MOTOROLA

Level 1 and 2 Service Manual

V80
Tri-Band Digital Wireless Telephone

GSM 900/1800/1900 MHz
GPRS

Contents

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 this wireless telephone. 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 this wireless telephone. 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, procedures and processes for repairing this wireless telephone at Level 1 and 2 service centers including:

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

Conventions

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

Note: Emphasizes additional information pertinent to the subject matter.

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

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

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

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

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

Warranty Service Policy

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

Out of Box Failure Policy

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

Product Support

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

Customer Support

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

Parts Replacement

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

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

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

Accessories and Aftermarket Division (AAD)

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

U.S.A.	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 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	374 DCS, and 374 PCS channels with 8 timeslots per channel
Modulation	GMSK at BT = 0.3
Transmitter Phase Accuracy	5 Degrees RMS, 20 Degrees peak
Duplex Spacing	45 MHz GSM, 95 MHz DCS 80 MHz PCS
Frequency Stability	± 0.10 ppm of the downlink frequency (Rx)
Operating Voltage	+3.0V dc to +4.2V dc (battery) +4.4V dc to +6.3V dc (external connector)
Average Transmit Current	310 mA nominal at room temperature
Average Stand-by Current	6.4 mA (DRX2), 3.5 mA (DXR9) nominal at room temperature
Dimensions	90 mm x 47.5 mm x 26 mm
Size (Volume)	76.5 cc with 750 mAh battery 86.19 cc with 800 mAh battery
Weight	106 gm with 750 mAh battery 111 gm with 800 mAh battery
Temperature Range	-10° C to +55° C (+15° F to +130° F)
Battery Life, 650 mAh LI Ion Battery	Talk Time up to 220 minutes Standby up to 152 hours 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.

Transmitter Function	Specification
RF Power Output	33 dBm nominal GSM, 30 dBm nominal DCS, 30 dBm nominal PCS
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	-106 dBm GSM, -104 dBm DCS, -104 dBm PCS
RX bit error rate (100k bits) Type II	< 2%
Channel Hop Time	500 microseconds
Time to Camp	Approximately 5-10 seconds

Speech Coding Function	Specification
Speech Coding Types	FR - Regular pulse excitation / linear predictive coding with long term prediction (RPE LPC with LTP) HR - Vector sum excited linear prediction (VSELP) EFR - Algebraic CELP (ACELP) AMR - Algebraic CELP (ACELP)

Speech Coding Function	Specification
Bit Rate	13.0 kbps (FR) 12.2 kbps (EFR) 4.75 - 12.2 kbps (8 AMR TCH/FS modes) 5.6 kbps (HR) 4.75 - 7.95 kbps (6 AMR TCH/HS modes)
Frame Duration	4.615 ms
Block Length	260 bits
Classes	Class 1A = 50 bits; Class 1B = 132; Class 2 bits = 78 bits
Bit Rate with FEC Encoding	22.8 kbps

Product Overview

Motorola V80 telephones feature global system for mobile communications (GSM) air interface, general packet radio service (GPRS) transport technology, and wireless application protocol (WAP) Internet. The V80 incorporates a color user interface (UI) that is both icon and list-based for easy operation, allows Short Message Service (SMS) text messaging, Enhanced Message service (EMS), Multimedia Messaging Service (MMS), and includes personal information manager (PIM) functionality. The V80 is a tri-band phone that allows roaming within the GSM 900 MHz, digital cellular system (DCS) 1800 MHz, and personal communication service (PCS) 1900 MHz bands.

V80 telephones support GPRS, SMS, EMS, 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. 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 (GPRS). 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. Multimedia messaging allows the end user to send photos along with personalized voice messages.

The telephones are made of polycarbonate plastic with a metal enclosure. The display and speaker, as well as the keypad, transceiver printed-circuit board (PCB), microphone, charger and headphone connectors, and power button are contained within the rotator form-factor housing. The standard 750 mAh Lithium Ion (Li Ion) battery fits behind the back cover.

The phone accepts 3V and 1.8V mini Subscriber Identity Module (SIM) cards which fit into the SIM holder underneath the battery. The antenna is mounted internally. Inexpensive direct connection to a computer or handheld device via RS232 or USB for data and fax calls, and for synchronizing phonebook entries with TrueSync® software, can be accomplished by using the optional data cable and soft modem.

The phone also contains Bluetooth® technology for wireless connections to Bluetooth enabled wireless speaker and headphone accessories.

