



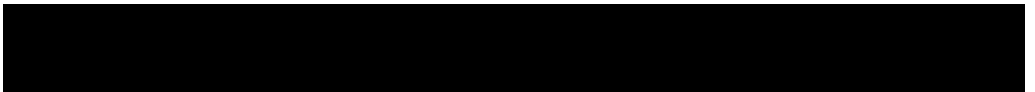
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**PTC-2124**

**User's**

**Guide**







# PTC-2124

## User's Guide

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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-2124 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-2124 User's Guide* provides information that allows the user to set up and use the PTC-2124. This manual is meant to provide information on the various components of this product, including

- General regulations,
- Overview of the PTC-2124,
- 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-2124 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](http://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 device 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.

**!** This is a Class A product. In a domestic environment, this product may cause radio interference, in which case the user may be required to take adequate measures.

## **89/336/EEC compatibility statement**

The EC conformity mark is affixed to this equipment to indicate that the equipment conforms to the appropriate requirements of the Council Directive 89/336/EEC.

## **73/23/EEC directive statement**

The EC conformity mark is affixed to this equipment to indicate that the equipment conforms to the appropriate requirements of the Council Directive 73/23/EEC.

## **Spread spectrum radio regulations**

If your PTC contains a direct-sequence or frequency-hopping spread spectrum radio the following regulations apply.

## **FCC regulations**

The PTC-2124 uses radios (transceivers) and radio communication in its operation. The PTC-2124 also uses a spread spectrum radio transceiver that qualifies for unlicensed use. The FCC ID is on a label on the back of the unit.

## **DOC statement**

The PTC-2124's radio is also approved for use in Canada. The PTC-2124 uses a spread spectrum radio transceiver that qualifies for unlicensed use. The Canadian DOC ID is on a label on the back of the unit.

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.

## ETSI compliance statement

The plug-in radio device used in this equipment has been tested and found to comply with the European Telecommunications Standard ETS 300.328. This standard covers wide-band data transmission systems referred to in the CEPT recommendation T/R 10.01.

## DataTAC radio regulations

The PTC-2124's internal transmitter has been type accepted in accordance with FCC CFR Title 47, Part 90. The FCC ID, Canadian DOC ID, or ID number for another appropriate regulatory agency is on a label on the back of the PTC.

You must subscribe to the DataTAC radio network (U.S.), Bell-Mobility (Canada), or the DataTAC system carrier in the country of operation before using this internal radio. You will need to provide the logical link identifier (LLI) number from the label on the rear of the unit for registration on the network. See your Symbol representative for information on subscribing to the network in the country in which the PTC will be used.

No license is required to operate this product in the U.S. or Canada. For information on operating regulations in other countries, see your Symbol representative.

## Mobitex radio regulations

The PTC-2124's internal transmitter has been type accepted in accordance with FCC CFR Title 47, Part 90. The FCC ID, Canadian DOC ID, or ID number for another appropriate regulatory agency is on a label on the back of the PTC.

**You must subscribe to the Bell-South Mobile Data radio network in the country of operation before using this internal radio. You will need to provide the Mobitex access number (MAN) from the label on the rear of the unit for registration on the network. See your Symbol representative for information on subscribing to the network in the country in which the PTC will be used.**

**No license is required to operate this product in the U.S. or Canada. For information on operating regulations in other countries, see your Symbol representative.**



## Safety information

### Using and disposing of lithium-ion batteries

Follow these guidelines when handling the PTC's lithium-ion battery pack:

- 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 lithium-ion battery pack.

Lithium-ion batteries contain chemically active materials that are hazardous to the environment; therefore, they must be disposed of properly. Never attempt to incinerate a lithium-ion battery; doing so could cause it to explode. Symbol urges you to contact the Environmental Protection Agency, the Department of Natural Resources, a local hazardous waste disposal agency, or the Symbol Product Support Center at 1-800-653-5350 for assistance prior to disposing of your lithium-ion batteries.

### Disposing of nickel-cadmium batteries

The PTC's nickel-cadmium bridge battery is not user accessible; however, it contains chemically active materials that are hazardous to the environment and must be disposed of properly. Never attempt to incinerate a nickel-cadmium battery; doing so could 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 before the unit is disposed of permanently.

## PTC containing a radio

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

## PTC having a laser scanner module



Do not stare into the scanner's laser beam if the protective cover is removed. Permanent eye damage could result.

The PTC-2124's optional laser scanner module is a Class II laser product. It emits a 1.0 mW 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 an internal protective cover.

The laser safety warning label required by the DHHS for the PTC-2124's optional laser scanner module is located on the scanner module near the scanning window.

# Scope of the manual


This manual provides general information on the PTC-2124's parts, features, and accessories. It also explains how to operate and maintain the PTC.

This manual does not provide instructions on how to perform the tasks specific to your job in your organization. For that information, refer to the manual or instructions provided by your supervisor.

## Document conventions

The following conventions are used throughout this manual.

## Warnings

Warnings indicate potential bodily injury or death. They are set off in the left-hand columns of this manual by the following symbol: .

## Cautions

Cautions indicate potential damage to equipment. They are set off in the left-hand columns of this manual by the following symbol: ! .

## Notes

Notes provide supplementary information. They are set off in the left-hand columns of this manual and are not preceded by a symbol.

## Related publications

Refer to Appendix B for ordering information.

The following manuals may be useful as you operate the PTC:

- *SC-1124/VC-1124 User's Guide*—Contains operation and maintenance instructions for the communication cradles that can be used with the PTC-2124.
- *CP-1124 Read-Me-First Sheet*—Describes the connector pod that can be used with a PTC-2124. The sheet provides instructions on connecting the pod to the PTC and on using the pod's keyboard, Ethernet, serial, and charger ports.
- Documentation provided with the Symbol Pen-Based SC400 Software Development Kit—A set of manuals describing and providing programming information for the software components of a PTC with an SC400-based processor.
- *PTC-2124 Software Guide*—Serves as a supplement to the documentation provided with the Symbol Pen-Based SC400 Software Development Kit. It provides software and programming information specific to the PTC-2124.

# Overview of the PTC-2124

The PTC-2124 is a rugged, SC400-processor-powered, PC-compatible, pen-based portable teletransaction computer (PTC). It is used to collect, store, and transmit data. Unlike personal computers, which rely primarily on a keyboard for data entry, the PTC-2124 uses its screen as the main input device.

In general, operate your PTC by using your finger or the supplied stylus to select choices from menus. The stylus may also be used to write directly on the screen to fill in forms or check off boxes. The actions you take depend on the application program your organization has developed for its specific needs. See the manuals or instructions that your organization provides for details on your application.

Through its pen operating environment, the PTC recognizes the touches or 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.

100 MHz is the default setting.

The PTC can also be set to operate at 33 or 66 MHz to reduce power consumption. To change the processor speed, press the F2 key from an attached keyboard during boot-up to access the CMOS setup. Then select the Advanced option and press the + or - key to set the speed to 33, 66, or 100 MHz.

# Operating system/environment

The PTC-2124 uses the MS-DOS 6.22 or Windows CE 2.12 operating system. PenRight!, a separate pen operating environment that may run on top of the operating system, allows the PTC to recognize touches as well as written letters and numbers.

## Memory

The PTC-2124 has two types of memory: read-only memory (ROM) and random access memory (RAM).

### ROM

The PTC-2124 comes with 512 kilobytes (KB) of read-only memory. It is used to store the PTC's Basic Input/Output System (BIOS).

### RAM

The PTC-2124 can be ordered with 4, 20, 36, or 64 megabytes (MB) of random access memory.

RAM is used to store data that the PTC needs while it is running. One MB of RAM is reserved for running the operating system and your application. The remaining RAM may be used by the pen-operating environment or by some applications.

Refer to Chapter 15 for information on resetting the PTC.

Data stored in RAM can 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 run out of power or if the PTC is rebooted or reset.

Refer to the section titled "Advanced power management" on page 17 for information on the PTC's APM feature.

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

# Display

! If left in direct sunlight for an extended time, the display can get hotter than its maximum operating temperature and darken. Shade it as much as possible from direct sunlight

The PTC-2124 contains a 1/4 VGA, transflective, monochrome display with an EL panel backlight.

A *transflective* 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.

The PTC-2124 features a *resistive touch panel digitizer*, which is mounted above the display. The digitizer enables the PTC to recognize data entered with a stylus. It also has a palm reject feature, which prevents accidental activation of the unit by casual hand or finger contact.

## Entering data

Data can be entered into the PTC-2124 in a variety of ways. You can use your finger or the PTC's stylus to select options on the PTC's screen; scan 1D bar codes with an optional laser scanner module; or receive data through an optional internal radio.

### With your finger or a stylus

As a pen-based computer, the PTC-2124 is ideal for forms-based data gathering. Use your finger to select menu options or the PTC's stylus to write in the fields of a form displayed on the PTC's screen or to check off items on a list. You may also have the option to capture signatures onto electronic forms (for example, when a delivery is made or an order is placed).

A *bar code* is a series of vertical bars and spaces used to encode information in a machine-readable form. They are used on nearly every item in business today.

## Through an optional laser scanner module

A second method of entering data is with the PTC's optional laser scanner module. When you scan a 1D bar code that the PTC is programmed to read, the PTC and scanner interpret the data and store it in the PTC's memory. See Appendix F for instructions on using the scanner module and for a list of supported bar codes.

## Via the radio

Refer to the section titled "Radio" on page 13 for information on radio communication.

## Applications

The Symbol Pen-Based SC400 Software Development Kit, Symbol part number SK20-0219, is available to assist you in developing pen-based applications for your PTC. Contact your Symbol representative for more information.

