VMIVME-8440
IOWorks PC-Based Controller System

Installation Guide

READ ME FIRST

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522-008440-000 Rev. B

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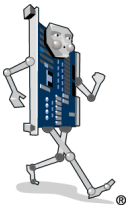

(I/O man figure)

(IOWorks man figure)

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Overview

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Introduction

The VMIVME-8440 IOWorks® PC-Based Controller System is a complete, high-performance VMEbus 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 provides turnkey solutions for applications ranging from high-speed process control to data acquisition to industrial automation.

Read this document first so 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 are ready to get started, skip to Chapter 1, "Installation" on page 21.

Feature Summary

The VMIVME-8440 controller rolls the PC's power and connectivity in with the universality of the VMEbus platform. The VMEbus platform is ideal for a variety of applications ranging in complexity and allows easy integration of VMIC and third-party I/O products.

VMIC uses the latest technology to develop both the hardware and software components comprising the VMIVME-8440. Its all-in-one construction saves panel space, and its powerful features bring productivity and savings to even the most cost-conscious control applications. Enclosed in an industrial class chassis, the controller CPU has a high-performance Celeron 366 MHz processor. The CPU comes standard with 128 Mbyte of SDRAM. Interfaces offered include Reflective Memory, Ethernet TCP/IP, Modbus, GeniusBus, Profibus-DP, and DeviceNet, to name a few. To ensure there is plenty of room for data access and storage, you can purchase a hard disk drive, a 3.5-inch 1.44 MByte floppy disk drive, and a minimum 32X internal CD-ROM.

The main features provided by the VMIVME-8440 are described below.

- **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."
- **Integrated solution and support.** You can purchase the target 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. See "Contacting VMIC" on page 42.

- **All-in-one casing**. Achieve substantial installation savings through reduction in wiring and labor by locating the controller near the sensors and controlled devices. The VMIVME-8440 chassis is designed for either 19" rack mount or wall mount applications, or you can set it up as a benchtop system.
- **Plug and play installation**. For an operational system, simply (1) connect the common PC support peripherals such as the keyboard, mouse, and (2) connect the controller to your local area network (LAN).
- **Front panel display**. 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.
- **Hard real-time deterministic solutions**. Time-critical data exchange can be built with the Wind River® VxWorks operating system running on your controller.
- **Open VMEbus standard for remote I/O**. VMIC offers one of the widest selections of VME-based I/O boards in the industry. Most of these boards are supported by the VMIVME-8440. In addition, the VMEbus enables you to connect third-party I/O systems and other fieldbuses.
- **Flexible programming options**. Use Ladder Logic and Function Block IEC 61131-3 languages, or C\C++ languages to create control applications.

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 PLCs.

IOWorks enables you to use your VMIVME-8440 as a target controller in a PC-based, distributed system. You will need an industrial or desktop PC running Windows NT 4.0 and the IOWorks host application.

The following list summarizes the key features of IOWorks:

- Unlimited target controllers can connect to a single host CPU; enabling you to build systems of varying complexities.
- IOWorks drivers support 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 and buffer outgoing data.
- OPC, COM and ActiveX technologies on the user-provided host CPU can be used to control I/O programs from outside applications. COM and OPC are industry-standard communication exchange technologies for real-time data access. Third-party applications, such as database programs and HMIs (Human-Machine Interface), can gather I/O information from IOWorks using OPC and COM protocols.
- On the host CPU, 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 programming features enable you to control applications on-the-fly from the host CPU.

- A test edit feature enables you to update individual sequences without interrupting program execution.
- Configure host-independent target controllers to boot up, load and run compiled applications without user/host intervention.

About 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. You have the flexibility to upgrade your environment as well as mix-and-match products to use the most current and cost-effective technologies.

Controller Requirements

VMIC has more than 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 as a system to work in tandem with your current PLC(s).

Basic Concepts

As a PC-based controller, your VMIVME-8440 can be used as a remote target controller in a distributed system. In a distributed system, a *host* CPU connects to your VMIVME-8440 CPU via Ethernet. A host CPU contains the program development tools and runs under the Windows NT 4.0 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

Target controllers represent the run-time functionality of a controller to execute the control programs developed on the host. The *target controller* in a distributed system provides the program execution and run-time functionality. A remote target controller off-loads computing responsibilities from the host CPU.

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

- Maintains the internal file system for target controller configuration, startup and recovery
- Manages real-time target controller data
- Enables on-line editing
- Schedules program execution for real-time control

Using this Document

This manual provides procedures to install, verify and troubleshoot your VMIVME-8440 system.

