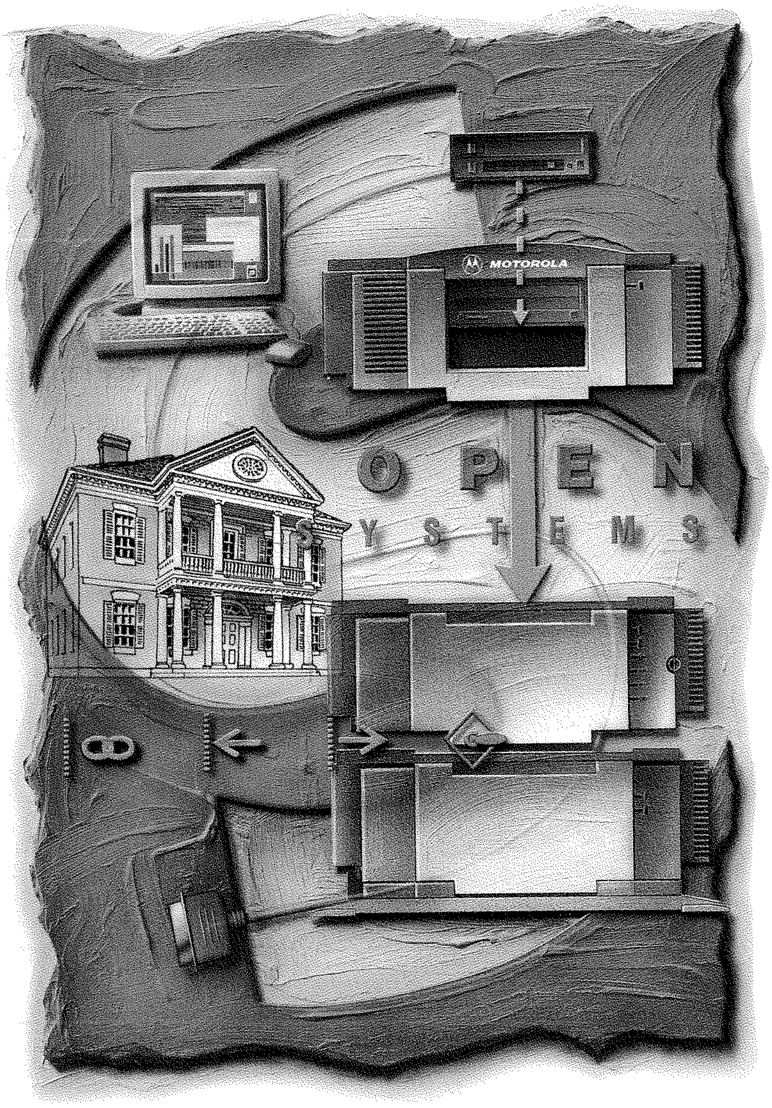

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Series 900

Reference Guide

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Preface

The Series 900 Reference Guide is written for the person who needs advanced operational information. The manual presents a technical discussion of all the major components of the computer system.

Printed in the United States of America

October 1994

WARNING

This equipment generates, uses, and can radiate radio frequency energy and if not installed and used in accordance with the documentation for this product, 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 the user's own expense, will be required to take whatever measures necessary to correct the interference.

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 Motorola is 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 your local Motorola representative 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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INTRODUCTION 1

The Series 900 family of servers and multi-user computers is based on the Motorola M88000 family of microprocessors and the VMEbus standard. The Series 900 computer systems feature a modern and compact modular design. The Series 900 multi-user computer systems consist of 3 major components: the CPU module, the VME Expansion module, and the SCSI Device Expansion Module.

This manual is directed toward the person who needs advanced operational information. The manual presents a technical discussion of all the major components of the computer system.

Manual Organization

This manual is organized into five chapters and three appendices.

- Chapter 1, *Introduction*. This chapter gives an overview of the Series 900 system and references other publications that may be of interest.
- Chapter 2, *CPU Module*. This chapter discusses the CPU Module, its configuration, power supply, front panel switch, and its LED indicators.
- Chapter 3, *VME Expansion Module*. This chapter discusses the VME Expansion Module, its configuration, power supply, VME backplane and its LED indicators.
- Chapter 4, *SCSI Device Expansion Module*. This chapter discusses the SCSI Device Expansion Module, its configuration, SCSI backplane, power supply, and drive termination.
- Chapter 5, *Base and Crown*. This chapter provides information on the system's base and crown.
- Appendix A, *System Maintenance*. This appendix lists the recommended procedures for system preventative maintenance.
- Appendix B, *Cables*. This appendix lists all Series 900 associated cable pinouts.
- Appendix C, *System Specifications*. This appendix lists the specifications for all Series 900 modules.

Major Components

The Series 900 computer system consists of modular units that are installed in a stacked arrangement. These modules are designed to interconnect with a vertical latching mechanism. The maximum number of modules in a single stack is five. This can be:

- a combination of the CPU Module and one to three VME Expansion Modules and one to four SCSI Device Expansion Modules, or
- up to five stand-alone SCSI Device Expansion modules.

There are three categories of modules:

- CPU Module

  where the Applications Processor resides;
- VME Expansion Module

  add-on VME options are installed in this module;
- SCSI Device Expansion Module

  contains fixed and removable disk drives.

CPU Module

The CPU Module contains the single board computer, the I/O Distribution board, and the optional modem. This module has four slots. The top or first slot is reserved for the I/O Distribution board. The single board computer is normally installed in the second slot. The remaining slots may be used for memory expansion or VME options.

VME Expansion Module

The VME Expansion Module houses additional VME options such as the Serial I/O Controller, SCSI-2 controller, Ethernet LAN controller, and SNA, BSC, X.25 Communications controllers. Each VME Expansion Module contains four VME expansion slots.

SCSI Device Expansion Module

The SCSI Device Expansion Module contains four half-height peripheral bays. Two bays accommodate 3.5-inch hard disk drives and two bays accommodate either 3.5-inch hard disk drives or half-height removable media devices.

Crown and Base

The crown is a separate part covering the interconnect opening in the top surface of the module. The base latches to the bottom module and provides several functions. The base adds stability to the stack of modules, lifts it out of dusty air, and protects the cooling vents from blockage. The base contains two electronic modules: the VME terminator and the Base Unit Power System.

Related Documentation

Document Title	Motorola Publication Number
MVME167/187 Single Board Computers SCSI Software User's Manual	MVME187FW
MVME167/187 Single Board Computers Programmer's Reference Guide	MVME187PG
MVME187 RISC Single Board Computer User's Manual	MVME187
MVME187Bug Debugging Package User's Manual	MVME187BUG
MVME187 RISC Single Board Computer Installation Guide	MVME187IG
MVME197LE Single Board Computer User's Manual	MVME197LE
MVME197LE, MVME197DP, and MVME197SP Single Board Computers Programmer's Reference Guide	MVME197PG
MVME197Bug User's Manual	MVME197BUG
MVME197LE Diagnostics Manual	MVME197DIAG
MVME197 Dual Processor User's Manual	MVME197
MVME332XT Intelligent Communication Controller User's Manual	MVME332XT
MVME332XT Serial Intelligent Peripheral Controller Firmware User's Manual	MVME332XTFW
MVME333BUG Debug Package User's Manual	MVME333BUGE
MVME334A Multiprotocol Communications Controller User's Manual	MVME334A
MVME334ABUG 334ABug Debugging Package User's Manual	MVME334ABUG
MVME376 Ethernet Communications Controller User's Manual	MVME376
MVME733 Modem Operations Manual	MVME733
Site Planning Guide for Motorola Computer Systems	SITEGD

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).**

CPU MODULE 2

This chapter describes the CPU Module and its components. The CPU Module contains the single board computer, internal modem, and I/O distribution board.

There is only one CPU Module in a stack. Up to three expansion modules may be stacked under the CPU Module. The CPU Module has three VME board positions.

CPU Configuration

The CPU Module contains the single board computer, the I/O distribution board, and the internal modem. There are four positions in this module. The top slot is designated as the first slot because the VME bus expands from the top down. Due to special routing of signals in the backplane and VME terminator board the first slot is the last logical slot.

The first slot in the CPU Module has a partial P1 only VME bus. The P1 only interface to the VME bus is used by the I/O distribution board for communication to the system.

I/O Distribution Board

The I/O distribution board contains all the input and output connections from the single board computer. It is a single wide VME form factor board. The I/O distribution board has four primary functions:

- System power control

  These circuits, powered by the base system power supply, turn the modules' power supplies on and off. The circuits are connected to the keylock switch located on the front of the CPU Module.

- Power monitor

  This circuit detects when any module power supply is out of regulation.

- Modem and cooling reset

  When the keylock switch is turned to the reset position, the internal modem and the cooling failure power shutdown circuitry is reset.

- ❑ Temperature monitor

  Each module's temperature is monitored for two thresholds. At the first threshold, a cooling failure warning is issued, and a cooling failure LED is lit. At the second threshold, DC power is removed from the module.

- ❑ Ethernet twisted pair output

  This circuit converts the Ethernet AUI output from the CPU board to a 10 Base T twisted pair output.

- ❑ I/O

  The front panel of the I/O Distribution board provides:

  - one SCSI-2 port (cable daisy-chained to SCSI modules)
  - one RJ45 port labeled **CONTROL** (cable daisy-chained to SCSI modules)
  - four serial ports
  - one RJ45 twisted pair Ethernet port labeled **10 BASE T**
  - one DB15 AUI port
  - modem present LED

System Power Control

The I/O distribution board provides circuits that enable and disable, (turn on and off), the power supplies in all system modules. The circuitry that does this is powered by the base system power supply. It is this circuitry that is connected to the keylock switch on the front of the CPU Module.

Power Monitor Function

A circuit on the I/O distribution board detects when any module's power supply 5 V output is substantially out of regulation. When the out of regulation condition persists, and for 200 milli second minimum after, the I/O distribution board drives VME system reset.

Keylock Switch Reset Function

The I/O distribution board resets the modem and the cooling failure power shut down circuitry when the switch is in the reset position. A system reset is not generated by this switch.

I/O Distribution Board Front Panel I/O

The front panel of the I/O distribution board supplies the following functions:

- Four serial ports

  All four originate on the single board computer. The system console port (port one) is labeled **CONSOLE** and utilizes a RJ45 connector.

  The second serial port is labeled **SP2/TEL**. It utilizes a RJ45 connector. This serial port converts to a Telco port when the optional modem is installed.

  The third serial port is labeled **SP3**.

  The fourth serial port is labeled **SP4/UPS**. It may be programmed to interface to an un-interruptible power source (UPS).

- One RJ45 for SCSI Device Expansion Module cooling sensors, DC failure and power enable interconnect cable labeled **CONTROL**.
- One RJ45 twisted pair Ethernet port labeled **10 BASE T**.

  Note that the 10 Base T transceiver is not part of the single board computer's I/O. The I/O distribution board converts the single board computer's AUI port to 10 Base T with optional circuitry. A circuit on the I/O distribution board allows proper operation of either the AUI port or the 10 Base T port when only one interface is connected.

- One DB15 AUI port

  This port is not functional when it has been converted to 10 Base T in the I/O distribution board.

- Modem present LED
- A 68 pin SCSI II connector

Note

The parallel port signals from the single board computer are not brought to the outside of the module. The parallel port would not fit on the limited space on the panel and was omitted.

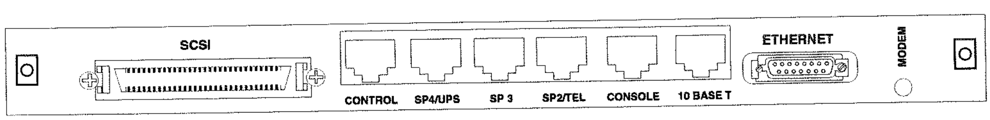


Figure 2-1. I/O Distribution Board's Front Panel

Internal Modem

Mounting and direct plug-in connection for the 9600 BPS service modem is provided on the I/O distribution board. The modem is a functional equivalent of the modem transition board, the MVME733. See the *MVME733 Modem Operations Manual*, part number MVME733, for additional information.

Power Switch

The power control switch is on the front panel of the CPU Module. It is connected to the I/O distribution board. The I/O distribution board uses the 5V supplied by a small power supply in the Base to turn on the power supplies in the modules that make up a stack. The small +5 V power supply in the base is part of the Base Unit Power system, and it is on all the time AC power is connected.

This switch has three positions: Standby Power, Run, and Reset. The reset function of this switch is for modem and/or environmental monitor reset, it does not generate VME bus reset. The single board computer's VME front panel switch for Abort and System reset that are accessible in the rear of the module are used for abort and system reset functions.

Table 2-1. Keylock Switch Settings

Key Position	Effect
⏻	System is not operational. DC power is off, but AC power is still available. Turn the key to this position for system shutdown.
I	System is in normal operating or run mode.
◁	Resets the modem and environmental monitoring function on the I/O Distribution board. The abort and system reset functions are on the single board computer's front panel switch, located on the rear of the CPU Module.

Power Supply

A power supply is installed in each module. It slides in from the front of the module when the bezel is removed and fastens in place with a finger operated integral plastic latch. The 190 watt auto or wide ranging power supply contains two fans for cooling. The power supplies do not operate when the power supply is disengaged from the enclosure at its output connector. This stops the fans from running.

DC Voltages

DC voltages of three VME Expansion Modules and the DC fail signal from the SCSI Device Expansion Module are monitored by a circuit on the I/O distribution board. That circuit generates a SYSRESET* during the time any DC voltage has dropped out. The CPU Module relies on the single board computer to monitor its DC.

VME Backplane

The VME backplane obtains power directly from the power supply. A 96-pin DIN connector in the power supply is used. It engages a 96 contact receptacle connector identical to the one used for P1 in the VME slots.

Power Supply Circuit Board

Six LEDs are soldered into a power supply circuit board. The power on indicator is driven by 5V power. The other 5 LEDs are driven by the I/O distribution board via pins in the 96-pin connector.

AC Connection

There is not an AC power switch. All the power supplies are turned on by a 5 volt signal that drives an LED in each power supply's opto-isolator. The power supply's front end circuits are powered up as soon as AC power is connected to the outlet. The power supply runs only when the 5V signal is present.

The 190 watt power supply requires the Base Unit Power System to meet power cord RFI regulatory requirements. Its power cord must be wired to the Base Unit power system where the low frequency filter is located.

Power Limitations

One maximum payload stack requires a 15 amp 115 volt service or the VA equivalent at other voltages. It is rated at 12 amps at 115 volts. This rating is on the Base. The total payload is limited to 585 watts of DC power. Payloads are limited: (1) to the specification of the power supply in each module, (2) to the rating of the module, and (3) to the rating for the stack.

Cooling

Cooling of the modules is provided by fans that are part of the power supply assemblies. The modules have air flow in one side and out the other. A positive pressure technique is used to avoid taking in dirt through the removable media drive openings. Eighteen inches of space are required between two stacks to reduce having the heated air from one stack enter the air intake of the other stack.

A cooling sensor is on the I/O distribution board. Comparator circuits for the first VME Expansion Module and for three VME Expansion Modules are on the I/O distribution board.

An air filter is provided with each module. The filters are serviceable from the front of the enclosure. The bezel must be removed to access the filter. The filter is made of 30 PPI reticulated washable foam.

Slot Numbering

Each module has four physical positions. The top slot is called the first slot since the VME bus expands from the top down. The VME bus in the CPU module has proprietary interconnection between the first and second slots.

The VME modules install component side up. The first VME slot is the second from the top slot of the first module and slot numbering progresses from top to bottom. The first slot of the CPU Module is the last logical slot on the VME bus and it is reserved for the I/O distribution board.

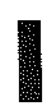
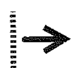
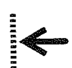
P2 of the first slot is proprietary with the B row dedicated to enclosure level signals. The B row connects to the power supply to drive LEDs and to control the power supply. It connects to the front panel switch via the power supply. The B row also connects to cooling sensors in the expansion backplanes and to the base power supply through the terminator in the Base.

LEDs

The front panel of the CPU Module has the following LEDs: power, cooling failure, disk activity, ethernet transmit, ethernet receive, and ethernet link.

The VME Expansion Module shows only the **power** LED and **cooling failure** LED. Symbols are used to indicate the meaning of the indicator. The LEDs are green except the second from the top is amber. The indicators on the front panel of the CPU Module are arranged as shown below.

Table 2-2. Module LED Icons

Module	LED Icon	Meaning
CPU/VME/SCSI		Power On
CPU[1]/VME/SCSI[2]		Cooling Failure
CPU		Disk Activity
CPU		Ethernet Transmit[3]
CPU		Network Activity[3]
CPU		Ethernet Link[3]

[1]LED lights when CPU and any other module experience cooling failure.
[2]Located on rear of SCSI Device Expansion Module
[3]Active when 10 Base T port is used.

2

Installing the System Comsole

The system console is the terminal from which system administrative functions should be performed. The system console cable must be inserted in the RJ45 connector labeled CONSOLE on the I/O distribution board.

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)

Power-up Sequence

When external devices such as drives are added to the system, the power-up sequence is to power up the system stack and then the drive device or any other peripherals. Unless this sequence is followed, the system or device indicators will not reflect a true state.

Environmental Monitoring

There is a temperature sensing circuit located on the I/O distribution board to monitor the temperature in the CPU Module. A maximum of three high temperature sensing circuits can be monitored by the I/O distribution board from the VME Expansion Module. The sensor combines the capability of sensing ambient temperature fluctuations as well as airflow changes through the chassis. The environmental conditions are sensed with respect to how well self-heating devices with the computer chassis are being cooled.

By placing this sensor inside the VME Expansion Module and the SCSI Device Expansion Module, the sensor's output can be monitored for proper cooling within the chassis. The sensor's output is fed into an analog comparator whose threshold is calibrated for proper operation.

The I/O distribution board notifies the operating system in the event high operating temperatures are reached inside the module due to stopped fans, clogged filters, or high ambient temperature. The ENV Monitor circuit is equipped with two over-temperature trip points located in the SCSI Device Expansion Module, CPU Module, and VME Expansion Module.

If the first trip point is reached in one of the SCSI Modules, an "interrupt request" process is started. If the second trip point is reached before the software finishes the shutdown process, the DC power is removed from that SCSI Module.

The software system shutdown continues until it stops or finishes, depending on which SCSI device has the over-temperature problem. An over-temperature LED on that failed SCSI device is lit to indicate failure. A system over-temperature failure message should also appear on the system console. The DC power is removed either by the user or the software for the entire system. This event should rarely occur because the temperature should not rise fast enough to hit the second trip point.

If the first "over-temperature" trip point is reached on the CPU Module or any VME Expansion Module, an interrupt is generated from the I/O distribution board to the CPU board, and the software shutdown process is started. If the second trip point is reached before the software finishes the shutdown process, the DC power is removed from the entire system. This prevents damage to the system in case temperatures in any module rises too high.

Once the system has powered down due to the over-temperature condition, an operator is required to manually restart the system by turning the reset/power on-off switch to the reset position located on the front panel. When the fault condition is caused by an AC failure, and the system shut downs, reestablishment of AC power is sufficient to allow the system to power up and reboot the system software without the need for human intervention.

There are two jumpers on the I/O distribution board for disable or enable over-temperature IRQ (interrupt request) and enable or disable hardware power shutdown.

DC Power Enable

A DC-enable signal located on the power/over-temp RJ45 connector of the I/O distribution board's front panel is a DC control signal. This DC-enable signal is a low-true signal driven from the I/O distribution board to all the SCSI Modules through the daisy-chained RJ45 connector. A high-true version of this DC-enable signal is driven to all the VME Expansion Modules through a 140-pin VME Module connector.

This DC-enable signal turns on or off the DC power to all SCSI Modules and all VME Expansion Modules. It also turns off the system DC power in case the over-temp condition occurs in any part of the system. If the over-temp condition occurs in any module, the DC power is turned off to the entire system. The system is not able to restart until the operator turns the power/reset key to the reset position on the front panel or cycles the AC-power for the entire system.

