VXI

VXIpc™ 700 Series
User Manual

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This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

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If necessary, consult National Instruments or an experienced radio/television technician for additional suggestions. The following booklet prepared by the FCC may also be helpful: *Interference to Home Electronic Entertainment Equipment Handbook.* This booklet is available from the U.S. Government Printing Office, Washington, DC 20402.

Canadian Department of Communications

This Class A digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

Cet appareil numérique de la classe A respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

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About This Manual

This manual contains instructions for installing and configuring the National Instruments VXIpc 700 Series embedded computer kit.

Organization of This Manual

This manual is organized as follows:

- Chapter 1, *Introduction*, describes the VXIpc 700 Series of embedded VXI computers, lists what you need to get started, describes the hardware, and lists optional equipment and software.
- Chapter 2, *Functional Overview*, contains functional descriptions of each major logic block on the VXIpc 700 Series embedded computers.
- Chapte 3, *VXIpc 700 Series Configuration and Installation*, contains the instructions to configure and install the VXIpc 700 Series embedded computer.
- Chapter 4, *BIOS*, contains information on BIOS, the low-level interface between the hardware and PC software that configures and tests your hardware at boot up.
- Appendix A, *Specifications*, describes the environmental, electrical, and mechanical specifications of the VXIpc 700 Series embedded computer.
- Appendix B, *VXIpc 700 Series System Resources*, describes what system resources are available on the VXIpc 700 Series and where they are allocated.
- Appendix C, *LED Indicators*, describes how to read the LEDs on the front panel to interpret the status of the VXIpc 700 Series.
- Appendix D, *Front Panel and Connectors*, describes the front panel and connectors on the VXIpc 700 Series.
- Appendix E, *Common Questions*, answers common questions you may have when using the VXIpc 700 Series.
- Appendix F, *Customer Communication*, contains forms you can use to request help from National Instruments or to comment on our products and manuals.
- The *Glossary* contains an alphabetical list and description of terms used in this manual, including abbreviations, acronyms, metric prefixes, mnemonics, and symbols.

- The *Index* contains an alphabetical list of key terms and topics used in this manual, including the page where you can find each one.

Conventions Used in This Manual

The following conventions are used in this manual:

< >	Angle brackets enclose the name of a key on the keyboard (for example, <DEL>).
-	A hyphen between two or more key names enclosed in angle brackets denotes that you should simultaneously press the named keys—for example, <Control-Alt-Delete>.
♦	The ♦ symbol indicates that the text following it applies only to a specific product.
	This icon to the left of bold italicized text denotes a note, which alerts you to important information.
	This icon to the left of bold italicized text denotes a caution, which advises you of precautions to take to avoid injury, data loss, or a system crash.
	This icon to the left of bold italicized text denotes a warning, which advises you of precautions to take to avoid being electrically shocked.
bold	Bold text denotes the names of menus, menu items, dialog box buttons or options, or LEDs.
bold italic	Bold italic text denotes a note, caution, or warning.
italic	Italic text denotes emphasis, a cross reference, or an introduction to a key concept. This font also denotes text from which you supply the appropriate word or value, such as in Windows 3.*x*.
`monospace`	Text in this font denotes text or characters that are to be literally input from the keyboard, sections of code, programming examples, and syntax examples. This font is also used for the proper names of disk drives, paths, directories, device names, functions, variables, filenames, and extensions.
`monospace bold`	Bold text in this font denotes the messages and responses that the computer automatically prints to the screen.

VXIpc 700 Series

The terms *VXIpc 700 Series* and *VXIpc-700* refer to a series of C-size, single-slot VXI controllers. Currently, this series consists of the VXIpc-740 and VXIpc-745.

How to Use This Documentation Set

Begin by reading the *Getting Started with Your VXIpc 800/700 Series* manual for basic instructions for setting up the hardware and software. This is a brief quick start manual that describes how to get started with your kit using the default hardware and software settings, and how to configure and use the NI-VXI software. Refer to the following manuals for more information about the hardware or software.

This manual, the *VXIpc 700 Series User Manual*, contains more details about changing the installation or configuration from the defaults, and using the hardware.

When you are familiar with the material in these manuals, you can begin to use the *NI-VXI User Manual*. This manual presents the concepts of VXI and prepares you for detailed explanations of the NI-VXI functions. The NI-VXI online help describes the NI-VXI functions to help you fully understand the purpose and syntax of each function. You can find this same information in the *NI-VXI Programmer Reference Manual*. These two manuals are available in the `c:\NIVXI\Manuals` directory under the names `NI-VXIUsersMan.pdf` and `NI-VXIProgrammerMan.pdf`, respectively. Use the Acrobat Reader program, Version 3 or later, to open these files.

You can also access the NI-VXI online help for Windows 95/NT/3.1 in the `NIVXI` folder.

Refer to the *NI-VXI Graphical Utilities Reference Manual* and the *NI-VXI Text Utilities Reference Manual* to learn more about the NI-VXI utilities.

Refer to the *NI-VISA User Manual* to learn about VISA and how to use it in your system. The NI-VISA online help describes the attributes, events, and operations you can use in NI-VISA. You can find this same information in the *NI-VISA Programmer Reference Manual*. These two manuals are available in the `c:\Vxipnp\os\NIvisa\Manuals` directory (where `os` is either `Win95` or `WinNT`) under the names `NI-VISAUsersMan.pdf` and `NI-VISAProgrammersMan.pdf`, respectively. Use the Acrobat Reader program, Version 3 or later, to open these files.

