PROFESSIONAL DIGITAL TWO-WAY RADIO
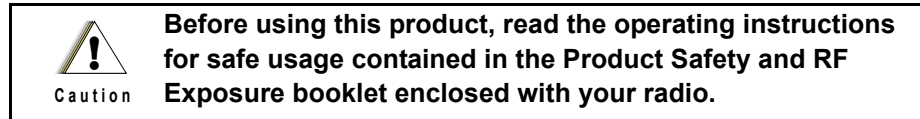
MOTOTRBO™
SL SERIES
SL7550 PORTABLE
BASIC SERVICE MANUAL

Foreword

This manual covers all models of the SL7550 series Portable Radios, unless otherwise specified. It includes all the information necessary to maintain peak product performance and maximum working time, using levels 1 and 2 maintenance procedures. This level of service goes down to the board replacement level and is typical of some local service centers, self-maintained customers, and distributors.

Product Safety and RF Exposure Compliance

⚠️ **Caution**	**Before using this product, read the operating instructions for safe usage contained in the Product Safety and RF Exposure booklet enclosed with your radio.**

ATTENTION!

This radio is restricted to occupational use only to satisfy FCC/ICNIRP energy exposure requirements. Before using this product, read the RF energy awareness information and operating instructions in the Product Safety and RF Exposure booklet enclosed with your radio (Motorola Publication part number 68009553001) to ensure compliance with RF energy exposure limits.

For a list of Motorola-approved antennas, batteries, and other accessories, visit the following web site: http://www.motorolasolutions.com/slseries

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Notes

Document History

The following major changes have been implemented in this manual since the previous edition:

Edition	Description	Date
68009555001-A	Initial Release	Feb. 2012

Notes

Table of Contents

List of Figures

List of Tables

Notes

Related Publications

Notes

Commercial Warranty

Limited Warranty

MOTOROLA COMMUNICATION PRODUCTS

I. What This Warranty Covers And For How Long

MOTOROLA SOLUTIONS INC. ("MOTOROLA") warrants the MOTOROLA manufactured Communication Products listed below ("Product") against defects in material and workmanship under normal use and service for a period of time from the date of purchase as scheduled below:The

Series Digital Portable Radios	Two (2) Years
Product Accessories (Excluding Batteries and Chargers)	One (1) Year

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B. Defects or damage from misuse, accident, water, or neglect.

C. Defects or damage from improper testing, operation, maintenance, installation, alteration, modification, or adjustment.

D. Breakage or damage to antennas unless caused directly by defects in material workmanship.

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F. Product which has had the serial number removed or made illegible.

G. Rechargeable batteries if:

- any of the seals on the battery enclosure of cells are broken or show evidence of tampering.

- the damage or defect is caused by charging or using the battery in equipment or service other than the Product for which it is specified.

H. Freight costs to the repair depot.

I. A Product which, due to illegal or unauthorized alteration of the software/firmware in the Product, does not function in accordance with MOTOROLA's published specifications or the FCC type acceptance labeling in effect for the Product at the time the Product was initially distributed from MOTOROLA.

J. Scratches or other cosmetic damage to Product surfaces that does not affect the operation of the Product.

K. Normal and customary wear and tear.

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B. that MOTOROLA will have sole control of the defense of such suit and all negotiations for its settlement or compromise; and

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VII. Governing Law

This Warranty is governed by the laws of the State of Illinois, USA.

Battery and Charger Warranty

Workmanship Warranty

The workmanship warranty guarantees against defects in workmanship under normal use and service.

Lithium-Ion (Li-Ion) Batteries (BT70 and BT90)	One (1) Year
Chargers	Two (2) Years

Capacity Warranty

The capacity warranty guarantees 80% of the rated capacity for the warranty duration.

Lithium-Ion (Li-Ion) Batteries (BT70 and BT90)	12 Months

Chapter 1   Introduction

1.1   Notations Used in This Manual

Throughout the text in this publication, you will notice the use of note and caution notations. These notations are used to emphasize that safety hazards exist, and due care must be taken and observed.

NOTE	An operational procedure, practice, or condition that is essential to emphasize.

> ⚠️ **Caution**
>
> CAUTION indicates a potentially hazardous situation which, if not avoided, might result in equipment damage.

> ⚠️ WARNING
>
> **WARNING indicates a potentially hazardous situation which, if not avoided, could result in death or injury.**

1.2   Radio Description

The SL7550 series portable radios are available in the following frequency ranges and power levels.

Table 1-1. Radio Frequency Ranges and Power Levels

Frequency Band	Bandwidth	Power Level
UHF	403 – 470 MHz	2 Watt

These digital radios are among the most sophisticated two-way radios available. They have a robust design for radio users who need high performance, quality, and reliability in their daily communications. This architecture provides the capability of supporting a multitude of legacy and advanced features resulting in a more cost-effective two-way radio communications solution.

1.2.1   **Radio Overview**
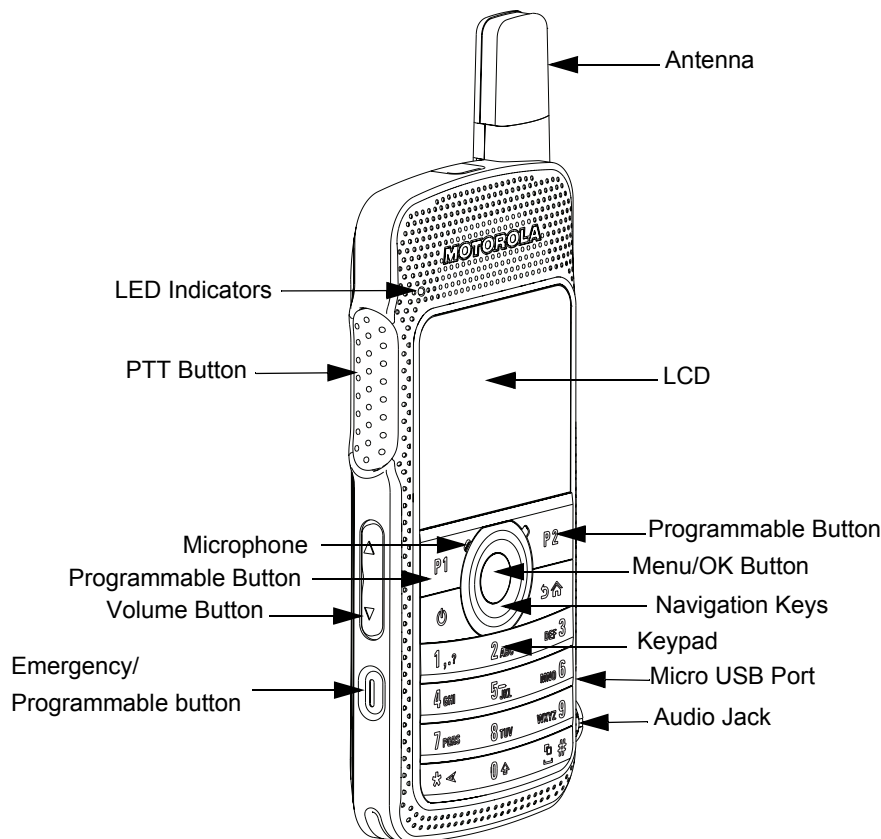
Figure 1-1. Display Model

- LED INDICATORS – Red, green and orange light-emitting diodes indicate operating status.
- LCD (Liquid Crystal Display) – 320x240 Liquid Crystal Display provides visual information about many radio features.
- NAVIGATION KEYS and MENU/OK– To provide menu navigation and to select the interface.
- VOLUME BUTTON – To adjust speaker volume.
- KEYPAD – Twelve keys that allow the user to input characters for various text based operations.
- FRONT and SIDE PROGRAMMABLE BUTTONS – These three buttons are field programmable using the CPS.
- PUSH-TO-TALK (PTT) BUTTON– Press to execute voice operations (e.g. Group call and Private Call).
- ANTENNA – Provides the needed RF radiation when transmitting or receiving.
- MICROPHONE – Allows voice to be sent when PTT or voice operations are activated.
- AUDIO JACK – Interface point for audio accessories to be used with the radio.
- MICRO USB PORT – Programs the radio through the computer and charges the radio through a wall charger.

NOTE Charging the radio through the computer is not supported.

- EMERGENCY/ PROGRAMMABLE BUTTON – Turns on and off the programmable Emergency Operations.

• SPEAKER – Outputs all tones and audio generated by the radio (e.g. features such as keypad tones and voice audio).

1.3   Portable Radio Model Numbering Scheme

Model No.Example :   AZ   H   8   1   Q   C   N   9   M   A   2   A   N

Position   :   1   2   3   4   5   6   7   8   9   10   11   12

AZ: APAC
LA: Latin America
AA: North America
MD: EMEA

H: Portable

81: SL Series

Band
Q: 403 – 470MHz

Power Level
C: 2W

Physical Packages
N: Color Display FKP

Channel Spacing
9: Variable/Programmable

Primary Operation
M: Standard w/BT
N: GOB w/BT

Primary System Type
A: Conventional

Feature Level
2: Non-FM

Version Letter

Unique Variation
N: Standard Package

Figure 1-2. Portable Radio Model Numbering Scheme

1.4   Model Charts

1.4.1   UHF 2W GOB Enabled (403 – 470 MHz) Model Chart

UHF 403 – 470 MHz 2W, GOB Enabled	
Model	**Description**
AAH81QCN9NA2AN	403-470 MHz, 2W, MOTOTRBO SL7550 Full Keypad Alphanumeric Display Portable, GOB Enabled
Item	**Description**
X PMUE3877_	MOTOTRBO™ Display Portable (GOB Enabled)
X PMAE4078_	Antenna Kit - Band 1 (403 – 425 MHz)
X PMAE4076_	Antenna Kit - Band 2 (420 – 445 MHz)
X PMAE4077_	Antenna Kit - Band 3 (438 – 470 MHz)
X 68009553001	Portable Quick Reference Guide/ Product Safety and RF Exposure
X 68009554001	MOTOTRBO™ SL7550 Portable User Guide
X = Item Included _ = The latest version kit. When ordering a kit, refer to your specific kit for the suffix number.	

1.5 Specifications

General	SL7550
Channel Capacity	1000
Frequency	UHF: 403 – 470 MHz
Dimensions (HxWxT) with BT70 battery with BT90 battery	121 x 55 x 17.4 mm 121 x 55 x 19.8 mm
Weight with BT70 battery with BT90 battery	153g 165g
Power Supply	3.7 V nominal
FCC Description	ABZ99FT4090
IC Description	109AB-99FT4090
Average battery life at 5/5/90 duty cycle with battery saver enabled	
BT70 1370 mAh battery	8.5 hrs
BT90 1800 mAh battery	11.5 hrs

Receiver	SL7550
Frequencies	403 – 470 MHz
Channel Spacing	12.5 kHz
Frequency Stability (-30°C to +60°C)	+/-1.5 ppm
Digital Sensitivity	5% BER: 0.3µV
Intermodulation (ETSI-EN300 113-1)	65 dB
Adjacent Channel Selectivity (ETSI-EN300 113-1)	60 dB @ 12.5 kHz
Spurious Rejection (ETSI-EN300 113-1)	70 dB
Rated Audio	500 mW
Audio Distortion @ Rated Audio	3% (typical)
Digital Hum and Noise	-40 dB @ 12.5 kHz
Conducted Spurious Emission (ETSI-EN300 113-1)	-57 dBm

Transmitter	SL7550
Frequencies	403 – 470 MHz
Frequency Stability (-30°C to +60°C)	+/-1.5 ppm
Power Output	2 W
Digital Hum and Noise	-40 dB @ 12.5 kHz
Conducted / Radiated Emission	-36 dBm < 1 GHz -30 dBm > 1 GHz
Digital Adjacent Channel Power	60 dB @ 12.5 kHz
Audio Response	+1, -3 dBm
Audio Distortion	3%
4FSK Digital Modulation	12.5 kHz Data: 7K60F1D & 7K60FXD 12.5 kHz Voice: 7K60F1E & 7K60FXE Combination of 12.5 kHz Data & Voice: 7K60F1W
Digital Vocoder Type	AMBE+2$^{™}$
Digital Protocol	ETSI TS 102 361 -1,-2,-3

UHF1 Self-Quieter Frequencies
403.200 MHz ± 15 kHz
404.000 MHz ± 10 kHz
408.000 MHz ± 10 kHz
412.000 MHz ± 5 kHz
420.000 MHz ± 15 kHz
422.400 MHz ± 15 kHz
428.000 MHz ± 5 kHz
432.000 MHz ± 20 kHz
432.100 MHz ± 10 kHz
432.165 MHz ± 10 kHz
432.450 MHz ± 5kHz
436.000 MHz ± 5 kHz
440.000 MHz ± 5 kHz
441.600 MHz ± 15 kHz
443.895 MHz ± 5 kHz
444.000 MHz ± 20 kHz
444.100 MHz ± 10 kHz
451.200 MHz ± 15 kHz
452.000 MHz ± 10 kHz
456.000 MHz ± 20 kHz
460.000 MHz ± 5 kHz
460.800 MHz ± 15 kHz
468.000 MHz ± 20 kHz
468.100 MHz ± 10 kHz

Military Standards		
Applicable MIL–STD	MIL 810F Methods/ Procedures	MIL 810G Methods/ Procedures
Low Pressure	500.4/ Procedure II	500.5/ Procedure II
High Temperature	501.4/ Procedure I/Hot, Procedure II/Hot	501.5/ Procedure I/ A1, Procedure II/A1
Low Temperature	502.4/ Procedure I/ C1, Procedure II/ C1	502.5/ Procedure I/ C1, Procedure II/ C1
Temperature Shock	503.4/ Procedure I	503.5/ Procedure I/C
Solar Radiation	505.4/ Procedure I	505.5/ Procedure I/ A1
Rain	506.4/ Procedure I	506.5/ Procedure I
Dust	510.4/ Procedure I	510.5/ Procedure I
Vibration	514.5/ Procedure I/24	514.6/ Procedure I/24
Shock	516.5/ Procedure IV	516.6/ Procedure IV, VI

Environmental Specifications	
*Operating Temperature	-10 °C to +60 °C
Storage Temperature	-30 °C to +70 °C
ESD	IEC 61000-4-2
Water & Dust Intrusion	IP54
Humidity	8 hour soak @ +50 °C and 95% RH
Salt Fog	8 hours exposure to 5% saline solution Sodium Chloride (NaCI) at 35 °C, 16 hours standing period

* Operating temperature specification for a Non Lithium-Ion (Li-Ion) battery is -20 °C to +60 °C.

Notes

Chapter 2   Test Equipment and Service Aids

2.1   Recommended Test Equipment

The list of equipment contained in Table 2-1 includes most of the standard test equipment required for servicing Motorola portable radios.

