



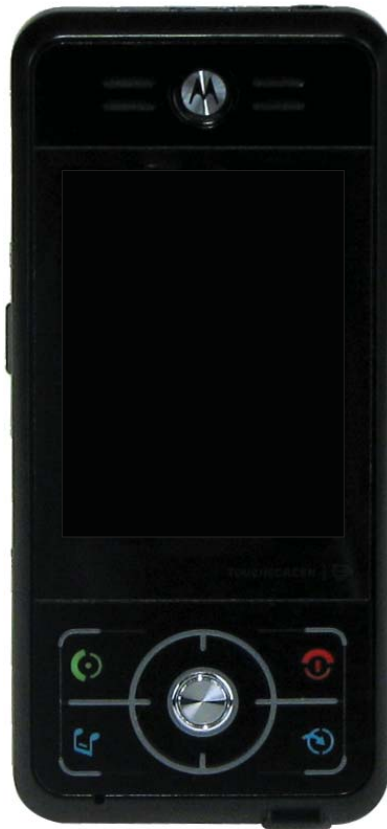
MOTOROLA

Level 1 & 2 Service Manual

6809506A02-O

E6 GSM

Digital Wireless Telephone



E6 GSM 900/1800/1900 MHz GPRS

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Introduction

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

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

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

Product Identification

Motorola products are identified by the model number on a label usually located under the battery. Use the entire model number when inquiring about the product. Numbers are also assigned to chassis and kits. Use these numbers when requesting information or ordering replacement parts.

Product Names

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

Product Changes

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

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

Regulatory Agency Compliance

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

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

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

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

Computer Program Copyrights

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

About This Service Manual

Using this service manual and the suggestions contained in it assures proper installation, operation, and maintenance of E6 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 E6 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 E6 telephones, and also to provide procedures and processes for repairing the units at Level 1 and 2 service centers including:

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

Conventions

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



Note: Emphasizes additional information pertinent to the subject matter.




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



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



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

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

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

Warranty Service Policy

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

Out of Box Failure Policy

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

Product Support

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

Customer Support

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

Parts Replacement

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

Order replacement parts, test equipment, and manuals from AAD.

U.S.A.

Phone: 800-422-4210

FAX: 800-622-6210

Website: <http://businessonline.motorola.com>

Outside U.S.A.

Phone: 847-538-8023

FAX: 847-576-3023

EMEA

Phone: +49 461 803 1404

Website: <http://emeaonline.motorola.com>

Asia

Phone: +65 648 62995

Website: <http://asiaonline.motorola.com>

Specifications

General Function	Specification
Frequency Range GSM 900	880-915 MHz Tx (with EGSM) 925-960 MHz Rx
Frequency Range DCS 1800	1710-1785 MHz Tx 1805-1880 MHz Rx
Frequency Range PCS 1900	1850-1910 MHz Tx 1930-1990 MHz Rx
Channel Spacing	200 kHz
Channels	174 EGSM, 374 DCS, 374 PCS carriers with 8 channels per carrier
Modulation	GMSK at BT = 0.3
Transmitter Phase Accuracy	5 Degrees RMS, 20 Degrees peak
Duplex Spacing	45 MHz
Frequency Stability	± 0.10 ppm of the downlink frequency (Rx)
Operating Voltage	+3.2V dc to +5.5V dc (battery) +4.8V dc to +6.5V dc (external connector)
Transmit Current Drain	101-260 mA average talk current drain
Stand-by Current drain	4.5 mA (DRX2), 3.5 mA (DXR9) typical
Temperature Range	-10° C to +55° C (+15° F to +130° F)
Dimensions, with 1000 mAh Li Ion battery	51.5 mm x 111 mm x 14.8 mm (2.03 inches x 4.37 inches x 0.58 inches)
Size (Volume)	87 cc (5.31 in ³), with battery
Weight	120 grams (4.23 oz), with battery
Battery Life, with standard 1000 mAh Li-Ion Battery	Talk Time 5-10 hours Standby time 275-309 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.
Battery Charge Time	4 hours to 90% of 1000 mAh capacity
Alert volume	Max 95 dB @5cm, 0.5 Watts input

Transmitter Function	Specification
RF Power Output	32.5 dBm nominal GSM 900, 29.5 dBm nominal GSM 1800/1900
Output Impedance	50 ohms nominal
Spurious Emissions	-36 dBm from 0.1 to 1 GHz, -30 dBm from 1 to 4 GHz

Receiver Function	Specification
Receive Sensitivity	Better than -102 dBm
RX Bit Error Rate (100k bits) Type II	< 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

Speech Coding Function	Specification
Classes	Class 1 bits = 182 bits; Class 2 bits = 78 bits
Bit Rate with FEC Encoding	22.8 kbps

Product Overview

Motorola E6 mobile telephones feature Global system for mobile communications (GSM) air interface, general packet radio service (GPRS) transport technology, and wireless application protocol (HTML) 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 includes clock, alarm, datebook, calculator, and caller profiling personal management tools. The E6 is a tri-band phone that allows roaming within the GSM 900MHz, DCS 1800 MHz and PCS 1900 MHz bands.

E6 telephones support GPRS, SMS, and MMS 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. A key advantage is the provision of a permanent virtual connection to the network. This “always on” connection is possible because GPRS use packet data transfer so that, for example, email can be downloaded in “background mode.” There is no need for the user to re-connect before requesting a service, eliminating connection set-up delays and adding convenience and immediacy to data services access. The “virtual” nature of this connection means that network resources are not consumed during periods when a user is not actually sending or receiving data.

The telephones are made of polycarbonate plastic. The display and speaker, as well as the transceiver printed circuit board (PCB), microphone, charger and headphone connectors, and buttons are contained within the candy bar form-factor housing. The 1000 mAh Lithium Ion (Li Ion) battery provides up to 5-10 hours of talk time with up to 275-309 hours of standby time¹. The phone accepts 3V and 1.8V mini subscriber identity module (SIM) cards which fit into the SIM holder under the rear housing cover. These telephones feature a 240 x 320, 262k QVGA TFT color display and an internal antenna.

Features

E6 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 the E6 include:

- 2.0 Mega Pixel Camera w/ Macro view
- FOTA (Firmware Over The Air)
- Native Media player
- SD memory card
- Video capture, playback
- Lower voltage technology that provides increased standby and talk times
- Extended GSM (EGSM) channels
- Tri-coder/decoder (CODEC) that allows full rate, half rate, and enhanced full rate modes of transmission
- Supports MP3, AAC, AAC+, AAC+ enhanced, MIDI, AMR-NB, Streaming 3GPP
- Expandable to over 4 GB with removable memory (SD/MMC card)
- High quality playback (RV, H.263, MPEG4)
- 5 hour video capture capable

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.

-
- Multi-Media Messaging (MMS)
 - PIM functionality with Picture Caller ID
 - Downloadable themes (ringers, images, sounds)
 - Text to Speech
 - Class 10 GPRS (2U/4D)
 - Email: POP3, SMTP
 - PIM and real desktop sync
 - Enhanced Bluetooth™ profiles, including stereo headset support.
 - High Speed synchronization with Desktop with USB 2.0 for faster music and personal information downloads.
 - Large (2.4 inch), high resolution (240x320), (TFT, 262K color display)
 - 2.0 Megapixel camera with Macro view for capturing images or video.
 - Approximately 10 Mbytes of built-in end user storage.

Simplified Text Entry

Motorola Labs handwriting and 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. This 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 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.



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.

Network Based Chat Messaging

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

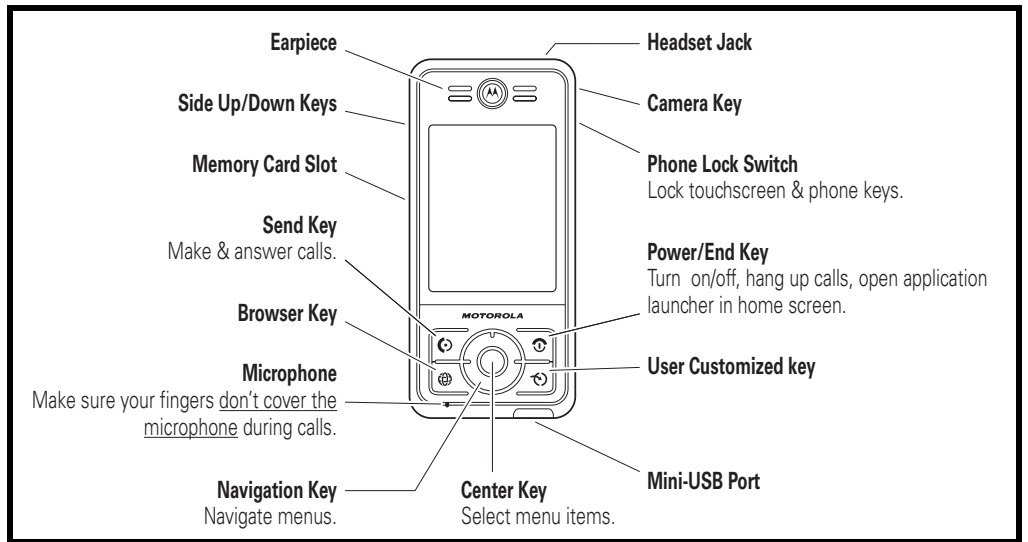
Personal Information Management

The E6 telephone contains a built in calendar with date book reminders and phonebook that can be synchronized easily to a computer.