## Storing data

Data entered into the PTC can be stored in the PTC's RAM, on an internal solid-state compact flash hard disk drive, on removable PCMCIA solid-state data cards, or on rotating media.

In addition to storing data entered by the user, the PTC's solid-state compact flash hard disk drive also stores the DOS or WinCE operating system.

If your PTC contains a factory-installed LAN radio, only one PCMCIA slot, which accepts Type II cards, is available.

*PCMCIA data cards* are credit-card-sized memory cards that are used much as floppy disks are in a personal computer. The PTC-2124 has two user-accessible PCMCIA slots that can accept two Type II cards (one per slot) or one Type III card.



# Communication

For more information, see the documentation provided with the accessory.

## Cradle connector

The PTC's cradle connector allows direct connection to an SC-1124 Desktop Cradle, a VC-1124 Vehicle Cradle, or a CP-1124 Connector Pod. Each of these accessories provides communication and battery pack charging and can be connected to various external devices.

## IrDA port

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

## Radio

The PTC can be equipped with one local area network (LAN) radio or one wide area network (WAN) radio.

### LAN radio options

- Direct-sequence spread spectrum radio.
- 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.

No license is required to operate a WAN radio in the U.S. or Canada, but you must subscribe to the corresponding radio network (or another DataTAC network) before the radio can be operated.

### WAN radio options

- DataTAC radio

A DataTAC radio allows the PTC to communicate via a wide-area DataTAC communication network.

- **Mobitex radio**

A Mobitex radio allows the PTC to communicate via the wide-area Bell-South Mobile Data digital communication network.

A *wide-area network* is a radio network that supports data communications across a broad area, such as a city, a state, or even nationwide.

Your PTC's application program controls the radio. Refer to your application's manual for details on using the radio to transmit and receive data.

The PTC uses its radio to communicate with a host computer. Via the radio, the PTC can send data to the host, and the host can send data and instructions to the PTC.

## Antenna

If the PTC-2124 contains an expansion module and a radio, the radio antenna is located inside the expansion module.

Fold the antenna against the PTC when the unit is not in use.

If the PTC contains a radio but not an expansion module, a single external articulating 800 MHz, 900 MHz, or 2.4 GHz antenna is attached to the blank module cover on the right side of the PTC. The articulating antenna bends at a 90° angle at its knuckle and rotates 360° degrees around its mounting point. To achieve maximum signal strength for both transmission and reception, make sure the antenna is perpendicular to the ground, regardless of whether you are holding the PTC or it is installed in a communication cradle.

# Power

## AC adapter (optional)

**!** Use only the AC adapter supplied by Symbol with the PTC. Using any other adapter could cause damage.

A 15 VDC, 2.7 A AC adapter provides power to recharge the PTC's lithium-ion battery pack and nickel-cadmium 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 CEE.22 connector that accepts a wide range of AC cords with an input voltage between 100 and 240 VAC at 50/60 Hz.

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

## Battery pack

**!** Never leave the PTC without the battery pack installed. Removal of the pack will drain the bridge battery (even with the unit suspended).

Operating power for the PTC-2124 is provided by a rechargeable lithium-ion battery pack.

The battery pack can be charged via an AC adapter, vehicle adapter, desktop cradle, vehicle cradle, or connector pod.

Replace the PTC's battery pack after 500 charge cycles.

The amount of time during which the PTC can operate on a fully charged battery pack depends on the features used and on the length of time the PTC spends communicating with the host computer. The more the radio, backlight, PCMCIA slot(s), hard disk drive, and optional expansion modules are used, the sooner the battery pack will run out of power.

See Appendix C for more information on the Batt LED codes.

When battery pack power is low, the PTC sounds five sets of three beeps, and the Batt LED glows red. If you hear or see these warnings, promptly recharge the battery pack.

**!** Always suspend the PTC before removing its battery pack.

## Bridge battery

An internal rechargeable nickel-cadmium bridge battery provides power to protect data stored in the PTC's RAM memory while the battery pack is being replaced or if it runs out of power. The bridge battery can protect the PTC's memory for a cumulative total of 4 to 5 hours with the PTC suspended and the battery pack removed. The bridge battery is recharged automatically when the main battery pack is recharged.

The bridge battery's condition is checked every time the PTC is resumed. If the bridge battery power is low, the PTC beeps five times, and the Batt LED blinks red. If you hear or see these warnings, immediately recharge the unit for 5 hours.

## Vehicle adapter (optional)

**!** Use only the vehicle adapter supplied by Symbol with the PTC. Using any other vehicle adapter could cause damage.

A 15 VDC, 2.7 A vehicle adapter 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 or directly to a vehicle's battery or fuse panel.

Refer to Appendix B for ordering information.

Three vehicle adapters are available:

- A cigarette lighter adapter for 12-volt automotive systems.
- A wire adapter for 12-volt automotive systems.
- A wire adapter for 24-volt automotive systems.

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

# Other features

## Advanced power management

### Reduced power state

The PTC goes into a reduced power state if it is not used for a period of time or if it is suspended using the **On/Off** button. In the reduced power state, the PTC turns off portions of its internal electronics to conserve power.

The PTC has two stages of reduced power. The first stage (standby) begins after approximately 1 minute of inactivity. 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 CPU LED blinks red every 2 seconds 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.

The second stage (suspend) begins approximately 16 minutes after the PTC enters the **standby** mode or if the **On/Off** button is pressed while the unit is operational. This stage turns off additional hardware elements and provides only minimal memory refresh operations. The CPU LED blinks every 4 seconds.

The exact amount of time before the PTC goes into either reduced power state is programmable. Consult the *PTC-2124 Software Guide* for programming instructions.

### Resume

Refer to the *PTC-2124 Software Guide* for a list of other possible wake sources.

When the PTC is in **standby** mode, touching the PTC's screen with the stylus or pressing the **On/Off** button turns the PTC back on and returns you to the point at which you left the application.

When the PTC is in suspend mode, you must press the **On/Off** button to turn the PTC back on. Once again, you are returned to the point at which you left the application.

## Backlight

The PTC's backlight lights up the screen, making it easy to read. The backlight can be turned on or off by pressing the **Backlight** button.

To save power, the screen and backlight automatically turn off when there has been no activity on the screen. The duration of inactivity can be set by your application program.

## Battery power check

The PTC regularly checks the amount of power remaining in the battery pack and the bridge battery.

Before either battery is exhausted, the unit warns you with a series of beeps. When you hear them, promptly recharge the PTC's battery pack.

Refer to the section titled "Low-battery warning" on page 19 and Chapter 11 for more information.

## Clock

The PTC'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. How the clock is used depends on your application program. For example, the PTC can use the clock to show the date and time on its screen or to time-stamp a file.

If the PTC's battery pack and bridge battery become fully discharged, the date and time will be lost and have to be re-entered.

The clock can be set using the MS-DOS TIME and DATE commands.

If the screen is completely dark or blank, press the Contrast button to select an appropriate contrast level.

## Display contrast

The PTC screen's contrast can be changed using the **Contrast** button. Pressing this button adjusts the contrast in one direction, from lightest to darkest. Once the darkest setting is reached, the contrast wraps back to the lightest contrast level.

## Low-battery warning

The PTC warns you when the battery pack or the bridge battery is running out of power.

See Appendix C for more information on the Batt LED codes.

The battery pack is monitored constantly. If power runs low, the PTC sounds five sets of three short beeps with a pause between sets, and the Batt LED glows red. When you hear or see these warnings, promptly save any data and recharge the PTC's battery pack.

The bridge battery is checked every time the PTC is resumed. If the bridge battery is running out of power, the PTC sounds five beeps, and the Batt LED blinks red. If you hear or see these warnings, immediately save any data and recharge the bridge battery.

## Accessories

### Communication cradles

Two communication cradles are available for use with the PTC-2124: the SC-1124 Desktop Cradle and the VC-1124 Vehicle Cradle. These cradles recharge simultaneously the PTC's battery pack and a spare pack and allow the PTC to communicate with a host computer. Each cradle also provides Ethernet and serial interfaces to external devices as well as a keyboard connector.

## Connector pod

Appendix E lists the pinouts for the CP-1124's keyboard, Ethernet, and serial ports.

The CP-1124 Connector Pod, which attaches to the PTC's cradle connector, allows the PTC to be connected to a variety of external devices, including a keyboard, an Ethernet network, and a serial device. The pod also contains a charger jack to recharge the PTC's battery pack.



# Getting started

## Unpacking the PTC-2124

Any additional accessories are shipped separately.

Each shipping box contains

- a PTC-2124 pen-based computer,
- a lithium-ion battery pack,
- a 15 VDC, 2.7 A AC or vehicle adapter (if ordered),
- a stylus,
- a *PTC-2124 Read-Me-First Sheet*, and
- a *PTC-2124 User's Guide*.

The following steps should be performed in unpacking the shipping box.

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

1. Remove the PTC and other parts from the box.
2. Remove all packing material from the PTC. Save the packaging in case the PTC is ever stored or shipped to Symbol for service.
3. Check the contents of the package to make sure you have received everything ordered.
4. Check the PTC and accessories for shipping damage. Pay particular attention to the PTC case and screen.

## Setting up the PTC

Follow the instructions in this section to set up the PTC for the first time.

**!** If the plastic sheets are not removed, the PTC may not operate properly.

## Preparing the display screen and IrDA port

The PTC-2124's display screen and IrDA port may be covered by a thin sheet of plastic to provide protection during shipment. Carefully peel off these sheets before using the PTC's display and IrDA port.