Table 2-1. Recommended Test Equipment

Equipment	Characteristics	Example	Application
Service Monitor	Can be used as a substitute for items marked with an asterisk (*)	Aeroflex Digital Radio Test Set Model 3920 with DMR option	Frequency/deviation meter and signal generator for wide-range troubleshooting and alignment
Digital RMS Multimeter *	100 µV to 300 V 5 Hz to 1 MHz 10 Mega Ohm Impedance	Fluke 179 or equivalent (www.fluke.com)	AC/DC voltage and current measurements. Audio voltage measurements
RF Signal Generator *	100 MHz to 1 GHz -130 dBm to +10 dBm FM Modulation 0 kHz to 10 kHz Audio Frequency 100 Hz to 10 kHz	Agilent 443X R&S Signal Generator	Receiver measurements
Oscilloscope *	2 Channel 50 MHz Bandwidth 5 mV/div to 20 V/div	Leader LS8050 (www.leaderusa.com), Tektronix TDS1001b (www.tektronix.com), or equivalent	Waveform measurements
Power Meter and Sensor *	5% Accuracy 100 MHz to 500 MHz 50 Watts	Bird 43 Thruline Watt Meter (www.bird-electronic.com) or equivalent	Transmitter power output measurements
RF Millivolt Meter	100 mV to 3 V RF 10 kHz to 1 GHz	Boonton 92EA (www.boonton.com) or equivalent	RF level measurements
Power Supply	0 V to 32 V 0 A to 20 A	B&K Precision 1790 (www.bkprecision.com) or equivalent	Voltage supply

NOTE   Service Monitor can be used as a substitute to the items marked with (*).

2.2   Service Aids

Table 2-2 lists the service aids recommended for working on the radio. While all of these items are available from Motorola, most are standard workshop equipment items, and any equivalent item capable of the same performance may be substituted for the item listed.

Table 2-2. Service Aids

Motorola Part No.	Description	Application
RVN5115_	MOTOTRBO CPS, Tuner and AirTracer Applications CD	CPS allows Dealers/Distributors to program radio parameters. AirTracer allows the capturing of radio traffic into logs for analysis by Motorola.
25-124330-01R	Portable Programming Cable	Cable connects the radio to a USB port for radio programming and data applications.
28012039001	RF Antenna Adaptor (SMA Female)	Adapts radio's antenna port to test equipment.
07012042001	RF Antenna Adaptor Holder	Holds the RF antenna adaptor.
PMNN4429_	Battery Eliminator	Connects to radio via battery eliminator cable.

Chapter 3   Transceiver Performance Testing

3.1   General

These radios meet published specifications through their manufacturing process by utilizing high accuracy laboratory-quality test equipment. The recommended field service equipment approaches the accuracy of the manufacturing equipment with few exceptions.

3.2   Setup

Supply voltage is provided using a 3.7 VDC power supply. The equipment required for alignment procedures is connected as shown in the Radio Tuning Equipment Setup Diagram, Figure 4-2.

⚠ WARNING	**Do NOT use any form of connector, e.g. wires, crocodile clips, and probes, to supply voltage to the radio, other than the Motorola approved battery eliminator.**

The tables in this chapter contain the following related technical data:

Table Number	Title
Table 3-1	Front Panel Access Test Mode Displays
Table 3-2	Test Frequencies
Table 3-3	Transmitter Performance Checks
Table 3-4	Receiver Performance Checks

Setup:

Set up the DMR Transmitter and Receiver Test as per Figure 3-1.

     a. Connect the Programming cable to the radio and to the computer.

     b. Remove the radio's name plate label and the RF Plug (blue) as shown in Figure 3-2. and Figure 3-3.

     c. Connect the RF antenna adaptor to the 50 Ohm RF Input/Output port of the radio as shown in Figure 3-4.

     d. Connect the other end of the RF antenna adaptor to the T/R port of the Radio Test Set 3920 using the RF cable shown in Figure 3-1.

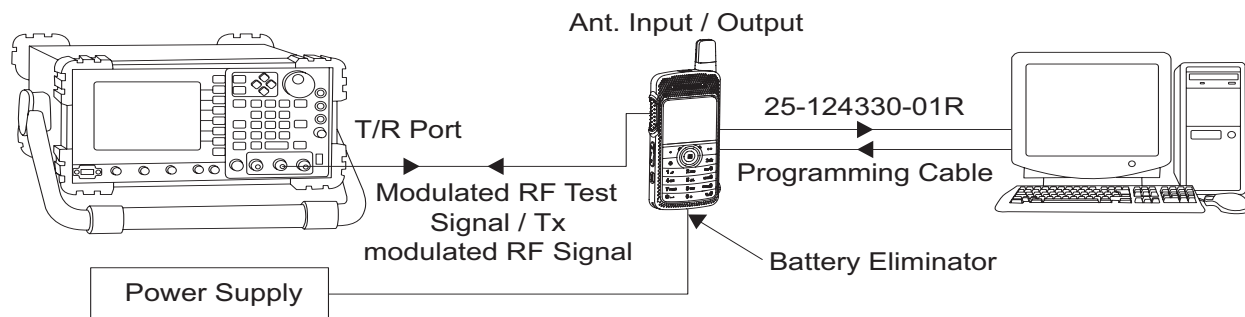*Figure 3-1. DMR Radio Transmitter and Receiver Testing Setup*
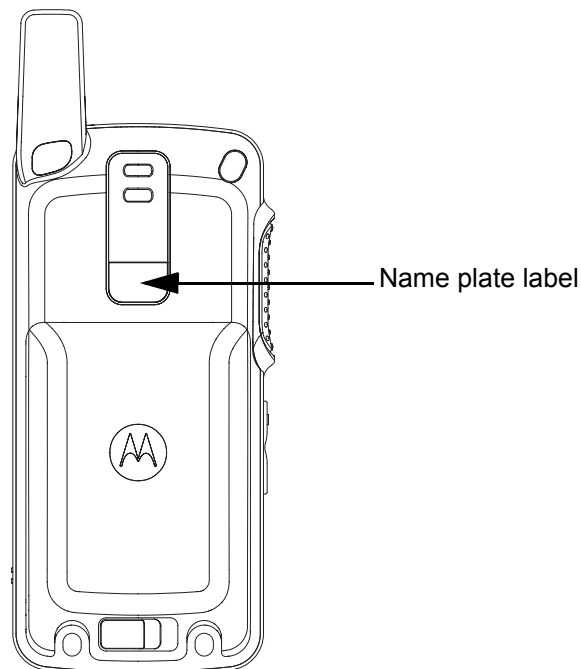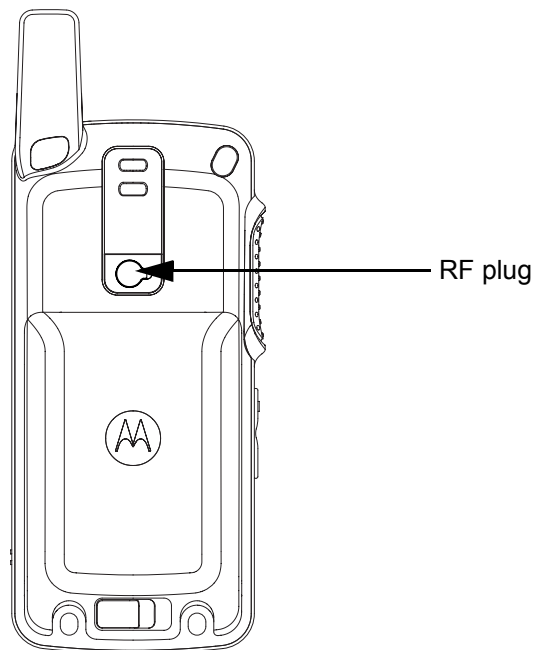

Figure 3-2. Name plate label

RF plug

Figure 3-3. RF plug

RF antenna
adaptor holder
(07012042001)

RF antenna
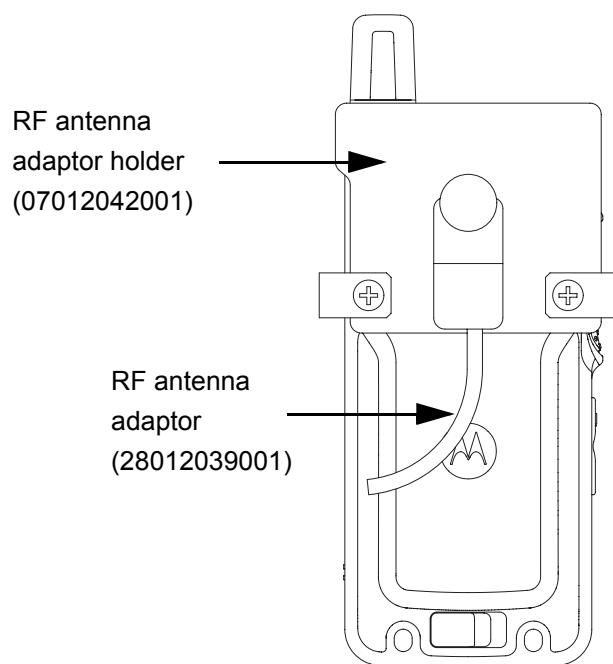adaptor
(28012039001)

Figure 3-4. Connect RF Antenna adaptor to radio RF input/output port

3.3   Test Mode

3.3.1   Radio Test Mode

1. Turn the radio on.
2. Within 10 seconds after Self Test is complete, press the **P2 button** five times in succession.
3. The radio beeps and shows a series of display that gives information regarding various version numbers and subscriber specific information.

The displays are described in Table 3-1.

Table 3-1. Front Panel Access Test Mode Displays

Name of Display	Description	Appears
Service Mode	The literal string indicates the radio has entered test mode.	Always
Host Version	The version of host firmware.	Always
DSP Version	The version of DSP firmware.	Always
Model Number	The radio's model number as programmed in the codeplug.	Always
MSN	The radio's serial number as programmed in the codeplug.	Always
FLASHCODE	The FLASH codes as programmed in the codeplug.	Always
RF Band	The radio's band.	Always

NOTE The radio stops at each display for 2 seconds before moving to the next information display. If the information cannot fit into 1 line, the radio display scrolls automatically character by character after 1 second to view the whole information. If the Left Navigation Key (◄) is pressed before the last information display, the radio will suspend the information display until the user presses the Right Navigation Key (►) to resume the information display. The radio beeps when each button is pressed. After the last display, RF Test Mode will be displayed.

3.3.2   RF Test Mode

When the radio is operating in its normal environment, the radio's micro controller controls the RF channel selection, transmitter key-up, and receiver muting, according to the customer codeplug configuration. However, when the unit is on the bench for testing, alignment, or repair, it must be removed from its normal environment via a special routine, called **TEST MODE**.

In RF Test Mode, the display upon the first line is "RF Test". The display upon the second line is the test environment, the channel number and channel spacing. The default test environment is DIG.

NOTE DIG is digital mode

1. Press of channel selector button will cycle through the test channel 1->2->3->4->5->6->7->1 as described in Table 3-2. The radio beeps in each position. Frequency units in the table below is in MHz.

Table 3-2. Test Frequencies

Frequency	UHF RX	UHF TX
F1	403.075	403.075
F2	414.075	414.075
F3	425.075	425.075
F4	436.075	436.075
F5	447.075	447.075
F6	458.075	458.075
F7	469.075	469.075

Table 3-3. Transmitter Performance Checks

Test Name	IFR Setting	Radio	Test Set	Comments
RF Power	DMR mode. Slot 1 Power and Slot 2 Power	TEST MODE, Digital mode, transmit without modulation	Key up radio without modulation using Tuner	TTR Enable is needed and IFR to be set to trigger mode with signal level ~1.5V
FSK Error	DMR mode. FSK error	TEST MODE, Digital mode, transmit with 0153 test pattern	Key up radio with 0513 test pattern modulation using Tuner	Not Exceed 5%
Magnitude Error	DMR mode. Magnitude error	As above	As above,	Not Exceed 1%.
Symbol Deviation	DMR mode. Symbol deviation	As above	As above	Symbol Deviation should be within 648Hz +/-10% and 1944Hz +/-10%
Transmitter BER	DMR mode	As above	As above	Transmitter BER should be 0%

Table 3-4. Receiver Performance Checks

Test Name	IFR Setting	Radio	Test Set	Comments
Receiver BER	IFR DMR mode. Signal generator with 0.153 test pattern	Test Mode, Digital mode, receive 0.153 test pattern	Read BER using Tuner. Adjust RF level to get 5% BER	RF level to be <0.35uV for 5% BER

3.3.3   Display Test Mode

1. Press and hold the **P1 button** in RF Test Mode. The radio beeps once and momentarily displays "Display Test Mode."

2. Upon entering the Display Test Mode, the radio displays a white background with "Display Test Mode" in black font.

3. Upon any button/key press, the radio displays black active background with "Display Test Mode" in white font.

4. Upon any button/key press, the radio shows solid red color display.

5. Upon any button/key press following the above display, the radio shows green color display.

6. Upon any button/key press following the above display, the radio shows blue color display.

7. Upon any button/key press following the above display, the radio shows a big 46% grey "+" on black background.

8. Upon any button/key press following the above display, the radio shows a big 46% grey 90 degrees rotated "H" on black background.

9. Upon any button/key press following the above display, the radio shows a big 46% grey "H" on black background.

10. Upon any button/key press following the above display, the radio displays a black horizontal line in between two white horizontal lines.

11. Upon any button/key press following the above display, the radio displays a red horizontal line in between two white horizontal lines (increasing one colored horizontal line above and one below the center row). Once the horizontal lines cover up the screen, the radio shows red color display.

NOTE   Each key press will change the screen color from, red->green->blue->black->red.

12. When the screen is filled up with horizontal lines, any button/key press clears the screen and displays red and white vertical lines at column 0,3,6,9,12,15,18,21,24,27,30. Any button/ key press fills the screen with vertical lines of the next color, (1 line to the right of any existing line) until the display is filled up with black display.

NOTE   Each key press will change the screen color from red->green->blue->black->red->black.

13. Once the radio shows solid black color display, the next button/key press clears the screen and displays the first 10 available icons on the screen. Successive button/key press displays the remaining 4 icons.

3.3.4   Photosensor Test Mode

1. Press and hold the **P1 button** after Display Test Mode. The radio beeps once and displays "Photosensor Test Mode".
2. Upon any button/ key press, the radio displays "Step 1", then "Place Radio in Light", followed by **Menu/OK Button** press.
3. Upon the **Menu/OK Button** press, the radio takes few seconds to read the photosensor and to compare it with the predefined value, the result of this test is shown at the end of photosensor mode. The radio displays "Step 2", then "Cover Photosensor", followed by **Menu/OK Button** press.
4. By pressing the **Menu/OK Button** the second time, the radio takes a few seconds to read the photosensor and compares it with the predefined value, the result will then be shown on the screen. The four possible results are:- Photosensor Test Step 1 Failed, Photosensor Test Step 2 Failed, Photosensor Test Both Steps Failed, or Photosensor Test Passed.

NOTE   Select "Press OK" by pressing the center button of the navigation keys.

3.3.5   Accelerometer Test Mode

1. Press and hold the **P1 button** after Photosensor Mode. The radio beeps once and displays "Accelerometer Test Mode".
2. Upon any button/ key press, the radio reads the x,y,z positions and compares them with the predefined values (x,y,z) and displays the result on the screen. A pass result will only occur when the radio is placed in a horizontal position. The possible results are: Accelerometer Test Failed, Accelerometer Test Passed.

3.3.6   Vibrator Test Mode

Press and hold the **P1 button** after the Accelerometer Mode. The radio beeps once and vibrates twice, first a short vibration and second a longer vibration, and displays "Vibrator Test Mode".

3.3.7   LED Test Mode

1. Press and hold the **P1 button** after Vibrator Test Mode. The radio beeps once and displays "LED Test Mode".
2. Upon any button/key press, the radio's red LED lights up and displays "Red LED On".
3. Upon any button/key press following the above display, the red LED turns off. The green LED will then light up and displays "Green LED On".
4. Upon any button/key press following the above display, the green LED turns off. Both the LEDs will then light up and displays "Both LEDs On".

