MOTOROLA

EM325
Dual-Band Wireless Telephone

EM325
GSM 900/1800 or 850/1900/MHz

EM325Contents

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, decompiler, 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 EM325 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 EM325 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 EM325 telephones, and also to provide procedures and processes for repairing the units at Level 1 and 2 service centers including:

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

Conventions

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

Note: Emphasizes additional information pertinent to the subject matter.

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

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

Warranty Service Policy

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

Out of Box Failure Policy

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

Product Support

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

Customer Support

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

Parts Replacement

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

When the Motorola part number of a component is not known, use the product model number or other related major assembly along with a description of the related major assembly and of the component in question.

In the U.S.A., to contact Motorola, Inc. on your TTY, call: 800-793-7834.

Accessories and Aftermarket Division (AAD)

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

U.S.A.	**Outside U.S.A.**
Phone: 800-422-4210	Phone: 847-538-8023
FAX: 800-622-6210	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
Frequency Range DCS 850	824-849 MHz Tx 869-894 MHz Rx
Frequency Range DCS 900	880-915 MHz Tx 925-960 MHz Rx
Frequency Range DCS 1800	1710-1785 MHz Tx 1805-1880 MHz Rx
Frequency Range DCS 1900	1850-1910 MHz Tx 1930-1990 MHz Rx
Channel Spacing	200KHz
Channels	EGSM 174/DCS 374/ PCS 299/ GSM 850 (Carrier with 8 channel per carrier
Modulation	GMSK at BT= 0.3
Transmitter Phase Accuracy	$\leqq$ 5 degrees RMS, 20 degrees peak
Duplex Spacing	45 MHz (GSM850, GSM 900), 95 MHz (DCS1800), 80MHz (PCS 1900)
Frequency Stability	± 0.10 ppm
Operating Voltage	+ 3.4V dc to + 4.2V dc (battery)
Transmit Current Drain	180 mA average talk current drain
Standby Current Drain	4.2 mA (DRX2), 2.1 mA (DRX9)
Temperature Range	-10℃ to 55℃ (15℉ to 130℉)
Dimensions	L 100.99mm x W46mm x H13.9mm
Weight	90 g
Battery Life, with standard 780 mAh Li-Ion Battery	GSM Voice call: 250 mins Standby DRX5 = 288 hrs All talk and standby times are approximate and depend on network configuration, signal strength, and features selected. Standby time are quoted at DRX=5 Talk time are quoted with DTX ON
Battery Charge time	4 hours to 90% of 780 mAh capacity
Alert Volume	Max 95 dB @ 5 cm, 0.5 watts input

Transmitter Function	Specification

RF Power Output	32.8 dBm nominal EGSM 900/ 29.0 dBm nominal DCS 1800/ 32.2 dBm nominal GSM 850/ 30.0 dBm nominal PCS 1900/
Output Impedance	50 ohms nominal
Spurious Emissions	$\leq$ -36 dBm from 0.1 to 1 GHz, -30 dBm from 1 to 4 GHz

Receiver Function	Specification
Receive Sensitivity	GSM:-108 dBm DSC:-108 dBm
Rx Bit Error Rate (100k bits) Type II	$\leq$ 2%

Speech Coding Function	Specification
Speech Coding Type	Regular pulse excitation/Linear predictive coding with long term prediction (RPE LPC with LTP)
Bit Rate	13.0 kbps
Frame Duration	20 ms
Block Length	260 bits
Classes	Class 1 bit = 182 bits/Class 2 bits = 78 bits
Bit Rate with FEC Encoding	22.8 kbps

Product Overview

Motorola EM325 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 EM325 is a dual-band phone that allows roaming within the 900 MHz and digital cellular system (DCS) 1800 MHz, or GSM 850/personal communication system (PCS) 1900 MHz, depends on hardware.

EM325 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 poly carbonate plastic. The display and speaker, as well as the 23-key keypad, transceiver printed circuit board (PCB), microphone, charger and headphone connectors, and power button are contained within the slider form-factor housing. The user-replaceable 750 mAh Lithium Ion (LiIon) battery provides up to 497 minutes of talk time with up to 250 hours of standby time[1]. 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 160 pixel high-resolution color graphics display and an internal antenna.

Features

EM325 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:

- Bluetooth 2.0, Class 2, A2DP
- Office quality speakerphone
- PIM (phone & date book, calculator, alarm)
- Messaging - SMS, MMS
- iTAP v5.5.5 (predictive text)
- Audio - MP3, AAC
- Connectivity - EMU (USB charging)
- USB 2.0 FS
- 3.5 mm headset wired Audio
- Native Music Player
- WAP 2.0
- Java MIDP 2.0
- OMA V1.0 DRM
- Moto ID

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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.

Wireless Access Protocol (WAP) 2.0 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 EM325'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 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.

Personal Information Management

The EM325 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 EM325 telephone user guides listed in the Related Publications section toward the end of this manual.

General Operation

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

The EM325 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. EM325 Telephone Controls Locations

Menu Navigation

EM325 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. 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 a 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.

Figure 2 shows some common icons displayed on the LCD.

Icon	Name	Description
	Signal Strength	Indicates strength of signal being received. The more vertical bars, the better the reception (5 bars maximum).
	Battery Power Level	Indicates remaining battery power. The more bars, the more battery power available (3 bars maximum).
	Roaming	Indicates you are on another network.
	Voice Call Active	Indicates a call is connected.
	New Voicemail Message	Indicates new unheard voicemail message(s).
	SMS/MMS Full	Indicates the phone's memory which stores SMS/MMS messages is full. You must read new SMS messages to receive more SMS messages.
	New SMS Message	Indicates new unread SMS message(s).
	New MMS Message	Indicates new unread MMS message(s).
	GPRS Available	Indicates your service provider supports GPRS.
	GPRS Connected	Indicates GPRS is connected.
	GPRS Attached	Indicates you are surfing over the GPRS network.

Icon	Name	Description
	Ringer On / Loud	Indicates ringer is turned on and sound is loud.
	Ring On / Soft	Indicates ringer is turned on and sound is soft.
	Vibrator On	Indicates vibrator is turned on.
	Ringer/Vibrator On	Indicates ringer and vibrator are turned on.
	Silent	Indicates ringer is turned off.
	Alarm On	Indicates alarm is on.
	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.

Icon	Name	Description
	WAP Connected	Indicates WAP is connected.
	WAP Hold	Indicates WAP is on hold.
	WAP Security	Indicates the secure page is connected.
	Home Zone	Indicates phone is in home zone.
	Bluetooth Search	Indicates Bluetooth is active.
	Bluetooth Connected	Indicates Bluetooth is connected.
	BT type: access point / audio	Indicates the connected Bluetooth device type is acess point / audio.
	BT type: computer / handheld	Indicates the connected Bluetooth device type is computer / handheld.
	BT type: headsets / music	Indicates the connected Bluetooth device type is headsets / music.
	BT type: mobile / peripheral	Indicates the connected Bluetooth device type is mobile / peripheral.

Figure 2. EM325 Display Icon Indicators

Alert Settings

In addition to 64 preset ring tones, EM325 telephones allow the user to download 5 additional ring tones via GPRS. (Availability is carrier and Network dependant). Motorola EM325 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.

Tools and Test Equipment

Table 1 lists the tools and test equipment used on EM325 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- Cross	Used to remove and replace screws
—	Torque Driver Bit T-5 Plus, Apex 440-6IP 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) 814-0601 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 EM325 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 3.
2. Completely remove the battery door.

