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Model 743 Owner's Guide



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Preface

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Audience

This guide is intended for HP Model 743 Board Computer users.

Safety and Regulatory Statements

Safety

For safety information see the owner's guide that came with the system in which you are installing your Model 743 board computer.

Regulatory Statements

Emissions Regulations

Federal Communications Commission (FCC) This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules and interference causing regulations of Industry Canada. These limits are designed to provide reasonable protection against harmful interference in a non-residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception (determined by turning the equipment off and on), you can correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and the receiver.
- Connect the equipment to an outlet on a circuit different from that to which the receiver is connected.

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Hewlett-Packard's system certification tests were conducted with HP-supported peripheral devices and HP shielded cables, such as those you receive with your computer. Changes or modifications not expressly approved by Hewlett-Packard could void the user's authority to operate the equipment.

Australia EMC Standards

This equipment has applied for and received approval to display the Australian C-Tick mark according to the standards of AS/NZS 2064.1/2:1992 and AS/NZS 3548:1995.

VCCI Class A ITE

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Electrostatic Discharge (ESD) Precautions

Electrostatic charges can damage the integrated circuits on printed circuit boards. To prevent such damage from occurring, observe the following precautions during board unpacking, installation, and configuration:

- Stand on a static-free mat.
- Wear a static strap to ensure that any accumulated electrostatic charge is discharged from your body to ground.
- Connect all equipment together, including the static-free mat, static strap, routing nodes, and peripheral units.
- Keep uninstalled printed circuit boards in their protective antistatic bags.
- Handle printed circuit boards by their edges, once you have removed them from their protective antistatic bags.

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Release Document(s)

Please refer to the *Release Document(s)* you received with your system or system software for additional information that we may not have been able to include in this guide at the time of its publication.

Related Manuals

If you are using HP-UX, refer to the following manuals for more information:

- *Model 748 Owner's Guide* (A4511-90604)
- *VME Services for HP-UX 10* (A4412-90022)
- *Using Your HP Workstation* (A2615-90003)
- *Using the Audio Developer's Kit* (B2355-90069)
- *Installing and Updating HP-UX* (B2355-90050)
- *Configuring HP-UX for Peripherals* (B2355-90053)
- *HP Visual User Environment User's Guide* (B1171-90079)
- *Managing Clusters of HP 9000 Computers: Sharing the HP-UX File System* (B2355-90038)
- *HP-UX X User Environment User's Guide*
- *HP-UX System Administration Tasks*
- *Precision Architecture RISC HP 9000 Series 700 Diagnostics Manual*

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If you are using HP-RT, refer to the following manuals for more information:

- *Application Programming in the HP-RT Environment*
- *Driver Writing in the HP-RT Environment*
- *ELOG Library Programer's Guide*
- *HP Z5117A PCMCIA Adapter Installation and User's Guide*
- *HP-RT Reference*
- *HP-RT Quick Reference*
- *HP-RT System Administration Tasks*
- *VME Backplane Networking Administration Guide*
- *X11 SERVERrt Installation and Configuration Guide*
- *Using SNMP in the HP-RT Environment*
- *Using STREAMS in the HP-RT Environment*

To order manuals, please contact your local sales office.

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Revision History

The revision history for each edition of the manual is listed below:

HP Part No.	Edition	Revision History
A2636-90014		First printing
A2636-90603	E0297	Second printing
A2636-90606	E1097	Third printing

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Documentation Conventions

Unless otherwise noted in the text, this guide uses the following symbolic conventions.

user-supplied values	Italic words or characters in formats and command descriptions represent values that you must supply.
sample user input	In examples, information that the user enters appears in bold.
`output`	Information that the system displays appears in `this typeface`.
literal values	Bold words or characters in formats and command descriptions represent commands or keywords that you must use literally. Pathnames are also in bold.
KEY	Text with a line above and a line below denotes a key on your keyboard, or a key or button which is drawn on your workstation's graphic display. (In this manual we refer to the **Enter** key. On your keyboard the key may be labeled either **Enter** or **Return**.)

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Safety Symbols and Conventions

The following conventions are used throughout this manual:

NOTE: Notes contain important information set off from the text.

CAUTION: Caution messages indicate procedures which, if not observed, could result in damage to equipment. Do not proceed beyond a CAUTION sign until the indicated conditions are fully understood and met.

WARNING: **Warning messages indicate procedures or practices which, if not observed, could result in personal injury. Do not proceed beyond a WARNING sign until the indicated conditions are fully understood and met.**

Questions, Suggestions, or Problems

If you have any questions, suggestions, or problems with our hardware, software, or documentation, please call 1-800-633-3600 (U.S. and Canada) or contact the HP Response Center for your country.

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Declaration of Conformity

DECLARATION OF CONFORMITY

according to ISO/IEC Guide 22 and EN45014

Manufacturer's Name: Hewlett Packard

Manufacturer's Addresses: 100 Domain Drive
Exeter, N.H. 03833
USA

declares that the product

Product Name: VMEbus Board Computer
Model Number: HP 9000 / 743i
Base Product Number: A4260A
Product Options: All

conforms to the following Product Specifications:

Safety: IEC 950:1991 + A1, A2 / EN 60950:1992 + A1, A2

EMC: CISPR 22:1985 / EN 55022:1988 Class A (1)
CISPR 11:1990 / EN 55011:1991 Group 1 Class A
EN 50082−1:1992
IEC 801−2: 1991 / prEN 55024−2:1992 − 4 kV CD, 8 kV AD
IEC 801−3: 1984 / prEN 55024−3:1991 − 3 V/m
IEC 801−4: 1988 / prEN 55024−4:1992 − 4 kV Power Lines
2 kV Signal Lines

Supplementary Information:

The product herewith complies with the requirements of the Low Voltage Directive 73/23/EEC and the EMC Directive 89/336/EEC.

(1) The product was tested in a typical Hewlett Packard workstation configuration.

Exeter, June 13, 1996
Date

James Kelly
James Kelly
Quality and Engineering Manager

European Contact: Your local Hewlett−Packard Sales and Service Office or Hewlett−Packard GmbH, Department ZQ/Standards Europe, Herrenberger Strasse 130, D−71034 Boeblingen (FAX:+49−7031−143143)

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1

Model 743 Board Computer Overview

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This chapter introduces the Model 743 board computer. Its purpose is to familiarize you with the board computer and its installation procedure.

The instructions in this chapter assume you are using either the HP-UX or HP-RT operating system.

The major sections within this chapter are:

- Product description
- Installation overview
- Supported products
- Environmental requirements
- Operating system overview
- Manuals for system information
- Online sources of information
- Installing HP-UX and HP-RT
- Audio

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Product Description

The HP 9000 Model 743 is a high-performance Precision Architecture board computer based on the HP PA-RISC 7100LC technology. It contains the following key features:

- Model types:

  Model 743*i*/64
  Model 743*rt*/64
  Model 743*i*/100
  Model 743*rt*/100

- VME slot configuration

  Single slot
  Dual slot (requires PCI Mezzanine Card (PMC) bridge board, General System Connect (GSC) expansion kit or HCRX graphics card
  Three slot (requires PMC bridge and expansion boards or GSC expansion kit with ATM card)

- CPU PA-RISC PA7100-LC, processor performance

  64 or 100 MHz
  Cache - 256 KB

- Clocks

  Battery-backed real-time clock
  Interval timers (One 32 bit, Two 16 bit)
  Watchdog timer

- Operating systems

  HP-UX 9.05 (or later; some options require later releases). The Model 743 typically boots from a hard disk drive. HP-UX may also be installed from an external DDS or CD-ROM drive.

  If a client on a LAN, HP-UX can be booted over the LAN.

  HP-RT 2.0 and later.

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- User interface

  CDE or HP VUE graphical user interface (HP-UX only)

- Compatibility

  Source and binary code compatible with Series 700 product family.

- Monitors

  Single or multiple display depending on number of installed graphics options (onboard and/or external).

  Color monitors:
  HP A4490D, 17-inch, resolution 1280 x 1024
  HP A4331D, 20-inch, resolution 1280 x 1024

  Terminal (text only) connected to RS-232 port.

- Optional Graphics Capability

  Graphics chip set providing onboard (including accelerated I/O) graphics.

  GSC expansion kit provides two slots for GSC HP A4267A 8-plane graphic cards.

  HCRX8 or HCRX24 graphics boards allow the choice of one HP A4267A graphics card in addition to the graphics board itself.

NOTE: Either a GSC expansion kit or the HCRX expansion graphics boards extend graphics capability beyond the onboard graphics chip set of a Model 743 board computer. However, the HP-RT operating system supports only one graphics display, and HP-UX 10.x supports up to three graphics displays.

- Main Memory

  Single VME slot 743*i*: 16 to 128 MB RAM
  Single VME slot 743*rt*: 8 to 128 MB RAM
  Dual VME slot 743*i*: 16 to 256 MB RAM
  Dual VME slot 743*rt*: 8 to 256 MB RAM
  (Dual slot means an expansion kit or HCRX board must be installed.)

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NOTE: A Model 743 configured for more than one RAM card in each RAM stack requires installation of an expansion kit or an HCRX graphics board and occupies two VME slots.

Up to four RAM cards may be installed - three cards in RAM stack 1 and one card in RAM stack 2.
RAM cards may be placed in any order. A higher capacity memory card can be added on top of a lower capacity card or you can reverse the order, with a lower capacity card on top of a higher capacity card.

- Standard Features

  Internal SCSI-2 single-ended bus
  2 asynchronous RS-232-C ports (requires a conversion cable)
  1 HP parallel port (requires a conversion cable)
  1 LAN AUI port (requires a conversion cable)
  2 mini-DIN PS/2 ports
  1 slot for RAM memory (memory cards can be stacked)
  CD-quality audio, supported only by HP-UX and requires a conversion cable
  PCMCIA adapter, supported only by HP-RT

- Dual Slot Upgrades

  PMC bridge board (with two PMC sites, cannot be used w/HCRX, and supported only on HP-UX)
  GSC expansion kit (with two GSC sites)
  HCRX8 graphics board (with one additional GSC site)
  HCRX24 graphics board (with one additional GSC site)
  GSC HP A4267A graphics card
  FWD SCSI card

- 3-slot Upgrade

  PMC expansion board (with two PMC sites, requires PMC bridge)
  ATM Network Card (up to 2, GSC expansion kit required, cannot be used with HCRX graphics)

- Other Supported Configurations

  Hewlett-Packard supports only products with HP approved parts, accessories, peripherals, operating systems, and programs.

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Installation Overview

Chapter 2 provides step-by-step instructions for attaching and installing accessories in a typical VME chassis, and connecting external devices.

Accessories are products that attach to the computer's system board and must be attached **before** installing the board computer in a VME card cage. Devices are products used externally to the board computer. Examples are keyboards, monitors and mass storage devices. Other devices are connected through cables. Depending on your specific application, you may need one or more accessory and device products. Installation instructions for most products used directly with your Model 743 Board Computer are explained in this manual.

Chapter 3 presents the installation tasks required to install the board computer. It provides information to help you configure and install your VME board computer.

Installation Notes

Your Model 743 Board Computer uses micro-miniature connectors for several interface ports. Cable connectors for these ports are very small, but may be positioned so that a slight angle exists between them. This situation has been tested by HP and full functionality is maintained.

CAUTION: The Model 743 Board Computer's P2 connector has a local bus on the user-defined pins. Verify that your VME card cage's backplane makes no connections to J2/P2, rows A and C. Refer to IEEE STD 1014-1987, Chapter 7, for more information on user-defined pins used in VME backplane connectors.

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Supported Products

Only products with Hewlett-Packard approved parts, accessories, peripherals, operating systems, and application programs are supported by Hewlett-Packard. Any product with other than HP approved hardware or software connected or installed must have the non-HP approved hardware and software removed by the customer before on-site repair is conducted. The following lists describe the products supported by HP.

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Accessory Cards

The Model 743 supports the following accessory cards:

- Memory; one or more of these RAM cards supported on both HP-UX and HP-RT operating systems:

  HP A4263A 8 Mbyte RAM Card
  HP A4264A 16 Mbyte RAM Card
  HP A4265A 32 Mbyte RAM Card
  HP A4266A 64 Mbyte RAM Card

- HP A4504A PMC Bridge Adapter - provides two sites for third party PMC cards (HP-UX only)
- HP A4509A PMC Expansion Adapter - provides two additional sites for third party PMC cards (requires PMC Bridge Adapter - HP-UX only)
- HP A4262A GSC expansion kit
- Mezzanine (GSC expansion kit) cards:

  HP A4267A 8-plane color graphics card
  HP A4268A FWD SCSI
  HP J3420A ATM (supported only by HP-UX)

- PCMCIA (supported only by HP-RT)

  10-MB Flash disk card
  20-MB Flash disk card
  40-MB Flash disk card (HP-RT 3.0, later - not available from HP)

- Sub-Mezzanine Cards:

  HCXR8 graphics card
  HCRX24 graphics card

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Typical External Devices

The Model 743 supports the following external devices:

- LAN Transceiver:

  HP A2670A ThinLAN Ethernet Transceiver
  HP A2671A EtherTwist Transceiver.

- Speaker; 8 ohm impedance with $^{1}/_{8}$-inch sub-miniature stereo connector (HP-UX only).

Cables

Model 743 board computers use micro-miniature connectors for several interface ports and standard connectors for others. You need conversion cables to connect from the micro-miniature connectors to standard size interfaces. The Model 743 supports the following cables:

- Conversion cables:

  HP A4300A HP Parallel; High-Density 25-Pin to standard 25-Pin F
  HP A4301A RS-232; High-Density 9-Pin to Standard 9-Pin M
  HP A4302A Audio; High-Density 9-Pin to Stereo Line-In
  HP A4303A LAN; High-Density 15-Pin to 15-Pin AUI
  HP A4304A Video; High-Density 15-Pin to Standard 15-Pin F
  HP A4305A Video; High-Density 15-pin to EVC connector
  HP A4167A Video; Standard 15-pin to EVC connector (for use with optional GSC 8-plane graphics card and EVC monitor)

- Standard cables:

  HP K2296 SCSI; High-Density 50-Pin to Standard Bail Lock
  HP 92284A HP Parallel; 25-Pin M to 25-Pin M
  HP 24542G RS-232 Terminal Cable; 9-Pin F to 25-Pin M
  HP 24542H RS-232 Modem Cable; 9-Pin F to 25-Pin F

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Keyboard and Mouse

The Model 743 supports the following:

- HP A2840A Keyboard with mini-DIN connector
- HP A2839A Mouse with mini-DIN connector

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Environmental Requirements

Table 1-1 shows the environmental requirements for the Model 743.

Table 1-1 Environmental Requirements

Temperature	Operating: 0˚ to 55˚C; 10˚c/min rate of change maximum Non-operating: -40˚ to 70˚C
Humidity	Operating: 40˚C: 95% RH max
Altitude	Operating: 4,600m (15,000 ft.) to 40˚C Non-operating: 15,300m (50,000 ft.) to 70˚C
Air flow	150 linear feet per minute, 0˚ to 35˚C 200 linear feet per minute, 35˚ to 55˚C

CAUTION: Integrated circuit case temperatures must not exceed those shown in Figure 1-1.

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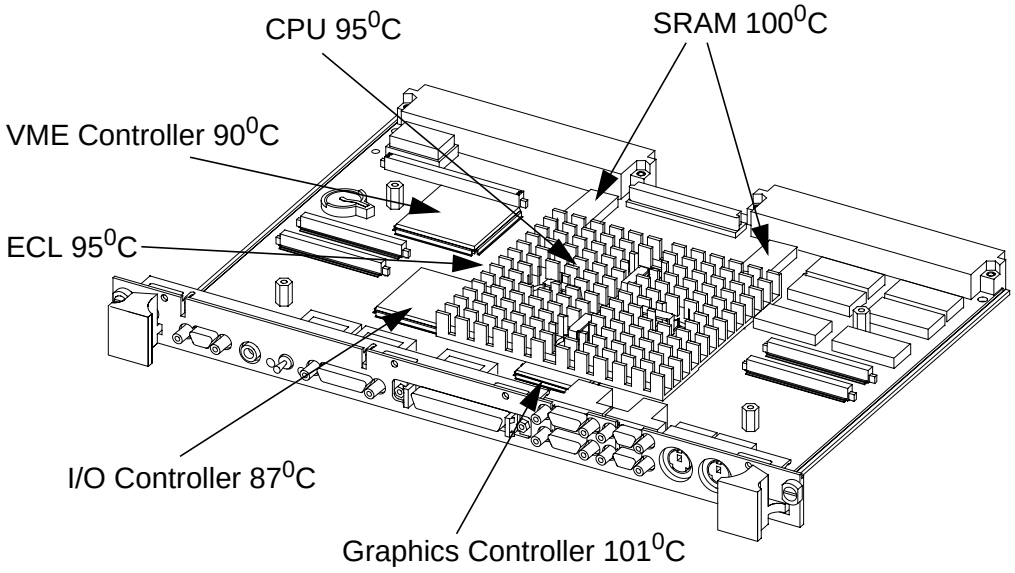


Figure 1-1 **Model 743 VME Board Computer Temperatures**

NOTE: The Model 743 should only be operated in an environment that is free from conductive pollution, including dry non-conductive pollution that may become conductive due to expected condensation.

