



MOTOROLA

Level 1 and 2 Service Manual

V975/V980

Digital Wireless Telephone



UMTS 2100, GSM 900/1800/1900 GPRS

| | |
|-------------------------------------------------------------------------|-----------|
| Introduction | 5 |
| Product Identification | 5 |
| Product Names | 5 |
| Product Changes | 5 |
| Regulatory Agency Compliance | 5 |
| Computer Program Copyrights | 6 |
| About This Service Manual | 6 |
| Warranty Service Policy | 7 |
| Parts Replacement | 8 |
| Product Overview | 11 |
| Features | 11 |
| General Operation | 14 |
| Controls, Indicators, and Input / Output (I/O) Connections | 14 |
| Alert Settings | 15 |
| Battery Function | 15 |
| Operation | 16 |
| Tools and Test Equipment | 17 |
| Disassembly | 18 |
| Removing and Replacing the Battery Cover and Battery | 18 |
| Removing and Replacing the Subscriber Identity Module (SIM) | 20 |
| Removing and Replacing the Antenna | 21 |
| Removing and Replacing the Rear Housing | 22 |
| Removing and Replacing the Transceiver Board Assembly | 24 |
| Removing and Replacing the Real-Time Clock (RTC) Battery | 28 |
| Removing and Replacing the Keypad, Volume/Smart and Voice Buttons | 29 |
| Removing and Replacing the Flip Assembly | 30 |
| Removing and Replacing the Flip Cover | 31 |
| Removing and Replacing the Flip Display Assembly | 33 |
| Removing and Replacing the Camera Assembly | 36 |
| Removing and Replacing the Display Module | 37 |
| Subscriber Identity Module (SIM) and Identification | 38 |
| SIM Card | 38 |
| Personality Transfer | 38 |
| Identification | 38 |
| Troubleshooting | 40 |
| Troubleshooting Chart | 40 |
| Programming: Software Upgrade and Flexing | 42 |
| Part Number Charts | 43 |
| Related Publications | 43 |
| Exploded View Diagram | 44 |
| Exploded View Parts List | 45 |

Introduction

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

Available on a contract basis, Motorola Inc. offers comprehensive maintenance and installation programs that allow 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.
- 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

Use of this manual assures proper installation, operation, and maintenance of Motorola products and equipment. It contains all service information required for the equipment described and is current as of the printing date. Refer questions about this manual to the nearest Customer Service Manager.

Audience

This manual aids service personnel in testing and repairing V975 and V980 GSM 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 V975 and V980 telephones, and also provides procedures and processes for repairing the phones at Level 1 and 2 service centers including:

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

Conventions

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



Note: Emphasizes additional information pertinent to the subject matter.




Caution: Emphasizes information about actions 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 displays on the screen. For example, **ALERTS** or `ALERTS`.

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

Warranty Service Policy

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

Out-of-Box Failure Policy

The standard out-of-box failure criteria applies. Return customer units that fail very early on after the date of sale 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 units will be repaired but not refurbished as standard. Appointed Motorola Service Hubs will perform warranty and non-warranty field service for level 2 (assemblies) and level 3 (limited PCB component). 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 is available through the local Motorola Support Center.

Parts Replacement

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

Outside U.S.A.

Phone: 847-538-8023

FAX: 847-576-3023

For EMEA spare parts call +49 461 803 1638.

For Asia spare parts call +65 648 62995.

Specifications

Table 1. Specifications

| Function | Specification |
|-------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Frequency Range EGSM | TX: 880 - 915 MHz Frequency (MHz) = $890 + (0.2 \times n)$ where: $0 \leq n \leq 124$ Frequency (MHz) = $890 + (0.2 \times (n - 1024))$ where: $955 \leq n \leq 1023$ RX: 925 - 960 MHz Frequency (MHz) = $935 + (0.2 \times n)$ where: $0 \leq n \leq 124$ Frequency (MHz) = $935 + (0.2 \times (n - 1024))$ where: $955 \leq n \leq 1023$ |
| Frequency Range DCS | TX: 1710 to 1785 MHz Frequency (MHz) = $1710.2 + (0.2 \times (n - 512))$ where: $512 \leq n \leq 885$ RX: 1805.2 to 1879.8 MHz Frequency (MHz) = $1805.2 + (0.2 \times (n - 512))$ where: $512 \leq n \leq 885$ |
| Frequency Range PCS | TX: 1850 to 1910 MHz Frequency (MHz) = $1850.2 + (0.2 \times (n - 512))$ where: $512 \leq n \leq 810$ RX: 1930 to 1990 MHz Frequency (MHz) = $1930.2 + (0.2 \times (n - 512))$ where: $512 \leq n \leq 810$ |
| Frequency Range UMTS | TX: 1920 to 1980 MHz Frequency (MHz) = $\text{UARFCN}^1 + 5$, where: $9612 \leq \text{UARFCN}^1 \leq 9888$ UARFCN ¹ in increments of 25 RX: 2110 to 2170 MHz Frequency (MHz) = $\text{UARFCN}^1 + 5$, where: $10562 \leq \text{UARFCN}^1 \leq 10838$ UARFCN ¹ in increments of 25 |
| Channel Spacing | 200 kHz (GSM, DCS, PCS), 5 MHz UMTS |
| Channels | 174 EGSM, 374 DCS, 274 PCS carriers with 8 channels per carrier, 11 UMTS |
| Duplex Spacing | 45 MHz GSM, 95 MHz DCS, 80 MHz PCS, 190 MHz UMTS |
| Modulation | GMSK AT BT = 0.3 (GSM, DCS, PCS), QPSK (UMTS) |
| Transmitter Phase Accuracy | 5 degrees RMS, 20 Degrees peak |
| Frequency Error | ± 0.1 ppm |
| Input/Output Impedance | 50 ohms (nominal) |
| Nominal Operating Voltage | 3.6 Vdc $\pm 10\%$ (battery) +4.4 Vdc $\pm 10\%$ (external connector) |
| Size | 105 cc |
| Weight | 140 g |
| Display | Main Display: 65K color TFT, 176 x 220, 1.9" CLI Display: 4K color STN, 96x80, 1" |
| Battery Life (820mAh) ² | GSM: Up to 215 minutes (Talk Time), up to 220 to 260 hours (Standby) WCDMA Video Talk Time: Up to 70 minutes |
| Nominal Operating Temperature Range | -10° C to +55° C |

| GSM System Functions | Specification |
|----------------------|---------------|
|----------------------|---------------|

| | |
|---------------------|--------------------------------------------------------------------------------------------------|
| Speech Coding Type | Regular Pulse excitation / linear predictive coding with long term prediction (RPE LPC with LTP) |
| Bit Rate | 13.0 kbps |
| RF Power Output | 32 dBm nominal GSM, 28.5 dBm nominal DCS / PCS |
| Receive Sensitivity | -102 dBm GSM, -102 dBm DCS / PCS |
| RX Bit Error Rate | < 2% |

| UMTS System Functions | Specification |
|--------------------------|-----------------------------------------------|
| Speech Coding Type | Adaptive Multirate (AMR) |
| RF Power Output | 21 dBm |
| Error Vector Magnitude | < 17.5% |
| PN9 Bit Error Rate (VER) | 0.1% @ 12.2K, -106.7 dBm |
| ACLR | -33 dBm @ ± 5 MHz, -43 dBm @ ± 10 MHz |

Product Overview

Motorola V975 and V980 telephones deliver 3G features in a small and lightweight package. These Global System for Mobile communications (GSM) General Packet Radio Service (GPRS) 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. V975 and V980 are tri-band phones that allow roaming within the GSM 900 MHz, 1800 MHz Digital Cellular System (DCS), the GSM 850 MHz, and PCS 1900 MHz bands, in addition to the UMTS WCDMA 2100 MHz band.

V975 and V980 telephones have a clam form factor. They feature an externally viewable 96 x 80 4K color STN CLI display for caller identification with date/time, and an internal 167 x 220 65K 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 820 mAh Lithium Ion (Li Ion) battery fits behind a removable back cover.

The phone accepts both 3V Subscriber Identity Module (SIM) cards that fit into the SIM holder under the battery. The antenna is a fixed stub type 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

V975 and V980 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.

Features available in this family of telephones include:

- WCDMA 2100 MHz, GSM/GPRS 900/1800/1900 MHz
- Volume 105 cc
- 176 x 220, 1.9", 65K TFT color display
- 96 x 80, 1", 4K color STN CLI display
- VGA image capture w/ 4X zoom and lighting solution
- CIF camera for video conferencing
- 5 way navigation key
- Dedicated camera key
- Accepts removable TransFlash memory (16, 32 64, 128, or 256MB) modules
- Talk time: up to 215 minutes (WCDMA, CS)
- Standby time: up to 260 hours
- Video clip playback
- 2MB user memory-V980
- 8MB user memory-V975

Speaker Dependant Voice Activation and Voice Note Recording

Voice tags can be used for voice dialing up to 20 phone numbers in the phonebook and for creating up to 5 voice shortcuts for menu items. The phone must be “trained” by the voice tag being read into the phone’s memory twice before it is recognized.

You can add voice tags to the phone’s memory using the usual name addition methods (phonebook menu structure or with the shortcut editor).



You cannot place or receive calls while adding voice tags to the phone’s memory.



Because the GSM standard does not allow you to store voice tags on the SIM card, voice tags are added to the phone’s memory.

V975 and V980 telephones also include a voice note recorder that allows up to 2 minutes of personal messages to be recorded. This feature has a complete set of record, playback, and management tools that make it easy to store and maintain a list of personal memos.

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 using 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.



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

SIM Application Toolkit™ - Class 2

SIM Application Toolkit is a value-added service software product 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

There are three different ways to enter text using the phone keypad:

- iTAP predictive text entry. Press a key to enter 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.

- Tap. Press a key to enter a character.
- Numeric. The keypad produces numeric characters only. For some text areas, such as phone numbers, this is the only method available.