## Selecting your work area

Hold the PTC or set it on a flat surface at a comfortable height. Choose an area that is free of

- rapid changes in temperature and humidity;
- dust, moisture, extreme heat, and direct sunlight;
- objects that radiate heat;
- objects that generate a strong electromagnetic field (such as stereo speakers); and
- liquids and corrosive chemicals.

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

## Installing the battery pack

If the battery pack is not already installed, follow the instructions in the section titled "Installing a new battery pack" on page 45.

## Charging the battery pack

**!** For first-time use, charge the unit for 5 hours.

The battery pack must be charged before you can use the PTC. Follow the instructions in the section "Recharging the battery pack" on page 43.

See Chapter 12 for more information.

## Charging the bridge battery

The bridge battery must be charged before you can use the PTC. Charging the main battery pack for 5 hours (as instructed in the previous section) will also fully charge the bridge battery.

## Loading software

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

If you need to load application software, instructions are provided in the *PTC-2124 Software Guide* and in the documentation that accompanies the Symbol Pen-Based SC400 Software Development Kit. Refer to Appendix B for ordering information.

## Configuring the PTC

See your MS-DOS manuals for an explanation of the CONFIG.SYS and AUTOEXEC.BAT files.

Your PTC is configured through the MS-DOS **config.sys** and **autoexec.bat** files. These files load and execute software device drivers and application programs and can be used to manage your PTC's memory. The documentation provided with the Symbol Pen-Based SC400 Software Development Kit contains information on configuring your PTC through these files.



# Parts

Figures 1 through 3 on the following pages show and describe the parts of the PTC-2124. The parts listed below are not shown in any of the figures.

## Flash EPROM

Flash EPROMs are electronic chips installed inside the PTC. In the PTC-2124, a flash EPROM holds the boot loader. If your PTC contains a radio, a separate flash EPROM holds the program that controls the radio.

Flash EPROMs can be erased and reprogrammed while they are inside the PTC. The documentation provided with the Symbol Pen-Based SC400 Software Development Kit contains instructions on reprogramming flash EPROMs. Refer to Appendix B for ordering information.

## Stylus

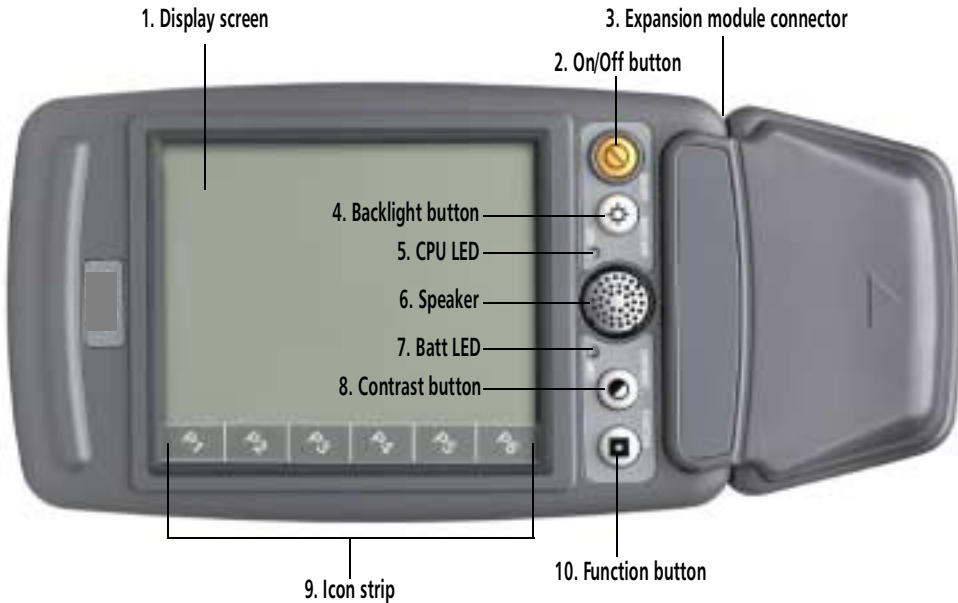
**!** Do not write on the PTC's screen with an ink pen, pencil, or marker; using these will mar the screen.

A stylus may be used to write directly on the PTC's screen. An optional stylus holder, which attaches to the PTC, is available to hold the stylus when it is not in use.

## Disposable screen protectors

Disposable screen protectors, Symbol part number 30782-001, are available to protect the PTC's screen from scratches and damage (e.g., from repeatedly striking a soft key in an application).

**Figure 1. The PTC-2124 (top view)**



1. This 1/4 VGA, transfective, monochrome liquid crystal display (LCD) screen has 320 x 240 lines of resolution and features a built-in backlight to enhance readability. The screen displays data entered into the PTC and may show prompts, error messages, and other information.
2. Pressing the On/Off button turns on the PTC or wakes it from a reduced power state. If the PTC is awake, pressing *On/Off* puts the unit into suspend mode.
3. If your PTC contains an optional expansion module (laser scanner), it will be attached to the PTC via the expansion module connector. See Appendix E for the scanner expansion module connector pinouts. If your PTC does not have an expansion module, the expansion module connector will be sealed with a blank expansion module cover. Figure 1 shows the PTC with an attached laser scanner module.
4. The *Backlight* button turns the display's backlight on or off.
5. This LED indicates the status of the PTC. See Appendix C for an interpretation of the CPU LED codes.
6. The speaker, located behind this grill, can be used by your application program to warn you of problems or to prompt you

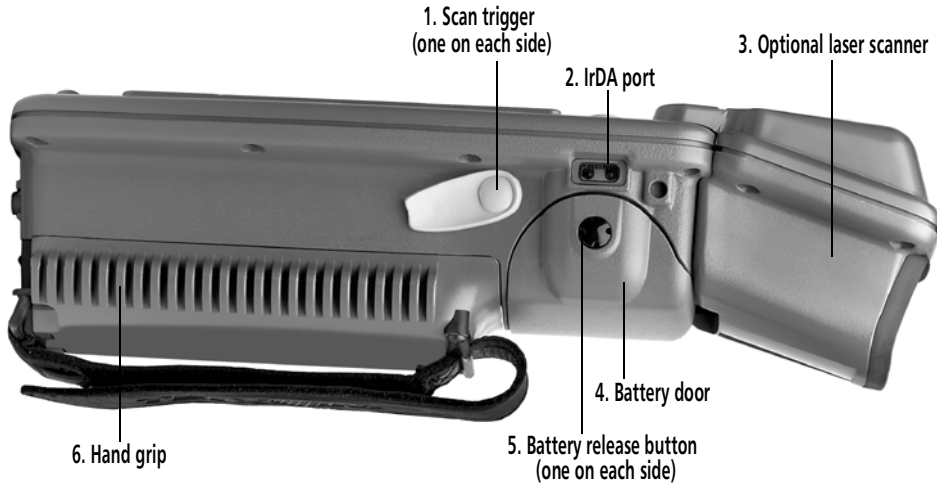
to take an action. For example, the PTC warns you with a series of beeps when the battery pack or bridge battery is running out of power. Refer to the section titled "Beep codes" on p. 58 for an explanation of the standard beep codes. Other codes may be specific to your application, which controls how the speaker is used. Your PTC can also be programmed to change the volume of the beeps emitted by the speaker.

7. This LED indicates when the PTC's battery pack or bridge battery is low, the charging status of the battery pack, and whether any errors have occurred. See Appendix C for an interpretation of the Batt LED codes.
8. The *Contrast* button can be used to change the contrast of the PTC's screen. Pressing the Contrast button adjusts the contrast in one direction, from lightest to darkest and then wraps back to the lightest contrast level.

***Note:** If the screen is completely dark or blank, press the **Contrast** button to select an appropriate contrast level.*

9. An additional line at the bottom of the display is reserved for six icons: P1 through P6. These icons can be custom programmed to meet the needs of your application. The **PTC-2124 Software Guide** provides information on programming the PTC's display icons.
10. This button can be programmed via the PTC's application to perform a specific function.

**Figure 2. The PTC-2124 (right side view)**



1. Pressing one of the scan triggers (one on each side of the PTC) activates the PTC's optional laser scanner module. The shape of the scan trigger conforms to the shape of the human thumb for ease of operation. Press directly on the raised round area of either trigger. You will hear and feel a distinctive "click" when the scanner has been activated. The CPU LED glows solid green and the PTC beeps to indicate a successful scan.
2. This IrDA 1.0 port allows the PTC to communicate via pulses of light to and from other IrDA-compliant devices, such as printers and host systems. See Chapter 10 for information on using the PTC's IrDA port.
3. This optional laser scanner module allows 1D bar codes to be read, interpreted, and stored in the PTC's memory.
4. The battery door provides access to the battery compartment, which contains the PTC's Reset button and the lithium-ion battery pack that powers the unit.
5. Pressing these two buttons (one on each side of the PTC) allows the PTC's battery door and battery pack to be removed. Refer to Chapter 11 for instructions on replacing the battery pack.
6. Use the PTC's hand grip to hold the PTC during use. The hand grip is molded to provide a secure grip. An optional adjustable leather hand strap (shown in Figure 3) is available for use with the hand grip.



**Figure 3. The PTC-2124 (back view)**



1. This connector allows the PTC to be connected quickly and easily to an SC-1124 Desktop Cradle, a VC-1124 Vehicle Cradle, or a CP-1124 Connector Pod for communication and battery pack charging. The PCMCIA door must be closed completely before any of these devices can be attached to the PTC. See Appendix E for this connector's pinouts.
2. Opening this flexible door provides access to the PCMCIA slot(s). When the door is closed, it seals the PTC from dust, dirt, and moisture. The PCMCIA slots are connectors that allow you 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-2124's PCMCIA slots accept two Type II or one Type III PCMCIA card. Type III cards must be inserted into Slot 1, the slot farthest from the PTC's cradle connector.

