



PDT 7200 Series



Product Reference Guide for DOS



***PDT 7200 Series
Product Reference Guide for DOS***

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Revision A

March 2001



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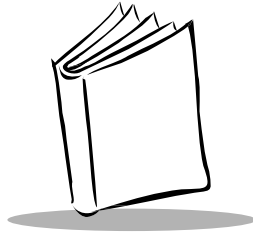
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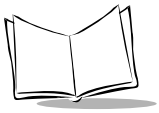
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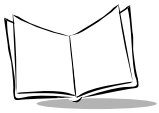
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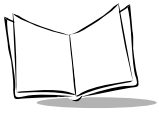
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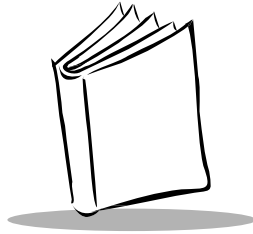
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About This Guide

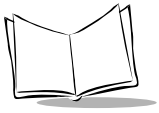
Introduction

The *PDT 7200 Series Product Reference Guide* provides general instructions for the System Administrator for setting up, initializing, operating, troubleshooting and maintaining the PDT 7200 Series terminal.

Chapter Descriptions

The manual includes the following chapters:

- [Chapter 1, *Getting Started*](#), describes procedures for setting up the terminal.
- [Chapter 2, *Software Installation on Development PC*](#), provides an overview of the different pieces of development software used with the PDT 7200 Series terminal, and provides instructions on installing this software.
- [Chapter 3, *Cradle Setup and Operation*](#), describes how to set up the cradle, and details using the cradle to charge the terminal's battery and perform host communication.
- [Chapter 4, *Operating the Terminal*](#), provides detailed instructions on operating the terminal.
- [Chapter 5, *Terminal Configuration Issues*](#), describes options for configuring the terminal, to assist in planning your application development.
- [Chapter 6, *Terminal Configuration: Editing the Configuration Files*](#), provides instructions on the edits which must be made to the DOS files on the development PC.
- [Chapter 7, *Terminal Configuration: Building and Sending the Hex Image*](#), details the use of the TCM(Terminal Configuration Manager) Utility and IPL, which are used to build and send the hex image from the development PC to the terminal.



- [Chapter 8, Terminal Configuration: Load a RAM Disk](#), provides instructions on setting up a RAM disk on the terminal for writable data storage.
- [Chapter 9, Terminal Configuration: Setup](#), takes you through the setup utility provided on the terminal, which allows you to define specific settings on the unit, such as screen contrast, backlight, current date and time.
- [Chapter 10, Terminal Configuration: Setting Up PCMCIA Cards](#), provides instructions on formatting and using PCMCIA cards in the PDT 7200 Series terminal.
- [Chapter 11, Troubleshooting and Maintenance](#) provides information about possible problems with the terminal and cradle, and suggests solutions to these problems. Also described is the procedure for accessing the PCMCIA card slot.
- [Appendix A, Specifications](#), details the terminal's technical specifications.

Notational Conventions

The following conventions are used in this document:

- Italics are used to highlight specific items in the general text, and to identify chapters and sections in this and related documents.
- Bullets (•) indicate:
 - action items
 - lists of alternatives
 - lists of required steps that are not necessarily sequential
- Sequential lists (e.g., those that describe step-by-step procedures) appear as numbered lists.

Related Documents

- *PDT 7200 Series Quick Reference Guide*, p/n 72-39640-xx

Service Information

If you have a problem with your equipment, contact the [Symbol Support Center](#) for your region. See [page xi](#) for contact information. Before calling, have the model number, serial number, and several of your bar code symbols at hand.

Call the Support Center from a phone near the scanning equipment so that the service person can try to talk you through your problem. If the equipment is found to be working properly and the problem is symbol readability, the Support Center will request samples of your bar codes for analysis at our plant.

If your problem cannot be solved over the phone, you may need to return your equipment for servicing. If that is necessary, you will be given specific directions.

Note: *Symbol Technologies is not responsible for any damages incurred during shipment if the approved shipping container is not used. Shipping the units improperly can possibly void the warranty. If the original shipping container was not kept, contact Symbol to have another sent to you.*

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Symbol Technologies, Inc.
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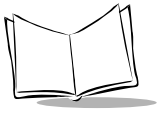
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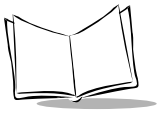
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Wear items and accessories having a Symbol serial number, will carry a 90-day limited warranty. Non-serialized items will carry a 30-day limited warranty.

Warranty Coverage and Procedure

During the warranty period, Symbol will repair or replace defective products returned to Symbol’s manufacturing plant in the US. For warranty service in North America, call the Symbol Support Center at 1-800-653-5350. International customers should contact the local Symbol office or support center. If warranty service is required, Symbol will issue a Return Material Authorization Number. Products must be shipped in the original or comparable packaging, shipping and insurance charges prepaid. Symbol will ship the repaired or replacement product freight and insurance prepaid in North America. Shipments from the US or other locations will be made F.O.B. Symbol’s manufacturing plant.

Symbol will use new or refurbished parts at its discretion and will own all parts removed from repaired products. Customer will pay for the replacement product in case it does not return the replaced product to Symbol within 3 days of receipt of the replacement product. The process for return and customer’s charges will be in accordance with Symbol’s Exchange Policy in effect at the time of the exchange.

Customer accepts full responsibility for its software and data including the appropriate backup thereof.

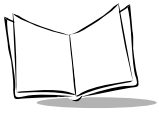
Repair or replacement of a product during warranty will not extend the original warranty term.

Symbol’s Customer Service organization offers an array of service plans, such as on-site, depot, or phone support, that can be implemented to meet customer’s special operational requirements and are available at a substantial discount during warranty period.

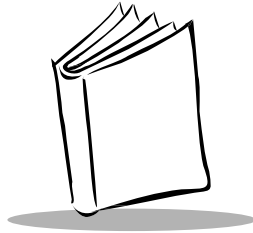
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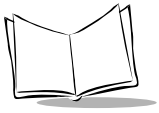


Chapter 1

Getting Started

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Introduction

The PDT 7200 is an advanced portable terminal that puts the processing power of a 486 PC in the user's hand. The terminal incorporates touch screen technology, a graphical user interface (GUI) and bar code scanning capability. With a 1/4 VGA-sized screen, the PDT 7200 supports two different input methods: touch input and virtual keypad input. The integrated scanner adds bar code input capability, allowing one- and two-dimensional bar code reading. PDT 7200 models are also available with Spectrum24[®] RF wireless LAN technology.

The PDT 7200 uses a standard DOS operating environment: MS-DOS 6.22. Recommended application development tools include C and PenRight! for DOS.

Symbol provides extensions for non-PC peripherals (RF, scanning, power management, etc.) in the form of C libraries and TSRs. To assist in downloading files to the PDT 7200 terminal, Symbol provides the Windows-based Terminal Configuration Manager (TCM) which allows the user to create a script listing the files to include in a hex image, build the hex image, and transfer the hex image to the terminal.

The PDT 7200 Series

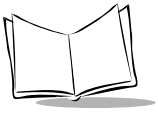
The PDT 7200 Series of terminals consists of the following models:

PDT 7200	performs batch communication
PDT 724X	performs wireless communication via Symbol's Spectrum24 [®] wireless LAN.

Unpacking the Terminal

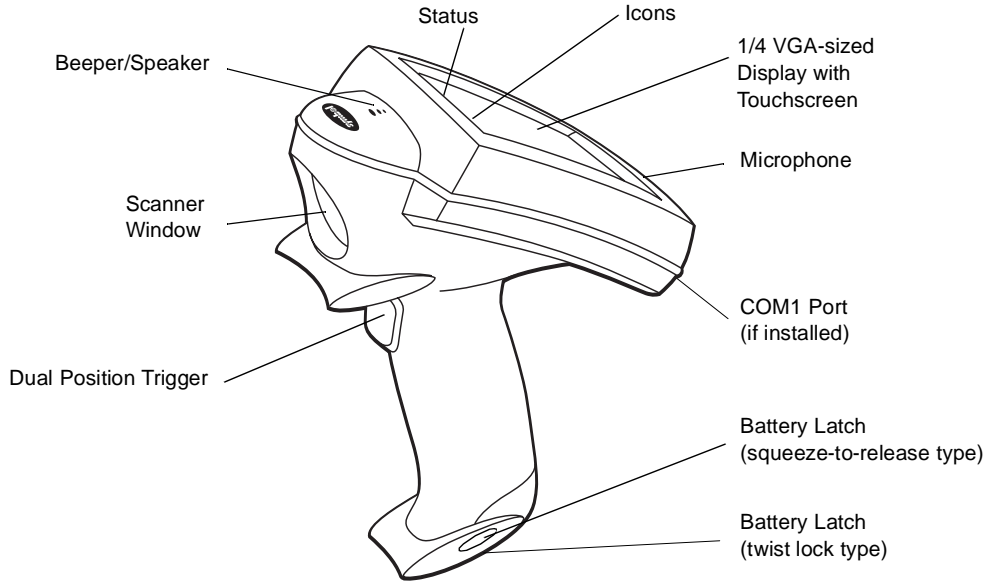
Carefully remove all protective material from around the terminal and save the shipping container for later storage and shipping.

Verify that you received all equipment listed on the packing slip and inspect the equipment for damage. If you find any damaged or missing items, contact the Symbol Support Center immediately.



Parts of the Terminal

The following illustration displays the basic parts of the PDT 7200 terminal. A brief description of each part follows.



- Beeper/Speaker - allows you to play back pre-recorded voice data; beeps.
- Scanner Window - shields the scan engine mechanism.
- Display - 240 X 320 pixel display with Touchscreen for virtual keypad usage.
- Dual Position Trigger - displays the virtual keypad, activates the scan function and performs other user-defined functions.
- Status LEDs - Scan/decode, battery voltage/charge, and RF communications indicators.
- Battery latch - secures the battery.
- Microphone - allows recording of voice data.
- Control Panels: allows you to control the terminal's:
 - Power
 - Contrast
 - Backlight.

Accessories/Peripherals

Development PC with PCMCIA Card Adapter

The development PC must have:

- Hard Disk:Minimum of 100MB hard drive space free
- Operating System(s):Windows 95 or Windows 98
- PeripheralsPC Card Adapter.

Development PC versus Production Terminal

Remember that the PDT 7200 terminal — even configured with 16 MB RAM and 4 MB flash — does not have the same capability and memory capacity as the development PC. Please recognize that applications developed on a high-performance PC may perform differently on the terminal.

Cradles

The cradle performs three functions:

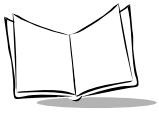
- communication with the host or other devices
- battery charging with A/C power
- storage.

Symbol offers a single-slot cradle. The cradle contains an RS-232C communication port and can connect with up to 59 daisy-chained slave cradles. Each cradle is supplied with (and requires) its own international power supply with IEC connector.

The cradle provides terminal storage, in-terminal battery charging, spare battery pack charging, and RS-232 communications to a Symbol Series 3000 cradle, PPT 4100 cradle, host computer, or an external serial device such as a printer.

Battery Packs

Primary power for the PDT 7200 is provided by a rechargeable Lithium-Ion (Li-Ion) battery pack. For information on installing and charging the battery pack, refer to [Chapter 3, Cradle Setup and Operation](#).



PCMCIA Cards

PDT 7200 offers one type II PCMCIA slot for inserting memory or communications peripherals. This port supports 5 volt and 5/3 volt PC cards.

The PCMCIA slot supports:

- Symbol's Spectrum 24[®] RF wireless LAN card with internally mounted antenna
- Flash memory cards.

PDT 724X Spectrum24 Radio Terminals

The PDT 724X is equipped with a Spectrum24 adapter card (Type II PC card connected to an internally mounted antenna) that enables the terminal to operate in a Spectrum24 network.

The software required (interface, drivers, and configuration files) is described in the *Spectrum24 NDK Product Reference Guide*. For information on configuration file edits to ensure proper operation of the PDT 724X in a Spectrum24 environment, refer to the Spectrum24 NDK.

SDK

The Series 7000 Software Development Kit (SDK) contains software and documentation to assist you in developing applications to run on the PDT 7200.

You will need one or more application development environments (ADEs) from other vendors to develop applications for the PDT 7200. Some examples are Microsoft and PenRight! for DOS.

Spectrum24 NDK for DOS

The Network Development Kit (NDK) for Spectrum24 contains the network drivers, samples, and documentation to assist you in developing network-aware applications to run on the PDT 724X.

To develop applications for Spectrum24 for the PDT 724X, you must install both the Series 7000 SDK and the Spectrum24 NDK for DOS .

Third-Party Software

Other application development environments are available, such as Zetes MCL[®] Collection. Contact your Symbol Representative for more information.

Before You Use the Terminal

Install and Charge Battery

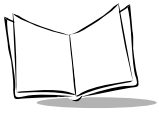
Prior to using the PDT 7200 for the first time, charge the Lithium-Ion battery. The battery can be charged while in the terminal or charged separately in the cradle's charging slot. Refer to [Chapter 3, *Cradle Setup and Operation*](#), for instructions on setting up the cradle and charging the terminal's battery.

Configure the Terminal

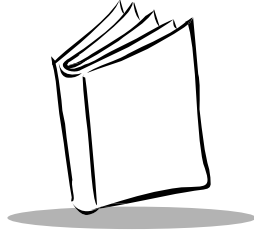
Terminal configuration consists of loading the software and applications into terminal storage and setting the terminal's operating parameters. For more information on configuration issues and considerations and an overview of the process, refer to [Chapter 4, *Terminal Configuration Issues*](#). For configuration procedures, refer to Chapters 5-10.

Run Setup

Run the Setup, described in [Chapter 9, *Terminal Configuration: Setup*](#) before using the terminal for the first time.



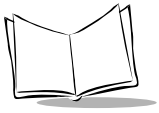
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Introduction

To develop applications to run on the PDT 7200, one software development kit (SDK) and one network development kit (NDK) are available. These kits are:

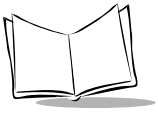
- The Series 7000 SDK for DOS, which includes:
 - MS DOS 6.22
 - Symbol-provided DOS Files (TSRs)
 - PCMCIA Software
 - Default Hex Image
 - TCM Scripts
 - Sample Code
- The Spectrum24 NDK for DOS, which includes:
 - Terminal Network Drivers for ODI
 - TCM Scripts
 - Sample Code
 - Spectrum24 NDK Reference Guide

SDK for DOS

The PDT 7200 is designed to run MS DOS 6.22, and all of the programs provided by Symbol for the PDT 7200 are based on MS DOS 6.22. If you use any other version of DOS in the PDT 7200, Symbol cannot guarantee that all of the terminal's features will function properly.

The SDK installation program loads the required MS DOS 6.22 components on the development PC used to create the hex files (via Terminal Configuration Manager) for download to the terminal.

Note: *The copy of MS DOS 6.22 supplied in the SDK is for use on the PDT 7200 ONLY. No license is included in the PDT 7200 SDK for using MS DOS on the development PC; you must have your own valid MS DOS license (preferably for MS DOS 6.22) for the development PC to use the SDK.*



Spectrum24 NDK for DOS

The NDK provides the driver, utilities, sample code and documentation necessary to interface to the Spectrum24 LAN.

The NDK also provides components of the Novell NetWare and LAN Workplace stacks for use with the PDT 7240. To obtain the full set of components and documentation, contact Novell.

Installing the SDK on the Development PC

The SDK and NDKs for DOS are installed through Windows. Both use a common directory, C:\SYMSDK\SDK7000, by default unless you change it. Install the SDK first, then the NDK(s).

Installing the SDK and NDK

1. Insert the CD in the CD drive on the development PC.
2. From the Start menu, choose **Run**.
3. In the open box, type: <drive>:SETUP and press **ENTER**.

Note: *To ensure the best operation of the SDK and NDK, do not change the base path set up in the installation.*

4. Follow the installation prompts.
5. Repeat the process for the NDK, if required.

Once installation of the development kits is complete, change to the C:\SYMSDK\SDK7000 directory and check for the directories shown in [Figure 2-1](#) (SDK) and [Figure 2-2](#) (Spectrum24 NDK).

