ass'y Main Body			592-140
5	Body Main		702-225
6	Plate Name for U.S.A Plate Name for Canada Plate name for AUST.		794-875 794-876 794-877
7	Rivet, Blind		670-025
Ass'y PCB Sub			593-032
LED1	LED Lamp Green 3V 20mA		251-029-9
LED2	LED Lamp Red 3V 20mA		251-016-7
8	LED Display LTD323L		252-050-2
SW1-2	Tack Switch SAT-1102-2		436-020-1
9	P.C.B, Sub		411-322-B
10	Strip-Felt, Light Cutter, 31 × 8.5 × 1T, BLK		906-136
Miscellaneous			
C328	Ceramic 150P (NPO) 50V ± 10%		131-510-9
VR1	Resistor Variable W/Nut, Washer 50KA, Volume		450-622-1
VR2	Resistor Variable W/Nut, Washer 10KB, Squelch		450-424-9
11	Socket 5Pin, DIN, Lock Type, BLK		421-513-2
12	Can Shield 90 × 25 × 0.3T, SPTE		770-336
13	Body Front		702-230

Ref. No.	Description	RS Part No.	MFR. Part No.
14	Heatsink (For IC KIA7217) Large		761-640
15	Heatsink (For IC KIA7217) Small		760-704
16	Mica (For TR 2SC 2078)		440-004-0
17	Stopper Cord		750-039
18	Receptacle ANT, W/Nut, Washer		421-046-7
19	Holder ANT, SPTE, 29×35×0.3T Ni-Plate		731-791
20	Ass'y Cord Power W/Fuse 250V 2A		504-055
21	Speaker C065A20-G0062 65M 8 ohm		420-121-6
22	Cap, Speaker PE, Clear		830-043
23	Knob, Channel Up		825-011
24	Knob, Channel Down		825-006
25	Knob, Control		825-116
26	Spring For CH Knob		881-425
Ass'y Upper Cover			592-138
27	Upper Cover, Black		717-885
28	Fiber, Insulation Plate 135×100×0.3T		906-025
29	Strip Felt 104×6×0.5T, Black		906-020
Ass'y Bottom Cover			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
Ass'y Escutcheon			592-141
33	Escutcheon, ABS Black		801-195
34	Lens, Acyle		813-666
Ass'y Microphone			512-50M-A
M1	Cover Bottom, ABS 94HB BLK		716-630
M2	Cover Upper, ABS 94HB BLK		716-640
M3	Lever, ABS 94HB BLK		740-483
M4	Holder, ABS 94HB BLK		731-940
M5	Clamp Wire (Cord), Nylon		870-036
M6	Screw Tapping (F.H), 3×8-2S Zn-Plate		623-654
M7	Screw Tapping (O.H), 3×16-2S Zn-Plate		623-830
M8	MIC Condenser UM034CY		420-205-9
M9	Cord Curled		420-302-3
M10	Plug 5Pin		421-025-8
M11	Switch Push		432-034-1
M12	Plate Name		794-483

Ref. No.	Description	RS Part No.	MFR. Part No.
M13	Plate Back		794-880
M14	Rubber Holder, BLK		892-890
R601	Resistor Carbonfilm 3.9k ohm 1/16W $\pm 5\%$		002-392-4
Hardware KIT			592-143
N1	Nut M3		651-024
S1	Screw Machine (F.H), 3 $\times$ 6-2S ZNY		623-168
S2	Screw Machine (B.H), 3 $\times$ 10 Zn-Plate		613-332
S3	Screw Tapping (B.H), 3 $\times$ 6-2S Zn-Plate		623-265
W1	Washer Spring M3 Zn-Plate		662-305
35	Bushing For TR 2SC2078		441-004-5
S4	Screw Tap Tite (B.H), 3 $\times$ 6 BLK		633-082
S5	Screw Maching (F.H), M2.6 $\times$ 5 Zn-Plate		611-095
S6	Screw Tap Tite (B.H), 3 $\times$ 6 BLK		633-082
W3	Washer M3.5 ZNY		664-703
W4	Washer M5 ZNY		664-518
S8	Screw Tapping, 3.5 $\times$ 6-2S Ni-Plate		620-084
S9	Screw Tapping, 5 $\times$ 12-1S ZNY		625-007
Installationa KIT			592-142
36	Bracket-Set Mounting, BLK		722-080
S7	Screw-Securing, Black		600-051
W2	Washer Rubber 0.7 $\times$ 0.25 $\times$ 15T, BLK		660-138
37	Bracket-Microphone		720-095

