

Chapter 7 Bluetooth

Introduction

Bluetooth-equipped devices can communicate without wires, using frequency-hopping spread spectrum (FHSS) radio frequency (RF) to transmit and receive data in the 2.4 GHz Industry Scientific and Medical (ISM) band (802.15.1). Bluetooth wireless technology is specifically designed for short-range (10 meters (30 feet)) communication and low power consumption.

ES400s with Bluetooth capabilities can exchange information (e.g., files, appointments, and tasks) with other Bluetooth enabled devices such as printers, access points, and other Enterprise Smart Phones. To use the ES400 as a modem, create a dial-up modem connection between a computer and ES400.

Adaptive Frequency Hopping

Adaptive Frequency Hopping (AFH) is a method of avoiding fixed frequency interferers, and can be used with Bluetooth voice. All devices in the piconet (Bluetooth network) must be AFH-capable in order for AFH to work. There is no AFH when connecting and discovering devices. Avoid making Bluetooth connections and discoveries during critical 802.11b communications. AFH for Bluetooth consists of four main sections:

- Channel Classification - A method of detecting an interference on a channel-by-channel basis, or pre-defined channel mask.
- Link Management - Coordinates and distributes the AFH information to the rest of the Bluetooth network.
- Hop Sequence Modification - Avoids interference by selectively reducing the number of hopping channels.
- Channel Maintenance - A method for periodically re-evaluating the channels.

When AFH is enabled, the Bluetooth radio “hops around” (instead of through) the 802.11b high-rate channels. AFH coexistence allows Motorola Enterprise Smart Phones to operate in any infrastructure.

The Bluetooth radio in this ES400 operates as a Class 2 device power class. The maximum output power is 2.5 mW and the expected range is 10 meters (32.8 feet). A definition of ranges based on power class is difficult to obtain due to power and device differences, and whether one measures open space or closed office space.



NOTE It is not recommended to perform Bluetooth wireless technology inquiry when high rate 802.11b operation is required.

Security

The current Bluetooth specification defines security at the link level. Application-level security is not specified. This allows application developers to define security mechanisms tailored to their specific need. Link-level security occurs between devices, not users, while application-level security can be implemented on a per-user basis. The Bluetooth specification defines security algorithms and procedures needed to authenticate devices, and if needed, encrypt the data flowing on the link between the devices. Device authentication is a mandatory feature of Bluetooth while link encryption is optional.

Pairing of Bluetooth devices is accomplished by creating an initialization key that is used to authenticate the devices and create a link key for them. Entering a common PIN number in the devices being paired generates the initialization key. The PIN number is never sent over the air. By default, the Bluetooth stack responds with no key when a key is requested (it is up to user to respond to the key request event). Authentication of Bluetooth devices is based-upon a challenge-response transaction. Bluetooth allows for a PIN number or passkey that is used to create other 128-bit keys used for security and encryption. The encryption key is derived from the link key used to authenticate the pairing devices. Also worthy of note is the limited range and fast frequency hopping of the Bluetooth radios that makes long-distance eavesdropping difficult.

Recommendations are:

- Perform pairing in a secure environment
- Keep PIN codes private and don't store the PIN codes in the ES400
- Implement application-level security.

The Microsoft stack supports Smart-pairing. For detailed information, refer to the Microsoft MSDN.

Bluetooth Configuration

The following services are supported:

- OBEX Object Push Services
- Hands-Free Audio Gateway Services
- Serial Port Services
- Personal Area Networking Services
- PBAP Services
- Dial-Up Networking Services
- HID Client Services
- A2DP/AVRCP Services
- File Transfer profile
- General Audio/Video Distribution Profile
- SIM Access Profile
- Headset Profile
- Generic Object Exchange Profile
- Service Discovery Access profile
- Generic Access Profile.

The following COM ports available:

- COM5
- COM9.

Bluetooth Power States

Cold Boot

Performing a cold boot retain the state of the Bluetooth radio prior to the cold boot.

Warm Boot

Performing a warm boot retain the state of the Bluetooth radio prior to the warm boot.

Suspend

When there is an active Bluetooth connection, the Bluetooth radio goes into low power mode maintaining the active connection. When there is no active connection, the Bluetooth radio turns off.



NOTE If there is an active Bluetooth connection between the ES400 and another Bluetooth device and there is no data activity, the ES400 will timeout. However, if the user presses the Power button on the ES400, the ES400 will suspend (except when on a call) and upon receiving data from a remote Bluetooth device, the ES400 will wake from suspend mode. For example, headset redial or Bluetooth scanner sending data to the ES400.

Resume

When the ES400 resumes, Bluetooth turns on if it was on prior to suspend.

Turning Bluetooth On and Off

Turn off the Bluetooth radio to save power or if entering an area with radio restrictions (e.g., an airplane). When the radio is off, other Bluetooth devices cannot see or connect to the ES400. Turn on the Bluetooth radio to exchange information with other Bluetooth devices (within range). Communicate only with Bluetooth radios in close proximity.



NOTE To achieve the best battery life turn off radios not in use.

Enabling Bluetooth

To enable Bluetooth:

1. Tap **Wireless Manager** and then tap the **Bluetooth** bar or
Tap **Start > Setting > Bluetooth** icon > **Mode** tab.

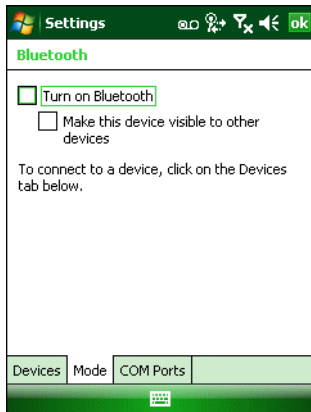


Figure 7-1 Bluetooth Mode Tab

2. Check the **Turn On Bluetooth** checkbox.
3. Tap **OK**.

Disabling Bluetooth

To disable Bluetooth:

1. Tap **Wireless Manager** and then tap the **Bluetooth** bar or
Tap **Start > Setting > Bluetooth** icon > **Mode** tab.

- 2. Un-check the **Turn On Bluetooth** checkbox.
- 3. Tap **OK**.

Discovering Bluetooth Device(s)

The ES400 can receive information from discovered devices without bonding. However, once bonded, the ES400 and a bonded device exchange information automatically when you turn the Bluetooth radio on. See [Bonding with Discovered Device\(s\) on page 7-34](#) for more information.

To find Bluetooth devices in the area:

- 1. Ensure that Bluetooth is enabled on both devices.
- 2. Ensure that the Bluetooth device to discover is in discoverable and connectable modes.
- 3. Ensure that the two devices are within 30 feet (10 meters) of one another.
- 4. Tap **Start > Settings > Bluetooth icon > Devices** tab.



Figure 7-2 Bluetooth - Devices Tab

- 5. Tap **Add new device**. The ES400 begins searching for discoverable Bluetooth devices in the area.
- 6. Select a device from the list.



Figure 7-3 Select a Bluetooth Device

- 7. Tap **Next**. The **Enter Passcode** window appears.



NOTE If Smart-pairing is configured and the device is requesting one of the pre-defined PINs, the **Enter Passcode** window does not appear.

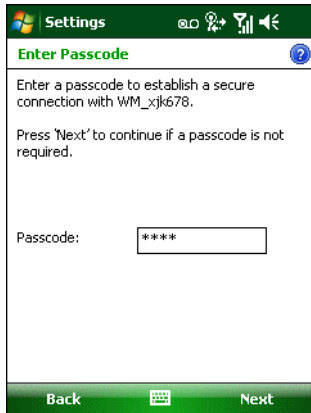


Figure 7-4 *Enter Passcode*

8. Enter the Passcode on the other device. The device is added to the Bluetooth list.



Figure 7-5 *Bluetooth Connection Confirmation*

You are prompted to enter a passcode. If the device has a specific passcode, enter it in the Passcode field and tap **Next**. If the device does not have a specific passcode, enter a passcode in the Passcode field and tap **Next**. The Bluetooth radio tries to connect with the device.

9. If you created a passcode, you will be prompted by the other device to enter the same passcode. Enter the created passcode to establish a paired connection. (If you entered a passcode from the device, you shouldn't have to do anything on the other device.)
10. When the connection is complete, a list of matching and supported services on the device appears.
11. Select the services you want to use and tap Finish. The services on the new devices have to be selected or else the pairing won't include those services, even though the devices are paired. If services are not selected, you will be continually reprompted for the passcode from the device.
12. The device appears in the list on the main window.

After the passcodes have been accepted on both sides, you have a trusted ("paired") connection.

Available Services

✓ **NOTE** Some devices might not require a PIN. This depends upon the device's authentication.

The ES400 with Microsoft Bluetooth stack offers the following services:

- OBEX Object Push Services via Beam
- Hands-Free Audio Gateway Services
- Serial Port Services
- Personal Area Networking Services
- PBAP Services
- Dial-up Networking
- HID Client
- A2DP/AVRCP.

See the following sections for information on these services.

Object Push Services via Beam

✓ **NOTE** You can only send files to a remote device using the Beam function.

Use the OBEX Push Service to send files and contacts to another Bluetooth device. To transfer files between the ES400 and another Bluetooth enabled device:

1. Ensure that Bluetooth is enabled and discoverable on both devices.
2. Ensure that the two devices are within 30 feet (10 meters) of one another.
3. Tap **Start > File Explorer**.
4. Navigate to the file to transfer.
5. Tap and hold on the filename until the pop-up menu appears.

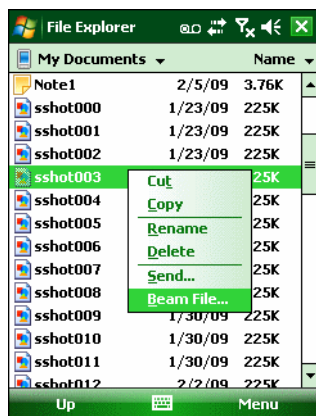


Figure 7-6 File Explorer Window

6. Select **Beam File**. The ES400 searches for Bluetooth devices in the area.
7. Tap **Tap to send** next to the Bluetooth device to send the file to. The ES400 communicates with the device and send the file. When completed, **Tap to send** changes to **Done**.

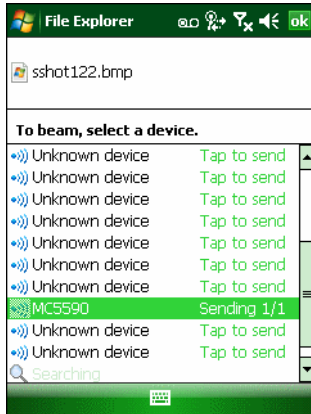


Figure 7-7 Beam File Window

To transfer a contact between the ES400 and another Bluetooth enabled device:

1. Ensure that Bluetooth is enabled and discoverable on both devices.
2. Ensure that the two devices are within 30 feet (10 meters) of one another.
3. Tap **Start > Contacts**
4. Navigate to the contact to transfer.
5. Tap and hold on the contact until the pop-up menu appears.

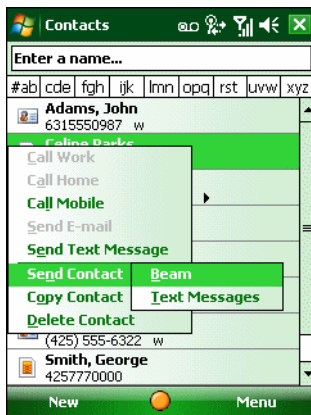


Figure 7-8 Contact Window

6. Select **Send Contact > Beam**. The ES400 searches for Bluetooth devices in the area.
7. Tap **Tap to send** next to the Bluetooth device to send the file to. The ES400 communicates with the device and send the contact. When completed, **Tap to send** changes to **Done**.

Internet Sharing

Internet Sharing allows the user to connect a computer or laptop to the ES400 and use the ES400 as a modem to connect to an office network or ISP.

To use ES400 as a modem using Bluetooth:

1. Ensure that the device is not connected to the computer or laptop.
2. On the ES400, ensure that the Phone is on and a data connection is configured.
3. Tap **Start > Internet Sharing**.
4. In the **PC Connection** list, select **Bluetooth PAN**.
5. In the **Network Connection** list, select the connection type.
Select the network connection that the device should use to connect to the Internet.
6. Tap **Connect**.
7. On the computer or laptop, setup a Bluetooth PAN with your device.
 - a. Select **Start > Control Panel > Network Connections**.
 - b. Under **Personal Area Network**, select **Bluetooth Network Connection**.
 - c. Right-click on **Bluetooth Network Connection** and select **View Bluetooth** network devices.
 - d. In the **Bluetooth Personal Area Network Devices** window select your device.
 - e. Click **Connect**. The computer connects to the device via Bluetooth.

✓ **NOTE** If your computer is Bluetooth-enabled and you select Bluetooth as the PC connection, you must initiate and complete the Bluetooth PAN partnership before Internet Sharing will work. For more information, refer to Windows Help and Support.

8. To verify, on the PC or laptop, launch **Internet Explorer** and open a web site.
9. To end dial-up networking, on the ES400 tap **Disconnect**.

Hands-free Services

To connect to a Bluetooth headset:

✓ **NOTE** Newer Bluetooth headsets are device dependant and remember the last device they connected to. If problems occur while connecting to the headset, place the headset in discovery mode. Refer to the headset user manual for more information.

Only WAN audio is routed to the headset. System audio is still emitted through the ES400 speaker.

You can accept calls and re-dial using the Hands-free profile.

Hands-free profile does not support 3-way calling.

1. Ensure that Bluetooth is enabled and discoverable on both devices.
2. Ensure that the two devices are within 30 feet (10 meters) of one another.
3. Tap **Start > Settings > Bluetooth** icon.

4. Tap New device. The ES400 searches for Bluetooth devices in the area.
5. Select the headset name and tap **Next**. The Passcode window appears.
6. Enter the headset's passcode.
7. Tap **Next**. The ES400 connects to the headset. Refer to the headset user manual for instructions on communicating with a Bluetooth device.

✓ **NOTE** During an active connection, the ES400 cannot go into suspend mode when the Power Button is pressed. A message appears notifying the user.

Once the WAN call is disconnected (with Hands-free profile) the Power button is enabled.

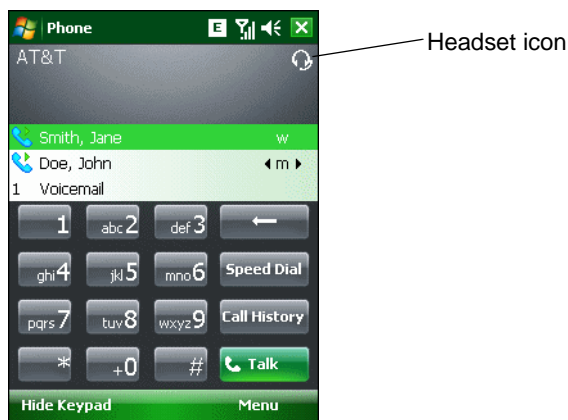


Figure 7-9 WWAN Bluetooth Audio Notification Dialog Box

Serial Port Services

Use the wireless Bluetooth serial port connection as you would a physical serial cable connection. Configure the application that will use the connection to the correct serial port.