Figure 3. Removing the Battery Door

3.   To replace, align the battery door to the lower housing in Figure 4. Slide the battery door in the direction shown until it clicks into place and hear a click sound. Then completely replace the battery door.
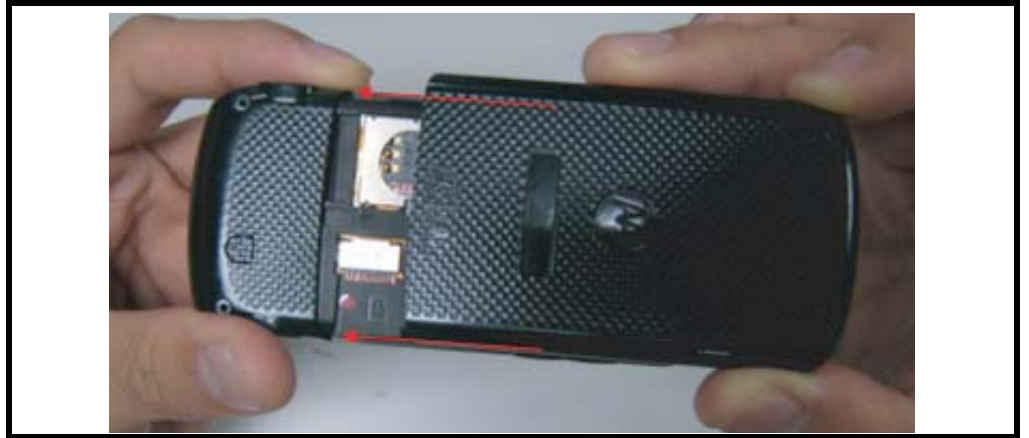
Figure 4. Replacing the Battery Door

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 5.

Figure 5. Removing the Battery

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

3. To replace, insert battery with 90 degree angle into handset and press battery downward. Make sure the battery latch can lock battery.

Figure 6. 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 6 screws with a 6-corner-star T5 screwdriver as shown in Figure 7.
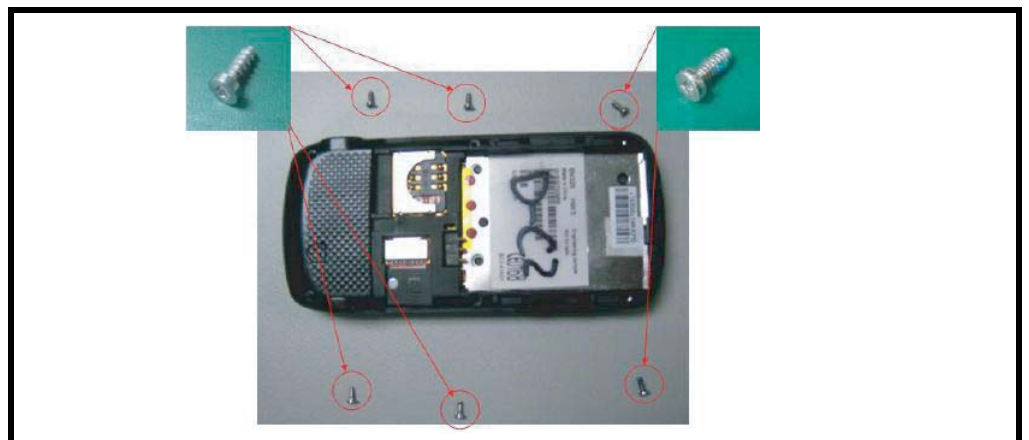
Figure 7. Removing 6 Screws

3. Release the 3 hooks between Case D and Hinge which shown in Figure 8 by pushing the edge of Case D outward then pull up.
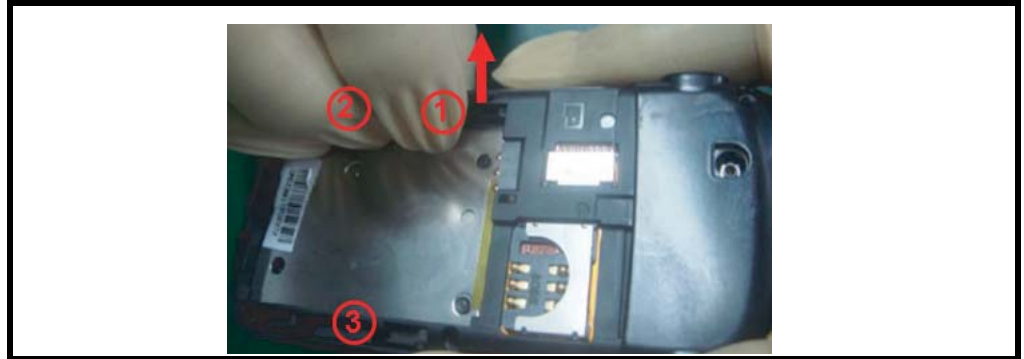
Figure 8. Removing the 3 hooks

4. Insert the plastic tool between Case K and keypad to separate Case D in Figure 9.

Figure 9. Removing the Lower Housing Cover

5.   To Replace, align the earphone jack to the lower housing as in Figure 10.
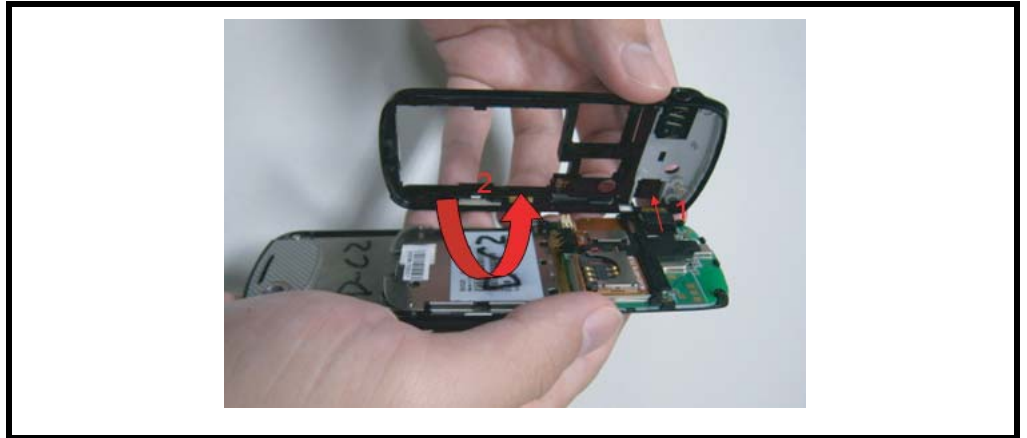
Figure 10. Replacing the Lower Housing Cover

6.   Press the lower housing cover into place, allowing the 3 housing latches indicate in the
      Figure 11 to snap into position.

Figure 11. Replacing the Lower Housing Cover

7.   Replace the battery and battery door as described in the procedures.

Removing and Replacing the Main PCBA

1. Remove the battery door, battery, and lower housing cover as described in the procedures.
2. Release the 4 hooks as indicate in the Figure 12.
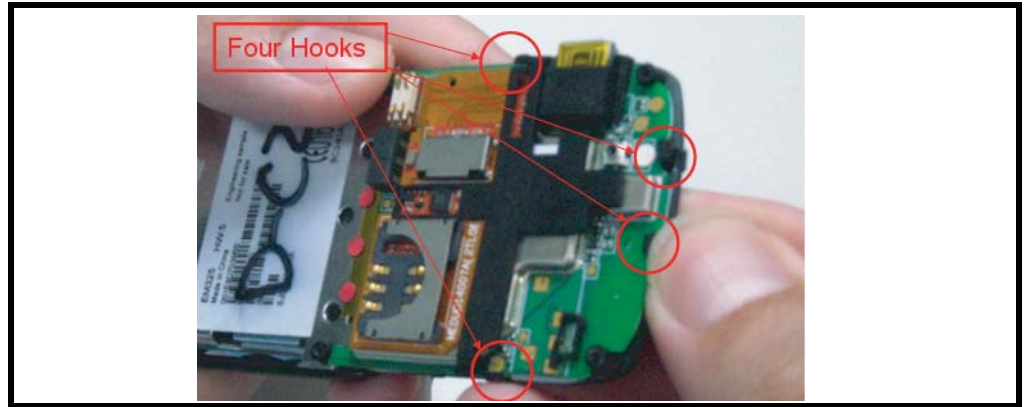
Figure 12. Removing the Main PCBA