Caller Line Identification

Upon receipt of a call, the calling party's phone number is compared to the phonebook. 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. If no caller identification information is available, the Incoming Call message is displayed.



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

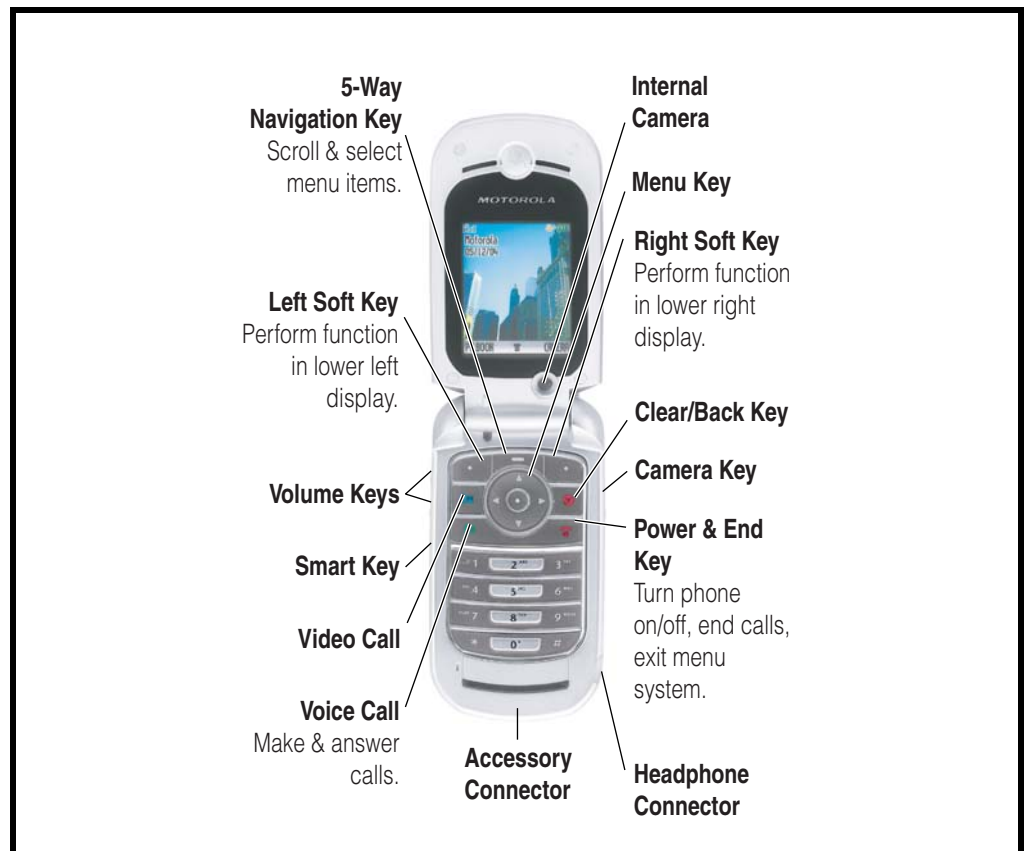
Other Features

Detailed descriptions of these and the other features can be found in the appropriate user's guide listed in the "Related Publications" section toward the end of this manual.

General Operation

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

The V975 and V980 telephone's controls are located on the sides of the phone and on the keypad. Indicators, in the form of icons, are displayed on the LCD (see Figure 2). V975 and V980 phones have an audible alert transducer on the top and I/O connectors, consisting of a headset jack and an accessory port, located on the side and bottom of the phone. See Figure 1.



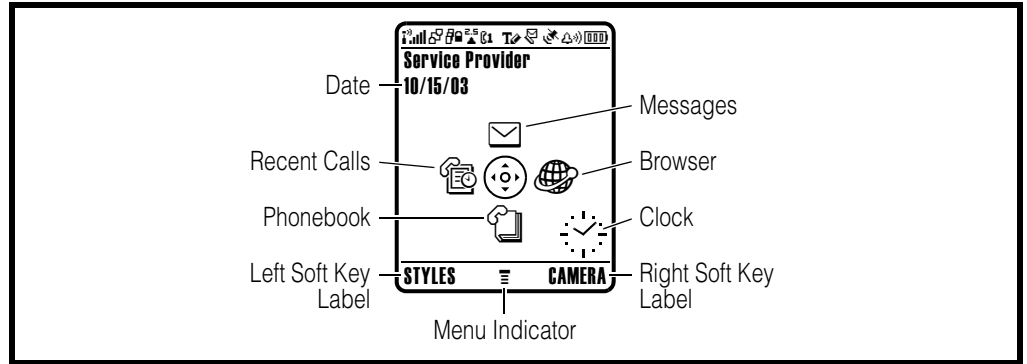
0316290

Figure 1. Telephone Controls, indicators, and I/O Connections

Main Display

The main display provides a 65k color backlit display for easy readability in all light conditions. The 176 x 220 display provides room for text, graphics, icons, and prompts.

Display animation makes the phone's menus move smoothly as the user scrolls up and down. Turn animation off to conserve the battery. Figure 2 shows common icons displayed on the LCD.



031422o

Figure 2. Icon Indicators



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

Alert Settings

V975 and V980 telephones include up to 32 preset ring tones and vibrations that can be applied to all alert events at the same time.



Pressing either volume key will mute the alert.

Battery Function

Battery Gauge

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

Battery Removal

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



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



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

Operation

For detailed operating instructions, refer to the appropriate user's guide listed in "Related Publications" on page 43.

Tools and Test Equipment

Table 1 lists tools and test equipment recommended for disassembly and reassembly of V975 or V980 telephones. Use either the listed items or equivalents.

Table 1. General Test Equipment and Tools

| Motorola Part Number ¹ | Description | Application |
|-----------------------------------|---------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|
| RSX4043-A | Torque Driver | Used to remove and replace screws. |
| -- | #0 Cross Point Screwdriver | Used to remove cross point screws in the flip assembly. |
| — | Torque Driver Bit T-6 Plus, Apex 440-6IP Torx Plus or equivalent | Used with torque driver. |
| See Table 7 | Rapid Charger | Used to charge battery and to power phone. |
| 0180386A82 | Antistatic Mat Kit (includes 66-80387A95 antistatic mat, 66-80334B36 ground cord, and 42-80385A59 wrist band) | Provides protection from damage to device caused by electrostatic discharge (ESD). |
| 6680388B67 | Disassembly tool, plastic with flat and pointed ends (manual opening tool) | Used during assembly/disassembly of phone. |
| 6680388B01 | Tweezers, Plastic | Used during assembly/disassembly of phone. |
| — | Digital Multimeter, HP34401A ² | Used to measure battery voltage. |
| 8102430Z04 | GSM / DCS Test SIM | Used to enable manual test mode. |

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 Hewlett Packard at (800) 452-4844.

Disassembly

This section provides instructions for the disassembly of V975 and V980 telephones. Tools and equipment used for the phone are listed in Table 1, preceding.



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



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

Removing and Replacing the Battery Cover 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, touches exposed terminals. The conductive material may complete an electrical circuit (short circuit) and become very hot. Use care in handling any charged battery, particularly when placing it inside a pocket, purse, or other container with metal objects.

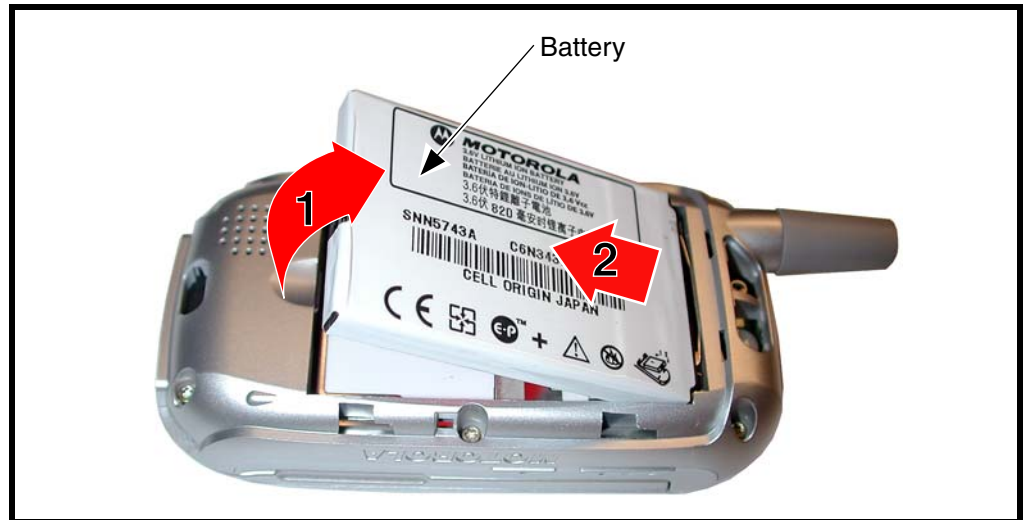
1. Ensure the phone is turned off.
2. Slide the battery cover as shown in Figure 1 and lift it completely off the phone.



0409390

Figure 1. Removing the Battery Cover

3. Lift the bottom end of the battery first and then lift the battery out the phone. (see Figure 2).



0409400

Figure 2. Removing the Battery

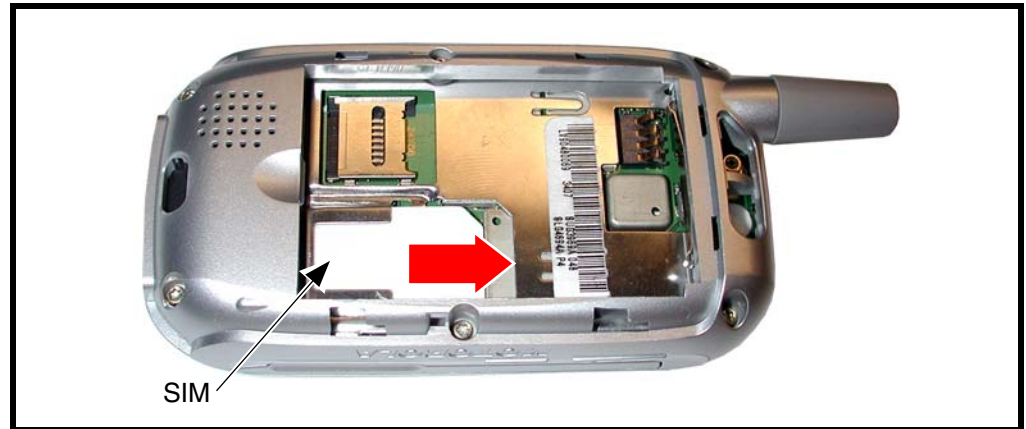


There is a danger of explosion if the Lithium Ion battery is replaced incorrectly. Replace only with the same type of battery or equivalent as recommended by the battery manufacturer. Dispose of used batteries according to the manufacturer's instructions.

