

Chapter 6 Configuring the Terminal: Build and Send the Hex Image

Introduction

This chapter provides instructions on setting up the ROM image, and covers the transferring the hex image to terminal from the development PC.

Burning a ROM Image Via RS-232 Cable Connection

The PPT 41xx is shipped with numerous files stored on the ROM disk. While this default ROM contains the majority of the files needed for most applications, you may wish to burn a new ROM image, either to add other files or to place your application into the ROM disk. This process involves building the new image on the PC, using the DISKCFG utility, and then transferring it to the terminal via the serial cable, using the HEX2TERM utility. The default ROM image, called ROMDISK.HEX is located in the C:\SDK4100\SYSTEM\ROMDISK subdirectory on the development PC. It may be used with the HEX2TERM utility to restore the terminal's default ROM disk to its original state, if it has been replaced and the functionality of the default ROM disk is required.

Requirements for Burning the ROM Disk Image

The following are the required items needed for burning the ROM image:

- RS-232 Null Modem Cable (for general purpose, hardware flow control or LapLink™ cable)
- RS-232 Cable (p/n 20-12509-01)
- DISKCFG utility software
- HEX2TERM utility software
- Initial Program Loader (IPL) - this utility is permanently burned into the terminal)
- Diskette - (If a bootable ROM disk is desired, the diskette must be formatted with MS DOS 5.0 operating system).

Utilities

The two utilities which are used in setting up and burning the ROM disk image are DISKCFG.EXE and HEX2TERM.EXE. Both of these utilities are available with the Software Development Kit (SDK), and are located in C:\SDK4100\TOOLS. One additional program, called Initial Program Loader (IPL) is used in burning the ROM image. This program is permanently burned into a special area in the terminal. These utilities are described in detail later in this chapter.

Setting Up the ROM Image

In creating the files to be included, create a directory and keep all the files in that directory.

Example

The following files are included on the default ROM image:

File	Description	Installed Location
COMMAND.COM	DOS 5.0 (plus Hidden Files)	\SDK4100\SYSTEM\DOS
RAMDRIVE.SYS	DOS Ramdrive Driver	\SDK4100\SYSTEM\DOS
SYS.COM	DOS System Program	\SDK4100\SYSTEM\DOS
AUTOEXEC.BAT	DOS Autoexec file	\SDK4100\SYSTEM\ROMDISK
CONFIG.SYS	DOS Configuration file	\SDK4100\SYSTEM\ROMDISK
PCCEMM.SYS	C&T Memory Driver	\SDK4100\SYSTEM\MEMORY
HIDOS.SYS	C&T Memory Driver	\SDK4100\SYSTEM\MEMORY
PEN4100.EXE	Liberty Mouse Emulator	\SDK4100\SYSTEM\PEN\MOUSE
LOADC5.EXE	Handwriting Recognition Driver	\SDK4100\SYSTEM\PEN\HWNUM
GROUP000.BIN	Handwriting Recognition Driver	\SDK4100\SYSTEM\PEN\HWNUM
GROUP001.BIN	Handwriting Recognition Driver	\SDK4100\SYSTEM\PEN\HWNUM
GROUP002.BIN	Handwriting Recognition Driver	\SDK4100\SYSTEM\PEN\HWNUM
GROUP003.BIN	Handwriting Recognition Driver	\SDK4100\SYSTEM\PEN\HWNUM
XSMBIOS.EXE	Symbol BIOS Extensions	\SDK4100\SYSTEM\BIOS
SETUP.COM	Phoenix Setup	\SDK4100\SYSTEM\BIOS
CRADLE.COM	Cradle Driver	\SDK4100\SYSTEM\CRADLE
SRAMFORM.EXE	SRAM Format Utility	\SDK4100\TOOLS
MSFORMAT.BIN	SRAMFORM Image file	\SDK4100\TOOLS