3. Slide the hinge around 1 cm then pull the Main PCBA to the direction as Figure 13.
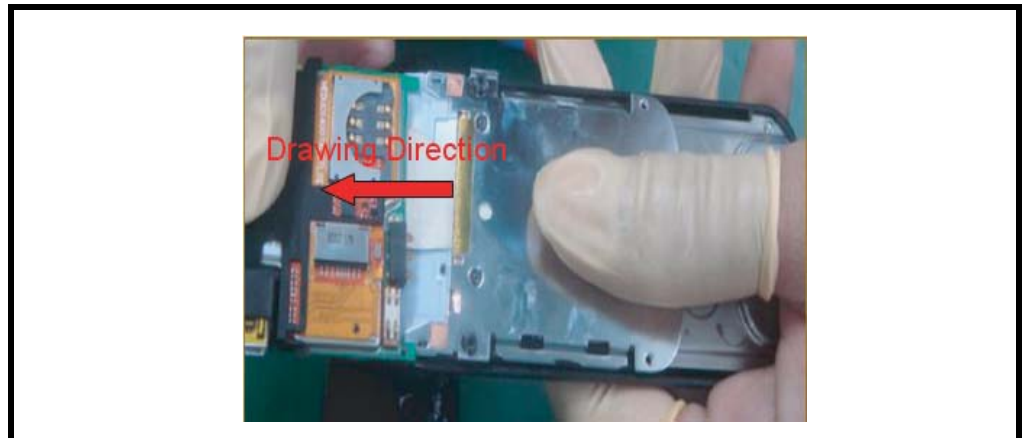
Figure 13. Slide the Hinge

4.   Turn the Main PCBA over. Release the FPC connector to remove the Main PCBA.
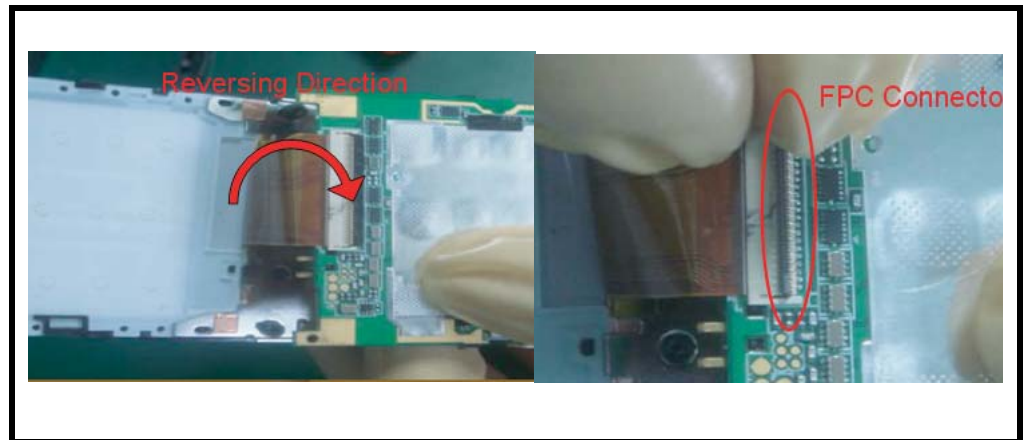
Figure 14. Releasing the Board to Board FPC

5.   To replace, slide the hinge 1 cm to pull out the board to board FPC
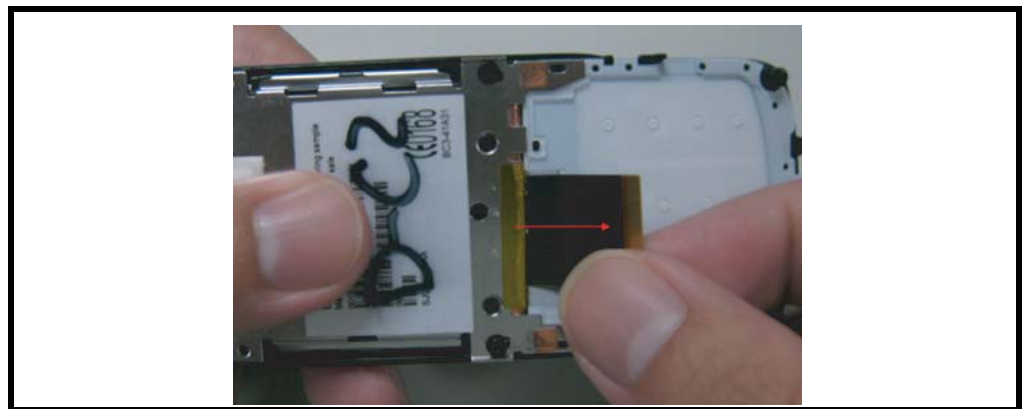
Figure 15. Pull out the board to board FPC

6. Place the Keypad on the right hand side. Bend over the FPC to inset to the FPC connector of the Main PCBA.
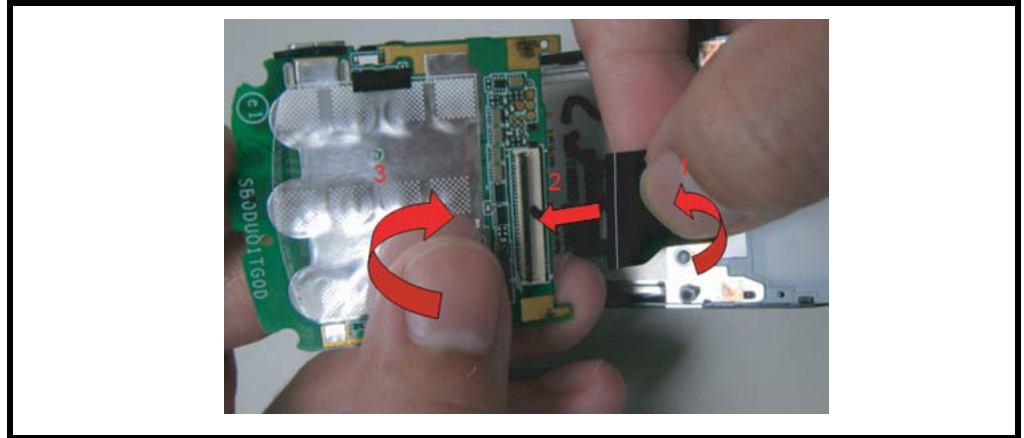
Figure 16. Inserting the board to board FPC

7. slider the hinge back to place the Main PCBA to align to the hook of hinge. Press the Main PCBA to lock on the keypad.
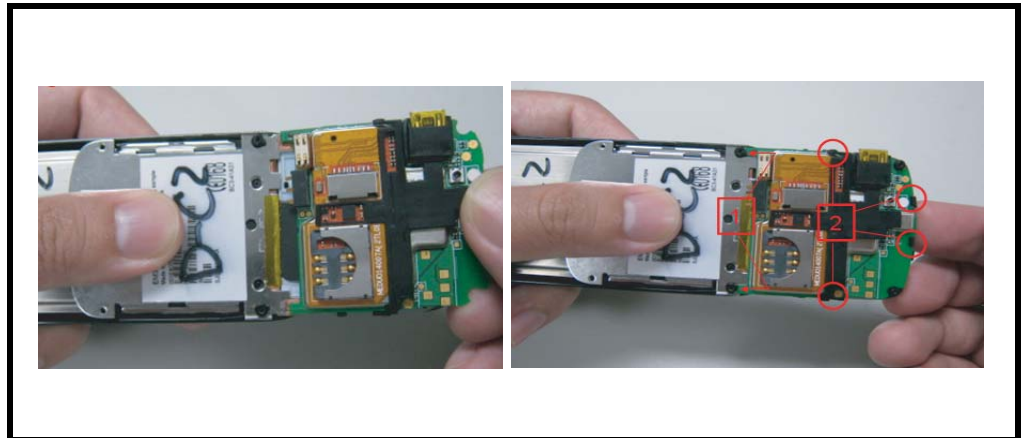
Figure 17. Locking the Main PCBA on its position

