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MVME712M
Transition Module
Installation and Use

VME712MA/IH2

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Preface

This manual, *MVME712M Transition Module and P2 Adapter Board Installation and Use*, provides general information, hardware preparation, installation instructions, and support information for the MVME712M Transition Module and the P2 Adapter Board.

The modules are used as the interface between the following families of Motorola VMEmodules, and their peripheral devices:

- MVME147 MPU VMEmodule
- MVME162 Embedded Controller
- MVME167 Single Board Controller (SBC)
- MVME177 Single Board Controller (SBC)
- MVME1600 Single Board Computer (SBC)
- MVME2600 Single Board Computer (SBC)
- MVME2700 Single Board Computer (SBC)
- MVME3600 VME Processor Module
- MVME4600 VME Processor Module

A P2 adapter module and cable are supplied with the MVME712M.

This manual is intended for anyone who wants to design OEM systems, supply additional capability to an existing compatible system, or in a lab environment for experimental purposes. A basic knowledge of computers and digital logic is assumed.

To use this manual, you should be familiar with the publications in *Related Documentation*.

All Motorola PWBs (printed wiring boards) are manufactured by UL-recognized manufacturers, with a flammability rating of 94V-0.

WARNING

This equipment generates, uses, and can radiate electromagnetic energy. It may cause or be susceptible to electromagnetic interference (EMI) if not installed and used in a cabinet with adequate EMI protection.

CE

European Notice: Board products with the CE marking comply with the EMC Directive (89/336/EEC). Compliance with this directive implies conformity to the following European Norms:

EN55022 (CISPR 22) Radio Frequency Interference

EN50082-1 (IEC801-2, IEC801-3, IEEC801-4) Electromagnetic Immunity

The product also fulfills EN60950 (product safety) which is essentially the requirement for the Low Voltage Directive (73/23/EEC).

This board product was tested in a representative system to show compliance with the above mentioned requirements. A proper installation in a CE-marked system will maintain the required EMC/safety performance.

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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 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 be plugged into an approved three-contact electrical outlet. The power jack and mating plug of the power cable meet International Electrotechnical Commission (IEC) safety standards.

Do Not Operate in an Explosive Atmosphere.

Do not operate the 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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General Information 1

Introduction

This chapter provides general information about the MVME712M Transition Module and the P2 adapter board, specifications, cooling requirements, and FCC compliance.

Description

The MVME712M is an I/O transition module for Motorola's MPU VMEmodule, VME Processor Module, Embedded Controller, and Single Board Computer (SBC) families of processor modules, referred to in this manual as MVME*xxxx*.

The MVME712M is used as an interface between the processor module and its peripheral devices. The purpose of this module is to provide rear panel industry-standard connectors that simplify external customer cable requirements.

The P2 adapter board and cables are supplied for interconnection between the MVME712M and the MVME*xxxx*. The P2 adapter assembly routes the I/O signals and grounds from the P2 connector on the chassis backplane, at the VMEmodule MPU connection, to the MVME712M.

The MVME712M routes the signals to four serial ports, implemented with four industry standard DB-25 connectors on its front panel. The serial ports may be configured for EIA-232-D DTE or DCE through jumper arrangements on the MVME712M.

The MVME712M front panel also has an Ethernet port, a SCSI port, and a printer port. In addition, the MVME712M routes the EIA-232-D port 2 signals to an internal modem.

MVME712M Transition Module

The features of the MVME712M include:

- Four 25-pin multiprotocol EIA-232-D serial ports (through P2 adapter)
- One independent printer port (through P2 adapter)
- Small Computer Systems Interface (SCSI) shielded connector bus interface (through P2 adapter) for connection to internal and external devices
- Green LED on module to indicate terminator power
- Yellow LED on module to indicate transceiver power
- SCSI terminating resistors mounted in sockets for end of cable or middle of cable configuration
- Modem connection on module
- Radio Frequency Interference (RFI) protection on front panel
- Electrostatic Discharge (ESD) protection on front panel

P2 Adapter Board

The MVME712M requires the use of the P2 adapter board. The features of the P2 adapter board include:

- A connector that permits SCSI cable connection to other SCSI devices and/or to MVME712M through a flat ribbon cable
- SCSI terminating resistors mounted in sockets, for end of cable or middle of cable configuration
- Terminator power developed on the P2 adapter from the +5 Vdc on connector P2, and fused (1 A) on the P2 adapter
- A connector that interfaces the EIA-232-D ports, printer port, SCSI, and Ethernet signals to the MVME712M

Specifications

The following table lists the general specifications for the MVME712M Transition Module. The subsequent sections detail cooling requirements and FCC compliance.

A complete functional description of the MVME712M appears in Chapter 2.

Table 1-1. MVME712M specifications

Characteristics		Specifications
Power requirements		+5 Vdc 281 mA maximum 255 mA typical +12 Vdc -12 Vdc Note:+5 Vdc, +12 Vdc, -12Vdc power supplied by backplane. Used for internal modem interface.
I/O ports	Serial	Four multiprotocol serial ports (connected through P2 adapter board)
	Printer	Centronics printer port (connected through P2 adapter board)
Operating temperature		0 degrees to 55 degrees C at point of entry of forced air (approximately 5 CFM)
Storage temperature		-40 degrees to 85 degrees C
Relative humidity		5% to 90% (non-condensing)
Physical characteristics (excluding front panel)	Height	9.187 inches (233.35 mm)
	Depth	3.200 inches (80.0 mm)
	Thickness	0.063 inches (1.6 mm)

Cooling Requirements

Motorola VMEmodules are specified, designed, and tested to operate reliably with an incoming air temperature range from 0 degrees C to 55 degrees C (32 degrees F to 131 degrees F) with forced air cooling.

Temperature qualification is performed in a standard Motorola VMEsystem 1000 chassis. Twenty-five watt load boards are inserted in the two card slots, one on each side, adjacent to the board under test to simulate a high power density system configuration. An assembly of three axial fans, rated at 71 CFM per fan, is placed directly under the MVME card cage. The incoming air temperature is measured between the fan assembly and the card cage where the incoming airstream first encounters the module under test.

Test software is executed as the module is subjected to ambient temperature variations. Case temperatures of critical, high power density integrated circuits are monitored to ensure component vendors specifications are not exceeded.

While the exact amount of airflow required for cooling depends on the ambient air temperature and the type, number, and location of boards and other heat sources, adequate cooling can usually be achieved with 5 CFM flowing over the module. Less air flow is required to cool the module in environments having lower maximum ambients.

Under more favorable thermal conditions it may be possible to operate the module reliably at higher than 55 degrees C with increased air flow. It is important to note that there are several factors, in addition to the rated CFM of the air mover, which determine the actual volume of air flowing over a module.

FCC Compliance

The MVME712M Transition Module was tested in an FCC-compliant chassis, and meets the requirements for Class A equipment. FCC compliance was achieved under the following conditions:

- Shielded cables on all external I/O ports
- Cable shields connected to earth ground via metal shell connectors bonded to a conductive module front panel
- Conductive chassis rails connected to earth ground; this provides the path for connecting shields to earth ground
- Front panel screws properly tightened

For minimum RF emissions, it is essential that the conditions above be implemented. Failure to do so could compromise the FCC compliance of the equipment containing the modules.

Related Documentation

The publications listed below are referenced in this document. To purchase manuals you may contact Motorola in these ways:

- ❏ Through your local Motorola sales office
- ❏ By contacting the Literature Center via phone or fax at the numbers listed under Product Literature at MCG's World Wide Web site, http://www.mcg.mot.com/literature

Document Title	Motorola Publication Number
MVME147-0*xx* MPU VMEmodule Installation and Use	VME147A/IH
MVME162 Embedded Controller Installation Guide	MVME162IG/D
MVME162FX Embedded Controller Installation and Use	V162FXA/IH
MVME162LX Embedded Controller Installation Guide	MVME162LXIG/D
MVME167 Single Board Computer Installation Guide	MVME167IG/D
MVME177 Single Board Computer Installation and Use	VME177A/IH
MVME1600 Single Board Computer Installation and Use	V1600A/IH
MVME2600 Series Single Board Computer Installation and Use	V2600A/IH
MVME2700 Series Single Board Computer Installation and Use	V2700A/IH
MVME3600 Series VME Processor Module Installation and Use	V3600A/IH
MVME4600 Series VME Processor Module Installation and Use	V4600A/IH

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Preparing and Installing the Hardware

2

Introduction

This manual provides hardware preparation and installation instructions for the MVME712M Transition Module and P2 adapter board.

Unpacking the Hardware

Note If the carton is damaged upon receipt, request that carrier's agent be present during unpacking and inspection of the equipment.

Unpack the equipment from the shipping carton. Refer to the packing list and verify that all items are present. Save the packing material for storing and reshipping of the equipment.



Caution

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

2

Preparing the MVME712M Module

The locations of the headers, LEDs, terminators, and connectors for the MVME712M are shown in Figure 2-1. The module has been factory tested and is shipped with factory-installed jumpers that configure the MVME712M to provide the system functions required for a VMEbus system.

The factory default configurations are shown in the following paragraphs with descriptions of each header. The module is operational with the factory-installed jumpers.

DTE/DCE configuration select headers

Serial ports 1 through 4 can be configured as a modem (DCE) for connection to terminal or configured as a terminal (DTE) for connection to modem. The MVME712M is shipped with the ports configured for DTE operation.

The following table lists the serial ports with their corresponding jumper headers.

Table 2-1. Serial port jumpers/headers

Serial Port	Board Connector	Panel Connector	Jumper Header DCE/DTE
Port 1	J7	Serial port 1/ Console	J1/J11
Port 2	J8	Serial port 2/ TTY	J16/J17
Port 3	J9	Serial port 3	J13/J14
Port 4	J10	Serial port4	J18/J19

Figures 2-2 through 2-9 illustrate the VME module and MVME712M transition module with the interconnections and jumper settings for DCE/DTE configuration on each serial port.

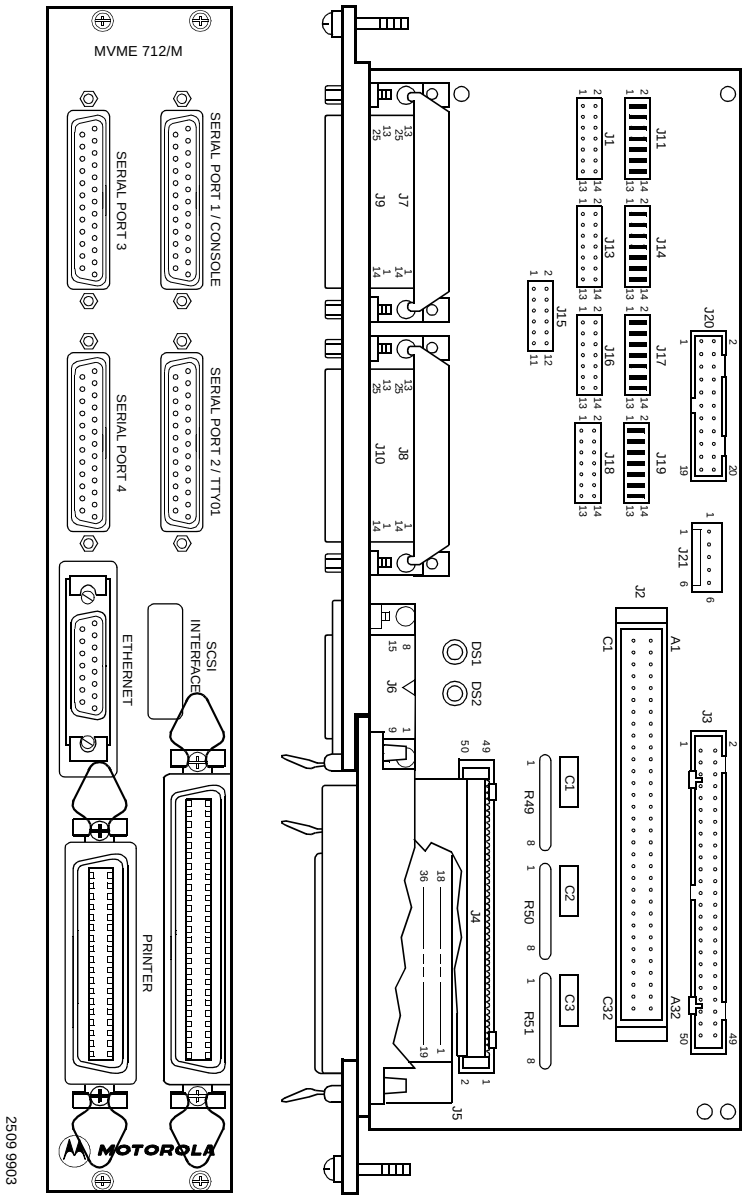


Figure 2-1. MVME712M header locations

Serial port 1 DCE configuration -- J1 and J11

To configure port 1 for DCE (modem to terminal) operation, install jumpers on headers J1 and remove jumpers on headers J11 as shown below. The schematic representation of this configuration is shown in Figure 2-2.

