



**MOTOROLA**

6809515A16  
Level 1-2 Service Manual

# W160/W156/W180/W175/ W161/W181

## Dual Band Wireless Telephone



W160/W156/W180/W175/W161/W181  
GSM 900/1800  
GSM 850/1900

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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 that 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

The model number on a label (usually on the housing) identifies Motorola products. 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.

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## Computer Program Copyrights

The Motorola products described in this manual may include Motorola computer programs stored in semiconductor memories or other media that are copyrighted with all rights reserved worldwide to Motorola. Laws in the United States and other countries preserve for Motorola, Inc. certain exclusive rights to the copyrighted Introduction 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 W160/W156/W180/W175/W161/W181 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 W160/W156/W180/W175/W161/W181 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 W160/W156/W180/W175/W161/W181 telephones, and also provides 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 that may result in equipment damage.*



*Warning: Emphasizes information about actions that 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

The 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 Transceiver 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

| General Functions          | Specification  |
|----------------------------|--|
| Dimensions                 | 113.2mm x 42.0mm x 14.0mm  |
| Weight                     | 84grams (with battery)   |
| LCD Display                | 65K Color CSTN(MT); Mono STN(LT)<br>Active Area: 27.264mm x 27.264mm(MT); 28.79 x 28.79 mm(LT)<br>Hardware pixels: 128 x 128 |
| Band                       | GSM900/1800 or GSM850/PCS1900  |
| Battery                    | 910 mAh Li Ion Battery   |
| Product type               | BAR type   |
| Antenna                    | Internal Antenna   |
| Frequency Range (EGSM)     | 880-915 MHz Tx,<br>925-960 MHz Rx  |
| Frequency Range (DCS)      | 1710 – 1785 MHz Tx,<br>1805-1880 MHz Rx  |
| Frequency Range (GSM850)   | 824-849 MHz Tx,<br>869-894 MHz Rx  |
| Frequency Range (PCS)      | 1850-1910MHz Tx,<br>1930-1990 MHz Rx   |
| Channel Spacing            | 200KHz   |
| Channels                   | 174 EGSM, 374 DCS,<br>124 GSM850, 299 PCS  |
| Modulation                 | GMSK at BT=0.3   |
| Transmitter Phase Accuracy | 5 Degrees RMS, 20 Degrees peak   |
| Duplex spacing             | 45MHz EGSM, 95MHz DCS,<br>45MHz GSM850, 80MHz PCS  |
| Frequency Stability        | ±0.1PPM of the downlink frequency (Rx)   |
| Operating voltage          | 3.53V ~4.2V  |
| Average Transmit Current   | Power Level 5: 175 mA<br>Power Level 19: 90 mA   |
| Average Standby Current    | DRX 2: 4.0 mA<br>DRX 9: 1.9 mA   |
| Temperature Range          | -10°C to 55°C  |
| Battery Life               | Talk Time: 250-500 Mins; Stand by Time:<br>150~300 Hours   |
| Battery Charge Time        | 4 Hours to 90% of 940mAH capacity  |
| Alert Volume               | Max 95dB@ 5cm, 0.5 watts input   |

| <b>Transmitter Functions</b> | <b>Specification</b>   |
|------------------------------|--|
| RF Power Output              | 33 dBm typical GSM850/GSM900<br>30 dBm typical DCS1800/PCS1900 |
| Output Impedance             | 50 ohms nominal  |
| Spurious Emissions           | -36 dBm from 0.1 to 1GHz,<br>-30 dBm from 1 to 4 GHz           |

| <b>Receiver Functions</b>             | <b>Specification</b>  |
|---------------------------------------|---|
| Receiver Sensitivity                  | -107 dBm typical GSM 850/GSM900<br>-107 dBm typical DCS1800/PCS1900 |
| RX Bit Error Rate (100K bits) type II | <2%   |
| Channel Hop Time                      | 500 microseconds  |
| Time to Camp                          | Approximately 6~10 Second   |

| <b>Speech Coding Functions</b> | <b>Specification</b>   |
|--------------------------------|--|
| Speech Coding Type             | Regular pulse excitation/linear predictive coding with long term prediction (PRE LPC with LTP) |
| Bit Rate                       | 13.0 Kbps  |
| Frame Duration                 | 20 ms  |
| Block Length                   | 260 bits   |
| Classes                        | Class 1 bits =182 bits;<br>Class 2 bits = 78 bits  |
| Bit Rate with FEC Encoding     | 22.8 Kbps  |

## Product Overview

The Motorola W160/W156/W180/W175/W161/W181 features a global system for mobile communications wireless interface technology. It also features a simplified icon and graphical user interface (UI) for easier operation in addition to short message service text messaging (SMS), speed dialing, quick dialing, an alarm, a calculator, games, and an address book. The W160/W156/W180/W175/W161/W181 is a dual-band phone that allows for roaming within the EGSM900 / DCS1800 or GSM850 / PCS 1900.

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 clam shell form-factor housing. The Userreplaceable 910 mAh Lithium-Ion (Li-Ion) battery provide up to 238-469 Mins of talk time with up to 133-307 Hours of standby time. The phone accepts 1.8V/3V mini subscriber identity module (SIM) cards that fit into the SIM holder next to the battery. These telephones feature a 128 x 128 pixel Depends on LBI LT(gray) or MT(color). display and an internal antenna.

## Features

W160/W156/W180/W175/W161/W181 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:

- A 128 x 128 pixel color graphics (Depends on LT or MT) display
- Internal antenna
- Lower voltage technology that provides increased standby and talk times
- Extended GSM (EGSM) channels
- Display animation (Depends on LT or MT)
- VibraCall® vibrating alert
- 5-Way navigation key
- SIM Toolkit™ Class 2 (STK) (Network, subscription and SIM card or service provider dependent feature. Not available in all areas.)
- Backlight
- Speed-, Quick- and One-Touch dialing
- Call Forwarding and Holding
- Customized Menus
- Personal management tools calculator with currency converter, and clock with date
- Other features

## Caller Line Identification

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

## Simplified Text Entry

The W160/W156/W180/W175/W161/W181 features 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.

## 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 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.

## LBI\_MT/LT\_Comparison Chart

| LBI_LT    | Band                          | LCD              | FM Radio | MEMORY |
|-----------|-------------------------------|------------------|----------|--------|
| W160/W161 | GSM 900/1800,<br>GSM 850/1900 | Mono STN 128*128 | YES      | 32/16  |
| W156      | GSM 900/1800,<br>GSM 850/1900 | Mono STN 128*128 | NO       | 32/16  |
| LBI_MT    | Band                          | LCD              | FM Radio | MEMORY |
| W180/W181 | GSM 900/1800,<br>GSM 850/1900 | CSTN 128*128     | YES      | 64/16  |
| W175      | GSM 900/1800,<br>GSM 850/1900 | CSTN 128*128     | NO       | 64/16  |

## Other Features

Detailed descriptions of the other features can be found in the appropriate W160/W156/W180/W175/W161/W181 telephone user guides listed in the Related Publications section at the end of this manual.

# General Functions

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

The W160/W156/W180/W175/W161/W181 phone's controls are located on the front side of the device and on the keyboard as shown in below. Indicators icons are displayed on the LCD.

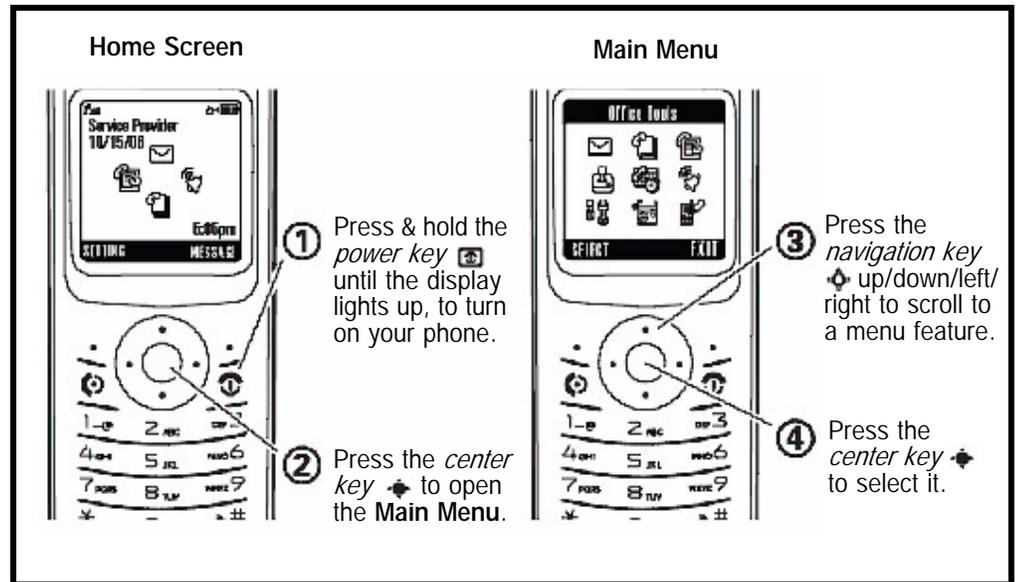
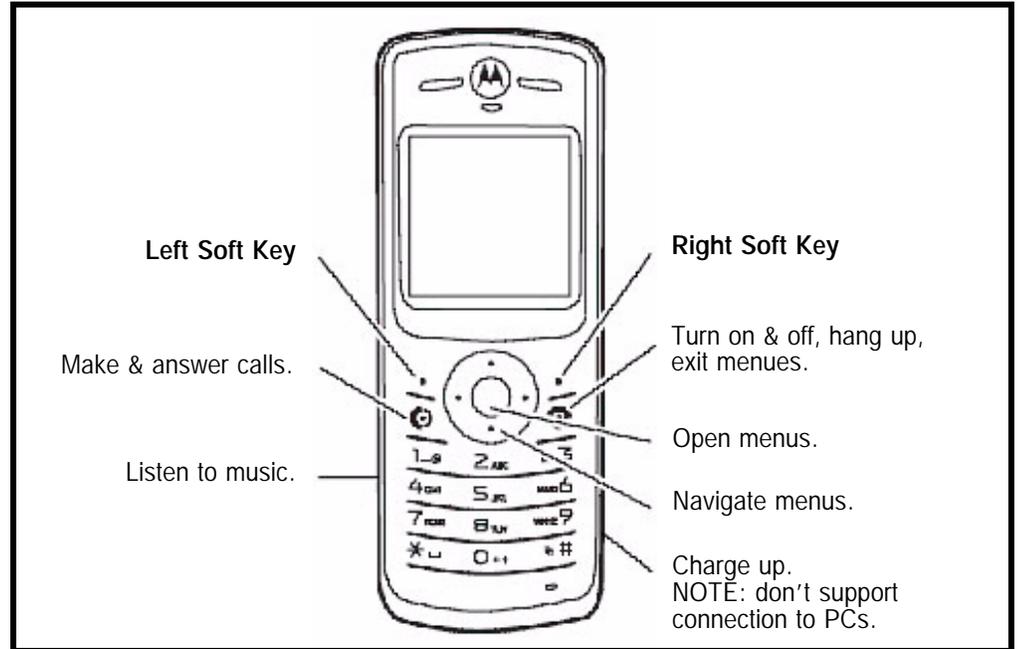


