



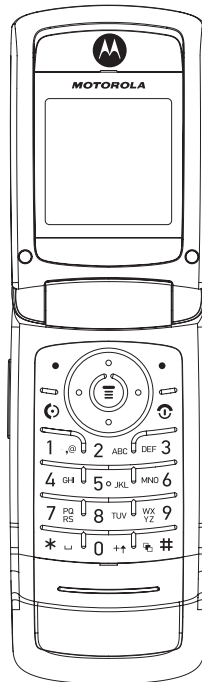
MOTOROLA

PRELIMINARY

Level 1-2 Service Manual

W220

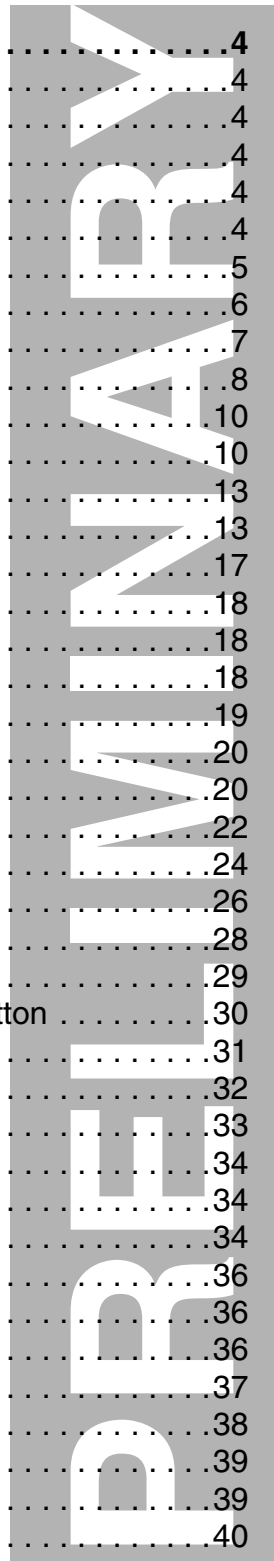
Dual-Band Wireless Telephone



W 220
GSM 900/1800MHz

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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 W220 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 W220 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 W220 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.

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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

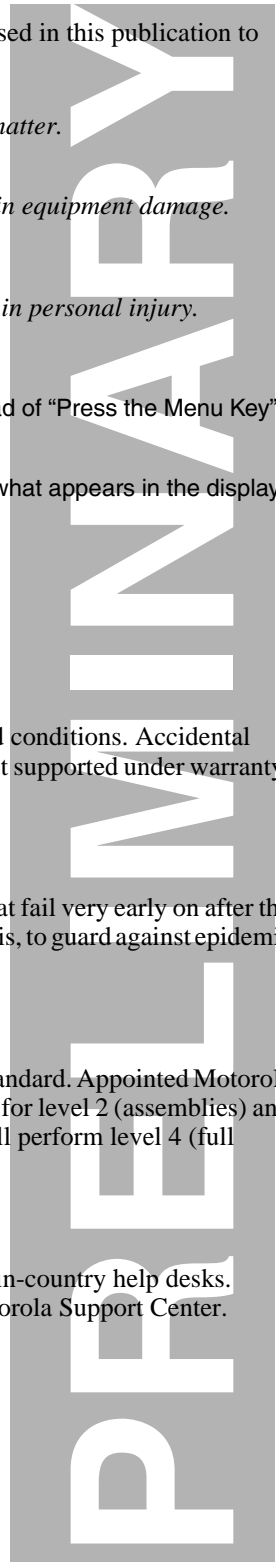
The standard out of box failure criteria applies. Customer phones that fail very early on after the date of sale, are to be returned to Manufacturing for root cause analysis, to guard against epidemic criteria. Manufacturing to bear the costs of early life failure.

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

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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

General Function	Specification
Dimensions	95 x 46.7 x 16.7 mm
Size (Volume)	74 cc
Weight	≤ 93g
Main Display	Type: CSTN 65K Resolution: 128 x 128
Band	Dual-band (EGSM 900 + DCS 1800)
Polyphonic Ring Tone	32 polyphonic ring tones
Alert Volume	100dB @5 cm
Battery	Capacity: 850 mAh Talk Time: 497 mins Standby Time: 293 hrs Charge Time: 4 hrs
Data Support	GPRS class 8
Browser	WAP 1.2.1 Certificated, WAP 2.0 Complied
Product Type	Clam-Shell phone with built in antenna
Messaging	SMS/MMS/EMS
Antenna	Internal type
I/O Bus Connector	Audio Jack
Frequency Range	EGSM: 880-915 MHz Tx/925-960 MHz Rx DCS: 1710-1785 MHz Tx/1805-1880 MHz Rx
Channel Spacing	200 KHz
Channels	EGSM 174/ DCS 374/ (carriers with 8 channels per carrier)
Modulation	GMSK at BT= 0.3
Transmitter Phase Accuracy	≤ 5 degrees RMS, 20 degrees peak
Duplex Spacing	EGSM 45 MHz/ DCS 95 MHz/
Frequency Stability	±0.10 ppm of the downlink frequency (Rx)
Operating Voltage	+3.3V dc to +4.2V dc (battery)
Average Transmit Current	105-260 mA average talk current drain
Average Standby Current	6.5 mA (DRX2), 3 mA (DRX9)
Temperature Range	-10°C to 55°C (15°F to 130°F)

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Transmitter Function	Specification
RF Power Output	32.5 dBm nominal EGSM 900/ 29.7 dBm nominal DCS 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	GSM:-106 dBm DSC:-105 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 bit = 182 bits/Class 2 bits = 78 bits
Bit Rate with FEC Encoding	22.8 kbps

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Product Overview

Motorola W220 mobile telephones feature global system for mobile communications (GSM) air interface, general packet radio service (GPRS) transport technology, and wireless application protocol (WAP) Internet browser. The mobile telephone uses a simplified icon and graphical-based user interface (UI) for easier operation, allows short message service (SMS) text messaging, and include clock, alarm, datebook, calculator, and caller profiling personal management tools. The W220 is a dual-band phone that allows roaming within the GSM 900 MHz and digital cellular system (DCS) 1800 MHz.

W220 telephones support GPRS and SMS in addition to traditional circuit switched transport technologies. GPRS, where available, provides substantial increases in mobile data communications performance and the efficient use of radio spectrum. Data transmission rates for GSM networks can potentially increase from the current rate of 9.6 kbps up to a theoretical maximum of 171.2 kbps. An increased data rate is by no means the only benefit provided by GPRS. A key advantage is the provision of a permanent virtual connection to the network. This “always on” connection is possible because GPRS uses packet data transfer so that, for example, email can be downloaded in “background mode.” There is no need for the user to reconnect before requesting a service, eliminating connection set-up delays and adding convenience and immediacy to data services access. The “virtual” nature of this connection means that network resources are not consumed during periods when a user is not actually sending or receiving data.

The telephones are made of polycarbonate plastic. The display and speaker, as well as the 21-key keypad, transceiver printed circuit board (PCB), microphone, charger and headphone connectors, and power button are contained within the clamshell form-factor housing. The user-replaceable 850 mAh Lithium Ion (LiIon) battery provides up to 497 minutes of talk time with up to 293 hours of standby time¹. The phone accepts 3V mini subscriber identity module (SIM) cards which fit into the SIM holder under the battery. These telephones feature a 128 x 128 pixel high-resolution color graphics display and an internal antenna.

Features

W220 telephones use advanced, self-contained, sealed, custom integrated circuits to perform the complex functions required for GSM GPRS communication. Aside from the space and weight advantage, microcircuits enhance basic reliability, simplify maintenance, and provide a wide variety of operational functions.

Features available in this family of telephones include:

- 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, MMS, instant messaging, and cell broadcast messages²
- Supports GPRS, circuit switched, and SMS networks²
- WAP 1.2.1 compliant²
- 128 x 128 pixel 65K color graphical display with 4 lines of text, 1 line of icons, and 1 line of prompts
- Display animation
- VibraCall® vibrating alert
- 4-way navigation key
- Downloadable wallpapers, icons, animations, and MIDI ring tones³

1. All talk and standby times are approximate and depend on network configuration, signal strength, and features selected. Standby times are quoted as a range from DRX=2 to DRX=9. Talk times are quoted as a range from DTX off to DTX on.

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

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- Polyphonic speaker supporting 128 different instruments
- Simplified text entry using iTAP™ predictive text entry
- Caller line identification (CLI)³
- Supports call diverting for incoming voice calls³
- Supports 3V SIM cards
- SIM Toolkit™ class 2 (STK)³
- Personal management tools calculator with currency converter, real time clock with date, reminders, and caller profiling
- Phase II Unstructured Supplementary Service Data (USSD)³
- Chat messaging via WAP over GPRS³
- Multiple destination SMS

Wireless Access Protocol (WAP) 1.2.1 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 W220'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

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.

Caller Line Identification

Upon receipt of a call, the calling party's phone number is compared to the phonebook. If the number matches a phonebook entry, that name will be displayed. If there is no phonebook entry, the incoming phone number will be displayed. In the event that no caller identification information is available, an incoming call message is displayed.

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

SIM Toolkit™ - Class 2

SIM Application Toolkit is a value-added service delivery mechanism that allows GSM operators to customize the services they offer their customers, from the occasional user who requests sports news and traffic alerts, to a high call time business user who receives stock alerts

3.

and checks flight times. Operators can now create their own value-added services menu quickly and easily in the phone. The customized menu will appear as the first menu and may be updated over-the-air with new services when customers request them.

Network Based Chat Messaging

The chat messaging feature provides a constant WAP connection through GPRS to carrier, service center, or factory flexed WAP site. The specific site can also be entered by the user. Chat messaging is a carrier option.

Personal Information Management

The W220 telephone contains a built-in calendar with datebook reminders and phonebook.

Other Features

Detailed descriptions of the other features can be found in the appropriate W220 telephone user guides listed in the Related Publications section toward the end of this manual.

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General Operation

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

The W220 telephones' controls are located on the front and side of the device, and on the keyboard as shown in Figure 1. Indicators, in the form of icons, are displayed on the LCD (see Figure 2).

