



**PTC-960SL**



**User's Guide**



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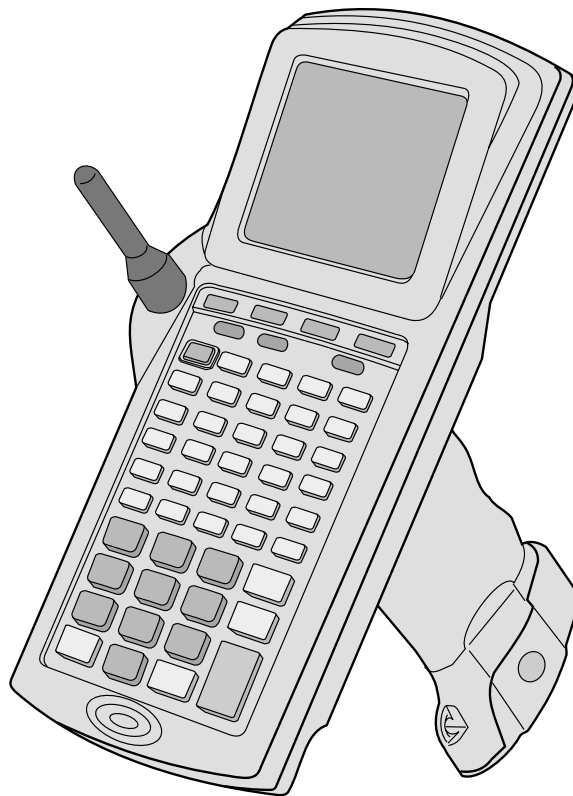
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# PTC-960SL

## User's Guide





# PTC-960SL

User's Guide

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# Regulations 1

## General regulations

### FCC statement

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

### DOC statement

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

This Class A digital apparatus meets all requirements of the Canadian Interference-causing Equipment Regulations.

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

## **If your PTC contains a spread spectrum radio**

### **FCC regulations**

The PTC-960SL uses radios (transceivers) and radio communication in its operation. The PTC-960SL 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-960SL's radio is also approved for use in Canada. The PTC-960SL 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.

# Safety information 2

## Using the batteries

Follow these guidelines when handling the PTC's lithium-ion or nickel-cadmium 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 battery pack.

## Disposing of lithium-ion or nickel-cadmium batteries

Lithium-ion and nickel-cadmium 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 or nickel-cadmium battery; doing so could cause it to explode. Telxon urges you to contact the Environmental Protection Agency, the Department of Natural Resources, a local hazardous waste disposal agency, or the Telxon Customer Support Center at 1-800-800-8010 for assistance prior to disposing of your lithium-ion or nickel-cadmium batteries.

## If your PTC contains 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.

## Using the internal laser scanner

Laser light exits the PTC through this opening. Do not stare into the beam!

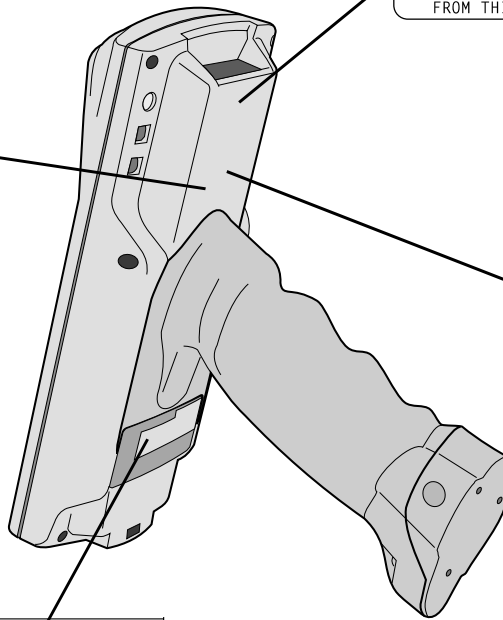
This label is embossed on the PTC directly below the scanner lens.

CLASS II LASER PRODUCT  
AVOID LONG TERM VIEWING  
OF DIRECT LASER LIGHT  
AVOID EXPOSURE  
LASER LIGHT IS EMITTED  
FROM THIS APERTURE

**CAUTION**  
DO NOT STARE INTO BEAM  
 LASER LIGHT  
1.0 MILLIWATT  
MAX OUTPUT  
680 nm LASER LIGHT  
CLASS II LASER PRODUCT

**CAUTION!** This Class II laser product emits up to a 1-milliwatt beam of laser light. Do not stare into the beam!

This label is permanently affixed to the back of the PTC above the handle.




**CAUTION!** Laser light is emitted when the PTC's protective housing is open. Do not stare into the beam! (top of label)

**CAUTION**  
LASER LIGHT WHEN OPEN  
DO NOT STARE INTO BEAM  
CLASS II LASER PRODUCT  
THIS PRODUCT CONFORMS  
TO DHHS REGULATION 21  
CFR SUBCHAPTER J  
THIS PRODUCT CONTAINS

This PTC is a Class II laser product. It conforms to the Department of Health and Human Services (DHHS) Regulation 21 CFR Subchapter J. (bottom of label)

This label is permanently affixed to the back of the PTC above the handle.

**TELX**  **MADE IN USA** MFG. LOC.   
MODEL:  DATE:   
U.S. PATENTS 4387297, 4460120, 4593186, 4758717, 5130520  
S/N:  REF NO.

This label lists the location and date of manufacture, the model number, and the serial number of the PTC. It is permanently affixed to the back of the PTC below the handle.

# Scope of the manual 3

This manual provides general information on the PTC-960SL's parts, features, and accessories. It also explains how to operate and maintain the PTC.

This manual does not include the specific operating instructions for your organization's unique data collection program. Operating instructions and training should be available from your organization.

## 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.

# Overview of the PTC-960SL 4

The Telxon PTC-960SL is a battery-powered, hand-held computer used to collect, store, and transmit data. It has a built-in laser scanner and may contain a spread spectrum radio.

The PTC-960SL automates your data collection procedures and is custom programmed to efficiently handle your organization's unique data collection jobs.

The PTC runs a program specially designed to collect data for your organization. This program leads you through the data collection procedure with a series of display messages, prompts, and beeps. Messages tell you when you make an error and provide information on the program or the PTC's status. Prompts and beeps tell you when to enter data, what type of data to enter, and when you complete certain operations.

The PTC-960SL is extremely durable. It is designed to withstand low pressure, a 4-foot (1.2-meter) drop to concrete, vibration, shock, dust, and moisture.

See [page 33](#) for more information on extended temperature versions.

An extended temperature version of the PTC-960SL is designed for use in extremely cold environments, such as those found in walk-in freezers. This optional unit can be operated in temperatures as low as -22 degrees F (-30 degrees C).

