

ADJUSTMENT

Required Test Equipment

1. Tester and DC V.M
Use a tester with high input impedance.
2. RF VTVM (RF VM)
Input impedance: 1 M ohms or more, 2 pF or less
Voltage range: FS = 10 mV to 300 V
Measurable frequency: 1,300 MHz (maximum)
3. Frequency counter (F counter)
Input sensitivity: Approximately 50 mV
Measurable frequency: 1,300 MHz or more
4. DC power supply
Voltage: 10 to 17 V (variable)
Current: 12 A or more
5. Power meter
Power measurement ranges: 100 W, 50 W, and 15 W
Input impedance: 50 ohms
Measurable frequency: 1,300 MHz
6. AF vacuum voltmeter (AF VM)
Input impedance: 1 M ohms or more
Voltage range: FS= 1 mV to 30 V
Measurable frequency: 50 Hz to 10 kHz
7. AF generator (AG)
Output frequency: 100 Hz to 10 kHz
Output voltage: 0.5 mV to 1 V
8. Linear detector
Measurable frequency: 1,300 MHz
9. Spectrum analyzer
Measurable frequency: 1,300 MHz
10. Directional coupler
11. Oscilloscope
Use a high-sensitivity oscilloscope with horizontal input socket.
12. SSG
Use an SSG that produces a frequency of 20 to 1,300 MHz with amplitude and frequency modulation.
Output level: 0.1μV to 100 mV
13. Dummy resistor
Use an 8-ohm resistor exceeding the rated value in each band.

14. Noise generator

Use a noise generator whose output contains a high-frequency component of more than 1,300 MHz (near ignition noise).

15. Sweep generator

Use a sweep generator that can sweep the 1,300 MHz band.

16. Tracking generator

Preparation

- Set controls to the position shown in Table 23 unless otherwise specified.

| | |
|------------|-----|
| POWER SW | OFF |
| AF VOL VR | MIN |
| SQL VOL VR | MIN |

Table 23

(When viewed from the front of the set)

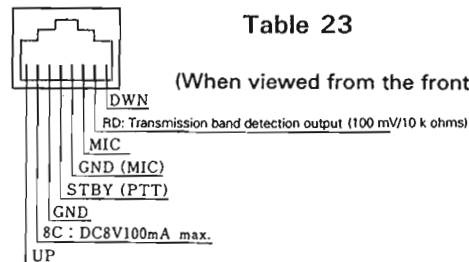


Fig. 55 Microphone Socket (on Front Panel)

- Use an insulated tool such as a plastic tool during adjustment (especially trimmer coil adjustment).
- For SSG protection, do not connect a microphone to the microphone socket during receiver block adjustment.
- Check that the power switch is off before the power cord is connected.
- The SSG output level is displayed at the release end.
- After setting the various controls as shown in Table 23, make sure that the indications of the display and the LEDs are as shown in Figure 56 when the POWER switch is turned ON while pushing the MR key.

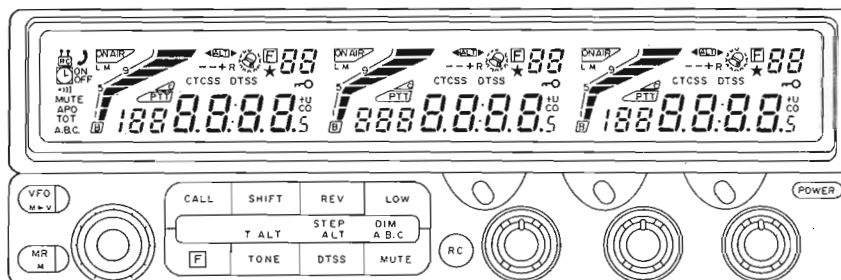


Fig. 56

ADJUSTMENT

• 144 MHz Band (TM-742 A/E, TM-942A)

Common Section Adjustment

| Item | Condition | Measurement point | | | Adjustment point | | | Specification |
|-----------------------|-------------------------------------|-------------------|-------|----------|------------------|-------|-------------------------|---------------|
| | | Test equipment | Unit | Terminal | Unit | Parts | Method | |
| 1. Lock voltage check | 1. Frequency: 144.040MHz Receive | Digital voltmeter | TX-RX | TP2 | | | Check the lock voltage. | 1.8 ~ 3.0 V |

The DC power supply must be set to the rated voltage.

