MOTOROLA

Level 2 Service Manual

680910A65-O

MOTO Q™ 9h

Digital Wireless Telephone

WCDMA 2100, GSM 850/900/1800/1900, HSDPA, GPRS, EDGE

Mobile Devices Business,
Sawgrass International Concourse
789 International Parkway
Room S2C
Sunrise, FL 33325-6220

Contents

Introduction

Motorola® Inc. maintains a worldwide organization that is dedicated to provide responsive, full-service customer support. Motorola products are serviced by an international network of company-operated product-care centers as well as authorized independent service firms.

Available on a contract basis, Motorola Inc. offers comprehensive maintenance and installation programs that enable customers to meet requirements for reliable, continuous communications.

To learn more about the wide range of Motorola service programs, contact your local Motorola products representative or the nearest Customer Service Manager.

Product Identification

Motorola products are identified by the model number on the housing. Use the entire model number when inquiring about the product. Numbers are also assigned to chassis and kits. Use these numbers when requesting information or ordering replacement parts.

Product Names

Product names are listed on the front cover. Product names are subject to change without notice. Some product names, as well as some frequency bands, are available only in certain markets.

Regulatory Agency Compliance

This device complies with Part 15 of the FCC Rules. Operation is subject to the following conditions:

- This device may not cause any harmful interference
- This device must accept interference received, including interference that may cause undesired operation

This class B device also complies with all requirements of the Canadian Interference-Causing Equipment Regulations (ICES-003).

Cet appareil numérique de la classe B respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

Computer Program Copyrights

About this Service Manual

Using this service manual and the suggestions contained in it assures proper installation, operation, and maintenance. Refer questions about this manual to the nearest Customer Service Manager.

Audience

This service manual aids service personnel in testing and repairing MOTO Q™ q9 telephones. Service personnel should be familiar with electronic assembly, testing, and troubleshooting methods, and with the operation and use of associated test equipment.

Use of this manual assures proper installation, operation, and maintenance of Motorola products and equipment. It contains all service information required for the equipment described and is current as of the printing date.

Scope

This manual provides basic information relating to q9 telephones, and provides procedures and processes for repairing the units at Level 1 and 2 service centers including:

- Unit swap out
- Repairing of mechanical faults
- Basic modular troubleshooting
- Testing and verification of unit functionality
- Initiate warranty claims and send faulty modules to Level 3 or 4 repair centers

Conventions

The following special characters and typefaces are used in this manual to emphasize certain types of information.

Note: Emphasizes additional information pertinent to the subject matter.

Caution: Emphasizes information about actions that may result in equipment damage.

Warning: Emphasizes information about actions that may result in personal injury.

Keys to be pressed are represented graphically. For example, instead of "Press the End key", you will see "Press ".

Information from a screen is shown in text as similar as possible to what displays on the screen. For example, ALERTS.

Information that you need to type is printed in **boldface type**.

Warranty Service Policy

The product is sold with the standard 12-month warranty terms and conditions. Accidental damage, misuse, and extended warranties offered by retailers are not supported under warranty. Non warranty repairs are available at agreed fixed repair prices.

Out-of-Box Failure Policy

The standard out of box failure criteria applies. Customer units that fail very early on after the date of sale, are to be returned to Manufacturing for root cause analysis, to guard against epidemic criteria. Manufacturing will bear the costs of early life failure.

Product Support

Customer's original units will be repaired but not refurbished as standard. Appointed Motorola Service Hubs will perform warranty and non-warranty field service for level 2 (assemblies) and level 3 (limited PCB component). The Motorola High Technology Centers will perform level 4 (full component) repairs.

Customer Support

Customer support is available through dedicated Call Centers and in-country help desks. Product Service training is available through the local Motorola Support Center.

Parts Replacement

When ordering replacement parts or equipment, include the Motorola part number and description used in the service manual.

When the Motorola part number of a component is not known, use the product model number or other related major assembly along with a description of the related major assembly and of the component in question.

Replacement Parts Service Division (RPSD)

Order replacement parts, test equipment, and manuals from RPSD.

U.S.A.	**Outside U.S.A.**
Phone: 800-422-4210	Phone: 847-538-8023
FAX: 800-622-6210	FAX: 847-576-3023

Website: http://businessonline.motorola.com

EMEA

Phone: +49 461 803 1404

Website: http://emeaonline.motorola.com

Asia

Phone: +65 648 62995

Website: http://asiaonline.motorola.com

Specifications

Table 1. Specifications

Function	Specification
Frequency Range EGSM	**TX**: 880 - 915 MHz Frequency (MHz) = 890 + (0.2 × n) where: 0 ≤n ≤124 Frequency (MHz) = 890 + (0.2 × (n – 1024)) where: 955 ≤n ≤1023 **RX**: 925 – 960 MHz Frequency (MHz) = 935 + (0.2 × n) where: 0 ≤n ≤124 Frequency (MHz) = 935 + (0.2 × (n – 1024)) where: 955 ≤n ≤1023
Frequency Range DCS	**TX**: 1710 to 1785 MHz Frequency (MHz) = 1710.2 + (0.2 × (n – 512)) where: 512 ≤n ≤885 **RX**: 1805.2 to 1879.8 MHz Frequency (MHz) = 1805.2 + (0.2 × (n – 512)) where: 512 ≤n ≤885
Frequency Range PCS	**TX**: 1850 to 1910 MHz Frequency (MHz) = 1850.2 + (0.2 × (n – 512)) where: 512 ≤n ≤810 **RX**: 1930 to 1990 MHz Frequency (MHz) = 1930.2 + (0.2 × (n – 512)) where: 512 ≤n ≤810
Frequency Range UMTS	**TX**: 1920 to 1980 MHz Frequency (MHz) = UARFCN[1] ÷ 5, where: 9612 ≤ UARFCN[1] ≤ 9888 UARFCN[1] in increments of 25 **RX**: 2110 to 2170 MHz Frequency (MHz) = UARFCN[1] ÷ 5, where: 10562 ≤ UARFCN[1] ≤ 10838 UARFCN[1] in increments of 25
Channel Spacing	200 kHz (GSM, DCS, PCS), 5 MHz UMTS
Channels	174 EGSM, 374 DCS, 274 PCS carriers with 8 channels per carrier, 11 UMTS
Duplex Spacing	45 MHz GSM, 95 MHz DCS, 80 MHz PCS, 190 MHz UMTS
Modulation	GMSK AT BT = 0.3 (GSM, DCS, PCS), QPSK (UMTS)
Transmitter Phase Accuracy	5 degrees RMS, 20 Degrees peak
Frequency Error	± 0.1ppm
Input/Output Impedance	50 ohms (nominal)
Nominal Operating Voltage	3.6 Vdc ±10% (battery) +4.4 Vdc ±10% (external connector)
Dimensions (xyz)	107.9 mm, 50.6mm, 15.45mm
Size	77.6 cc
Weight	112 g
Display	16M color TFT, 320 x 240, 2.2”
Battery Life (1170mAh)[2]	**GSM:** Talk time: better than 390 minutes **GSM**: Standby time: better than 380 hours **WCDMA** Talk time**:** better than 260 minutes **WCDMA** Standby time**:** better than 480 hours
Nominal Operating Temperature Range	-10º C to +55º C

GSM System Functions	Specification
Speech Coding Type	Regular Pulse excitation / linear predictive coding with long term prediction (RPE LPC with LTP)
Bit Rate	13.0 kbps
RF Power Output	32 dBm nominal GSM, 28.5 dBm nominal DCS / PCS
Spurious Emissions	-36 dBm from 0.1 to 1 GHz, -30 dBm from 1 to 4 GHz
Receive Sensitivity	-102 dBm GSM, -102 dBm DCS / PCS
RX Bit Error Rate	< 2%

UMTS System Functions	Specification
Speech Coding Type	Adaptive Multirate (AMR)
RF Power Output	21 dBm
Spurious Emissions	-36 dBm from 0.1 to 1 GHz, -30 dBm from 1 to 4 GHz
Error Vector Magnitude	< 17.5%
PN9 Bit Error Rate (VER)	0.1% @12.2K, -106.7 dBm
ACLR	-33 dBm @$\pm$5 MHz, -43 dBm @$\pm$10 MHz

Product Overview

Motorola Q mobile telephones feature Wideband Code Division Multiple Access (WCDMA) technology. Q also supports High Speed Downlink Packet Access (HSPDA) a wireless radio broadband data standard adopted by many WCDMA mobile phone service providers. Compared to 1xEV-DO networks currently being used by CDMA operators, HSPDA is significantly faster, providing mobile devices with air interface speeds from 384kbps to 3.5Mpbs.

The q9 uses the Microsoft Windows Mobile operating system. Windows Mobile is a compact operating system for mobile devices based on the Microsoft Win32 API.

The q9 mobile device provides Short Message Service (SMS) text messaging, and includes clock, alarm, datebook, calculator, and caller profiling personal management tools. The q9 also has a built in 2.0 Megapixel camera with 6X digital zoom, Bluetooth wireless connectivity. The phone provides 32 Embedded ring tones including VibraCall vibrating alert and 32 Downloadable/Customizable iMelody ring tones. The phone also contains a Secure Data (SD) removable memory expansion slot. The Q is a dual mode phone that allows roaming within the UMTS 2100 MHz bands and GSM 800/850/1800 and 1900 MHz bands.

The q9 phone consists of a main housing assembly that contains the battery, battery cover, accessory connector, main circuit board, chassis, keypad, and internal antenna. The main display, speaker, control keys, and a QWERTY keyboard are located on the front of the device. The camera, battery compartment, and rf connectors are located at the rear of the device.

The main circuit board contains the Receiver, Transmitter, Synthesizer and Control Logic Circuitry which together comprise the dual band phone electronics.

The main display is a 2.4" 320 x 240 65k TFT LCD. The camera is a 2.0 mega pixel, with 8X digital zoom.

The telephones are made of polycarbonate plastic. The 1170 mAh Lithium Ion (Li Ion) battery provides up 260 minutes of talk time and up to 480 hours of standby time in WCDMA mode, and up to 390 minutes of talk time and up to 380 hours of standby time in GSM mode[1].

Features

Q telephones use advanced, self-contained, sealed, custom integrated circuits to perform the complex functions required for CDMA communication. Aside from the space and weight advantage, microcircuits enhance basic reliability, simplify maintenance, and provide a wide variety of operational functions.

Features available in this product include:

- Thinnest Converged Device on the market – 11.5mm
- Windows Mobile™ 6.0 software with email, calendar, contacts and tasks
- Enabled for leading corporate email solutions
- Receive and view documents, spreadsheets, presentations and more
- Optimized QWERTY keyboard
- Video capture and playback
- Connectivity via ActiveSync®, AirSync®, Bluetooth™ wireless technology and IrDA

1. All talk and standby times are approximate and depend on network configuration, signal strength, and features selected. Standby times are quoted as a range from DRX=2 to DRX=9. Talk times are quoted as a range from DTX off to DTX on.

- 2.0 mega pixel camera
- Multi-Media Messaging (MMS)
- Dual stereo quality speakers
- Audio formats supported: iMelody, MIDI, MP3, AAC, WAV, WMA, WAX, QCELP
- Image formats supported: GIF87a, GIF89a, JPEG, WBMP, BMP, PNG
- Video formats supported: H.263, MPEG-4, GSM-AMR, AAC, WMV
- Mini-SD removable memory
- Large, high-resolution display (320 x 240 pixels, 65K TFT)
- Display: 2.4” 320x240 65K TFT

Personal Information Management

The q9 leverages Microsoft Windows Mobile software and is among the first devices to run on the new Windows Mobile 5.0 platform which delivers scalable and cost-effective mobile messaging support with Exchange 2003 out of the box.

Enabled for leading corporate email solutions, the q9 can meet the diverse needs of the enterprise.

The user can receive and view documents, spreadsheets, presentations and more.

General Operation

Controls, Indicators, and Input/Output (I/O) Connectors

The q9 telephones' controls are on the front and sides of the device, and on the keyboard as shown in Figures 1 and 2.

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Figure 1. Controls and Indicators Locations, Front and Right

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Figure 2. Controls and Indicator Locations, Left and Back

Menu Navigation

A 5-way navigation key allows you to move easily through menus. Figure 3 provides a view of the Home screen display.

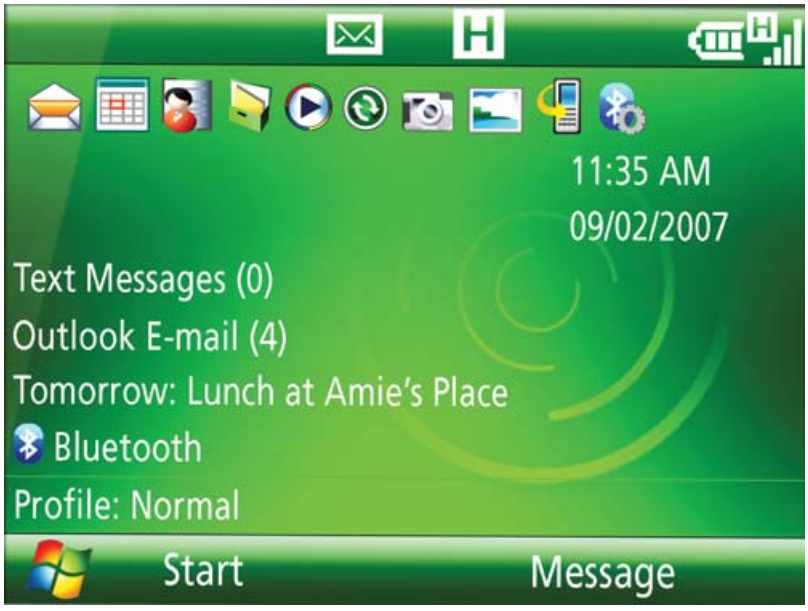

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Figure 3. Home Screen Display

Status Icons

The main display provides constant graphical representations of battery capacity and signal strength, as well as the real-time clock. The MOTO Q q9 user guide provides more information about icons shown on the main display.

Whether a phone displays all indicators depends on the programming and services to which the user subscribes.

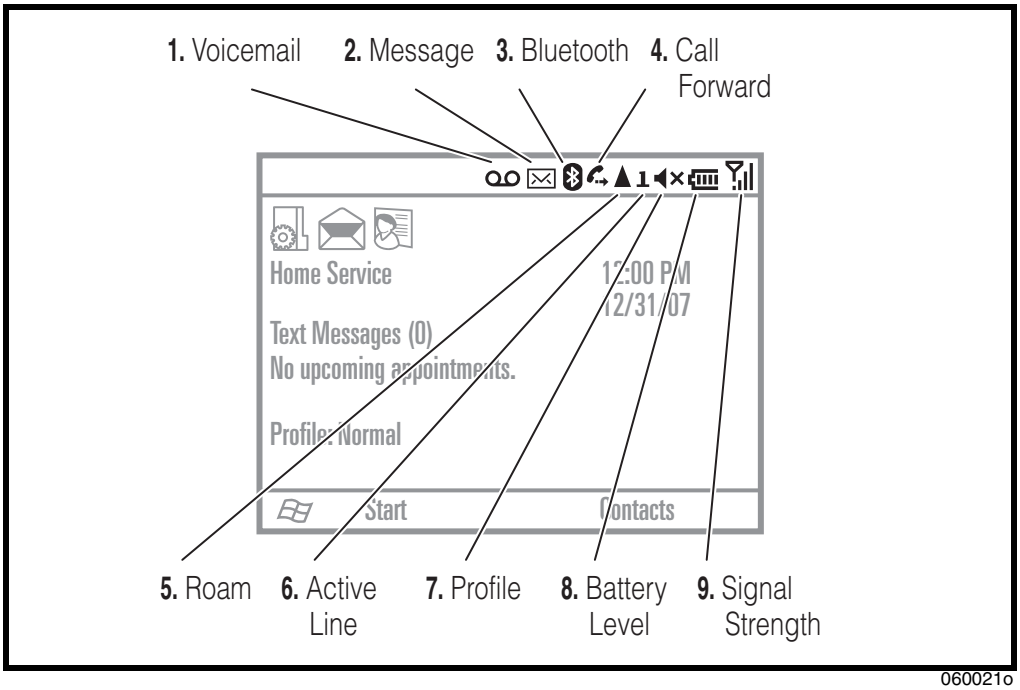

Figure 4. Home Screen Status Icons

1 Data Indicator Shows connection status. Other indicators can include:

= secure data transfer = Bluetooth™ wireless connection

2 Message Indicator Shows when you receive a new message. Indicators can include:

= new e-mail or text message = voicemail message

3 Roam Indicator The roam indicator shows when your phone is seeking or using a network outside your home network. Other indicators can include:

= 2G home = roaming unavailable

4 Active Line Indicator Shows ABC to indicate an active call, or VP to indicate when call forwarding is on. Indicators can include:

1 = line 1 active 2 = line 2 active

= line 1 active, call forward on

= line 2 active, call forward on

5 Signal Strength Indicator Vertical bars show the strength of the network connection. You can't make or receive calls when or displays.