To establish a serial port connection:

1. Ensure that Bluetooth is enabled and discoverable on both devices.
2. Ensure that the two devices are within 30 feet (10 meters) of one another.
3. Tap **Start > Settings > Bluetooth** icon > **Devices** tab.
4. Tap **Add new device**. The ES400 begins searching for discoverable Bluetooth devices in the area.
5. Select a device from the list.
6. Tap **Next**. The **Enter Passcode** window appears.

✓ **NOTE** If Smart-pairing is configured and the device is requesting one of the pre-defined PINs, the **Enter Passcode** window does not appear.

7. Enter the Passcode and tap **Next**. The device is added to the Bluetooth list.
8. In the device list, tap the serial device. The **Partnership Settings** window displays.
9. Select the **Serial Port** checkbox.

10. Tap **Save**.
11. Tap **COM Ports** tab.
12. Tap **New Outgoing Port**. The add device window appears.
13. Select the serial device in the list and then tap **Next**.
14. Select a COM port from the drop-down list.
15. Tap **Finish**.

✓ **NOTE** No connection is made at this point. An application must open the selected COM port to trigger Microsoft Bluetooth stack to open the connection.

ActiveSync Using Serial Port Services

Use the wireless Bluetooth serial port connection for ActiveSync just as you would a physical serial cable connection. You must configure the application that will use the connection to the correct serial port.

To set up a Bluetooth ActiveSync connection:

Before setting up a Bluetooth ActiveSync connection, configure the Bluetooth function of your device.

✓ **NOTE** For additional security, disable network bridging on the computer (specifically, bridging to a Remote NDIS adapter) before connecting to the computer to pass through to the Internet or a network. For more information on network bridging, see **Windows Help** on your computer.

The instructions below are for computers that support the Windows XP SP2 or later version operating system.

1. Ensure that Bluetooth is enabled and discoverable on both devices.
2. Ensure that the two devices are within 30 feet (10 meters) of one another.
3. On the computer, click **Start > Settings > Control Panel**.
4. Double-click **Bluetooth Devices**.
5. On the **Options** tab, select the **Turn discovery on** and **Allow Bluetooth devices to connect to this computer** checkboxes.

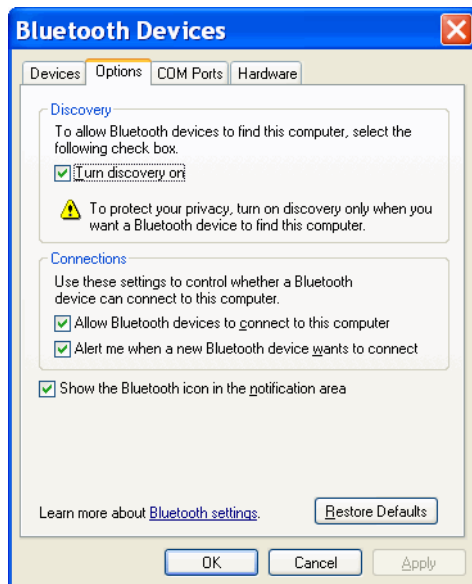


Figure 7-10 Computer Bluetooth Devices Window

6. On the **COM Ports** tab, click **Add**.
7. Select the **Incoming (device initiates the connection)** option, then click **OK**.
Note the number of the COM port that was added.
8. Click **OK**.
9. Click **Start > All Programs > Microsoft ActiveSync**.
10. Click **File > Connection Settings**.

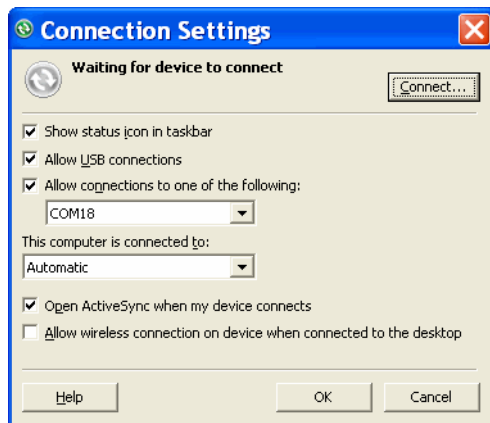


Figure 7-11 ActiveSync Connection Settings

11. On the **Allow connections to one of the following** drop-down list, select the COM port with the number you noted earlier.
12. On the ES400, tap **Start > ActiveSync**.
13. Tap **Menu > Connect via Bluetooth**.

Synchronization is automatically initiated. The **ActiveSync** icon appears on the lower right corner of the **Today** screen.

If an Authentication is required, the **Enter Passcode** screen appears, type an alphanumeric passkey (PIN code), then tap **Next**; enter the same passkey on the other device.

The passkey is recommended for enhanced security. Your passkey must be between 1 to 16 alphanumeric characters.

If you do not want to use a passkey, tap **Next**.

14. To disconnect the ActiveSync connection, tap the **ActiveSync** icon on the Today screen.
15. Tap **Disconnect**.

Phone Book Access Profile Services

Phone Book Access profile (PBAP) is used to synchronize contacts between a remote device and the ES400. To establish an PBAP synchronization:

1. Ensure that Bluetooth is enabled and discoverable on both devices.
2. Ensure that the two devices are within 30 feet (10 meters) of one another.
3. Tap **Start > Settings > Bluetooth** icon > **Devices** tab.
4. Tap **Add New Device**. The ES400 searches for a Bluetooth device, such as a car kit.
5. Select a device from the list.
6. Tap **Next**. The **Enter Passcode** window appears.

✓ **NOTE** If Smart-pairing is configured and the device is requesting one of the pre-defined PINs, the **Enter Passcode** window does not appear.

7. Enter the Passcode and the tap **Next**. The device is added to the Bluetooth list.
8. A dialog box appears requesting if you want to transfer contacts to the car kit.
9. Select **Yes** or **No**.
10. If **Yes** is selected, contacts from the ES400 are transferred to the car kit.

Dial-Up Networking Services

Dial-up networking allows the user to connect a PC or laptop to the ES400 and use the ES400 as a modem to connect to an office network or ISP.

Before setting up dial-up networking, obtain dial-up information and other necessary settings (username, password and domain name, if required) for the office network or ISP. To create a new Bluetooth connection:

1. Ensure the ES400 is discoverable and connectable.
2. On the PC or laptop, set up Bluetooth according to the manufacturer's instructions.
3. On the PC or laptop Bluetooth software, search for the ES400 and select the Dial-up Networking service.
4. Using dial-up software on the PC or laptop, connect to the ES400.
5. The ES400 phone function dials the ISP number and connects to the ISP.
6. To verify, on the PC or laptop, launch Internet Explorer and open a web site.

Connect to a HID Device

The ES400 can connect to an Human Interface Device (HID) device such as a Bluetooth keyboard or mouse:

1. Ensure that Bluetooth is enabled on both devices.
2. Ensure that the Bluetooth device to discover is in discoverable and connectable modes.
3. Ensure that the two devices are within 10 meters (32.8 feet) of one another.
4. Tap **Start > Settings > Bluetooth** icon > **Devices** tab.
5. Tap **Add new device**. The ES400 begins searching for discoverable Bluetooth devices in the area.
6. Select a HID device from the list.
7. Tap **Next**. The **Enter Passcode** window appears. Refer to the device's User Manuals for more information.

✓ **NOTE** If Smart-pairing is configured and the device is requesting one of the pre-defined PINs, the **Enter Passcode** window does not appear.

8. Tap **Connect**. The ES400 connects to the HID device.

A2DP/AVRCP Services

A2DP/AVRCP is used to connect to a high-quality stereo headset:

1. Ensure that Bluetooth is enabled on both devices.
2. Ensure that the Bluetooth device to discover is in discoverable and connectable modes.
3. Ensure that the two devices are within 10 meters (32.8 feet) of one another.
4. Tap **Start > Settings > Bluetooth** icon > **Devices** tab.
5. Tap **Add new device**. The ES400 begins searching for discoverable Bluetooth devices in the area.
6. Select a stereo headset from the list.
7. Tap **Next**. The **Enter Passcode** window appears. Refer to the device's User Manuals for more information.

✓ **NOTE** If Smart-pairing is configured and the device is requesting one of the pre-defined PINs, the **Enter Passcode** window does not appear.

8. Tap **Connect**. The ES400 connects to the stereo headset.

For stereo headsets that can use hands-free services, connect to the hands-free service after connecting to the A2DP service:

1. Tap **Start > Settings > Bluetooth** icon > **Devices** tab.
2. Tap **Add new device**. The ES400 begins searching for discoverable Bluetooth devices in the area.
3. Select a stereo headset from the list.
4. Tap **Next**. The **Enter Passcode** window appears. Refer to the device's User Manuals for more information.

✓ **NOTE** If Smart-pairing is configured and the device is requesting one of the pre-defined PINs, the **Enter Passcode** window does not appear.

5. Tap **Connect**. The ES400 connects to the stereo headset.

Chapter 8 Using GPS Navigation

Introduction

The ES400 includes Global Positioning System (GPS) technology using the SiRFstar III chipset. GPS technology is based on a worldwide system of GPS satellites orbiting the earth that continuously transmit digital radio signals. These radio signals contain data on the satellites' locations and their exact clock time and are used to determine your location on the earth.



WARNING! When using the ES400 in a vehicle, it is the user's responsibility to place, secure and use in a manner that will not cause accidents, personal injury or property damage or obstruct their view. It is the responsibility of the driver to operate the vehicle in a safe manner, maintain observation of all driving conditions at all times, and not become distracted by the device to the exclusion of safe driving practices. It is unsafe to operate the controls of the device while driving.

Software Installation

Third-party GPS navigation software is required. Evaluation software is available from various suppliers. For example; VisualGPS, visit: <http://www.visualgps.net/VisualGPSce/>

If interested in purchasing GPS navigation software check with the GPS software vendor (before purchasing, downloading, or installing any software) to determine that the application is compatible with the ES400. Refer to the application's user guide for application installation and setup information.

ES400 GPS Setup

The GPS-enabled ES400 uses Microsoft Windows Mobile 6.5, so the operating system automatically manages access to the GPS receiver to allow multiple programs to simultaneously access GPS data.

By default, the MC75A has the following settings:

1. Tap **Start > Settings > System > External GPS** icon.
2. In the **Programs** tab, the **GPS program port** is set to **None**.
3. In the **Hardware** tab, the **GPS hardware port** is set to **COM8**.

To access the GPS receiver from multiple programs simultaneously, the user can either use the Microsoft GPS API or change the GPS program port setting and access the GPS program port in the multiplexed way.

Operation

Acquiring satellite signals may take several seconds to a few minutes. It is best to be outside and have a clear, unobstructed view of the sky. Without a clear view, acquisition takes much longer and could result in the ES400 being unable to compute the initial position quickly. When operating the device indoors access to the GPS signals may be limited or unavailable.

- ✓ **NOTE** When using a GPS navigation application, ensure that the ES400 does not go into suspend mode. If the ES400 suspends then the power to the GPS radio is removed. Upon resume the GPS receiver must reacquire a valid GPS signal, resulting in a delay of positional information.

GPS Maps on microSD Cards

GPS navigation software vendors may sell maps on microSD cards. If using a microSD card with the GPS navigation software install the microSD memory card using procedure in [Installing a microSD Card on page 1-2](#).

Answering a Phone Call While Using GPS

If you receive a phone call while using your GPS navigation software:

1. Answer the phone call by pressing the **Answer** button.
2. Once you end the phone call, press the **End Call** button to resume the audio on the GPS software.

- ✓ **NOTE** Anytime you are using GPS on the ES400 and you receive a phone call, the audio on the GPS navigation software is muted until you finish the call.

Losing the GPS Signal While in a Vehicle

GPS performance on the ES400 may be affected if the vehicle has thermal glass windows and windshields, which can block the ES400 from receiving a GPS signal from satellites. To improve GPS signal strength, place the ES400 where there is a clear view of the sky. A direct line of sight is required between the ES400 and the GPS satellites to access information from the satellites.

The Global Positioning System (GPS) is a system that allows the user to track their position anywhere on the earth.

Assisted GPS

GPS can be used in stand-alone or Assisted GPS (A-GPS) modes. A Stand-alone GPS receiver downloads data from GPS satellites. In certain environments, it can take several minutes to get a fix. By using GPS Location servers, A-GPS dramatically reduces the TTFF (Time To First Fix) and improves the sensitivity of GPS receivers by providing them with data that they would ordinarily have to download from the GPS satellites. With the A-GPS data, GPS receivers can operate faster and more reliably.

A-GPS follows the Secure User Plane Location (SUPL) protocol which allows a mobile device to communicate with a SUPL server. Refer to the EMDK Help file for information on setting up SUPL on the ES400.

Chapter 9 Settings

Introduction

Personalizing Your ES400

Time and Date

Regional Settings

Locking the ES400

You can lock the ES400 by disabling key presses and screen tap or by requiring a password or finger swipe.

There are two types of locking features available; the standard Microsoft lock and the Motorola lock.

To select either the Microsoft lock or the Motorola lock:

1. Tap **Start > System > Lock Switch**.
2. Tap the **Select Lock** soft key.
3. Select either **Moto lock** or **Microsoft lock**.
4. Tap **OK**.

Microsoft Locking

Locking the ES400 turns off keyboard and touch screen functionality. This is helpful when the ES400 is turned on and you want to prevent accidental key presses.

To lock the device, tap **Start > Lock**.



Figure 9-1 *Device Locked/Unlocked Icons*

To unlock the device and free it for use, tap **Unlock**.

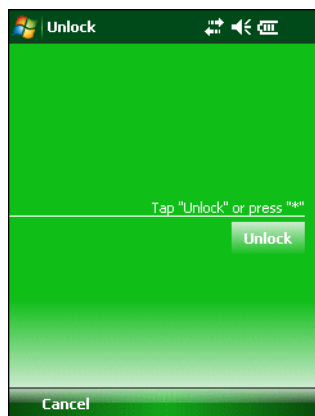


Figure 9-2 *Unlock Device Window*

Tap **Unlock** on the **Unlock** window.

✓ **NOTE** You can make emergency calls even when the ES400 is locked. See XXXXXXXX for more information.

Password Locking

Use the **Password** window to set a password to disable unauthorized access to the ES400.

✓ **NOTE** If the device is configured to connect to a network, use a strong (difficult to figure out) password to help protect network security. Password cracking tools continue to improve and the computers used to crack passwords are more powerful than ever.

1. Tap **Start > Settings > Personal tab > Lock icon > Password tab**.



Figure 9-3 Password Window - Password Tab

2. Select **Prompt if device unused for** check box to enable password protection.
3. From the drop-down list, select a time value for the protection to take affect after non-use.
4. From the **Password type:** drop-down list, select either **Simple PIN** or **Strong alphanumeric**.
5. For a simple password, enter a four-digit password in the **Password** field.
For a stronger password:
 - a. Enter a seven character password in the **Password:** field. A strong password must contain at least seven characters and contain at least three of the following: uppercase and lowercase letters, numerals, and punctuation.
 - b. Re-enter the password in the **Confirm:** field.
6. Tap **OK**.
7. To set a hint to remember the password, tap the **Hint** tab.