Related Documentation

The following documents contain information that you may find helpful as you read this manual:

- ANSI/IEEE Standard 1014-1987, *IEEE Standard for a Versatile Backplane Bus: VMEbus*
- ANSI/IEEE Standard 1155-1993, *IEEE VMEbus Extensions for Instrumentation: VXIbus*
- ANSI/VITA 1-1994, *VME64*
- VXI-6, *VXIbus Mainframe Extender Specification*, Rev. 1.0, VXIbus Consortium

Customer Communication

National Instruments wants to receive your comments on our products and manuals. We are interested in the applications you develop with our products, and we want to help if you have problems with them. To make it easy for you to contact us, this manual contains comment and configuration forms for you to complete. These forms are in Appendix F, *Customer Communication*, at the end of this manual.

1

Introduction

This chapter describes the VXIpc 700 Series of embedded VXI computers, lists what you need to get started, describes the hardware, and lists optional equipment and software.

Overview

The VXIpc 700 Series consists of the VXIpc-740 and VXIpc-745 models. Refer to Appendix D, Front Panel and Connectors, for information about each connector on the module. Figure 1-1 shows the VXIpc-740 and Figure 1-2 shows the VXIpc-745.

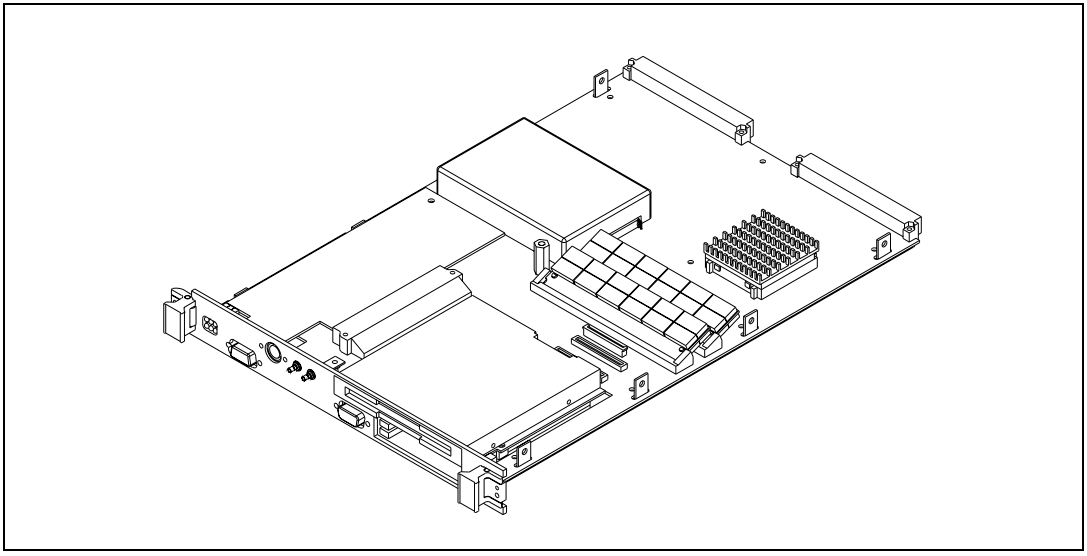


Figure 1-1. VXIpc-740 Embedded Computer

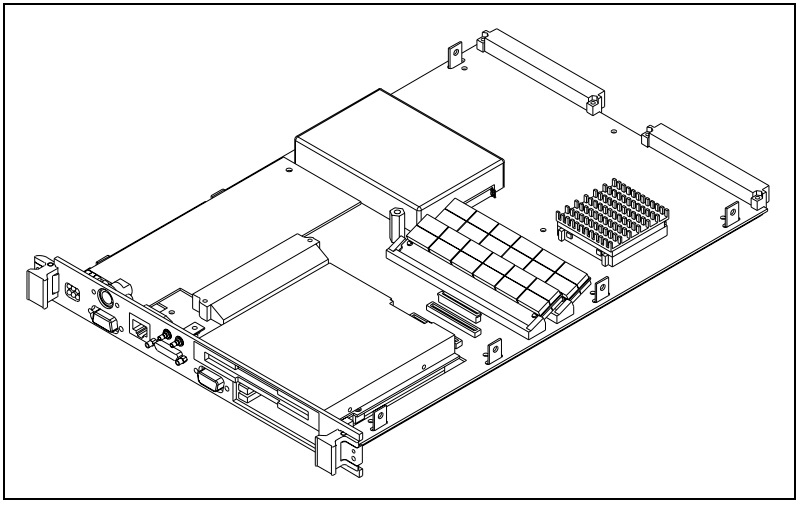


Figure 1-2. VXIpc-745 Embedded Computer

The VXIpc 700 Series controllers are C-size, embedded computers based on the Peripheral Component Interface (PCI) bus and Industry Standard Architecture (ISA). These computers are high-performance, easy-to-use platforms for controlling VXIbus systems, featuring complete VXI functionality through interactive utilities and C function calls. In addition, the VXIpc-745 has Ethernet capability plus an IEEE 488.2 interface that is compatible with the NI-488.2 architecture. You can install a PCMCIA-GPIB card in a PCMCIA slot to get IEEE 488.2 capability on the VXIpc-740.

The VXIpc 700 Series is a custom computer that you install directly in one C-size slot of your VXIbus mainframe. An embedded computer can take full advantage of the VXI high-performance backplane capabilities and give you direct control of VXI registers, memory, interrupts, and triggers.

All models in the VXIpc 700 Series are fully VXI*plug&play* compliant and are compatible with PC-compatible software tools, the National Instruments LabVIEW and LabWindows/CVI application software, and the NI-VXI, NI-VISA, and NI-488.2 bus interface software.

Optional Equipment

You can contact National Instruments to order the optional single-shielded 2 m GPIB cable for the VXIpc-745.

National Instruments Software

National Instruments has developed several software kits that you can use with the VXIpc 700 Series. The NI-VXI bus interface software for the VXIpc 700 includes a Resource Manager, an interactive VXI resource editor program, a comprehensive library of software routines for VXI/VME programming, and an interactive control program for interacting with VXI/VME. You can use this software to seamlessly program multiple-mainframe configurations and have software compatibility across a variety of VXI/VME controller platforms.

