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Royce 1-650 Service Manual

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I-650

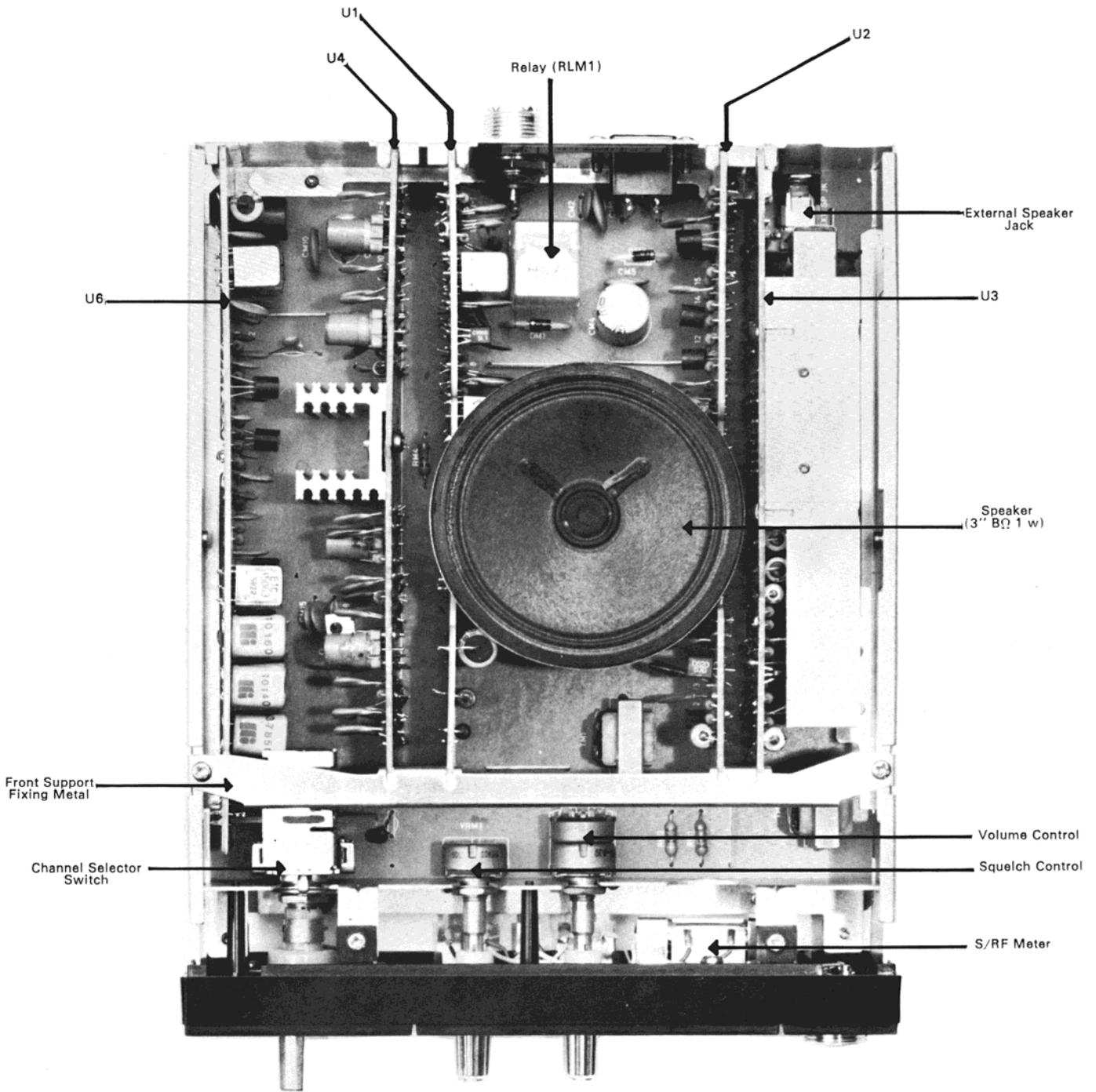


Figure 1