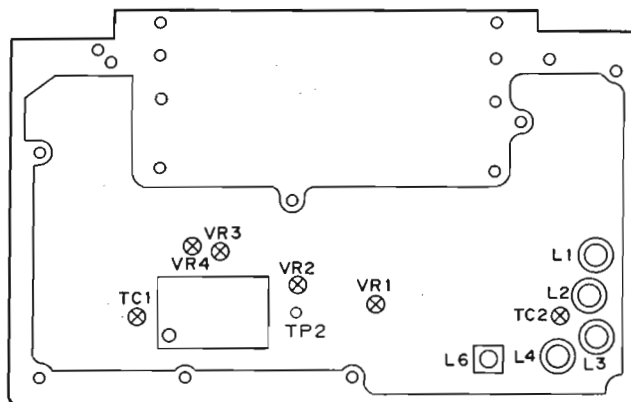
Receiver Section Adjustment

| Item | Condition | Measurement point | | | Adjustment point | | | Specification |
|-------------------------------------|--|---|------------|----------|------------------|-------|---|---|
| | | Test equipment | Unit | Terminal | Unit | Parts | Method | |
| 1. Bandpass filter (BPF) adjustment | 1. Frequency: 144.040MHz SSG output: 0 dBμ Modulation: 1 KHz Deviation: 3 KHz Receive | Digital voltmeter SSG | | | TX-RX | L1-4 | Adjust so that the voltmeter reading is maximum. | Voltmeter reading is maximum. |
| 2. Receive sensitivity check | 1. Frequency: 144.040 MHz 145.940 MHz 147.940 MHz SSG output: -9 dBμ Modulation: 1 KHz Deviation: 3 KHz | Distortion meter Millivoltmeter Oscilloscope SSG | Rear panel | EXT.SP | | | Check | 12 dB SINAD or more |
| | 2. AM sensitivity (K and P models only) Frequency: 118.040 MHz SSG output: 25 dBμ Modulation: 1 KHz Deviation: 30% | | | | | | Press the MHz key and check that the frequency is set to 118.040 with an encoder. | 12 dB SINAD or more |
| | Press the MR key | | | | | | | |
| 3. Distortion factor adjustment | 1. Frequency: 145.040 MHz SSG output: 40 dBμ Modulation: 1 KHz Deviation: 3 KHz AF output: 4V/8 ohms | Distortion factor Oscilloscope SSG | Rear panel | EXT.SP | TX-RX | L6 | Minimize the distortion factor. | 5% or less |
| 4. Signal strength meter adjustment | 1. Frequency: 145.040 MHz SSG output: 22dBμ Modulation: 1 KHz Deviation: 3 KHz | SSG | | | TX-RX | VR1 | Adjust so that all LEDs go on, then one LED goes off. | |
| | 2 SSG output 23 dBμ MOD: 1 kHz DEV: 3 kHz | | | | | | Adjust the SSG output so that all signal strength meter LEDs go on. | The SSG output is 20 ± 6 dBμ |
| 5. Squelch check | 1. Frequency: 146.040 MHz SSG output: Off Modulation: 1 KHz Deviation: 3 KHz | SSG | Rear panel | EXT.SP | | | Set the SQL control to the closing position | Control position 8:00-11:00 BUSY should go out |
| | 2 SSG output: -14dBμ MOD: 1 kHz DEV: 3 kHz | | | | | | | Squelch should open, and BUSY should light up |
| | 3. SSG output: -3 dBμ | | | | | | SQL control fully clockwise | Noise should disappear Squelch should open |

ADJUSTMENT

Transmitter Section Adjustment

| Item | Condition | Measurement point | | | Adjustment point | | | Specification |
|---------------------------------|---|---------------------------------|------------|----------|------------------|-------|---|-----------------------------|
| | | Test equipment | Unit | Terminal | Unit | Parts | Method | |
| 1. Power adjustment (check) | 1. Maximum power check Frequency: 136.000 MHz 145.980 MHz 147.980 MHz Transmit | Powermeter Ammeter | Rear Panel | ANT | TX-RX | VR3 | Check | 57 W or more |
| | 2. High-power adjustment Transmit | | | | TX-RX | VR3 | Adjust. 54W | 46 to 59 W (11.5 A or less) |
| | 3. Medium-power adjustment Transmit | | | | TX-RX | VR4 | Adjust. 12W | 10 to 14 W |
| | 4. Low-power check Transmit | | | | | | Check | 3 to 8 W |
| 2. Deviation adjustment (check) | 1. Frequency: 145.980 MHz AG: 1 kHz, 50 mV (K, P, M) 28 mV (E) Filter: 25 15K Transmit | DC detector Oscilloscope | Rear Panel | ANT | TX-RX | VR2 | Adjust (in the higher + or - direction). 4.2 KHz | ± 4.0 to 5.0 KHz |
| | 2. Frequency: 145.980 MHz AG: 1 KHz, 5.0 mV (K, P, M) 2.8 mV (E) Transmit | | | | | | Check | ± 2.2 to 3.6 kHz |
| 3. Tone check | 1. Frequency: 144.980 MHz Tone On Transmit | DC detector Oscilloscope | Rear Panel | ANT | | | Check | ± 0.5 to 1.5 KHz |
| 4. Protection check | 1. Frequency: 147.980 MHz Antenna: open Transmit | Ammeter | | | | | Check | 12.0 A or less |
| 5. Frequency adjustment | 1. Frequency: 145.980 MHz Transmit | Frequency counter Powermeter | | | TX-RX | TC1 | 145.980 MHz | ± 100 Hz |



Note: Use an adjustment tool with a ceramic or plastic tip 1.5 mm square for L1 through L4.

Fig. 57 144 MHz band adjustment: Component layout (upper view)

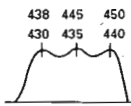
ADJUSTMENT

- 430/440 MHz Band (TM-742A/E, TM-942A, UT-440S)

Common Section adjustment

| Item | Condition | Measurement point | | | Adjustment point | | | Specification |
|-----------------------|--------------------------------------|-------------------|-------|----------|------------------|-------|-------------------------|--|
| | | Test equipment | Unit | Terminal | Unit | Parts | Method | |
| 1. Lock voltage check | 1. Frequency: 468.000 MHz Receive | Digital voltmeter | TX-RX | TP2 | | | Check the lock voltage. | 7.5 ~ 9.1 V (K, P) 7.0 ~ 9.5 V (E, M) |

