PTC-960LE

User's Guide

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TELXON

PTC-960LE

User's Guide

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PTC-960LE
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Contents

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 numerique de la Classe A respecte toutes les exigences du Reglement sur le material broilleur du Canada.

If your PTC contains a direct-sequence or frequency-hopping spread spectrum radio

FCC regulations

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

If your PTC contains a FieldNet 500 radio module

FCC statement

The FieldNet 500 radio module within the PTC-960LE fully complies with FCC Part 15.249 limits for intentional radiation as well as FCC Part 15.209 for unintentional emissions.

FCC regulations

The PTC-960LE uses radios (transceivers) and radio communication in its operation. The PTC-960LE is a low-power transceiver operating under FCC Part 15.249. No license is required for operation.

DOC statement

The PTC-960LE's FieldNet 500 radio module is also approved for use in Canada. No license is required for operation.

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 and disposing of lithium-ion or nickel-cadmium batteries

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

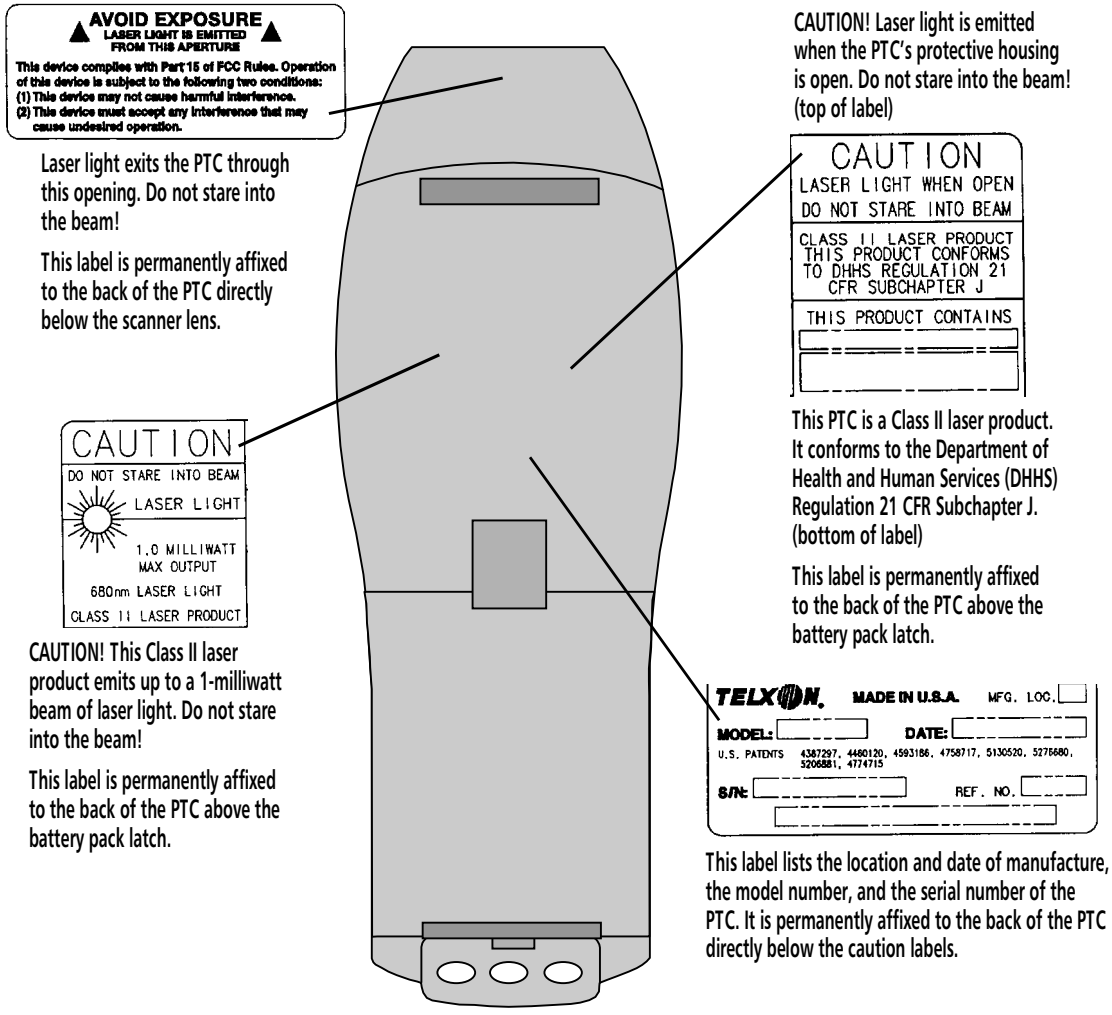
- Do not expose the battery pack to water, metal objects, direct sunlight, extreme heat, or fire.
- Do not attempt to disassemble the battery pack.
- Do not handle a damaged or leaking battery pack.

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.

If your PTC contains an internal short-range laser scanner



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

This label is permanently affixed to the back of the PTC directly below the scanner lens.

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

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)

