

ALIGNMENT/ADJUSTMENTS; HP-405

A. GENERAL

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

CHANNEL NUMBER	RECEIVE FREQUENCY(RX) (MHz)	TRANSMIT FREQUENCY(TX) (MHz)	RX/TX TONE CODE	CHANNEL SPACING
CH 1	469.950	469.990	NO TONE	25KHz
CH 2	450.050	450.025	NO TONE	25KHz
CH 3	455.050	455.050	100Hz TONE	25KHz
CH 4	455.050	455.050	627 DCS CODE	25KHz
CH 5	450.050	450.025	NO TONE	12.5KHz

Make connections to the Unit per Figure 1 (Equipment Test Set-up) below and Figure 2 (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 voltmeter to TP1.
2. Place the Unit on channel 1 (469.950MHz, RX; 469.990MHz, TX).
3. Tune CV901 in Receive mode for $4.80V \pm 0.05V$ at TP1.
4. Push the PTT switch (TX) and tune CV902 for $4.80V \pm 0.05V$ at TP1.

Frequency Adjustment

1. Connect the Radio in accordance with Figure 1.
2. Place the Unit on channel 1 (469.950MHz, RX; 469.990MHz, TX).
3. Operate the transmitter and adjust RV402 for a Frequency Counter reading within $\pm 100Hz$ of the programmed transmit frequency.

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 1.
2. Place the Radio on the channel 2 (450.050MHz, RX; 450.025MHz, TX).
3. Place the Unit in HIGH POWER mode.
4. Turn RV401 and RV405 fully clockwise.
5. Operate the transmitter, using TA-S1, to make sure that the maximum RF output power reading on the wattmeter is 4.5 W or greater.
6. Adjust RV401 (HI PWR ADJ) for a reading of $4.0 \text{ W} \pm 0.1 \text{ W}$. Check to make sure that the transmit current is within 1000 - 1400 mA after the adjustment has been made.
7. Place the Unit in the LOW POWER mode.
8. Adjust RV405 (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 - 700 mA after the adjustment has been made.

MODULATION ADJUSTMENT

1. Connect the Radio in accordance with Figure 1.
2. Place the Radio on channel 2 (450.050MHz, RX; 450.025MHz, TX).
3. Apply a 1kHz tone signal to Test Adapter's AF Input (Figure 2), which is the microphone impedance matching network.
4. Plug the Test Adapter into the external speaker/microphone jack.
5. Set the audio generator's output level at approximate 300mVrms at TPA of the Test adapter.
6. Operate the transmitter, using TA-S1, and adjust RV201(MOD.ADJ) for $\pm 4.0\text{kHz}$ deviation.
7. To adjust CTCSS and DCS Deviation, perform step1 though 6 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.
8. Place the Radio on channel 4 (455.050MHz, TX; 627 DCS CODE).
Set the audio generator output to 0V operate the transmitter, using TA-S1 and adjust the DCS balance control RV203 to U1-U2 is minimum on the Oscilloscope.
9. Place the Radio on channel 3 (455.050MHz, TX; 100Hz Tone).
Operate the transmitter using TA-S1, and adjust RV202 to $\pm 800\text{Hz}$ deviation on Modulation Analyzer.