Intended Audience

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

- VMEbus
- CPU hardware configuration
- Ethernet networking and setup

Conventions

This section describes the type conventions used throughout this guide.

Table 1 Conventions List

Type	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.

WARNING: 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.

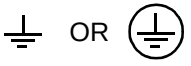
CAUTION: Denotes a hazard. It calls attention to an operating procedure, a practice, or a condition, which, if not correctly performed or adhered to, could result in damage to or destruction of part or all of the system.

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

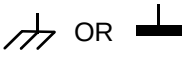
More information on safety usage is provided in the "Safety Summary" on page 19.

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



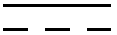
Protective conductor terminal. For protection against electrical shock in case of a fault. Used with field wiring terminals to indicate the terminal which must be connected to ground before operating equipment.

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, terminals marked with this symbol must be connected to ground in the manner described in the installation (operation) manual.

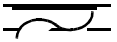


Frame or chassis terminal. A connection to the frame (chassis) of the equipment which normally includes all exposed metal structures.

Alternating current (power line).



Direct current (power line).



Direct current (power line) and Alternating or direct current (power line).

Document Organization

Chapters in this guide are organized as described below.

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

Chapter 2 "Post Installation: I/O Board Setup and Troubleshooting." This chapter contains guidelines on connecting remote I/O boards to your VMEbus CPU, as well as providing troubleshooting information to resolve installation or configuration problems.

Related Documents

VMIVME-7698 Product Manual (500-007698-000) - describes CPU features, and provides installation and configuration instructions.

IOWorks

IOWorks 9510 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, as well as manage target controllers through the IOWorks Manager interface.

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.

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

www.vmic.com

VMEbus

VMEbus Specification - contains the specifics on the VMEbus. Available from:

VITA
7825 E. Gelding Dr. #104
Scottsdale, AZ 85260
PH: (602) 951-8866
FX: (602) 951-0720

Wind River

For information about the VxWorks operating system, see the Wind River website:

www.wrs.com/

Physical Description and Specifications

Refer to Specification 800-008440-000 available from:

VMIC
12090 South Memorial Pkwy.
Huntsville, AL 35803-3308
(256) 880-0444
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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.

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

CHAPTER

1

Installation

Contents

Before You Begin...

Take a few minutes to review the items you need to set up your VMIVME-8440 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 wall mounting the VMIVME-8440. 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 (10Ux 17"x8.3"). There is a drop-down access panel in the rear. The ON/OFF and RESET switches, along with the power on LEDs, are located on the bottom of the front panel.

Hardware

NOTE: You can purchase VMIC's adapter kit, VMIACC-0045, that contains all required cables.

- A null modem serial cable with female-to-female connections
- A keyboard, mouse, and monitor for the system CPU
- Serial, parallel, and I/O cables and connectors
- An RJ-45 Ethernet cable

- Host CPU (optional)
  If you are using the VMIVME-8440 CPU as an IOWorks remote target controller, you must connect a host CPU or desktop PC to it and set up network connections. The host CPU must be running the Windows NT 4.0 operating system with Service Pack 5.

What Your Controller System Contains (Unpacking)

Included with the VMIVME-8440 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 claims need to be filed with the shipping carrier. VMIC will provide instructions concerning the disposition of the damaged item(s).

Hardware Components

One VMIVME-8440 system chassis containing:

- One VMIVME-7698 single-slot VMEbus CPU with a Celeron 366 MHz processor. The CPU contains the following general hardware settings:

  64 Mbyte CompactFlash drive memory

  Software-selectable Watchdog Timer with reset

  128 MByte SDRAM using 144-pin Dual In-Line Memory Modules (SODIMM)

  SVGA: 1280x1024-pixel resolution at 75 Hz refresh rate maximum supported

  On-board Fast Ethernet controller supporting 10BaseT and 100BaseTx

  VME64 modes supported:
  A32/A24/D32/D16/D08(EO)/MBLT64/BLT32

Includes byte-swapping hardware for little-endian and big-endian data interfacing (patent pending)

Passive heatsink design (no moving parts)

- I/O board dimensions: typical 6U Eurocard format 160 mm (W) x 233 mm (H) single-slot front boards
- Supports up to 20 slots
- Switchable 110\220 VAC power unit supplied with the 110 cable
- Keyboard/Mouse Y-cable
- One IOWorks Mousepad
- One floppy disk/hard drive and connector cables (optional)
- One CD-ROM drive and connector cables (optional)

Software

- One IOWorks CD-ROM disk (with purchase of IOWorks target controller)

NOTE: The VxWorks operating system is installed at VMIC. No documentation or disks from Wind River are supplied with VxWorks.