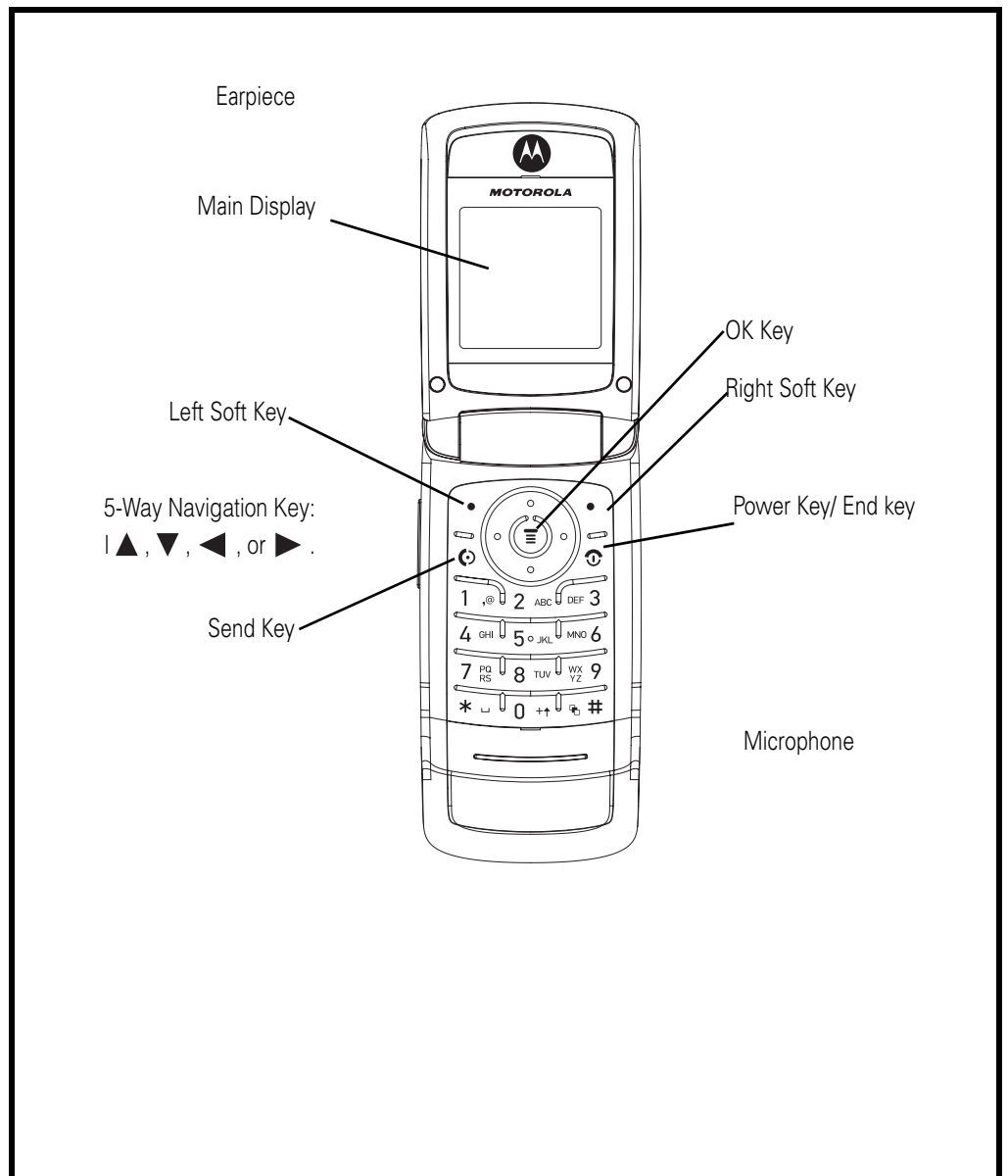


Figure 1. W220 Telephone Controls Locations

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Menu Navigation

W220 telephones are equipped with a simplified icon and graphical-based user interface. The phone also features 6 user-definable shortcuts to menu options that are accessed by pressing the soft keys and 4-way navigation key. See Figure 3 for details of the W220 menu structure. A 4-way navigation key allows you to move easily through menus. Left soft key lets you confirm your selection. When the up/down side key (voice activation key) is held down from an idle display, provides a shortcut to voice dialing and voice feature launcher.

Liquid Crystal Display (LCD)

The LCD provides an 832 square millimetre multicolor backlit color display with user-adjustable contrast settings for optimum readability in all light conditions. The large bit-mapped 128 x 128 pixel display includes up to 4 lines of text, 1 line of icons, and 1 line of prompts.

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

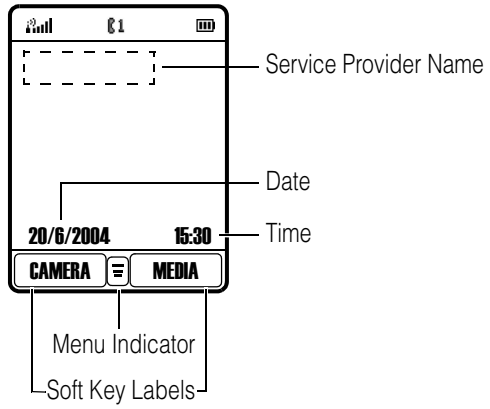


Whether a phone displays all indicators depends on the programming and services to which the user subscribes.

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Figure 2 shows some common icons displayed on the LCD.













Service Provider Name

Date

Time

Menu Indicator

Soft Key Labels

Icon	Name	Description
	Signal Strength	Indicates strength of signal being received. The more vertical bars, the better the reception (5 bars maximum). Bars differ in color by signal strength: green > orange > red.
	Battery Power Level	Indicates remaining battery power. The more bars, the more battery power available (3 bars maximum). Bars differ in color by power level: green > orange > red. The icon flashes when battery power is near empty.
	Roaming	Indicates you are on another network.
	Voice Call Active	Indicates a call is in progress.
	New SMS Message	Indicates new unread SMS message(s). The icon flashes when the phone's memory which stores SMS messages is full. You must read new SMS messages to receive more SMS messages.
	New Voicemail Message	Indicates new unheard voicemail message(s).
	New SMS/Voicemail Message	Indicates new unread/unheard message(s).
	New SMS Message	Indicates new unread SMS message(s).
	New MMS Message	Indicates new unread MMS message(s).
	MMS Message Processing	Indicates you are receiving/sending MMS message(s).












Icon	Name	Description
	Ringer On	Indicates ringer is turned on.
	Vibrator On	Indicates vibrator is turned on.
	Ringer/Vibrator On	Indicates ringer and vibrator are turned on.
	Silent	Indicates ringer is turned off.
	GPRS Mode	Indicates your service provider supports GPRS.
	GPRS Data Call Active	Indicates you are surfing over the GPRS network.
	Online Chat Active	Indicates you open Chatroom to have an online chat.
	Line 1/Line 2	Indicates the telephone line you are using.
	Call Waiting	Indicates a call is waiting to answer.
	Call Diverting	Indicates all of your incoming calls will be transferred to another phone number.
	Call Muted	Indicates a call is muted.

Figure 2. W220 Display Icon Indicators

User Interface Menu Structure

Figure 3 shows a portion of the W220 telephone menu structure.

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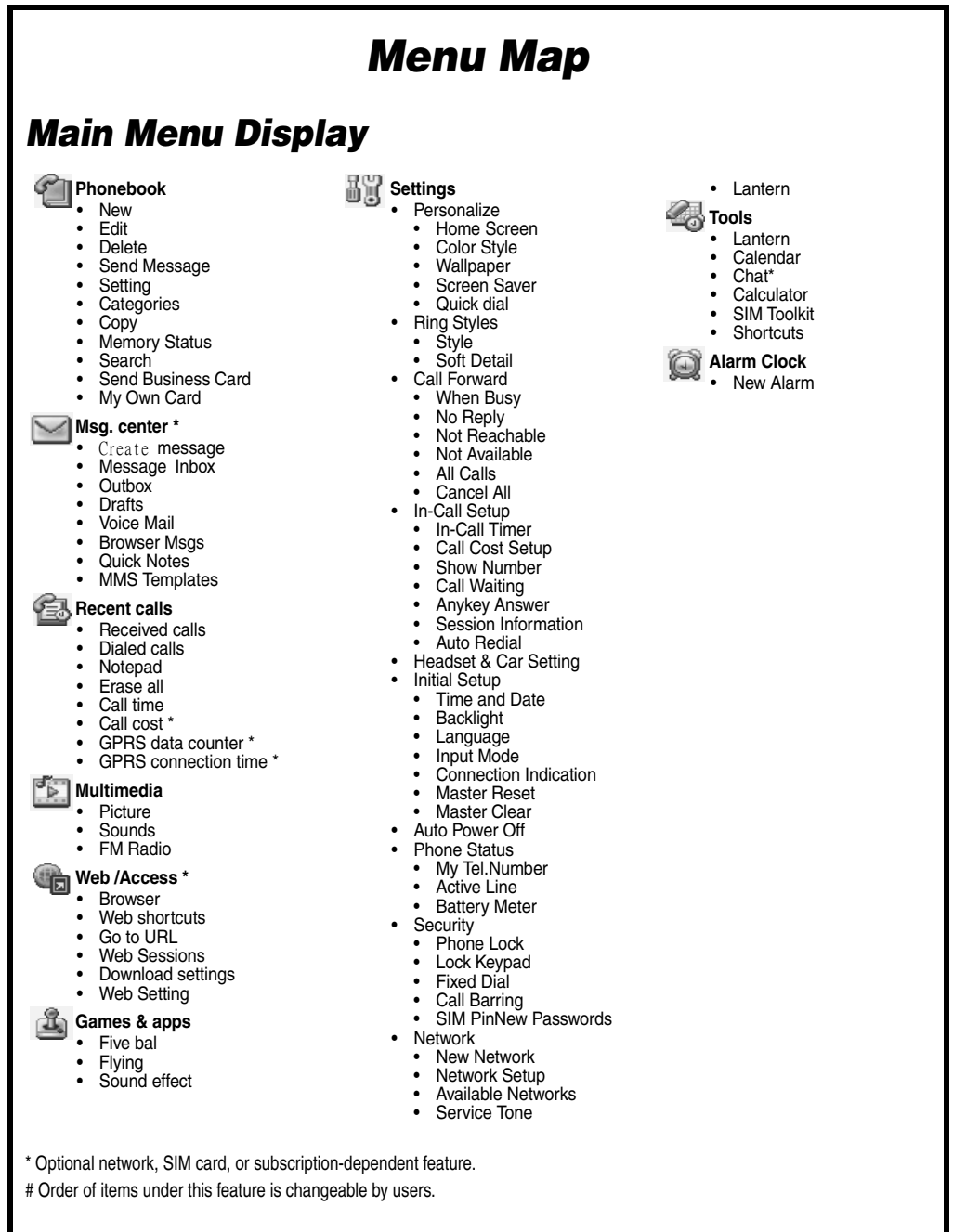


Figure 3. W220 Menu Structure

Alert Settings

In addition to 64 preset ring tones, W220 telephones allow the user to download 5 additional ring tones via GPRS. (Availability is carrier and Network dependant). Motorola W220 phones incorporate the VibraCall[®] discreet vibrating alert that helps to avoid disturbing others when a ringing phone is unacceptable. Alerts can be set to ring only, vibrate only, vibrate then ring, or no ring or vibrate. Additionally, the profiling feature allows users to identify incoming calls by a specific ringer tone.

Battery Function

Battery Charge Indicator

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

Battery Removal

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



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 is 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 toward the end of this manual.

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Tools and Test Equipment

Table 1 lists the tools and test equipment used on W220 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 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)
8102430Z04	GSM/DCS Test SIM	Used to enable manual test mode
6680388B67	Disassembly tool, plastic with flat and pointed ends (manual opening tool)	Used during assembly/disassembly
6680388B01	Tweezers, plastic	Used during assembly/disassembly
RSX4043-A	Torque Driver	Used to remove and replace screws
—	Torque Driver Bit T-5 Plus, Apex 440-61P Torx Plus or equivalent	Used with torque driver
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, AAD can be reached by calling (847) 538-8023 or by fax (847) 576-3023.

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

Disassembly

This section describes how to disassemble an W220 telephone. Tools and equipment used are listed in Table 1, preceding.



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



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

Removing and Replacing the Battery Door

1. Press and push the battery door forward to the direction illustrated in Figure 4.
2. Completely remove the battery door.

