

SYS3200U/D1

**System Manual
For
Model 3200
Workgroup Computer System**



MOTOROLA



Delta Series 3000

SYSTEM MANUAL
for
DELTA SERIES 3000
MODEL 3200
Workgroup Computer System

(SYS3200U/D1)

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PREFACE

The *System Manual For Delta Series 3000 Model 3200* (Part Number SYS3200U/D1) describes the installation, components, and configurations of the Model 3200 Workgroup Computer System.

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WARNING

THIS EQUIPMENT GENERATES, USES, AND CAN RADIATE RADIO FREQUENCY ENERGY AND IF NOT INSTALLED AND USED IN ACCORDANCE WITH THE INSTRUCTIONS MANUAL, MAY CAUSE INTERFERENCE TO RADIO COMMUNICATIONS. IT HAS BEEN TESTED AND FOUND TO COMPLY WITH THE LIMITS FOR A CLASS A COMPUTING DEVICE PURSUANT TO SUBPART J OF PART 15 OF FCC RULES, WHICH ARE DESIGNED TO PROVIDE REASONABLE PROTECTION AGAINST SUCH INTERFERENCE WHEN OPERATED IN A COMMERCIAL ENVIRONMENT. OPERATION OF THIS EQUIPMENT IN A RESIDENTIAL AREA IS LIKELY TO CAUSE INTERFERENCE IN WHICH CASE THE USER, AT HIS OWN EXPENSE, WILL BE REQUIRED TO TAKE WHATEVER MEASURES NECESSARY TO CORRECT THE INTERFERENCE.

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First Edition

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SAFETY SUMMARY

SAFETY DEPENDS ON YOU

The following general safety precautions must be observed during all phases of operation, service, and repair of this equipment. Failure to comply with these precautions or with specific warnings elsewhere in this manual violates safety standards of design, manufacture, and intended use of the equipment. Motorola Inc. assumes no liability for the customer's failure to comply with these requirements. The safety precautions listed below represent warnings of certain dangers of which we are aware. You, as the user of the product, should follow these warnings and all other safety precautions necessary for the safe operation of the equipment in your operating environment.

GROUND THE INSTRUMENT.

To minimize shock hazard, the equipment chassis and enclosure must be connected to an electrical ground. The equipment is supplied with a three-conductor ac power cable. The power cable must either be plugged into an approved three-contact electrical outlet or used with a three-contact to two-contact adapter, with the grounding wire (green) firmly connected to an electrical ground (safety ground) at the power outlet. The power jack and mating plug of the power cable meet International Electrotechnical Commission (IEC) safety standards.

DO NOT OPERATE IN AN EXPLOSIVE ATMOSPHERE.

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

KEEP AWAY FROM LIVE CIRCUITS.

Operating personnel must not remove equipment covers. Only Factory Authorized Service Personnel or other qualified maintenance personnel may remove equipment covers for internal subassembly or component replacement or any internal adjustment. Do not replace components with power cable connected. Under certain conditions, dangerous voltages may exist even with the power cable removed. To avoid injuries, always disconnect power and discharge circuits before touching them.

DO NOT SERVICE OR ADJUST ALONE.

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

USE CAUTION WHEN EXPOSING OR HANDLING THE CRT.

Breakage of the Cathode-Ray Tube (CRT) causes a high-velocity scattering of glass fragments (implosion). To prevent CRT implosion, avoid rough handling or jarring of the equipment. Handling of the CRT should be done only by qualified maintenance personnel using approved safety mask and gloves.

DO NOT SUBSTITUTE PARTS OR MODIFY EQUIPMENT.

Because of the danger of introducing additional hazards, do not install substitute parts or perform any unauthorized modification of the equipment. Contact Motorola Field Service Division for service and repair to ensure that safety features are maintained.

DANGEROUS PROCEDURE WARNINGS.

Warnings, such as the example below, precede potentially dangerous procedures throughout this manual. Instructions contained in the warnings must be followed. You should also employ all other safety precautions which you deem necessary for the operation of the equipment in your operating environment.

WARNING

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

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CHAPTER 1

INTRODUCTION

This system manual describes the Delta Series 3000 Model 3200 Workgroup Computer System. The purpose of this manual is to provide a central source of information on Model 3200 components, configurations, start-up, and installation.

This system manual is organized in five chapters and eight appendices. The first four chapters describe information on system installation and start-up. The last chapter of the manual covers board strapping information. Eight appendices provide reference information including system specifications, cabling, using removable media, printer and terminal descriptions, and equipment maintenance.

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 3200.
- Appendix A, "Bootting VERSAdos" gives the procedure on how to boot VERSAdos on the system.
- Appendix B, "System Specifications" lists the specifications for the computer and disk drives.
- Appendix C, "Cabling Instructions" describes the cables required for the system.
- Appendix D, "Using Removable Media" describes how to load and unload removable media from the drives.
- Appendix E, "Disk Drive Configuration and Placement" describes correct strapping for all supported drives.
- Appendix F, "Terminals" lists the terminals that are supported.
- Appendix G, "Printers" lists the printers that are supported.

INTRODUCTION

- Appendix H, "Computer Maintenance and Care" describes the proper care for the computer system.

System Description

The Model 3200 Workgroup Computer System uses a 32-bit 16 or 25 MHz MC68030 microprocessor, 4 or 8Mb of shared onboard memory, and a MC68881 (16MHz) or MC68882 (25MHz) floating-point coprocessor. A SCSI interface with DMA, four asynchronous serial ports, a parallel printer port, a time of day clock with battery backup, and an Ethernet interface (25MHz configuration) are included. The system uses SYSTEM V/68 Release 3 as its operating system. SYSTEM V/68 Release 3 is compliant with AT&T's System V Interface Definition (SVID).

The system enclosure houses up to three 3 1/2 in. peripherals (normally a streaming tape drive and one or two 3 1/2 in. Winchester disk drives) or one 5 1/4 in. streaming tape drive and one 3 1/2 in. Winchester disk drive. The system supports from 48 to 344Mb of disk storage.

The Model 3200 hardware includes:

- 3-Slot Enclosure
- VMEbus
- The Applications Processor with Memory
- I/O and Communications Controllers
- Disk and Tape Devices
- Local and Remote Diagnostic Capabilities

The system enclosure has a 3-slot VME compatible card cage and a 6-slot VME distribution module area. This provides connectivity to a diverse and large number of peripheral devices. The enclosure contains a 175 watt switching power supply and is air cooled.

Detailed descriptions of configurations and individual modules are provided in Chapter 5.

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. Information on booting VERSAdos is in Appendix A. Board strapping is the same for SYSTEM V/68 Release 3 and VERSAdos operating systems.

Related Publications

The following publications may provide additional helpful information. They may be purchased from the Motorola Literature Distribution Center, 616 West 24th Street, Tempe, Arizona 85282; telephone (602) 994-6561.

MVME147 VMEmodule MPU VMEmodule User's Manual, MVME147.

MVME147BUG 147Bug Debugging Package User's Manual, MVME147BUG.

MVME147 SCSI Firmware User's Manual, MVME147FW.

MVME332XT Intelligent Communication Controller User's Manual, MVME332XT.

MVME332XT Serial Intelligent Peripheral Controller Firmware User's Manual, MVME332XTFW.

MVME333-2 Intelligent Communication Controller User's Manual, MVME333.

MVME333BUG Debug Package User's Manual, MVME333BUGE.

X25NET333 M333X25 Driver User's Manual, MVME333UDX.

X25NET333 M333DRV Driver User's Manual, MVME333VDX.

MVME335 Serial and Parallel I/O Module User's Manual, MVME335.

MVME374 Multi-Protocol Ethernet Interface Module User's Manual, MVME374.

MVME374BUG 374 Debugging Package, MVME374BUG.

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MVME705A 6-Channel Serial Transceiver Module User's Manual, MVME705A.

MVME710 8-Channel Serial I/O Distribution Module User's Manual, MVME710.

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 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 is an invitation to losing data if the circuit is overloaded and the breaker is tripped.

The branch AC power circuit used to supply the 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 computer 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 are shipped with a 3-prong male plug on the power cable (NEMA type 5-15P). Computers for international shipment may require local installation of the

correct cord set. The computer has a power supply that automatically switches between 115 volts and 230 volts operation.

Electro-Static Discharge

The system 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 (refer to "Troubleshooting"). The maximum recommended length for RS-232C cables is 50 feet (15 meters). 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," 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 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
- Power ON/OFF switch

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

- Four RS-232C connectors on the MVME712A module. The connector on the far left is used to connect the system console terminal. The connector labeled "TTY01" is normally used to connect the internal modem and is therefore not available if the remote maintenance feature is installed. This connector may be used to connect a terminal or printer, but limitations apply and configuration changes are required.
- Up to sixteen additional RS-232C serial connectors for various combinations of serial terminals, printers, and modems. There may be two sets of connectors

SITE PREPARATION

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labeled SP1 through SP8, representing the eight ports on each of two MVME332XT modules.

- Four RS-232C serial connectors on the MVME335 module.
- External SCSI and Ethernet connectors on the MVME712B.
- One phone jack connector (optional) to connect the internal modem to the remote maintenance facility.
- One power cord connector.

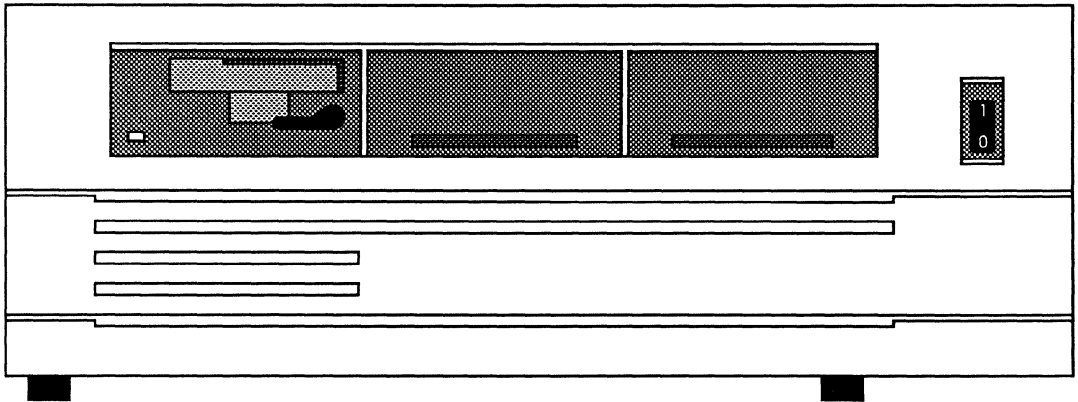


Figure 2-1. Model 3200 Front View

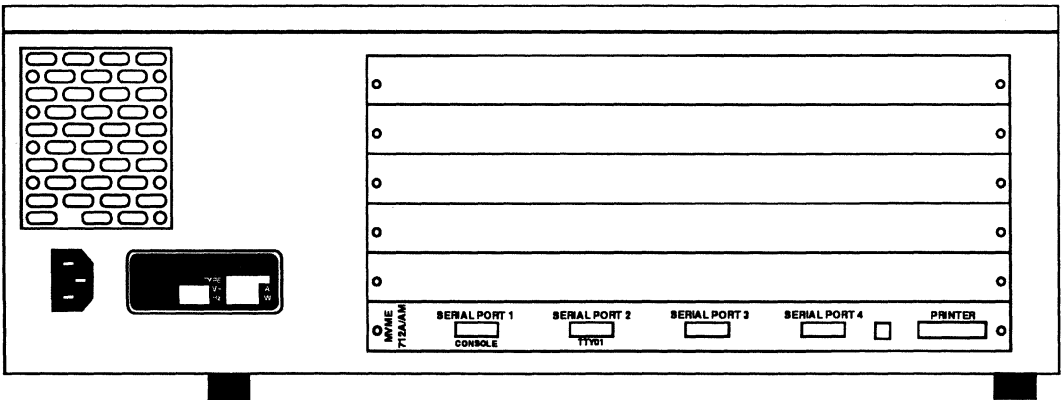


Figure 2-2. Model 3200 Rear View

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 eleven 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.

GETTING STARTED

3

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 <i>Operating System Software Release Guide</i> . Also review information on "System Power-up Menu" in Chapter 4 of this manual.
Step 5	Log on as System Administrator (root) See Chapter 4 of this manual. <i>System Administrator's Guide</i> : 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 <i>System Administrator's Guide</i> : P8, "TTY Management Procedures"; Chapter 8, "TTY Management"; Appendix B, "Directories and Files"; <i>Administrator's Reference Manual</i> , "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	<p>Place System in Multi-User Mode</p> <p><i>System Administrator's Guide: P2, "User Services Procedures"; P3, "Processor Operations Procedures"; Chapter 2, "User Services"; Chapter 3, "Processor Operations"</i></p>
Step 10	<p>Add Users</p> <p><i>System Administrator's Guide: P2, "User Services Procedures"; P8, "TTY Management Procedures"; Chapter 2, "User Services"; Chapter 8, "TTY Management"</i></p>
Step 11	<p>Edit Line Printer Administration Files</p> <p><i>System Administrator's Guide: P7, "LP Spooler Administration Procedures"; Chapter 7, "Line Printer Administration"; System Administrator's Reference Manual: lp.cnfg(1M)</i></p>
Step 12	<p>Manage Disk File Systems</p> <p><i>System Administrator's Guide: P4, "Disk System Management Procedures"; P5, "File System Administration Procedures"; Chapter 4, "Disk Management"; Chapter 5, "File System Administration"</i></p>
Step 13	<p>Set Up Basic Networking System</p> <p><i>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"</i></p>
Step 14	<p>Remote File Sharing (RFS)</p> <p><i>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"</i></p>
Step 15	<p>Install Other Software Packages</p> <p>See the <i>Software Release Guide</i> for the product to be installed.</p>

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.

3

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) and special files (Section 7).

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.

GETTING STARTED

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CHAPTER 4

SYSTEM INSTALLATION

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

4

Hardware Installation

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, Motorola Part Number MVMECBLT25 or equivalent. This cable has a 9-pin D connector on the system end and a 25-pin D connector on the terminal end.

2. On the rear of the system, identify the connector labeled SERIAL PORT 1/CONSOLE. It is located on the rear panel. Connect the other end of the RS-232C cable (labeled DPU) to this connector.

SYSTEM INSTALLATION

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 20 RS-232C connectors to connect combinations of serial terminals, printers, (one parallel port), and/or modems using two serial I/O controllers (MVME332XT). The MVME335 module can also be used to connect up to four additional serial devices. To connect these peripherals, use the procedure described for the system console in "Installing the System Console," but connect the cable (DB25 to DB25 connectors) to a port labeled "Serial Port *x*" or "SP*x*" on the rear panel, where *x* is a number from 1 through 8. In addition, parallel printers may be attached to the MVME332PA1 transition module through the MVME332XT controller.

Controls and Indicators

The system power switch is located on the front of the system (refer to Figure 2-1). Move the rocker switch to the ON (1) position to power up the system or to the OFF (0) position to power down the system. When the system is powered up, a reset is also performed.

When the cartridge tape drive is accessed, the associated drive's LED is illuminated.

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 turning the ON/OFF switch to the ON position.
4. Power up all the other peripherals, such as terminals, or printers.

Autoboot

NOTE

Other operating systems (for example, VERSAdos) may be installed on the 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. See Appendix A for information on booting VERSAdos.

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
```

(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" for information on how to use this menu.

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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.

To enter single-user mode, use the shutdown procedure described in "Shutting Down the System." For additional information about operating levels refer to Chapter 3, "Processor Operations," in the SYSTEM V/68 Release 3 *System Administrator's Guide*.

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

SYSTEM INSTALLATION

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.

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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).

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.

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).

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).

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

SYSTEM INSTALLATION

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.

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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 *SYSTEM V/68 Release 3 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 4-1.

Table 4-1. Troubleshooting Hints

SYMPTOM	POSSIBLE SOLUTION
<p>No power. No sound of fans turning.</p>	<p>Plug in line cord. NOTE: There are no fuses or user-replaceable circuit breakers. Check for power at receptacle.</p>
<p>Cannot communicate with system via console.</p>	<p>Console cable must be Motorola DTE to DTE type or equivalent cables.</p> <p>Make sure RS-232C cable is plugged into the MVME712A in the RS-232C connector, labeled SERIAL PORT 1/CONSOLE.</p> <p>Make sure the terminal is on-line and has the correct set-up (see below). Try another terminal.</p> <p>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.</p>
<p>System will not boot. (SST message appears on screen).</p>	<p>See if boot drive light comes on. If not, call service. If light comes on, record fault message and then call service.</p>
<p>System powers on but turns itself "off" after a time.</p>	<p>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.</p>

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

SYMPTOM	POSSIBLE SOLUTION
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 MVME712A module. Check F1 on the MVME147 paddle board.
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.

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 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)

Now, 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> if <cr>:

Set VME Chip: <cr>

Board ID [0-FF] = \$00? <cr>

GCSR base address [0-OF] = \$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 V/68 Release 3 *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.

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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(1M)**). 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 V/68 Release 3 *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(1M)** utility is used to create the necessary device entries which permits users to communicate with the system through the MVME332XT or MVME335 serial controllers. 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(1M)** 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 V/68 Release 3 *System Administrator's Guide* and also in the SYSTEM V/68 Release 3 *User's Reference Manual* pages for **sysadm(1M)**. The *System Administrator's Guide* information includes a reference guide for tasks and **sysadm** commands.

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

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1	diagnostics	system diagnostics menu (not SSID)
2	diskmgmt	disk management menu
3	filemgmt	file management menu
4	machinmgmt	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 V/68 Release 3 *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 V/68 Release 3 *System Administrator's Guide*.

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 SYSTEM V/68 Release 3 *User's Guide* gives details on modifying the **.profile**

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file. A sample **.profile** is shown in Example 4-1.

