VMICPCI-8420 IOWorks PC-Based Controller System

Setup Guide



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(I/O man figure)



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Overview

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Introduction

The VMICPCI-8420 IOWorks PC-Based Controller System is a complete, high-performance CompactPCI system that can come to you loaded with VMIC's IOWorks software controller package. This controller system is just one in a series of cost-effective, PC-based systems offered by VMIC. With its extensive line of I/O boards, PC-based controller systems, and software, VMIC can provide you with turnkey solutions for applications ranging from high-speed process control to data acquisition to industrial automation.

Read this document first so that you can install system components, verify system operation, and troubleshoot any problems. The "Overview" summarizes features provided by your controller and the IOWorks software package.

If you are already familiar with PC-based control concepts and ready to get started, skip to Chapter 1, "Installation."

PC-Based Control

PC-based controllers use standard communication software and hardware technologies. Instead of using a dedicated, closed architecture implemented in PLCs, a PC-based controller distributes basic controller functions and responsibilities among standard PC 'plug-and-play' components. What this means to you as a VMIC system customer is that you have the flexibility to upgrade your environment as well as mix-and-match products to use the most current and cost-effective technology.

Controller Requirements

VMIC, has 13+ years of experience in the controller industry and knows that to compete successfully in the growing PC-based controller market, the following issues *must* be addressed:

- Real-time control
- Modular software and hardware
- System speed and throughput
- Power failure and recovery
- Quick program-development
- Monitor and on-line debug
- High capacity CPU disk and memory
- Durable casing in a factory environment
- Third-party fieldbus connectivity

These requirements enable a PC-based controller to be a viable solution as either an alternative to PLCs, or a system to work in tandem with your current PLC(s).

Basic Concepts

PC-based controllers can be used as an embedded system or remote target controllers in a distributed control system.

- As an *embedded* system, the controller's CPU provides for the development and execution of programs on the same platform. Embedded systems can be also be used to test programs before placing them in a distributed system.
- In a distributed system, the *host* CPU contains the program development tools and supports the Windows NT operating system. The host encapsulates the utility functions of the controller as listed below:

Provides the user interface for program development, configuration, and control.

Contains compiler to build programs.

Supports multiple logical ports.

The *target controller* in a distributed system can either be the same physical CPU as the host (an *embedded target controller*), or multiple remote CPUs connected to the host. A remote target controller off-loads computing responsibilities from the host CPU. IOWorks Remote target controllers support the Windows NT and VxWorks operating systems. Target controllers represent the run-time functionality of a controller to execute the control programs developed on the host.

A few of the remote target controller functions are listed below:

Maintains internal file system for target controller configuration, startup, and recovery.

Manages real-time target controller data.

Enables online editing.

Schedules program execution for real-time control.

Feature Summary

The VMICPCI-8420 controller rolls the PC's power and connectivity in with the high speed of the CompactPCI platform. CompactPCI was specifically designed for industrial and/or embedded applications. It is an open standard that combines the high-performance PCI (Peripheral Component Interconnect) bus with the rugged Eurocard format popularized by VME. Unlike many proprietary hardware solutions, CompactPCI leverages the PCI standard to provide low-cost systems and peripherals.

VMIC uses the latest technology to develop both the hardware and software components comprising the VMICPCI-8420. Its all-in-one construction saves panel space and its powerful features bring productivity and savings to even the most cost-conscious control applications. The controller CPU has a high-performance Intel Pentium or AMD K6-2 processor with MMX in speeds of 233MHz and 400MHz, respectively, and comes standard with 128 Mbytes of SDRAM. To ensure there is plenty of room for data access and storage, the CPU has available a 4.0 Gbyte IDE hard disk drive; and a 3.5-inch 1.44 MByte floppy disk drive.

The main features provided by the VMICPCI-8420 are described below:

- **Integrated solution and support.** You can purchase the controller, software, remote I/O and other add-ons from a single vendor, VMIC. This 'one-stop' shopping makes ordering, integration, and technical support easy and convenient. If you have a question about the controller or its components, you can call VMIC for assistance.
- All-in-one casing. Substantial installation savings can be achieved through reduction in wiring and labor by locating the controller near the sensors and controlled devices. The VMICPCI-8420 chassis is designed for either 19" rack mount applications or you can set it up as a benchtop system.

