MOTOROLA

V235

Digital Wireless Telephone

GSM 850/900/1800/1900 MHz GPRS

Contents

Introduction

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

Available on a contract basis, Motorola Inc. offers comprehensive maintenance and installation programs 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 V235 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 V235 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 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.	**Outside U.S.A.**
Phone: 800-422-4210	Phone: 847-538-8023
FAX: 800-622-6210	FAX: 847-576-3023

Website: http://businessonline.motorola.com

EMEA

Phone: +49 461 803 1404

Website: http://emeaonline.motorola.com

Asia

Phone: +65 648 62995

Website: http://asiaonline.motorola.com

Specifications

General Function	Specification
Frequency Range GSM 850	824-848 MHz Tx 869-893 MHz Rx
Frequency Range GSM 900	880-915 MHz Tx (with EGSM) 925-960 MHZ Rx
Frequency Range DCS 1800	1710-1785 MHz Tx 1805-1880 MHz Rx
Frequency Range PCS 1900	1850-1910 MHz Tx 1930-1990 MHz Rx
Channel Spacing	200 kHz
Channels	174 EGSM, 374 DCS, 374 PCS, 124 GSM 850 carriers with 8 channels per carrier
Modulation	GMSK at BT = 0.3
Transmitter Phase Accuracy	5 Degrees RMS, 20 Degrees peak
Duplex Spacing	45 MHz
Frequency Stability	± 0.10 ppm of the downlink frequency (Rx)
Operating Voltage	+3.2V dc to +5.5V dc (battery) +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 810 mAh Li Ion battery	46.5 mm x 85.9 mm x 24.7 mm (1.83 inches x 3.38 inches x 0.97 inches)
Size (Volume)	82.4 cc (5.02 in^3), with battery
Weight	103.7 grams (3.78 oz), with battery
Battery Life, with standard 810 mAh Li-Ion Battery	Talk Time 240 to 480 minutes Standby time 190 to 290 hours 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 810 mAh capacity
Alert volume	Max 95 dB @5cm, 0.5 Watts input

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

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)
Bit Rate	13.0 kbps
Frame Duration	20 ms

Speech Coding Function	Specification
Block Length	260 bits
Classes	Class 1 bits = 182 bits; Class 2 bits = 78 bits
Bit Rate with FEC Encoding	22.8 kbps

Product Overview

Motorola V235 telephones are small and lightweight global system for mobile communications (GSM) general packet radio service (GPRS) transport technology, enhanced Date Rate for Global Evolution (EDGE) and wireless application protocol (WAP) mobile phones. The V235 phones incorporate a graphical user interface (GUI) for easier operation, allows multimedia message service (MMS) messaging, and includes personal information manager (PIM) functionality.

The V235 is quad-band designed phone that also allows roaming within the GSM 850/900/1800/1900 MHz bands or GSM 850/1800/1900 MHz band or GSM 900/1800/1900 MHz band depending on programming.

V235 telephones support GPRS, EDGE, and SMS in addition to traditional circuit switched transport technologies. The telephones have a clam form factor. They feature an externally viewable 96 x 32 pixel inverse video display for caller identification and date/time, an internal 128 x 160 pixel 65K CSFTN 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 810 mAh Lithium Ion (Li Ion) battery fits behind a removable back cover.

The phone accepts 3V mini subscriber identity module (SIM) cards which slide into the SIM holder underneath the battery. The antenna is a fixed stub type antenna. Inexpensive direct connection to a computer or handheld device via USB for data and fax calls, and for synchronizing phonebook entries with TrueSync® software, can be accomplished by using the optional USB data cable and soft modem.

Features

V235 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 (2U/4D) North America/ LATM markets
- GSM 850/1800/1900 MHz GPRS (2U/4D) EMEA markets
- GSM 900/1800/1900 MHz GPRS (2U4D) EMEA markets
- 65K CSTN Active Color Display
- MPEG4 Video
- 22 KHz polyphonic speaker w/ MP3, MIDI
- Downloadable themes (ringers, images, sounds)
- MotoMixer remixable Ring Tones
- External CLI Display
- Speaker Phone
- 'Real' music ringtones with MP3 & AAC
- PTT over cellular
- Up to 9MB embedded user memory
- Video capture & playback
- VGA camera with x4 zoom
- Picture and Instant Messaging with MMS & IM
- Carrier Dedicated keys
- Hands free speakerphone

- Picture Caller ID
- Multi character phonebook search

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.*

V235 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) 1.1 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 V235 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^{TM} - 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.*

General Operation

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

The V235 telephone's controls are located on the sides of the device and on the keypad. Indicators, in the form of icons, are displayed on the LCD (see Figure 2). V235 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 top and bottom of the phone. See Figure 1.
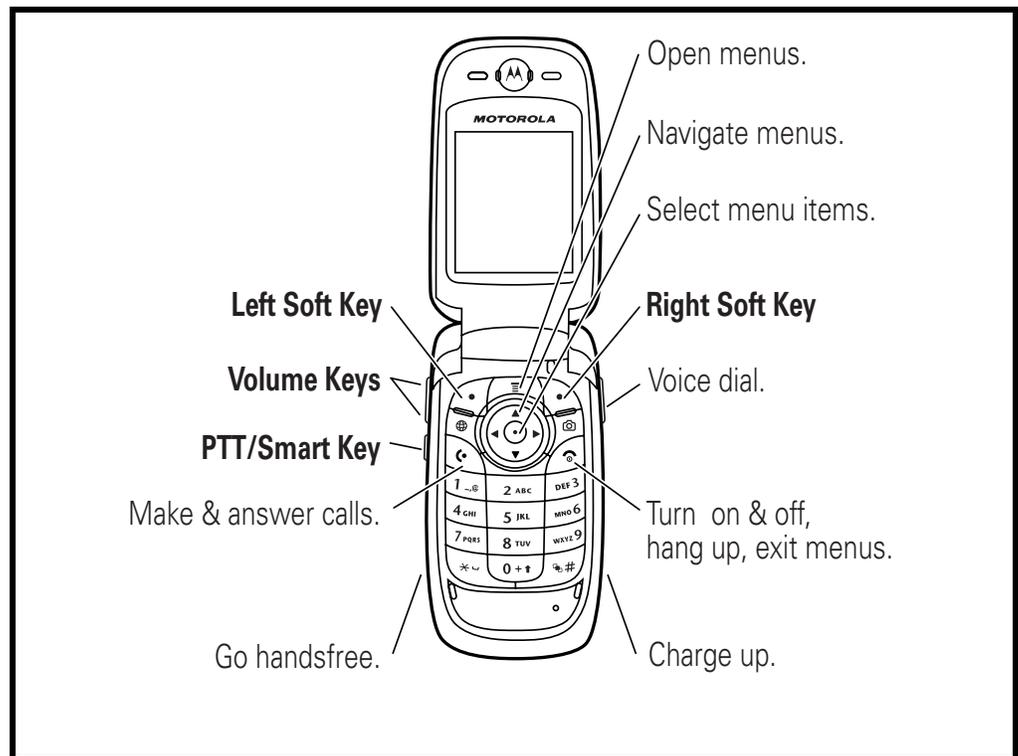

031935o

Figure 1. Controls, indicators, and I/O

"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.

Color Display

The V235 wireless phone features a 65k color CSTN Thin Film Transistor (TFT) 128 x 160 pixel display.The flip contains a 96x32 CLI display.