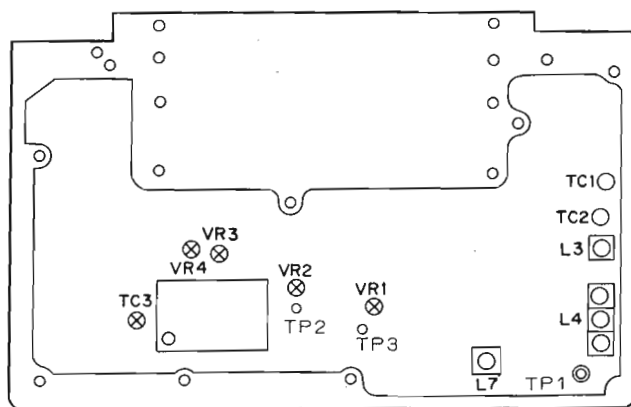
Receiver Section Adjustment

| Item | Condition | Measurement point | | | Adjustment point | | | Specification |
|---|---|--|------------|----------|------------------|--------------------|--|---|
| | | Test equipment | Unit | Terminal | Unit | Parts | Method | |
| 1. Helical scanning adjustment | 1. Frequency: 445.050 MHz (K and P) 435.050 MHz (E, M) Spectrum analyzer: Center of above frequency Tracking generator: Output: -30 dBm | Digital voltmeter Spectrum analyzer Tracking generator | | | TX-RX | TC1, TC2, L3, L4X3 |  <p>Adjust each frequency as shown in the figure.</p> | |
| 2. Receive sensitivity check | 1. Frequency: 445.050 MHz (K and P) 435.050 MHz (E, M) SSG output: -9 dBμ Modulation: 1 KHz Deviation: 3 KHz | Distortion meter Millivoltmeter Oscilloscope SSG | Rear panel | EXT.SP | | | Check | 12 dB·SINAD or more |
| 3. Distortion factor adjustment | 1. Frequency: 445.050 MHz (K and P) 435.050 MHz (E, M) SSG output: 40 dBμ Modulation: 1 KHz Deviation: 3 KHz AF output: 4 V/8 ohms | Distortion meter Oscilloscope SSG | Rear panel | EXT.SP | TX-RX | L7 | Minimize the distortion factor. | 5% or less |
| 4. Signal strength meter adjustment (check) | 1. Frequency: 445.050 MHz (K and P) 435.050 MHz (E, M) SSG output: 23 dBμ Modulation: 1 KHz Deviation: 3 KHz | SSG | | | TX-RX | VR1 | | Adjust so that all LEDs go on, then one LED goes off. |
| | 2. SSG output: 24 dBμ | | | | | | Adjust the SSG output so that all signal strength meter LEDs go on. | The SSG output is 20 ± 6 dBμ. |
| 5. Squelch check | 1. Frequency: 445.050 MHz (K and P) 435.050 MHz (E, M) SSG output: Off Modulation: 1 KHz Deviation: 3 KHz | SSG | Rear panel | EXT.SP | | | Set the SQL control to the closing position | Control position 8:00-11:00 BUSY should go out |
| | 2. SSG output: -14 dBμ | | | | | | | Squelch should open, and BUSY should light up |
| | 3. SSG output: -3 dBμ | | | | | | SQL control fully clockwise | Noise should disappear Squelch should open |

ADJUSTMENT

Transmitter Section Adjustment

| Item | Condition | Measurement point | | | Adjustment point | | | Specification |
|---------------------------------|--|---------------------------------|------------|----------|------------------|-------|---|---------------------------|
| | | Test equipment | Unit | Terminal | Unit | Parts | Method | |
| 1. Power adjustment (check) | 1. Maximum power check Frequency: 445.000 MHz (K and P) 435.000 MHz (E, M) Transmit | Powermeter Ammeter | Rear panel | ANT | TX-RX | VR3 | Check | 38 W or more |
| | 2. High power adjustment Frequency: 445.000 MHz (K and P) 435.000 MHz (E, M) Transmit | | | | TX-RX | VR3 | Adjust. 37W | 31 to 42 W (10 A or less) |
| | 3. Medium power adjustment Frequency: 445.000 MHz (K and P) 435.000 MHz (E, M) Transmit | | | | TX-RX | VR4 | Adjust. 13W | 10 to 14 W |
| | 4. Low power check Frequency: 445.000 MHz (K and P) 435.000 MHz (E, M) Transmit | | | | | | Check | 3 to 8 W |
| 2. Deviation adjustment (check) | 1. Frequency: 445.000 MHz (K and P) 435.000 MHz (E, M) AG: 1 kHz 50 mV (K, P) 28 mV (E) Filter: 25 15K Transmit | DC detector Oscilloscope | Rear panel | ANT | TX-RX | VR2 | Adjust (in the higher + or - direction). 4.2 KHz | ± 4.0 to 5.0 KHz |
| | 2. Frequency: 445.000 MHz (K and P) 435.000 MHz (E, M) AG: 1 KHz, 5.5 mV (K, P) 2.8 mV (E) Transmit | | | | | | Check | ± 2.2 to 3.6 kHz |
| 3. Tone check | 1. Frequency: 434.980 MHz (E, M) 448.200 MHz (K, P) Tone: On Transmit | DC detector Oscilloscope | Rear panel | ANT | | | Check | ± 0.5 to 1.5 KHz |
| 4. Protection check | 1. Frequency: 449.980 MHz (K and P) 439.980 MHz (E, M) Antenna: Open Transmit | Ammeter | | | | | Check | 10 A or less |
| 5. Frequency adjustment | 1. Frequency: 445.000 MHz (K and P) 435.000 MHz (E, M) Transmit | Frequency counter Powermeter | | | TX-RX | TC3 | 445.000 MHz 435.000 MHz K, P E, M, M2 | ± 500 Hz |