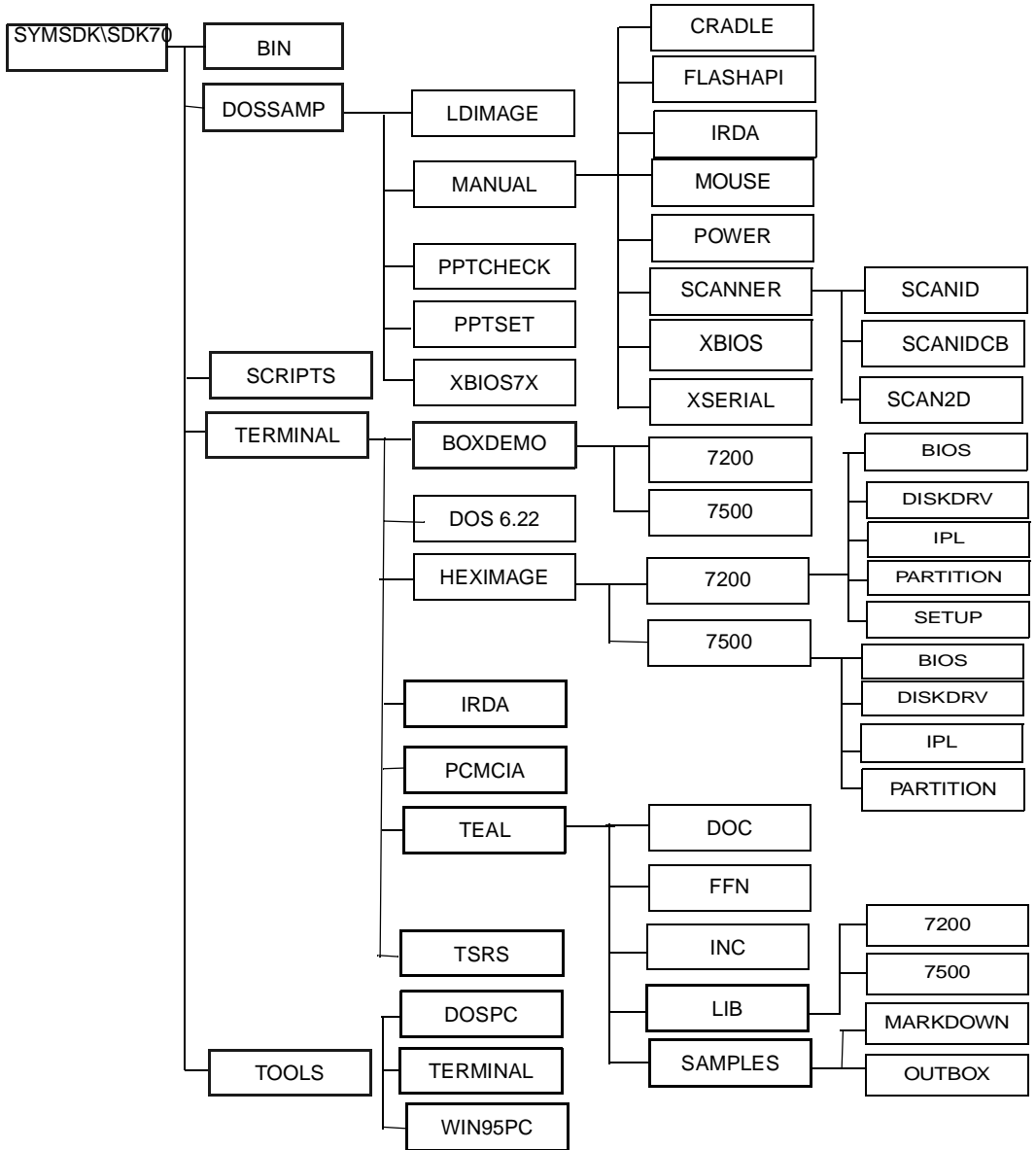


Figure 2-1. PDT 7200 SDK Directories

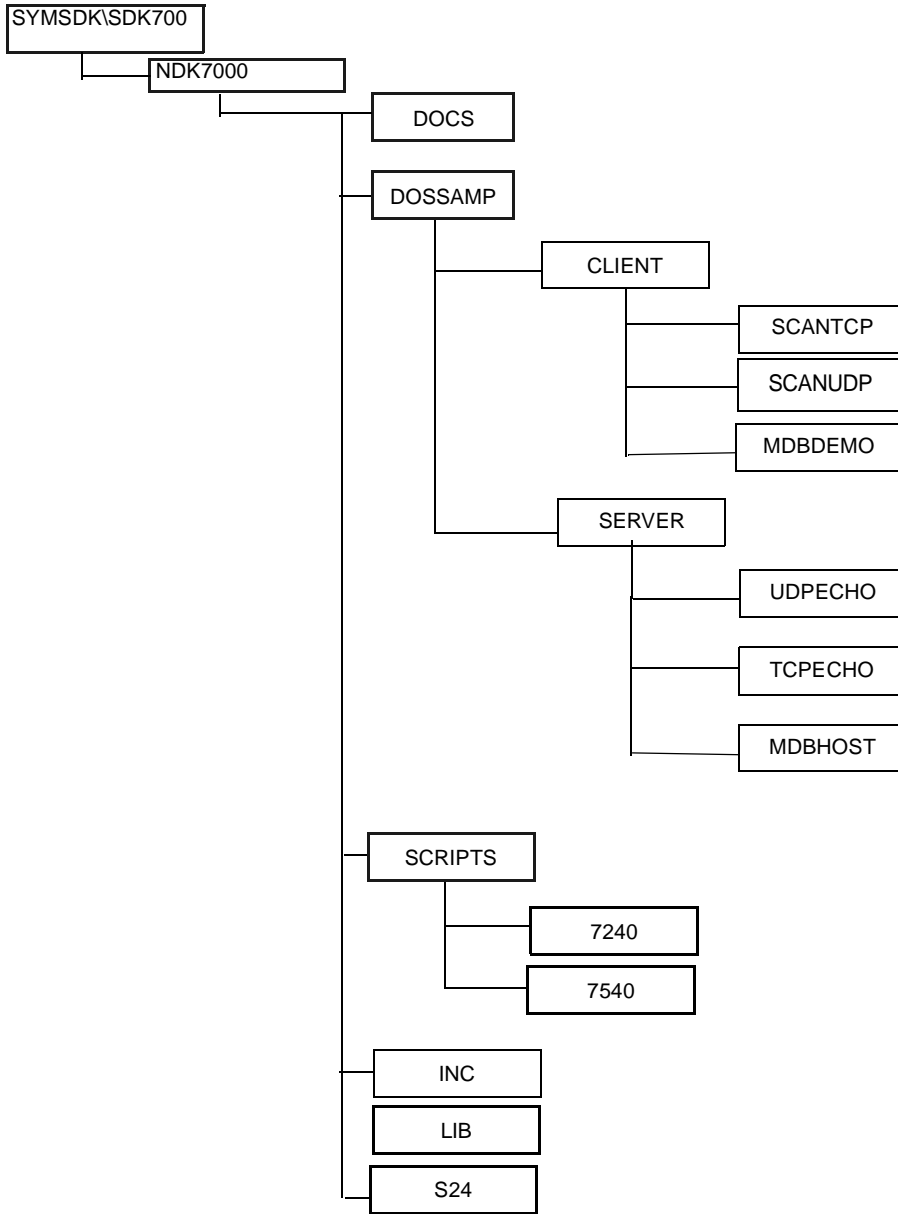
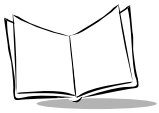
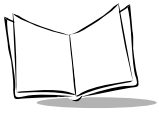


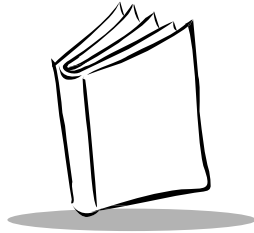
Figure 2-2. PDT 7240 NDK Directories

Installing Other Development Software

Developing applications for the PDT 7200 may require installing other development software such as application development environments (e.g., Visual C++.) on the development PC. Follow the installation instructions provided with this software.



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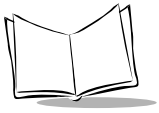


Chapter 3

Cradle Setup and Operation

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PDT 7200 Series Product Reference Guide

Introduction

The CRD 7200 single-slot cradle is used for battery charging, host communication, and terminal storage. This chapter covers setting up the cradle, using the cradle to charge the terminal's battery and performing host communication with the cradle.

Setting Up the Cradle

Setting up the cradle involves connecting power to the cradle and connecting it to the host PC.

Connecting Power

1. Connect the power supply cable to the power port on the back of the cradle.
2. Connect the power supply cable's AC connector to a standard electrical outlet.

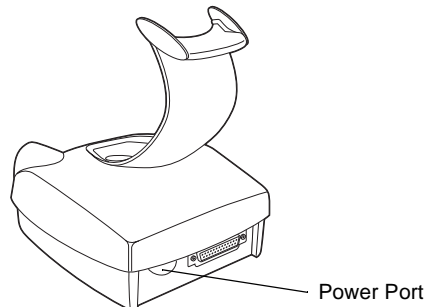
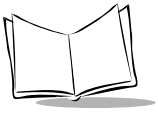


Figure 3-1. Power Connection

3. At power-up, the communications LED lights yellow for 3 seconds, then blinks seven times.



Connecting to a Host Computer, Printer or Modem

1. Plug an RS-232 serial cable into the RS-232 port located on the back of cradle.

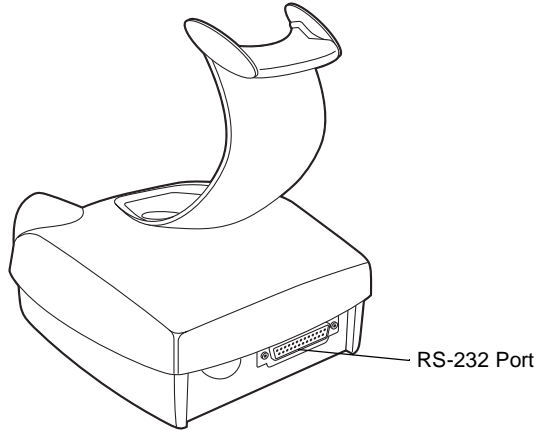


Figure 3-2. RS-232 Communication Port

2. Connect the other end of the cable to the serial (COM) port of the host computer or printer.

Note: *In most cases, you must use a null-modem cable. However, modems and some serial printers (DCE-type) require a DB9 or DB25 connection. For a DB25 connection, use cable p/n 25-19297-01. For a DB9 connection, use cable p/n 25-19299-01 (see your System Administrator).*

Using the Cradle

Charging the Terminal's Battery

The Li-Ion battery is automatically recharged whenever the terminal is properly inserted in the cradle. The terminal may be on or off.

To insert the terminal in the cradle, engage the terminal's scan bumper on the cradle rest, then gently rotate the terminal into the cradle. Make sure the scan bumper is supported by the cradle rest, as shown in [Figure 3-3](#).

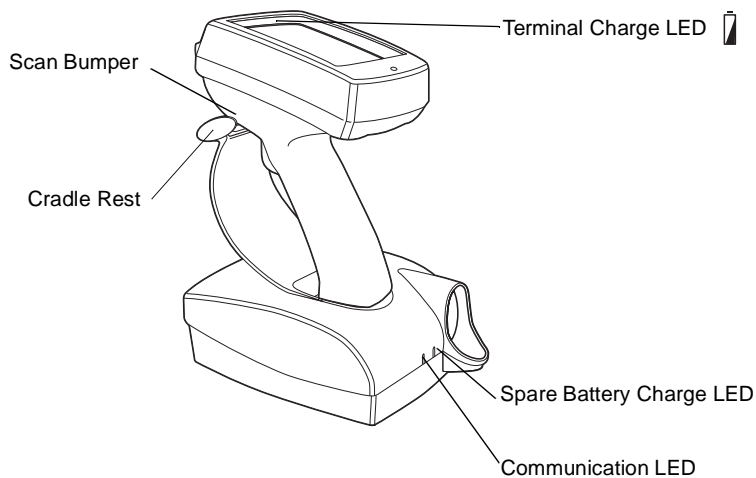

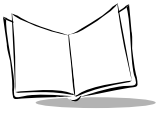


Figure 3-3. PDT 7200 Seated in Cradle

The terminal charge LED  turns yellow when a terminal is placed in the cradle, and the battery begins to charge. The terminal must be left in the cradle 2 hours to recharge a fully discharged battery pack. Once charging is complete, the terminal charge LED turns green. If the LED is off, either the terminal is not properly seated in the cradle, or a faulty battery pack is installed in the terminal.



Caution

The temperature range for charging the battery pack is 5°C- 45°C. Do not use the cradle outside these temperatures.

To remove the terminal from the charging slot, pull straight up and lift out of the cradle.

Caution

Removing the terminal while the cradle's COM LED is blinking red disrupts communication between the host and the terminal.

Charging A Spare Battery

To recharge a spare battery, insert the battery in the spare battery charging slot, as shown in [Figure 3-4](#).

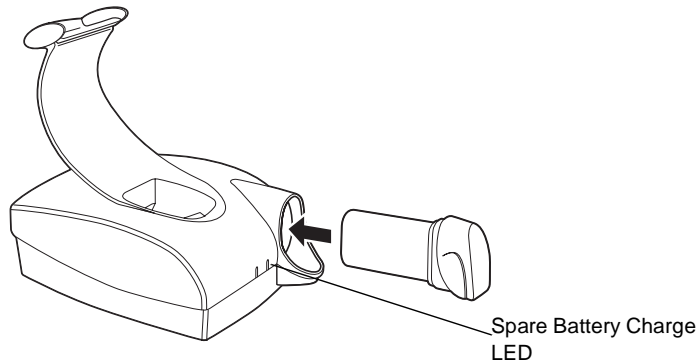


Figure 3-4. Inserting Spare Battery in Cradle

If a spare battery pack is present in the spare battery charge slot, the spare battery charge LED turns yellow. Once charging is complete, the spare battery charge LED turns green. If the LED is off, either no battery pack is present or a faulty battery pack is present in the slot. The battery must be left in the spare battery charging slot for approximately 4 hours to recharge a fully discharged battery.

Host Communication

The cradle can be used to communicate with a host, printer or modem. The data is transferred via the IrDA port on the terminal to the IrDA port on the cradle, then transferred serially from the cradle to the host.

Sending Data

1. Make sure the cradle is receiving power.
2. Make sure the cradle is connected to the host, printer or modem.
3. Insert the terminal in the cradle.
4. Press the appropriate key on the terminal as required by your application program.

The cradle's COM LED blinks when communication begins.

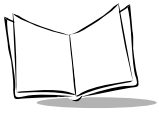
Caution

Removing the terminal while the cradle's COM LED is blinking disrupts communication between the host and the terminal.

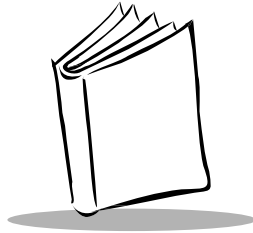
Cradle LED Indications

The following table describes the LED indicators.

Condition	SPARE BATTERY CHARGE LED	TERMINAL CHARGE LED	COM LED
ON	Yellow: spare battery is inserted in the cradle and the spare battery is charging; Green: spare battery is fully charged.	Yellow: terminal is inserted in the cradle and the battery is charging; Green: terminal's battery is fully charged.	
OFF	No spare battery. (battery not inserted into spare battery slot)	Terminal is not properly inserted in the cradle.	Terminal is not trying to communicate.
BLINKING	Faulty battery.		Terminal is able to send and receive data.



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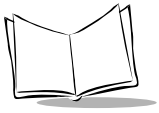


Chapter 4

Operating the Terminal

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PDT 7200 Series Product Reference Guide

Introduction


This chapter describes how to perform basic tasks with a terminal that has been configured and charged. For information on configuring the terminal, see chapters 5-10.


Powering the PDT 7200

Power for the PDT 7200 is provided by a Li-Ion rechargeable battery pack. Before powering on the terminal, initialize it and install a new or fully-charged battery pack. Refer to [Chapter 3, Cradle Setup and Operation](#) for more information on battery packs. Refer to Chapters 5 - 10 for information on initializing the terminal.


To power the PDT 7200 on or off, press the  on the display in the upper left-hand corner.

Booting the Terminal


Warm booting the terminal is similar to performing a **CTRL+ALT+DEL** on a PC. To warm boot the terminal, press and hold the  icon for at least 6 seconds, but less than the cold boot timeout value defined in Setup.

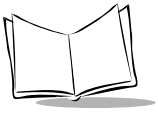
Cold booting the terminal generates a system reset, the same as a power-on boot on a standard PC. To cold boot the terminal, press and hold the  icon for 16 seconds, then release. See [Chapter 9, Terminal Configuration: Setup](#) for more information.

Suspending and Resuming Operation

To suspend or resume the PDT 7200, tap the  icon in the upper left-hand corner of the display. The terminal can also resume operation from various wake-up sources (if enabled through application development).

Terminal operation can be suspended in four ways:

- Manual
 - the operator taps the  icon. Refer to [Table 4-1](#) for the default values.
- Automatic
 - the terminal times out because of no operator activity. Refer to [Table 4-1](#) for the default values.
- Programmatic



- the application requests a suspend via an API call, or the application sets a wakeup.
- Critical
 - the battery is removed or is very low.
 - power switch required to resume.

The wake-up sources available on the PDT 7200 are listed in [Table 4-1](#).

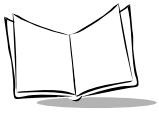
Note: *The default for enabling/disabling these wake-up causes depends on how the terminal is suspended (**manual** suspend using the power switch vs. **automatic** suspend via timeout). An application can also override the defaults to control the cause of a terminal wakeup.*

Table 4-1. PDT 7200 Wakeup Sources

Source	Manual Default (power switch)	Timeout Default
Touch panel power area	enabled	enabled
AC adapter connect	disabled	disabled
Cradle insert/remove	enabled	enabled
Battery insert	disabled	disabled*
Scan trigger(s)	disabled	disabled
Keyboard (any key)	disabled	disabled [†]
Touch pad (any touch)	disabled	disabled
Alarm timer	disabled	disabled
PCMCIA Slot	disabled	disabled ^{† ‡}
* Not supported at this time. Inserting a battery does NOT wake up the terminal.		
† For these devices to cause a wakeup, they must be “rearmed” if they were enabled when the terminal was suspended and the battery unlatched without an external power source being connected. Wakeup sources do not function once the battery is re-installed until the terminal is suspended and resumed again.		
‡ Some cards are designed to wake up the terminal (e.g., radio or modem cards). Be sure to use wakeup ONLY on cards that are designed for it and that you want to wake up.		

Table 4-1. PDT 7200 Wakeup Sources (Continued)

Source	Manual Default (power switch)	Timeout Default
COM ring (1)	disabled	disabled
* Not supported at this time. Inserting a battery does NOT wake up the terminal.		
† For these devices to cause a wakeup, they must be “rearmed” if they were enabled when the terminal was suspended and the battery unlatched without an external power source being connected. Wakeup sources do not function once the battery is re-installed until the terminal is suspended and resumed again.		
‡ Some cards are designed to wake up the terminal (e.g., radio or modem cards). Be sure to use wakeup ONLY on cards that are designed for it and that you want to wake up.		



Using the Touchscreen

The PDT 7200 is equipped with a touchscreen, which allows you to use your finger to select items on the screen as you would with a mouse. The full range of touchscreen uses depends on the application running on the terminal.


Using the Touchscreen Keypad

The PDT 7200 is equipped with virtual keypad capability. Symbol's Keyboard Builder software (which runs on a PC using Windows 95) can be used to design customized keypads for multiple applications.


For more information on designing virtual keypads, refer to the *Keyboard Builder User's Guide*.

Adjusting the Display and Backlight

To adjust the display contrast:

- Press and hold the  Contrast icon located at the top of the display to decrease the contrast. To increase the contrast, repeatedly tap the contrast icon until you reach the desired setting.

To adjust the backlight:

- Tap the  Backlight icon to toggle the backlight on/off.

Scanning

The PDT 7200 gains scanning capability through an integrated scanning module, and supports:

- 1-Dimensional standard and long range scanning elements
- PDF417 2-Dimensional symbology.

Note: *The scanning application and scanner driver must be loaded on the terminal to perform scanning.*

Using the Dual-Position Trigger

The PDT 7200 has a dual-position scan trigger, which serves two functions. These functions are programmable and may be changed for your application. The two positions of the trigger are activated as follows:

- The first trigger position is accessed by pulling the trigger to the first click. Use this, for example, as an aiming function or to activate the keypad.
- The second position is accessed by pulling the trigger the remaining distance to the handle. This activates the scanner.

Using the Scanner

1. Verify that the terminal is on (the display is active).
2. Ensure that a scanning-capable application is loaded and prepared to allow scanning.
3. Point the scanner at the bar code and pull the trigger to the handle.
4. Ensure that the scan beam crosses all bars and spaces on the symbol, as shown:



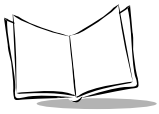
Optimal scanning distance varies with bar code density and scanner optics, but most combinations work within 4 to 10 inches. Generally:

- Hold the scanner farther away for larger symbols.
- Move the scanner closer for symbols with bars that are close together.
- 5. If the decode is successful, the LED turns from yellow to green. The terminal may also beep.

Note: *The procedure for your scanner may differ from the one listed above. Scanner operation depends on the application.*

Scanning Considerations

Usually, scanning is a simple matter of aim, scan, and decode, and a few quick trial efforts master it. However, two important considerations can optimize any scanning technique — range and angle.



Range

Any scanning device decodes well over a particular working range — minimum and maximum distances from the bar code. This range varies according to bar code density and scanning device optics.

Scanning within range brings quick and constant decodes; scanning too close or too far away prevents decodes. So you need to find the right working range for the bar codes you are scanning. However, the situation is complicated by the availability of multiple integrated scanning modules, some with specialized capabilities such as long range and 2-D decode capability. The best way to specify appropriate working range per bar code density is through a chart called a decode zone for each scan module. A decode zone simply plots working range as a function of minimum element widths of bar code symbols. See [Appendix A, Specifications](#) for more information about the decode zone for the PDT 7200 terminal.

Angle

Scanning angle is important for promoting quick decodes. When laser beams reflect directly back into the scanner from the bar code, this specular reflection can “blind” the scanner.

To avoid this, scan the bar code so that the beam does not bounce directly back. But don't scan at too sharp an angle; the scanner needs to collect scattered reflections from the scan to make a successful decode. Practice quickly shows what tolerances to work within.

Note: *Contact the Symbol Support Center if you have chronic difficulties scanning. Decoding properly printed bar codes should be quick and effortless.*

Scanning Options

Smart Raster Capability

All integrated 1-D/PDF417 scan elements may be programmed for “Smart Raster” capability, which causes the scanner to emit a raster pattern dynamically optimized to the particular PDF417 bar code's shape. To increase scanning efficiency and optimize decode time, the scanner determines the geometry of the bar code and opens at a rate and size optimal for decoding that bar code.

