



**MOTOROLA**

Level 1 and 2 Service Manual

6809495A82-A

# V3i

## Digital Wireless Telephone



GSM 850/900/1800/1900 MHz EDGE, GPRS



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|                                                                   |           |
|-------------------------------------------------------------------|-----------|
| <b>Introduction</b> .....                                         | <b>5</b>  |
| 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         |
| <b>Specifications</b> .....                                       | <b>9</b>  |
| <b>Product Overview</b> .....                                     | <b>11</b> |
| Features .....                                                    | 11        |
| <b>General Operation</b> .....                                    | <b>14</b> |
| Controls, Indicators, and Input / Output (I/O) Connections .....  | 14        |
| User Interface Menu Structure .....                               | 18        |
| Alert Settings .....                                              | 18        |
| Battery Function .....                                            | 18        |
| Operation .....                                                   | 19        |
| <b>Tools and Test Equipment</b> .....                             | <b>21</b> |
| <b>Disassembly</b> .....                                          | <b>22</b> |
| Removing and Replacing the Battery Cover and Battery .....        | 22        |
| Removing and Replacing the Subscriber Identity Module (SIM) ..... | 24        |
| Removing and Replacing the Trans Flash Memory Module .....        | 25        |
| Removing and Replacing the Rear Housing .....                     | 26        |
| Removing and Replacing the Antenna .....                          | 29        |
| Removing and Replacing the Transceiver Board Assembly .....       | 31        |
| Removing and Replacing the Flip Assembly Cover .....              | 32        |
| Removing and Replacing the Camera Assembly .....                  | 34        |
| Removing and Replacing the Display Module Assembly .....          | 36        |
| Removing and Replacing the CLI Lens .....                         | 39        |
| <b>Subscriber Identity Module (SIM) and Identification</b> .....  | <b>41</b> |
| SIM Card .....                                                    | 41        |
| Personality Transfer .....                                        | 41        |
| Identification .....                                              | 41        |
| <b>Troubleshooting</b> .....                                      | <b>43</b> |
| Manual Test Mode .....                                            | 43        |
| Manual Test Mode Commands .....                                   | 43        |
| Troubleshooting Chart .....                                       | 45        |
| Programming: Software Upgrade and Flexing .....                   | 47        |
| Related Publications .....                                        | 47        |
| Exploded View Diagram .....                                       | 48        |
| Exploded View Parts List .....                                    | 49        |
| Accessories .....                                                 | 50        |



## 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.

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## 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 V3i 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 V3i 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

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## 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, **PHONEBOOK**.

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.

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## Parts Replacement

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

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

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<br>869-893 MHz Rx                                                                                                                                                                                                                                                                    |
| Frequency Range GSM 900                            | 880-915 MHz Tx (with EGSM)<br>925-960 MHz Rx                                                                                                                                                                                                                                                        |
| Frequency Range DCS 1800                           | 1710-1785 MHz Tx<br>1805-1880 MHz Rx                                                                                                                                                                                                                                                                |
| Frequency Range PCS 1900                           | 1850-1910 MHz Tx<br>1930-1990 MHz Rx                                                                                                                                                                                                                                                                |
| Channel Spacing                                    | 200 kHz                                                                                                                                                                                                                                                                                             |
| Channels                                           | 174 EGSM, 374 DCS, 374 PCS, 124 GSM 850 carriers with 8 channels per carrier                                                                                                                                                                                                                        |
| Modulation                                         | GSMK + EDGE at BT = 0.3                                                                                                                                                                                                                                                                             |
| Transmitter Phase Accuracy                         | 5 Degrees RMS, 20 Degrees peak                                                                                                                                                                                                                                                                      |
| Duplex Spacing                                     | 45 MHz                                                                                                                                                                                                                                                                                              |
| Frequency Stability                                | ± 0.10 ppm of the downlink frequency (Rx)                                                                                                                                                                                                                                                           |
| Operating Voltage                                  | +3.2V dc to +5.5V dc (battery)<br>+4.8V dc to +6.5V dc (external connector)                                                                                                                                                                                                                         |
| Transmit Current Drain                             | 101-260 mA average talk current drain                                                                                                                                                                                                                                                               |
| Stand-by Current drain                             | 5 mA (DRX2), 2 mA (DXR9) typical                                                                                                                                                                                                                                                                    |
| Temperature Range                                  | -10° C to +55° C (+15° F to +130° F)                                                                                                                                                                                                                                                                |
| Dimensions, with 700 mAh Li Ion battery            | 53 mm x 98 mm x 13.9 mm<br>(2.08 inches x 3.85 inches x 0.54 inches)                                                                                                                                                                                                                                |
| Size (Volume)                                      | 65 cc (3.96 in <sup>3</sup> ), with battery                                                                                                                                                                                                                                                         |
| Weight                                             | 90 grams (3.17 oz), with battery                                                                                                                                                                                                                                                                    |
| Battery Life, with standard 700 mAh Li-Ion Battery | Talk Time 6-8 hours<br>Standby time 6.5 -10.4 days<br><br>All talk and standby times are approximate and depend on network configuration, signal strength, and features selected. Standby times are quoted as a range from DRX=2 to DRX=9. Talk times are quoted as a range from DTX off to DTX on. |
| Battery Charge Time                                | 4 hours to 90% of 700 mAh capacity                                                                                                                                                                                                                                                                  |
| Alert volume                                       | Max 95 dB @5cm, 0.5 Watts input                                                                                                                                                                                                                                                                     |

| Transmitter Function | Specification                                               |
|----------------------|-------------------------------------------------------------|
| RF Power Output      | 32 dBm nominal GSM 850/900,<br>29 dBm nominal GSM 1800/1900 |
| Output Impedance     | 50 ohms nominal                                             |
| Spurious Emissions   | -36 dBm from 0.1 to 1 GHz, -30 dBm from 1 to 4 GHz          |
| Bluetooth            | Class 1                                                     |

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

| Speech Coding Function | Specification                                                                                  |
|------------------------|------------------------------------------------------------------------------------------------|
| Speech Coding Type     | Regular pulse excitation/linear predictive coding with long term prediction (RPE LPC with LTP) |

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| Speech Coding Function     | Specification                                   |
|----------------------------|-------------------------------------------------|
| 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                                       |

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## Product Overview

Motorola V3i telephones represent the thinnest, compact and lightweight global system for mobile communications (GSM) general packet radio service (GPRS) wireless application protocol (WAP)-enabled mobile phones. The V3i phones incorporate a new user interface (UI) for easier operation, allows short message service (SMS) text messaging, and includes personal information manager (PIM) functionality.

The V3i is a quad-band phone that allows roaming within the GSM 900 MHz, GSM 850 MHz, 1800 MHz digital cellular system (DCS), and 1900 MHz PCS bands.

V3i telephones support EDGE, GPRS and SMS in addition to traditional circuit switched transport technologies.

V3i telephones have a clam form factor. They feature an anodized aluminum housing and have an externally viewable 96 x 80 pixel 65K CSTN display for caller identification and date/time, an internal 176 x 220 pixel 64K TFT display, and the speaker 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 700 mAh Lithium Ion (Li Ion) battery fits behind a removable back cover.

The phone accepts both 3V and 1.8V mini subscriber identity module (SIM) cards which fit into the SIM holder next to the battery. The antenna is internal. Inexpensive direct connection to a computer or handheld device via RS232 USB or Bluetooth® for data and fax calls, and for synchronizing phonebook entries with Mobile Phone Tools software, can be accomplished by using the optional data cable and soft modem.

## Features

V3i 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:

- GSM 850/900/1800/1900 MHz GPRS Class 10 (2U/4D) EDGE Class 10 (1U/4D) or (2U/3D) depending on SW type.
- Built in 1.3 Mega Pixel Camera (640x480 pixels)
- 64K Thin Film Transistor (TFT) Active Color Display
- External 65K CSTN CLI Display
- Polyphonic Speaker
- Speaker Phone
- Bluetooth™ Class 1 device
- 5MB User Memory
- Trans Flash card reader holds up to 512 MB memory module.

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## Speaker Dependant Voice Activation and Voice Note Recording

Voice tags can be used for voice dialing up to 20 phone numbers in the phone book 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 (i.e., via the phone book 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 provide the option to store voice tags onto the SIM card, voice tags are added to the phone’s memory.*

V3i telephones also include a voice 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 via the mobile network.

The V3i 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.*



*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 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

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

- 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.
- Tap. Press a key to generate a character.
- Numeric. The keypad produces numeric characters only. For some text areas this is the only method available; for example, phone numbers.

## 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, the Incoming Call message is displayed.



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

## Other Features

Detailed descriptions of these and other V3i 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 V3i series telephone's controls are located on the sides of the flip and on the keypad. Indicators, in the form of icons, are displayed on the LCD (see Figure 3). V3i phones have an audible alert transducer on the top and I/O connectors, consisting of a charger/accessory port, located on the side of the phone. See Figure 1.



0511690

Figure 1. Controls, indicators, and I/O

The V3i has an external color display along with several keys, indicators, and an imaging device. These are shown in Figure 2.