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

Removing and Replacing the Keypad and Hinge Module

1. Remove the battery door, battery, lower housing cover, and the Main PCBA as described in the procedures.

2.   Push up the keypad then pull out gently the keypad from the key ring of the hinge as shown Figure 18.
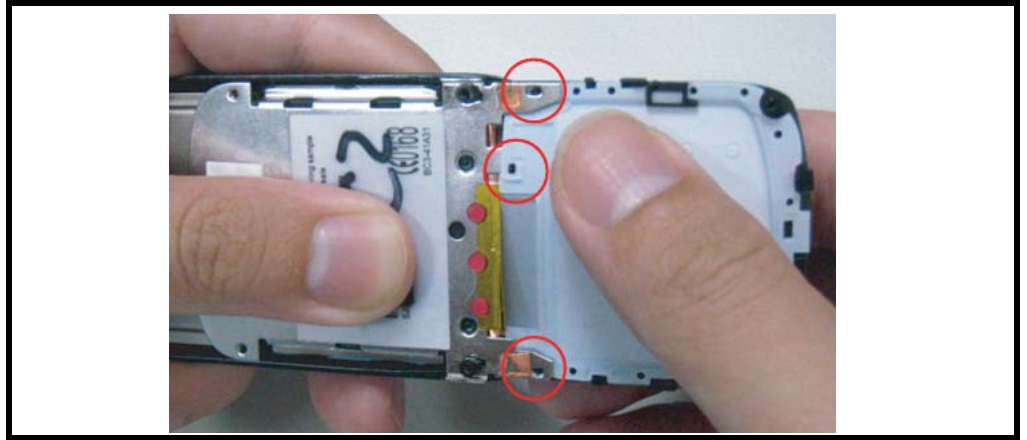
Figure 18. Removing Keypad

3.   Unscrew the 4 cross screws and 2 T5 screws as Figure 19.
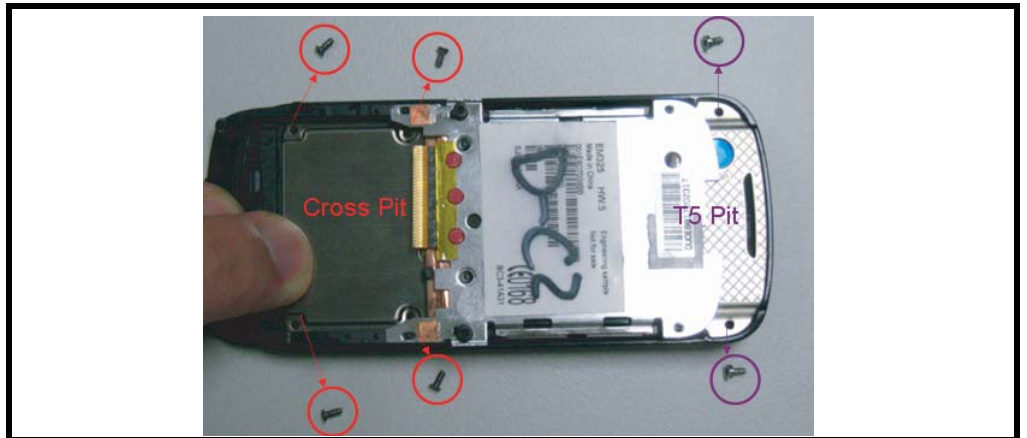
Figure 19. Unscrew the 6 screws

4.   Pull the hinge upward to remove the hinge from the upper module.
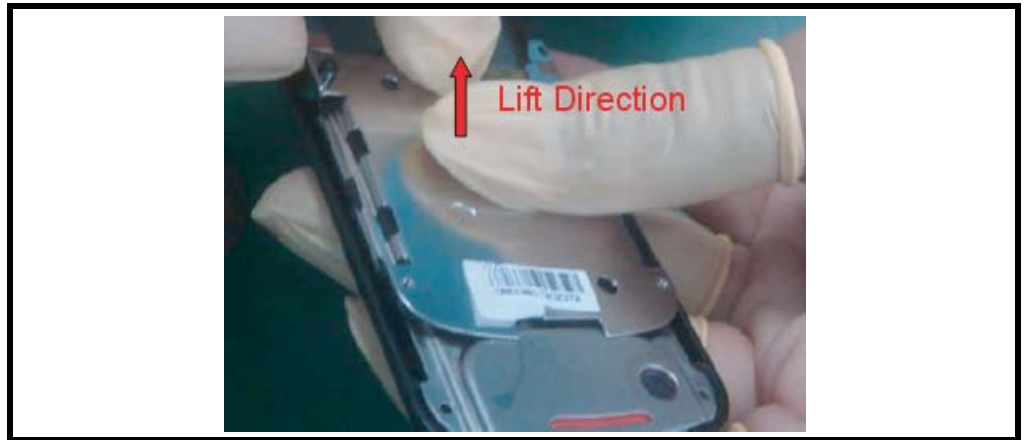
Figure 20. Remove the hinge

5.   To replace, slider the hinge to the middle and fix it.

Figure 21. Fix hinge

6.   Insert the board to board FPC into hinge module as shown in Figure 22.

Figure 22. Insert FPC

7.   Insert the board to board FPC into the channel of the hinge, the pull out the FPC from the other side as shown in Figure 23.
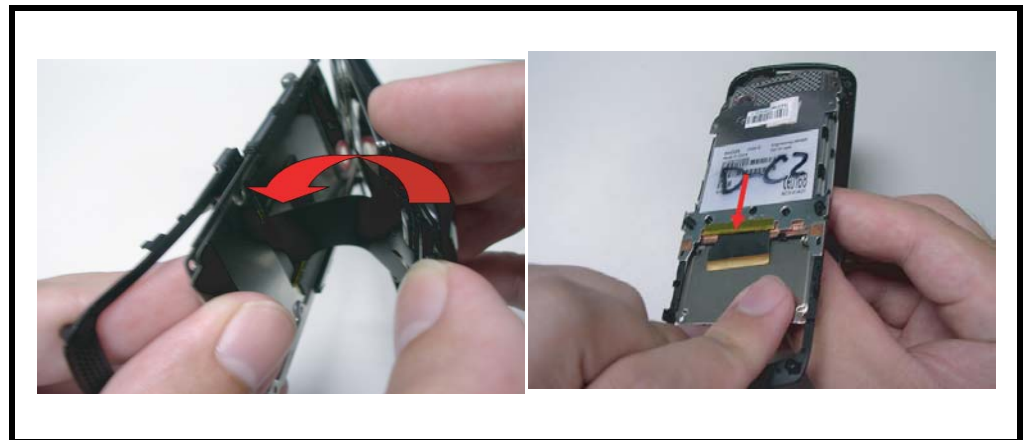
Figure 23. Insert FPC