Over-Temperature LED Indicator

An over-temp signal located on the power/over-temp RJ45 connector warns the user that the over-temperature condition has occurred in one of the SCSI Device Expansion Modules. This over-temp signal is an open-collector (low true) signal which is daisy chained from all the SCSI Modules to the front panel of the I/O distribution board.

There is an over-temp LED indicator in every SCSI Device Expansion Module. If the over temperature condition is from one of the SCSI Modules, the user can check the LED on the SCSI Modules to find out which module exceeded the temperature specifications. There is a system over-temp LED on the front panel of the CPU Module. This LED is used to indicate any over-temp condition in any of the SCSI Device Expansion Modules, VME Expansion Modules, or the CPU Module.

On every VME Expansion Module, there is a temperature sensing circuit on each of the VME backplanes. If an over-temp condition occurred in the VME Expansion Module, an over-temp signal is sent to the I/O distribution board through the VME Expansion Module connector. A low true high-temp LED control signal is driven back from the I/O distribution board to the failed VME Expansion Module to turn on the over-temp LED. A VME Expansion Module over-temp bit is set in the status register of the I/O distribution board, and an over-temp interrupt request "IRQ" is generated to the CPU board.

Housekeeping Power Supply

There is a +5 volt housekeeping voltage supplied from the base of the system to the CPU Module. This voltage is required to control the DC power control circuitry in case the main power supply is turned off by different sources. This housekeeping voltage is there whenever the AC power is available in the system.

VCC +5 Volt Power Monitor

The VCC (+5V) power from all the SCSI Device Expansion Modules is monitored by the I/O distribution board. If any VCC voltage drops to 4.0 volts or lower, a system reset is generated from the I/O distribution board to the VME bus and a "SCSI VCC failed" bit is latched in the status C register.

The VCC (+5V) power from all the VME Expansion Modules is also monitored by the I/O distribution board. If any VCC voltage drop to 4.0 volts or lower, a system reset is asserted from the I/O distribution board to the VME bus. A "VME Chassis VCC failed" bit is latched in the status C register.

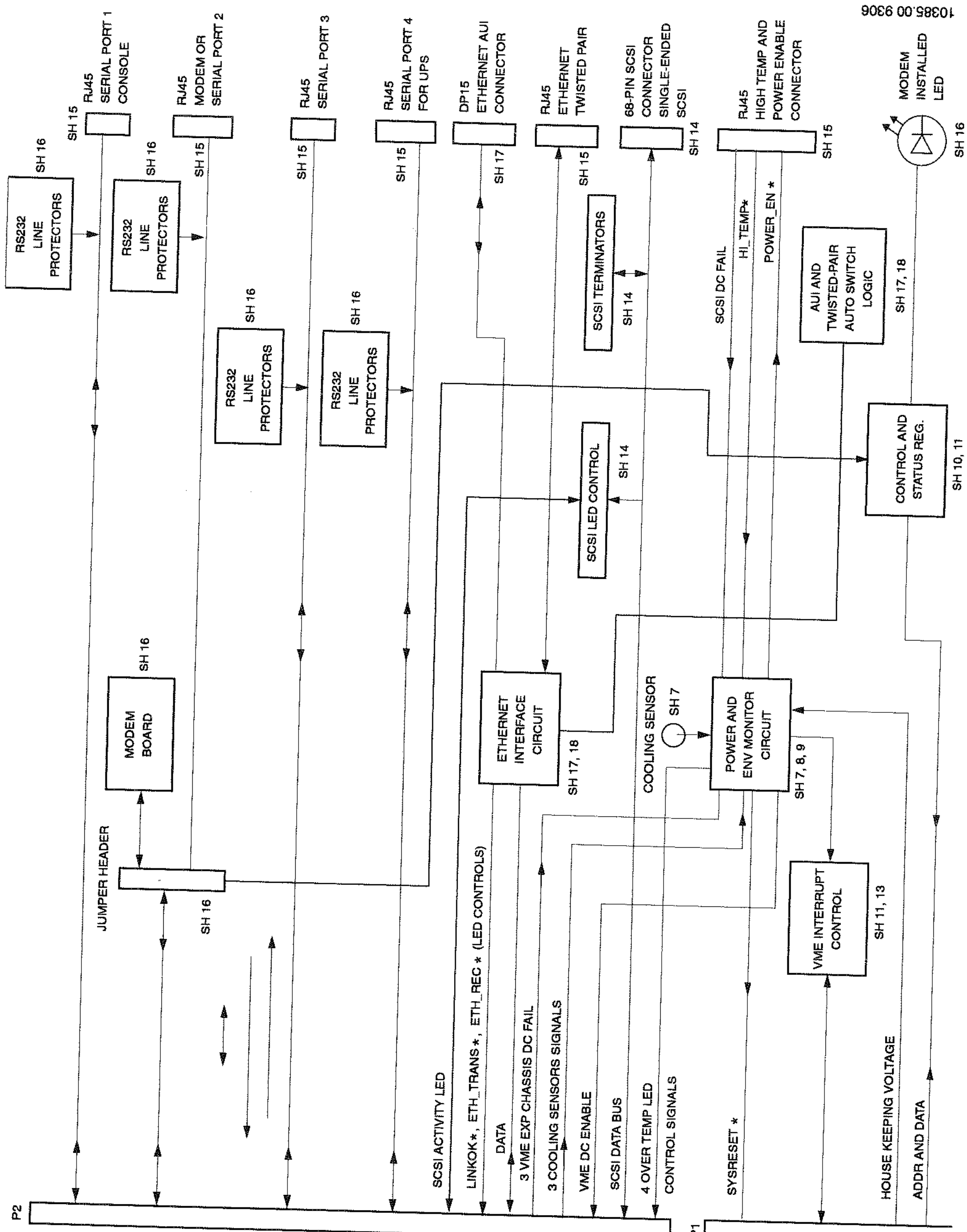


Figure 2-2. I/O Distribution Board Block Diagram

MVME187 RISC Microcomputer Module

The MVME187 is a double-high VMEmodule based on the MC88000 RISC microprocessor. The MVME187 has 4, 8, 16, or 32MB of dynamic RAM, a SCSI mass storage interface, four serial ports, a printer port, and an Ethernet transceiver interface. The MVME187 onboard DRAM is located on a mezzanine board. The main board and the mezzanine board together take one slot.

Front Panel Switches

The MVME187 module has ABORT and RESET switches; and FAIL, STAT, RUN, SCON, LAN, +12V (LAN power), SCSI, and VME indicators; all located on the front panel of the module.

When enabled by software, the front panel ABORT switch generates an interrupt at a user-programmable level. It is normally used to abort program execution and return to the 187Bug debugger firmware located in the MVME187 EPROMs.

The ABORT switch interrupter in the VMEchip2 is an edge-sensitive interrupter connected to the ABORT switch. This interrupter is filtered to remove switch bounce.

The front panel RESET switch resets all onboard devices, and drives SYSRESET* if the board is system controller. The RESET switch may be disabled by software.

Front Panel LEDs

There are eight LEDs on the MVME187 front panel: FAIL, STAT, RUN, SCON, LAN, +12V (LAN power), SCSI, and VME.

The red FAIL LED (part of DS1) is lit when the BRDFAIL signal line is active.

The yellow STAT (status) LED (part of DS1) is controlled by software on the MVME187.

The green RUN LED (part of DS2) is lit when the local bus TIP* signal line is low.

The green SCON LED (part of DS2) is lit when the VMEchip2 in the MVME187 is the VMEbus system controller.

The green LAN LED (part of DS3) lights when the LAN chip is local bus master.

The MVME187 supplies +12V power to the Ethernet transceiver interface through a fuse. The green +12V (LAN power) LED (part of DS3) lights when power is available to the transceiver interface.

The green SCSI LED (part of DS4) lights when the SCSI chip is local bus master.

The green VME LED (part of DS4) lights when the board is using the VMEbus or when the board is accessed by the VMEbus.

MVME187 Jumper Settings

The MVME187 has been factory tested and is shipped with the factory jumper settings described in the following sections. The MVME187 operates with its required and factory-installed Debug Monitor, MVME187Bug (187Bug), with these factory jumper settings. Settings can be made for:

General purpose readable register (J1)
Each MVME187 may be configured with readable jumpers. These jumpers can be read as a register (at $FFF40088) in the VMEchip2 LCSR. The bit values are read as a one when the jumper is off, and as a zero when the jumper is on.

System controller select (J2)
The MVME187 can be system controller. The system controller function is enabled/disabled by jumpers on header J2. When the MVME187 is system controller, the SCON LED is turned on.

Serial port 4 clock configuration select (J6 and J7)
Serial port 4 can be configured to use clock signals provided by the RTXC4 and TRXC4 signal lines. Headers J6 and J7 on the MVME187 configure serial port 4 to drive or receive RTXC4 and TRXC4, respectively. Factory configuration is with port 4 set to receive both signals.

2

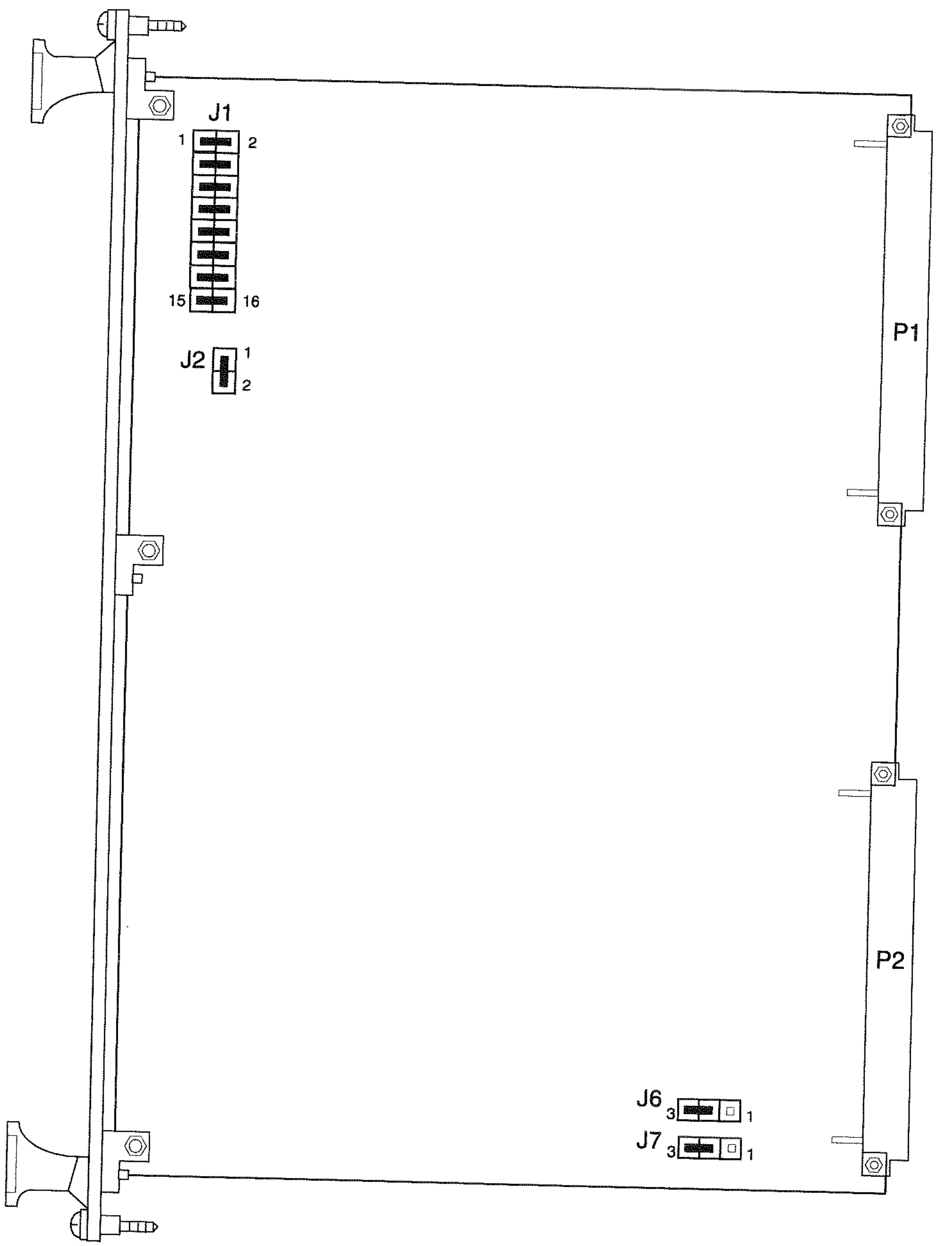


Figure 2-3. MVME187 Jumper Header Locations

MVME197LE Single Board Computer

The MVME197LE module is a double-high VMEmodule based on the MC88110 RISC microprocessor. The MVME197LE has:

- 32/64MB of DRAM, 1MB of flash memory, 8Kb of static RAM (with battery backup)
- a time of day clock (with battery backup)
- an Ethernet transceiver interface, four serial ports with EIA-232-D interface, a SCSI bus interface with DMA, a Centronics printer port, and a VMEbus system controller.

The I/O on the MVME197LE is connected to the VMEbus P2 connector.

Front Panel Switches and Indicators

Switch S1

The system controller function is enabled/disabled by configuring switch S1-9. When the MVME197LE is system controller, the SCON LED is turned on.

Switch S6

Switch S4 can be configured to use clock signals provided by the RTXC4 and TRXC4 signal lines. Switch S6 on the MVME197LE configures serial port 4 to receive RTXC4 and TRXC4.

The MVME197LE has ABORT and RESET switches, and six indicators on its front panel.

ABORT Switch S2

When enabled by software, the front panel ABORT switch generates an NMI type interrupt. It is normally used to abort program execution and return to the 197Bug debugger.

RESET Switch S3

The RESET switch resets all onboard devices and drives SYSRESET*.

Front Panel Indicators

The yellow FAIL LED (DS1) is lit when the BRDFAIL signal is active.

The green SCON LED (DS2) is lit when the BRDFAIL signal line is active.

The green RUN LED (DS3) is lit when the MC88110 bus MC* pin is low.

The green LAN LED (DS4) lights when the LAN chip is local bus master.

The green VME LED (DS5) lights when the board is using the VMEbus or when the board is accessed by the VMEbus.

The green SCSI LED (DS6) lights when the SCSI chip is local bus master.

The MVME197LE supplies +12V power to Ethernet transceiver interface through a fuse.

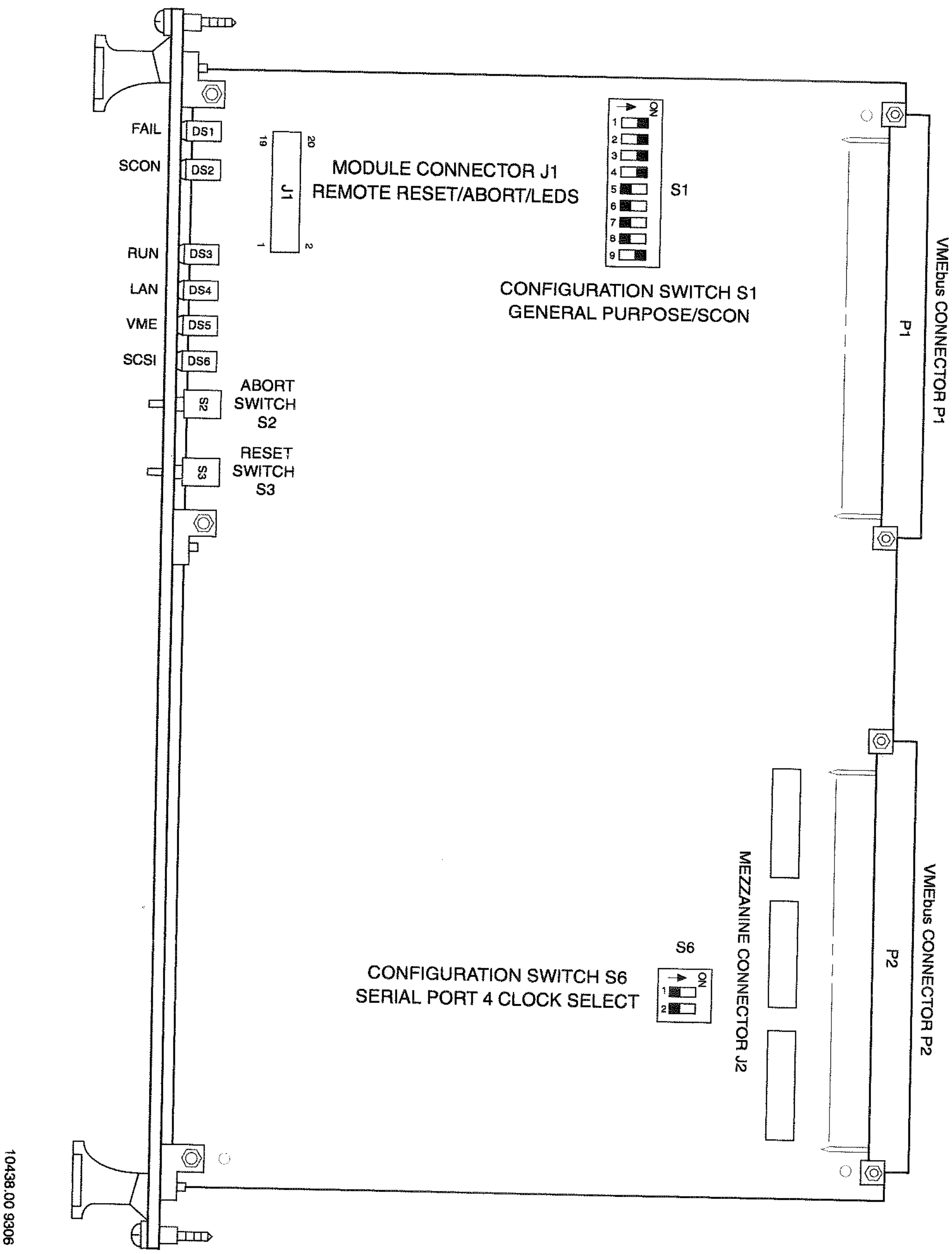


Figure 2-4. MVME197LE Switch Settings

MVME197SP/DP Single Board Computer

Each MVME197 module is a double-high VMEmodule based on the MC88110 RISC (Reduced Instruction Set Computer) microprocessor. The MVME197DP/SP module series have:

- 128/256MB of onboard DRAM with programmable ECC (Error Checking and Correction)
- 256KB of external cache memory for each MC88110/MC88410 microprocessor/cache controller combination (note that the MVME197SP version has only one MC88110/ MC88410 device combination)
- 1MB of flash memory, 8KB of static RAM (with battery backup), a time of day clock (with battery backup)
- an Ethernet transceiver interface, four serial ports with EIA-232-D interface, six tick timers, a watchdog timer, 128/256KB of BOOT ROM, a SCSI bus interface with DMA (Direct Memory Access), a Centronics printer port, an A16/A24/A32/D8/ D16/D32 VMEbus master/slave interface, and a VMEbus system controller.

Front Panel Switches, Indicators, and Connectors

There are two push-button switches and six LEDs on the front panel of the MVME197SP/DP. The switches are RESET and ABORT.

Switch S3

The RESET switch (S3) resets all onboard devices and drive the SYSRESET* signal if the board **is** the system controller. The RESET switch (S3) will reset all onboard devices except the DCAM and ECDM if the board **is not** the system controller. The VMEchip2 generates the SYSREST* signal. The BusSwitch combines the VMEchip2 local reset, the power up reset, and the reset switch to generate a local board reset.

Switch S2

The ABORT switch (S2) can generate an interrupt to CPU0 via the NMI* signal. It is normally used to abort program execution and return to the debugger. This capability is controlled via the ABORT register in the BusSwitch.

Front Panel Indicators

The six LEDs on the MVME197SP/DP front panel are: FAIL, SCON, RUN, LAN, VME, and SCSI.

The yellow FAIL LED (DS1) is lit when the BRDFAIL signal line is active.

