

## Suggested Test Equipment

<u>TEST INSTRUMENT</u>	<u>REQUIRED SPECIFICATIONS</u>	<u>INSTRUMENT TYPE</u>
DC Power Supply	13.8 VDC, 10 amps	Power Mate BPA-20PF
Wattmeter	50 watts, 136-174 MHz	Bird model 43 with 50C element and 50 ohm load
Digital Multimeter	0.1 to 20 volts DC & AC	B-K 2810
Distortion Analyzer	1KHz, < 2% range	HP-333A
Speaker Load	3.2 ohms, 10 watt	
RF Signal Generator	136-174 MHz range. 0.1-1KuV output. FM modulation	Cushman CE-31A
Deviation Meter	136-174 MHz. +/-5KHz range	p/o Cushman CE-31A
Frequency Meter or Frequency Counter	136-174 MHz within 0.2ppm	p/o Cushman CE-31A or Heath SM-4120
Audio Generator	0-10 KHz sine-wave, 0-5 Vrms output	Heath SG-5218
LMR Test Set		Midland 70-E10

## Alignment Set-up

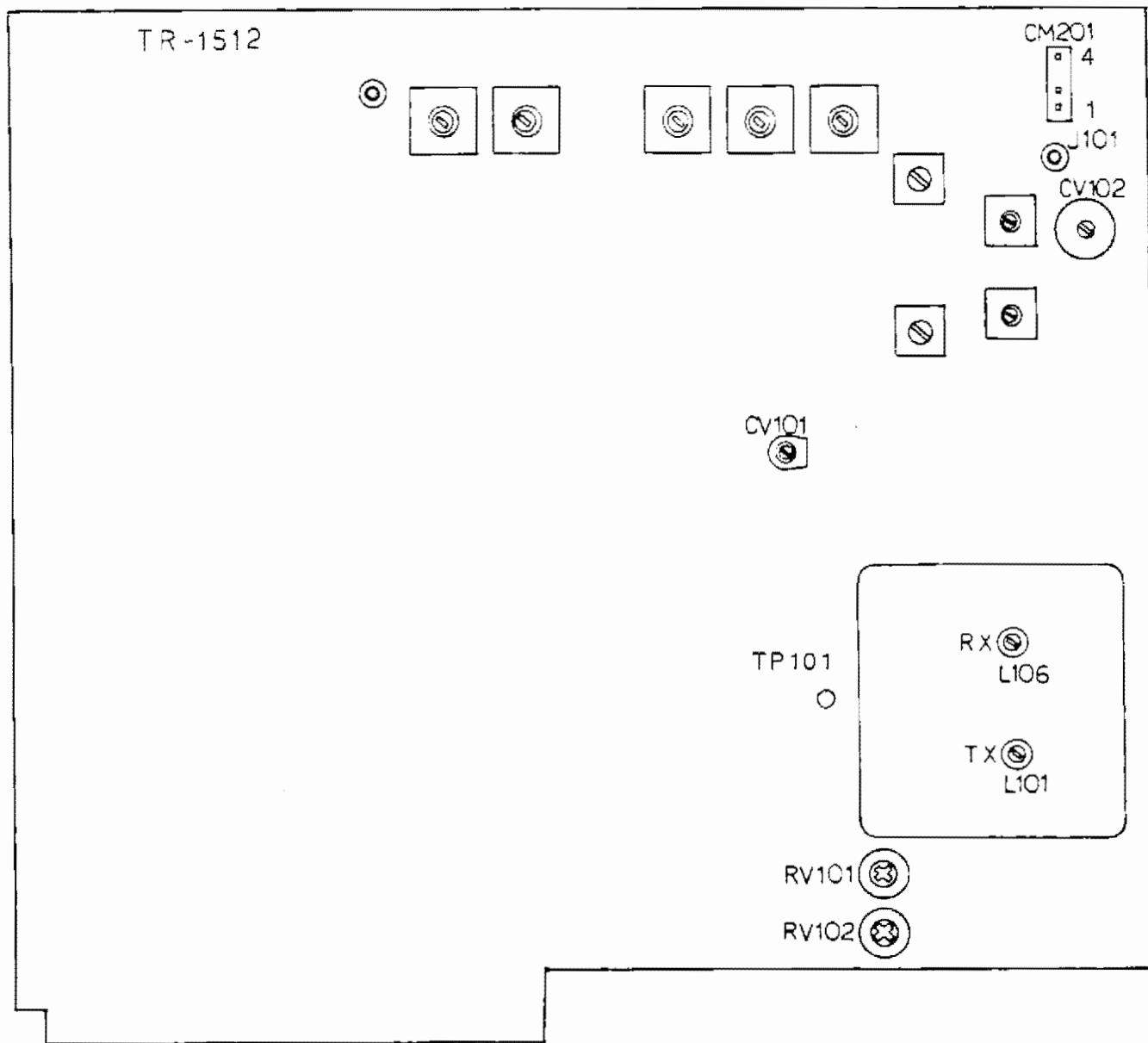
Remove the 8 screws securing the top and bottom covers. Loosen the 4 screws securing the PA assembly. Turn the volume control to a mid position and the squelch control fully clockwise. If the 70-E10 test set is used, the WHITE 5 pin test socket should be connected to CM201 for alignment with the unused socket position toward the rear of the transceiver and the black ground clip to chassis. Refer to the 70-E10 TEST PINS switch position underlined in the steps below. Supply power to the radio and connect a wattmeter and dummy load with an attenuated sample output for a frequency counter and modulation meter.