```
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
```

Example 4-1. 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 V/68 Release 3 *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 V/68 Release 3 *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 SYSTEM V/68 Release 3 *Administrator's Guide* gives steps for rebuilding the operating system.

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CHAPTER 5

SYSTEM HARDWARE OVERVIEW

This chapter describes hardware configurations and individual components of the Model 3200 Computer System. Detailed information about the modules is contained in the hardware manuals listed in "Related Publications." Physical specifications for system components are given in Appendix B.

NOTE

Unless otherwise specified, all address references are in hexadecimal.

Basic Configurations

There are nine configurations for the system. These configurations include the following general components:

- system enclosure
- processor and memory
- mass storage devices

Model 3200 Computer System Configurations

Configuration SYS3204NY04F includes the following components.

- 3-slot desktop enclosure
- MVME147RF (16 MHz, 4Mb DRAM) with 68881 and MVME712A
- MVME862 48Mb SCSI Winchester Disk Drive (3½ in.)
- MVME884 1-4Mb SCSI Diskette Drive (3½ in.)

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Configuration SYS3204NY043 includes the following components.

- 3-slot desktop enclosure
- MVME147RF (16 MHz, 4Mb DRAM) with 68881 and MVME712A
- MVME862 48Mb SCSI Winchester Disk Drive (3½ in.)
- MVME855 155Mb SCSI Streaming Tape Drive (3½ in.)

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Configuration SYS3204NY045 includes the following components.

- 3-slot desktop enclosure
- MVME147RF (16 MHz, 4Mb DRAM) with 68881 and MVME712A
- MVME862 48Mb SCSI Winchester Disk Drive (3½ in.)
- MVME853 150Mb SCSI Streaming Tape Drive (5¼ in.)

Configuration SYS3204NY103R includes the following components.

- 3-slot desktop enclosure
- MVME147RF (16 MHz, 4Mb DRAM) with 68881 and MVME712A
- MVME863 104Mb SCSI Winchester Disk Drive (3½ in.)
- MVME855 155Mb SCSI Streaming Tape Drive (3½ in.)

Configuration SYS3204NY105R includes the following components.

- 3-slot desktop enclosure
- MVME147RF (16 MHz, 4Mb DRAM) with 68881 and MVME712A
- MVME863 104Mb SCSI Winchester Disk Drive (3½ in.)
- MVME853 150Mb SCSI Streaming Tape Drive (5¼ in.)

Configuration SYS3204NY103 includes the following components.

- 3-slot desktop enclosure
- MVME147S-1 (25 MHz, 4Mb DRAM) with 68882 and MVME712A/MVME712B
- MVME863 104Mb SCSI Winchester Disk Drive (3½ in.)
- MVME855 155Mb SCSI Streaming Tape Drive (3½ in.)

Configuration SYS3204NY105 includes the following components.

- 3-slot desktop enclosure
- MVME147S-1 (25 MHz, 4Mb DRAM) with 68882 and MVME712A/MVME712B
- MVME863 104Mb SCSI Winchester Disk Drive (3½ in.)
- MVME853 150Mb SCSI Streaming Tape Drive (5¼ in.)

Configuration SYS3208NY103 includes the following components.

- 3-slot desktop enclosure
- MVME147SA-1 (25 MHz, 8Mb DRAM) with 68882 and MVME712A/MVME712B
- MVME863 104Mb SCSI Winchester Disk Drive (3½ in.)
- MVME855 155Mb SCSI Streaming Tape Drive (3½ in.)

Configuration SYS3208NY105 includes the following components.

- 3-slot desktop enclosure
- MVME147SA-1 (25 MHz, 8Mb DRAM) with 68882 and MVME712A/MVME712B
- MVME863 104Mb SCSI Winchester Disk Drive (3½ in.)
- MVME853 150Mb SCSI Streaming Tape Drive (5¼ in.)

System Components

VMEmodules that use the VMEbus backplane in the system 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 #	DESCRIPTION	VME SLOTS USED	MAX. IN SYSTEM	INITIAL REV. LEVEL
MVME147RF	68030 16 MHz Processor w/4Mb DRAM	1	1	01-W3520B21D
MVME147S-1	68030 25 MHz Processor w/4Mb DRAM	1	1	TBD
MVME147SA-1	68030 25 MHz Processor w/8Mb DRAM	1	1	TBD
MVME224-1	4Mb DRAM Memory Module	1	2	01-W3500B01D
MVME224-2	8Mb DRAM Memory Module	1	2	01-W3500B02D
MVME332XT	8-port Serial/Parallel Controller	1	2	01-W3475B01 RevK
MVME333	Intelligent WAN Controller for SNA or BSC	1	2	TBD
MVME333X25	X.25 Controller	1	1	TBD
MVME335	Serial and Parallel I/O Module	1	1	01-W3530B02A
MVME336	DeltaLink Controller	1	1	TBD
MVME374	Ethernet LAN Controller	1	2	TBD

SYSTEM HARDWARE OVERVIEW

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
MVME332PA1	Single Parallel Port	MVME332XT	1
MVME705B	3-Port Serial Transition Board	MVME333/MVME333X25	1
MVME710	Serial Port Transition Board	MVME332XT	2
MVME712A	Serial 4-Port Transition Board	MVME147	1
MVME712B	Ethernet/SCSI Adapter	MVME147	1
MVME715P	4-Port Serial Transition Board	MVME335	2
MVME732	Remote Service Modem	None; connect to MVME712A	0
MVME751	Serial Port Transition Board	MVME336	2

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Disk and tape drives that can be configured in the system are listed in Table 5-3. Configuration information is given in Appendix E.

Table 5-3. Disk and Tape Drives

PART NUMBER	DESCRIPTION	PERIPHERAL SLOTS USED	MAXIMUM IN SYSTEM
MVME853	150Mb SCSI Streaming Tape Drive (5¼ in.)	1 half-height	1
MVME855	155Mb SCSI Streaming Tape Drive (3½ in.)	1 half-height	1
MVME862	48Mb SCSI Winchester Disk Drive (3½ in.)	1 half-height	2
