



Level 1 & 2 Service Manual

6809509A89-O

W510

Digital Wireless Telephone



W510 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 W510 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 W510 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 W510 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.

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 with 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	80-290 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 880 mAh Li-Ion battery	45mm x 99mm x 17.5mm (1.77 inches x 3.90 inches x 0.69 inches)
Size (Volume)	70 cc (4.27 in ³)
Weight	106 grams (3.74 oz) with battery
Battery Life, with standard 880 mAh Li-Ion Battery	GSM Voice Call - 215 mins to 450 mins Standby DRX5 = ~500 hrs All talk and standby times are approximate and depend on network configuration, signal strength, and features selected. Standby times are quoted at DRX=5. Talk times are quoted with DTX ON.
Battery Charge Time	4 hours to 90% of 880 mAh capacity
Alert Volume	Max 95dB @ 5cm, 0.5 Watts input

Transmitter Functions	Specification
RF Power Output	31.8dBm nominal (GSM 850) 32.0dBm nominal (GSM 900) 29.0dBm nominal (DCS 1800/PCS 1900)
Output Impedance	50 ohms nominal
Spurious Emissions	-36dBm from 0.1 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 W510 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. W510 is a tri-band phones that allow roaming within the GSM 850 MHz, GSM 900 MHz, 1800 MHz Digital Cellular System (DCS), and PCS 1900 MHz bands.

W510 telephones have a clam form factor. They feature an externally viewable 96 x 80 65K color STN CLI display for caller identification with date/time, and an internal 176 x 220 262K 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 880 mAh Lithium Ion (Li Ion) battery fits behind a removable back cover and provides up to 450 minutes of talk time and 350 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

W510 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 12
- EDGE Class 12

Physical

- Width 45mm
- Height 99 mm
- Depth 17.5 mm
- Volume 70 cc
- Weight 106.0 grams

Audio

- AAC
- AAC+
- MP3
- AAC+ Enhanced

Video

- MPEG4 Video clip playback
- H.263
- 3GP

Display

- Main display 176 x 220 pixel 262k TFT
- CLI display 96 x 80 65k CSTN

Memory

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

Imaging

- Primary camera resolution 1.3 MP

Wireless Access Protocol (WAP) 2.0 Compliance

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.

The W510's microbrowser can be configured for baud, idle timeout, line type, phone number, and connection type.



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 W510 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 W510 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

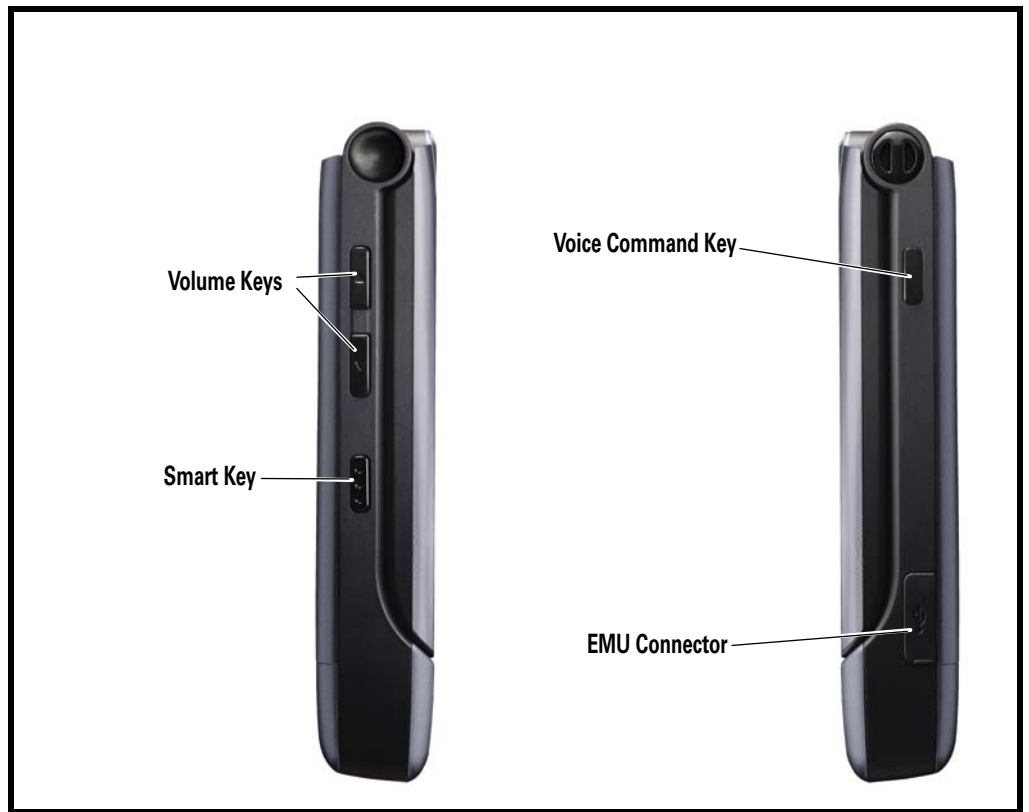


Figure 2. Telephone Controls and Indicators Locations (Sides)

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

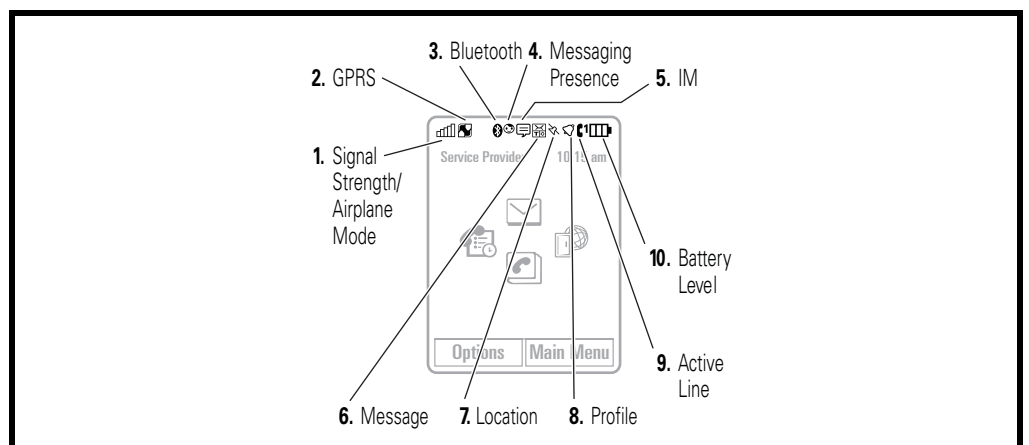















Figure 3. Main Screen Icon Display









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



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:

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

W510 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 176 x 220 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 4 shows the Idle Screen display.

