SYS1147U/D2

System Manual
For
Model 1147
Computer System

Ⓜ MOTOROLA

▲ Delta Series 3000
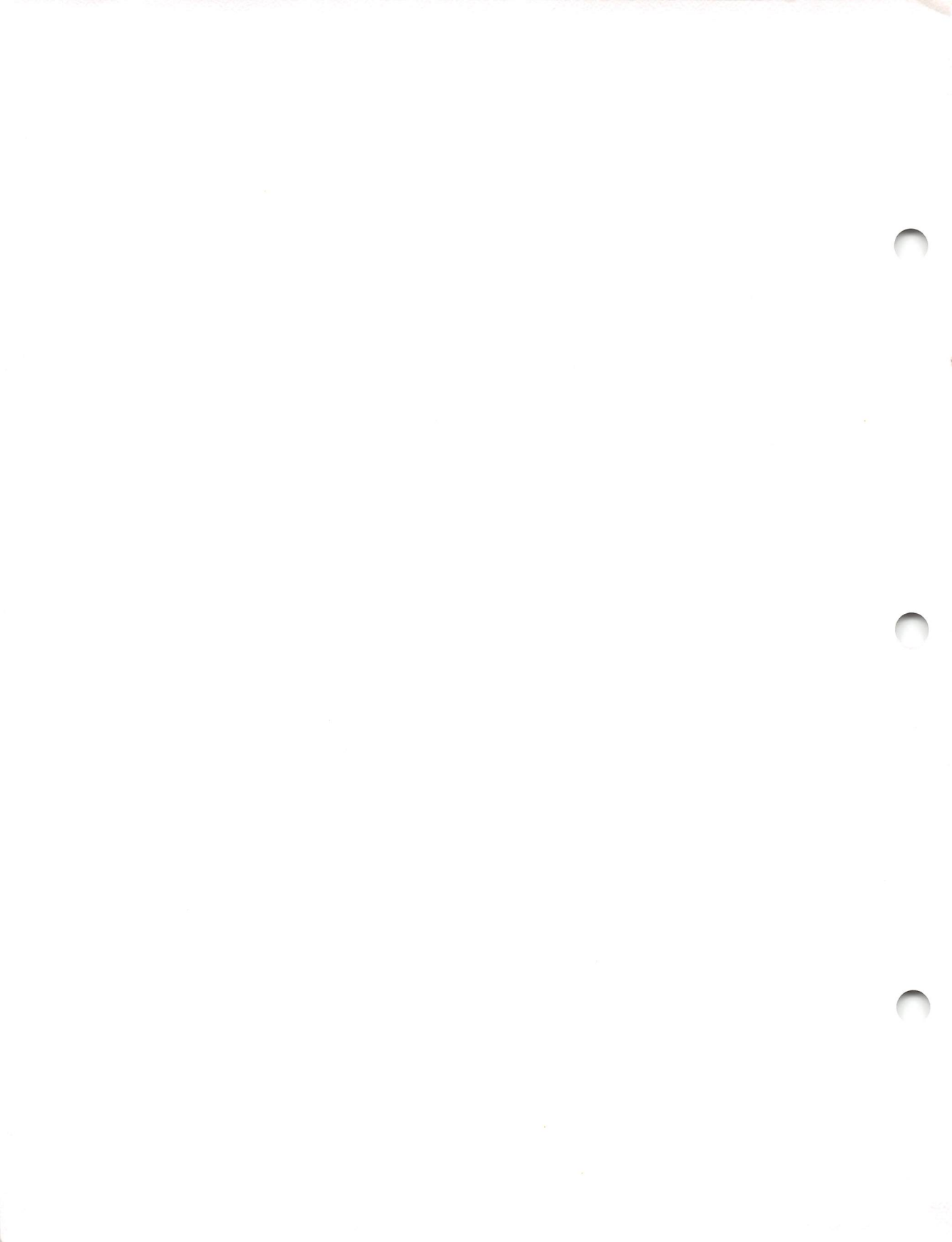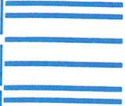
BUSINESS REPLY MAIL

FIRST CLASS MAIL   PERMIT NO. 2565   PHOENIX, ARIZONA
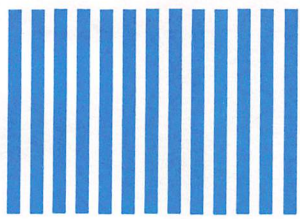
POSTAGE WILL BE PAID BY ADDRESSEE

MOTOROLA INC.

Computer Group, Microcomputer Division, DW164

2900 South Diablo Way

Tempe, AZ 85282-9741

To order additional Motorola publications, contact:

Literature Distribution Center
616 West 24th Street
Tempe, AZ 85282
(602) 994-6561

To comment on Motorola hardware, software, or system products, contact:

Motorola Field Service Division/Customer Support
(800) 528-1908
(602) 438-3100

MOTOROLA INC.

READER COMMENTS

Motorola welcomes your comments on its documentation. Please use this form.

Manual Title _____

Part Number _____ Date _____

Your Name _____

Your Title _____ Telephone Number _____

Company _____

Address _____

_____

_____

General Information:

Do you read this manual in order to:

☐ Install the product   ☐ Use the product   ☐ Repair the product

☐ Reference information   ☐ Other _____

In general, how do you locate information within this manual?

☐ Index   ☐ Table of Contents   ☐ Page Headings   ☐ Other _____

Completeness: ☐ Excellent   ☐ Very Good   ☐ Good   ☐ Fair   ☐ Poor

What topic would you like more information on:

_____

_____

Presentation: ☐ Excellent   ☐ Very Good   ☐ Good   ☐ Fair   ☐ Poor

What features of the manual are most useful (tables, figures, appendixes, index, etc.)?

_____

_____

Is the information easy to understand? ☐ Yes   ☐ No   If you checked no, please explain:

_____

_____

Is the information easy to find? ☐ Yes   ☐ No   If you checked no, please explain:

_____

_____

Technical Accuracy: ☐ Excellent   ☐ Very Good   ☐ Good   ☐ Fair   ☐ Poor

If you have found technical or typographical errors, please list them here.

Page Number	Description of Error

System Manual

for

Delta Series

Model 1147

Computer System

(SYS1147U/D2)

PREFACE

The *System Manual For Delta Series Model 1147 Computer System* (Part Number SYS1147U/D2) describes the installation, components, and configurations of the Model 1147 computer system. This system manual should be used by anyone who wants general as well as technical information about the computer system.

This is the second release of the system manual for the Model 1147. This version of the manual includes descriptions of the surface-mount MVME147S/SA processors and the MVME712A/B transition modules. The MVME732 remote service modem is also described.

The computer program stored in Read Only Memory of this device contains material copyrighted by Motorola, Inc., first published 1986, and may be used only under a license such as the License For Computer Programs (Article 14) contained in Motorola's Terms and Conditions of Sale, Rev. 1/79.

CONTENTS

FIGURES

TABLES

CHAPTER 1
INTRODUCTION

This system manual describes the Delta Series Model 1147 Computer System. The purpose of this manual is to provide a central source of information on Model 1147 components, configurations, start-up, and installation.

The manual is organized in five chapters and four appendices. The first four chapters describe information on system installation and start-up. The last chapter of the manual describes the boards supported in the system. Four appendices provide reference information including system specifications, cabling, and using removable media.

The following is a summary of this system manual.

- Chapter 2, *Site Preparation* describes the proper working environment for the computer equipment.

- Chapter 3, *Getting Started* contains a system installation checklist and a guide to SYSTEM V/68 documentation.

- Chapter 4, *System Installation* describes how to set up the computer and its peripherals. This chapter also describes how to boot up the operating system.

- Chapter 5, *System Hardware Overview* provides technical information on each component in the Model 1147.

- Appendix A, *System Specifications* lists the specifications for the computer and disk drives.

- Appendix B, *Disk Drive Configuration and Placement* describes the proper strapping for supported drives in the system.

- Appendix C, *Peripheral Cables* describes the cables required for the system.

- Appendix D, *Using Removable Media* describes how to load and unload removable media from the drives.

1

System Description

The Model 1147 Computer System is an MC68030-based Delta Series system, offering Delta Series performance and capabilities in a 12-slot rack-mountable chassis with a bench-top enclosure.

The Model 1147 is software and hardware compatible with other Delta Series systems. It is designed for a variety of uses, such as industrial automation, communications/networking, and factory control systems. In addition, the Model 1147 serves as a real-time development station in a VMEexec environment. With its 12-slot card cage, which supports large configurations, the Model 1147 adapts to most current application interfaces and allows system growth in a modular fashion.

The Model 1147 hardware includes:

- 12-slot enclosure (either 110V or 220V)
- VMEbus
- The applications processor with memory
- I/O and communications controllers
- Disk and tape devices
- Local and remote diagnostic capabilities

NOTE

Please note that other operating systems may be installed on the system. Information can be found in the appropriate operating system manual and *Software Release Guide*.

Related Documentation

The following publications may provide additional helpful information. If not shipped with this product, they may be purchased from the Motorola Literature Distribution Center, 616 West 24th Street, Tempe, AZ 85282; telephone (602) 994-6561.

Document Title	Motorola Publication Number
MVME147 VMEmodule Monoboard Microcomputer and MVME712/MVME712M Transition Module User's Manual	MVME147
MVME147BUG 147Bug Debugging Package User's Manual	MVME147BUG
MVME147S MPU VMEmodule User's Manual	MVME147S
MVME147Bug Debugging Package User's Manual	MVME147SBUG
MVME147 SCSI Firmware User's Manual	MVME147SFW
MVME224-1-2 4/8 MB DRAM Memory Modules User's Manual	MVME224
MVME332XT Intelligent Communication Controller User's Manual	MVME332XT
MVME333-2 Intelligent Communication Controller User's Manual	MVME333
MVME336 VME Hub Module and MVME751 Transition Module User's Manual	MVME336
MVME374 Multi-Protocol Ethernet Interface Module User's Manual	MVME374
MVME374BUG 374 Debugging Package	MVME374BUG

Document Title	Motorola Publication Number
MVME393 Multi-Channel Graphics Display Controller User's Manual	MVME393
MVME393 Multi-Channel Graphics Display Controller Diagnostic Manual	MVME393DIAG
MVME393 Multi-Channel Graphics Display Controller Firmware Manual	MVME393FW
MVME705 A 6-Channel Serial Transceiver Module	MVME705A
MVME710 8-Channel Serial I/O Distribution Module User's Manual	MVME710
MVME712A/MVME712AM/MVME712B Transition Module and MVME127P2 Adapter Board User's Manual	MVME712A
Remote Graphics Breakout (RGB) Unit User's Manual	MVMERGB

NOTE: Although not shown in the above list, each Motorola MCD manual publication number is suffixed with characters which represent the revision level of the document, such as "/D2" (the second revision of a manual); a supplement bears the same number as the manual but has a suffix such as "/A1" (the first supplement to the manual).

CHAPTER 2
SITE PREPARATION

Setting up the proper working environment for computer equipment can greatly increase its reliability and utility. This section provides guidelines for site preparation before installation of the Model 1147 Computer System.

Power Requirements

Power for the system should be supplied from a totally dedicated circuit breaker. Do not plug other electrical items into an outlet that is connected to the circuit breaker serving the computer. Making the computer share a circuit with other electrical equipment can cause system interruptions and data loss if the circuit is overloaded and the breaker is tripped.

The branch AC power circuit used to supply the 110V computer may be either a 15A or 20A type. For protection of data in the computer, disable all other outlets not used by the computer that are on the same branch circuit. It is suggested that adhesive labels be placed over outlets in order to prevent their use.

NOTE

The circuit breaker on the branch circuit is not for the protection of the computer.

Using a "power strip" with its own circuit breaker does not help protect the computer. The object is to prevent having some other appliance draw enough power from the same branch circuit to cause the branch circuit breaker to trip or reduce the branch circuit voltage below acceptable levels.

The branch circuit used for the computer can also be used for the system console.

The ground wire in the 3-wire power distribution must be at true ground potential with a resistance (measured at the power panel bus) of 5 ohms or less between the outlet and earth. The ground must be "third wire" type, not conduit ground.

The Model 1147 is equipped with a separate power cord and should be placed within 6 feet of the electric receptacle. If absolutely required, extension cords are to be #16 or #14 AWG, or larger, with ground.

Computers for U.S. domestic customers that will be used with 120 volt, AC input are shipped with a 3-prong male plug on the power cable (NEMA type 5-15P).

2

The computer has the power supply set for the correct input voltage at the factory. If any doubt exists about this setting, have it checked by a qualified technician before applying power. Computers for international shipment may require local installation of the correct cord set and input voltage selection on the power supply.

Electro-Static Discharge

The Model 1147 is designed to withstand 12 kV (kilovolts) of Electro-Static Discharge (ESD) without system interference and up to 24 kV without damage to the equipment.

The system is designed to operate in an area with 10% to 80% non-condensing relative humidity. A dry area (below 20% relative humidity) is conducive to ESD problems.

Cables

Terminals, printers, and some other peripherals use Motorola RS-232C cables. Use of cables other than those supplied with the system is not recommended. Although RS-232C shielded cables can be successfully used over extended distances, reliable communication over cables longer than 50 feet depends on the absence of electrical noise, correct ground potentials at termination points, and other variables. For this reason, error-free communication cannot be guaranteed on RS-232C cables longer than 50 feet. An alternative solution to extending cables is to use "short-haul" modems for devices further than 50 feet from the computer processor.

Refer to *Installing the System Console* section, and Table 4-2, *Troubleshooting Hints*, for additional requirements for console cables.

To achieve maximum reliability, use the following cautions when planning the installation of cables.

- Do not run signal cables parallel to AC power cables for more than a few feet if they are within four inches of each other.

- Do not install signal cables close to electric motors, power line regulators, relays, or power supplies.

- Avoid laying signal cables close to air conditioners, copy machines, water coolers, and other similar equipment that generates power line "noise."

- Do not run signal cables near equipment that generates radio frequency interference (for example, radio transmitters).

• Do not lay signal cables outside buildings without protecting from lightning and weather.

• Use the shortest possible cable between the processor unit and peripherals.

• To ensure that maximum protection for the equipment and operators is achieved, check the protective grounds at each power outlet for adequacy.

Remote Maintenance

Remote maintenance is an optional feature of the system which is implemented with an internal modem cabled to the MVME712M/MVME712A module. The user must provide a separate phone number by installation time to enable the remote maintenance connection for the service.

The system can use the phone line to inform the service facility if it is experiencing difficulties that may be indicators of more serious problems. The service center, with the user's permission, can log on to the system to help diagnose operational problems.

Some internal PABX (telephone switchboard) systems interfere with the modem. The telephone line for remote maintenance should be independent from an internal PABX.

For more detailed information on the remote maintenance feature, contact a sales representative or a Motorola Field Service Division representative.

Mechanical Features

A front view of one configuration of the system is shown in Figure 2-1. The following items may be identified:

• A half-height cartridge tape drive

• A hard disk drive

• Power ON/OFF switch

2

The rear view of a Model 1147 is shown in Figure 2-2. The number of connectors on an individual system varies, depending on the configuration. The Model 1147 may have the following connectors on the rear of the unit:

- Four 25-pin RS-232C connectors on the MVME712M module or four 9-pin RS-232C connectors on the MVME712A module. The connector labeled "SERIAL PORT 1/CONSOLE" is used to connect the system console terminal. The 25-pin connector labeled "PRINTER" can be used to connect a parallel printer.

- Up to 32 additional RS-232C serial connectors for various combinations of serial terminals, printers, and modems. There may be four sets of connectors labeled SP1 through SP8, representing the eight ports on each of four MVME332XT modules.

- One power cord connector.

2
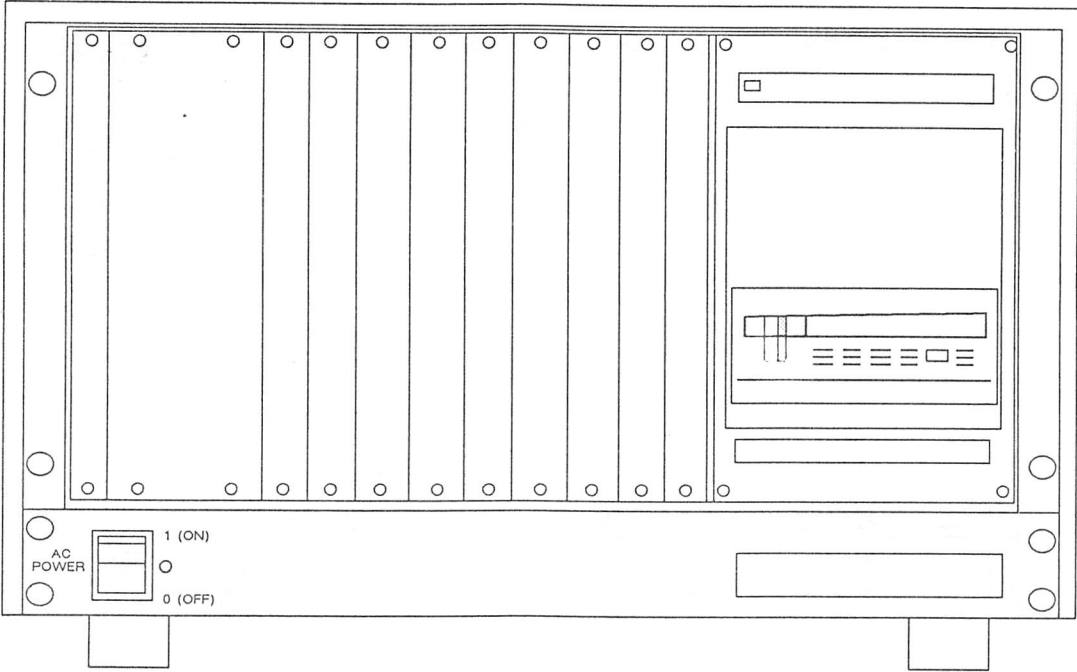
Figure 2-1. Model 1147 Front View

2
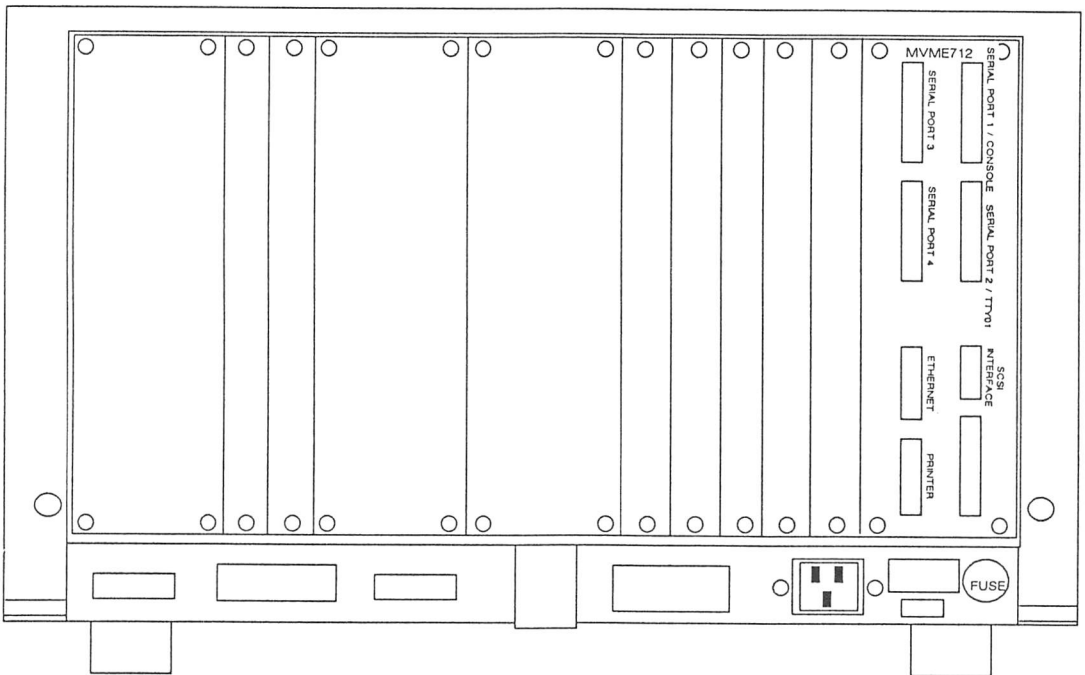
Figure 2-2. Model 1147 Rear View

CHAPTER 3
GETTING STARTED

This chapter describes where to find the information needed when installing a system. The SYSTEM V/68 Release 3 documentation set has 11 manuals plus various software release guides to reference, and because of this volume of information, it can be difficult to know which manual to use. The information described in the following pages is meant only as a guide since installations differ according to the system configuration.

The first part of this chapter contains a checklist that lists a task and then references the manual(s) containing information on the particular task. The second part of this chapter lists the SYSTEM V/68 Release 3 documentation set.

Installation Checklist

The following list describes some of the general steps that may be followed when installing a new system. This list only covers the major areas of system installation; your system may require additional procedures for its set-up.

Installation Checklist	
Step 1	**Unpack Computer and Peripherals** Unpacking instructions are attached to the computer's shipping box; peripheral unpacking instructions are included in the peripheral user's manual.
Step 2	**Cable System Console** See Chapter 4 of this manual.
Step 3	**Power Up Computer and Console** See Chapter 4 of this manual.
Step 4	**Boot Operating System** See Chapter 4 of this manual and the Operating System *Software Release Guide*. Also review information in the *System Power-up Menu* section in Chapter 4 of this manual.
Step 5	**Log on as System Administrator (root)** See Chapter 4 of this manual. *System Administrator's Guide*: P1, *System Identification and Security*; P3, *Processor Operations Procedures*; Appendix D, *System Administration Menu Package*
Step 6	**Cable all other peripherals** See Chapter 4 of this manual and also review user manuals enclosed with the peripherals.
Step 7	**Edit inittab file** *System Administrator's Guide*: P8, *TTY Management Procedures*; Chapter 8, *TTY Management*; Appendix B, *Directories and Files*; *Administrator's Reference Manual*, "init(1M)"
Step 8	**Power up Peripherals** See Chapter 4 of this manual and also review user manuals enclosed with the peripherals.

Installation Checklist	
Step 9	**Place System in Multi-User Mode** *System Administrator's Guide*: P2, *User Services Procedures*; P3, *Processor Operations Procedures*; Chapter 2, *User Services*; Chapter 3, *Processor Operations*
Step 10	**Add Users** *System Administrator's Guide*: P2, *User Services Procedures*; P8, *TTY Management Procedures*; Chapter 2, *User Services*; Chapter 8, *TTY Management*
Step 11	**Edit Line Printer Administration Files** *System Administrator's Guide*: P7, *LP Spooler Administration Procedures*; Chapter 7, *Line Printer Administration*; *System Administrator's Reference Manual*: **lp.cnfg**(1M)
Step 12	**Manage Disk File Systems** *System Administrator's Guide*: P4, *Disk System Management Procedures*; P5, *File System Administration Procedures*; Chapter 4, *Disk Management*; Chapter 5, *File System Administration*
Step 13	**Set Up Basic Networking System** Network Services Extension *Software Release Guide*; *System Administrator's Guide*: P9, *Basic Network Procedures*; P10, *Remote File Sharing Procedures*; Chapter 9, *Basic Networking*; Chapter 10, *Remote File Sharing*; RFS *Programmer's Guide Supplement*, Section 19: *The Transport Interface*
Step 14	**Remote File Sharing (RFS)** Network Services Extension *Software Release Guide*; *System Administrator's Guide*: P9, *Basic Network Procedures*; P10, *Remote File Sharing Procedures*; Chapter 9, *Basic Networking*; Chapter 10, *Remote File Sharing*; RFS *Programmer's Guide Supplement*, Section 19: *The Transport Interface*
Step 15	**Install Other Software Packages** See the *Software Release Guide* for the product to be installed.

3

System Development Documentation Set

The SYSTEM V/68 Release 3 documentation set consists of 11 manuals. The following is a list of available SYSTEM V/68 Release 3 documentation.

SYSTEM DEVELOPMENT DOCUMENTATION SET

Programmer's Reference Manual. This document contains manual pages for programming commands (Section 1), system calls (Section 2), library subroutines and functions (Section 3), file formats (Section 4), and miscellaneous facilities (Section 5).

Programmer's Guide. This document describes the operating system programming environment and provides detailed descriptions of many programming tools, including shared libraries, screen-handling programs, File and Record Locking facilities, Interprocess Communication facilities, **awk**(1) language and command, **lex**(1) lexical analysis tool, **make**(1) utility for maintaining, updating, and regenerating groups of programs, **sccs**(1) (Source Code Control System), **sdb**(1) symbolic debugger, and **yacc**(1) compiler-compiler.

STREAMS Programmer's Guide. This document is divided into two parts. The first part describes the use of user-level applications. The second part describes programming use of STREAMS facilities to write kernel modules and device drivers.

STREAMS Primer. This document provides a high-level overview of the STREAMS support for networking services, including terminology, a summary of the mechanism, a simple example, a discussion of each of the STREAMS facilities, and a comparison of design features of character I/O device drivers with STREAMS modules and drivers.

Remote File Sharing Reference Card.

DIAGNOSTICS SET

Terminal and Printer Diagnostics User's Guide. This document describes how to configure, use, and maintain the Terminal and Printer Diagnostics (TPD) program designed for Motorola computer systems.

Standalone System Interactive Diagnostics User's Guide. This document describes the program that tests and diagnoses system problems through a menu system that includes extensive help screens that describe the various tests and commands.