## Entering data

Entering data into the PTC-960SL is easy. You can key in data through the keyboard or scan bar codes with the internal laser scanner. Additionally, data can be received through an optional internal direct-sequence or frequency-hopping spread spectrum radio.

*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 the keyboard

Entering data through the keyboard is similar to operating a calculator. As you press the data keys, the corresponding number or letter appears on the screen. Pressing the ENTER key stores data in the PTC's memory.

## With the internal laser scanner

A second method of entering data is with the PTC's internal laser scanner. When you scan a bar code the PTC is programmed to read, the PTC and scanner interpret the data and store it in the PTC's memory.

## Via the radio

Refer to [pages 19](#) and [28](#) for information on radio communication.

## Storing data

Data entered into the PTC can be stored in files in the PTC's memory.

Each file holds a separate group of application-related data. For example, a PTC used to collect many types of data (sales orders, inventory changes, and employee hours) would store all data relating to sales orders in one file, all data relating to inventory changes in another, and all data relating to employee hours in still another.

## Communicating data

After collecting the data, the PTC must either transmit it to a host computer for processing or send it to a printer, or both, to make it useful to you and your organization. The PTC-960SL can transmit data through its internal radio, via an optional communi-



cation cradle, or by being connected by cable to a host computer, printer, or other accessory.

Once the host computer receives the data from the PTC, it uses that data to update its master files and records. In some cases, the host computer may even transmit data back to the PTC, asking you, as the PTC's operator, to perform a new task.

# Getting started 5

## Unpacking the PTC-960SL

Any additional accessories are shipped separately.

Each shipping box contains

- a PTC-960SL,
- a 1300-mAhr lithium-ion or 500-mAhr nickel-cadmium battery pack,
- a 12-VDC, 200-mA power module (if ordered),
- an antenna (if your PTC was ordered with a radio),
- a wrist strap,
- a *Guide to Maintaining Nickel-cadmium and Lithium-ion Batteries*,
- a *PTC-960SL Read-Me-First Sheet*, and
- a *PTC-960SL User's Guide*.

1. Remove the PTC from the box.
2. Remove all packing material from the PTC. Save the packaging in case the PTC is ever stored or shipped to Telxon 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, display screen, and scanner lens.

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

! Do not turn on the PTC or attempt to transmit data unless the antenna is attached; otherwise, the radio may be damaged.

## Connecting the antenna

If your PTC-960SL contains a radio, screw the supplied antenna into the antenna connector on the top of the unit.

## Installing the battery pack

If your PTC was not shipped with the battery pack installed, follow the instructions in [Chapter 10](#) to insert the battery pack.

## Charging the battery pack

Refer to [Appendix C](#) for information on ordering a charging accessory.

The PTC-960SL's lithium-ion or nickel-cadmium battery pack can be recharged via a power module, a communication cradle, or a universal four-bay battery charger. Charge the PTC's battery pack when you first receive the unit and whenever the pack becomes low. The Batt LED glows and a low-battery message may display when the battery pack is running out of power.

### Charging via the power module

#### Equipment required:

- A 12-VDC, 200-mA power module
  - An electrical outlet within 6 feet (1.8 meters) providing 110 volts AC in the U.S. or Canada
1. Turn off the PTC and disconnect any attached accessories.
  2. Connect the power module's cable to the PTC's micro DB-15 connector.
  3. Plug the power module into the electrical outlet. The Chg LED glows.

To charge the battery pack outside of the U.S. or Canada, you need a power module designed for the country's AC voltage supply (e.g., 220 volts).

A lithium-ion battery pack will take longer to charge if recharging is not performed at room temperature.

4. Charge the PTC's battery pack for 8 hours (lithium-ion) or 5 to 6 hours (nickel-cadmium).
5. When charging is finished, first unplug the power module from the electrical outlet; then disconnect it from the PTC.

### Charging via the communication cradle

To charge the PTC's battery pack via the SC-960SL Single-bay Communication Cradle, simply insert the PTC into the cradle, following the instructions shipped with the cradle. The PTC's battery pack will be recharged automatically.

### Charging via the universal battery charger

The Universal Battery Charger can recharge up to four PTC-960SL lithium-ion and/or nickel-cadmium battery packs in 3 hours or less. Refer to the documentation shipped with the charger for specific instructions.

## Turning on the PTC

Press the ON/OFF key to turn on the PTC-960SL.

## Checking the PTC

1. Make sure the PTC is turned on.
2. Look at the PTC's display screen. What appears on the screen depends on the program your organization uses.

If the PTC is operating correctly, you should not see or hear any of the following:

- A low-battery warning
- A blank display screen
- Any warning beeps

Repeat the steps in this section if your PTC is not operating properly. If the problem persists, refer to the "Troubleshooting" section on [page 36](#).

# Parts 6

**Figures 1 through 3** on the following pages show and describe the external parts of the PTC-960SL. The parts listed below are internal and, therefore, are not shown in any of the figures.

## Flash EPROM

A *flash EPROM* is an electronic component installed inside the PTC. It contains the PTC's data collection program and determines the PTC's key functions, the display prompts and messages, and how and when the PTC prints or transmits data. If your PTC has an internal radio, a second flash EPROM holds the program that controls the radio.

For details on erasing and reprogramming flash EPROMs, refer to the *Guide to the Flash Utilities (TCAL or MS-DOS Version)*.

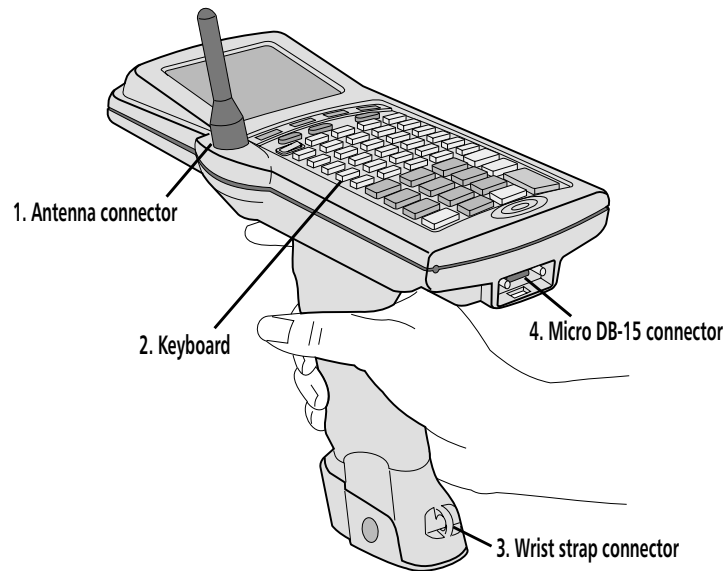
Flash EPROMs can be erased and reprogrammed while they are inside the PTC. First, the PTC must be connected to a host computer, via a cable or by being placed in an optical communication cradle. Then, using software in the PTC's operating system, you can erase the flash EPROMs and reprogram them with a new program from the host computer.