NOTE   As there is only one LED on the radio, the LED color is in orange when both the LED lights up.

3.3.8   Backlight Test Mode

1. Press and hold the **P1 button** after LED Test Mode. The radio beeps once and displays "Backlight Test Mode".
2. The radio turns on both LCD and keypad backlight at the same time.

3.3.9   Speaker Tone Test Mode

1. Press and hold the **P1 button** after Backlight Test Mode. The radio beeps once and displays "Speaker Tone Test Mode".

2. The radio generates a 1 kHz tone with the internal speaker.

3.3.10 Earpiece Tone Test Mode

1. Press and hold the **P1 button** after Speaker Tone Test Mode. The radio beeps once and displays "Earpiece Tone Test Mode".

2. The radio generates a 1 kHz tone with the earpiece.

3.3.11 Audio Loopback Earpiece Test

1. Press and hold the **P1 button** after Earpiece Tone Test Mode. The radio beeps once and displays "Audio Loopback Earpiece Test Mode".

2. The radio shall route any audio on the external mic to the earpiece.

3.3.12 Battery Check Test Mode

1. Press and hold the **P1 button** after Audio Loopback Earpiece Test Mode. The radio beeps once and momentarily displays "Battery Check Test Mode".

2. The radio will display the following:

Rem. Capacity 91%

Figure 3-5. Battery Check Test Mode Display

3.3.13 Button/Knob/PTT Test Mode

1. Press and hold the **P1 button** after Battery Check Test Mode. The radio beeps once and displays "Button Test"(line 1) and displays "160/1".

2. Press the **Volume Up Button**; "80/1" appears and radio beeps; release, "80/0" appears and radio beeps.

3. Press the **Volume Down Button**; "81/1" appears and radio beeps; release, "80/1" appears and radio beeps.

4. Press the **PTT Button**; "1/1" appears and radio beeps; release, "1/0" appears and radio beeps.

5. Press the **Emergency/ Programmable Button**; "148/1" appears and radio beeps; release, "148/0" appears and radio beeps.

6. Keypad Checks:

   - Press **0**, "48/1" appears and radio beeps; release, "48/0" appears and radio beeps.
   - Press **1**, "49/1" appears and radio beeps; release, "49/0" appears and radio beeps.
   - Press **2**, "50/1" appears and radio beeps; release, "50/0" appears and radio beeps.
   - Press **3**, "51/1" appears and radio beeps; release, "51/0" appears and radio beeps.
   - Press **4**, "52/1" appears and radio beeps; release, "52/0" appears and radio beeps.
   - Press **5**, "53/1" appears and radio beeps; release, "53/0" appears and radio beeps.
   - Press **6**, "54/1" appears and radio beeps; release, "54/0" appears and radio beeps.
   - Press **7**, "55/1" appears and radio beeps; release, "55/0" appears and radio beeps.
   - Press **8**, "56/1" appears and radio beeps; release, "56/0" appears and radio beeps.

- Press **9**, "57/1" appears and radio beeps; release, "57/0" appears and radio beeps.
- Press *****, "58/1" appears and radio beeps; release, "58/0" appears and radio beeps.
- Press **#**, "59/1" appears and radio beeps; release, "59/0" appears and radio beeps.
- Press **P1**, "160/1" appears and radio beeps; release, "160/0" appears and radio beeps.
- Press **P2**, "161/1" appears and radio beeps; release, "161/0" appears and radio beeps.
- Press **Menu**/**OK**, "85/1" appears and radio beeps; release, "85/0" appears and radio beeps.
- Press **Back/Home**, "129/1" appears and radio beeps; release, "129/0" appears and radio beeps.
- Press ◄, "128/1" appears and radio beeps; release, "128/0" appears and radio beeps.
- Press ►, "130/1" appears and radio beeps; release, "130/0" appears and radio beeps.
- Press ▲, "135/1" appears and radio beeps; release, "135/0" appears and radio beeps.
- Press ▼, "136/1" appears and radio beeps; release, "136/0" appears and radio beeps.

7. After the test mode is completed, turn the radio off.
8. Turn the radio on.

Notes

Chapter 4   Radio Programming and Tuning

4.1   Introduction

This chapter provides an overview of the MOTOTRBO Customer Programming Software (CPS), as well as the Tuner and AirTracer applications, which are all designed for use in Windows XP/Vista/Win7 environment. These programs are available in one kit as listed in Table 4-1. An Installation Guide is also included with the kit.

NOTE   Refer to the appropriate program on-line help files for the programming procedures.

Description	Kit Number
MOTOTRBO CPS, Tuner and AirTracer Applications CD	RVN5115_

Table 4-1. Software Installation Kits Radio Tuning Setup

4.2   Customer Programming Software Setup

The CPS programming setup, shown in Figure 4-1 is used to program the radio.

NOTE   Refer to the appropriate program on-line help files for the programming procedures.

> ⚠ **C a u t i o n**   Computer USB ports can be sensitive to Electrostatic Discharge. Do not touch exposed contacts on cable when connected to a computer.
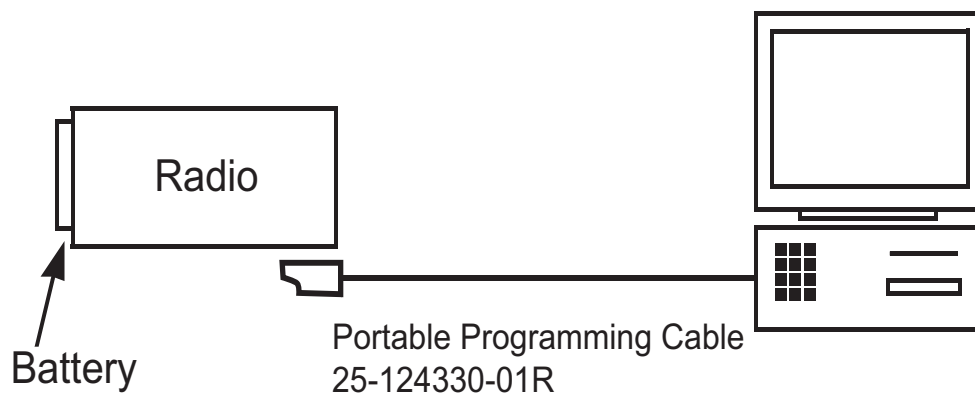

Figure 4-1. CPS Programming Setup

4.3   AirTracer Application Tool

The MOTOTRBO AirTracer application tool has the ability to capture over-the-air digital radio traffic and save the captured data into a file. The AirTracer application tool can also retrieve and save internal error logs from MOTOTRBO radios. The saved files can be analyzed by trained Motorola personnel to suggest improvements in system configurations or to help isolate problems.

4.4   Radio Tuning Setup

A personal computer (PC), Windows XP/Vista/Win7 and a tuner program are required to tune the radio. To perform the tuning procedures, the radio must be connected to the PC and test equipment setup as shown in Figure 4-2.
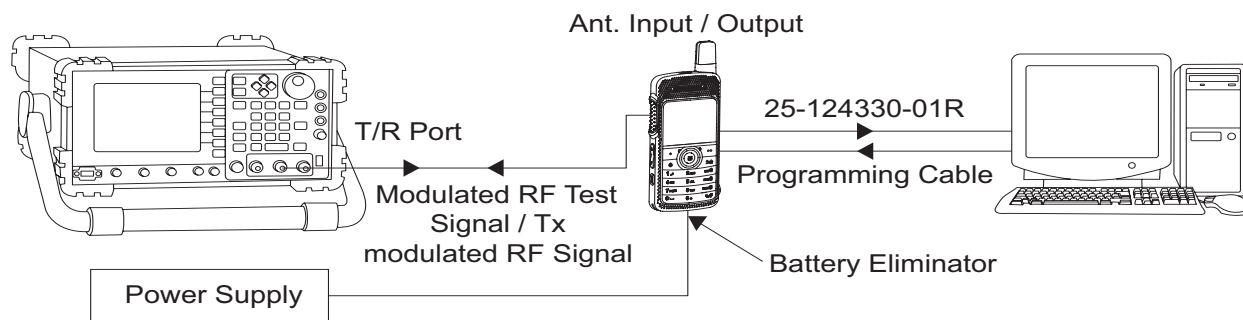

Figure 4-2. Radio Transmitter and Receiver Tuning Setup

Chapter 5 Disassembly/Reassembly Procedures

5.1　Introduction

This chapter provides details about the following:

- Preventive maintenance (inspection and cleaning).
- Safe handling of CMOS and LDMOS devices.
- Repair procedures and techniques.
- Disassembly and reassembly of the radio.

5.2　Preventive Maintenance

Periodic visual inspection and cleaning is recommended.

5.2.1   Inspection

Check that the external surfaces of the radio are clean, and that all external controls and switches are functional. It is not recommended to inspect the interior electronic circuitry.

5.2.2   Cleaning Procedures

The following procedures describe the recommended cleaning agents and the methods to be used when cleaning the external and internal surfaces of the radio. External surfaces include the front housing, housing assembly and battery case. These surfaces should be cleaned whenever a periodic visual inspection reveals the presence of smudges, grease, and/or grime.

NOTE Internal surfaces should be cleaned only when the radio is disassembled for service or repair.

The only recommended agent for cleaning the external radio surfaces is a 0.5% solution of a mild dishwashing detergent in water. The only factory recommended liquid for cleaning the printed circuit boards and their components is isopropyl alcohol (100% by volume).

> ⚠️
> **Caution**
>
> Use all chemicals as prescribed by the manufacturer. Be sure to follow all safety precautions as defined on the label or material safety data sheet.
>
> The effects of certain chemicals and their vapors can have harmful results on certain plastics. Avoid using aerosol sprays, tuner cleaners and other chemicals.

Cleaning External Plastic Surfaces

Apply the 0.5% detergent-water solution sparingly with a stiff, non-metallic, short-bristled brush to work all loose dirt away from the radio. Use a soft, absorbent, lintless cloth or tissue to remove the solution and dry the radio. Make sure that no water remains entrapped near the connectors, cracks, or crevices.

Cleaning Internal Circuit Boards and Components

Isopropyl alcohol (100%) may be applied with a stiff, non-metallic, short-bristled brush to dislodge embedded or caked materials located in hard-to-reach areas. The brush stroke should direct the dislodged material out and away from the inside of the radio. Make sure that controls or tunable components are not soaked with alcohol. Do not use high-pressure air to hasten the drying process since this could cause the liquid to collect in unwanted places. After completing of the cleaning process, use a soft, absorbent, lintless cloth to dry the area. Do not brush or apply any isopropyl alcohol to the frame, front housing or back housing.

NOTE Always use a fresh supply of alcohol and a clean container to prevent contamination by dissolved material (from previous usage).

5.3   Safe Handling of CMOS and LDMOS Devices

Complementary metal-oxide semiconductor (CMOS) and Laterally Diffused Metal Oxide Semiconductor (LDMOS) devices are used in this family of radios, and are susceptible to damage by electrostatic or high voltage charges. Damage can be latent, resulting in failures occurring weeks or months later. Therefore, special precautions must be taken to prevent device damage during disassembly, troubleshooting, and repair.

Handling precautions are mandatory for CMOS/LDMOS circuits and are especially important in low humidity conditions. DO NOT attempt to disassemble the radio without first referring to the CMOS CAUTION paragraph in the Disassembly and Reassembly section of the manual.

DO NOT attempt to disassemble the radio without first referring to the following CAUTION statement.

⚠️ **C a u t i o n**	**This radio contains static-sensitive devices. Do not open the radio unless you are properly grounded. Take the following precautions when working on this unit:** • Store and transport all CMOS/LDMOS devices in conductive material so that all exposed leads are shorted together. Do not insert CMOS/LDMOS devices into conventional plastic "snow" trays used for storage and transportation of other semiconductor devices. • Ground the working surface of the service bench to protect the CMOS/LDMOS device. We recommend using the Motorola Static Protection Assembly (part number 0180386A82), which includes a wrist strap, two ground cords, a table mat, and a floor mat. • Wear a conductive wrist strap in series with a 100k resistor to ground. (Replacement wrist straps that connect to the bench top covering are Motorola part number 4280385A59). • Do not wear nylon clothing while handling CMOS/LDMOS devices. • Do not insert or remove CMOS/LDMOS devices with power applied. Check all power supplies used for testing CMOS/LDMOS devices to be certain that there are no voltage transients present. • When straightening CMOS/LDMOS pins, provide ground straps for the apparatus used. • When soldering, use a grounded soldering iron. • If at all possible, handle CMOS/LDMOS devices by the package and not by the leads. Prior to touching the unit, touch an electrical ground to remove any static charge that you may have accumulated. The package and substrate may be electrically common. If so, the reaction of a discharge to the case would cause the same damage as touching the leads.

5.4　　Repair Procedures and Techniques – General

NOTE　Environmentally Preferred Products (EPP) (refer to the marking on the printed circuit boards — examples shown below) were developed and assembled using environmentally preferred components and solder assembly techniques to comply with the European Union's **Restriction of Hazardous Substances (ROHS) Directive 2002/ 95/EC** and **Waste Electrical and Electronic Equipment (WEEE) Directive 2002/96/ EC**. To maintain product compliance and reliability, use only the Motorola specified parts in this manual.
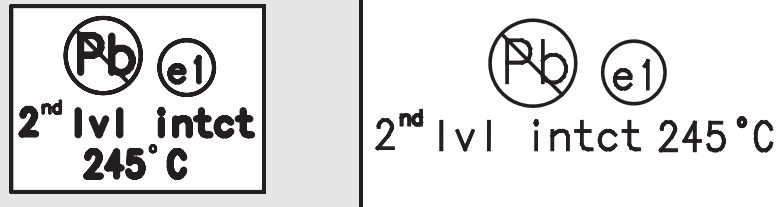
Any rework or repair on Environmentally Preferred Products must be done using the appropriate lead-free solder wire and lead-free solder paste as stated in the following table:

Table 5-1. Lead Free Solder Wire Part Number List

Motorola Part Number	Alloy	Flux Type	Flux Content by Weight	Melting Point	Supplier Part number	Diameter	Weight
1088929Y01	95.5Sn/3.8Ag/0.7Cu	RMA Version	2.7-3.2%	217C	52171	0.015"	1lb spool

Table 5-2. Lead Free Solder Paste Part Number List

Motorola Part Number	Manufacturer Part Number	Viscosity	Type	Composition & Percent Metal	Liquid Temperature
1085674C03	NC-SMQ230	900-1000KCPs Brookfield (5rpm)	Type 3 (-325/+500)	(95.5%Sn-3.8%Ag-0.7%Cu) 89.3%	217°C

Parts Replacement and Substitution

When damaged parts are replaced, identical parts should be used. If the identical replacement part is not locally available, check the parts list for the proper Motorola part number and order the part from the nearest Motorola Radio Products and Solutions Organization (RPSO) listed in Appendix A of this manual.

Rigid Circuit Boards

This family of radios uses bonded, multi-layer, printed circuit boards. Since the inner layers are not accessible, some special considerations are required when soldering and unsoldering components. The printed-through holes may interconnect multiple layers of the printed circuit. Therefore, exercise care to avoid pulling the plated circuit out of the hole.

When soldering near a connector:

- Avoid accidentally getting solder in the connector.
- Be careful not to form solder bridges between the connector pins.
- Examine your work closely for shorts due to solder bridges.