END USER DOCUMENTATION SET

User's Reference Manual. This document contains manual pages for user commands (Section 1). An Introduction describes how to use the manual and gives basic information for getting started on the operating system.

System Administrator's Reference Manual. This document contains manual pages for administrative commands (Section 1M), special files (Section 7), and system maintenance procedures (Section 8).

User's Guide. This document provides an introduction to the use of the operating system, including a general description, using a terminal, using the file system, the line editor, **ed**(1), the screen editor, **vi**(1), shell programming, **sh**(1), electronic mail, and the UNIX-to-UNIX CoPy (**uucp**(1C)) program.

System Administrator's Guide. This document provides instructions on how to do administrative tasks and background information about when and why the tasks should be performed. There are two main parts to this guide. Part 1 contains step-by-step procedures on how to keep the system in operation. Part 2 contains more detailed information about each procedure listed in Part 1.

Release Notes. This document describes the new features of a release; additional information about commands, system calls, or files; hardware and compatibility notes; enhancements; and a documentation summary.

CHAPTER 4
SYSTEM INSTALLATION

This chapter is divided into three sections: hardware installation, booting the system, and system administrator tasks.

Hardware Installation

This section provides procedures for installing the system console, terminals, printers, and modems.

Installing the System Console

The system console is the terminal from which system administrative functions should be performed. The cable that is used to connect this terminal is the same as for any other terminal; however, the system console cable must be attached to the connector labeled SERIAL PORT 1/CONSOLE on the rear panel of the system.

The console should be configured as follows:

> Transmit = 9600 bps
> Receive = Transmit
> XON/XOFF flow control
> XOFF at 128
> 8 data bits, no parity
> 1 stop bit
> No local echo (full-duplex)

Use the following procedure to connect the system console and the power cord on the system.

1. Select an RS-232C cable labeled WORKSTATION/PRINTER. Choose the terminal that is to be the system console. On the back of the terminal, locate the connector for the cable that will connect the terminal to the system. Connect the end of the cable labeled WORKSTATION/PRINTER to this port.

   The console cable must be WORKSTATION/PRINTER (DTE to DTE type), Motorola Part Number 30-W2849B01 or equivalent.

2. On the rear of the computer, identify the connector labeled SERIAL PORT 1/CONSOLE. If you have a MVME712M module, connect the other end of the RS-232C cable (labeled DPU) to this connector.

   If you have a MVME714A module, use the 9-pin to 25-pin cable (MVMECBLT25) or the 2 foot adapter cable (MVMECBLSA2), attaching the 9-pin end to the connector on the MVME712A and the 25-pin end to the console.

3. Plug one end of the system's power cord into the input power connector located at the rear of the system. When the system installation is finished, plug the other end of the system's power cord into an electrical outlet.

4. Plug one end of the terminal's power cord into the power connector located at the rear of the terminal. When the system installation is finished, plug the other end of the terminal's power cord into an electrical outlet.

CAUTION

Disconnect the power cords for the system and the system console from the electrical outlet before installing the other peripherals. Reconnect the system and the peripherals to an electrical outlet after the entire system is cabled together.

Terminals, Printers, Modems

The system can have up to 32 RS-232C connectors to connect combinations of serial terminals, printers, and/or modems using four serial I/O controllers (MVME332XT). To connect these peripherals, use the procedure described for the system console in *Installing the System Console* section, but connect the cable to a port labeled "Serial Port *x*" on the rear panel, where *x* is a number from 1 through 8. In addition, parallel printers may be attached to the MVME332PA1/PA2 transition modules through the MVME332XT controller.

Power-Up Procedures

To power up the system, follow these steps:

1. Plug all power cords into their respective electrical outlets.

2. Power up the system console. Some terminals take a minute or two to warm up and perform self-tests.

3. Power up the system by locating the power switch on the left-hand side of the chassis front. Move the rocker switch to the "1" position.

4. Power up all the other peripherals, such as terminals, or printers.

Autoboot

NOTE

Other operating systems may be installed on this system and information can be found in the appropriate operating system manual and or software release guide. This chapter addresses only the SYSTEM V/68 Release 3 operating system.

Following power-up, the system goes through a minimal set of self-tests as part of the autoboot procedure. If the tests are successful, a copyright statement, a current revision number of the System Self Test firmware and the System Monitor firmware, and the following message is displayed on the system console screen in about ten seconds:

```
FPC passed test
MMU passed test

COLD START
(pause)
```

"FPC" refers to the Floating Point Co-processor and "MMU" refers to the Memory Management Unit. The FPC and MMU lines display messages indicating whether the tests passed or failed or that the FPC/MMU options were not detected.

If a **147-Bug**> prompt is displayed on the screen after power-up, see the *Troubleshooting* section later in this chapter for the procedure to follow.

If no operator interaction is done, the system will start extended self-test.

NOTE

After the message listed above is displayed, there is a five-second delay. During this delay, the start-up sequence can be halted by typing the letter **h** (for halt). A special menu is then displayed. Refer to "Power-Up Menu" section in this chapter for information on how to use this menu.

After the system has gone through the initial self-tests and is not halted (no errors encountered), it performs some extended self-tests. During this testing, a display line appears on the screen with the name of each test being performed followed by either the word PASSED or the word FAILED. This display line changes rapidly.

If all the extended self-tests are successful, the following message appears on the console screen:

Testing Complete

Autoboot in progress ...   To abort hit <BREAK>

If autoboot fails, a failure message appears. If the extended self-tests or autoboot fail, contact your service representative.

If extended self-tests and autoboot are successful, the operating system is loaded into system memory. Several messages appear on the console screen concerning release information, amount of real and available system memory, and general start-up information.

The file system is then checked automatically. During the file system check, various messages appear on the console screen relating to the system check. When the file system check is done, a series of messages appears ending with:

The system is ready.

and the login prompt:

Console Login:

NOTE

The first time the system is booted after the software is loaded, a message directing the system administrator to perform "SETUP" is displayed. Refer to the *Software Release Guide* for the operating system for more information.

The system is now ready for use. Note that whenever the system is powered up and booted, it moves automatically through single-user mode to multi-user mode. Single-user mode might be more appropriately named "System Maintenance Mode" because its correct use is to install software on the root device, back up and restore file systems, perform file system checks, and recover from crashes. All other system administrative functions can be performed in multi-user mode.

Power-Up Menu

As described in the system power-up, a five-second delay occurs during the display of the system self-test message. During this delay, the start-up sequence can be halted by typing the letter **h** (halt). A special menu called the Service Menu then appears on the screen. This menu is also displayed if the system fails the self-test or if a primary boot device is not available for bootloading. The Service Menu can also be displayed after extended SST starts by pressing the BREAK key.

```
1) Continue System Start-up
2) Select Alternate Boot Device
3) Go To System Debugger
4) Initiate Service Call
5) Display System Test Errors
6) Dump Memory to Tape
Enter menu #:
```

To select one of these menu items, enter the menu item number (1-6) followed by a carriage return.

If the system self-test fails, an error message is displayed on the system console screen. If this happens **and** the remote maintenance service is present on your system, call the service number provided, and you will receive instructions to initiate a remote service call. If you do not have the remote maintenance facility, call your service representative.

Continue System Start-Up

To continue the system start-up process, type **1** in response to the Service Menu. This menu item is usually selected after completion of one of the other menu items. For example, after selecting an alternate boot device using menu item 2, the system returns the Service Menu to the screen. Now type **1** to continue system start-up. Selecting menu item 1 always causes system start-up to begin from the first Extended System Self Test.

Select an Alternate Boot Device

To select a boot device other than the default device, type **2** in response to the Service Menu. The following prompt is then displayed:

> Enter Alternate Boot Device (Controller, Drive, File):
> x,y,z

where x is the controller to be accessed, y is the drive, and z is the file to be loaded. For SCSI, the controller number refers to the Controller/Drive because the controller is embedded in the drive. The drive parameter y is thus redundant, but must be entered as a zero (0) as indicated in Table 4-1.

After typing the alternate boot device, the service menu is displayed. Type **1** to continue system start-up. Before booting from the alternate boot device, the controller number, drive number, and filename (if changed) are displayed following the "Testing Complete" message.

Table 4-1. Boot Device (SCSI) Configurations

Controller	Drive	File
0	0 MVME874 150Mb Winchester	Any file in the SYSTEM V/68 file system partition 0 (directory "/"). ***/stand/sysV68**
2	0 MVME875/MVME876 300Mb/600Mb Winchester	Any file in the SYSTEM V/68 file system partition 0 (directory "/"). ***/stand/sysV68**
3	0 MVME873 85Mb Winchester	Any file in the SYSTEM V/68 file system partition 0 (directory "/"). ***/stand/sysV68**
4	0 MVME853 150Mb Streaming Tape	Any file in the SYSTEM V/68 file system partition 0 (directory "/"). ***/stand/sysV68**
5	0 MVME852 60Mb Streaming Tape	Any file in the SYSTEM V/68 file system partition 0 (directory "/"). ***/stand/sysV68**
6	0 MVME881 1.2Mb Diskette	Any file in the SYSTEM V/68 file system partition 0 (directory "/"). ***/stand/sysV68**

4

System Debugger

This feature should be used only by someone familiar with the MVME147Bug and 147Diag facilities. To go to the system debugger, type **3** in response to the Service Menu. The following prompt is then displayed:

147Diag>

NOTE

Provisions in this ROM loaded facility exist to allow booting from the drives installed. If you boot from 147Diag, no self-tests are performed.

While in the 147Bug or 147Diag, any error or exception process will cause control to be passed to the Service Menu.

Refer to the *MVME147BUG 147Bug Debugging Package* (MVME147BUG) or the *MVME147Bug Debugging Package User's Manual*, MVME147SBUG.

To return to the Service Menu, type **menu**.

Initiate a Service Call

Systems with an internal modem can communicate with the remote maintenance facility at the Motorola National Technical Support Center (NTSC) where test and diagnosis of system problems can be done. This facility can be used if Extended System Self Test fails.

Instructions for making a service call will be provided by your Service Representative at the time a maintenance contract is purchased.

When the service call has ended, the Service Menu will be displayed again.

Display System Test Errors

This feature should be used only by someone familiar with the 147Bug and 147Diag facilities.

To display system test errors, type **5** in response to the Service Menu.

All system self-test errors that have been detected are then displayed in a table format. The table contains the major test category and number of failures within that category. Errors are cleared only at the beginning of the Extended System Self Test sequence or manually from the debugger. Refer to the *MVME147BUG 147Bug Debugging Package* (MVME147BUG) or the *MVME147Bug Debugging Package User's Manual*, MVME147SBUG.

After the table is displayed, the Service Menu appears on the screen.

Dump Memory to Tape

This feature provides a way to dump system memory to a tape. The option is useful for troubleshooting an operating system failure. It should be used by someone who has a technical understanding of the operating system.

Type **6** in response to the Service Menu. A question-and-answer sequence follows, the tape is retensioned, and two files are written to the tape. The memory dump to tape has been completed when the following message appears:

> Done with tape you may remove it.

A copy of the **/stand/sysV68** file should always be made when the memory dump to tape will be used to troubleshoot a system failure. The tape cannot be analyzed without the **/stand/sysV68** file contents. Refer to **cp**(1), **cpio**(1), and **tar**(1) in the SYSTEM V/68 Release 3 *User's Reference Manual* or the *User's Guide*, Section 3, for instructions on copying the **/stand/sysV68** file.

Troubleshooting

Some initial steps to take if problems occur are described in Table 4-2.

Table 4-2. Troubleshooting Hints

Symptom	Possible Solution
No power. No sound of fans turning.	Plug in line cord. NOTE: There are no fuses or user-replaceable circuit breakers. Check for power at receptacle.
Cannot communicate with system via console.	Console cable must be Motorola DTE to DTE type (Part Number 30-W2849B01) or equivalent cables.
	Make sure RS-232C cable is plugged into the MVME712M or MVME712A in the RS-232C connector labeled SERIAL PORT 1/CONSOLE.
	Make sure the terminal is on-line and has the correct set-up (see below). Try another terminal.
	Ensure that the console terminal is configured as follows: 9600 baud, full duplex, 8 data bits, 1 stop bit, no parity, XON/XOFF flow control.
	The following RS-232C signals must be used:
DPU P1 Pin 1 - CG (chassis ground) Pin 2 - TxD (transmit data) Pin 3 - RxD (receive data) Pin 7 - SG (signal ground) Pin 8 - RCD (carrier detect) Pin 20 - DTR (data terminal ready) **Jumpers** Pin 6 - DSR (data set ready) (jumper) Pin 4 - RTS (request to send) (jumper) Pin 5 - CTS (clear to send) (jumper)	**Terminal/Printer P2** Pin 1 - CG (chassis ground) Pin 3 - RxD (receive data) Pin 2 - TxD (transmit data) Pin 7 - SG (signal ground) Pin 20 - DTR (data terminal ready) Pin 8 - RCD (carrier detect)

Table 4-2. Troubleshooting Hints (cont'd)

Symptom	Possible Solution
System will not boot. (SST message appears on screen).	See if boot drive light comes on. If not, call service, If light comes on, If not, call service. If light comes on, record fault message and then call service. Check autoboot and drive addressing.
System powers on but turns itself "off" after a time.	Possible fan failure. Turn power switch off, wait 30 seconds. Turn power on while verifying that fans spin normally before shutdown. Possible power supply failure.
System hangs after initial boot.	Ensure that the console terminal is using the proper RS-232C configuration. Verify that the backplane VMEbus IACK and bus grant jumpers are installed in empty slots.
System will not access streaming tape unit.	Check for loose cable between the cartridge tape unit and MVME712M or MVME712A module. Check F1 on the MVME147 paddle board. Check DS 2 on the MVME712M (SCSI Terminator power indicator).
No communication with expansion ports.	Ensure that the 60-pin ribbon cable is connected between the transition module and the P2 connector of the communications controller module. Verify the jumper settings of the modules. Check the terminal configuration.

4

If during system power-up (a "Cold-Start") a "147-Bug>" prompt displays on the screen, it is an indication that the system's non-volatile RAM has been destroyed. It is then necessary to use the following procedure in order to successfully boot the system. Operator input is in bold type.

147-Diag> iot;t

Scanning system for available disk/tape controllers . . .

Disk Controllers Available

(The following screen may not represent what you have in your system; it is only an example.)

LUN	Type	Address	# dev			
0	VME147	$FFFE4000	1	SCSI Addr = 0 -	CDC	94351-126
1	VME147	$FFFE4000	1	SCSI Addr = 4 -	TEAC	MT-2ST/N50
2	VME147	$FFFE4000	1	SCSI Addr = 6 -	TEAC	FD-55/35 JHF
	VME147	$FFFE4000	*	SCSI Addr = 7		

Align LUNs to SCSI addresses [Y,N] N? **y**

Disk Controllers Available

.

.

Save map in NVRAM [Y,N] N? **y**

To check the configuration enter:

iot;h (at 147-Diag> prompt)

Invoke the **ab** command.

147-Diag>   ab <cr>

Controller LUN =00?   (See following table for response)
Device LUN =00?   **<cr>**

Table 4-3. SCSI Device Configurations

Disk Devices						
Drive	150Mb	300Mb 600Mb	48Mb 85Mb	60Mb Tape	150Mb Tape 155Mb Tape	1.2Mb Floppy
1st	00	02	03	04	04	06
2nd	01	03	00	05	05	N/A
3rd	02	00	01	N/A	N/A	N/A
4th	03	01	02	N/A	N/A	N/A

```
Default String = ?    <cr>
Boot at power-up only [Y,N]?    y
```

Use the **env** command to set up the system's environment.

```
147-Bug>    env

Bug or System environment [B, S] = S?    <cr>
SYSTEM V/68 or VERSAdos operating system [S, V] = S?
      (enter s or v)
Execute/Bypass SST Memory test [E, B] = B?
      (user's choice)<cr>
Set VME Chip: <cr>
Board ID [0-FF] = $00? <cr>
GCSR base address [0-0F] = $0F? <cr>
Utility Interrupt Mask [0-FE] = $00? <cr>
Utility Interrupt Vector [$20-$3E0] = $0180? <cr>
```

System Administration Procedures

Procedures for performing administrative tasks under SYSTEM V/68 Release 3 are provided in the *System Administrator's Guide*. Both step-by-step directions and background information are included. This section points to procedures and provides examples and system-specific information for common system and administrative tasks.

Logging On as Setup

To set up the system initially, follow Procedure 1 in the *System Administrator's Guide*. Most of the procedures are based on the System Administration Menus (**sysadm**(1)). Log on as **setup** to set up the system. You will be reminded to do this every time the system is booted until you do so.

Once this has been done, no other user should execute **setup** again without the system administrator's knowledge.

Logging On as Root

Root is a very powerful user, appropriately called the "superuser." The superuser is the only user who may perform all the system maintenance tasks. Because the superuser, or root, is the only user with access permission for everything on the operating system, whoever is logged on as root can read, change, or remove anything on the system.

The powers of the superuser should be reserved for a limited number of users, perhaps solely for the system administrator. (Refer to the *System Administrator's Guide* for more information about the role of the system administrator.) This may be accomplished by giving root a password known only to those users to whom superuser powers are given.

Logging on is the process of identifying yourself to the system. To log on as root, type:

Console Login: **root**

The system then will ask for a password. If this is the first time anyone has logged on as root, a password for root must be assigned. In the as-shipped system, the password assigned is the carriage return character (<RETURN>).

Hardware Changes

The interactive **sysgen**(1M) command is used to incorporate changes to the system. Modules known to the system can be added to or deleted from the configuration and values for parameters such as "Number of Devices" can be altered. To make new hardware devices known to the system, use the **mknod**(1M) command. Chapter 5 of this document contains configuration information (for example, memory addresses) for VMEmodules that may be used in the system.

The portconfig Utility

The **portconfig**(8) utility is used to create the necessary device entries which permits users to communicate with the system through the MVME332XT serial controller. In order to execute **portconfig**, it is necessary to log on as root. Once this procedure has been executed, you may need to modify the TTY line characteristics in order to cause **getty**(1M)'s to be respawned on the appropriate lines.

Refer to Procedure 8 and Chapter 8 of the *System Administrator's Guide* for information regarding modification of TTY line characteristics. More information on **portconfig**(8) can be found in the *System Administrator's Reference Manual*.

System Administration Menu Package

Most system administration procedures can be performed using the System Administration Menu package. This package is a hierarchical structure of interactive screens for performing administrative tasks. The menu interface is described in the Introduction and Appendix D of the *System Administrator's Guide* and also in the *User's Reference Manual* pages for **sysadm**(1). The *System Administrator's Guide* includes a reference guide for tasks and **sysadm** commands.

If the **sysadm** command is given without an argument, the following menu is displayed.

SYSTEM ADMINISTRATION

1	diagnostics	system diagnostics menu (not SSID)
2	diskmgmt	disk management menu
3	filemgmt	file management menu
4	machinemgmt	machine management menu
5	packagemgmt	package management menu
6	softwaremgmt	software management menu
7	syssetup	system setup menu
8	ttymgmt	tty management menu
9	usermgmt	user management menu

Enter a number, a name, the initial part of a name, or
? or <number>? for HELP, q to QUIT:

Figure 4-1. sysadm Menu

To access one of the submenus shown in the display, enter the menu item number, the menu name, or the initial part of the menu name, followed by a carriage return. For example, to install a new software package, type one of the following:

6 <RETURN>

softwaremgmt <RETURN>

software <RETURN>

If the **sysadm** command is given with an argument, the named sub-command or submenu is accessed directly without going through the top menu. For example, the command

sysadm chgpassword

can be used to change a user password without stepping through the System Administration Menu and "moduser" sub-menu.

Experienced users and administrators of SYSTEM V/68 are familiar with commands and command sequences for performing many of the tasks included in the System Administration Menu package. These commands and procedures can still be used by the superuser and in many cases are shown as part of the

procedures described in "Part 1: Procedures" in the *System Administrator's Guide*. In the procedures described in this section, the individual superuser commands are given as alternate methods, where applicable.

The "System Setup" sub-menu provides routines for describing the system environment, including:

- Setting the date and time
- Establishing system passwords
- Assigning or changing the machine nodename

Refer to Procedures 1.1 through 1.5 in the *System Administrator's Guide*.

4

Using the .profile File

When you log on, the system looks for a file named **.profile** in your home directory to set up the environment and terminal variables. If you want information about some of the variables that have been set, use the **env**(1) command.

$ **env**

The terminal will display several lines of information in the form *name=value*, where *name* is a variable and *value* is the current assignment for that variable.

When user accounts are created, the standard **.profile** that is shipped with the system can be copied to the user's home directory. This can be done by the user with the command:

$ **cp** /etc/stdprofile /u/*logname*.**profile**

where /u/*logname* is the name of the user's home directory. Do not perform this command as root because the group and owner of the new **.profile** will be root. Lines in the file **.profile** that begin with the # character will be read as comments. Use the text editor to remove the # character at the beginning of lines in the **.profile** that should not be read as comments.

Now log off the system, using either

$ **exit**

or

CONTROL-D

and then log back on so that the **.profile** is invoked. Chapter 7 in the *User's Guide* gives details on modifying the **.profile** file. A sample **.profile** is shown in Figure 4-2.

```
LOGNAME=root
MAIL=/usr/mail/root
mailcheck=600
PATH=:/bin:/etc:/usr/bin:/mot/bin
stty erase
stty kill
stty echoe echok ixon ixoff -tabs
TERM=vt100
PS1=#
PS2=>
TZ=MST7
export LOGNAME MAIL MAILCHECK PATH
export TERM PS1 PS2 TZ
```

Figure 4-2. Sample .profile

Shutting Down the System

It is extremely important to use the correct procedure to shut down the system. Do not panic and use the RESET button or the ON/OFF system power switch, and do not pull the electrical plug to stop the system. If you feel you have made a mistake, this will only compound the problem.

Only the superuser may shut down the system. If you are logged on as a user, log off this account and log back on as root. When you see the root prompt (#), type:

shutdown –y –gn **–is**

where n is the number of seconds that will elapse from the time users are notified to the time the system is shut down (default is 60 seconds). The **–i** option specifies the state **init**(1M) is to have, in this case single-user state or level 1. This specification causes the system to unmount everything and terminate all currently

running processes (other than the system console). The superuser is asked whether a special message is to be used to broadcast the shutdown to users. Users are informed how many seconds will elapse before shutdown. The **shutdown**(1M) program then kills all active processes, unmounts file systems, and updates the file system superblocks (by means of the **sync**(1) command). The message, "Wait for INIT SINGLE USER MODE before halting," then appears on the screen. When the message, "INIT SINGLE USER MODE" appears, type:

    # sync
    # sync
    # sync

and wait for 30 seconds after the root prompt (#) is displayed. The RESET or ON/OFF switch can then be used to halt the system. For a more detailed explanation of the **shutdown** command and its options, refer to the manual page **shutdown**(1M) and Chapter 3, *Processor Operations*, in the *System Administrator's Guide*.

Changing Operating Level

When tasks such as software installation, file backup and restore, hard disk formatting, and system reconfiguration are performed, the system administrator may need to take the system to single-user mode. Using the root login, the system can be taken from multi-user mode (run state 2) to single-user mode via the **shutdown** command.

    # shutdown -y -is

To return to multi-user mode after administrative tasks have been completed, use the following command.

    # init 2

or

    # init 3 (if using Network Services)

For additional information about operating levels, refer to Chapter 3, *Processor Operations*, in the *System Administrator's Guide*.

Reconfiguration Procedures

The system is set to a basic configuration that is satisfactory for most applications. It may be reconfigured to enhance the performance for a particular application or to add new memory and peripherals. Procedure 6.1 in the *Administrator's Guide* gives steps for rebuilding the operating system.

4

CHAPTER 5
SYSTEM HARDWARE OVERVIEW

This chapter describes hardware configurations and individual components of the Model 1147 Computer System. Detailed information about the modules is contained in the hardware manuals listed in *Related Documentation* at the end of Chapter 1.

Physical specifications for system components are given in Appendix A.

Basic Configurations

The Model 1147 is housed in a 12-slot rack-mountable chassis. There are five basic configurations for the system and each is available in a 110V or 220V version. These configurations include the following general components:

- system enclosure
- processor and memory
- mass storage devices

Model 1147 Computer System Configurations

Configuration SYS1147NY081 includes the following components. Configuration SYS1147NY082 is the 220V version of the same configuration.

- MVME945B-1 enclosure with 110V power supply or MVME945B-2 enclosure with 220V power supply
- MVME147 Processor with 4Mb DRAM (20 MHz) with MVME712M or
- MVME147S-1 Processor with 4Mb DRAM (25 MHz) with MVME712A/B
- MVME873TA 150Mb SCSI Streaming Tape Drive and 85Mb SCSI Winchester Disk Drive

Configuration SYS1147NY151 includes the following components. Configuration SYS1147NY152 is the 220V version of the same configuration.

- MVME945B-1 enclosure with 110V power supply or MVME945B-2 enclosure with 220V power supply
- MVME147 Processor with 4Mb DRAM (20 MHz) with MVME712M or

- MVME147S-1 Processor with 4Mb DRAM (25 MHz) with MVME712A/B
- MVME874TA 150Mb SCSI Streaming Tape Drive and 150Mb SCSI Winchester Disk Drive

Configuration SYS1147NY301 includes the following components. Configuration SYS1147NY302 is the 220V version of the same configuration.

- MVME945B-1 enclosure with 110V power supply or MVME945B-2 enclosure with 220V power supply
- MVME147A Processor with 8Mb DRAM (20 MHz) with MVME712M or
- MVME147SA-1 Processor with 8Mb DRAM (25 MHz) with MVME712A/B
- MVME875TA 150Mb SCSI Streaming Tape Drive and 300Mb SCSI Winchester Disk Drive

5

Configuration SYS1147ANY151 includes the following components. Configuration SYS1147ANY152 is the 220V version of the same configuration.

