



MOTOROLA

Level 1 & 2 Service Manual

6809513A81-A

U9

Digital Wireless Telephone



GSM 850/900/1800/1900 GPRS/EDGE



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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 U9 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 U9 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 U9 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 ”.

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 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.

Phone: 800-422-4210

FAX: 800-622-6210

Website: <http://businessonline.motorola.com>

Outside U.S.A.

Phone: 847-538-8023

FAX: 847-576-3023

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, 299 PCS, 124 GSM 850 carriers (8 channels per carrier)
Modulation	GMSK at BT=0.3
Transmitter Phase Accuracy	5 Degrees RMS, 20 Degrees peak
Duplex Spacing	45MHz (GSM 850, GSM 900), 95MHz (DCS 1800), 80MHz (PCS 1900)
Frequency Stability	+/-0.10 ppm of the downlink frequency (Rx)
Operating Voltage	+3.35Vdc to +4.35Vdc (Battery) +5.00Vdc max (external connector)
Transmit Current Drain	60-290 mA average talk current drain
Standby Current Drain	~3 mA (DRX2), 2 mA (DRX9) typical
Temperature Range	-10 degC to +55 degC (+15 deg F to +130 deg F)
Dimensions, with 900 mAh Li-Ion battery	50mm x 87.5mm x 22.7mm
Size (Volume)	55-60 cc
Weight	103 grams with battery
Battery Life, with standard 900mAh Li-Ion Battery	GSM Talk time Up to 400 mins Standby time Up to 250 hrs All talk and standby times are approximate and depend on network configuration, signal strength, and features selected. Standby times are quoted at DRX=2 to DRX=9. Talk times are quoted as a range from DTX off to DTX on.
Battery Charge Time	3 hours to 95% of 900mAh capacity
Alert Volume	Max 95dB @ 5cm, 0.5 Watts input

Transmitter Functions	Specification
RF Power Output	32.5 dBm nominal (GSM 850/900) 29.5 dBm nominal (DCS1800/PCS1900)
Output Impedance	50 ohms nominal
Spurious Emissions	-36dBm from 0.03 to 1 GHz, -30dBm from 1 to 4 GHz

Receiver Functions	Specification
Receive Sensitivity	Better than -103dBm
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 U9 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. U9 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.

U9 telephones have a clam form factor. They feature an externally viewable 1.45" 128 x 160 262K OLED CLI display for caller identification with date/time, and an internal 2.0" 240 x 320 QVGA TFT color display located in the flip. The bottom part of the clam (front housing) contains the keypad, transceiver printed circuit board (PCB), microphone, flex connection, external accessory connector, smart button, volume buttons, and voice button. The standard 900mAh Lithium Ion (Li Ion) battery fits behind a removable back cover and provides up to 630 minutes of talk time and 450 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

U9 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
- GPRS Class 12
- EDGE Class 12

Physical

- Width 50mm
- Height 87.5 mm
- Depth 22.7 mm
- Volume 55-60 cc
- Weight 103.0 grams

Audio

- AAC
- MP3
- WMA
- AAC+/enhanced

Video

- MPEG4
- H.263

Audio + Video

-
- WMV v10
 - WMV v9
 - RV v9
 - H.264
 - H.263
 - MPEG4

Display

- Main display 2.0" QVGA 262K TFT
- CLI display 1.45" 128 x 160 262K OLED

Memory

- 20 MB internal memory

Imaging

- Camera resolution: 2 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.

Caller Line Identification

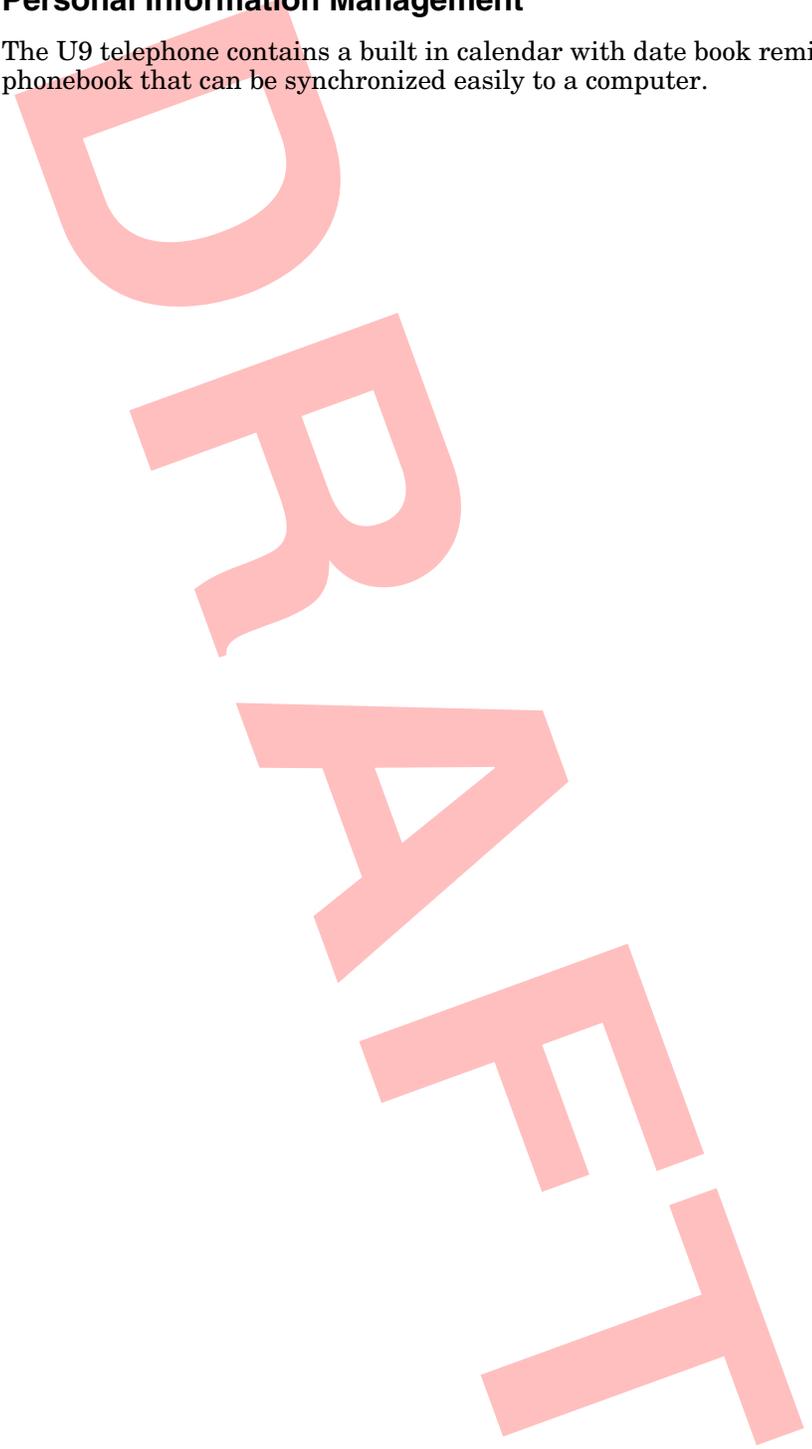
Upon receipt of a call, the calling party's phone number is compared to the phone book. If the number matches a phone book entry, that name will be displayed. If there is no phone book entry, the incoming phone number will be displayed. In the event that no caller identification information is available, an incoming call message is displayed.



