Level 1 & 2 Service Manual

6809511A67-O

Q GSM

Digital Wireless Telephone

Q GSM 850/900/1800/1900 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 which 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 a label usually located under the battery. 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.

Product Changes

When electrical, mechanical or production changes are incorporated into Motorola products, a revision letter is assigned to the chassis or kit affected, for example;
-A, -B, or -C, and so on.

The chassis or kit number, complete with revision number is imprinted during production. The revision letter is an integral part of the chassis or kit number and is also listed on schematic diagrams, and printed circuit board layouts.

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, and
*   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

The Motorola products described in this manual may include Motorola computer programs stored in semiconductor memories or other media that are copyrighted with all rights reserved worldwide to Motorola. Laws in the United States and other countries preserve for Motorola,

Inc. certain exclusive rights to the copyrighted computer programs, including the exclusive right to copy, reproduce, modify, decompile, disassemble, and reverse-engineer the Motorola computer programs in any manner or form without Motorola's prior written consent. Furthermore, the purchase of Motorola products shall not be deemed to grant either directly or by implication, estoppel, or otherwise, any license or rights under the copyrights, patents, or patent applications of Motorola, except for a nonexclusive license to use the Motorola product and the Motorola computer programs with the Motorola product.

About This Service Manual

Using this service manual and the suggestions contained in it assures proper installation, operation, and maintenance of Q telephones. Refer questions about this manual to the nearest Customer Service Manager. This manual contains mechanical service information required for the equipment described and is current as of the printing date.

Audience

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

Scope

This manual provides basic information relating to Q telephones, and also to provide 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

Special characters and typefaces, listed and described below, are used in this publication to emphasize certain types of information.

> *Note: Emphasizes additional information pertinent to the subject matter.*

> *Caution: Emphasizes information about actions which may result in equipment damage.*

> *Warning: Emphasizes information about actions which may result in personal injury.*

Keys to be pressed are represented graphically. For example, instead of "Press the Menu Key", you will see "Press ☰".

Information from a screen is shown in text as similar as possible to what appears in the display. For example, **MESSAGE**.

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 phones 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 to bear the costs of early life failure.

Product Support

Customer's original phones 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). Motorola High Tech 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 should be arranged through the local Motorola Support Center.

Parts Replacement

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

In the U.S.A., to contact Motorola, Inc. on your TTY, call: 800-793-7834.

Accessories and Aftermarket Division (AAD)

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

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

General Function	Specification
Frequency Range GSM 850	824-848 MHz Tx 869-893 MHz Rx
Frequency Range GSM 900	880-915 MHz Tx (with EGSM) 925-960 MHZ Rx
Frequency Range DCS 1800	1710-1785 MHz Tx 1805-1880 MHz Rx
Frequency Range PCS 1900	1850-1910 MHz Tx 1930-1990 MHz Rx
Channel Spacing	200 kHz
Channels	174 EGSM, 374 DCS, 374 PCS, 124 GSM with 8 channels per carrier
Modulation	GMSK at BT = 0.3
Transmitter Phase Accuracy	5 Degrees RMS, 20 Degrees peak
Duplex Spacing	45 MHz
Frequency Stability	$\pm$ 0.10 ppm of the downlink frequency (Rx)
Operating Voltage	+3.4V dc to +4.2V dc (battery) +5.0V dc (external connector)
Transmit Current Drain	101-260 mA average talk current drain
Stand-by Current drain	4.6 mA (DRX2), 4 mA (DXR9) typical
Temperature Range	-10° C to +55° C (+15° F to +130° F)
Dimensions, with 1170 mAh Li Ion battery	117 x 64 x 11.5 (in mm)
Size (Volume)	85 cc, with battery
Weight	115 grams with battery
Battery Life, with standard 1170 mAh Ion Battery	Talk Time 300 to 420 minutes with 50 % VAF and DTX ON Standby time 230 in DRx 2 and 270 hours in DRx 9 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 with 50 % VAF and DTX ON
Battery Charge Time	4 hours to 90% of 1070 mAh capacity on mid-rate 2 hours to 90% of 1070 mAh capacity on fast-rate
Alert volume	Max 95 dB @5cm, 0.5 Watts input

Transmitter Functions	Specification
RF Power Output	32 dBm nominal GSM 850 abd 900 bands, 29 dBm nominal GSM 1800 and GSM 1900 bands
Output Impedance	50 ohms nominal
Spurious Emissions	-36 dBm from 0.1 to 1 GHz, -30 dBm from 1 to 4 GHz

Receiver Functions	Specification
Receive Sensitivity	Better than -103 dBm
RX Bit Error Rate (100k bits) Type II	< 2%

Speech Coding Functions	Specification
Speech Coding Type	Regular pulse excitation/linear predictive coding with long term prediction (RPE LPC with LTP)
Bit Rate	13.0 kbps
Frame Duration	20 ms
Block Length	260 bits
Classes	Class 1 bits = 182 bits; Class 2 bits = 78 bits
Bit Rate with FEC Encoding	22.8 kbps

Product Overview

Motorola Q telephones deliver GSM features in a small and lightweight package. These Global System for Mobile communications (GSM) General Packet Radio Service (GPRS) Enhanced Data Rates for GSM Evolution (EDGE) & Wireless Application Protocol (WAP)-enabled mobile phones incorporate an icon based User Interface (UI) for easier operation, allows Short Message Service (SMS) text messaging, Multi-media Messaging Services (MMS), and includes Personal Information Manager (PIM) functionality. Q is a quad-band phones that allow roaming within the GSM 850 MHz, GSM 900 MHz, 1800 MHz Digital Cellular System (DCS), and PCS 1900 MHz bands.

Q telephones have a tablet form factor. They feature viewable 2.4" 240 x 320 TFT, 64k color display for caller identification with date/time. The bottom part of the tablet contains the keypad, transceiver printed circuit board (PCB), microphone, flex connection, external accessory connector, smart button, volume buttons, and voice button. The standard 1170 mAh Lithium Ion (Li Ion) battery fits behind a removable back cover and provides up to 300 minutes of talk time and 192 hours of standby time in GSM mode.

The phone accepts 3V Subscriber Identity Module (SIM) cards that fit into the SIM holder under the battery. The phone also incorporates an internal designed antenna. Inexpensive direct connection to a computer or handheld device through USB for data and fax calls, and for synchronizing phonebook entries with Motorola mobile Phone Tools™ software, can be accomplished using the optional data cable and soft modem.

Features

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

Other features available in this family of telephones include:
- GSM/GPRS/EDGE 850/900/1800/1900 MHz
- Bluetooth Class 2
- GPRS Class 10
- EDGE Class 10

Physical
- Width 64 mm
- Height 117 mm
- Depth 11.5 mm
- Volume 85 cc
- Weight 115.0 grams

Audio
- AAC
- MP3
- WMA
- WAV

Video
- MPEG4 Video clip playback
- H.263
- WMV

Display
- 2.4" 240 x 320 TFT, 64k colors

Memory
- 64 MB internal memory
- Accepts removable microSD memory up to 2GB modules

Imaging
- Primary camera resolution 1.3 MP

Wireless Access Protocol (WAP) 2.0 Compliancy

In the WAP environment, access to the Internet is initiated in wireless markup language (WML), which is derived from hypertext markup language (HTML). The request is passed to a WAP gateway which retrieves the information from the server in standard HTML (subsequently filtered to WML) or directly in WML if available. The information is then passed to the mobile subscriber via the mobile network.

Bitmap image data will download as text. If the image is larger than the screen, only part of the image will display.

If the user receives a call while in browser mode, the browser will pause and allow the user to resume after completing the call.

SIM Toolkit™ - Class 2

SIM Application Toolkit is a value-added service delivery mechanism that allows GSM operators to customize the services they offer their customers, from the occasional user who requests sports news and traffic alerts, to a high call time business user who receives stock alerts and checks flight times. Operators can now create their own value-added services menu quickly and easily in the phone. The customized menu will appear as the first menu and may be updated over-the-air with new services when customers request them.

Simplified Text Entry

iTAP™ predictive text entry. Press a key to generate a character and a dynamic dictionary uses this to build and display a set of word or name options. The iTAP™ feature may not be available on the phone in all languages.

Caller Line Identification

Upon receipt of a call, the calling party's phone number is compared to the phone book. If the number matches a phone book entry, that name will be displayed. If there is no phone book

entry, the incoming phone number will be displayed. In the event that no caller identification information is available, an incoming call message is displayed.

▶ *User must subscribe to a caller line identification service through their service provider.*

Personal Information Management

The Q telephone contains a built in calendar with date book reminders and phonebook that can be synchronized easily to a computer.

