

# ALIGNMENT/ADJUSTMENTS-MPV08

## A. GENERAL

For proper alignment, the unit should be programmed with the following channel and frequency information.

CHANNEL NUMBER	RECEIVE FREQUENCY(RX) (MHz)	RX TONE CODE	TRANSMIT FREQUENCY(TX) (MHz)	TX TONE CODE
CH 1	154.050	00	154.060	00
CH 2	161.0475	00	161.0025	00
CH 3	166.950	00	168.990	00
CH 4	146.0475	00	146.0025	00
CH 5	173.9975	00	173.9525	00
CH 6	165.000	10	165.000	01
CH 7	165.000	038	165.000	038
CH 8	165.000	054	165.060	054

Make connections to the Unit per Figure 5 (Equipment Test Set-up) below and Figure 6 (Test Adapter). For the location of the components called out in these procedures, refer to RF Board and SUB Board.

## B. SYNTHESIZER/TRANSMITTER

### VCO Check

NOTE: VCO check must be accomplished before proceeding with the Transmitter and/or Receiver Alignment.

1. Connect the radio in accordance with Figure 5.
2. Place the Unit on channel 3 (168.950MHz, RX; 168.990MHz, TX).
3. Connect the voltmeter to TP1. Check to make sure that the voltmeter reading is between 3.95 V and 4.25 V when the unit is in the receive mode.
4. Operate the transmitter to make sure that the voltmeter reading at TP1 is between 3.95 V and 4.25 V.

NOTE: Refer to the following for typical values for other frequencies.

### APPROXIMATE TRACKING VOLTAGE AT TP1

CHANNEL NUMBER	Receive (V)	Transmit (V)
CH 1		
CH 2		
CH 3		
CH 4		
CH 5		

### Frequency Adjustment

1. Connect the Radio in accordance with Figure 5.
2. Place the Unit on channel 1 (154.050MHz, Rx; 154.000MHz, TX).
3. Operate the transmitter and adjust C407 for a Frequency Counter reading within  $\pm 50$ Hz of the programmed transmit frequency.
4. Place the Unit on channel 2 (161.0475MHz, RX; 161.0025MHz, TX).
5. Operate the transmitter and adjust R320 for a frequency Counter reading 161.0025MHz  $\pm 50$ Hz.

## Transmitter Alignment

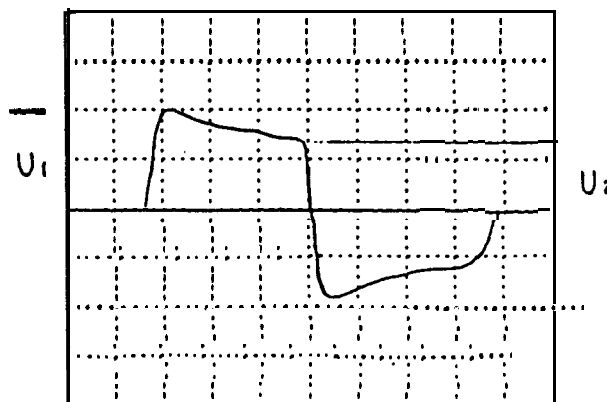
NOTE: In order to obtain proper transmission output power, connect the Radio to the power supply with a cable that is rated to withstand a current of 2 amperes or greater.

### POWER ADJUSTMENT

1. Connect the Radio in accordance with Figure 5.
2. Place the Radio on the channel 2 (161.0475MHz, RX; 161.0025MHz, TX).
3. Place the Unit in HIGH POWER mode.
4. Turn R289 and R288 fully clockwise.
5. Operate the transmitter, using TA-S1, to make sure that the maximum RF output power reading on the wattmeter is 5.5 W or greater.
6. Adjust R289 (HI PWR ADJ) for a reading of  $5.0 \text{ W} \pm 0.1 \text{ W}$ . Check to make sure that the transmit current is within 1000 - 1300 mA after the adjustment has been made.
7. Place the Unit in the LOW POWER mode.
8. Adjust R288 (LO PWR ADJ) for a reading of  $1.0 \text{ W} \pm 0.1 \text{ W}$ . Check to make sure that the transmit current is within 500 - 650 mA after the adjustment has been made.
9. Operate the transmitter, using TA-S1, to make sure that the difference between the maximum and minimum transmitter output power reading is within 0.1 W 154.000MHz - 168.990MHz range.
10. Place the Unit in HIGH POWER mode.
11. Operate the transmitter, using TA-S1, to make sure that the difference between the maximum and minimum transmitter output power reading is within 0.5 W in the 154.000MHz - 168.990MHz range.