**Note:** *If the PTC contains a factory-installed LAN radio, only one PCMCIA slot, which accepts Type II cards, is available. Type III cards are not supported if the PTC contains only one PCMCIA slot.*

3. A 15 VDC, 2.7 A AC or vehicle adapter connects to this jack and to an electrical outlet or a vehicle's cigarette lighter socket or power source to recharge the PTC's battery pack.



# Drive lettering and boot sequence

## Drive lettering

The PTC's operating system identifies drive letters according to the PTC's software configuration. The following sections provide the possible drive letter assignments for your PTC.

### Without Card and Socket services

Without Card and Socket services applies only during a boot sequence.

The PTC can be booted without Card and Socket services from the compact flash or from a slot on the PCMCIA controller.

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	RAM disk drives.

If you boot an ATA card in Slot 0 as drive C, the other PCMCIA slot is currently not usable for other PCMCIA devices.

## With Card and Socket services and DOS

The following drive letters are assigned when the PTC is used with Card and Socket services and DOS.

Drive letter	Assignment
C	Internal compact flash hard disk drive.
D	SRAM support or ATA hard disk drive card in Slot 0 (based on configuration of Card services ATA driver).
E	SRAM support or ATA hard disk drive card in Slot 1 (based on configuration of Card services ATA driver).
F	ATA hard disk drive card in Slot 0 (if SRAM support is configured in the ATA driver).
G	ATA hard disk drive card in Slot 1 (if SRAM support is configured in the ATA driver).

## With Card and Socket services and Windows

When the PTC is used with Card and Socket services and Windows, drives are dynamically assigned as they are installed and allocated.

## Boot sequence

*Drive 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 searches for **config.sys** first, starting on drive C and then searching Slot 0 (the slot closest to the PTC's cradle connector) until the file is found.
- The PTC then searches for **autoexec.bat**, starting on drive C and then searching Slot 0 until the file is found.

# Operating the PTC

## Holding the PTC

An optional hand strap is available.

Use the PTC's hand grip to hold the unit securely during use.

## Positioning the antenna

If your PTC contains a radio but not an expansion module, an external antenna will be attached to the PTC. To achieve maximum signal strength for both transmission and reception, bend the antenna at its knuckle; then, make sure the antenna is perpendicular to the ground, regardless of whether you are holding the PTC or it is installed in a communication cradle.

## Turning on the PTC

To turn on the PTC, press the **On/Off** button. The CPU LED blinks rapidly while the PTC boots.

Refer to the *PTC-2124 Software Guide* for a list of other possible wake sources.

When the PTC is in standby mode, you can wake it by gently tapping the tip of the stylus on the PTC's screen or by pressing the **On/Off** button.

When the PTC is in suspend mode, you can activate it by pressing the **On/Off** button.

# Turning off the PTC

! Observe the cautions below before suspending the PTC.

Refer to the section titled "Advanced power management" on page 17 for more information.

Press the **On/Off** 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 automatically enters **standby** mode if it has not been used for approximately 1 minute.

## Power-off cautions

Before you suspend the PTC, make sure that

- the PTC is not accessing the PCMCIA slot(s) or the hard disk drive,
- the PTC is not communicating through its internal radio or IrDA port, and
- you have saved all files as a precaution.

# Entering information on the screen

To enter data via the PTC's screen, use your finger to select a menu option or the PTC's stylus to write letters and numbers in a field.

**!** Never use anything other than your finger or the PTC's stylus on the screen; otherwise, you could damage it.

See Appendix D for tips on how to enter data that your pen operating environment may recognize.

Your application may allow only certain portions of the screen to be sensitive to your finger or 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 just as you would an ink pen or pencil.
2. To make a choice from a menu, lightly tap the tip of the stylus (or your finger) on that choice.
3. To write data in a field on a form, use the stylus to print the letters or numbers. Use very little pressure when writing on the screen.

Print the letters or numbers larger than the space between the top and bottom of the field.





## Using the PCMCIA slots

The PTC-2124 contains two user-accessible PCMCIA slots that can accept two Type II or one Type III PCMCIA card or device.

**Note:** *If the PTC contains a factory-installed LAN radio, only one PCMCIA slot, which accepts Type II cards, is available. Type III cards are not supported if the PTC contains only one PCMCIA slot.*

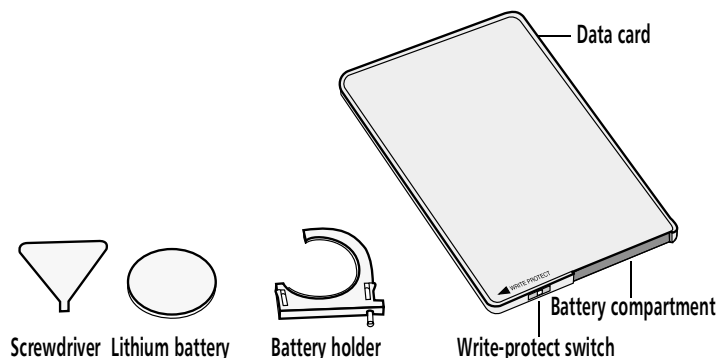
## Preparing a PCMCIA card

### Data card

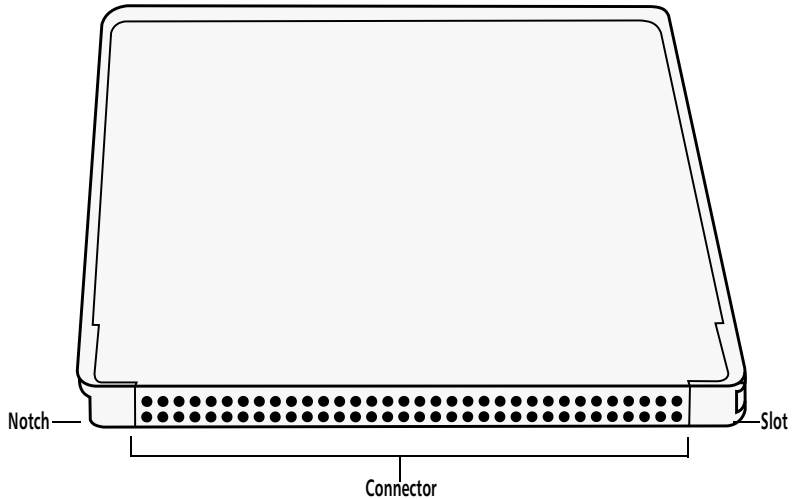
**!** If an SRAM data card is stored for a long period of time, the battery may run down, and your data will be lost. Change the battery periodically to protect the data on the card.

Static RAM (SRAM) data cards may require assembly. They use a small battery to maintain stored data. This battery must be installed before the card can be used. Refer to the instruction sheet packed with your SRAM card for instructions on how to install the battery.

**Figure 4. Parts of a typical data card**



**Figure 5. Typical data card (connector end)**



## Other PCMCIA devices

Other PCMCIA devices may also need preparation before they can be used. Refer to the instructions packed with the device.

## Inserting a PCMCIA card or device

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

**!** Do not force a card into the slot. You could damage both the card and the slot. If it 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. Doing so could cause damage.

Before you begin, examine the card. One end has two rows of holes. This is the connector that connects the card to the PCMCIA slot. One side of the card has a notch, and the other has a slot. These key the card so that it can be inserted into the slot in only one way. On a data card, a small write-protect switch is on the end opposite the connector. See Figures 4 and 5.

1. Suspend the PTC.
2. Open the PCMCIA door by pulling the flexible door open with your index finger.

Type III cards must be inserted into PCMCIA Slot 1, which is the slot farthest from the PTC's cradle connector. If Slot 0 contains a PCMCIA radio, Type III cards cannot be inserted into slot 1.

3. Slot 0 (which may be occupied by a factory-installed PCMCIA LAN radio) does not have an eject button. Before inserting a card into Slot 0, place a loop of tape over the card opposite its connector so you will be able to remove the card when necessary.
4. Hold the card label side down and with its connector toward the PTC; then, insert the card into the slot.
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. If the card is in Slot 0, use the tape as a pull tab to remove the card. If the card is in slot 1, press the **Eject** button located near the PCMCIA slot.
4. Close the PCMCIA door.
5. Resume the PTC.



# Communicating data

**!** Suspend the PTC before attaching it to a communication cradle or connector pod that has an attached keyboard to prevent damage to the keyboard.

Refer to the section titled "Radio" on page 13 for information on the PTC-2124's radio options.

The PTC can communicate with a host computer via radio, optional PCMCIA devices, its IrDA port, a communication cradle, or a connector pod.

## Communicating via radio

All radio communication is controlled by your application program. See the instructions provided with the program for information.

## Communicating using an optional PCMCIA device

See the instructions provided with the PCMCIA device and the information in Chapter 9.

## Using the IrDA port

The PTC-2124's IrDA 1.0 port allows the PTC to communicate via pulses of light to and from other IrDA-compliant devices, such as printers and host systems. Follow the instructions below to use the PTC's IrDA port.

1. Line up the PTC and the other IrDA-compliant device so that their IrDA ports are within 2 to 3 ft (0.6 to 0.9 m) of one another.
2. Follow the instructions or manual provided by your supervisor for the proper communication procedure to follow.

## Connecting to a communication cradle

See the manual provided with your cradle for instructions on how to install the PTC.