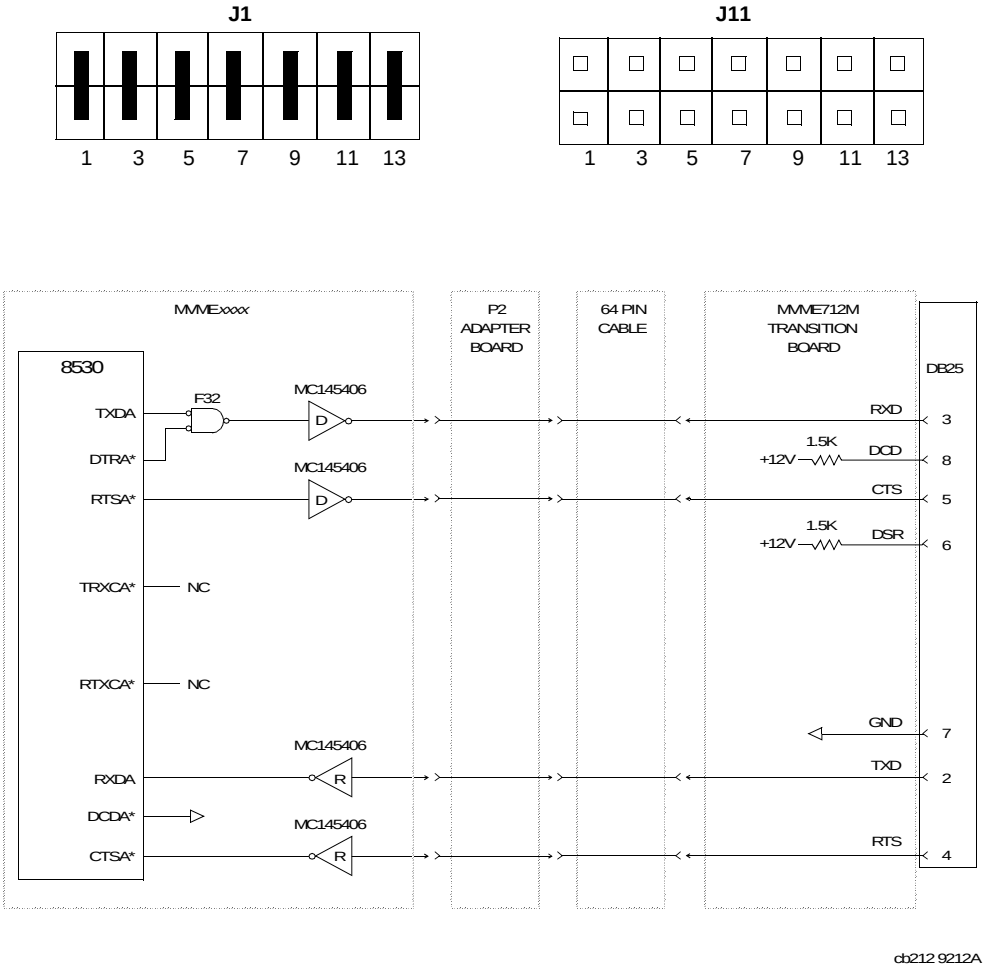


Figure 2-2. Serial port 1 configured as DCE

Serial port 1 DTE configuration -- J1 and J11

To configure port 1 for DTE (terminal to modem) operation, remove jumpers from header J1 and install jumpers on header J11 as shown below. This is the default configuration as shipped from the factory. The schematic representation of this configuration is shown in Figure 2-3.

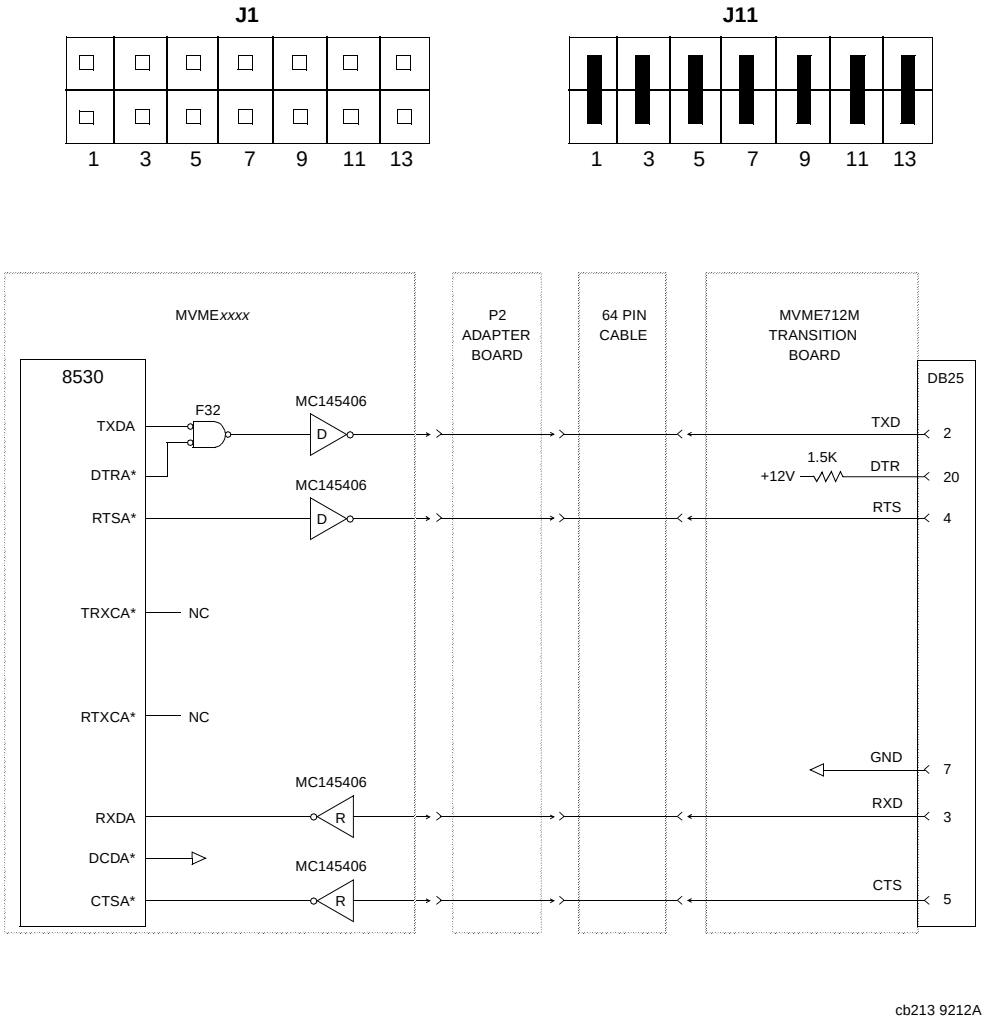


Figure 2-3. Serial port 1 configured as DTE

Serial port 2 DCE configuration -- J16 and J17

To configure port 2 for DCE (modem to terminal) operation, install jumpers on header J16 and remove jumpers from header J17 as shown below. The schematic representation of this configuration is shown in Figure 2-4.

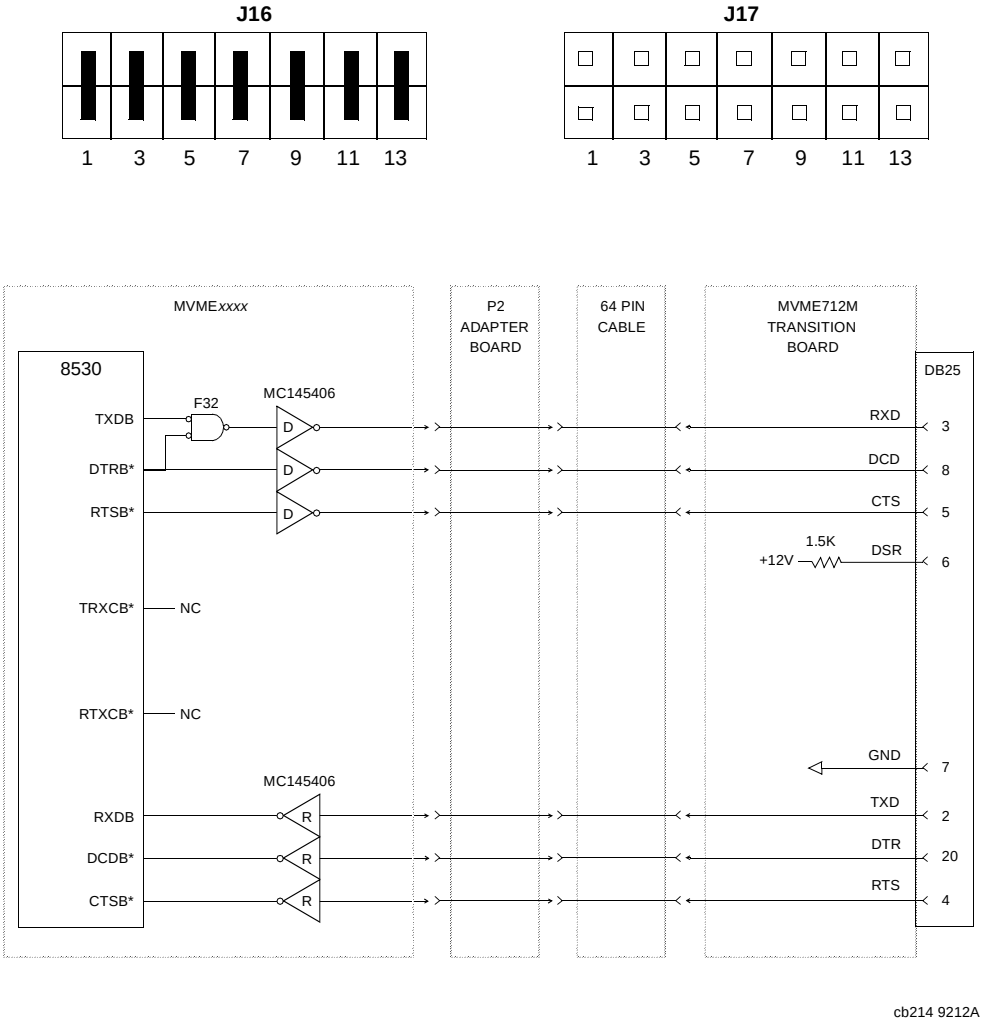


Figure 2-4. Serial port 2 configured as DCE

Serial port 2 DTE configuration -- J16 and J17

To configure port 2 for DTE (terminal to modem) operation, remove jumpers from header J16 and install jumpers on header J17 as shown below. This is the default configuration as shipped from the factory. The schematic representation of this configuration is shown in Figure 2-5.

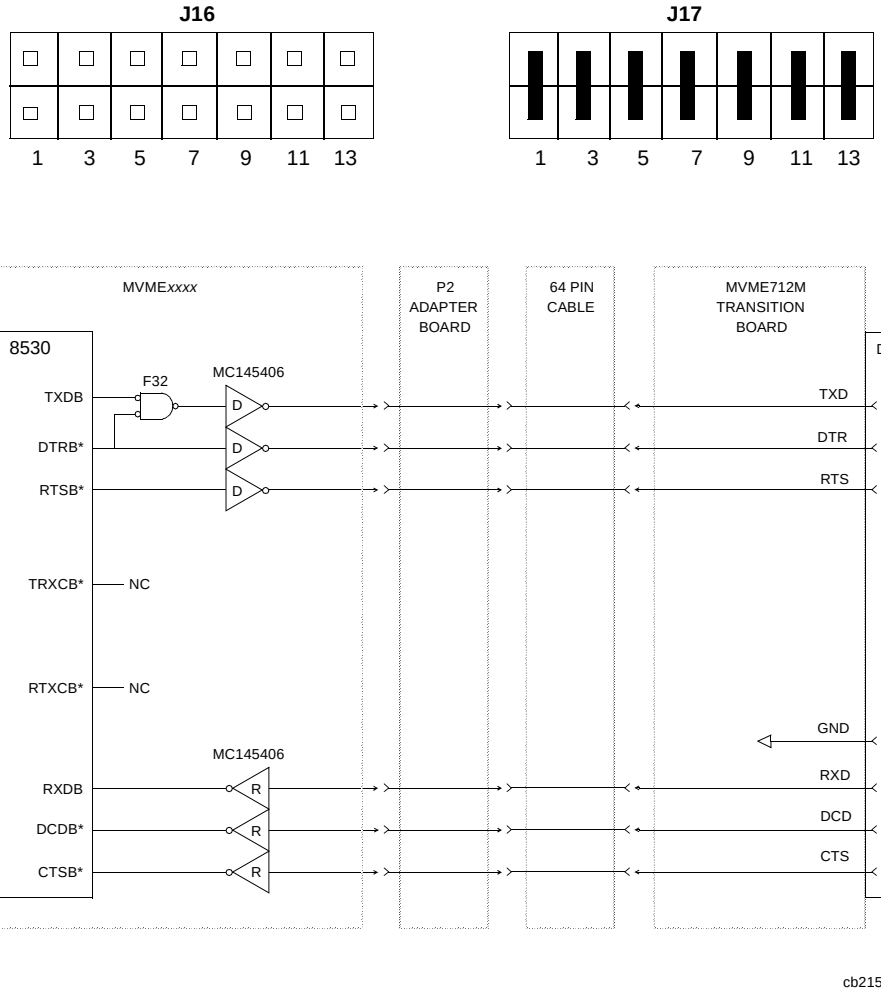


Figure 2-5. Serial port 2 configured as DTE

Serial port 3 DCE configuration -- J13 and J14

To configure port 3 for DCE (modem to terminal) operation, install jumpers on header J13 and remove jumpers from header J14 as shown below. The schematic representation of this configuration is shown in Figure 2-6.

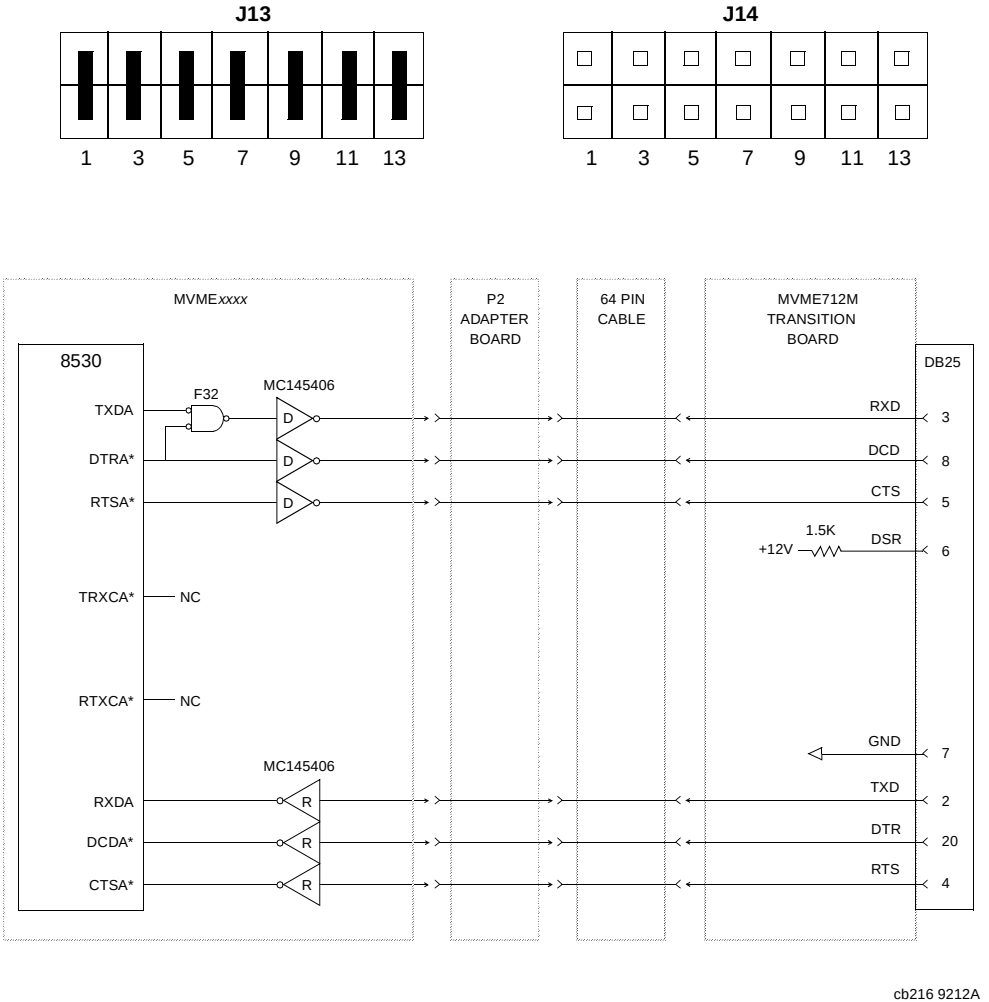


Figure 2-6. Serial port 3 configured as DCE

Serial port 3 DTE configuration - J13 and J14

To configure port 3 for DTE (terminal to modem) operation, remove jumpers from header J13 and install jumpers on header J14 as shown below. This is the default configuration as shipped from the factory. The schematic representation of this configuration is shown in Figure 2-7.

