REALISTIC®

Service Manual

21-1663

TRC-216
40 CHANNEL
CB WALKIE-TALKIE

Catalog Number: 21-1663

CUSTOM MANUFACTURED FOR RADIO SHACK, A DIVISION OF TANDY CORPORATION

CONTENTS

SPECIFICATIONS

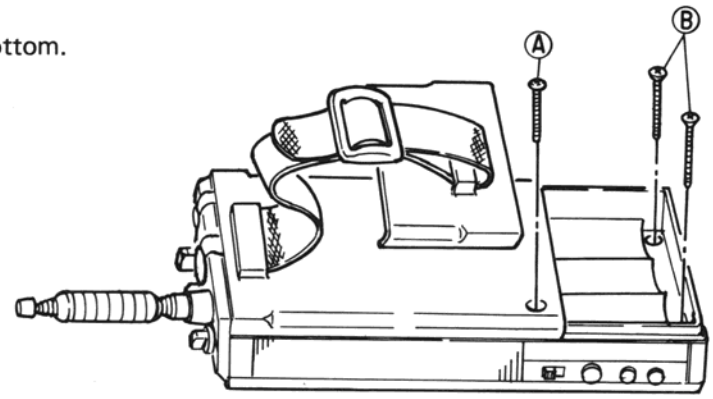
Description	Condition	Nominal	Limit
TRANSMITTER			
RF input power	12.5V DC POWER: Hi	5W	
	: Lo	3W	
RF output power	12.5V DC POWER: Hi	3.3W	3W ~ 4W
	: Lo	1.5W	1.5±0.5W
Modulation level control	50% Mod. +30 dB	90% (±5%)	80% (±15%)
Frequency tolerance		±0.002%	±0.005%
Spurious and harmonics	Ratio from fundamental	–65 dB	–60 dB
Current drain	Unmodulated POWER: Hi	660 mA	800 mA
	: Lo	500 mA	650 mA
	80% Modulated POWER: Hi	1100 mA	1500 mA
	: Lo	800 mA	1000 mA
RECEIVER			
Intermediate frequency		455±1 kHz	455±2 kHz
Sensitivity	500 mW output		
	10 dB (S+N)/N	0.5 μV	1 μV
Selectivity	±10 kHz	70 dB	60 dB
Bandwidth	–6 dB point	6 kHz	4 ~ 10 kHz
Squelch	Threshold	0.5 μV	1 μV
	Tight	1000 μV	300 μV to 3 mV
Signal-to-noise ratio	RF input 1 mV 30% Mod.	40 dB	35 dB
Audio output	8Ω 10% THD	2.0W	1.5W
AGC range	–10 dB AF range	95 dB	80 dB
Current drain	Squelched	70 mA	90 mA
	Max. volume	600 mA	700 mA
GENERAL			
Antenna impedance	50Ω		
Frequency range	26.965 to 27.405 MHz		
Frequency control	PLL frequency synthesizer, with one crystal		
Speaker	8Ω 2'' (50mm) dynamic type		
Jacks	External speaker (3.5mm) 8–16Ω		
	External microphone (matched to 21-1172)		
	Battery charger (matched to 21-516)		
	External power (matched to 270-1533)		
	External antenna jack (RCA Type)		

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 within any limit spec.*

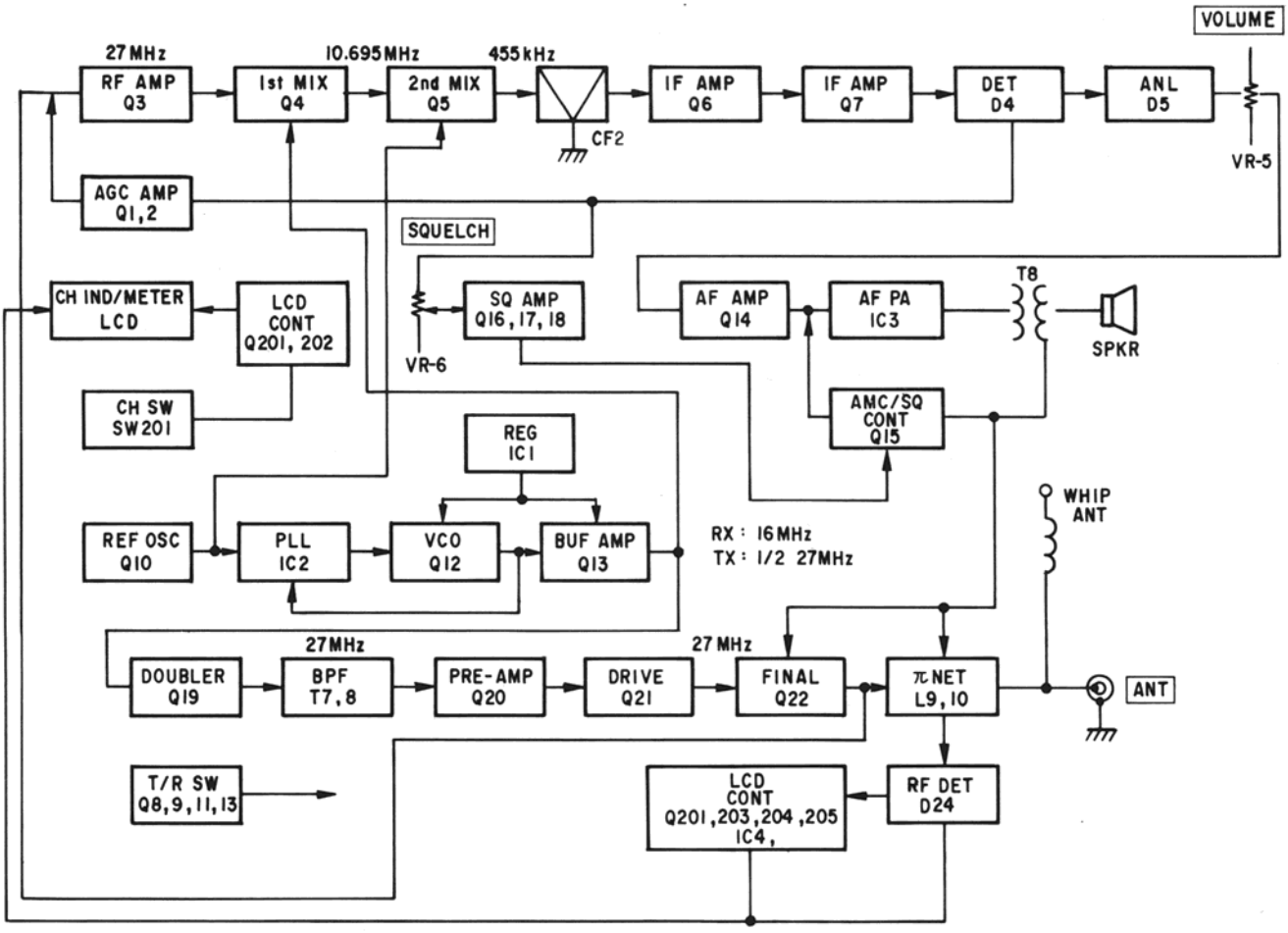
DISASSEMBLY

To Remove the Front Case:

1. Remove one screw Ⓐ on the cabinet bottom.
2. Remove two screws Ⓑ at battery pack.
3. Detach the front and rear case.



BLOCK DIAGRAM



PRINCIPLES OF OPERATION

PLL CIRCUIT

The TRC-216 uses a Digital Phase Lock Loop circuit to synthesize each of the channel frequencies using only one crystal. The PLL Circuit consists of a Phase Detector, Low Pass Filter (LPF) and a Voltage Controlled Oscillator (VCO, which uses a varicap diode as the frequency control device).

Refer to the Block Diagram of the PLL circuit as you go through the following description. A 10.24 MHz Crystal is used as a reference frequency. The Crystal oscillates in the Q10 circuit. The 10.24 MHz is processed by the PLL IC, as well as being used for the 2nd Mixer.

VCO frequencies (see Table 1) are divided by "N" 3254 through 3342 as determined by the channel selector switch. Thus the resulting frequency is 5.0 kHz for receiving.

Also, the reference oscillator frequency, 10.24 MHz, is divided by 2048 (internally by the IC) resulting in another 5.0 kHz frequency.

These two 5.0 kHz signals are fed to the Phase Detector (internally by the IC). A DC error voltage is generated by the Phase Detector which is in proportion to the phase difference between these two 5.0 kHz signals. This error voltage appears at Pin 5. The error voltage that appears at Pin 5 is the result of the phase difference, plus effects of harmonics and extraneous noise. Pin 6 is the input to an LPF and Pin 7 is output, where the error voltage is integrated and harmonics and noises are filtered out. The resulting DC voltage is applied to the VCO (a varicap diode) whose capacity varies with applied DC voltage. With proper circuit design and precise adjustments, the VCO frequency is accurate and precise. When the Phase Detector senses no frequency or phase difference between the two 5.0 kHz signals, the system is "locked" and the VCO generates a frequency that is as accurate and stable as the reference crystal oscillator.

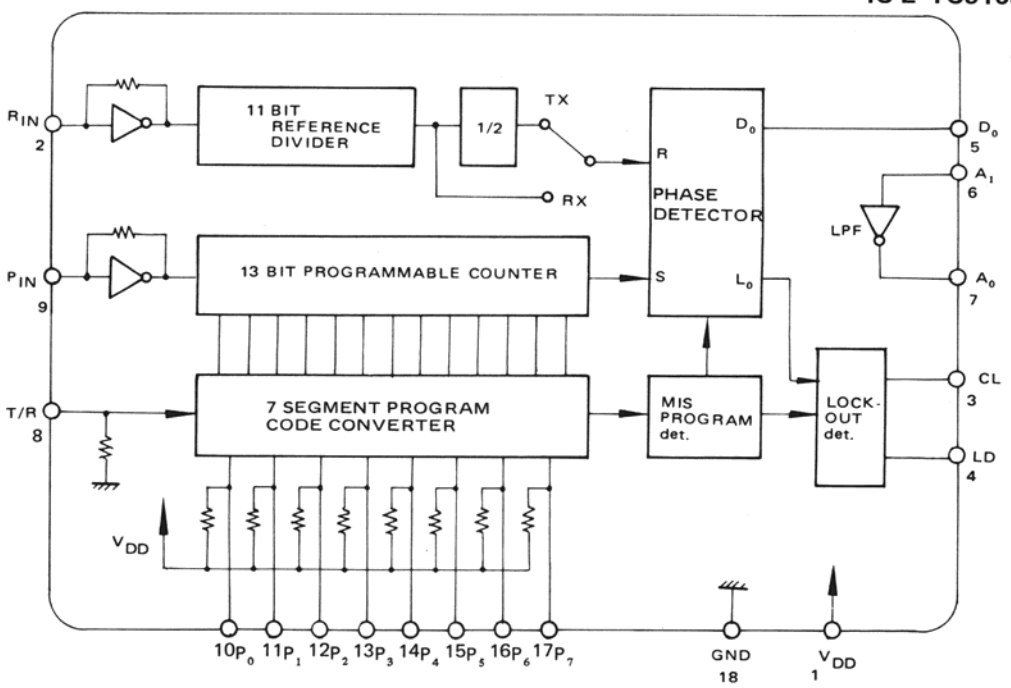
The Channel Selector switch provides a ROM code output that is connected to Pins 10 – 17; the IC converts these signals into binary code. The resulting code determines "N," the divider that produces the required output frequency for each channel (precisely spaced 10 kHz apart).

For Transmit, the same VCO is used, which oscillates in the 13.5 MHz band. (See Table 1.) These signals are divided by "N" (5393 through 5481) as determined by the Channel Selector switch. The circuits function in the same way, except for the method of dividing the VCO frequencies.

When the PLL is "unlocked," an inhibit signal is available at Pin 4. This signal is applied to Q19 to turn it off.

