

## 3 ADJUSTMENTS

### 3.1 General

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

Channel number	Receive Frequency (MHz)	Transmit Frequency (MHz)	RX/TX Tone Code	Channel Spacing (KHz)
CH 1	174.050	174.025	NO TONE	25
CH 2	163.050	163.025	NO TONE	25
CH 3	163.050	163.050	100Hz TONE	25
CH 4	163.050	163.050	627 DCS CODE	25
CH 5	163.050	163.025	NO TONE	12.5

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.

### 3.2 Synthesizer/Transmitter VCO Check


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

- 1) Connect the voltmeter to **TP6**.
- 2) Place the unit on channel 1 (174.050MHz, RX; 174.025MHz, TX).
- 3) Tune **CV401** in Receive mode for  $4.90V \pm 0.05V$  at **TP6**.
- 4) Push the PTT switch (TX) and tune **CV402** for  $4.30V \pm 0.05V$  at **TP6**.

#### 3.2.a Frequency Adjustment

- 1) Connect the Radio in accordance with Figure 1.
- 2) Place the unit on channel 1 (174.050MHz, RX; 174.025MHz, TX).
- 3) Operate the transmitter and adjust **RV402** for a Frequency Counter reading within  $\pm 50\text{Hz}$  of the programmed transmit frequency.

### 3.3 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.

#### 3.3.a Power Adjustment

- 1) Connect the Radio in accordance with Figure 1.
- 2) Place the radio on the **channel 2** (163.050MHz, RX; 163.025MHz, 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 5.5 W or greater.
- 6) Adjust **RV401** (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 - 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.

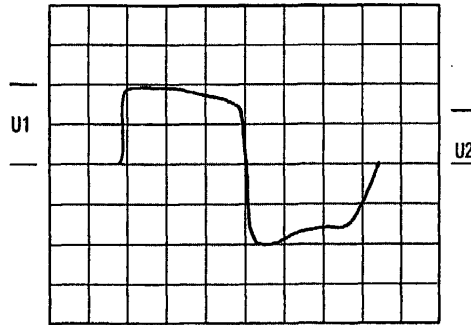
#### 3.3.b Modulation Adjustment

- 1) Connect the Radio in accordance with Figure 1.
- 2) Place the Radio on **channel 2** (163.050MHz, RX; 163.025MHz, TX).
- 3) Apply a 1 KHz 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  $\pm 4.0$  KHz deviation.

### 3.3.c CTCSS/DCS adjustment

- 7) To adjust CTCSS and DCS Deviation, perform step1 though 6 above. Then set the FM liner detector audio bandwidth of 0.25 Hz or less to 15,000 Hz or more. Turn the de-emphasis function off.
- 8) Place the Radio on channel 4 (163.050MHz, 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 (163.050MHz, TX; 100Hz Tone). Operate the transmitter using TA-S1, and adjust **RV202** to  $\pm 800$ Hz deviation on Modulation Analyzer.