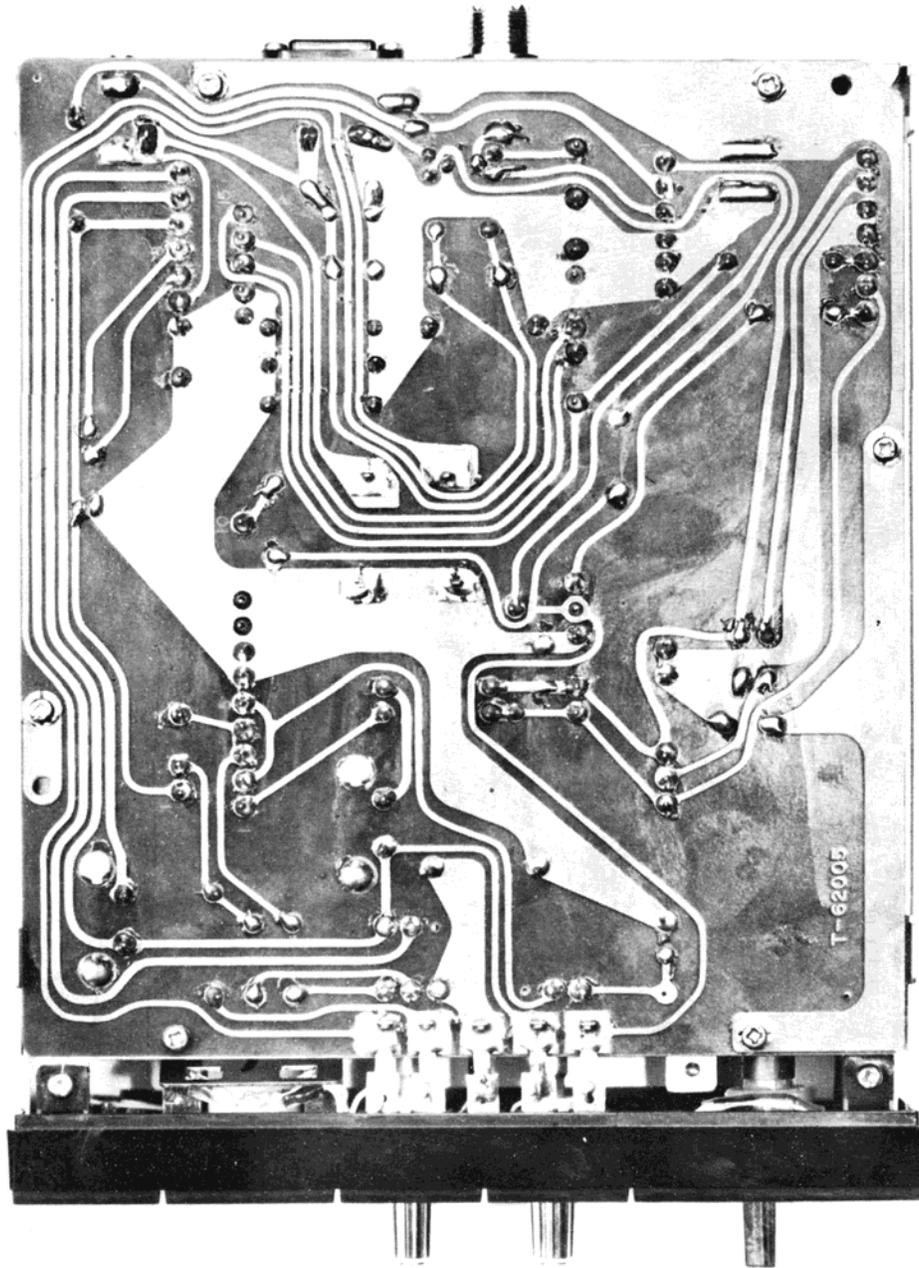
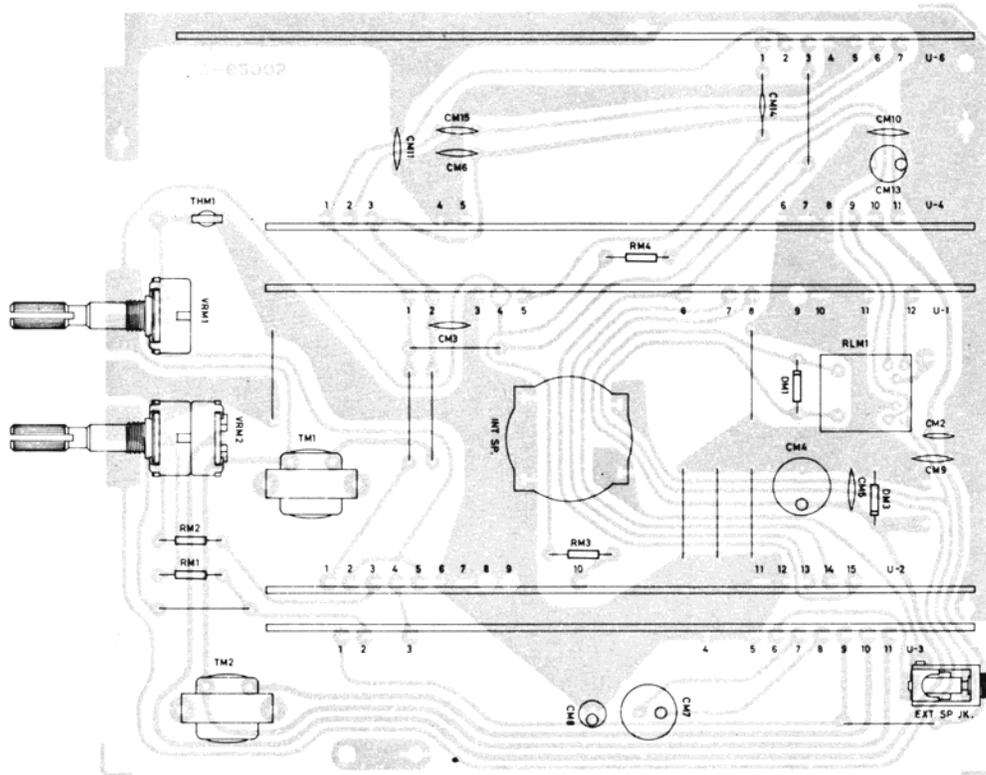
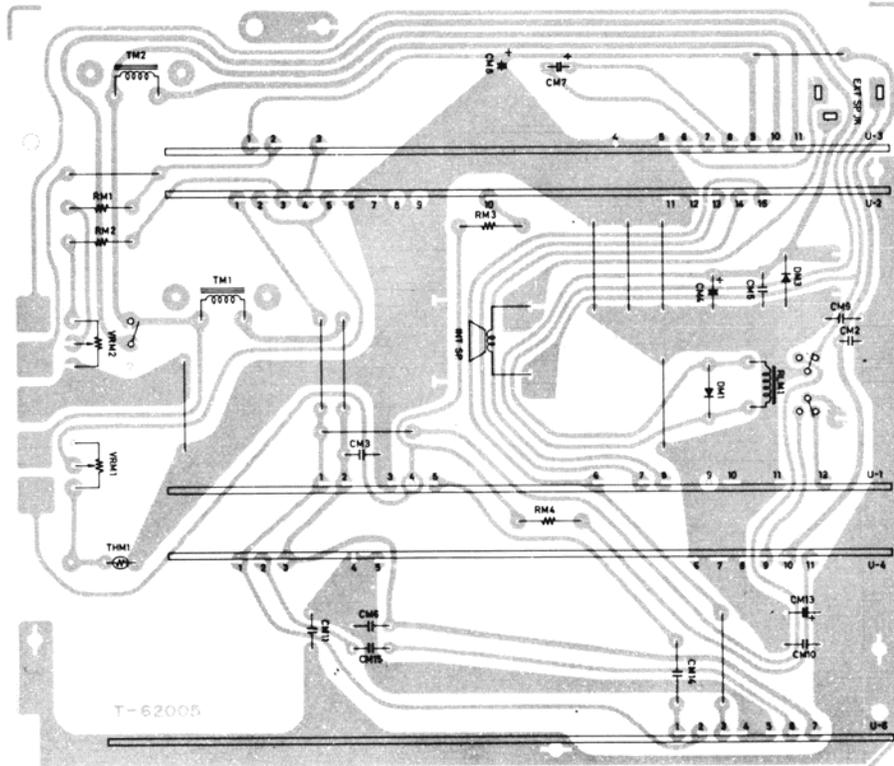


