Royce 1-650 Service Manual

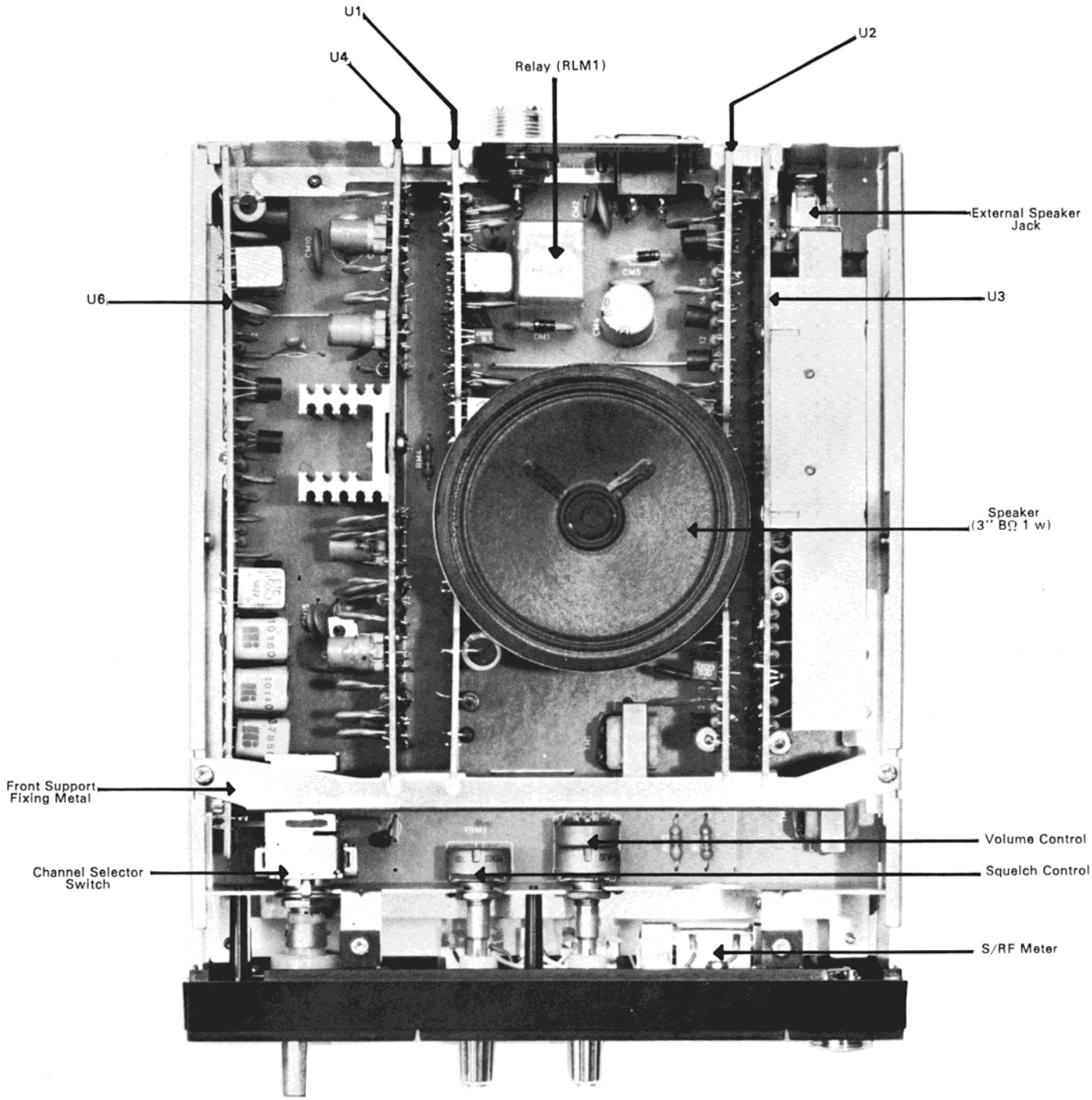

U1
U4
Relay (RLM1)
U2
External Speaker Jack
U6
U3
Speaker (3" BΩ 1 w)
Front Support Fixing Metal
Volume Control
Channel Selector Switch
Squelch Control
S/RF Meter