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 some common icons displayed on the LCD.
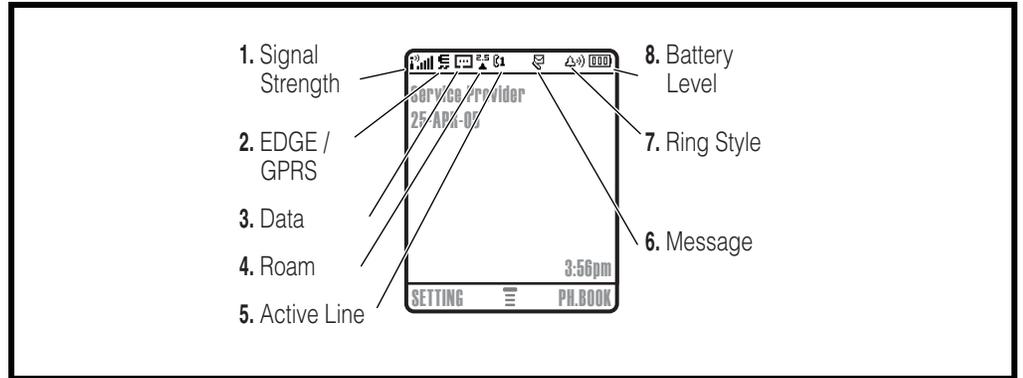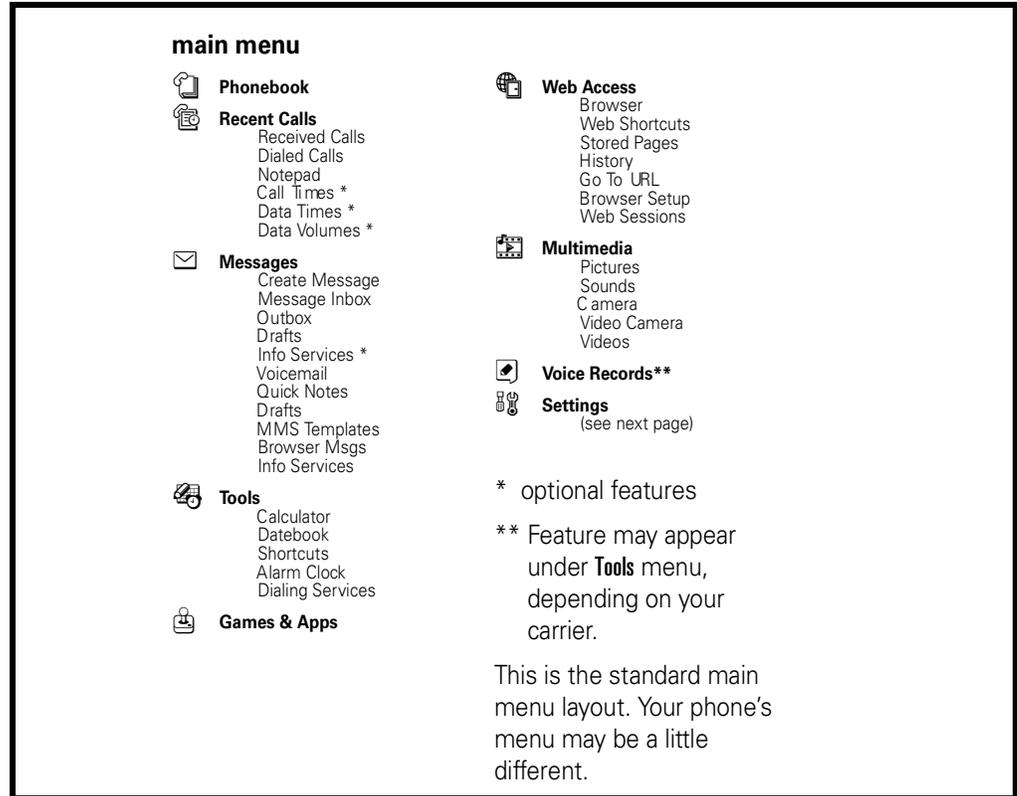

031939o

Figure 2. Icon Indicators

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

- **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**.[5] 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**.[5] Appears when the phone receives a text message. This is a network-dependent feature.
- **Voice Message Waiting Indicator**.[1] 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 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.

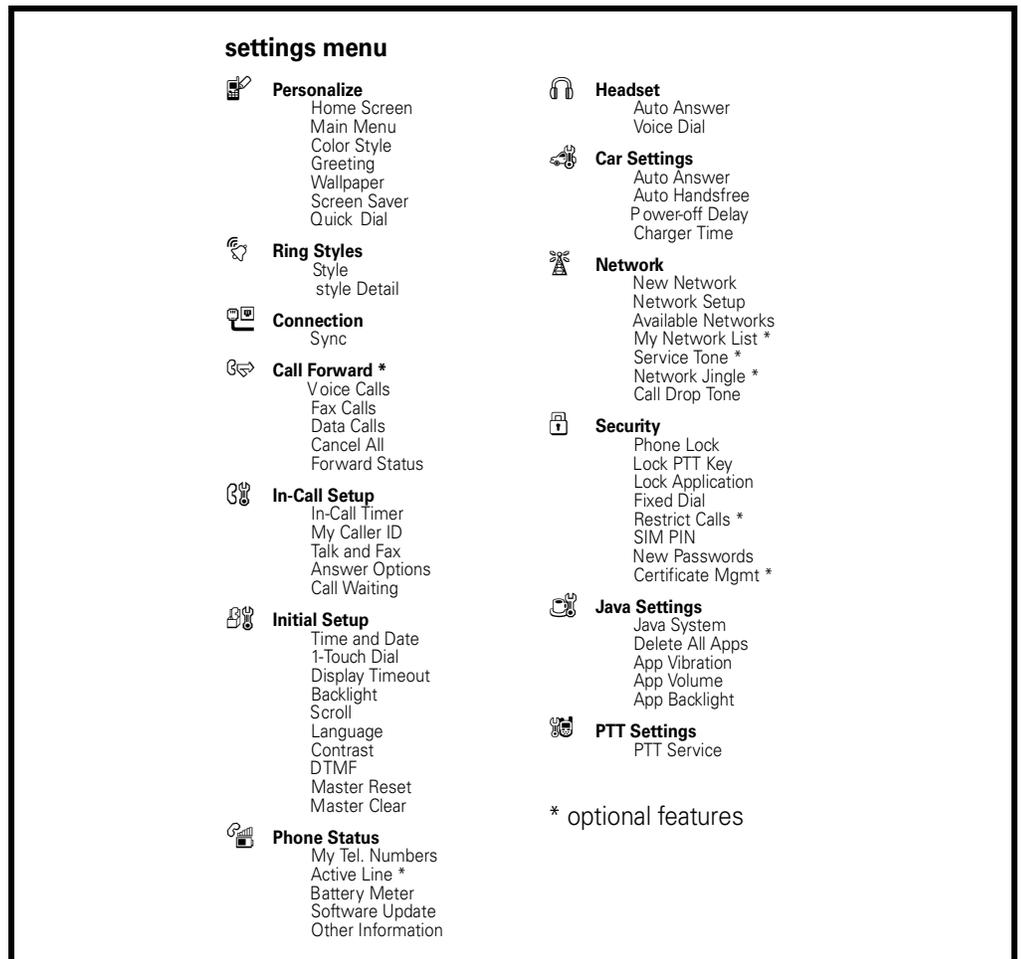1. Network, subscription and SIM card or service provider dependent feature. Not available in all areas.

User Interface Menu Structure

Figures 3 and 4 show the telephone menu structure.

Figure 3. Main Menu Structure

settings menu

Personalize
 Home Screen
 Main Menu
 Color Style
 Greeting
 Wallpaper
 Screen Saver
 Quick Dial

Ring Styles
 Style
 style Detail

Connection
 Sync

Call Forward *
 Voice Calls
 Fax Calls
 Data Calls
 Cancel All
 Forward Status

In-Call Setup
 In-Call Timer
 My Caller ID
 Talk and Fax
 Answer Options
 Call Waiting

Initial Setup
 Time and Date
 1-Touch Dial
 Display Timeout
 Backlight
 Scroll
 Language
 Contrast
 DTMF
 Master Reset
 Master Clear

Phone Status
 My Tel. Numbers
 Active Line *
 Battery Meter
 Software Update
 Other Information

Headset
 Auto Answer
 Voice Dial

Car Settings
 Auto Answer
 Auto Handsfree
 Power-off Delay
 Charger Time

Network
 New Network
 Network Setup
 Available Networks
 My Network List *
 Service Tone *
 Network Jingle *
 Call Drop Tone

Security
 Phone Lock
 Lock PTT Key
 Lock Application
 Fixed Dial
 Restrict Calls *
 SIM PIN
 New Passwords
 Certificate Mgmt *

Java Settings
 Java System
 Delete All Apps
 App Vibration
 App Volume
 App Backlight

PTT Settings
 PTT Service

* optional features

050470o

Figure 4. Settings Menu Structure

Alert Settings

V235 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.

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 V235 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
—	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 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[2]	Used to measure battery voltage

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 V235 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.