- Easy installation. For an operational system, you need only (1) connect the common PC support peripherals (keyboard and mouse), and (2) connect the controller to your local area network.
- **Front panel display**. An ON/OFF key switch includes LED status lights for power ON and HDD activity
- **Standard network communication**. Ethernet and Fast Ethernet are the supported network topologies. Networked users -- at all levels of organization in a plant -- can get access to real-time data. In addition, data can be transferred between any connected PLCs and the controller simultaneously.
- **High-speed solutions.** The CompactPCI platform supports real-time machine control, industrial automation, real-time data acquisition, instrumentation, military systems, or any other application requiring high speed computing and long term support.
- Flexible programming options. You can use Ladder Logic, Function Block, or C++ languages to create control applications.
- A CPU Pre-loaded with IOWorks. You can order your controller with an IOWorks system pre-loaded at the factory. The IOWorks PC-based control software provides the project management, programming environment, and run-time tools necessary for PLC-like functionality. More information about IOWorks is provided in the next section, "Your Controller and IOWorks."

Your Controller System and IOWorks

The flexibility and power behind each of VMIC's system solutions is the IOWorks software, consisting of project and application development tools, and I/O drivers. VMIC offers a packaged IOWorks controller solution as well as individual support products for I/O connectivity and bus access. IOWorks, when added to supporting computer hardware, creates a control system with throughput, performance and programming capabilities exceeding those of conventional PLC

IOWorks enables you to use your VMICPCI-8420 as an embedded controller system, or as a host or target controller in a distributed system.

- As a *host*, your VMICPCI-8420 CPU contains a project management tool and an IEC 1131 programming environment for fast program development. To minimize the learning curve, the host CPU runs within the popular Microsoft Windows NT operating system.
- When used as a *target controller*, you can select either the Windows NT or VxWorks operating systems to run on your controller CPU. Because ethernet is supported, you can connected any industrial or desktop PC to your controller CPU to serve as a host.

The following list summarizes the key features of the VMICPCI-8420 with IOWorks:

- Unlimited target controllers can connect to a single host CPU enabling you to build systems of varying complexities.
- IOWorks has drivers to supports a variety of Fieldbus networks.
- System recovery settings enable host and target controllers to automatically restart after a system failure. In addition, if the host fails, connected target controller CPUs can continue to run; buffering outgoing data.
- OLE automation and ActiveX technologies can be used to control I/O programs from outside applications.

- OLE and OPC are industry-standard communication exchange technologies for real-time data access. Through these protocols, third-party applications such as database programs and HMI's (Human-Machine Interface) can gather I/O information.
- Standard Graphical User Interface (GUI) controls and operations are based on Windows NT GUIs; thus minimizing your learning curve and development time.
- Force data points, single-step, and debug features enable you to control applications on-the-fly.
- A test edit feature gives you the ability to update individual sequences without interrupting program execution.
- Host-independent target controllers, once configured, can boot up, load, and run compiled applications without user/host intervention.

Using this Document

This manual provides procedures to install, verify and troubleshoot your VMICPCI-8420 system.

Intended Audience

The manual is written for users with an intermediate to advanced knowledge of:

- PCI and CPCI bus platforms.
- CPU hardware configuration.
- Ethernet networking and setup.

Conventions

This section describes the type conventions used throughout this guide.

Туре	Represents
Italic type	Emphasized text and document titles are italicized.
"quotation marks"	Chapters and sections within a document are enclosed in quotation marks.
bold type	Windows NT and other graphical user interface elements are in bold type.
monospace type	Text, function names, parameters, and program code.
bold, monospace type	User response: key-in text.
SMALL, UPPERCASE	Keyboard names.

 Table 1
 Conventions List

STOP! Informs the operator that a practice or procedure should not be performed. Actions could result in injury or death to personnel, or could result in damage to or destruction of part or all of the system.

WARNING! Denotes a hazard. It calls attention to a procedure, a practice, a condition, which, if not correctly performed or adhered to, could result in injury or death to personnel.

CAUTION! Denotes a hazard. It calls attention to an operating procedure, a practice, or a condition, which, if not correctly performed or adhered to, could result in damage to or destruction of part or all of the system.

Note Denotes important information. It calls attention to a procedure, a practice, a condition or the like, which is essential to highlight.