8.   Fasten the 4 cross screws and 2 T5 screws

9. Align the keypad withe three guide hole/pin and do not let main FPC draw back into the channel.
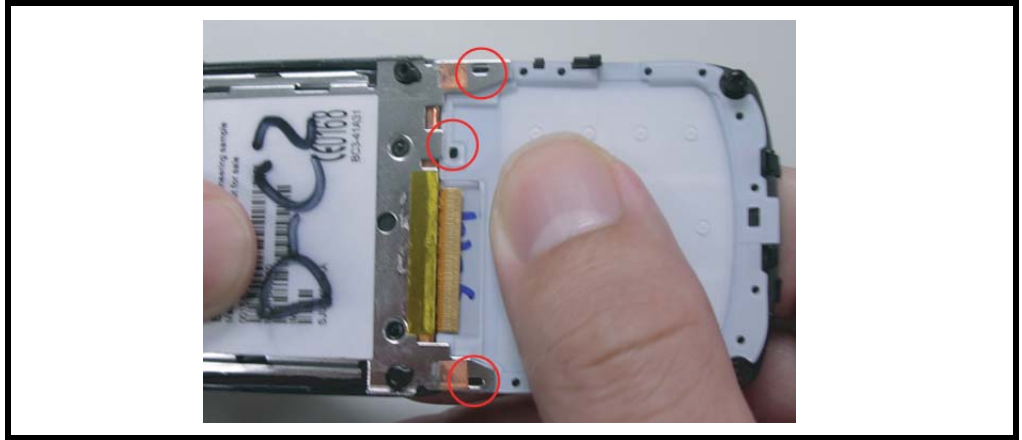
Figure 24. Replacing the keypad

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

Removing and Replacing the Board to Board FPC

1. Remove the battery door, battery, lower housing cover, the Main PCBA, the keypad, and hinge module as described in the procedures.
2. Unlock the 3 FPC connector to dismantle the main FPC as shown in Figure 25.
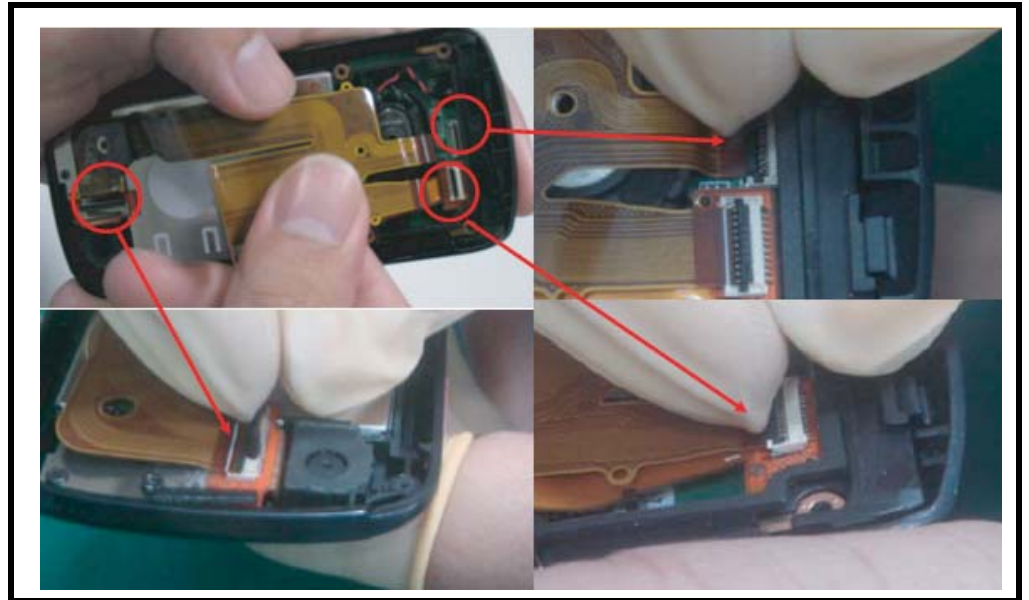
Figure 25. Remove board to board FPC

3. To replace, insert the board to board FPC into the corresponding connector completely. The white line on the FPC has to align to the connector latch.
4. Replace the hinge module, the keypad, the Main PCBA, lower housing cover, battery, and battery door as described in the procedures.

Removing and Replacing the Camera/Vibrator Flex module and Receiver

1. Remove the battery door, battery, lower housing cover, the Main PCBA, the keypad, the hinge module, and the board to board FPC as described in the procedures.

2.   Remove the camera rubber by finger as shown in Figure 26.

Figure 26. Removing the camera rubber

3.   Unscrew the 3 cross screws and remove the camera/ vibrator flex module.
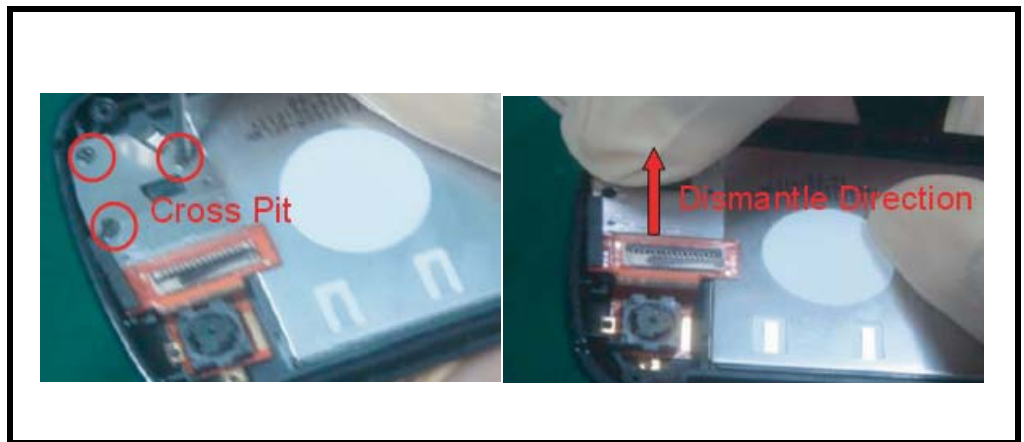
Figure 27. Removing the Camera / Vibrator flex module

4.   Remove the receiver by finger or tweezers.
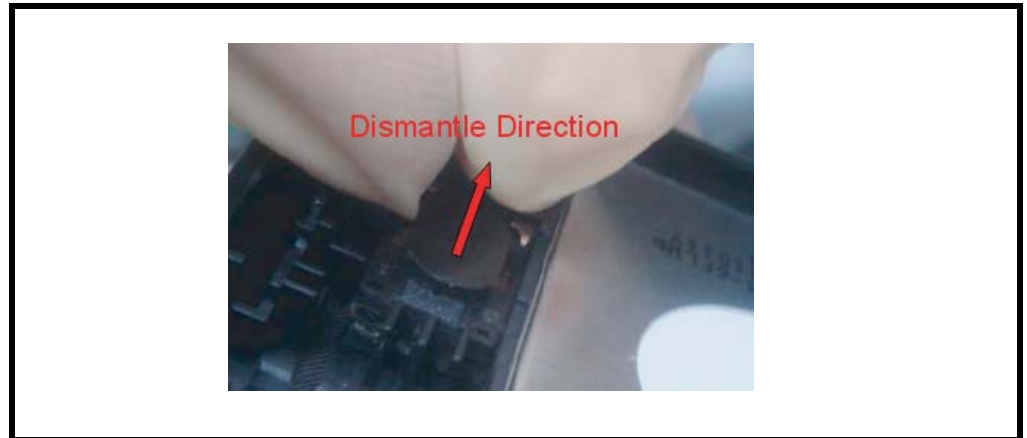
Figure 28. Removing the receiver