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Operating System Overview

The Model 743 can be used with either of two operating systems, HP-UX or HP-RT. This manual provides basic information you will need for booting and running HP-UX. It also provides some overview information for HP-RT.

- The Model 743*i* uses the standard HP-UX operating system, a highly versatile system for multitasking, running your application programs, and performing a variety of development tasks. For information on installing HP-UX, see the manual *Installing and Updating HP-UX*

  To get started with using HP-UX, go to Chapter 5 in this manual for information on booting and running the system.

- The Model 743*rt* uses HP-RT, a real-time operating system. For information on installing and operating HP-RT, see the manual *HP-RT System Administration Tasks.*

HP-UX

Refer to *HP-UX System Administration Tasks* for detailed configuration and operation procedures for HP-UX.

HP-RT

Refer to *HP-RT System Administration Tasks* for detailed installation and operation procedures for HP-RT.

The HP-RT development environment consists of the following:

- An HP-UX host system (for example, a Model 748*i*), running the supported HP-UX operating system with CDE, X Window System, or HP VUE installed.
- DDS-Format tape drive or CD ROM for loading HP-RT on the host system.
- The HP-RT target system (such as a Model 743*rt*).

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Manuals for System Information

HP-UX

After you have done the installation procedures in this book, you may want to see the following sources for further information:

- For administration information, see *System Administration Tasks.*
- For a quick reference to commonly-used HP-UX commands, see the Appendix in *Using HP-UX*.
- HP CDE or HP VUE is the default interface for HP-UX. At some point, you may want to interact with the Model 743*i* using CDE or HP VUE via the LAN, with an X Window System display. As a simpler window alternative, you can also use the X Window System by itself, also included in HP-UX. For further information, see the manual *Using the X Window System, Using HP-UX, CDE User's Guide,* or *HP VUE User's Guide*.

The following manuals are also useful:

- If you have not yet installed your HP-UX system, see *Managing HP-UX Software with SD-UX*.
- For troubleshooting HP-UX, see Chapter 6, in this manual, and the manual *Solving HP-UX Problems*.
- For VME configuration information, see *VME Services for HP-UX 10,* or *VME Configuration Guide for HP-UX* (9.05).

HP CDE

For information on installing, using and configuring the HP CDE interface with HP-UX, see the *HP CDE Getting Started Guide*.

HP VUE

For information on using and configuring the HP VUE interface with HP-UX, see the *HP VUE User's Guide*. For information on installing HP VUE, see the *HP VUE Installation Guide*.

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Online Sources of Information (HP-UX and HP-RT)

HP-UX is designed so that you can access many sources of information without leaving your system. Most of these information sources are accessible through the shell command line on a character terminal.

- Man Pages: The HP-UX information found in *HP-UX Reference* is online and accessible by clicking on the Toolbox button at the right of your Front Panel, or by entering on a command line **man *command***, where *command* is the name of the HP-UX command or routine you want to get information on. If you're not sure of the command name you can enter **man -k *keyword***, where *keyword* is a likely topic word to search on. This results in a display listing commands having the keyword in their description.

  Similar reference information on HP-RT, found in *HP-RT Reference*, can be displayed by entering **rtman *name*** on your HP-UX host system, where *name* is the name of the HP-RT command, system call, or function call you want to get information on.

There are also a variety of files on your HP-UX system which contain version-specific information. These will be useful in administering and configuring cards and devices for your version of HP-UX. Among these files are the following:

- Release Notes: This is the online version of the Release Notes which comes with your system. It contains all the latest information, undocumented changes and bug fixes for your release of HP-UX. It also contains information on the current version of HP VUE. The Release Notes document resides in the **/usr/share/doc** or **/etc/newconfig** directory, named by its release number, for example, **10.20 RelNotes** for HP-UX 10.20.
- HP-UX and HP VUE Help. For graphics displays, extensive help information on the operating system and the visual interface is included with HP VUE.
- Newconfig: The directory **/etc/newconfig** contains information and new versions of HP-UX product configuration files, as well as shell scripts which may have been customized on your system. The contents of this directory will vary depending on which products you have loaded on your

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system. In most cases, old versions of these files, in their regular locations in the file system, are not overwritten by the update process. See the README file in **/etc/newconfig** for information on the contents of this directory.

In HP-RT, you will find an HP-RT specific README file in **$HPRTroot/etc/newconfig**, on the HP-UX host system. This file contains version-specific information.

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Installing HP-UX and HP-RT

For procedures to install and configure HP-UX, refer to *HP-UX System Administration Tasks*.

For information on clusters, refer to *Managing Clusters of HP-UX Computers*, and the *HP VUE User's Guide*.

For procedures to install and configure HP-RT, refer to *HP-RT System Administration Tasks*.

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Audio

HP-UX includes audio software comprising an audio editor, Audio Application Program Interface (AAPI), and some sample programs. Audio output is available through the audio port on the front panel of the Model 743*i*. For highest quality audio, an external headphone set or speaker is recommended.

Audio is implemented using a CODEC (coder-decoder) combining CD-quality stereo audio-digital converters for microphone and line-input levels. The input sampling rate and format are programmable, as are the input gain and output attenuation.

A $^{1}/_{8}$-inch mini-jack is used for the speaker output connection. The remaining audio signals are via a 9-pin D-sub connector. Output impedance is nominally 8 ohms, but higher impedance devices can also be driven.

For information on programming for audio, refer to *Using the Audio Developer's Kit* (B2355-90069) and the man page *audio*.

This feature is not supported by HP-RT.

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2

Accessories Installation

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This chapter describes the accessories that you can install on the Model 743 Board Computer and tells you how to install them.

The instructions in this chapter assume you are using either the HP-UX or HP-RT operating systems.

The major sections within this chapter are:

- Tools required and preliminary procedures
- Safety precautions
- Memory
- GSC expansion kit
- GSC mezzanine cards (graphics and SCSI cards)
- PMC bridge and expansion boards
- PCMCIA

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Tools Required and Preliminary Procedures

Tools Required for Installation

All field replaceable parts can be accessed with these tools:

Grounding wrist strap

No. 1 Pozidrive screwdriver

Small flat-tipped screwdriver

5mm ($^{3}/_{16}$-inch) nutdriver.

Preliminary Procedures

Perform the following steps before installing or removing accessories.

1 Exit application programs.

2 Shut down the operating system and power off the VME card cage (see for details).

3 Remove all cables connected to the board computer.

4 Set up a static-free place on which to work.

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Safety Precautions

CAUTION: It is essential to practice safety precautions when working with any electrical or electronic products. Following these safety precautions can help protect both you and the equipment from injury and possible permanent damage.

Whether the ICs are installed on a printed circuit board or laying on a table, integrated circuit components can be damaged by electro-static discharge. Static charges can build up in people to a potential of several thousand volts by simply walking across a room.

Protect integrated circuits by:

Using a static free work place and wearing clothes that do not hold static charges before handling any of the workstation's PC boards.

Unplugging the power supply before removing or installing a part.

Touching sheet metal with your fingers before touching the printed circuit assembly.

If the assembly is not going to be re-installed, place the assembly in an anti-static bag and set it aside. Following these precautions extends the life of the computer products you maintain.

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Memory

This section provides step-by-step instructions for installing RAM cards in your Model 743.

Preliminary Requirements

Perform the following steps before you install a RAM card in your Model 743:

1. If the Model 743 is already installed in your system card cage, you must remove it. See Chapter 3 of this book for instructions on removing and replacing the Model 743.
2. Place the Model 743 on a static free mat on a clean, level surface.

RAM Card Installation

You do not need to follow any particular card order when installing RAM cards into your Model 743. Use these steps to install the RAM cards:

1. Place the first RAM card on the board standoffs, lining up the connector on the RAM card with the connector on the board, as shown in Figure 2-1.
2. Gently press to seat the RAM card in the connector.
3. To stack RAM cards, install standoffs between each card, ending with retaining screws on the top RAM card. If you install single RAM cards in either the left or right locations, the retaining screws go into the board standoffs.

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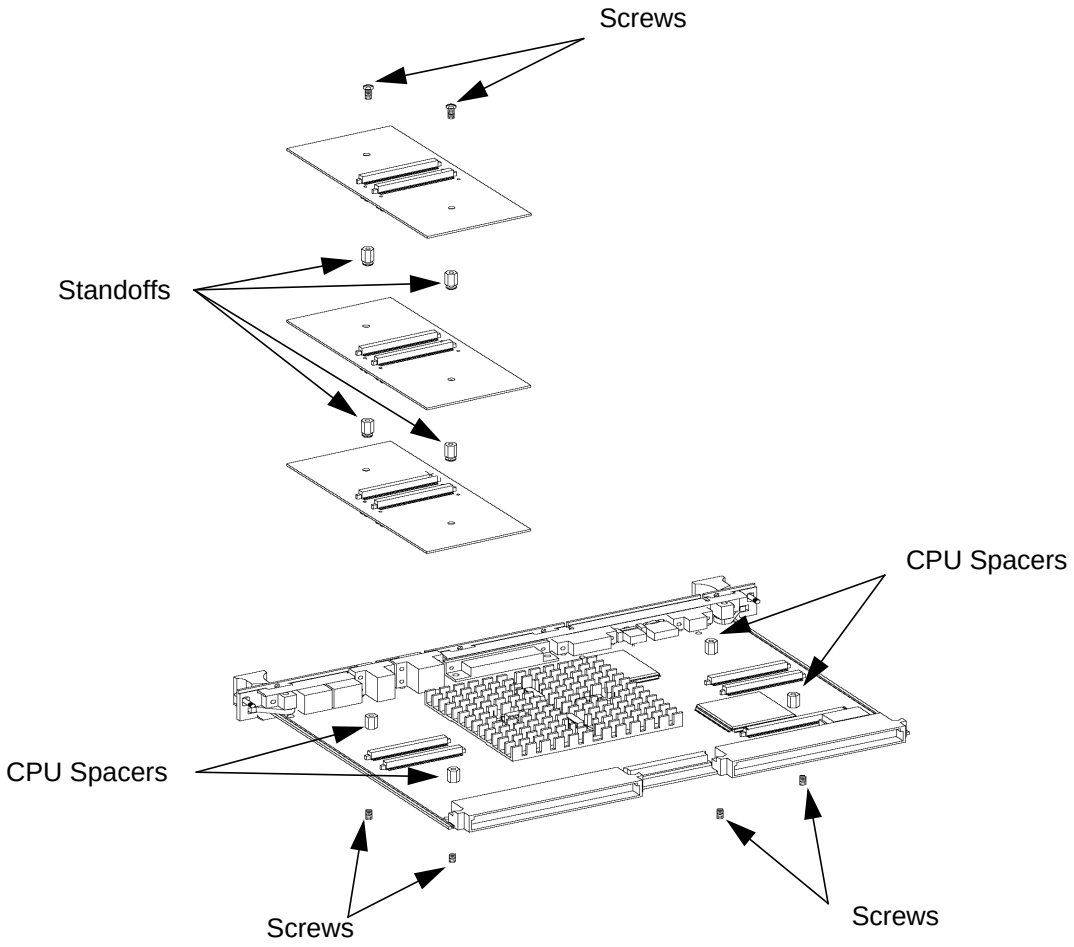


Figure 2-1 Installing RAM Cards

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GSC Expansion Kit

The GSC expansion kit consists of two parts: the adaptor fixture and the front panel extension. This section provides step-by-step instructions for installing the GSC expansion kit onto the Model 743.

Preliminary Requirements

Perform the following steps before installing the adapter (GSC expansion kit) onto your Model 743:

1. If the Model 743 is already installed in your system card cage, you must remove it. See Chapter 3 of this book for instructions on removing and replacing the Model 743.
2. Place the Model 743 on a static free mat on a clean, level surface.

GSC Expansion Kit Installation

Follow these steps to install the expansion kit onto the Model 743:

1. Place the adaptor fixture so that you line up the four M2.5x12 screw holes that flank the DIN connectors. See Figure 2-2.
2. Insert the four M2.5x12 screws one at a time, finger tighten, then snug down with a screwdriver. Do not overtighten.
3. Insert the two M2.5x6 screws, finger tighten, then snug down with a screwdriver.
4. Remove the EMI gasketing from the front panel of the Model 743.
5. Place the panel extension over the front panel so that the four tabs on the bottom of the extension panel line up and slip into their respective slots on the top of the front panel.
6. Insert the four front panel screws, finger tighten, then snug down with a screwdriver, as shown in Figure 2-3.

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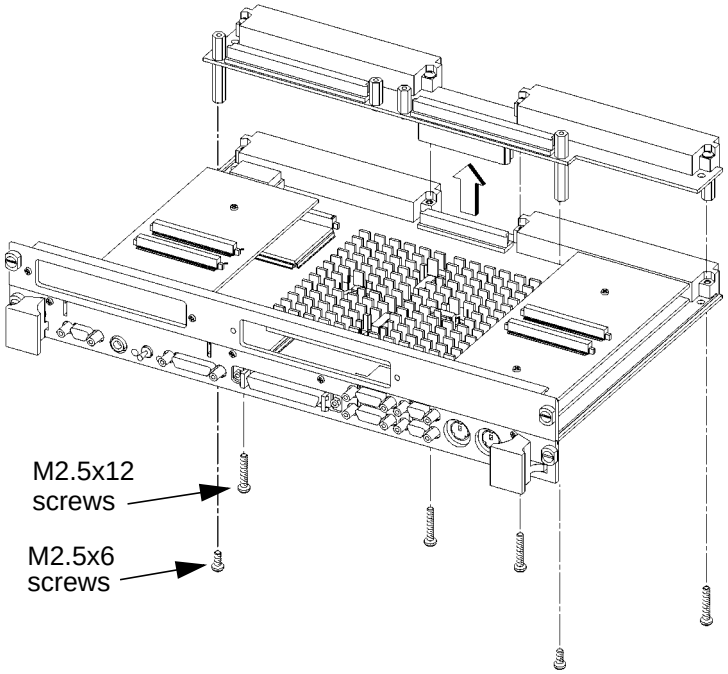


Figure 2-2 Installing the GSC Expansion Kit

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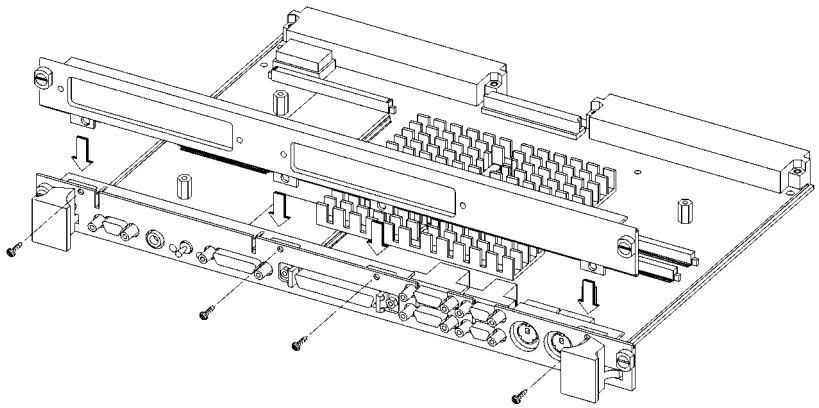


Figure 2-3 Adding the Front Panel Screws

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GSC Mezzanine Cards

Installing GSC Mezzanine Cards

This section provides step-by-step instructions for installing GSC mezzanine cards into your Model 743.

Preliminary Requirements

Perform the following steps before you install a GSC card:

1. The Model 743 must already have a GSC expansion kit installed.
2. If the Model 743 board computer is already installed in your system card cage, you must remove it. See Chapter 3 of this book for instructions on removing and replacing the Model 743 board computer from its chassis.
3. Place the Model 743 board computer on a static free mat on a clean, level surface.

