MOTOROLA

Level 1 and 2 Service Manual

Product Family D10

Dual Band Wireless Telephone

C200

GSM 900/1800 MHz, GSM 850/1900 MHz

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Introduction

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

Available on a contract basis, Motorola Inc. offers comprehensive maintenance and installation programs which enable customers to meet requirements for reliable, continuous communications.

To learn more about the wide range of Motorola service programs, contact your local Motorola products representative or the nearest Customer Service Manager.

Product Identification

Motorola products are identified by the model number on the housing. 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 included in Product Family D10 telephones 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.

Regulatory Agency Compliance

This device complies with Part 15 of the FCC Rules. Operation is subject to the following conditions:

1. This device may not cause any harmful interference, and
2. 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

About This Service Manual

Using this service manual and the suggestions contained in it assures proper installation, operation, and maintenance of PF D10 telephones. Refer questions about this manual to the nearest Customer Service Manager.

A product family is the group of products having the same Account Product Code (APC). To locate the APC on a device, refer to “Mechanical Serial Number (MSN)” later in this manual.

Audience

This document aids service personnel in testing and repairing PF D10 telephones. Service personnel should be familiar with electronic assembly, testing, and troubleshooting methods, and with the operation and use of associated test equipment.

Use of this document 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.

Scope

The scope of this document is to provide the reader with basic information relating to PF D10 (C200) telephones, and also to provide procedures and processes for repairing the units at Level 1 and 2 service centers including:

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

Conventions

Special characters and typefaces, listed and described below, are used in this publication to emphasize certain types of information.

Note: Emphasizes additional information pertinent to the subject matter.

Caution: Emphasizes information about actions which may result in equipment damage.

Warning: Emphasizes information about actions which may result in personal injury.

Keys to be pressed are represented graphically. For example, instead of “Press the Menu Key”, you will see “Press ”.

Information from a screen is shown in text as similar as possible to what appears in the display. For example, ALERTS or ALERTS.

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

Warranty Service Policy

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

Out of Box Failure Policy

The standard out of box failure criteria applies. Customer units that fail very early on after the date of sale, are to be returned to Manufacturing for root cause analysis, to guard against epidemic criteria. Manufacturing to bear the costs of early life failure.

Product Support

Customer’s original 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). The Motorola High Tech Centers will perform level 4 (full component) repairs.

Customer Support

Customer support is available through dedicated Call Centers and in-country help desks. Product Service training should be arranged through the local Motorola Support Center.

Parts Replacement

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

When ordering crystals or channel elements, specify the Motorola part number, description, crystal frequency, and operating frequency desired.

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)

Replacement parts, test equipment, and manuals can be ordered 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

To order spare parts in the EMEA region call +44 131 479 1274.

To order spare parts in Asia call +65 648 62995.

Specifications

General Function	Specification
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
Channel Spacing	200 kHz
Channels	174 EGSM
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	+3.3V dc to +4.2V dc (battery) 5V dc to +6.5 dc (external connector)
Transmit Current	185 - 250 mA average talk current drain
Stand-by Current	Typically 6mA (DRX2),4mA (DXR9)
Dimensions,	105.2 mm x 44.4 mm x 19.5 mm (4.14 inches X 1.74 inches X.76 inches)
Size (Volume)	75 cc (4.5 in^3), with 700 mAh battery
Weight	90 gm (2.9 oz), with 700 mAh battery
Temperature Range	-10° C to +55° C (+15° F to +130° F)
Battery Life, 550 Ni Mh Battery	Talk Time 120 to 300 minutes Standby 110 to 220 hours
Battery Charge Time	3 Hours
Alert Volume	95 dB @ 5 cm

Transmitter Function	Specification
RF Power Output	33 dBm nominal GSM 900, 30 dBm nominal GSM 1800
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%
Channel Hop Time	500 microseconds
Time to Camp	Approximately 5-10 seconds

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
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 C200 mobile telephones feature global system for mobile communications (GSM) air interface. The C200 also provides a wireless application protocol (WAP) Internet browser. The C200 telephones incorporate a new user interface (UI) for easier operation, allows short message service (SMS) text messaging, and includes personal information manager (PIM) functionality. It is a dual-band phone that allows roaming within the GSM 900 MHz and digital cellular system (DCS) 1800 MHz bands. C200 telephones support SMS in addition to traditional circuit switched transport technologies.

C200 telephones are made of a polycarbonate plastic. The display and speaker, as well as the keypad, transceiver printed circuit board (PCB), microphone, external accessory connector, volume buttons, power button, and voice button, are contained within the candy bar form-factor housing. The phone accepts both 3V and 5V mini subscriber identity module (SIM) cards which fit into the SIM holder underneath the battery. The antenna is built-in to the endo skeleton housing assembly.

Features

C200 telephones use advanced, self-contained, sealed, custom integrated circuits to perform the complex functions required for GSM 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:

- Ergonomic design for comfort and enhancement of one hand operation
- Icon Based Simplified User Interface
- Animated Screen Savers
- Lower voltage technology that provides increased standby and talk times
- Extended GSM (EGSM) channels
- Tri-coder/decoder (CODEC) that allows full rate, half rate, and enhanced full rate modes of transmission
- Supports SMS, concatenated SMS, and cell broadcast messages
- WAP 1.1 compliant
- 700 mm^2 98 x 64 pixel, high resolution 4 line graphic display
- Icon based simplified user interface
- Display zoom
- Display animation
- VibraCall® vibrating alert
- Voice recorder personal memo feature
- Voice activation for phone book entries and menu shortcuts
- Simplified text entry using iTAP™ predictive text entry
- Supports calling name presentation
- Supports call forwarding for incoming voice, fax, and data calls
- Supports 3V and 5V SIM cards
- SIM Toolkit (STK), Class II

Speaker Dependant Voice Recognition and Voice Note Recording

This feature allows voice tags to 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.

Voice tags can be added to the phone's memory using the usual name addition methods (i.e., via the phone book menu structure or with the shortcut editor).

The user 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.

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 C200's microbrowser can be configured for baud, idle timeout, line type, phone number, and connection type.

Bitmap image data will download as text. If the image is larger than the screen, only part of the image will display.

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

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 message INCOMING CALL is displayed.

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

Call Forwarding

Call forwarding is a network feature that diverts incoming calls to another phone number if the user or phone is unavailable, or the user does not wish to receive calls. This option can be used to:

- Divert all incoming voice calls unconditionally
- Divert incoming voice calls whenever the phone is unavailable, busy, not reachable, or not answered
- Divert incoming fax calls
- Divert incoming data calls
- Allow all calls through to the phone.