General Operation

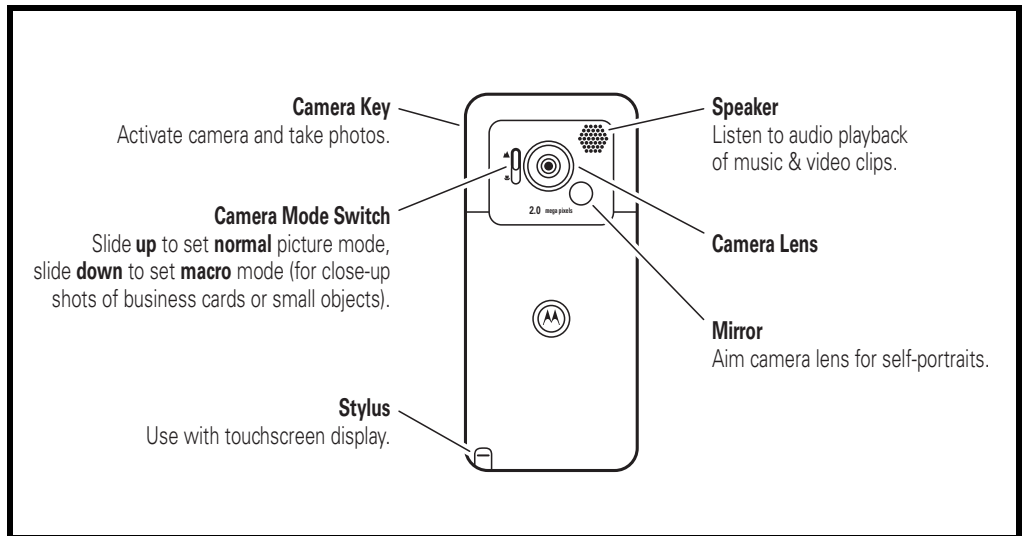
Controls, Indicators, and Input/Output (I/O) Connectors

The E6 controls are located on the front and sides of the device, and on the keyboard, as shown in Figures 1, 2 and 3.



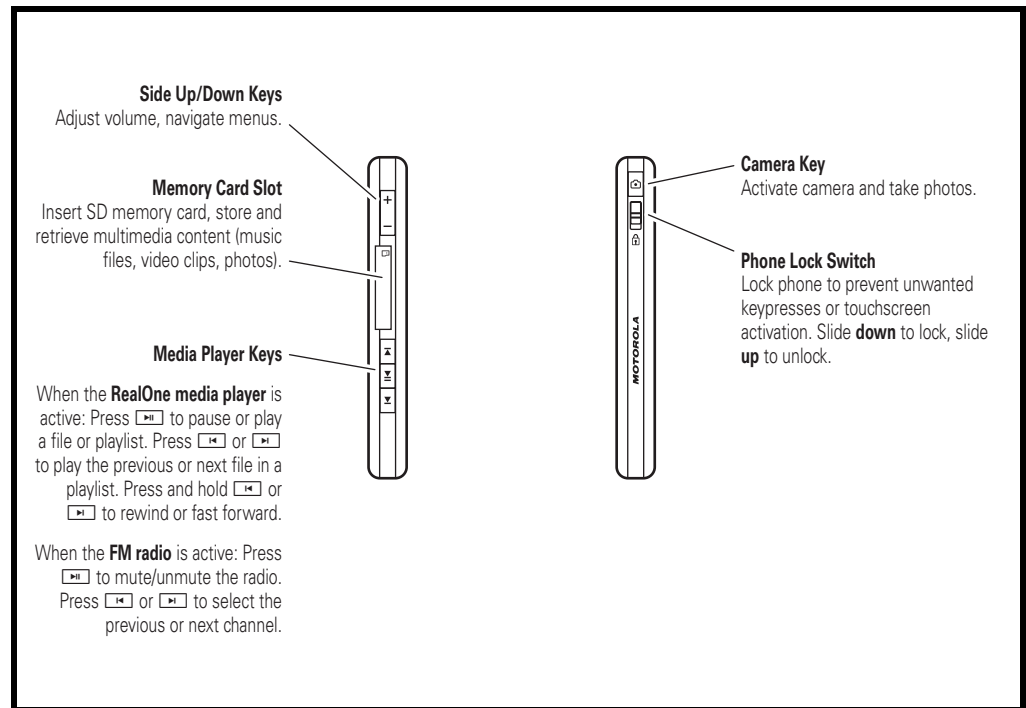
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Figure 1. Telephone Controls and Indicators Locations (Front)



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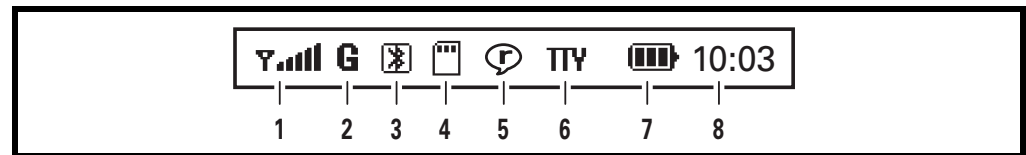
Figure 2. Telephone Controls and Indicators Locations (Back)



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Figure 3. Telephone Controls and Indicators Locations (Sides)

Indicators, in the form of icons, are displayed on the LCD (see Figure 4).



061420o

Figure 4. Icon Indicators

- Signal Strength** – Vertical bars show the strength of the network connection. You can't make or receive calls when the no signal indicator or no transmission indicator shows.
- GPRS Indicator** – Shows when your phone is using a high-speed *General Packet Radio Service* (GPRS) network connection.
- Bluetooth** – Shows that Bluetooth™ power is turned on. When Bluetooth power is on, your phone can make a wireless connection with a headset accessory or other external device.
- memory card** – Shows when a memory card is inserted in your phone.
- RealOne** – Shows when the RealOne media player is playing media content.
- TTY** – Shows when your phone is set up for use with an optional TTY device.
- battery level** – Vertical bars show the battery charge level. Recharge the battery when your phone shows LowBattery.

- 8. **clock** – Shows the current time.

Menu Navigation

E6 telephones are equipped with an icon and graphical-based user interface. All of the phone's features can be accessed with a 5-way navigation key that allows you to move easily through menus and select menu items.

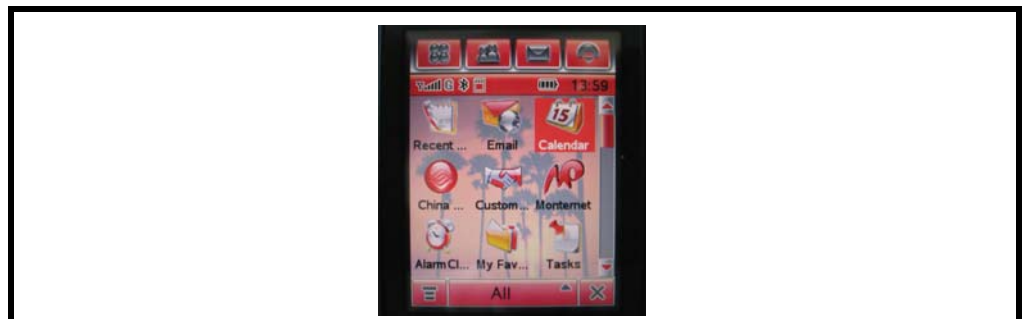
Liquid Crystal Display (LCD)

The LCD provides an large color display with user-adjustable brightness settings for optimum readability in all light conditions. The large 240 x 320 pixel display provides room for entering text, viewing graphics, tapping icons, and system prompts.