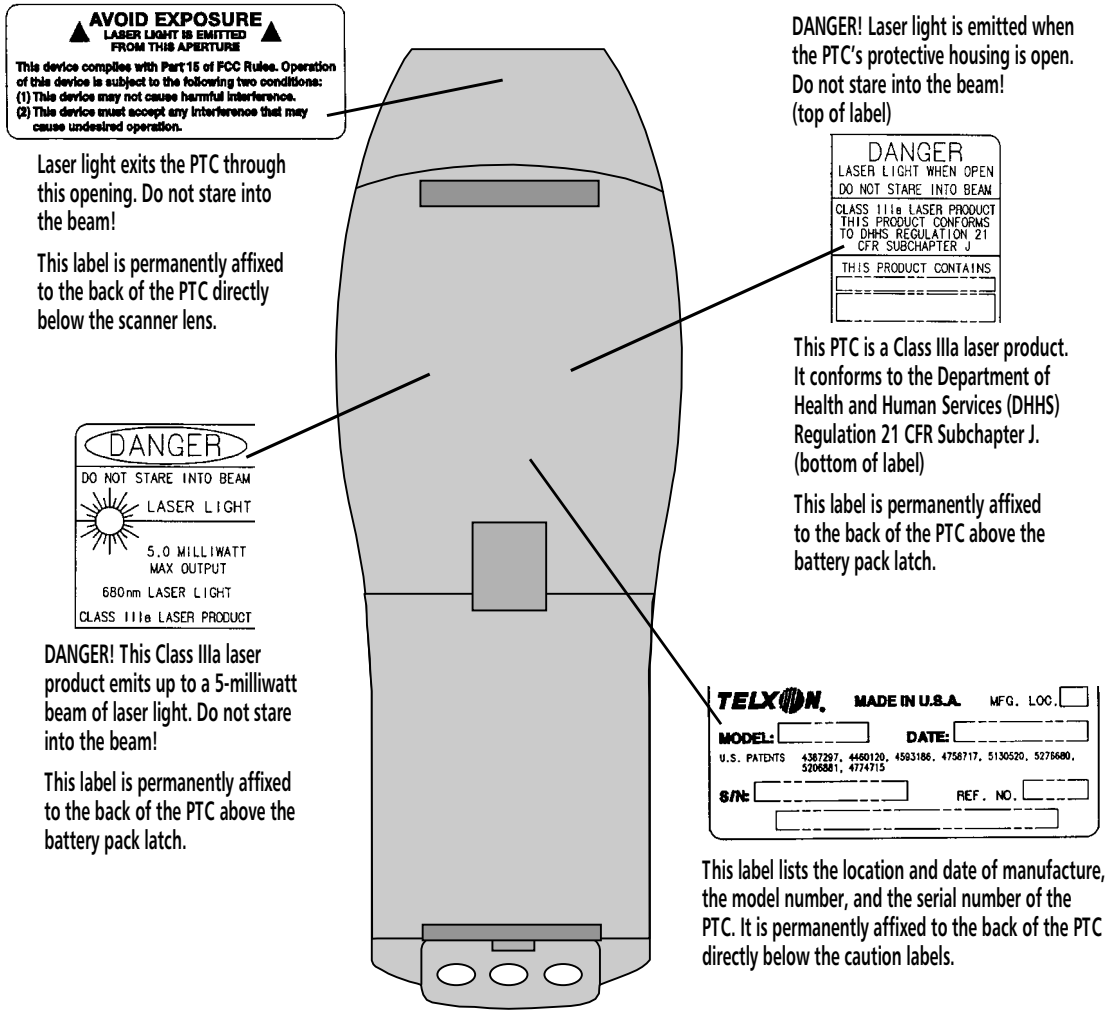
This label is permanently affixed to the back of the PTC above the battery pack latch.

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 battery pack latch.

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 directly below the caution labels.

If your PTC contains an internal medium-range laser scanner



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

This label is permanently affixed to the back of the PTC directly below the scanner lens.

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

This PTC is a Class IIIa 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 battery pack latch.

DANGER! This Class IIIa laser product emits up to a 5-milliwatt beam of laser light. Do not stare into the beam!

This label is permanently affixed to the back of the PTC above the battery pack latch.

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 directly below the caution labels.

Scope of the manual 3

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

This manual does not include 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-960LE 4

The Telxon PTC-960LE is a rugged, lightweight, battery-powered, hand-held computer used to collect, store, and transmit data. It 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 an error has been made 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 have completed certain operations.

Entering data

Entering data into the PTC-960LE is easy. You can key in data through the keyboard, scan 1D bar codes with the optional internal laser scanner, or decode 1D and 2D bar codes and capture signatures via the optional internal image reader. Additionally, data can be received through an internal direct-sequence or frequency-hopping spread spectrum radio or a FieldNet 500 radio module.

Through the keyboard

Entering data through the keyboard is similar to operating a calculator or a personal computer. 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 *bar code i*s 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.

A second method of entering data is with the PTC's optional internal laser scanner. When you scan a 1D bar code the PTC is programmed to read, the PTC and scanner interpret the data and store it in the PTC's memory.

With the internal image reader

If your PTC is equipped with an image reader, it cannot contain an internal radio.

Data can also be entered via the PTC's optional internal image reader, which can decode 1D and 2D bar codes as well as capture handwritten signatures.

Via the radio

Refer to pages 21 and 30 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-960LE can transmit data through its internal radio; via an optional single-bay communication cradle, wall-mount communication

cradle, or vehicle 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-960LE

Any additional accessories are shipped separately.

Each shipping box contains

- a PTC-960LE with a handstrap,
- a 1300-mAhr lithium-ion battery pack or a 500-mAhr nickel-cadmium battery pack,
- a 12-VDC, 200-mA AC adapter (if ordered),
- a *PTC-960LE Read-Me-First Sheet*,
- a *PTC-960LE User's Guide*, and
- a *Guide to Maintaining Nickel-cadmium and Lithium-ion Batteries*.

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.

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

4. Check the PTC and accessories for shipping damage. Pay particular attention to the PTC case, display screen, and scanner lens.

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

Charge the PTC-960LE's lithium-ion or nickel-cadmium battery pack when you first receive the PTC and whenever the battery pack becomes weak. A Low Battery icon appears on the PTC's screen when the battery pack is running out of power.

This section explains how to recharge the PTC's battery pack using an AC adapter. For instructions on charging the battery pack via a communication cradle or a four-bay battery charger, refer to the documentation shipped with the cradle or charger.

Equipment required:

- A 12-VDC, 200-mA AC adapter
- An electrical outlet within 6 feet (1.8 meters) providing 110 volts AC in the U.S. or Canada

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

1. Turn off the PTC and disconnect any attached accessories.
2. Connect the AC adapter's cable to the PTC's micro DB-15 connector.
3. Plug the AC adapter into an electrical outlet. The PTC's Charging LED glows.
4. Charge the battery pack for 8 hours. The Charging LED turns off when the battery pack has reached a full charge.
5. When charging is finished, disconnect the AC adapter from the PTC and the outlet.

Turning on the PTC-960LE

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

The PTC can also be turned on by pressing the Scan button.

Checking the PTC-960LE

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 (for longer than 15 seconds)
   - Any warning beeps

   Repeat the steps in this section if your PTC-960LE is not operating properly. If the problem persists, refer to the "Troubleshooting" section on page 38.

It may take several seconds for information to appear on the PTC's display the first time the unit is turned on.

Parts 6

Figures 1 through 3 on the following pages show and describe the external parts of the PTC-960LE. 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.

