

## 70-0674C Alignment Procedure

### SETUP

- 1 Remove the six securing screws from the bottom cover , and the cover itself.
- 2 Connect a resistive 50  $\Omega$  RF load and wattmeter to Antenna Connector J502.
- 3 Connect 13.4V DC power to transceiver J505.
- 4 Connect a 3.2  $\Omega$ , 20W resistor to pins 4 and 6 of the Accessory Plug. The jumper between pins 5 and 6 must be temporarily removed to make this connection. The resistor serves as a constant load to replace the speaker's inconsistencies.

**CAUTION:** Both speaker terminals are LIVE. Never ground either one. Connect grounded receive-audio measuring-equipment to only one side of the speaker, and chassis ground. Normally, voltage measurement will be half of true values.

- 5 Turn the radio on (Push on and Push off switch), set the VOLUME control to a mid-position.

Connect the Programmer to Programming Port Mic Jack J302.

Upload the radio programming Data-Packet into the Programmer and initiate its Remote Control Mode. Refer to the appropriate manual for details.

### SYNTHESIZER ALIGNMENT

#### •VCO Resonance

- 1 Select the Remote Control Mode of the Programmer and enter the following test frequencies:

	C-Band
RX Frequency	42.00 MHz
TX Frequency	42.00 MHz

- 2 Adjust Channel RX Tank L713 for 1.5V DC at VC (VCO Steering) .
- 3 Active transmit mode (using the programmer ) and adjust TX Tank L702 for 1.5V DC at VC (VCO Steering) .

•Reference Oscillator

- 4 Initiate transmit on any channel. Measure transmitted RF carrier frequency without modulation and, if necessary, adjust REFERENCE OSCILLATOR X701 for carrier frequency to within  $\pm 30\text{Hz}$  of channel frequency.

### 110W PA MODULE ALIGNMENT

The 70-0674C should be adjusted to have a 8 MHz channel spread at 110W.

To do so :

- 1 Remove the four screws on the PA cover.
- 2 Remove a cable from J501.
- 3 Adjust RV501 and RV502 counter-clockwise just until stop.
- 4 Activate transmit mode, measure current.
- 5 Adjust RV501 clockwise just until currents increase 0.5A.
- 6 Adjust RV502 clockwise just until currents increase 0.5A more.
- 7 Stop transmit mode. Change the TX test frequency to the desired frequency.
- 8 Connect the removed cable to J501.
- 9 Activate transmit mode and measure RF power at Antenna connector J502.  
Set RF output power to 110W at J502 using the programmer.

### MODULATOR ALIGNMENT

•Modulation Limiting

- 1 Disconnect the hand microphone from its front panel Mic Jack J302.  
Apply 3Vrms of 1000Hz signal to pin 1 of Mic Jack J302, and then initiate transmit.
- 2 Measure total carrier deviation and, if needed adjust modulation limiting to obtain  $\pm 5\text{KHz}$  (wide) or  $\pm 2.5\text{KHz}$  (narrow) using the programmer.

•Microphone Gain

3 No alignment for Microphone gain is required.

•CTCSS/DCS

4 Remove the 1KHz audio signal from Mic Jack J302.

5 Add 250.3Hz CTCSS tone to the transmit test by testing frequency using the programmer.

6 Adjust CTCSS deviation to  $\pm 750 \text{ Hz} \pm 10 \text{ Hz}$  (wide) or  $\pm 375 \text{ Hz} \pm 10 \text{ Hz}$  (narrow) deviation using the programmer.

7 Change 67.0 Hz CTCSS tone to the transmit test by testing frequency using in the programmer.

8 Adjust RV401 for  $\pm 750 \text{ Hz} \pm 100 \text{ Hz}$  (wide) or  $\pm 375 \text{ Hz} \pm 100 \text{ Hz}$  (narrow) deviation.

9 Change the transmit DCS code +023 to the transmit test by testing frequency using the programmer.

10 Adjust RV401 so that modulation waveform from modulation analyzer matches the correct waveform shown in Figure 2-1.

11 Change 250.3 Hz CTCSS tone to the transmit test by testing frequency using the programmer. Carefully adjust RV401 for  $\pm 750 \text{ Hz} \pm 10 \text{ Hz}$  (wide) or  $\pm 375 \text{ Hz} \pm 10 \text{ Hz}$  (narrow) deviation.