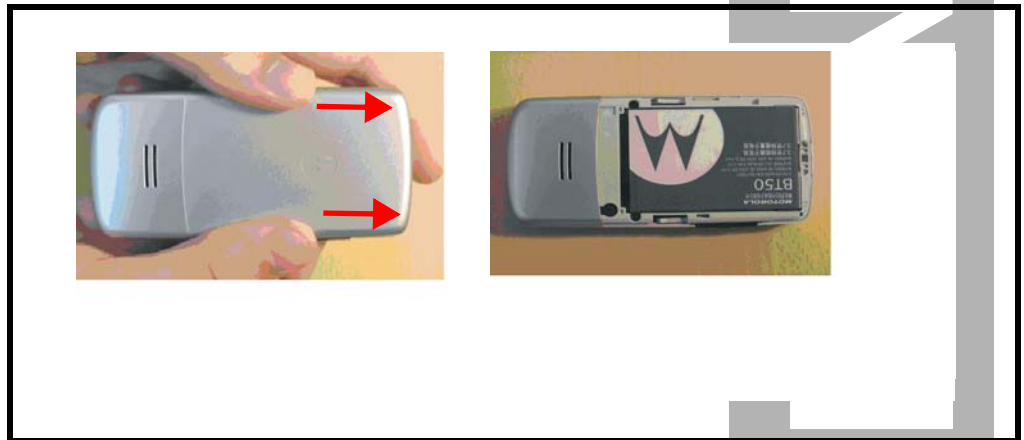


Figure 4. Removing the Battery Door

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3. To replace, the 7 side hooks should be aligned with the holes on the lower housing cover in Figure 5. Slide the battery door in the direction shown until it clicks into place and hear a click sound. Then completely replace the battery door.

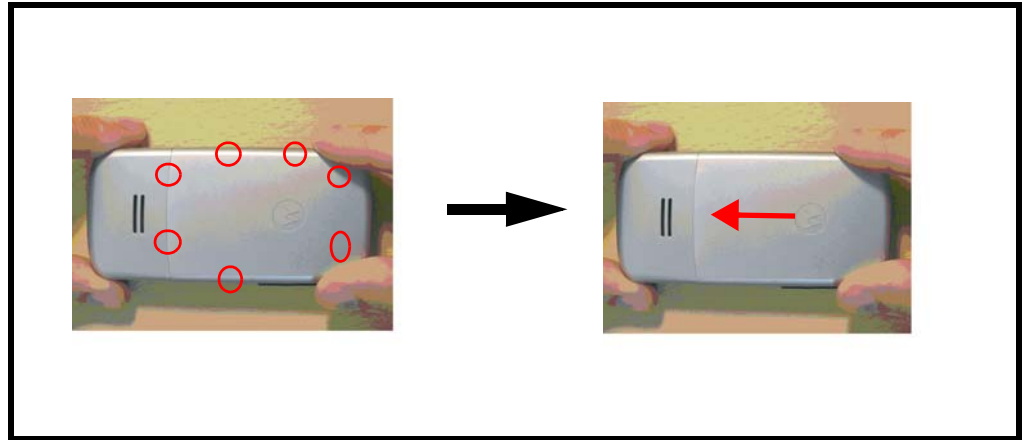


Figure 5. Replacing the Battery Door

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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 door as described in the procedures.
2. Raise and remove the battery at the direction illustrated in the Figure 6.

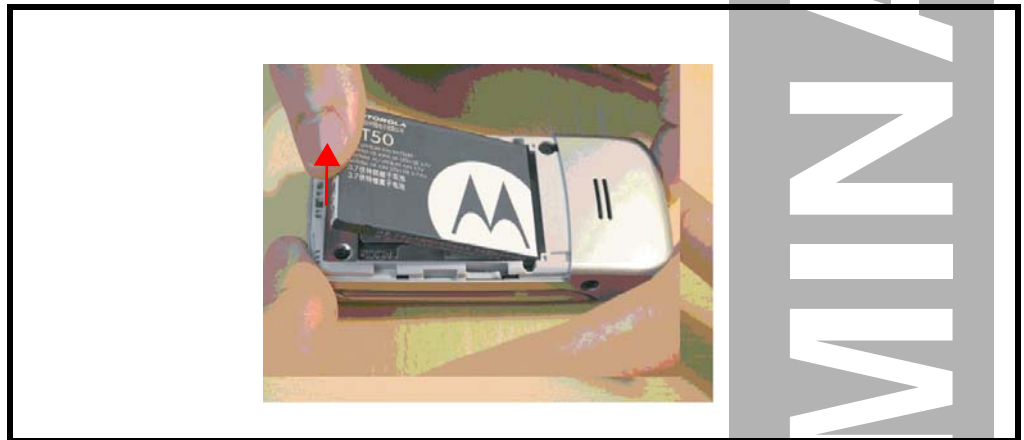


Figure 6. Removing the Battery



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.

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- 3. To replace, insert battery with an small angle into handset and press battery downward. Make sure the battery latch can lock battery.



Figure 7. Replacing the Battery

- 4. Replace the battery door as described in the procedures.

Removing and Replacing the Lower Housing Cover

1. Remove the battery door and battery as described in the procedures.
2. Sequentially remove 1-2-3-4 screws with a 6-corner-star T5 screwdriver as shown in Figure 8.

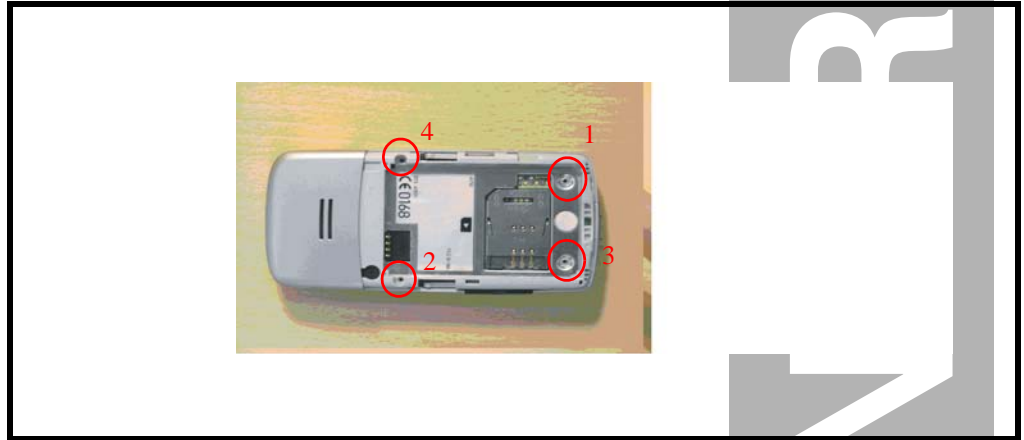


Figure 8. Removing 4 Screws

3. Release the hook between Case-C & D by fingernail as shown in Figure 9.

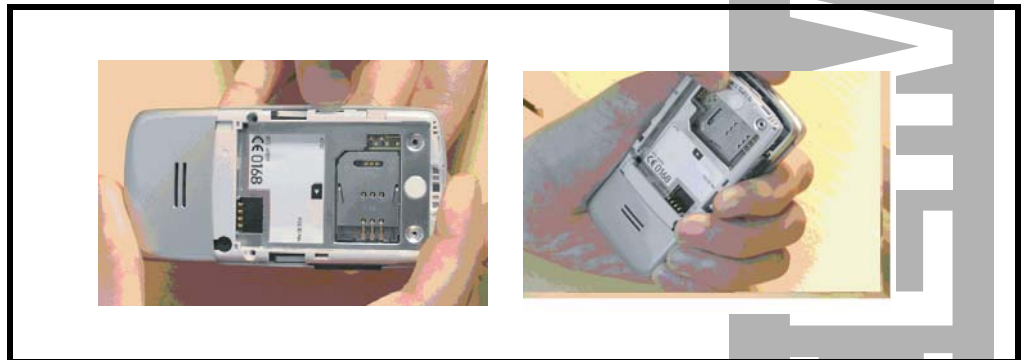


Figure 9. Removing the hooks

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4. Push the Case D forward to release Case C & D and remove Housing D in Figure 10.

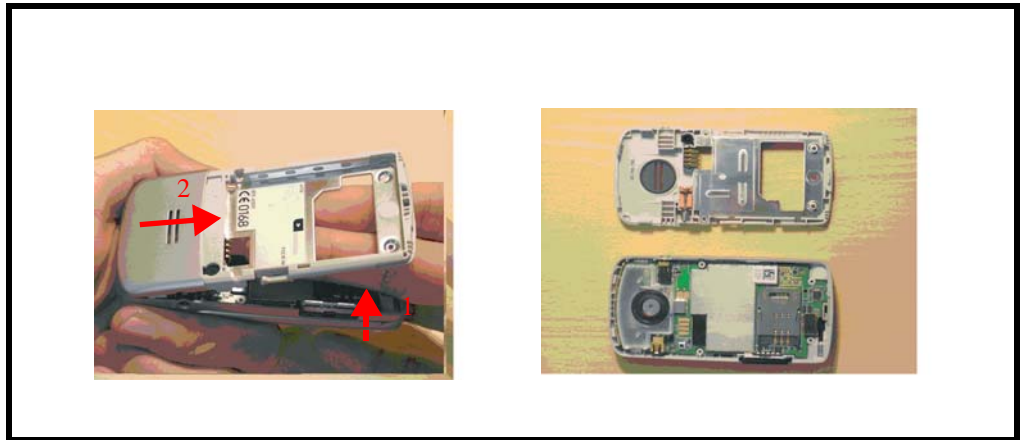


Figure 10. Removing the Lower Housing Cover

5. To replace, align the lower housing cover to the phone. Press the lower housing cover into place, allowing the housing latches on each side of the phone to snap into position.
6. Use 4 screws(T5) to fasten the lower housing cover to the front housing cover with 9 Ncm torque moment.
7. Replace the battery and battery door as described in the procedures.

Removing and Replacing the Volume Key PCBA and BTB-FPC Connector

1. Remove the battery door, battery, and lower housing cover as described in the procedures.
2. Remove the volume key PCBA from the Housing C with a tweezer as shown in Figure 11.

