

Installation/Service

HP 64700 Series
Installation/Service

HP 64700A Card Cage

Installation/Service Guide



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PACKARD**

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Printing History

New editions are complete revisions of the manual. The date on the title page changes only when a new edition is published.

A software code may be printed before the date; this indicates the version level of the software product at the time the manual was issued. Many product updates and fixes do not require manual changes, and manual corrections may be done without accompanying product changes. Therefore, do not expect a one-to-one correspondence between product updates and manual revisions.

Edition 1

64700-97002, January 1991

Safety

Summary of Safe Procedures

The following general safety precautions must be observed during all phases of operation, service, and repair of this instrument. Failure to comply with these precautions or with specific warnings elsewhere in this manual violates safety standards of design, manufacture, and intended use of the instrument. Hewlett-Packard Company assumes no liability for the customer's failure to comply with these requirements.

Ground The Instrument

To minimize shock hazard, the instrument chassis and cabinet must be connected to an electrical ground. The instrument is equipped with a three-conductor ac power cable. The power cable must either be plugged into an approved three-contact electrical outlet. The power jack and mating plug of the power cable meet International Electrotechnical Commission (IEC) safety standards.

Do Not Operate In An Explosive Atmosphere

Do not operate the instrument in the presence of flammable gases or fumes. Operation of any electrical instrument in such an environment constitutes a definite safety hazard.

Keep Away From Live Circuits

Operating personnel must not remove instrument covers. Component replacement and internal adjustments must be made by qualified maintenance personnel. Do not replace components with the power cable connected. Under certain conditions, dangerous voltages may exist even with the power cable removed. To avoid injuries, always disconnect power and discharge circuits before touching them.

Designed to Meet Requirements of IEC Publication 348

This apparatus has been designed and tested in accordance with IEC Publication 348, safety requirements for electronic measuring apparatus, and has been supplied in a safe condition. The present instruction manual contains some information and warnings which have to be followed by the user to ensure safe operation and to retain the apparatus in safe condition.

Do Not Service Or Adjust Alone

Do not attempt internal service or adjustment unless another person, capable of rendering first aid and resuscitation, is present.

Do Not Substitute Parts Or Modify Instrument

Because of the danger of introducing additional hazards, do not install substitute parts or perform any unauthorized modification of the instrument. Return the instrument to a Hewlett-Packard Sales and Service Office for service and repair to ensure that safety features are maintained.

Dangerous Procedure Warnings

Warnings, such as the example below, precede potentially dangerous procedures throughout this manual. Instructions contained in the warnings must be followed.

Warning



Dangerous voltages, capable of causing death, are present in this instrument. Use extreme caution when handling, testing, and adjusting.

Safety Symbols Used In Manuals

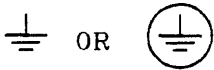
The following is a list of general definitions of safety symbols used on equipment or in manuals:



Instruction manual symbol: the product is marked with this symbol when it is necessary for the user to refer to the instruction manual in order to protect against damage to the instrument.



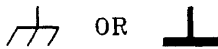
Indicates dangerous voltage (terminals fed from the interior by voltage exceeding 1000 volts must be marked with this symbol).



Protective conductor terminal. For protection against electrical shock in case of a fault. Used with field wiring terminals to indicate the terminal which must be connected to ground before operating the equipment.



Low-noise or noiseless, clean ground (earth) terminal. Used for a signal common, as well as providing protection against electrical shock in case of a fault. A terminal marked with this symbol must be connected to ground in the manner described in the installation (operating) manual before operating the equipment.



Frame or chassis terminal. A connection to the frame (chassis) of the equipment which normally includes all exposed metal structures.



Alternating current (power line).



Direct current (power line).



Alternating or direct current (power line).

Note



The Note sign denotes important information. It calls your attention to a procedure, practice, condition, or similar situation which is essential to highlight.

Caution



The Caution sign denotes a hazard. It calls your attention to an operating procedure, practice, condition, or similar situation, which, if not correctly performed or adhered to, could result in damage to or destruction of part or all of the product.

Warning



The Warning sign denotes a hazard. It calls your attention to a procedure, practice, condition or the like, which, if not correctly performed, could result in injury or death to personnel.

Electromagnetic Interference

What is Electromagnetic Interference?

All types of electronic equipment are potential sources of unintentional electromagnetic radiation which may cause interference with licensed communication services. Products which utilize digital waveforms such as any computing device are particularly characteristic of this phenomena and use of these products may require that special care be taken to ensure that Electromagnetic Interference (EMI) is controlled. Various government agencies regulate the levels of unintentional spurious radiation which may be generated by electronic equipment. The operator of this product should be familiar with the specific regulatory requirement in effect in his locality.

The HP 64700 Series Emulators have been designed and tested to the requirements of the Federal Republic of Germany VDE 0871 Level A. They have been licensed with the German ZZF as Level A products (FTZ - Serienprüfnummer C - 464/88). These specifications and the laws of many other countries require that if emissions from these products cause harmful interference with licensed radio communications, that the operator of the interference source may be required to cease operation of the product and correct the situation.

Reducing the Risk Of EMI

1. Ensure that the covers and front and rear metallic shielding panels are properly installed and that all screws are tight (do not over tighten).
2. Ensure that a properly shielded cable (such as those recommended in the Installation/Service Manual) is used to connect each of the RS-232-C ports (Port A and Port B), and local area network ports (15-pin AUI or BNC ports) to their respective controllers or peripherals.
3. Ensure that a shielded coaxial cable is used to connect the BNC trigger port on the rear of the instrument to other equipment.
4. When the HP 64700 Series Emulator is not in use, select "external clock" from the emulator configuration options and disconnect the emulation probe from the target system.

Reducing Interference

In the unlikely event that emissions from the HP 64700 Series Emulators result in electromagnetic interference with other equipment, you may use the following measures to reduce or eliminate the interference.

1. If possible, increase the distance between the HP 64700 Series Emulator and the susceptible equipment.
2. Rearrange the orientation of the chassis and cables of the HP 64700 Series Emulator.
3. Plug the HP 64700 Series Emulator into a separate power outlet from the one used by the susceptible equipment (the two outlets should be on different electrical circuits).
4. Plug the HP 64700 Series Emulator into a separate isolation transformer or power line filter.

5. Make sure that any peripheral devices (such as printers) connected to either port of the HP 64700 Series Emulator meet local radio frequency emissions regulations.

You may need to contact your local Hewlett-Packard sales office for additional suggestions. Also, the U.S.A. Federal Communications Commission has prepared a booklet entitled *How to Identify and Resolve Radio - TV Interference Problems* which may be helpful to you. This booklet (stock #004-000-00345-4) may be purchased from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402 U.S.A.

Manufacturer's Declarations

U.S.A. Federal Communications Commission

Warning - This equipment generates, uses, and can radiate radio frequency energy and if not installed and used in accordance with the instructions manual, may cause interference to radio communications. Operation of this equipment in a residential area is likely to cause interference in which case the user at his own expense will be required to take whatever measures may be required to correct the interference.

Federal Republic of Germany

Wenn Ihr Geraet in der Bundesrepublik Deutschland einschl. West-Berlin betrieben wird, senden Sie bitte die beiliegende Postkarte ausgefuellt an Ihr zustaendiges Fernmeldeamt.

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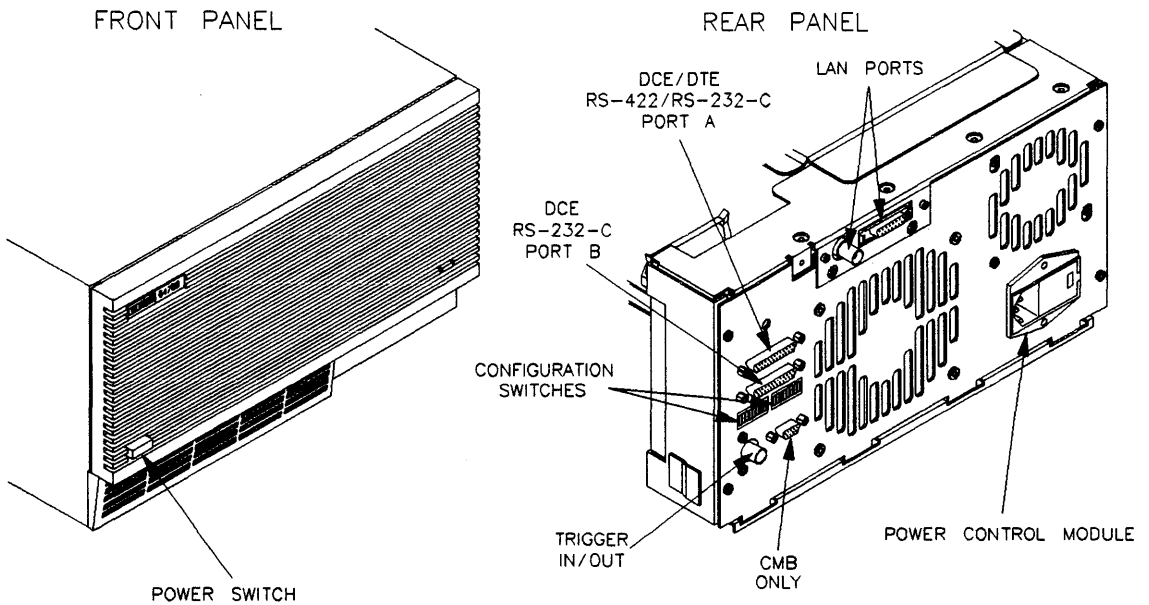
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The HP 64700A Card Cage at a Glance



Introduction

This chapter contains a list of features for the HP 64700 Series Emulator, and other products and host environments related to them. In this manual, PC or PC host refers to a Vectra PC or IBM PC-AT compatible running on MS-DOS. This chapter contains sections on the following topics:

- HP 64700 Series systems.
- HP 64700 Series Emulator features.
- HP 64700 Series Analysis features.
- HP 64700 Series External State/Timing Analyzer features.
- Basic configurations and related interfaces.
- PC Interface.
- Softkey Interface.
- Terminal Interface.
- Debugger Interface.
- HP 64700 Series documentation.

HP 64700 Series Systems

All HP 64700 Series Emulators

The following features apply to all HP 64700 Series Emulators.

- Stand-alone emulation/analysis vehicle.
- Small and Lightweight.
- Long Probe Cables.
- Two Communication Configuration Ports (RS-422/RS-232-C).
- Data Communication Switches.
- Support of Several Absolute File Formats
- Self Test and Performance Verification Testing.
- Coordinated Measurement Bus (CMB)

Stand-alone emulation/analysis vehicle

The HP 64700 Series Emulator is controlled via a basic terminal, and it may be configured in a number of different ways.

Small and Lightweight

Makes it portable and easy to position.

Long Probe Cables

Long probe cables with low profile connectors make it easier to plug the emulator into hard-to-access target system processor sockets.

Communications (RS-422/RS-232-C)

There are two communications ports (A and B).

Port A is capable of being either a DCE (Data Communications Equipment) or DTE (Data Terminal Equipment) port for RS-232-C. Embedded in Port A is RS-422 capability. RS-422 is a balanced, differential, and synchronous transmission protocol operating as a DCE device and capable of baud rates up to 460.8K Baud.

Port B is a DCE only configuration capable of baud rates up to 19200 Baud.

Data Communication Switches

Provides setting of baud rate, handshaking, and parity from rear panel switches. However, any of these parameters can be altered by software commands as well.

A pass-through (*transparent*) mode and datacom buffering are possible because the two ports can operate independently of each other. With software, commands may be made to pass through the HP 64700 Series Emulator to the next device down the line. This permits the use of the HP 64700 Series Emulator with a mainframe computer where a single port to the computer exists at an engineer's desk. Also the transparent mode can be useful for

attaching a PROM programmer or printer to a single PC host port, without the necessity of a second host I/O port.

Support of Several Absolute File Formats

You can load absolute files into the HP 64700 Series Emulators in the following file formats:

- HP format absolute files. These files are binary format files and are downloaded with HP's **transfer** utility.
- Motorola S-record.
- Intel hexadecimal.
- Extended Tektronix hexadecimal.

Self Test and Performance Verification Testing

On power-up, the HP 64700A emulation systems run performance verification tests. If the self tests pass, two green LEDs behind the emulator front panel are lit.

There is also a built-in `pv` command which allows you to run more extensive performance verification tests.

Coordinated Measurements (Multiple Emulator Start/Stop)

The Coordinated Measurement Bus (CMB) allows you to start and stop multiple emulators at the same time, and it provides for analyzer cross-triggering.

Connection to signals from external resources, such as logic analyzers or other external instruments is through a standard BNC connector and 50 ohm coaxial cables.

Normally, up to 16 emulators may be connected together on a CMB cable no more than 50 meters in length. Up to 32 emulators may be connected with modifications to the HP 64700 Series system.

Some information about CMB is covered in the System Configuration chapter; however, for more detailed information,

you may order a Terminal Interface documentation package that includes *Analyzer Terminal Interface User's Guide*, *Coordinated Measurement Bus (CMB) User's Guide*, and *Terminal Interface Reference*.

Additional Features

All modular HP 64700A Card Cages can be identified by a product number sticker on the back of the HP 64700A Card Cage with the number **64700A**. If the number is something other than 64700A (ex. 64778A), it is an earlier model of the HP 64700A Card Cage. New features of the HP 64700A Card Cage are:

- Modularity.
- More card slots.
- Customization of feature sets.
- Compatibility with feature sets used in earlier model HP 64700 Series Emulators.
- Optional local area network (LAN) interface.
- Flash EPROMs for updating emulation, analysis, host control, and LAN firmware using the *proflash* command.
- Compatibility with other host computers.
- Simplified documentation structure.

Modularity

The HP 64700A Card Cage is modular. The HP 64700A Card Cage features easy installation and removal of LAN, emulation, and analysis cards. A complete modular microprocessor development system tool set includes a new card cage, emulator control, pod and memory, and an emulation bus analyzer. The user interfaces are enhanced for the new configuration and a LAN card for the HP 9000 Series 300/400 Workstations are available. The individual components that you can order include:

- HP 64700A Card Cage
- Emulator card sets for various processors or debugger emulators.
- Analyzers:
 - 64703A (64 channels + 16 channels of State/Timing)
 - 64704A (80 channels)
 - 64706A (48 channels)
- Memory cards for various processors (if required).
- HP 64701A Local Area Network (LAN) card.

The modularized HP 64700A Card Cage can save you money. The earlier model HP 64700 Series Emulators are sold to you as a complete package with all the emulation and analysis features installed. If you needed another emulator for a different processor, you had to purchase another complete package. This meant that you would have several of the same cards in both card cages.

With modularity, you do not have to purchase a complete package. For example, if you need a different emulator, you only have to purchase emulator card sets. You may not have to purchase duplicate analyzer cards, because you may already have them in your HP 64700A Card Cage.

Another advantage of modularity is shared resources. If you have more than one modular HP 64700A Card Cage, you can interchange feature sets very easily from one card cage to the other. Ordering the components separately allows you to "mix and match" them to make a system that fits your development needs.

More Card Slots

More card slots provide the advantage of expandability for current and future enhancements. The new HP 64700A Card Cage has six card slots. The six card slots are divided into five optional slots for your embedded microprocessor development tools and one dedicated slot for the HP 64700A Control Card. It also has a dedicated half slot for the new LAN card (HP 64701A).

Customization of Microprocessor System Development Tools

You can customize your card cage with different embedded microprocessor development system tools because the new card cage is modular.

Compatibility with Feature Sets Used in Earlier HP 64700A Card Cages

The modular HP 64700A Card Cage accommodates the same emulator card sets and analysis card that are used in the earlier model HP 64700 Series systems.

Advantages to moving emulator/analizer card sets from the earlier HP 64700 Series systems to the new card cage is:

- to take advantage of LAN connections.
- you can add "external bits" to an existing emulator by using an HP 64703A analyzer that has 64 channels of emulator analysis and 16 state/timing channels of external analysis.
- you may simply want the added wattage and the potential for adding LAN or any other products that might be introduced in the future.

Information on removing cards from the earlier model HP 64700 Series systems is given in the chapter entitled "Hardware Removal and Installation."

Optional LAN Interface

The modular HP 64700A Card Cage has a dedicated half slot for a new optional LAN card (HP 64701A) that can be used to communicate with HP 9000 Series 300/400 Workstations.

Flash EPROMs

A Flash EPROM board is available for updating your emulation, analysis, host control, and LAN firmware. The updates are installed with the command **progflash**. This new update process is available for all HP 64700 Series Emulators.

For information about using *progflash*, refer to the chapter "Updating HP 64700 Series Firmware."

Compatibility with Different Host Computers

All HP 64700 Series Emulators can run on a PC host or HP 9000 Series 300/400 Workstations. For more information on system configurations, refer to the chapter "System Configuration."

Simplified Documentation Structure

Refer to the end of this chapter for information on documentation structure. The new documentation structure includes the following features:

- **Reduces manual duplication.** With the earlier HP 64700 Series system, you receive a complete set of manuals each time you purchased an emulator. With modularity, the appropriate documentation is tied to each module part ordered. This reduces the number of duplicate manuals.
- **Fewer manuals received.** Emulation and Analysis systems are complex and require a lot of documentation. To minimize the number of manuals, information from several manuals are combined into one. This reduces the number of manuals you receive, and saves you time finding information you need.
- **Reduce documentation cost.** Some manuals are optional and are no longer included as part of the product package. By not shipping these manuals automatically, Hewlett-Packard reduces your costs and eliminates excess documents that you may not want or need. You can "tailor" your order to fit your needs.

For example:

- For those of you who want an inside look into emulation and analysis, a new manual, *Concepts of Emulation and Analysis* is shipped with HP 64700 Series modular emulator card sets (and with assembled emulation and analysis "system products" that contain an emulator card set). This manual explains how emulators work and how they can be used in advanced design tasks.

- Each emulator has a Terminal Interface command set built into the firmware of the emulator. Though terse, it is very fast and efficient. If you are using HP's PC Interface (on HP Vectra or other IBM PC-AT compatibles running MS-DOS) or Softkey Interface (on HP 9000 Series 300/400 Workstations) for operating the emulator and analyzer, and you find that these interface commands are meeting your needs, you may not be interested in learning more about the Terminal Interface. Though you automatically receive an emulator specific *Terminal Interface User's Guide* with your emulator, the Terminal Interface Documentatin Package is an optional purchase. For more information, see your local Hewlett-Packard Representative. The Terminal Interface Documentaion Package includes the *Analyzer Terminal Interface User's Guide*, *Coordinated Measurement Bus (CMB) User's Guide*, and the *Terminal Interface Reference*.

Basic Configurations and Related Interfaces

HP 64700 Series Emulators may be used with a PC host, HP 9000 Series 300/400 Workstation, or with a terminal. Typically, the environment in which the emulator is used will dictate the configuration of the emulator and the interface used to control the emulator. Information about system configurations is provided in the chapter "System Configurations."

You can use the HP 64700 Series Emulators in:

- Remote configuration.
- Stand-alone configuration.
- Transparent configuration.

Remote Configuration

The HP 64700 Series Emulator is in a *remote configuration* when the emulator is connected to a host computer port, and is NOT directly connected to a terminal.

Stand-alone Configuration

Using a basic terminal to control an HP 64700 Series Emulator is the simplest possible configuration. This is called the *stand-alone configuration*. The terminal is connected to emulator Port A. Commands are entered from the terminal's keyboard, and results are viewed on your terminal's display.

The command interface used in the stand-alone configuration is called the *Terminal Interface*.

Transparent Configuration

An extension of the stand-alone configuration that allows absolute code to be downloaded into the emulator can be made by connecting the other emulator port to a host computer (HP 9000 Series 300/400, PC, etc.). This is called the *transparent configuration*. It is easiest to view this configuration as a normal terminal on a host computer, with an HP 64700 Series Emulator between the terminal and the host computer.

Local Area Network Configuration

If the HP 64700 Series system contains a LAN card (HP 64700A) and LAN/9000 is installed on an HP 9000 Workstation, the HP 64700 Series Emulator can communicate with the HP 9000 Workstation over an IEEE 802.3 or Ethernet Local Area Network.

PC Interface

The PC Interface is an HP 64000-PC hosted program that provides easy interaction with HP 64700 Series Emulators and it adds features not available in the Terminal Interface. The PC Interface is a window-oriented program. You can display emulation and analysis information in different windows. You can save window contents to files. The PC Interface allows you to enter commands with a minimum number of keystrokes.

List of Features

Some of the features provided by the PC Interface are listed below:

- Symbolic debugging.
- External timing analysis (requires external analysis).
- Windows.
- Easy command entry.
- Terminal window.
- Forking to MS-DOS.
- Command logging.

For More Information

On "Installation," see chapter 4 in this manual. For "Use," refer to the PC Interface manuals shipped with your product. Refer to the "Documentation" section at the end of this chapter.

Softkey Interface

The Softkey Interface is an HP 64000-UX hosted program that provides easy interaction with HP 64700 Series Emulators and additional features not available in the Terminal Interface. With Softkey Interface, you can enter many commands by pressing softkeys.

List of Features

Some of the features provided by the Softkey Interface are listed below:

- On-Line Softkey Interface help.
- Terminal Interface command help.
- Symbolic debugging.
- Easy command entry.
- Windowing.
- Display an event log.
- Loading a customized configuration.

For More Information

On "Installation," see chapter 4 in this manual. For "Use," refer to the Softkey Interface manuals shipped with your product. Refer to the "Documentation" section at the end of this chapter.

Terminal Interface

The Terminal Interface provides short commands, and includes an excellent "help" facility, command recall and editing, macros, and "equate" statements to make using the commands easy.

List of Features

Some of the features provided by the Terminal Interface are listed below:

- The "help" facility.
- Command recall.
- Macros.
- Equates.
- The repeat command.
- Command files.
- The echo command.
- The version command.
- The date command.
- Combining features.

For More Information

The "Terminal Interface Documentation Package" is an optional document set that includes *Analyzer Terminal Interface User's Guide*, *Coordinated Measurement Bus (CMB) User's Guide*, and *Terminal Interface Reference*. Each emulator is shipped with an emulator specific *Terminal Interface User's Guide* that describes how to use your specific emulator with the Terminal Interface. Refer to the "Documentation" section at the end of this chapter for information on documentation received for each modular product.

Debugger Interface

List of Features

Debuggers are available and work with HP 64700 Series Systems. Debugger/Emulators are debugging tools for microprocessor code. Debuggers execute on host computers using the HP-UX operating system. Debuggers load and execute C programs or assembly language programs on an emulator. The code is executed in real time unless a specific feature of the debugger or emulator requires halting the processor. The emulator functions as a high-speed execution environment for the debugger. Some of the features provided by the Debugger/Emulators and Debugger/Simulators are listed below:

- C Source language debugging
- assembly language debugging
- window-oriented display
- user-definable screens and windows
- breakpoints
- single-stepping code by source line
- stepping over or through function calls
- macro capability, using C syntax and parameter passing
 - breakpoint macros that execute when break occurs
 - high-level code patching using macros
- command files
- simulated I/O and interrupts
- on-line help
- stack backtrace for viewing parameters and automatic variables
- code browsing
- batch mode for automated testing
- command logging and journaling
- data monitoring

For More Information

Information is available in User's Guides, Concepts, and Reference manuals for Debugger/Emulators and Debugger/Simulators for specific processors.

HP 64700 Series Documentation

These are documents you will receive with HP 64700 Series modular products.

Product	Model Number	Documentation
Card Cage	64700A	<i>Installation/Service Guide</i> <i>Support Services Guide</i>
Emulator card sets	647nnF/G/H/J/K	Important Notice <i>Terminal Interface User's Guide</i> <i>Concepts of Emulation and Analysis</i>
Analyzers	64703A 64704A 64706A	Notice
memory boards	64725A 64726A 64727A	Notice
LAN card	64701A	Notice
Softkey interfaces	647nnS Opt 004	Important Notice <i>Emulator Softkey Interface User's Guide</i> <i>Analyzer Softkey Interface User's Guide</i> <i>Softkey Interface Reference</i>
PC interfaces	647nnS Opt 006	Important Notice <i>Emulator PC Interface User's Guide</i> <i>Analyzer PC Interface User's Guide</i> <i>PC Interface Reference</i>

NOTE: A Support Services guide accompanies each binder.

NOTE: A Terminal Interface Document Package includes: Terminal Interface Reference, Analyzer Terminal Interface User's Guide, and Coordinated Measurement Bus (CMB).

Notes

Hardware Removal and Installation

This chapter contains info on the following topics:

- Using a Ground Strap.
- Removing or installing Emulator, Memory, Analyzer and Host Cards.
- Removing or installing the External State/Timing Analyzer Adapter.
- Installing the External Analyzer Probe.
- Removing or installing the Local Area Network Card.
- Installing a ThinMAU.
- Removing or installing the Cable Egress Panel on the Emulation card.
- Using emulator and analyzer cards from earlier model HP 64700 Series systems.

Note



Any repair of the HP 64700 Series Emulator must be done by a qualified service representative.

Caution



DAMAGE TO EXTERNAL PARTS. Do NOT stand the instrument on the rear panel.

Warning



SHOCK HAZARD! Before removing or installing parts in the HP 64700A Card Cage, make sure that the card cage is powered off.

Tools

- Torx T-10
- Flatblade Screwdriver (5 inch shank or longer)

Using a Ground Strap

When removing or installing cards, you should use a ground strap to reduce the chances of damaging circuit cards from static discharge. A jack on the rear panel of the HP 64700A Card Cage is provided for this purpose as shown in figure 2-1.

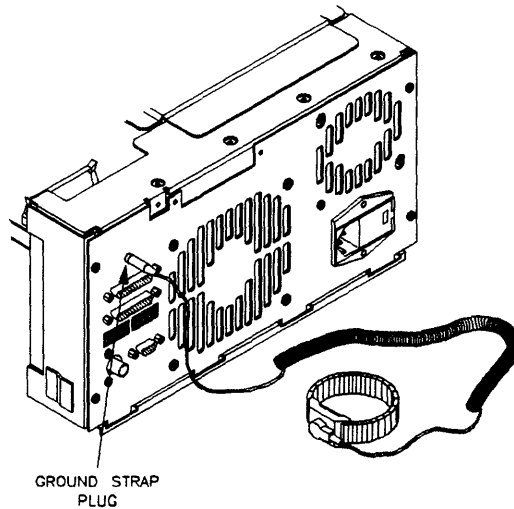


Figure 2-1. Ground Strap

Removing or Installing Emulator, Memory, Analyzer, and Host Cards

The following information shows you how to install/remove feature sets in the HP 64700A Card Cage. If you do not have a feature, skip that step and proceed to the next. This section shows you how to:

- Remove or Install top cover.
- Remove or Install card cage side cover.
- Remove or Install card supports and interconnect board.
- Remove emulation, memory, and analyzer cards.

Removing or installing the Top Cover

Turn the thumb screw and remove the top cover by sliding the cover toward the rear and up (figure 2-2).

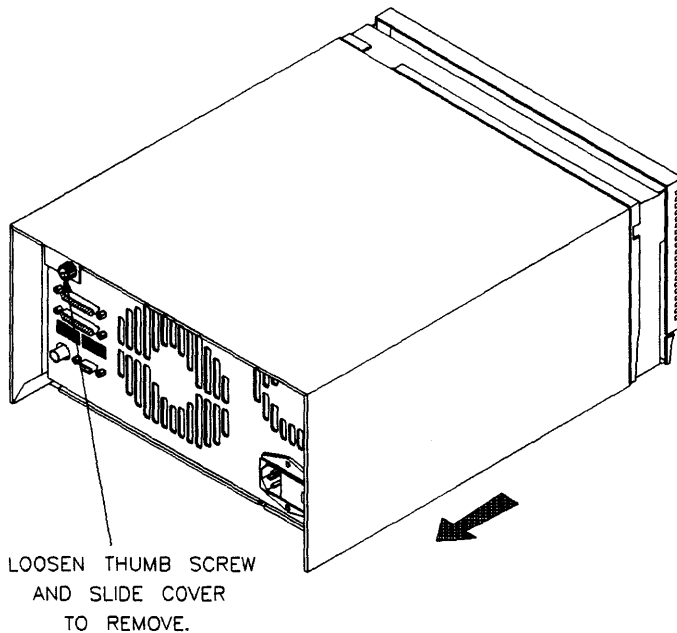


Figure 2-2. Top Cover

Install the top cover in reverse order, making sure that the side panels of the top cover are attached to the side clips on the frame (figure 2-3).

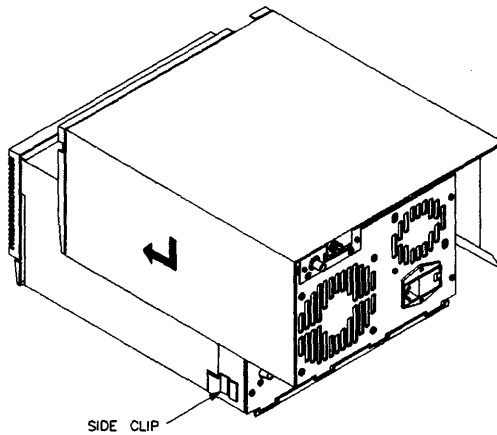


Figure 2-3. Top Cover Installation

Removing or installing the Side Cover

As viewed from the front, place the frame on its left side. Remove the HP 64700A Card Cage side cover by unsnapping the two latches and lifting off as shown in the figure below. To install, insert the side cover into the tab slots and fasten the two latches (figure 2-4).