GSC Mezzanine Card Installation

Follow these steps to install a GSC card into your Model 743 Board Computer:

1. Working from the back of the Model 743 Board Computer, you can install GSC graphics cards into either the right-hand or center position shown in Figure 2-4.
2. Using Figure 2-4 as a guide, position a card and line up its connector over the GSC connector on the board computer.
3. Press the card down to seat the connectors.
4. Insert the two M2.5x6 screws that hold the GSC card to the adapter fixture and screw into place.
5. Insert the two M2.5x5 screws that hold the card to the front panel expansion plate and screw into place.

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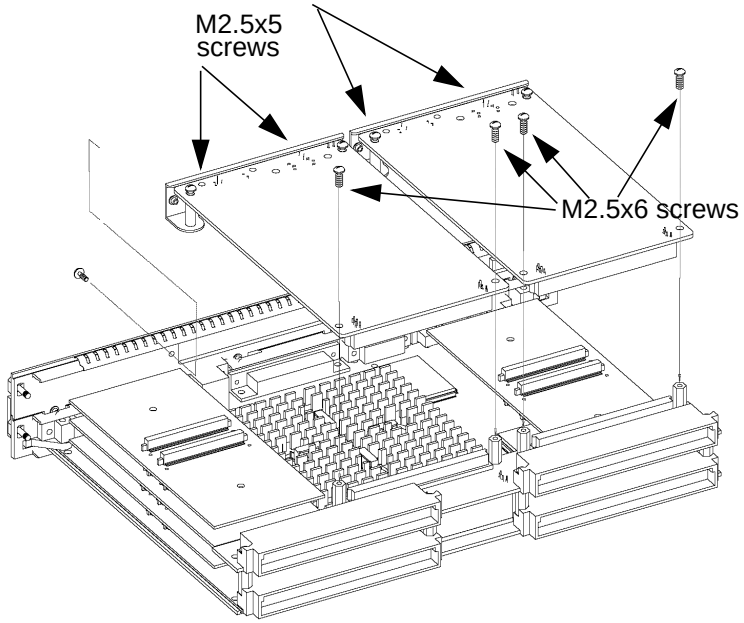


Figure 2-4 **Installing a GSC Mezzanine Card - Back View**

Installing an HCRX Graphics Board

An HCRX8 or HCRX24 graphics board occupies the same position as the Expansion Kit adapter. These boards fasten to the 743 in almost the same way as the expansion adapter, with four DIN screws and two M2.5X6 screws. On an HCRX board, there are two additional small screws located on each side of the graphics connector that are fastened through the front panel.

Preliminary Requirements

Perform the following steps before installing an HCRX board on your Model 743:

1 If the Model 743 is already installed in your system card cage, you must

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remove it. See Chapter 3 of this book for instructions on removing and replacing the Model 743 board computer from its chassis.

2 Place the Model 743 board computer on a static free mat on a clean, level surface.

NOTE: There is one GSC connector on the left side of an HCRX board (looking from the front of the board). A GSC card is installed in an HCRX board in the same manner as on the expansion adapter. See "Installing GSC Mezzanine Cards," earlier in this chapter.

HCRX Graphics Board Installation

Follow these steps to install an HCRX board in your Model 743:

1 Place the HCRX board on the board computer, lining up the screw holes for the M2.5x12 and M2.5x6 screws as shown in Figure 2-5.

2 Install the four DIN connector M2.5x12 screws from the bottom of the system board.

3 Install the two M2.5x6 screws from the bottom of the system board.

4 Install the two small screws at each end of the graphics connector on the front panel.

5 Install the panel extension as described on page 2-7 .

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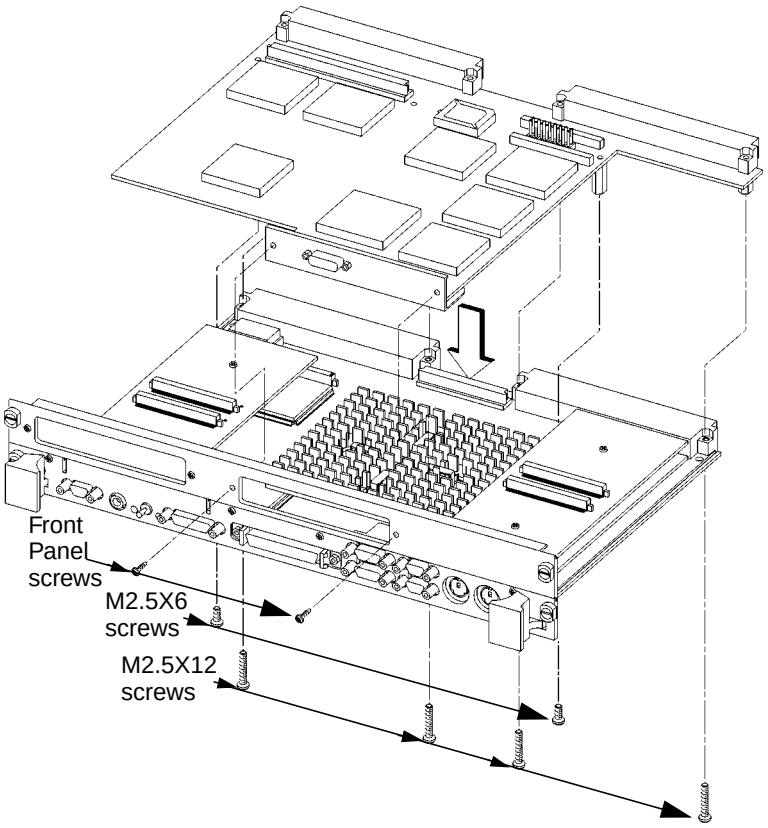


Figure 2-5 Installing an HCRX Graphics Board

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PMC Bridge Adapter and Expansion Adapter

This section provides step-by-step instructions for installing the PMC bridge and expansion adapters onto the Model 743 board computer. When the PMC bridge adapter is installed onto the Model 743, the result is a two-board assembly that is the installed into your VME card cage. When both the PMC bridge and expansion adapters are installed onto the Model 743, the result is a three-board assembly that is the installed into your VME card cage.

Preliminary Requirements

Perform the following steps before installing the adapters onto your Model 743 Board Computer:

1 If the Model 743 is already installed in your system card age, you must remove it. See Chapter 3 of this book for instructions on removing and replacing the Model 743 Board Computer.

2 Place the Model 743 on a static-free mat on a clean, level surface.

PMC Bridge Adapter and Expansion Adapter Installation

1 Refer to your PMC card installation manual, and set any configuration switches or jumpers that may be required for your application.

2 On the PMC bridge adapter board, at the sites where you will be installing the PMC card(s), remove the two screws that secure the bezel blank(s), and remove the blank(s). See Figure 2-6.

NOTE: When installing a PMC card, ensure that the O-ring type gasket near the bezel remains in place.

3 Install the PMC card(s) onto the bridge adapter by aligning the front of the card with the front bezel, and the rear of the card with the connectors and keying pin. See Figure 2-6. There are four screws that secure the PMC card from the bottom of the bridge adapter.

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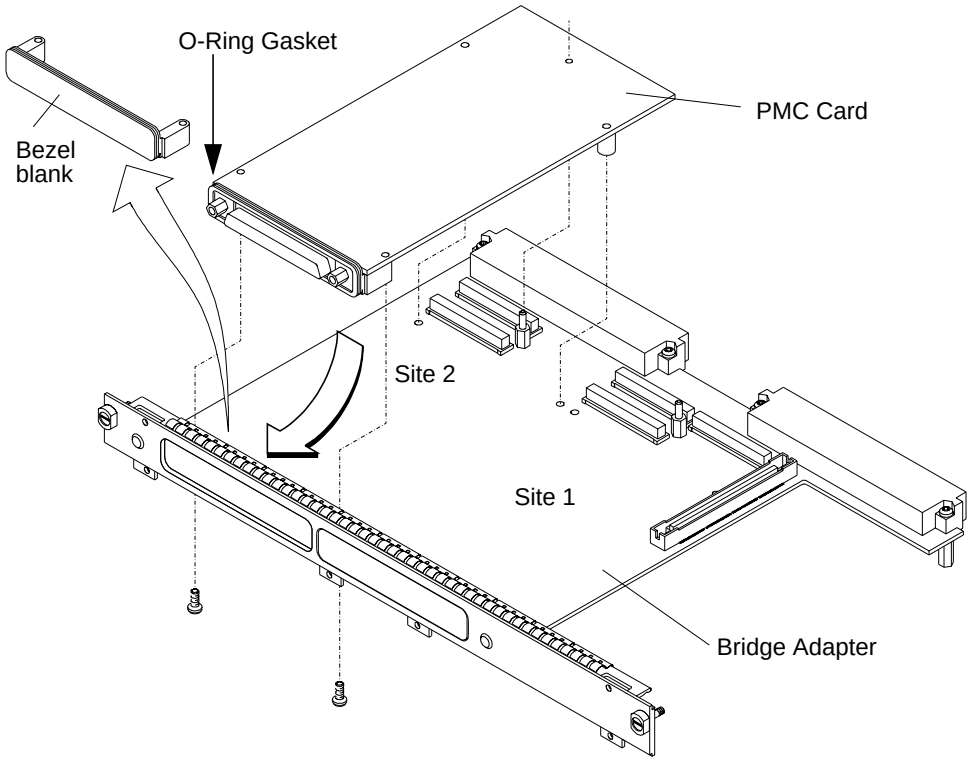


Figure 2-6 **Installing a PMC Card onto the Bridge Adapter**

If you are installing only the bridge adapter, go on to step 11. If you are also installing the expansion adapter, continue with step 4.

4 Refer to your PMC card installation manual, and set any configuration switches or jumpers that may be required for your application.

5 On the PMC expansion adapter, remove the bezel blank(s) from the sites where you will be installing the PMC card(s). See Figure 2-7.

NOTE: When installing a PMC card, ensure that the O-ring type gasket near the bezel remains in place.

6 Install PMC card(s) onto the expansion adapter by aligning the front of the card with the front bezel, and the rear of the card with the connectors and

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keying pin. See Figure 2-7.

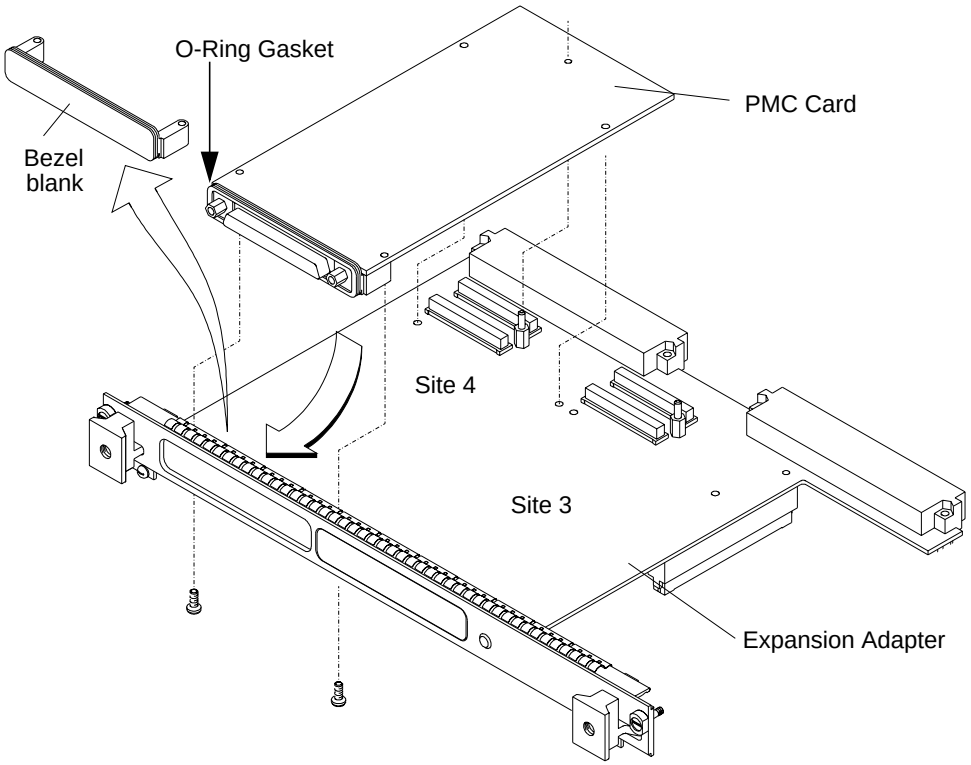


Figure 2-7 Installing a PMC Card onto the Expansion Adapter

7 The bridge adapter should NOT be assembled to the board computer. If it is, remove it by reversing the steps shown in Figure 2-10.

8 **Remove** the four screws from bridge adapter VME connectors, and replace them with the four standoffs included in the expansion adapter kit. See Figure 2-8.

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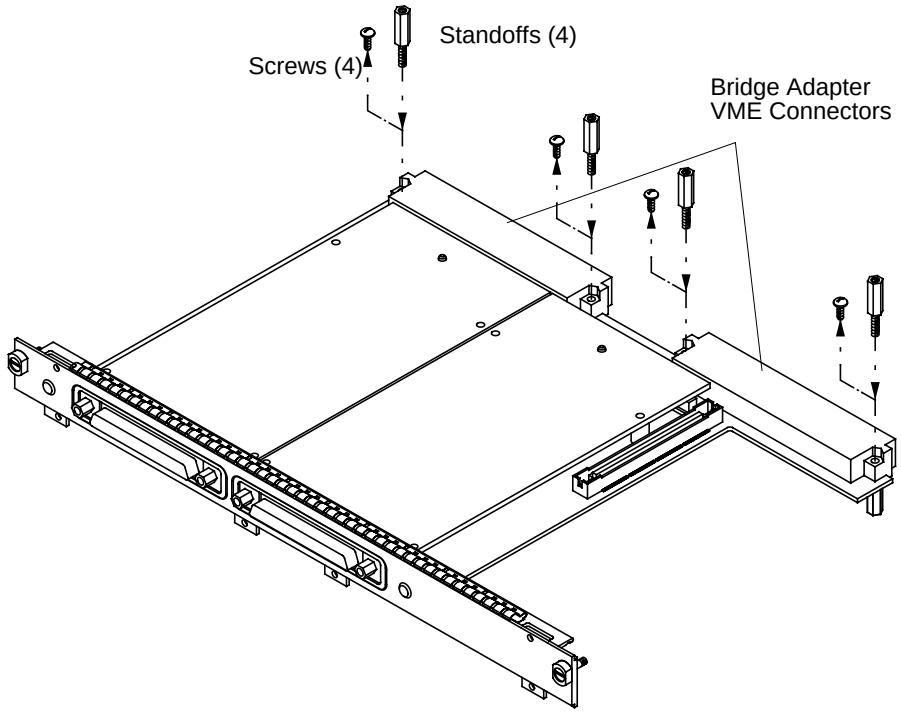


Figure 2-8 Removing Bridge Adapter Screws and EMI Gasket

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9 Making sure that the connector and bezels are properly aligned, install the PMC expansion adapter onto the bridge adapter, as shown in Figure 2-9. Ensure that the interboard connector seats properly by applying pressure to the top of the expansion board and to the bottom of the bridge board. There are two screws that secure the front bezel and four screws to secure the VMEbus connectors.

NOTE: If the interboard connector is not tightly seated, PMC cards on the expansion adapter will not operate.