5.   To Replace, assembly the receiver into Case A.
6.   Place the Camera/Vibrator Flex module in Case A and make sure the module aligns with the screw hole.
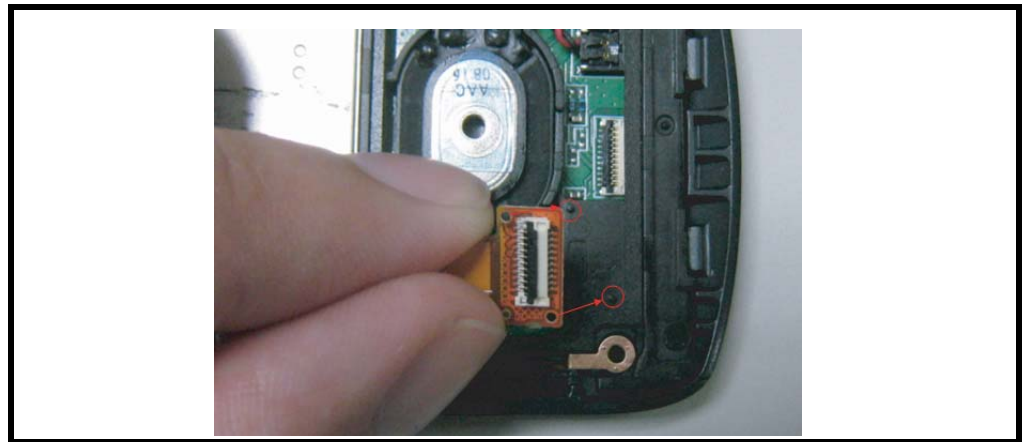7.   Fasten the 3 cross screws and place the camera rubber on the Camera.
8.   Replace the board to board FPC, the hinge module, the keypad, the Main PCBA, lower housing cover, battery, and battery door as described in the procedure.

Removing and Replacing the LCM module, Upper PCBA and Speaker

1.   Remove the battery door, battery, lower housing cover, the Main PCBA, the keypad, the hinge module, and board to board FPC as described in the procedures.
2.   Use tweezers to remove the LCM FPC from the speaker chamber. Then pull up the LCM module.
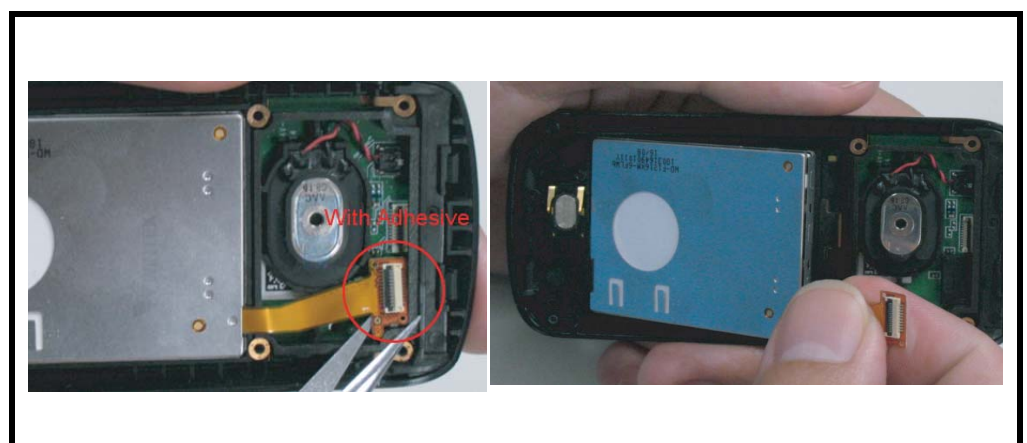
Figure 29. Removing LCM module

3. Bend edge of Case A genitally to release the 2 hooks as shown in Figure 30. Press the navigate key to lift the upper PCBA around 45 degrees then pull out the upper PCBA.
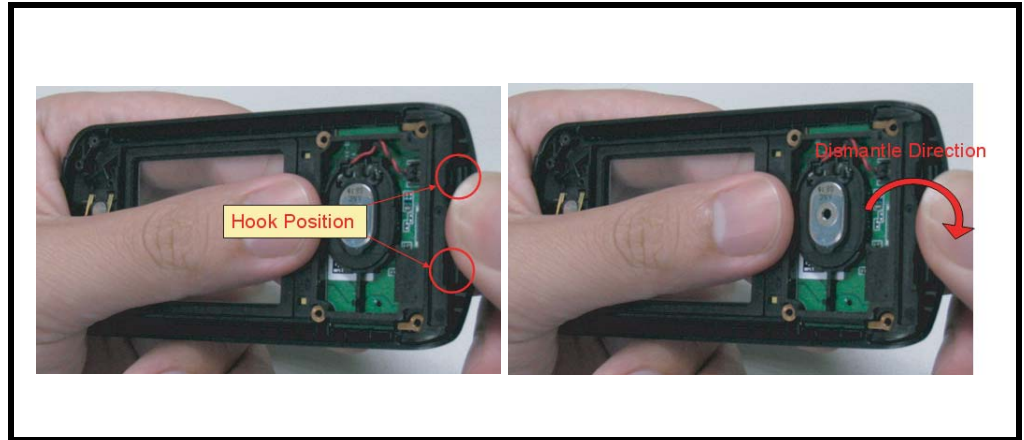
Figure 30. Removing upper PCBA

Figure 31. Removing upper PCBA

4.   Unlock Speaker wire from the upper PCBA by tweezers.

Figure 32. Removing the speaker

5.   Separate the Speaker Chamber from the Upper PCBA..
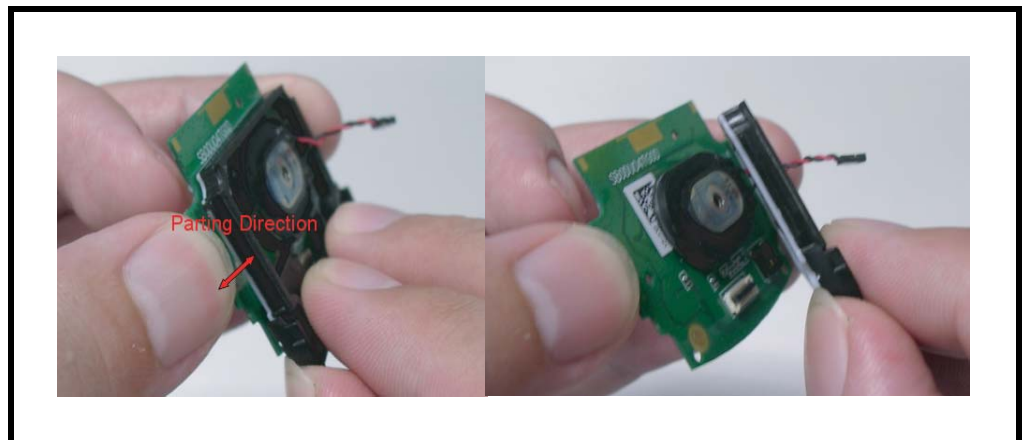
Figure 33. Removing the speaker chamber