In normal “Smart Raster” operation, a trigger pull causes a slab raster pattern to appear. If the target is a 1-D bar code, the pattern never gets beyond a slab raster. But if the target

bar code is PDF417, the scanning patterns open up to a full, optimized raster pattern as soon as the scanner is properly aligned over the bar code ([Figure 4-1](#)).

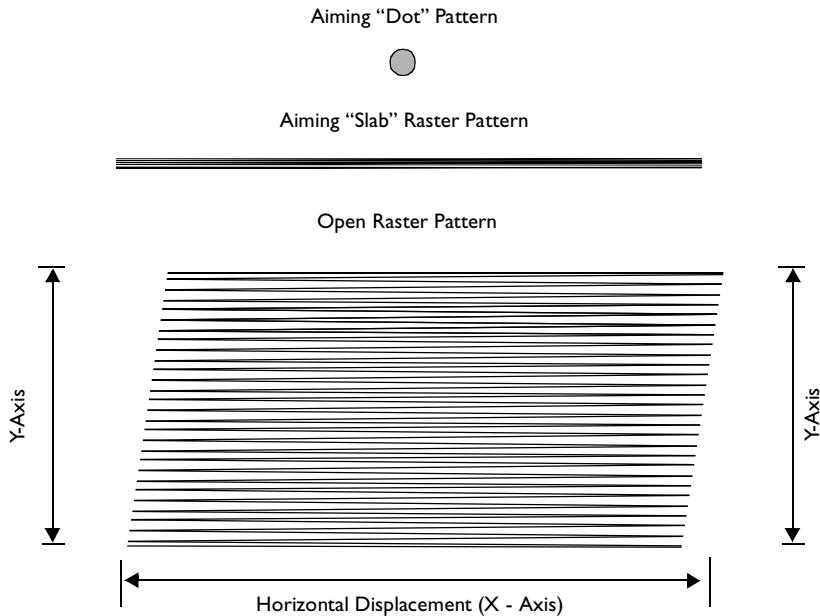


Figure 4-1. 1-D/PDF417 Scan Element Aiming and Scanning Patterns

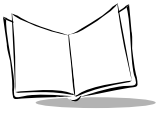
For best operation in smart raster mode, keep the scan pattern as parallel to the symbol's rows as possible, keep the scanner as still as possible, and hold the scanner at an angle which does not give specular reflection (refer to the section [Angle](#) on page 4-8). Likewise, the symbol should be in good condition.

1-D/PDF417 Scanning Mode Options

There are three scanning options: aiming with a dot pattern, scanning with a slab raster pattern, or always raster.

- *Aiming Dot Option*

A trigger pull creates the single dot aiming pattern, which lasts for a fixed interval. This dot easily can be seen in outdoor or high ambient light environments. A slab raster pattern or an open raster pattern appears next, depending on the



programmed scanning option. There are two programmable timeout periods for this option — normal and extended.

- *Slab Raster Option*

A trigger pull creates the slab raster pattern. If the target is a 1-D bar code, the pattern never gets beyond a slab raster. But if the target bar code is PDF417, the pattern opens up to an optimized raster pattern as soon as the scanner is properly aligned over the bar code.

- *Always Raster*

When programmed to this option, the PDF417 scan element directly opens to a full raster pattern whenever the trigger is pulled.

Scanning PDF417 Bar Codes

Make sure the terminal is programmed for a slab raster aiming pattern and smart raster mode.

1. Aim the scanner at the symbol. Try to keep the nose of the scanner parallel with the symbol's rows.
2. Make sure the symbol you want to scan is within the scanning range; refer to the 1-D/PDF417 decode zones. Then pull the trigger to scan.

The scan pattern first covers the symbol horizontally ([Figure 4-2](#)).



Figure 4-2. Slab Raster Pattern on a PDF417 Bar Code

Make sure the scan pattern extends at least three-quarters of an inch beyond the edges of the bar code.

If the pattern is parallel to the symbol's rows, the pattern spreads vertically to cover the symbol ([Figure 4-3](#)). If the pattern does not cover the top and bottom of the symbol, pull the scanner back until it does.

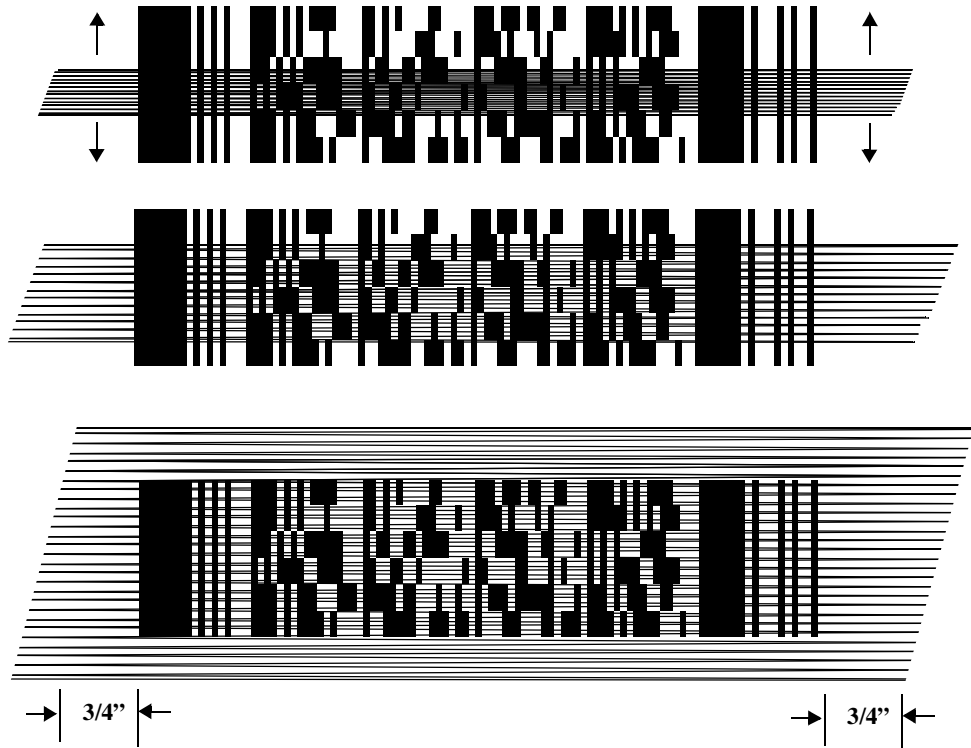


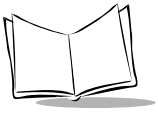
Figure 4-3. Scanning Pattern Spreading Over PDF417 Bar Code

The scanner has successfully decoded the symbol when:

- The green LED lights.
- You hear a short, high tone beep.

Scan the Entire Bar Code Symbol

- The larger the symbol, the farther away you should hold the scanner to permit the raster pattern to cover the symbol (but not more than 8 inches). See [Appendix A, Specifications](#) for more detail on the 1-D/PDF417 Scan Element Decode Zones.
- Hold the scanner close for denser symbols (not less than 2 inches).
- In all cases, make sure the scan pattern extends *at least 3/4 inch* beyond each edge of the bar code ([Figure 4-4](#)).



- The PDF417 bar code symbol has multiple rows, but the raster pattern also has multiple scanning rows. For this reason, as you scan:
 - Center the aiming pattern on the bar code, as illustrated in [Figure 4-3](#).
 - Keep the pattern in the same horizontal plane as the bar code.

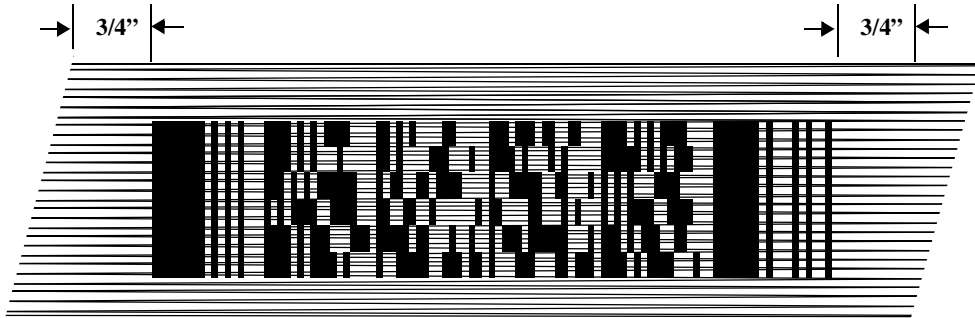


Figure 4-4. Orienting Scanning Pattern On PDF417 Bar Code

- If the vertical scan pattern is not high enough to cover a “tall” PDF417 symbol, move the scanner slowly down toward the bottom of the symbol, keeping the beam horizontal to the rows, and then slowly back upward toward the top ([Figure 4-5](#)).



Figure 4-5. Moving Scan Pattern Upward and Downward on “Tall” PDF Symbol

Performing Communication

There are a variety of host communication options available with the PDT 7200 terminal.

IrDA Communication

The PDT 7200 has an IrDA port on the base of the terminal's handle which enables communication with another IrDA-compliant device.

To perform IrDA communications, align the terminal with the other device via the IR communications port:

1. Power on the terminal and the host.
2. Align the IR port on base of the terminal's handle directly with the IR port on host IrDA device.
3. Initiate communication according to your application's requirements.

Communicating with Printers

The PDT 7200 communicates with IrDA-compliant peripherals (e.g., Comtec and O'Neil printers) through the IrDA interface in the base of the terminal. To print, point the base of the PDT 7200 handle at the IrDA-compliant printer from a maximum distance of 39 inches [1 meter] and run the application's print function.

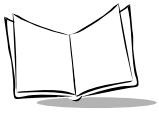
Cradle Communication

The cradle enables communications between the PDT 7200 and a computer, printer, modem, or other peripheral device. See [Chapter 3, *Cradle Setup and Operation*](#) for instructions on connecting the cradle to the host device and performing host communication with the cradle.

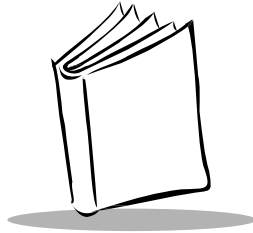
Spectrum24 Communication

For information on changing subnets (changing ESS_ID), performing network diagnostics on the terminal, or general Spectrum24 configuration, refer to the *Spectrum24 NDK for DOS Reference Guide* provided with the NDK.

For general information on the Spectrum24 wireless LAN network, refer to the *Spectrum24 Ethernet Access Point User Guide*, *Spectrum24 Wireless LAN PC Card User Guide*, and the *Spectrum24 Wireless LAN ISA Adapter User Guide*.



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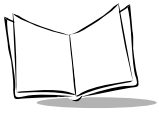


Chapter 5

Terminal Configuration Issues

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Configuration Options

The terminal's on-board RAM and on-board flash configuration determine what software can be loaded on the terminal.

On-Board RAM

RAM configurations range from 8 MB to 16 MB. Following lists the RAM required to run applications on the PDT 7200.

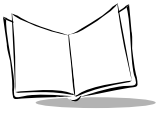
- DOS: 2MB
- DOS and TPA: 1 MB
- RAM Disk: 1-15 MB

On-Board Flash

PDT 7200 terminals can be ordered with additional on-board flash. To obtain more “disk” storage, use DRVSPACE [™], compact-flash disk or a PCMCIA card.

Note: *Expansion via a PCMCIA card can only be performed on the PDT 7200, not the PDT 724X.*

For more information on PCMCIA card options, refer to [PCMCIA Card Considerations](#) on page 5-5.



The on-board flash segments are grouped into areas. Typically, all segments in an area are erased and updated together. The supported areas are IPL, BIOS, and Flash disk partitions.

IPL	16K
Partition Table	8K
Reserved	40K
Setup	64K
Disk	896K or 2944K
BIOS	128K
Disk	896K

Figure 5-1. Flash Memory Allocations

Each partition can be updated without effecting any other partition. In calculating flash requirements, remember that code such as DOS, and applications, can only be *stored* in flash. Applications and operating systems cannot *execute* out of flash; instead, they load from flash into RAM where they execute.

Compact-Flash Disk

You can use a compact-flash disk to further expand your storage space. There are a variety of memory configurations available in compact-flash disks. Contact your Symbol Representative for more information.

Application Size Considerations

DOS applications often include an entire support infrastructure (aside from DOS and BIOS calls, and various APIs supplied by TSRs). The need to include graphics support code within DOS applications results in large, sophisticated, graphical DOS programs. This often

means that multiple applications carry multiple copies of such code. Some DOS development systems allow applications to share code, but that is the exception.

PCMCIA Card Considerations

PCMCIA cards can be used to provide additional storage space for applications and data. PCMCIA cards recommended for use on the PDT 7200 include:

- SRAM with FAT format, using CardSoft™
- non-ATA (Native) flash with FAT format, using CardSoft
- ATA flash using CardSoft.

The features of various types of PCMCIA storage cards are summarized in [Table 5-1](#).

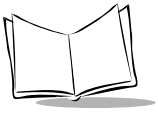
Table 5-1. PCMCIA Card Storage Comparisons

Card	Read/Write*	Cost/MB	Power Use	Comments
SRAM	Y	High	Very Low	Read/Write Static Ram. Low-power CMOS with backup battery. Rugged.
Native (non-ATA) Flash	N**	Low	Very Low	Read-only flash which emulates a disk drive, but has no smart logic to allow file-by-file write. Rugged.
ATA Flash	Y	Medium	Medium	Read/write capability, has smart logic to emulate disk drive. Less expensive than SRAM. Higher power consumption than SRAM. Rugged.
<p>* On PDT 7200 terminal.</p> <p>** Native (non-ATA) flash cards can be written on some systems (en-masse) but cannot be updated file-by-file on any system (if FAT-formatted) and cannot be written to on a PDT 7200 at all.</p>				

PCMCIA Support Software

CardSoft

CardSoft supports the following PCMCIA cards, based on the combination of software components loaded:



- SRAM cards (FAT-formatted)
- FAT-formatted Native (Non-ATA) cards
- ATA cards.

CardSoft operation requires loading the CardSoft drivers into TPA memory, but provides more flexibility in configuring a system. CardSoft treats SRAM Cards as read/write/write-protected floppies and FAT-formatted native (non-ATA) flash cards as read-only floppies. Refer to [Table 5-4](#) for details on installing CardSoft components and the amount of memory they use.

Matching Software Requirements to the Hardware Available

In this chapter, we've discussed issues specifically related to Flash disk, RAM disk, PCMCIA cards, and applications. How does all of this information fit together?

There are a number of ways to configure your DOS application, based on the amount of memory (flash and RAM) and, optionally, the number and type of storage cards you plan to use.

There are four ways to set up a hardware configuration in DOS

- a Flash Disk
- a PCMCIA card
- Compact Flash-based
- a combination of flash disk or compact flash card, augmented by an additional PCMCIA card.

The discussion for each option lists the minimum configuration and storage requirements or possibilities, then provides alternatives for increasing memory and storage. [Table 5-2](#) through [Table 5-4](#) provide a quick comparison of requirements, hardware required, and recommended configurations.

Flash Disk

The terminal boots from flash disk and does *not* use PCMCIA cards for additional storage. This configuration is set up with:

- 4 MB Flash (minimum)
- 8 MB RAM (minimum)
- DOS, TSRs, application(s), and data stored in flash disk.

- Some software and data may be stored, via RAM disk, in extended RAM (>1MB).

Note: *Some software can load some or all of their code into EMS or XMS, which uses RAM beyond the first MB.*

To meet additional software and data storage needs:

- Use DRVSPACE to compress the Flash disk and extend program and data storage.
- Add additional flash (e.g., 4 MB) to meet program and data storage needs.
- Add additional RAM (beyond the first 8 MB, up to 16 MB).
- Use DRVSPACE to compress the RAM disk.

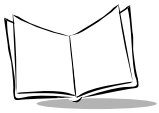
Flash Disk or Compact-Flash, Augmented by Additional ATA or SRAM Card

This configuration combines flash disk and PCMCIA storage to provide more flexibility in meeting software and data storage needs.

- The minimum configuration is the same as for either the Flash disk-based or PCMCIA SRAM card-based options for DOS (4 MB of flash, 8 MB of RAM).
- Add a PCMCIAATA card or SRAM card, as needed, to meet application and data storage needs.
- Use DRVSPACE to compress disks to gain additional space.

Options to extend Flash disk, RAM disk, Compact flash disk and PCMCIA card storage include:

- Use DRVSPACE to compress the disks
- Add Flash
- Add RAM.



Memory Requirements

Table 5-2 through Table 5-4 summarize the memory requirements for program and data storage for various configurations based on application requirements.

Table 5-2. Program Storage

Application Requirements		Recommended Configuration(s)	Hardware Required
A	Small Program Storage Operating system (OS) and support files fit within 1.8 MB of flash disk when uncompressed.	Flash Disk Based	2 MB flash Boot from flash disk Operating system and support files stored in Flash disk.
B	Medium Program Storage OS and support files fit within 3.8 MB of flash disk uncompressed or within 1.8 MB of flash disk compressed.	Flash Disk Based	Same as A, but with 4 MB flash OR Same as A, but with flash disk compressed using DRVSPACE ¹ .
C	Large Program Storage OS and support files fit within 3.8 MB of flash disk when compressed.	Flash Disk Based	Same as A, but with 4 MB flash and with flash disk compressed using DRVSPACE.

¹ DRVSPACE requires approximately 60KB of conventional memory to load. It can be configured to use EMS or XMS memory, reducing the amount of conventional memory required, but increasing the total amount of RAM required.

² Some possible reasons why DRVSPACE might not be usable are listed below:

- a. The application requires a large amount of various types of memory (conventional, XMS, EMS, etc.) and the memory required by DRVSPACE cannot be spared.
- b. DRVSPACE conflicts with the application or some utility used with the application (no such conflicts have yet been found), depending on how you choose to load DRVSPACE.
- c. The minor performance penalty imposed by DRVSPACE is unacceptable.

