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MPMC202
Fast Ethernet Adapter
Installation and Use

PMC202A/IH1

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Preface

This manual is based in part on information contained in the *RNS 2300/2350 Series PCI Bus Fast Ethernet Adapter User's Guide*.

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Related Documentation

The publications listed below are referenced in this document. If not shipped with this product, Motorola manuals may be purchased by contacting your local Motorola sales office.

Document Title	Publication Number
PCI Local Bus Specification Rev 2.0; PCI Special Interest Group	PCI Rev 2.0
Common Mezzanine Card Specification; IEEE	P1386 Draft 1.3
PCI Mezzanine Card Specification; IEEE	P1386.1 Draft 1.3
DECchip 21140A PCI Fast Ethernet LAN Controller Hardware Reference Manual	EC-QN7NC-TE
PowerBase Embedded Controller Installation and Use	VMEPBA/IH
MVME1603/MVME1604 Single Board Computer Installation and Use	V1600-1A/IH
MVME2600 Single Board Computer Installation and Use	V2600A/IH
MVME3600 Single Board Computer Installation and Use	V3600A/IH

Note Although not shown in the above list, each Motorola Computer Group manual publication number is suffixed with characters which represent the revision level of the document, such as "/IH2" (the second revision of a manual); a supplement bears the same number as the manual but has a suffix such as "/IH2A1" (the first supplement to the manual).

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

WARNING

This equipment generates, uses, and can radiate electro-magnetic energy. It may cause or be susceptible to electro-magnetic 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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Introduction 1

Overview

The MPMC202 Fast Ethernet module provides high-performance communication between your Fast Ethernet local area network (LAN) and a PCI bus-based host. It supports Fast Ethernet 10Base-T and 100Base-TX networking module with un-shielded twisted pair (UTP) RJ-45 cable. The MPMC202 can be used with both 10Mbps and 100Mbps networks.

General Description

The MPMC202 Fast Ethernet module brings high performance and reliability to VME bus based systems that support the PCI Mezzanine Card (PMC) standard. It is a single-wide PMC card which contains a +5V PCI interface through two 64-pin PMC connectors.

It is designed to be used on VME carrier boards with PCI Bus functionality.

The front panel is equipped with a DB-14 female connector. An RJ-45 adapter cable, part number 30NW9302B78, is provided for connecting a Category 5 Unshielded Twisted Pair (UTP) cable with an RJ-45 connector to the MPMC202.

Figure 1-1 shows the MPMC202 board layout and front panel.

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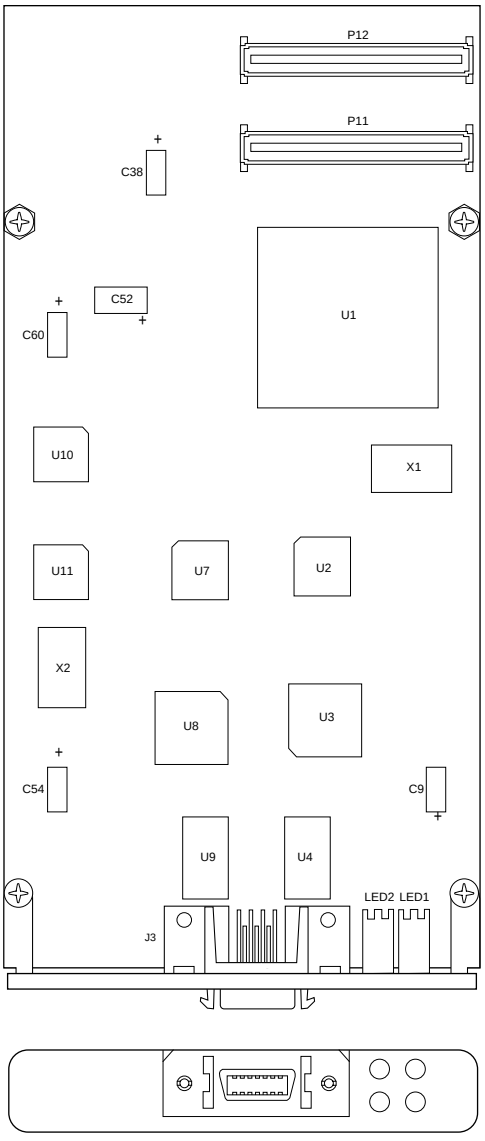


