

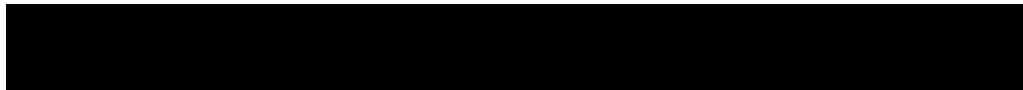


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PTC-2234

User's

Guide





PTC-2234

User's Guide

Document Number: 30314-000-002

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Introduction

This Guide's Purpose and Scope

This manual was written by the Symbol Technical Publications Group. This group is tasked with providing technical documentation for the Symbol PTC-2234 product line that uses the Microsoft® Windows CE® Operating System. Every effort has been made to provide accurate and concise information to you, our customer.

The *PTC-2234 Product Reference Guide* provides information that allows the user to set up and use the PTC-2234. This manual is meant to provide information on the various components of this product, including

- General regulations,
- Overview of the PTC-2234,
- Maintenance and troubleshooting,
- Available accessories.

This manual, however, does not provide instructions on how to perform the tasks specific to your job within your organization. For job-specific information, refer to the instructions provided by your organization.

Contacting Symbol's Support Center

Symbol's Support Center may be contacted to obtain help in resolving any PTC-2234 system problem that you may experience.

If you have a problem running your unit or using your equipment, contact your facility's technical or system support. If there is a problem with the equipment, the system support will contact the Symbol Support Center at 1-800-653-5350.

For additional information on Symbol's products and services, please visit our website at **www.symbol.com**.

Regulations

General Regulations

FCC Statement

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the Federal Communications Commission (FCC) rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with this instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case users will be required to correct the interference at their own expense.

DOC Statement

This digital apparatus does not exceed the Class A limits for radio noise emissions from digital apparatus as outlined in the Radio Interference Regulations of the Canadian Department of Communications (DOC). This Class A digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

Cet appareil numérique de Classe A respecte les Standards Canadiens d'émissions et perturbations électromagnétiques.

Direct-Sequence and Frequency-Hopping Spread Spectrum Radios

FCC Regulations

The PTC-2234 uses radios (transceivers) and radio communication in its operation. The PTC-2234 uses a spread spectrum radio transceiver that qualifies for unlicensed use. The FCC ID is on the unit's rear label.

DOC Statement

The PTC-2234's radio is also approved for use in Canada. The PTC-2234 uses a spread spectrum radio transceiver that qualifies for unlicensed use. The Canadian DOC ID is on the unit's rear label. This device complies with RSS-210 of Industry and Science Canada. Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Safety Information

Disposing of Lithium-Ion and Nickel-Cadmium Batteries

The following guidelines are to be used when handling the lithium-ion and nickel-cadmium battery packs:

- Do not expose the battery pack to water, metal objects, direct sunlight, extreme heat, or fire.
- Do not attempt to disassemble the battery pack.

Do not handle a damaged or leaking battery pack. PTC batteries contain chemically active materials that are hazardous to the environment and must be disposed of properly.

Note: *Do not incinerate battery packs; doing so may cause it to explode.*

Do not throw away the PTC when it has reached the end of its useful life. Send it to an authorized Symbol service center for bridge battery removal and recycling.

Users may also contact the Environmental Protection Agency, the Department of Natural Resources, a local hazardous waste disposal agency, or the Symbol Support Center at 1-800-653-5350 for assistance in disposing of battery packs.

PTC Radios

This device is in compliance with the ANSI C95.1 (1992) Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields per FCC Docket 93-62.

Laser Scanner Modules

Caution: *Do not stare into the scanner's laser beam. Permanent eye damage may result.*

The PTC-2234's optional laser scanner module is a Class II laser product. It emits a 1.0-milliwatt beam of laser light from the output window. No maintenance is required to keep this product in compliance with U.S. Department of Health and Human Services (DHHS) Regulation 21 CFR Subchapter J. No controls are provided for operation or maintenance. Laser light in excess of Class I limits is inside of an internal protective cover. The laser safety warning label required by the DHHS for the PTC-2234's optional laser scanner module is located on the scanner module near the scanning window.

External Laser Scanner

See the laser safety information included with the scanner.

PTC-2234 Overview

The PTC-2234 is a rugged, SC400-processor-powered, PC-compatible, version of the PTC-2134 pen-based portable teletransaction computer (PTC) that has been modified and approved for use in certain hazardous locations. The product has been approved by Underwriters Laboratories for the Class 1, Division 2 rating for Parts A, B, C, and D.

The PTC-2234 is used to collect, store, and transmit data. A passive stylus is the PTC's primary input device. The stylus allows the user to make selections on the screen or to write on the screen in much the same way as on paper with an ink pen. In general, the PTC is operated by using the stylus to write directly on the screen to fill in forms, to check off boxes, or to make choices from menus.

An organization's specific application program that was developed for its needs will determine the actions to be taken by a user. See the manuals or instructions provided by your organization for application details.

Through its pen operating environment, the PTC recognizes the written letters and numbers on its screen and translates them into a form that can be used and stored in the PTC.

Processor

The PTC's 100-MHz AMD Elan SC400 microprocessor is fully IBM PC compatible. It provides exceptional processing speed and is designed for low power consumption.

Operating System

The PTC-2234 uses the Windows 95 operating system.

Applications

A Software Development Kit is available to assist in the development of pen-based applications for the PTC. Contact your Symbol representative for more information.

Memory

The PTC-2234 has two types of memory: read-only memory (ROM) and random access memory (RAM).

ROM

The PTC-2234 comes with 512 kilobytes (KB) of read-only memory. It contains the Basic Input/Output System (BIOS) for Windows 95.

RAM

The PTC-2234 contains 20, 36, or 64 megabytes (MB) of random access memory. RAM is used to store data that are required by the PTC while it is running.

RAM data may be easily read, written, and changed. It is also volatile. All data in RAM will be lost if the PTC's battery pack and bridge battery becomes fully depleted or if the PTC is reset.

During normal operation, the PTC's advanced power management (APM) feature automatically protects data in RAM and saves the user's place in the application.

Display

The PTC-2234 has a VGA, transreflective, monochrome liquid crystal display (LCD) that can show up to 16 shades of gray, and features a resistive touch panel digitizer.

Transreflective Display

A *transreflective* display uses reflected ambient light to produce viewable display images. It is ideal for use in outdoor applications. For indoor use, the PTC's backlight may be used to optimize the display visibility in low lighting or under fluorescent lights.

Digitizer

The PTC-2234 features a *resistive touch panel digitizer*, which is mounted above the display. The digitizer enables the PTC to recognize data entered with a passive stylus. It also has a palm reject feature, which prevents accidental activation of the unit by casual hand or finger contact.

Data Entry Methods

Data may be entered into the PTC-2234 in a variety of ways. Each method is discussed below.

Data Entry Via the Stylus

As a pen-based computer, the PTC-2234 is ideal for forms-based data gathering. The PTC's stylus may be used to select menu options, to write in the fields of a form displayed on the PTC's screen, or to check off items on a list. The PTC may also be equipped with an option that captures signatures onto electronic forms (for example, when a delivery is made or an order is placed).

Data Entry Via the Keyboard

Caution: *Do not connect a keyboard to a PTC installed in the SC/VC-2X34 cradle.*

Data may also be entered into the PTC via an external PC/AT keyboard. The keyboard connects to the PTC via an optional serial/keyboard Y adapter cable.

Data Entry Via the Laser Scanner/Bar-Code Wand

Entering data may also be accomplished with the PTC's optional laser scanner module, an external laser scanner, or a bar-code wand. When scanning a 1D bar code, the PTC and the scanner/wand interpret the data and store it into the PTC's memory. See [Appendix E on p. 81](#) for instructions on using the scanner/wand and for a list of supported bar codes.

Data Storage

Data entered into the PTC may be stored in the PTC's RAM, on an internal compact flash hard disk drive, on an optional auxiliary storage card, or on a removable PCMCIA solid state data card. The PTC's internal solid state compact flash hard disk drive stores the unit's operating system. The PTC's application program and data entered by the user may reside in compact flash or on a factory-installed solid state ATA drive (auxiliary storage card).

PCMCIA data cards are credit-card-size memory cards that are used much as floppy disks are used in a desktop computer. The PTC-2234 has two user-accessible PCMCIA slots that can accept two Type II cards (one per slot) or one Type III card. Each Type II card occupies one slot, and Type III cards, which must be inserted into Slot 1, occupy both slots.

The number of available PCMCIA slots is dependent on the PTC's factory configuration options. For example, an auxiliary storage card or a field-installed radio card uses one or both PCMCIA slots, depending on the card type.

Communication

Cradle Port

The PTC's cradle port allows direct connection to an optional desktop/vehicle cradle. The cradle provides both communication and battery pack charging.

For more information, see the documentation shipped with the cradle.

IrDA Port

The IrDA 1.0 port allows the PTC to communicate via pulses of infrared light to and from other IrDA-compliant devices, such as printers or host systems.

Radio

A Type III field-installed radio (optional) occupies both user-accessible PCMCIA slots.

The PTC-2234 may be ordered with an internal factory-installed radio or with the radio-ready feature. A radio-ready unit enables a field-installed Type II or Type III 2.4-GHz radio to be inserted into one of the PTC's PCMCIA slots. Units with internal radios or the radio-ready feature are shipped with antennas.

The PTC may be equipped with one of the following types of local area network (LAN) radios.

- 2.4-GHz **direct-sequence** 802.11-compliant spread spectrum radio.
- 2.4-GHz **frequency-hopping** 802.11-compliant spread spectrum radio.

Spread spectrum radios allow the PTC to communicate interactively in real time with a host computer on a radio-based local area network. They provide secure, interference-free communication and do not require a license for operation.

Serial/Keyboard Connector

So long as the PTC is installed in the SC/VC-2X34 cradle, the serial/keyboard Y adapter cable **cannot** be used with the PTC.

A built-in 15-pin connector allows the PTC to connect to standard serial devices and to an external PC/AT keyboard. An optional serial/keyboard Y adapter cable is required to make these connections.

Power

AC Adapter

***Note:** Use the AC adapter supplied by Symbol with the PTC. Using any other adapter may damage the PTC.*

A 15-VDC, 2.7- or 3-A AC adapter provides power to recharge the PTC's lithium-ion battery pack and bridge battery. The adapter connects to the PTC's power jack and to an electrical outlet via an AC power cord. The adapter has a special connector that accepts a wide range of AC cords that supplies an input voltage between 100 and 240 volts AC at 50/60 Hz.

When the AC or vehicle adapter is attached to the PTC, the unit draws most of its power from the electrical outlet or a vehicle's power source, not from the PTC's battery pack. As a result, the PTC may remain on and be operated while its battery pack is being fast charged.