For soldering components with Hot-Air or infra red solder systems, please check your user guide of the solder system to get information on solder temperature and time for the different housings of the integrated circuits and other components

5.5   Disassembling and Reassembling the Radio – General

When disassembling and reassembling the radio, it is important to pay particular attention to the snaps and tabs, and how parts align with each other.

The following tools are required for disassembling and reassembling the radio:

- 6IP Torx Plus^TM
- 4IP Torx Plus
- Torque wrench
- Tweezers

If a unit requires further testing or service than is customarily performed at the basic level, please send the radio to a Motorola Service Center listed in Appendix B.

> ⚠ **Caution**   To assure the safety and regulatory compliance of the SL7550, the radio must be repaired only at Motorola service facilities. Please contact your local dealer or Point of sale for futher instructions.

5.6   Radio Disassembly – Detailed

5.6.1   External Antenna Disassembly

1. Turn off the radio.

2. Remove the antenna plug and the escutcheon cover from the back housing as shown in Figure 5-1.

NOTE   a) Remove the antenna plug with fingers.

b) Remove the escutcheon cover with tweezers. Dispose the escutcheon cover once it has been removed.

c) Use a cotton bud and IPA (Isopropyl alcohol) to remove the glue residue on the back cover.
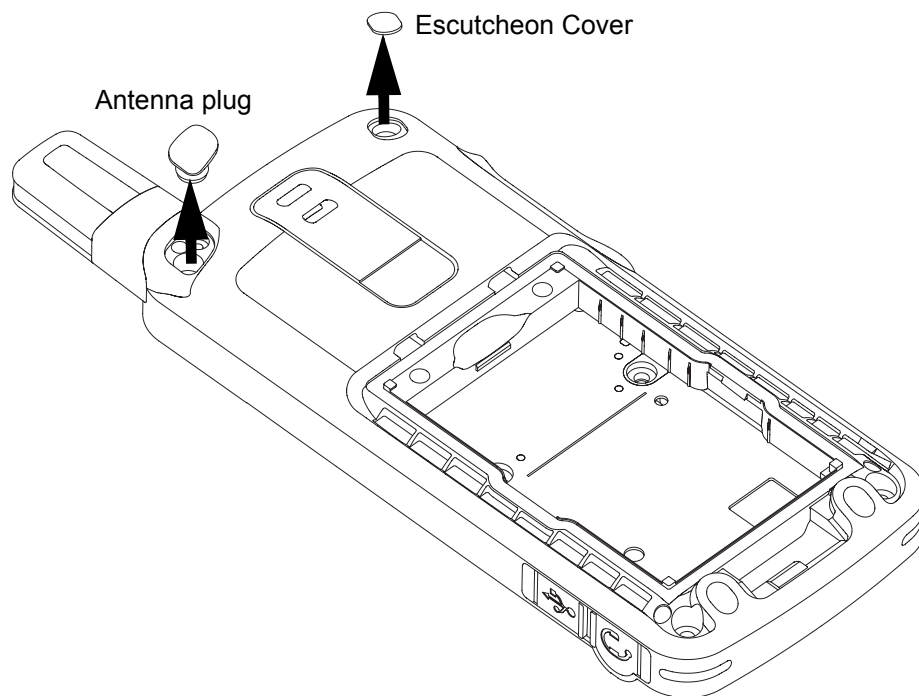
Figure 5-1. Antenna plug and escutcheon cover removal

3. Remove the antenna screw with the 4IP Torx Plus screwdriver as shown in Figure 5-2.
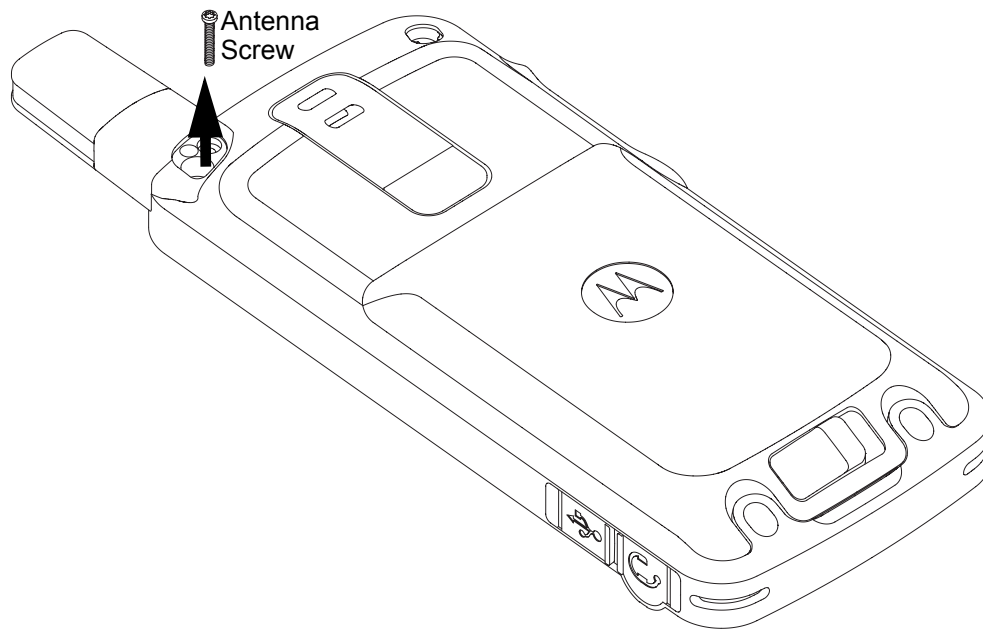
Figure 5-2. Antenna screw removal

4. Remove the antenna from the radio by pulling it upwards as shown in Figure 5-3.
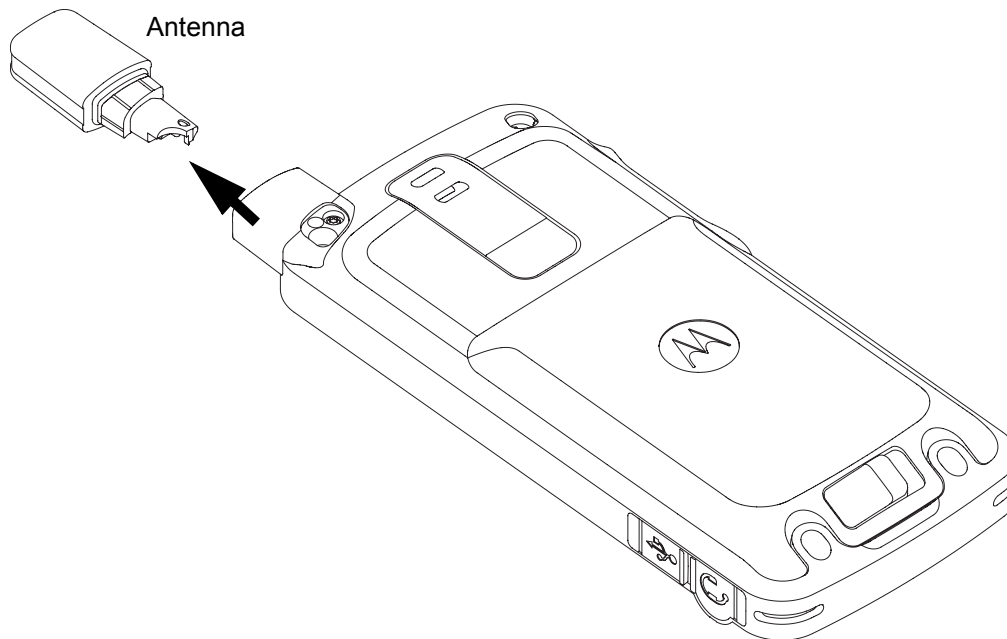
Figure 5-3. Antenna removal

5.6.2   Back housing Disassembly

1. Remove the battery door from the back housing by unlocking the latch as shown in Figure 5-4.
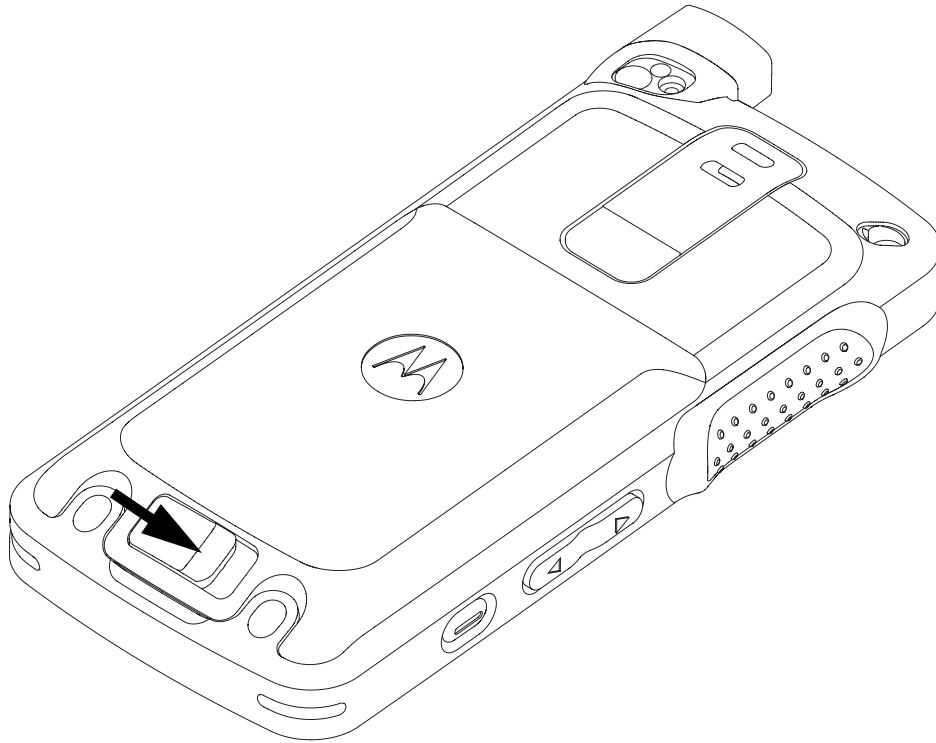
Figure 5-4. Unlatching battery door

2. Remove the battery door by lifting it upwards as shown in Figure 5-5.
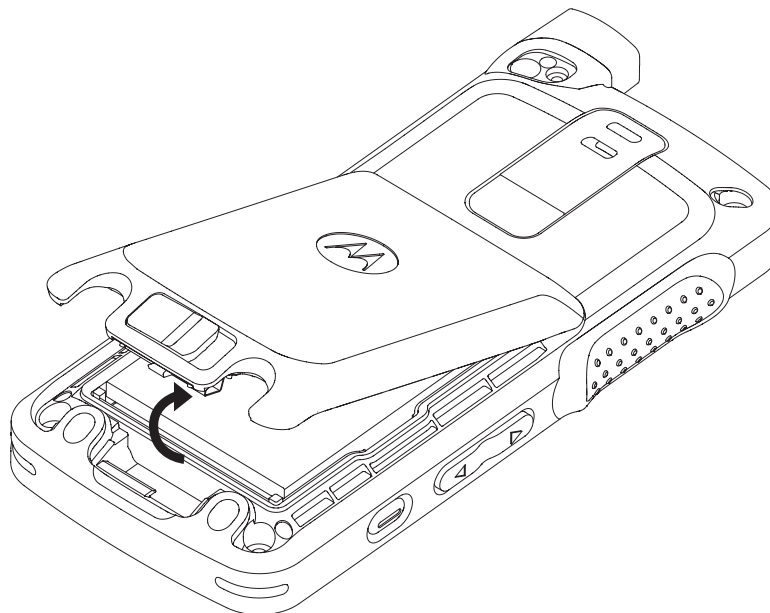
Figure 5-5. Battery door removal

3. After removing the battery door, remove battery from battery compartment as shown in Figure 5-6. To remove battery, grasp the battery groove at the top of the battery and lift up the battery.

NOTE	The battery cannot be removed bottom first.

Battery groove
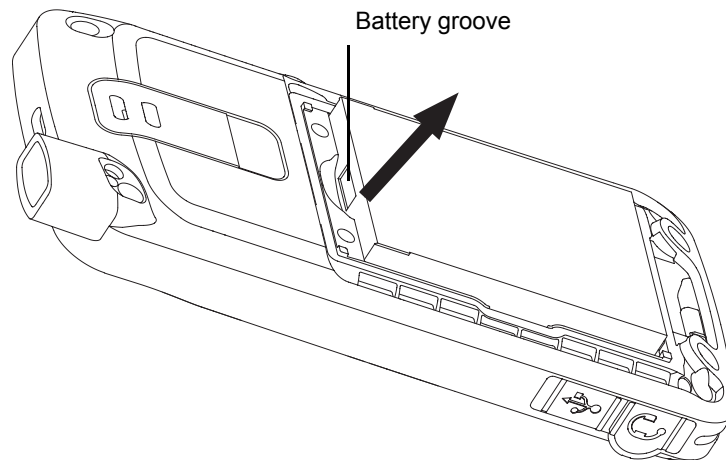
Figure 5-6. Battery removal

4. Remove the self tapping screws from four corners of the back housing marked (a,b,c,d) by using the 6IP Torx Plus as shown in Figure 5-7.

5. Remove the two machine screws in the battery compartment marked (e and f) by using the 6IP Torx Plus as shown in Figure 5-7.
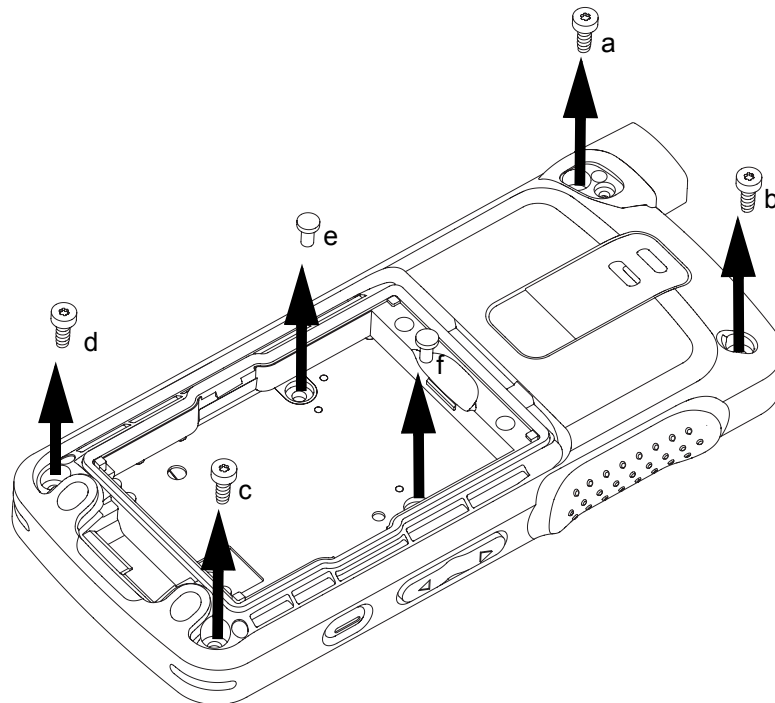
Figure 5-7. Self tapping screws and machining screws removal

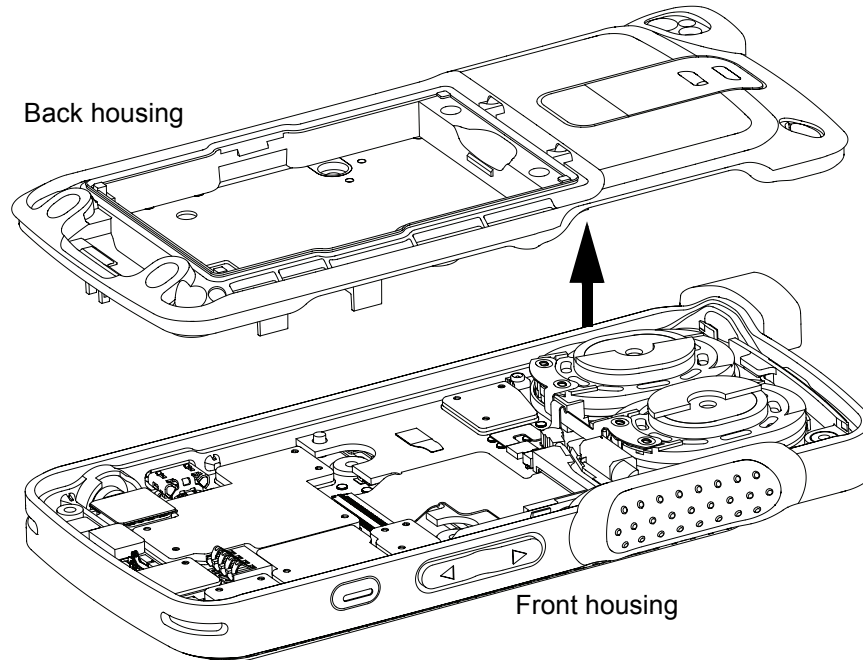6.   Lift back housing from the front housing as shown in Figure 5-8.