File	Description	Installed Location
DSKACHK.COM	Disk A Detect Utility	\SDK4100\TOOLS
DSKBCHK.COM	Disk B Detect Utility	\SDK4100\TOOLS
RIGHTSW.COM	Right Side Switch Detect Utility	\SDK4100\TOOLS
LEFTSW.COM	Left Side Switch Detect Utility	\SDK4100\TOOLS
COM1ON.COM	COM1 Enable Utility	\SDK4100\TOOLS
SLEEPOFF.COM	Sleep Disable Utility	\SDK4100\TOOLS
SUSPOFF.COM	Suspend Disable Utility	\SDK4100\TOOLS
XSYMRST.COM	Restore Power Management Utility	\SDK4100\TOOLS
NOSYS.COM	Non-system Disk Maker Utility	\SDK4100\TOOLS
LDIMAGE.COM	BIOS, ROM Image Update Utility	\SDK4100\TOOLS

We recommend that you keep this ROM Image intact, in case you need to re-use it. In addition to having this image burned on the ROM disk, the actual hex image of the above is supplied as part of the SDK. Having a hex image of this enables restoration of the terminal's ROM disk to its original state, if necessary.

Follow these instructions to create the ROM disk image:

1. Insert a diskette in drive A or B.
2. Format the diskette as a non-system disk using MS-DOS format.
Note: The version of DOS on the development PC can be any version of MS-DOS that is 5.0 or later.
3. Run DISKCFG.EXE to place the MS-DOS 5.0 system files onto the freshly formatted non-system diskette (if a bootable ROM disk is desired).
4. Copy all files that you want on the ROM disk onto the diskette. Do not create subdirectories on the diskette. All files should be in the root directory.
5. Verify that all desired files are on the root directory of the diskette using the DIR command.
6. Run DISKCFG to create a .HEX file from the diskette contents. To run DISKCFG: type:

```
diskcfg A: /xxxxxx.hex, or diskcfg B: /xxxxxx.hex  
where xxxxxx refers to the file name of the output diskcfg hex file.
```

Note: If you are using MS-DOS 5.0 or later on the

development PC, you can replace steps 2-3 with a
format /s command.

Once DISKCFG has run successfully, the hex file has been created, and is ready to be downloaded to the PPT 41xx.

If the contents of the diskette need to be changed, you should reformat the diskette and copy the new files onto it again. Do NOT simply copy and delete files, as this will fragment the diskette and make your resulting ROM image too large.

Transferring the ROM Disk Image Hex File to the PPT 41xx

Transferring the hex file to the terminal from the PC involves the use of the HEX2TERM utility.

Performing a transfer involves the following steps:

Note: An AC adapter should be connected to the terminal if a cradle is not being used.

1. Boot into IPL on the terminal, by pressing both side switches while pressing the RESET button on the terminal.

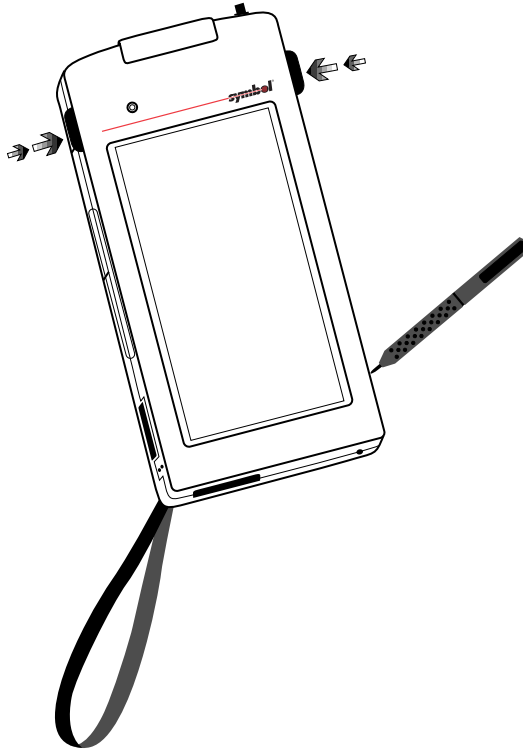


Figure 6-1. Booting into Initial Program Loader (IPL)

2. Use the side buttons on the terminal to select the appropriate ROM Disk Upgrade Area, the Serial Communication Parameters (baud rate, word length, parity, stop bits), Handshaking (not required - None, X-ON/ X-OFF, CTS/RTS). Do NOT press the left button to initiate transfer yet.