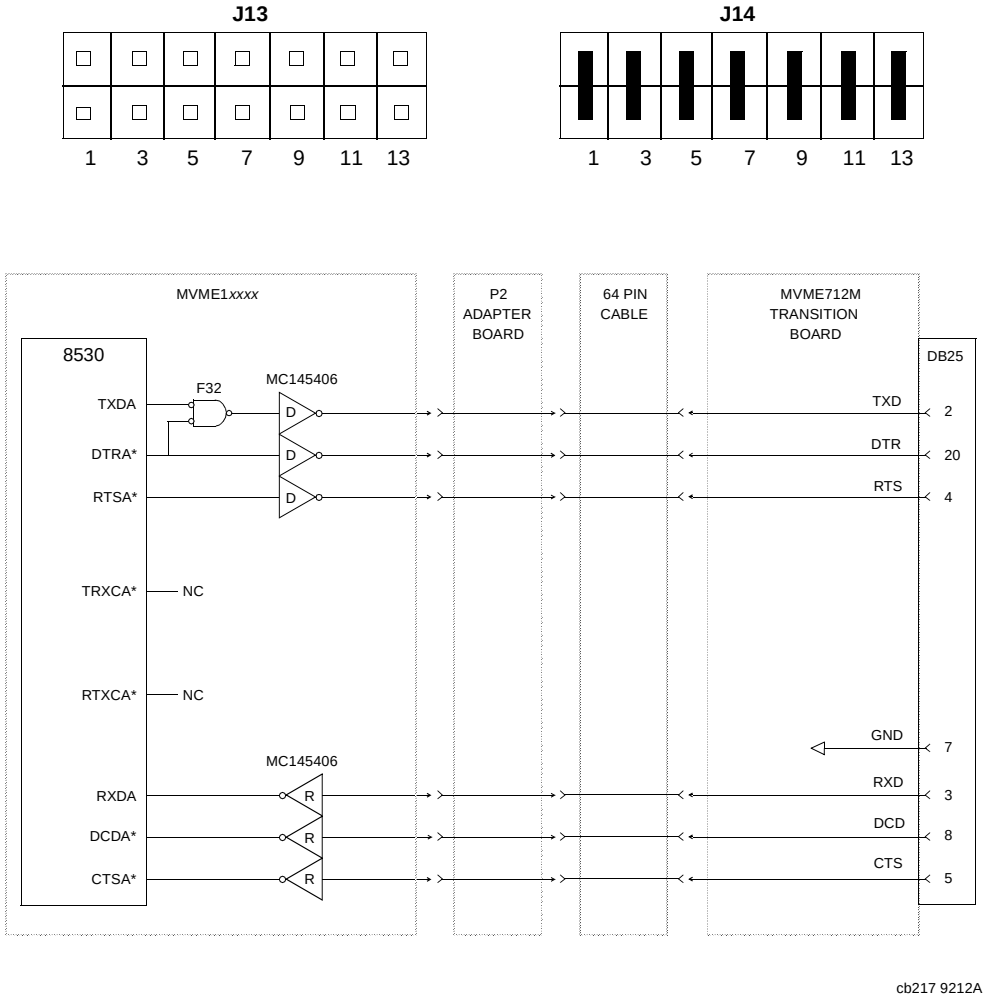


Figure 2-7. Serial port 3 configured as DTE

Serial port 4 DCE configuration -- J18 and J19

To configure port 4 for DCE (modem to terminal) operation, install jumpers on header J18 and remove jumpers from header J19 as shown below. The schematic representation of this configuration is shown in Figure 2-8.

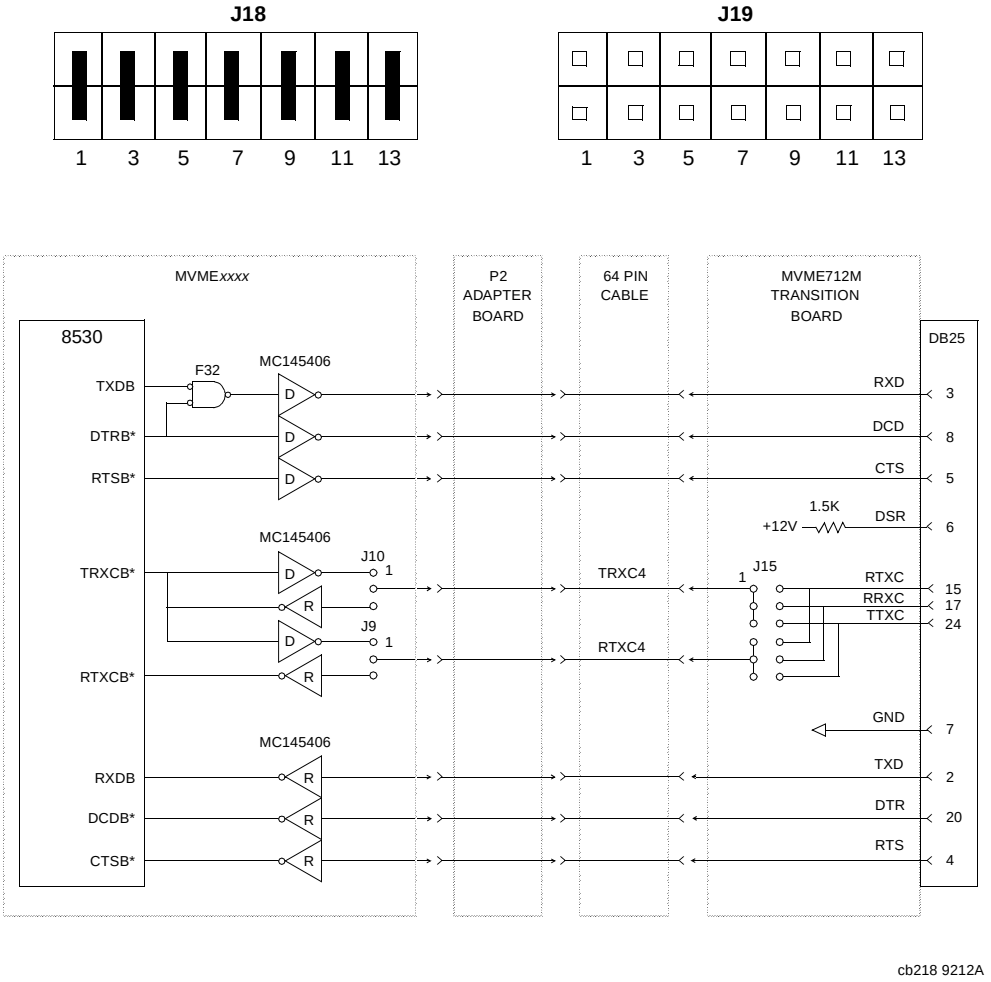


Figure 2-8. Serial port 4 configured as DCE

Serial port 4 DTE configuration - J18 and J19

To configure port 4 for DTE (terminal to modem) operation, remove jumpers from header J18 and install jumpers on header J19 as shown below. This is the default configuration as shipped from the factory. The schematic representation of this configuration is shown in Figure 2-9.

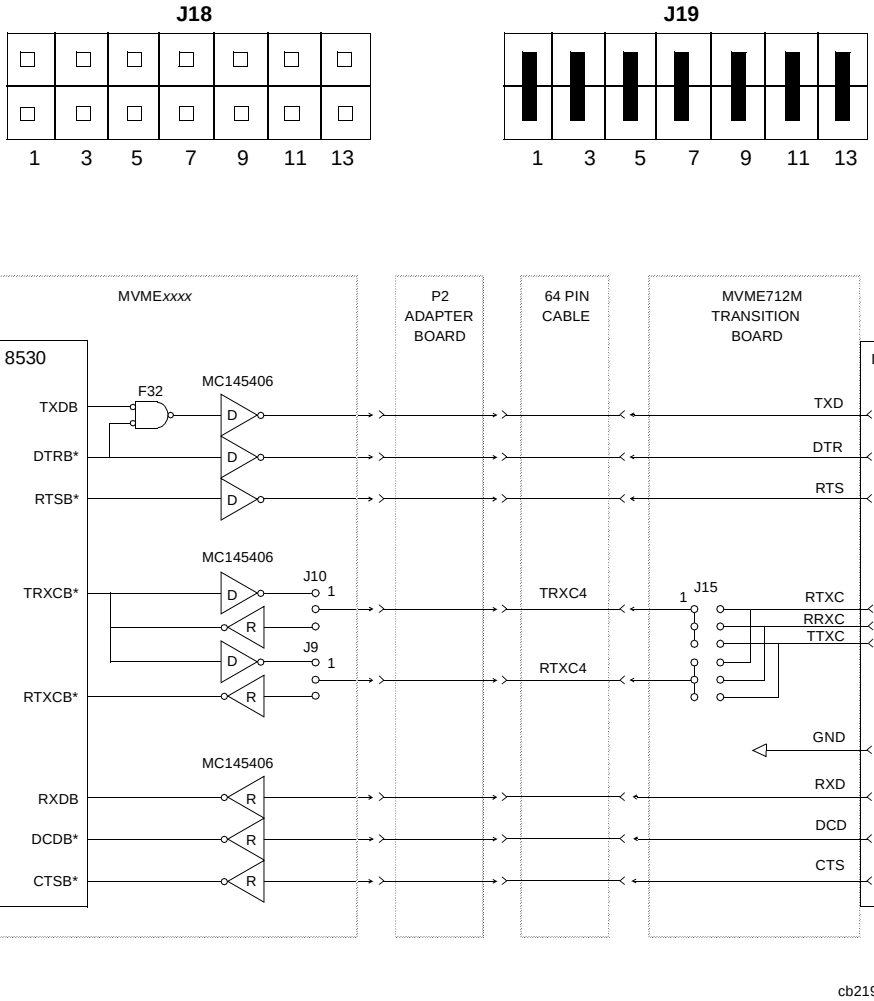


Figure 2-9. Serial port 4 configured as DTE

Serial port 4 clock configuration select header -- J15

Serial port 4 can be configured to use clock signals by the TRXC4 and RTXC4 signal lines. Header J15 configurations of the clock lines are shown in Figure 2-10. The module is shipped without clock lines connected (no jumpers).

Part of the configuration must be done with headers or switches on the processor VMEmodule, as listed in the following table.

Table 2-2. VMEmodule headers/switches

Processor Module	Header	Processor Module	Header
MVME147	J8, J9	MVME1600	J8, J15, J16
MVME162	J12	MVME2600	J16, J17, J20
MVME167	J9, J10	MVME2700	J16, J17, J19
MVME177	J9, J10	MVME3600	J9, J10, J16
		MVME4600	J9, J10, J16

For more information see Figure 2-9 and the installation guide furnished with your processor VMEmodule.

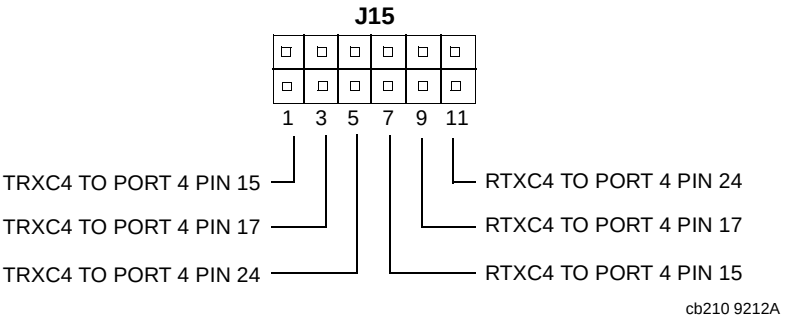


Figure 2-10. J15 clock line configuration

SCSI Termination

You must ensure that the SCSI bus is terminated properly. The P2 adapter and the MVME712M module have sockets for terminating the SCSI lines. Both the P2 adapter and the MVME712M use three 8-pin SIP resistors. Refer to the installation instructions for use of the terminators.

2

Preparing the P2 Adapter Board

The P2 adapter board is required. Preparation of the P2 adapter consists of removing or replacing the terminating resistors for SCSI. Figure 2-11 shows the component locations. Refer to the installation instructions in *Installing the MVME712M*, in this chapter, for use of the terminators.

A P2 mounting bracket kit is also furnished for use on some systems.

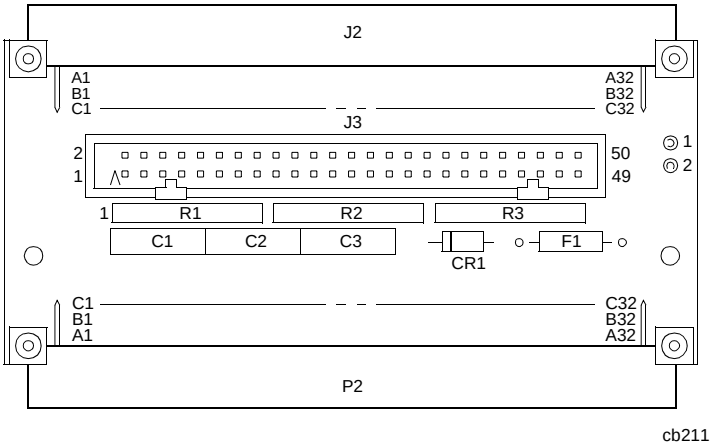


Figure 2-11. P2 adapter connector locations

Cables and Connectors

The MVME712M front panel has four serial ports, one printer port, one SCSI port, and one Ethernet port. The connectors for these ports, the P2 backplane connector, and two modem connectors are described in the following table. The P2 adapter board's MVME712M connector, P2 connector, and SCSI connector are also described in the table.

Cables recommended for use with the connectors are also listed in the table. Note that not all peripheral cables needed are provided with the MVME712M. You may need to fabricate or purchase certain cables.