6 Battery Charge Indicator Vertical bars show the battery charge level. Recharge the battery when your phone shows Low Battery.

7 Profile Indicator Shows the call alert (ring) setting. When the profile is normal, outdoor, or automatic, no indicator is displayed.

= meeting	= speakerphone
= car	(no icon) = normal
= silent	(no icon) = outdoor
= headset	(no icon) = automatic

8 Location Indicator Shows when your phone can send location information or not .

Battery Function

Battery Charge Indicator

The telephone displays a battery charge indicator icon in the idle screen to indicate the battery charge level. The gauge shows four levels: 100%, 66%, 33%, and Low Battery.

Battery Removal

Removing the battery causes the device to shut down immediately and lose any pending work (partially entered phone book entries or outgoing messages, for example). If battery is removed before the unit is fully powered down, the display will not display properly until the unit is powered down correctly and then powered up. (Snowy screen).

All batteries can cause property damage and/or bodily injury, such as burns if a conductive material, such as jewelry, keys, or beaded chains touch exposed terminals. The conductive material may complete an electrical circuit (short circuit) and become quite hot. Exercise care in handling any charged battery, particularly when placing it inside a pocket, purse, or other container with metal objects.

If the battery is removed while receiving a message, the message is lost.

To ensure proper memory retention, turn the phone OFF before removing the battery. Immediately replace the old battery with a fresh battery.

Operation

For detailed operating instructions, refer to the appropriate User Guide listed in the Related Publications section toward the end of this manual.

Tools and Test Equipment

The following table lists tools and test equipment recommended for disassembly and reassembly of q9 telephones. Use either the listed items or equivalents.

Table 2. General Test Equipment and Tools

Motorola Part Number[1]	Description	Application
RSX4043-A	Torque Driver	Used to remove and replace screws
—	Torque Driver Bit T-6, Apex 440-6 Torx or equivalent. Torque setting is 1.25 in-lbs or 14 Ncm	Used with torque driver
See Table 7	Rapid Charger	Used to charge battery and power phone
0180386A82	Antistatic Mat Kit (includes 66-80387A95 antistatic mat, 66-80334B36 ground cord, and 42-80385A59 wrist band)	Provides protection from damage to device caused by electrostatic discharge (ESD)
19501980 (AMS)[2]	Generic Press Tool	
0-00-00-30005 (AMS)[2]	Disassembly tool, plastic with flat and pointed ends (manual opening tool)	Used during assembly/disassembly of phone

1. To order in North America, contact Motorola Aftermarket and Accessories Division (AAD) at (800) 422-4210 or FAX (800) 622-6210; Internationally, AAD can be reached by calling (847) 538-8023 or by fax (847) 576-3023.
2. Not available from Motorola. To order, contact: AMS Software & Elektronik GmbH, c/o Holger Grube, Lise-Meitner-Straße 9 D-24941 Flensburg Tel.: +49-461-90398-0 Fax: +49-461-90398-50

Disassembly

The procedures in this section provide instructions for the disassembly of a q9 telephone. Tools and equipment used for the phone are listed in Table 2, preceding.

Many of the integrated devices used in this phone are vulnerable to damage from electrostatic discharge (ESD). Ensure adequate static protection is in place when handling, shipping, and servicing the internal components of this equipment.

Avoid stressing the plastic in any way to avoid damage to either the plastic or internal components.

Removing the Battery Door

1. Ensure the phone is turned off.
2. Press down on the battery door latch.
3. Slide the battery door as shown in Figure 5.
4. Gently lift the battery door away from the phone.

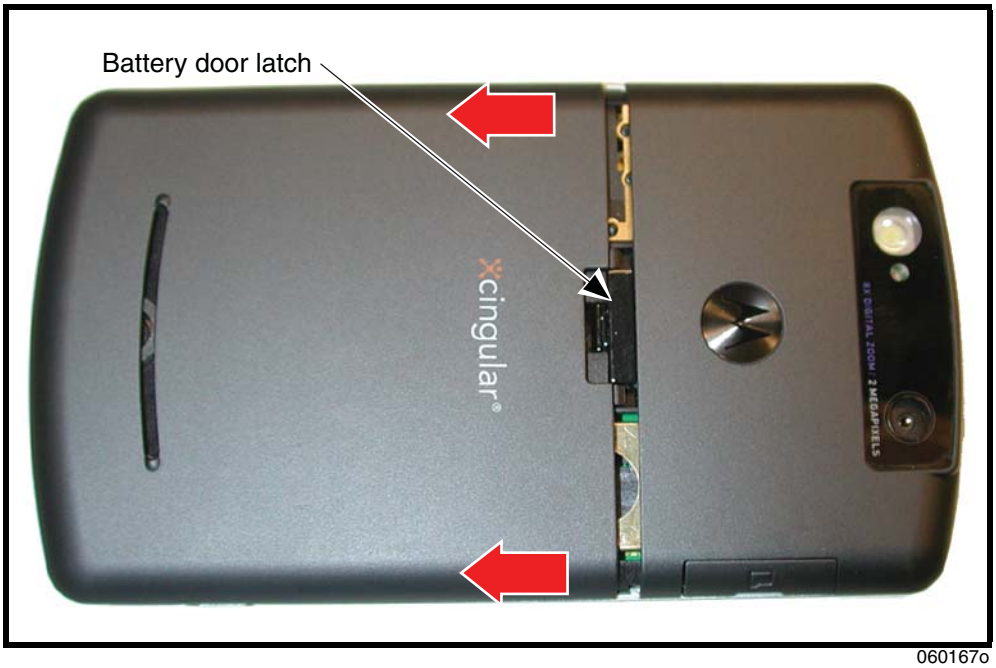

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Figure 5. Removing the Battery Door

5. To replace, align the battery door to the phone.
6. Slide the battery cover into the phone until the battery door latch snaps into place.

Removing and Replacing the Battery

All batteries can cause property damage and/or bodily injury, such as burns if a conductive material, such as jewelry, keys, or beaded chains touch exposed terminals. The conductive material may complete an electrical circuit (short circuit) and become quite hot. Exercise care in handling any charged battery, particularly when placing it inside a pocket, purse, or other container with metal objects.

1. Remove the battery cover as described in the procedures.
2. Lift up the edge of the battery near the side of the phone, as shown in Figure 6.
3. Lift the battery out of the phone.

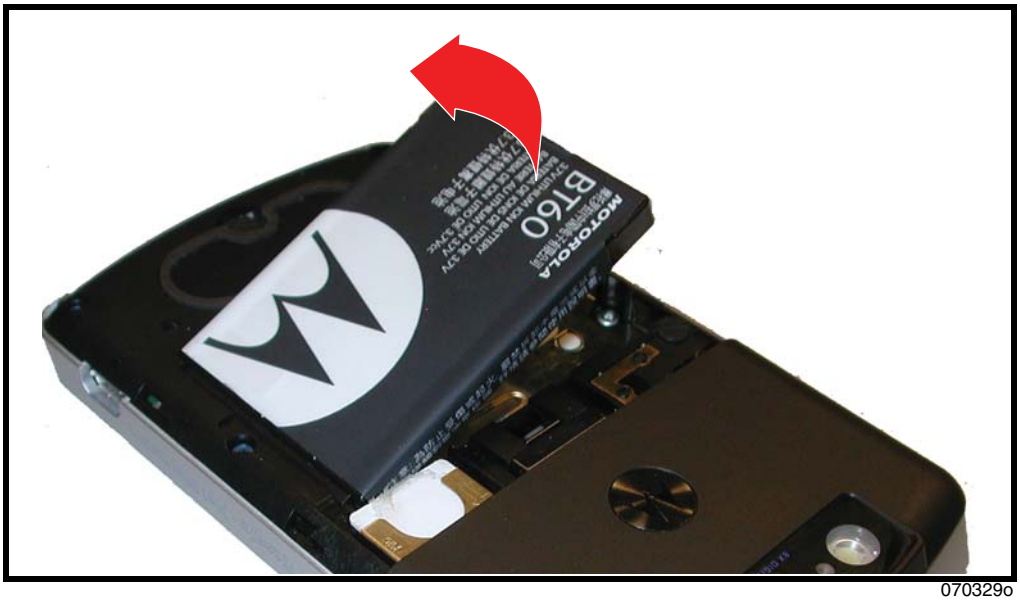

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Figure 6. Removing the Battery

4. To replace, align the battery with the battery compartment so the contacts on the battery match the battery contacts in the phone.
5. Insert the left edge of the battery into the battery compartment.
6. Lower the right edge of the battery into the battery compartment until the battery is completely seated.
7. Replace the battery door as described in the procedures.

Removing and Replacing the Subscriber Identity Module (SIM)

1. Remove the battery door and battery as described in the procedures.
2. Slide the SIM out of the slot as indicated by the arrow (see Figure 7).
3. Carefully remove the SIM from the phone.

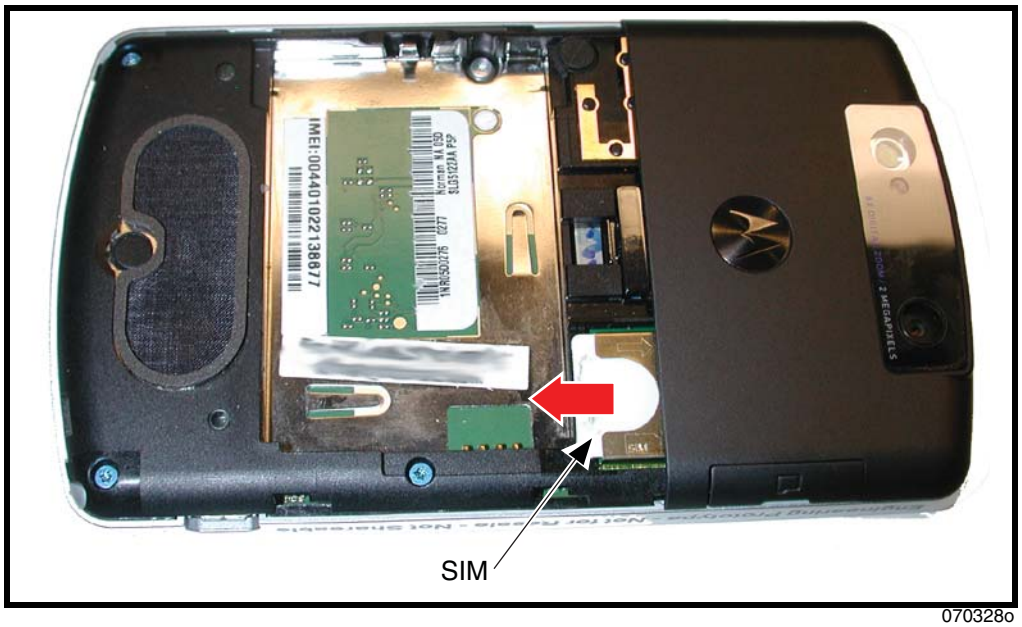

Figure 7. Removing the SIM

4. To replace, slide the SIM into the holder, ensuring the notched corner of the SIM aligns with the notch molded into the holder.
5. Replace the battery and battery door as described in the procedures.

Removing and Replacing the Rear Housing

1. Remove the battery door, and the battery as described in the procedures.
2. Open trans-flash card cover.
3. Use the disassembly tool just below the memory card door, insert as shown and force top cover wall outward to disengage the lower-side snap.

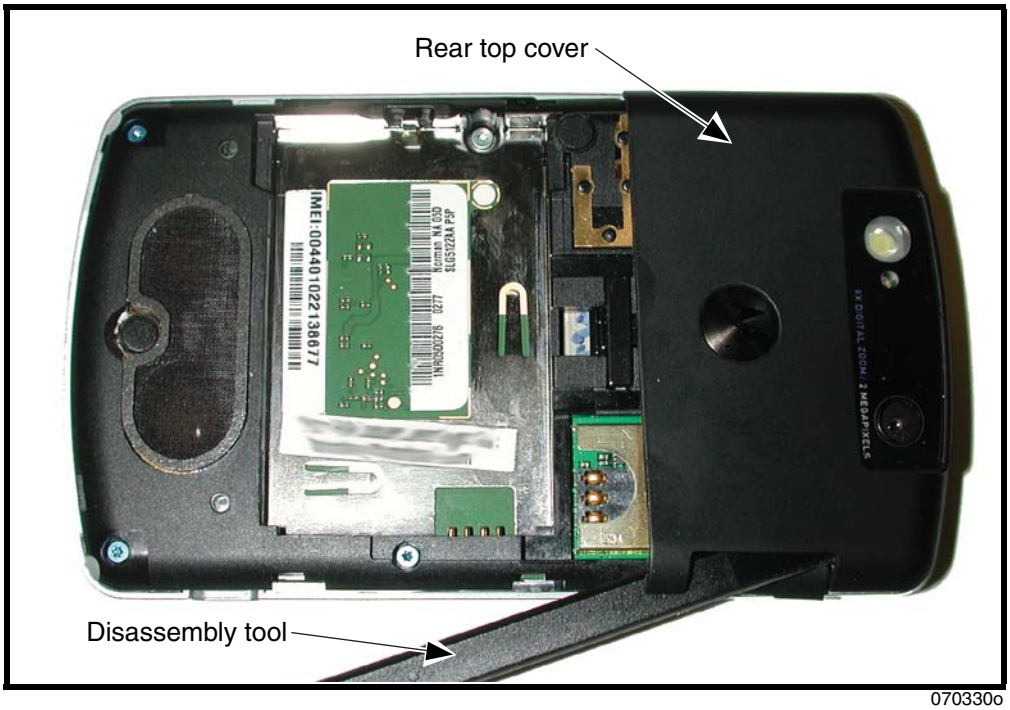

Figure 8. Removing the Rear Top Cover

4. Insert tool as shown and pry upward to disengage snap in top corner of phone.

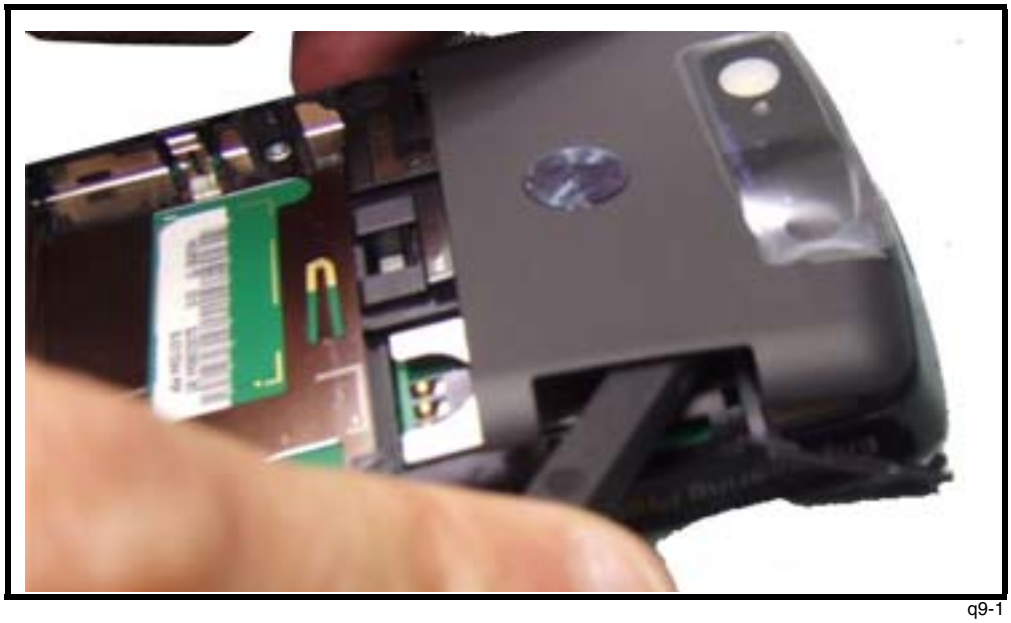

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Figure 9. Removing the Rear Top Cover

5. Insert tool further to pry open center snap, located in lens area, then slide and remove Top Cover as shown. Scrap the Top Cover and Lens Bezel.