BLOCK DIAGRAM OF THE CIRCUIT

IC-2 TC9109BP



VCO OUTPUT FREQUENCY AND IC-2 INPUT CODE TABLE

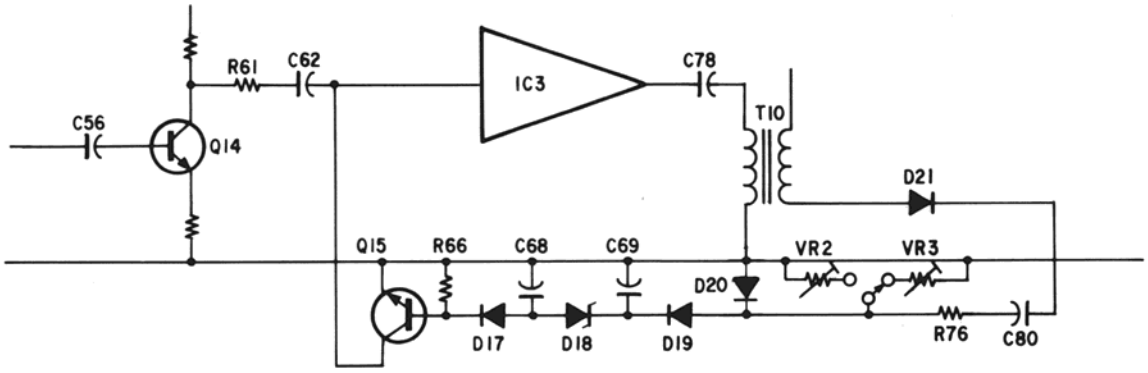
CH No.	Frequency (MHz)	Program code								R/T = H (Rx)		R/T = L (Tx)	
		P_0	P_1	P_2	P_3	P_4	P_5	P_6	P_7	N	f_{VCO}	N	f_{VCO}
1	26.965	○	○	○	○	○	○	○	○	3254	16.27	5393	13.4825
2	26.975	○					○	○	○	3256	16.28	5395	13.4875
3	26.985	○			○		○	○	○	3258	16.29	5397	13.4925
4	27.005		○		○	○	○	○	○	3262	16.31	5401	13.5025
5	27.015				○		○	○	○	3264	16.32	5403	13.5075
6	27.025		○				○	○	○	3266	16.33	5405	13.5125
7	27.035	○		○	○	○	○	○	○	3268	16.34	5407	13.5175
8	27.055						○	○	○	3272	16.36	5411	13.5275
9	27.065				○	○	○	○	○	3274	16.37	5413	13.5325
10	27.075			○				○	○	3276	16.38	5415	13.5375
11	27.085	○	○	○	○	○		○	○	3278	16.39	5417	13.5425
12	27.105	○						○	○	3282	16.41	5421	13.5525
13	27.115	○			○			○	○	3284	16.42	5423	13.5575
14	27.125		○		○	○		○	○	3286	16.43	5425	13.5625
15	27.135				○			○	○	3288	16.44	5427	13.5675
16	27.155		○					○	○	3292	16.46	5431	13.5775
17	27.165	○		○	○	○		○	○	3294	16.47	5433	13.5825
18	27.175							○	○	3296	16.48	5435	13.5875
19	27.185				○	○		○	○	3298	16.49	5437	13.5925
20	27.205			○			○		○	3302	16.51	5441	13.6025
21	27.215	○	○	○	○	○	○		○	3304	16.52	5443	13.6075
22	27.225	○					○		○	3306	16.53	5445	13.6125
23	27.255	○			○		○		○	3312	16.56	5451	13.6275
24	27.235		○		○	○	○		○	3308	16.54	5447	13.6175
25	27.245				○		○		○	3310	16.55	5449	13.6225
26	27.265		○				○		○	3314	16.57	5453	13.6325
27	27.275	○		○	○	○	○		○	3316	16.58	5455	13.6375
28	27.285						○		○	3318	16.59	5457	13.6425
29	27.295				○	○	○		○	3320	16.60	5459	13.6475
30	27.305			○					○	3322	16.61	5461	13.6525
31	27.315	○	○	○	○	○			○	3324	16.62	5463	13.6575
32	27.325	○							○	3326	16.63	5465	13.6625
33	27.335	○			○				○	3328	16.64	5467	13.6675
34	27.345		○		○	○			○	3330	16.65	5469	13.6725
35	27.355				○				○	3332	16.66	5471	13.6775
36	27.365		○						○	3334	16.67	5473	13.6825
37	27.375	○		○	○	○			○	3336	16.68	5475	13.6875
38	27.385								○	3338	16.69	5477	13.6925
39	27.395				○	○			○	3340	16.70	5479	13.6975
40	27.405			○				○		3342	16.71	5481	13.7025

○ Mark: H level $f_{RXVCO} = 0.005 \times N$ (MHz) $f_{TXVCO} = 0.0025 \times N$ (MHz)

Table 1

AUTOMATIC MODULATION CONTROL CIRCUIT

The Automatic Modulation Control (AMC) circuit consists of Q15, D17, D18, D19 and D20. The Mic input signal is fed to base of Q14, where it is amplified. The Audio Amplifier/Modulation IC (IC3) further amplifies this signal and drives T10, whose secondary incorporates C80 which couples a portion of the signal to AMC detector diodes D19 and D20. This applies a DC voltage to the base of Q15, and thus controls the output signal of Q14. The DC voltage autmatically sets the desired audio signal level processed by the audio amplifier circuit; VR-2 is adjusted to set a modulation level of less than 100% for Lo power and VR-3 is adjusted for Hi power.



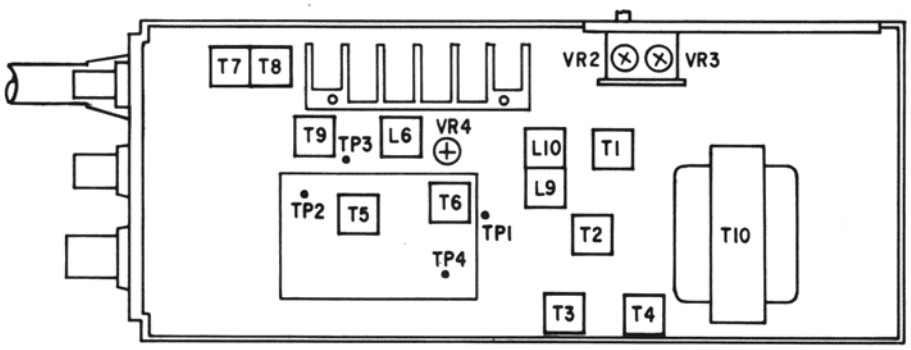
ALIGNMENT PREPARATION

Test instruments required

1. Oscilloscope
2. AC SSVM (RF)
3. DC SSVM
4. Frequency Counter
5. 8Ω Dummy Load
6. RF Signal Generator 455 kHz to 30 MHz
7. Power Meter (50Ω)
8. 50Ω 5W Dummy Load
9. Audio Signal Generator
10. Distortion Meter
11. DC Power Supply (12.5V 2A)
12. DC Current Meter

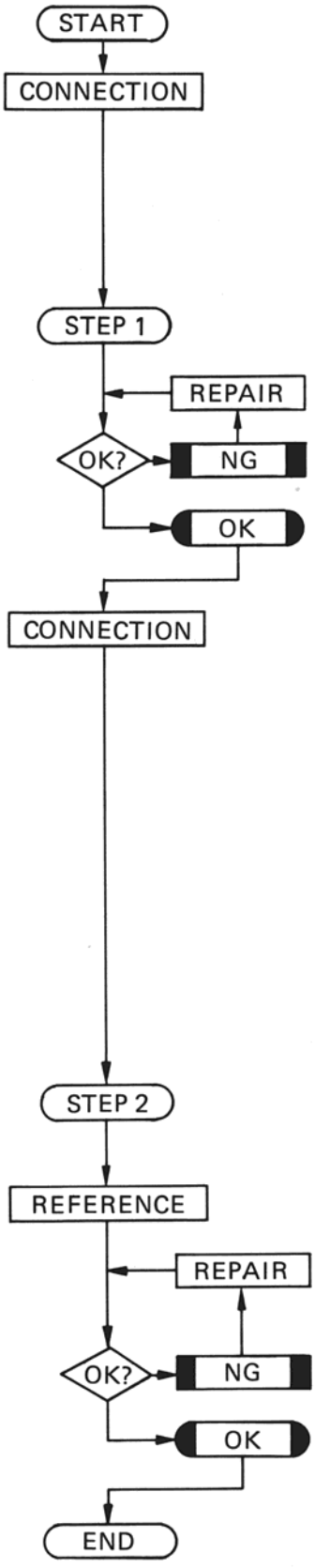
NOTE: Use non-metallic tuning tools.
Allow instruments and unit 15 minutes to warm-up prior to alignment. Maintain generator output level at minimum necessary to obtain usable output readings. (This will avoid saturation and clipping.)

ALIGNMENT LOCATIONS AND POINTS



Note: Use bare leads of R17, R43, L5 and R54 for test points.

AF OPERATION CHECK BEFORE ALIGNMENT



Connect POWER SUPPLY to plus (+) and minus (−) terminal on Ext. PWR jack J2 through the DC current meter as shown in Figure 1.

Figure 1

Check DC current drain (must be 60~90 mA).
Control Setting: VOLUME (minimum), SQUELCH (fully counterclockwise).

See TROUBLESHOOTING items 1, 3.

DC current drain exceeds 90 mA or is less than 60 mA.

DC current drain is 60~90 mA.

Connect the AF generator to the "hot" end of VOLUME control. Connect oscilloscope, distortion meter and AC SSVM to Ext. SPeaker Jack J1 across 8Ω dummy load as shown in Figure 2.

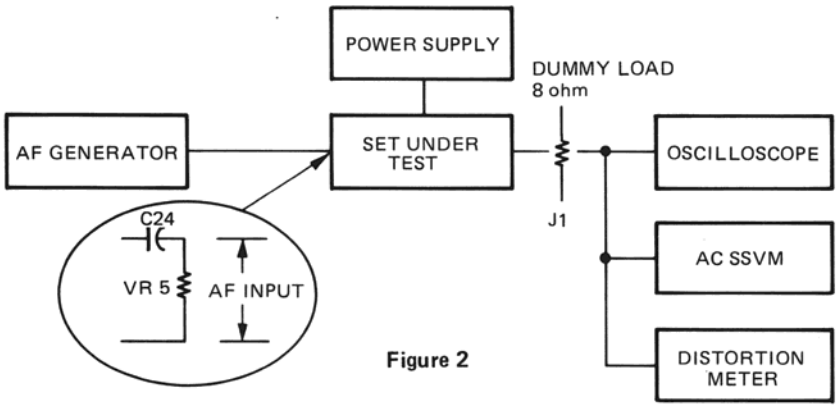


Figure 2

Check AF output with 10–20 mV input
Control Setting: VOLUME (maximum), SQUELCH (fully counterclockwise).
Set AF generator frequency to 1 kHz.

AF output power is 2W with 10–20 mV input and distortion is below 10%.

Check AF circuit. See TROUBLESHOOTING item 4.

AF output power is not 2W with 10–20 mV input and/or distortion exceeds 10%.

AF output power is 2W with 10–20 mV input and distortion is no more than 10%.

RECEIVER OPERATION CHECK BEFORE ALIGNMENT

START

CONNECTION

Connect the instruments as shown in Figure 3.

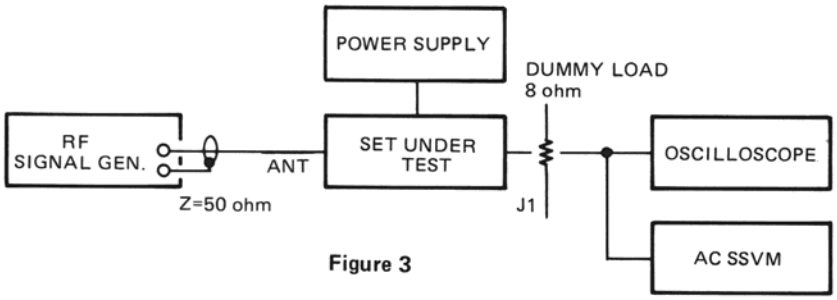


Figure 3

STEP 1

Set RF generator to CH–18 (27.175 MHz), mod. 1 kHz 30% and 1μV output.
Control Setting: VOLUME [output level for approx. 0.775V (0 dB)]
SQUELCH (fully counterclockwise).

STEP 2

Turn off the modulation.

REFERENCE

Nominal S/N should be 15 dB (over 10 dB is acceptable) with 1 μV input.

REPAIR

See TROUBLESHOOTING items 5, 6.

OK? — NG

S/N ratio is less than 10 dB.

OK

S/N ratio is over 10 dB.

STEP 3

Turn SQUELCH control fully clockwise. Set RF generator output to open squelch.

REFERENCE

Squelch should turn on/off with an RF input level of 1 mV, ±10 dB.

REPAIR

See TROUBLESHOOTING item 7.

OK? — NG

Squelch action did not take place with an RF input level of 1 mV, ±10 dB.