Features

V80 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 reliability, simplify maintenance, and provide a wide variety of operational functions.

Features available in this family of telephones include:
- Low voltage technology that provides increased standby and talk times
- Extended GSM channels
- Tri-coder/decoder (CODEC) that allows full rate, half rate, and enhanced full rate modes of transmission
- Supports mobile originated/mobile terminated SMS, concatenated SMS, and

cell broadcast messages[1]
- Supports GPRS, circuit switched, and SMS networks[1]
- Email: POP3 and IMAP4
- WAP 2.0 compliant[1]
- Supports SIM Toolkit (STK), Class 2[1]
- Caller ID with link to phone book alerts[1]
- Dual thin film technology (TFT) displays with electroluminescent (EL) backlighting: internal 176 X 220 pixel resolution.
- Display provides 3 lines of text, 1 line of icons, and 1 line of prompts.
- Display zoom
- Display animation
- PIM functionality includes: date book, message center, and 1000 number phone book with Starfish® and TrueSync® support[2]
- Voice activation for phonebook entries and menu shortcuts
- Voice note voice recorder[3]
- iTAP™ software for predictive text entry
- Turbo Dial® abbreviated dialing.
- Multi-language support
- 32 alerts
- VibraCall® vibrating alert
- Data capable without PC card using RS232 or USB
- Integrated headset jack
- Smart button operation
- Hearing aid telephone interconnection system (HATIS) support[4]

Speaker Dependant Voice Activation and Voice Note Recording

This feature allows voice tags to be used for voice dialing up to 20 phone numbers in the phone book and for creating up to 5 voice shortcuts for menu items. The phone must be "trained" by the voice tag being read into the phone's memory twice before it is recognized.

Voice tags can be added to the phone's memory using the usual name addition methods (i.e., via the phone book menu structure or with the shortcut editor).

▶ *The user cannot place or receive calls while adding voice tags to the phone's memory.*

▶ *Because the GSM standard does not provide the option to store voice tags onto the SIM card, voice tags are added to the phone's memory.*

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1. Network, subscription and SIM card or service provider dependent feature. Not available in all areas.
2. Designed to synchronize with basic features of the initial release of many popular Personal Information Management (PIM) software and hardware products.
3. Use of this function may be subject to varying State and Federal laws regarding privacy of phone conversations.
4. Not compatible with all hearing aids. Hearing aids must contain a T-coil. T-coil must be activated when using the phone.

V80 telephones also include a voice note recorder that allows up to 2 minutes of personal messages to be recorded. This feature has a complete set of record, playback, and management tools that make it easy to store and maintain a list of personal memos.

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 V80'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.*

▶ *When the user receives a call while in browser mode, the browser will pause and allow the user to resume after completing the call.*

SIM Application Toolkit^{TM} - 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.

Simplified Text Entry

Using iTAP™ predictive text entry, pressing a key generates 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 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 displays. If there is no phone book entry, the incoming phone number displays. If no caller identification information is available, the Incoming Call message displays.

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

Other Features

Detailed descriptions of these and the other V80 features can be found in the appropriate V80 telephone user guide listed in the "Related Publications" section toward the end of this manual.

General Operation

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

The V80 telephone's controls are located on the sides of the device and on the keypad (see Figure 1). Indicators, in the form of icons, are displayed on the LCD V80 phones have an audible alert transducer on the top and I/O connectors, consisting of a headset jack and an accessory port, located on the top and bottom of the phone.
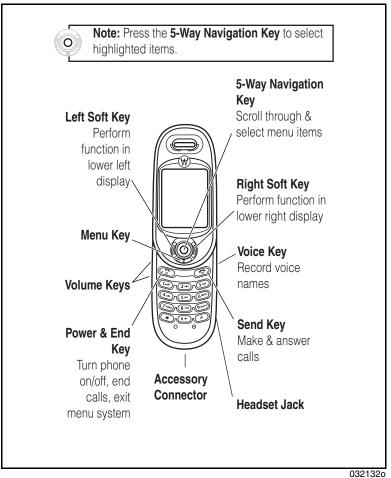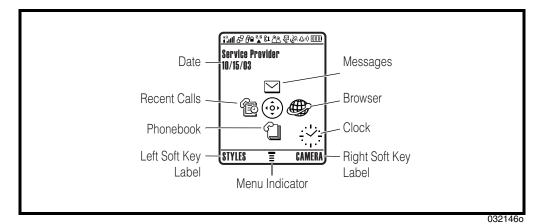

032132o

Figure 1. Phone Controls, Indicators and I/O

Color Display

The color display provides a high contrast backlit display for easy readability in all light conditions. The large bit-mapped 120 x 160 pixel display includes 3 lines of text, 1 line of icons, and 1 line of prompts.