The NI-488.2M software kit gives you access to the industry-standard NI-488.2M software for controlling external GPIB instruments through the GPIB port on the front panel of your VXIpc-745, or through a PCMCIA slot on the VXIpc-740. The GPIB interface on your VXIpc controller is fully compatible with the NI-488.2M driver for a variety of operating systems. Any software using NI-488.2M will run on the VXIpc 700 Series.

You can use the NI-VISA high-level programming API to program GPIB, serial, parallel, and VXI devices in much the same manner.

You can also use the National Instruments LabVIEW and LabWindows/CVI application programs and instrument drivers to ease your programming task. These standardized programs match the modular virtual instrument capability of VXI and can reduce your VXI/VMEbus software development time. These programs are fully VXI*plug&play* compliant and feature extensive libraries of GPIB, Serial, and VXI instrument drivers written to take full advantage of direct VXI control. LabVIEW and LabWindows/CVI include all the tools needed for instrument control, data acquisition, analysis, and presentation.

LabVIEW is a complete programming environment that departs from the sequential nature of traditional programming languages and features a graphical programming environment.

LabWindows/CVI is an interactive C development environment for building test and measurement and instrument control systems. It includes interactive code-generation tools and a graphical editor for building custom user interfaces.

Hardware Description

The VXIpc 700 Series consists of two models—the VXIpc-740 and the VXIpc-745. Both models use a 486 class microprocessor running at 100 MHz.

The CPU module and its memory sockets are easily accessible for you to install up to an additional 64 MB of DRAM in the field for the VXIpc 700 Series.

The VXIpc-700 contains at least an 800 MB internal, enhanced IDE hard disk. For information on adding RAM by installing SIMMs, refer to Appendix A, *Specifications*.

Slot 0 Functionality

You can use the VXIpc 700 Series computers to achieve full VXI Slot 0 control of your VXI system. You can also install the VXIpc-700 in another slot and use it in Non-Slot 0 mode. You do not have to change any switches or jumpers when moving between these two modes, as the VXIpc-700 can automatically detect whether it is installed in Slot 0 and it will automatically enable or disable the Slot 0 onboard circuitry.

Custom Application-Specific Interface Chips

The VXIpc 700 Series uses the MITE and MANTIS custom ASICs to deliver high VXI performance, and can achieve more than 20 MB/s DMA block-mode data transfer rates across the VXI backplane.

The VXIpc-745 also has the TNT4882C custom ASIC to give full GPIB control of external instruments via a front-panel connector. This chip is also on the National Instruments PCMCIA-GPIB card that you can connect to the VXIpc-740 to achieve the same functionality. GPIB capability is fully compatible with IEEE 488.2 and the industry-standard NI-488.2 driver for a variety of operating systems.

The MITE custom ASIC is a sophisticated dual-channel DMA controller with standard interfaces for VXI and PCI. By using MITE DMA to transfer data and commands to and from devices, the MITE frees the computer's microprocessor to perform other tasks such as data analysis and presentation. In addition to DMA, the MITE incorporates the new VME64 MBLT (8-byte block transfers in which both the address bus and data bus are used to transfer data) directly into the ASIC to perform the fastest

transfer operation to instruments. With the multiple windowing scheme of the MITE, you can easily access all of VXI address space.

The VXI trigger interface on the VXIpc-700 is based on the MANTIS custom ASIC. The VXIpc-700 front panel has two SMB trigger I/O connectors, which you can use to route any of the TTL trigger lines between the backplane and external devices. The MANTIS ASIC on the VXIpc-700 provides the complete VXI interface to the backplane connector in a single chip. The VXIpc-700 can respond to all VXI-defined protocols on all P2 TTL and ECL trigger lines at the same time. The MANTIS features an internal cross-matrix switching system for routing between lines as well as to and from the front panel and onboard clocks.

☞ **Note** ***The MANTIS ASIC contains the exact functionality of the TIC ASIC, which appeared on the VXIpc-486 Model 500 Series controllers. Any application that currently uses any of the TIC functionality, such as the crosspoint switch and counter/timers, can run on a controller containing the MANTIS ASIC without modification.***

Front Panel Features

The VXIpc-700 has the following front-panel features:

- Either two Type I/II PCMCIA slots or one Type III slot
- Internal 3.5 in. floppy drive
- System reset push-button
- Front-panel connectors as listed in the following table

Connector	VXIpc-740	VXIpc-745
RS-232 Serial	✓	✓
VGA Controller	✓	✓
IEEE 488.2	—	✓
10BaseT Ethernet	—	✓
Trigger Output	✓	✓
Trigger Input	✓	✓
PS/2-Style Keyboard	✓	✓

- Six front-panel LEDs that show VXI and PC status
  - **SYSFAIL** LED indicates that the VMEbus SYSFAIL line is asserted.
  - **FAILED** LED indicates that the VXIpc-700 is driving the SYSFAIL signal.
  - **TEST** LED indicates that the VXIpc-700 is performing its self-tests or startup Resource Manager operations.
  - **ON LINE** LED indicates that the VXIpc-700 is performing or has completed its startup Resource Manager operations.
  - **ACCESS** LED indicates when the VXIpc-700 MODID line is asserted or the VXIbus registers or shared memory are accessed by another bus master.
  - **DRIVE** LED indicates when the internal hard drive is in use.

Peripheral Expansion

The VXIpc-700 uses the PCI local bus and ISA bus for peripheral expansion. The PCIbus is a 32-bit multimaster bus that achieves a top throughput of 132 MB/s and can handle numerous peripherals. The ISA bus is the legacy peripheral bus found on current and older PCs.

For information on installing and configuring these peripherals for use with the VXIpc-700, refer to the `c:\images\manuals` directory. The `drivers.txt` file explains how to install support for each peripheral. This directory also contains manufacturer's documentation for the video, PCMCIA, and SCSI peripherals. Also refer to the `readme` files for the most up-to-date information.