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

The flash EPROM can be erased and reprogrammed while it is 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 EPROM and reprogram it with a new program from the host computer.

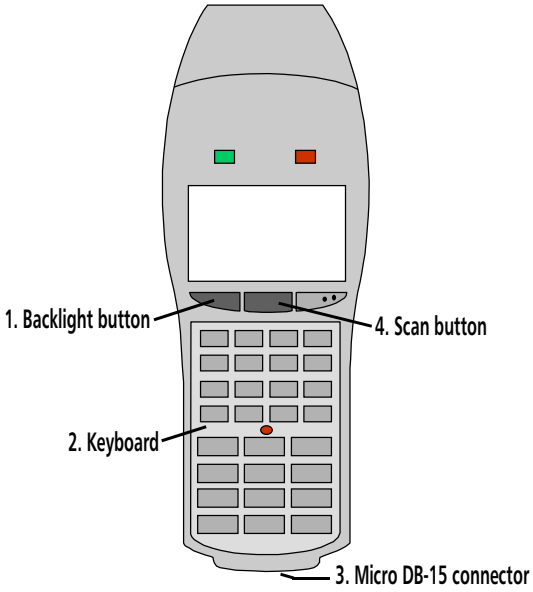
Radio

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

If your PTC is equipped with an image reader, it cannot contain a radio.

Your PTC-960LE may contain a 900-MHz or 2.4-GHz direct-sequence spread spectrum radio, a 2.4-GHz frequency-hopping spread spectrum radio, or a 2.4-GHz FieldNet 500 radio module. These radios allow the PTC to interactively communicate 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.

Figure 1. The PTC-960LE (front view)



1. The Backlight button turns the screen's backlight on or off. It can also be used to control screen contrast. See page 27 for instructions.
2. The PTC-960LE's keyboard has 35 keys. The keyboard has 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 ENTER, FUNC, ON/OFF, and SHIFT keys. They are used to perform a special procedure or function.

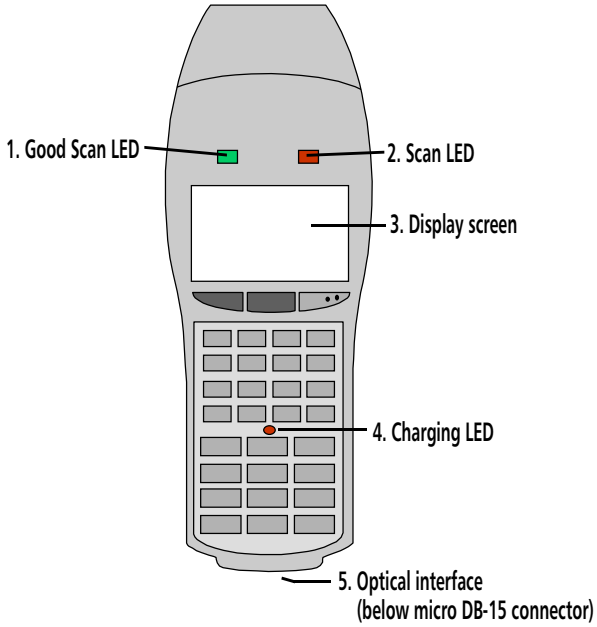
   ENTER key - How you use this key depends on your application. Usually you press this key to tell the application that you have finished typing data, have finished an operation, or want the PTC to begin an operation, such as sending data to the host computer.

   FUNC key - This key activates the letters, symbols, or functions above the PTC's keys (for example, pressing the FUNC key followed by the 7 key generates the letter Q). The FUNC key can also be used with the Backlight button to adjust the contrast of the PTC's display. See page 27 for details.

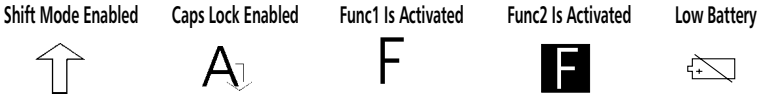
   ON/OFF key - Pressing this key turns the PTC on or off.

   SHIFT key - This key activates the symbols on the left side of the number keys (for example, pressing the SHIFT key followed by the 7 key generates the & symbol).
3. 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 an AC adapter to recharge the PTC's lithium-ion or nickel-cadmium battery pack. Refer to Appendix C for cable part numbers.
4. Pressing this button activates the PTC's internal laser scanner or image reader, allowing you to scan 1D bar codes or to decode 1D and 2D bar codes and capture handwritten signatures, respectively.

Figure 2. The PTC-960LE (front view)

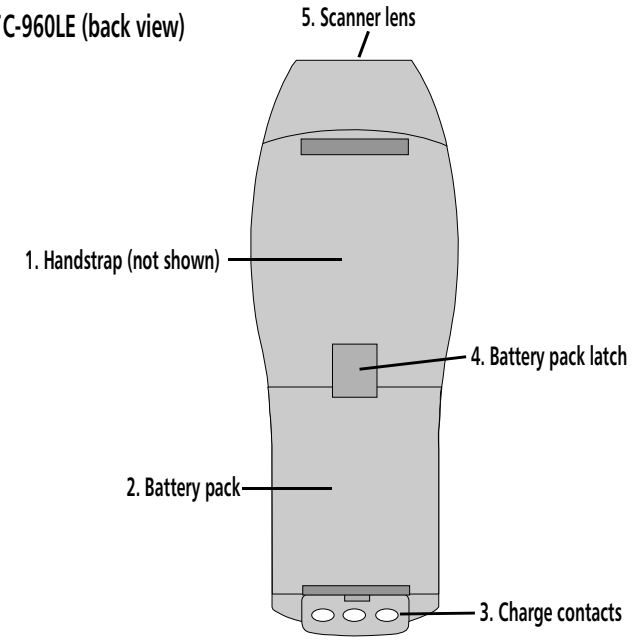


1. This green light-emitting diode (LED) glows when the PTC's internal laser scanner or image reader has successfully read a 1D bar code or decoded a 1D or 2D bar code or captured a handwritten signature, respectively.
2. This red LED glows when the PTC's Scan button has been pressed to activate the internal laser scanner or image reader.
3. 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 4 or 8 lines of information with 16 or 21 characters each. Your screen is also able to display graphics. An additional line at the bottom of the display is reserved for status indicator icons. These icons are as follows:



4. This red LED glows when the PTC's lithium-ion or nickel-cadmium battery pack is being recharged.
5. This interface allows 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 a similar interface on the cradle. Then the cradle converts the pulses of light into electronic signals and transmits them to the host computer or to an external peripheral. The cradle can also send data to the PTC via the optical interface. Refer to the *SC-960LE/WM-960LE User's Guide* or the *VC-960LE User's Guide* for instructions on using the cradle.