Battery Pack

Note: *Removal of the battery pack will drain the bridge battery (even with the unit suspended).*

Operating power for the PTC-2234 is provided by a rechargeable lithium-ion battery pack. The battery pack may be charged via an AC adapter, a vehicle adapter, a cradle, or a four-bay battery charger. The amount of time that the PTC can operate on a fully charged battery pack depends on the features and devices used and on the time that the PTC spends communicating with the host computer. The more the radio, backlight, serial port, IrDA port, PCMCIA slot(s), hard disk drive, and optional expansion modules are used, the sooner the battery pack will run out of power.

Bridge Battery

Note: *Always suspend the PTC before removing the battery pack.*

Refer to [Chapter 11 on p. 51](#) for information on conditioning the bridge battery.

An internal rechargeable nickel-cadmium bridge battery provides power to protect data stored in the PTC's RAM when the main battery pack is being replaced, or if the main battery pack runs out of power. Once the main battery has been fully discharged (and is left in the unit), the bridge battery may protect the PTC's memory for as long as 24 hours.

The bridge battery is recharged automatically when the unit is attached to the charger. The bridge battery's condition is checked each time the PTC is resumed.

Note: *If using a four-bay battery charger to recharge the main battery pack, the unit still needs to be attached to an AC or vehicle adapter, or placed in a cradle to recharge the bridge battery.*

Vehicle Adapter

***Note:** Use the vehicle adapter supplied by Symbol with the PTC. Using any other adapter may damage the PTC.*

A 15-VDC, 2.7-A vehicle adapter (optional) may be used to recharge the PTC's lithium-ion battery pack and nickel-cadmium bridge battery. The adapter plugs into the PTC's power jack and into a vehicle's cigarette lighter socket.

Other Features

Advanced Power Management

Sleep States

The PTC goes into a sleep state if it is not used for a period of time or if it is suspended using the **Resume** button. In the sleep state, the PTC turns off portions of its internal electronics to conserve power. The PTC has two stages of sleep: **Standby** and **Resume**.

Standby

Standby begins after a period of inactivity (programmable). During this stage, the PTC's screen goes blank, the backlight turns off, and other subsystems inside the PTC may slow down or turn off to conserve power. The PTC's Status LED blinks slowly to indicate that the PTC is in **Standby** mode. The application program running at the time is suspended, and any data in RAM are protected. To wake the PTC from the **Standby** mode, touch the display screen with the stylus.

Suspend

Suspend begins (1) after the **Standby** counter reaches zero, or (2) if the **Resume** button is pressed while the unit is on. This stage turns off additional hardware elements and provides only minimal memory refresh operations. The Status LED and the PTC turn off.

The time requirements of PTC inactivity for either sleep state is user definable. Consult the *PTC-2134/2234 Win95 Software Guide* and the documentation provided with the Software Development Kit for programming instructions.

***Note:** PTCs will not go into the **Suspend** mode (via the **Resume** button or after a period of inactivity) if either PCMCIA slot contains an ATA card.*

*Installing a PCMCIA card will not wake the PTC from **Standby** or **Suspend**. Touch the PTC's display or press the **Resume** button to reactivate the PTC before inserting a PCMCIA card.*

Resume

When the PTC is in the **Standby** mode, touching the PTC's screen with the stylus or pressing the **Resume** button turns the PTC back on and returns to the point at which it left the application. When the PTC is in **Suspend** mode, press the **Resume** button to turn the PTC back on. The system will return to the point at which it left the application.

Bar-Code Autodiscrimination

The PTC's application program may be set up to read and automatically discriminate among a number of bar-code types. See your organization's application manual or instructions for the bar-code types that the PTC is programmed to recognize.

Automatic Keyboard Recognition

The PTC automatically recognizes when a keyboard is attached and may immediately accept input from it.

Backlight

The PTC's backlight makes the screen readable in low light. Pressing the **Brightness** button toggles the backlight on and off. To save power, the backlight automatically turns off when there has been no activity on the screen. The duration of inactivity may be set by the application program.

Clock

The PTC-2234's built-in clock keeps track of the date (month, day, year, and day of the week) and the time (hours, minutes, seconds, and tenths of seconds). The clock operates continuously. The application program will determine how the PTC's clock is used. For example, the PTC may use the clock to show the date and time on its screen or to time stamp a file.

Display Contrast

The PTC's screen contrast may be increased or decreased using the PTC's **Increase** and **Decrease Contrast** buttons. Pressing the **Increase Contrast** button lightens the PTC's display in steps until it reaches the maximum contrast. Similarly, the **Decrease Contrast** button progressively darkens the display contrast until it reaches the minimum contrast. Eight contrast settings are available.

Low-Battery Warning

Some applications may allow the user to view the battery's charge status on the PTC's screen. See your application's manual for instructions.

See [Chapter 10 on p. 43](#) for information on battery life and recalibrating the battery pack's internal gas gauge.

The PTC provides a warning when the battery pack or the bridge battery approaches a critically low power level. When this happens, the PTC will sound five sets of three short beeps with a pause between sets, and the Power LED will glow red. If these warnings are observed, recharge the battery pack promptly (see [Chapter 10 on p. 43](#) for the recharging procedure).

Accessories

The PTC-2234 may be used with the following optional communication/charging accessories: the SC/VC-2X34 Cradle and the Universal Battery Charger.

The cradle allows the PTC to communicate with a host computer and provides the power to recharge the PTC's battery pack. The universal battery charger can simultaneously recharge up to four spare PTC battery packs.

Getting Started

Unpacking the PTC-2234

The PTC-2234 package contains a

- PTC-2234 pen-based computer with ordered expansion modules installed,
- lithium-ion battery pack,
- 15-VDC, 2.7- or 3-A AC or vehicle adapter (if ordered),
- stylus and stylus holder,
- radio antenna (if the PTC has an internal radio or is configured as radio ready),
- shoulder strap, and
- *PTC-2234 Getting Started Guide*.

Additional accessories, such as cables, are shipped separately.

To unpack the unit follow the steps below.

1. Remove the PTC and other parts from the box.
2. Remove all packing material from the PTC. **Do not** discard the packaging. Use the packaging for storage or for shipping the PTC to Symbol for servicing.
3. Ensure that all items ordered have been received.

Note: If anything is missing or damaged, notify your Symbol sales representative.

4. Check the contents for shipping damage. Pay particular attention to the PTC's case and screen.

PTC Setup

This section provides instructions for setting up the PTC for the first time.

Work Area Selection

Choose an area that is free of rapid changes in temperature and humidity. Avoid areas that may have extremes of dust, moisture, heat, or is exposed to direct sunlight. Strong electromagnetic fields (i.e., stereo speakers) and corrosive chemicals should also be avoided.

Whether using or storing the PTC, ensure that the environment is neither too hot nor too cold. If you are comfortable, the temperature and humidity will be suitable for the PTC.

Connecting the Antenna

Caution: *Radio damage may occur if the PTC is turned on or if there is an attempt to transmit data without the antenna being attached.*

If the PTC has an antenna, screw it into the antenna mount on the PTC's upper left corner. Refer to the section entitled "[Antenna Handling](#)" on p. 56 for additional information on handling the antenna.

Battery Pack Installation/Removal

To install the battery pack, align the six keyway holes of the battery pack with the six keys on the back of the PTC. With the battery pack's connector and the PTC's connector facing each other, slide the connectors together.

To remove the battery pack, press and hold the oval button at the top of the battery pack while sliding the battery pack toward the bottom of the PTC.

The battery pack and bridge battery must be charged before the PTC may be used. Refer to the section entitled ["Recharging the Battery Pack" on p. 43](#) for instructions on charging the batteries.

Attaching the Stylus Holder to the PTC

The supplied stylus holder allows for a secure attachment to the PTC. Follow the steps below to attach the holder to the PTC.

1. Find a convenient location on the back of the PTC to attach the holder; then, clean the area with alcohol.
2. Remove the protective strip from the holder's adhesive pad; then, firmly press the pad against the PTC at the chosen location.
3. Before using the holder, wait 4 hours for the pad's adhesive to set.

When the PTC's stylus is not in use, it may be stored in the stylus holder.

Loading Software

The operating system and the pen operating environment are loaded into the PTC at the factory.

To load application software, follow the instructions that are provided in the *PTC-2134/2234 Win95 Software Guide* and in the documentation that accompanies the Software Development Kit. Refer to [Appendix B on p. 75](#) for ordering information.

External Components

Shoulder Strap

A shoulder strap (not shown) maybe attached to the PTC to provide support when it is in use or when being carried.

Stylus

A passive stylus (not shown) is the PTC's primary input device. The stylus allows the user to write directly onto the PTC's screen. It is specially designed not to scratch the coating on the screen's touch panel.

Using instruments other than the stylus for performing screen input functions may damage the screen.

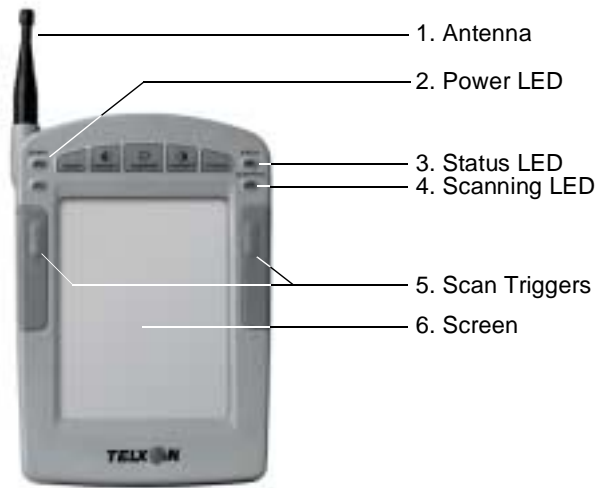


Figure 1. The PTC-2234 (front view).

1. If the PTC has an internal radio or is configured as radio ready, a whip antenna screws onto the mount on the PTC's upper left corner. Refer to [Chapter 12 on p. 55](#) for information on handling the antenna.
2. The Power LED glows solid red when the battery pack is low and blinks red when the bridge battery is low. It is off when both batteries are adequately charged. When the PTC is connected to a charger, the Power LED blinks green until the battery pack reaches a 90% charge and remains solid green thereafter. If the charger is disconnected from the PTC, the Power LED turns off.
3. The green **Status LED** indicates the status of the PTC. When the **Status LED** blinks at a 2-second interval, it indicates that the PTC is in the **Standby** mode. Once the PTC enters the second sleep stage (**Suspend**), the **Status LED** blinks at a 4-second interval. Press the **Resume** button to reactivate the PTC from either sleep stage. The **Status LED** blinks rapidly when the PTC is reset (restarted).