050707o

**Figure 2. External Display, Keys, indicators, and I/O**

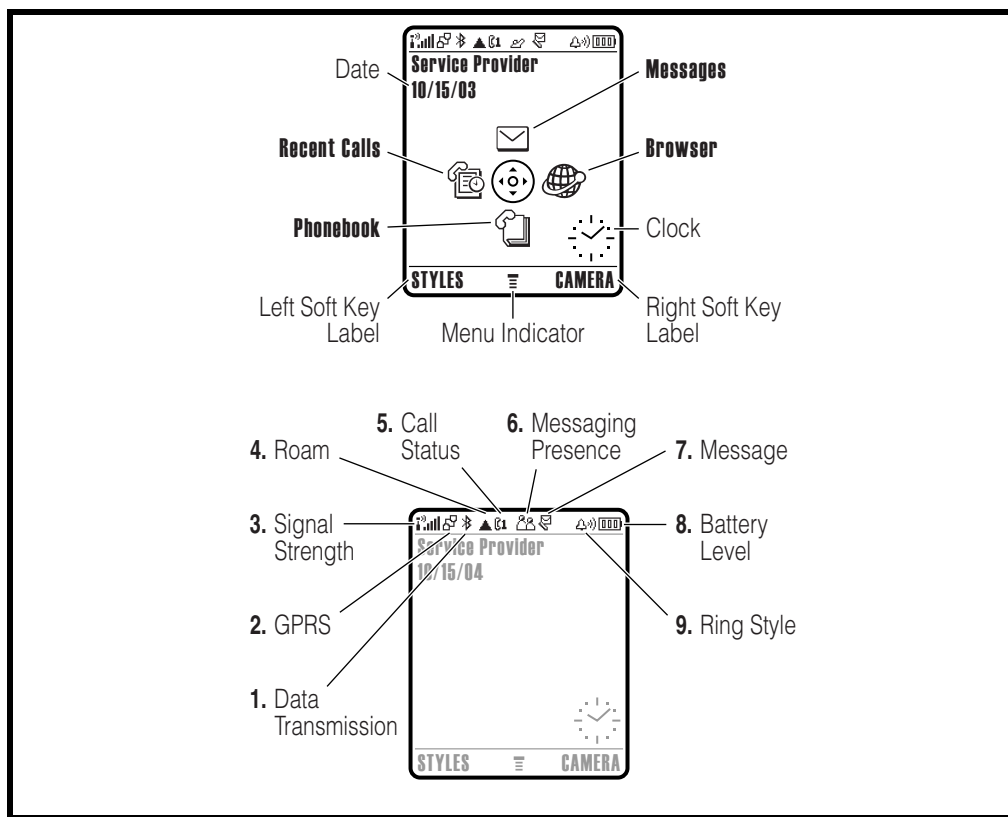
### Color Display

The V3i wireless phones feature a 64k color Thin Film Transistor (TFT) 176x220 pixel display.

“Soft keys” refer to non-labeled keys that correspond to text options displayed on the screen. The left and right soft keys perform the function shown in the corners of the display. The right key will usually select an option whereas the left key will usually exit a function or return to a previous screen.

The menu key opens the initial menu structure, or allows access to a submenu whenever  appears on the display.

Display animation makes the phone's menus move smoothly as the user scrolls up and down.



040146o, 040147o

**Figure 3. Icon Indicators**



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

Figure 3 shows some common icons displayed on the LCD.

- **Signal Strength Indicator.** Shows the strength of the phone's connection with the network. Calls cannot be sent or received when the "no signal" indicator is displayed.
- **In Use Indicator.** Appears when a call is in progress.
- **Roam Indicator.**<sup>5</sup> Appears when the phone uses another network system outside the user's home network. When leaving the home network area, the phone roams, or seeks another network.
- **Message Waiting Indicator.**<sup>5</sup> Appears when the phone receives a text message. This is a network-dependent feature.
- **Voice Message Waiting Indicator.**<sup>1</sup> Appears when a voicemail message is received. This is a network-dependent feature.
- **Battery Level Indicator.** Shows the amount of charge left in the battery. The more segments visible, the greater the charge. Recharge the battery as soon as

1. Network, subscription and SIM card or service provider dependent feature. Not available in all areas.

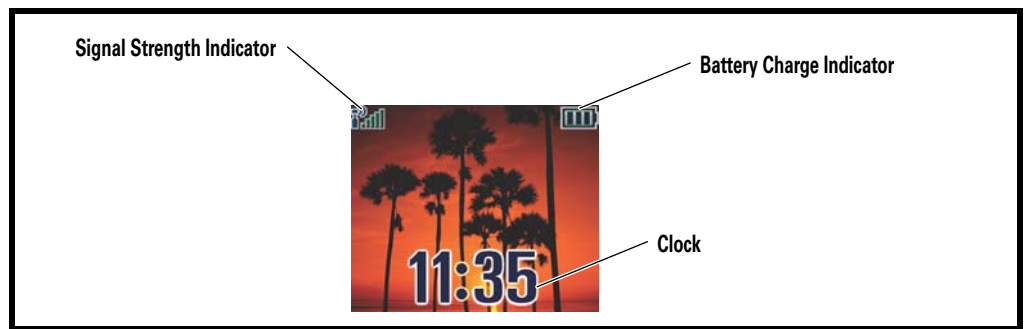


possible when the Low Battery warning message appears.

- **Clock.** Shows the current date and time.
- **Menu Indicator.** Indicates the user can press the menu soft key to open a menu.
- **Alert Setting Indicator.** Shows the current selected alert. The default alert setting is a ringer.

### CLI display

Figure 4 provides an example of the V3i CLI display in idle mode.



**Figure 4. CLI Idle Mode Display**



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

## User Interface Menu Structure

Figure 5 shows the telephone menu structure.

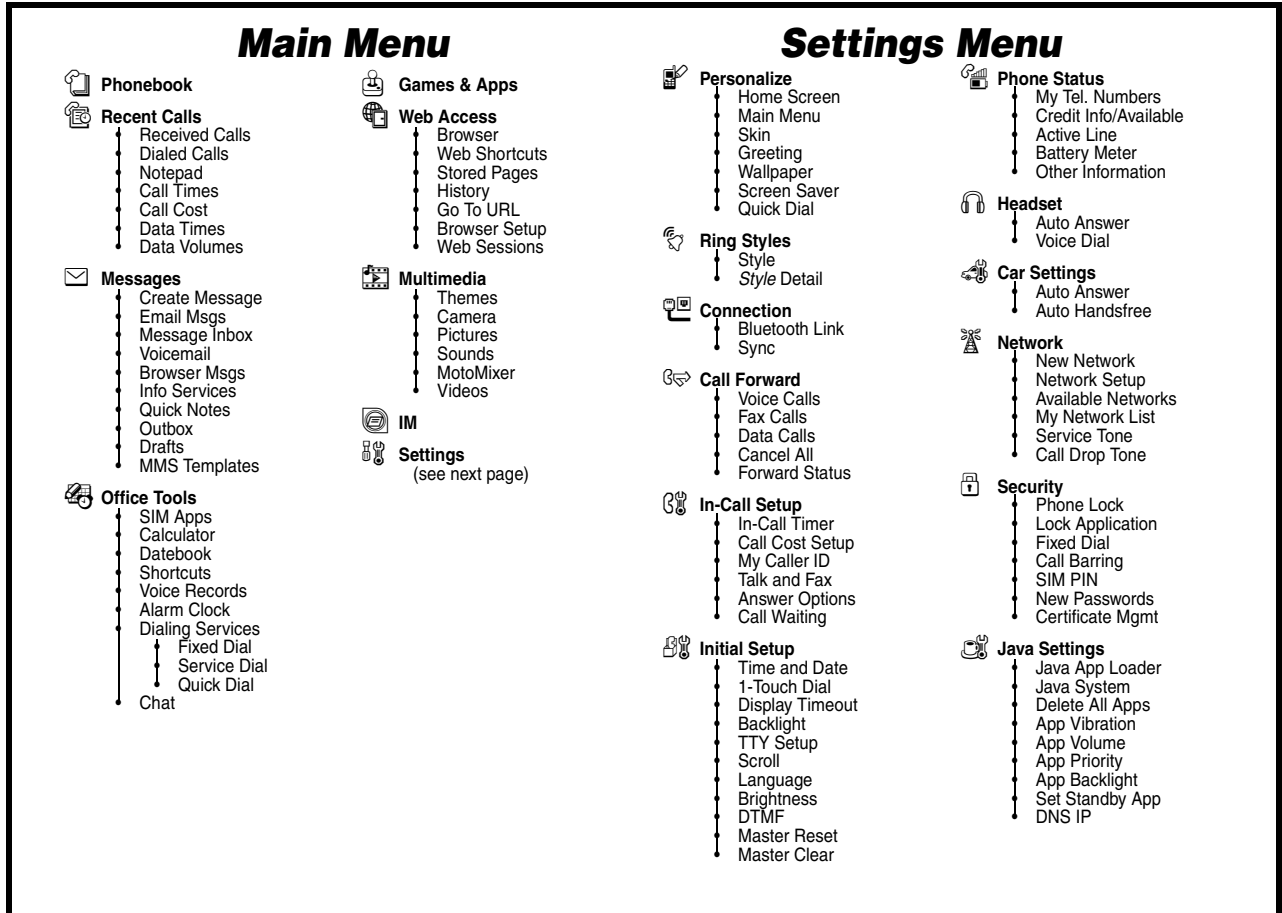


Figure 5. Menu Structure

## Alert Settings

V3i telephones include up to 32 preset alert 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. An LED indicator on the flip cover of the phone provides an indication of the battery charge level when the flip is closed.

### Battery Removal

Removing the battery causes the device 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 the Related Publications section toward the end of this manual.



## Tools and Test Equipment

The following table lists tools and test equipment recommended for disassembly and reassembly of V3i telephones. Use either the listed items or equivalents.

**Table 1. General Test Equipment and Tools**

| Motorola Part Number <sup>1</sup> | Description                                                                                                   | Application                                                                       |
|-----------------------------------|---------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|
| RSX4043-A                         | Torque Driver (T6, T5, T3)                                                                                    | Used to remove and replace screws                                                 |
| —                                 | Torque Driver Bit T-5 Plus, Apex 440-6IP Torx Plus or equivalent                                              | 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) |
| 6680388B67                        | Disassembly tool, plastic with flat and pointed ends (manual opening tool)                                    | Used during assembly/disassembly of device                                        |
| 6680388B01                        | Tweezers, plastic                                                                                             | Used during assembly/disassembly                                                  |
| —                                 | Digital Multimeter, HP34401A <sup>2</sup>                                                                     | 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

The procedures in this section provide instructions for the disassembly of V3i telephones. 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 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 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 in and hold the battery door latch as shown in Figure 1.