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

Figure 5 shows the Idle Screen display.



061421o

Figure 5. Main Screen Display

Battery Information

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



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



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



To ensure proper memory retention, turn the phone OFF before removing the battery.

Tools and Test Equipment

The following table lists tools and test equipment recommended for disassembly and reassembly of E6 telephones. Use either the listed items or equivalents.

Table 1. General Test Equipment and Tools

Motorola Part Number ¹	Description	Application
RSX4043-A	Torque Driver	Used to remove and replace screws
--	#0 Cross Point Screwdriver	Used to remove cross point screws
—	Torque Driver Bit T-5 Plus, Apex 440-6IP Torx Plus or equivalent	Used with torque driver
See Table 5	Rapid Charger	Used to charge battery and to power device
0180386A82	Antistatic Mat Kit (includes 66-80387A95 antistatic mat, 66-80334B36 ground cord, and 42-80385A59 wrist band)	Provides protection from damage to device caused by electrostatic discharge (ESD)
6680388B67	Disassembly tool, plastic with flat and pointed ends (manual opening tool)	Used during assembly/disassembly of device
6680388B01	Tweezers, plastic	Used during assembly/disassembly
—	Digital Multimeter, HP34401A ²	Used to measure battery voltage
8102430Z04	GSM / DCS Test SIM	Used to enable manual test mode

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

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

Disassembly

The procedures in this section provide instructions for the disassembly of an E6 telephone. Tools and equipment used for the phone are listed in Table 1, preceding.



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



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

Removing and Replacing the Battery Door and 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. Ensure the phone is turned off.
2. Slide the Stylus out of the pocket.
3. Slide down and hold the battery cover latch, as shown in Figure 1.



Figure 1. Removing the Battery Door

4. Slide the battery cover and lift it completely off the phone.

5. Lift the end of the battery and remove it completely. See Figure 2.



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Figure 2. Removing the Battery

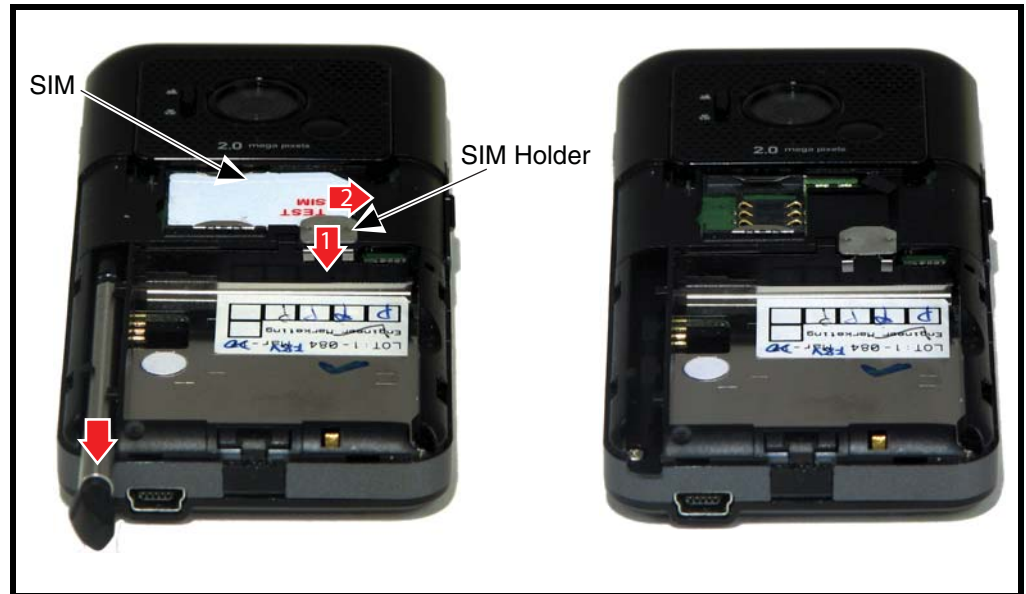


There is a danger of explosion if the Lithium Ion battery is replaced incorrectly. Replace only with the same type of battery or equivalent as recommended by the battery manufacturer. Dispose of used batteries according to the manufacturer's instructions.

6. To replace, Align the battery with the battery compartment so the contacts on the battery match the battery contacts in the phone.
7. Insert the battery, contacts side first, into the battery compartment and push down.
8. Insert the ridge at the bottom of the battery housing into the base of the phone, then push the cover down and snap it into place.

Removing and Replacing the Subscriber Identity Module (SIM)

1. Remove the battery door and battery as described in the procedures.



0614240

Figure 3. Removing the SIM

2. Slide the SIM holder away from the SIM, as shown in Figure 3.
3. Slide the SIM away from the SIM holder.
4. Carefully lift the SIM from the phone.
5. To replace, insert the SIM into the holder, ensuring the keyed corner of the SIM faces the top edge of the holder.
6. Slide in to lock the SIM holder.
7. Replace the battery and battery door as described in the procedures.

Removing and Replacing the Rear Housing

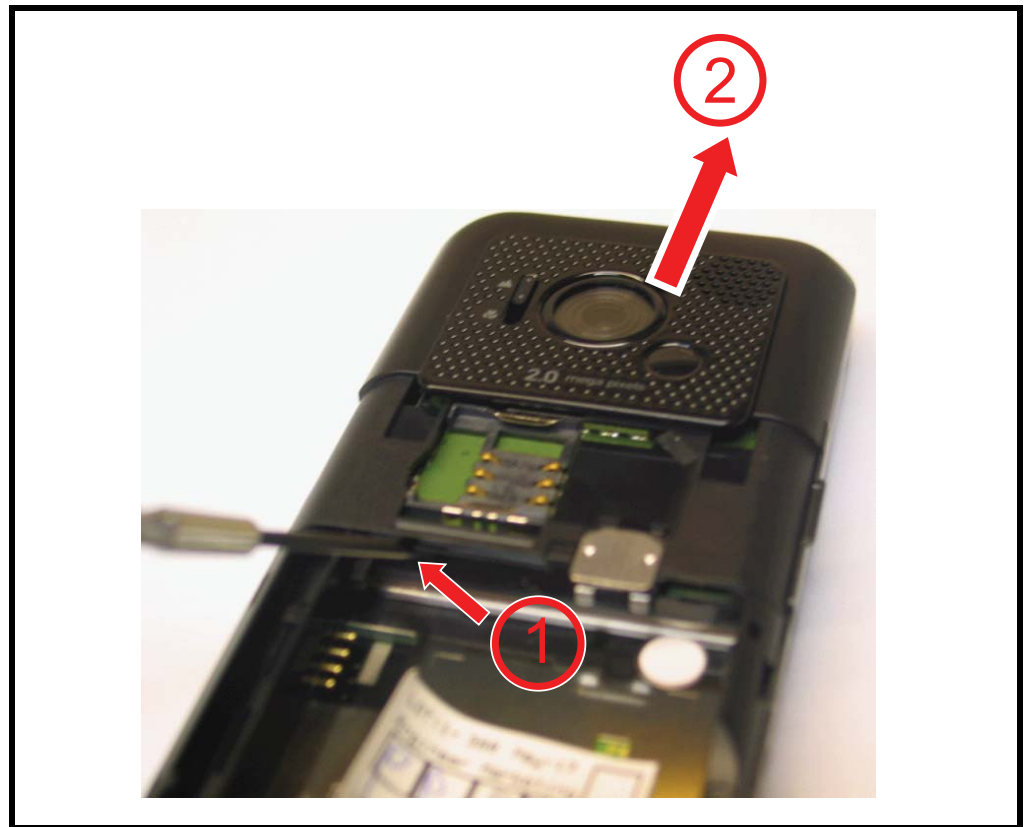


This product contains static-sensitive devices. Use anti-static handling procedures to prevent electrostatic discharge (ESD) and component damage.

1. Remove the battery cover, battery, and SIM as described in the procedures.
2. Release the housing latches by inserting the flat end of the plastic disassembly tool into the openings slot & slide the rear Housing outwards.



In addition to 4 screws, the rear chassis assembly is fastened with plastic catches. These are fragile and should be released with care.



