

Chapter 7 Initial Program Loader (IPL)

Purpose and Operation

The Initial Program Loader (IPL) is a utility for loading system software and user applications into the 1 Mbyte of Flash EEPROM. It downloads a new 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 connects the PC to the PPT 41XX either directly to a PPT 41XX terminal or indirectly through a PPT 41XX cradle. With a direct connection multiple PPT 41XX terminals can be connected to the same PC cable (see Figure 7-1). With an indirect connection, several cradles can be connected together, and more than one cradle can be connected to the PC cable (see Figure 7-2).

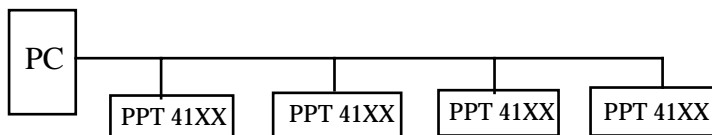


Figure 7-1. Direct Connection, Multiple Terminals to the Same PC

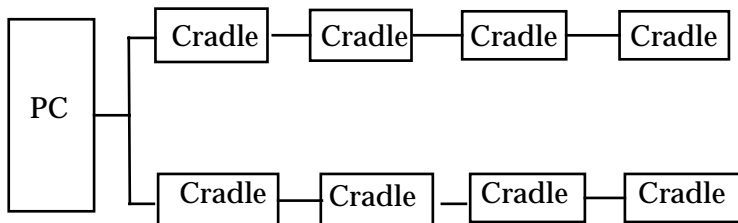


Figure 7-2. Indirect Connection, Multiple Cradles Connected to the PC Cable

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

- Intel Hex
- Extended Hex
- Binary Mode
- Transparent Mode

Each of these formats is a variation of Intel Hex format.

If input is from an SRAM card, 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, as provided by Symbol Technologies for BIOS updates

Note: SRAM card input is not supported if IPL is selected at reset.

IPL may be selected by:

- resetting the PPT 41XX while pressing both side switches
- invoking **Interrupt 0x15, Function 0xF6** through an application program (see *Supported API Command*)

The following parameter selections are required:

- area updated, i.e., BIOS or ROMDISK
- serial configuration, i.e., baud rate, word length, parity, and stop bits
- handshaking, i.e., None, XON/XOFF, CTS/RTS

If IPL is selected by resetting with the side switches pressed, the selection of the above parameters is done through a menu.

If IPL is invoked through Interrupt 0x15, Function 0xF6, the above parameters must be passed to IPL in registers. See *Supported API Command* for a description of the API command used to select IPL.

LDIMAGE Utility

LDIMAGE is an IPL utility that programs a new BIOS or ROM image in the PPT 41XX terminal. The only command line option is a filename, which is fixed depending on whether the target is the BIOS or the ROM disk. This utility supports two file formats: the *binary* format, indicated by a BIN extension, and *hexadecimal* indicated by the HEX extension.

This utility must be run from a bootable SRAM card with the utility itself and the appropriate image file both located in the root directory. To eliminate the need for a keyboard, invoke LDIMAGE from the AUTOEXEC.BAT file. Once the download is complete, the user is prompted to reboot the terminal. If the AUTOEXEC.BAT file is set up to program the terminal, however, rebooting results in the re-programming of what was just programmed. In this case, the terminal must be suspended so the bootable SRAM card may be removed from the socket.

The following help screen is displayed by LDIMAGE if either the /H option is used or an invalid filename is specified when the utility is invoked.

LDIMAGE: IPL Interface Download Utility

Version 1.00

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Use the following syntax to invoke the LDIMAGE utility:

Syntax: LDIMAGE <Filename>

where

<Filename> = PTLBIOS.BIN to specify a binary BIOS image

PTLBIOS.HEX to specify a hex BIOS image

ROMDISK.BIN to specify a binary ROM disk image

ROMDISK.HEX to specify a hex ROM disk image

As this help screen indicates, the fixed filename for a BIOS download is PTLBIOS with a BIN or HEX extension as appropriate for the file format. Similarly, the fixed filename ROMDISK must be used as the command line option to download a ROM image, again with BIN or HEX extensions. The default ROM image shipped with the PPT 41XX terminal is provided with the SDK and is installed into the \SDK4100\SYSTEM\ROMDISK directory. This image may be used with this utility to restore the initial state of the terminal's ROM disk.

Supported API Command

The Initial Program Loader (IPL) utility can be selected by an application program that calls the **Invoke IPL** API described in the following section.

Invoke IPL

Function: 0xF6

Description

Executes the Initial Program Loader (IPL) program which downloads a new BIOS or ROMDISK image to the PPT 41XX Flash ROM.

Note: When an application is sending data to IPL at 115200, character spacing is required to avoid overrun errors. At this speed, the transmitting program should insert a delay of at least 150 microseconds between adjacent characters.

Interrupt

0x15

Input Registers

AH = 0xF6

AL = Data format, as follows:

0x00: Binary image files (as provided by Symbol Technologies for BIOS updates), SRAM card only

0x01: Hex, SRAM card or serial

BH = Area updated, as follows:

0x00: BIOS

0x01: ROMDISK

BL = Input device selection, as follows:

0x00: SRAM card

0x01: Serial

CL = Serial communications format parameters, as follows:

Bit 7 = Stop bits, as follows:

0 = 1 bit

1 = 2 bits

Bit 6 = Data size, as follows:

0 = 8 bits

1 = 7 bits

Bits 5, 4 = Parity, as follows:

00 = None

01 = Odd

10 = Even

Bit 3 is always 0. Reserved for future use.

Bits 2, 1, 0 = Baud, as follows:

000 = 1200

001 = 2400

010 = 4800

011 = 9600

100 = 19200

101 = 38400

110 = 115200

Note: Standard hex can be used at 38400 baud without flow control.

DH = Flow control, as follows:

00 = No flow control

01 = XON/XOFF

02 = RTS/CTS

Note: Flow control is not appropriate for use in multi-terminal downloads.

Output Register

Returns to caller if there is any error in input parameters.