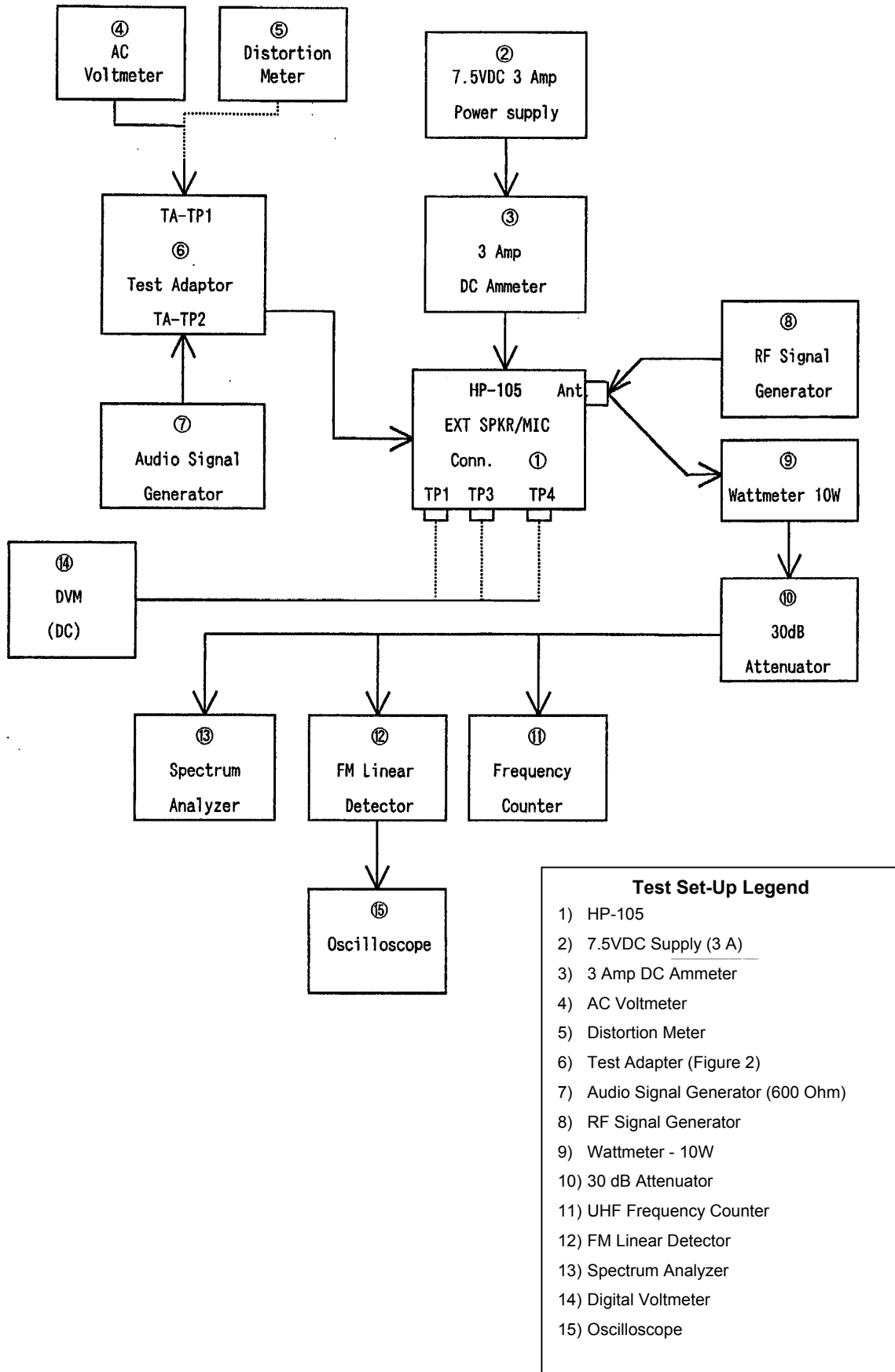
### 3.3.d Selcal adjustment

- 10) Set up a selcall sequence which includes, at least, an hi-pitched tone and a tone length of 1 second minimum (in order to allow a convenient deviation check)
- 11) Send the selcal by keeping pressed the **MON** or **FUNC** keys and adjust **RV1** in order to obtain the following minimum /maximum deviation according to the channel bandwidth:
  - For 12.5 KHz channel bandwidth - min  $\pm 1.5$  KHz / max  $\pm 2.5$  KHz
  - For 25 KHz channel bandwidth - min  $\pm 2.5$  KHz / max  $\pm 3$  KHz

## 3.4 Receiver Alignment

- 1) Connect the Radio in accordance with Figure 1.
- 2) Place the Radio on the **channel 2** (163.050MHz, RX; 163.025MHz, TX).
- 3) Adjust the Squelch Control **RV204** until the BUSY LED (Green) turns ON.
- 4) Apply the RF generator signal with 1 KHz tone at 3 KHz deviation so that the tone can be heard in the speaker.
- 5) Adjust the volume control for the rated audio.
- 6) Set the RF signal generator's level obtain a 9dB SINAD reading.
- 7) Adjust **RV204** (Squelch control) counter clockwise slowly just until the BUSY LED goes out.
- 8) Adjust **RV204** clockwise slowly just until the BUSY LED goes ON.
- 9) Place the radio on the **channel 5** (163.050MHz, RX; 163.025MHz, TX).
- 10) Adjust the squelch control **RV205** until the BUSY LED (Green) turns ON.
- 11) Apply the RF generator signal with 1 KHz tone at 1.5 KHz deviation so that the tone can be heard in the speaker.
- 12) Adjust the volume control for the rated audio.
- 13) Set the RF signal generator's level obtain 9dB SINAD reading.
- 14) Adjust **RV205** counter clockwise slowly just the BUSY LED goes on.
- 15) Adjust **RV205** clockwise slowly just until the BUSY LED goes on.

3.5 Figure 1 - Equipment Test set-up



3.6 Figure 2 - Test adaptor