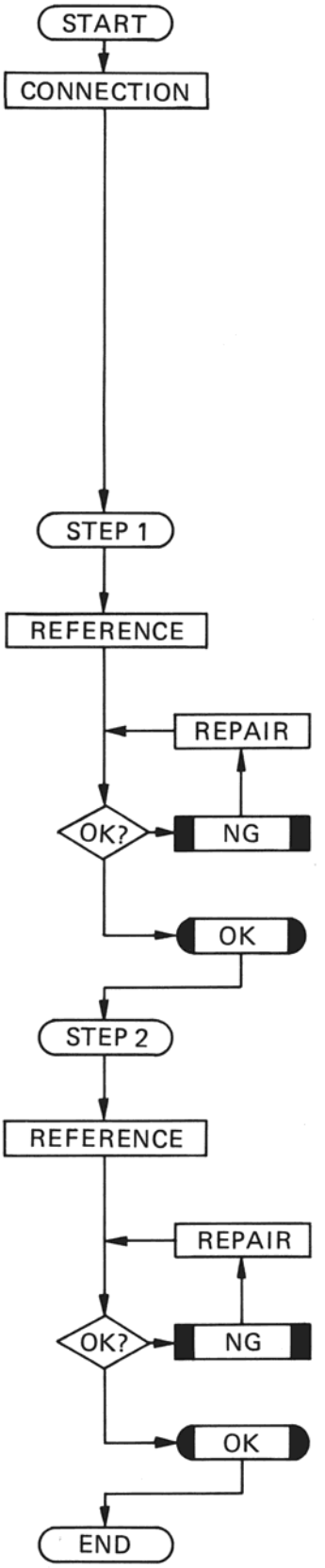
OK

Squelch action takes place at correct input level.

END

Proceed to TRANSMITTER OPERATION CHECK.

TRANSMITTER OPERATION CHECK BEFORE ALIGNMENT



Connect the instruments as shown in Figure 4.

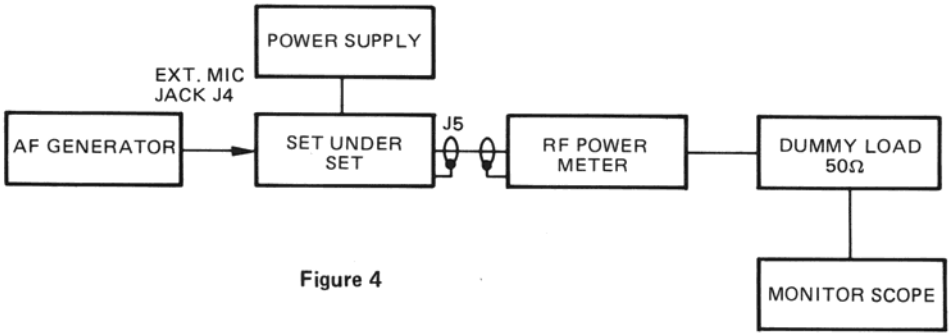


Figure 4

Set AF generator frequency to 1 kHz. Increase level of AF generator from approximately 5 mV to 63 mV. Set POWER switch to Hi.

Nominal modulation should be 90—100% with 7.5—63 mV input.
RF output power should be 3—4W.

See TROUBLESHOOTING items 8, 9, 10.

Modulation is not 90—100% with 7.5—63 mV input.
RF output power is not 3—4W.

Modulation is 90—100% with 7.5—63 mV input.
RF output power is 3—4W.

Set AF generator frequency to 1 kHz. Increase level of AF generator from 5 mV to 63 mV. Set POWER switch to Low.

Nominal modulation should be 90—100% with 5—63 mV input.
RF output power should be 1—2.

Check POWER HI-LOW switch and associated circuit.

Modulation is not 90—100% with 5—63 mV input.
RF output power is not 1—2W.

Modulation is 90—100% with 5—63 mV input.
RF output power is 1—2W.

PLL SECTION ALIGNMENT CHART

Step	Control Setting	Test Equipment	Test Equipment Connection	Adjust
1	Power Switch: ON CH: 18	DC SSVM	TP2	T5 for 3.4V±0.2V
2	Power Switch: ON CH: 18	Frequency Counter	TP4	TC1 16.48 MHz±50 Hz
3	Power Switch: ON CH: 18 TX: ON	Frequency Counter	TP4	Check the frequency Nominal: 13.5875 MHz±50 Hz

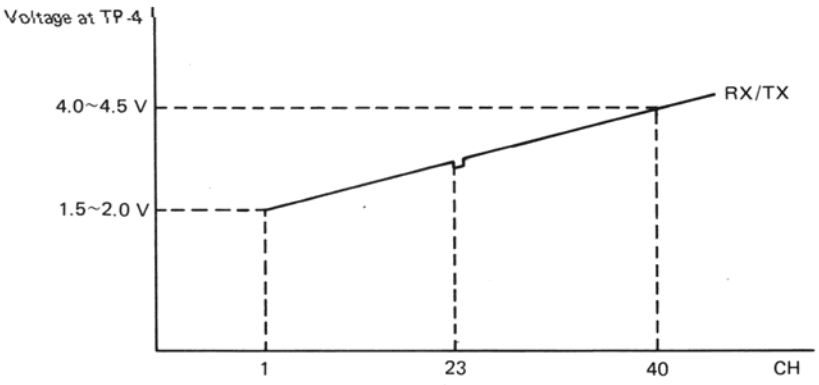
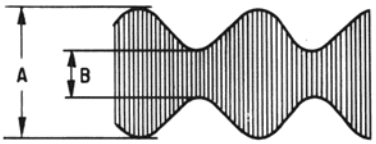


Figure 5

4	Power Switch: ON CH: 18 TX: ON	DC SSVM	TP2	Check the voltage Nominal: 2.5±0.5V

NOTE: Activate channels 1 through 40 and check that the PLL circuit will "lock." (Use a frequency counter at TP4 in RX-mode and TX-mode.)
At the same time, check the VCO control voltage at TP2. It should vary as shown in Figure 5. If necessary, repeat Steps 2 and 3.

TRANSMITTER ALIGNMENT CHART

Step	Control Setting	Test Instruments Connection and Setting	Adjust	Remarks
1	Power Switch: ON CH: 18. Power HI/LOW SW: Hi Press-to-Talk Button: Push	Connect RF Power Meter, Dummy Load, and Monitor Scope to ANT Jack on set. (Figure 6)	T7 T8 T9 L6 L9 L10	Alignment of Power Stage Adjsut T7, T8, T9, L6, L9 and L10 for max. indication on RF Power Meter.
2	Same as step 1	Same as step 1	VR4	Adjustment of Power Adjust VR4 for approx. 3.3 W
3	Same as step 1 Power HI/LOW SW: Low	Same as step 1		Check that RF power output is between 1.0 and 2.0 watts
4	Same as step 1	Connect RF Power Meter, Dummy Load, and Monitor Scope to ANT Jack. Connect AF Generator to EXT. MIC jack J4 across AC SSVM (Figure 4) Adjust output of Audio Gen. so that the waveform on Monitor scope shows 50% modulation. Calculation of Modulation Degree $\text{Mod.} = \frac{A - B}{A + B} \times 100$ Mod. (%): Modulation Degree  Modulation Waveform		
5	Same as step 1	Same instrument connection as for step 4. Increase input level to EXT. MIC jack J4 +20 dB from 50% modulation input level.	VR2 VR3	Adjustment of AMC Adjust VR2 for 90 – 100% mod. on Low power and VR3 on Hi power (but not so that over modulation occurs).

NOTE: If no output appears in step 1, pre-adjust T7 and T8 for max. output on RF SSVM or Oscilloscope at TP3.

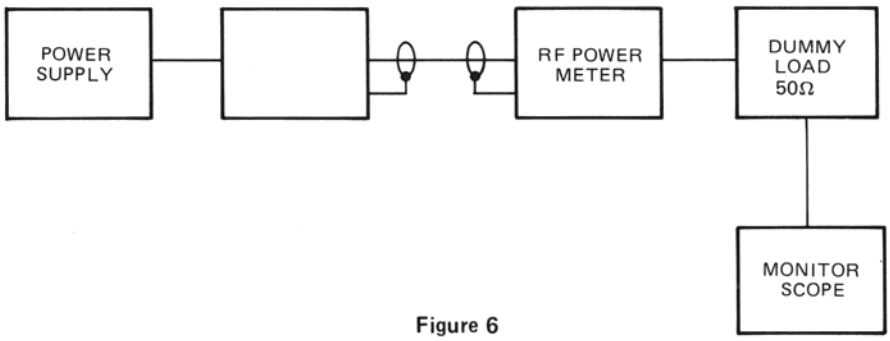


Figure 6

RECEIVER ALIGNMENT CHART

NOTE: Alignment of Receiver Section must not be done until PLL and Transmitting Section alignment is completed.

Step	Control Setting	Test Instrument Connection	Signal Generator Setting	Adjust	Remarks
1	Power Switch: ON	Connect RF Signal Generator, DC SSVM, and Power Supply as shown in Figure 8.	R.F.S.G.: Set to 455 kHz (no modulation).	T3 T4	Alignment of IF Adjust the core of T3, 4 for max. indication on DC SSVM.
2	VOLUME control: Fully clockwise SQUELCH control: Fully counter-clockwise CH: 18	Connect RF Signal Generator, AC SSVM, Oscilloscope, 8 ohm Dummy Load, and Power Supply as shown in Figure 3.	Freq. 27.175 MHz (Channel 18) at 1 kHz 30% Modulation	T1 T2 T6	Alignment of RF Adjust the core of T1, T2 and T6 for max. indication on Oscilloscope and AC SSVM. Keep output of RF SG as low as possible (to avoid overloading AGC and swamping problems) and still obtain usable output.
3	Repeat Steps 1 and 2 as necessary to obtain maximum output (keep output of RF Signal Generator at low level to avoid overloading, swamping and AGC action.) After final adjustments, seal the cores of T1 and T2 (then check sensitivity once more.)				
4	Turn SQUELCH control fully clockwise and check Squelch function (output should cease). Return SQUELCH to minimum.				
5	VOLUME control: set AF output level for approx. 0.775 V (0 dB) SQUELCH control: Fully clockwise CH: 18	Same as step 2	Freq. 27.175 MHz (Channel 18) at 1 kHz 30% Modulation Increase SG output to 1 mV.	VR1	Adjustment of SQUELCH Adjust VR1 so Squelch just opens/ closes with 1 mV signal input.

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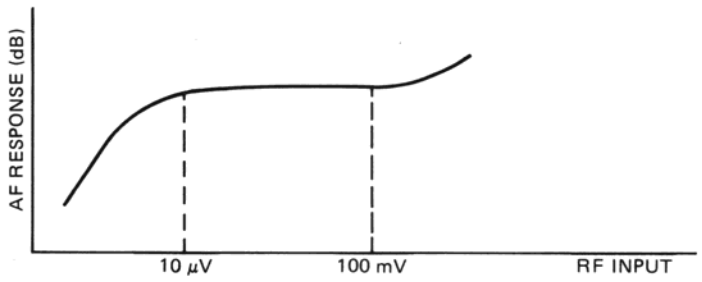

Figure 7

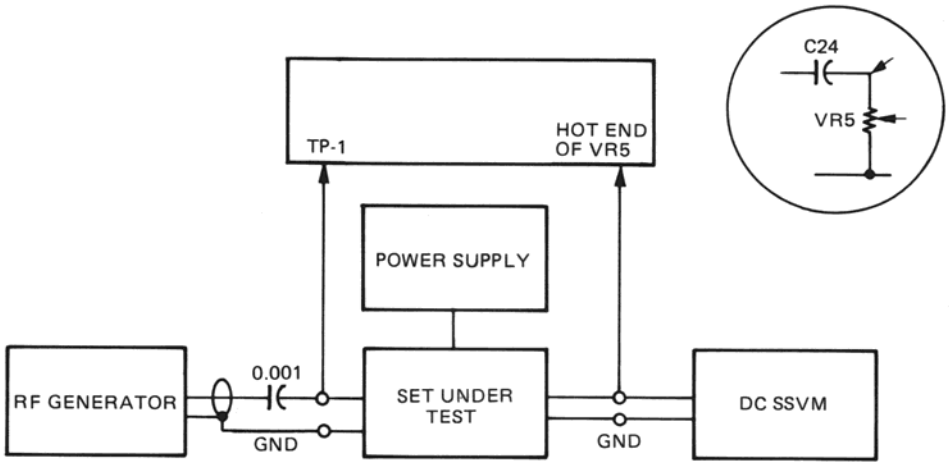

Figure 8

TROUBLESHOOTING

Symptom	Cause and Remedy
1) Channel LCD does not light and/or set fails to operate when power is on.	A) Weak batteries: Change batteries. B) Wrong battery polarity: Adjust polarity of batteries. C) Defective power switch: Replace. D) Defective power jack: Replace. E) Defective LCD, Q201, 202 and/or associated circuit components: Replace the defective parts.
2) Channel LCD remains on.	Defective LCD driver circuit Q201, 202 and/or associated circuit components: Replace the defective parts.
3) Batteries become hot and/or short circuit when ext. power supply is used.	A) Defective power jack: Replace. B) Defective IC201: Replace.

