



MOTOROLA

Level 1 and 2 Service Manual

A920, A925 Wireless Telephone



A920, A925
GSM and WCDMA 900/1800/1900/2100 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 a label usually located under the battery. Use the entire model number when inquiring about the product. Numbers are also assigned to chassis and kits. Use these numbers when requesting information or ordering replacement parts.

Product Names

Product names are listed on the front cover. Product names are subject to change without notice. Some product names, as well as some frequency bands, are available only in certain markets.

Product Changes

When electrical, mechanical or production changes are incorporated into Motorola products, a revision letter is assigned to the chassis or kit affected, for example; -A, -B, or -C, and so on.

The chassis or kit number, complete with revision number is imprinted during production. The revision letter is an integral part of the chassis or kit number and is also listed on schematic diagrams, and printed circuit board layouts.

Regulatory Agency Compliance

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

- This device may not cause any harmful interference, and
- this device must accept interference received, including interference that may cause undesired operation

This class B device also complies with all requirements of the Canadian Interference-Causing Equipment Regulations (ICES-003).

Cet appareil numérique de la classe B respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

Computer Program Copyrights

The Motorola products described in this manual may include Motorola computer programs stored in semiconductor memories or other media that are copyrighted with all rights reserved worldwide to Motorola. Laws in the United States and other countries preserve for Motorola, Inc. certain exclusive rights to the copyrighted computer programs, including the exclusive right to copy, reproduce, modify, decompile, disassemble, and reverse-engineer the Motorola computer programs in any manner or form without Motorola's prior written consent. Furthermore, the purchase of Motorola products shall not be deemed to grant either directly or by implication, estoppel, or otherwise, any license or rights under the copyrights, patents, or patent applications of Motorola, except for a nonexclusive license to use the Motorola product and the Motorola computer programs with the Motorola product.

About This Service Manual

Using this service manual and the suggestions contained in it assures proper installation, operation, and maintenance of A920 or A925 telephones. Refer questions about this manual to the nearest Customer Service Manager. This manual contains mechanical service information required for the equipment described and is current as of the printing date.

Audience

This document aids service personnel in testing and repairing V290 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 A920 or A925 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 the standard 12 month warranty terms and conditions. Accidental damage, misuse, and extended warranties offered by retailers are not supported under warranty. Non warranty repairs are available at agreed fixed repair prices.

Out of Box Failure Policy

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

Product Support

Customer's original phones will be repaired but not refurbished as standard. Appointed Motorola Service Hubs will perform warranty and non-warranty field service for level 2 (assemblies) and level 3 (limited PCB component). Motorola High Tech Centers will perform level 4 (full component) repairs.

Customer Support

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

Parts Replacement

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

Replacement parts, test equipment, and manuals can be ordered from AAD.

U.S.A.

Phone: 800-422-4210

FAX: 800-622-6210

Outside U.S.A.

Phone: 847-538-8023

FAX: 847-576-3023

For EMEA spare parts call +49 461 803 1638.

For Asia spare parts call +65 648 62995.

Specifications

Table 1. Specifications

General Function	Specification
Frequency Range EGSM	TX: 880 - 915 MHz Frequency (MHz) = $890 + (0.2 \times n)$ where: $0 \leq n \leq 124$ Frequency (MHz) = $890 + (0.2 \times (n - 1024))$ where: $975 \leq n \leq 1023$ RX: 925 - 960 MHz Frequency (MHz) = $935 + (0.2 \times n)$ where: $0 \leq n \leq 124$ Frequency (MHz) = $935 + (0.2 \times (n - 1024))$ where: $975 \leq n \leq 1023$
Frequency Range DCS	TX: 1710 to 1785 MHz Frequency (MHz) = $1710 + (0.2 \times (n - 511))$ where: $512 \leq n \leq 885$ RX: 1805 to 1880 MHz Frequency (MHz) = $1805 + (0.2 \times (n - 511))$ where: $512 \leq n \leq 885$
Frequency Range PCS	TX: 1850 to 1910 MHz Frequency (MHz) = $1850 + (0.2 \times (n - 511))$ where: $512 \leq n \leq 810$ RX: 1930 to 1990 MHz Frequency (MHz) = $1930 + (0.2 \times (n - 511))$ where: $512 \leq n \leq 810$
Frequency Range UMTS	TX: 1920 to 1980 MHz Frequency (MHz) = $\text{UARFCN}^1 \div 5$, where: $9612 \leq \text{UARFCN}^1 \leq 9888$ UARFCN ¹ in increments of 25 RX: 2110 to 2170 MHz Frequency (MHz) = $\text{UARFCN}^1 \div 5$, where: $10562 \leq \text{UARFCN}^1 \leq 10838$ UARFCN ¹ in increments of 25
Channel Spacing	200 kHz (GSM, DCS, PCS), 5MHz UMTS
Channels	174 EGSM, 374 DCS, 274 PCS carriers with 8 ch. Per carrier, 11 UMTS
Duplex Spacing	45 MHz GSM, 95 MHz DCS, 80 MHz PCS, 190 MHz UMTS
Modulation	GMSK AT BT = 0.3 (GSM, DCS, PCS), QPSK (UMTS)
Transmitter Phase Accuracy	5 degrees RMS, 20 Degrees peak
Frequency Error	± 0.1 ppm
Input/Output Impedance	50 ohms (nominal)
Nominal Operating Voltage	3.6 Vdc $\pm 10\%$ (battery) +4.4 Vdc $\pm 10\%$ (external connector)
Dimensions (Volume) (w/Standard battery)	148.5 x 60 x 24.3 (mm), 5.8 x 2.3 x 0.96 (in)
Volume	172 cc, 10.5 in ³
Weight	209 g, (6.75 oz) with battery, stylus, and SD card
Display	TFT active matrix full color display (65K colors) 208 x 320 pixel LED front lighting
Battery Life (800mAh) ²	GSM: Up to 150 min. (Talk Time), up to 200 hours (Standby) WCDMA: Up to 90 min. (Talk Time), up to 185 hours (Standby)
Nominal Temperature Range	-20° C to +50° C

¹UTRA Absolute Radio Frequency Channel Number (UARFCN)

²All talk time and standby times are approximate and depend on network configuration, signal strength, and features selected

Table 2. GSM System

General Function	Specification
Speech Coding Type	Regular Pulse excitation/linear predictive coding with long term prediction (RPE LPC with LTP)
Bit Rate	13.0 kbps
RF Power Output	32 dBm nominal GSM, 28.5 dBm nominal DCS/PCS
Receive Sensitivity	-107 dBm GSM, -102 dBm DCS/PCS
RX Bit Error Rate	< 2%

Table 3. UMTS System

General Function	Specification
Speech Coding Type	Adaptive Multirate (AMR)
RF Power Output	21 dBm
Error Vector Magnitude	< 17.5% @ Pout > -20 dBm
PN9 Bit Error Rate (VER)	0.1% @ 12.2k, -106.7 dBm
ACLR	-33 dB @ ±5 MHz, -43 dB @ ±10 MHz

Product Overview

The A920 and A925 are Motorola's next evolution of a smart phone 3G device. This product provides high speed network access and rich multimedia content all in a superior voice centric unit. A video camera and GPS functionality provide additional value by offering unique business and entertainment solutions.

The mechanical architecture features a 208 x 320 pixel, 0.192mm pitch TFT active color display, a built-in speaker phone, SD-MMC memory expansion slot, an integrated camera, integrated GPS and a removable Li-Polymer battery.

As 3G products, the A920 and A925 comply with all key specifications as defined by the 3GPP. Key product features are listed below.

- UMTS: WCDMA 2100, GSM 900/1800 and 1900 MHz Tri-band technology
- High speed packet data (64 kbps UL, 384 kbps DL)
- 208 x 320 TFT Active Color, 65K color display
- 8 MB Flash Memory available to the user (6MB for Chinese version), Expandable SD-MMC memory card
- Integrated Bluetooth
- MP3 Player
- Enhanced Multimedia Capability (Audio/Video, Games, MMS)
- Unique 5-way Navigation Key
- Touchscreen-based graphical user interface
- Full internet browser (HTML, XHTML, WML, XML)
- Full Personal Information Manager (PIM) with Synchronization (OTA, Desktop)
- Integrated Video/Still Camera and Integrated A-GPS
- Voice Recognition Driven Dialing and Menu Shortcuts
- Voice Note Voice Recorder
- 24 Polyphonic MIDI Ringer Sounds
- Programmable (J2ME)
- QuickPrint™ handwriting recognition input
- Integrated Stereo Headset Jack



Some of the features listed below may be subject to the following: Network, subscription, or service provider dependent. Not available in all areas.

- E911 Services

Video Camera and Location Solutions

Video Camera Features:

- JPEG Image Capture @ VGA Resolution
- MPEG4 Video Capture @ QCIF Resolution
- Rotateable Lens w/180° Range of Motion (take pictures and video of others or yourself)
- Streaming Video and Audio
- Sending captured Video Clips and Pictures using MMS, Email.
- Simultaneous Voice/Data – Take a picture or video clip and send while you're on the phone
- Video Conferencing (2-Way Video Telephony)

Location (AGPS) Applications:

- Get to specific location, with appropriate choices of destinations and routes and guidance to destination
- Identify local places of interest for hotels, taxi companies, restaurants, theatres, sightseeing, shopping
- Receive information through alerts or display on map ahead of traffic congestion.
- Receive roadside assistance, with rescue service network and location information from the cellular network used to complement any information the pedestrian/driver is able to provide.

Operation

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

The telephone's controls are located on the front and side of the phone as shown in Figure 1. Indicators, in the form of icons, are displayed on the LCD.



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Figure 1. A920 Controls (Front and Right Side View)



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Figure 2. Phone Controls (Rear View)

Color Display

The top section of the color display shows available applications. Figure 3 shows some of the indicators that you may see at the top of the display when using your phone.

Messages, phone keypad, and menu options appear in the middle of the display. The status bar at the bottom of the display shows the current phone status.

Some of the phone functions must be performed from the home screen display (see Figure 3). The term *home screen display* refers to the standard display you see when the phone is on and ready to use, when you are *not* on a call or using the menu system.