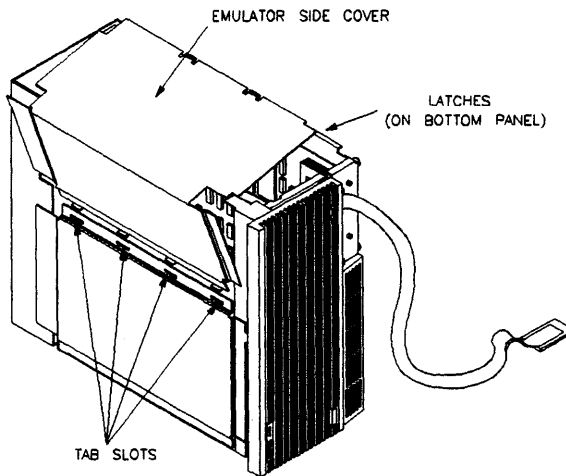


Figure 2-4. Side Cover

Removing or installing Card Supports and Interconnect Board

Remove the card supports and interconnect board (if present) as shown in the figure. Install in reverse order (figure 2-5).

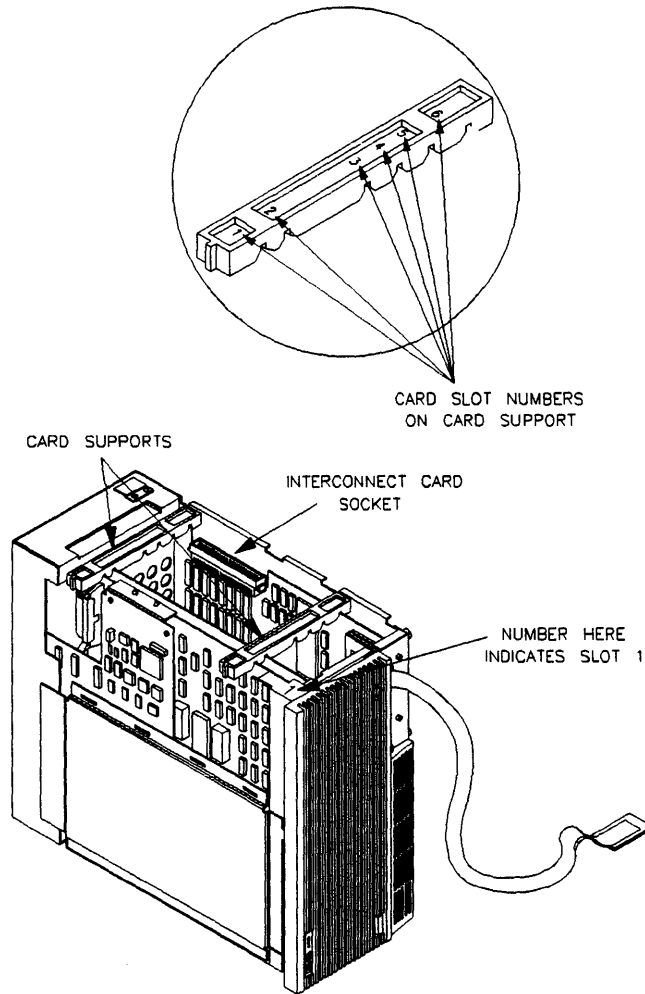


Figure 2-5. Card Supports and Interconnect Board

Removing or Installing Emulator, Memory, Analyzer, and Host Cards

The cable and egress panel are part of the emulator/debugger card. To remove the **emulator/debugger card**, loosen the four cable egress thumb screws, then insert a flat blade screwdriver in the access hole and eject the emulator/debugger card by rotating the screwdriver as shown below (figure 2-6).

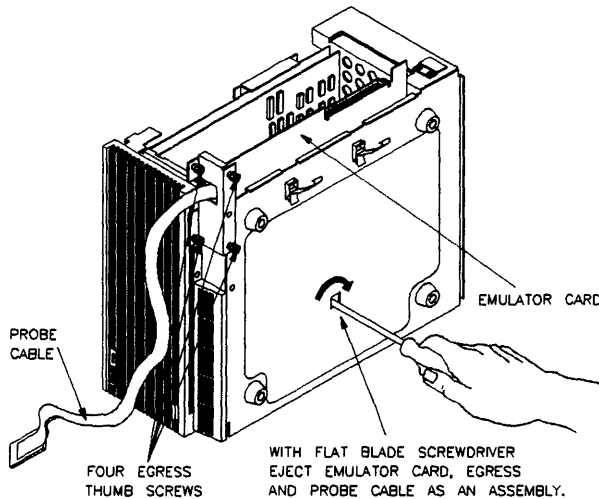


Figure 2-6. Feature Cards and Host Control Card

Analyzer and **memory** cards are also ejected with the flatblade screwdriver.

Analyzer cards with an **External state/timing analyzer** and the **host control card** are also removed with the flatblade screwdriver, with two additional steps.

- If you are removing an analyzer card with external state/timing, you must first remove the front bezel to remove the external state/timing analyzer cable adapter from the front grill shown in the following steps.
- The host control card is located next to the LAN card. If you have a LAN card, you must first remove the LAN card (shown later in this chapter) before removing the host control card. There is also a ribbon cable that must be removed from the host control card that connects to the rear panel assembly.

To install, insert the cards into the plastic guides and press cards into mother board sockets. Check to insure that the cards are seated all the way into the sockets. If the cards can be removed with your fingers, the cards are NOT seated all the way into the mother board socket (figure 2-7).

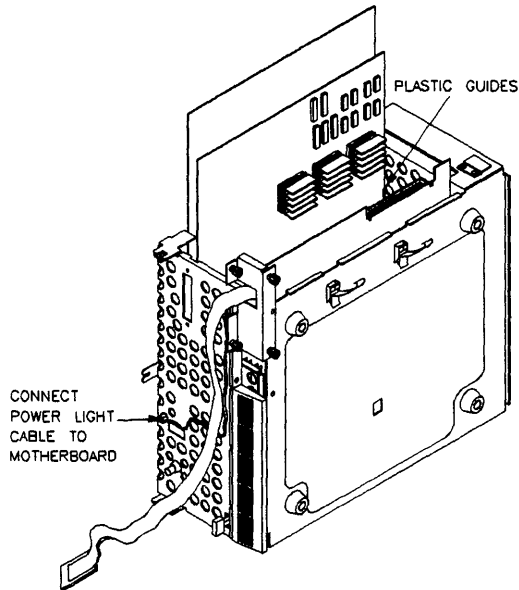


Figure 2-7. Card Installation

Note



In the figure, the front bezel is removed. It may NOT be off in other situations; you only remove the front bezel when you are removing or installing the power supply, an external state/timing analyzer, the power light cable, or the power switch extender.

Removing or Installing Analyzer Adapter

To remove or install the External State/Timing Analyzer right angle adapter, you must first remove the front bezel. Insert a screw driver into the third slot of the front bezel and push the catch to release the right side of the bezel from the front grill. Pull the bezel toward you approximately 2 inches (figure 2-8).

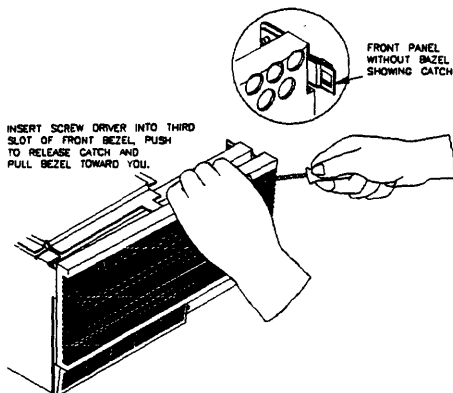


Figure 2-8. Releasing Bezel Catch

Push the front bezel to the left to release the left side of the bezel then pull the upper left corner of the bezel toward you (figure 2-9).

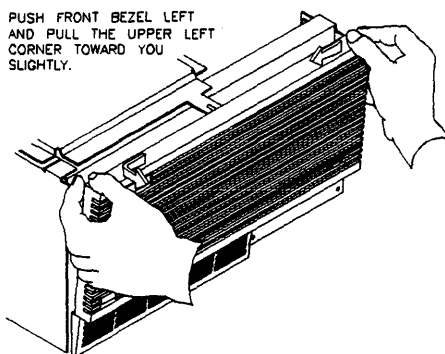


Figure 2-9. Pushing Bezel to the Left

Lift the bezel panel to remove. Be careful not to put stress on the power switch extender (figure 2-10).

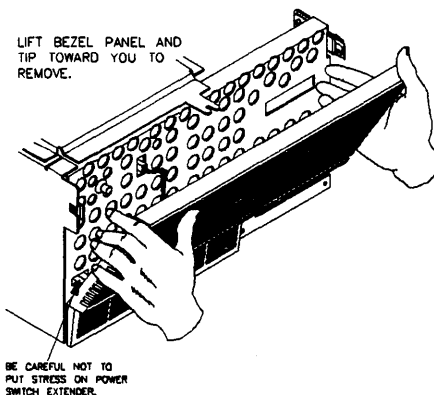


Figure 2-10. Removing Bezel

Remove or install the right angle adapter board as shown. Note the up arrow indication. Unplug/plug the external state/timing analyzer cable from/into the right angle adapter. The analyzer cable is routed down and below the front bezel to exit above the emulator probe cable (figure 2-11).

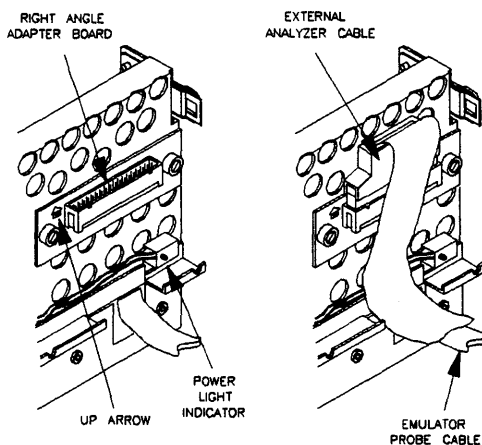


Figure 2-11. External Analyzer Right Angle Adaptor

To install front bezel, be sure that the bottom rear groove of the front bezel is aligned with lip as shown below (figure 2-12).

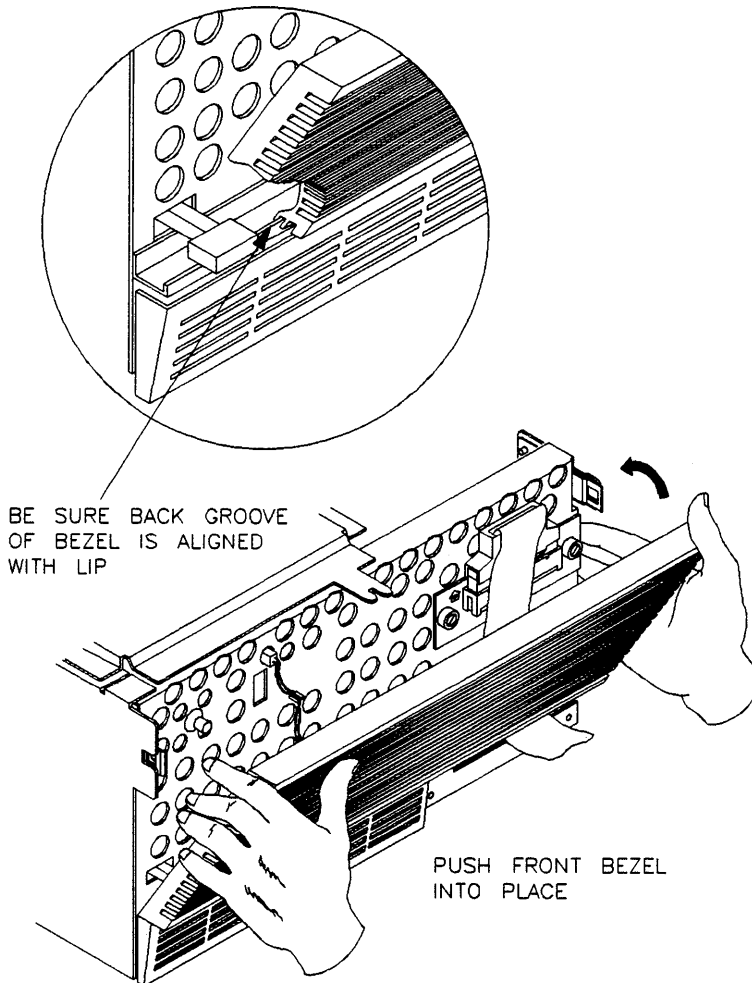


Figure 2-12. Front Bezel Installation

Installing the External Analyzer Probe

The HP 64703A Emulation Bus Analyzer and 16-channel State/Timing Analyzer provides 64 channels for analysis of the emulation bus plus 16 external channels. The external channels allow you to capture activity on signals external to the emulation bus, typically other target system signals. This section shows you how to install the external state/timing analyzer probe.

Before You Can Use the External Analyzer

After installing the right angle adapter, there are several steps to do before you can use the external state/timing analyzer:

1. Assemble the analyzer probe.
2. Connect the probe to the emulator.
3. Connect the probe wires to the target system.

Assembling the Analyzer Probe

The analyzer probe is a two-piece assembly, consisting of a ribbon cable and 18 probe wires (16 data channels and the J and K clock inputs) attached to a connector. Either end of the ribbon cable may be connected to the 18-wire connector, and the connectors are keyed so that you can attach them in only one way. Align the key of the ribbon cable connector with the slot in the 18-wire connector, and firmly press the connectors together (figure 2-13).

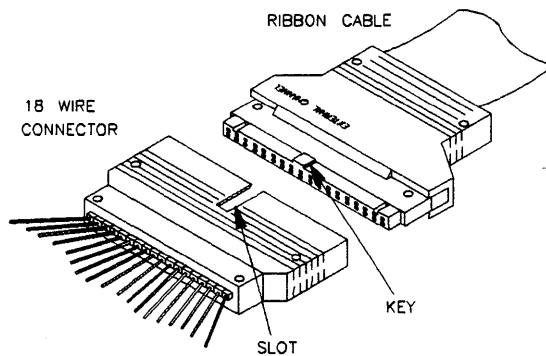


Figure 2-13. Ribbon Cable and 18 Wire Connector

Caution



DAMAGE TO CIRCUITRY! Turn OFF target system power before connecting external state/timing analyzer probe wires to the target system. The probe grabbers are difficult to handle with precision, and it is extremely easy to short the pins of a chip (or other connectors which are close together) with the probe wire while trying to connect it.

Each of the 18 probe wires has a signal and a ground connection for a total of 36 grabbers (figure 2-14). Each probe wire is labeled for easy identification. The signal and ground connections are attached to the pin in the grabber handle.

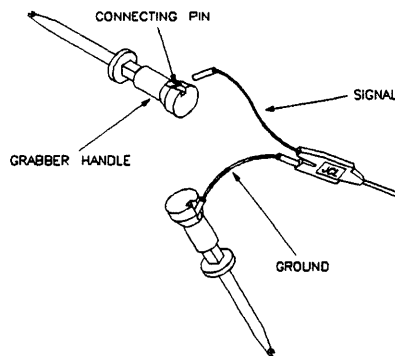


Figure 2-14. Probe Wire Signal and Ground

Connecting Probe Wires to the Target System

You can connect the grabbers to pins, connectors, wires, etc., in the target system. Pull the hilt of the grabber towards the back of the grabber handle to uncover the wire hook. When the wire hook is around the desired pin or connector, release the hilt to allow the tension of the grabber spring to hold the connection (figure 2-15).

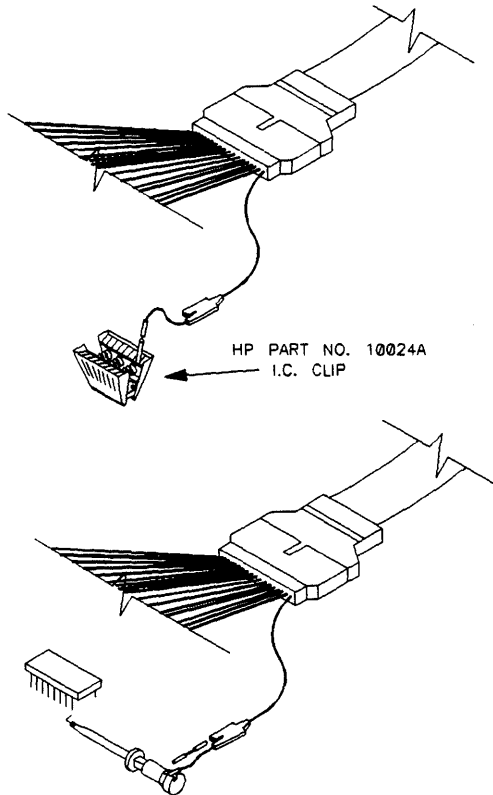


Figure 2-15. Probe Wire Connection to Target System

Removing or Installing the Local Area Network Card

If you did not removed the top cover or side panel of the HP 64700A Card Cage, go to the sections for removal of the above. Then return here. There is a dedicated slot for the Local Area Network (LAN) card. To remove or install the LAN card and LAN card panel, loosen or tighten the four Torx T-10 screws on the rear panel and the two screws on the top of the frame and install or remove the LAN card (figure 2-16).

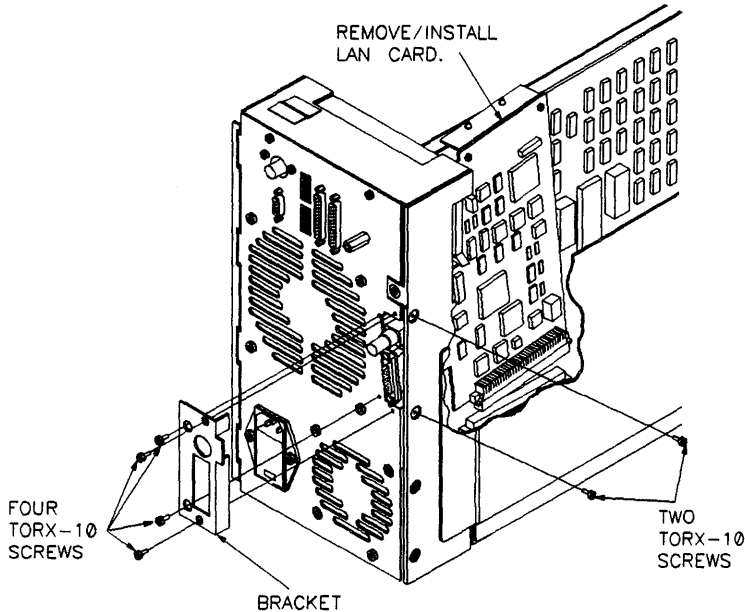


Figure 2-16. Local Area Network Card

Information on connecting an HP 64700 Series Emulator via the LAN is provided in the chapter entitled "System Configuration." Information on updating LAN firmware is provided in the chapter entitled "Updating HP 64700 Series Firmware."

For replacement of the LAN card under the Exchange program, refer to the chapter entitled "Service." Keep the LAN panel and LAN card together because the link-level address for each LAN card is printed on the card and the LAN panel.

Installing a ThinMAU HP 28641A

Caution



CORRUPTED DATA!

The LAN connection to the BNC will maintain software integrity and can maintain communication when subjected to low levels of Electrostatic Discharge (ESD) directly to the LAN connector.

When operating in an environment where ESD pulses are in excess of 2500 volts, using a ThinMAU adapter verses a direct connection to the LAN card is more reliable and less susceptible to data corruption from ESD to the LAN cable.

Refer to the *Installing and Administering LAN/9000 Series 300* manual for proper grounding.

The 15-pin AUI output from the HP 64701A LAN card can be used as a ThinLAN by connecting a ThinMAU adapter to the 15-pin AUI output. Should you decide to use a ThinMAU (an optional purchase), connect it to the 15-pin AUI output (figure 2-17).

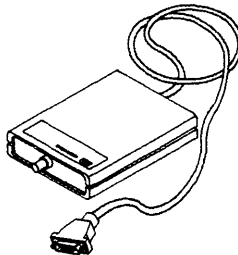


Figure 2-17. ThinMAU Adaptor

Installing the Cable Egress Panel on the Emulation Card

The cable egress panel is part of the emulation card in the new HP 64700A Card Cage; however, if you want to use the emulator card from an earlier HP 64700 Series System, you must order an egress panel (figure 2-18). The egress panel comes in two sizes to accommodate the width of the emulation probe cable.

To order the egress panel, refer to the chapter entitled "Service."

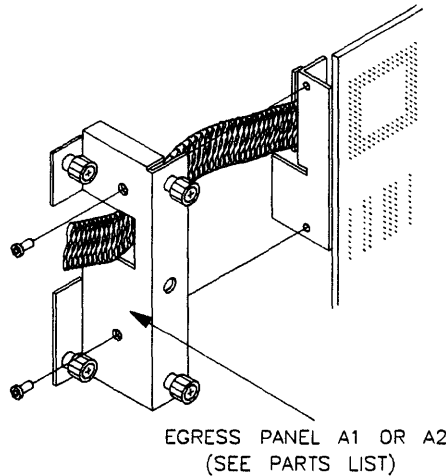


Figure 2-18. Egress Panel

Using Feature Sets from Earlier HP 64700 Series Systems

The new HP 64700A Card Cage can use feature sets (emulator, analyzer, and memory boards) from the earlier HP 64700 Series systems. This section explains how to remove feature cards from the earlier HP 64700 Series systems.

Caution



VOIDING WARRANTY! Any removal, installation, adjustment, or repair of this product must be performed by qualified service personnel. Performing this service by someone other than qualified service personnel will void your warranty. **Changing the CPU should be done only by a qualified HP Service Representative.**

Warning



Make sure power is off prior before doing removal or installation instructions given below and wait at least 5 minutes for the high-voltage capacitors in the power supply to fully discharge.

Disassembly Procedure

Tools required:

- T-10 TORX Driver
- T-15 TORX Driver

1. Before disassembling the HP 64700 Series Emulator, unplug the instrument and wait **at least 5 minutes** for the high-voltage capacitors in the power supply to fully discharge.
2. Place the instrument with the top cover facing up, and remove the nine **Torx head screws** in the recesses of the top cover (figure 2-19).

Note



Use a TORX T-15 screw driver to remove these screws. A cordless screwdriver with a T-15 Driver Bit (Skill Twist Model 2105) can be used to make the operation faster.

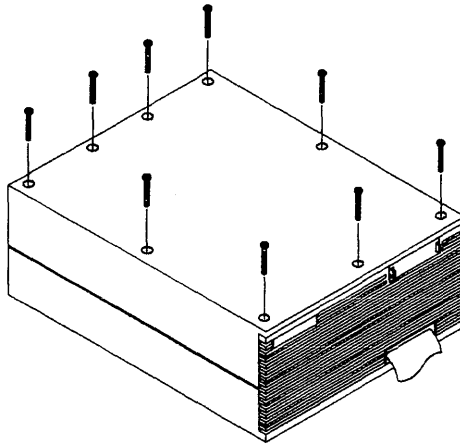


Figure 2-19. Top Cover

3. Remove the State Egress Clip (figure 2-20).

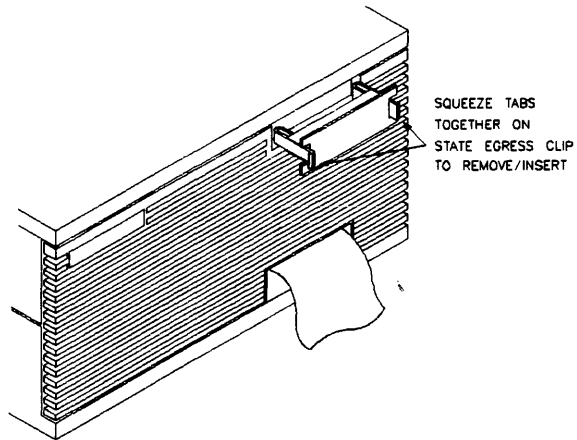


Figure 2-20. State Egress Clip

4. Raise the top cover approximately 1/4-1/2" and remove the **Front Grill** (figure 2-21).

Note



The **Front Grill** will fall forward and can then be removed.

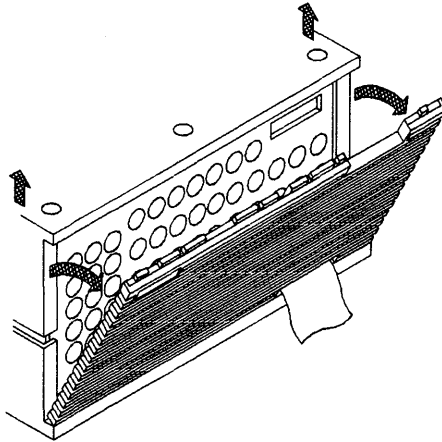


Figure 2-21. Front Grill

5. Lift off the top cover (figure 2-22).

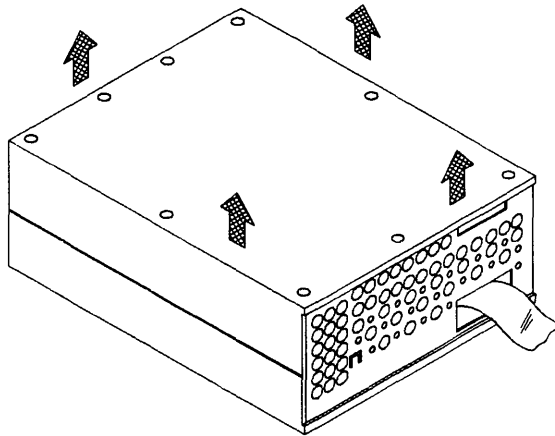


Figure 2-22. Lifting off Top Cover

6. Remove the Board Lock Rod (figure 2-23).

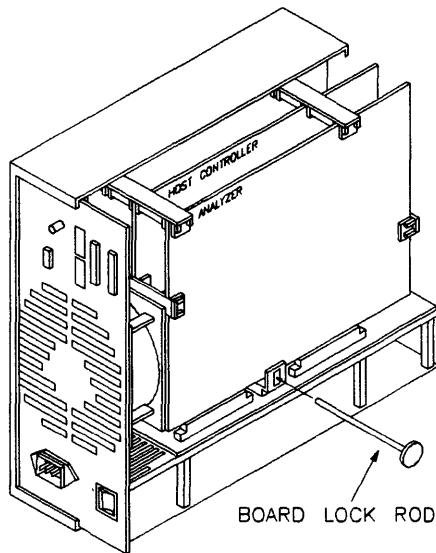


Figure 2-23. Board Lock Rod

7. Taking care NOT to twist the User Cable, grasp the unit with both hands and turn it upside down. This will expose the **bottom cover**. Remove the **bottom cover** by lifting it straight up (figure 2-24).

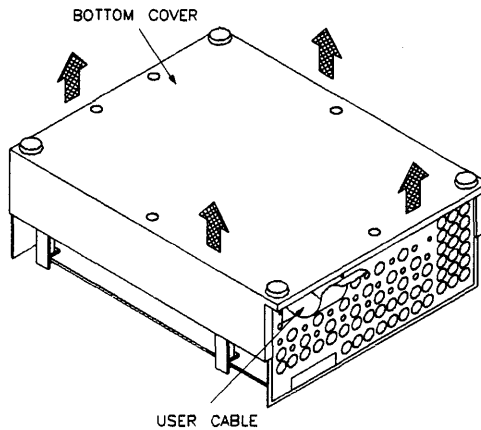


Figure 2-24. Bottom Cover

8. Taking care NOT to twist the User Cable, grasp the chassis with both hands and turn it rightside up. Remove the **Front Metal Shield** by removing 5 screws with a Torx T-10 screwdriver. This allows you to remove the board without removing the User Cable (figure 2-25).

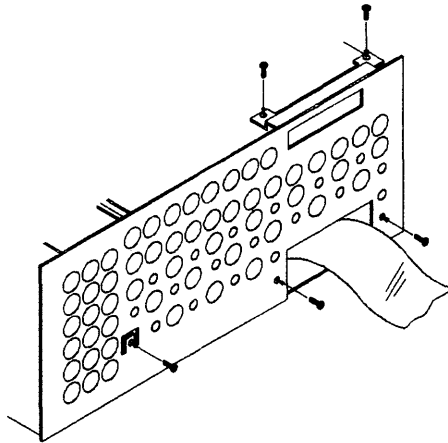


Figure 2-25. Front Metal Shield

9. Remove four **Snap-On Card Supports** by twisting and pulling. Note that the supports are keyed and go on only one way. To remove the **Snap-On Card Support** at the rear of the chassis, you must push the rear panel away from the internal cards to provide room for removal (figure 2-30).

Caution



BENT REAR PANEL!

When pushing the back panel away from the internal boards, be careful **NOT** to push the rear panel too far. This would create a permanent bend in the back panel.