- MVME945B-1 enclosure with 110V power supply or MVME945B-2 enclosure with 220V power supply
- MVME945CVR Desktop cover for the chassis
- MVME147SA-1 Processor with 8Mb DRAM (25 MHz) with MVME712A/B
- MVME874TA 150Mb SCSI Streaming Tape Drive and 150Mb SCSI Winchester Disk Drive

Configuration SYS1147ANY601 includes the following components. Configuration SYS1147ANY602 is the 220V version of the same configuration.

- MVME945B-1 enclosure with 110V power supply or MVME945B-2 enclosure with 220V power supply
- MVME945CVR Desktop cover for the chassis
- MVME147SA-1 Processor with 8Mb DRAM (25 MHz) with MVME712A/B
- MVME876TA 150Mb SCSI Streaming Tape Drive and 600Mb SCSI Winchester Disk Drive

System Components

VMEmodules that can be used in the Model 1147 are listed in Table 5-1. The table lists the number of slots required for each module and the maximum number that can be used in the system.

NOTE

Installation information (installation instructions) for expansion modules ordered separately is packed with the module.

Table 5-1. VMEmodule Components

Module Number	Description	VME Slots Used	Max. in System
MVME147	68030 20 MHz 4Mb Processor	1	1
MVME147A	68030 20 MHz 8Mb Processor	2	1
MVME147-1	68030 25 MHz 4Mb Processor	1	1
MVME147A-1	68030 25 MHz 8Mb Processor	2	1
MVME147S-1	68030 25 MHz Processor w/4Mb DRAM	1	1
MVME147SA-1	68030 25 MHz Processor w/8Mb DRAM	1	1
MVME224-1	4Mb DRAM Memory Module	1	2
MVME224-2	8Mb DRAM Memory Module	1	2
MVME332XT	8-port Serial/Parallel Controller	1	4
MVME333	Intelligent WAN Controller	1	2
MVME333X25	X.25 Controller	1	1
MVME336	DeltaLink Controller	1	1
MVME374	Ethernet LAN Controller	1	6
MVME393	Graphics Controller	1	1

5

Transition boards and the internal modem for the system are listed in Table 5-2. These components use backpanel slots.

Table 5-2. Transition Boards and Internal Modem

Module Number	Description	Associated Module	Backpanel Slots
MVME705A	6-Port Serial Transition Board	MVME333	2
MVME705B	3-Port Serial Transition Board	MVME333X25	1
MVME710	Serial 8-Port Transition Board	MVME332XT	2
MVME712M	CPU Transition Board	MVME147	2
MVME712A	Serial 4-Port Transition Board (CPU)	MVME147	1
MVME712B	Ethernet/SCSI Adapter	MVME147	1
MVME731	Remote Service Modem	None; connect to MVME712M	0
MVME732	Remote Service Modem	None; connect to MVME712A	0
MVME751	Serial Port Transition Board	MVME336	2
MVME792-2	Graphics Transition Board	MVME393	1

Disk and tape drives that can be configured in the system are listed in Table 5-3.

Table 5-3. Disk and Tape Drives

Part Number	Description	Peripheral Slots Used	Max. in System
MVME873TA	150Mb SCSI Streaming Tape 85Mb SCSI Winchester Drive	1 half-height 1 half-height	1
MVME874TA	150Mb SCSI Streaming Tape 150Mb SCSI Winchester Drive	1 half-height 1 full-height	1
MVME875TA	150Mb SCSI Streaming Tape 300Mb SCSI Winchester Drive	1 half-height 1 full-height	1
MVME876TA	150Mb SCSI Streaming Tape 600Mb SCSI Winchester Drive	1 half-height 1 full-height	1
MVME852	60Mb SCSI Streaming Tape (Archive 2060S)	1 half-height	1
MVME853	150Mb SCSI Streaming Tape (Archive 2150S)	1 half-height	1
MVME855	155Mb SCSI Streaming Tape (3½ in.) (Teac)	1 half-height	1
MVME873	85Mb SCSI Winchester Disk (Seagate ST-296N)	1 half-height	1
MVME874	150Mb SCSI Winchester Disk (CDC Wren III)	1 full-height	1
MVME875	300Mb SCSI Winchester Disk (CDC Wren IV)	1 full-height	1
MVME876	600Mb SCSI Winchester Disk (CDC Wren V)	1 full-height	1
MVME881	1.2Mb Diskette (OMTI)	1 half-height	1
MVME884	1-4Mb SCSI Diskette (3½ in.)	1 half-height	1
MVME856	2Gb SCSI Cartridge Tape (Exabyte EXB-8200)	external device	1
MVME858-1 MVME858-2	110V 9-Track 6250 SCSI Tape 220V 9-Track 6250 SCSI Tape (Kennedy)	external device external device	1 1

5

Module Placement

The position of boards in the system's card cage is shown in Table 5-4. The slots, numbered 1 through 12 in the table are read from left to right when facing the front of the computer. The numerical references given for each slot for a given board designate the preferred positions for that board.

The listing of modules is also significant in determining which board is to be placed in which slot. The modules listed first have precedence over those that follow.

Table 5-4. VMEmodule Positions in 12-Slot Front Card Cage

Slot	1	2	3	4	5	6	7	8	9	10	11	12
1 MVME147	1st	/	/	/	/	/	/	/	/	/	/	/
MVME147A		1st	/	/	/	/	/	/	/	/	/	/
MVME147S/SA	1st	/	/	/	/	/	/	/	/	/	/	/
2 1st MVME224-2		1st	2nd	/	/	/	/	/	/	/	/	/
3 2nd MVME224-2			1st	2nd	/	/	/	/	/	/	/	/
4 1st MVME224-1		1st	2nd	3rd	/	/	/	/	/	/	/	/
5 2nd MVME224-1			1st	2nd	/	/	/	/	/	/	/	/
6 1st MVME374		1st	2nd	3rd	4th	/	/	/	/	/	/	/
7 2nd MVME374			1st	2nd	3rd	4th	/	/	/	/	/	/
8 3rd MVME374				1st	2nd	3rd	4th	/	/	/	/	/
9 4th MVME374					1st	2nd	3rd	4th	/	/	/	/
10 5th MVME374						1st	2nd	3rd	4th	/	/	/
11 6th MVME374							1st	2nd	3rd	4th	/	/
12 1st MVME332XT		1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th	11th
13 2nd MVME332XT			1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th
14 3rd MVME332XT				1st	2nd	3rd	4th	5th	6th	7th	8th	9th
15 4th MVME332XT					1st	2nd	3rd	4th	5th	6th	7th	8th
16 1st MVME333		1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th	11th
17 2nd MVME333			1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th
18 MVME333X25		1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th	11th
19 MVME336		1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th	11th
20 MVME393		1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th	11th
21 Filler Panel												

Install filler panels in empty slots for proper cooling.

Slots in the rear panel are designated from right to left. Preferred positions for modules in the rear panel are shown in Table 5-5. Note that only the first 13 slots of the 21-slot rear card cage are shown in the table.

Table 5-5. Module Positions in Rear Panel

Slot	-	12	11	10	9	8	7	6	5	4	3	2	1
1 MVME712M/147/A													1st	
MVME712A/147S/SA														1st
2 1st MVMELAN/374												2nd	1st	/
3 2nd MVMELAN/374											2nd	1st	/	/
4 3rd MVMELAN/374										2nd	1st	/	/	/
5 4th MVMELAN/374									2nd	1st	/	/	/	/
6 5th MVMELAN/374								2nd	1st	/	/	/	/	/
7 6th MVMELAN/374							2nd	1st	/	/	/	/	/	/
8 1st MVME710/332XT			5th		4th		3rd		2nd		1st		/
9 2nd MVME710/332XT			4th		3rd		2nd		1st		/	/	/
10 3rd MVME710/332XT			3rd		2nd		1st		/	/	/	/	/
11 4th MVME710/332XT			2nd		1st		/	/	/	/	/	/	/
12 1st MVME705A/333			5th		4th		3rd		2nd		1st		/
13 2nd MVME705A/333			4th		3rd		2nd		1st		/	/	/
14 1st MVME705B/333X25		11th	10th	9th	8th	7th	6th	5th	4th	3rd	2nd	1st	/
15 2nd MVME705B/333X25		10th	9th	8th	7th	6th	5th	4th	3rd	2nd	1st	/	/
16 MVME751/336			5th		4th		3rd		2nd		1st		/
17 MVME792-2/393		11th	10th	9th	8th	7th	6th	5th	4th	3rd	2nd	1st	/
18 Filler Panel														

5

MVME147 Processor

The MVME147 microcomputer board is a double-high VMEmodule (through-hole technology). The module has high functionality with large onboard shared RAM (4Mb or 8Mb), serial ports, and Centronics printer port. The module provides a SCSI bus controller with DMA, Ethernet interface, floating point processor, and time-of-day clock/calendar with battery backup.

Table 5-6. MVME147 Jumper Settings

Header	Description	Setting
J3 J4	128K x 8 ROM/PROM/EPROM	2-4, 3-5, 6-8, 13-15, 14-16
J5	System Controller Enabled	1-2
J6	Factory Use Only	1-2
J7	Factory Use Only	2-4
J8	Factory Use Only 20 MHz 25 MHz	 3-4 5-6
J9	Clock Configuration-receives RTXC4	2-3
J10	Clock Configuration-drives TRXC4	1-2
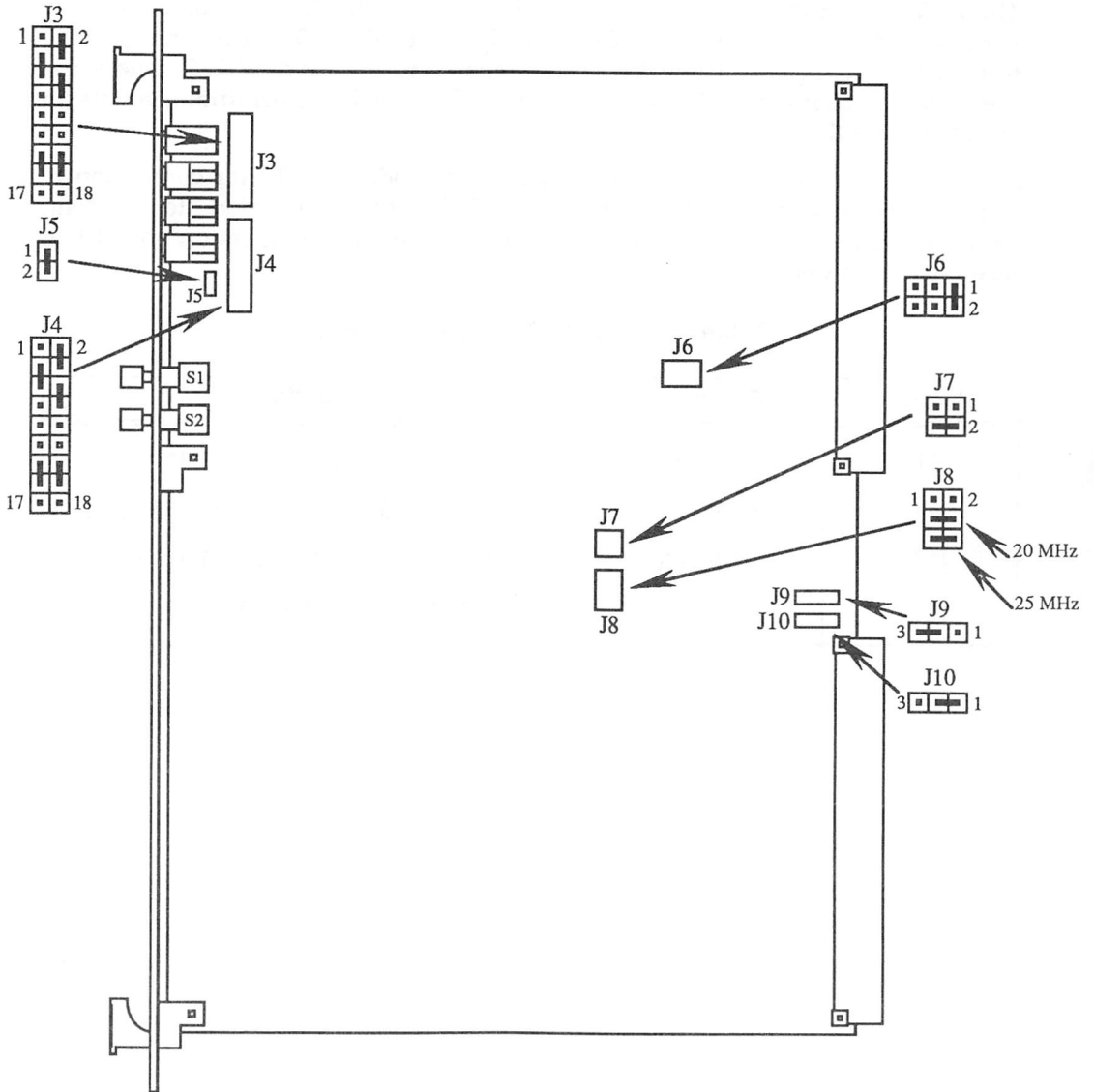
Figure 5-1. MVME147 Jumper Header Locations

MVME712M Serial Port Distribution Module

The MVME712M is used as the interface between the MVME147 module and the peripheral devices. A special cable assembly routes the I/O signals and grounds from the P2 connector on the MVME147 module to the MVME712M. The serial ports may be configured for use as DTE or DCE through jumper arrangements on the MVME712M.

Serial ports 1 through 4 can be configured as a modem (DCE) for connection to terminal or configured as a terminal (DTE) for connection to modem. Configuration of each port is accomplished by positioning jumpers on one of two headers for each port.

Table 5-7. MVME712M Jumper Settings

Header	Description	Setting
J11	DTE Select	1-2, 3-4, 5-6, 7-8, 9-10, 11-12, 13-14
J14	DTE Select	1-2, 3-4, 5-6, 7-8, 9-10, 11-12, 13-14
J17	DTE Select	1-2, 3-4, 5-6, 7-8, 9-10, 11-12, 13-14
J19	DTE Select	1-2, 3-4, 5-6, 7-8, 9-10, 11-12, 13-14

5
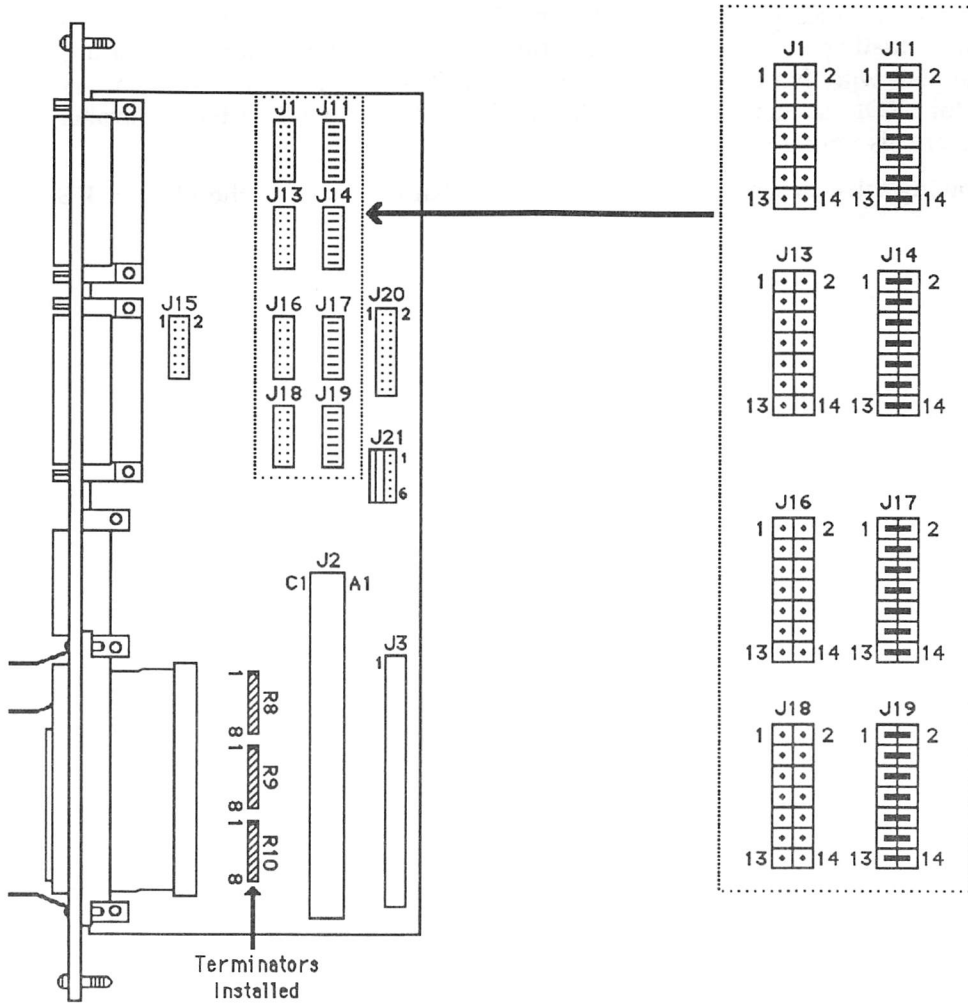
Figure 5-2. MVME712M Jumper Header Locations

MVME147S/A Processor

The MVME147S is a complete microcomputer system. The module (surface-mount technology) has high functionality with large onboard shared RAM, serial ports, and Centronics printer port. The module provides a SCSI bus controller with DMA, floating point processor, tick timer, watchdog timer, and time-of-day clock/calendar with battery backup. There is 2Kb of static RAM with battery backup, four ROM sockets, and A32/D32 VMEbus interface with system controller functions are also provided.

The following table describes some of the main characteristics of the MVME147S module.

Table 5-8. MVME147S Specifications

Characteristics	Specifications
Microprocessor	MC68030
Clock signal	16/20/25 MHz to MPU and FPC (depends on version)
Addressing	
Total address range (on and offboard)	4Gb
EPROM/EEPROM	Four sockets 32-pin for 8K x 8 to 1M x 8 devices
Dynamic RAM	4Mb/8Mb (depends on version)
I/O ports	
Serial	Four multiprotocol serial ports (connected through P2 to transition module)
Parallel	Parallel I/O Centronics printer port (connected through P2 to transition module)
Timers	4 total
Time-of-day clock	Mostek MK48T02
Watchdog timer	16-bit (tick timer output is watchdog timer input)
Tick timers	Two 16-bit programmable
Bus configuration	Data transfer bus master, with 32-bit address (A32) and 32-bit data (D32) (A24:D16 also supported)
Interrupt handler	Any or all onboard plus up to seven VMEbus interrupts
Bus arbitration	Two modes: prioritized mode and rotating priority mode
Reset	RESET switch which can be enabled/disabled by software. If the MVME147S is the system controller, it also activates SYSRESET* (system reset) on the VMEbus

5

MVME147S Switches and Indicators

The MVME147S has RESET and ABORT switches, and RUN, STATUS, FAIL, and SCON indicators, all of which are located on the front panel of the module.

A front panel RESET switch S2 (if enabled) generates a local reset and (if system controller) also generates a VMEbus system reset. A software ABORT switch S1 is normally used to abort program execution and return to the debugger.

The red LED FAIL indicator (DS1) indicates that status of the BRDFAIL bit in the VMEchip. The yellow LED STATUS indicator (DS2) is lit whenever the MC68030 STATUS* pin is low. When the yellow LED is full lit, the processor has halted.

The green LED RUN indicator (DS3) is connected to the MC68030 address strobe (AS*) signal and indicates that the MPU is executing a bus cycle. The green LED SCON indicator (DS4) is lit when the MVME147S is the VMEbus system controller.

Table 5-9. MVME147S/A Jumper Settings

Header	Description	Setting
J1	ROM Configuration Select 128K x 8 ROM/PROM/EPROM	2-4, 3-5, 6-8, 13-15, 14-16
J2	ROM Configuration Select 128K x 8 ROM/PROM/EPROM	2-4, 3-5, 6-8, 13-15, 14-16
J3	System Controller Select	1-2
J5	Factory Use Only	1-2
J6	Factory Use Only 25 MHz	1-2
J8	Serial Port 4 Clock Configuration Select Receives RTXC4	2-3
J9	Serial Port 4 Clock Configuration Select Receives TRXC4	1-2
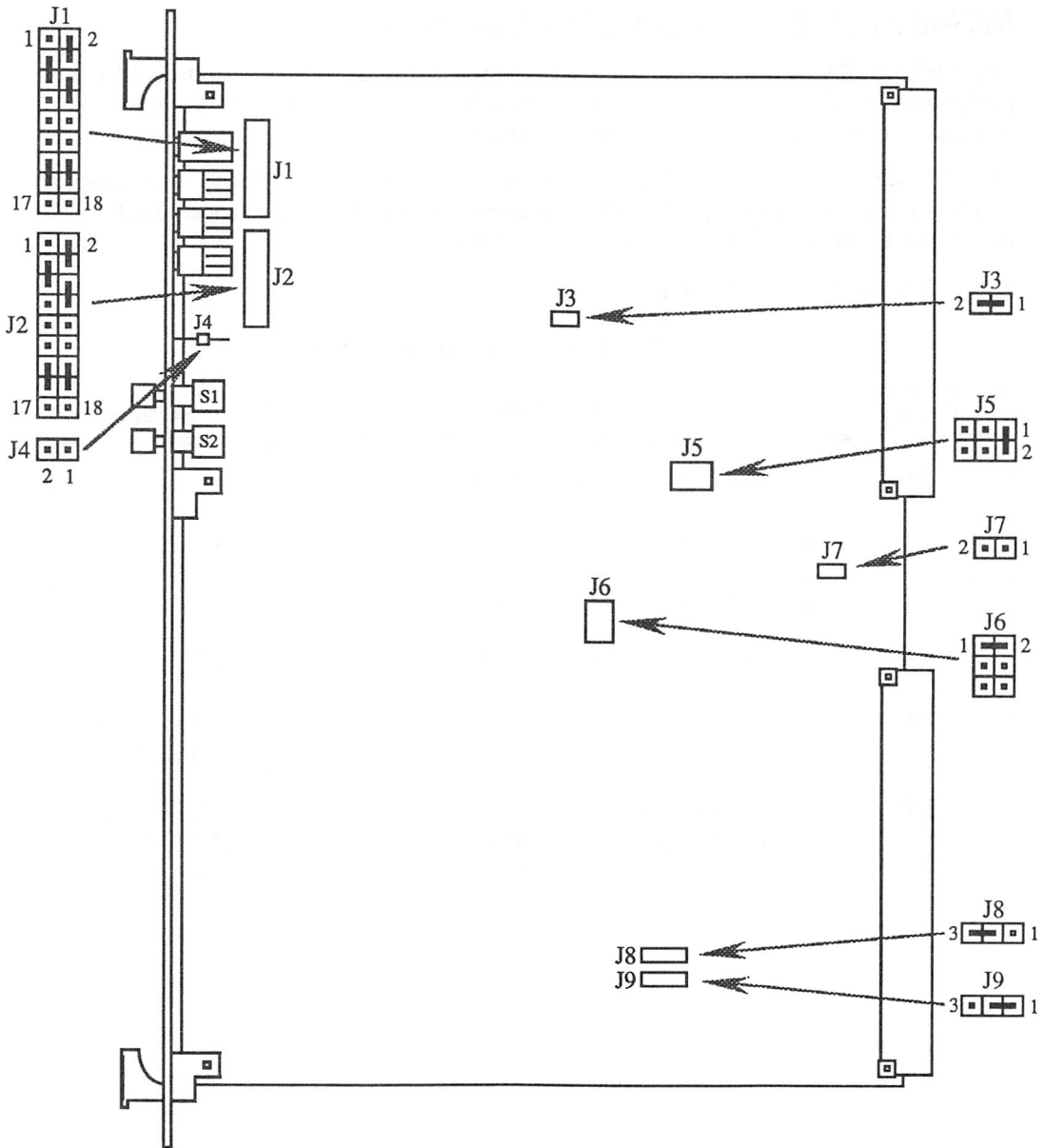
Figure 5-3. MVME147S/A Jumper Header Locations

MVME712A Serial Port Distribution Module

The MVME712A is used as the interface between the MVME147 module and the peripheral devices. A P2 adapter module and a cable is supplied for interconnection between the MVME712A and the MVME147.

The MVME712A has four DB-9 connectors for the serial ports, one 25-pin connector for the printer port, and a Telco modular jack on the front panel. See Appendix C for more information on these ports.

Figure 5-4 shows the modem port enabled.