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



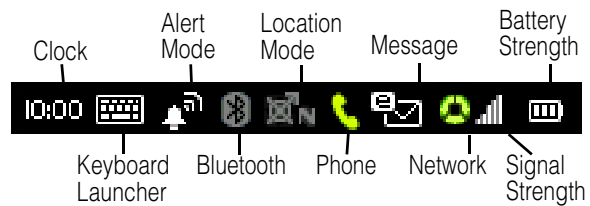
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Figure 3. Home Screen Display



Status Bar

The status bar at the bottom of the telephone display shows the following status indicators:



Clock – Shows the current time.

Keyboard Launcher – Tap to display the on-screen keyboard. (The keyboard displays only when the cursor is in a text-entry field.)

Alert Mode – Shows the currently selected alert mode:

Audio: Vibrate: Silent:

The alert mode indicates how the communicator notifies you of an incoming call or message.

To change the alert mode, tap this indicator and select the setting you want.

 *Bluetooth functionality is not implemented in the initial release of this product.*

Bluetooth – Shows the current status of the Bluetooth radio system. The color indicates the Bluetooth status:

- Off: Gray
- On: White
- Connect: Green

On means Bluetooth is enabled, but not connected to a Bluetooth-capable device. Connect means the communicator is connected to a Bluetooth-capable device.

To turn Bluetooth on or off, tap this indicator and select the setting you want.


Location Mode – Shows whether the GPS (Global Positioning System) Location mode is off, idle (in standby), or busy (requesting location information). The color indicates the Location mode:

- Off: Gray
- Idle: White
- Busy: Green




To turn the Location mode on or off, tap the indicator and select the setting you want. Location mode allows you to track your current location on the communicator screen.


Phone – Shows the status of an active call:

- Connected: 
- Muted: 

 displays when you have a new voice message and no active call.








Message – Shows that you have a new message and what type:

- Email: 
- SMS: 
- MMS: 

If an MMS or SMS message sender's phone number is in your Contact list, the indicator is white. If the message sender's phone number is not in your Contact list, the indicator is amber. If multiple types of new messages are available,  displays.

Network – Shows the type of network service connection:



	No service
	Emergency service
	Connected to GSM home network
	Connected to GPRS home network
	Connected to UMTS home network
	Roaming to non-home network
	Airplane mode (phone disabled)

To turn Airplane mode on or off, tap this indicator and select the setting you want.

Signal Strength – Shows the network signal strength. The more bars, the stronger the network signal.

Strong  No signal

Battery Strength – Shows the amount of charge in the battery. The more bars, the greater the charge. The indicator displays in red when the communicator is consuming a large amount of battery power, such as during a video call.

High  Empty

Status Light

A 3-color LED at the top of the communicator visually indicates network status, incoming calls, and messages. Table 4 describes the status light indications.

Table 4: Status Light

Indication	Description
Rapidly flashing green	Incoming call, phone number stored in Contacts
Alternating green/red	Incoming call, phone number not stored in Contacts
Rapidly flashing amber	Incoming message, address or phone number stored in Contacts
Alternating amber/red	Incoming message, address or phone number not stored in Contacts
Slowly flashing green (every 2 seconds)	Connected to home network
Slowly flashing amber (every 2 seconds)	Roaming (connected to non-home network)
Slowly flashing red (every 2 seconds)	No service or emergency service
Continuous red (when connected to battery charger)	Battery charging
Continuous green (when connected to battery charger)	Battery fully charged

User Interface Structure

Menu Navigation


The A920 and A925 telephones use a simplified icon and list-based user interface.


Opening Applications

The communicator has many built-in applications for communications, personal organization, and entertainment. Every application has an associated icon.

You can open an application in the following ways:

Select one of the icons in the Application Selector bar at the top of the screen. These shortcuts are always visible on the screen.

























Select . The Application Launcher displays, showing icons of all of the communicator's applications. Select the application you want to open.

Press  (Shortcut key) to open your favorite application. The default application is the Home screen.

You don't have to close applications — just open the next one. Changes or entries are always automatically saved.

The application icons (see Table 5) open communicator applications:

Table 5: A920 Application Icons

	Agenda		Messaging		Games
	Calculator		Phone		GPS
	Connect to PC		Time		Help
	Contacts		To Do		Application Installer
	Control Panel		Voice Notes		Palette
	Jotter		Web		Sync to PC
	Audio Player		Picture Viewer		Video Player
	Home Screen		Camera		Virus Scan

Alert Settings

Motorola wireless phones incorporate the VibraCall[®] discreet vibrating alert that helps avoid disturbing others when a ringing phone is unacceptable.

You can set alerts to ring only, vibrate only, vibrate then ring, or no ring or vibrate. An icon on the status bar displays the current alert mode setting.

Additionally, the personalization feature allows you to identify incoming calls by a specific ringer tone.

Battery Function

Battery Charge Indicator

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

Battery Removal

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



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



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 fresh battery.

Operation

For detailed operating instructions, refer to the appropriate user guide listed in the Related Publications section.

Tools and Test Equipment

Table 6 lists the tools and test equipment used on A920 and A925 telephones. Use either the listed items or equivalents.

Table 6. General Test Equipment and Tools

Motorola Part Number ¹	Description	Application
See Table 12	Charger	Used to charge battery and to power phone
0180386A82	Antistatic Mat Kit (includes 66-80387A95 antistatic mat, 66-80334B36 ground cord, and 42-80385A59 wrist band)	Provides protection from damage to phone caused by electrostatic discharge (ESD)
0-00-00-30005 ³	Disassembly tool, black plastic with flat and pointed ends	Used to assemble/disassemble phone
6680388B01	Tweezers, plastic	Used to assemble/disassemble phone
RSX4043-A	Torque Driver	Used to remove and replace screws
—	Torque Driver Bit T-8 Plus, Apex 440-6IP Torx Plus or equivalent	Used to assemble/disassemble phone
HP34401A ²	Digital Multimeter	Used to measure battery voltage

1. To order in North America, contact Motorola Aftermarket and Accessories Division (AAD) by phone at (800) 422-4210 or FAX (800) 622-6210; Internationally, call (847) 538-8023 or fax (847) 576-3023.

2. Not available from Motorola. To order, contact Hewlett Packard at (800) 452-4844.

3. Not available from Motorola. To order, contact

AMS Software & Elektronik GmbH
 c/o Holger Grube
 Lise-Meitner-Straße 9
 D-24941 Flensburg Tel.: +49-461-90398-0
 Fax: +49-461-90398-50

Disassembly

This section describes how to disassemble a A920 or A925 telephone. Tools and equipment used are listed in Table 6, preceding.



Many of the integrated devices used in this equipment are vulnerable to damage from electrostatic discharge (ESD). Ensure adequate static protection is in place when handling, shipping, and servicing the internal components of this equipment.

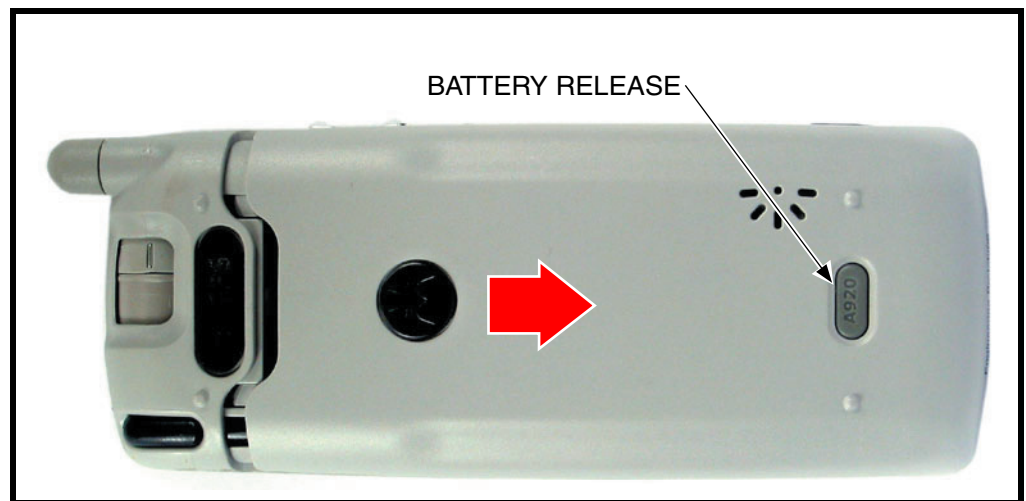


Avoid stressing the plastic in any way to avoid damage to either the plastic or internal components.

Removing and Replacing the Battery Door

To Remove the Battery Door

1. Ensure the phone is turned off.
2. Press the battery door release button.
3. Slide the battery door as indicated by the red arrow.
4. Carefully lift the battery door up and away from the phone.



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Figure 4. Removing the Battery Door

To Replace the Battery Door

1. Align the battery door tabs to the slots on the back of the phone.
2. Lower the battery door onto the back of the phone.
3. Slide the battery door into its final position.

Removing and Replacing the Battery



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

You must install and charge the battery to use the phone.



Caution: The phone is designed to be used only with Motorola Original batteries and accessories. We recommend that you store batteries in their protective cases when not in use.

To Remove the Battery

1. Ensure the phone is turned off.
2. Remove the battery door (see page 16).
3. Pinch the top of the battery from the sides and lift it out of the phone, releasing it from the tab at the bottom of the battery compartment.



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Figure 5. Removing the Battery



The Lithium ion battery can explode if 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.

To Replace the Battery

1. If necessary, remove the battery from its protective clear plastic case.

2. Insert the battery, printed arrow first, under the tab at the bottom of the battery compartment, then press the top of the battery into place.
3. Replace the battery door (see page 16).