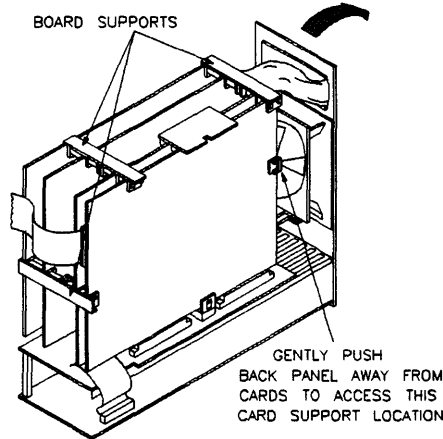


Figure 2-26. Snap-On Card Supports

10. Some of the HP 64700 Series Emulators do not require an interconnect board as part of the feature set. These emulators have the CPU and memory on the same card. If the HP 64700 Series Emulator does NOT have an interconnect board, skip this step.

Some HP 64700 Series Systems may have Interconnect boards that are attached with tie wraps. In this case, you must remove the CPU and memory cards together.

If the HP 64700 Series System has an Interconnect board with screws, use a Torx T-10 screwdriver to remove the four screws on the **Interconnect Board** and remove the **Interconnect Board** (figure 2-27).

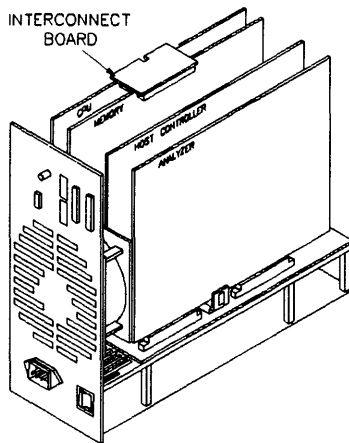


Figure 2-27. Interconnect Board

11. Remove the feature cards by pushing it up from the Motherboard, and place the cards on a static free bench (figure 2-28).

Caution



DAMAGE TO CIRCUITRY!

Take precautionary measures to protect the printed circuit assembly from static discharge during handling. It is good practice to use additional antistatic protection, such as grounding straps, when servicing, removing, or installing assemblies that may be sensitive to electrostatic discharge.

Caution



DAMAGE TO CIRCUITRY!

Avoid touching integrated circuit leads while picking up or handling the circuit card. Handle the card by the edges.

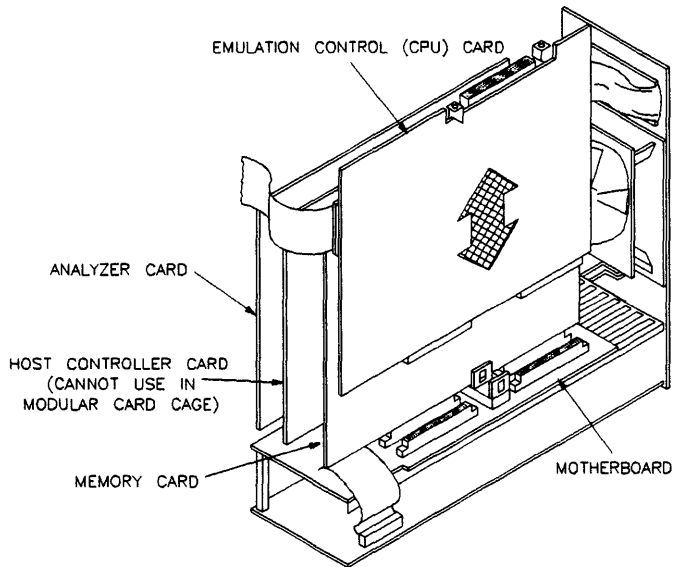


Figure 2-28. Removing Feature Cards

This completes the steps for removing feature cards from earlier model HP 64700A Card Cages. Assemble the HP 64700 Series Emulator in the reverse order of disassembly.

Note



When installing the emulator card into the new modular HP 64700A Card Cage, you will need a cable egress panel. You can order this panel through your local HP Representative. Refer to the chapter entitled "Service" for part numbers.

HP 64700 Series Installation on an HP 9000

Introduction

The modular HP 64700A Card Cage provides five card slots for HP 64700 Series embedded microprocessor development system tools: for, emulators, logic analyzers, and other tools.

The HP 64700 Series Emulator may be used with HP 9000 Series 300 Workstations (except Model 310) and HP Apollo 9000 Series 400 Workstations.

Interfaces that may be used to connect the HP 64700 Series Emulator to the HP 9000 Workstation are:

- LAN Interface
- RS-422/RS-232-C Interface

Supported HP-UX Operating System Versions

The HP 64700 Series Emulator requires an HP-UX operating system version of 7.0 or greater. To determine the version of your HP-UX operating system, enter the command:

```
# uname -a 
```

If the version number of the HP-UX operating system is less than 7.0, you must update the operating system to 7.0 or higher before you can use the HP 64700 Series Emulator.

Note



The HP 64700 Series Emulator is NOT supported in heterogeneous clusters. These are diskless cluster systems in which the server node is an HP 9000 Series 800 Workstation and the diskless cnodes are HP 9000 Series 300 Workstations.

Connecting the HP 64700 Series Emulator via the LAN Interface

If the HP 64700 Series system contains a LAN card (HP 64701A) and LAN/9000 is installed on your HP 9000 Workstation (as described in the *Installing and Administering LAN/9000* manual), the HP 64700 Series Emulator can communicate with the HP 9000 Workstation over an IEEE 802.3 or Ethernet Local Area Network. The HP 64701A LAN card has two connectors:

- A BNC connector that can be directly connected to a ThinLAN cable. When using this connector, the HP 64701A provides the functional equivalent of a Medium Attachment Unit (MAU) for ThinLAN.
- A 15-pin connector for an Attachment Unit Interface (AUI) cable. The AUI cable allows you to connect to an off-board MAU for ThinLAN, a ThickLAN connection, or to a Pod for a StarLAN 10 connection.



Note



Use either the BNC or the AUI connector. Do NOT use both. The LAN card will not work with both connected at the same time.

When connecting the HP 64700 Series Emulator to the HP 9000 Workstation via the LAN, these are the steps you must take:

1. Install HP 64700 Series Softkey Interface product software.
2. Make sure LAN/9000 is loaded and configured.
3. Configure HP 64700 Series LAN Parameters.
 - Using the Terminal Interface.
 - Using Bootp.
4. Set up 64700tab.net file.
5. Verify communication between the HP 9000 and the HP 64700 Series Emulator.
6. Run performance verification tests.

Step 1: Install Softkey Interface Software

Requirements

The following requirements must be met before you can install your HP 64700 Series Softkey Interface product software and hardware.

HP 64801 and HP 64700 Series Software. For the HP 64700 Series Emulator to operate properly with the HP 9000 Workstation, the HP 64801 operating environment software and specific HP 64700 Series Softkey Interface software must be installed on the host computer. (The HP 64801 software is ordered separately from the HP 64700 Series products.)

Specifically, the fileset "64700" (64700 SERIES EMULATION COMMON FILES) must be installed in order to proceed with the subsequent installation instructions. This fileset is in partition "64801" (64000-UX OPERATING ENVIRONMENT).

Disk Space. If you are installing the HP 64801 software for the first time, it requires approximately 4.8 megabytes of disk space. The HP 64801 software is installed under directory /usr/hp64000.

Installing HP 64700 Series Product Software

Refer to the "Updating HP-UX" chapter of the *HP-UX System Administration Tasks* manual for detailed information on updating your system.

To install HP 64700 Series software on the HP 9000 Workstation:

1. Become the root user on the system you want to update.
2. Make sure the tape's write-protect screw points to SAFE.
3. Put the "HP 64700 Series Products" update tape in the tape drive that will be the "source device".

4. Be sure that the tape drive BUSY and PROTECT lights are on. If either the PROTECT or BUSY light is off, check the tape's write-protect screw or the tape drive for proper operation. The tape drive will condition the tape for about three minutes or less for shorter tapes.
5. When the BUSY light stays off for at least 10 seconds, start the update program by typing:

```
# /etc/update 
```
6. When the HP-UX Update Utility Main Menu screen appears, make sure that the source and destination devices are correct. The defaults are:

```
    /dev/update.src (for Series 300 and 400  
    Workstations)  
    / (for the destination directory)
```
7. If you do not use the defaults, change the "source device" and/or "destination directory" as appropriate.
8. Select **Load Everything from Source Media** when your source and destination directories are correct.
9. To begin the update, press the softkey **<Select Item>**. At the next menu, press the softkey **<Select Item>** again. Answer the last prompt with

```
y .
```

It takes about 10 minutes to read the tape.
10. When the installation is complete, read /tmp/update.log to see the results of the update.

Step 2: Make sure LAN/9000 is Loaded and Configured

LAN/9000 software must be loaded and configured on the HP 9000 Workstation. For information, refer to the *Installing and Administering LAN/9000* manual.

Step 3: Configuring HP 64700A LAN Parameters

The HP 64700 Series Emulator must be configured with certain network parameters before it can operate on the local area network. These network parameters are held in nonvolatile memory within the HP 64700 Series Emulator. There are two ways these values can be initially loaded:

- Via the Terminal Interface.
- Via BOOTP protocol (over the LAN).

Using the Terminal Interface

1. Configure LAN parameters via the Terminal Interface
 - a. First, set all of the rear panel switches to the down position. This will make the HOST port the active port running at 9600 baud as a DCE.
 - b. Connect an ASCII terminal to the host port with a 25-pin RS-232-C cable.
 - c. Turn ON the HP 64700 Series Emulator. Press the terminal's return key a couple times. You should see the "R>" prompt.

At this point, you should be communicating with the HP 64700 Series Emulator.
 - d. Type "lan" and press return. You should see the current LAN configuration values. For Example:

```
R>lan
lan -i 0.0.0.0
lan -g 0.0.0.0
lan -s 0.0.0.0
lan -p 6470
Ethernet Address : 08000903212f
```


e. Type **help lan** to display the following:

```
R>help lan
```

```
lan - set configuration parameters

lan          - display the current lan configuration
lan -i <ip_addr> - set Internet Protocol address
lan -g <ip_addr> - set Internet Protocol Gateway address
lan -s <mask>   - set the subnet mask
lan -p <port>   - set TCP service port number - commands

--- VALID <ip_addr> SELECTIONS ---
Internet Address in dot notation - (192.6.94.2)

--- VALID <mask> SELECTIONS ---
subnet mask value - (255.0.0.0)

--- VALID <port> SELECTIONS ---
Any number that is likely to be unused - 6470
```

At this point you might note the link-level address. This address is preassigned at the factory, and is printed on the LAN card and on the rear panel.

Each device on a TCP/IP network must have a unique Internet Address. The Internet Address that you assign to the HP 64700 Series Emulator should be supplied by your LAN administrator.

f. For example, to assign an Internet Address of 192.6.94.2 to the HP 64700 Series Emulator, enter the following command:

```
R>lan -i 192.6.94.2 
```

The Internet Address and any other LAN parameters you assign are stored in nonvolatile memory in the HP 64700 LAN Interface. The address you assign will remain the Internet Address until another "lan -i" command is entered. Turning OFF power to the emulator does not change the Internet Address setting.

g. If your network uses subnetting, you can assign a subnet mask to the HP 64700 Series Emulator with the "lan -s" command. For example:

```
R>lan -s 255.0.0.0 
```

For information on subnetting and why it's used, refer to manual entitled *Installing and Administering LAN/9000 Series 300*.

If you will be accessing the HP 64700 Series Emulator through a gateway, the Internet Address for the gateway can be supplied by your system administrator. The gateway Internet Address is assigned with the "lan -g" command.

Once the LAN parameters are configured to make the initial connection, they can be changed by either telneting to the HP 64700 Series Emulator and changing them with the LAN command or changing them through the Softkey Interface. The changes made will be stored in EEPROM and will take effect the next time the HP 64700 Series Emulator is powered off and back on again.

- h. The HP 9000 host software communicates with the HP 64700 Series Emulator through two TCP service ports. A TCP service port number must be greater than 1024. The HP 64700 Series Emulator is shipped with default base port numbers 6470. It uses two ports. The one at the base value (default 6470) and the next higher port number (default 6471). The base port number can be changed with the *lan -p* command. If you change it, the new value must also be entered in */etc/services*. For example you could add line:

```
emul700    6470/tcp
```

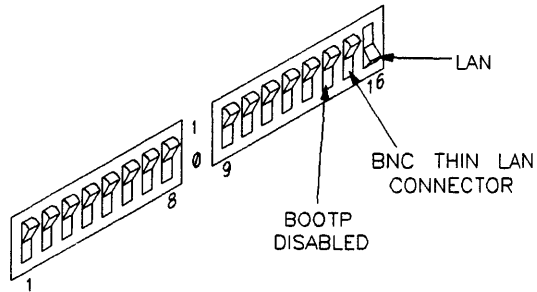
The default number (6470) can be changed if they conflict with some other product on your network.

2. Connecting the HP 64700 Series Emulator to the LAN

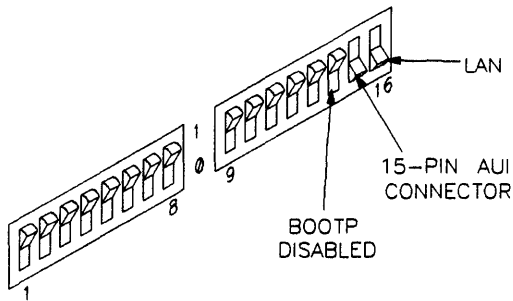
Once the network parameters are set via the Terminal Interface, you must turn OFF the HP 64700 Series Emulator, connect the HP 64700 Series Emulator to the LAN, and change the HP 64700 Series configuration switch settings. Whenever the HP 64700 Series Emulator is to communicate with the host computer over LAN, switch 16 must be set.

3. Set the Communication Configuration Switches

If you use the BNC connector, the HP 64700 Series configuration switches should be set as shown below.



If you use the 15-pin AUI connector, the HP 64700 Series configuration switches should be set as shown below.



4. Turn ON the HP 64700 Series Emulator.

Using BOOTP Protocol

The BOOTP software is shipped with HP-UX version 8.0 or later. Your Hewlett-Packard Sales Engineer can provide the BOOTP software if you have an earlier version of HP-UX.

If you have HP-UX version 8.0 or later or have acquired the BOOTP software from your HP Sales Engineer, you must check to see that your machine supports BOOTP. If the following commands yield the results shown below, your machine supports the BOOTP protocol.

```
# grep bootp /etc/services return
bootps      67/udp
bootpc      68/udp

# grep bootp /etc/inetd.conf return
bootps dgram udp wait root
/etc/bootpd bootpd
```

If the commands did not yield the results shown, you must either add BOOTP support to your HP 9000 or configure the HP 64700A LAN parameters via the Terminal Interface.

1. Adding BOOTP Support to Your HP 9000.

BOOTP is provided with HP-UX version 8.0 or later or it can be provided by your HP Sales Engineer if you have an earlier version of HP-UX. If you do not have BOOTP, you must configure the HP 64700A LAN parameters via the Terminal Interface.

If you have HP-UX version 8.0 or later, you can add BOOTP by doing the following steps.

Become root user.

Edit the /etc/services file and insert the following lines:

```
bootps      67/udp          # bootpserv; BOOTP (RFC 951)
bootpc      68/udp          # bootpclic; BOOTP (RFC 951)
```

a. Become root user.

b. Edit the `/etc/services` file and insert the following:

```
bootps      67/udp      # bootpserver; BOOTP (RFC 951)
bootpc      68/udp      # bootpcclient; BOOTP (RFC 951)
```

c. Next, edit the `/etc/inetd.conf` file and insert the following line:

```
bootps dgram udp wait root /etc/bootpd bootpd
```

d. Finally, enter the following command to reconfigure the Internet services daemon.

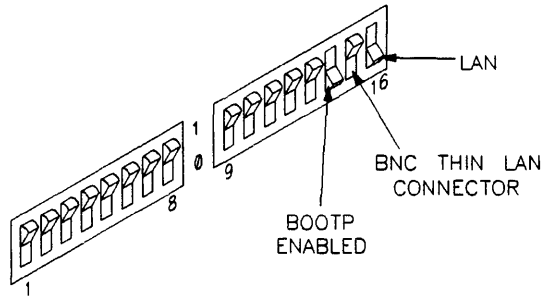
```
# inetd -c return
```

Verification of the configured LAN parameter can be verified simply by being able to telnet to the HP 64700 Series Emulator.

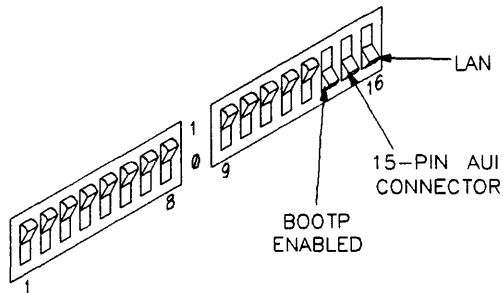
For additional information about using `bootpd`, refer to the HP-UX man pages.

2. Connecting the HP 64700 Series Emulator to the LAN

If you use the BNC connector, the HP 64700 Series configuration switches should be set as shown below.



If you use the 15-pin AUI connector, the HP 64700 Series configuration switches should be set as shown below.



3. Configuring LAN Parameters with BOOTP Protocol

- a. If your host provides the BOOTP service, you will need to make an entry to the host BOOTP database file.

Edit the file `/etc/bootptab`. For example:

```
# Define a global entry which specifies what every host uses.

global.dummy:\
    :SM=255.255.248.0:\
    :vm=auto:hn:\
    :bs=auto:

hplsdai.hp.com:tc=global.dummy:ht=1:ha=080009090B0E:ip=192.6.29.31
```

The link-level address is printed on the LAN card and on the HP 64700 Series Emulator rear panel. The `inet-addr` and the `node-name` are the IP address and node name you obtained from your local LAN administrator for use by the HP 64700 Series Emulator.

4. Turn ON the HP 64700 Series Emulator. Verify that both green lights stay on after 20 seconds by looking through the front panel grill.

The HP 64700 Series Emulator will make the BOOTP request for its Internet Address (when switch 14 and switch 16 are set to 1). After picking up the IP address over bootp, it is now stored in EEPROM and switch 14 should be set back to zero so this operation is NOT rerun everytime the HP 64700 Series Emulator is powered down and back on again.

Step 4: Setting Up the 64700tab.net File

When connecting the HP 64700 Series via the LAN interface, the Softkey Interface reads the `/usr/hp64000/etc/64700tab.net` file to find out which interface is being used to communicate with a particular HP 64700 Series Emulator over the network. The `64700tab.net` file below shows the proper interface characteristics to specify when using the LAN interface.

```
#-----#
# Channel | Logical | Processor | Remainder of Information for the Channel
# Type   | Name   | Type     | (IP address for LAN connections)
#-----#
lan:    my68k    m68000    21.17.9.143
```

This file is shipped with read-only permissions. If you wish to allow any user to be able to modify this file, change its mode with:

```
chmod +w 64700tab.net
```

For more information about the `64700tab.net` file (and the original `64700tab` file), enter:

```
$ man 64700tab 
```

Step 5: Verifying Communications

To verify communications between the HP 9000 and the HP 64700 Series Emulator, enter the following command:

```
#emul700 -l my68k
```

where `my68k` is the logical name you configured in the `64700tab.net` file. You are now ready to run performance verification on the HP 64700 Series Emulator.

Step 6: Running the Performance Verification Tests

While accessing the HP 64700 Series Emulator via the LAN interface, you can run performance verification on everything but the LAN card.

The only way to run performance verification on the LAN card is to connect the HP 64700 Series Emulator to a terminal or one of the HP 9000's RS-422 or RS-232-C interfaces. Refer to the following sections for information on connecting the HP 64700 Series Emulator via one of these interfaces. Instructions for running LAN PV is provided in the chapter entitled *Service*.

Accessing the HP 64700 Series Emulator using Telnet

Telnet is a network means to get direct access to the terminal mode interface of the HP 64700 Series system. After the HP 64701A LAN card is configured with an IP Address (for example 192.6.94.2), the HP 64700 Series system can be accessed by issuing the command:

```
telnet 192.6.94.2
```

This connection is identical to an RS-232-C connection with the full HP 64700 Series command set available as specified in the *HP 64700 Series Terminal Interface Reference* manual.

If the etc/hosts file has an entry for the IP Address,

```
192.6.94.2          hpemul
```

the telnet connection can be made by a reference to the host name.

```
telnet             hpemul
```

The telnet session with the HP 64700 Series system can be ended by typing a <CTRL> <D>.

Connecting the HP 64700 Series Emulator via the RS-422/RS-232-C Interface

You can connect the HP 64700 Series RS-422/RS-232-C interface (port A) to the following HP 9000 interfaces:

- HP 98659A High Speed RS-422 Interface.
- Built-in RS-232-C Interface of the HP 9000 Model 345/375 Workstations.
- Built-in RS-232-C Interface of the HP 9000 Series 400 Workstations.
- HP 98642A 4-Channel Multiplexer Interface (RS-232-C).
- HP 98628A Datacomm Interface (RS-232-C).

Caution



The HP 98628A and HP 98642A interface cards are used primarily for host-to-peripheral transfers. They are less capable of supporting the large peripheral-to-host transfers required by the HP 64700 Series Emulator. You may see dropped characters and/or other communications failures when using these cards in this manner. If these situations occur, you may need to press **Ctrl C** (to send a SIGINT signal) to the user interface to recover control of the emulator. Some information may be lost in this case.

A communications failure during a binary transfer of trace data or absolute files can cause an emulation session to "end release" or a debug session to "quit" when using an RS-232-C interface.

Note

The HP 98642A 4-Channel Multiplexer Interface card may have an unacceptable error rate in some applications. Reducing the baud rate and/or the load on the host computer may help.

The HP 98642A card has four ports. The "modem" port has the lowest error rate when used with the HP 64700 Series Emulator. Port 3 has the highest error rate.

Table 3-1. RS-422/RS-232-C Configuration

HP 9000 Interface	Use HP Cable	Maximum Baud Rate	DCE/DTE	Handshake	HP 64700A Configuration Switches (1 - 16)
HP 98659A	98659-63001	230,400	DCE	RTS	1110 1000 0001 0000
Model 345/375 Built-In RS-232-C Interface	24542M ¹	115,200	DCE	RTS	1100 0000 0001 0000
Series 400 Built-In RS-232-C Interface	92219G ¹	115,200	DCE	RTS	0010 0000 0001 0000
HP 98642A	98642-66506 ² 98642-66508	19,200	DCE DTE	XON	0010 0000 0000 1000 0011 0000 0000 1000
HP 98628A	5061-4215	19,200	DTE	XON	0011 0000 0000 1000

¹ Cable is NOT supplied with the HP 9000 computer.
² The 98642-66506 cable is used with the modem port and the 98642-66508 cable is used with the terminal ports.

When connecting the HP 64700 Series Emulator to the HP 9000 Workstation via the RS-422/RS-232-C interface, these are the steps you must take:

1. Install software.
2. Make HP-UX kernel modifications.
3. Install the interface card into the HP 9000 Workstation (unless a built-in interface is being used).
4. Connect the HP 64700 Series Emulator to the interface card.
5. Create a device file for the interface card.
6. Configure the HP 64700 Series Emulator.
7. Verify communications and run performance verification tests.

Step 1: Installing Software

The filesset "64700" (64700 SERIES EMULATION COMMON FILES) must be installed in order to proceed with the following instructions. This filesset is in partition "64801" (64000-UX OPERATING ENVIRONMENT).

If you didn't install the HP 64700 Series software, go back to the beginning of this chapter and follow the steps for software installation. Then return here.

Step 2: Making HP-UX Kernel Modifications

When you add an RS-422/RS-232-C interface card, you must modify the HP-UX kernel so that it contains the proper interface driver. Also, depending on the HP-UX kernel version, you may need to install kernel patches in order to use the built-in RS-232-C interfaces of the Model 345/375 or Series 400 Workstations.

Login to the HP 9000 as root.

Note



On a diskless cluster, you must login to the node to which the HP 64700 Series Emulator will be connected.

Step 2a: Modifying Kernel Library Files

If you are using the HP 98642A or HP 98628A interfaces, you can skip this step and go on to step 2b.

If you are using the HP 98659A or the built-in RS-232-C interfaces of the Model 345/375 or Series 400 Workstations, follow the instructions in the appropriate section below.

Model 345/375 and Series 400 Built-In RS-232-C Interface

Prior to HP-UX version 7.05, you must add some custom patches in order to use the built-in RS-232-C port for communication with the HP 64700 Series Emulator at 115200 baud; specifically, add customer patches to version 7.02 and 7.03 (patches will also work with version 7.05) The patches, and instructions for installing those patches, are in a shell archive "hs232.shar-7.0" in the directory /etc/conf.

To unpack the shell archive, enter the following commands.

```
# cd /etc/conf 
```

```
# sh hs232.shar-7.0 
```

Save your original kernel libraries files and archive the new object files into the libraries with the following commands. (The patches are backward compatible for use with other workstations.)

```
# cp libmin.a libmin.a.old 
# cp libdreq.a libdreq.a.old 
# ar -r libmin.a pci.o 
# ar -r libdreq.a kernel.o 
# ar -r libdreq.a tt0.o 
```

Add the new baud rates to /usr/include/termio.h by editing the file and adding the contents of /etc/conf/termio.h.sup. (This is not required unless you plan on using the new baud rates for other applications.)

HP 98659A Select the correct HP 98659A driver object file for your current HP-UX kernel release, then copy it to 98659.o. If you are uncertain about which HP-UX version you have, execute the command **uname -a**. The "98659.README" file will tell you which object file is correct for your current HP-UX kernel. As an example, if your system is running HP-UX 7.0, you would enter:

```
# cp 98659.o-7.0 98659.o 
```

Next, archive the HP 98659A driver object file into the kernel development library (the object file is 98659.o). Enter:

```
# ar -r libdevelop.a 98659.o 
```

Step 2b: Adding the Interface Driver

If you are using the built-in RS-232-C interface of the Series 300 Model 345/375 or Series 400 Workstations, you can skip this step and go on to step 2c.

When installing an interface card, you must insert entries required for the card in the /etc/conf/dfile and /etc/master files. The entry in "dfile" tells the **config** command what drivers to include in the kernel. The "master" file contains information on the devices that are specified in the system description file (dfile).

Change to the /etc/conf directory. Enter:

```
# cd /etc/conf 
```

Edit the file named "dfile".

Add the appropriate entries before the swap space entries in your dfile:

```
* 98659 RS-422/64700 High Speed Interface
98659
* 98642 RS-232-C Multiplexer Interface
98642
* 98628 RS-232-C Datacomm Interface
98628
```

Edit the */etc/master* file and add the appropriate line in the first section which lists cards/devices that can be specified in the system description file.

```
98659    ody        1        1FC    -1    52
98642    sio642     10       100    -1    -1
98628    sio628     10       100    -1    -1
```

Step 2c: Build the New Kernel

First, generate the "conf.c" and "config.mk" files. Enter:

```
# config dfile 
```

Now, to build the kernel, enter:

```
# make -f config.mk 
```

Replace the present kernel with the new kernel.

If your host computer is part of a diskless cluster, enter:

```
# cp /hp-ux+/(nodename)
/hp-ux+/(nodename).BCK 
# cp ./hp-ux /hp-ux+/(nodename) 
```

If your host computer is a stand-alone system, enter:

```
# cp /hp-ux /SYSBCKUP 
# cp /etc/conf/hp-ux /hp-ux 
```

Whenever you reconfigure the HP-UX kernel, you must reboot the workstation. If you are installing an interface card, you need to halt the workstation and turn power OFF in order to install the interface card -- the computer will reboot when you turn it back ON.

Shut your system down.

```
# cd / 
```

```
# shutdown -h 0 
```

When the system is halted (the message "halted" will appear in the lower right-hand corner of the display), turn OFF power to the HP 9000, and unplug the power cord.

Step 3: Installing the Interface Card

If you are using the built-in RS-232-C interface of the Series 300 Model 345/375 or Series 400 Workstations, you can skip this step and go on to step 4.

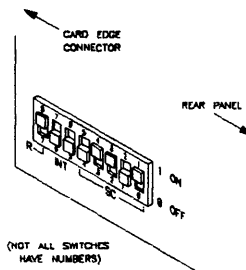
If you are installing the HP 98659A interface card, refer to the *High Speed RS-422 Interface Installation Manual* for complete details.

If you are installing the HP 98642A or HP 98628A interface cards, refer to the *HP-UX Installing Peripherals* manual for complete details.

Examples of interface card configuration switch settings are shown in the following diagrams.

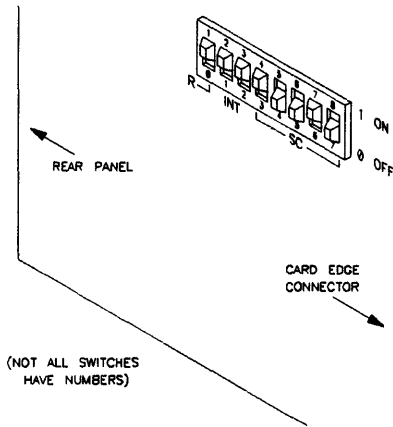
HP 98659A

The diagram below shows the settings for select code 13.