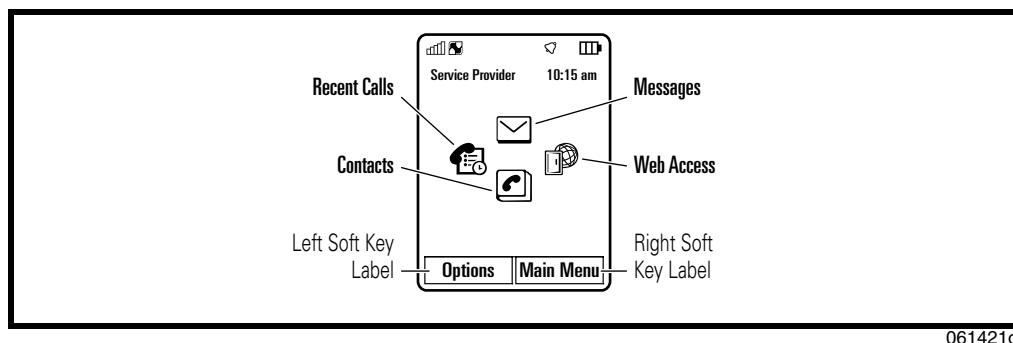


Figure 4. Main Screen Display

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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 W510 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
19501980 (AMS) ²	Generic press tool	Used to assemble the main lens and 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-Straße 9 D-24941 Flensburg Tel.: +49-461-90398-0 Fax: +49-461-90398-50.

Disassembly

The procedures in this section provide instructions for the disassembly of a W510 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.

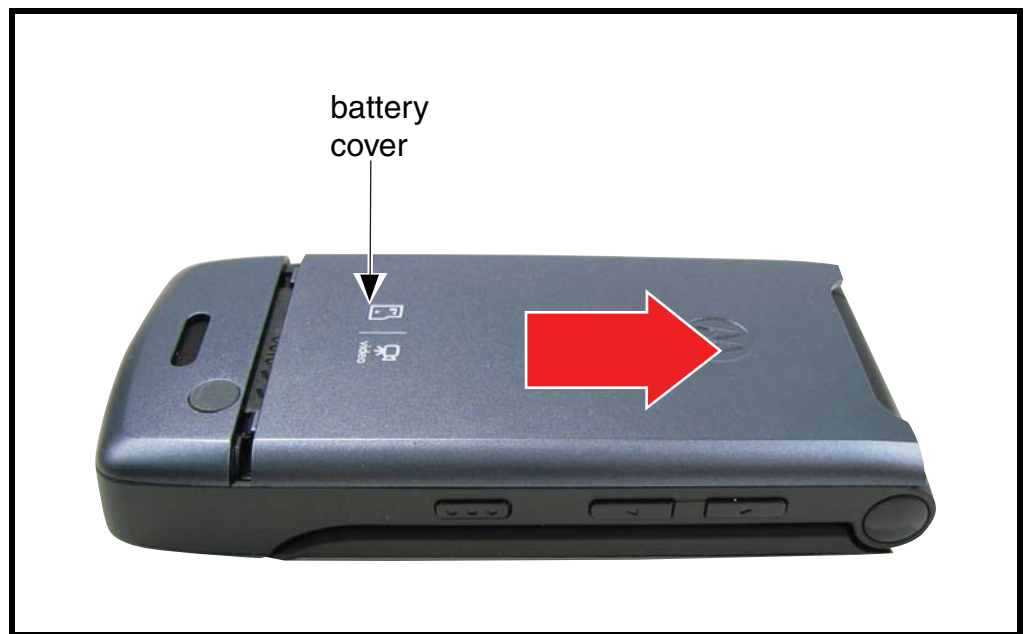


Figure 1. Removing the Battery Door

3. Lift the battery cover completely off the phone.

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

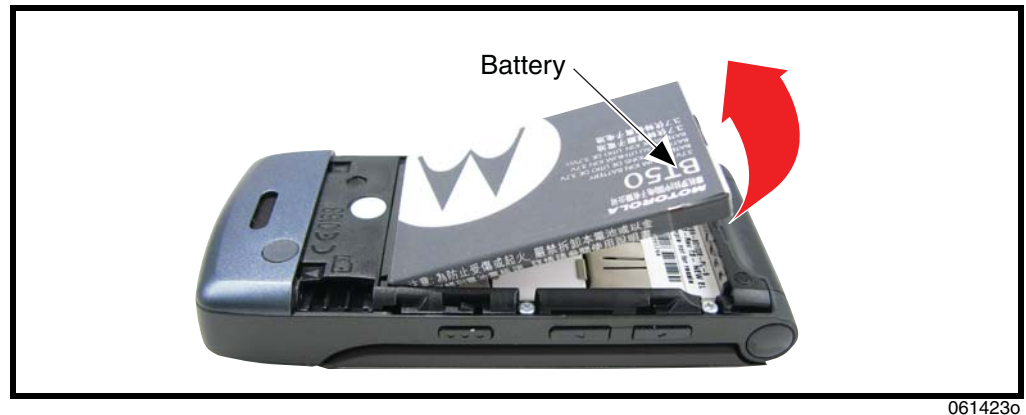


Figure 2. Removing the Battery



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.

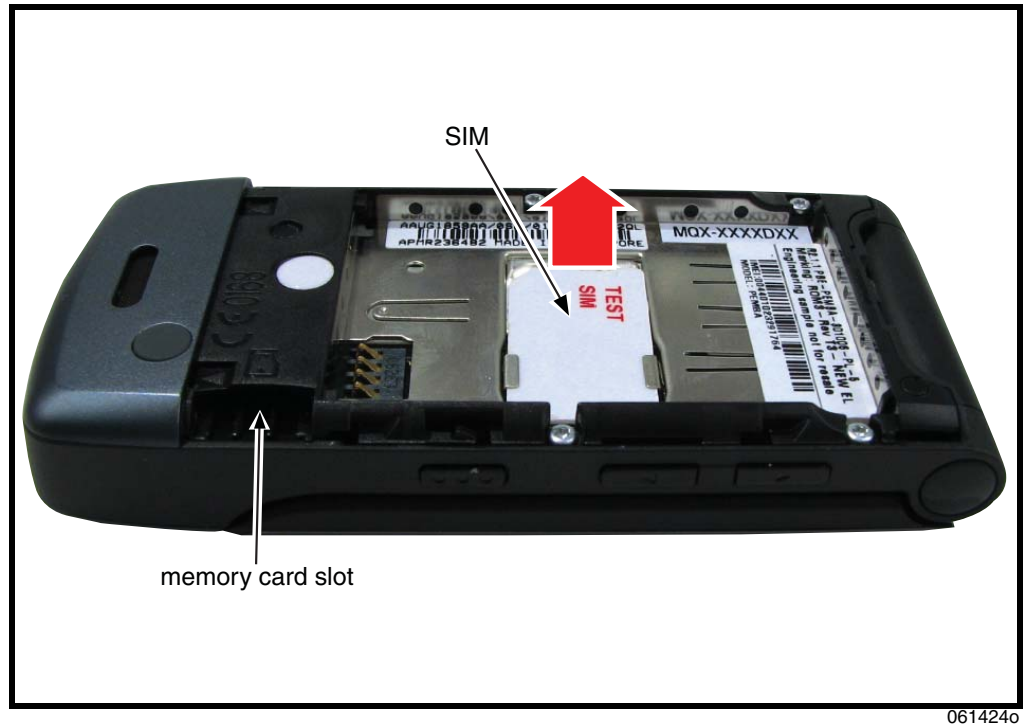


Figure 3. Removing the SIM and Memory Card

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 faces the outward edge of the phone.
5. Replace the battery and battery door as described in the procedures.
6. Slide the memory card away from the memory card holder, as shown in Figure 3.
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