Figure 1. W160/W156/W180/W175/W161/W181 Telephone Control Locations

### Menu Navigation

W160/W156/W180/W175/W161/W181 telephones are equipped with a simplified icon and graphical-based user interface. See the table below for details of the W160/W156/W180/W175/W161/W181 menu structure. A five-way navigation key allows you to move easily through menus and confirm your selection.

## Liquid Crystal Display (LCD)

The LCD provides a 700 square millimeter multicolor backlit color display with user-adjustable contrast settings for optimum readability in all light conditions. The bit-map 128 x 128 pixel display includes up to 3 lines of text, 1 line of icons, and 1 line of prompts.

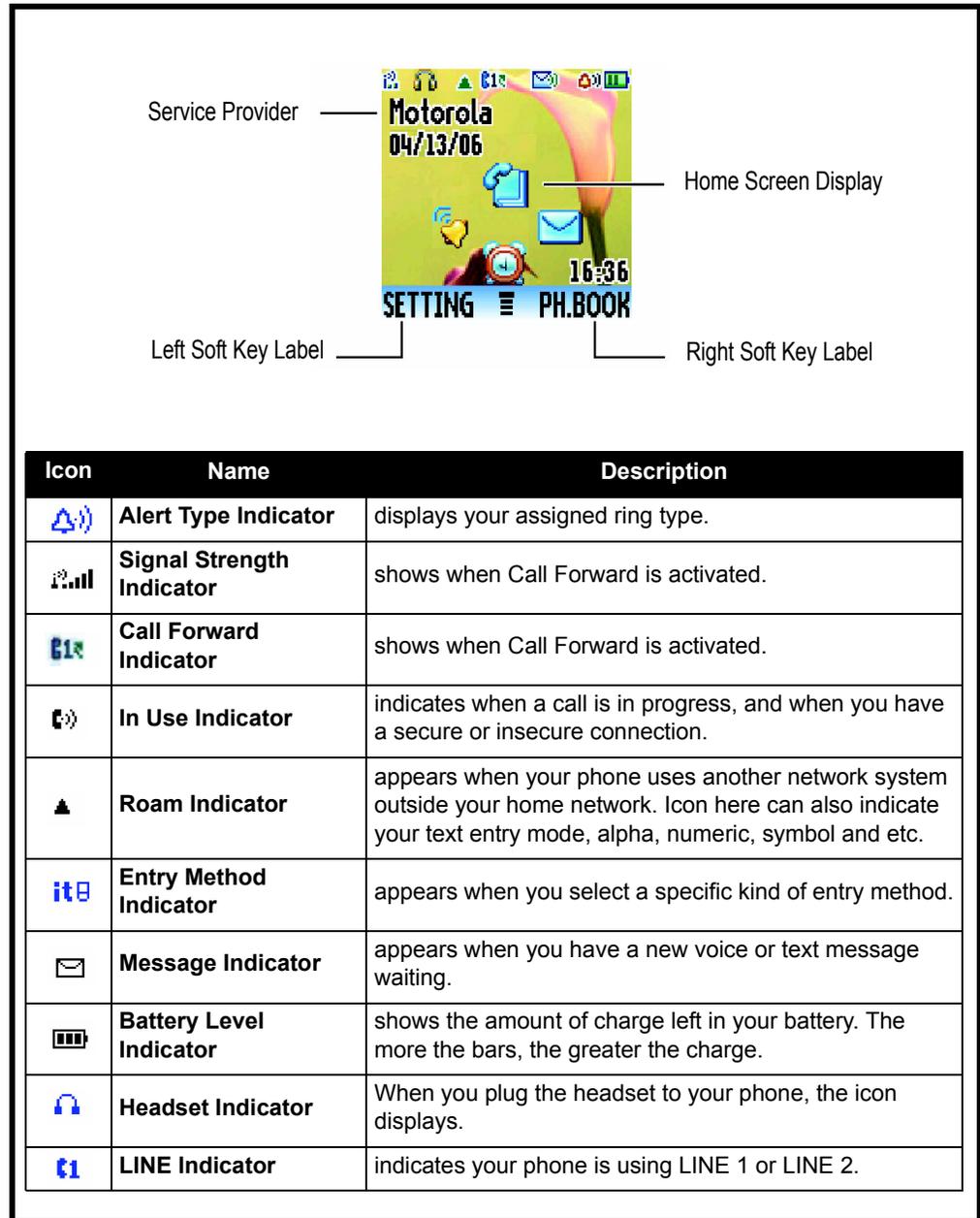


Figure 2. Display Icon Indicators

## User Interface Menu Structure

The table below shows a portion of the W160/W156/W180/W175/W161/W181 telephone menu structure.

### Menu Map (LBI\_LT)

|   |   |  |
|---|---|--|
| <p><b>main menu</b></p> <ul style="list-style-type: none"> <li>✉ <b>Messages</b> <ul style="list-style-type: none"> <li>• Create Message</li> <li>• Voicemail</li> <li>• Inbox</li> <li>• Info Services</li> <li>• Quick Notes</li> <li>• Outbox</li> <li>• Drafts</li> </ul> </li> <li>📖 <b>Phonebook</b> <ul style="list-style-type: none"> <li>• [New Entry]</li> </ul> </li> <li>📞 <b>Recent Calls</b> <ul style="list-style-type: none"> <li>• Received Calls</li> <li>• Dialed Calls</li> <li>• Notepad</li> <li>• Call Times</li> <li>• Call Cost</li> </ul> </li> </ul> | <ul style="list-style-type: none"> <li>🎮 <b>Games</b> <ul style="list-style-type: none"> <li>• Spring Ball</li> <li>• FootBall</li> <li>• Maze</li> </ul> </li> <li>🛠️ <b>Office Tools</b> <ul style="list-style-type: none"> <li>• Calculator</li> <li>• MyMenu</li> <li>• Alarm Clock</li> <li>• Calendar</li> <li>• Stop Watch</li> <li>• Quick Dial</li> <li>• Fixed Dial</li> <li>• Service Dial</li> <li>• STK *</li> </ul> </li> <li>👂 <b>Ring Styles</b> <ul style="list-style-type: none"> <li>• Style</li> <li>• Ring Detail</li> <li>• My Tones</li> </ul> </li> </ul>   | <ul style="list-style-type: none"> <li>⚙️ <b>Settings</b> <ul style="list-style-type: none"> <li>• (see next page)</li> </ul> </li> <li>📻 <b>FM Radio †</b></li> <li>📱 <b>Personalize</b> <ul style="list-style-type: none"> <li>• Home Screen</li> <li>• Main Menu</li> <li>• Greeting</li> <li>• Quick Dial</li> </ul> </li> </ul> <p>* Network Dependent<br/>                 † Provided on the W160 only</p> <p>This is the standard main menu layout.<br/> <b>Your phone's menu may be different.</b></p> |
| <p><b>setting menu</b></p> <ul style="list-style-type: none"> <li><b>Call Forward</b> <ul style="list-style-type: none"> <li>• Voice Calls</li> <li>• Cancel All</li> <li>• Forward Status</li> </ul> </li> <li><b>Phone Status</b> <ul style="list-style-type: none"> <li>• My Tel. Numbers *</li> <li>• Active Line *</li> <li>• Battery Meter</li> </ul> </li> <li><b>In-Call Setup</b> <ul style="list-style-type: none"> <li>• In-Call Timer</li> <li>• Call Cost Setup</li> <li>• My Caller ID</li> <li>• Answer Options</li> <li>• Call Waiting</li> </ul> </li> </ul>   | <ul style="list-style-type: none"> <li><b>Security</b> <ul style="list-style-type: none"> <li>• Phone Lock</li> <li>• Lock Keypad</li> <li>• Lock Keypad Timer</li> <li>• Fixed Dial</li> <li>• Call Barring</li> <li>• SIM PIN</li> <li>• New Passwords</li> </ul> </li> <li><b>Initial Setup</b> <ul style="list-style-type: none"> <li>• Time and Date</li> <li>• Power on/off</li> <li>• 1-Touch Dial</li> <li>• Backlight</li> <li>• Scroll</li> <li>• Language</li> <li>• Display Timeout</li> <li>• Contrast</li> <li>• DTMF</li> <li>• TTY Setup</li> <li>• Master Reset</li> <li>• Master Clear</li> </ul> </li> </ul> | <ul style="list-style-type: none"> <li><b>Network</b> <ul style="list-style-type: none"> <li>• New Network</li> <li>• Network Setup</li> <li>• Avail. Networks</li> <li>• My Network List</li> <li>• Service Tone</li> <li>• Call Drop Tone</li> <li>• Band Selection</li> </ul> </li> <li><b>Headset</b> <ul style="list-style-type: none"> <li>• Auto Answer</li> </ul> </li> </ul> <p>* Network Dependent</p>   |

Figure 3. W160/W156/W180/W175/W161/W181 Menu Structure

## Battery Function

The telephone displays a battery charge indicator icon in the idle screen to indicate the battery charge level. The gauge shows four levels: 50%, 20%, 5%, and Low Battery.