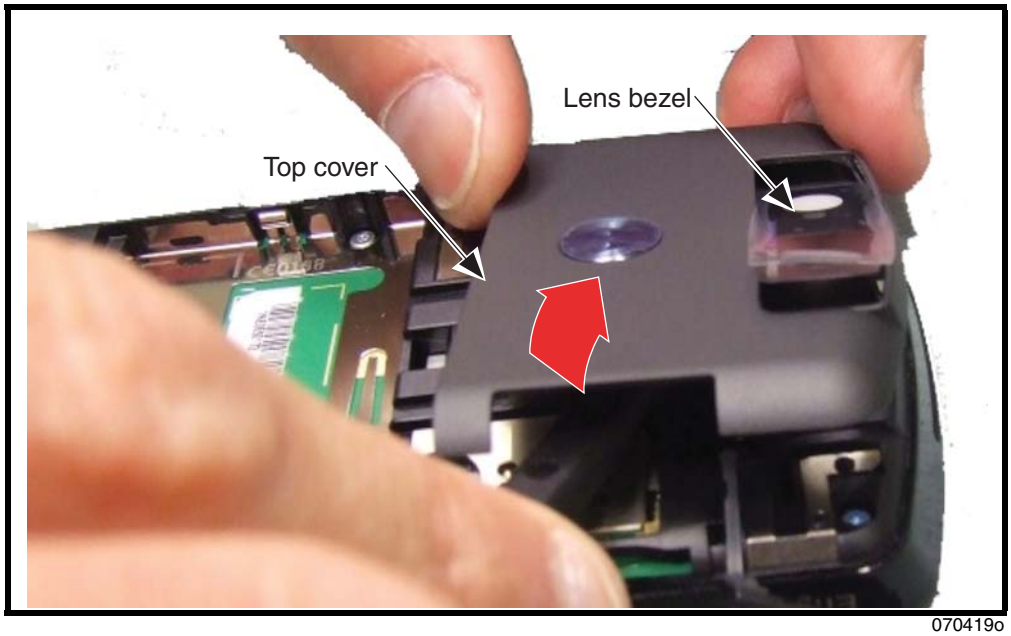

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Figure 10. Removing the Rear Top Cover

6. Use a T-5 driver to remove the six housing screws on the back of the phone (see Figure 11). Retain the screws for reassembly.

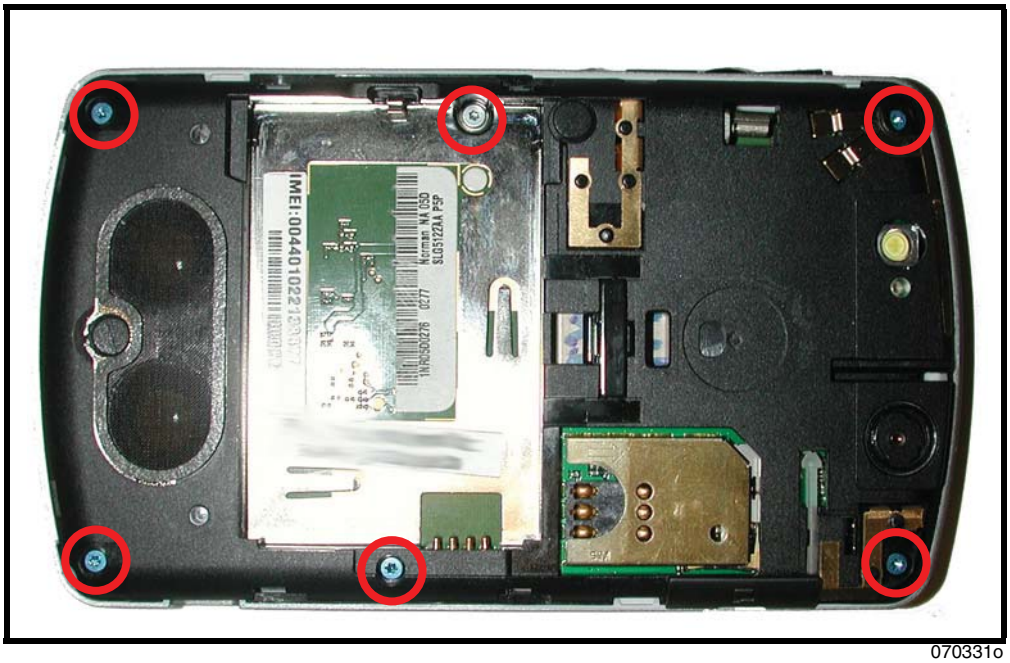

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Figure 11. Removing the Rear Housing Screws

7. Using moderate force, insert the disassembly tool between the rear housing and front bezel at the top center of the phone. Once the tool has been inserted, push inwards to undo the snap (see Figure 12).

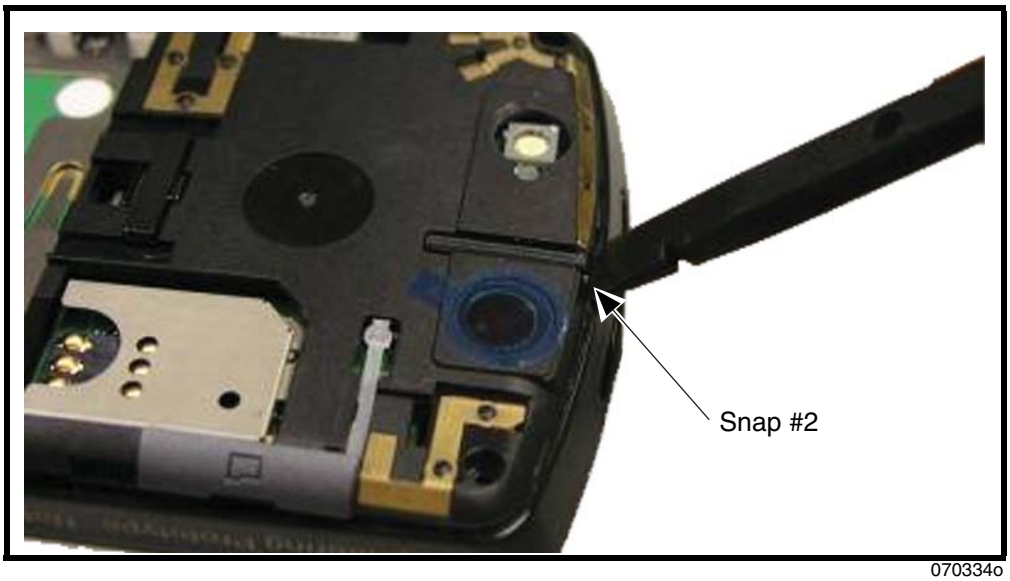

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Figure 12. Removing the Top Rear Housing Snap

8. Next, insert the disassembly tool along the lower side wall and slide down the side of the phone towards the lower side snap (see Figure 13).

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Figure 13. Removing the Rear Housing Snaps

9. At the lower side snap location, wedge open the lower side snap (see Figure 14).

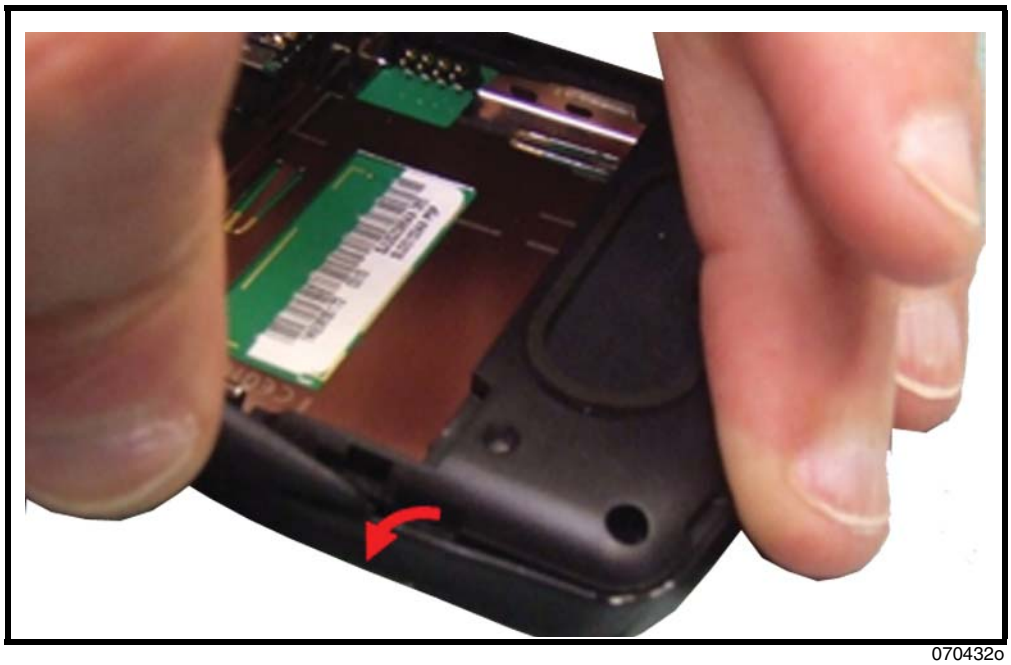

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Figure 14. Removing the Rear Housing Snaps

10. Next, insert the disassembly tool as sown in the bottom corner of the phone and slide towards the center until the bottom snap disengages (see Figure 15).

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Figure 15. Removing the Rear Housing Snaps

11. With the top, lower side, and bottom snaps disengaged, remove the rear housing by carefully rotating the housing up and off (see Figure 16).

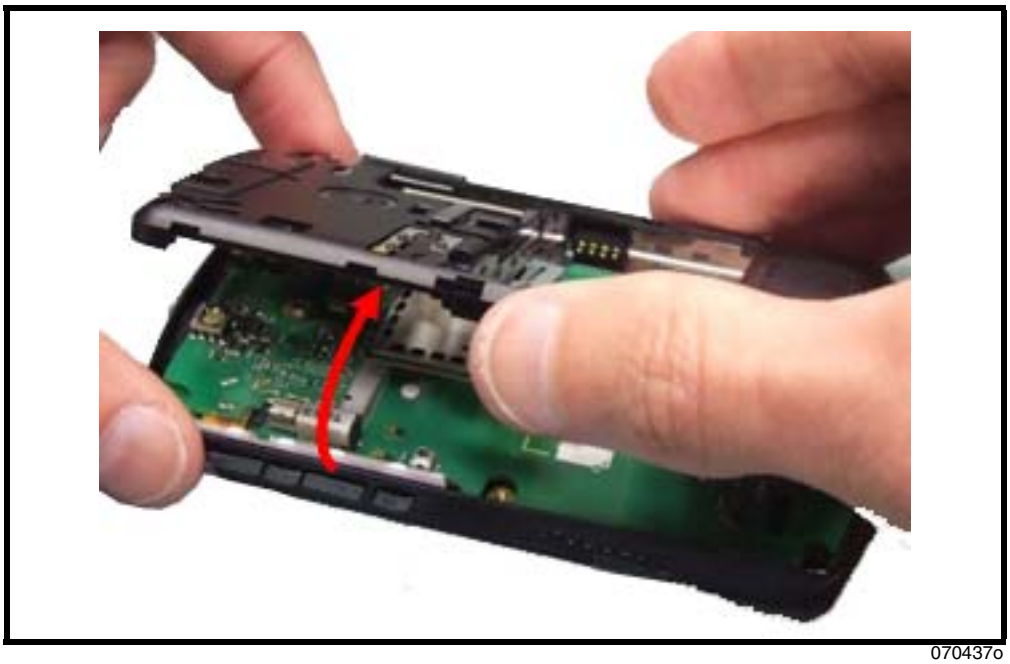

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Figure 16. Removing the Rear Housing

12. Inspect the rear housing snaps for damage. If there is any damage to the snaps, please change the housing.
13. To replace, align the rear housing to the phone.
14. Ensure the camera lens inner surface is free from any dust or foreign matter.
15. Engage and pivot in the top housing snap (see Figure 17).