Display zoom allows setting the phone's display to show either three lines or two lines of text plus soft key labels. Three lines of text display more information, while two lines increase text size for improved visibility.

Display animation makes the phone's menus move smoothly as the user scrolls up and down. Turn animation off to conserve the battery.

032146o

Figure 2. Icon Indicators

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

Figure 2 shows common icons displayed on the LCD.

User Interface Menu Structure

Figure 3 shows the telephone menu structure.

Main Menu

Games & Apps

Multimedia
- Themes
- Camera
- Pictures
- Sounds
- MotoMixer
- Videos

Tools
- SIM Apps
- Calculator
- Datebook
- Shortcuts
- Voice Records
- Alarm Clock
- Dialing Services
  - Call Barring
  - Fixed Dial
  - Service Dial
  - Quick Dial

Settings
- (see next page)

IM

Web Access
- Browser
- Web Shortcuts
- Stored Pages
- History
- Go To URL
- Web Sessions
- Browser Setup

Phonebook

Recent Calls
- Received Calls
- Dialed Calls
- Notepad
- Call Times
- Call Cost
- Data Times
- Data Volumes

Messages
- Create Message
- Voicemail
- Message Inbox
- Email Msgs
- Browser Msgs
- Info Services
- Quick Notes
- Outbox
- Drafts

Chat

This is the standard main menu layout. Menu organization and feature names may vary on your phone. Not all features may be available on your phone.

Comment: If you do not find a feature in the main menu, select More (f) to see additional menu features.

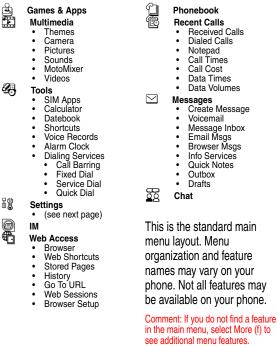**Figure 3. Telephone Menu Structure**

Alert Settings

V80 telephones include up to 32 preset alert tones and vibrations that can be applied to all alert events at the same time.

▶ *Pressing either volume key mutes the alert.*

Battery Function

Battery Gauge

The telephone displays a battery level 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 (for example, partially entered phone book entries or outgoing messages) is lost.

▶ *To ensure proper memory retention, turn OFF the phone before removing the battery. Immediately replace the old battery with a fresh battery.*

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

Operation

For detailed operating instructions, refer to the appropriate user's guide listed in the Related Publications section toward the end of this manual.

Tools and Test Equipment

The following table lists tools and test equipment recommended for disassembly and reassembly of V80 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
—	Torque Driver Bit T-6 and Driver Bit T-3 Plus, Apex 440-6IP Torx Plus or equivalent	Used with torque driver
See Table 7	Rapid 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 device caused by electrostatic discharge (ESD)
6680388B67	Disassembly tool, plastic with flat and pointed ends (manual opening tool)	Used during assembly/disassembly of phone
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 by fax (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 a V80 telephone. Tools and equipment used for the phone 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 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 Cover

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. Press in and hold the battery cover latch as shown in Figure 4.

020200o

Figure 4. Removing the Battery Cover

3. Lift the battery cover completely off the phone.
4. To replace, align the battery cover with the phone.
5. Slide the bottom end of the battery cover into position.
6. Press the top end of the battery cover onto the phone until the battery cover latch is secure.

Removing and replacing the Battery

1. Remove the battery cover as described in the procedures.
1. Lift the end of the battery and remove it completely (See Figure 5).

020201o
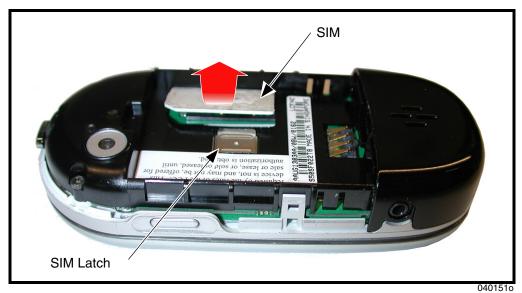
Figure 5. Removing the Battery

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.