4. The **Scanning LED** glows red when the laser scanner module is scanning. It glows green to indicate a good scan.
5. The PTC has a laser scanner activation trigger on both sides to accommodate left- or right-hand use. There is also a trigger on each side of the optional laser scanner module (if so equipped). Pressing either scan trigger turns on the laser scanner module.
6. The screen is either a white-on-black or a black-on-white, VGA-resolution liquid crystal display (LCD). It has 640 x 480 lines of resolution and features a built-in backlight to make it readable in dim lighting. The screen displays data entered into the PTC and may show prompts, error messages, and other information. The screen may display a list of choices on a menu or a form with fields that require input.



Figure 2. PTC-2234 front panel buttons.

1. Pressing the **Resume** button toggles the PTC between sleep and awake.
2. Pressing the **Decrease Contrast** button decreases screen contrast in steps until the screen reaches the minimum setting.
3. Pressing the **Brightness** button toggles the screen's backlight **On** and **Off**.
4. Pressing the **Increase Contrast** button increases screen contrast in steps until the screen reaches the maximum setting.
5. The **Right Mouse** button's default function is to emulate the right button on a Microsoft mouse. However, the button is software programmable and may be used to perform a user-defined function. See the instructions in the *PTC-2134/2234 Win95 Software Guide* for further information.



Figure 3. The PTC-2234 (rear view).

1. The PTC may be equipped with one of a number of removable expansion modules, including a laser scanner, or an RJ-41 connector module. If no option has been ordered, a blank module is installed. [Appendix B on p. 75](#) lists part numbers for ordering expansion modules; [Appendix D on p. 79](#) provides instructions for attaching or removing the modules; [Appendix E on p. 81](#) provides instructions for using the modules; and [Appendix F on p. 89](#) lists the expansion module connector pinouts.
2. The cradle port allows the PTC to be quickly and easily connected to a cradle for communication and charging. See [Appendix F on p. 89](#) for the cradle port pinouts.

3. This spring-loaded latch above the battery pack holds the pack in place. Pressing on the latch frees the battery pack so that it may be removed.
4. These two indentations on either side of the battery pack are designed to provide a solid grip when holding the PTC.
5. The PTC receives its operating power from a lithium-ion battery.
6. An elastic handstrap is attached to the back of the battery pack. It is used to secure the PTC to the user's hand.

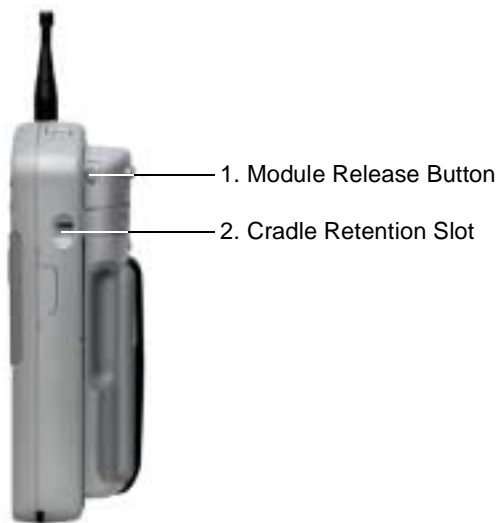


Figure 4. The PTC-2234 (side view).

1. Pressing both module release buttons (one on either side) releases the expansion module from the PTC.
2. These recesses (one on either side) are used to secure the PTC into the cradle.



Figure 5. The PTC-2234 (top view).

1. Opening this door provides access to the PCMCIA slots and the Reset/Ship button. When the door is closed, it helps to protect the PTC from dust, dirt, and moisture. The door is permanently attached to the PTC by a durable plastic strip.
2. PTCs that have an internal radio or are configured as radio ready will have a whip antenna screwed into this mount. PTCs with no radio will have the antenna mount sealed with a rubber plug. See [Chapter 12 on p. 55](#) for instructions on handling the antenna.
3. To open the PCMCIA door, slide the latch toward the middle of the door; then, pull the door open. To close the door, insert the end with the tab into the notch in the opening in the PTC. Then, press the door into place and slide the latch toward the outside of the PTC until it stops.

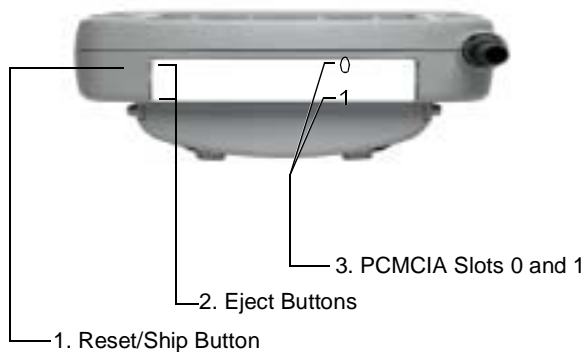


Figure 6. The PTC-2234 (top view-PCMCIA door open).

1. This small blue button resets the PTC or puts the unit into **Ship** mode. Before pressing this button, see [“Resetting the PTC” on p. 66](#).
2. Press these buttons to release PCMCIA cards from the PCMCIA slots.
3. The PCMCIA slots house connectors that allow the user to attach a variety of credit-card-size accessories. These include data cards, modems, local area network (LAN) adapters, and wireless communication cards. The PTC-2234's PCMCIA slots accept two Type II or one Type III PCMCIA card.

Note: *Type III cards, which occupy both PCMCIA slots, must be inserted into Slot 1, the slot closest to the battery.*

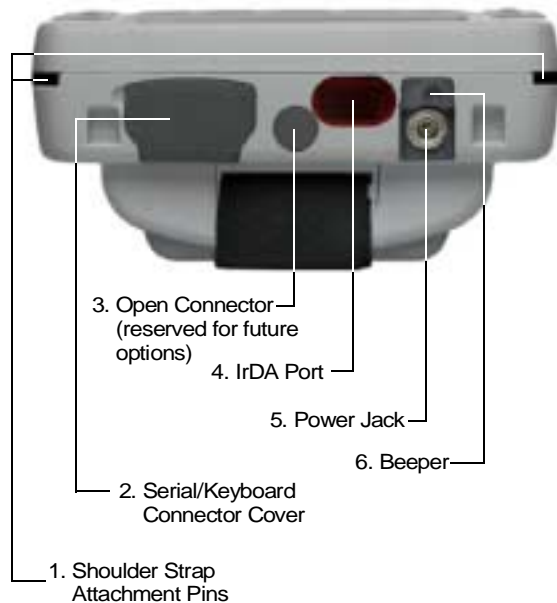


Figure 7. The PTC-2234 (bottom view).

1. The shoulder strap clips attach to these two pins.
2. When snapped in place over the serial/keyboard connector, this cover protects the PTC from dust, dirt, and moisture.
3. This connector is available for future options. The connector is sealed with a rubber plug.
4. This infrared v1.0 port allows the PTC to communicate via pulses of infrared light to and from other IrDA-compliant devices, such as printers.
5. The AC or vehicle adapter connects to this jack when recharging the battery pack.

6. The beeper, located behind this grill, can be used by the application to warn the user of problems or to prompt the user to take an action. For example, if invalid data are input, the PTC may beep to alert the user. The beeper also provides a series of beeps as a warning when the battery pack or bridge battery approaches depletion.

See [Appendix C on p. 77](#) for an explanation of the standard beep codes. Other codes may be specific to your application. The application program may also allow for adjustments to the beeper's volume.



Figure 8. Serial/Keyboard Connector.

1. This 15-pin connector allows the PTC to connect to external serial devices, such as printers and modems, and to an external IBM PC/AT-type keyboard (the pinouts for this connector may be found in [Appendix F on p. 89](#)). A special Y adapter cable must be used for these connections. Refer to [Appendix B on p. 75](#) for cable part numbers.

Drive Lettering and Boot Sequence

Drive Lettering

The PTC's operating system identifies the drive letters according to the PTC's software configuration. This chapter provides information on the possible PTC drive letter assignments.

Without Card and Socket Services

Under normal conditions, the PTC boots from the internal Compact Flash card and then loads Card and Socket Services to support SRAM and ATA cards.

The PTC may be booted from a PCMCIA slot without Card and Socket Services.

***Note:** PCMCIA access without Card and Socket Services installed applies during the boot sequence only.*

Drive Letter Assignment

A — SRAM support in PCMCIA Slot 0.

B — SRAM support in PCMCIA Slot 1.

C — Internal compact flash hard disk drive (if present) or ATA hard disk drive card in Slot 0 or 1 (replaces drives A and B).

D or above — RAMdisk drives.

***Note:** If booting from an ATA card in Slot 0 as drive C, the other PCMCIA slot will **not** be usable for other PCMCIA devices.*

With Card and Socket Services and Windows

If the PTC is used with the Card and Socket Services utility installed and is using Windows as an operating system, the drives are assigned dynamically as they are installed and allocated.

Boot Sequence

The boot sequence is the order in which the PTC searches its disk drives (physical and logical) to locate the **config.sys** and **autoexec.bat** files. The PTC is preconfigured to look in drive A first for a bootable device. If it does not find one, it looks in drive C. The order in which this is performed may be changed in the CMOS setup, so that drive C is searched before drive A.

Once the PTC finds the first bootable drive, it locates the **config.sys** and **autoexec.bat** files on that drive and looks no further.

For example, if the sequence is drive A followed by drive C and a bootable device is found in drive A, the PTC loads **config.sys** and **autoexec.bat** from that device without looking further.

Operating the PTC-2234

Holding the PTC

The PTC's battery is equipped with a 1.5 inch elastic strap along its back side. With the battery installed, insert the right or left hand underneath the strap. The battery has grooves on either side for the thumb and fingers.

Turning On the PTC

To turn on the PTC, press the **Resume** button. The Status LED blinks rapidly while the PTC boots. When the PTC is in the **Standby** mode (indicated by a slowly blinking Status LED), it may be awakened by touching the PTC's screen with the stylus or by pressing the **Resume** button. When the PTC is in the **Suspend** mode, it may be awakened by pressing the **Resume** button.

Turning Off the PTC

The PTC must be placed into the **Suspend** mode to turn it off (**Suspend** = **Off**). Before placing the PTC in the **Suspend** mode, ensure that the PTC is not accessing the PCMCIA slot(s) or the hard disk drive; the PTC is not communicating through its serial/ keyboard connector, radio, or IrDA port; and all open files may be saved as a precaution.

Press the **Resume** button to **Suspend** the PTC (or put it to sleep). Suspending the PTC saves power and allows the unit to resume operation exactly where it left off.

In addition, the PTC suspends automatically if it has not been used. Refer to the section entitled [“Advanced Power Management” on p. 12](#) for more information.

Entering Information on the Screen

***Note:** Using instruments other than the stylus supplied with the PTC may damage the screen.*

To enter data via the PTC's screen, use the PTC's stylus to select a menu option or to write letters and numbers in a field. The application may allow only certain portions of the screen to be sensitive to the stylus. These are the menu “buttons” or fields in a form. The rest of the screen does not react.