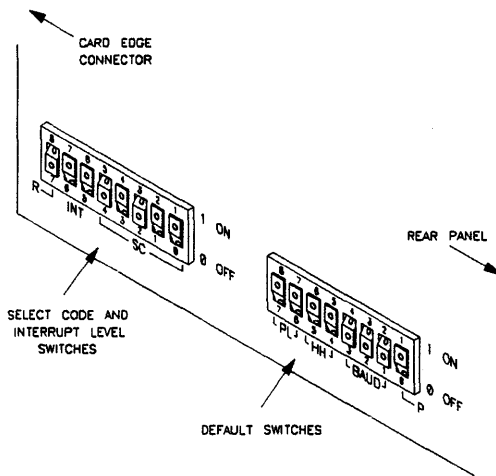
HP 98642A

The diagram below shows the settings for select code 13.



HP 98628A

The diagram below shows the settings for select code 20.



Step 4: Connecting the HP 64700 Series Emulator to the HP 9000 Interface

Connect port A of the HP 64700 Series Emulator to the HP 9000 interface using the appropriate cable listed in table 3-1.

After the HP 64700 Series Emulator is connected to the HP 9000 interface, reconnect the power cord to the HP 9000, and power-up the workstation.

If you installed an interface card, the boot rom will include one of the following entries in its table:

```
98659A at "sc"  
98642A at "sc"  
98628A at "sc"
```

(sc is the decimal select code of the interface)

And the hp-ux boot program will print out the appropriate message:

```
HP98659 RS-422 64700 interface at select code "sc"  
HP98642 RS-232-C Multiplexer at select code "sc"  
HP98628 RS-232-C Datacomm Interface at select code "sc"
```

(sc is the decimal select code of the interface)

If one of the following messages is displayed,

```
HP98659 RS-422 64700 interface at select code "sc"  
ignored; interface driver not present.  
  
HP98642 RS-232-C Multiplexer at select code "sc"  
ignored; interface driver not present.  
  
HP 98628 RS-232-C Datacomm Interface at select code "sc"  
ignored; interface driver not present.
```

go back to step 2 ("Making HP-UX Kernel Modifications") and make sure that you have properly installed the driver.

Step 5: Creating a Device File

Login as root on the HP 9000 to which the HP 64700 Series Emulator will be connected.

When naming device files, the prefix "emcom" is preferred over "tty" because some system administration tools automatically configure login ports and overwrite "tty" files. Therefore, do not use "tty" in HP 64700A device files.

Follow the instructions in the appropriate section below.

HP 98659A

Create the device file for the HP 98659A interface using the following command.

```
# mknod /dev/emcomSc c 1 0xSc0004 
```

Sc is the select code. For example, if the select code of the HP 98659A is 13, create the device file with the following command.

```
# mknod /dev/emcom13 c 1 0x0d0004 
```

```
# chmod +w /dev/emcom13 
```

Observe the entry for the device file. Enter:

```
# ll /dev/emcom13 
```

The list should be:

```
crw-rw-rw-  1 root      other  1 0x0d0004 Oct 11 10:09 /dev/emcom13
```

Model 345/375 and Series 400 Built-In RS-232-C Interface

Create the device file for the built-in RS-232-C interface using the following command.

```
# mknod /dev/emcom9 c 1 0x090088 
```

```
# chmod +w /dev/emcom9 
```

Observe the entry for the device file. Enter:

The list should be:

```
crw-rw-rw-  1 root      other  1 0x090088 Oct 11 10:09 /dev/emcom9
```

HP 98642A

Create the device file for the HP 98642A interface using the following command.

```
# mknod /dev/emcomSc c 1 0xScPo04 
```

Sc is the select code, and Po is the port number (where 00 is the modem port and 01, 02, and 03 are the terminal ports). For example, if the select code of the HP 98642A is 13 and you will be using the modem port, create the device file with the following command.

```
# mknod /dev/emcom13 c 1 0x0d0004 
```

```
# chmod +w /dev/emcom13 
```

Observe the list for the device file. Enter:

```
# ll /dev/emcom13 
```

The list should be:

```
crw-rw-rw-  1 root      other  1 0x0d0004 oct 11 10:09 /dev/emcom13
```

HP 98628A

Create the device file for the HP 98628A interface using the following command.

```
# mknod /dev/emcomSc c 1 0xSc0000 
```

Sc is the select code. For example, if the select code of the HP 98628A is 20, create the device file with the following command.

```
# mknod /dev/emcom20 c 1 0x140000 
```

```
# chmod +w /dev/emcom20 
```

Observe the entry for the device file. Enter:

```
# ll /dev/emcom20 
```

The list should be:

```
crw-rw-rw- 1 root      other      1 0x140004 Oct 11 10:09 /dev/emcom20
```

Step 6: Configuring the HP 64700 Series Emulator

Set the HP 64700 Series configuration switches as described in table 3-1.

Connect the power cord to the HP 64700 Series Emulator, and set the line switch to the ON position. Verify that both green lights stay on after 20 seconds by looking through the front panel grill.

Step 7: Verifying Communications

You cannot run the HP 64700 Series performance verification (`pv`) command from within the HP-UX hosted interface. You can, however, run the HP 64700 Series performance verification by using the UNIX `cu` command to connect to the firmware-resident Terminal Interface.

Before you can use the `cu` command to connect to the emulator's Terminal Interface, the following line must be present in the `/usr/lib/uucp/Devices` file:

```
Direct emcomSc - (baud rate) direct
```

`emcomSc` is the name you gave the device file (e.g. `/dev/emcom20`), and the baud rate is the number shown in table 3-1.

Enter the following command to connect to the emulator's firmware-resident Terminal Interface:

```
# cu -l emcomSc 
```

The command above causes the word "Connected" to appear on your display. If you press , you should see the Terminal Interface prompt (for example, "R>", "M>", or "U>", etc.).

If you do see a prompt, the HP 9000 is communicating with the HP 64700 Series Emulator as it should.

If you do not see a prompt, make sure:

- The HP 64700 Series Emulator powered is ON.
- The HP 64700 Series configuration switches are set correctly.
- The correct interface cable is being used and that the cable is securely connected.

To run the emulator's performance verification tests once, enter:

```
R>pv 1 
```

Setting Up the 64700tab.net File

The Softkey Interface and other products that communicate with the HP 64700 Series Emulator read the file named /usr/hp64000/etc/64700tab.net to find out which interface is being used to communicate with a particular HP 64700 Series Emulator. The 64700tab.net file also describes the baud rate and other characteristics of the interface. For example, the 64700tab.net file below shows the proper interface characteristics to specify when using the HP 98659A interface.

```
#-----#
# Channel Logical processor Host Physical Xpar Baud Parity Flow Stop Char
# Type Name Type Name Device Mode Rate Rate XON Bits Size
# OFF NONE RTS 2 8
#-----#
serial: em68k m68000 myhost /dev/emcom23 OFF 230400 NONE RTS 2 8
```

For more information about the 64700tab.net file, enter the following command:

```
$ man 64700tab 
```

Note



Software products issued prior to December, 1990 read the 64700tab file instead of the 64700tab.net file. If you are using products dated before December, 1990, add an entry to the 64700tab rather than the 64700tab.net. Products issued after December, 1990 read both files; this supports backward compatibility.

To verify your new entry, use this command:

```
emul700 -l em68k
```

where *em68k* is the logical name you configured in the 64700tab.net file.

**Additional
Information about
HP 98659A**

Additional information about the HP 98659A is contained in the *HP 98659A High-Speed RS-422 Interface Card Installation* Manual. The manual is supplied with the HP 98659A. The chapter "Service" provides information on Performance Verification.

The "HP 98659A Performance Verification" in the "Service" chapter contains information about running performance verification on this card. This information is also found in the help file in directory */usr/CE.utilities/98659*.

HP 64700 Series Installation on a PC

This installation procedure will show you how to set up your HP 64700 Series Emulator/Analyzer connected to an HP Vectra PC or IBM PC-AT compatible computer running MS-DOS. The connection can be made via RS-422 or RS-232-C. This installation covers RS-232-C only. A separate installation procedure ships with the HP 64037A RS-422 interface .

Component Checklist

Before you begin, check to be sure that you have all of the necessary components.

1. Complete HP 64700 Series system, one power cable, and manuals.

Binders are supplied containing one or more manuals.

- a. HP 64700 Series Installation/Service guide (this manual).
 - b. PC Interface Emulator/Analyzer User's Guide/Reference.
 - c. Terminal Interface User's Guide.
2. HP Vectra PC or IBM PC-AT compatible computer with MS-DOS 3.1 or greater, 640 Kbytes memory, and a fixed disk drive (up to 750 Kbytes disk space required)

You can determine your version of MS-DOS, by typing 'VER' at the MS-DOS prompt:

```
C> VER 
```

To determine memory and available disk space, type 'CHKDSK' at the MS-DOS prompt:

```
C> CHKDSK 
```

A message similar to the following example will be displayed:

```
21309440 bytes total disk space
 59392 bytes in 4 hidden files
 122880 bytes in 56 directories
16783360 bytes in 986 user files
4343808 bytes available on disk  <-- available disk space

651264 bytes total memory  <-- total memory (640 Kbytes)
562688 bytes free
```

3. Disks supplied with HP 64700 Series Emulators (7 disks)

a. EMUL/TIMING PC INTERFACE (4 disks)

Contains the PC Emulation Interface and the Timing Interface Software. The first of four disks is the MASTER APPLICATION DISK, which contains the install program used to install this and the assembler software.

b. USER DEFINABLE ASSEMBLER (1 disk)

Contains core assembler files.

c. CROSS ASSEM/LINKER (1 disk)

Contains microprocessor-specific assembler files.

d. EMUL/BACKGROUND MONITOR (1 disk)

*** Not Required For Installation ***

Contains foreground monitor source files to allow user customization of the monitor. Details can be found in the PC Interface User's Guide.

e. FLASH EPROM EMULATION FIRMWARE (1 or more disks)

4. Serial interface card for your PC.

At least one is included with your PC. You will need to know if the connector you are going to use is SERIAL 1 (COM1) or SERIAL 2 (COM2). This can be determined by removing the card from the PC and looking at the switches on the card for each connector. For help on this, refer to your PC and/or serial card manual(s).

If you have more than one serial card installed, you can have up to four serial ports with the possible additions of SERIAL 3 (COM3) and SERIAL 4 (COM4). The HP 64700 Series Emulator can use any of these; just remember which one you are using.

5. RS-232-C Cable (NOT INCLUDED WITH HP 64700 Series Emulators)

You will need the cable appropriate to the connector you will be using.

Recommended cables are:

HP 13242N cable

Connectors: 25-pin male to 25-pin male

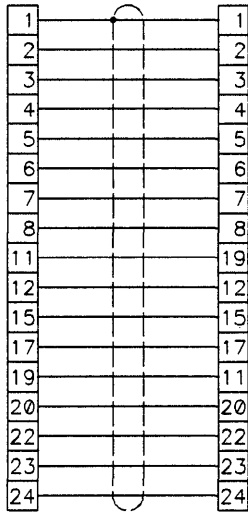
HP 24542M

Connectors: 9-pin female to 25-pin male

These cables are available from your local Hewlett-Packard sales representative or your authorized distributor sales representative; they are equivalent to a MODEM cable.

13242N RS-232-C 25-25 pin

CPU HP 64700
25-pin M 25-pin M



24542M RS-232-C 9-25 pin

CPU HP 64700
9-pin M 25-pin M

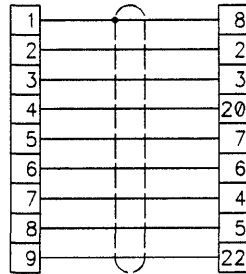


Figure 4-1. RS-232-C Pin-outs

If you want to build your own RS-232-C cable, follow one of the pin-outs shown above for HP cables (figure 4-1).

Hardware Installation

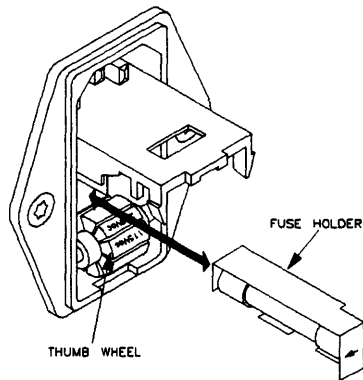


Figure 4-2. Line Voltage and Fuse



1. Check the power control module on the rear panel to ensure the HP 64700 Series Emulator is factory preset to the correct voltage for your country (110 VAC or 220 VAC). See figure 4-2.
2. Be sure the power (line) switch is off. Then connect the power cable to the rear panel and the other end into a power outlet. Do not power-up the HP 64700 Series Emulator until configuration switches are properly set. Instructions for setting these switches are given in Step 6 (figure 4-3).
3. Plug the 25-pin end of the RS-232-C cable to PORT A on the rear of the HP 64700 Series Emulator. Ensure good connection by tightening the connector screws.

Note



This cable is NOT supplied as part of the HP 64700 Series Emulator (see table 5-1 Tables of Cables). Refer to the Component Checklist section of this chapter for information on recommended cables. Then return here.

4. Plug the other end (9-pin or 25-pin) of the RS-232-C cable into the RS-232-C connector on the rear of the PC. Ensure good connection by tightening connector screws.

Determine which communication port you are using. (Typically this will be designated as COM1 or COM2 but it could be COM3 or COM4 as well). You will need this information for the PC software installation.

To determine which port you are using, go back to step 4 of the Component Checklist section. Then return here.

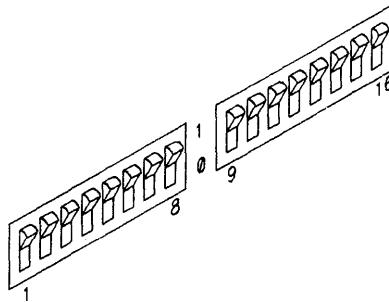


Figure 4-3. Communication Configuration Switches

5. Set each set of eight 'COMM CONFIG' (communications configuration) switches on the rear panel of the HP 64700 Series Emulator to the zero, or open, position (figure 4-3).

Note



Switch settings are enabled ONLY after the HP 64700 Series Emulator is powered up. Any changes made to the switches after power-up will not be enabled until you turn the HP 64700 Series Emulator off and back on again).

6. Hardware installation is now complete. The HP 64700 Series Emulator does not have to be turned on until after software installation is complete.

Software Installation

1. Insert the EMUL/TIMING PC INTERFACE MASTER APPLICATION DISK into drive A:
2. Change MS-DOS prompt to drive A: by typing 'A:' at the MS-DOS 'C>' prompt.

C> A:

3. The install program allows you to selectively install the PC interface, the timing interface, the assembler, and the user-definable assembler software. You should, at a minimum, install the PC interface, the assembler, and the user-definable assembler software.

The timing interface software is required only if you have external state/timing analysis capability, the HP 64703A 64-channel analyzer with 16 external state/timing analysis probes. If you have NOT installed this analyzer state/timing analyzer, there is no need to install this software.

At the MS-DOS prompt A>, type 'INSTALL':

A> INSTALL

After confirming that you want to continue with the installation, the install program will give you the option of changing the default drive and/or subdirectory where the software will reside. The defaults are:

Drive = C:

Directory Path = C:\HP64700

Follow the remaining instructions to install the separate software packages. These instructions include editing your CONFIG.SYS and AUTOEXEC.BAT files. Details follow in the next steps.

4. After completing the install program, use the PC editor of your choice and edit the \CONFIG.SYS file to include these lines:

```
BREAK=ON
FILES=20
```

BREAK=ON allows the system to check for two break conditions, CTRL break and CTRL c.

FILES=20 allows 20 files to be accessed concurrently. This number must be at LEAST 20 to allow the PC interface to operate properly.

5. Edit the AUTOEXEC.BAT file to add:

```
C:\HP64700\BIN (to the end of the PATH
variable)
SET HPTABLES=C:\HP64700\TABLES (as a new
line)
```

Part of an example AUTOEXEC.BAT file resembles:

```
ECHO OFF
SET HPTABLES=C:\HP64700\TABLES
PATH=C:\DOS;C:\HP64700\BIN
```

6. If you are NOT using COM1 or COM2 as your communication ports, you will need to edit the \HP64700\TABLES\64700TAB file. Otherwise, this file contains default entries to establish the communications connection for COM1 and COM2. The content of this file is:

```
# Lines beginning with '#' are ignored. The following information must
# be in the specified order.
```

logical name	processor type	physical device	xpar mode	baud rate	parity	flow XON/	stop bits	character size
emul_com1	<emul>	COM1	OFF	9600	NONE	ON	1	8
emul_com2	<emul>	COM2	OFF	9600	NONE	ON	1	8

If you used COM3 or COM4 as your ports, either add another line or modify one of the existing lines. For example:

```
emul_com3 <emul> COM3 OFF 9600 NONE ON 1 8
emul_com4 <emul> COM4 OFF 9600 NONE ON 1 8
```

7. Software installation is now complete. The PC must be rebooted to enable the changes made to the CONFIG.SYS and AUTOEXEC.BAT files. To reboot, press the <CTRL> <ALT> keys simultaneously.

After rebooting the PC, turn on the HP 64700 Series Emulator and start the PC interface by typing in the <startup command> at the MS-DOS prompt:

```
C> <startup command> EMUL_COM1 <Return>
```

Refer to the *PC Interface User's Guide* for the <startup command> specific for your HP 64700 Series Emulator. Some examples for starting up the PC Interface using COM1:

```
C> PCM68K EMUL_COM1 (for 68000)
C> PCM68332 EMUL_COM1 (for 68332)
C> PCAM29K EMUL_COM1 (for Am29000)
C> PCZ80 EMUL_COM1 (for Z80)
C> PC8051 EMUL_COM1 (for 8051)
C> PCI808X EMUL_COM1 (for 808x)
C> PCI18X EMUL_COM1 (for 8018x/80C18x)
```

'EMUL_COM1' is the logical emulator entry from your C:\HP64700\TABLES\64700TAB file which, in this instance, uses the COM1 port.

System Configuration

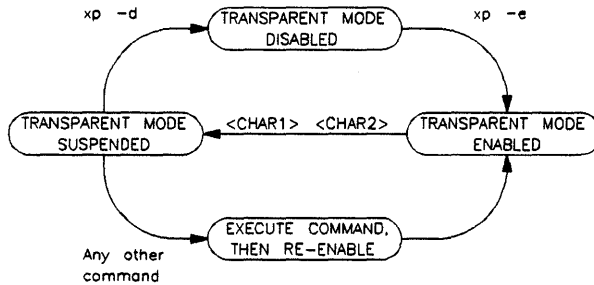
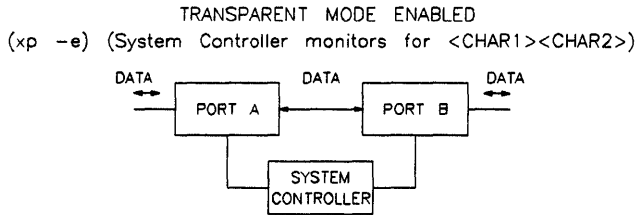
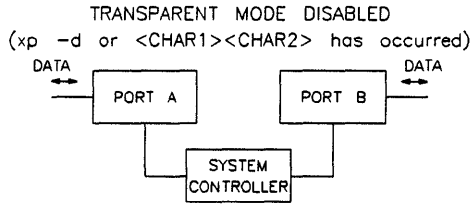
Choosing an Emulator Configuration

Before you proceed further with installation of your HP 64700 Series Emulator, you need to decide how you will configure the emulator with your terminals/host computers and peripherals. This chapter shows you various HP 64700A configurations using ports A and B, and the Local Area Network (LAN) so that you can select the best one for your needs.

HP 64700 Series Data Communications Overview

Each HP 64700 Series Emulator has two data communications ports that can be configured to receive commands. The one labeled Port A is the Main data communications port and can be used as a DTE (Data Terminal Equipment) port or as a DCE (Data Communications Equipment) device. The one labeled Port B is the auxiliary data communications port and can only be used as a DCE port. In addition, Port A can act as an RS-422 or RS-232-C device; Port B can only act as an RS-232-C port. Each port allows certain handshake parameters and a variety of baud rates (although Port B is more restricted than Port A in this regard).

One of the unique features of the two ports is that you can configure them into a transparent mode. When operating normally, data passing through Port A is independent of that passing through Port B and vice versa. However, when you give the emulator a command called **xp -e**, the emulator is put into transparent mode. When in transparent mode, all information received by Port A is sent directly to Port B and vice versa. The data is monitored by the HP 64700 Series system controller but not acted upon until a two-character escape sequence (either **<ESC>g** or one defined by you) is encountered, when the emulator temporarily suspends the transparent mode communications.



NOTE: xp -d, xp -e, and <CHAR1> <CHAR2> are the terminal interface commands to disable, enable, and suspend transparent mode.

Figure 5-1. Transparent Mode Operations

You may then enter an `xp -d` command, which completely disables transparent mode; or, you may enter another emulator command, to be executed by the emulator before returning to transparent mode. See figure 5-1 for a summary diagram transparent mode.

Note



Throughout this chapter, when you see HP 64700 Series ports labeled "A" and "B" in a diagram, these correspond to Port A and Port B on an HP 64700 Series Emulator. Remember that the configurations could have ports A and B reversed, depending on your needs. For example, it is not necessary in every case to have Port A connected to a data terminal and Port B connected to a host computer. You could just as easily connect B to the terminal and A to the host; this, in fact, would be the preferred configuration.

The HP 64700 Series Emulators provide transparent mode operation so that you can control multiple HP 64700 Series Emulators or other RS-232-C peripherals without using more than one data communications port from your terminal or host computer.

Now that you have seen a description of transparent mode, you can read on and learn about each of the possible emulator configurations. Remember, in any given set of emulator configurations, you may have these types of equipment:

- Data Terminals
- Host Computers (such as an HP Vectra or HP 9000 Series 300/400 Series Workstation running HP-UX)
- HP 64700 Series Emulators (possibly more than one)
- Peripherals (such as printers)

HP 64700 Series Emulator Configurations

Each of the possible general configurations described in the chapter are focused on how you connect your HP 64700 Series Emulator to controlling devices, such as data terminals and host computers. Other subtleties of configuration are possible, as we will point out later. When choosing a configuration, your overriding concern is the question of how to control your emulator.

Stand-alone Configuration

In Stand-alone Configuration, the following are true:

1. Your HP 64700 Series Emulator is connected directly to a display terminal.
2. Your HP 64700 Series Emulator is not connected to a host computer.

See figure 5-2. This configuration allows you to control the emulator using the emulator's built-in Terminal Interface software.

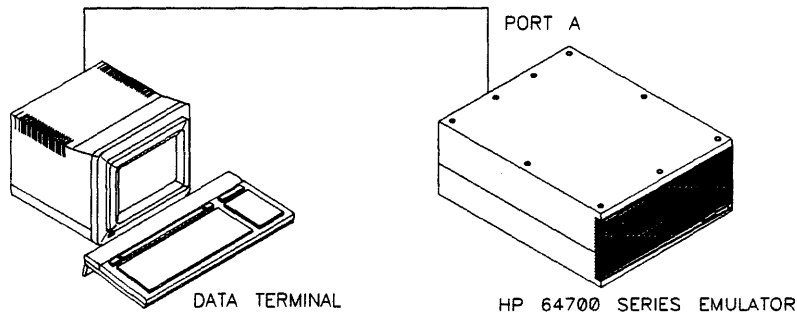


Figure 5-2. Standalone Configuration

Advantages of the stand-alone configuration are that you can control each emulator function directly, as the Terminal Interface allows you complete control over emulator operation. The disadvantage is that you do not have the resources of a host computer to use in assembling/compiling and downloading code into the emulator. You also do not have an access to host computer

resources, which would allow you to combine frequently used commands into command files, or save the emulator configuration into a host file for later reuse. You also need host resources if you want to display timing measurements from the external state/timing analyzer.

Transparent Configuration

In Transparent Configuration, the following things are true:

1. Your HP 64700 Series Emulator is connected directly to a display terminal.
2. Your HP 64700 Series Emulator is also connected to a host computer.

See figure 5-3. In this configuration, you can use the emulator's built-in Terminal Interface software for emulator control. You now also have access to host computer resources by using the transparent mode of operation on the HP 64700 Series Emulator. This allows you to compile and assemble program files on the host computer and download them into the emulator for testing. You can also save the emulator's configuration and then load it into the emulator at your next emulation session.

Finally, you need to run only one RS-232-C data communications line to your emulator rather than two.

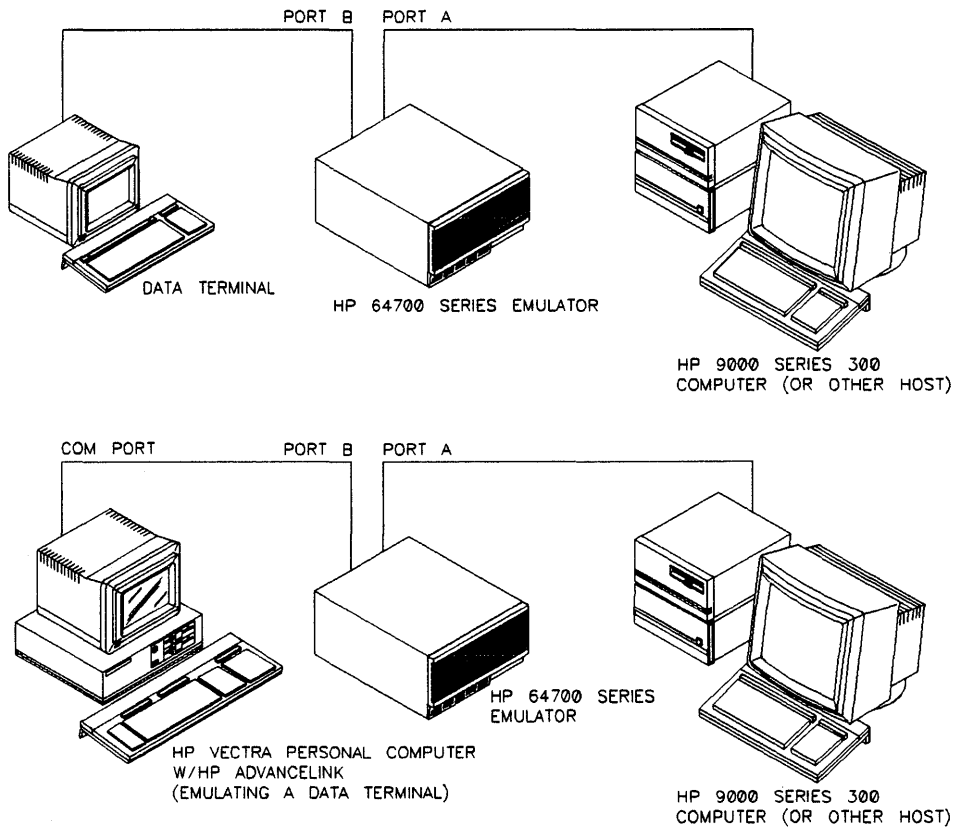


Figure 5-3. Transparent Configuration

Note



Notice the difference between the terms Transparent Mode and Transparent Configuration. **Transparent Mode**, refers to Port A and Port B of the emulator passing information directly through without processing the information as commands. **Transparent Configuration**, refers to the specific hardware configuration where a data terminal is connected to one port of the HP 64700 Series Emulator and a host computer is connected to the other port.

Remote Configuration

In Remote Configuration, the following are true:

1. Your HP 64700 Series Emulator is not connected directly to a display terminal (or to any other form of I/O line connecting your display and keyboard to the host computer).
2. Your HP 64700 Series Emulator is connected to a host computer.

See figure 5-4. The preferred method of controlling your emulator in Remote Configuration is to use one of the software interfaces for the HP 64700 Series Emulators. For the HP Vectra and other IBM PC-AT compatible personal computers running MS-DOS, you can use the HP 647nnS option 006 PC Interface. For the HP 9000 Series 300/400 Workstations, you can use the HP 647nnS option 006 Softkey Interface. The interface frees you from entering several Terminal Interface commands to accomplish a particular function. In addition, the interfaces post processing of data received from the emulator, allowing the display of timing information from the optional HP 64703A external state/timing analyzer

In this configuration, you can also control your emulator/debugger using the emulator's built-in Terminal Interface software. However, you will also need to have a data terminal emulation program running on your host computer that communicates with the host computer port you have chosen for the HP 64700 Series connection.

For example, if you decide to connect your HP 64700 Series Emulator to an HP Vectra personal computer, and want to control the emulator via the emulator's Terminal Interface Software, you would need a program such as HP's AdvanceLink software to communicate with the emulator.