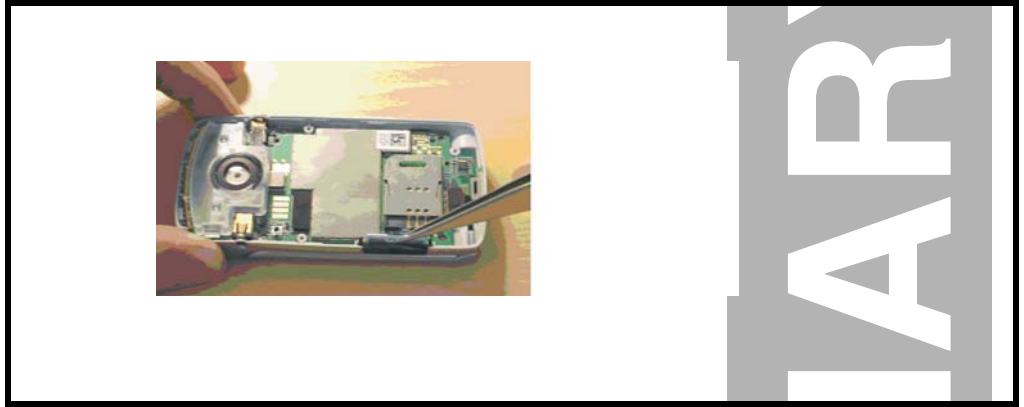


Figure 11. Removing Volume Key PCBA

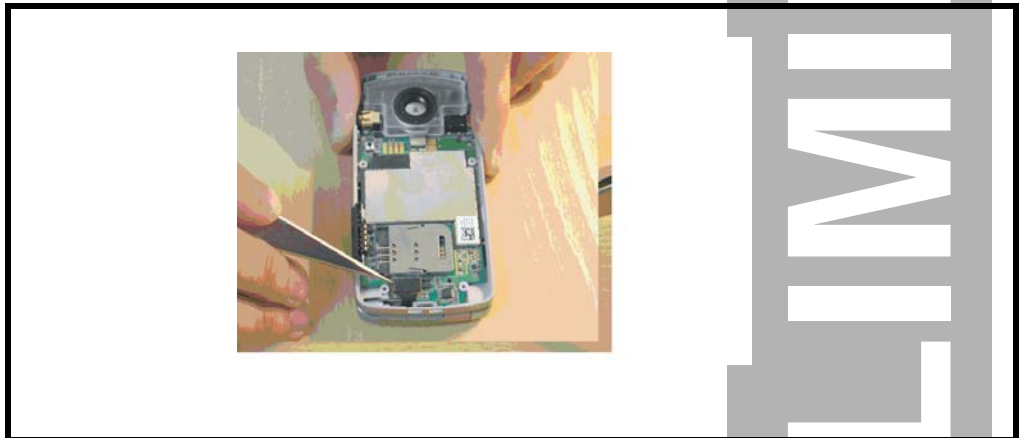


Figure 12. Removing BTB-FPC Connector

3. Remove the BTB-FPC connector from Main PCBA with a tweezer as shown in Figure 12.

4. Insert the BTB-FPC into the original position.



Figure 13. Removing Volume Key PCBA

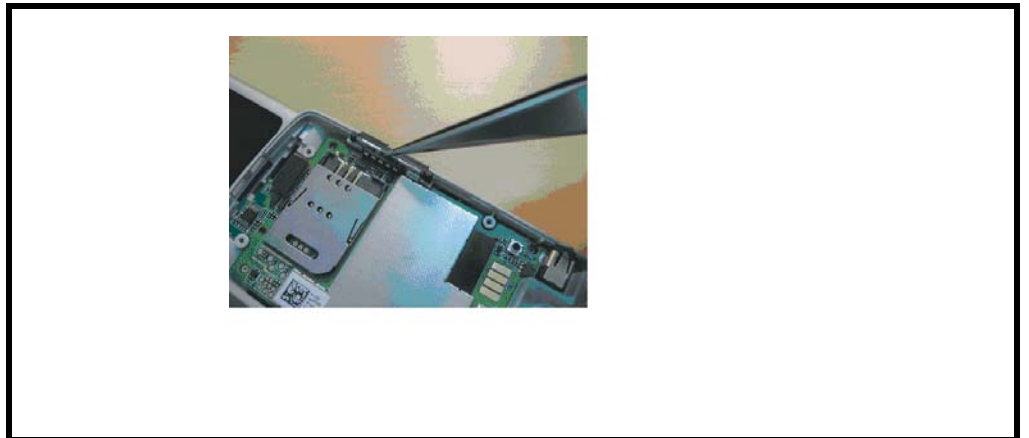


Figure 14. Removing BTB-FPC Connector

5. Press Volume Key PCBA into the Housing C.

Removing and Replacing the PCBA

1. Remove the battery door, battery, lower housing cover, volume key PCBA, and BTB-FPC as described in the procedures.
2. Press the hook and release PCBA from lower housing cover as shown in Figure 15.

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3. Put Main PCBA into the Housing C as Figure 16, 17.

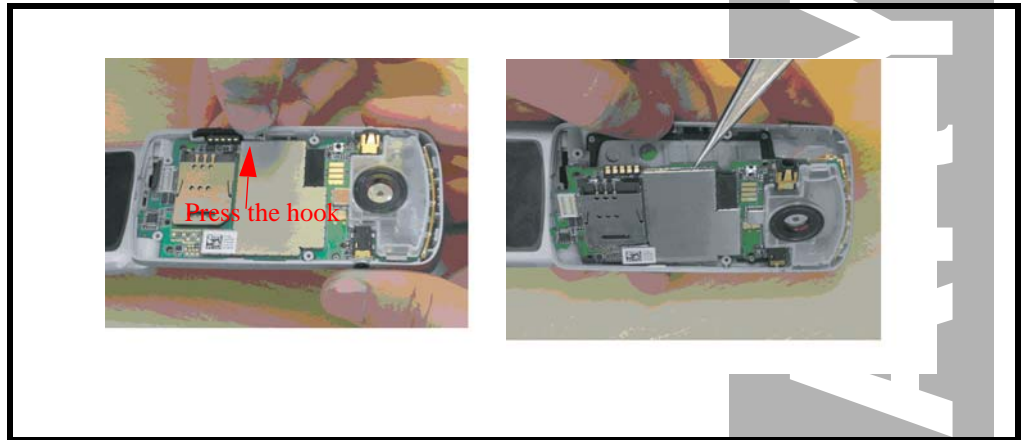


Figure 15. Removing PCBA from lower housing cover



Figure 16. Replacing PCBA to lower housing cover

PRELIMINARY

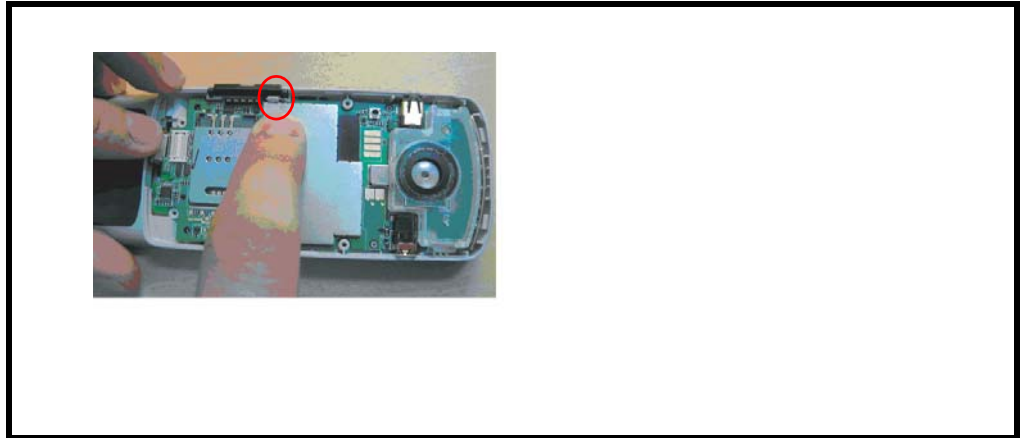


Figure 17. Replacing the Main PCBA to lower housing cover.

4. To replace, align the PCBA to the phone and then press it into place.
5. Hook PCBA to lower housing cover.
6. Replace the lower housing cover, volume key, BTB-FPC, battery, and battery door as described in the procedures

Removing and Replacing the Antenna Carrier

1. Remove the battery door, battery, lower housing cover and lower PCB as described in the procedures.
2. Lift the antenna carrier from the Main PCBA by tweezers as shown in Figure 18.

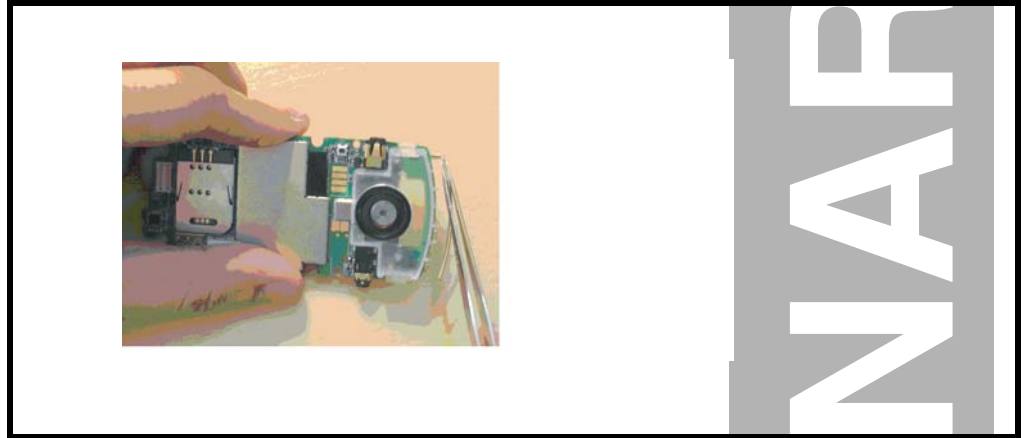


Figure 18. Removing the Antenna Carrier

3. To replace, align the position holes on antenna carrier onto the lower phone case.
4. Replace the PCBA, lower housing cover, battery, and battery door as described in the procedures.

Removing and Replacing the Speaker Box

1. Remove the battery door, battery, lower housing cover, lower PCB, antenna carrier as described in the procedures.
2. Remove the Speaker Box from the Main PCBA as shown in Figure 19.

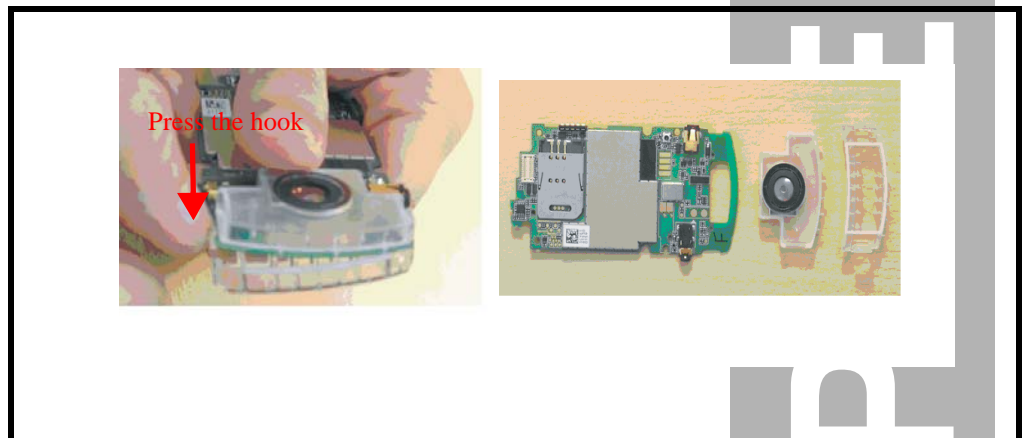


Figure 19. Removing the Speaker Box

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3. Pick one side of Speaker box hook into Main PCBA as shown in Figure 20.
4. Pick the other side of Speaker box hook into Main PCBA.
5. Replace the PCBA, lower housing cover, battery, and battery door as described in the procedures.

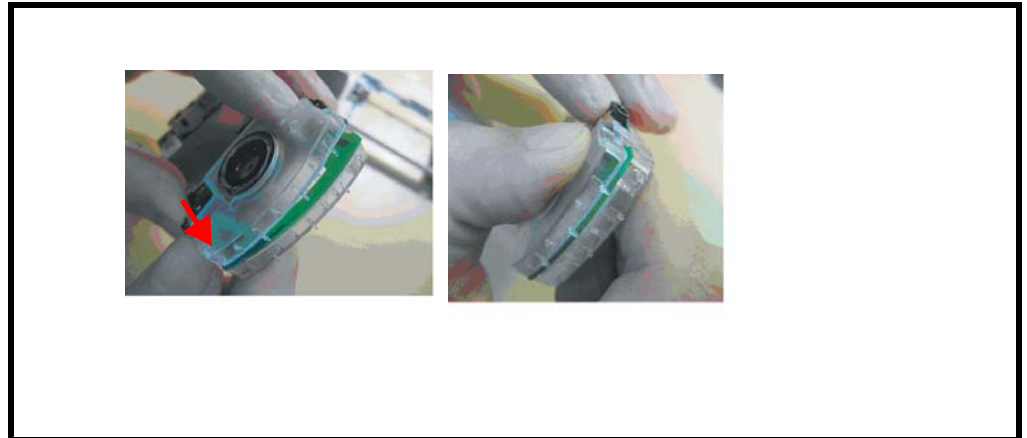


Figure 20. Replacing the Speaker Box

Removing and Replacing the RF Cap, Vibrator and battery connector

1. Remove the battery door, battery, lower housing cover, PCBA, antenna carrier as described in the procedures.
2. Remove RF Cap, Vibrator, and Battery Connector from Housing D as shown in Figure 21.