Figure 2

# TOP VIEW

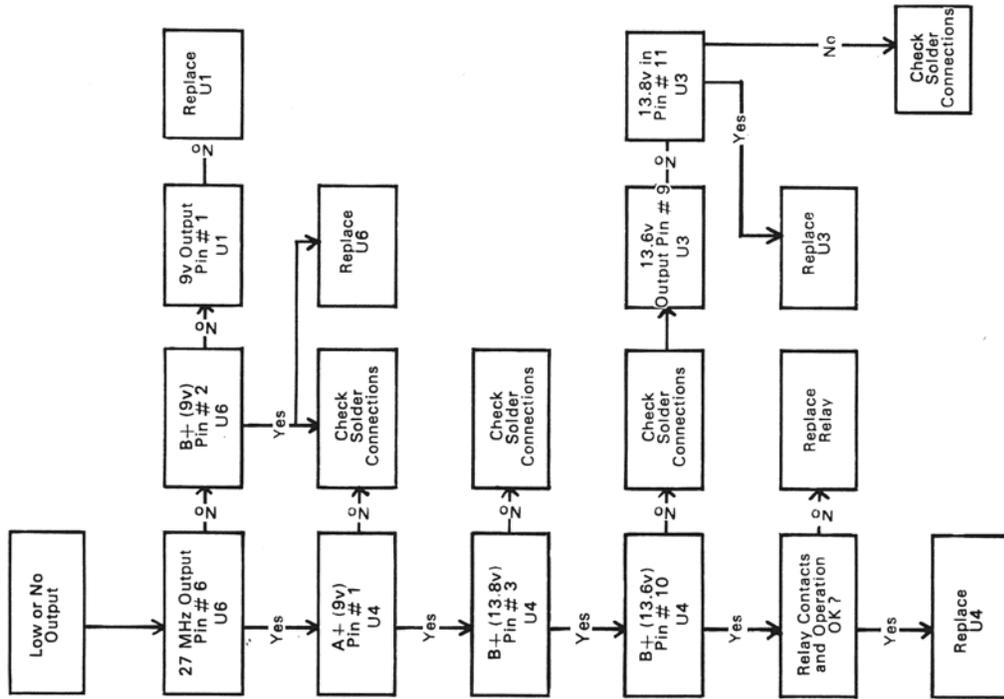


# BOTTOM VIEW

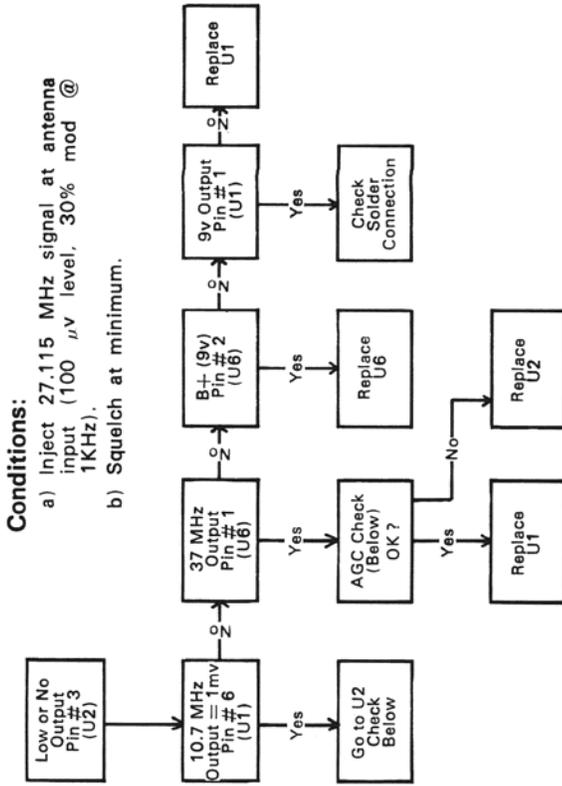


# TROUBLE-SHOOTING CHART

## Transmitter



## Receiver



### Conditions:

- a) Inject 27.115 MHz signal at antenna input (100  $\mu$ v 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
100 $\mu$ v	.54
10 $\mu$ v	1.25