Table 5-10. MVME712A Jumper Settings

Header	Description	Setting
J8	DSR Line Pull Up, Port 3	1-2
J9	DSR Line Pull Up, Port 2	1-2
J13	DSR Line Pull Up, Port 1	1-2
J14	DSR Line Pull Up, Port 4	1-2
J16	Serial Port 2 Select (No Modem)	1-2, 3-4, 5-6, 7-8, 9-10
J17	Modem Port (With MVME732 modem)	1-2, 3-4, 5-6, 7-8, 9-10
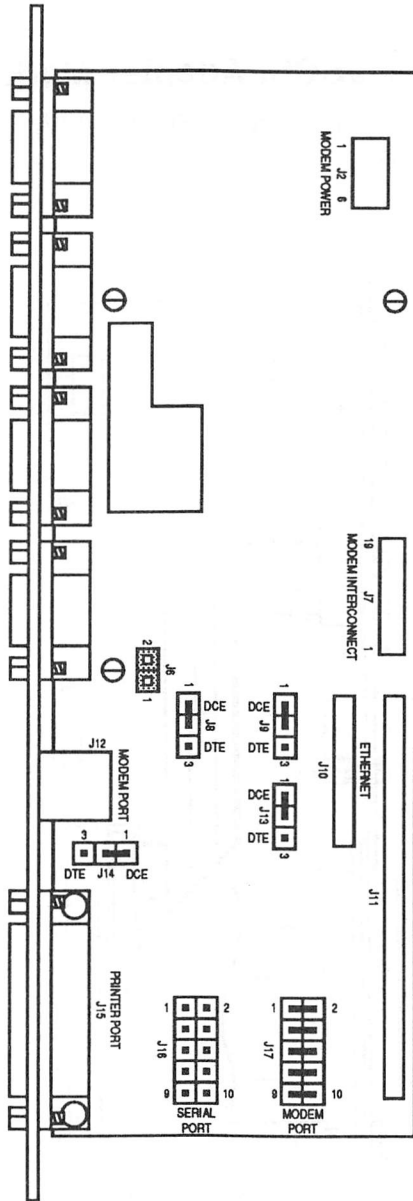
Figure 5-4. MVME712A Jumper Header Locations

MVME712B Ethernet/SCSI Adapter Module

The MVME712B is used in conjunction with the MVME712A for external SCSI and/or Ethernet connections.
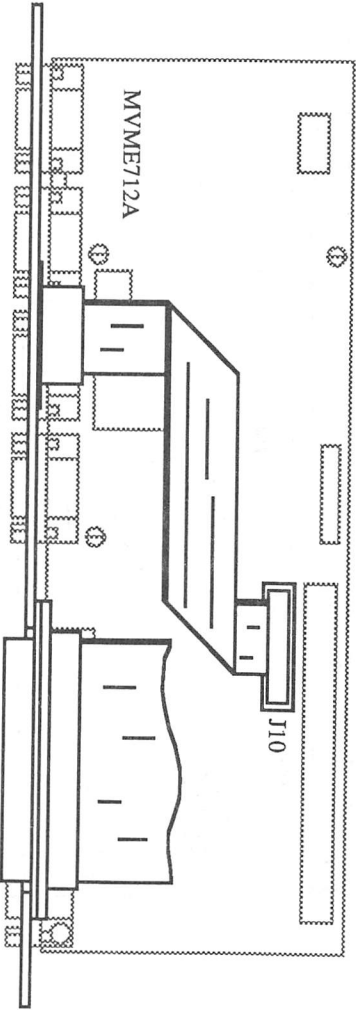
Figure 5-5. MVME712B Adapter Module

MVME731 Remote Service Modem

The MVME731 modem (used with the MVME712M) is a two-wire, full-duplex voiceband data set intended for switched-network operation. This modem is 212A compatible. It provides operation at 300 or 1200 bps and can dial on pulse or tone networks. It can answer and speed detect a calling modem.

Three header locations on the MVME731 are configured for the system. Forced DTR/Normal DTR is set 1-2 for Normal DTR. Asynchronous/Synchronous is set 2-3 for asynchronous operation. 9-bit data/10-bit data/11-bit data is set for 10-bit data.

NOTE

If you are using the modem for purposes other than connecting to the Motorola National Technical Support Center, your scripts must contain the following two elements. First, you must include a command to instruct the modem to hang up and second, a command to close the port. The modem does not automatically disconnect if there is no activity on the line.
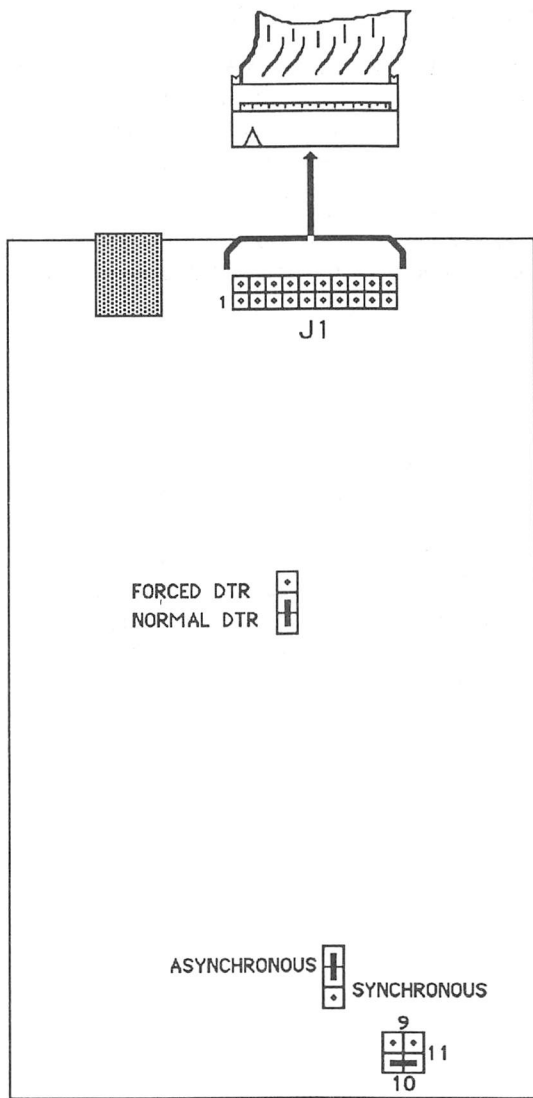
5

Figure 5-6. MVME731 Jumper Header Locations

MVME732 Remote Service Modem

The MVME732 modem (used with the MVME712A) is a UDS 2242980 modem that provides full duplex operation. The MVME732 operates asynchronously at data rates of 0 to 300, 600, 1200, or 2400 bps and synchronously at data rates of 1200 and 2400 bps.

The MVME732 modem provides transmit and receive filtering, adaptive equalization, and modulation and demodulation. Dual Tone Multi-Frequency (DTMF) tone encoding is also provided. The modem provides command selection of either pulse or DTMF auto dialing. Also included is automatic answer and automatic speed adjustment to the speed of the originating modem. The auto dialing command set is compatible with the "AT" command set.

5
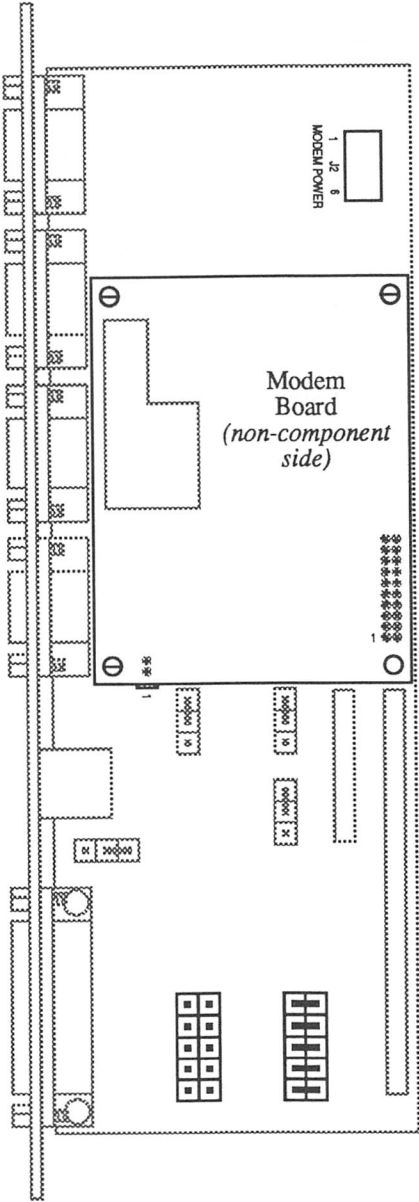
Figure 5-7. MVME712A with MVME732 Modem

MVME224 Memory Module

The MVME224-1 (4Mb) and MVME224-2 (8Mb) memory modules are high performance dynamic memory modules, dual-ported to both the VMEbus and VSB. The MVME224 uses an advanced arbitration method which buries the arbitration time for the next cycle in the current cycle, thus increasing throughput.

Some of the features of the MVME224 include longword (32-bit), word (16-bit), and byte (8-bit) data transfers, memory base address switch-selectable on any 1Mb boundary through the VMEbus and VSB address space, command and status register, and transparent refresh support.

Table 5-11. MVME224 Jumper Settings

Header	Description	Setting
J3	Factory Jumper	1-2
J4	VMEbus Lock	No Jumper
J5	Read Cycle Access (No Cache)	No Jumper

5
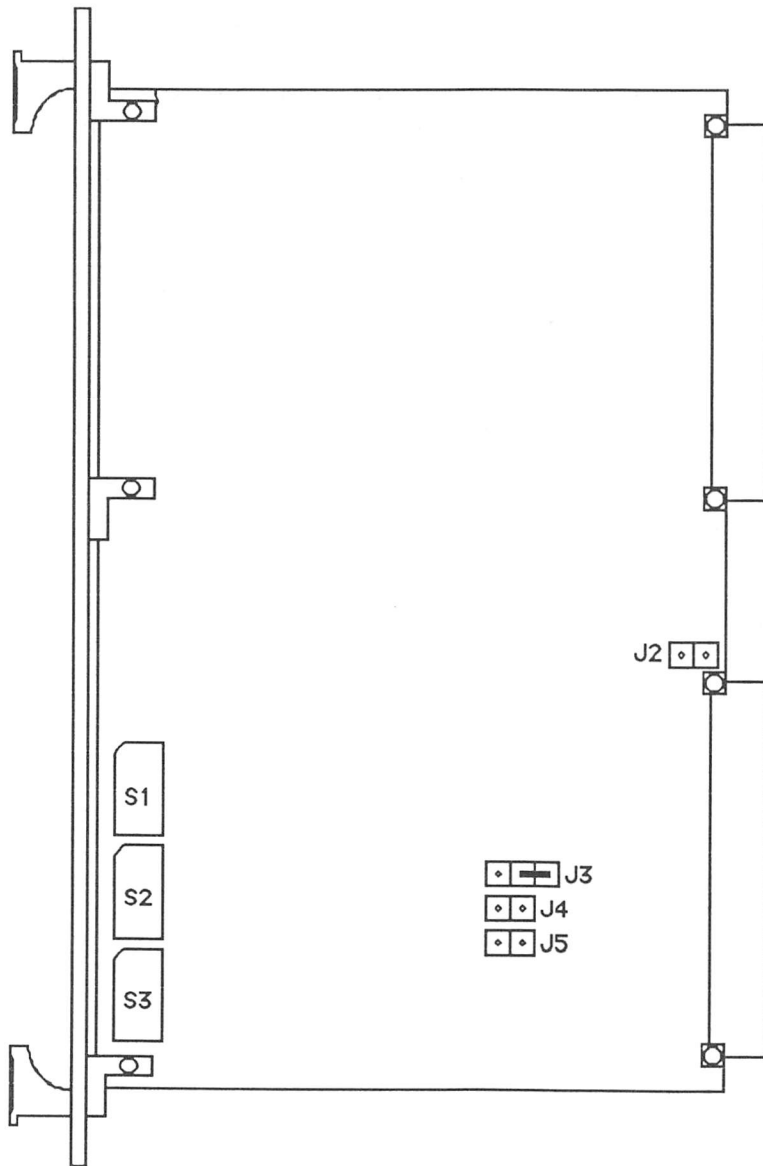
Figure 5-8. MVME224 Jumper Header Locations

5

(4-8Mb)

1st MVME224-1
Board

(8-12Mb)

2nd MVME224-1
Board if 1st Board
is an MVME224-1

(12-16Mb)

2nd MVME224-1
Board if 1st Board
is an MVME224-2
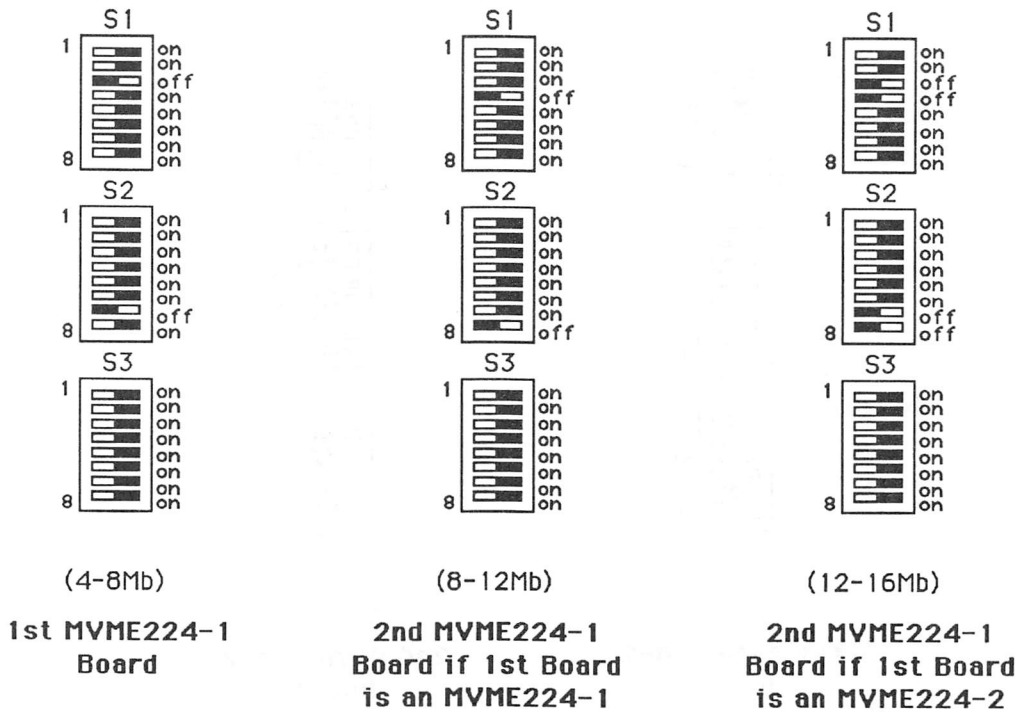
Figure 5-9. MVME224-1 Switch Settings with the MVME147/MVME147S-1

5

(4-12Mb)

**1st MVME224-2
Board**

(12-20Mb)
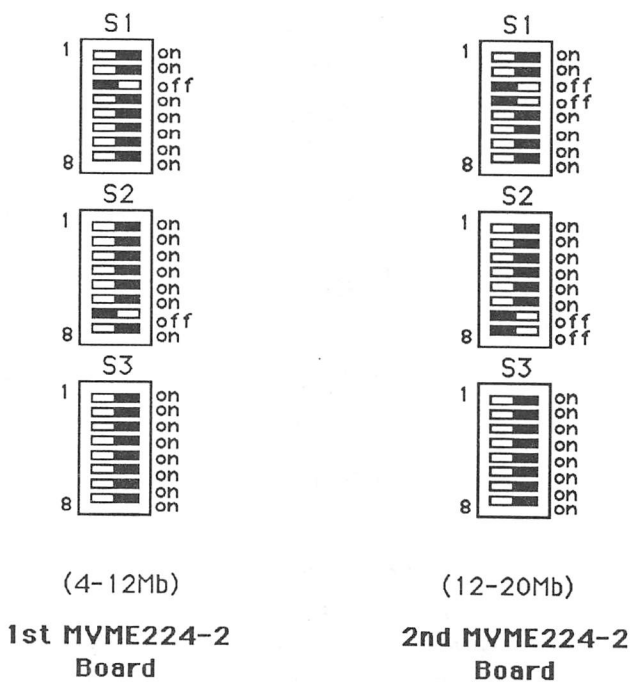
**2nd MVME224-2
Board**

Figure 5-10. MVME224-2 Switch Settings with the MVME147/MVME147S-1

(8-12Mb)

1st MVME224-1
Board

(12-16Mb)

2nd MVME224-1
Board if 1st Board
is an MVME224-1

(16-20Mb)

2nd MVME224-1
Board if 1st Board
is an MVME224-2
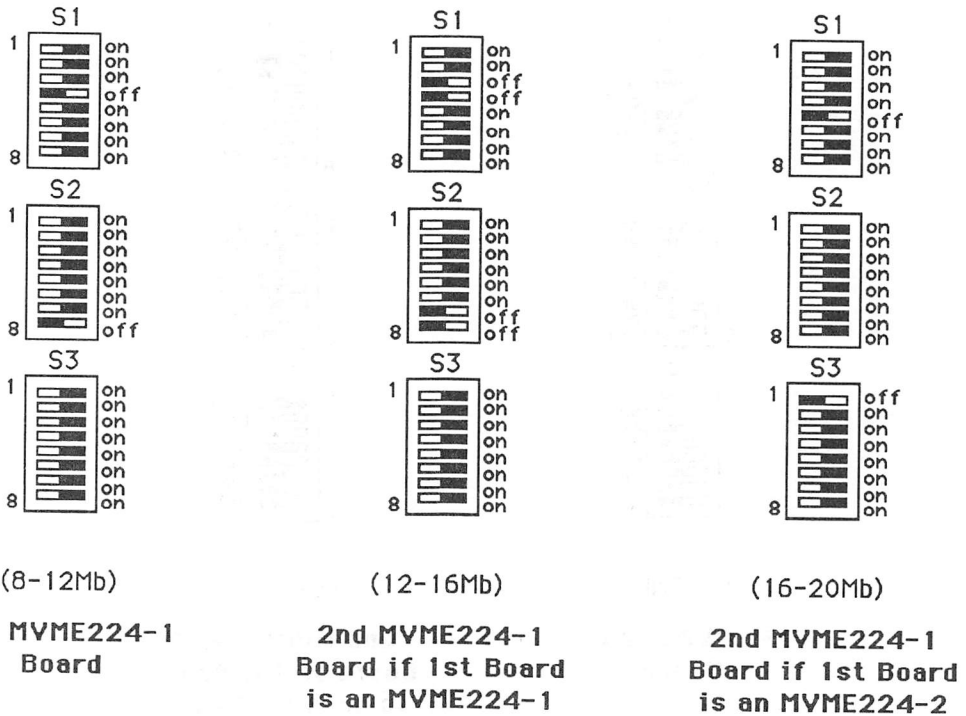
Figure 5-11. MVME224-1 Switch Settings with the MVME147A/SA-1

5

(8-16Mb)

1st MVME224-2
Board

(16-24Mb)

2nd MVME224-2
Board if 1st Board
is an MVME224-2
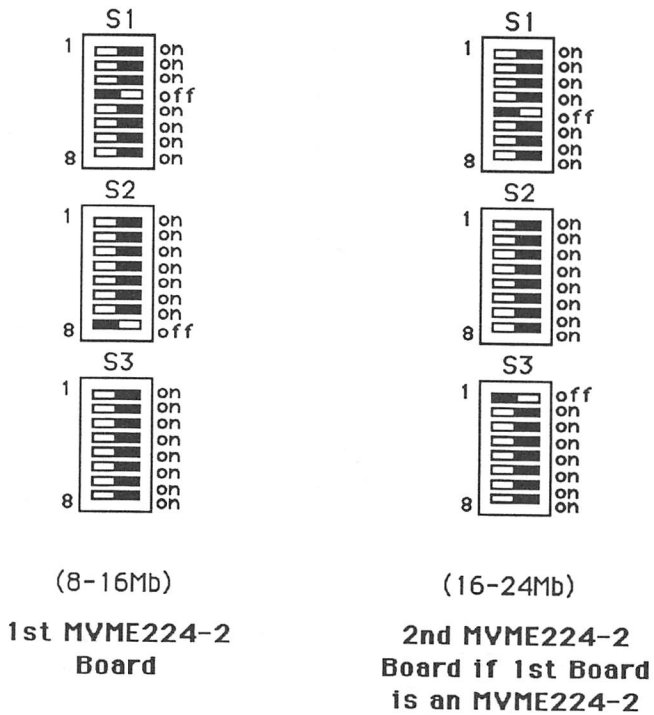
Figure 5-12. MVME224-2 Switch Settings with the MVME147A/SA-1

MVME332XT High Performance Serial I/O Controller

The MVME332XT Serial I/O Controller is a double-high VMEmodule used for serial and printer I/O. The MVME332XT has eight asynchronous serial I/O channels that support up to 38.4 Kbaud, full-duplex operation with either hardware or software handshaking.

All the ports are RS-232C compatible. Modem and terminal interface selection is made via jumper arrays on the MVME710 8-Channel Serial I/O Distribution Module.

The MVME332XT supports one Centronics-compatible parallel printer port, accessible via a shielded front panel mounted connector that is extended to a similar connector at the backpanel.

5

Table 5-12. MVME332XT Jumper Settings

Header	Description	Setting
J1	VMEbus Grant/Request Priority Level	1-2, 5-6, 7-9, 8-10, 11-12, 15-17
J4	ROM/EPROM Size Selection (64K x 8 devices)	1-2
Switch S2	Firmware Mode	S2-1 OFF S2-2 OFF S2-3 ON S2-4 ON

Board Number	\<center\>S1 Switch Positions\</center\>								Base Address
	1	2	3	4	5	6	7	8	
1	ON	OFF	OFF	OFF	OFF	ON	ON	ON	ff780000
2	ON	OFF	OFF	OFF	OFF	ON	ON	OFF	ff790000
3	ON	OFF	OFF	OFF	OFF	ON	OFF	ON	ff7a0000
4	ON	OFF	OFF	OFF	OFF	ON	OFF	OFF	ff7b0000
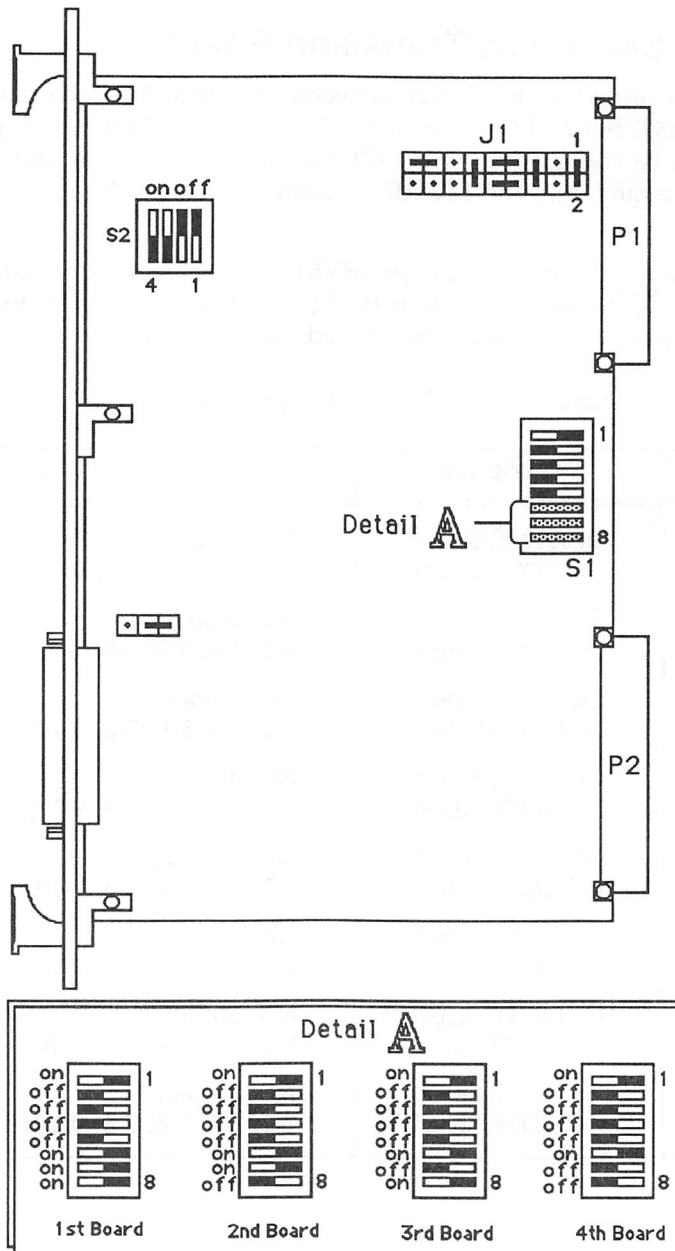
Figure 5-13. MVME332XT Jumper Header and Switch Locations

MVME710 Serial Port Transition Board

The MVME710 provides an adapter between the serial I/O cable connectors and the MVME332XT Serial I/O controller. Each of the eight serial ports on the MVME710 can be configured either DCE for connection to a terminal or DTE for connection to a modem. The MVME710 connects via a ribbon cable to P2 of the MVME332XT.

All eight ports (J1 through J8) of the MVME710 are configured DTE to use the Motorola RS-232C cross-over cable (see Figure 5-11). To connect for DCE, move the associated jumpers to the header labeled "No Jumpers" (see Table 5-13).