MVME863	104Mb SCSI Winchester Disk Drive (3½ in.)	1 half-height	2
MVME884	1-4Mb SCSI Diskette Drive (3½ in.)	1 half-height	1

Table 5-4. Optional Accessories

PART NUMBER	DESCRIPTION
MVME952AFO	3-slot Air Filter Option
MVMECBLSA2	2 ft DB9 to DB25 Serial Adapter Cable
MVMECBLT25	25 ft DB9 to DB25 Terminal Cable
MVMECBLCP25	25 ft DB25 to Centronics Printer Cable
MVMECORDUK	British Power Cord
MVMECORDFRG	German Power Cord

Module Placement

The position of boards in the system's card cage is shown in Table 5-5. The numerical references given for each slot for a given board designate the preferred positions for that board. The listing of modules in Table 5-5 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 5-5. VMEmodule Positions in 3-Slot Backplane

SLOT		1	2	3
1	MVME147	1st	/	/
2	1st MVME224-2	/	1st	2nd
3	2nd MVME224-2	/	/	1st
4	1st MVME224-1	/	1st	2nd
5	2nd MVME224-1	/	/	1st
6	1st MVME332XT	/	1st	2nd
7	2nd MVME332XT	/	/	1st
8	MVME374	/	1st	2nd
9	1st MVME333	/	1st	2nd
10	2nd MVME333	/	/	1st
11	MVME333X25	/	1st	2nd
12	MVME335	/	1st	2nd
13	MVME336	/	1st	2nd
NOTE: Slot 1 is the bottom slot.				

Install filler panels in empty slots for proper cooling. Preferred positions for modules in the rear panel are shown in Table 5-6.

Table 5-6. Module Positions in Rear Panel

SLOT	6	5	4	3	2	1
1 MVME712A/147	/	/	/	/	/	1st
2 MVME712B/147	/	/	/	/	1st	/
3 MVME332PA1/332XT	/	/	/	2nd	1st	/
4 1st MVME710/332XT	/	2nd		1st		/
5 2nd MVME710/332XT	/	1st		/	/	/
6 MVME374T/374	5th	4th	3rd	2nd	1st	/
7 1st MVME705B/333	5th	4th	3rd	2nd	1st	/
8 2nd MVME705B/333	4th	3rd	2nd	1st	/	/
9 MVME715P/335	5th	4th	3rd	2nd	1st	/
10 MVME751/336	/	2nd		1st		/

Device Names

Device names are assigned to the disk drives for the system according to the conventions described in **intro(7)** of the SYSTEM V/68 Release 3 *System Administrator's Reference Manual* and Appendix A of the SYSTEM V/68 Release 3 *System Administrator's Guide*. The naming convention described in **intro(7)** creates separate subdirectories under **/dev** for each type of disk or tape device.

MVME147RF Processor

The MVME147RF microcomputer board is a double-high VME module. The module has high functionality with large onboard shared RAM, serial ports, and a Centronics printer port. The module provides a SCSI bus controller with DMA, floating point processor, and time-of-day clock/calendar with battery backup.

Table 5-7. MVME147RF Jumper Settings

HEADER	DESCRIPTION	SETTING
J3	64K x 8 ROM/PROM/EPROM	2-4, 3-5, 6-8, 13-15, 14-16
J4	64K 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	1-2
J8	Factory Use Only	3-4
J9	Clock Configuration-receives RTXC4	2-3
J10	Clock Configuration-drives TRXC4	1-2

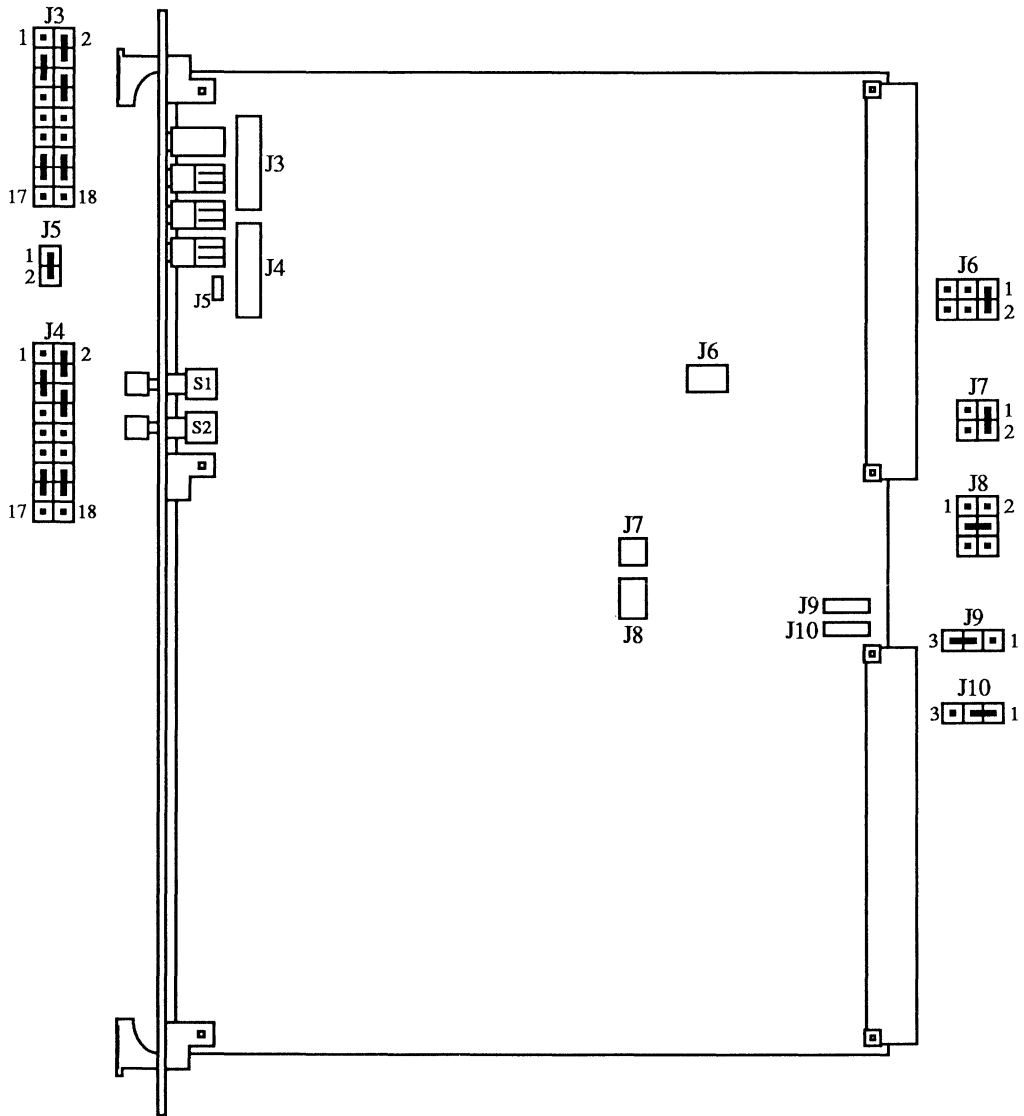


Figure 5-1. MVME147RF Jumper Header Locations

MVME147S/A Processor

The MVME147S/A microcomputer board is a double-high VME module with large onboard shared RAM, serial ports, and a 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.

Table 5-8. MVME147S/A Jumper Settings

HEADER	DESCRIPTION	SETTING
J1	ROM Configuration Select	2-4, 3-5, 6-8, 13-15, 14-16
J2	ROM Configuration Select	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	1-2
J8	Serial Port 4 Clock Configuration Select	2-3
J9	Serial Port 4 Clock Configuration Select	1-2

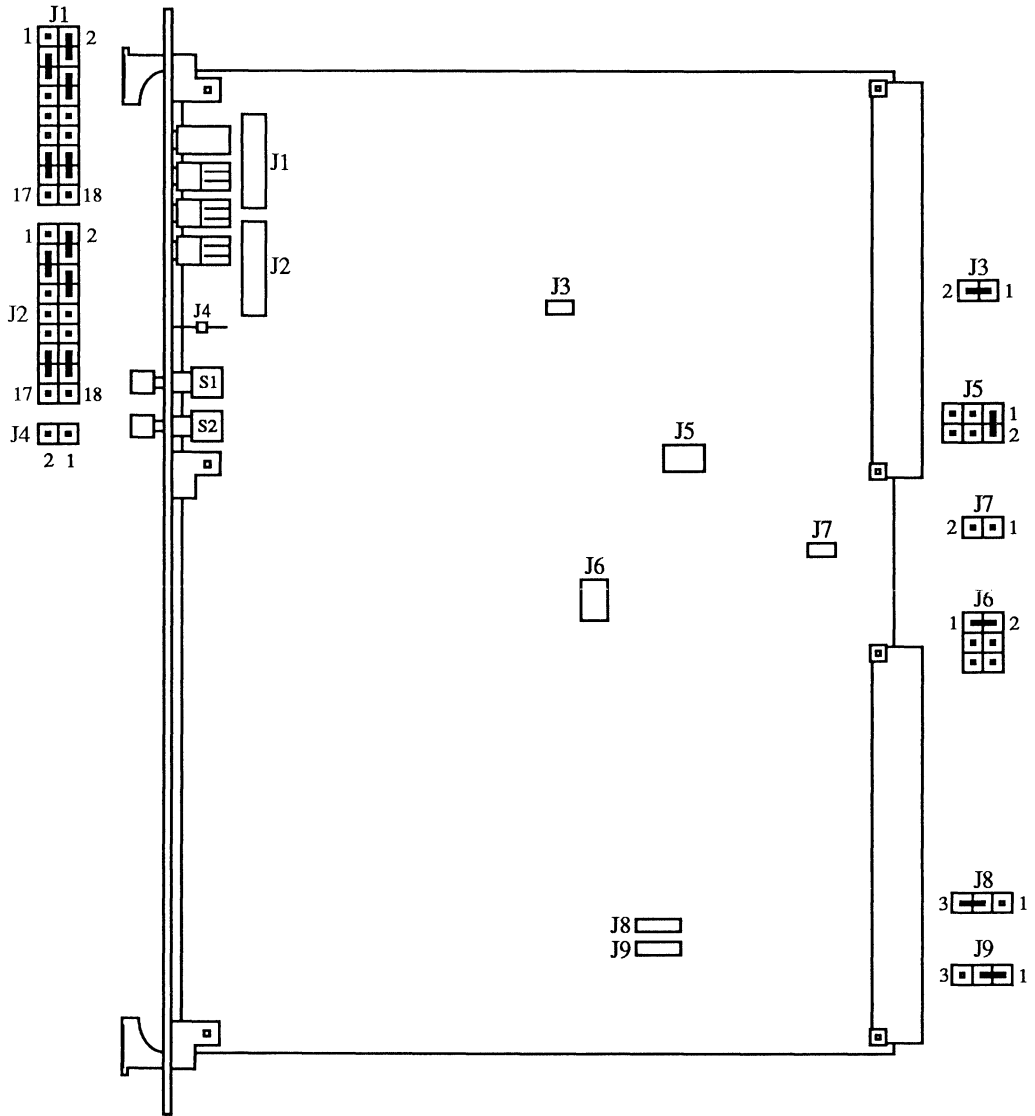


Figure 5-2. MVME147S/A Jumper Header Locations

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.

Table 5-9. 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

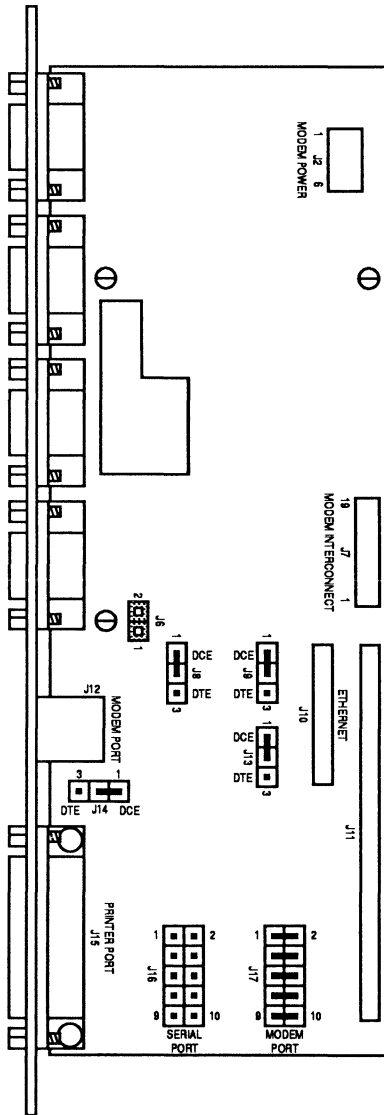


Figure 5-3. MVME712A Jumper Header Locations

MVME712B Ethernet/SCSI Adapter Module

The MVME712B is used in conjunction with the MVME712A for external SCSI and/or Ethernet connections.

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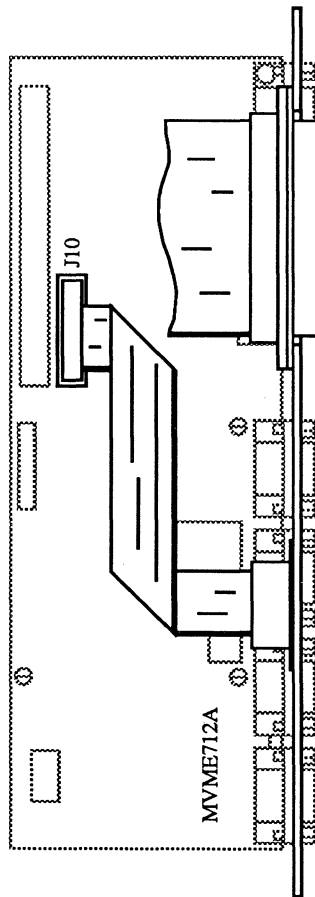


Figure 5-4. MVME712B Adapter Module

MVME732 Remote Service Modem

The MVME732 modem 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.

MVME224 Memory Module

The MVME224-1 (4Mb) and MVME224-2 (8Mb) memory modules are high performance dynamic memory modules. 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 1-megabyte boundary through the VMEbus and VSB address space, command and status register, and transparent refresh support.

Table 5-10. MVME224 Jumper Settings

HEADER	DESCRIPTION	SETTING
J3	Factory Jumper	1-2
J4	VMEbus Lock	No Jumper
J5	Read Cycle Access (No Cache)	No Jumper

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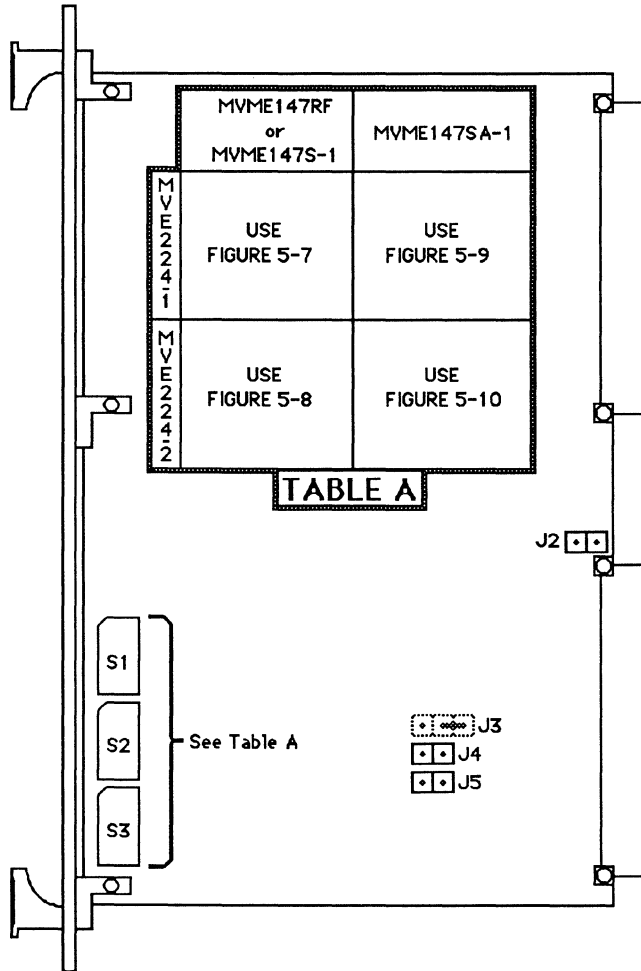


Figure 5-6. MVME224 Jumper Header Locations

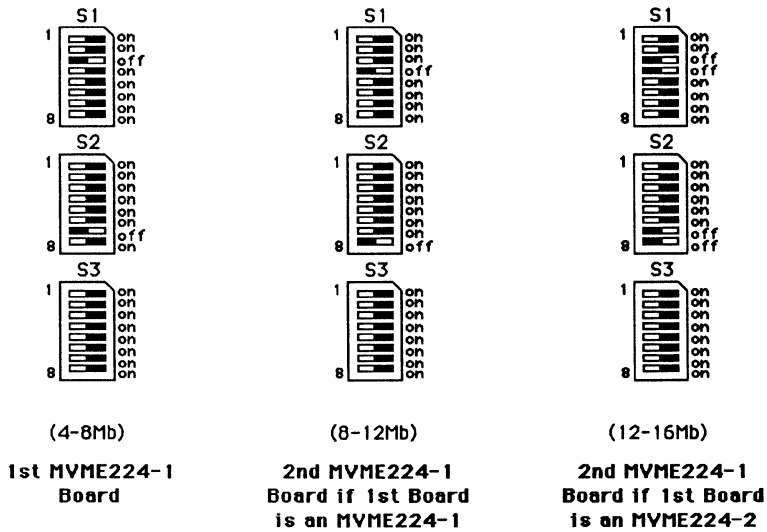


Figure 5-7. MVME224-1 Switch Settings with the MVME147RF or MVME147S-1

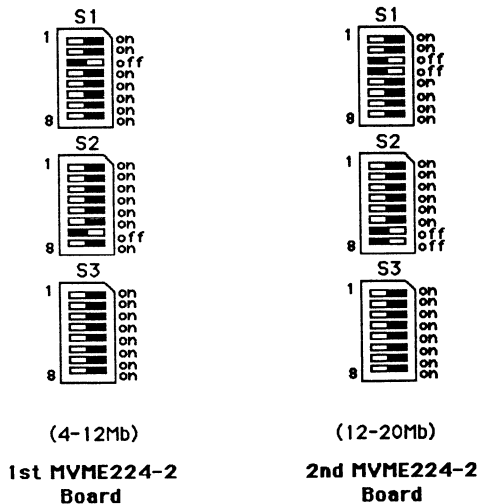


Figure 5-8. MVME224-2 Switch Settings with the MVME147RF or MVME147S-1

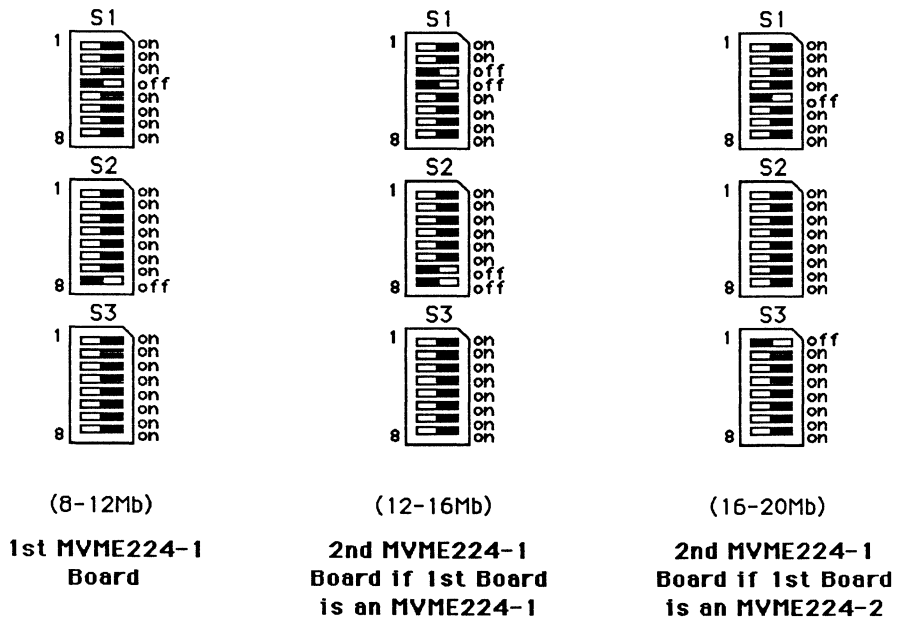


Figure 5-9. MVME224-1 Switch Settings with the MVME147SA-1

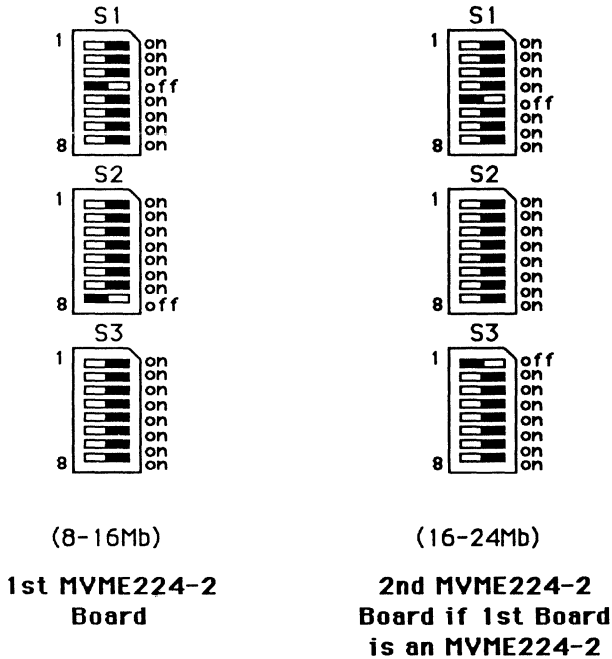


Figure 5-10. MVME224-2 Switch Settings with the MVME147SA-1

MVME332XT High Performance Serial I/O Controller

The MVME332XT Serial I/O Controller is a double-high VME module 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 Eight 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.