Safety Symbols Used in This Manual

Indicates dangerous voltage (terminals fed from the interior by voltage exceeding 1,000 V are so marked).



Protective conductor terminal. For protection against electrical shock in case of a fault. Used with field wiring terminals to indicate the terminal which must be connected to ground before operating equipment.

Low-noise or noiseless, clean ground (earth) terminal. Used for a signal common, as well as providing protection against electrical shock in case of a fault. Before operating the equipment, terminal marked with this symbol must be connected to ground in the manner described in the installation (operation) manual.
Frame or chassis terminal. A connection to the frame (chassis) of the equipment which normally includes all exposed metal structures.
Alternating current (power line).
Direct current (power line).
Direct current (power line) and Alternating or direct current (power line).

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Document Organization

Chapters in this guide are organized as described below:

"Overview." describes the basic concepts of PC-based control and summarizes how IOWorks can be used with your VMICPCI-8420 system.

Chapter 1 "Installation." Use this chapter for step-by-step instructions on setting up your system and connecting it to your local area network.

Chapter 2 "Post Installation: Troubleshooting." This chapter contains information to help resolve any problems you may have encountered during installation.

Related Documents

PCI/CPCI Information

Refer to *PCI Local Bus Specification* for a detailed explanation of the PCI Local bus. The PCI Local bus Specification is available from the following source:

PCI Special Interest Group P.O. Box 14070 Portland, OR 97214 U.S.: (800) 433-5177 International: (503) 797-4207 FAX: (503) 234-6762

For a detailed explanation of the CompactPCI bus and its characteristics, refer to the *CompactPCI Specification*, 2.0 R2.1 from the following source:

PCI Industrial Computer Manufacturers Group (PICMG) 301 Edgewater Place Suite 220 Wakefield, MA 01880 USA (617) 224-1100 (503) 797-4207 (International) Fax: (617) 224-1239 Web: www.PICMG.ORG

Refer to *M-Systems DiskOnChip* 2000 Utilities (July 97). The Specification is available from the following source:

M-Systems Flash Disk Pioneers USA Office 39899 Balentine Dr. Suite 335 Newark, CA 94560 Tel: (510) 413-5950 Fax: (510) 413-5980 info@m-sys.com

VMIC Manuals

IOWorks Installation Guide (522-009416-000) - provides step-by-step instructions on installing each of the IOWorks soft logic packages. Information on target controller setup and configuration is provided.

IOWorks Manager User's Guide (520-009440-910) - describes how to create and organize workspaces, use the database, and resolve problems using the Information manager.

Visual IOWorks User's Guide (520-009410-910) - describes how to create ladder-logic programs, generate source code, and monitor sequences running on a target controller.

VMICPCI-7585 Product Manual - describes the CPU that comes with the VMICPCI-8420 system.

For more information about other *IOWorks* products, see the VMIC web site at:

http://www.vmic.com

Physical Description and Specifications

Refer to Specification 800-657585-000 available from VMIC:

VMIC 12090 South Memorial Parkway Huntsville, Alabama 35803-3308 (256) 880-0444 (800) 322-3616 Fax: (256) 882-0859

Safety Summary

The following general safety precautions must be observed during all phases of the operation, service, and repair of this product. Failure to comply with these precautions or with specific warnings elsewhere in this manual violates safety standards of design, manufacture, and intended use of this product.

VMIC assumes no liability for the customer's failure to comply with these requirements.

Ground the System

To minimize shock hazard, the chassis and system cabinet must be connected to an electrical ground. A three-conductor AC power cable should be used. The power cable must either be plugged into an approved three-contact electrical outlet or used with a three-contact to two-contact adapter with the grounding wire (green) firmly connected to an electrical ground (safety ground) at the power outlet.

Do Not Operate in an Explosive Atmosphere

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

Keep Away from Live Circuits

Operating personnel must not remove product covers. Component replacement and internal adjustments must be made by qualified maintenance personnel. 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.

Do Not Substitute Parts or Modify System

Because of the danger of introducing additional hazards, do not install substitute parts or perform any unauthorized modification to the product. Return the product to VMIC for service and repair to ensure that safety features are maintained.

Dangerous Procedure Warnings

Warnings, such as the example below, precede only potentially dangerous procedures throughout this manual. Instructions contained in the warnings must be followed.

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

CHAPTER 1

Installation

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Before You Begin...