2. To replace, align the battery with the battery compartment so the contacts on the battery match the battery contacts in the phone.
3. Insert the battery, printed arrow first, into the battery compartment and push down.
4. Insert the ridge at the bottom of the battery housing into the base of the phone, then push the battery down and snap it into place.
5. Replace the battery cover as described in the procedures.

Removing and Replacing the Subscriber Identity Module (SIM)

1. Remove the battery housing and battery as described in the procedures.
2. Slide the SIM latch away from the SIM card to unlock as shown in Figure 6.
3. Carefully lift the SIM from its holder.

Figure 6. Removing the SIM

4. To replace, insert the SIM into the holder, ensuring the keyed corner of the SIM aligns with the notch molded into the holder.
5. Lock the SIM into place by sliding the latch towards the SIM card.
6. Replace the battery and battery housing as described in the procedures.

Removing and Replacing the Antenna Housing

1. Remove the battery cover, battery, and SIM as described in the procedures.
2. Use the disassembly tool to release the antenna housing latches at the sides of the antenna housing.
3. Lift the bottom end of the antenna housing off the phone followed by the top end (See Figure 7).

040171o

Figure 7. Removing the Antenna

4. When the antenna latches are completely disengaged, lift the antenna housing off of the phone to remove.

⚠ *Ensure antenna housing latches are properly engaged to prevent damage to the antenna or antenna housing.*

5. To replace, carefully align the antenna housing to the phone and press the antenna housing onto the phone.
6. Ensure all antenna housing latches are engaged.
7. Replace the battery and battery cover as described in the procedures.

Removing and Replacing the Rear Housing 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, and antenna housing as described in the procedures.
2. Using a Torx driver with a T-6 bit, remove the 4 screws from the rear housing assembly (See Figure 8). Retain the 4 screws for reassembly

020251o

Figure 8. Removing the Rear Housing Assembly Screws

3. Use the disassembly tool to release the 2 housing latches; one on each side of the phone, as shown in Figure 8.
4. Lift the rear housing assembly up and away from the phone.
5. To replace, carefully align rear housing assembly with the front housing, then press the rear assembly down until the 2 housing catches engage with the corresponding openings on the rear housing. Press the housings together until the catches snap into place.
6. Replace the 4 screws and tighten to 1.8 +/- 0.1 lb.-in. Do not over tighten.
7. Replace the antenna housing, SIM, battery, and battery cover as described in the procedures.

Removing and Replacing the Camera Assembly

1. Remove the battery cover, battery, SIM, antenna housing, rear housing assembly as described in the procedures.
2. Use the disassembly tool to unseat the camera assembly connector from its socket connector.
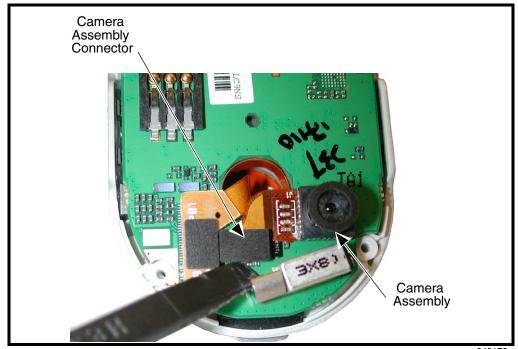3. Lift the camera assembly away from the phone.

040173o

Figure 9. Removing the Camera Assembly

4. To replace, align the camera assembly socket to its connector on the phone.
5. Gently and firmly seat the camera assembly socket into its connector.
6. Replace the rear housing, antenna housing, SIM, battery, and 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, antenna housing, rear housing assembly, and camera assembly as described in the procedures.

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

2. Using the plastic disassembly tool, disconnect the display flex connector from its socket on the transceiver PCB assembly (See Figure 10).
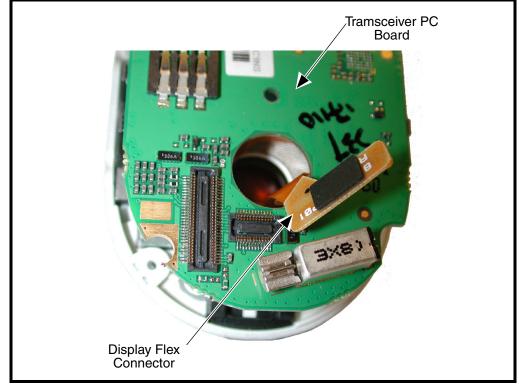