050541o
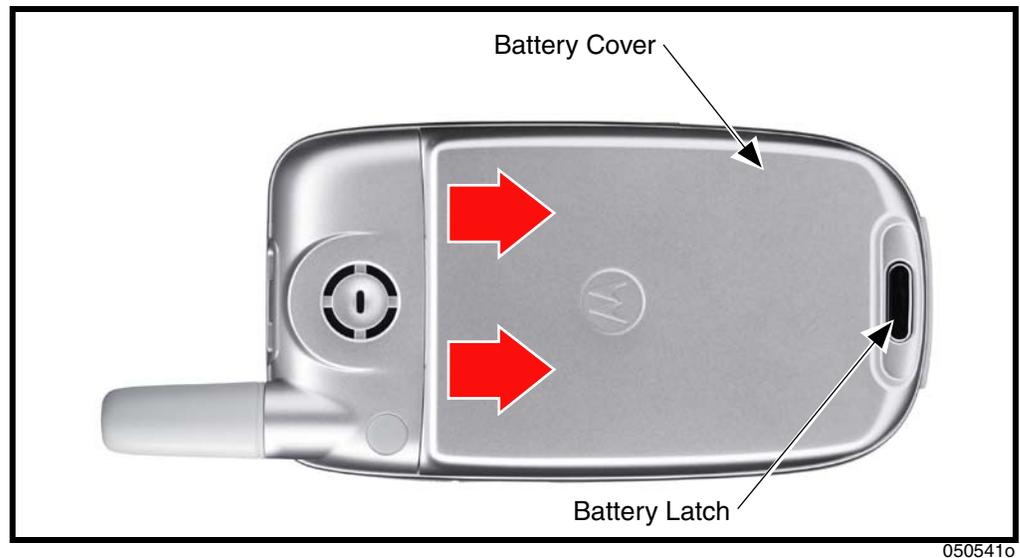
Figure 1. Removing the battery door

3. Slide the battery cover and lift it completely off the phone.
4. Lift the end of the battery up out of the phone.

5. Slide the battery away from antenna and lift away from phone. See Figure 2.
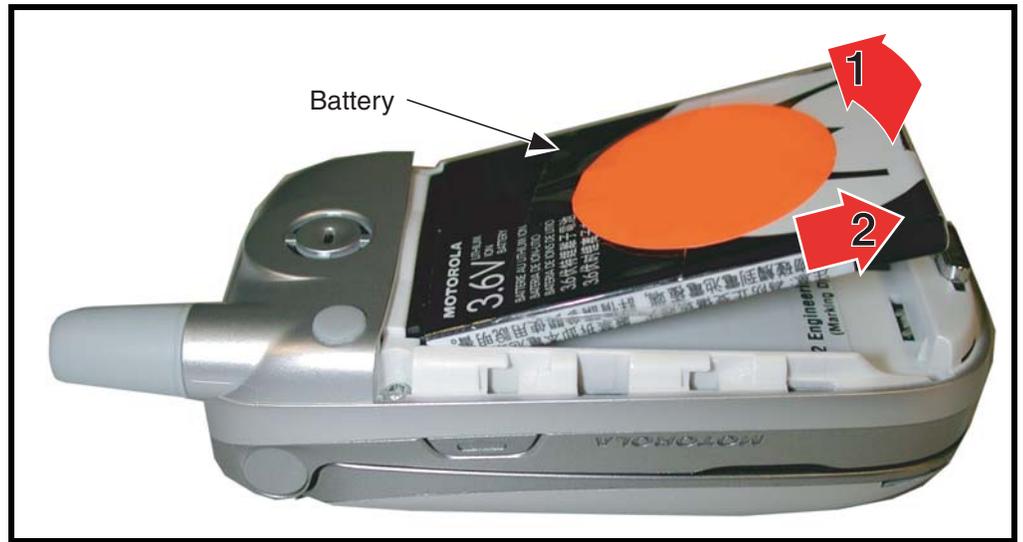

Figure 2. Removing the battery

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

6. To replace, Align the battery with the battery compartment so the contacts on the battery match the battery contacts in the phone.
7. Insert the top end of the battery near the antenna, into the battery compartment.
8. Insert the bottom end of the battery housing into the base of the phone.
9. Slide the battery cover onto the phone and snap it into place.

Removing and Replacing the Subscriber Identity Module (SIM)

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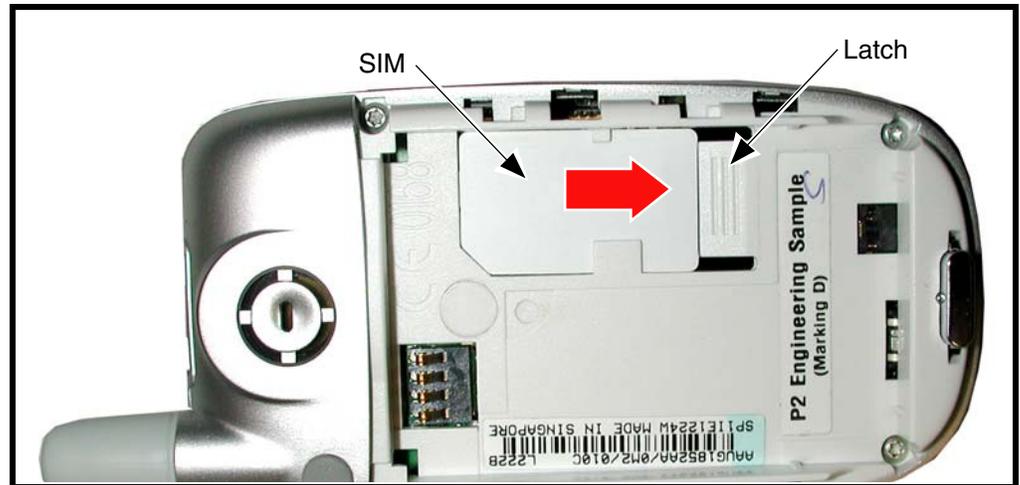
Figure 3. Removing the SIM

2.   Press down on the SIM latch. Slide the SIM out of its compartment as shown in Figure 3.
3.   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.   The SIM latch snaps into place when the SIM is fully inserted into the holder.
6.   Replace the battery and battery door as described in the procedures.

Removing and Replacing the Antenna

1. Remove the battery door and battery as described in the procedures.
2. Carefully insert the disassembly tool under the speaker cover to release the 4 latches that secure the speaker to the rear housing.
3. To remove the antenna, by hand, rotate the antenna counterclockwise until loose. See Figure 4.

050476o
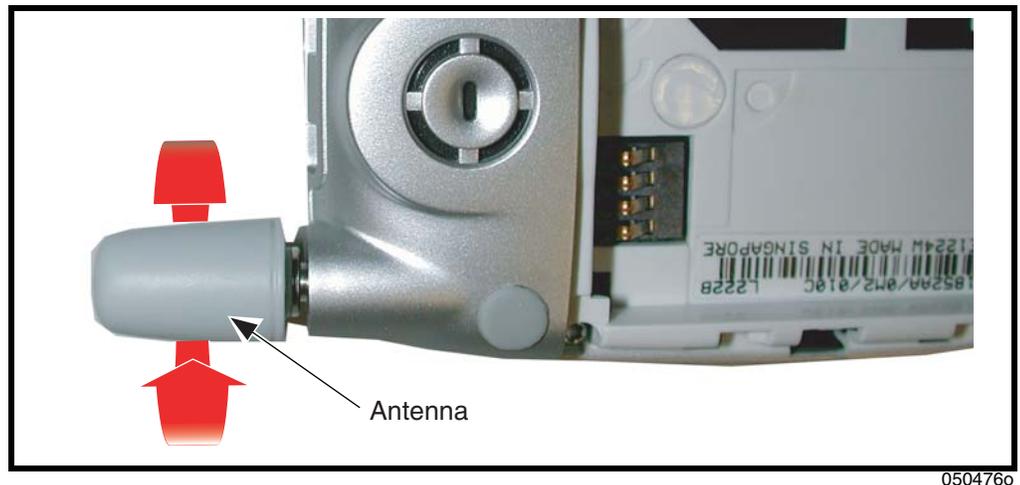
Figure 4. Removing the Antenna

4. 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 damage to the antenna or housing.*

5. 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.
6. 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.

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

2. Use the metal tweezers to remove the two rubber screw covers near the antenna. Retain the screw covers for reassembly.
3. Using a Torx driver with a T-6 bit, remove the 4 screws at each corner of the rear housing. Retain the screws for reassembly. See Figure 5.
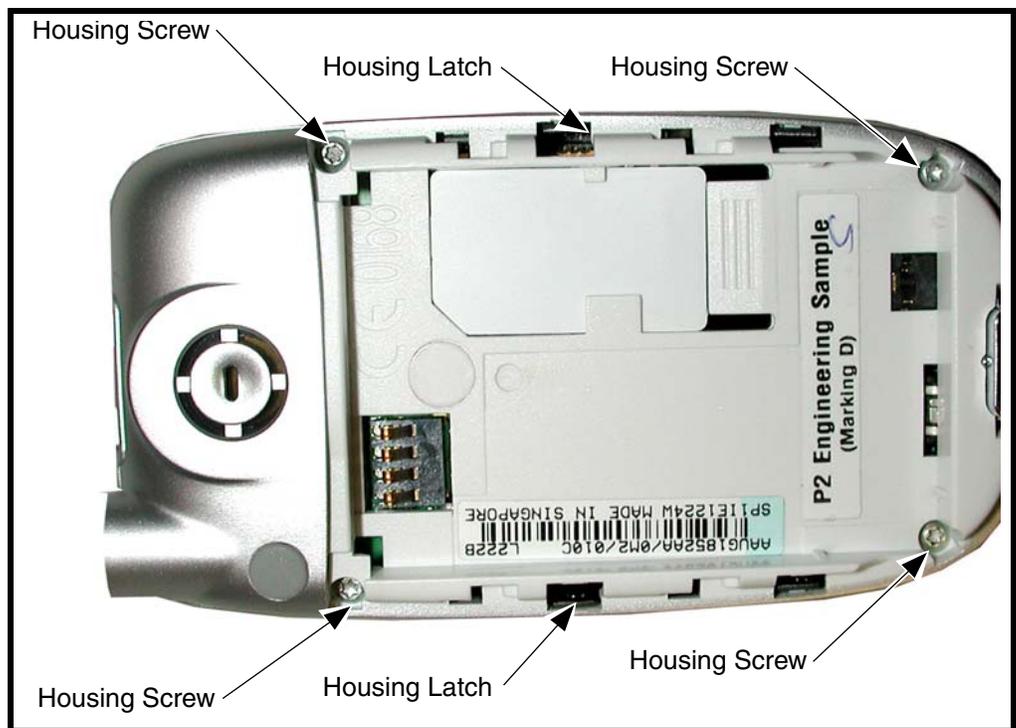
Figure 5. Removing the Rear Housing Screws

4. Release the two housing latches by inserting the pointed end of the plastic disassembly tool into the openings on the rear housing.