General Operation

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

The Q controls are located 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. Telephone Controls, indicators, and I/O Connections
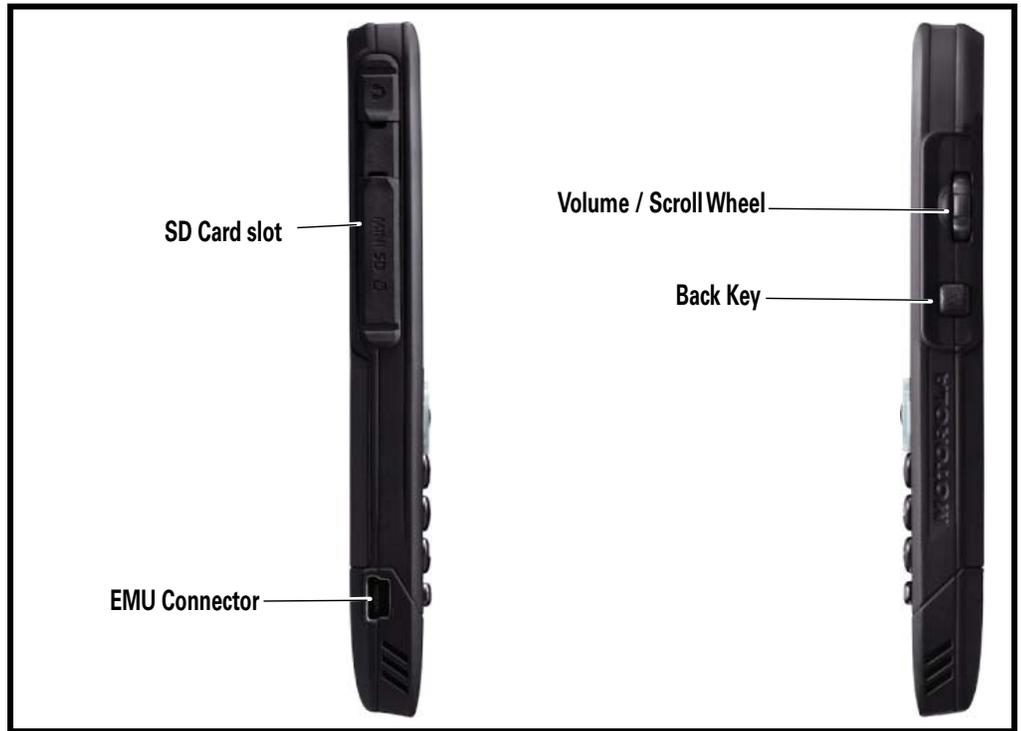
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Figure 2. Telephone Controls and Indicators Locations (Sides)

Indicators, in the form of icons, are displayed on the LCD (see Figure 3).
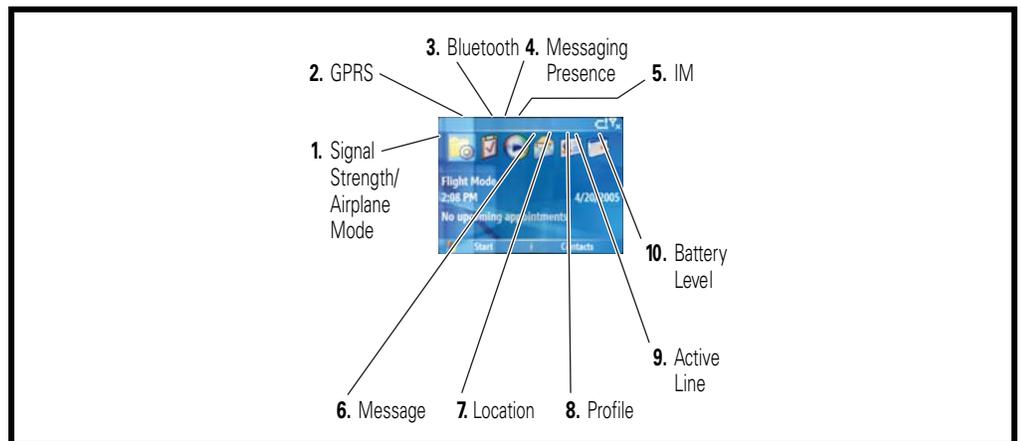
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Figure 3. Main Screen Icon Display

1. **Signal Strength/Airplane Mode Indicator** – Vertical bars show the strength of the network connection. You can't make or receive calls when the no signal indicator or airplane mode indicator shows. The roam indicator (or) shows when your phone is seeking or using a network outside your home network.

2. **GPRS Indicator** – Shows when your phone is using a high-speed *General Packet Radio Service* (GPRS) network connection. Indicators can include:

■ = GPRS connection

⇔ = GPRS secure data transfer

⇌ = GPRS data transfer

⇔ = GPRS unsecure data transfer

3. **Bluetooth Indicator** – Shows when your phone is connected to another device in a Bluetooth connection.

4. **Messaging Presence Indicator** – Shows your instant messaging (IM) status. Indicators can include:

☻ = online   ♭ = offline

♭ = busy   ♭ = discrete

♭ = invisible to IM

5. **IM Indicator** – Shows when you receive a new IM message.

6. **Message Indicator** – Shows when you receive a new text or voicemail message.

7. **Profile Indicator** – Shows the profile setting.

▽ = normal   ✈ = airplane

▤ = vibrate   ♪▽ = sleeping

⌀▽ = silent   ▽♪ = active

♪▽ = meeting   ▽ = car

8. **Active Line Indicator** – Shows X to indicate an active call, or Y to indicate when call forwarding is on. Indicators for dual-line-enabled SIM cards can include:

✆^{1} = line 1 active   ✆^{2} = line 2 active

✆$_1$ = line 1 call forward on   ✆$_2$ = line 2 call forward on

9. **Battery Level Indicator** – Vertical bars show the battery charge level. Recharge the battery when your phone shows Low Battery.

Menu Navigation

Q telephones are equipped with an icon and graphical-based user interface. All of the phone's features can be accessed with a 5-way navigation key that allows you to move easily through menus and select menu items.

Liquid Crystal Display (LCD)

The LCD provides an large color display with user-adjustable brightness settings for optimum readability in all light conditions. The large 2.4" 240 x 320 TFT, 64k color display provides room for entering text, viewing graphics, tapping icons, and system prompts.

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

Figures 4 shows the Idle Screen display.
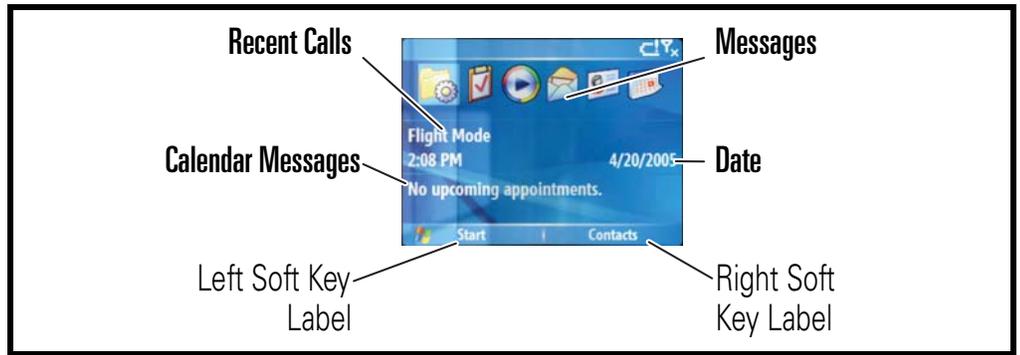
Figure 4. Main Screen Display

Battery Information

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%, 50%, 30%, 15% and Low Battery.

Battery Removal

Removing the battery causes the device to immediately shut down and any pending work (partially entered phone book entries or outgoing messages, for example) is lost.

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 will be lost.

To ensure proper memory retention, turn the phone OFF before removing the battery.

Tools and Test Equipment

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

Table 1. General Test Equipment and Tools

Motorola Part Number[1]	Description	Application
0-00-00-40810	(U)SIM test card	Used to enable manual test procedures.
RSX4043-A	Torque Driver	Used to remove and replace screws
—	Torque Driver Bit T-6	Used with torque driver
See Table 7	Rapid Charger	Used to charge battery and to power device
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)
0-00-00-30005 (AMS)[2]	Disassembly tool, plastic with flat and pointed ends (manual opening tool)	Used during assembly/disassembly of device
19501980 (AMS)[2]	Generic press tool	Used to assemble the main lens.

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 faxing (847) 576-3023.
2. Not available from Motorola. To order, contact: AMS Software & Elektronik GmbH, c/o Holger Grube, Lise-Meitner-Straße9 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 Q telephone. Tools and equipment used for the phone are listed in Table 1, preceding.

Many of the integrated devices used in this equipment 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 and Replacing the Battery Door and 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. Ensure the phone is turned off.
2. Press and slide the battery cover, as shown in Figure 1.