\* \* \* \* \* IMPORTANT NOTE \* \* \* \* \*

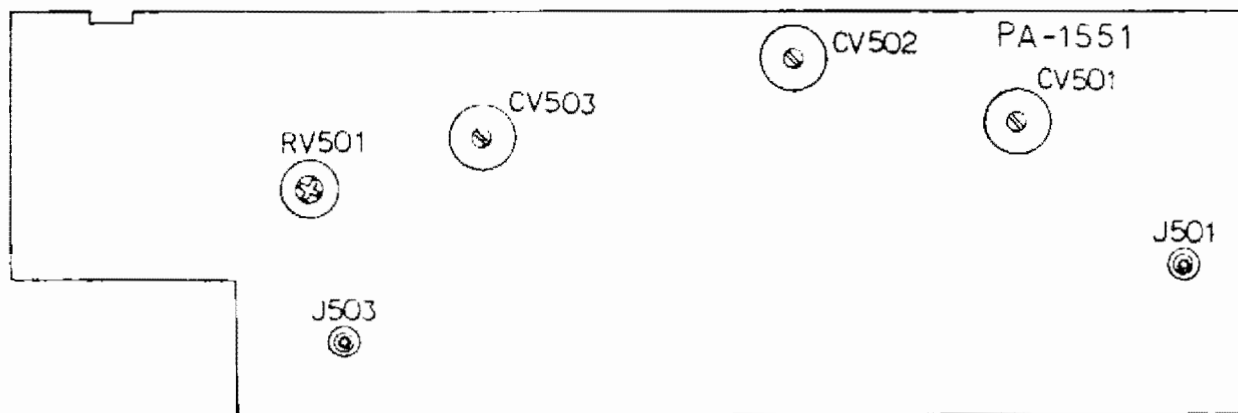
\* A "9" error code display and triple beep can be expected at \*  
\* unit turn on if the channel frequencies programmed in the \*  
\* E/PROM are outside the band for which the VCO is currently \*  
\* aligned. To eliminate this error indication, adjust L106 for \*  
\* 4 volts at TP101. The normal alignment procedures can then \*  
\* be performed. \*  
\* \*  
\* Error code "0" indicates the E/PROM module to be missing, \*  
\* improperly inserted or incorrectly programmed. Refer to the \*  
\* EPROM Programming section if this error occurs. \*  
\* \*  
\* \* \* \* \*

# TRANSMITTER ALIGNMENT POINTS

70-336



## PA ALIGNMENT POINTS



## Transmitter Alignment

The transmit mode can be activated when necessary by shorting MICROPHONE J310 pins 2 and 4.