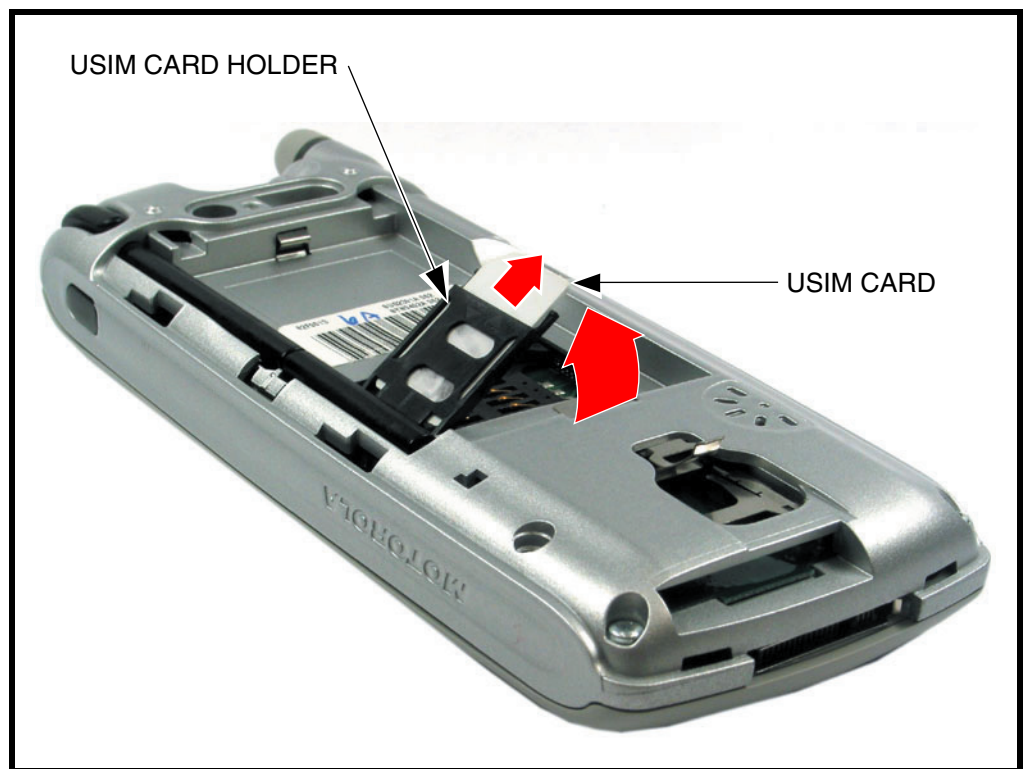
Removing and Replacing the USIM

The UMTS Subscriber Identity Module (USIM) contains the phone number, service details, and phonebook/message memory. The phone can use GSM SIM cards, but not all features will be available.

Do not bend or scratch the USIM card. Avoid exposing it to static electricity, water, or dirt.

To Remove the USIM

1. Ensure the phone is off.
2. Remove the battery door (see page 16).
3. Remove the battery (see page 17).
4. Slide the USIM card holder to unlock it and lift it to open.
5. Slide the USIM out of the USIM card holder.



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Figure 6. Removing and Replacing the USIM Card

To Replace the USIM

1. To replace the USIM, insert the USIM card in the card holder. The card notch fits in the lower left corner, and the gold contacts face down.
2. Close the USIM card holder and slide it up to lock it in place.

Removing and Replacing the Front Housing



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

To Remove the Front Housing

1. Ensure the phone is off.
2. Remove the battery door (see page 16).
3. Remove the battery (see page 17).
4. Remove the USIM (see page 19).
5. Using a T8 driver, remove the two screws that secure the front housing to the rear housing (see Figure 7A).



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Figure 7. Removing the Front Housing

6. Insert a small slotted screwdriver carefully into one of the slots on the side of the phone (see Figure 7B).
7. Release the snaps with a prying motion toward the center of the housing while lifting the front housing away from the phone.
8. Repeat step 7 for each of the slots on the rear of the phone (Figure 7C).
9. Release the snaps along the side of the phone by carefully moving the front housing in a side-to-side motion.
10. Release the last two snaps near the antenna by sliding the front housing toward the antenna.

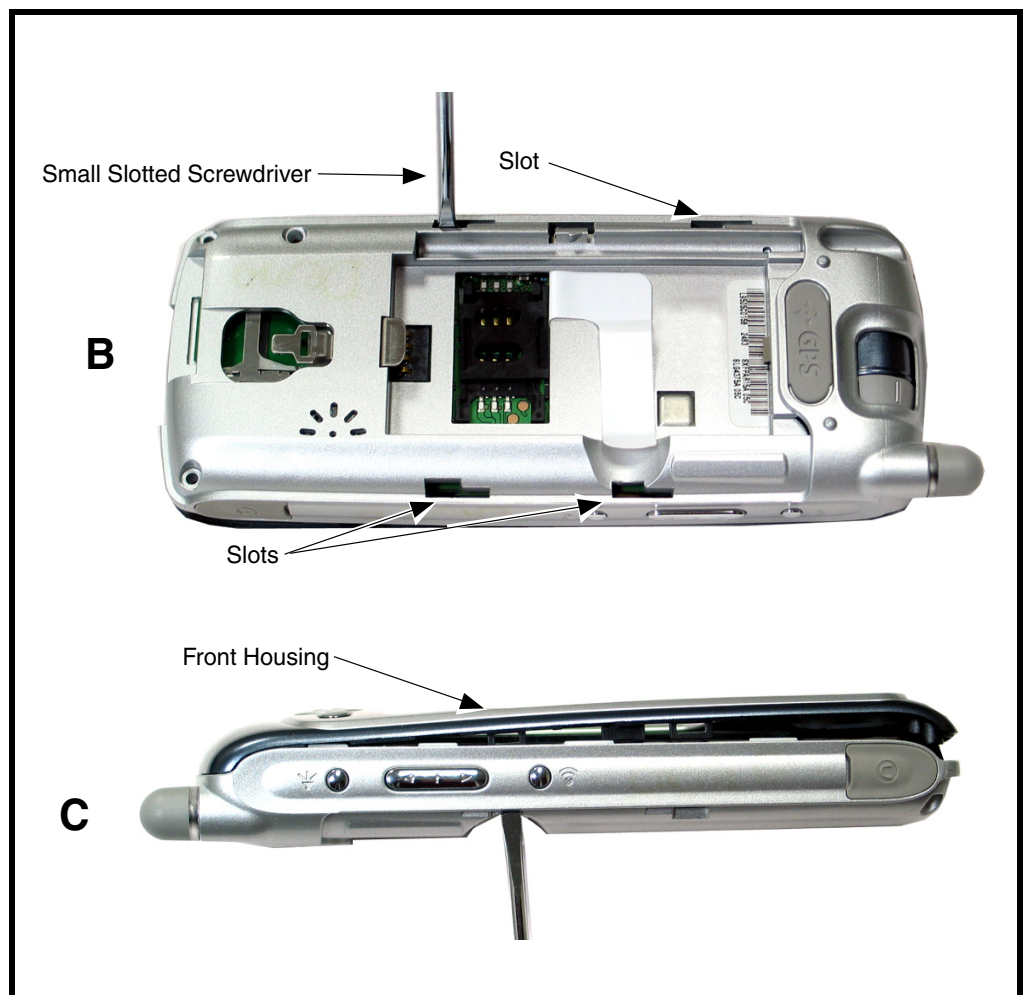
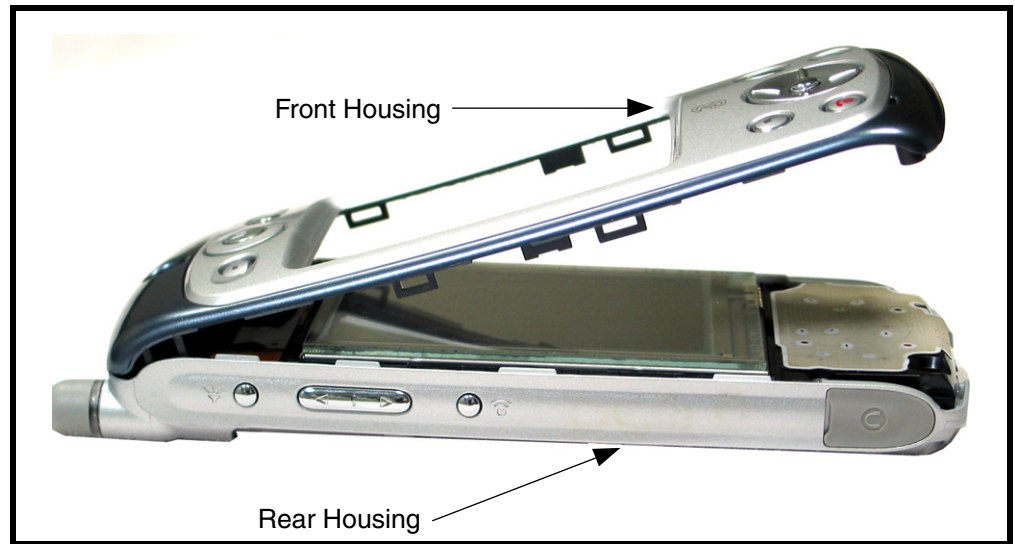


Figure 7. Removing the Front Housing (Continued)

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To Replace the Front Housing

1. Align the front housing to the rear housing. Attach the front housing snaps into place at the top end of the phone near the antenna (see Figure 8).
2. Lower the front housing onto the rear housing. Press the 4 snaps into place along the sides of the front housing.



031116a

Figure 8. Replacing the Front Housing

3. Replace the USIM, battery, and battery door as described in the procedures.

Removing and Replacing the Plastic Chassis Housing

To Remove the Plastic Chassis Housing (PCH)

1. Ensure the phone is off.
2. Remove the battery door (see page 16).
3. Remove the battery (see page 17).
4. Remove the USIM (see page 19).
5. Remove the front housing (see page 20).
6. Remove the four screws holding the PCH in place and set aside for reuse (see Figure 9A).
7. Disengage the two snaps on each side (see Figure 9B).
8. Disengage the snap located by the Planar Inverted F Antenna (PIFA) from the Rear Housing (see Figure 9C).