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

Personal Information Management

The U9 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 U9 controls are located on the front and sides of the device, and on the keyboard, as shown in Figures 1 and 2.



Figure 1. Telephone Controls, indicators, and I/O Connections (Flip Open)



Figure 2. Telephone Controls, indicators, and I/O Connections (Flip Closed)

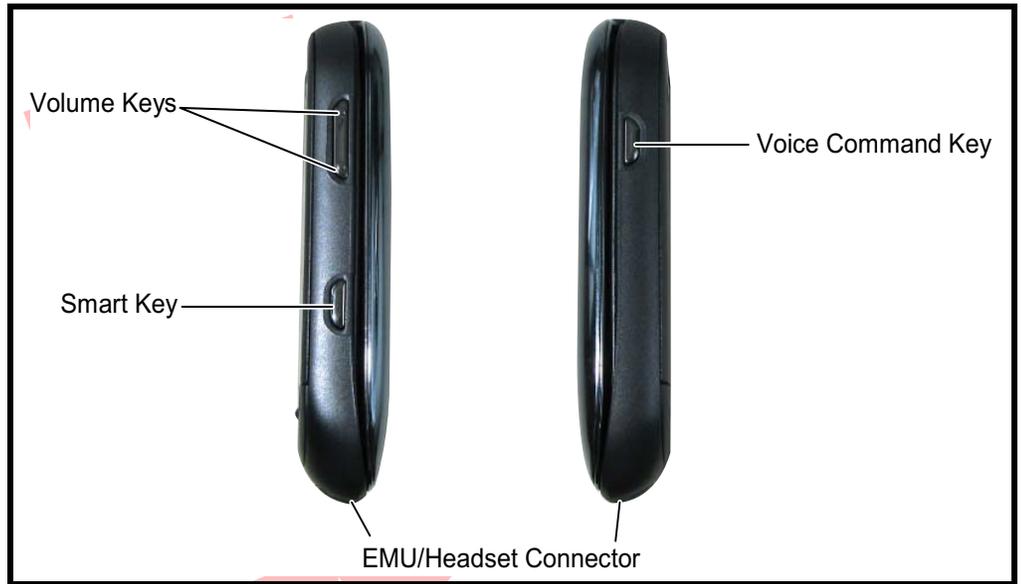


Figure 3. Telephone Controls and Indicators Locations (Sides)

Indicators, in the form of icons, are displayed on the LCD (see Figure 4).

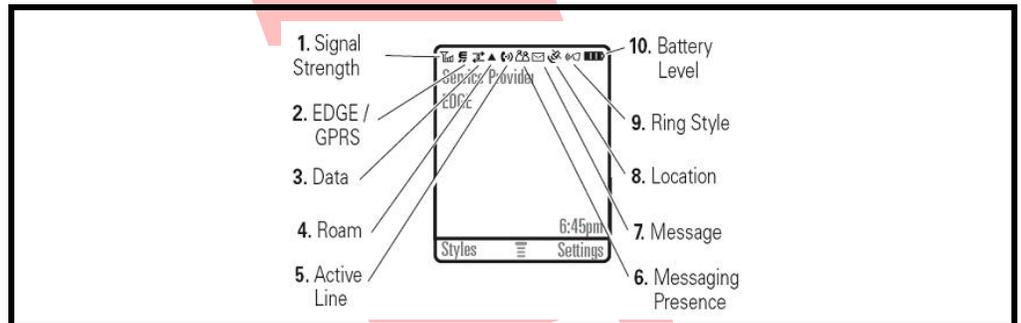


Figure 4. Main Screen Icon Display

1. **Signal Strength Indicator** — Vertical bars show the strength of the network connection. You can't make or receive calls when or displays.
2. **EDGE/GPRS Indicator**— Shows when your phone is using a high-speed Enhanced Data for GSM Evolution (EDGE) or General Packet Radio Service (GPRS) network connection. Indicators can include:
 - = GPRS PDP context active
 - = EDGE
 - = GPRS packet data available
3. **Data Indicator**— Indicators can include:
 - = secure packet data transfer
 - = unsecure packet data transfer

 = secure application connection	 = unsecure application connection
 = secure Circuit Switch Data (CSD) call	 = unsecure CSD call

4. **Roam Indicator**— Shows  when your phone is seeking or using a network outside your home network. 
 5. **Active Line Indicator**— Shows  to indicate an active call, or  to indicate when call forwarding is on. Indicators for dual-line-enabled SIM cards can include:

 = line 1 active	 = line 1 active, call forward on
 = line 2 active	 = line 2 active, call forward on


 6. **Messaging Presence Indicator**— Shows when instant messaging (IM) is active. Indicators can include: 

 = IM active	 = available for IM
 = busy	 = invisible to IM
 = available for phone calls	 = offline
- The Java™ indicator  shows when a Java application is active.
7. **Message Indicator**— Shows when you receive a new message. Indicators can include:

 = text message	 = voice message
 = voicemail & text message	 = IM message
 8. **Location Indicator**— Shows when your phone can send location information  or not . 
 9. **Ring Style Indicator**— Shows the ring style setting.

 = loud ring	 = vibrate & ring
 = soft ring	 = vibrate then ring
 = vibrate	 = silent
 10. **Battery Level Indicator**— Vertical bars show the battery charge level. Recharge the battery when your phone shows LowBattery.

Menu Navigation

U9 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 128 x 160 65K TFT pixel 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.

Figure 5 shows the Idle Screen display.

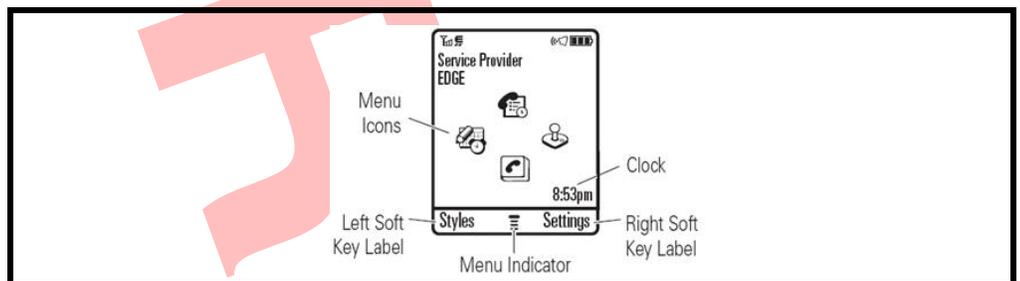


Figure 5. Main Screen Display

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%, 20%, 5% 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.



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 U9 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-3, T-5 and T-3 Torx	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
0-00-00-40883 (AMS)	U9 Main Lens Press Fixture	Used to assemble the main lens
19501980 (AMS) ²	Generic press tool	Used to assemble the main lens and the CLI 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 U9 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. Press down on the battery latch and it lift up as shown in Figure 1.