Table 5-13. MVME710 Jumper Settings (DTE)

Header	Description	Setting
J9	DCE/DTE Select	No Jumpers
J10	DCE/DTE Select	1-2, 3-4, 5-6, 7-8, 9-10, 11-12, 13-14
J11	DCE/DTE Select	No Jumpers
J12	DCE/DTE Select	1-2, 3-4, 5-6, 7-8, 9-10, 11-12, 13-14
J13	DCE/DTE Select	No Jumpers
J14	DCE/DTE Select	1-2, 3-4, 5-6, 7-8, 9-10, 11-12, 13-14
J15	DCE/DTE Select	No Jumpers
J16	DCE/DTE Select	1-2, 3-4, 5-6, 7-8, 9-10, 11-12, 13-14
J17	DCE/DTE Select	No Jumpers
J18	DCE/DTE Select	1-2, 3-4, 5-6, 7-8, 9-10, 11-12, 13-14
J19	DCE/DTE Select	No Jumpers
J20	DCE/DTE Select	1-2, 3-4, 5-6, 7-8, 9-10, 11-12, 13-14
J21	DCE/DTE Select	No Jumpers
J22	DCE/DTE Select	1-2, 3-4, 5-6, 7-8, 9-10, 11-12, 13-14
J23	DCE/DTE Select	No Jumpers
J24	DCE/DTE Select	1-2, 3-4, 5-6, 7-8, 9-10, 11-12, 13-14
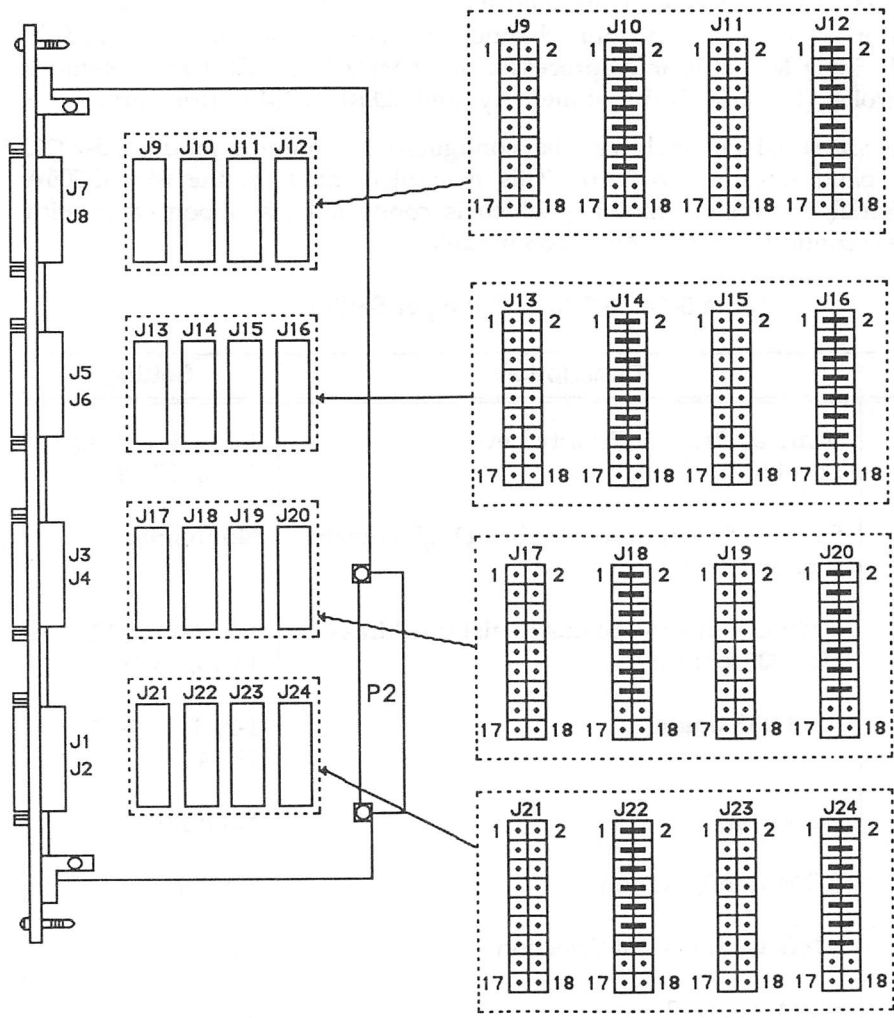
Figure 5-14. MVME710 Jumper Header Locations (DTE)

MVME333 Intelligent WAN Controller

The MVME333 Intelligent WAN Controller module supports six full-duplex serial communication channels with four channels of DMA control. The module contains a 10 MHz MC68010 microprocessor, a 10 MHz MC68450 Direct Memory Access Controller (DMAC), 512Kb of memory, and 128Kb ROM in firmware.

Each of the six serial channels can be configured to conform to the RS-232C standard at baud rates up to 9600. This is implemented on the MVME705A 6-Channel Serial Transceiver Module, which is connected via ribbon cable with the lower rear connector of the MVME333 module.

Table 5-14. MVME333 Jumper Settings

| Header	Description	Setting
K1	VMEbus Request Priority Level Level 0	1-2, 3-4, 6-8, 10-12 14-16, 17-18
K2	SYSFAIL* Output to VMEbus Disable/Enable (not enabled)	No Jumper
K3	VME Control and Status Register Address (**1st 333 board**)	1-2, 3-4, 11-12, 13-14, 15-16
K3	(**2nd 333 board**)	1-2, 3-4, 11-12, 13-14
K4	Status Bit	No Jumper
K5	ROM Configuration	1-2, 7-8
K6	VMEbus Time-Out Selection	7-8
K7	ROM Access Time	3-4
K8	Test Facility	Factory Use Only
K9	Local Memory Addresses	2-3
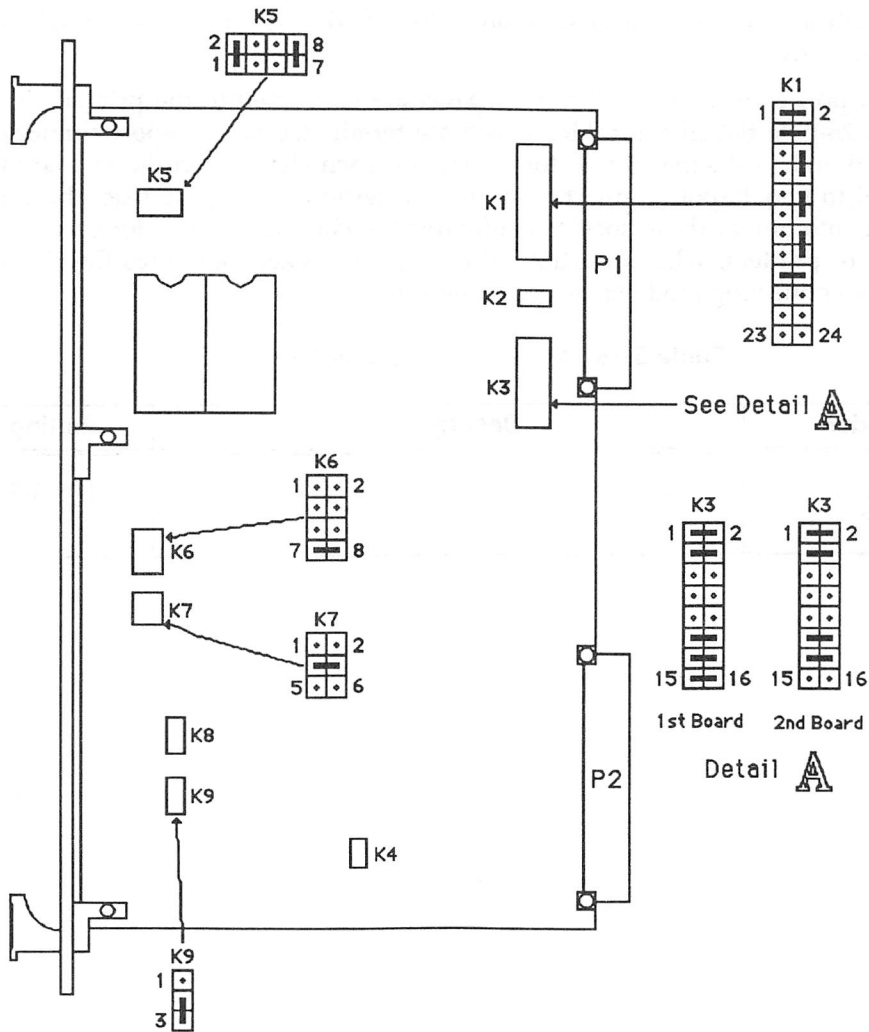
Figure 5-15. MVME333 Jumper Header Locations

MVME705A 6-Channel Serial Transceiver Module

The MVME705A 6-Channel Serial Transceiver Module provides the receiver and transmitter circuits for converting the I/O signals of the MVME333 Intelligent WAN Controller to the RS-232C and/or the RS-422B standard for serial data communications.

The serial port connectors on the front panel are connected to the printed circuit board via 26-pole flat ribbon cables which are terminated with 26-pole connectors at the PCB end. All serial connector signals for each channel on the PCB are fed in parallel to two 26-pole connector sockets. Insertion of the plug from the serial connector into one of these sockets configures the channel as DCE for connecting terminals or printers, while insertion into the other socket configures the channel as DTE for connecting modems or host computers.

Table 5-15. MVME705A Jumper Settings

| Header	Description	Setting
K1, K2, K3, K4, K5, K6	DTE	1-2, 5-6
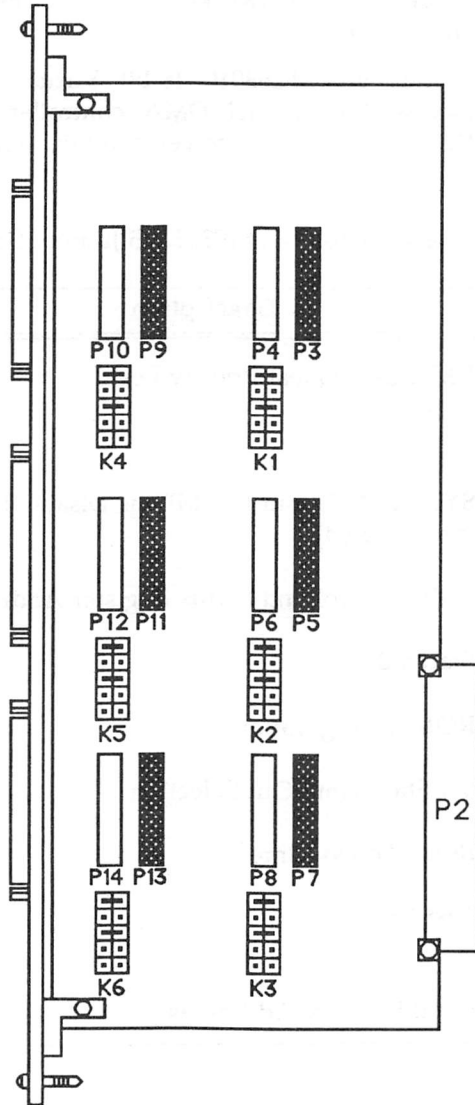
Figure 5-16. MVME705A Jumper Header Locations

MVME333X25 X.25 Communications Controller

The MVME333X25 X.25 Communications Controller connects the system to packet-switched, Wide Area Networks (WAN). The module provides two independent X.25 connections.

The MVME333X25 uses the MC68010 16-bit Virtual Memory Microprocessor, 512Kb local memory and 4-channel DMA controller. The MVME333X25 set includes an MVME705B Serial Transceiver Module which provides three serial ports.

Table 5-16. MVME333X25 Jumper Settings

Header	Description	Setting
K1	VMEbus Request Priority Level Level 0	1-2, 3-4, 6-8, 10-12, 14-16, 17-18
K2	SYSFAIL* Output to VMEbus Disable/Enable (not enabled)	No Jumper
K3	VME Control and Status Register Address	1-2, 3-4, 11-12
K4	Status Bit	No Jumper
K5	ROM Configuration	1-2, 3-4
K6	VMEbus Time-Out Selection	5-6
K7	ROM Access Time	5-6
K8	Test Facility	Factory Use Only
K9	Local Memory Addresses	1-2
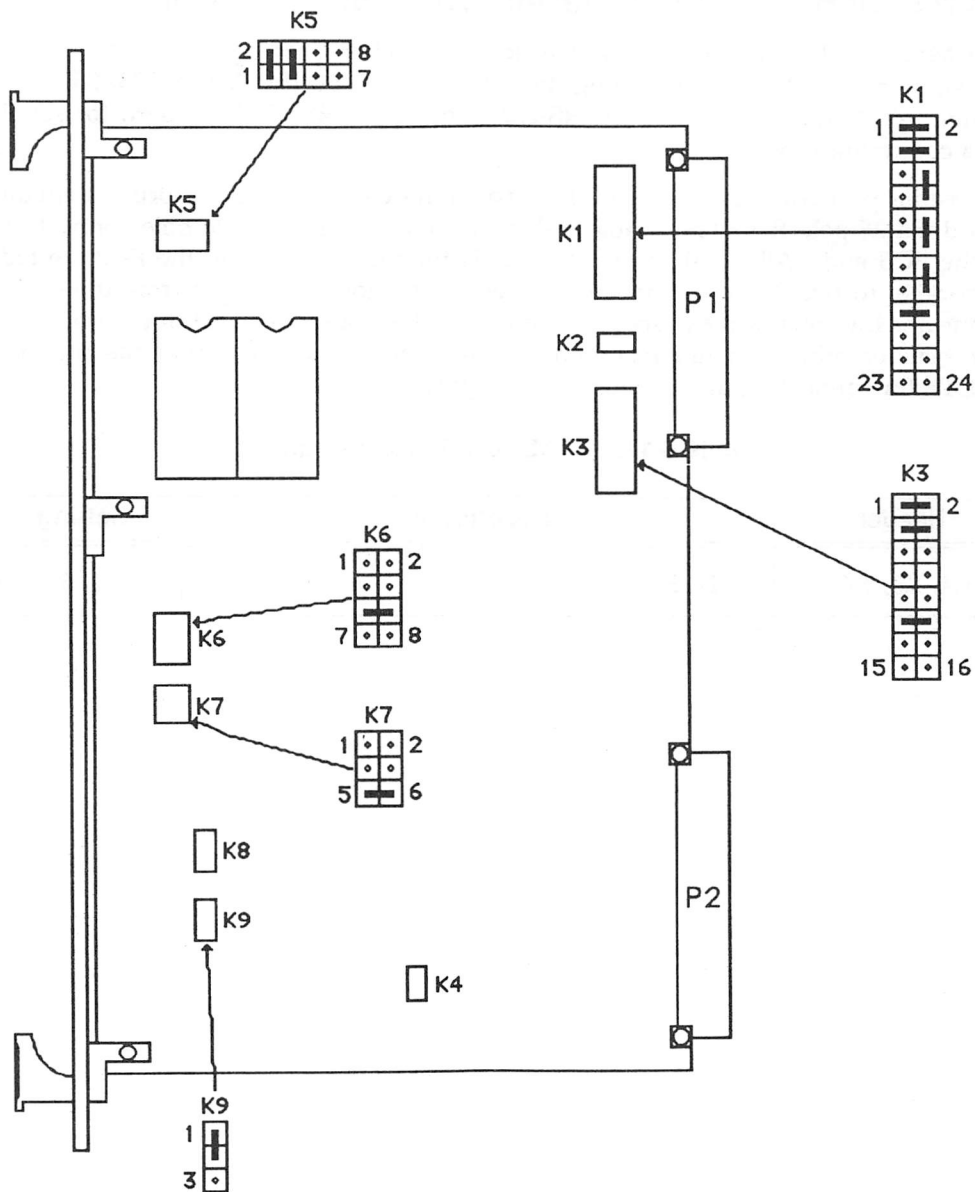
Figure 5-17. MVME333X25 Jumper Header Locations

MVME705B 3-Channel Serial Transceiver Module

The MVME705B 3-Channel Serial Transceiver Module provides the receiver and transmitter circuits for converting the I/O signals of the MVME333X25 X.25 Communications Controller to the RS-232C and/or the RS-422B standard for serial data communications.

The serial port connectors on the front panel are connected to the printed circuit board via 26-pole flat ribbon cables which are terminated with 26-pole connectors at the PCB end. All serial connector signals for each channel on the PCB are fed in parallel to two 26-pole connector sockets. Insertion of the plug from the serial connector into one of these sockets configures the channel as DCE for connecting terminals or printers, while insertion into the other socket configures the channel as DTE for connecting modems or host computers.

Table 5-17. MVME705B Jumper Settings

Header	Description	Setting
K4, K5, K6,	DTE	1-2, 5-6
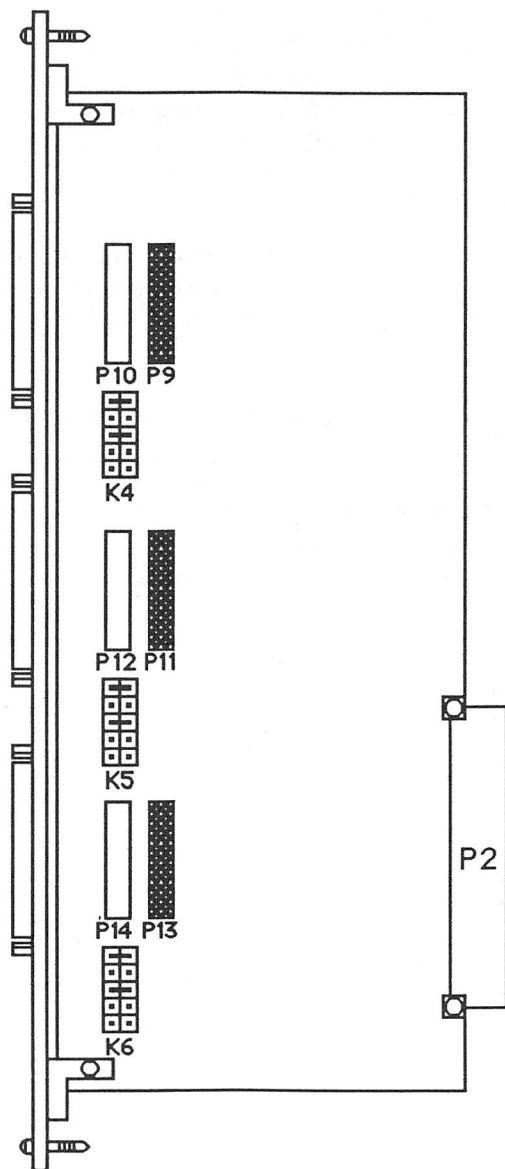
Figure 5-18. MVME705B Jumper Header Locations

MVME336 VME Hub Module

The MVME336 VME Hub Module is used to connect up to 96 asynchronous devices using one VME card slot. The MVME336 can support up to six Servers. The Server is a high performance multiplexer which provides connections for up to 16 RS-232C asynchronous interfaces running full duplex at up to 38.4 Kbps each. The link between the MVME336 (Hub) and Server operates synchronously at 1,000,000 bps in both directions concurrently using inexpensive two twisted pair unshielded telco wiring.

The MVME336 Hub module has a global memory area shared by the VMEbus and six data link ports. Data link control is accomplished with the MC68605 X.25 Protocol Controller (XPC) chip. There are six XPC chips on the module, one for each full-duplex path.

Table 5-18. MVME336 Jumper Settings

Header	Description	Setting
K1	Base Address	5-12
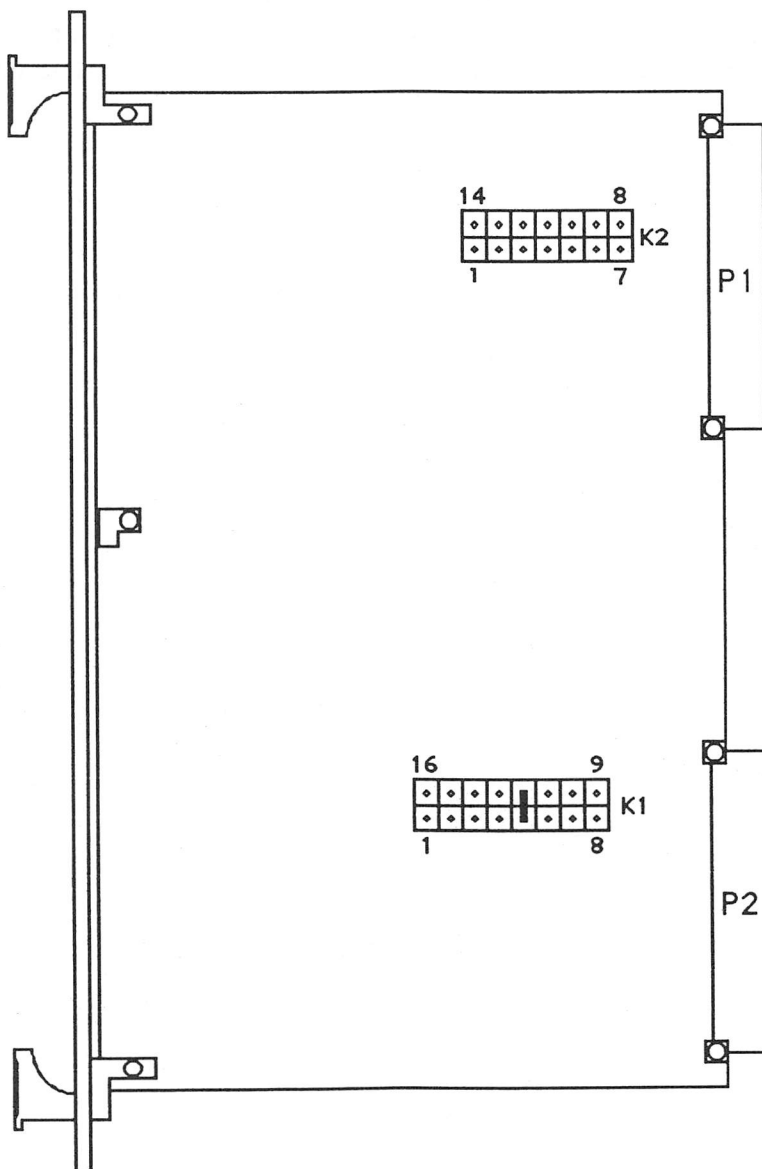
Figure 5-19. MVME336 Jumper Header Locations

MVME751 Serial Port Distribution Module

The MVME751 provides six RJ-11 connectors for connecting the MVME336 to standard telephone wire. The MVME751 connects via a ribbon cable to P2 of the MVME336.
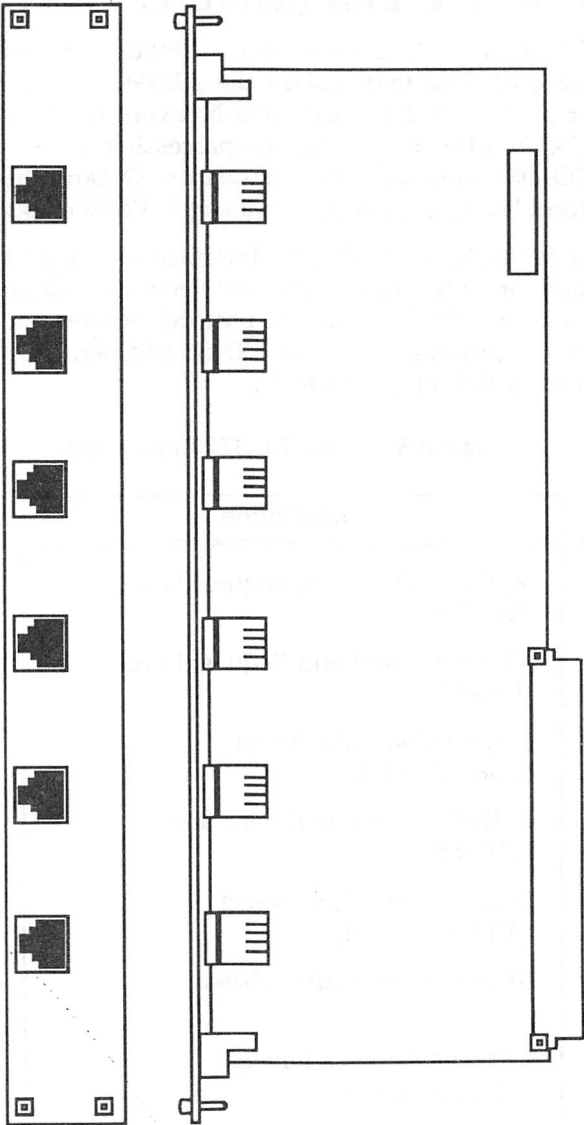
Figure 5-20. MVME751 Connector Locations

MVME374 Ethernet LAN Controller

The MVME374 is a high performance, VMEbus compatible, Multi-Protocol Ethernet Interface Module that utilizes the AM7990 LANCE chip to provide the MAC layer for an IEEE 802.3 Local Area Network (LAN) node. The MVME374 utilizes an MC68020 MPU to provide the processing power required to efficiently implement ISO-OSI (International Standards Organization - Open Systems Interface) protocol layers 2 through 7 on a single VMEbus board.

The MVME374 Multi-Protocol Ethernet Interface is a complete front end protocol processor which provides connection between an Ethernet network and the VMEbus. To relieve a VMEbus host of protocol burden, the MVME374 can serve as a front end for processing TCP/IP, XNS, DECnet, TOP and other protocols downloaded into its 1Mb of shared RAM.