[1]

Table 2-3. Cables and connectors

MVME712M Board Front Panel			
Port	**Connector**	**Description**	**Cable**
Serial ports 1 through 4	J7 through J10	25-pin female DB-25 connectors that cable to your serial devices	User-supplied serial EIA-232-D DTE or DCE cable (pins used depend upon the processor VMEmodule)
Printer port	J5	36-pin female connector that cables to your printer	User-supplied Centronics-type parallel printer cable, male-to-male
Ethernet port	J6	15-pin female DB-15 connector that cables to your Ethernet network controller, or connects to an adapter box	User-supplied network cable or user-supplied adapter box to convert to another medium
SCSI Interface port	J4	50-pin female connector that cables to your SCSI devices	User-supplied 50-conductor cable with SCSI connector(s) as needed
MVME712M Board Top Side			
Interconnection	**Connector**	**Description**	**Cable**
SCSI	J3	50-pin male IDC connector that cables to J3 on the P2 adapter board and/or to SCSI devices, in almost all configurations	Part number 30-W2960B01A. 17.5-inch, 50-conductor flat-ribbon cable furnished with the MVME712M, used only in the external-SCSI-only configuration labeled *Configuration E* in Table 2-4 and Figure 2-18. Otherwise, a user-supplied 50-conductor cable with SCSI connector(s) as needed

Modem	J20	20-pin male IDC connector, connects to a user-supplied modem	User-supplied 20-conductor cable; usually supplied with the modem
	J21	6-pin polarized male connector, supplies power to the modem	User-supplied 6-conductor cable; usually supplied with the modem
VME	J2	64-pin male connector that cables to J2 on the P2 adapter board	Part number 30-W2514B02. 17.5-inch 64-conductor flat ribbon cable furnished with the MVME712M (see Note below)
P2 Adapter Board			
Interconnection	**Connector**	**Description**	**Cable**
VME	P2	96-pin female DIN 41612 connector that connects to the chassis backplane	None needed
	J2	64-pin male connector that cables to J2 on the MVME712M	Part number 30-W2514B02. 17.5-inch 64-conductor flat ribbon cable furnished with the MVME712M (see Note below)
SCSI	J3	50-pin male IDC connector that cables to J3 on the MVME712M and/or to SCSI devices	Part number 30-W2960B01A. 17.5-inch 50-conductor flat-ribbon cable furnished with the MVME712M, used only in the external-SCSI-only configuration labeled *Configuration E* in Table 2-4 and Figure 2-18. Otherwise, a user-supplied 50-conductor cable with SCSI connector(s) as needed

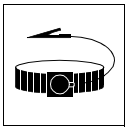
Note If you wish to use your own cable for the P2 signals from J2 on the P2 adapter board to J2 on the MVME712M, note that the cable should be kept as short as possible. Any cable over 2.5 to 3 feet is likely to cause signal problems.

The maximum cable length that can be used from the P2 adapter board to the MVME712M will vary depending on what other cables are attached to the MVME712. The connections most susceptible to problems caused by long P2 cables are the Ethernet and parallel port connections.

Installing the MVME712M Module and P2 Adapter Board

The MVME712M can be connected in different configurations. The installation procedure begins on this page, and continues using the instructions given for one of the configurations listed in Table 2-2.

Use ESD



Wrist Strap

Motorola strongly recommends that you use an antistatic wrist strap and a conductive foam pad when installing or upgrading the system. Electronic components, such as disk drives, computer boards, and memory modules, can be extremely sensitive to ESD. After removing the component from the system or its protective wrapper, place the component flat on a grounded, static-free surface, and in the case of a board, component-side up. Do not slide the component over any surface.

If an ESD station is not available, you can avoid damage resulting from ESD by wearing an antistatic wrist strap (available at electronics stores) that is attached to an unpainted metal part of the system chassis.



Caution

Connecting modules while power is applied may result in damage to components on the module.



Warning

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

Procedure

To begin the installation of the MVME712M in the system, proceed as follows:

1. Turn all equipment power OFF and disconnect the power cable from the AC power source.
2. Remove the chassis cover as instructed in the equipment user's manual.

3. Remove the filler panel(s) from the appropriate card slot(s) at the rear of the chassis (if the chassis has a rear card cage). Other modules in the unit may have to be moved to allow space for the cables connected to the P2 adapter and the MVME712M.
4. Continue the installation procedure by choosing one of the configurations listed in the following table, and described on the following pages.

   Note that the designations A through F are used solely as convenient references.

Table 2-4. Cabling configurations

Configuration	Internal SCSI Devices	External SCSI Devices	Pages
A	X		2-19, 2-20
B	X		2-21, 2-22
B1	X		2-23, 2-24
C	X	X	2-25, 2-27
C1	X	X	2-28, 2-29
D	X	X	2-30, 2-32
E		X	2-33, 2-34
F		X	2-35, 2-37

Configuration A - Internal SCSI Devices Only

If SCSI devices are to be attached *internal* to your system, proceed as follows. See Table 2-12.

1. The MVME*xxxx* is at one end of the cable, so terminators must be installed on the P2 adapter module.
2. Install the P2 adapter module to the backplane directly in line with the P2 connector on the MVME*xxxx*. Be sure to orient pin 1 of the adapter with pin 1 of the backplane connector.
3. Connect a user-supplied 50-conductor cable with compatible pinouts from connector J3 on the P2 adapter to the internal SCSI devices.
4. Terminators must be installed on the last SCSI device in the system.
5. Attach the furnished 64-conductor cable from connector J2 on the P2 adapter to connector J2 on the MVME712M. Be sure to orient cable pin 1 with connector pin 1.
6. Insert the MVME712M module into the selected slots and tighten the attaching screws, making good contact with the transverse mounting rails to minimize RF emissions.
7. Make sure that cables will not be pinched by the cover and install the cover that you previously removed.
8. Connect the power cable to the AC power source and turn the unit on.
9. The LED (DS1, toward the serial ports) on the MVME712M should be lit (the LED can be seen through the opening in the front panel). If not lit, then either a cabling problem exists, a fuse is blown, or both.

   If it is a cabling problem, then fix it. If not, check the fuse on the MVME*xxxx* module, and replace if necessary. The fuse on the MVME*xxxx* is for Ethernet transceiver power. The resistance of this fuse should be less than 1 ohm.

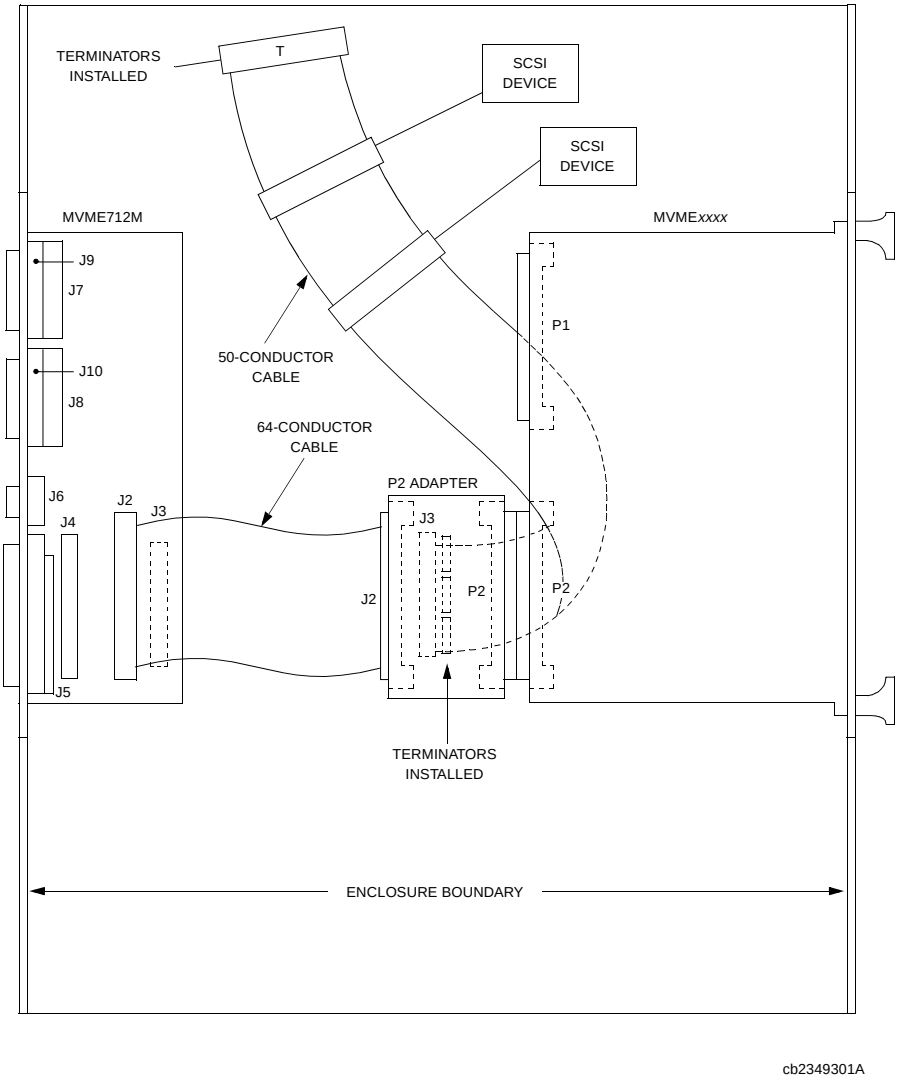


Figure 2-12. Configuration A -- internal-only SCSI connections

Configuration B - Internal SCSI Devices Only

If SCSI devices are to be attached *internal* to your system, and cabled for easy change to configuration C, proceed as follows. See Figure 2-13.

1. The MVME*xxxx* is at one end of the cable, so terminators must be installed on the P2 adapter module.
2. The MVME712M is at one end of the cable, so terminators must be installed on the MVME712M.
3. Install the P2 adapter module to the backplane directly in line with the P2 connector on the MVME*xxxx*. Be sure to orient pin 1 of the adapter with pin 1 of the backplane connector.
4. Connect a user-supplied 50-conductor cable with compatible pinouts from connector J3 on the P2 adapter to the internal SCSI devices and on to connector J3 on the MVME712M. This cable must be a continuous cable.
5. Attach the furnished 64-conductor cable from connector J2 on the P2 adapter to connector J2 on the MVME712M. Be sure to orient cable pin 1 with connector pin 1.
6. Insert the MVME712M module into the selected slots and tighten the attaching screws, making good contact with the transverse mounting rails to minimize RF emissions.
7. Make sure that cables will not be pinched by the cover and install the cover that you previously removed.
8. Connect the power cable to the AC power source and turn the unit on.
9. Both LEDs (DS1 and DS2) on the MVME712M should be lit (the LEDs can be seen through the opening in the front panel). If not lit, then either a cabling problem exists, a fuse is blown, or both.

   If it is a cabling problem, then fix it. If not, check the fuse on the P2 adapter module and on the MVME*xxxx* module, and replace if necessary. The fuse on the P2 adapter module is for SCSI terminator power. The fuse on the MVME*xxxx* is for Ethernet transceiver power. The resistance of each fuse should be less than 1 ohm.

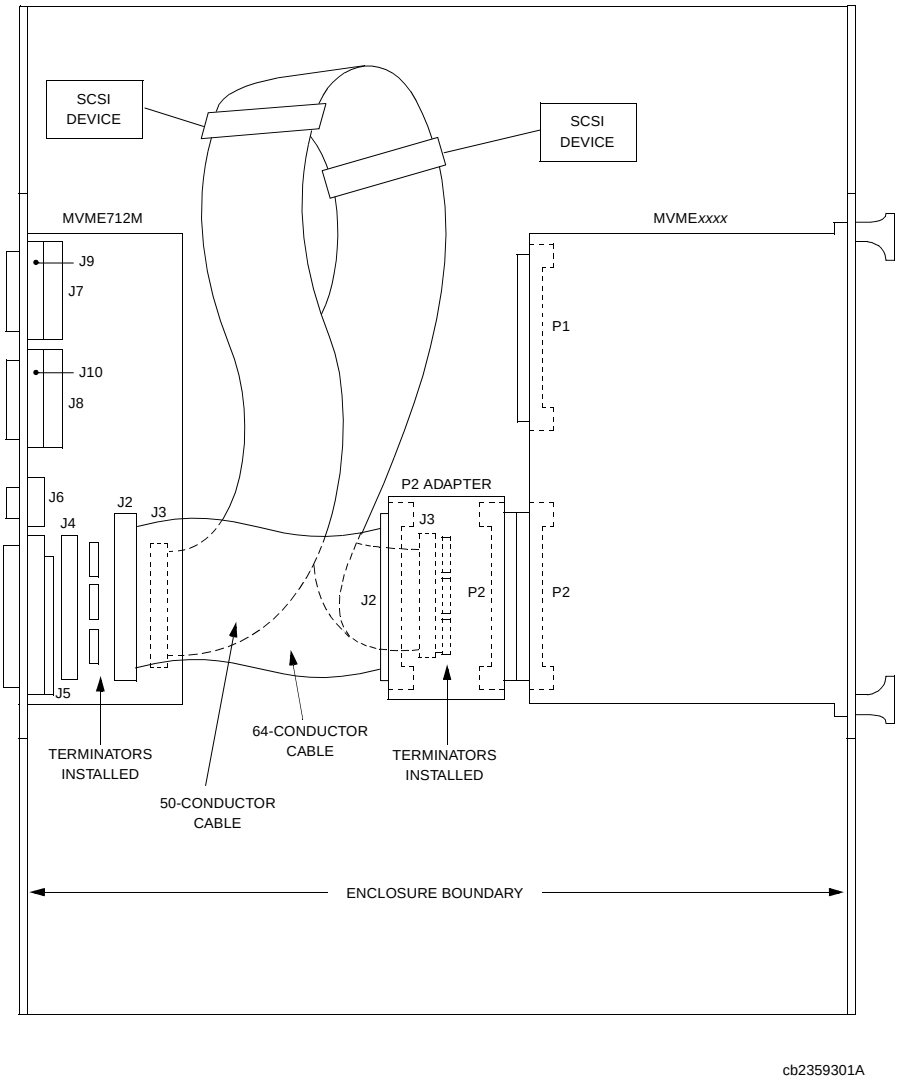


Figure 2-13. Configuration B -- internal-only SCSI connections

Configuration B1 - Internal SCSI Devices Only

If SCSI devices are to be attached *internal* to your system, and cabled for easy change to configuration C1, proceed as follows. See Figure 2-14.