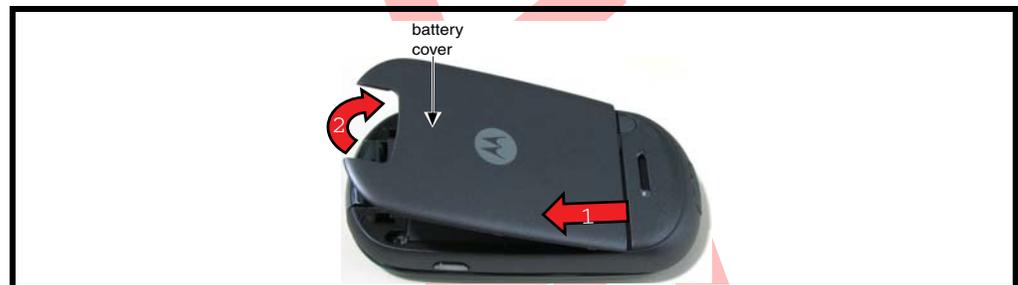


Figure 1. Removing the Battery Door

2. Lift the battery cover completely off the phone.
3. Press the battery inwards in the direction shown in Figure 2.
4. Lift the battery completely out of the phone.



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 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)

1. Remove the battery door and battery as described in the procedures.



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 are in the correct orientation.
5. Replace the battery and battery door as described in the procedures.

Removing and Replacing the Housing Screws



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, and SIM as described in the previous procedures.



In addition to 6 screws, the rear housing assembly is fastened with plastic latches. These are fragile and should be released with care.

2. Using a T-5 torque driver, remove the 6 screws on the back housing. Be careful not to damage the back housing. See Figure 4.



Figure 4. Removing the Rear Housing Screws

Removing the Main PCB Assembly

1. Using the flat tip of the disassembly tool, gently & carefully insert in between the keypad cover and flip knuckle joint as shown below.
2. Slide the disassembly tool around the outline of the keypad cover to release the keypad cover from the Xcvr housing .



Figure 5. Removing the Keypad to Access the Xcvr Assembly

3. After removing the keypad cover with the disassembly tool, carefully raise the PCB assembly slowly to show access to the main flex connector. Be careful not to tear the flex cable.

4. After revealing the main flex connector, as shown below, carefully pry off the connector using the black disassembly tool.

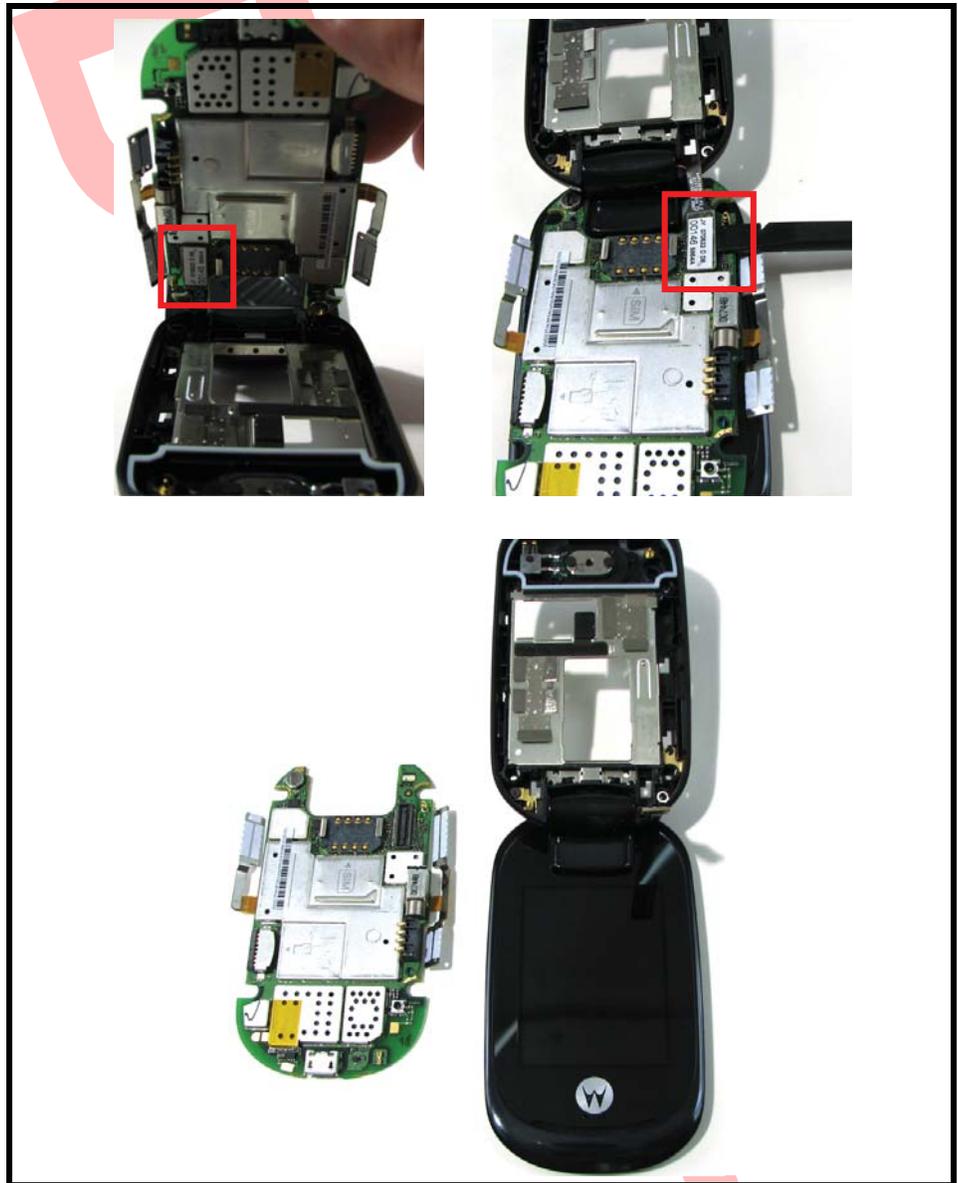
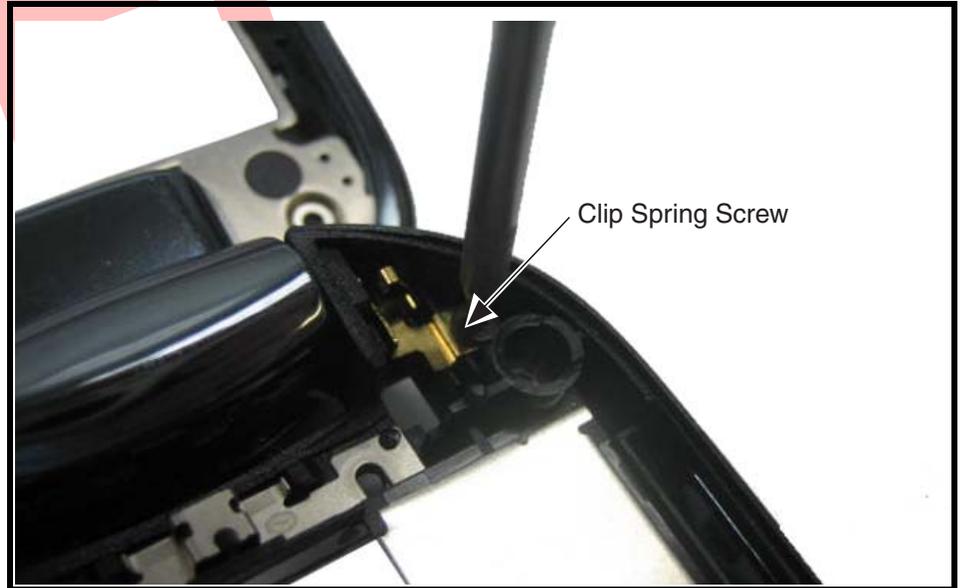


Figure 6. Locating and Separating the Main Flex Connector

5. Lift the PCB assembly away from the housing.
6. To replace, attach the main flex cable onto the PCB assembly.
7. Gently place the PCB assembly into the housing.
8. Apply new adhesive to the keypad cover. Align, then press firmly into place.
9. Replace the 6 housing screws and tighten to a final torque setting of 1.4 +/- 0.1 lbs. Do not over tighten.
10. Replace the SIM, battery, and battery cover as described in the procedures.