Detailed operating instructions for these and the other C200 features can be found in the appropriate C200 telephone user's guides listed in the "Related Publications" section toward the end of this manual.

General Operation

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

The C200 telephone controls are located on the keyboard. The headphone jack and power jack are on the side and bottom, respectively. Indicators, in the form of icons, are displayed on the LCD (see Figures 2 and 3).

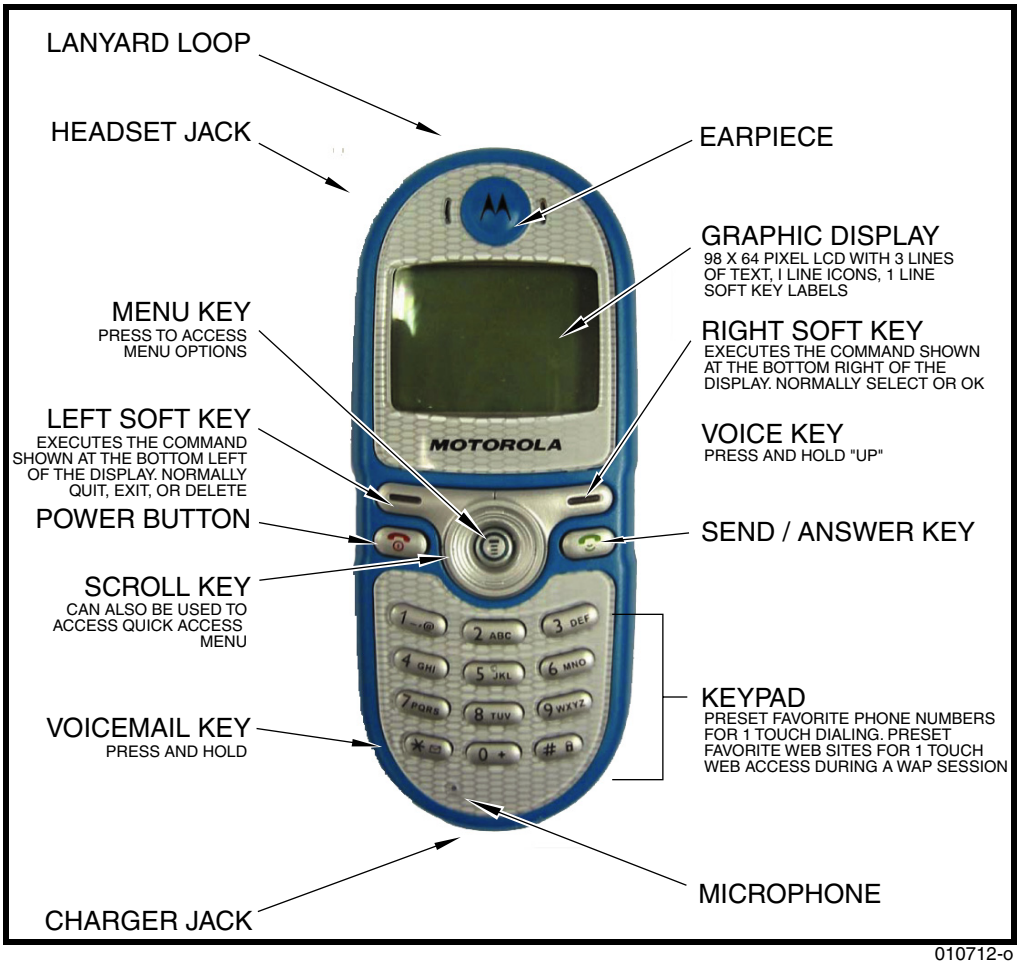

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Figure 1. C200 Controls and indicators locations

Liquid Crystal Display (LCD)

The LCD provides a high contrast backlit display for easy readability in all light conditions. The large bit-mapped 98 x 64 pixel display includes 3 lines of text, 1 line of icons, and 1 line of soft key labels.

Display animation makes the phone's menus move smoothly as the user scrolls up and down. Turn animation off to conserve the battery.

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

Figure 2 shows the appearance of the C200 display when idle.

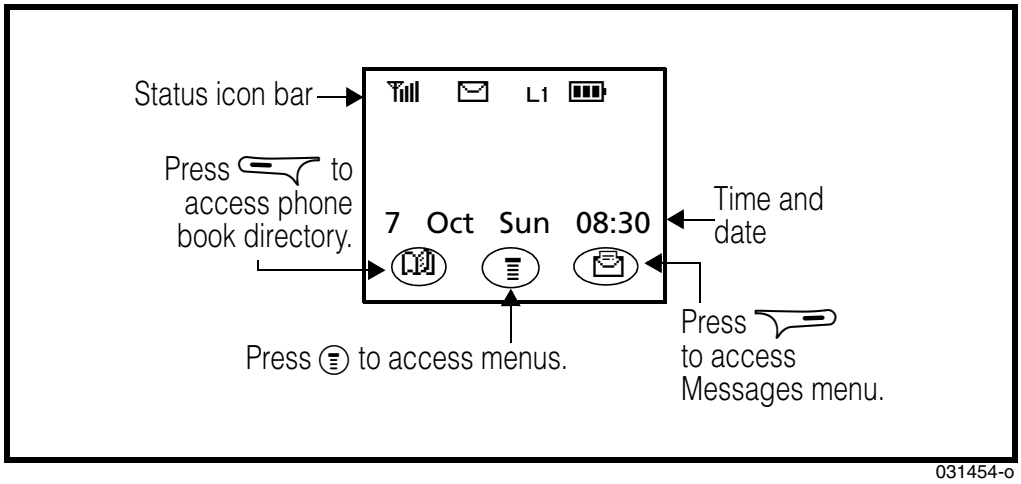

Figure 2. Idle Display

The phone's icon indicators are shown in Figure 3.

Icon	Function	Descriptions
	Signal Strength	Signal strength of your designated network. The more bars displayed, the stronger the signal.
	Short message	Receiving a short text message or having unread messages.
	Voice mail waiting	You have a new voice mail.
	Call divert	All incoming calls are diverted to a designated number.
L1	Line in use	The current line in use.
	Vibration only	Your phone only vibrates without ringing when a call comes in.
	Battery	Battery power level, the more bars, the more the battery power. Four bars: full. No bars: Recharging immediately. The icon scrolls during charging until the battery is full.
	Key lock	Key lock is activated.
	Roaming	When your phone is not used on your home network, this icon will appear.