The green SCON LED (DS2) is lit when the VMEchip2 is the VMEbus system controller.

The green RUN LED (DS3) is lit when the MC88110 bus MC* pin is low.

The green LAN LED (DS4) lights when the LAN chip is the local peripheral bus master.

The green VME LED (DS5) lights when the board is using the VMEbus or when the board is accessed by the VMEbus.

The green SCSI LED (DS6) lights when the SCSI chip is the local peripheral bus master.

Connectors

The P1 connector is a 96-pin connector which provides the interface to the VMEbus signals.The P2 connector is a 96-pin connector which provides the interface to the extended VMEbus signals and other I/O signals.

The J1 connector is a 249-pin connector which provides the interface to the MC88110 address, data, and control signals to and from the mezzanine memory expansion.

The J4 connector pins are not used; all ten pin sockets are soldered over.

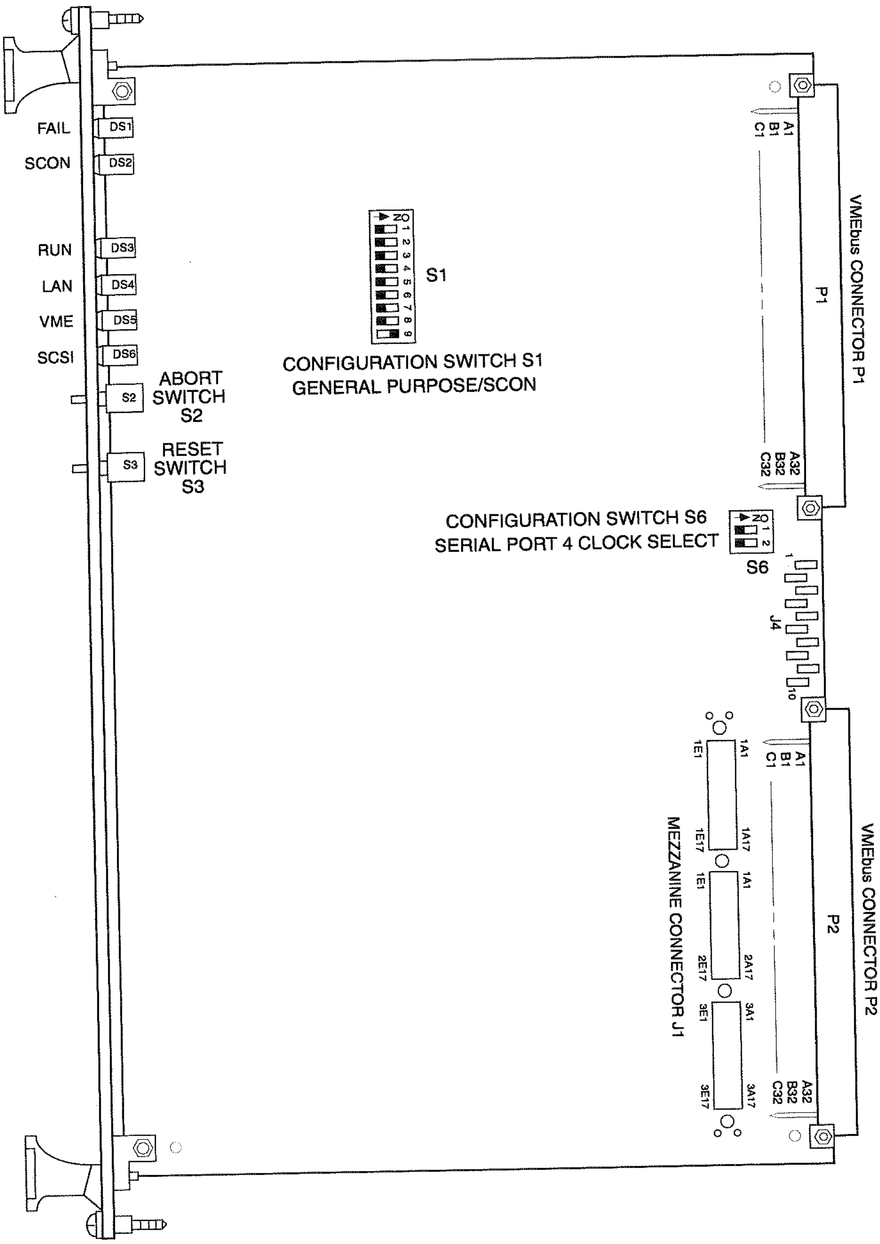


Figure 2-5. MVME197SP/DP Switch Settings

VME EXPANSION MODULE 3

This chapter describes the VME Expansion Module and its VME board add-on options.

The VME Expansion Module is an expansion module containing four single wide VME board slots. These modules and their backplanes are connected to the bottom of the CPU Module or the bottom of the last expansion module. The VME terminator is built into the Base. Additions to a single module enclosure can be done by latching additional VME Expansion Modules under the existing module.

VME Backplane

A backplane is mounted in every VME Expansion Module. There are two types of backplanes, one for the CPU Module and another one for the VME Expansion Module. The CPU Module backplane has receptacle connectors at the bottom of the module but no connectors at the top for interconnection. The backplanes have a direct connection to the power supply through a press fit 96-pin connector identical to the connector used for VME bus P1.

Connections

Board connections to the backplane are made via standard 96-pin DIN connectors. Internal connections are allowed to the A and C rows of VME bus J2 by having long pins on the J2 connector.

External connections consist of pairs of 4-row 140-pin Eurocard connectors. Pin connectors are at the top of every VME Expansion Module backplane and receptacle connectors are on the bottom of every VME Expansion Module backplane. These connectors provide the total signal interconnection between the VME Expansion Modules and also the interconnection to the terminator in the base.

The A row of pins in both 140 pin connectors are dedicated to the interconnection of signal ground between modules. These 70 pins behave as a ground plane. They do not behave as separate contacts in parallel due to their physical topology. Therefore, the impedance of this ground plane interconnect is much lower than the impedance of a single A row contact divided by 140. This is necessary to allow the ground referenced VME bus to work.

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Test Points

The backplanes have test points for all power supply outputs. The test points are plated through holes with silk screen labeling. They are accessible when the front bezel is removed from the module.

Battery Backup and Cooling

5 V STBY has been interconnected between backplanes. This allows the design of a VME battery module to supply 5 V STBY to the total system bus.

Cooling sensors for the VME Expansion Module are on the backplane. The analog output of the cooling sensor runs in the backplane to the I/O distribution board.

Termination

One VME bus terminator is integral with the CPU backplane. The second terminator is a separate board that plugs onto the two 4 row 140 receptacle contact connectors that are always at the end of the bus. The backplane uses proprietary termination. This improves the noise immunity of VME control signals. The VME backplane has DIP ICs to perform the daisy chain jumpering and active termination.

Power Supply

One maximum payload enclosure requires a 15 amp 115 volt service or the VA equivalent at other voltages. It is rated at 12 amps at 115 volts. This rating is on the Base. The result is that the total enclosure payload is limited to 585 watts of DC power. Payloads in the system are limited to the specification of the power supply in each module, to the rating of the module, and to the rating for the enclosure.

Cooling

Cooling is provided by fans that are part of the power supply unit.

VME Terminator

The VME terminator is contained in the base assembly. It "moves" with the base assembly as VME expansion modules are added to a system stack.

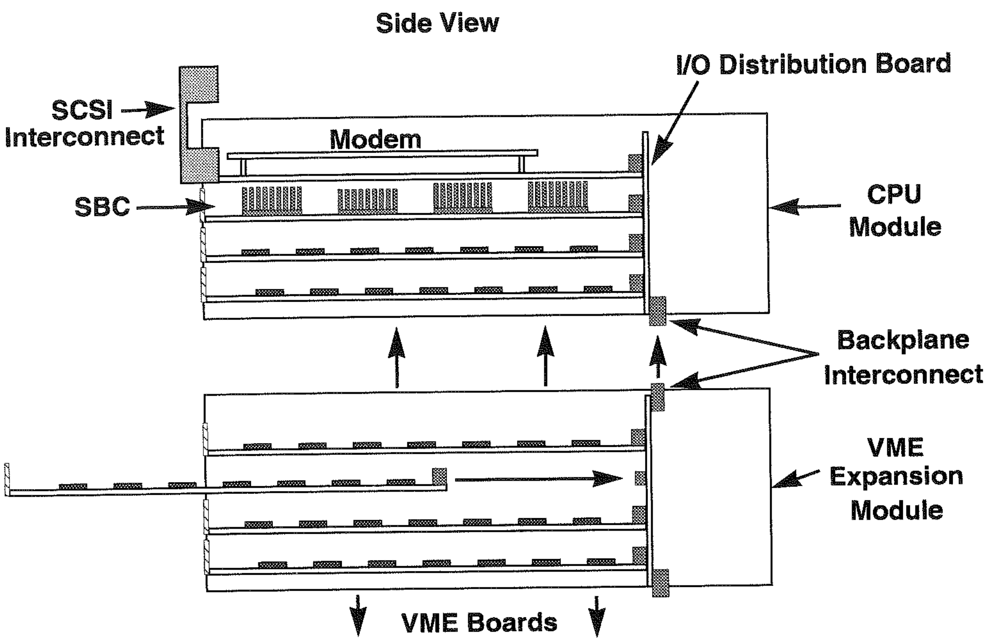

Figure 3-1. Side Views of CPU Module and VME Expansion Module

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MVME328XT-1/-2 SCSI-II Controller

The MVME328XT is a SCSI-II controller capable of controlling up to 14 SCSI devices, seven with the primary SCSI channel (channel 0), plus seven more with the secondary SCSI channel (channel 1).

Table 3-1. MVME328XT Jumper Settings

Header	Description	Setting
J1	Hardware halt	No Jumper
J2	Terminator power to primary SCSI bus (power connected)	1-2
J3	EPROM selection (128K x 8 (27C010)	No Jumper
J4	EPROM selection (128K x 8 (27C010)	No Jumper
J5	SCSI bus ID and VME bus grant	No Jumper
J6	Console Message disabled and GDB initialized on exit	5-6, 7-8
J7	16 bit block mode disabled, clear SysFail after passing diagnostics, reset disabled, debugger enable	3-4, 5-6, 7-8
J8	Load firmware from EPROM, normal run mode, 2K bytes of secondary short I/O space	5-6, 7-8
J9	2K bytes of primary short I/O space, primary master control register reset enabled	1-2, 3-4, 7-8
J10	Secondary channel address modifiers 29 or 2D	1-2
J11	Primary channel address modifiers 29 or 2D	1-2
J12 J13 J14 J15	Primary short I/O Base address	See Figure
J16 J17 J18 J19	Secondary short I/O address	See Figure
P4	Terminator power to secondary SCSI bus is connected	Jumper In

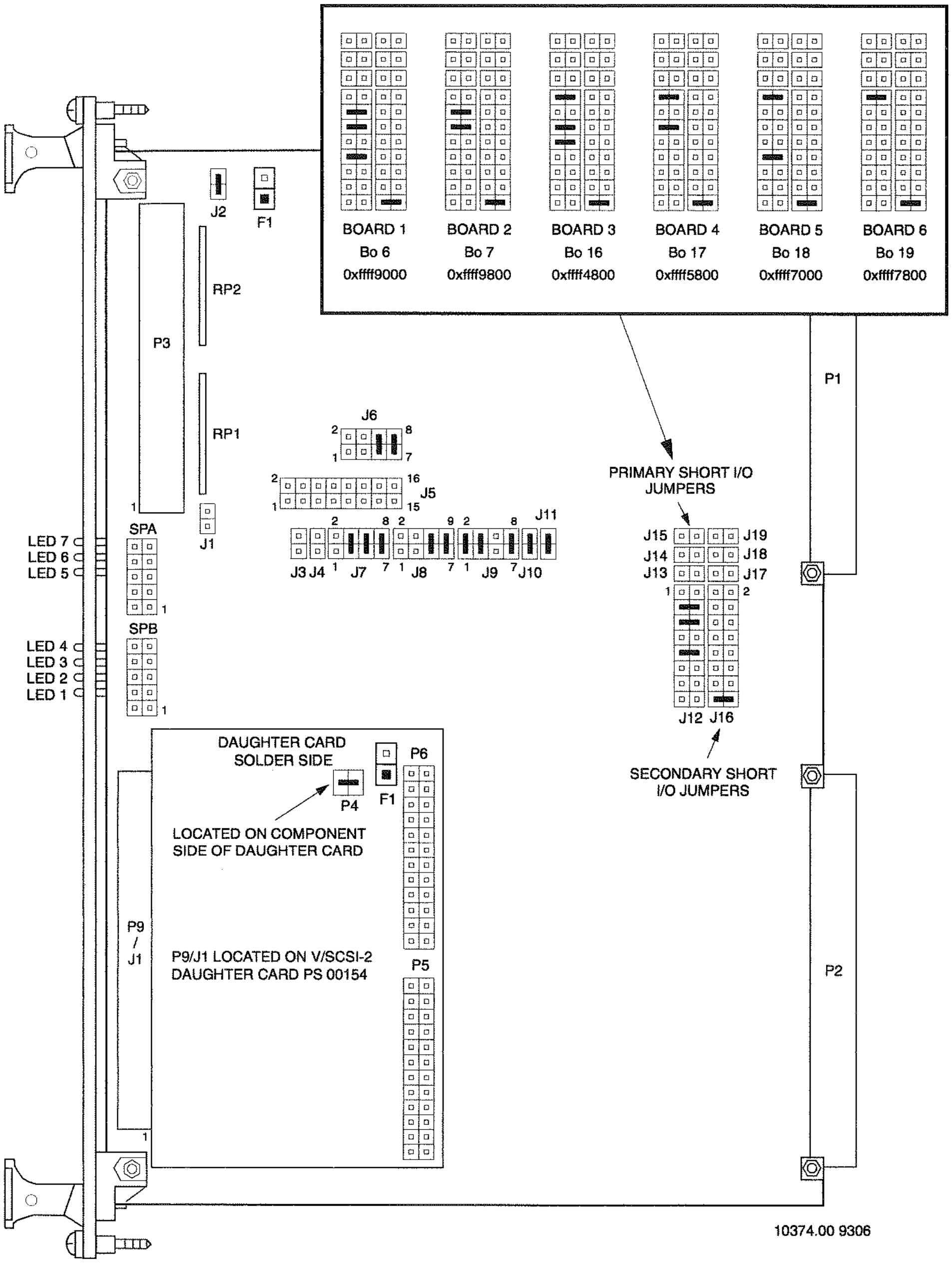

Figure 3-2. MVME328XT Single and Dual Channel Jumper Locations

Table 3-2. MVME328XT Jumper Settings (revision D)

Header	Description	Setting
J4	Terminator power to primary SCSI bus (power connected)	1-2
J5	FLASH enabled	1-2
J10	16 bit block mode disabled, clear SysFail after passing diagnostics, reset disabled, debugger enable	3-4, 5-6, 7-8
J14	Load firmware from EPROM, normal run mode, 2K bytes of secondary short I/O space	5-6, 7-8
J15	Console Message disabled and GDB enabled (initialized on exit)	5-6, 7-8
J16	2K bytes of primary short I/O space, primary master control register reset enabled	1-2, 3-4, 7-8
J17	Secondary channel address modifiers 29 or 2D	1-2
J18	Primary channel address modifiers 29 or 2D	1-2
J22 J23 J24 J25	Primary short I/O Base address	See Figure
J26 J27 J88 J29	Secondary short I/O address	See Figure
P4	Terminator power to secondary SCSI bus is connected	Jumper In

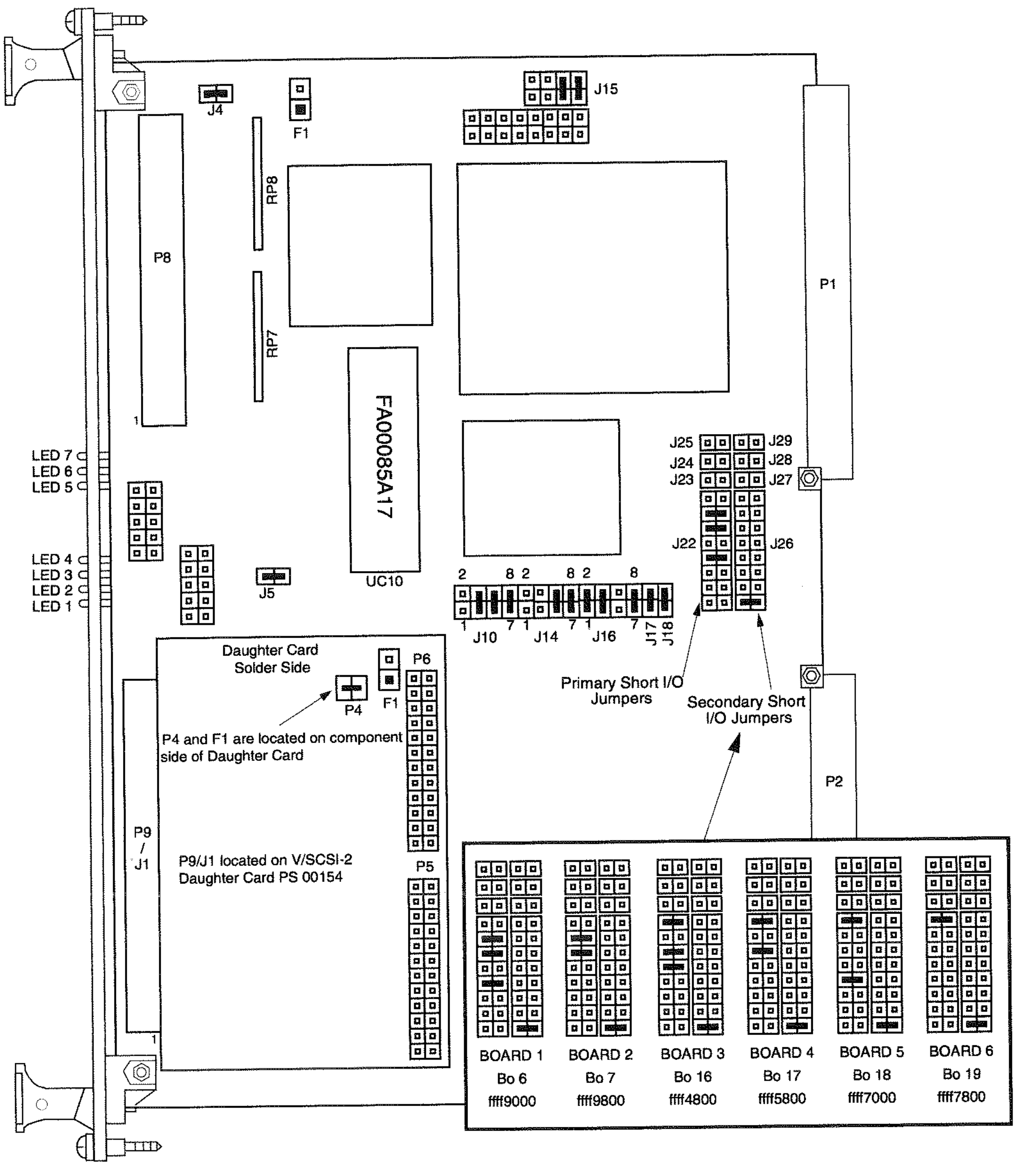

Figure 3-3. MVME328XT Single and Dual Channel Jumper Settings (revision D)

MVME332XT High Performance Serial I/O Controller

The MVME332XT Serial I/O Controller is a double-high VMEmodule used for serial and printer I/O. The MVME332XT has eight asynchronous serial I/O channels that support up to 38.4 Kbaud, full-duplex operation with either hardware or software handshaking. All the ports are EIA-232-D compatible.