Clip Spring Removal and Replacement

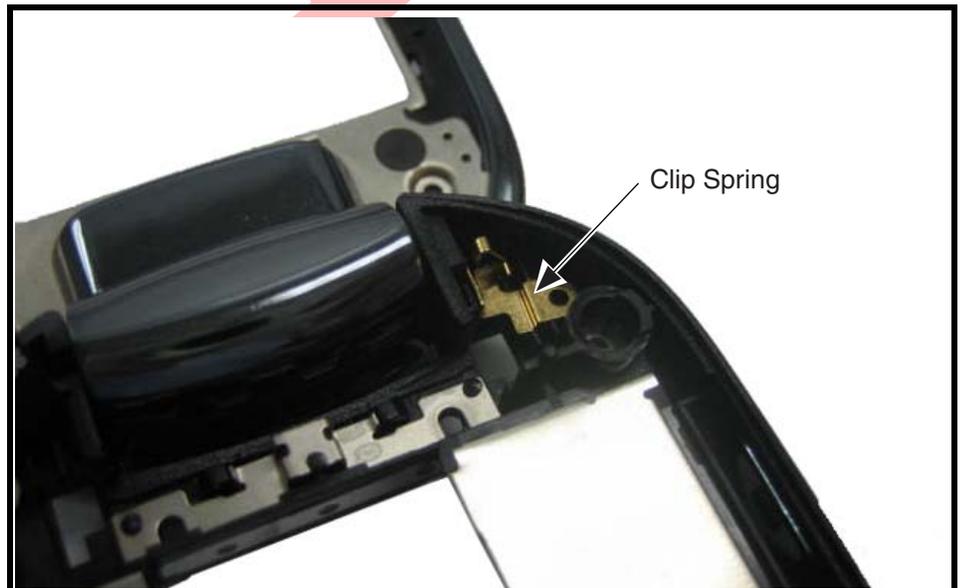
11. Remove the clip spring screw with a T3 torque driver.



v534250

Figure 7. Clip Spring Removal

12. Remove the clip spring from the rear housing.
13. To replace, insert a new clip spring into the rear housing..



v534252

Figure 8. Clip Spring Replacement

14. Insert and tighten the clip spring screw and tighten with a T3 torque driver.

Removing the Hinge 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 PCB from the housing as described in the procedures.
2. Hold flip with one hand, and press hinge with a metal stick as indicated in figure 9. Press to the end, remove the assembly.



For this operation the disassembly tool must be have a lever movement to avoid damage to the connector or electronic components.

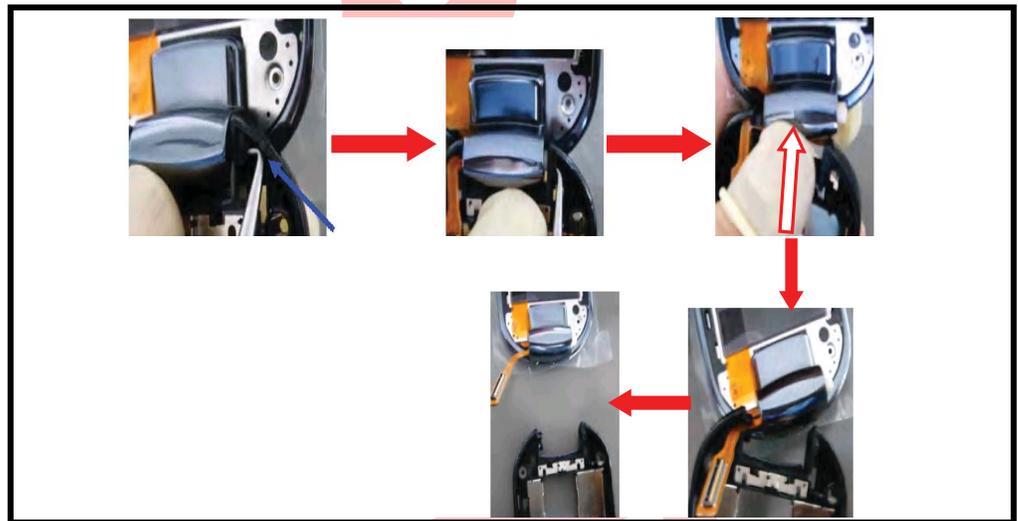


Figure 9. Separating the Flip Assembly from the Xcvr Assembly

3. To replace, insert the side buttons into its slots.
4. Align and insert the transceiver board assembly into the rear housing.
5. Carefully and gently place the side key flex into the designated slot and the transceiver board into position.
6. Carefully align the flex cable connector to the socket and then gently but firmly seat the connector into its socket.
7. Replace the rear housing, SIM, battery, and battery cover as described in the procedures.

Removing and Replacing the Main Lens

1. Remove the battery cover, battery, SIM, rear housing, transceiver board, front housing as described in the procedures.
2. Using the disassembly tool, insert the tool under the display lens at the top of the flip. Slide the tool around the edges of the display lens to remove the lens. Remove any left over adhesive from the flip.
3. Take off the main lens, paste a liner on the main lens and LCD.



Figure 10. Removing the Main Lens to Expose Housing Screws

4. Using a T-5 torque driver, remove the 4 flip housing screws. Set the screws aside for reassembly.



Figure 11. Removing the Flip Housing Screws

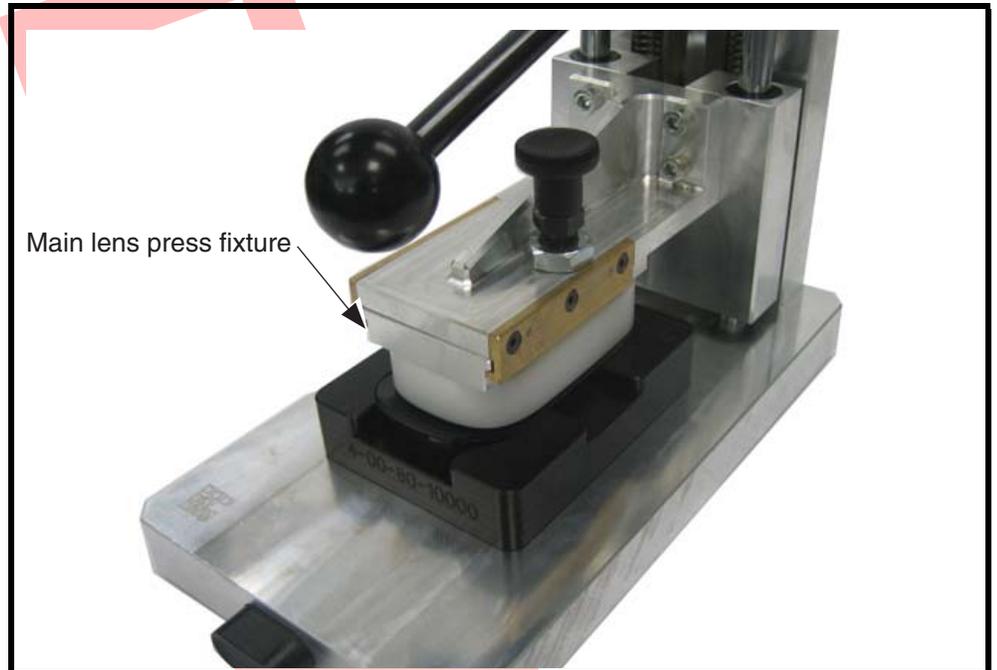
5. Insert the disassembly tool between the front and rear flip housing to unlatch the flip catches in the sequence shown below. Separate the flip rear & front housing after all catches are being unlatched.