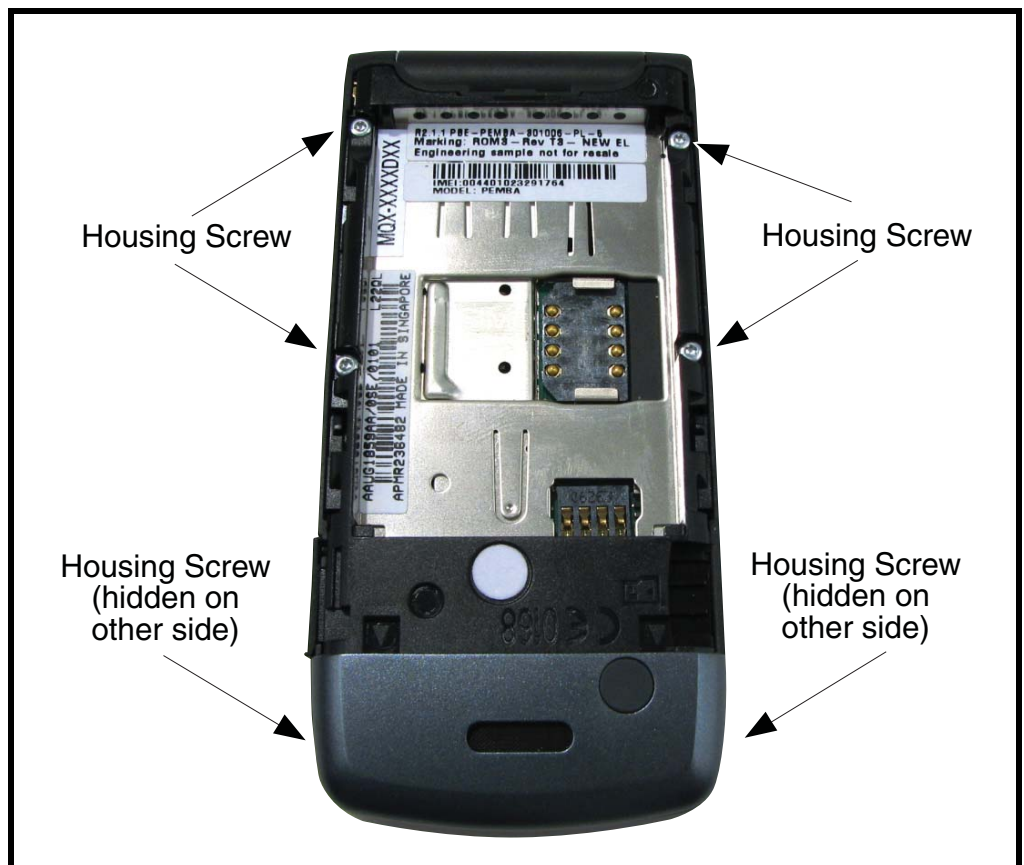
This product contains static-sensitive devices. Use anti-static handling procedures to prevent electrostatic discharge (ESD) and component damage.

1. Remove the battery cover, battery, SIM and memory card as described in the procedures.



In addition to 2 screws, the rear housing assembly is fastened with plastic latches. These are fragile and should be released with care.

2. Using a Torx driver with a T-5 bit, remove the screws at each side of the phone. Retain the screws for reassembly. See Figure 4.



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Figure 4. Removing the Rear Speaker Housing Screws

3. Flip the handset over and using a hand tool to insert from the left or right side, unlatch the catches on the front housing cap, as shown in figure 5. Using a Torx driver with a T-5 bit, remove the screws at each side of the phone. Retain the screws for reassembly.



Figure 5. Removing the Rear Housing Latches

4. Carefully rotate the rear housing away from the front housing and flip assembly.



Figure 6. Removing the Rear Housing Assembly

5. Lift the rear housing assembly away from the phone.

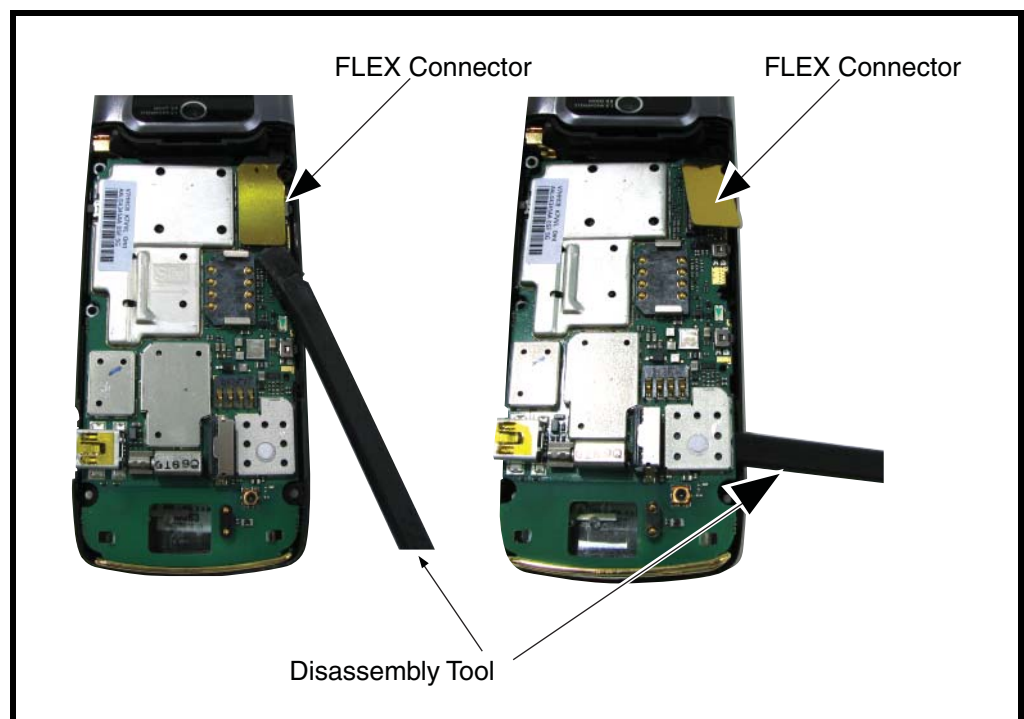
6. To replace, carefully align the rear housing to the front & flip assembly.
7. Gently press the housings together until they fit snugly.
8. Replace the 4 housing screws and tighten to a final torque setting of 1.4 +/- 0.1 lbs. Do not over tighten.
9. Flip over the phone & replace the 2 front housing cap screws & tighten to a final torque setting of 1.4 +/- 0.1 lbs. Do not over tighten.
10. Replace the SIM, memory card, 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 plastic tweezers to pry loose the FLEX connector.
3. Lift the transceiver board assembly out of the front housing with the plastic tweezers. See Figure 7.