Back housing

Front housing

Figure 5-8. Back housing removal

5.6.3   Internal Antenna Disassembly

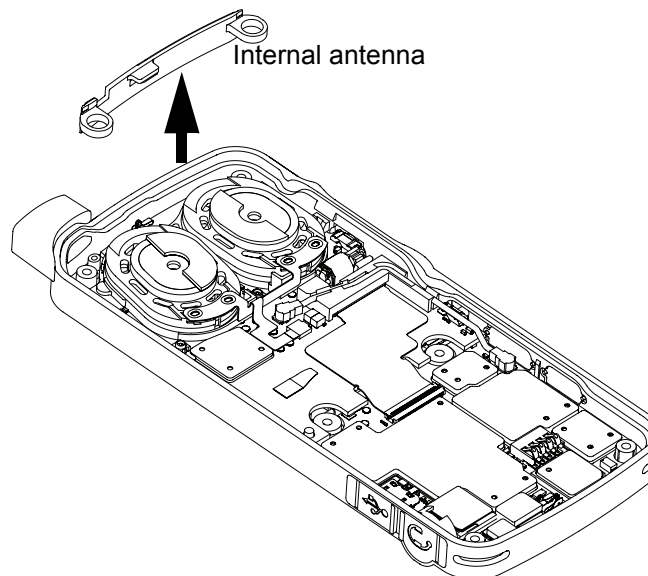1.   Remove the internal antenna upwards by using tweezers as shown in Figure 5-9

Internal antenna

Figure 5-9. Internal antenna removal

5.6.4 PCB Disassembly

1. Unplug the board flex cable and coax cable connector from the main board. To remove the board to board flex, unlatch the flex connector tab as shown in Figure 5-10.

Coax
cable connector

Flex
connector tab
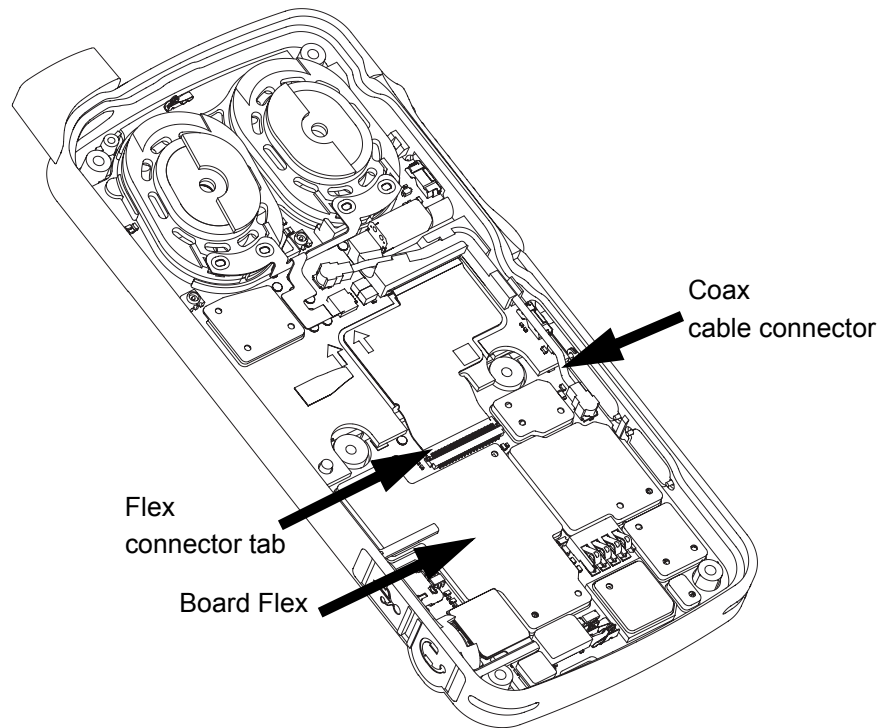
Board Flex

Figure 5-10. Board flex and coax cable connector disassembly

2. Remove the interface board from the front housing by sliding it out from the PCB retainer catch as shown in Figure 5-11
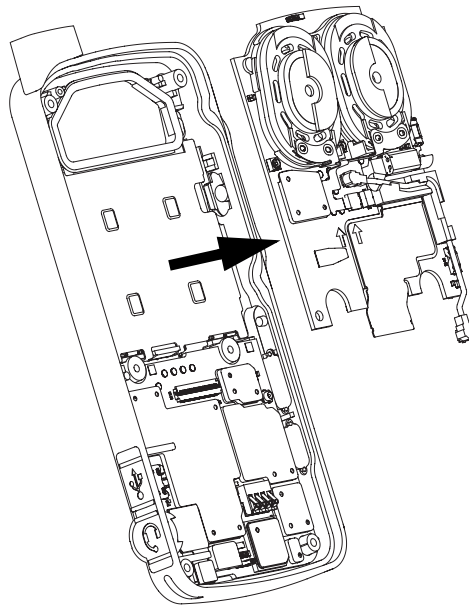
Figure 5-11. Interface board removal

5.6.5   Audio Jack Disassembly

1. Unplug the keypad flex connector from the main board.

2. Unplug the audio jack flex connector from the main board.

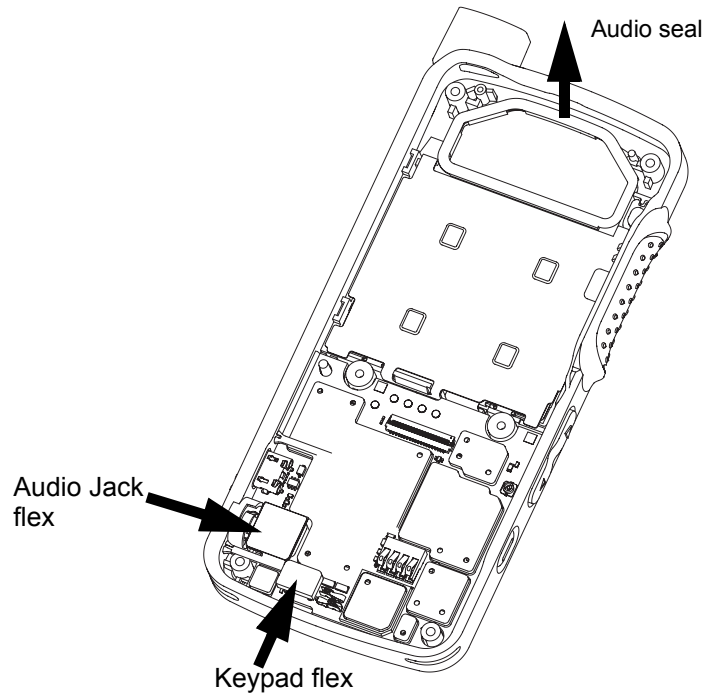3. Remove the audio seal as shown in Figure 5-12.

Figure 5-12. Audio jack flex and keypad flex disassembly

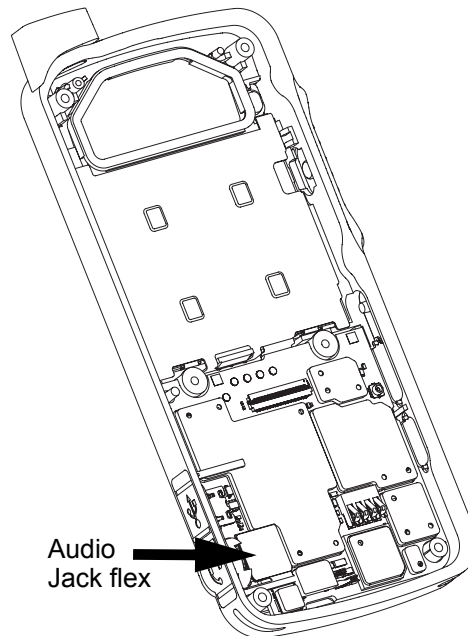4. Lift and pull out the audio jack from its recess as shown in Figure 5-13.

Figure 5-13. Audio jack flex removal

5.6.6   LCD Display Disassembly

1. Lift the PCB slightly from the right corner using tweezers as shown in Figure 5-14.
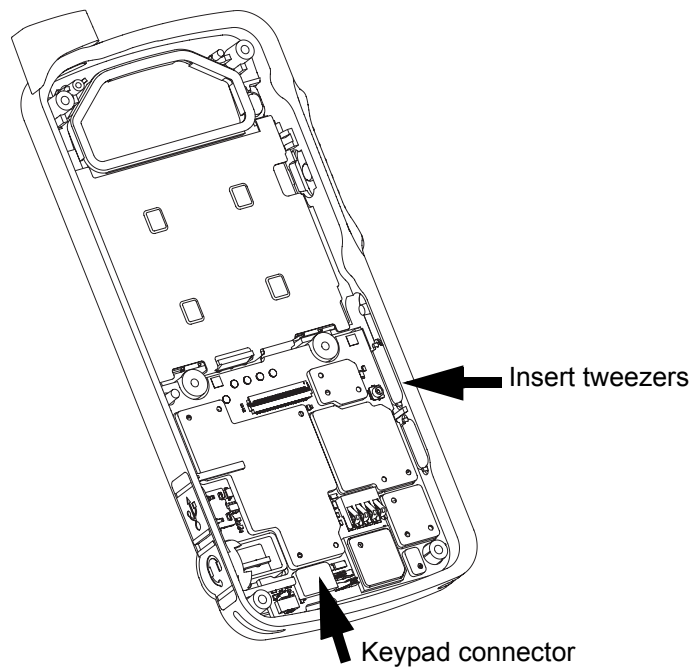

Insert tweezers

Keypad connector

Figure 5-14. LCD display disassembly

2. Remove the main PCB from the front housing by turning it slightly counter-clockwise to release the PCB retainer catch.
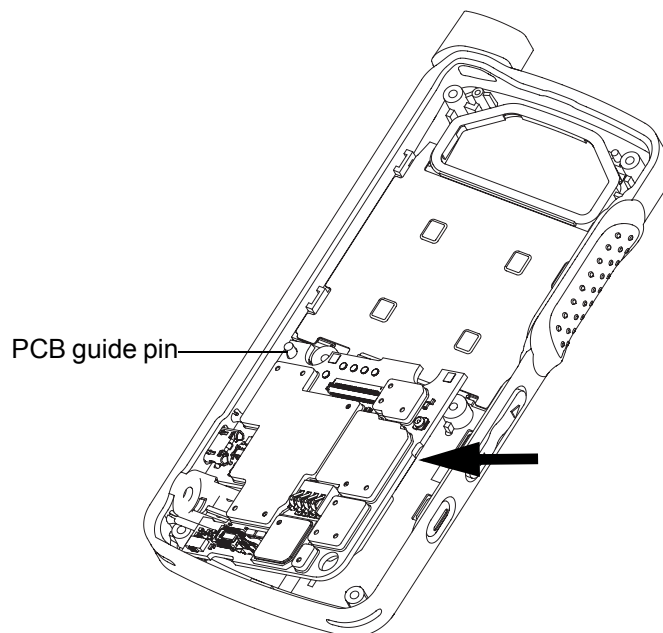3. Lift the PCB upwards and away from the PCB guide pin as shown in Figure 5-15.

PCB guide pin

Figure 5-15. Lifting of PCB board

4. Remove the main PCB from the front housing by unlatching its flex connector tab as shown in Figure 5-16.
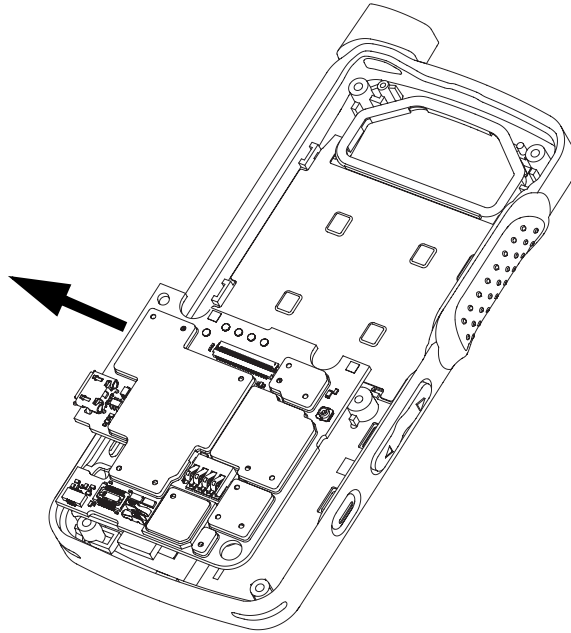

Figure 5-16. PCB board removal

5. Remove the speaker seal.
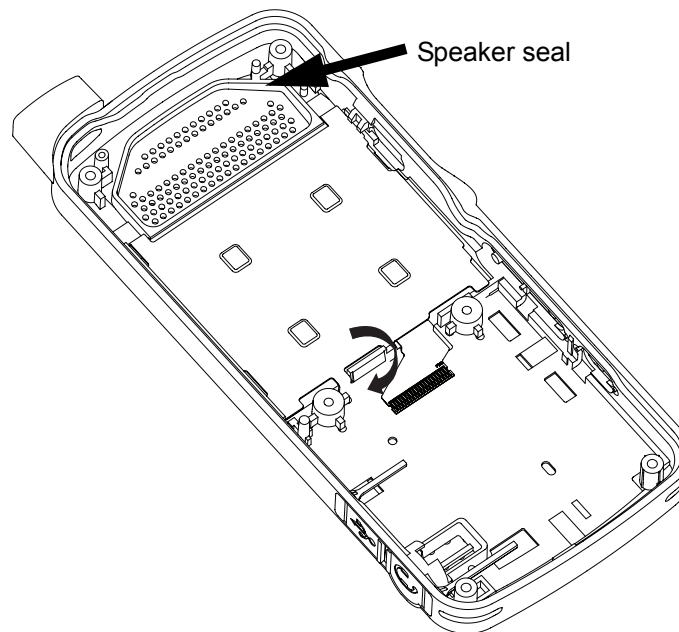6. Unlatch the display retainer lock as shown in Figure 5-17.