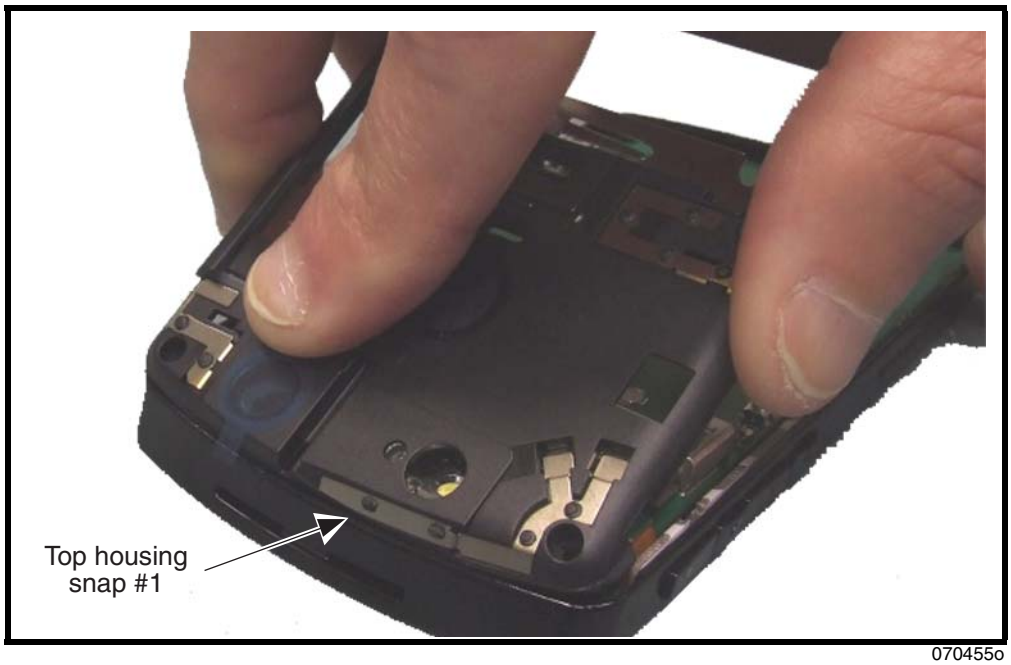

Figure 17. Engaging the Top Housing Snap

16. Engage the upper side snap (see Figure 18).

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Figure 18. Engaging the Upper Side Snap

17. Engage the bottom snap (see Figure 19).

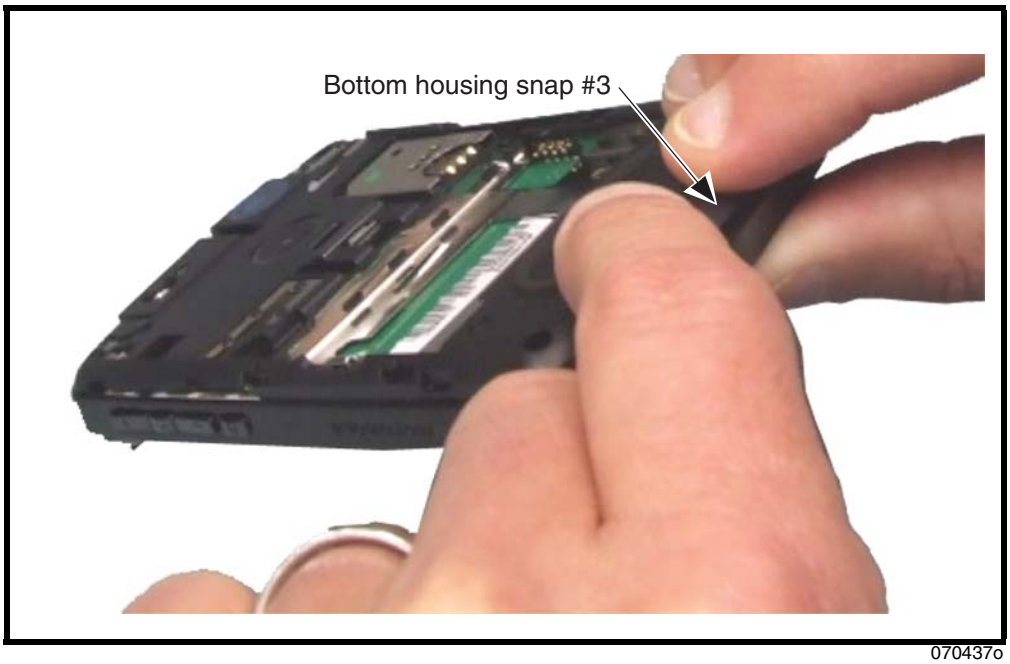

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Figure 19. Engaging the Bottom Snap

18. Engage the lower side snap (see Figure 20).

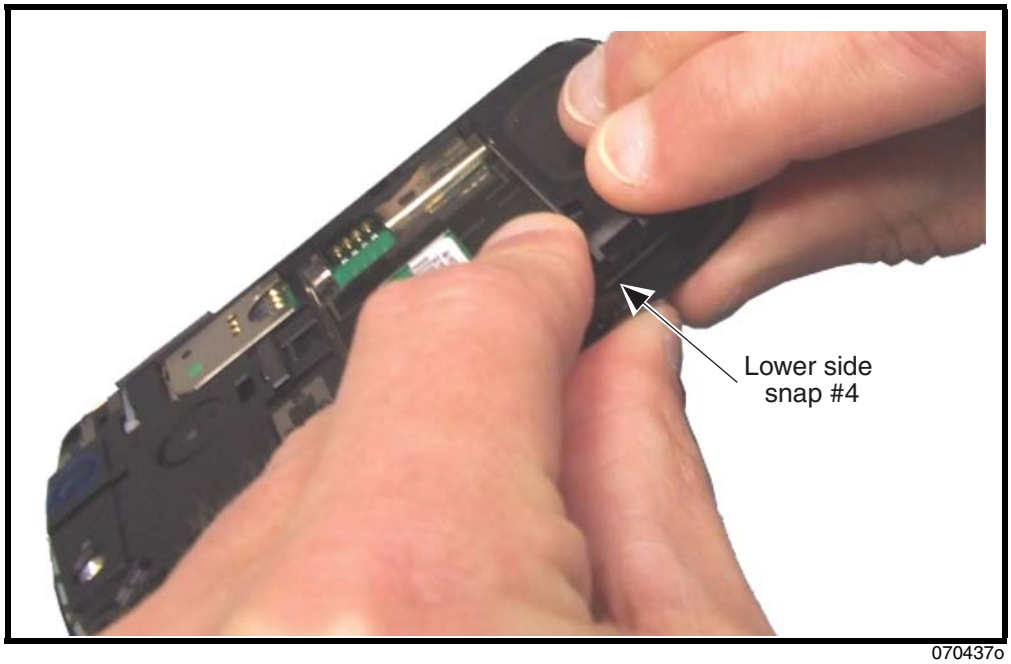

Figure 20. Engaging the Lower Side Snap

19. Carefully press the rear housing onto the phone until all the housing snaps are fully engaged.

20. Insert 6 T5 screws into the rear housing assembly in the order shown, and tighten to 18 Ncm (1.6 inch-pounds) (see Figure 21).

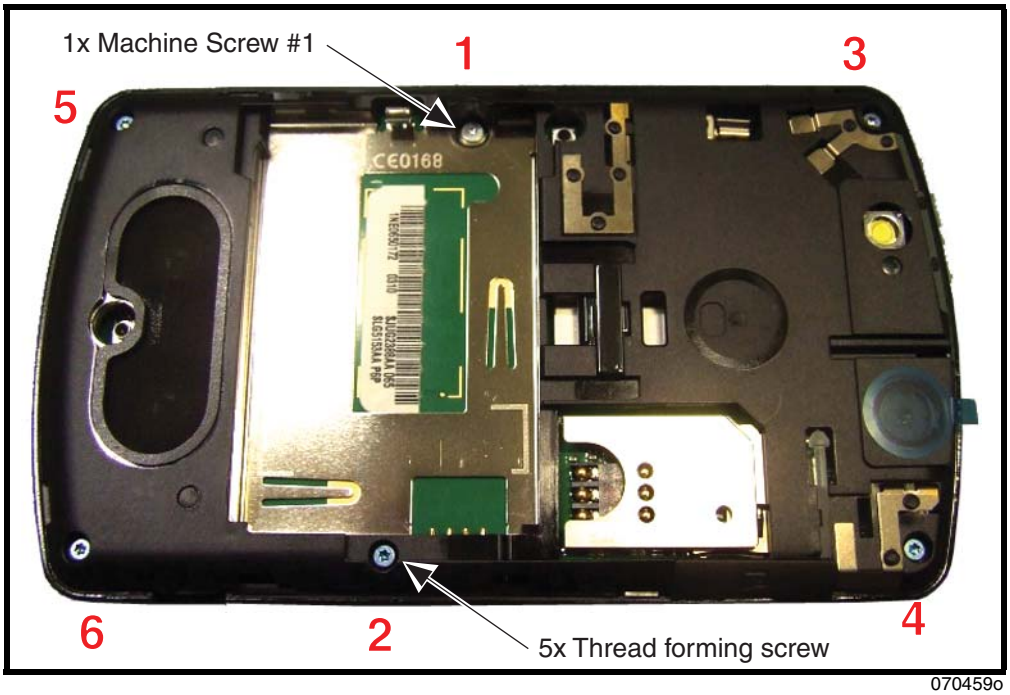

Figure 21. Inserting Rear Housing Screws

21. Top Rear Cover assembly. Engage the two hook features (1 & 2) of the top cover to the rear housing by aligning and sliding sideways as shown.

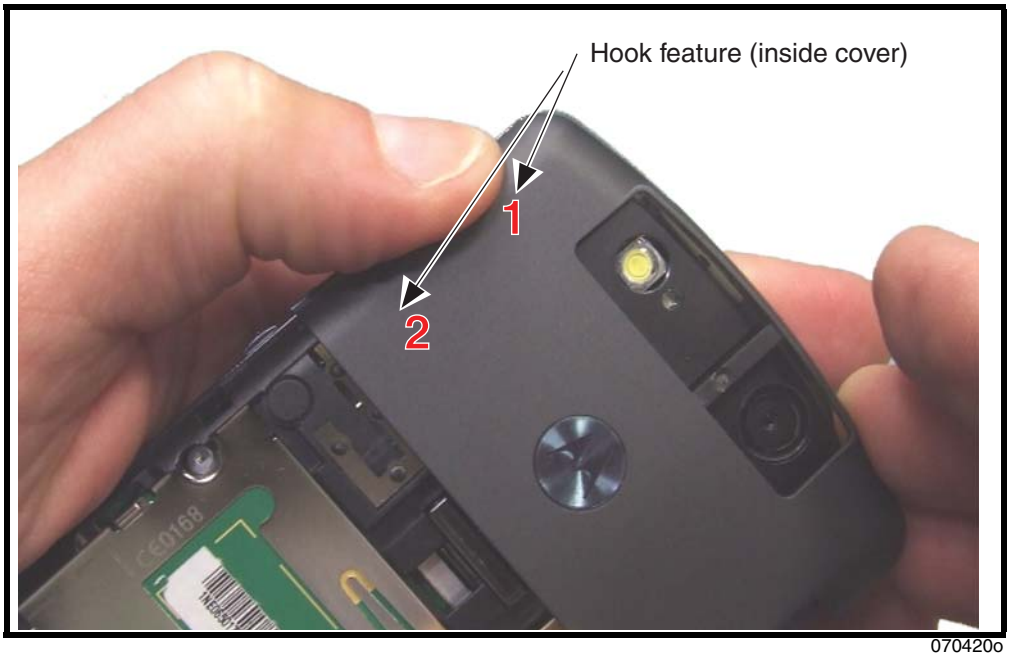

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Figure 22. Engaging the Top Rear Cover Hook Feature

22. Firmly press downward to engage center snap feature as shown. Snap feature is located under the cross beam between camera & flash.

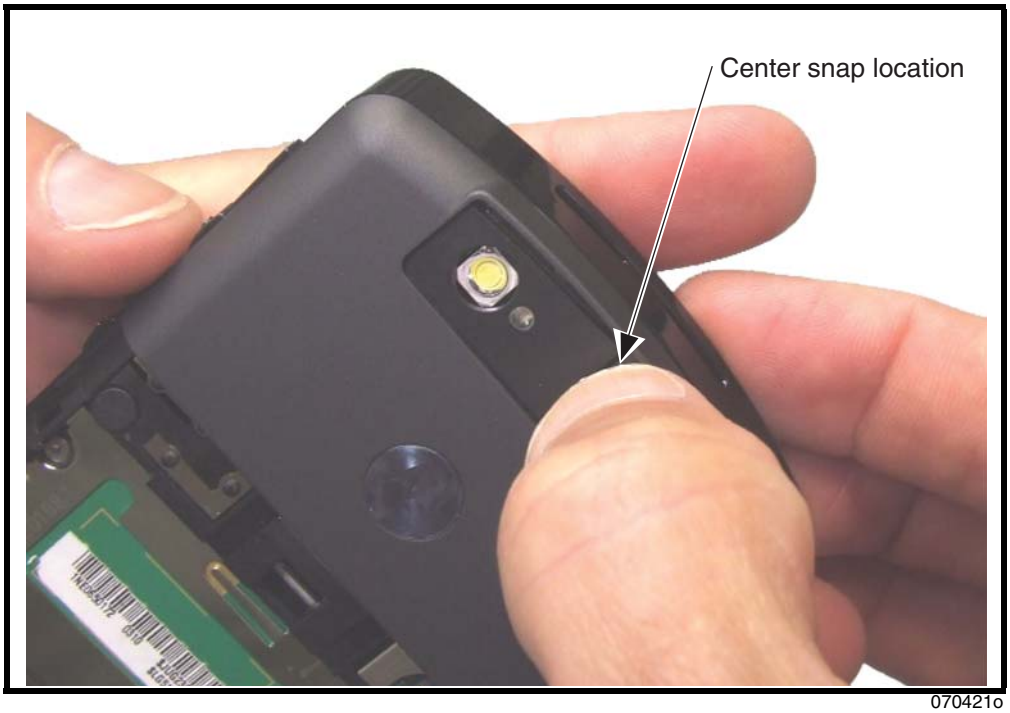
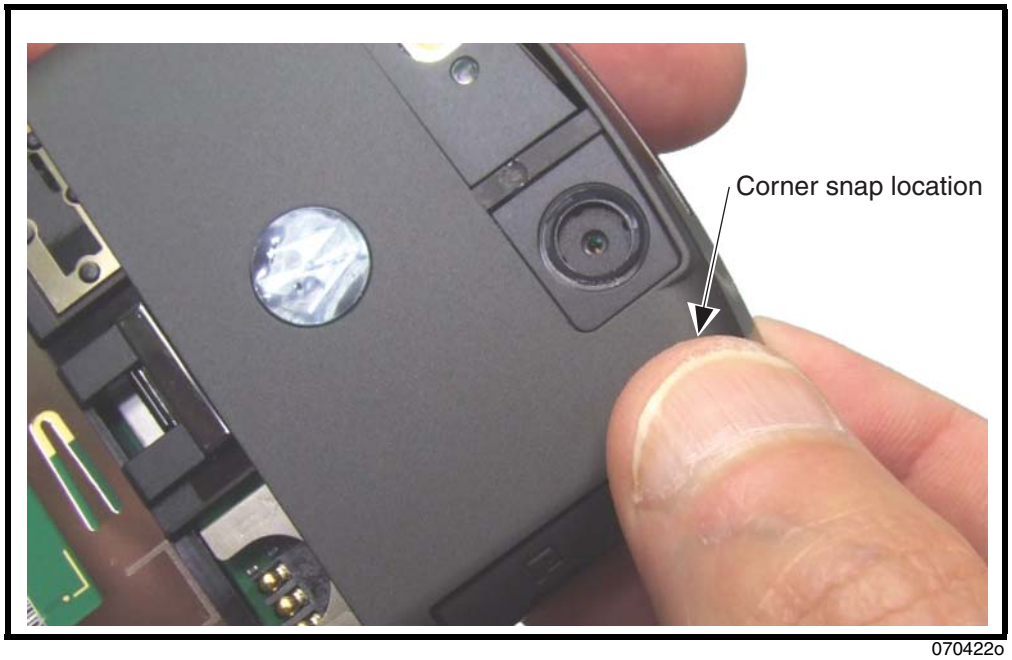


Figure 23. Engaging the Center Snap

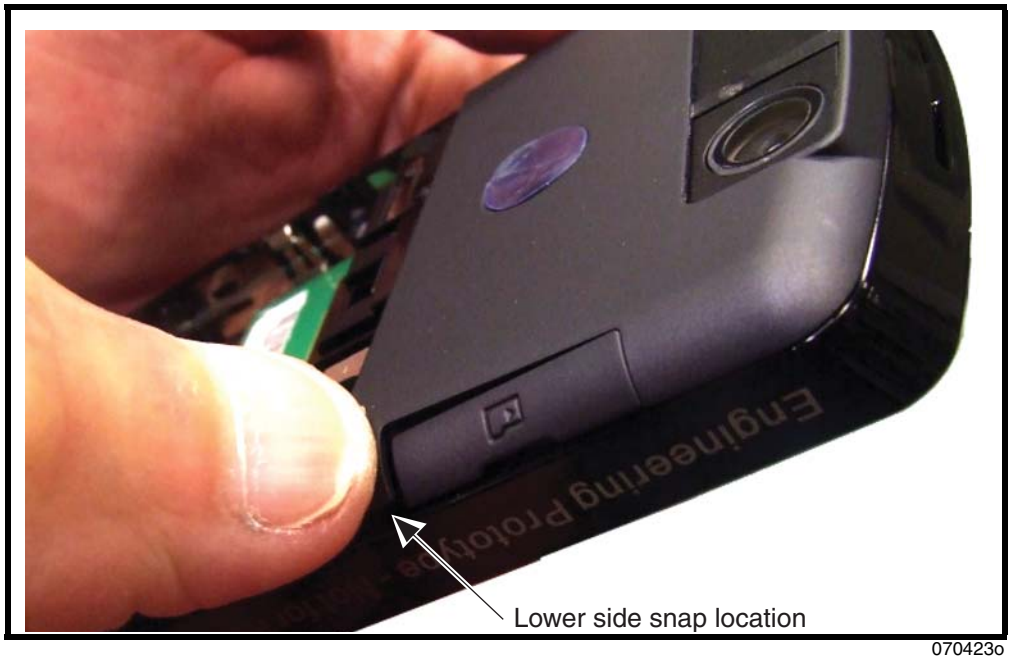
23. Firmly press downward to engage corner snap feature as shown.



