



## *About This Document*

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### **Overview**

The Portable Pen Terminal 4100/4110/4140 (PPT 4100/4110/4140) is a PC-compatible hand-held computer which incorporates pen input, an integrated bar code laser scanner, and radio frequency wireless technology via Symbol's Spectrum One® (4110) or Spectrum24® (4140) radio card. The PPT 4100/4110/4140 runs industry-standard software for application development and use.

**Note:** In this manual “PPT 41XX” refers to the PPT 4100, PPT 4110, or PPT 4140 unless describing a feature specific to the PPT 4110 (Spectrum One radio) or to the PPT 4140 (Spectrum24 radio).

This System Software Manual provides information on low level utilities that may be required for programming the PPT 41XX at system level. In this manual, system software refers to the following components delivered with the terminal:

- Standard ROM BIOS and the following extensions to it:
  - Phoenix Technologies XT BIOS
  - Symbol Technologies extensions, XSYMBIOS and YSYMBIOS
  - PenBIOS
- Advanced Power Management capabilities provided in XSYMBIOS
- MS DOS 5.0
- Mouse emulator
- Handwriting Recognition System (HRS)
- Initial Program Loader (IPL)

## **Audience**

This manual is written for the application programmer or software engineer who, while writing applications for a PPT 41XX hand-held computer, must use low-level function calls to:

- develop or modify higher level structures
- access special features of the PPT 41XX that are available only through these low level functions

## Chapter Descriptions

Following is a list of the chapters in this document along with brief descriptions of the contents in each:

- *Chapter 1, XSYMBIOS/Symbol Extended BIOS* describes the extensions to ROM BIOS services that are provided by Symbol's Extended BIOS TSR (XSYMBIOS.EXE) and are available on PPT 41XX hand-held computers.
- *Chapter 2, XSYMBIOS/ Power Management* describes the power management subsystem provided by the XSYMBIOS TSR.
- *Chapter 3, Disk Operating System (MS DOS 5.0)* describes the interface between the disk operating system (MS DOS 5.0) and the PPT 41XX.
- *Chapter 4, Scanning Operations* describes scanning operations with the PPT 41XX and scanning services supported by the scanner driver.
- *Chapter 5, Mouse Emulator* describes the mouse emulator software customized to support pen-aware applications on the PPT 41XX.
- *Chapter 6, Handwriting Recognition* describes the Handwriter Recognition System used on the PPT 41XX to convert pen strokes to ASCII text.
- *Chapter 7, Initial Program Loader (IPL)* describes the Initial Program Loader (IPL), a utility that loads system software and user applications into the 1 Mbyte of Flash EEPROM on PPT 41XX hand-held computers.
- *Chapter 8, Spectrum24®RF Communications* describes Spectrum24, Symbol Technologies' wireless LAN (Local Area Network) accessed by the PPT 4140 hand-held computer.
- *Appendix A, Porting Series 3000 Applications to PPT 41xx Terminals* lists Series 3000 C library functions that can be used without change in applications for the PPT 4100/4110, Series 3000 BIOS calls for which there are XSYMBIOS functions that are to some degree equivalent, and the C interface routines in the DOS function library for Series 3000 system level applications that may be used in applications for the PPT 4100/4110.
- *Glossary of Terms and Acronyms.*

## Notational Conventions

The following conventions are used in this document:

- “PPT 41XX” refers to features, utilities, services, etc. that apply to PPT 4100, PPT 4110, and PPT 4140 hand-held computers. “PPT 4110” or “PPT 4140” is used when referring to features that apply only to the PPT 4110 or PPT 4140.
- “Operator” and “User” refer to anyone using an application on a PPT 41XX hand-held computer.
- “PC” refers to the IBM personal computer or compatible system used to develop applications.
- “Terminal” refers to a PPT 41XX hand-held computer.
- “You” refers to the programmer creating applications for the PPT 41XX.
- Keystrokes in **bold** type within angle brackets indicate non-alphanumeric keystrokes on the PC or on the terminal. For example:

Select the <**F1**> key on the terminal to access on-line help.

- **Bold** type is used:
  - for the names of services, functions, and commands
  - to identify menu items and input or text fields on a terminal screen
  - display command lines

**Note:** Program command names and required parameters appear **without** brackets; optional parameters appear in square [] brackets.
- *Italics* are used:
  - for the names of parameters in function prototypes and variable names in usage and syntax descriptions
  - to highlight specific items in the general text
  - to identify chapters and sections in this and related documents
- Square brackets [] in a command line enclose optional command-line parameters.
- The piping symbol | represents “or” when used to separate command-line parameters on a command line; i.e., it separates alternative values for parameters.
- 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 Publications

The following is a list of documents which provide more information on the PPT 4100/4110 terminal itself or the tools and utilities available for writing applications for the terminal.

### Documents available from Symbol Technologies:

- *PPT 41XX Product Reference Guide*, p/n 70-11997-xx
- *PPT 41XX PenStep Programmer's Guide*, p/n 70-12200-xx
- *PPT 41XX Quick Reference Guide*, p/n 70-11959-xx
- *PPT 41XX RF Reference Manual*, p/n 70-12860-xx
- *PPT 41XX PCMCIA Card Services Manual*, p/n 70-14933-xx
- *CRD 4100-101X Cradle Quick Reference Guide*, p/n 70-11995-xx

### External Documents and Publications:

- *The Peter Norton PC Programmer's Bible, Third Edition*, Peter Norton, Peter Aiken, Richard Wilton, 1993, Microsoft Press
- *Inside the IBM PC and PS/2*, Peter Norton, 1991, Brady Publishing
- *PC Programmer's Guide to Low-Level Functions and Interrupts*, Marcus Johnson, 1994, Sams Publishing
- *MS-DOS Programmer's Reference*, 1993, Microsoft Press
- *The Bar Code Book, Second Edition, 1991*, by Roger C. Palmer, Helmers Publishing, Inc., 174 Concord Street, Peterborough, NH.
- *Advanced Power Management, (APM), BIOS Interface Specification, Revision 1.1, September 1993*, copies of which are available from either of the following sources:
  - Intel Corporation  
Literature Distribution Center  
PO Box 7641Mt. Prospect, IL 60056-7641  
Intel Order Number: 241704-001
  - Microsoft Corporation

Hardware Vendor Relations Group  
1 Microsoft Way  
Redmond, WA 98052  
Microsoft Part Number: 781-110-X01