Symptom	Cause and Remedy
4) Battery meter indicator reads OK, but there's no sound on any channel.	A) Defective speaker and/or Ext. SPeaker jack: Replace the defective parts. B) Defective talk switch and/or Mic jack switch: Replace the defective parts. C) Defective AF amplifier circuit, IC 3, and/or associated circuit components: Replace the defective parts. D) Defective squelch circuit, Q16, 17, 18 and/or associated circuit components: Replace the defective parts. E) Defective AMC circuit Q15 and/or associated circuit components: Replace the defective parts. F) Defective pre-amp circuit Q14 and/or associated circuit: Replace the defective parts.
5) Transmits but does not receive.	A) Poor and/or wrong frequency PLL: Replace the defective parts. B) Defective Q8 and/or associated circuit components: Replace the defective parts. C) Defective talk switch and/or Mic jack switch: Replace the defective parts. D) Defective RF circuit Q1, Q2, Q3 and/or associated circuit components: Replace the defective parts. E) Defective speaker and/or Ext. SPeaker jack: Replace the defective parts.
6) Poor Receive sensitivity.	A) Weak batteries: Replace batteries. B) Poor and/or wrong frequency PLL: Replace the defective parts. C) Faulty RF amplifier Q3 and or mixer circuit Q4 components: Replace the defective parts. D) Faulty IF amplifier circuit Q6, Q7: Replace the defective parts. E) Defective ceramic filter CF-1 and/or CF-2: Replace the defective parts.
7) Receiver works but squelch control does not operate.	A) Defective squelch control circuit Q16–18: Replace the defective parts. B) Faulty VR6: Replace the defective parts.
8) Does not transmit.	A) Weak batteries: Replace batteries. B) Poor and/or wrong frequency PLL: Replace the defective parts. C) Defective talk switch and/or Mic jack switch: Replace the defective parts. D) Defective Q19–Q22, and/or associated circuit components: Replace the defective parts. E) Defective Q23, D26 and/or associated circuit: Replace the defective parts.
9) Receiver works but no modulation.	A) Faulty microphone unit: Replace. B) Defective Mic jack and/or Mic jack switch: Replace the defective parts.
10) Automatic Modulation Control does not operate.	Defective Q15, D18–D20, and/or associated circuit: Replace the defective parts.
11) Self-oscillation on transmit.	Faulty TX/RX control circuit Q8, and/or Q9: Replace the defective parts.
12) Receiver and/or Transmitter does not work when ext. Mic is used.	A) Defective Ext. microphone: Replace. B) Defective Ext. Mic jack and/or Mic jack switch: Replace the defective parts.
13) Microphone operates on receive mode.	Defective Q23 and associated circuit: Replace the defective parts.

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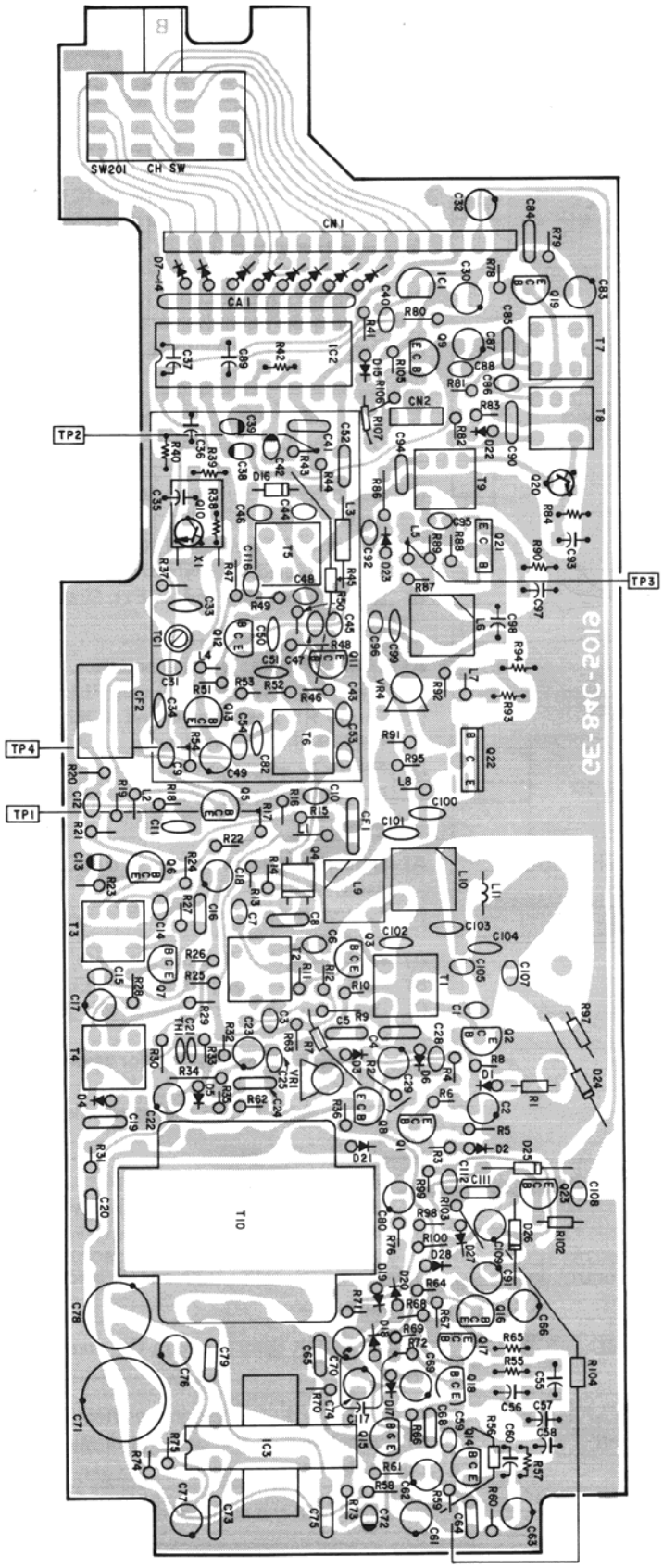
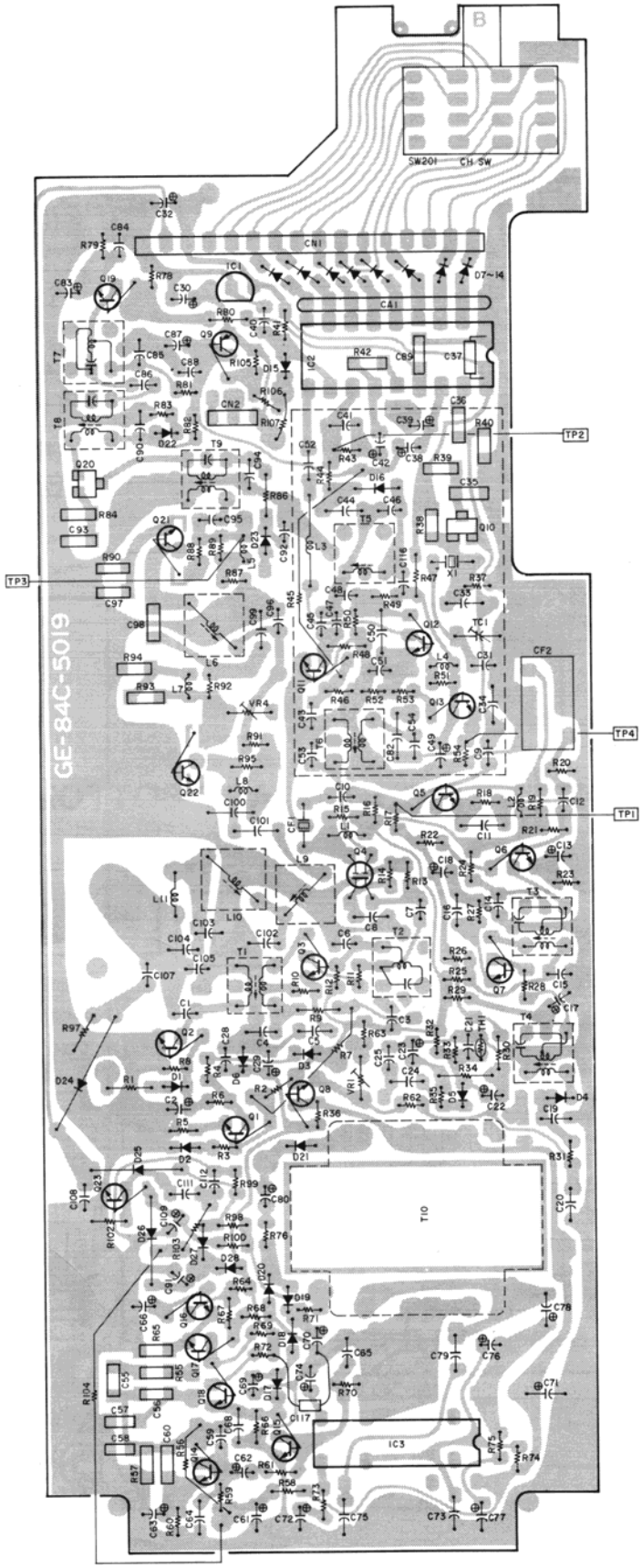
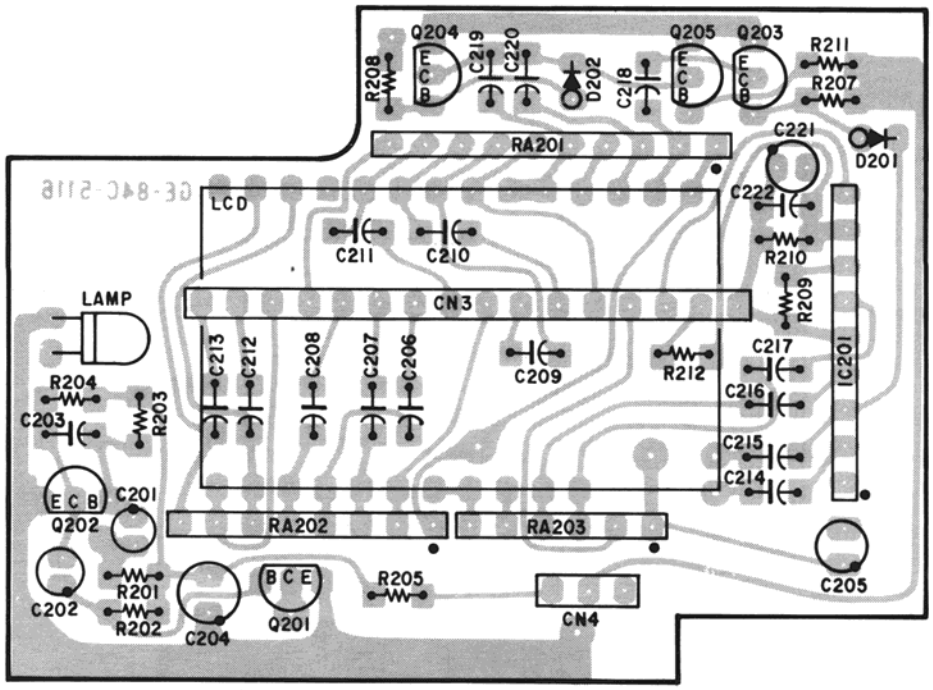
MAIN PRINTED CIRCUIT BOARD TOP VIEW