Follow this procedure to enter information with the stylus.

1. Hold the stylus as you would an ink pen or pencil.
2. To make a choice from a menu, use the stylus to touch that choice.
3. To write data into a field on a form, use the stylus to print the letters or numbers. Screen entries require less pressure than when writing on paper.

Using the PCMCIA Slots

The PTC-2234 contains two user-accessible PCMCIA slots that can accept two Type II or one Type III PCMCIA card or device.

The number of available PCMCIA slots is dependent upon the PTC's factory configuration options. For example, an auxiliary storage card or a field-installed radio card uses one or both PCMCIA slots, depending upon the card type. Type II cards occupy one slot, and Type III cards, which must be inserted into Slot 1, occupy both slots.

Installing a PCMCIA card will not wake the PTC from the **Standby** or **Suspend** modes. Touch the PTC's display or press the **Resume** button to reactivate the PTC before inserting a PCMCIA card.

The PTC will not go into the **Suspend** mode (via the **Resume** button or after a period of inactivity) if either PCMCIA slot contains an ATA card. The unit will remain in the **Standby** mode indefinitely.

Inserting a PCMCIA Card or Device

Use the following procedure to insert PCMCIA cards or devices into the PTC's PCMCIA slot(s).

Do not force a card into the slot; the card or the slot may be damaged. If the card does not go in easily, turn the card over and try again. Do not insert anything other than PCMCIA cards or devices into the slot.

Note that one end of the card has two rows of holes. This is the female connector that connects to the male strip of the PCMCIA slot. The card has a notch on one side and a slot on the other (see Figure 9) to facilitate proper insertion. Data cards have a write-protect switch on the end opposite the connector.

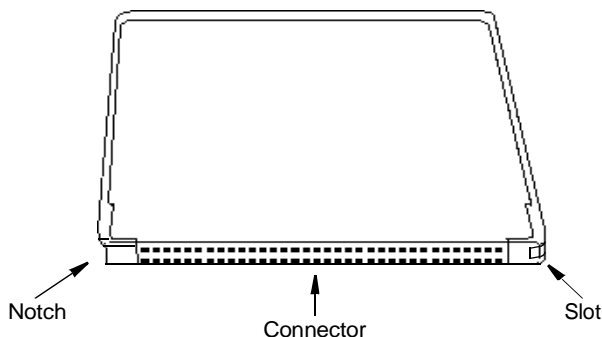


Figure 9. PCMCIA card features.

1. Suspend the PTC.
2. Open the PCMCIA door by sliding the latch toward the middle of the door and then pulling the door open.

Note: The PCMCIA door is permanently attached to the PTC. Do not attempt to remove it completely.

3. Hold the PCMCIA card such that its connector is toward the PTC and the slot is near the **Eject** button.

Note: Type III cards must be inserted into PCMCIA Slot 1, which is the slot closest to the battery.

4. Insert the card into the PCMCIA slot until the **Eject** button extends to the card's edge.

5. Close the PCMCIA door.
6. Resume the PTC.

Removing a PCMCIA Card or Device

1. Suspend the PTC.
2. Open the PCMCIA door.
3. Use the PTC's stylus to press the **Eject** button to eject the card.
4. Remove the card.
5. Close the PTC's PCMCIA door.
6. Resume the PTC.

Communication and Connections

The PTC-2234 can communicate with a host computer or other devices via radio, cable, optional PCMCIA devices, or its IrDA port. Communication may also be accomplished by inserting the PTC into an optional cradle.

Communicating Via Radio

See the section titled "[Radio](#)" on [p. 9](#) for information on the PTC's radio options.

All radio communication is controlled by the application program. See the instructions provided with the application program for specifics on radio communication.

Communicating Via Cable

A serial device may be connected, such as a printer or a modem, and an IBM PC/AT-type keyboard to the PTC-2234 by attaching a Y adapter cable to the PTC's 15-pin serial/keyboard connector.

***Note:** When the PTC is installed in the cradle, the serial/keyboard Y adapter cable cannot be used with the PTC.*

The Y adapter cable has a 15-pin female connector (PTC), a round 5-pin female DIN connector (keyboard), and a 9-pin male D-type RS-232 connector (serial communications).

***Note:** See [Appendix B](#) on [p. 75](#) for cable part numbers.*

Connecting a Serial Device

Equipment Required

- Serial/keyboard Y adapter cable.
- Serial cable for the device to which the PTC is being connected.

Follow this procedure to connect an external serial device to the PTC.

1. Suspend the PTC and turn off the serial device.
2. Pull open the serial/keyboard connector cover (refer to [Figure 7 on p. 29](#)).

Note: The connectors mate easily. Do not force them together. The connector or the pins may be damaged by forcing the connection.

Ensure that the pins are straight and that the mating connectors are lined up correctly.

3. Connect the adapter cable's 15-pin female connector to the PTC's serial/keyboard connector.
4. Secure the cable to the PTC using the two connector mounted screws.
5. To dissipate any PTC static charge from the PTC, touch the adapter cable and the serial device's connector together. If you are using a serial cable, touch the adapter cable and the serial cable together. Then, connect the adapter cable's 9-pin male connector to the serial device (or to the device's serial cable).
6. Turn on the serial device; then, resume the PTC.

Disconnecting a Serial Device

1. Suspend the PTC and turn off the serial device.
2. Undo the securing screws of the adapter cable.

Note: *Grasp the connector while removing the cable. Pulling the cable may break the conductors inside. Pull straight out with no rocking or twisting motion.*

3. Pull the adapter cable's connector from the PTC.
4. Pull the adapter cable's connector from the serial device (or serial cable).
5. Close the serial/keyboard connector cover.

Connecting a Keyboard

The PTC automatically recognizes when a keyboard is attached and accepts input from it.

Note: *Do not connect a keyboard to the PTC via the serial/keyboard Y adapter cable when the PTC is in a cradle with a keyboard already attached. Having two keyboards connected to the PTC will adversely affect the PTC's performance.*

Equipment Required

- Serial/keyboard Y adapter cable.
- IBM PC/AT-type keyboard with a standard 5-pin male DIN connector (not a PS/2 connector).

Use the following procedure to connect a keyboard to your PTC.

1. Suspend the PTC.
2. If your keyboard is switchable between XT and AT, make sure the switch is in the AT position.

3. Attach the adapter cable to the PTC's serial/keyboard connector.
4. Line up the pins on the keyboard's connector with the holes in the adapter cable's round 5-pin female DIN connector; then, press the connectors together.

Note: The connectors mate easily. Do not force them together. The connector or the pins may be damaged by forcing the connection.

5. Resume the PTC.

PCMCIA Communication Options

See the instructions provided with the PCMCIA device.

Using the IrDA Port

The PTC-2234's IrDA 1.0 port allows the PTC to communicate via pulses of infrared light to and from other IrDA-compliant devices, such as printers and host systems.

To use the PTC's IrDA port, perform the following:

1. Line up the PTC and the other IrDA-compliant device, such that their IrDA ports are within 2–3 feet (0.6–0.9 meters) of one another.
2. Follow the instructions or manual provided by your organization for the proper communication procedure to follow.

Connecting to a Communication Cradle

See the documentation provided with the SC/VC-2X34 for instructions on connecting the PTC.

Battery Pack Maintenance

Low-Battery Warning

When the battery pack's charge depletes to the "low power" threshold, the PTC sounds five sets of three beeps. There is a pause between sets, and the Power LED glows red. When these warnings are observed, promptly recharge the PTC's battery pack.

Checking Battery Charge

The application program may allow the user to monitor the battery's charge. See your application's instructions for more information.

Recharging the Battery Pack

Spare battery packs may be recharged via a four-bay battery charger.

Note: *To recharge the bridge battery, the unit must be connected to an AC or vehicle adapter, or to a cradle. The bridge battery cannot be recharged from the four-bay battery charger.*

The PTC's lithium-ion battery pack may be recharged via an AC or vehicle adapter or by a cradle. Charge the PTC's battery pack before the unit's first-time use and when the low-battery indication is observed.

Note: *A lithium-ion battery pack will take longer to recharge if the charging process occurs below room temperature.*

The PTC's built-in charger recharges a depleted battery pack to a 90% capacity in 5 to 6 hours (at room temperature). The charger senses the power remaining in the battery pack and decreases the charging time accordingly. For example, a half-discharged battery pack takes 2.5 to 3 hours to reach a 90% charge.

The built-in charger also protects the battery pack from being overcharged if charging continues after the pack has reached a full charge.

Battery Charging using the AC or Vehicle Adapter

The PTC-2234's battery pack can be recharged in one of two ways: via an AC adapter that connects to both the PTC's power jack and an AC electrical outlet (via a power cord) or via a vehicle adapter that attaches to the PTC's power jack and to a vehicle's cigarette lighter socket.

Equipment Required

- A power cord with an appropriate connector for the power supply at one end and an appropriate wall plug at the other end (if using the PTC outside of the U.S. or Canada).
- A 15-VDC, 2.7- or 3-A AC adapter and an appropriate power cord or a 15-VDC, 2.7-A vehicle adapter.
- An electrical outlet providing 100 to 240 volts AC or a vehicle's cigarette lighter socket.

Procedure

1. Connect the appropriate power cord to the AC adapter.
2. Connect the AC or vehicle adapter to the PTC's power jack; then, plug the AC adapter's power cord into an electrical outlet or the vehicle adapter into a vehicle's cigarette lighter socket.

3. The Power LED glows solid green when the battery pack reaches a 90% charge. Reaching a 100% charge takes another 2 to 3 hours because the charge rate drops as the battery nears capacity.
4. Charge the battery pack for 5 to 6 hours or until the Power LED glows solid green.
5. When charging is finished, disconnect the AC adapter from the electrical outlet and the PTC or disconnect the vehicle adapter from the cigarette lighter socket and the PTC.

Battery Charging using the Communication Cradle

To charge the PTC's battery pack via the cradle, simply insert the PTC into the cradle, following the instructions provided. The PTC's battery pack will be recharged automatically.

***Note:** If the PTC is not stored in a cradle, it must be recharged periodically (at least once every several days).*

Battery Charging using the Four-Bay Battery Charger

Spare battery packs may be recharged by a Universal Battery Charger. This charger can simultaneously recharge up to four PTC-2234 lithium-ion battery packs. Refer to the documentation shipped with the charger for more information.

***Note:** The unit must be connected to an AC or vehicle adapter, or to a cradle for recharging of the bridge battery.*

Operating the PTC with the AC or Vehicle Adapter Connected

Some activities require more power than the adapter can provide; this extra power is supplied by the battery pack.

When the AC or vehicle adapter is attached to the PTC, the unit draws most of its power from the electrical outlet or a vehicle's power source, not from the PTC's battery pack. As a result, the PTC can remain on and be operated while its lithium-ion battery pack is being charged.