Table 3-3. MVME332XT Jumper Settings

Header	Description	Setting
J1	VMEbus Grant/Request Priority Level	1-2, 5-6, 7-9, 8-10, 11-12, 15-17
	ROM/EPROM Size Selection (64K x 8 devices)	1-2
J5	MVME332XTP	
J4	MVME332XTP, Revision D	
	Firmware Mode	S2-1 OFF
Switch S2	MVME332XTP	S2-2 OFF
Switch S1	MVME332XTP, Revision D	S2-3 ON
		S2-4 ON
Board Number	**S1/S2 Switch Positions**	**Base Address**
1	(See next two Figures)	ff780000
2		ff790000
3		ff7a0000
4		ff7b0000
5		ff7c0000
6		ff7d0000
7		ff7e0000
8		ff7f0000

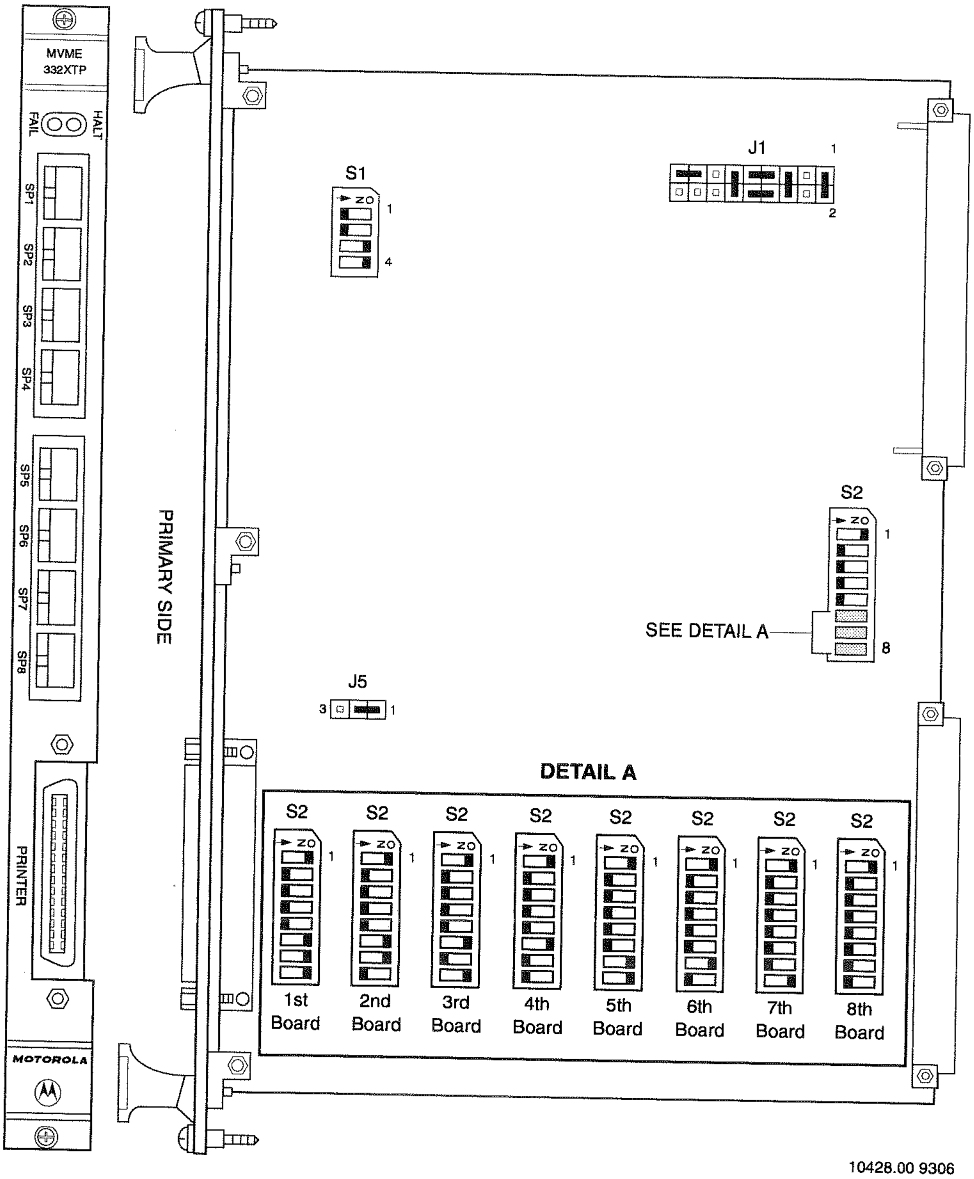

Figure 3-4. MVME332XT Jumper and Switch Settings

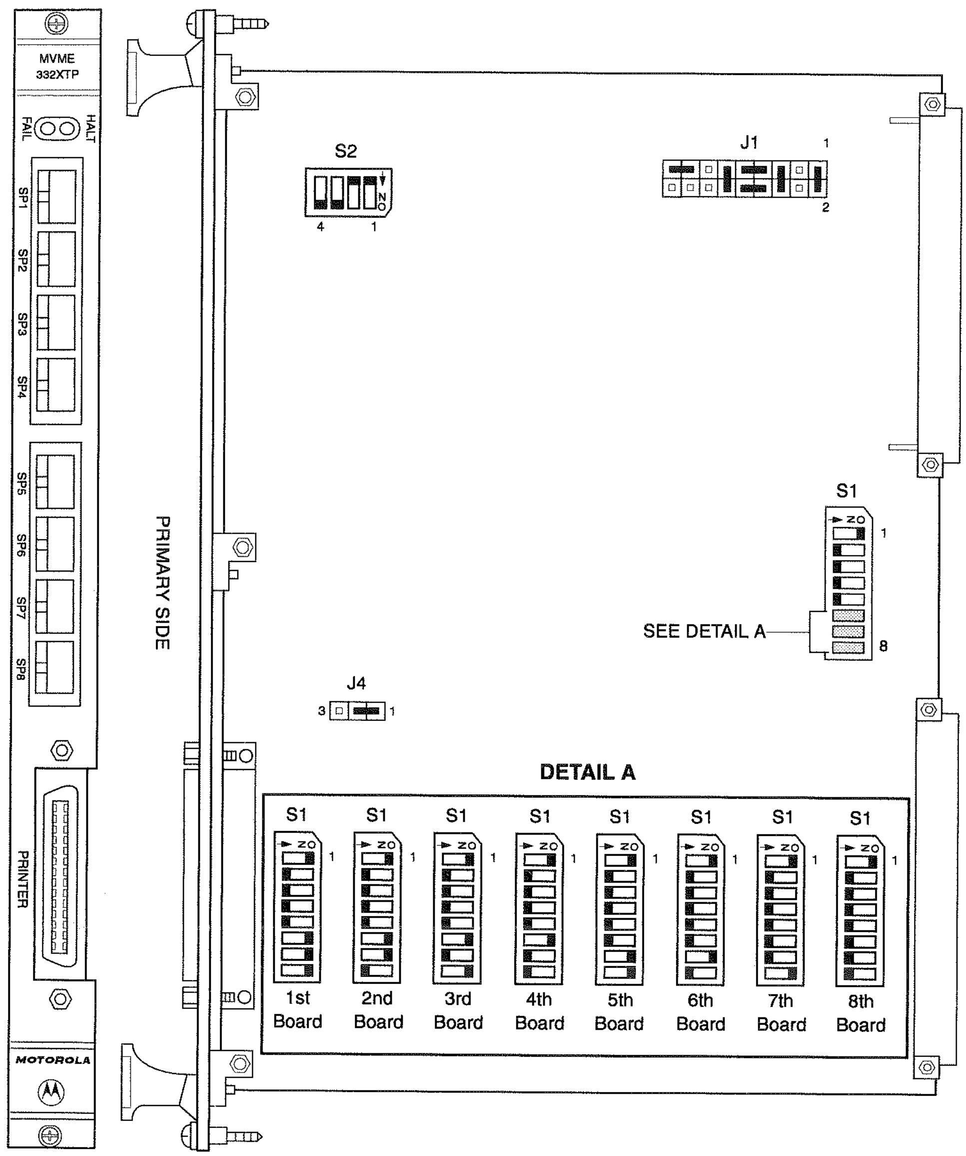

Figure 3-5. MVME332XT Jumper and Switch Settings (Revision D)

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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.

Refer to Appendix B for information on cable pin-outs.

Table 3-4. MVME333 Jumper Settings

Header	Description	Setting
K1	VMEbus Request Priority Level (Level 3)	2-4, 6-8, 10-12, 13-14, 15-16, 23-24
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
	(2nd 333 board)	1-2, 3-4, 11-12, 13-14
K4	Status Bit = 1	No Jumper
K5	ROM Configuration (EPROM type 27512)	5-6, 7-8
K6	VMEbus Time-Out Selection (infinity)	7-8
K7	ROM Access Time (350 nanoseconds)	3-4
K9	Local Memory Addresses (RAM at $000000, ROM at $100000)	2-3
J5		1-2
J6		1-2
J7		1-2
J8		1-2

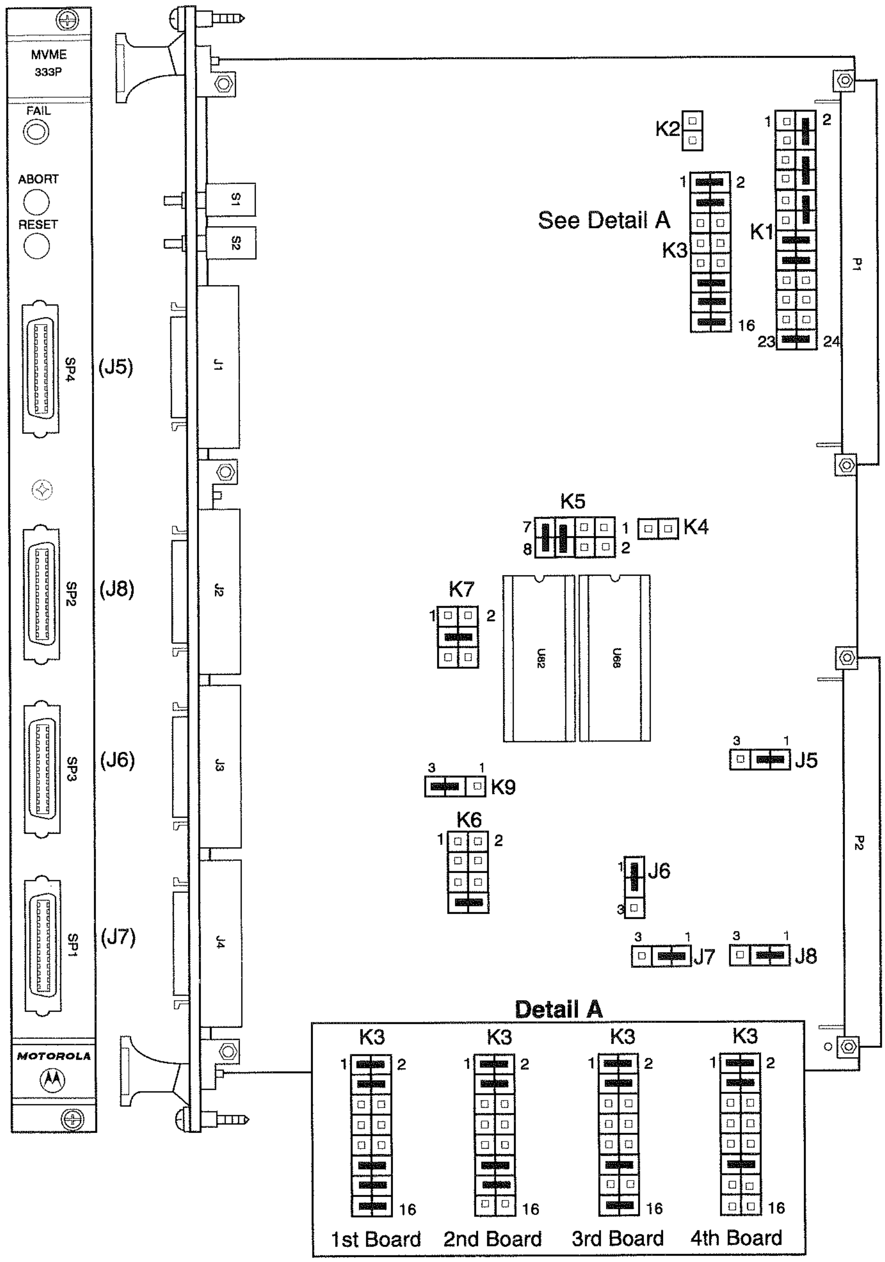

Figure 3-6. MVME333 Jumper Settings

Serial Ports (SP1 - SP4) Configuration Options

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Table 3-5. DTE port, TRXC Programmed as Input (jumper on pins 1-2)

EIA232 Signal Name	DB25 Pin #	Direction	SCC Pin	Usage
TXC	15	Input	TRXC	Transmit Clock
RXC	17	Input	RTXC	Receive Clock
ETXC	24	Output		Not Used

Table 3-6. DTE port, TRXC Programmed as Output (jumper on pins 2-3)

EIA232 Signal Name	DB25 Pin #	Direction	SCC Pin	Usage
TXC	15	Input		Not Used
RXC	17	Input	RTXC	Receive Clock
ETXC	24	Output	TRXC	Transmit Clock

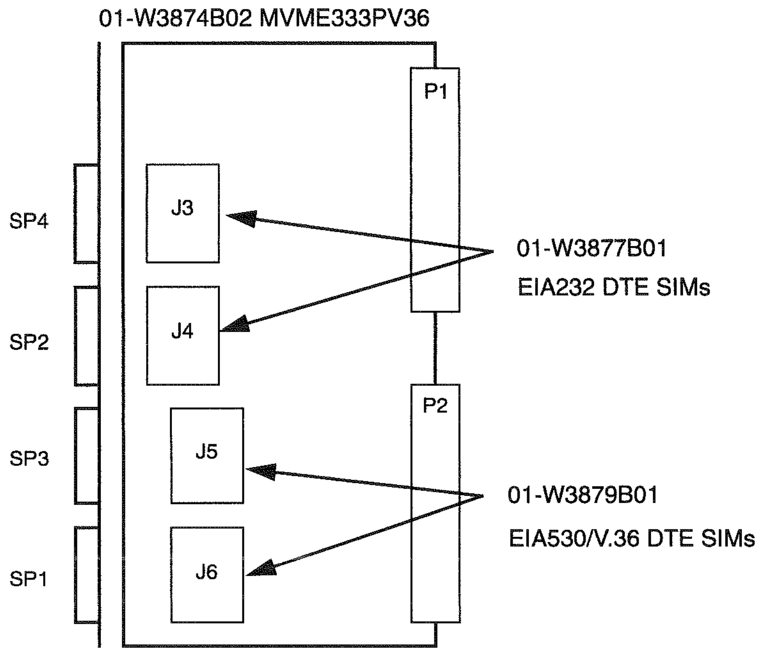
Table 3-7. DCE port, TRXC Programmed as Output (jumper on pins 2-3)

EIA232 Signal Name	DB25 Pin #	Direction	SCC Pin	Usage
TXC	15	Output	TRXC	Transmit Clock
RXC	17	Output	TRXC	Receive Clock
ETXC	24	Input	RTXC	Optional transmit clock

Serial Port	Jumper Number
SP1	J7
SP2	J8
SP3	J6
SP4	J5

The table below gives the correct configurations of the MVME333P with V.36/EIA530 serial ports.

Front Panel Serial Port Number	On-board Header Number	SIM Part Number	SIM Type
SP4	J3	01-W3877B0*x*	EIA232 DTE
SP2	J4	01-W3877B0*x*	EIA232 DTE
SP3	J5	01-W3877B0*x*	EIA530/V.36 DTE
SP1	J6	01-W3877B0*x*	EIA530/V.36 DTE



The 01-W3874B01 MVME333P simply contains four 01-W3877B01 EIA232 DTE SIMs.

The 01-W3874B03 MVME333P contains no SIMs at any location.

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MVME334A Multiprotocol Communications Controller

The MVME334A is a VMEmodule that provides all the hardware for a universal intelligent controller for serial data communications on six full duplex channels.

Refer to Appendix B for information on cable pin-outs.

Table 3-8. MVME334A Jumper Settings

Header	Description	Setting
J5	VMEbus Functions Select	5-6
J6	Bus Timeout Select	3-4
J7	VMEbus Requester Priority Level Select	2-4, 6-8, 10-12, 13-14, 15-16, 23-24
J8	Module Address Mode Select	No Jumper
J9	Module Base Address Select	1-2, 3-4 (See next figure for additional boards)
J12	ABORT/RESET Switches, Status Register Select	No Jumper
J14	Module Base Address Select	1-2, 3-4, 5-6, 7-8, 9-10, 11-12, 13-14, 15-16 (See next figure for additional boards
J15	Port SP0, DTE/DCE	5-6, 7-8
J16	Port SP1, DTE/DCE	1-2, 3-4
J18	Port SP3, DTE/DCE	1-2
J19	Port SP2, DTE/DCE	3-4
J20	DMAC Request Configuration Select	3-5, 4-6

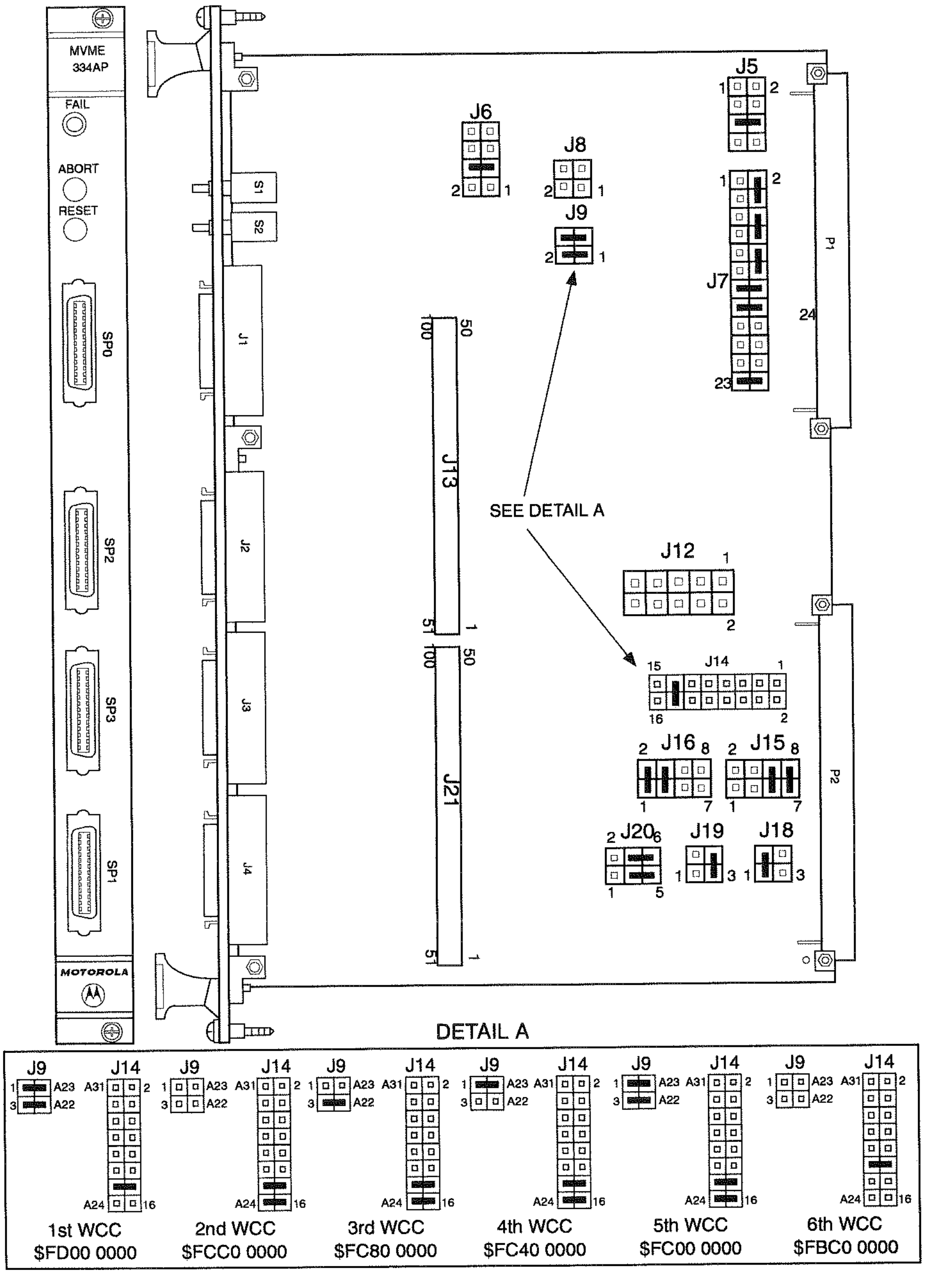

Figure 3-7. MVME334A Jumper Settings

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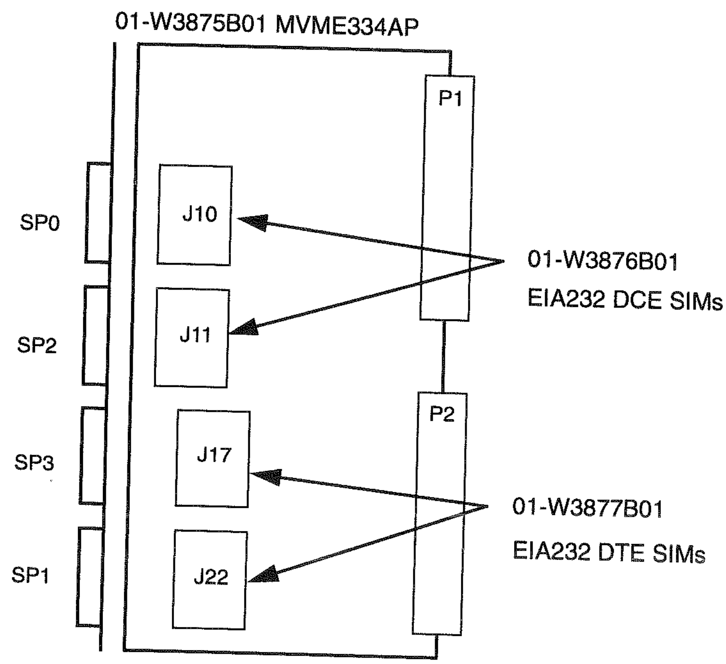
Serial Ports (SP0 - SP3) Configuration Options

The following is the correct information regarding the configuration of the MVME334AP with EIA232 serial ports.