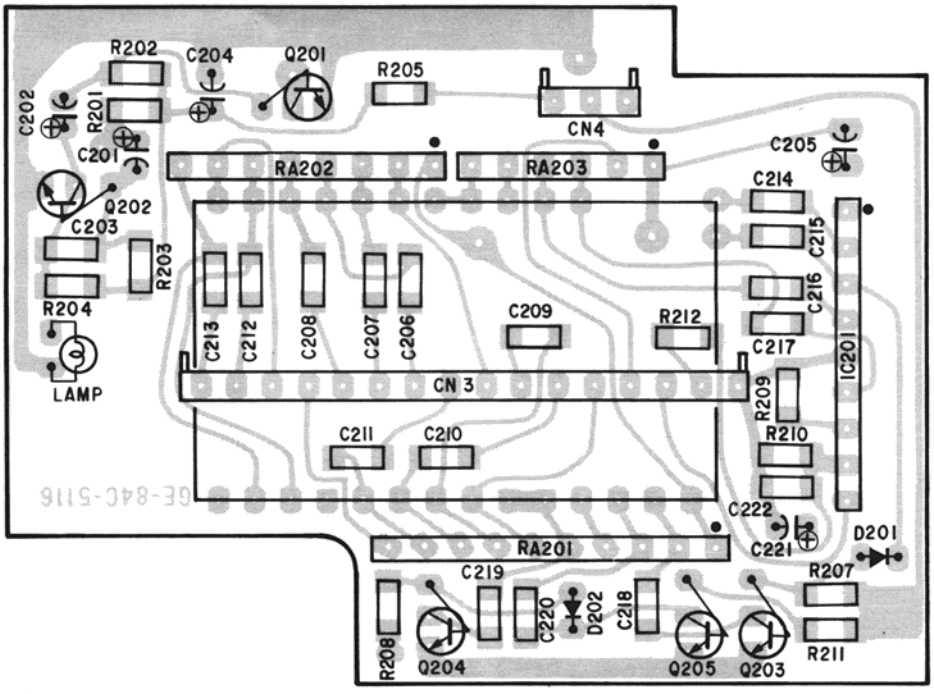
MAIN PRINTED CIRCUIT BOARD BOTTOM VIEW



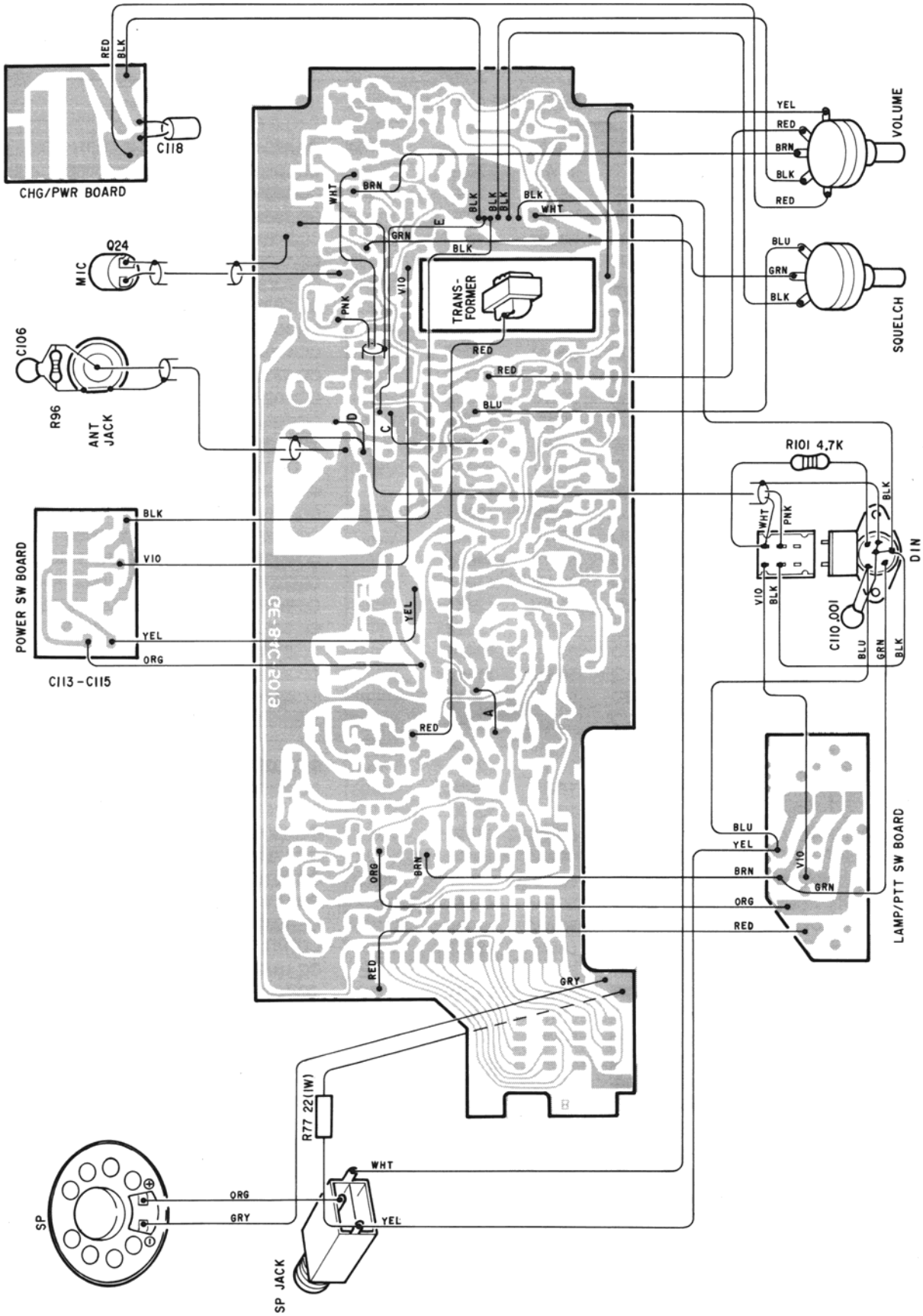
LCD PRINTED CIRCUIT BOARD TOP VIEW



LCD PRINTED CIRCUIT BOARD BOTTOM VIEW



WIRING DIAGRAM



ELECTRICAL PARTS LIST

Ref. No.	Description				RS Part Number	MFR's Part Number
			CAPACITORS			
C1	Ceramic Disk	10pF	50WV	±10%	CC-100KJCP	CC45CH1H110K
C2	Electrolytic	10μF	16WV	±20%	CC-106MDAP	16MV100SS
C3	Ceramic Disk	0.01μF	25WV	±20%	CC-103MFCP	SS45X1E103M
C4	Mylar*	0.01μF	50WV	±10%	CC-103KJMP	AK1-UU103K50
C5	Mylar	0.01μF	50WV	±10%	CC-103KJMP	AK1-UU103K50
C6	Ceramic Disk	0.01μF	25WV	±20%	CC-103MFCP	SS45X1E103M
C7	Ceramic Disk	22pF	50WV	±10%	CC-220KJCP	CC45CH1H220K
C8	Mylar	0.01μF	50WV	±10%	CC-103KJMP	AK1-UU103K50
C9	Ceramic Disk	10pF	50WV	±10%	CC-100KJCP	CC45CH1H100K
C10	Ceramic Disk	0.001μF	50WV	±10%	CC-102KJCP	CK45B1H102K
C11	Ceramic Disk	0.047μF	25WV	±20%	CC-473MFCP	SS45X1E473M
C12	Ceramic Disk	0.001μF	50WV	±10%	CC-102KJCP	CK45B1H102K
C13	Tantalum	1μF	35WV	±20%	CC-105MGTP	CS15E1V1R0M1S
C14	Ceramic Disk	0.01μF	25WV	±20%	CC-103MFCP	SS45X1E103M
C15	Ceramic Disk	0.01μF	25WV	±20%	CC-103MFCP	SS45X1E103M
C16	Mylar	0.033μF	50WV	±10%	CC-333KJMP	AK1-UU333K50
C17	Electrolytic	1μF	50WV	±20%	CC-105MJAP	50MV1R0SS
C18	Electrolytic	10μF	16WV	±20%	CC-106MDAP	16MV100SS
C19	Mylar	0.022μF	50WV	±10%	CC-223KJMP	AK1-UU223K50
C20	Mylar	0.022μF	50WV	±10%	CC-223KJMP	AK1-UU223K50
C21	Ceramic Disk	0.01μF	25WV	±20%	CC-103MFCP	SS45X1E103M
C22	Electrolytic	3.3μF	35WV	±20%	CC-335MGAP	35MV3R3SS
C23	Electrolytic	3.3μF	35WV	±20%	CC-335MGAP	35MV3R3SS
C24	Mylar	0.0033μF	50WV	±10%	CC-332KJMP	AK1-UU332K50
C25	Ceramic Disk	470pF	50WV	±10%	CC-471KJCP	CK45B1H471K
C26	Not used					
C27	Not used					
C28	Ceramic Disk	0.01μF	25WV	±20%	CC-103MFCP	SS45X1E103M
C29	Electrolytic	10μF	16WV	±20%	CC-106MDAP	16MV100SS
C30	Electrolytic	22μF	16WV	±20%	CC-226MDAP	16MV220HA
C31	Ceramic Disk	33pF	50WV	±10%	CC-330KJCP	CC45RH1H330K
C32	Electrolytic	47μF	16WV	±20%	CC-476MDAP	16MV470HA
C33	Ceramic Disk	220pF	50WV	±10%	CC-221KJCP	CC45CH1H221K
C34	Ceramic Disk	120pF	50WV	±10%	CC-121KJCP	CC45CH1H121K
C35	Ceramic Chip	0.01μF	50WV	±20%	CC-103MJCP	C2K31P1HC103M
C36	Ceramic Chip	100pF	50WV	±5%	CD-101JJCP	C1C31P1HCG101J
C37	Ceramic Chip	0.01μF	50WV	±20%	CC-103MJCP	C2K31P1HC103M
C38	Tantalum	0.1μF	35WV	±20%	CC-104MGTP	CS15E1V0R1M1S
C39	Tantalum	0.1μF	35WV	±20%	CC-104MGTP	CS15E1V0R1M1S
C40	Ceramic Disk	0.001μF	50WV	±10%	CC-102KJCP	CK45B1H102K
C41	Mylar	0.033μF	50WV	±10%	CC-333KJMP	AK1-UU333K50
C42	Tantalum	0.22μF	35WV	±20%	CC-224MGTP	CS15E1VR22M1S
C43	Ceramic Disk	0.01μF	25WV	±20%	CC-103MFCP	SS45X1E103M
C44	Ceramic Disk	39pF	50WV	±10%	CC-390KJCP	CC45CH1H390K
C45	Ceramic Disk	22pF	50WV	±10%	CC-220KJCP	CC45CH1H220K
C46	Ceramic Disk	10pF	50WV	±0.5pF	CC-100DJCP	CC45RH1H100D
C47	Ceramic Disk	2pF	50WV	±0.25pF	CC-020CJCP	CC45CH1H020C
C48	Ceramic Disk	22pF	50WV	±10%	CC-220KJCP	CC45CH1H220K

* Mylar is a registered trademark of E.I. Du Pont de Nemours and Company.

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Ref. No.	Description				RS Part Number	MFR's Part Number
C49	Electrolytic	10μF	16WV	±20%	CC-106MDAP	16MV100SS
C50	Ceramic Disk	47pF	50WV	±10%	CC-470KJCP	CC45CH1H470K
C51	Ceramic Disk	47pF	50WV	±10%	CC-470KJCP	CC45CH1H470K
C52	Mylar	0.01μF	50WV	±10%	CC-103KJMP	AK1-UU103K50
C53	Ceramic Disk	27pF	50WV	±10%	CC-270KJCP	CC45RH1H270K
C54	Ceramic Disk	22pF	50WV	±10%	CC-220KJCP	CC45CH1H220K
C55	Ceramic Chip	0.01μF	50WV	±20%	CC-103MJCP	C2K31P1HC103M
C56	Ceramic Chip	0.022μF	50WV	±20%	CC-223MJCP	C2K31P1HC223M
C57	Ceramic Chip	0.022μF	50WV	±20%	CC-223MJCP	C2K31P1HC223M
C58	Ceramic Chip	330pF	50WV	±10%	CD-331KJCP	C1C31P1HCG331K
C59	Ceramic Disk	22pF	50WV	±10%	CC-220KJCP	CC45CH1H220K
C60	Ceramic Chip	0.01μF	50WV	±20%	CC-103MJCP	C2K31P1HC103M
C61	Electrolytic	47μF	16WV	±20%	CC-476MDAP	16MV470HA
C62	Electrolytic	0.47μF	50WV	±20%	CC-474MJAP	50MVR47SS
C63	Electrolytic	1μF	50WV	±20%	CC-105MJAP	50MV1R0SS
C64	Mylar	0.015μF	50WV	±10%	CC-153KJMP	AK1-UU153K50
C65	Mylar	0.033μF	50WV	±10%	CC-333KJMP	AK1-UU333K50
C66	Electrolytic	3.3μF	35WV	±20%	CC-335MGAP	35MV3R3SS
C67	Not used					
C68	Mylar	0.01μF	50WV	±10%	CC-103KJMP	AK1-UU103K50
C69	Electrolytic	10μF	16WV	±20%	CC-106MDAP	16MV100SS
C70	Electrolytic	10μF	16WV	±20%	CC-106MDAP	16MV100SS
C71	Electrolytic	470μF	16WV	±20%	CC-477MDAP	16MV471HA
C72	Tantalum	10μF	10WV	±20%	CC-106MCTP	CS15E1A100M1S
C73	Mylar	0.047μF	50WV	±10%	CC-473KJMP	AK1-UU473K50
C74	Electrolytic	33μF	16WV	±20%	CC-336MDAP	16MV330HA
C75	Mylar	0.022μF	50WV	±10%	CC-223KJMP	AK1-UU223K50
C76	Electrolytic	10μF	16WV	±20%	CC-106MDAP	16MV100SS
C77	Electrolytic	0.1μF	50WV	±20%	CC-104MJAP	50MV0R1SS
C78	Electrolytic	220μF	16WV	±20%	CC-227MDAP	16MV221HA
C79	Mylar	0.0033μF	50WV	±10%	CC-332KJMP	AK1-UU332K50
C80	Electrolytic	1μF	50WV	±20%	CC-105MJAP	50MV1R0SS
C81	Not used					
C82	Ceramic Disk	120pF	50WV	±10%	CC-121KJCP	CC45CH1H121K
C83	Electrolytic	22μF	16WV	±20%	CC-226MDAP	16MV220HA
C84	Mylar	0.01μF	50WV	±10%	CC-103KJMP	AK1-UU103K50
C85	Mylar	0.01μF	50WV	±10%	CC-103KJMP	AK1-UU103K50
C86	Ceramic Disk	2pF	50WV	±0.25pF	CC-020CJCP	CC45CH1H020C
C87	Electrolytic	22μF	16WV	±20%	CC-226MDAP	16MV220HA
C88	Ceramic Disk	0.01μF	25WV	±20%	CC-103MFCP	SS45X1E103M
C89	Ceramic Chip	0.01μF	50WV	±20%	CC-103MJCP	C2K31P1HC103M
C90	Mylar	0.01μF	50WV	±10%	CC-103KJMP	AK1-UU103K50
C91	Electrolytic	1μF	50WV	±20%	CC-105MJAP	50MV1R0SS
C92	Ceramic Disk	0.01μF	25WV	±20%	CC-103MFCP	SS45X1E103M
C93	Ceramic Chip	0.022μF	50WV	±20%	CC-223MJCP	C2K31P1HC223M
C94	Mylar	0.01μF	50WV	±10%	CC-103MKJP	AK1-UU103K50
C95	Ceramic Disk	0.001μF	50WV	±10%	CC-102KJCP	CK45B1H102K
C96	Ceramic Disk	0.01μF	25WV	±20%	CC-103MFCP	SS45X1E103M
C97	Ceramic Chip	0.01μF	50WV	±20%	CC-103MJCP	C2K31P1HC103M
C98	Ceramic Chip	220pF	50WV	±10%	CC-221KJCP	C1C31P1HCG221K
C99	Ceramic Disk	220pF	50WV	±10%	CC-221KJCP	CC45CH1H221K
C100	Ceramic Disk	0.047μF	25WV	±20%	CC-473MFCP	SS45X1E473M
C101	Ceramic Disk	150pF	50WV	±10%	CC-151KJCP	CC45CH1H151K
C102	Ceramic Disk	330pF	50WV	±10%	CC-331KJCP	CC45SL1H331K