Figure 5-17. Display retainer lock removal

7. Remove the display retainer by sliding it upwards to clear the PCB retainer catch.
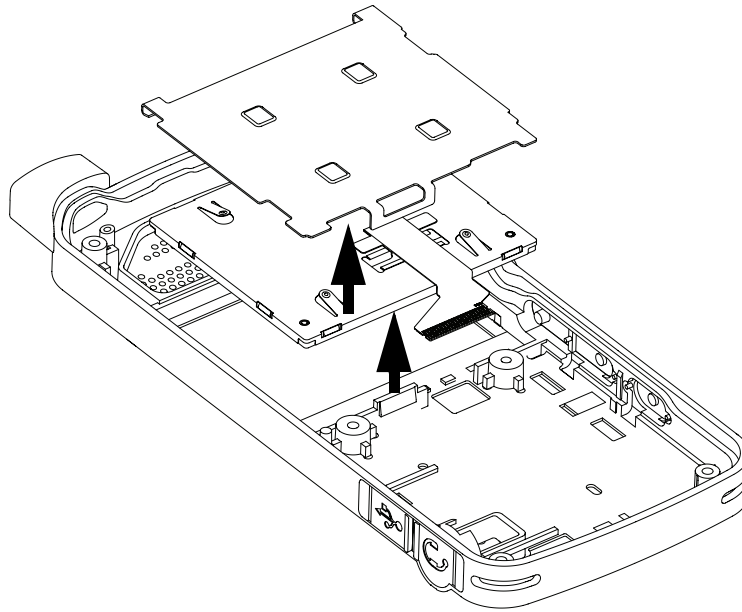
8. Remove the LCD display as shown in Figure 5-18.

Figure 5-18. LCD display removal

5.7   Radio Reassembly – Detailed

5.7.1   LCD Display Reassembly

1. Insert the LCD display.

2. Insert the display retainer slightly higher than the display module and slide it to fit below the PCB retainer catch as shown in Figure 5-19.
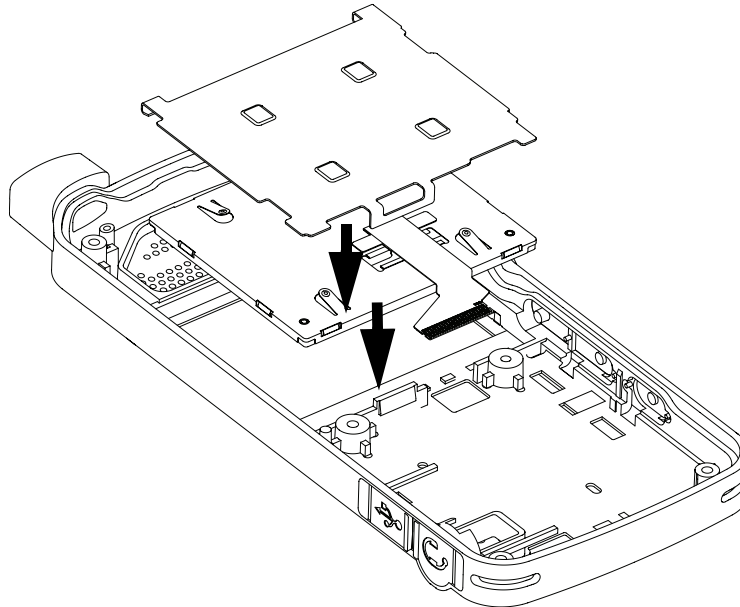

Figure 5-19. LCD display reassembly

3. Press down on the display retainer lock to secure the display retainer.

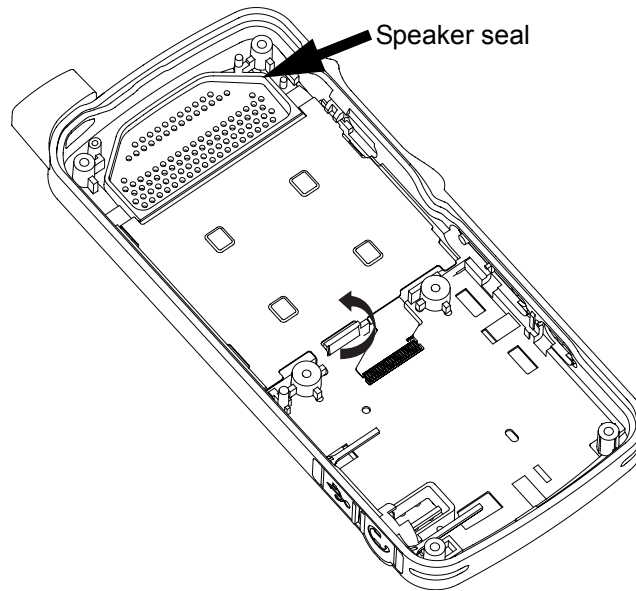4. Insert the speaker seal as shown in Figure 5-20.

Speaker seal

Figure 5-20. Display retainer lock reassembly

5. Attach the main PCB flex to the main PCB and secure it in place by latching the flex connector tab as shown in Figure 5-21.

Latch

Flex connector
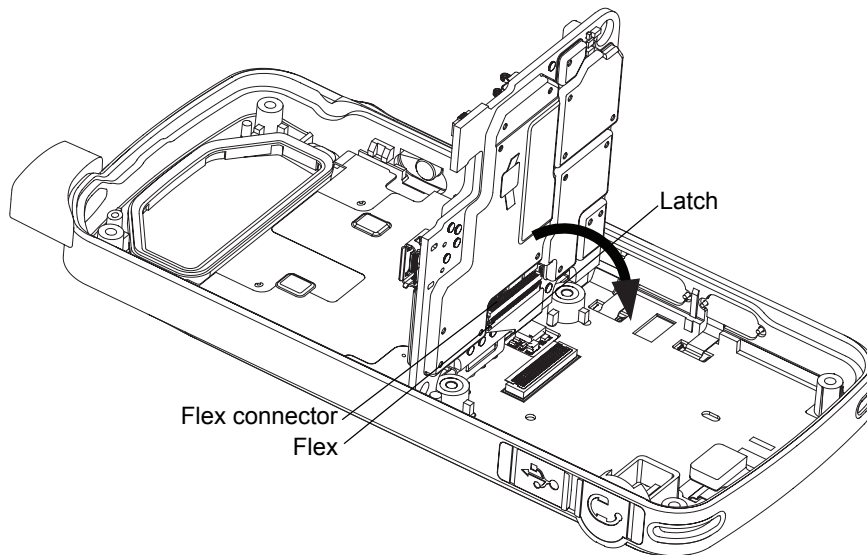
Flex

Figure 5-21. Flex connector tab reassembly

6. Place the main PCB onto the PCB guide pin and pivot the PCB into the front housing by turning it clockwise slightly so that it slots under the PCB retainer catch as shown in Figure 5-22.
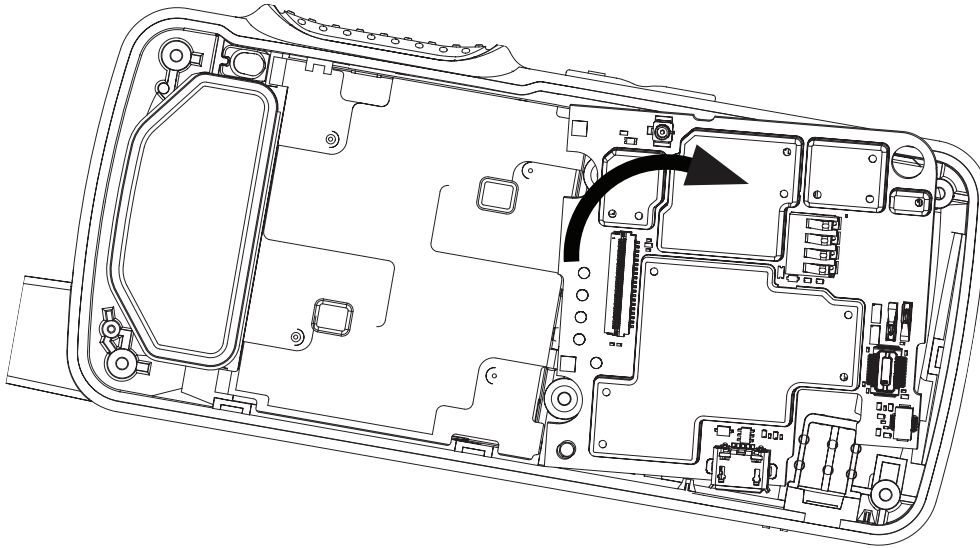
Figure 5-22. PCB board reassembly

5.7.2 Audio Jack Reassembly

1. Place the audio jack into its recess on the front housing as shown in Figure 5-23.
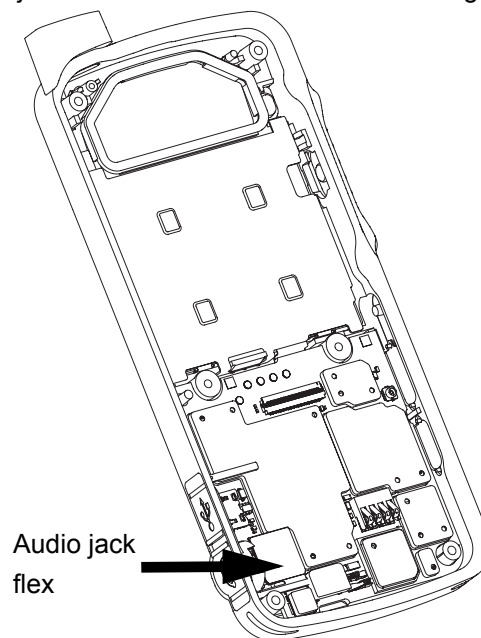
Audio jack flex

Figure 5-23. Audio jack connector reassembly

2. Attach the audio jack flex connector and keypad flex connector to the main board as shown in Figure 5-24.

Audio jack flex
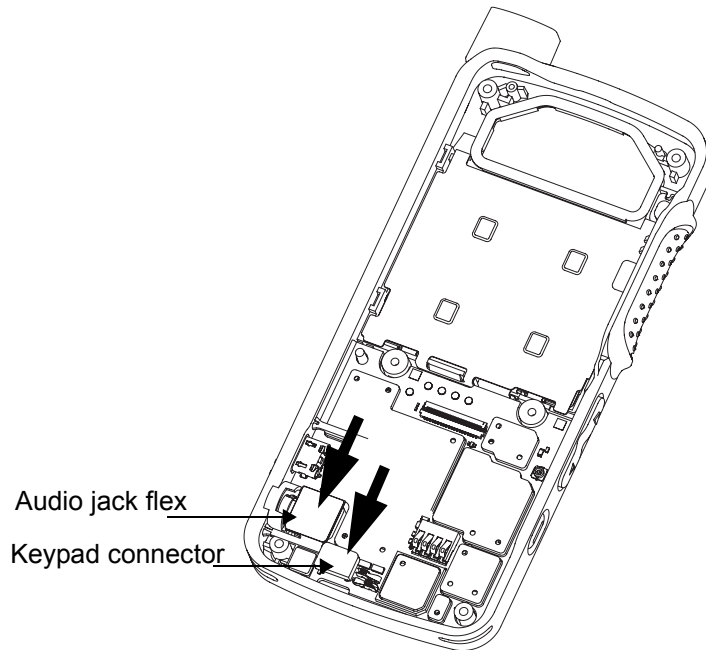
Keypad connector

Figure 5-24. Audio jack flex connector and keypad connector reassembly

5.7.3   PCB Reassembly

1. Insert the interface board into the front housing by sliding it under the PCB retainer catch as shown in Figure 5-25

Front

Housing

Figure 5-25. Interface board reassembly

2. Attach the board flex cable to the main board connector and secure it by latching the flex connector tab.

3. Plug in the coax cable connector to the main board as shown in Figure 5-26.
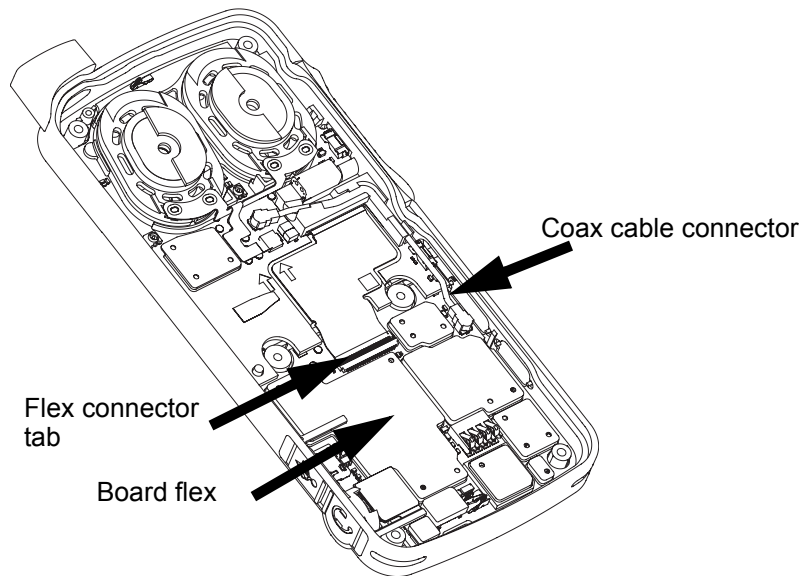
Figure 5-26. Board flex reassembly

5.7.4   Internal Antenna Reassembly

1. Insert the internal antenna by using tweezers as shown in Figure 5-27.
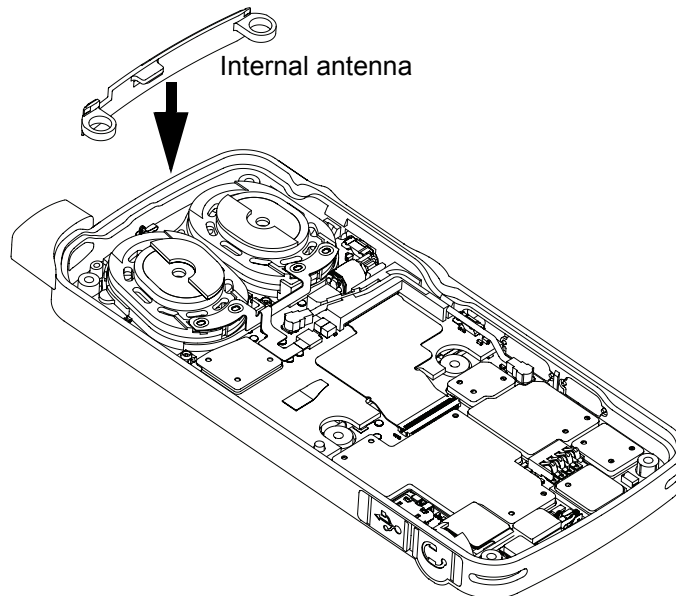
Figure 5-27. Internal antenna reassembly

5.7.5   Back Housing Reassembly

1. Place the back housing onto the front housing as shown in Figure 5-28.
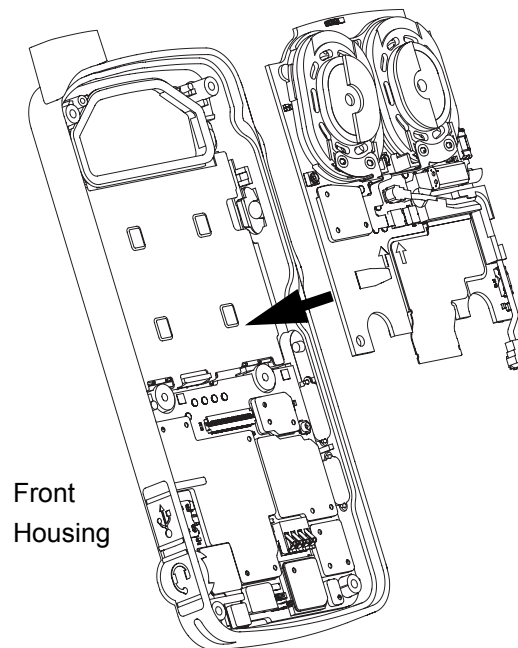
Back housing

Front housing
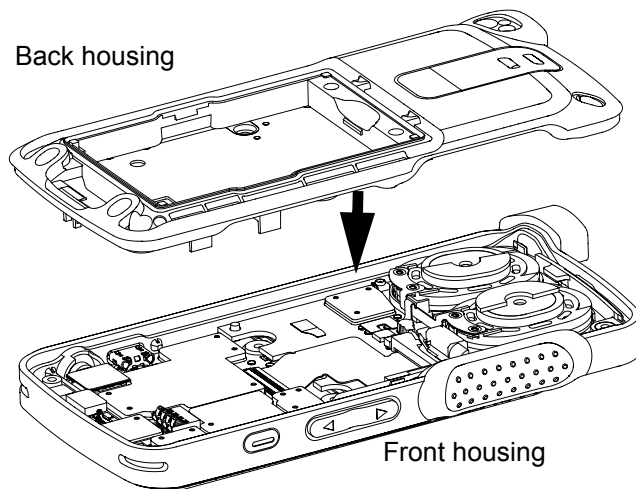
Figure 5-28. Back housing reassembly

2. Using a torque wrench, screw in the self tapping screws at all four corners from back housing marked (a,b,c,d) by using the 6IP Torx Plus as shown in Figure 5-29.