## Radio (optional)

Your PTC's application program controls the radio. Refer to your application's manual for details.

The PTC-960SL can be equipped with a 900-MHz or 2.4-GHz direct-sequence spread spectrum radio or with a 2.4-GHz frequency-hopping spread spectrum radio. Each radio allows the PTC to interactively communicate in real-time with a host computer on a radio-based local area network. Spread spectrum provides secure, interference-free communication and does not require a license for operation.

Figure 1. The PTC-960SL (top, front, and side view)



1. If your PTC has an internal radio, an antenna screws into this connector. Otherwise, the connector is sealed with a plastic plug. The antenna sends and receives radio transmissions, allowing the PTC to communicate with a host computer. The antenna must be attached to the PTC before the unit can be used.
2. The PTC-960SL's standard keyboard has 45 keys. An optional 28-key keyboard is also available. Both keyboards have two different types of keys: data keys and function keys. Data keys are the letter and number keys, A-Z and 0-9. You use them to type data into the PTC. Function keys include the F1-F4, ENTER/YES, and SEND keys. They are used to perform a special procedure or function. For example, you may use the SEND function key to transmit data to the host computer.

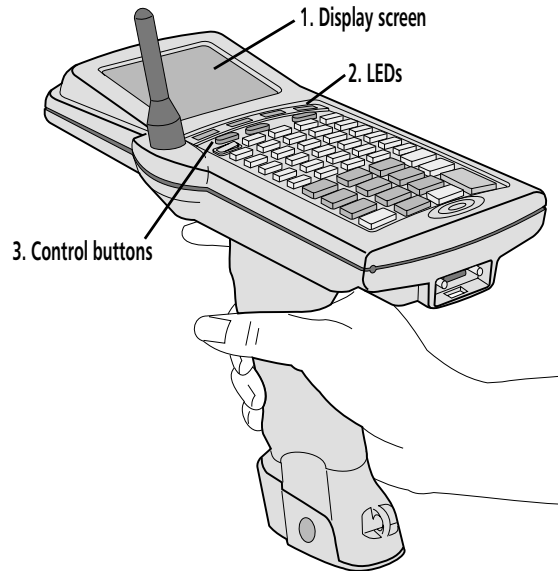
ENTER/YES key - How you use this key depends on your application. Usually you press this key to tell the application that you have finished typing data, have finished an operation, or want the PTC to begin an operation, such as sending data to the host computer.

ON/OFF key - Pressing this key turns the PTC on or off.

SHIFT key - On a 45-key keyboard, the SHIFT key activates only the function keys labeled on the overlay. The numeric keys are always available. On a 28-key keyboard, the SHIFT key shifts between the numeric and alphabetic keyboard and also activates some of the function keys your application uses.

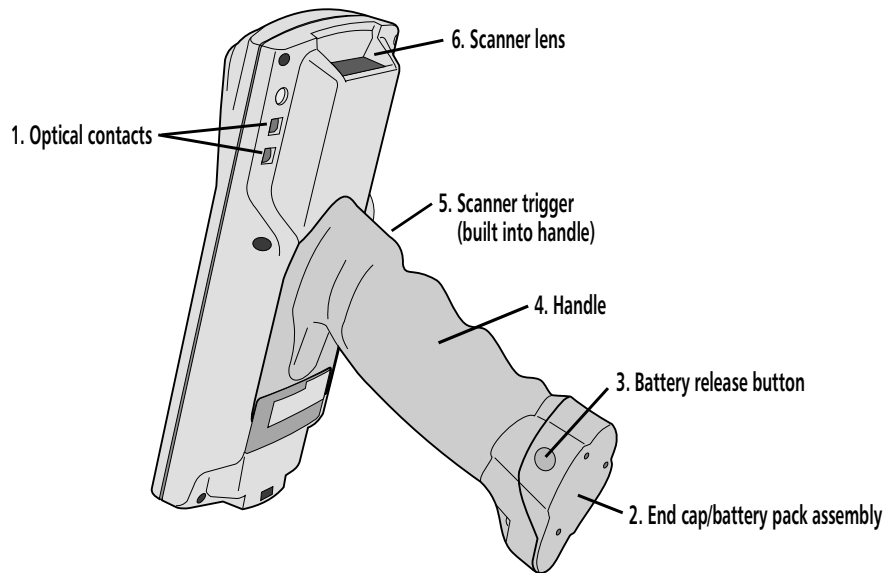
3. A looped wrist strap attaches to this connector. Put your hand through the wrist strap and use it to prevent the PTC from falling if you accidentally let go of it.
4. This 15-pin connector connects the PTC via cable to a host computer or to standard serial devices such as printers and modems. It can also be used with a power module to recharge the PTC's lithium-ion or nickel-cadmium battery pack. Refer to [Appendix C](#) for cable part numbers.

Figure 2. The PTC-960SL (top, front, and side view)




1. The liquid crystal display (LCD) screen shows the information you type or scan into the PTC as well as messages from the PTC or host computer. The screen can show 8 or 16 lines of information with 16 or 21 characters each. Your screen may also be able to display graphics.
  2. These four light-emitting diodes (LEDs) provide information on the PTC's status.
    - Batt - This red LED glows when the PTC's battery pack is running out of power. A low-battery message may also display on the PTC's screen. Immediately stop what you are doing, save any data you have entered, and recharge or replace the PTC's battery pack whenever this LED lights.
    - Func - This red LED glows when the FUNC key is pressed.
    - Chg - This red LED glows when the PTC's battery pack is being recharged.
    - Scan - This LED glows red while the PTC's internal laser scanner is active. It glows green when the scanner has successfully read a bar code.
  3. These three buttons control the PTC's display screen.
    - ⊖ The Decrease Contrast button decreases screen contrast in steps until the screen reaches minimum contrast.\*
    - ⊕ The Increase Contrast button increases screen contrast in steps until the screen reaches maximum contrast.\*
    - ☀ The Backlight button turns the screen's backlight on or off.
- \* Repeatedly pressing either the Decrease or Increase Contrast button will loop the PTC's display screen through all 16 contrast settings, eventually returning to the first setting.