Ref. No.	Description				RS Part Number	MFR's Part Number
C103	Ceramic Disk	180pF	50WV	±10%	CC-181KJCP	CC45CH1H181K
C104	Ceramic Disk	68pF	50WV	±10%	CC-680KJCP	CC45CH1H680K
C105	Ceramic Disk	56pF	50WV	±10%	CC-560KJCP	CC45SL1H560K
C106	Ceramic Disk	68pF	50WV	±10%	CC-680KJCP	CC45CH1H680K
C107	Ceramic Disk	2pF	50WV	±0.25pF	CC-020CJCP	CC45CH1H020C
C108	Ceramic Disk	0.01μF	25WV	±20%	CC-103MFCP	SS45X1E103M
C109	Electrolytic	1μF	50WV	±20%	CC-105MJAP	50MV1R0SS
C110	Ceramic Disk	0.001μF	50WV	±10%	CC-102KJCP	CK45B1H102K
C111	Mylar	0.033μF	50WV	±10%	CC-333KJMP	AK1-UU333K50
C112	Ceramic Disk	0.001μF	50WV	±10%	CC-102KJCP	CK45B1H102K
C113	Ceramic Disk	0.01μF	25WV	±20%	CC-103MFCP	SS45X1E103M
C114	Ceramic Disk	0.001μF	50WV	±10%	CC-102KJCP	CK45B1H102K
C115	Ceramic Disk	0.01μF	25WV	±20%	CC-103MFCP	SS45X1E103M
C116	Ceramic Disk	0.001μF	50WV	±10%	CC-102KJCP	CK45B1H102K
C117	Ceramic Disk	0.01μF	25WV	±20%	CC-103MFCP	SS45X1E103M
C118	Electrolytic	470μF	16WV	±20%	CC-477MDAP	16MV471HA
C201	Electrolytic	0.22μF	50WV	±20%	CC-224MJAP	50MVR22SS
C202	Electrolytic	0.22μF	50WV	±20%	CC-224MJAP	50MVR22SS
C203	Ceramic Chip	0.022μF	50WV	±20%	CD-223MJCP	C2K31P1HC223M
C204	Electrolytic	47μF	16WV	±20%	CC-476MDAP	16MV470SS
C205	Electrolytic	1μF	50WV	±20%	CC-105MJAP	50MV1R0SS
C206	Ceramic Chip	0.047μF	25WV	±20%	CD-473ZJCP	C1K31P1HF473Z
C207	Ceramic Chip	0.047μF	25WV	±20%	CD-473ZJCP	C1K31P1HF473Z
C208	Ceramic Chip	0.047μF	25WV	±20%	CD-473ZJCP	C1K31P1HF473Z
C209	Ceramic Chip	0.047μF	25WV	±20%	CD-473ZJCP	C1K31P1HF473Z
C210	Ceramic Chip	0.047μF	25WV	±20%	CD-473ZJCP	C1K31P1HF473Z
C211	Ceramic Chip	0.047μF	25WV	±20%	CD-473ZJCP	C1K31P1HF473Z
C212	Ceramic Chip	0.047μF	25WV	±20%	CD-473ZJCP	C1K31P1HF473Z
C213	Ceramic Chip	0.047μF	25WV	±20%	CD-473ZJCP	C1K31P1HF473Z
C214	Ceramic Chip	0.047μF	25WV	±20%	CD-473ZJCP	C1K31P1HF473Z
C215	Ceramic Chip	0.047μF	25WV	±20%	CD-473ZJCP	C1K31P1HF473Z
C216	Ceramic Chip	0.047μF	25WV	±20%	CD-473ZJCP	C1K31P1HF473Z
C217	Ceramic Chip	0.047μF	25WV	±20%	CD-473ZJCP	C1K31P1HF473Z
C218	Ceramic Chip	0.047μF	25WV	±20%	CD-473ZJCP	C1K31P1HF473Z
C219	Ceramic Chip	0.047μF	25WV	±20%	CD-473ZJCP	C1K31P1HF473Z
C220	Ceramic Chip	0.047μF	25WV	±20%	CD-473ZJCP	C1K31P1HF473Z
C221	Electrolytic	10μF	16WV	±20%	CC-106MDAP	16MV100SS
C222	Ceramic Chip	0.001μF	50WV	±10%	CD-102KJCP	C2K31P1HC102K
CA1	Ceramic Array	0.01μF	50WV	±10%	CF-2296	EXF-P8102ZW
CERAMIC FILTERS						
CF1		10.695 MHz			C-1327	10.7MF-23 or SFE10.7MJ
CF2		455 kHz			C-1350	LFH-6SD or CFW455HT
DIODES						
D1	Diode	US1040		Silicon	DX-2421	US1040
D2	Diode	1K60		Germanium	DX-2013	1K60
D3	Diode	1K60		Germanium	DX-2013	1K60
D4	Diode	1K60		Germanium	DX-2013	1K60
D5	Diode	1K60		Germanium	DX-2013	1K60

Ref. No.	Description			RS Part Number	MFR's Part Number
D6	Diode Zener	HZ11A2L	Silicon	DX-1316	HZ11A2L
D7	Diode	US1040	Silicon	DX-2421	US1040
D8	Diode	US1040	Silicon	DX-2421	US1040
D9	Diode	US1040	Silicon	DX-2421	US1040
D10	Diode	US1040	Silicon	DX-2421	US1040
D11	Diode	US1040	Silicon	DX-2421	US1040
D12	Diode	US1040	Silicon	DX-2421	US1040
D13	Diode	US1040	Silicon	DX-2421	US1040
D14	Diode	US1040	Silicon	DX-2421	US1040
D15	Diode	US1040	Silicon	DX-2421	US1040
D16	Diode	1S2268	Silicon	DX-1030	1S2268
D17	Diode	US1040	Silicon	DX-2421	US1040
D18	Diode Zener	HZ7B3L	Silicon	DX-1687	HZ7B3L
D19	Diode	US1040	Silicon	DX-2421	US1040
D20	Diode	US1040	Silicon	DX-2421	US1040
D21	Diode	SR1K-2	Silicon	DX-0475	SR1K-2
D22	Diode	1K60	Germanium	DX-2013	1K60
D23	Diode	US1090	Silicon	DX-0014	US1090
D24	Diode	1K60	Germanium	DX-2013	1K60
D25	Diode	US1040	Silicon	DX-2421	US1040
D26	Diode	1K60	Germanium	DX-2013	1K60
D27	Diode	US1040	Silicon	DX-2421	US1040
D28	Diode	US1040	Silicon	DX-2421	US1040
D29	Diode	SR1K-2	Silicon	DX-0475	SR1K-2
D201	Diode	US1040	Silicon	DX-2421	US1040
D202	Diode	US1040	Silicon	DX-2421	US1040
	INTEGRATED CIRCUITS				
IC1	6V Regulator, Linear TA78L006AP or AN78L06			MX-4568	TA78L006P or AN78L06
IC2	PLL, Linear/Logic TC9109BP			MX-4960	TC9109BP
IC3	Audio Amp, Linear TBA810S			MX-3364	TBA810S
IC201	LCD Drive, Linear BA6124			MX-5588	BA6124
	COILS				
L1	RFC	470μH		CA-0010	LAL03NA471K
L2	RFC	470μH		CA-0010	LAL03NA471K
L3	RFC	3.3μH		CA-0008	LAL03NA3R3K
L4	RFC	4.7μH		CA-0009	LAL03NA4R7K
L5	RFC	4.7μH		CA-0009	LAL03NA4R7K
L6	Coil Drive			CA-0005	GR-M730
L7	RFC	4.7μH		CA-0009	LAL03NA4R7K
L8	RFC	1μH		CA-0007	LAL04NA1R0M
L9	Coil T Network			CA-0006	GR-M729
L10	Coil π Network			CA-0005	GR-M730
L11	RFC	0.12μH		CA-3488	4LNC-092(T)
L12	RFC	20μH		CA-0011	3B037(T)
L13	RFC	20μH		CA-0011	3B037(T)