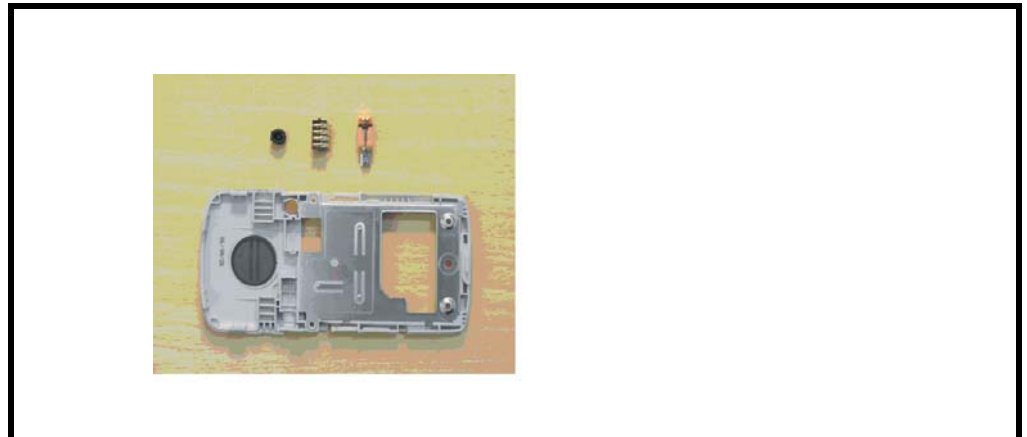


Figure 21. Removing Vibrator and battery connector

3. To replace, align the lower housing cover and press into place.
4. Replace the antenna carrier, PCBA, lower housing cover, battery, and battery door as described in the procedures.

Removing and Replacing the Keypad and Hinge Stopper from Housing C

1. Remove the battery door, battery, lower housing cover, PCBA, antenna carrier, vibrator, and battery connector as described in the procedures.
2. Remove the keypad and hinge stopper from Housing C as shown in Figure 22.



Figure 22. Removing the Keypad and Hinge Stopper

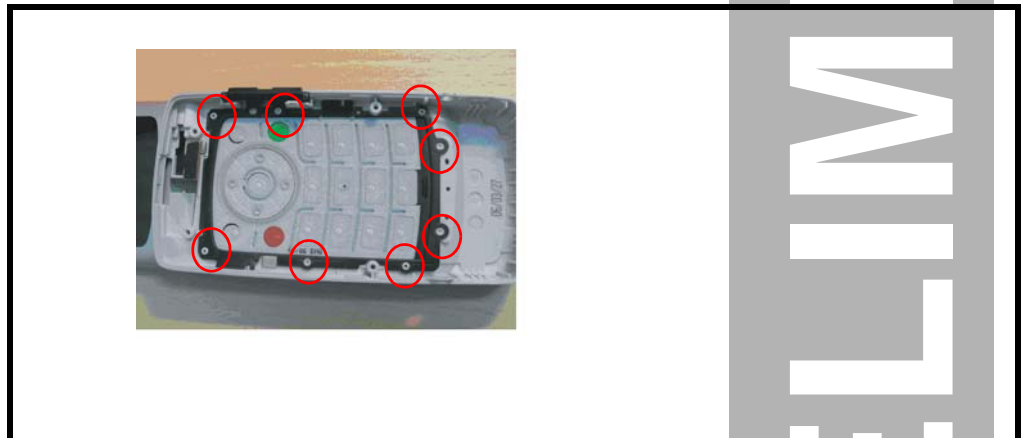


Figure 23. Replacing the Keypad and Hinge Stopper

3. To replace, put keypad into the Housing C.
4. Replace the antenna carrier, PCBA, lower housing cover, battery, and battery door as described in the procedures.

Removing and Replacing the Speaker

1. Remove the battery door, battery, lower housing cover, PCBA, and antenna carrier, as described in the procedures.
2. Remove the Speaker from Speaker Box with a tweezer as shown in Figure 24.

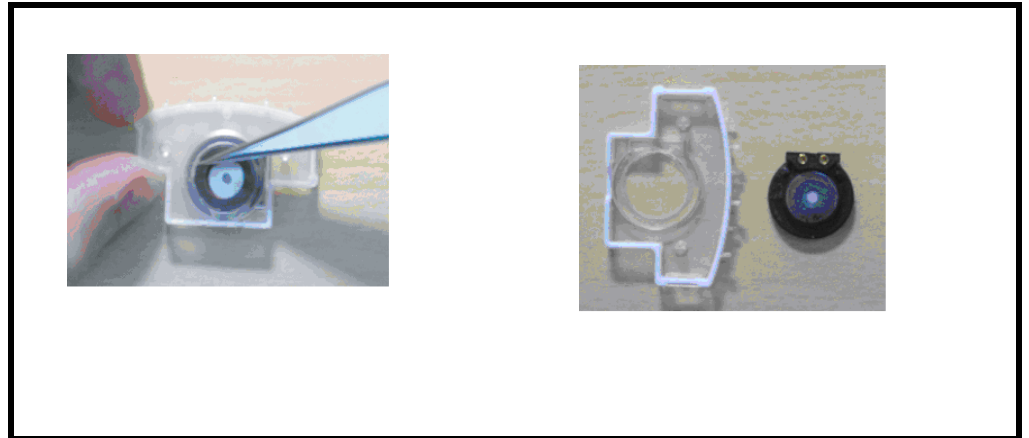


Figure 24. Removing the Camera-FPC and Speaker-FPC connectors

3. To replace, align the speaker hook onto the Speaker Box.
4. Replace the speaker box, antenna carrier, PCBA, lower housing cover, battery, and battery door as described in the procedures.

Removing and Replacing the Screw Cover & Cap & Screws from Housing B

1. Remove the battery door, battery, lower housing cover, lower PCB, antenna carrier as described in the procedures.
2. Remove the Screw Cover & Cap from Housing B with a tweezer as shown in Figure 25.

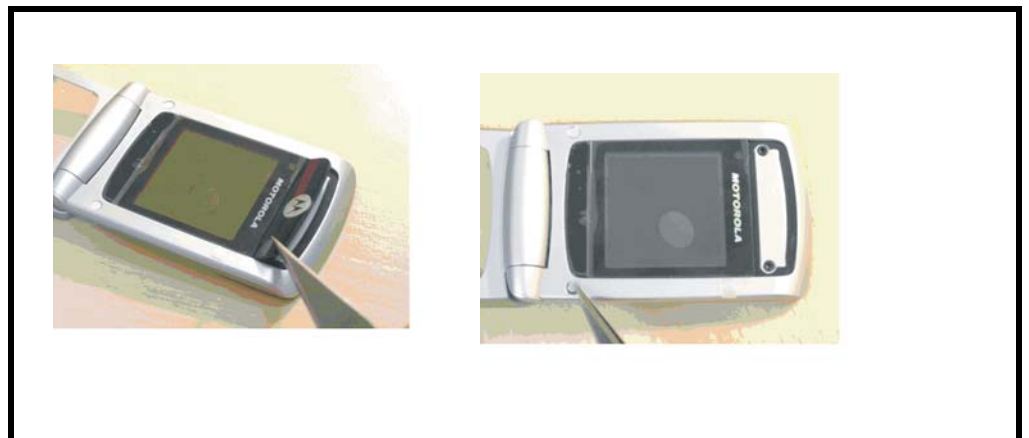


Figure 25. Removing the Screw Cover & Cap

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3. Completely disassemble the screw cover and screw cap as shown in Figure 26.

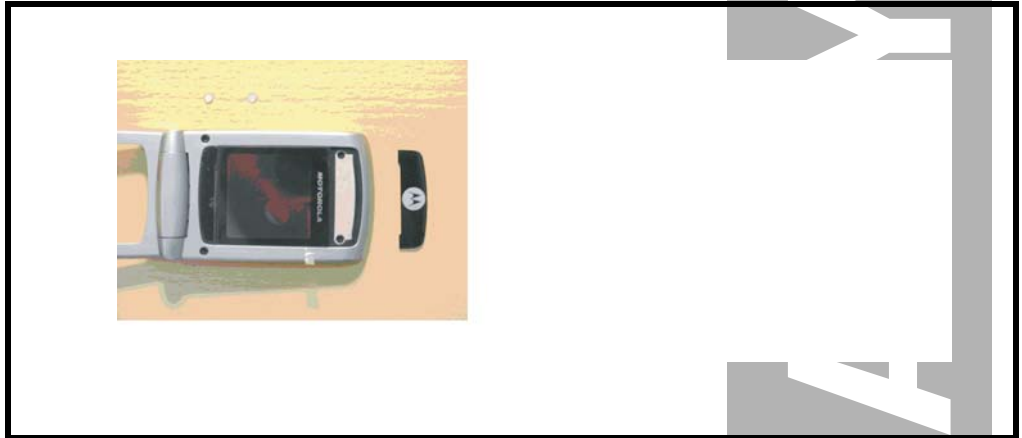


Figure 26. Disassembling the Screw Cover and Screw Cap

4. Sequentially remove 1-2-3-4 screws with T5 screwdriver as shown in Figure 27.



Figure 27. Removing screws

5. To replace, sequentially fasten 1-2-3-4 screws with 9 Ncm torque moment and speed.

PRELIMINARY

- 6. To replace, put screw cover into the Housing B with a tweezer as shown in Figure 27.



Figure 28. Replacing the Screw Cover and Screw Cap

- 7. To replace, put screw cap into the Housing B with a tweezer as shown in Figure 28.

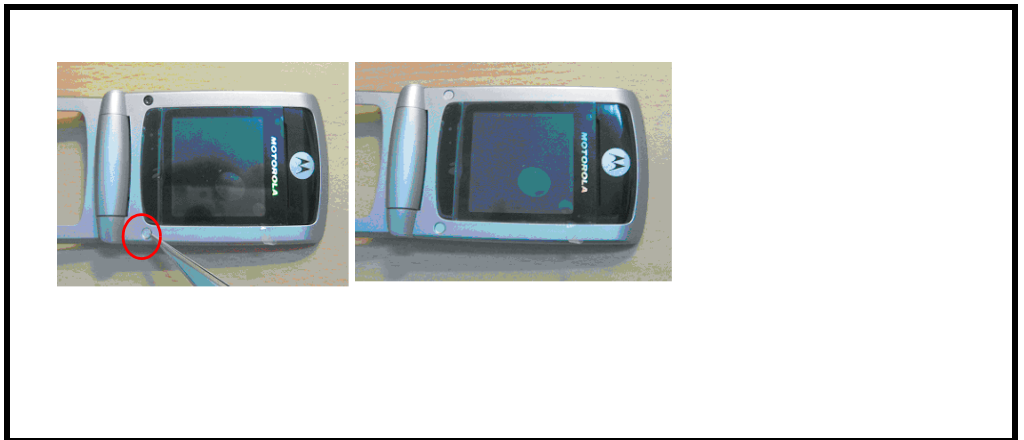


Figure 29. Replacing the Screw Cover and Screw Cap

- 8. Replace the speaker box, antenna carrier, PCBA, lower housing cover, battery, and battery door as described in the procedures

Disassembling and Assembling Case-A and Case-B

1. Remove battery door, battery, lower housing cover, and PCBA as described in the procedures.
2. Release the hook between Case-A and Case-B by fingernail or tweezers as shown in Figure 30.