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Figure 3. Icon Indicators

- **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.
- **Short Message**. Appears when the phone receives a text message or has an unread text message. This is a network-dependent feature.
- **Voice Mail Waiting**. Appears when a voicemail message is received. This is a network-dependent feature.
- **Call Divert.** All incoming calls are diverting to a designated number.
- **Line In Use**. Indicates the current line is in use.
- **Vibration Only.** The phone vibrates without ringing when a call is received.
- **Battery Level Indicator**. Shows the amount of charge left in the battery. The more segments visible, the greater the charge. When no bars are visible, recharge the battery as soon as possible.
- **Key Lock.** Indicates that the phone's key pad locked is activated.
- **Roam Indicator**. 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.
- **Menu Indicator**. Indicates the user can press the menu soft key to open a menu.
- **Clock**. Shows the current time. This is a network-dependent feature.

User Interface Menu Structure

Menu Navigation

C200 telephones are equipped with a simplified user-friendly interface that employs soft keys and a 2-way scroll key to access phone functions and features. See Figure 1.

"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 left key will usually select an option whereas the right key will usually exit a function or return to a previous screen.

Alert Settings

C200 telephones include up to 32 preset alert tones and vibrations that can be applied individually to specific alert events or to all 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.

All batteries can cause property damage and/or bodily injury such as burns if a conductive material such as jewelry, keys, or beaded chains touch exposed terminals. The conductive material may complete an electrical circuit (short circuit) and become quite hot. Exercise care in handling any charged battery, particularly when placing it inside a pocket, purse, or other container with metal objects.

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

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

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 tables list the tools and test equipment used on the C200 telephones. Use either the listed items or equivalents.

Table 1. General Test Equipment and Tools

Motorola Part Number[1]	Description	Application
See Table 6	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
RSX4043-A	Torque Driver	Used to remove and replace screws
	Torque Driver Bit (long) T-5, Apex 440-5IP Torx Plus or equivalent	Used with torque driver
6680388B01	Tweezers, plastic	Used during assembly/disassembly
HP34401A[2]	Digital Multimeter	Used to measure battery voltage

1. To order in North America, contact Motorola Aftermarket and Accessories Division (AAD) at (847) 538-8000; 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 C200 telephones. Tools and equipment used for the phone are listed in Table 1.

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 the Battery Cover

1. Ensure the phone is turned off.
2. Press the battery latch and slide the battery cover away from the phone (see Figure 5).

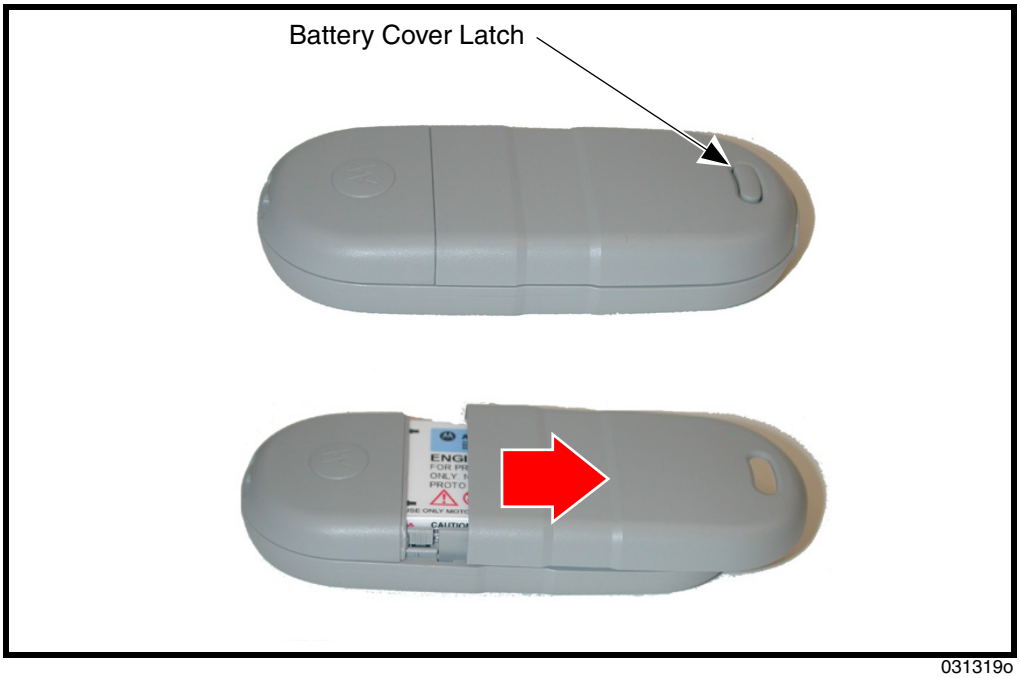

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Figure 4. Removing the Battery Cover

3. To replace, align the battery cover with the battery compartment.
4. Slide the battery cover over the battery compartment until it locks into place.

Removing and Replacing the 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. Remove the battery cover as described on page 18.
2. Lift the bottom end of the battery from the phone, then remove it completely as shown in Figure 4.

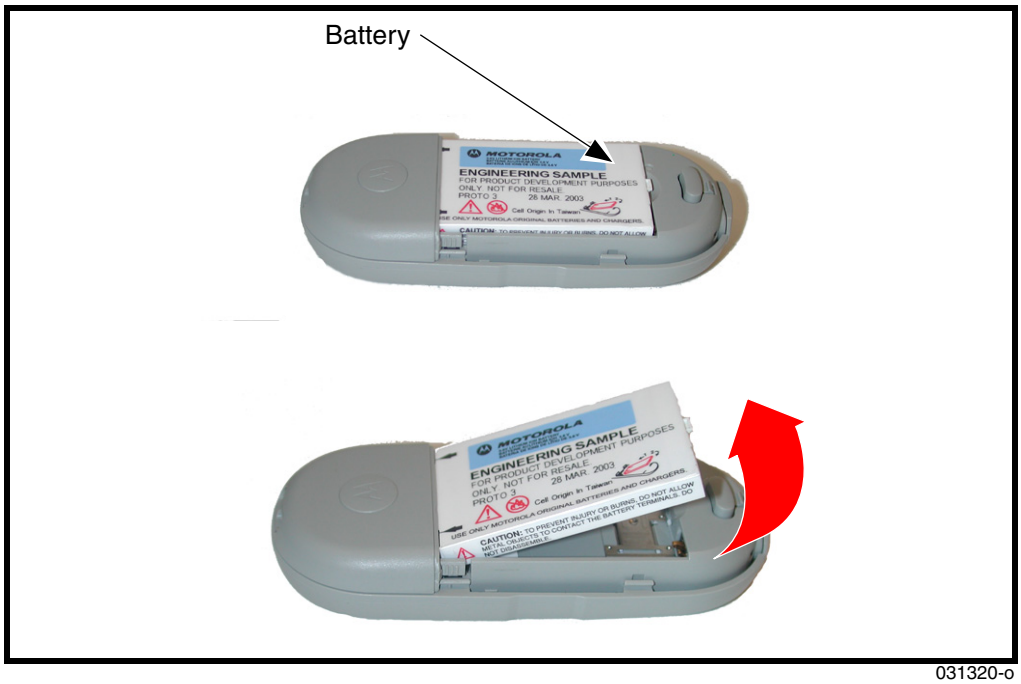

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Figure 5. Removing the Battery

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.