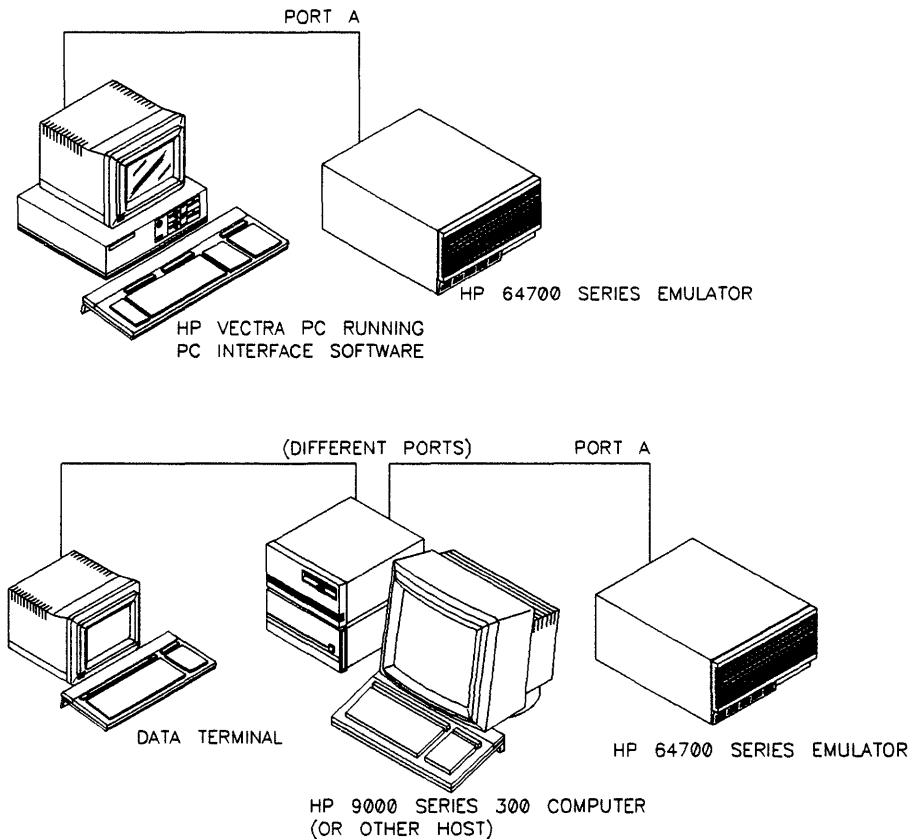


Figure 5-4. Remote Configuration

Using an HP 64100A Logic Development Station. In one variation on the remote configuration, you can use an HP 64100A development station in the terminal emulation mode to control the HP 64700 Series Emulator. Although you are restricted to using the Terminal Interface, you can develop code on the HP 64100A station and download it to the emulator using the transfer utility.

Note



When using the terminal emulation mode on the HP 64100A station, you must set the terminal configuration option "Remote device input buffer size" to the value "512." Refer to the *HP 64000 Terminal Mode Operating Manual* for information on this and other Terminal Mode configuration items.

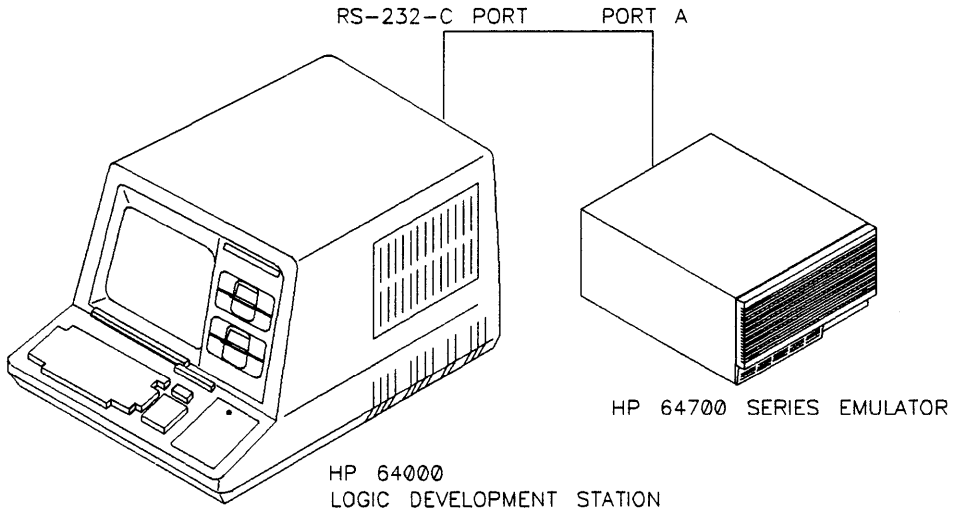


Figure 5-5. Using an HP 64100A Development Station

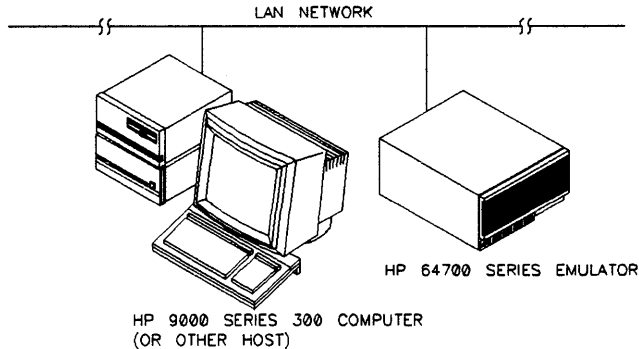


Figure 5-6. Local Area Network Configuration

Local Area Network (LAN) Configuration

In the LAN Configuration, the following are true:

1. Your HP 64700 Series Emulator is NOT connected to a display terminal (or to any other form of I/O line connecting your display and keyboard to the workstation).
2. Your HP 64700 Series Emulator is connected to the LAN (Ethernet).

See figure 5-6. In this configuration, emulator ports A and B are disabled and the LAN communication interface ports are enabled. The LAN card in the HP 64700 Series Emulator has two ports. The BNC port is used for a ThinLAN and the 15-pin attachment unit (AUI) port for ThickLAN. A ThinMAU (thin medium attachment unit) adapter can be added to the output of the 15-pin AUI to be used as a ThinLAN. The ThinMAU adapter is used when operating in an environment where Electrostatic Discharge (ESD) pulses are in excess of 2500 volts. The ThinMAU adapter is more reliable and less susceptible to ESD data corruption from ESD to the LAN cable.

Choosing a Configuration

You should now select a general emulator configuration from one of the choices presented. You can ask yourself some questions that may help you decide (see figure 5-7):

1. Do I have access to a host computer?

If so, you should probably use the Transparent Configuration or the Remote Configuration. Either of these configurations let you access valuable host resources that can simplify your emulation and debugging tasks.

2. If I'm going to use a host, when should I use Transparent Configuration versus Remote Configuration?

If your host is an HP Vectra personal computer or other IBM PC-AT compatible running MS-DOS, you will have to use Remote Configuration.

If your host is an HP 9000 Series 300/400 Workstation running HP-UX, or another multiuser machine, the answer depends on the availability of display terminals and data communications ports for your system. For example, if your local display terminal is a high-resolution display for the HP 9000 Series 300/400 Workstation such as an HP 92782A, you cannot use the transparent configuration. Instead, you must use the remote configuration. However, if your local display terminal is a standard RS-232-C type terminal such as an HP 2392A, you could use either configuration, depending on the number of free data communications ports, and your choices in controlling the emulator via the Terminal Interface Software or the Softkey Interface.

If you don't have access to a host computer, you must use at least a data terminal with a minimum set of RS-232-C data communications capabilities to control your emulator.

Once you have decided upon a configuration, you can proceed to the section entitled "Configuring Data Communications" and begin connecting your emulator data communications ports. If you want to know about some possible variations in configurations, some are described in the next section.

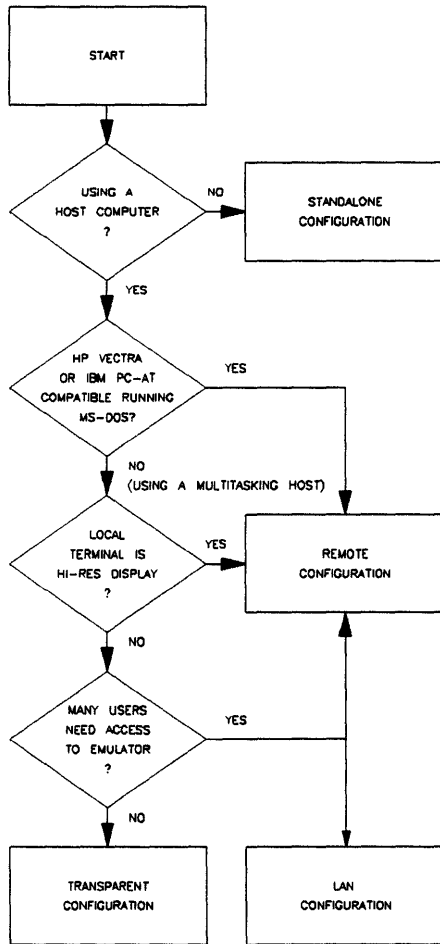


Figure 5-7. Configuration Selection Flowchart

Variations of the Standard Configurations

Connecting Multiple Emulators

All the configurations listed above will support daisy chained connections (Port B of first emulator to Port A of second emulator, etc.) See figure 5-8. This allows you to connect several emulators to a terminal or host computer (or both) using only a single data communications port from the terminal or host. Through creative use of the **xp** command in the HP 64700 Series built-in Terminal Interface Software, you can selectively communicate with any emulator in the chain. For more information about connecting multiple emulators, you can purchase the optional *Terminal Interface Documentation Package* that includes an *HP 64700 Series CMB User's Guide*.

Connecting a Printer or Modem

To conserve RS-232-C ports on your host or data terminal, you may wish to connect your host/data terminal to one of the HP 64700 Series ports and connect an RS-232-C peripheral, such as a printer or modem, to the other port (see figure 5-9). By using the HP 64700 Series **xp** command, you can selectively direct communications from your controlling device to the printer or modem. Or, you may use the **po** command to redirect all output from an emulation session to a printer.

Note



You can only use a configuration if the base configuration that includes a printer or modem is the Stand-alone Configuration or the Remote Configuration.

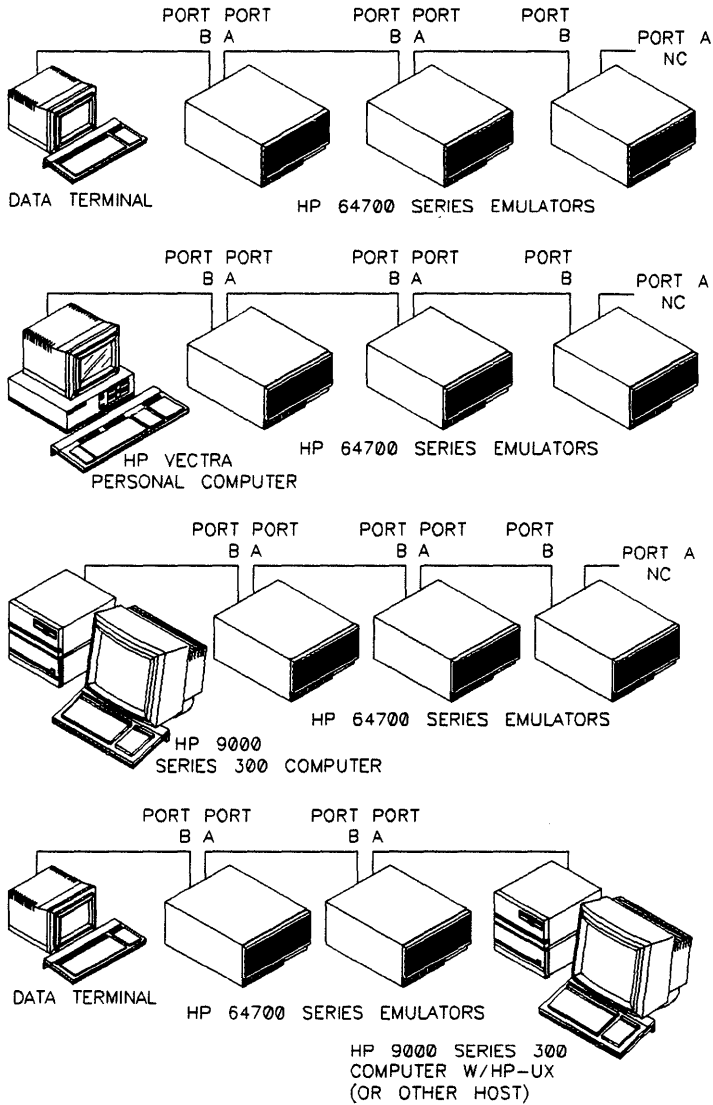


Figure 5-8. Using Multiple Emulators on One Data Link

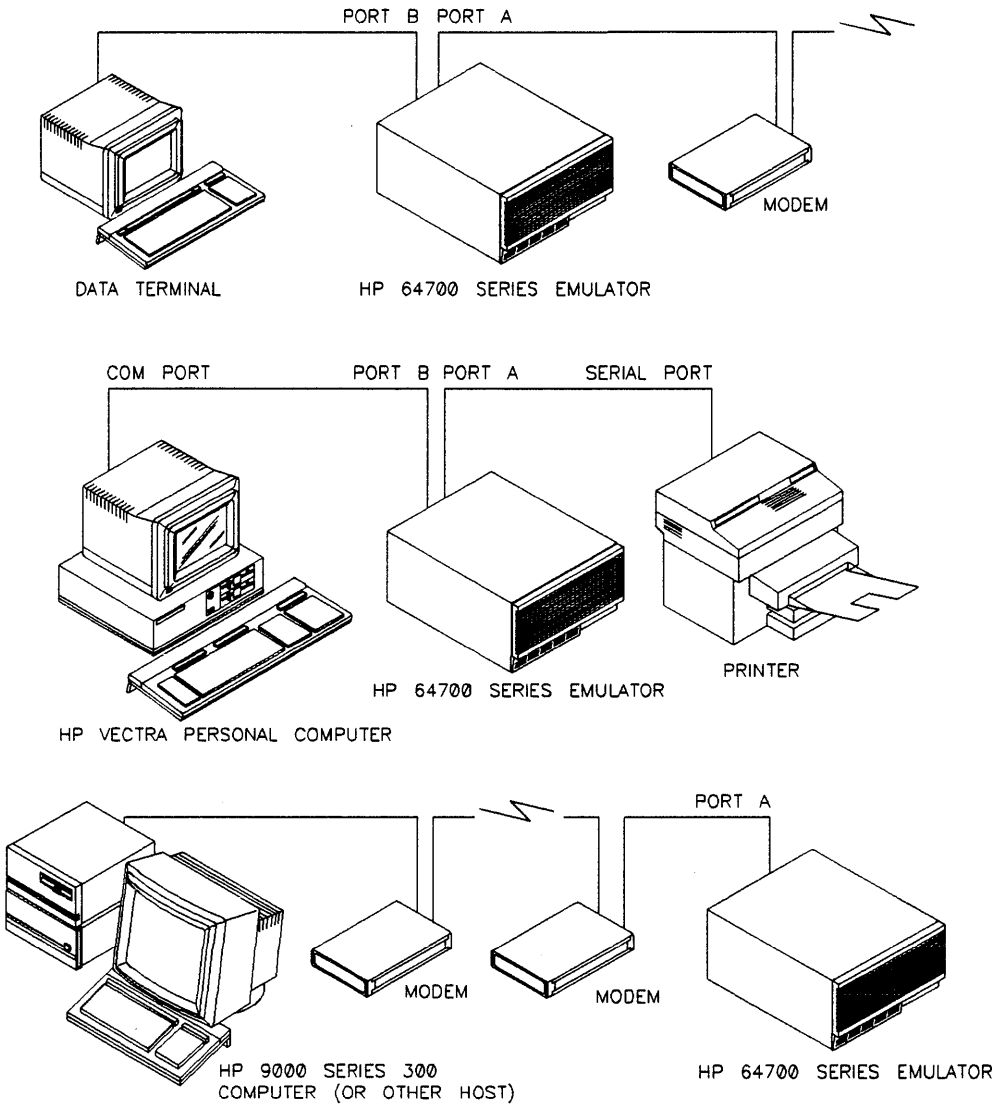


Figure 5-9. Using a Printer or Modem

Note



You should use this configuration with caution when a host computer is connected to the HP 64700 Series Emulator in Remote Configuration. Other host processes, such as printer drivers, will not know that the other device is not directly connected to the assigned port, and may generate errors if the HP 64700 Series Emulator was not put into transparent mode before those processes began. Modify these programs to check the status of the device first and generate the correct strings to put the HP 64700 Series Emulator into transparent mode if necessary. Also, note that the escape sequences used to temporarily suspend the transparent mode of the HP 64700 Series Emulator may be used by some other device. You can redefine the escape sequences used by the HP 64700 Series Emulator so that they do not conflict with those used by the peripheral device. See the **xp** syntax pages in the *HP 64700 Series Terminal Interface Reference* manual for more information (This manual is purchased as part of a separate documentation package).

You can also set up a configuration where the controlling device, such as host computer, is separated from the HP 64700 Series Emulator by a pair of modems and a telephone link. You might use such a configuration in a factory setting where you need to monitor the operation of remote processors in hazardous environments.

Configure Data Communications

This section will give you general information on how to connect the data communications cables between your HP 64700 Series Emulator and a terminal or host computer or peripheral. It lists the data communications switch settings for various communications configurations. Although we cannot cover all possible installation scenarios, the information provided should enable you to hook up to your terminal or host computer after doing some research into their data communications characteristics.

This section is not a tutorial on basic data communications principles. The book *Touring Datacomm: A Data Communications Primer* covers basic RS-232-C principles. This book is available under HP Part Number 5957-4622 from HP Direct Marketing Division. Another book that you may find helpful is *The RS-232-C Solution*, which you can order from HP under the product number HP 92234X.

In connecting to various data terminals and host computers, you refer to the reference manuals, to determine default data communications configurations. Change the default values as necessary, or modify the HP 64700 Series data communications parameters to match the host parameters

Figure 5-10 shows the rear panel of the emulator and points out the location of the data communications ports and the data communications switches. Table 5-2 (at the end of this chapter) is a complete table of all the possible data communications switch settings for the HP 64700 Series Emulators.

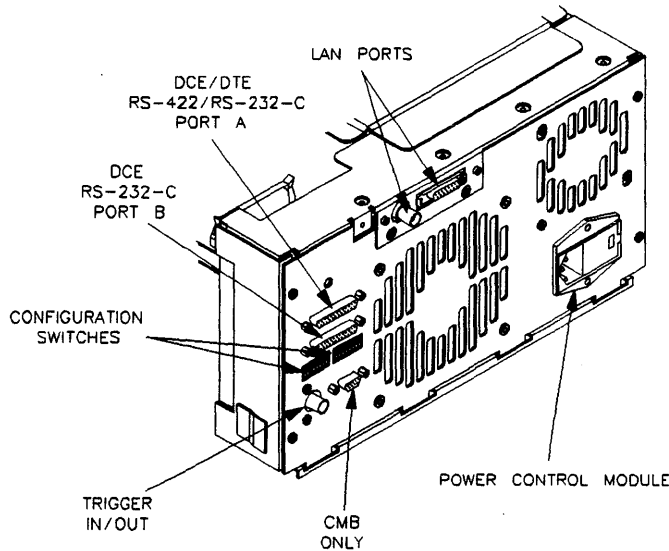


Figure 5-10. Datacomm Port and Switch Location

Which Port Do I Use?

If you are connecting a single device, such as a terminal or host computer, to the HP 64700 Series Emulator, use Port A because it provides the greatest data communications flexibility.

If you are connecting two devices to the HP 64700 Series Emulator, the port you will use to connect each device depends on whether:

- The device you are connecting to the HP 64700 Series Emulator uses RS-422 protocol or RS-232-C protocol.
- The device you are connecting acts as a DTE (Data Terminal Equipment) or a DCE (Data Communications Equipment) device.

Here are some examples of decisions you might make regarding choices of ports:

1. You need to connect an RS-422 interface on a host computer to the HP 64700 Series Emulator and you are also connecting an RS-232-C printer to the HP 64700 Series Emulator. Here, use port A to connect to the host, as it is the only port that supports RS-422 communications. Then, you will connect Port B to the printer. Since most printers are DCE devices, you will need a null modem cable to connect Port B to the printer.
2. You need to connect a terminal to one port of the HP 64700 Series Emulator and a host computer to the other port. Both devices use RS-232-C interfaces. You can choose either port A or port B for either connection. However, since most host computer interfaces act as DCE devices, you can avoid the need for a null modem cable by connecting port A to the host (and configuring it as a DTE device), then connect port B to the terminal.

You can use the same sort of configuration if you wanted to connect a data terminal and a modem to the HP 64700 Series Emulator. Modems act as DCE devices, so you would hook the modem to port A and the terminal to port B.

Note



The device that controls the emulator will act as a DTE device; therefore, you will want to hook into a port on the HP 64700 Series Emulator that acts as a DCE. Your decision here is whether you need another HP 64700 Series port to act as a DTE. If so, you should connect the controlling device to port B and the other device to port A to avoid the need for a null modem cable.

Once you have determined which port will go to which devices, you may need to make the following configuration switch changes on the rear panel of the HP 64700 Series Emulator:

1. If you are using Port A as an RS-422 port, set configuration switch S5 to a one (1). See figure 5-11.
2. If you need to have Port A act as a DTE device, set configuration switch S4 to a one (1). See figure 5-12.

Note



You cannot have port A act as an RS-422 device and a DTE device simultaneously. If you select port A to be an RS-422 device, it operates as a DCE device, and the setting of the DCE/DTE switch is ignored.

3. If you are connecting the controlling device in your system to Port A, set configuration switch S6 to zero (0). However, if you are connecting the controlling device to port B, set switch S6 to one (1). See figure 5-13.

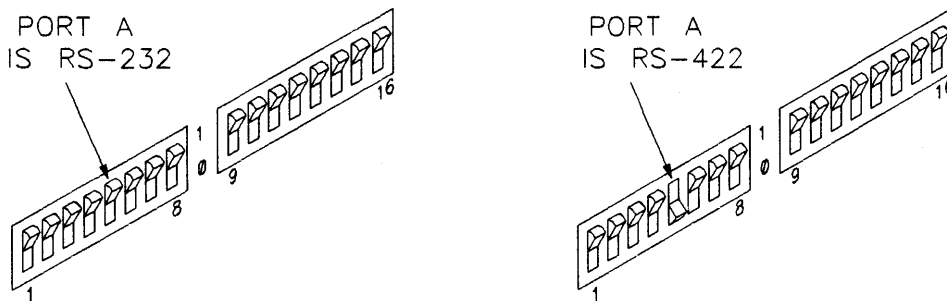


Figure 5-11. RS-422/RS-232-C Configuration Switch

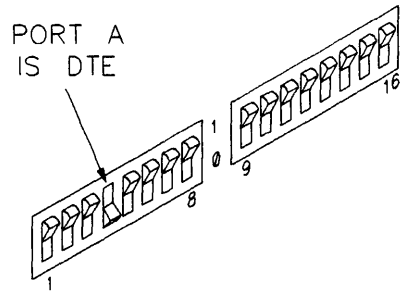
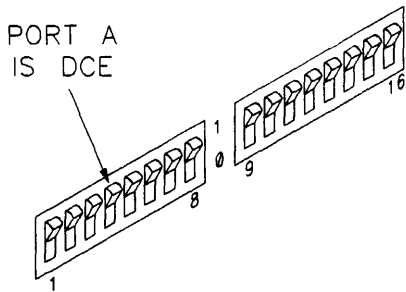


Figure 5-12. DCE/DTE Configuration Switch

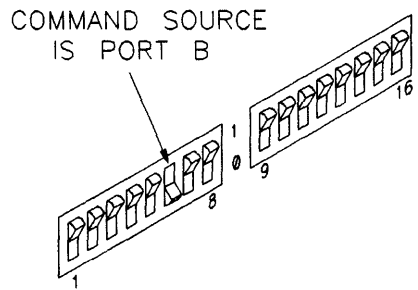
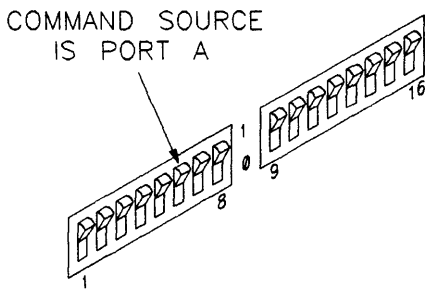


Figure 5-13. Command Source Configuration Switch

How Do I Set Baud Rate?

Your next step in the data communications installation process is to set the baud rate for each port and for the associated terminals, host computers, and peripherals.

In the HP 64700 Series Emulators, port A supports baud rates from 300 to 460,800 baud (above 19200 baud will use the RS-422 interface for reliable communications). Only baud rates from 1200 to 230,400 are selected by setting switches. The others may be selected using the Terminal Interface **stty** command (*Terminal Interface Reference* manual). Port B supports baud rates from 300 to 38400 baud. Only baud rates from 1200 to 19200 are switch-selectable. The others may be set using the **stty** command.

Note



All combinations of Port A and Port B baud rates are allowed except in the situation in which one port is set to 19200 baud and the other port is set to 38400 baud. If you try to set such a combination, one of the ports will actually be set to a baud rate other than the one you requested.

Before you can set the baud rates, you should determine the best balance of rates for your system. Let's look at some examples.

1. Assume you have a personal computer with a terminal emulation program connected to port B of the HP 64700 Series Emulator, and that a 1200 baud modem is connected to port A. You only use the modem occasionally to dial up a minicomputer and download code. Otherwise, your primary interaction is with the HP 64700 Series Emulator. Set the baud rate on port A to 1200 and the baud rate of port B to the maximum rate possible with your computer. Because most versions of MS-DOS do not support baud rates greater than 9600, usually you should set port B to 9600. Whenever you need to use your data communications program to communicate with the minicomputer, you can put the HP 64700 Series Emulator into transparent mode to communicate directly with the modem.

Note



You will not need to alter the baud rates of either port to match the other when you use transparent mode, as long as you use some form of handshake (see "Setting the Handshake" later in this chapter. If you do not use any handshake protocol, then you will need to alter the baud rate of one of the ports to match the other when using transparent mode. Use the `stty` command to alter baud rate during operation. This prevents data loss due to a data overrun (buffer fills faster than the controller can process the data).

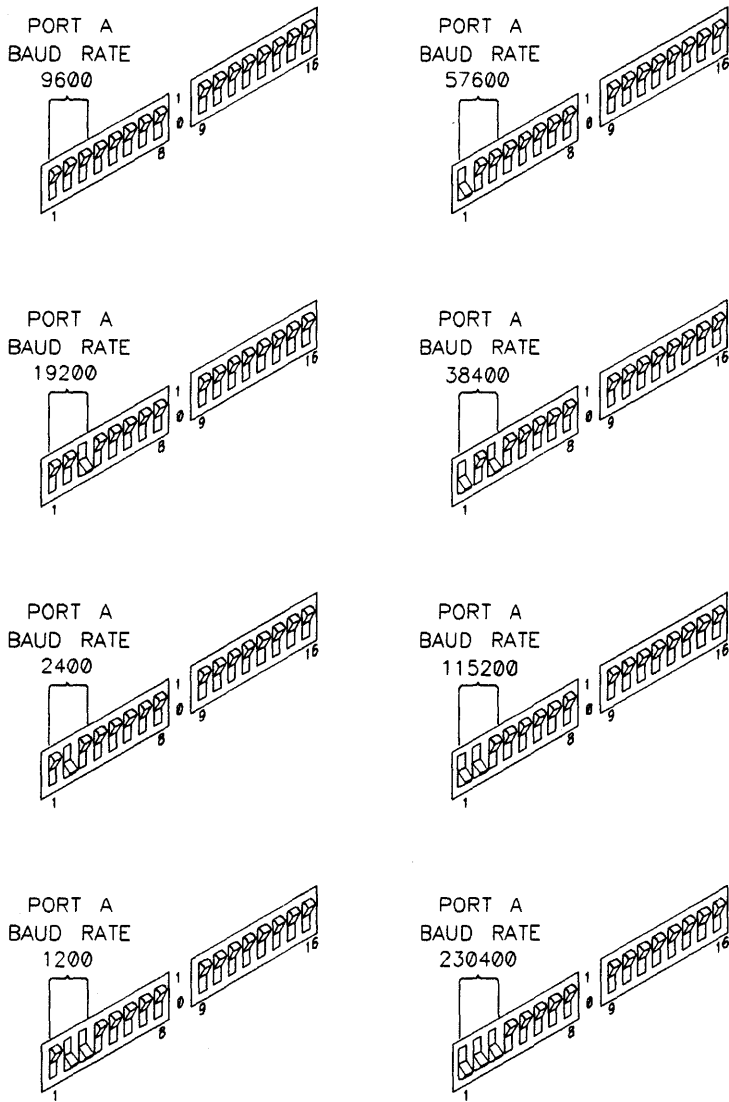


Figure 5-14. Port A Baud Rate Configuration Switches

2. If you are using only one of the HP 64700 Series ports, controlled by a data terminal or host computer, the best technique is to set the HP 64700 Series baud rate to the maximum value, allowing reliable communications between the terminal or host and the HP 64700 Series Emulator. For RS-232-C links, this will generally be a maximum of 19,200 baud. RS-422 links, because of their balanced lines, will generally support datacomm up to the maximum port A baud rate of 460,800.