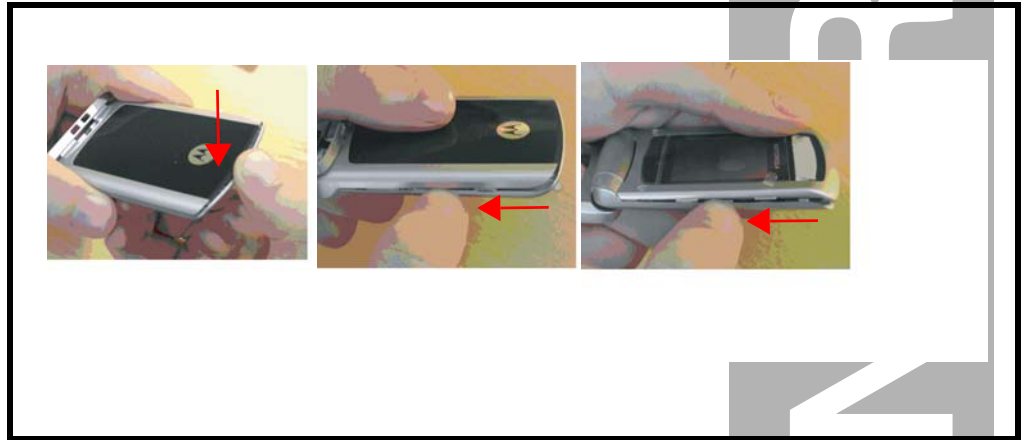


Figure 30. Disassembling Case-A and Case-B

3. Push the Case-A forward to release Case-A and Case-B as shown in Figure 31.



Figure 31. Disassembling Case-A and Case-B

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4. To replace, press Case-A down on the top side of Case-B to hook into Case-B as shown in Figure 31.

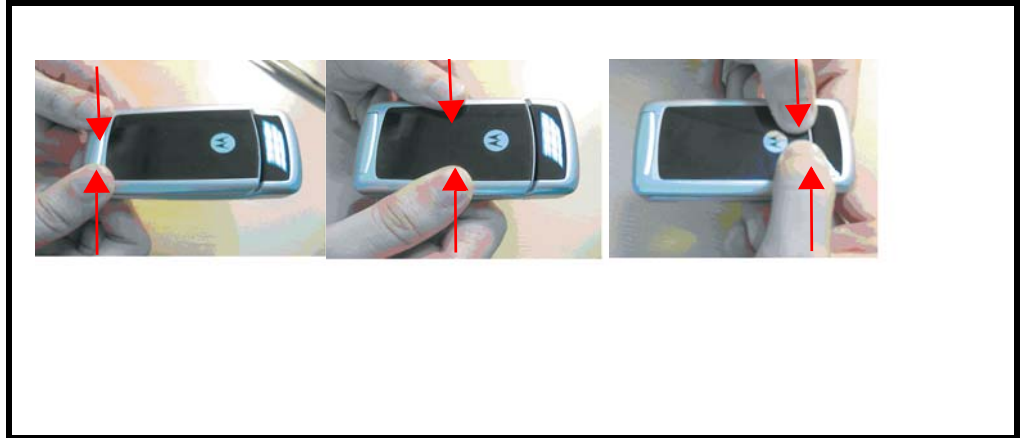


Figure 32. Assembling Case-A and Case-B

5. Replace the speaker box, antenna carrier, PCBA, lower housing cover, battery, and battery door as described in the procedures

Removing Contact Spring, BTB-FPC Connector, and FPC

1. Remove battery door, battery, lower housing cover, and PCBA as described in the procedures.
2. Remove the contact spring from Case-B with tweezers.

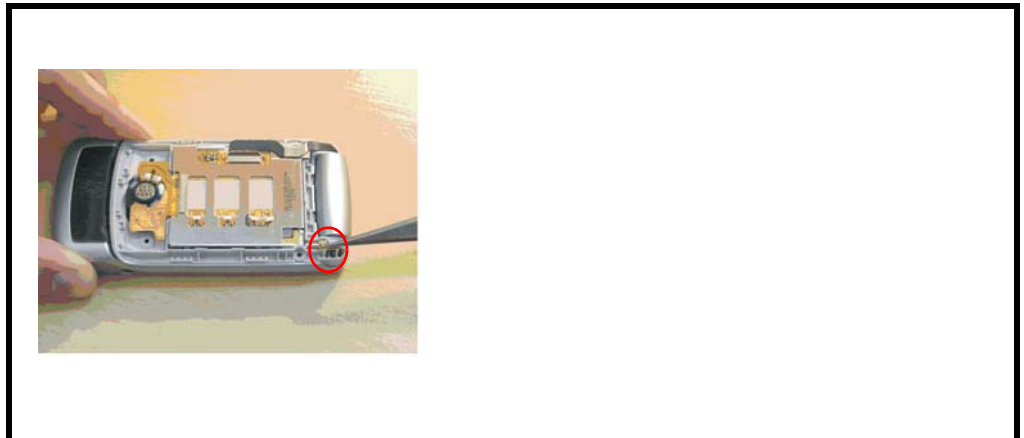


Figure 33. Removing Contact Spring

3. Open the BTB-FPC Connector cap and remove FPC from Case-B with tweezers.



Figure 34. Removing FPC

4. Remove the FPC from Case-B and Case-C Case-C with tweezers.

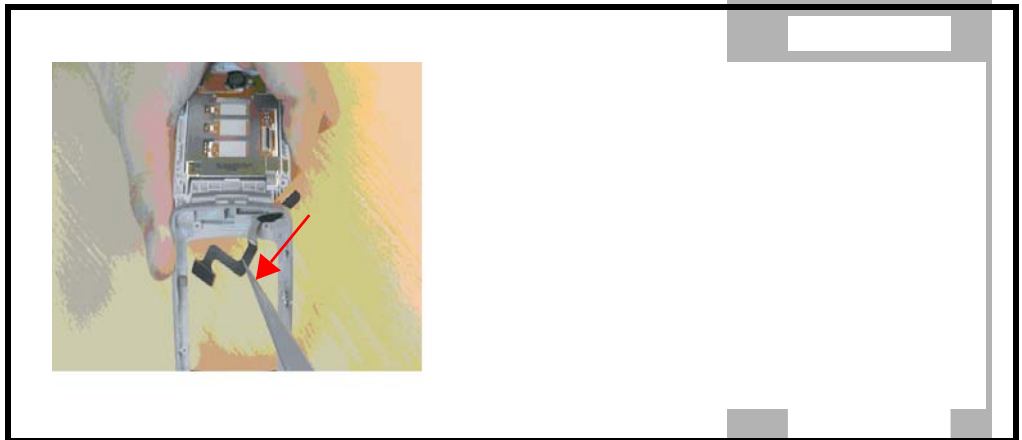


Figure 35. Removing FPC

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5. Insert the BTB-FPC through the hole as shown in Figure 36.

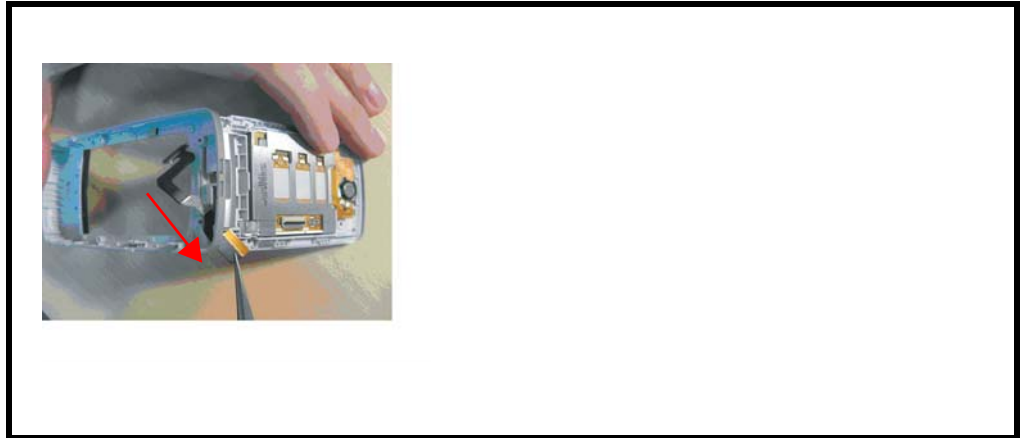


Figure 36. Replacing FPC

6. Insert the BTB-FPC into the connector as shown in Figure 37.

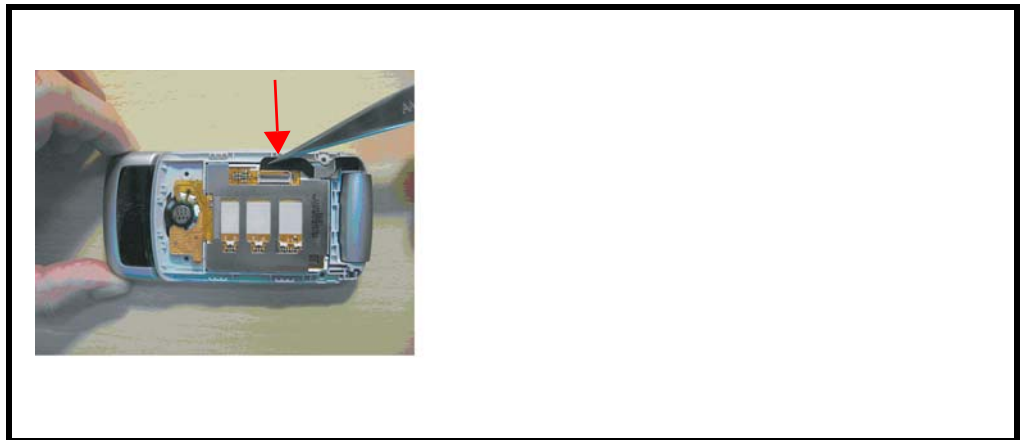


Figure 37. Replacing FPC

7. Lock the connectro cap as shown in Figure 38.

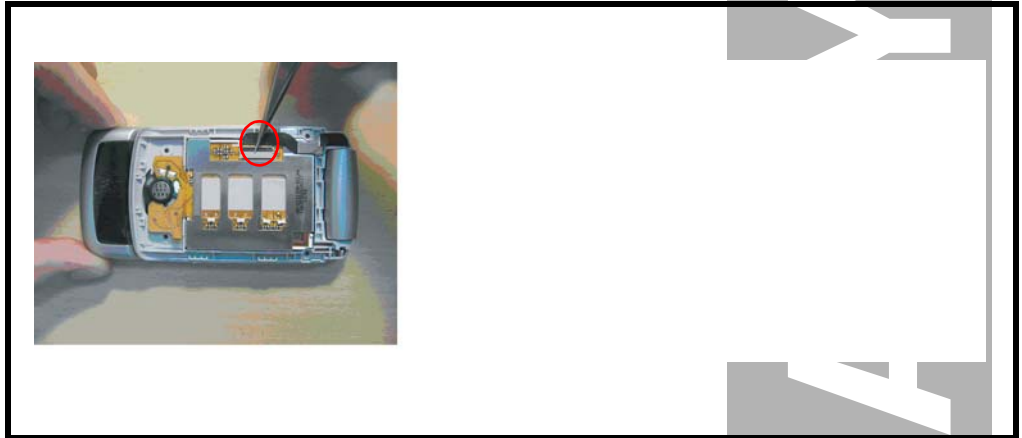


Figure 38. Replacing FPC

8. Replace the speaker box, antenna carrier, PCBA, lower housing cover, battery, and battery door as described in the procedures

Removing and Replacing the LCM module from Case-B

1. Remove battery door, battery, lower housing cover, and PCBA as described in the procedures.
2. Remove the LCM module from the Case-B with tweezers as shown in Figure 39.