3. To replace, align the battery with the battery compartment so the contacts on the battery match the battery contacts in the phone.
4. Slide the top of the battery into the receptacle molded into the housing, then press the bottom end of the battery securely into the battery compartment until it locks into place.
5. Replace the battery cover as described in the procedures.

Removing and Replacing the Subscriber Identity Module (SIM)

1. Remove the battery cover and battery as described in the procedures.
2. Slide the SIM latch in the direction of the arrow to unlock as shown in Figure 6.
3. Slide the SIM out as shown in the figure.

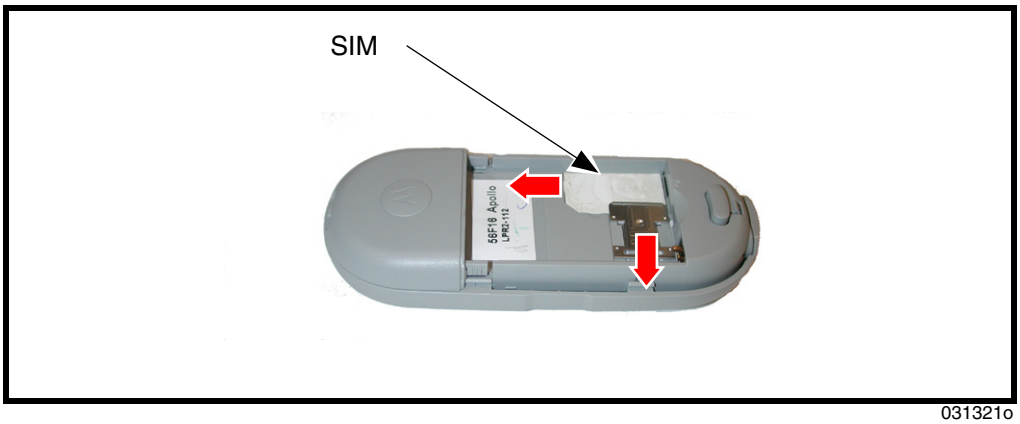

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Figure 6. Removing the SIM

4. To replace, carefully insert the SIM into the SIM holder. Be sure the SIM is correctly positioned to contact the terminals when closed.
5. Slide the SIM latch to lock in place.
6. Replace the battery as described in the procedures.

Removing and Replacing the Antenna Cover

1. Remove the battery cover and battery as described in the procedures.
2. Release the antenna cover latches on each side of the phone. See Figure 7.

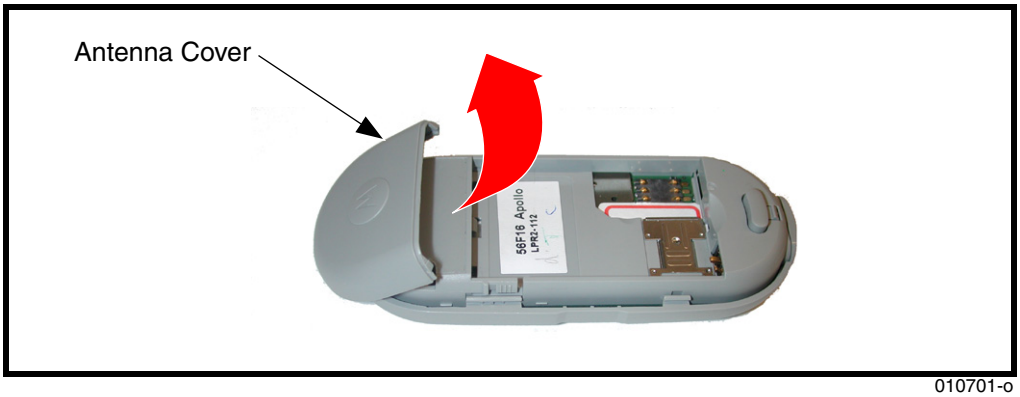

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Figure 7. Removing the Antenna Cover

1. Remove the battery cover and battery as described in the procedures.
2. Release the antenna cover latches on each side of the phone. See Figure 7.
3. Remove the antenna cover by first lifting the bottom end of the antenna cover away from the phone.

4. Lift the top end of the antenna cover away from the phone. Be careful not to damage the lanyard loop at the top end of the phone.
5. To replace, align the antenna cover to the phone.
6. Attach the top end of the antenna cover to the top of the phone.
7. Press the bottom end of the antenna cover until it locks into place.
8. Replace the battery and battery cover as described in the procedures.

Removing and Replacing the Endo Assembly

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

The housing is fastened with plastic catches. These are delicate and should be parted using utmost care.

1. Remove the battery cover, battery, SIM, and antenna cover as described in the procedures.
2. Use the disassembly tool to release the 4 latches located on the sides of the phone as shown in Figure 8.