4. To replace, align the battery with the battery compartment so the contacts on the battery match the battery contacts in the phone.
5. Insert the battery, top end first, into the battery compartment and push down.
6. Insert the bottom edge of the battery housing into the base of the phone, then slide the battery cover over the battery 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.
2. Slide the SIM out of the SIM holder as shown in Figure 3.



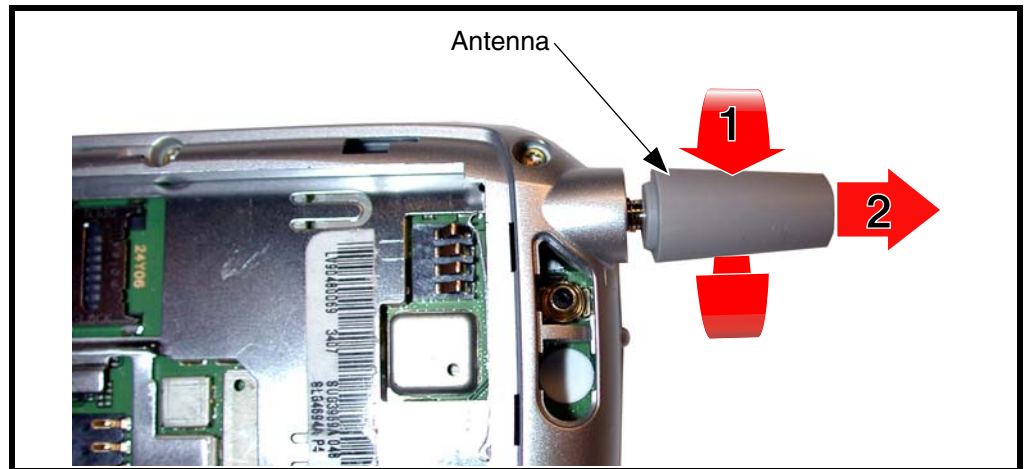
0409410

Figure 3. Removing the SIM

3. Carefully lift the SIM out of the phone.
4. To replace, slide the SIM into the holder, ensuring the keyed corner of the SIM aligns with the notch molded into the holder.
5. Replace the battery and battery cover as described in the procedures.

Removing and Replacing the Antenna

1. Remove the battery cover and battery as described in the procedures.
2. By hand, rotate the antenna counterclockwise until loose (see Figure 4.)



040942o

Figure 4. Removing the Antenna

3. When the antenna threads are completely disengaged, pull the antenna straight out of the phone to remove.



Ensure antenna threads are properly engaged before tightening to prevent damaging the antenna or housing.

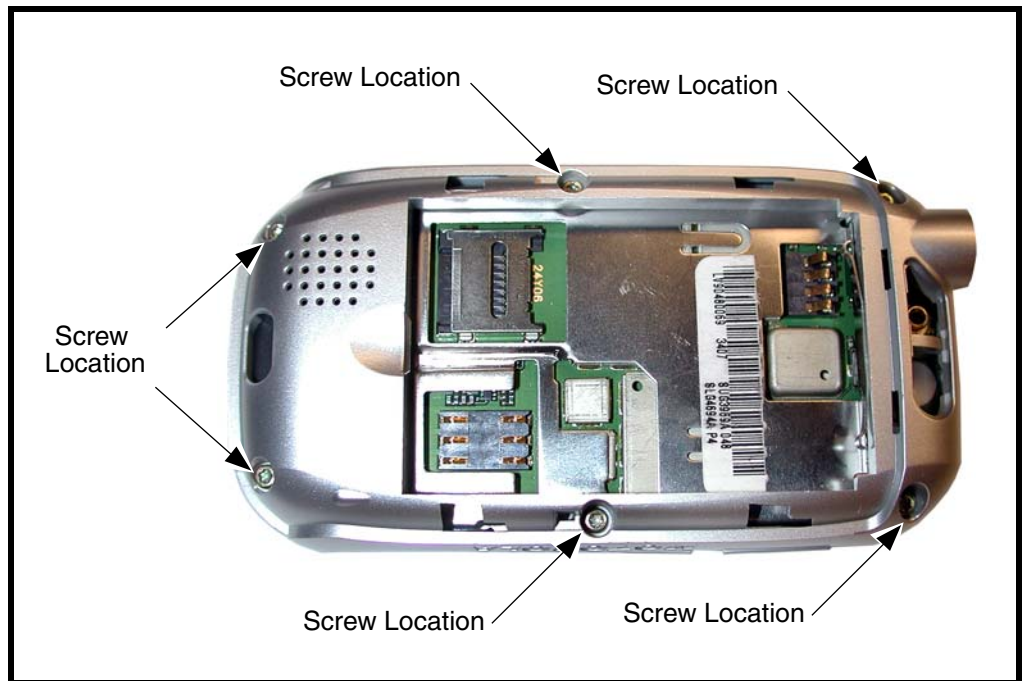
4. To replace, insert the threaded end of the antenna carefully into the housing and, after ensuring the threads are properly engaged, rotate clockwise. Tighten firmly by hand.
5. Replace the SIM, battery, and battery cover as described in the procedures.

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.

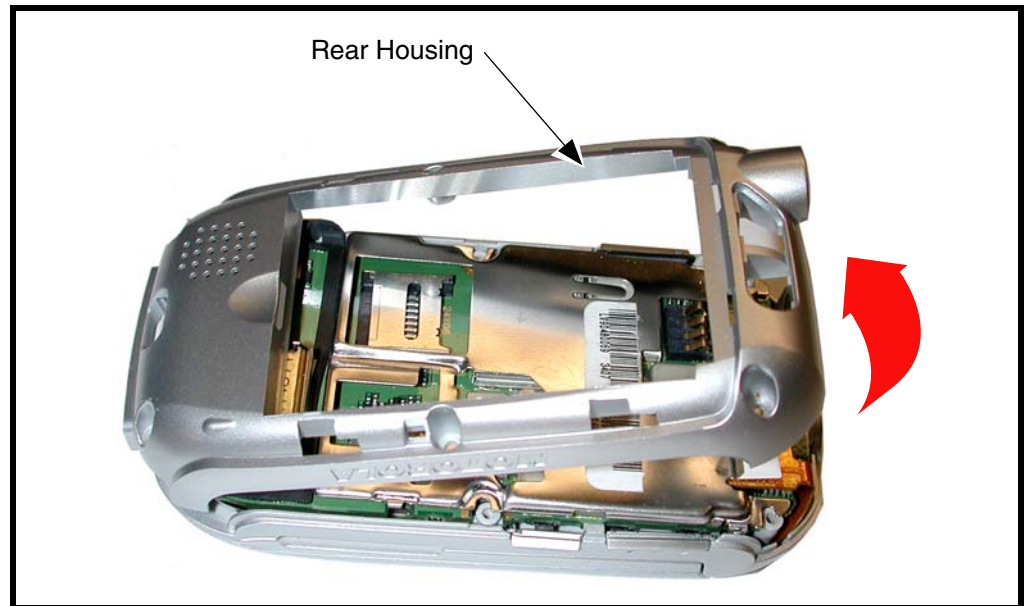
1. Remove the battery cover, battery, SIM, and antenna as described in the procedures.
2. Using a Torx driver with a T-6 bit, remove the 6 screws along the sides of the rear housing (see Figure 5).



040943o

Figure 5. Removing the Rear Housing Screws

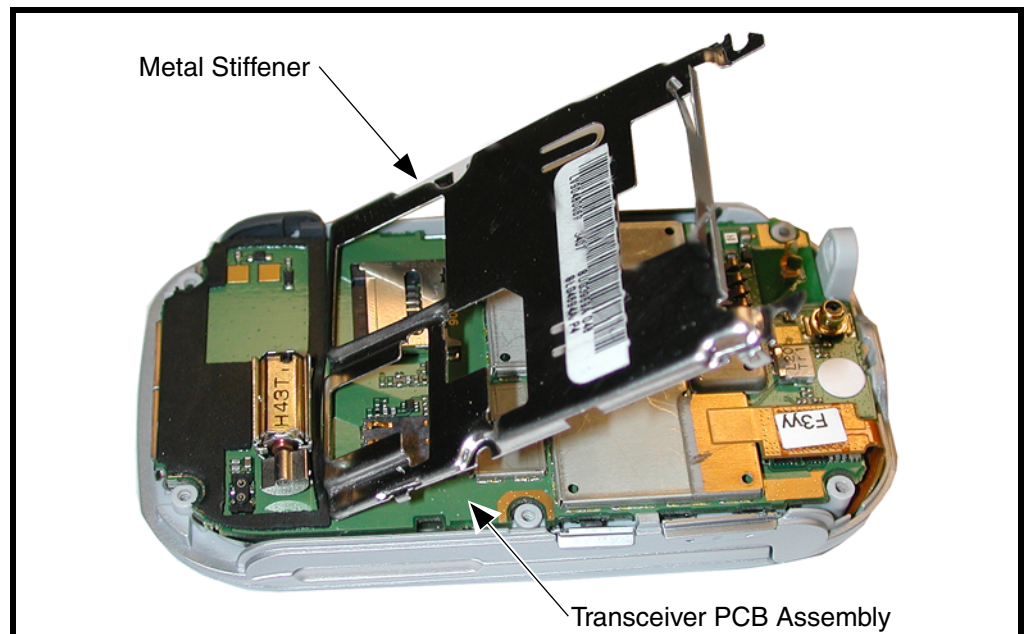
- Carefully lift the rear housing away from the phone as shown in Figure 6.