Replacing the Battery Pack

Caution: *Do not leave the PTC without the battery pack installed. The bridge battery will drain in 24 hours, and all data in RAM will be lost!*

Use the following procedures to remove and replace the PTC's battery pack when necessary.

Removing the Battery Pack

Note: *Removing the battery pack before suspending the PTC will drain the bridge battery.*

1. Suspend the PTC.
2. Press the battery pack latch as you slide the battery pack toward the bottom of the PTC.
3. When the battery pack will slide no farther, lift it off the PTC.

Installing a New Battery Pack

1. Line up the openings on the battery pack with the hooks on the back of the PTC; then, place the openings over the hooks.
2. Slide up the battery pack until the battery pack latch clicks into place.
3. Resume the PTC.

Getting the Most out of Your Battery Pack

How long the PTC operates on a fully charged battery pack depends on whether you are using the hard disk drive, the PCMCIA slot(s), or the screen's backlight; whether your PTC is using an expansion module, such as a laser scanner; whether your PTC is spending a lot of time communicating through its serial port, IrDA port, or internal radio; what the surrounding temperature is; and what accessories are attached that draw power from the PTC.

Maximizing Operating Time

You can maximize the support time of a charged battery pack by controlling how you use your PTC.

Here are some tips:

- Keep the battery pack at room temperature. The colder a battery pack becomes, the less capacity it has. You may see a decline in capacity below 32° F (0° C).
- Do not operate the PTC's expansion module more often than necessary. Turn it off when it is not being used, if possible.
- Keep radio use to a minimum.
- Reduce the screen's display contrast or turn the backlight off.

Note: Symbol recommends cleaning the contacts using isopropyl alcohol or a battery contact cleaner.

- Keep the battery pack contacts and the contacts on the PTC clean.

See the *Guide to Maintaining Nickel-Cadmium and Lithium-Ion Batteries* for more information on caring for your PTC-2234's battery pack.

Battery Pack Life

The PTC's battery pack is rated for approximately 500 recharges. The battery pack's capacity gradually decreases until approximately the 500th charge, at which point the capacity is about 80% that of a new battery pack.

Battery Pack Care

The following guidelines will help you to protect your battery pack and get the most use out of it.

- Do not take the battery pack apart.
- Keep sharp objects away from the battery pack case and contacts.
- To avoid short circuiting the battery pack, do not touch the battery pack contacts with any metal object.

Note: Refer [Cleaning the PTC on p. 58](#) for cleaning instructions.

- Periodically, clean the battery pack contacts and the contacts on the PTC.
- Store spare battery packs in a cool, dry place out of direct sunlight.
- Do not incinerate old battery packs. Refer to the instructions for disposing of them in [Chapter 2 on p. 3](#).

Gas Gage Recalibration

This procedure may be performed at any time if you suspect that the gas gage reading is incorrect.

The battery pack includes a gas gage that the PTC's application can query. Your application may alert you before the battery pack reaches a power-fail state. In this case, the battery pack's gas gage may not reset properly.

To ensure that your battery pack's gas gage remains properly calibrated and accurate over the battery pack's lifetime, perform the following steps about once a month.

1. Starting with a fully charged battery pack, allow the PTC to run until the battery pack discharges to a level that causes the Power LED to glow red and the PTC to beep.
2. Recharge the battery pack to 100% capacity (6 to 8 hours).

Disposing of Battery Packs

Lithium-ion battery packs are hazardous waste. Refer to [Chapter 2 on p. 3](#) for information on how to dispose of lithium-ion battery packs properly.

Bridge Battery Maintenance

Recharging the Bridge Battery

The PTC-2234 has an internal rechargeable nickel-cadmium bridge battery that protects data in the PTC's memory when the main battery pack runs out of power or is being replaced. While a charged battery pack is in the PTC, the bridge battery is inactive.

If the bridge battery power is low, the Power LED blinks red.

Note: If the PTC is not stored in a cradle, it must be recharged periodically (at least once every several days).

The bridge battery is intended to provide power to the PTC only when the battery pack is discharged or being replaced. Leaving the PTC without a battery pack for longer than necessary will deplete the bridge battery power.

Under normal operating conditions, the main battery pack maintains the bridge battery charge. That is, the bridge battery receives a slow charge while the main battery pack is being fast charged.

However, upon receipt of a new PTC or if the main battery pack has been left out of the PTC for an extended period of time, it may be necessary to charge the bridge battery. To do this, ensure that the main battery pack is installed properly in the PTC; then, plug the AC adapter into the unit's power jack and the AC power cord into an electrical outlet. The bridge battery will be fully charged in approximately 5 hours.

A fully charged bridge battery can back up the PTC's memory safely for approximately 24 hours with the main battery pack removed.

***Note:** The bridge battery is recharged by attaching the AC or vehicle adapter to the unit, or inserting the unit into a cradle. If the unit is recharged using a four-bay charger for the main battery pack, the bridge battery will not be recharged.*

If the PTC will be stored for longer than 30 days, keep the main battery pack installed (after fully charging it) and place the PTC into ship/storage mode by following the instructions in [Chapter 12 on p. 55](#).

Conditioning the Bridge Battery

The PTC-2234's nickel-cadmium bridge battery is susceptible to “memory” effects. This means that even if the bridge battery appears to be fully charged, it may not be able to maintain the contents of the PTC's memory if the main battery pack is removed before the PTC is placed in suspend mode.

Memory effects are characteristic of nickel-cadmium battery technology. To reduce the risk of memory effects, perform the following procedure once a month to condition the bridge battery.

It is not necessary to back up data or program files that are stored on the internal solid-state hard disk drive.

1. Transfer any data stored in the PTC to a PCMCIA card or a host computer. Ensure that there is a copy of any programs stored in RAM memory.
2. Remove any PCMCIA cards from the PCMCIA slot(s).
3. Remove the main battery pack from the PTC.

4. Store the PTC and the battery pack at room temperature. The PTC must not be placed in a cradle or be connected to any power source during the ensuing discharge period.
5. Allow the PTC to remain idle while the bridge battery discharges (at least 6 hours).
6. After the 6-hour discharge period, place the main battery pack back into the PTC.
7. Charge the PTC for at least 5 hours.

The bridge battery has now been conditioned for one month of service. Repeat this procedure monthly for maximum battery life.

Replacing the Bridge Battery

The PTC's nickel-cadmium bridge battery is not user replaceable. When the bridge battery no longer holds a charge, send your PTC to an authorized Symbol service center to have the bridge battery replaced.

The service center will replace the defective bridge battery and follow the proper recycling procedure for the failed battery.

Maintaining the PTC-2234

Operating Conditions

If the PTC is operated below room temperature, the display may darken, and the response time may decrease.

If the PTC's screen is exposed to direct sunlight for a period of time (several minutes), the screen may darken from the elevated temperature. To correct this, shade the display from sunlight for a few minutes; it will resume normal operation.

Although the PTC-2234 is designed to resist dust, dirt, and moisture, it should not be used in excessively dirty or moist conditions. The PTC may be operated at temperatures between -4° and 122° F (-20° to 50° C).

Handling the PTC-2234

The following information will help to ensure safe, reliable, and trouble-free service from your PTC-2234.

Do not open the PTC's case. Only a trained Symbol technician may service the parts inside the PTC. Opening the unit may violate the warranty.

Always keep the PCMCIA door closed and latched, unless inserting or removing PCMCIA devices.

Always secure the cover over the serial/keyboard connector when it is not in use.

If the PTC or the battery pack is stored below 32° F, allow the PTC or battery to reach room temperature before attempting to operate the unit or to charge the battery.

The display's performance may be improved if the PTC is allowed to reach room temperature before operating.

Suspend the PTC before connecting or removing any cables or accessories or replacing the battery pack.

Use only Symbol-approved accessories. Do not attempt to connect any electrical device to the PTC that is not part of the PTC-2234 system.

Antenna Handling

Use care when handling the PTC to avoid unnecessary damage to the antenna. Although Symbol antennas are designed to rigorous electrical and mechanical reliability standards, damage may occur if the PTC is handled improperly.

The PTC's warranty does not cover damage to the antenna resulting from improper handling. Follow the guidelines below to avoid mishandling the PTC and its antenna.

Do not use the antenna as a handle to pick up or hold the PTC. Do not use tools to install or tighten the antenna. Overtightening may result in damage to the antenna or the PTC's antenna mount.

When handling heavy objects and the PTC at the same time, do not use the antenna to balance heavy loads. Extreme weight directly on the antenna may cause damage.

Although the PTC is designed to withstand a 4-foot drop, do not throw the device. This is considered to be intentional abuse, and such treatment may cause damage to the antenna and the PTC and may violate the warranty.

PTC Storage

Follow these instructions when planning to ship the PTC or store it for more than 30 days.

Do not store the PTC-2234 in temperatures below –13° F (–25° C) or above 158° F (70° C).

Do not store the PTC-2234 in a damp or humid environment.

1. Transfer any data stored in the PTC to a PCMCIA memory card, a host computer, another PTC or print the data.
2. Make sure you have a copy of any programs stored in the PTC.
3. Disconnect all accessories from the PTC and remove any PCMCIA cards from the PCMCIA slots.
4. Close the cover over the serial/keyboard connector.

***Note:** Pressing the **Reset/Ship** button places the PTC in **Ship** mode, which results in maximum shelf storage time. Refer to “Resetting the PTC” in [Chapter 14 on p. 65](#) for more information.*

5. Press the PTC’s **Reset/Ship** button.
6. Recharge the PTC’s battery pack.
7. Close and latch the PTC’s PCMCIA door.
8. Pack the PTC in the original packing material or in a padded box and put it in a safe place, away from dust, dirt, humidity, and excessive cold or heat.
9. Recharge the PTC’s battery pack every 120 days.

Cleaning the PTC

Equipment Required

- Soft, lint-free cloth.
- Nonabrasive liquid glass cleaner.

Caution: *Do not soak the cleaning cloth and do not spray or pour cleaning liquids directly onto the PTC.*

To clean the PTC, slightly moisten a soft, clean, lint-free cloth with a mild, nonabrasive liquid cleaner and wipe the outside surfaces. Do not use a paper towel.

To clean the battery pack contacts and the contacts of the PTC, use a cloth moistened with isopropyl alcohol or a battery contact cleaner. To clean the PTC's display, use ethanol.

If the PTC becomes extremely dirty or if liquids, dirt, or other foreign materials get inside the case, contact your Symbol service representative.

Servicing the PTC

Do not attempt to service the PTC. Only a trained Symbol technician may service the PTC. Follow the procedure set up by your organization to have the PTC serviced properly.

Disposing of the PTC

When your PTC has reached the end of its useful life, do not throw it away. Contact the Symbol Support Center at 800-653-5350 for bridge battery removal and recycling as well as the unit's disposal.