### VCO ALIGNMENT

1. Select a channel with receive frequency near the center of the programmed frequencies. Monitor VCO STEERING TP101 with a DC voltmeter and adjust RX VCO L106 for 4.0 volts.
2. Select a channel with transmit frequency near center. Monitor TP101 with a DC voltmeter. Key the transmitter and adjust TX VCO L101 for 4.0 volts.

### TRANSMIT DRIVER ALIGNMENT

3. Monitor CM201 Pin 1 (position 5) with a DC voltmeter. Adjust PRE-DRIVER CV102 for a minimum reading.

### POWER AMPLIFIER ALIGNMENT

4. Adjust POWER-SET RV501 (on the PA) to maximum clockwise and adjust CV501, CV502, and CV503 for maximum RF output power. Re-adjust RV501 for 35 watts RF output.

### MODULATION ADJUSTMENT

5. If the CTCSS option is installed, select any channel programmed for CTCSS encode. Key the transmitter and adjust TONE LEVEL RV102 on the CTCSS board for the desired CTCSS modulation.
6. Apply a 1 volt rms 2500 Hz signal to the microphone input (J310 pin-1) and adjust DEVIATION LIMITING RV102 for 5 KHz deviation. Vary the modulating signal level to insure deviation does not exceed +/- 5 KHz.

### OSCILLATOR FREQUENCY ADJUSTMENT

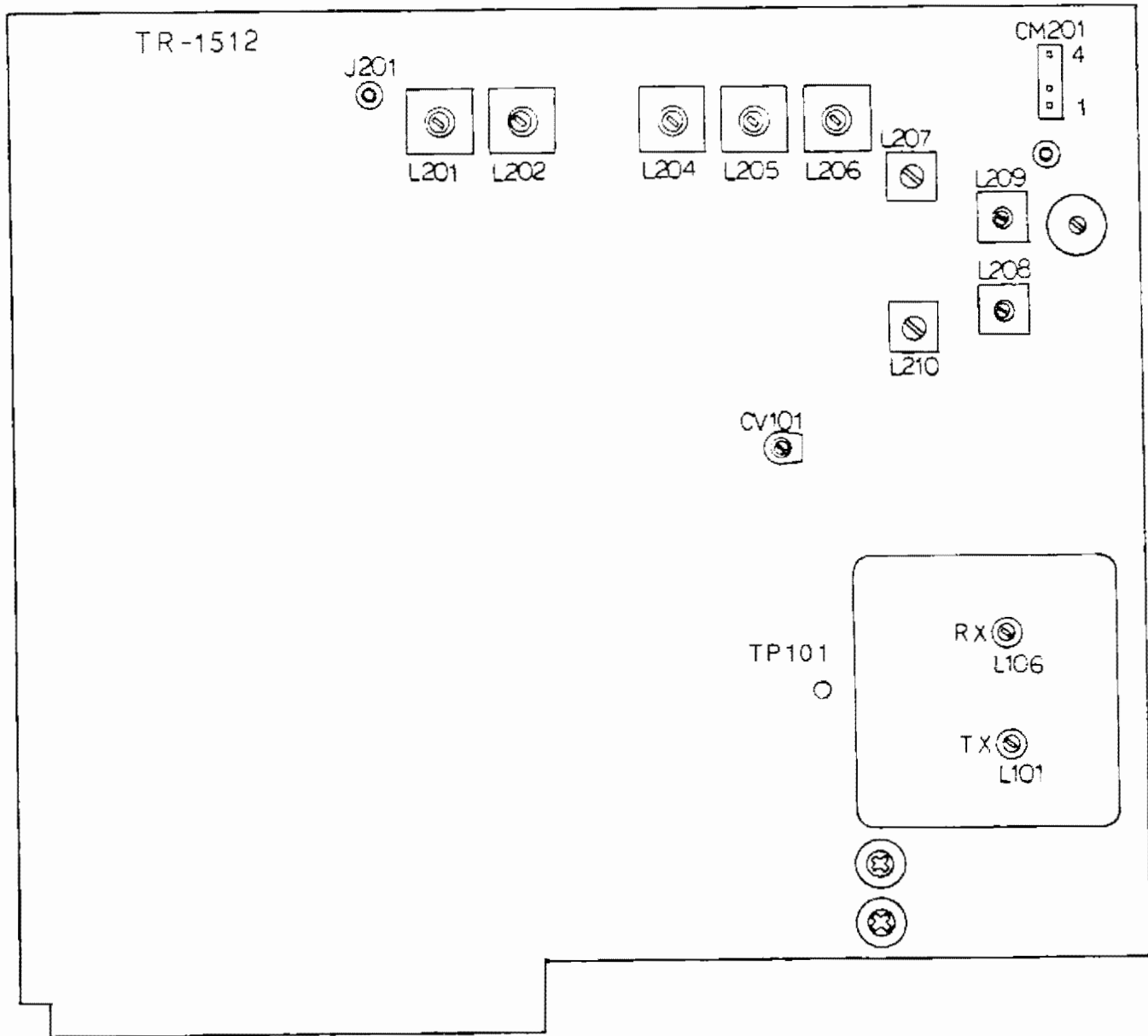
7. Monitor the frequency of the transmitted signal and adjust MASTER OSCILLATOR CV101 for the correct frequency.
8. Replace the RF Power Amplifier assembly to its original position and tighten the screws.