Figure 9-4 Password Window - Hint Tab

8. In the text box, enter a hint for a password reminder.
9. Tap **OK**.

When the ES400 is not used for a period of time and the user tries to access the device, the Lock window appears.



Figure 9-5 *Lock Window*

1. Slide the Lock button to the left or right.
2. Enter the password to un-lock the device.



Figure 9-6 *Enter Password Window*

3. Tap the **Unlock** icon.

Motorola Locking

With the Motorola Lock you can use a password or fingerprint swipe to un-lock the device.

Tap **Start** > **Lock**.



Figure 9-7 Motorola Lock Settings Window

Password Locking

1. Tap **Password type** to toggle between Simple and Strong.
2. For a simple password:
 - a. enter a four-digit password in the **Password** field.
 - b. Re-enter the password in the **Confirm:** field.
 For a stronger password:
 - c. Enter a seven character password in the **Password:** field. A strong password must contain at least seven characters and contain at least three of the following: uppercase and lowercase letters, numerals, and punctuation.
 - d. Re-enter the password in the **Confirm:** field.
3. To set a hint to remember the password, tap the **Hint** button.

Figure 9-8 Password Window - Hint Tab

4. In the text box, enter a hint for a password reminder.
5. Tap **OK**.

Finger Swipe Locking

To enable device un-locking using a fingerprint swipe:

1. Tap **Add fingerprint**.



Figure 9-9 Add Fingerprint Window

2. Select a finger and slide the fingerprint across the fingerprint reader in a downward motion starting at the bottom of the fingerprint.
3. When the fingerprint is read successfully, a green checkmark appears in the first box.
4. Repeat swiping your fingerprint three more times.
5. If a red X appears in the box, re-swipe your fingerprint.

You can add up to 10 fingerprints.

Editing Fingerprint Swipes

After enrolling fingerprints you change edit the enrolled fingerprint.

1. Select the fingerprint to edit.
2. In the text box, change the name associated with this fingerprint.
3. Tap **Change fingerprint** to edit the fingerprint data.
4. Swipe a new fingerprint.
5. Tap **Program launched** to select a program to automatically launch when you swipe a particular fingerprint.
6. To remove a fingerprint, tap **Remove fingerprint**.
7. Tap **Yes** to confirm deleting the fingerprint.

Edit Lock Screen

When the device suspends and you try to resume, the Motorola Lock screen appears.

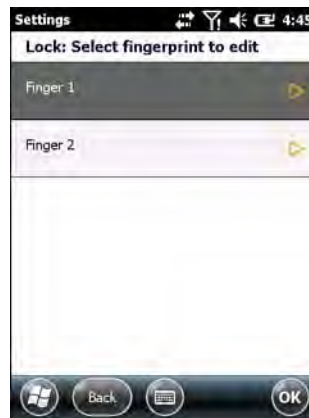


Figure 9-10 *Motorola Lock Screen*

You can change what information appears on the screen.

Tap **Edit Lock Screen**.

Figure 9-11 *Edit Lock Screen Window*

Select the item to display on the Lock screen. A yellow target appears when the item is enabled.

Tap **OK** when done.

Audio Feedback

To enable an audio sound to be heard upon a successful finger swipe:

Tap **Audio feedback**.

To change the fingerprint tap the

Sound Settings

Ringer

Enabling Sounds

Vibrate

Backlight and Keylight Settings

The Display brightness automatic/manual setting shall provide the ability to automatically detect the brightness in a specific environment.

Tap **Start > Settings > System > Backlight & Keylight** icon.

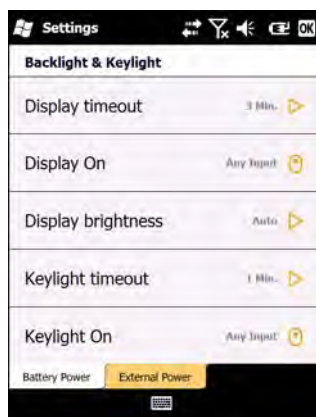


Figure 9-12 Backlight & Keylight - Battery Power Window

Battery Power Tab

Use the **Battery Power** tab to set the backlight and keylight settings when the ES400 is on battery power.

Display Time-out

Sets the time of inactivity before the screen backlight turns off. select between 10 sec., 30 sec., 1 Min. (default), 3 min. and Off.

Display On

Set the display to turn on upon a key or screen touch. Toggle between Touch only and Any input (default).

Display Brightness

Sets the brightness of the display.

Keylight Time-out

Sets the time of inactivity before the screen keylight turns off. Select between 10 Sec., 30 Sec., 1 Min., 3 Min., Off, Follow display (Default).

Keylight On

Set the keylight to turn on upon a key or screen touch. Select between Keylight on: Toggle- Touch Only, Any Input (Default). Keylight on is disabled if Keylight time-out is Off. "Touch only" shall be any action/touch of the touch screen; "Any input" shall be either touching the screen, or pressing any key (keypad or side keys).

External Power Tab

Use the **External Power** tab to set the backlight and keylight settings when the ES400 is on external power.

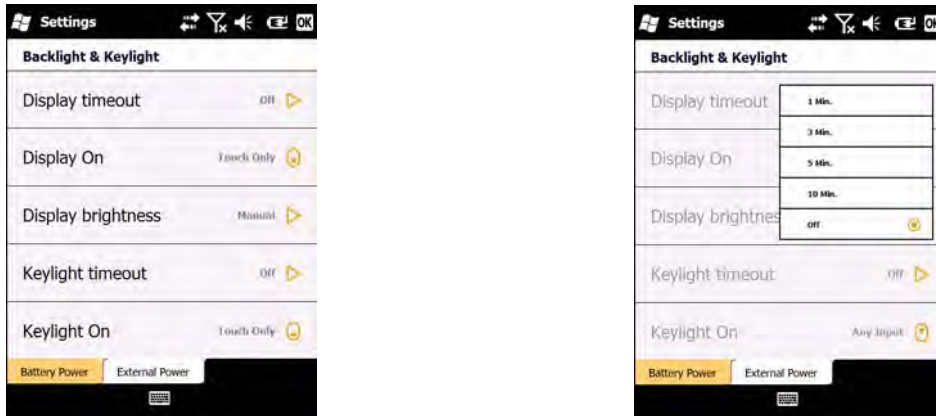


Figure 9-13 Backlight & Keylight - External Power Window

Display Time-out

Sets the time of inactivity before the screen backlight turns off. 1 Min., 3 Min., 5 Min., 10 Min., None (Default).

Display On

Set the display to turn on upon a key or screen touch.

Display Brightness

Sets the brightness of the display.

Keylight Time-out

Sets the time of inactivity before the screen keylight turns off. 1 Min., 3 Min., 5 Min., 10 Min., None, Follow Display (Default).

Keylight On

Set the keylight to turn on upon a key or screen touch. Touch Input or Any Input (default)

Brightness

Location Settings

ES400 Setup Options

End Running programs

Shortcuts

Auto Answer Mode

Setting Smart Dialing

Accelerometer

Provides the ability to customize the accelerometer behaviors when in a call or using the display. The Accelerometer application provides the ability to track the events and to show a shortcut in the Windows Mobile Classic home screen.

The Accelerometer takes the existing IST application and provides finger friendly assistance and simplicity.

The Accelerometer has the following value adds:

The user shall have the ability to set behaviors when the device is in motion, has a certain orientation of if the device is face down.

Display Tab

The user shall have the ability to conserve battery life when using accelerometer behaviors and to set the device to automatic operations.

Start > Settings > System > Accelerometer icon.

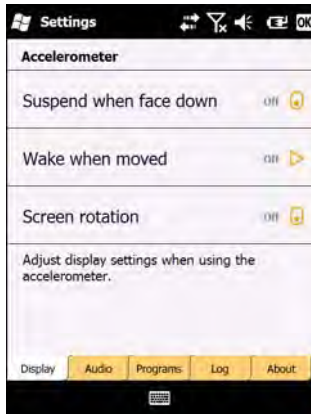


Figure 9-14 Accelerometer - Display Window

Suspend when face down

Places the ES400 in suspend mode when it is placed face down.

Wake when moved

Wakes the ES400 from suspend mode when the device is moved.

Screen Rotation

Enable or disable screen rotation.

The screen can be rotated between portrait and landscape modes automatically, depending on the physical orientation of the ES400. For example, if the ES400 is rotated 90° counterclockwise, the display rotates counterclockwise 90° so that the screen display appears correct.

Audio Tab

The user shall have the ability to set the ringer when the device is face down, set speaker and hold settings when the user is in a phone call.

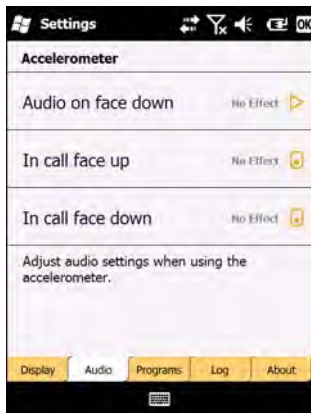


Figure 9-15 Accelerometer - Audio Window

Audio on face down

Select between Silent, Vibrate or No change (default)

In call face up

Toggle between Speaker on and no effect (default)

In call face down

Toggle between Call Hold or No Effect (default)**Programs Tab**

The user shall have the ability to set the device navigational motions.



Figure 9-16 Accelerometer - Programs Window

Navigation

Select between Page Scroll, List Scroll, Program Switch or Off (default)

Log Tab

The user shall have the ability to view the fall counts of the device.

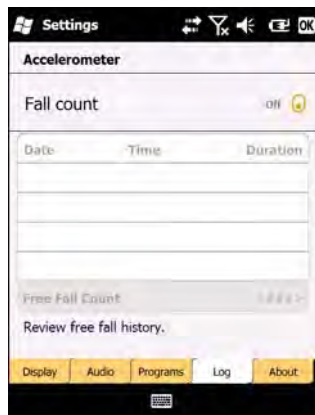


Figure 9-17 Accelerometer - Log Window

Fall Count - Toggle between On and Off (default)

About Tab

The user shall have the ability to view accelerometer information.



Figure 9-18 Accelerometer - About Window

Icon shortcut - Toggle between On and Off (default)

Sensor - Lists the sensor type.

Firmware version - Lists the firmware version.

Driver version - Lists the driver version.

Sensor ID - Lists the sensor ID number.

Status - Displays the status of the accelerometer.

Optical Mouse Settings

Lock Switch

LAN

Master Reset

The Master reset/clear application allows the user to restore the device back to default settings and remove personal information off of the device.

Touch Vibration

Settings Folder

[Table 9-1](#) lists applications pre-installed on the ES400. Tap **Start > Settings** to open the **Settings**.

Table 9-1 *Setting Applications*









Icon	Name	Description
	Bluetooth	Turn on Bluetooth, set the ES400 to visible mode and scan for other Bluetooth devices in the area.
	Lock	Set a password for the ES400.
	Clock & Alarms	Set the device clock to the date and time of your locale or to a visiting time zone when you're traveling. Alarms can also be set at specified days and times of a week.
	Power	Check battery power and set the time-out for turning off the display to conserve battery power.
	Today	Customize the appearance of the Today screen and the information to display on it.
	Sounds & Notifications	Enable sounds for events, notifications, and more, and set the type of notification for different events.
	Connections Folder	Contains connection applications.
	System Folder	Contains system applications.

Table 9-1 *Setting Applications (Continued)*












Icon	Name	Description
	Personal Folder	Contains personal applications.
	Microsoft My Phone	
Connections Folder		
	Beam	Set the ES400 to receive incoming IrDA beams.
	Domain Enroll	
	Connections	Set up one or more types of modem connections for your device, such as phone dial-up, GPRS, Bluetooth, and more, so that your device can connect to the Internet or a private local network.
	Phone Network Setup	
	USB to PC	Enables or disables the enhanced network connectivity.
	USB Connect	
	Wi-Fi	Setup wireless network connection and customize settings.
	WLAN Options	
	Wireless Manager	Enables or disables the ES400's wireless radios and customizes Wi-Fi, Bluetooth and Phone settings.

Table 9-1 Setting Applications (Continued)











Icon	Name	Description
Personal Folder		
	Buttons	Assign a program to a button.
	Input	Set options for each of the input methods.
	Holster	
	Nav pad	
	Phone	
	Owner Information	Enter personal information on the ES400.
System Folder		
	About	View basic information such as the Windows Mobile® version and type of processor used on the ES400.
	Backlight	Set the display backlight time-out and adjust brightness.
	Accelerometer	
	Backlight & Keylight	

Table 9-1 *Setting Applications (Continued)*












Icon	Name	Description
	Certificates	See information about certificates installed on the ES400.
	Cellular Network Options	
	Customer Feedback	Submit feedback on the Windows Mobile 6 software.
	Encryption	Allow files on a storage card to be encrypted. Encrypted files are readable only on your device.
	Device information	
	Error Reporting	Enable or disable the device's error reporting function. When this function is enabled and a program error occurs, technical data about the state of the program and your computer is logged in a text file and delivered to Microsoft's technical support if you choose to send it.
	Keylight	
	External GPS	Set the appropriate GPS communication ports, if required. You may need to do this when there are programs on your device that access GPS data or you have connected a GPS receiver to the ES400.
	Lock Switch	
	Memory	Check the device memory allocation status and memory card information and stop currently running programs.
	Managed Programs	Displays the programs that were installed on the ES400 using Mobile Device Manager.

Table 9-1 *Setting Applications (Continued)*

Icon	Name	Description
	Regional Settings	Set the regional configuration to use, including the format for displaying numbers, currency, date, and time on the ES400.
	Screen	Change the screen orientation, re-calibrate the screen, and change the screen text size.
	Remove Programs	Remove programs that you installed on the ES400.
	Task Manager	Stop running programs.

Program Shortcuts Setup

Program Window Setup

Chapter 10 Accessories

Introduction

[Table 10-1](#) lists the accessories available for the ES400 Series Enterprise Smart Phone.

Table 10-1 *ES400 Accessories*

Accessory	Part Number	Description
Cradles		
Single Slot USB Cradle		Charges the ES400 main battery. Synchronizes the ES400 with a host computer through a USB connection.
Vehicle Cradle		Installs in a vehicle and charges the ES400 main battery.
Chargers		
Auto Charge Cable		Charges one ES400 in a vehicle.
Miscellaneous		
1540 mAh Battery		Replacement battery.
3080 mAh Battery		Replacement battery.
1540 mAh Battery Kit		Replacement battery door and stylus.
3080 mAh Battery Kit		Replacement battery door and stylus.
1540 mAh Battery Kit		Replacement battery, battery door and stylus.
3080 mAh Battery Kit		Replacement battery, battery door and stylus.
1X Stylus Kit		Replacement Stylus (3-pack)
2X Stylus Kit		Replacement Stylus (3-pack)
Soft Holster		
Screen Protector Kit		

Single Slot USB Cradle

The Single Slot USB Cradle provides 5.4 VDC power for operating the ES400 and synchronizes information between the ES400 and a host computer.