Figure 3. The PTC-960SL (bottom view)



1. These four contacts (two on each side) allow the PTC to communicate with a host computer through an optional optical communication cradle. Instead of sending data in the form of electronic signals through the micro DB-15 connector, the PTC sends the data in the form of pulses of light to similar contacts on the cradle. Then the cradle converts the pulses of light into electronic signals and transmits them to the host computer. The cradle can also send data to the PTC via the optical contacts. Refer to the *SC-960SL User's Guide* for instructions on using the cradle.
2. The PTC-960SL is powered by a lithium-ion or nickel-cadmium battery pack, which is inserted into the PTC's handle. The PTC handle end cap and the battery pack are combined in a single module. Removing the end cap also removes the battery pack. When the battery pack is replaced, the entire module is replaced with a new one. In general, a lithium-ion battery pack doubles the run time of the PTC (in comparison to a nickel-cadmium battery pack).
3. Pressing these buttons (one on each side of the PTC's end cap) releases the battery pack, allowing it to be removed from the PTC.
4. The handle allows you to hold the PTC and aim the built-in laser scanner when you are scanning bar codes. It also contains the PTC's lithium-ion or nickel-cadmium battery pack.
5. Pressing this trigger, which is built into the rubber skin of the handle, activates the PTC's internal laser scanner, allowing you to scan bar codes. Note: Your application program may not support scanned data for all fields. Consult the documentation for your application to determine when the scanner and trigger are enabled.
6. The laser light emitted from the PTC's internal laser scanner exits the unit through this lens.

 Do not stare into the laser beam or point the scanner at anyone's eyes while the scanner is active; permanent eye damage could result.



# Features 7

See [Appendix B](#) for a list of the bar-code types your PTC is programmed to read.

## Autodiscrimination between bar codes

Your PTC-960SL's application program can read and automatically discriminate between up to six different bar-code types.

## Automatic off

To conserve battery power, the PTC-960SL automatically turns itself off after approximately 1 minute of inactivity. The exact length of time depends on your application program.

## Automatic return at on

When you turn off the PTC-960SL (or when the PTC turns itself off), it remembers where it was in the application. Then when you turn the PTC back on, it returns to that same point in the application. You do not need to review what you have done or perform any other start-up function to find your place.

## Backlight

The screen's backlight lights up the screen and makes information on the display readable in dark or dim conditions. Pressing the Backlight button turns the backlight on or off.

! Do not store the PTC-960SL for over two months without charging or replacing the battery pack. Both the main battery and the backup battery will drain, and any data or programs in the PTC's memory will be lost.

## Backup battery

The PTC-960SL's built-in backup battery provides enough power to protect data stored in the PTC's memory when the battery pack is being replaced or if it runs out of power. The backup battery system provides approximately 20 minutes of protection when the battery pack is removed.

## Beeper

The PTC's beeper is used by the PTC and your application to warn you of problems or to prompt you to take an action. For example, if your application program has temporarily turned off a key, the PTC will beep if you press that key.

Depending on your organization's application software, you may be able to control the beeper's volume. See the manual or instructions provided by your organization.

## Clock

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

The PTC-960SL has a built-in clock that 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.

## Communication

The PTC-960SL is capable of communicating with a host computer through its internal radio, through an optional optical communication cradle, or by being connected directly via a cable. See the manual or instructions provided by your organization for the proper communication procedure for your application.

## Memory

The PTC-960SL has two types of memory: read-only memory (ROM) and random access memory (RAM).

The PTC's ROM is contained on an electronic chip called a *flash EPROM*, which can be reprogrammed while inside the PTC. It is used to store the PTC's operating system and application program.

RAM is used to store data entered into the PTC and application configuration settings. 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 backup battery run out of power.

The amount of memory in your PTC determines how much data you can enter before you have to send it to a host computer or print it. Various amounts of memory are available from Telxon, and the amount actually installed in your PTC has been determined by your organization's needs.


# Scanning bar-code labels 8

The PTC-960SL is programmed to automatically recognize, read, and discriminate between up to six bar-code types. See the information provided by your organization and [Appendix B](#) for a list of the bar-code types your PTC is programmed to read.

PSC scanners are preconfigured for the marker beam feature at the factory, but Symbol scanners must be configured for this feature through the PTC's application program. If your PTC contains a Symbol scanner, refer to the *RAMSaver Application Development Manual* for instructions on enabling the marker beam feature.

When the PTC's scanner trigger is pressed, the PTC usually emits a horizontal scanning line and immediately initiates the scanning process. However, the PTC-960SL's laser scanner features a marker beam option that can assist you by temporarily providing a highly visible marker. With the marker beam feature enabled, the PTC emits a bright red dot that can be used to aim the laser and center it over a bar code. This feature is especially useful for outdoor or long-range scanning applications, which typically require additional time to aim the laser beam.

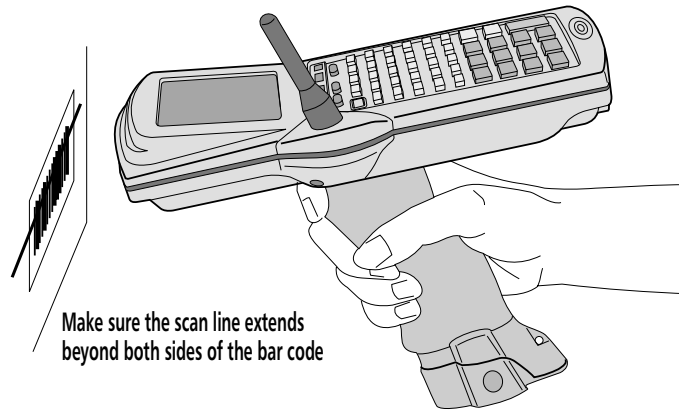
Follow this procedure to scan bar-code labels with the PTC-960SL's built-in laser scanner.

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

1. Point the PTC-960SL at the label to be scanned. The scanner can be at an angle to the label.

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. See [Appendix B](#) for the recommended scanning distance.

Figure 4. Scanning bar-code labels



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

If the scan is successful, the Scan LED glows green, and the PTC beeps.

2. Press and hold the trigger on the PTC's handle to start scanning. The Scan LED glows red while the scanner is active.

If the scanner's marker beam feature is enabled, quickly center the aiming dot over the bar code.

3. Watch the line of light made by the scanner as it scans the bar code.
4. Hold the PTC so that the scanning line is perpendicular to the bars in the bar-code label. Also, make sure that the line passes over all of the bars. See Figure 4.

# Communicating data 9

The PTC-960SL is able to communicate with other PTCs, host computers, and external accessories such as printers. It can both send and receive data and instructions. Communication is controlled by your organization's application program. See the manual or instructions provided by your organization for details on conducting communication sessions.

The PTC-960SL is designed to use its internal radio as its primary means of communicating with a host computer, but it can also communicate by being connected directly to the host computer via cable or by being placed in an optical communication cradle that is connected to the host computer. Accessories such as printers are connected to the PTC with a cable.

## Using the radio

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

## Using the micro DB-15 connector

To connect the PTC-960SL to another PTC, host computer, or accessory via the micro DB-15 connector, you need the correct cable. Different cables may be required depending on what you are connecting the PTC to. See the manual or instructions your organization supplies for your application program.

! If your PTC contains a radio, do not turn on the PTC or attempt to transmit data unless the antenna is attached; otherwise, the radio may be damaged.

Refer to [Appendix C](#) for cable part numbers.

! Do not force any connectors together if they do not mate easily; you could damage them.