### FACTORY PRESETS:

RV101, L111, and L112 are factory set and should not require field adjustment. In the event adjustment is necessary due to related component replacement, adjustment instructions can be found in the Servicing Section.

# RECEIVER ALIGNMENT POINTS

70-336



## Receiver Alignment

All audio measurements are taken across an external 3.2 ohm resistor connected to pins 4 and 6 in place of the wire jumper in pins 5 and 6 of the ACCY/POWER CONNECTOR to J402. The internal speaker will be disabled.

### L.O. AMPLIFIER ALIGNMENT

9. Monitor CM201 pin-4 (position 2) and adjust L208 and L209 for a maximum indication.

### PRESELECTOR ALIGNMENT

10. Apply an un-modulated, on-channel signal to the antenna connector at a level sufficient to maintain approximately 20 to 30 dB quieting. Adjust L201, L202, L204, L205, and L206 for maximum indication at CM201 pin-2 (position 4).

### QUADRATURE COIL ALIGNMENT

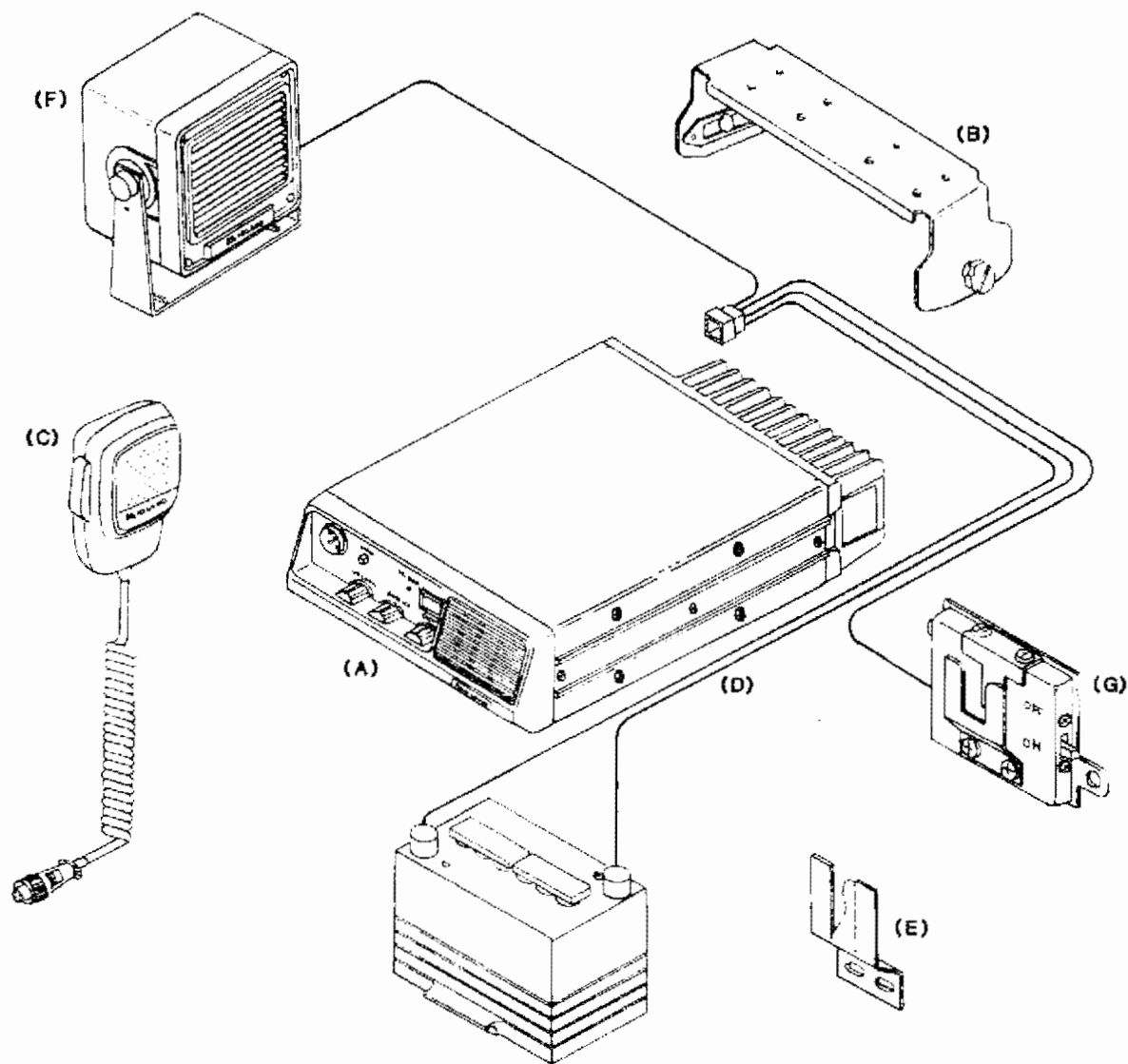