6.   Remove the speaker from upper PCBA.
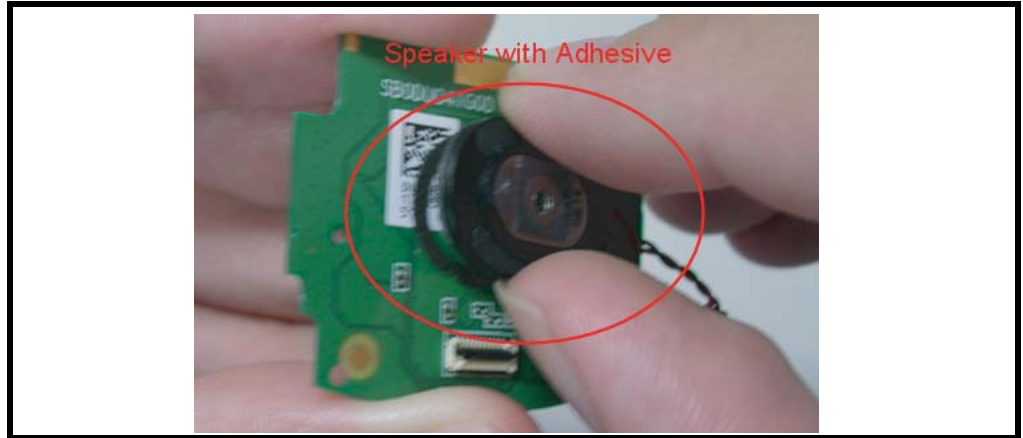
Figure 34. Removing the speaker

7.   To replace, lean the upper PCBA 40 degree to place on the case A. Put the speaker chamber on top of the upper PCBA and make sure the hook is lock.
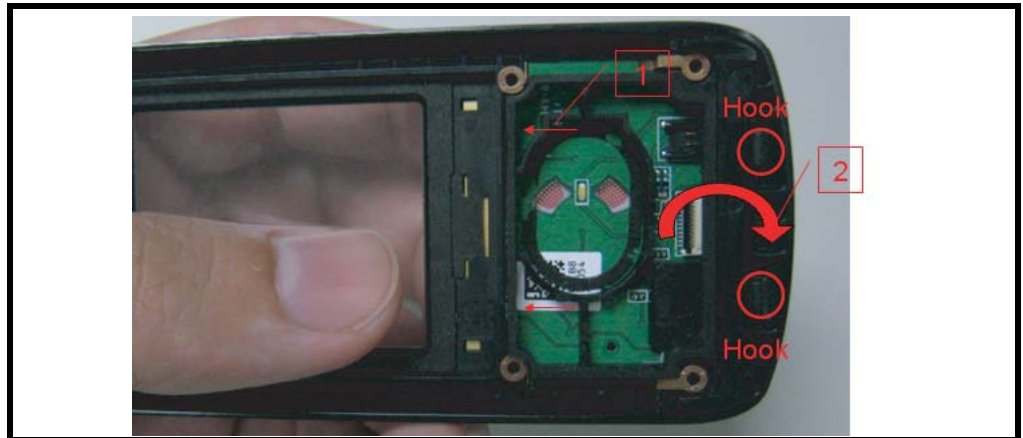
Figure 35. Replacing Upper PCBA and Speaker chamber

8.   Place the speaker on the speaker chamber and make sure the speaker wire is on the right side. Also, the white dot on the speaker wire connector should face up when connect to the upper PCBA.
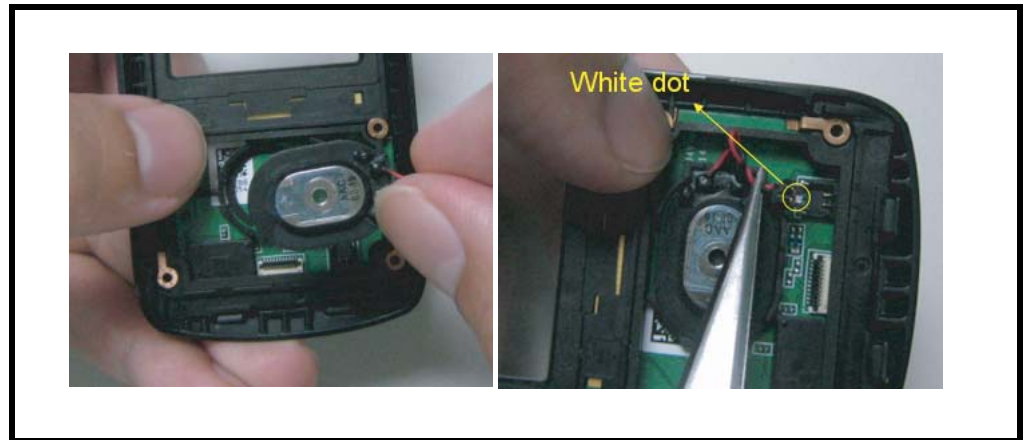
Figure 36. Replacing speaker

9.   Place the LCM module on the Case A. The hole of LCM FPC should align with the pin of the speaker chamber.

Figure 37. Replacing speaker

10.   Replace the board to board FPC, the hinge module, the keypad, the Main PCBA, lower housing cover, battery, and battery door as described in the procedure.

Removing and Replacing the Antenna Carrier and Audio Jack

1.   Remove the battery door, battery, and lower housing cover as described in the procedures.

2. Push the RF cap from inside of lower housing to remove.
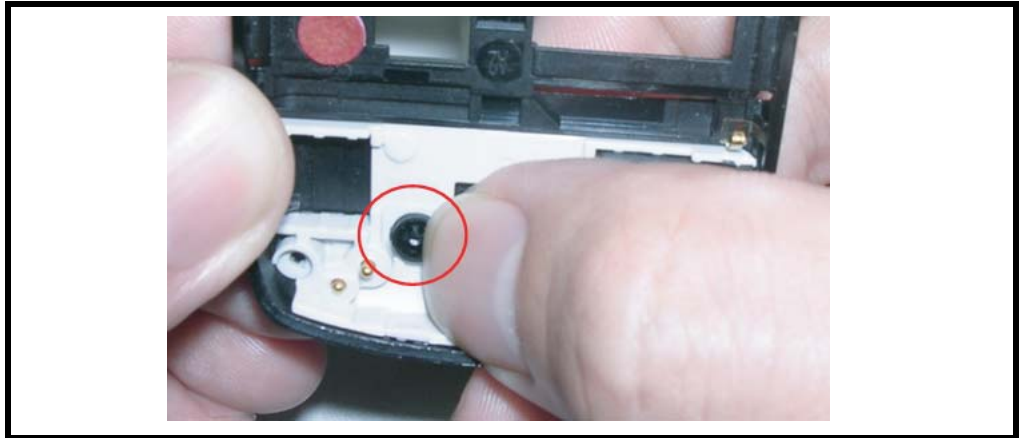
Figure 38. Remove the RF cap

3. Remove the audio jack and the audio jack rubber by finger.
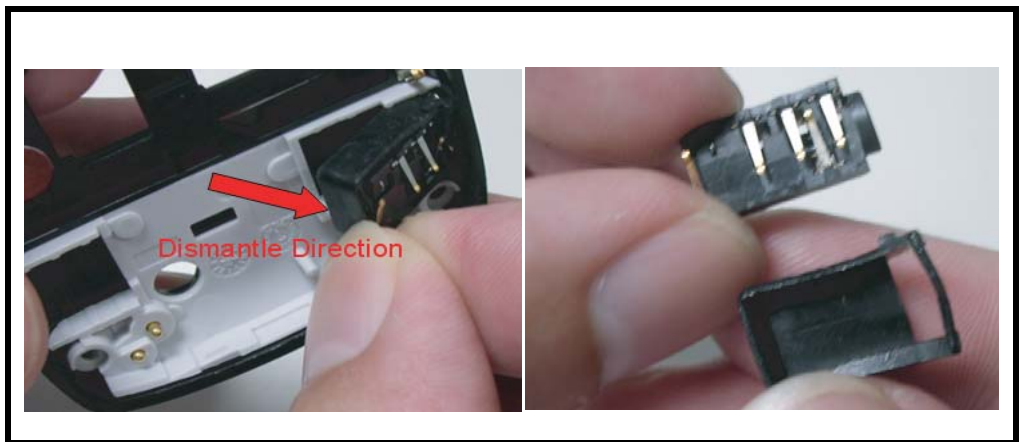
Figure 39. Remove the audio jack

4.   Remove the antenna carrier from case D as shown in Figure 40.

Figure 40. Remove the audio jack

5.   To replace, assembly the antenna carrier into Case D.
6.   Put the audio jack into audio jack rubber and put the audio jack into antenna carrier.
7.   Place lower housing cover, battery, and battery door as described in the procedure.

