

ADJUSTMENT

1) Required Test Equipment

1. Digital Multimeter

2. Regulated Power Supply

Supply voltage: 13.8VDC
Current: 15A or more

3. Oscilloscope

Measurable frequency: Audio Frequency

4. Spectrum Analyzer

Measuring range: Up to 2GHz or more

5. Tracking Generator

Output frequency: Up to 2GHz or more

6. Dummy Load

Measurable frequency: Up to 500MHz
Impedance: 50Ω, unbalanced
Power: 50W or more

7. Speaker (2 units)

Impedance: 8Ω

8. SSG

Output frequency: 1 GHz or more
Output level: -20dB/0.1μV to 1 20dB/1 V
Modulation: AM/FM

9. Transceiver Tester

500MHz or more

a. Frequency Counter

b. Power Meter

Impedance: 50Ω, unbalanced
Measuring range: 50W or more

c. Audio Voltmeter

Measurable frequency: 50Hz~10kHz
Sensitivity: 1mV ~ 10V

d. Distortion Meter

Measurable frequency: 1 kHz
Input level: Up to 40dB
Distortion level: 1% -100%

e. Audio Generator

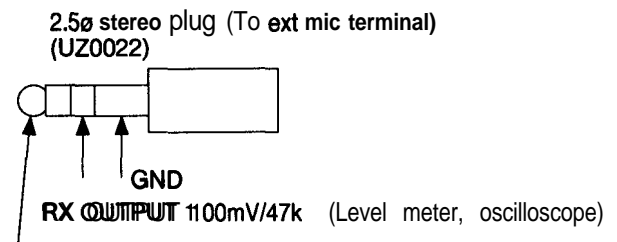
Output frequency: 1 kHz~10kHz
Output impedance: 600Ω, unbalanced

f. Linear Detector

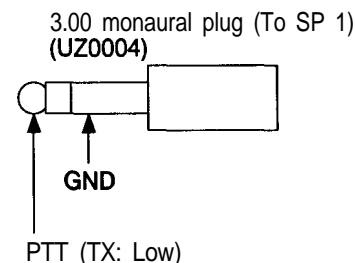
Filter: HPF (30Hz~50Hz)
LPF (1 0kHz~15kHz)

10. 9600bps Hi-Speed Packet Testing

While pushing the FUNC key, push RC key.
Make sure that "A" flashes on the UHF side.
Connect the plug to the **SP1** jack on the rear of the unit.



TX MOD 4.8kHz -1 dBm (AF OSC)



Note 1

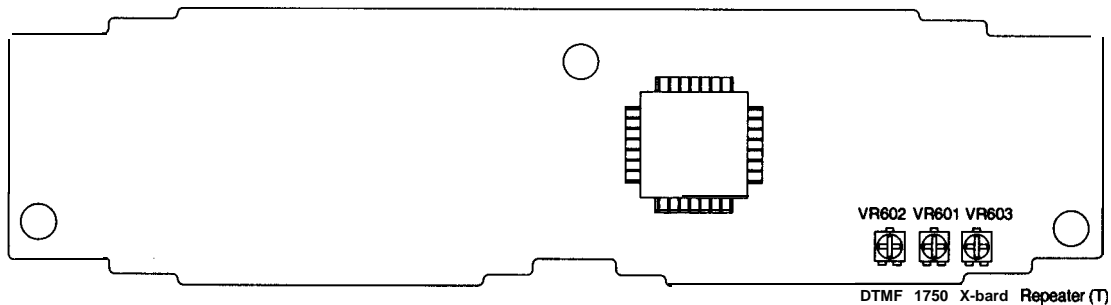
1. All SSG output is indicated by EMF.
2. AG output level connecting with the load is measured.
3. Standard Modulation: **1kHz +/- 3.5kHz/DEV**
4. Audio Output level: **50mW~100mW at 8Ω**
5. Coaxial cable: **5D2W 1 m**