Take a few minutes to review the items you need to set up your VMICPCI-8420 system as well as check the system components you should receive with your purchase.

What You Need

Here are the tools and items you need for system setup.

Environment Setup

- Any hardware tools necessary to mount the chassis in the desired location. Make sure you provide room for peripherals (monitor, keyboard and mouse).
- Required temperature should be in the -40°C to +85°C operating range.
- Allow room for proper ventilation when mounting the VMICPCI-8420. No other electrical equipment can be placed *above* the wall mounted chassis because the exhaust air is vented straight up from the chassis. In addition, no other equipment should be placed *next to* the chassis to prevent blockage of cool air flow into the fan tray from the input vents on the sides.
- Chassis dimensions are Width: 19.0 in., Depth: 9.8 in., Height: 5.2 in., and Weight: 21 lb. (net).

Hardware

- A null modem serial cable with female-to-female connections.
- A keyboard, mouse, and monitor for the system CPU.
- An RJ-45 Ethernet cable.
- Host CPU (optional). If you are using the VMICPCI-8420 CPU as an IOWorks remote target controller, you must connect it to a host CPU.

What Your Controller System Contains (Unpacking)

Included with the VMICPCI-8420 controller system are the following hardware, software, and documentation components. Several components are optional, and are available based on your specific order, such as the operating system for the controller CPU and the purchase of IOWorks.

Upon receipt, any precautions found in the shipping container should be observed. All items should be carefully unpacked and thoroughly inspected for damage that might have occurred during shipment. Call **Customer Service at (800) 322-3616** for help in filling out any needed claims arising from shipping damage. These need to be filed with the shipping carrier. VMIC will provide instructions concerning the disposition of the damaged item(s).

Hardware Components

Included with the VMICPCI-8420 IOWorks PC-based Controller system are the following hardware components:

One VMICPCI-8420 system enclosure containing:

One AMD K6-2 3DNow 400 MHz SBC processor.
 -or One Intel Pentium 233 Mhz processor with MMX.

The following list shows the CPU default settings.

One 4.0 Gbyte HDD, and a 1.44 Mbyte FDD

CPU Clock Bus Frequency: 66 MHz

CPU Core/Bus Ratio: 3.5X(Intel) or 5.0X (AMD)

Watch-Dog Timer function: Disabled

128 MByte SDRAM using 144-pin Dual In-Line memory Modules (DIMM).

16 Mbyte of M-Systems DiskOnChip Flash Memory (optional with purchase of VxWorks O/S).

SVGA: 1280x1024-pixel resolution at 75 Hz refresh rate maximum. At boot-up, standard VGA (650x480-pixel resolution) at 60 Hz is selected.

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- VMIPMC-7441 timing board with a PMC-to-CompactPCI adapter card
- Front panel ON/OFF key Switch.
- One AC power cord to power supply unit in the enclosure.
- One IOWorks Mousepad.
- A mini-parallel port adapter cable .
- A "Y- adapter" keyboard/mouse cable.

Software

- Windows NT disks
- Windows NT Service Pack 5 CD-ROM (optional).
- IOWorks PC-based Controller system CD-ROM disk (optional).
- RealTek ISA PnP Ethernet adapter card driver diskette.
- MAXI-100L driver diskette (for 10/100BaseTX option).

Note If you ordered the VxWorks operating system, it is installed at VMIC. No documentation or disks from Wind River are supplied with VxWorks.

Documentation

- *Windows NT Workstation Edition Manual* (optional with purchase of Windows NT operating system)
- VMICPCI-8420 Installation Guide (this document)
- VMICPCI-7585 Product Manual
- *IOWorks Installation Guide* and the *IOWorks Getting Started Guide* (optional with purchase of IOWorks VMISFT-9510 package)

Setup and Connection

Follow the steps below to connect peripherals to your VMICPCI-8420. If you purchased the 10/100Base-Tx Ethernet card, refer to Appendix A in this manual for the positions of switches and connectors on the card.

Caution! Power down the system prior to installing any CompactPCI boards or other hardware additions.



NOTE: The USB ports are not supported with Windows NT OS. The VMIPMC-7441 is used in conjunction with the VxWorks OS.

Figure 1-1 VMICPCI-8420 Front and Rear Views

Follow the instructions below to connect the keyboard, mouse, power cable, and network cable to the VMICPCI-8420 CPU.