Figure 12. Separating the Flip Front Housing from the Flip Rear Housing

6. To replace, align the flip rear housing to the flip assembly and carefully press downwards to engage the 7 latches.
7. Turn the flip assembly over & insert the 4 flip screws. Tighten with a T-5 torque driver to a final torque setting of 1.4 +/- 0.1 lbs.

8. Remove the adhesive liner from the new display lens and use the main lens press fixture (see Figure 13). Press and hold for 15 +/- 1 seconds.



v527346

Figure 13. Main Lens Press Fixture

9. Replace the front housing, transceiver board, rear housing, SIM, battery & battery cover as described in the procedures.

Removal & Replacing the Flip Board Assembly & Display

1. Remove the battery cover, battery, SIM, rear housing, transceiver board, front housing, flip housing as described in the procedures.
2. Using a tweezer, gently pushing outwards to release the 4 display bracket catches shown below.

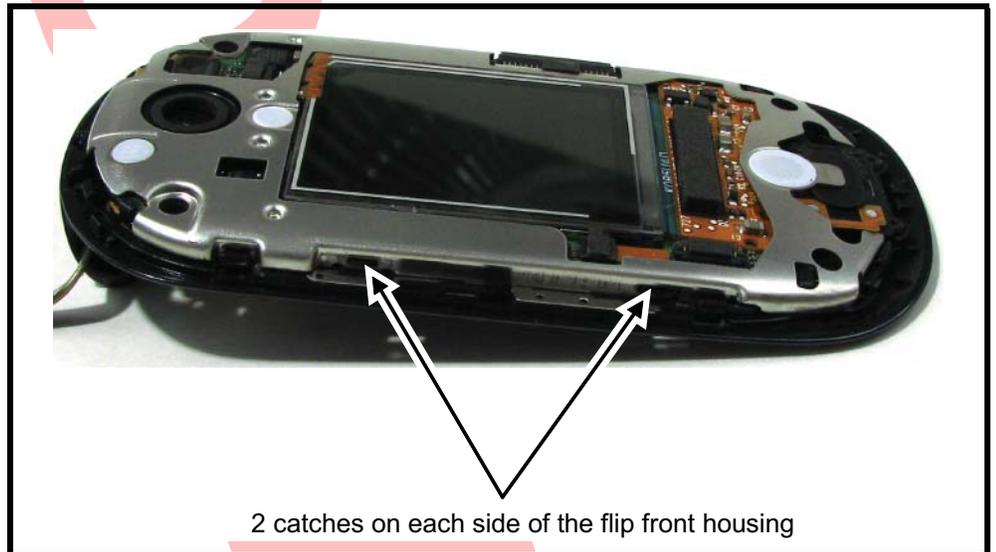


Figure 14. Disengaging the Display Bracket Assembly Catches

3. Carefully lift the display bracket away from the flip assembly.



Figure 15. Removing the Display Bracket Assembly



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

4. Carefully pry the display away from the flip assembly.
5. To replace, carefully align and replace the display onto the flip assembly.
6. Replace the display bracket onto the flip assembly..
7. Replace the flip housing, front housing, transceiver board, rear housing, SIM, battery and battery cover as described in the procedures.

Removing the Camera Assembly

1. Remove the battery cover, battery, SIM, rear housing, transceiver board, front housing, flip housing, display bracket and display as described in the previous procedures.
2. Locate the camera flex and flip flex connectors as shown in figure 16.

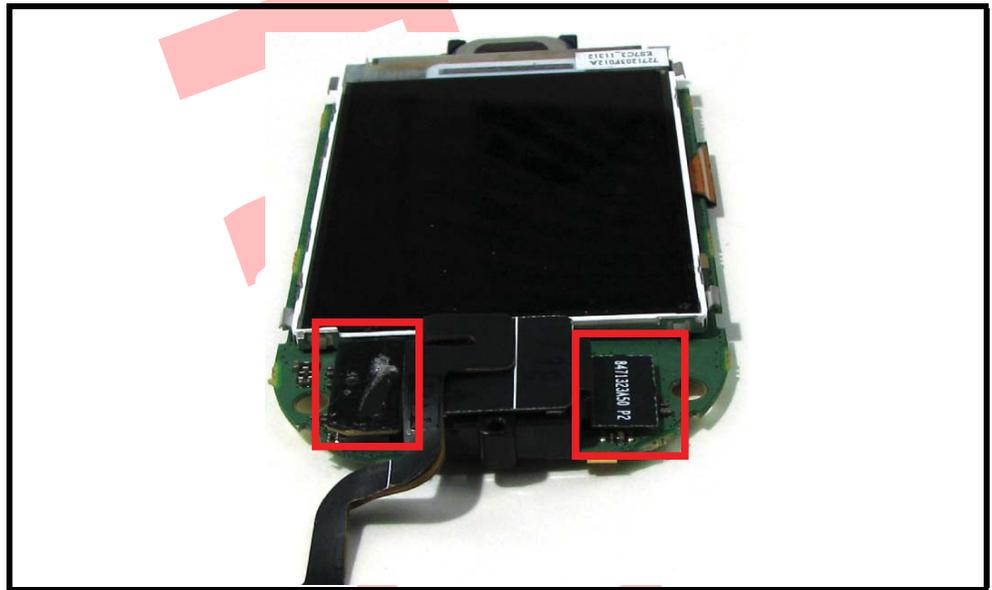


Figure 16. Locating the Camera and Flip Flex Connectors

3. Using the disassembly tool, unseat the camera flex connector from its socket.

- Using the disassembly tool, unseat the flip flex connector from its socket.