Figure 1. Removing the Battery Door

3. Lift the battery cover completely off the phone.

4.   Lift the end of the battery and remove it completely. See Figure 2.
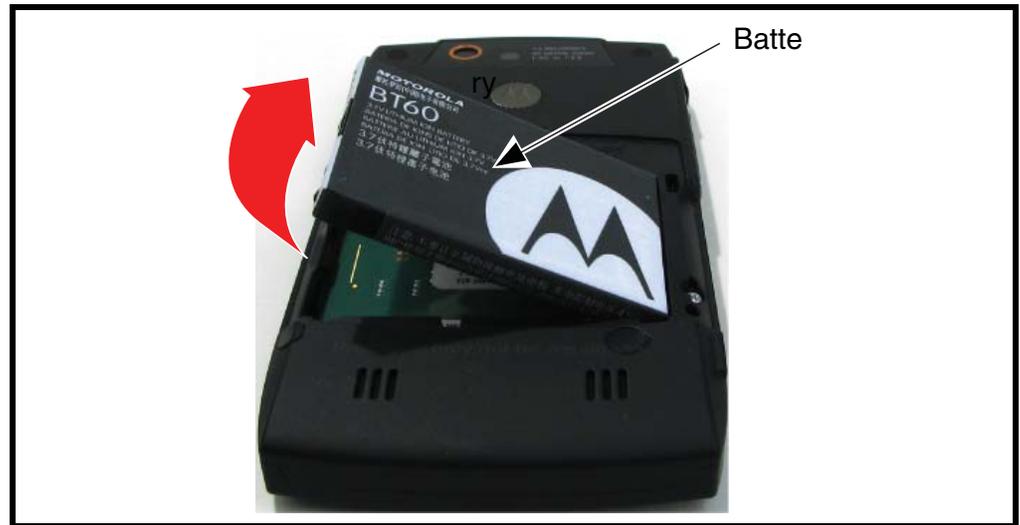
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Figure 2. Removing the Battery

There is a danger of explosion if the Lithium Ion battery is replaced incorrectly. Replace only with the same type of battery or equivalent as recommended by the battery manufacturer. Dispose of used batteries according to the manufacturer's instructions.

5.   To replace, Align the battery with the battery compartment so the contacts on the battery match the battery contacts in the phone.
6.   Insert the battery, contacts side first, into the battery compartment and push down.
7.   Insert the ridge at the bottom of the battery housing into the base of the phone, then push the cover down and snap it into place.

Removing and Replacing the Subscriber Identity Module (SIM) and Memory Card

1. Remove the battery door and battery as described in the procedures.
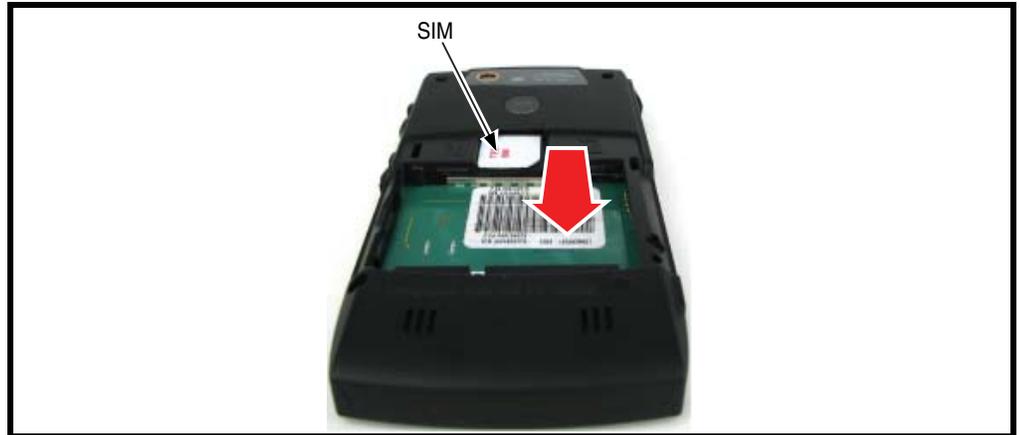
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Figure 3. Removing the SIM

2. Slide the SIM away from the SIM holder, as shown in Figure 3.
3. Carefully lift the SIM from the phone.
4. To replace, insert the SIM into the holder, ensuring the keyed corner of the SIM card should align with alignment groove.
5. Replace the battery and battery door as described in the procedures.
6. Slide the memory card away from the memory card holder.
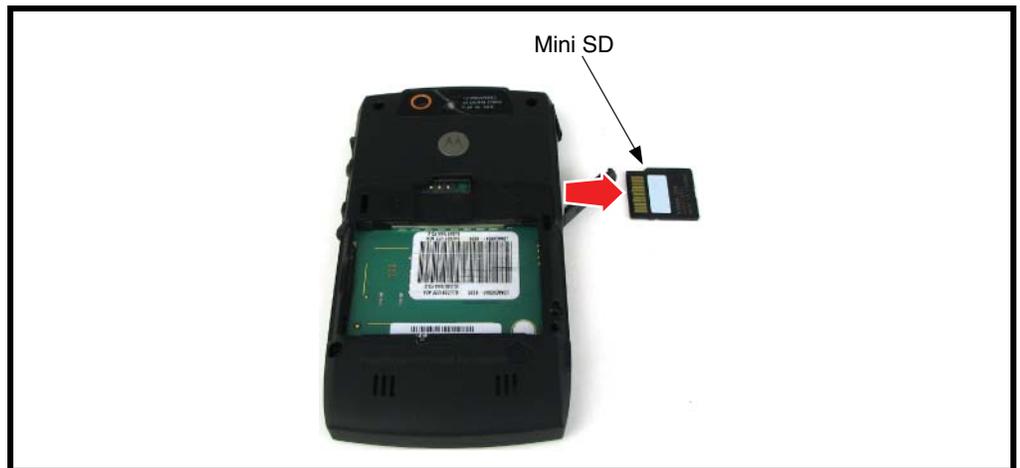
061424o

Figure 4. Removing the Memory Card

7. Carefully lift the memory card from the phone.
8. To replace, insert the memory card into the holder, ensuring the keyed corner of the memory card faces the top edge of the phone.
9. Replace the battery and battery door as described in the procedures.

Removing and Replacing the Rear Housing

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

1. Remove the battery cover, battery, SIM and memory card as described in the procedures.
2. Remove and save the 3 screw grommets covering the housing screws.

⚠ *In addition to 4 screws, the rear housing assembly is fastened with plastic latches. These are fragile and should be released with care.*

3. Using a Torx driver with a T-6 bit, remove the screws at each side of the phone. Retain the screws for reassembly. See Figure 5.

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Figure 5. Removing the Rear Speaker Housing Screws

4. Open the top snap by seperating the front housing from the back housing.

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Figure 6. Seperating the Front Housing from the Back H ousing

5. Un-snap the side snap by the scroll wheel by pressing on the front housing.

Apply force to front housing between scroll wheel and side button.

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Figure 7. Removing the Scroll Wheel

6. Apply side force on the rear housing to disengage the lower right snap.

Lower right snap.

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Figure 8. Disengaging the Lower Right Snap

7.   Finish separating the housing as shown below.

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Figure 9. Separating the Housing

8.   Carefully rotate the rear housing away from the front housing assembly.
9.   Lift the rear housing assembly away from the phone.
10. To replace the housing assembly take notice that he lower right screw does not fasten to a screw insert, but rather a locking bracket, a small "L" shaped stamped metal part. This will come loose once the screw is loosened. Postion the bracket before replacing the housing.

Slide locking bracket into this location as shown.
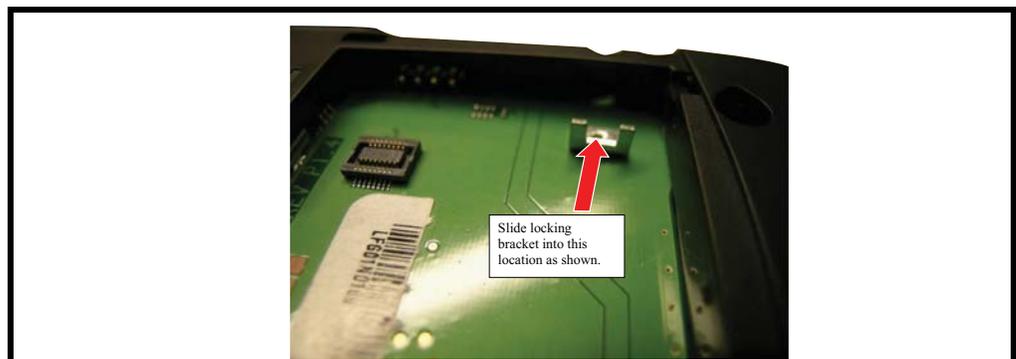
061425o

Figure 10. Locking Bracket Positioning

11. Carefully align the rear housing to the front assembly.
12. Gently press the housings together until they fit snuggly.
13. Replace the 4 housing screws and tighten to a final torque setting of 2.2 +/- 0.2 lbs. Do not over tighten.
14. Replace the SIM, memory card, battery, and battery cover as described in the procedures.

Removing and Replacing the Camera Assembly

1. Remove the battery cover, battery, SIM, and rear housing as described in the procedures.

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

2. Use the disassembly tool to unlock the camera flex connector from the daughter board.
3. Use the disassembly tool to remove the daughter board.