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Figure 7. Disconnecting the Flex from the Transceiver Board

4. To replace, insert the transceiver board assembly into the rear housing.
IMPORTANT During reassembly, make sure the PCB is not seated over the acoustic grommet.
5. Carefully and gently press the transceiver board into position and until it snaps into place.
6. 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 latches and carefully release them from the transceiver board slots. See Figure 8.

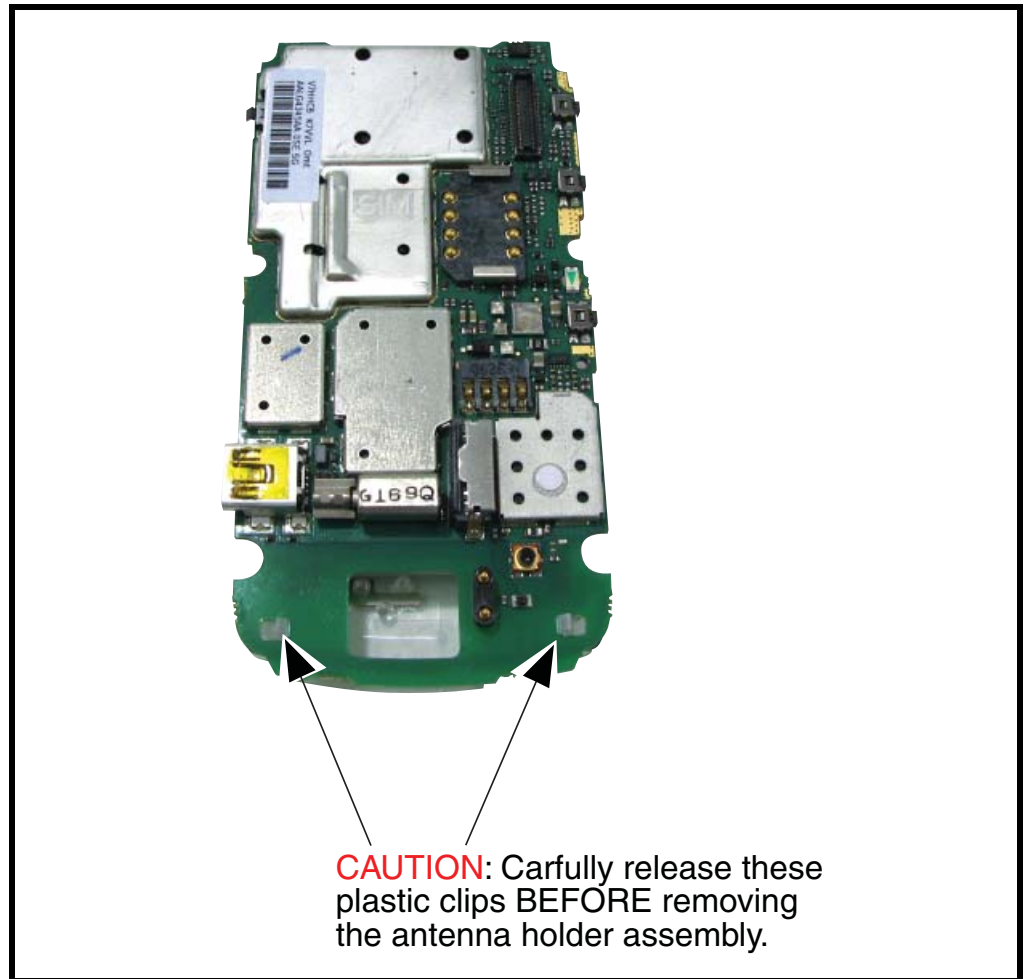
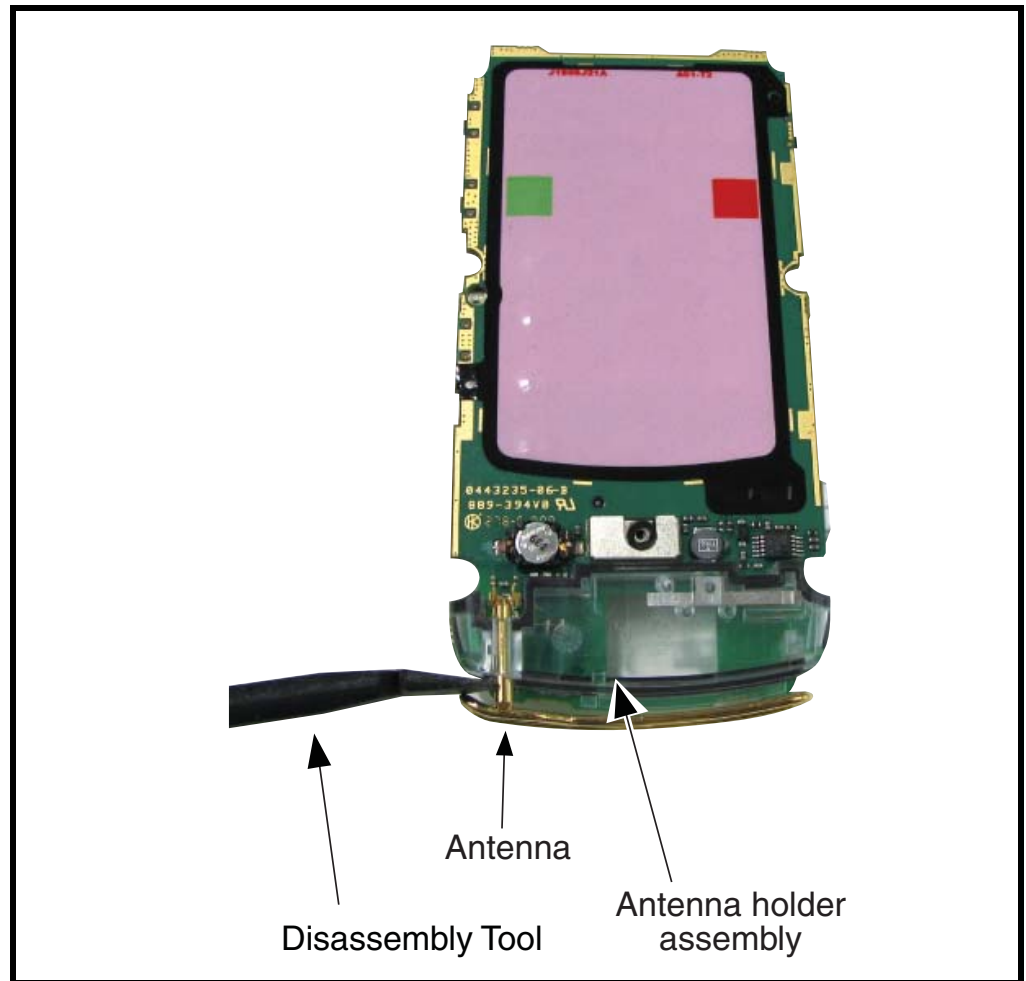


Figure 8. Removing the Antenna

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3. Use the disassembly tool to release the antenna assembly as shown in Figure 8.