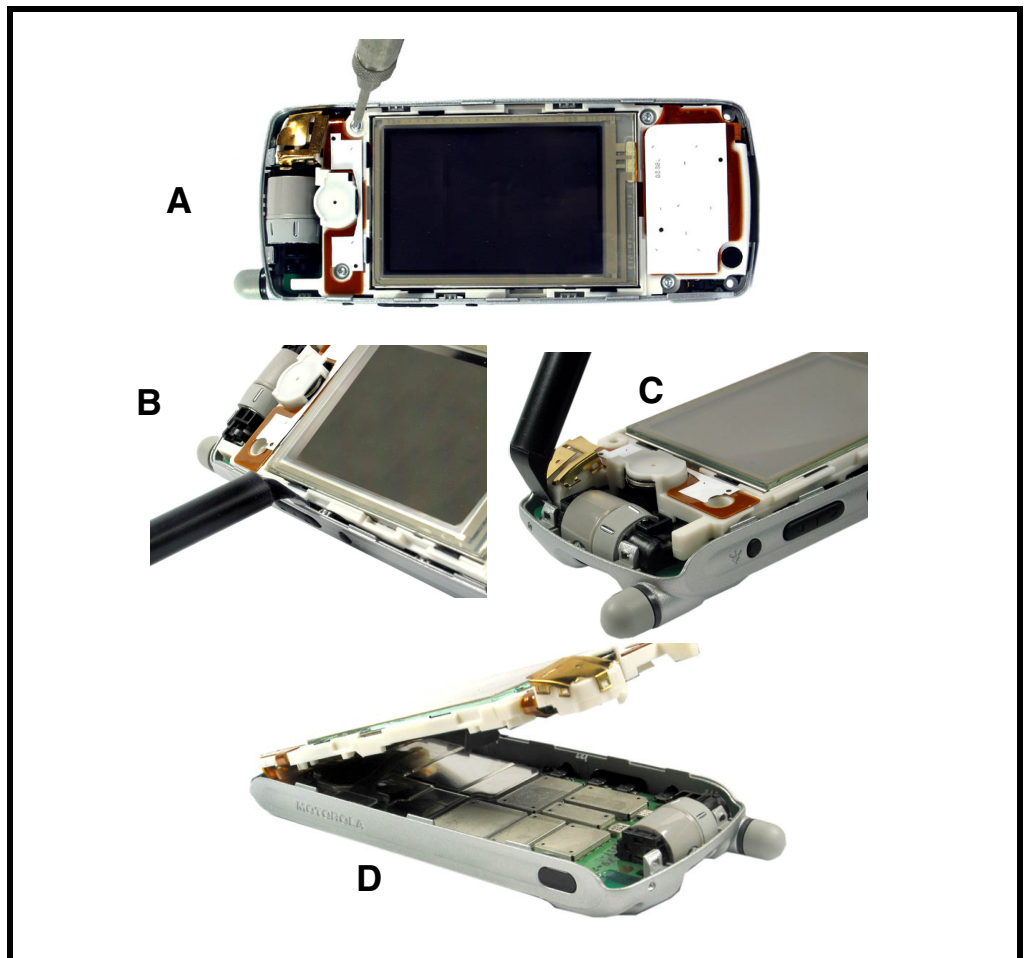
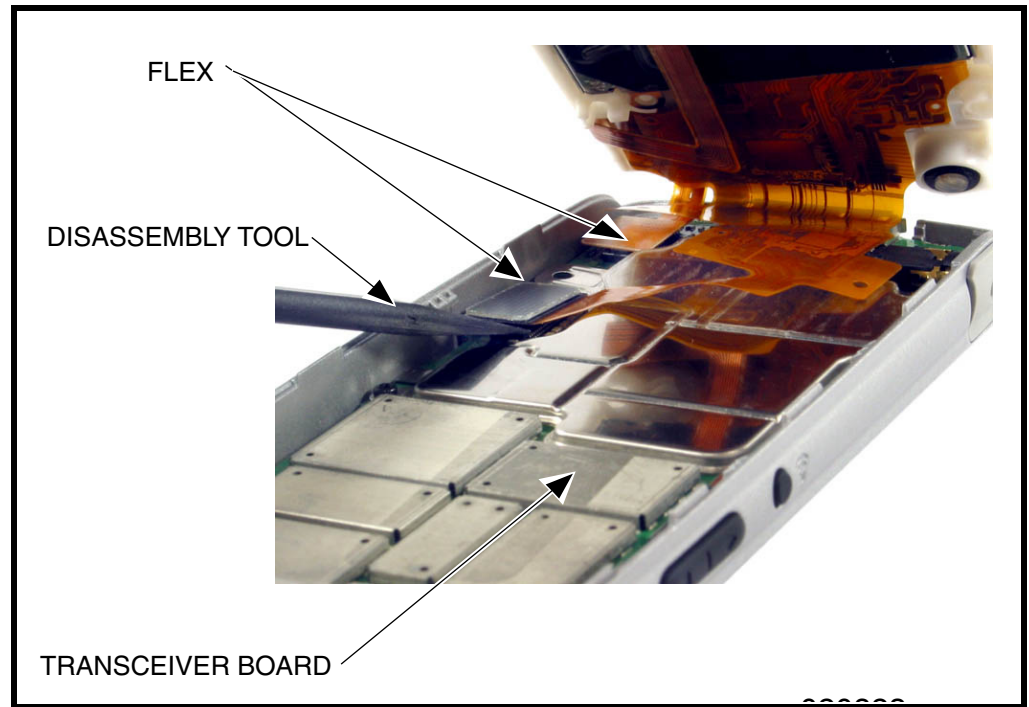


Figure 9. Removing and Replacing the Plastic Chassis Housing

9. Raise the top of the PCH assembly (see Figure 10D) to avoid damaging the Display and PCH Flex connectors.

10. Disconnect the Display Flex connector by gently prying upward with the disassembly tool.
11. Disconnect the PCH Flex connector by gently prying upward with the disassembly tool.



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Figure 10. Removing and Replacing the PCH Flex Connector

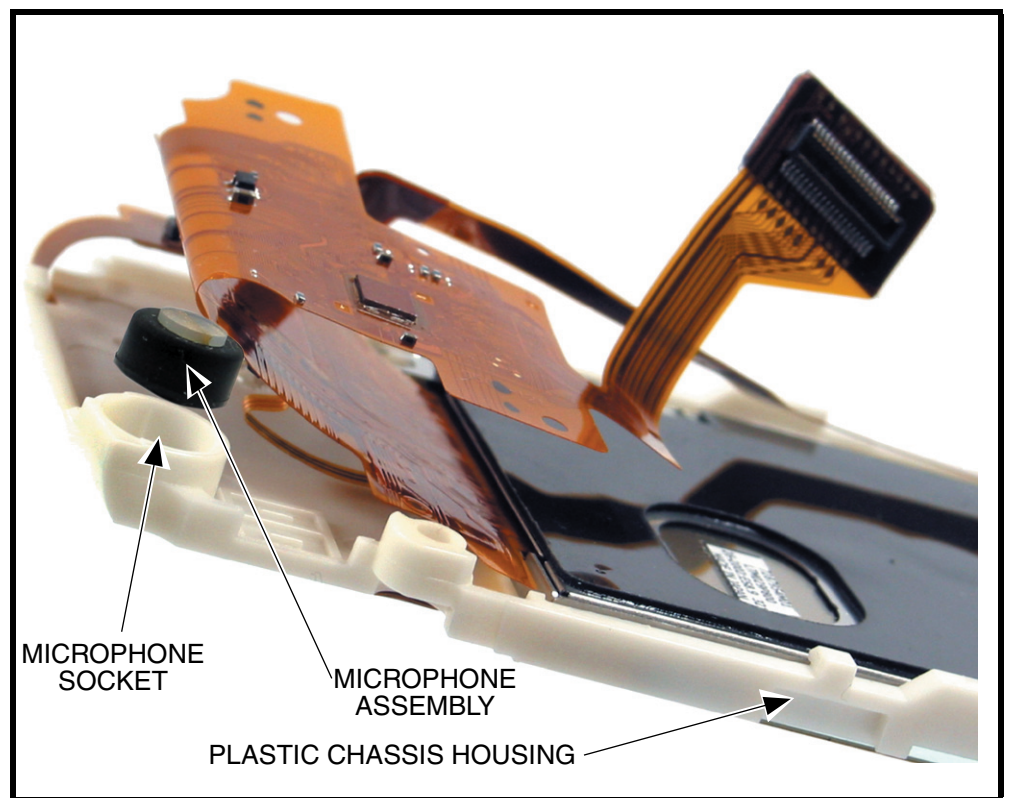
To replace the PCH

1. Attach both the PCH Flex and the Display Flex as shown in Figure 10. Hold the Display/PCH assembly at a 90-degree angle to the Rear Housing assembly while attaching the connectors.
2. Place the PCH/Display in the Rear Housing and secure it by:
 - snapping the PIFA into place first, then,
 - engaging the two snaps on each side of the PCH.
3. Insert the four screws and torque to 2.3-inch lbs.
4. Replace the front housing, USIM, battery, and battery door as described in the procedures.

Removing and Replacing the Microphone Assembly

To Remove the Microphone Assembly

1. Ensure the phone is turned off.
2. Remove the battery door (see page 16).
3. Remove the battery (see page 17).
4. Remove the USIM (see page 19).
5. Remove the front housing (see page 20).
6. Remove the PCH (see page 23).
7. Use the plastic tweezers to grasp the microphone assembly and lift it out of the microphone socket.



020833-o

Figure 11. Removing the Microphone Assembly

To Replace the Microphone Assembly

1. Align the microphone assembly with the microphone socket and press into place.
2. Ensure that the microphone elastomeric connector is correctly positioned to contact the transceiver board.
3. Replace the PCH, front housing, USIM, battery, and battery door as described in the procedures.

Removing and Replacing the Transceiver Board

To remove the transceiver board

1. Ensure the phone is turned off.
2. Remove the battery door (see page 16).
3. Remove the battery (see page 17).
4. Remove the USIM (see page 19).
5. Remove the Front Housing (see page 20).
6. Remove the PCH (see page 23).
7. Using the Torx driver and T-6 bit, remove the 2 screws shown in Figure 12A. Set the screws aside for reuse.
8. If necessary, lift the transceiver board out of the rear housing as shown in Figure 12B. Pry outward on the sides of the housing to release the board.