Communication and Charging the ES400 Battery

To charge the ES400 battery and to communicate with a host computer:

1. Ensure that the cradle is connected to power and to a host computer.

Figure 10-1 *Cradle Setup*

The ES400's Battery Status LED indicates the status of the battery charging in the ES400. See [Table 2-6 on page 2-7](#) for charging status indications. The 1500 mAh battery fully charges in less than three hours and the 3000 mAh battery fully charges in less than six hours.

Vehicle Holder



WARNING! Some countries prohibit the mounting of any electronic device in any location on the vehicle dashboard. Be sure to check your local laws acceptable mounting areas before installing the auto mounting kit.

Installation Reminders

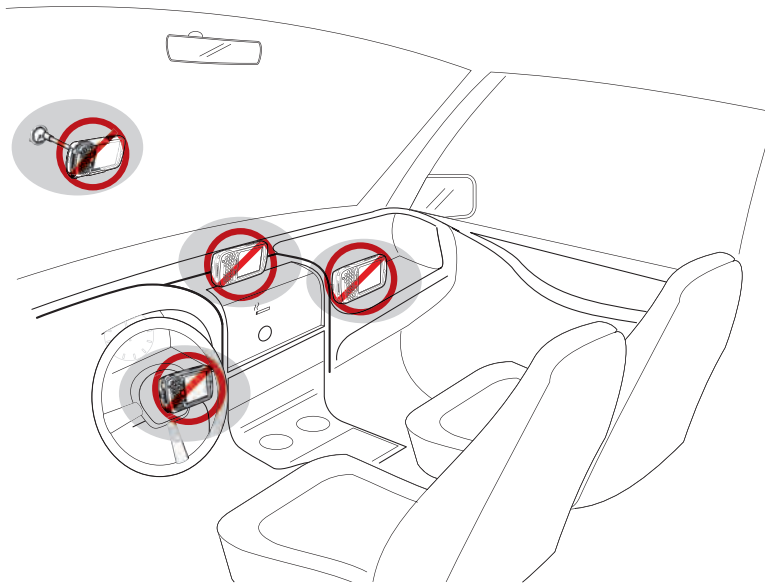


Figure 10-2 Vehicle Holder Mounting

- Do not mount the vehicle holder where it will obscure the driver's view of the road.
- Do not mount the vehicle holder near the driver seat air bag deployment area.
- Do not place the ES400 on top of the dashboard or anywhere without securing it in the vehicle holder.
- Do not mount the vehicle holder near the passenger seat air bag deployment area.
- Install the vehicle holder on the surface of your vehicle that is reasonably flat and free of dirt and oil.

Device Mounting Precautions

- Some countries prohibit the mounting of any electronic device in any location on the vehicle dashboard. Be sure to check your local laws acceptable mounting areas before installing the vehicle holder.
- The heating and cooling cycle of a vehicle's interior will in some cases loosen the adhesion of the suction cup. Check the vacuum seal of the vehicle mount kit for adequate adhesion each time you use the unit, and reinstall if necessary.
- If the vehicle holder has problems staying on, clean the plastic suction cup with alcohol, then reinstall.

Installation

Install the vehicle mount on the surface of your vehicle that is reasonably flat and free of dirt and oil. Clean the mounting surface with a glass cleaner and a clean cotton cloth. Install the vehicle mount on the windshield or other flat car surface using the supplied mounting disc.

Assembly

1. Insert the vehicle holder's cradle plate to the holes on the back of the cradle.
2. Push the cradle down until both parts are engaged.

Windshield Installation

1. Fix the suction cup mount to the selected area with the suction lever facing up.

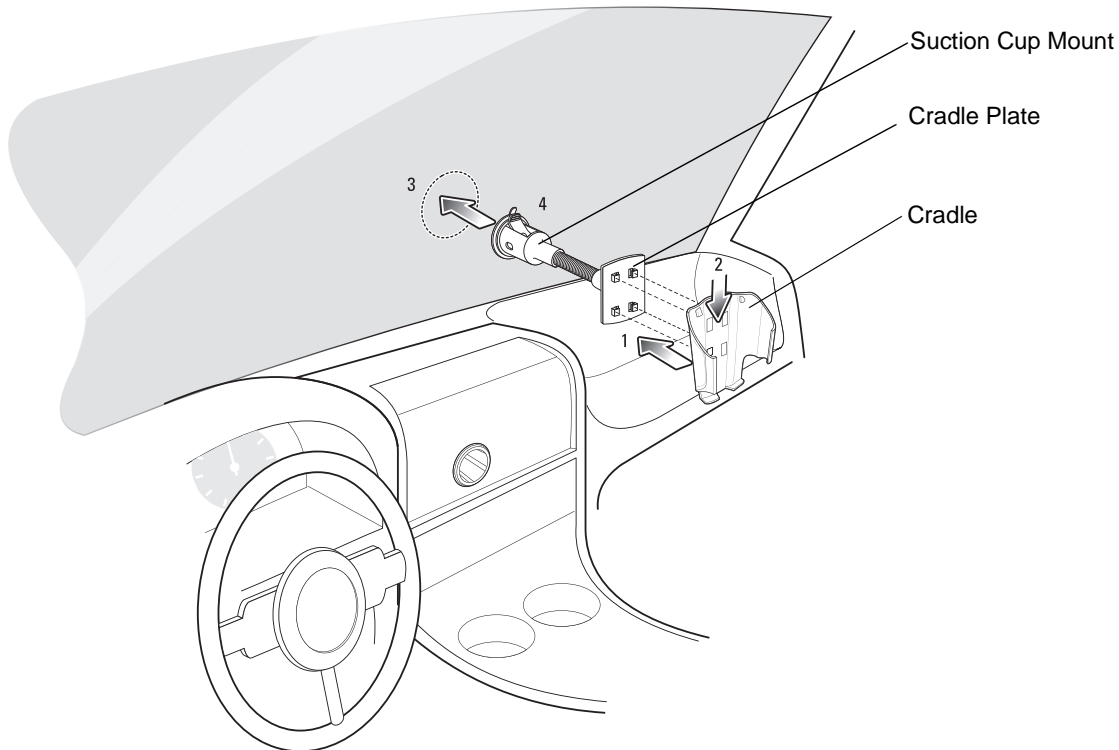


Figure 10-3 *Windshield Installation*

2. Flip the lever down to create a vacuum between the suction cup and the mounting surface.
3. Make sure that the suction bond is strong enough before proceeding to the next step.
4. Slide the ES400 into the cradle.

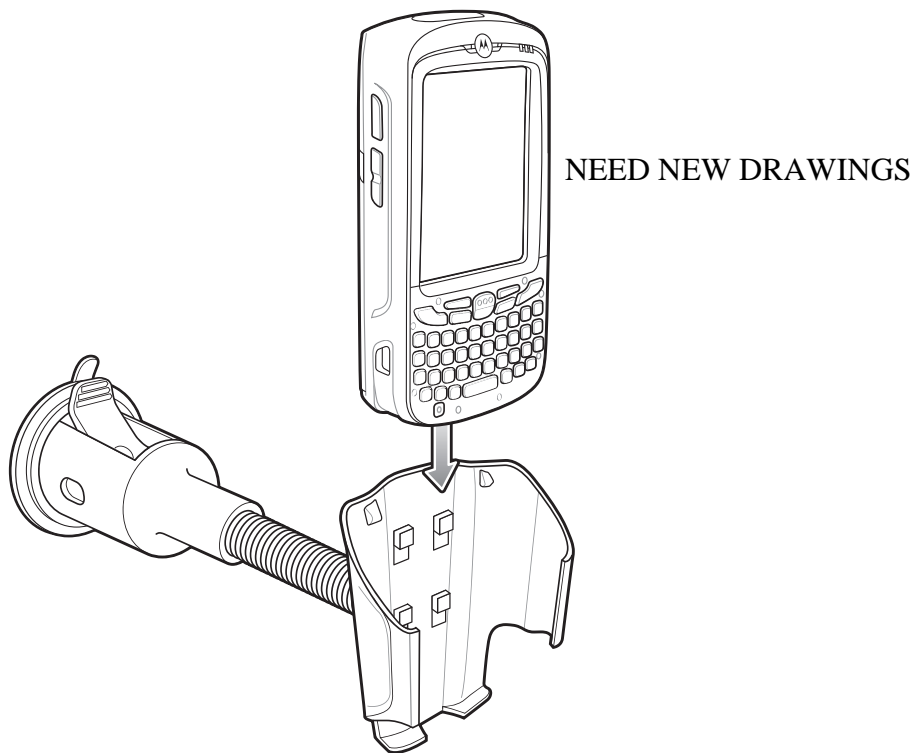


Figure 10-4 *Insert ES400 into Vehicle Holder*

5. Connect the auto charger cable to the ES400 and slide the two locking tabs up to secure the cable cup to the ES400.
6. Connect the other end to the cigarette lighter socket.
The LED indicator on the right side of the touch screen lights up orange during charging.

Cables

This section describes how to set up and use the cables. The cables are available with a variety of connection capabilities.

The following communication/charge cables are available:

- USB/Charge cable
 - Provide the ES400 with operating and charging power when used with the Motorola approved power supply.
 - Synchronize information between the ES400 and a host computer. With customized or third party software, it can also synchronize the ES400 with corporate databases.

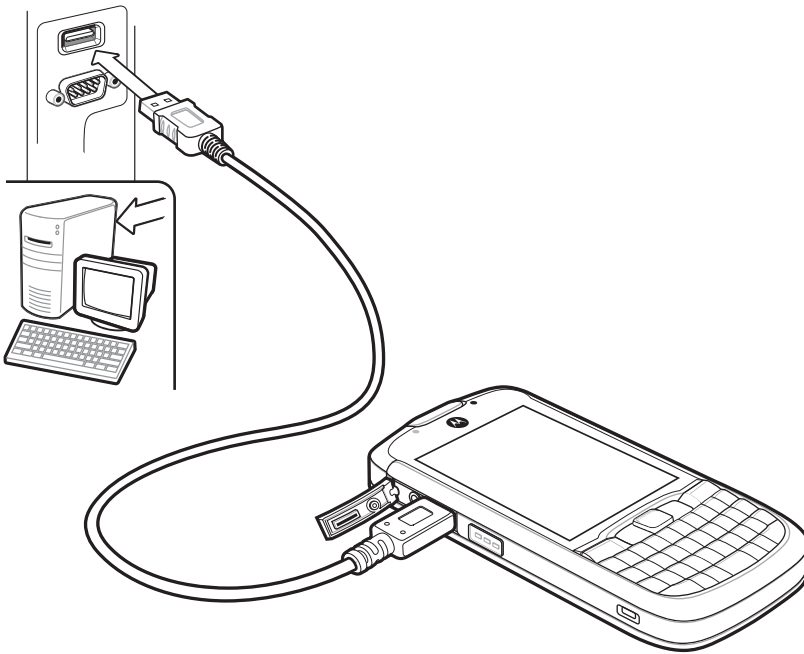


Figure 10-5 *USB/Charge Cable*

- Auto Charge cable.
 - Provides the ES400 with operating and charging power through a cigarette lighter plug.

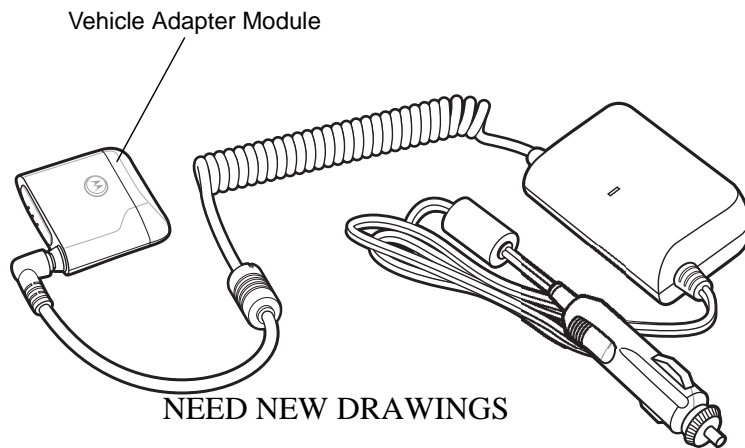


Figure 10-6 *Auto Charge Cable*

Holster

Use the holster to store the ES400 when not in use or when using a Bluetooth headset.

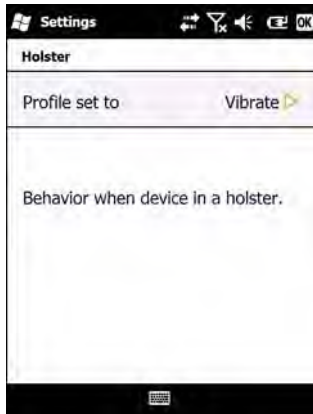
Figure 10-7 *Soft Holster*

Place the ES400 with the display toward the your body into the holster. The ES400 automatically goes into suspend mode (depending upon the holster setting application).

Use the Holster settings window to control the behavior of the ES400 when it is placed in a holster.

Tap **Start > Settings > Personal > Holster** icon.

To change the holster profile, tap **Profile set to** to open the options menu.



Select one of the following options:

- Schedule
- Vibrate - When the ES400 is placed in the holster and a call or notification occurs, the ES400 vibrates.
- Silent -
- Outdoor
- Ambient
- Normal

Tap **OK** when done.

ActiveSync

To communicate with various host devices, install Microsoft ActiveSync (version 4.5 or higher) on the host computer. Use ActiveSync to synchronize information on the mobile computer with information on the host computer. Changes made on the mobile computer or host computer appear in both places after synchronization.

- ✓ **NOTE** When a mobile computer with Windows Mobile 6.5 is connected to a host computer and an ActiveSync connection is made, the WLAN radio is disabled. This is a Microsoft security feature to prevent connection to two networks at the same time.

ActiveSync software:

- Allows working with mobile computer-compatible host applications on the host computer. ActiveSync replicates data from the mobile computer so the host application can view, enter, and modify data on the mobile computer.
- Synchronizes files between the mobile computer and host computer, converting the files to the correct format.
- Backs up the data stored on the mobile computer. Synchronization is a one-step procedure that ensures the data is always safe and up-to-date.
- Copies (rather than synchronizes) files between the mobile computer and host computer.

- Controls when synchronization occurs by selecting a synchronization mode, e.g., set to synchronize continually while the mobile computer is connected to the host computer, or set to only synchronize on command.
- Selects the types of information to synchronize and control how much data is synchronized.

Installing ActiveSync

To install ActiveSync on the host computer, download version 4.5 or higher from the Microsoft web site at <http://www.microsoft.com>. Refer to the installation procedures included with the ActiveSync software.

Mobile Computer Setup

✓ **NOTE** Microsoft recommends installing ActiveSync on the host computer before connecting the mobile computer.

The mobile computer can be set up to communicate with a USB connection. [Chapter 2, Accessories](#) provides the accessory setup and cable connection information for use with the mobile computer. The mobile computer communication settings must be set to match the communication settings used with ActiveSync.