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



*Note: All batteries can cause property damage and/or bodily injury such as burns if a conductive material such as jewelry, keys, or beaded chains touches 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.

## Tools and Test Equipment

The table below lists the tools and test equipment used on W215 telephones. Use either the listed items or the equivalent.

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

| Motorola Part Number <sup>1</sup> | Description   | Application  |
|-----------------------------------|---|--|
| See Table 3                       | 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) |
| -                                 | Antistatic Gloves   | Provides protection from damage to phone caused by electrostatic discharge (ESD) |
| 0-00-00-3005 (AMS)                | Disassembly tool, plastic with flat and pointed ends (manual opening tool)                                    | Used during assembly/disassembly   |
| 6680388B01                        | Tweezers, plastic   | Used during assembly/disassembly   |
| -                                 | T5 Screw driver   | Used with Screw Driver   |
| HP34401A <sup>2</sup>             | 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.



Figure 4. A screwdriver (T5), a pair of tweezers, and a wedge tool

## Disassembly

This section describes how to disassemble a W160/W156/W180/W175/W161/W181 telephone. Tools and equipment used are listed on the preceding page.



*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.*

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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 touches exposed terminals. The conductive material may complete an electrical circuit (short circuit) and become quite hot. Exercise care in handling any charged battery, particularly when placing it inside a pocket, purse, or other container with metal objects.*

1. Ensure the phone is turned off.
2. Push the latch and pop out the battery cover.



**Figure 5. Removing the battery cover**

3. Press the tab to pop out 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.*

4. To replace, insert the battery with 2 tabs on its bottom end into the battery slot.



**Figure 6. Replace the battery cover**

5. Click the battery into place, then slip the battery cover over it.

## Removing and Replacing the SIM Card

1. Remove the battery.
2. Remove the SIM from its holder by sliding it in the direction shown below.



**Figure 7. Removing the SIM card**

3. To replace, carefully slide the SIM into position in its socket.

---

## Removing and Replacing the Front Housing

1. Remove the SIM card.
2. Remove six T5 screws around the rear housing.
3. Use torque force of 13.73 N-cm.



Figure 8. Removing the six T5 screws

4. Use a flat wedge tool to pry the case open along the central seam.



Figure 9.

5. Remove the rear housing.
  1. Disengage the hook at the top first (labeled as 1)
  2. The hooks at both sides can only be disengaged after you have disengaged the hook at the top.



Figure 10. Prying the case apart along the seam



Figure 11. Removing the rear housing

6. (Optional) Remove and replace the LENS.

NOTE: LENS and shielding case must be secured using the adhesive tape shown in Fig. 13.



Figure 12. Removing the LENS



Figure 13. ADHENSIVE PN: 8609H28001W



Figure 14.

## Removing and Replacing the Transceiver Board, Shielding case, and Vibrator Module

1. Remove the Shielding Case.
2. Disengage the both side hooks which help to secure the transceiver board to the shielding case, and then pop it out.

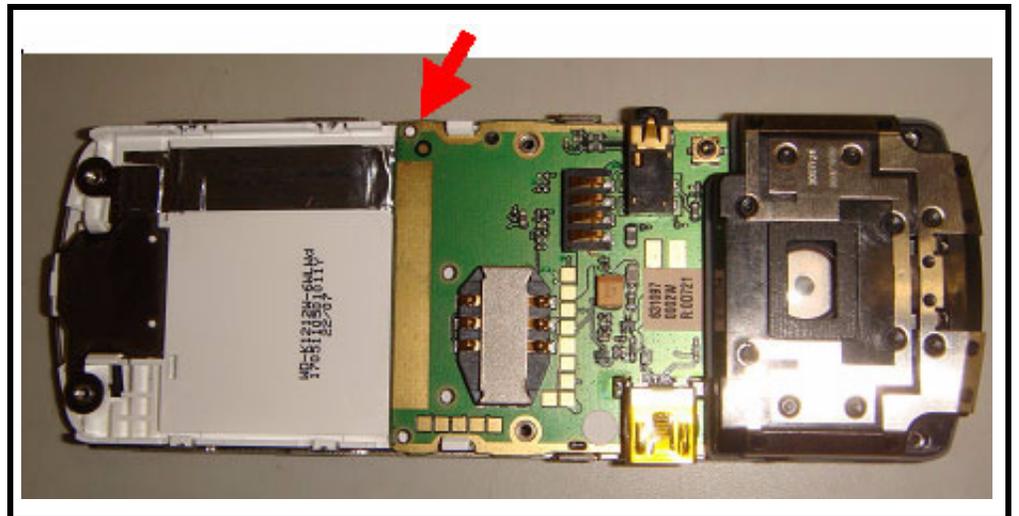


Figure 15.

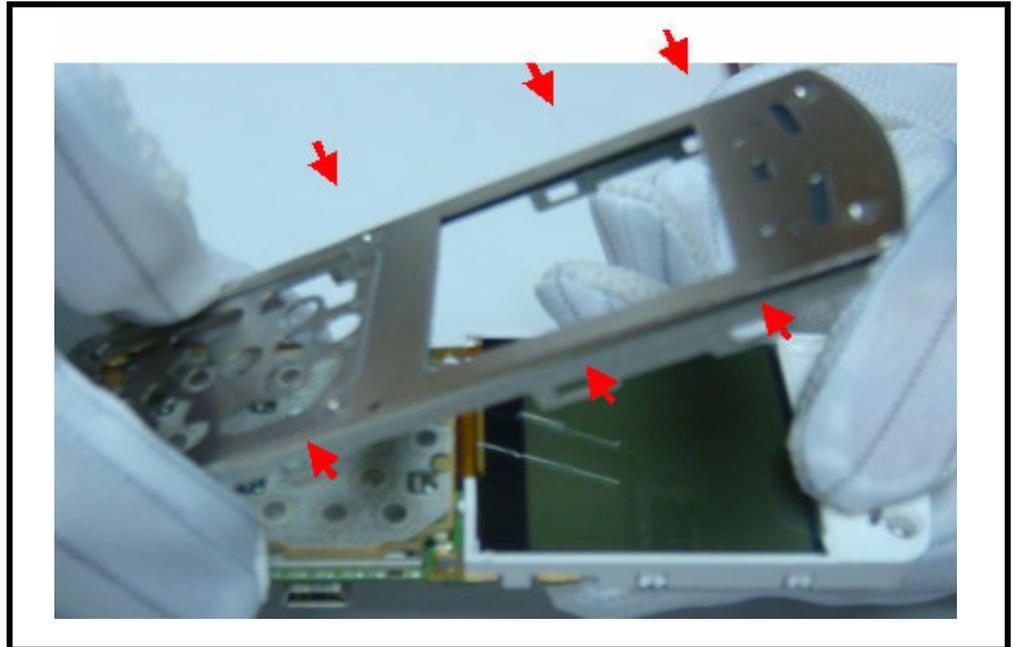


Figure 16. Disengaging the shielding case from six hooks



Figure 17. Separation shielding and transceiver board

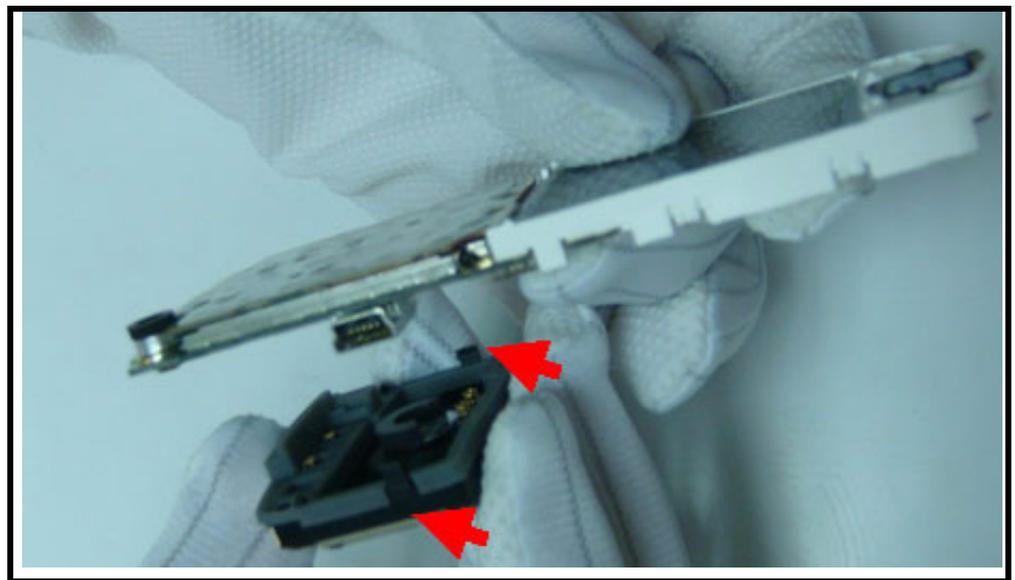
3. In the rear housing component, gently pry out the vibrator module.