Table 5-11. 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 S1 (1st 332XT board)	Base Address S1-1 ON S1-2 OFF S1-3 OFF S1-4 OFF	S1-5 OFF S1-6 ON S1-7 ON S1-8 ON
Switch S1 (2nd 332XT board)	Base Address S1-1 ON S1-2 OFF S1-3 OFF S1-4 OFF	S1-5 OFF S1-6 ON S1-7 ON S1-8 OFF
Switch S2	Firmware Mode	S2-1 OFF S2-2 OFF S2-3 ON S2-4 ON

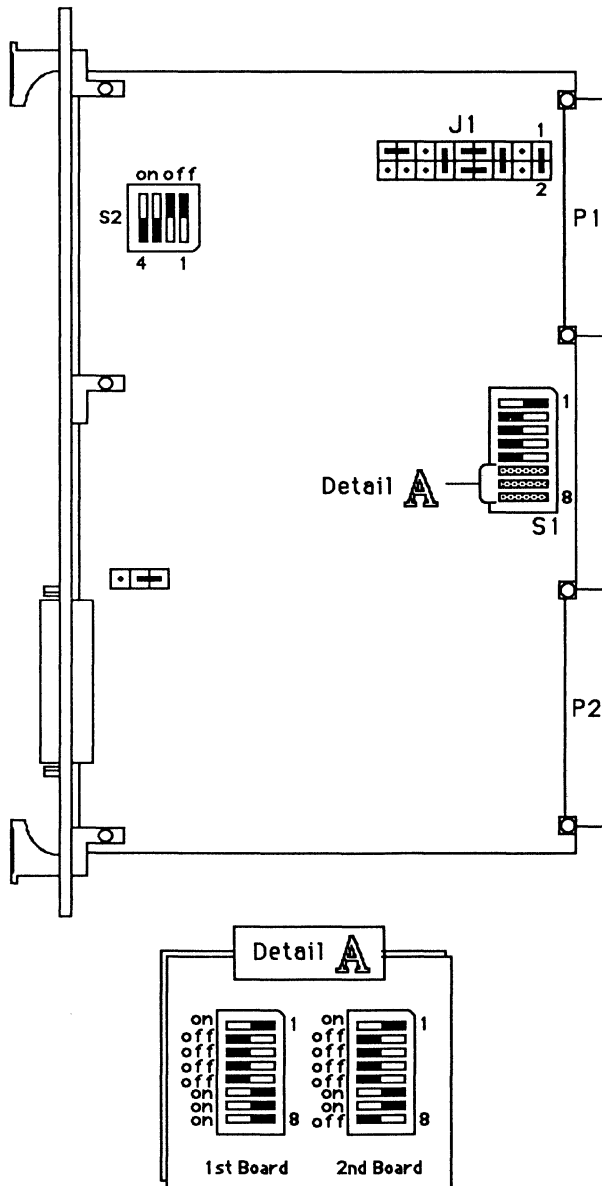


Figure 5-11. MVME332XT Jumper Header and Switch Locations

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.

In this system, all eight ports (J1 through J8) of the MVME710 are configured DTE to use the Motorola RS-232C cross-over cable as shown in the figure. To connect for DCE, move the associated jumpers to the header shown as "No Jumpers" in the table below.

Table 5-12. 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

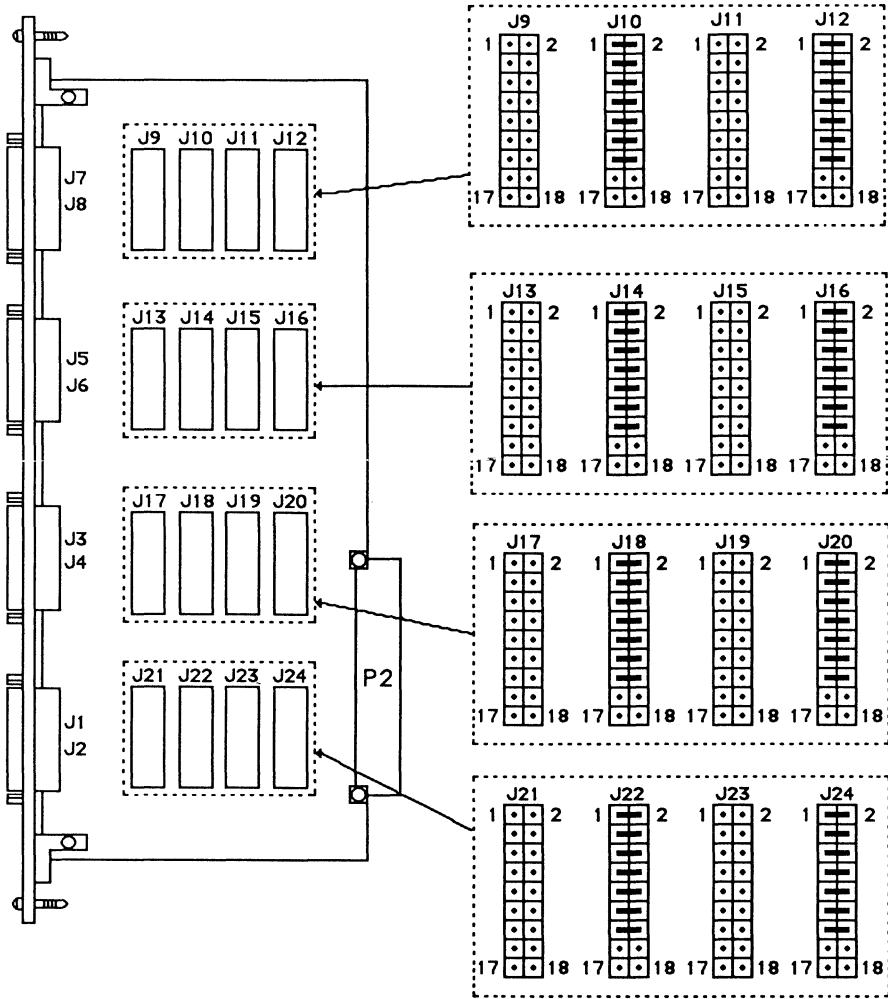


Figure 5-12. MVME710 Jumper Header Locations (DTE)

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 MVME705B 3-Channel Serial Transceiver Module, which is connected via ribbon cable with the lower rear connector of the MVME333 module.

Table 5-13. 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

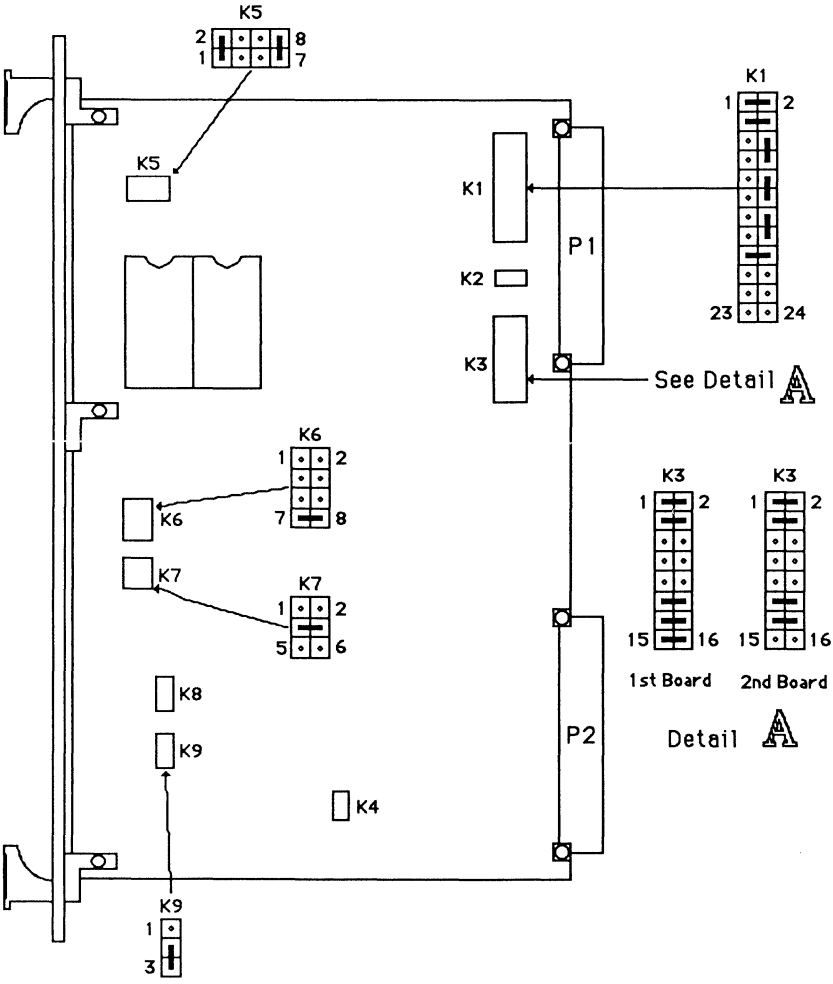


Figure 5-13. MVME333 Jumper Header Locations

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 includes an MVME705B Serial Transceiver Module which provides three serial ports.

Table 5-14. 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

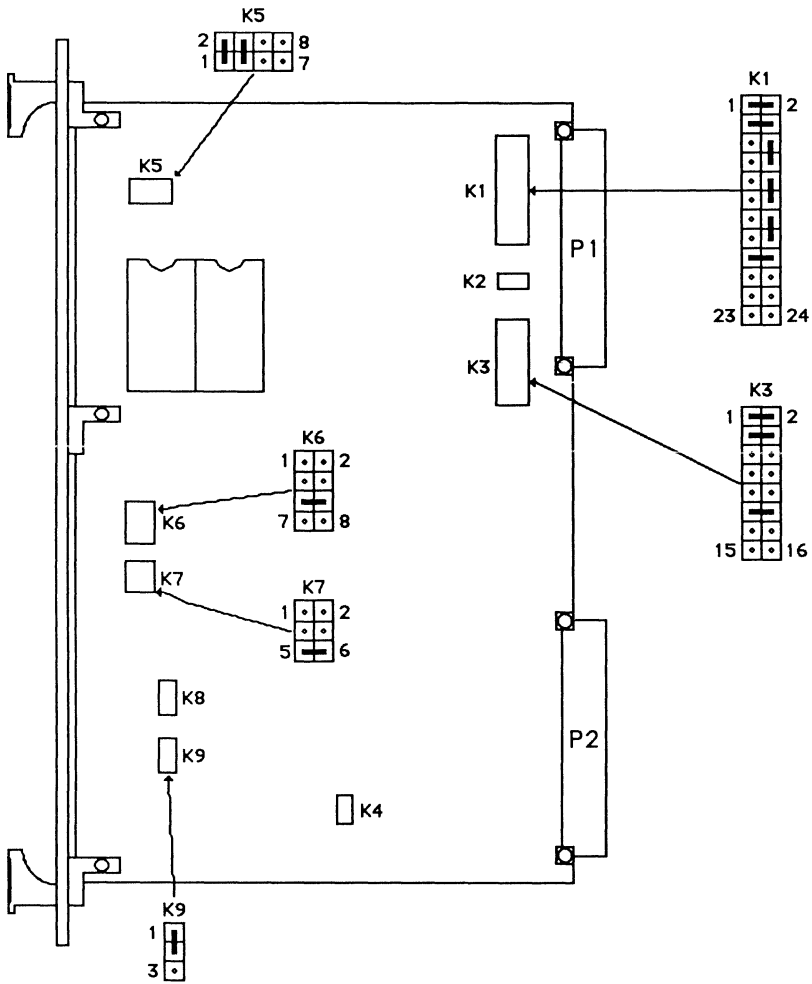


Figure 5-14. MVME333X25 Jumper Header Locations

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 5-15. MVME705B Jumper Settings

HEADER	DESCRIPTION	SETTING
MODEM		
K4, K5, K6,	DTE for connect to modem.	1-2, 5-6

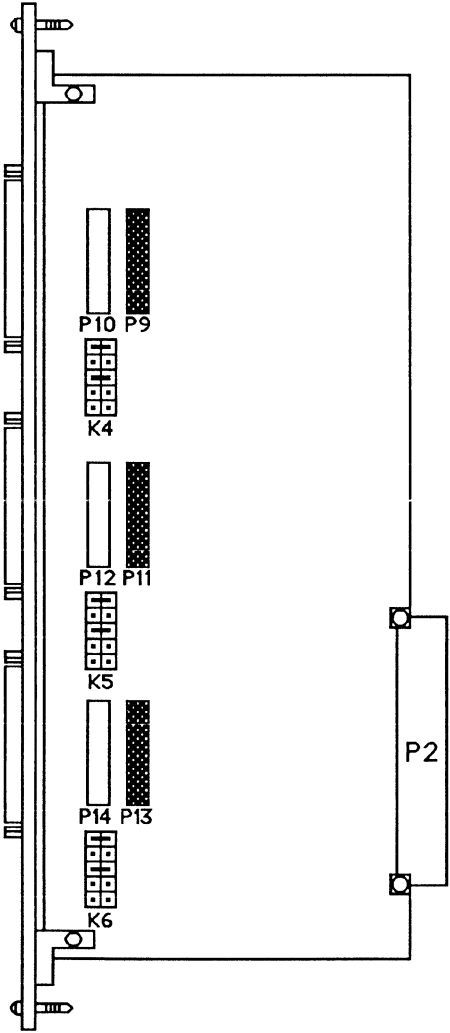


Figure 5-15. MVME705B for Connection to Terminal

MVME335 Serial and Parallel I/O Module

The MVME335 provides the interface for four asynchronous serial communication devices and a parallel printer to the system. A 24-bit timer and two 16-bit timers support generation of periodic or single interrupts after elapsed periods of time. The VMEbus interface complies with all requirements for the signal driver/receiver characteristics and bus protocols, as specified in the VMEbus Specification Rev. C. The module responds to address modifier codes for short non-privileged and supervisory access and the module base address is jumper-configurable in increments of 256 bytes.

A Centronics type printer can be connected via the MVME715P transition board. The serial I/O signal lines are at RS-232C voltage levels and are available on the four connectors.

Table 5-16. MVME335 Jumper Settings

HEADER	DESCRIPTION	SETTING
K3	Base Address	1-2, 3-4, 9-10, 15-16
K4	DUART Interrupt Level (1-7)	5-6
K5	PI/T Port Interrupt Level (1-7)	3-4
K6	PI/T Timer Interrupt Level (1-7)	1-2
K7	Factory Setting	1-2
K8	Factory Setting	1-2
K9	Factory Setting	1-2
K10	Factory Setting	1-2

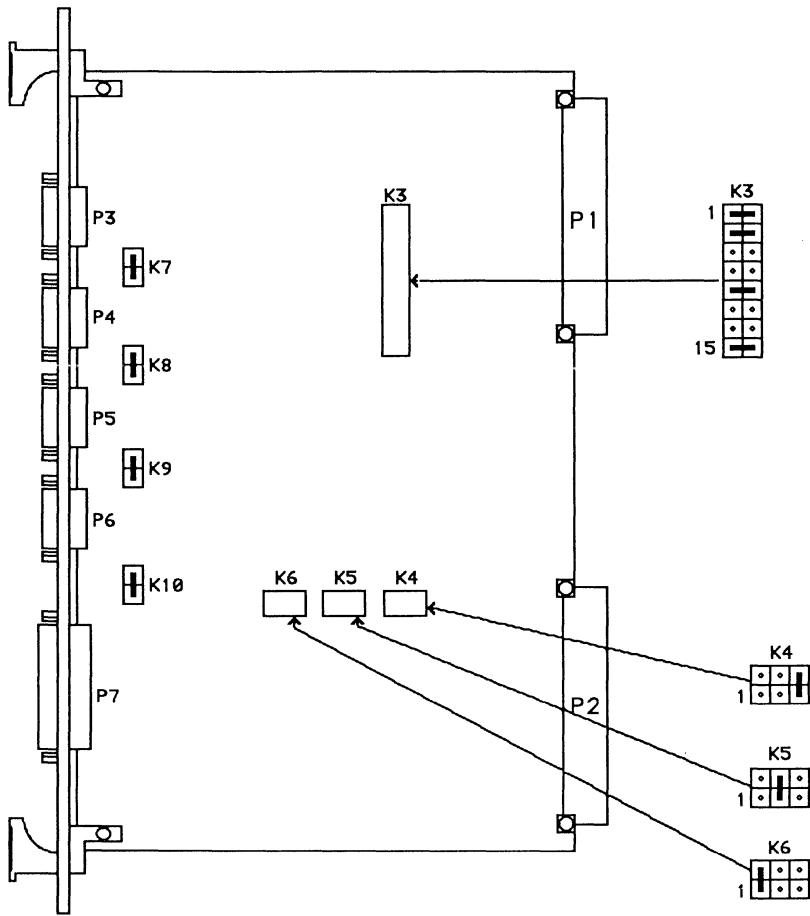


Figure 5-16. MVME335 Jumper Header Locations

MVME715P Asynchronous Serial/Parallel Printer Transition Board

The MVME715P provides an adapter between the serial I/O cable connector, parallel printer, and the MVME335 serial and parallel I/O module.

In this system, all four serial ports are configured DTE for modem connection.

Table 5-17. MVME715P Jumper Settings

HEADER	DESCRIPTION	SETTING
J5	DCE/DTE Select	No Jumpers
J6	DCE/DTE Select	No Jumpers
J7	DCE/DTE Select	No Jumpers
J8	DCE/DTE Select	No Jumpers
J9	DCE/DTE Select	1-2, 3-4, 5-6, 7-8, 9-10, 11-12, 13-14
J10	DCE/DTE Select	1-2, 3-4, 5-6, 7-8, 9-10, 11-12, 13-14
J11	DCE/DTE Select	1-2, 3-4, 5-6, 7-8, 9-10, 11-12, 13-14
J12	DCE/DTE Select	1-2, 3-4, 5-6, 7-8, 9-10, 11-12, 13-14
J13	No Jumper	

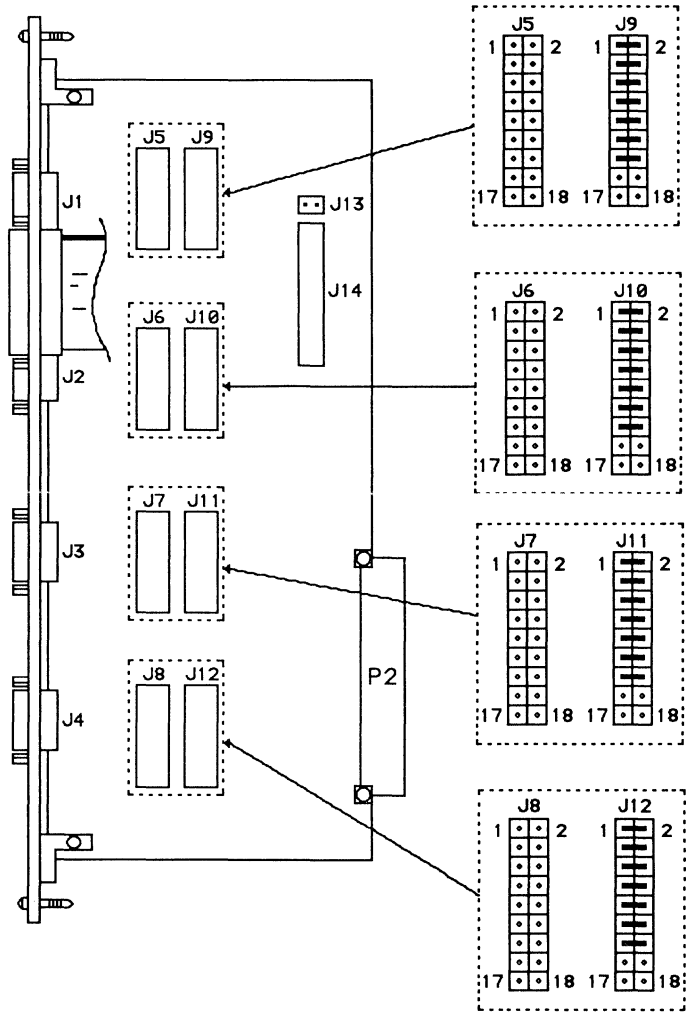


Figure 5-17. MVME715P Jumper Header Locations

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.

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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

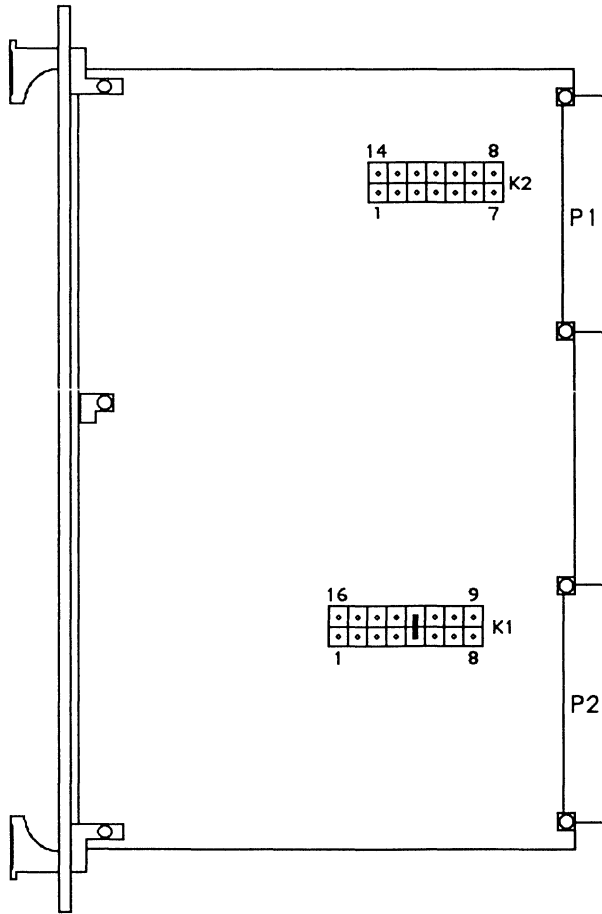


Figure 5-18. MVME336 Jumper Header Locations

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.

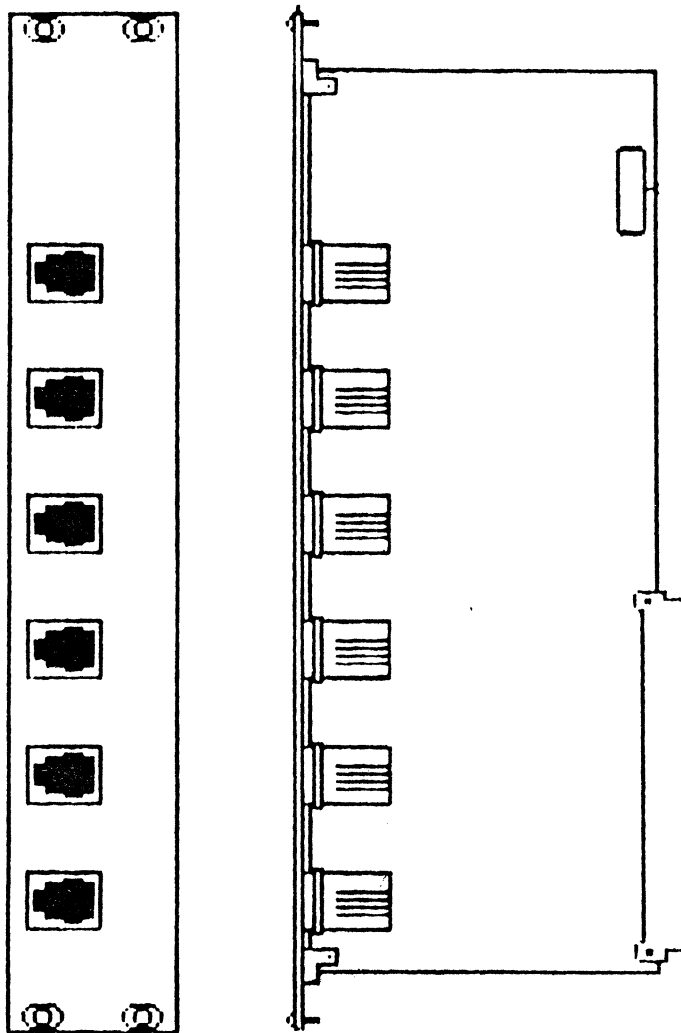


Figure 5-19. MVME751 Connector Locations

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.

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 (1st Board)	1-2, 9-10, 11-12, 13-14, 15-16
	(2nd Board)	1-2, 9-10, 11-12, 13-14
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

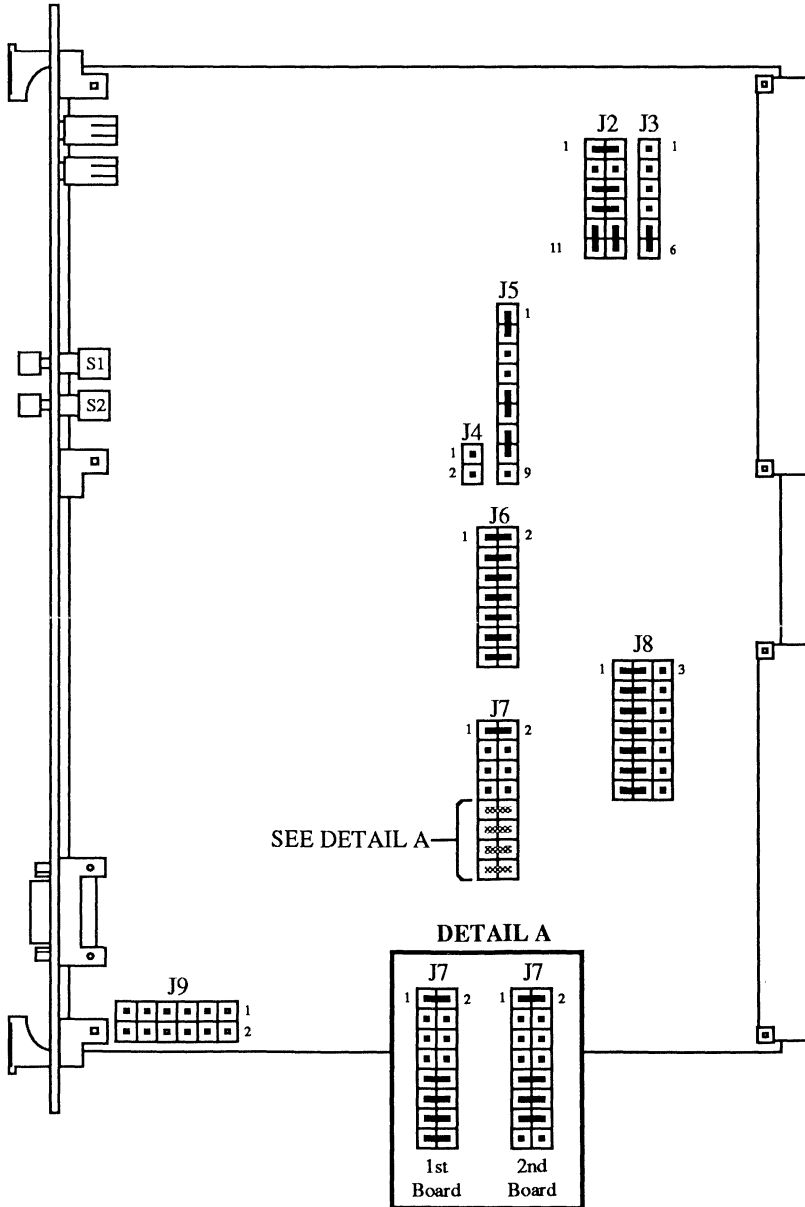


Figure 5-20. MVME374 Jumper Header Locations

SYSTEM HARDWARE OVERVIEW

5

APPENDIX A

BOOTING VERSAdos

The following information contains procedures for booting VERSAdos from a Model 3200 System (via streaming tape). Additional information concerning the VERSAdos utilities can be found in the *VERSAdos System Facilities Reference Manual*, M68KVSF.

1. Insert the VERSAdos boot tape into the tape drive.
2. Reset the system and within a few seconds enter **h** to halt the automatic sequence. A short menu displays on the screen.
3. Select the firmware debugger by typing **3**.
4. Modify the environment for VERSAdos by entering the environment command, **env**.