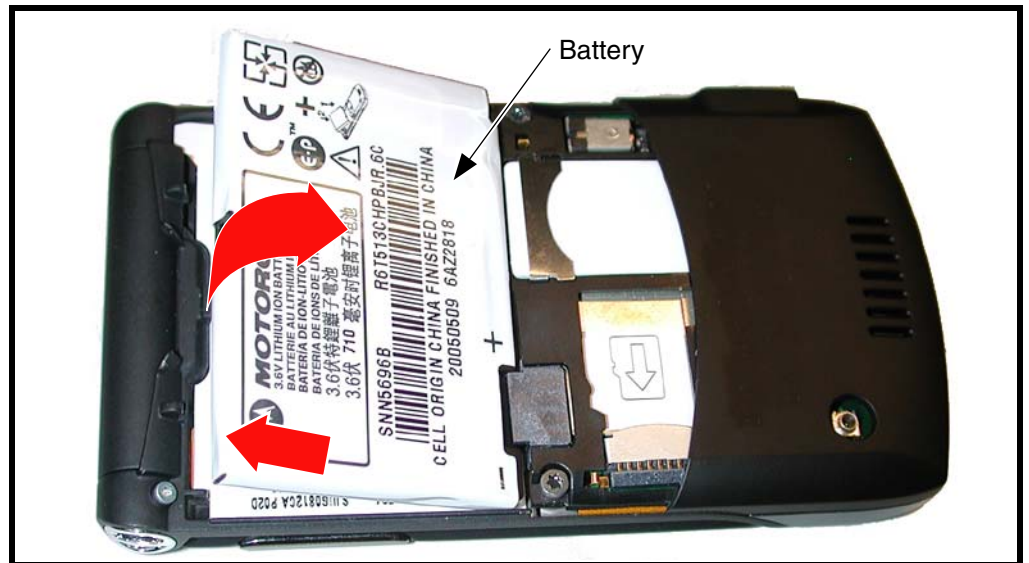


**Figure 1. Removing the Battery Cover**

051055o

3. Rotate the battery cover upward and lift it completely off the phone.

4. Lift the end of the battery first, then remove it from the phone. See Figure 2.



0510560

**Figure 2. Removing the battery**



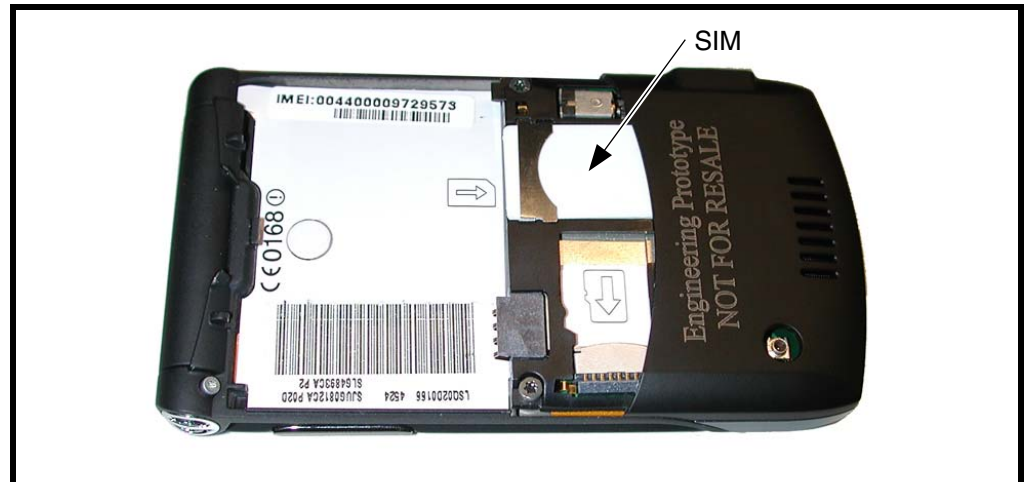
*There is a danger of explosion if the Lithium Ion battery is replaced incorrectly. Replace only with the same type of battery or equivalent as recommended by the battery manufacturer. Dispose of used batteries according to the manufacturer's instructions.*

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 followed by the opposite edge of the battery.
7. Insert the bottom edge of the of the battery cover into the rear housing, then push the top edge of the cover down and snap it into place.

---

## Removing and Replacing the Subscriber Identity Module (SIM)

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



051108o

**Figure 3. Removing the SIM**

2. Slide the SIM card out of the phone 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 cover as described in the procedures.



---

## Removing and Replacing the Trans Flash Memory Module

1. Remove the battery cover and battery as described in the procedures.
2. Slide the Trans Flash memory module toward the SIM to release the memory module from it's socket as shown in Figure 4.

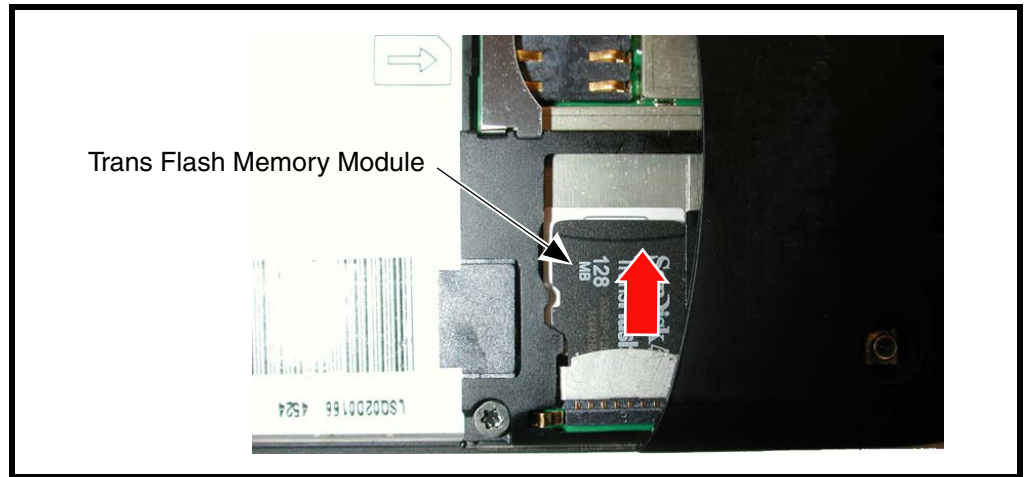


Figure 4. Removing the Trans Flash Memory Module

3. Use the plastic tweezers to carefully lift the memory module out of the phone.
4. To replace, align the memory module according to the diagram in the phone.
5. Place the memory module into it's slot with the contacts facing down.
6. Slide the memory module all the way into position as shown in Figure 4.
7. Reinstall the 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, and SIM 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-6 bit, remove the screws at each side of the phone. Retain the screws for reassembly. See Figure 5.

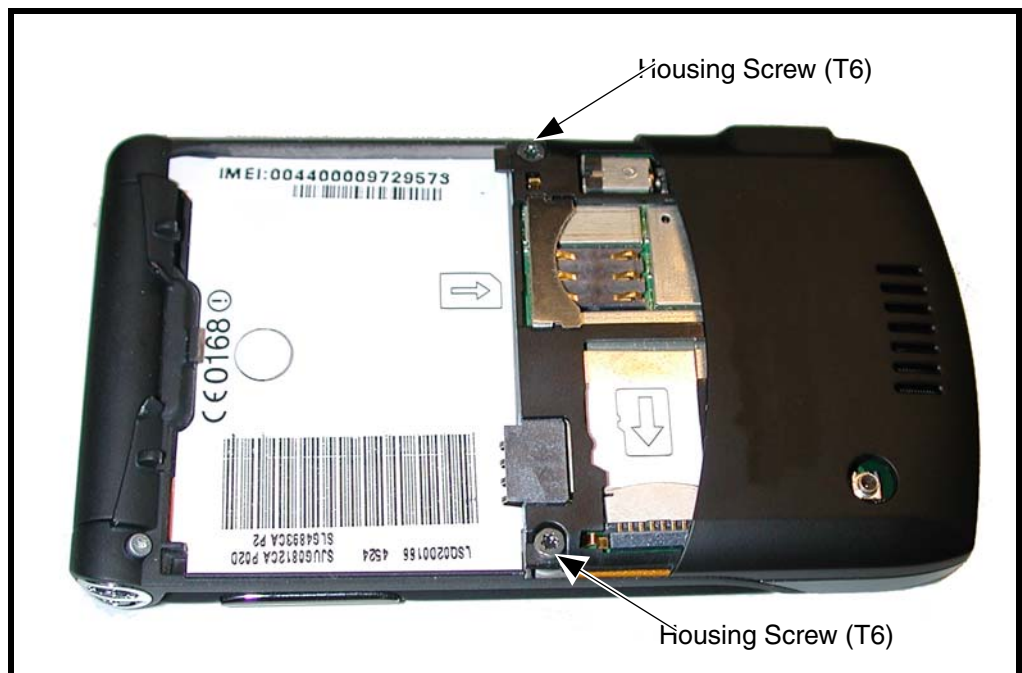


Figure 5. Removing the rear housing screws

0511090

3. Release the four housing latches by inserting the flat end of the plastic disassembly tool into the openings on the rear housing.