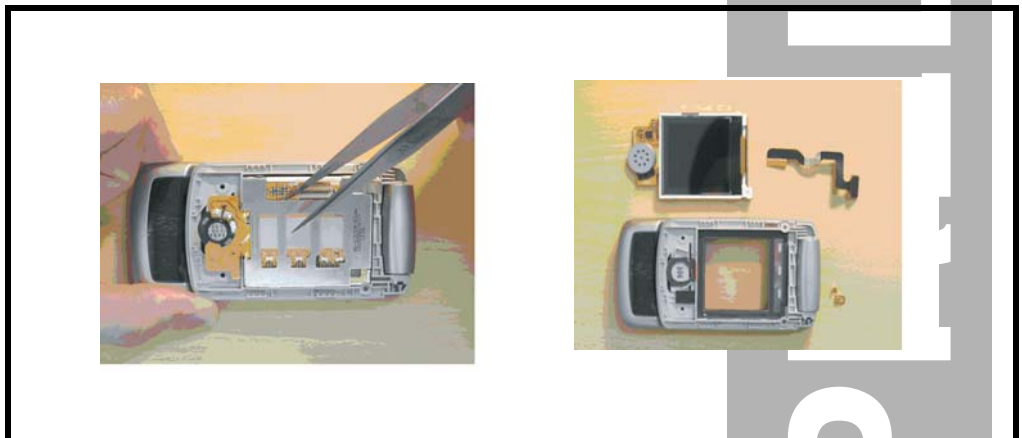


Figure 39. Removing LCM Module

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3. To replace, insert LCM module with a small angle into Case-B as shown in Figure 40.

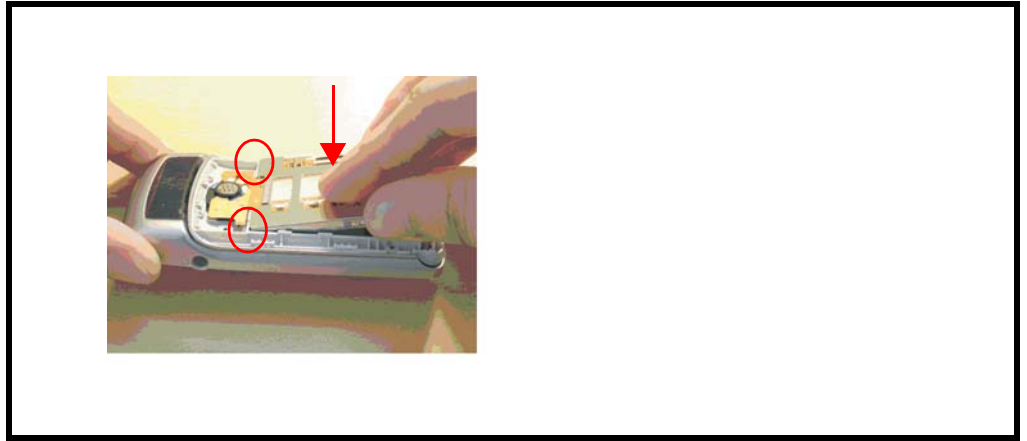


Figure 40. Removing LCM Module

4. Replace the PCBA, lower housing cover, battery, and battery door as described in the procedures.

Disassembling and Assembling Case-B and Case-C

1. Remove the battery door, battery, lower housing cover, PCBA, and LCM shielding cover as described in the procedures.
2. Push out the hinge to disassemble Case-B and Case-C with tweezers as shown in Figure 41.

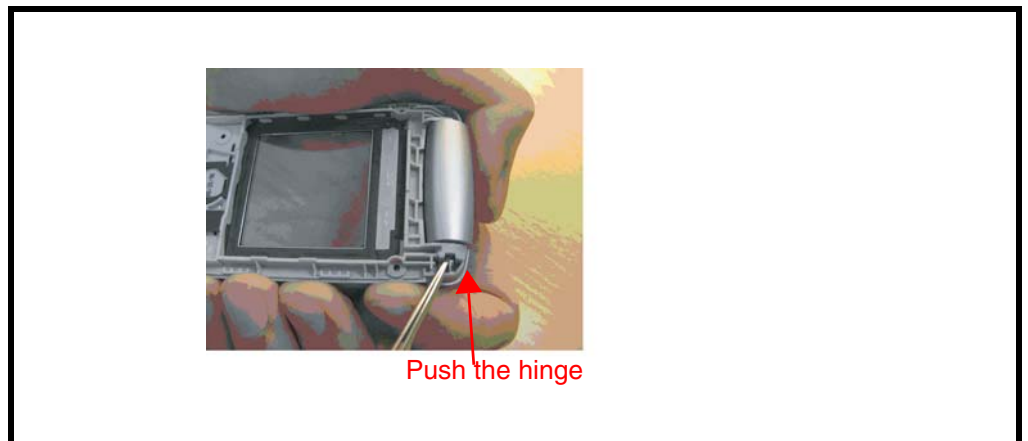


Figure 41. Removing the hinge

3. Separate Case-B and Case-C as shown in Figure 42.

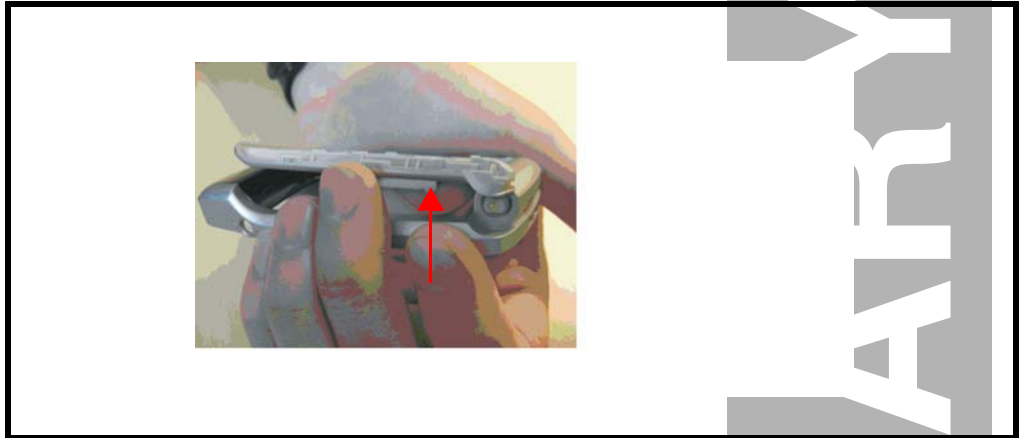


Figure 42. Separating Case-B and Case-C

4. Push the hinge out from Case-C as shown in Figure 43.

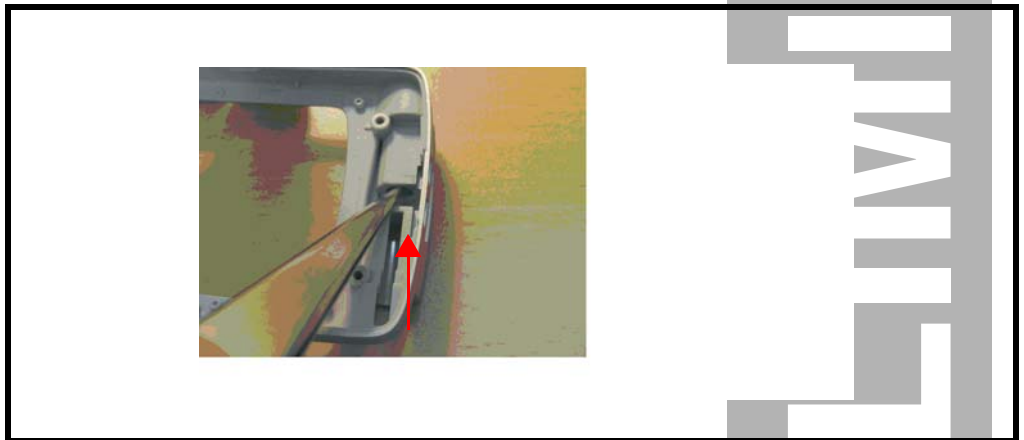


Figure 43. Removing the hinge

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5. Separate Case-B, Case-C, and the hinge as shown in Figure 44.



Figure 44. Separating Case-B, Case-C, and the hinge

6. To replace, assemble the hinge to Case-C as shown in Figure 44.

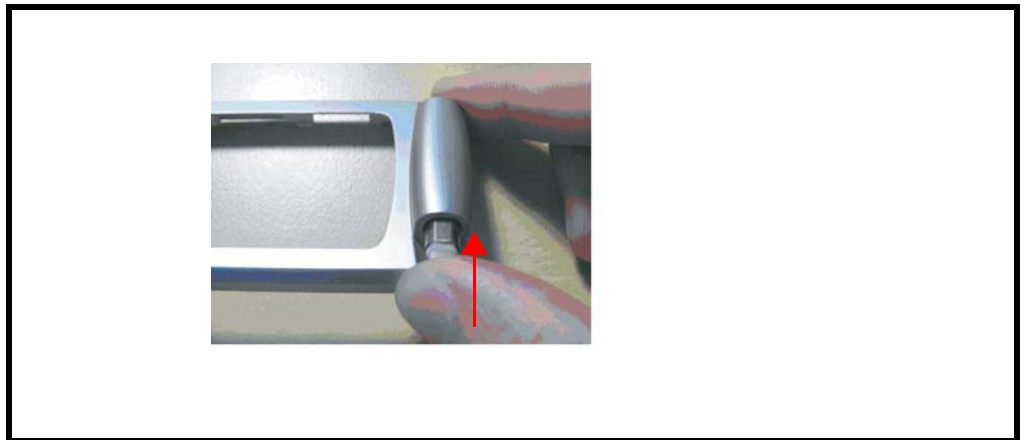


Figure 45. Assembling Case-C and the hinge

7. Insert the right side of Case-C into the shaft of Case-B as shown in Figure 46.



Figure 46. Assembling Case-C and the hinge

8. Press the hinge and push the Case-C into the left side of Case-B as shown in Figure 47.

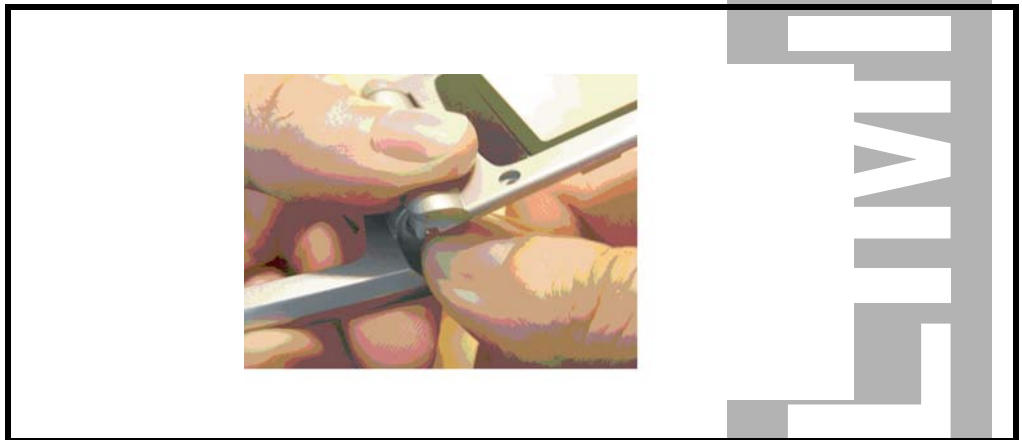


Figure 47. Assembling Case-C and Case-B

PRELIMINARY

9. Insert the hinge into Case-B as shown in Figure 48.



Figure 48. Assembling Case-C and Case-B

10. Replace the LCM shielding cover, lower PCB, lower housing cover, battery, and battery door as described in the procedures.