0409450

Figure 6. Removing the Rear Housing

- Lift the metal stiffener away from the transceiver PC board.



0409460

Figure 7. Removing the Rear Metal Stiffener

- To replace, place the metal stiffener onto the transceiver board. Ensure the screw holes are aligned to the screw holes on the transceiver PCB assembly.

6. Lower the rear housing onto the phone. Ensure the screw holes are aligned to the transceiver PCB assembly.
7. Insert the 6 housing screws and tighten to a torque setting of 1.5 inch pounds or 16 N/cm (Newton/centimeters). Do not over tighten.
8. Replace the antenna, SIM, battery, and battery cover as described in the procedures.

Removing and Replacing the Transceiver Board Assembly



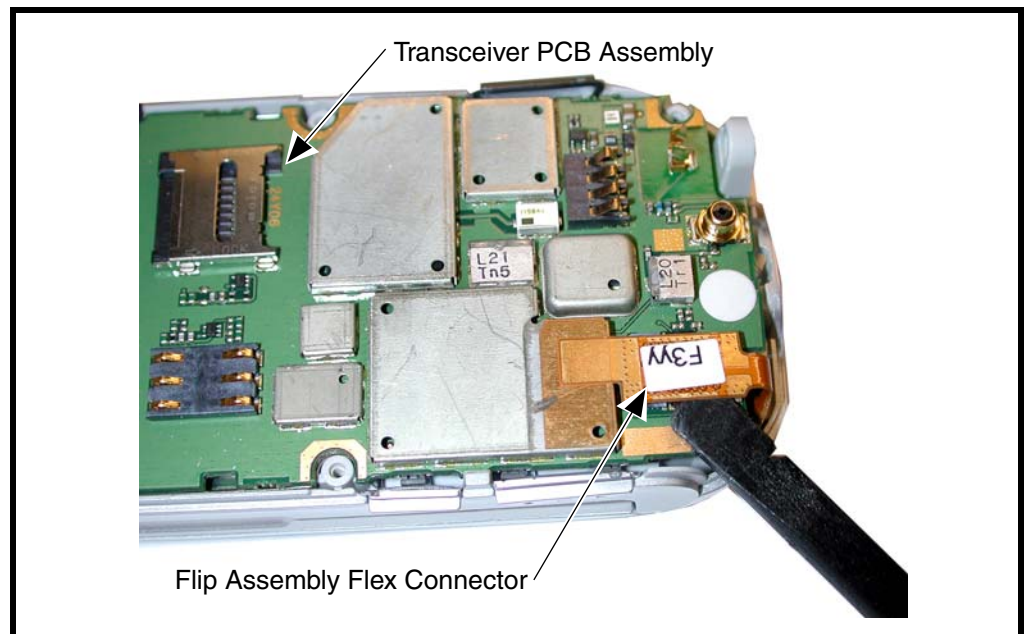
This product contains static-sensitive devices. Use anti-static handling procedures to prevent ESD and component damage.

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



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

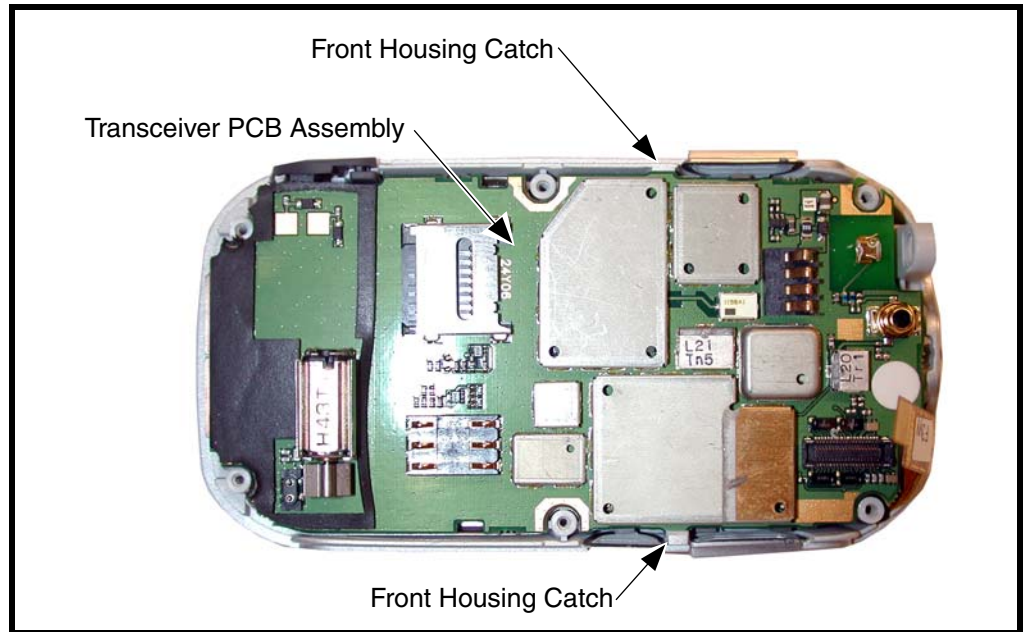
2. Carefully work the flat end of the disassembly tool under the flex connector and unseat the connector from its socket the transceiver board (see Figure 8).



0409470

Figure 8. Disconnecting the Flex From the Transceiver Board

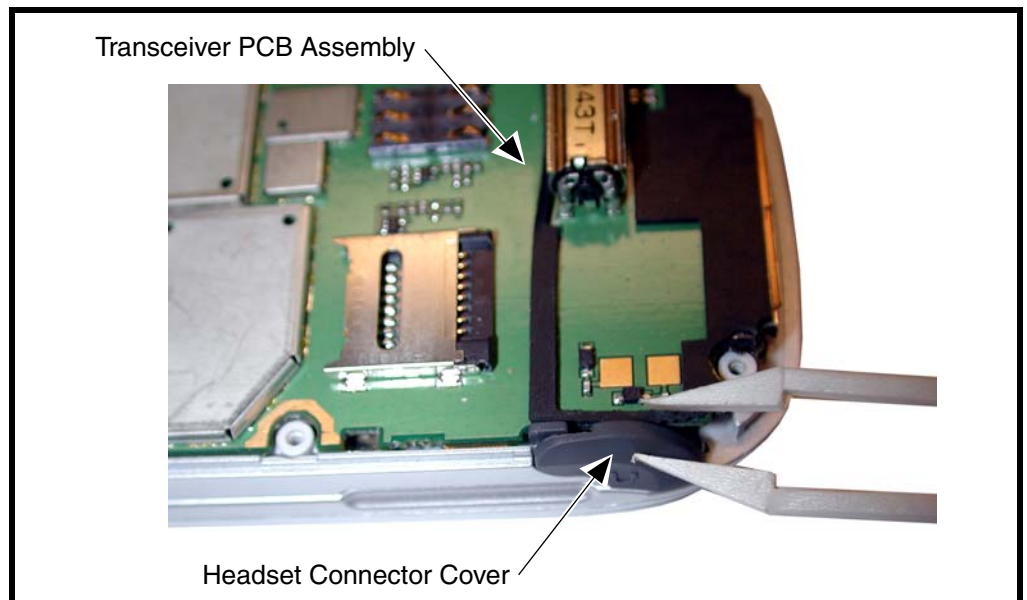
3. Flex the front housing outward slightly to release the housing catch on each side of the transceiver PCB assembly (see Figure 9).