### MODULATION ADJUSTMENT

1. Connect the Radio in accordance with Figure 5.
2. Place the Radio on channel 2 (161.0475MHz, RX; 161.0025MHz, TX).
3. Apply a 1kHz tone signal to Test Adapter's AF input (Figure 6), which is the microphone impedance matching network.
4. Plug the Test Adapter into the external speaker/microphone jack.
5. Operate the transmitter, using TA-S1, and adjust the audio generator's output level for  $\pm 3\text{kHz}$  deviation on the Modulation Analyzer. Turn OFF the transmitter and note the audio generator's output level (TA-TP2). The level should be between 20 and 30 mV.
6. Increase the audio generator's output level by 20 dB.
7. Operate the transmitter, using TA-S1, and adjust the master deviation control R266 for  $\pm 4.30\text{kHz}$  deviation on the Modulation Analyzer, if CTCSS or DCS is not to be employed.  
If CTCSS or DCS is to be employed, adjust R266 for  $\pm 3.90\text{kHz}$  deviation.
8. To adjust CTCSS and CCS Deviation, perform step 1 through 7 above. Then set the FM liner detector audio bandwidth of  $\leq 0.25\text{Hz}$  to  $\geq 15,000\text{Hz}$ . Turn the de-emphasis function off.
9. Place the Radio on channel 8 (165.000MHz, RX; 165.000MHz, TX).  
Set the audio generator output to 0V operate the transmitter, using TA-S1 and adjust the DCS balance control R291 to U1-U2 is minimum on the Oscilloscope.
10. Place the Radio on channel 6 (165.000MHz, RX; 165.000MHz, TX).  
Operate the transmitter using TA-S1, and adjust R141 to  $\pm 900\text{Hz}$  deviation on Modulation Analyzer.