1. The adjustment of the 430M BAND can be carried out by taking the 144M BAND unit out of the control unit.

Fig. 58 430 MHz band adjustment: Component layout (upper view)

ADJUSTMENT

• 1200 MHz Band (TM-942A, UT-1200)

Common Section Adjustment

| Item | Condition | Measurement point | | | Adjustment point | | | Specification |
|-----------------------|---------------------------------------|-------------------|-------|----------|------------------|-----------|-------------------------|---------------|
| | | Test equipment | Unit | Terminal | Unit | Parts | Method | |
| 1. Lock voltage check | 1. Frequency: 1299.975 MHz Receive | Digital voltmeter | TX-RX | TP2 | TX-RX IC11 | TRIM-CAP. | Check the lock voltage. | 6.1 ~ 6.9 V |

Receiver Section Adjustment

| Item | Condition | Measurement point | | | Adjustment point | | | Specification |
|---|--|---|------------|----------|------------------|-------|--|---|
| | | Test equipment | Unit | Terminal | Unit | Parts | Method | |
| 1. ALT adjustment | 1. Frequency: 1270.100 MHz | Digital voltmeter SSG | | | | | Check the voltage. | AV |
| | 2. The same as the above frequency. SSG: Off | | | | TX-RX | VR2 | Adjust so that the voltage is 0.1 V higher than above. | AV + 0.1 V |
| | 3. The same as the above frequency. SSG output: 0 dBμ Modulation: 1 KHz Deviation: 3 KHz | | | | TX-RX | L6 | Check that the voltage is 0.2 V higher than above when ALT is on, then turn ALT off. | (A + 0.1) V + 0.2 V |
| 2. Receive sensitivity check | 1. Frequency: 1270.100 MHz SSG output: -9 dBμ Modulation: 1 KHz Deviation: 3 KHz | Distortion meter Millivoltmeter Oscilloscope SSG | Rear panel | EXT.SP | | | Check | 12 dB SINAD or more |
| 3. Distortion adjustment | 1. Frequency: 1270.100 MHz SSG output: 40 dBμ Modulation: 1 KHz Deviation: 3 KHz AF output: 4 V/8 ohms | Distortion meter Oscilloscope SSG | Rear panel | EXT.SP | TX-RX | L4 | Minimize the distortion factor. | 5% or less |
| 4. Signal strength meter adjustment (check) | 1. Frequency: 1270.100 MHz SSG output: 24 dBμ Modulation: 1 KHz Deviation: 3 KHz | SSG | | | TX-RX | VR1 | | Adjust so that all LEDs go on, then one LED goes off. |
| | 2. SSG output: 25 dBμ | | | | | | Adjust the SSG output so that all signal strength meter LEDs go on. | The SSG output is 20 ± 6 dBμ. |
| 5. Squelch check | 1. Frequency: 1270.100 MHz SSG output: Off Modulation: 1 KHz Deviation: 3 KHz | SSG | Rear panel | EXT.SP | | | Set the SQL control to the closing position | Control position 8:00-11:00 BUSY should go out |
| | 2. SSG output: -14 dBμ MOD: 1 kHz DEV: 3 kHz | | | | | | | Squelch should open, and BUSY should light up |
| | | | | | | | SQL control fully clockwise | Noise should disappear |
| | 3. SSG output: -3 dBμ | | | | | | | Squelch should open |

ADJUSTMENT

Transmitter Section Adjustment

| Item | Condition | Measurement point | | | Adjustment point | | | Specification |
|---------------------------------|---|---------------------------------|------------|----------|------------------|-------|--|---------------------------|
| | | Test equipment | Unit | Terminal | Unit | Parts | Method | |
| 1. Power adjustment | 1. Maximum power check Frequency: 1270.000 MHz Transmit | Powermeter Ammeter | Rear panel | ANT | TX-RX | VR4 | Check | 11 W or more |
| | 2. High-power adjustment Frequency: 1270.000 MHz Transmit | | | | TX-RX | VR4 | Adjust 10W The fan runs when the PTT switch is pressed. (It continues for a while after the PTT switch is released, then stops.) | 8 to 14 W (6.5 A or less) |
| | 3. Low-power adjustment Frequency: 1270.000 MHz Transmit | | | | TX-RX | VR5 | Adjust 1 W | 0.7 to 1.4 W |
| 2. Deviation adjustment (check) | 1. Frequency: 1270.000 MHz AG: 1 kHz 50 mV (K, P M) 28 mV (E) Transmit | DC detector Oscilloscope | Rear panel | ANT | TX-RX | VR3 | Adjust (in the higher + or - direction). 4.2 KHz | ± 4.0 to 5.0 KHz |
| | 2. Frequency: 1270.000 MHz AG: 1 KHz, 5.0 mV (K, P M) 2.8 mV (E) Transmit | | | | | | Check | ± 2.2 to 3.6 kHz |
| 3. Tone check | 1. Frequency: 1279.98 MHz Tone: On Transmit | DC detector Oscilloscope | Rear panel | ANT | | | Check | ± 0.5 to 1.5 KHz |
| 4. Protection check | 1. Frequency: 1240.000 MHz 1270.000 MHz 1299.980 MHz Antenna: Open Transmit | Ammeter | | | | | Check | 8.5 A or less |
| 5. Frequency check | 1. Frequency: 1270.000 MHz Transmit | Frequency counter Powermeter | | | | | 1270.000 MHz | ± 1 KHz |