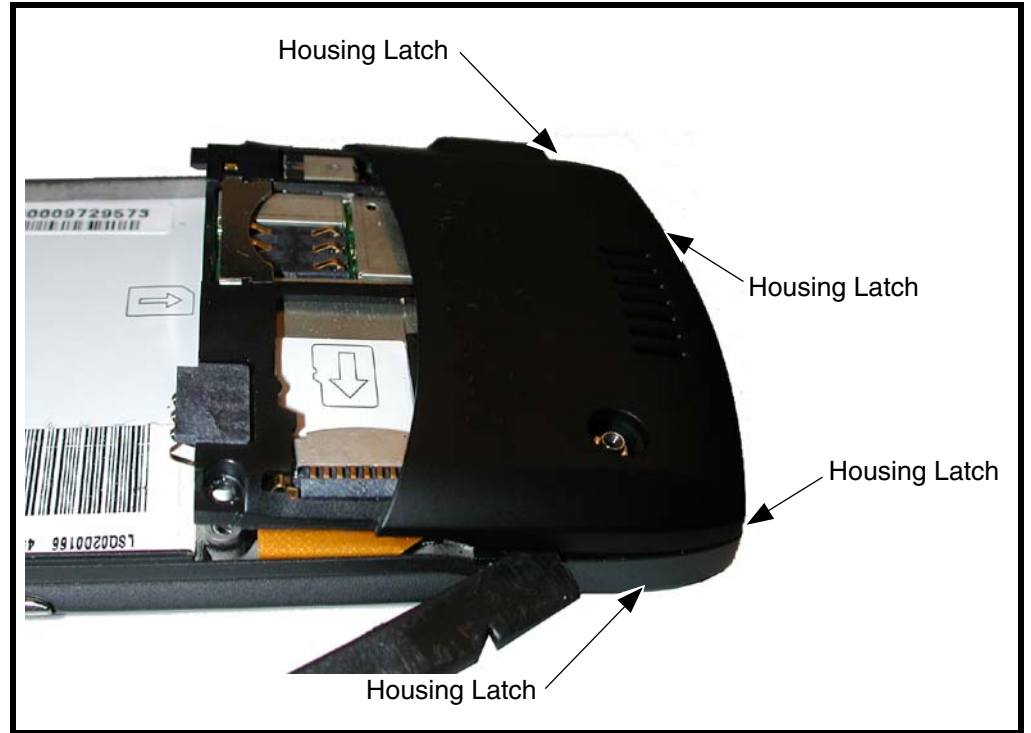


Figure 6. Removing the Rear Housing Latches

051110o

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

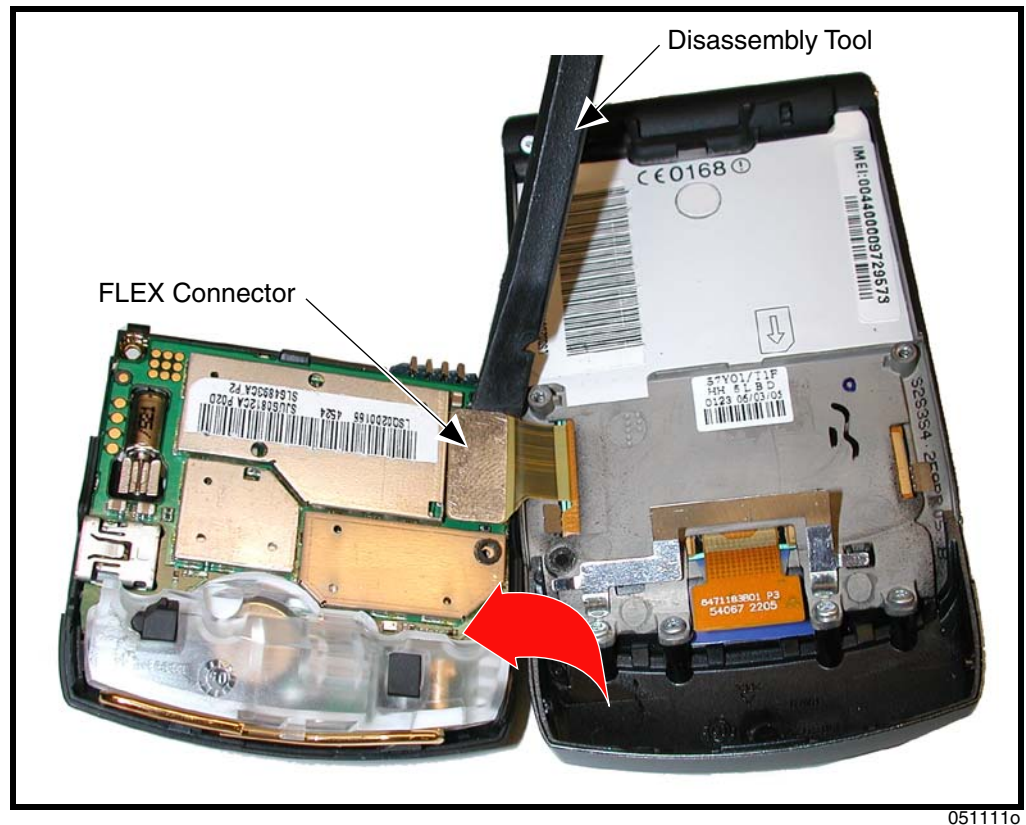


Figure 7. Removing the Rear Housing Assembly

0511110



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

5. Use the disassembly tool to unseat the flex connector from its socket.
6. Lift the rear housing assembly away from the phone.
7. To replace, carefully align the flex connector to its socket on the rear housing assembly, then gently press down on the flex connector until it is properly seated in its socket.
8. Rotate the rear housing assembly so it sits over the phone.
9. Align the housing latches with the corresponding openings on the front housing. Gently press the housings together until the catches snap into place.
10. Replace the 2 housing screws and tighten to a final torque setting of 16 Ncm (1.5 inch pounds). Do not over tighten.
11. Replace the antenna, SIM, battery, and battery cover as described in the procedures.

## Removing and Replacing the Antenna

1. Remove the battery cover, battery, SIM, and rear housing assembly as described in the procedures.
2. Use the metal tweezers to grasp the rubber antenna grommets and carefully remove them from the antenna assembly. See Figure 8. Set the rubber grommets aside for reuse.

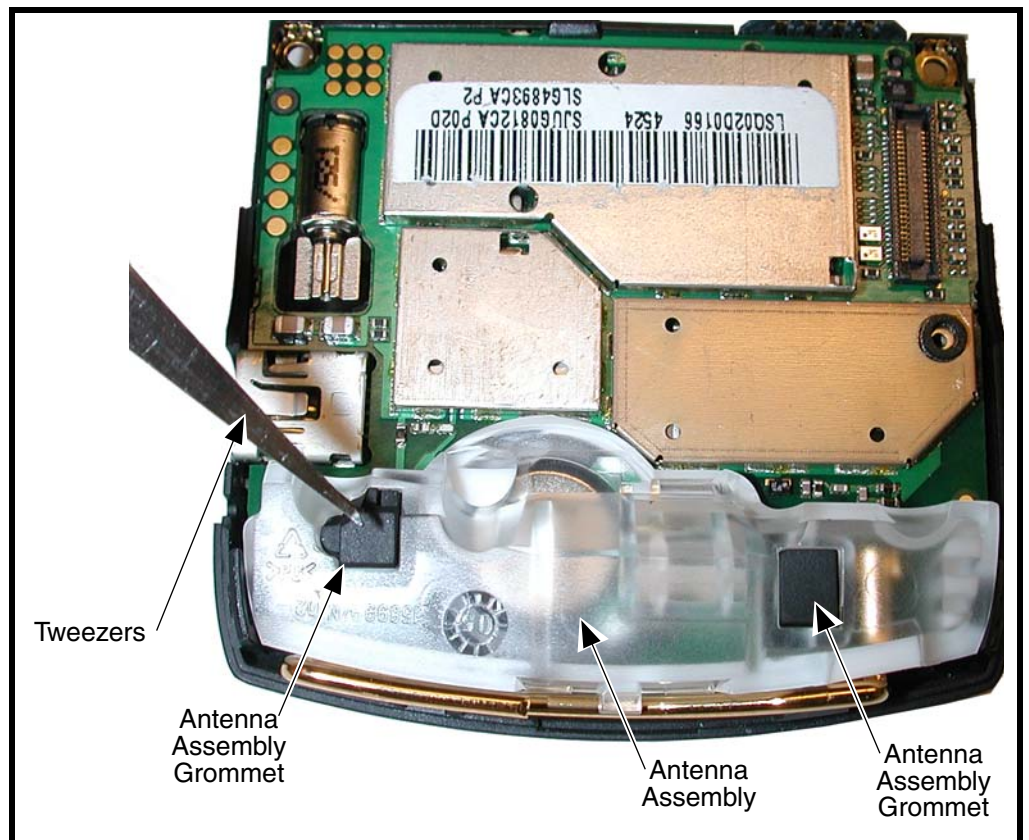
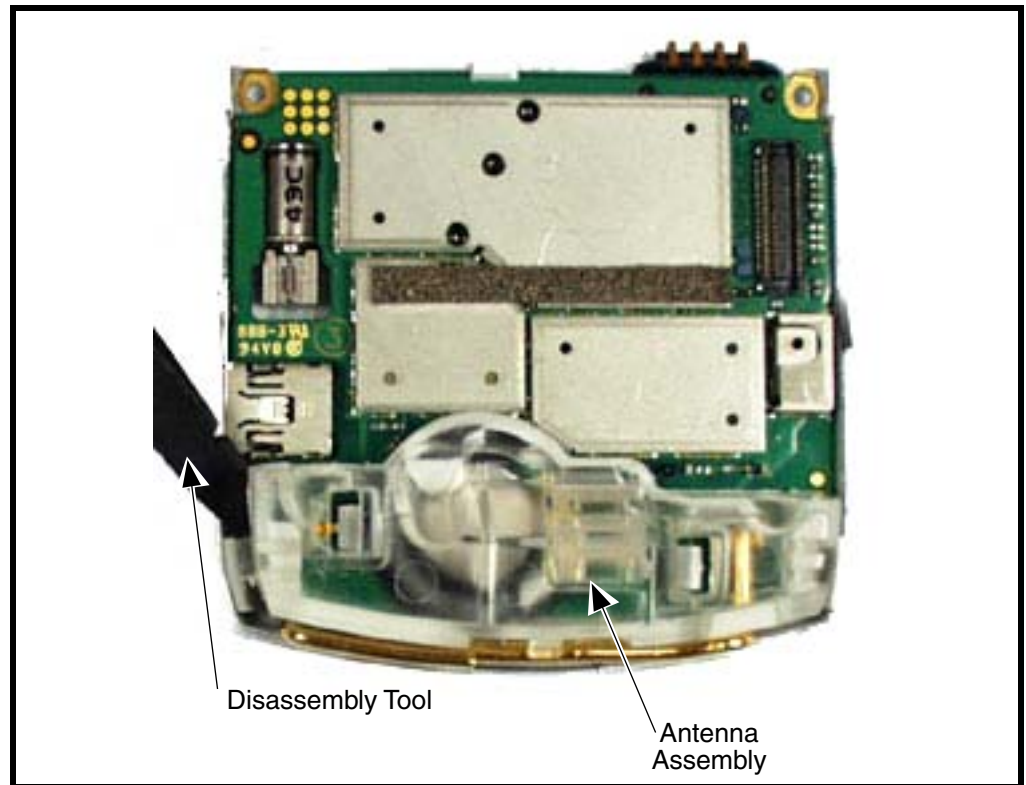