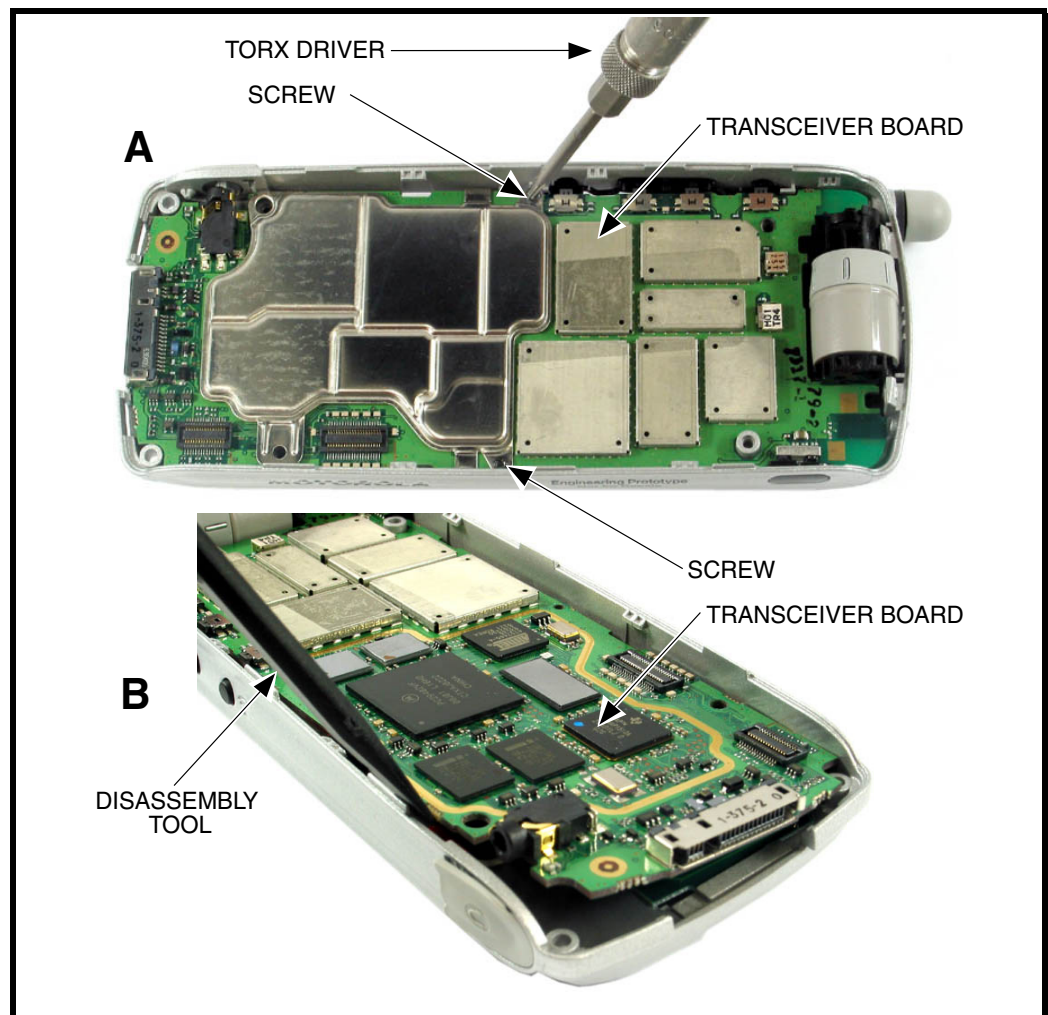


Figure 12. Removing the Transceiver Board

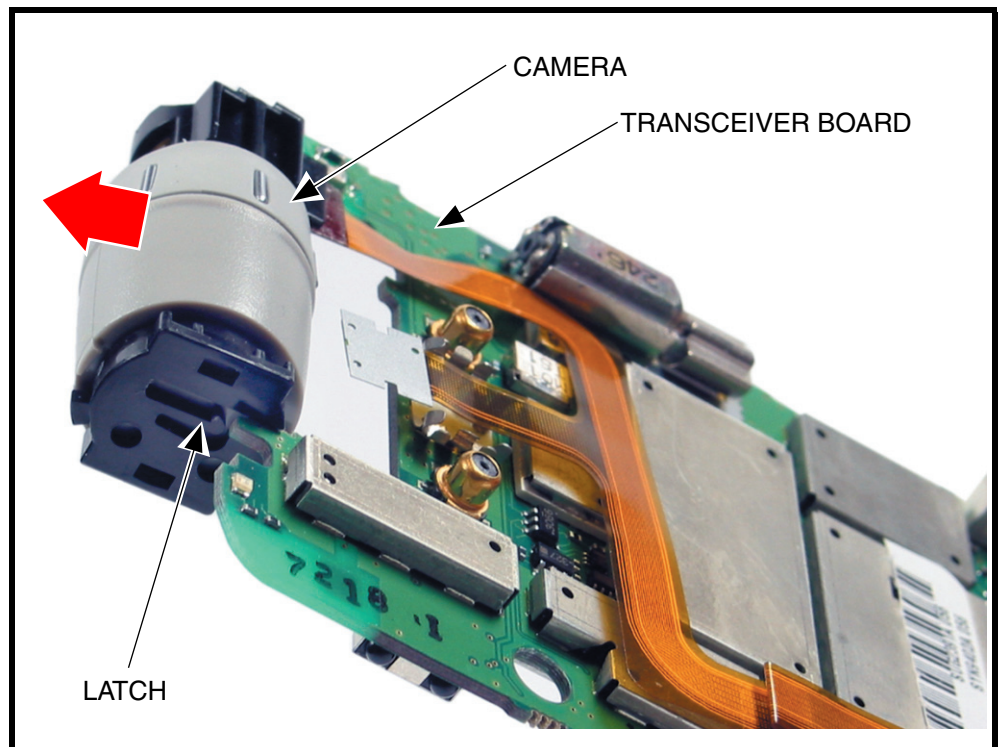
To Replace the Transceiver Board

1. Align the transceiver board with the rear housing and set it in place. If necessary, press gently to make sure the board is fully seated in the housing.
2. Insert and tighten the two screws, using the T-6 Torx driver. Do not overtighten.
3. Replace the PCH, front housing, USIM, battery, and battery door as described in the procedures.

Removing and Replacing the Camera

To Remove the Camera

1. Ensure the phone is off.
2. Remove the battery door (see page 16).
3. Remove the battery (see page 17).
4. Remove the USIM (see page 19).
5. Remove the Front Housing (see page 20).
6. Remove the PCH (see page 23).
7. Remove the transceiver board (see page 26).
8. Disconnect the camera's flex connector carefully grasping both sides of the connector and gently pulling upward. Be careful to avoid damaging the flex cable or connector.
9. Gently disengage the latch on each side of the camera and carefully slide it away from the transceiver board.



020832-0

Figure 13. Removing and Replacing the Camera

To Replace the Camera

1. Align the slots on the side of the camera with the transceiver board.
2. Slide the camera into position on the transceiver board. The latches on each side of the transceiver board lock the camera in place.
3. Carefully align the flex connector to the connector socket on the transceiver board and press into position.

Removing and Replacing the Display Assembly

To remove the Display Assembly

1. Follow the procedures to remove the:
 - Battery Door (page 16)
 - Battery (page 17)
 - USIM Card (page 19)
 - Front Housing (page 20)
 - PCH (page 23)
2. Release the display assembly clips from the PCH on each side of the display assembly as shown in Figure 14.



The flexible printed cable connecting the display module to the display board is fragile. Use extreme care when handling.

3. Carefully lift the left side of the display assembly away from the PCH.
4. Carefully lift the right side of the display assembly away from the PCH.

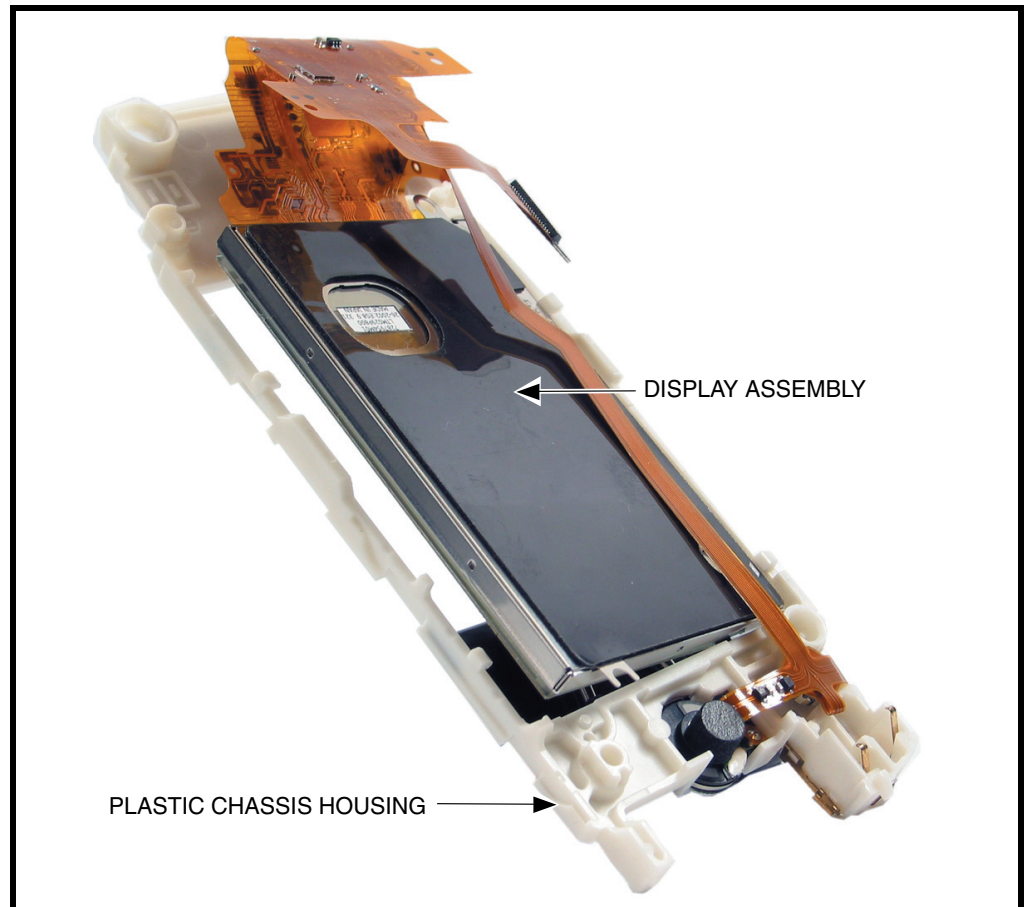


Figure 14. Removing the Display Assembly

5. Remove the display assembly (including the attached circuit board away from the PCH).

To Replace the Display Assembly

1. Align the display assembly with the PCH.
2. Insert the display assembly into the PCH. Ensure that the PCH tabs snap into place as you seat the display assembly in the PCH.
3. Ensure that you seat the display assembly circuit board completely in the PCH.
4. Follow the procedures to replace the:
 - PCH (page 27)
 - Front Housing (page 22)
 - USIM Card (page 19)
 - Battery (page 17)
 - Battery Door (page 16)

Removing and Replacing the Secure Card/Multimedia Card (SD/MMC) PCB

To Remove the (SD/MMC) PCB

1. Follow the procedures to remove the:
 - Battery door (page 16)
 - Battery (page 17)
 - USIM Card (page 19)
 - Front Housing (page 20)
 - PCH (page 23)
 - Transceiver board (page 26)
2. Use the disassembly tool to lift one edge of the SD/MMC PCB out of the rear housing as shown in Figure 15.
3. Lift the SD/MMC PCB up and out of the rear housing.