Camera Flex   Flex Connector
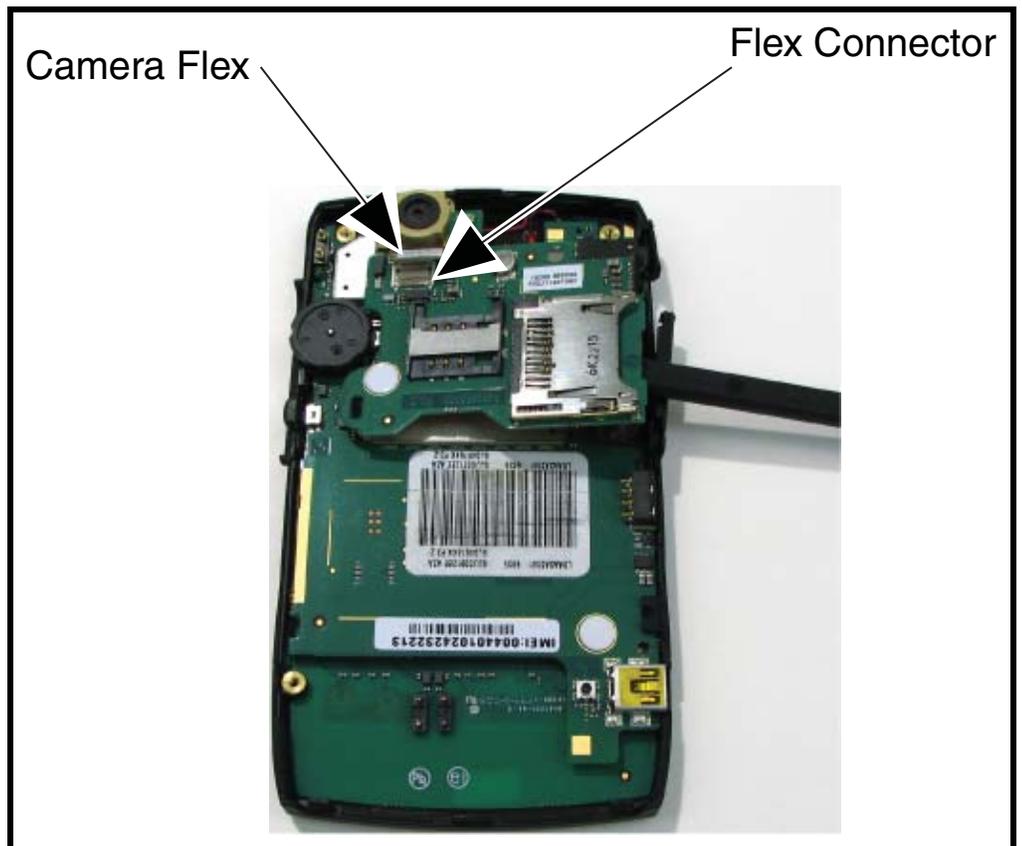
061469o

Figure 11. Removing the Daughter Board

4. Remove conductive gasket then unlock the flex connector.
5. Using the disassembly tool and the plastic tweezers, remove the camera assembly.

Figure 12. Camera Assembly Removal

6. To replace, carefully insert the camera assembly into its slot in the front housing assembly, making sure the camera grommet is placed onto the plastic guide pin.
7. Apply adhesive to daughter board.
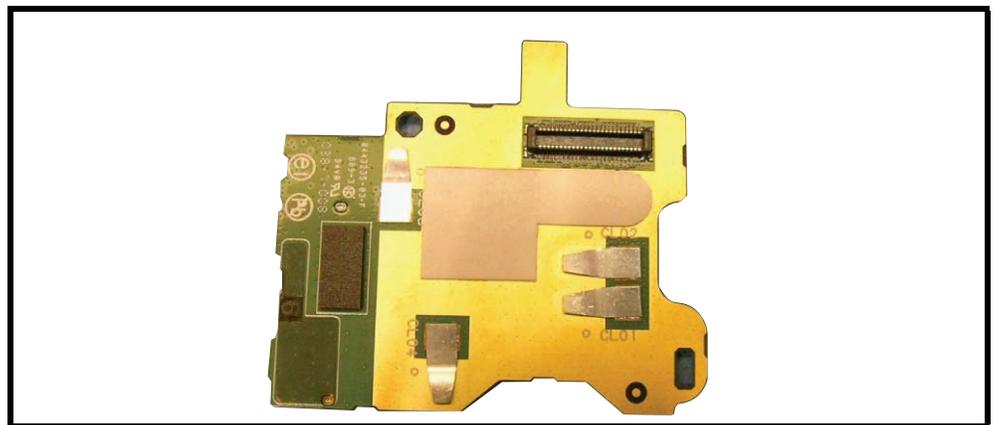
Figure 13. Camera Assembly Removal

8.   Place the daughter board onto the main board.
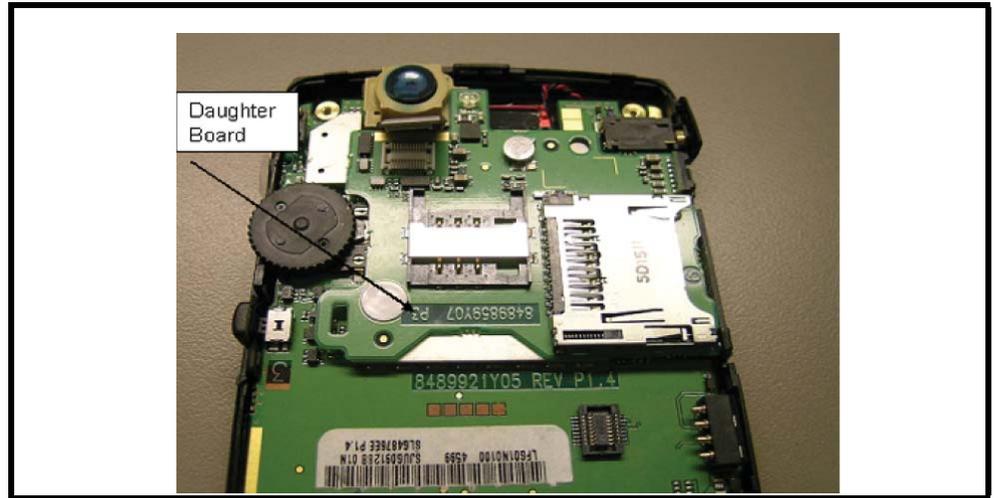
Figure 14. Camera Assembly Removal

9.   Attach the camera flex by seating the flex cable, then press firmly until it snaps into place.
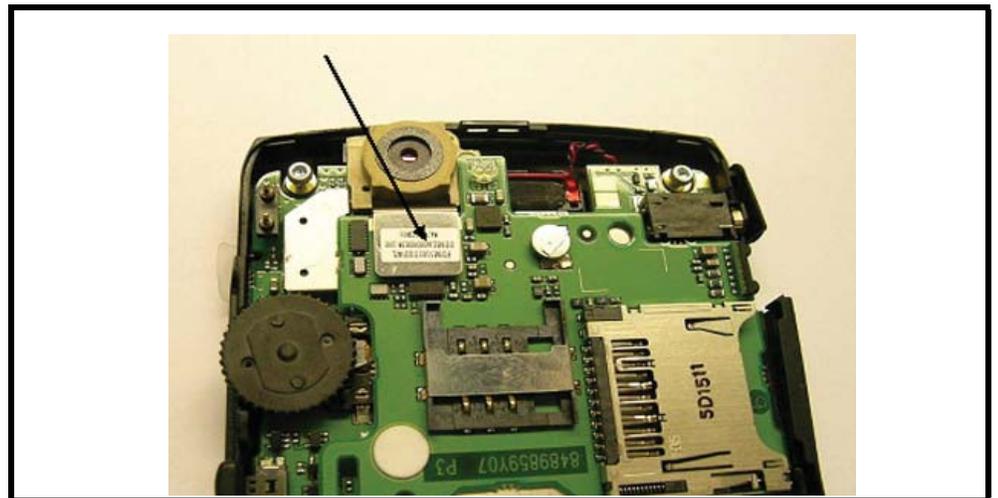
Figure 15. Camera Assembly Placement

10. Place the camera assembly back into the front housing. Connect the camera flex cable to the daughter board. After connecting the camera flex, apply the conductive gasket as shown below.
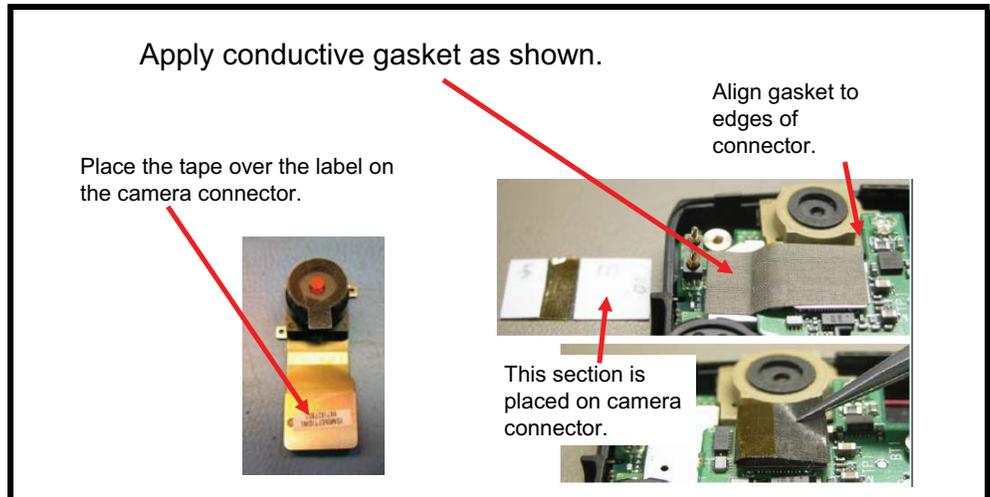
Figure 16. Camera Assembly Placement

11. Place water detect label in location shown.

Figure 17. Camera Assembly Removal

12. Replace the rear housing, SIM, battery, and battery cover as described in the procedures.

Removing and Replacing the Transceiver Board Assembly

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

1. Remove the battery cover, battery, SIM, and rear housing as described in the procedures.
2. Use the disassembly tool to pry loose the display flex connector from the main board.

