

MAINTENANCE AND REPAIR

GENERAL

UHF

The UHF hand portable radio covers the UHF band from 400 to 500 MHz. The radio have been factory aligned for operation within frequency band.

Any repair or adjustment should only be made by or under the supervision of a qualified radio service technician.

REMOVING AND REPLACING

When removing or fitting, use the Exploded View and Parts List in conjunction with the following procedures:

Removing And Replacing Battery

To remove the battery

1. Hold the radio chassis in one hand, press and hold the battery release catch on the top side.
2. Using the other hand, slide the battery toward the bottom side and off the the battery guide rail.

To replace the battery

1. With the slides of the battery positioned in line with the radio battery rail guides, slide the battery into position untill a click is heard.

ALIGNMENT PROCEDURE

The SP230/250 U2 Receiver is designed for broad band covering UHF(440-470MHz) and should require no special alignment, unless repairs are performed on the receiver portion.

The only alignment normally required is to squelch circuit, Apply a signal that produes 10dB SINAD, reduce the input to -130dBm, close the squelch control(RV2,RV4) until the receiver mutes.

Increase the signal to 10dB SINAD reading reference level and adjust RV2 or RV4 until the squelch opens. In high noise environment, some users may prefer to have the squelch opening set somewhat tighter, e.g.:12 to 14dB SINAD.

Should repairs be required, the following procedures should be applied:

VCO

1. Set the unit to the lowest transmitter frequency, 440MHz(UHF), 138MHz(VHF) and adjust the VCO L203 to 2.5V and 1.0V respectively.
2. Set the unit to the highest transmitter frequency, 470MHz(UHF), 162MHz(VHF) and check that the VCO voltage is below 11 volts.
3. Set the unit to the lowest receiver frequency, 440MHz(UHF), and adjust the VCO C208 to 1.5V.
4. Set the unit to the highest receiver frequency 470MHz(UHF), 162(VHF) and check that the VCO voltage is below 11 volts.

* Note : use TP1 to measure the voltage.

Transmitter

Connect the unit to a Service Monitor with the power meter setting to the 5 W scale (or autorange)

TCXO

Set the channel selector to the mid-range frequency 455 MHz, adjust CT1, for a reading of 445 MHz +/- 200Hz. For the VHF data radio, adjust the CT1 and set the frequency within the required range.

APC

1. Adjust RV1 for fixing up High Power(5W)
2. Adjust RV3 for fixing up Low Power(1W)

COMPONENT REPLACEMENT

Surface Mount Components

Surface mount components should always be replaced using a temperature controlled soldering system. The soldering tools may be either a temperature controlled soldering iron or a temperature controlled hot-air soldering station. A hot-air system is recommended for the removal of components on these boards. With either soldering system, a temperature of 700 F(371 C) should be maintained.

The following procedures outline the removal and replacement of surface mount components. If a hot-air soldering system is employed. See the manufacture's operating instructions for detailed information on the use of your system.

* CAUTION : Avoid applying heat to the body of any surface mount component using standard soldering methods. Heat should be applied only to the metalized terminals of the components. Hot-air systems do not damage the components since the heat is quickly and evenly distributed to the external surface of the component.

* CAUTION : The CMOS Integrated Circuit devices used in this equipment can be destroyed by static discharges. Before handling one of these devices, service technicians should discharge themselves by touching the case of a bench test instrument that has a 3-prong power cord connected to an outlet with a known good earth ground. When soldering or desoldering a CMOS device, the soldering equipment should have a known good earth ground.

Surface Mount Removal

1. Grip the component with tweezers or small needle nose pliers.
2. Alternately heat the metalized terminal ends of the surface mount component with the soldering iron. If a hot-air system is used, direct the heat to the terminals of the component. Use extreme care with the soldering equipment to prevent damage to the printed circuit board (PCB) and the surrounding components.
3. When the soldering on all terminals is liquefied, gently remove the component. Excessive force may cause the PCB pads to separate from the board if all solder is not completely liquefied.
4. It may be necessary to remove excess solder using a vacuum de-soldering tool or Solder wick. Again, use great care when de-soldering or soldering on the printed circuit board. It may also be necessary to remove the epoxy adhesive that was under the surface mount component and any flux on the printed circuit board.

Surface Mount Component Replacement

1. "Tin" one terminal end of the new component and the corresponding pad of one the PCB. Use as little solder as possible.
2. Place the component on the PCB pads, observing proper polarity for capacitors, diodes, transistors, etc.
3. Simultaneously touch the "tinned" terminal end and the "tinned" pad with the soldering Iron. Slightly press the components down on the board as the solder liquefies. Solder all terminals, allowing the component time to cool between each application of heat. Do not apply heat for an excessive length of time and do not use excessive solder.

With a hot-air system, apply hot air until all "tinned" areas are melted and the component is seated in place. It may be necessary to slightly press the component down on the board. Touch-up the soldered connections with a standard soldering iron if needed. Do not use excessive solder.

* CAUTION: Some chemicals may damage the internal and external plastic parts of the radio.

4. Allow the component and the board to cool and then remove all flux from the area using alcohol or another approved flux remover.

Surface Mounted Integrated Circuit Replacement

Soldering and de-soldering techniques of the surface mounted IC's are similar to the above outlined procedures for the surface mounted chip components. Use extreme care and observe static precautions when removing or replacing the defective (or suspect) IC's. This will prevent any damage to the printed circuit board or the surrounding circuitry.

The hot-air soldering system is the best method of replacing surface mount IC's. The IC's can easily be removed and installed using the hot-air system. See the manufacturer's instructions for complete details on tip selection and other operating instructions unique to your system.

If a hot-air system is not available, the service technician may wish to clip the pins near the body of the defective IC and remove it. The pins can then be removed from the PCB with standard soldering iron and tweezers, and the new IC installed following the Surface Mount Component Replacement procedures. It may not be necessary to "tin" all (or any) of the IC pins before the installation process.

TROUBLESHOOTING GUIDE

SYMPTOMS	CAUSES	COUNTERMEASURES
Unit does not Work	1. Complete discharge of battery (7.5+/-10%) 2. Fuse blown up 3. 5v voltage source	1. Replace battery. 2. Replace fuse 3. IC5 (5v+/-0.2v)
Warning tone& No Work	1. PLL error 2. Filtering Error 3. EEPROM Fail 4. Low battery (lower then 5.6V)	1. Check TCXO/VCO/PLL IC 2. Check LPF 3. Re-programming 4. Replace or charge battery
Bad RX Sensitivity (-10 to -60dB)	1. Defective ANT sw 2. defective front-end 3. Defective DBM 4. IF IC 5. VCO level drop 6. Change of 1'st local frequency	1. check D5,D6 2. Check Q601 3. Check D9,T1,T2 4. Replace IC5 5. RX VCO level >2dBm 6. Retune TCXO
Defective RX	1. VCO frequency change or level drop 2. Defective voltage Source	1. Repair VCO Defective IF IC (IC1) 2. IC5, Q1,Q3
PLL Error	1. Defective 12.8 MHz TCXO 2. Voltage source for RX VCO/ TX VCO 3. Defective PLL IC	1. Replace TCXO. 2. Check RX VCO/TX VCO 3. Replace IC2
NO TX Power	1. Tx buffer APC 2. Power module 3. APC control	1. Check Q3,16,17 2. Replace Power module 3. Check Q19,21,22
Low TX power output	1. APC	1. Re-adjust RV1
No modulation	1. SW IC & mic amp IC	1. Check IC401, IC406
No programming	1. short protector VCC	1. Defective programming lead
NO S.A.T	1. IC406	1. Check IC406