```
Bug or System environment [B,S] = S? <cr>
SYSTEM V/68 or VERSAdos operating system [S,V] = S? (V)
Execute/Bypass SST Memory test [E, B] = B? <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>
```

5. Boot from the tape:
BO 4,0,VME147T..
6. Log onto VERSAdos, specifying **RAM:0** as the default volume. Enter the date and time.
7. Initialize the hard disk:

```
INIT #HD00;V
```

The volume name to be assigned to the disk should be **SYS**. There are several questions to be answered when using the **INIT** utility. One of these is whether to format or not. You must answer yes (**Y**) to this question.

It takes approximately ten minutes to format a disk.

BOOTING VERSAdos

8. Copy the files from the boot tape to volume **SYS** as follows:

```
LOADVDOS.CF TZ40,SYS
```

9. Remove the tape and copy the file **SYS:0.VME147.VERSADOS.SY** to the null catalog in order to simplify booting:

```
COPY SYS:0.VME147.VERSADOS.SY,SYS:0.&..;B
```

10. At this point, all files have been copied onto volume **SYS**, which is now bootable. Reset the system and VERSAdos should boot automatically. Log onto volume **SYS** and enter the date and time.

A

APPENDIX B

SYSTEM SPECIFICATIONS

Table B-1. Model 3200 Enclosure Specifications

Dimensions	
Height	6.4 in. (16.26 cm)
Depth	17.0 in. (43.18 cm)
Width	17.0 in. (43.18 cm)
Weight (typical)	45 lbs. (20.5 kg)
Temperature	
	+5° to +35° C (operating) -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 Specifications	
	Input Voltages (auto-ranging): 90 to 132 Vac; 180 to 264 Vac Input Frequency: 47Hz to 63Hz Output Current: +5 VDC @ 20A; +12 VDC @ 5A (8A peak) -12 VDC @ 1A (2A peak) Output Power: 175W continuous (220W peak)
Transportation, packaged	
	Packaging and shipping containers and procedures comply with the current NSTA preship test procedures.
Electrostatic Discharge	
No observable effect	5,000 volts
No operator-perceived errors	12,000 volts
No permanent damage	24,000 volts
Acoustic Noise	
	45 dBA maximum
Emissions	
	The system less external peripherals, meets the Class B emission limits specified by the FCC rules per Part 15, Subpart J Meets VDE 0871/6.78, Class B
Safety	
	Meets UL 478 (EDP) Meets CSA 220 (EDP) Meets VDE 0806/8.81, IEC 380, and IEC 950

B

SYSTEM SPECIFICATIONS

Table B-2. Controller Specifications

CONTROLLER TYPE	INTERFACE	NUMBER OF CHANNELS/DRIVES AS EMPLOYED	TRANSFER RATE (per second)
SCSI Bus Interface	SCSI	7	Up to 4Mb Sync Up to 1.5Mb Async
Terminal/Printer Interface	RS-232C	4	Up to 9.6Kbits
	Parallel	1	Up to 300 lpm
8-Port Serial	RS-232C	8	Up to 38.4Kbits
	Parallel	1	Up to 2000 lpm
WAN	RS-232C	2	Up to 19.2Kbits
X.25 Comm.	CCITT X.21bis	2	Up to 64Kbits
Ethernet CSMA/CD	IEEE 802.3	1	10Mbits

B

Table B-3. Mass Storage Devices

FORM-FIT	INTERFACE	FORMATTED CAPACITY	AVERAGE ACCESS TIME	DRIVES PER SYSTEM
Disk Drives				
3-1/2"	SCSI	48Mb	28.0 ms	2
3-1/2"	SCSI	104Mb	15.0 ms	2
3-1/2"	SCSI	2.9Mb	94.0 ms	1
Tape Drives				
3-1/2"	SCSI	155Mb		1
5-1/4"	SCSI	150Mb		1

Table B-4. VME module Space and Power Requirements

VME module	SPACE REQUIRED	POWER REQUIREMENTS
MVME147RF	Single slot	+5 Vdc @ 7.0A
	Double-high VME standard	+12 Vdc @ 1.0A
MVME147S-1	Single slot	+5 Vdc @ 7.0A
	Double-high VME standard	+12 Vdc @ 1.0A
MVME147SA-1	Single slot	+5 Vdc @ 7.0A
	Double-high VME standard	+12 Vdc @ 1.0A
MVME224-1/2	Single slot	+4.75 to 5.25 Vdc @ 5A max.,
	Double-high VME standard	3.9A typ.
MVME332XT	Single slot	+5 Vdc @ 4.5A
	Double-high VME standard	+12 Vdc @ 100mA max., 50mA typ. -12 Vdc @ 100mA max., 50mA typ.
MVME333	Single slot	+5 Vdc @ 3.8A
	Double-high VME standard	±5%
MVME333X25	Single slot	+5 Vdc @ 3.8A
	Double-high VME standard	±5%
MVME335	Single slot	+5 Vdc @ 1.1A
	Double-high VME standard	+12 Vdc @ 75mA max., 55mA typ. -12 Vdc @ 75mA max., 55mA typ.
MVME374	Single slot	+5 Vdc @ 4.5A typ., 4.9A max.
	Double-high VME standard	+12 Vdc @ 360mA typ., 400mA max. -12 Vdc @ 40mA typ., 50mA max.
MVME705B	Single slot	+5 Vdc @ .5A max., 0.2-1.0A typ.
	Double-high VME standard	+12 Vdc @ 150mA max., 0-110mA typ. -12 Vdc @ 150mA max., 0-110mA typ.
MVME710	Double slot	0 power
	Double-high VME standard	
MVME712A	Single slot	0 power
	Double-high VME standard	
MVME712B	Single slot	0 power
	Double-high VME standard	
MVME715P	Double slot	0 power
	Double-high VME standard	
MVME732	2.75" x 3.5". Not a standard VME module.	+5 Vdc @ 100mA max.
		+12 Vdc @ 25mA max.
		-12 Vdc @ 25mA max.
MVME751	Double slot	0 power
	Double-high VME standard	



SYSTEM SPECIFICATIONS

B

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 #	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.

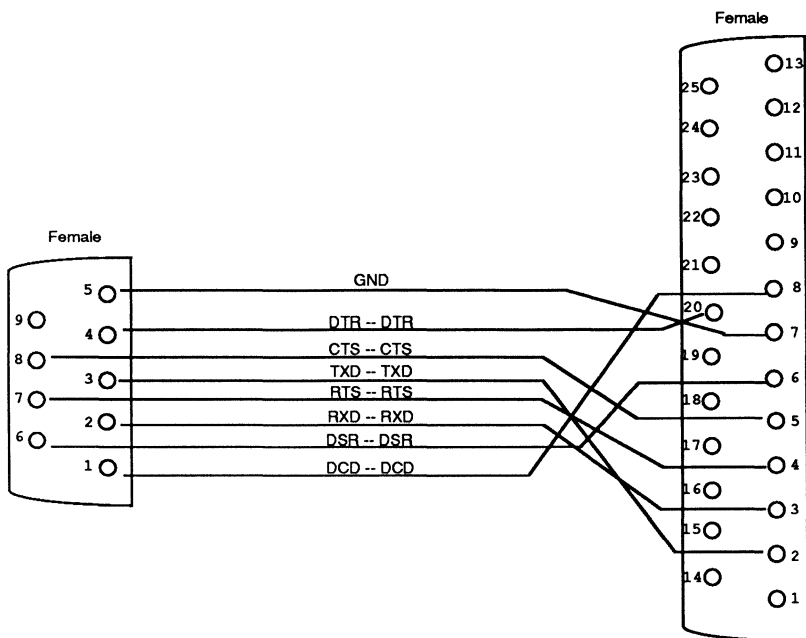


Figure C-1. MVMECBLSA2 DB9 to DB25 Serial Adapter Cable

PERIPHERAL CABLES

The following figure illustrates the pinouts for the 25 ft DB9 to DB25 terminal cable.

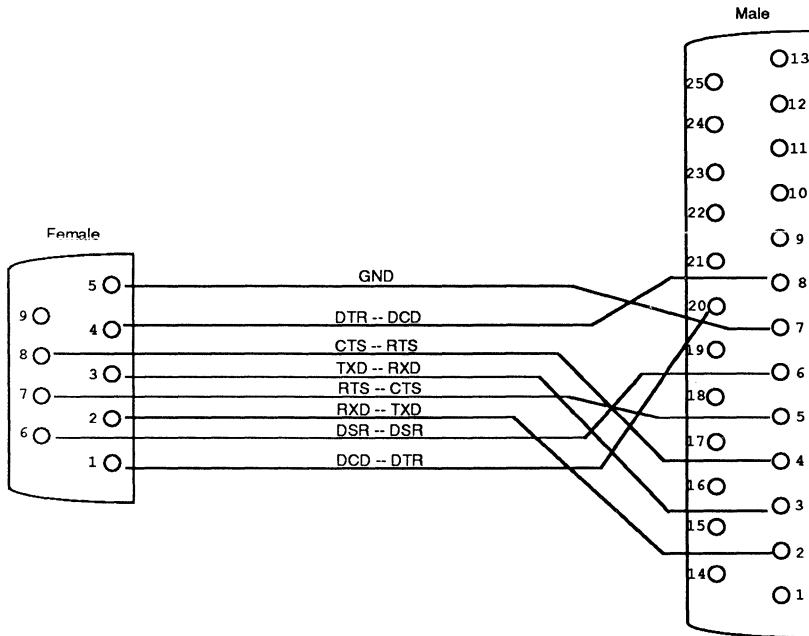


Figure C-2. MVMECBLT25 DB9 to DB25 Terminal Cable

PERIPHERAL CABLES

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



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 & 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.



PERIPHERAL CABLES

Table C-2. MVME712A RS-232C Connectors J1, J3 – J5 Interconnect Signals (cont'd)

PIN NUMBER	SIGNAL MNEMONIC	SIGNAL NAME & 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 & 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

PERIPHERAL CABLES

C

APPENDIX D

USING REMOVABLE MEDIA

Loading and Unloading a 5¼ inch Cartridge Tape

To load a 5¼ inch 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.

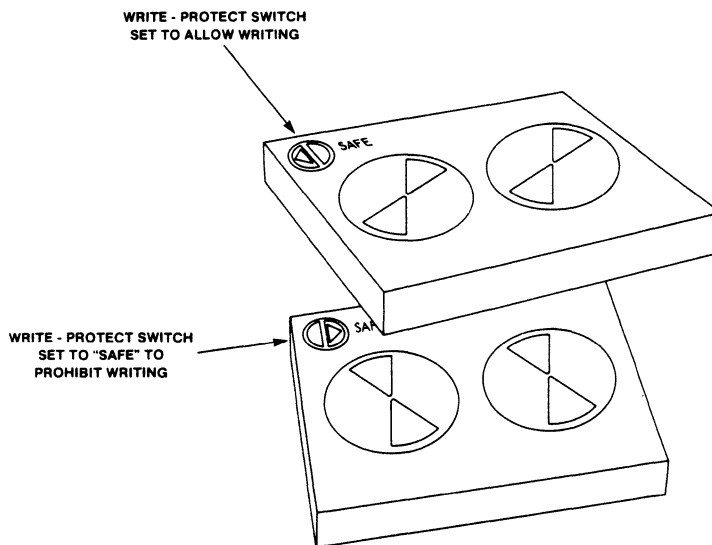


Figure D-1. Setting the Write-Protect Switch

USING REMOVABLE MEDIA

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.

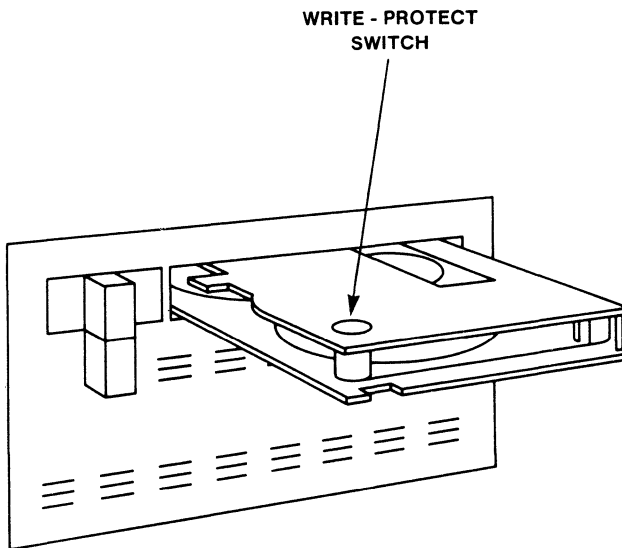


Figure D-2. Loading the 5¼ inch Cartridge Tape

To unload a 5¼ inch 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.

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.

USING REMOVABLE MEDIA

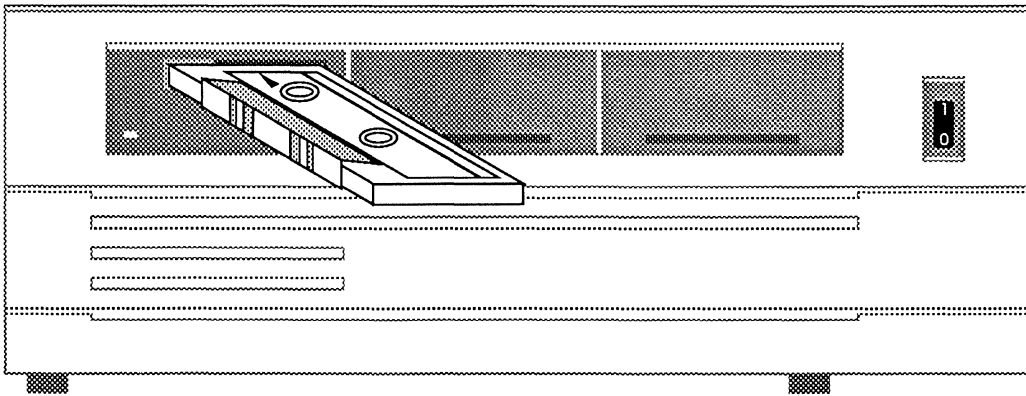


Figure D-3. Loading the 3½ inch Cartridge Tape

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.

Loading and Unloading a 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.
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.

USING REMOVABLE MEDIA

D

APPENDIX E

DISK DRIVE CONFIGURATION and PLACEMENT

This appendix describes the strapping of the supported disk and removable media drives. It is important to note that the information given applies to the way the drives should be configured for operation in the system.

MVME853 and MVME855 SCSI Streaming Tape Drives

The MVME853 (5¼ inch 150Mb) and MVME855 (3½ inch 155Mb) SCSI streaming tape drives should be configured as follows:

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

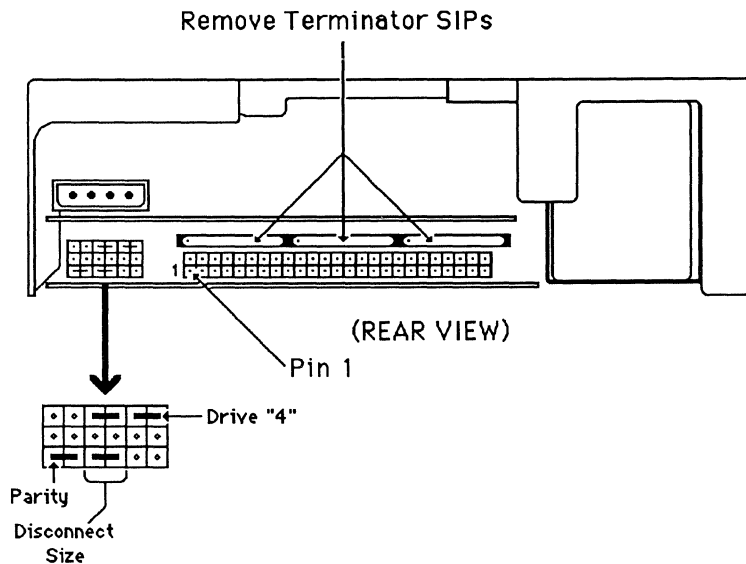


Figure E-1. MVME853 150Mb SCSI Streaming Tape Strapping

DISK DRIVE CONFIGURATION and PLACEMENT

E

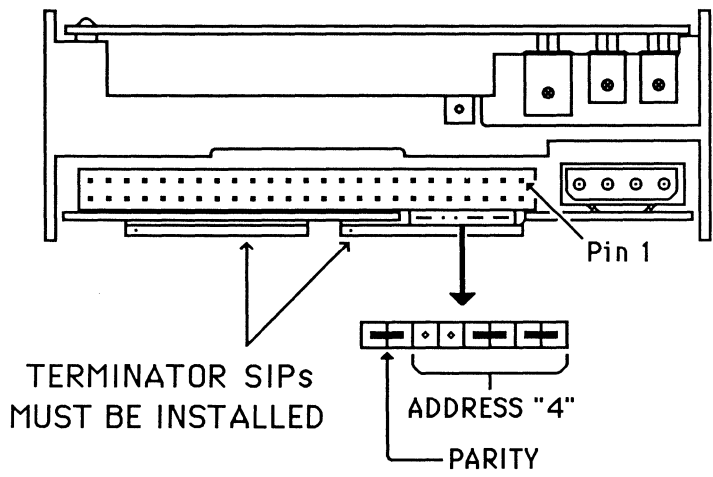


Figure E-2. MVME855 155Mb SCSI Streaming Tape Strapping

MVME862 and MVME863 SCSI Winchester Disk Drives

The MVME862 (3½ inch 48Mb) and MVME863 (3½ inch 104Mb) SCSI Winchester disk drives should be configured as follows:

1. Check the strapping of the SCSI disk drive according to the drawings below.
2. Connect the cables.

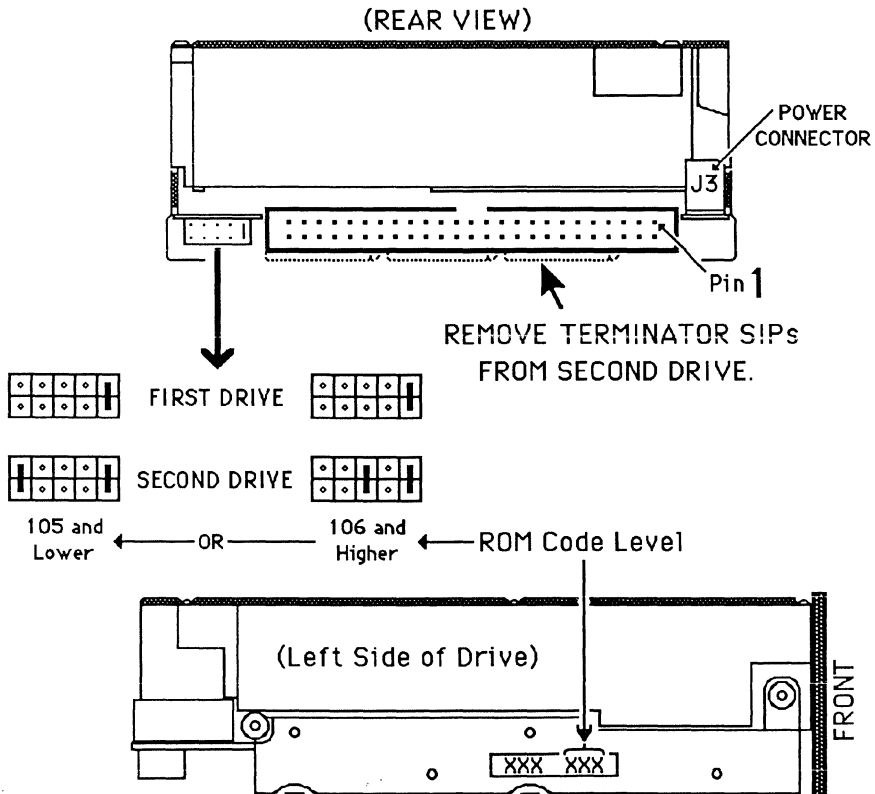
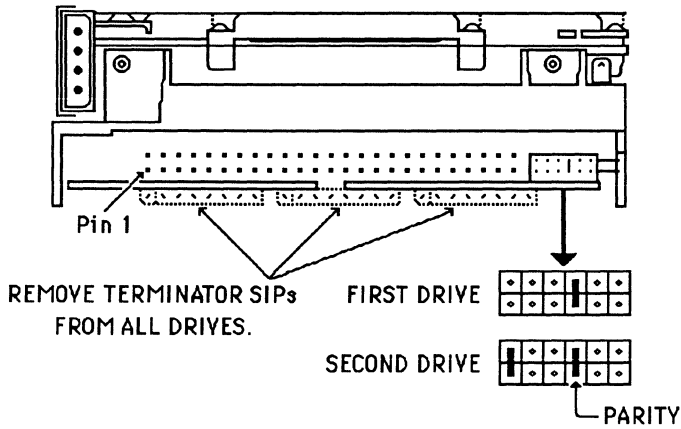


Figure E-3. MVME862 48Mb SCSI Winchester Strapping

DISK DRIVE CONFIGURATION and PLACEMENT



E

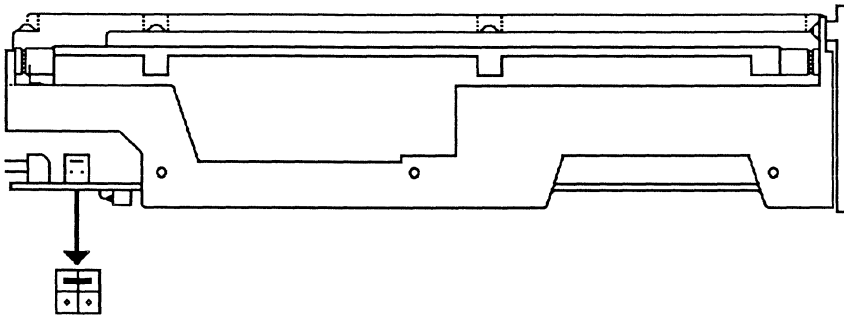


Figure E-4. MVME863 104Mb SCSI Winchester Strapping

DISK DRIVE CONFIGURATION and PLACEMENT

E

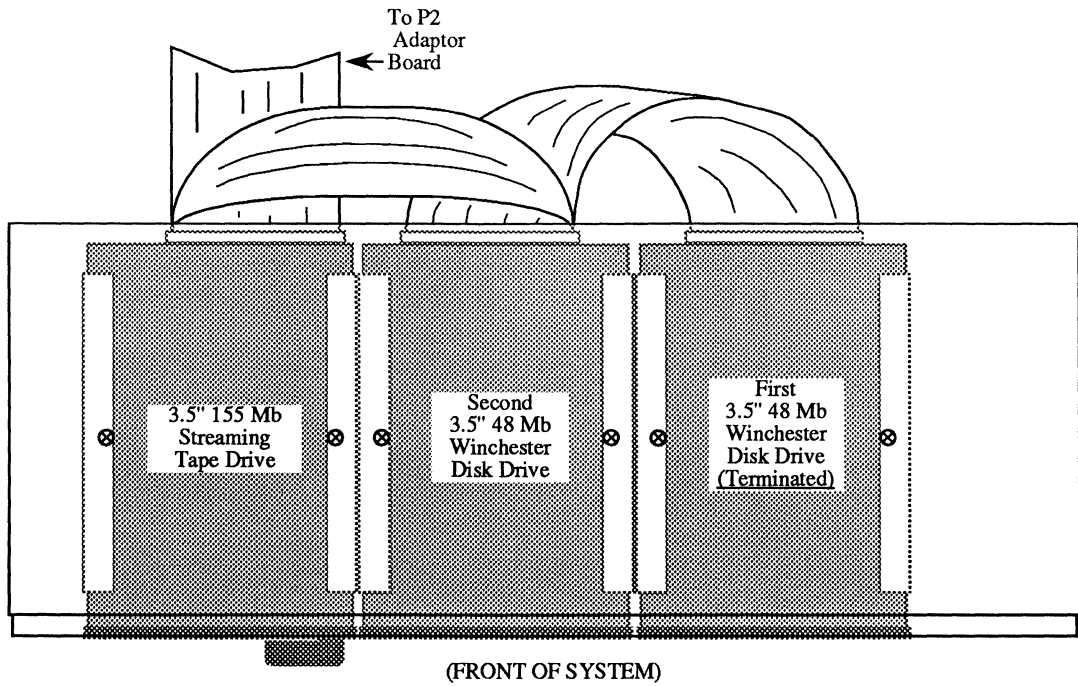
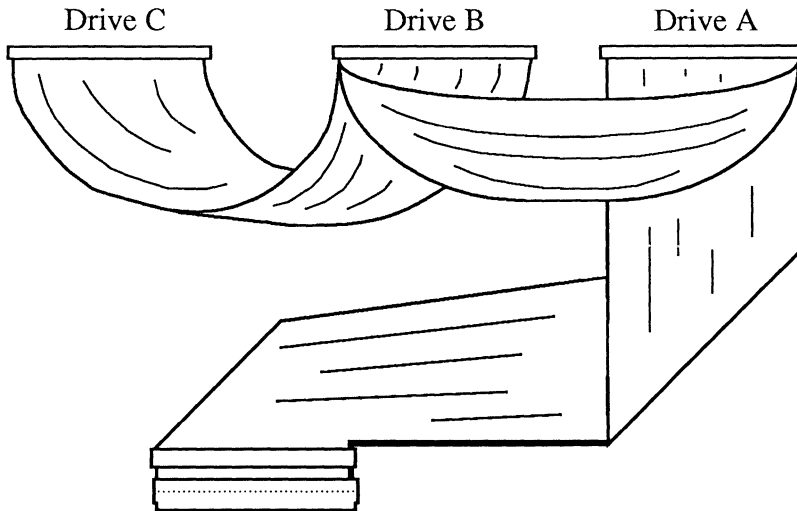


Figure E-6. Typical Drive Placement and Cabling

DISK DRIVE CONFIGURATION and PLACEMENT



Typical SCSI Drive Cable Folds

(Drive A is an MVME855
Drive B and C are MVME862)

Figure E-7. Typical SCSI Drive Cable Folds

E

DISK DRIVE CONFIGURATION and PLACEMENT

E

APPENDIX F PRINTERS

Printers must be set up or configured specifically for the system. This is done through the switch settings usually located on the front panel of the printer. This appendix lists the general hardware settings for many common printers, as well as the switch settings for Motorola-supplied printers. Additional information on configuring printers under SYSTEM V/68 can be found in the *System Administrator's Guide*.

Software instructions must be given to the system to complete the configuration so that the printer can work with the system. The software configuration instructions are found either in the *Software Release Guide* or in the installation manual for the software.

For unpacking instructions and detailed installation procedures, consult the manual that was supplied with the printer.

Printer Descriptions

Motorola versions and equivalent printers are listed below.

Table F-1. Motorola Equivalent Printers

MOTOROLA MODEL NUMBER	LP TYPE CODE	DESCRIPTION
PT235	pt39	60/142 cps, 132 column dot matrix
PT2100	pt37	40/220 cps, 80 column dot matrix
PT2200	pt38	40/220 cps, 132 column dot matrix
PT3401	pt34	50/200 cps, 132 column dot matrix
PT3501	pt35	55 cps daisy wheel
PT3604	pt36	Line printer
PT3607	pt43	Line printer
PT3610	pt44	Line printer
PT3615	pt45	Line printer
PT3620	pt46	Line printer
PT4000	pt40	8 ppm page printer
PT4010	pt41	8 ppm page Post Script printer

F

PRINTERS

In addition to the printers listed above, the following printers can be configured with a system for use with the Motorola Computer System's Life.Forms and Life.Plans software. Since there is no Motorola Computer System model number for these printers, you must use the LP type code when configuring these printers.

Table F-2. Additional Printer Codes

LP TYPE CODE	PRINTER DESCRIPTION
ptTJ	Hewlett-Packard ThinkJet
ptLJ	Hewlett-Packard LaserJet
ptPL	Hewlett-Packard 7475A Plotter
ptFX	Epson FX
ptLW	Apple LaserWriter

General Printer Setup Values