Table 5-19. MVME374 Jumper Settings

Header	Description	Setting
J2	VMEbus Grant and Request Level (Level 3)	1-2, 5-6, 7-8, 9-11, 10-12
J3	VMEbus Grant and Request Level (Level 3)	5-6
J4	System Controller Select (Controller Off)	No Jumper
J5	EPROM/EEPROM Device Size (32K x 8)	1-2, 5-6, 7-8
J6	Local Address Line Select (All Lines Used)	1-2, 3-4, 5-6, 7-8, 9-10, 11-12, 13-14
J7	Module Base Address Select	1-2, 9-10, 11-12, 13-14, 15-16
J8	VMEbus Address Line Select (All Lines Used)	1-2, 4-5, 7-8, 10-11, 13-14, 16-17, 19-20
J9	Auxiliary Ethernet Connection (Ethernet Signals Not Connected to P2)	No Jumpers
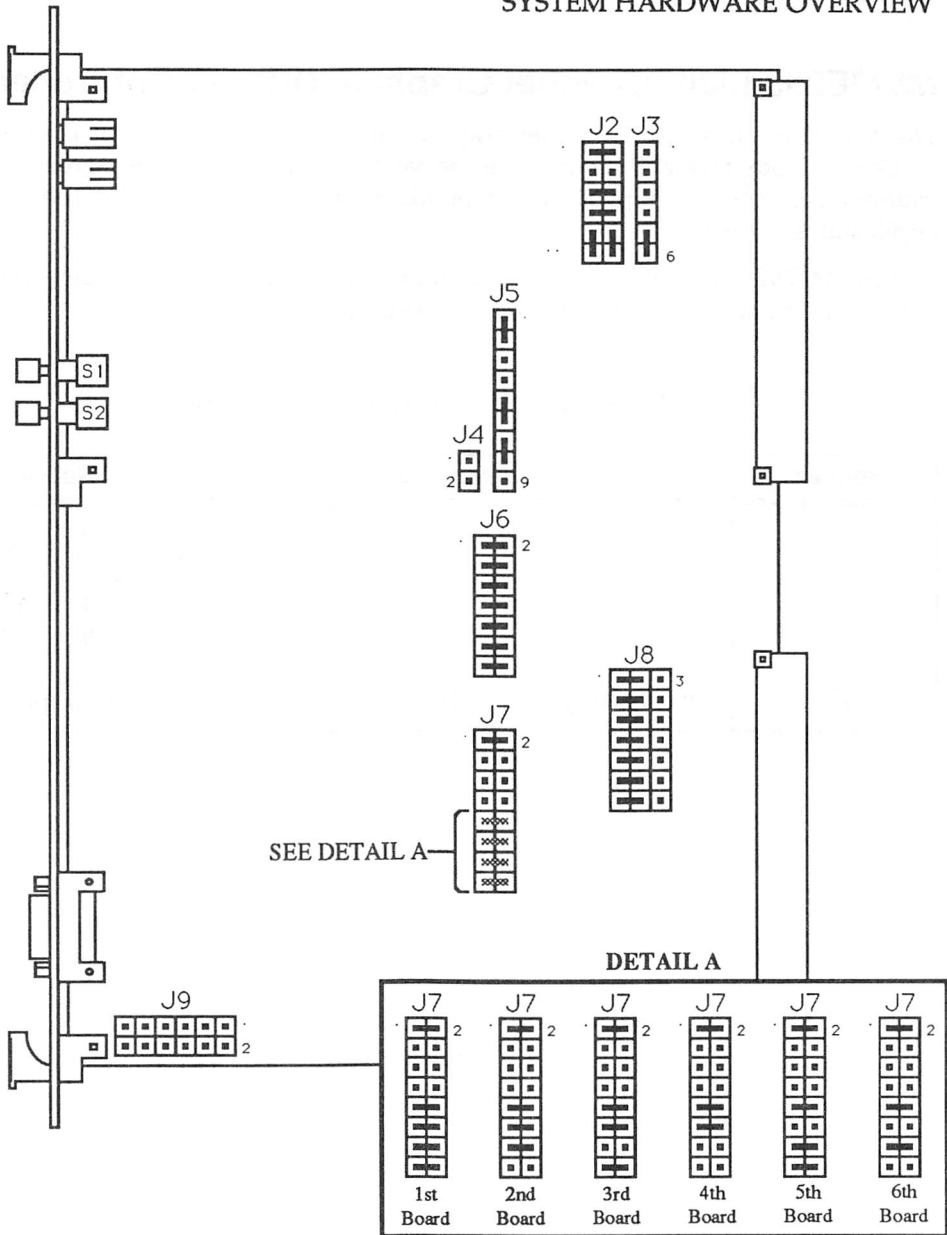
Figure 5-21. MVME374 Jumper Header Locations

MVME393 Multi-Channel Graphics Display Controller

The MVME393 is a multi-channel graphics display controller which is optimized to deliver both text and graphics information to multiple video screens. Each channel can control numerous independent tasks as defined by the resident applications software.

The MVME792-2 transition module contains the actual display circuitry and thus defines the number and type of channels available.

Table 5-20. MVME393 Jumper Settings

Header	Description	Setting
J1		1-2, 3-4, 5-6, 7-8, 9-10, 11-12, 13-14, 15-16, 17-18, 19-20
J2	For Factory Use Only	No Jumper
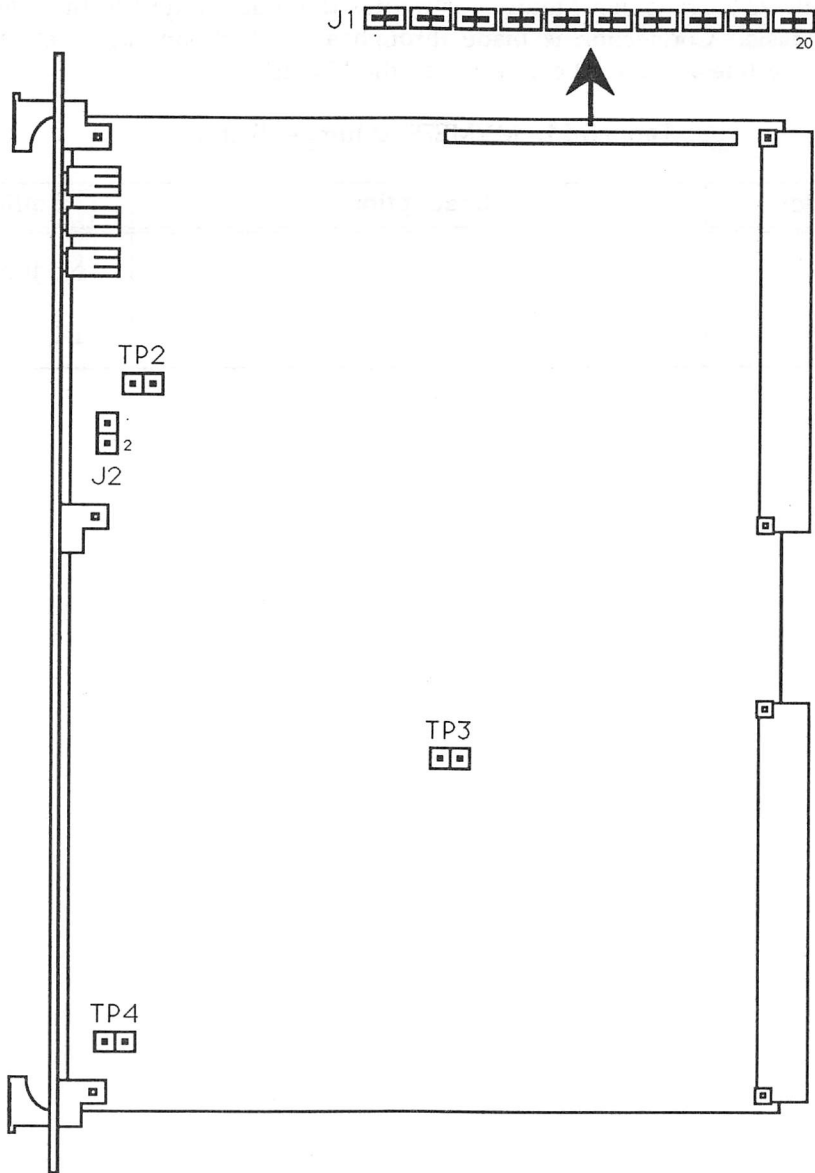
Figure 5-22. MVME393 Jumper Header Locations

MVME792-2 Transition Module

The MVME792-2 Transition Module distributes the video output to the rear panel on the chassis. Connection is made through a short ribbon cable between the transition module and the P2 connector on the MVME393-2.

Table 5-21. MVME792-2 Jumper Settings

Header	Description	Setting
J12		No Jumper
J14		1-2
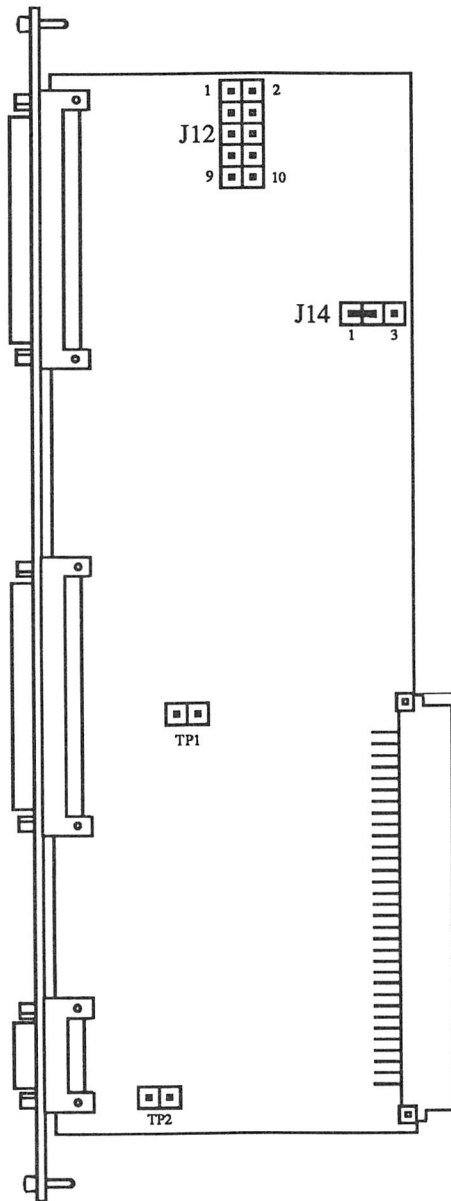
5

Figure 5-23. MVME792-2 Jumper Header Locations
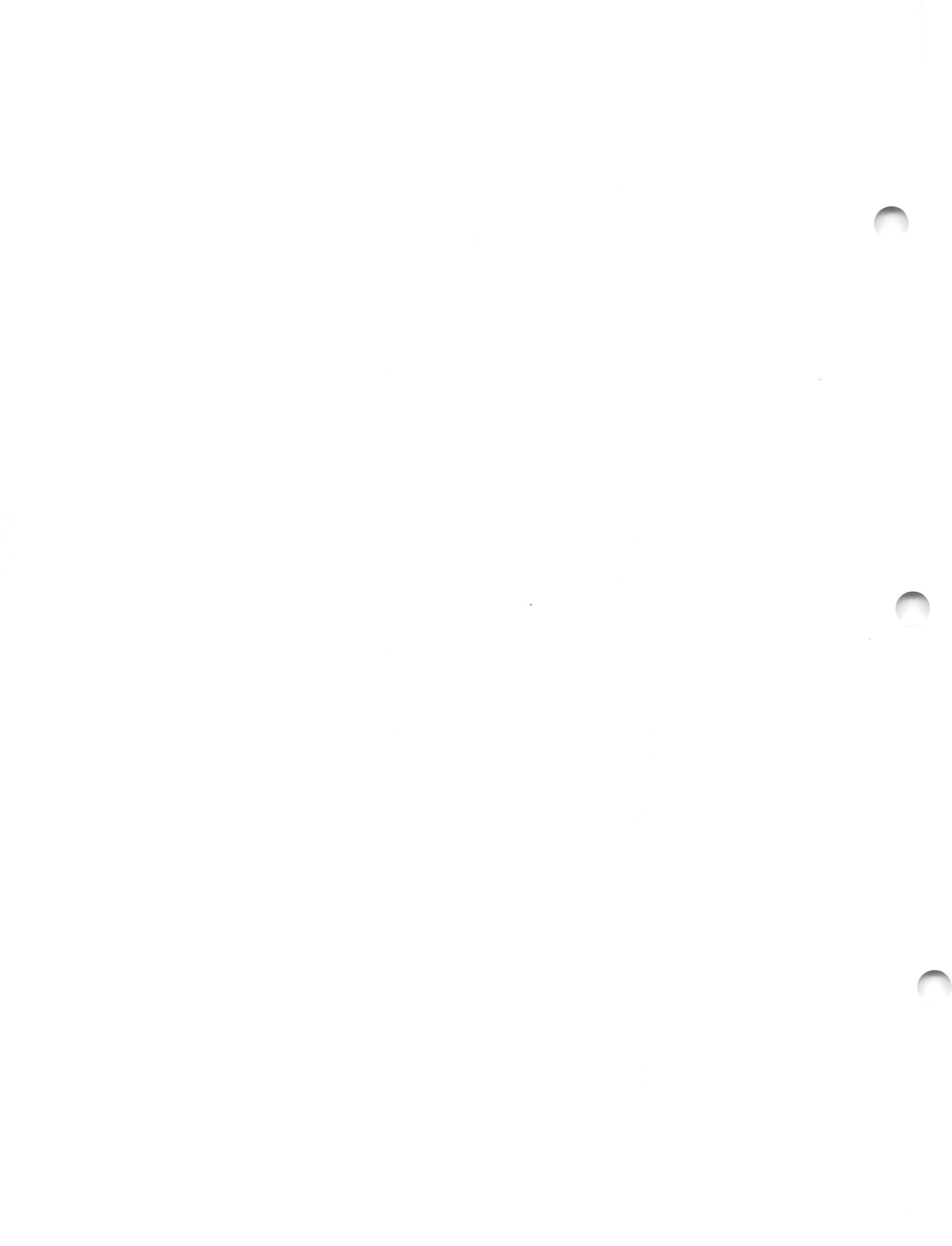
APPENDIX A
SYSTEM SPECIFICATIONS

Table A-1. System Enclosure Specifications

Dimensions
  Height
  Depth
  Width
  Weight (typical)
	12.2" (31.0 cm)
	19.75" (50.2 cm)
	19.0" (48.3 cm)
	61.5 lbs. (28 Kg)

Temperature	+5° to +40° C (operating); 10° C/hour max. gradient -40° C to +60° C (non-operating)
Relative Humidity	10% to 80% non-condensing (operating) 10% to 90%, non-condensing (non-operating)
Altitude	10,000 feet ASL (operating) 30,000 feet ASL (non-operating)

Electrical Characteristics
 	
  Input Voltages
  Input Frequency
  Input Power
 	
  Output Current
 	
  Output Power
	(The ac loads specified below represent the loads presented to the line by a fully configured system.)
	90 to 132 Vac; 186 to 264 Vac
	47 to 63 Hz
	6.0 amps ac @ 115 volts
	3.0 amps ac @ 230 volts
	+5 Vdc @ 80 amps; +12 Vdc @ 10 amps
	-12 Vdc @ 10 amps
	690 watts continuous

Transportation, packaged	Packaging and shipping containers and procedures comply with the ASTM-4169 preship test procedures.
Electrostatic Discharge No observable effect No operator-perceived errors No permanent damage	 5,000 volts 12,000 volts 24,000 volts
Acoustic Noise	55 dBA maximum
Emissions	Meets FCC Part 15, Sub-part J, Class A Meets VDE 0871/6.78, Class A
Safety	Meets UL 478 (EDP) Meets CSA 154 (EDP) Meets VDE 0806/8.81

A

FCC Compliance

The modules of the Model 1147 system were tested in an FCC compliant chassis and meet the requirements for Class A equipment. FCC compliance was achieved under the following conditions:

1. Shielded connectors on all external I/O ports. Shields are connected to earth ground via metal shell connectors bonded to a conductive module front panel where practical.

2. Conductive chassis rails connected to earth ground. This provides the path for connecting shields to earth ground.

3. Front panel screws properly tightened.

For minimum RF emissions, it is essential that the above conditions be adhered to when using the modules shipped with this system and when plugging in additional modules. Failure to do so could compromise the FCC compliance of the equipment containing the modules.

Table A-2. Controller Specifications

Controller Type	Interface	Number of Channels/Drives as Employed	Transfer Rate (per second)
High Performance SCSI Bus Interface	SCSI	7	Up to 4Mb Sync Up to 1.5Mb Async
SCSI Diskette	SA-450	1	Up to 62.5Kbits
Terminal/Printer Interface	RS-232C Parallel	4 1	Up to 9.6Kbits Up to 300 lpm
8-Port Serial	RS-232C Parallel	8 1	Up to 38.4Kbits Up to 2000 lpm
DeltaLink Hub WAN X.25 Comm. Ethernet CSMA/CD	X.25 RS-232C CCITT X.21bis IEEE 802.3	6 2 2 1	1Mbits Sync Up to 19.2Kbits Up to 64Kbits 10Mbits

Table A-3. Mass Storage Devices

Form-Fit	Interface	Formatted Capacity	Average Seek Time	Drives Per System
Disk Drives				
5-1/4"	SCSI	85Mb	28 ms	2
5-1/4"	SCSI	150Mb	16.5 ms	2
5-1/4"	SCSI	300Mb	16.5 ms	2
5-1/4"	SCSI	600Mb	16 ms	2
5-1/4"	SA-450	1.2Mb	181 ms	1
3-1/2"	SCSI	2.9Mb	94.0 ms	1
Tape Drives				
5-1/4"	SCSI	150Mb		2
5-1/4"	SCSI	60Mb		1
3-1/2"	SCSI	155Mb		1

A

Table A-4. VMEmodule Space and Power Requirements

VMEmodule	Space Required	Power Requirements
MVME147/-1	Single slot Double-high VME standard	+5 Vdc @ 7.0A +12 Vdc @ 1.0A
MVME147A/-1	Double slot Double-high VME standard	+5 Vdc @ 7.0A +12 Vdc @ 1.0A
MVME147S-1	Single slot Double-high VME standard -12 Vdc, 100mA max.	+5 Vdc @ 7.0A max. +12 Vdc @ 1.0A max.
MVME147SA-1	Single slot Double-high VME standard -12 Vdc, 100mA max.	+5 Vdc @ 7.0A max. +12 Vdc @ 1.0A max.
MVME224-1/2	Single slot Double-high VME standard	+4.75 to 5.25 Vdc @ 5A max., 3.9A typ.
MVME332XT	Single slot Double-high VME standard	+5 Vdc @ 4.5A +12 Vdc @ 100mA max., 50mA typ. -12 Vdc @ 100mA max., 50mA typ.
MVME333	Single slot Double-high VME standard	+5 Vdc @ 3.8A typ., 4.4A max.
MVME333X25	Single slot Double-high VME standard	+5 Vdc @ 3.8A typ., 4.4A max.
MVME336	Single slot Double-high VME standard	+5 Vdc @ 4.3A typ., 7.0A max.
MVME374	Single slot Double-high VME standard	+5 Vdc @ 4.5A typ., +12 Vdc, 360 mAdc typ., -12 Vdc, 40 mAdc typ.,
MVME393	Single slot Double-high VME standard	+5 Vdc @ 5 A max.

Table A-4. VMEmodule Space and Power Requirements (cont'd)

VMEmodule	Space Required	Power Requirements
MVME705A	Double slot Double-high	+5 Vdc @ 1.5A max., +12 Vdc @ 150mA max. -12 Vdc @ 150mA max.
MVME705B	Single slot Double-high	+5 Vdc @ 1.5A max., +12 Vdc @ 150mA max. -12 Vdc @ 150mA max.
MVME710	Double slot Double-high	0 power
MVME712M	Double slot Double-high VME standard	0 power
MVME712A	Single slot Double-high VME standard	0 power
MVME712B	Single slot Double-high VME standard	0 power
MVME731	7" x 4". Not a standard VMEmodule; is installed in back panel.	+5 Vdc @ 0.1A +12 Vdc @ 50mA max. -12 Vdc @ 50mA max.
MVME732	2.75" x 3.5". Not a standard VMEmodule.	+5 Vdc @ 100mA max. +12 Vdc @ 25mA max. -12 Vdc @ 25mA max.
MVME751	Double slot Double-high	0 power
MVME792-2	Single slot Double-high	0 power
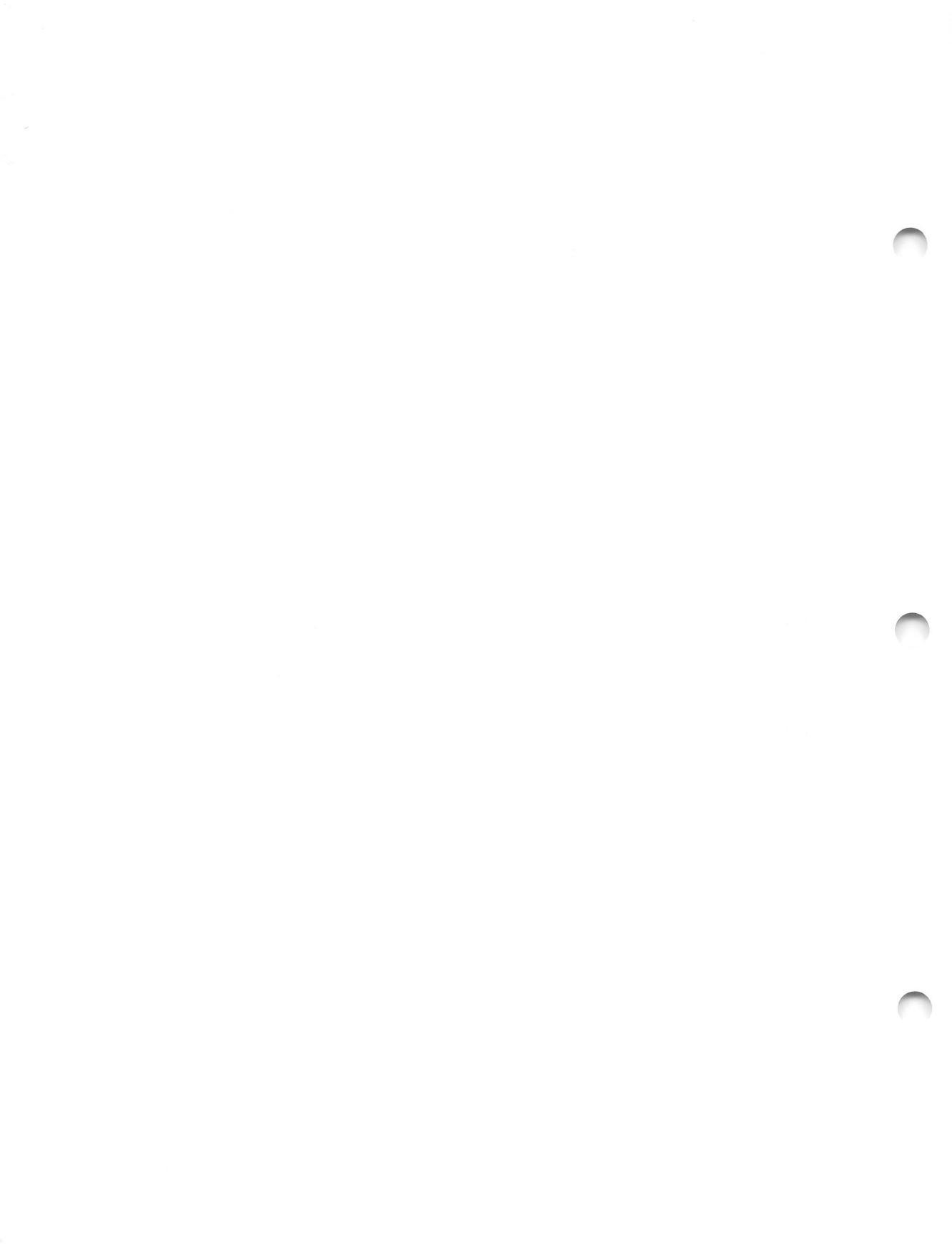
APPENDIX B
DISK DRIVE CONFIGURATION AND PLACEMENT

This appendix describes the strapping of the supported disk and removable media drives. At the end of the appendix, there are placement diagrams for the drives.

It is important to note that the information given applies to the way the drives should be configured for operation in the system.

MVME852 and MVME853 SCSI Streaming Tape Drive

The MVME852 60Mb and MVME853 150Mb SCSI streaming tape drives should be configured as follows:

1. Check the strapping of the SCSI Streaming Tape Drive according to the drive number it is going to be used as. Both the 60Mb and 150Mb drives look the same, so the strapping is the same. Strap the first drive as **4** and the second drive as **5**.