Figure 1-1. MPMC202 Board Layout and Front Panel

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Key Features

Auto-sensing Connectors

At system start-up time, the MPMC202 automatically detects whether it is connected to a 10Mbps or a 100Mbps Ethernet connection. In order for autosensing to occur correctly, be sure to have the cable connected to the MPMC202 before powering up the system.

Switched Hub Operation

The MPMC202 has been tested for operation with the following 10Base-T/100Base-TX or 100 Mbps Fast Ethernet hubs:

- Bay Network
- Grand Junction
- 3Com
- Networth

Standards Compliance

The MPMC202 conforms to all relevant IEEE 802.3U 100Base-TX standards. It conforms to the PCI Local Bus Specification, Rev. 2.0., as well as the IEEE P1386 and IEEE P1386.1 mezzanine card specification,

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Specifications

Features

The MPMC202 has these features:

Form Factor	Single-wide PCI Mezzanine Card (PMC)
Dimensions	2.9 inches wide (74 mm) 5.9 inches long (149 mm)
Host Bus Interface	PCI Local Bus Specification, Rev 2.0
IEEE Compliance	IEEE P1386 and IEEE P1386.1 mezzanine card specification IEEE 802.3U Fast Ethernet Standards
Fast Ethernet Controller	DEC 21140
Bus Structure	32-bit PCI Local Bus
Cable	Category 5 Unshielded Twisted Pair (UTP)
Connector	DB-14 female connector; RJ-45 connection is provided via a 6 inch RJ-45 Adapter Cable
Signaling/Power	4.75 to 5.25 V at 1.5 A (maximum)
LEDs	Activity (2, 10Mbps and 100Mbps) Link (2, 10Mbps and 100Mbps)
LAN	Compatible with 10Base-T and 100Base-TX Ethernet hub, connector, or switch
Reliability	190,509 hours mean time between failure; 107,681 hours at 95% confidence

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Operating Environment

The MPMC202 requires the following operating environment:

Operating temperature	0˚ to 55˚C
Storage temperature	-40˚ to 85˚C
Operating humidity, non-condensing	10-90%
Storage humidity, non-condensing	5-95%

Forced air cooling is not required when the ambient temperature is below 40 degrees C. Above 40 degrees C, forced air cooling is required.

Cabling

Motorola recommends using Category 5 UTP cabling, even if you have a 10Mbps network. This allows you to upgrade the network to 100Mbps without needing to replace the existing cables.

Category 3 and 4 cabling supports 10Mbps operation. Category 5 cabling is required for 100Mbps operation.

Category 5 cabling supports Ethernet 802.3, 10Base-T, and Token Ring 802.5 (4MB, 16MB). Category 5 supports 100 meters of cable length between stations, and uses data grade modular wall outlets and patch cables.

The MPMC202 is compliant with the 100 meter requirement of the TP-PMD specification.

Terminal Connectors

Category 5 data grade cable requires discrete modular data grade terminal connectors that plug into a panel or wall jack. When routing Category 5 cable, use data grade connectors instead of punchdown blocks.

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Category 5 Routing Considerations

Category 5 data grade cable requires delicate handling. Be aware of conditions to avoid that will reduce the performance of your network:

- Routing over fluorescent lighting fixtures
- Overly acute bends in cable
- Cables routed too closely together

LAN Configuration Considerations

Fast Ethernet supports a maximum of two Ethernet repeaters between any two end nodes (i.e., a workstation and a concentrator).