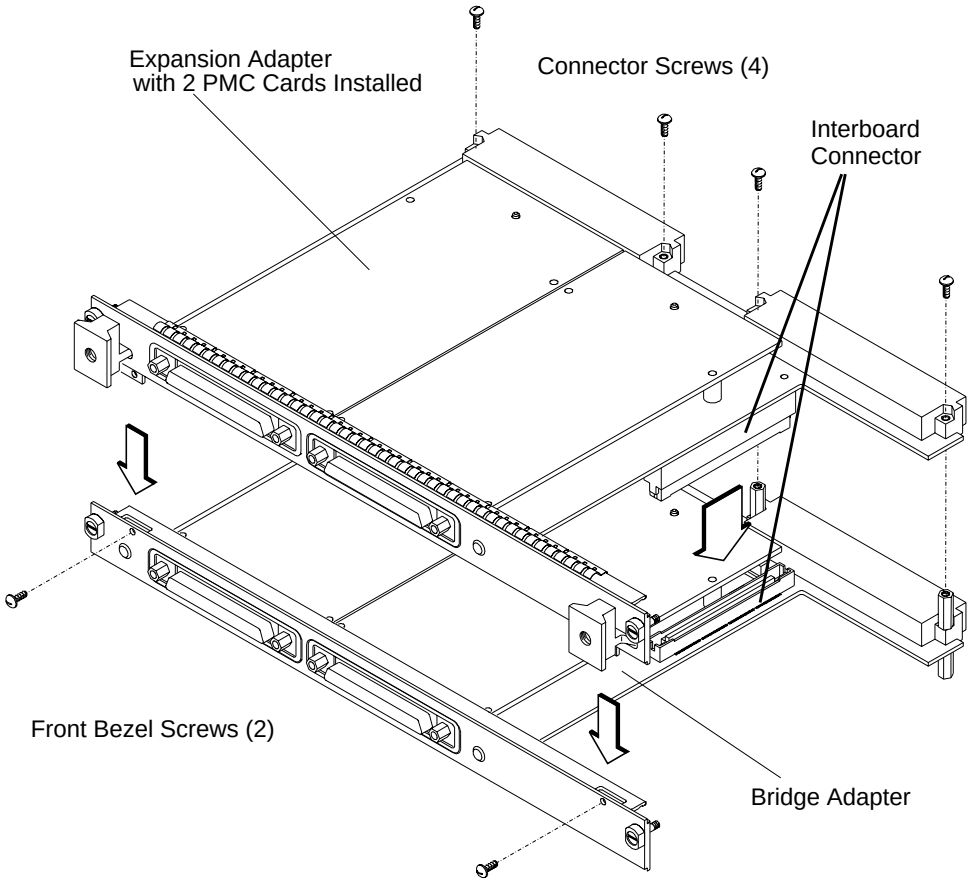


Figure 2-9 Installing the Expansion Adapter onto the Bridge Adapter

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10 Remove the EMI gaskets from the bezel of the board computer, if installed.

11 Install the PMC bridge adapter (as shown in Figure 2-10) or the bridge adapter with expansion adapter (as shown in Figure 2-11) onto the board computer. Align the GSC connector first, then the tabs on the front panel, and push the boards together. There are four screws that secure the front bezel, and four screws that secure the VME connectors.

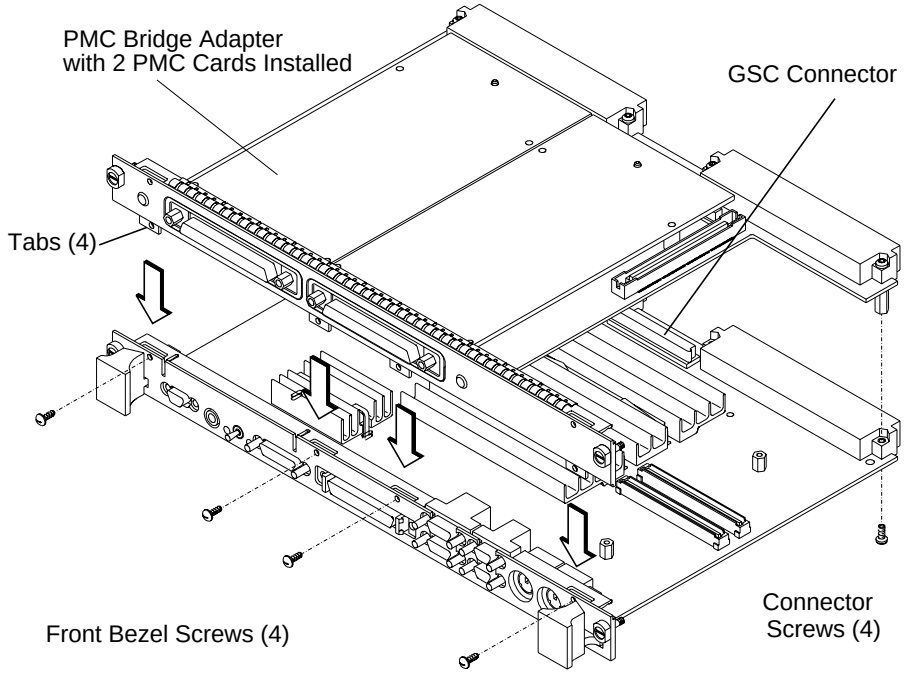


Figure 2-10 Installing the PMC Bridge Adapter onto the Board Computer

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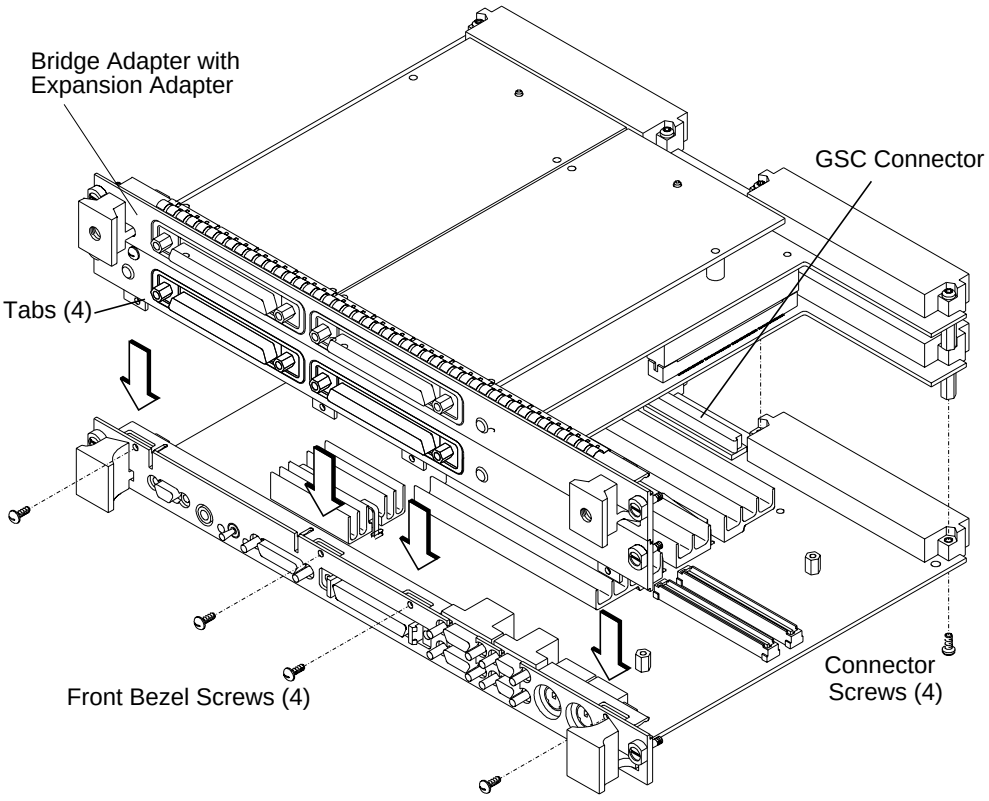


Figure 2-11 Installing the Bridge Adapter with the Expansion Adapter onto the Board Computer

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12 If you have installed a PMC expansion adapter, resulting in a three board assembly, we recommend that you install the ejector handle sleeves included in your kit.

a Remove the logo and model labels from the ejector handles on your board computer, as shown in Figure 2-12.

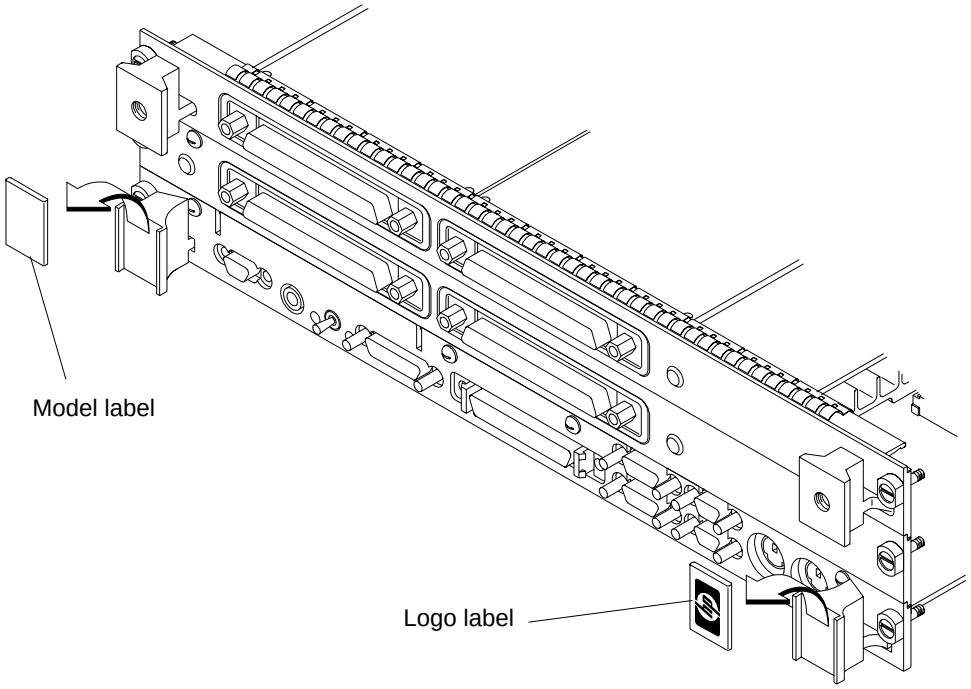


Figure 2-12 Removing Ejector Handle Labels

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b Slide the sleeves over each set of handles, as shown in Figure 2-13.

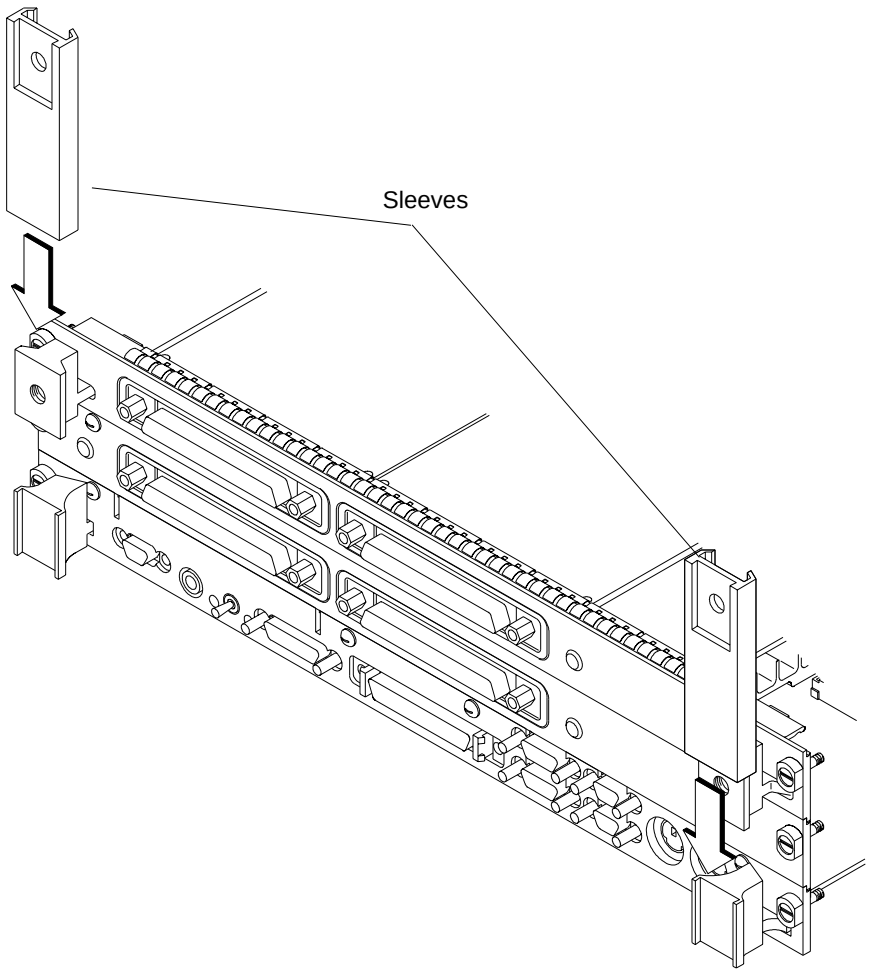


Figure 2-13 Installing Ejector Handle Sleeves

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c Thread the springs included in the kit into the ejector handles on the PMC expansion board, and with the springs compressed, slide the labels from the board computer into the sleeves, as shown in Figure 2-14.

NOTE: To properly identify the board computer model and manufacturer, we strongly advise that the original labels from the board computer be placed into the ejector handle sleeves.

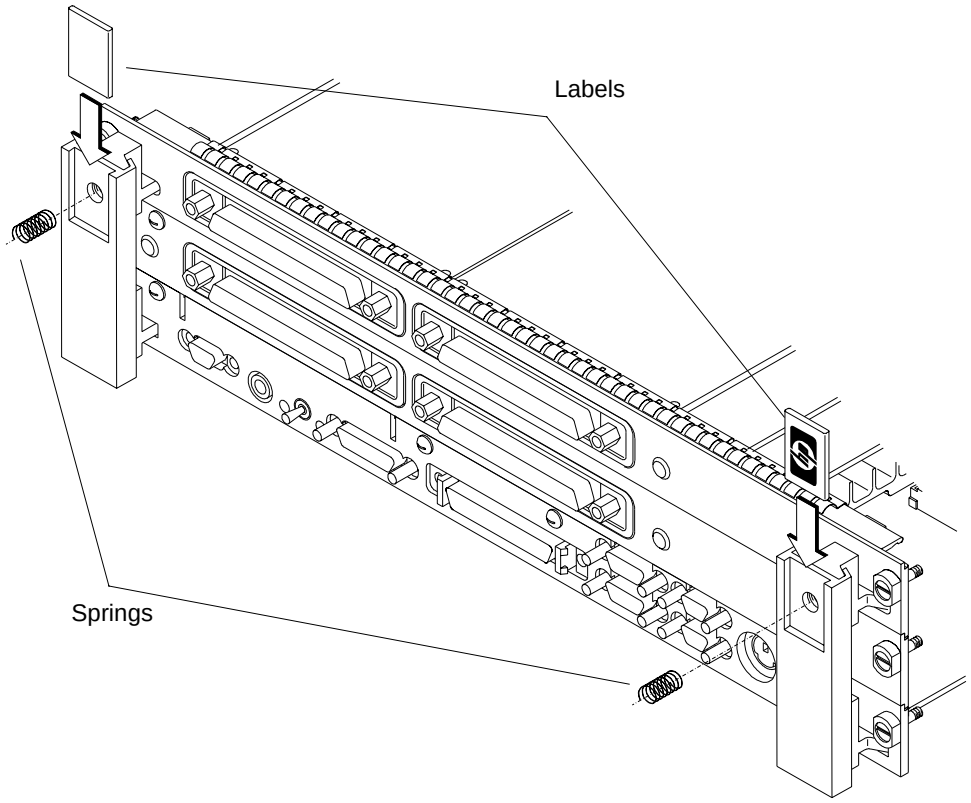


Figure 2-14 Installing the Springs and Labels

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13 Remove the VME slot cover plate(s) from the VME card cage, as required to open the slots the new assembly will occupy.

CAUTION: When installing the board computer and PMC adapter(s) into a Model 748 industrial workstation, to properly seat the assembly in the card cage you must push down slightly on the assembly for the last 2.5 cm (one inch) of travel in order to compress the EMI gasket on the card cage.

14 Insert the board computer with the attached PMC adapter(s) into card cage slots until the assembly seats properly and the front panels are flush against the card cage.

CAUTION: Do not tighten any captive screws until each captive screw has been started to be threaded into its hole.

15 Engage all captive screws before tightening each screw of the board computer and PMC adapter(s). See Figure 2-15.

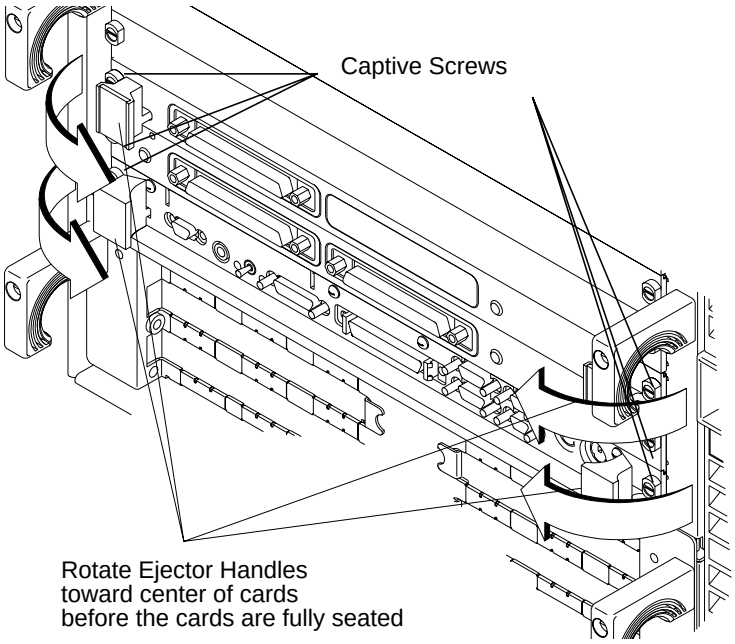


Figure 2-15 Installing the Board Computer with PMC into VMEbus Card Cage

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16 Plug in the power cord(s), and then turn on the power for the VME card cage and boot the operating system.