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Figure 4. Removing the Rear Housing

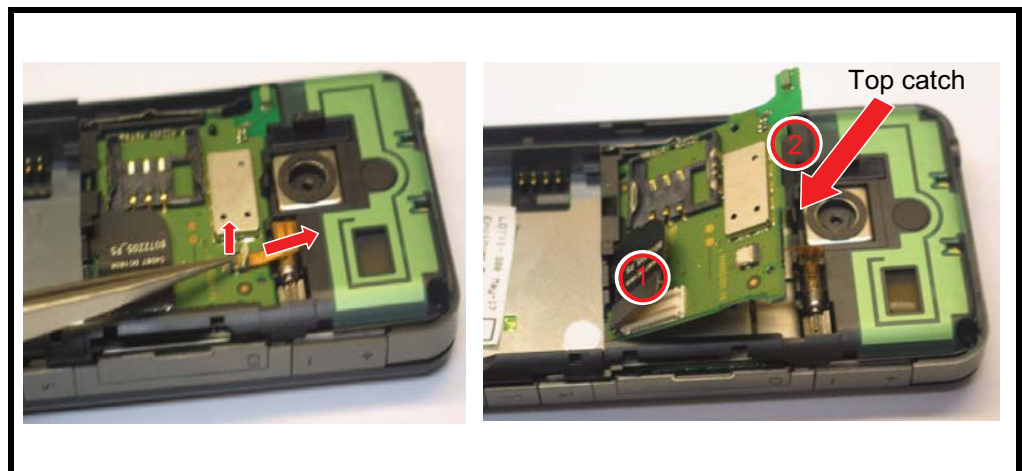
3. To replace, properly align the rear housing to the Chassis & then slide the housing forward. Ensure that the housing latches are properly engaged.
4. Replace the SIM, Battery & Battery Door as described in the procedures.

Removing and Replacing the Small PCB



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

1. Remove the Battery Door, Battery, SIM & Rear Housing as described in the procedures.
2. Lift up the ZIF connector cover.
3. Using a plastic tweezers, remove the Vibrator Flex cable out of the ZIF connector.
4. Using the disassembly tool, carefully unseat the B2B connector.
5. Release the Top catch & remove the small PCB.



061426o

Figure 5. Removing and Replacing the Small PCB

6. To replace, insert the small pcb, B2b connector flex & Vibrator Flex.
7. Replace the Rear Housing, SIM, Battery & Battery Door as described in the procedures.

Removing and Replacing the Chassis



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

1. Remove the Battery Door, Battery, SIM, Rear Housing & Small PCB as described in the procedures.
2. Using a Torx driver with a T-6 bit, remove the 4 screws at each corner of the rear housing. See Figure 5.

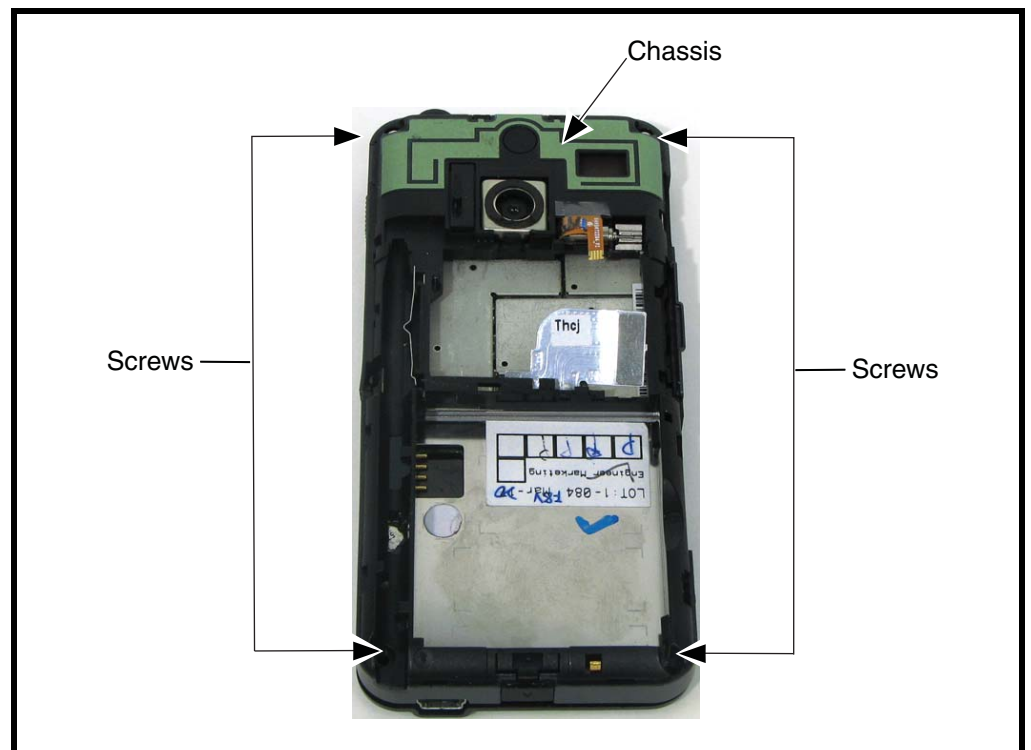


Figure 6. Removing and Replacing the Chassis

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3. Using the disassembly tool, release the housing latches on each side of the phone, as shown in Figure 6.

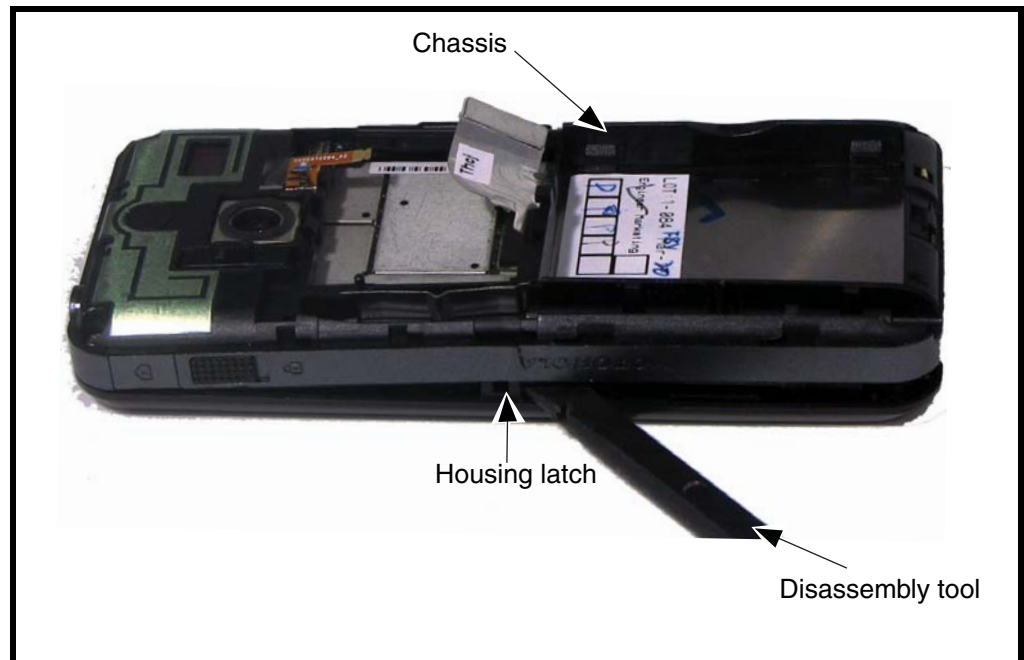


Figure 7. Removing the Rear Housing Latches

4. Lift the bottom end of the housing away, followed by the top end of the housing.
5. To replace, carefully align rear chassis assembly with the front housing, then press the rear chassis assembly down until the 2 housing catches engage with the corresponding openings on the rear chassis assembly. Press the housings together until the catches snap into place.
6. Replace the 4 transceiver screws and tighten securely. Do not over tighten.
7. Replace the small PCB housing cover, SIM, battery, and battery housing as described in the procedures.