032300o

Figure 10. Removing the Display Flex Connector

⚠ *The flex is fragile and easily damaged. Be very careful when passing the flex through the transceiver PCB opening.*

3. Gently lift the transceiver board and carefully pass the flex connector through the opening in the transceiver board (See Figure 11).
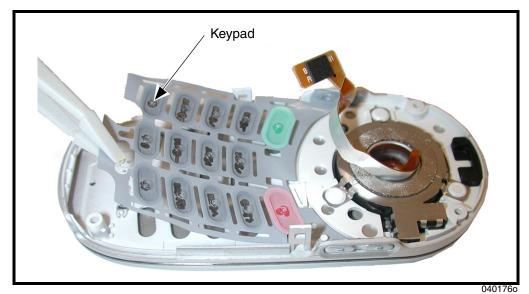

040175o

Figure 11. Removing the Transceiver Board

4. After the flex connector is clear of the transceiver board, lift the transceiver board assembly from the phone.
5. To replace, align the transceiver board assembly with the phone housing.
6. Insert the flex connector through the opening in the transceiver board assembly.
7. Lower the transceiver board assembly onto the housing.
8. Coil the flex assembly in a clockwise direction.
9. Insert the flex connector squarely into its mating connector on the transceiver board and press firmly until it snaps into place.
10. Replace the rear housing assembly, antenna housing, SIM, battery, and battery cover as described in the procedures.

Removing and Replacing the Keypad

1. Remove the battery cover, battery, SIM, antenna, rear housing assembly, and transceiver board assembly as described in the procedures.
2. Use the plastic tweezers to lift the keypad from the front housing as shown in Figure 12.

Keypad

040176o

Figure 12. Removing the Keypad

3. To replace, insert the keypad into the front housing, ensuring the keys align properly with the openings in the front housing.
4. Replace the transceiver board, rear housing assembly, antenna, SIM, battery, and battery cover as described in the procedures.

Removing and Replacing the Microphone

1. Remove the battery cover, battery, SIM, antenna, rear housing assembly, and transceiver board assembly as described in the procedures.
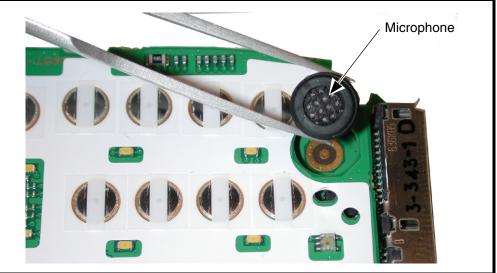2. Using the tweezers, carefully lift the microphone out of the transceiver board assembly (See Figure 13).

040177o

Figure 13. Removing the Microphone

3. To replace,
4. Replace the transceiver board, rear housing assembly, antenna, SIM, battery, and battery cover as described in the procedures.

Removing and Replacing the Real-Time Clock (RTC) Battery

1. Remove the battery cover, battery, SIM, antenna housing, rear housing assembly, and transceiver board assembly as described in the procedures.
2. Note battery polarity (positive terminal facing upward) before removing the RTC battery.
3. Carefully use the pointed end of the plastic disassembly tool to lift one edge of the RTC battery out of its socket on the transceiver board.
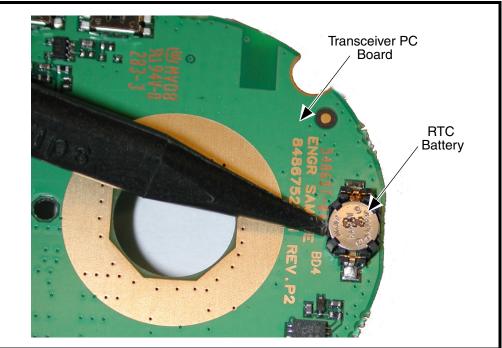4. Use the plastic tweezers to lift the battery off of the transceiver board.

040178o

Figure 14. Removing the RTC BAttery

5. To replace, align a fresh RTC battery (positive terminal facing up) over the RTC battery holder.
6. Insert one end of the battery into the battery holder. Gently press the other side of the battery into place in the battery holder. Ensure all battery latches are engaged and holding the RTC battery in place.
7. Replace the transceiver board, rear housing assembly, antenna housing, SIM, battery, and battery cover as described in the procedures.