3. Using a torque wrench, screw in the two machine screws in the battery compartment of the back housing marked (e and f) by using the 6IP Torx Plus as shown in Figure 5-29.

> ⚠ **Caution**   Do not over torque these screws. Please refer to the torque chart on Table 5-4.

a

b

e

d

f

c
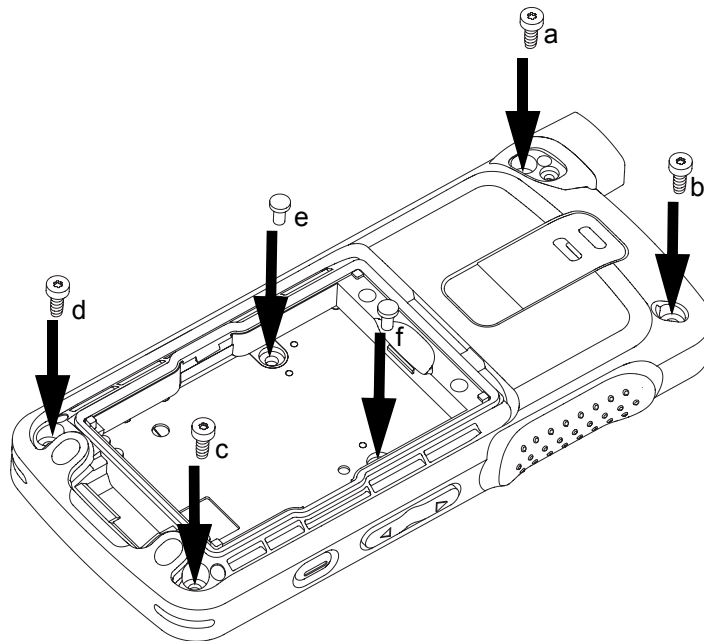
Figure 5-29. Self tapping screws and machining screws reassembly

4. Insert the battery into the battery compartment on the back housing as shown in Figure 5-30.
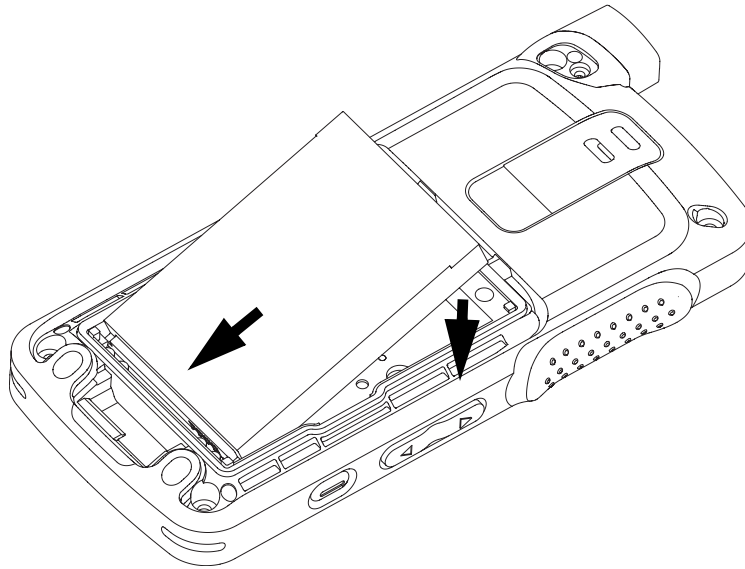
Figure 5-30. Battery reassembly

5. Insert the battery door as shown in Figure 5-31.
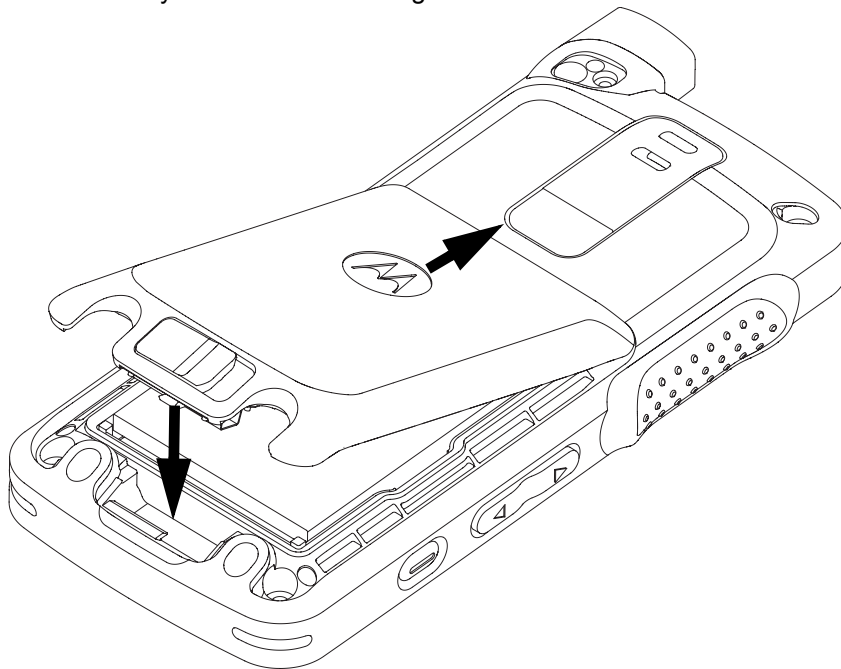
Figure 5-31. Battery door reassembly

6. Fasten the battery door latch as shown in Figure 5-32.
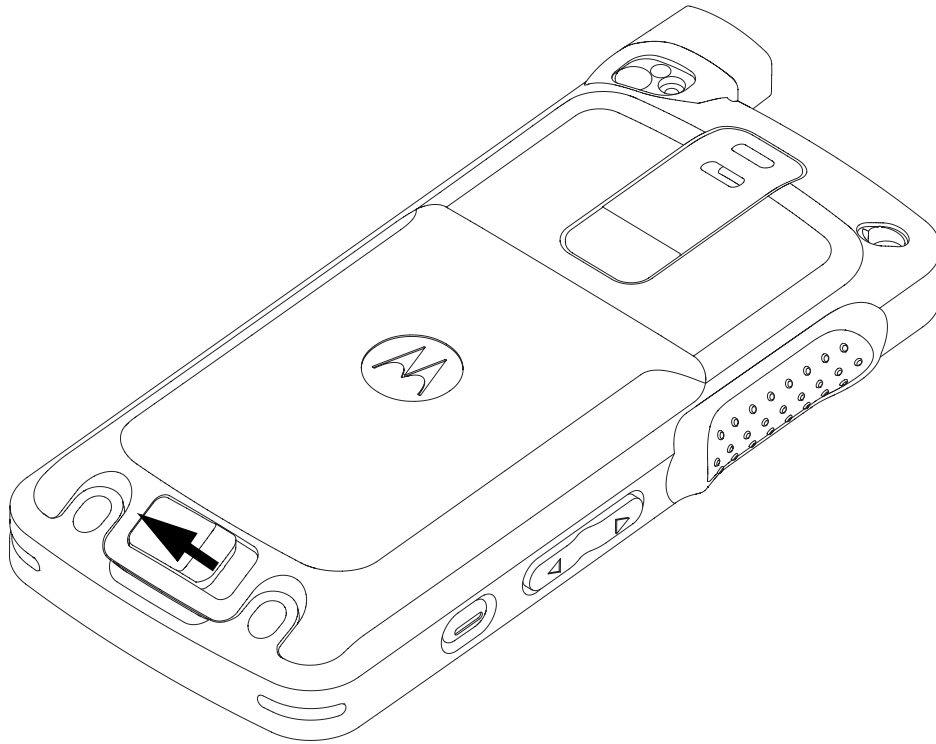
Figure 5-32. Latching battery door

7. Attach the antenna to the radio as shown in Figure 5-33.
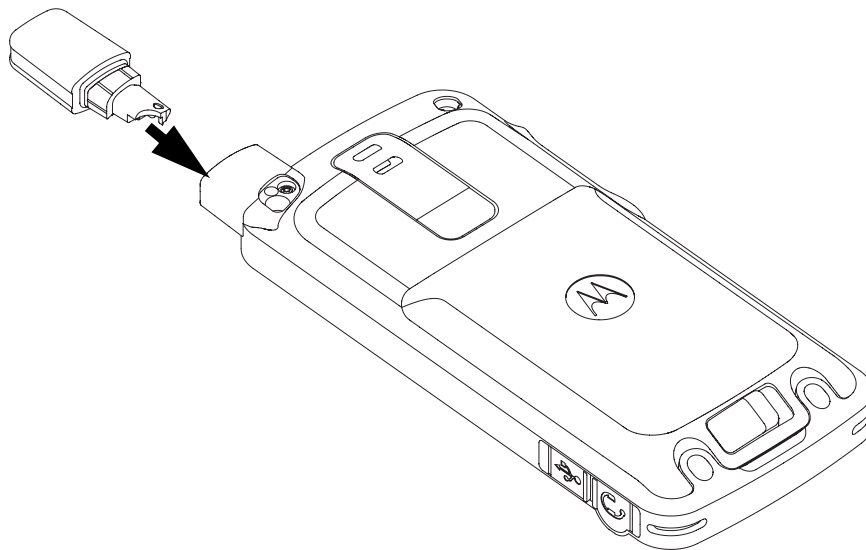
Figure 5-33. Antenna reassembly

8. Using a torque wrench, screw in the antenna screw with the 4IP Torx Plus screwdriver as shown in Figure 5-34.

NOTE   a) The antenna must be fully inserted before screwing in the antenna screw.

b) Ensure that there is no gap between the antenna and the housing.

⚠️ **Caution**	Tighten the antenna screw with tightening torque as below → 0.8lbf. in. or → 0.9 N-m or → 0.92 kgf-cm DO NOT over tighten the antenna screw.
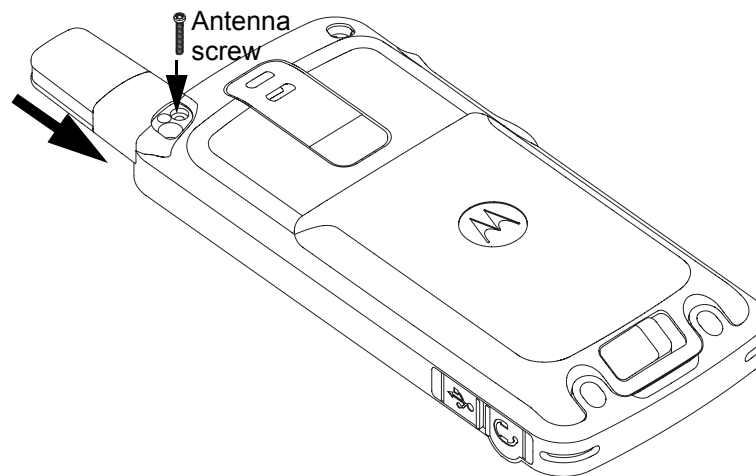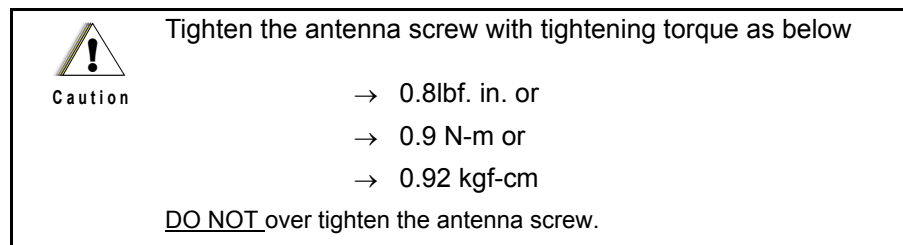
Figure 5-34. Antenna screw reassembly