Figure 3. The PTC-960LE (back view)



1. An elastic handstrap on the back of the unit allows you to hold the PTC securely during operation. The bottom of the handstrap must be detached from the unit when the PTC's battery pack needs to be replaced. See page 33 for instructions on removing the handstrap.
2. The PTC-960LE is powered by a rechargeable lithium-ion or nickel-cadmium battery pack.
3. When the PTC is inserted into an optional communication cradle, these contacts connect with similar contacts on the cradle, allowing the PTC's battery pack to be fast charged.
4. Sliding this latch toward the top of the PTC allows you to remove the battery pack. Sliding the latch toward the bottom of the PTC secures the battery pack to the back of the unit.
5. The laser light emitted from the PTC's internal laser scanner or the illuminated crosshairs emitted from the PTC's internal image reader 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

Autodiscrimination between bar codes

See Appendix B for a list of the bar codes your PTC can be programmed to read.

If your PTC-960LE contains a laser scanner, it can be programmed to read and automatically discriminate between up to six different types of 1D bar codes. If your PTC contains an image reader, it can be programmed to decode and automatically discriminate between up to six 1D bar-code types and four 2D bar-code types.

Automatic off

To conserve battery power, the PTC 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-960LE (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

Once the backlight is turned on, a timer running within the PTC may turn it off again.

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.

Backup battery

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

The PTC-960LE'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 disabled 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-960LE 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-960LE 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.

Display contrast

During its 16-step cycle, the contrast loops from darkest to lightest.

You can increase or decrease the display contrast in steps by pressing the FUNC key and then the Backlight button.

Memory

The PTC-960LE 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.

Using the PTC's laser scanner or image reader 8

Using the PTC's internal laser scanner (optional)

If your PTC-960LE contains a laser scanner, the unit can be programmed to automatically recognize, read, and discriminate between up to six 1D bar-code types. See Appendix B 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.

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

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

1. Point the PTC-960LE 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.

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

2. Press the PTC's Scan button to start scanning. The red Scan LED glows while the scanner is active.

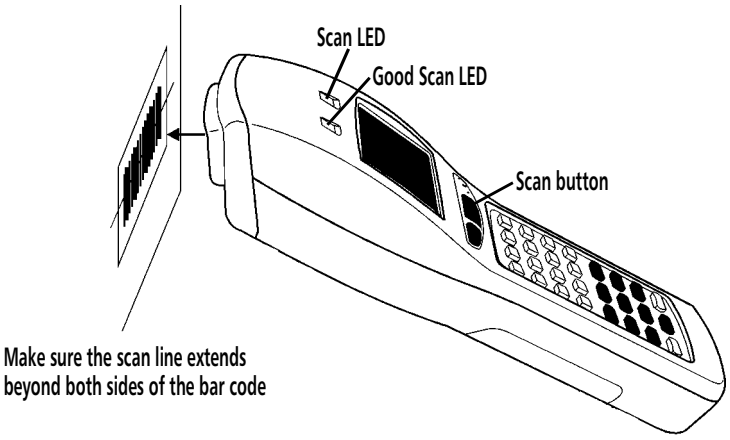
3. Watch the line of light made by the scanner as it scans the bar code.

4. Hold the PTC at an angle to the bar code so that the light emitted from the scanner is not perpendicular to the label's surface.

   Make sure the scanning line is perpendicular to the bars in the bar-code label and passes over all of the bars. See Figure 4.

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

Figure 4. Scanning bar-code labels



Using the PTC's internal image reader (optional)

If your PTC-960LE contains an image reader, the unit can be programmed to automatically decode up to six 1D bar-code types and four 2D bar-code types. See Appendix B for a list of these bar codes and the information provided by your organization for details on how your PTC has been programmed.

Use this procedure to decode 1D and 2D bar codes or to capture handwritten signatures with the PTC-960LE's internal image reader.

1. Point the PTC at the bar code or signature.
2. Press the PTC's Scan button to activate the reader. The red Scan LED glows.

   The bar code or signature must be within the perimeter of the crosshairs emitted from the reader. If the decode/capture is successful, the green Good Scan LED glows, and the PTC beeps.

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

Communicating data 9

The PTC-960LE is able to communicate with other PTCs, host computers, and external accessories such as printers, external radios, and modems. 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-960LE 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, radios, and modems 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

Refer to Appendix C for cable part numbers.

Making a direct connection between the PTC-960LE and another computer or accessory requires a cable with a micro DB-15 connector on one end and a standard RS-232 signal interface on the other. The cable must be ordered separately.

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. Loosen the cable's jack screws, if present.

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

4. Gently slip the cable's micro DB-15 connector into the PTC's micro DB-15 connector.
5. Connect the other end of the cable to the computer or accessory. Make sure the connectors line up correctly.
6. Tighten the cable's jack screws, if present.
7. Turn on the PTC and then turn on the device it is connected to.
8. Follow the instructions for your application program to communicate.

Disconnecting a cable

Always disconnect connectors by pulling them directly away from each other. Do not pull at an angle or use a rocking or twisting motion.

1. Turn off the PTC.
2. Turn off the device the PTC is connected to.
3. Loosen the cable's jack screws, if present.

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

4. Pull the cable's connector directly away from the PTC's micro DB-15 connector.
5. If necessary, disconnect the other end of the cable from the computer or accessory.

Using an optical communication cradle

Refer to the *SC-960LE/WM-960LE User's Guide* or the *VC-960LE User's Guide* for instructions on using the PTC-960LE with the cradle.

The PTC-960LE's optical interface converts electronic signals inside the PTC into pulses of light that can be detected by the SC-960LE Single-bay Communication Cradle, the WM-960LE Wall-mount Communication Cradle, or the VC-960LE Vehicle Cradle.