Table 5-2. Program Storage (Continued)

Application Requirements		Recommended Configuration(s)	Hardware Required
D	Very Large Program Storage OS and support files will not fit within 3.8 MB of flash disk when compressed.	Flash Disk Based, augmented by PCMCIA Card or Compact Flash	Same as A, B, or C. Additional program storage can be off-loaded to an SRAM or ATA card or Compact Flash. Additional program storage can be traded off between additional flash disk (via 4 MB Flash memory and/or compressed using DRVSPACE) and an additional or larger PCMCIA card or Compact Flash (optionally compressed using DRVSPACE) to achieve optimum cost balance.
E	Very Large Program Storage OS and support files will not fit within 3.8 MB of flash disk when uncompressed, and DRVSPACE cannot be used ² .	Flash Disk Based, augmented by PCMCIA Card or compact flash.	Same as D.
F	Enormous Program Storage OS and support files far exceed the storage capacity of a 3.8 MB flash disk when compressed, and of an SRAM card when compressed.	Flash Disk Based, augmented by PCMCIA Card and compact flash.	Same as A, B, or C. Additional program storage can be achieved via a large ATA flash card compressed, or a Compact Flash card, possibly compressed.
<p>¹. DRVSPACE requires approximately 60KB of conventional memory to load. It can be configured to use EMS or XMS memory, reducing the amount of conventional memory required, but increasing the total amount of RAM required.</p> <p>². Some possible reasons why DRVSPACE might not be usable are listed below:</p> <p>a. The application requires a large amount of various types of memory (conventional, XMS, EMS, etc.) and the memory required by DRVSPACE cannot be spared.</p> <p>b. DRVSPACE conflicts with the application or some utility used with the application (no such conflicts have yet been found), depending on how you choose to load DRVSPACE.</p> <p>c. The minor performance penalty imposed by DRVSPACE is unacceptable.</p>			

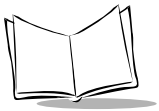


Table 5-3. Data Storage

Application Requirements		Recommended Configuration(s)	Hardware Required
A	Very Small Data Storage, Noncritical Data storage fits within one or more RAM Disks that can be located within the available (not used by applications) amounts of 640 KB Conventional Memory and/or the 1 MB of Extended Memory.	Use RAMDRIVE.SYS to create RAM Disk	8 MB RAM Ram Disk(s) can be located (via RAMDRIVE) in Conventional Memory, Extended, and/or Expanded Memory. ¹ A RAM Disk created using RAMDRIVE.SYS loses its contents if the terminal is rebooted.
<p>¹. The first MB of RAM is dedicated for use as Conventional Memory and Shadow Memory. Shadow Memory is used by the BIOS and is not directly accessible to applications. Conventional Memory (640 KB) is used to load operating system software, drivers, TSRs, utilities, and applications. The second MB of RAM is used to allocate the HMA (64KB) if HIMEM.SYS is loaded in CONFIG.SYS. The remainder of the first MB of RAM is available for use as Extended Memory. The HMA may be used to load DOS high (which increases the amount of Conventional Memory available for applications) by specifying DOS=HIGH in CONFIG.SYS. Some or all of the available Extended Memory may be converted to Expanded Memory by loading EMM386.EXE in CONFIG.SYS. Available Conventional, Extended, or Expanded Memory can be used to allocate a RAM Disk by loading RAMDRIVE.SYS in CONFIG.SYS. Generally, Extended Memory is the best to use for creating a RAM Disk.</p>			

Table 5-4. CardSoft Program/Data Storage

	Application Requirements	Recommended Configuration(s)																
A	<p>Full CardSoft, Low, No EMS</p> <p>Application requires support of SRAM and ATA cards, plus power management of cards.</p> <p>Using additional conventional memory to hold card configuration information is preferable to using EMS memory.</p> <p>Uses a total of 93 KB of conventional memory, broken down as follows:</p> <table border="0" data-bbox="235 594 611 862"> <tr> <td>Socket Services</td> <td>4 KB</td> </tr> <tr> <td>Card Services</td> <td>43 KB</td> </tr> <tr> <td>ATA Support</td> <td>11 KB</td> </tr> <tr> <td>SRAM Support</td> <td>3 KB</td> </tr> <tr> <td>MTD Driver</td> <td>10 KB</td> </tr> <tr> <td>Card ID</td> <td>21 KB</td> </tr> <tr> <td>Power Management</td> <td>1 KB</td> </tr> <tr> <td>Total</td> <td>93 KB</td> </tr> </table>	Socket Services	4 KB	Card Services	43 KB	ATA Support	11 KB	SRAM Support	3 KB	MTD Driver	10 KB	Card ID	21 KB	Power Management	1 KB	Total	93 KB	<p>Load full CardSoft into conventional memory without EMS.</p> <p>Use the following list of commands in CONFIG.SYS:</p> <p>DEVICE=ss365sl.exe</p> <p>DEVICE=cs.exe</p> <p>DEVICE=csalloc.exe</p> <p>DEVICE=atadv.exe</p> <p>DEVICE=mtsr.am.exe</p> <p>DEVICE=mtddrv.exe</p> <p>DEVICE=cardid.exe</p> <p>INSTALL=cs_apm.exe</p> <p>Ensure that the files CSALLOC.INI and CARDID.INI are placed into the directory in which the CardSoft executables are located. Additionally, ensure that all Card Library Files (.CLB) for card types that will be used are loaded into the same directory and referenced as CardLib= lines in the [Libraries] section of CARDID.INI. Ensure that the line UseEMS=No appears in the [Common] section of CARDID.INI.</p>
Socket Services	4 KB																	
Card Services	43 KB																	
ATA Support	11 KB																	
SRAM Support	3 KB																	
MTD Driver	10 KB																	
Card ID	21 KB																	
Power Management	1 KB																	
Total	93 KB																	
B	<p>Full CardSoft, Low, EMS</p> <p>Application requires support of SRAM and ATA cards and power management of cards.</p> <p>Using EMS memory to hold card configuration information is preferable to using additional conventional memory.</p> <p>Uses a total of 73 KB of conventional memory (see breakdown of memory use that follows).</p>	<p>Same as option A above, but ensure that the line UseEMS=Yes appears in the [Common] section of CARDID.INI.</p> <p>Load HIMEM.SYS and EMM386.EXE (MIN=XXX RAM XXX) in CONFIG.SYS to provide EMS support. Note that "xxx" should be 32 KB plus the amount of EMS needed for other software.</p>																

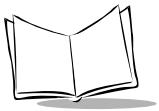


Table 5-4. CardSoft Program/Data Storage (Continued)

Application Requirements		Recommended Configuration(s)
B	Full CardSoft, Low, EMS (continued)	
	Socket Services 4 KB	
	Card Services 43 KB	
	ATA Support 11 KB	
	SRAM Support 3 KB	
	MTD Driver 10 KB	
	Card ID 1 KB	
	Power Management 1 KB	
Total 73 KB		
Uses 32 KB of extended memory, as 32 KB of expanded EMS memory.		
C	Full CardSoft, High (Best Case), No EMS	Load full CardSoft into UMBs (as much as possible) without EMS.
	Uses a total of 22 KB of conventional memory, broken down as follows:	Load HIMEM.SYS and EMM386.EXE in CONFIG.SYS to provide UMB support.
	Card ID 21 KB	Use DOS=HIGH and DOS=UMB commands in CONFIG.SYS to enable loading DOS high and to enable UMB support.
	Power Management 1 KB	Use the following commands in CONFIG.SYS:
	Total 22 KB	DEVICEHIGH=ss365sl.exe
	Uses a total of 96 KB of extended memory as one 64 KB UMB and one 32 KB UMB, of which 71 KB is used (see breakdown below). The remaining 25 KB is available for use by other software.	DEVICEHIGH=cs.exe
	Socket Services 4 KB	DEVICEHIGH=csalloc.exe
	Card Services 43 KB	DEVICEHIGH=atadv.exe
	ATA Support 11 KB	DEVICEHIGH=mtsr.am.exe
	SRAM Support 3 KB	DEVICEHIGH=mtddrv.exe
MTD Driver 10 KB	DEVICE=cardid.exe	
Total 71 KB	INSTALL=cs_apm.exe	
	Ensure that the files CSALLOC.INI and CARDID.INI are placed in the directory in which the CardSoft executables are located.	

Table 5-4. CardSoft Program/Data Storage (Continued)

	Application Requirements	Recommended Configuration(s)														
C	Full CardSoft, High (Best Case) No EMS (continued)	Also ensure that all card library (.CLB) files for card types that will be used are loaded into the same directory and referenced as CardLib= lines in the [Libraries] section of CARDID.INI. Ensure that the line UseEMS=No appears in the [Common] section of CARDID.INI.														
D	<p>Partial CardSoft, High, No EMS, Support for ATA only.</p> <p>Uses a total of 22 KB of conventional memory, broken down as follows:</p> <table border="0" data-bbox="235 646 611 743"> <tr> <td>Card ID</td> <td>21 KB</td> </tr> <tr> <td>Power Management</td> <td>1 KB</td> </tr> <tr> <td>Total</td> <td>22 KB</td> </tr> </table> <p>Uses a total of 64KB of extended memory as one 64 KB UMB, of which 58 KB is used (see breakdown below). The remaining 6 KB is available for use by other software.</p> <table border="0" data-bbox="235 893 611 1027"> <tr> <td>Socket Services</td> <td>4 KB</td> </tr> <tr> <td>Card Services</td> <td>43 KB</td> </tr> <tr> <td>ATA Support</td> <td>11 KB</td> </tr> <tr> <td>Total</td> <td>58 KB</td> </tr> </table>	Card ID	21 KB	Power Management	1 KB	Total	22 KB	Socket Services	4 KB	Card Services	43 KB	ATA Support	11 KB	Total	58 KB	<p>Load appropriate parts of CardSoft into UMBs without EMS.</p> <p>Same as option C, but use only the following commands in CONFIG.SYS:</p> <pre> DEVICEHIGH=ss365sl.exe DEVICEHIGH=cs.exe DEVICEHIGH=csalloc.exe DEVICEHIGH=atadrv.exe DEVICE=cardid.exe INSTALL=cs_apm.exe </pre>
Card ID	21 KB															
Power Management	1 KB															
Total	22 KB															
Socket Services	4 KB															
Card Services	43 KB															
ATA Support	11 KB															
Total	58 KB															
E	<p>Partial CardSoft, High, No EMS, Support for SRAM Only</p> <p>Uses a total of 21 KB of conventional memory.</p> <table border="0" data-bbox="235 1149 611 1247"> <tr> <td>Card ID</td> <td>21 KB</td> </tr> <tr> <td>Power Management</td> <td>1 KB</td> </tr> <tr> <td>Total</td> <td>22 KB</td> </tr> </table> <p>Uses a total of 64 KB of extended memory as one 64 KB UMB, of which 60 KB is used (see breakdown below) and the remaining 4 KB is available for use by other software.</p>	Card ID	21 KB	Power Management	1 KB	Total	22 KB	<p>Load appropriate parts of CardSoft into UMBs without EMS.</p> <p>Same as option C, but use only the following commands in CONFIG.SYS:</p> <pre> DEVICEHIGH=ss365sl.exe DEVICEHIGH=cs.exe DEVICEHIGH=csalloc.exe DEVICEHIGH=mtsr.am.exe DEVICEHIGH=mtddrv.exe DEVICE=cardid.exe INSTALL=cs_apm.exe </pre>								
Card ID	21 KB															
Power Management	1 KB															
Total	22 KB															

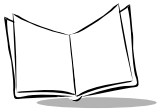


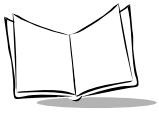
Table 5-4. CardSoft Program/Data Storage (Continued)

Application Requirements		Recommended Configuration(s)
E	Partial CardSoft, High, No EMS, Support for SRAM Only (continued)	
	Socket Services 4 KB	
	Card Services 43 KB	
	SRAM Support 3 KB	
	MTD Driver 10 KB	
	Total 60 KB	

Terminal Configuration Process

Setting up and initializing the PDT 7200 requires performing one or more of a series of procedures listed below.

- Creating the applications — refer to the *Series 7000 System Software Manual* (p/n 70-36860-xx) included with the SDK for more information
- Setting up the terminal's operating system files (covered in [Chapter 6, Terminal Configuration: Editing the Configuration Files](#))
 - Editing the DOS configuration files
 - Editing the network configuration files
- Building the hex image via TCM (covered in [Chapter 7, Terminal Configuration: Building and Sending the Hex Image](#))
 - Creating the hex image
 - Downloading the Flash disk image(s)
- Loading a RAM disk (covered in [Chapter 8, Terminal Configuration: Load a RAM Disk](#)).



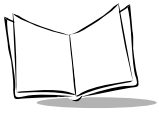
PDT 7200 Series Product Reference Guide



Chapter 6 Terminal Configuration: Editing the Configuration Files

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PDT 7200 Series Product Reference Guide

Introduction

This chapter details the edits recommended for DOS system files. For more information on editing these files, please refer to the Microsoft® MS-DOS User's Guide.

Note: *see the Spectrum24 NDK for config.sys and autoexec.bat file edits required for use in that environment.*

CONFIG.SYS

HIMEM.SYS Device Driver

This driver provides access to the terminal's extended memory (RAM beyond the first 1 MB). It provides services for managing the High Memory Area (HMA), which is the first 64K of extended memory, and an Extended Memory Specification (XMS) API for managing the remainder of extended memory.

Various uses of extended memory include:

- Loading DOS high (see DOS Settings: DOS = HIGH)
- Using Upper Memory Blocks (UMBs; see EMM386.EXE)
- Using Expanded Memory (EMS; see EMM386.EXE)
- Using DOS Extenders (e.g., Windows).

Note: *HIMEM.SYS must be loaded in CONFIG.SYS to allow use of extended memory. Most configurations created for the PDT 7200 should include this driver.*

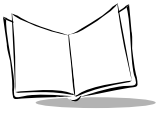
Recommended usage in CONFIG.SYS is:

```
DEVICE=HIGHMEM.SYS/TESTMEM:OFF
```

The /TESTMEM:OFF option skips the memory test and speeds up the boot process.

EMM386.EXE Device Driver

This driver provides alternate access to extended memory. It requires that HIMEM.SYS be loaded first and uses the XMS API provided by HIMEM.SYS to further manage extended memory.



Extended memory is “translated” into other types of memory such as Upper Memory Blocks (UMBs) and Expanded Memory (EMS). UMBs allow additional RAM memory to be located in unused areas of the first 1 MB of the address space. TSRs and drivers can be loaded into UMBs via the LOADHIGH and DEVICEHIGH commands, leaving additional Transient Program Area (TPA) available for application use. Expanded memory uses a 64K page frame within the first 1MB of the address space to allow RAM to be mapped in 16K pages via the EMS (LIM 4.0) API.

Note: Include *EMM386.EXE* in the PDT 7200 configuration **ONLY** if UMBs or EMS are required.

Recommended command line switches include:

1. If EMS memory is not required, add the following line to allocate all unused Upper Memory Blocks for DEVICEHIGH and LOADHIGH commands:

```
DEVICE=EMM386.EXE NOEMS X=C000-CFFF RAM=A000-AFFF RAM=D000-DFFF
```

CONFIG.SYS DOS Settings

• **BREAK = [ON | OFF]**

Controls whether or not extended CTRL+C checking is enabled. Since this feature introduces additional overhead and is useful only when a keyboard is attached, it should be disabled under most circumstances. Off is the default setting; hence this command need not be used unless this feature is being enabled.

• **BUFFERS = n[,m] 1≤n≤99 0≤m≤8**

Specifies the number of disk buffers to be allocated for use by DOS. The default value for the PDT 7200 is n=15 and m=0. Many applications and environments request a larger setting. Windows, for example, recommends a setting of n=20 and m=0. Using too large a value wastes memory and using too small a value can reduce performance. Unless there is a specific requirement, we recommend using the n=20 and m=0 settings.

• **COUNTRY = XXX[,YYY]**

Specifies the country-specific settings. The default is U.S. This command is required only for a different country setting.

- **DEVICE = driver.ext**
DEVICEHIGH = driver.ext

Causes a device driver to be loaded either low (into TPA) or high (into UMBs). Drivers cannot be loaded high until both HIMEM.SYS and EMM386.EXE are loaded low and DOS=UMB is specified.

In addition to the DEVICEHIGH lines required to support CardSoft (refer to the *CardSoft 3.1 User's Guide*), you have the option of setting the number of sockets that support ATA and/or SRAM cards. Use the following formula to calculate the number of drive letters that will be used by CardSoft:

of drives available to CardSoft =
(# of sockets for ATA cards) + (# of sockets for SRAM cards)
using the following table as a guide.

Table 1:

# of Sockets Set	# of ATA Cards Supported	# of SRAM Cards Supported	Total Drive Letters Used: ATA & SRAM
1	1	1	2

Add the line:

```
devicehigh=c:\cardsoft\atadriv.exe/S:X
```

where **X** is the number of sockets to be available to CardSoft.

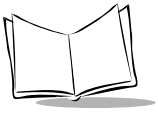
- **DOS = [HIGH | UMB]**

Allows DOS to load information into the HMA (DOS = HIGH), increasing the amount of TPA available for applications. This command also enables loading TSRs and drivers into UMBs via the LOADHIGH and DEVICEHIGH commands (DOS=UMB).

Note: *DOS = HIGH can only be used if HIMEM.SYS is loaded.
DOS = UMB can be used only if both HIMEM.SYS and
EMM386.EXE are loaded.*

- **FILES = n 8≤n≤255**

Controls the number of files that DOS can open at once. The larger this number, the more memory DOS allocates for file handles. The default is 8, which is generally inadequate for most applications and environments. Allocating too many files wastes memory; allocating



too few files may cause an application or environment to fail if it attempts to open too many files. Unless there is a specific requirement for more files, we recommend using a value of `n=20`.

- **INSTALL = file.ext**

Loads a TSR from CONFIG.SYS. It can be used to load TSRs (low only) that go along with drivers (as a convenience). Note that DOS does not load the TSRs until the end of CONFIG.SYS (as opposed to where they appear). If you use your application as a shell (see SHELL=), you can use this command to load TSRs prior to execution of the application as the shell.

- **LASTDRIVE = x**

Specifies the number of disk drives managed by DOS. This command is necessary only if the number of drive letters managed by DOS must be increased. DOS automatically allocates C: and possibly D:, E: and F:, if additional FLASH disk(s) are present.

CardSoft, the RAM disk driver, and DRVSPACE are device drivers that allocate new drive letters beyond those automatically allocated by DOS. LASTDRIVE only adds new drive letters (to be managed by DOS) if the drive letter specified is greater than the last drive letter automatically allocated by DOS or by device drivers such as RAM Disk, CardSoft, and/or DRVSPACE.

One common use of this command is to reserve one or more drive letters for use by the DOS SUBST command, in addition to the drives needed for RAM Disk, CardSoft, and DRVSPACE.

For example, if DOS is managing drives A-F, set **LASTDRIVE=G**.

For Spectrum24 use with Novell Netware and LAN Workplace TCP/IP stack, LASTDRIVE= must be set to **Z**.

- **NUMLOCK = [ON | OFF]**

Sets the state of the numeric lock key on the keyboard on boot up.

- **SET**

Sets environment variables in CONFIG.SYS instead of in AUTOEXEC.BAT.

Note: *Environment variables are set in CONFIG.SYS only at the end of CONFIG.SYS, regardless of where the SET command occurs. Consequently, these settings cannot be used by device drivers, and this command is generally only used if environment variables are*

required by TSRs loaded via the INSTALL= command, or if the application is being used as a command shell (e.g., turn-key application).

• **SET COMSPEC=**

Specifies the drive and path where the shell can be found. Use this command only if the SHELL= command is used to select a program other than COMMAND.COM as the shell, or if the shell is located in a directory other than the root directory of the boot drive.

• **SHELL = file.ext**

Specifies the command shell to be used. The default command shell is COMMAND.COM from the boot drive's root directory.

Reasons for using this command include:

- To increase the size of the environment table when running COMMAND.COM as the shell.

The recommended command line for this is: `SHELL=C:\COMMAND.COM/P/E:1024`

For additional information, consult the *MS-DOS User's Guide*.

To run (and store) COMMAND.COM in a directory other than the root directory (see also **SET COMSPEC=** above)

Note: *TCM automatically puts COMMAND.COM in the root directory of a FLASH disk marked as bootable, so this should seldom be needed.*

- To use an application other than COMMAND.COM as the shell.

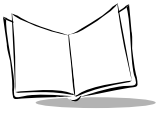
• **STACKS = n, s0≤n≤64, 32≤s≤512**

Controls the number and size of the DOS stacks used to service hardware interrupts. Unless there is a specific requirement otherwise, we recommend using a value of n=9 and s=256 to save memory.

Other MS-DOS Device Drivers

• **ANSI.SYS**

Provides text mode display attribute support for applications that desire ANSI terminal command set portability.



- **DISPLAY.SYS**

Allows internationalization of the text mode character set.

- **RAMDRIVE.SYS**

Creates a simulated “disk” using TPA, EMS, or XMS RAM.

