Alignment/Adjustments-MPV32D

General

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

Channel Number	RX Frequency (MHZ)	TX frequency (MHZ)	TX/RX tone code	DTMF code
CH 1	154.050	154.000	000(no tone)	
CH 2	161.0475	161.0025	000(no tone)	
CH 3	168.950	168.990	000(no tone)	
CH 4	148.0475	148.0025	000(no tone)	
CH 5	173.9925	173.9575	000(no tone)	
CH 6	161.050	161.000	001(67Hz tone)	
CH 7	161.050	161.000	012(100Hz tone)	
CH 8	161.050	161.000	038(250.3Hz tone)	
CH 9	161.050	161.000	141(CCS code)	
CH 10	162.050	162.050	072(100Hz tone)	1234
CH 11	161.050	169.900		

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.

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 3.90V and 4.30V when the unit is in the receive mode.
4. Operate the transmitter to make sure that the voltmeter reading at TP1 is between 3.90V and 4.30V.

Note: refer to the following for typical values for other frequencies.

APPROXIMATE TRACKING VOLTAGE AT TP1

Channel Number	Receive (V)	Transmit (V)
CH 1	2.10	2.30
CH 2	2.90	3.00
CH 3	3.95	4.00
CH 4	1.55	1.70
CH 5	4.70	4.70

Frequency adjustment

1. Connect the radio in accordance with figure 5.
2. Place the unit on channel 3 (168.950mhz RX; 168.990mhz TX)
3. Operate the transmitter and adjust C407 for a frequency counter reading within + 50Hz 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) +50Hz.

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 amps 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 RX)
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 5.5W or greater.
6. Adjust R289 (HI PWR ADJ) for a reading of 5.0W _ 0.1W. Check to make sure that the transmit current is with in 1000-1400MA 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 1.0W _0.1W. Check to make sure that the transmit current is within 500-700MA after the adjustment has been made.
9. Operate the transmitter output power reading is within 0.1W 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 0.5W 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 +3khz 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 + 4.00mhz deviation on the modulation analyzer, if CTCSS or DCS is not be employed.
8. To adjust CTCSS and DCX deviation perform steps 1 through 7 above. Then set the FM liner detector audio bandwidth of < 0.25hz to > 15,000hz. Turn the de-emphasis function off.
9. Place the radio on channel 9 (161.050mhz RX; 161.000mhz 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 7 (161.050mhz RX; 161.00mhz TX). Operate the transmitter using TA-S1, and adjust R705 to + 800hz deviation on modulation analyzer.
11. Place the radio on channel 2 (460.050mhz RX; 450.000mhz TX).
12. To adjust DTMF deviation, perform steps 1 through 7 above. Set the audio generator output to 0V. Operate the transmitter, using TA-S1 and press the 0 key. Adjust the DTMF deviation on control R714 for + 3.0khz deviation on the 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 LCD (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 –77d bm.
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 0.25uv maximum.