Documentation

- *VMIVME-8440 Installation Guide* (this document)
- *IOWorks Installation and Getting Started Guide* (with purchase of IOWorks)
- *VMIVME-7698 Product Manual*

Installation Procedures

Follow the instructions in this section to set up the VMIVME-8440 CPU, connect peripherals, set up network connections, and, if you are using IOWorks, connect to a host CPU. The figure below lists the peripheral connections of the controller CPU (VMIVME-7698).

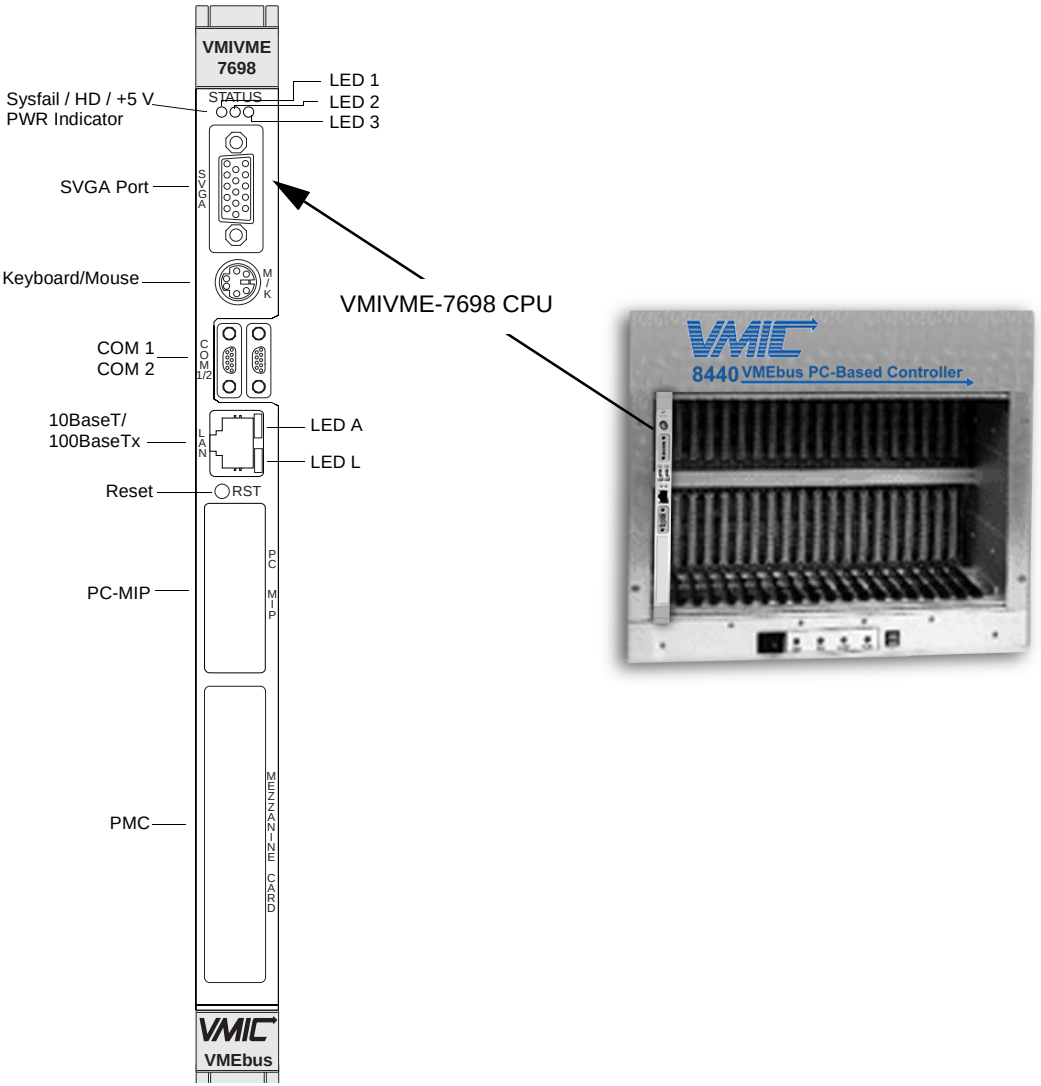


Figure 1-1 VMIVME-8440 Chassis with the VMIVME-7698 CPU

Peripherals Setup

1. Prepare a safe, stable location for the VMIVME-8440 system and its support items (keyboard, etc.).
2. Connect the keyboard and mouse to the P/S2 connector on the front of the unit, using the supplied adapter.
3. Connect the CRT (monitor screen) to the front panel DB-15 connector.
4. Connect the power cable to the chassis unit and then to an AC outlet.
5. Connect a network cable to the LAN Ethernet connector in the CPU:
   - A network based on a 100BaseTx standard uses unshielded twisted-pair cables and an RJ-45 connector. The 100BaseTx has a maximum deployment length of 250 m.
   - The RJ-45 connector is also used with the 10BaseT standard. 10BaseT has a maximum length of 100 m from the wiring hub to the terminal node.
6. The system ON/OFF switch is located at the bottom of the front panel. Press the switch to power the backplane on and off. The system boots to display the **C:** prompt.

The initial hardware setup is complete. For detailed descriptions of the VMIVME-7698, refer to the *VMIVME-7698 Product Manual* included in your VMIVME-8440 system package.