Figure 18. Removing the vibrator module

## Removing and Replacing the Antenna Module, Microphone

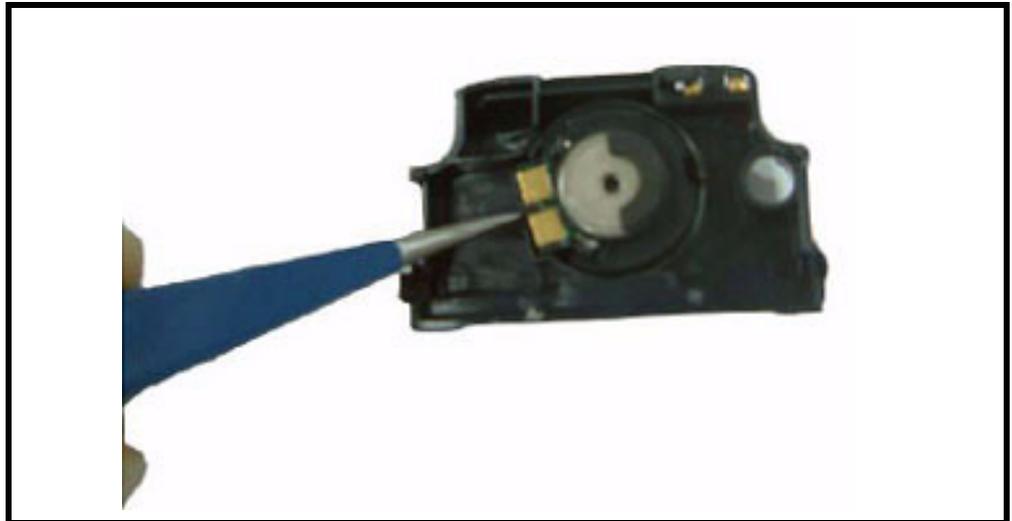
1. Remove the transceiver board, the vibrator module, and the rear housing.
2. Disengage both latches (as indicated by the arrows in the figure) alongside the transceiver board to remove the antenna module from the transceiver board.



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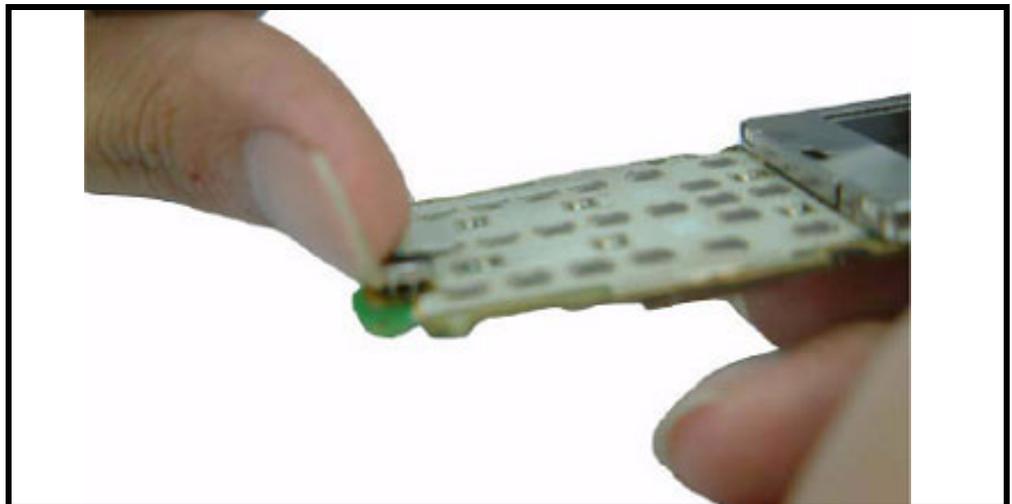
**Figure 19. Removing the antenna module**

3. (Optional) Remove and replace the speaker.



**Figure 20. Removing the speaker**

4. Carefully pry off the microphone component.



**Figure 21. Removing the microphone**

---

# 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 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 labeled 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 22.

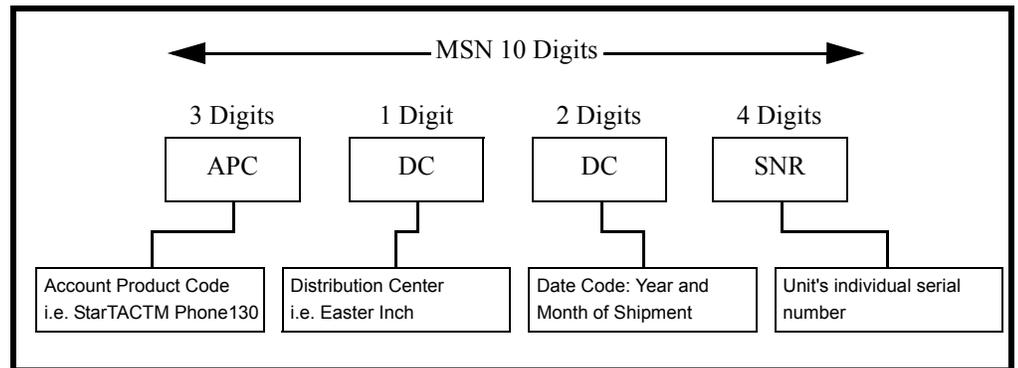


Figure 22. MSN Label Breakdown

### International Mobile Station Equipment Identity (IMEI)

The International Mobile Station Equipment Identity (IMEI) number is an individual number unique to the Transceiver 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 the table below.

**Table 2: IMEI Number Breakdown**

| TAC      | Serial Number | Check Digit |
|----------|---------------|-------------|
| NNXXXXXX | ZZZZZZ        | A           |

Where

**TAC** Type Allocation Code, formerly known as Type Approval Code

**NN** Reporting Body Identifier (BABT or CTIA)

**XXXXXX** Type Identifier (defined by BABT or CTIA)

**ZZZZZZ** Individual unit serial number

Phase 1 = 0.

**A** Phase 2 & 2+= check digit and is defined as a function of all other IMEI digits

Other label number configurations present are:

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

# Troubleshooting

## Manual Test Mode

Motorola W160/W156/W180/W175/W161/W181 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 as described in the procedures.
3. Remove the customer's SIM card from the phone as described in the procedures.
4. Insert the test SIM into the SIM slot.
5. Replace the battery as described in the procedures.
6. Press and hold  to turn the phone ON.

## Manual Test Mode Commands

**Table 3: Manual Test Commands**

| Key Sequence | Test Function/Name  | Remarks |
|--------------|---------------------|---------|
| #02#         | Handset information |         |
| #03#         | RF information      |         |
| #04#         | ADC information     |         |
| #09#         | Simple Test mode    |         |
| **0102#      | FFS format          |         |
| **0105#      | Disable EFEM mode   |         |
| *#06#        | IMEI number         |         |

## 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. 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.   | 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.   |

**Table 4: Level 1 and 2 Troubleshooting Chart (Continued)**

| Symptom   | Probable Cause                 | Verification and Remedy  |
|---|--------------------------------|--|
| 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. |
| 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 or refer to a Level 3 Service Center for the keypad metal dome replacement.   |
| 9. Vibrator feature not functioning.                | a) Vibrator faulty.            | Check general condition of vibrator. If it is good, proceed to b.  |
|   | b) Vibrator defective.         | Replace the defective vibrator.  |
| 10. No or weak audio when using headset.            | Headset plug not fully pushed. | Ensure the headset plug is fully seated in the 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 W160/W156/W180/W175/W161/W181 telephones.