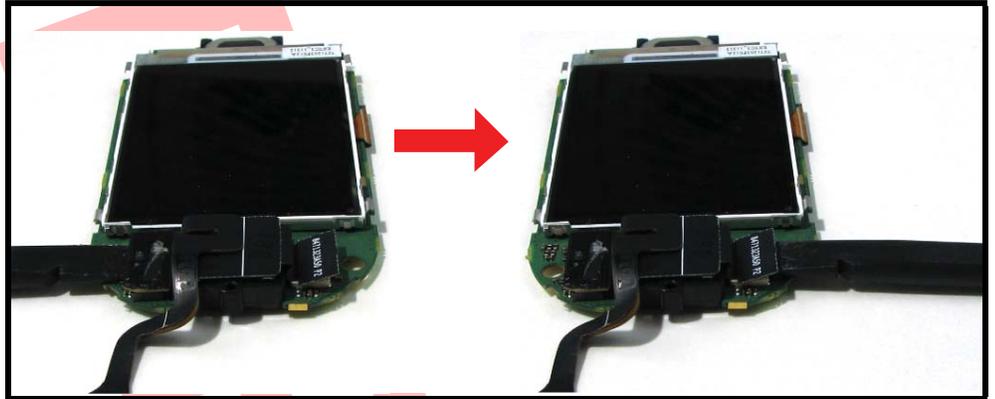


Figure 17. Unseating the Camera and Flip Flex Connectors

- After disconnecting the flex connectors, notice that the camera becomes loose and should slide away from the display assembly as shown in figure 18.

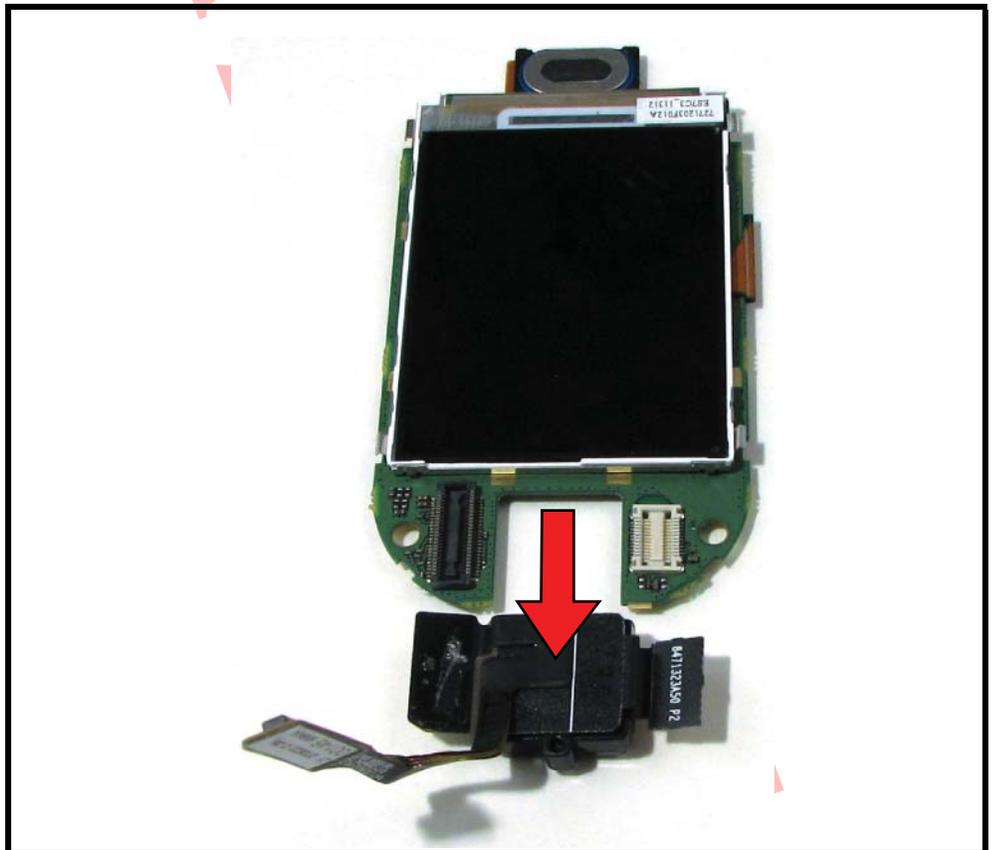


Figure 18. Removing the Camera Assembly

-
6. To replace, carefully align & lower the flip board assembly onto the flip front housing.
 7. Insert the vibrator module into its slot and gently press downwards to ensure it sits properly on the housing.
 8. Press the camera module connector into its socket on the flip board assembly.
 9. Reconnect the flip flex connector to its socket on the flip board assembly.
 10. Align the lower 2 tips of the display bracket into the 2 stoppers on the flip front housing. Carefully lowered the display bracket & press gently downwards along the sides of the bracket to engage the 6 latches.
 11. Replace the flip housing, front housing, transceiver board, rear housing, SIM, battery and battery cover as described in the procedures.

Disassemble Housing Components

1. Remove the battery cover, battery, SIM card, rear housing, and transceiver board assembly as described in the procedures.
2. Hold the edge of the antenna as shown in figure 19, take the antenna out of the housing



Figure 19. Removing the Antenna from the Housing

3. Remove the 3 side keys from the housing.



Figure 20. Removing the Front Housing Assembly

4. To replace, position the 3 side keys back into the housing.
5. Carefully place the antenna assembly into the housing..
6. Replace the transceiver board, rear housing, SIM, battery and battery cover as described in the procedures.

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. U9 telephones use TrueSync® synchronization software to effect a personality transfer.

Identification

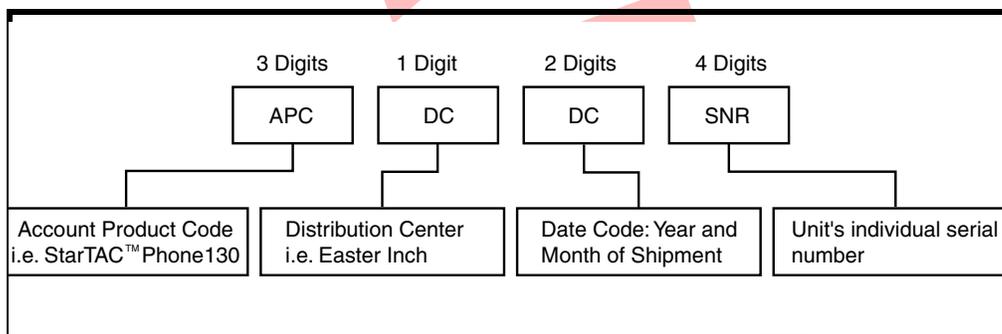
Each Motorola GSM device is labeled with a variety of identifying numbers. The following information describes the current identifying labels.

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 21.



000807a

Figure 21. 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:

- **TRANSCIVER 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.

HTCMD (Handset Test Command)

Enter test command	Insert Test SIM Card & Battery into handset. To enter Test Command Screen, Press <Menu> button followed by 048263*
Enter Suspend Mode	Enter "54", then select <OK> When "Success" message appears, press <Back> to activate. (MUST DO)
Display Light OFF Test	Enter 62*1*0 followed by <OK>, <OK>, the Display Backlight should light OFF, select <Back> after test.
Display Light ON Test	Remark: To turn on display light, enter 62*1*1 followed by <OK>, <OK>, the Display Backlight should light ON, select <Back> after test.
Vibration Test	- For Vibrator On: Enter 3*0*1 & select <OK>, select <Back> after start. - For Vibrator Off: Enter 3*0*0 & select <OK>, select <Back> after stop.
Alert Test 1 - Audio Loop-back Check	To activate the audio loop check command. Enter 6*2*2*0*0*0*0 & select <OK>, select <Back> after "Success" To set the loudness level. Enter 5*0*7 & select <OK>, select <Back> after "Success" Note: The last number is level. Example: 7 as above. To do audio loop test Enter 4*3*1 & select <OK>, just say "Hello", select <Back> after test.
EMU Ear piece audio loop-back test	Insert EMU ear piece. Test for either Stereo or Mono Headset if applicable. Enter 2312 & select <OK> Say "Hello" to test. Unplug EMU Ear piece. Select "Back" after test.
Ringer Test	To activate the ringer function test command. Enter 6*1*3*0*0*0*0 & select <OK> Select <Back> after "success". To set the loudness level. Enter 5*0*15 & select <OK> Select <Back> after "success". Note: The last number is level. Example: 14 as above. To do the ringer test Enter 0*0*42 & select <OK> Select <Back> after start. To do stop the ringer test Enter 0*1*0 & select <OK> Select <Back> after stop.