It may be required that other codes be set to specific values, depending on the printer manufacturer. Setting items listed below, however, will normally enable the basic functioning of a printer connected to the system.

- 9600 baud
- 8 data bits
- No parity bits
- 1 stop bit
- XON/XOFF buffer and printer status

Daisywheel Printers:

- 9600 baud
- 7 data bits
- Even parity
- 2 stop bits
- XON/XOFF buffer and printer status

If you are configuring a Diablo 630-compatible, non-Motorola supplied printer using the PT3001 model number, the system expects your printer to be set up as a Daisywheel printer.

Line Printer Baud Rate

When adding a line printer to your system via a serial port, be aware that the maximum print speed that can be achieved is dependent upon three factors: the baud rate that is used to transmit data to the printer, the average number of characters in each line, and the print band that is installed in the printer.

For example, a PT3604 with a 96-character print band can print at a rate of approximately 430 lines-per-minute. If your typical print job consists of print lines that have 80 or fewer characters per line (including spaces), a baud rate of 5200 bits-per-second is all that is needed to drive the printer at the rated speed of 430 lines-per-minute. If your typical print job consists of print lines that have 132 characters per line, a baud rate of about 8500 bits-per-second is required to drive the printer at 430 lines-per-minute.

If your PT3604 has a 48-character print band, the printer is capable of printing approximately 650 lines-per-minute. Since the printer can print the data at a faster rate with a 48-character print band, the computer must send the data to the printer at a faster rate if the printer is to be able to print at its rated speed. With a 48-character print band, a print job that consists of 80 characters per line requires a baud rate of 7800 bits-per-second, while a job that consists of 132 characters-per-line requires a baud rate of approximately 13000 bits-per-second.

The following table lists the baud rates required to drive a PT3604, PT3607, or PT3610 at rated speed for print jobs consisting of 80 characters-per-line and jobs consisting of 132 characters-per-line for each of the print bands that can be used.

PRINTERS

Table F-3. Printer Baud Rates

PRINT BAND	PT3604	PT3607	PT3610
48-Character Band			
Rated Speed (lines-per-minute)	650	700	1000
Baud Rate Required for Jobs with 80 characters-per-line	7800	8400	12000
132 characters-per-line	13000	14000	19800
64-Character Band			
Rated Speed (lines-per-minute)	600	660	840
Baud Rate Required for Jobs with 80 characters-per-line	7200	8000	10100
132 characters-per-line	12000	13100	16700
96-Character Band			
Rated Speed (lines-per-minute)	430	485	640
Baud Rate Required for Jobs with 80 characters-per-line	5200	5900	7700
132 characters-per-line	8600	9600	12700
128-Character Band			
Rated Speed (lines-per-minute)	----	385	515
Baud Rate Required for Jobs with 80 characters-per-line	----	4700	6200
132 characters-per-line	----	7700	10200

When you use **lp.cnfg** to add printer type PT3604, PT3607, or PT3610, **lp.cnfg** asks you whether the printer is configured for 9600 baud or 19200 baud. (At the factory, the PT3604 and PT3607 are configured for 9600 baud, and a PT3610 is configured for 19200 baud.) Note that if you are also using the printer with the Motorola Print System, you must operate the printer at 9600 baud.

PT235 Printer

The following table lists the settings that allow the PT235 printer to work with the system. Consult the printer user's guide for specific instructions on how to change the settings. The PT235 is Motorola's version of the Fujitsu Model DL2400.

Table F-4. PT235 Hardware Settings

ITEM	SETTING	ITEM	SETTING
Style Function Selectable Options			
EMULATE	DIABLO	QUALITY	LETTER
FONT	COUR 10	CHAR SET	SET 1
ATTRIB	NONE	LANGUAGE	USA
CHAR SP	10 CPI	LINE SP	6 LPI
PAGE LG	11.0 IN	PRF SKP	NO
LFT END	1 COLM	TOP MRG	1 LINE
OFFSET	0	PPR OUT	DETECT
DC3-CDE	ENABLE	CR-CODE	CR ONLY
LF-CODE	LF ONLY	AUTO CR	YES
PRT DIR	BI-DIR	BUZZER	ON
Interface Function Selectable Options			
TYPE	SERIAL	WORD LG	8 BIT
FORMAT	8NONE 1	BAUD RT	9600
PROTOCOL	XON/XOFF	CONTROL	3 WIRE

If you are attaching the PT235 to the system via the Centronics parallel port on the MVME332XT board, set the TYPE item of the Interface Function Selectable Options to PARALLEL.

Unpredictable results have been seen when running this printer off of the parallel port on an MVME335 Serial/Parallel I/O board. Attaching this printer to the Centronics parallel port on the MVME335 is not recommended.

If you are attaching the PT235 to the system via a serial port and are using the standard Motorola Workstation/Printer cable, you must establish a **port_hold** condition on the device port that the printer is attached to. For further information refer to **port_hold(1M)**.

PRINTERS

PT2100 and PT2200 Printers

The table below lists the switch settings for the PT2100 and PT2200 printers. These printers are Motorola's version of the Fujitsu Series 2000, Model 2100 and Model 2200 printers.

Table F-5. PT2100 and PT2200 Switch Settings

Memory Circuit Card Switch Settings								
DIP Switch #1	1	2	3	4	5	6	7	8
	OFF	OFF	OFF	OFF	OFF	ON	ON	ON
DIP Switch #2	1	2	3	4				
	ON	OFF	OFF	OFF				
Serial Interface Card Switch Settings								
DIP Switch #1	1	2	3	4	5	6	7	8
	ON	OFF	OFF	OFF	OFF	ON	ON	OFF

With the switches set as indicated above, the PT2100/PT2200 is setup as follows:

Standard character size	Skip-over-perforation disabled
Unslashed zero	CR only
Paper out detection enabled	XON/XOFF protocol
All RAM storage is used as a data input buffer	8-bit data word length
11 inch paper length	No parity check
USA language	1 stop bit
Printer is enabled on-line at power on	9600 baud
Sheet feeder not installed	

PT3401 Printer

The next two tables list the settings that allow the PT3401 printer to work with the system. Consult the printer user's guide for specific instructions on how to change the settings. The PT3401 is Motorola's version of the Centronics Model 353.

The required settings on the PT3401 include feature and configuration settings. The following two tables list the feature and configuration settings.

Table F-6. PT3401 Feature Settings

FEATURE	SETTING
Horizontal Tab	008 HOR TAB
Vertical Tab	006 VER TAB
Forms Length	066 FORMS L
Characters Per Inch	10 CPI
Lines Per Inch	6 LPI
Country Character Set	USA COUNTRY
Automatic Line Feed	0 AUTO LF
Vertical Margin	1 VER MAR
Audio Alarm	1 ALARM
Memory	MEMORY

Table F-7. PT3401 Hardware Configuration Settings

FEATURE	SETTING	MEANING
Speed	960	9600 baud
Serial/Parallel	1	Serial*
Data Bits	3	8 data bits
Parity	0	None
Buffer Status	3	XON/XOFF
Printer Status	3	XON/XOFF
Reverse Channel Polarity	any	not used
Inverted Data Strobe	0	Normal
Inverted Data Bit 8	0	Normal
Bit 8 Control	1	Normal
703/ANSI	0	703
Prime on Select	0	Disabled
Prime on Delete	0	Disabled
Print on Paper Motion	2	No CR
Page Mode	1	Enabled

*If you are attaching the PT3401 to the system via the Centronics parallel port on the MVME335 or MVME332XT Serial/Parallel I/O Board, set this feature to zero, meaning Parallel.

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PT3501 Printer

The following table lists the switch and control settings that allow the PT3501 to work with the system. Consult the printer user's guide for specific instructions on how to change the settings. The PT3501 is Motorola's version of the Fujitsu SP830.

Table F-8. PT3501 Switch and Control Settings

SWITCH/CONTROL	SETTING
Form Length rotary switch	11 in.
Column Space	10 cpi
Line Space	6 lpi
Print Wheel	Switch B2 = ON*
Proportional Spacing	Switch PS = OFF*
Paper out Disable Switch ON for Sheet Feeder	OFF for tractor Feed
Automatic Line Feed Switch (AUT LF)	OFF
Word Processing Switch (WP)	OFF
Automatic Carriage Return Switch (AUT CR)	OFF
Echo Test Switch	OFF
Baud Rate Switches (B0, B1, B2) (1200 baud)	B0, B1 = ON, B2 = OFF
Duplex Switch (FD or HD)	FD
Parity Switch (EN or OD)	EN
Parity Mark Switch	OFF
ETX/ACK or DC1/DC3 Switch	DC1/DC3
DTR Switch	OFF
*These values may differ, depending on the type of printwheel being used.	

TM3 Logic PCB Straps

This PCB is located at the rear, under the cover. If all other switches are correct and other operational requirements have been checked, a service representative must be called to check these straps. The proper switch settings are: OFF, ON, OFF, OFF, ON.

There are other TM jumper (strap) positions on the logic PCB. These positions are overridden by the front panel controls and switches and should not be disturbed. If a sheet feeder is to be used with the PT3501 printer, the jumpers on the TM9

jumper block should be checked to verify that they are set as follows:
ON, OFF, ON, OFF, ON.

PT3604 Printer

The following table lists the hardware switch settings that allow the PT3604 printer to work with the system. For illustrations and detailed information on how to set these switches, see the printer user's guide. The PT3604 is Motorola's version of the Data Products B300/B600 line printer.

Table F-9. PT3604 Switch Settings

Serial Interface CCA Printed Circuit Board								
DIP Switch #1	1	2	3	4	5	6	7	8
	OFF	OFF	ON	ON	ON	ON	ON	ON
DIP Switch #2	1	2	3	4	5	6	7	8
	OFF	OFF	OFF	OFF	OFF	ON	OFF	OFF
DIP Switch #3	1	2	3	4	5	6	7	8
	ON	OFF	OFF	OFF	OFF	ON	ON	OFF
DPC Centronics-Compatible Interface Printed Circuit Board								
DIP Switch #1	1	2	3	4	5	6	7	8
	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
DIP Switch #2	1	2	3	4	5	6	7	8
	OFF	OFF	OFF	OFF	ON	OFF	OFF	OFF
DIP Switch #3	1	2	3	4	5	6	7	8
	OFF	ON	OFF	OFF	ON	OFF	OFF	OFF
DIP Switch #4	1	2	3	4	5	6	7	8
	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF

These switch settings provide for operation of the PT3604 at 9600 baud. If you are using a 48- or 64-character print band and want to operate the printer at its maximum speed, you will need to configure the printer to operate at 19200 baud. To configure the PT3604 for 19200 baud, set position 1 of DIP switch #3 on the Serial Interface printed circuit board to the OFF position. If you also have the Motorola Print System (MPS) installed on your system and are printing on a PT3604 via MPS, you must operate the printer at 9600 baud.