Note: HEX2TERM requires 8 data bits, no parity, 1 stop bit, and does not require handshaking at speeds up to 57600 baud.

3. If prompted, connect the PPT 41xx into an external power source (A/C adapter or cradle).

4. Connect the terminal to the PC using a NULL Modem cable to match the flow control chosen, or insert the terminal into the cradle.

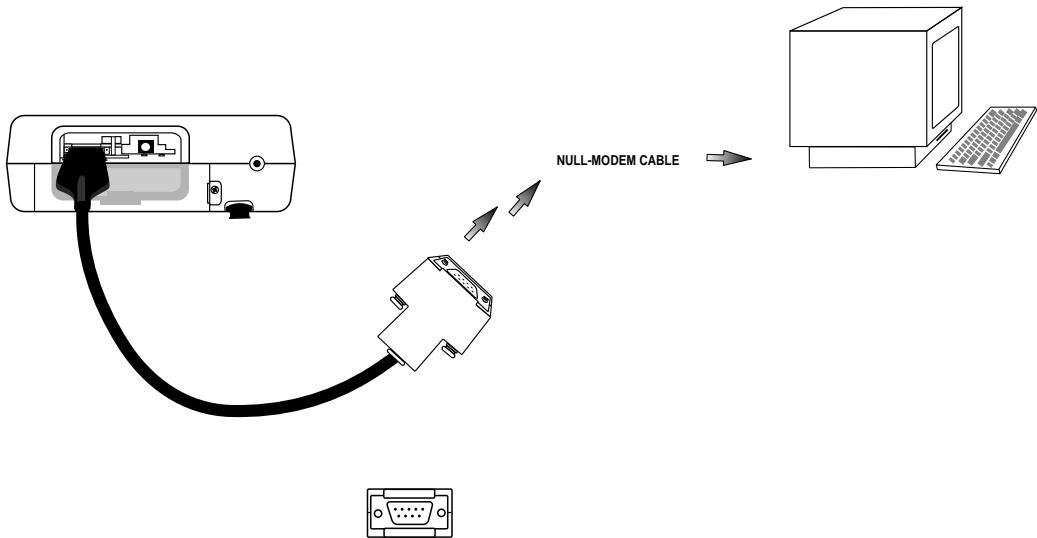


Figure 6-2. Connecting the Terminal to the PC

5. On the PC, run HEX2TERM with the appropriate parameters.
6. When HEX2TERM prompts for a key, press the left button on the terminal. The terminal will erase the old ROM Disk and display the message: "Ready to receive from RS-232C, or Insert Terminal into Cradle."
7. Press the appropriate key on the PC to begin the transfer. Don't wait longer than 5 minutes to press the key on the PC, or a timeout will occur and you will have to start this process again.

Upon completion of a successful transfer, rebooting the terminal reflects the ROM Disk image just loaded.

DISKCFG.EXE

DISKCFG.EXE is a disk configuration utility for building ROM images. It runs on a PC and is invoked with the following syntax:

```
DISKCFG <Drive:>/O<File>[/F<Format>][[/H][ /V]
```

The following command-line parameters are supported:

<Drive:>Source drive letter.

<Drive:> may be any valid DOS drive letter (such as A: or B:). The drive letter indicates the diskette on the PC which contains the files to be placed into a ROM disk image. This parameter must be specified.

/O<File>Output filename.

<File> must be a valid DOS filename for the DISKCFG output file. This parameter is required.

/F<Format>Output format.

<Format> specifies the format of the hex output file. STD is the default format.

Supported formats are:

INT (or STD) for Standard Intel Hex

COM for Compressed Hex

BIN for Binary Compressed Hex

TRA for Transparent Mode Hex

/HDisplay help screen.

This switch displays the command syntax, including the valid switches.

/vVerbose mode.

This option results in additional messages being displayed on the console.

The DISKCFG utility is used when creating a new ROM disk image for a PPT 41xx terminal. To create a new ROM disk image for the PPT 41xx, see steps 1-6 under *Setting Up the ROM Image*.

Note: Using /FBIN or /FTRA results in the smallest output files which can be downloaded faster to the PPT 41xx terminal.