1. On the mobile computer tap **Start > Programs > ActiveSync** icon. The **ActiveSync** window appears.

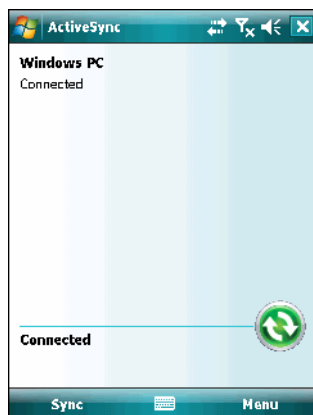


Figure 10-8 ActiveSync Window

2. Tap **Menu > Connections**.
3. Select the connection type from the drop-down list.
4. Tap **OK** to exit the **Connections** window and tap **OK** to exit the **ActiveSync** window.
5. Proceed with installing ActiveSync on the host computer and setting up a partnership.

Setting Up an ActiveSync Connection on the Host Computer

To start ActiveSync:

1. Select **Start > Programs > Microsoft ActiveSync** on the host computer. The **ActiveSync** Window displays.

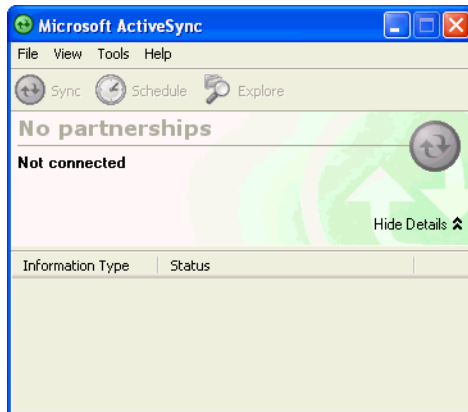


Figure 10-9 ActiveSync Window

- ✓ **NOTE** Assign each mobile computer a unique device name. Do not try to synchronize more than one mobile computer to the same name.

- In the **ActiveSync** window, select **File > Connection Settings**. The **Connection Settings** window appears.



Figure 10-10 Connection Settings Window

- Select **Allow USB connections** check box.
- Select the **Show status icon in Taskbar** check box.
- Select **OK** to save any changes made.

Synchronization with a Windows Mobile 6.5 Device

- ✓ **NOTE** When a mobile computer with Windows Mobile 6.5 is connected to a host computer and an ActiveSync connection is made, the WLAN radio (if applicable) is disabled. This is a Microsoft security feature to prevent connection to two networks at the same time.

To synchronize with a Windows Mobile 6.5 device:

- If the **Get Connected** window does not appear on the host computer, select **Start > All Programs > Microsoft ActiveSync**.

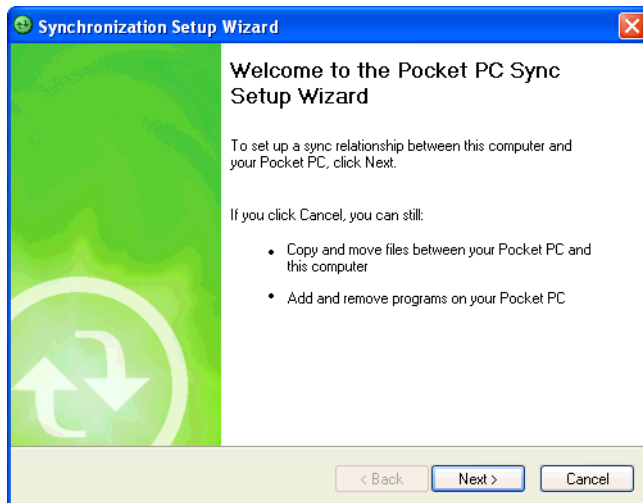


Figure 10-11 *Synchronization Setup Wizard Window*

2. Click **Next**.

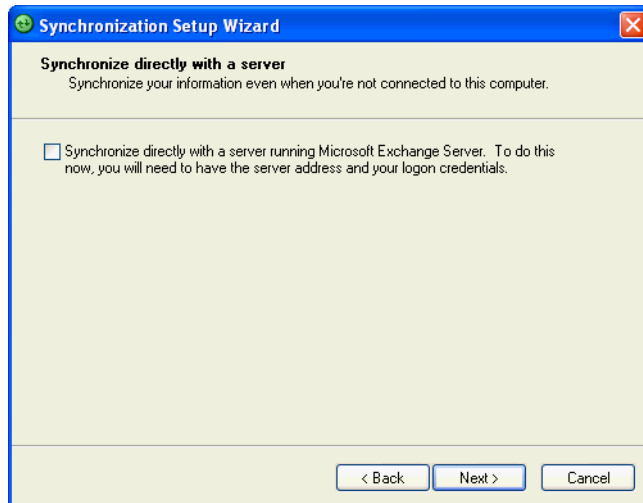


Figure 10-12 *Synchronization Directly With a Server Window*

3. Select the check box to synchronize with a server running Microsoft Exchange if applicable.

4. Click **Next**.

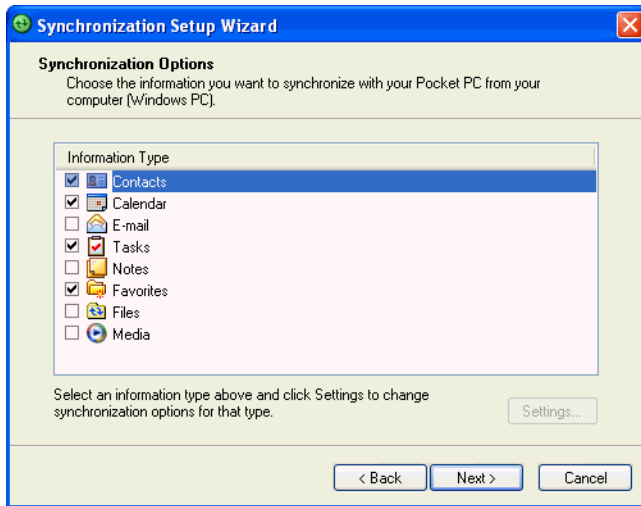


Figure 10-13 Synchronization Option Window

5. Select the appropriate settings and click **Next**.

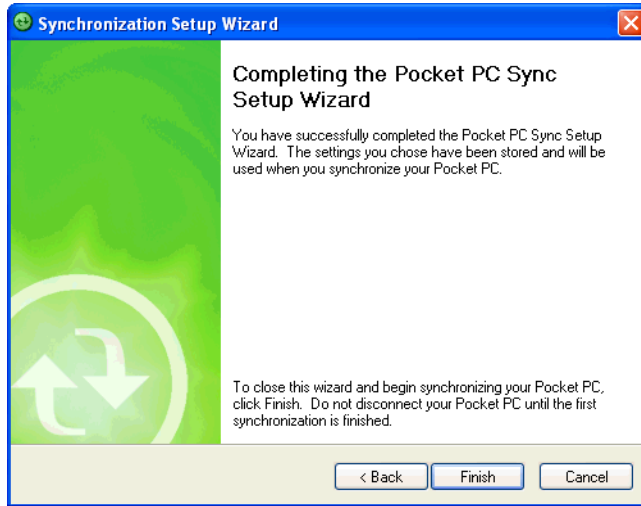


Figure 10-14 Wizard Complete Window

6. Click **Finish**.

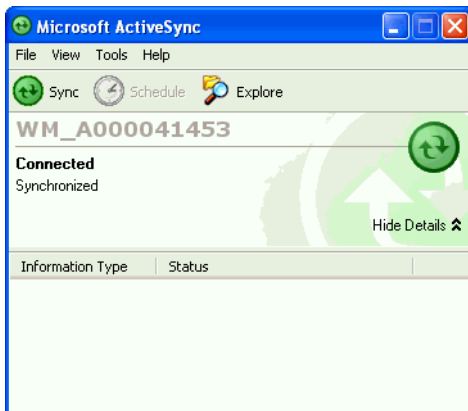


Figure 10-15 ActiveSync Connected Window

During the first synchronization, information stored on the mobile computer is copied to the host computer. When the copy is complete and all data is synchronized, the mobile computer can be disconnect from the host computer.

✓ **NOTE** The first ActiveSync operation must be performed with a local, direct connection. Windows Mobile retains partnerships information after a cold boot.

For more information about using ActiveSync, start ActiveSync on the host computer, then see ActiveSync Help.

Chapter 11 Windows Mobile Operating System

Introduction

This chapter explains the buttons, status icons, and controls on the Windows Mobile 6.5 operating system.

NOTE TAKE INFO FROM MC75A UG.

Today Screen

The Today screen displays important information, such as upcoming appointments and status indicators. Tap a section on the screen to open the associated program. Alternatively, tap **Start > Today** to display the **Today** screen.

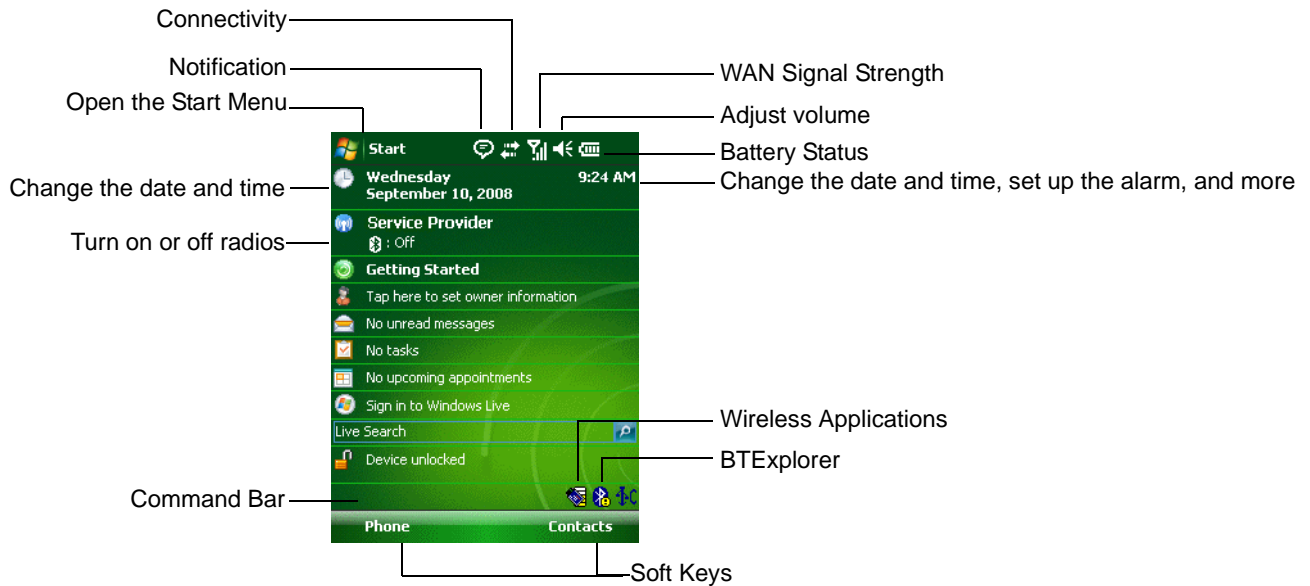


Figure 11-1 Today Screen

To customize the **Today** screen, tap **Start > Settings > Today** icon. Use the **Appearance** tab to customize the background and the **Items** tab to change the list and order of items that appear on the screen.

Status Icons

The Navigation bar at the top of the screen can contain the status icons. See XXXXX in CHapter X for a list of status icons.

The Command Bar at the bottom of the screen can contain the application icons listed in [Table 11-1](#).

Table 11-1 Command Bar Icons

Icon	Description	
	Wireless connection status	Indicates WLAN signal strength.
	Out-of-network range (not associated)	Indicates no wireless LAN network connection. Notify the network administrator.
	No wireless LAN network card detected	Indicates Wireless LAN disabled or radio disabled. Notify the network administrator.
	ActiveSync	Indicates an active serial connection between the ES400 and the host computer.
	IST icon	Opens the IST settings menu.

Programs

lists the default programs on the **Start** menu.

lists programs that are listed in the Programs window.

Settings

lists control applications pre installed on the ES400. Tap **Start > Settings** to open the **Settings** window.

Chapter 12 Maintenance & Troubleshooting

Introduction

This chapter includes instructions on cleaning and storing the ES400, and provides troubleshooting solutions for potential problems during ES400 operation.

Maintaining the ES400

For trouble-free service, observe the following tips when using the ES400:

- Do not scratch the screen of the ES400. When working with the ES400, use the supplied stylus or plastic-tipped pens intended for use with a touch-sensitive screen. Never use an actual pen or pencil or other sharp object on the surface of the ES400 screen.

Motorola recommends using a screen protector, p/n KT-122010-01R.

- The touch-sensitive screen of the ES400 is polycarbonate. Do not drop the ES400 or subject it to strong impact.
- Protect the ES400 from temperature extremes. Do not leave it on the dashboard of a car on a hot day, and keep it away from heat sources.
- Do not store the ES400 in any location that is dusty, damp or wet.
- Use a soft lens cloth to clean the ES400. If the surface of the ES400 screen becomes soiled, clean it with a soft cloth moistened with a diluted window-cleaning solution.
- Periodically replace the rechargeable battery to ensure maximum battery life and product performance. Battery life depends on individual usage patterns.
- Do not scratch the exit window. Clean the window periodically. Dust, contamination, and scratches on the exit window can cause visible blemishes in the images captured with the Imager.

- A screen protector is applied to the ES400. Motorola recommends using this to minimize wear and tear. Screen protectors enhance the usability and durability of touch screen displays. Benefits include:
 - Protection from scratches and gouges
 - Durable writing and touch surface with tactile feel
 - Abrasion and chemical resistance
 - Glare reduction
 - Keeping the device's screen looking new
 - Quick and easy installation.

Removing the Screen Protector

A screen protector is applied to the ES400. Motorola recommends using this to minimize wear and tear. Screen protectors enhance the usability and durability of touch screen displays.

To remove the screen protector, lift the corner using a thin plastic card, such as a credit card, then carefully lift it off the display.

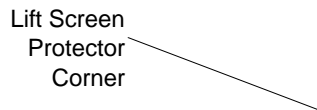


Figure 12-1 *Removing the Screen Protector*



CAUTION Do not use a sharp object to remove the protector. Doing so can damage the display.



NOTE Not using a screen protector can affect warranty coverage. To purchase replacement protectors, contact your local account manager or Motorola, Inc. These include screen protector installation instructions. Part number: KT-122010-01R Screen Protector 3/pk.

Battery Safety Guidelines

- The area in which the units are charged should be clear of debris and combustible materials or chemicals. Particular care should be taken where the device is charged in a non commercial environment.
- Follow battery usage, storage, and charging guidelines found in the user's guide.
- Improper battery use may result in a fire, explosion, or other hazard.