- **SETVER.EXE**

Reports different version numbers for use with DOS-version-specific software programs. Consult the *MS-DOS User's Manual* for more information.

- **SMARTDRV.EXE**

Caches access to disk drives, thus increasing disk access speed. Due to the solid state nature of the “disks” available on the PDT 7200, this driver may be of limited use.

CardSoft Device Drivers

CardSoft is supplied with the Symbol Series 7000 SDK as a series of drivers that must be loaded in the terminal and activated via CONFIG.SYS.

- **ATADRV.EXE**

ATA card driver (flash or rotating disk).

- **CS.EXE**

PCMCIA card services.

- **CSALLOC.EXE**

This driver performs card services resource allocation.

- **SS365SL.exe**

PCMCIA socket services for 365SL PCMCIA controller.

- **CARDID.EXE**

Card identification driver.

Note: Although `CS_APM` is a TSR, not a device driver, it can be loaded in `CONFIG.SYS` (instead of `AUTOEXEC.BAT`) with the other CardSoft files listed above using the `Install=` command.

Do **NOT** load `CS_APM` in both `CONFIG.SYS` and `AUTOEXEC.BAT`!

Symbol Supplied Drivers

AUTOEXEC.BAT

Note: `AUTOEXEC.BAT` is processed by `COMMAND.COM` and has no meaning if another program is used as a shell (see the section **SHELL=** above).

DOS Settings

- **ECHO [ON | OFF | TEXT]**

This command (which is commonly used in batch files, especially `AUTOEXEC.BAT`) displays a text string (the `TEXT` option), or enables/disables the echoing of commands in the batch file as it is executed. When a batch file is used to execute a program, it gives a more “transparent” look if the commands which “set up” the applications’ execution are hidden. To prevent the `ECHO OFF` command from itself echoing, precede it with an `@` sign (e.g., `@ECHO OFF`).

- **MODE**

This command sets up and/or configures various drivers. Refer to the *MS-DOS User’s Manual* for more information.

- **PATH**

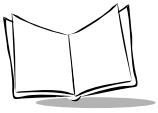
This command sets the path(s) used to find executable programs.

- **PROMPT**

This command modifies the DOS `COMMAND.COM` shell prompt.

- **SET**

This command sets environment variables, typically those required by TSRs or applications/environments.



Symbol-Supplied TSRs

Symbol has provided the following device drivers and TSRs for use with the PDT 7200. For information on loading the TSRs and device drivers, and on the APIs supported by each device driver or TSR, refer to the *Series 7000 System Software Manual for DOS*, p/n 70-36860-XX.

• POWER7XT.EXE

The Power Management Driver TSR API provides operating-system level power management. Use this TSR **instead of** the POWER.EXE TSR supplied with MS-DOS. While POWER.EXE can be used on the PDT 7200, it cannot be used in conjunction with POWER7XT.EXE, and does not provide as efficient a power management. POWER7XT.EXE requires that XBIOS7XT.EXE be loaded first and will not load unless one of these two files is present. When used on the development PC with XBIOS7XT.EXE, this TSR can be used for testing power management functionality of an application on the development PC.

• XBIOS7XT.EXE

This TSR provides extended BIOS-level functionality specific to Series 7000 features. XBIOS7XT.EXE can be loaded on the development PC or the Series 7000 terminal for use in testing and debugging Series 7000 applications on the development PC.

• MOUSE7XT.EXE

The Mouse TSR API provides Microsoft Mouse-compatible use to support the use of the pen and digitizer as a mouse. Mouse-aware applications can use this TSR to provide mouse emulation.

• SCN1DQST.EXE and SCN2DQST.EXE

The DOS Scanner API provides one- and two-dimensional bar code scanning support and supplies an API for controlling scanning from an application. These TSRs require the presence of POWER7XT.EXE and XBIOS7XT.EXE to load. Additionally, these drivers require the presence of Series 7000-specific hardware, and cannot be loaded on the development PC (even if XBIOS7XT.EXE is loaded).

• WARMBEEP.EXE

This application, when loaded on the terminal, causes a beep to sound when the defined warm boot time has expired. This alerts the user when a warm boot occurs. See the *Series 7000 System Software Manual for DOS Applications* for more information.

PC72T.EXE

This TSR provides debug support for screen rotation and a keyboard.

CardSoft

CS_APM

A TSR that must be loaded if you want to use CardSoft's advanced power management function. This TSR can also be installed in CONFIG.SYS with the CardSoft drivers using the Install command.

Note: Do **NOT** load CS_APM in CONFIG.SYS and AUTOEXEC.BAT.

Spectrum24 ODI

The Spectrum24 ODI drivers provided by Symbol consist of Novell's Link Support Layer (LSL), Novell's TCP/IP and Symbol's Multiple Link Interface Driver (MLID) layers. These executables are part of the Spectrum 24 NDK for DOS.

LSL.COM

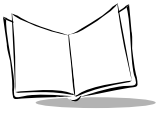
The LSL manages communications between protocol TCP/IP stacks and SL8ODIOS. This layer is a component of the Novell Open DataLink Interface (ODI) driver specification.

TCPIP.EXE

This is Novell's TCP/IP Multiple Protocol Interface (MPI). It supports the Berkley socket APIs. This layer is a component of the ODI driver specification.

SLAODIOS.EXE

This is the Spectrum24 MLID network driver. The MLID layer controls a specific network interface and works below the LSL. The MLID manages the transmission and reception of packets to and from a physical or logical network interface. This layer is a component of the ODI driver specification.



Symbol-Supplied Utilities

PDTSET.EXE

A utility that allows various system settings to be altered from AUTOEXEC.BAT. This utility is provided with the source code and an abstract explaining its use in the DOSSAMP\PDTSET directory.

PDTCHECK.EXE

A utility that allows various system conditions to be tested (e.g., trigger, pen, drive letter presence, display size, etc.). This utility is provided with the source code and an abstract explaining its use in the DOSSAMP\PDTCHECK directory.

CardSoft is supplied with the Symbol Series 7000 SDK as a series of drivers which are loaded in CONFIG.SYS:

ATADRV.EXE	DEVICEHIGH=atadv.exe
CS.EXE	DEVICEHIGH=cs.exe
CSALLOC.EXE	DEVICEHIGH=csalloc.ini
SS365SL.EXE	DEVICEHIGH=SS365SL.EXE
CARDID.EXE	DEVICE=cardid.exe

CSALLOC.INI

This file is used by the CSALLOC.EXE driver to allocate memory, I/O, and interrupt resources to PCMCIA cards. Much of the upper memory area is used by the BIOS. This memory must be excluded from use by lines in the CSALLOC.INI file.

The default CSALLOC.INI file contains the following memory settings:

```
RIO=2F8-2FF,370-377,3E8-3FF,100-1FF  
MEMEXCLUDE=C000-CFFF,D000-DFFF,E000-EFFF
```

Generally, these lines are constant and should *never be changed* by the user.

The PDT 7200 has IRQ lines dedicated for internal system use, others are available for PCMCIA I/O cards. IRQ 11 and 15 are available to PCMCIA I/O cards; IRQ 3 and 4, although allocated for internal communication ports, can be used by PCMCIA modems when the internal communication ports (COM1 and COM2) are not active.

To allow use of an I/O card that requires an IRQ line in a PCMCIA slot, the default CSALLOC.INI contains the following lines:

```
IRQEXCLUDE=0-2,5-9,C-E  
IRQINCLUDE=A-B,F
```

This restricts the I/O cards to IRQ lines 10, 11, and 15.

In addition to the IRQ lines discussed above, modem cards may also use IRQ lines 3 and 4 for COM3 and COM4, respectively. To use IRQ lines 3 and 4 for modem cards, modify the default CSALLOC.INI (below the resource modification line) to read:

```
IRQEXCLUDE=0-2,5-9,C-E  
IRQINCLUDE=3-4,A-B,F
```

Consult the *CardSoft 3.1 User's Guide* for more information.

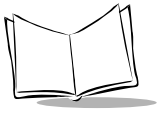
- ***CARDID.INI***

Card identification initialization file (base).

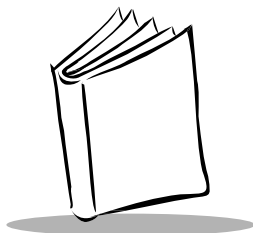
Note: . CLB includes various card library files used in *CARDID.INI* to allow automatic recognition and configuration of PCMCIA cards.

Symbol-Supplied Network Configuration Files

See the Spectrum24 NDK for DOS for specific network configuration instructions.



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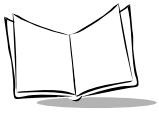


Chapter 7

Terminal Configuration: Building and Sending the Hex Image

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Introduction

Terminal Configuration Manager (TCM) is a Symbol SDK utility designed to assist you in setting up the FLASH Disk image. TCM simplifies building and downloading hex images to the terminal.

In TCM, you create a *script* that contains the information (commands to copy files) for building the image. TCM works with directory windows which display the directory structure of your script and the source directories, files, and scripts from which you pull components. You can open multiple scripts, drag and drop items from a drive/directory to the script, rename and delete files in the script, etc. Upon building the image, TCM adds all the files, directories, and scripts referenced in the script to the image.

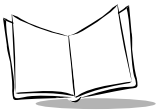
The SDK includes a number of standard scripts and demos/samples for you to use as a base for creating your own scripts. These scripts can be found in the SYMSDK\SCRIPTS directory.

Note: *Before you create a script to build a hex image, identify the files required (system files, drivers, applications, etc.) and locate the files' source directories to make the script building process easier.*

The required processes for building a hex image in TCM include:

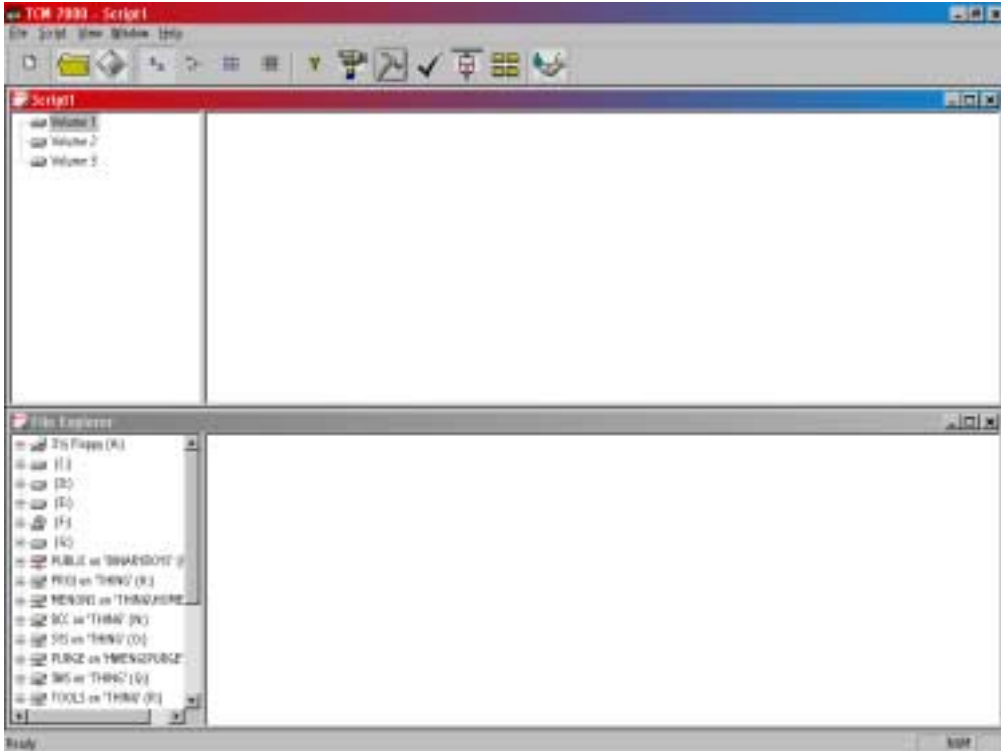
- Starting TCM
- Creating or modifying a script
- Building the hex image
- Sending the hex image.

Each process is described in the sections that follow.












Starting Terminal Configuration Manager

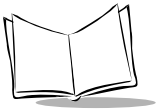
To start TCM, double click on the TCM icon in the SYMSDK group. The following screen appears, displaying two directory windows; Script1 and File Explorer. Each directory window is split; the left half (or *pane*) of the window displays the directory tree for the current drive, and the right half displays the directory contents for the current drive.



The following table lists the components of the TCM start-up screen.

Table 7-1. TCM Screen Components

Component	Description			
Script Window	<p>Associated with a script file containing the information to create a Flash Disk image. This window is the <i>target</i> window, or the primary TCM window in which you can create a script or change a script file's contents by copying, deleting, and renaming files and directories. More than one script window can be open at a time.</p> <p>The Script Window consists of two panes, the Directory Tree Pane on the left and the Directory Contents Pane on the right. Subordinate directories and files of each volume are listed in the Directory Contents Pane.</p>			
File Explorer	<p>A <i>read-only source</i> window for files and/or directories to include in the script being built.</p>			
Tool Bar	<p>Contains the tools, illustrated below, for taking action on a script.</p>			
		<p>Create a new script file.</p>		<p>Check script for existing files.</p>
		<p>Open a script file.</p>		<p>Select the hex image to load.</p>
		<p>Save a script file.</p>		<p>Tile windows.</p>
		<p>View script properties.</p>		<p>Build and send the hex image to the terminal.</p>
		<p>Build a script.</p>		



Defining Script Properties

Before a script is created, the script properties must be defined. This defines the type of terminal, type of flash type, number of disks being created, the memory configuration of each disk volume.

To define the script properties:

1. With TCM open, click on the Script Window to make it the active window.
2. Under the script menu, select the Properties option.

OR

Click on  from the tool bar. The Script Properties window displays.

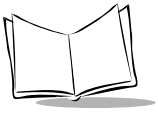
	Terminal	Flash Type	Disks	System File Path	Script File Path	Custom
	7200	0508A	3	E:\0056.22		15

	Volume Label	Boot Disk	Size	Access
	NONE	<input type="radio"/>	NONE	NONE
Disk 1:	Volume 1	<input checked="" type="radio"/>	836	Read/Write
Disk 2:	Volume 2	<input type="radio"/>	2944	Read/Write
Disk 3:	Volume 3	<input type="radio"/>	4096	Read/Write

3. Under the Terminal pull-down menu, select 7200.
4. In the Flash Type field, enter the type of flash chip installed in your unit, as indicated by booting into IPL.
5. Under the Disks pull-down menu, select the number of disk volumes to be created.

Note: *The options available under the disks pull-down menu changes depending on the flash type. Some flash types only have one option for the number of disk volumes, others have two options.*

6. If you have selected four volumes under the disk pull-down menu, you have the option to change the memory configuration of the third and fourth volumes. To do so, click on the up or down arrow for either of the volumes, until the memory configuration of each is set to the desired value. You will notice that as you change the values for one of the volumes, the other volume is automatically changed accordingly.
7. Decide which volume will be the boot disk, and click on the boot disk box next to that volume. This disk becomes the C: drive.
8. For each disk volume, determine the Read/Write access option.
9. The current path for your operating system source displays in the System File Path field (MSDOS6.22 for DOS terminals). If this is not the correct path, click on the Browse button and navigate to the correct directory.
10. The Script File Path displays the path of the selected script file.
11. Select a Cushion percentage from the Cushion pull-down menu to specify the percent of flash reserved for cushion. Choosing a higher number reduces disk storage space, but also increases write performance on fragmented disks or disks becoming full. To speed the writing process, select as high a number as your storage needs permit (up to 25%).



Creating the Script for the Hex Image

On start-up, TCM displays the screen shown on [page 4](#), with the Script1 window and File Explorer window pointing to the SYMSDK\SCRIPTS directory and the SDK7X00 directory. The Script1 Window directory pane displays three volumes: Volume1, Volume2, and Volume3. Depending on the type of flash chip you have, the number of volumes may change. Files can be added to each of the volumes.


- Create a new script file or open an existing script
- Drag and drop existing files and directories to that script
- Set the script parameters
- Save the script
- Review and modify the script.

Each process is described in the sections that follow.


Open a New or Existing Script

Scripts are created in the Script Window.

To open a new script:

- Choose New from the File Menu, OR
- Click on  from the tool bar.

To open an existing script (e.g., a standard script provided in the SDK):

- Choose Open from the File Menu and select the script file name, OR
- Click on  from the toolbar and select the script file name, OR
- Double click on an existing script in the Script Browser window.

Note: *If you open and make changes to an existing script, saving the changes writes over the existing script. If you wish to use an original or Symbol-supplied standard script as a base and save the changes in a new script, use Save As instead of Save after making the changes.*

Copy Components to the Script

Copy files from the File Explorer Window to the Script Window using the drag and drop method with the mouse or the Copy command.

To copy *files or directories* to the script being generated:

1. Click on the File Explorer Window to make it the active window.
2. Click on the source directory in the Directory Tree Pane. TCM displays the directory contents in the Contents Pane.
3. Click on the file(s) and/or directory in File Explorer.

Note: *Optionally, use the standard Windows Shift+Left-click and Control+Left-click features to select multiple files and directories.*

4. Drag and drop the selected file(s) and/or directory from File Explorer to the target directory in the Script Window.

OR


Click on the target directory and select the File Explorer Copy icon from the toolbar.

Save the Script

To save the changes to a new script:

1. From the File menu, choose Save As.

OR


On the toolbar, click on  .

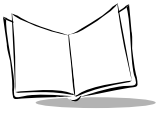
2. Enter the path and filename. TCM appends a.TCM extension to the script.
3. Choose the OK button.

Note: *If you save an untitled script, TCM by default saves the script to the directory that the Script Browser is pointing to.*

To save changes to an existing script:

- From the File menu, choose Save, OR

- On the toolbar, click  .



Note: *If you open and make changes to an existing script, saving the changes writes over the existing script.*

If you wish to use an original or Symbol-supplied standard script as a base and save the changes in a new script, use Save As instead of Save after making the changes.

Building the Image


As part of the build, TCM performs a check on the script which verifies that all files referenced in the script exist. If the image is bootable, TCM verifies that the boot files are available.

Note: *Performing a check is more important for previously existing scripts to ensure that files referenced in the script are still in the designated locations.*

To check a script:

1. In the Script Window, select the script.
2. Save the script, if not already saved.
3. From the Script Menu, choose Check.

OR


On the toolbar, choose  .

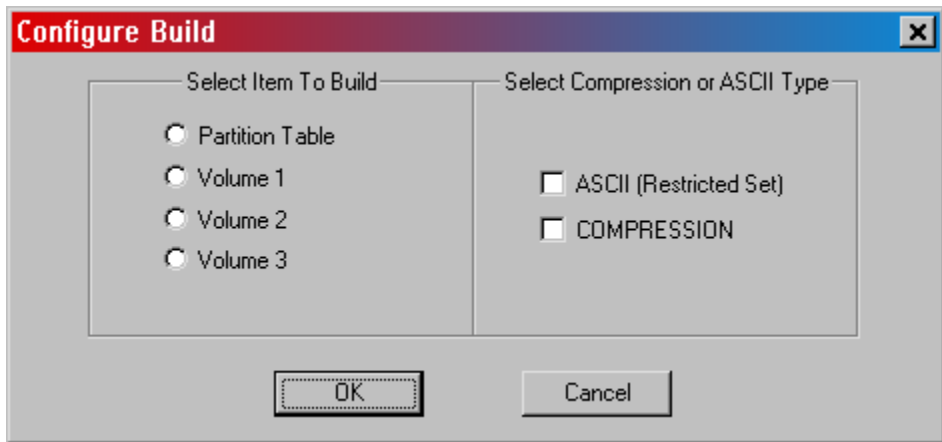
4. TCM verifies that files referenced in the script exist on available drives and lists an error message in the Errors found box for any missing files.
5. Choose the OK button to exit.