# I-650 Alignment Instruction

## RECEIVER

- A. Inject at the ant. jack a 27.115MHz signal ( $\pm .002\%$ ; 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 $1\mu V$ ; S & N/N= more than 10dB on all channels

## AGC RESPONSE

Set the output voltage of a signal generator at  $50000\mu V$  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  $5\mu V$  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 $\pm 800Hz$
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 $\geq 50\%$

## CRYSTAL SYNTHESIZER CHART

(A) Group 6 pcs.

X<sup>1</sup> 37.60 MHz  
 X<sup>2</sup> 37.65 MHz  
 X<sup>3</sup> 37.70 MHz  
 X<sup>4</sup> 37.75 MHz  
 X<sup>5</sup> 37.80 MHz  
 X<sup>6</sup> 37.85 MHz

(b) Group 4 pcs.  
 (Transmitting)

X<sup>7</sup> 10.635 MHz  
 X<sup>8</sup> 10.625 MHz  
 X<sup>9</sup> 10.615 MHz  
 X<sup>10</sup> 10.595 MHz

(C) Group 4 pcs.

X<sup>11</sup> 10.18 MHz  
 X<sup>12</sup> 10.17 MHz  
 X<sup>13</sup> 10.16 MHz  
 X<sup>14</sup> 10.14 MHz

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

## 1-650 MAIN CHASSIS PARTS LIST

Description	Part #
<b>Semiconductors</b>	
DMI            10D-1	
LEDMI        L.E.D. (tx) .....	1-001
DM3          10D-1	
<b>Controls</b>	
VRM1        Squelch Control    10K ohm .....	4-210
VRM2        Volume Control    50K ohm .....	4-112
<b>Cast Parts</b>	
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 Indicator Disc .....	3-354
Volume/Squelch Knob .....	3-312
D.C. Input Jack .....	5-505
<b>Coils—Inductors</b>	
TM1        Choke .....	2-0031
TM2        Choke .....	2-0031
<b>Capacitors</b>	
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	
<b>Resistors</b>	
RM1        22K	
RM2        47K	
RM3        4.7K	
RM4        18K	
RP1        2.2K (on front panel)	
THMI       TD5-135 (thermister)	
<b>Miscellaneous</b>	
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                        |
| 5. Power Supply                        | : 13.8 Volts DC (positive or negative ground)           |
|  | : 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)               |

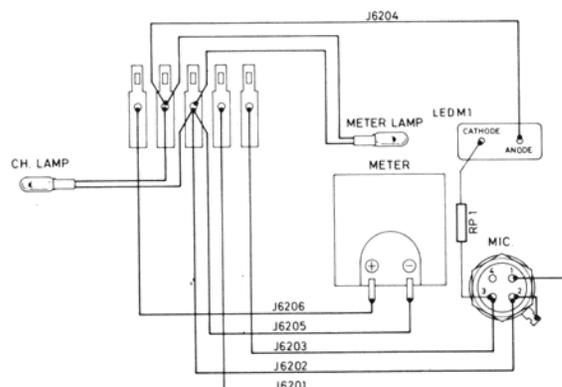
### RECEIVER

- |  |                                   |
|--|-----------------------------------|
| 1. Frequency Range (MHz)                                   | : 26.965 – 27.255                 |
| 2. Sensitivity   | : 0.5 $\mu$ V 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<br>(1 KHz = 0 dB, 6 dB down)             | : 400 Hz – 2,000 Hz               |
| 7. A.G.C. figure of merit<br>(Input 94 dB for 10 dB range) | : More than 80 dB                 |
| 8. Squelch sensitivity (Threshold)                         | : Less than 0.5 $\mu$ V           |
| 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   | : $\pm$ 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).