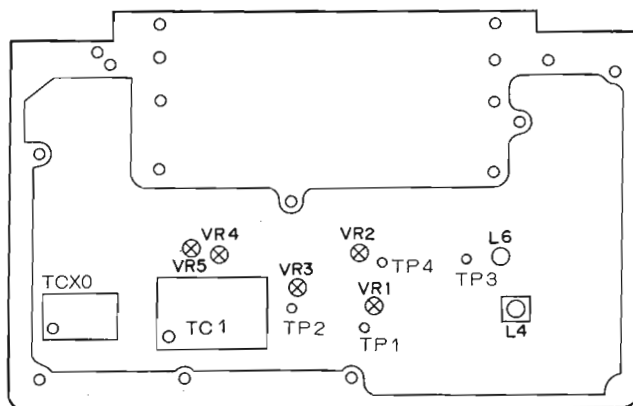


Fig. 59 1200 MHz band adjustment: Component layout (upper view)

The adjustment of the 12000MHz BAND can be carried out by taking the 144MHz BAND and 430MHz BAND units out of the control unit and by installing the 1200MHz BAND at the position of the 430MHz BAND (central part). Cord with alligator clip should be used to connect the power supply. Take care for the clip not to short-circuit with the casing.

ADJUSTMENT

● 28 MHz Band (UT-28S)

Common Section Adjustment

| Item | Condition | Measurement point | | | Adjustment point | | | Specification |
|-----------------------|------------------------------------|-------------------|-------|----------|------------------|-------|------------------------|---------------|
| | | Test equipment | Unit | Terminal | Unit | Parts | Method | |
| 1. Lock Voltage check | 1. Frequency: 29.700MHz Receive | Digital voltmeter | TX-RX | TP3 | | | Check the lock voltage | 5.5 - 7.0 V |

Receiver Section Adjustment

| Item | Condition | Measurement point | | | Adjustment point | | | Specification |
|--------------------------------------|--|---|------------|----------|------------------|-------|---|---|
| | | Test equipment | Unit | Terminal | Unit | Parts | Method | |
| 1. Band pass filter (BPF) adjustment | 1. Frequency: 29.700MHz SSG output: 0 dB μ Modulation: 1KHz Deviation: 3 KHz Receive | Digital voltmeter SSG | Rear panel | ANT | TX-RX | L1-4 | Adjust so that the voltmeter reading is maximum | voltmeter reading is maximum |
| 2. Distortion factor adjustment | 1. Frequency: 28.890MHz SSG output: 60 dB μ Modulation: 1KHz Deviation: 3KHz | Distortion meter Oscilloscope SSG | Rear panel | EXT.SP | TX-RX | L5 | Minimize the distortion factor | 5% or less |
| 3. Receive sensitivity check | 1. Frequency: 28.040MHz SSG output: -9 dB μ Modulation: 1KHz Deviation: 3 KHz | Distortion meter Millivoltmeter Oscilloscope SSG | Rear panel | EXT.SP | | | Check | 12 dB SINAND or more |
| | 2. Frequency: 29.700 MHz SSG output: -9 dB μ Modulation: 1KHz Deviation: 3 KHz | | Rear panel | EXT.SP | | | Check | 12 dB SINAND or more |
| | 3. Frequency: 22.040 MHz SSG output: 20 dB μ Modulation: 1KHz Deviation: 3 KHz | | Rear panel | EXT.SP | | | Check | 12 dB SINAND or more |
| 4. Signal strength meter adjustment | 1. Frequency: 28.890 MHz SSG output: 24 dB μ Modulation: 1 KHz Deviation: 3 KHz | SSG | | | TX-RX | VR1 | Adjust so that all LEDS go on, then one LED goes off. | |
| 5. Signal strength meter check | 2. Frequency: 28.890 MHz SSG output: 25 dB μ Modulation: 1 KHz Deviation: 3 KHz | | | | | | Adjust the SSG output so that all signal strength meter LEDs go on. | The SSG output is 20 ± 6 dB μ |
| 6. Squelch check | 1. Frequency: 28.890 MHz SSG output: OFF | SSG | Rear panel | EXT.SP | | | Set the SQL control to the closing position | Control position 8:00-11:00 BUSY should go out |
| | 2. Frequency: 28.890 MHz SSG output: -14 dB μ Modulation: 1 KHz Deviation: 3 KHz | | | | | | | Squelch should open, and BUSY should light up |
| | 3. SSG. output: -3 dB μ | | | | | | SQL control fully clockwise | Noise should disappear Squelch should open |