### Exploded View Diagram (W160)

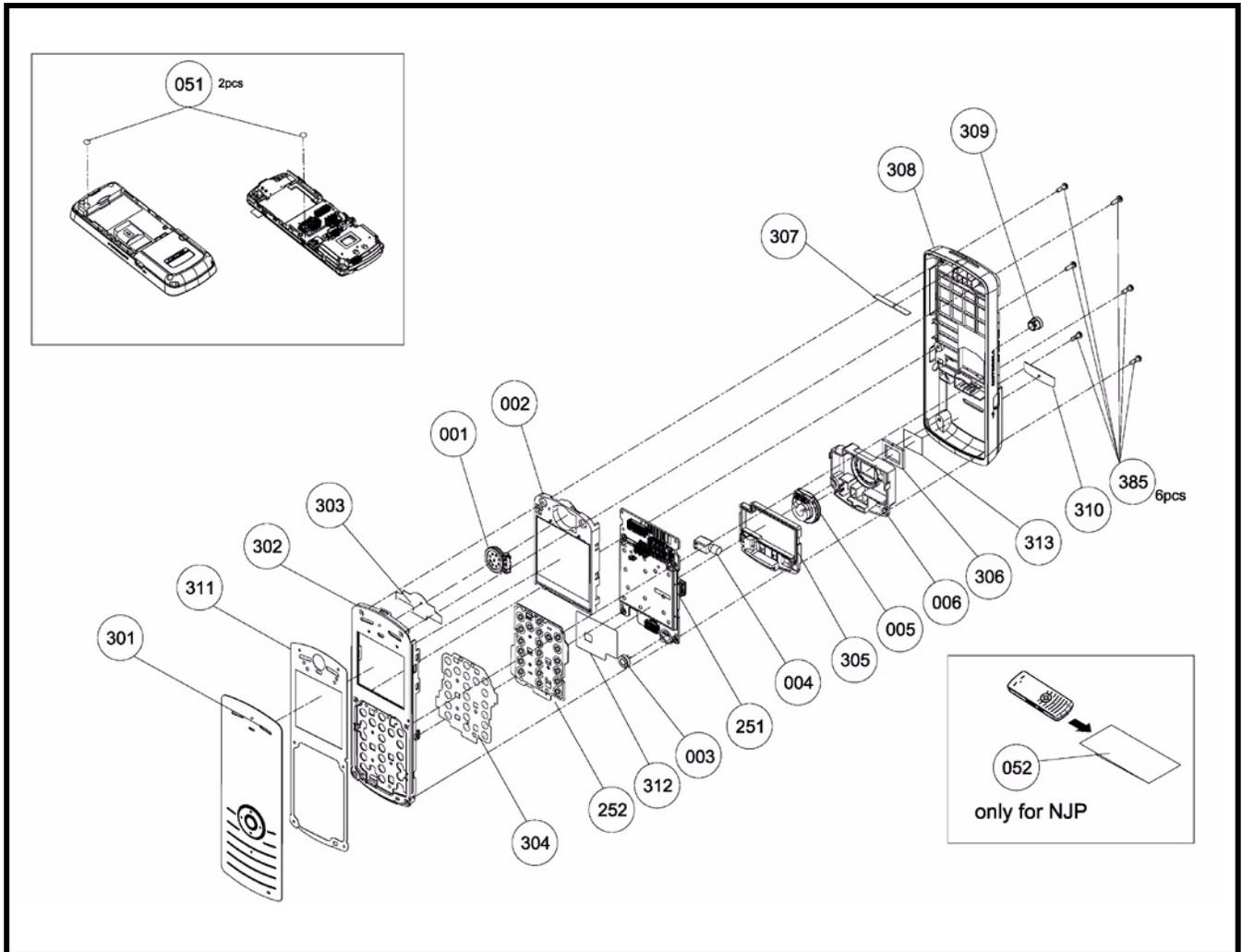


Figure 23. W160 (H28) Exploded View Diagram

## Exploded View Parts List (W160)

Table 5: W160 (H28) Exploded View Parts List

| Part Number | Item Number | Description | Specification                    |
|-------------|-------------|-------------|----------------------------------|
| 001         | 2240133208W | RECEIVER    | SDR1332F-S2-FB4-G 32OHM AAC      |
| 002         | 7630121254W | LCM         | WD-K1212W-6WLW 128*128 WINTEK    |
| 003         | 2220602207W | MIC         | ACMG6022-03P28-443 $\phi$ 6 AAC  |
| 004         | 3930408022W | SPR-VIB     | $\psi$ 4*L8 1.3V ME9A-MC4 SHICOH |
| 005         | 2250160815W | SPEAKER     | DMS1608F-S2-05-PC-FB2-G AAC      |
| 006         | 2300H28001W | I-ANTENNA   | H28 ANT+HOLDER EU                |
| 051         | 82E5800003W | LABEL       | E58 WATERPROOF 3M5559 $\phi$ 4mm |
| 251         | 6910970002W | F/WMB 33    | H28 GA-129 W/FM                  |
| 252         | 6320520001W | SMT MMI     | H28 GS-080 KEYPAD                |
| 300         | 5501650001W | ME/PT 33    | H28/H28A BLACK                   |
| 301         | 31A1H28011W | DIAL-ASSY   | H28-P+R-BLACK-E-21KEY            |
| 302         | 3013H28001W | LCMBRAASY   | H28-METAL FRAME+SPONGE ASSY      |
| 303         | 303FH28001W | REC-COV     | H28-MESH-30*12.82-REC            |
| 304         | 3109H28001W | MET-DOME    | H28- $\phi$ 4*160g-21KEY         |
| 305         | 3068H28001W | GASKET      | H28-ANT-RUBBER                   |
| 306         | 303EH28001W | SPK-SPON    | H28-PORON-12.4*9.4-SPK           |
| 307         | 303FH28002W | REC-COV     | H28-MESH-22*2.9                  |
| 308         | 2523H28002W | LOW-CASE    | H28-PC-BLACK                     |
| 309         | 3028H28001W | RF-COV      | H28-BLACK                        |
| 310         | 3062H28002W | NAMEPLATE   | H28-PC-BLACK                     |
| 311         | 8609H28001W | ADHESIVE    | H28-NITTO-106.27*39.01*0.15      |
| 312         | 8609H28002W | ADHESIVE    | H28-D228B-27.6*19.5*0.1          |
| 313         | 303EH28002W | SPK-SPON    | H28-MESH-17.9*9.4-SPK            |
| 385         | 3501645204W | SCREW_G     | FPH-TROX-M1.6 H=4.5 BLA-NYL      |

### Exploded View Diagram (W156)

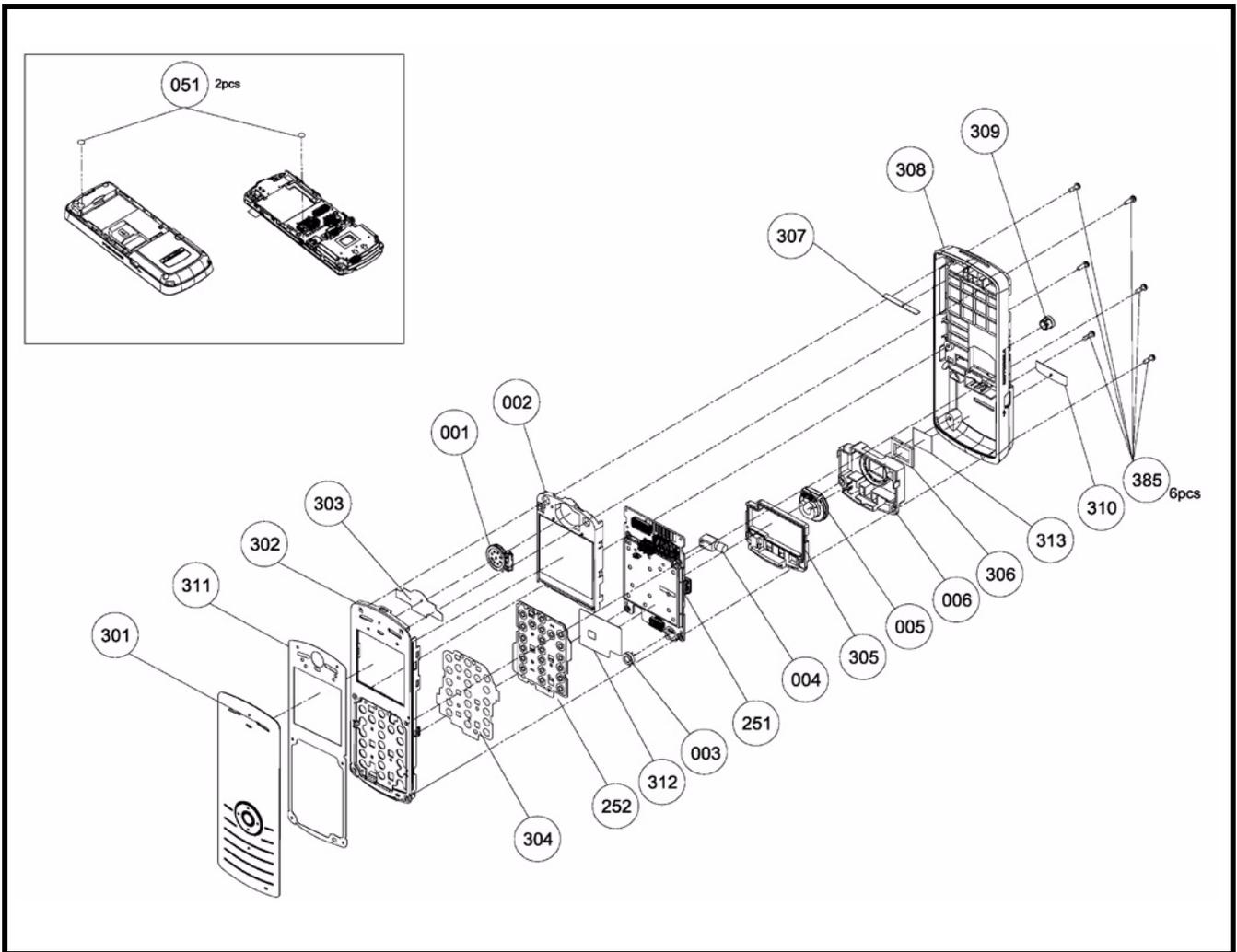


Figure 24. W156 (H32) Exploded View Diagram

## Exploded View Parts List (W156)

Table 6: W156 (H32) Exploded View Parts List

| Part Number | Item Number | Description | Specification                    |
|-------------|-------------|-------------|----------------------------------|
| 001         | 2240133208W | RECEIVER    | SDR1332F-S2-FB4-G 32OHM AAC      |
| 002         | 7630121254W | LCM         | WD-K1212W-6WLW 128*128 WINTEK    |
| 003         | 2220602207W | MIC         | ACMG6022-03P28-443 $\phi$ 6 AAC  |
| 004         | 3930408022W | SPR-VIB     | $\psi$ 4*L8 1.3V ME9A-MC4 SHICOH |
| 005         | 2250160815W | SPEAKER     | DMS1608F-S2-05-PC-FB2-G AAC      |
| 006         | 2300H28001W | I-ANTENNA   | H28 ANT+HOLDER EU                |
| 051         | 82E5800003W | LABEL       | E58 WATERPROOF 3M5559 $\phi$ 4mm |
| 251         | 6910970061W | F/WMB 33    | H32 GA-129                       |
| 252         | 6320520001W | SMT MMI     | H28 GS-080 KEYPAD                |
| 300         | 5501770001W | ME/PT 33    | H32 BLACK                        |
| 301         | 3104H32011W | DIAL-KEY    | H32-P+R-BLACK-E-21KEY            |
| 302         | 3013H28001W | LCMBRAASY   | H28-METAL FRAME+SPONGE ASSY      |
| 303         | 303FH28001W | REC-COV     | H28-MESH-30*12.82-REC            |
| 304         | 3109H28001W | MET-DOME    | H28- $\phi$ 4*160g-21KEY         |
| 305         | 3068H28001W | GASKET      | H28-ANT-RUBBER                   |
| 306         | 303EH28001W | SPK-SPON    | H28-PORON-12.4*9.4-SPK           |
| 307         | 303FH28002W | REC-COV     | H28-MESH-22*2.9                  |
| 308         | 2523H31001W | LOW-CASE    | H31-PC-BLACK-W/O FM              |
| 309         | 3028H28001W | RF-COV      | H28-BLACK                        |
| 310         | 3062H32001W | NAMEPLATE   | H32-PC-BLACK W156                |
| 311         | 8609H28001W | ADHESIVE    | H28-NITTO-106.27*39.01*0.15      |
| 312         | 8609H28002W | ADHESIVE    | H28-D228B-27.6*19.5*0.1          |
| 313         | 303EH28002W | SPK-SPON    | H28-MESH-17.9*9.4-SPK            |
| 385         | 3501645204W | SCREW_G     | FPH-TROX-M1.6 H=4.5 BLA-NYL      |