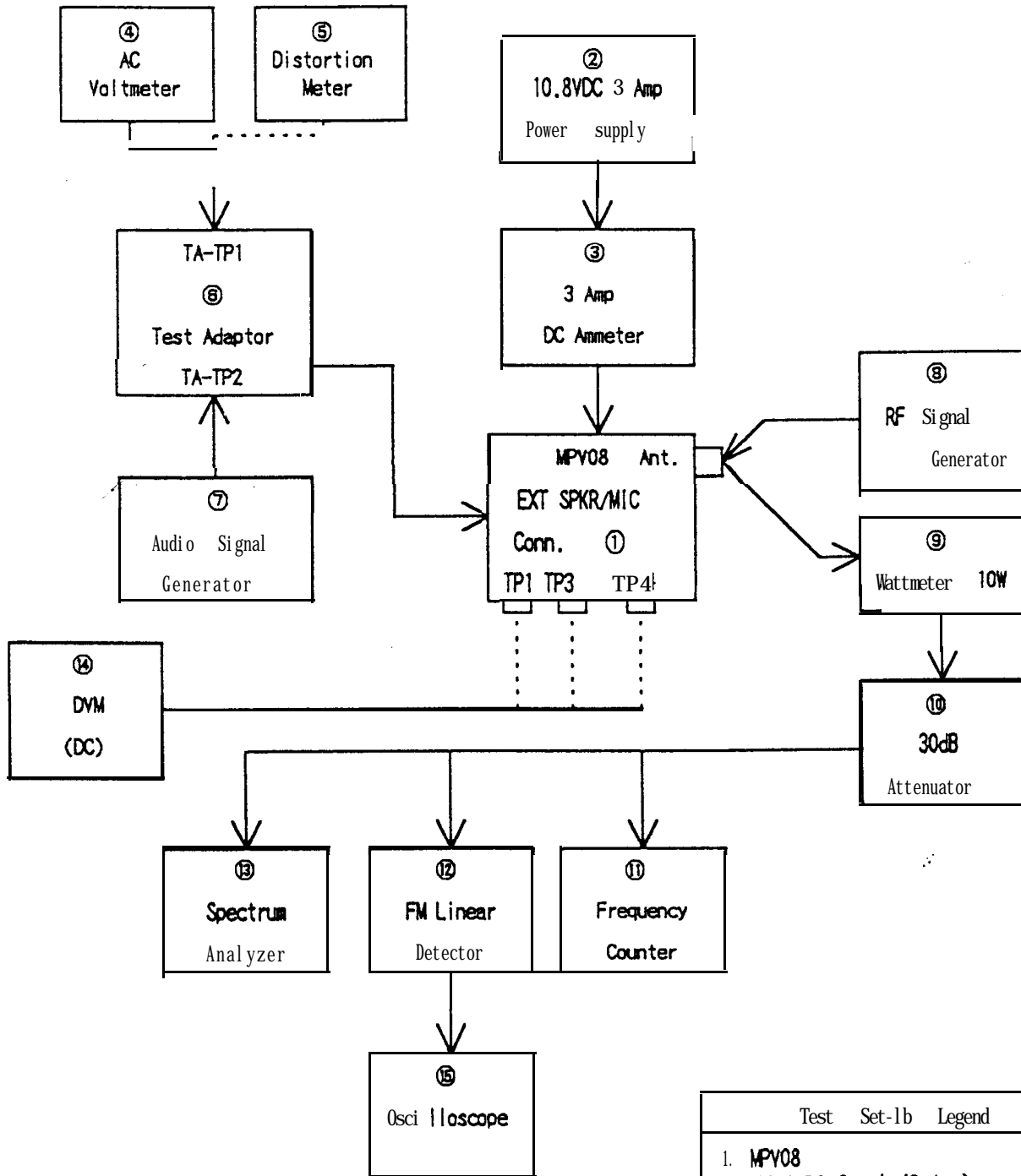


### C. RECEIVER

NOTE: Perform adjustments and checks without removing the shield plate on the RF circuit board.