ADJUSTMENT

Transmitter Section Adjustment

| Item | Condition | Measurement point | | | Adjustment point | | | Specification |
|------------------------------------|--|-----------------------------------|------------|----------|------------------|-------|-------------------|--|
| | | Test equipment | Unit | Terminal | Unit | Parts | Method | |
| 1. Maximum power check | 1. Frequency: 28.850 MHz Transmit | Powermeter Ammeter | Rear panel | ANT | TX-RX | VR3 | Check | 52 W or more |
| 2. High-power adjustment (check) | 1. Frequency: 28.850 MHz Transmit | | | | TX-RX | VR3 | Adjust | 50 W |
| | 2. Frequency: 28.000 MHz Transmit | | | | | | Check | 44 W or more |
| | 3. Frequency: 29.640 MHz Transmit | | | | | | Check | 44 W or more |
| 3. Medium-power adjustment (check) | 1. Frequency: 28.850 MHz Transmit | Powermeter | Rear panel | ANT | TX-RX | VR4 | Adjust | 11.5 W |
| | 2. Frequency: 28.000 MHz Transmit | | | | | | Check | 9.5 W or more |
| | 3. Frequency: 29.640 MHz Transmit | | | | | | Check | 9.5 W or more |
| 4. Low-power check | 1. Frequency: 28.850 MHz Transmit | Powermeter | Rear panel | ANT | | | Check | 3.0 ~ 8.0 W |
| | 2. Frequency: 28.000 MHz Transmit | | | | | | Check | 3.0 ~ 8.0 W |
| | 3. Frequency: 29.640 MHz Transmit | | | | | | Check | 3.0 ~ 8.0 W |
| 5. Deviation adjustment (check) | 1. Frequency: 28.850 MHz AG: 1 kHz 50 mV (K, P M) 28 mV (E) Filter: 25 15K Transmit | DC detector Oscilloscope AG | Rear panel | ANT | TX-RX | VR2 | Adjust 4.4 KHz | $\pm 4.4 \text{ KHz} \pm 200 \text{ Hz}$ |
| | 2. Frequency: 28.050 MHz AG: 1 KHz, 5.0 mV (K, P M) 2.8 mV (E) Filter: 25 15K Transmit | | | | | | Check | $\pm 2.2 \text{ to } 3.6 \text{ kHz}$ |
| 6. Frequency adjustment | 1. Frequency: 28.850 MHz Transmit | Frequency counter Powermeter | Rear panel | ANT | TX-RX | TC1 | Adjust | 28.850 MHz \pm 20 Hz |
| 7. Protection check | 1. Frequency: 29.690 MHz Antenna: Open Transmit | Ammeter | | | | | Check | 12A or less |

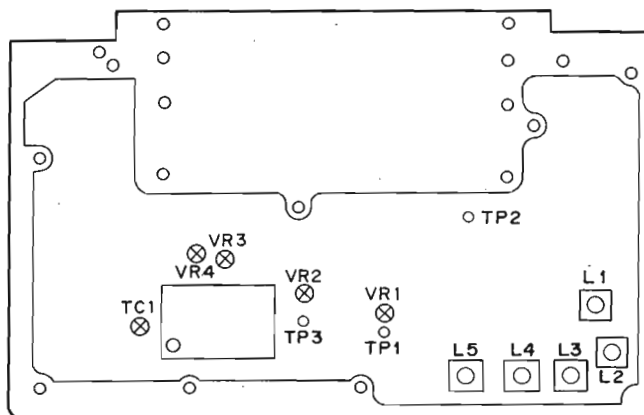


Fig. 60 28 MHz Band adjustment: Component layout (upper view)

ADJUSTMENT

● 50 MHz Band (UT-50S)

Common Section Adjustment

| Item | Condition | Measurement point | | | Adjustment point | | | Specification |
|-----------------------|-------------------------------------|-------------------|-------|----------|------------------|-------|------------------------|---------------|
| | | Test equipment | Unit | Terminal | Unit | Parts | Method | |
| 1. Lock Voltage check | 1. Frequency: 54.000 MHz Receive | Digital voltmeter | TX-RX | TP3 | | | Check the lock voltage | 6.0 - 7.6 V |

Receiver Section Adjustment

| Item | Condition | Measurement point | | | Adjustment point | | | Specification |
|-------------------------------------|---|---|------------|----------|------------------|-------|---|---|
| | | Test equipment | Unit | Terminal | Unit | Parts | Method | |
| 1. Bandpass filter (BPF) adjustment | 1. Frequency: 52.040 MHz SSG output: 0 dBμ Modulation: 1 KHz Deviation: 3 KHz Receive | Digital voltmeter SSG | Rear panel | ANT | TX-RX | L1~4 | Adjust to that the voltmeter reading is maximum | voltmeter reading is maximum |
| 2. Distortion factor adjustment | 1. Frequency: 52.040 MHz SSG output: 60 dBμ Modulation: 1 KHz Deviation: 3 KHz | Distortion meter Oscilloscope SSG | Rear panel | EXT.SP | TX-RX | L5 | Minimize the distortion factor | 5% or less |
| 3. Receive sensitivity check | 1. Frequency: 53.940 MHz SSG output: -9 dBμ Modulation: 1 KHz Deviation: 3 KHz | Distortion meter Millivoltmeter Oscilloscope SSG | Rear panel | EXT.SP | | | Check | 12 dB SINAND or more |
| | 2. Frequency: 50.040 MHz SSG output: -9 dBμ Modulation: 1 KHz Deviation: 3 KHz | | Rear panel | EXT.SP | | | Check | 12 dB SINAND or more |
| | 3. Frequency: 40.040 MHz SSG output: 20 dBμ Modulation: 1 KHz Deviation: 3 KHz | | Rear panel | EXT.SP | | | Check | 12 dB SINAND or more |
| 4. Signal strength meter adjustment | 1. Frequency: 52.040 MHz SSG output: 24 dBμ Modulation: 1 KHz Deviation: 3 KHz | SSG | | | TX-RX | VR1 | Adjust so that all LEDs go on, then one LED goes off. | |
| 5. Signal strength meter check | 2. Frequency: 52.040 MHz SSG output: 25 dBμ Modulation: 1 KHz Deviation: 3 KHz | | | | | | Adjust the SSG output so that all signal strength meter LEDs go on. | The SSG output is 20 ± 6 dBμ |
| 6. Squelch check | 1. Frequency: 52.040 MHz SSG output: Off | SSG | Rear panel | EXT.SP | | | Set the SQL control to the closing position | Control position 8:00-11:00 BUSY should go out |
| | 2. Frequency: 52.040 MHz SSG output: -14 dB Modulation: 1 KHz Deviation: 3 KHz | | | | | | | Squelch should open, and BUSY should light up |
| | 3. SSG output: -3 dBμ | | | | | | SQL control fully clockwise | Noise should disappear Squelch should open |