- 1. Prepare a safe, stable location for the VMICPCI-8420 system and its support items (keyboard, mousepad, etc.).
- 2. Connect the keyboard and mouse to the P/S2 connector on the front of the unit, using the supply adapter.
- 3. Connect the CRT (monitor screen) to the front panel DB-15 connector.
- 4. Connect the power cable to the back of the unit and then to an AC outlet.
- 5. The system ON/OFF key switch is on the front panel of the unit. Turn the key clockwise to power the backplane. The system will boot directly into Windows NT (if installed, or the C: prompt displays for the VxWorks operating system).
- 6. Connect a TPE network cable to the Ethernet card.



• For 100Base-Tx, your network cable must be Category 5, twisted-pair wiring. If you plan to run this Ethernet card at 100 Mbps, it must be connected to a 100Base-TX hub or switch (not a 100Base-T4 hub). • For 10Base-T (standard), use Category 3, 4, or 5 twisted-pair wiring. If you want to use this Ethernet card in a residential environment, you must use a Category 5 cable.

NOTE: Twisted-Pair Ethernet (TPE) cables are differentiated by category or level with differing speed and capabilities per level.

Category or Level 1 = Voice grade Speed = 1 MBPS (Megabytes per/sec)

Category or Level 2 = Data grade Speed = 4 MBPS

Category or Level 3 = LAN grade Speed = 10MBPS

Category or Level 4 = Super grade Speed = 16MBPS

Category or Level 5 = Hyper grade Speed = 100MBPS

- 7. To configure the Ethernet card, follow networking procedures specific to your operating system. In configuring the Ethernet card, you must set the IP address for the card.
- 8. If you purchased the VMICPCI-8420 as an IOWorks host development system, connect the target controller CPUs to your refer to the IOWorks Installation guide to install the IOWorks target programwith IOWor

Using the M-Systems Flash Disk

The VMICPCI-8420 contains the DiskOnChip (DOC) flash memory with purchase of the VxWorks operating system. The DOC comes pre-installed. It is plugged into a standard 32-pin EEPROM socket and mapped into a 32 Kbyte boundary in the BIOS expansion address space of the PC.



Figure 1-2 Location of U1 on DaughterCard

See the *VMIPCI-7585 Product Manual* that came with your VMICPCI-8420 package for switch settings to configure the M-Systems DOC address (page 2-4, U1, pins 1 through 4). Figure 1-2 shows the location of U1 on the daughter card.

The DOC contains a built-in copy of the M-Systems industry standard TrueFFS software, which makes the DOC operate as a standard disk drive. The DOC can contain the operating system in it to allow systems to boot without a hard disk. The DOC comes configured as the boot device.

ltem	Function			Remark
M-System Address	C0000	C8000	D0000	*D8000
U1-1	ON	OFF	OFF	OFF
U1-2	OFF	ON	OFF	OFF
U1-3	OFF	OFF	ON	OFF
U1-4	OFF	OFF	OFF	ON
* Denotes Default Setup				

Table 1-1 M-System Address Switch Setting

Configuring the DOC as the First Drive

The DOC can be configured as the last drive (default), or as the first drive in the system. When configured as the last drive, the DOC is installed as the last drive if there is another drive installed, and as drive C if no other drive is installed.

When configured as the first drive, the DOC is always installed as drive C:. The DOC is shipped from the factory configured to install as the last drive. To configure the DOC to install as the first drive, follow the steps below:

- 1. Boot the system and make sure the DOC is installed correctly as drive D:.
- 2. Insert the utility diskette into the floppy drive and type A:[e].
- 3. At the DOS prompt type: DUPDATE D: /FIRST /S:DOC2000.EXB.
- 4. After rebooting the system, the DOC will display as drive C:.

Utilities and drivers are available on M-Systems website.

www.m-sys.com

If the system is ordered with VxWorks, a highly accurate timing board (VMIPMC-7441) is provided, along with an PMC-to-CompactPCI adapter card. See the "*VMIPMC-7441 Product Manual*" for details on the operation of the VMIPMC-7441.

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Getting Information

VMIC provides information in both online and harcopy media. The table below lists the documentation supplied with the VMIVME-8420.