Figure 1

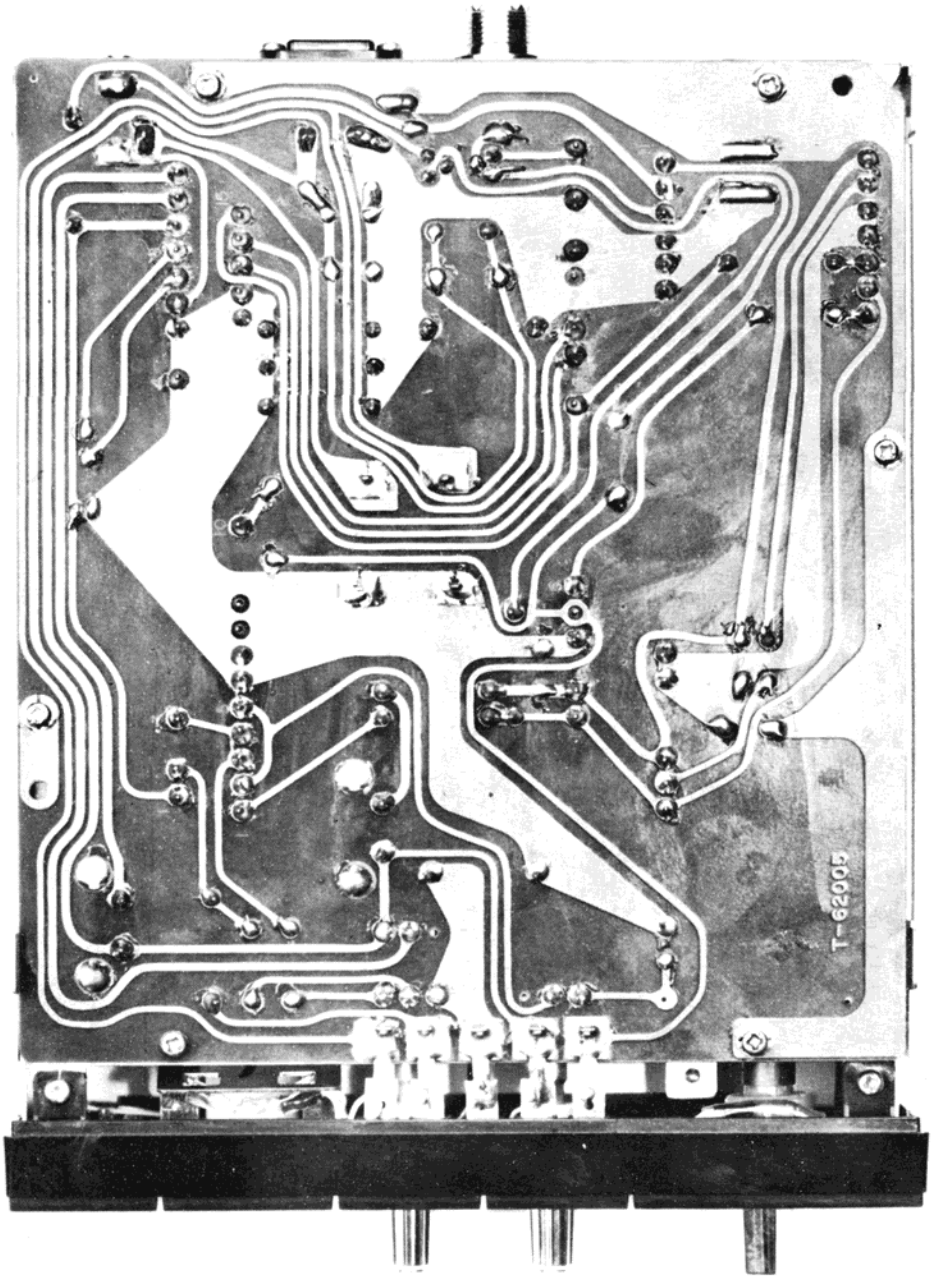