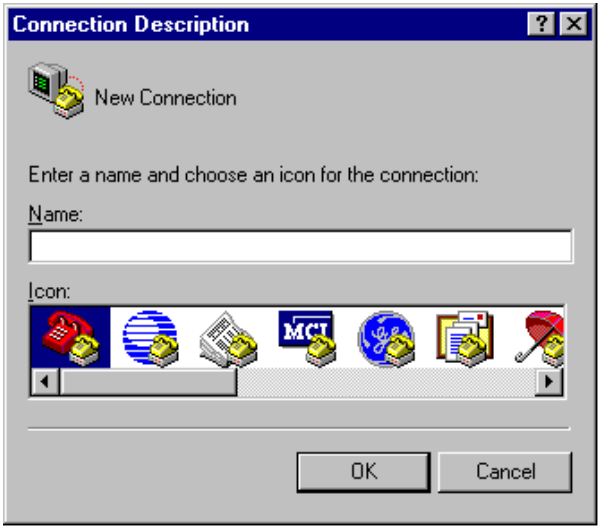
Host Connection (with IOWorks)

If you are using the VMIVME-8440 as a remote target controller in an IOWorks system, you must connect a serial cable between the host computer (COM 1) and the target controller (COM 1) so that the two CPUs can communicate.

Follow the procedures below:

1. Install IOWorks onto your host CPU. Open the *IOWorks Installation and Getting Started Guide* that came with your VMIVME-8440 package and follow the IOWorks host installation instructions.
2. Upon successful installation, reboot your host CPU.
3. From the host CPU, select **Start** and then click **Accessories** to access the serial port connection. From the first list of programs that displays, click **HyperTerminal**.

   The **Connection Description** dialog box displays.

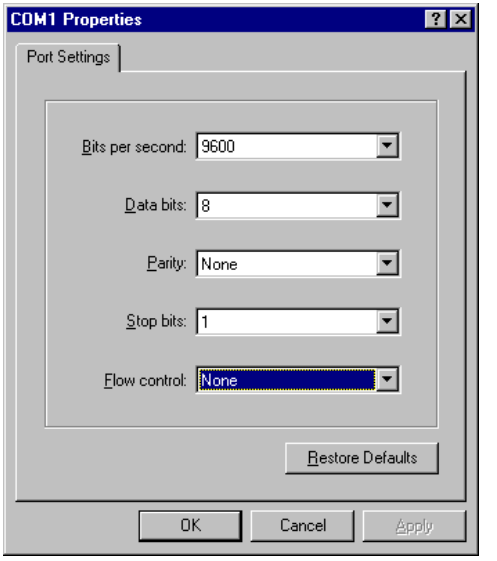


4. Key in a name for the VxWorks target controller and select an icon to represent the VxWorks target controller. Click **OK**.

5. The **Connect To** screen displays with the target controller name you assigned. Make sure that **COM 1** is selected in the **Connect Using** field.

6. Click **OK** when you have finished.

   The **Com1 Properties** dialog box displays.



Modify the communications serial device parameters to the settings listed below.

Table 1-1 Serial Device Parameters

Serial Device Fields	Parameters
Bits per second	9600 Baud
Data bits	8
Parity	None
Stop bits	1
Flow control	None

7. Click **OK.** Then press ENTER.

   The -> prompt for your VxWorks target controller displays.