Troubleshooting

General

When an error occurs, halt all operations. Write down what the system is doing and what actions were taken immediately before the error message was displayed.

If any messages display on the screen, look them up in your software manuals. Do any lights glow? Which ones? Do they stay on or blink? Has the beeper sounded? How many times and in what pattern? Do the beeps seem to be related to anything you are doing? Is the PTC making any unusual noises?

Confirm that the PTC has been set up properly. Do some applications run and not others? Ensure that the software is installed properly and that the application program and data files are not corrupted.

If using more than one external device, disconnect all devices and reconnect them one at a time. Retest the PTC after you connect each device. If the PTC locks up (the application stops responding to the stylus), reboot the PTC. Refer to "[Rebooting/Resetting the PTC](#)" on p. 65 for details.

Beep Codes

The PTC beeps when the battery pack or the bridge battery is running low on power.

Five Sets of Three Beeps

Five sets of three beeps with a pause between sets means the battery pack is running low. When this warning is observed, save all open files and recharge the PTC's battery pack.

Five Beeps

Five beeps means the bridge battery is approaching a critically low power level. When this warning is observed, recharge the bridge battery.

LED Codes

Refer to [Appendix C on p. 77](#) for an explanation of the Power, Status, and Scanning LED codes.

Common Solutions

Listed below are our most frequent service call issues and their solutions. If any of the following problems are experienced, follow the instructions provided.

PTC Does Not Turn On

Charge or replace the battery pack. Refer to [Chapter 10 on p. 43](#) for instructions.

Try to reboot the PTC.

If the PTC still does not operate, follow your organization's procedure to have the PTC serviced.

PTC Does Not Respond to the Stylus or Responds Inappropriately

The PTC's digitizer may need to be recalibrated. Make arrangements with your VAR representative or the Symbol Support Center at 800-653-5350 to have the unit's digitizer recalibrated.

If the PTC still does not respond correctly, follow your organization's procedure to have the PTC serviced.

PTC Does Not Recognize the Information Written on the Screen

Allow the PTC to warm up to room temperature if it has been stored or used in below room temperature conditions.

Refer to [Appendix G on p. 95](#) for tips on how to form letters and numbers correctly for system recognition.

PTC's Screen is Slow to Refresh

Allow the PTC to warm up to room temperature if it has been stored or used in below room temperature conditions.

Radio Fails to Establish Contact

Change the PTC's location by a few feet and transmit again. Recharge or replace the PTC's battery pack. Ensure that the receiving equipment is turned on and is properly connected to the host computer. If the PTC still does not establish contact, follow your organization's procedure to have the PTC serviced.

Battery Pack Does Not Hold a Full Charge After Being Recharged

The battery pack may be faulty or worn out, particularly if it is old. Replace it with a new one.

Battery Pack Runs Down Rapidly After Being Charged

Remove any PCMCIA devices from the PTC's PCMCIA slot(s). Disconnect the AC or vehicle adapter from the PTC. Contact the Symbol Support Center at 800-653-5350 if the problem continues.

Bar-Code Wand Does Not Read a Label

Ensure that the wand's connector is firmly connected to the PTC's RJ-41 connector module. Ensure that the application has activated the wand. Try pulling the wand across the top or bottom of the bars on the label. The label or wand tip may be dirty. Wipe off the label and wand tip. Try again.

Laser Scanner Does Not Read a Label

If using an external scanner, ensure that its connector is firmly attached to the PTC's RJ-41 connector module. Ensure that the application has activated the scanner.

Move the laser scanner closer to or farther away from the bar-code label. You may not be scanning at the correct distance. Change the angle of the laser scanner to the bar-code label. The scanner may be too far above or below the bar-code label or too far to the side to scan properly.

Clean the scanner's lens. Point the scanner at a blank surface and press the scan trigger. Look for the scanning line that appears on the blank surface when the scanner is operating. If no scanning line appears, follow your organization's procedure to have the scanner serviced.

Ensure that the bar-code label you are trying to scan is one of the bar-code types your PTC has been programmed to recognize. The PTC's application program may not support scanned data at this particular field. Consult the documentation for the PTC's application program to determine when the scanner and scan triggers are enabled.

Your Application Locks up

Reboot or reset the PTC using the instructions in [Chapter 14 on p. 65](#). Follow your organization's procedure to have the PTC serviced if required.

Getting Help

Review the troubleshooting sections in your pen operating environment, the Microsoft manuals, and the documentation for your application before contacting Symbol.

Cannot Correct the Problem

Contact your Symbol service representative for information on purchasing a service contract.

Notify your Symbol service representative or contact the Symbol Support Center at 1-800-653-5350.

Rebooting/Resetting the PTC

In the event that the application locks up (fails to respond), reboot the PTC using one of the methods discussed in this chapter. If the reboot is unsuccessful, see [“Resetting the PTC” on p. 66](#).

***Note:** Under normal circumstances, a reboot will unlock the unit.*

Rebooting the PTC

***Note:** Rebooting the PTC erases all programs and data in RAM.*

Rebooting stops the PTC, resets the unit, and then restarts it. When the PTC starts again, it returns to the operating system.

Warm Boot

To execute a **warm boot**, follow the steps below:

1. Suspend the PTC.
2. Press and hold the **Increase Contrast** button and the **Resume** button simultaneously.
3. Release the **Increase Contrast** button.
4. Press and release the **Increase Contrast** button again.
5. Release the **Resume** button. Reset is now complete. The screen will be blank for 15 seconds and the **Status LED** blinks quickly while the unit boots up.
6. Press the **Resume** button to restart the PTC.

From an Attached Keyboard

If a keyboard is attached to the PTC, the unit may be rebooted by pressing the **Ctrl**, **Alt**, and **Delete** keys simultaneously.

Via the Pop-Up Keyboard from the DOS Prompt

To reboot the PTC from the pop-up keyboard, go to the DOS prompt and, using the stylus, touch the PTC's screen three times. When the pop-up keyboard displays, use the stylus to select the **Ctrl**, **Alt**, and **Del** keys (in this order).

Resetting the PTC

Note: Resetting the PTC erases all programs and data in RAM.

If rebooting is not effective, a system reset may be required. When the PTC reboots after a reset, it returns to the operating system.

Procedure

A thin, non-conductive object will be required for the following procedure (for example, a plastic coffee stirrer).

1. Open the PTC's PCMCIA door.

*Note: The PTC does not have to be **On** to be reset.*

2. Use a thin, nonconductive object to press the **Ship/Reset** button. The **Ship/Reset** button is inside of the PCMCIA card area. It is the blue button adjacent to the PCMCIA card eject buttons.
3. Press the **Resume** button to restart the unit.

References

SC/VC-2X34 User's Guide — Contains operation and maintenance instructions for the cradle that may be used with the PTC-2234.

PTC-2134/2234 Win95 Software Guide — Serves as a supplement to the documentation provided with the Software Development Kit. The guide provides software and programming information specific to the PTC-2234.

The documentation that is supplied with the Software Development Kit includes a set of manuals that provides programming information for the software components of the PTC-2234.

Specifications

Communication and I/O

I/O Device	Description
Radio	Choice of any single radio.
	<u>LAN radio options</u> 2.4-GHz direct-sequence 802.11-compliant, or 2.4-GHz frequency-hopping 802.11-compliant spread spectrum radio.
Serial	RS-232 via 15-pin connector.
Cradle port	14-pin connector; connects to cradle.
Expansion module connector	40-pin connector for attaching a laser scanner, or RJ-41 connector.
PCMCIA slots	Accept two Type II or one Type III PCMCIA device.
IrDA 1.0 port	Infrared lens for serial IrDA communications.
Keyboard	Optional PC/AT via 15-pin connector and Y adapter cable.

Display Features	Description
Type	Monochrome, transreflective, LCD with 16 levels of gray.
Size	4.96 x 3.74 in./12.6 x 9.5 cm.
Resolution	VGA, 640 x 480 pixels.
Digitizer	Transparent pressure-sensitive resistive touch panel; 200 x 270-ppi resolution, 200-ppi sampling.

Electrical Parameters	Description
Battery pack	Lithium-ion.
Bridge battery	Nickel-cadmium.
AC adapter	Input: 100–240 VAC @ 50/60 Hz.
Output	15 VDC @ 2.7 or 3 A.
Vehicle adapter	Input: 9–16 or 11–28 VDC.
Output	15 VDC @ 2.7 A.

Environmental	Description
Operating temperature	–4° to 122° F (–20° to 50° C) Battery charging will take longer if performed below room temperature.
Storage temperature	–13°–158° F (–25°–70° C).
Operating humidity	0 to 95% non-condensing.
Shock	3.3 ft (1.0 m) drop to concrete.
Operating altitude	Up to 15,000 ft (4546 m).
ESD protection	15 kV.

Note: *If the PTC is operated below room temperature, the display may darken, and the response time may increase*

Expansion Modules (optional)	Description
Laser Scanner	Standard range.
RJ-41 connector	Provides port for external bar-code wands or laser scanners.
Shock	3.3 ft (1.0 m) drop to concrete.
Operating altitude	Up to 15,000 ft (4546 m).
ESD protection	15 kV.

Note: *The shock and operating altitude specifications do not apply to a rotating disk PCMCIA card.*

Mass Storage	Description
Compact flash	Internal solid-state compact flash hard disk drive; 96 MB nominal.
PCMCIA	Two Type II or one Type III PCMCIA card.

Note: See [Chapter 8 on p. 35](#) for more information on auxiliary storage cards

Memory	Description
ROM	512-KB flash PROM.
RAM	20-, 36-, and 64-MB EDO DRAM.

Microprocessor	Description
Type and speed	AMD Elan SC400 (100 MHz).

Operating System	Description
Operating system	Windows 95.
Pen operating environment	Windows 95 extensions.

Physical	Description
Length	8.4 in./21.3 cm.
Width	5.4 in./13.7 cm.
Height	2.2 in./5.6 cm 2.7 in./6.9 cm (at hand grip).
Weight	2.5 lb/1.1 kg (w/ batt. pack).

Stylus	Description
Type	Aluminum with spring-loaded Teflon tip.

Accessory Part Numbers

The following tables contain the part numbers of PTC-2234 accessories.

Hardware	
Part Name	Part Number
AC adapter (15 VDC, 2.7 A)	21988-002
Antenna, spread spectrum (2.4 GHz)	21990-401
Antenna plug (no radio option)	18046-000
Lithium-ion battery pack	24172-002
Shoulder strap	20296-000
Stylus	24322-001
Stylus holder	19231-201
Vehicle adapter (15 VDC, 2.7 A)	21438-001

Accessories	
SC/VC-2X34 Cradle	24910-001
Universal Battery Charger	
Base charger (desktop version)	23151-002
Base charger (wall-mount version)	23152-002
2134/2234 adapter	24911-001

Expansion Modules	
Blank module	19398-001
Laser module (standard range)	19391-103
RJ-41 connector module	24171-001

Cables	
Serial/keyboard Y adapter cable	18412-002

Software	
Software Development Kit	SK20-0219

Manuals	
PTC-2134/2234 Win95 Software Guide	30661-000

LED Indicators

This appendix explains the functions of the PTC-2234's front panel light-emitting diodes (LEDs).