HEX2TERM.EXE

HEX2TERM is a PC utility used to transfer hex files from a PC, over a null modem serial cable, to the PPT 41xx terminal. The hex file may be either a BIOS update or a ROM disk image.

The HEX2TERM command syntax is as follows:

```
HEX2TERM filename[baud][port]
```

The following command-line parameters are supported:

filename Specifies the name of the hex file being transferred to the terminal. Any file format generated by DISKCFG is acceptable.

[baud] Baud Rate.

The baud rate defaults to 9600. Possible values for <baud> are:
1200, 2400, 4800, 9600 (default), 19200, 38400.

[port] COM Port Designation: COM1 (default), or COM2

The default **COMM** parameters are:

9600 baud

COM1

8 bit data

No parity

Xon/Xoff flow control

The **baud rate** and **port** are optional parameters. Since the parameters are position sensitive, if you need to specify the port number, you must also specify a baud rate.

Initial Program Loader (IPL)

The Initial Program Loader (IPL) is a utility for loading system software and user applications into the Flash EEPROM. Its purpose is to download a BIOS or ROMDISK image from a PC or SRAM card to the PPT 41xx Flash ROM.

IPL supports serial input or input from an SRAM card. On a download from a PC, a serial cable and null modem connect the PC to the PPT 41xx terminal. This may be through either a direct connection to the terminal, or an indirect connection through a CRD 4100-101X cradle. With a direct connection, multiple PPT 41xx terminals can be connected to the same PC cable (see figure 6-3). With an indirect connection, several cradles can be connected together, and more than one cradle can be connected to the PC cable.

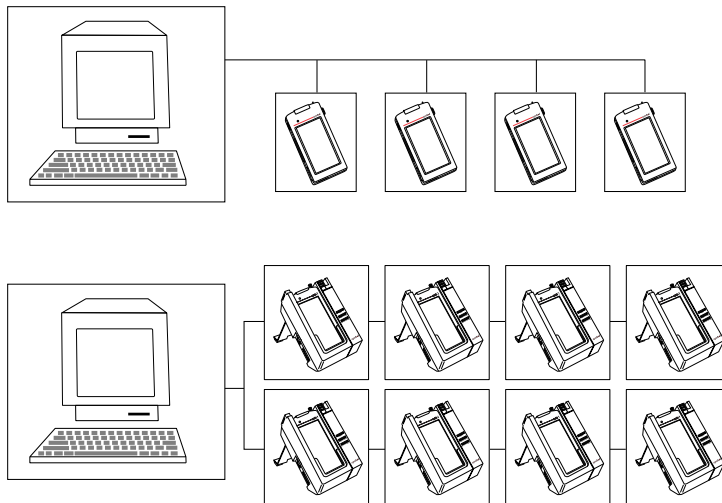


Figure 6-3. PC-Terminal and PC-Cradle Connection

Data transmitted from the PC should be in one of the following formats:

- Standard Intel Hex
- Compressed Hex
- Binary Compressed
- Transparent Mode Hex

Each of these formats is a variation of Intel Hex format (output by DISKCFG).

If input is from an SRAM card, then the following constraints apply:

- DOS must be loaded and active
- the SRAM card must be accessible to DOS as drive A:
- the data file named must be fixed as PTLBIOS.xxx or ROMDISK.xxx, where xxx is:
 - HEX, for any hex file formats
 - BIN, for a binary image

IPL may be selected by:

- resetting the PPT 41xx while pressing both side switches
- invoking Interrupt 0x15, Function 0xF6 through an application program

The following parameter selections are required:

- area update, i.e., BIOS or ROMDISK
- Serial Configuration, i.e., Baud Rate, word length, parity, and stop bits
- Handshaking, i.e., None, XON/XOFF, H/W

If IPL is selected by resetting with the side switches pressed, then the selection of the above parameters is done through a menu, and only input from serial is permitted.

If IPL is invoked through Interrupt 0x15, Function 0xF6, the above parameters must be passed to IPL in registers, and input from an SRAM card is permitted. Refer to the *PPT 41xx System Software Manual* (p/n 70-12524-xx) for a complete description of the application programming interface.