- To charge the mobile device battery, the battery and charger temperatures must be between +32 °F and +104 °F (0 °C and +40 °C)
- Do not use incompatible batteries and chargers. Use of an incompatible battery or charger may present a risk of fire, explosion, leakage, or other hazard. If you have any questions about the compatibility of a battery or a charger, contact Motorola Enterprise Mobility support.
- For devices that utilize a USB port as a charging source, the device shall only be connected to products that bear the USB-IF logo or have completed the USB-IF compliance program.
- To enable authentication of an approved battery, as required by IEEE1725 clause 10.2.1, all batteries will carry a Motorola hologram. Do not fit any battery without checking it has the Motorola authentication hologram.
- Do not disassemble or open, crush, bend or deform, puncture, or shred.
- Severe impact from dropping any battery-operated device on a hard surface could cause the battery to overheat.
- Do not short circuit a battery or allow metallic or conductive objects to contact the battery terminals.
- Do not modify or remanufacture, attempt to insert foreign objects into the battery, immerse or expose to water or other liquids, or expose to fire, explosion, or other hazard.
- Do not leave or store the equipment in or near areas that might get very hot, such as in a parked vehicle or near a radiator or other heat source. Do not place battery into a microwave oven or dryer.
- Battery usage by children should be supervised.
- Please follow local regulations to properly dispose of used re-chargeable batteries.
- Do not dispose of batteries in fire.
- In the event of a battery leak, do not allow the liquid to come in contact with the skin or eyes. If contact has been made, wash the affected area with large amounts of water and seek medical advice.
- If you suspect damage to your equipment or battery, contact Motorola Enterprise Mobility support to arrange for inspection.

Cleaning



CAUTION Always wear eye protection.

Read warning label on compressed air and alcohol product before using.

If you have to use any other solution for medical reasons please contact Motorola for more information.



WARNING! Avoid exposing this product to contact with hot oil or other flammable liquids. If such exposure occurs, unplug the device and clean the product immediately in accordance with these guidelines.

Materials Required

- Alcohol wipes
- Lens tissue
- Cotton tipped applicators

- Isopropyl alcohol
- Can of compressed air with a tube.

Cleaning the ES400

Housing

Using the alcohol wipes, wipe the housing including keys and in-between keys.

Display

The display can be wiped down with the alcohol wipes, but care should be taken not to allow any pooling of liquid around the edges of the display. Immediately dry the display with a soft, non-abrasive cloth to prevent streaking.

Camera Window

Wipe the camera window periodically with a lens tissue or other material suitable for cleaning optical material such as eyeglasses.

Interface Connector

1. Remove the battery from ES400. See xxxxxxxxxx.
2. Dip the cotton portion of the cotton tipped applicator in isopropyl alcohol.
3. Rub the cotton portion of the cotton tipped applicator back-and-forth across the interface connector on the back of the ES400. Do not leave any cotton residue on the connector.
4. Repeat at least three times.
5. Use the cotton tipped applicator dipped in alcohol to remove any grease and dirt near the connector area.
6. Use a dry cotton tipped applicator and repeat steps 3 through 5.
7. Spray compressed air on the connector area by pointing the tube/nozzle about ½ inch away from the surface. CAUTION: Do not point nozzle at yourself and others, ensure the nozzle or tube is away from your face.
8. Inspect the area for any grease or dirt, repeat if required.
9. Replace the battery.

Battery Contacts

1. Remove the battery from ES400. See xxxxxxxxxxxxxx.
2. Dip the cotton portion of the cotton tipped applicator in isopropyl alcohol.
3. Rub the cotton portion of the cotton tipped applicator back-and-forth across the battery contacts on the back of the battery. Do not leave any cotton residue on the contacts.
4. Repeat at least three times.
5. Use the cotton tipped applicator dipped in alcohol to remove any grease and dirt near the contact area.
6. Use a dry cotton tipped applicator and repeat steps 3 through 5.
7. Spray compressed air on the contact area by pointing the tube/nozzle about ½ inch away from the surface. CAUTION: Do not point nozzle at yourself and others, ensure the nozzle or tube is away from your face.

8. Inspect the area for any grease or dirt, repeat if required.
9. Replace the battery in the ES400.

Cleaning Cradle Connectors

To clean the connectors on a cradle:

1. Remove the DC power cable from the cradle.
2. Dip the cotton portion of the cotton tipped applicator in isopropyl alcohol.
3. Rub the cotton portion of the cotton tipped applicator along the pins of the connector(s). Slowly move the applicator back-and-forth from one side of the connector to the other. Do not let any cotton residue on the connector.
4. All sides of the connector should also be rubbed with the cotton tipped applicator.
5. Spray compressed air in the connector area by pointing the tube/nozzle about ½ inch away from the surface. CAUTION: do not point nozzle at yourself and others, ensure the nozzle or tube is pointed away from your face.
6. Ensure that there is no lint left by the cotton tipped applicator, remove lint if found.
7. If grease and other dirt can be found on other areas of the cradle, use lint free cloth and alcohol to remove.
8. Allow at least 10 to 30 minutes (depending on ambient temperature and humidity) for the alcohol to air dry before applying power to cradle.

If the temperature is low and humidity is high, longer drying time is required. Warm temperature and dry humidity requires less drying time.

Cleaning Frequency

The cleaning frequency is up to the customer's discretion due to the varied environments in which the mobile devices are used. They may be cleaned as frequently as required. However when used in dirty environments, it may be advisable to periodically clean the scanner exit window to ensure optimum scanning performance.

Troubleshooting

ES400

Table 12-1 *Troubleshooting the ES400*

Problem	Cause	Solution
ES400 does not turn on.	Battery not charged.	Charge or replace the battery in the ES400.
	Battery not installed properly.	Install the battery properly. See Installing the Battery on page 1-4 .
	System crash.	Perform a warm boot. If the ES400 still does not turn on, perform a cold boot. See Resetting the ES400 on page 2-19 .
Battery did not charge.	Battery failed.	Replace battery. If the ES400 still does not operate, perform a warm boot, then a cold boot. See Resetting the ES400 on page 2-19 .
	No power to cradle or cable.	Ensure that power is applied to the cradle or cable. The Battery Status LED flashes amber to indicate that the ES400 is charging.
	ES400 removed from cradle while battery was charging.	Hook the ES400 onto the cradle. The 4800 mAh battery fully charges in less than six hours.
	Extreme battery temperature.	Battery does not charge if ambient temperature is below 0°C (32°F) or above 40°C (104°F).
	ES400 not functioning.	Perform a warm boot. If the ES400 still does not turn on, perform a cold boot. See Resetting the ES400 on page 2-19 .
Cannot see characters on display.	ES400 not powered on.	Press the Power button.
During data communication, no data transmitted, or transmitted data was incomplete.	ES400 removed from cradle or disconnected from host computer during communication.	Replace the ES400 onto the cradle, or reattach the communication cable and re-transmit.
	Incorrect cable configuration.	See the system administrator.
	Communication software was incorrectly installed or configured.	Perform setup. Refer to the <i>ES400 Enterprise Smart Phone Integrator Guide</i> for details.
No sound.	Volume setting is low or turned off.	Adjust the volume. See Adjusting Volume on page 2-11 .

Table 12-1 Troubleshooting the ES400 (Continued)

Problem	Cause	Solution
ES400 shuts off.	ES400 is inactive.	The ES400 turns off after a period of inactivity. If the ES400 is running on battery power, set this period from 1 to 5 minutes, in one-minute intervals. If the ES400 is running on external power, set this period to 1, 2, 5, 10, 15, or 30 minutes. Check the Power window by selecting Start > Settings > System tab and tapping the Power icon. Select the Advanced tab and change the setting for a longer delay before the automatic shutoff feature activates.
	Battery is depleted.	Recharge or replace the battery.
	Battery is not inserted properly.	Insert the battery properly. See Installing the Battery on page 1-4 .
Tapping the window buttons or icons does not activate the corresponding feature.	Screen is not calibrated correctly.	Re-calibrate the screen. Tap Start > Settings > System tab > Screen icon > Align Screen button.
	The ES400 is not responding.	Warm boot the ES400. See Resetting the ES400 on page 2-19 .
A message appears stating that the ES400 memory is full.	Too many files stored on the ES400.	Delete unused memos and records. If necessary, save these records on the host computer (or use a microSD card for additional memory).
	Too many applications installed on the ES400.	Remove user-installed applications on the ES400 to recover memory. Select Start > Settings > System tab and tap the Remove Programs icon. Select the unused program and tap Remove .
The Battery Status LED flashes with the Power button is pressed and the ES400 does not turn on.	The ES400's battery is low.	Recharge the battery.
Camera application does not launch.	DataWedge application running.	Stop DataWedge application. Tap Start > Settings > System > Task Manager . Select DataWedge application and tap End Task .

Table 12-1 *Troubleshooting the ES400 (Continued)*

Problem	Cause	Solution
The ES400 does not decode with reading bar code.	Scanning application is not loaded.	Load a scanning application on the ES400. See your system administrator.
	Unreadable bar code.	Ensure the symbol is not defaced.
	Distance between exit window and bar code is incorrect.	Place the ES400 within proper scanning range.
	ES400 is not programmed for the bar code.	Program the ES400 to accept the type of bar code being scanned. Refer to the EMDK or Control Panel application.
	ES400 is not programmed to generate a beep.	If the ES400 does not beep on a good decode, set the application to generate a beep on good decode.
	Battery is low.	If the scanner stops emitting a laser beam upon a trigger press, check the battery level. When the battery is low, the scanner shuts off before the ES400 low battery condition notification. Note: If the scanner is still not reading symbols, contact the distributor or Motorola.

Bluetooth Connection

Table 12-2 *Troubleshooting Bluetooth Connection*

Problem	Cause	Solution
ES400 cannot find any Bluetooth devices nearby.	Too far from other Bluetooth devices.	Move closer to the other Bluetooth device(s), within a range of 10 meters.
	The Bluetooth device(s) nearby are not turned on.	Turn on the Bluetooth device(s) to find.
	The Bluetooth device(s) are not in discoverable mode.	Set the Bluetooth device(s) to discoverable mode. If needed, refer to the device's user documentation for help.
When trying to connect a Bluetooth phone and ES400, the phone thinks a previously paired ES400 is used.	The phone remembers the name and address of the ES400 it last paired with via the Bluetooth radio.	Manually delete the pairing device and name from the phone. Refer to the phone's user documentation for instructions.

Single Bay USB Cradle

Table 12-3 *Troubleshooting the Single Bay USB Cradle*

Symptom	Possible Cause	Action
ES400 battery is not charging.	ES400 was removed from cradle or cradle was unplugged from AC power too soon.	Ensure cradle is receiving power. Ensure ES400 is seated correctly. Confirm main battery is charging under Start > Settings > System > Power . The 1500 mAh battery fully charges in less than three hours and the 3000 mAh battery fully charges in less than six hours.
	Battery is faulty.	Verify that other batteries charge properly. If so, replace the faulty battery.
	No power to cradle.	Ensure that power is applied to the cradle. The Battery Status LED flashes amber to indicate that the ES400 is charging.
	The ES400 is not fully seated in the cradle.	Remove and re-insert the ES400 onto the cradle properly.
	Extreme battery temperature.	Battery does not charge if ambient temperature is below 0°C (32°F) or above 40°C (104°F).
	Single Slot USB Cradle is not functioning properly.	Replace the Single Slot USB Cradle.
During data communication, no data transmits, or transmitted data was incomplete.	ES400 removed from cradle during communications.	Replace ES400 in cradle and retransmit.
	Communication software is not installed or configured properly.	Perform setup as described in the <i>ES400 Enterprise Smart Phone Integrator Guide</i> .

Vehicle Holder

Table 12-4 *Troubleshooting the Vehicle Cradle*

Symptom	Possible Cause	Action
ES400 battery charging LED does not light up.	Cradle is not receiving power.	Ensure the power input cable is securely connected to the cradle's power port.

Table 12-4 *Troubleshooting the Vehicle Cradle*

Symptom	Possible Cause	Action
ES400 battery is not recharging.	ES400 was removed from the cradle too soon.	Replace the ES400 in the cradle. The 4800 mAh battery fully charges in less than six hours.
	Battery is faulty.	Replace the battery.
	No power to charger.	Ensure that power is applied to the charger. The Battery Status LED flashes amber to indicate that the battery is charging.
	ES400 is not placed correctly in the cradle.	Remove the ES400 from the cradle, and re-insert correctly. If the battery still does not charge, contact customer support. The ES400 battery charging LED slowly blinks amber when the ES400 is correctly inserted and charging.
	Ambient temperature of the cradle is too warm.	Move to an area where the ambient temperature is between 0°C and 35°C.
	Vehicle Cradle is not functioning properly.	Replace the Vehicle Cradle.

Appendix A Technical Specifications

ES400 Technical Specifications

The following tables summarize the Enterprise Smart Phone's intended operating environment and technical hardware specifications.

ES400

Table A-1 ES400 Technical Specifications

Item	Description
Physical Characteristics	
Dimensions	With 1X battery: Height: 12.85 cm (5.06 in.) Width: 6.04 cm (2.38 in.) Depth: 1.69 cm (0.67 in.) With 2X battery: Height: 12.85 cm (5.06 in.) Width: 6.04 cm (2.38 in.) Depth: 2.15 cm (0.85 in.)
Weight	With 1X battery: TBS g (TBS oz.) With 2X battery: TBS g (TBS oz.)
Display	3.0" VGA color with backlight
Touch Panel	
Backlight	LED backlight
Battery	Rechargeable Lithium Ion 3.7V, 1500 mAh or 3000 mAh Smart battery
Expansion Slot	User accessible microSD card slot. Supports up to TBS GB cards.