Power LED

The PTC's Power LED indicates the status of the battery pack or bridge battery and is off while the PTC is running on battery power.

LED State	Battery State
Off	The battery pack and bridge battery are not low or power is not available.
Red	Battery pack is low.
Blinking red	Bridge battery is low.
Green	Battery pack is charged to a 90% or greater capacity.
Blinking green	Battery pack is charging.
Blinking red/green	The temperature is too hot or too cold for charging to occur.

Status LED	PTC Status
Fast blink	PTC is booting.
Slow blink	PTC is in the Standby mode.

Scanning LED	Scanning Activity
Red	Scanning.
Green	Good scan.

The PTC's Scanning LED glows red or green to indicate the scanning activity of the PTC-2234's laser scanner module.

Expansion Module Interface

The PTC-2234 may be equipped with an expansion module, such as a laser scanner, or an RJ-41 connector module. These modules may be attached and removed as needed. Follow the instructions in this section to attach or remove an expansion module.

Attaching an Expansion Module

To connect an expansion module to the PTC, perform the following:

1. Suspend the PTC and remove the battery pack.
2. If a different type of module is already connected to the PTC, remove it ["Disconnecting an Expansion Module" on p. 80](#).
3. Slide the module onto the PTC, such that the slotted female keyways of the module align themselves with the male keys of the PTC.
4. Slide the module down until the latches on both sides snap into place.
5. Replace the PTC's battery pack.
6. Perform a warm boot using the instructions found in the section entitled ["Warm Boot" on p. 65](#).

Disconnecting an Expansion Module

1. Suspend the PTC.
2. Grasp the module such that the thumb and middle finger press against the release buttons on both sides of the module.
3. Slide the module up until it clears the mounting rails.

Expansion Modules

Using the Optional Expansion Modules

Instructions for connecting expansion modules to the PTC are provided in [Appendix D on p. 79](#).

Follow the instructions in this chapter to operate the laser scanner module or the RJ-41 connector module.

If necessary, refer to the documentation provided with the Software Development Kit for instructions on loading the driver.

The following procedures assume that the PTC has already been loaded with a software driver for the expansion module.

Laser Scanner Module

If the PTC-2234 has an attached laser scanner module, the unit may be programmed to automatically recognize, read, and discriminate up to six 1D bar-code types. Refer to ["1D Bar-Code Types" on p. 83](#) for a list of the bar-code types. Also, see the information provided by your organization for details on how the PTC has been programmed.

Warning: *Do not stare into the PTC's laser beam or point the scanner at anyone's eyes. Permanent eye damage may result.*

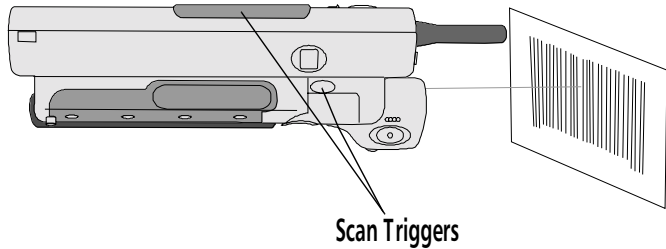


Figure 10. Reading a Bar Code with a Laser Scanner

Follow this procedure to scan bar-code labels with a laser scanner module.

Note: Consult the application documentation to determine when the scanner and scan triggers are enabled.

1. Point the PTC at the label to be scanned. The laser beam exits the scanner module at a 15-degree angle so the PTC should not have to be tilted downward when scanning.

See the information provided by your organization for the recommended scanning distance.

The maximum distance from the scanner lens to the label depends on the size of the label being scanned and the type of laser being used.

Note: The application program may not support scanned data for all fields.

2. Press one of the PTC's scan triggers to start scanning (refer to [Figure 10](#)). The Scanning LED glows red while the laser is active.
3. Ensure that the laser line passes over all of the bars being read. If the scan is successful, the Scanning LED glows green.

The PTC can support up to six bar-code types. Other bar-code types may be added and are available by special order. However, for each new type added, one of the default code types must be removed.

1D Bar-Code Types

Upon receipt, the PTC-2234's optional laser scanner module will be programmed to read and automatically discriminate among the following 1D bar-code types:

- Codabar
- Code 2 of 5
- Code 39
- Code 128
- Plessey
- UPC/EAN

Press any of the scan triggers to activate the laser scanner.

The scanning line should extend beyond the sides of the bar code.

Using the RJ-41 Connector Module

See the application instructions for the codes that the PTC can recognize.

The RJ-41 connector module allows external bar-code wands and laser scanners to be used with the PTC.

This section provides instructions on connecting an external wand or scanner to the RJ-41 connector module and then explains how to use these devices to scan bar codes.

Connecting an External Bar-Code Wand or Laser Scanner

Caution: *Do not insert a telephone connector into the PTC's RJ-41 connector; this may damage the PTC.*

Note: *See Appendix D for instructions on attaching an RJ-41 connector module.*

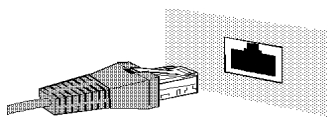


Figure 11. An RJ-41 Connector

Only wands or laser scanners with an RJ-41-type modular connector will attach to the PTC's RJ-41 connector module. The connector resembles a modular telephone connector but has six wire contacts instead of four.

To connect an external bar-code wand or laser scanner to the PTC, perform the following:

1. Suspend the PTC.
2. Locate the RJ-41 connector on the module.
3. If necessary, remove the rubber plug from the RJ-41 connector.
4. Align the wand or laser's connector with the connector on the module. The wand or laser's connector has a tab that must line up with the slot in the module's connector (refer to [Figure 11](#)). Push the connector in until the locking tab clicks into place. Press down on the tab with a small screwdriver or the stylus tip to disconnect.

To connect an external bar-code wand or scanner perform the following:

1. Slip the wand or laser's connector into the module's connector until the locking tab clicks into place.
2. Resume the PTC; then, turn on the scanner.

Using a Bar-Code Wand

Follow this procedure only if the PTC is equipped with a bar-code wand. If it has a laser scanner, refer to the section entitled "[Laser Scanner Module](#)" on p. 81

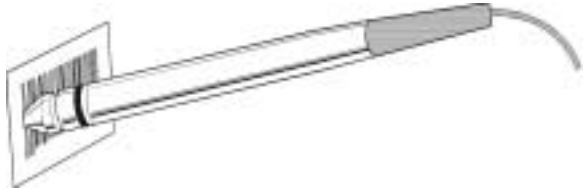


Figure 12. Bar-Code Wand

1. Grasp the wand in the middle of its shaft and hold it as if it were a pencil.
2. Place the tip of the bar-code wand to the left or right of the bars in the bar-code label. Ensure that the reader touches the label and is within 30° of vertical in any direction (see [Figure 12](#)).

***Note:** Do not draw the wand across the label too slowly. More reading failures occur from scanning the bar code too slowly rather than too quickly.*

3. Draw the wand across the label with a smooth, quick motion. The PTC may beep or provide some other indication when it successfully reads a bar code. Start outside the bar code on either side and draw the wand all the way across the bar code and off the other side.

Using an External Laser Scanner

When using an external laser scanner, use the following procedure. Also, see the documentation provided by your organization for the recommended scanning distance.

1. Point the laser scanner at the label to be scanned. The scanner need not be perpendicular to the label. The maximum distance from the window on the nose of the scanner to the label depends on the range of the scanner and the size of the label being scanned.
2. Press the scanner trigger to start scanning. The scanner may have a scanning indicator light to show that the scanner is active.
3. Watch the line of light made by the scanner as it scans the bar code. Ensure that the scan line extends beyond both sides of the bar code. If the scan has been successful, your PTC may beep or inform you in some other way, depending on your application program. The scanner may also have an indicator light to indicate a successful scan (see the scanner's manual for details). Ensure that the scan line extends beyond both sides of the bar code.

Disconnecting an External Bar-Code Wand or Laser Scanner

The wand or laser scanner is usually not meant to be disconnected from the PTC. However, if it must be removed, follow this procedure.

Procedure

The following procedure will require a small screwdriver or the PTC's stylus.

1. Suspend the PTC.
2. Turn off the scanner.

3. Grasp the connector when disconnecting. Do not pull directly on the wand or laser's cable. Doing so may break internal cable wires.
4. Use the tip of the small screwdriver or the PTC's stylus to press the tab down on the wand or laser's connector; then, pull the connector out of the module.
5. If necessary, replace the rubber plug in the PTC's RJ-41 connector.

Connector Pinouts

This appendix provides pinouts of the PTC-2234's communication connectors.

Table 1. Serial/keyboard connector pinouts

Pin	Signal Name	Description	Signal Level
1	N/C	Not Connected	
2	COMA_TXD	COM 2—EIA-232 Transmit Data	RS-232
3	COMA_RXD	COM 2—EIA-232 Receive Data	RS-232
4	COMA_RTS	COM 2—EIA-232 Request to Send	RS-232
5	COMA_CTS	COM 2—EIA-232 Clear to Send	RS-232
6	COMA_DSR	COM 2—EIA-232 Data Set Ready	RS-232
7	GND	Ground	
8	COMA_CD	COM 2—EIA-232 Carrier Detect	RS-232
9	COMA_DTR	COM 2—EIA-232 Data Terminal Ready	RS-232

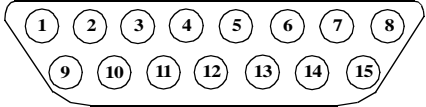
Pin	Signal Name	Description	Signal Level
10	COMA_RI	COM 2—EIA-232 Ring Indicator	RS-232
11	KBPWR	Keyboard Power (+5 VDC @ 100 mA)	+5 VDC
12	LS_KBCLK	Keyboard Clock	+5 V
13	LS_KBDATA	Keyboard Data	+5 V
14	N/C	Not Connected	
15	DB15_VCHARGE	Charger Power (15 VDC @ 2.7 A)	+15 VDC
			

Table 2. Cradle port pinouts

Pin	Signal Name	Description	Signal Level
1	OTXD	COM 2—Optical Transmit Data	+5 VDC
2	ORXD	COM 2—Optical Receive Data	+5 VDC
3	OTXS#	COM 2—Optical Transmit Status	+5 VDC
4	ORXS#	COM 2—Optical Receive Status	+5 VDC
5	KB_CLK	Keyboard Clock	+5 VDC
6	GND	Ground	
7	VCHARGE	Charger Voltage	
8	5VSW	Switched Power	+5 VDC
9	GND	Ground	
10	KB_DATA	Keyboard Data	+5 VDC
11	ETXD+	Ethernet Transmit Pair	+5 VDC
12	ETXD–		
13	ERXD+	Ethernet Receive Pair	+5 VDC
14	ERXD–		