1. The MVME*xxxx* is not at one end of the cable, so terminators must be removed from the P2 adapter module.
2. The MVME712M is at one end of the cable, so terminators must be installed on the MVME712M.
3. Install the P2 adapter module to the backplane directly in line with the P2 connector on the MVME*xxxx*. Be sure to orient pin 1 of the adapter with pin 1 of the backplane connector.
4. Connect a user-supplied 50-conductor cable with compatible pinouts from connector J3 on the MVME712M to connector J3 on the P2 adapter and on to the internal SCSI devices. This cable must be a continuous cable.
5. Terminators must be installed on the last SCSI device on the cable.
6. Attach the furnished 64-conductor cable from connector J2 on the P2 adapter to connector J2 on the MVME712M. Be sure to orient cable pin 1 with connector pin 1.
7. Insert the MVME712M module into the selected slots and tighten the attaching screws, making good contact with the transverse mounting rails to minimize RF emissions.
8. Make sure that cables will not be pinched by the cover and install the cover that you previously removed.
9. Connect the power cable to the AC power source and turn the unit on.
10. Both LEDs (DS1 and DS2) on the MVME712M should be lit (the LEDs can be seen through the opening in the front panel). If not lit, then either a cabling problem exists, a fuse is blown, or both.

    If it is a cabling problem, then fix it. If not, check the fuse on the P2 adapter module and on the MVME*xxxx* module, and replace if necessary. The fuse on the P2 adapter module is for SCSI terminator power. The fuse on the MVME*xxxx* is for Ethernet transceiver power. The resistance of each fuse should be less than 1 ohm.

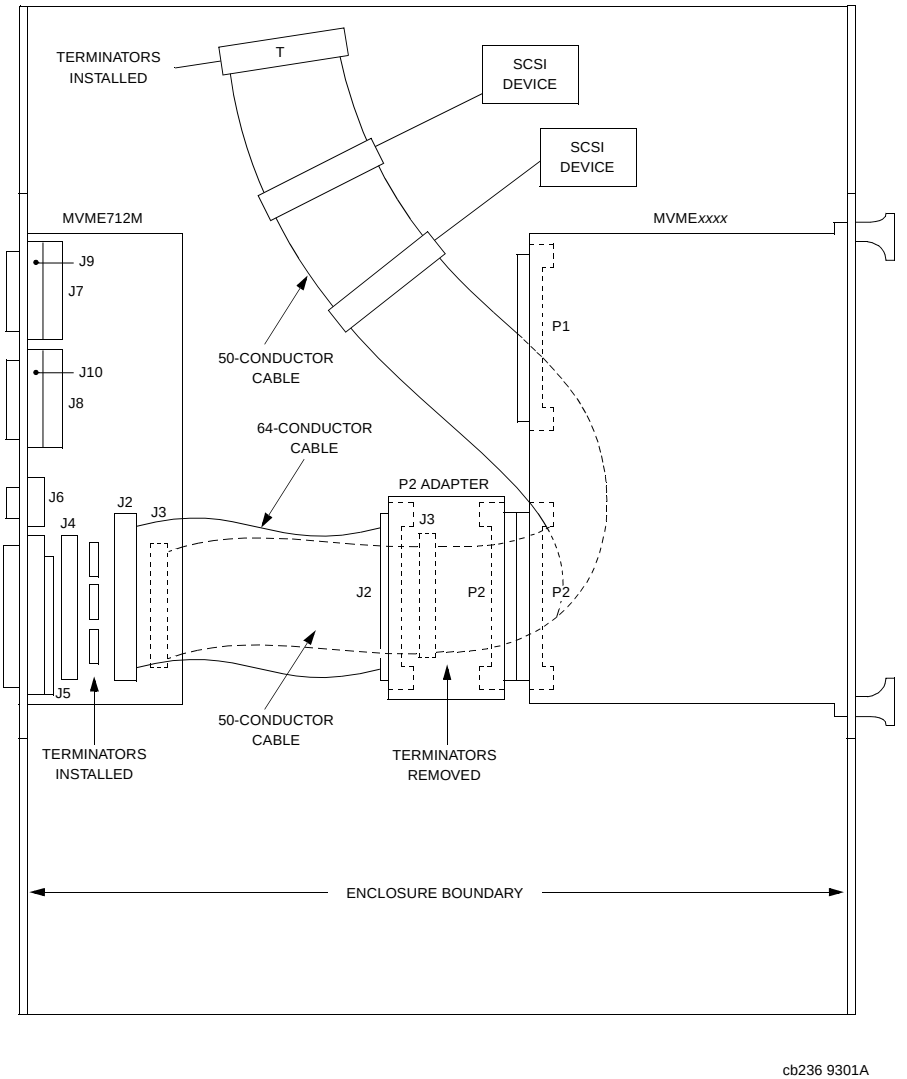


Figure 2-14. Configuration B1 -- internal-only SCSI connections

Configuration C - Internal and External SCSI Devices

If SCSI devices are to be attached *internal and external* to your system and the MVME*xxxx* is at one end of the cable, proceed as follows. See Figure 2-15.

1. The MVME*xxxx* is at one end of the cable, so terminators must be installed on the P2 adapter module.
2. The MVME712M is not at one end of the cable, so terminators must be removed from the MVME712M.
3. Install the P2 adapter module to the backplane directly in line with the P2 connector on the MVME*xxxx*. Be sure to orient pin 1 of the adapter with pin 1 of the backplane connector.
4. Connect a user-supplied 50-conductor cable with compatible pinouts from connector J3 on the MVME712M to the internal SCSI devices and on to connector J3 on the P2 adapter. This cable must be a continuous cable.
5. Attach the furnished 64-conductor cable from connector J2 on the P2 adapter to connector J2 on the MVME712M. Be sure to orient cable pin 1 with connector pin 1.
6. Insert the MVME712M module into the selected slots and tighten the attaching screws, making good contact with the transverse mounting rails to minimize RF emissions.
7. Connect a user-supplied 50-conductor cable with compatible pinouts from the SCSI connector on the front panel of the MVME712M to the external SCSI devices.
8. Terminators must be installed on the last SCSI device on the cable.
9. Make sure that cables will not be pinched by the cover and install the cover that you previously removed.
10. Connect the power cable to the AC power source and turn the unit on.
11. Both LEDs (DS1 and DS2) on the MVME712M should be lit (the LEDs can be seen through the opening in the front panel). If not lit, then either a cabling problem exists, a fuse is blown, or both.

    If it is a cabling problem, then fix it. If not, check the fuse on the P2 adapter module and on the MVME*xxxx* module, and replace if necessary. The fuse on the P2 adapter module is for SCSI terminator

power. The fuse on the MVME*xxxx* is for Ethernet transceiver power. The resistance of each fuse should be less than 1 ohm.

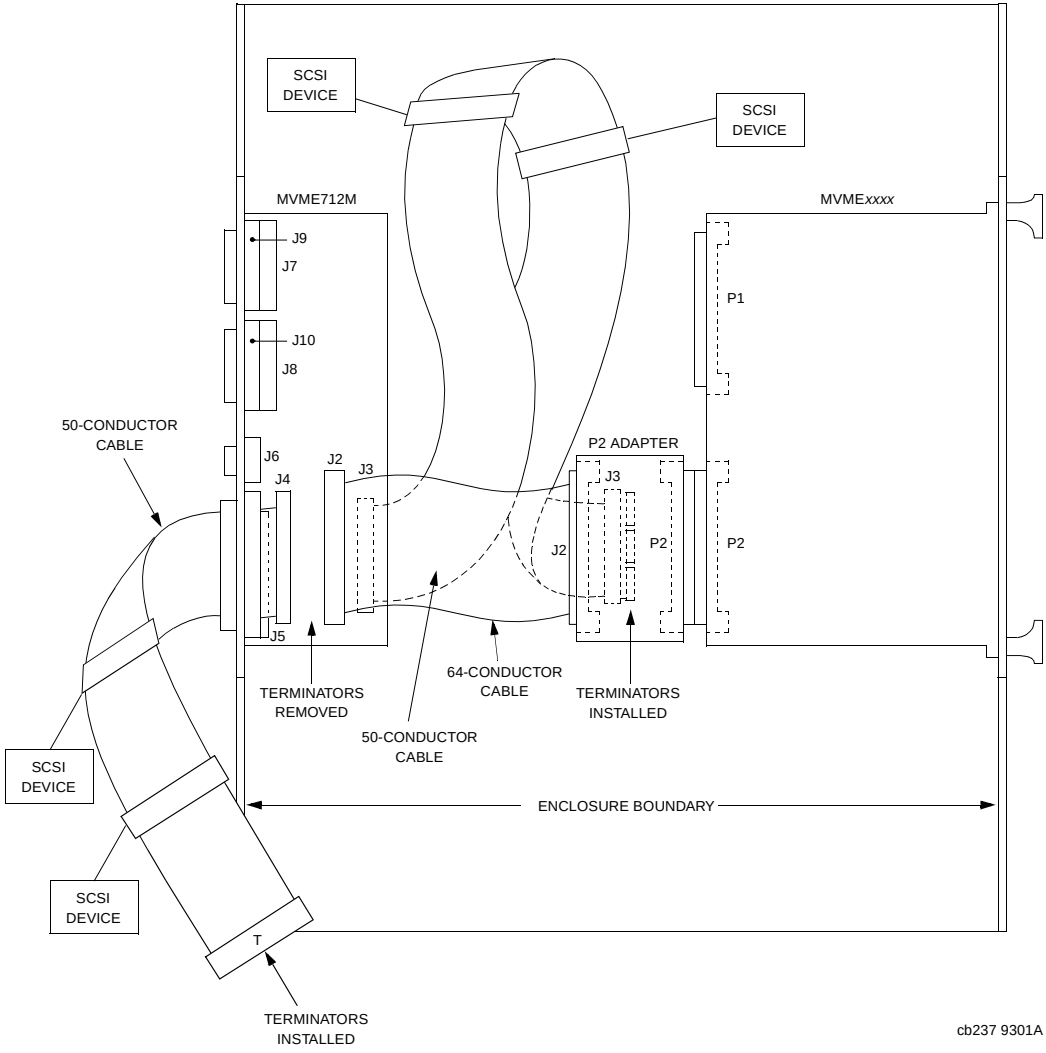


Figure 2-15. Configuration C -- internal and external SCSI connections

Configuration C1 - Internal and External SCSI Devices

If SCSI devices are to be attached *internal and external* to your system and the internal SCSI device is at one end of the cable, proceed as follows. See Figure 2-16.

1. The MVME*xxxx* is not at one end of the cable, so terminators must be removed from the P2 adapter module.
2. The MVME712M is not at one end of the cable, so terminators must be removed from the MVME712M.
3. Install the P2 adapter module to the backplane directly in line with the P2 connector on the MVME*xxxx*. Be sure to orient pin 1 of the adapter with pin 1 of the backplane connector.
4. Connect a user-supplied 50-conductor cable with compatible pinouts from connector J3 on the MVME712M to connector J3 on the P2 adapter and on to the internal SCSI devices. This cable must be a continuous cable.
5. Terminators must be installed on the last SCSI device on the cable.
6. Attach the furnished 64-conductor cable from connector J2 on the P2 adapter to connector J2 on the MVME712M. Be sure to orient cable pin 1 with connector pin 1.
7. Insert the MVME712M module into the selected slots and tighten the attaching screws, making good contact with the transverse mounting rails to minimize RF emissions.
8. Connect a user-supplied 50-conductor cable with compatible pinouts from the SCSI connector on the front panel of the MVME712M to the external SCSI devices.
9. Terminators must be installed on the last SCSI device on the cable.
10. Make sure that cables will not be pinched by the cover and install the cover that you previously removed.
11. Connect the power cable to the AC power source and turn the unit on.
12. Both LEDs (DS1 and DS2) on the MVME712M should be lit (the LEDs can be seen through the opening in the front panel). If not lit, then either a cabling problem exists, a fuse is blown, or both.

    If it is a cabling problem, then fix it. If not, check the fuse on the P2 adapter module and on the MVME*xxxx* module, and replace if necessary. The fuse on the P2 adapter module is for SCSI terminator power. The fuse on the MVME*xxxx* is for Ethernet transceiver power. The resistance of each fuse should be less than 1 ohm.

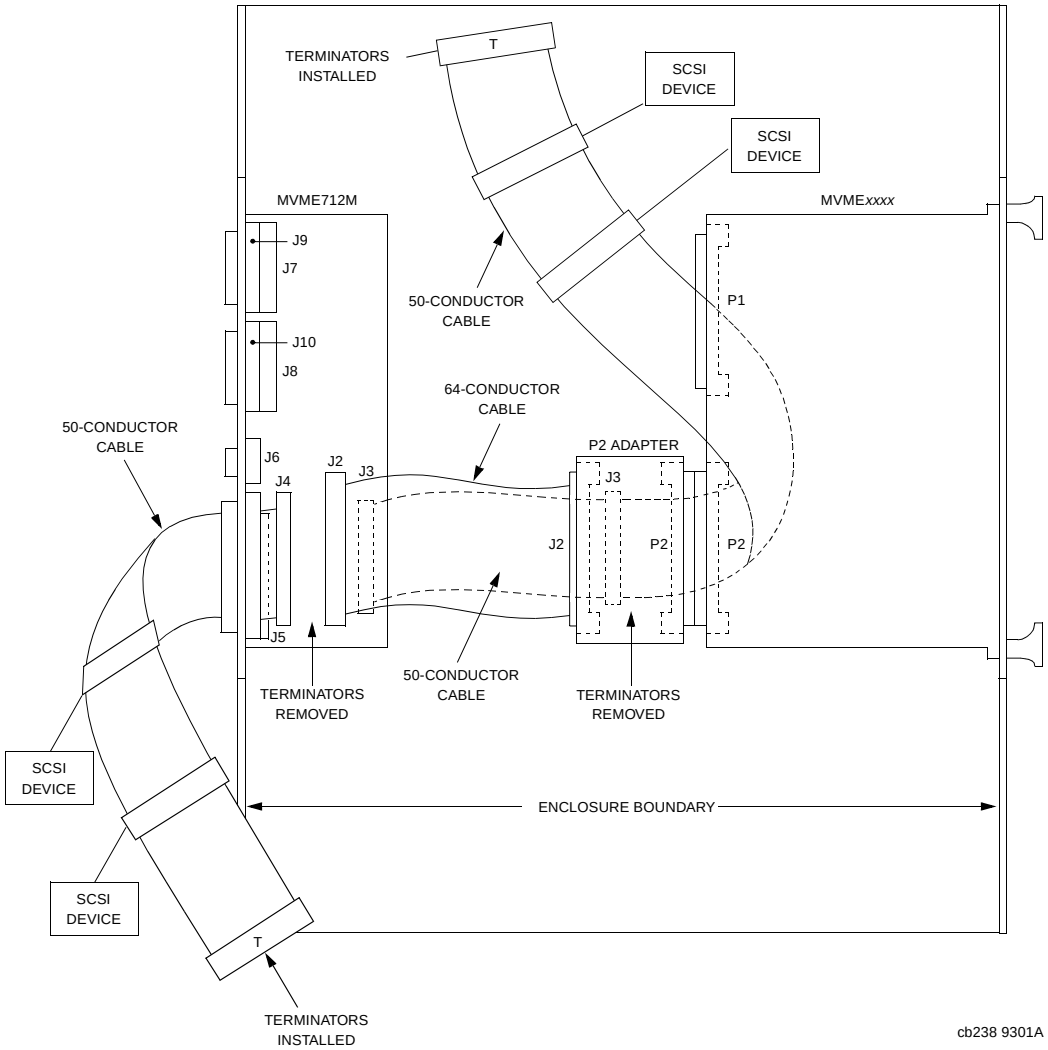


Figure 2-16. Configuration C1 -- internal and external SCSI connections

Configuration D - Internal and External SCSI Devices

If SCSI devices are to be attached *internal and external* to your system and neither the internal SCSI device nor the MVME*xxxx* is at one end of the cable, proceed as follows. See Figure 2-17.