040948o

Figure 9. Disconnecting the Flex from the Transceiver Board

4. Use the plastic tweezers to remove the headset connector cover from the front housing (see Figure 10).



040948o

Figure 10. Removing the Headset Connector Cover

5. Lift the transceiver board assembly and the keypad switchdome assembly out of the front housing (see Figure 11).

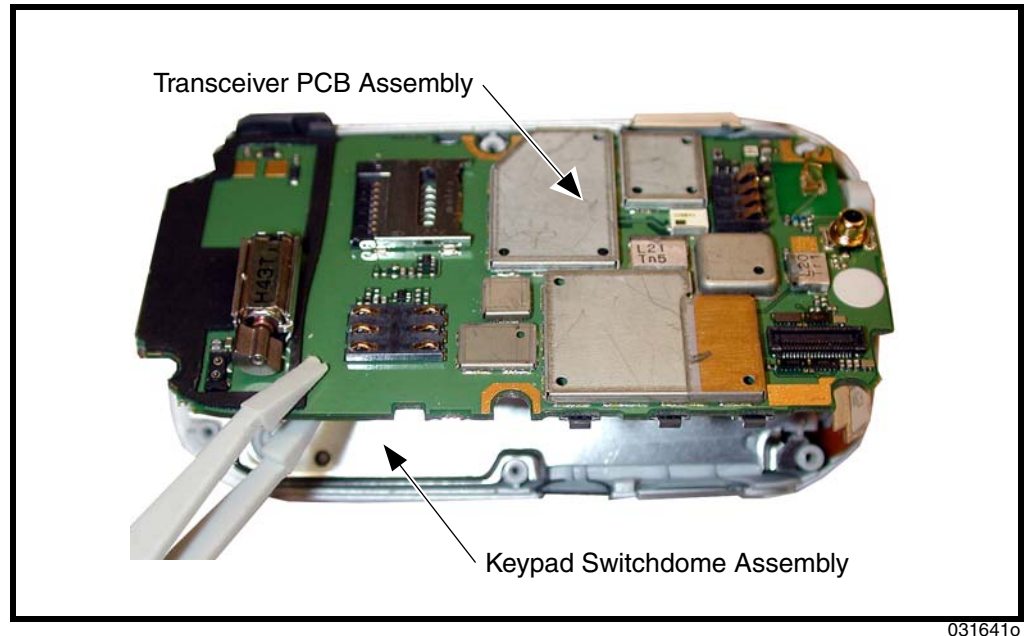


Figure 11. Removing the Transceiver Board Assembly

031641o

6. Turn the transceiver board assembly over to expose the switchdome keypad flex connector.

7. Use the disassembly tool to unseat the switchdome keypad flex connector from its socket (see Figure 12).

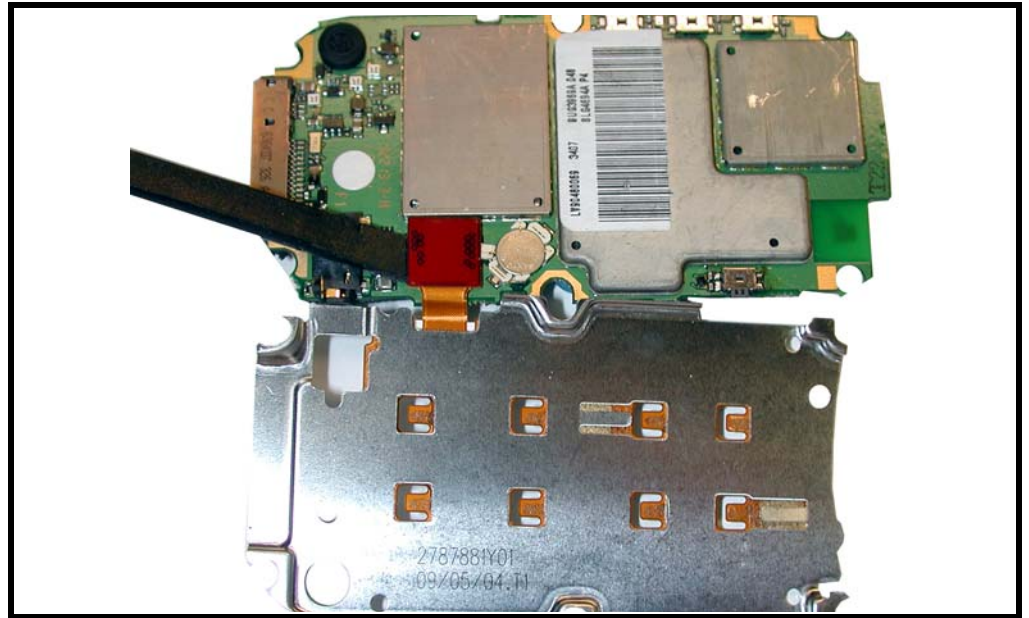
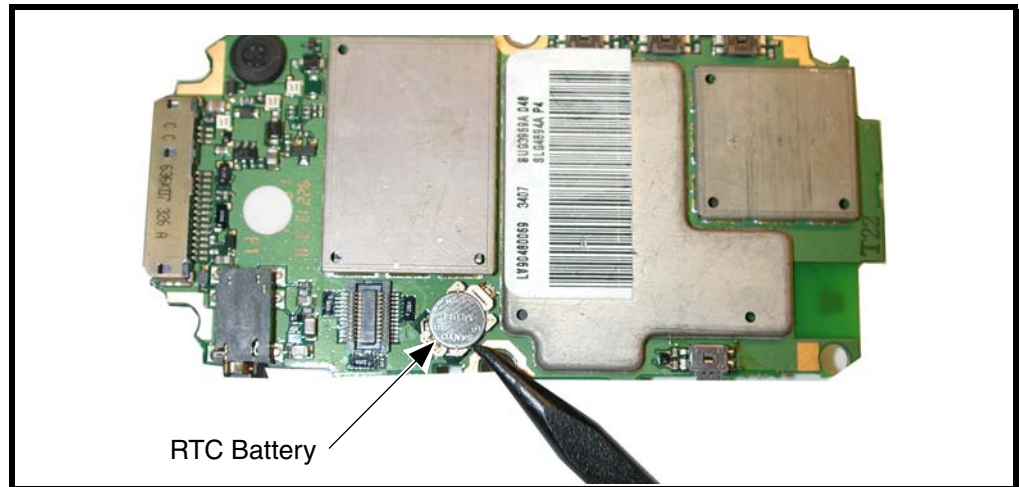


Figure 12. Removing the Switchdome Flex Connector

8. To replace, place the transceiver board assembly next to the switchdome assembly with the flex connector on top.
9. Insert the switchdome flex connector squarely into its mating connector on the back of the transceiver board and press firmly until it snaps into place.
10. Carefully place the transceiver board and the switchdome assembly into the front housing.
11. Insert the headset speaker cover into its place on the front housing.
12. Insert the display flex connector squarely into its mating connector on the transceiver board and press firmly until it snaps into place.
13. Replace the rear housing, antenna, SIM, battery, and battery cover as described in the procedures.

Removing and Replacing the Real-Time Clock (RTC) Battery

1. Remove the battery cover, battery, SIM, antenna, rear housing, and transceiver board assembly as described in the procedures.
2. Use the disassembly tool to pry the RTC battery out of its socket on the transceiver board (see Figure 13).



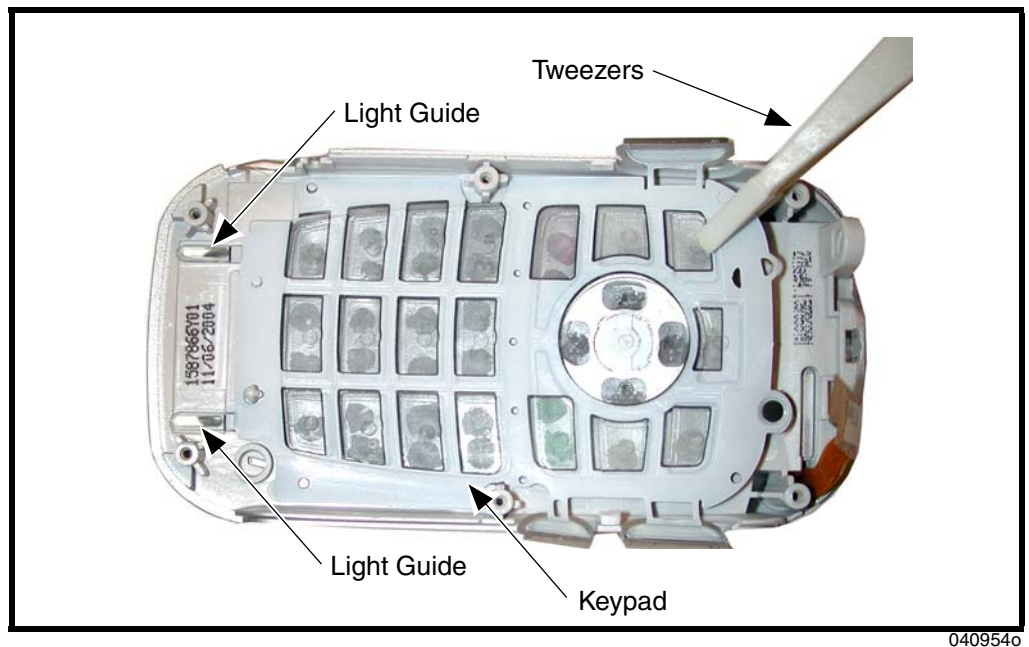
040952o

Figure 13. Removing the RTC Battery

3. Remove the RTC battery, while making note of the polarity.
4. To replace, align the RTC battery with its socket on the transceiver board.
5. Press the RTC battery into its socket.
6. Replace the transceiver board assembly, rear housing, antenna, SIM, battery, and battery cover as described in the procedures.

Removing and Replacing the Keypad, Volume/Smart, and Voice Buttons

1. Remove battery cover, battery, SIM, antenna, rear housing, and transceiver board assembly as described in the procedures.
2. Using the plastic tweezers, lift the top part of the keypad assembly, which includes the volume/smart buttons and voice button, away from the transceiver board assembly (see Figure 14).