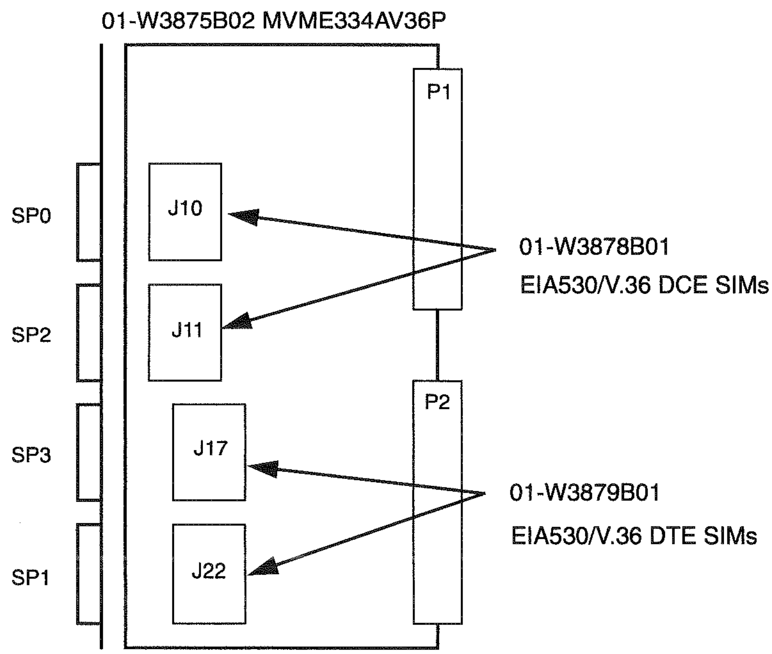
Front Panel Serial Port Number	On-board Header Number	SIM Part Number	SIM Type
SP0	J10	01-W3876B0*x*	EIA232 DCE
SP2	J11	01-W3876B0*x*	EIA232 DCE
SP3	J17	01-W3877B0*x*	EIA232 DTE
SP1	J22	01-W3877B0*x*	EIA232 DTE



The 01-W3875B03 MVME334AP contains no SIMs at any location.

The following is the correct information regarding the configuration of the MVME334AV36P with EIA530/V.36 serial ports.

Front Panel Serial Port Number	On-board Header Number	SIM Part Number	SIM Type
SP0	J10	01-W3878B0*x*	EIA530/V.36 DCE
SP2	J11	01-W3878B0*x*	EIA530/V.36 DCE
SP3	J17	01-W3879B0*x*	EIA530/V.36 DTE
SP1	J22	01-W3879B0*x*	EIA530/V.36 DTE



The 01-W3875B03 MVME334AP contains no SIMs at any location.

3

MVME338 Terminal I/O Subsystem Controller

The MVME338 terminal I/O subsystem controller is a terminal server used to connect a variety of EIA-232-D devices and parallel printers to the system.

Note **If you have an MVME338 and MVME339 installed in your system, you need to make sure that the addresses of those boards are unique. If the addresses are the same, your system will panic during boot up.**

Table 3-9. MVME338 (20 MHz) Jumper Settings

Header	Setting
E1	9-10
E2	7-8
E3, E4, E5	2-3
E6	1-2, 3-4
E7, E8, E9	No Jumper
E10	1-2
E11	3-4
E12	2-3
E13, E14, E17, E18	1-2
E15, E16, E19	No Jumper
E20	(See Figure)
E21	No Jumper
E22	3-4, 7-8, 13-14
E23 - E27	(See Figure)
E28, E29, E31	No Jumper
E30	1-2
E32	1-2, 3-4, 5-6, 7-8, 9-10, 11-12, 13-14, 15-16
E33	1-2

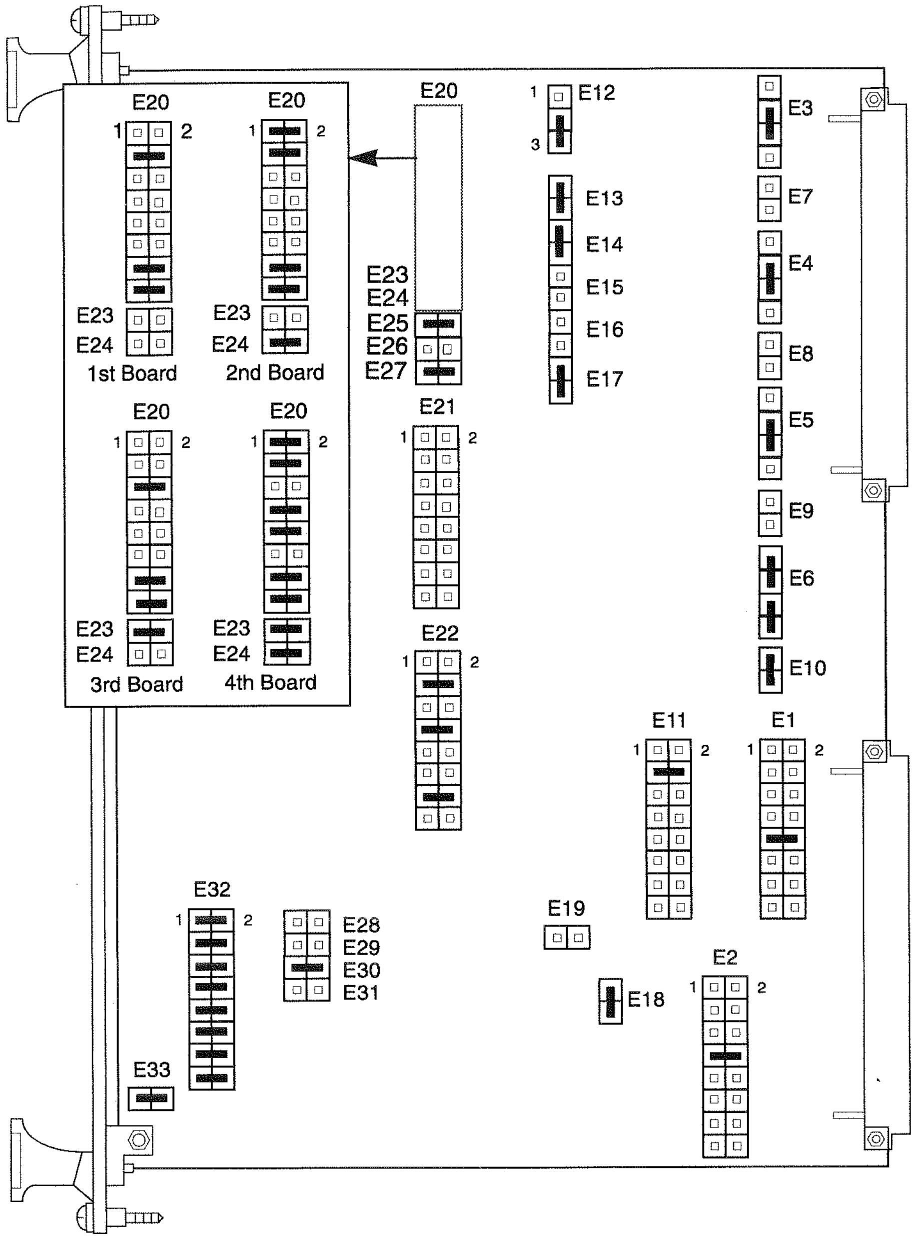


Figure 3-8. MVME338 (20 MHz) Jumper Settings

Table 3-10. MVME338 (25 MHz) Jumper Settings

Header	Setting
E1	(See Figure)
E2	7-8
E3, E4, E5	2-3
E6	1-2, 3-4
E7, E8, E9	No Jumper
E10	1-2
E11	3-4
E12	2-3
E13, E14, E17, E18	1-2
E16, E19	No Jumper
E20	(See Figure)
E22	3-4, 13-14
E23 - E24	(See Figure)
E25, E27	1-2
E26	No Jumper
E32	1-2, 3-4, 5-6, 7-8, 9-10, 11-12, 13-14, 15-16
E33, E34	1-2
E35, E36	No Jumper

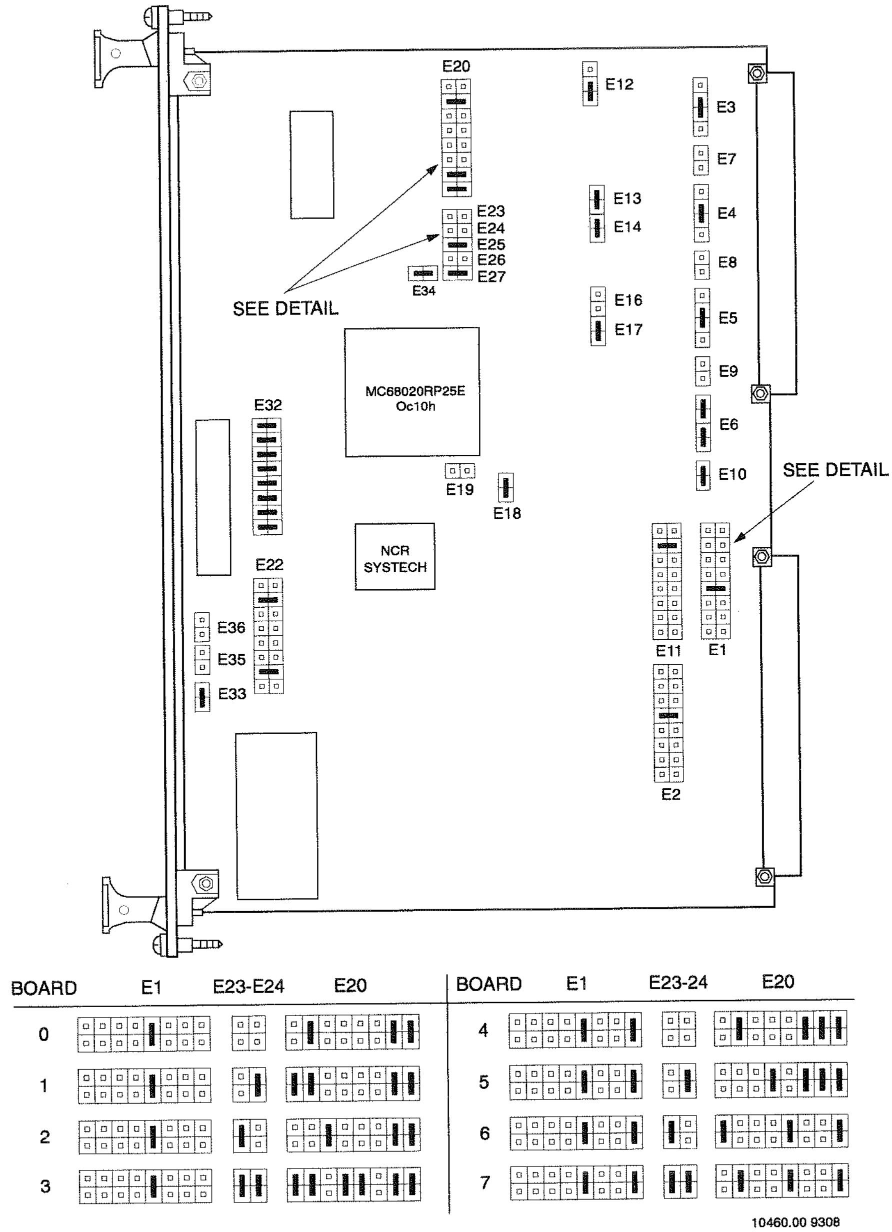


Figure 3-9. MVME338 (25 MHz) Jumper Settings

MVME339 Etherplex Controller

The MVME339 is a terminal I/O subsystem controller is a terminal server used to connect a variety of EIA-232-D devices and parallel printers to the system.

Note **If you have an MVME338 and MVME339 installed in your system, you need to make sure that the addresses of those boards are unique. If the addresses are the same, your system will panic during boot up.**

Table 3-11. MVME339 Jumper Settings

Header	Description	Setting
E1	VMEbus Interrupt Configuration	3-4
E2		1-2, 5-6
E3	Slave Address Base	7-8
E4		(See Figure)
E5	Slave Address Jumper	(See Figure)
E6	Bus Grant Level Selection (Level 3)	1-2, 3-4
E8		2-3
E10		2-3
E12		2-3
E7	Bus Request Level Selection	1-2
E9		No Jumper
E11		No Jumper
E13		No Jumper
E14	Status/ID Byte	(See Figure)
E15	Master Cycles Allowed 100 (decimal) transfers (64H)	1-2, 3-4, 7-8, 9-10, 15-16
E16	Enables E15	1-2
E17	Dual-Port Memory Jumpers	1-2
E18		1-2
E19		No Jumper
E20		1-2
E21	32/16-Bit Master Cycles	1-2
E22	EPROM Size Configuration (64K bytes)	1-2
E23	Self-Test Jumper/Configuration Register Settings	1-2, 3-4

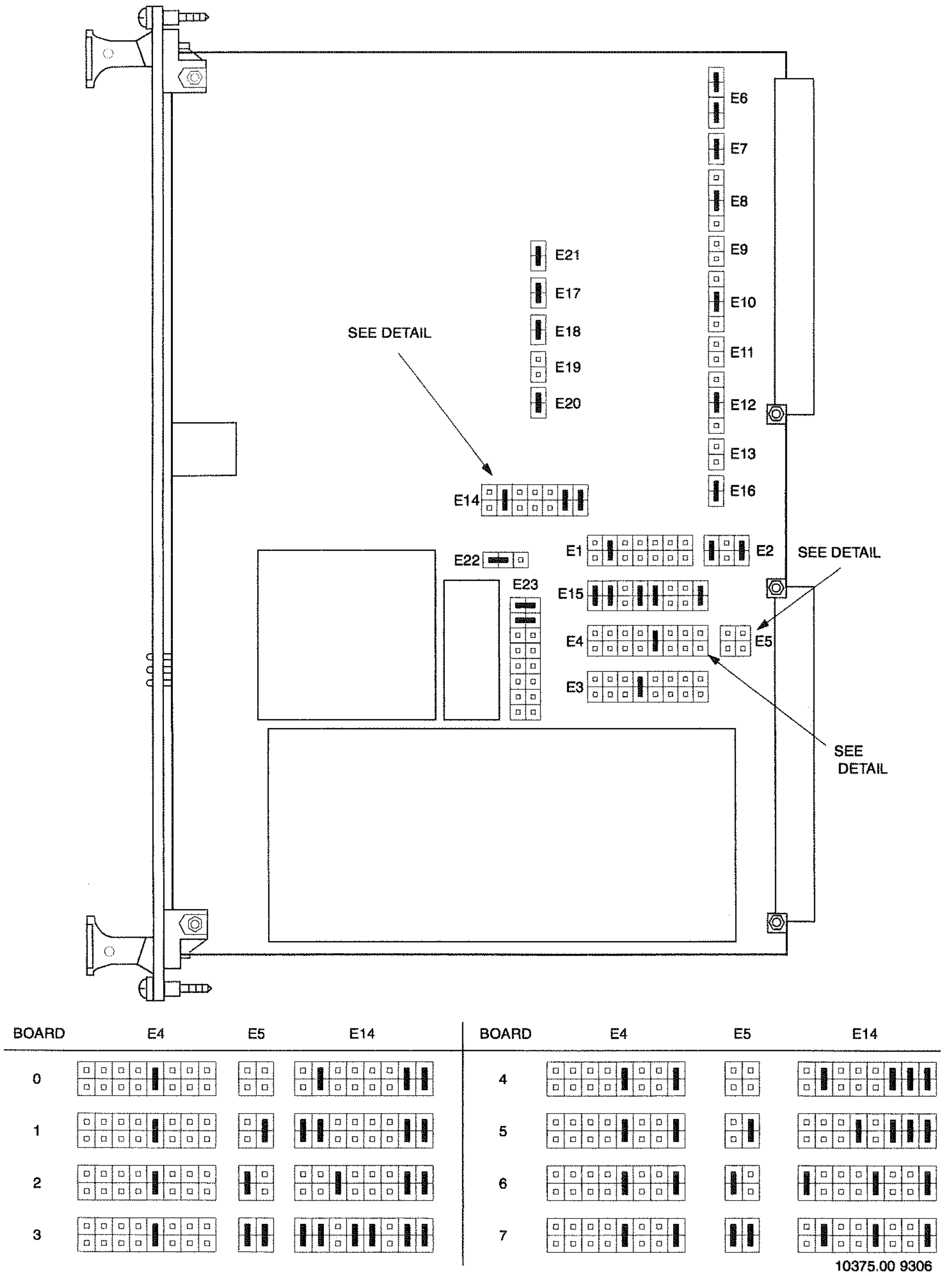


Figure 3-10. MVME339 Jumper Settings

A new revision (01-W2476D01B) of the MVME339 module is now shipping. Along with new firmware, jumpers have been removed on Header E23.