For most HP terminals using RS-232-C links, you can run at a maximum of either 9600 or 19,200 baud depending on the terminal model. Most HP personal computers support baud rates of either value, depending on the version of MS-DOS installed. HP 9000 Series 300/400 Workstations will support either maximum, depending on the interface card installed.

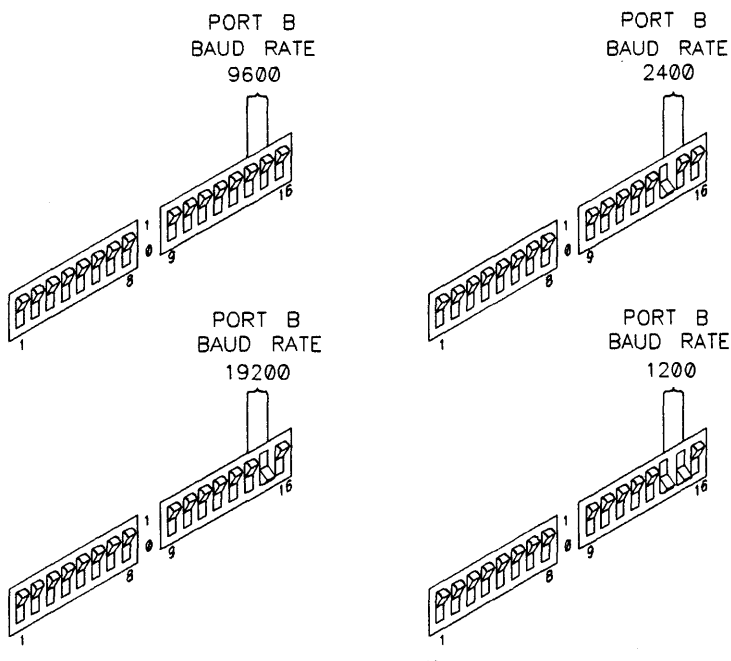


Figure 5-15. Port B Baud Rate Configuration Switches

Note



Certain HP 9000 Series 300/400 RS-422 and RS-232-C interface cards have their own configuration switches, that must be set before you install the card in the workstation. Refer to the documentation for the interface card and to the HP-UX system documentation for more information.

3. If you are using both HP 64700 Series ports in the Transparent Configuration, with one port is connected to a host computer and the other port is connected to a data terminal, you should generally select a baud rate for both ports that is the same as the one you would use if your terminal was directly connected to the host computer. For example, if you are using an HP terminal with an HP 9000 Series 300/400 workstation, you would set the baud rates for both ports to either 9600 baud or 19200 baud depending on the interface installed in the workstation.

When you have decided upon a baud rate setting for each port, set the HP 64700 Series rear panel configuration switches (S1..S3 for port A, S14..S15 for port B) to the necessary values. Refer to figures 5-14 and 5-15 and table 5-2 for exact information regarding the switch settings necessary for each baud rate. Once you have set the baud rate for the HP 64700 Series Emulator, be sure that the baud rate settings are identical on the devices you intend to connect to each port.

Taking a Shortcut

If you're in a hurry to use your emulator, you can ignore the rest of the information here and set the other datacomm switches later as needed to resolve specific communications problems. Skip to the next section in this chapter entitled "Selecting and Connecting Cables." However, if you're not very familiar with data communications, we suggest you continue with the next section.

Setting the Handshake

Different devices use different ways of controlling the stream of data through the interface. These are called handshakes. The HP 64700 Series Emulator may be preset to four different types of handshake as.

No Handshake

Devices connected to the HP 64700 Series Emulator must be able to receive data as fast as it is sent.

XON/XOFF Handshake

This software handshake uses the characters DC1 and DC3 to tell other devices to "start transmission" or "stop transmission." When its receive buffer is three fourths full, the HP 64700 Series Emulator will send a DC3 (XOFF) character to tell the other device to stop transmitting data. After it has processed half of the data in the buffer, it will send a DC1 (XON) character to tell the other device to resume transmission.

RTS/CTS and DSR/DTR Handshake

The hardware handshake uses the control lines on the RS-232-C interface to control the flow of information. The definition and use of the control signals have been modified from the RS-232-C standard. There are a limited number of interface cards which support this modified handshake. They include the HP 98659A RS-422 High-Speed Interface, the HP 98659A PC High-Speed RS-422 Interface, and the built-in RS-232-C interface in the HP 9000 Workstation.

When HP 64700 Series Emulator Is Set up as a DTE Device

DTR is output at power-up to indicate that the emulator is available. DSR is ignored. The Clear To Send signal (CTS) is used to control the output. The HP 64700 Series Emulator receives CTS, and will only output data when CTS is true. The DCE can stop the HP 64700 Series Emulator from sending data by setting CTS false.

The Request To Send signal (RTS) is used as a reverse channel CTS to control the output of the remote DCE. When the HP 64700 Series Emulator has a full input buffer, it sets RTS false. When it is able to receive data again, it sets RTS true. This provides bidirectional hardware control of the data streams.

When HP 64700 Series Emulator is Set up as a DCE Device.

DSR is output at power-up to indicate that the emulator is available. DTR is ignored. The HP 64700 Series Emulator sends CTS when the buffer is full. The HP 64700 Series Emulator uses receipt of the Request To Send signal (RTS) to control data output.

Hardware handshaking is supported for RS-422 and RS-232-C on port A. Port B only supports RS-232-C, but it also supports hardware handshaking.

XON/XOFF, RTS/CTS and DSR/DTR Handshake

This handshake method combines the former two methods to allow complete hardware and software control of information flow across the interface.

The type of handshake you use depends to a certain extent on the type of cable you use. If you are using a three wire RS-232-C connection (transmit, receive, and ground), you are restricted to no handshake or an XON/XOFF handshake.

Note



You should generally choose XON/XOFF as the minimum handshake level if supported by the other devices in your configuration. This ensures that data is not lost if the controlling device can dump data in larger blocks than the HP 64700 Series system controller can handle, or vice versa. Setting the handshake is especially important if you use the emulator in a transparent configuration where Port A and Port B are set to different baud rates.

If you are using the recommended HP data communications cables, you may use all the hardware handshakes as well.

Note



If you choose to use the hardware handshake (whether or not in conjunction with the software handshake), you must connect the HP 64700 Series Emulator to devices which also support hardware handshake. If these devices do not support hardware handshake, the HP 64700 Series Emulator will fail to complete its power-up sequence. Here, you should change the handshake configuration to use the software handshake only or no handshake as appropriate.

You may need to refer to the manuals supplied with your data terminals, host computer, or peripherals to determine the handshakes supported.

Once you choose a handshake method, set the HP 64700 Series rear panel configuration switches to the desired handshake. See figure 5-16 and table 5-2 for detailed information on the proper switch settings for each handshake type. You will also need to configure your other devices to the correct handshake type.

Setting Parity

When you set parity output, each byte transmitted by the HP 64700 Series Emulator will have an additional parity bit added to show the proper parity to the receiving device. This provides error checking for each byte transmitted.

You can enable or disable parity output by the HP 64700 Series Emulator. If enabled, you can set the HP 64700 Series Emulator to output odd parity or even parity.

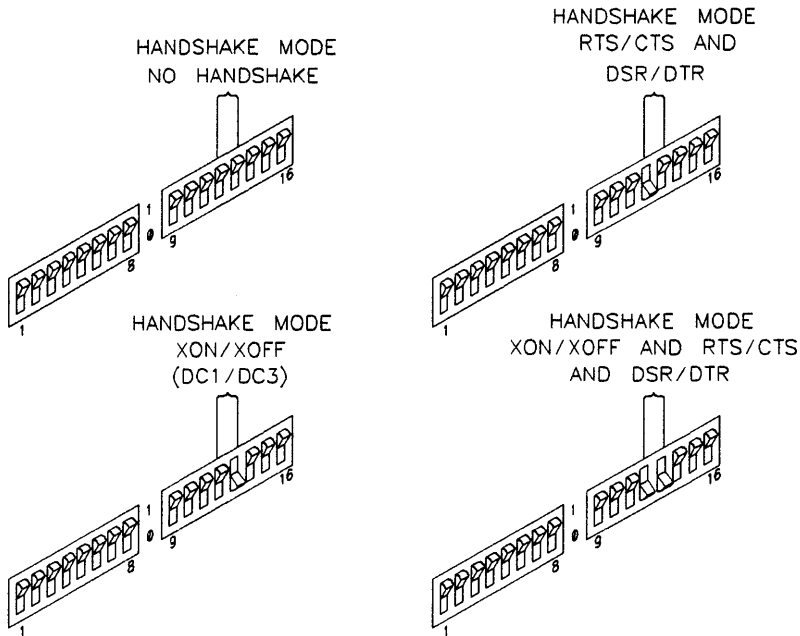


Figure 5-16. Handshake Configuration Switches

Whether you set parity output depends on the devices you use with the HP 64700 Series Emulator. For example, many host computers require some form of parity checking. You should refer to the manuals for these associated devices to determine their parity check requirements. Remember that if you are using multiple devices with the HP 64700 Series Emulator, you need to match parity checking on all devices. For example, if you set even parity output on the emulator to be compatible with a host computer, a data terminal attached to the other port should also be set to even parity.

After you have determined the correct parity configuration, you can set the HP 64700 Series rear panel configuration switches. See figure 5-17 for the parity switch settings.

If you want to enable parity output, set switch S10 to a one (1).

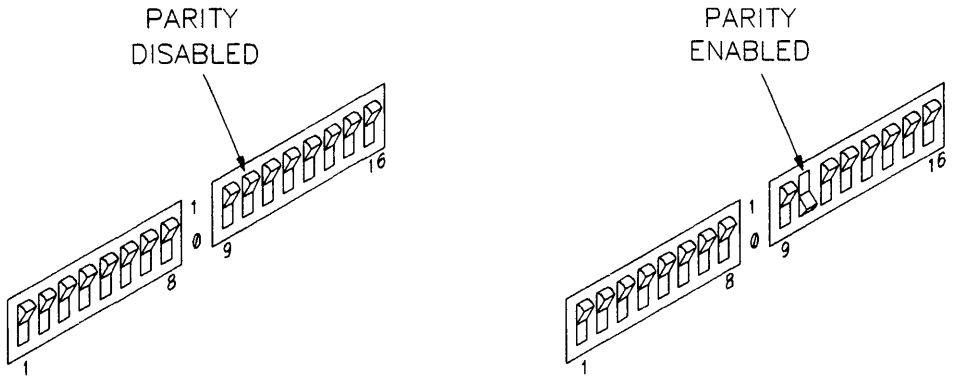


Figure 5-17. Parity Disable/Enable Configuration Switch

If you have enabled parity output, you can set the HP 64700 Series Emulator to output odd parity by toggling switch S11 to a zero (0). To output even parity, set switch S11 to a one (1). See figure 5-18.

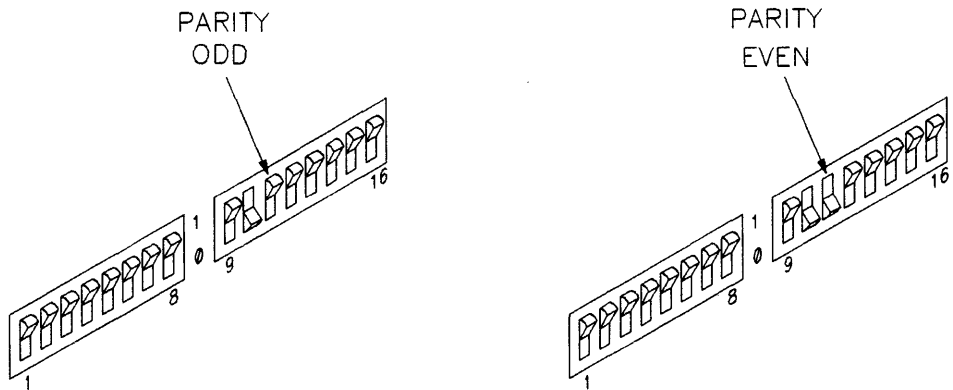


Figure 5-18. Parity Odd/Even Configuration Switch

Setting the Character Length

Devices that you might use with the HP 64700 Series Emulator may differ in the number of bits they transfer to represent each ASCII character. Although only 7 bits are required to transmit the ASCII character set, many manufacturers of data terminals, host computers, and printers use the eighth bit to extend the ASCII character set with another 128 characters. It is important for the HP 64700 Series Emulator to send and receive characters with the proper number of bits so that characters are represented correctly. Some examples of differing character sets include:

1. Most UNIX systems send and receive 7-bit characters. These include systems such as HP-UX running on HP 9000 Series 300/400 Workstations. However, some applications in an HP-UX workstation may use 8-bit characters to represent certain foreign language characters.
2. Personal computers running the MS-DOS operating system have standardized on the IBM PC-8 character set. This is an 8-bit character set.
3. Hewlett-Packard printers are standardized on an 8-bit character set known as Roman-8.
4. Most all other systems will use only the standard 7-bit ASCII character set.

Note



If you intend to use a binary transfer protocol (such as the HP 64000 **transfer** utility) to transfer programs or trace listings between a host computer and the HP 64700 Series Emulator (or another device connected to the other HP 64700 Series port), you must set the HP 64700 Series Emulator to send and receive 8 bits.

Refer to the manuals for the other devices used with your system (data terminals, host computers, printers, etc.) to determine the correct number of bits used by the device. Remember that you should set all devices to the same number of bits per character; for example, if your host computer uses 8 bits per character, and you are using the HP 64700 Series Emulator in the Transparent Configuration, you should set the HP 64700 Series Emulator and the data terminal to 8 bits per character.

Once you have determined the correct number of bits per character, set the HP 64700 Series Emulator rear panel configuration switch to the correct value. See figure 5-19 for the switch settings.

If you want the HP 64700 Series Emulator to send and receive 7 bits per character, set switch S9 to a one (1).

If you want the HP 64700 Series Emulator to send and receive 8 bits per character, set switch S9 to a zero (0).

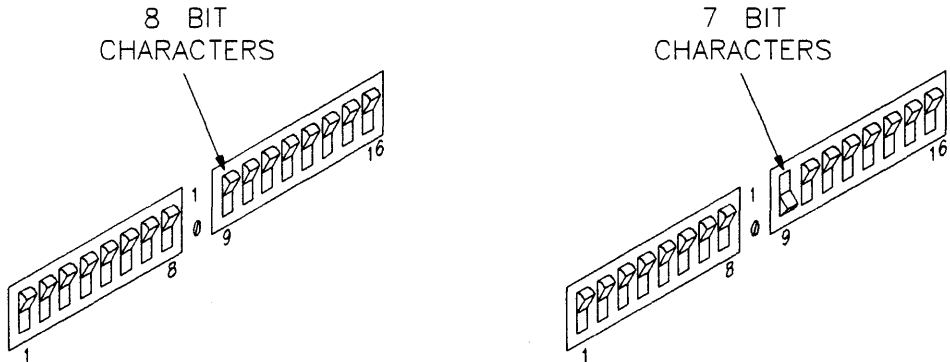


Figure 5-19. Character Length Configuration Switch

Setting Local Echo

When you type characters on a keyboard, some software must to send the characters received to your display screen so that you can monitor what you have typed. This is known as "echoing" the characters. Each system handles echo in different ways. For example, in most Hewlett-Packard computer systems, the host computer automatically echoes characters typed in at a data terminal. Even though HP data terminals provide an echo function, the correct configuration at the data terminal is to disable the local echo. Otherwise, every character typed at the keyboard would appear twice on the display screen.

Each HP 64700 Series Emulator provides a configuration switch to enable or disable the echo function. If enabled, each character received by the HP 64700 Series Emulator is echoed back on the same port as received. If disabled, the characters received are not echoed back. With Hewlett-Packard computers, you will normally want to enable the local echo function. See figure 2-20.

Normally, you want the active device furthest from your input echoing back characters. This provides you with feedback that the receiving system is receiving characters. For example, in Stand-alone Configuration, you would want to enable the HP 64700 Series Emulator echo function and disable the data terminal's echo function. Then, if anything goes wrong with the data communication cable or with the HP 64700 Series Emulator, you will be immediately aware of a problem since character echo will cease. Conversely, if you enabled the data terminal echo function and disabled it on an HP 64700 Series Emulator, you might not be aware of such a failure. (Although the HP 64700 Series Emulator would cease sending command prompts or requested information to the data terminal, anything you typed in would echo.)

Refer to manuals for your other devices to determine a need for echo. A good way to determine echo requirements is to draw out your configuration and show which devices automatically echo characters as part of their system software and cannot disable echo. Then look at other devices in the chain and determine whether they will need to echo characters back to other devices.

Once you've determined the need for echo, set the rear panel configuration switches on the HP 64700 Series Emulator. See figure 2-21.

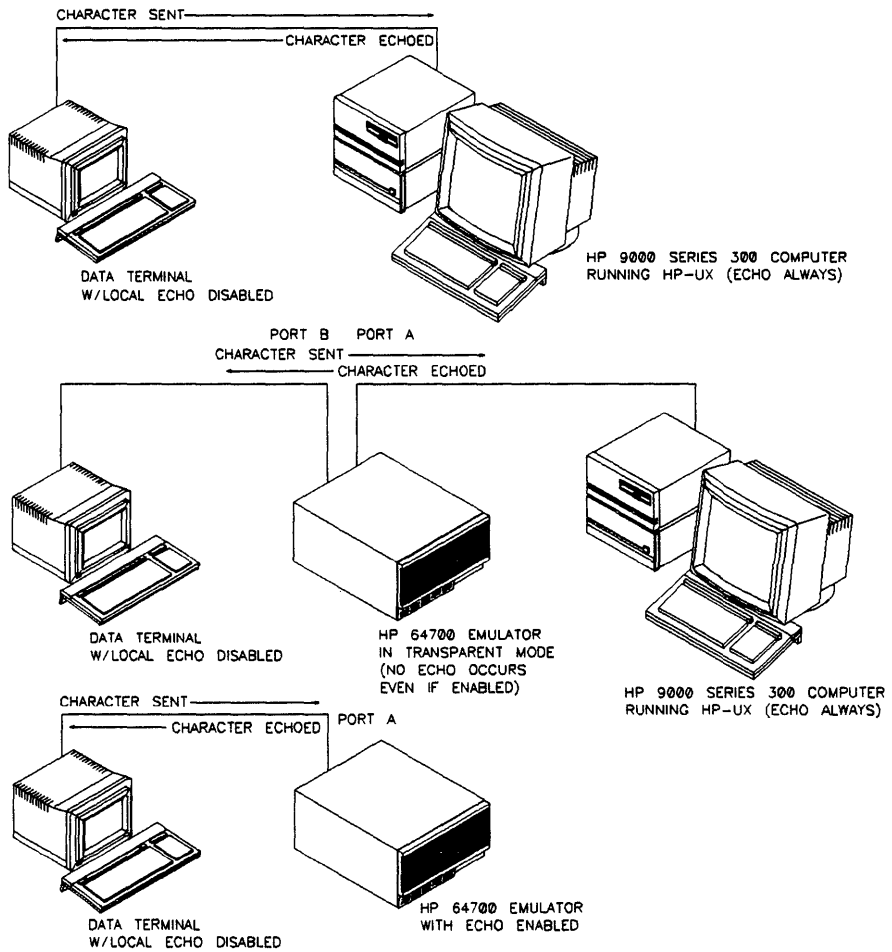


Figure 5-20. Echoed Characters in Your System

1. To have the HP 64700 Series Emulator echo characters received (on either port), set switch S8 to zero(0).
2. If you don't want the HP 64700 Series Emulator to echo characters received, set switch S8 to one (1).

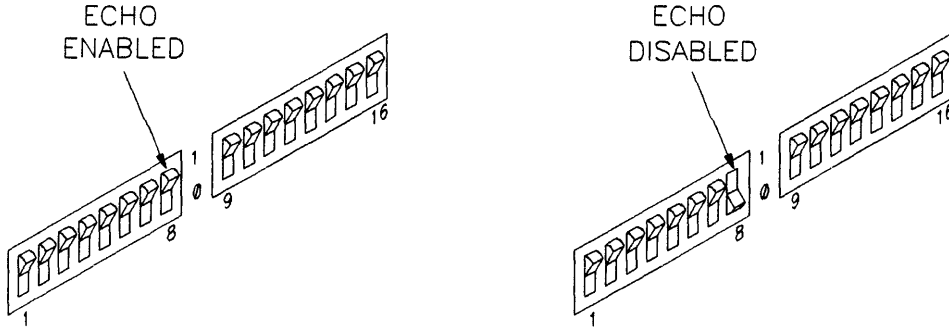


Figure 5-21. Echo Enable/Disable Configuration Switch

Transparent Mode Upon Power-up

If you are using the HP 64700 Series Emulator in a Transparent Configuration, or in any configuration with another device connected to the second data communications port, you may want the HP 64700 Series Emulator to be in transparent mode whenever it powers up. You can modify the mode using the Terminal Interface `xp` command. You would normally do this if you spend most of your time working with the other device, rather than the emulator.

1. If you want the HP 64700 Series Emulator to be in transparent mode upon power-up, set rear panel configuration switch S7 to one (1). See figure 5-23.
2. If you don't want the HP 64700 Series Emulator to be in transparent mode upon power-up, set switch S7 to zero (0).

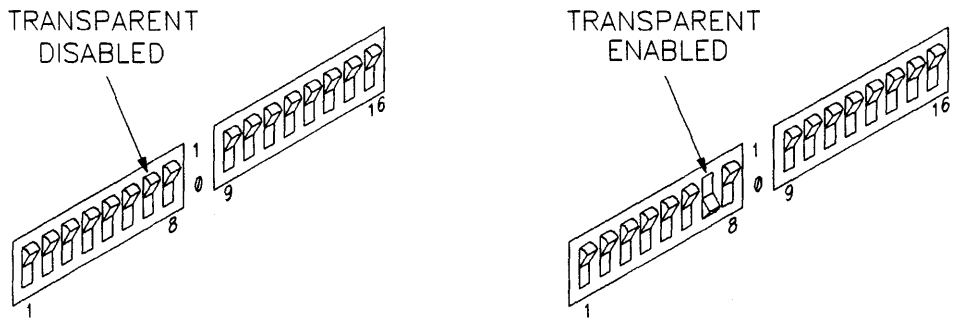


Figure 5-22. Transparent Disable/Enable Configuration

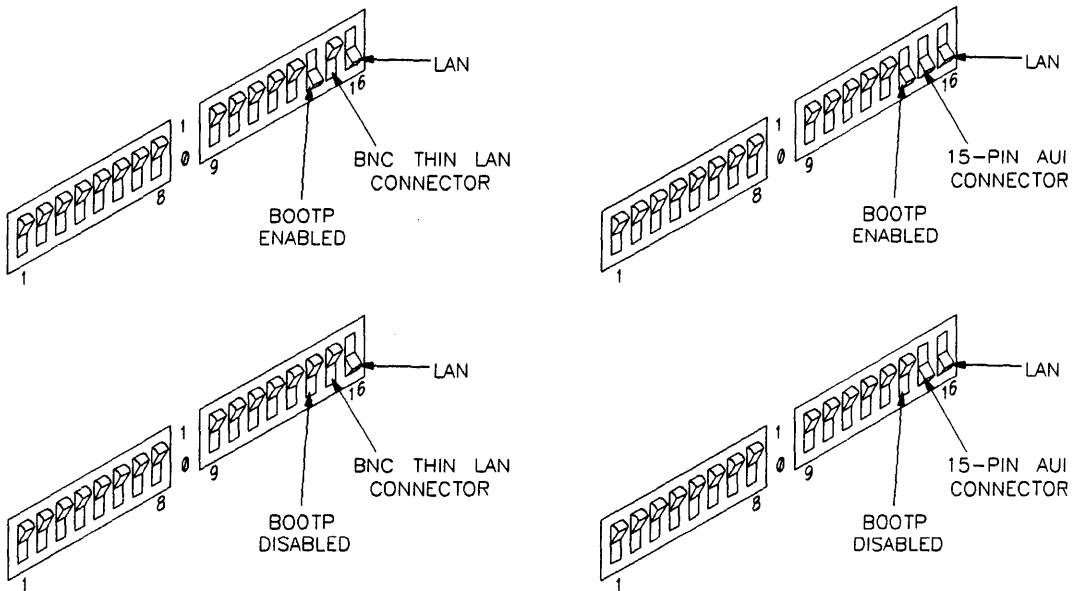


Figure 5-23. Local Area Network Switches

Enabling the LAN Interface

There are three communication switches for enabling the LAN Interface - S14, S15, and S16. When S16 is set to "0", the communication switches S1 through S15 are used for Datacomm ports A and B. When S16 is set to "1" the LAN Interface is enabled, and switches S1 through S13 are NOT used. S14 and S15 are no longer used for setting the baud rate for Port B. When switch 14 is set, BOOTP protocol will be initiated from the HP 64700 Series Emulation to obtain its IP address from a host. S15 is used to select the LAN Interface port; either the 15-pin AUI port for a ThickLAN output or the BNC port for a ThinLAN output. See figure 5-22.

When using the LAN Interface switches (S14, S15, and S16), set S12 to zero. This insures that the HP 64700 Series Emulator will NOT be looking for RS-422/RS-232-C hardware; otherwise, the LAN will NOT boot. A good rule of thumb is to set all other switches (S1 through S13) to zero when using the LAN Interface.

For information on connecting the HP 64700 Series Emulator via the LAN Interface, refer to the chapter entitled *HP 64700.A Installation on an HP 9000*.

Overriding the Configuration Switches

After your system has powered up, and you can communicate with the HP 64700 Series Emulator through a controlling device, you can change any of the data communications parameters assigned to either port using the Terminal Interface **stty** command. The primary goal of the hardware configuration switches is to have the system come up in a state where you can access and modify the HP 64700 Series Terminal Interface. The *Terminal Interface Reference* manual describes on the **stty** command.

Selecting Cables

Now that you have set the power-up configuration, you need to choose the proper cables to connect your devices to the HP 64700 Series Emulator. Refer to table 5-1 for a list of supported cable types for the devices listed. Cables not listed in table 5-1 have not been tested for compliance with RFI regulations, and therefore are not recommended.

Connecting Cables

To the HP 64700 Series Emulator. To connect cables to the HP 64700 Series Emulator, simply align the cable with the desired port (A or B) and insert the 25-pin male connector of the cable until it is firmly seated. You should then tighten the holding screws on each side of the cable with a small flat blade screwdriver. This will ensure that the cable pins and shield hood make good contact with the HP 64700 Series connector and will also guard against accidental disconnection of the cable. See figure 5-24.

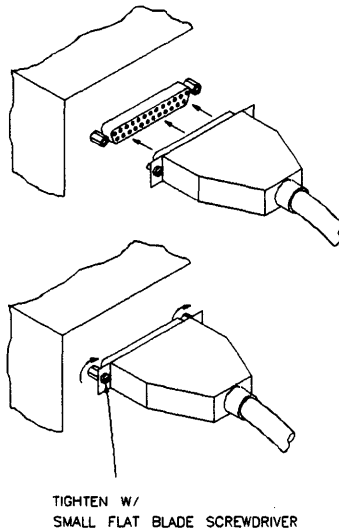


Figure 5-24. Connecting R-232-C Cables

To Other Devices. Refer to the specific installation manuals for the other devices you will be using with the HP 64700 Series Emulator to determine how to connect cables to those devices.

Table 5-1. HP 64700 Series Recommended Cables

To Connect To ...	Using Interface ...	Use HP Cable	HP 64700-Series Port Type Setting
HP Vectra Personal Computers IBM PC-AT compatibles	24540A/24541A - 9 pin connector 24541A - 25 pin connector	24542M U.S. Modem Cable (3 meters) 13242N (5 meters) or 92218A (15 meters)	Port A or B DCE
HP 9000 Series 300/400 Workstations	98628A or 98626A 98561-66530 98644A 98642A Mux * (port 0 only)	5061-4215 (DTE cable)	Port A or B DCE
HP 239X Series Terminals	Standard	40242M (5 meters)	Port A or B DCE
Hewlett-Packard Printers (LaserJet, ThinkJet, QuietJet, etc.)	RS-232-C	17244M (1.2 meters) or 13242-60010 (5 meters) or 17244D (1.2 meters) or 92219J (5 meters)	Port A DTE
Modems	Standard 25 pin female	13242N (5 meters)	Port A DTE
* If you experience problems with data loss using a 98642A Mux card, contact your HP Sales and Service Office for assistance.			