Note 2

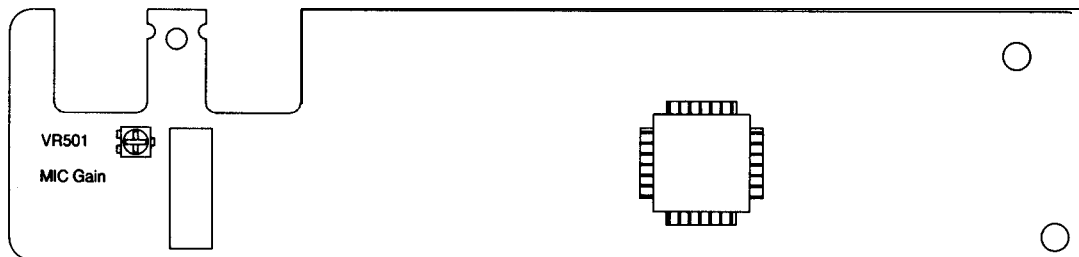
1. Power supply voltage is **13.8V**.
Power switch is off.
2. Turn the squelch and volume knobs counterclockwise.
3. Press and hold the "F" key, then turn the power switch on.
The display shows the frequency as follows:
145.00 433.00 (E version)
145.00 445.00 (T version)

2) Adjustment Points

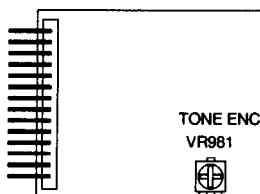
Sub Control Unit



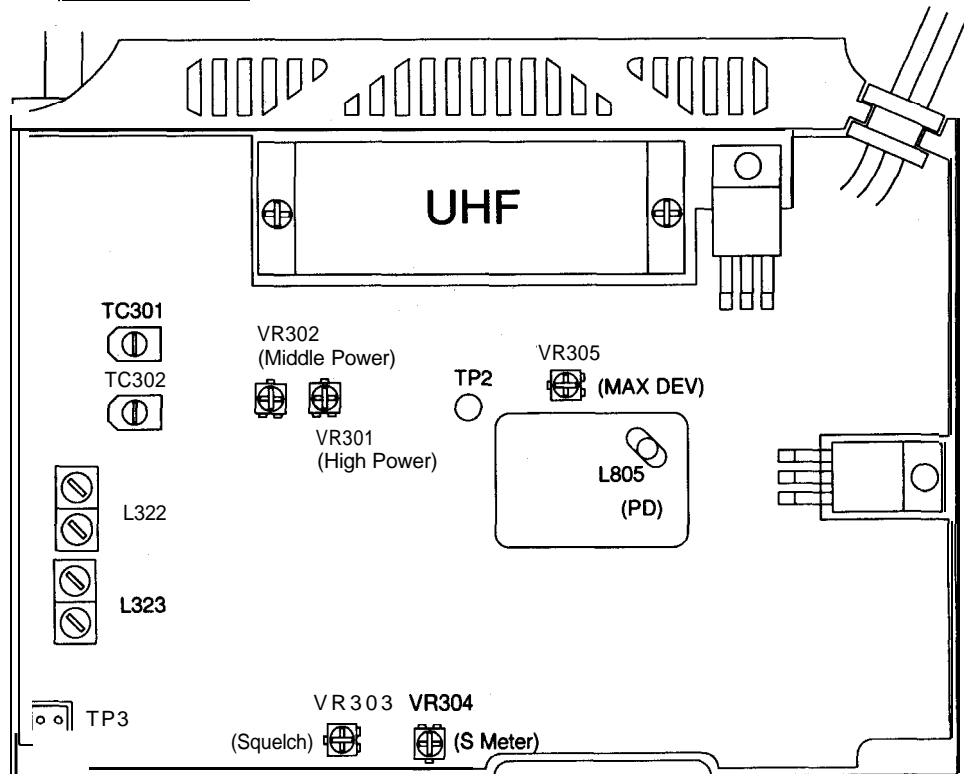
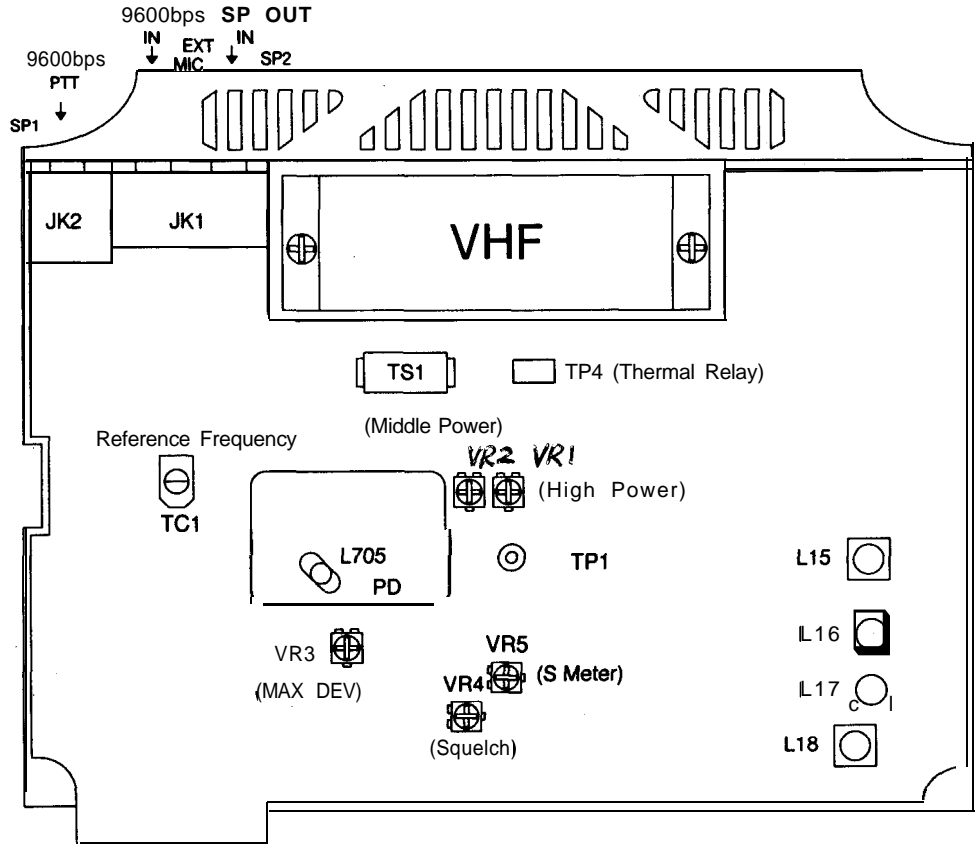
Front Control Unit