Figure 8. Removing the Antenna Grommets

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



**Figure 9. Removing the Antenna Assembly**

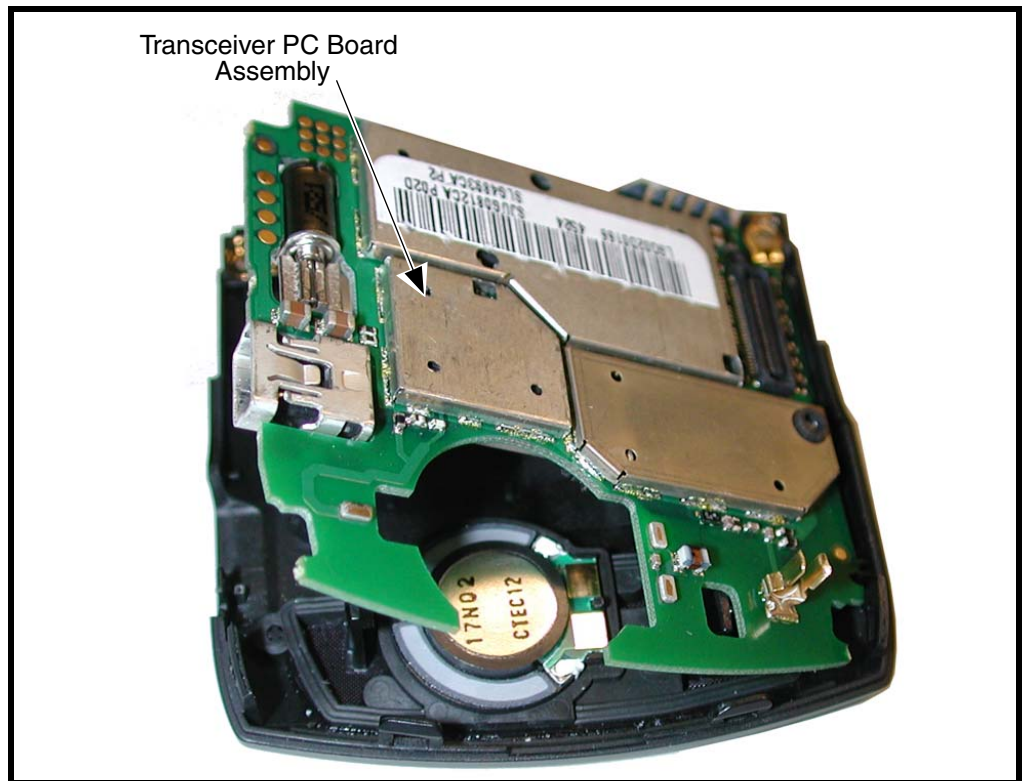
4. Carefully lift the antenna assembly away from the phone.
5. To replace, align the antenna assembly to the phone.
6. Carefully press the antenna assembly into position until the antenna assembly latches snap into position.
7. Reinstall the rubber antenna assembly grommets into their slots. Each antenna grommet is uniquely shaped to fit into its respective position.
8. Replace the rear housing assembly, SIM, battery and battery cover as described in the procedures.

## Removing and Replacing the Transceiver Board Assembly



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

1. Remove the battery cover, battery, SIM, antenna, rear housing and battery tray as described in the procedures.
2. Lift the transceiver board assembly out of the front housing with the metal tweezers. See Figure 10.



**Figure 10. Removing the Transceiver PC board Assembly**

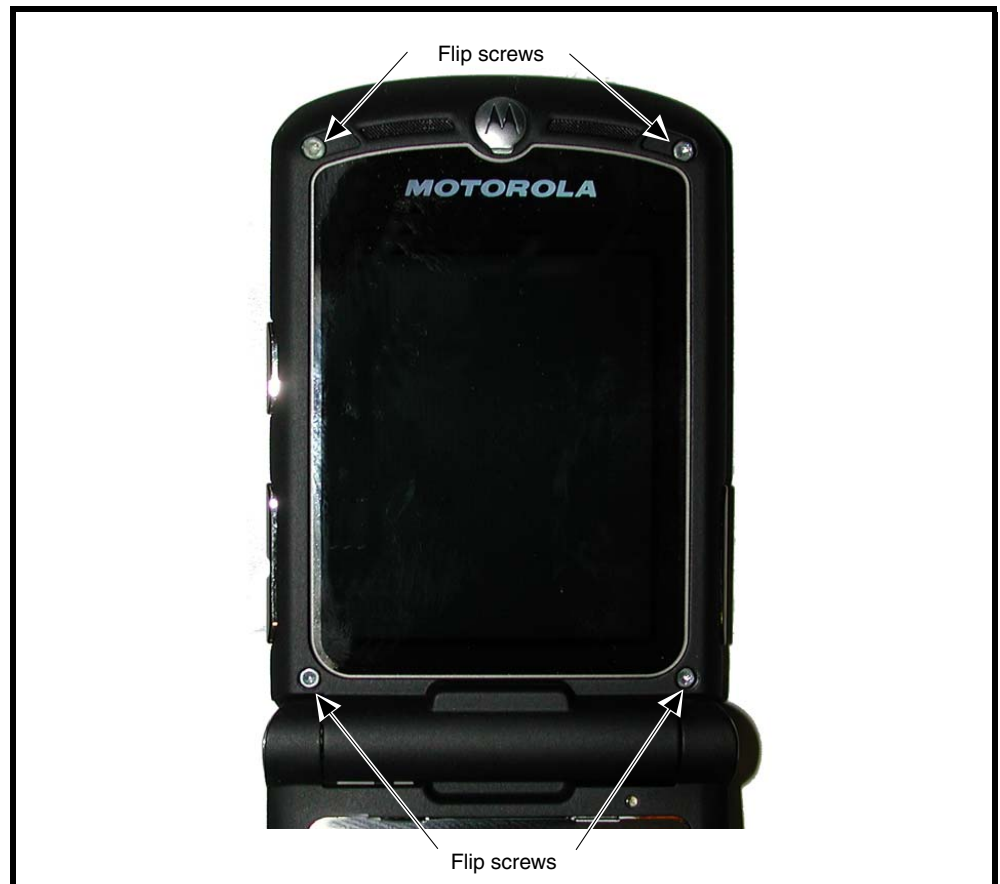
0511130

3. To replace, insert the transceiver board assembly into the rear housing.
4. Carefully and gently press the transceiver board into position and until it snaps into place.
5. Replace the antenna assembly, rear housing, SIM, battery, and battery cover as described in the procedures.

---

## Removing and Replacing the Flip Assembly Cover

1. Remove the battery cover, battery, SIM, antenna, 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 T5 screws from the flip assembly (see Figure 11). Retain the screws for re-assembly.



051128o

**Figure 11. Removing the Flip Assembly Screws**

4. Before removing the flip cover, note the locations of the smart buttons on the sides of the flip assembly.



5. Use the disassembly tool to gently pry off the flip cover (see Figure 12).



0511320

**Figure 12. Separating the Flip Assembly Cover**

6. Remove the smart buttons on the side of the flip assembly. Set them aside for reassembly.
7. Lift the flip cover away from the flip assembly. Be careful not to damage the display flex cable.
8. To replace, insert the smart buttons into the phone. Ensure the buttons contact their respective switches on the display assembly.
9. Align the flip cover to the flip assembly, gently press the flip cover onto the flip assembly until the flip cover latches engage.
10. Insert and tighten the 4 screws to secure the flip cover to the flip assembly. Avoid damage to the flex cable.
11. Insert the 4 rubber screw covers over the flip assembly screws.
12. Replace the transceiver board assembly, rear housing, antenna assembly, SIM, battery, and battery cover as described in the procedures.

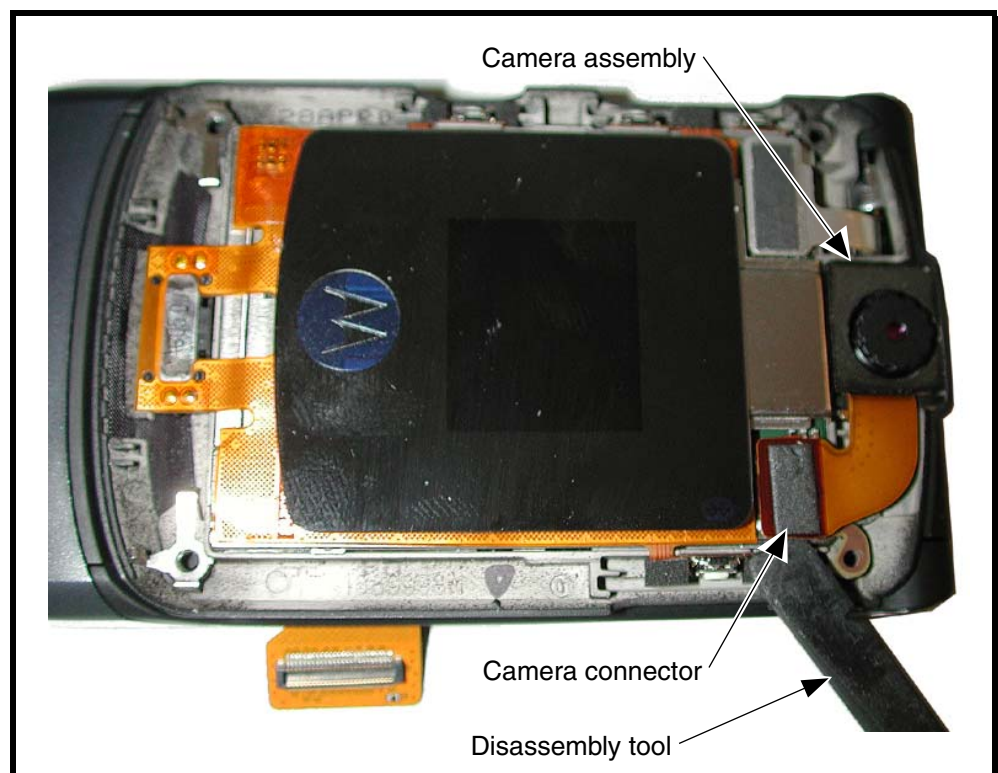
## Removing and Replacing the Camera Assembly

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



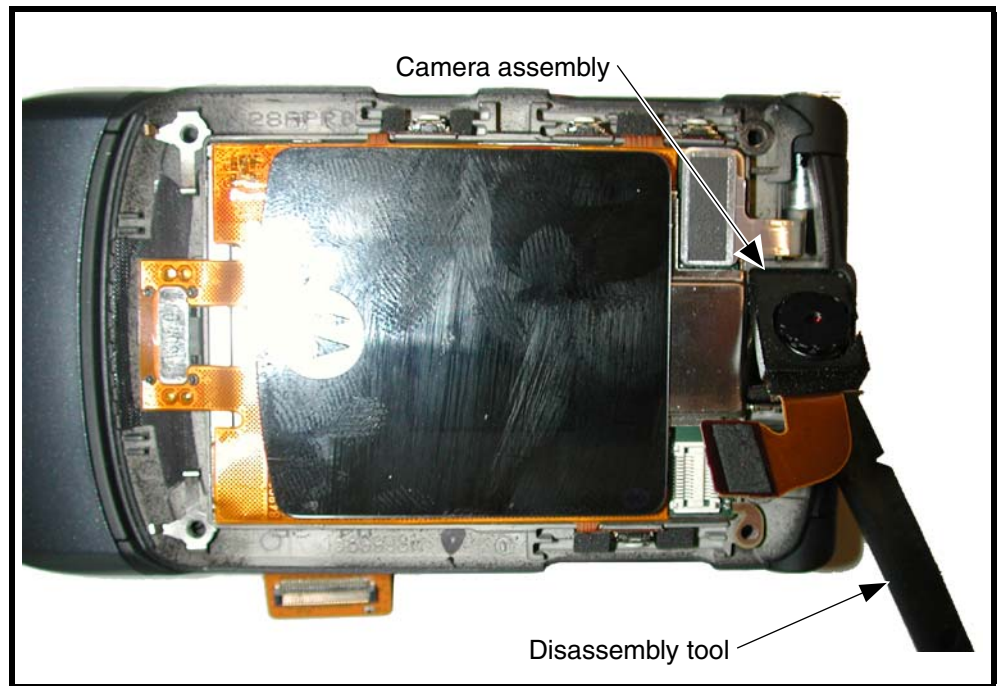
*The flexible printed cable (FPC) (flex) is easily damaged. Exercise extreme care when handling.*

2. Use the disassembly tool to unseat the camera connector from the camera connector socket.



**Figure 13. Camera Assembly Removal**

- Carefully lift the camera assembly and flex out of the flip assembly (see Figure 13).