Display Segment/ Pixel Test	<p>Turn On All Pixels to inspect the display grid on LCD Enter 55*2*001 & select <OK>, press  after test.</p> <p>Turn On Checkboard pattern A Enter 55*2*002 & select <OK>, press  after test.</p> <p>Turn On Checkboard pattern B Enter 55*2*003 & select <OK>, press  after test.</p> <p>Turn On Border pixels ON Enter 55*2*004 & select <OK>, press  after test.</p> <p>Turn On All RED Pixels Enter 55*2*011 & select <OK>, press  after test.</p> <p>Turn On All BLUE Pixels Enter 55*2*012 & select <OK>, press  after test.</p> <p>Turn On All GREEN Pixels Enter 55*2*013 & select <OK>, press  after test.</p> <p>Turn Off All Pixels to inspect the display grid on LCD Enter 55*2*000 & select <OK>, press  after test.</p> <p>To display Horizontal Color Bar, Enter 55*2*008 & select <OK>, press  after test.</p>
Keypad LEDs ON Test	Enter 62*0*1 followed by <OK>, <OK>, the Keypad LEDs should light ON, select <Back> after test.
Band test	<p>Enter 10*0*3 (GSM 900) Enter 10*0*4 (DCS 1800) Enter 10*0*5 (PCS 1900) Enter 10*0*6 (Dual band GSM 900 / 1800) Enter 10*0*7 (Dual Band GSM 850/1900) Enter 10*0*8 (GSM850)</p> <p>Check using 10*1*0 3=GSM, 4=DCS, 5=PCS, 6=GSM/DCS</p>
MC/MR	<p>18*0 - Initialize no-volatile memory (MR) 18*1 - Initialize no-volatile memory (MC)</p>
To exit test command mode	Press the  key.
SW / IMEI check	<p>Enter *#9999# - SW/Flex version Enter *#06# - IMEI no.</p>

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) Flip assembly defective.	Temporarily replace the flip assembly with a known good assembly. If fault has been cleared, reassemble with the new flip assembly. If fault not cleared, proceed to c.
	c) Transceiver board assembly defective.	Forward to an authorized level 3 service center.
4. Incoming call alert transducer audio distorted or volume is too low.	a) Faulty Loudspeaker	Replace back housing assembly. Verify that the fault has been cleared and reassemble the unit. If fault not cleared, proceed to b.
	b) 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 by reworking the microphone. If fault is not cleared, proceed to d.
	c) Microphone Hole obstructed	Remove the Transceiver board, remove the obstruction from the keypad and/or the PCB Microphone holes.

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

SYMPTOM	PROBABLE CAUSE	VERIFICATION AND REMEDY
	d) 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 flip assembly to the transceiver board assembly. If flex is at fault, replace flip assembly. If flex connector is at fault, proceed to d. If connection is not at fault, proceed to b.
	b) Flip assembly defective.	Temporarily replace the flip assembly with a known good assembly. If fault has been cleared, reassemble with the new flip assembly. If fault not cleared, proceed to c.
	c) 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.
	d) 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) Flip assembly defective.	Temporarily replace the flip assembly with a known good assembly. If fault has been cleared, reassemble with the new flip assembly. If fault not cleared, proceed to c.
	c) Transceiver board assembly defective.	Forward to an authorized level 3 service center.
8. Phone does not sense when flip is opened or closed (usually indicated by inability to answer incoming calls by opening the flip, or inability to make outgoing calls).	a) Flip assembly defective.	Temporarily replace the flip assembly with a known good assembly. If fault has been cleared, reassemble with the new flip assembly. If fault not cleared, proceed to b.
	b) Transceiver board assembly defective.	Forward to an authorized level 3 service center.
9. Vibrator feature not functioning.	a) Flip assembly defective.	Temporarily replace the flip assembly with a known good assembly. If fault has been cleared, reassemble with the new flip assembly. If fault not cleared, proceed to b.
	b) Transceiver board assembly defective.	Forward to an authorized level 3 service center.
10. 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.

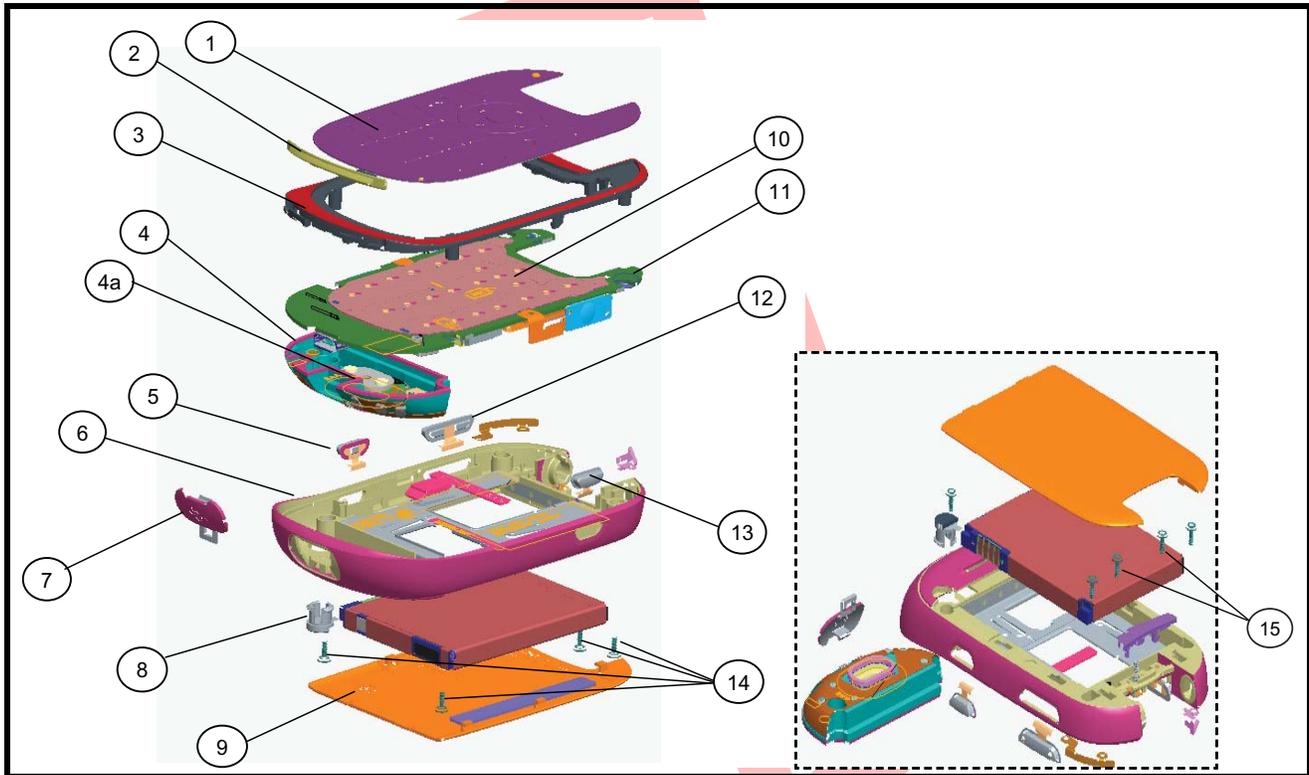
Table 3. : Level 1 and 2 Troubleshooting Chart (Continued)