Table 1-1 lists the various peripherals, indicates the VXIpc model(s) on which the peripheral is available, and describes the external connector, its bus interface, and its function.

Table 1-1. VXIpc 700 Series Peripherals Overview

Peripheral	Availability	External Connector	ISA or PCI	Function
Video	VXIpc-740 VXIpc-745	15-pin DSUB (standard VGA)	PCI	High-resolution/ color support for a Super VGA monitor
IDE	VXIpc-740 VXIpc-745	None	PCI	Supports internal fast ATA-2 hard drive
Ethernet	VXIpc-745	RJ-45	ISA	10BaseT Ethernet connection

Table 1-1. VXIpc 700 Series Peripherals Overview (Continued)

Peripheral	Availability	External Connector	ISA or PCI	Function
PCMCIA	VXIpc-740 VXIpc-745	Two Type I/II or One Type III	PCI	Supports two independent PCMCIA slots
GPIB	VXIpc-745	24-pin CHAMP	ISA	IEEE 488.2 interface compatible with the National Instruments AT-GPIB/TNT
VXI	VXIpc-740 VXIpc-745	Two 96-pin DIN (rear of board)	PCI	High-performance VXIbus interface
Serial	VXIpc-740 VXIpc-745	Serial Port (Mini DSUB)	ISA	16550 serial ports

2

Functional Overview

This chapter contains functional descriptions of each major logic block on the VXIpc 700 Series embedded computers.

VXIpc-700 Functional Description

The VXIpc-700 is a modular PC in a VXIbus C-size form factor. It includes many high-performance peripherals that normally require add-in cards on desktop PCs. In addition, it has a VXIbus interface that is controlled from the PCI local bus, providing extremely high performance and reliability.

Figure 2-1 is a functional block diagram of the VXIpc 700 Series. Following the diagram is a description of each logic block shown.

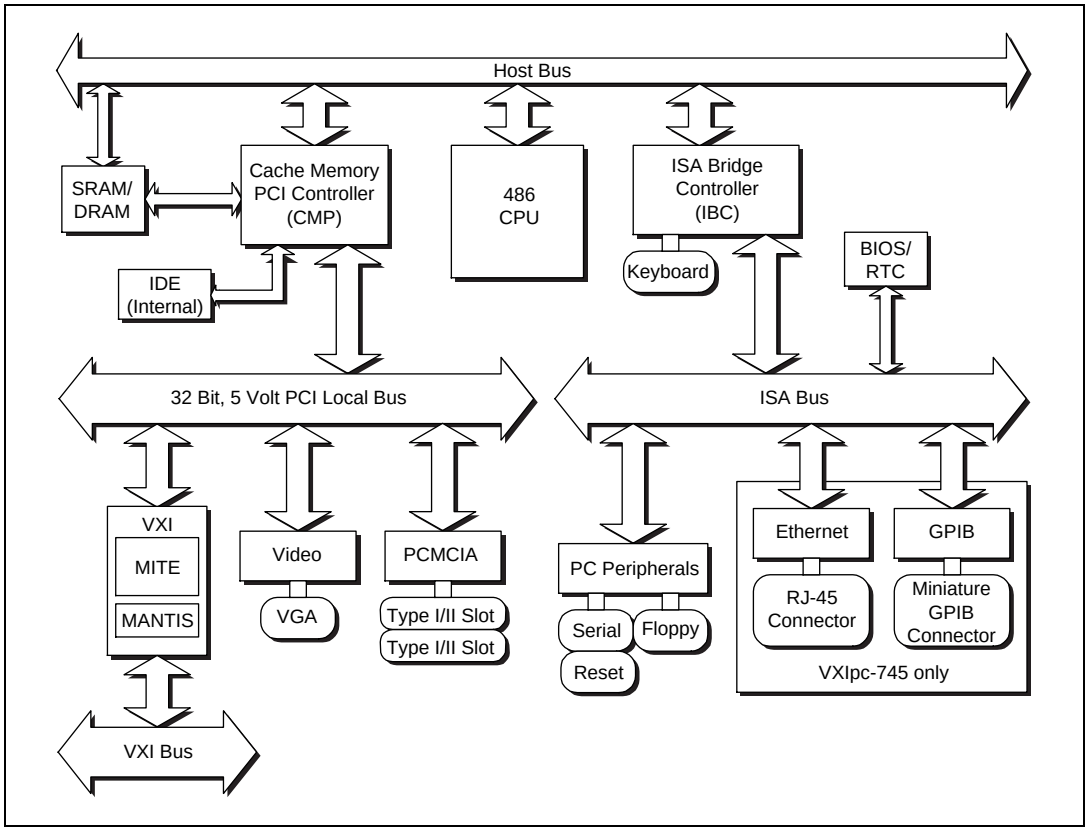


Figure 2-1. VXIpc 700 Series Block Diagram

The VXIpc-700 consists of the following logic blocks:

- IDE—This is dedicated PCI-IDE circuitry providing fast ATA-2 transfers to the internal hard drive. The IDE for the VXIpc 700 Series is built into the chip set.
- VXI—This is the PCI-VXIbus interface circuitry. The MITE is a National Instruments ASIC developed to efficiently manage data transfers between the VXIbus and the processor (via the PCI bus). The MANTIS ASIC (also developed by National Instruments) performs VXIbus arbitration and manages interrupts and triggers. Also part of the VXIbus interface are the SMB connectors, which you can use to route triggers and the CLK10 signal to or from the VXIbus.