8. At the prompt, key in the `setRTBootparams` function, the target controller CPU IP address, and the host CPU IP address using the format shown below. The login name and password are optional and are used for target controller FTP access to the host.

   Keyin format:

   `setRTBootparams "[target controller IP address]","[host IP address]", "[login name],"[password]"`

   Example:

   `setRTBootparams "122.2.48.5","122.2.48.1", "[login name]", "[password]"`

9. Wait as the VMIVME-8440 boots automatically. A **C:** prompt displays on the monitor connected to your VMIVME-8440.

Verification

If you have a host CPU connected to the VMIVME-8440, key in the following PING command from the host CPU to make sure they are communicating:

From a DOS prompt, key in: **PING [*IP address*]**

The ***IP address*** is the address of the VMIVME-7698 CPU. See your system administrator if you do not know the IP address.

You should receive reply messages from the CPU. If you did not receive a reply, check your network configuration.

Congratulations! Now that you have all the key elements in your system set, you can connect I/O boards and begin work with the VMIVME-8440! If you purchased IOWorks, refer to the "Starting IOWorks" chapter in the *IOWorks Getting Started Guide* to set up a sample workspace.

CHAPTER

2

Post Installation: Board Setup and Troubleshooting

Contents

Introduction

Once you have installed your VMIVME-8440 controller, use information in this chapter to connect I/O boards and resolve installation problems.

Getting Information

VMIC provides information in both on-line and hardcopy media. The table below lists the documentation supplied with the VMIVME-8440.

Table 2-1 Information Resources

Documentation	Description
CPU Product Manual: *VMIVME-7698 Product Manual*	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.
IOWorks Installation Guide (included with purchase of IOWorks)	Contains instructions for installing IOWorks on host development and target systems. The "Getting Started" section provides a tutorial on how to create a workspace and set up your targets. Refer to this document when upgrading IOWorks.
VMEbus Access Installation Guide (included with purchase of IOWorks)	Describes the VMEbus Access software product, which is automatically included with your purchase of IOWorks. Although VMEbus Access can come to you pre-installed at the factory, use this document for general product information and upgrading. VMEbus Access provides the means to develop programs that access data over the VMEbus.
IOWorks Board Drivers Installation Guide (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 2-1 Information Resources (Continued)

IOWorks Online Manuals (included with purchase of IOWorks)	Provides information on how to use commands in the IOWorks interface to organize, control and maintain a controller system. You can view and print out information from the manuals 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)	"How To" information and context-sensitive help are all available online. To access IOWorks online help: • Select **Start > 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**

I/O Board Setup

Use this section when installing I/O boards in an IOWorks controller system. IOWorks is designed to operate with I/O drivers developed by VMIC, as well as third party I/O drivers.

Guidelines for Installing VME-Based I/O Boards

Listed below are guidelines to follow when arranging and installing your CPU and I/O boards on a VMEbus chassis.

- Processor CPU board should be installed in Slot 1 and configured as the System Controller. Insert additional processor boards in adjacent slots from slot 1.
- Additional processor boards cannot be configured as the System Controller.
- Any empty slots between bus masters must be configured with the backplane jumpers for IACK and Bus Grant 0 - 3 installed.
- Interrupting boards must be placed adjacent to the processor board in sequential slots, with no empty slots. If empty slots cannot be avoided, the backplane jumper for IACK must be installed for bypassing each empty slot.
- The IACK daisy chain must propagate to the VME slot in which the interrupting board is installed. All empty slots between the interrupt handler (CPU) and the interrupting board must have IACK jumpers.
- Not all boards maintain IACK daisy chaining. If you have any boards installed between the interrupt handler (CPU) and the interrupting board, you must ensure that the IACK daisy chain is intact.

Board Addressing Guidelines (VMEbus)

Here are some general steps to follow for I/O board addressing:

- Address space A16 0x0 - 0x1000 is reserved for IOWorks target controllers.
- Plan the layout of address space used by the boards.
- Determine the amount of space needed.
- Choose the base address for each I/O board so that they do not overlap.
- Configure the I/O boards with the given addresses.
- Install each I/O board and verify response at the assigned address range.
- For VxWorks-based targets, this can be performed by using the 'm' command from the VxWorks shell. On VxWorks, the upper 8 or 16 bits of the address must correspond to the address space used for the board.
- After each board has been individually verified to respond at its assigned address, install the I/O boards in the target VMEbus system.
- Record the base addresses assigned to the I/O boards so they can be referenced later when software is set up to use the boards.