Macau screw tightening torque

	<i>N-m</i>	<i>Lb-in</i>	<i>Kg-f-cm</i>	<i>N-cm</i>
torque	2	17.7	0.2	200
Tolerance(+/-)		5%		

Removing and Replacing the Antenna

1. The antenna is a non-removable part of the rear housing.
2. See Figure 7 to find the location of the antenna.

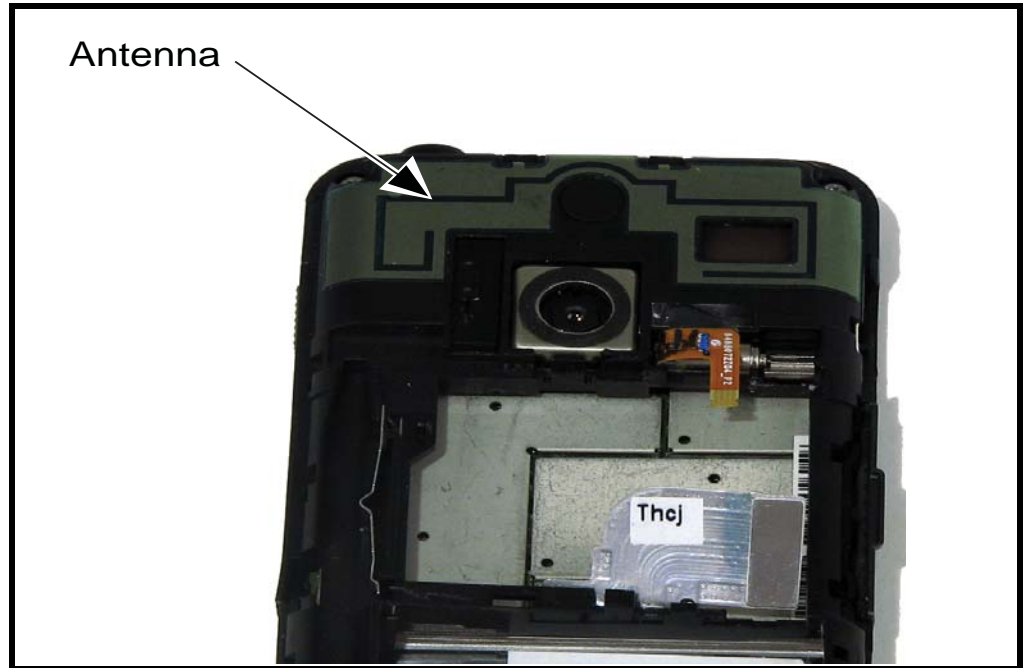
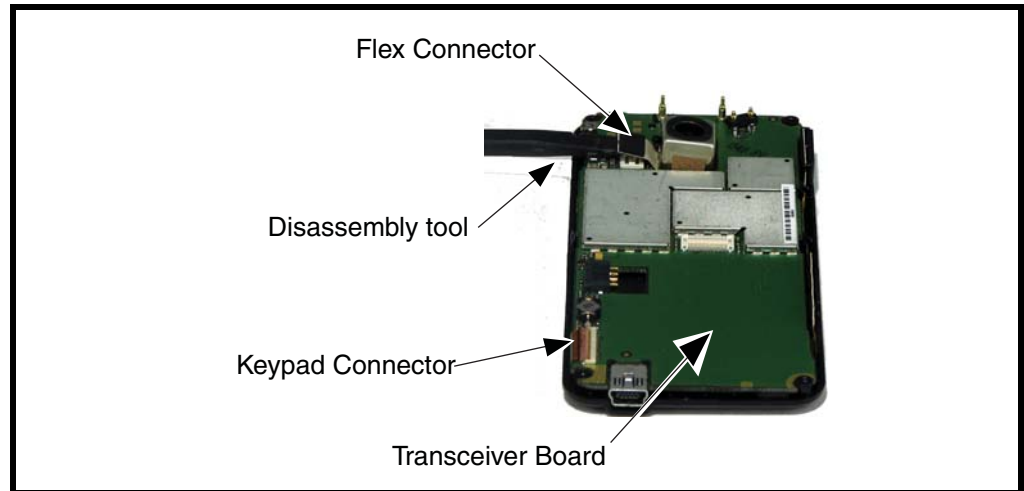


Figure 8. Removing the Antenna

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Removing and Replacing the Camera Module

1. Remove the Battery Door cover, Battery, SIM, Rear Housing, Small PCB & Chassis as described in the procedures.
2. Remove the Camera Module by using the flat end of the disassembly tool to release the flex connector, as indicated in Figure 8.



061429o

Figure 9. Removing and Replacing the CLI Lens.

3. To replace, carefully insert the Camera Module between the 4 catches on the transceiver board.
4. Insert the flex connector squarely into its mating connector on the transceiver board and press firmly until it snaps into place.
5. Replace the Chassis, small PCB, Rear Housing, SIM, Battery & Battery cover as described in the procedures.

Removing and Replacing the Transceiver Board Assembly



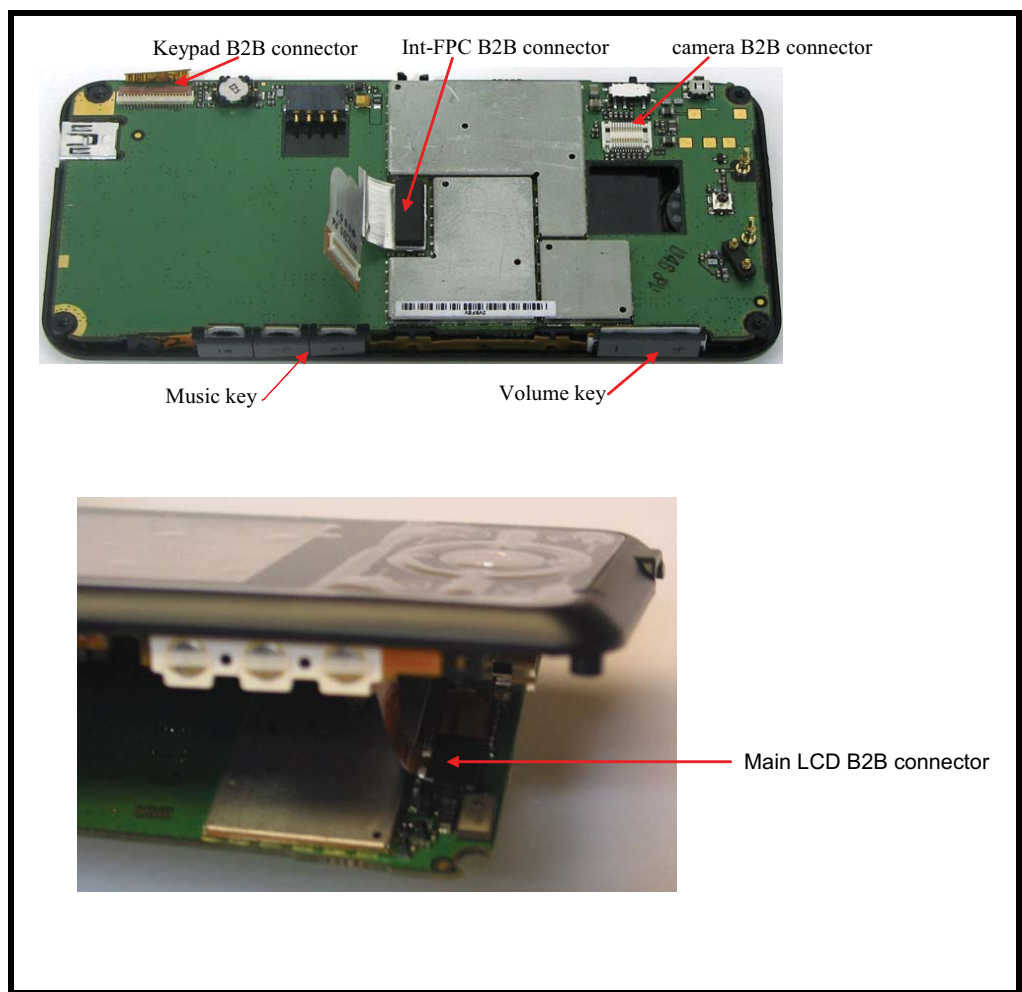
This product contains static-sensitive devices. Use anti-static handling procedures to prevent electrostatic discharge (ESD) and component damage.

1. Remove the battery cover, battery, SIM, rear camera housing, and rear housing as described in the procedures.



The flexible printed cable (FPC) (flex) is easily damaged. Exercise extreme care when handling.

2. Remove the Volume & Music Keys from the slot.
3. Using the disassembly tool, carefully disengage the B2B connector for the Keypad, inter Flex for small PCB & Main LCD. See Figure 10.