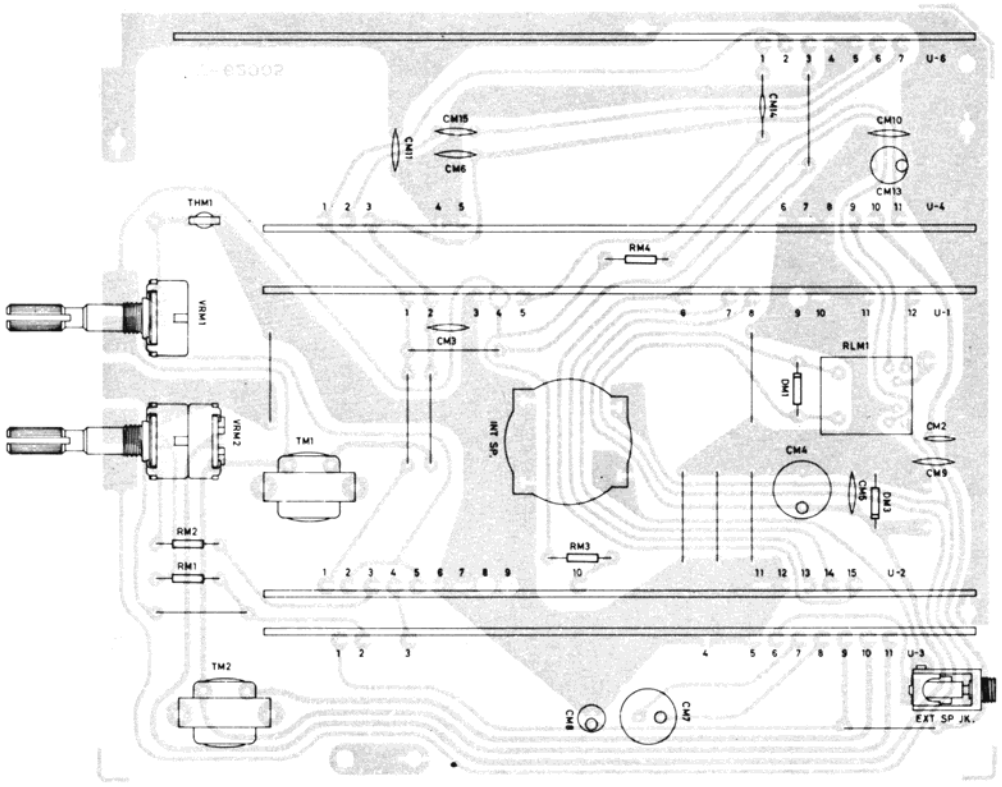
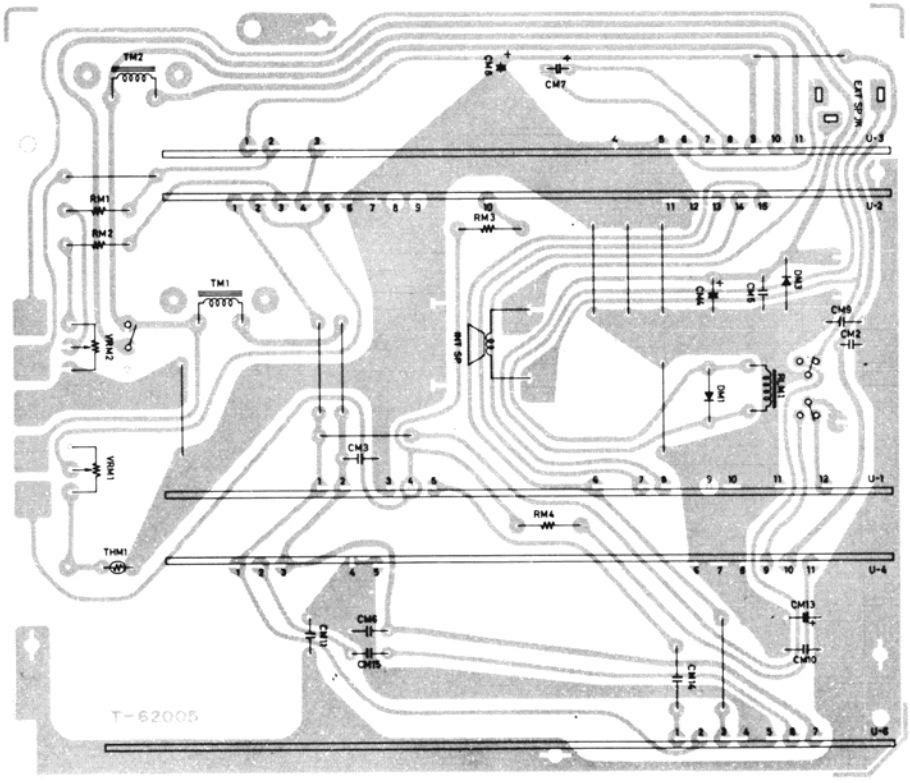