Removing and Replacing the Blade Assembly

1. Remove the battery cover, battery, SIM, antenna housing, rear housing assembly, transceiver board assembly, and keypad as described in the procedures.
2. Using a T3 driver, remove the 4 screws on the back of the blade assembly. Set the screws aside for reuse (See Figure 15).
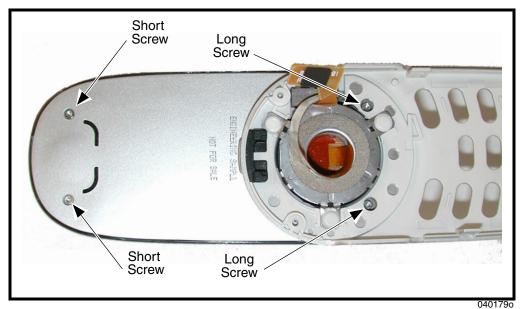

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Figure 15. Removing the Blade Assembly

3. Carefully turn the blade assembly over and lift the display lens from the blade assembly.
4. To replace, align the display lens to the blade assembly.
5. Lower the blade assembly into position on the blade assembly.
6. Insert and tighten the 4 blade assembly screws.

Note: there are 2 short screws and two long screws. The 2 short screws are inserted near the tip of the blade and the 2 longer screws are inserted near the keypad.

7. Replace the transceiver board, rear housing assembly, antenna, SIM, battery, and battery cover as described in the procedures.

Removing and Replacing the Display Module.

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

1. Remove the battery cover, battery, SIM, antenna housing, rear housing assembly, transceiver board assembly, keypad and blade assembly as described in the procedures.
2. Use the disassembly tool to disconnect the display module flex connector from the blade assembly (See Figure 16).
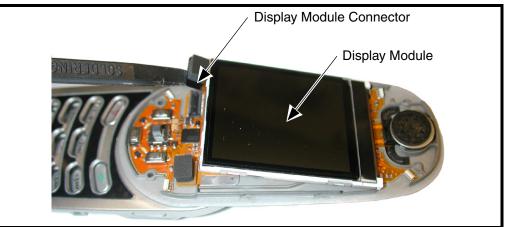3. Lift the display module up and away from the blade assembly.

Display Module Connector

Display Module

040180o

Figure 16. Removing the Display Module

4. To replace, carefully lower the display module onto the blade assembly..

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

5. Carefully press the display module connector into its socket.
6. Replace the keypad, keyboard assembly, spacer gasket, transceiver board assembly, rear housing assembly, antenna housing, SIM, battery, and battery cover as described in the procedures.

Subscriber Identity Module (SIM) and Identification

SIM Card

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. V80 telephones use TrueSync® synchronization software to effect a personality transfer.
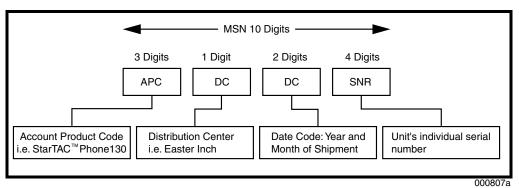
Identification

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 17.

000807a

Figure 17. 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 31/03/2004
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:

• **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 V80 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.

Manual Test Mode Commands

Table 3. Manual Test Commands

Key Sequence	Test Function/Name	Remarks
<Menu>048263*	Enter manual test mode	
"End" Key	Exit manual test mode	
54*	Suspend	Required for all Test Mode Operations
0*0*0	Select tone 0	
0*0*1	Select tone 1	
0*0*2	Select tone 2	
0*0*3	Select tone 3	
0*0*4	Select tone 4	
0*0*5	Select tone 5	
0*0*6	Select tone 6	
0*0*7	Select tone 7	
0*0*8	Select tone 8	
0*0*9	Select tone 9	
0*1*X	Disable tone X	
3*0*1	Enable vibrator	
3*0*0	Disable vibrator	
5*0*0	Set audio level 0	
5*0*1	Set audio level 1	
5*0*2	Set audio level 2	
5*0*3	Set audio level 3	
5*0*4	Set audio level 4	
5*0*5	Set audio level 5	
5*0*6	Set audio level 6	
5*0*7	Set audio level 7	

Table 3. Manual Test Commands (Continued)