2. Connect the cables.

(REAR VIEW)
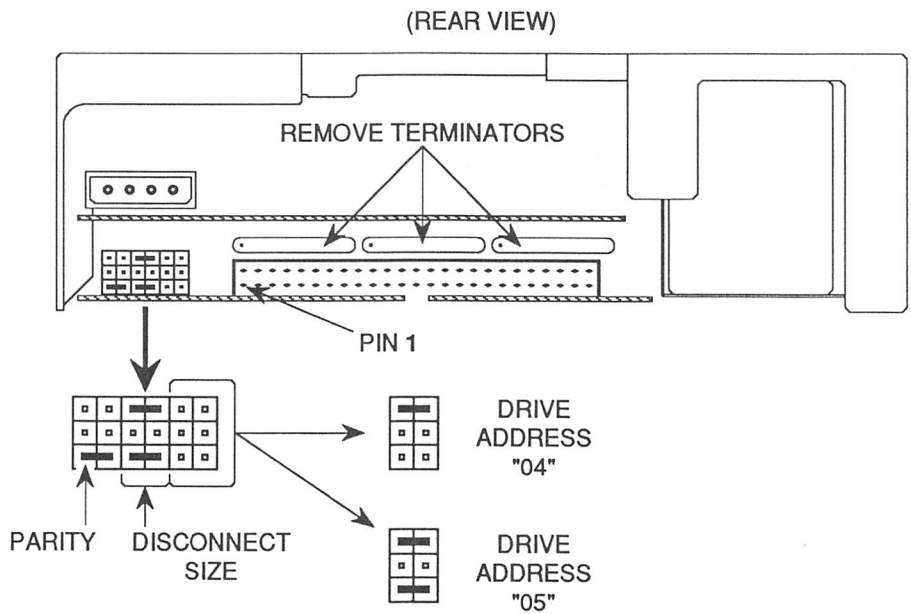
Figure B-1. MVME852 and MVME853 SCSI Streaming Tape Strapping and Cabling

MVME855 SCSI Streaming Tape Drive

The MVME855 (3½ inch 155Mb) SCSI streaming tape drive should be configured as follows:

1. Check the strapping of the SCSI streaming tape drive according to the drawings below.

2. Connect the cables.
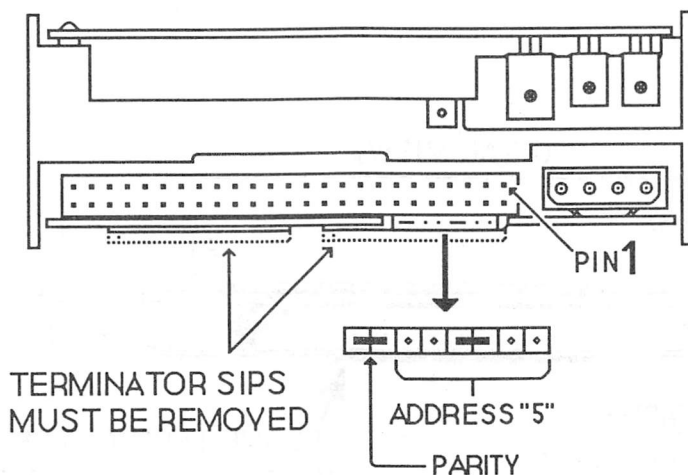
Figure B-2. MVME855 155Mb SCSI Streaming Tape Strapping

MVME873, MVME874, MVME875, and MVME876 SCSI Winchester Disk Drives

The MVME873 (85Mb), MVME874 (150Mb), MVME875 (300Mb), and MVME876 (600Mb) SCSI Winchester disk drives should be configured as follows:

1. Check the strapping of the SCSI disk drive according to the drive number it is going to be used as.

2. The terminator resistor pack must be installed on the first drive and **not** on the second, third, or fourth drive.

3. Connect the cables.
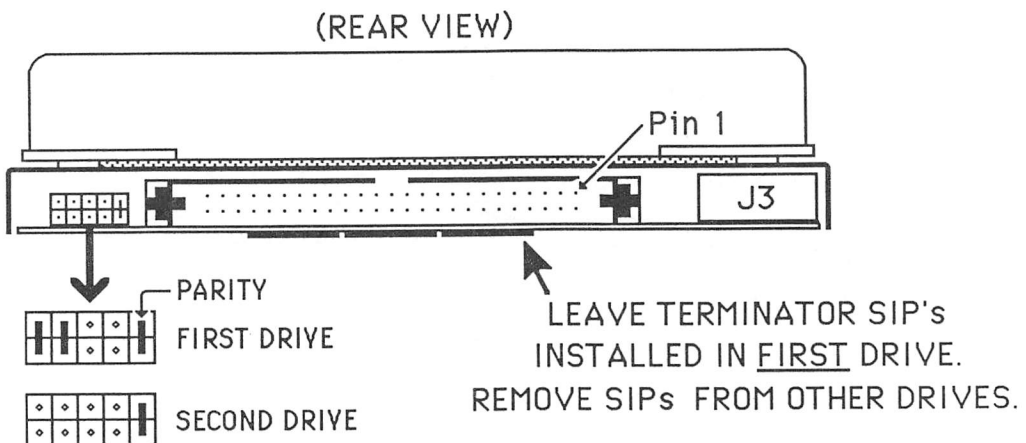
Figure B-3. MVME873 85Mb SCSI Winchester Strapping

B

(REAR VIEW)

Pin 1

J3

PARITY
FIRST DRIVE

SECOND DRIVE

LEAVE TERMINATOR SIP's
INSTALLED IN FIRST DRIVE.
REMOVE SIPs FROM OTHER DRIVES.
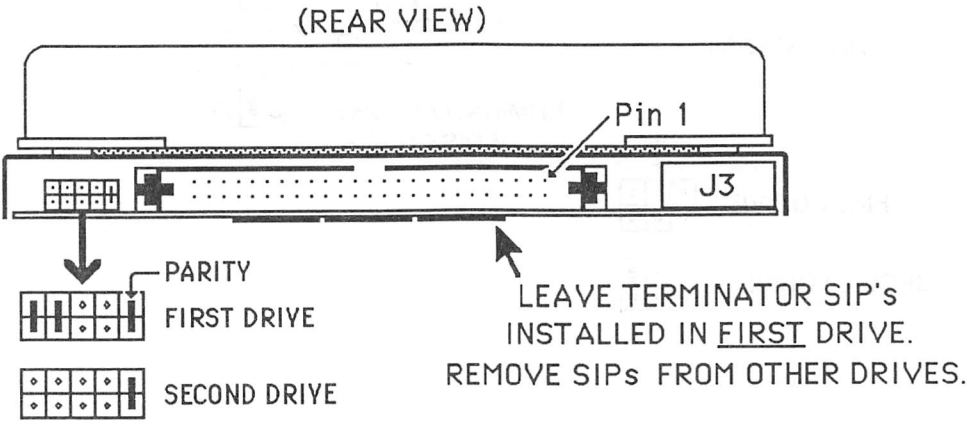
Figure B-4. MVME874 150Mb SCSI Winchester Strapping

B
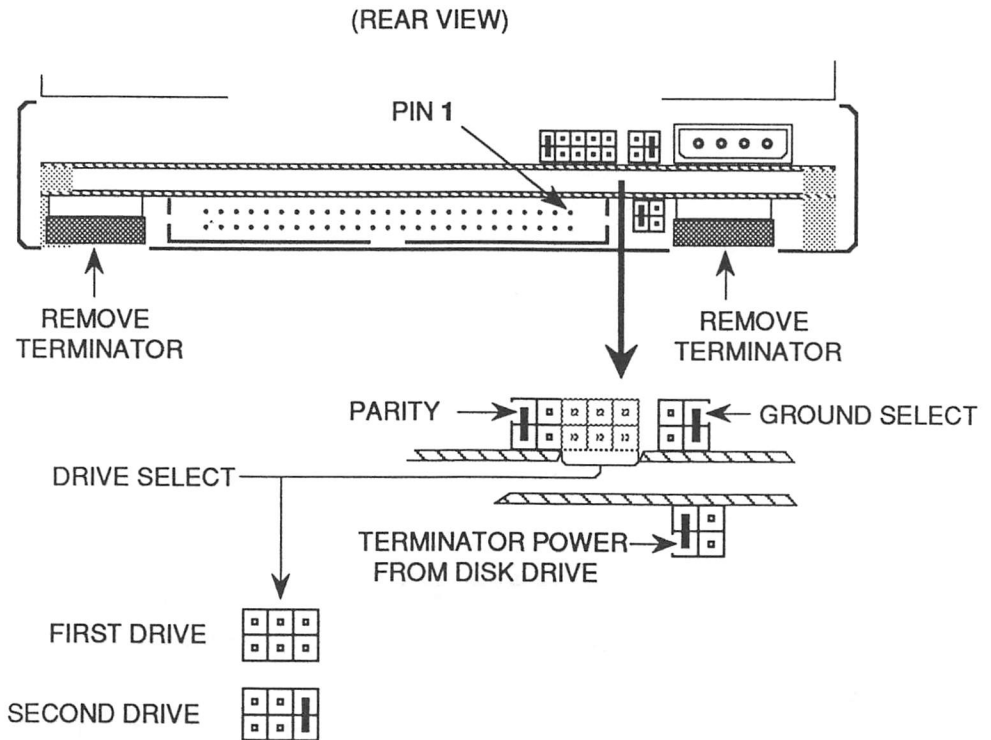
Figure B-5. MVME875 300Mb SCSI Winchester Strapping

(REAR VIEW)
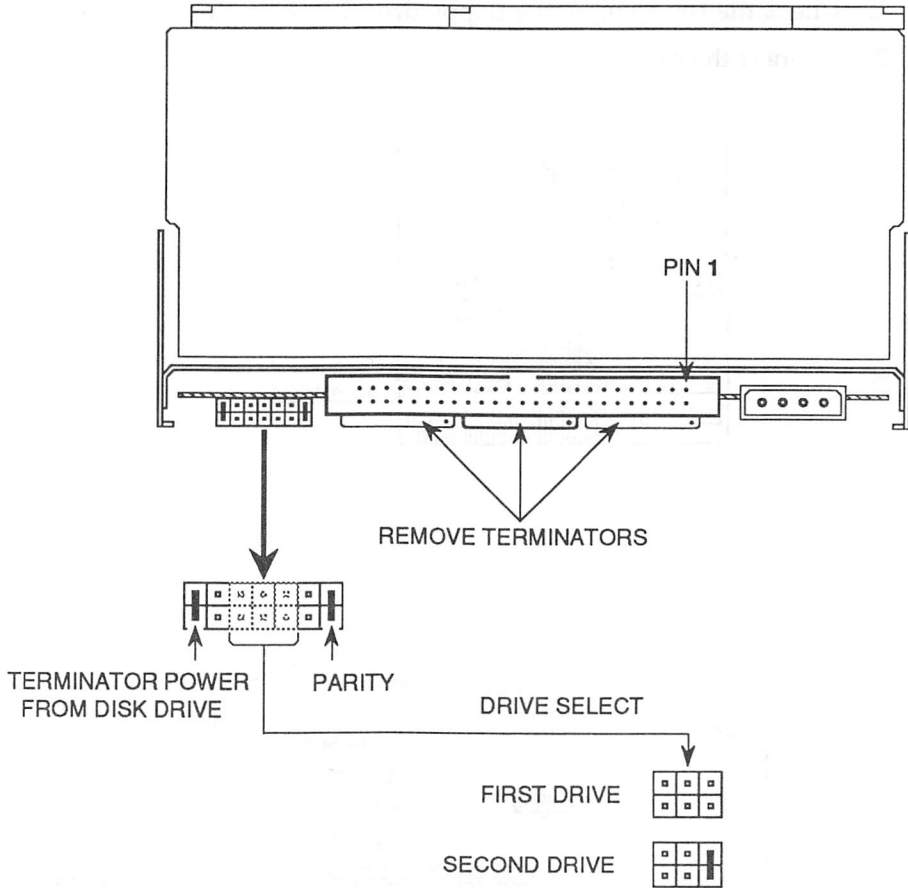
Figure B-6. MVME876 600Mb SCSI Winchester Strapping

MVME881 1.2Mb Floppy Disk Drive

The MVME881 1.2Mb diskette drive should be configured as follows:

1. Check the strapping of the floppy drive according to the figure.
2. Connect the cables.
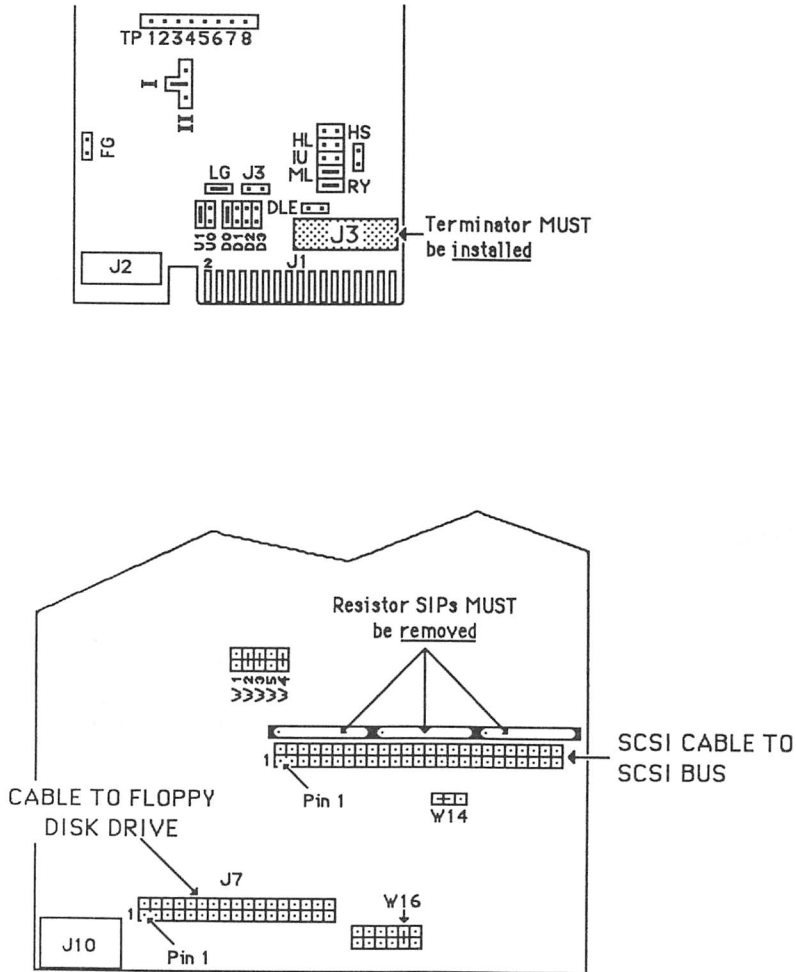
Figure B-7. MVME881 1.2Mb Floppy Disk Strapping

MVME884 Diskette Disk Drive

The MVME884 (3½ inch 1-4Mb) diskette drive should be configured as follows:

1. Check the strapping of the floppy drive according to the figure below.

2. Connect the cables.

BOTTOM FRONT VIEW

TOP REAR VIEW

Power
Connector

Jumpered as Drive "6"   Pin 1

Install Terminator SIPs in RA1 and RA2
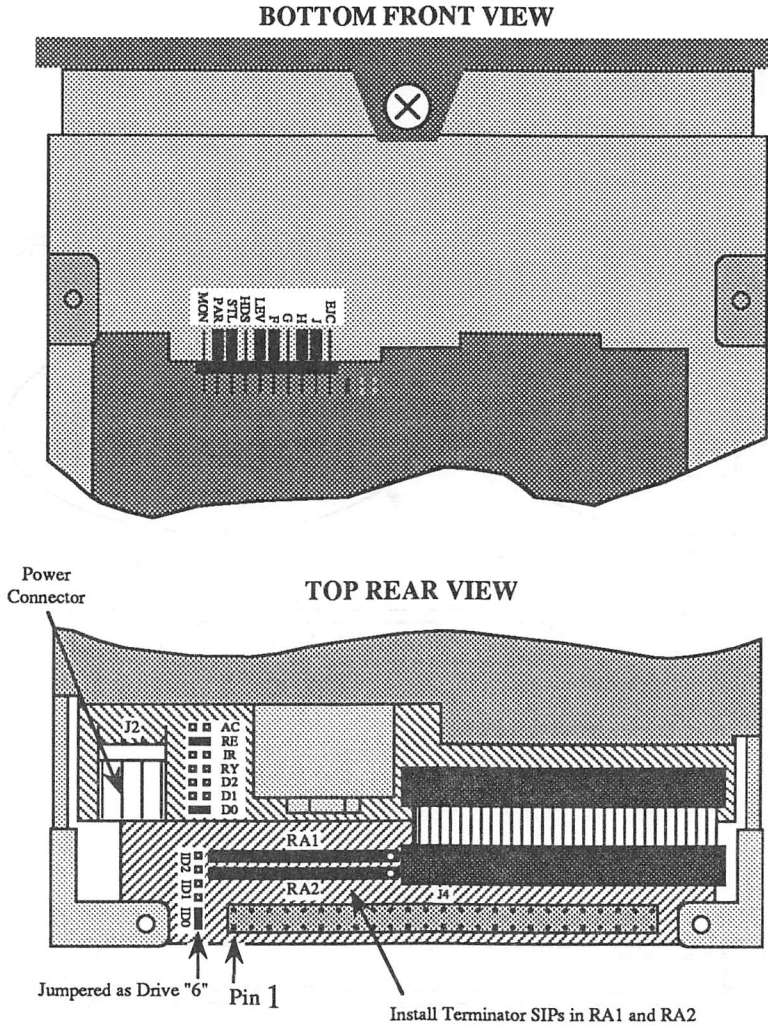
Figure B-8. MVME884 Floppy Disk Strapping

MVME856 2Gb SCSI Cartridge Tape Subsystem

The MVME856 2Gb SCSI cartridge tape subsystem should be configured as follows:

1. Check the strapping of the SCSI cartridge tape subsystem.

2. Connect the SCSI adaptor cable assembly to the connector on the drive.
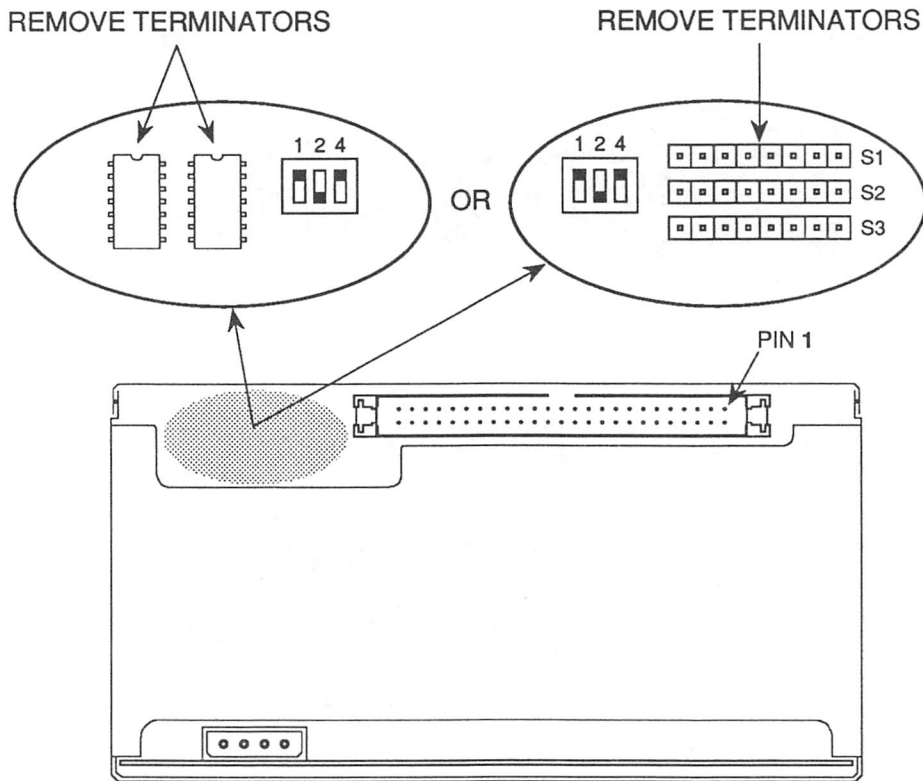
Figure B-9. MVME856 2Gb SCSI Cartridge Tape Subsystem Strapping and Cabling

APPENDIX C
PERIPHERAL CABLES

This appendix describes the types of cables that are used for attaching peripherals to the computer system.

Motorola-Supplied Cables

The following cables may be ordered from Motorola with the system.

Table C-1. Motorola-supplied Cables

Part Number	Description	Application
MVMECBLSA2	2 ft DB9 to DB25 Serial Adapter cable	Adapter cable for previously purchased Motorola-supplied cables (allows connection to other Delta Series systems).
MVMECBLT25	25 ft DB9 to DB25 Terminal cable	Terminal cable for MVME712A serial ports.
MVMECBLCP25	25 ft DB25 to Centronics Printer cable	Centronics printer cable for "PRINTER" port on MVME712A.

PERIPHERAL CABLES

The following figure illustrates the pinouts for the 2 ft DB9 to DB25 adapter cable for previously purchased Motorola-supplied RS-232C cables.
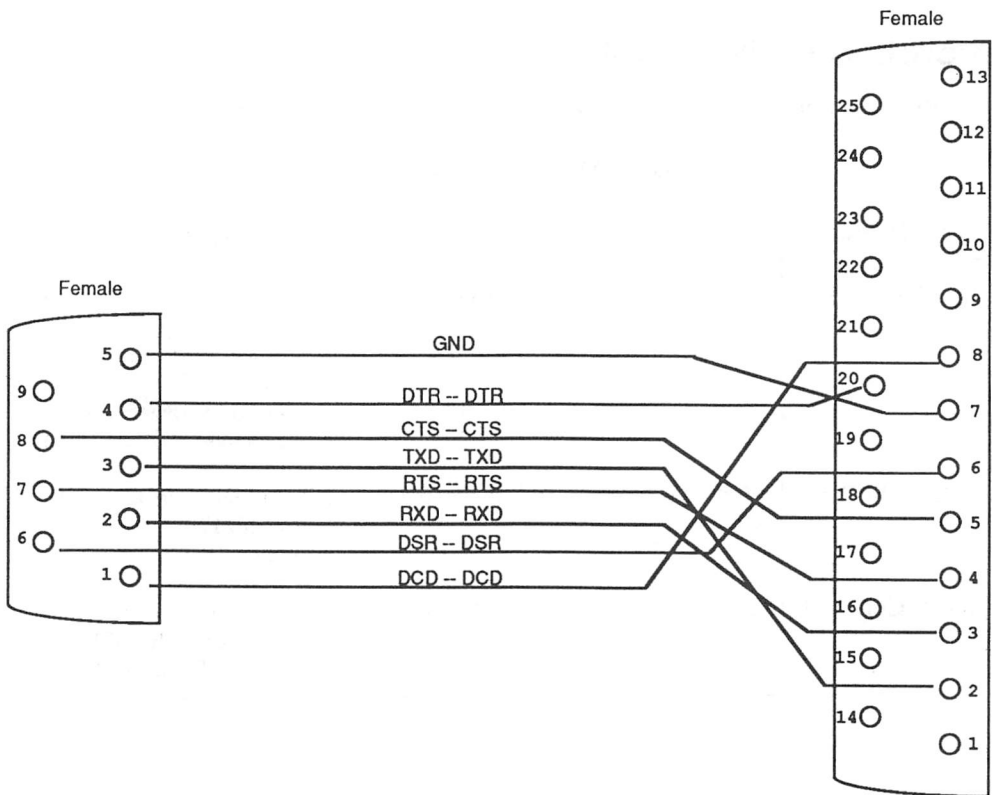
Figure C-1. MVMECBLSA2 DB9 to DB25 Serial Adapter Cable

The following figure illustrates the pinouts for the 25 ft DB9 to DB25 terminal cable.
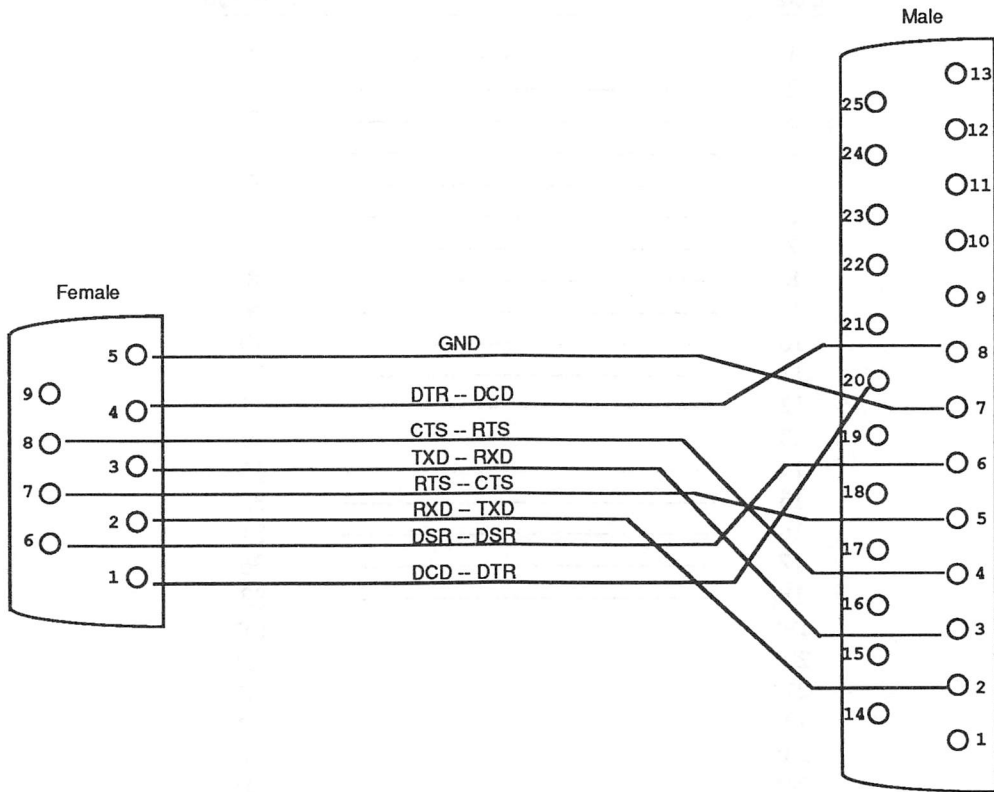
Figure C-2. MVMECBLT25 DB9 to DB25 Terminal Cable

The following table lists the pin descriptions for a DB25 connector ("PRINTER" port on the MVME712A) to a Centronics 36 connector.

Table C-2. MVMECBLCP25 DB25 to Centronics Printer Cable

DB25		EMC-36
1	--	1
2	--	2
3	--	3
4	--	4
5	--	5
6	--	6
7	--	7
8	--	8
9	--	9
10	--	10
11	--	11
12	--	12
13	--	13
14	--	14
15	--	32
16	--	31
17	--	36
18	--	33
19*		19*
20*		20*
21*		21*
22*		22*
23*		23*
24*		24*
25*		25*
		26*
		27*
		28*
		29*
		30*
		16*

* Denotes jumper connection

C-4

MVME712A Transition Module Connectors

The following table lists the pin descriptions for connectors J1, J3, J4, and J5 on the MVME712A transition module.