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 41.
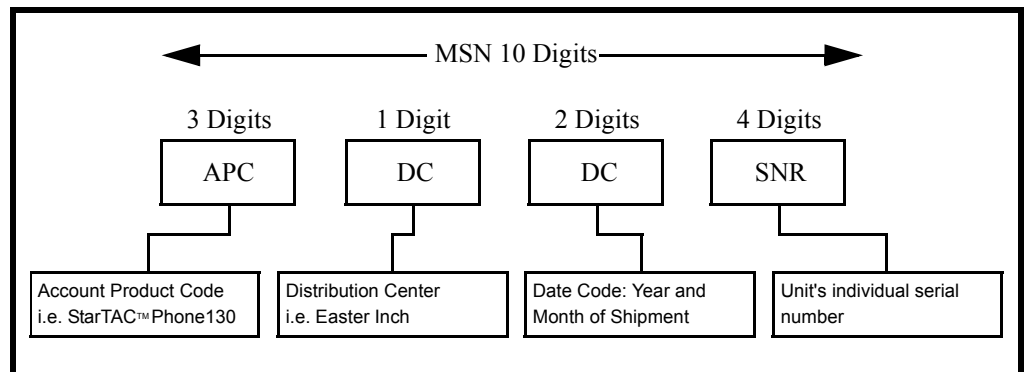
Figure 41. MSN Label Breakdown

International Mobile Station Equipment Identity (IMEI)

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

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

Table 2. IMEI Number Breakdown

TAC	Serial Number	Check Digit
NNXXXX YY	ZZZZZZ	A

Where

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

- **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 EM325 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
*#**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.	Refer service to a Level 3 Service Center for replacement.
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 EM325 telephones.

Related Publications

Motorola EM325 Wireless Phone User Guide

Exploded View Diagram
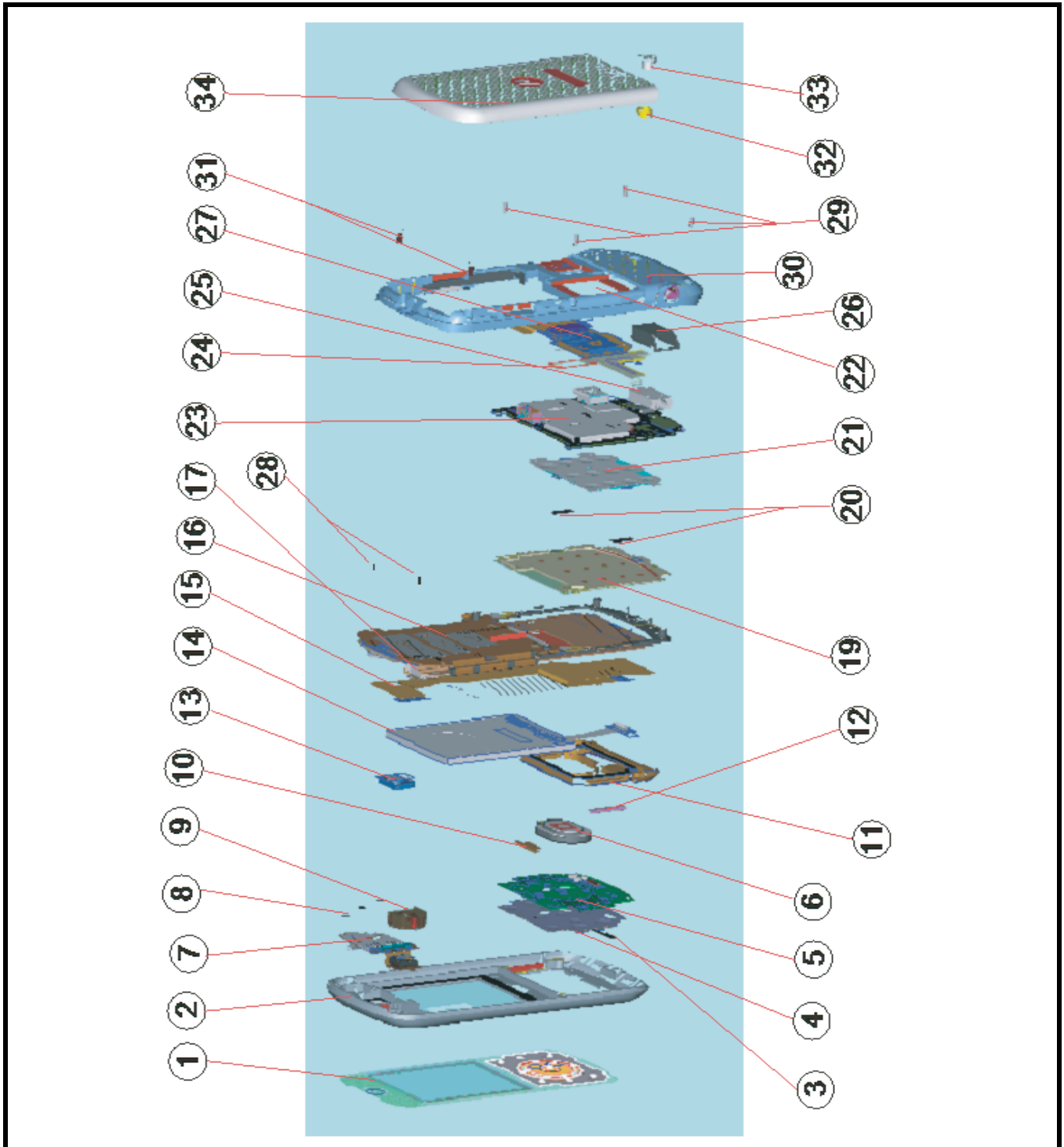
Figure 42. EM325 Exploded View Diagram

Exploded View Parts List

Table 5. Exploded View Parts List

Item Number	Part Number	Description
1	MEDUO61005A	Assy_Function_Keypad_Lens
2	MEDUO61001A	Assy_Case_A
3	MEDUO31009A	Mylar_LED_Upper_Board
4	MEDUO61006A	Assy_Function_Key_Dome
5	SB0DUO4TG1A	Slide-PCB
6	S0S1420C010	Speaker
7	S0C03758020	Camera Sensor
8	W5101143220	Screw_PT_Cross Pit_I Head
9	MEDUO39001A	Conductive_Rubber_camera
10	MEDUO39003A	Conductive_Rubber_LCM center
11	MEDUO61002A	Assy_Speaker_chamber
12	MEDUO13001A	Magent
13	S0R0711K010	Receiver_Impendance:32
14	SLT1216X700	LCM_TFT_ 128*160 dots
15	MEDUO14002A	FPC_Main _career
16	MEDUO61003A	Assy_Hinge_Slide
17	MEDUO08003A	Lens_Cameo
18	MEDUO07002A	Main_ Key
19	MEDUO36005A	Rubber_Lens_Charger_ Indicator
20	MEDUO31005A	Mylar_LED
21	MEDUO16002A	Dome_Main_Key
22	PKDUO15002A	Label_Water_indication
23	SB0DUO1TG0A	PCB Main
24	MEDUO36002A	Rubber_Grommet_EMU

Item Number	Part Number	Description
25	MEDUO42001A	Conn_Phone_jack_5 pin
26	MEDUO36001A	Rubber_Sealing
27	MEDUO14007A	FPC_shielding Career
28	W5401143200	screw_PT_T5_J_Head_1.4*3.2 _Lathe
29	W5401143800	screw_PT_T5_J_Head_1.4*3.8 _Lathe
30	MEDUO61004A	Assy_Case_D
31	W6401160420	screw_M_Type_T5 W/O washer_Head_ 1.6*3.8
32	MEDUO36006A	Rubber_RF_cover
33	MEDUO01007A	RF_Cover
34	MEDUO01006A	Battery_Cover

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 6. List of Accessories

Description	Part Number
Power Solution	
Battery 850 mAh LiIon	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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