Table 5-2. Datacomm Switches

Switch	Position	Function	Description																																	
S1,S2,S3	See description.	Port A Baud Rate	Sets baud rate of Port A after power-up.																																	
			<table border="1"> <thead> <tr> <th>S1</th> <th>S2</th> <th>S3</th> <th>Baud Rate</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>0</td> <td>0</td> <td>9600</td> </tr> <tr> <td>0</td> <td>0</td> <td>1</td> <td>19200</td> </tr> <tr> <td>0</td> <td>1</td> <td>0</td> <td>2400</td> </tr> <tr> <td>0</td> <td>1</td> <td>1</td> <td>1200</td> </tr> <tr> <td>1</td> <td>0</td> <td>0</td> <td>57600</td> </tr> <tr> <td>1</td> <td>0</td> <td>1</td> <td>38400</td> </tr> <tr> <td>1</td> <td>1</td> <td>0</td> <td>115200</td> </tr> <tr> <td>1</td> <td>1</td> <td>1</td> <td>230400</td> </tr> </tbody> </table> <p>S1, S2, S3 disabled when S16 is set to 1.</p>	S1	S2	S3	Baud Rate	0	0	0	9600	0	0	1	19200	0	1	0	2400	0	1	1	1200	1	0	0	57600	1	0	1	38400	1	1	0	115200	1
S1	S2	S3	Baud Rate																																	
0	0	0	9600																																	
0	0	1	19200																																	
0	1	0	2400																																	
0	1	1	1200																																	
1	0	0	57600																																	
1	0	1	38400																																	
1	1	0	115200																																	
1	1	1	230400																																	
S4	0 1	Port A is DCE Port A is DTE	<p>Selects whether Port A functions as a DCE (data communications equipment) or DTE (data terminal equipment).</p> <p>Disabled when S16 is set to 1.</p>																																	
S5	0 1	Port A is RS232 Port A is RS422	<p>If 0 is selected, port A functions as RS232. If 1 is selected, Port A functions as an RS422 DCE device and the setting of S4 is ignored.</p> <p>Disabled when S16 is set to 1.</p>																																	
S6	0 1	Command source is Port A Command source is Port B	<p>Selects source of commands after power up.</p> <p>Disabled when S16 is set to 1.</p>																																	
<p>Note: An adhesive label containing the information from this table is attached to each HP 64700 Series Emulator.</p>																																				

Table 5-2. Datacomm Switches (Cont'd)

Switch	Position	Function	Description
S7	0 1	Transparent mode disabled at power up.	Selects whether or not the HP 64700 Series Emulator "wakes up" in transparent mode. After power up, the transparent mode may be enabled and disabled with the xp command. Disabled when S16 is set to 1.
S8	0 1	Local echo enabled. Local echo disabled.	Selects whether or not characters sent to the HP 64700 Series Emulator are echoed back to the host. The switch controls echo for both Port A and Port B. Disabled when S16 is set to 1.
S9	0 1	Send/receive 8 bits. Send/receive 7 bits.	Determines number of bits used to represent each ASCII character. Disabled when S16 is set to 1.
S10	0 1	Parity output disabled. Parity output enabled.	Determines whether or not parity output is enabled. If disabled, state of S11 (parity mode switch) is a don't care. Disabled when S16 is set to 1.
S11	0 1	Parity is Odd. Parity is Even	Sets up parity output for odd or even parity. The position is a don't care if parity output is disabled by S10. Disabled when S16 is set to 1.

Table 5-2. Datacomm Switches (Cont'd)

Switch	Position	Function	Description																											
S12 S13	See Description.	Handshake mode	<p>S12 and S13 set the hardware & software handshake modes for datacomm according to the following table:</p> <table border="1"> <thead> <tr> <th>S12</th> <th>S13</th> <th>Handshake Mode</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>0</td> <td>No handshake</td> </tr> <tr> <td>0</td> <td>1</td> <td>XON/XOFF (DC1/DC3</td> </tr> <tr> <td>1</td> <td>0</td> <td>RTS/CTS and ST/DRT</td> </tr> <tr> <td>1</td> <td>1</td> <td>XON/XOFF AND RTS/CTS</td> </tr> </tbody> </table> <p>Note: When using the LAN Interface (S16 set to 1), S12 must be set to 0.</p> <p>S13 is disabled when S16 is set to 1.</p>	S12	S13	Handshake Mode	0	0	No handshake	0	1	XON/XOFF (DC1/DC3	1	0	RTS/CTS and ST/DRT	1	1	XON/XOFF AND RTS/CTS												
S12	S13	Handshake Mode																												
0	0	No handshake																												
0	1	XON/XOFF (DC1/DC3																												
1	0	RTS/CTS and ST/DRT																												
1	1	XON/XOFF AND RTS/CTS																												
S14 S15	See description.	Port B Baud Rate or LAN communications.	<p>When S16 is 0: Sets the baud rate for Port B at power-up as shown below.</p> <table border="1"> <thead> <tr> <th>S14</th> <th>S15</th> <th>Baud Rate</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>0</td> <td>9600</td> </tr> <tr> <td>0</td> <td>1</td> <td>19200</td> </tr> <tr> <td>1</td> <td>0</td> <td>2400</td> </tr> <tr> <td>1</td> <td>1</td> <td>1200</td> </tr> </tbody> </table> <p>When S16 is 1: LAN Interface is enabled.</p> <table border="1"> <thead> <tr> <th>S14</th> <th>BOOTP on power-up</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>disabled</td> </tr> <tr> <td>1</td> <td>enabled</td> </tr> </tbody> </table> <table border="1"> <thead> <tr> <th>S15</th> <th>LAN Interface</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>BNC ThinLAN</td> </tr> <tr> <td>1</td> <td>15-pin AUI</td> </tr> </tbody> </table>	S14	S15	Baud Rate	0	0	9600	0	1	19200	1	0	2400	1	1	1200	S14	BOOTP on power-up	0	disabled	1	enabled	S15	LAN Interface	0	BNC ThinLAN	1	15-pin AUI
S14	S15	Baud Rate																												
0	0	9600																												
0	1	19200																												
1	0	2400																												
1	1	1200																												
S14	BOOTP on power-up																													
0	disabled																													
1	enabled																													
S15	LAN Interface																													
0	BNC ThinLAN																													
1	15-pin AUI																													

Table 5-2. Datacomm Switches (Cont'd)

Switch	Position	Function	Description
S16	0 1	Port A & B enabled LAN enabled	<p>When S16 is 0: Switches S1 through S15 are used to configure Ports A and B. S14 and S15 are used to set Port B's baud rate.</p> <p>When S16 is 1: Switches S1 through S13 are disabled. That is, ports A and B are inactive. S14 is used to enable BOOTP. S15 is used to select the LAN Interface port .</p> <p>S12 must be set to 0 or the emulator will not boot in LAN mode. As a general rule, when using LAN, set S1 through S13 to 0.</p>

Connecting to Other Instruments

Your HP 64700 Series Emulator includes powerful facilities for communicating with other measuring instruments, including logic analyzers, oscilloscopes, and other HP 64700 Series Emulators. These facilities make it possible to start or stop measurements in one instrument when another instrument reaches a certain state.

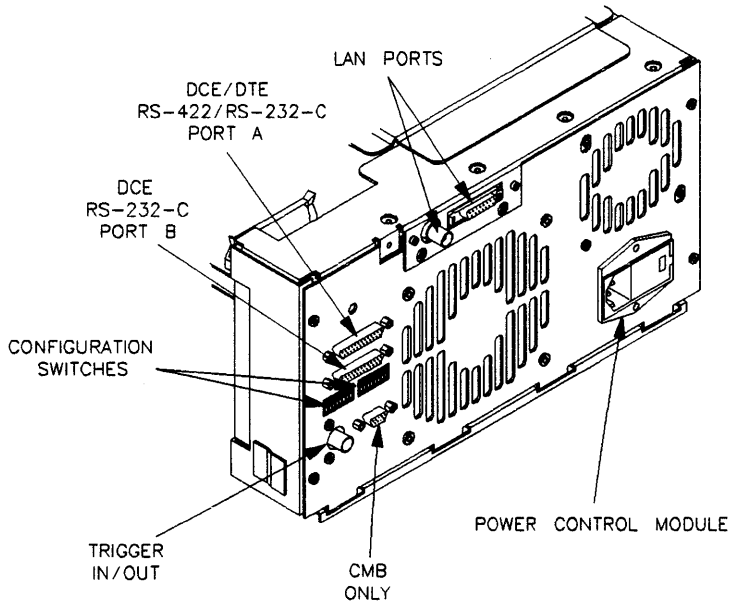


Figure 5-25. Location of CMB and BNC Connectors

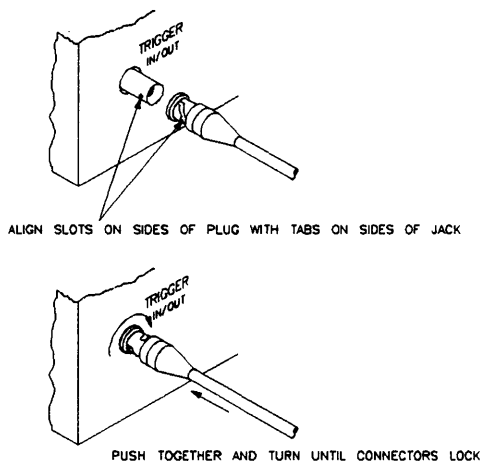


Figure 5-26. Connecting a BNC Cable to the HP 64700

Connecting to the Rear Panel BNC

The rear panel BNC connector allows you to connect various measurement instruments that have a 50 ohm trigger input or output line to the HP 64700 Series Emulator. Thus, you can trigger an HP 64700 Series Emulator measurement from another instrument, or vice versa, depending on the configuration of the two instruments.

To connect the BNC connector to another instrument, simply connect one end of a 50 ohm coaxial cable with male BNC connectors to the HP 64700 Series BNC receptacle, and the other end to the appropriate BNC receptacle on the other measuring instrument.

Caution



USE THE CORRECT BNC CONNECTOR! If your HP 64700 Series Emulator has a LAN card, it will have an AUI and BNC connector located at the top of the rear panel. The BNC for triggers is located on the lower left corner of the rear panel.

Caution



POSSIBLE DAMAGE TO EMULATOR!

The BNC line on the HP 64700 Series Emulator accepts input and output of TTL levels only. (TTL levels should not be less than 0 volts or greater than 5 volts.) Failure to observe these specifications may result in damage to the HP 64700 Series Emulator.

Connecting the Coordinated Measurement Bus (CMB)

The Coordinated Measurement Bus (CMB) allows you to connect multiple HP 64700 Series Emulators together to participate in a measurement. Using the commands provided by the controlling software interfaces, you can set up the multiple emulators to begin emulation runs synchronously, have one emulation analyzer begin a measurement when another finds a certain state, and so on. The *CMB User's Guide* describes making coordinated measurements using the CMB. This manual is part of the optional Terminal Interface documentation package (see your HP Sales Representative for more information).

To use the CMB, you will need one CMB cable for the first two emulators and one additional CMB cable for every emulator after the first two. The cable is four meters long.

To connect two emulators together using the CMB cable, see figure 5-3.

To connect more than two emulators together using multiple CMB cables, you use the female connector spaced a short distance from one end of the CMB cable. This allows you to daisy chain emulators up to the limits of maximum CMB cable length. The *CMB User's Guide* describes cabling restrictions and configuration information.

Caution



POSSIBLE DAMAGE TO EMULATOR!

Be careful to not confuse the 9-pin connector used for CMB operations with those used by some computer systems for RS-232-C communications. Applying RS-232-C signals to the CMB connector is likely to result in damage to the HP 64700 Series Emulator.

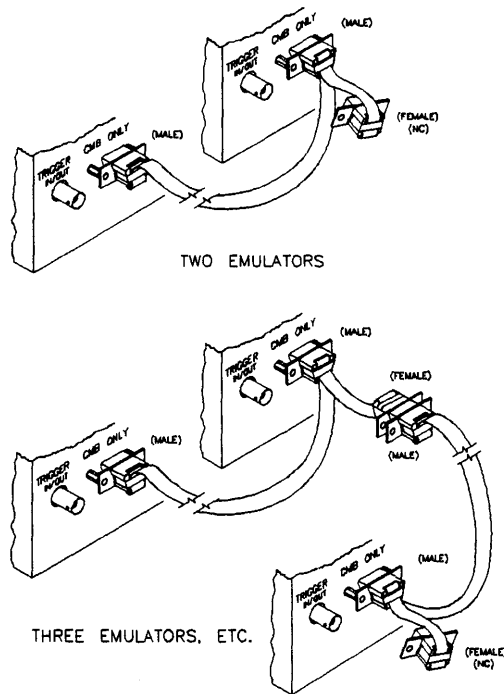


Figure 5-27. Connecting the CMB Cable

Notes

Updating HP 64700 Series Firmware

This chapter provides information for:

- Updating firmware on modular HP 64700 Series Emulators.
- Updating firmware on earlier HP 64700 Series Emulators.
- Updating firmware on the Local Area Network card.

Introduction

It is much easier to manage firmware revisions for the HP 64700 Series Emulator using Flash EPROMs. This is an easier, inexpensive, and faster update method. You only have to buy a Flash EPROM board once. After that, the Flash EPROM board remains in the card cage and all subsequent updates require only the new software revisions. This is a great savings to you over replacing ROMs. In this chapter, PC host refers to a Vectra PC or IBM PC-AT compatible running MS-DOS.

Updating Firmware for the HP 64700 Series Emulator

With the new Flash EPROM update, you can update all modular HP 64700 Series emulation systems (control card, emulator/debugger, and analysis) with the newest firmware without changing any ROMs. All that is required for a Flash EPROM Update is:

- a Flash EPROM card installed in HP 64700A Card Cage
- Software update materials.

How Do I Order and Install the Flash EPROM Card and Software Update?

To order the Flash EPROM card update:

1. Order an HP 64700 Series Flash EPROM card (HP part number 64700-66502) from the Support Materials Organization (SMO).
2. Order the HP BasicLine software support service for the products that are to be kept up to date. The Software Update Materials will include the software for the firmware and the host-resident user interface (HP 647nnS option 004 or 006).

progflash and the flashware for the LAN, Host, and analyzer are on the HP 64801 software for the HP 9000 Workstation and on a separate floppy for PC's.
3. Order an SMS subscription for the HP 64801 software for the HP 9000 Workstation, or HP 64700 Option 006 for the PC.
4. Install the Flash EPROM card in the HP 64700A Card Cage, and load the new software on the host computer.
5. Instructions for installing the Flash EPROM card are provided later in this chapter. Software is loaded with the /etc/update program for an HP 9000 Series 300/400 Workstation or the install software for a PC host.
6. Run the program *progflash* to update all firmware. This program:
 - a. looks in the 64700tab and 64700tab.net file for the names of emulation systems and asks the user which emulator is to be updated,
 - b. identifies update software on the host that matches the specified emulation system,
 - c. uses this information to load the latest revision onto the Flash EPROM card.

Can I Update Firmware on Earlier HP 64700 Series Emulators?

The same Flash EPROM update strategy used in the new modular HP 64700A Card Cage can also be used with the earlier HP 64700 Series systems with one additional step.

The extra step is a final, one-time firmware update of the control card in the HP 64700 Series systems using one last ROM kit. The new modular HP 64700 Series systems already has this feature. Once the new ROMs are installed, the control card can communicate with the new Flash EPROM card. Thereafter, all firmware updates can be made using software, just as in the new modular HP 64700A Card Cage.

Components for the Flash EPROM update are:

- Flash ROM card, HP part number 64700-66502
- Software update materials
- ROM kit, HP part number 64740-68704
- Update instructions (included with the ROM kit).

These components update all of the resident subsystems (control card, emulator, and analyzer). After this update, the latest revisions of the emulator, analyzer, or control card software residing on the HP 9000 Series 300/400 Workstation or PC host will be accessed through the Flash EPROM card. Firmware from ROMs installed on the control card will be executed only at emulation identification.

Installing the Flash EPROM Card

The Flash EPROM card can be installed in any available slot in the frame. Traditionally, the card slots are allotted in this order:

HP 64700A Card Cage Card Slots	
Slot	Card Installed from Top of Card Cage
7	Local Area Network card (half slot)
6	Control card.
5	Analysis card (an upside-down slot).
4	Empty.
3	Empty.
2	Empty or second card of two-card emulator.
1	Emulator card.

What Type of Media Will I Receive?

On the HP 9000 Series 300/400

Emulator update software is sent to you on a DC-600 tapes as part of the Softkey Interface software.

Control, Analysis, and LAN update software are sent to you on a DC-600 tape as part of your 64000-UX operating environment (HP 64801) software.

On an HP Vectra PC or PC AT Compatible Computer

Emulator, Control, Analysis, and LAN updates are sent to you on separate 5 1/4 inch diskettes and is identified by the word firmware printed on the label. You may receive several similar product updates. Updates for your emulator is identified by product number.

Where is the Software Located on the Host Computer?

The following information lists directories, files and the purpose of each file for updating firmware in the HP 64700 Series Emulator, on an HP 9000 or PC host.

On an HP 9000 Series 300/400		
Directory Path	Files	Purpose
/usr/hp64000/bin	progflash	Command to update Flash EPROM card and Flash EPROM LAN card.
/usr/hp64000/lib	npf.X	Downloaded code to program Flash EPROM downloading and programming a record at a time.
	lpf.X	Downloaded code to program Flash EPROMs downloading all code and then programming the entire block.
/usr/hp64000/inst/update	64700.X 64700.cfg	Program bits for updating control firmware. Configuration file.
	64740.X 64740.cfg	Program bits for updating analyzer firmware. Configuration file.
	64701.cfg	Configuration file for progflash.
	64701_188.X 64701_68.X	i80188 program bits for LAN. m68000 program bits for LAN.
On a Vectra PC or PC AT Compatible Computer		
Directory Path	Files	Purpose
\hp64700\bin \hp64700\lib \hp64700\update	same files as above	Files in the bin, lib, and update directories are the same as above. The purpose of the files are also the same.
The following files in the /usr/hp64000/inst/update directory are loaded onto the HP 9000 Series 300/400 as part of the Softkey Interface software respectively: <prod_number>.X and <prod_number>.cfg		

Should I Update all HP 64700 Series Firmware?

When you subscribe to SMS, you will receive updates for your HP 64700 Series system. If the version of the update matches the version of your firmware, updates are not required. Updates are for emulation, analysis, host control and LAN.

You can determine which version of firmware you have by entering the Terminal Interface **ver** command.

When using the Softkey interface, the **ver** command can be accessed by entering the command string:

```
pod command "ver"
```

When using the PC Interface, the **ver** command can be accessed by entering the command string:

```
system command ver
```

Procedure for Updating the Flash EPROM Card

After loading your update software on the HP 9000 Series 300/400 Workstation or PC host, the next step is to use the *proflash* command to update the Flash EPROM Card.

Synopsis

```
proflash [-v] [emulname] [configfile]
```

Description

The *proflash* command downloads flash programming code to an HP 64700 Series Emulator and sends commands to the downloaded code to erase and program EPROMs on the Flash EPROM card.

If the *-v* (verbose) option is specified, *proflash* displays progress status messages during operation.

emulname is a logical emulator name from the *64700tab* or *64700tab.net* file. The *emulname* is selected from a list displayed after you enter the *proflash* command.

configfile is a configuration file describing the parameters for the programming. The configuration file is in */usr/local/lib/<prod_number>.cfg*. The *emulname(s)* and

configfile(s) are listed on the display after you enter the progflash command. When displayed, you are prompted to select which emulname and configfile set you want updated.

If arguments are missing, progflash will prompt for the needed arguments. Choices are scrolled onto the screen and you are asked to choose one by entering its number. That is, progflash must know which HP 64700 Series Emulator to update.

The progflash command then lists the number of the product to update. This could be the emulator, host control, analyzer, or LAN product. If you want to begin updating, press return. To abort, press <CTRL> <C>.

The time required to download is dependent upon the number of bits and the baud rate. The number of bits are displayed during the download process. For example, at 9600 baud it could take as long as 20 minutes. With an RS-422 Interface, it would take only a few seconds.

Example:

Enter the command:

```
progflash 
```

A list will appear similar to the one shown below. This selection tells progflash which card cage to look at.

	Logical Name	Processor
1	mau	m68000
2	mdg	m68000
3	bar	m68000

Select the number corresponding to the logical name and processor you want to update and press return. A list of product names are displayed similar to the one shown.

Number of Emulator to Update? (cntl C to abort) 2

Product	
1 64701	(LAN CARD)
2 64700	(HOST CONTROL CARD)
3 64749	(EMULATOR CARD)
4 64742	(EMULATOR CARD)
5 64745	(EMULATOR CARD)
6 64703/64704/64706/64740	(ANALYZER CARD)
7 64743	(EMULATOR CARD)
8 64746	(EMULATOR CARD)
9 64774	(EMULATOR CARD)
10 64779	(EMULATOR CARD)
11 64753	(EMULATOR CARD)
12 64764A	(EMULATOR CARD)

Number of Product to Update? (cntl C to abort) 1

Enable progress messages? {y/n} (y)

The product selected can be a LAN card, control card, emulator, or analyzer.

Diagnostics

proglash will return 0 if all went well; otherwise, it will return a nonzero (error) and a message will be written on the standard error output because programming may break communications with the host. Verify the version of the update after programming.

Service

Introduction

This chapter provides information for:

- Performance Verification
- Solutions to Problems.
- AC Power Connections
- Power Supply Removal and Installation
- Locating Parts
- Part Numbers

Warning



SHOCK HAZARD!

Any adjustment, maintenance and repair of the opened apparatus under voltage shall be avoided as far as possible and, if inevitable, shall be carried out only by a skilled person who is aware of the hazard involved.

When the apparatus is connected to its supply, terminals may be live, and the opening of covers or removal of parts (except those to which access can be gained by hand) is likely to expose live parts.

The apparatus shall be disconnected from all voltage sources before it is opened for any adjustment, replacement, maintenance, or repair.

Capacitors inside the apparatus may still be charged even if the apparatus has been disconnected from all voltage sources.

Warning



SHOCK HAZARD!

Whenever it is likely that the protection has been impaired, the apparatus shall be made inoperative and be secured against any unintended operation. The protection is likely to be impaired if, for example, the apparatus:

- . shows visible damage,
 - . fails to perform the intended measurements,
 - . has been subjected to prolonged storage under unfavorable conditions,
 - . has been subjected to severe transport stresses.
-

Performance Verification

This section includes performance verification information for the:

- HP 64701A Local Area Network (LAN) card.
- HP 98659A High Speed RS-422 Interface.

Performance Verification for the HP 64701A LAN Card

The HP 64701A LAN Card can be tested through a command called *lanpv*. This command can only be run when you are talking to the HP 64700 Series Emulator with an RS-232 connection. You can NOT do this while you have a LAN connection.

To run the test, the modular HP 64700 Series Emulator must be disconnected from the main network. The tests will fail unless the connector is completely terminated with a 75 ohm termination, and only one connector is terminated. That is, you can NOT have both connectors terminated at the same time. Also, only one connector can be tested at a time.

Help lanpv

Now that the HP 64700 Series Emulator is connected through the RS-232 serial port and is configured for running LAN pv, you can begin by accessing help by entering the command string

help lanpv or ? lanpv

M>help lanpv

lanpv - performance verification on 64701A LAN board

lanpv -b - testing performed through BNC connector

lanpv -a - testing performed through AUI connector

lanpv -v - print the error code value

--- NOTES ---

To run performance verification, the connector under test must be removed from the network and capped with a 50-ohm terminator.

By selecting -b, testing is performed through the BNC connector. A -1 tests the LAN through the AUI connector. If you want to print the error code, select -v. This command will return "PASSED" or "FAILED" before issuing a prompt.

Example:

lanpv -vb

Testing: HP 64701A LAN board (BNC connector)

PASSED

Performance Verification for the HP 98659A

Introduction

The HP 98659A High-Speed RS-422 Interface has two levels of performance verification (PV). The first level is a series of built-in ROM-based power-up tests which perform a checksum on the ROM, test the onboard RAM, and test other local resources. These tests are the same as those embedded in the other programmable datacomm interface products. Other programmable datacomm interfaces include the HP 98628, HP 98629, HP 98641, and HP 98649.

The second level is an HP-UX based test, which is unique for this interface. It exercises the drivers and receivers and provides data integrity testing.

If Power-up Tests Fail. If any of the power-up tests fail, the bootrom initialization in the HP 9000 Series 300 during power-up or rebooting of the HP-UX system will display the following message:

```
HP98659 at "sc" Failed
```

“sc” is the select code of the interface.

During the HP-UX booting process, if the power-up tests fail, the error message will read:

```
HP98691 at select code "sc" ignored; unrecognized card option
```

This error message occurs after the power-up test fails, because the kernel.s procedure (**data_com_type**) returns a value of -1 instead of the protocol ID of the board. The HP 98691 message comes from the kernel.s procedure (**last_make_entry**). These failures prevent the driver from being linked, and therefore the HP-UX based tests cannot be run. The failure mode is available on the card but currently there is no way under HP-UX to access it.

The second level of HP-UX based performance verification can be run as a field verification test. The field verification test is described in this section. The HP-UX based tests check the external interface logic and the user cable, if connected. It will use a test hood to feed back all used signals for verification of both drivers and receivers.

Customer/Field Test Hood Requirements

Table 7-1 shows the interconnections in the test hood used with the HP 98659A High-Speed RS-422 Interface. This test hood is for customer and Hewlett-Packard Customer Engineer (CE) testing.

Part Numbers. The part number of the test hood is 98659-67950. The test hood has a 25-pin connector, which plugs into the cable assembly (part number 98659-63001) that connects the interface card to the emulator.

Table 7-1. Customer/Field Test Hood Requirements

Signal Type	Signal Definition	Pin Direction	Data Flow
Data	SD (A) --> RD (A)	9 --> 25	SD=Send Data (from cable) RD=Receive Data (to cable)
	SD (B) --> RD (B)	10 --> 18	
Control	RS (A) --> CS (A)	17 --> 21	RS=Request to Send (from cable) CS=Clear to Send (to cable)
	RS (B) --> CS (B)	19 --> 23	
	DM (A) , RR (A) <-- TR	12 <-- 20	DM=Data Mode, RR=Receiver Ready (to cable) TR=Terminal Ready (from cable) SG=Signal Ground
	DM (B) , RR (B) <-- SG	13 <-- 7	
Timing	TT (A) --> RT (A) , ST (A)	24 --> 11	TT=Terminal Timing (from cable) RT=Receive Timing, ST=Send Timing (to cable)
	TT (B) --> RT (B) , ST (B)	14 --> 16	
<p>Note: Some pins in the connector have two names (representing functions). For example, pin 12 serves as both Data Mode and Receiver Ready.</p>			

Invocation of the HP-UX based PV is through an executable file named `/usr/CE.utilities/98659/98659pv`. Executing the program without any options displays the following:

HP 98659A Performance Verification Test:

Usage

`98659pv /dev/xxx [loop]`

`"/dev/xxx"` is the special device file for the HP 98659A card under test. `"loop"` is an optional request to loop on a portion of the test. Adding a loop option provides a regular stimulus response which is useful for repair of a faulty interface card. `"DTR"` or `"DSR"` will toggle the DTR output/DSR input. `"DATA"` will loop at 19200 baud with no handshake, toggling the data lines. `"RTS"` or `"CTS"` will toggle the RTS/CTS Handshake, in a 230400 baud data loop. A **CTRL C** will exit from any of the loops.

Test without Looping. If the test starts with a valid special device file, no looping options, and a working card (and cable if connected), the following is displayed:

```
98659A Performance Verification Test:
Test Requires Test Hood # 98659-67950
Driver opened for /dev/ody25, fildes = 3
Passed DTR Toggle Test
sending a 5K byte file out at 19200 baud,
No pacing enabled, checking data out/in lines
returned string same as send string
Passed Data Transfer Test at 19200 Baud
sending a 5K byte file out at 460800 baud,
RTS/CTS pacing enabled, checking clock and RTS/CTS lines
returned string same as send string
Passed Data Transfer Test at 460800 Baud
Passed EXTERNAL CLOCK and RTS/CTS check
Driver closed for /dev/ody25
98659A Performance Verification PASSED for device /dev/ody25
```

If the test starts with an invalid special device file, the following is displayed:

```
98659A Performance Verification Test:  
Test Requires Test Hood # 98659-67950  
ERROR!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!  
Failure to OPEN  
errno = 20  
ERROR EXIT
```

If you specify an invalid looping option, the following is displayed:

```
ERROR!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!  
Unsupported Option: xxx  
ERROR EXIT
```

“xxx” represents the invalid option entered.

If any failures occur during these tests, an error message is printed and the test terminates. The fault can be in either the card or the cable.