Documentation	Use to Find
CPU Manual	This doucment provides specifications, hardware settings, and technical information specific to the controller CPU. Use this document to check features and capabilities of your VMIC CPU, in addition to setting the BIOS.
<i>IOWorks Installation Guide</i> (included with purchase of IOWorks)	Contains instructions for installing IOWorks on host development and target controller systems. The "Getting Started" section provides a tutorial on how to create a workspace and set up your target controllers. Refer to this document when upgrading IOWorks.
<i>VMEbus Access</i> <i>Installation Guide</i> (included with purchase of IOWorks)	Describes the IOWorks Access software product, which is automatically included with your purchase of IOWorks. Although IOWorks Access can come to you pre-installed at the factory, use this document for general product information and upgrading. IOWorks Access provides the means to develop programs that access data over the VMEbus.
<i>IOWorks Board</i> <i>Drivers Installation</i> <i>Guide</i> (included with purchase of IOWorks)	Describes the IOWorks Board Drivers software product, which is automatically included with your purchase of IOWorks. Although the IOWorks Board Drivers package can come to you pre-installed at the factory, use this document for general product information and upgrading. The IOWorks Board Drivers product contains a library of functions used to program VMIC's most popular VMEbus I/O boards.

Table 1-1 Information Resources

IOWorks Online Manuals (included with purchase of IOWorks development)	Provides user information for the IOWorks Manager, Soft Logic Link, and Visual IOWorks products; all are components of your purchased IOWorks package. You can view and print out the appropriate IOWorks user's guide for your product using Adobe Acrobat (version 3.0 or later), available on the IOWorks CD-ROM. To print the entire user's guide for your product, choose the Print function from the File pull-down menu in the Adobe Acrobat Reader	
IOWorks Online Help (included with purchase of IOWorks development)	 "How To" information and context-sensitive help are all available online. To access IOWorks online help: Go to Start menu > Programs > IOWorks > Help Topics Print Help topics by: Selecting Print Topic from the Help File menu Selecting the Print button on the Help toolbar Clicking the right mouse button on the help window and selecting Print Topic. 	

Table 1-1 Information Resources

Guidelines for Installing PCI/CPCI I/O Boards

1. Install your processor CPU board in Slot 1 and configure it as the System Slot CPU. In CPCI systems, Slot 1 can be distinguished by special color coding (usually red) and is located on either the far left or the far right of the CPCI chassis.

For installation of IOWorks in a CPCI system using two CPUs or more, the target controller CPU should always be installed and configured as the system slot CPU. It should handle the majority of the interrupts and accesses for the CPCI bus. Once these requirements are met, it does not matter if other CPUs are configured for the host or additional target controllers.

- 2. Insert additional processor boards in adjacent slots from Slot 1. Additional processor boards *cannot* be configured as the System Controller.
- 3. Install the I/O board(s) in other available slots.
- 4. Run the appropriate utility for your platform. Refer to the "Board Mapping Utilities" section below.

Board Mapping Utilities

Utilities should be rerun to ensure mapping is correct if you install or remove any boards in the system chassis. First, cycle the power to the system, and then rerun the appropriate utility for your system.

If your system is Windows NT-based, run the Generic Device Driver Device Probe utility to identify the bus number, the device ID number, the slot number, etc. This utility comes with purchase of the IOWorks package.

To open the Device Probe utility on a Windows NT- based system, select the **Start > Programs > Generic Device Driver > Device Probe Utility** command.

If your system is VxWorks-based, run **pciDeviceShow**. The **pciDeviceShow** command identifies the bus number, the device number (slot number), the device ID, etc. The command requires the input of a bus number for the argument. For example, the command below would print a table of information for bus 0.

\$ pciDeviceShow 0

If you cannot locate your board in the printed table, check bus 1, bus 2, etc. by changing the argument.

Troubleshooting

There are a few items that you *must* have for IOWorks to run properly. Verify that your system conforms to the bulleted items below:

- While target controllers may run in numerous operating systems, the IOWorks host portion of the product runs only on Windows NT.
- You must run Windows NT 4.0 with Service Pack 5 installed.
- IOWorks uses TCP/IP to communicate between the host portion of IOWorks and the target controller CPU. While you do not have to have a network adapter, some configuration of your TCP/IP settings may be necessary.

Erratic Initialization of Installation/System Crashing

The install will not correctly initialize when certain programs are running. *All* programs should be closed before running the install. Antivirus software should be disabled.