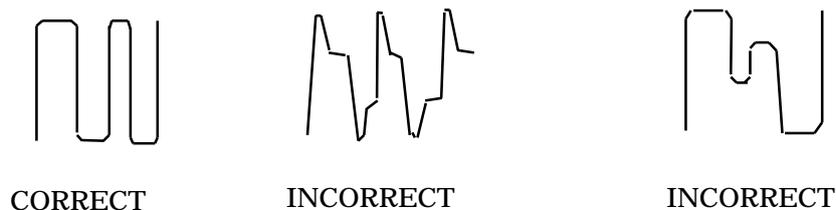


Figure 2-1 Modulation Waveforms

•DTMF

12 Clear the CTCSS tone, then initiate transmit test by testing frequency using the

programmer.

- 13 Adjust DTMF deviation to  $\pm 2.0\text{KHz} \pm 10\text{ Hz}$  (wide) or  $\pm 1\text{KHz} \pm 10\text{ Hz}$  (narrow) deviation using the programmer.

#### RECEIVER ALIGNMENT

- 1 Change the RX test frequency to 46.0 MHz for C-Band radios.

- First Injection

- 2 No adjustment for first injection is required.

- Preselector Alignment

- 3 No adjustment for the preselector (L201, L202, L203, L204, L205, L206, L207, and L208 ) is required.

- Quadrature Detector

- 4 No adjustment for the quadrature is required.

- First IF

- 5 Apply enough modulated ( by 1KHz tone at  $\pm 3\text{KHz}$  (wide) or  $\pm 1.5\text{KHz}$  (narrow) deviation ) on-channel carrier to maintain 12 to 15 dB SINAD. Adjust L215, and L217.

- Tight Squelch

- 6 Squelch level set maximum ( 80 ). by using the front UP / DN switch
- 7 Apply 0.95 uV of modulated standard deviation on-channel RF signal to the 50  $\Omega$  antenna connector.

Adjust Squelch range RV201 counter-clockwise just until squelch opens ( audio on ).