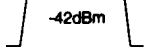
Tone ENC Unit



Main Unit



3) UHF RX Adjustment

| item | Condition | Measurement | | | | Adjustment | | | Specifications |
|---------------------|---|-------------|------------------------------------|---|----------|--------------|----------------|---|---|
| | | TX/RX | Equipment | Unit | Terminal | Unit | Parts | Method | |
| Reference Frequency | f=445.00MHz (T) f=435.00MHz (E) | TX | Freq. Counter Power Meter | Back | JHF ANT | VHF Main | TC1 | 445MHz (T) 435MHz (E) | +/- 100Hz |
| PLL VCO | f=440.00MHz | RX | Digital Multimeter | UHF Main | TP2 | UHF v c o | L805 | 4.2V | 4.2V+/-0.2V |
| | f=440.00MHz | TX | | | | | --- | 4.5V (Check) | 4.0V~5.5V |
| | f=145.00MHz (SUB) | RX | | | | | | 3.8V (Check) | 3.2V~4.8V |
| Herical coil | f=445.00MHz (T) f=435.00MHz (E) | RX | T.G. -40dBm | Back | JHF ANT | UHF Main | L322 L323 | Max Gain | 440M (T) 450M (T) 430M (E) 440M (E)  |
| | | | Spectrum Analyzer | UHF | TP3 | | TC301 TC302 | | |
| UHF Sensitivity | f=438.00MHz (T) f=445.02MHz (T) f=449.99MHz (T) SSG OUT: -9.0dBμ | RX | SSG Dist. Meter Oscilloscope | Back | JHF SP2 | | | Check | SINAD is above 12dB |
| | f=430.00MHz (E) f=435.00MHz (E) f=439.99MHz (E) SSG OUT: -9.0dBμ | | | | | | | | |
| VHF Sensitivity | f=138.00MHz (T) SSG OUT: -4.0dBμ | RX | | | | | | Check | SINAD is above 12dB |
| | f=145.00MHz SSG OUT: -6.0dBμ | | | | | | | | |
| | f=173.99MHz (T) SSG OUT: -4.0dBμ | | | | | | | | |
| S Meter | f=445.00MHz (T) f=435.00MHz (E) SSG OUT: 18.0dBμ | R X | LCD UHF S Meter | Front panel | | UHF Main | VR304 | "Full" Flashing | |
| | SSG OFF | | | | | | | Check | Does not light. |
| SQL level | f=445.00MHz (T) f=435.00MHz (E) SSG OFF SQ VR: 9 o'clock | RX | | Main | | UHF Main | VR303 | Turn VR303 to close the squelch | |
| | | | | | | | | Turn the UHF SQ VR to make sure that the squelch closes at 9-1 0 o'clock. | |
| ATT | f=445.00MHz (T) f=435.00MHz (E) | RX | | While pushing FUNC key, push H/L key. The ATT is lit. Make sure that the receiving sensitivity is attenuated about 10 ~ 20dB. | | | | | |