Ref. No.	Description				RS Part Number	MFR's Part Number
			LCD			
LCD1	LCD Display				L-1579	LU-196
			TRANSISTORS			
Q1	Transistor	2SC1815(O)	NPN		2SC-1815	2SC1815(O)
Q2	Transistor	2SC1923(O)	NPN		2SC-1923	2SC1923(O)
Q3	Transistor	2SC1923(O)	NPN		2SC-1923	2SC1923(O)
Q4	Transistor	3SK77(GR-LB)	FET		3SK-77	3SK77(GR-LB)
Q5	Transistor	2SC1815(GR)	NPN		2SC-1815	2SC1815(GR)
Q6	Transistor	2SC1815(GR)	NPN		2SC-1815	2SC1815(GR)
Q7	Transistor	2SC1815(GR)	NPN		2SC-1815	2SC1815(GR)
Q8	Transistor	JC501(Q)	NPN		MX-0015	JC501(Q)
Q9	Transistor	JA101(Q)	PNP		MX-0014	JA101(Q)
Q10	Transistor	2SC2712(GR)	NPN		2SC-2712	2SC2712(GR)
Q11	Transistor	2SC1923(O)	NPN		2SC-1923	2SC1923(O)
Q12	Transistor	2SC1815(GR)	NPN		2SC-1815	2SC1815(GR)
Q13	Transistor	2SC1815(GR)	NPN		2SC-1815	2SC1815(GR)
Q14	Transistor	JC501(Q)	NPN		MX-0015	JC501(Q)
Q15	Transistor	JC501(Q)	NPN		MX-0015	JC501(Q)
Q16	Transistor	JC501(Q)	NPN		MX-0015	JC501(Q)
Q17	Transistor	JC501(Q)	NPN		MX-0015	JC501(Q)
Q18	Transistor	JC501(Q)	NPN		MX-0015	JC501(Q)
Q19	Transistor	JC501(Q)	NPN		MX-0015	JC501(Q)
Q20	Transistor	2SC2712(GR)	NPN		2SC-2712	2SC2712(GR)
Q21	Transistor	2SC2314(E) or (F)	NPN		2SC-2314	2SC2314(E) or (F)
Q22	Transistor	2SC2078(E)	NPN		2SC-2078	2SC2078(E)
Q23	Transistor	JC501(Q)	NPN		MX-0015	JC501(Q)
Q201	Transistor	JC501(Q)	NPN		MX-0015	JC501(Q)
Q202	Transistor	JC501(Q)	NPN		MX-0015	JC501(Q)
Q203	Transistor	JC501(Q)	NPN		MX-0015	JC501(Q)
Q204	Transistor	JC501(Q)	NPN		MX-0015	JC501(Q)
Q205	Transistor	JC501(Q)	NPN		MX-0015	JC501(Q)
			RESISTORS			
R1	Carbon film	2.2kΩ	1/6W	±5%	N-0216ECC	RD-1/6M222J
R2	Carbon film	180kΩ	1/6W	±5%	N-0387ECC	RD-1/6U184J
R3	Carbon film	27kΩ	1/6W	±5%	N-0316ECC	RD-1/6U273J
R4	Carbon film	2.2kΩ	1/6W	±5%	N-0216ECC	RD-1/6U222J
R5	Carbon film	47Ω	1/6W	±5%	N-0099ECC	RD-1/6U470J
R6	Carbon film	4.7kΩ	1/6W	±5%	N-0247ECC	RD-1/6U472J
R7	Carbon film	6.8kΩ	1/4W	±5%	N-0262EEC	ERD-25TJ682
R8	Carbon film	2.2kΩ	1/6W	±5%	N-0216ECC	RD-1/6U222J
R9	Carbon film	2.2kΩ	1/6W	±5%	N-0216ECC	RD-1/6U222J
R10	Carbon film	1kΩ	1/6W	±5%	N-0196ECC	RD-1/6U102J
R11	Carbon film	680Ω	1/6W	±5%	N-0183ECC	RD-1/6U681J
R12	Carbon film	220Ω	1/6W	±5%	N-0149ECC	RD-1/6U221J
R13	Carbon film	22kΩ	1/6W	±5%	N-0311ECC	RD-1/6U223J
R14	Carbon film	100Ω	1/6W	±5%	N-0132ECC	RD-1/6U101J
R15	Carbon film	1kΩ	1/6W	±5%	N-0196ECC	RD-1/6U102J
R16	Carbon film	220kΩ	1/6W	±5%	N-0396ECC	RD-1/6U224J

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Ref. No.	Description				RS Part Number	MFR's Part Number
R17	Carbon film	470Ω	1/6W	±5%	N-0169ECC	RD-1/6P471J
R18	Carbon film	1kΩ	1/6W	±5%	N-0196ECC	RD-1/6U102J
R19	Carbon film	2.2kΩ	1/6W	±5%	N-0216ECC	RD-1/6U222J
R20	Carbon film	2.2kΩ	1/6W	±5%	N-0216ECC	RD-1/6U222J
R21	Carbon film	82kΩ	1/6W	±5%	N-0360ECC	RD-1/6U823J
R22	Carbon film	470Ω	1/6W	±5%	N-0169ECC	RD-1/6U471J
R23	Carbon film	220Ω	1/6W	±5%	N-0149ECC	RD-1/6U221J
R24	Carbon film	220Ω	1/6W	±5%	N-0149ECC	RD-1/6U221J
R25	Carbon film	220kΩ	1/6W	±5%	N-0396ECC	RD-1/6U224J
R26	Carbon film	27kΩ	1/6W	±5%	N-0316ECC	RD-1/6U273J
R27	Carbon film	220Ω	1/6W	±5%	N-0149ECC	RD-1/6U221J
R28	Carbon film	100Ω	1/6W	±5%	N-0132ECC	RD-1/6U101J
R29	Carbon film	220Ω	1/6W	±5%	N-0149ECC	RD-1/6U221J
R30	Carbon film	18kΩ	1/6W	±5%	N-0303ECC	RD-1/6U183J
R31	Carbon film	1kΩ	1/6W	±5%	N-0196ECC	RD-1/6U102J
R32	Carbon film	100kΩ	1/6W	±5%	N-0371ECC	RD-1/6U104J
R33	Carbon film	10kΩ	1/6W	±5%	N-0281ECC	RD-1/6U103J
R34	Carbon film	10kΩ	1/6W	±5%	N-0281ECC	RD-1/6U103J
R35	Carbon film	10kΩ	1/6W	±5%	N-0281ECC	RD-1/6U103J
R36	Carbon film	1kΩ	1/6W	±5%	N-0196ECC	RD-1/6U102J
R37	Carbon film	22kΩ	1/6W	±5%	N-0311ECC	RD-1/6U223J
R38	Chip	33kΩ	1/8W	±5%	ND-0324EBB	ERJ-8GCYJ333
R39	Chip	120Ω	1/8W	±5%	ND-0136EBB	ERJ-8GCYJ121
R40	Chip	2.2kΩ	1/8W	±5%	ND-0216EBB	ERJ-8GCYJ222
R41	Carbon film	4.7kΩ	1/6W	±5%	N-0247ECC	RD-1/6U472J
R42	Chip	2.2kΩ	1/8W	±5%	ND-0216EBB	ERJ-8GCYJ222
R43	Carbon film	27kΩ	1/6W	±5%	N-0316ECC	RD-1/6P273J
R44	Carbon film	22kΩ	1/6W	±5%	N-0311ECC	RD-1/6U223J
R45	Carbon film	3.3kΩ	1/4W	±5%	N-0230EEC	ERD-25TJ332
R46	Carbon film	10kΩ	1/6W	±5%	N-0281ECC	RD-1/6U103J
R47	Carbon film	100Ω	1/6W	±5%	N-0132ECC	RD-1/6U101J
R48	Carbon film	330kΩ	1/6W	±5%	N-0410ECC	RD-1/6U334J
R49	Carbon film	22kΩ	1/6W	±5%	N-0311ECC	RD-1/6U223J
R50	Carbon film	33kΩ	1/6W	±5%	N-0324ECC	RD-1/6U333J
R51	Carbon film	1kΩ	1/6W	±5%	N-0196ECC	RD-1/6U102J
R52	Carbon film	2.2kΩ	1/6W	±5%	N-0216ECC	RD-1/6U222J
R53	Carbon film	2.2kΩ	1/6W	±5%	N-0216ECC	RD-1/6U222J
R54	Carbon film	470Ω	1/6W	±5%	N-0169ECC	RD-1/6P471J
R55	Chip	10kΩ	1/8W	±5%	ND-0281EBB	ERJ-8GCYJ103
R56	Carbon film	56kΩ	1/4W	±5%	N-0345EEC	ERD-25TJ563
R57	Chip	4.7kΩ	1/8W	±5%	ND-0247EBB	ERJ-8GCYJ472
R58	Carbon film	1kΩ	1/6W	±5%	N-0196EEC	RD-1/6U102J
R59	Carbon film	3.9kΩ	1/6W	±5%	N-0237ECC	RD-1/6U392J
R60	Carbon film	100Ω	1/6W	±5%	N-0132ECC	RD-1/6U101J
R61	Carbon film	330Ω	1/6W	±5%	N-0159ECC	RD-1/6U331J
R62	Carbon film	33kΩ	1/6W	±5%	N-0324ECC	RD-1/6U333J
R63	Carbon film	120kΩ	1/6W	±5%	N-0375ECC	RD-1/6U124J
R64	Carbon film	18kΩ	1/6W	±5%	N-0303ECC	RD-1/6U183J
R65	Chip	270Ω	1/8W	±5%	ND-0155EBB	ERJ-8GCYJ271
R66	Carbon film	27kΩ	1/6W	±5%	N-0316ECC	RD-1/6U273J
R67	Carbon film	10kΩ	1/6W	±5%	N-0281ECC	RD-1/6U103J
R68	Carbon film	4.7kΩ	1/6W	±5%	N-0247ECC	RD-1/6U472J
R69	Carbon film	68kΩ	1/6W	±5%	N-0354ECC	RD-1/6U683J
R70	Carbon film	33kΩ	1/6W	±5%	N-0324ECC	RD-1/6U333J

Ref. No.	Description				RS Part Number	MFR's Part Number
R71	Carbon film	820kΩ	1/6W	±5%	N-0440ECC	RD-1/6U824J
R72	Carbon film	4.7kΩ	1/6W	±5%	N-0247ECC	RD-1/6U472J
R73	Carbon film	22Ω	1/6W	±5%	N-0078ECC	RD-1/6U220J
R74	Carbon film	100Ω	1/6W	±5%	N-0132ECC	RD-1/6U101J
R75	Carbon film	2.2Ω	1/6W	±5%	N-0032ECC	RD-1/6U2R2J
R76	Carbon film	1kΩ	1/6W	±5%	N-0196ECC	RD-1/6U102J
R77	Metal film	22Ω	1W	±5%	N-0078EGC	ERG-1ANJ220
R78	Carbon film	6.8kΩ	1/6W	±5%	N-0262ECC	RD-1/6U682J
R79	Carbon film	270Ω	1/6W	±5%	N-0155ECC	RD-1/6U271J
R80	Carbon film	12kΩ	1/6W	±5%	N-0288ECC	RD-1/6U123J
R81	Carbon film	100Ω	1/6W	±5%	N-0132ECC	RD-1/6U101J
R82	Carbon film	18kΩ	1/6W	±5%	N-0303ECC	RD-1/6U183J
R83	Carbon film	1kΩ	1/6W	±5%	N-0196ECC	RD-1/6U102J
R84	Chip	22Ω	1/8W	±5%	ND-0078EBB	ERJ-8GCYJ220
R85	Not used					
R86	Carbon film	22Ω	1/6W	±5%	N-0078ECC	RD-1/6U220J
R87	Carbon film	220Ω	1/6W	±5%	N-0149ECC	RD-1/6U221J
R88	Carbon film	10Ω	1/6W	±5%	N-0063ECC	RD-1/6U100J
R89	Carbon film	220Ω	1/6W	±5%	N-0149ECC	RD-1/6U221J
R90	Chip	4.7Ω	1/8W	±5%	ND-0047EBB	ERJ-8GCZJ4R7
R91	Carbon film	100Ω	1/2W	±5%	N-0132EEC	ERD-50TJ101
R92	Carbon film	47Ω	1/6W	±5%	N-0099ECC	RD-1/6U470J
R93	Chip	220Ω	1/8W	±5%	ND-0149EBB	ERJ-8GCYJ221
R94	Chip	10Ω	1/8W	±5%	ND-0063EBB	ERJ-8GCYJ100
R95	Carbon film	1kΩ	1/2W	±5%	N-0196EEC	ERD-50TJ102
R96	Carbon film	1kΩ	1/4W	±5%	N-0196EEC	ERD-25TJ102
R97	Carbon film	330Ω	1/6W	±5%	N-0169ECC	RD1/6M331J
R98	Carbon film	22kΩ	1/6W	±5%	N-0311ECC	RD-1/6U223J
R99	Carbon film	22kΩ	1/6W	±5%	N-0311ECC	RD-1/6U223J
R100	Carbon film	8.2kΩ	1/6W	±5%	N-0271ECC	RD-1/6U822J
R101	Carbon film	4.7kΩ	1/4W	±5%	N-0247EEC	ERD-25TJ472
R102	Carbon film	4.7kΩ	1/6W	±5%	N-0247ECC	RD1/6M472J
R103	Carbon film	2.2kΩ	1/6W	±5%	N-0216ECC	RD-1/6U222J
R104	Carbon film	2.2kΩ	1/4W	±5%	N-0216EEC	ERD-25TJ222
R105	Carbon film	10kΩ	1/6W	±5%	N-0281ECC	RD-1/6U103J
R106	Carbon film	10kΩ	1/6W	±5%	N-0281ECC	RD-1/6U103J
R107	Carbon film	10kΩ	1/6W	±5%	N-0281ECC	RD-1/6U103J
R201	Chip	1.2kΩ	1/8W	±5%	ND-0199EBB	ERJ-8GCYJ122
R202	Chip	82kΩ	1/8W	±5%	ND-0360EBB	ERJ-8GCYJ823
R203	Chip	82kΩ	1/8W	±5%	ND-0360EBB	ERJ-8GCYJ823
R204	Chip	1.2kΩ	1/8W	±5%	ND-0199EBB	ERJ-8GCYJ122
R205	Chip	100Ω	1/8W	±5%	–	ERJ-8GCYJ101
R206	Not used					
R207	Chip	560kΩ	1/8W	±5%		ERJ-8GCYJ564
R208	Chip	330kΩ	1/8W	±5%	ND-0410EBB	ERJ-8GCYJ334
R209	Chip	10kΩ	1/8W	±5%	ND-0281EBB	ERJ-8GCYJ103
R210	Chip	330Ω	1/8W	±5%	ND-0159EBB	ERJ-8GCYJ331
R211	Chip	10kΩ	1/8W	±5%	ND-0281EBB	ERJ-8GCYJ103
R212	Chip	120Ω	1/8W	±5%	ND-0132EBB	ERJ-8GCYJ121
RA201	Array resistor, metal film		1MΩ x 9	±5%	RX-0001	EXBF10E-105J
RA202	Array resistor, metal film		1MΩ x 7	±5%	RX-0002	EXBF8E-105J
RA203	Array resistor, metal film		1MΩ x 5	±5%	RX-0003	EXBF6E-105J