- Video—The video circuitry is a plug-in PCI card that has a 64-bit data path to up to 4 MB of EDO DRAM.
- PCMCIA—This is a dedicated PCI-PCMCIA interface that supports two independent PCMCIA cards. You can install two Type I or II cards or one Type III card.
- PC Peripherals—These blocks represent the other peripherals supplied by the VXIpc-700. Refer to the Front Panel Features section of Chapter 1, Introduction, to see which of these apply to the models in the VXIpc 700 Series.
- Ethernet—This is an ISA-based Ethernet circuit on the VXIpc-745. It uses an RJ-45 connector for access to an external Ethernet-based LAN.
- GPIB—This logic block represents the IEEE 488.2 port on the VXIpc-745. It uses the National Instruments TNT4882 ASIC for maximum performance as an ISA-based GPIB controller.

3

VXIpc 700 Series Configuration and Installation

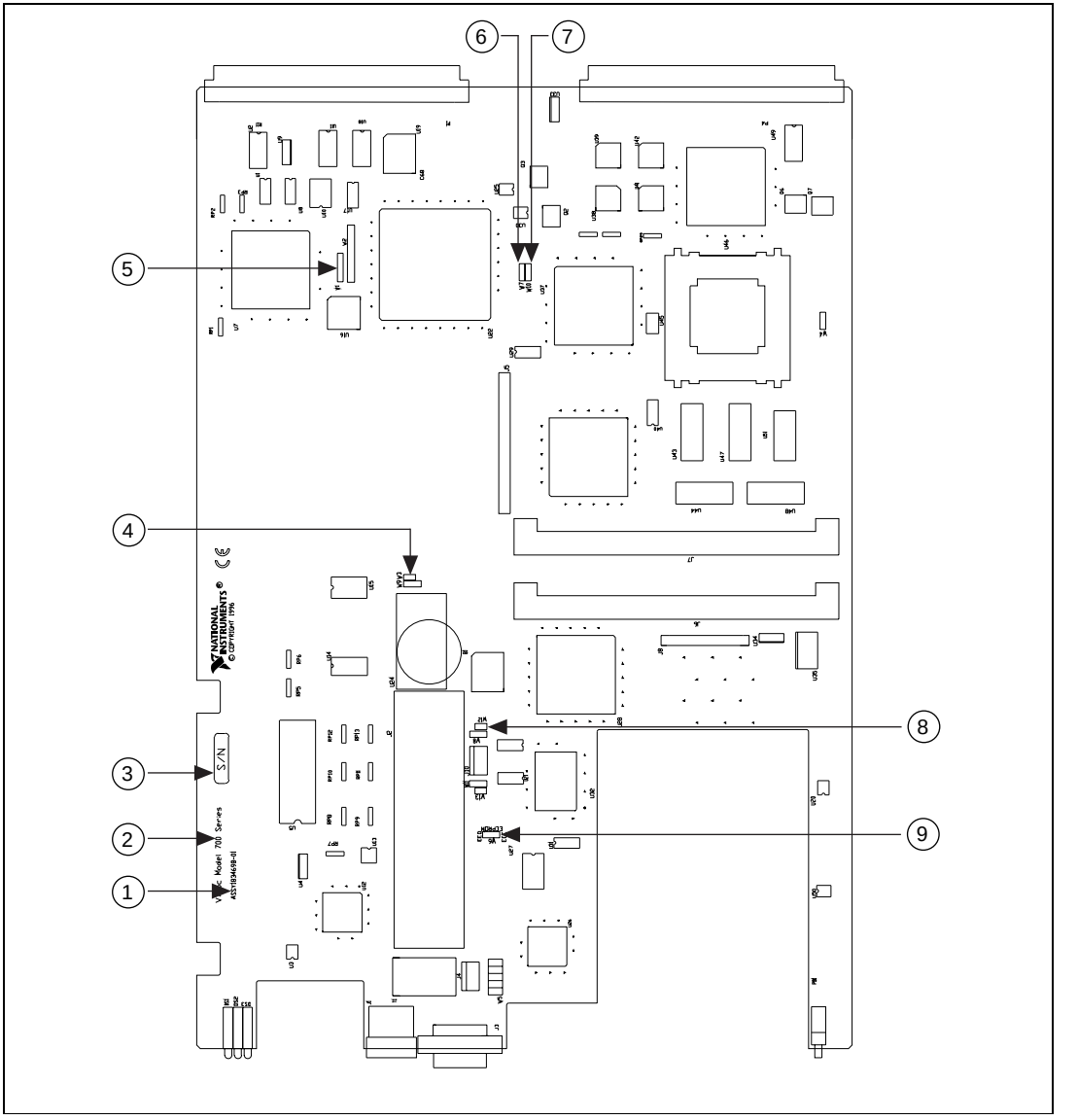
This chapter contains the instructions to configure and install the VXIpc 700 Series embedded computer. Unless otherwise noted, these instructions apply to all models in the VXIpc 700 Series, which currently consists of the VXIpc-740 and the VXIpc-745.

Caution ***Electrostatic discharge can damage several components on your VXIpc-700 module. To avoid such damage in handling the module, touch the antistatic plastic package to a metal part of your VXI chassis before removing the module from the package.***

Default Settings

This section summarizes the hardware default settings for the VXIpc 700 Series for easy reference. The module is set at the factory for the most commonly used configuration.

Figure 3-1 shows the location and factory-default settings of most of the configuration jumpers on the VXIpc 700 Series.



1	Assembly Number	4	CMOS (W3)	7	MITE Self Configuration (W10)
2	Product Name	5	Slot 0 Identification (W1)	8	Trigger In Termination (W12)
3	Serial Number	6	MITE EEPROM Configuration (W7)	9	Ethernet EEPROM Configuration (W6)

Figure 3-1. VXIpc 700 Series Parts Locator Diagram

Table 3-1 lists the factory-default settings and options for the onboard jumpers.