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**Figure 14. Camera Assembly Removal**

- To replace, carefully press the camera assembly into its slot in the flip assembly.
- Carefully and firmly seat the camera connector into the camera connector socket on the flip assembly. Avoid damage to the camera flex cable.
- Replace the flip assembly cover, transceiver board, rear housing, antenna, SIM, battery, and battery cover as described in the procedures.

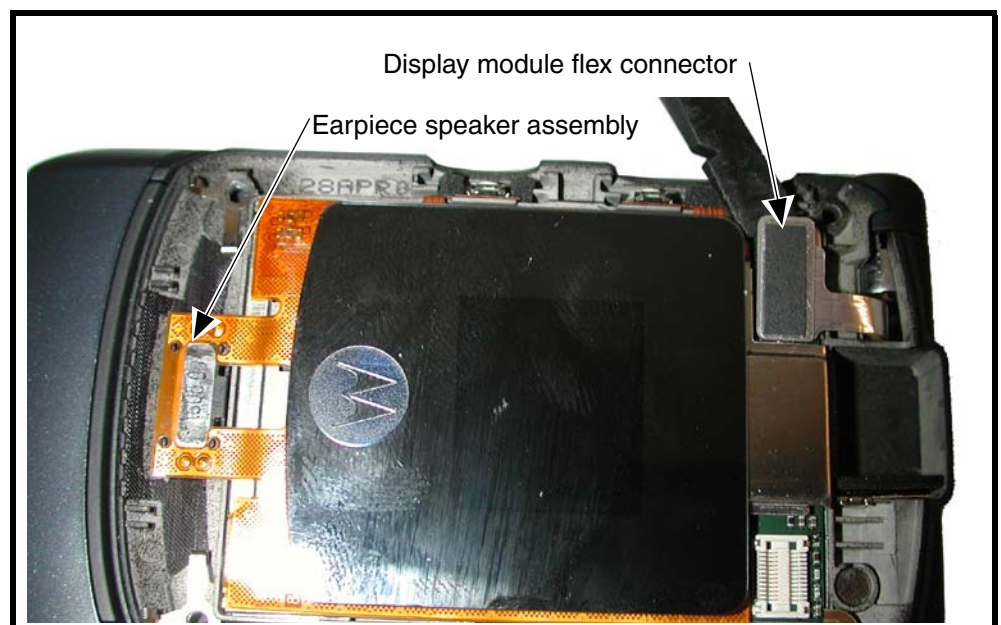
## Removing and Replacing the Display Module Assembly

1. Remove the battery cover, battery, SIM, rear housing, antenna, transceiver board assembly, flip assembly cover, 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 15).

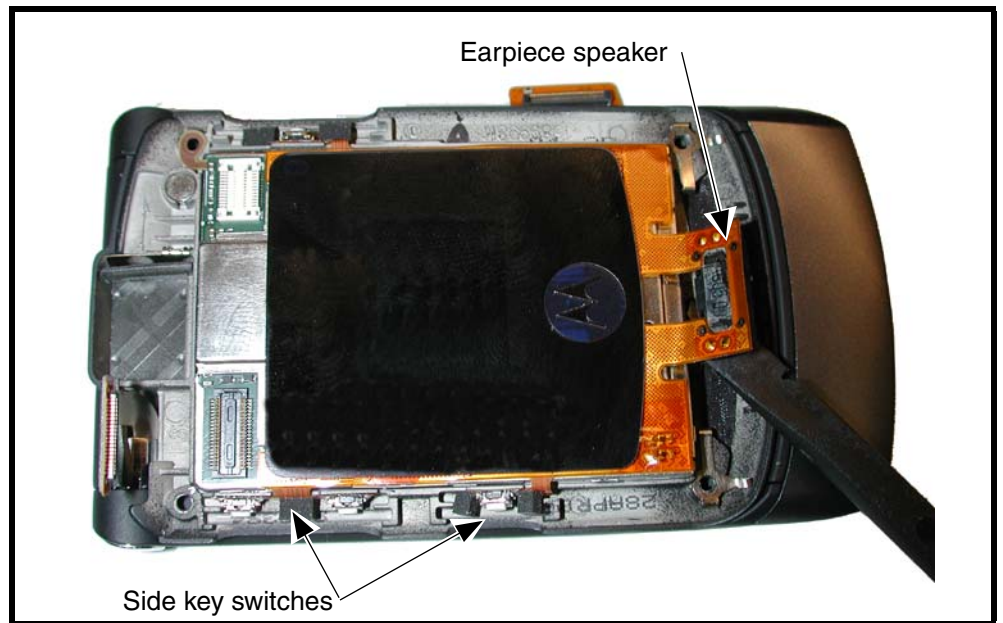


**Figure 15. Display Module Assembly Flex Connector**



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

3. Use the disassembly tool to pry the earpiece speaker off of the flip assembly (see Figure 16).

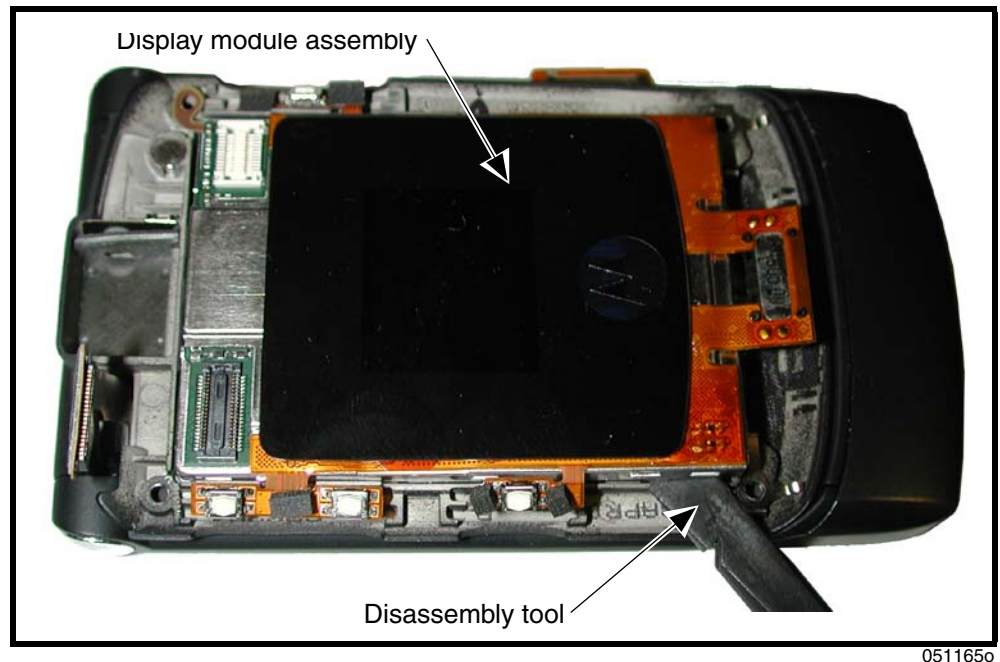


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**Figure 16. Earpiece Speaker and Side Key Switch Flex Cables**

4. Carefully pry the side key switches away from the flip assembly (see Figure 15).

- Carefully and gently lift one corner of the display module assembly out of the flip assembly.



**Figure 17. Display Module Assembly Removal**

- Avoid damage to the electrical components on the flex while carefully removing the display module assembly from the flip assembly.
- Carefully lift the display lens away from the flip assembly.
- To replace, align the display module assembly to the flip assembly.
- Carefully lower the display module into the flip assembly. Ensure that none of the display assembly components are damaged.
- Align the flip display flex to the flex connector on the flip display assembly and gently press down on the flex connector until properly seated.
- Replace the camera assembly, flip assembly cover, transceiver board, rear housing, antenna, SIM, battery, and battery cover as described in the procedures.

## Removing and Replacing the CLI Lens

1. Remove the battery cover, battery, SIM, rear housing, antenna, transceiver board assembly, flip assembly cover as described in the procedures.
2. Heat the CLI lens to a temperature of 100°C (212° F) for 20 seconds.