Figure 2

TOP VIEW

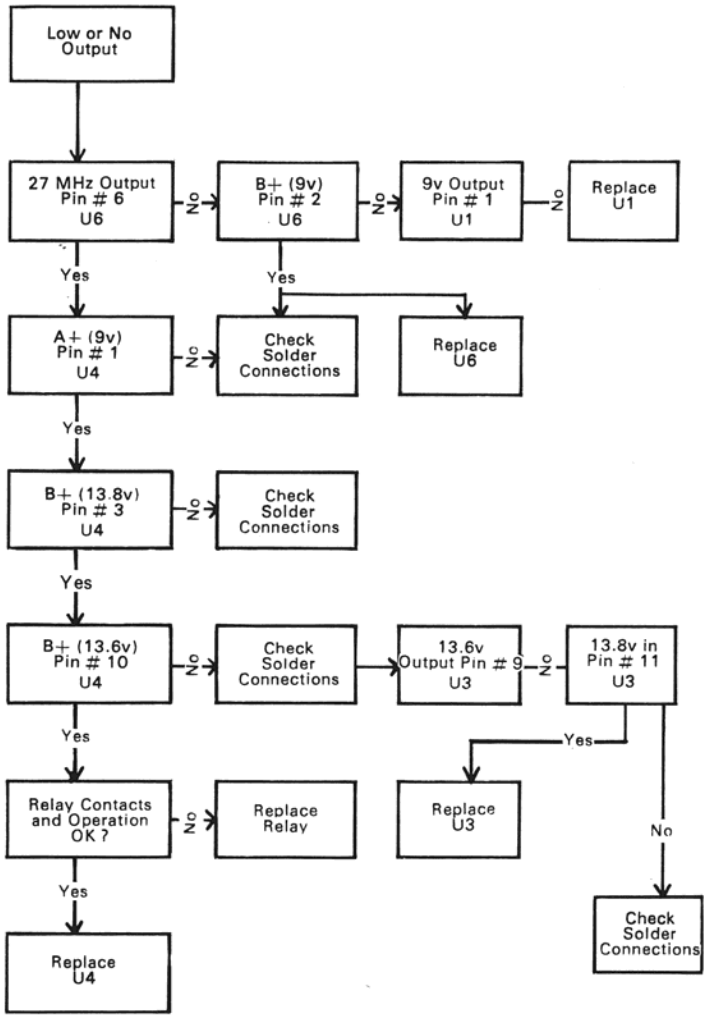


BOTTOM VIEW



TROUBLE-SHOOTING CHART

Transmitter

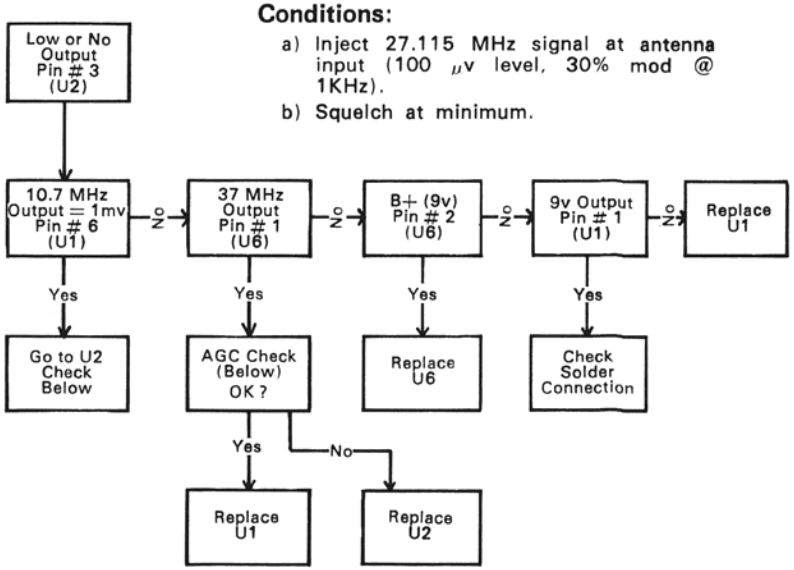


Receiver

Conditions:

a) Inject 27.115 MHz signal at antenna input (100 μv level, 30% mod @ 1KHz).

b) Squelch at minimum.



AGC CHECK

Conditions:

a) Inject 455 KHz (1mv) at pin 15 (U2), 30% mod @ 1KHz.

b) Squelch at minimum.

1) Disconnect pin 6 (U1), then apply power.
2) Inject signal as per conditions above.
3) Measure AGC voltage at pin 13 (U2) for the following generator settings:

	P13v
1mv	.45
100μv	.54
10μv	1.25

I-650 Alignment Instruction

RECEIVER

A. Inject at the ant. jack a 27.115MHz signal (±.002%;30% modulation at 1KHz).
B. Connect an audio voltmeter and oscilloscope across on 8 ohm load and plug into external speaker jack.

Test Equipment	Test Point	Adjust	Remarks
1. RF signal generator (low range to avoid audio saturation)	Inject at ant. jack	Channel sel to 13	———
		T-101, T-102, T-201	Max. output with vol. control at max, squelch control at min. output should be more than 500mw (2.0v/8 ohm) with gen. voltage at 1μV; S & N/N= more than 10dB on all channels

AGC RESPONSE

Set the output voltage of a signal generator at 50000μV and adjust the volume control so that the voltmeter output is 500mW (2.0v/8 ohms). Then, lower the output voltage of the generator so that the voltmeter output is 10dB down. The output voltage of the signal generator should be under 5μV at this time.

AUDIO POWER CHECK

With a generator output of 1mV and squelch control at minimum, audio output should be more than 4w (5.7v/8 ohm) at maximum position of volume control.

TRANSMITTER

A. Power Supply −13.8VDC.
B. Use a suitable power meter, non-inductive dummy load and oscilloscope connected to antenna jack.