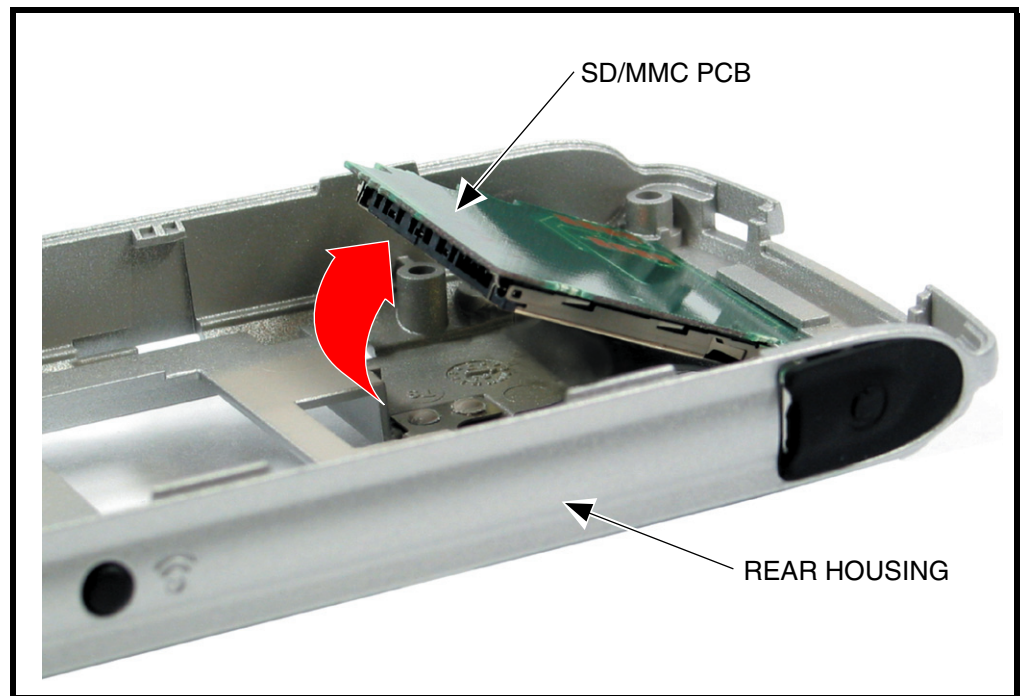


Figure 15. (SD/MMC) PCB Removal

020835-0

To Replace the SD/MMC PCB

1. Align the SD/MMC PCB to the rear housing.
2. Carefully lower the bottom end of the SD/MMC PCB into place in the rear housing followed by the top edge of the PCB until the board is seated properly in position.
3. Follow the procedures to replace the transceiver board, PCH, front housing, USIM card, battery, and rear housing cover.

Subscriber Identity Module (SIM) and Identification Label

SIM

A SIM is required to access the existing local GSM network, or remote networks when traveling (if a roaming agreement has been made with the provider).

The SIM 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 Label

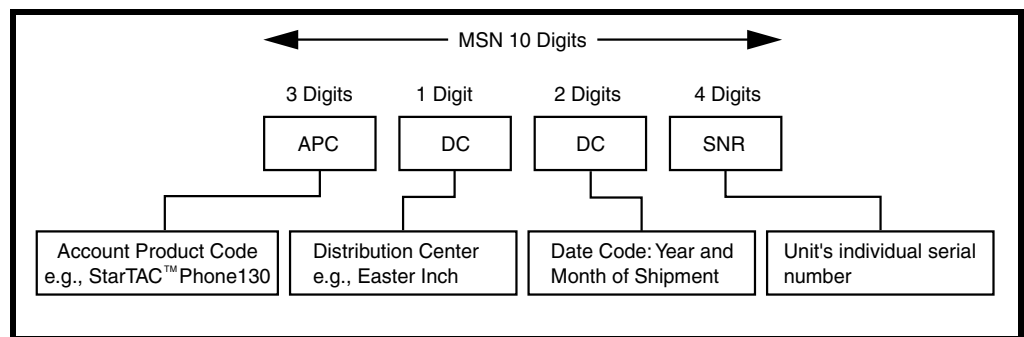
Each Motorola GSM phone is labeled with a variety of identifying numbers. The following section describes the current identifying labels.

Mechanical Serial Number (MSN)

The MSN is an individual unit identity number and remains with the unit throughout its life.

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

The MSN is divided into the four sections shown in Figure 16.

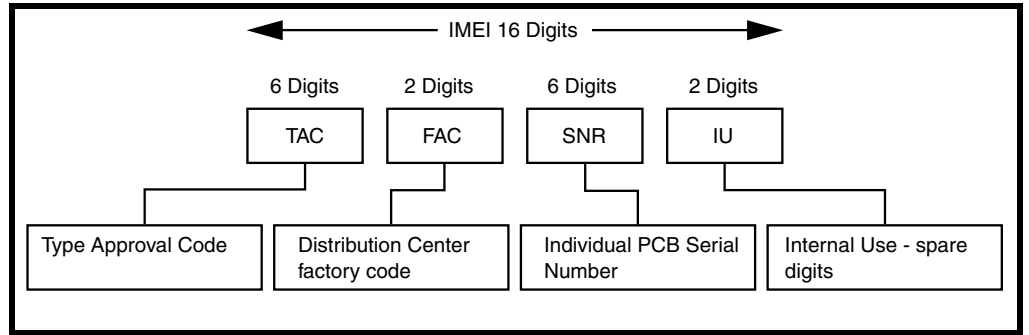


000807a

Figure 16. MSN Label Description

International Mobile Equipment Identity (IMEI)

The IMEI number is a number unique to the PCB and is stored within the phone's memory. The IMEI number is divided into the four sections shown in Figure 17.



000808o

Figure 17. IMEI Label Breakdown

Other label number configurations are:

- **Transceiver Number:** Identifies the product type, usually the SWF number (e.g. V100).
- **Package Number:** Identifies the equipment type, mode, and language pack in the phone.

Troubleshooting

Table 7. 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 it is <3.25 Vdc, recharge the battery using the appropriate charger. If it will not recharge, replace the battery. If battery is not at fault, proceed to b.
	b) Battery terminals open or misaligned.	Visually inspect battery terminals on both battery and phone. Realign and, if necessary, either replace the battery or refer to a Level 3 Service Center for battery connector replacement. If battery terminals are not at fault, proceed to c.
	c) Transceiver board defective.	Remove transceiver board assembly. Substitute a known good transceiver board and temporarily reassemble the phone. Press the PWR button; if phone turns on and stays on, disconnect the dc power source and reassemble phone with new transceiver board. 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 defective.	Check connection between antenna and transceiver board. If the connection is OK, substitute a known good antenna. If the fault is still present, proceed to b.
	b) Transceiver board defective.	Replace transceiver board (refer to 1c). Verify that fault has been cleared and reassemble phone with new transceiver board.
3. Display is erratic, or provides partial or no display.	a) Mating connections to or from transceiver board faulty.	Check general condition of flex and flex connector. If flex and connector are good, check that display assembly mounting tabs are fully engaged. If connector is not at fault, proceed to b.
	b) Transceiver board defective.	Replace transceiver board (refer to 1c). Verify that fault has been cleared and reassemble phone with new transceiver board.
4. Incoming call alert transducer audio distorted or volume is too low.	Faulty transceiver board.	Replace transceiver board (refer to 1c). Verify that fault has been cleared and reassemble unit with new transceiver board.
5. Telephone transmit audio is weak. (usually indicated by called parties complaining of difficulty in hearing voice).	a) Microphone defective.	Replace microphone as described in procedures. If fault is not cleared, proceed to b.
	b) Transceiver board defective.	Replace transceiver board (refer to 1c). Verify that fault has been cleared and reassemble phone with new transceiver board.
6. Receive audio from earpiece speaker is weak or distorted.	a) Connections to or from transceiver board defective.	Check connection from earpiece to transceiver board. If connection is not at fault, proceed to b.

Table 7. Level 1 and 2 Troubleshooting Chart (Continued)

Symptom	Probable Cause	Verification and Remedy
	b) Earpiece speaker defective.	Temporarily replace speaker with a known good speaker. Ensure good connection. Place a call and verify improvement in earpiece audio. If fault is cleared, reassemble phone with good transceiver board. If fault is not cleared, proceed to c.
	c) Transceiver board defective.	Replace transceiver board (refer to 1c). Verify that fault has been cleared and reassemble phone with new transceiver board.
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 contacts are clean, insert a known good SIM card into phone. Power up phone and confirm that card has been accepted. If fault no longer exists, replace defective SIM card. If SIM card is not at fault, proceed to b.
	b) Transceiver board defective.	Replace transceiver board (refer to 1c). Verify that fault has been cleared and reassemble phone with new transceiver board.
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 defective.	Replace transceiver board (refer to 1c). Verify that fault has been cleared and reassemble phone with new transceiver board.
9. Internal Charger not working.	Faulty charger circuit on transceiver board.	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.
10. No or weak audio when using headset.	a) Headset plug not pushed in fully.	Ensure the headset plug is fully seated in the jack.
	b) Faulty jack on transceiver board.	Replace transceiver board (refer to 1c). Verify that fault has been cleared and reassemble phone with new transceiver board.

Manual Test Mode

Motorola A920 or A925 telephones are designed with a test mode. This allows service personnel to verify functionality and troubleshoot by entering commands.

1. Launch the application by tapping the icon on the Application Launcher screen. A password dialog box displays (see Figure 18).