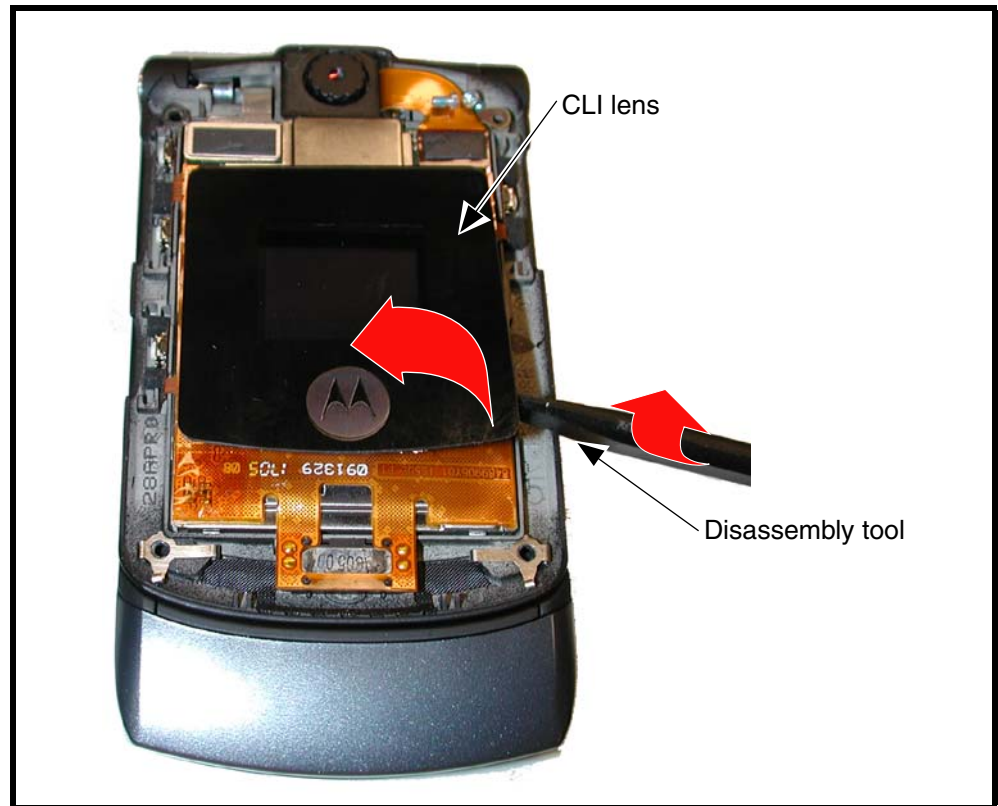


Figure 18. CLI Lens Removal

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3. Slide the flat end of the plastic disassembly tool, between the lens and the metal frame.

4. Slowly rotate the plastic disassembly tool by 90°.



051851o

5. Carefully lift up the CLI Lens from the display module assembly.
6. Carefully use the plastic tool remove any remaining glue.



Do not use any kind of liquid or spray to remove the remaining glue.



# 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 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. V3i telephones use TrueSync® synchronization software to effect a personality transfer.

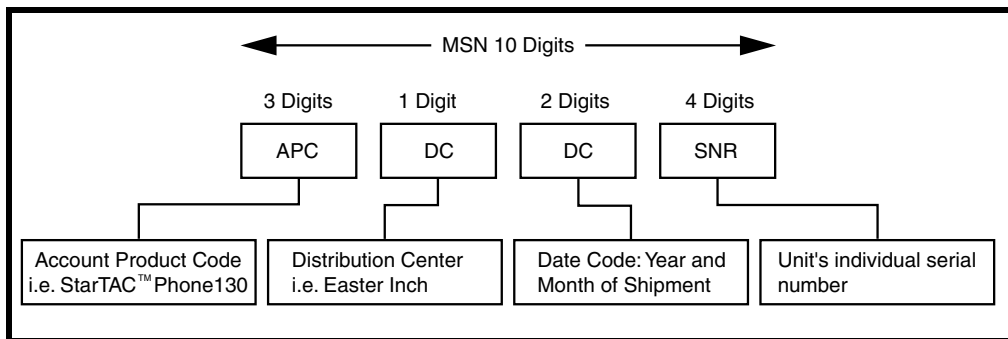
## Identification

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 20.



000807a

Figure 20. 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.

# Troubleshooting

## Manual Test Mode

Motorola V3i telephones are equipped with a manual test mode capability. This allows service personnel to verify functionality and perform fault isolation by entering keypad commands.

To enter the manual test command mode, a GSM / DCS test SIM must be used.

1. Press  to turn the phone OFF.
2. Remove the battery as described in the procedures.
3. Remove the customer's SIM card from the phone as described in the procedures.
4. Insert the test SIM into the SIM slot.
5. Replace the battery as described in the procedures.
6. Press  to turn the phone ON.

## Manual Test Mode Commands

**Table 3. Manual Test Commands**

| Key Sequence  | Test Function/Name     | Remarks                               |
|---------------|------------------------|---------------------------------------|
| <Menu>048263* | Enter manual test mode |                                       |
| "End" Key     | Exit manual test mode  |                                       |
| 54*           | Suspend                | Required for all Test Mode Operations |
| 0*0*0         | Select tone 0          |                                       |
| 0*0*1         | Select tone 1          |                                       |
| 0*0*2         | Select tone 2          |                                       |
| 0*0*3         | Select tone 3          |                                       |
| 0*0*4         | Select tone 4          |                                       |
| 0*0*5         | Select tone 5          |                                       |
| 0*0*6         | Select tone 6          |                                       |
| 0*0*7         | Select tone 7          |                                       |
| 0*0*8         | Select tone 8          |                                       |
| 0*0*9         | Select tone 9          |                                       |
| 0*1*X         | Disable tone X         |                                       |
| 3*0*1         | Enable vibrator        |                                       |
| 3*0*0         | Disable vibrator       |                                       |
| 5*0*0         | Set audio level 0      |                                       |
| 5*0*1         | Set audio level 1      |                                       |
| 5*0*2         | Set audio level 2      |                                       |
| 5*0*3         | Set audio level 3      |                                       |
| 5*0*4         | Set audio level 4      |                                       |
| 5*0*5         | Set audio level 5      |                                       |
| 5*0*6         | Set audio level 6      |                                       |
| 5*0*7         | Set audio level 7      |                                       |

**Table 3. Manual Test Commands (Continued)**

| Key Sequence                                                 | Test Function/Name                                         | Remarks                         |
|--------------------------------------------------------------|------------------------------------------------------------|---------------------------------|
| 5*0*8                                                        | Set audio level 8                                          |                                 |
| 5*0*9                                                        | Set audio level 9                                          |                                 |
| 5*0*10                                                       | Set audio level 10                                         |                                 |
| 5*0*11                                                       | Set audio level 11                                         |                                 |
| 5*0*12                                                       | Set audio level 12                                         |                                 |
| 5*0*13                                                       | Set audio level 13                                         |                                 |
| 5*0*14                                                       | Set audio level 14                                         |                                 |
| 5*0*15                                                       | Set audio level 15                                         |                                 |
| 6*2*2*0*0                                                    | Set Audio Path. Int Mic, IntSpk, RX unmute, TX unmute      |                                 |
| 6*4*6*0*0                                                    | Set Audio Path. Boom Mic, Boom Spk, RX unmute, TX unmute   |                                 |
| 10*0*3                                                       | Set band GSM 900                                           |                                 |
| 10*0*4                                                       | Set band DCS 1800                                          |                                 |
| 10*0*5                                                       |                                                            |                                 |
| 10*0*6                                                       | Set dual band GSM 900 / 1800                               |                                 |
| 10*1*0                                                       | Read band                                                  | 3= GSM 4= DCS 5= PCS 6 =GSM/DCS |
| 18*0                                                         | Initialize non-volatile memory (Master Reset)              |                                 |
| 18*1                                                         | Initialize non-volatile memory (Master Clear)              |                                 |
| 55*2*001                                                     | Test Display. All pixels ON                                |                                 |
| 55*2*000                                                     | Test Display. All pixels OFF                               |                                 |
| 55*2*002                                                     | Test Display. Checkerboard pattern A                       |                                 |
| 55*2*003                                                     | Test Display. Checkerboard pattern B                       |                                 |
| 55*2*004                                                     | Test Display. Border pixels ON                             |                                 |
| *#06#                                                        | IMEI Check                                                 | No Test Mode Required           |
| Phone Set up --><br>Phone Status --><br>Other<br>Information | Flex Version / Technology / S-W Version / Readiness Status | No Test Mode Required           |

## Troubleshooting Chart

Table 4. Level 1 and 2 Troubleshooting Chart

| SYMPTOM                                                                                                                 | PROBABLE CAUSE                             | VERIFICATION AND REMEDY                                                                                                                                                                                                                                                                                                                        |
|-------------------------------------------------------------------------------------------------------------------------|--------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1. Telephone will not turn on or stay on.                                                                               | a) Battery either discharged or defective. | Measure battery voltage across a 50 ohm (>1 Watt) load. If the battery voltage is <3.25 Vdc, recharge the battery using the appropriate battery charger. If the battery will not recharge, replace the battery. If battery is not at fault, proceed to b.                                                                                      |
|                                                                                                                         | b) Battery connectors open or misaligned.  | Visually inspect the battery connectors on both the battery and the telephone. Realign and, if necessary, either replace the battery or refer to a Level 3 Service Center for the battery connector replacement. If battery connectors are not at fault, proceed to c.                                                                         |
|                                                                                                                         | c) Transceiver board assembly defective.   | Remove the transceiver board assembly. Substitute a known good assembly and temporarily reassemble the unit. Press and hold the PWR button; if unit turns on and stays on, disconnect the dc power source and reassemble the telephone with the new transceiver board assembly. Verify that the fault has been cleared.                        |
| 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 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.   | 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 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) 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.                                                                                                                                                                                  |

**Table 4. 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.                        | 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 or transflash memory card.                                                                                                  | a) SIM or transflash memory card defective.                     | Check the SIM or transflash memory card contacts for dirt. Clean if necessary and check if fault has been cleared. If the contacts are clean, insert a known good SIM or transflash memory card into the telephone. Power up the unit and confirm that the SIM or transflash memory card has been accepted. If the fault no longer exists, replace the defective SIM or transflash memory card. If the SIM or transflash is not at fault, 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.                                                                                                                                                                                                                                                                                           |
| 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 the unit with the new transceiver board assembly.                                                                                                                                                                                                                                                                                           |
| 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 the unit 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 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.                                                                                                                                                                                                                                                                                                                                                                                              |