5. Carefully lift the rear housing away from the front housing and flip assembly.
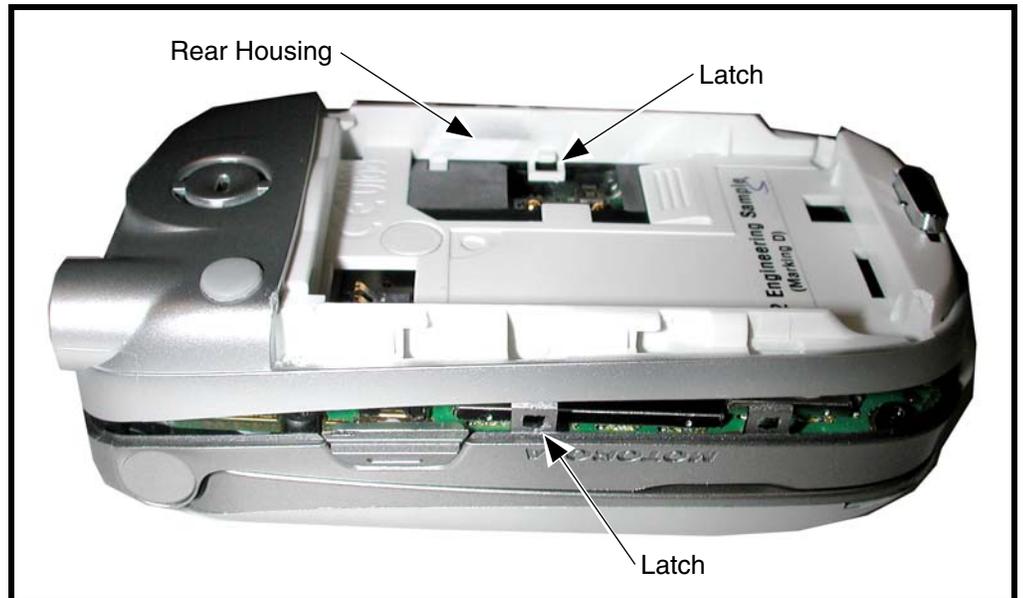
Figure 6. Removing the Rear Housing

6. To replace, carefully align the rear housing to the front housing and the flip assembly, then press the rear chassis assembly down until the 2 housing catches engage with the corresponding openings on the rear chassis assembly. Press the housings together until the catches snap into place.
7. Replace the 4 transceiver screws and tighten to a final torque setting of 16 Ncm or 1.5 inch pounds. 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 electrostatic discharge (ESD) and component damage.*

1. Remove the battery cover, battery, SIM, antenna, and rear housing as described in the procedures.
2. Use the plastic tweezers to lift the transceiver board gasket away from the transceiver board (see Figure 7) .
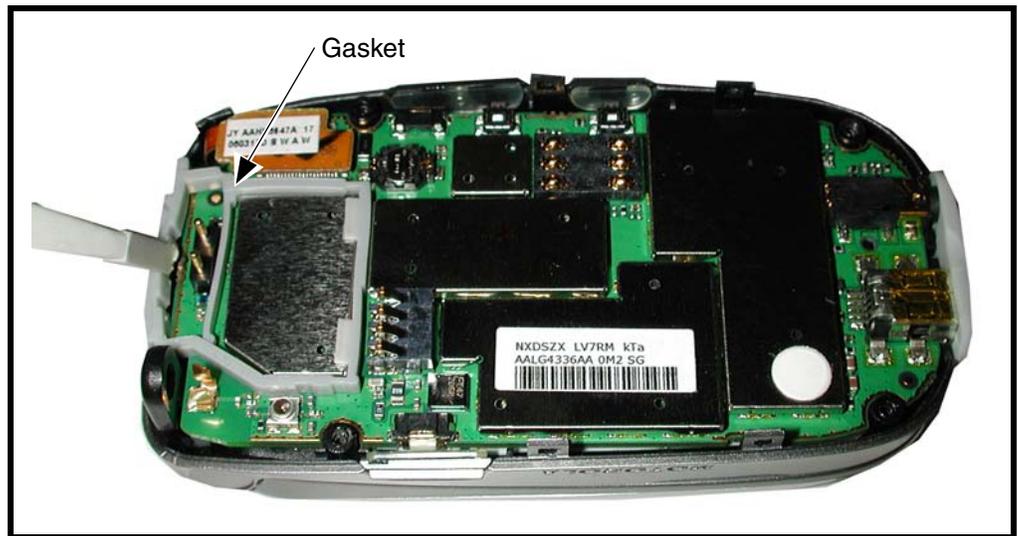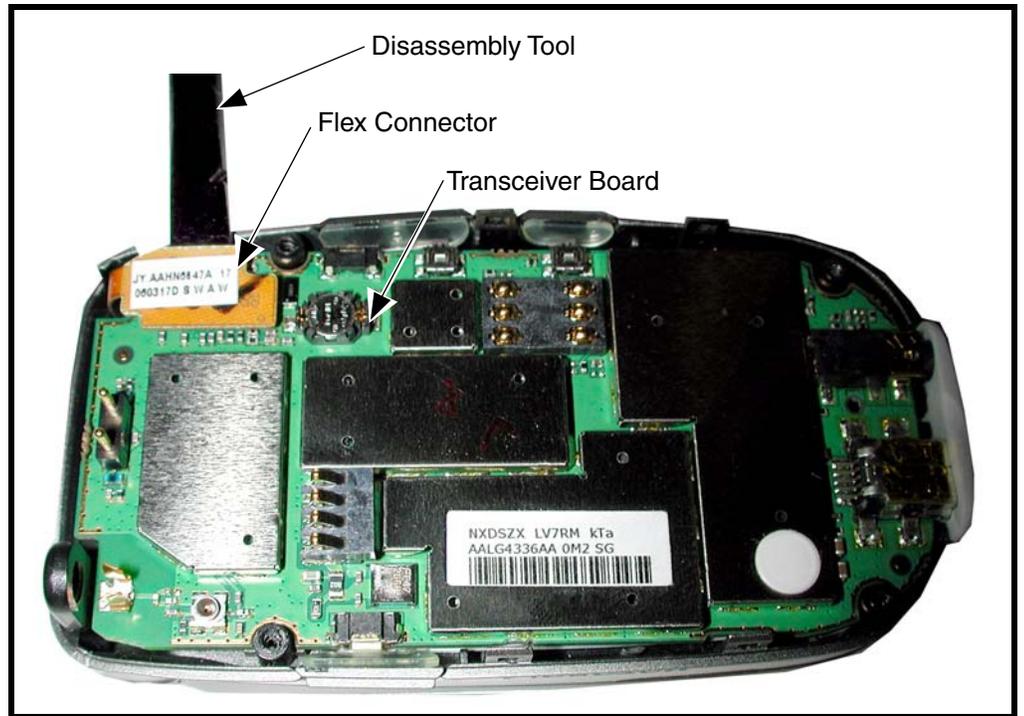

050480o

Figure 7. Removing the Gasket From the Transceiver Board

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

3. Carefully work the flat end of the disassembly tool under the flex connector and remove the connector from the transceiver board. See Figure 8.