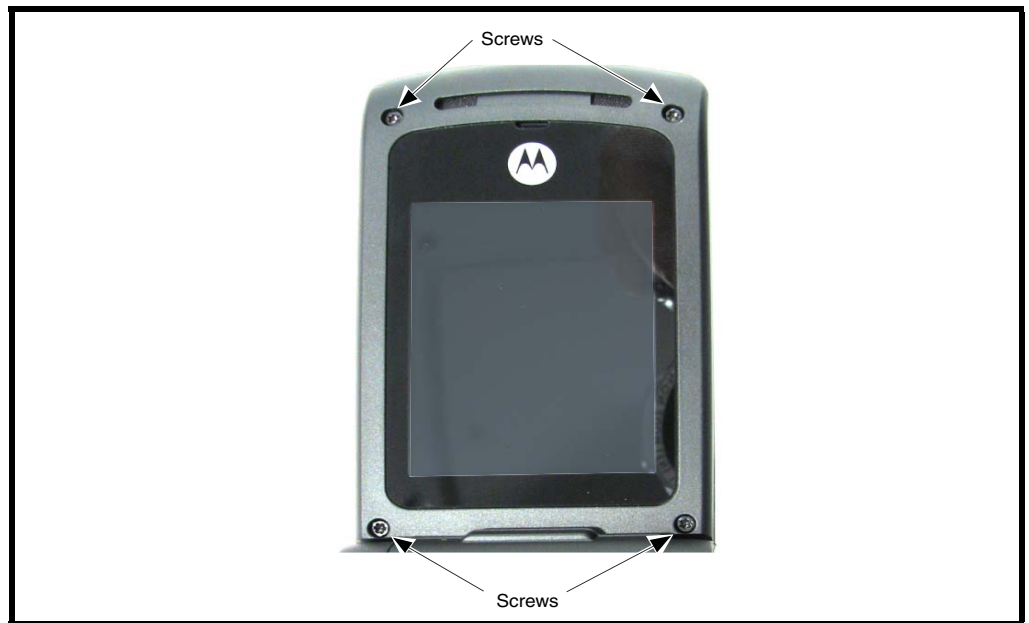
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Figure 9. Removing the Antenna Assembly

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

Removing and Replacing the Top Flip Assembly Cover

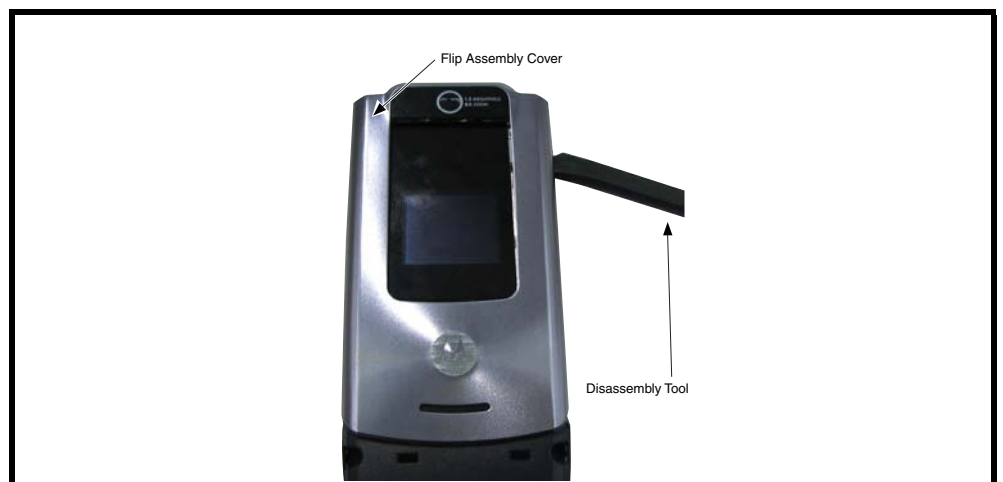
1. Remove the battery cover, battery, SIM, memory card, rear housing, and transceiver board assembly as described in the procedures.
2. Remove the 4 flip assembly screw caps.
3. Use the T-5 driver to remove the 4 screws from the flip assembly (see Figure 10). Retain the screws for re-assembly.



061431o

Figure 10. Removing the Flip Assembly Screws

4. Use the disassembly tool to gently pry off the top flip cover (see Figure 11).



040722o

Figure 11. Separating the Top Flip Assembly Cover

5. Lift the flip cover away from the flip assembly. Be careful not to damage the display flex cable (see Figure 12).



040723o

Figure 12. Removing the Flip Assembly Cover

6. To replace, align the flip cover to the flip assembly, gently press the flip cover onto the flip assembly until the flip cover latches engage.*
7. Insert the 4 screws, tighten to a final torque setting of 1.4 +/- 0.1 lbs to secure the flip cover to the flip assembly. Avoid damage to the flex cable.
8. Insert the 4 rubber screw covers over the flip assembly screws.
9. Replace the transceiver board assembly, rear housing, SIM, battery, and battery cover as described in the procedures.



The CLI Lens will be sticking on the display bracket while the flip cover is being removed. Check its condition. Replace if necessary.

Removing and Replacing the CLI Lens

1. Remove the battery cover, battery, SIM, memory card, rear housing, transceiver board assembly and top flip cover as described in the procedures.
2. Use the disassembly tool to gently pry apart the CLI lens and the flip bracket.
3. Divide CLI lens and flip bracket along the edge of CLI lens.