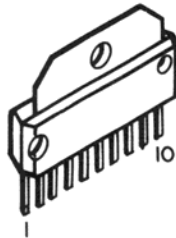
EXPLODED VIEW PARTS LIST

Ref. No.	Description	RS Part No.	Mfr's Part No.
1	P.C.B, Main		411-020-B
2	Shield Plate, VCO Bottom, SPTE		771-460
3	Insulation Plate, VCO Bottom, Fiber		905-625
4	Ext Jack		420-707-6
5	Body Main		702-225
6	Plate Name		794-875
7	Rivet, Blind		670-025
8	LED Display LTD 323L		252-050-2
9	P.C.B, Sub		411-322-B
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 90×25×0.3T, SPTE		770-336
13	Body Front		702-230
14	Heatsink (For IC KIA 7217) Large		761-640
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16	Mica (For TR 2SC 2078)		440-004-0
17	Stopper Cord		750-039
18	Receptacle ANT, W/Nut, Washer		421-046-7
19	Holder ANT, SPTE, 29×35×0.3T, Ni-Plate		731-791
20	Ass'y Cord Power W/Fuse 250V 2A		504-055
21	Speaker C065A20-G0062 65M 8 ohm		420-121-6
22	Cap, Speaker PE, Clear		830-043
23	Knob, Channel Up		825-011
24	Knob, Channel Down		825-006
25	Knob, Control		825-116
26	Spring For CH Knob		881-425
27	Upper Cover, Black		717-885
28	Fiber, Insulation Plate 135×100×0.3T		906-025
29	Strip Felt 104×6×0.5T, Black		906-020
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
33	Escutcheon, ABS Black		801-195
34	Lens, Acyle		813-666
35	Bushing For TR 2SC2078		441-004-5
36	Bracket-Set Mounting, Black		592-142
37	Bracket-Microphone		720-095
LED1	LED Lamp Green 3V 20mA		251-029-9
LED2	LED Lamp Red 3V 20mA		251-016-7
SW1, 2	Tack Switch SAT-1102-2		436-020-1
VR1	Resistor Variable, W/Nut, Washer 50KA, Volume		450-622-1
VR2	Resistor Variable, W/Nut, Washer 10KA, Squelch		450-424-9
N1	Nut M3		651-024
S1	Screw Machine(F.H) 3×6 – 2S ZNY		623-168
S2	Screw Machine(B.H) 3×10 Zn-Plate		613-332
S3	Screw Tapping (B.H) 3×6 – 2S Zn-Plate		623-265
S4	Screw Tap Tite (B.H) 3×6 BLK		633-082
S5	Screw Maching (F.H) M2.6×5 Zn-Plate		611-095
S6	Screw Tap Tite (B.H) 3×6 BLK		633-082
S7	Screw-Securing, Black		600-051
S8	Screw Tapping 3.5×6 – 2S Ni-Plate		620-084
S9	Screw Tapping 5×12 – 1S ZNY		625-007
W1	Washer Spring M3 Zn-Plate		662-305
W2	Washer Rubber 0.7×0.25×15T, BLK		660-138
W3	Washer M3.5 ZNY		664-703
W4	Washer M5 ZNY		664-518

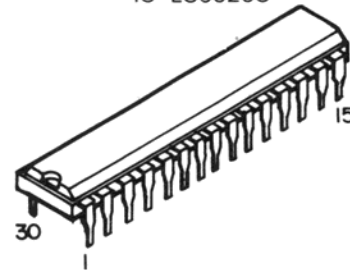
SEMICONDUCTOR LEAD IDENTIFICATION AND IC INTERNAL CONNECTION

Integrated Circuits

IC KIA7217AP



IC LC6526C



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

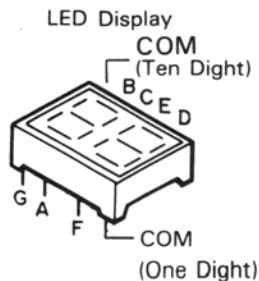
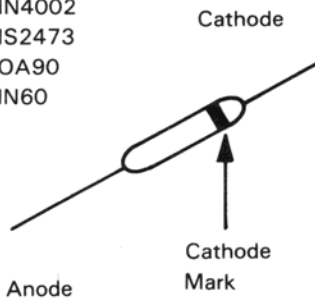