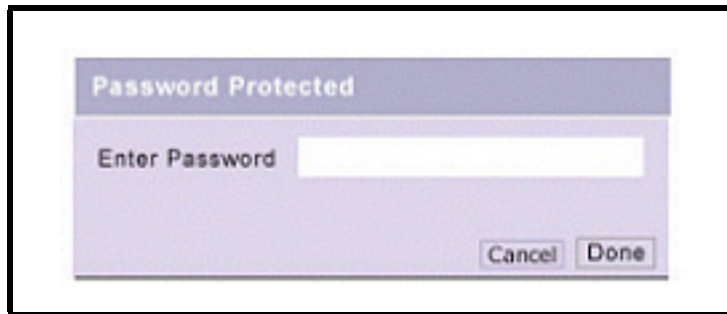


Figure 18. Test Commands Application Password Box

2. Enter the test commands application password **0HTCMD#**, then tap **Done**. When the correct password is entered, the test commands application main screen displays (see Figure 19).

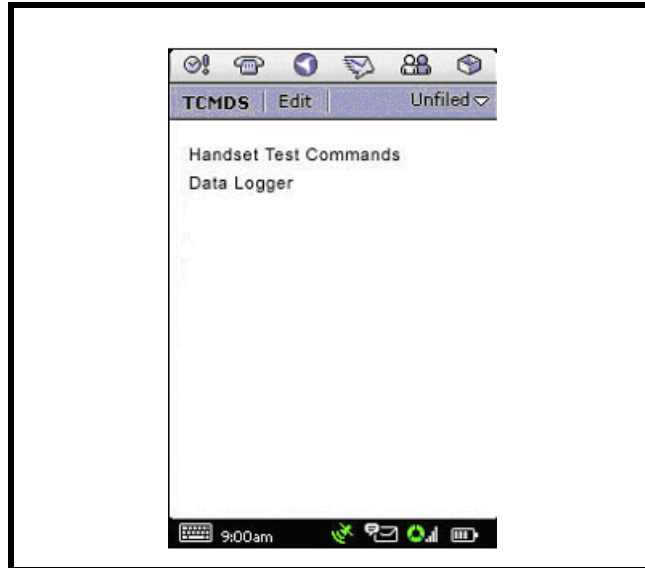


Figure 19. Test Command Application Screen

3. Select **Handset Test Commands**. The Handset Test Commands application main screen displays (see Figure 20).

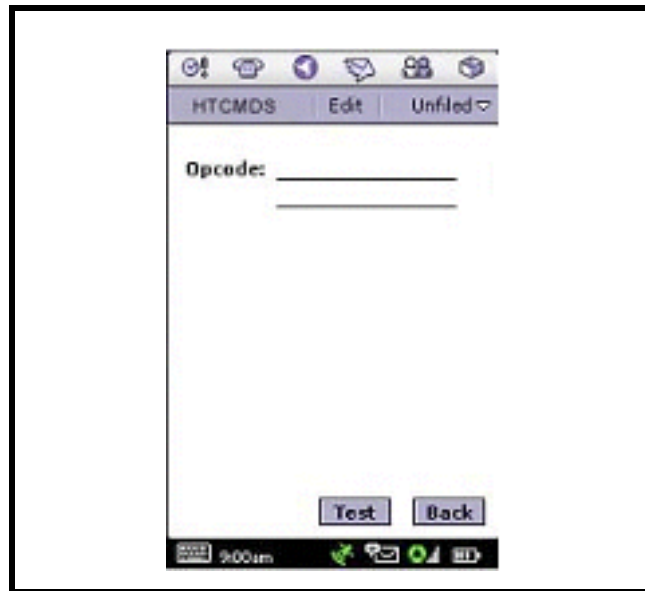


Figure 20. Handset Test Commands Application

4. From Edit menu, select input format (Hex or Decimal) for test commands.
5. Enter an Opcode and press **Test**.
 Enter Opcode parameters in the fields provided.
 You can also enter an Opcode and field values separated by commas, on the Opcode field (see Figure 21).

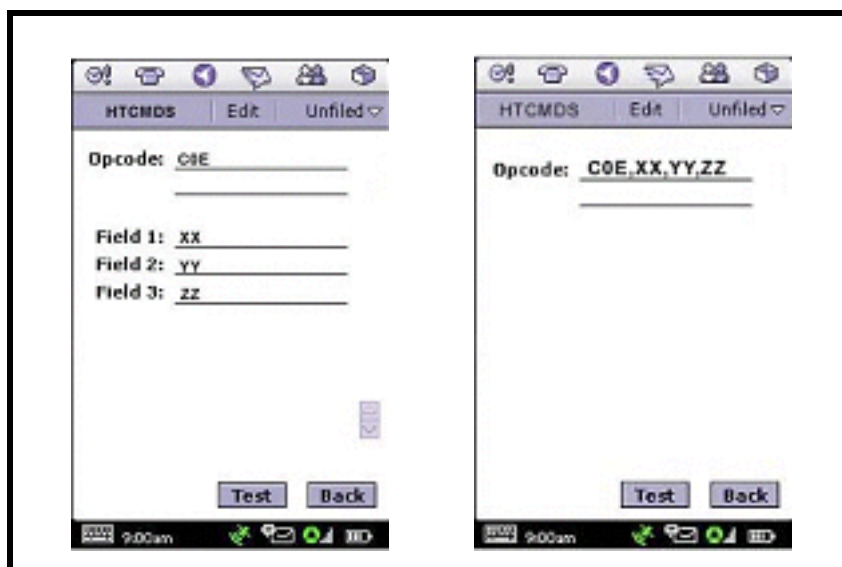


Figure 21. Test Command Opcode Entries

Click the keyboard icon at the bottom of the screen to display a keyboard. Use the keyboard to enter the Opcode and field values. You can also use the stylus to enter opcodes and field values (see Figure 20).

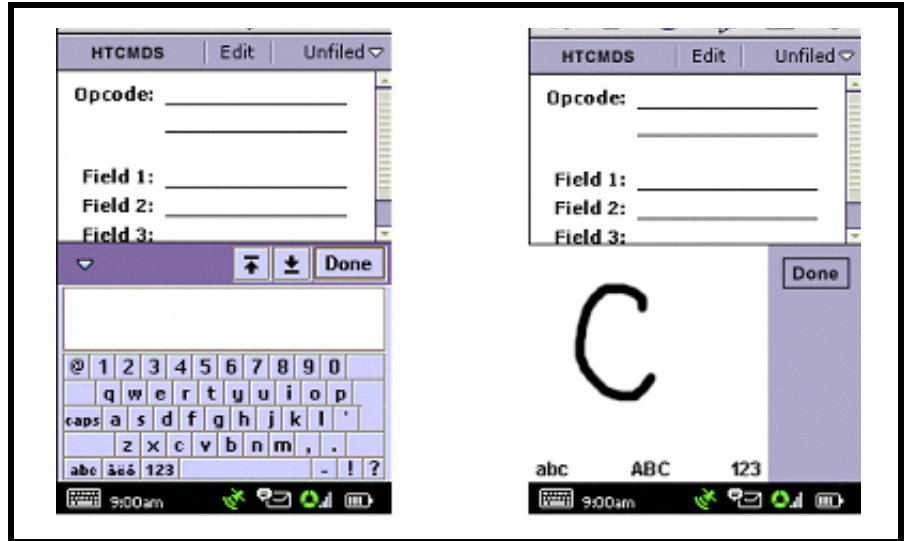


Figure 22. Test Command Opcode Entries with the Keyboard or Stylus

Handset Test commands are listed in Table 8.

Note: The handset can be suspended only by executing the SUSPEND test command. You can exit the feature and return to idle if the handset has not yet been suspended. Otherwise, exiting the feature causes a restart.

Manual Test Mode Commands

Table 8. Level 2, 3G Handset Test Commands

Opcode (Decimal)	Opcode Mnemonic	Key Entry Format	Description	Field	Field Value
0	AUD_TN_LST	0 * <Action> * <Tone Identifier> OK	Generate/disable predefined tone	Field 1	0 = start a tone
					1 = stop a tone
				Field 2	0-9 = DTMF tones
3	AUD_CTRL	3 * <Device/Process> * <Action> OK	Control various audio functions; enable/disable vibrator	Field 1	0 = Vibrator
					2 = Echo canceling
					3 = Noise suppressor
				Field 2	0 = Disable
					1 = Enable

Table 8. Level 2, 3G Handset Test Commands (Continued)

Opcode (Decimal)	Opcode Mnemonic	Key Entry Format	Description	Field	Field Value
4	AUD_LPB	4 * <Loopback Type> * <Action>OK	Enable audio loopback	Field 1	0 = PCAP loopback
					6 = CODEC loopback
					7 = VOCODER (speech) loopback
				Field 2	0 = Disable audio loopback
					1 = Enable audio loopback
				Field 3	This field is valid only for VOCODER loopback
					0 = AMR 4.75
					1 = AMR 5.15
					2 = AMR 5.90
					3 = AMR 6.70
					4 = AMR 7.40
					5 = AMR 7.95
					6 = AMR 10.20
					7 = AMR 12.20
					8 = Full Rate
	16 = Enhanced Full Rate				
	32 = Half Rate				
5	AUD_LVL	5 * <Get/ Set> * <Volume> OK	Set audio level	Field 1	0 = Set the volume specified
				Field 2	0 = lowest, 7 = loudest

Table 8. Level 2, 3G Handset Test Commands (Continued)

Opcode (Decimal)	Opcode Mnemonic	Key Entry Format	Description	Field	Field Value
6	AUD_PATH	6 * <Input Path> * <Output Path> * <RX Mute> * <TX Mute> OK	Change audio path	Field 1	0 = As is
					1 = Mute input path
					2 = Internal (handset) mic
					3 = Ext audio input (CE Bus)
					4 = Boom (headset) mic
					5 = Ext digital audio (USB)
					7 = Bluetooth time slot 1 audio input
					8 = Bluetooth time slot 2 audio input
					9 = Bluetooth time slot 3 audio input
				Field 2	0 = As is
					1 = Mute output path
					2 = Internal (handset) speaker
					3 = Alert
					4 = Ext audio output (CE Bus)
	5 = Speakerphone				
	6 = Boom (headset) speaker				
34	RESTART	34 * OK	Generate a software restart	Field 1	As is
54	SUSPEND	54 OK	Terminate normal mode and enter test mode	Field 1	As is

Table 8. Level 2, 3G Handset Test Commands (Continued)