Table C-3. MVME712A RS-232C Connectors J1, J3 – J5 Interconnect Signals

PIN NUMBER	SIGNAL MNEMONIC	SIGNAL NAME AND DESCRIPTION
1	DCD	Data Carrier Detect - Sent by the modem to the terminal to indicate that a valid carrier is being received. Not used by port 1 (J1).
2	RXD	Receive Data - Data that is demodulated from the receive line is presented to the terminal by the modem.
3	TXD	Transmit Data - Data to be transmitted is furnished on this line to the modem from the terminal.
4	DTR	Data Terminal Ready - A signal from the terminal to the modem indicating that the terminal is ready to send or receive data.
5	GND	Ground
6	DSR	Data Set Ready - DSR is a function supplied by the modem to the terminal to indicate that the modem is ready to transmit data. This signal can be held high or low through header J8, J9, J13, J14.

Table C-3. MVME712A RS-232C Connectors J1, J3 – J5 Interconnect Signals (cont'd)

PIN NUMBER	SIGNAL MNEMONIC	SIGNAL NAME AND DESCRIPTION
7	RTS	Request To Send - RTS is supplied by the terminal to the modem when it is required to transmit a message. With RTS off, the modem carrier remains off. When RTS is turned on, the modem immediately turns on the carrier.
8	CTS	Clear to Send - CTS is a function supplied to the terminal by the modem, and indicates that it is permissible to begin transmission of a message. When using a modem, CTS follows the off-to-on transition of RTS after a time delay.
9		Not used.

The following table lists the pin descriptions for connector J15 on the MVME712A transition module.

Table C-4. MVME712A Connector J15 Interconnect Signals

PIN NUMBER	SIGNAL MNEMONIC	SIGNAL NAME AND DESCRIPTION
1	PRSTB	Data Strobe - An active low output pulse used to clock data from the system to the printer.
2	PRD0	Data (bit 0)
3	PRD1	Data (bit 1)
4	PRD2	Data (bit 2)
5	PRD3	Data (bit 3)
6	PRD4	Data (bit 4)
7	PRD5	Data (bit 5)
8	PRD6	Data (bit 6)
9	PRD7	Data (bit 7)
10	PRACK	Data Acknowledge - A low level input pulse indicating that the next character may be sent.
11	PRBSY	Busy - An input signal indicating that the printer cannot receive data.
12	PRPE	Paper Empty - Out of paper.
13	PRSEL	Selected - An input signal indicating that the printer is selected.
14		Not used.
15	PRFAULT	Fault - An input signal that indicates a printer fault condition.
16	INPRIME	Input Prime - An output signal that clears the printer buffer and initializes the logic.
17		Not used.
18-25	GND	Ground

C

APPENDIX D
USING REMOVABLE MEDIA

Loading and Unloading a 5¼ inch Cartridge Tape

The cartridge tape slot is the top slot in the front of the computer. To load a cartridge tape, follow these steps:

1. Check to make sure that the cartridge switch is aligned with the center marker before loading the cartridge.

2. Remove the cartridge tape from its plastic carrier.

3. To prohibit the writing of information onto the cartridge tape, set the write-protect switch arrow to SAFE (refer to Figure D-1). To enable writing on the cartridge tape, set the write-protect switch with the arrow directly opposite the SAFE position.

WRITE-PROTECT SWITCH
SET TO ALLOW WRITING

WRITE-PROTECT SWITCH
SET TO "SAFE" TO
PROHIBIT WRITING
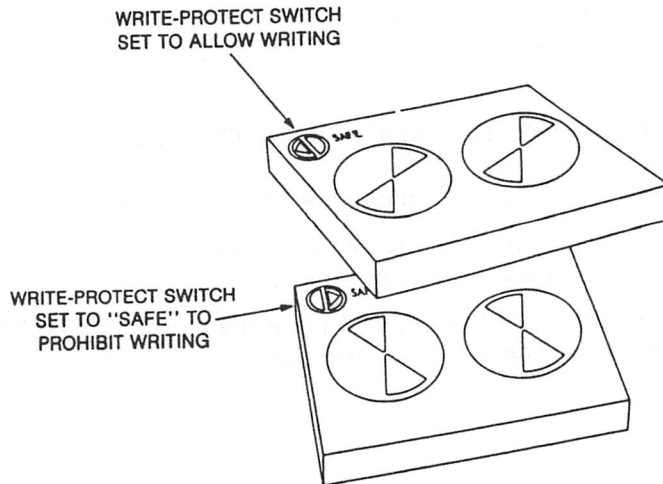
Figure D-1. Setting the Write-Protect Switch

4. Load the cartridge tape into the cartridge slot as shown in Figure D-2. Push the cartridge gently into the slot until the cartridge engages. Push the cartridge switch to the right to lock in the cartridge.
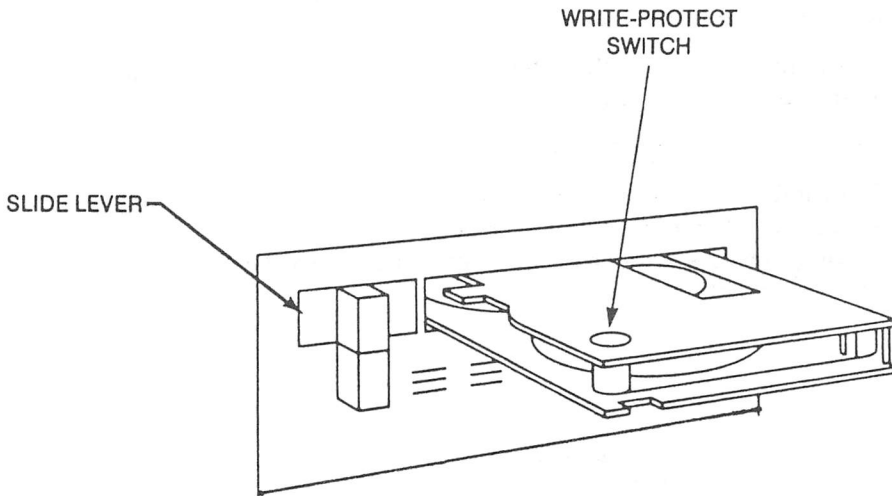
Figure D-2. Loading the 5¼ inch Cartridge Tape

To unload a cartridge tape, perform the following steps:

1. Push the cartridge switch over to the left, which ejects the cartridge a short distance to make it easier to pull out the tape.

2. Pull the cartridge out of the slot and place the cartridge tape into its plastic carrier to protect it from dust and other harmful substances.

CAUTION

Unload the cartridge tape before powering down the system; otherwise, the data on the cartridge could be destroyed.

D

Loading and Unloading a 3½ inch Cartridge Tape

To load a 3½ inch cartridge tape, follow these steps:

1. Remove the cartridge tape from its plastic carrier.

2. To prohibit the writing of information onto the cartridge tape, slide the write-protect switch over to the opposite side.

3. Load the cartridge tape into the cartridge slot as shown in Figure D-3. The label with the arrow should be facing up. Push the cartridge gently into the slot until the cartridge engages. Push the cartridge switch up (in direction of the arrow) to lock in the cartridge.

D
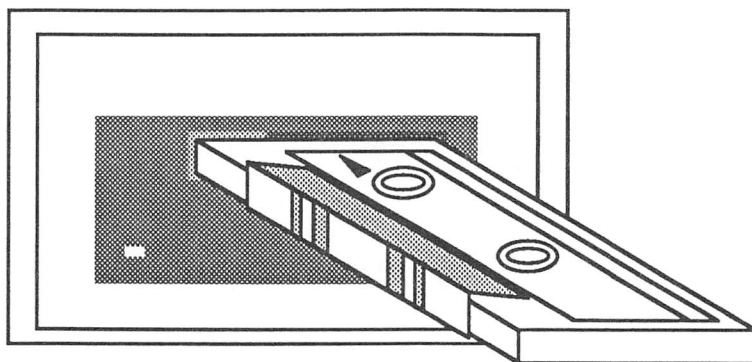
Figure D-3. Loading the 3½ inch Cartridge Tape

To unload a 3½ inch cartridge tape, perform the following steps:

1. Push the cartridge switch down, which ejects the cartridge a short distance to make it easier to pull out the tape.

2. Pull the cartridge out of the slot and place the cartridge tape into its plastic carrier to protect it from dust and other harmful substances.

CAUTION

Unload the cartridge tape before powering down the system; otherwise, the data on the cartridge could be destroyed.

D

Loading and Unloading a 5¼ inch Floppy Diskette

The floppy disk slot is located in the upper left front of the computer enclosure, immediately below the cartridge tape slot. To load a floppy diskette into the system, follow these steps:

1. Turn the floppy disk lever counterclockwise.

2. Near one corner of the floppy diskette is a square cut-out, which is the write-protect slot. Before placing the diskette in the drive, check the write-protect slot. If a label covers the square slot, you will not be able to write on the diskette.

3. Insert the diskette with the oblong cutout on the diskette going into the disk slot first, with the small round cutout on the left as you face the computer (refer to Figure D-4).

```
                    CAUTION

Insert the diskette only after powering up the
system and remove the diskette before powering
down the system; otherwise, the data could be
destroyed. Do not touch the diskette surface
exposed by the cutouts in the carrier envelope of
the floppy diskette.
```

FLOPPY DISK SLOT

OBLONG
CUTOUT

ROUNDED
CUTOUT
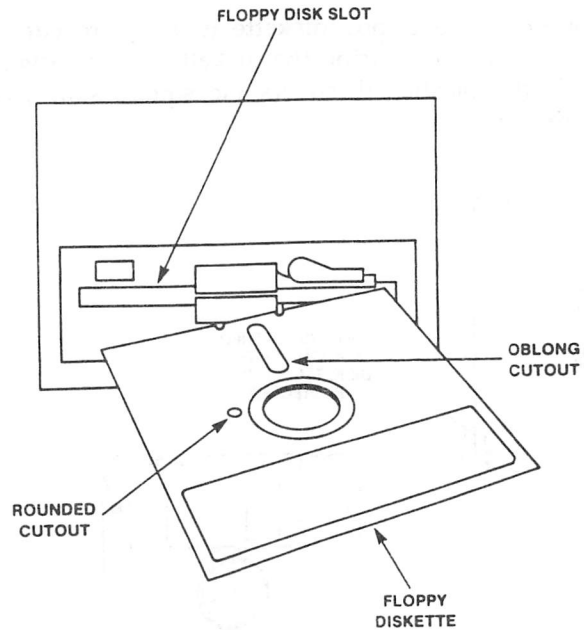
FLOPPY
DISKETTE

D

Figure D-4. Inserting the 5¼ inch Floppy Diskette

4. After inserting the diskette, turn the disk level clockwise to secure the diskette. The indicator light on the floppy disk drive lights when the floppy diskette is loaded correctly (only on domestic units).

Loading and Unloading a 3½ inch Floppy Diskette

The floppy disk slot is located in the front of the computer enclosure. To load a floppy diskette into the system, follow these steps:

1. Near one corner of the floppy diskette is a square cut-out, which is the write-protect slot. Before placing the diskette in the drive, check the write-protect slot. If the plastic tab covers the square slot, you will be able to write on the diskette.

IF HOLE IS COVERED,
YOU CAN WRITE;
DISKETTE IS WRITE
PROTECTED

IF HOLE IS VISIBLE,
YOU CANNOT WRITE TO
DISKETTE
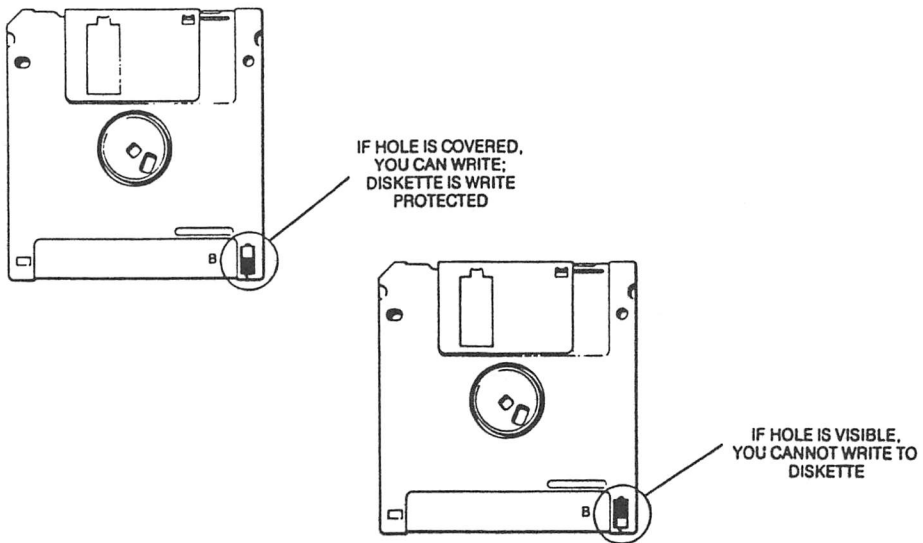
Figure D-5. Setting the Write-Protect Switch

2. Insert the diskette into the disk slot with the arrow on the diskette face up and in the direction of the disk slot. Push the diskette gently into the slot until the diskette engages.

To unload a floppy diskette, press the button on the right side of the floppy drive, and the diskette is automatically ejected.

CAUTION

Insert the diskette only after powering up the system and remove the diskette before powering down the system; otherwise, the data could be destroyed.

D

Caring for the Removable Media

To prevent loss of data or damage to the cartridge tapes, store them in a protected location which meets the following requirements:

- No direct sunlight

- No sources of magnetization

- No dust

- Temperature range from 50 degrees to 125 degrees F (10 to 40 degrees C), or as stated on the cartridge cover (may vary from one manufacturer to another). Try to place the cartridge tapes in the middle of this temperature range for best storage results.

- Relative humidity range from 8% to 80%. The best storage humidity environment is at the middle of this range.

- To prevent damage to data on the cartridge tapes, avoid touching the exposed surfaces or breaking open the protective coverings on the media.

MVME856 2Gb Tape Subsystem

The following guidelines must be followed when you have a 2Gb tape subsystem installed on your computer system.

- The tape head on the 2Gb tape subsystem **must** be cleaned every 30 tape motion hours. It is recommended that cleaning be scheduled at least once a week. If you wait and clean the head **after** you encounter problems, it will very likely result in a service call. A cleaning kit is shipped with the tape subsystem and instructions for cleaning the tape are contained in the kit.

- The door to the tape subsystem cannot be opened to remove the media until the tape is rewound and there are no pending commands.

- The maximum operating temperature specification for the tape media is 40° C (104° F).

- 8mm tapes are available in sizes ranging from 30 minutes (500Mb) to 2 hours (2Gb). Approved tape sources are Sony, TDK, and Maxell.

- Tapes and additional cleaning kits may be ordered through Express Supplies (1-800-648-0500) or FAX (214-888-2246).
  Note: Express Supplies will stock only the 2Gb size tape.

Removable Media

Many customers have requested a recommended source of media for the Delta systems. The following list of media types are compatible with our supported disk drives and all are available through Motorola's Express Supplies (1-800-648-0500) or FAX (214-888-2246).

Table D-1. Recommended Media

Media	Capacity	Industry ID	Express Supplies #
3 ½ in. diskette	.720Mb 1.5 (1.44)Mb 2.9Mb	DS/DD DS/HD PMF-2ED(ED)	89000384 89000470 89000411
5 ¼ in. diskette	.655 to 1.2Mb	DS/HD	89000383
3 ½ in. cassette tape	155Mb	EXT (TEAC CT-600N)	89000410
5 ¼ in. streaming tape	60Mb 125/150Mb	550 Oe, 600 ft. 550 Oe, 600 ft., XTD	89000077 89000378
8mm data cartridge	2.3Gb	1450 Oe, 2300 gauss	89000467
9-track tape reel (½ in.)	2400 ft. w/band 2400 ft w/canister	6250 tpi 6250 tpi	89000078 89000079

D

INDEX

When using this index, keep in mind that a page number indicates only where referenced material begins; it may extend to the following page or pages.

INDEX

H

hardware changes 4-15
hardware installation 4-1
hardware manuals 1-3
hardware overview 5-1

I

init(1M) 4-18
installation checklist 3-1

J

jumper header locations
    MVME147 5-9
    MVME147S/A 5-15
    MVME224 5-24
    MVME332XT 5-31
    MVME333 5-35
    MVME333X25 5-39
    MVME336 5-43
    MVME374 5-47
    MVME710 5-33
    MVME712A 5-17
    MVME731 5-20
    MVME792-2 5-51
jumper settings
    MVME147 5-8
    MVME147S/A 5-12
    MVME224 5-23
    MVME332XT 5-29
    MVME333 5-34
    MVME333X25 5-38
    MVME336 5-42
    MVME374 5-46
    MVME393 5-48
    MVME705A 5-36
    MVME705B 5-40
    MVME710 5-32

MVME712A 5-16
MVME712M 5-10
MVME731 5-19
MVME792-2 5-50

L

loading a diskette D-6
loading a tape D-1
log on as root 4-14
log on as setup 4-14

M

manual summary 1-1
mass storage devices A-3
MC68030 1-2
mechanical features 2-3
media
    recommended D-11
Memory Management Unit (MMU)
    4-3
memory tape dump 4-9
mknod(1M) 4-15
modems 2-2
module placement 5-6
module positions
    rear panel 5-7
Motorola National Technical Support
    Center (NTSC) 4-8
Motorola-supplied cables C-1
multi-user mode 4-5
MVME147 5-3
    description 5-8
    jumper header locations 5-9
    jumper settings 5-8
MVME224
    description 5-23
    jumper header locations 5-24
    jumper settings 5-23

INDEX

O

I
N
D
E
X

INDEX

T

tape subsystem D-10
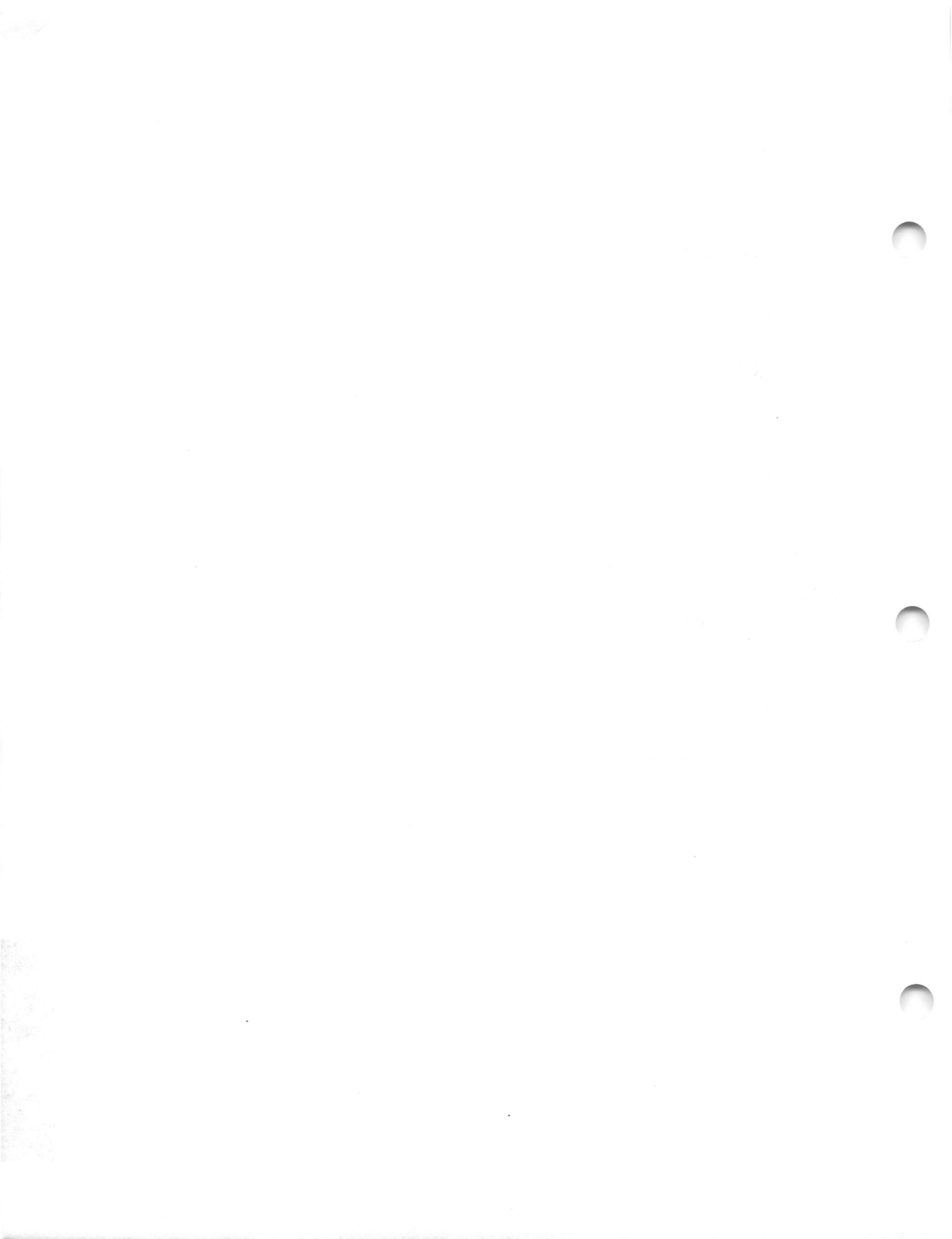transition boards 5-4
troubleshooting 4-10

U

unloading diskette D-6
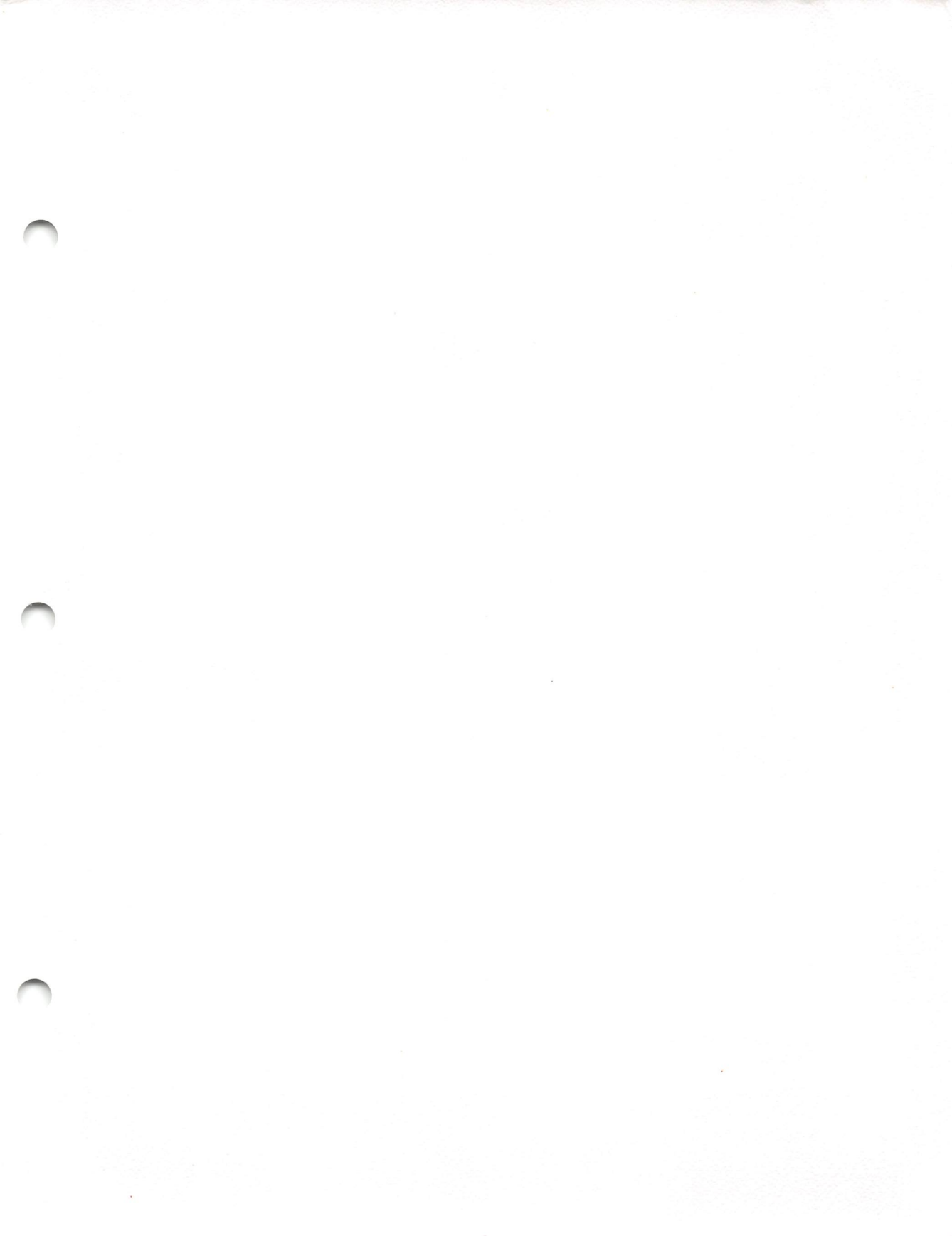unloading tape D-1
using removable media D-1

V

VMEbus 5-23
VMEexec 1-2
VMEmodule components 5-3
VMEmodule positions 5-6
VMEmodule requirements A-4
VSB 5-23

W

write-protect switch D-1

68NW9209G13B