3

Table 3-12. MVME339 Jumper Settings

Header	Description	Setting
E1	VMEbus Interrupt Configuration	3-4
E2		1-2, 5-6
E3	Slave Address Base	7-8
E4		(See Figure)
E5	Slave Address Jumper	(See Figure)
E6	Bus Grant Level Selection (Level 3)	1-2, 3-4
E8		2-3
E10		2-3
E12		2-3
E7	Bus Request Level Selection	1-2
E9		No Jumper
E11		No Jumper
E13		No Jumper
E14	Status/ID Byte	(See Figure)
E15	Master Cycles Allowed 100 (decimal) transfers (64H)	1-2, 3-4, 7-8, 9-10, 15-16
E16	Enables E15	1-2
E17	Dual-Port Memory Jumpers	1-2
E18		1-2
E19		No Jumper
E20		1-2
E21	32/16-Bit Master Cycles	1-2
E22	EPROM Size Configuration (64K bytes)	1-2
E23	Self-Test Jumper/Configuration Register Settings	No Jumper

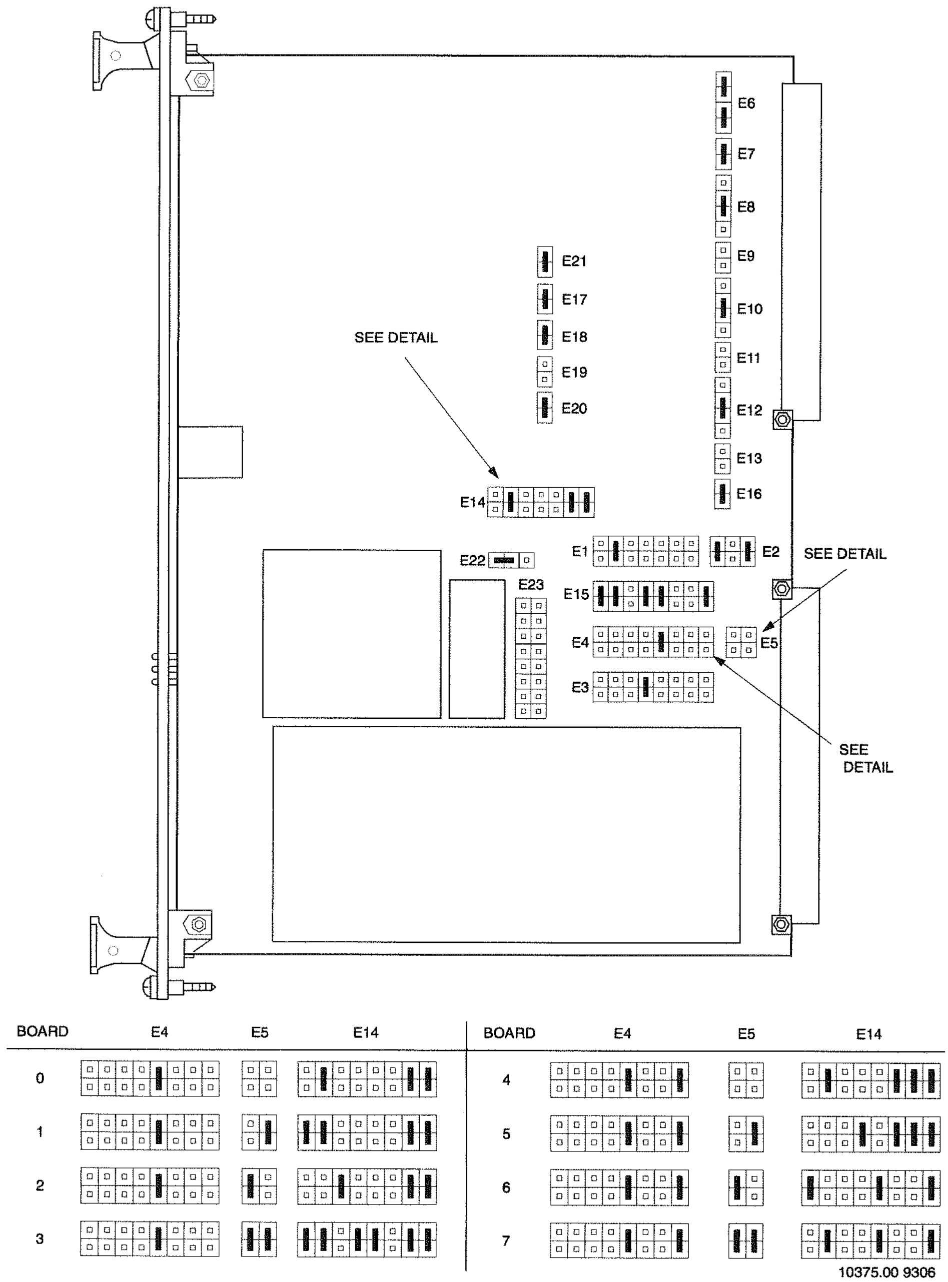


Figure 3-11. MVME339 Jumper and Switch Settings (Revision B)

MVME376 Ethernet Communications Controller

The MVME376 is a VMEbus Local Network Controller for Ethernet and other IEEE 802.3 compatible networks. The MVME376 utilizes the combination of an Am7990 Local Area Network Controller for IEEE-802.3/Ethernet (LANCE), an Am7992B Serial Interface Adapter (SIA), and 256 Kbytes of dual ported RAM.

Table 3-13. MVME376 Jumper Settings

Header	Description	Setting
JA1	+12V transceiver power to AUI connection at J1 connector	1-2
JA4	DTACK timing for VMEbus initiated transfers: fast	2-3
JA5	Reserved for future use	No Jumper
JA7	Factory test point	No Jumper
JA8	Disable special parity error reporting	2-3
JA9	Disable VMEbus reporting of parity error	2-3
JA10	SYSCLOCK signal	2-3
JA11	SYSFAIL to VMEbus disabled	No Jumper
JA12	Parity errors sensed by polling board level status register	2-3
JA13	Half-step signaling AUI interface	No Jumper
JA16	Selects A16 and A32 slave access only; disables A24 slave access	1-2
JA18	AUI connector	No Wire Jumper
SW1		See next figure
SW2		See next figure
SW3		See next figure

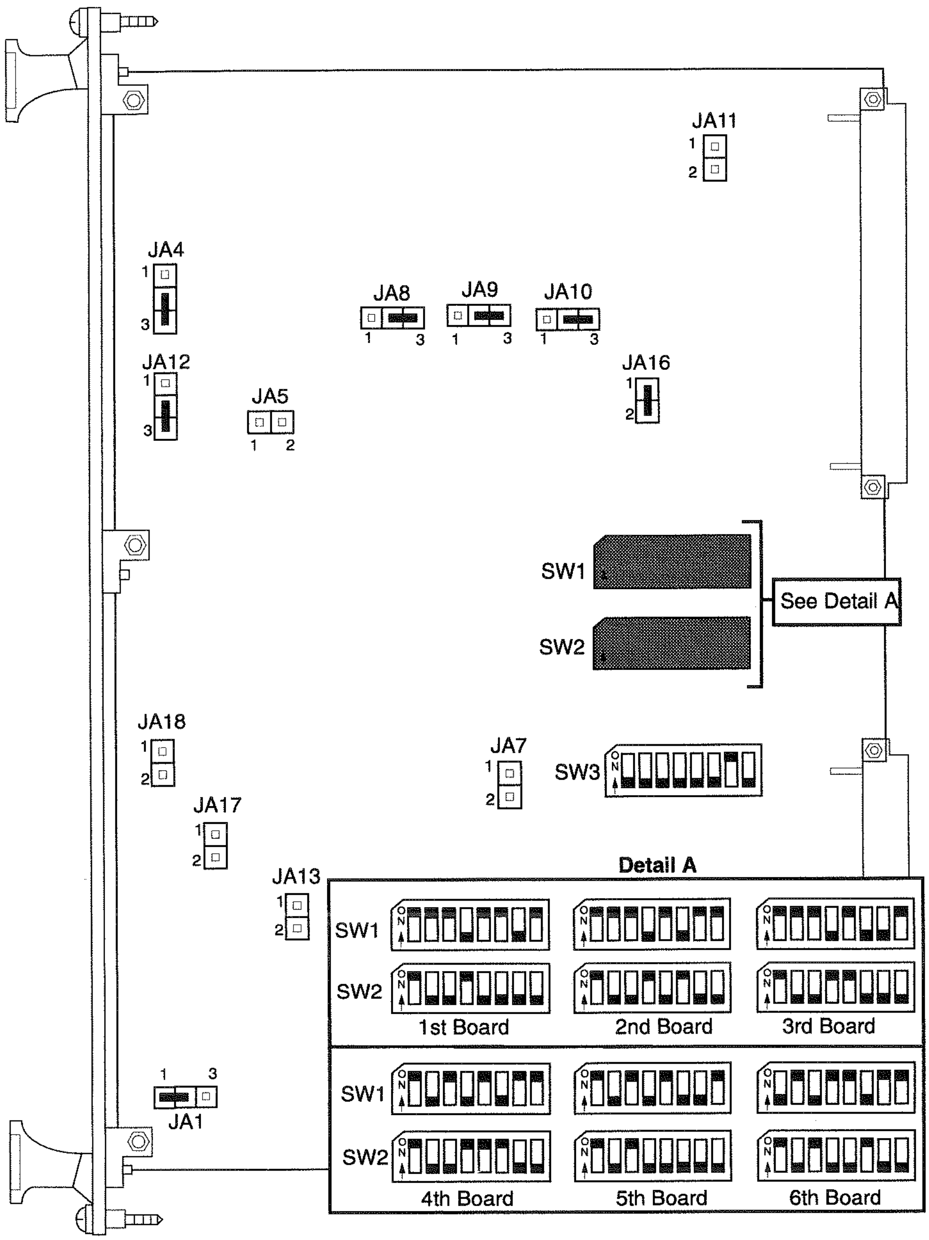


Figure 3-12. MVME376 Jumper and Switch Settings

SCSI DEVICE EXPANSION MODULE

4

This chapter describes the SCSI Device Expansion Module and its components. The SCSI Device Expansion Module has room for up to four SCSI devices. Two positions support 3.5 inch non-removable media devices. The other two positions support half height 5.25 inch SCSI devices. The 5.25 inch devices may be removable media devices. Also 3.5 inch devices may be installed in the 5.25 inch positions.

Power Control

Two types of power control are provided in the SCSI Device Expansion Module. Two RJ45 jacks in the rear of the module allow daisy chaining of the power control signal from the enclosure control board. When AC power is connected to the module, a SCSI interface with terminator power present, and the power control signal is in the ON state, the power supply in the module turns on.

If unable to use the power control cable, a switch accessible with a pointed object can be set to allow the module to power up when AC power is connected and SCSI terminator power is present.

SCSI Backplane

The SCSI backplane is mounted in every SCSI Device Expansion Module. The backplane has a direct connection to the SCSI device power supply and accepts up to four 3.5 inch drive carriers and two 5.25 inch drive carriers per module. The SCSI backplane has all the module level electronic devices that are not part of the power supply assembly.

The SCSI backplane has two RJ45 external connectors for power control, DC failure and cooling sensor lines. The connectors are on very small boards that turn them 90 degrees and these are considered part of the backplane assembly. The two connectors are interconnected pin for pin on the backplane. The signals are stubbed out to circuits on the backplane. These connectors provide daisy chaining of the wire ored signals from the enclosure control board to all of the SCSI Device Expansion Modules that are part of a system. When present, separate SCSI only modules are also included in this single daisy chain. The pin-out has been made symmetrical and redundant so that cross-over or pin to pin cables work.

A cooling sensor for the SCSI Device Expansion Module is on the backplane. The backplane contains the comparator circuitry to determine cooling failure. Two thresholds are used. The lower temperature threshold sends an open collector signal back to the host and illuminates the yellow LED on the rear of the SCSI Device Expansion Module. The higher threshold powers off the SCSI Device Expansion Module protecting its contents regardless of the action taken by the host. A voltage sensing circuit sends a signal back to the host when the DC output of the power supply has dropped out.

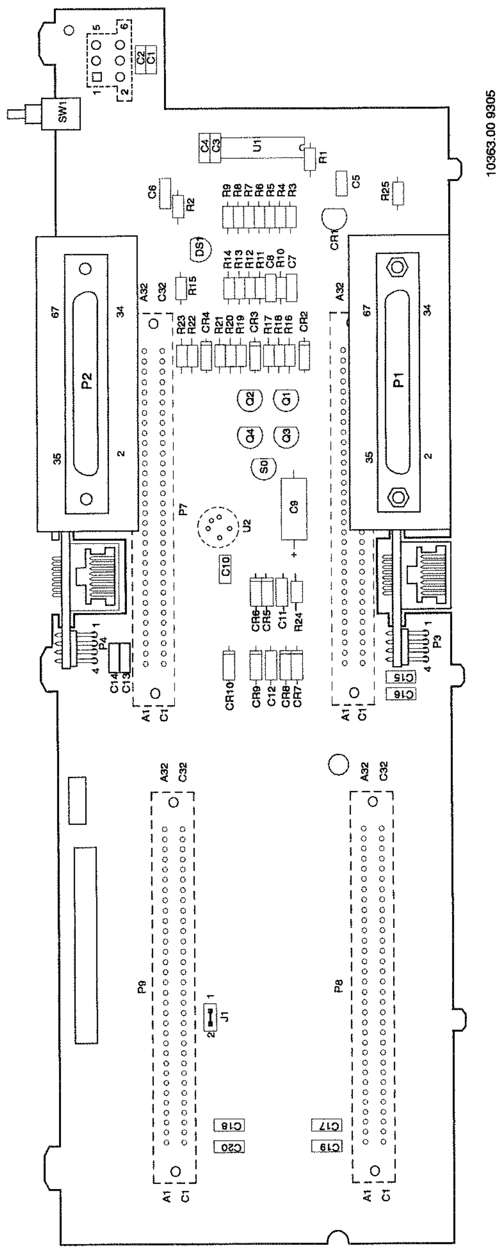


Figure 4-1. SCSI Backplane

Power Supply

The SCSI Device Expansion Module power supply is a 100 watt auto or wide ranging unit with a fan for cooling. The power supply is in a plastic and metal housing that is part of the power supply assembly. It slides in from the front of the module when the bezel is removed, and fastens in place with an integral plastic latch. It has a DC connector that directly engages the SCSI Device Expansion Module backplane.

The RJ45 connectors on the rear of all SCSI Expansion Modules daisy chain PWRSUPENABLE* and COOLFAIL*. With the power supply enable signal running in the same cable as the fail signal, there is an automatic "verification" that the alarm signal is connected.

The power supply utilizes IEC320 style inlet and outlet for AC power. These face out the rear of the enclosure when the supply is installed.

Cooling is provided by fans that are part of the power supply unit. The fan latches into the plastic portion of the power supply housing and obtains its 12 volt DC power directly from the power supply.

The power-on LED is driven directly from the +5V in the supply. It is located in the front of the power supply module. This LED provides the only indication of an operating or malfunctioning power supply.

Drive Carriers

Injection molded plastic cradles hold the drive and an adapter board assembly. The cradle slides in from the front of the SCSI Device Expansion Module, plugs into the backplane and latches into place. Two types of drive carrier assemblies are used.

The bottom device mounting holes are used for 5.25 inch removable devices. A single high bezel filler panel is removed when this assembly is installed. The assembly for 3.5 inch non-removable media devices fits in either side of the SCSI enclosure.

A circuit board assembly, the adapter board, with short cables permanently attached, fastens to the cradle with two self taping screws. The adapter board has a 64-pin DIN connector, B row contacts omitted, that plugs into the backplane for all power and signals. A grounding tab is part of this assembly for ESD control. SCSI addresses are selectable via a rotary switch soldered to the adapter board.

Connection to CPU Module

Connection to the CPU Module is made by a custom molded SCSI III connector or a separate SCSI cable. There is a custom molded daisy chain AC power jumper and RJ45 in and out connectors for power enable lines and environmental failure data lines.

Control Cable

A short, pin 1 to pin 1, non-crossover, cable with shield and shielded RJ-45 connectors are used to daisy chain the enclosure control board to the SCSI Device Expansion Module in the same enclosure. This is the same type of cable used for serial port cables. A longer version of the cable is used to interconnect separate SCSI enclosure.

SCSI Device Expansion Module

The SCSI Device Expansion Module contains four half-height peripheral bays. Two bays accommodate 3.5-inch hard disk drives and two bays accommodate either 3.5-inch hard disk drives or half-height removable media devices. Use the figure below for determining placement.

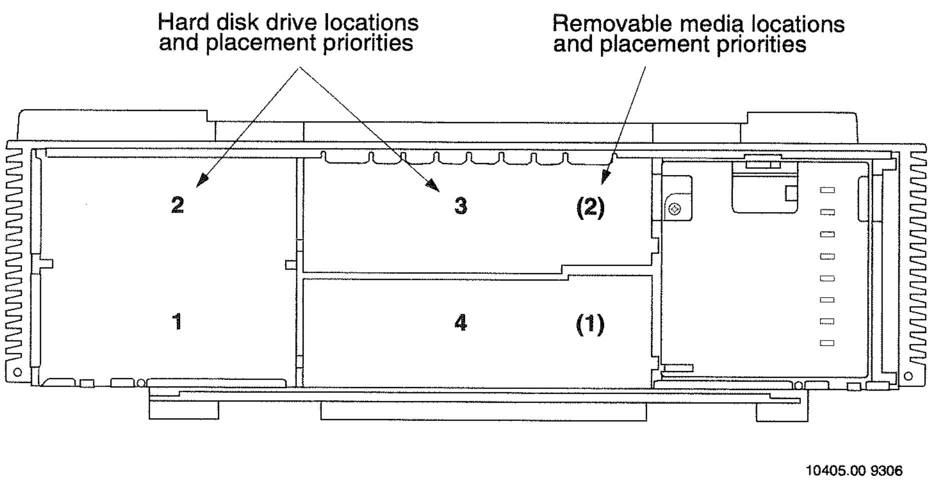


Figure 4-2. Disk Drive and Removable Media Placement Priorities

BASE AND CROWN 5

A single CPU Module or SCSI Device Expansion Module becomes a complete enclosure with the addition of a base and crown. This chapter describes the functions of these two components.

Base

The base module provides several functions. Physically, the base is wider than the stack for stability and appearance; additionally, it lifts the chassis out of the dusty air near the floor and protects the cooling vents from blockage. The base provides space for two electronic modules, the VME terminator and the Base Unit Power System.

The base latches to the bottom chassis with the same mechanism that interconnects the modules. The footprint of the base is larger than the stack to meet safety requirements for stability and to prevent installing the stack too close to another system or structure and completely blocking its air flow.

The base has a molded in strain relief for the main power cord that prevents accidental pull out, but allows a loop that is large enough to meet regulatory safety requirements for a main power disconnect point. A post-plated sheet metal panel covers the bottom of the base for shielding and safety considerations. The metal panel latches into place to ensure safety requirements of restricting operator access. The base is always required in order to meet regulatory and transient suppression requirements.

The VME terminator latches into place from the top of the base. The VME terminator directly interconnects with the base power unit in the base.

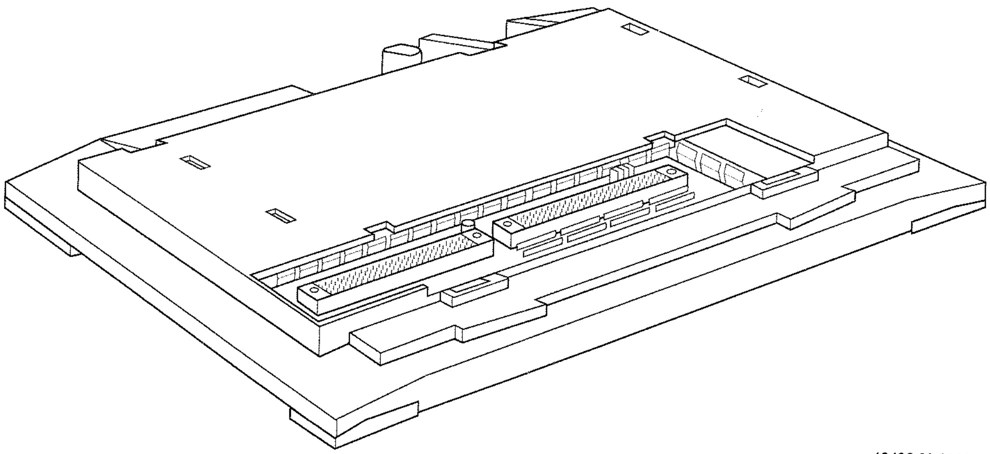
Base Unit Power System

The Base Unit Power System board is installed from the bottom of the base. It is covered by the metal panel. A single screw and integral latches hold it in place.

The base power system locates in one place several functions that would otherwise be repeated in the 100 and 190 watt power supplies. It provides the enclosure control board with a housekeeping voltage deleting an expensive and unreliable bi-stable relay.