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PT3607 Printer

The table below lists the switch settings that enable the PT3607 printer to work with the system when attached via one of the serial I/O (RS-232C) ports. The second table lists the switch settings that enable the PT3607 to work with the system when attached via a Centronics parallel port.

Note that the RS-232C interface is preconfigured at the factory to operate at 9600 baud. Depending on the print band that you install, you may need to change the default baud rate. If you are also using the printer with the Motorola Print System, the printer must be configured for 9600 baud. The PT3607 is Motorola's version of the Hitachi UP-700A.

Table F-10. PT3607 RS-232C Interface Settings

	Register Address						
	1	2	3	4	5	6	7
Mode 8, Register 1	0	0	1	0	0	1	0
Mode 8, Register 2	0	0	1	0	0	0	0
Mode 9, Register 1	0	0	0	0	0	0	0
Mode 9, Register 2	0	0	0	0	0	0	0
Mode 9, Register 3	0	0	1	0	0	0	0
Mode 9, Register 4	0	0	0	0	0	1	0
Mode 9, Register 5	0	0	1	0	1	1	0
Mode 9, Register 6	0	1	1	1	0	0	0
Mode 9, Register 7	1	0	0	0	0	0	0
Mode 9, Register 8	1	0	1	1	1	0	0

Table F-11. PT3607 CDCC Interface Settings

	Register Address						
	1	2	3	4	5	6	7
Mode 8, Register 1	0	0	1	0	0	1	0
Mode 8, Register 2	0	0	1	0	0	0	0
Mode 9, Register 1	0	0	0	0	0	0	0
Mode 9, Register 2	0	0	0	0	0	0	0
Mode 9, Register 3	0	0	1	0	0	0	0
Mode 9, Register 4	0	0	0	0	0	1	0
Mode 9, Register 5	0	1	0	0	0	1	0

PT3610 Printer

The "PT3610 RS-232C Interface Settings" table lists the switch settings that enable the PT3610 printer to work with the system when attached via a serial I/O (RS-232C) ports. The "PT3610 CDCC Interface Settings" table lists the switch settings that enable the PT3610 to work with the system when attached via a Centronics parallel port.

The RS-232C interface is pre-configured at the factory to operate at 19200 baud. When configuring the PT3610 to operate via the serial connector, you may need to change the default baud rate. If you intend to operate the PT3610 at its default setting of 19200 baud, you must have an MVME332XT 8-port Serial/Parallel I/O Interface Module. Do not attempt to operate a PT3610 at 19200 baud using an MVME332 8-port Serial I/O Interface Module or the MVME335 4-port Serial/Parallel I/O Interface Module. Attaching a PT3610 via the parallel port on the MVME335 is not recommended.

If you are also using the printer with the Motorola Print System, the printer must be configured for 9600 baud. The PT3610 is Motorola's version of the Hitachi UP-1000A.

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Table F-12. PT3610 RS-232C Interface Settings

	Register Address						
	1	2	3	4	5	6	7
Mode 8, Register 1	0	0	0	0	0	0	0
Mode 8, Register 2	0	0	1	0	0	0	0
Mode 9, Register 1	0	0	0	0	0	0	0
Mode 9, Register 2	0	0	0	0	0	0	0
Mode 9, Register 3	0	0	1	0	0	0	0
Mode 9, Register 4	0	0	0	0	0	1	0
Mode 9, Register 5	0	0	1	0	1	1	0
Mode 9, Register 6	0	1	1	1	0	0	0
Mode 9, Register 7	0	0	0	0	0	0	0
Mode 9, Register 8	1	0	1	1	1	0	0

Table F-13. PT3610 CDCC Interface Settings

	Register Address						
	1	2	3	4	5	6	7
Mode 8, Register 1	0	0	0	0	0	1	0
Mode 8, Register 2	0	0	1	0	0	0	0
Mode 9, Register 1	0	0	0	0	0	0	0
Mode 9, Register 2	0	0	0	0	0	0	0
Mode 9, Register 3	0	0	1	0	0	0	0
Mode 9, Register 4	0	0	0	0	0	1	0
Mode 9, Register 5	0	1	0	0	0	1	0

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PT3615 and PT3620 Printers

The following table lists the switch settings that allow the PT3615 and PT3620 printers to work with the system. PT3615 and PT3620 printers must be attached to the system via the Centronics parallel port on the MVME332XT. Consult the user's guide for specific instructions on how to change the settings. The PT3615 is Motorola's version of the Hitachi FP-1500. The PT3620 is Motorola's version of the Hitachi FP-2000A.

Table F-14. PT3615 and PT3620 Settings

IF13X Interface Board								
DIP Switch #1	1	2	3	4	5	6	7	8
	OFF	OFF	OFF	OFF	ON	OFF	OFF	OFF
DIP Switch #2	1	2	3	4	5	6	7	8
	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
DIP Switch #3	1	2	3	4	5	6	7	8
	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
DIP Switch #4	1	2	3	4	5	6	7	8
	OFF	OFF	ON	ON	ON	OFF	OFF	OFF
DIP Switch #5	1	2	3	4	5	6	7	8
	OFF	OFF	OFF	ON	OFF	OFF	OFF	OFF
DIP Switch #6	1	2	3	4	5	6	7	8
	ON	ON	OFF	OFF	OFF	OFF	ON	OFF

PT4000 Printer

The following table lists the switch settings that allow the PT4000 to work with the system. Consult the printer user's guide for specific instructions on how to change the settings. The PT4000 is Motorola's version of the NEC LC-815.

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Table F-15. PT4000 Switch Settings

DIP Switch #1	1	2	3	4	5	6	7	8	9
	ON	OFF	OFF	OFF	OFF	ON	ON	ON	OFF
DIP Switch #2	1	2	3	4	5	6	7	8	9
	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	OFF
DIP Switch #3	1	2	3	4	5	6	7	8	9
	ON	OFF	ON	OFF	OFF	OFF	ON	ON	ON

These switch settings are required to attach a PT4000 to the system via the serial interface. If you attach the PT4000 to the system via an MVME332XT Centronics parallel port, set position 1 of SW1 OFF. Unpredictable results have been observed when this printer was attached to the system via the parallel port on an MVME335 serial/parallel I/O board. Attaching a PT4000 via the Centronics parallel port on an MVME335 is not recommended.

PT4010 Printer

The following table lists the printer configuration settings that allow the PT4010 to work with the system. Consult the printer user's guide for specific instructions on how to change the settings. The PT4010 is Motorola's version of the NEC LC-890.

Note that the setup given below configures the PT4010 to operate in PostScript batch mode. Even if you are planning to operate a PT4010 in HP LaserJet Plus or Diablo 630 modes, configure the PT4010 in accordance with the parameters given below.

Table F-16. PT4010 Settings

PARAMETER	REQUIRED SETTING
Software Intf	POSTSCRIPT BATCH
Hardware Intf	
Serial RS-232C	
Baud Rate	9600
Data Bits	8
Stop Bits	1
Parity	SPACE
Flow Control	XON XOFF
Miscellaneous	
Do Start Page	NO
Set Wait Time	30 SECONDS

In addition to the above settings, set the following Diablo 630 emulation parameters before setting the Software Intf to POSTSCRIPT BATCH.

Table F-17. Emulation Parameters

Diablo 630 PARAMETER	REQUIRED SETTING
Pitch	10
Auto LF	NO
Fonts	
Regular	COURIER
Bold	COURIER OBLIQUE

You must attach the PT4010 to your system via the serial interface. If you attach the PT4010 via the parallel port, improper operation results.

If you are attaching the PT4010 to the system using the standard Motorola Workstation/Printer cable, you must establish a **port_hold** condition on the device port to which the printer is attached. Refer to **port_hold(1M)**.

Parallel Printer Interface

The MVME335 printer interface provides a printer port with Centronics-compatible signals. The handshake with the printer is performed by onboard hardware; therefore, no software overhead is required for data transfer to the printer.

The table below identifies all printer port signals used on the MVME332XT and MVME335 modules by mnemonics and functional descriptions. Printer port signal locations at the front panel connector and the rear connector P2 are shown in the tables on the next page for the MVME335. The printer port signals from the MVME332FPA1 and MVME332FPA2 are the same as Table F-19 (front connector).

Table F-18. Printer Port Signal Description

SIGNAL	DESCRIPTION
STROBE*	DATA STROBE* An active low output signal indicating that data is valid.
ACK*	ACKNOWLEDGE* An active low input signal indicating that the printer has accepted data.
DATA1..DATA8	DATA BITS 1..8 Eight data lines that transfer data bytes to the printer.
BUSY	BUSY An active high input signal indicating the printer is unable to receive data.
PAPOUT	PAPER OUT An active high input signal indicating that the printer is out of paper.
SELECT	SELECT An active high input signal indicating the printer is in a ready condition.
PRIME*	INPUT PRIME* An active low output signal used to initialize the printer.
FAULT*	FAULT* An active low input signal indicating that the printer has detected a fault condition.
GND	GROUND
CHASSIS	CHASSIS GROUND

Table F-19. MVME335 Front Connector Printer Port Signal Locations

PIN NO.	SIGNALS	SIGNALS	PIN NO.
1	STROBE*	GND	19
2	DATA1	GND	20
3	DATA2	GND	21
4	DATA3	GND	22
5	DATA4	GND	23
6	DATA5	GND	24
7	DATA6	GND	25
8	DATA7	GND	26
9	DATA8	GND	27
10	ACK*	GND	28
11	BUSY	GND	29
12	PAPOUT	GND	30
13	SELECT	PRIME*	31
14	GND	FAULT*	32
15	----	GND	33
16	GND	----	34
17	CHASSIS	----	35
18	----	----	36

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Table F-20. MVME335 Connector P2 Printer Port Signal Locations

PIN NO.	SIGNALS	SIGNALS	PIN NO.
15	---	---	19
16	CHASSIS	---	20
17	GND	---	21
18	---	GND	22
19	GND	FAULT*	23
20	SELECT	PRIME*	24
21	PAPOUT	GND	25
22	BUSY	GND	26
23	ACK*	GND	27
24	DATA8	GND	28
25	DATA7	GND	29
26	DATA6	GND	30
27	DATA5	GND	31
28	DATA4	GND	32
29	DATA3	GND	33
30	DATA2	GND	34
31	DATA1	GND	35
32	STROBE*	GND	36

APPENDIX G

TERMINALS

This appendix provides information about the terminals supplied by Motorola. Two classes of Motorola-supplied terminals can be used with the system: the TM220 and the TM3000-series. For unpacking instructions and detailed installation procedures, consult the manual that was supplied with the terminal. This appendix gives only a general overview on TM220 and TM3000-series terminals.

Table G-1. Terminal Models

TERMINAL TYPE	MODEL NUMBER
VT220 compatible	TM220
Monochrome w/Office keyboard	TM3220
Amber Monochrome w/Office keyboard	TM3220A
Monochrome w/IBM-styled keyboard	TM3180
Amber Monochrome w/IBM-styled keyboard	TM3180A
Color graphics w/Office keyboard	TM3241G