Test Equipment	Test Point	Adjust	Remarks
1. VTVM	Secondary of T-601	T-601	Adjust for peak level
	Secondary of T-602, T-603	T-602, T-603	Adjust for peak level
2. Power Meter	antenna jack	T-401, T-402, L-403, L-404	Adjust for maximum output power
3. Freq. Counter	across dummy load	———	Check all channels ± 800Hz
4. A.F. Oscillator with AF voltmeter in shunt (1KHz 10mV)	Inject at mic input	———	−90% modulation on oscilloscope
		———	Reduce AF oscillator output to 5mV; modulation ≥ 50%

CRYSTAL SYNTHESIZER CHART

(A) Group 6 pcs.	(b) Group 4 pcs. (Transmitting)	(C) Group 4 pcs.
X^1 37.60 MHz	X^7 10.635 MHz	X^{11} 10.18 MHz
X^2 37.65 MHz	X^8 10.625 MHz	X^{12} 10.17 MHz
X^3 37.70 MHz	X^9 10.615 MHz	X^{13} 10.16 MHz
X^4 37.75 MHz	X^{10} 10.595 MHz	X^{14} 10.14 MHz
X^5 37.80 MHz		
X^6 37.85 MHz		

CHANNEL	FREQUENCY (MHz)	COMBINATION (Transmit)	COMBINATION (Receive)
1.	26.965	$X^1 - X^7$	$X^1 - X^{11}$
2.	26.975	$X^1 - X^8$	$X^1 - X^{12}$
3.	26.985	$X^1 - X^9$	$X^1 - X^{13}$
4.	27.005	$X^1 - X^{10}$	$X^1 - X^{14}$
5.	27.015	$X^2 - X^7$	$X^2 - X^{11}$
6.	27.025	$X^2 - X^8$	$X^2 - X^{12}$
7.	27.035	$X^2 - X^9$	$X^2 - X^{13}$
8.	27.055	$X^2 - X^{10}$	$X^2 - X^{14}$
9.	27.065	$X^3 - X^7$	$X^3 - X^{11}$
10.	27.075	$X^3 - X^8$	$X^3 - X^{12}$
11.	27.085	$X^3 - X^9$	$X^3 - X^{13}$
12.	27.105	$X^3 - X^{10}$	$X^3 - X^{14}$
13.	27.115	$X^4 - X^7$	$X^4 - X^{11}$
14.	27.125	$X^4 - X^8$	$X^4 - X^{12}$
15.	27.135	$X^4 - X^9$	$X^4 - X^{13}$
16.	27.155	$X^4 - X^{10}$	$X^4 - X^{14}$
17.	27.165	$X^5 - X^7$	$X^5 - X^{11}$
18.	27.175	$X^5 - X^8$	$X^5 - X^{12}$
19.	27.185	$X^5 - X^9$	$X^5 - X^{13}$
20.	27.205	$X^5 - X^{10}$	$X^5 - X^{14}$
21.	27.215	$X^6 - X^7$	$X^6 - X^{11}$
22.	27.225	$X^6 - X^8$	$X^6 - X^{12}$
23.	27.255	$X^6 - X^{10}$	$X^6 - X^{14}$

1-650 MAIN CHASSIS PARTS LIST

Description			Part #
Semiconductors			
DMI	10D-1		
LEDMI	L.E.D. (tx)		1-001
DM3	10D-1		
Controls			
VRM1	Squelch Control	10K ohm	4-210
VRM2	Volume Control	50K ohm	4-112
Cast Parts			
Main Case			3-144
Front Panel			3-239
Meter Fixing Metal			6-101
Channel Lamp Fixing Metal			6-102
Module Front Support Metal			6-104
Speaker Extension			5-115
Mic Jack			5-501
Antenna Jack			5-502
External Speaker Jack			5-503
Mounting Bracket			3-412
Mic Hanger			3-428
Wingbolt (Large)			3-437
Wingbolt (Small)			3-436
Channel Knob and Disc			3-330
Channel Indictor Disc			3-354
Volume/Squelch Knob			3-312
D.C. Input Jack			5-505
Coils—Inductors			
TM1	Choke		2-0031
TM2	Choke		2-0031
Capacitors			
CM2	.022uF		
CM3	.022uF		
CM4	1,000uF 16v		
CM5	.039uF		
CM6	.022uF		
CM7	220uF 16v		
CM8	1uF 50v		
CM9-11	.039uF		
CM13	47uF 16v		
CM14	10pF		
CM15	100pF		
Resistors			
RM1	22K		
RM2	47K		
RM3	4.7K		
RM4	18K		
RP1	2.2K (on front panel)		
THMI	TD5-135 (thermister)		
Miscellaneous			
Speaker			5-103
RLM Relay			4-607
Channel/Meter Lamp			5-301
S/RF Meter			5-215