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Figure 18. Disconnecting the Flex from the Display Module

3. Use the disassembly tool to separate main board from front housing.
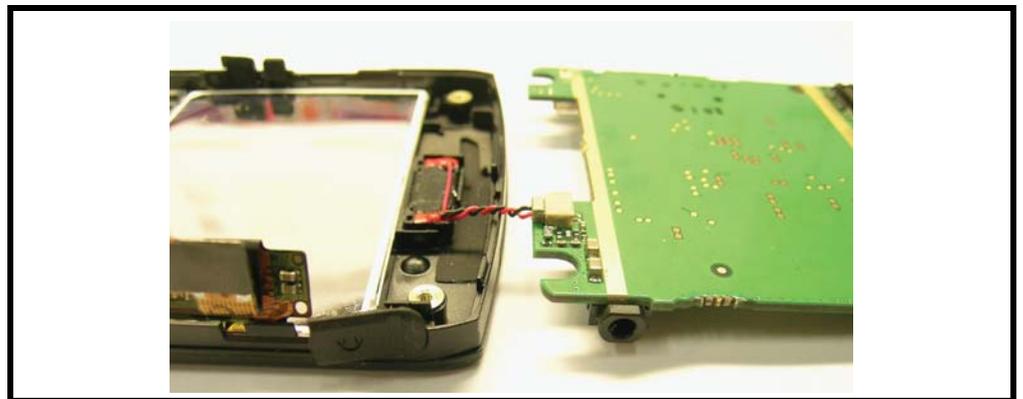
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Figure 19. Separating the Main Board from the Front Housing

4.   Remove the main board and disconnect ear speaker.

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Figure 20. Removing the Main board and Disconnecting the Ear Speaker.

5.   To replace, place keyboard on fixture # 2341A as shown.
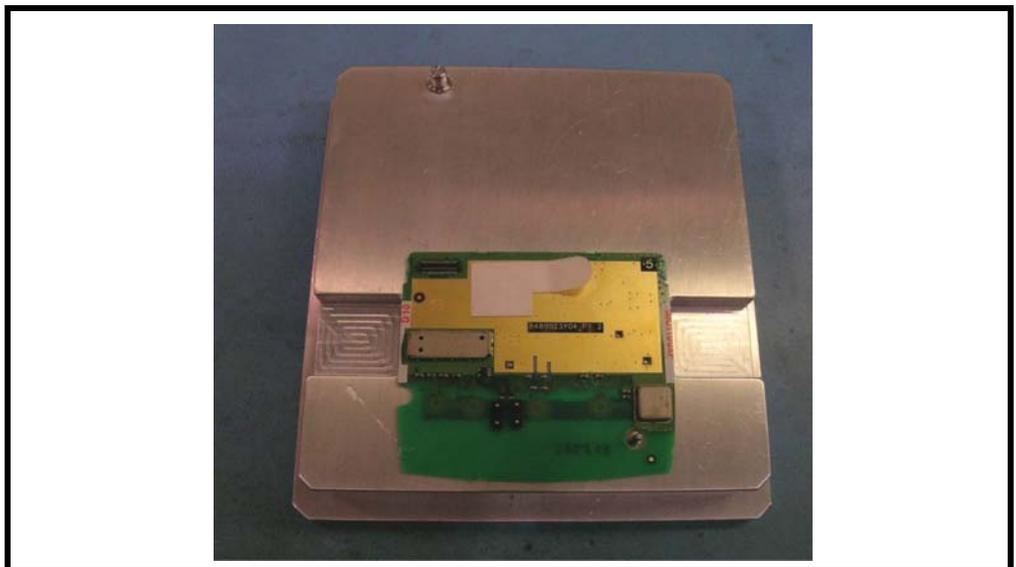
061469o

Figure 21. Removing the Display Connector Pad

6.   Remove Liner from doubled sided adhesive on keyboard. Attach keyboard to main board as shown. Insure that the board to board connector is fully engaged.

Remove Tape from Connector.
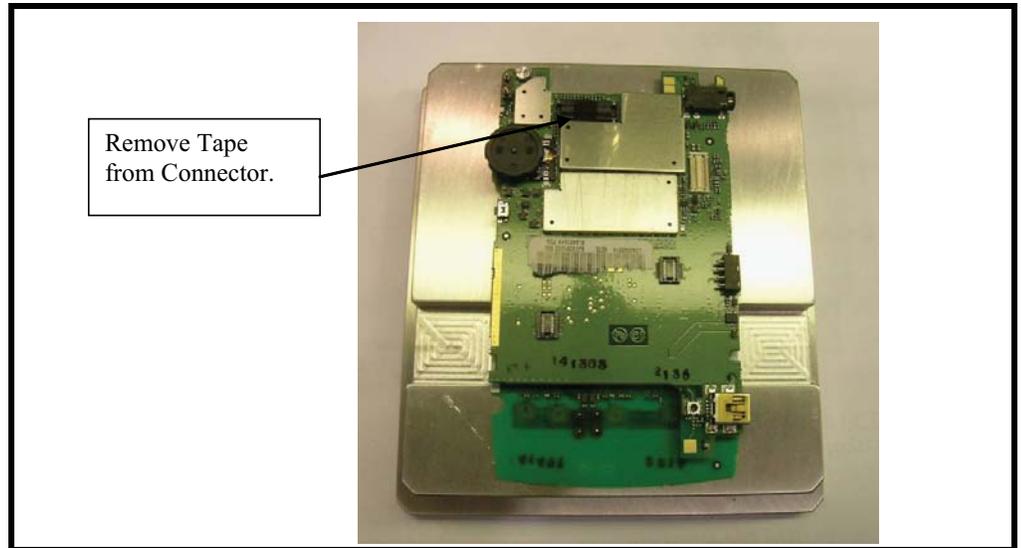
061469o

Figure 22. Removing the Display Connector Pad

7.   Activate double side adhesive using Fixture# 2454 and air press set 6 psi and cycle time to achieve 5 sec dwell of full contact.

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Figure 23. Removing the Display Connector Pad

8.   Replace the rear housing, SIM, battery, and battery cover as described in the procedures.

Removing and Replacing the Antenna

1. Remove the battery cover, battery, SIM, memory card, rear housing and transceiver board assembly as described in the procedures.
2. Use the plastic tweezers to grasp the plastic antenna and carefully release the bottom latches, See Figure 24.