1. The MVME*xxxx* is not at one end of the cable, so terminators must be removed from the P2 adapter module.
2. The MVME712M is not at one end of the cable, so terminators must be removed from the MVME712M.
3. Install the P2 adapter module to the backplane directly in line with the P2 connector on the MVME*xxxx*. Be sure to orient pin 1 of the adapter with pin 1 of the backplane connector.
4. Connect a user-supplied 50-conductor cable with compatible pinouts from connector J3 on the MVME712M to connector J3 on the P2 adapter and on to the internal SCSI devices and then to a user-supplied panel on the enclosure. This cable must be a continuous cable.
5. Attach the furnished 64-conductor cable from connector J2 on the P2 adapter to connector J2 on the MVME712M. Be sure to orient cable pin 1 with connector pin 1.
6. Insert the MVME712M module into the selected slots and tighten the attaching screws, making good contact with the transverse mounting rails to minimize RF emissions.
7. Connect a user-supplied 50-conductor cable with compatible pinouts from the SCSI connector on the front panel of the MVME712M to the external SCSI devices.
8. Terminators must be installed on the last SCSI device on the cable.
9. Connect a user-supplied 50-conductor cable with compatible pinouts from the connector on the user-supplied panel to the external SCSI devices.
10. Terminators must be installed on the last SCSI device on the cable.
11. Make sure that cables will not be pinched by the cover and replace the cover.
12. Connect the power cable to the AC power source and turn the unit on.
13. Both LEDs on the MVME712M should be lit. If not lit, then either a cabling problem exists, a fuse is blown, or both. If it is a cabling problem, then fix it. If not, check the fuse on the P2 adapter module and on the VMEmodule, and replace if necessary. The fuse on the

P2 adapter module is for SCSI terminator power. The fuse on the MVME*xxxx* is for Ethernet transceiver power. The resistance of each fuse should be less than 1 ohm.

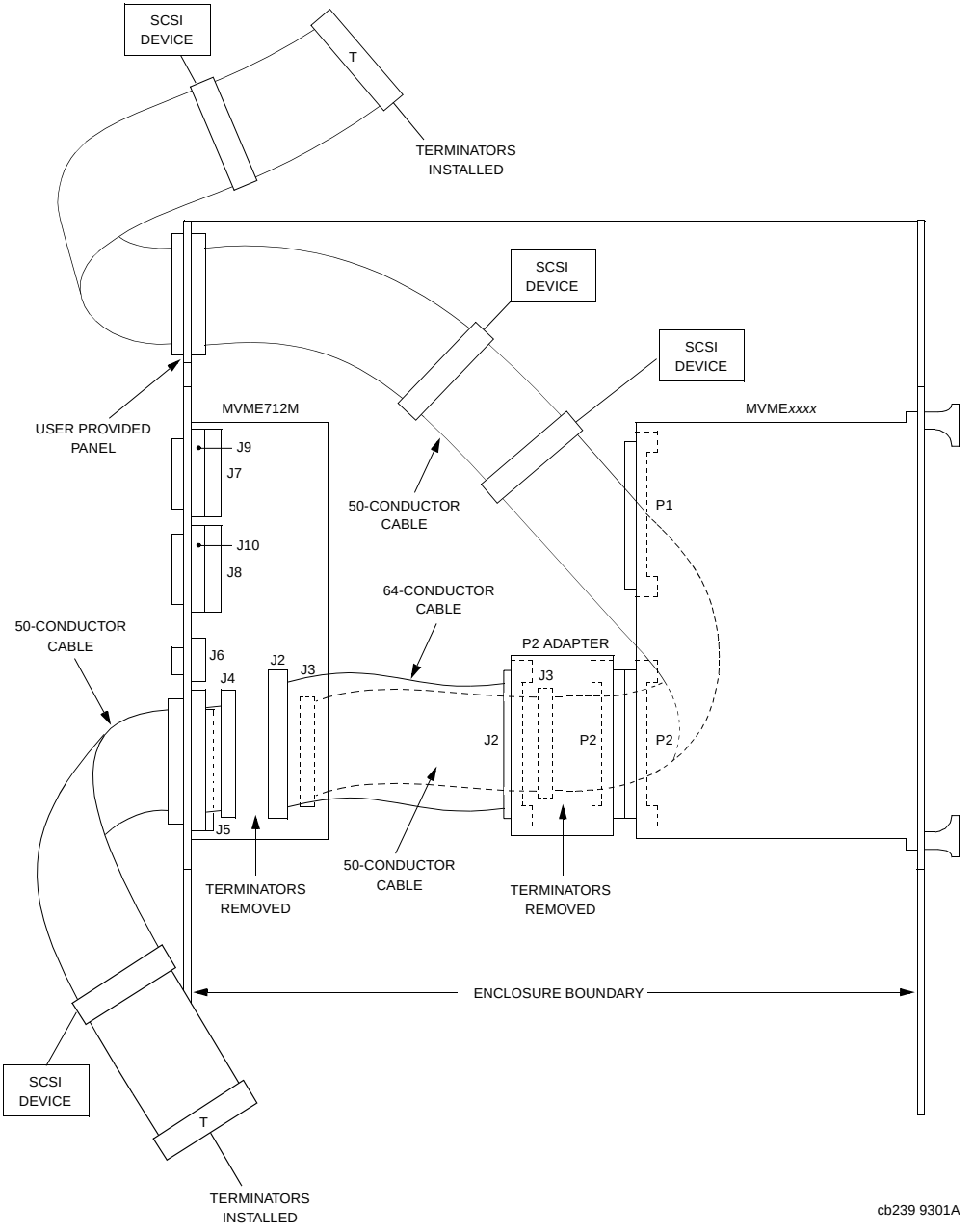


Figure 2-17. Configuration D -- internal and external SCSI connections

Configuration E - External SCSI Devices Only

If SCSI devices are to be attached *external* to your system and the MVME*xxxx* is at one end of the cable, proceed as follows. See Figure 2-18.

1. The MVME*xxxx* is at one end of the cable, so terminators must be installed on the P2 adapter module.
2. The MVME712M is not at one end of the cable, so terminators must be removed from the MVME712M.
3. Install the P2 adapter module to the backplane directly in line with the P2 connector on the MVME*xxxx*. Be sure to orient pin 1 of the adapter with pin 1 of the backplane connector.
4. Attach the furnished 50-conductor cable from connector J3 on the MVME712M to connector J3 on the P2 adapter.
5. Attach the furnished 64-conductor cable from connector J2 on the P2 adapter to connector J2 on the MVME712M. Be sure to orient cable pin 1 with connector pin 1.
6. Insert the MVME712M module into the selected slots and tighten the attaching screws, making good contact with the transverse mounting rails to minimize RF emissions.
7. Connect a user-supplied 50-conductor cable with compatible pinouts from the SCSI connector on the front panel of the MVME712M to the external SCSI devices.
8. Terminators must be installed on the last SCSI device on the cable.
9. Make sure that cables will not be pinched by the cover and install the cover that you previously removed.
10. Connect the power cable to the AC power source and turn the unit on.
11. Both LEDs on the MVME712M should be lit. If not lit, then either a cabling problem exists, a fuse is blown, or both.

    If it is a cabling problem, then fix it. If not, check the fuse on the P2 adapter module and on the VMEmodule, and replace if necessary. The fuse on the P2 adapter module is for SCSI terminator power. The fuse on the MVME*xxxx* is for Ethernet transceiver power. The resistance of each fuse should be less than 1 ohm.

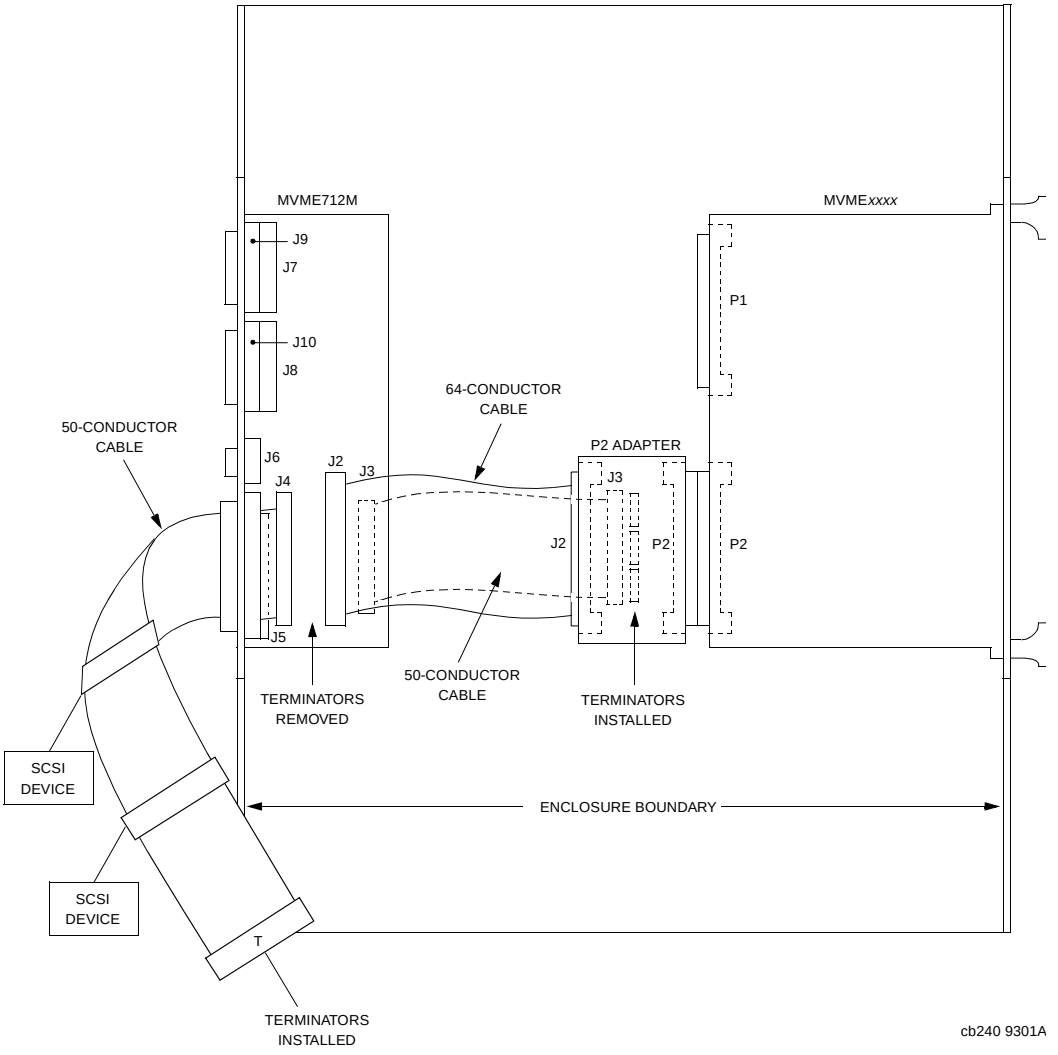


Figure 2-18. Configuration E -- external-only SCSI connections

Configuration F - External SCSI Devices Only

If SCSI devices are to be attached *external* to your system and the MVME-*xxxx* is not at one end of the cable, proceed as follows. See Figure 2-19.

1. The MVME*xxxx* is not at one end of the cable, so terminators must be removed from the P2 adapter module.
2. The MVME712M is not at one end of the cable, so terminators must be removed from the MVME712M.
3. Install the P2 adapter module to the backplane directly in line with the P2 connector on the MVMExxxx. Be sure to orient pin 1 of the adapter with pin 1 of the backplane connector.
4. Connect a user-supplied 50-conductor cable with compatible pinouts from connector J3 on the MVME712M to connector J3 on the P2 adapter and on to a user-supplied panel on the enclosure. This cable must be a continuous cable.
5. Attach the furnished 64-conductor cable from connector J2 on the P2 adapter to connector J2 on the MVME712M. Be sure to orient cable pin 1 with connector pin 1.
6. Insert the MVME712M module into the selected slots and tighten the attaching screws, making good contact with the transverse mounting rails to minimize RF emissions.
7. Connect a user-supplied 50-conductor cable with compatible pinouts from the SCSI connector on the front panel of the MVME712M to the external SCSI devices.
8. Terminators must be installed on the last SCSI device on the cable.
9. Connect a user-supplied 50-conductor cable with compatible pinouts from the connector on the user-supplied panel to the external SCSI devices.
10. Terminators must be installed on the last SCSI device on the cable.
11. Make sure that cables will not be pinched by the cover and replace the cover.
12. Connect the power cable to the AC power source and turn the unit on.
13. Both LEDs on the MVME712M should be lit. If not lit, then either a cabling problem exists, a fuse is blown, or both.

    If it is a cabling problem, then fix it. If not, check the fuse on the P2 adapter module and on the VMEmodule, and replace if necessary. The fuse on the P2 adapter module is for SCSI terminator power.

The fuse on the MVME*xxxx* is for Ethernet transceiver power. The resistance of each fuse should be less than 1 ohm.