Table A-1 ES400 Technical Specifications (Continued)

Item	Description
Network Connections	High-speed USB client, full-speed USB host
Notification	Programmable LED, audio notifications and vibrator alerts.
Keypad Options	Alphanumeric; QWERTY, QWERTZ and AZERTY
Audio	VoWWAN; VoWLAN; TEAM Express compliant, rugged audio connector; high-quality speakerphone; headset (wired or Bluetooth) and handset and speaker phone modes.
Performance Characteristics	
CPU	Qualcomm MSM7627 600 MHz
Operating System	Microsoft® Windows Mobile™ 6.5 Professional
Memory	128 MB RAM/512MB Flash
Interface	USB 2.0 Client/USB 1.1 Host
Output Power	USB: 5 VDC @ 500 mA max.
User Environment	
Operating Temperature	-0°C to 40°C (-32°F to 104°F)
Storage Temperature	-40°C to 70°C (-40°F to 158°F)
Charging Temperature	32°F to 104°F / 0° C to 40° C
Humidity	5 - 95% non-condensing
Drop Specification	1.8 m (6 ft.) drop to concrete across the operating temperature range; meets and exceeds applicable MIL-STD-810G drop specifications.
Tumble	2000 1 m (3.2 ft.) tumbles (4,000 hits) at room temperature; meets and exceeds applicable IEC tumble specifications.
Electrostatic Discharge (ESD)	+/-15kVdc air discharge, +/-8kVdc direct discharge, +/-8kVdc indirect discharge
Sealing	IP67 sealing; meets and exceeds applicable IEC sealing specifications.
Wireless WAN Data and Voice Communications	
Wireless Wide Area Network (WWAN) radios	Qualcomm 3.5G HSPA and EVDO Rev A. Tri Band UMTS (850, 1900, 2100 MHz) Quad Band GSM (850, 900, 1800, 1900 MHz) GPRS – EDGE Class 12 CDMA (850, 1900 MHz)
Wireless LAN Data and Voice Communications	
Wireless Local Area Network (WLAN) radio	Tri-mode IEEE® 802.11a/b/g
Data Rates Supported	1, 2, 5.5, 6, 9, 11, 12, 18, 24, 36, 48, and 54 Mbps

Table A-1 ES400 Technical Specifications (Continued)

Item	Description
Operating Channels	Chan 1-13 (2412-2472 MHz), Chan 14 (2484 MHz) Japan only; actual operating channels/frequencies depend on regulatory rules and certification agency
WLAN Security	TKIP, AES, WPA (Personal or Enterprise), WPA2 (Personal or Enterprise), 802.1x, EAP-TLS, TTLS (CHAP, MS-CHAP, MS-CHAPv2, PAP or MD5), PEAP (TLS, MSCHAPv2, EAP-GTC), LEAP, EAP-FAST (TLS, MS-CHAPv2, EAP-GTC), CCXv4 certified, support for IPv6, FIPS140-2 certified
Spreading Technique	Direct Sequence Spread Spectrum (DSSS) and Orthogonal Frequency Division Multiplexing (OFDM)
Antenna	Internal with diversity
Voice Communication	Voice-over-IP ready (with P2P, PBX, PTT clients), Wi-Fi™-certified, IEEE 802.11 a/b/g direct sequence wireless LAN, Wi-Fi Multimedia (WMM), Motorola Voice Quality manager (VQM)
Wireless PAN Data and Voice Communications	
Bluetooth	Class II, v 2.1 with EDR; internal antenna.
Regulatory	
Electrical Safety	IEC/UL/CSA/EN 60950-1
Environmental	RoHS-compliant
WLAN and Bluetooth (PAN)	USA: FCC Part 15.247, 15.407 Canada: RSS-210 EU: EN 300 328, EN 301 893 Japan: ARIB STD-T33, T66, T70, T71 Australia: AS/NZS 4268s
Wireless Wide Area Network	GSM-HSDPA Global: 3GPP TS 51.010, 3GPP TS 34.121, 3GPP TS 34.123, GCF approved module USA: FCC Part 22, Part 24 Canada: RSS-132, RSS-133 EU: EN 301 511, EN 301 908 Australia: AS/ACIF S 024 CDMA-EvDO Rev A USA: FCC Part 22, Part 24 Canada: RSS-129, RSS-133 HAC compliant

Table A-1 ES400 Technical Specifications (Continued)

Item	Description
RF Exposure	USA: FCC Part 2, FCC OET Bulletin 65 Supplement C Canada: RSS-102 EU: EN 50360 Japan: ARIB STD T56 Australia: Radio communications Standard 2003
EMI/RFI	USA: FCC Part 15, Class B Canada: ICES 003 Class B EU: EN55022 Class B, EN55024, EN 301 489-1, EN 301 489-7, EN 301 489-17, EN 301 489-19, EN 301 489-24, EN 60601-1-2, EN 50121-3-2, EN 50121-4 Australia: AS/NZS CISPR-22
Laser Safety	IEC/Class 2/FDA Class II in accordance with IEC60825-1/EN60825-1
Data Capture Specifications	
Options	color camera
Camera Specifications	
Resolution	3.2 Mega pixel with flash and auto focus.

Table A-2 Data Capture Options

Item	Description
Camera Decode Capability	1-D Bar Codes Code 39 UPCA UPCE WEAN13 EAN8 Code 128 UCC/EAN 128 ISBT128 Code 93 Code 11 Web Code MSI Interleaved 2 of 5 Discrete 2 of 5 Codabar UPCE1 Coupon CODE Trioptic 39 Chinese 2 of 5 Korean 3 of 5 GS1 DataBar GS1 DataBar Truncated GS1 DataBar Limited GS1 DataBar Stacked GS1 DataBar Expanded GS1 DataBar Expanded Stacked GS1 DataBar Stacked Omni 2-D Bar Codes PDF-417 Micro PDF Marco Micro PDF Composite AB Composite C Data MAtrix QR Code Micro QR Aztec Linked Aztec US Planet US Postnet UK 4-state Australian 4-state Japanese 4-state Dutch Postal UK Intellimail Signiture Image

ES400 Accessory Specifications

Single Slot USB Cradle

Table A-3 *Single Slot USB Cradle Technical Specifications*

Feature	Description
Dimensions	Height: TBS Width: TBS Depth: TBS
Weight	TBS
Input Power	12 VDC
Power Consumption	TBS watts
Interface	USB
Operating Temperature	0°C to 50°C (32°F to 122°F)
Storage Temperature	-40°C to 70°C (-40°F to 158°F)
Charging Temperature	0°C to 40°C (32°F to 104°F)
Humidity	5% to 95% non-condensing
Drop	76.2 cm (30.0 in.) drops to vinyl tiled concrete at room temperature
Electrostatic Discharge (ESD)	+/- 15 kV air +/- 8 kV contact

Appendix B Keypads



Introduction

The ES400 offers three types of alphanumeric keypad configurations:

- QWERTY
- AZERTY
- QWERTZ.

Alpha Primary Keypad

The Alpha Primary keypad produces the 26-character alphabet (A-Z, both lowercase and uppercase), numbers (0-9), and assorted characters. The keypad is color-coded to indicate which modifier key to press to produce a particular character or action. The keypad default is lowercase alpha characters. See [Table B-1](#) for key and button descriptions and [Table B-3 on page B-6](#) for the keypad's special functions.

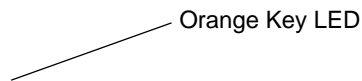


Figure B-1 *Alpha Primary Keypad Configuration*

Table B-1 Alpha Primary Keypad Descriptions




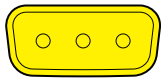
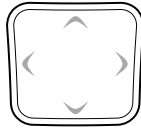








Key	Action
Orange Key 	<p>Accesses the secondary layer of characters and actions (shown on the keypad in orange).</p> <p>Press the Orange key once to activate this mode temporarily, followed by another key. This illuminates the LED and displays the following icon at the bottom of the screen, until a second key is pressed: </p> <p>Press the Orange key twice to lock this mode. This illuminates the LED and displays the following icon at the bottom of the screen: </p> <p>Press the Orange key a third time to unlock.</p>
Scan 	<p>Activates the scanner/imager in a scan enabled application.</p>
Navigation 	<p>Moves up one item.</p> <p>Moves left one item when pressed with the Orange key.</p> <p>Moves down one item.</p> <p>Moves right one item when pressed with the Orange key.</p>
Shift 	<p>Changes the state of the alpha characters from lowercase to uppercase.</p> <ul style="list-style-type: none"> Press the Shift key to activate this mode temporarily, followed by another key. This displays the following icon at the bottom of the screen, until a second key is pressed:  Press the Shift key twice to lock this mode. This displays the following icon at the bottom of the screen:  <p>Press the Shift key a third time to unlock.</p>
Backspace 	<p>Produces a backspace.</p>
Enter 	<p>Executes a selected item or function.</p>
CTRL 	<p>Press and release the CTRL key to activate the keypad alternate CTRL functions. The  icon appears at the bottom of the screen.</p> <p>Press the Orange key followed by the CTRL key to activate the keypad alternate ALT functions. The  icon appears at the bottom of the screen.</p>

Table B-1 Alpha Primary Keypad Descriptions (Continued)




Key	Action
SPACE 	Produces a space character.
ESC 	Exits the current operation.
TAB 	Move from one field to another.

Table B-2 Alpha Primary Keypad Input Modes

Key	Normal	Shift + Key	Orange + Key
A	a	A	a
B	b	B	1
C	c	C	2
D	d	D	3
E	e	E	e
F	f	F	4
G	g	G	5
H	h	H	6
I	i	I	i
J	j	J	7
K	k	K	8
L	l	L	9
M	m	M	m
N	n	N	*
O	o	O	0
P	p	P	#
Q	q	Q	q
R	r	R	au

Note: An application can change the key functions. The keypad may not function exactly as described.

Table B-2 Alpha Primary Keypad Input Modes (Continued)

Key	Normal	Shift + Key	Orange + Key
S	s	S	@
T	t	T	/
U	u	T	?
V	v	V	v
W	w	W	w
X	x	X	x
Y	y	Y	y
Z	z	Z	z
-	-	-	-
'	'	<	'
.	.	>	.
ENTER	Enter	Enter	Enter
TAB	Tab	Tab	Tab
SPACE	Space	Space	Space
BKSP	Backspace	Backspace	Backspace

Note: An application can change the key functions. The keypad may not function exactly as described.

Special Character Key

✓ **NOTE** Special characters are only available on the alpha-numeric keypad configurations.

To add special characters using the ES400 **áü** key, type the related character first, then press the Orange twice followed by the **áü** key. Continue pressing the **áü** key until the special character displays. To modify an existing character, move the cursor to the right of the character then press the Orange key twice and then press the **áü** key until the special character replaces the original character. [Table B-3](#) lists the special characters you can generate.

Table B-3 Special Characters

Key	Special Characters	Key	Special Characters
a	à á â ã ä å æ	A	À Á Â Ã Ä Å Æ
c	ç ć ċ ©	C	Ç Ć Ć ©
d	ð	D	Ð
e	è é ê ë ě	E	È É Ê Ë Ě
i	ì í î ï	I	Ì Í Î Ï
l	ł	L	Ł
n	ñ	N	Ñ
o	ò ó ô õ ö ø œ	O	Ò Ó Ô Õ Ö Ø Œ
p	þ	P	Þ
r	®	R	®
s	ş š ß	S	Ş Š ß
t	ţ	T	Ț
u	ù ú û ü ú	U	Ù Ú Û Ü
y	ý	Y	Ý
z	ź ż	Z	Ź Ż
\$	€ £ ¥	/	\
"	' « ' »	([{ < «
)] } > »	+	± & - _
!	! ? ¿	.	! , ;
*	#	@	~ %
%	^	,	; . :
#	*	&	- _ + ±

Table B-3 *Special Characters (Continued)*

Key	Special Characters		Key	Special Characters
_	+ ± & -		'	« » "
?	¿ ! ¡		:	, ; .
-	_ + ± &			



Appendix C Using the Time Tracker Application

Introduction



Appendix D Using the Weather Application

Introduction

Glossary

A

API. An interface by means of which one software component communicates with or controls another. Usually used to refer to services provided by one software component to another, usually via software interrupts or function calls

Aperture. The opening in an optical system defined by a lens or baffle that establishes the field of view.

Application Programming Interface. See **API**.

ANSI Terminal. A display terminal that follows commands in the ANSI standard terminal language. For example, it uses escape sequences to control the cursor, clear the screen and set colors. Communications programs support the ANSI terminal mode and often default to this terminal emulation for dial-up connections to online services.

ASCII. American Standard Code for Information Interchange. A 7 bit-plus-parity code representing 128 letters, numerals, punctuation marks and control characters. It is a standard data transmission code in the U.S.

Autodiscrimination. The ability of an interface controller to determine the code type of a scanned bar code. After this determination is made, the information content is decoded.

B

Bar. The dark element in a printed bar code symbol.

Bar Code. A pattern of variable-width bars and spaces which represents numeric or alphanumeric data in machine-readable form. The general format of a bar code symbol consists of a leading margin, start character, data or message character, check character (if any), stop character, and trailing margin. Within this framework, each recognizable symbology uses its own unique format. See **Symbology**.

Bar Code Density. The number of characters represented per unit of measurement (e.g., characters per inch).

Bar Height. The dimension of a bar measured perpendicular to the bar width.

Bar Width. Thickness of a bar measured from the edge closest to the symbol start character to the trailing edge of the same bar.

BIOS. Basic Input Output System. A collection of ROM-based code with a standard API used to interface with standard PC hardware.

Bit. Binary digit. One bit is the basic unit of binary information. Generally, eight consecutive bits compose one byte of data. The pattern of 0 and 1 values within the byte determines its meaning.

Bits per Second (bps). Bits transmitted or received.

BOOTP. A protocol for remote booting of diskless devices. Assigns an IP address to a machine and may specify a boot file. The client sends a bootp request as a broadcast to the bootp server port (67) and the bootp server responds using the bootp client port (68). The bootp server must have a table of all devices, associated MAC addresses and IP addresses.

boot or boot-up. The process a computer goes through when it starts. During boot-up, the computer can run self-diagnostic tests and configure hardware and software.

bps. See **Bits Per Second**.

Byte. On an addressable boundary, eight adjacent binary digits (0 and 1) combined in a pattern to represent a specific character or numeric value. Bits are numbered from the right, 0 through 7, with bit 0 the low-order bit. One byte in memory is used to store one ASCII character.

C

CDRH. Center for Devices and Radiological Health. A federal agency responsible for regulating laser product safety. This agency specifies various laser operation classes based on power output during operation.

CDRH Class 1. This is the lowest power CDRH laser classification. This class is considered intrinsically safe, even if all laser output were directed into the eye's pupil. There are no special operating procedures for this class.

CDRH Class 2. No additional software mechanisms are needed to conform to this limit. Laser operation in this class poses no danger for unintentional direct human exposure.

Character. A pattern of bars and spaces which either directly represents data or indicates a control function, such as a number, letter, punctuation mark, or communications control contained in a message.

Character Set. Those characters available for encoding in a particular bar code symbology.

Check Digit. A digit used to verify a correct symbol decode. The scanner inserts the decoded data into an arithmetic formula and checks that the resulting number matches the encoded check digit. Check digits are required for UPC but are optional for other symbologies. Using check digits decreases the chance of substitution errors when a symbol is decoded.

Codabar. A discrete self-checking code with a character set consisting of digits 0 to 9 and six additional characters: ("-", "\$", ".", "/", ",", "+").

Code 128. A high density symbology which allows the controller to encode all 128 ASCII characters without adding extra symbol elements.

Code 3 of 9 (Code 39). A versatile and widely used alphanumeric bar code symbology with a set of 43 character types, including all uppercase letters, numerals from 0 to 9 and 7 special characters (“-”, “.”, “/”, “+”, “%”, “\$” and space). The code name is derived from the fact that 3 of 9 elements representing a character are wide, while the remaining 6 are narrow.

Code 93. An industrial symbology compatible with Code 39 but offering a full character ASCII set and a higher coding density than Code 39.

Code Length. Number of data characters in a bar code between the start and stop characters, not including those characters.

Cold Boot. A cold boot restarts the [mobile-computerEnterprise Smart Phone](#) and erases all user stored records and entries.

COM port. Communication port; ports are identified by number, e.g., COM1, COM2.

Continuous Code. A bar code or symbol in which all spaces within the symbol are parts of characters. There are no intercharacter gaps in a continuous code. The absence of gaps allows for greater information density.

Cradle. A cradle is used for charging the terminal battery and for communicating with a host computer, and provides a storage place for the terminal when not in use.

D

Data Communications Equipment (DCE). A device (such as a modem) which is designed to attach directly to a DTE (Data Terminal Equipment) device.