Disassembly tool
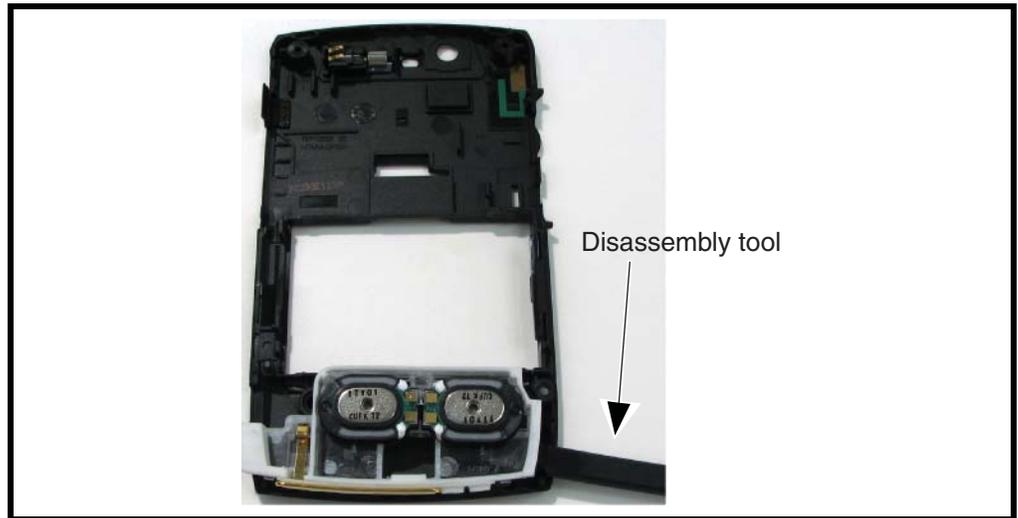
061467o

Figure 24. Removing the Antenna

3. Use the disassembly tool to separate the antenna assembly, See Figure 25.

Antenna holder assembly
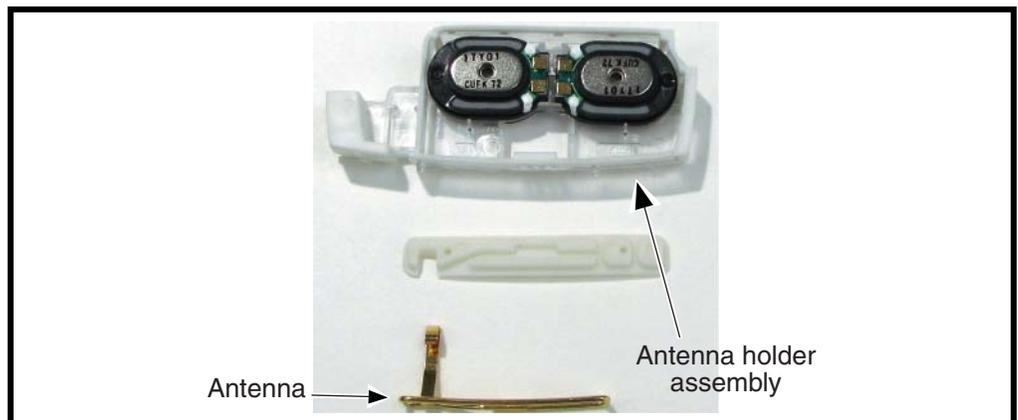
Antenna

061428o

Figure 25. Separating the Antenna Assembly

4. To replace, assembly starts from right to left. Align the antenna assembly to the phone.
5. Carefully press the antenna assembly into position until the antenna assembly latches snap into position.
6. Replace the transceiver board, rear housing assembly, SIM, battery and battery cover as described in the procedures.

Removing and Replacing the Display Module Assembly

1. Remove the battery cover, battery, SIM, rear housing, transceiver board assembly, and camera assembly as described in the procedures.

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

2. Using the disassembly tool, carefully disengage the side hooks of the display bracket.
3. Lift the display from the bracket.

Figure 26. Removing the Display Module

4. Carefully and gently lift one corner of the display module assembly out of the housing assembly.

Figure 27. Display Module Removed

5. To replace the main display lens, properly align the display lens on the bracket.
6. Align the display module to the housing assembly.

7. Remove protective liners as shown. Remove FM from display and housing using de-ionized air.

Figure 28. Removing the Protective Liners

8. Gently fold flex upward and place display in place as shown. To prevent display cracking, engage snaps in order shown below. Only press on edges of display.

These tabs must remain in this position. Be careful not to trap tabs under the LCD display

Close up of tab
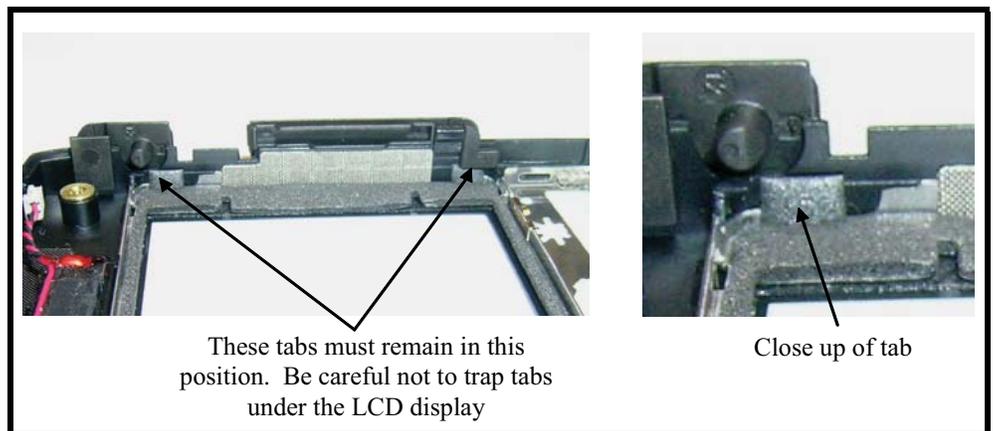
Figure 29. DisplayPlacement and Tabs

9.   Only fold the display flex in the direction shown. Never bend the flex in the opposite direction. Bending in the opposite direction will damage the display.
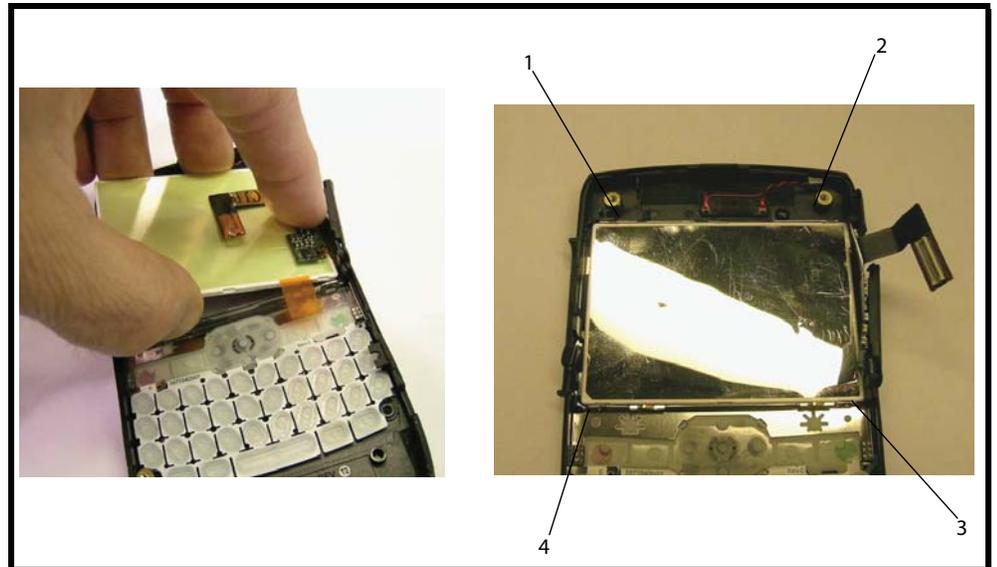
Figure 30. Inserting the Display Module

10.   Remove protective liner as shown.
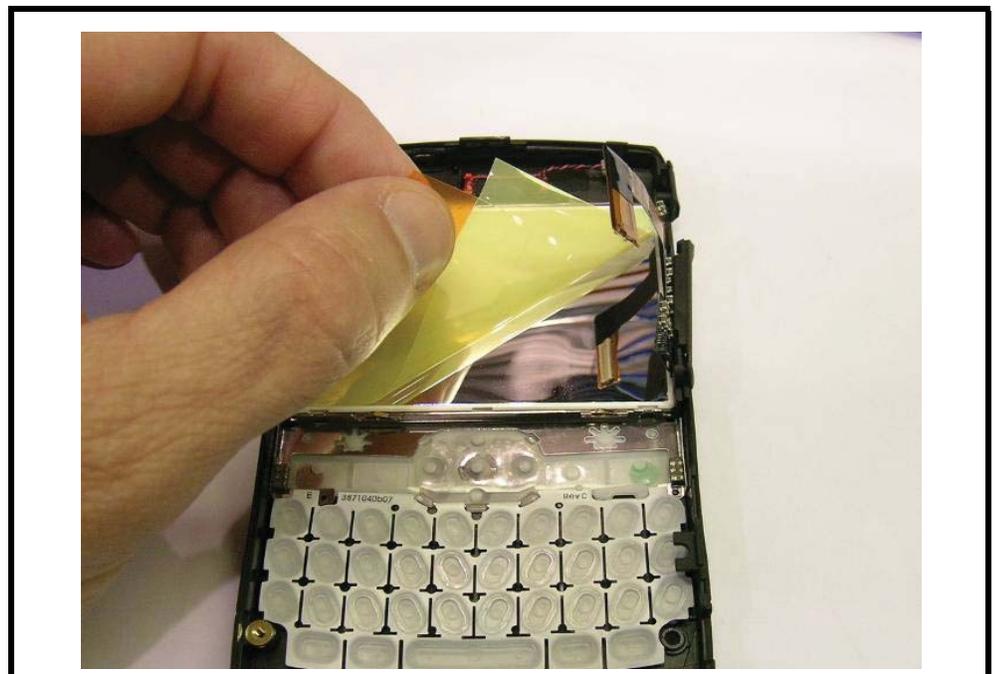
Figure 31. Removing the Protective Liner

Subscriber Identity Module (SIM) and Identification

SIM

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

The SIM contains:

- All the data necessary to access 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. Q telephones use TrueSync® synchronization software to effect a personality transfer.