070422o

Figure 24. Engaging the Corner Snap

24. Firmly press inward to engage the lower-side snap feature as shown. Inspect to ensure all 5 snaps are engaged.



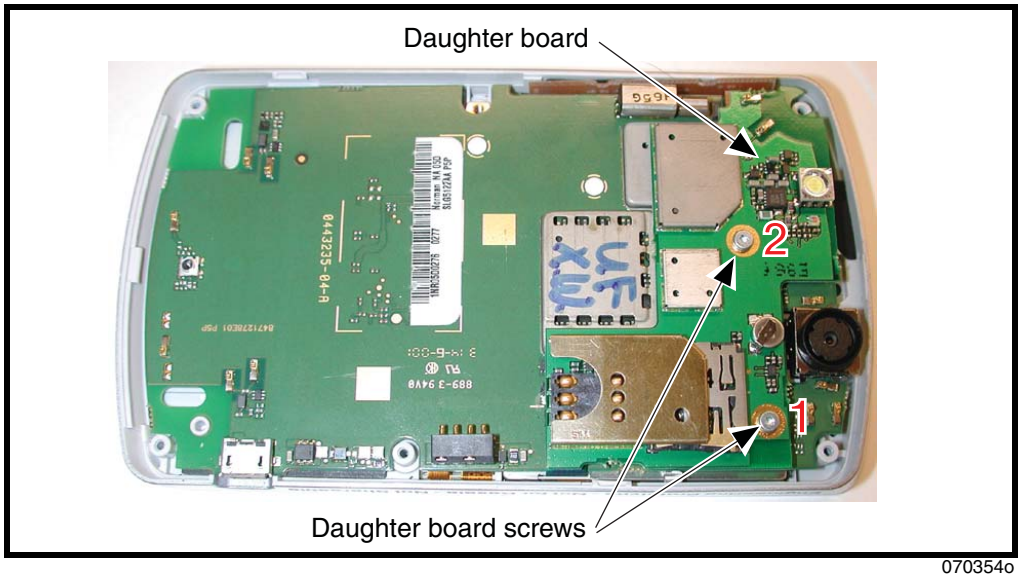
070423o

Figure 25. Engaging the Lower Side Snap

25. Use the generic lens press to attach the camera bezel to the rear top cover
26. Replace the SIM, battery and battery door as described in the procedures.

Removing and Replacing the Daughter Board

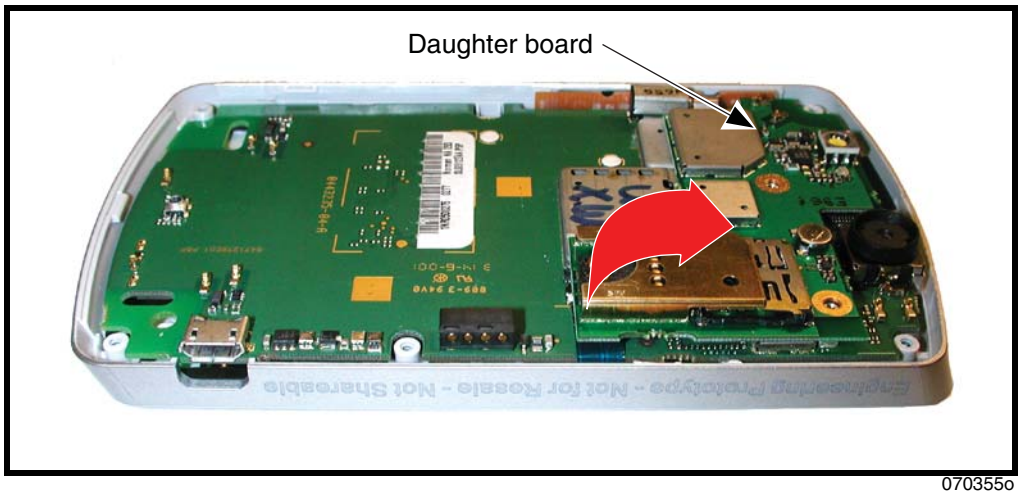
1. Remove the battery door, battery, and rear housing, as described in the procedures.
2. Use a T5 Torx bit, remove the two daughter board screws in order as shown (see Figure 26).



070354o

Figure 26. Removing the Daughter Board Assembly Screws

3. Rotate the daughter board upward as shown, to disconnect from the transceiver board.



070355o

Figure 27. Removing the Daughter Board Assembly Screws

4. To replace, align the daughter board to its place in the rear housing assembly.

5. Align the daughter board connector (use the daughter board screw holes to align) and connect it (see Figure 28).

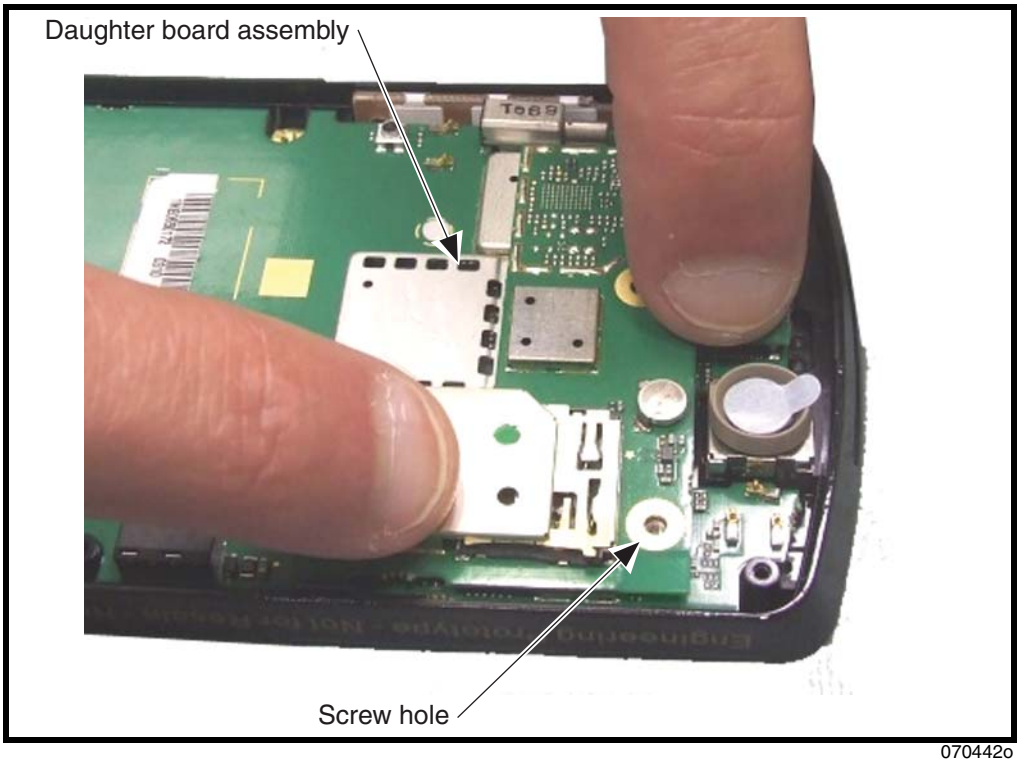


Figure 28. Align the Daughter Board Assembly Connector

6. Insert and tighten the center daughter board screw with the T5 Torx bit to 1.6 in.-lbs. torque (see Figure 29).

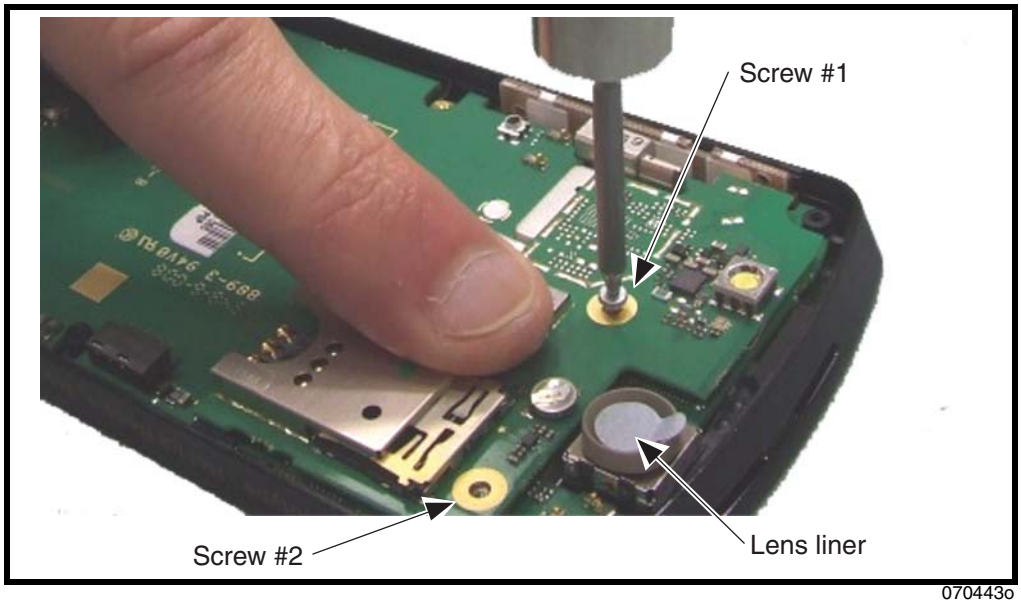


Figure 29. Driving the Daughter Board Assembly Screws

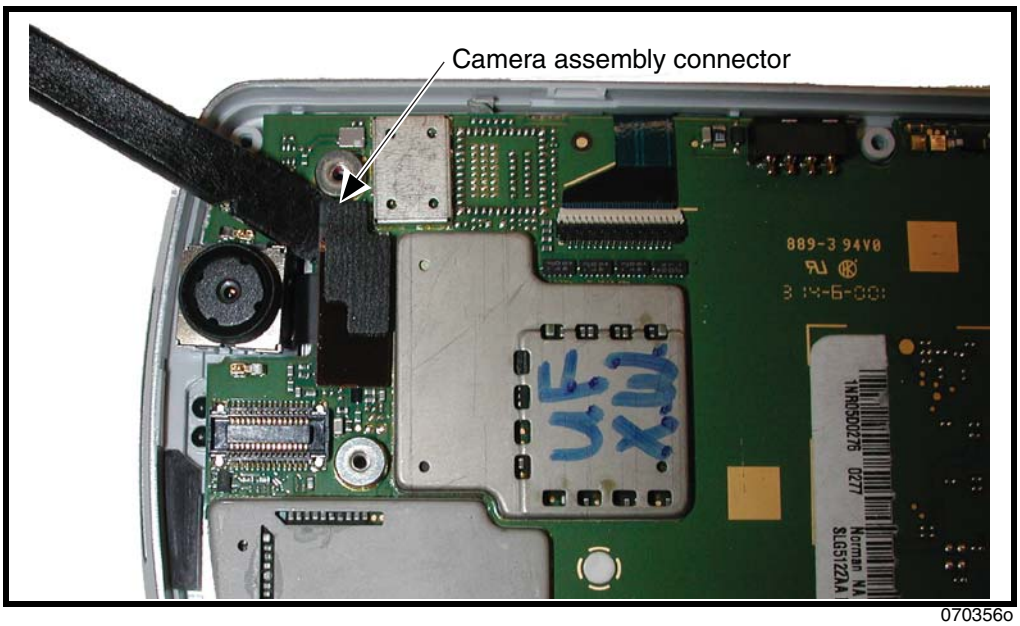
7. Insert and tighten the second daughter board screw with the T5 Torx bit to 1.6 in.-lbs. torque (see Figure 29).
8. Remove and discard the top lens liner (see Figure 29).
9. Replace the rear housing assembly, SIM, battery, and battery door as described in the procedures.

Removing the Camera Assembly

1. Remove the battery door, battery, rear housing, antenna, and daughter board as described in the procedures.

The flexible printed cable (FPC) (flex) is easily damaged. Exercise extreme care when handling.

2. Insert the flat end of the disassembly tool under the edge of the camera connector and rotate the tool to unseat the camera connector from the socket (see Figure 30).



070356o

Figure 30. Removing the Camera Assembly Connector

3. Grasp the camera module firmly and pull upward to unseat from adhesive mounting.

4. To replace, remove and discard the adhesive liner from the bottom of the camera to expose the adhesive (see Figure 31). Do not remove the top lens liner yet.

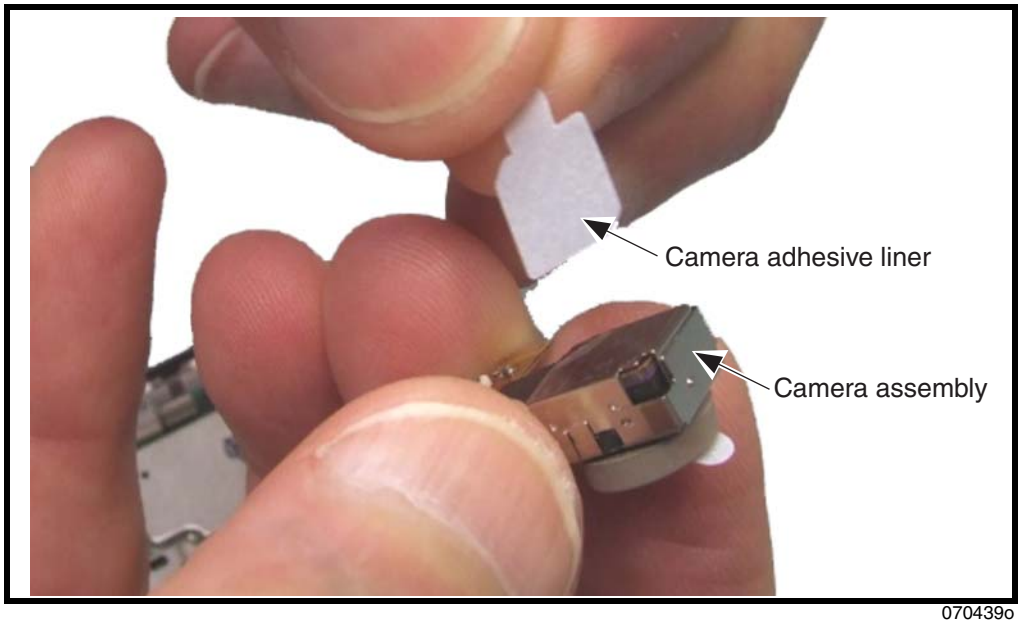


Figure 31. Removing the Camera Assembly Adhesive Liner

5. Align the camera body to the two corner locating features in the housing, then seat and apply firm pressure for 3 seconds to adhere the camera body to the housing (see Figure 32).