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Figure 10. Disconnecting the Flex from the Transceiver Board

4. Lift the transceiver board assembly from the front housing. See Figure 11.



Figure 11. Removing the Transceiver Board Assembly

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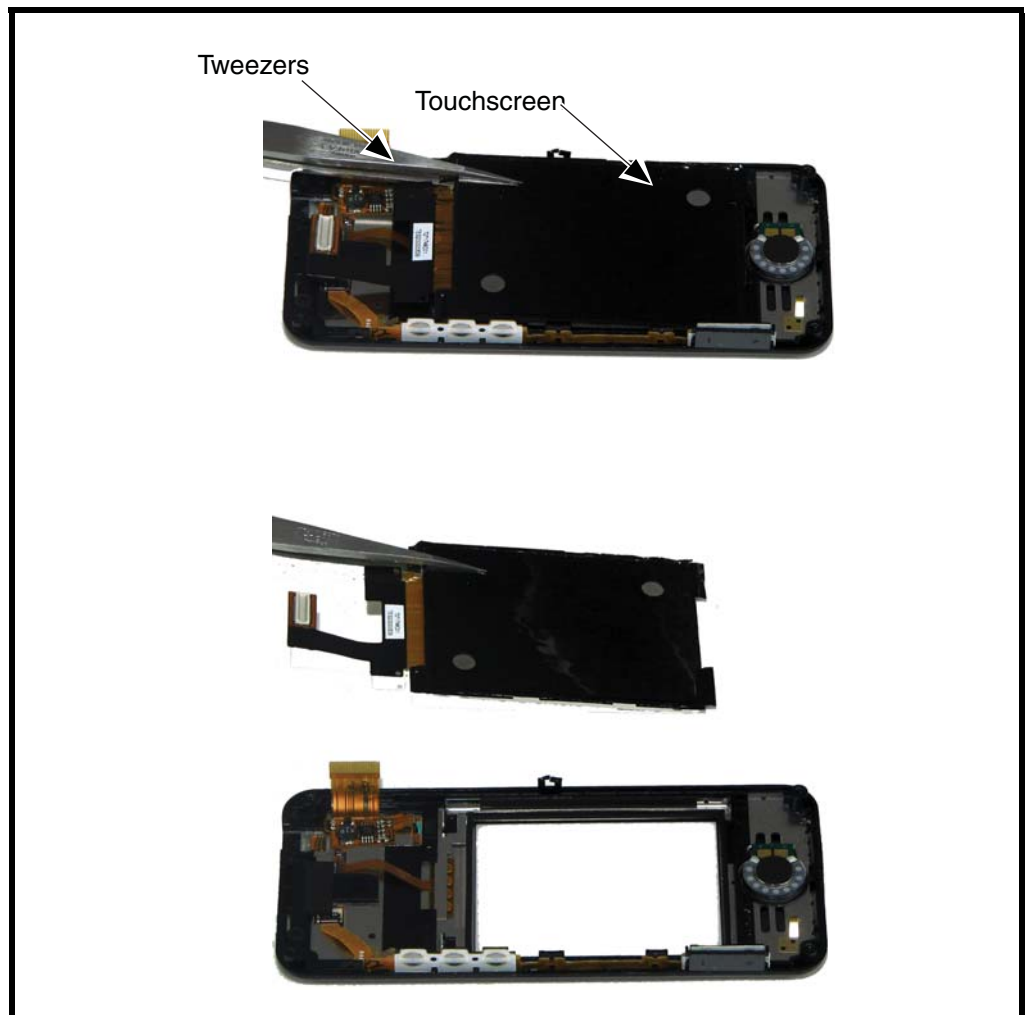
5. To replace, insert the transceiver board assembly into the front housing. Press the transceiver board down firmly and ensure the Main LCD connector is properly engaged.

➔ *Be sure the volume and music buttons are correctly positioned in relation to the corresponding switches on the transceiver board. Verify operation of the buttons after replacing the transceiver board and rear chassis assembly.*

6. Insert the Keypad flex and inter flex for small PCB squarely into its mating connector on the transceiver board and press firmly until it snaps into place.
7. Replace the Chassis, small PCB, SIM, battery, and battery cover as described in the procedures.

Removing and Replacing the Touchscreen Assembly

1. Remove battery housing cover, battery, SIM, rear housing, small PCB, Chassis, Camera Module, and transceiver board assembly as described in the procedures.
2. Using the plastic tweezers, carefully pry apart the adhesive joining the top of the touchscreen to the housing. Lift the touchscreen away from the transceiver board assembly. See Figure 12.



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Figure 12. Removing the Touchscreen Assembly

3. Insert the touchscreen ensuring the screen is aligned properly with the openings in the front housing.
4. Replace the transceiver board assembly, Camera Module, Chassis, Small PCB, rear housing, SIM, battery, and battery cover as described in the procedures.

Subscriber Identity Module (SIM) and Identification

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.

Personality Transfer

A personality transfer is required when a phone is express exchanged or when the main board is replaced. Personality transfers reproduce the customer's original personalized details such as menu and stored memory such as phone books, or even just program a unit with basic user information such as language selection. E6 telephones use TrueSync® synchronization software to effect a personality transfer.

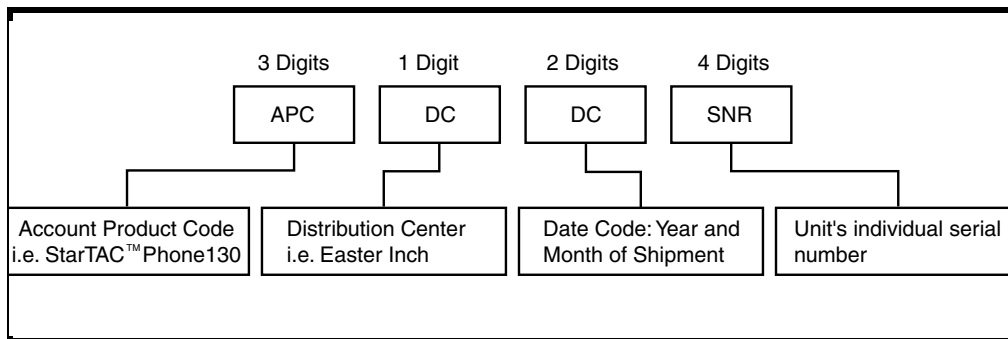
Identification

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

Mechanical Serial Number (MSN)

The Mechanical Serial Number (MSN) is an individual unit identity number and remains with the unit throughout the life of the unit.

The MSN can be used to log and track a unit on Motorola's Service Center Database. The MSN is divided into 4 sections, as shown in Figure 13.



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Figure 13. 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
NNXXXXXX	ZZZZZZ	A

Where

- TAC** Type Allocation Code, formerly known as Type Approval Code
- NN** Reporting body identifier
- XXXXXX** Type Identifier
- ZZZZZZ** Individual unit serial number
- A** Phase 1 = 0.
Phase 2 = check digit defined as a function of all other IMEI digits

Other label number configurations present are:

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

Troubleshooting

Manual Test Mode

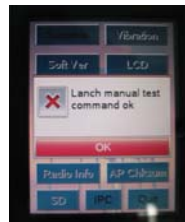
Motorola E6 telephones are equipped with a manual test mode capability. This allows service personnel to verify functionality and perform fault isolation by entering keypad commands.

To enter the manual test command mode, a GSM / DCS test SIM must be used.

1. 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. Turn the phone ON.
7. On the main screen, tap the phone icon to switch the phone to dial mode.



8. On the dial mode screen, tap and hold the # key for 5 seconds to enter the Test Menu.



9. The test mode screen displays.



Troubleshooting Chart

Table 3. : 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 connectors open or misaligned.	Visually inspect the battery connectors 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 connectors are not at fault, proceed to c.
	c) Transceiver board assembly defective.	Forward to an authorized level 3 service center.
	d) keyboard assembly failure.	Replace the keyboard assembly. Temporarily connect a +3.6 Vdc supply to the battery connectors. Press and hold the PWR button. If unit turns on and stays on, disconnect the dc power source and reassemble with the new keyboard assembly.
2. Telephone exhibits poor reception or erratic operation such as calls frequently dropping or weak or distorted audio.	a) Antenna assembly defective.	Check to make sure that the antenna pin is properly connected to the transceiver board assembly. If connected properly, substitute a known good antenna. If the fault is still present, proceed to b.
	b) Transceiver board assembly defective.	Forward to an authorized level 3 service center.
3. Display is erratic, or provides partial or no display.	a) Transceiver board connections faulty.	Remove rear chassis assembly from unit, check general condition of flexible printed cable (flex). If the flex is good, check that the flex connector is fully pressed down. If not, check connector to transceiver board connections. If faulty connector, replace the transceiver board assembly. If connector is not at fault, proceed to b.
	c) Transceiver board assembly defective.	Forward to an authorized level 3 service center.
4. Incoming call alert transducer audio distorted or volume is too low.	Faulty transceiver board assembly.	Replace the transceiver board assembly (refer to 1c). Verify that the fault has been cleared and reassemble the unit with the new transceiver board assembly.
5. Telephone transmit audio is weak. (usually indicated by called parties complaining of difficulty in hearing voice).	a) microphone obstructed by user while holding the phone	Verify transmit audio quality. If transmit audio quality is still weak and microphone is not obstructed, proceed to b.
	b) Microphone defective.	Replace the microphone as described in the procedures. If fault is not cleared, proceed to c.
	c) Transceiver board defective.	Forward to an authorized level 3 service center.
6. Receive audio from earpiece speaker is weak or distorted.	a) Connections to or from transceiver board assembly defective.	Gain access to the transceiver board assembly as described in the procedures. Check flex and the flex connector to the transceiver board assembly. If flex connector is at fault, proceed to d. If connection is not at fault, proceed to b.