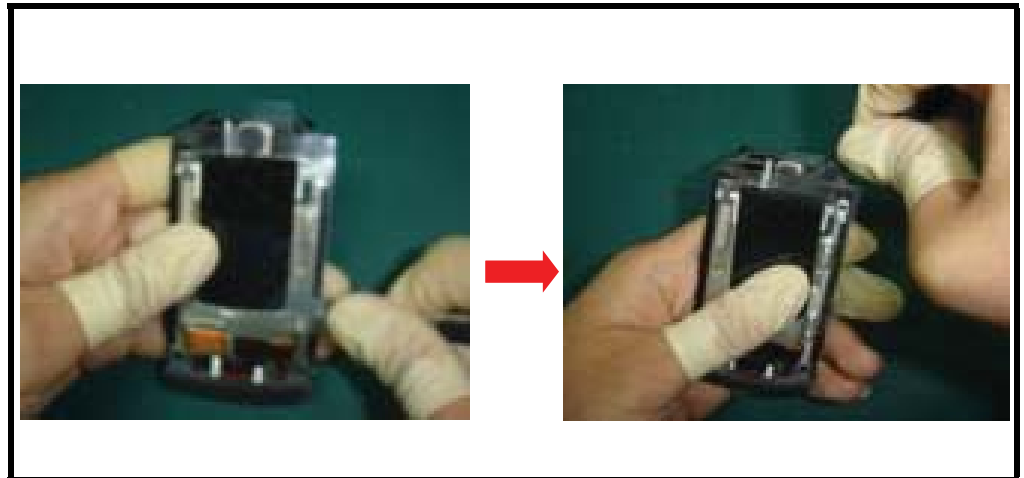


Figure 13. Separating the CLI Lens

040722o

4. Add protective film on CLI.



Figure 14. Replacing Protective Film on CLI

040723o

5. To replace, remove protective film from the CLI.
6. Remove the lens protective tape and adhesive from a new piece of CLI lens.
7. Align the CLI Lens to the Top Flip Cover.
8. Replace the top flip cover, transceiver board assembly, rear housing, memory card, SIM card, battery and battery cover as described in the procedures.

Removing and Replacing the Camera Assembly

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



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

2. Unlock the ZIF connector and remove the camera assembly flex connector.
3. Carefully lift the camera assembly and flex out of the flip assembly (see Figure 15).



Figure 15. Camera Assembly Removal

4. To replace, carefully insert the camera assembly into its slot in the flip assembly.
5. Insert the end of the camera assembly flex cable into its slot in the ZIF connector on the flip display assembly. Avoid damage to the flex cable.
6. Replace the CLI lens, the flip assembly cover, transceiver board, rear housing, 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, flip assembly cover, CLI lens and camera assembly, 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 unseat the display module assembly flex connector from its socket (see Figure 16)
3. Using the disassembly tool, carefully disengage the side hooks of the display bracket.
4. Lift the display bracket from the Flip pcb & housing.



Figure 16. Display Module Assembly Flex Connector

5. Separate the speaker from its adhesive by prying the speaker off using the disassembly tool.
6. Carefully and gently lift one corner of the display module assembly out of the flip assembly.
7. Avoid damage to the electrical components on the flex while carefully removing the display module assembly from the flip assembly.

8. Carefully lift the display lens away from the flip assembly.

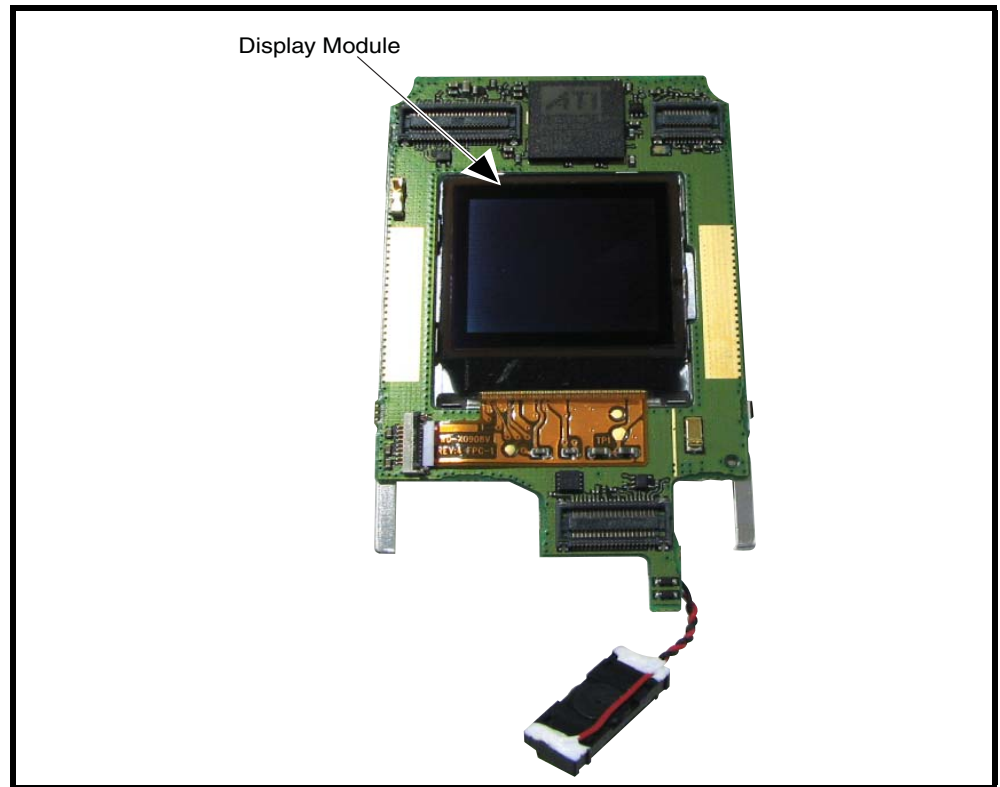


Figure 17. Removing the Display Module Assembly

9. To remove the main display module lens, carefully disconnect the flex connector for the main display and then pry it off from the metal shield.
10. To remove the CLI display, pill off the kapton tape covering the CLI Flex circuit & ZIF connector.
11. Using the disassembly tool, carefully unseat the CLI flex circuit from the adhesive underneath.

12. Remove the CLI display from the Flip pcb.



Figure 18. Removing the Display Module Lens



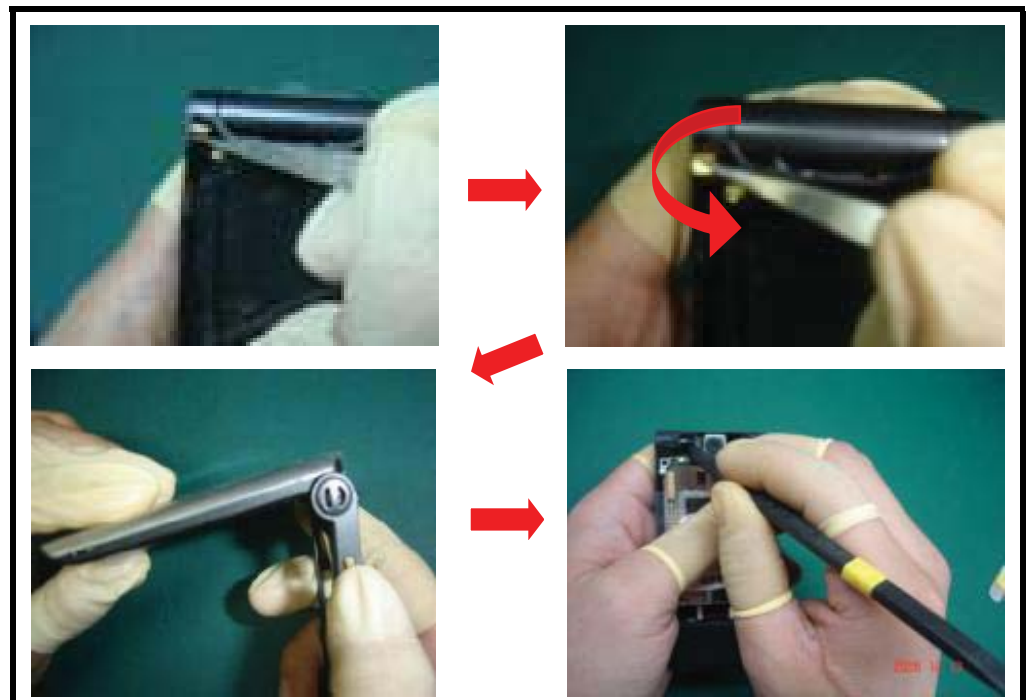
A new adhesive strip might be required for proper securing of the CLI Flex in place on the Flip pcb.