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Ref. No.	Description	RS Part Number	MFR's Part Number
	SWITCHES		
SW1	LAMP	S-0002	KHC-10901
SW2	POWER HI/LOW	J-5022	XQ6469
SW3/VR5	POWER/POT VOLUME	P-0008	V12M41S(SJ) 15FHA50K
SW4	TALK	S-2973	AH1210
SW5/J4	Jack, MIC (DIN5P)	J-6532	D5-705B-10
SW201	Channel	S-1581	SRS-202U
	COILS		
T1	Coil RF (27 MHz)	CA-3964	GR-N555(U)
T2	Coil Mixer (27 MHz)	CA-3433	1624B(U)
T3	Coil IF (455 kHz)	CA-8183	GR-P352203(U)
T4	Coil IF (455 kHz)	CA-7844	GR-P4202
T5	Coil VCO (13/16 MHz)	CA-0003	GR-C732
T6	Coil Buffer (16 MHz)	CA-0004	GR-C731
T7	Coil BPF (27 MHz)	CA-4966	GR-N549(U)
T8	Coil BPF (27 MHz)	CA-4966	GR-N549(U)
T9	Coil BPF (27 MHz)	CA-4966	GR-N549(U)
T10	Transformer (Mod.)	TA-0002	E4006C
	TRIMMER CAPACITOR		
TC1	Capacitor Trimmer 20pF	C-1351	ECR-GA020E30
	THERMISTOR		
TH1	Thermistor 10kΩ	T-0001	TD5-C310D
	VARIABLE RESISTORS		
VR1	Trimmer 20kΩ	P-8008	V6EK-PV(1S)B20K
VR2	Trimmer 50kΩ	P-0007	V6EK-PH(1S)B50K
VR3	Trimmer 50kΩ	P-0007	V6EK-PH(1S)B50K
VR4	Trimmer 100Ω	P-0006	V6CK-PV(1S)B100
VR5	Volume Control 50kΩA	P-0008	V12M4-1S(SJ) 15FHA 50K
VR6	Squelch Control 50kΩC	P-0009	V12M4-1N15FH C50K
	CRYSTAL		
X1	10.240 MHz	MX-1043	10.240 MHz
	MISCELLANEOUS		
	Case, shield		GE-84D-5177
	Case, shield, bottom		GE-83D-3958
	Case, shield, top		GE-84D-5143
	Connector, socket 3P	J-0003	3024-03CH
	Connector, socket 16P	J-5072	3024-16CH
	Connector, wafer 3P	J-0001	3022-03B
	Connector, wafer 16P	J-0002	3022-16B

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Ref. No.	Description	RS Part Number	MFR's Part Number
①	Heat sink (IC3)		GE-84D-5142
②	Heat sink (Q21, 22)		GE-84D-4914
J1 ③	Jack, speaker	J-0840	SG-8022
J2/J3 ④	Jack, board, PWR/CHG	J-5022	XQ6469
	Lamp	L-0010	BP26V30mAW25
⑤	Microphone	M-2352	WM-034CY
⑥	Speaker (8Ω, 0.3W)	SP-0003	SP-505
⑦	Fiber, heat sink		GE-84D-5184
⑧	Fiber, PLL shield cover (Bottom)		GE-83D-3959

MECHANICAL PARTS LIST

Ref. No.	Description	RS Part Number	MFR's Part Number
⑨	Antenna	A-0001	T-4143
	Accessories		
	Battery, dummy	CS-0045	GE-21D-5915
	Case, carrying	Z-0012	GE-84B-5138
⑩	Bracket, antenna	A-4520	GE-82D-3329
⑪	Bracket, MIC jack		GE-82D-3553
⑫	Bracket, TALK/LAMP PCB		GE-84D-5250
⑬	Buckle	HC-0065	GE-84D-5077
	Case assembly, front (Non-repairable)	Z-0014	GA-84D-4955
⑭	Case, front		GE-84B-4945
⑮	Window, LCD		GE-84D-4946
	Case, rear, assembly for USA (Non-repairable)	Z-0015	GA-84D-4956
⑯	Case, battery		GE-84B-4948
⑰	Case, rear		GE-84B-4947
⑱	Terminal, battery		GE-82D-3314
⑲	Spring, battery (L)	RB-0004	GE-82D-3315
⑳	Spring, battery (S)	RB-0005	GE-82D-3316
㉑	Strap		GE-84D-5076
㉒	Nut, push 3m/m		CS TYPE 3mm
	Case, rear, assembly for CANADA (Non-repairable)		GA-84D-5232
⑯	Case, battery		GE-84B-4948
⑰	Case, rear		GE-84B-4947
	Label, model		GE-84D-5225
⑱	Terminal, battery		GE-82D-3314
⑲	Spring, battery (L)	RB-0004	GE-82D-3315
⑳	Spring, battery (S)	RB-0005	GE-82D-3316
㉑	Strap		GE-84D-5076
㉒	Nut, push 3m/m		CS TYPE 3mm
	Case, rear, assembly for AUSTRALIA (Non-repairable)		GA-84D-5233
⑯	Case, battery		GE-84B-4948
⑰	Case, rear		GE-84B-4947
	Label, model		GE-84D-5222
⑱	Terminal, battery		GE-82D-3314
⑲	Spring, battery (L)	RB-0004	GE-82D-3315
⑳	Spring, battery (S)	RB-0005	GE-82D-3316
㉑	Strap		GE-84D-5076
㉒	Nut push 3m/m		CS TYPE 3mm

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Ref. No.	Description	RS Part Number	MFR's Part Number
㉓	Cap, jack board	HB-2565	GE-83D-3661
㉔	Cap, MIC/SP jack	HB-0002	GE-84D-4943
㉕	Cover, battery	DB-0001	GE-84C-4951
	Frame ass'y (Non-repairable)	Z-0013	GA-84D-4954
㉖	Escutcheon	–	GE-84B-4940
㉗	Frame	–	GE-84B-4939
㉘	Grommet, antenna	A-4018	GE-13C-0907
④	Jack board (Non-repairable)	J-5022	XQ6469
	Jack, ANT		
	Jack, CHG		
	Switch, POWER HI/LO		
	Jack, PWR		
②	Heat sink (Q21, 22)	–	GE-84D-4914
㉙	Knob, channel	K-0013	GE-84D-4942
㉚	Knob, SQUELCH, VOLUME	K-5492	GE-82D-3439
㉛	Knob, talk	K-0014	GE-84D-5140
㉜	PCB ass'y, CHG/PWR	XB-0673	GA-84D-5211
㉝	PCB ass'y, TALK/LAMP switch	XB-0671	GA-84D-5212
㉞	PCB ass'y, LCD	XB-0670	GA-84D-5209
㉟	PCB ass'y, main	XB-0669	GA-84D-5208
㊱	PCB ass'y, POWER HI/LOW	XB-0672	GA-84D-5210
	Reflector, Lamp		GE-84D-5157
	Screws		
	2x10 countersunk head	HD-0008	
	2x25 countersunk head (black)		
	2x30 pan head (black)		
	3x5 pan head	HD-2059	
	3x6 pan head		
	3x6 pan head P type		
	3x6 pan head polysulphane		
	3x8 countersunk head	HD-0007	
㊲	Shield plate		GE-84D-5251
㊳	Shield, VCO bottom		GE-83D-3958
㊴	Shield, VCO case		GE-84D-5177
㊵	Shield, VCO top		GE-84D-5143
㊶	Spacer, Lamp switch		GE-84D-5279
㊷	Spacer, Talk switch		GE-84D-5278

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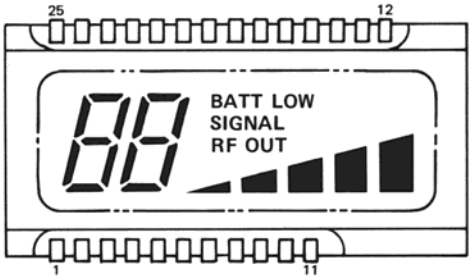
LCD PIN CONFIGURATION

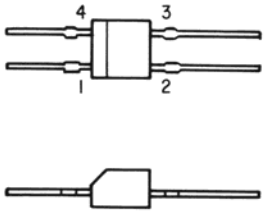


Pin No.	Segment	Pin No.	Segment
1	1e	15	SIGNAL
2	1d	16	RF
3	1c	17	OUT
4	2e	18	2b
5	2d	19	2a
6	2c	20	2f
7	L1	21	2g
8	L2	22	1b
9	L3	23	1a
10	L4	24	1f
11	L5	25	1g
12	COM		
13	LOW		
14	BATT		

SEMICONDUCTOR LEAD IDENTIFICATION

(A): 3SK77(GR-LB)
(B): 2SC2712(GR)
(C): 2SC1815(O), 2SC1815(GR), 2SC1923(O), JA101(Q), JC501(Q)
(D): 2SC2314(E,F)
(E): 2SC2078(E)

(A)



1. SOURCE
2. DRAIN
3. GATE 2
4. GATE 1

(B)

1. EMITTER
2. COLLECTOR
3. BASE

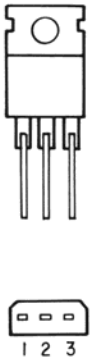
(C)

1. EMITTER
2. COLLECTOR
3. BASE

(D)

1. EMITTER
2. COLLECTOR
3. BASE

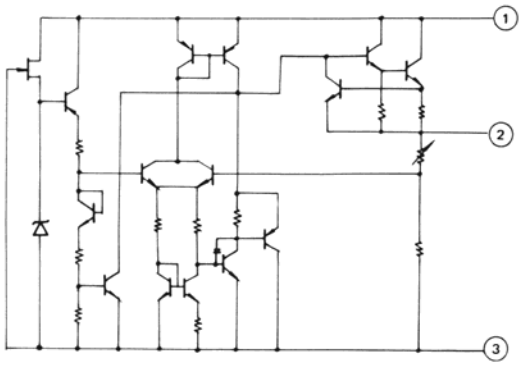
(E)



1. BASE
2. COLLECTOR
3. EMITTER

IC PIN CONFIGURATIONS

IC 1 AN78L06, TA78L006AP 6V REGULATOR

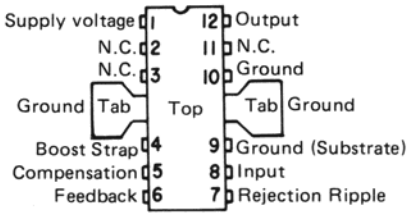


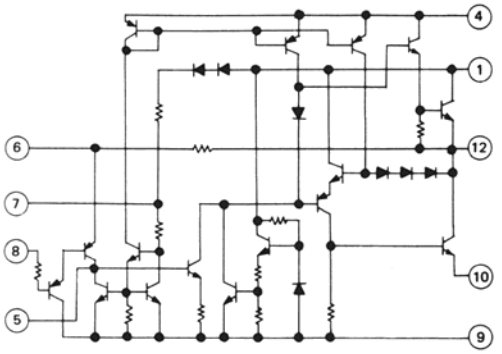
1. INPUT
2. OUTPUT
3. COMMON

IC 2 TC9109BP PLL

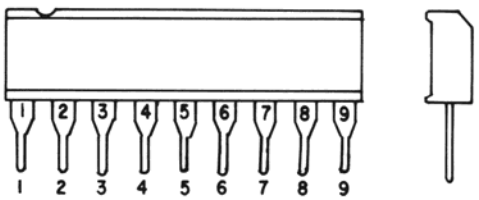
For pin configuration, see page 5.

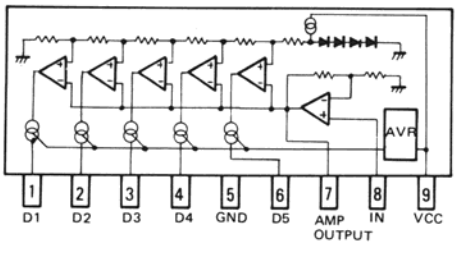
IC 3 TBA810S AF POWER AMPLIFIER





IC 201 BA6124 LCD METER DRIVER





EXPLODED VIEW