Subscriber Identity Module (SIM) and Identification Label

SIM

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

The SIM contains:

- All the data necessary to access GSM services
- The ability to store user information such as phone numbers
- All information required by the network provider to provide access to the network

Identification

Each Motorola GSM phone is labelled with a variety of identifying numbers. The following information 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 4 sections as shown in Figure 49.

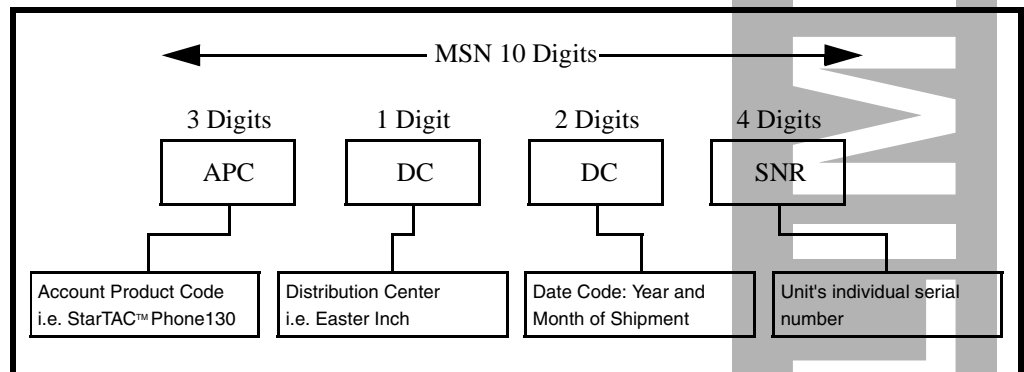


Figure 49. MSN Label Breakdown

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.

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Table 2. IMEI Number Breakdown

TAC	Serial Number	Check Digit
NNXXXX YY	ZZZZZZ	A

Where

- TAC** Type Allocation Code, formerly known as Type Approval Code
- NN** Reporting body identifier
- XXXX** Type identifier
- YY** YY is set to 00 from 01/01/2003 until 31/03/2005.
- 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:

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

Troubleshooting





Manual Test Mode

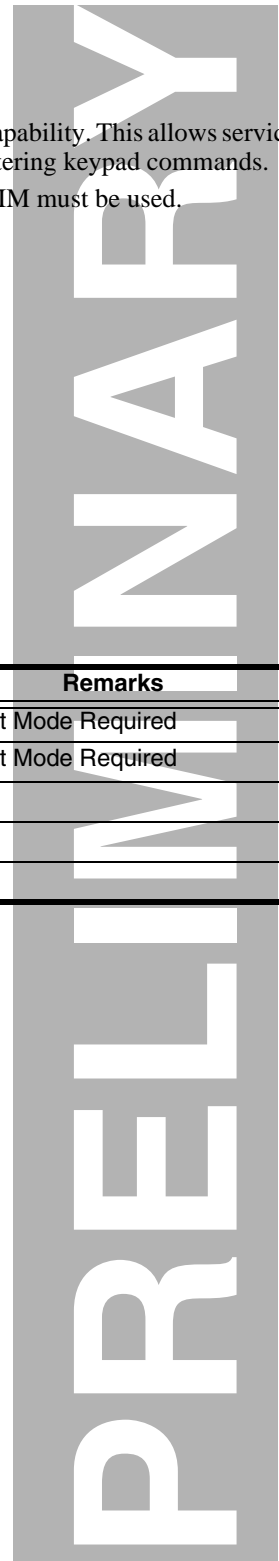
Motorola W220 telephones are equipped with a manual test mode capability. This allows service personnel to verify functionality and perform fault isolation by entering keypad commands. To enter the manual test command mode, a GSM/DCS/PCS test SIM must be used.

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

Manual Test Mode Commands

Table 3. Manual Test Commands

Key Sequence	Test Function/Name	Remarks
*#06#	IMEI Check	No Test Mode Required
***837# 	Flex Version/Technology/S-W Version/Readiness Status	No Test Mode Required
***367628# 	Erase data from the file system, such as photos, melodies, java, etc.	
***778337# 	Erase data from E2P, such as user's phonebook	
***372# 	Test Display. Melody, speaker, keypad, etc.	



Troubleshooting Chart

Table 4. Level 1 and 2 Troubleshooting Chart

Symptom	Probable Cause	Verification and Remedy
1. Telephone will not turn on or stay on.	a) Battery either discharged or defective.	Measure battery voltage across a 50 ohm (>1 Watt) load. If the battery voltage is <3.25 Vdc, recharge the battery using the appropriate battery charger. If the battery will not recharge, replace the battery. If battery is not at fault, proceed to b.
	b) Battery 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) Keypad defective.	Replace the keypad as described in the procedures. Temporarily connect a +3.6 Vdc supply to the battery terminals. Press and hold the PWR button. If unit turns on and stays on, disconnect the dc power source and reassemble with the new keypad.
2. Telephone exhibits poor reception or erratic operation such as calls frequently dropping or weak or distorted audio.	Connections to or from lower PCB defective.	Check connection between the antenna and the lower PCB.
3. Display is erratic, or provides partial or no display.	a) FPC cable faulty.	Check general condition of FPC cable and upper PCB. If the FPC cable and upper PCB are good, proceed to b.
	b) LCM defective.	Replace the LCM. Verify that the fault has been cleared and reassemble the unit with the new LCM.
4. Incoming call alert transducer audio distorted or volume is too low.	Speaker defective.	Replace the speaker as described in the procedures. Verify that the fault has been cleared and reassemble the unit with the new speaker.
5. Telephone transmit audio is weak (usually indicated by called parties complaining of difficulty in hearing voice).	Microphone defective.	Replace the microphone as described in the procedures. Verify that the fault has been cleared and reassemble the unit with the new microphone.
6. Receive audio from earpiece speaker is weak or distorted.	a) Connections to or from lower PCB defective.	Check connection between the antenna and the lower PCB. If the connection is OK, proceed to b.
	b) Speaker defective.	Temporarily replace the speaker with a known good speaker. Ensure good connection. Place a call and verify improvement in earpiece audio. If fault is cleared, reassemble the telephone with the good speaker.
7. Telephone will not recognize or accept SIM card.	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.

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

Symptom	Probable Cause	Verification and Remedy
8. Keypad not functioning.	Keypad defective.	Use alcohol to wipe the keypad metal dome. Check if fault has been cleared. If the fault is still present, either replace the keypad as described in the procedures or refer to a Level 3 Service Center for the keypad metal dome replacement.
9. No or weak audio when using headset.	Headset plug not fully pushed.	Ensure the headset plug is fully seated in the audio jack.

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 section provides a reference for the parts associated with W220 telephones.

Related Publications

Motorola W220 Wireless Phone User Guide

6802919J61

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Exploded View Diagram

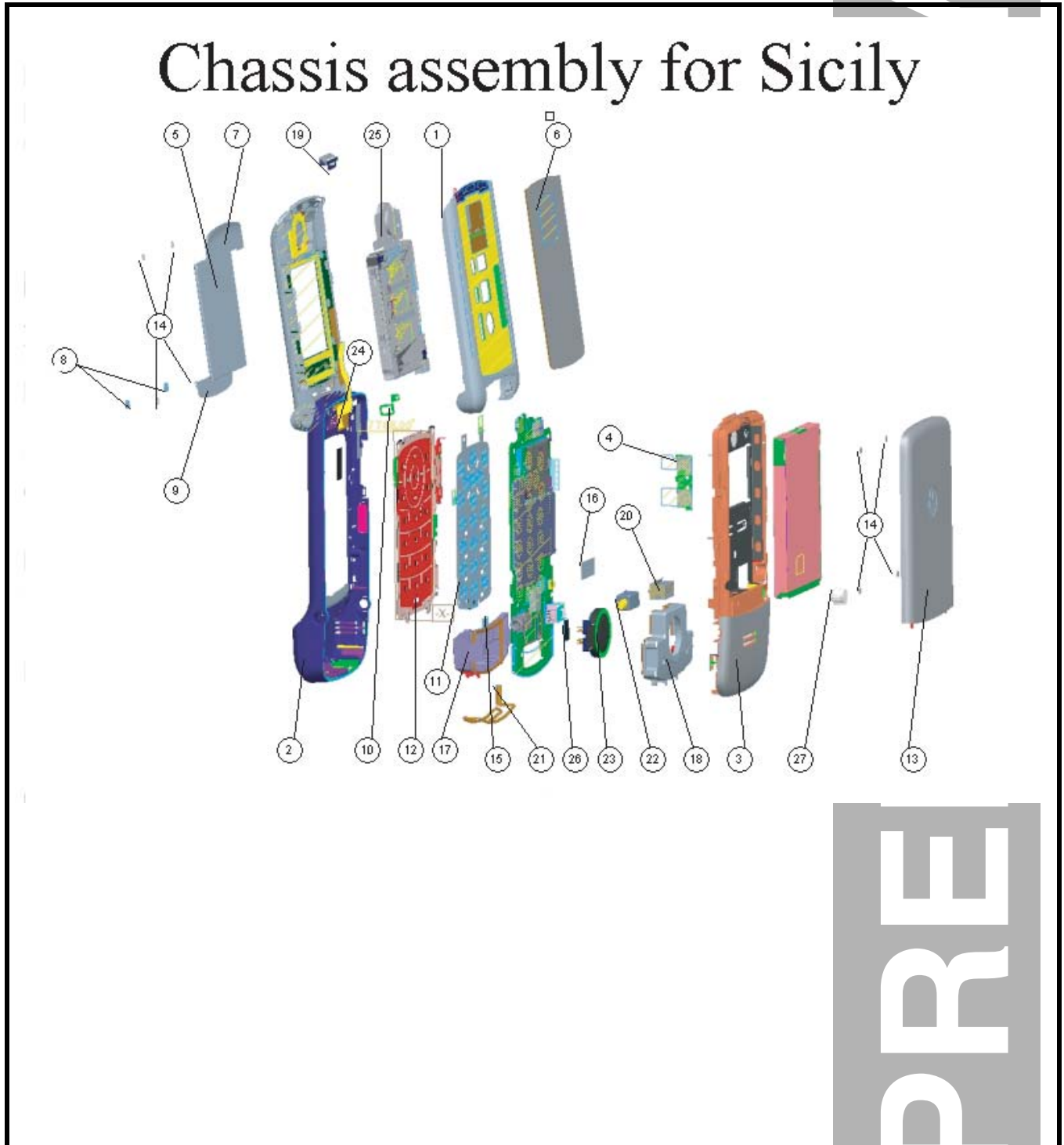


Figure 50. W220 Exploded View Diagram

To order parts please use the following Link:

<https://servicelink3.motorola.com>

(Password is Required)

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

Accessories

Table 6. List of Accessories

Description	Part Number
Power Solution	
Battery 850 mAh Lilon	SNN5744
Black battery door	SHN9510A
AC charger - PRC plug	AAPN4061
AC charger - UK/HK plug	SPN5164
AC charger - Aus plug	SPN5295A
AC charger - India plug	SPN5169A
AC charger - US/TWN plug	SPN5268
Audio & Connectivity	
Headset	CHYN4516
USB data transfer cable	SKN6371
Mobile phone tools CD-ROM	AAVN4008
Consumer Personalization	
Silver lanyard (PRC)	CHYN4152B
Carrying case (TWN)	CHYN4642A

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