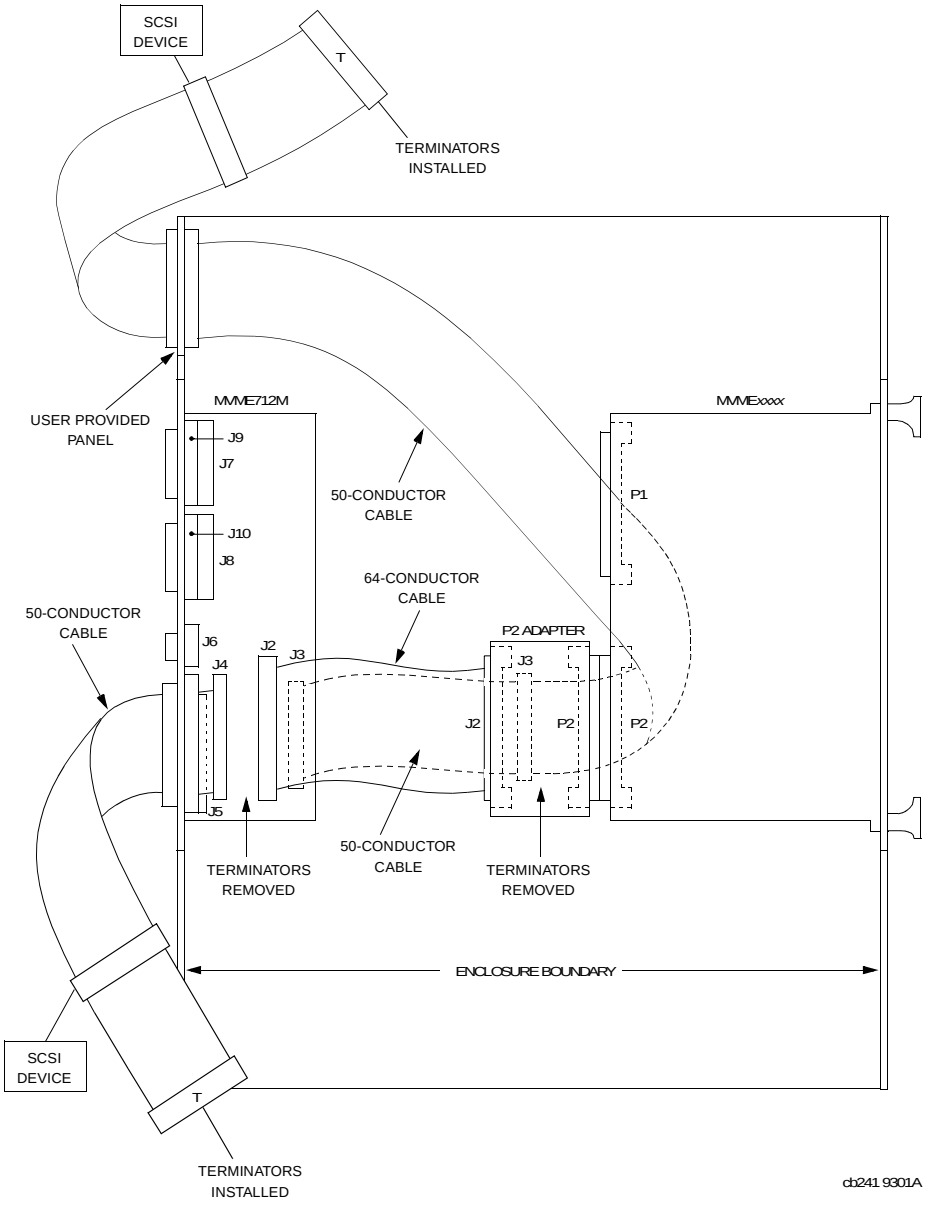


Figure 2-19. Configuration F -- external-only SCSI connections

Interconnect Signals 3

Introduction

This chapter provides the interconnection signals for the MVME712M and P2 adapter board. The connectors described are listed in the following table.

All front panel connectors have metal shells and jack posts that are electrically connected to the front panel. If the front panel is electrically connected to the chassis ground, then the shells and jack posts are connected to chassis ground. This allows shielded cable to be used for effective reduction of EMI and EMC problems.

Table 3-1. P2 adapter board and MVME712M connectors

P2 Adapter	MVME712M	Connectors
J2	J2	64-pin DIN connectors, always cabled together
J3	J3	50-pin IDC connectors, cabled together in most configurations
P2		96-pin DIN connector, connected to the chassis backplane at the MVME*xxxx* processor module's P2 connector.
	J4	50-pin connector for the SCSI port
	J5	36-pin Centronics-type connector for the printer port
	J6	15-pin DB-15 connector for the Ethernet interface
	J7 - J10	25-pin DB-25 connectors for the serial ports on the MVME712M front panel
	J20	20-pin IDC connector for connection to a chassis internal modem
	J21	6-pin polarized connector for modem power

P2 Adapter Board

The following paragraphs provide the interconnection signals for the connectors on the P2 adapter board.

P2 connector

Connector P2 is a standard DIN 41612 triple-row, 96-pin connector. Each pin connection, signal mnemonic, and signal characteristic for the connector rows A and C are the same pin-for-pin as connector P2 on the MVME*xxxx* processor module. Row B has only +5 Vdc and ground connected on the P2 adapter.

J2 connector

Connector J2 on the P2 adapter board and connector J2 on the MVME712M are 64-pin DIN connectors that are the same pin-for-pin. Each pin connection, signal mnemonic, and signal characteristic for these connectors is listed in the following table.

Table 3-2. Connector J2 interconnect signals

Pin Number	Signal Mnemonic	Signal Name and Description
A1	C-	COLLISION - (input) (Ethernet) - part of a differential pair.
A2	T-	TRANSMIT - (output) (Ethernet) - part of a differential pair.
A3	R-	RECEIVE - (input) (Ethernet) - part of a differential pair.
A4	+12VF	+12 Vdc power - fused on the MPU board.
A5	GND	GROUND
A6	PRD01	DATA (bit 1) (Printer)
A7	PRD03	DATA (bit 3) (Printer)
A8	PRD05	DATA (bit 5) (Printer)
A9	PRD07	DATA (bit 7) (Printer)

Table 3-2. Connector J2 interconnect signals (Continued)

Pin Number	Signal Mnemonic	Signal Name and Description
A10	PRACK*	DATA ACKNOWLEDGE (Printer) - a low level input pulse indicating that the next character may be sent.
A11	PRBSY	BUSY (Printer) - an input signal indicating that the printer cannot receive data.
A12	PRSEL	SELECTED (Printer) - an input signal indicating that the printer is selected.
A13	PRFAULT*	FAULT (Printer) - an input signal that indicates a printer fault condition.
A14	TXD3	TRANSMIT DATA (Serial Port 3) - data to be transmitted is furnished on this line to the modem from the terminal.
A15	RXD3	RECEIVE DATA (Serial Port 3) - data that is demodulated from the receive line is presented to the terminal by the modem.
A16	RTS3	REQUEST TO SEND (Serial Port 3) - 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.
A17	DTR3	DATA TERMINAL READY (Serial Port 3) - a signal from the terminal to the modem indicating that the terminal is ready to send or receive data.
A18-A20	GND	GROUND
A21	CTS1/DCD1	CLEAR TO SEND (Serial Port 1) - 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.
A22	TXD4	TRANSMIT DATA (Serial Port 4) - data to be transmitted is furnished on this line to the modem from the terminal.
A23	RXD4	RECEIVE DATA (Serial Port 4) - data that is demodulated from the receive line is presented to the terminal by the modem.

Table 3-2. Connector J2 interconnect signals (Continued)

Pin Number	Signal Mnemonic	Signal Name and Description
A24	RTS4	REQUEST TO SEND (Serial Port 4) - 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.
A25	TRXC4	TRANSMIT CLOCK (Serial Port 4) - this line can be configured to clock output data to the modem from the terminal.
A26	CTS4	CLEAR TO SEND (Serial Port 4) - 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.
A27	DCD4	DATA CARRIER DETECT (Serial Port 4) - sent by the modem to the terminal to indicate that a valid carrier is being received.
A28	RTXC4	RECEIVE CLOCK (Serial Port 4) - this line can be configured to clock input data from a terminal to a modem.
A29	TXD2	TRANSMIT DATA (Serial Port 2) - data to be transmitted is furnished on this line to the modem from the terminal.
A30	RXD2	RECEIVE DATA (Serial Port 2) - data that is demodulated from the receive line is presented to the terminal by the modem.
A31	RTS2	REQUEST TO SEND (Serial Port 2) - 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.
A32	DTR2	DATA TERMINAL READY (Serial Port 2) - a signal from the terminal to the modem indicating that the terminal is ready to send or receive data.
C1	C+	COLLISION + (input) (Ethernet) - a signal to indicate that multiple stations are contending for access to the transmission medium.

Table 3-2. Connector J2 interconnect signals (Continued)

Pin Number	Signal Mnemonic	Signal Name and Description
C2	T+	TRANSMIT + (output) (Ethernet) - this line is intended to operate into terminated transmission lines.
C3	R+	RECEIVE + (input) (Ethernet) - a data input sourced by the MAU.
C4	PRSTB*	DATA STROBE (Printer) - an active low output pulse used to clock data from the system to the printer.
C5	PRD00	DATA (bit 0) (Printer)
C6	PRD02	DATA (bit 2) (Printer)
C7	PRD04	DATA (bit 4) (Printer)
C8	PRD06	DATA (bit 6) (Printer)
C9,C10	GND	GROUND
C11	PRPE	PAPER EMPTY (Printer) - out of paper.
C12	INPRIME*	INPUT PRIME (Printer) - an output signal that clears the printer buffer and initializes the logic.
C13-C15	GND	GROUND
C16	CTS3	CLEAR TO SEND (Serial Port 3) - 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.
C17	DCD3	DATA CARRIER DETECT (Serial Port 3) - sent by the modem to the terminal to indicate that a valid carrier is being received.
C18	TXD1	TRANSMIT DATA (Serial Port 1) - data to be transmitted is furnished on this line to the modem from the terminal.
C19	RXD1	RECEIVE DATA (Serial Port 1) - data that is demodulated from the receive line is presented to the terminal by the modem.
C20	RTS1	REQUEST TO SEND (Serial Port 1) - 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.
C21-C25	GND	GROUND

Table 3-2. Connector J2 interconnect signals (Continued)

Pin Number	Signal Mnemonic	Signal Name and Description
PIN	SIGNAL	NUMBER
C26	DTR4	DATA TERMINAL READY (Serial Port 4) - a signal from the terminal to the modem indicating that the terminal is ready to send or receive data.
C27-C30	GND	GROUND
C31	CTS2	CLEAR TO SEND (Serial Port 2) - 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.
C32	DCD2	DATA CARRIER DETECT (Serial Port 2) - sent by the modem to the terminal to indicate that a valid carrier is being received.

J3 connector

Connector J3 on the P2 adapter board and connectors J3 and J4 on the MVME712M module are 50-pin connectors that are the same pin-for-pin. Each pin connection, signal mnemonic, and signal characteristic for these connectors is listed in the following table.

Table 3-3. Connector J3 interconnect signals

Pin Number	Signal Mnemonic	Signal Name and Description
1	GND	GROUND
2	DB00*	DATA bus (bit 0) - least significant bit and the lowest priority during the arbitration phase.
3	GND	GROUND
4	DB01*	DATA bus (bit 1)
5	GND	GROUND
6	DB02*	DATA bus (bit 2)
7	GND	GROUND
8	DB03*	DATA bus (bit 3)
9	GND	GROUND
10	DB04*	DATA bus (bit 4)
11	GND	GROUND
12	DB05*	DATA bus (bit 5)
13	GND	GROUND
14	DB06*	DATA bus (bit 6)
15	GND	GROUND
16	DB07*	DATA bus (bit 7) - most significant bit and the highest priority during the arbitration phase.
17	GND	GROUND
18	DBP*	DATA bus (parity) - data parity is odd. Use of parity is a system option. Parity is not valid during the arbitration phase.
19-24	GND	GROUND
25		Not used.
26	TERMPWR	TERMINATOR POWER

Table 3-3. Connector J3 interconnect signals (Continued)

Pin Number	Signal Mnemonic	Signal Name and Description
27-31	GND	GROUND
32	ATN*	ATTENTION - signal driven by the initiator. Indicates the attention condition.
33-35	GND	GROUND
36	BSY*	BUS BUSY - OR-tied signal that indicates that the bus is being used.
37	GND	GROUND
PIN	SIGNAL	NUMBER
38	ACK*	ACKNOWLEDGE - signal driven by an initiator to indicate an acknowledgment for a REQ/ACK data transfer handshake.
39	GND	GROUND
40	RST*	RESET - OR-tied signal that indicates the RESET condition.
41	GND	GROUND
42	MSG*	MESSAGE - signal driven by the target during the message phase.
43	GND	GROUND
44	SEL*	SELECT - signal used by an initiator to select a target or by a target to reselect an initiator.
45	GND	GROUND
46	D/C*	DATA/COMMAND - signal driven by the target. It indicates whether command or data information is on the data bus. True (low) indicates command.
47	GND	GROUND
48	REQ*	REQUEST - signal driven by a target to indicate a request for a REQ/ACK data transfer handshake.
49	GND	GROUND
50	O/I*	OUTPUT/INPUT - signal driven by a target which controls the direction of data movement on the bus. True (low) indicates input to the initiator. False (high) indicates output from the initiator. This signal is also used to distinguish between selection and reselection phases.

MVME712M Transition Module

The following paragraphs provide the interconnection signals for the connectors on the MVME712M transition module.

J2 connector

Connector J2 on the MVME712M and connector J2 on the P2 adapter board are 64-pin DIN connectors that are the same pin-for-pin. Each pin connection, signal mnemonic, and signal characteristic for these connectors is listed in the following table.

Table 3-4. Connector J2 interconnect signals

Pin Number	Signal Mnemonic	Signal Name and Description
A1	C-	COLLISION - (input) (Ethernet) - part of a differential pair.
A2	T-	TRANSMIT - (output) (Ethernet) - part of a differential pair.
A3	R-	RECEIVE - (input) (Ethernet) - part of a differential pair.
A4	+12VF	+12 Vdc power - fused on the MPU board.
A5	GND	GROUND
A6	PRD01	DATA (bit 1) (Printer)
A7	PRD03	DATA (bit 3) (Printer)
A8	PRD05	DATA (bit 5) (Printer)
A9	PRD07	DATA (bit 7) (Printer)
A10	PRACK*	DATA ACKNOWLEDGE (Printer) - a low level input pulse indicating that the next character may be sent.
A11	PRBSY	BUSY (Printer) - an input signal indicating that the printer cannot receive data.
A12	PRSEL	SELECTED (Printer) - an input signal indicating that the printer is selected.
A13	PRFAULT*	FAULT (Printer) - an input signal that indicates a printer fault condition.