Identification

Each Motorola GSM 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 32.
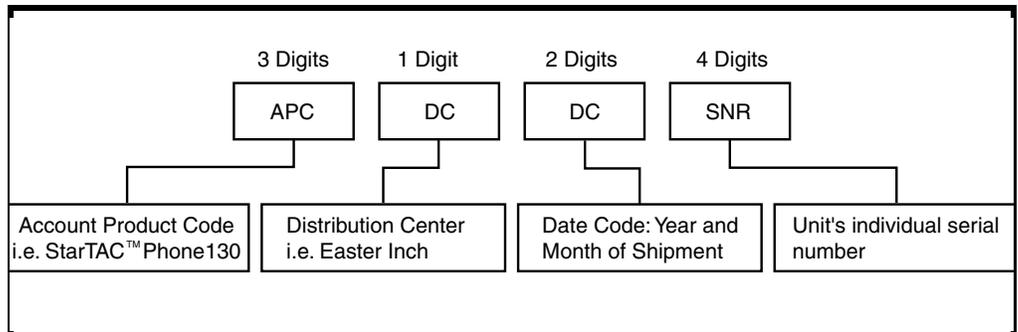
000807a

Figure 32. 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 GSM networks based on mobile station types or individual units. The full IMEI structure is listed in Table 2.

Table 2. 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

Troubleshooting Chart

Table 3. : 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 <3.4 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 assembly defective.	Forward to an authorized level 3 service center.
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 assembly defective.	Forward to an authorized level 3 service center.
3. Display is erratic, or provides partial or no display.	a) Transceiver board connections faulty.	Remove rear chassis assembly from unit, check general condition of flexible printed cable (flex). If the flex is good, check that the flex connector is fully pressed down. If not, check connector to transceiver board connections. If faulty connector, replace the transceiver board assembly. If connector is not at fault, proceed to b.
	b) Transceiver board assembly defective.	Forward to an authorized level 3 service center.
4. Incoming call alert transducer audio distorted or volume is too low.	Faulty transceiver board assembly.	Replace the transceiver board assembly (refer to 1c). Verify that the fault has been cleared and reassemble the unit with the new transceiver board assembly.
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) Microphone defective.	Replace the microphone as described in the procedures. If fault is not cleared, proceed to c.
	c) Transceiver board defective.	Forward to an authorized level 3 service center.
6. Receive audio from earpiece speaker is weak or distorted.	a) Connections to or from transceiver board assembly defective.	Gain access to the transceiver board assembly as described in the procedures. Check flex and the flex connector from the front assembly to the transceiver board assembly. If flex is at fault, replace front housing assembly. If flex connector is at fault, proceed to d. If connection is not at fault, proceed to b.

Table 3. : Level 1 and 2 Troubleshooting Chart (Continued)

SYMPTOM	PROBABLE CAUSE	VERIFICATION AND REMEDY
	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 d.
	c) Transceiver board assembly defective.	Forward to an authorized level 3 service center.
7. Telephone will not recognize or accept SIM.	a) SIM defective.	Check the SIM contacts for dirt. Clean if necessary and check if fault has been cleared. If the contacts are clean, insert a known good SIM into the telephone. Power up the unit and confirm that the SIM has been accepted. If the fault no longer exists, replace the defective SIM. If the SIM is not at fault, proceed to b.
	b) Transceiver board assembly defective.	Forward to an authorized level 3 service center.
8. Vibrator feature not functioning.	Transceiver board assembly defective.	Forward to an authorized level 3 service center.
9. 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. Replace the transceiver board assembly (refer to 1c). Verify that the fault has been cleared and reassemble the unit with the new transceiver board assembly.
10. Real Time Clock resetting when standard battery is removed.	Lithium button cell in the display board may be depleted.	Refer service to a Level 3 service center for replacement.
11. 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.	Replace the transceiver board assembly (refer to 1c). Verify that the fault has been cleared and reassemble the unit with the new transceiver board assembly.

Programming: Software Upgrade and Flexing

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

Exploded View Diagram (Main assembly)
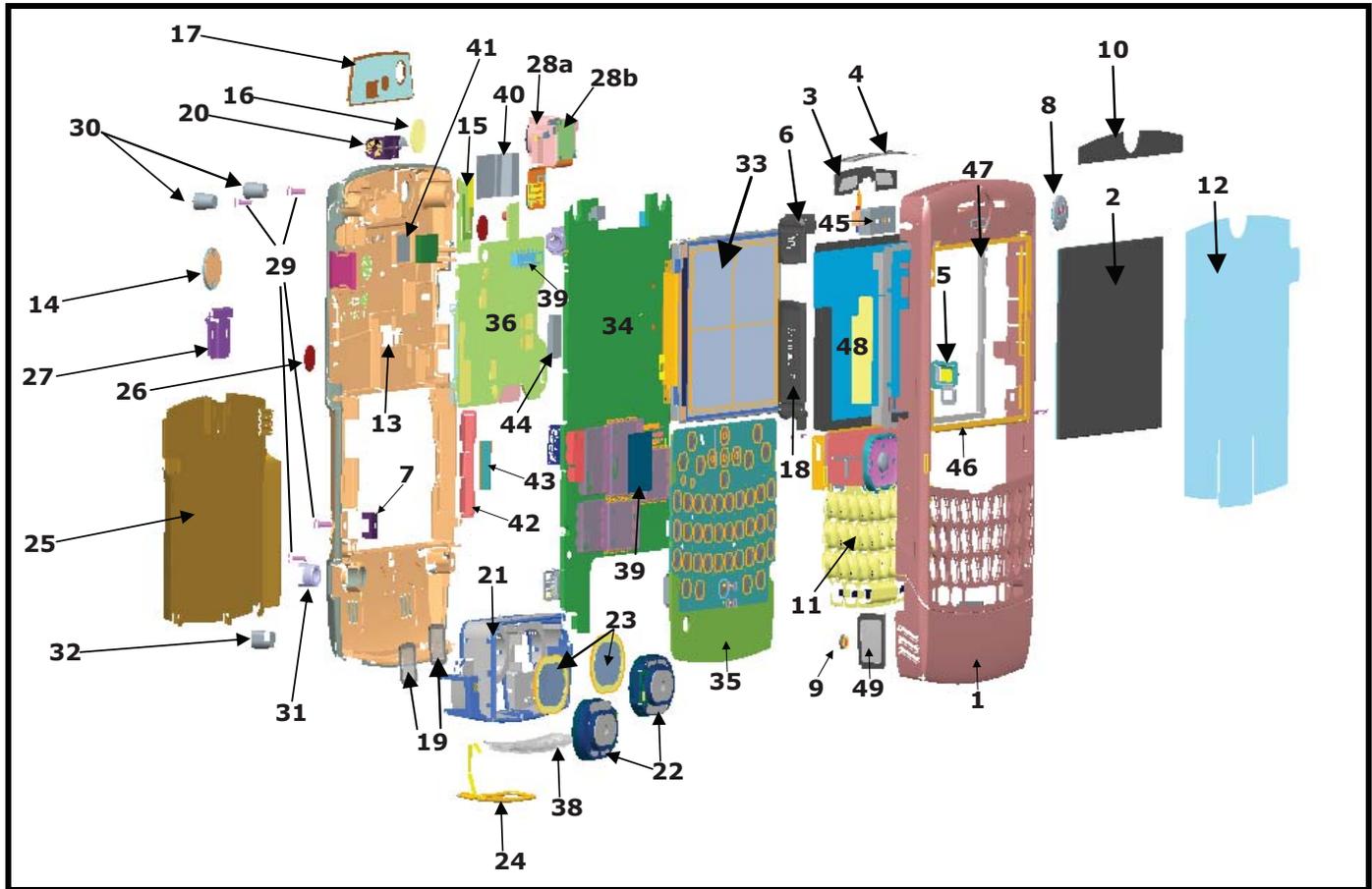
031826o

Figure 33. Exploded View Diagram (Main assembly)

Exploded View Parts List (Main assembly)

The following part number table is provided only for reference. Please contact your local Motorola parts organization for current part number information.

Table 4. Exploded View Parts List

Item Number	Part Number	Description	Item Number	Part Number	Description
1	1571446B01	Front Housing painted, Licorice Black	25	1571206C01	Battery door standard, painted black
2	6171110B02	Main Lens	26	4171793B01	Battery door latch spring
3	3571236B01	Screen, earpiece secondary	27	5571196C02	Battery door latch, plated black
4	3571452B01	Screen, earpiece tertiary	28	8471427B01	Camera Module - 1.3 (a)
5	3871041B02	Side Button		0571124B01	Camera Grommet (b)
6	0571119B01	HSJ Grommet	29	0387790L13	Screws (4X)
7	0771117B01	Locking Bracket	30	3871116B01	Screw hole plug, top (2X)
8	1371115B02	Batwing Front	31	3871301B01	RF grommet
9	3571294C01	Screen, MIC	32	3871127B01	Screw hole plug, bottom
10	6471043B02	Decorative Bezel	33	7289804Y01	Display - Inner Module
11	3871040B07	Keypad Assembly	34	N/A	Main Board Assembly
12	1171571C01	Front Liner	35	N/A	Keyboard Assembly
13	1571447B01	Rear Housing painted, Licorice Black	36	N/A	Daughter Board Assembly
14	1371107B02	Batwing Rear			
15	8589419Y01	Bluetooth Antenna	38	4371477B01	Antenna Spacer
16	6187835N02	Lens, Camera	39	3271044F01	Main-Keypad Adhesive
17	6171280B01	Camera Bezel	40	3271840F01	Conductive Gasket, Camera Connector to BT Shield
18	0571058D01	Mini SD Grommet	41	7571282B01	Camera Connector Pad
19	3571419B01	Screen, Rear port	42	5571041F01	Battery Latch
20	0171267C01	Vibrator Motor Assembly	43	7571065F01	Battery Latch Pad
21	1571126B01	Antenna/Speaker Carrier	44	3271827B01	Display Connector Pad
22	5088317Y01	Loud Speaker - 14 x 20 (2x)	45	5071324E01	Earpiece Speaker
23	3571269B01	Screen, Loudspeaker (2x)	46	4271831B01	Ground Clips, Display (2x)
24	8571026B01	Main Antenna	47	3289157Y01	Gasket, Main 2.4 Display
			48	3271378D01	Gasket, Display Side
			49	3571485B01	Sideport Screen

There is a danger of explosion if the Lithium Ion battery pack is replaced incorrectly. Replace only with the same type of battery or equivalent as recommended by the battery manufacturer. Dispose of used batteries according to the manufacturer's instructions.