### Connecting a cable

1. Make sure you have the correct cable for the device to which you are connecting. If you use the wrong cable, the PTC may not be able to communicate.
2. Turn off the PTC and the computer or accessory to which you are connecting.
3. Connect the 15-pin connector on the appropriate cable to the PTC's micro DB-15 connector.
4. Connect the other end of the cable to the computer or accessory.
5. Turn on the PTC and then turn on the device to which it is connected.
6. Follow the instructions for your application program to communicate.

### Disconnecting a cable

! Pull on the cable connector when disconnecting. Pulling on the cable can break the internal wires.

1. Turn off the PTC.
2. Turn off the attached computer or accessory.
3. Pull the cable's connector directly away from the PTC's micro DB-15 connector.
4. If necessary, disconnect the other end of the cable from the computer or accessory.

## Using the optical communication cradle

Refer to the *SC-960SL User's Guide* for instructions on using the PTC-960SL with the cradle.

The PTC-960SL's optical contacts convert electronic signals inside the PTC into pulses of light that can be detected by the SC-960SL Single-bay Communication Cradle.

When the PTC-960SL is placed in the cradle, optical contacts on the cradle sense the pulses of light from the PTC and convert them into electronic signals for

direct communication to the host computer or, with an external modem, for transmission over telephone lines. Likewise, the cradle can communicate back to the PTC through the optical contacts.



# Replacing the battery pack 10

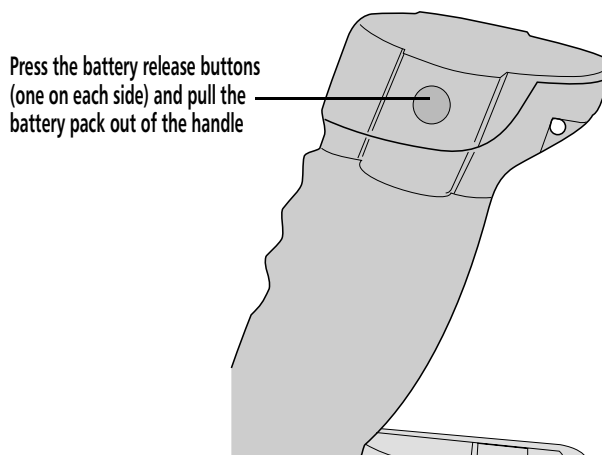
Use the procedures in this section to remove a weak lithium-ion or nickel-cadmium battery pack from the PTC-960SL and replace it with a new one.

## Removing the battery pack

! Do not leave the PTC without a battery pack for longer than 20 minutes; all data and programs in the PTC's memory will be lost.

1. Turn off the PTC.
2. With your thumb and index finger, press the battery release buttons on both sides of the handle end cap; then pull the end cap and the attached battery pack out of the handle. See Figure 5.
3. Refer to the "Safety information" section on [page 10](#) for instructions on properly disposing of your lithium-ion or nickel-cadmium battery pack.

Figure 5. Removing the battery pack



Refer to **Appendix C** for battery pack part numbers.

## Installing a new battery pack

Newer versions of the PTC-960SL are shipped with a different nickel-cadmium battery pack than older versions; however, either pack can be used in any PTC-960SL. Lithium-ion battery packs, on the other hand, can be used in only newer versions of the PTC-960SL. A lithium-ion pack will physically not fit into the handle of an older PTC-960SL.

1. Make sure the PTC is off.
2. Line up the end cap/battery pack assembly with the opening in the handle. The curved sides of the end cap allow the battery pack to be inserted in only one way.
3. Slide the end cap/battery pack into the handle until the end cap presses against the body of the handle and the release buttons snap into place.
4. Pull on the end cap to make sure it is locked into place.

# Maintaining the PTC-960SL 11

## Operating conditions

The PTC-960SL is designed for use in harsh environments. It can be operated at temperatures between –4 degrees F (–20 degrees C) and 122 degrees F (50 degrees C).

### Extended temperature units

If your PTC-960SL was ordered as an extended temperature unit, it can be used in extremely cold environments, such as those found in walk-in freezers.

- An extended temperature version of the PTC-960SL can be operated at temperatures between –22 and 70 degrees F (–30 to 21 degrees C).
- The PTC can be operated in environments with a maximum relative humidity of 70% noncondensing.
- Do not leave the PTC unattended (without being held or operated by a user) in a freezer environment (0 to –22 degrees F/–18 to –30 degrees C) for more than 2 hours.
- Do not leave the PTC's battery pack unattended in a freezer environment for more than 1 hour as the battery pack will freeze and appear to be “dead.”

While the PTC is held by a user, body heat is transferred to the PTC, preventing freezing of the unit and its components.

If the PTC's battery pack freezes, allow it to warm up to at least 65 degrees F (18 degrees C) before recharging it.

## Handling the PTC

The following information will help to ensure you receive safe, reliable, and trouble-free service from your PTC-960SL.

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

- Do not open the PTC's case. Only a trained technician can service the parts inside the PTC.
- If your PTC has an internal radio, do not operate it without the antenna installed.
- Make sure the PTC is off before connecting or removing any accessories.
- Make sure all accessories are connected correctly and the correct cables are used.
- Use only Telxon-approved accessories. Do not attempt to connect any electrical device that is not part of your PTC system to the PTC-960SL.
- If you store a PTC-960SL containing a lithium-ion or nickel-cadmium battery pack in below-freezing temperatures for more than 1 hour, do not charge the pack until it warms up to room temperature. Charging cold battery packs could damage them.

## Storing the PTC

- Do not store the PTC-960SL in temperatures below –40 degrees F (–40 degrees C) or above 167 degrees F (75 degrees C).
  - Do not store the PTC-960SL in a damp or humid environment.
1. Transfer any data stored in the PTC to a host computer or another PTC or print the data. See the manual or instructions for your organization's application program for directions.
  2. Make sure you have a copy of any programs stored in the PTC.
  3. Disconnect all accessories from the PTC.
  4. Recharge the PTC's battery pack or replace it with a charged pack.

5. 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.
6. Charge the PTC's battery pack every two months.

## Cleaning the PTC

! Be careful not to scratch the scanner lens when you clean it. Scratches can reduce the scanner's effectiveness.

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

### Equipment required:

- A soft, lint-free cloth
- A nonabrasive liquid cleaner such as Windex

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

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

## Servicing the PTC

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

# Troubleshooting 12

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

## The PTC does not turn on

- Charge or replace the lithium-ion or nickel-cadmium battery pack.
- Contact your Telxon service representative.

## The laser scanner does not read a label

See [Appendix B](#) for recommended scanning distances.

See [page 35](#) for instructions.