### Exploded View Diagram (W180)

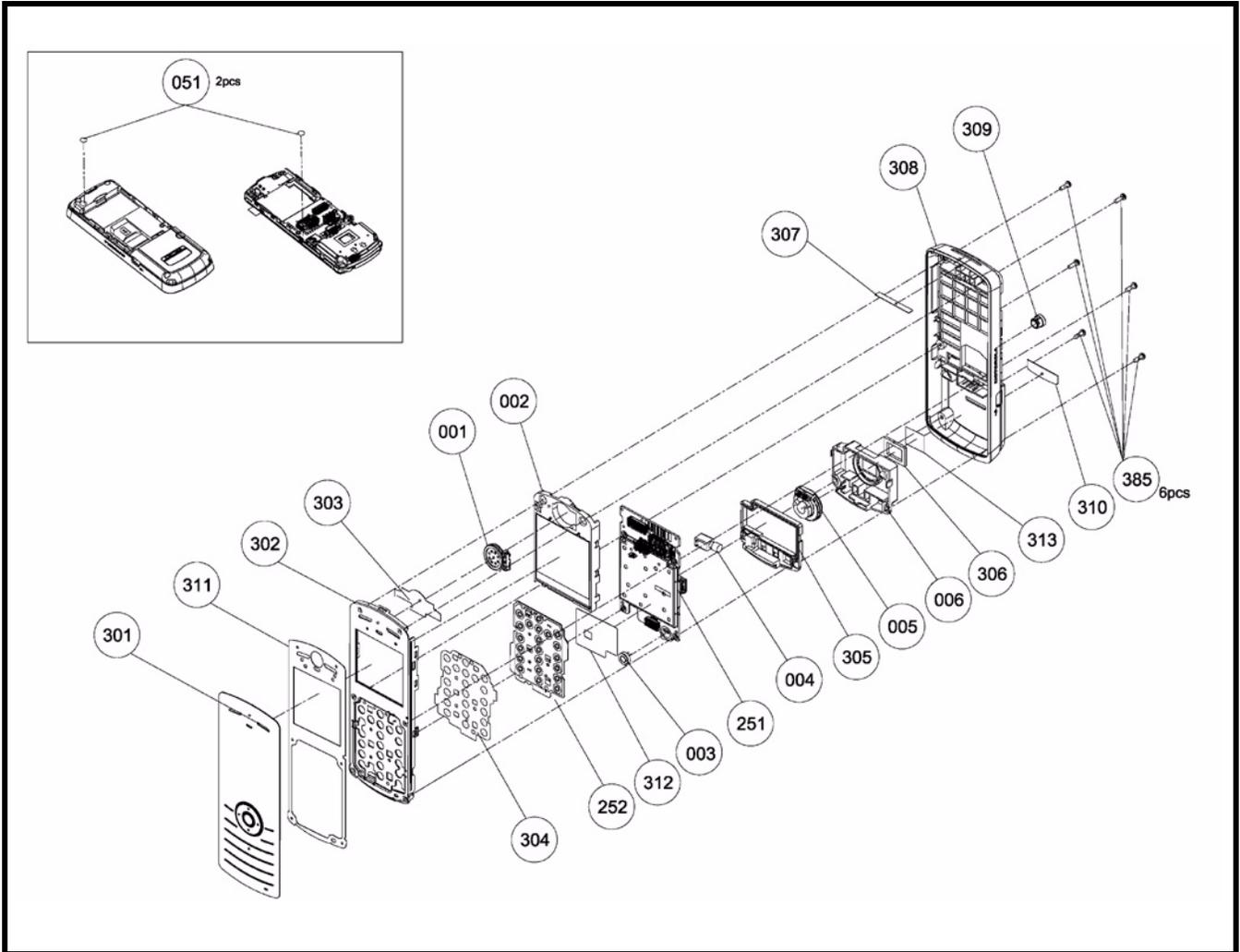


Figure 25. W180 (H29) Exploded View Diagram

## Exploded View Parts List (W180)

Table 7: W180 (H29) Exploded View Parts List

| Part Number | Item Number | Description | Specification                    |
|-------------|-------------|-------------|----------------------------------|
| 001         | 2240133208W | RECEIVER    | SDR1332F-S2-FB4-G 32OHM AAC      |
| 002         | 7630121257W | LCM         | WD-Y1212VP-6CLW 128*128 WINTEK   |
| 003         | 2220602207W | MIC         | ACMG6022-03P28-443 $\phi$ 6 AAC  |
| 004         | 3930408022W | SPR-VIB     | $\psi$ 4*L8 1.3V ME9A-MC4 SHICOH |
| 005         | 2250160815W | SPEAKER     | DMS1608F-S2-05-PC-FB2-G AAC      |
| 006         | 2300H28001W | I-ANTENNA   | H28 ANT+HOLDER EU                |
| 051         | 82E5800003W | LABEL       | E58 WATERPROOF 3M5559 $\phi$ 4mm |
| 251         | 6910970021W | F/WMB 33    | H29 GA-129 W/FM                  |
| 252         | 6320520001W | SMT MMI     | H28 GS-080 KEYPAD                |
| 300         | 5501700001W | ME/PT 33    | H29/H29A BLACK                   |
| 301         | 3104H29011W | DIAL-KEY    | H29-P+R-BLACK-E-21KEY            |
| 302         | 3013H28001W | LCMBRAASY   | H28-METAL FRAME+SPONGE ASSY      |
| 303         | 303FH28001W | REC-COV     | H28-MESH-30*12.82-REC            |
| 304         | 3109H28001W | MET-DOME    | H28- $\phi$ 4*160g-21KEY         |
| 305         | 3068H28001W | GASKET      | H28-ANT-RUBBER                   |
| 306         | 303EH28001W | SPK-SPON    | H28-PORON-12.4*9.4-SPK           |
| 307         | 303FH28002W | REC-COV     | H28-MESH-22*2.9                  |
| 308         | 2523H28002W | LOW-CASE    | H28-PC-BLACK                     |
| 309         | 3028H28001W | RF-COV      | H28-BLACK                        |
| 310         | 3062H29001W | NAMEPLATE   | H29-PC-BLACK                     |
| 311         | 8609H28001W | ADHESIVE    | H28-NITTO-106.27*39.01*0.15      |
| 312         | 8609H28002W | ADHESIVE    | H28-D228B-27.6*19.5*0.1          |
| 313         | 303EH28002W | SPK-SPON    | H28-MESH-17.9*9.4-SPK            |
| 385         | 3501645204W | SCREW_G     | FPH-TROX-M1.6 H=4.5 BLA-NYL      |