When the PTC-960LE is placed in the cradle, an optical interface on the cradle senses the pulses of light from the PTC and converts them into electronic signals for direct communication to the host computer or an external peripheral. Likewise, the cradle can communicate back to the PTC through the optical interfaces.

Replacing the battery pack 10

! 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.

Use the procedures in this chapter to remove a weak lithium-ion or nickel-cadmium battery pack from the PTC-960LE and replace it with a new one. The Low Battery icon appears on the PTC's display when the battery pack is running out of power.

Removing the battery pack

1. Turn off the PTC.
2. Place the unit face down.
3. Grasp the bottom of the handstrap and pull it away from the PTC until it disengages.
4. Lift up the handstrap to expose the battery pack latch.
5. Slide the latch toward the top of the unit; then grasp the battery pack and remove it from the PTC.
6. Refer to the "Safety information" section on page 11 for instructions on properly disposing of your lithium-ion or nickel-cadmium battery pack.

Installing a new battery pack

1. Make sure the PTC is off.
2. Hold the new battery pack over the battery compartment, making sure the Telxon label is facing down and the tab is pointing toward the bottom of the PTC.

3. Insert the battery pack's tab into the slot in the bottom of the battery compartment.
4. Slide the battery pack latch toward the top of the unit; then lower the battery pack into the compartment.
5. Slide the battery pack latch toward the bottom of the PTC until it will go no farther.
6. Reconnect the handstrap to the bottom of the PTC by stretching the strap past the PTC's optical interface and inserting the handstrap bracket into the slots provided.

Maintaining the PTC-960LE 11

Operating conditions

The PTC's display screen will be slower and darker if the unit is operated at lower temperatures.

The PTC-960LE is designed to minimize the intrusion of dust, dirt, and moisture. An optional holster, listed in Appendix C, is recommended when using the PTC in exceptionally harsh environments. Units containing a frequency-hopping radio can be operated at temperatures between 32 degrees F (0 degrees C) and 120 degrees F (49 degrees C); units without a frequency-hopping radio can be operated in temperatures as low as –4 degrees F (–20 degrees C).

Handling the PTC

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

- Do not stare into the laser beam or point the PTC's scanner at anyone's eyes. You could cause permanent eye damage.
- Do not open the PTC's case. Only a trained technician can service the parts inside the PTC.
- Make sure the PTC is off before you connect or remove any cables or accessories or replace the battery pack.
- 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-960LE.
- Protect the PTC from excessive heat, cold, moisture, and harsh, dirty environments.

- If you store a PTC-960LE 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.
- Do not insert anything other than Telxon-approved cables into the PTC's micro DB-15 connector.

Storing the PTC

- Do not store the PTC-960LE in temperatures below –20 degrees F (–29 degrees C) or above 160 degrees F (71 degrees C).
- Do not store the PTC-960LE 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.

Equipment required:

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

! 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 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 listed in this chapter, follow the instructions provided.

The PTC does not turn on

- Charge or replace the PTC's battery pack.
- Contact your Telxon service representative.

The laser scanner does not read a label

- Make sure the label you are trying to scan is one of the bar-code types 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 button are enabled.
- Point the scanner at a blank surface and press the Scan button. Look for the scanning line that appears on the blank surface when the scanner is operating. If no scanning line appears, follow your organization's procedure to have the scanner serviced.

The image reader does not decode a bar code

- Make sure the bar code you are trying to decode is one of the types your PTC is programmed to recognize.
- Move the reader's lens closer to or farther away from the label. You may not be scanning at the correct distance.
- Change the angle of the reader to the label. You may be too far above or below the label or too far to the side.
- Clean the reader's 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 reader and Scan button are enabled.
- Make sure the label is within the perimeter of the crosshairs emitted from the reader.

The image reader does not capture a signature

- The file size may be too large. Try to capture another signature.

Your 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.

Other problems

If you experience any other problems with your PTC-960LE 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 interface and SC-960LE, WM-960LE, or VC-960LE
Internal radio:	Optional 900-MHz or 2.4-GHz direct-sequence spread spectrum radio, 2.4-GHz frequency-hopping spread spectrum radio, or 2.4-GHz FieldNet 500 radio module
Scanner/Reader:	Internal laser scanner or image reader

Display

Type:	FSTN monochrome liquid crystal display
Text mode:	4 or 8 lines with 16 or 21 characters
Graphics mode:	128 x 64-pixel resolution
Pixel size:	0.015 x 0.015 in/0.38 x 0.38 mm
Active area:	2.1 x 1.03 in/52.5 x 26.2 mm
Backlight:	Electro-luminescent (EL) panel
Screen icons:	Shift Mode Enabled, Caps Lock Enabled, Func1 Is Activated, Func2 Is Activated, Low Battery

Electrical

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

Environmental

Operating temperature

Units w/ a frequency-hopping radio:	32 to 120 degrees F* (0 to 49 degrees C)
Units w/o a frequency-hopping radio:	–4 to 120 degrees F* (–20 to 49 degrees C)

*The PTC's display screen will be slower and darker at lower temperatures.

Relative humidity:	0 to 95% noncondensing
Storage temperature:	–20 to 160 degrees F (–29 to 71 degrees C)
Shock:	4 ft/1.2 m drop to concrete
Vibration:	Loose vibration, 0.06-inch (1.5-mm) peaks @ 30 Hz
Physical durability:	Loose cargo 1 inch (2.5 cm) peak to peak orbital movement @ 400 RPM
ESD protection:	15 kV

Memory

Application flash EPROM:	512 KB
O.S. flash EPROM:	256 KB
RAM	
Batch units:	1, 2, or 4 MB
Radio units:	1 or 2 MB

Operating system

Options:	MS-DOS 5.0

Physical

Length:	9 in/22.9 cm
Width:	3.1 in/7.9 cm
Height:	1.9 in/4.9 cm (at display) 1.25 in/3.2 cm (at keyboard)
Weight:	18.2 oz/.52 kg (w/ lithium-ion battery pack, internal laser scanner, and 2.4-GHz frequency-hopping spread spectrum radio) 19.2 oz/.55 kg (w/ lithium-ion battery pack, internal laser scanner, and 900-MHz direct-sequence spread spectrum radio)

Processor

Type:	V20H @ 9.83 MHz

Appendix B

Supported 1D and 2D 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-960LE's optional internal laser scanner can be programmed to read and automatically discriminate between the following 1D bar-code types:

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

The PTC's optional internal image reader can be programmed to decode and automatically discriminate between the following 1D and 2D bar codes:

1D bar codes

- Codabar
- Code 2 of 5
- Code 39
- Code 93
- Code 128
- UPC/EAN

2D bar codes

- Supercode
- PDF 417
- Maxicode
- Data Matrix

Appendix C

Accessory part numbers

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

Table 1 contains part numbers for ordering PTC-960LE accessory hardware.