050477o

Figure 8. Disconnecting the Flex from the Transceiver Board

4. Lift the transceiver board assembly out of the front housing. See Figure 9.
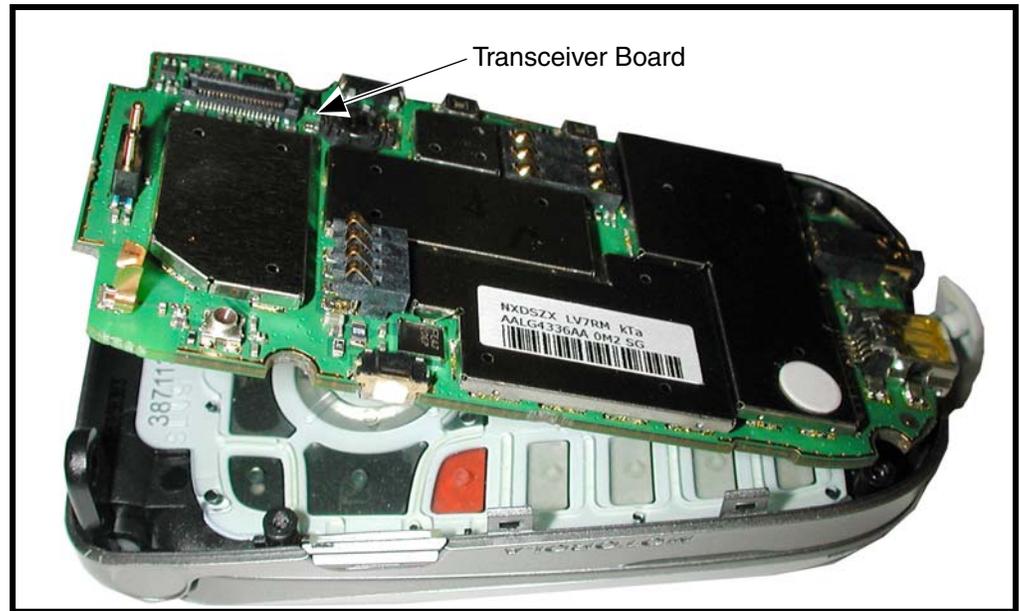
050482o

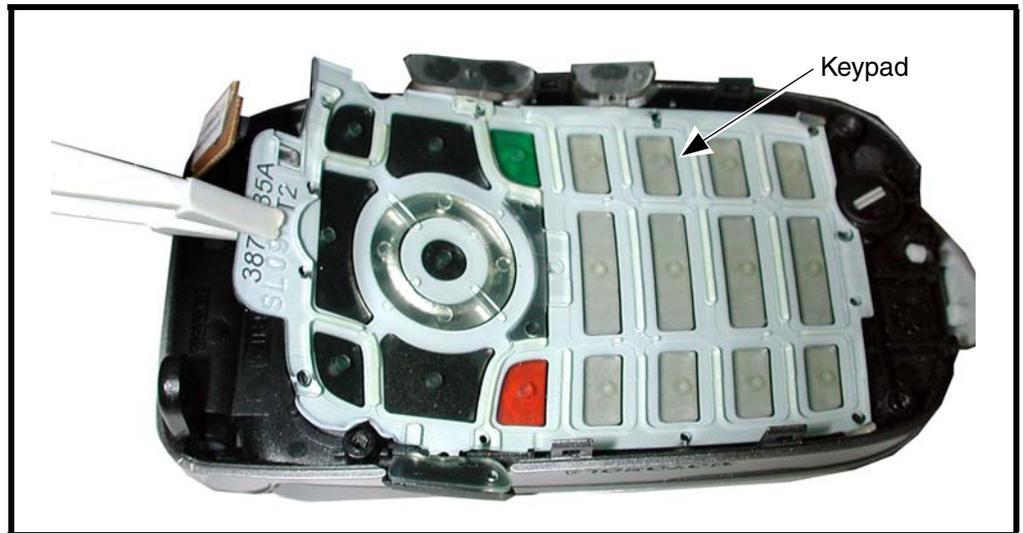**Figure 9. Removing the transceiver PC board assembly**

5. To replace, insert the transceiver board assembly into the front housing with the flex connector on top.

▶ *Be sure the volume/smart buttons and voice button are correctly positioned in relation to the corresponding switches on the transceiver board. Verify operation of the buttons after replacing the transceiver board.*

6. Insert the flex connector squarely into its mating connector on the transceiver board and press firmly until it snaps into place.
7. Replace the 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 disassembly tool, 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 10).

050483o

Figure 10. Removing the Keypad, Volume/Smart, and Voice Buttons

3. To replace, remove any protective covering to expose the keypad adhesive.
4. Carefully set the keypad volume/smart buttons and voice button assembly onto the metal switchdome assembly. Ensure the volume/smart key keypads will contact the switchdome assembly on the transceiver board when installed.
5. Insert the keypad into the front housing, ensuring the keys align properly with the openings in the front housing.
6. 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 Microphone

1. Remove battery cover, battery, SIM, antenna, rear housing, and transceiver board assembly as described in the procedures.
2. Use the disassembly tool to pry the microphone out of the front housing as shown in Figure 11.

040248o

Figure 11. Removing the Microphone

3. To replace, insert the microphone into its place in the front housing. Ensure that the elastomeric connector is facing upward. Press the microphone firmly into place.
4. 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 battery cover, battery, SIM, antenna, rear housing, and transceiver board assembly as described in the procedures.
2. Flex the right side of the front housing assembly to allow the flip assembly hinge to separate from the knuckle (see Figure 12).
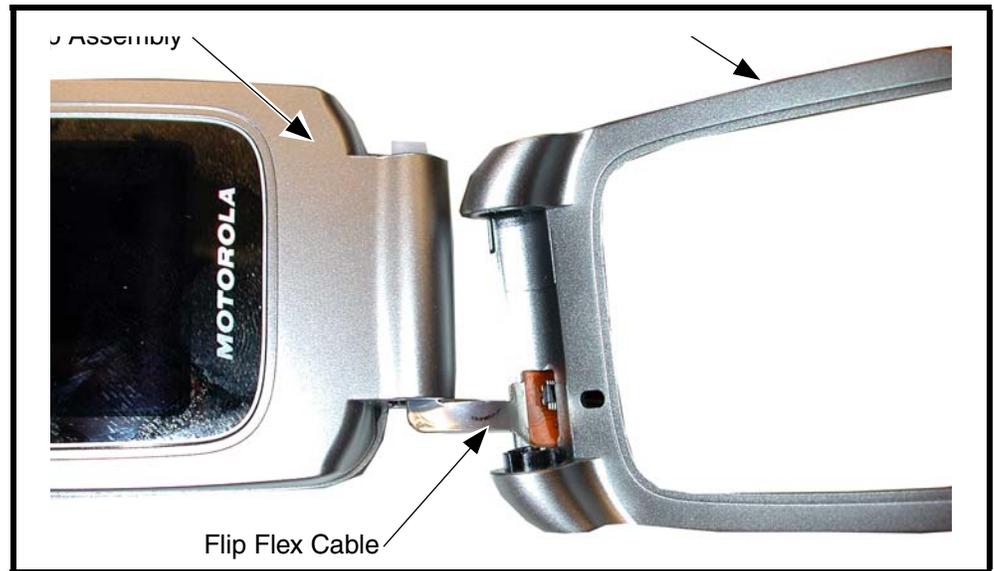

Figure 12. Removing the Flip Assembly

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

3. Carefully remove the flip assembly from the left knuckle on the front housing. Use extreme caution when removing the display flex from the front housing (see Figure 13).

050346o

Figure 13. Removing the Flip Assembly

4. To replace, slide the flex connector through the narrow opening on the front of the front housing.
5. Insert the left side of the flip assembly into the left knuckle on the front housing.
6. Carefully bend the right knuckle on the front housing to insert the flip hinge into the right knuckle. Ensure that the flip opens and closes easily.
7. Replace the transceiver board assembly, rear housing, antenna, SIM, battery, and battery cover as described in the procedures.

Removing and Replacing the Flip Cover

1. Remove battery cover, battery, SIM, antenna, rear housing, transceiver board assembly, and flip assembly as described in the procedures.
2. Insert the flat edge of disassembly tool into the top of the flip cover and pry down flip cover to the bottom to release the flip cover (see Figure 14).


Flip Cover

Disassembly tool
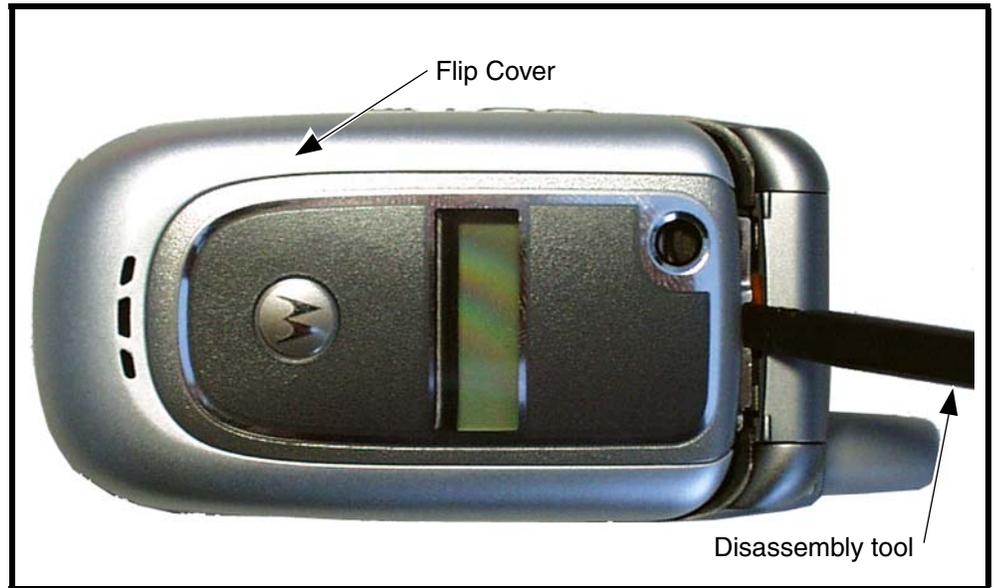
060394o

Figure 14. Removing the Flip Cover

3. Slide the flip cover down to the bottom and lift the cover away from the flip assembly.
4. To replace, align the flip cover to the flip assembly.
5. Carefully press the flip cover onto the flip assembly until all latches are fully engaged.
6. Replace the flip assembly, transceiver board assembly, rear housing, antenna, SIM, battery, and battery cover as described in the procedures.