9. Insert the antenna plug and a new escutcheon cover to the back housing as shown in Figure 5-35.

10. Turn the radio on.
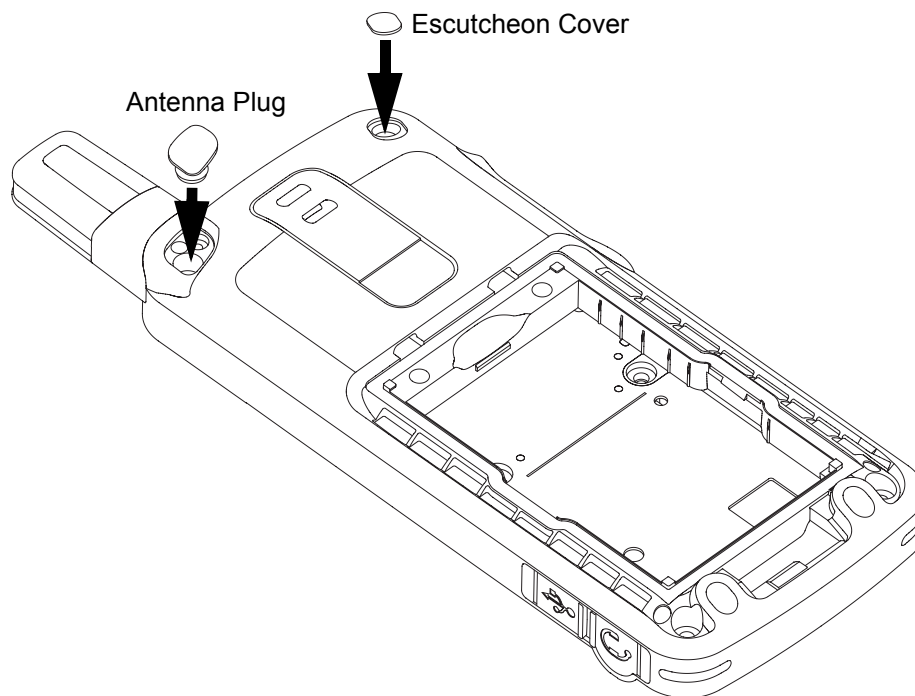
Figure 5-35. Antenna plug and screw plug reassembly

5.7.6   Exploded View and Parts List
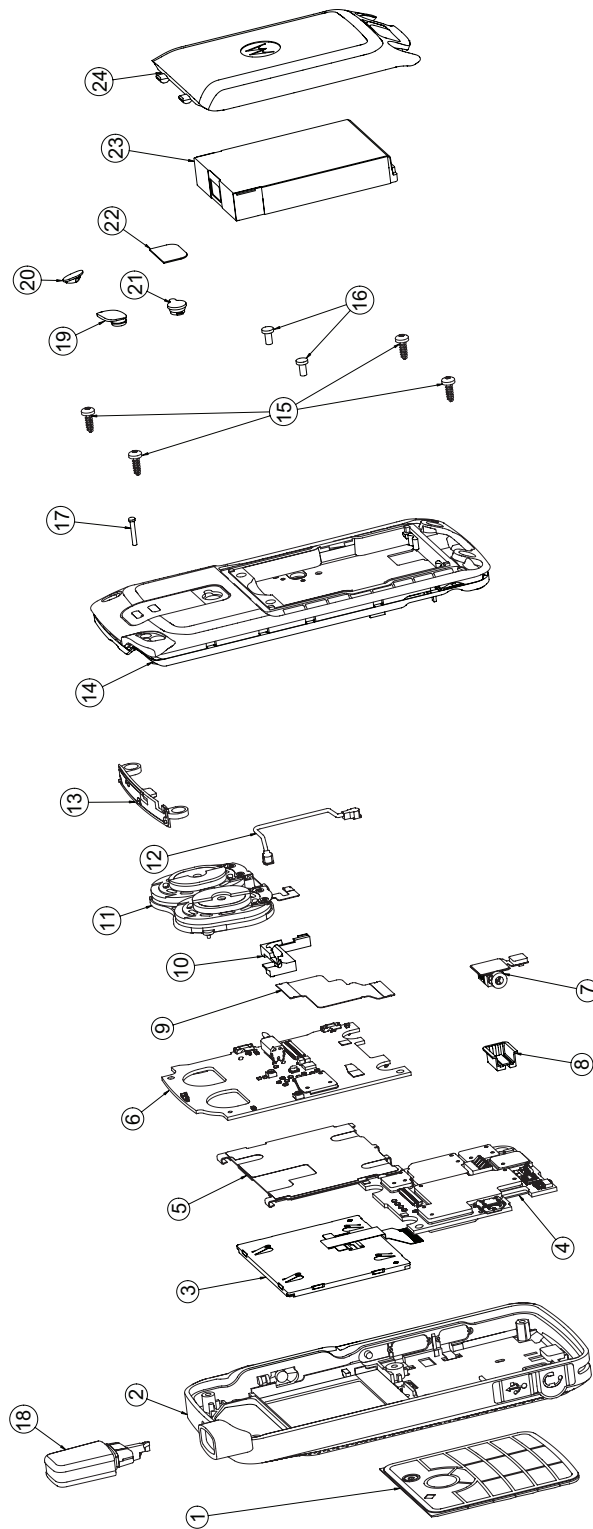
Figure 5-36.   GOB Model Exploded View

Item	Description	Part Number
1	Keypad Assembly (English)	PMLN6059_
2	Front Housing Assembly	PMLN5969_
3	LCD Module	72013002001
4	Main Board	PMLE4812_
5	Display Bracket Assembly	0104044J48
6	Interface Board	PMLN5971_
7	Audio Jack Flex Assembly	0104043J45
8	Audio Jack Boot	32012157001
9	Board to Board Flex	84012346001
10	Coax Cable Holder	07012034001
11	Speaker Module	0104042J77
12	Coax Cable Connector	42012051001
13	Internal Antenna	85012037001
14	Back housing Assembly	PMLN5968_
15	Top and Bottom Screws	03012043001
16	Middle Screws	0386104Z06
17	Antenna Screw	03012044001
18	Stubby Antenna	Please refer to Section 1.4 "Model Charts" for antenna options
19	Antenna Plug	38012025001
20	Escutcheon Cover	33012045001
21	RF Plug	28012032001
22	Product Nameplate - NAG	33012041002
23	Battery HI-CAP (BT90)	HKNN4013_
24	Battery Door HI-CAP	PMLN6001_

Table 5-3. GOB Model Exploded View Parts List

5.8   Torque Chart

Table 5-4 lists the various screws by part number and description, followed by the torque values in different units of measure. Torque all screws to the recommended value when assembling the radio.

> ⚠ **Caution**   A proper torque screwdriver must be used during installation to ensure that these torque values are not exceeded.

Table 5-4. Torque Specifications for Screws

Part Number	Description	Qty	Driver/ Socket	Torque		
				N-m	**lbs-in**	**kgf-cm**
03012044001	Screw Antenna	1	4IP Torx Plus	0.09	0.80	0.92
0386104Z06	Screw Torx Plus 6IP Machine	2	6IP Torx Plus	0.20	1.80	2.07
03012043001	Screw Torx T-6, M2 self-tapping	4	6IP Torx Plus	0.20	1.80	2.07

Chapter 6   Basic Troubleshooting

6.1   Introduction

This chapter contains error codes and board replacement procedures. If the board does not pass all the performance checks in Chapter 3 or exhibits an error code listed below, then the circuit board should be replaced. If repair requires knowledge of details of component level troubleshooting, please send radio to a Motorola Service Center listed in Appendix B.

NOTE To access the various connector pins, use the housing eliminator/test fixture along with the diagrams found in this section of the manual. (See the section, "Service Aids" on page 2-2, for the appropriate Motorola service aids and tools parts numbers.)

6.2   Power-Up Error Codes

Upon powering up, the radio performs certain tests to determine if its basic electronics and software are in working order. Any error detected has an associated error code that is presented on the radio display. These error codes are intended to be used by a service technician when the radio generates the Self Test Fail Tone. If these tests are successfully completed, the radio will generate the Self Test Tone.

There are two classes of detectable errors, fatal and non-fatal. If it is considered as a fatal error, then the normal radio operation will be inhibited. Fatal errors include hardware errors detected by the microprocessor and certain memory errors. These memory errors include incorrect ROM checksum, incorrect RAM checksum, and incorrect checksums of codeplug (Persistent Storage) blocks that contain operating parameters. If the codeplug block operating parameters are corrupted, operation of the unit on the proper frequency, system, and group are in question. Attempts to use this information could provide the user with a false sense of security that others are receiving his messages. Corrupted codeplug blocks of call IDs, or their associated aliases are considered non-fatal errors. While the user may be inconvenienced, normal communication is still possible.

Table 6-1. Power-Up Error Codes

Error Code	Description	Error Type	Corrective Action
ERROR 01/02	Call ID or associated aliases codeplug block checksum is wrong.	Non-Fatal	Normal communication is still possible, but the user may be inconvenienced. Reprogram codeplug.
ERROR 01/22	Tuning Codeplug block checksum is wrong.	Non-Fatal	Normal communication is still possible.
FAIL 01/82	External Codeplug block checksum is wrong.	Fatal	Reprogram codeplug.
FAIL 01/92	Secure Codeplug checksum error	Fatal	Reprogram codeplug.
FAIL 01/A2	Tuning Codeplug block checksum is wrong.	Fatal	Reprogram codeplug.

Table 6-1. Power-Up Error Codes (Continued)

Error Code	Description	Error Type	Corrective Action
FAIL 01/81	ROM Checksum is wrong.	Fatal	Reprogram FLASH Memory, then retest. If message reoccurs, replace main board or send radio to nearest Motorola Depot.
FAIL 01/88	Radio RAM Test Failure.	Fatal	Retest radio by turning it off and turning it on again. If message reoccurs, replace main board or send radio to nearest Motorola Depot.
FAIL 01/90 or FAIL 02/90	General hardware test failure.	Fatal	Retest radio by turning it off and turning it on again. If message reoccurs, replace main board or send radio to nearest Motorola Depot.
FAIL 02/81	DSP ROM Checksum is wrong.	Fatal	Reprogram FLASH Memory, then retest. If message reoccurs, replace main board or send radio to nearest Motorola Depot.
FAIL 02/82	DSP RAM1 test failure.	Fatal	Retest radio by turning it off and turning it on again. If message reoccurs, replace main board or send radio to nearest Motorola Depot.
FAIL 02/84	DSP RAM2 test failure.	Fatal	Retest radio by turning it off and turning it on again. If message reoccurs, replace main board or send radio to nearest Motorola Depot.
FAIL 02/88	DSP RAM test failure.	Fatal	Retest radio by turning it off and turning it on again. If message reoccurs, replace main board or send radio to nearest Motorola Depot.
FAIL 02/C0	DSP ROM Checksum is wrong.	Fatal	Retest radio by turning it off and turning it on again. If message reoccurs, replace main board or send radio to nearest Motorola Depot.
No Display	Display module is not connected properly. Display module is damaged.	Fatal	Check connection between main board and display module. Replace with new display module.

6.3 Operational Error Codes

During radio operation, the radio performs dynamic tests to determine if the radio is working properly. Problems detected during these tests are presented as error codes on the radio's display. The presence of an error code should prompt a user that a problem exists and that a Motorola Authorized MOTOTRBO dealer should be contacted. Use Table 6-2 to aid in understanding any particular operational error codes.

Table 6-2. Operational Error Codes

Error Code	Description	Error Type	Corrective Action
FAIL 001	Synthesizer Out-of-Lock.	Non-Fatal	1. Reprogram the codeplug. 2. Refer to Detailed Service Manual (68009556001)
FAIL 002	Personality checksum or system block error.	Non-Fatal	Reprogram the codeplug.

Notes

Chapter 7   Accessories

7.1   Introduction

Motorola provides the following approved accessories to improve the productivity of a digital portable two-way radio.

For a list of Motorola-approved antennas, batteries and other accessories, visit the following web site: http://www.motorolasolutions.com/governmentandenterprise

7.1.1   Antennas

Part No.	Description
PMAE4076_	Antenna Kit, 420 – 445 MHz
PMAE4077_	Antenna Kit, 438 – 470 MHz
PMAE4078_	Antenna Kit, 403 – 425 MHz
PMLN6040_	Mounting kit, antenna (Pack of 10 screws and plugs)

7.1.2   Audio

Part No.	Description
PMLN5957_	Surveillance Earpiece with in-line microphone and PTT
PMLN5958_	Swivel earpiece with in-line microphone and PTT

7.1.3   Batteries

Part No.	Description
HKNN4013_	Battery BT90 (1800 mAh Lithium Ion)
PMNN4425_	Battery BT70 (1370 mAh Lithium Ion)

7.1.4   Bluetooth

Part No.	Description
89409N_	HK200 Bluetooth Headset (US)
NNTN8125_	Operations critical wireless earpiece, 12" Cable (US)
NNTN8126_	Operations critical wireless earpiece, 9.5" Cable (US)
NNTN8127_	Operations critical wireless Push to Talk POD (US)
NTN2575_	Replacement wireless earpiece, 9.5" cable
NTN2572_	Replacement wireless earpiece, 12" cable

7.1.5   Cable

Part No.	Description
25-124330-01R	Programming Cable, Micro USB

7.1.6   Carry Devices

Part No.	Description
PMLN6074_	Wrist Strap
PMLN5956_	Carry Holster

7.1.7   Chargers

Part No.	Description
3004209T03	POWER CORD for Multi Unit Charger (US)
PMLN5892_	Multi Unit Charger, SL Series (Base Only)
PMLN5916_	Multi Unit Charger, SL Series (US)
PMPN4009_	Micro USB Charger (US)

7.1.8   Miscellaneous Accessories

Part No.	Description
PMLN6000_	Battery Cover for BT70 (1370 mAh)
PMLN6001_	Battery Cover for BT90 (1800 mAh)

Notes

Appendix A   Replacement Parts Ordering

A.1   Basic Ordering Information

When ordering replacement parts or equipment information, the complete identification number should be included. This applies to all components, kits, and chassis. If the component part number is not known, the order should include the number of the chassis or kit of which it is a part, and sufficient description of the desired component to identify it.

A.2   Motorola Online

Motorola Online users can access our online catalog at http://motorolasolutions.com/businessonline

To register for online access:

- Have your Motorola Customer number available.
- Please go to http://motorolasolutions.com/businessonline and click on "Sign Up Now."
- Complete form and submit it.
- Contact your BDM to complete set-up and it will be done within 24 to 48 hours.

Notes

Appendix B   Motorola Service Centers

B.1   Servicing Information

If a unit requires further complete testing, knowledge and/or details of component level troubleshooting or service than is customarily performed at the basic level, please send the radio to a Motorola Service Center as listed below.

B.2   Motorola Service Center

1220 Don Haskins Drive
Suite A
El Paso, TX 79936
Tel: 915-872-8200

B.3   Motorola Federal Technical Center

10105 Senate Drive
Lanham, MD 20706
Tel: 1-800-969-6680
Fax: 1-800-784-4133

B.4   Motorola Canadian Technical Logistics Center

Motorola Canada Ltd.
8133 Warden Avenue
Markham, Ontario, L6G 1B3
Tel: 1-800-543-3222
Fax: 1-888-331-9872 or 1-905-948-5970

Notes

Glossary

This glossary contains an alphabetical listing of terms and their definitions that are applicable to portable and mobile subscriber radio products. All terms do not necessarily apply to all radios, and some terms are merely generic in nature.

Term	Definition
Band	Frequencies allowed for a specific purpose.
CPS	Customer Programming Software: Software with a graphical user interface containing the feature set of a radio.
Default	A pre-defined set of parameters.
Digital	Refers to data that is stored or transmitted as a sequence of discrete symbols from a finite set; most commonly this means binary data represented using electronic or electromagnetic signals.
FCC	Federal Communications Commission.
Frequency	Number of times a complete electromagnetic-wave cycle occurs in a fixed unit of time (usually one second).
kHz	kilohertz: One thousand cycles per second. Used especially as a radio-frequency unit.
LCD	Liquid-Crystal Display: An LCD uses two sheets of polarizing material with a liquid-crystal solution between them. An electric current passed through the liquid causes the crystals to align so that light cannot pass through them.
LED	Light Emitting Diode: An electronic device that lights up when electricity is passed through it.
MHz	Megahertz: One million cycles per second. Used especially as a radio-frequency unit.
PC Board	Printed Circuit Board. Also referred to as a PCB.
Programming Cable	A cable that allows the CPS to communicate directly with the radio using USB.
Receiver	Electronic device that amplifies RF signals. A receiver separates the audio signal from the RF carrier, amplifies it, and converts it back to the original sound waves.
RF	Radio Frequency: The portion of the electromagnetic spectrum between audio sound and infrared light (approximately 10 kHz to 10 GHz).
RX	Receive.
Signal	An electrically transmitted electromagnetic wave.

Term	Definition
Spectrum	Frequency range within which radiation has specific characteristics.
Squelch	Muting of audio circuits when received signal levels fall below a pre-determined value. With carrier squelch, all channel activity that exceeds the radio's preset squelch level can be heard.
Transceiver	Transmitter-receiver. A device that both transmits and receives digital signals. Also abbreviated as XCVR.
Transmitter	Electronic equipment that generates and amplifies an RF carrier signal, modulates the signal, and then radiates it into space.
TX	Transmit.
UHF	Ultra-High Frequency.
USB	Universal Serial Bus: An external bus standard that supports data transfer rates of 12 Mbps.

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