17 Log in as **root** and use the **SAM** utility to configure the HP-UX kernel for PCI support. (PMC cards require PCI drivers in the kernel.)

18 When SAM has started, choose the `Kernel Configuration ->` menu.

19 From the Kernel Configuration menu, choose `Drivers`

20 From the Drivers menu, select `GSCtoPCI Driver.`

21 Go to the `Actions` menu and select `Add Driver to Kernel.`

22 Go to the `Actions` menu and select `Create a New Kernel.`

23 When the new kernel is built, SAM asks if you want to move the kernel into place and reboot. Choose **Yes.**

The system reboots with the PCI driver loaded.

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PCMCIA

For information on installing a PCMCIA adapter and a flash disk card, see *HP Z5117A PCMCIA Adapter Installation and User's Guide*. (Z5117-90001)

NOTE: A Model 743*rt* cannot support both a PCMCIA adapter and an HCRX/VME graphics mezzanine card because of temperature restrictions.

PCMCIA is supported by HP-RT only.

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3

Typical Installation in a VME Card Cage

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This chapter describes the Model 743 system board and tells you how to install it.

The instructions in this chapter assume you are using either the HP-UX or HP-RT operating system.

The major sections within this chapter are:

- Configuring the VME card cage
- Keyboard and mouse
- Board computer installation
- Non-HP installation
- HP installation when Model 743 is not the primary CPU
- Board computer removal

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Configuring the VME Card Cage

This section provides step-by-step instructions for configuring the VME card cage.

Use Table 3-1 to help determine the configuration for the VME card cage, and use Table 3-2 to determine power requirements.

Table 3-1 Determining the VMEbus Card Cage Configuration

If your Model 743 Board Computer...	Then...
Has an HP A4262A Expansion Kit attached, and will be installed in an HP 9000 Series 700 Model 748 VME System	the Model 743 board computer must be installed in either: Slots 1 and 2; the bottom two slots Slots 3 and 4, or any other higher numbered slot pair See the Caution text
Is single-board configured	the VME card can be installed in any slot
Was removed from its VME card cage to change or add accessories	see “Board Computer Installation” on page 3-6.
Is going to be installed for the first time in a VME card cage	follow the step-by-step instructions below

CAUTION: In the Model 748 card cage, slots 1 and 2 are powered by the bottom power supply. Slots 3 through 8 are powered by the top power supply. A Model 743 with its expansion kit attached installed in slots 2 and 3 will cause the power supplies to shut down.

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Table 3-2 Power Requirements

Each Model 743 Board Computer	+5V dc Amps	+12V dc Amps	-12V dc Amps
If 64 MHz, current for +5V dc is 6.1A [1] If 100 MHz, current for +5V dc is 7.5A	_____	0.1A	0.1A
____RAM cards x 0.2A each =	_____		
Graphics subsystems [2] x 0.7A each =	_____		
FWD SCSI GSC card x 0.7A each =	_____		
HCRX graphics board 2.0A	_____		
PMC bridge adapter 0.6A	_____		
PMC cards on bridge adapter [3]	_____	_____	_____
Totals for Model 743 board computer	_____	_____	_____

1. Does not include on-board graphics, if installed.
2. On-board graphics and graphics accessory cards are each separate graphics subsystems.
3. PMC cards may also draw +3.3 current that is provided through the +5 on the bridge adapter. The **+3.3 current** FOR ALL PMC CARDS ON THE BRIDGE ADAPTER AND EXPANSION ADAPTER (do not include other expansion adapter currents) must be entered into the +5 column after multiplying the +3.3 current by .75 to convert to the actual +5 current draw.

1 Shut down your VME application and power-off the VME card cage.

If your VME card cage backplane is autoconfiguring, see “Board Computer Installation” in this chapter.

If not, refer to your VME card cage documentation for configuring its VME backplane. Go to Step 2.

2 Ensure the backplane IACK and Bus Grant (0, 1, 2, and 3) daisy-chains are:

- Enabled from the previous slot(s) into the slot in which the Model 743 board computer will be installed.
- Passed through all other empty backplane slots.

3 Set the backplane switches/jumpers to enable the board computer’s operation.

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Keyboard and Mouse

This section provides step-by-step instructions for connecting a keyboard and mouse to your Model 743.

1 Unpack your new keyboard and place it near your board computer.

2 Plug the keyboard cable connector into your board computer at the PS/2 connector labeled **PS/2 0 Kbd**.

NOTE: The keyboard must be connected to PS/2 0 to be operational.

3 Unpack your new mouse and locate the mouse's black rubber ball in the mouse box.

4 Remove the ball plate from the bottom of the mouse. Insert the ball and replace the ball plate.

5 Plug the mouse cable connector into your board computer at the PS/2 connector which is labelled **PS/2 1**.

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Board Computer Installation

Tools Required

Installing the board computer requires the following tools:

Table 3-3 Required Tools for Installation

Tool	Used For
Grounding wrist strap (supplied with the installation kit)	Preventing static discharge problems
No. 1 Pozidriv screwdriver	Attaching accessory cards
5 mm ($^{3}/_{16}$-inch) nutdriver	Attaching accessory cards
Light-duty flat-tipped screwdriver	Attaching accessory cards

Preliminary Requirements

Before you install the board computer into the VMEbus card cage, read the steps in “Configuring the VMEbus Card Cage,” earlier in this chapter.

Installing a Single VME Slot 743 into an HP Card Cage

Follow these steps to install the board computer into the VME card cage:

1. Position the board computer at the desired slot and slide it into the card cage until it seats properly and the Front Panel is flush against the card cage.
2. Push both ejector levers in until they are flush with the front panel.
3. Engage and tighten the captive screws (labeled 1 and 2 in Figure 3-1) at each end of the board computer. These screws hold the computer in the VME card cage.

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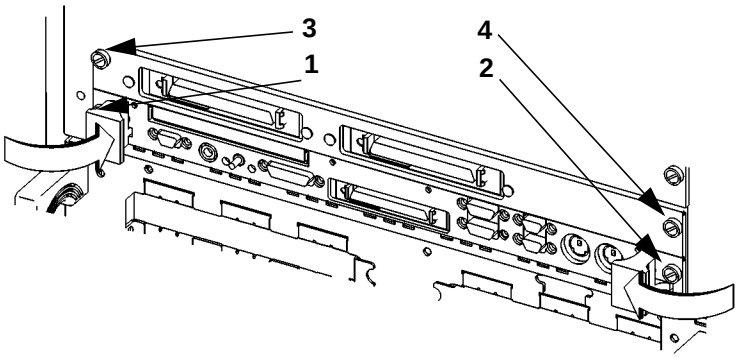


Figure 3-1 **Board Computer Captive Screws**

Installing a Dual-Slot Model 743

1 Put the board computer at the desired slot. Position and slide it into the card cage until it seats properly with the front panel and front panel extension flush against the card cage.

2 Engage all captive screws (labeled 1 and 2, 3 and 4, in Figure 3-1) before tightening each screw of the board computer and the extension panel(s).

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Non-HP Installation

CAUTION: The Model 743 board computer's P2 connector has a local bus on user-defined pins. Verify that your VME card cage backplane makes no connections to J2/P2, rows A and C.

Refer to Chapter 7 of IEEE STD 1014-1987 for more information on user-defined pins used in VME backplane connectors.

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HP Installation (Other than Primary CPU)

The Model 743 board computer's P2 connector has a local bus on user-defined pins. The VME slot used by the Model 743 must make no connections to J2/P2, rows A and C.

Refer to Chapter 7 of IEEE STD 1014-1987 for more information on user-defined pins in VME backplane connectors.

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Model 743 Removal

Tools Required

Model 743 removal requires the following tools:

Tool	Used For
Static grounding wrist strap	Preventing static discharge problems
Light-duty flat-tipped screwdriver	Loosening card cage screws

Preliminary Requirements

Perform the following procedure before you remove the board computer from the VME card cage:

1 Read the steps in “Turning Off the System,” in Chapter 5.

Removing a Model 743

Follow these steps to remove the Model 743 from a VME card cage:

1 Loosen the captive screws at each end of the board computer that hold the computer in the VME card cage (in Figure 3-1, the screws are labeled 1 and 2 for a single slot board computer, or 1 through 4 for a dual slot board computer).

2 Pull both ejector levers out until the board ejects from the card cage.

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4

Connecting Cables

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This chapter describes the various cable connections you will make when installing the Model 743 board computer.

The instructions in this chapter assume you are using either the HP-UX or HP-RT operating system.

The major sections within this chapter are:

- Connecting a single monitor, multi-display system, or text-only terminal
- Audio connection
- Video connection
- Keyboard and mouse connections
- Network connection
- Printer connection
- SCSI connection

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Introduction

This chapter discusses connecting cables to one of the following ports on your Model 743 Board Computer from a peripheral or accessory:

- Text terminal (RS-232) connection
- An audio connection
- A video (graphics circuit) connection
- A keyboard or mouse (PS/2 ports) connection
- A network (AUI LAN) connection
- Printer (HP parallel and RS-232-C) connections
- A SCSI port connection

Figure 4-1 shows the front panel connectors for the Model 743.

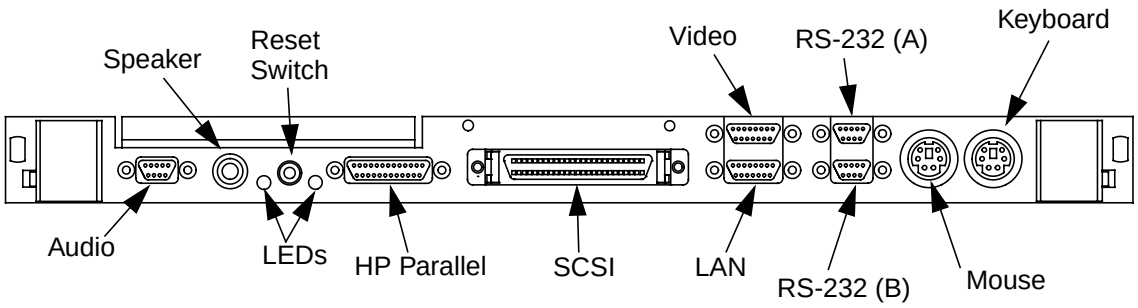


Figure 4-1 Model 743 Front Panel Connectors

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Connecting a Single Monitor, Multi-Display System, or Text-Only Terminal

The Model 743 typically uses one of two types of display:

- CRT-based color monitor connected to a video port
- Terminal connected to a serial port

Depending on your operating system, the Model 743 supports a maximum of three monitors at the same time. For more information on connecting multiple monitors to your Model 743, see Multi-Display Systems later in this chapter. (HP-RT supports only one monitor at a time.)

Configuration Requirements

This section provides information on configuration requirements and step-by-step instructions for connecting one or more display devices to your Model 743 board computer.

Monitors

If your board computer does not have on-board graphics, it must first have at least one of these accessories installed:

- HP A4262A GSC Expansion Kit and an HP A4267A 8-Plane Color Graphics Card
- HCRX Graphics Board

For instructions on installing a GSC Expansion Kit and Graphics Card, or an HCRX Graphics board, refer to Chapter 2 of this guide.

NOTE: Monitors are supplied with a video cable. Use this cable either directly or with the conversion video cable, depending on what graphics capability you have installed.

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Table 4-1 lists the video conversion cables required to connect a monitor to a video connector.

Table 4-1 Monitor Conversion Cables Required

Graphics Type	Cable Type from Monitor	
	Standard 15-pin connector	EVC connector
On-board graphics	A4304A	A4305A
GSC mezzanine card	None	A4167A
HCRX graphics	A4304A	A4305A

Multi-Display Systems

HP-UX 10.10 and later supports up to three monitors simultaneously. To have more than one display on your system, you must have multiple graphics capability installed. Four architectures support multi-display systems:

- On-board graphics and an expansion kit with one or two GSC graphics cards installed (one, two, or three displays).
- On-board graphics and an HCRX board with or without a GSC graphics card installed (one, two, or three displays).
- No on-board graphics and an expansion kit with one or two GSC graphics cards installed (one or two displays).
- No on-board graphics and an HCRX graphics board with a GSC graphics card installed (one or two displays).

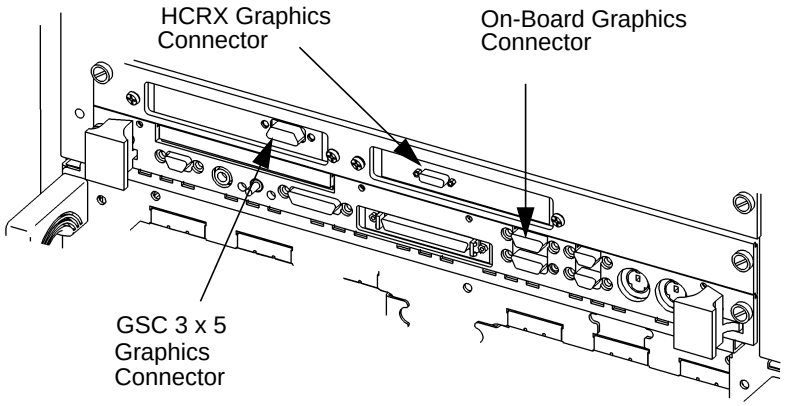
See the *Graphics Administration Guide* (B2355-90109) for more information about setting up multiple displays.

Connecting the Monitor

This section provides step-by-step instructions for connecting a monitor to your Model 743 Board Computer with on-board graphics, HCRX graphics, or GSC graphics. Refer to Figure 4-2 for help when connecting your monitor.

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CAUTION: Some CRT-based monitors are heavy. Use caution when lifting and unpacking the monitor.



Note: On-board and HCRX connectors require conversion cable.

Figure 4-2 Connecting a Monitor to HCRX, GSC, or On-Board Video Connector

1 On-board graphics and HCRX board:

a Plug the small connector of the conversion video cable into the video connector of your board computer, or the connector on your HCRX board.

b Connect the monitor cable to the conversion cable.

c Connect the monitor cable to your monitor as follows:

- Red to R (RED)
- Green to G (GREEN)
- Blue to B (BLUE)

2 GSC graphics cards:

a Connect the monitor cable to the GSC card connector.

b Connect the other end of the cable to the monitor as specified in the previous step.

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Power Cord

If your monitor has an attached power cord, connect the plug to a power source. If your monitor has a separate cord, connect the cord to the monitor, then connect the plug to a power source.

WARNING: **Do not connect your monitor to a power extension strip. Doing so can cause a shock hazard.**

NOTE: Do not turn on your monitor at this time.

Connecting a Terminal

This section provides step-by-step instructions for connecting a terminal to your Model 743 Board Computer. Refer to Figure 4-3.

1 Using the HP A4301A conversion RS-232C Cable, plug its micro-miniature connector to one of the RS-232 connectors as follows:

- The recommended port for connecting a terminal is the (A) port.
- Using the (B) port for terminal connection is not recommended.

NOTE: Use of the (B) port requires that VME Services software be installed in the kernel under HP-UX. The (B) port *is not* supported during “cold installs” of HP-UX because VME Services is not installed in the “install kernel”.

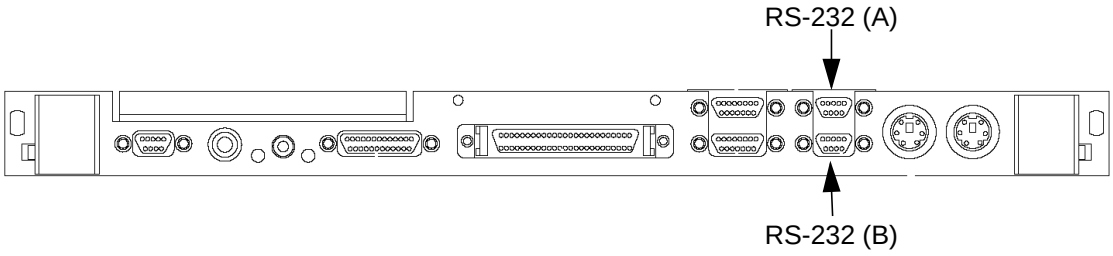


Figure 4-3 **Connecting a Terminal to the RS-232 Ports**

2 Plug the standard end of the conversion cable into the appropriate connector of RS-232 serial cable HP 24525G.

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3 Plug the other end of the serial cable into the serial connector on the terminal.