The maximum distance between any two Fast Ethernet devices is 100 meters or less, limited by the following equation:

$$400 - (r \times 95)$$

where r is the number of repeaters (i.e., concentrator hubs, switches, routers and repeaters).

We recommend Fast Ethernet be implemented in work group environments where you have smaller LANs but need the 100Mbps bandwidth.

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Fast Ethernet Technology

10Base-T Technology

The popularity of 10Mbps Ethernet makes 10Base-T a natural baseline for faster Ethernet technologies. 10Base-T is a universal, world-standard LAN technology. Its cost per node is low because you do not usually need to upgrade your cables for installation.

100Base-TX Technology

100Base-TX technology is derived from 10Base-T. It achieves 100Mbps speeds by sending signals 10 times faster over two pairs of UTP cable. To retain signal integrity at high speed, 100Base-TX requires data grade Category 5 UTP cabling. 100Base-TX supports both half- and full-duplex operation.

Front Panel LED Activity

Self-adapting LEDs indicate your workstation's connection to your 10Mbps or 100Mbps network and its Tx/Rx activity.

- If your network is operating at 10Mbps speeds, the yellow LEDs indicates that type of operation.
- If your network is operating at 100Mbps speeds, the green LEDs indicate that type of operation.

The LED activity on the front panel is not valid until the driver has been loaded and configured.

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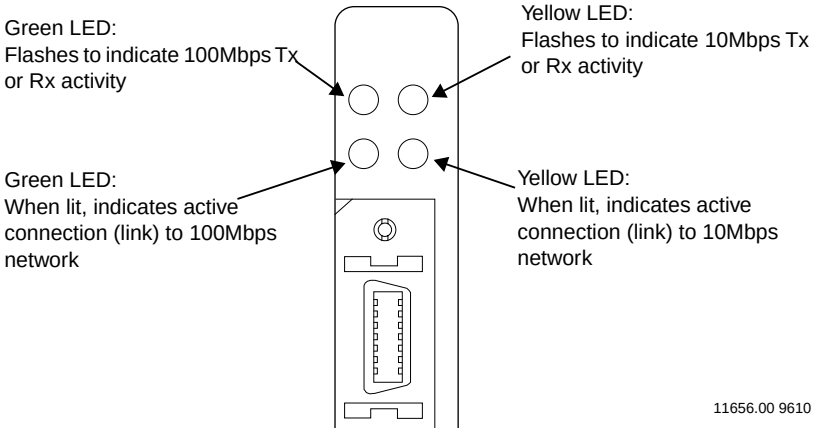


Figure 1-2. LEDs on the MPMC202 Front Panel

Fast Ethernet LAN Controller Programming

Please refer to *DECchip 21140A PCI Fast Ethernet LAN Controller Hardware Reference Manual*, publication number EC-QN7NC-TE, for information on programming the PCI Fast Ethernet LAN Controller.

AIX Driver

The device driver for the DECchip 21140 Fast Ethernet LAN Controller on the MPMC202 is supplied with AIX 4.1.4 R4 or later releases.

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Installation 2

Introduction

This chapter contains instructions for installing the MPMC202 Fast Ethernet module onto a carrier board.

Installation and Configuration Tasks

Perform the following tasks to install and configure the MPMC202:

- Install the MPMC202 on the carrier board per the instructions in *Installing the MPMC202 on the Carrier Board* on page 2-2.
- Connect the RJ-45 cables per the instructions in *Connecting the Fast Ethernet Cable* on page 2-5.
- Power-up the system/Start the MPMC202 per the instructions in the system chassis manual.
- Install the AIX Fast Ethernet LAN controller device driver (if the MPMC202 is a system upgrade on an MVME130*x* or MVME160*x* carrier board) per the instruction in Chapter 3.
- Set the adapter characteristics and Configure TCP/IP per the guidelines in *Configuring the MPMC202* on page 2-8.
- Reboot the system.