4) UHF TX Adjustment

| Item | Condition | TX/RX | Measurement | | | Adjustment | | | Specification: | | |
|---------------|---|---------------|---|------|----------|-------------|-------|-----------------------|-----------------------------|----------------|------------------------------|
| | | | Equipment | Unit | Terminal | Unit | Parts | Method | | | |
| High Power | f=445.05MHz (T) f=435.05MHz (E) | TX High | Power Meter Current Meter Voltage Meter | Back | UHF ANT | UHF Main | VR301 | Max | Above 36W | | |
| | 36W | | | | | | | +/-1 .ow below 10A | | | |
| | Check | | | | | | | 33-4ow 9A | | | |
| Middle Power | f=445.00MHz (T) f=435.00MHz (E) | T X Middle | | | | | VR302 | 10W | 10+/-0.5W | | |
| Low Power | | TX Low | | | | | | Check | 5+/-1 w | | |
| DEV | f=445.00MHz (T) f=435.00MHz (E) Mod: 1kHz Mic : -30dBm | TX | Linear Det. Oscilloscope Power Meter | Back | UHF ANT | UHF Main | VR305 | 4.7kHz /DEV | 4.7kHz +/-0.2kHz /DEV | | |
| MIC Gain | Mod: 1kHz Mic : -46dBm | | | | | | | Front | VR501 | Check | 4.0 kHz +/-0.3kHz /DEV |
| CTCSS Tone | f=445.00MHz (T) f=435.00MHz (E) Mod: OFF Tone SW ENC 88.5Hz | | | | | | | ENC | VR981 | 0.8kHz /DEV | 0.8kHz +/-0.1 kHz /DEV |
| Tone Burst | f=439.00MHz Mod: OFF PTT+DOWN | | | | | | | SUB | VR601 | Check | 3.0kHz +/-0.3kHz /DEV |
| DTMF | f=439.00MHz CODE= "1111111111111111" Auto dialer ON | | | | | | | | | VR602 | Check |