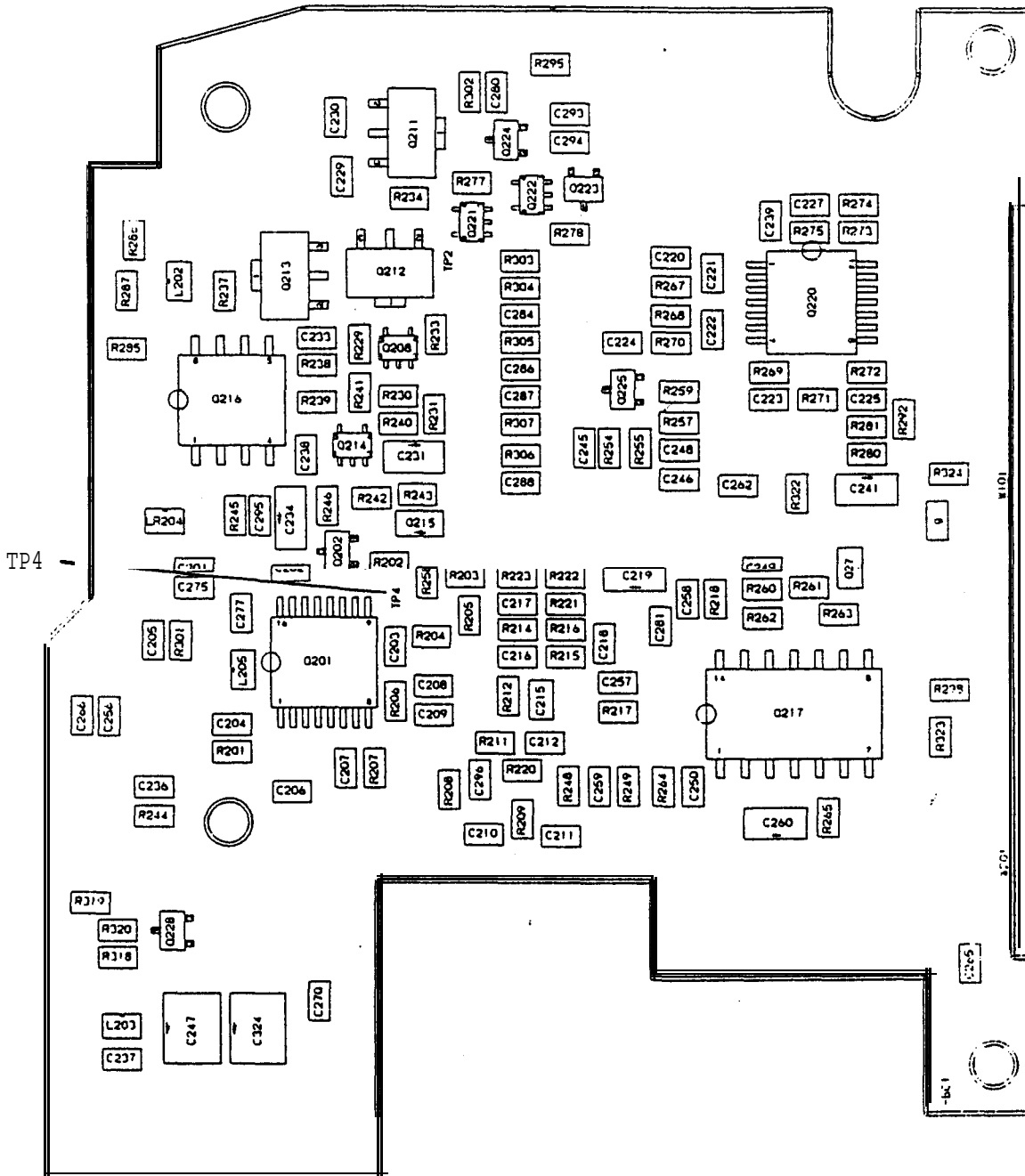
1. Connect the Radio in accordance with Figure 5.
2. Adjust the Squelch Control S299(SQL) to the fully counter-clockwise position (unit unsquelched) until the BUSY LED (Green) turns ON.
3. Place the Radio on the channel 1 (154.050MHz, RX; 154.000MHz, TX).
4. Apply the RF generator signal with 1 kHz tone at 3 KHz deviation and adjust its RF output level to approximately -77 dBm.
5. Adjust L201 for the maximum audio level on the AC voltmeter (TA-TP1).
6. Connect the digital voltmeter to TP4; see Figure 9.
7. Preset the cores of L405 to the BOTTOM of the coil form and L406, L407, L408, L409 to the TOP of the coil form.
8. Adjust L405, L406, L407, L409, and L408 in this order to obtain the maximum voltmeter at TP4. Reduce the RF generator's level as necessary to maintain a mid scale reading on the voltmeter as the coils are adjusted.
9. Repeat step 8 until no further improvement can be made.
10. Check the 12dB SINAD sensitivity reading at both ends of the operating range of the Unit. The specification is 0.25  $\mu$ V maximum. ✓

Figure 5. Equipment Test Set-b



Test Set-1b Legend	
1.	MPY08
2.	10.8VDC Supply(3 Amp)
3.	3 Amp CC Ammeter
4.	AC Voltmeter
5.	Distortion Meter
6.	Test Adaptor (Figure 6)
7.	Audio Signal Generator (600 Ω)
8.	RF Signal Generator
9.	Wattmeter- 10W
10.	30dB Attenuator
11.	VW Frequency Counter
12.	FM Linear Detector
13.	Spectrum Analyzer
14.	Digital Voltmeter
15.	Oscilloscope





Components Called OUT, SUB Board Bottom Side.

Figure 6. Test Adaptor.