ADJUSTMENT

Transmitter Section Adjustment

| Item | Condition | Measurement point | | | Adjustment point | | | Specification |
|---------------------------------------|---|-----------------------------------|---------------|----------|------------------|-------|-------------------|--|
| | | Test equipment | Unit | Terminal | Unit | Parts | Method | |
| 1. Maximum power check | 1. Frequency: 52.000 MHz Transmit | Powermeter Ammeter | Rear Panel | ANT | TX-RX | VR3 | Check | 53W or more |
| 2. High-power adjustment (check) | 1. Frequency: 52.000 MHz Transmit | | | | TX-RX | VR3 | Adjust | 51W |
| | 2. Frequency: 50.000 MHz Transmit | | | | | | Check | 45W or more |
| | 3. Frequency: 53.940 MHz Transmit | | | | | | Check | 45W or more |
| 3. Medium-power adjustment (check) | 1. Frequency: 52.000 MHz Transmit | Powermeter | Rear Panel | ANT | TX-RX | VR4 | Adjust | 11.5W |
| | 2. Frequency: 50.000 MHz Transmit | | | | | | Check | 9.5W or more |
| | 3. Frequency: 53.940 MHz Transmit | | | | | | Check | 9.5W or more |
| 4. Low-power check | 1. Frequency: 52.000 MHz Transmit | Powermeter | Rear Panel | ANT | | | Check | 3.0 ~ 8.0W |
| | 2. Frequency: 50.000 MHz Transmit | | | | | | Check | 3.0 ~ 8.0W |
| | 3. Frequency: 53.940 MHz Transmit | | | | | | Check | 3.0 ~ 8.0W |
| 5. Deviation adjustment (check) | 1. Frequency: 52.000 MHz AG: 1KHz, 50 mV (K, P M) 28 mV (E) Filter: 25 15K Transmit | DC detector Oscilloscope AG | Rear Panel | ANT | TX-RX | VR2 | Adjust 4.4 KHz | $\pm 4.4 \text{ KHz} \pm 200 \text{ Hz}$ |
| | 2. Frequency: 52.000 MHz AG: 1KHz, 5.0 mV (K, P M) 2.8 mV (E) Filter: 25 15K Transmit | | | | | | Check | $\pm 2.2 \text{ to } 3.6 \text{ kHz}$ |
| 6. Frequency adjustment | 1. Frequency: 52.000 MHz Transmit | Frequency counter Power meter | Rear Panel | ANT | TX-RX | TC1 | Adjust | 52.000 MHz \pm 20 Hz |
| 7. Protection check | 1. Frequency: 53.990MHz Antenna: Open Transmit | Ammeter | | | | | Check | 12A or less. |

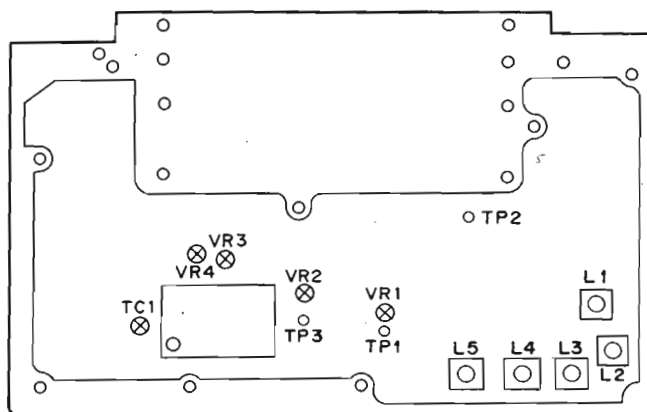


Fig. 61 50 MHz BAND adjustment: Component layout (upper view)

ADJUSTMENT

● 220 MHz Band (UT-220S)

Common Section Adjustment

| Item | Condition | Measurement point | | | Adjustment point | | | Specification |
|-----------------------|--------------------------------------|-------------------|-------|----------|------------------|-------|------------------------|---------------|
| | | Test equipment | Unit | Terminal | Unit | Parts | Method | |
| 1. Lock voltage check | 1. Frequency: 215.000 MHz Receive | Digital voltmeter | TX-RX | TP2 | | | Check the lock voltage | 1.2 ~ 2.6V |