### Exploded View Diagram (W175)

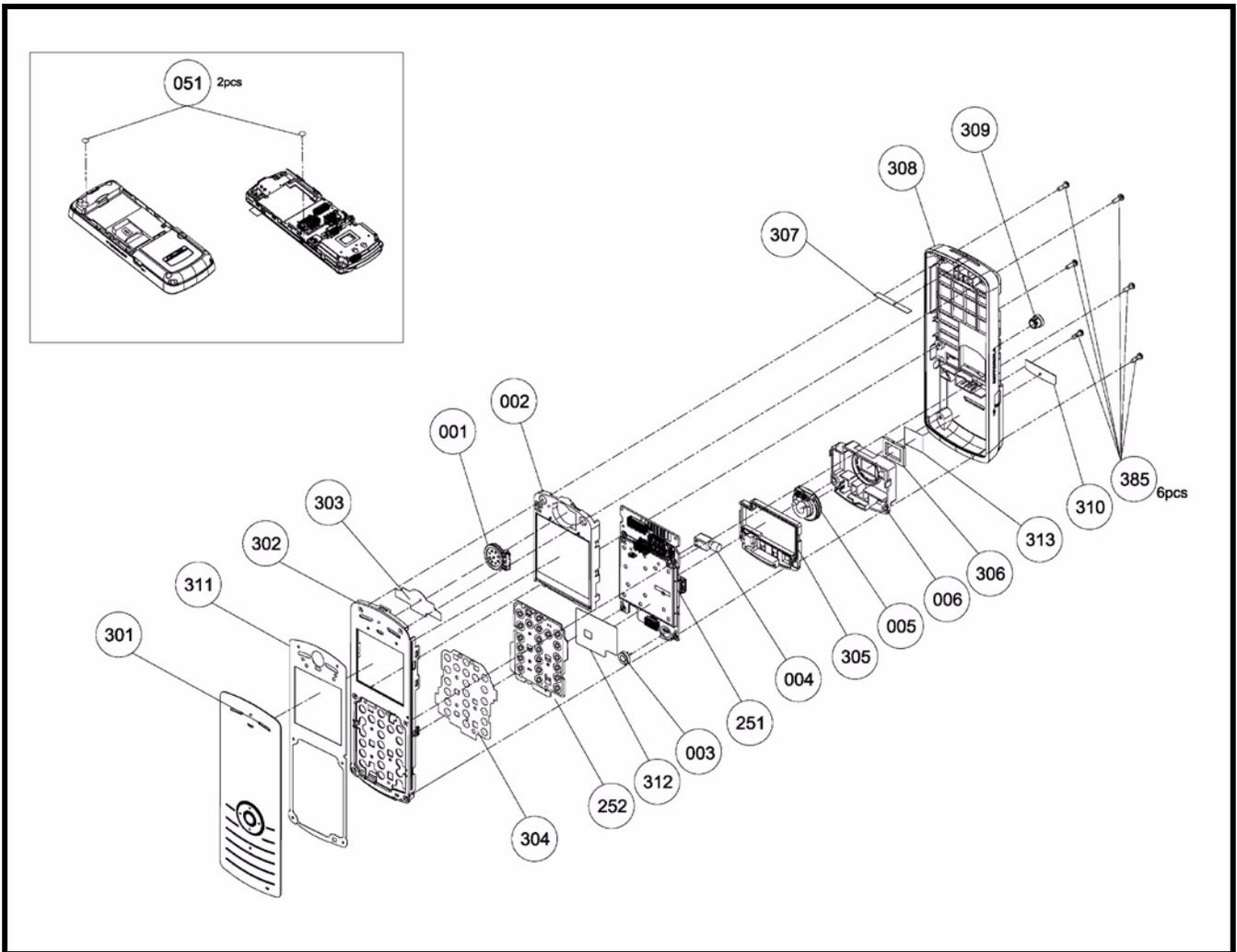


Figure 26. W175 (H31) Exploded View Diagram

## Exploded View Parts List (W175)

Table 8: W175 (H31) Exploded View Parts List

| Part Number | Item Number | Description | Specification                    |
|-------------|-------------|-------------|----------------------------------|
| 001         | 2240133208W | RECEIVER    | SDR1332F-S2-FB4-G 32OHM AAC      |
| 002         | 7630121257W | LCM         | WD-Y1212VP-6CLW 128*128 WINTEK   |
| 003         | 2220602207W | MIC         | ACMG6022-03P28-443 $\phi$ 6 AAC  |
| 004         | 3930408022W | SPR-VIB     | $\psi$ 4*L8 1.3V ME9A-MC4 SHICOH |
| 005         | 2250160815W | SPEAKER     | DMS1608F-S2-05-PC-FB2-G AAC      |
| 006         | 2300H28001W | I-ANTENNA   | H28 ANT+HOLDER EU                |
| 051         | 82E5800003W | LABEL       | E58 WATERPROOF 3M5559 $\phi$ 4mm |
| 251         | 6910970041W | F/WMB 33    | H31 GA-129                       |
| 252         | 6320520001W | SMT MMI     | H28 GS-080 KEYPAD                |
| 300         | 5501740001W | ME/PT 33    | H31/H31A BLACK                   |
| 301         | 3104H31011W | DIAL-KEY    | H31-P+R-BLACK-E-21KEY            |
| 302         | 3013H28001W | LCMBRAASY   | H28-METAL FRAME+SPONGE ASSY      |
| 303         | 303FH28001W | REC-COV     | H28-MESH-30*12.82-REC            |
| 304         | 3109H28001W | MET-DOME    | H28- $\phi$ 4*160g-21KEY         |
| 305         | 3068H28001W | GASKET      | H28-ANT-RUBBER                   |
| 306         | 303EH28001W | SPK-SPON    | H28-PORON-12.4*9.4-SPK           |
| 307         | 303FH28002W | REC-COV     | H28-MESH-22*2.9                  |
| 308         | 2523H31001W | LOW-CASE    | H31-PC-BLACK-W/O FM              |
| 309         | 3028H28001W | RF-COV      | H28-BLACK                        |
| 310         | 3062H31001W | NAMEPLATE   | H31-PC-BLACK W175                |
| 311         | 8609H28001W | ADHESIVE    | H28-NITTO-106.27*39.01*0.15      |
| 312         | 8609H28002W | ADHESIVE    | H28-D228B-27.6*19.5*0.1          |
| 313         | 303EH28002W | SPK-SPON    | H28-MESH-17.9*9.4-SPK            |
| 385         | 3501645204W | SCREW_G     | FPH-TROX-M1.6 H=4.5 BLA-NYL      |

### Exploded View Diagram (W161)

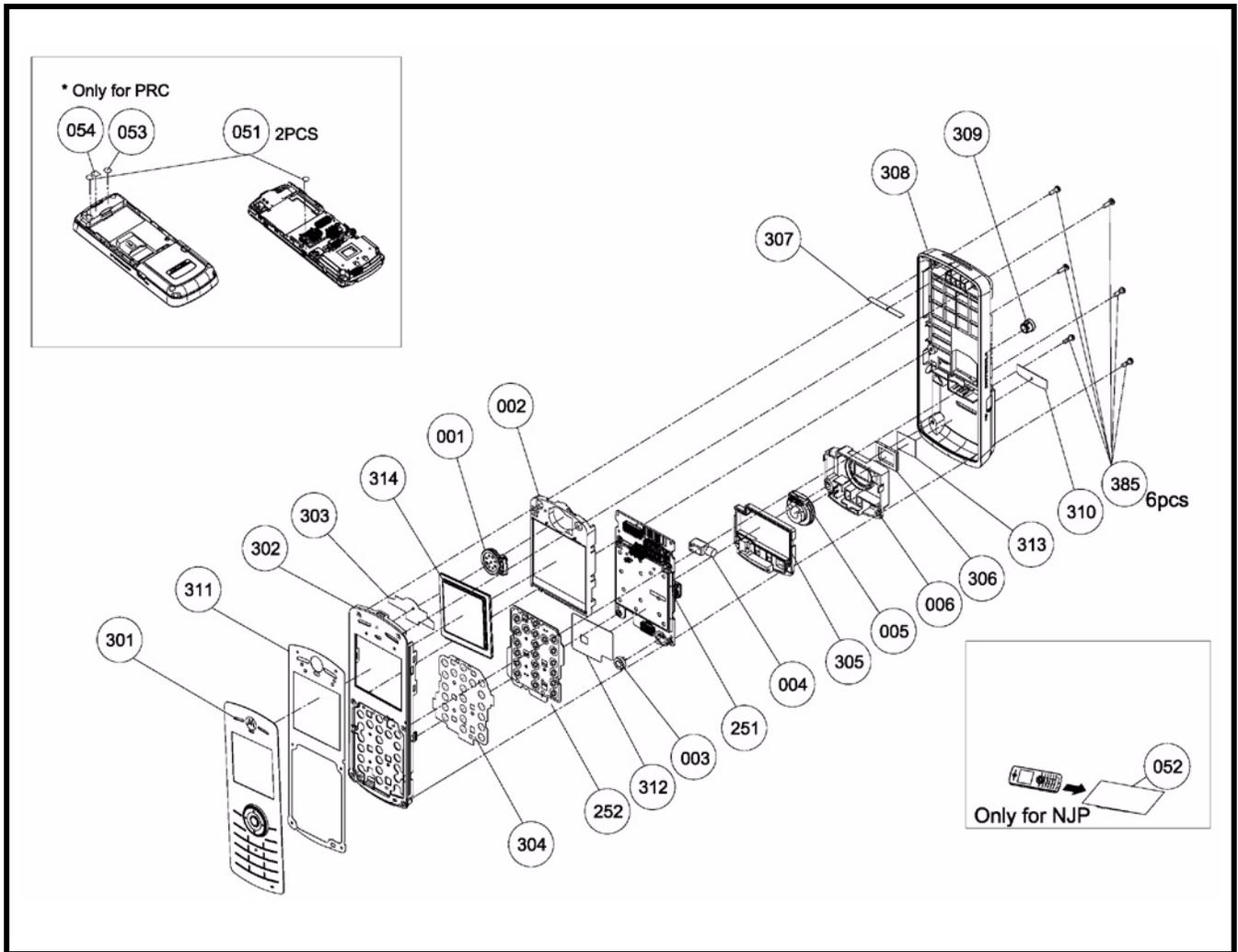


Figure 27. W161 (M48) Exploded View Diagram

## Exploded View Parts List (W161)

Table 9: W161 (M48) Exploded View Parts List

| Part Number | Item Number | Description | Specification                    |
|-------------|-------------|-------------|----------------------------------|
| 001         | 2240133208W | RECEIVER    | SDR1332F-S2-FB4-G 32OHM AAC      |
| 002         | 763012125CW | LCM         | WD-K1212Y-6WLW 128*128 WINTEK    |
| 003         | 2220602210W | MIC         | ACMG6022-03P28-001-443-F1 AAC    |
| 004         | 3930408024W | SPR-VIB     | $\phi$ 4*L8 1.3V LA4-459EG COPAL |
| 005         | 2250160815W | SPEAKER     | DMS1608F-S-05-PC-FB2-G AAC       |
| 006         | 2300H28001W | I-ANTENNA   | H28 ANT+HOLDER EU                |
| 051         | 82E5800003W | LABEL       | E58 WATERPROOF 3M5559 $\phi$ 4mm |
| 251         | 6910970071W | F/WMB 33    | M48 GA-129                       |
| 252         | 6320520001W | SMT MMI     | H28 GS-080 KEYPAD                |
| 300         | 5501840001W | ME/PT 33    | M48 BLACK                        |
| 301         | 3104M48011W | DIAL-KEY    | M48-P+R-BLACK-E-21KEY            |
| 302         | 3013M48001W | LCMBRAASY   | M48-METAL FRAME+ADHESIVE ASSY    |
| 303         | 303FH28001W | REC-COV     | H28-MESH-30*12.82-REC            |
| 304         | 3109H28002W | MET-DOME    | H28- $\phi$ 4*160g-21KEY 60CR    |
| 305         | 3068H28001W | GASKET      | H28-ANT-RUBBER                   |
| 306         | 303EH28001W | SPK-SPON    | H28-PORON-12.4*9.4-SPK           |
| 307         | 303FH28002W | REC-COV     | H28-MESH-22*2.64                 |
| 308         | 2523M48001W | LOW-CASE    | M48-PC-BLACK FM                  |
| 309         | 3028H28001W | RF-COV      | H28-BLACK                        |
| 310         | 3062M48001W | NAMEPLATE   | M48-PC-BLACK W161                |
| 311         | 8609M48002W | ADHESIVE    | M48-5000NS-104.98*37.9*0.15      |
| 312         | 8609H28002W | ADHESIVE    | H28-TESA60975-31.6*20.5*0.1      |
| 313         | 3061H28001W | DUST-PRO    | H28-MESH-17.9*9.4-SPK            |
| 314         | 251FM48001W | LENS-ASSY   | M48-LCD LENS+SPONGE ASSY         |
| 385         | 3501645204W | SCREW_G     | FPH-TROX-M1.6 H=4.5 BLA-NYL      |