5

- Low frequency line filter provided.
- Transient suppression devices provided
- 0.3 ma +5 V housekeeping supply provided
- Main AC power inlet provided



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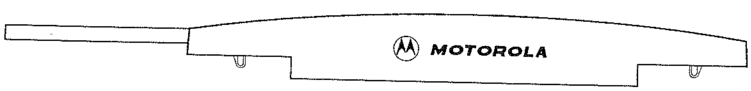
Crown

The crown is a separate part that covers the interconnect opening in the top surface of the chassis. The crown holds the key to the CPU Module's keylock switch.



MAINTENANCE A

Series 900 computer systems require minimum maintenance and care to keep them operating properly. A proper environment for the computer means placing the unit within the appropriate temperature, humidity, and altitude ranges. See *Specifications* for a list of these environmental ranges. For the best performance of the computer and for the comfort of the operator, it is better to place the computer in the middle of these environmental ranges. It is important that the environmental conditions not change abruptly.

Cleaning

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 equipment's user manual for cleaning instructions.

Tape Drive Maintenance

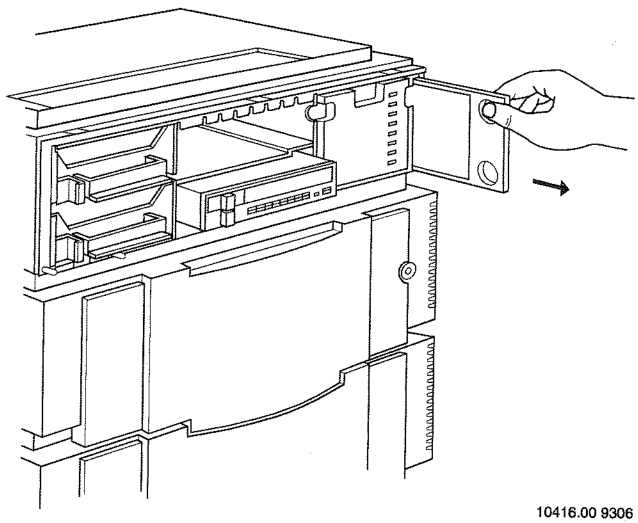
It is your responsibility to ensure that tape drives are properly cleaned. The cartridge tape drive should be cleaned after every eight hours of use, and cartridge tape cleaning supplies are available from Motorola. The MVME857 DAT drive should be cleaned after every 25 hours of use. A cleaning kit is supplied with this drive.

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

- No direct sunlight
- No sources of magnetization
- No dust
- Temperature range from 50° to 104° F (10° to 40° 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.

Air Filter

Check the air filters at least once a month. Depending on your environment, it may be necessary to check more often, especially if you are experiencing heat problems. If the air filter is filled with dust, remove it from its carrier, wash it in a mild detergent, and let it dry completely before reinserting.



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Removing and Installing Device Modules

A device module is normally removed when a new VME expansion module is installed. When a new SCSI device expansion module is installed, it is usually added to the top of the stack. Use the following steps if you need to remove and add a device module.

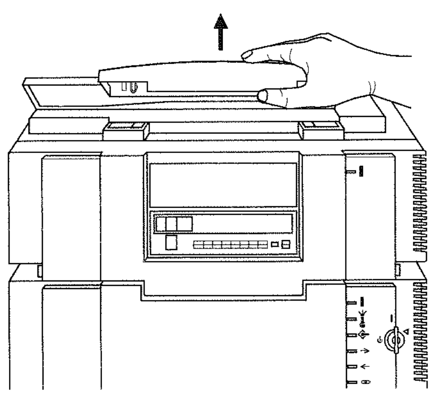
Step	Action
1	An ESD strap must be secured to your wrist and to ground throughout the procedure.

Caution

Avoid touching areas of integrated circuitry; static discharge can damage these circuits.

Before doing this installation, it is recommended that you: (1) perform an operating system shutdown; (2) turn the keylock switch to the "standby" power position (left-most); and (3) disconnect the AC power cord from the Base.

Step	Action
2	Remove the crown by lifting up the front of the crown.



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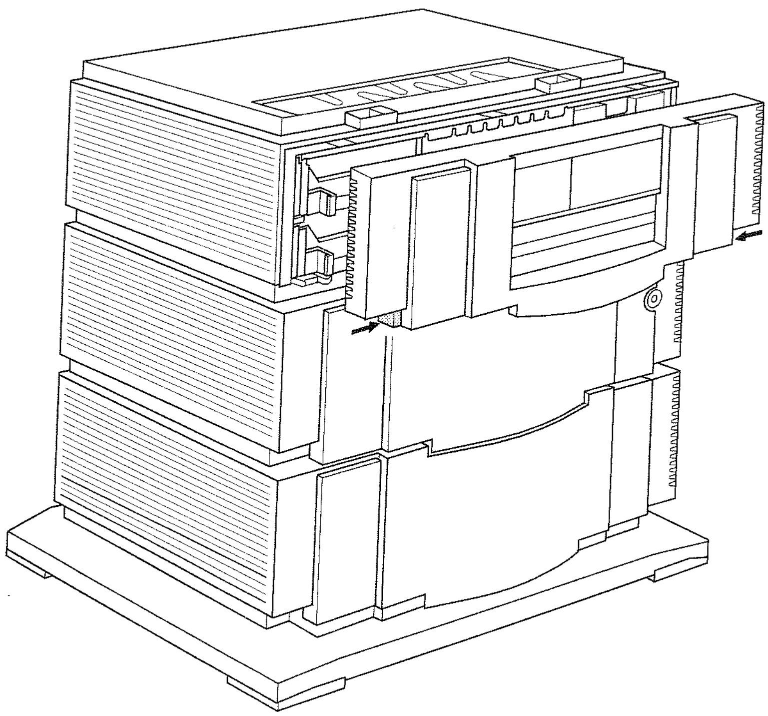
Step	Action
3	Remove the SCSI Device Module's AC jumper cable, SCSI Interconnect cable, environmental control cable, and SCSI terminator. Do this for each SCSI Device Module in the stack.
4	Remove the front bezel of the top module by pushing inward on the bezel release latches located on the bottom of the bezel. Lift the bezel upward until it is free of the module.



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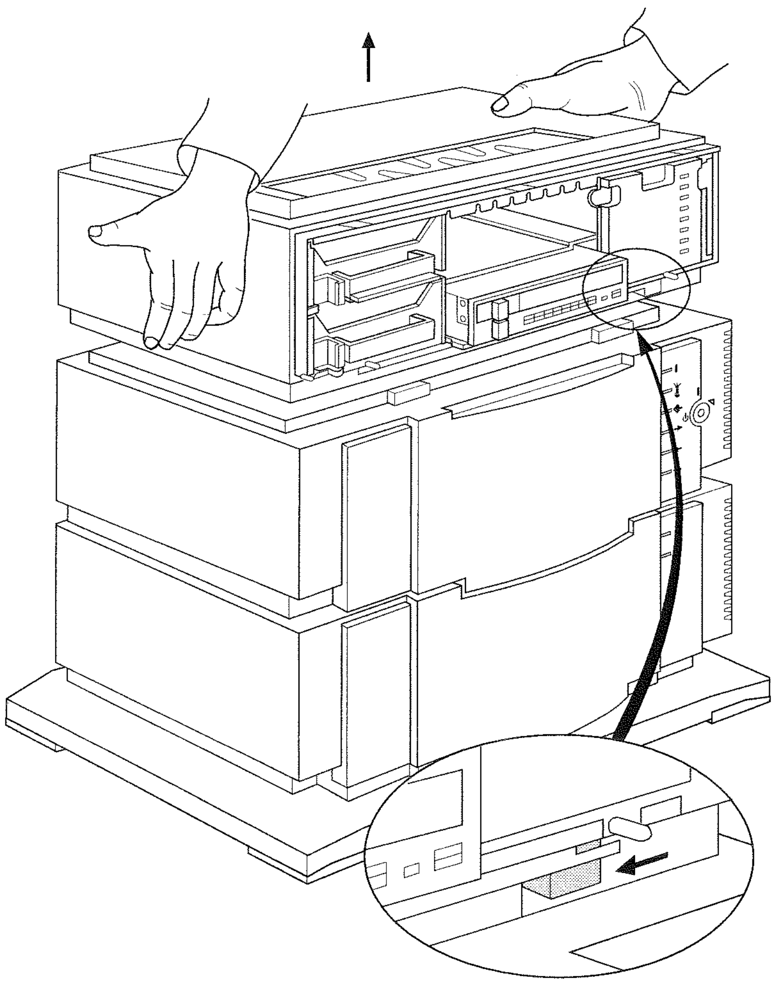
Step	Action
5	Remove the module from the stack by pushing inward on the module release latch. Once the module is free, lift it up and then back until it is free of the rear latches.



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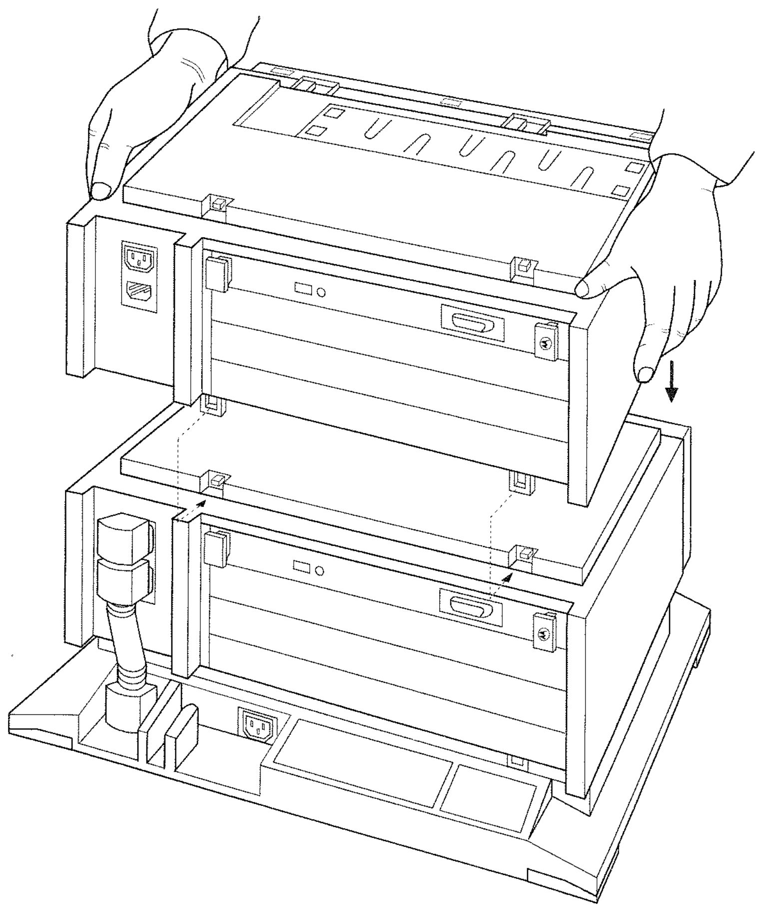
6	Repeat steps 4 and 5 as necessary.

Step	Action
7	To install the new module, tip the front of the module at a slight upward angle, and align the rear slots over the tabs on the top of the installed module. Lower the module until the tabs are engaged. Pull forward and press downward to engage the front tabs. A loud click is heard when the two modules are connected.



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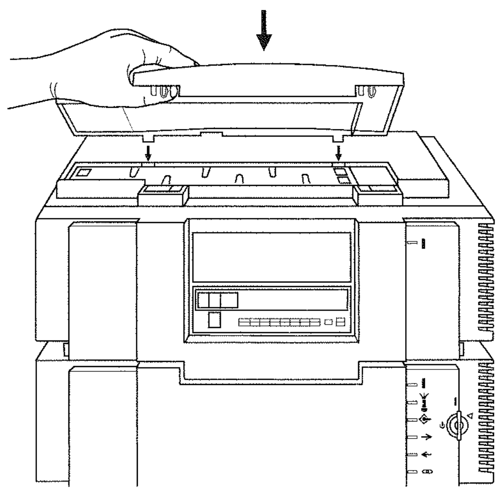
8	Stack the remaining modules using the instructions in step 7.

Step	Action
9	Install the SCSI Device Module's AC jumper cable, SCSI Interconnect cable, environmental control cable, and SCSI terminator (if applicable). Do this for each SCSI Device Module in the stack. Install all AC jumper cables on the stack. Attach any other cables removed.
10	To replace the crown, align the tabs on the rear of the crown with the rectangular slots on the module and press downward.



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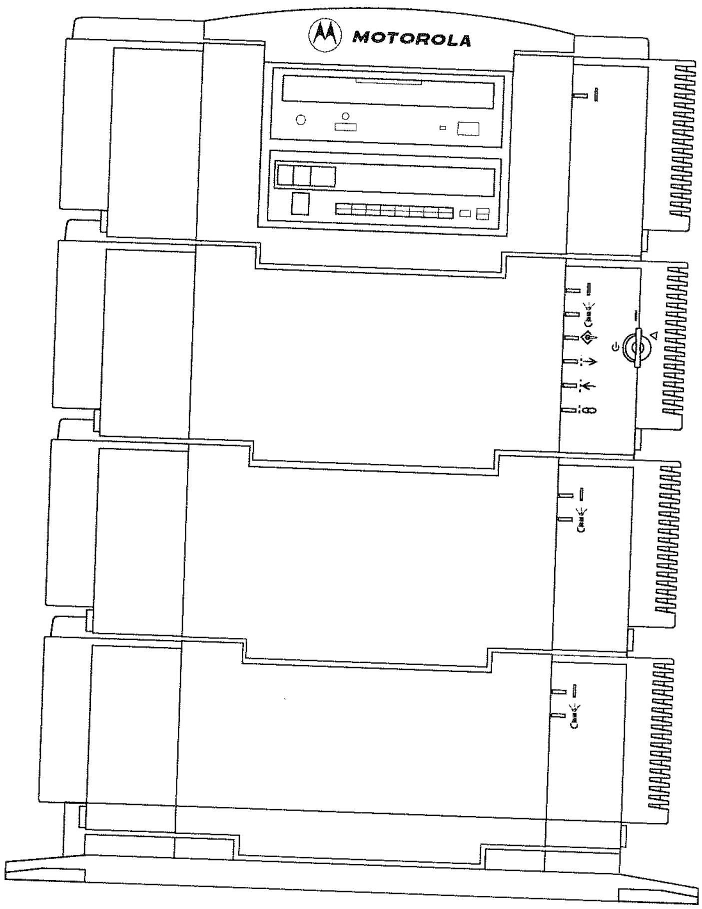
Step	Action
11	Reconnect the AC power cord and turn the keylock switch to the "run" position.



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CABLES B

Series 900 Cables Supplied by Motorola

The next table lists all available cables for the computer system.

Table B-1. Series 900 Cables

Model Number	Component Number	Description
CA01	30-W2482D03_ 30-W2486D01_	15 ft. RJ45 to RJ45 with DB25 adaptor
CA02	30-W2482D04_ 30-W2486D01_	25 ft. RJ45 to RJ45 with DB25 adaptor
CA03	30-W2482D05_ 30-W2486D01_	50 ft. RJ45 to RJ45 with DB25 adaptor
CA11	30-W2482D03_ 30-W2486D02_	15 ft. RJ45 to RJ45 modem cable with DB25 adaptor
CA22	30-W2155C01_	10 ft. parallel printer cable
CA23	30-W2156C01_	25 ft. parallel printer cable
CA24	30-W2157C01_	50 ft. parallel printer cable
CA30	30NW9302B26	2 meter 68-pin to 50-pin SCSI cable
CA31	30NW9302B24 30-W2482D01_	1 meter 68-pin to 68-pin SCSI cable
CA32	30NW9302B23 30-W2482D01_	2 meter 68-pin to 68-pin SCSI cable
CA33	30NW9302B25	3 ft. 68-pin to 50-pin SCSI cable
CA40	30NW9302B29	15 ft. 26-pin miniD (male) to DB-25 (male) cable`
CA41	30NW9302B30	15 ft. 26-pin miniD (male) to V.36 (female) cable
CA42	30NW9302B31	15 ft. 26-pin miniD (male) to V.36 (male) cable

B

Pinouts for Series 900 Cables

The pinouts of the RJ45 connector which provides an async EIA-232 serial interface which is used on the MVME332XT, the I/O Distribution board, and various other products. This pinout allows any Motorola RJ45 port to be connected to any other Motorola RJ45 port using a standard cross-over cable described below. By always using this pinout and a cross-over cable, we eliminate DCE/DTE jumpering on the module, and are able to use the same cable for loopback between ports for running certain diagnostics (see diagnostics manuals for details).

Table B-2. EIA-232 RJ45 Pinout Description for MVME332XT and I/O Distribution Board

RJ45 Pin Number	EIA-232 Name	Direction	Signal Function
1	DCD	INPUT	Signals module that remote device is attached and powered on
2	RTS	OUTPUT	Flow control, to enable remote device to send data
3	SG		Signal return (NOT chassis ground)
4	TXD	OUTPUT	Serial data out, from module to remote device
5	RXD	INPUT	Serial data in, from remote device to module
6	SG		Signal return (NOT chassis ground)
7	CTS	INPUT	Flow control, to enable this module to send data on TXD
8	DTR	OUTPUT	Signals remote device that this module is attached and powered on

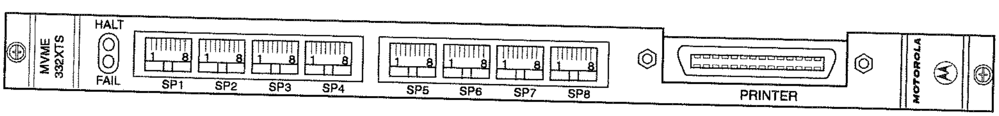

Figure B-1. MVME332XT Backpanel

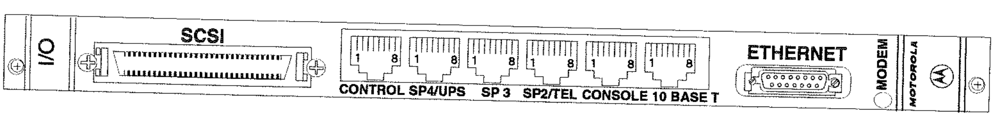

Figure B-2. MVME713/714 I/O Backpanel

Serial Cable Diagram

The following figures illustrate the pin numbers and signal directions for cabling from the I/O distribution board or the MVME332XT to the RJ45 Adapter.

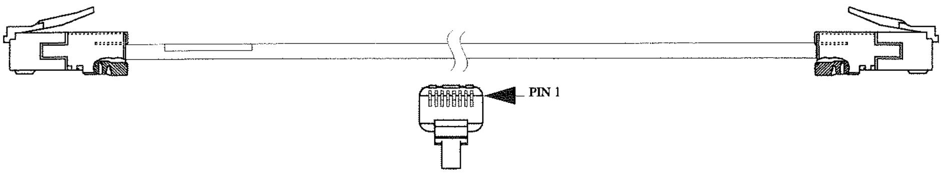

Table B-3. RJ45 to RJ45 Cable, Reversed (30-W2482D*xxx*)

RJ45 Plug Pin Number/Signal		RJ45 Plug Pin Number/Signal
1 DCD	←	8 DTR
2 RTS	→	7 CTS
3 SG	—	6 SG
4 TXD	→	5 RXD
5 RXD	←	4 TXD
6 SG	—	3 SG
7 CTS	←	2 RTS
8 DTR	→	1 DCD
Reversed RJ45 cables that are shipped by Motorola can be used as loopback cables between ports when running diagnostics.		

Part Numbers 30-W2482D02*x* (6 ft.), D03x (15 ft.), D04*x* (25 ft.), D05*x* (50 ft.) are used with Motorola Adapter (30-W2486D01*x*); use Table B-4 to connect to **Terminal** (DTE); or Adapter (30-W2486D02*x*) Table B-5 to connect to **Modem** (DCE).

