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 ± 0.05V at **TP6**.
4) Push the PTT switch (TX) and tune **CV402** for 4.30V ± 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 ± 50Hz 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 W ±0.1 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 W ±0.1 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.

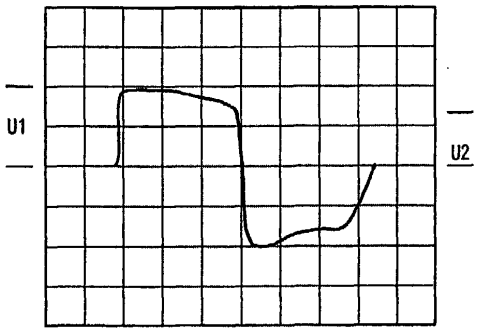
6) Operate the transmitter, using TA-S1, and adjust **RV201**(MOD.ADJ) for ±4.0 KHz deviation.

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 to15,000 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 ±800Hz 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 ±1.5 KHz / max ±2.5 KHz
- For 25 KHz channel bandwidth - min ±2.5 KHz / max ±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.

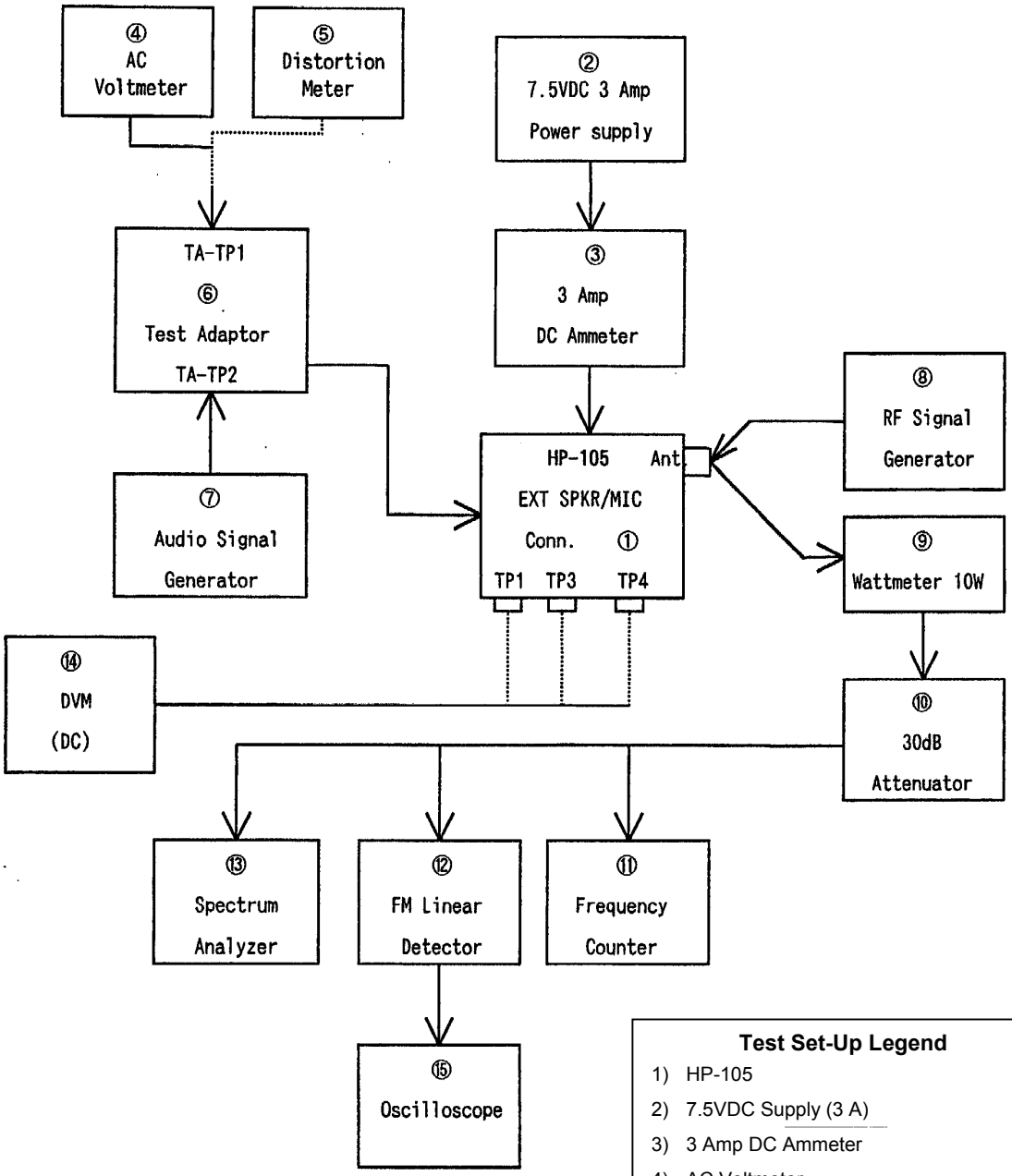
12) Ad just the volume control for the rated audio.

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) Ad just **RV205** clockwise slowly just until the BUSY LED goes on.

3.5 Figure 1 - Equipment Test set-up



Test Set-Up Legend

1) HP-105
2) 7.5VDC Supply (3 A)
3) 3 Amp DC Ammeter
4) AC Voltmeter
5) Distortion Meter
6) Test Adapter (Figure 2)
7) Audio Signal Generator (600 Ohm)
8) RF Signal Generator
9) Wattmeter - 10W
10) 30 dB Attenuator
11) UHF Frequency Counter
12) FM Linear Detector
13) Spectrum Analyzer
14) Digital Voltmeter
15) Oscilloscope

3.6 Figure 2 - Test adaptor