Troubleshooting

There are a few items you *must* have in order for IOWorks to run properly. Verify that your system conforms to the items listed 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 CPU. While you do not have to have a network adapter, some configuration of your TCP/IP settings may be necessary. Consult your system administrator.

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 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 DOS **`ping`** command to verify machines are visible on the network.
6. Make sure no other hosts are already connected to the VMIVME-8440 target.

Troubleshooting Serial Communications

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

What is the connector interface for VMIC CPU serial ports?

On 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.

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.

Table 2-2 9-Pin to 25-Pin Connector Adapter

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

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 serial port is wired to receive data wire on the other serial port.
- Finally, verify that the receive data wire on the remote target 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.

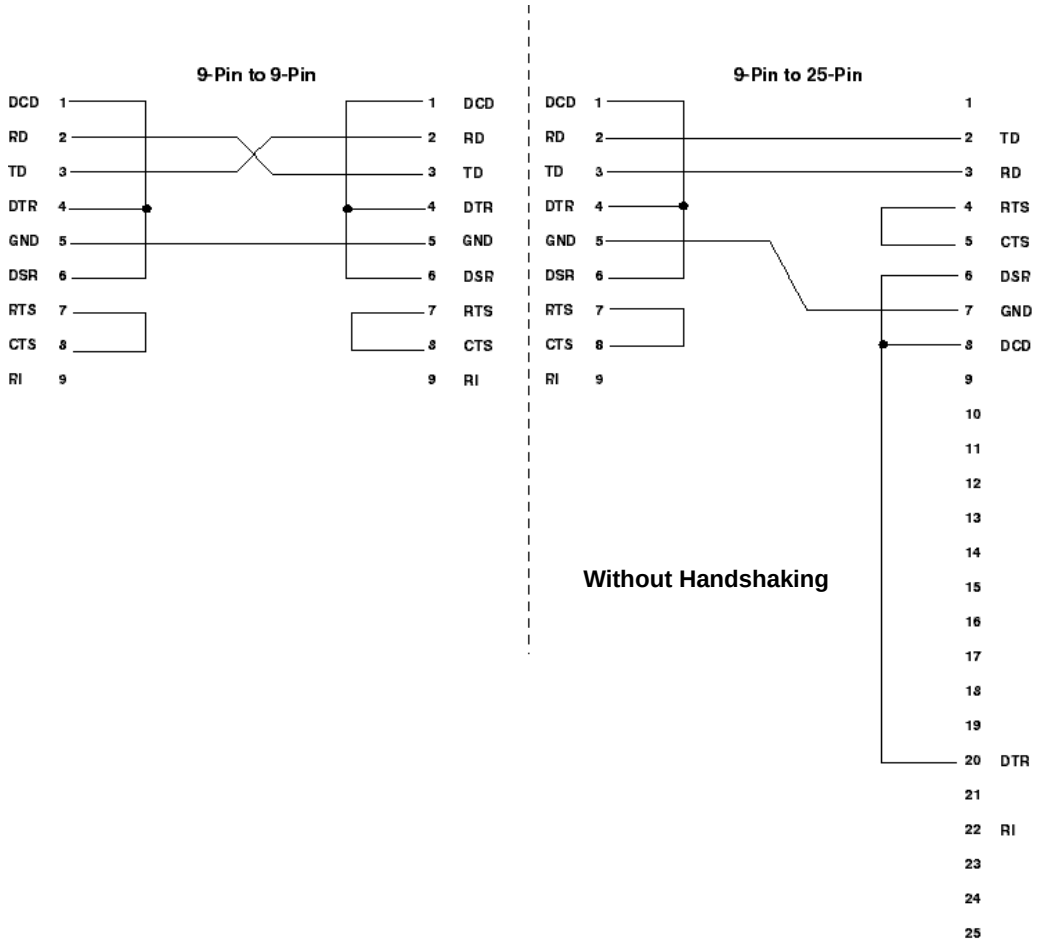


Figure 2-1 RS232 Connections and Wiring Diagrams

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 the following:

- 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 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 VMEbus 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," for more information.

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

IOWorks 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

Providing Information

With your correspondence, please provide the following:

- Type of computer hardware including processor, available disk space, RAM and network board
- List of any connected I/O boards
- IOWorks software version number
- Software version numbers of Windows NT
- List of any other VMIC products you are using
- List of 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