Color graphics w/IBM-styled keyboard	TM3179G
Monochrome graphics w/Office keyboard	TM3220G
Amber graphics w/Office keyboard	TM3220AG
Monochrome graphics w/IBM-styled keyboard	TM3180G
Amber graphics w/IBM-styled keyboard	TM3180AG

Feature and Setup Requirements

Terminals other than a TM220 or TM3000-series used with the system must meet certain setup requirements to operate successfully. These setup requirements use the Motorola TM220 feature definitions. Terminals should be configured as follows:



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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)

TM220 Terminal Description

The TM220 terminal has two parts: the display unit and the keyboard. The display unit has a 14-inch diagonal screen and is mounted on a pedestal which allows the unit to tilt and swivel. The pedestal holds the ON/OFF switch for the terminal, two ports for attaching the unit to other equipment, and a port for connecting the keyboard to the display unit.

The brightness control is located underneath the lower right side of the display unit. A screen-saver (CRT saver) built into the terminal turns off the display after about 10 minutes if no new characters are sent to the screen. If the screen has been darkened because of the CRT Saver feature, the first character typed restores the display but is not sent to the screen.

CAUTION

When deciding where to install the terminal, do not block any of the air vents on the unit. All air vents must be kept clear for the unit to cool properly during operation.

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Cable Connection

The TM220 terminal has two standard RS-232C serial port interfaces. The PRIMARY port is used to connect the terminal to the computer.

To connect the terminal to the computer, connect the Motorola RS-232C cable end labeled WORKSTATION/PRINTER to the terminal. The other end labeled DPU should be connected to the computer.

When connecting the terminal to the computer, make sure that the pins on the terminal connector are matched properly with the pins on the connector of the computer.

Keyboard Connection

The keyboard port connection is located on the left side of the display unit. The keyboard connects to the terminal by attaching the keyboard cable to this port. Insertion is "keyed," i.e., there is only one way to insert the cable into the opening.

CAUTION

Do not connect or disconnect the keyboard to or from the display unit when the power is on. Erratic performance may result.

Do not attempt to connect another manufacturer's keyboard or a keyboard from another Motorola terminal model to the TM220 terminal.

Power Up

The ON/OFF (power) switch is a rocker-type switch located on the right rear of the unit.

To turn on the terminal:

1. Plug the AC power cord into the proper outlet or receptacle.
2. Make sure all interface cables are connected properly.
3. Set the ON/OFF switch to 1 (rear "swing" down).

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TM3000-Series Terminals

There are two versions of the TM3000 terminal. One version is a monochrome terminal with optional graphics capabilities. The other version is a color terminal with optional graphics capabilities. For a list of model numbers, refer to Table G-1.

The TM3000 terminals support two basic types of keyboard, a typewriter-style layout for general office application usage and an IBM-styled keyboard.

Cable Connection

Connect the power cable, keyboard, cable, and RS-232C cable to the back of the terminal. The Motorola RS-232C cable end labeled WORKSTATION/PRINTER should be connected to the back of the terminal (marked HOST). The other end labeled DPU should be connected to the computer.

Keyboard Connection

The keyboard port connection is located on the back of the display unit. The keyboard connects to the terminal by attaching the keyboard cable to the port labeled KBD.

CAUTION

Do not connect or disconnect the keyboard to or from the display unit when the power is on. Erratic performance may result.

Do not attempt to connect another manufacturer's keyboard or a keyboard from another Motorola terminal model to the TM3000 terminal.

Power Up

The terminal has two control switches, an ON/OFF switch, and a keylock. The "on" position is indicated by a "1" next to the switch. If this side is pushed down, the terminal is powered on. If the side of the switch next to the "0" is pushed down, the terminal does not have power. Some terminals have a keylock switch that disables the keyboard.

The front of the terminal contains a single knob which brightens or darkens the screen.

To turn on the terminal:

1. Plug the power cord into the proper outlet or receptacle.
2. Make sure all interface cables are connected properly.
3. Set the ON/OFF switch to the "on" position by pushing down the side labelled "1."

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Terminal Specifications

Table G-2. Specifications for TM220 and TM3000-Series Terminals

TM220	TM3000
Display Screen	
14-inch non-glare screen Amber or green phosphor 60 or 65 Hz refresh rate	14-inch non-glare screen Red, green, sky blue phosphor (color models only) 50 or 60 Hz refresh rate
Video Attributes	
Bold, reverse video, blink, underline, and combinations of these	Bold, reverse video, blink, underline, and combinations of these
Cursor Type	
9 x 12 dot matrix, block or underline, line, cursor ON/OFF	Block or underline; blinking, steady, or invisible
Character Sets	
266+ displayable characters Custom characters	Multinational character set Special graphics set National replacement character (NRC) set Down-line-loadable (soft) character set
Keyboard	
Slimline keyboard, tiltable, detachable coiled cable Adjustable keyclick LED indicators	Slimline keyboard, tiltable, detachable coiled cable Piezoelectric buzzer LED indicators
Communication Features	
Baud rates: 75, 110, 150, 300, 600, 1200, 2400, 4800, 9600, 19,200 XON/XOFF; RS-232C	Baud rates: 75, 110, 150, 300, 600, 1200, 2400, 4800, 9600, 19,200 XON/XOFF; RS-232C
Physical Dimensions - Terminal	
Width: 13.5" (343 mm) Depth: 13.5" (343 mm) Height: 14.5" (369 mm) Weight: 19.4 lb (8.7 kg)	Width: 13.3" (388 mm) Depth: 16.2" (411 mm) Height: 15.6" (395 mm) Weight: 39.8 lbs (18.1 kg)
Physical Dimensions - Keyboard	
Width: 21.2" (538 mm) Depth: 7.6" (193 mm) Height: 1.5" (38 mm) Weight: 2.0 lbs. (0.9 kg)	Width: 20.4" (519 mm) Depth: 7.4" (188 mm) Height: 1.2" (30 mm) Weight: 3.3 lbs. (1.5 kg)
Power Requirements	
115 VAC/60 Hz 230 VAC/50 Hz	110 VAC/60 Hz 220 VAC/50 Hz

Terminal Information Data Base

Terminals are described in the **terminfo** data base so that applications programs such as **vi**(1) and **curses**(3X) can work with different types of terminals without changes to the programs. Source descriptions in **terminfo** give terminal capabilities, padding requirements, and initialization sequences.

Names for terminals in **terminfo** follow conventions described in **terminfo**(4) and **term**(5) in the SYSTEM V/68 Release 3 *Programmer's Reference Manual*.

Information for preparing a source description is given in **terminfo**(4). The **tic**(1M) utility is used to compile the source description and place it in **/usr/lib/terminfo**. The utility **infocmp**(1M) can be used to compare or print out **terminfo** descriptions. When used with the **-l** option, **infocmp** returns information about the terminal exported by the **TERM** variable. The value of **TERM** can be determined with the command **env**(1).

Chapter 10 of the SYSTEM V/68 Release 3 *Programmer's Guide* gives additional information about working with the **terminfo** data base.

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APPENDIX H

COMPUTER MAINTENANCE AND CARE

The Model 3200 requires minimum maintenance and care to keep it operating properly. This appendix gives a brief description of the proper maintenance procedures for the computer, the disk drives, and the removable media.

The Working Environment

A proper environment for the computer means placing the unit within the appropriate temperature, humidity, and altitude ranges. The computer can operate in a fairly wide range of temperature, humidity, and altitude environments. For the best performance of the computer and for the comfort of the operator, it is better to place the computer unit in the middle of these environmental ranges. It is important that the environmental conditions not change abruptly. Refer to Appendix B for a table of the environmental ranges.

Cleaning the Computer

If the housing of the computer needs cleaning, spray a small amount of a mild household cleaner on a clean, soft, cotton cloth and gently wipe the surfaces. Be careful not to get any liquid into the computer's operating mechanisms by spraying cleaner directly on the cabinet. For printers, terminals, or other peripherals, refer to the user's manuals for the equipment for cleaning instructions.

The computer has a removable filter (optional) that should be periodically cleaned. How often it is cleaned depends on the dust conditions in your working environment. The filter is removed by taking off the front panel of the computer. The front panel can be popped off by inserting a sturdy object such as a screwdriver in the crevice between the front panel and the chassis cover. The filter is located on the left side and can be removed by sliding it out of its brackets.

Once the filter is removed, shake it to dislodge the dust. Slide the filter back into its brackets and reinstall the front panel.

The cartridge tape and floppy drives should be cleaned after every eight hours of use. Cleaning supplies are available from Motorola. Follow the instructions enclosed with the cleaner.



Caring for the Removable Media

To prevent loss of data or damage to the cartridge tapes or floppies, 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.

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