## Programming: Software Upgrade and Flexing

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

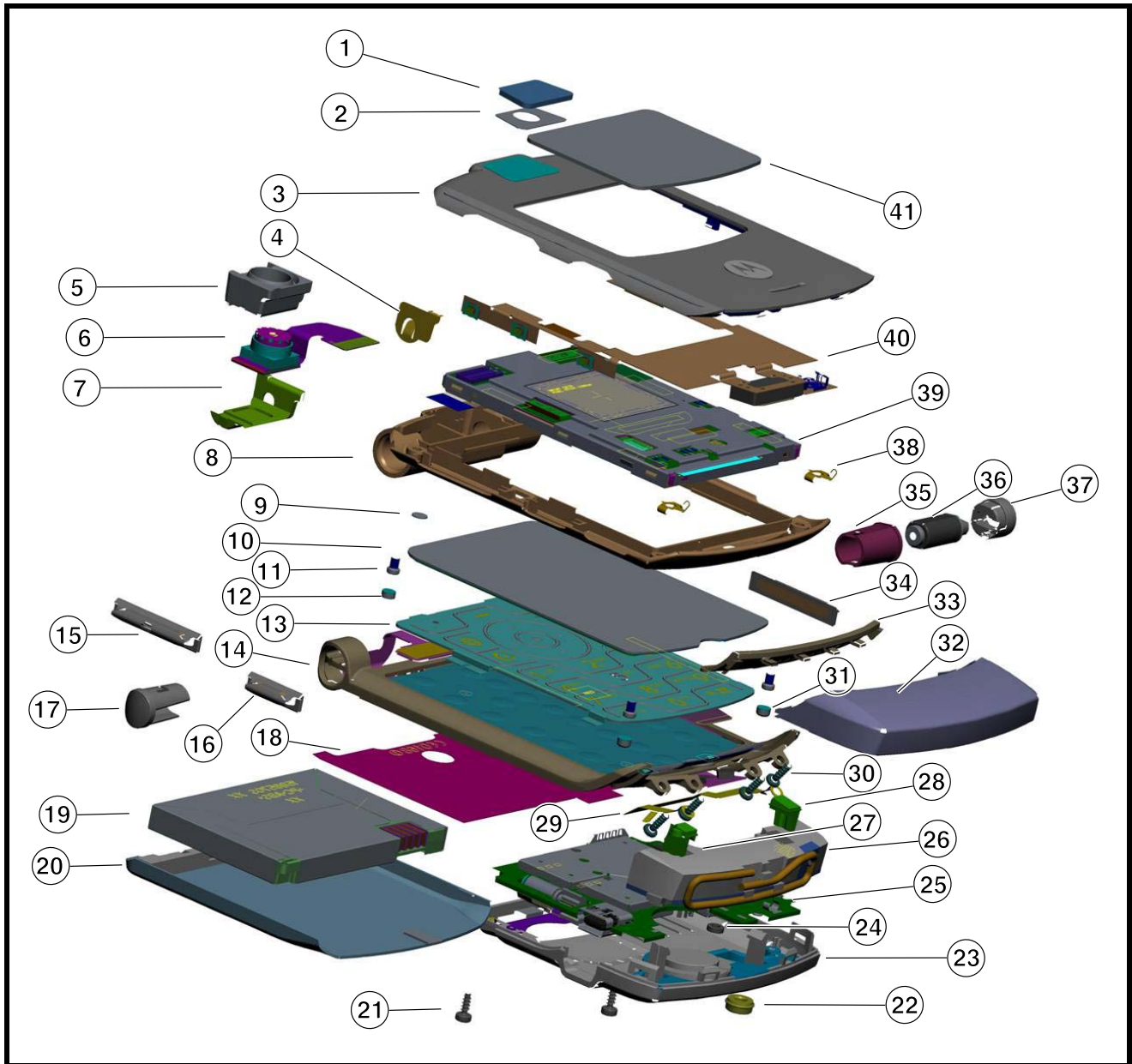
The following information is provided as a reference for the parts associated with V3i telephones.

## Related Publications

Motorola V3i User's Guide, English

68XXXXX103

### Exploded View Diagram



051483o

Figure 21. Exploded View Diagram



## Exploded View Parts List

Table 5. Exploded View Parts List

| Item Number | Part Number              | Description                                                       |
|-------------|--------------------------|-------------------------------------------------------------------|
| 1           | 6190019N03               | Camera Lens                                                       |
| 2           | 3287378Y02               | Camera Gasket                                                     |
| 3           | 079000N05<br>079000N06   | Flip Outer, Ass'y Silver<br>Flip Outer Ass'y Black                |
| 4           | 4289441Y01               | Flip Inner Ground Clip                                            |
| 5           | 0590033N01               | Upper Camera Grommet                                              |
| 6           | 8489891Y01               | Camera Module                                                     |
| 7           | 0587343Y02               | Lower Camera Grommet                                              |
| 8           | 1589880Y02               | Flip Inner Housing                                                |
| 9           | 5471536C01               | Water Detect label (x2)                                           |
| 10          | 3287306Y03               | Main Lens                                                         |
| 11          | 0387726M02               | Screws, Flip Inner (x4)                                           |
| 12          | 3890022N01<br>3890022N03 | Flip Bumper Knuckle (x2) Silver<br>Flip Bumper Knuckle (x2) Black |
| 13          | 3888182Y03               | Keypad                                                            |
| 14          | 1590044N03<br>1590044N07 | Front Housing w/K-Flex Silver<br>Front Housing w/K-Flex Black     |
| 15          | 3890012N01               | Side Button, Volume                                               |
| 16          | 3890013N01               | Side Button, Smart                                                |
| 17          | 1589126Y01               | End Cap Shaft                                                     |
| 18          | 1487942Y02               | Battery Insulator                                                 |
| 19          | SNN5696A                 | Battery                                                           |
| 20          | SHN8739A<br>SHN8962A     | Battery Door, Ass'y Silver<br>Battery Door, Ass'y Black           |

| Item Number | Part Number              | Description                                                 |
|-------------|--------------------------|-------------------------------------------------------------|
| 21          | 0387473K07               | Flip Xcvr Screws (x2)                                       |
| 22          | 0590070N01<br>0590070N02 | RF Grommet Silver<br>RF Grommet Black                       |
| 23          | 1590048N05<br>1590048N06 | Rear Housing, Ass'y Silver<br>Rear Housing, Ass'y Black     |
| 24          | 3587505Y01               | Microphone Screen                                           |
| 25          | SLG5007AA                | PCB Ass'y                                                   |
| 26          | 1590051N03               | Antenna Ass'y                                               |
| 27          | 3887388Y01               | Antenna Bladder Plug Left                                   |
| 28          | 3887389Y01               | Antenna Bladder Plug Right                                  |
| 29          | 3988406Y01               | Grounding Boot Strap                                        |
| 30          | 0387347Y01               | PT Pan Head Screws (x4)                                     |
| 31          | 3890023N02<br>3890023N03 | Flip Bumper Nose (x2) Silver<br>Flip Bumper Nose (x2) Black |
| 32          | 1587371Y01<br>1587371Y02 | Front Antenna Cover Silver<br>Front Antenna Cover Black     |
| 33          | 1587373Y01<br>1587373Y02 | Antenna Grill Silver<br>Antenna Grill Black                 |
| 34          | 3890014N01               | Side Button, Carrier                                        |
| 35          | 1589127Y01               | End Cap, Hinge                                              |
| 36          | 5590242N02               | Hinge Ass'y                                                 |
| 37          | 1587510Y01               | Hinge Sleeve                                                |
| 38          | 3987941Y01               | Flip Ground Contact (x2)                                    |
| 39          | 7290086N02               | Display Module                                              |
| 40          | 8490007N02               | Personality Flex                                            |
| 41          | 6190015N02               | CLI Lens                                                    |

To order parts please use the following Link:

[https://wissc.motorola.com/wissc\\_root/main/BrowserOK.html](https://wissc.motorola.com/wissc_root/main/BrowserOK.html)

(Password is Required)

For information on ordering parts please contact EMEA at + 49 461 803 2690.



*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

**Table 6. Accessories**

| Part Description                                           | Part Number |
|------------------------------------------------------------|-------------|
| Headset, FM stereo radio                                   | SYN8609     |
| Headset, with send/end button                              | SYN8419     |
| Headset, retractable                                       | SYN8284     |
| Neckloop, hands-free (compatible with T-coil hearing aids) | SYN7875     |
| Holster                                                    | SYN8454     |
|                                                            |             |

**A**

alert setting indicator 17  
alert settings 18  
antenna, removing and replacing 29

**B**

battery  
    function 18  
    gauge 18  
    removing 22  
battery housing  
    removing 22  
battery level indicator 16

**C**

caller ID 13  
camera assembly, removing and replacing 34  
Canadian Interference-Causing Equipment regulations 5  
changes  
    product 5  
CLI lens, removing and replacing 39  
commands, manual test mode 43  
conventions 7  
copyrights  
    computer software 6

**D**

disassembly 22

**E**

exploded view diagram 48  
exploded view parts list 49

**F**

FCC rules 5  
features  
    caller ID 13  
    SIM Toolkit 12  
    text entry 13  
    voice recognition 12  
    Wireless Access Protocol (WAP) 12  
features, product 11  
flip assembly, removing and replacing 32  
flip display module assembly, removing and replacing 36

**I**

identification 41

international mobile station equipment identity 42  
mechanical serial number 41  
product 5

IMEI 42

in use indicator 16

indicators

    alert setting 17  
    battery level 16  
    in use 16  
    menu 17  
    message waiting 16  
    roam 16  
    signal strength 16  
    voice message waiting 16

Introduction 5

**M**

manual test mode 43  
menu  
    structure diagram 18  
menu indicator 17  
message waiting indicator 16  
MSN 41

**N**

names  
    product 5

**O**

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

**P**

part numbers  
    accessories 50  
parts 47  
    exploded view diagram 48  
    exploded view parts list 49  
product  
    changes 5  
    identification 5  
    names 5  
publications, related 47

**R**

rear housing

---

- removing 26
- regulatory agency compliance 5
- related publications 47
- removing
  - antenna 29
  - battery 19, 22
  - battery housing 22
  - camera assembly 34
  - CLI lens 39
  - flip assembly 32
  - flip display module assembly cover 36
  - rear housing 26
  - SIM 24
  - transceiver board assembly 31
  - TransFlash Memory Module 25
- replacement parts
  - contact information 8
- replacing
  - antenna 29
  - battery 22
  - camera assembly 34
  - CLI lens 39
  - flip assembly 32
  - flip display module assembly 36
  - rear housing 26
  - SIM 24
  - transceiver board assembly 31
  - TransFlash Memory Module 25
- roam indicator 16

## S

- serial number
  - mechanical 41
- 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 19
- signal strength indicator 16
- SIM Application Toolkit 12
- SIM card 41
  - personality transfer 41
  - replacing 24

- SIM, removing and replacing 24
- specifications 9
- support
  - customer 7
  - product 7

## T

- text entry 13
- tools and test equipment 21
- transceiver board assembly, removing and replacing 31
- TransFlash Memory Module, removing and replacing 25
- troubleshooting 43
  - manual test mode 43
  - manual test mode commands 43

## U

- user interface diagrams 18

## V

- voice message waiting indicator 16
- voice recognition 12

## W

- warranty service 7
- wireless access protocol (WAP) 12



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



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