Table 3-1. VXIpc 700 Series Hardware Default Settings

Jumper	Default Setting	Optional Setting
W1	Enable automatic Slot 0 detection	Force Slot 0; Force Non-Slot 0
W3	Normal CMOS operation	Clear CMOS
W6	Enable Ethernet EEPROM configuration	Disable Ethernet EEPROM configuration (uses default power on values)
W10	Enable MITE self-configuration	Disable MITE self-configuration
W7	MITE user configuration	MITE factory configuration
W12	No termination on external trigger input	Terminate external trigger input to 50 Ω

Configuring the VXIpc 700 Series

This section describes how to configure the following options on the VXIpc 700 Series:

- VXIbus Slot 0/Non-Slot 0
- Trigger Input Termination
- EEPROM
- Installed system RAM

How to Remove the Metal Enclosure

The VXIpc-700 is housed in a metal enclosure comprised of a top and bottom cover to improve EMC performance and to provide easy handling. You must remove the top cover to change many of the switch and jumper settings. You must also remove the top cover to change the amount of DRAM installed on the module.

Remove the top cover by removing the 10 screws that attach it to the module.

VXIbus Slot 0/Non-Slot 0

The VXIpc-700 is configured at the factory to automatically detect if it is installed in Slot 0 of a VXIbus mainframe. With automatic Slot 0 detection, you can install the module into any VXIbus slot.

You can manually configure the VXIpc-700 for either Slot 0 or Non-Slot 0 operation by defeating the automatic-detection circuitry. Use the five-position jumper W1 to select automatic Slot 0 detection, Slot 0, or Non-Slot 0 operation. Figure 3-2 shows these three settings.

Caution ***Do not install a device configured for Slot 0 into another slot without first reconfiguring it to either Non-Slot 0 or automatic configuration. Neglecting to do this could result in damage to the device, the VXIbus backplane, or both.***

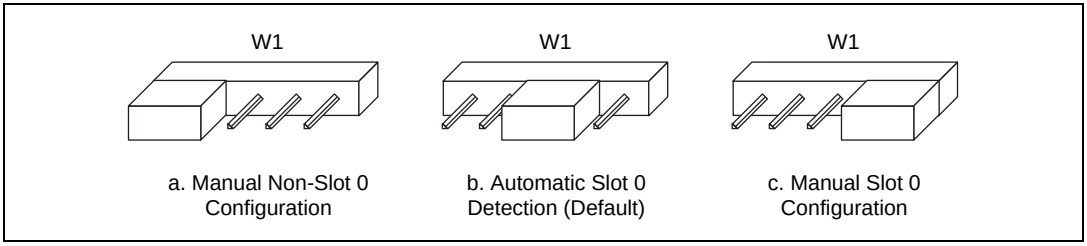


Figure 3-2. VXIbus Slot Configuration

When the VXIpc-700 is installed in Slot 0, it becomes the VXIbus System Controller. In this role, it has VXIbus Data Transfer Bus Arbiter circuitry that accepts bus requests on all four VXIbus request levels, prioritizes the requests, and grants the bus to the highest priority requester. As VXIbus System Controller, the VXIpc-700 also drives the 16 MHz VXIbus system clock by an onboard 16 MHz oscillator.

As required by the VXIbus specification, the VXIpc-700 drives the 10 MHz signal CLK10 on a differential ECL output when installed in Slot 0. When not installed in Slot 0, the VXIpc-700 only receives the CLK10 signal.

Trigger Input Termination

You can use jumper W12 to terminate the external trigger input SMB with 50 Ω to ground. Figure 3-3a shows the default setting for a non-terminated trigger input SMB. Use the setting of Figure 3-3b to terminate the trigger input SMB.

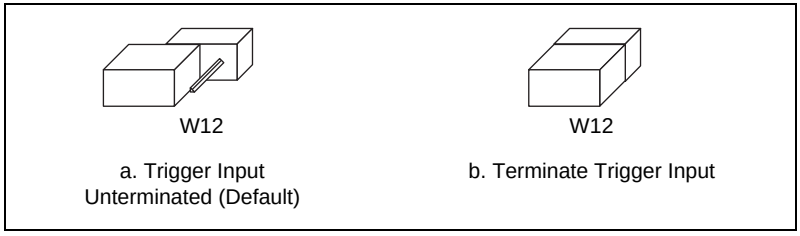


Figure 3-3. SMB Trigger Input Termination

EEPROM

The VXIpc-700 has an onboard EEPROM, which stores default register values for the VXI circuitry. These values are loaded when you power up the computer. These values read from the EEPROM tell the PCI interface of the VXIbus registers so that the VXI interface is ready to respond to Resource Manager accesses within the required 5 s of SYSRST* deasserting. You can change jumper W10 to disable this power-on self-configuration (POSC) circuit. Although this makes the VXI circuitry unusable, it is sometimes helpful in debugging address and interrupt conflicts with add-in boards. In general, however, you should leave W10 in its factory-default setting. Figure 3-4 shows the possible configurations for W10.

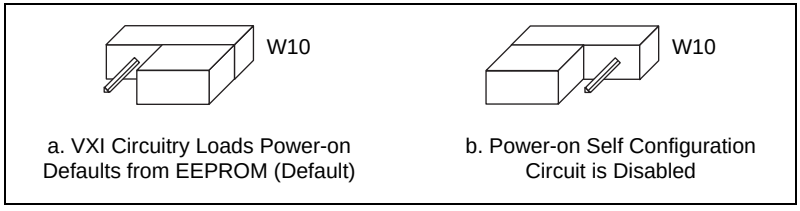


Figure 3-4. Power-on Self Configuration Status

The EEPROM is divided into two halves; one half is factory configured and one half is user configurable. Use jumper W7 to control the operation of the EEPROM. The setting of this jumper determines whether the VXIpc-700 boots off the factory-configured half or the user-modified settings. This is useful in the event that the user-configured half of the EEPROM becomes corrupted in such a way that the VXIpc-700 boots to an unusable state. In its default setting, the VXIpc-700 boots off the user-configurable half.