### Exploded View Diagram (W181)

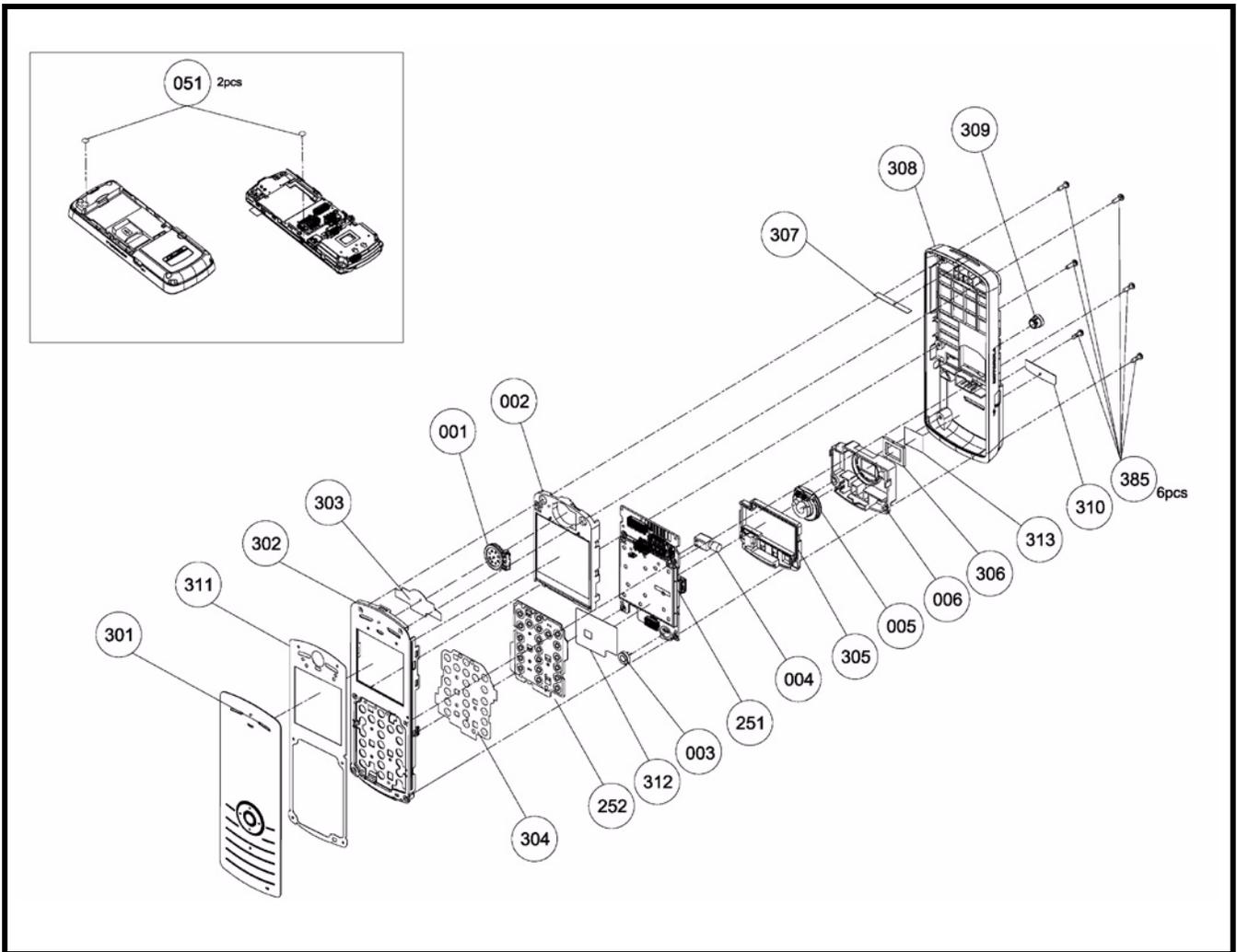


Figure 28. W181 (M49) Exploded View Diagram

## Exploded View Parts List (W181)

Table 10: W181 (M49) Exploded View Parts List

| Part Number | Item Number | Description | Specification                       |
|-------------|-------------|-------------|-------------------------------------|
| 001         | 2240133208W | RECEIVER    | SDR1332F-S2-FB4-G 32OHM AAC         |
| 002         | 7630121257W | LCM         | WD-Y1212VP-6CLW 128*128 WINTEK      |
| 003         | 2220602207W | MIC         | ACMG6022-03P28-001-443 $\phi$ 6 AAC |
| 004         | 3930408024W | SPR-VIB     | $\phi$ 4*L8 1.3V LA4-459EG COPAL    |
| 005         | 2250160815W | SPEAKER     | DMS1608F-S-05-PC-FB2-G AAC          |
| 006         | 2300H28001W | I-ANTENNA   | H28 ANT+HOLDER EU                   |
| 051         | 82E5800003W | LABEL       | E58 WATERPROOF 3M5559 $\phi$ 4mm    |
| 251         | 6910970021W | F/WMB 33    | H29 GA-129 W/FM                     |
| 252         | 6320520001W | SMT MMI     | H28 GS-080 KEYPAD                   |
| 300         | 5501830001W | ME/PT 33    | M49 BLACK                           |
| 301         | 3104M49011W | DIAL-KEY    | M49-P+R-SILVER-E-21KEY              |
| 302         | 3013H28002W | LCMBRAASY   | H28-METAL FRAME+SPONGE ASSY-KY      |
| 303         | 303FH28001W | REC-COV     | H28-MESH-30*12.82-REC               |
| 304         | 3109H28002W | MET-DOME    | H28- $\phi$ 4*160g-21KEY 60CR       |
| 305         | 3068H28001W | GASKET      | H28-ANT-RUBBER                      |
| 306         | 303EH28001W | SPK-SPON    | H28-PORON-12.4*9.4-SPK              |
| 307         | 303FH28002W | REC-COV     | H28-MESH-22*2.64                    |
| 308         | 2523H28002W | LOW-CASE    | H28-PC-BLACK                        |
| 309         | 3028H28001W | RF-COV      | H28-BLACK                           |
| 310         | 3062M49001W | NAMEPLATE   | M49-PC-BLACK W181                   |
| 311         | 8609H28001W | ADHESIVE    | H28-5000NS-104.98*37.9*0.15         |
| 312         | 8609H28002W | ADHESIVE    | H28-TESA60975-31.6*20.5*0.1         |
| 313         | 3061H28001W | DUST-PRO    | H28-MESH-17.9*9.4-SPK               |
| 385         | 3501645204W | SCREW_G     | FPH-TROX-M1.6 H=4.5 BLA-NYL         |



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

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 11: List of Accessories**

| <b>Accessory</b>                                      | <b>Part Number</b> |
|---|--------------------|
| <b>Mini-USB plug</b>                                  |                    |
| EMU Switch Mode Midrate (PRC)                         | SPN5188            |
| EMU Switch Mode Midrate (US)                          | SPN5185            |
| EMU Switch Mode Midrate (Taiwan)                      | SPN5216            |
| EMU Switch Mode Midrate (Euro)                        | SPN5189            |
| EMU Switch Mode Midrate (HK/UK)                       | SPN5190            |
| EMU Switch Mode Midrate (Australia)                   | SPN5193            |
| EMU Switch Mode Midrate (India)                       | SPN5194            |
| EMU Switch Mode Midrate (Mexico)                      | SPN5186            |
| EMU Switch Mode Midrate (Brazil)                      | SPN5187            |
| EMU Switch Mode Midrate (Arg)                         | SPN5192            |
| EMU Switch Mode Midrate (Japan)                       | SPN5274            |
| EMU Switch Mode Midrate (Korea)                       | SPN5351            |
| EMU Switch Mode Dual Rate (Brazil)                    | SPN5196            |
| EMU Switch Mode Dual Rate (Arg)                       | SPN5197            |
| EMU Switch Mode Dual Rate (PRC)                       | SPN5198            |
| EMU Switch Mode Dual Rate (HK)                        | SPN5199            |
| EMU Switch Mode Dual Rate (Mex)                       | SPN5200            |
| EMU Switch Mode Dual Rate (US)                        | SPN5202            |
| EMU Switch Mode Dual Rate (Twn)                       | SPN5270            |
| EMU Switch Mode Dual Rate (Japan)                     | SPN5275            |
| Charger Adapter - Aust / NZ Plug                      | SYN8127            |
| Charger Adapter - Euro Plug                           | SYN7456            |
| Charger Adapter - UK Plug                             | SYN7455            |
| Travel Charger BASE ONLY Standard- PRC<br>COMMON USBA | SPN5440A           |
| Mini USB Data Charging cable                          | SKN6253            |
| <b>In-Vehicle</b>                                     |                    |
| Hi Performance VPA                                    | SPN5401            |
| P310 EMU MidRate                                      | SYN1630            |
| VC700 EMU Power Adapter                               | SYN0847            |
| <b>Audio</b>  |                    |
| Mono Earbud Headset (Black)                           | SYN8390            |
| <b>Batteries</b>                                      |                    |
| Battery BQ50 Li-Ion 940 mAh                           | SNN5804A           |

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