The PTC-2124 can be installed in an optional SC-1124 Desktop Cradle or VC-1124 Vehicle Cradle, which provides communication, battery pack charging, and connection to external devices.

## Connecting to a connector pod

See the documentation provided with the connector pod for instructions on attaching the pod to the PTC.

A CP-1124 Connector Pod, which provides connections to an external keyboard, an Ethernet network, and serial devices, can be attached to the PTC-2124's cradle connector.

# Maintaining the battery pack

## Low-battery warning

See Appendix C for more information on the Batt LED codes.

When your battery pack runs low on power, the PTC sounds five sets of three beeps, with a pause between sets, and the Batt LED glows solid red. When you hear or see these warnings, promptly recharge the PTC's battery pack.

## Operating the PTC with the AC or vehicle adapter connected

When the 15 VDC, 2.7 A AC or vehicle adapter is attached to the PTC, the unit draws 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 fully charged.

## Recharging the battery pack

The PTC's lithium-ion battery pack can be recharged via an AC adapter, a vehicle adapter, a communication cradle, or a connector pod. Charge the PTC's battery pack before you use the unit for the first time and whenever the PTC's Batt LED glows red to indicate a low-battery warning.

A lithium-ion battery pack will take longer than 1.5 to 2.5 hours to recharge if the charging process occurs below room temperature.

The PTC's built-in charger fully recharges a depleted battery pack in 1.5 to 2.5 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 0.75 to 1.25 hours to recharge.

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

## Charging via the AC or vehicle adapter

The PTC-2124'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 or directly to a vehicle's battery or fuse panel.

The wire vehicle adapter is available in two voltages. Make sure you use the adapter appropriate for your vehicle. See Appendix B for ordering information.

Follow the instructions in this section to charge your PTC's battery pack via an AC adapter and an electrical outlet or via vehicle power using a cigarette lighter vehicle adapter. To recharge the PTC's battery pack using a wire vehicle adapter that attaches directly to the vehicle's battery or fuse panel, follow the instructions in Appendix G.

The items required for recharging the battery pack are as follows:

If you are using the PTC outside of the U.S. or Canada, you need a power cord with a CEE-22 connector at one end (for the power supply) and an appropriate wall plug at the other end.

- A 15 VDC, 2.7 A AC adapter and an appropriate power cord or a 15 VDC, 2.7 A cigarette lighter vehicle adapter,
- An electrical outlet providing 100 to 240 VAC or a vehicle's cigarette lighter socket.

The following procedure should be used for recharging the battery pack:

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.



The Batt LED glows to show the recharging status. See Appendix C for an explanation of the Batt LED codes.

3. Charge the battery pack for 1.5 to 2.5 hours or until the Batt LED glows solid green.
4. 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.

## Charging via a communication cradle

To charge the PTC's battery pack via the SC-1124 or the VC-1124, simply insert the PTC into the cradle, following the instructions provided. The PTC's battery pack will be recharged automatically.

## Charging via a connector pod

To charge the PTC's battery pack while a CP-1124 Connector Pod is attached to the PTC, follow the instructions provided with the pod.

## Replacing the battery pack

Always connect the AC adapter to the PTC and an electrical outlet before removing the PTC's battery pack if the Batt LED is blinking red to avoid losing data in RAM.

**!** Never leave the PTC without the battery pack installed. The bridge battery will drain in 4 to 5 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

1. Suspend the PTC.
2. Press the PTC's two battery release buttons; then, remove the battery door.
3. Tilt the PTC and allow the pack to slide out into your hand.

### Installing a new battery pack

1. Insert the battery pack into the PTC's battery compartment, making sure that the battery pack's contacts align with the contacts inside the battery compartment.

2. Replace the battery door and push down firmly until it locks into place.
3. Resume the PTC.

## Getting the most out of the 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 the optional laser scanner module;
- whether your PTC is spending a lot of time communicating through its radio or IrDA port;
- the number of times that the battery pack has previously been recharged; and
- what the surrounding temperature is.

## 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).
- Reduce the screen's contrast or turn the backlight off.
- Keep radio use to a minimum.
- Keep the battery pack contacts and the contacts on the PTC clean.

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

Abnormally short operation of the PTC after charging is usually best corrected by replacing the battery pack.

## Battery pack life

The PTC's battery pack is rated for approximately 500 recharges, depending on the PTC's configuration and use.

## 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.
- Do not touch the battery pack contacts. Oil from your fingers could cause a bad connection with the PTC.
- 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. See the instructions for disposing of them in Chapter 2.

Refer to the section titled "Cleaning the PTC" on page 55 for cleaning instructions.

## Disposing of battery packs

Lithium-ion battery packs are hazardous waste. See Chapter 2 for information on how to dispose of them properly.



# Maintaining the bridge battery

## Recharging the bridge battery

The PTC-2124 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 bridge battery power is low, the Batt LED blinks red, and the PTC sounds five beeps.

The bridge battery is intended to provide power to the PTC only when the battery pack is being replaced. Leaving a PTC without a battery pack for longer than necessary to replace it uses up power in the bridge battery.

Under normal operating conditions, the bridge battery maintains its charge from the main battery pack. However, when you receive a new PTC or if you leave the main battery pack out of the PTC for an extended period of time, you need to charge the bridge battery. To do this, make sure the main battery pack is properly installed 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 charged in approximately 5 hours.

The PTC's ability to support RAM is reduced if the PTC is not suspended before the battery pack is removed.

A fully charged bridge battery can safely back up the PTC's memory for approximately 4 to 5 hours with the PTC suspended and main battery pack removed.

If the PTC will be stored for longer than 30 days, keep the main battery pack installed and place the PTC into **ship/storage** mode, following the instructions in the section titled "Storing/shipping the PTC" on page 54.

# Conditioning the bridge battery

The PTC-2124'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 back up 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. Make sure you have 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 somewhere out of the way and 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 for 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 and is good for another month of service.

## 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 insert a new bridge battery into your PTC and follow the proper procedure to recycle the failed battery.





# Maintaining the PTC-2124

## Operating conditions

If the PTC is operated at low temperatures, the display may darken, and the response time may be slow.

Although the PTC-2124 is designed to resist dust, dirt, and moisture, it should not be used in excessively dirty or moist conditions. The PTC can be operated at temperatures between  $-4^{\circ}$  and  $122^{\circ}$  F ( $-20^{\circ}$  to  $50^{\circ}$  C).

## Handling the PTC

The following information will help to ensure that you receive safe, reliable, and trouble-free service from your PTC-2124

- Do not open the PTC's case. Only a trained Symbol technician can service the parts inside the PTC.
- If you have stored the PTC or its battery pack in below-freezing temperatures for more than 1 hour, the battery pack may be too cold to charge. When the pack warms up to room temperature, charging will begin, provided the pack is connected to an appropriate power source.
- If you store the PTC in below-freezing temperatures for more than 1 hour, you can improve the display's performance by waiting until the unit warms up to room temperature before using it.
- Suspend the PTC before you replace the battery pack.

# Storing/shipping the PTC

The following precautions should be taken if you plan to store a PTC for any extended period of time

- Do not store the PTC in temperatures below  $-22^{\circ}$  F ( $-30^{\circ}$  C) or above  $158^{\circ}$  F ( $70^{\circ}$  C).
- Do not store the PTC in a damp or humid environment.

Follow the instructions below if you plan to ship the PTC or store it for more than 30 days.

1. Transfer any data stored in the PTC to a PCMCIA card or a host computer.
2. Make sure you have a copy of any programs stored in the PTC.
3. Remove any PCMCIA cards from the PCMCIA slot(s).
4. Remove the PTC's battery pack, following the instructions in Chapter 11.
5. Use a thin, nonconductive object (such as a coffee stirrer) to press the **Reset** button inside the battery compartment.
6. Reinstall the PTC's battery pack, following the instructions in Chapter 11.
7. Recharge the PTC's battery pack.
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 60 days.

Pressing the Reset button places the PTC in ship mode, which results in maximum shelf storage time. See "Resetting the PTC" in Chapter 15 for more information.

# Cleaning the PTC

The following items are needed for cleaning a PTC

- A soft, lint-free cloth,
- A nonabrasive liquid cleaner, such as Windex,
- Isopropyl alcohol or a battery contact cleaner.

**!** Do not soak the 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 on the PTC, use a cloth moistened with isopropyl alcohol or a battery contact cleaner.

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. Send it to an authorized Symbol service center for bridge battery removal and recycling before the unit is disposed of permanently.



# Troubleshooting

As a first step in resolving problems, consider the points in this section.

## General

- As soon as an error occurs, stop what you are doing. Write down what the system is doing and what actions you took immediately before the problem occurred.
- 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 speaker sounded? How many times and in what pattern? Do the beeps seem related to anything you are doing?
- Is the PTC making any unusual noises?
- Confirm that the PTC has been set up properly.
- Can you run some applications but not others? Check that your software is properly installed and that the application program and data files are not corrupted.
- If the PTC locks up (the application stops responding), perform a warm reboot.

See Chapter 15 for instructions.

# Beep codes

The PTC beeps to warn you when either 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 that the battery pack is running low. When you hear these beeps, promptly recharge the PTC's battery pack.

## Five beeps

Five beeps means that the bridge battery is running out of power. If you hear these beeps, immediately recharge the bridge battery.

## LED codes

See Appendix C for an explanation of the CPU and Batt LED codes.

# Common solutions

If you experience any of the problems in this section, follow the instructions provided.

## PTC does not turn on

- Charge or replace the battery pack.
- Try to reboot the PTC.
- If the PTC still does not operate, follow your organization's procedure to have the PTC serviced.