Removing and Replacing the Display Assembly Bracket

1. Remove the battery cover, battery, SIM, antenna, rear housing, transceiver board assembly, flip assembly, and flip assembly cover as described in the procedures.
2. Use the Torx driver and a T6 bit to remove the 4 flip assembly screws from the flip assembly (see Figure 15).
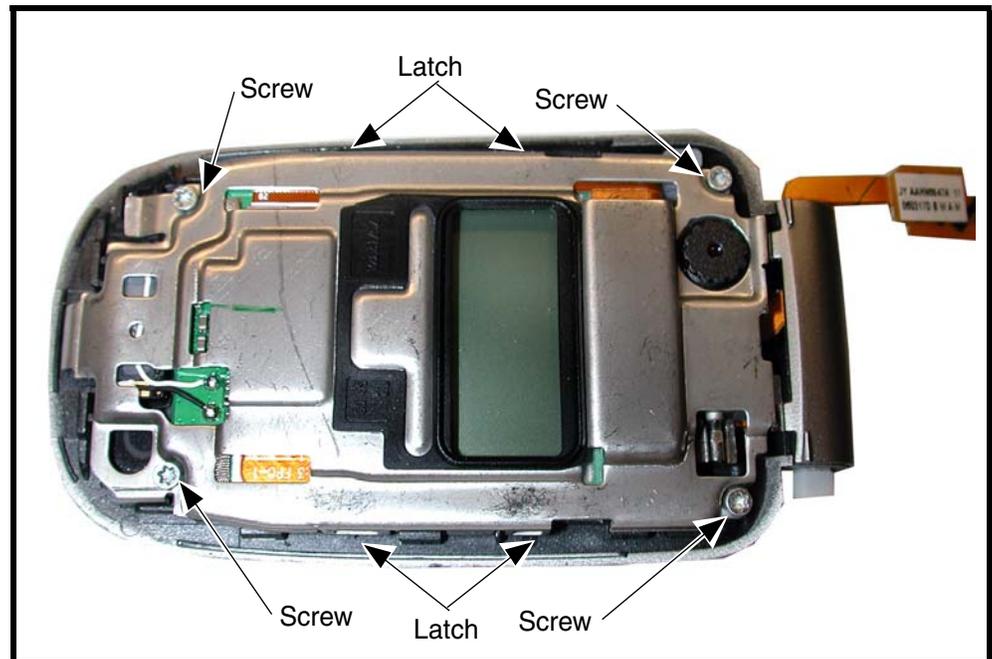
050348o

Figure 15. Removing the Flip Assembly Screws and Latches

3. Use the disassembly tool to release the latches on the sides of the display assembly.
4. Carefully lift the display bracket up and away from the display assembly.
5. To replace, align the display bracket over the display assembly.
6. Carefully and gently lower the display bracket onto the display assembly. Press the display bracket into place so that all the latches are attached to the display assembly.
7. Insert and tighten the four T6 screws to a torque setting of 16 Ncm.
8. Replace the flip assembly bezel, flip assembly, transceiver board assembly, rear housing, antenna cap, 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 flip display bracket as described in the procedures.

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

2. Use the plastic tweezers to remove the camera assembly snubber from the flip assembly (see Figure 16). Set the snubber aside for reassembly.
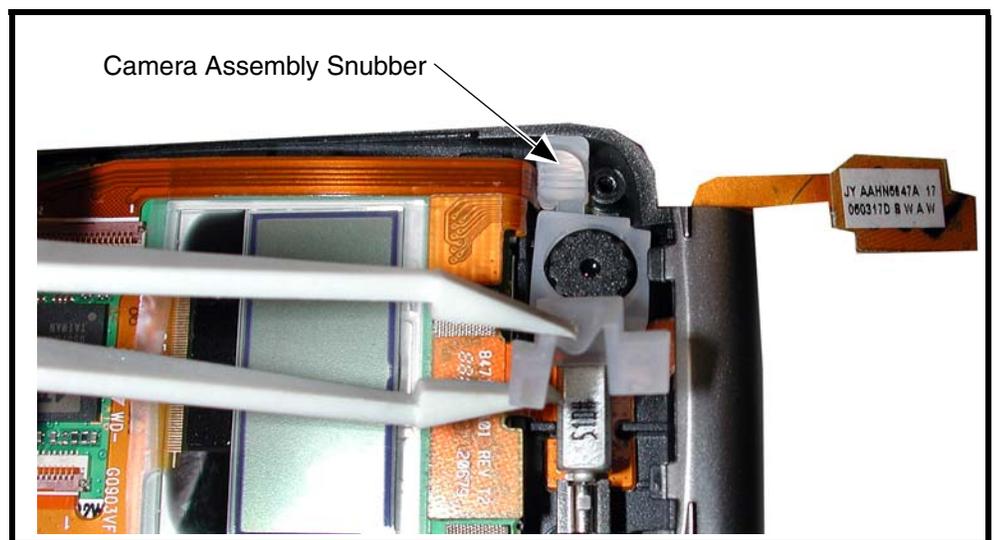
050480o

Figure 16. Camera Assembly Snubber Removal

3.   Unlock the ZIF connector and remove the camera assembly flex connector (see Figure 17).

050491o

Figure 17. Camera Assembly Flex Connector Removal

4.   Carefully lift the camera assembly and flex out of the display assembly.
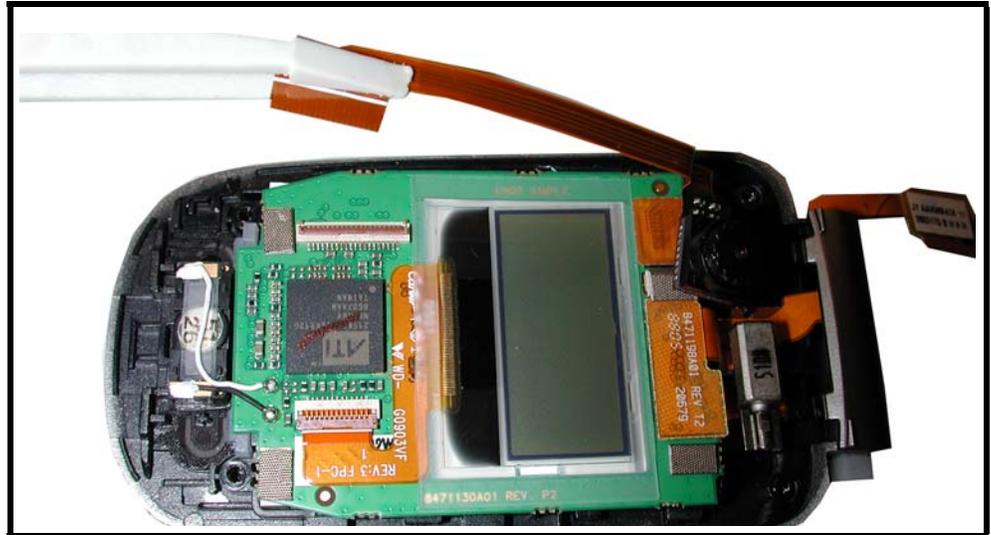
050492o

Figure 18. Camera Assembly Removal

5.   To replace, carefully press the camera assembly into its slot in the flip display assembly.
6.   Insert the end of the camera assembly flex cable into its slot in the ZIF connector on the flip display assembly. Avoid damage to the flex cable.

7.   Replace the flip display assembly, flip assembly cover, flip assembly, 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, and transceiver board assembly, flip assembly cover, flip display bracket, and camera module as described in the procedures.