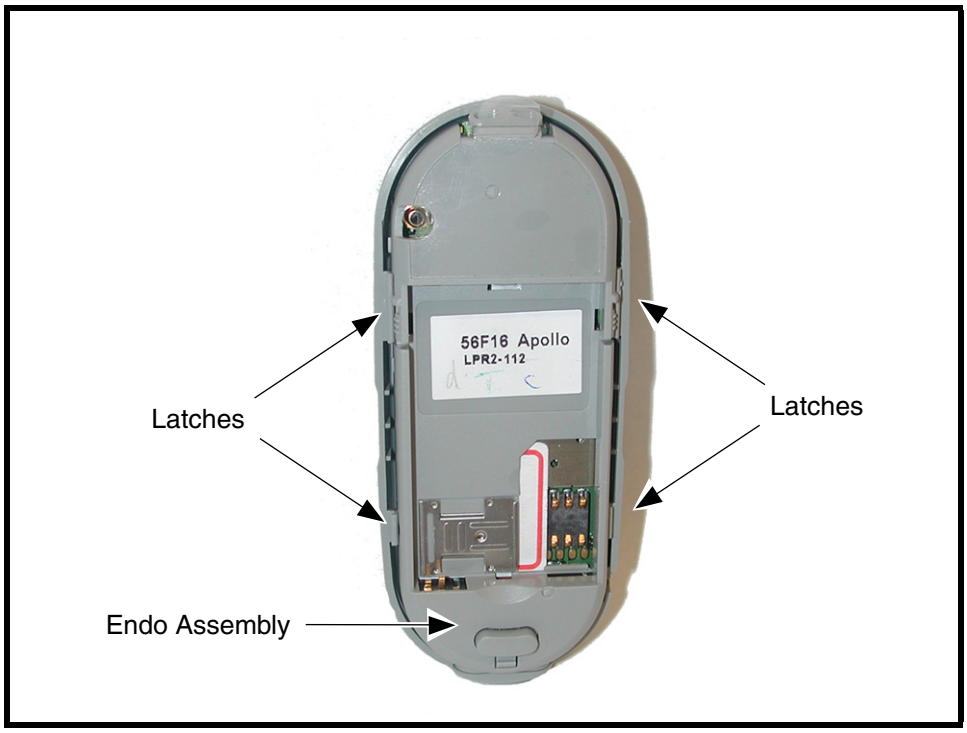


Figure 8. Removing the Endo Assembly

3. Using the flat end of the disassembly tool, carefully disengage the catches on each side of the housing, then carefully separate the endo assembly from the front housing.
4. To replace, align the endo assembly to the front housing then firmly press together until the catches engage and the housings are properly assembled.
5. Replace the antenna cover, SIM, battery, and battery cover as described in the procedures.

Removing and Replacing the Front Endo Assembly

1. Remove the battery cover, battery, SIM, antenna cover, and Endo assembly as described in the procedures.
2. Using T5 driver, remove the 4 screws from the Endo assembly. See Figure 9. Set the screws aside for re-use.

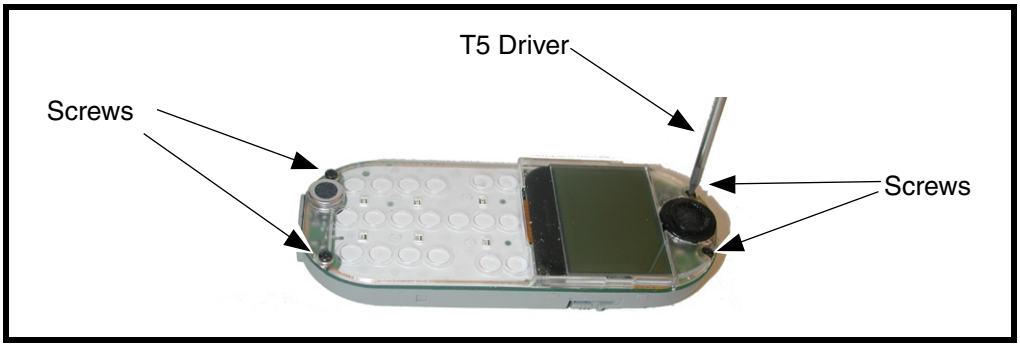


Figure 9. Removing the Front Endo Assembly

3. To replace, align the front endo assembly with the rear endo assembly. Insert and tighten the 4 screws with the T-5 driver.
4. Replace the endo assembly, antenna cover, SIM, battery, and battery cover as described in the procedures.

Removing and Replacing the Vibrator Motor

1. Remove the battery cover, battery, SIM, endo assembly, and front endo assembly as described in the procedures.
2. Use the disassembly tool to carefully pry the vibrator motor from its location in the rear endo assembly as shown in Figure 10. The assembly should come away from the rear housing easily.
3. Separate the vibrator from the vibrator grommet.

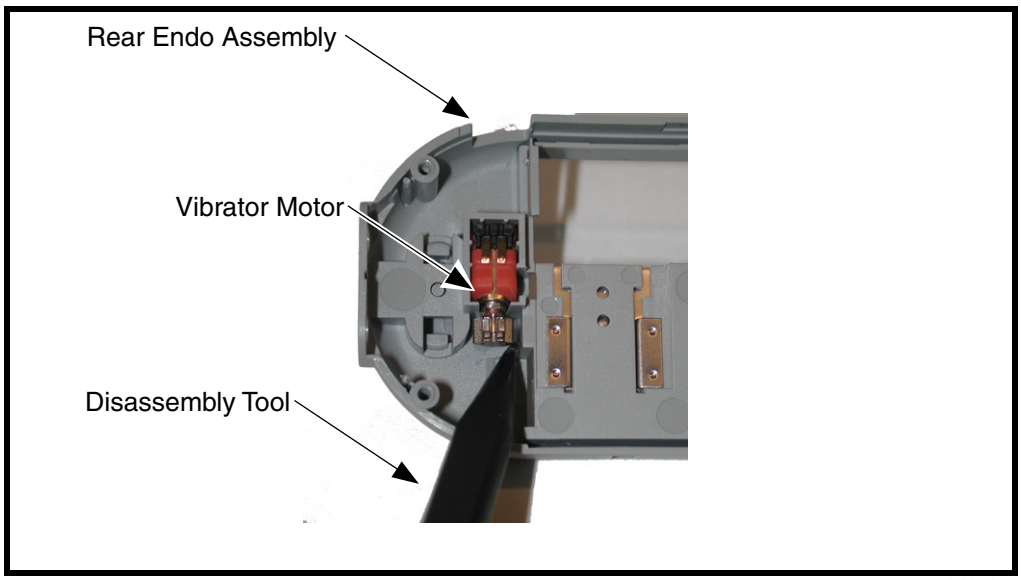


Figure 10. Removing the Vibrator Motor

4. To replace, insert the vibrator into the grommet. Ensure the vibrator shaft can to rotate freely.
5. Align the vibrator assembly with the rear housing so the vibrator terminals will contact the transceiver board contacts when reassembled, then press into place until fully seated.
6. Replace the front endo assembly, endo assembly, antenna cover, SIM, battery, and battery cover as described in the procedures.

Removing and Replacing the Transceiver Board

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 cover, and rear endo as described in the procedures.
2. Remove the upper endo assembly from the transceiver board by lifting it upwards and then allow the LCD display to pass through the hole of the front endo.
3. Using the flat end of the disassembly tool, carefully loosen the transceiver board from the front housing.