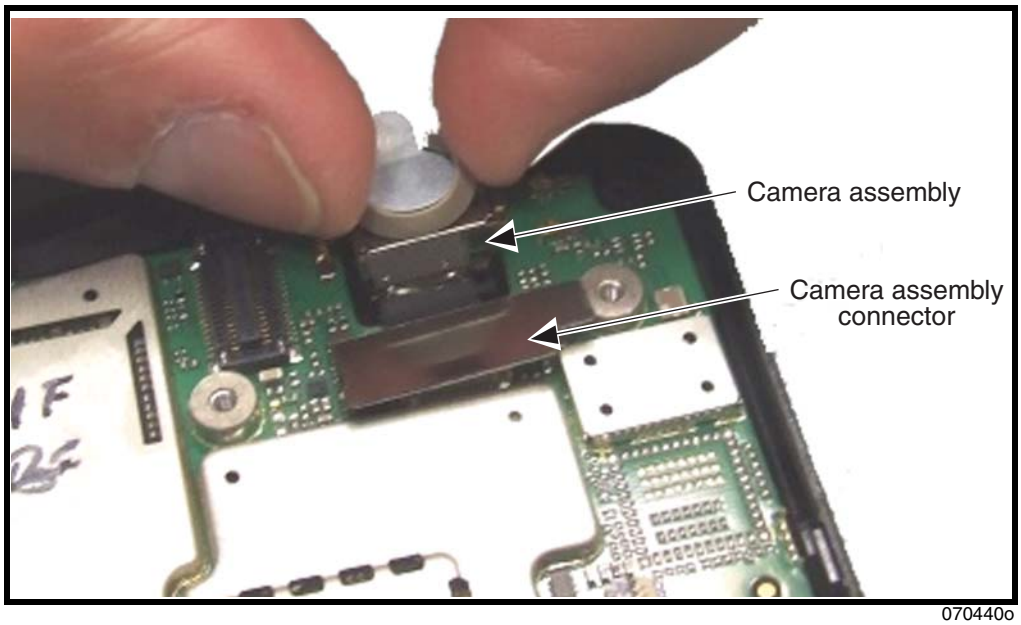


Figure 32. Installing the Camera Assembly

6. While securing the camera body, align the camera board-to-board (flex) connector and connect it (see Figure 33).

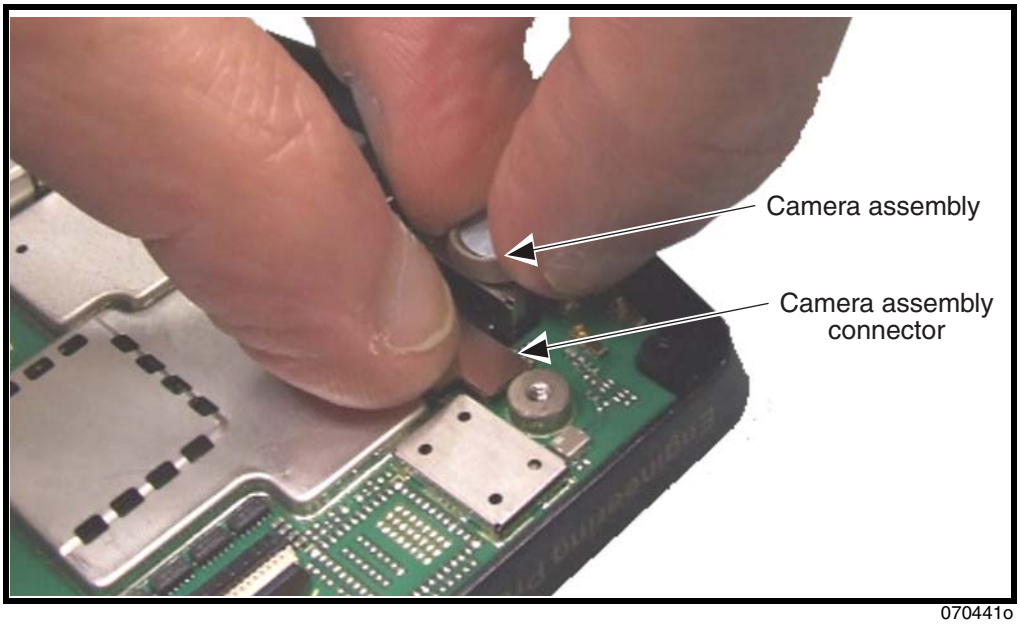


Figure 33. Seating the Camera Assembly

7. Replace the daughter board, rear housing, SIM, battery, and battery door as described in the procedures.

Removing and Replacing the Side Keys Flex

1. Remove the battery door, battery, and rear housing, as described in the procedures.
2. Insert the flat edge of the disassembly tool under the side keys flex and unseat the flex connector from its socket (see Figure 34).

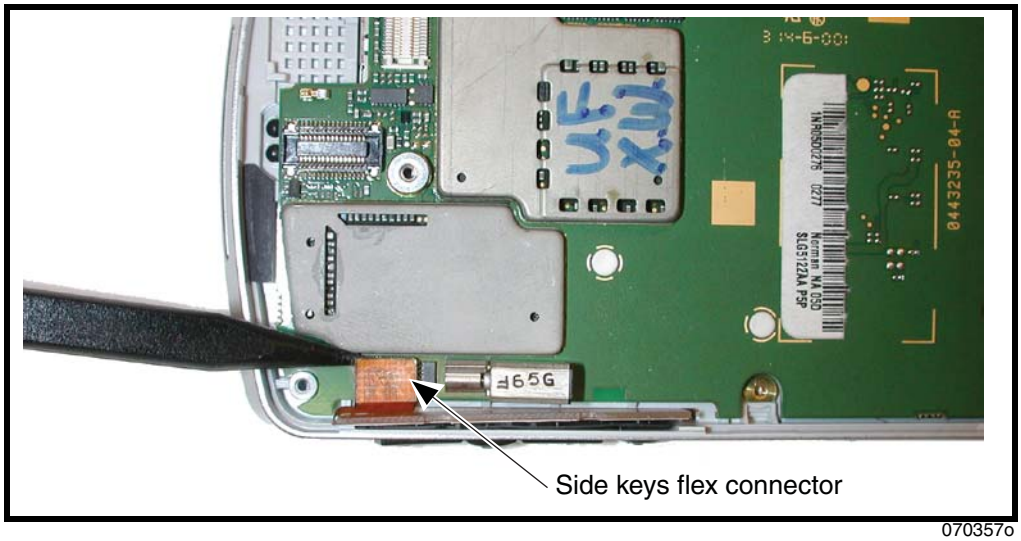


Figure 34. Removing the Side Keys Flex

3. Carefully lift the side keys flex out of the phone with the plastic tweezers.
4. To replace, align the side keys flex to the socket connector on the transceiver board.
5. Gently press down on the connector until it snaps into the socket.
6. Insure the side keys make proper contact with the side keys flex.
7. Replace the camera assembly, daughter board assembly, rear housing, SIM, battery and battery door as described in the procedures.

Removing and Replacing the Main Board

1. Remove the battery door, battery, rear housing, antenna, keypad bezel, daughter board, keyboard stiffener, and speaker carrier, as described in the procedures.

The flexible printed cable (FPC) (flex) is easily damaged. Exercise extreme care when handling.

2. Carefully unlock the display flex ZIP connector (see Figure 35).

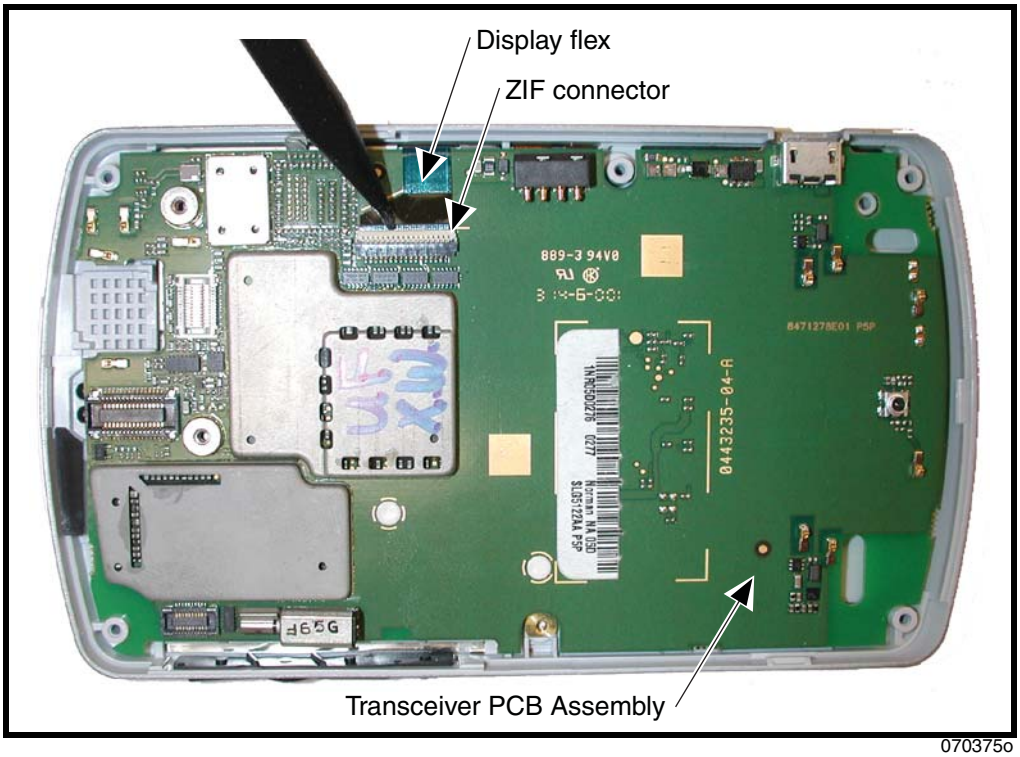
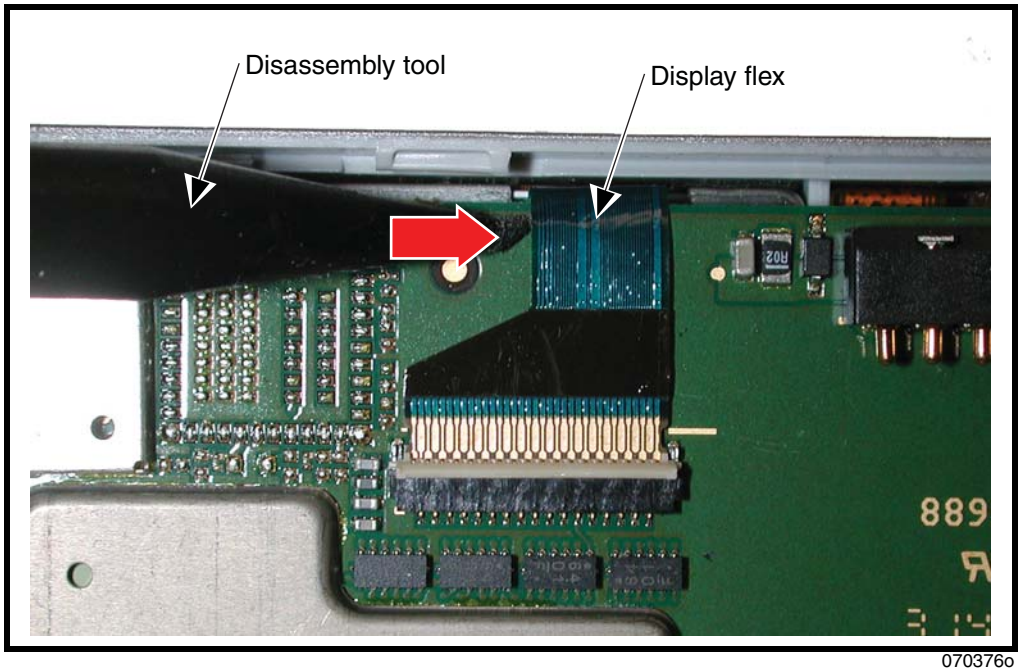


Figure 35. Unlocking the Display FLEX Connector

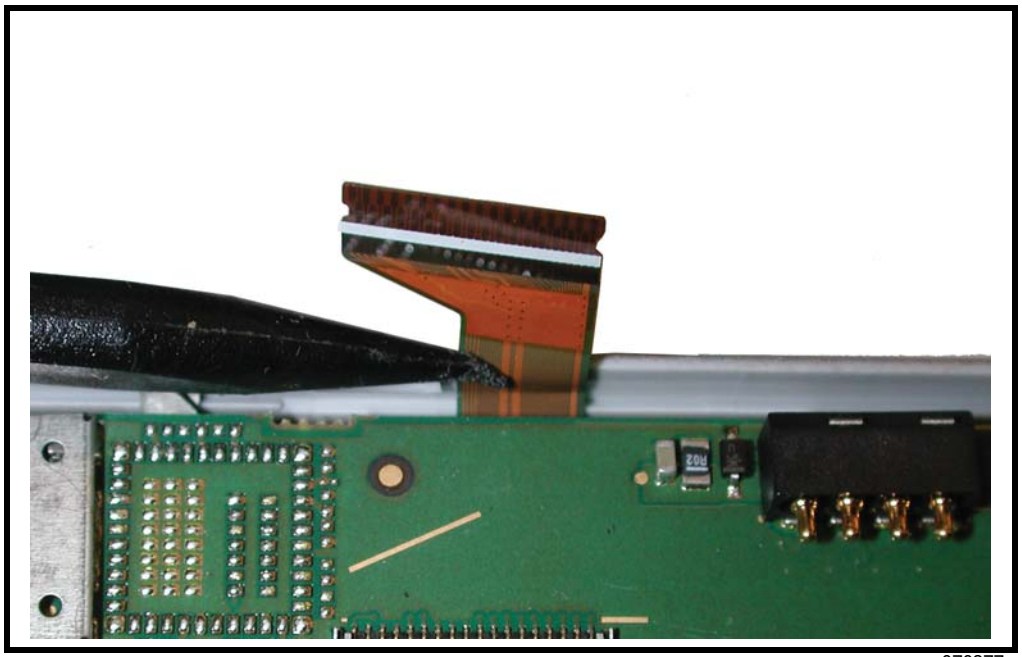
3. Insert the disassembly tool under the display flex and carefully slide it out of the ZIF connector (see Figure 36).



0703760

Figure 36. Removing the Display FLEX Connector

4. Move the display flex out of the way before moving the transceiver PC board.



0703770

Figure 37. Removing the Display FLEX

5. Rotate the left side of the transceiver PC board assembly out of the front housing and use the disassembly tool to unseat the keypad flex connector (see Figure 38).

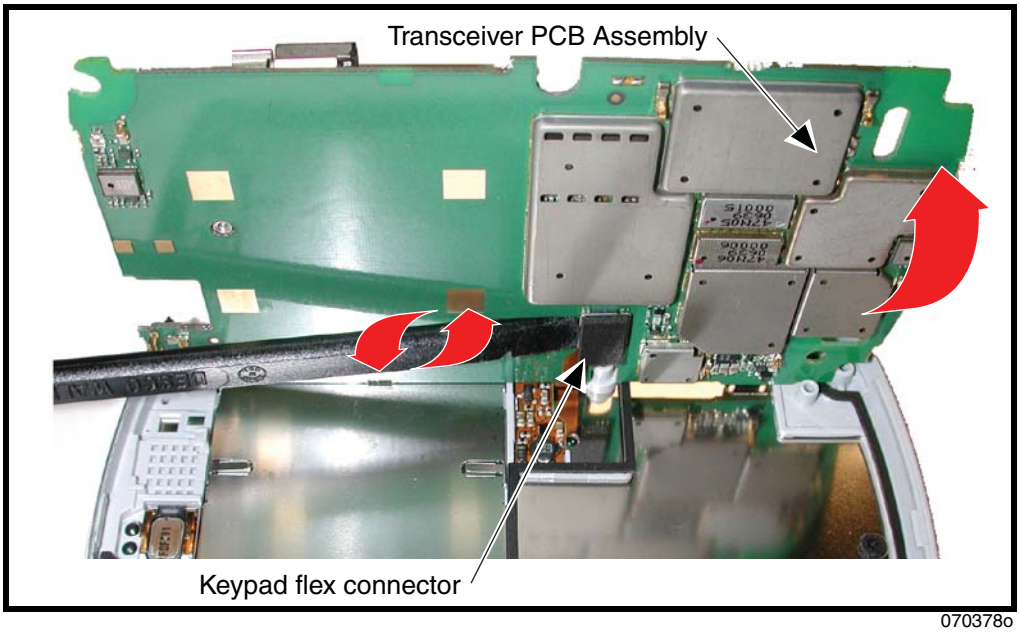


Figure 38. Disconnecting the Keypad Flex Connector

This product contains static-sensitive devices. Use anti-static handling procedures to prevent electrostatic discharge (ESD) and component damage.