See Chapter 15 for instructions.

## **PTC does not respond correctly to the stylus**

- The PTC's resistive touch panel digitizer may need to be recalibrated. Make arrangements with your VAR representative or an authorized Symbol service center 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**

- Wait until the PTC warms up to room temperature if it has been stored or used in the cold.
- Refer to Appendix D for tips on how to form letters and numbers correctly for system recognition.

## **PTC's screen is slow to refresh**

- Wait until the PTC warms up to room temperature if it has been stored or used in the cold.

## **Radio fails to establish contact**

- Change your location by a few feet and transmit again.
- Recharge or replace the PTC's battery pack.
- Make sure 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 recharging

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

## Laser scanner module does not read a label

- Make sure the label you are trying to scan is one of the bar-code types that your PTC is programmed to recognize.
- Move the scanner lens 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. You may be too far above or below the label or too far to the side to scan properly.
- Clean the scanner lens.
- 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.
- Point the scanner at a blank surface and press one of the scan triggers. 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 laser scanner module serviced.
- If the bar code is oriented along the circumference of a round tube, the scanner will not be able to read it.

## Application locks up

- Reboot the PTC using the instructions in Chapter 15.
- Reset the PTC using the instructions in Chapter 15.
- Follow your organization's procedure to have the PTC serviced.



# Getting help

Try the following before contacting Symbol:

- Review the troubleshooting sections in your pen operating environment and Microsoft manuals.
- Review the documentation for your application.

## 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 Customer Support Center at 1-800-653-5350.



# Rebooting/Resetting the PTC

Under normal circumstances, a reboot will unlock the unit.

If your application locks up (stops responding), reboot the PTC using one of the following procedures. If the reboot is unsuccessful, follow the instructions on the next page to reset the PTC.

## Rebooting the PTC

! Do not reboot the PTC unless absolutely necessary. Rebooting the PTC erases all programs and data in RAM.

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

### Via a warm boot

1. Suspend the PTC.
2. Hold down the **Contrast** button and the **On/Off** button.
3. Release the **Contrast** button.
4. Press and release the **Contrast** button.
5. Release the **On/Off** button. The warm boot is now complete.
6. Press the **On/Off** button to restart the PTC.

The screen is blank for 15 seconds, and the CPU LED blinks red quickly while the unit boots up.

### From an attached keyboard

If a keyboard is attached to your PTC-2124 via a communication cradle or connector pod, you can reboot the unit 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 tap the tip of the stylus on 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

! Never reset the PTC unless absolutely necessary. Resetting the PTC erases all programs and data in RAM.

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

To reset a PTC, a thin, nonconductive object (for example, a plastic coffee stirrer) is required.

The following procedure should be preformed:

1. Remove the PTC's battery pack, following the instructions in Chapter 11.
2. Use a thin, nonconductive object to press the Reset button within the battery compartment.
3. Reinstall the PTC's battery pack, following the instructions in Chapter 11.
4. Press the **On/Off** button.

The CPU LED blinks red quickly and the screen is blank for approximately 10 seconds while the PTC reboots.

The PTC does not have to be on to be reset.

# Appendix A

## Specifications

### Communication and I/O

Radio:

Choice of any single radio:

LAN options:

Direct-sequence spread spectrum, 2.4 GHz direct-sequence 802.11-compliant spread spectrum, or 2.4 GHz frequency-hopping 802.11-compliant spread spectrum

WAN options:

DataTAC or Mobitex

Cradle connector:

13-pin connector; connects to SC-1124 connector: Desktop Cradle, VC-1124 Vehicle Cradle, or CP-1124 Connector Pod

If your PTC contains a factory-installed LAN radio, only one PCMCIA slot, which accepts Type II cards, is available.

PCMCIA slots:

Accept two Type II or one Type III PCMCIA device

IrDA 1.0 port:

Infrared lens for serial IrDA communications; up to 115.2 Kbps

### Display

Type:

Transflective monochrome LCD

Size:

4.7 in./11.7 cm (diagonal)

Resolution:

1/4 VGA, 320 x 240 pixels

Digitizer: ‘

Transparent resistive touch panel

## Electrical

Battery pack:	Lithium-ion
Bridge battery:	120 mAh nickel-cadmium
AC adapter:	Input: 100-240 VAC @ 50/60 Hz
Output:	15 VDC @ 2.7 A
Vehicle adapter:	Input: 9–16 or 11–28 VDC
Output:	15 VDC @ 2.7 A

## Environmental

If the PTC is operated at low temperatures, the display may darken, and the response time may slow.

Operating temperature:	–4° to 122° F (–20° to 50° C) Battery charging will take longer if performed below room temperature.
Storage temperature:	–22° to 158° F (–30° to 70° C)
Operating humidity:	0 to 95% noncondensing @ 104° F (40° C)
Vibration:	30 Hz orbital movement with 0.06 displacement
Shock:	3 ft (1 m) drop to concrete surface
Operating altitude:	Up to 15,000 ft (4,572 m)
Rain:	Rain drip on all surfaces
ESD protection:	15 kv; no damage (U.S. and Canada) 8 kv; no reset (Europe)

## Expansion modules (optional)

Laser scanner:	Standard range
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## Memory

ROM:	512 KB flash PROM
RAM:	4, 20, 36, or 64 MB

## Microprocessor

Type and speed:	AMD Elan SC400 (100 MHz)
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The PTC can also be set to operate at 33 or 66 MHz to reduce power consumption. Refer to the section titled "Processor" on p. 9 for instructions.

## Operating system/environment

Operating system:	MS-DOS 6.22 or Windows CE 2.12
Pen operating environment:	PenRight!

## Physical

Length:	7.6 in./19.3 cm
Width:	4.5 in./11.4 cm
Thickness:	2.4 in./6.1 cm
Weight:	24.5 oz/0.7 kg (with battery pack)

## Storage

PCMCIA:	Two Type II or one Type III PCMCIA data card
Hard drive:	Internal solid-state compact flash hard disk drive; 8 MB nominal

If your PTC contains a factory-installed LAN radio, only one PCMCIA slot, which accepts Type II cards, is available.

## Stylus

Type:	Aluminum with spring-loaded Teflon tip
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# Appendix B

## Accessory part numbers

Contact your Symbol sales representative to order any of the following parts.

The following table contains part numbers for ordering PTC-2124 accessories.

**Table 1. Accessory part numbers SC-1124 Desktop Cradle**

Item	Part Number
<b>Hardware</b>	
Lithium-ion battery pack	21588-000
AC adapter (15 VDC, 2.7 A)	20991-000
U.S. power cord	09038-000
Stylus	19415-000
Vehicle adapters (15 VDC, 2.7 A)	
9 to 16 volt cigarette lighter adapter	21438-001
9 to 16 volt wire adapter	21438-002
11 to 28 volt wire adapter	23662-001
<b>Accessories</b>	
CP-1124 connector pod	23450-001
SC-1124 desktop cradle	23449-001
VC-1124 vehicle Cradle	23448-001
Disposable screen protectors	30783-001

Item	Part Number
<b>Software</b>	
Symbol Pen-Based SC400 Software Development Kit	24136-000
<b>Related publications</b>	
<i>SC-1124/VC-1124 User's Guide</i>	24390-000
<i>CP-1124 Read-Me-First Sheet</i>	23382-002
<i>PTC-2124 Software Guide</i>	24136-200

# Appendix C

This appendix interprets the codes for both of the PTC's light-emitting diodes (LEDs).

## CPU LED codes

The PTC's CPU LED glows or blinks to indicate the status of the PTC.

**Table 2. CPU LED codes**

Color	Explanation
Blinking red (every 1/4 second)	PTC is booting.
Blinking red (every 2 seconds)	PTC is in software <b>standby</b> mode.
Blinking red (every 4 seconds)	PTC is in <b>suspend</b> mode.
Solid red	The PTC's scanner is active.
Solid green	The PTC has successfully scanned a bar code.

## Batt LED codes

The PTC's Batt LED glows or blinks to indicate the status of battery pack charging.

**Table 3. Batt LED codes**

Color	Explanation
Solid red	Low battery pack—recharge it.
Blinking red	Low bridge battery—recharge bridge battery or send PTC to Symbol service center to have bridge battery replaced.
Blinking green	Battery pack is being charged.
Solid green	Battery pack has reached a full charge.
Alternating red/green	Reset the PTC. If problem persists frequently, consult the PSC. The charging system may have detected a component failure.

# Appendix D

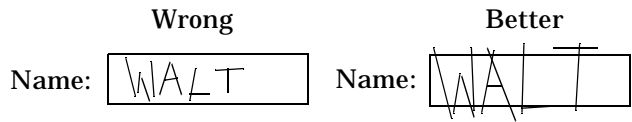
## Tips on using a stylus to enter data

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

### General guidelines

Follow the guidelines listed below to use the stylus to enter data on the PTC's screen.

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



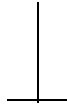
- Print neatly, making sure to form characters distinctly.
- Leave room between characters, but make sure that all strokes of a single character are connected.
- Print uppercase letters larger than lowercase letters.
- Write commas near the bottom of the field, and apostrophes near the top of the field.
- When printing colons or semicolons, draw the top dot first.
- Write the letter “Z” with a small horizontal line through its middle.



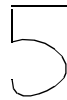
- Write the number “0” with a slash through it.



- Write the number “1” with a small horizontal line under it.



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



# Appendix E

## Connector pinouts

The cradle connector is shown in Figure 3 on page 29, with the position of Pin 1 indicated.