Figure 3-5 shows the configuration settings for EEPROM operation.

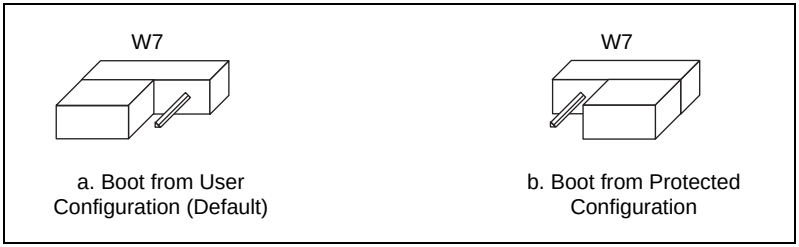


Figure 3-5. EEPROM Configuration

How to Fix an Invalid EEPROM Configuration

The NI-VXI software includes a configuration utility you can use to edit the configuration of the VXIpc-700. Use T&M Explorer with Windows 95/NT or VXIedit with all other platforms. Some of these settings are stored in files that are read by the NI-VXI software, while other settings are stored directly in the VXIpc-700 EEPROM. Certain EEPROM configurations can lock up your PCI computer while it is booting up. Generally, only the size and location of the memory windows can cause your VXIpc-700 to lock up your system. For example, many PCI-based computers will not boot if a board in its system requests more memory space than the computer can allocate. If you encounter this situation you should reduce the size of the VXIpc-700 user window.

If this situation occurs after you change the configuration, perform the following steps to reconfigure the VXIpc-700.

1. Turn your computer off.

Warning ***To protect both yourself and the mainframe from electrical hazards, the mainframe should remain off until you are finished changing the settings on the VXIpc-700 module.***

2. Change jumper W7 as shown in Figure 3-5b to restore the factory configuration.
3. Turn on the computer. The computer should boot this time because the factory-default configuration is being used to initialize the VXIpc-700 module.
4. Run your software configuration utility to re-adjust the VXIpc-700 configuration.
5. After saving the configuration, exit Windows and turn off the computer.

6. Change jumper W7 back to the position shown in Figure 3-5a.
7. Turn on the computer. If the computer does not boot with this configuration, you will have to repeat these steps, modifying your configuration until a final configuration is reached.

Installed System RAM

The 16 MB of installed RAM is factory configured per customer order. You can change the amount of installed RAM on the VXIpc 700 Series by installing DRAM SIMMs. Refer to Appendix A, *Specifications*, for more information on SIMMs.

Configuring the PC

This section describes how to configure the following options on the PC:

- System CMOS
- Ethernet power-on defaults

System CMOS

The VXIpc-700 contains a backed-up memory used to store BIOS defaults and configuration information.

To clear the CMOS contents, simply short the pins of W3 as shown in Figure 3-6b.

Caution ***Do not keep these two pins short-circuited. The computer cannot sustain the CMOS memory when the power is turned off if you leave these two pins shorted.***

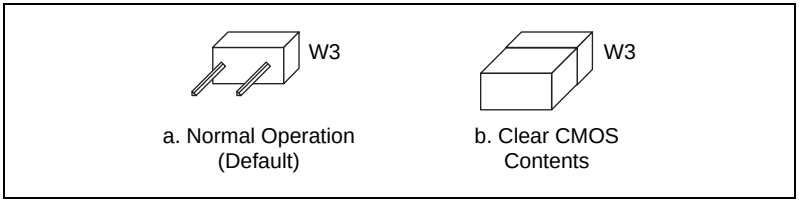


Figure 3-6. System CMOS

Ethernet Power-On Defaults

The VXIpc-700 Ethernet circuitry loads its power-on settings from an EEPROM. Do not change W6 from its default setting as shown in Figure 3-7a. Figure 3-7b shows the alternate position only for informational purposes.

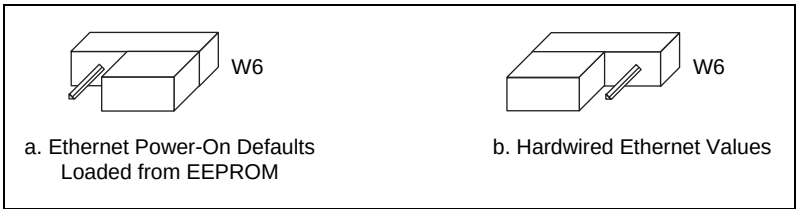


Figure 3-7. Ethernet Power-on Defaults

Installing the VXIpc 700 Series

This section contains general installation instructions for the VXIpc-700. Consult your VXIbus mainframe user manual or technical reference manual for specific instructions and warnings.

1. Plug in your mainframe before installing the VXIpc-700. The power cord grounds the mainframe and protects it from electrical damage while you are installing the module.

Warning ***To protect both yourself and the mainframe from electrical hazards, the mainframe should remain off until you are finished installing the VXIpc-700 module.***

2. Remove or open any doors or covers blocking access to the mainframe slots.
3. If you are installing the VXIpc-700 into a D-size mainframe, install a support designed for installing C-size boards in D-size mainframes. The VXIpc-700 has no P3 connector and cannot provide P3 Slot 0 control to VXI devices requiring this capability.

Caution ***If the VXIpc-700 is not configured for automatic Slot 0 detection, be certain that the slot you select in your VXIbus mainframe matches the VXIpc-700 configuration as either a Slot 0 device or a Non-Slot 0 device. If you install your VXIpc-700 into a slot that does not correspond with the jumper setting, you risk damage to the VXIpc-700, the VXIbus backplane, or both.***

4. Insert the VXIpc-700 in the slot you have selected by aligning the top and bottom of the module with the card-edge guides inside the mainframe. Slowly push the VXIpc-700 straight into the slot until its plug connectors are resting on the backplane receptacle connectors. Using slow, evenly distributed pressure, press the module straight in until it seats in the expansion slot. The front panel of the VXIpc-700 should be even with the front panel of the mainframe.
5. Tighten the retaining screws on the top and bottom edges of the front panel.
6. Check the installation.
7. Connect the keyboard and mouse to the appropriate connectors. Use the keyboard adapter cable that you received with your kit to adapt AT-style keyboards to the VXIpc-700 mini-DIN connector. Connect the mouse to the COM1 serial port.
8. Connect the VGA monitor video cable to the VGA connector.
9. Connect devices to ports as required by your system configuration.
10. Replace or close any doors or covers to the mainframe.