Key Sequence	Test Function/Name	Remarks
5*0*8	Set audio level 8	
5*0*9	Set audio level 9	
5*0*10	Set audio level 10	
5*0*11	Set audio level 11	
5*0*12	Set audio level 12	
5*0*13	Set audio level 13	
5*0*14	Set audio level 14	
5*0*15	Set audio level 15	
6*2*2*0*0	Set Audio Path. Int Mic, IntSpk, RX unmute, TX unmute	
6*4*6*0*0	Set Audio Path. Boom Mic, Boom Spk, RX unmute, TX unmute	
10*0*3	Set band GSM 900	
10*0*4	Set band DCS 1800	
10*0*5	Set band PCS 1900	
10*0*6	Set dual band GSM 900/1800	
10*1*0	Read band	3= GSM 4= DCS 5= PCS 6 =GSM/DCS
18*0	Initialize non-volatile memory (Master Reset)	
18*1	Initialize non-volatile memory (Master Clear)	
55*2*001	Test Display. All pixels ON	
55*2*000	Test Display. All pixels OFF	
55*2*002	Test Display. Checkerboard pattern A	
55*2*003	Test Display. Checkerboard pattern B	
55*2*004	Test Display. Border pixels ON	
*#06#	IMEI Check	No Test Mode Required
Phone Set up --> Phone Status --> Other Information	Flex Version/Technology/S-W Version/Readiness Status	No Test Mode Required

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 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.	Remove the transceiver board assembly. Substitute a known good assembly and temporarily reassemble the unit. Depress the PWR button; if unit turns on and stays on, disconnect the dc power source and reassemble the telephone with the new transceiver board assembly. Verify that the fault has been cleared. If the fault has not been cleared then proceed to d.
	d) keyboard assembly failure.	Replace the keyboard assembly. Temporarily connect a +3.6 Vdc supply to the battery connectors. Depress 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.	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.
3. Display is erratic, or provides partial or no display.	a) Transceiver board connections faulty.	Remove rear housing 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.
	b) Blade assembly defective.	Temporarily replace the blade assembly with a known good assembly. If fault has been cleared, reassemble with the new blade assembly. If fault not cleared, proceed to c.
	c) Transceiver board assembly defective.	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.
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.

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

Symptom	Probable Cause	Verification and Remedy
5. Telephone transmit audio is weak. (usually indicated by called parties complaining of difficulty in hearing voice).	a) Microphone connections to the transceiver board assembly defective.	Gain access to the microphone as described in the procedures. Check connections. If connector is faulty proceed to c; if the connector is not at fault, proceed to b.
	b) Microphone defective.	Gain access to microphone. Disconnect and substitute a known good microphone. Place a call and verify improvement in transmit signal as heard by called party. If good, reassemble with new microphone. If microphone is not at fault, reinstall original microphone and proceed to c.
	c) Transceiver board assembly defective.	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.
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 from the flip assembly to the transceiver board assembly. If flex is at fault, replace flip assembly. If flex connector is at fault, proceed to d. If connection is not at fault, proceed to b.
	b) Blade assembly defective.	Temporarily replace the blade assembly with a known good assembly. If fault has been cleared, reassemble with the new blade assembly. If fault not cleared, proceed to c.
	c) 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.
	d) Transceiver board assembly defective.	Replace the transceiver board assembly (refer to 1c). Verify that the fault has been cleared and reassemble with the new transceiver board assembly.
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.	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.
8. Phone does not sense when rotator is opened or closed (usually indicated by inability to answer incoming calls by opening the blade, or inability to make outgoing calls).	a) Blade assembly defective.	Temporarily replace the blade assembly with a known good assembly. If fault has been cleared, reassemble with the new blade assembly. If fault not cleared, proceed to b.
	b) Transceiver board assembly defective.	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.
9. Vibrator feature not functioning.	Transceiver board assembly defective.	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.

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

Symptom	Probable Cause	Verification and Remedy
10. 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.
11. 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.
12. 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.Part Number Charts

The following charts are provided as a reference for the parts associated with V80 telephones.