This appendix provides pinouts of the PTC-2124's cradle connector and scanner expansion module connector. It also lists pinouts for the CP-1124 Connector Pod's keyboard port, Ethernet port, and serial port.

**Table 4. PTC-2124 cradle connector pinouts**

Pin	Signal name	Description	Signal level
1	GND	Ground.	
2	OTXS# or COMA_RTS#	COM2—optical transmit status or 4-wire request to send.	RS-232
3	ORXS# or COMA_CTS#	COM2—optical receive status or 4-wire clear to send	RS-232
4	VCHARGE	Charger voltage +15 VDC @ 2.7 A.	+15 VDC
5	OTXD or COMA_TXD#	COM2—optical transmit data or 4-wire transmit data.	RS-232
6	ORXD or COMA_RXD#	COM2—optical receive data or 4-wire receive data.	RS-232
7	RXD+	Ethernet receive pair.	+5 V
8	RXD-		
9	TXD+	Ethernet transmit pair.	+5 V
10	TXD-		
11	VCC	VCC Power (+5 VDC @ 100 mA)	+5 VDC
12	KCLK	Keyboard clock.	+5 V
13	KDAT	Keyboard data.	+5 V

With the top cover of the scanner expansion module removed, the scanner expansion module connector is located just under the top of the PTC housing. Refer to Figure 2. The PTC-2124 (right side view) on page 28. The scanner expansion module connector is the small, white, 30-pin connector, with Pin 1 located on the right when viewing the PTC from the top.

**Table 5. PTC-2124 scanner expansion module connector pinouts**

Pin	Signal	Description
1	CONFIG0	Configuration 0
2	VSCAN_5V	Scanner +5 volt power
3	GND	Ground
4	MARKER/ SCAN_RXD#	Marker or scanner receive data
5	SCAN_DTR#	Scanner data terminal ready
6	TRIG_IMG	Connected to 47.5 K $\Omega$ resistor to ground
7	PEN_EN#	Pen enable
8	SCAN_TXD#	Scanner transmit data
9	BARCODE/ SCAN_DSR	Wand in/scanner data set ready
10	LED_EN	LED enable
11	TRIG#	Trigger
12	MARKER/ SCAN_RXD#	Marker/scanner receive data
13	SCAN_TXD#	Scanner transmit data
14	SCAN_SOS	Scanner start of scan
15	SCAN_CTS#	Scanner clear to send
16	SCAN_RTS#	Scanner request to send
17	SCAN_CD#	Scanner carrier detect
18	VSCAN_PWR	Scanner +7.2 volt power
19	VSCAN_PWR	Scanner +7.2 volt power



Pin	Signal	Description
20	VSCAN_PWR	Scanner +7.2 volt power
21	SCAN_ID0	Scanner ID bit 0
22	SCAN_ID1	Scanner ID bit 1
23	SCAN_ID2	Scanner ID bit 2
24	SCAN_ID3	Scanner ID bit 3
25	GND	Ground
26	GND	Ground
27	GND	Ground
28	CONFIG2	Configuration 2
29	VSCAN_5V	Scanner +5-volt power
30	CH_GND	Chassis ground

**Table 6. CP-1124 keyboard port pinouts**

Pin	Signal	Description
1	KDAT	Keyboard data (TTL signals)
2	N/C	No connection
3	GND	GND ground
4	VCC	Keyboard power (+5 VDC)
5	KCLK	Keyboard clock (TTL signal)
6	N/C	No connection

**Table 7. CP-1124 Ethernet port pinouts**

Pin	Signal	Description
1	TXD+	Ethernet transmit pair
2	TXD-	
3	RXD+	Ethernet receive pair
4	RXD-	
5	N/C	No connection
6	N/C	No connection
7	N/C	No connection
8	N/C	No connection

**Table 8. CP-1124 serial port pinouts**

Pin	Signal	Description
1	N/C	No connection
2	RXD	Receive data
3	TXD	Transmit data
4	N/C	No connection
5	GND	Signal ground
6	N/C	No connection
7	RTS	Request to send
8	CTS	Clear to send
9	N/C	No connection

# Appendix F

## Using the optional expansion modules

Follow the instructions in this appendix to use the PTC-2124's optional laser scanner module.

### Using the laser scanner module

If your PTC-2124 has an attached laser scanner module, the unit can be programmed to recognize, read, and discriminate automatically among six 1D bar-code types. See the next page for a list of these bar-code types and the information provided by your organization for details on how your PTC has been programmed.



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

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

Your application program may not support scanned data for all fields. Consult the documentation for your application to determine when the scanner and scan triggers are enabled.

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

1. Point the PTC at the label to be scanned.

The maximum distance from the scanner lens to the label depends on the size of the label being scanned and the type of laser that was selected by your organization.

2. Press one of the PTC's scan triggers to start scanning.
3. Watch the line of light made by the scanner as it scans the bar code.
4. If the scan is successful, the CPU LED glows solid green and the PTC beeps.
5. Hold the PTC at an angle to the bar code so that the scanning line is perpendicular to the bars in the bar-code label. Make sure the line passes over all of the bars.

# Supported bar codes


Other bar-code types (such as Code 11 and Code 93) are available by special order. However, the PTC can support only six bar-code types, so any additional bar code will have to replace one of the default bar codes.

The PTC-2124's optional laser scanner module can 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

# Appendix G

## Connecting a wire vehicle adapter to the PTC

 The procedures in this appendix should be performed only by qualified maintenance personnel.

This appendix provides instructions for connecting a wire vehicle adapter to the PTC-2124's power jack and to a vehicle's constant 12 or 24 VDC power source, such as the battery or fuse panel. When the PTC is connected directly to the vehicle's power source, power is supplied to operate the PTC and to recharge its battery pack.

### Electrical installation

The wire vehicle adapter is available in two voltages. Make sure you use the adapter appropriate for your vehicle. See Appendix B for ordering information.

Electrical installation varies according to vehicle. Use the following information to plan your installation.

The wire vehicle adapter consists of two wires attached to a power connector. The connector attaches to the PTC's power jack, and the wires are used for vehicle hookup. The wires are defined in Table 9.

**Table 9. PTC-2124 wire vehicle adapter**

Wire	Description
Power (+)	Smaller wire with writing; terminated in a spade lug.
Ground (–)	Ground (–) larger wire without writing; terminated in a ring lug for a #8 stud.

Follow the appropriate set of instructions on the following pages.

## Installing the power wire

Connect the power wire to a continuous 12 or 24 VDC source (one that provides power even when the vehicle is not running). This can be a direct connection to the vehicle's battery or a connection to a continuous source on the vehicle's fuse panel.

## Connecting to a battery with top terminals

The following items are required for connecting the power wire directly to a battery:

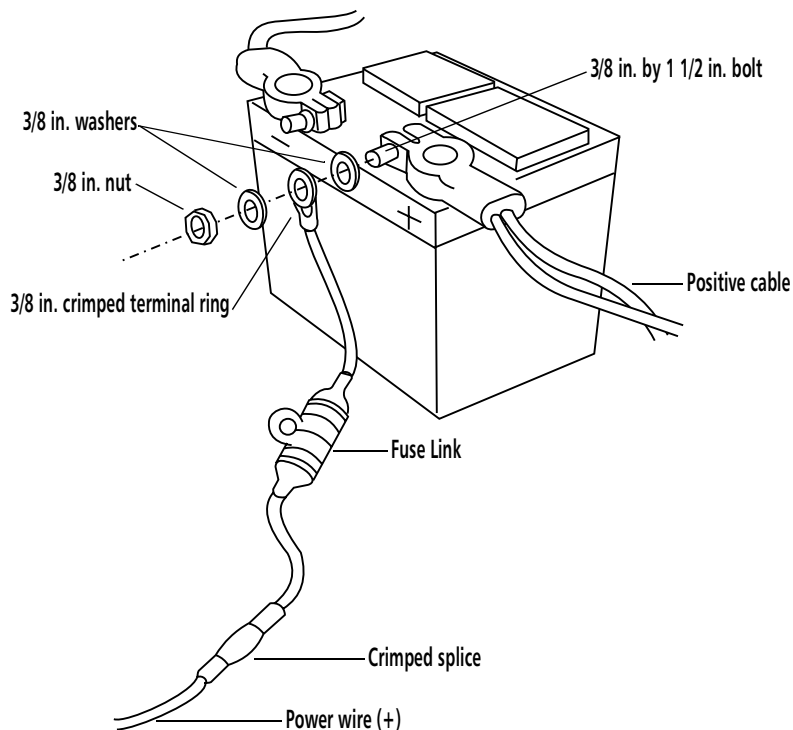
- A length of wire
- Two crimped splices
- A power drill and an assortment of drill bits
- A snap-in bushing
- A wire stripping/crimping tool
- A fuse link
- A 3/8 in. terminal ring
- A 3/8 in. by 1 1/2 in. bolt
- Two 3/8 in. washers
- A 3/8 in. nut
- Socket wrenches or box wrenches

Refer to Figure 7 as you perform the following steps:

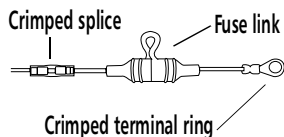
1. Determine if the power wire is long enough to reach the battery's positive (+) terminal.
2. If necessary, use a crimped wire splice (for #18 AWG) to join the additional length of wire to the power wire after cutting off the spade lug.
3. If necessary, drill a hole through the vehicle's firewall for the power wire.

If the wire is not long enough, you will need an additional length of wire.