6. Carefully remove the main board out of the front housing.

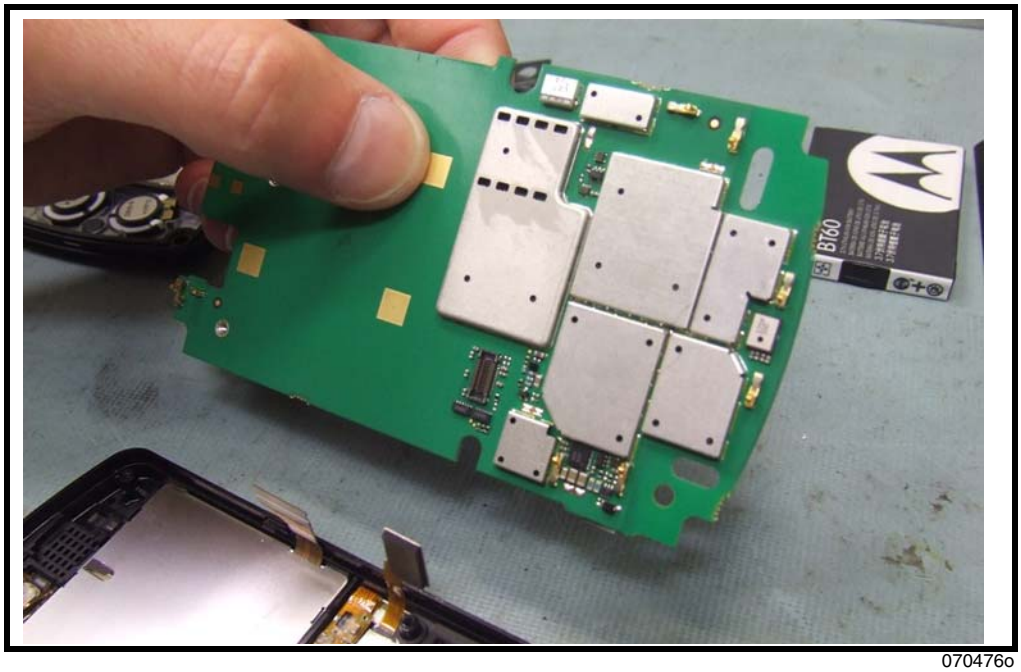


Figure 39. Removing the Main Board

This product contains static-sensitive devices. Use anti-static handling procedures to prevent electrostatic discharge (ESD) and component damage.

7. To replace, place the side edge of the main board into the front housing.
8. Connect the keypad flex to the socket on the main board.
9. lower the main board into place in the front housing.
10. Reconnect the display flex to its socket on the main board.
11. Press display flex connector onto its socket.
12. Replace the side keys flex, camera assembly, daughter board, rear housing SIM, battery, and battery cover as described in the procedures.

Removing the Display Assembly

1. Remove the battery door, battery, rear housing, daughter board, camera assembly, main board, as described in the procedures.
2. Using flat, round-tip tweezers, carefully insert between display bezel and front housing wall in corner as shown to disengage snap #1. Move to other corner as shown and repeat to disengage snap #2. Repeat again at snap #3. With snaps #1,2, & 3 disengaged, the display will simply rotate up and out of the front housing (see Figure 40).

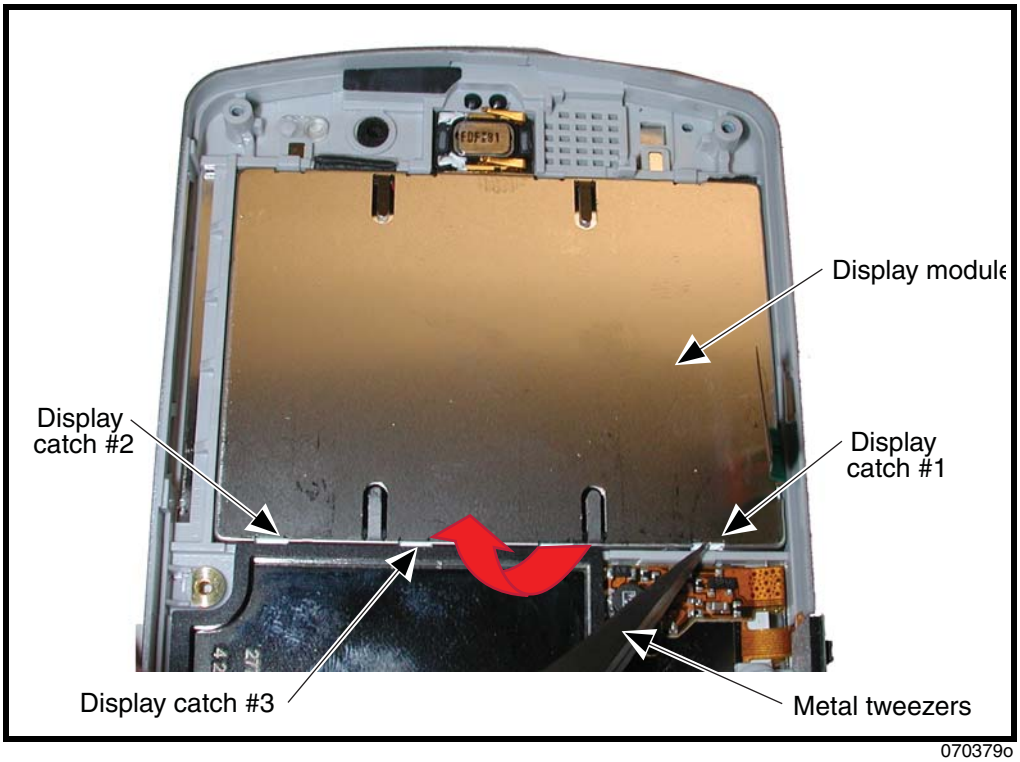
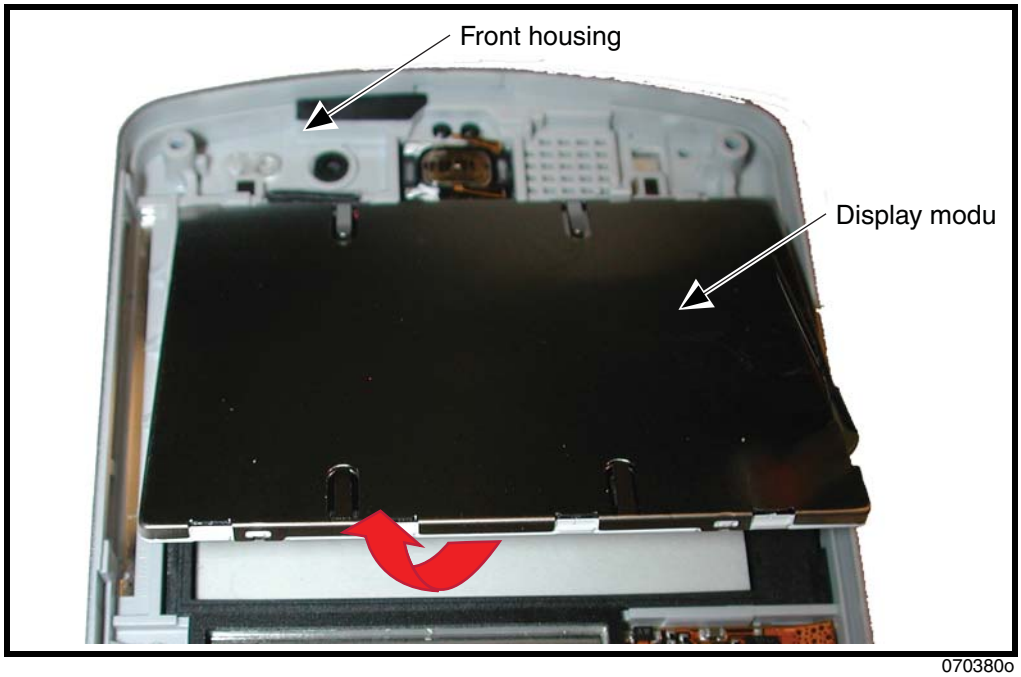


Figure 40. Removing the Display Assembly Catches

3. Rotate the bottom edge of the display upward out of the front housing (see Figure 41).



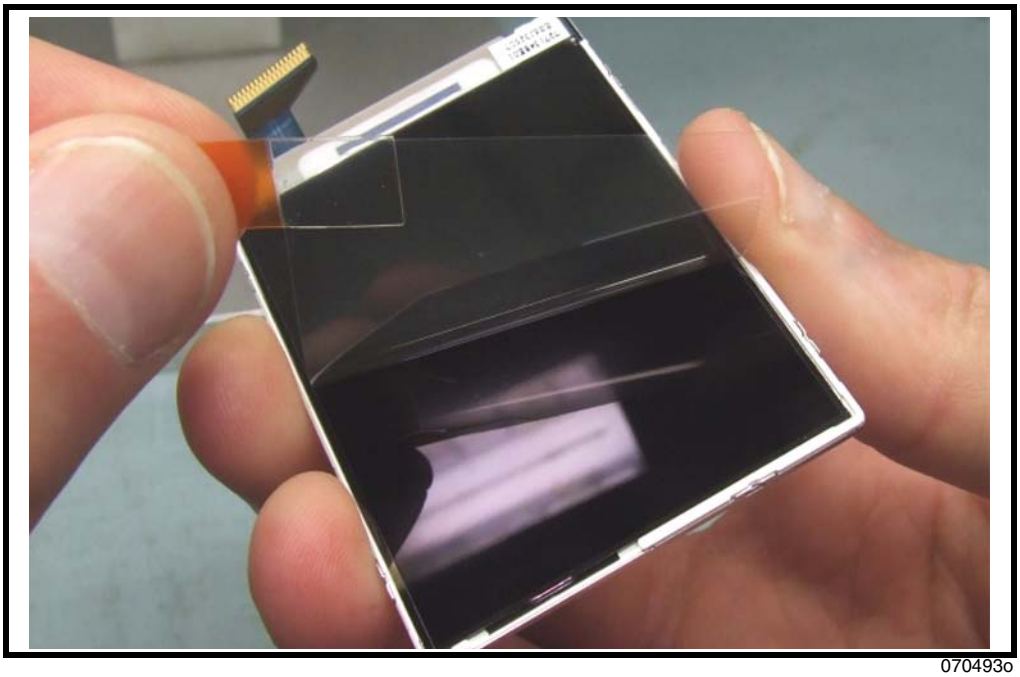
070380o

Figure 41. Removing the Display Assembly

The flexible printed cable (FPC) (flex) is easily damaged. Exercise extreme care when handling.

4. Carefully lift the display assembly out of the front housing.

5. To replace, remove and discard the LCD lens liner (see Figure 42).

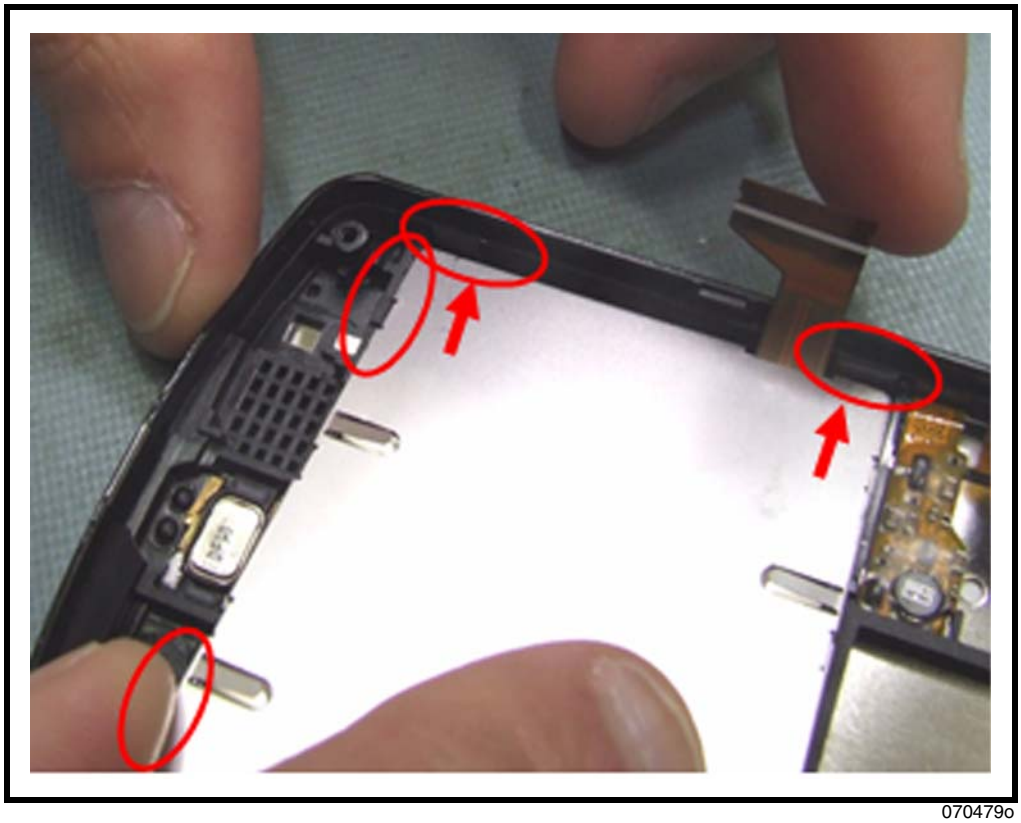


070493o

Figure 42. Removing the LCD Liner

6. Ensure the LCD is free from any dust or foreign matter.
7. Align the display assembly to the front housing.

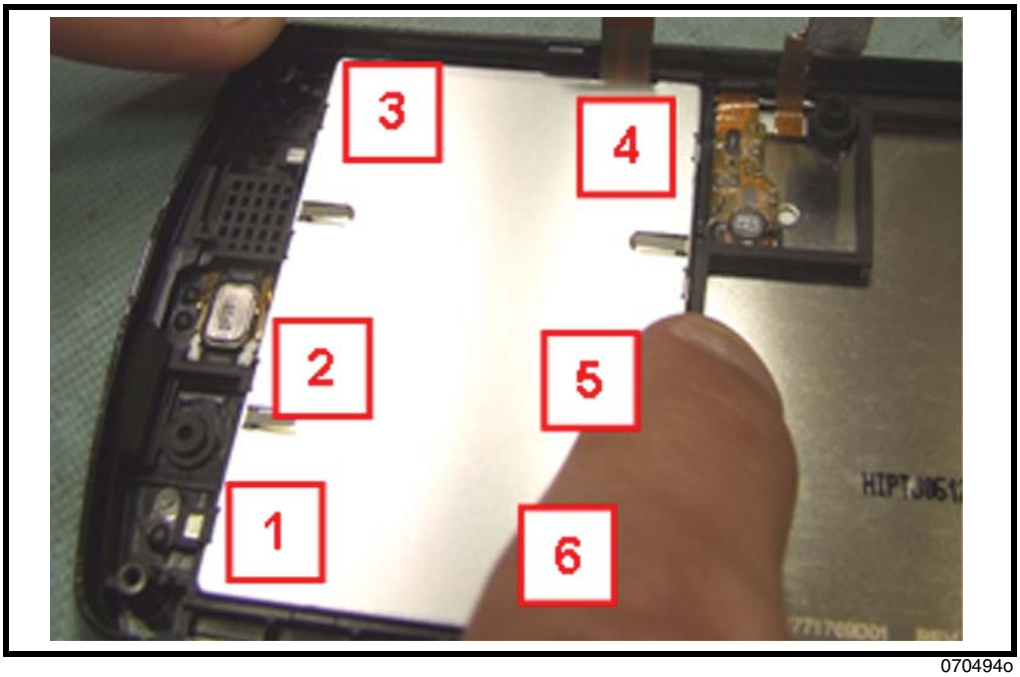
8. Tilt display, insert the flex edge of the display assembly first, then lower the display assembly into the front housing. Ensure that all four poron bias tabs (indicated by ovals) are not crushed under the LCD (see Figure 43).