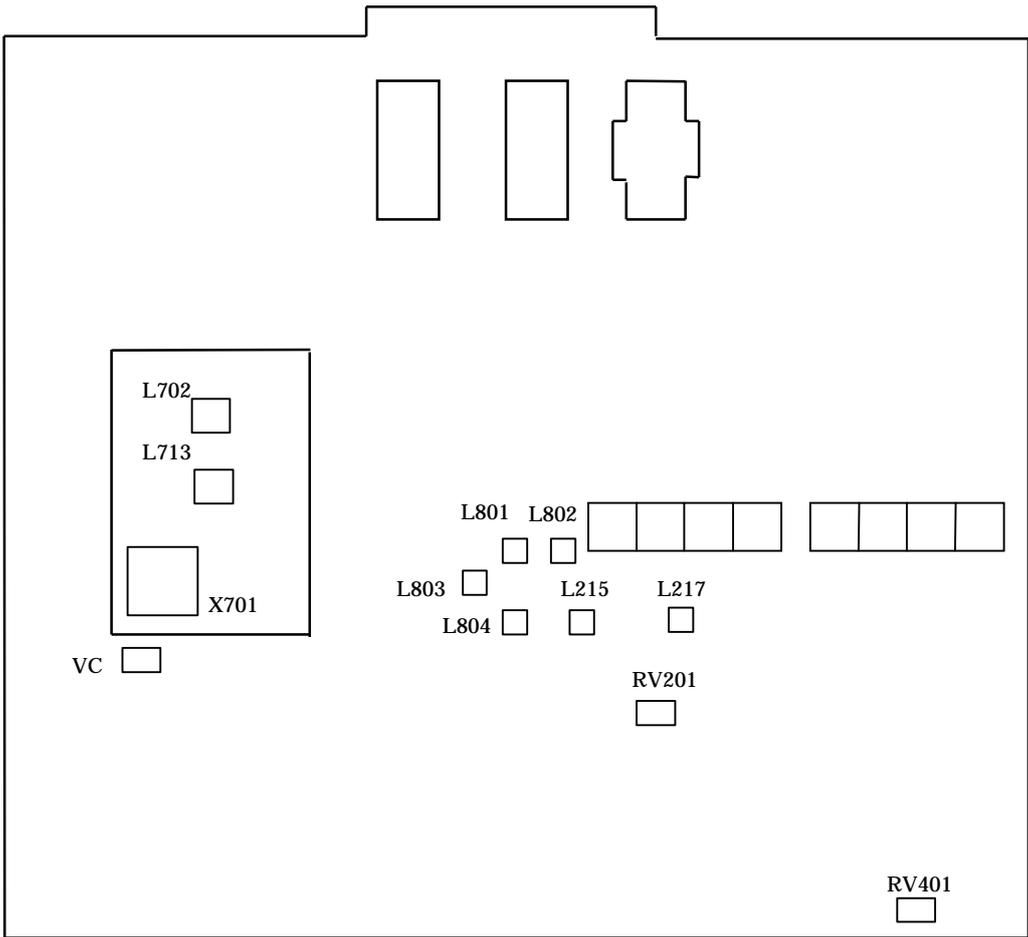


Figure 2-2 Adjustment Map ( TR-055 )

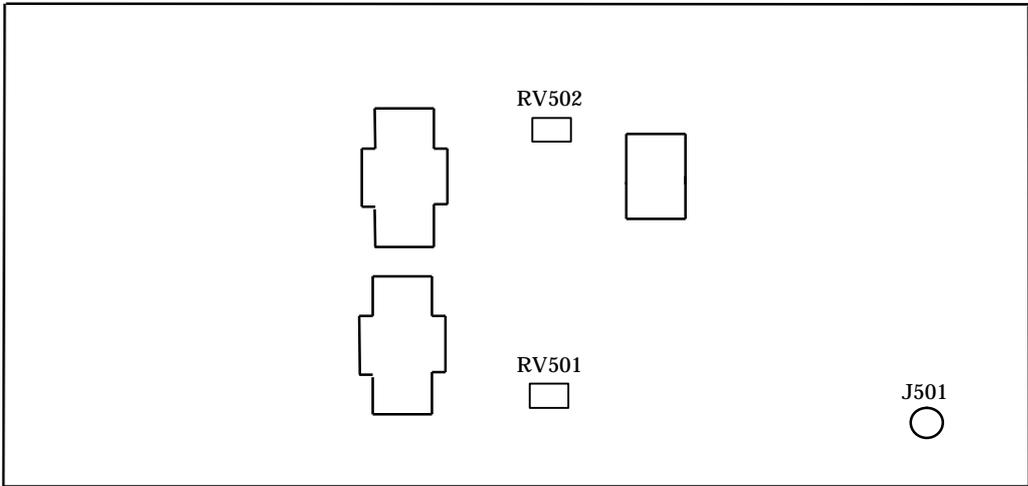


Figure 2-3 Adjustment Map ( PA--X0001 )

COMPLETE REALIGNMENT

Complete realignment is only needed when a component that affects alignment has been replaced. RADIO REPROGRAMMING WITH TEST FREQUENCIES IS REQUIRED.

Table 2-1 TEST EQUIPMENT REQUIRED

TEST INSTRUMENT	INSTRUMENT CAPABILITIES	USE
Regulated DC Power supply	13.4 V DC, 30 A, adjustable voltage	Radio power source
RF Wattmeter	150 W, 30 - 50MHz, 50 ohm circuit	Transmitter power measurements
RF Load Resistor	50 ohm, 200 W	Antenna dummy load
Frequency Modulation Meter	30 - 50 MHz, peak-responding, +/- 5KHz range	Modulation level measurements
Frequency Meter or Frequency Counter	30 - 50 MHz, 1.0 ppm accuracy	Carrier frequency measurements
Audio Generator	1,000KHz sine-wave 0-4 Vrms output	Modulation level measurements
RF Signal Generator	30 - 50 MHz range, 0.1 - 1 KuV output, 3KHz FM mod. With 1 KHz tone	All receiver measurements
Distortion Analyzer	1 KHz notch, 1% measuring range	Receiver performance test and IF alignment
Load Resistor ( audio )	3.2 ohms, 20 W	Speaker load for all receiver measurements
AC Voltmeter	10mV to 10 Vrms	Audio level adjustments
Oscilloscope	DC to 500KHz bandwidth	
Digital Multimeter	0.1 to 20 V DC	Test point measurements and power supply setup
Programmer	PC Programming Software	Manual radio control