Error Messages

Various failures display the following error messages:

DTR or DSR failure. The DTR or DSR error occurs when DTR or DSR will not go true. The result on screen resembles:

```
98659A Performance Verification Test:
Test Requires Test Hood # 98659-67950
Driver opened for /dev/ody25, fildes = 4
ERROR!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
  DTR will not go true (false)
ERROR!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
Failure in modem line test
errno = 25
ERROR EXIT
```

Data Read Failure. The Data Read error occurs when the test fails to read the data. The result on screen resembles:

```
98659A Performance Verification Test:
Test Requires Test Hood # 98659-67950
Driver opened for /dev/ody25, fildes = 3
Passed DTR Toggle Test
sending a 5K byte file out at 19200 baud,
No pacing enabled, checking data out/in lines
ERROR!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
Failure to read
errno = 5
ERROR EXIT
```

Data Character Loss Failure. The Data Character Loss Failure error occurs when the test fails to read all the data. The result on screen resembles:

```
98659A Performance Verification Test:
Test Requires Test Hood # 98659-67950
Driver opened for /dev/ody25, fildes = 3
Passed DTR Toggle Test
sending a 5K byte file out at 19200 baud,
No pacing enabled, checking data out/in lines
ERROR!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
Failure to read all of data
ERROR EXIT
```

Data Corruption Failure. The Data Corruption Failure error occurs when the test returns a string that differs from the string sent. The result on screen resembles:

```
98659A Performance Verification Test:
Test Requires Test Hood # 98659-67950
Driver opened for /dev/ody25, fildes = 3
Passed DTR Toggle Test
sending a 5K byte file out at 19200 baud,
No pacing enabled, checking data out/in lines
ERROR!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
return string not same as sent string
ERROR EXIT
```

RTS/CTS and Clock Test Failure. The RTS/CTS and Clock Test Failure error occurs when the test fails to read the data when RTS/CTS pacing is enabled. The result on screen resembles:

```
returned string same as send string
Passed Data Transfer Test at 19200 Baud
sending a 5K byte file out at 460800 baud,
RTS/CTS pacing enabled, checking clock and RTS/CTS lines
ERROR!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
Failure to read
errno = 5
ERROR EXIT
```

Looping Options. If you specify the “DTR” or “DSR” option, the following is displayed:

```
98659A Performance Verification Test:
Test Requires Test Hood # 98659-67950
Driver opened for /dev/ody25, fildes = 3
toggling DTR out, DSR in
```

The lines will be toggling so that any open or short circuits in the path can be located.

If you specify the "DATA" option, the following is displayed:

```
98659A Performance Verification Test:
Test Requires Test Hood # 98659-67950
Driver opened for /dev/ody25, fildes = 3
Passed DTR Toggle Test
Loop is sending out 5K binary 8 bit file
Reading back as much as possible
```

This will allow the data path to be traced so that any problems in the data loop can be isolated.

If invoked with the "RTS" or "CTS" option, the following is displayed:

```
98659A Performance Verification Test:
Test Requires Test Hood # 98659-67950
Driver opened for /dev/ody25, fildes = 3
Passed DTR Toggle Test
sending a 5K byte file out at 19200 baud,
No pacing enabled, checking data out/in lines
returned string same as send string
Passed Data Transfer Test at 19200 Baud
Loop is sending out 5K binary 8 bit file
at 460800 baud using RTS/CTS handshaking and
the external X1 clock
Reading back as much as possible
Failures could be in data, clock, or RTS/CTS
```


This provides stimulus for checking the clock path and the RTS output to CTS input path.

These tests, when used without a looping option, provide a simple yes/no test for use in field testing. With the addition of the looping option, they also provide a tool for repair.

Additional Information. For additional information about the HP 98659A, refer to the *Installation Guide* supplied with that card.

Solutions to Problems

This section provides solutions to configuration problems when mixing feature sets, configuring communications with the LAN, and updating firmware plus any other problem areas to consider. Areas to consider are:

- The emulator will NOT boot up when configured for LAN.
- The meas_sys command does not work.
- Power glitches during firmware updates.
- Firmware and Software Revisions.
- Mixing Feature Sets.
- Some commands over the LAN will NOT work.

The Emulator will not Boot Up when Configured for LAN

Check the HP 64700 Series Emulator rear panel communication configuration switches. Make sure that switch S12 is set to the 0 position to disable the handshake mode for RS-422/RS-232. Though you are configured for LAN, if switch S12 is set to a 1, the emulator will NOT boot up because the emulator is looking for an RS-422/RS-232 connection. A general rule of thumb when using switches S14, S15, and S16 for LAN is to set the other two switches to 0.

meas_sys does not Support LAN

When HP 64000 products are hosted on HP 9000 Series 300/400 Workstations, the Measurement System (meas_sys) is a collection of commands that manage all aspects of making measurements on your emulator. Though the Measurement System will work over RS-422 or RS-232 serial mode communications, it will NOT support the Local Area Network (LAN).

If you try to access the Measurement System while using LAN, you will get an error message directing you to use the **emul700** command from the shell.

Using the `emul700` command on serial configurations and LAN configurations is the recommended method to manage emulation resources because there will be less confusion should you want to use an HP 64700 Series Emulator over the LAN in the future.

Power Glitches during Firmware Updates

If you should get a power glitch while updating your firmware, chances are that you may have lost some bits during the download process and your emulator will not boot up. Simply repeat the update process using *progflash* and download the software again. If LAN doesn't work, after updating the LAN, try running *progflash* using the RS-232-C or RS-422 connection.

Firmware and Software Revisions

Do I Need Current Firmware/Software?

All of the emulator and analyzer card sets used in the earlier HP 64700 Series systems will work in the modular HP 64700A Card Cage; however, emulators and analyzers must be updated to current revisions of:

- firmware.
- user interface software.

Mixing Feature Sets

It is possible to mix old and new products in the modular HP 64700A Card Cage (for example, an old revision of an emulator with a new revision of an analyzer or user interface software). While most of these combinations will run, they will not be formally supported by Logic Systems Division, Product Support Division, or Applications Support Division. Formally, supported configurations must include the latest revisions of all software and firmware.

Example Problems

You have two modular HP 64700A Card Cages with the feature sets shown below. Each emulator is different. The flash EPROM card in each emulation system was updated to the current software revision, and both emulator feature sets are working in both emulators:

First HP 64700A Card Cage

- host control card (1)
- analyzer card (1)
- flash EPROM card (1)
- emulator card (1)

Second HP 64700A Card Cage

- host control card (2)
- analyzer card (2)
- flash EPROM card (2)
- emulator card (2)

Problem 1. If you move emulator card (1) into the second card cage, the second card cage won't work. The problem here is that the software revision on flash EPROM card (2) is not compatible with emulator card (1) and the emulator tries to operate from the old revision of emulator ROMs rather than from the Flash EPROM card. A simple fix is to update flash EPROM card (2) so the firmware is compatible with the different emulator card (1).

Problem 2. A similar problem would occur by interchanging or moving Flash EPROM cards from one modular card cage to another. The same simple fix is required. You must update the firmware on the Flash EPROM card so it is compatible with the feature sets it is using.

Problem 3. Another similar problem is moving the analyzer card to another card cage. The same simple fix applies. Update your Flash EPROM card's firmware to the current revision of firmware for the different analyzer card.

Problem 4. Your Flash EPROM card appears inoperable. Though this card is very reliable, failure can happen. When operating the emulator, if the Flash EPROM card appears

inoperable, the emulator will try to use the firmware from the ROMs on the host control card. To test this, check the software version that your emulator is using. If it's a software revision older than the revision on the Flash EPROM card, chances are that the Flash EPROM card is not working. Try reloading the update software onto the Flash EPROM card using the command *progflash*. If this doesn't solve the problem but you have another Flash EPROM card, update the other Flash EPROM card and try again. If the other Flash EPROM card works, the original Flash EPROM card is bad. Contact your local HP Representative for information on ordering new Flash EPROM cards.

Problem 5. The update software was accidentally purged from your host system. Reload the update software from your diskettes or DC-600 tape. If the backup media is missing, contact your local HP Service Representative.

Before mixing feature sets, you should know the version of firmware that the Flash EPROM is using for the control card, emulator card, and analyzer card. Also, if you are using an HP 64701A LAN card, you should know the revision of firmware it is using. By moving the entire feature set from one card cage to another, you shouldn't have any problems, but once you customize features, the Flash EPROM card must be compatible with the features it is using.

By subscribing to SMS for generic HP 64801 software revisions and for your specific emulator user interface software, you should have the latest software updates. Also, update software is sent to you with each modular software product purchased.

**Some Commands
over the LAN will
NOT Work**

The following list of commands when used over the LAN simply do nothing or behave differently when a LAN connection is made to the HP 64700 Series Emulator versus using an RS-422 or RS-232 Datacomm Port.

- | | |
|------|---|
| stty | This allows you to change baud rates etc on the RS-232 ports. Though you can enter this command, it simply has no effect. |
| xp | The transparent mode command can be entered but simply has no effect. |
| po | This command performs two functions. For those functions indicating where the output is to be directed etc., this command has no effect. This command can also be used to specify prompt characters (>, or \$, etc). This command still works for this request. |

AC Power Connections to the HP 64700 Series Emulator

After you have selected an emulator system configuration and installed the data communications connections (see chapter 5), you can proceed with connecting the emulator to a power source.

This section contains information on connecting the emulator to the proper power source. Topics include:

- Input voltage and current requirements.
- Connecting the emulator to power and power-up.
- Verifying data communications.
- An overview of how to verify emulator communications with its controller.
- Use your emulator

Input Voltage and Current Requirements



Your HP 64700 Series Emulator was preset at the factory for either 110 VAC or 220 VAC, depending on your country's prevailing voltage. The input frequency must be in the range of 48-66 Hz. The line voltage is set from a thumb wheel switch inside the power control module (see figure 7-1).

Input Current

At 110 VAC, the emulator will draw a maximum of 3.0 A. At 220 VAC, it will draw a maximum of 1.5 A.

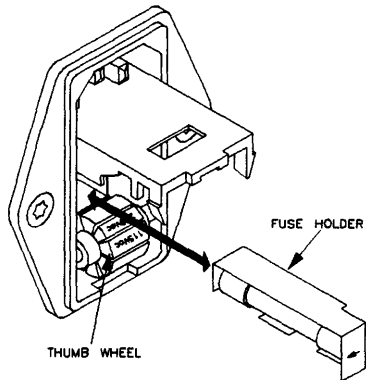


Figure 7-1. Location of Line Voltage Switch and Fuse.

Connecting Power and Power-up

Power Cords

Your HP 64700 Series Emulator is shipped from the factory with one power cord appropriate for your country. You should verify that you have the correct power cable for installation by comparing the power cord you received with the HP 64700 Series Emulator with the drawings under the "Plug Type" column of table 7-2. One end of your cable should match one of the drawings. If it does not, or if the cable you received is not appropriate for your electrical power outlet type, contact your Hewlett-Packard sales and service office.

Table 7-2. Power Cord Configurations

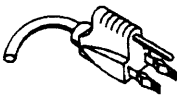


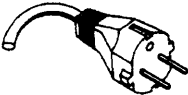

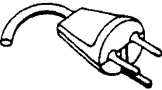

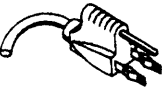
Plug Type	Cable Part No.	Plug Description	Length in/cm	Color
Opt 903 124V ** 	8120-1378	Straight * NEMA5-15P	90/228	Jade Gray
	8120-1521	90°	90/228	Jade Gray
Opt 900 250V 	8120-1351	Straight * BS136A	90/228	Gray
	8120-1703	90°	90/228	Mint Gray
Opt 901 250V 	8120-1369	Straight * NZSS198/ASC	79/200	Gray
	8120-0696	90°	87/221	Mint Gray
Opt 902 250V 	8120-1689	Straight * CEE7-Y11	79/200	Mint Gray
	8120-1692	90°	79/200	Mint Gray
	8120-2857	Straight (Shielded)	79/200	Coco Brown
* Part number shown for plug is industry identifier for plug only. Number shown for cable is HP part number for complete cable including plug. ** These cords are included in the CSA certification approval for the equipment.				

Table 7-2. Power Cord Configurations (Cont'd)

Plug Type	Cable Part No.	Plug Description	Length in/cm	Color
Opt 906 250V 	8120-2104	Straight * SEV1011	79/20	Mint Gray
	8120-2296	1959-24507 Type 12 90°	79/200	Mint Gray
Opt 912 220V 	8120-2957	Straight *DHCK107 90°	79/200	Mint Gray
			79/200	Mint Gray
Opt 917 250V 	8120-4600	Straight SABS164	79/200	Jade Gray
	8120-4211	90°	79/200	
Opt 918 100V 	8120-4753	Straight Miti	90/230	Dark Gray
	8120-4754	90°	90/230	
* Part number shown for plug is industry identifier for plug only. Number shown for cable is HP part number for complete cable including plug. ** These cords are included in the CSA certification approval for the equipment.				

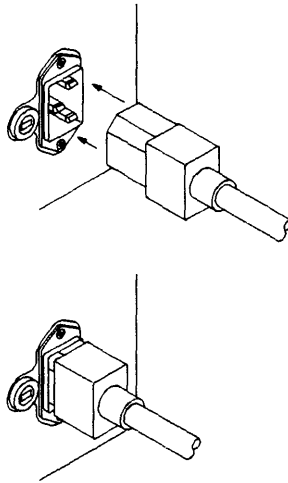


Figure 7-2. Connecting the Power Cord

To connect the power cord, plug the female end (three holes) into the receptacle on the back of the emulator chassis (see figure 7-2) and connect the other end to a power source complying with the preset input voltage of the emulator.

Line Switch

The line switch is a push button located at the lower left hand corner of the front panel. To power on the HP 64700 Series Emulator, connect the line cord as described above and push the line switch button to the ON (1) position. To turn power off, switch the rocker to the OFF (0) position.

Power-up Sequence

When you have turned on power to the emulator, you can verify that the emulator has correctly executed its power-up sequence by looking through the emulator front panel grill.

LED's (Just behind front panel)

SEQUENCE	LEFT (Green)	MIDDLE (Red)	RIGHT (Green)	COMMENTS
1	●	●	●	Illuminated briefly
2	○	○	●	
3	●	○	●	Left LED flashes then remains on

○ LED not illuminated
● LED illuminated

(Approximately 15 seconds elapse between power on and left/right LED's remaining on)

Figure 7-3. LED Sequence at Powerup

Note



If the LEDs do not light in the sequence described above, you may have a loose power connection or an incorrect data communications handshake selection. Recheck your power connections and your handshake configuration (see chapter 5).

If none of the LEDs light and you do not hear the fan running, the emulator line fuse may have failed.

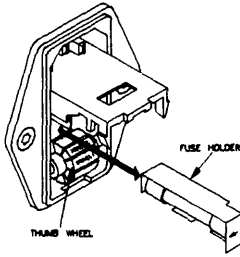


Figure 7-4. Location of Line Voltage

Fuse

Caution



Make sure that only fuses with the required rated current and of the specified type are used for replacement. The use of makeshift fuses and the short-circuiting of fuse holders are prohibited.

A five-ampere, 250 VAC rated fast-acting fuse is used to protect the HP 64700 Series Emulator from severe damage due to incorrect line voltages. It also protects your site power from severe line faults within the emulator. (Both 100-110 VAC and 220-250 VAC applications use the same type and rating fuse.)

If the HP 64700 Series Emulator will not start up when connected to the proper power source and switched on, the fuse may have opened. To replace the fuse, do the following:

1. Place the HP 64700 Series Emulator line switch in the off (0) position.
2. Disconnect the line cord from the power source and from the HP 64700 Series Emulator.
3. Insert a medium flat-blade screwdriver in the plastic slot of the power control module and pry open the cover (see figure 7-4).

4. Remove the fuse from the fuse holder and replace it with a 5A 250 VAC fast-acting fuse.
5. Reconnect the line cord to the HP 64700 Series Emulator and the power source and power on the HP 64700 Series Emulator. If the instrument still does not power-up (fans do not rotate, no datacomm initialization, no power on LED at front), refer to the *HP 64700 Series Emulator Support Services* manual.

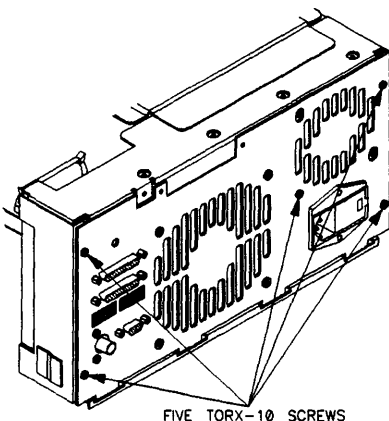


Figure 7-5. Removing and Installing the Rear Panel

Removing/Installing the Power Supply

Warning



Shock Hazard!

Before removing the power supply, make sure that the card cage is powered off and wait a few minutes for the capacitors to discharge.

To remove the power supply:

1. remove the top cover.*
2. remove side panel.*
3. remove all feature boards.*
4. remove the LAN card.*
5. remove the host board.*
6. remove front bezel and disconnect the power light cable.**
7. remove five Torx T-10 screws as shown above (figure 7-5)

*Instructions given earlier in this chapter.

**See power light cable wire in figure 2-12.

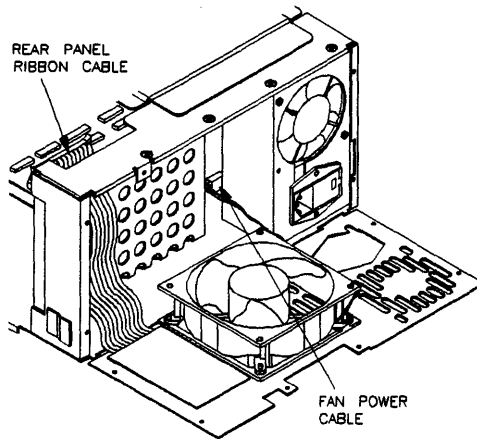


Figure 7-6. Fan Cable

Pull the rear panel back and remove the fan cable. Remove two screws holding the power supply in place (figure 7-7).

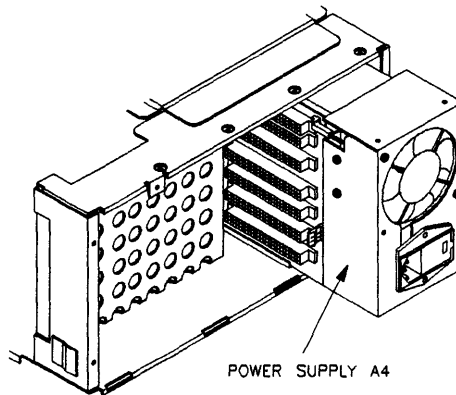


Figure 7-7. Power Supply

Slide power supply assembly back to remove (figure 7-7).

Install power supply in reverse order.

For replacement of the power supply assembly under the Exchange program, refer to the chapter "Service."

Verifying Data Communications

When the emulator powers up, it sends a brief message to the selected command port and then displays the Terminal Interface prompt. You can verify that your data communications configuration is at least partially functional by looking for the message and prompt on the controlling device.

For example, if you have an HP Vectra personal computer running HP AdvanceLink, select the proper datacomm port in AdvanceLink (the same one you used to connect to the emulator) and power-up the emulator. You should see a message similar to the following (from an HP 64700 Series Emulator for the 68000 microprocessor):

```
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written permission is prohibited, except as allowed under copyright laws.
```

```
HP 64700 Series Emulation System
Version:  A.00.00 20Nov87
```

```
HP 64742 Motorola 68000 emulator
HP 64740 Emulation Analyzer
```

```
R>
```

The procedure is similar if your emulator is connected to a data terminal. Also, given the proper terminal emulation software, you can verify communications with an HP 9000 Series 300/400 Workstation.

You can now run performance verification on the emulator. First, remove the conductive pin protector from the target system probe. Then type the **pv** command, along with the number of times you want to execute the command, as follows:

```
R> pv 2
```



```
Testing: HP 64742 Motorola 68000 emulator
PASSED
Number of tests: 1           Number of failures: 0
Testing: HP 64740 Emulation Analyzer
PASSED
Number of tests: 1           Number of failures: 0

Testing: HP 64742 Motorola 68000 emulator
PASSED
Number of tests: 2           Number of failures: 0
Testing: HP 64740 Emulation Analyzer
PASSED
Number of tests: 2           Number of failures: 0
```

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written permission is prohibited, except as allowed under copyright laws.

```
HP 64700 Series Emulation System
Version: A.00.00 20Nov87
```

```
HP 64742 Motorola 68000 emulator
HP 64740 Emulation Analyzer
R>
```

If the emulator fails to communicate or fails performance verification:

1. Make sure that you have connected the emulator to the proper power source and that the power-up LEDs have cycled as indicated under the heading "Power-up Sequence."
2. Make sure that you have properly configured the data communications switches on the emulator and the data communications parameters on your controlling device. You should also verify that you are using the correct cable. Refer to chapter 2 of this manual if you have questions.
3. Make sure you have removed the conductive pin protector from the target system probe and that the emulator is not plugged into a target system.

If none of these items seems to solve the problem, call the nearest Hewlett-Packard Sales and Service office listed in the *Support Services* manual.

Use Your Emulator

Now that you have connected data communications and power, you can immediately proceed to using your emulator with the Terminal Interface. You can start with the *Emulator Terminal Interface User's Guide* supplied with your emulator.

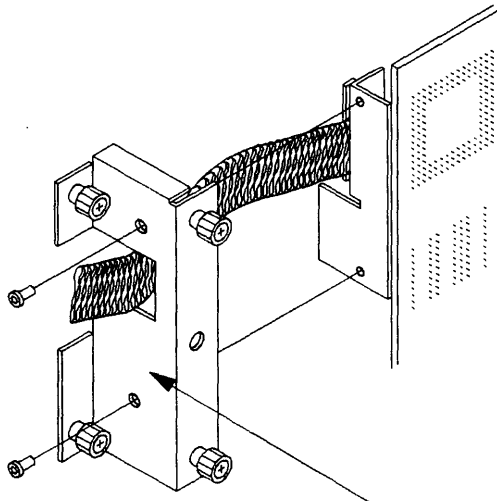
If you are planning to use your emulator with the PC Interface, you need to install software first, so go back to chapter 4 then on to the PC user's guide and reference.

If you are planning to use your emulator with the Softkey Interface, you will also need to install software. Go back to chapter 3 then on to the Softkey Interface users's guide and reference.

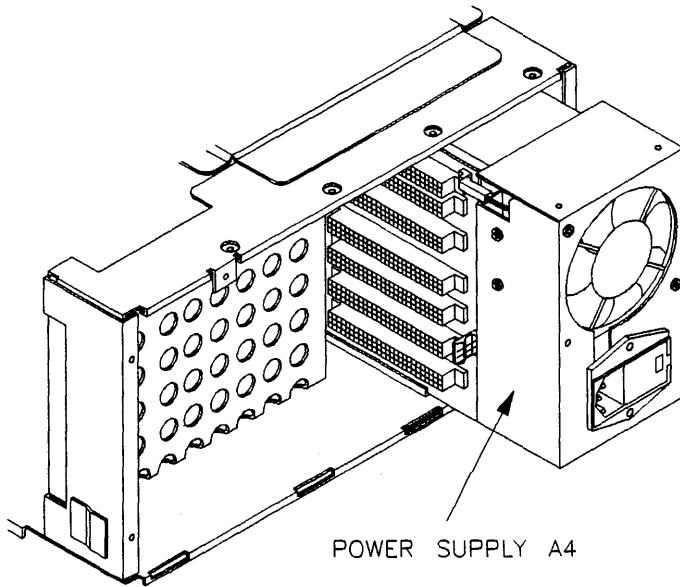
The following chapters give some details about connecting the HP 64700 Series Emulator to your target system and to other instruments for making coordinated measurements.

Parts Locator

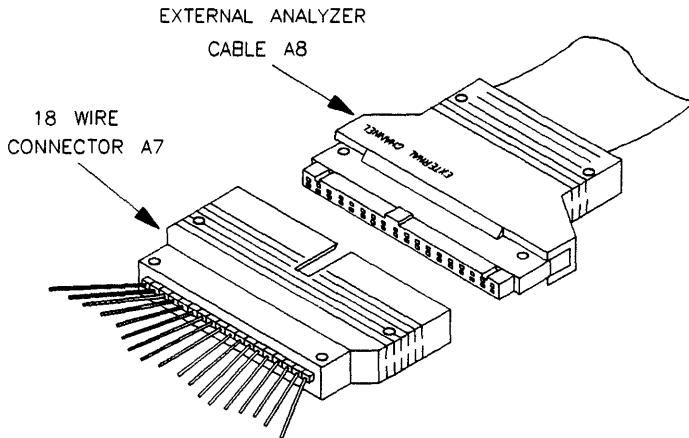
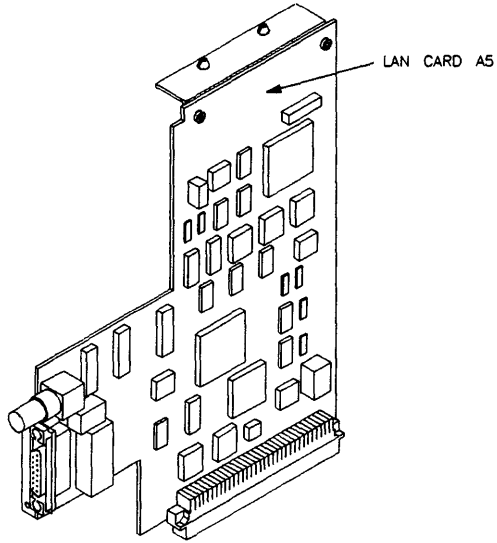
This section provides information in the form of illustrations for locating hardware parts you may want to order. When you find the part in the illustration, it is labeled by a reference designator number. All reference designators in this chapter will have the prefix "A" followed by a designator number. When you have located the designator number, go to the next section entitled Parts List and find the reference designator in the first column. The corresponding part number and description of the part will be listed in this section. You can order the parts through the Support Materials Organization (SMO), or through your local HP Representative.

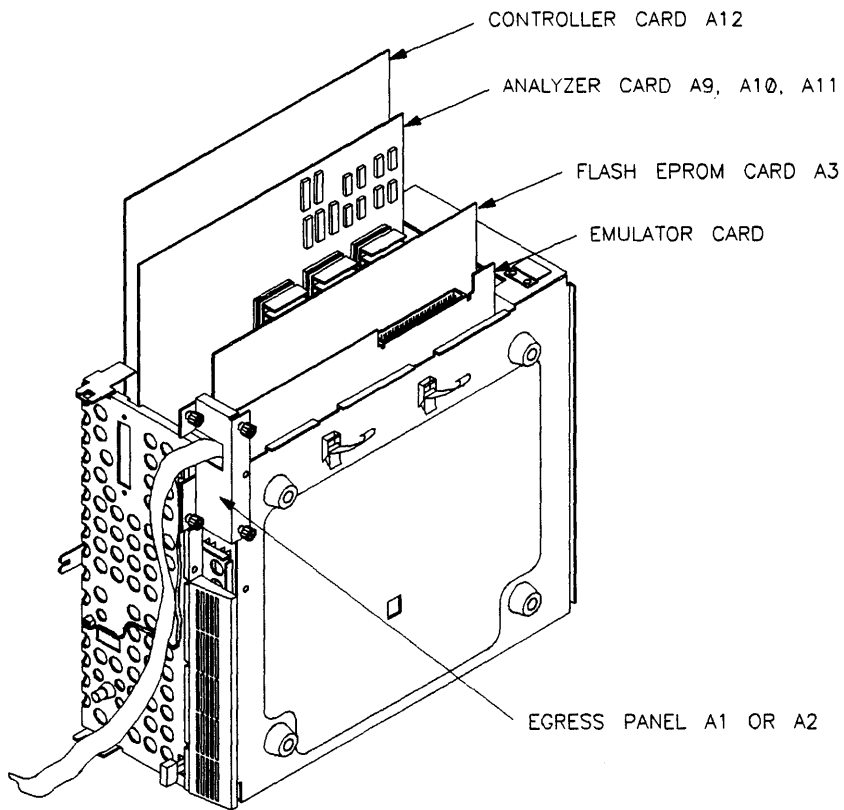


EGRESS PANEL A1 OR A2
(SEE PARTS LIST)



POWER SUPPLY A4





Parts List

The host ROM kit is NOT located in the Parts Locator Section, but is listed below. The ROM kit is a generic kit with four host controller ROM chips (64700-80000 through -80003). This kit is used to replace ROMs in the earlier model HP 64700 Series Emulators so the host controller can recognize when the Flash ROM card is present in the card cage.

Table 7-3. Parts List

Ref	Part Number	Description
A1	64700-00203	Egress Panel (for narrow width cables)
A2	64700-00204	Egress Panel (for wide width cables)
A3	64700-66502	Flash EPROM card.
A4	64700-62601	Power Supply Assembly
	64700-69601	Power Supply Assembly - Exchange Part Number
A5	64701-66502	Local Area Network Card
	64701-69502	Local Area Network Card - Exchange Part Number
A6	64703-66501	External State/Timing Analyzer Right Angle Adapter Board
A7	64740-61602	External State/Timing Analyzer 18 wire connector
A8	64740-64604	External Analyzer Cable
A9	647740-66520	48-channel Analyzer HP 64706A
	647740-69520	48-channel Analyzer - Exchange Part Number

Table 7-3. Parts List (Cont'd)

A10	64740-66523	64-channel Analyzer HP 64703A
	64740-69523	64-channel Analyzer - Exchange Part Number
A11	64740-66526	80-channel Analyzer HP 64704A
	647400-69526	80-channel Analyzer - Exchange Part Number

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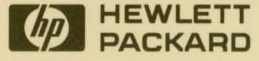
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