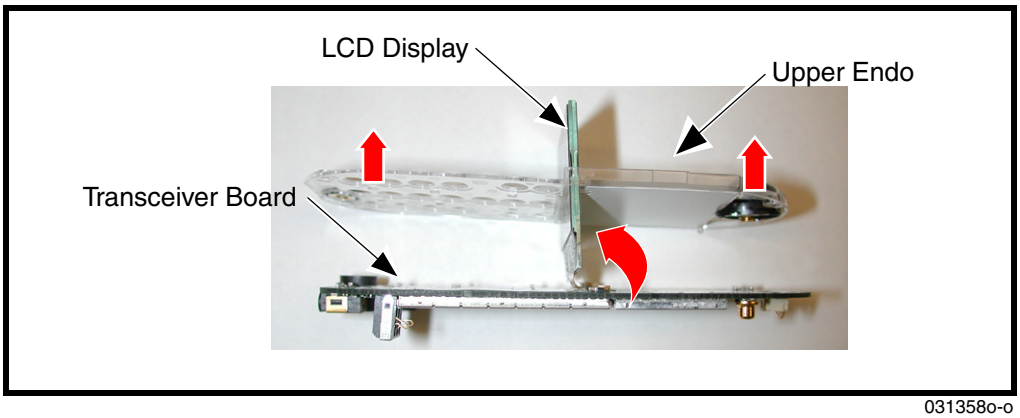


Figure 11. Removing the Transceiver Board

4. Lift the transceiver board completely away from the front housing as shown in Figure 11.
5. To replace, align the transceiver board with the front housing and gently press into place.

Ensure the keypad is correctly positioned in the front housing relative to the transceiver board. Verify operation of the keys after replacing the transceiver board.

6. Replace the rear housing, SIM, and battery as described in the procedures.

Removing and Replacing the Keypad

1. Remove the battery, SIM, rear housing, and transceiver board, as described in the procedures.

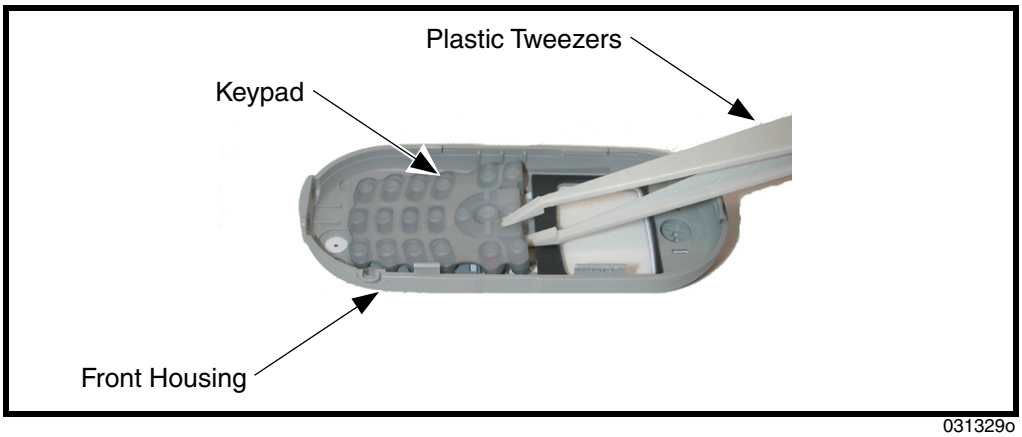


Figure 12. Removing the Keypad

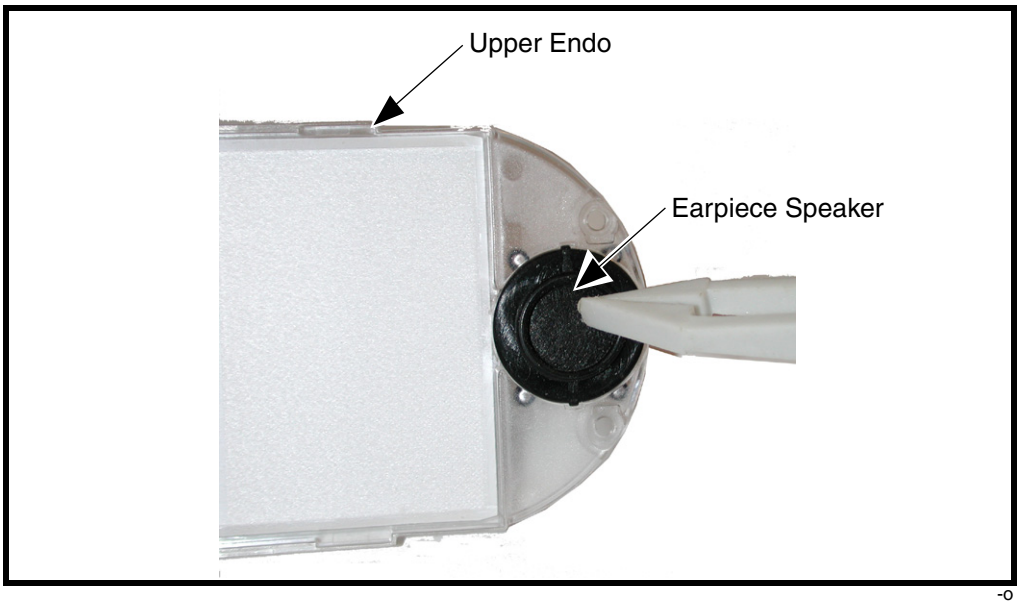
2. Lift the keypad from the front housing as shown in Figure 12.
3. To replace, insert the keypad into the front housing. Ensure the keys align properly with the openings and the keypad is fully seated in the front housing.

Ensure the keypad is correctly positioned in the front housing relative to the transceiver board. Verify operation of the keys after replacing the transceiver board.

4. Replace the transceiver board, rear housing, SIM, and battery as described in the procedures.
5. Verify correct operation.

Removing and Replacing the Earpiece Speaker

1. Remove the battery, SIM, rear housing, and transceiver board as described in the procedures.



-o

Figure 13. Removing the Earpiece Speaker

2. Using the flat end of the plastic tweezers, push the earpiece speaker from its cavity in the upper endo as shown in Figure 17.

The earpiece speaker is secured to the front housing by a rubber grommet. Exercise care when removing to prevent damage to the grommet.

3. To replace the earpiece speaker, press the earpiece speaker into the speaker grommet in the upper endo cavity. Be sure the speaker is straight, fully seated within the cavity, and positioned so its terminals will contact the transceiver board when reassembled.
4. Replace the transceiver board, upper endo, rear housing, antenna cover, SIM, and battery as described in the procedures.