To build a script:

1. In the Script Window, select the script to be built.
2. From the Script menu, select Build.

OR

On the toolbar, choose  . The Configure Build window appears.

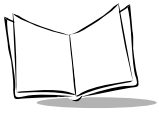


3. Select whether to build the partition table, or one volume.
4. Select ASCII format for your hex image, or Compression, which reduces the size of most hex images in order to speed downloading. Click OK.
5. TCM performs a check. If the script is has no errors, TCM proceeds with the build.

If the Build Fails

If the build fails, TCM displays a message indicating which file(s) are missing.

If the total amount of flash required by the script exceeds the image size, a TCM error results and the build fails. To correct this, reduce the number of files in the volume, or make the disk non-bootable. Refer to [Defining Script Properties](#) on page 7-6 for more information on setting the image size appropriately.



Sending the Hex Image

Once the hex file is built, you are ready to download it to the terminal. A Hex image download requires both TCM and a program loader stored on the terminal. The terminal comes with a program loading utility, Initial Program Loader (IPL), stored in the terminal's write-protected flash. To run IPL, the terminal must be inserted in a cradle or connected to a host PC by direct serial connection.

Loading the BIOS

Uploading a new BIOS erases only the 128K of Flash where BIOS is stored. While IPL is updating the BIOS, the BIOS image is saved in memory until the entire BIOS is received and verified. The Flash Disk image and application storage area are unaffected.

Saving the Script

If you made changes to the script since last saving it, save the script again.

Connect The Terminal and Development PC

To send the hex file to the terminal, first link the terminal and development PC by one of the following devices:

- Direct serial link
- Cradle (refer to Chapter 3, *Cradle Setup and Operation* in the *Product Reference Guide* for more information on setting up the cradle).

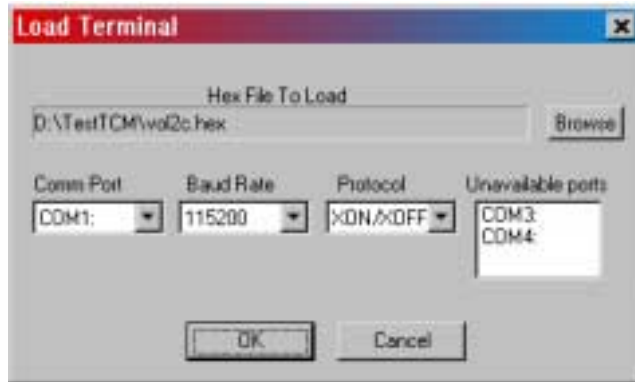
Begin the Send in TCM

In TCM on the PC:

1. Select the script.
2. From the file menu, choose LoadTerminal.

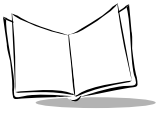
OR

On the toolbar, choose  . The Load Terminal screen displays.



3. If the correct hex file is not displayed in the Hex File to field, click on the browse button and navigate to the correct hex file to be downloaded.
4. Click on the Comm Port pull-down menu and select the COM port being used. Ports already in use display in the Unavailable Ports field.
5. Click on the Baud Rate pull-down menu and select the appropriate baud rate. Your options are 2400, 4800, 9600, 19200,38400, 57600, 115200.
6. Click on the Protocol pull-down menu and select the appropriate protocol. Your options are: RTS/CTS and XON/XOFF.

You may now return to the *Product Reference Guide* for information on running the terminal's Initial Program Loader (IPL).



Initial Program Loader (IPL)

Initial Program Loader (IPL) is a small utility program that is built into each terminal. The purpose of IPL is to verify the flash contents prior to a cold boot of the system, and to provide a simple method of updating the flash contents via the serial port or cradle. The images that IPL can accept are in the form of “hex” files” that contain not only the data to be downloaded to the terminal, but also sufficient extra information to ensure that each hex file contains an image for a single partition. Hex files for standard system components such as the BIOS and Setup are provided by Symbol. Hex files for custom components, such as disk images or custom partition maps are built on a PC using the TCM program. IPL is only capable of loading whole partitions (it cannot update individual files in a disk image).

Using the Keyboard

Operation of the IPL is controlled by the keyboard. IPL recognizes the following keys:

- Cursor Up
- Cursor Down
- Enter or Trigger
- Backlight
- Lighter
- Darker

The effects of these keys are as follows:

Cursor Up/Down	Whenever these keys are pressed in a menu screen, they cause the previous/next item in the menu to be highlighted. Moving off the end of a menu causes a wrap to the other end of the menu list. If the menu is longer than the screen is deep, then screen will automatically scroll up or down to keep the highlighted item visible on the screen.
Enter or Trigger	Whenever this key is pressed in a menu screen, the currently highlighted item is selected, and IPL advances to the next screen. If the system supports more than one trigger, then any of the triggers can be used as the Enter key.
Backlight	Pressing this key toggles the backlight (if present) between on and off. This key is always active (even if IPL is not in a menu screen).
Lighter/Darker	Each press of these keys adjusts the screen contrast up or down. The keys are always active (even if IPL is not in a menu screen).

Using the Touch Screen

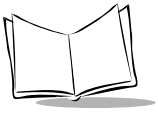
If the system supports a touch screen, then the touch screen can be used instead of the keyboard to control IPL.

Cursor Up/Down	Touching the screen on the up or down arrows on the screen is exactly the same as using the Cursor Up/Down keys on the keyboard.
Enter	Touching the bottom of the screen exactly the same as pressing the Enter key on the keyboard.
Backlight	This can only be controlled from the touch screen on the 7200. Each tap on the backlight control area of the 7200 screen will toggle the backlight (if present) between on and off.
Contrast	The screen contrast can only be adjusted by the touch screen on the 7200. Tapping the contrast control area on the 7200 screen increases the screen contrast by one step with each tap. Continually pressing the contrast control area on the 7200 screen decreases the contrast at a rate of approximately five steps per second.

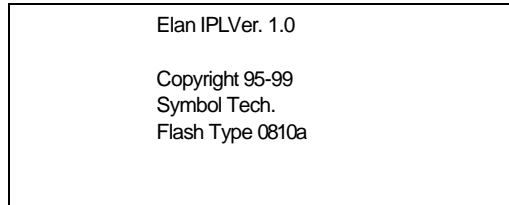
Invoking IPL

To deliberately invoke the IPL, hold the trigger while performing a cold boot by pressing and holding the Power Icon for the required amount of time. If the trigger is pressed when the terminal is reset, then control is passed to IPL instead of to the BIOS. If the trigger is not pressed, then IPL verifies all mandatory partitions to ensure that they are present, and verifies the checksum on all checksummed partitions (IPL, Partition Map, BIOS, and Setup). If any of these partitions is missing or corrupted, then control is automatically passed to IPL instead of the BIOS, so that the corrupted data can be reloaded before it causes any problems. If IPL is invoked accidentally, then either reset the terminal again without holding the trigger, or select Run System option in the baud rate menu.

When IPL is invoked (by cold booting while pressing the trigger, or by detecting a corrupt flash partition), IPL sounds the beeper to indicate that IPL has been invoked, and displays the Copyright Screen.

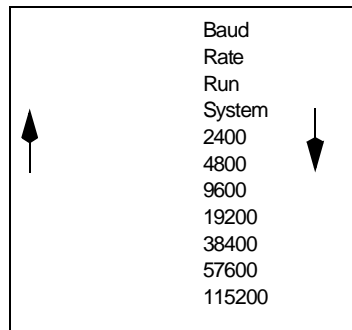


The terminal displays the copyright screen for three seconds. During this time, IPL is verifying the Partition Map and the mandatory and checksummed partitions.



The version number on the top of the screen identifies the version of IPL you are using. The flash type at the bottom of the screen identifies the size and type of flash chip installed in the terminal, which you need for your TCM script generation. See [Defining Script Properties](#) on page 7-6.

Pressing the Enter key while the copyright screen is displayed advances the program to the Baud Rate Menu.

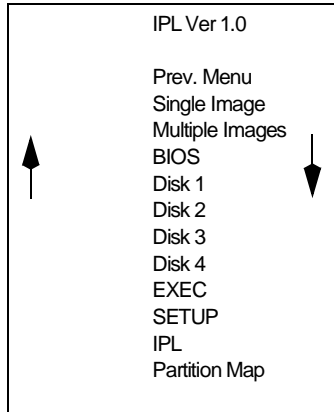


1. Use the up and down cursor keys, or tap the arrows on the touch screen to scroll to the appropriate baud rate. IPL supports baud rates from 2400 to 115200 baud. (default is 115200 baud)
2. Press the **Enter** key or the **Scan** key to accept the selected baud rate.

Note: *If IPL is selected accidentally, or the IPL session is complete, you may select "Run System" from this menu to exit IPL and boot the system. The only other way to exit IPL manually is to hold the Power*

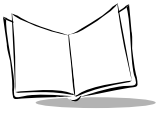
Icon for 16 seconds. Both methods have the same effect, but selecting “Run System” is faster.

Once the selection is made, IPL proceeds to the Area Selection Menu.



3. Use the up and down cursor keys or the up and down arrows on the touch screen to select the area to be received. You have the following options on this screen:

Prev. Menu	Returns you to the Baud Rate menu to modify the baud rate.
Single Image	Indicates that a single image is to be received, without specifying the area to be received.
Multiple Images (default selection)	Indicates that more than one area is to be received contiguously. Note: TCM must be set up to respond to RTS/CTS handshaking. See Sending the Hex Image on page 7-12 for more information on this setting in TCM.
BIOS	Indicates that a new BIOS is to be received.
Disks 1 - 4	Indicates the specific disk volume(s) to be received.
EXEC	For factory diagnostic use only.
SETUP	Indicates that a new graphical setup program is to be received.
IPL	For service use only.
Partition Map	Indicates that the partition map is to be received.



4. After selecting the area, press Enter. IPL checks for the presence of external power. If the system is running off battery power, IPL displays the Connect to Power Screen:

Insert in Cradle
Or
Connect Power Supply

5. Place the terminal in the cradle or connect the external power supply and serial connection. IPL waits at this screen until external power is supplied. If the terminal is already running from external power, this screen does not display. While this screen is displayed, pressing Enter or the Cursor Up/Down keys on the keyboard returns IPL to the Area Selection screen.
6. After the power and serial connections are made, the following screen displays:

Waiting for
data
Multiple
Images

Note: *If a cradle is the input source, serial parameters are fixed at 38400 baud, no parity, 8 data bits, and 1 stop bit. These parameters cannot be changed.*

The second and fourth lines of this screen reflect the selections made on the Area Selection and Baud Rate menus, respectively. This screen continues to display until the first character of the image to be downloaded is received from the host. While this screen is displayed, pressing the Enter or Cursor Up/Down keys on the keyboard returns IPL to the Area Selection screen.

As soon as the first character of data is received, IPL displays the receiving screen:

Multiple Images

Pages to Erase
Pages to Receive
Page to Write

The top line of this screen identifies the area selected in the Area Selection screen. Once a character has been received, IPL stays in this screen until an entire image has been received, or until an error is detected. The only other way to exit from this screen is to reset the terminal by holding the power switch down for 16 seconds. As more data is received, the Receiving Screen is updated to reflect the current status. The first record in the image identifies the area to be processed. When IPL receives the record, it verifies that the area is valid, and updates the Receiving screen as follows:

```
BIOS
Pages to Erase16
Pages to Receive16
Page to Write16
```

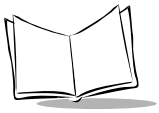
The top line of the display identifies the actual area being processed. The remainder of the display identifies the number of 8Kbyte pages to erase, receive and write. To process the data, IPL must receive, erase, and write the entire image. With the exception of the disk images, IPL receives the entire image before starting the erase, and completes the erase before starting to write. With disk images, IPL multiplexes all three operations as data is received. Eventually, (assuming no errors), all three counts reduce to 0.

When the entire image is received, and the flash is updated, IPL displays the Verify screen:

```
BIOS
Verifying Image
```

This screen continues to display while the image is being verified. Once the image is verified, IPL displays the Success screen:

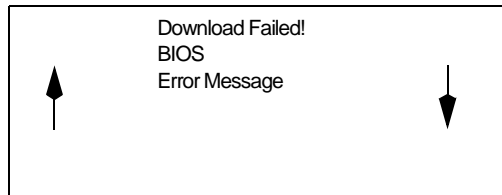
```
BIOS
Download Complete
No Errors Detected
```

If the Multiple Images option was selected on the Area Selection screen, IPL then immediately returns to the Waiting for Data screen to wait for the next image. If any other selection was made on the Area Selection screen, then IPL stays at the success screen until the operator acknowledges the message by pressing Enter (or the trigger, or taps Enter on the touchscreen). Once the screen has been acknowledged, IPL returns to the Area Selection screen to wait for a new selection.

IPL Error Detection

While receiving data, IPL performs many checks on the data to ensure that the data is received correctly. If any error is detected, IPL immediately aborts the download, and reports the error on an error screen:



This screen is displayed until the operator acknowledges the error by pressing Enter (or trigger, or Enter on the touch screen). Once the screen has been acknowledged, IPL returns to the Area Selection screen to wait for a new selection.

The second line of the displays the area that was being processed when the error was detected. The third line of the screen identifies the cause of the error. The errors that can be reported, and the probable cause of the error, are as follows:

Table 7-2. IPL Errors

Error	Explanation
Erase Error	Either the flash is faulty, and the terminal needs to be returned for service, or an attempt was made to erase IPL. (IPL is write-protected, and cannot be erased or programmed without special hardware.)

Table 7-2. IPL Errors

Error	Explanation
Line Stat Err	A framing error was detected in the incoming data. The most probable cause of this is a parameter mismatch between the terminal and the device used to transmit the data. The baud rate on both devices must be set to the same value, and the transmitting device must be set to 8 data bits, no parity, and at least one stop bit.
Baud too High	This error could be caused by transmitting large compressed images at a high baud rate, or by faulty flash.
Image Corrupt	This error indicates that the image received by the terminal is corrupt. The most probable cause of this error is inserting an IPL-enabled terminal into a cradle while the host is transmitting an image.
Wrong Area	This error indicates that the image being received has an incorrect area number. This could be caused by specifically selecting an area, and loading an image intended for another area, or by receiving an image for an area that is not defined in the partition map.
Not Hex File	This error is caused by transmitting the wrong file format to IPL. IPL can only receive Hex files supplied by Symbol, or generated by TCM.
Write Error	This error is caused by a failure of the flash device used to hold the image. If this error is seen, then the terminal requires maintenance.
Checksum Err	This error is occurs when one of the critical partitions (BIOS, Partition Map, or Setup) has been received with no apparent errors, but the received image does not pass the checksum check. The most probable cause of this error is a failure of the tool used to generate the image. If this error is displayed, then the original contents of the partition will not have been changed as the error is detected before any flash is updated.

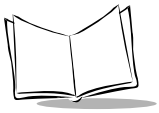


Table 7-2. IPL Errors

Error	Explanation
Verify Failed:	This error is caused when the image has been written to flash, but cannot be read back correctly. It only applies to critical sections of the flash, and will prevent an exit from IPL as a critical section of the flash is damaged. If this error occurs, the terminal needs maintenance. Contact Symbol Support for help.
Lost Connection	This error displays when the terminal is removed from the cradle during an IPL session. The terminal should be replaced in the cradle when the host is no longer transmitting an image, and the image should be resent to the terminal that lost the connection. Disconnecting the serial cable does not generate this error, and attempting to reconnect the cable will result in an Image Corrupt error.
Cradle Error	This error indicates that corrupted data is being continually received from the cradle. The most probable cause of the error is an obstruction on the IRDA window on the terminal or the cradle. If cleaning the windows fails to correct the problem, then the terminal requires service. Contact Symbol Support for help.

To exit and restart IPL, hold the reset button for 12 seconds (or whatever value was set in Setup).

Restarting after Download Fails

If the download fails, exit IPL by rebooting the terminal.

If possible, determine what caused the download to fail. If a communications failure occurred, check all the cables between the terminal and the host to ensure they are secure. If the hex file is too large to fit in the terminal's Flash disk, reset the hex file's size (refer to [Defining Script Properties](#) on page 7-6) and rebuild the image.

Exiting IPL

To exit IPL, cold boot the terminal (hold the reset switch for 15 seconds, or whatever value was set in Setup). The terminal should boot to an application or to a login screen.

Exiting TCM

To exit TCM on the development PC:

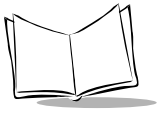
Choose Exit from the File Menu.

OR

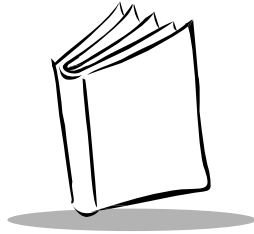
Press **Alt+F4**.

OR

Double-click the close box.



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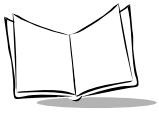


Chapter 8

Terminal Configuration: Load a RAM Disk

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Standard RAM Disk Driver	8-3
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Loading a RAM Disk

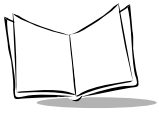
RAM disks allow the PDT 7200's RAM to be organized as a simulated disk for writable data storage. To create one or more RAM disks, you can use RAMDRIVE.SYS (supplied as part of DOS).

Standard RAM Disk Driver

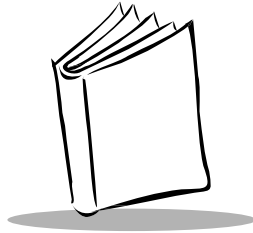
RAMDRIVE.SYS creates a RAM disk in extended, expanded, or conventional memory, or a combination of extended and conventional memory. The RAM disk created through RAMDRIVE.SYS is NOT protected, and its contents are always lost on terminal reboot (warm or cold).

Multiple RAM Disks

It is possible to create multiple RAM drives using Microsoft's RAMDRIVE.SYS. The multiple RAM drive option allows you to separate application files on more than one RAM drive letter.



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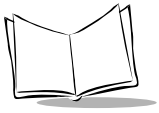


Chapter 9

Terminal Configuration: Setup

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Main Setup	9-6
Advanced	9-7
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Introduction

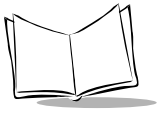
The PDT 7200 Series terminal has a system setup program that allows you to configure many of the terminal's basic characteristics. Specifically, the setup program is made up of five screens and defines:

- contrast value
- backlight
- beeper volume
- suspend time
- backlight time
- boot sequence
- reset time
- CPU speed
- system date and time.

Setup also displays the Terminal Type and RAM and Flash sizes. This describes how to set each of these default values using the setup program.

Navigating Setup

The setup program is a touch-sensitive application, so use your finger to tap the buttons on the screen.



Invoking Setup

To invoke the setup application:

1. Start the terminal by performing a cold boot (press the power button without holding the trigger until the terminal reboots).

While the terminal is booting, a message displays on the bottom of the screen, "Hold Trig for Setup".

2. Press and hold the scan trigger button, until the setup application starts. The Symbol PDT 7200 Setup screen displays, providing the menu of setup options for selection.