Ensure that the **Temp** variable is pointing to a valid, empty directory. Check this variable by selecting **Start** -> **Settings** -> **Control Panel**. When the **Control Panel** dialog box appears, double-click on the **System** icon. The **System Properties** dialog box displays; select the **Environment** tab. Ensure that the **Temp** variable displays in the **User Variables** field.

Host-Target Controller Connection

Connection Problems

- 1. Make sure Network Interface Cards (NICs) are installed and operating properly.
- 2. Make sure devices are properly connected to the appropriate network medium.
- 3. TCP/IP protocol must be installed and working.
- 4. Make sure any network aliases required for name resolution are properly configured.

- 5. Use the 'ping' command to verify machines are visible on the network.
- 6. Make sure no other hosts are already connected to the target controller with which you are attempting to establish communication.

Troubleshooting Serial Communications

Use this information to resolve any problems you may have when you connect the host and target controller CPUs.

What is the connector interface for VMIC CPU serial ports?

On the VMIC CPUs, an adapter cable is used to provide a standard IBM PC-compatible male DB9 serial interface. The serial port connector interface implements what is commonly referred to as a Data Communication Equipment (DCE) interface.

I have connected a serial cable between my PC and the VMIC CPU, but they are not communicating. What should I do?

Typical serial communication requires that a Data Terminal Equipment (DTE) interface connects to a DCE interface device. An industry standard null modem can be used to convert a DCE interface to a DTE interface or a DTE interface to a DCE interface. A null modem simply switches the communication (transmit and receive data pins) and hardware control lines from one standard to the other.

On your PC you have either DB25 (DTE) serial connectors or DB9 (DCE) serial connectors. More than likely, the PC has a DB9 male connector that has a DCE interface. The standard for serial ports on IBM-compatible PCs is DB25 connectors are DTE devices, and DB9 connectors are DCE devices.

If your PC has a DB25 serial interface, you need a DB9 to DB25 serial port adapter (also a null modem) and a straight-through serial cable.

Pin No.	9-Pin Connector	Pin No.	25-Pin Connector
1	DCD	8	DCD
2	RD	3	RD
3	TD	2	TD
4	DTR	20	DTR
5	GND	7	GND
6	DSR	6	DSR
7	RTS	4	RTS
8	CTS	5	CTS
9	RI	22	RI

Table 1-1 9-Pin to 25-Pin Connector Adapter

How do I verify my cable?

Follow these steps to verify your cable:

- Use a multimeter to "ohm" the cables out end-to-end on every pin. Be sure not to skip adapters or null modems.
- Using the hardware equipment manuals, record which pins transmit data and which receive data.
- Verify that the transmit data wire on the remote target controller serial port is wired to receive data wire on the other serial port.
- Then verify that the receive data wire on the remote target controller serial port is wired to transmit data wire on the other serial port. If you still have problems, examine the pins in the male connectors to ensure that they are the same height. In particular, check pins two and three.

Troubleshooting



Cable and Connector Troubleshooting

Some common problems with pins include the following:

- Pins that have been pushed back into the connector or are bent over.
- Failed female connectors or connectors with missing wires.

I have verified my cable and still cannot communicate. What should I do?

Most problems with serial communication involve cables or port configuration. Try these suggestions:

- Verify the configuration.
- Buy more than one null modem. If you have verified the configuration, install the new null modem and try the connection again. It is easier to put an inexpensive null modem in between your cables and retest than to verify cable pin outs.
- If you are using a terminal emulator on a computer, reboot and cycle power on the computer(s). If you are using a VT100 type terminal, cycle power and check the baud rate again.

Maintenance

This section provides information relative to the care and maintenance of VMIC's products. Should the products malfunction, you must verify the following:

- 1. Software
- 2. System configuration
- 3. Electrical connections
- 4. Jumper or configuration options
- 5. Boards fully inserted into their proper connector location
- 6. Connector pins are clean and free from contamination
- 7. No components of adjacent boards are disturbed when inserting or removing the board from the PCI board slot
- 8. Quality of cables and I/O connections

Software Maintenance Agreement

A software service agreement is included with your software shipment. The agreement enables you to receive product updates and VMIC customer service. To purchase maintenance/service for your software product, send VMIC the completed form using the address indicated. You receive 30 days free maintenance with your purchase. After that time, you must purchase a maintenance agreement in order to receive customer service. The policies are valid for one year and are renewable each year. VMIC will notify you for maintenance renewal. When you call the 800-customer service phone number, you must give your service representative the product serial number to receive customer support. You can find this serial number on the CD or on the invoice.