Removing and Replacing the Microphone

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

1. Remove the battery, SIM, rear housing, and transceiver board as described in the procedures.

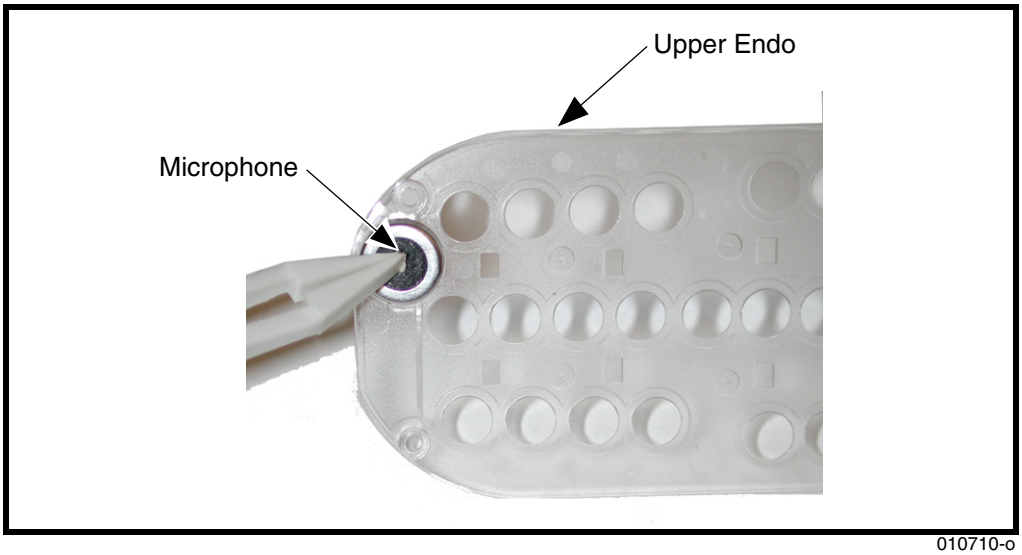


Figure 14. Removing the Microphone

2. Using the plastic tweezers, carefully push the microphone assembly from its socket on the transceiver board. The microphone assembly should come out of its socket easily. See Figure 14.
3. To replace, insert the microphone into the upper end so the terminals on the bottom of the microphone will contact the circuit board when assembled. Ensure the microphone is straight and pushed completely into the microphone socket.

The microphone assembly is keyed to fit the microphone socket only one way. Be sure the opening in the microphone grommet is positioned to face the opening in the housing when reassembled.

4. Replace the transceiver board, rear housing, SIM, and battery as described in the procedures.

SIM Card and Identification

SIM Card

A SIM (Subscriber Identity Module) card 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 card 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.

Identification

Each Motorola GSM device is labelled 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 15.

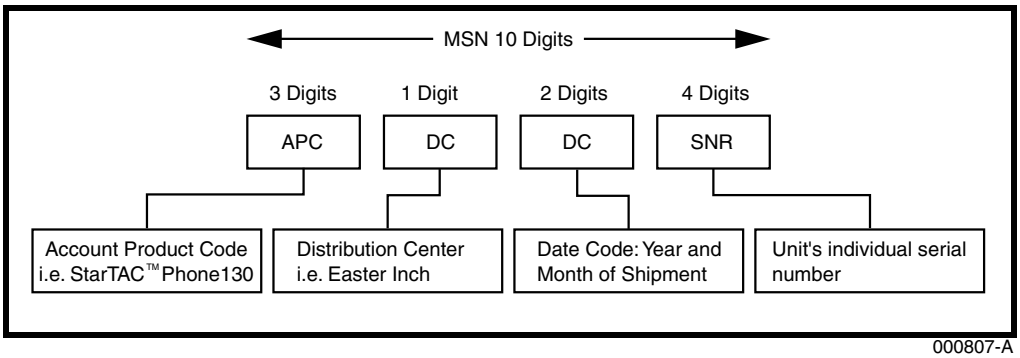


Figure 15. MSN Label Breakdown

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
NNXXXX YY	ZZZZZZ	A

Where

TAC Type Allocation Code, formerly known as Type Approval Code

NNXXXX Type Identifier

YY YY is set to 00 from 01/01/2003 until 31/03/2004

ZZZZZZ Individual unit serial number

A Phase 1 = 0. Phase 2 & 2+= check digit and is 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 C200 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 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.
7. Press and hold the # button for approximately 3 seconds until TEST displays on the screen. The phone may now be issued test commands listed in Table 3.

Manual Test Mode Commands

Table 3. Test Commands

Test Command	Test Function/Name
*#300# OK	List Software and Hardware version
*#301# OK	Full keypad functional test
*#302# OK	Acoustic Test [1] 1 - Greeting 2 - Main Volume Gain 3 - Input Cal 4 - Output Cal 5 - Side In Gain 6 - Vox Gain 7 - Min Mic Energy 8 - More (a) - In Volume Gain (b) - Aux Volume Gain (c) - Silence Prd (d) - Supp Prd (e) - In Volume (f) - Out Volume (g) - Icon (h) - Image (i) - Animation
#303# OK	Settings Saved [1]
*#307# OK	Engineering Test Mode
#400# OK	ADC, Cal val [1]
*#402# OK	Adjust display Intensity/Contrast
*#403# OK	List the Manufacturing Information
1998 0722 OK	Master Unlock code for Phone and Sim Lock

1. Use with care - Contains calibration factors

Troubleshooting Chart

Table 4. C200 Telephones: 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 terminals open or misaligned.	Visually inspect the battery terminals 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 terminals 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. Depress 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 terminal makes proper contact with 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.	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) Defective alert transducer.	Replace alert transducer according to the procedures. If fault still present, proceed to b.
	b) Faulty transceiver board assembly.	Replace the transceiver board assembly (refer to 1c). Verify that the fault has been cleared and reassemble the unit with the new transceiver board assembly.
5. Telephone transmit audio is weak. (usually indicated by called parties complaining of difficulty in hearing voice).	a) Microphone misaligned or defective.	Ensure microphone is correctly positioned in socket. If fault still present, replace the microphone as described in the procedures. If fault is 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.
6. Receive audio from earpiece speaker is weak or distorted.	a) Earpiece speaker defective.	Temporarily replace the LCD speaker assembly with a known good assembly. Ensure good connection. Place a call and verify improvement in earpiece audio. If fault is cleared, reassemble the phone with the good assembly. If fault is not cleared, proceed to b.