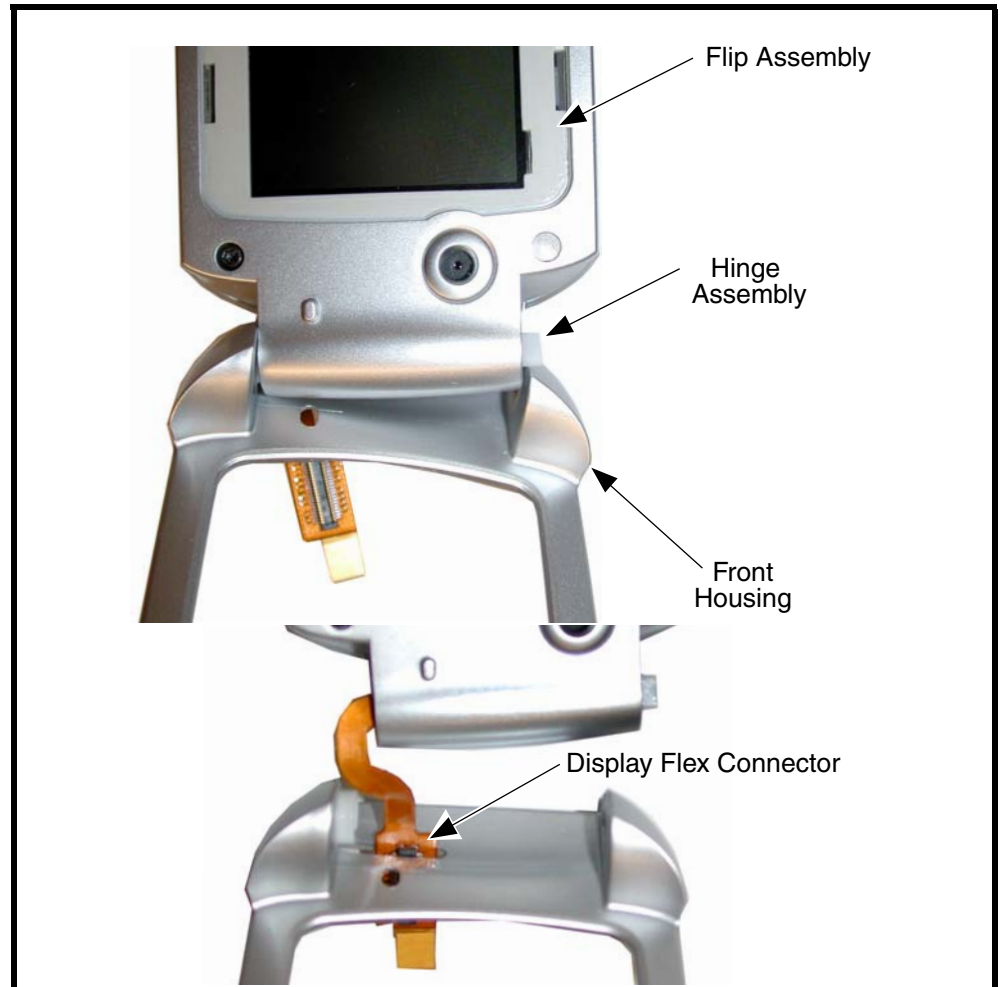
040954o

Figure 14. Removing the Keypad, Volume/Smart, and Voice Buttons

3. There are two light guides at the bottom of the keypad assembly. Remove the light guides and the keypad assembly from the transceiver board with extreme caution.
4. To replace, carefully insert the light guides into their slots on the front housing. Avoid damaging to the light guides while inserting them.
5. Carefully set the keypad volume/smart buttons and voice button assembly onto the metal switchdome assembly. Ensure the volume/smart key keypads make contact with the switchdome assembly on the transceiver board when installed.
6. Insert the keypad into the front housing, ensuring the keys align properly with the openings in the front housing.
7. Replace the transceiver board assembly, display flex connector, rear housing assembly, antenna, SIM, battery, and battery cover as described in the procedures.

Removing and Replacing the Flip Assembly

1. Remove the battery cover, battery, SIM, antenna, rear housing, transceiver board assembly, and keypad assembly as described in the procedures.
2. Carefully flex the front housing downward to release the hinge assembly from the front housing (see Figure 15).



0409550

Figure 15. Removing the Flip Assembly

3. Carefully slide the display flex cable and connector through the housing assembly. Avoid damage to the flex cable.



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

4. Lift the housing assembly away from the flip assembly. Be careful not to damage the display flex cable.

5. To replace, carefully thread the display flex connector through the slot on the keypad housing assembly. Avoid damaging the flex cable.
6. Flex the front housing slightly and insert the hinge assembly into the front housing. Avoid damaging the flex cable and connector.
7. Replace the keypad assembly, transceiver board assembly, rear housing, antenna, SIM, battery, and battery cover as described in the procedures.

Removing and Replacing the Flip Cover

1. Remove the battery cover, battery, SIM, antenna, rear housing, transceiver board assembly, keypad assembly and flip assembly as described in the procedures.
2. Remove the 4 flip assembly screws located under the screw covers (see Figure 18). Set the screws aside for reuse unless they are damaged.



Figure 16. Removing the Flip Cover Screws

040957o

3. Use the disassembly tool to release the 3 latches on each side of the flip assembly (see Figure 17).

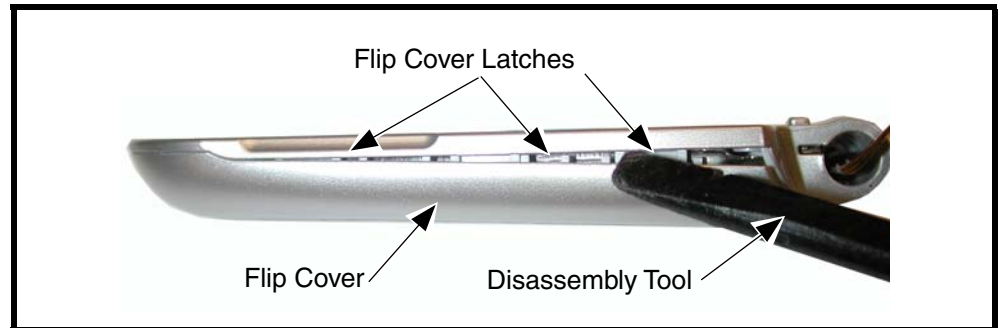


Figure 17. Removing the Flip Cover Latches

4. Carefully lift the flip cover away from the flip assembly. Avoid damaging the display flex cable and connector.
5. To replace, align the flip cover with the flip assembly. Press the flip cover onto the flip assembly until the 6 latches are fully engaged.
6. Replace the flip assembly, keypad assembly, transceiver board assembly, rear housing, antenna, SIM, battery, and battery cover as described in the procedures.

Removing and Replacing the Flip Display Assembly

1. Remove the battery cover, battery, SIM, antenna, rear housing, transceiver board assembly, keypad assembly, flip assembly, and flip cover as described in the procedures.
2. Use the metal tweezers to release the 2 latches on each side of the flip display shield (see Figure 18).

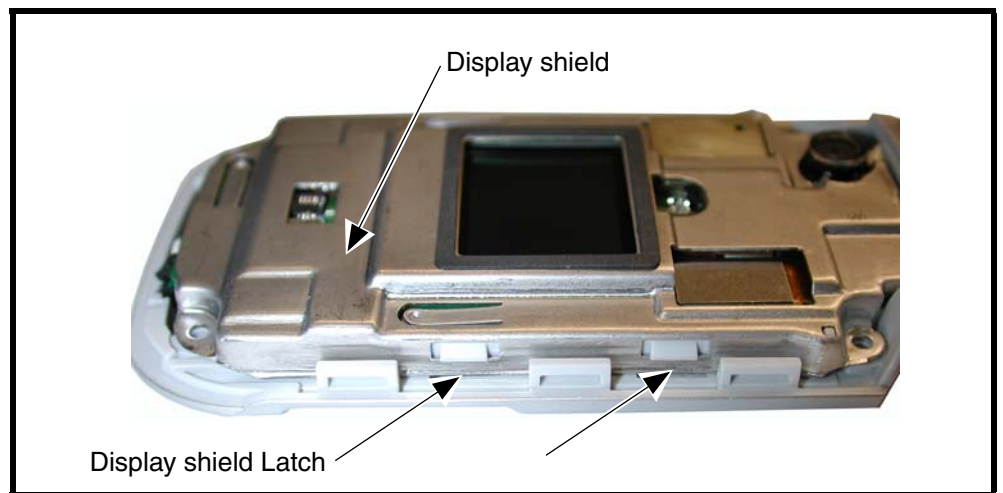


Figure 18. Removing the Flip Display Assembly Shield

3. Lift the display shield away from the flip assembly. Do not reuse the display shield for reassembly.
4. Remove the display assembly shock pad from the display module assembly (see Figure 19).

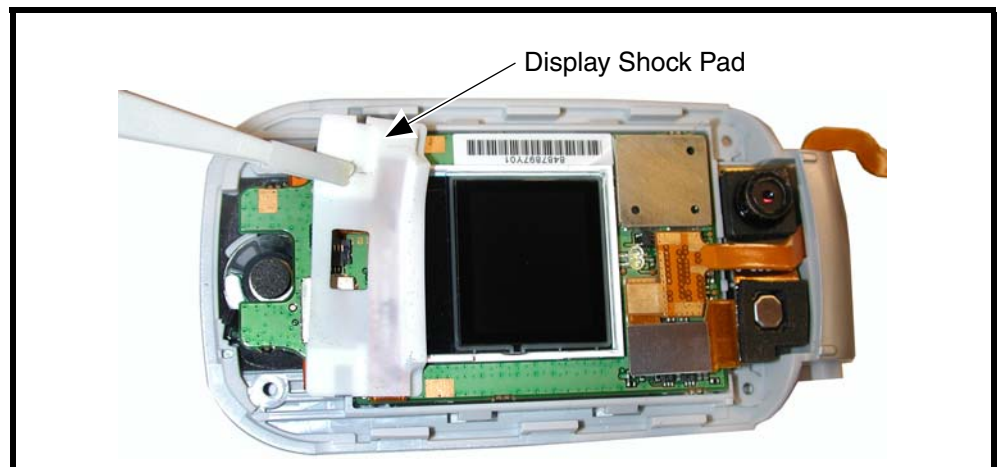
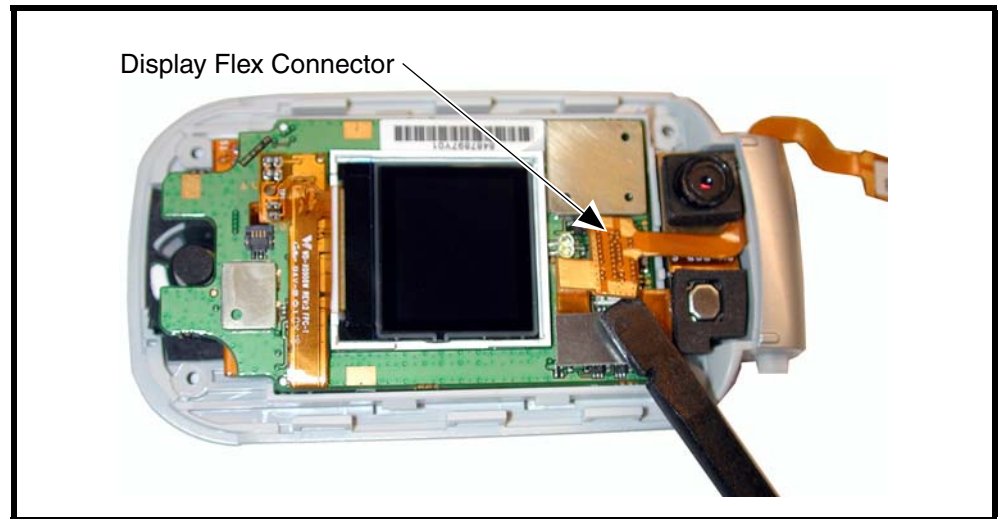