B

Table B-4. RJ45 to DB-25 Adapter (30-W2486D01*x*)

RJ45 Plug Pin Number		DB-25 Plug Pin Number/Signal
1	→	6 DSR
	→	8 DCD
2	←	4 RTS
3	—	7 SG
6	—	
4	←	2 TXD
5	→	3 RXD
7	→	5 CTS
8	←	20 DTR
RJ45 to DB-25 Terminal (DTE) Adapter used with Motorola reversed cables described in Table B- 3.		

Table B-5. RJ45 to DB-25 Adapter (30-W2486D02*x*)

RJ45 Plug Pin Number		DB-25 Plug Pin Number/Signal
1	→	20 DTR
2	←	5 CTS
3	—	7 SG
6	—	
4	←	3 RXD
5	→	2 TXD
7	→	4 RTS
8	←	8 DCD
RJ45 to DB-25 Modem (DCE) Adapter to be used with Motorola reversed cables as described in Table B-3.		

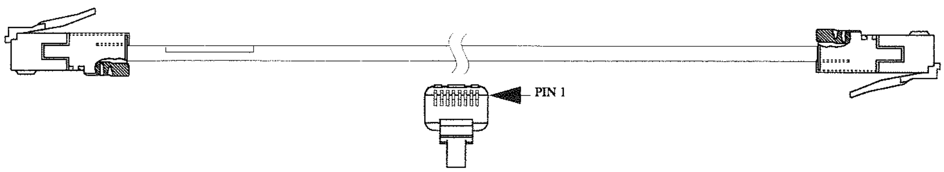

Table B-6. RJ45 to RJ45, Straight-Thru

RJ45 Plug Pin Number/Signal		RJ45 Plug Pin Number/Signal
1 DCD	←	1 DCD
2 RTS	→	2 RTS
3 SG	—	3 SG
4 TXD	→	4 TXD
5 RXD	←	5 RXD
6 SG	—	6 SG
7 CTS	←	7 CTS
8 DTR	→	8 DTR
Straight-thru RJ45 cables that can be supplied by the installer and to be used with the Adapter described in Table B-7 which connects to **Terminal** (DTE), or the Adapter described in Table B-8 which connects to **Modem** (DCE).		

Table B-7. RJ45 to DB-25 Adapter

RJ45 Plug Pin Number		DB-25 Plug Pin Number/Signal
1	←	20 DTR
2	→	5 CTS
3	—	7 SG
6	—	
4	→	3 RXD
5	←	2 TXD
7	←	4 RTS
8	→	8 DCD
	→	6 DSR
RJ45 to DB-25 **Terminal** (DTE) Adapter to be used with straight-thru cables described in Table B-6.		

Table B-8. RJ45 to DB-25 Adapter

RJ45 Plug Pin Number		DB-25 Plug Pin Number/Signal
1	←	8 DCD
2	→	4 RTS
3	—	7 SG
6	— (joined to 3)	
4	→	2 TXD
5	←	3 RXD
7	←	5 CTS
8	→	20 DTR

RJ45 to DB-25 **Modem** (DCE) Adapter to be used with straight-thru cables described in Table B-6.

Note

If you used a cable with another Motorola system and it functioned, it should work with the Series 900 (with adapters) regardless of the number of wires. If you are using cross-over cables such as the MVMECBL330-334 to connect to a terminal, the computer end of the cable is a DCE interface and requires the DCE adapter instead of the DTE adapter.

MVME333P and MVME334AP Cabling

The EIA-530 Serial Interface Module (SIM) for the MVME333P and MVME334AP provides a true EIA-530 interface, or with an adapter to a 37-position D-shell connector, a true V.36 interface. All the interface signals are V.11 (EIA-422) balanced lines with the exception of the RL, LL, and TM signals which (per the EIA-530 and V.36 specification) are V.10 (EIA-423) single-ended signals.

The EIA-530 DB-25 connector **cannot** be directly connected to the DB-25 connector of the MVME705 or MVME709 series of transition modules. The MVME705/709 series have a "V.35/V.36 Interface" option, but this is not compatible with the EIA-530 interface for two reasons.

The first incompatibility is in the pinout of the connector. The signals on the DB-25 connector for the MVME705/709 are not on the same pins as the signals on the EIA-530 DB-25 connector. Even if this is resolved by using an adaptor cable, a second level of incompatibility exists.

This second incompatibility is due to the nature of the V.28 (EIA-232) receivers used on the MVME705/709 transition boards. These receivers have an extremely wide hysteresis band for maximum noise immunity. This has the disadvantage of requiring the input to be below -2.0 VDC before the receiver will detect it as a low (negated) input. The V.11 (EIA-422) drivers on the EIA-530 SIM only drive low to about +0.5 VDC. Some V.28 receivers would reliably detect this as a low (negated) input, however, the receivers on the MVME705/709 transition boards do not.

If you wish to connect the MVME333P and MVME334AP to the MVME705 or MVME709 transition boards, the preferred method is to configure both ports as V.28 (EIA-232). If this is not possible, configure the MVME333P or MVME334AP as EIA-530, and the MVME705/709 as a "V.35/V.36 Interface," and only connect the data and clock lines using the next table.

Since the modem control (handshake) lines are not connected, in-band flow control (XON/XOFF protocol) must be used. This assumes that one port is configured as DTE, and the other port is configured as DCE.

B

MVME333P/334AP EIA-530 DB-25 Pin Number	MVME705/709 V.35/V.36 Compatible DB-25 Pin Number	Signal Name
2	15	TD_A
3	16	RD_A
7	7	Signal Ground
9	11	RXC_B
12	10	TXC_B
14	2	TD_B
15	23	TXC_A
16	3	RD_B
17	24	RXC_A

Note

The MVME705-100 series distribution modules use the same plug-in Serial Interface Modules (SIMs) which the MVME333P and MVME334AP use. The MVME705-100 series provides a true EIA-530/V.36 interface. This may be connected directly to the MVME333P and MVME334AP with the same type of interface, as long as one is configured as DTE and one as DCE.

The MVME705-100 provides six ports on a single-slot front panel, using the high-density HD-26 connector recommended as an alternate in EIA publication TSB-26, in place of the traditional DB-25 connector

B

HD-26 Connectors

This section gives the pinouts of the HD-26 connectors used on the MVME333P, MVME334AP, and MVME705-100 Series modules. These connectors are configured for various serial interface standards by using Serial Interface Modules (SIMs). SIMs are small plug-in printed circuit boards containing all the circuitry needed to convert a TTL-level synchronous or asynchronous port to standard voltage levels needed by various industry standard serial interfaces, such as EIA-232, EIA- 530, V.36. Separate SIMs exist for DTE and DCE interfaces.

HD26 Connector Pinouts

All Serial Interface Modules share the following electrical characteristics:

1. All port signals (those going to the external connector) contain surge suppression circuitry on the SIM. For EIA-232 level signals, this is a 100 ohm series resistor and a dual 15 volt clamp diode to chassis ground. For EIA-422 level drivers, each line contains a series 10 ohm resistor and a dual 15 volt clamp diode to chassis ground. For EIA-422 level receivers, EIA-423 level drivers, and EIA-423 level receivers, each line contains a series 100 ohm resistor and a dual 15 volt clamp diode to chassis ground. EIA-422 level receivers used for clocks and data have a 100 ohm termination resistor on the line side of the series resistors. All other EIA-422 level receivers are unterminated.
2. The Signal Ground pin on the connector is connected to local signal ground via a 39 ohm resistor to limit current due to ground potential differences. No connection is made between chassis ground and signal ground at each serial port. This is a chassis-level function which must be done elsewhere, usually on the VMEbus backplane.

B

EIA-232 DTE Pinouts

This table lists the specific pinouts used in the EIA-232 DTE SIM (Motorola Part Number 01-W3877B0*x*). Any HD-26 connector pin not listed below is not connected. The first two columns give the TTL signal name and if the PWB sources or receives that signal. The next two columns give the HD-26 pin number the signal is driven to or received from, and its name according to the EIA-232 specification. The last column gives the direction of the EIA-232 signal.

Table B-9. EIA-232 DTE Pinouts

TTL Name	TTL Direction	HD-26 Pin Number	EIA-232 Name	EIA-232 Direction
TD	Sourced	HD26-2	TD	Output
ETXC	Sourced	HD26-24	ETXC	Output
RTS*	Sourced	HD26-4	RTS	Output
DTR*	Sourced	HD26-20	DTR	Output
LL*	Sourced	HD26-18	LL	Output
RL*	Sourced	HD26-21	RL	Output
RD	Received	HD26-3	RD	Input
CTS*	Received	HD26-5	CTS	Input
DSR*	Received	HD26-6	DSR	Input
CD*	Received	HD26-8	CD	Input
TXC	Received	HD26-15	TXC	Input
RXC	Received	HD26-17	RXC	Input
RI*	Received	HD26-22	RI	Input
TM*	Received	HD26-25	TM	Input
GND		HD26-7	SG	

B

EIA-232 DCE Pinouts

This section lists the specific pinouts used in the EIA-232 DCE SIM (Motorola Part Number 01-W3876B0*x*). Any HD-26 pin not listed below is not connected. The first two columns give the TTL signal name and if the PWB sources or receives that signal. The next two columns give the HD-26 pin number the signal is driven to or received from, and its name according to the EIA-232 specification. The last column gives the direction of the EIA-232 signal.

Table B-10. EIA-232 DCE Pinouts

TTL Name	TTL Direction	HD-26 Pin Number	EIA-232 Name	EIA-232 Direction
TD	Sourced	HD26-3	RD	Output
ETXC	Sourced	HD26-15	TXC	Output
ETXC	Sourced	HD26-17	RXC	Output
RTS*	Sourced	HD26-5	CTS	Output
DTR*	Sourced	HD26-8	CD	Output
LL*	Sourced	HD26-25	TM	Output
RL*	Sourced	HD26-22	RI	Output
RD	Received	HD26-2	TD	Input
CTS*	Received	HD26-4	RTS	Input
DSR*	Received (1)	HD26-6	DSR	Output (1)
CD*	Received	HD26-20	DTR	Input
TXC	Received	HD26-24	ETXC	Input
RXC	Received	HD26-24	ETXC	Input
RI*	Received	HD26-21	RL	Input
TM	Received	HD26-18	LL	Input
GND		HD26-7	SG	

(1) Both the TTL DSR* output and the HD-26 DSR signal are tied active.

B

EIA-530/V.36 DTE Pinouts

The table below lists the specific pinouts used in the EIA-530/V.36 DTE SIM (Motorola Part Number 01-W3879B0*x*). This interface uses all of the HD-26 pins (except pin 1, which is not connected) to provide differential signals on most lines. If pins HD26-2 through HD26-25 are pinned out to a DB25 connector on the same pin number, an EIA-530 DTE interface is provided. If pins HD26-2 through HD26-26 are pinned out to a DB37 connector as noted in the V.36 Pin Number column, a V.36 DTE interface is provided

Table B-11. EIA-530/V.36 DTE Pinouts

TTL Name	TTL Direction	HD-26 Pin Number	EIA-530 Name	EIA-530/V.36 Direction	V.36 Name	V.36 Pin Number
TD	Sourced	HD26-2	TD-A	Output	TD-A	DB37-4
		HD26-14	TD-B	Output	TD-B	DB37-22
ETXC	Sourced	HD26-24	TSET-A	Output	TSET-A	DB37-17
		HD26-11	TSET-B	Output	TSET-B	DB37-35
RTS*	Sourced	HD26-4	RTS-A	Output	RTS-A	DB37-7
		HD26-19	RTS-B	Output	RTS-B	DB37-25
DTR*	Sourced	HD26-20	DTER-A	Output	DTR-A	DB37-12
		HD26-23	DTER-B	Output	DTR-B	DB37-30
LL*	Sourced	HD26-18	LL	Output	LL	DB37-10
RL*	Sourced	HD26-21	RI	Output	L/MT	DB37-14
RD	Received	HD26-3	RD-A	Input	RD-A	DB37-6
		HD26-16	RD-B	Input	RD-B	DB37-24
CTS*	Received	HD26-5	CTS-A	Input	RFS-A	DB37-9
		HD26-13	CTS-B	Input	RFS-B	DB37-27
DSR*	Received	HD26-6	DCER-A	Input	DSR-A	DB37-11
		HD26-22	DCER-B	Input	DSR-B	DB37-29
CD*	Received	HD26-8	RLSD-A	Input	RLSD-A	DB37-13
		HD26-10	RLSD-B	Input	RLSD-B	DB37-31
TXC	Received	HD26-15	TSET-A	Input	TSET-A	DB37-5
		HD26-12	TSET-B	Input	TSET-B	DB37-23
RXC	Received	HD26-17	RSET-A	Input	RSET-A	DB37-8
		HD26-9	RSET-B	Input	RSET-B	DB37-26
RI*	Received	HD26-26	Not used	Input	CI	DB37-15
TM*	Received	HD26-25	TM	Input	TI	DB37-18
GND		HD26-7	SG		SG	DB37-19

EIA-530/V.36 DCE Pinouts

The next table lists the specific pinouts used in the EIA-530/V.36 DCE SIM (Motorola Part Number 01-W3878B0*x*). This interface uses all of the HD-26 pins (except pin 1, which is not connected) to provide differential signals on most lines. If pins HD26-2 through HD26-25 are pinned out to a DB25 connector on the same pin number, an EIA-530 DCE interface is provided. If Port pins HD26-2 through HD26-26 are pinned out to a DB37 connector as noted in the V.36 Pin Number column, a V.36 DCE interface is provided

B

Table B-12. EIA-530/V.36 DCE Pinouts

TTL Name	TTL Direction	HD-26 Pin Number	EIA-530 Name	EIA-530/V.36 Direction	V.36 Name	V.36 Pin Number
TD	Sourced	HD26-3	RD-A	Output	RD-A	DB37-6
		HD26-16	RD-B	Output	RD-B	DB37-24
ETXC	Sourced	HD26-15	TSET-A	Output	TSET-A	DB37-5
		HD26-12	TSET-B	Output	TSET-B	DB37-23
		HD26-17	RSET-A	Output	RSET-A	DB37-8
		HD26-9	RSET-B	Output	RSET-B	DB37-26
RTS*	Sourced	HD26-5	CTS-A	Output	RFS-A	DB37-9
		HD26-13	CTS-B	Output	RFS-B	DB37-27
DTR*	Sourced	HD26-8	RLSD-A	Output	RLSD-A	DB37-13
		HD26-10	RLSD-B	Output	RLSD-B	DB37-31
LL*	Sourced	HD26-25	TM	Output	TI	DB37-18
RL*	Sourced	HD26-26	Not used	Output	CI	DB37-15
RD	Received	HD26-2	TD-A	Input	TD-A	DB37-4
		HD26-14	TD-B	Input	TD-B	DB37-22
CTS*	Received	HD26-4	RTS-A	Input	RTS-A	DB37-7
		HD26-19	RTS-B	Input	RTS-B	DB37-25
DSR*	Received (1)	HD26-6	DCER-A	Output (1)	DSR-A	DB37-11
		HD26-22	DCER-B	Output (1)	DSR-B	DB37-29
CD*	Received	HD26-20	DTER-A	Input	DTR-A	DB37-12
		HD26-23	DTER-B	Input	DTR-B	DB37-30
TXC	Received	HD26-24	TSET-A	Input	TSET-A	DB37-17
		HD26-11	TSET-B	Input	TSET-B	DB37-35
RXC	Received	HD26-24	TSET-A	Input	TSET-A	DB37-17
		HD26-11	TSET-B	Input	TSET-B	DB37-35
RI*	Received	HD26-21	RL	Input	L/MT	DB37-14
TM*	Received	HD26-18	LL	Input	LL	DB37-10
GND		HD26-7	SG		SG	DB37-19

(1) Both the DSR* TTL output and DCER/DSR Port outputs are tied active.

SPECIFICATIONS C

System Specifications

Table C-1. Mechanical Specifications

Physical Dimensions:	
Height of Stack with CPU Module & one SCSI Device Expansion Module	12.6 in. (320 mm)
Height added by each additional Module	5.0 in. (127 mm)
Maximum Stack Height	27.6 in. (701 mm)
Width of each Module	15.9 in. (403 mm)
Width of Base	17.8 in. (452 mm)
Depth of each Module	11.3 in. (286 mm)
Depth of Base	13.3 in. (338 mm)
Weight:	
Maximum Stack Fully Loaded	100 lbs. (45 Kg)

Table C-2. Environmental Specifications

Temperature	
Operating	5° C to 35° C
Non-operating	-25° C to 65° C
Altitude	
Operating	10,000 Feet ASL
Non-operating	30,000 Feet ASL
Relative Humidity	
Operating	20% to 80% (noncondensing)
Non-operating	10% to 90% (noncondensing)
Cooling	Fan forced ambient air with optional 30 PPI washable foam air filter
Transportation	Packaging and shipping containers comply with ASTM 4169 Level 3.
Acoustic Noise Level	50 dBA maximum

Table C-3. Electrical Specifications

Electrical Service Requirements	One maximum payload enclosure requires a 15 amp 115 volt or 7.5 amp 230 volt service.
AC Power Ratings	Power Factor of 0.6 (Use for derating UPS.)
Enclosure Rating	12 amps at 115 VAC, 50/60 Hz 6 amps at 230 VAC, 50/60 Hz

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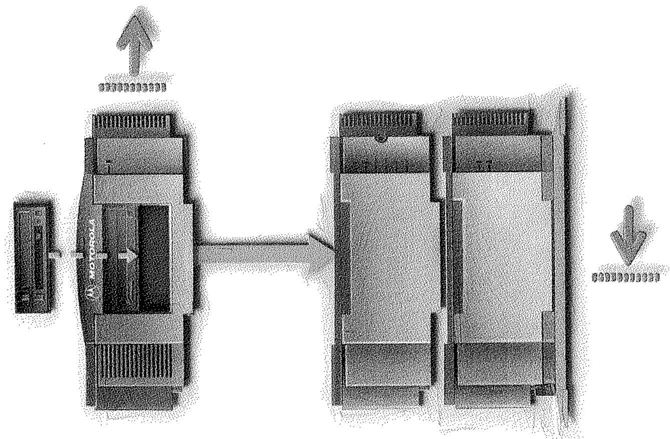

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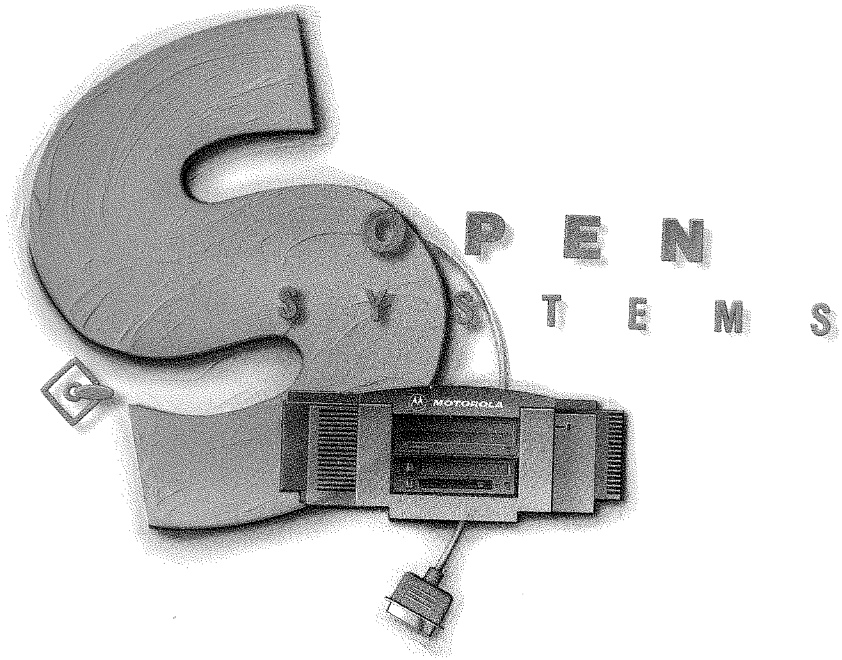

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