- Make sure the bar-code label you are trying to scan is one of the bar-code types your PTC is programmed to recognize.
- Move the laser scanner closer to or farther away from the bar-code label. You may not be scanning at the correct distance.
- Change the angle of the laser scanner to the bar-code label. You may be too far above or below the bar-code 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 trigger are enabled.
- Point the scanner at a blank surface and press the scanner trigger. Look for the scanning line or aiming dot that appears on the blank surface when the scanner is operating. If no scanning line or aiming dot appears, follow your organization's procedure to have the scanner serviced.

## Your radio fails to establish contact

- Change your location by a few feet and transmit again.
- Make sure the antenna is securely attached.
- Recharge or replace the PTC's lithium-ion or nickel-cadmium 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.

## Other problems

If you experience any other problems with your PTC-960SL that you cannot solve, notify your Telxon service representative or contact the Telxon Customer Support Center at 1-800-800-8010.

# Appendix A

## Specifications

### Communication and I/O

Serial:	RS-232 via micro DB-15 connector; 300 to 38,400 baud
Optical:	Via optical contacts and SC-960SL
Internal radio:	Optional 900-MHz or 2.4-GHz direct-sequence spread spectrum radio or 2.4-GHz frequency- hopping spread spectrum radio

### Radio data rates

900-MHz DS spread spectrum:	344 kbps
2.4-GHz DS spread spectrum:	2 Mbps
2.4-GHz FH spread spectrum:	1 Mbps

### Display

Type:	FSTN monochrome liquid crystal display
Text mode:	8 or 16 lines with 16 or 21 characters; double-height character option available
Graphics mode:	128 x 128-pixel resolution
Pixel size:	0.015 x 0.014 in/0.38 x 0.36 mm
Active area:	2.1 x 1.9 in/53.3 x 48.3 mm
Backlight:	Electro-luminescent (EL) panel



## Electrical

Battery pack:	500-mAhr nickel-cadmium or 1300-mAhr lithium-ion
Backup battery:	Supercap
Power module	
Input:	110 VAC @ 50/60 Hz
Output:	12 VDC @ 200 mA

## Environmental

Operating temperature	
Standard units:	-4 to 122 degrees F (-20 to 50 degrees C)
Extended temperature units:	-22 to 70 degrees F (-30 to 21 degrees C)
Relative humidity	
Standard units:	95% noncondensing
Extended temperature units:	70% noncondensing
Storage temperature:	-40 to 167 degrees F (-40 to 75 degrees C)
Shock:	4 ft/1.2 m drop to concrete
Vibration:	Loose cargo 1" peak-to-peak orbital movement @ 400 RPM
Moisture:	Drip
Operating altitude:	Up to 15,000 ft/4,572 m
ESD protection:	15 kV

## Keyboard

Types:	45-key alphanumeric (standard); 28-key numeric (optional)
Keypad options:	DOS, 3278/5251, or ANSI/VT220

See **Appendix B** for a list of supported bar-code types and scanning range specifications.

## Laser scanner

Options: PSC-DI-1400, Symbol SE-1200, or Symbol SE-1200LR

Safety classification: Class II

## Memory

Application flash EPROM: 512 KB

O.S. flash EPROM: 256 KB

RAM: 1 to 4 MB

## Microprocessor

Type: V20H/80C88 @ 10 MHz  
(for terminal processing) and  
Z182 (for RF communications)

## Physical

Length: 8.5 in/21.6 cm

Width: 3.5 in/8.9 cm

Depth: 7 in/17.8 cm

Weight: 22 oz/.62 kg (w/ nickel-cadmium battery pack);  
26 oz/.73 kg (w/ radio and nickel-cadmium battery pack)

## Software

Operating system: MS-DOS 5.0 or TCAL

RF terminal emulation: 3278, 5251, or ANSI/VT220

# Appendix B

## Bar-code types and scanning distances

This appendix provides a list of the bar-code types supported by the PTC-960SL and the ranges at which they can be read.

### Bar-code types supported

The PTC-960SL is programmed to read and automatically discriminate between the following bar-code types:

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

### Scanning distances

The **following table** lists the supported ranges for scanning bar-code labels based on the size of the label and the type of scanner installed in the PTC.

Other bar-code types (such as Code 11, Code 16K, 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.

Table 1. Scanning ranges

Label size	Supported scanning distance (in inches)		
	PSC-DI-1400	Symbol SE-1200	Symbol SE-1200LR
5 mil	5.75 to 7.75	3 to 5.5	
6 mil	5.5 to 9.5	2.5 to 6.5	
7.5 mil	5 to 12	2.5 to 9	12 to 15.75
10 mil	5 to 16	2.5 to 13	11 to 20
15 mil	5 to 22	2.5 to 20	
20 mil	5 to 25	2 to 22	8.25 to 37
40 mil	6 to 31	2 to 30	8.25 to 65
55 mil	8 to 36	2 to 36	11.25 to 85

# Appendix C

## Accessory part numbers

Contact your Telxon representative to order any of the following parts.

Table 2 contains part numbers for ordering PTC-960SL accessory hardware.

Table 2. Accessory part numbers

Item	Part number
<b>Accessories</b>	
Antenna, 900-MHz version	18334-201
Antenna, 2.4-GHz version	21990-302
Battery pack, lithium-ion	23065-001
Battery pack, nickel-cadmium	19903-106
Power module (12 VDC, 200 mA)	20210-001
SC-960SL Single-bay Communication Cradle	
Intelligent-charge version	20825-101
Continuous-charge version	20825-102
Universal Battery Charger	
Base charger (desktop version)	23151-001
Base charger (wall-mount version)	23152-001
PTC-960SL adapter	23153-001
Wrist strap	17495-000
<b>Manuals</b>	
<i>Guide to the Flash Utilities (TCAL or MS-DOS Version)</i>	16541-000
<i>Guide to Maintaining Nickel-cadmium and Lithium-ion Batteries</i>	16488-000
<i>SC-960SL User's Guide</i>	20714-000
<i>Universal Battery Charger Instruction Manual</i>	23324-000
<i>RAMSaver Application Development Manual</i>	14303-103

	Item	Part number
* These cables must be used with pigtail communication cable 20955-002 or 21019-001.	<b>Cables</b>	
	Pigtail (12") micro DB-15-to-DB-25 adapter cable (with charging jack)**	20955-002
** Use this cable with AC wall adapter 12176-000 or 10142-200.	Pigtail (12") micro DB-15-to-DB-25 adapter cable (w/o charging jack)	21019-001
	Micro DB-15-to-DB-9 adapter cable (6")	21146-000
	Clone cable	21018-001
	PTC-to-1/2 duplex modem cable*	10124-0X1
	PTC-to-full duplex modem cable*	10124-0X2
	PTC-to-host (DTE) cable*	10124-0X3
	PTC-to-host (9-pin) download cable*	
	3 ft/.91 m	13656-313
	6 ft/1.8 m	13656-323
	10 ft/3.05 m	13656-333
PTC-to-host (25-pin) download cable*		
6 ft/1.8 m (female)	10582-000	
6 ft/1.8 m (male)	10582-110	

# Appendix D

## Communication connections

This chapter provides information on the connections used to establish and maintain communication between the PTC-960SL and other devices.