Figure 19. Removing the Flip Display Shock Pad



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

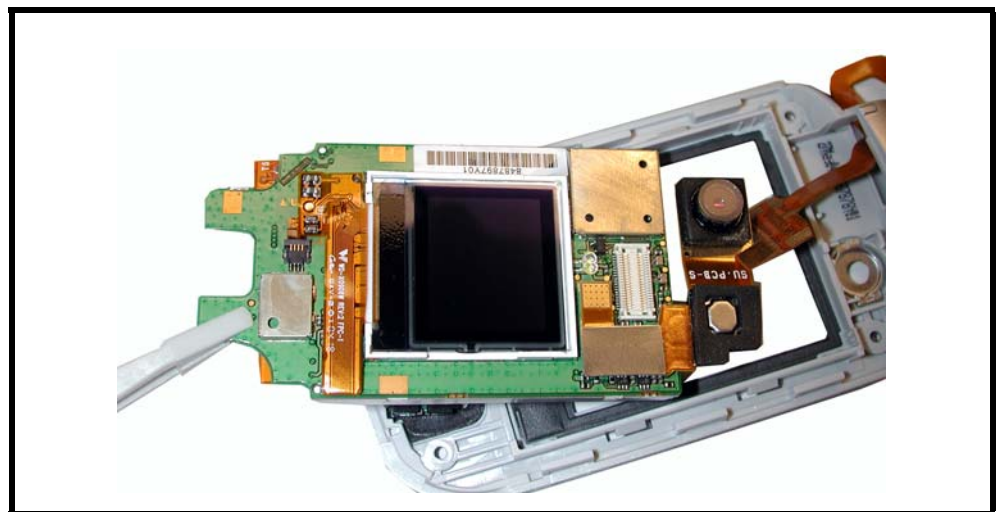
5. Use the disassembly tool to unseat the display assembly flex connector from its socket (see Figure 20).



040963o

Figure 20. Removing the Display Assembly Flex Connector

6. Disconnect the flex connector from the display assembly PCB.
7. Lift the display assembly away from the flip assembly (see Figure 21).



040964o

Figure 21. Removing the Display Assembly

8. To replace, align the display assembly to the flip assembly.



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

9. Carefully seat the display flex connector to the socket on the flip assembly.
10. Align the display lens assembly with the flip assembly.
11. Carefully lower the display assembly onto the flip assembly. Be careful not to damage the display flex or flex connector while reassembling the display lens assembly.
12. Place the rubber shock pad onto the display assembly.
13. Place a new display shield onto the display assembly. Do not reinstall the old display shield.
14. Replace the flip assembly cover, flip assembly, keypad assembly, transceiver board, rear housing, antenna, SIM, battery, and battery cover as described in the procedures.

Removing and Replacing the Camera Assembly

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



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

2. Use the disassembly tool to unseat the camera assembly flex connector from its socket (see Figure 22).

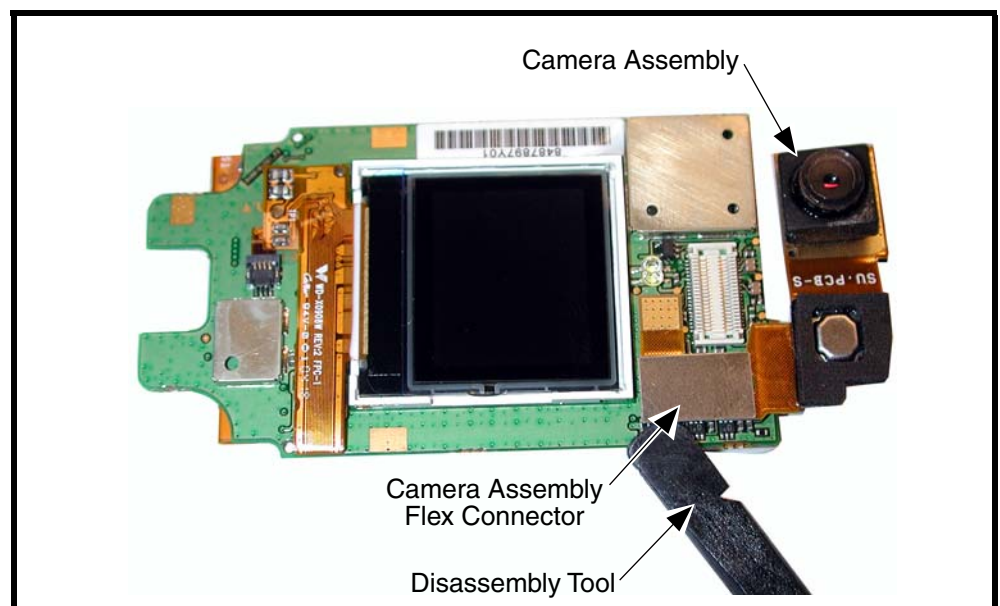


Figure 22. Camera Assembly Removal

3. Carefully lift the camera assembly away from the display assembly.
4. To replace, carefully press the camera assembly flex connector into its socket on the display assembly until fully seated.
5. Replace the flip display assembly, flip assembly, keypad, transceiver board assembly, rear housing, antenna, SIM, battery, and battery cover as described in the procedures.

Removing and Replacing the Display Module

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



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

Use the disassembly tool to unseat the CLI display connector from its socket on the display module (see Figure 23).

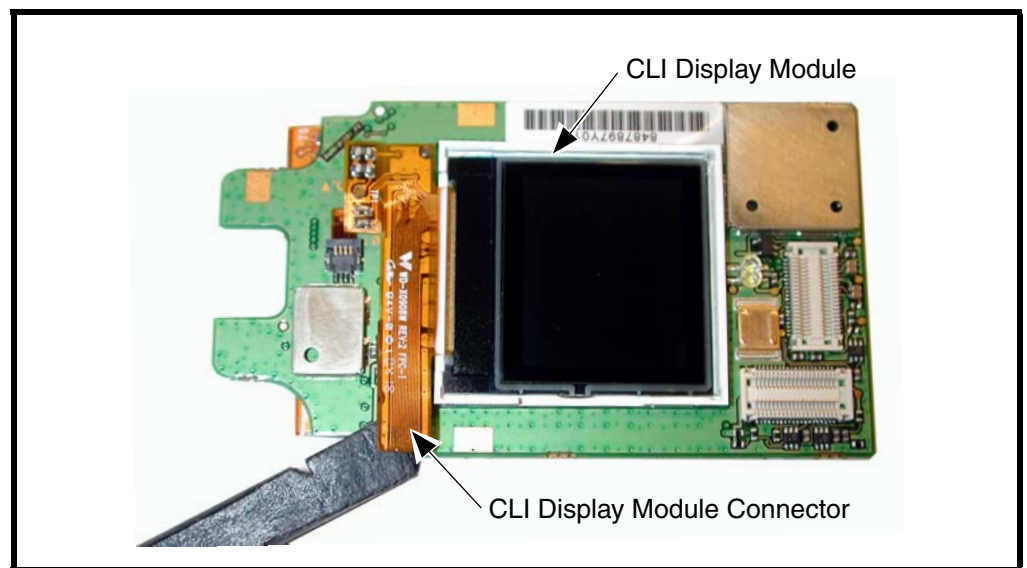


Figure 23. Removing the CLI Display Connector

0409660

Subscriber Identity Module (SIM) and Identification

SIM Card

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 personalized details such as menu, and stored memory, such as phonebooks, or program the customer's phone with basic user information such as language selection. V975 and V980 telephones use mobile PhoneTools® synchronization software to effect a personality transfer.

Identification

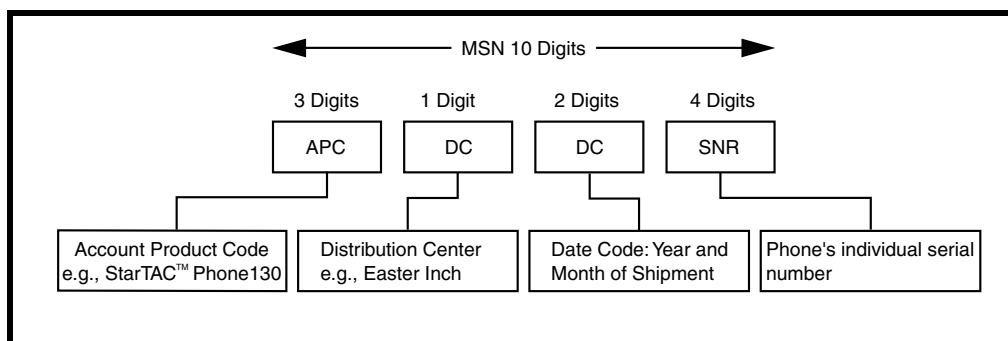
Each Motorola GSM phone is labeled with a several identifying numbers. The following section describes the current identifying labels.

Mechanical Serial Number (MSN)

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

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

The MSN is divided into 4 sections as shown in Figure 24.



000807b

Figure 24. 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 stored within the phone's memory.

The IMEI uniquely identifies an individual mobile station provides a way to control access to GSM networks based on mobile station types or individual phones. The full IMEI structure is listed in Table 2.

Table 2. IMEI Number Breakdown

| TAC | Serial Number | Check Digit |
|-----------|---------------|-------------|
| NNXXXX YY | ZZZZZZ | A |

Where:

- TAC** Type Allocation Code, formerly known as Type Approval Code
- NN** Reporting body identifier
- XXXX** Type identifier
- YY** YY is set to 00 from 01/01/2003 until 31/03/2004
- 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, usually the SWF number. (for example, V100).
- **PACKAGE NUMBER:** Identifies the equipment type, mode, and language in which the product is shipped.