Packaging

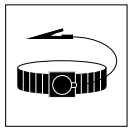
The MPMC202 is packed in an anti-static package to protect it from any static discharge. Observe standard handling practices of static sensitive equipment.

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2

Electro-static Discharge Precautions

Use ESD



Wrist Strap

Motorola strongly recommends that you use an antistatic wrist strap and a conductive foam pad when installing the MPMC202. Electronic components can be extremely sensitive to electro-static discharge (ESD). After removing the board from the protective wrapper, place it component side up on a grounded, static-free surface. Do not slide the board over any surface.

Installing the MPMC202 on the Carrier Board

Follow these steps to install the MPMC202 on the carrier board:

1. Place an ESD strap on your wrist and attach the grounding line end of the ESD strap to the chassis as a ground. The ESD strap must be secured to your wrist and to ground throughout the procedure.
2. Remove the carrier board from the system chassis.
3. Lay the carrier board on a level surface with the PMC connectors facing you.
4. Remove the cover from the PMC connector slot on the carrier board's front panel.
5. Remove the screws from the stand-offs on the component side of the MPMC202.
6. Turn the MPMC202 component-side down, and position it above the carrier board as shown in Figure 2-1 (an MVME160*x* carrier board is shown).



Caution

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

7. Insert the DB-14 external connector, J3, through the PMC connector slot on the carrier board front panel.

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8. Align the guide hole and P11 and P12 connectors on the MPMC202 over the guide pin and the PMC connectors on the carrier board.
9. Gently seat the MPMC202 onto the carrier board.
10. Turn the carrier board component-side down, and fasten the four screws through the carrier board into the stand-offs on the PMC.
11. Install the carrier board in the system chassis.

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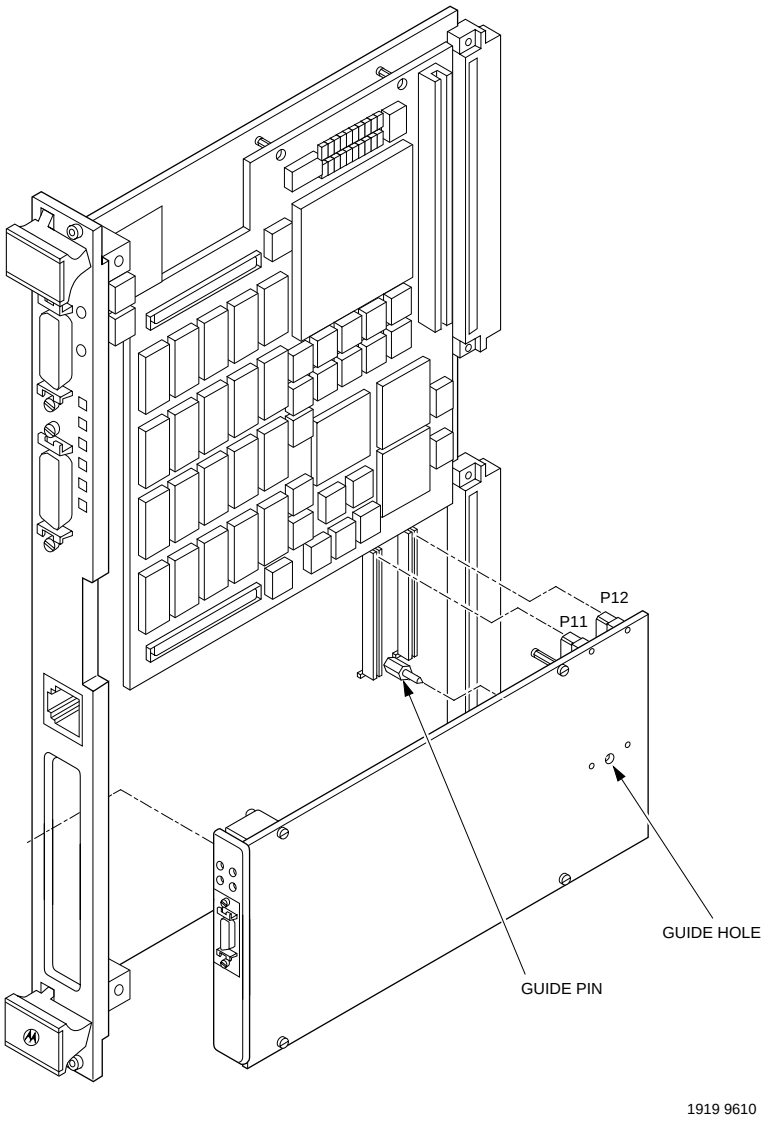