Table 3. : Level 1 and 2 Troubleshooting Chart (Continued)

SYMPTOM	PROBABLE CAUSE	VERIFICATION AND REMEDY
	b) Antenna assembly defective.	Check to make sure the antenna is installed correctly. If the antenna is installed correctly, substitute a known good antenna assembly. If this does not clear the fault, reinstall the original antenna assembly and proceed to d.
	c) Transceiver board assembly defective.	Forward to an authorized level 3 service center.
7. Telephone will not recognize or accept SIM.	a) SIM defective.	Check the SIM contacts for dirt. Clean if necessary and check if fault has been cleared. If the contacts are clean, insert a known good SIM into the telephone. Power up the unit and confirm that the SIM has been accepted. If the fault no longer exists, replace the defective SIM. If the SIM is not at fault, proceed to b.
	b) Transceiver board assembly defective.	Forward to an authorized level 3 service center.
8. Vibrator feature not functioning.	Transceiver board assembly defective.	Forward to an authorized level 3 service center.
9. Internal Charger not working.	Faulty charger circuit on transceiver board assembly.	Test a selection of batteries in the rear pocket of the desktop charger. Check LED display for the charging indications. If these are charging properly, then the internal charger is at fault. Replace the transceiver board assembly (refer to 1c). Verify that the fault has been cleared and reassemble the unit with the new transceiver board assembly.
10. Real Time Clock resetting when standard battery is removed.	Lithium button cell in the display board may be depleted.	Refer service to a Level 3 service center for replacement.
11. No or weak audio when using headset.	a) Headset not fully pushed home.	Ensure the headset plug is fully seated in the jack socket. If fault not cleared, proceed to b.
	b) Faulty jack socket on transceiver board assembly.	Replace the transceiver board assembly (refer to 1c). Verify that the fault has been cleared and reassemble the unit with the new transceiver board assembly.

Programming: Software Upgrade and Flexing

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

Exploded View Diagram

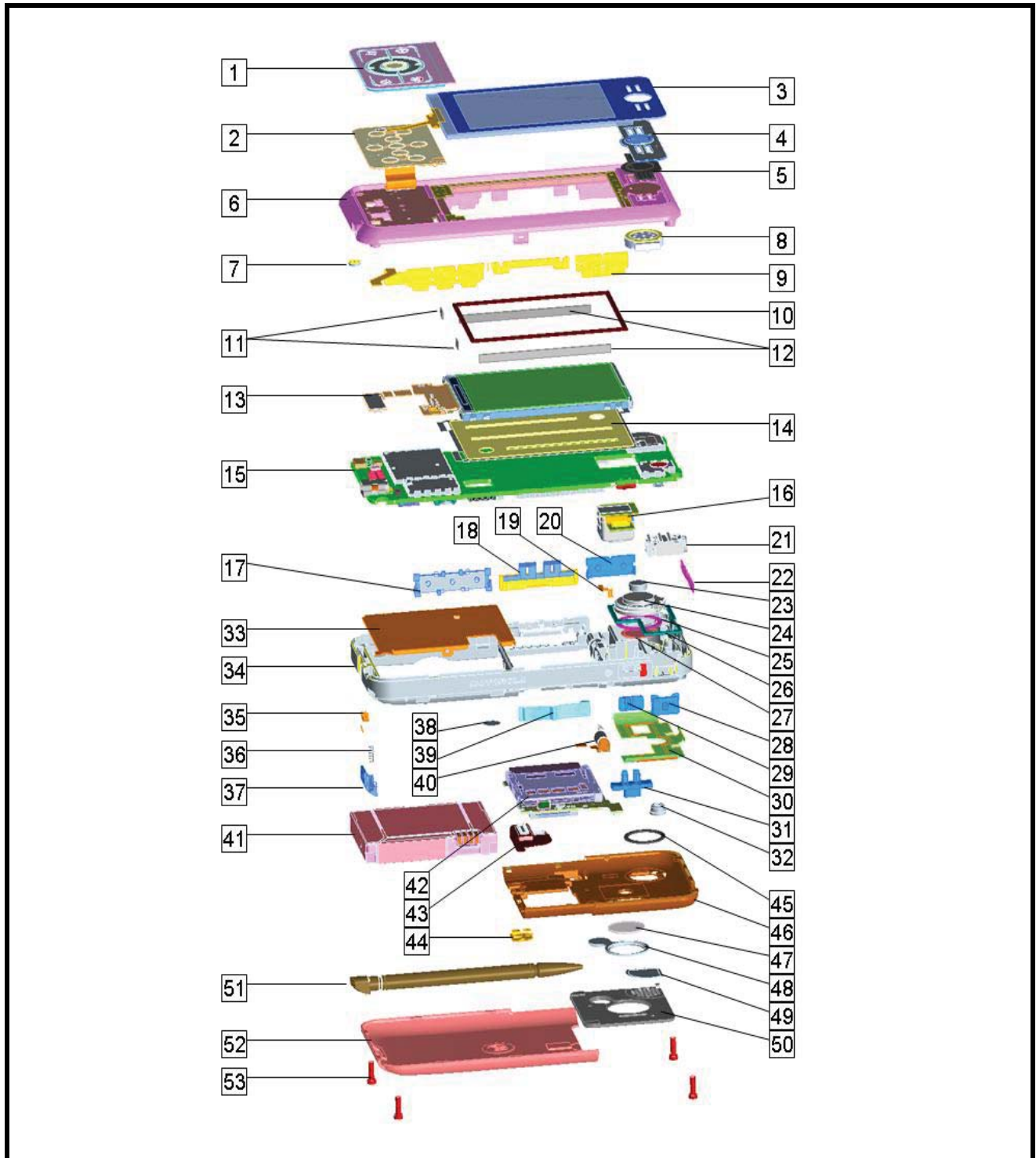


Figure 14. Exploded View Diagram

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Exploded View Parts List

Part numbers are only provided as a reference. Contact your local Motorola parts organization for current part number information.

Table 4. Exploded View Parts List

Item Number	Part Number	Description	QTY
1	3888642Z02	Keypad	1
2	8488638Z01	FPC kit, keypad	1
3	6188709Z01	TTW	1
4	1388725Z01	Logo, Macau	1
5	3588596Z04	Felt, receiver passive	1
6	1588632Z	Front Housing	1
7	3288422Z07	Gasket, MIC	1
8	5089081L01	Receiver,13mm	1
9	8488640Z01	FPC kit, side key	1
10	3288422Z06	Gasket, TTW	1
11	3288422Z05	gasket,display,bottom	2
12	3288422Z04	gasket,display,side	2
13	7271748D01	Display Assembly	1
14	7588489Z31	Cushion, Back, Display	1
15	CHLF4632AA	Main Board Assembly	1
16	0188045Z05	Camera Module assembly	1
17	3888646Z01	Side key, Music	1
18	1588636Z01	SD cover	1
19	4188576Z14	Clip, Grounding, Camera	1
20	3888645Z01	Side key, Volume	1
21	0971177D01	Headset Jack, 3.5mm	1
22	3588596Z06	Felt, Leakage port, Receiver	1
23	7588489Z32	Pad, Speaker	1
24	5071710C01	Loud speaker	1
25	1188432Z09	Adhesive, Speaker	1
26	3288422Z08	Gasket, Acoustic chamber	1
27	3588596Z08	Mesh Speaker, Macau	1