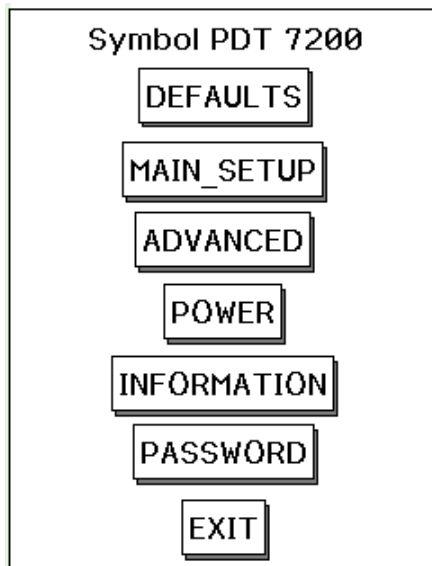


Figure 9-1. PDT 7200 Setup Screen

Defaults

Selecting the Defaults option on the main setup screen displays the Reset Confirmation screen, which allows you to confirm your request to reset the terminal's features to the

factory defaults. To cancel the reset and return to the Main Setup screen, tap the CANCEL option. To confirm the resetting of default values, tap the RESET DEFAULTS option.

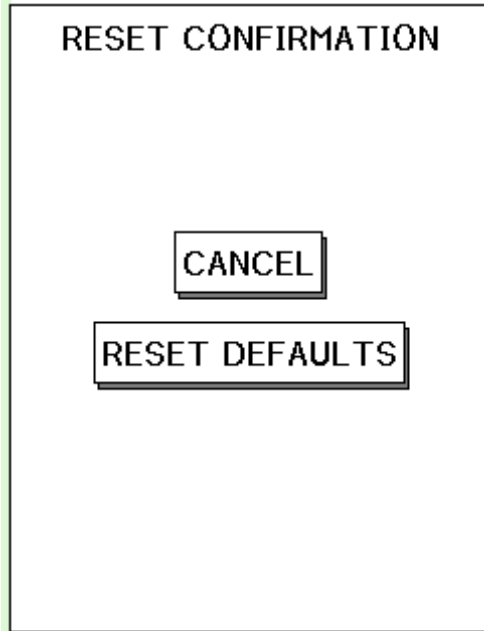
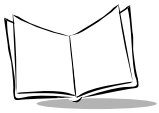


Figure 9-2. Set Defaults Screen



Main Setup

Selecting the Main Setup option on the PDT 7200 Setup screen displays the Main Setup screen.

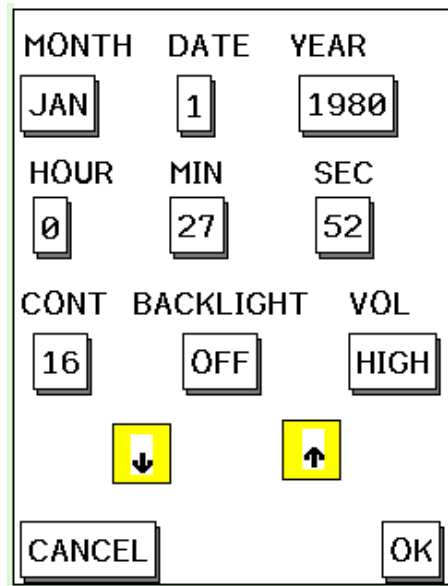


Figure 9-3. Main Setup Screen

This screen allows you to set the system clock for the terminal, and set the desired screen contrast, backlight, and beeper volume. To change the values in any of the fields, tap with your finger to highlight the field, then use the up and down arrow buttons to scroll through the available options for each field. When the correct value is entered in each field, tap OK. Tap CANCEL to exit this screen without saving changes and return to the PDT 7200 Setup screen.

Advanced

Selecting the Advanced option on the PDT 7200 Setup Screen displays the Advanced Setup screen.

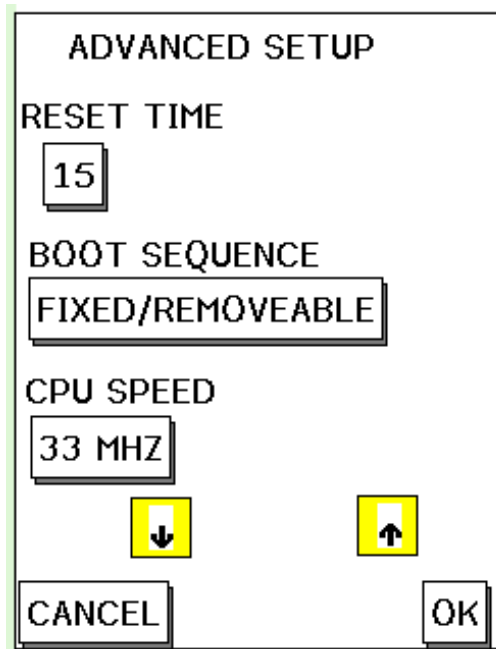
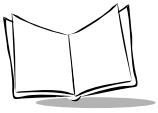


Figure 9-4. Advanced Setup Screen

This screen allows you to set the reset time, which is the period of time in seconds that the power icon must be pressed to cold boot the terminal; the boot sequence, which defines the order in which the system should boot, and the allowable CPU speed. To change the reset time, tap in the Reset Time field, and use the up and down arrow buttons to change the value. The Boot Sequence and CPU Speed fields each have pull-down menus to select from. When you tap on the field, the pull-down menu displays. When the desired values are displayed in all the fields, tap OK. Tap CANCEL to return to the PDT 7200 Setup screen without saving changes made to this screen.

Note: *The boot sequence is ignored unless the compact flash is present. If compact flash is present, and removable/fixed is selected, then the*



compact flash is drive C: and the on-board flash drives are drives D: and upwards. If compact flash is selected and fixed/removable is selected, then the first on-board flash is drive C:, the compact flash is drive D: and the remaining on-board flash disks are drive E: and upwards.

Power

Selecting the Power option on the PDT 7200 Setup screen displays the Power Settings screen.

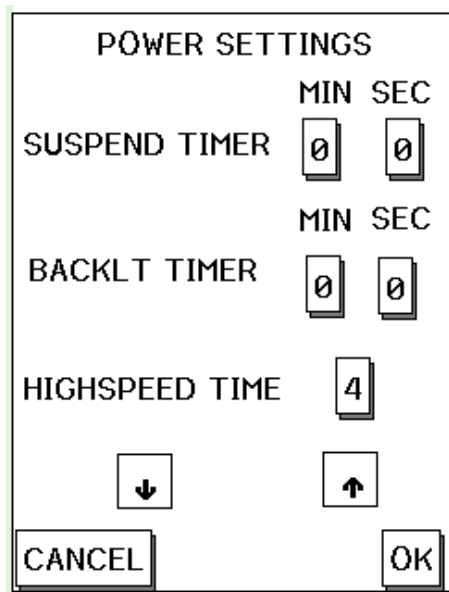


Figure 9-5. Power Settings Screen

This screens allows you to define:

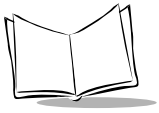
- Suspend Timer: the period of inactive time after which the terminal suspends, in minutes and seconds.
- Backlight Timer: the period of time after which the backlight turns off, in minutes and seconds.

- Highspeed Time: defines how long the CPU stays at 66 MHz when the system does not detect any activity before dropping to 33 MHz. The following table illustrates the times associated with each value.

Timer Value	Time at 66 MHz (in second)
0	Does not drop to 33 MHz
1	0.125
2	0.25
3	0.5
4	1
5	4
6	8
7	16

Note: *This field has no effect unless the CPU speed is set to 66 MHz.
Higher numbers increase power consumption.*

To modify the values in any of these fields, tap the field to be changed, and use the up and down arrow keys to select the appropriate value. When all fields display the correct values, tap OK to accept. Tap CANCEL to exit this screen without saving the changes, and return to the PDT 7200 Setup screen.



Information

Selecting the Information option on the PDT 7200 Setup screen displays the System Information screen.

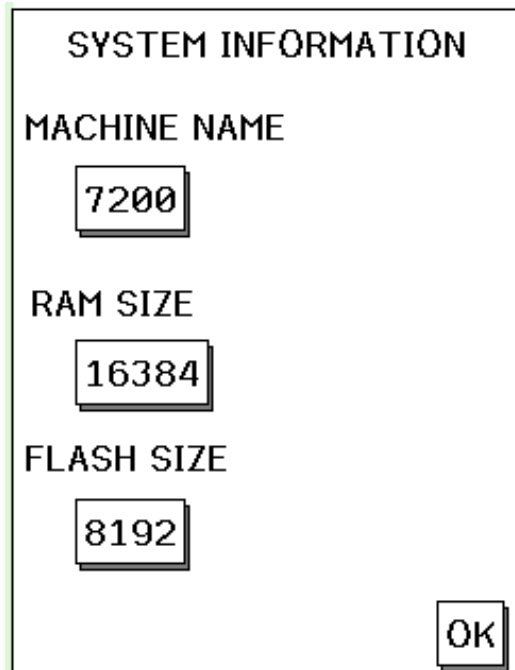


Figure 9-6. System Information Screen

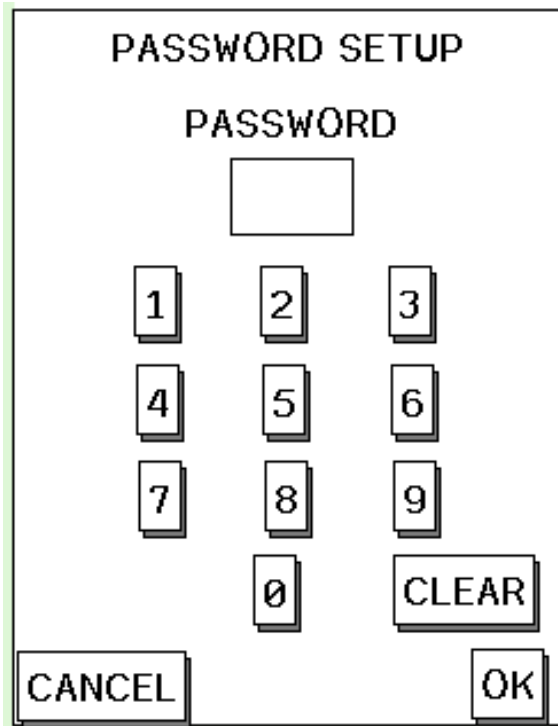
This screen is a read-only screen which displays:

- Machine Name: displays the terminal name
- RAM Size: displays the size of the RAM disk on the terminal
- Flash Size: displays the size of the Flash disk on the terminal.

After reviewing the data on this screen, tap OK to return to the PDT 7200 Setup screen.

Password

Selecting the Password option on the PDT 7200 Setup screen displays the Password Setup screen.

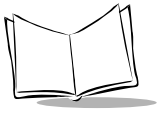


The screenshot shows a terminal screen titled "PASSWORD SETUP". Below the title is the word "PASSWORD" and an empty rectangular input field. Below the input field is a numeric keypad with buttons for digits 1 through 9, 0, and a "CLEAR" button. At the bottom of the screen are two buttons: "CANCEL" on the left and "OK" on the right.

Figure 9-7. Password Setup Screen

To select a numeric password for your terminal, tap the desired numbers. As they are selected, they display in the Password field. Tap clear to clear the data from the password field. Tap OK to accept the password entry and return to the PDT 7200 Setup screen. Tap CANCEL to return to the PDT 7200 Setup screen without selecting a password.

Note: A custom set up is required to activate the password. The password can be used to make individual setup fields read-only or invisible.



Exit

Selecting the Exit option from the PDT 7200 Setup screen displays the Exit Confirmation screen.

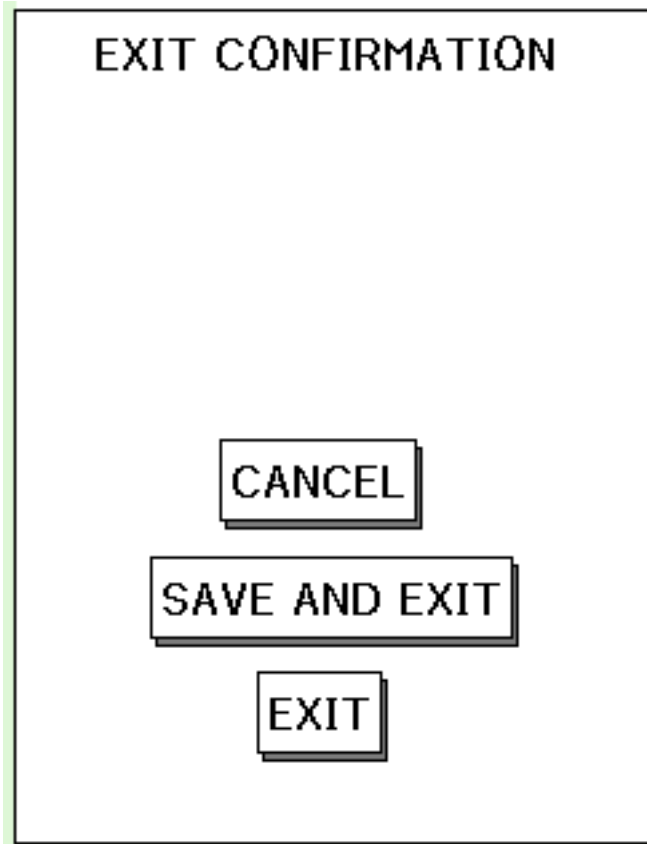
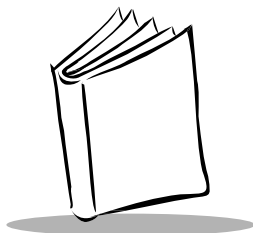


Figure 9-8. Exit Confirmation Screen

This screen allows you to determine how you want to exit the setup. To cancel the exit request, tap **CANCEL**. To save the changes you've made to the setup, tap **SAVE AND EXIT**. To exit without saving the changes you've made to the setup, tap **EXIT**.

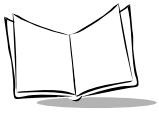


Chapter 10

Terminal Configuration: Setting Up PCMCIA Cards

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Non-ATA Flash	10-3
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Using DRVSPACE to Extend Storage on PCMCIA Card	10-4



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PCMCIA Cards

PCMCIA cards supplement the terminal's on-board flash or RAM, and provide additional I/O devices. There are many options regarding the type of card and format to use. For a discussion of PCMCIA card options, refer to [Chapter 5, Terminal Configuration Issues](#).

Formatting PCMCIA Cards

SRAM Cards

SRAM cards can be FAT-file formatted on the PDT 7200 terminal using the DOS format command.

Non-ATA Flash

Non-ATA flash cards are inexpensive, fast, nonvolatile, read only, and block erasable. We currently have no means of formatting these cards for use on the PDT 7200. FAT-file formatting using DOS format and CardSoft does not work on Non-ATA flash cards because DOS assumes that the card is a read/writable floppy, and these cards are not randomly writable. If an external method of FAT formatting non-ATA flash cards is available (some non-CardSoft PC card slots do support this), then CardSoft treats the card as if it were a write-protected SRAM.

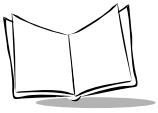
ATA Cards

To format an ATA Card, first initialize the card. Use CardSoft and the ATA initialization program ATAINIT, provided with CardSoft. For more information, refer to the *CardSoft 3.1 User Guide*.

Once initialized, format the card using CardSoft and DOS format. Refer to the *CardSoft 3.1 User's Guide* for information on formatting the card.

Moving Files to the PCMCIA Card

Once the cards are formatted, move or copy files to them as you would to any removable disk.



Using DRVSPACE to Extend Storage on PCMCIA Card

DRVSPACE can be used to extend storage on PCMCIA cards in the same way it is used to extend storage on a standard PC drive. The process is as follows:

1. Insert an empty, formatted PCMCIA card in the development PC.
2. Type the following:

```
create D: <Enter>
```

where **D:** is the drive letter of the PCMCIA card.

3. DRVSPACE creates an empty compressed volume on the card.
4. Install the card in the PDT 7200 and reboot the terminal.
5. When the terminal finishes booting, mount the card by typing:

```
DRVSPACE D:
```

where **D:** is the drive letter associated with the slot and card type being used.

6. If you use Chkdsk to check the amount of space available, there should be approximately twice as much space available as there is physical memory on the card.

Refer to your MS-DOS 6.22 user documentation for more information about the DRVSPACE utility.

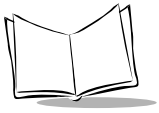


Chapter 11

Troubleshooting and Maintenance

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Troubleshooting	11-4
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Cleaning the Terminal

The PDT 7200 requires a minimal amount of maintenance. To prolong its life and avoid problems, keep the terminal clean. Use a clean, soft cloth dampened with a mild cleanser such as soap and water to clean the terminal. Do NOT use abrasive paper/cloth or abrasive/corrosive cleaners.

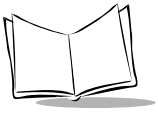
Wipe the entire terminal, except for the scanner window. Wipe the scanner window periodically with a lens tissue or other material suitable for cleaning optical material such as eyeglasses.

Storage

If the terminal will not be used for longer than a week, store it in a cool, dry place away from dust. Remove the battery and repackage the terminal in its original shipping container.

To store the terminal for a shorter period of time (a few days), leave the battery in the terminal. Note that if the battery is left in the terminal for an extended amount of time, any data stored on the terminal may be lost. The Lithium-Ion battery pack must be kept charged to avoid loss of data.

Note: *If you leave the terminal without a main battery for longer than 20 minutes, the terminal automatically reboots when you install the battery again. Run the Setup Utility to reset the date and time. See [Chapter 9, Terminal Configuration: Setup](#) for more information.*



Troubleshooting

Terminal Problems

Table 11-1 covers some common terminal problems and what actions to take.

Table 11-1. Terminal Problems

Symptom	Possible Cause	Action
Terminal does not power up	Battery not installed or fully charged.	Verify that the battery is installed in the terminal. Charge the battery, either in the terminal or separately for a full 2 hours.
	Power supply is not plugged in.	Verify that the power supply is connected properly to the terminal and plugged in the wall socket.
	Battery is not secured.	Fully engage the battery latch.
Cannot see screen	Terminal not powered on.	Press the Power icon on the top of the screen.
	Contrast not adjusted properly.	Press and hold the contrast icon to increase, tap to decrease.
Touch screen not working	Display not properly calibrated.	Recalibrate the screen through the calib72.com program.
Scanner does not come on when trigger pressed	Scanner driver is not loaded.	Verify that scanner driver is loaded on the terminal. Check application software to ensure that scanner driver is properly referenced.
Scanner does not decode a bar code	Bar code is unreadable.	Verify that the bar code is not defective, i.e., smudged or broken.
	Symbology not enabled.	Verify with the programmer that the application is designed to perform scanning.

Table 11-1. Terminal Problems (Continued)

Symptom	Possible Cause	Action
Battery life is inadequate	Battery is not fully charged.	Charge the battery, either in the terminal or separately for a full 2 hours.
	Battery is old.	Replace with a fresh, fully charged battery.
	Terminal being used in low-temperature conditions.	Battery life is shortened if used in extremely cold conditions.
	Unnecessary peripherals draining power.	Disconnect any peripherals not being used to reduce the drain on the battery pack.
	The application is not designed for efficient power use.	Consider using power management services provided in the Series 7000 SDK to reduce drain on battery pack.
Cannot access flash drive	Drive not formatted.	Format the drive or download a new disk image using TCM and IPL.

Cradle Problems

Table 11-2 lists some common cradle problems and actions to take to resolve them.

Table 11-2. Cradle Troubleshooting

Symptom	Probable Cause	Action
No communication between terminal and cradle	Cradle in use.	Wait until available.
	Optical window obstructed or dirty.	Remove obstruction or clean the optical window.
	Terminal not seated properly in cradle.	Reseat the terminal in cradle.