Table 3. Expansion module connector pinouts

Pin	Signal Name	Description	Signal Level
1	CHASSIS_GND	Chassis Ground	
2	SCAN_5V	Scanner Power	+5 VDC
3	SCAN_RXD	Scanner Receive Data	+5 VDC
4	WANDIN	Scanner Data	+5 VDC
5	SCAN_DTR	Scanner Data Terminal Ready	+5 VDC
6	TRIG#	Scanner Trigger	+5 VDC
7	MSR3#	MSR Track 3 Strobe	+5 VDC
8	SOS	Scanner Start of Scan	+5 VDC
9	SCAN_DSR	Scanner Data Set Ready	
10	WANDIN	Scanner Data	+5 VDC
11	SCAN_RTS	Scanner Request to Send	+5 VDC
12	5V_SW	Backup Power-Switched	+5 VDC
13	SCAN_CTS	Scanner Clear to Send	+5 VDC
14	MSRD3#	MSR Track 3 Data	+5 VDC
15	SCAN_CD	Scanner Carrier Detect	+5 VDC

Pin	Signal Name	Description	Signal Level
16	LED_EN	Scanner Good Scan LED Enable	+5 VDC
17	SCAN_ID0	Scanner ID Bit 0	+5 VDC
18	PEN_EN#	Scanner Pen Enable	+5 VDC
19	SCAN_ID1	Scanner ID Bit 1	+5 VDC
20	N/C	Not Connected	
21	SCAN_ID2	Scanner ID Bit 2	+5 VDC
22	MSR_CD#	MSR Card Detect	+5 VDC
23	GND	Ground	
24	SCAN_7V	Scanner Power	+7 VDC
25	MSRS1#	MSR Track 1 Strobe	+5 VDC
26	SCAN_7V	Scanner Power	+7 VDC
27	GND	Ground	
28	TRIG#	Scanner Trigger	+5 VDC
29	GND	Ground	
30	MSRD1#	MSR Track 1 Data	+5 VDC
31	GND	Ground	
32	MSRD#2	MSR Track 2 Data	+5 VDC
33	MSRS32	MSR Track 2 Strobe	+5 VDC

Pin	Signal Name	Description	Signal Level
34	MSR_5V	MSR Power	+5 VDC
35	5V_SW	Backup Power Switched	+5 VDC
36	V_POWER	Main Battery Power	
37	5V_SW	Backup Power-Switched	+5 VDC
38	SCAN_TXD	Scanner Transmit Data	+5 VDC
39	CHASSIS_GND	Chassis Ground	
40	CHASSIS_GND	Chassis Ground	

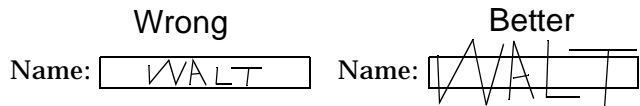
Stylus Information

Stylus Data Entry Tips

This appendix provides helpful tips on how to use a stylus to write on the PTC's screen.

General Guidelines

Write larger than the field. Writing too small is the primary cause of poor recognition.



Print neatly, making sure to form characters distinctly.

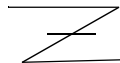
Leave room between characters, but make sure all strokes of a single character are connected.

Print uppercase letters larger than lowercase letters.

Write commas near the bottom of the field, and apostrophes near the top of the field.

When printing colons or semicolons, draw the top dot first.

Write the letter “Z” with a small horizontal line through its middle.



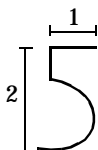
Write the number “0” with a slash through it.



Write the number “1” with a small horizontal line at its base.



Write the number “5” with two strokes rather than one.



Glossary

Application — A PC, mainframe, or PTC program that is designed to perform a specific task. Examples include route accounting, payroll, price lookup, shipping, and inventory control.

Bar Code — A series of vertical bars and spaces used to encode numeric or alphanumeric information. Bar codes are designed to be read by electronic means, such as bar code readers or laser scanners.

Bar Code Reader — An electrical device that recognizes and deciphers bar code labels. When the reader passes over the bar code, it converts the bar code into electronic signals representing data. The PTC can then enter this data into files in its memory.

Bar Code Wand — A cylindrical bar code reader shaped like a pencil.

BIOS — **B**asic **I**ntput/**O**utput **S**ystem.

Boot or Boot-up — The process that a PTC goes through when it first starts up. During boot-up, the PTC runs self diagnostics and configures hardware and software.

Bridge Battery — A battery that is used to protect data in the PTC's memory when the main battery pack is discharged or removed.

Byte — A group of eight bits that acts as a basic unit for information transfer and storage.

CD — Carrier detect signal. CD indicates that the modem is receiving a signal from the remote modem.

CTS — Clear-to-send signal. CTS indicates that the line between a modem and a terminal device is clear for transmission. CTS typically follows a raised request-to-send (RTS) signal.

Data Card — A credit-card-size electronic device used to hold data and programs.

Data Communication — The transfer of encoded information from one device to another.

DataTAC — A wide area radio frequency data network.

Digitizer — A device that is mounted above the PTC's LCD. It enables the unit to recognize data entered with the PTC's stylus.

Display — The LCD panel on a PTC. A PTC's display shows data, prompts, and error messages.

DOC — Department of Communications — Canada.

DSR — Data set ready signal. The modem sends DSR to the attached device to indicate that the modem is connected, on, and ready.

DTR — Data terminal ready signal. The signal sent by the terminal device to the modem to indicate that the terminal is ready for transmission.

EPROM — Erasable programmable read-only memory.

ESD — Electrostatic discharge.

FCC — Federal Communications Commission — U.S.A.

Field — An area of the PTC's screen where data may be entered.

File — Any group or collection of related information stored in memory. To add data to a file or to read data from a file, the program must access the file by its file name.

Flash EPROM — A type of erasable programmable read-only memory that may be erased and reprogrammed electronically while installed in a PTC.

Frequency-Hopping (FH) Radio — A type of spread spectrum radio that continually jumps from one frequency to another to avoid interference.

Gnd — Ground.

Hard Boot — To turn off and completely reset the PTC. A hard boot clears RAM, so any data or programs stored in RAM memory are erased.

Hardware — Equipment used in conjunction with programs or data communication.

Host Computer — A personal computer or mainframe that receives and processes data from remote PTCs.

Hertz (Hz) — A unit of frequency equal to one cycle per second.

Interface — The connection between two devices, defined by common physical characteristics, signal characteristics, and signal meanings. Types of interfaces include RS-232 and PCMCIA.

I/O Port — Input/output port. The location on a PTC where RS-232-compatible accessories are attached. Also, the point through which the PTC sends and receives transmission signals.

LAN — Local area network. A radio network that supports data communication within a local area, such as within a warehouse or building. Contrast with *WAN*.

Laser Scanner — A type of bar-code reader that uses a beam of laser light.

LCD — Liquid crystal display.

LED — Light emitting diode.

Lithium-Ion Battery — A type of rechargeable battery used to power some PTCs. The advantage of lithium-ion batteries (over nickel-cadmium batteries) is their increased capacity in comparable weight and volume.

mA — Milliamperes.

mAh — Milliampere hour(s). A measurement of the ability to provide electrical power over time.

Modem — Modulator-demodulator. A communication device that converts serial digital data from a transmitting device to a signal suitable for transmission over a telephone line and then reconverts the signal to serial digital data for the receiving device.

MS-DOS — Microsoft Disk Operating System.

MSR — Magnetic stripe reader.

Network — An interconnection of computer systems, terminals, and data communication facilities.

Nickel-Cadmium Battery — A rechargeable battery used to power some PTCs and accessories. The PTC-2134 contains a nickel-cadmium bridge battery.

PCMCIA — Personal Computer Memory Card International Association. A standardized interface that enables the PTC to connect to many standard devices, including data cards and PCMCIA modems.

Pen Operating Environment — An operating environment, usually running on top of the operating system, that enables the use of a stylus with a PTC. The PTC-2134 uses the PenRight! pen operating environment.

Prompt Words (or symbols) — Shown on the PTC's or PC's display to guide the user through the steps of an application. Prompts are defined in the application program.

PTC — Portable Teletransaction Computer. A battery-powered, programmable, hand-held device that is used to collect, store, and transmit/receive data.

RAM — Random access memory. In a PTC, RAM chips store the program files and data entered by the user.

Resume — A feature of the PTC-2134 that returns the system to the point in the application at which it was prior to being suspended.

RF — Radio frequency.

RI — Ring indicate signal. RI alerts a modem to a call waiting on the attached telephone line.

RJ-41 — A type of modular connection used by the PTC-2134 for communication with external bar code readers.

ROM — Read only memory. In the PTC-2134, ROM contains the BIOS for MS-DOS/Windows 95 or the bootloader for Windows CE.

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.

RTS — Request-to-send signal. RTS initiates the data transmission sequence on a communication line between a modem and a terminal device.

RXD — Receive data signal. RXD indicates that a device is currently receiving data.

Signals — Electronic impulses that transmit data from one device to another.

Sleep — A power-saving feature of the PTC-2134. The PTC is capable of slowing or turning off sections of its electronics to extend battery pack support time. Sleep occurs automatically when the PTC has not been used for a predetermined period of time.

Software — A stored program or set of programs that is loaded into RAM for execution.

Software Development Kit — Disks containing libraries of C programs and Symbol utilities to be used for programming pen-based applications for the PTC.

Spread Spectrum — A radio communication technology that distributes an RF signal over a wide range of frequencies for transmission; it then “despreads” the signal to the original frequency range at the receiver.

Stylus — A passive pointing device shaped like a writing pen. When used with the PTC-2134, it allows commands and data to be entered by touching or writing directly on the PTC’s screen.

Transflective Display — A display that uses reflected ambient light to produce viewable display images. It is ideal for use in outdoor applications. Contrast with *transmissive display*.

Transmissive Display — A display that is intended for indoor use only. It requires the backlight to be on at all times. Contrast with *transflective display*.

TXD — Transmit data signal. TXD indicates that a device is currently transmitting data.

VAC — Volts alternating current. A unit of measure of electric potential or potential difference in a bidirectional electrical current.

VDC — Volts direct current. A unit of measure of electric potential or potential difference in a unidirectional electrical current.

WAN — Wide area network. A radio network that supports data communication beyond a local area. That is, information can be sent across a city, state, or even nationwide. Contrast with *LAN*.

Warm Boot — To turn on a PTC with its memory intact. The warm boot restores all hardware and causes the application program to return to the beginning.

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