Table 3-4. Connector J2 interconnect signals (Continued)

Pin Number	Signal Mnemonic	Signal Name and Description
A14	TXD3	TRANSMIT DATA (Serial Port 3) - data to be transmitted is furnished on this line to the modem from the terminal.
A15	RXD3	RECEIVE DATA (Serial Port 3) - data that is demodulated from the receive line is presented to the terminal by the modem.
A16	RTS3	REQUEST TO SEND (Serial Port 3) - 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.
A17	DTR3	DATA TERMINAL READY (Serial Port 3) - a signal from the terminal to the modem indicating that the terminal is ready to send or receive data.
A18-A20	GND	GROUND
A21	CTS1/DCD1	CLEAR TO SEND (Serial Port 1) - 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.
A22	TXD4	TRANSMIT DATA (Serial Port 4) - data to be transmitted is furnished on this line to the modem from the terminal.
A23	RXD4	RECEIVE DATA (Serial Port 4) - data that is demodulated from the receive line is presented to the terminal by the modem.
A24	RTS4	REQUEST TO SEND (Serial Port 4) - 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.
A25	TRXC4	TRANSMIT CLOCK (Serial Port 4) - this line can be configured to clock output data to the modem from the terminal.

Table 3-4. Connector J2 interconnect signals (Continued)

Pin Number	Signal Mnemonic	Signal Name and Description
A26	CTS4	CLEAR TO SEND (Serial Port 4) - 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.
A27	DCD4	DATA CARRIER DETECT (Serial Port 4) - sent by the modem to the terminal to indicate that a valid carrier is being received.
A28	RTXC4	RECEIVE CLOCK (Serial Port 4) - this line can be configured to clock input data from a terminal to a modem.
A29	TXD2	TRANSMIT DATA (Serial Port 2) - data to be transmitted is furnished on this line to the modem from the terminal.
A30	RXD2	RECEIVE DATA (Serial Port 2) - data that is demodulated from the receive line is presented to the terminal by the modem.
A31	RTS2	REQUEST TO SEND (Serial Port 2) - 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.
A32	DTR2	DATA TERMINAL READY (Serial Port 2) - a signal from the terminal to the modem indicating that the terminal is ready to send or receive data.
C1	C+	COLLISION + (input) (Ethernet) - a signal to indicate that multiple stations are contending for access to the transmission medium.
C2	T+	TRANSMIT + (output) (Ethernet) - this line is intended to operate into terminated transmission lines.
C3	R+	RECEIVE + (input) (Ethernet) - a data input sourced by the MAU.
C4	PRSTB*	DATA STROBE (Printer) - an active low output pulse used to clock data from the system to the printer.
C5	PRD00	DATA (bit 0) (Printer)
C6	PRD02	DATA (bit 2) (Printer)

Table 3-4. Connector J2 interconnect signals (Continued)

Pin Number	Signal Mnemonic	Signal Name and Description
C7	PRD04	DATA (bit 4) (Printer)
C8	PRD06	DATA (bit 6) (Printer)
C9,C10	GND	GROUND
C11	PRPE	PAPER EMPTY (Printer) - out of paper.
C12	INPRIME*	INPUT PRIME (Printer) - an output signal that clears the printer buffer and initializes the logic.
C13-C15	GND	GROUND
C16	CTS3	CLEAR TO SEND (Serial Port 3) - 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.
C17	DCD3	DATA CARRIER DETECT (Serial Port 3) - sent by the modem to the terminal to indicate that a valid carrier is being received.
C18	TXD1	TRANSMIT DATA (Serial Port 1) - data to be transmitted is furnished on this line to the modem from the terminal.
C19	RXD1	RECEIVE DATA (Serial Port 1) - data that is demodulated from the receive line is presented to the terminal by the modem.
C20	RTS1	REQUEST TO SEND (Serial Port 1) - 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.
C21-C25	GND	GROUND
PIN	SIGNAL	NUMBER

Table 3-4. Connector J2 interconnect signals (Continued)

Pin Number	Signal Mnemonic	Signal Name and Description
C26	DTR4	DATA TERMINAL READY (Serial Port 4) - a signal from the terminal to the modem indicating that the terminal is ready to send or receive data.
C27-C30	GND	GROUND
C31	CTS2	CLEAR TO SEND (Serial Port 2) - 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.
C32	DCD2	DATA CARRIER DETECT (Serial Port 2) - sent by the modem to the terminal to indicate that a valid carrier is being received.

J3 and J4 connectors

Connectors J3 and J4 on the MVME712M module and connector J3 on the P2 adapter board are 50-pin connectors that are the same pin-for-pin. Each pin connection, signal mnemonic, and signal characteristic for these connectors is listed in the following table.

Table 3-5. Connectors J3 and J4 interconnect signals

Pin Number	Signal Mnemonic	Signal Name and Description
1	GND	GROUND
2	DB00*	DATA bus (bit 0) - least significant bit and the lowest priority during the arbitration phase.
3	GND	GROUND
4	DB01*	DATA bus (bit 1)
5	GND	GROUND
6	DB02*	DATA bus (bit 2)
7	GND	GROUND
8	DB03*	DATA bus (bit 3)
9	GND	GROUND
10	DB04*	DATA bus (bit 4)
11	GND	GROUND
12	DB05*	DATA bus (bit 5)
13	GND	GROUND
14	DB06*	DATA bus (bit 6)
15	GND	GROUND
16	DB07*	DATA bus (bit 7) - most significant bit and the highest priority during the arbitration phase.
17	GND	GROUND
18	DBP*	DATA bus (parity) - data parity is odd. Use of parity is a system option. Parity is not valid during the arbitration phase.
19-24	GND	GROUND
25		Not used.
26	TERMPWR	TERMINATOR POWER

Table 3-5. Connectors J3 and J4 interconnect signals

Pin Number	Signal Mnemonic	Signal Name and Description
27-31	GND	GROUND
32	ATN*	ATTENTION - signal driven by the initiator. Indicates the attention condition.
33-35	GND	GROUND
36	BSY*	BUS BUSY - OR-tied signal that indicates that the bus is being used.
37	GND	GROUND
PIN	SIGNAL	NUMBER
38	ACK*	ACKNOWLEDGE - signal driven by an initiator to indicate an acknowledgment for a REQ/ACK data transfer handshake.
39	GND	GROUND
40	RST*	RESET - OR-tied signal that indicates the RESET condition.
41	GND	GROUND
42	MSG*	MESSAGE - signal driven by the target during the message phase.
43	GND	GROUND
44	SEL*	SELECT - signal used by an initiator to select a target or by a target to reselect an initiator.
45	GND	GROUND
46	D/C*	DATA/COMMAND - signal driven by the target. It indicates whether command or data information is on the data bus. True (low) indicates command.
47	GND	GROUND
48	REQ*	REQUEST - signal driven by a target to indicate a request for a REQ/ACK data transfer handshake.
49	GND	GROUND
50	O/I*	OUTPUT/INPUT - signal driven by a target which controls the direction of data movement on the bus. True (low) indicates input to the initiator. False (high) indicates output from the initiator. This signal is also used to distinguish between selection and reselection phases.

SCSI interface connector

The SCSI port is the connector labeled SCSI INTERFACE on the front panel of the MVME712M, connected to connector J4 on the top of the board. Each pin connection, signal mnemonic, and signal characteristic for the SCSI port connector is listed in the following table

Table 3-6. Connector SCSI interface interconnect signals

Pin Number	Signal Mnemonic	Signal Name and Description
1-25	GND	GROUND
26	DB00*	DATA bus (bit 0) - least significant bit and the lowest priority during the arbitration phase.
27	DB01*	DATA bus (bit 1)
28	DB02*	DATA bus (bit 2)
29	DB03*	DATA bus (bit 3)
30	DB04*	DATA bus (bit 4)
31	DB05*	DATA bus (bit 5)
32	DB06*	DATA bus (bit 6)
33	DB07*	DATA bus (bit 7) - most significant bit and the highest priority during the arbitration phase.
34	DBP*	DATA bus (parity) - data parity is odd. Use of parity is a system option. Parity is not valid during the arbitration phase.
35-37	GND	GROUND
38	TERMPWR	TERMINATOR POWER
39,40	GND	GROUND
41	ATN*	ATTENTION - signal driven by the initiator. Indicates the attention condition.
42	GND	GROUND
43	BSY*	BUS BUSY - OR-tied signal that indicates that the bus is being used.
44	ACK*	ACKNOWLEDGE - signal driven by an initiator to indicate an acknowledgment for a REQ/ACK data transfer handshake.
45	RST*	RESET - OR-tied signal that indicates the RESET condition.

Table 3-6. Connector SCSI interface interconnect signals

Pin Number	Signal Mnemonic	Signal Name and Description
46	MSG*	MESSAGE - signal driven by the target during the message phase.
47	SEL*	SELECT - signal used by an initiator to select a target or by a target to reselect an initiator.
48	D/C*	DATA/COMMAND - signal driven by the target. It indicates whether command or data information is on the data bus. True (low) indicates command.
49	REQ*	REQUEST - signal driven by a target to indicate a request for a REQ/ACK data transfer handshake.
50	O/I*	OUTPUT/INPUT - signal driven by a target which controls the direction of data movement on the bus. True (low) indicates input to the initiator. False (high) indicates output from the initiator. This signal is also used to distinguish between selection and reselection phases.

J5 connector

Connector J5 is the port labeled PRINTER on the MVME712M front panel. This is a Centronics type parallel port. Each pin connection, signal mnemonic, and signal characteristic for the printer port connector is listed in the following table.

Table 3-7. Connector J5 interconnect signals

Pin Number	Signal Mnemonic	Signal Name and Description
1	PRSTB*	DATA STROBE - an active low output pulse used to clock data from the system to the printer.
2	PRD0	DATA (bit 0)
3	PRD1	DATA (bit 1)
4	PRD2	DATA (bit 2)
5	PRD3	DATA (bit 3)
6	PRD4	DATA (bit 4)
7	PRD5	DATA (bit 5)
8	PRD6	DATA (bit 6)
9	PRD7	DATA (bit 7)
10	PRACK*	DATA ACKNOWLEDGE - a low level input pulse indicating that the next character may be sent.
11	PRBSY	BUSY - an input signal indicating that the printer cannot receive data.
12	PRPE	PAPER EMPTY - out of paper.
13	PRSEL	SELECTED - an input signal indicating that the printer is selected.
14,15		Not used.
16	GND	GROUND
17,18		Not used.
19-30	GND	GROUND
31	INPRIME*	INPUT PRIME - an output signal that clears the printer buffer and initializes the logic.
32	PRFAULT*	FAULT - an input signal that indicates a printer fault condition.
33-36		Not used.

J6 connector

Connector J6 is the port labeled ETHERNET on the MVME712M front panel. Each pin connection, signal mnemonic, and signal characteristic for the Ethernet port connector is listed in the following table.

Table 3-8. Connector J6 interconnect signals

Pin Number	Signal Mnemonic	Signal Name and Description
1		Not used.
2	C+	COLLISION + (input) - a signal to indicate that multiple stations are contending for access to the transmission medium.
3	T+	TRANSMIT + (output) - this line is intended to operate into terminated transmission lines.
4		Not used.
5	R+	RECEIVE + (input) - a data input sourced by the MAU.
6	GND	GROUND
7,8		Not used.
9	C-	COLLISION - (input) - part of a differential pair.
10	T-	TRANSMIT - (output) - part of a differential pair.
11		Not used.
12	R-	RECEIVE - (input) - part of a differential pair.
13	+12VF	+12 Vdc power - fused on the MPU.
14, 15		Not used.

J7 - J10 connectors

Connectors J7 through J10 are EIA-232-D 25-pin front panel connectors, labeled SERIAL PORT1/CONSOLE, SERIAL PORT2/TTY01, SERIAL PORT 3, and SERIAL PORT 4. Each pin connection, signal mnemonic, and signal characteristic for the serial port connectors is listed in the following table.

Table 3-9. Connectors J7 - J10 interconnect signals

Pin Number	Signal Mnemonic	Signal Name and Description
1		Not used.
2	ETXD	TRANSMIT DATA - data to be transmitted is furnished on this line to the modem from the terminal.
3	ERXD	RECEIVE DATA - data that is demodulated from the receive line is presented to the terminal by the modem.
4	RTS	Not used.
5	ECTS	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.
6	EDSR	DATA SET READY - DSR is a function supplied by the modem to the terminal to indicate that the modem is ready to transmit data.
7	GND	SIGNAL GROUND - Common return line connected to the MVME*xxxx* ground plane. Not connected to chassis ground.
8	EDCD	DATA CARRIER DETECT - Sent by the modem to the terminal to indicate that a valid carrier is being received. Not used by port 1 (J7).
9-14		Not used.
15	ERTXC4	TRANSMIT CLOCK (port 4 only) - This line can be configured to clock output data to the modem from the terminal.
16		Not used.
17	ERRXC4	RECEIVE CLOCK (port 4 only) - This line can be configured to clock input data from a terminal to a modem.

Table 3-9. Connectors J7 - J10 interconnect signals

Pin Number	Signal Mnemonic	Signal Name and Description
18-19		Not used.
20	EDTR	DATA TERMINAL READY - A signal from the terminal to the modem indicating that the terminal is ready to send or receive data.
21-23		Not used.
24	ETTXC4	TRANSMIT CLOCK (port 4 only) - This line can be configured to clock output data to the modem from the terminal.
25		Not used.

J20 connector

Connector J20 is the internal modem port. Each pin connection, signal mnemonic, and signal characteristic for the modem port connector is listed in the following table.

Table 3-10. Connector J20 interconnect signals

Pin Number	Signal Mnemonic	Signal Name and Description
1	CTS2	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.
2	TXD2	TRANSMIT DATA - data to be transmitted is furnished on this line to the modem from the terminal.
3	DCD2	DATA CARRIER DETECT - Sent by the modem to the terminal to indicate that a valid carrier is being received.
4	RXD2	RECEIVE DATA - data that is demodulated from the receive line is presented to the terminal by the modem.
5-10		Not used.

Table 3-10. Connector J20 interconnect signals (Continued)

Pin Number	Signal Mnemonic	Signal Name and Description
11	DTR2	DATA TERMINAL READY - A signal from the terminal to the modem indicating that the terminal is ready to send or receive data.
12	-12VMODEM	-12 Vdc Power - used by the internal modem.
13	+5VMODEM	+5 Vdc Power - used by the internal modem.
14-15	GND	GROUND
16	+12VMODEM	+12 Vdc Power - used by the internal modem.
17-20		Not used.

J21 connector

Connector J21 is the backplane modem power connector. Each pin connection, signal mnemonic, and signal characteristic for the modem power connector is listed in the following table.

Table 3-11. Connector J21 interconnect signals

Pin Number	Signal Mnemonic	Signal Name and Description
1	+5VMODEM	+5 Vdc Power - supplied by the backplane and routed to J20.
2	+12VMODEM	+12 Vdc Power - supplied by the backplane and routed to J20.
3	-12VMODEM	-12 Vdc Power - supplied by the backplane and routed to J20.
4	GND	GROUND
5,6		Not used.

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