Troubleshooting

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 <3.25 Vdc, recharge the battery using the appropriate battery charger. If the battery will not recharge, replace the battery. If battery is not at fault, proceed to b. |
| | b) Battery connectors open or misaligned. | Visually inspect the battery connectors on both the battery and the telephone. Realign and, if necessary, either replace the battery or refer to a Level 3 Service Center for battery connector replacement. If battery connectors are not at fault, proceed to c. |
| | c) Transceiver board assembly defective. | Remove the transceiver board assembly. Substitute a known good assembly and temporarily reassemble. Press and hold the PWR button; if the phone turns on and stays on, disconnect the dc power source and reassemble with the new transceiver board assembly. Verify that the fault has been cleared. If the fault has not been cleared then proceed to d. |
| | d) keyboard assembly failure. | Replace the keyboard assembly. Temporarily connect a +3.6 Vdc supply to the battery connectors. Press and hold the PWR button. If the phone turns on and stays on, disconnect the dc power source and reassemble with the new keyboard assembly. |
| 2. Telephone exhibits poor reception or erratic operation such as calls frequently dropping or weak or distorted audio. | a) Antenna assembly defective. | Check to make sure that the antenna pin is properly connected to the transceiver board assembly. If connected properly, substitute a known good antenna. If the fault is still present, proceed to b. |
| | b) Transceiver board assembly defective. | 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. |
| 3. Display is erratic, or provides partial or no display. | a) Transceiver board connections faulty. | Remove rear chassis assembly from the phone, check general condition of FPC (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. | 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. |
| 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 with the new transceiver board assembly. |

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

| SYMPTOM | PROBABLE CAUSE | VERIFICATION AND REMEDY |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 5. Telephone transmit audio is weak (usually indicated by called parties complaining of difficulty in hearing voice). | a) Microphone connections to the transceiver board assembly defective. | Gain access to the microphone as described in the procedures. Check connections. If connector is faulty proceed to c; if the connector is not at fault, proceed to b. |
| | b) Microphone defective. | Gain access to microphone. Disconnect and substitute a known good microphone. Place a call and verify improvement in transmit signal as heard by called party. If good, reassemble with new microphone. If microphone is not at fault, reinstall original microphone and proceed to c. |
| | c) Transceiver board assembly defective. | Replace the transceiver board assembly (refer to 1c). Verify that the fault has been cleared and reassemble with the new transceiver board assembly. |
| 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 that 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. | Replace the transceiver board assembly (refer to 1c). Verify that the fault has been cleared and reassemble with the new transceiver board assembly. |
| 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 phone 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. | Replace the transceiver board assembly (refer to 1c). Verify that the fault has been cleared and reassemble with the new transceiver board assembly. |
| 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. | Replace the transceiver board assembly (refer to 1c). Verify that the fault has been cleared and reassemble with the new transceiver board assembly. |

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

| SYMPTOM | PROBABLE CAUSE | VERIFICATION AND REMEDY |
|-----------------------------------------------------------------|-----------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 9. Vibrator feature not functioning. | Transceiver board assembly defective. | Replace the transceiver board assembly (refer to 1c). Verify that the fault has been cleared and reassemble with the new transceiver board assembly. |
| 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 the batteries charge 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 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 plug not fully pushed into the jack socket. | 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 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.

Part Number Charts

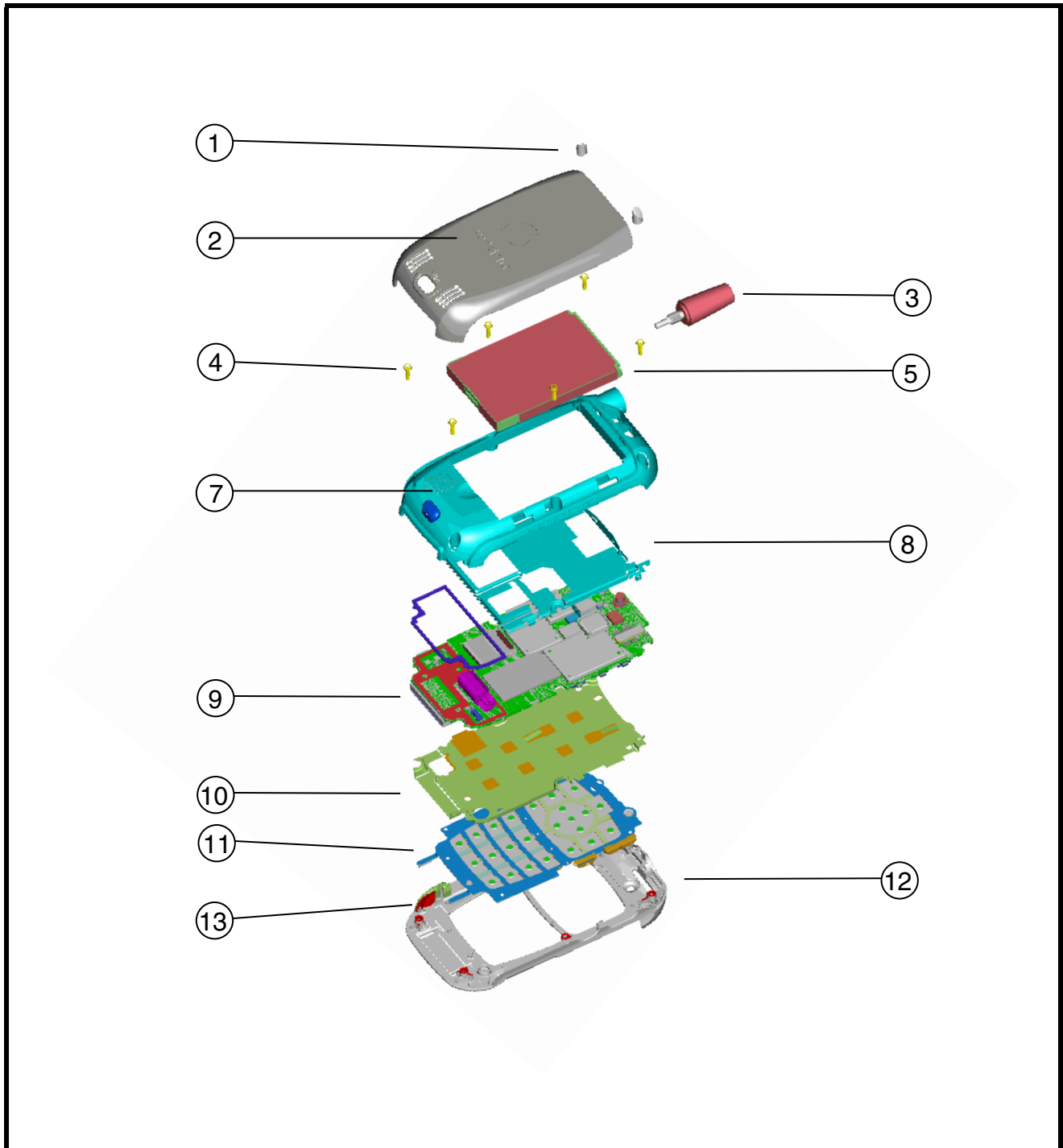
The following charts are provided as a reference for the parts associated with V975 and V980 telephones.

Related Publications

Motorola V975 User's Guide, English

TBD

Exploded View Diagram



0409670

Figure 25. Exploded View Diagram

A

alert settings 15
antenna, removing and replacing 21

B

battery
 function 15
 gauge 15
 removing 18
battery cover
 removing 18

C

caller ID 13
camera assembly, removing and replacing 36
Canadian Interference-Causing Equipment regulations 5
changes
 product 5
conventions 7
copyrights
 computer software 6

D

disassembly 18
display 14

E

exploded view diagram 44
exploded view parts list 45

F

FCC rules 5
features
 caller ID 13
 SIM Toolkit 12
 text entry 12
 voice recognition 11
 Wireless Access Protocol (WAP) 12
features, product 11
flip assembly, removing and replacing 30
flip cover, removing and replacing 31
flip display assembly, removing and replacing 33

I

identification 38
 international mobile station equipment identity 39
 mechanical serial number 38

 product 5
IMEI 39
indicators
 service indicator (status light) 14
Introduction 5

L

Liquid Crystal Display (LCD) 14

M

MSN 38

N

names
 product 5

O

operation
 controls, indicators, and I/O 14
operation, general 14
overview, product 11

P

parts 43
 exploded view diagram 44
 exploded view parts list 45
product
 changes 5
 identification 5
 names 5
publications, related 43

R

real-time clock battery, removing and replacing 28
rear housing
 removing 22
regulatory agency compliance 5
related publications 43
removing
 antenna 21
 battery 15, 18
 battery cover 18
 camera assembly 36
 flip assembly 30
 flip cover 31
 flip display assembly 33
 real-time clock battery 28

- rear housing 22
- SIM 20
- transceiver board assembly 24
- volume/smart buttons 29

replacement parts

- contact information 8

replacing

- antenna 21
- battery 18
- camera assembly 36
- flip assembly 30
- flip cover 31
- flip display assembly 33
- real-time clock battery 28
- rear housing 22
- SIM 20
- transceiver board assembly 24
- volume/smart buttons 29

S

- serial number
 - mechanical 38
- service manual
 - about 6
 - revisions 7
 - scope 6
- service policy 7
 - customer support 7
 - out of box failure 7
 - product support 7
- service procedure
 - ordering replacement parts 8
- shut down
 - upon battery removal 15
- SIM Application Toolkit 12
- SIM card 38
 - personality transfer 38
 - replacing 20
- SIM, removing and replacing 20
- specifications 9
- support
 - customer 7
 - product 7

T

- text entry 12
- tools and test equipment 17
- transceiver board assembly, removing and replacing 24
- troubleshooting 40

V

- voice recognition 11
- volume/smart buttons, removing and replacing 29

W

- warranty service 7
- Wireless Access Protocol (WAP) 12

MOTOROLA, the Stylized M Logo, and all other trademarks indicated as such herein are trademarks of Motorola, Inc.
All other product or service names are the property of their respective owners.

® Reg. U.S. Pat. & Tm. Off.

© 2004 Motorola, Inc.

All rights reserved.

Personal Communications Sector,
Sawgrass International Concourse
789 International Parkway, Mailstop S2C
Sunrise, FL 33325-6222

6809490A74-O