Table 3 lists the pinouts for the PTC-960SL's micro DB-15 connector. All I/O lines are directional and support RS-232 voltage levels.

Figures 6 through 14 illustrate the configurations for cables that can connect the PTC-960SL to other devices.

Table 3. Micro DB-15 connector pinouts

Pin #	Signal	Description	Direction
1	Open	N.C.	
2	TXD	Transmit data	Output
3	RXD	Receive data	Input
4	RTS	Request to send	Output
5	CTS	Clear to send	Input
6	DSR	Data set ready	Output
7	GND	Ground	
8	CD	Carrier detect	Input
9	DTR	Data terminal ready	Output
10	RING	Ring indicate	Input
11	DS0	Device select zero	Output
12	DTMF	Dual-tone audio analog	Output
13	Open	N.C.	
14	VCC	Switched power +5 volts	Output
15	VCHG	Battery charge	Input

Figure 6. Pigtail micro DB-15-to-DB-25 adapter cable (w/ charging jack), P/N 20955-002

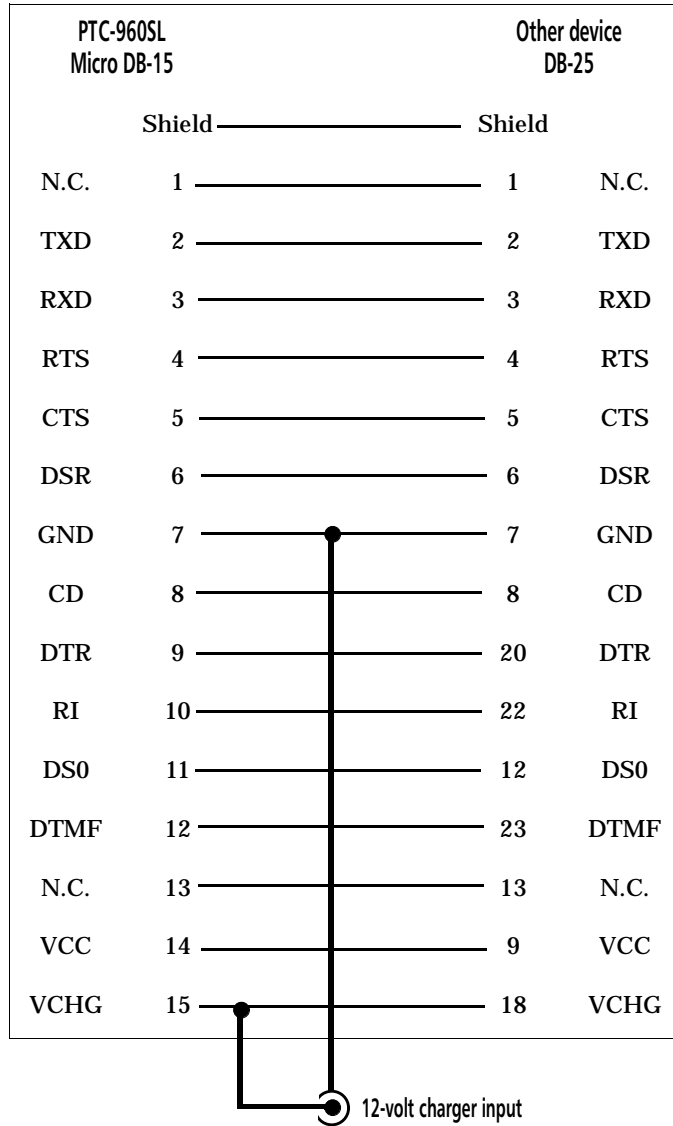




Figure 7. Pigtail micro DB-15-to-DB-25 adapter cable (w/o charging jack),  
P/N 21019-001

PTC-960SL Micro DB-15		Other device DB-25	
VCHG	15	18	VCHG
DTR	9	20	DTR
TXD	2	2	TXD
CTS	5	5	CTS
RING	10	22	RING
DSR	6	6	DSR
RTS	4	4	RTS
RXD	3	3	RXD
GND	7	7	GND
N.C.	1	1	N.C.
CD	8	8	CD
DS0	11	12	DS0
DTMF	12	23	DTMF
N.C.	13	13	N.C.
VCC	14	9	VCC
Shield		Shield	

Figure 8. Micro DB-15-to-DB-9 adapter cable, P/N 21146-000

PTC-960SL Micro DB-15		Other device DB-9	
DTR	9	6	DSR
TXD	2	2	RXD
DSR	6	4	DTR
CTS	5	7	RTS
RTS	4	8	CTS
RXD	3	3	TXD
GND	7	5	GND
Shield		Shield	

Figure 9. Clone cable, P/N 21018-001

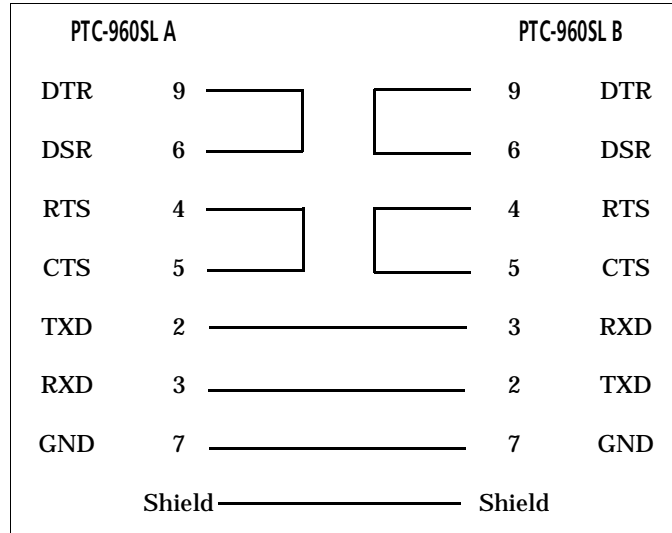


Figure 10. PTC-to-1/2 duplex modem cable, P/N 10124-0X1

PTC-960SL			Modem/Type I (1/2 Duplex)	
TXD	2	—————	2	TXD
RCV	3	—————	3	RCV
DSR	6	—————	6	DSR
DTR	20	—————	20	DTR
RTS	4	—————	4	RTS
CTS	5	—————	5	CTS
RI	22	—————	22	RI
CD	8	—————	8	CD
SG	7	—————	7	SG
-5 VDC	10	┌—————┐		
OUT	11	└—————┘		