Opcode (Decimal)	Opcode Mnemonic	Key Entry Format	Description	Field	Field Value
57	VERSION	57 *<version Type>OK	Retrieve SW version information	Field 1	016000 = DSP version
					017000 = User (login) of process that created this file
					017001 = Build time (universal) in ISO-8601 format
					017002 = Clearcase view tag name
					017003 = Product base label from Clearcase config spec
					017004 = Product ID
					017005 = Version number
					017006 = Build commentary
					018000 = Flash booter version number (P2K Booter only)

Manual Test Mode Response Codes

Table 9. Level 2, 3G Handset Test Command Response Codes

Opcode (Decimal)	Field Value
0	Parse error (no data follows): Invalid data length for command
1	Parse error (no data follows): Inadequate security level for command/parameter
2	Parser error (no data follows): Command/parameter not supported for current protocol (CDMA, GSM, TDMA)
3	Parse error (no data follows): Command/parameter not supported for current mode (normal, test mode, handset test mode)
4	Parse error (no data follows): Unsupported/invalid opcode
5	Parse error (no data follows): Unsupported/invalid parameter for opcode
6	Command response: Generic success (no data follows)
7	Command response: Generic failure (no data follows)
8	Command response: Data follows
9	Unsolicited/multiple response: Data follows (sequence tag is 0)
10	Error: Couldn't allocate memory
11	Error: Internal task error
12	Error: Test Command task timed out waiting for response from another SW component

Table 9. Level 2, 3G Handset Test Command Response Codes(Continued)

Opcode (Decimal)	Field Value
13	CDMA: parse error (no data follows): command/parameter not supported for current sub-mode TDMA: command not supported in current Call Stack Test Mode
14	Error: Length specified in command header greater than length received by transport layer
15	Error: Irrecoverable error; phone state has been lost. Phone is being powered down

Level 2 Troubleshooting Procedures

A fully charged battery is all that is needed to perform the procedures described in this section. For each test, enter the Manual Test Command Mode as described in "Manual Test Mode" on page 36, then enter the codes listed.

Vibrator Test

1. **54** (Suspend)
2. **3*0*1** (Enable Vibrator)
3. **3*0*0** (Disable Vibrator)
4. Verify vibration function when enabled.

Handset Mic/Speaker Test

1. **54** (Suspend)
2. **6*2*2** (Enable internal mic and handset speaker)
3. **4*7*1*16** (Enable VOCODER loopback at Enhanced Full Rate)
4. Speak into the handset mic and listen for undistorted speech in the handset speaker.

Headset Mic/Speaker Test

1. **54** (Suspend)
2. **6*4*6** (Enable headset mic and headset speaker)
3. **4*7*1*16** (Enable VOCODER loopback at Enhanced Full Rate)
4. Speak into the headset mic and listen for undistorted speech in the headset speaker.

Software Version Check

1. **57*017005** (Read version number)
2. Returned data is read as follows: F1 (D): 80530002
which translates to SW Version 53.00.02.

Programming: Software Upgrade and Flexing

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

Part Number Charts

This section provides a reference for the parts associated with A920 and A925 telephones.

Related Publications

Motorola A920 Wireless Phone User Guide, UK English

SJJN4952

Motorola A920 Wireless Phone Reference Guide, English

68809454A45

A920 Exploded View Parts List

Table 10. Exploded View Parts List

Item	Motorola Part No.	Description
1	1588021M01	Battery door assembly
2	0188493L01	Battery
3	0587841M01	Headset grommet
4	8488593M01	MMC PCB
5	0587841M01	RF connector grommet
6	1588005M01	Rear housing assembly
7	3887843N01	Side buttons
8	6187845M01	Light guide
9	6187903M01	IrDA lens
10	8487342M01	Transceiver PCB
11	5085600J01	Microphone

Item	Motorola Part No.	Description
12	8588540M01	Main antenna
13	1588460M01	Stylus
14	0309315B16	Board screws
15	1587832M02	Plastic chassis housing assembly
16	0187837M01	Camera assembly
17	7287358M01	Display assembly
18	3887745M01	Keypad
19	0388325M01	Screws
20	3988220M01	GPS antenna
21	1588003M01	Front housing assembly



The Lithium ion battery pack may explode if 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.

A925 Exploded View Parts List

Table 11. A925 Exploded View Parts List

Item	Motorola Part No.	Description
1	1588021M04	Battery door assembly 840 mAh
2	0188493L01	Battery
3	0587841M04	Headset grommet
4	8488593M01	MMC PCB
5	0588203M01	RF connector grommet
6	1588005M08	Rear housing assembly
7	3887843N01	Side buttons
8	6187845M01	Light guide
9	6187903M01	IrDA lens
10	8488488N01	Transceiver PCB
11	5085600J01	Microphone

Item	Motorola Part No.	Description
12	8588540M05	Main antenna
13	1588460M02	Stylus
14	0309315B16	Board screws
15	1589488N01	Plastic chassis housing assembly
16	0187837M01	Camera assembly
17	7289433N01	Display assembly
18	3889426N01	Keypad
19	0388325M01	Screws
20	3988220M01	GPS antenna
21	1589458N01	Front housing assembly



The Lithium ion battery pack may explode if 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.

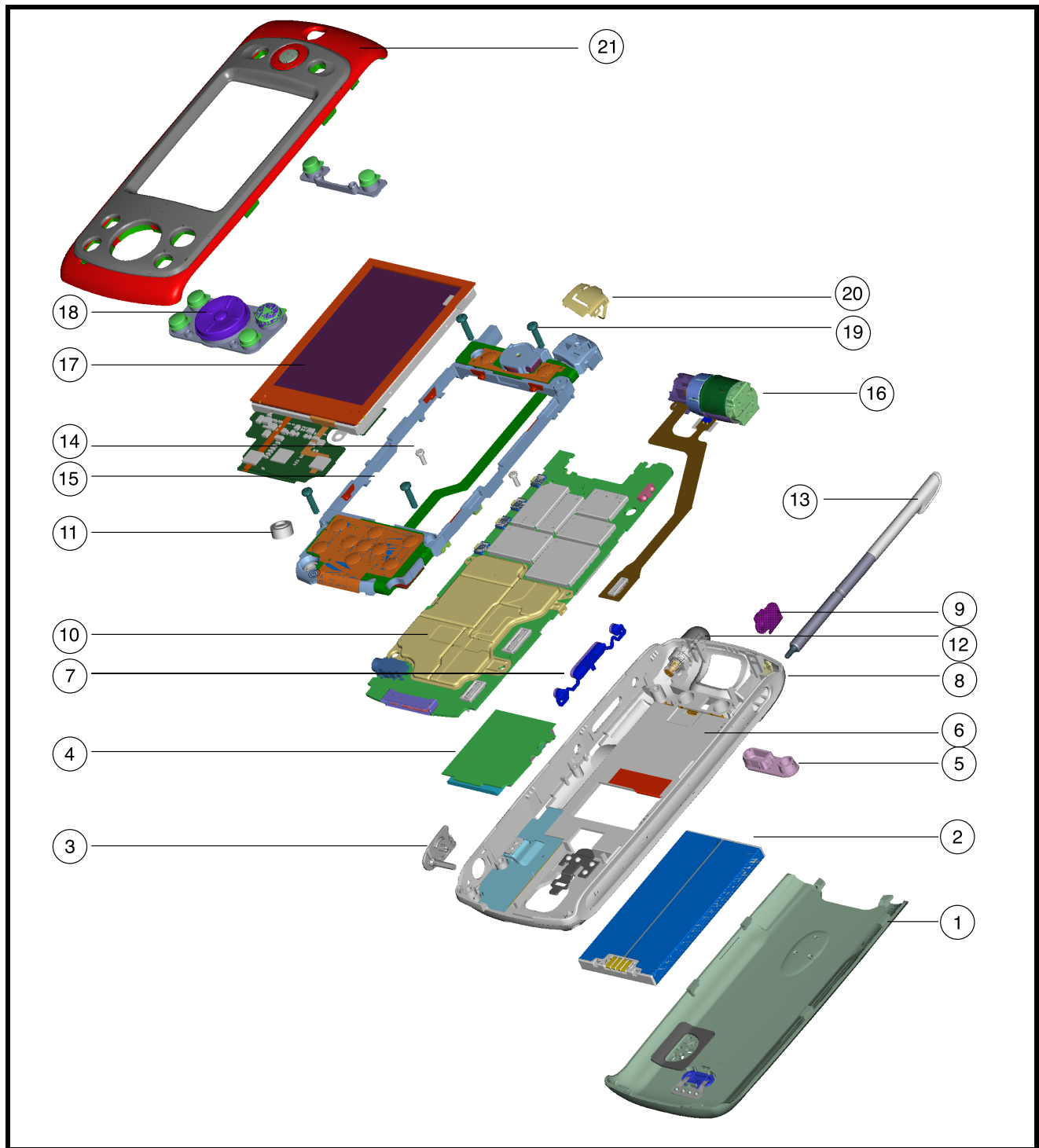
To order parts use the following link:

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

(Password is Required)

For information on ordering parts contact EMEA at +49 461 803 1638.

Exploded View Diagram



020825-0

Figure 23. Exploded View Diagram

Accessories

Table 12. List of Accessories

Description	Part Number
Free Charge	U.S. Retail: 98418H-blue & 98419H-yellow
Standard Battery (800 mAh)	SNN5639
Standard Battery (800 mAh) PRC ¹	SNN5638
Desktop Charger (dual pocket)	SPN5109
Desktop Charger (dual pocket) PRC ¹	SPN5110
Travel Charger (US)	SPN5049
Travel Charger (HK)	SPN5051
3-Prong Power Adapter (UK)	SYN7455
Power Adapter (Australia)	SYN8127
2-Prong Power Adapter (Euro)	SYN7456
Vehicle Power Adaptor (VPA)	SYN7818
Pro Install Car Kit	S9609 or S9609 & HUC (part number TBD)
Stereo Headset with Send/End Button	SYN0384
Universal Customizable One Touch (standard monophonic headset)	SYN9351
Bluetooth Headset	SYN9006
Neckloop	SYN7875
Bluetooth PCMCIA Card (connectivity kit)	SYN8625
Hangup Cup Holder	SYN0577
USB Cable	SKN6311
RS-232 Cable	SKN6315/SYN0729
Carrying Case	SYN0422
CD ROM	8289058M01
Stylus	SHN8241B

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