Related Publications

Motorola V80 User Guide, English   6809469A53 (SJJN5445)

note: kit numbers are not all inclusive and may change without notice.
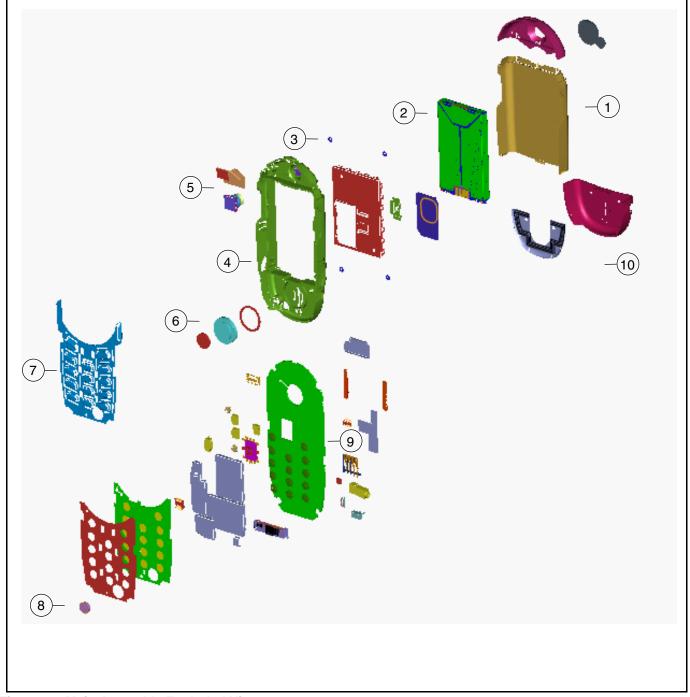
Exploded View Diagram

Figure 18. Main Assembly Exploded View

Exploded View Parts List

Table 5. Main Assembly Exploded View Parts List

Item Number	Motorola Part Number	Description
1	1586821P01	Battery Door
2	SNN5614	Battery Slim Li Ion
3	0309315B07	Back Housing Screws
4	1586818P01	Back Housing
5	728631P01	Camera Module
6	5088017N01	MIDI Speaker 16 MM
7	7586852P02 7586852P03	Keypad Stroke Keypad Bopomofo
8	5002811Y28	Microphone Assembly
9	8486752P02	Transceiver PC Board
10	0170299N01	Antenna Assembly
		Keypad PC Board

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.

Figure 19. Blade Assembly Exploded View

Table 6. V80 Blade Assembly Parts List

Item Number	Motorola Part Number	Description
1	0170386K01	Blade Lens Assembly, V80
2	7570382A35	LCD Gasket
3	3286824P01	Felt, Earpiece, Front
4	0186857P01	LCD Assembly
5	3270341C05	Gasket, BTB
6	3886832P01	Joystick Cluster
7	3286823P02	Gasket, Earpiece
8	0186960P01	P Flex Assembly
9	3270341C04	Gasket, Earpiece, Support
10	0186961P01	C Flex Assembly
11	3286824P02	Felt, Earpiece, Bottom
12	7570382B02	Pad, Support, LCD
13	0370303B01	Screw, Mechanism
14	7570382B01	Pad, Grounding, LCD
15	1586815P01	Rear Blade Mg Die-cast
16	5988515L01	Magnet
17	0370303C02	Screw, Blade, Bottom
18	0370303C01	Screw, Blade, Top
19	0170386J01	Front Housing Assembly, V80
20	4786836P01	Lanyard Wire
21	3786835P01	Lanyard Grommet
22	5570373A01	Mechanism
23	7502914Y14	Pad, Housing
24	3286888P01	Gasket, Ground Front
25	7586924P01	V80, Sound Bumper

Accessories

Table 7. Accessories

Part Description	Part Number
Mid-Rate travel charger	SPN4992
Adapter, travel charger, Euro plug	SPN4993
Adapter, travel charger, UK plug	SPN4994
Adapter, travel charger, Brazilian plug	SPN4741
Adapter, travel charger, Argentinian plug	SPN4739
Adapter, travel charger, Korean plug	SPN4774
Adapter, travel charger, Hong Kong plug	SPN4756
Vehicle power adapter	SYN7818
Headset, Bluetooth (HS820)	SYN9951
Headset, FM stereo radio	SYN8609
Headset, dual, retractable	SYN8284
Headset, single, retractable	SYN9050
Headset, send / end button	SYN8419
Headset, over the ear	SYN8908
Headset, silver	AAYN4264
Neckloop, hands-free (compatible with T-coil hearing aids)	SYN7875
Speaker, hands-free clip-on	SYN8610
Desktop station, hands-free	SYN8596
Data kit, USB	S8951
Data kit, serial multi-connect	S8952
Data kit, serial multi-connect for Palm™ III/V	S8953
Data cable, USB	SKN6311
Data cable, serial	SKN6315
Data cable, serial for Palm™ III	SKN6320
Belt clip, black	SYN8631

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