SYMPTOM	PROBABLE CAUSE	VERIFICATION AND REMEDY
11. 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.
12. 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



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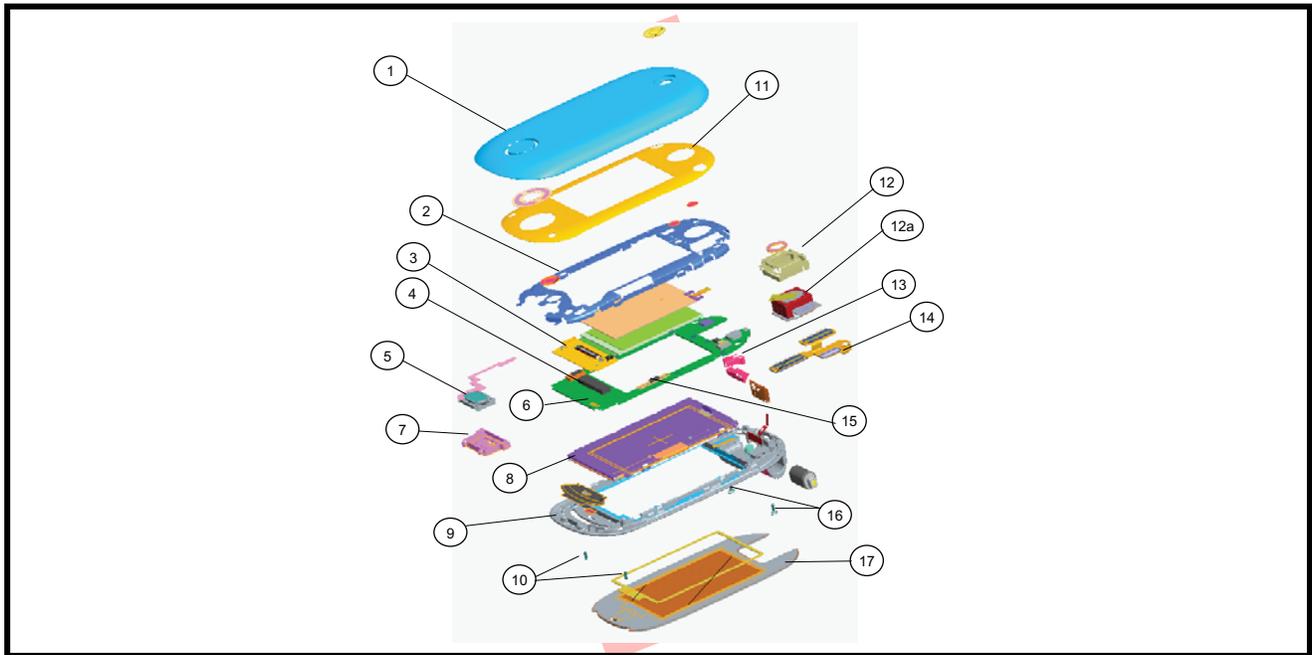
Figure 22. Exploded View Diagram (Flip Assembly)

Exploded View Parts List (Flip 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 (Flip Assembly)

Number	Description	Part number	Number	Description	Part number
1	Assembly, Keypad	3871791A01	9	Assembly, Battery Door (BX-40)	0171907A01
2	Flip Bumper Foot	7571081J01	10	Assy, EL - Dome - Flex	0171289A86
3	Assembly, Housing Front Xcvr	0171927A01	11	PCB Main	8471793A01
4	Assembly, Antenna	0171289A78	12	Side Key (Volume Control)	3871076J01
5	Side Key (PTT)	3871078J01	13	Side Key (Camera)	3871077J01
6	Assembly, Xcvr Rear	0171901A01	14	Screw Xcvr, K14x0.57x5.0,T5	0370303B19
7	Cover, Micro USB Connector	3771079J01	15	Screw Xcvr, K14x0.57x3.4, T5, Delta Pt	0370303B20
8	RF Plug	3771083J01			



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Figure 23. 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.

Figure 24. Exploded View Parts List (Main Assembly)

Number	Description	Part number	Number	Description	Part number
1	Assembly, Housing Flip Outer	0171797A01	10	Screw Flip, CSK, T3, Delta Pt	0370303B23
2	Assembly, Flip Metal Bracket	0171289A73	11	Flip Mask	1471468A12
3	Assembly, Secondary LCD (CLI)	0171289A76	12	Assembly, 2MP Camera Module, FF 06 (Socket) (8.5mm x 8.5mm x 4.4mm)	0171289A77
4	PAD,CMPRSN,PORON,COF SEC DISP,PICO	7571926A10	13	Cover, Slot, Flip	1571967A01
5	Assembly, Receiver	0170298Z66	14	Assy , Hinge Flex	0171289A74
6	Assembly, Flip PCBA	AALG4372AA	15	PAD,CMPRSN,PORON,ZIF,17 POSTN,PICO	7571926A09
7	Grommet, Receiver	3271233A46	16	Screw,SLFTP,3.2MM,STAR,PAN,STL, T3,K12X0.51X3,DELTA PT,PICO	0370303B21
8	Primary LCD Display Module, 2.0" QVGA, 240 x 320, TFT	7271203F01	17	Assembly, Main Lens	0171798A01
9	Assembly, Housing Flip Inner	0171796A01			



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
Data & Business Communications	
Data Cable Mini USB/USB/Serial	SKN6371
Grey EMU data cable	SKN6234
Digital Accessories	
Data Cable TTA	AAKN4013
Motorola Phone Tools Phase 4	SVN5539
Music & Entertainment	
S255 EMU Mono HS	SYN1471
Power	
Travel Charger EMU Rapid Switcher - MEX Portuguese	SPN5361
Travel Charger EMU Rapid Switcher - US Portuguese	SPN5360
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
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

Table 5. Accessories(Continued)

Part Description	Part Number
Travel Charger EMU Rapid Switcher - TWN	SPN5270
Standard Car Charger EMU - P310	SYN1630
Vehicle Power Adapter EMU - VC700	SYN0847
P510 VPA EMU High Performance "Loop"	SPN5401
Battery BC60 (SC5 Ltd) Li-Ion 900 mAh	SNN5781
P320 desktop BOC (battery-only-charge), platform, EMU	SPN5394
P320 desktop BOC, platform, EMU, Chinese label	SPN5395
P790 Portable Charger	SPN5353
Charger Adapter - Aust/NZ Plug	SYN8127
Charger Adapter - Euro Plug	SYN7456
Charger Adapter - UK Plug	SYN7455
Charger Adapter EMU/CE (Y-cable)	SKN6185
Charger Adapter EMU/EMU (Y-cable)	SKN6222

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