Accessories (Optional)

Table 5. Accessories

Part Description	Part Number
Automotive & Navigation	
Bluetooth Car Kit - High Tier, T505	SYN1717
T305 Portable Bluetooth Hands-Free Speaker, Bluetooth Car Kit, Mid Tier	SYN1716
T605 Pro Install Bluetooth Carkit	SYN1782
BT Pro-Install CarkIt IHF1000r	98676K
Data & Business Communications	
Bluetooth Class 1 USB Adapter PC850	SYN1244
128MB microSD card & Mot SD adapter	SYN1403
1GB microSD card & Mot SD adapter	SYN1406
256MB microSD card & Mot SD adapter	SYN1404
2GB microSD card & Mot SD adapter	SYN1407
512MB microSD card & Mot SD adapter	SYN1405
Grey EMU data cable	SKN6234
USB 2.0 SD Card Reader	SYN1045
Digital Accessories	
Data Cable Mini USB/USB/Serial	SKN6371
Data Cable USB/charging	AAKN4013
Motorola Phone Tools Phase 4	SVN5539
MobileVoice (Wireless BT Headsets)	
Bluetooth Headset H670 Black Slate (Canary)	SYN1853
Bluetooth Headset H670 Cosmic Blue (Canary)	SYN1855
Bluetooth Headset H670 Silver Quartz (Canary)	SYN1852
Bluetooth Headset H550 Silver (SLVR)	SYN1822
Bluetooth Headset - Plum - H700	SYN1818
Bluetooth Headset - Dark Pearl Blue - H800	SYN1639
Bluetooth Headset - Fire Red - H700	SYN1820
Bluetooth Headset - MiniBlue H9	SJ0095A
Bluetooth Headset H555 Black/Black (RAZR)	SYN1854
Bluetooth Headset - Pale Lilac - H350	SYN1948
Bluetooth Headset - Project (RED) - H500	SYN1966
Bluetooth Headset H505 EZ Pair - Black Gloss	SYN1949
Bluetooth Headset H505 EZ Pair - Pink	SYN1965
Bluetooth Headset H555 Silver/Black (RAZR)	SYN1821

Table 5. Accessories(Continued)

Part Description	Part Number
Bluetooth Headset Black H700 (not available in North America)	SYN1509
Bluetooth Headset H700 Blue/Black Cingular Only	SYN1508
Bluetooth Mono Headset, Nickel- H500	SYN1290
Bluetooth Headset - H700 (silver)	SYN1311
Bluetooth Headset - H605	SYN1303
Bluetooth Headset (Pearl Dark Gray) - H300	SYN1297
Bluetooth Headset H500 Pink	SYN1436
Bluetooth Headset H350 Dark Pearl Grey	SYN1763
Bluetooth Headset - HS850 (Refresh - Black)	SYN1107
Bluetooth Headset - HS850 (Refresh - Blue)	SYN1226
Bluetooth Headset (Pink) - H300	SYN1417
Bluetooth Headset (Pure White) - H300	SYN1416
Bluetooth Headset H700 D&G Gold	SYN1769
Bluetooth Headset H350 Sapphire Blue	SYN1738
Bluetooth Headset H350 Silver Quartz	SYN1765
Bluetooth Headset H350 Silver Sail	SYN1764
Bluetooth Headset H350 Black	SYN1439
Bluetooth Headset Softtouch Black H500	SYN1374
Bluetooth Headset H500 Celery	SYN1732
Bluetooth Headset H500 Cosmic Blue	SYN1617
Bluetooth Headset H500 Fire Red	SYN1667
Bluetooth Headset H500 Hot Pink	SYN1525
Bluetooth Headset H500 Oi Branded	SYN1735
Bluetooth Headset H500 Pumpkin	SYN1733
Bluetooth Headset H500 Steel Teal	SYN1734
Modules & Emerging Technologies	
Oakley RAZRWIRE (Mercury: NA) - H7	98679H
Oakley RAZRWIRE (Pewter/Black: NA) - H7	98677H
Oakley RAZRWIRE (Plantinum/Rootbeer: NA) - H7	98678H
Reverb (Oakley Stereo Bluetooth Eyewear - BLK)	SYN1552
Reverb (Oakley Stereo Bluetooth Eyewear - WHT)	SYN1553
REVERB (Oakley Stereo Bluetooth Eyewear Br. Sm.)	SYN1554
Audex Motorola Jacket Series Electronics - Deep Spruce	SYN1712
Audex Motorola Jacket Series Electronics - Fire Red	SYN1713
Music & Entertainment	

Table 5. Accessories(Continued)

Part Description	Part Number
HT820 BT Stereo Headphones Black (soft-touch black)	SYN1967
D&G Stereo Headset	SYN1744
EMU STEREO HEADSET FIRE RED	SYN1632
JBL Black On Tour Portable Speaker	SYN1451
Motorola Bluetooth Active Headphones S9	SYN1902
S200 EMU Stereo HS - Cherry Red	SYN1709
S200 EMU Stereo HS - Cingular	SYN1562
S255 EMU Mono HS	SYN1471
S262 EMU Stereo HS	SYN1457
Stereo Headset - EMU	SYN1301
Adapter EMU to 2.5mm stereo	SYN1505
Adapter EMU to 3.5 mm	SYN1504
Bluetooth Stereo Headset & Controller S705	SYN1711
Bluetooth Stereo Headset HT820	SYN0948
S805 DJ Headset - Bluetooth - Music and Telephony	SYN1673
JBL On Tour Mobile European Kit	OnTourMBBLKE
JBL On Tour Mobile portable speaker US Kit	OnTourMBBLK
JBL On Tour Mobile speaker PRC kit	CH1414A
JBL On Tour Mobile speaker UK kit	OnTourMBBLKU
Sinead Music Dock S850	SYN1847
Power	
Vehicle Power Adapter EMU - VC700	SYN0847
Battery BT50 (PF4 Ltd) Li-Ion 880 mAh	SNN5771
Standard Car Charger EMU - P310	SYN1630
Charger Adapter EMU/EMU (Y-cable)	SKN6222
Travel Charger EMU Mid-Rate Switcher - Argentina	SPN5192
Travel Charger EMU Mid-Rate Switcher - Australia	SPN5193
Travel Charger EMU Mid-Rate Switcher - BRAZIL	SPN5187
Travel Charger EMU Mid-Rate Switcher - EURO	SPN5189
Travel Charger EMU Mid-Rate Switcher - INDIA	SPN5194
Travel Charger EMU Mid-Rate Switcher - JAPAN	SPN5274
Travel Charger EMU Mid-Rate Switcher - KOREA	SPN5351
Travel Charger EMU Mid-Rate Switcher - MEXICO	SPN5186
Travel Charger EMU Mid-Rate Switcher - PRC	SPN5188
Travel Charger EMU Mid-Rate Switcher - TWN	SPN5216
Travel Charger EMU Mid-Rate Switcher - UK/HK	SPN5190

Table 5. Accessories(Continued)

Part Description	Part Number
Travel Charger EMU Mid-Rate Switcher - US ENG	SPN5185
Travel Charger EMU Rapid Switcher - Argentina	SPN5197
Travel Charger EMU Rapid Switcher - BRAZIL	SPN5196
Travel Charger EMU Rapid Switcher - HK	SPN5199
Travel Charger EMU Rapid Switcher - Japan	SPN5275
Travel Charger EMU Rapid Switcher - MEXICO	SPN5200
Travel Charger EMU Rapid Switcher - PRC	SPN5198
Travel Charger EMU Rapid Switcher - US	SPN5202
Travel Charger EMU Rapid TWN	SPN5270
VPA EMU High Performance "Loop"	SPN5401
P320 desktop BOC (battery-only-charge), platform, EMU	SPN5394
P790 Portable Charger	SPN5353
Charger Adapter - Aust/NZ Plug	SYN8127

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