11. Apply 1 mV on-carrier signal that is modulated to 3 KHz deviation by 1 KHz signal to the antenna connector. Adjust L211 for maximum audio output.

### I.F. ALIGNMENT

12. Apply sufficient on-carrier signal modulated to 3 KHz deviation by 1 KHz signal to produce 12 to 15 dB SINAD. Adjust L207 and L208 for best SINAD.
13. Apply 1 mV on-channel signal modulated to 3 KHz deviation by 1 KHz signal to the antenna connector. Re-adjust L207 and L208 for minimum distortion. NOTE: If a distortion analyzer is not available, this step may be deleted; although distortion specifications may not be met.

### TIGHT SQUELCH ADJUSTMENT

14. Adjust SQUELCH RANGE RV201 for desired tight squelch sensitivity.



UNIT AND INCLUDED ACCESSORIES:

MODEL NO.

PART NUMBER

- (A) Under Dash Type Land Mobile Radio
- (B) Mobile Mounting Bracket
- (C) Dynamic Microphone
- (D) DC Power Cord
- (E) Microphone Clip

- 70-2201
- 70-2303

- 70-034031
- 70-158015

OPTIONAL ACCESSORIES

- (F) Mobile External Speaker
- (G) Microphone Hang Up Box

- 70-2353
- 70-2195