MJF1033S

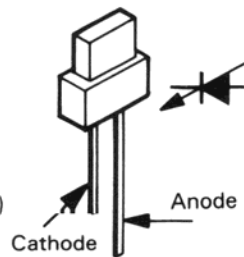


Diodes

IN4002
IS2473
OA90
IN60



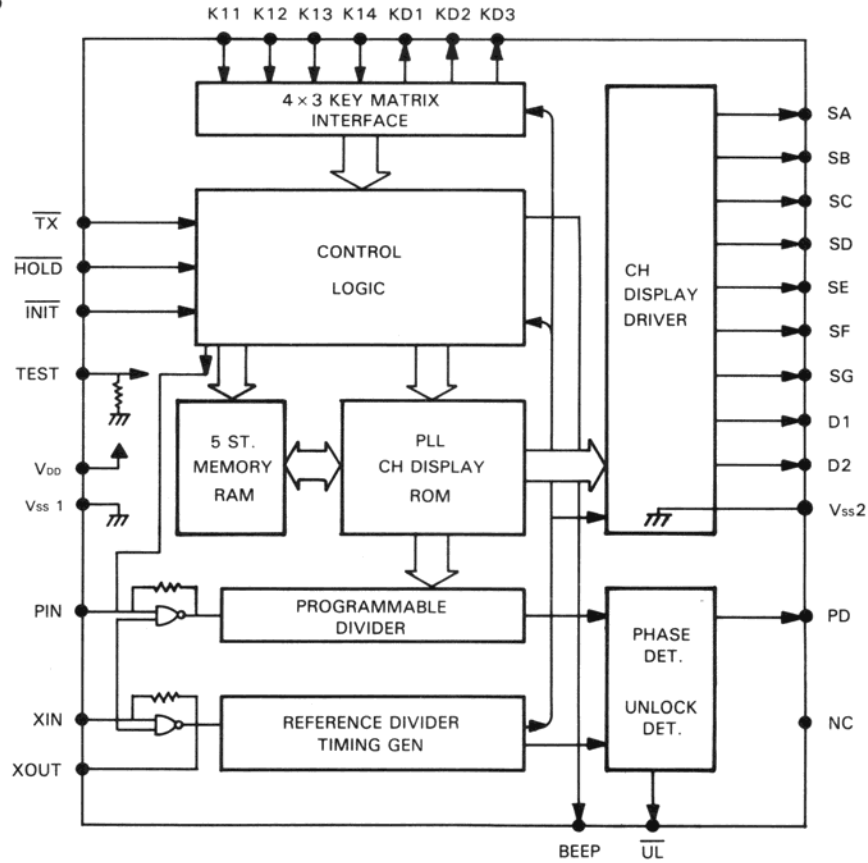
LED Lamp
SLB26UR3HL



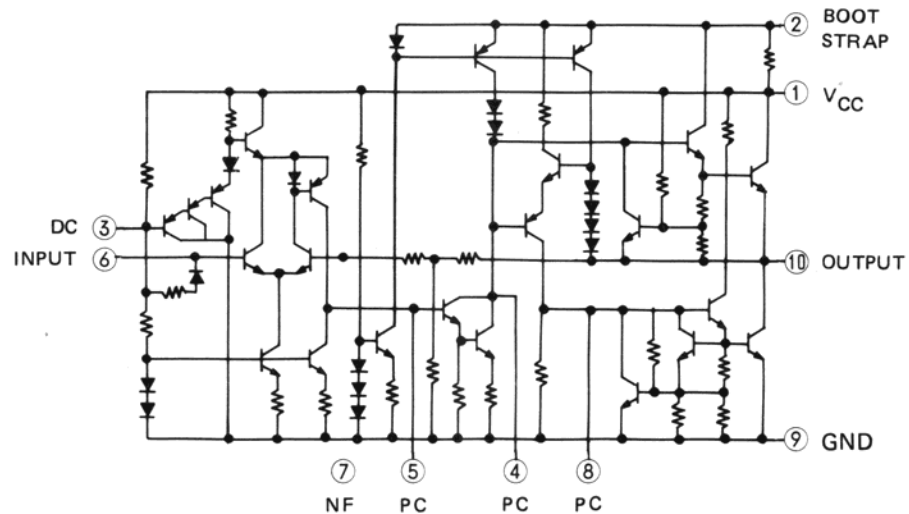
MV2209



IC1 LC7185



IC2 KIA7217AP



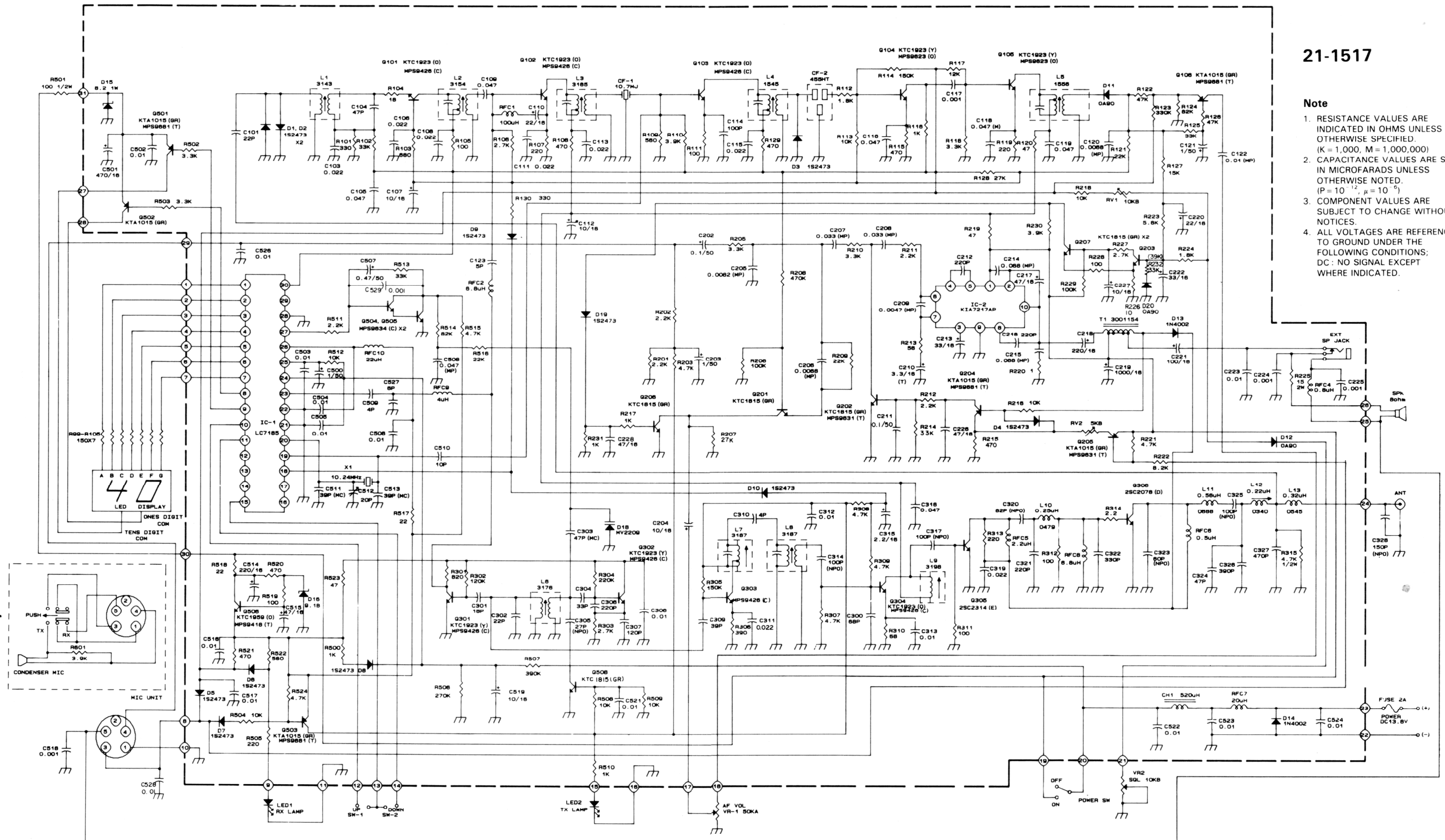
DC: Decoupling
 PC: Phase compensation
 NF: Negative feedback

SCHEMATIC DIAGRAM

21-1517

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} , μ = 10^{-6})
3. COMPONENT VALUES ARE SUBJECT TO CHANGE WITHOUT NOTICES.
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

Transistor

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

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

RADIO SHACK

**A Division of Tandy Corporation
Fort Worth, Texas 76102**

8A9

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