Table 4. C200 Telephones: Level 1 and 2 Troubleshooting Chart (Continued)

SYMPTOM	PROBABLE CAUSE	VERIFICATION AND REMEDY
	b) Transceiver board assembly defective.	Replace the transceiver board assembly (refer to 1c). Verify that the fault has been cleared and reassemble with the new transceiver board assembly.
7. Telephone will not recognize or accept SIM card.	a) SIM card defective.	Check the SIM card contacts for dirt. Clean if necessary, and check if fault has been cleared. If the contacts are clean, insert a known good SIM card into the telephone. Power up the unit and confirm that the card has been accepted. If the fault no longer exists, replace the defective SIM card. If the SIM card 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. Vibrator feature not functioning.	a) Vibrator defective.	Replace vibrator as described in the procedures. If the fault has not been 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. Internal Charger not working.	Faulty charger circuit on transceiver board assembly.	insert a known good discharged battery. Connect a known good charger and verify battery is being charged. If fault still present, 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. No or weak audio when using headset.	a) Headset plug not fully inserted.	Ensure the headset plug is fully seated in the jack.
	b) Faulty jack 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 Number Charts

The following charts are provided as a reference for the parts associated with C200 telephones.

Exploded View Diagram

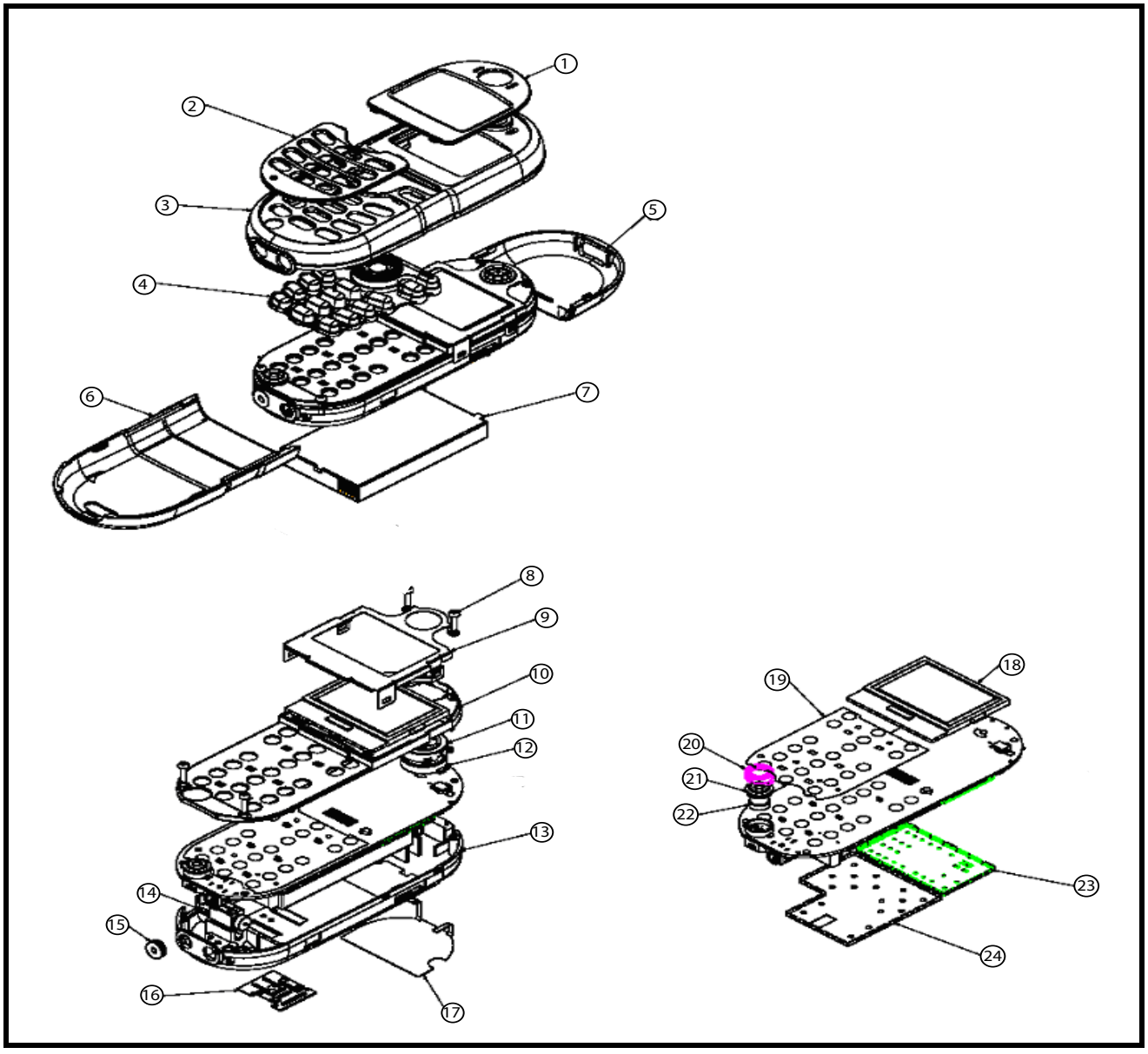


Figure 16. C200 Exploded View Diagram

Exploded View Parts List

Table 5. Exploded View Parts List

Item Number	Part Number	Description
1	42.G4903.001	LCD Display lens
2	42.G4904.001	Keypad Cover
3	60.G4904.001	Front Housing Assembly
4	47.G4904.001	Keypad
5	39.G4902.001	Antenna Cover
6	39.G4903.001	Battery Cover
7	60.G4901.001	Battery
8	86.00T00.2P1	Machine Screws (6)
9	33.G4901.001	LCD Frame
10	42.G4901.001	Upper Endo Skeleton
11	47.G4903.001	Speaker Cap
12	23.45003.011	Speaker
13	60.G4905.001	Lower Endo Skeleton Assembly
14	23.46009.002	Vibrator Motor
15	47.G4902.001	Alert Cap
16	34.G4908.001	SIM Lock
17	25.90001.001	Antenna
18	56.07G17.031	LCD Display
19	34.G4905.001	Mylar
20	34.G4907.001	Microphone Shielding
21	47.G4901.001	Microphone Cap
22	23.42007.011	Microphone
23	60.G4903.001	RF Shield
24	60.G4902.001	BB Shield

There is a danger of explosion if the Nickel Metal Hydride 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.

You can use the following link to order parts:

https://wissc.motorola.com/wissc_root/main/BrowserOK.html

A password is required.

For information on ordering parts for EMEA region please call +44 131 479 1274

Accessories

Table 6. Accessories

Part Description	Part Number
Headset Ear bud – Silver	AAYN4264A
Lanyard	SYN8392

Related Publications

Motorola C200 Wireless Phone User Guide, English

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