Figure 2-1. Installing the MPMC202 on the Carrier Board

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Connecting the Fast Ethernet Cable

Connect the MPMC202 to either a concentrator hub or another workstation with UTP Category 5 data grade cable that is terminated with an RJ-45 connector.

The MPMC202 front panel has a 14-pin female DB-14 connector, J3. on the faceplate. Attach the supplied 6 inch adapter cable, part number 30NW9302B78, to J3 on the MPMC202, and then connect an RJ-45-terminated cable to the female RJ-45 jack on the adapter cable.

Note For autosensing to work on power-up, the MPMC202 must be connected to the Fast Ethernet LAN. If no connection has been made, the MPMC202 defaults to 10 Mbps operation.

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2

Building Your Own Adapter Cable

You may build your own adapter cable per the wiring diagram in Figure 2-2.

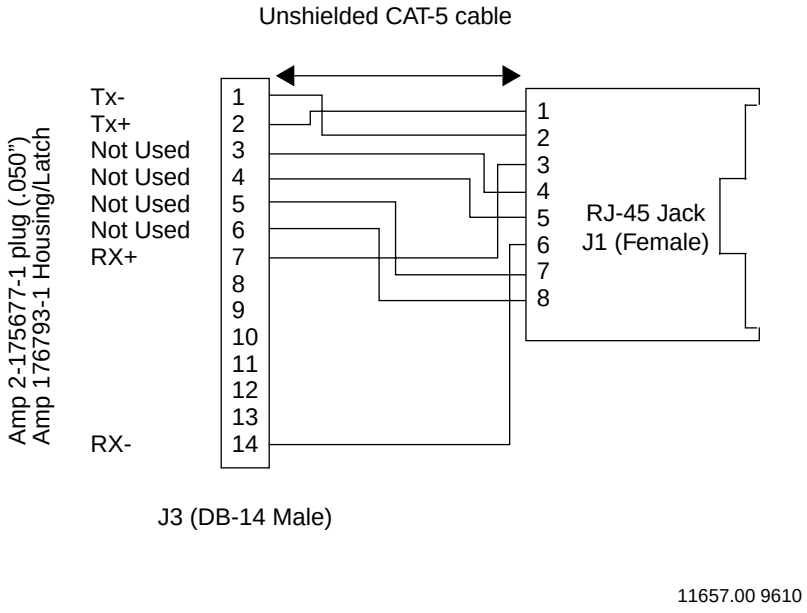


Figure 2-2. RJ-45 Adapter Cable Wiring Diagram

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Connecting Workstations

When connecting two workstations, install a crossover cable that swaps the transmit and receive pairs between the workstations, as illustrated below.