Item Number	Part Number	Description	QTY
28	3888644Z01	Side key, Camera	1
29	5588682Z02	Key, Screen Lock	1
30	8588669Z01	Radiator, Antenna	1
31	3688663Z01	Plectrum, Camera	1
32	0588666Z02	Boot, RF	1
33	NA	PCB cover	1
34	1588634Z	Chassis	1
35	4188576Z07	Clip, Grounding, door	1
36	4188576Z12	Spring, Latch	1
37	5588661Z02	Latch, Battery door, Black	1
38	5485042F01	Label Water Indicator	1
39	4288664Z01	Clip, Stylus	1
40	8488072Z07	FPC Kit, Motor	1
41	0188800P	battery (SNN5769A)	1
42	8488653Z01	Daughter Board Assembly	1
43	8488072Z06	Inter-fpc,b2b Kit	1
44	5588683Z01	SIM card holder	1
45	3288422Z10	gasket,speaker	1
46	1588633Z	Rear Housing	1
47	6188659Z02	Lens, Camera	1
48	0788318Z04	Frame, Camera lens	1
49	3588596Z05	Grillcloth, Speaker	1
50	1388660Z01	Bezel, Camera	1
51	0164079T01	Stylus assy	1
52	1588662Z03	Battery Door	1
53	0364579E03	Screw	4

Accessories (Optional)

Table 5. Accessories (Continued)

Part Description	Part Number
Audio and Media	
H3 Bluetooth Headset Dark Pearl Grey	SYN1507
H500 Bluetooth headset Black Softtouch	SYN1374
H500 Bluetooth Headset Hot Pink	SYN1525
H500 Bluetooth Headset IPOD Blue	SYN1523
H500 Bluetooth Headset IPOD Gold	SYN1524
H500 Bluetooth Headset Spa Blue	SYN1527
H500 Bluetooth Headset White	SYN1526
H500 Gloss Black	SYN1375
H500 Nickel Japan	SYN1441
H500 Pink	SYN1436
Headset Mono One Touch w/ Send-End (EMU)	SYN0896
Headset Stereo 3.5mm	SYN1302
Bluetooth Stereo Transceiver DC800	SYN1001
RAZR H3 Black	SYN1437
RAZR H3 Silver	SYN1438
Stereo Headset - EMU	SYN1301
H350 BT Headset Black	SYN1439
JBL Black On Tour Portable Speaker	SYN1451
JBL On Tour Mobile European Kit	OnTourMBBLKE
JBL On Tour Mobile portable speaker US Kit	OnTourMBBLK
JBL On Tour Mobile speaker PRC kit	CH1414A
JBL On Tour Mobile speaker UK kit	OnTourMBBLKU
S805 DJ Headset - Bluetooth - Music and Telephony	SYN1673
H500 Bluetooth Headset Fire Red	SYN1667
H500 Bluetooth Headset Celery	SYN1732
H500 Bluetooth Headset Pumpkin	SYN1733
H500 Bluetooth Headset Steel Teal	SYN1734
H500 Bluetooth Headset Oi	SYN1735
H3 Bluetooth Headset Cherry Red	SYN1736
H350 Bluetooth Headset Sapphire Blue	SYN1738
H350 Bluetooth Headset Silver Sail	SYN1764
H350 Bluetooth Headset Dark Pearl Grey	SYN1763
H350 Bluetooth Headset Silver Quartz	SYN1765

D&G Gold H700	SYN1769
Blue/Black Cingular Only H700	SYN1508
Black H700 (not available in North America)	SYN1509
Blue H700 (Verizon only in North America)	SYN1618
Bluetooth Module (Stereo Music and Telephony)	SYN1447
Bluetooth Stereo Headset & Controller S705	SYN1711
Bluetooth Headset - HS850 (Refresh - Black)	SYN1107
Bluetooth Headset - HS850 (Refresh - Blue)	SYN1226
Bluetooth Headset (Pearl Dark Gray) - H300	SYN1297
Bluetooth Headset (Pink) - H300	SYN1417
Bluetooth Headset (Pure White) - H300	SYN1416
Bluetooth Headset - H605	SYN1303
Bluetooth Mono Headset, Nickel- H500	SYN1290
Bluetooth Stereo Headset HT820	SYN0948
Bluetooth Headset - H700 (silver)	SYN1311
Bluetooth Car Kit - Asia/Americas	S9642
Bluetooth Car Kit - Euro	S9643
Bluetooth Car Kit - HF850	98675H
Bluetooth Car Kit - IHF1000 - Americas/Asia	98676J
Bluetooth Car Kit - IHF1000 - EMEA	CFLN1232AB
BT Pro-Install Carkit IHF1000r	98676K
T605 Pro Install Bluetooth Carkit	SYN1782A
Bluetooth Car Kit - High Tier, T505	SYN1717
Bluetooth Car Kit - Mid Tier, T305	SYN1716
1GB microSD card & Mot SD adapter	SYN1406
128MB microSD card & Mot SD adapter	SYN1403
Bluetooth TXTR Keyboard (silver)	SYN1391
2GB microSD card & Mot SD adapter	SYN1407
SD 128MB card	SYN1659
SD 1GB card	SYN1584
SD 256MB card	SYN1589
SD 2GB card	SYN1585
SD 512MB card	SYN1583
SD 64MB card	SYN1658
SD 4GB	SYN1586

256MB microSD card & Mot SD adapter	SYN1404
32MB microSD card & Mot SD adapter	SYN1401
512MB microSD card & Mot SD adapter	SYN1405
64MB microSD card & Mot SD adapter	SYN1402
Bluetooth Class 1 USB Adapter PC850	SYN1244
Data Cable Mini USB/USB/Serial	SKN6371
Mobile Phone Tools	Region-specific
Reverb (Oakley Stereo Bluetooth Eyewear - BLK)	SYN1552
Reverb (Oakley Stereo Bluetooth Eyewear - WHT)	SYN1553
REVERB (Oakley Stereo Bluetooth Eyewear Br. Sm.)	SYN1554
Bluetooth Helmet Adapter (Mage) - HS830	SYN0996
Oakley RAZRWIRE (Mercury: NA) - H7	98679H
Oakley RAZRWIRE (Pewter/Black: NA) - H7	98677H
Oakley RAZRWIRE (Plantinum/Rootbeer: NA) - H7	98678H
Battery BC70 (SC6) Li-Ion 1000 mAh	SNN5769
Charger Adapter - Aust/NZ Plug	SYN8127
Charger Adapter - Euro Plug	SYN7456
Charger Adapter - UK Plug	SYN7455
Charger Adapter EMU/EMU (Y-cable)	SKN6222
Travel Charger EMU Mid-Rate Switcher - Argentina	SPN5192
Travel Charger EMU Mid-Rate Switcher - Australia	SPN5193
Travel Charger EMU Mid-Rate Switcher - BRAZIL	SPN5187
Travel Charger EMU Mid-Rate Switcher - EURO	SPN5189
Travel Charger EMU Mid-Rate Switcher - INDIA	SPN5194
Travel Charger EMU Mid-Rate Switcher - MEXICO	SPN5186
Travel Charger EMU Mid-Rate Switcher - PRC	SPN5188
Travel Charger EMU Mid-Rate Switcher - TWN	SPN5216
Travel Charger EMU Mid-Rate Switcher - UK/HK	SPN5190
Travel Charger EMU Mid-Rate Switcher - US ENG	SPN5185
Travel Charger EMU Rapid Switcher - Argentina	SPN5197
Travel Charger EMU Rapid Switcher - BRAZIL	SPN5196
Travel Charger EMU Rapid Switcher - HK	SPN5199
Travel Charger EMU Rapid Switcher - MEXICO	SPN5200
Travel Charger EMU Rapid Switcher - PRC	SPN5198

Travel Charger EMU Rapid Switcher - US	SPN5202
Travel Charger EMU Rapid TWN	SPN5270
Vehicle Power Adapter EMU - VC700	SYN0847
Battery-Only-Charger for SC batteries, HongKong plug	SYN1486A
Battery-Only-Charger for SC batteries, PRC plug	SYN1492A
Battery-Only-Charger for SC batteries, Taiwan plug	SYN1485
Battery-Only-Charger for SC batteries, US/Euro plug	SYN1484
BATTERY-ONLY-CHARGER FOR KC/BK BATTERIES US PLG	SYN1699A
Battery-Only-Charger, KC (BK) battery, PRC plug	SYN1700
P320 desktop BOC (battery-only-charge), platform, EMU	SPN5394
P320 desktop BOC, platform, EMU, Chinese label	SPN5395
Travel Charger EMU Mid-Rate Switcher - JAPAN	SPN5274
Travel Charger EMU Rapid Switcher - Japan	SPN5275

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