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

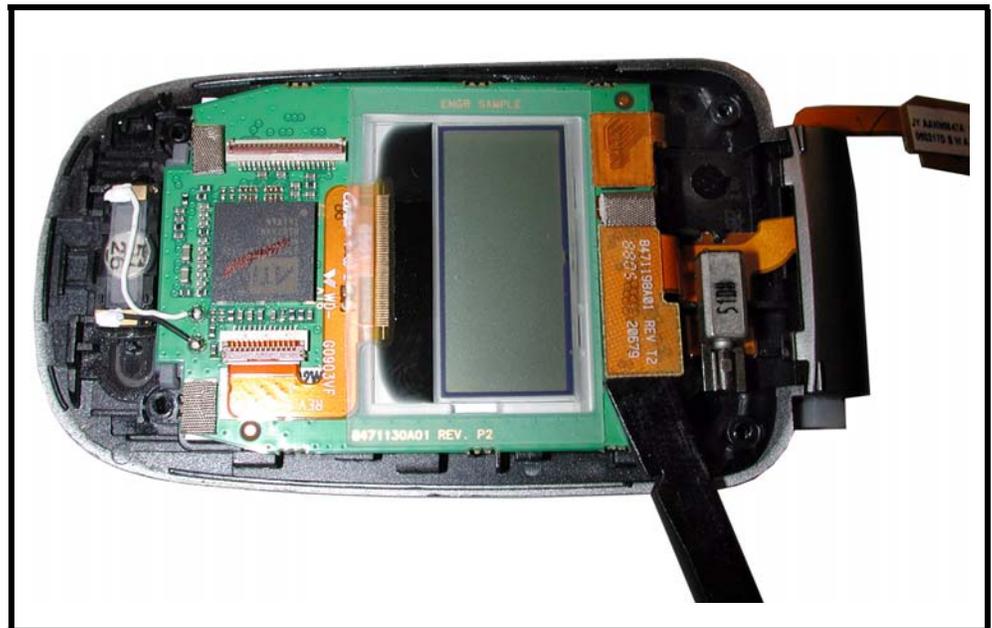2. Use the disassembly tool to unseat the display flex connector (see Figure 19).

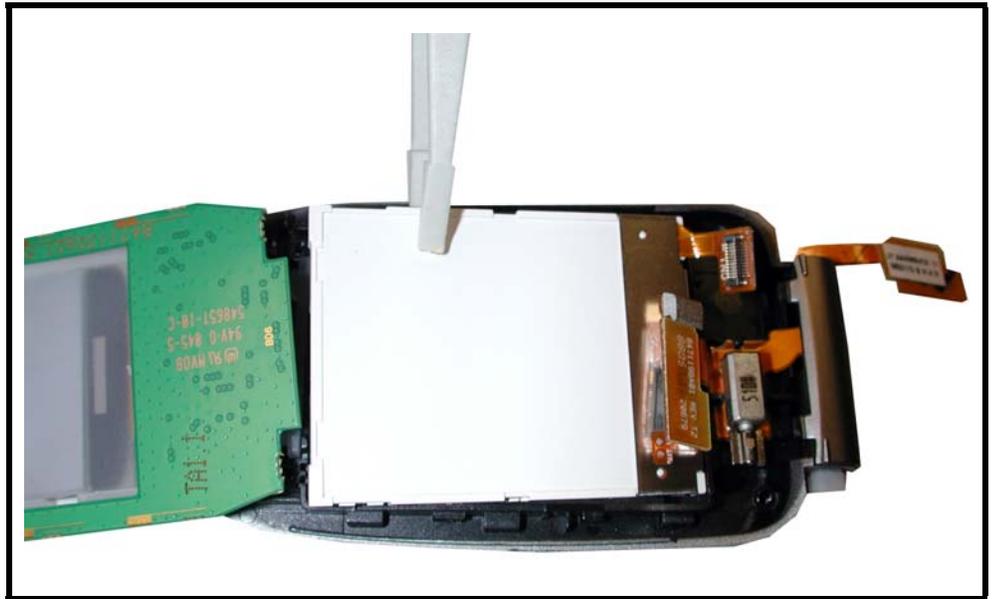050491o

Figure 19. Display Flex Connector Removal

3. Use the disassembly tool to unseat the display module flex connector (see Figure 20).

050495o

Figure 20. Camera Assembly Flex Connector Removal

4. Turn the display module printed circuit board over and use the plastic tweezers to lift away the display module from the flip (see Figure 21).

050496o

Figure 21. Display Module Removal

Removing and Replacing the Motor Vibrator 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 carefully lift the motor/vibrator assembly and flex from the flip assembly (see Figure 22). .

Motor/Vibrator/Flex

Figure 22. Motor/Vibrator Assembly Removal

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

3. Slide the flex connector through the opening in the flip hinge.
4. To replace, thread the flex connector through the slot in the flip hinge.
5. Remove the adhesive backing from the motor/vibrator and flex.
6. Align the motor/vibrator to its location in the flip assembly.
7. Gently but firmly press the motor/vibrator and flex into it's pocket until properly seated in the flip assembly.
8. Replace the camera assembly, display assembly, flip assembly cover, flip assembly, transceiver board, rear housing, antenna, SIM, battery, and battery cover as described in the procedures.

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. V235 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 23.
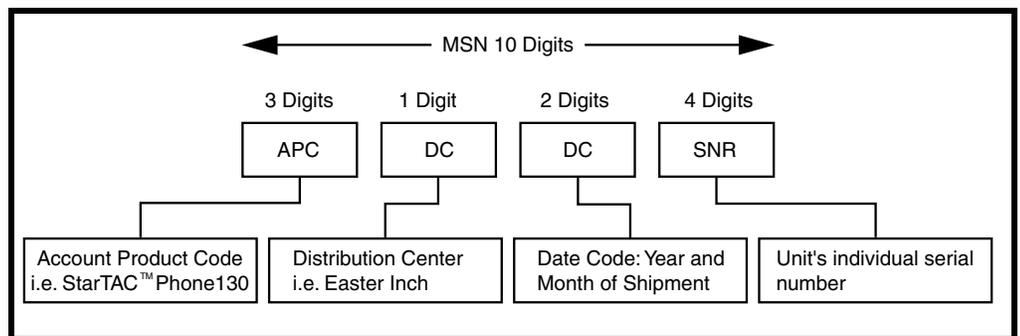
000807a

Figure 23. MSN Label breakdown

International Mobile Station Equipment Identity (IMEI)

The International Mobile station Equipment Identity (IMEI) number is an individual number unique to the PCB and is stored within the unit's memory.

The IMEI uniquely identifies an individual mobile station and thereby provides a means for controlling access to GSM networks based on mobile station types or individual units. The full IMEI structure is listed in Table 2.

Table 2. IMEI Number Breakdown

TAC	Serial Number	Check Digit
NNXXXXXX	ZZZZZZ	A

Where

TAC   Type Allocation Code, formerly known as Type Approval Code

NN   Reporting body identifier

XXXXXX   Type Identifier

ZZZZZZ   Individual unit serial number

A   Phase 1 = 0.
               Phase 2 = check digit defined as a function of all other IMEI digits

Other label number configurations present are:

- **TRANSCEIVER NUMBER**: Identifies the product type. Normally the SWF number. (i.e. V100).
- **PACKAGE NUMBER**: Identifies the equipment type, mode, and language in which the product is shipped.

Troubleshooting

Manual Test Mode

Motorola V235 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	

Table 3. Manual Test Commands (Continued)

Key Sequence	Test Function/Name	Remarks
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	
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 --> Phone Status --> Other 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.	a) Faulty alert transducer.	Replace the alert transducer with a known good alert transducer. Verify that the fault has been cleared and reassemble the unit with the new alert transducer. If the fault is not cleared, proceed to b.

Table 4. Level 1 and 2 Troubleshooting Chart (Continued)

SYMPTOM	PROBABLE CAUSE	VERIFICATION AND REMEDY
	b) Faulty transceiver board assembly.	Replace the transceiver board assembly (refer to 1c). Verify that the fault has been cleared and reassemble the unit with the new transceiver board assembly.
5. Telephone transmit audio is weak. (usually indicated by called parties complaining of difficulty in hearing voice).	a) Microphone 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 the unit 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 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.	a) SIM defective.	Check the SIM contacts for dirt. Clean if necessary and check if fault has been cleared. If the contacts are clean, insert a known good SIM into the telephone. Power up the unit and confirm that the SIM has been accepted. If the fault no longer exists, replace the defective SIM. If the SIM is not at fault, proceed to b.
	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.

Table 4. Level 1 and 2 Troubleshooting Chart (Continued)

SYMPTOM	PROBABLE CAUSE	VERIFICATION AND REMEDY
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) 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.
12. No or weak audio when using headset.	a) Headset not fully pushed home.	Ensure the headset plug is fully seated in the connector socket. If fault not cleared, proceed to b.
	b) Faulty connector socket on transceiver board assembly.	Replace the transceiver board assembly (refer to 1c). Verify that the fault has been cleared and reassemble the unit with the new transceiver board assembly.

Programming: Software Upgrade and Flexing

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

The following information is provided as a reference for the parts associated with V235 telephones.