GENERAL SPECIFICATIONS

1.	Semiconductors	: 14 Transistors and 13 Diodes One integrated circuit
2.	Self-Contained Speaker	: 4 inch, 8 ohm voice coil
3.	Microphone	: Dynamic microphone with push-to-talk switch, 500 ohms
4.	Controls, Indicators and Connectors	: Volume control with power on-off switch : Variable squelch control : Channel selector : Illuminated channel indicator : Illuminated S/RF Power Meter : Transmit light : Coaxial type antenna connector : External Speaker Jack : Microphone connector
5.	Power Supply	: 13.8 Volts DC (positive or negative ground)
6.	Cabinet Description	: Plastic front and metal cabinet
7.	Dimensions	: 8-13/16" (D) x 6-7/8" (W) x 2-9/32" (H)

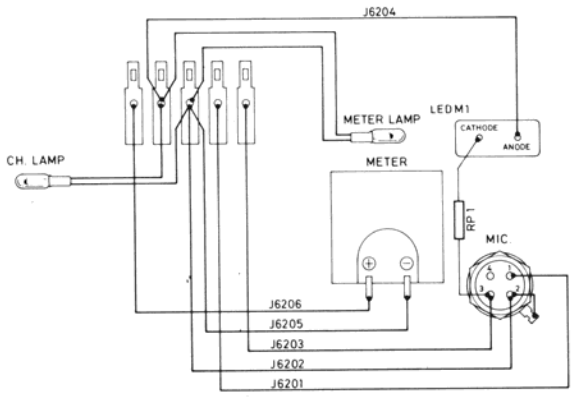
RECEIVER

1.	Frequency Range (MHz)	: 26.965 – 27.255
2.	Sensitivity	: 0.5 μV for 10 dB S + N/N
3.	Selectivity	: 5 KHz minimum at 6 dB down
4.	Adj. Channel Rejection	: More than 60 dB
5.	Audio Power output at 8 ohms	: More than 4 W at 10% distortion
6.	Audio fidelity (1 KHz = 0 dB, 6 dB down)	: 400 Hz – 2,000 Hz
7.	A.G.C. figure of merit (Input 94 dB for 10 dB range)	: More than 80 dB
8.	Squelch sensitivity (Threshold)	: Less than 0.5 μV
9.	Spurious Response	: More than 45 dB

TRANSMITTER

1.	Frequency Range (MHz)	: 26.965 – 27.255
2.	RF Output Power	: 4 W Average
3.	Modulation Capability	: 100%
4.	Spurious Suppression	: More than 50 dB
5.	Frequency Tolerance	: ±0.005%

WIRING DIAGRAM



1-650 SERVICE NOTES

1. After localizing a defective module, it will be necessary to remove the module front support metal before the module can be extracted (see Figure 1).

2. Take particular care in desoldering and resoldering on the main chassis. Engineering tests indicate an average of five solderings before damage results to the foil patterns.

3. If it becomes necessary to remove boards U1 or U2, it is also necessary to remove the entire speaker assembly on some models.

4. Front panel is removed by (a) removing volume-squelch knobs, (b) removing channel knob, (c) removing channel disc (note channel position for reinstallation of disc, (d) removal of four machine screws. Solder tabs slide out of slot on front panel (see Figure 2).