Table 1. Accessory part numbers

Item	Part number
Accessories	
AC adapter, 12-VDC, 200-mA	20210-001
Battery pack, 1300-mAhr lithium-ion	22409-001
Battery pack, 500-mAhr nickel-cadmium	22408-001
Handstrap	22405-001
Holster	P-82225-000
PSC4000TX Four-bay Battery Charger	
Base charger (desktop version)	23151-001
Base charger (wall-mount version)	23152-001
960LE adapter	23157-001
SC-960LE Single-bay Communication Cradle	23177-001
VC-960LE Vehicle Cradle	23179-001
WM-960LE Wall-mount Communication Cradle	23178-001
Cables	
Pigtail (12") micro DB-15-to-DB-25 adapter cable (with charging jack)**	20955-002
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')	21146-001
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

* These cables must be used with pigtail communication cable 20955-002 or 21019-001.

** Use this cable with AC wall adapter 12176-000 or 10142-200.

Item	Part number
Cables (continued)	
PTC-to-9-pin host download cable*	
3 ft/.91 m	13656-313
6 ft/1.8 m	13656-323
10 ft/3.05 m	13656-333
PTC-to-25-pin host download cable*	
6 ft/1.8 m (female)	10582-000
6 ft/1.8 m (male)	10582-110
Manuals	
Guide to the Flash Utilities (TCAL or MS-DOS Version)	16541-000
Guide to Maintaining Nickel-cadmium and Lithium-ion Batteries	16488-000
SC-960LE/WM-960LE User's Guide	23109-000
VC-960LE User's Guide	23110-000
RAMSaver Application Development Manual	14303-103
RAMSaver Application Development Manual Addendum	14303-109

Appendix D

Communication connections

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

Table 2 lists the pinouts for the PTC-960LE's micro DB-15 connector. All I/O lines are directional and support RS-232 voltage levels.

Figures 5 through 13 illustrate the configurations for cables that can connect the PTC-960LE to other devices.

Table 2. 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 5. Pigtail micro DB-15-to-DB-25 adapter cable (w/ charging jack), P/N 20955-002

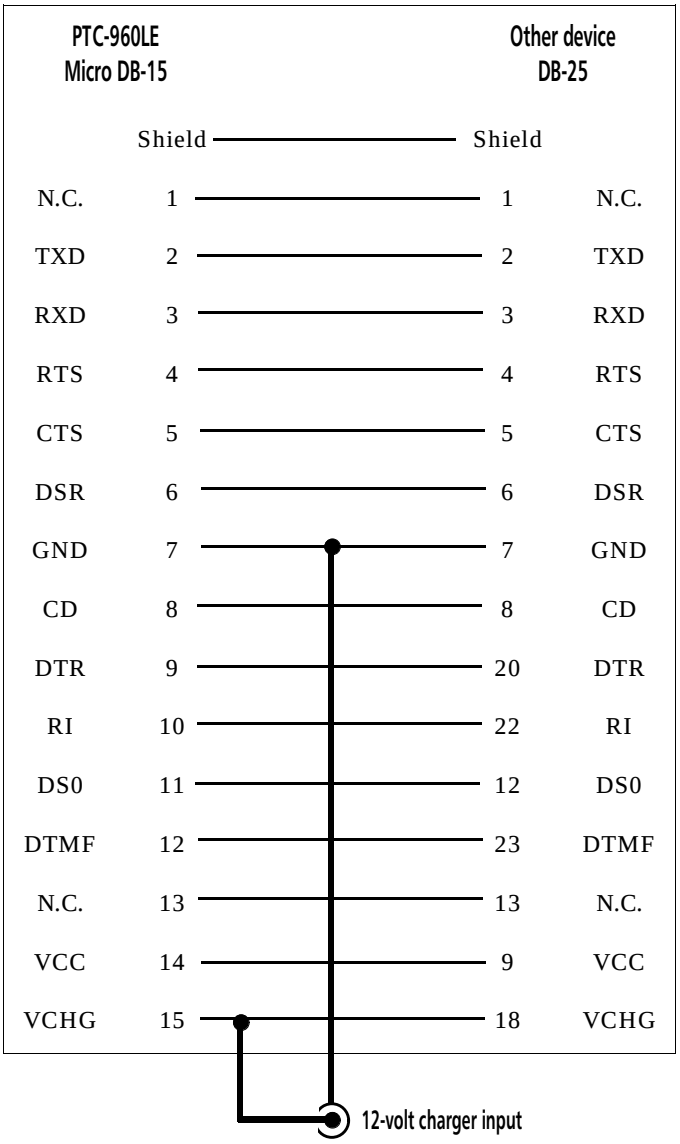


Figure 6. Pigtail micro DB-15-to-DB-25 adapter cable (w/o charging jack), P/N 21019-001