Related Publications

Motorola V235 User's Guide, English   SJJN6409A (6809482A70)

Exploded View Diagram
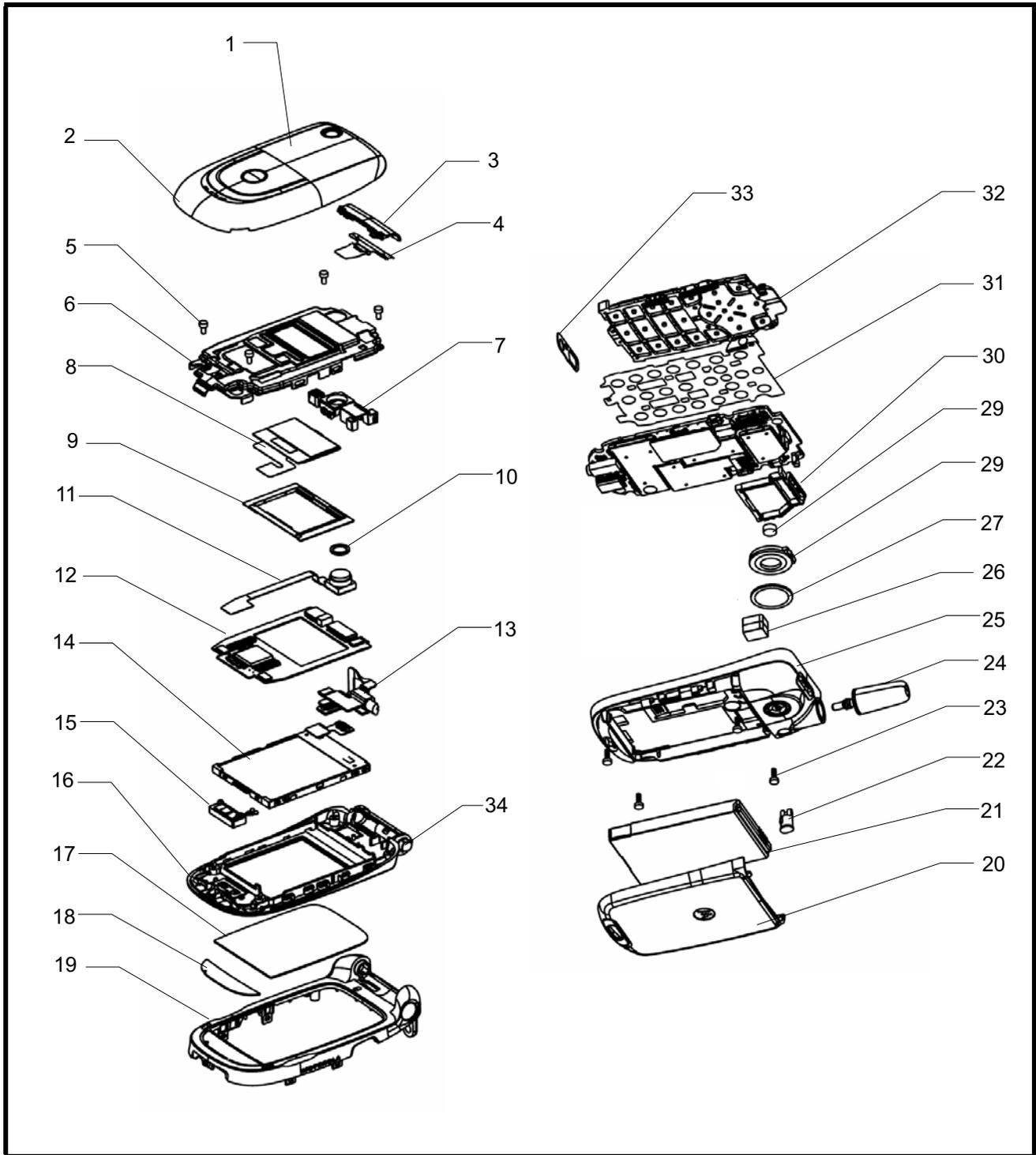
051918o

Figure 24. Exploded View Diagram

Exploded View Parts List

Table 5. Exploded View Parts List

Item Number	Motorola Part Number	Description
1	0170388E04	Flip front housing assembly, silver
2	0171285A02	Flip cover, silver
3	1571202A02	Cover hinge, silver
4	8471229A01	Tape
5	0370303D02	Screw, Flip M1.6x3mm
6	0170388Z01	Bracket, Flip
7	0571206A01	Grommet, Camera
8	7289713Y01	CLI display
9	3771324A04	Gasket, CLI display
10	3271233A17	Gasket, Camera
11	9471280A01	Camera assembly
12	0102733J82	Flip PCB assembly
13	0171191A01	Flex assembly
14	7288988Y01	Main display assembly
15	0170388D02	Speaker
16	0170388B02	Flip housing assembly, Silver
17	6171204A02	Lens, main display
18	1371145A03	Escutcheon, TIM Silver
19	1571134A02	Front housing assembly, Silver
20	AAHN5648A AAHN5675A	Battery door, Silver, PF4 Battery door, Silver, PF5
21	SNN5766A	Battery
22	0571205A02	RF grommet, Silver
23	0370303A04	Screw, rear housing, M1.6x4.8mm
24	8571190A04	Antenna
25	0170387P01	Rear housing assembly, Silver
26	7571369A03	Poron pad connector
27	3271163A02	Gasket, Alert
28	5088017N04	Alert speaker
29	3271164A01	Poron pad, Alert
30	3271165A02	Gasket, acoustic
31	4071154A01	Mylar
32	3871135A09	Keypad, English, Silver
33	1370316C05	Escutcheon connector
34	5570373B03	Hinge
--	5987825N02	Magnet

For information on ordering parts please contact EMEA at + 49 461 803 1404.

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

Accessory	Kit Number
Audio & Connectivity	
Data Cable Mini USB/USB/Serial	SKN6371
Headset Stereo FM - Universal (Cheerful Pink)	CHYN4391
Headset Stereo FM - Universal (Zest Blue)	CHYN4392
Headset Mono Earbud - Universal (Black)	SYN8390
Headset Mono Earbud - Universal (Silver)	AAYN4264
Headset One Touch Customizable - Universal	SYN9351
Headset One Touch w/ Send-End	SYN8419
Headset One Touch w/Send-End (EMU)	SYN0896B
Mobile Phone Tools	Region-specific
Headset Mono 4 Color Customizable - Universal	SYN9748
Headset Mono Customizable - Universal	SYN9350
Headset One Touch 4 Color Customizable - Universal	SYN9749
Consumer Personalization	
Carry Case	Licensee
Lanyard - Silver	CHYN4546
Lanyard - Silver*	AAYN4402
In-Vehicle Solutions	
Self Install Car Kit - Smart Drive - Motorola	SYN1134
Self Install Car Kit - Smart Drive+ - Motorola	SYN1137
Smart Cable EMU - Motorola	SYN1003
Vehicle Power Adapter EMU - VC700	SYN0847
Power Solutions	
Battery-Only-Charger for PF batteries, HK plug	SYN1491A
Battery-Only-Charger for PF batteries, PRC plug	SYN1489A
Battery-Only-Charger for PF batteries, TWN plug	SYN1490A
Battery-Only-Charger for PF batteries, US/Euro plug	SYN1488A
Charger Adapter - Aust/NZ Plug	SYN8127
Charger Adapter - Euro Plug	SYN7456
Charger Adapter - UK Plug	SYN7455
Travel Charger EMU Rapid Switcher - MEXICO	SPN5200

Table 6. Accessories (Continued)

Travel Charger EMU Rapid TWN	SPN5270
Battery BT50 (PF4) Li-Ion 820 mAh	SNN5766
Battery BT60 (PF5) Li-Ion 1020mAh	SNN5744
Travel Charger EMU Mid-Rate Switcher - Argentina	SPN5192
Travel Charger EMU Mid-Rate Switcher - Australia	SPN5193
Travel Charger EMU Mid-Rate Switcher - BRAZIL	SPN5187
Travel Charger EMU Mid-Rate Switcher - EURO	SPN5189
Travel Charger EMU Mid-Rate Switcher - INDIA	SPN5194
Travel Charger EMU Mid-Rate Switcher - MEXICO	SPN5186
Travel Charger EMU Mid-Rate Switcher - PRC	SPN5188
Travel Charger EMU Mid-Rate Switcher - TWN	SPN5216
Travel Charger EMU Mid-Rate Switcher - UK/HK	SPN5190
Travel Charger EMU Mid-Rate Switcher - US ENG	SPN5185
Travel Charger EMU Rapid Switcher - Argentina	SPN5197
Travel Charger EMU Rapid Switcher - BRAZIL	SPN5196
Travel Charger EMU Rapid Switcher - HK	SPN5199
Travel Charger EMU Rapid Switcher - PRC	SPN5198
Travel Charger EMU Rapid Switcher - US	SPN5202

6809495A43-C