0704790

Figure 43. Securing the Display Assembly

9. By carefully applying force along LCD outer perimeter, engage the snaps in order 1 through 6 as indicated.



070494o

Figure 44. Inserting the Display Assembly

10. Replace the main board, daughter board, rear housing, battery and battery door as described in the procedures.

UMTS Subscriber Identity Module (USIM) and Identification

SIM Card

A USIM is required to access the existing local UMTS and GSM networks, or remote networks when traveling (if a roaming agreement has been made with the provider).

The USIM contains:

- All the data necessary to access UMTS and GSM services.
- The ability to store user information, such as phone numbers.
- All information required by the network provider to provide access to the network.

Personality Transfer

A personality transfer is required when a phone is express exchanged or when the main board is replaced. Personality transfers reproduce the customer's original personalized details, such as menu and stored memory, such as phone books, or even just program a unit with basic user information such as language selection. MOTO Q q9 telephones use ActiveSync to effect a personality transfer.

Identification

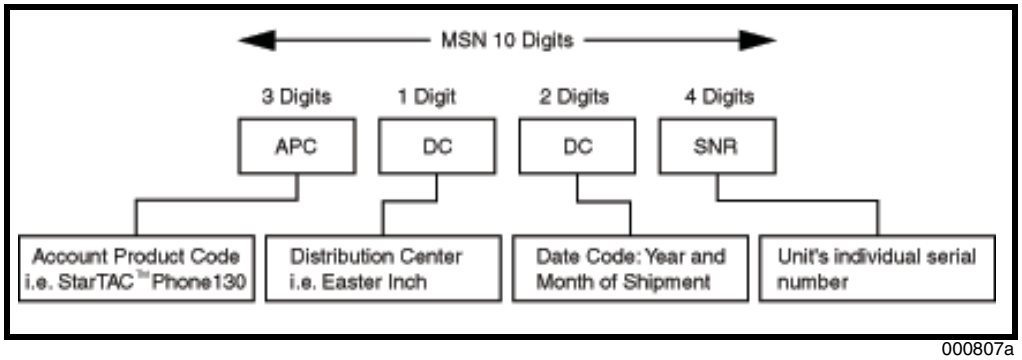
Each Motorola UMTS device is labeled with a variety of identifying numbers. The following information describes the current identifying labels.

Mechanical Serial Number (MSN)

The Mechanical Serial Number (MSN) is an individual unit identity number and remains with the unit throughout the life of the unit.

The MSN can be used to log and track a unit on Motorola's Service Center Database.

The MSN is divided into 4 sections as shown in Figure 45.



000807a

Figure 45. MSN Label breakdown

International Mobile Station Equipment Identity (IMEI)

The International Mobile station Equipment Identity (IMEI) number is an individual number unique to the PCB and is stored within the unit's memory.

The IMEI uniquely identifies an individual mobile station and thereby provides a means for controlling access to UMTS networks based on mobile station types or individual units. The full IMEI structure is listed in Table 3.

Table 3. IMEI Number Breakdown

TAC	Serial Number	Check Digit
NNXXXXXX	ZZZZZZ	A

Where

TAC Type Allocation Code, formerly known as Type Approval Code

NN Reporting body identifier

XXXXXX Type Identifier

ZZZZZZ Individual unit serial number

A Phase 1 = 0.
Phase 2 = check digit defined as a function of all other IMEI digits

Other label number configurations present are:

- **TRANSCEIVER NUMBER**: Identifies the product type. Normally the SWF number. (i.e. V100).
- **PACKAGE NUMBER**: Identifies the equipment type, mode, and language in which the product is shipped.

Troubleshooting

Table 4. Level 1 and 2 Troubleshooting Chart

Symptom	Probable Cause	Verification and Remedy
1. Telephone will not turn on or stay on.	a) Battery either discharged or defective.	Measure battery voltage across a 50 ohm (>1 Watt) load. If the battery voltage is <3.25 Vdc, recharge the battery using the appropriate battery charger. If the battery will not recharge, replace the battery. If battery is not at fault, proceed to b.
	b) Battery connectors open or misaligned.	Visually inspect the battery connectors on both the battery and the telephone. Realign and, if necessary, either replace the battery or refer to a Level 3 Service Center for the battery connector replacement. If battery connectors are not at fault, proceed to c.
	c) Transceiver board defective.	Refer service to authorized Level 3 service center for replacement.
	d) Front housing failure.	Replace the front housing assembly. Temporarily connect a +3.6 Vdc supply to the battery connectors. Depress the PWR button. If unit turns on and stays on, disconnect the dc power source and reassemble with the new front housing assembly.
2. Telephone exhibits poor reception or erratic operation such as calls frequently dropping or weak or distorted audio.	a) Antenna assembly defective.	Check to make sure that the antenna pin is properly connected to the transceiver board assembly. If connected properly, substitute a known good antenna. If the fault is still present, proceed to b.
	b) Transceiver board defective.	Refer service to authorized Level 3 service center for replacement.
3. Display is erratic, or provides partial or no display.	a) Connections to or from transceiver board defective.	Check general condition of flex and flex connector. If the flex and connector are good, check that the flex connector is fully connected. If not, check connector to transceiver board connections. If faulty connector, replace the transceiver board. If connector is not at fault, proceed to b.
	b) Transceiver board assembly defective.	Refer service to authorized Level 3 service center for replacement.
4. Incoming call alert transducer audio distorted or volume is too low.	Faulty transceiver board assembly.	Replace the transceiver board (refer to 1c). Verify that the fault has been cleared and reassemble the unit with the new transceiver board.
5. Telephone transmit audio is weak. (usually indicated by called parties complaining of difficulty in hearing voice).	a) microphone obstructed by user while holding the phone	Verify transmit audio quality. If transmit audio quality is still weak and microphone is not obstructed, proceed to b.
	b) Transceiver board assembly defective.	Refer service to authorized Level 3 service center for replacement.
6. Receive audio from earpiece speaker is weak or distorted.	a) Earpiece speaker defective.	Check speaker connections. If connections are at fault, replace speaker. If connection is not at fault, proceed to b.
	b) Antenna assembly defective.	Check to make sure the antenna is installed correctly. If the antenna is installed correctly, substitute a known good antenna assembly. If this does not clear the fault, reinstall the original antenna assembly and proceed to c.
	c) Transceiver board assembly defective.	Refer service to authorized Level 3 service center for replacement.

Table 4. Level 1 and 2 Troubleshooting Chart (Continued)

Symptom	Probable Cause	Verification and Remedy
7. Vibrator feature not functioning.	Motor/Vibrator assembly defective.	Replace the Motor/Vibrator assembly. Verify that the fault has been cleared and reassemble the unit with the new Motor/Vibrator assembly.
8. Internal Charger not working.	Faulty charger circuit on transceiver board assembly.	Test a selection of batteries in the rear pocket of the desktop charger. Check LED display for the charging indications. If these are charging properly, then the internal charger is at fault. Refer service to authorized Level 3 service center for replacement.
9. No or weak audio when using headset.	a) Headset not fully pushed home.	Ensure the headset plug is fully seated in the jack socket. If fault not cleared, proceed to b.
	b) Faulty jack socket on transceiver board assembly.	Refer service to authorized Level 3 service center for replacement.

Programming: Software Upgrade and Flexing

Contact your local technical support engineer for information about equipment and procedures for flashing and flexing.

Exploded View Diagram

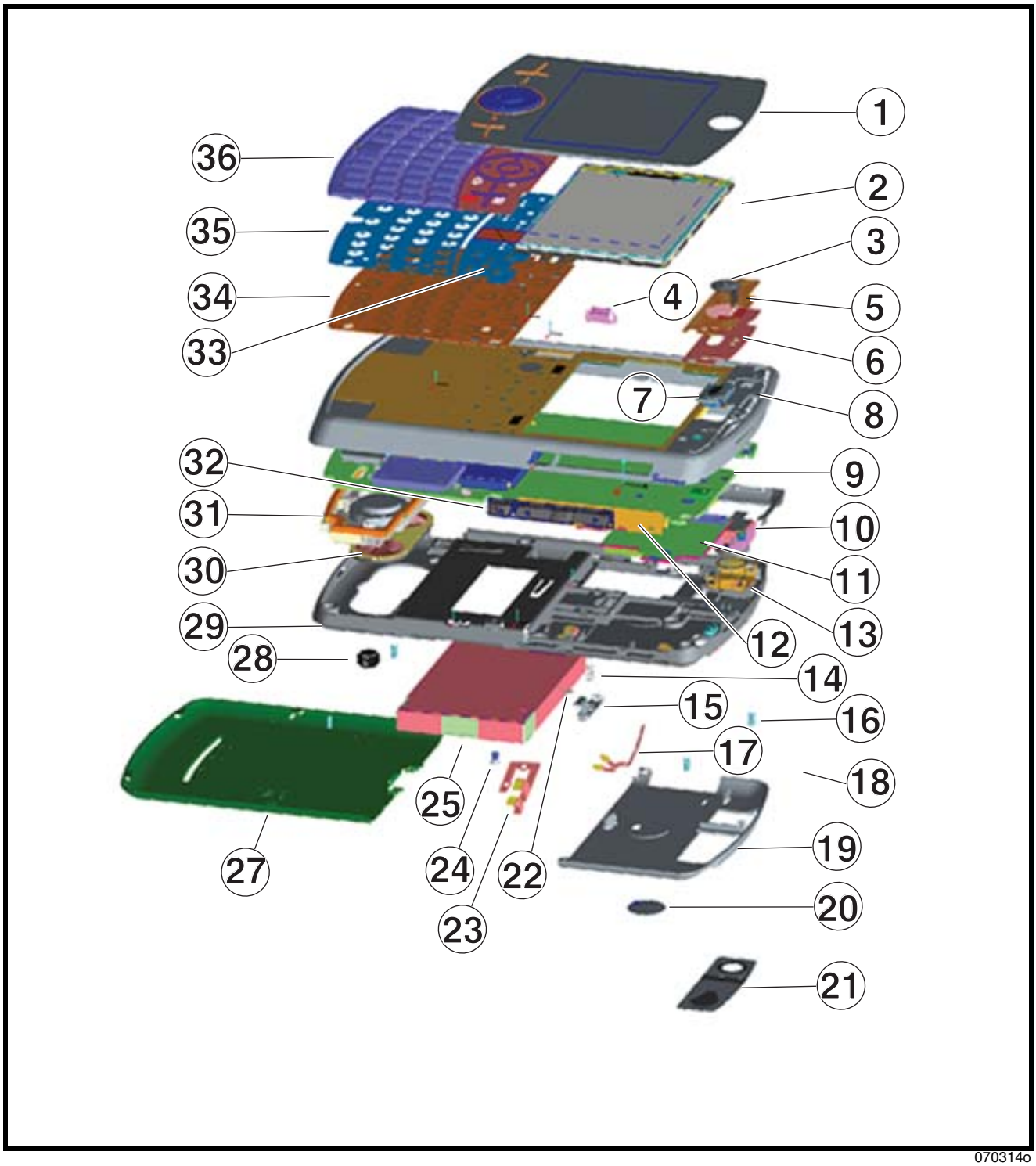


Figure 46. Exploded View

Exploded View Parts List

Table 5. Parts List

Item Number	Part Number	Description
1	6171282E01	Lens + nav keypad assy
2	7271348E01	Display, Module 2.4" QVGA
3	1371093E01	MEDALLION,EARPIECE,STAINLESS
4	1571654E01	USB-COVER
5	3571103E01	Mesh, PRIMARY PORT
6	2771518E01	Support, Earpiece sheet metal
7	5071400D01	Speaker, Earpiece
8	1571761D01	Bezel Front, Molded
9	SLG5153AA SLG5122AA	PCB Main Assembly, EMEA PCB Main Assembly, NA
9a	1571665E01	Cover, SD Card, Plastic, Micro, Painted
10	0171454D01	Assembly, Camera 2.0 MP
11	0171791F01	Daughter board assy, NA
12	0171624F01	Assembly, Side Control
13	3971477F01	Camera grounding clip
14	5588828Y01	Spring, Battery Latch
15	5571869D01	Latch, Battery Cover
16	0371613E01	Thread forming screw (x5)
17	8571307E01	Antenna, AGPS
18	8571339E01	Antenna, Bluetooth
19	1571957E01	Cover, Rear Top
20	1371820D01	Batwing, Rear
21	1371013E01	BZL,CAMR,PC,SCPLQWERTY
22	5471536C01	Label, Water Detect (x2)
23	8571337E01	Antenna, 2100
24	0371545E01	Machine Screw
25	SNN5782B	BATTERY, PF5
27	SHN0010A	PF5, Battery Cover, Vodaphone
28	3271641E01	SEAL,RF PROBE PORT (x2)
29	1571180E01	Housing, Rear, Molded
30	3271085E01	Gasket, Speaker
31	8571338E01	Antenna, Main GSM
32	3871940D01	Button, Side
33	4071944E01	Main Keypad, Upper Dome Array
34	0171993E01	Assembly, Keypad Flex
35	4071388E01	Main Keypad, Lower Dome Array
36	3871286E01	Assembly, Keypad/EL

Accessories

Table 6. Accessories

Description	Part Number
Power Solutions	
Battery Slim Li Ion (1130mAh)	SNN5783B
Battery High Performance (1640mAh)	SNN5765A
Travel Charger Rapid U.S. (non-leakage)	PSM5202A
In-Vehicle Solutions	
Bluetooth Car Kit	S9642
Self Install HF Retractable (Razorbill)	SYN0613
Professional Install Car Kit (Junction Box Only)	S9950
HUC for PCC	TBD
Low Tier VPA Mid rate	
VPA Verizon Exclusive Rapid	SYN9901
Vehicle Power Adapter, New ID Rapid	SYN0707
Audio & Connectivity	
Paladin Bluetooth Headset	SYN9826A
Caller ID Bluetooth Headset	TBD
Quadrant Bluetooth Speaker	TBD
Qwerty Bluetooth Keyboard	TBD
Platform Stereo Headset	TBD
FM Stereo Headset	SYN8609
Retractable Headset (new customizable)	SYN9050
One Touch Headset (new customizable)	SYN9351
Mono Headset Black	SYN8390B
Mono Headset Silver	AAYN4264A
Mono Headset (new customizable)	SYN9350
Over the Ear Headset	SYN8908
Neck Loop headset	SYN7875
USB 2.0 Card Reader	SYN1045A
Consumer Personalization	
Carry Cases	TBD
Lanyard	SYN9490A
Holster	TBD
Belt Clip	SYN8763

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