Once you have connected and powered on your terminal and board computer, you may need to reconfigure your board computer for the terminal to be the console (see Appendix A).

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Audio Connection

Model 743 Board Computers provide compact disc-quality audio input and output in stereo with a 16-bit coder-decoder (CODEC) over a frequency range of 25-20,000 Hz. Output is provided by a small internal speaker and a stereo headphone mini-plug (8 ohms impedance). Input is provided by a stereo line-in and mono microphone mini-plugs.

The CODEC combines CD quality stereo A/D converters for microphone and line input levels. D/A converters for driving headset and line outputs are used. The input sampling rate and format are programmable, as are the input gain control (used for software control of recording levels) and output attenuation.

A $^{1}/_{8}$-inch mini-jack is used for the speaker out connection. The other audio signals are on a 9-pin micro D-sub connector. The output is capable of driving 8 ohms; it can also be used for higher impedance devices with little or no additional distortion. A line-level input can be driven by the headset output.

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Table 4-2 lists the audio specifications, Figure 4-4 shows the audio connector, and Table 4-3 shows the audio connector pinouts.

.

Table 4-2 Audio Specifications

Function	Range
Headphone maximum output level	2.75 V pp at 50 ohms
Input sensitivity	Line in, 2.0 V pp at 47 K ohms microphone, 22 mV at 1 K ohm
Programmable input gain	0 to 22.5 dB in 1.5 dB steps
Programmable output attenuation	0 to 96 dB in 1.5 dB steps
Programmable rates	8, 11.025, 16, 22.05, 32, 44.1, 48 KHz
Signal to noise ratio	Headphone, 61 dB Line in, 61 dB Microphone, 57 dB

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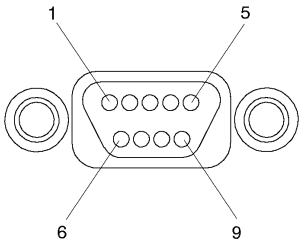


Figure 4-4 Audio Connector

Table 4-3 Audio Connector Pinouts

Pin Number	Signal
1	Mic GND
2	Line-in left
3	Line-in right
4	Headset right
5	Headset left
6	Mic-in A
7	Mic-in B
8	Line-in GND
9	Headset GND

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Video Connection

Model 743 Board Computers with on-board graphics circuit have the display RAM and can be configured for several types of monitors. Graphic monitors connect to the 15-pin video connector. Figure 4-5 shows the video connector, and Table 4-4 shows the video connector pinouts.

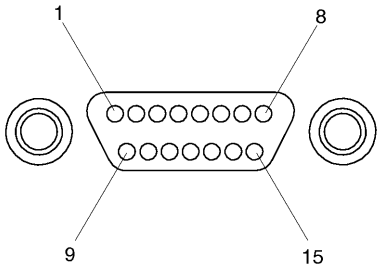


Figure 4-5 Video Connector

Table 4-4 Video Connector Pins and Signals

Pin Number	Signal	Pin Number	Signal
1	DDC	9	GND
2	GND	10	HSYNC
3	RED	11	+5V
4	GND	12	GND
5	GREEN	13	SSYNC
6	GND	14	GNC
7	BLUE	15	VSYNC
8	GND		

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Keyboard and Mouse Connections

There are two PS/2 style serial ports: one PS/2 keyboard port and one PS/2 mouse port. In the Boot Console Handler's hardware menu, they are listed as PS/0 and PS/1. Figure 4-6 shows the PS/2 connector. Also refer to Figure 4-1; the two ports on the right, labeled Mouse and Keyboard.

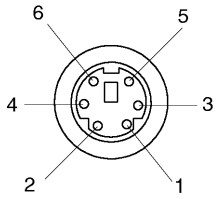


Figure 4-6 PS/2 Connector

Table 4-5 shows the PS/2 connector pinouts.

Table 4-5 PS/2 Connector Pinouts

Pin Number	Signal
1	Data
2	Not used
3	GND
4	+5
5	Clock
6	Not used

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Network Connection

LAN circuits use the Ethernet/IEEE 802.3 standard interface. Only the Attachment Unit Interface (AUI) version is used; no BNC connector is provided for ThinLAN. Figure 4-7 shows the AUI LAN connector. Also refer to Figure 4-1.

The AUI connector enables connections to an external MAU.

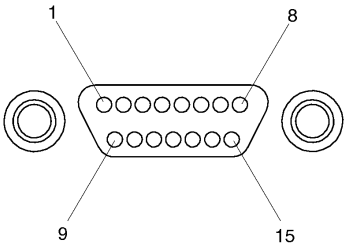


Figure 4-7 AUI LAN Connector

Table 4-6 shows the AUI LAN connector pinouts.

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Table 4-6 AUI LAN Connector Pinouts

Pin Number	Signal
1	GND
2	CI-A
3	DO-A
4	DI-S (GND)
5	DI-A
6	GND
7	CO-A (NC)
8	CO-S (NC)
9	CI-B
10	DO-B
11	DO-S (GND)
12	DI-B
13	+12V
14	GND
15	CO-B (NC)

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Printer Connections

Preparing for HP-UX Installation

You may have to do some configuration for appropriate data interchange with a new printer. This section gives you general guidance for these tasks.

You can use SAM (System Administration Manager) procedures to make your printer installation easier. SAM can determine the status of any of your connected devices and performs the necessary software installation of the printer for you.

If you don't want to use SAM to install the printer, or if SAM is not on your system, you can use HP-UX commands directly to accomplish the same tasks. For information on using manual system administration procedures, see *HP-UX System Administration Tasks*.

Configuring HP-UX for a Printer

You will need to supply certain items of information needed to identify the printer you are installing. It will help to have this reference information available during the software installation process. In the following checklist, fill in the items relevant to your printer:

Printer Interface

- Parallel:_____
- Serial (RS-232C) (Port A):_____
- Serial (RS-232C) (Port B): _____
- Printer Name (a name the system uses to identify the printer. It can be any name.):_____
- Printer Model Number (located on a label on the back of the printer):_____

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Printer Cables

For connection to the board computer high-density parallel port, depending on what printer you have and whether you select parallel or serial data exchange, you will need to select from the following:

- HP A4300A (HP Parallel): high-density 25-pin to standard 25-pin “F”
- HP A4301A (Serial): 9-pin high density to standard 9-pin “M”

Other standard cables may be required, depending on the selected printer.

Installation Procedure

Follow these steps to install your printer:

1 Log in as **root**. If you do not know how, or do not have permission to log in as root, ask your system administrator for help.

2 Run SAM by typing the following command:

/usr/sbin/sam Enter

If you need help using SAM, press the **F1** key to obtain context-sensitive information for the object at the location of the cursor.

Use the arrow keys and **Tab** to move the highlighted areas around the screen. Press **Enter** to “choose” an item when illuminated (such as OK).

3 At the SAM opening screen, choose the following:

```
Printers and Plotters
```

4 Choose **`Printers/Plotters`** from the next screen.

The system displays a message if there are no printers connected to your system. Make sure you have a printer connected. Choose **OK** or press **Enter**.

5 From the **`Actions`** menu (on the menu bar at the top of the screen), choose the following:

```
Add Local Printer/Plotter
```


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6 Choose an appropriate selection on the sub-menu giving options for Parallel, Serial, HP-IB, and so on.

A screen provides you with the information on available parallel or serial interfaces.

7 If you chose **`Add Serial (RS-232C) Printer/Plotter`**, more than one serial interface could be listed. The serial interfaces are listed in ascending order. The lowest-numbered serial interface corresponds to the lowest-numbered serial connector on your system. Choose the one to which your printer is connected.

8 Choose **OK**.

A display opens for **`Add Local Printer/Plotter`**.

9 Choose the box labeled **`Printer Name`** and enter your printer name for the new printer (see Printer Interface, earlier in this chapter).

10 Choose **`Printer/Model Interface`**.

11 Use the arrow keys to scroll down the next screen. Find the Model Name of your printer. Choose **OK** or press **Enter** when your printer is highlighted.

12 In the **`Add Local Printer/Plotter`** display, select and choose the box labeled:

```
Make this the system default printer
```

13 Choose **OK**.

14 If the print spooler was not previously running, a screen appears with the question: **`Do you want to start the print spooler now?`** Choose **Yes** or press **Enter**.

15 The system displays a confirmation screen asking if your printer is turned on, connected to your system, and online. Check your printer to ensure that it is ready, and press **Enter**.

16 The system displays the message **`Task completed`**. Press **Enter**.

17 Exit the task and press the **Exit SAM** function key.

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18 Enter the following to exit root and return to user status:

exit **Enter**

Refer to *System Administration Tasks* for additional SAM information.

Testing the Printer Installation

If you made your printer the default system printer, type the following commands to test it:

cd **Enter**

lp .profile **Enter**

If your printer (called printername) is not listed as the default system printer, enter the following command to test it:

lp -d*printername* **.profile** **Enter**

The file named **.profile** should print out on your new printer.

NOTE: For information on printer-related problems, see Chapter 6 of this book.

HP Parallel

The parallel port is compatible with Centronics® standards, plus some additional features found in HP Series 700 workstations. It supports a bi-directional register model interface in addition to printer-only DMA. Series 700 Scanjet interfaces are not supported.

A high-density micro D-sub connector is used for the HP Parallel interface. An HP A4300A conversion cable is required to convert to a standard PC compatible 25-pin female D-sub cable.

Figure 4-8 shows the HP parallel connector. Also refer to Figure 4-1.

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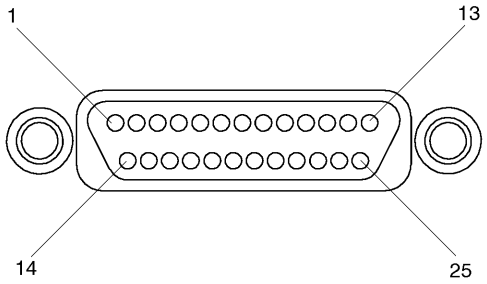


Figure 4-8 HP Parallel Connector

Table 4-7 shows the connector pinouts for the HP parallel connector.

Table 4-7 HP Parallel Connector Pinouts

Pin Number	Signal	Pin Number	Signal	Pin Number	Signal
1	NSTROBE	10	NACK	19	GND
2	Data 0	11	BUSY	20	GND
3	Data 1	12	PE	21	GND
4	Data 2	13	SLCT	22	GND
5	Data 3	14	NAFD	23	GND
6	Data 4	15	NERROR	24	GND
7	Data 5	16	NINIT	25	GND
8	Data 6	17	NSCT IN		
9	Data 7	18	GND		

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RS-232 Ports

There are two PS/2 type serial interfaces - Port A and Port B. The serial ports use a high-density connector. An HP A4301A conversion cable is required to convert to a standard PC-compatible 9-pin male D-sub cable. Figure 4-9 shows the RS-232 serial connector. Also refer to Figure 4-1. Table 4-8 shows the RS-232-C connector pinouts.

NOTE: The RS-232 Port B is not functional until VME services are operational.

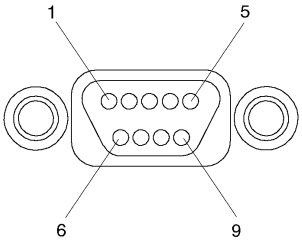


Figure 4-9 RS-232 Serial Connector

Table 4-8 RS-232-C Connector Pinouts

Pin Number	Signal
1	DCD
2	RXD
3	TXD
4	DTR
5	GND
6	DSR
7	RTS
8	CTS
9	RI

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SCSI Connection

The built-in SE SCSI port is implemented using an NCR710 macrocell inside the I/O ASIC chip. This 8-bit single-ended implementation is compatible with the current Series 700 products and supports 5 MB/sec data transfer rates.

The SCSI bus is terminated to 3.3 volts through 127 Ohms on the system board. If the board computer is used in a VMEbus chassis having internal mass storage devices, those devices must have their terminators removed. If an external disk drive is used, an active terminator must be used on the last drive's uncabled connector.

Figure 4-10 shows the SCSI connector.

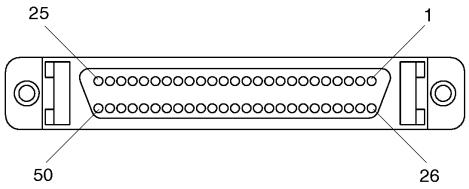


Figure 4-10 SCSI Connector

Table 4-9 shows the SCSI connector pinouts.

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Table 4-9 SCSI Connector Pinouts

Pin Number	Signal	Pin Number	Signal	Pin Number	Signal
1	GND	21	GND	41	ATN
2	GND	22	GND	42	GND
3	GND	23	GND	43	BSY
4	GND	24	GND	44	ACK
5	GND	25	GND	45	RST
6	GND	26	DATA 0	46	MSG
7	GND	27	DATA 1	47	SEL
8	GND	28	DATA 2	48	CD
9	GND	29	DATA 3	49	REQ
10	GND	30	DATA 4	50	IO
11	GND	31	DATA 5		
12	GND	32	DATA 6		
13	NC	33	DATA 7		
14	GND	34	Data Parity		
15	GND	35	GND		
16	GND	36	GND		
17	GND	37	GND		
18	GND	38	+5		
19	GND	39	GND		
20	GND	40	GND		

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5

Powering On and Off

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This chapter discusses how to turn on and turn off the system.

The instructions in this chapter assume you are using the HP-UX or HP-RT operating system.

The major sections within this chapter are:

- Turning on the system
- Turning off the system

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Turning On the System

To turn on the system, perform the following, with all peripheral devices turned off:

1. Turn on the power to your display. The power indicator LED on the display unit shows that it is turned on, even if the screen remains dark. Make sure of the following:
   - The appropriate LAN connection has been made to the Model 743.
   - If you use a remote graphical display host connected via LAN, make sure the remote system is configured to host the board computer. Normally, you will use a character terminal connected to the RS-232C (Port A), on the board computer.
2. Check the SCSI connections and power on any peripheral devices.
3. Turn on the VME card cage. Your Model 743 system turns on with the VMEbus card cage that it is plugged into.

NOTE: If your Model 743 does not have on-board or supplementary graphics, the default console display is available through the RS-232C (Port A).

If there is a problem arising from the console path having been changed, you can boot your Model 743 to display on any console device. See “Configuring the Console Path and Display Format” in Appendix A.

The green LED (on the right) on the panel blinks slowly until HP-UX is booted; then remains *on*. The red LED (on the left) will be *on* when power is activated and before HP-UX boots. After VME Services is booted, the red light is off.

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The following steps apply to HP-UX only. See *HP-RT System Administration Tasks* for information on configuring and booting an HP-RT system.

4 The system displays a sequence of boot messages. The Model 743*i* boots from the host system unless it has its own external disk or another LAN-configured system from which to boot. See Appendix A for configuring an automatic boot selection. Otherwise, allow the boot to continue.

5 During the boot process, a new system displays messages prompting you for the host name, IP number, and time zone. If you have this information, enter it as requested. Otherwise, press **Enter**.

You can also enter or update this information later by typing the following after you login:

set_parms initial Enter

The information is as follows:

a The time zone where your system is located.

b The host name for your system; any alphanumeric, single-word name with eight or fewer characters.

c The network address number, also called an IP number, for your system. This consists of four address fields separated by periods: for example, *255.32.3.10*. You may need to consult with your system administrator for this information. Or, if your host name and IP number have already been assigned, you can find out the host name, after boot, by entering **uname -a**. If you know your host name, you can determine your IP number by entering **nslookup *host_name***, at the system prompt.

6 The system prompts your to set a root password at this time.

The system completes the boot sequence and displays the following prompt:

```
Console login:
```


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Turning Off the System

This section provides step-by-step instructions for powering down your Model 743.

CAUTION: If you have a local disk attached to the Model 743, do not turn off power to the system without first shutting down the operating system software according to the following procedure. Turning off the power for your system without first doing the shutdown procedure may result in damage to data on your disk. Always execute the shut-down process to completion first.

1 Exit all processes currently running.

2 Enter the following command at the shell prompt:

reboot -h

This gives a zero-length "grace period" before the system goes down to the halted state.

3 After completing several shutdown procedures, the system eventually displays one of the following messages:

HP-UX Message

```
Halted, you may now cycle power.
```

HP-RT Message

```
**** HP-RT OS is down ****
Halting (in tight loop) -- OK To Hit Reset Button
```

4 At this time the system no longer responds to keyboard input and you may turn off the power. Turning the system back on initiates the boot sequence (see Appendix A of this book).

If you want to shutdown and reboot an HP-UX system automatically, instead of the above procedure, simply enter the shutdown command with no options.