13. To replace the CLI display, insert the CLI flex into the ZIF connector & close the latch.
14. Properly align the CLI display onto the bracket & press down on the CLI flex to ensure proper contact.
15. Paste a new kapton tape across the CLI flex & ZIF connector.
16. To replace the main display lens, properly align the display lens on the bracket.
17. Align the display flex to the flex connector & gently press it downwards for proper contact.

18. Align the display module to the flip assembly & then insert the receiver into the slot provided.
19. Insert the display bracket.
20. Insert the Flex cable to the slot of the connector on flip PCB.
21. Replace the display bracket, camera assembly, flip assembly cover, transceiver board, rear housing, antenna, SIM, battery, and battery connector as described in the procedures.

Removing and Replacing the Flip Hinge

1. Remove the battery cover, battery, SIM, memory card, rear housing, and transceiver board assembly as described in the procedures.
2. Insert the tweezer under the knuckle cap lock.
3. Turn the tweezer outward to disassemble the cap lock.
4. Open and close the flip and make the right knuckle come out
5. Insert the jig to the slot over the flex.



061431o

Figure 19. Removing the Flip Hinge

6. Use the disassembly tool to push the left knuckle out towards the left side.
7. Press the hinge inwards using the disassembly tool.
8. Separate and remove the flip and front housing.

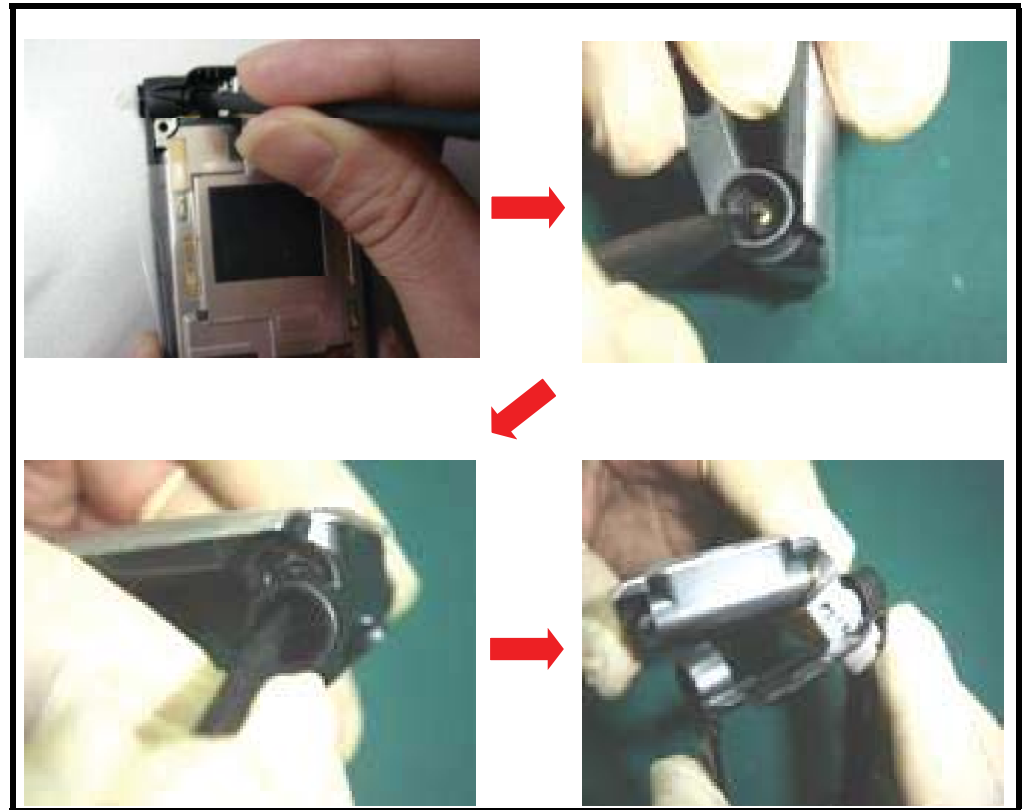


Figure 20. Removing the Flip Hinge

0407220

9. To replace the flip hinge, replace the flip and front housing.
10. Snap the right hinge back into place.
11. Using the disassembly tool to guide the left knuckle back into its socket.
12. Assemble the cap lock.
13. Replace the transceiver board assembly, rear housing, memory card, SIM card, 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. W510 telephones use TrueSync® synchronization software to effect a personality transfer.

Identification

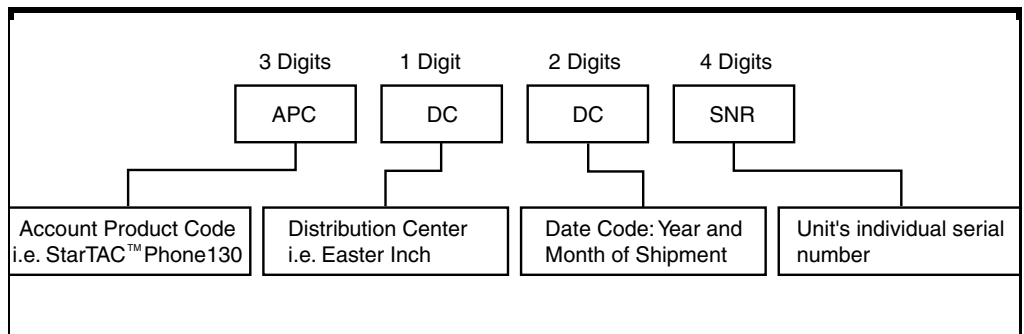
Each Motorola GSM device is labeled with a variety of identifying numbers. The following information describes the current identifying labels.