DCE. See **Data Communications Equipment**.

DCP. See **Device Configuration Package**.

Dead Zone. An area within a scanner's field of view, in which specular reflection may prevent a successful decode.

Decode. To recognize a bar code symbology (e.g., UPC/EAN) and then analyze the content of the specific bar code scanned.

Decode Algorithm. A decoding scheme that converts pulse widths into data representation of the letters or numbers encoded within a bar code symbol.

Decryption. Decryption is the decoding and unscrambling of received encrypted data. Also see, **Encryption** and **Key**.

Depth of Field. The range between minimum and maximum distances at which a scanner can read a symbol with a certain minimum element width.

Device Configuration Package. The Symbol Device Configuration Package provides the Product Reference Guide (PRG), flash partitions, Terminal Configuration Manager (TCM) and the associated TCM scripts. With this package hex images that represent flash partitions can be created and downloaded to the [mobile-computerEnterprise Smart Phone](#).

Discrete Code. A bar code or symbol in which the spaces between characters (intercharacter gaps) are not part of the code.

Discrete 2 of 5. A binary bar code symbology representing each character by a group of five bars, two of which are wide. The location of wide bars in the group determines which character is encoded; spaces are insignificant. Only numeric characters (0 to 9) and START/STOP characters may be encoded.

DRAM. Dynamic random access memory.

DTE. See **Data Terminal Equipment**.

E

EAN. European Article Number. This European/International version of the UPC provides its own coding format and symbology standards. Element dimensions are specified metrically. EAN is used primarily in retail.

Element. Generic term for a bar or space.

Encoded Area. Total linear dimension occupied by all characters of a code pattern, including start/stop characters and data.

ENQ (RS-232). ENQ software handshaking is also supported for the data sent to the host.

ESD. Electro-Static Discharge

F

File Transfer Protocol (FTP). A TCP/IP application protocol governing file transfer via network or telephone lines. See **TCP/IP**.

Flash Disk. An additional megabyte of non-volatile memory for storing application and configuration files.

Flash Memory. Flash memory is nonvolatile, semi-permanent storage that can be electronically erased in the circuit and reprogrammed. Series 9000 ~~mobile computer~~ **Enterprise Smart Phones** use Flash memory to store the operating system (ROM-DOS), the terminal emulators, and the Citrix ICA Client for DOS.

FTP. See **File Transfer Protocol**.

H

Hard Reset. See **Cold Boot**.

Hz. Hertz; A unit of frequency equal to one cycle per second.

Host Computer. A computer that serves other terminals in a network, providing such services as computation, database access, supervisory programs and network control.

I

IDE. Intelligent drive electronics. Refers to the solid-state hard drive type.

IEC. International Electrotechnical Commission. This international agency regulates laser safety by specifying various laser operation classes based on power output during operation.

IEC (825) Class 1. This is the lowest power IEC laser classification. Conformity is ensured through a software restriction of 120 seconds of laser operation within any 1000 second window and an automatic laser shutdown if the scanner's oscillating mirror fails.

IEEE Address. See **MAC Address**.

Input/Output Ports. I/O ports are primarily dedicated to passing information into or out of the ~~mobile computer~~ [Enterprise Smart Phone](#)'s memory. Series 9500 ~~mobile computer~~ [Enterprise Smart Phones](#) include a USB port.

Interleaved 2 of 5. A binary bar code symbology representing character pairs in groups of five bars and five interleaved spaces. Interleaving provides for greater information density. The location of wide elements (bar/spaces) within each group determines which characters are encoded. This continuous code type uses no intercharacter spaces. Only numeric (0 to 9) and START/STOP characters may be encoded.

Intercharacter Gap. The space between two adjacent bar code characters in a discrete code.

Interleaved Bar Code. A bar code in which characters are paired together, using bars to represent the first character and the intervening spaces to represent the second.

Internet Protocol Address. See **IP**.

IOCTL. Input/Output Control.

I/O Ports. interface The connection between two devices, defined by common physical characteristics, signal characteristics, and signal meanings. Types of interfaces include RS-232 and PCMCIA.

IP. Internet Protocol. The IP part of the TCP/IP communications protocol. IP implements the network layer (layer 3) of the protocol, which contains a network address and is used to route a message to a different network or subnetwork. IP accepts "packets" from the layer 4 transport protocol (TCP or UDP), adds its own header to it and delivers a "datagram" to the layer 2 data link protocol. It may also break the packet into fragments to support the maximum transmission unit (MTU) of the network.

IP Address. (Internet Protocol address) The address of a computer attached to an IP network. Every client and server station must have a unique IP address. A 32-bit address used by a computer on a IP network. Client workstations have either a permanent address or one that is dynamically assigned to them each session. IP addresses are written as four sets of numbers separated by periods; for example, 204.171.64.2.

IPX/SPX. Internet Package Exchange/Sequential Packet Exchange. A communications protocol for Novell. IPX is Novell's Layer 3 protocol, similar to XNS and IP, and used in NetWare networks. SPX is Novell's version of the Xerox SPP protocol.

IS-95. Interim Standard 95. The EIA/TIA standard that governs the operation of CDMA cellular service. Versions include IS-95A and IS-95B. See CDMA.

K

Key. A key is the specific code used by the algorithm to encrypt or decrypt the data. Also see, **Encryption** and **Decrypting**.

L

LASER. Light Amplification by Stimulated Emission of Radiation. The laser is an intense light source. Light from a laser is all the same frequency, unlike the output of an incandescent bulb. Laser light is typically coherent and has a high energy density.

Laser Diode. A semiconductor type of laser connected to a power source to generate a laser beam. This laser type is a compact source of coherent light.

laser scanner. A type of bar code reader that uses a beam of laser light.

LCD. See **Liquid Crystal Display**.

LED Indicator. A semiconductor diode (LED - Light Emitting Diode) used as an indicator, often in digital displays. The semiconductor uses applied voltage to produce light of a certain frequency determined by the semiconductor's particular chemical composition.

Light Emitting Diode. See **LED**.

Liquid Crystal Display (LCD). A display that uses liquid crystal sealed between two glass plates. The crystals are excited by precise electrical charges, causing them to reflect light outside according to their bias. They use little electricity and react relatively quickly. They require external light to reflect their information to the user.

M

MC. Mobile Computer.

MDN. Mobile Directory Number. The directory listing telephone number that is dialed (generally using POTS) to reach a mobile unit. The MDN is usually associated with a MIN in a cellular telephone -- in the US and Canada, the MDN and MIN are the same value for voice cellular users. International roaming considerations often result in the MDN being different from the MIN.

MIL. 1 mil = 1 thousandth of an inch.

MIN. Mobile Identification Number. The unique account number associated with a cellular device. It is broadcast by the cellular device when accessing the cellular system.

Misread (Misdecode). A condition which occurs when the data output of a reader or interface controller does not agree with the data encoded within a bar code symbol.

Mobile Computer. In this text, ~~mobile computer~~ **Enterprise Smart Phone** refers to the Symbol Series 9000 wireless portable computer. It can be set up to run as a stand-alone device, or it can be set up to communicate with a network, using wireless radio technology.

N

Nominal. The exact (or ideal) intended value for a specified parameter. Tolerances are specified as positive and negative deviations from this value.

Nominal Size. Standard size for a bar code symbol. Most UPC/EAN codes are used over a range of magnifications (e.g., from 0.80 to 2.00 of nominal).

NVM. Non-Volatile Memory.

O

ODI. See **Open Data-Link Interface**.

Open Data-Link Interface (ODI). Novell's driver specification for an interface between network hardware and higher-level protocols. It supports multiple protocols on a single NIC (Network Interface Controller). It is capable of understanding and translating any network information or request sent by any other ODI-compatible protocol into something a NetWare client can understand and process.

Open System Authentication. Open System authentication is a null authentication algorithm.

P

PAN . Personal area network. Using Bluetooth wireless technology, PANs enable devices to communicate wirelessly. Generally, a wireless PAN consists of a dynamic group of less than 255 devices that communicate within about a 33-foot range. Only devices within this limited area typically participate in the network.

Parameter. A variable that can have different values assigned to it.

PC Card. A plug-in expansion card for laptop computers and other devices, also called a PCMCIA card. PC Cards are 85.6mm long x 54 mm wide, and have a 68 pin connector. There are several different kinds:

Type I; 3.3 mm high; use - RAM or Flash RAM

Type II; 5 mm high; use - modems, LAN adaptors

Type III; 10.5 high; use - Hard Disks

PCMCIA. Personal Computer Memory Card Interface Association. See **PC Card**.

Percent Decode. The average probability that a single scan of a bar code would result in a successful decode. In a well-designed bar code scanning system, that probability should approach near 100%.

PING. (Packet Internet Groper) An Internet utility used to determine whether a particular IP address is online. It is used to test and debug a network by sending out a packet and waiting for a response.

Print Contrast Signal (PCS). Measurement of the contrast (brightness difference) between the bars and spaces of a symbol. A minimum PCS value is needed for a bar code symbol to be scannable. $PCS = (RL - RD) / RL$, where RL is the reflectance factor of the background and RD the reflectance factor of the dark bars.

Programming Mode. The state in which a scanner is configured for parameter values. See **Scanning Mode**.

Q

Quiet Zone. A clear space, containing no dark marks, which precedes the start character of a bar code symbol and follows the stop character.

QWERTY. A standard keyboard commonly used on North American and some European PC keyboards. "QWERTY" refers to the arrangement of keys on the left side of the third row of keys.

R

RAM. Random Access Memory. Data in RAM can be accessed in random order, and quickly written and read.

Reflectance. Amount of light returned from an illuminated surface.

Resolution. The narrowest element dimension which is distinguished by a particular reading device or printed with a particular device or method.

RF. Radio Frequency.

ROM. Read-Only Memory. Data stored in ROM cannot be changed or removed.

Router. A device that connects networks and supports the required protocols for packet filtering. Routers are typically used to extend the range of cabling and to organize the topology of a network into subnets. See **Subnet**.

RS-232. An Electronic Industries Association (EIA) standard that defines the connector, connector pins, and signals used to transfer data serially from one device to another.

S

Scan Area. Area intended to contain a symbol.

Scanner. An electronic device used to scan bar code symbols and produce a digitized pattern that corresponds to the bars and spaces of the symbol. Its three main components are: 1) Light source (laser or photoelectric cell) - illuminates a bar code; 2) Photodetector - registers the difference in reflected light (more light reflected from spaces); 3) Signal conditioning circuit - transforms optical detector output into a digitized bar pattern.

Scanning Mode. The scanner is energized, programmed and ready to read a bar code.

Scanning Sequence. A method of programming or configuring parameters for a bar code reading system by scanning bar code menus.

SDK. Software Development Kit

Self-Checking Code. A symbology that uses a checking algorithm to detect encoding errors within the characters of a bar code symbol.

Shared Key. Shared Key authentication is an algorithm where both the AP and the MU share an authentication key.

SHIP. Symbol Host Interface Program.

SID. System Identification code. An identifier issued by the FCC for each market. It is also broadcast by the cellular carriers to allow cellular devices to distinguish between the home and roaming service.

SMDK. Symbol Mobility Developer's Kit.

Soft Reset. See **Warm Boot**.

Space. The lighter element of a bar code formed by the background between bars.

Specular Reflection. The mirror-like direct reflection of light from a surface, which can cause difficulty decoding a bar code.

Start/Stop Character. A pattern of bars and spaces that provides the scanner with start and stop reading instructions and scanning direction. The start and stop characters are normally to the left and right margins of a horizontal code.

STEP. Symbol Terminal Enabler Program.

Subnet. A subset of nodes on a network that are serviced by the same router. See **Router**.

Subnet Mask. A 32-bit number used to separate the network and host sections of an IP address. A custom subnet mask subdivides an IP network into smaller subsections. The mask is a binary pattern that is matched up with the IP address to turn part of the host ID address field into a field for subnets. Default is often 255.255.255.0.

Substrate. A foundation material on which a substance or image is placed.

SVTP. Symbol Virtual Terminal Program.

Symbol. A scannable unit that encodes data within the conventions of a certain symbology, usually including start/stop characters, quiet zones, data characters and check characters.

Symbol Aspect Ratio. The ratio of symbol height to symbol width.

Symbol Height. The distance between the outside edges of the quiet zones of the first row and the last row.

Symbol Length. Length of symbol measured from the beginning of the quiet zone (margin) adjacent to the start character to the end of the quiet zone (margin) adjacent to a stop character.

Symbology. The structural rules and conventions for representing data within a particular bar code type (e.g. UPC/EAN, Code 39, PDF417, etc.).

T

TCP/IP. (Transmission Control Protocol/Internet Protocol) A communications protocol used to internetwork dissimilar systems. This standard is the protocol of the Internet and has become the global standard for communications. TCP provides transport functions, which ensures that the total amount of bytes sent is received correctly at the other end. UDP is an alternate transport that does not guarantee delivery. It is widely used for real-time voice and video transmissions where erroneous packets are not retransmitted. IP provides the routing mechanism. TCP/IP is a routable protocol, which means that all messages contain not only the address of the destination station, but the address of a destination network. This allows TCP/IP messages to be sent to multiple networks within an organization or around the world, hence its use in the worldwide Internet. Every client and server in a TCP/IP network requires an IP address, which is either permanently assigned or dynamically assigned at startup.

Telnet. A terminal emulation protocol commonly used on the Internet and TCP/IP-based networks. It allows a user at a terminal or computer to log onto a remote device and run a program.

Terminal. See **Mobile Computer**.

Terminal Emulation. A "terminal emulation" emulates a character-based mainframe session on a remote non-mainframe terminal, including all display features, commands and function keys. The VC5000 Series supports Terminal Emulations in 3270, 5250 and VT220.

Terminate and Stay Resident (TSR). A program under DOS that ends its foreground execution to remain resident in memory to service hardware/software interrupts, providing background operation. It remains in memory and may provide services on behalf of other DOS programs.

TFTP. (Trivial File Transfer Protocol) A version of the TCP/IP FTP (File Transfer Protocol) protocol that has no directory or password capability. It is the protocol used for upgrading firmware, downloading software and remote booting of diskless devices.

Tolerance. Allowable deviation from the nominal bar or space width.

Transmission Control Protocol/Internet Protocol. See **TCP/IP**.

Trivial File Transfer Protocol. See **TFTP**.

TSR. See **Terminate and Stay Resident**.

U

UDP. User Datagram Protocol. A protocol within the IP protocol suite that is used in place of TCP when a reliable delivery is not required. For example, UDP is used for real-time audio and video traffic where lost packets are simply ignored, because there is no time to retransmit. If UDP is used and a reliable delivery is required, packet sequence checking and error notification must be written into the applications.

UPC. Universal Product Code. A relatively complex numeric symbology. Each character consists of two bars and two spaces, each of which is any of four widths. The standard symbology for retail food packages in the United States.

V

Visible Laser Diode (VLD). A solid state device which produces visible laser light.

W

Warm Boot. A warm boot restarts the ~~mobile computer~~ Enterprise Smart Phone by closing all running programs. All data that is not saved to flash memory is lost.

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