See the HP-UX *reboot* man page for various other options.

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Using SAM to Stop the HP-UX System

If you are using SAM, you might also want to use it to shut down your system.

CAUTION: If you are using a local disk with the Model 743, do not turn off power to your system without first shutting down the operating system software according to the following procedure. Turning off the power for your system without first doing the shutdown procedure may result in damage to data on your disk. Always execute the shutdown process to completion first.

Follow these steps to use SAM to shut down your system.

1 Log in as root and type the following command, followed by **Enter**:

/usr/bin/sam

2 Choose **`Routine Tasks`** from the opening menu.

3 Choose **`System Shutdown`**.

4 The system provides you with the following choices:

- Halt the system. All currently executing processes except those essential to the system are terminated. Then the system is halted.
- Reboot (restart) the system. The system is shut down and rebooted automatically.
- Go to **`Single User State`**. The system is put in single-user mode for administrative purposes such as backup or file system consistency checks.

5 Exit SAM using the appropriate function key.

Using the Command Line

For guidance on entering HP-UX commands and using the HP-UX file system, tools, and networking commands, see *Using HP-UX*. For more advanced work with shell programming, see *Shells: User's Guide*.

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6

Solving Problems

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This chapter provides information on troubleshooting various problems.

The instructions in this chapter assume you are using either the HP-UX or HP-RT operating systems.

The major sections within this chapter are:

- Interpreting the LEDs
- Managing a boot failure
- Printer problems

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Interpreting the LEDs

The Model 743 provides two LEDs, located to the left and right of the Reset switch, as shown in Figure 6-1.

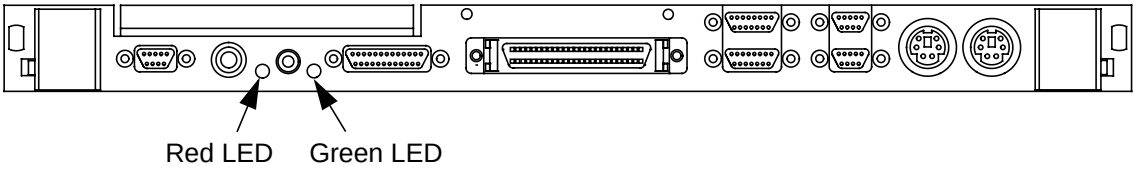


Figure 6-1 **Model 743 LED Location**

The indications for both HP-UX and HP-RT are as follows:

- When the system is booting or in configure mode, the green LED (right) on the front panel blinks slowly.
- When the system is running, the green LED is continuously on. A blinking green light indicates a failure.

The blink patterns occur in blink/second groups. Each blink pattern is repeated at one second intervals.

Table 6-1 provides more information on the red and green LEDs.

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Table 6-1 LED Indicators

SYSFAIL (Red)	POWER (Green)	Meaning	Possible Solution
Off	Off	No Power	Check for board seating in chassis.
On	2Hz Flash	Normal Power-on/self-test	
On	Off	Memory Failure	Troubleshoot for failed RAM card or problem with the RAM connection.
On	1 Flash/sec.	CPU (board) Failure	Replace the system board.
On	4 Flash/sec.	No console identified	Check the console search path and keyboard connections. If no problem is found, replace the system board.
On	On	OS is booted with VME services failure	Check the Operating System VME services. Check that VME services is configured in the kernel.
Off	On	OS is booted with VME services OK	

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Managing a Boot Failure

The boot program is located in the firmware of your Model 743. You can configure the behavior of the boot process by interacting with the Boot Console Handler (BCH). See Appendix A for procedures dealing with the boot console handler.

Problems during the first stage of the boot process are rare. If you have indications that the boot process has failed, check the following items:

- No power to the host system. Check the local circuit breakers and the power connections to your VMEbus chassis.
- Processor hardware failure.
- Interface card hardware failure.
- The Model 743 is not fully plugged into its VME slot.
- The LAN MAU connector is loose.
- The SCSI cable is not properly connected.

After checking these items, power off the VMEbus host system. Wait five or ten seconds and power on the system.

If the problem recurs, record the following information and report it to your HP service representative:

Symptoms

Status of the LED indicators

Messages that appear on your system console.

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Printer Problems

If you experience problems in printing, check the following:

- The power cord for the printer is plugged in.
- The printer is turned on.
- The printer selection switches are set for online.
- Paper is loaded into the printer (and it is not jammed).
- The correct interface has been set up.
- The printer cable is connected to the correct interface port on your printer.
- The cable is connected to the correct port on your system.

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A

The Boot Console Interface

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The Boot Console Interface

This appendix provides information about the Boot Console Handler (BCH) as well as step-by-step instructions for using the Boot Console Handler.

The instructions in this appendix assume you are using either the HP-UX or HP-RT operating system.

The major sections within this chapter are:

- The Boot Console Handler
- Using the Boot Console Handler interface
- Specifying a boot device
- Configuring the console path and display format
- Booting and resetting the Model 743
- Searching for bootable media
- Displaying and setting paths
- Displaying and setting the Fastboot Mode
- Displaying and setting the Secure Boot Mode
- Displaying the LAN station address
- System Configuration menu

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The Boot Console Handler

There are times when you want to interact directly with the hardware of your Model 743 before it boots an operating system. The system provides an EEPROM configuration interface, called the Boot Console Handler, which you can use before booting the operating system to display information, set paths, and set other system parameters even though the operating system is not running.

You can perform most of these tasks by selecting actions or data values from menus, or by using the default values programmed into the EEPROM at the factory.

Special Tasks

Listed below are the special tasks that you can perform using the boot console handler:

- Configure your system for different display protocols.
- Boot your system from any specified hardware device.
- Search for hardware devices that contain media from which your system can be booted.
- Configure the tests your system undergoes at boot.
- Get firmware (serial, LAN, and SCSI ports) and hardware information.
- Reset the system.
- Change or reconfigure the automatic operations the boot ROM code performs.

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Boot Console Information Display

Listed below is some of the information that the boot console handler can display:

- Settings and search order of the Boot Device paths
- Operating Mode
- ISL Mode (Automatic or Interactive)
- Hardware Information such as:

  Processor revision and frequency

  Memory RAM size

  Instruction and data cache size

  LAN interface address

  Board serial number

  VME controller revision.
- Module Revision Number for:

  RS-232

  LAN

  SCSI
- SCSI bus addresses
- VME Backplane Network configuration
- Primary and Secondary Boot Path configuration
- Console Path configuration

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Using the Boot Console Handler Interface

This section provides step-by-step instructions for using the boot handler interface.

1 Exit any applications you may have running and shut down your system.

2 Power-off the host system or VME card cage. Wait a few seconds, and turn the power back on.

3 To discontinue the auto boot process, press Esc at the following prompt:

```
System Search started ... Press [ESC] to discon-
tinue the Auto Boot process
```

The system displays the following message:

```
Auto Boot discontinued
```

The MAIN MENU is the first menu in the menu hierarchy.

```
==== MAIN MENU ================================

Key  Operation
---  ---------------------------------------

1  Boot From a Device
2  Path Configuration
3  Mode Configuration
4  Interactive Testing
5  Firmware Information
6  Hardware Information
7  System Configuration
.........................................
77  Reset the system
88  Change Mode
99  Restart Auto Boot
-----------------------------------------------
Press Key, then press [Enter/Return]
```

Table A-1 shows the key functions and operations that you can invoke from the Main Menu.

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Table A-1 Main Menu Options

Operation	Description
Boot From a Device	This menu lets you select a device from a list of present working devices in the current hardware configuration. The LAN interface lets other systems act as boot devices.
Path Configuration	The underlying menus show the devices currently specified For any of the device paths (primary boot, alternate boot, console or keyboard) choose a device to be remembered and used the next time the related search list is used. Paths are used to allow specific devices to be specified for use instead of just a device class. (See MODES).
Mode Configuration	The underlying menus lets you select a mode (see modes below) for use or change and save any of a mode's attributes.
Interactive Testing	This menu item lets you execute individual optional tests or enter the debug environment.
Firmware Information	This menu item lets you display the revision information of the main ROM and the names and revision numbers for all extension ROMs.
Hardware	This menu item lets you configure
Software Information	This menu item lets you display the revision information of the main ROM and the names and revision numbers for all extension ROMs.

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Specifying a Boot Device

This section provides information needed for specifying a boot device.

To display devices that can boot HP-UX, select the following from the Main Menu:

1 Boot From a Device

The system displays a list of boot device categories. The system configuration limits the devices from which the system can be booted:

```
==== BOOT DEVICE SELECT ======================

PRIMARY PATH  is  now [ SCSI.6.0 ]
ALTERNATE PATH is now [ SCSI.5.0 ]

Key  Operation
---  ---------------------------------------
  1  PCMCIA ATA 0
  2  PCMCIA ATA 1
  3  BPN
  4  LAN
  5  SCSI
  6  FWSCSI_1
  7  FWSCSI_2
  8  FWSCSI_3
  9  BPR
...  .......................................
  0  Previous Menu
 33  Effective ISL Mode  [ AUTOMATIC ]
 66  Auto Search for Boot Devices
 77  Reset the System
 88  Boot ALTERNATE PATH Device Now
 99  Boot PRIMARY PATH Device Now
-----------------------------------------------
Press Key, then press [Enter/Return] 0
```

If your Model 743 is a member of a cluster (a group of computers that share the file system of a host by means of a network connection), there may be no disks listed because your system has no disks directly attached to it.

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To determine which devices are available as boot devices, enter:

66 Enter

A list of devices similar to the following menu is displayed:

```
Scanning for Boot devices.  Please wait...


==== BOOT FROM DEVICE ========================

Key  Boot Device
---  ---------------------------------------
  1  LAN.15.20.92.249 INSTALL fibula
  2  LAN.15.20.93.16 INSTALL 15.20.93.16
  3  LAN.15.20.88.47 INSTALL 15.20.88.47
  4  LAN.15.20.88.100 INSTALL 15.20.88.100
  5  LAN.15.20.88.96 INSTALL 15.20.88.96
...  .......................................
  0  Previous Menu
 33  Effective ISL Mode  [ AUTOMATIC ]
 66  Rescan for Boot devices
 77  Reset the System
-----------------------------------------------
To boot from a device, Press Key, then press [Enter/
Return]
```

Otherwise, type a numerical choice from the menu, and press Enter. Your system proceeds to boot from the device you have just selected (if it is available).

To exit this menu without selecting a boot device, enter the following:

0 Enter

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Configuring the Console Path and Display Format

If you are using a terminal display connected to your Model 743 via an RS-232C port, the Console Path is set correctly by default: You do not need to set it. You can connect to either one of the serial ports, but Port A, by default, is the only serial port that delivers system diagnostics.

Setting the Display Format

NOTE: The RS-232C setting should always be 9600 Baud. Changing this setting may cause the terminal to display incorrectly.

If you disconnect or change your graphics display output hardware, it is possible that the console path and display format may not be configured properly. In this case you will need to be familiar with the following console search procedure to determine the configuration information for the current console.

Follow these steps to set the console path and display format:

1. Make sure the VMEbus host system power is off and the console (graphics monitor) is connected and turned on.
2. Hold the Rst/Abt front panel switch in the Abt (abort**)** position. This position is to the right.
3. Power-on the VMEbus host system and wait a few seconds.
4. Release the Abort switch.

   The system displays a message on your screen. The message repeats about every seven seconds using different font sizes and resolution.

   Depending on whether you are running graphics or a console terminal (RS-232C), one of the following message-types will appear:

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If you are using a terminal (RS-232C) display, the message prompts you to press Esc on the console keyboard, as follows:

```
Press ESC  to select this device as the CONSOLE
```

OR

If you are using a monitor (graphics) display, the message prompts you to enter a number, *N*, as follows:

```
Press N to select this CONSOLE, then press
[Enter/Return]
```

In either case, the action must be taken within about seven seconds in order to select the set of console display protocols which that particular screen represents. Press the indicated number key when the message displays clearly and is the font size you want.

In both cases, after you have indicated your selection, you will be asked to confirm the selection by the following prompt:

```
Press ESC to confirm
```

If you don't take any action, after seven seconds, the message cycles to the next set of display parameters, displaying the same message again.

If you take one of the actions (press Esc or type *N*) and confirm it by pressing Esc, the system then attempts to boot. To save this setting, discontinue the boot process by pressing Esc and setting the console path using the `Path Configuration` menu.

Setting the Console Path

If you are using a graphics display or if you are changing from graphics to a RS-232C display mode, you need to set the Console Path. Follow these steps to set the console path:

1 From the Main Menu**,** access the **`Console Path`** screen by entering the following:

2 Enter

The system displays the **`Path Configuration`** menu.

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```
==== PATH CONFIGURATION ======================

PRIMARY PATH  is  now [ SCSI.6.0 ]
ALTERNATE PATH is now [ LAN.090009-723333 ]
CONSOLE PATH  is  now [ RS-232 (A) ]
KEYBOARD PATH is now  [ PS/2 (0) ]

 Key  Operation
---  ----------------------------------------
1   Primary Boot Path
2   Alternate Boot Path
3   Console Path
4   Keyboard Path
...  ......................................
0   Previous Menu
77  Reset the System
-----------------------------------------------
Press Key, then press [Enter/Return]
```

2 From the **Path Configuration** menu, enter the following to select the **Console Path**:

3 Enter

The system displays a **Console Path** menu, similar to the following:

```
==== CONSOLE PATH ============================

CONSOLE PATH  is  now [ GRAPHICS 1 ]

Key  Device Path
---  ----------------------------------------
  1  GRAPHICS 1
  2  RS-232 (A)
  3  Null Device
  4  RS-232 (B)
...  ......................................
  0  Previous Menu
 66  Rescan for console devices
 77  Reset the System
-----------------------------------------------
To set the CONSOLE PATH, Press Key, then press
[Enter/Return]
```


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3 Enter the following to select the RS-232C, Port A, as the console path.

2 Enter

The system displays a menu for selecting the display format for the display mode you select.

4 For example, this screen indicates that your current console path is GRAPHICS 1. Type the number of this path. For this illustration, you would type "1 **Enter**."

5 For GRAPHICS 1, a screen similar to the following example appears, indicating the supported monitor types. In this example, the current monitor format is also indicated as Key 1, shown by the message at the top and the asterisk position:

```
==== CONSOLE PATH MONITOR TYPE ===============

CONSOLE PATH is [ GRAPHICS 1 ]  Type is Key 1

Key   Resolution   Hz   Style            Key   Resolution   Hz   Style
--- ------------------------------ --- ------------------------------
  1 * 1280 x 1024  72                 2   1024 x  768  75
  3   1024 x  768  70                 4   1024 x  768  75  Flat Panel
  5   1280 x 1024  60                 6   1024 x  768  60
  7    640 x  480  60                 8   1280 x 1024  75  VESA
  9   1024 x  768  75  VESA          10    800 x  600  75  VESA
 11    640 x  480  75  VESA          12   1280 x 1024  72
 13   1280 x 1024  50

Key  Operation
...  ........................................
 55  SAVE any changes  and goto  Previous Menu
---------------------------------------------
To select a Type, Press Key, then press [Enter/Return]
```

6 From this list, identify the set of parameters which describes your monitor. You can get this information from your HP-UX release notes (see Chapter 2). For a list of monitors supported on HP-RT, contact you HP Sales Response Center.

You can also invoke the console configuration process by accessing the **`Mode Configuration`** screen, then selecting the **Control Flags** submenu, enter **5 Enter**, and then selecting "8", Interactive Console Search. This gives you the same configuration opportunity at power-up.

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Booting and Resetting the Model 743

This section provides step-by-step instructions for booting and resetting the Model 743.

In case you do not want the usual automatic boot sequence to occur, you can load your operating system from a device that is different from your usual boot device. If your normal operating system kernel, or the disk on which it resides, becomes damaged or unusable, you may wish to boot from a different disk or perhaps another type of device, such as a DDS-format tape drive.

Follow these steps to boot from an alternate device:

1. At power-up, stop the Auto Boot process (if Auto Boot is configured) by pressing **Esc** at the following prompt:

   ```
   Press [ESC] to discontinue the Auto Boot process
   System Search started
   ```

2. From the Main Menu, select **`Boot From a Device`** by typing:

   1 Enter

   The system displays a list of bootable device categories.

3. To determine the list of bootable devices that are available, type:

   66 Enter

   The system displays a list of bootable devices.

4. Select a device or LAN path from the device list by entering its number. To exit from the Device Menu without making any changes, and to return to the previous menu, type the following:

   0 Enter

Also, the path of the desired bootable device can be entered directly for LAN, SCSI, BPN and BPR devices by selecting the appropriate submenu for that device category. For example, to boot directly from SCSI device 6 type the following from the `BOOT DEVICE SELECT` menu:

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```
5 Enter


==== BOOT SCSI DEVICE ========================

PRIMARY PATH  is  now [ SCSI.6.0 ]
ALTERNATE PATH is now [ SCSI.5.0 ]

CURRENT PATH  is  now [ SCSI.0.0 ]

Key  Parameter            Value
---  -------------------  --------------------
  1  ID                   0
  2  LUN                  0

Key  Operation
...  ......................................
  0  Previous Menu
 33  Effective ISL Mode  [ AUTOMATIC ]
 44  Set PRIMARY PATH to Current Device
 55  Set ALTERNATE PATH to Current Device
 77  Reset the System
 99  Boot This Device Now
---------------------------------------------
Press Key, then press [Enter/Return]
```

5 To enter the desired SCSI ID type:

```
1 Enter


Enter Device ID (valid range is 0..7):
```

```
6 Enter


This will change the CURRENT PATH to SCSI.6.0
```

6 To boot from this device type:

```
99 Enter
```


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In most boot console menus, you can enter the following to reset the system and return to the automatic boot process:

77 Enter

Resetting the System

The act of resetting your system causes it to restart completely. It is similar to turning the system off and then back on again.