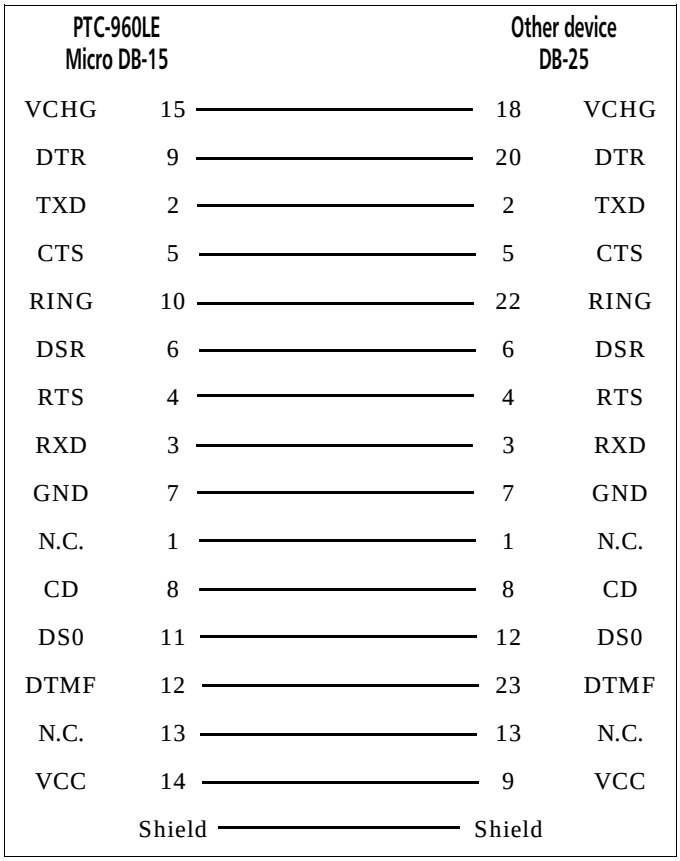


Figure 7. Micro DB-15-to-DB-9 adapter cable, P/N 21146-001

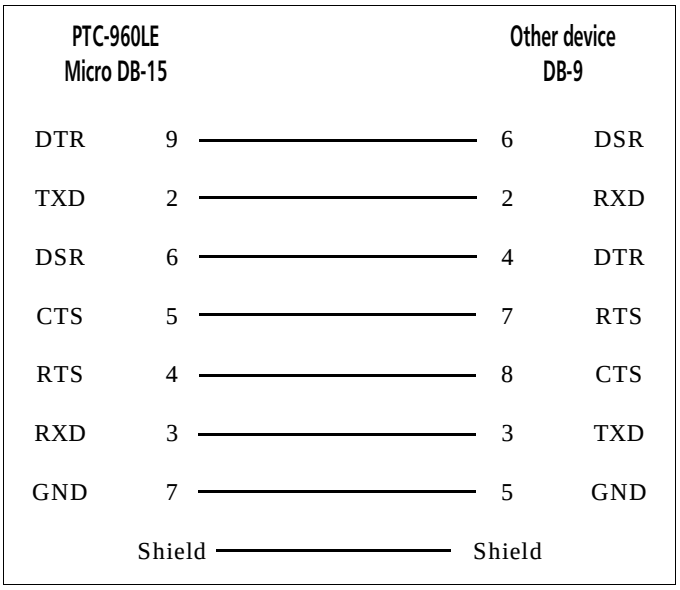


Figure 8. Clone cable, P/N 21018-001

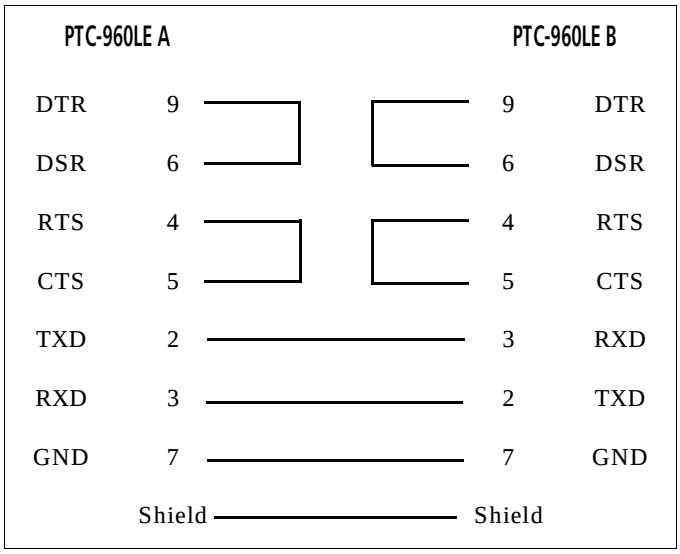


Figure 9. PTC-to-1/2 duplex modem cable, P/N 10124-0X1

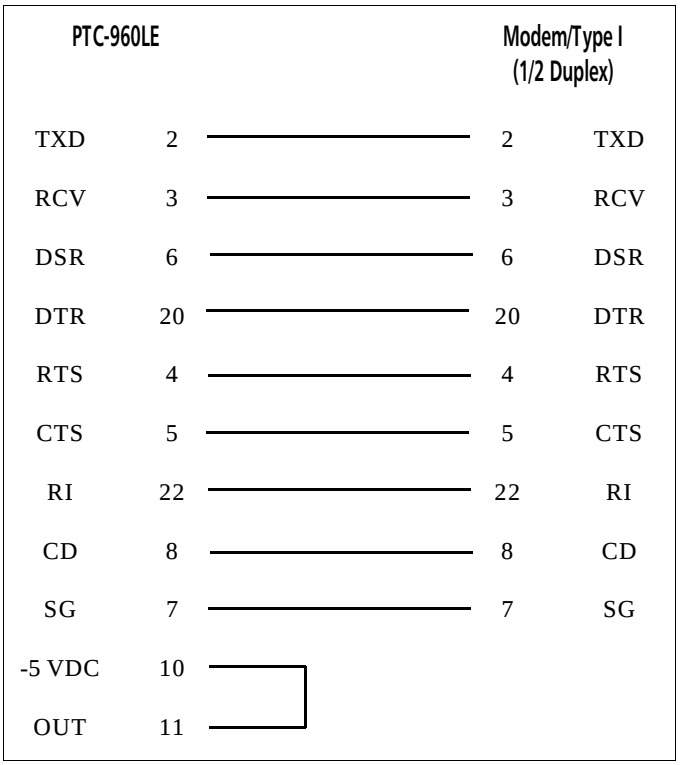


Figure 10. PTC-to-full duplex modem cable, P/N 10124-0X2

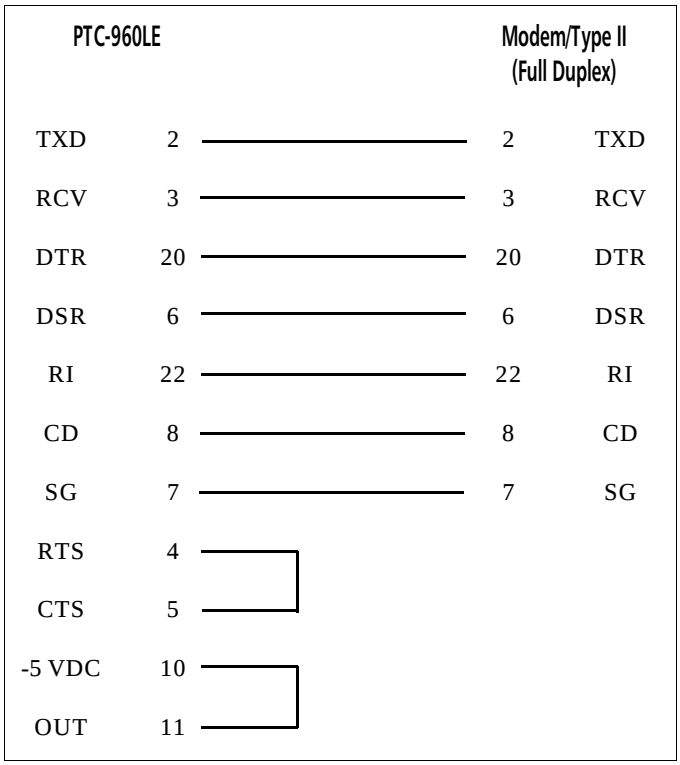


Figure 11. PTC-to-host (DTE) cable, P/N 10124-0X3

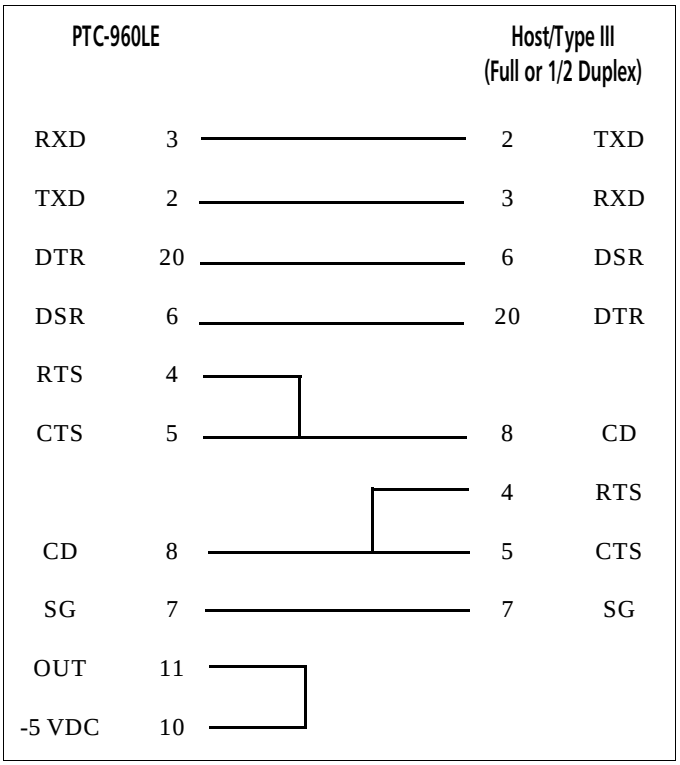


Figure 12. PTC-to-9-pin host download cable, P/N 13656-3X3