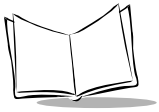
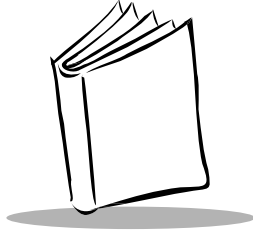


Table 11-2. Cradle Troubleshooting (Continued)

Symptom	Probable Cause	Action
Rechargeable battery in terminal or spare battery did not charge	Battery failed.	Replace battery.
	Terminal or battery was removed from cradle too soon OR Battery or terminal is improperly installed in cradle.	Replace terminal and/or spare battery in cradle and begin charging over. Battery in terminal requires 2 hours to recharge fully. A spare battery requires 4 hours to recharge fully.



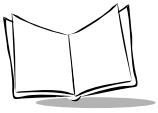
Appendix A Specifications

Environment

The PDT 7200 is designed to operate in harsh environments. [Table A-1](#) below summarizes the PDT 7200's intended operating environment.

Table A-1. PDT 7200 Operating Environment

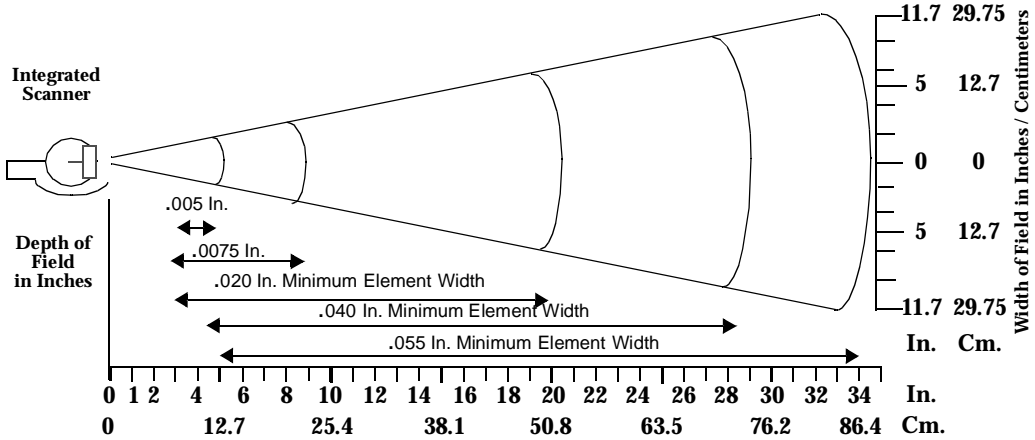
Operating Temperature	-20° C to 50° C (-4° F to 122° F)
Humidity	0% to 95% non-condensing
Shipping and Storage Temperature	-30° C to 60° C (-22° F to 140° F)
Electrostatic Discharge	±15 kv
Drop to Concrete	1.2 meters (4 ft)
Sealing	IP 65 and Mil Standard 810E (windblown rain and dust)



Decode Zones

Standard Range

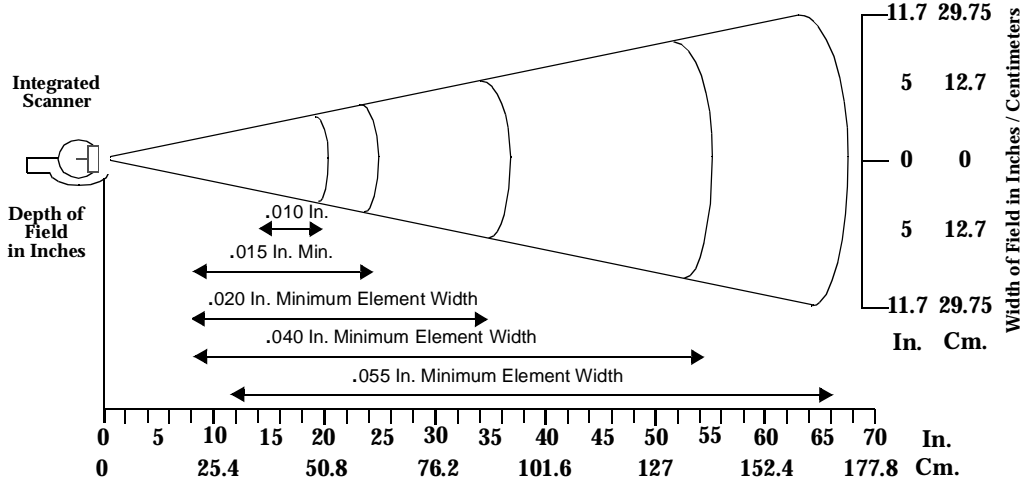
NOTE: Typical performance at 68° F (20° C) on high quality symbols.



Decode Zone: Depth of field as a function of minimum element width.

Long Range

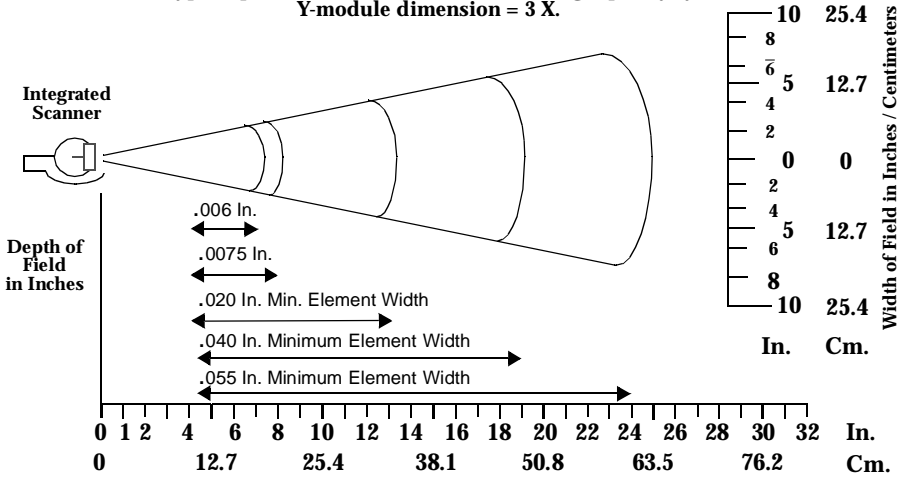
NOTE: Typical performance at 68° F (20° C) on high quality symbols.



Long Range Decode Zone: Depth of field as a function of minimum element width.

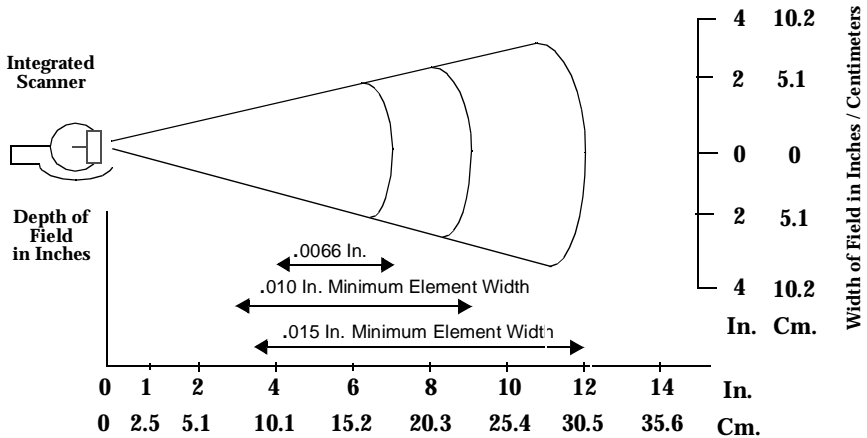
SE 2000 1-D Decode Zone

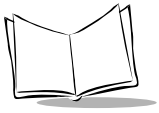
NOTE: Typical performance at 68° F (20° C) on high quality symbols.
Y-module dimension = 3 X.



SE 2000 Decode Zone: Depth of field as a function of minimum element width.

SE 2000 2-D Decode Zone (PDF417)





PDT 7200 Memory Map

BIOS + Flash API + Pen API	FFFF:000FH (1 meg)
Free RAM	E000:0000H
VIDEO RAM	C000:0000H
RESERVED 32K	B800:0000H
FREE RAM	B000:0000H
PC CARD (IF USED) 16K	A400:0000
COMMAND.COM (TPA)	A000:0000H
FREE RAM	
COMMAND.COM	
INSTALLABLE DEVICE DRIVERS	
FCBs	
DISK BUFFERS	
MSDOS.SYS	
IO.SYS	0000:0600H
FLASH BIOS TABLES	0000:0400H
INTERRUPT VECTOR TABLE	0000:0000H

Table A-2. PDT 7200 Interrupt Definitions

DOS IRQ Name	Win CE <u>IRQ Name</u> Interrupt ID Name Interrupt ID#	Interrupt Source	Interrupt Description	Notes/Comments
IRQ 0	<u>INTR_TIMER0</u> SYSINTR_RESCHEDULE 1	Internal to Elan	Timer Tick Interrupt (Internal Timer)	Standard PC Timer Tick
IRQ 1	<u>INTR_KEYBOARD</u> SYSINTR_KEYBOARD 8	Internal to Elan	AT Keyboard Interrupt (Emulation)	Emulated by SCP code in BIOS
IRQ 2	N/A	Internal to Elan	Cascade Interrupt (2nd 8259 - 2nd IRQ bank multiplex)	Not available for use.
IRQ 3	<u>INTR_COM2</u> SYSINTR_SERIAL2 40	Internal to Elan	COM2 Interrupt (Elan Internal UART)	In 6200 and Cobalt 486, used for IrDA. In Cobalt 486, used for cradle status or debug port.
IRQ 4	<u>INTR_COM1</u> SYSINTR_SERIAL 12	Elan PIRQ6 Pin	COM1 Interrupt (UART1 in ASIC)	In Cobalt 486, used for Primary Serial or Cradle Data. In 6200, used for Debug Port.
IRQ 5	<u>INTR_COM3</u> SYSINTR_SERIAL3 39	Elan PIRQ7 Pin	COM3 Interrupt (UART3 in ASIC)	May be used for WAN, Cordless Printing, etc.

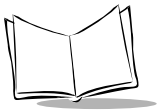


Table A-2. PDT 7200 Interrupt Definitions (Continued)

DOS IRQ Name	Win CE IRQ Name Interrupt ID Name Interrupt ID#	Interrupt Source	Interrupt Description	Notes/Comments
IRQ 6	INTR_PERIPH_MULTIPLEX	Elan PIRQ4 Pin	Multiplex B in ASIC	<u>Peripheral Multiplex Interrupt</u>
	SYSINTR_PERIPH_KEYBOARD 37	Internal to ASIC (Keyboard)	Matrix Keypad Key Make Interrupt	IR or Switch Matrix key make activity
			Matrix Keypad Timer Interrupt	Matrix keypad timer logic
			Control-Alt-Delete Interrupt	Simulated CTL+ALT+DEL from timer on power switch.
			AT UART Interrupt	Interrupt from AT UART.
	SYSINTR_POWER 11	ASIC Input Pin	Power Key	Physical Power Key
	SYSINTR_TOUCH_CHANGED 19	ASIC Input Pin	Digitizer Pen Up Interrupt	Digitizer Pen Up activity
	SYSINTR_TOUCH 9	ASIC Input Pin	Digitizer Pen Down Interrupt	Digitizer Pen Down activity.
	SYSINTR_PERIPH_OPTBOARD 36	ASIC Input Pin	Option Board Interrupt	Option Board activity.
	SYSINTR_ADC 10	Internal to ASIC (ADC)	A/D Converter Interrupt	A/D Converter data ready.
SYSINTR_AUDIO 13	ASIC Input Pin	Codec Interrupt	Codec data transfer complete.	
IRQ 6 (cont'd)	SYSINTR_PERIPH_SPARE1 21	ASIC Input pin	Spare	ASIC Pin reserved for future expansion

Table A-2. PDT 7200 Interrupt Definitions (Continued)

DOS IRQ Name	Win CE IRQ Name Interrupt ID Name Interrupt ID#	Interrupt Source	Interrupt Description	Notes/Comments
IRQ 7	<u>INTR_PCMCIA_B_DATA</u> SYSINTR_PCMCIA_LEVEL 18	Internal to Elan	PC Card 2 Interrupt (PCMCIA Controller)	Used by PCMCIA card client driver.
IRQ 8	<u>INTR_RTC</u> SYSINTR_RTC_ALARM 20	Internal to Elan	RTC Alarm Interrupt 1 ms Tick Interrupt (Real Time Clock)	Optional
IRQ 9	N/A	Internal to Elan	Reserved for future PC-compatible Display Emulation (Cursor Write Trap)	Mapped to vector for IRQ2
IRQ 10	<u>INTR_PCMCIA</u> SYSINTR_PCMCIA_STATE 16	Internal to Elan	PCMCIA Status change interrupt (PCMCIA controller)	Used by PCMCIA card services.
IRQ 11	<u>INTR_PCMCIA_DATA</u> SYSINTR_PCMCIA_LEVEL 18	Internal to Elan	PC Card 1 Interrupt (PCMCIA controller)	Used by PCMCIA card client driver
IRQ 12	<u>INTR_TIMER_MULTIPLEX</u>	Elan PIRQ3 pin	Multiplex A in ASIC	<u>Timer Multiplex Interrupt</u>
	SYSINTR_TIMING 26	Internal to ASIC (Watch Dog)	Watch Dog Timer Interrupt	Low Resolution down counter

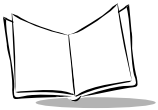


Table A-2. PDT 7200 Interrupt Definitions (Continued)

DOS IRQ Name	Win CE IRQ Name Interrupt ID Name Interrupt ID#	Interrupt Source	Interrupt Description	Notes/Comments
	SYSINTR_PROFILE 25	Internal to ASIC (1 ms timer)	Precision Timer Interrupt	Medium resolution down counter
	SYSINTR_TIMER_SPARE1 23	ASIC Input Pin	Spare	ASIC Pins reserved for future expansion
	SYSINTR_TIMER_SPARE2 22	ASIC Input Pin	Spare	ASIC Pins reserved for future expansion
IRQ 13	<u>INTR_SPARE1</u> SYSINTR_SPARE1 38	Elan PIRQ1 Pin	Spare PIRQ	Spare Interrupt or Floppy Disk
IRQ 14	<u>INTR_IDE</u> SYSINTR_IDE 28	Elan PIRQ0 Pin	IDE Disk Interrupt (I/O address decoded by ASIC)	In 6200, used for optional internal compact flash card.
IRQ 15	<u>INTR_SCANNER_MULTIPLEX</u>	Elan PIRQ5 Pin	Multiplex C in ASIC	<u>Scanner Multiplex Interrupt</u>
	SYSINTR_TRIGGER	ASIC Input Pins	Right Trigger, Stage 1	State Change on ASIC pin.
			Right Trigger, Stage 2	State change on ASIC pin.
			Left Trigger, Stage 1	State change on ASIC pin
			Left Trigger, Stage 2	State change on ASIC pin.
			External Trigger, Stage 1	State change on ASIC pin
External Trigger, Stage 2	State change on ASIC pin			

Table A-2. PDT 7200 Interrupt Definitions (Continued)

DOS IRQ Name	Win CE IRQ Name Interrupt ID Name Interrupt ID#	Interrupt Source	Interrupt Description	Notes/Comments
	SYSINTR_SCANNER_SOS 34	Internal to ASIC (ASIC QSNAC)	SOS Interrupt	Non-decoded scanner DBP data ready
	SYSINTR_SCANNER_ZIF 33	ASIC Input Pin	ZIF Interrupt	Single or dual stage trigger status change.
	SYSINTR_SCANNER_DECODE D 32	Internal to ASIC (ASIC UART 3)	UART 3 Interrupt	Decoded scanner transfer activity.
	SYSINTR_SCANNER_SPARE1 31	ASIC Input Pin	Spare	ASIC Pin reserved for future expansion
	SYSINTR_SCANNER_SPARE2 30	ASIC Input Pin	Spare	ASIC Pin reserved for future expansion
	SYSINTR_SCANNER_SPARE3 29	ASIC Input Pin	Spare	ASIC Pin reserved for future expansion

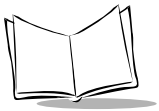


Table A-2. PDT 7200 Interrupt Definitions (Continued)

DOS IRQ Name	Win CE IRQ Name Interrupt ID Name Interrupt ID#	Interrupt Source	Interrupt Description	Notes/Comments
XMI	XMI	Elan GPIO_CS0 Pin	XMI from ASIC	
	N/A	XMI Multiplex Interrupt	Soft XMI	Software generated XMI by writing to ASIC register.
			Clock Ready	Clock control module indication that clocks are ready for high speed mode
			Battery Eject	Battery eject switch status change
			Power Key	Physical Power Switch
			Keyboard Multiplex	ASIC Keyboard multiplex register
			Smart Battery Data Ready	Smart Battery data transfer complete.
			A/D Converter Channels 0-7 Data Ready	A/D Converter data conversion complete

Table A-2. PDT 7200 Interrupt Definitions (Continued)

DOS IRQ Name	Win CE IRQ Name Interrupt ID Name Interrupt ID#	Interrupt Source	Interrupt Description	Notes/Comments
Wake Up		Elan Suspres Pin	WAKEUP multiplex from ASIC	
	SUSPRES	WAKE UP Multiplex	COM1 Ring	Wakeup from RI signal change on ASIC internal UART1
			COM2 Ring	Reserved for wakeup from Elan internal UART
			PCMCIA Card 1	Reserved for wakeup from Elan internal PCMCIA Card 1 interrupt.
			PCMCIA Card 2	Reserved for wakeup from Elan internal PCMCIA Card 2 interrupt.
			COM3 Ring	Wakeup from RI signal change on ASIC internal UART3.
			RTC Alarm	Reserved for wakeup from Elan internal RTC Alarm interrupt.
			Touch Pad	Wakeup from ASIC external digitizer activity interrupt pin.

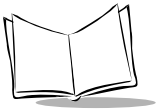
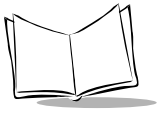


Table A-2. PDT 7200 Interrupt Definitions (Continued)

DOS IRQ Name	Win CE IRQ Name Interrupt ID Name Interrupt ID#	Interrupt Source	Interrupt Description	Notes/Comments
			Right Trigger	Wakeup from signal change on ASIC external Trigger 0 or Trigger 3 interrupt pins indicating trigger press (not release)
			Cradle Removal	Wakeup from signal change(s) on ASIC external AC power and cradle status pins indicating removal from cradle.
			Cradle Insertion	Wakeup from signal change(s) on ASIC external AC power and cradle status pins indicating insertion into cradle.
			AC connection	Wakeup from signal change on Elan external ACIN pin indicating connection of AC Power.
			Power Switch	Wakeup from signal change on ASIC external Power Switch pin indicating that Power Switch was pressed, held for less than the control-alt-delete time, then released.

Table A-2. PDT 7200 Interrupt Definitions (Continued)

DOS IRQ Name	Win CE IRQ Name Interrupt ID Name Interrupt ID#	Interrupt Source	Interrupt Description	Notes/Comments
			COM1 RXD	Wakeup from mark-to-space transition on RXD signal on ASIC internal UART1
			COM2 RXD	Reserved for wakeup from mark-to-space transition on RXD signal on Elan internal UART
			COM3 RXD	Wakeup from mark-to-space transition on RXD signal on ASIC internal UART3.



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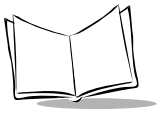
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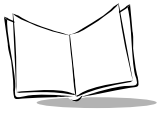
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PDT 7200 Series Product Reference Guide

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PDT 7200 Series Product Reference Guide for DOS



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