Reset the system by pressing the Rst/Abt switch on the front panel of the Model 743 to the **Rst** (left) position.

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Searching for Bootable Media

The initial search conducted by the boot console handler locates devices that might contain bootable media.

Unless configured otherwise in the boot console handler, the ISL (Initial System Loader) automatically searches for bootable media.

Follow these steps to change to interactive use of the ISL:

1 From the Main Menu, enter the following to select **`Boot from a Device`**:

1 Enter

2 From the **`Boot From a Device`** menu, enter the following to select **`Effective ISL Mode`**.

33 Enter

In automatic mode, ISL searches all types of I/O devices in the default order for the operating mode (Test, OEM, or User), or in another order if you have so specified in the BOOT FROM DEVICE menu.

3 From the **`Boot From Device`** menu, enter the following to update the list of devices (re-search for devices). Any newly connected devices will be listed.

66 Enter

To back out of this action and return to the previous menu, type the following:

0 Enter

4 To return to the automatic boot process (with any new configurations in the list), enter:

77 Enter

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Displaying and Setting Paths

This section provides instructions for selecting the primary path, selecting an alternate path, and reordering the boot device list.

A path is the hardware address of a device that is attached to the I/O system of your system.

To display the current settings for the system paths, select **`Path Configuration`** from the Main Menu by typing the following:

2 Enter

A screen similar to the following appears:

```
==== PATH CONFIGURATION ======================

PRIMARY PATH  is  now [ SCSI.6.0 ]
ALTERNATE PATH is now [ LAN.080009-723333 ]
CONSOLE PATH  is  now [ GRAPHICS 1 ]
KEYBOARD PATH is  now [ PS/2 (0) ]

Key  Operation
---  ---------------------------------------
1  Primary Boot Path
2  Alternate Boot Path
3  Console Path
4  Keyboard Path
... .....................................
0  Previous Menu
77  Reset the System
-----------------------------------------------
Press Key, then press [Enter/Return]
```

Selecting the Primary Path

This section provides instructions for selecting the primary boot device path.

1 To reconfigure the primary boot device path, select **`Primary Boot Path`** from the **`Path Configuration`** menu by entering the following:

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1 **Enter**

The system displays the **Primary Path** information, as shown:

```
PRIMARY PATH  is  now [ SCSI.6.0 ]

Key  Device Path
---  ----------------------------------------
  1  SCSI.6.0 QUANTUM FIREBALL1050S
  2  SCSI.5.0 QUANTUM FIREBALL1050S
...  ........................................
  0  Previous Menu
 66  Rescan for Boot devices
 77  Reset the System
----------------------------------------------
To set the PRIMARY PATH, Press Key, then press
[Enter/Return]
```

2 Update the path by typing in a key number from the list that represents your selection of the path/device.

For example, if you want to configure the boot console to boot from LAN.080009-723456 as its primary selection, type **3** **Enter**. The following statement appears above the menu:

```
PRIMARY PATH  is  now [ LAN.080009-723456 ]
```

3 Press **0** **Enter** to go back to the **Path Configuration** menu which confirms the new selection:

```
==== PATH CONFIGURATION ======================

PRIMARY PATH  is  now [ LAN.080009-723456 ]
ALTERNATE PATH is now [ SCSI.6.0
CONSOLE PATH  is  now [ GRAPHICS 1 ]
KEYBOARD PATH is  now [ PS/2 (0) ]
```


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Selecting the Alternate Path

From the **`Path Configuration`** menu, enter the following to access the **`Alternate path`** menu:

2 **Enter**

Reordering the Search Control List

Follow these steps to reorder the list of boot devices.

1 From the Main Menu, select the **`Mode Configuration`** menu by entering the following:

3 **Enter**

The system displays the **`Mode Configuration`** menu as shown.

```
 ==== MODE CONFIGURATION ======================

Mode is now [ USER ]

Key  Edited  Mode Attribute Class
-----------------------------------------

1          Boot Search Control
2          Console Search Control
3          Keyboard Search Control
4          Test Configuration
5          Control Flags
...  ......................................
0  Previous Menu
44  Set Mode Default Values
77  Reset the System
88  Change Mode
-----------------------------------------------
To edit Mode Attributes, press Key, then press
[Enter/Return]
```

2 From the **`Mode Configuration`** menu, select **`Console Search Control`** by entering:

2 **Enter**

The system displays the **`Console Search Control`** menu shown below. This menu has two lists, the Search Order list and the Available Modules list. You can swap items back and forth between these two lists.

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```
==== CONSOLE SEARCH CONTROL ==================
Now editing mode [ USER ] and has been edited.

Key  Search Order List
---  ---------------------------------------
  1  CONSOLE PATH
  2  GRAPHICS 1
  3  GRAPHICS 2
  4  RS-232 (A)
  5  RS-232 (B)

     Available Modules
---  ---------------------------------------
  6  Null device
  7  GRAPHICS 4
  8  GRAPHICS 3
...  .......................................
  0  Previous Menu
-----------------------------------------------
To change Search Order List, Press Key, then press
[Enter/Return]
```

3 Manipulate the order of the Search Order List by pressing the associated key (for example, **5** **Enter** for the RS232 (B) item) to move that item to the Available Module list.

Press the same key again to place that list item at the end of the Search Order List.

By removing devices to the Available Modules list or replacing them to the Search Order list by selecting numbers from Available Modules, you can manipulate the order of the Search Order as you like.

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Displaying and Setting the Fastboot Mode

This section provides instructions for displaying and setting the fastboot mode using the Mode Configuration menu.

When fastboot is enabled, your system does a quick check of the memory during its power-on self tests. This enables the system to complete its boot process more quickly. When fastboot is disabled, more extensive memory testing is performed during the self tests causing the boot process to take significantly longer.

If your system has a large amount of memory installed, the power-on tests may take several minutes to complete with fastboot set to off.

Follow these steps to display and set the fastboot mode on your Model 743:

1 From the Main Menu, select **`Mode Configuration`** by entering:

3 Enter

The system displays the **`Mode Configuration`** menu, as shown.

```
==== MODE CONFIGURATION ======================

Mode is now [ USER ]

Key  Edited  Mode Attribute Class
---     ---------------------------------------
1          Boot Search Control
2          Console Search Control
3          Keyboard Search Control
4          Test Configuration
5          Control Flags
...  .....................................
0   Previous Menu
44  Set Mode Default Values
77  Reset the System
88  Change Mode
-----------------------------------------------
To edit Mode Attributes, press Key, then press
[Enter/Return]
```


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2 From the **Mode Configuration** menu, select **Control Flags** by entering **5** **Enter.** Table A-2 lists the menu items and describes their meaning.

The system displays the **General Control** menu, as shown.

```
==== CONTROL FLAGS ========================

Now editing Mode [ USER ]

Key  Set   Flag Description
---  ----------------------------------------

1    NO     Fast Boot
2    NO     Secure Mode
3    YES    Auto Boot Select
4    NO     Diagnostics to RS-232 (A)
5    NO     Error Logging
6    NO     Interactive ISL
7    NO     Repeat Scan for AutoBoot Devices
8    NO     Interactive Console Search
.......................................
0  Previous Menu
-----------------------------------------------
To change a Flag, press Key, then press [Enter/
Return]
```

3 If Fast Boot is set to NO, the Fast Boot function is inactivated. To enable the fastboot mode, enter the following:

1 **Enter**

The menu entry for Fast Boot toggles to YES.

4 Type **0** **Enter** to return to `Mode Configuration`.

5 Type **55** **Enter** to save all changes.
or **66** **Enter** to cancel all changes.

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Table A-2 Mode Configuration - Control Flags

Control	Setting Indications
Fast Boot	YES means that optional selftests will not be executed and that tests on some interfaces and devices such as graphics will be minimized. Because HP-UX and HP-RT require that console and all graphics devices be initialized before control is given to the OS, it is strongly recommended that Fast Boot be left at NO.
Secure Mode	YES means that console input will not be enabled.
Auto Boot Select	YES means that at power on or reset, an attempt will be made to locate and boot from a boot device.
Diagnostics to RS-232 (A)	YES means that chassis codes will be sent to the RS-232 (A) device. This device is initialized to operate at 9600 baud, 8 bits per byte and no parity. If this device is the console, the console should have the same operating parameters. (these are the default parameters for RS-232 console devices) If the console must be RS-232 port A and the parameters must be different (e.g. 19200 baud) then Diagnostics to RS-232 port A should not be enabled.
Error Logging	YES means that chassis codes will be sent to an OEM supplied routine. The supplied default routine returns without taking any action.
Interactive ISL	YES means that when ISL is executed, it will stop and ask for commands. NO means that when ISL is executed, it will attempt to execute the commands in the AUTO file.
Repeat Scan for Auto Boot devices	YES means that if the attempt to locate a boot device fails, start at the beginning of the search list and try again. This process will continue indefinitely. NO means that if the attempt to locate a boot device fails, invoke the Boot Console Handler.
Interactive Console Search	YES means that at power up or reset, use the interactive console selection method to locate a console. NO means that the console and keyboard search lists will be used to locate a console device.

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Displaying and Setting the Secure Boot Mode

This section provides instructions for displaying and setting the secure boot mode for your Model 743.

There may be circumstances in which you would not wish to allow anyone to attempt to boot your system from a device other than the device you have specified, or to control the system from any console other than the one you have designated. This can be an important consideration in secure installations.

If you set up your system in such a way that it is physically impossible for unauthorized persons to disconnect it from its designated boot device, you can guarantee that the boot console handler cannot be used to boot the system from an unauthorized device or to change the console path.

With Secure Mode turned on (set to YES), the boot console handler cannot be activated. Thus, you are assured that your system's security cannot be compromised through interaction with that interface.

CAUTION: Once the secure boot mode is activated, the only way to turn it off is to disconnect the boot device. When you turn on your system after isolating it from its boot device, the boot console handler interface reappears. You can then turn the secure boot mode off, turn off your system, reconnect the boot device, and turn the system back on.

Follow these steps to display your current secure mode and to set your Model 743 to secure boot mode.

1 From the Main Menu, select **`Mode Configuration`** by entering:

3 Enter

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The system displays the **Mode Configuration** menu, as shown.

```
==== MODE CONFIGURATION ======================

Mode is now [ USER ]

Key  Edited  Mode Attribute Class
---     ---------------------------------------
1          Boot Search Control
2          Console Search Control
3          Keyboard Search Control
4          Test Configuration
5          Control Flags
...  .....................................
0   Previous Menu
44  Set Mode Default Values
77  Reset the System
88  Change Mode
-----------------------------------------------
To edit Mode Attributes, press Key, then press
[Enter/Return]
```

2 From the **Mode Configuration** menu, select **Control Flags** by entering:

5 Enter

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The system displays the **`Control Flags`** menu**.**

```
 ==== CONTROL FLAGS ========================

Mode is now [ USER ]

Key  Enable  Control Feature
---  ----------------------------------------

1    NO     Fast Boot
2    NO     Secure Mode
3    YES    Auto Boot Select
4    NO     Diagnostics to RS-232 (A)
5    NO     Error Logging
6    NO     Interactive ISL
7    NO     Repeat Scan for Boot Devices
8    NO     Interactive Console Search
.......................................
0  Previous Menu
-----------------------------------------------
To change a Feature, press Key, then press [Enter/
Return]
```

3 If Secure Boot is set to NO, the Secure Boot function is not activated. To enable the Secure Boot mode, enter:

2 Enter

The menu entry for Secure Boot toggles to YES.

4 Type **0 Enter** to return to `Mode Configuration`.

5 Type **55 Enter** to save all changes.
or **66 Enter** to cancel all changes.

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Displaying the LAN Station Address

This section provides instructions for displaying the LAN station address for your system.

The LAN station address (“LANIC ID”) of your system is the label that uniquely identifies the LAN connection for it at the link level (the hardware level). It is sometimes necessary for you to supply this address to other users. For example, if your system is to become a member of a cluster, the cluster administrator needs to know your LAN station address to add your system to the cluster.

Before booting your system, follow these steps to display your system’s LAN address:

1 From the Main Menu, select **`Hardware Information`** by entering:

6 Enter

The system displays the **`Hardware Information`** menu, as shown.

```
==== HARDWARE INFORMATION ====================
Machine Model           9000/743
System Board Serial No. 1234567890
Cache size              128 Kbytes 128 Kbytes

Key  Component
---  ---------------------------------------
CPU          Rev. 2.1, Freq. 100 MHz
RAM          16 Mbytes
1  I/O ASIC
2  VME ASIC     Rev. 2
GRAPHICS 1
GRAPHICS 2

Key Operation
.............................................
0   Previous Menu
77  Reset the System
---------------------------------------------
press Key, then press [Enter/Return]
```


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2 From the **Hardware Information** menu, select **I/O ASIC** by entering the following to display the **Hardware Component Info** screen, as shown. Note: in this example, the LAN address for your system is 080009-010203. Give this address to your system administrator.

```
1 Enter


==== Hardware Component Info =================

     I/O ASIC Rev     2.0

     SCSI
     LAN 080009-010203
     RS-232 (A)
     HP PARALLEL
     AUDIO
     PS/2 (0)
     PS/2 (1)


Key  Operation
.......................................
0   Previous Menu
77  Reset the System
-----------------------------------------------
Press Key, then press [Enter/Return]
```


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System Configuration Menu

This menu allows configuration information to be entered which does not lend itself to menu operations. As a general rule, considerable knowledge about the system is required before proper values can be entered here. The exact format and value limits of data entered here is peculiar to what is being configured.

WARNING: **Use this menu for BPN and BPR support ONLY after you have consulted with HP Support Services**

The only Hewlett-Packard supplied entries here are BPN (Backplane Networking) Configuration and BPR (Backplane ROM) Configuration.

```
==== SYSTEM CONFIGURATION ====================
 Key  Operation
---  ----------------------------------------
1     BPN configuration
2     BPR configuration

...  ........................................
0  Previous Menu
77 Reset the System
-----------------------------------------------
Press Key, then press [Enter/Return]
```

1 Pressing **1 Enter** puts the following BPN sub menu on the screen:

```
CPU No.      0
Anchor       0x00200000
AM code      0x30
value examples: 0 0x00200000 0x30
Type value(s), then press [Enter/Return]
```


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The general sequence of operations in this menu is:

2 Type **1** to choose BPN configuration.

3 Type in the data (CPU data, Anchor and AM code as one line, for example as indicated by the “value examples” listed below the “AM code” line.

4 Press **Enter** to exit this menu.

There are 3 data values for BPN, separated by spaces. Values not entered are ignored. Values entered or shown with a “0x” prefix are hex numbers; otherwise they are decimal.

5 Typing **2 Enter** at the `SYSTEM CONFIGURATION MENU` puts the following BPR sub menu on the screen:

```
Current BPR configuration:
   VME address  = 0x00000000
   AM code      = 0x00

values example: 0x12345678 0x0d
Type value(s), then press [Enter/Return]
```

The general sequence of operations in this menu is:

6 Type in the data (VME address, AM Code) as one line, as indicated by the "value example" listed below the "AM code" line.

7 Press **Enter** to exit this menu.

There are 2 data values for BPR, separated by spaces. Values not entered are ignored. Values entered or shown with a 0x prefix are hex numbers; otherwise they are decimal.

An arbitrary number of commands may be added to the debug environment. You can also add items to the firmware, hardware, and system configuration menus.

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