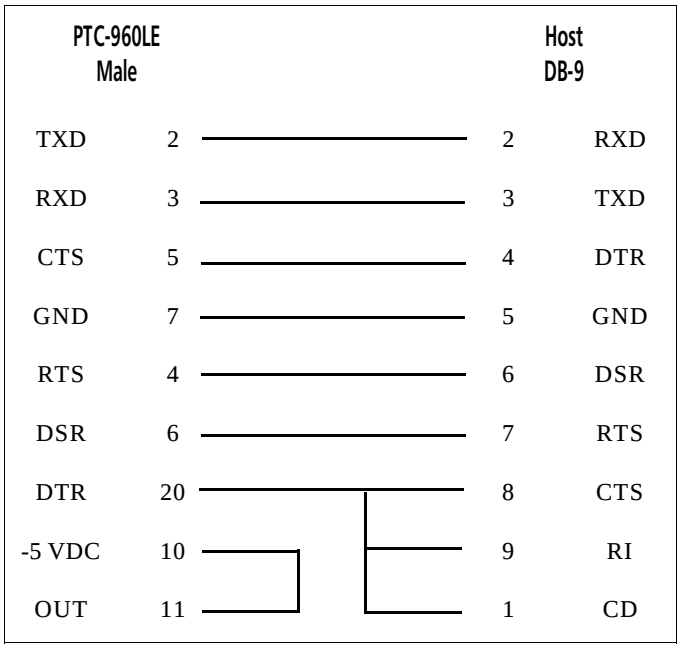
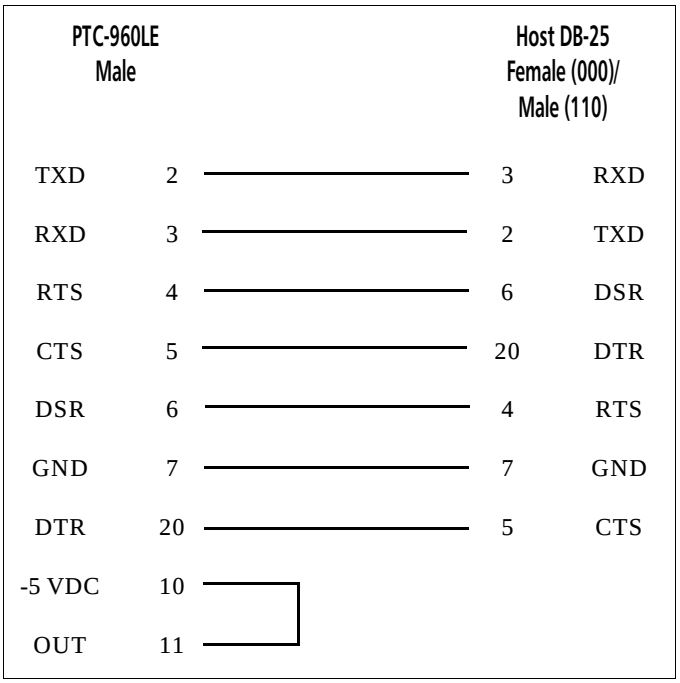


Figure 13. PTC-to-25-pin host download cable, P/N 10582-XX0



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 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 *software*.
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.
mAhr	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.
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 *hardware*.
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.
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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