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 <Clear> 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	<ul style="list-style-type: none"> - 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	<p>To activate the audio loop check command. Enter 6*2*2*0*0*0*0 & select <OK>, select <Back> after "Success"</p> <p>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.</p> <p>To do audio loop test Enter 4*3*1 & select <OK>, just say "Hello", select <Back> after test.</p>
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.
Alert Test 2 - Ear Piece Audio Loop-back check	Must plug in the ear piece before key in the test command. Enter 6*4*6*0*0*0*0 & select <OK> , just say "Hello", select <Back> after test. Unplug the ear piece after test.
Ringer Test	<p>To activate the ringer function test command. Enter 6*1*3*0*0*0*0 & select <OK> Select <Back> after "success".</p> <p>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.</p> <p>To do the ringer test Enter 0*0*42 & select <OK> Select <Back> after start.</p> <p>To do stop the ringer test Enter 0*1*0 & select <OK> Select <Back> after stop.</p>

Display Segment/ Pixel Test	<p>Turn On All Pixels to inspect the display grid on LCD Enter 55*2*001 & select <OK>, select <Exit> after test.</p> <p>Turn On Checkboard pattern A Enter 55*2*002 & select <OK>, select <Exit> after test.</p> <p>Turn On Checkboard pattern B Enter 55*2*003 & select <OK>, select <Exit> after test.</p> <p>Turn On Border pixels ON Enter 55*2*004 & select <OK>, select <Exit> after test.</p> <p>Turn On All RED Pixels Enter 55*2*011 & select <OK>, select <Exit> after test.</p> <p>Turn On All BLUE Pixels Enter 55*2*012 & select <OK>, select <Exit> after test.</p> <p>Turn On All GREEN Pixels Enter 55*2*013 & select <OK>, select <Exit> after test.</p> <p>Turn Off All Pixels to inspect the display grid on LCD Enter 55*2*000 & select <OK>, select <Cancel> after test.</p> <p>To display Horizontal Color Bar, Enter 55*2*008 & select <OK>. Select <End> 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)</p> <p>Check using 10*1*0 3=GSM, 4=DCS, 5=PCS, 6=GSM/DCS</p>
SW / IMEI check	<p>Enter *#9999# - SW/Flex version Enter *#06# - IMEI no.</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 <Cancel> key.

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.	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.

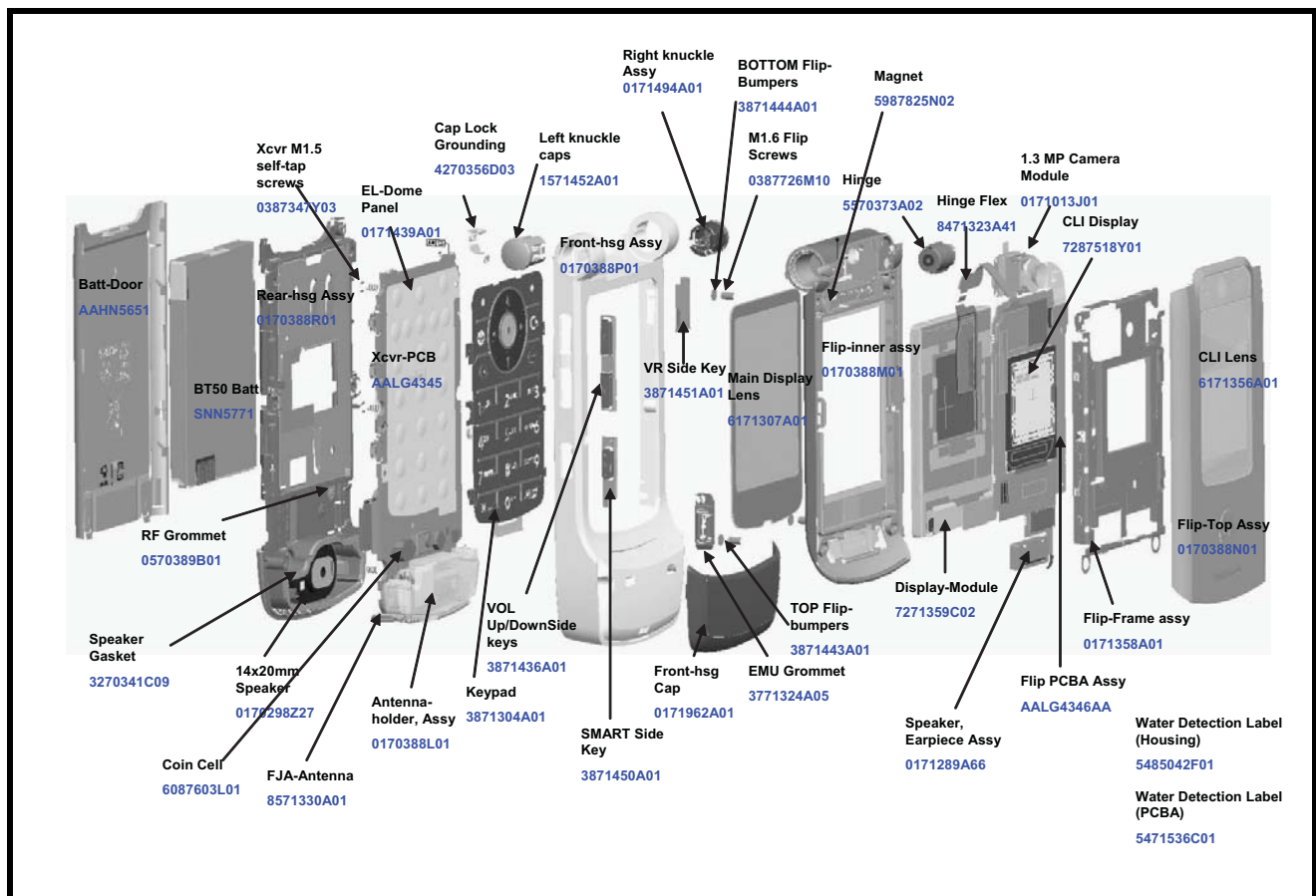
Table 3. : Level 1 and 2 Troubleshooting Chart (Continued)

SYMPTOM	PROBABLE CAUSE	VERIFICATION AND REMEDY
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.	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.
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 (Main assembly)



031826o

Figure 22. 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

	KIT NUMBER		SHN9950A	SHN9852A	SHN9953A
			BURNT ORANGE	LICORICE BLACK	"MIAMI INK" DRAGON
ITEM#	DESCRIPTION	QUANTITY	PART NUMBER		
1	ASSEMBLY, FLIP	1	0171432E01	0171432E02	0171432E03
2	ASSEMBLY, KEYPAD	1	0171437E01	0171437E01	0171437E01
3	BATTERY	1	SNN577I	SNN577I	SNN577I
4	ASSEMBLY, ANTENNA	1	0171656E01	0171656E01	0171656E01
5	ASSEMBLY, PCB, XCVR	1	SLG5120A	SLG5120A	SLG5120A
6	ASSEMBLY, HOUSING, REAR	1	0171431E01	0171431E02	0171431E03
7	ASSEMBLY, BATTERY DOOR	1	SHN0024A	SHN9867A	SHN0245A
8	Hsng and Hdwr, GENERIC	1	SHN9853A	SHN9853B	SHN9853C



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

Table 5. Accessories(Continued)

Part Description	Part Number
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
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

Table 5. Accessories(Continued)

Part Description	Part Number
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	
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

Table 5. Accessories(Continued)

Part Description	Part Number
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
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

Table 5. Accessories(Continued)

Part Description	Part Number
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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