**Figure 6. Connecting to a top-terminal battery**



4. If you have drilled a hole through the firewall or other sheet metal, insert a snap-in bushing to protect the wire.
5. Run the wire from inside the cab to the battery.
6. Strip 1/4 in. (0.64 cm) of insulation from the end of the power wire or the extension wire.
7. Attach a fuse link to the stripped end of the wire using a crimped splice. If necessary, crimp a 3/8 in. terminal ring onto the free end of the fuse link.
8. Remove the bolt from the battery's positive (+) terminal.
9. Replace the bolt with a 3/8 x 1 1/2 in. bolt.



10. Slide a 3/8 in. washer onto the bolt.
11. Slide the terminal ring on the power wire's fuse link onto the bolt.
12. Slide a second 3/8 in. washer onto the bolt.
13. Thread a 3/8 in. nut onto the bolt.
14. Tighten the nut securely.

## Connecting to a battery with side terminals

The following items are required for connecting the power wire directly to a battery:

- A length of wire
- Two crimped splices
- A power drill and an assortment of drill bits
- A snap-in bushing
- A wire stripping/crimping tool
- A fuse link
- A 3/8 in. terminal ring
- A 3/8 x 1 1/2 in. bolt
- A 3/8 in. nut
- Two 3/8 in. washers
- Socket wrenches or box wrenches

Refer to Figure 8 as you perform the following steps:

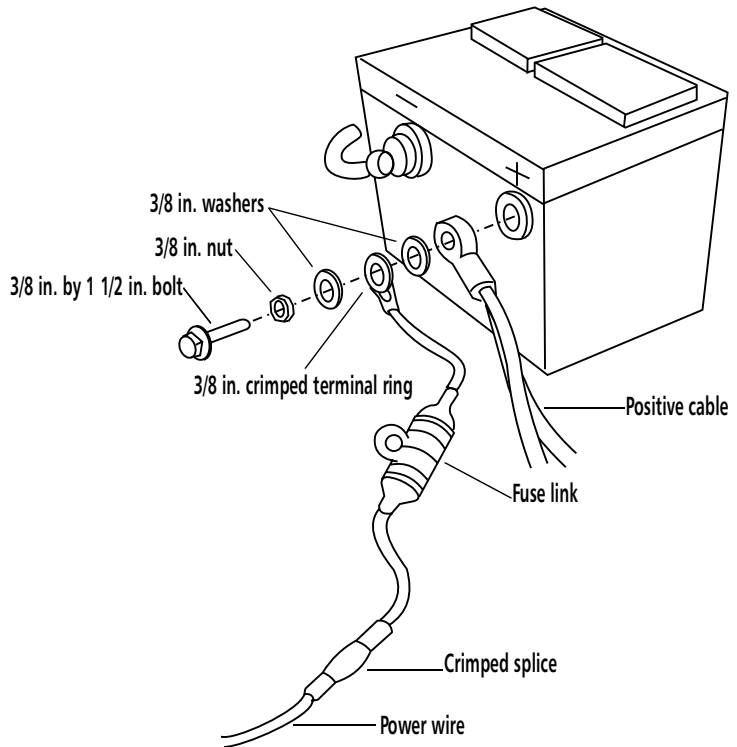
1. Determine whether the power wire is long enough to reach the battery's positive (+) terminal.
2. If necessary, use a crimped wire splice (for #18 AWG) to join the additional length of wire to the power wire after cutting off the spade lug.

If the wire is not long enough, you will need an additional length of wire.

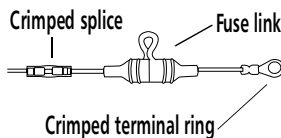


3. If necessary, drill a hole through the vehicle's firewall for the power wire.

**Figure 7. Connecting to a side-terminal battery**



4. If you have drilled a hole through the firewall or other sheet metal, insert a snap-in bushing to protect the wire.
5. Run the wire from inside the cab to the battery.
6. Strip 1/4 in. (0.64 cm) of insulation from the end of the power wire or the extension wire.
7. Attach a fuse link to the stripped end of the wire using a crimped splice. If necessary, crimp a 3/8 in. terminal ring onto the free end of the fuse link.



8. Remove the bolt from the battery's positive (+) terminal.
9. Thread a 3/8 in. nut onto a 3/8 x 1 1/2 in. bolt.
10. Slide one 3/8 in. washer onto the bolt.
11. Slide the terminal ring on the power wire's fuse link onto the bolt.
12. Slide a second 3/8 in. washer onto the bolt.
13. Slide the vehicle's positive (+) cable connector onto the bolt.
14. Screw the bolt into the battery's positive terminal and tighten it securely.
15. If necessary, tighten the nut installed on the bolt to secure the washers and cable connectors in place.

## Connecting to the fuse panel

The following items are required for connecting the power wire to a fuse panel:

- A wire stripping/crimping tool
- An assortment of crimp connectors
- A truck or automotive fuse

The following steps should then be performed:

1. Strip 1/4 in. (0.64 cm) of insulation from the end of the power wire.
2. Crimp the correct connector for your fuse panel onto the power wire.
3. Connect the power wire to the fuse panel.
4. Install a fuse of the proper rating (7.5 A) in the fuse panel.

Many fuse panels require a female spade connector.

## Installing the ground wire

The following items are required for the installation of a ground wire:

- A wire stripping/crimping tool
- An assortment of crimped terminal rings
- A power drill
- An assortment of drill bits
- A metal punch
- An assortment of sheet-metal screws
- An assortment of washers
- A screwdriver

The ground wire should be installed by performing the following steps. The following items are required for connecting the power wire to a fuse panel:

1. Select a place on the vehicle cab's sheet metal where you will attach the ground wire.
2. Drill a small hole at that spot.
3. With a punch, dimple and enlarge the hole slightly.
4. Scrape off a small circle of paint around the hole. You must expose the metal for a good electrical contact.
5. Use a sheet-metal screw and washer of the appropriate size to secure the ground wire's terminal ring to the sheet metal.

## Securing the wires

Wire ties should be used to secure the installed wires.

Secure the wires in place every 12 to 18 inches (30 to 46 centimeters) using wire ties.

- Make sure that the wires do not interfere with any equipment or vehicle controls.
- Make sure the wires will not be damaged by any engine parts or sheet metal.

## **Connecting the wire vehicle adapter to the PTC**

1. Place the PTC inside the vehicle's cab, provided electrical installation is complete.
2. Attach the vehicle adapter's power connector to the PTC's power jack.
3. Securely mount the vehicle adapter inside the vehicle's cab using double-sided tape.
4. Power is automatically applied to the PTC, and recharging of the PTC's battery pack begins. Charge the battery pack for 1.5 to 2.5 hours or until the Batt LED glows solid green.
5. If you wish to remove the PTC from the vehicle, disconnect the vehicle adapter from the PTC's power jack. If the PTC remains connected to vehicle power, the PTC will continue to receive power from the vehicle's battery or fuse panel, not from its battery pack.

# Glossary

analog	Continuously variable physical quantities, such as temperature and noise. Contrast with <i>digital</i> .
application	A PC, mainframe, or PTC program that is designed to perform a specific task for a user. 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 these data into files in its memory.
BIOS	Basic Input/Output System.
boot or boot-up	The process a PTC goes through when it first starts up. During boot-up, the PTC can run self diagnostics and configure hardware and software.
bridge battery	A battery used to protect data in the PTC's memory when the main battery pack is 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 transport of encoded information from one device to another.
digital	Discrete variable pulses or signal levels that represent continuously variable physical quantities. Contrast with <i>analog</i> .
digitizer	A device that is mounted above the PTC's LCD. It enables the unit to recognize data entered with your finger or the PTC's stylus.
display	The LCD 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 on the PTC's screen in which data can be written.
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 can 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. Contrast with <i>software</i> .
host computer	A personal computer or mainframe that receives and processes data from remote PTCs.
Hz	Hertz. 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	Input/output.
LAN	Local area network. A radio network that supports data communication within a local area, such as within a warehouse or building. Contrast with <i>WAN</i> .
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, including the PTC-2124. 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.
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.
network	An interconnection of computer systems, terminals, and data communication facilities.
nickel-cadmium battery	A type of rechargeable battery used to power some PTCs. The PTC-2124 contains a nickel-cadmium bridge battery.
PCMCIA	A type of standard interface used in the PTC-2124. It 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 MS-DOS, that enables the use of your finger or a stylus with the PTC. The PTC-2124 uses the PenRight! pen operating environment.
prompt	Words or symbols shown on the PTC's or PC's display to guide the operator through the steps of an application. Prompts are defined in the application program.
PTC	Portable Teletransaction Computer. A programmable, battery-powered, hand-held device 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 operator.
reduced power state	A power-saving feature of the PTC. The PTC is capable of slowing or turning off portions of its electronics to extend battery pack support time. This feature occurs automatically when the PTC has not been used for a predetermined period of time or is suspended using the <b>On/Off</b> button.



resume	A feature of the PTC that returns you to the point at which you were in your application program when the PTC entered a reduced power state. See <i>reduced power state</i> .
RF	Radio frequency.
RI	Ring indicate signal. RI alerts a modem to a call waiting on the attached telephone line.
ROM	Read-only memory. In the PTC-2124, ROM stores the PTC's BIOS.
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.
software	A stored program or set of programs that is loaded into RAM for execution. Contrast with <i>hardware</i> .
Software Development Kit	A set of diskettes 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 "de-spreads" the signal to the original frequency range at the receiver.
stylus	A passive pointing device shaped like a writing pen. 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.
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, a state, or even nationwide. Contrast with <i>LAN</i> .
warm boot	To turn on a PTC with its memory intact. A warm boot restores all hardware and causes the application program to return to the beginning.

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