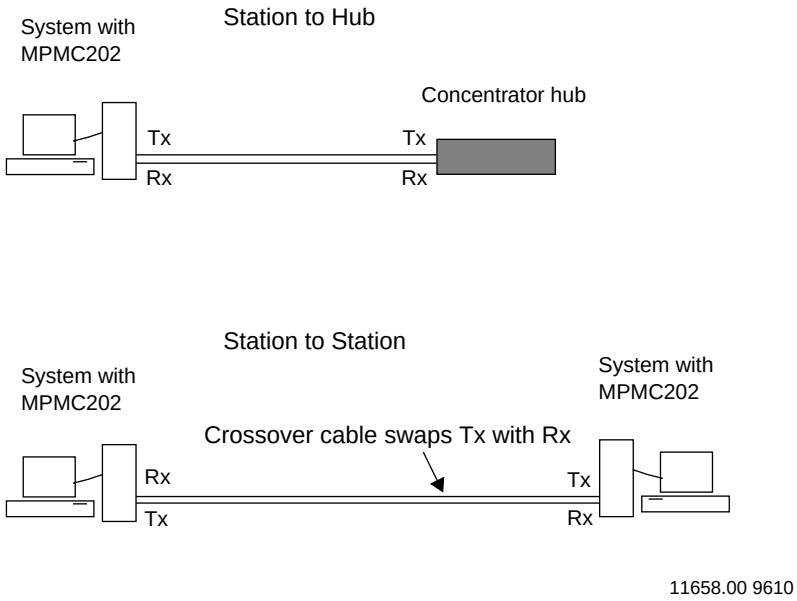


Figure 2-3. Workstation Connections

Starting the MPMC202

After installing the MPMC202 and attaching the cables, turn the power on as directed in the system manual. The MPMC202 should power-up automatically.

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2

Installing the AIX Driver

Install and configure the AIX driver for the Fast Ethernet LAN controller if you installed the MPMC202 as an upgrade on one of the following carrier boards:

- MVME130*x*
- MVME160*x*-0*xx*

Follow the instructions in Chapter 3 for installing the driver.

If the MPMC202 is present on one of these boards when AIX is installed and configured, the correct Fast Ethernet LAN controller driver is installed automatically during Initial Program Load (IPL).

You do not need to install the AIX driver if you install the MPMC202 on one of the following carrier boards:

- MVME160*x*-1*xx*
- MVME260*x*
- MVME360*x*

These boards use the same Fast Ethernet LAN controller as the MPMC202. Therefore, the correct device driver is installed automatically during IPL.

Configuring the MPMC202

After you have installed the MPMC202, attached the cables, and installed the AIX device driver, set the characteristics of the adapter to either Auto Detection, 10Base-T, or 100Base-TX.

Set at least a minimum TCP/IP configuration (host name, internet address, and network mask) and start TCP/IP.

Reboot the system.

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AIX Driver Installation 3

Overview

This chapter describes installation of the AIX driver for the MPMC202's Fast Ethernet LAN device.

Before installing the AIX device driver, install the MPMC202 onto the carrier board per the instructions in Chapter 2, and install the carrier board into the system chassis.

Installing the AIX Driver

Follow these steps to install the Fast Ethernet LAN driver using the AIX System Management Integration Tool (SMIT):

1. Log in to host system as root.
2. Insert the AIX OS CD-ROM in the CD-ROM drive on the host system.
3. Type the following at the command prompt and press **Enter**.

   smit devices

   The Devices screen appears.
4. From the Devices screen select **Install Additional Device Software** the following and press **Enter**:

   The Install Additional Device Software screen appears.
5. From the Install Additional Device Software screen, select the following responses:

   INPUT device / directory for software [**/dev/cd0**]

   SOFTWARE to install [**devices.pci.11100900**]

   AUTOMATICALLY install software [**yes**]

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Leave the default values in the other fields and press **Enter**. An "ok" command status message appears when the process is complete.

6. After the driver installation is complete, press **F3** to return to the **Devices** menu.
7. From the Devices menu select **Install/Configure Devices Added After IPL** and press **Enter**:

   Install/Configure Devices Added After IPL
8. From the Install/Configure Devices Added After IPL screen, select the following responses and press **Enter**:

   INPUT device / directory for software [**none**]

   SMIT returns an ok command status message when the process is complete.
9. Press **F3** to exit SMIT.

The Fast Ethernet LAN device driver is now installed.

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