Receiver Section Adjustment

| Item | Condition | Measurement point | | | Adjustment point | | | Specification |
|-------------------------------------|---|---|------------|----------|------------------|-------|---|---|
| | | Test equipment | Unit | Terminal | Unit | Parts | Method | |
| 1. Bandpass filter (BPF) adjustment | 1. Frequency: 222.540 MHz SSG output: 0dBμ Modulation: 1KHz Deviation: 3KHz Receive | Digital voltmeter SSG | Rear Panel | ANT. | TX-RX | L1~4 | Voltmeter reading is maximum. | Voltmeter reading is maximum. |
| 2. Distortion factor adjustment | 1. Frequency: 222.540 MHz SSG output: 60dBμ Modulation: 1KHz Deviation: 3KHz | Distortion meter Oscilloscope SSG | Rear Panel | EXT. SP | TX-RX | L6 | Minimize the distortion factor | 5% or less |
| 3. Receive sensitivity check | 1. Frequency: 222.540 MHz SSG output: -9dBμ Modulation: 1KHz Deviation: 3KHz | Distortion meter Millivoltmeter Oscilloscope SSG | Rear Panel | EXT. SP | | | Check | 12dB SINAND or more |
| | 2. Frequency: 215.040 MHz SSG output: 5dBμ Modulation: 1KHz Deviation: 3KHz | | Rear panel | EXT. SP | | | Check | 12dB SINAND or more |
| | 3. Frequency: 229.980 MHz SSG output: -5dBμ Modulation: 1KHz Deviation: 3KHz | | Rear panel | EXT. SP | | | Check | 12dB SINAND or more |
| 4. Signal strength meter adjustment | 1. Frequency: 222.540 MHz SSG output: 21dBμ Modulation: 1KHz Deviation: 3KHz | SSG | | | TX-RX | VR1 | Adjust so that all LEDs go on, then one LED goes off. | |
| 5. Signal strength meter check | 2. Frequency: 222.540 MHz SSG output: 22dBμ Modulation: 1KHz Deviation: 3KHz | | | | | | Adjust the SSG output so that all signal strength meter LEDs go on. | The SSG output is 20 ± 6 dBμ |
| 6. Squelch check | 1. Frequency: 222.540 MHz SSG output: OFF | SSG | Rear Panel | EXT. SP | | | Set the SQL control to the closing position | Control position 8:00-11:00 BUSY should go out |
| | 2. Frequency: 222.540 MHz SSG output: -14dB Modulation: 1KHz Deviation: 3KHz | | | | | | | Squelch should open, and BUSY should |
| | 3. SSG output: -3 dBμ | | | | | | SQL control fully clockwise | Noise should disappear Squelch should open |

ADJUSTMENT

Transmitter Section Adjustment

| Item | Condition | Measurement point | | | Adjustment point | | | Specification |
|---------------------------------------|--|------------------------------------|---------------|----------|------------------|-------|-------------------|---------------------------------------|
| | | Test equipment | Unit | Terminal | Unit | Parts | Method | |
| 1. Maximum power check | 1. Frequency: 222.500 MHz Transmit | Powermeter Ammeter | Rear Panel | ANT | TX-RX | VR3 | Check | 28W or more (reference) |
| 2. High-power adjustment (check) | 1. Frequency: 222.500 MHz Transmit | | | | TX-RX | VR3 | Adjust | 26W |
| | 2. Frequency: 222.000 MHz Transmit | | | | | | Check | 22W or more |
| | 3. Frequency: 224.980 MHz Transmit | | | | | | Check | 22W or more |
| 3. Medium-power adjustment (check) | 1. Frequency: 222.540 MHz Transmit | Powermeter | Rear Panel | ANT | TX-RX | VR4 | Adjust | 11W |
| | 2. Frequency: 222.000 MHz Transmit | | | | | | Check | 9W or more |
| | 3. Frequency: 224.980 MHz Transmit | | | | | | Check | 9W or more |
| 4. Low-power check | 1. Frequency: 222.540 MHz Transmit | Powermeter | Rear Panel | ANT | | | Check | 3.0 ~ 8.0W |
| | 2. Frequency: 220.000 MHz Transmit | | | | | | Check | 3.0 ~ 8.0W |
| | 3. Frequency: 222.980 MHz Transmit | | | | | | Check | 3.0 ~ 8.0W |
| 5. Deviation adjustment (check) | 1. Frequency: 222.500 MHz AG: 1 kHz, 50 mV Filter: 25 15K Transmit | DC detector Oscilloscope AG | Rear Panel | ANT | TX-RX | VR2 | Adjust 4.4 KHz | $\pm 4.4\text{KHz} \pm 200\text{ Hz}$ |
| | 2. Frequency: 222.500 MHz AG: 1 kHz, 5.0 mV Filter: 25 15K Transmit | | | | | | Check | $\pm 2.2\text{ to }3.6\text{ KHz}$ |
| 6. Frequency adjustment | 1. Frequency: 222.500 MHz Transmit | Frequency counter Powermeter | Rear Panel | ANT | TX-RX | TC1 | Adjust | $222.500\text{ MHz} \pm 2\text{KHz}$ |
| 7. Protection check | 1. Frequency: 224.980 MHz Antenna: Open Transmit | Ammeter | | | | | Check | 7.5A or less |

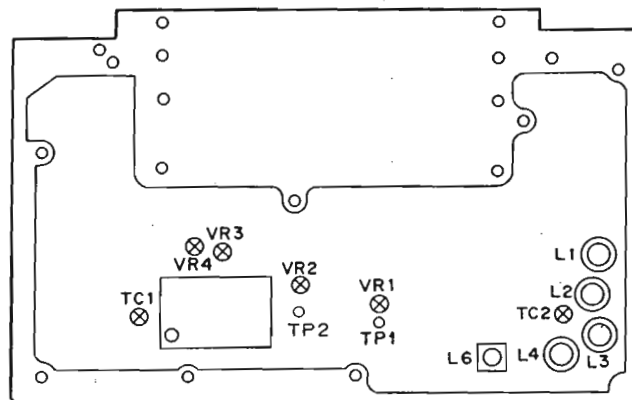


Fig. 62 220 MHz band adjustment: Component layout (upper view)