Figure 11. PTC-to-full duplex modem cable, P/N 10124-0X2

PTC-960SL		Modem/Type II (Full Duplex)	
TXD	2	2	TXD
RCV	3	3	RCV
DTR	20	20	DTR
DSR	6	6	DSR
RI	22	22	RI
CD	8	8	CD
SG	7	7	SG
RTS	4		
CTS	5		
-5 VDC	10		
OUT	11		

Figure 12. PTC-to-host (DTE) cable, P/N 10124-0X3

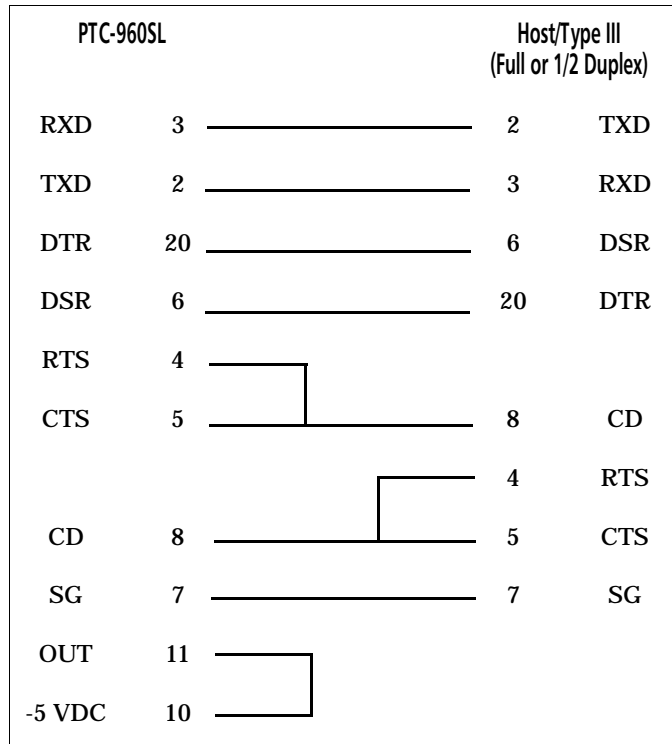


Figure 13. PTC-to-host (9-pin) download cable, P/N 13656-3X3

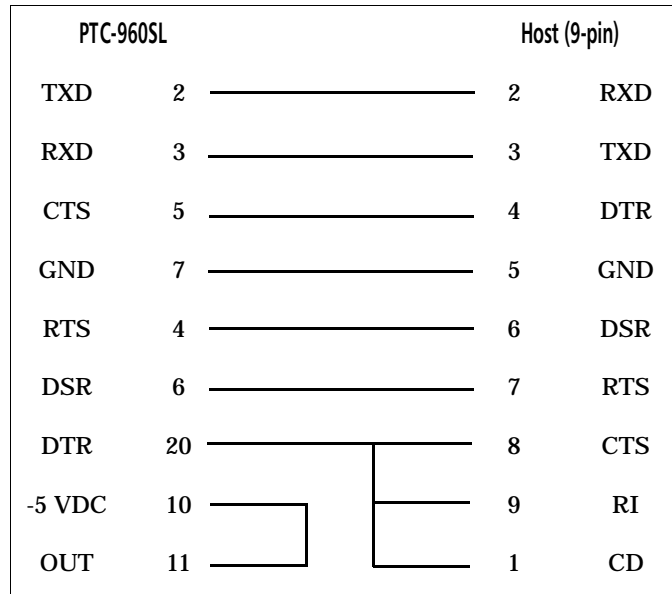


Figure 14. PTC-to-host (25-pin) download cable, P/N 10582-XX0

PTC-960SL		Host (25-pin) Female (000)/ Male (110)	
TXD	2	—————	3 RXD
RXD	3	—————	2 TXD
RTS	4	—————	6 DSR
CTS	5	—————	20 DTR
DSR	6	—————	4 RTS
GND	7	—————	7 GND
DTR	20	—————	5 CTS
-5 VDC	10	┌—————┐	
OUT	11	└—————┘	



# Glossary

application	A PTC program that is designed to perform a specific task for the user. Examples include route accounting, payroll, price lookup, shipping, and inventory control.
application flash EPROM	A flash EPROM that contains the PTC's application program.
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.
bps	Bits per second.
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.
character	A letter, number, or symbol.
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 communication	The transport of encoded information from one point to another.
DCE	Data communications equipment. A device that controls and converts incoming data or communication. For example, a modem.
display	The screen on the front of the PTC. It is used to show data entered into the PTC and warning prompts.

DSR	Data set ready signal. The modem sends DSR to the attached device to indicate that the modem is connected, on, and ready.
DTE	Data terminal equipment. A device comprising the data source. For example, the host computer.
DTR	Data terminal ready signal. The signal sent by the terminal device to the modem to indicate that the terminal is ready for transmission.
ESD	Electrostatic discharge.
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.
function key	A key on the PTC's keyboard that is defined by an application to perform a specific task. When pressed, a function key executes a certain function (for example, ENTER, END, ON/OFF).
GND	Ground.
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 PTCs.
Hz	Hertz. A unit expressing frequency in vibrations per second.
interface	The connection between two devices, defined by common physical characteristics, signal characteristics, and signal meanings.

I/O port	Input/output port. The location on a PTC where RS-232-compatible accessories are attached. Also, the point through which the PTC sends and receives transmission signals.
keyboard overlay	The plastic label that lies on top of the PTC keyboard, identifying the function key definitions.
laser scanner	A type of bar-code reader that uses a beam of laser light.
LCD	Liquid crystal display.
LED	Light-emitting diode.
lithium-ion battery	A type of rechargeable battery used to power some PTCs. The advantage of lithium-ion batteries (over nickel-cadmium batteries) is their increased capacity in comparable weight and volume.
mA	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.
nickel-cadmium battery	A type of rechargeable battery used to power some PTCs and their accessories.
one-way communication	Transport of information from one device to another without interruption. In one-way communication, the receiving device cannot respond directly to the sending device.
O.S.	Operating system. For example, MS-DOS.
prompt	Messages shown by the PTC that guide the operator through the steps of the application program. Prompts are different for different programs.

PTC	Portable Tele-Transaction Computer. A battery-powered, programmable device used to collect, store, and transmit data.
RAM	Random access memory. In a PTC, RAM chips store program files and data entered by the operator.
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 a PTC, ROM chips contain the operating system and the application program.
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> .
spread spectrum	A radio communication technology that distributes an RF signal over a wide range of frequencies for transmission; it then “despreads” the signal to the original frequency range at the receiver.
TCAL	Telxon Common Application Language. Telxon’s proprietary programming language for PTCs.

two-way communication	Exchange of information between two devices. After each block of data, the receiving device sends a positive or negative acknowledgment to the sending device.
TXD	Transmit data signal. TXD indicates that a device is currently transmitting data.
VDC	Volts direct current. A unit of measure of electric potential or potential difference in a unidirectional current.

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