5) VHF RX Adjustment

| Item | Condition | TX/RX | Measurement | | | Adjustment | | | Specification |
|-------------------------------|--|-------|------------------------------------|---|-------------|-------------|--|----------------------|------------------------|
| | | | Equipment | Unit | Terminal | Unit | Parts | Method | |
| Frequency | f=145.00MHz | TX | Freq. Counter Power Meter | Back | VHFANT | | | Check | +/- 100Hz |
| PLL VCO | f=145.00MHz | RX | Digital Multimeter | VHF Main | TP1 | VHF vco | L705 | 3.00V | 0.5V/-1v |
| | f=145.00MHz | TX | | | | | | Check | 3.0V+/-1.ov |
| | f=440.00MHz (SUB) | RX | | | | | | Check | 2.5V+/-0.8V |
| Note: | When you set the voltage of VHF RX PD to 3.0V, turn the core of L705 clockwise. If the voltage can not be set to 3.0V, 2.0V is allowable. | | | | | | | | |
| GAIN | f=145.00MHz | RX | Dist. Meter Oscilloscope | Back | VHF SP2 | VHF Main | L15 ~ L1a | SINAD MAX | SINAD is above 12dB |
| Sensitivity | f=145.00MHz SSG OUT: -9.0dBμ | | SSG Dist. Meter Oscilloscope | | | | L15 L1a | SINAD MAX | SINAD is above 12dB |
| | f=138.00MHz (T) f=173.99MHz SSG OUT: -4.0dBμ | | | | | | | Check | SINAD is above 12dB |
| AM Sensitivity (T only) | f = 18.00MHz * SSG OUT: 5.0dBμ | RX | | | | | Check | S/N is above 10dB | |
| S Meter | f=145.00MHz SSG OUT: 20.0dBμ | RX | LCD VHF S Meter | Front panel | VHF Main | VR5 | "Full" Flashing | | |
| | SSG OFF | | | | | | Check | Does not light. | |
| SQL level | f=145.00MHz SSG OFF SQ VR: 9 o'clock | RX | | VHF Main | VHF Main | VR4 | Turn VR4 to close the squelch | | |
| | | | | Turn the VHF SQ VR to make sure that the squelch closes at 9-10 o'clock. | | | | | |
| ATT | f=145.00MHz | RX | | While pushing FUNC key, push H/L key. The ATT is lit. Make sure that the receiving sensitivity is attenu- ated about 10 ~ 20dB. | | | | | |

6) VHF TX Adjustment

| Item | Condition | Measurement | | | | Adjustment | | | Specifications | | | | |
|-----------------|--|-------------|---|------|----------|------------|---------------|-------------|---------------------------|-----|----------|-------|---|
| | | TX/RX | Equipment | Unit | Terminal | Unit | Parts | Method | | | | | |
| High Power | f=145.00MHz | TX High | Power Meter Current Meter Voltage Meter | Back | VHF ANT | VHF Main | VR1 | Max | Above 55W | | | | |
| | | | | | | | VR1 | 52W | +/-1 .0w below 11A | | | | |
| | | Check | | | | | 43-48W 11A | | | | | | |
| | VR2 | 10W | | | | | 10+/-1W | | | | | | |
| Middle Power | f=146.00MHz (T) f=145.00MHz (E) | TX Middle | | | | | | Check | | | | | |
| Low Power | | TX Low | | | | | | Check | 4~7W | | | | |
| DEV | f=145.00MHz Mod: 1kHz Mic :-30dBm | TX | Linear Det. Oscilloscope Power Meter | Back | VHF ANT | VHF Main | VR3 | 4.7kHz /DEV | 4.7kHz +/-0.2kHz /DEV | | | | |
| MIC Gain | Mod: 1kHz Mic: -46dBm | | | | | | | Check | 4.0 kHz +/-0.3kHz /DEV | | | | |
| CTCSS Tone | f=145.00MHz Mod: OFF Tone SW ENC 88.5Hz | | | | | | | Check | 0.8kHz +/-0.2kHz /DEV | | | | |
| Tone Burst | f=145.00MHz Mod: OFF PTT+DOWN | | | | | | | Check | 3.0kHz +/-0.4kHz /DEV | | | | |
| DTMF | f=145.00MHz CODE= "1111111111111111" Auto dialer ON | | | | | | | Check | 3.0kHz +/-0.4kHz /DEV | | | | |
| X-BAND Repeater | f=145.00MHz RXf=445.00MHz (T) RXf=433.00MHz (E) X-BAND ON | | | | | | | | | SUB | VR603 | Check | 3.5kHz +/-0.5kHz /DEV |
| Thermal Relay | f=145.00MHz | | | | | | TX High | | | TP4 | VHF Main | | Make sure that the power changes from "Hi" to "Low" when TP4 is connected to GND. |