Hardware Maintenance

If hardware products must be returned, contact VMIC for a Return Material Authorization (RMA) Number. **This RMA Number must be obtained prior to any return**. See the next section, "Contacting VMIC."

Contacting VMIC

Hardware Technical Support

Contact VMIC's customer service for hardware related issues at:

TELEPHONE:	1-800-240-7782
FAX:	256-650-7245
E-MAIL:	customer.service@vmic.com

Software Technical Support

Contact VMIC's IOWorks customer service at:

TELEPHONE:	1-800-269-4714
FAX:	256-650-5472
E-MAIL:	software.cs@vmic.com

Service is free for 30 days after product delivery. After this time however, you must purchase VMIC's Maintenance Agreement for continued support. For more information, refer to the Maintenance Agreement documentation that was delivered with the product.

Providing Information

With your correspondence, please provide the following:

- Type of computer hardware including processor, available disk space, RAM, and network board.
- List any connected I/O boards.
- IOWorks software version number.
- Software version numbers of Windows NT.
- List any other VMIC products you are using.
- List any software packages you are using in conjunction with IOWorks.
- Exact wording of any messages on your screen.

- What you were doing when the error occurred.
- What steps you have taken (if any) to resolve the problem.

In addition, when e-mailing, please include the following:

- Your name.
- Your company's name.
- Your phone and fax numbers.





Ethernet Card Switches and Connectors

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Overview

This chapter gives the definitions and shows where to locate the positions of switches and connectors on your 10/100 Base-Tx Ethernet card.



Figure 1-1 10\100 Base-Tx Ethernet Card Switch and Connector Locations

Switches

Switches on the Ethernet card are used to select options for different components used. The switch-on or off is to accommodate the variations of the Boot ROM (Flash). There are two types of flash ROM with 5V and 12V VPP, respectively. Normally, the flash ROM for local area networks (LANs) is deleted. However, this option is reserved.

Switch Settings

	Switch 1	Switch 2	Switch 3	Switch 4
SCSI	ON	OFF	OFF	OFF
LAN	OFF	ON	OFF	OFF

Table A-1 Switch Settings for +12V Flash ROM Type

Table A-2 Switch Settings for 5v Flash ROM Type

	Switch 1	Switch 2	Switch 3	Switch 4
SCSI	OFF	OFF	OFF	OFF
LAN	OFF	OFF	OFF	OFF

Connectors

Connectors on the CPU Board provide interfaces to other devices.

PIN No.	Description	PIN No.	Description
1	+SD12	35	-SD12
2	+SD13	36	-SD13
3	+SD14	37	-SD14
4	+SD15	38	-SD15
5	+SDP1	39	-SDP1
6	+SD0	40	-SD0
7	+SD1	41	-SD1
8	+SD2	42	-SD2
9	+SD3	43	-SD3
10	+SD4	44	-SD4
11	+SD5	45	-SD5
12	+SD6	46	-SD6
13	+SD7	47	-SD7
14	+SDP0	48	-SDP0
15	GND	49	GND
16	DIFFSEN	50	Internal Sense
17	TPW	51	TPW
18	TPW	52	TPW
19	REV	53	REV
20	GND	54	GND
21	+SATN	55	-SATN

Table A-3 J2: SCSI C onnector Pin Definitions

22	GND	56	GND
23	+SBSY	57	-SBSY
24	+SACK	58	-SACK
25	+SRST	59	-SRST
26	+SMSG	60	-SMSG
27	+SSEL	61	-SSEL
28	+SCD	62	-SCD
29	+SREG	63	-SREQ
30	+SI0	64	-SIO
31	+SD8	65	-SD8
32	+SD9	66	-SD9
33	+SD10	67	-SD10
34	+SD11	68	-SD11

Table A-3 J2: SCSI C onnector Pin Definitions (Continued)

Table A-4 J3: LAN RJ45

PIN No.	Description	PIN No.	Description
1	TX+	2	TX-
3	RX+	4	GND
5	GND	6	RX-
7	GND	8	GND