4

BIOS

This chapter contains information on BIOS, the low-level interface between the hardware and PC software that configures and tests your hardware at boot up. This BIOS (Basic Input Output System) provides an easy-to-use graphical user interface to allow you to configure system aspects according to your needs.

Entering BIOS Setup

To enter the BIOS setup program, perform the following steps.

1. Turn on or reboot the system. A screen appears with a series of diagnostic checks.
2. When the message **`Hit <DEL> if you want to run SETUP`** appears, press the <DEL> key to enter the BIOS setup program.
3. Choose options with the keyboard. Modify the settings to reflect system options.

Default BIOS Setup Settings

To restore the default settings while inside the BIOS setup program, select either **Auto Configuration with Optimal Settings** or **Auto Configuration with Fail-Safe Settings**.

Select the Optimal settings if you want to get maximum performance from the VXIpc 700 Series. Fail Safe settings are more conservative settings.

A

Specifications

This appendix describes the environmental, electrical, and mechanical specifications of the VXIpc 700 Series embedded computer.

Requirements

Characteristic	Specification
VXIbus Configuration Space	64 B
A24 or A32 Space	16 KB Minimum (Programmable)

Electrical

Voltage (V)	Current (A)	
	Typical	Maximum (Fused)
+5	3.85 A	7 A
–5.2	331.4 mA	2 A
–2	78.1 mA	2 A
+12	3.92 mA	2 A
–12	2.98 mA	2 A

Physical

Characteristic	Specification
Size	One-slot VXIbus C-Size Module (233.35 by 340 by 30.48 mm)
Board Dimensions	Fully Enclosed, Shielded VXI C-Size Board 233.35 by 340 mm (9.187 by 13.386 in.)
Slot Requirements	One VXI C-Size Slot
Compatibility	Fully Compatible with VXI Specification
VXI Keying Class	Class 1 TTL
MTBF	VXIpc-740 41,982 hours VXIpc-745 41,563 hours
Weight	1.6 Kg (3.66 lb) Typical (16 MB DRAM Installed)

Environmental

Characteristic	Specification
Temperature	0° to 55° C Operating; –20° to 70° C Storage
Relative Humidity	0% to 95% Noncondensing, Operating; 0% to 95% Noncondensing, Storage
EMI	FCC Class A Verified, EC Verified
Vibration	Operational: 5 to 500 Hz, 0.31 g_{RMS}, 3 axes Non-operational: 5 to 500 Hz, 2.5 g_{RMS}, 3 axes
Functional Shock	MIL-T-28800E Class 3 (per Section 4.5.5.4.1) Half-Sine Shock Pulse (11 ms duration, 30 g_{RMS} peak, 3 shocks per face)

Note ***Random vibration profiles were developed in accordance with MIL-T-28800E and MIL-STD-810E Method 514. Test levels exceed those recommended in MIL-STD-810E for Category 1 (Basic Transportation, Figures 514.4-1 through 514.4-3). Test report available upon request.***

VMEbus Capability Codes

Capability Code	Description
A32, A24, A16 (master)	VMEbus master A32, A24, and A16 addressing
A32, A24, A16 (slave)	VMEbus slave A32, A24, and A16 addressing
D64, D32, D16, D08(EO) (master)	VMEbus master D64, D32, D16, and D08 data sizes
D64, D32, D16, D08(EO) (slave)	VMEbus slave D64, D32, D16, and D08 data sizes
BLT, MBLT (master)	VMEbus master block and D64 transfers
BLT, MBLT (slave)	VMEbus slave block and D64 transfers
RMW (master)	VMEbus master read/modify/write transfers
RMW (slave)	VMEbus slave read/modify/write transfers
RETRY (master)	VMEbus master retry support
RETRY (slave)	VMEbus slave retry support
FSD	First slot detector
SCON	VMEbus System Controller (Automatic Detection)
PRI, RRS	Prioritized or Round Robin Select arbiter
ROR, FAIR	Release on Request and FAIR bus requester
IH(7-1)	Interrupt handler for levels 7-1
I(7-1)	Interrupt requester for levels 7-1
D32, D16, D08(O) (Interrupt Handler)	VMEbus D32, D16, D08(O) interrupt handler

Capability Code	Description
D32, D16, D08(O) (Interrupter)	VMEbus D32, D16, D08(O) interrupter
ROAK, RORA	Release on Acknowledge or Register Access interrupter
BTO(x)	VMEbus bus timer (programmable limit)
LOCK	Can lock the VMEbus for indivisible transfers

Adding RAM

To add RAM to the VXIpc-700, remove the top cover and add SIMM modules to the empty SIMM sockets.

National Instruments recommends the following types of SIMMs for use with the VXIpc 700 Series controllers (Fast Page Mode):

8 MB: 2 MB × 36 SIMMs — 70 ns

16 MB: 4 MB × 36 SIMMs — 70 ns

32 MB: 8 MB × 36 SIMMs — 70 ns

The height of SIMMs used with VXIpc 700 Series controllers should be 1.2 in. Contact National Instruments for recommendations on specific manufacturers.

B

VXIpc 700 Series System Resources

This appendix describes what system resources are available on the VXIpc 700 Series and where they are allocated. Because PCI is a relatively new addition to PCs, this appendix describes how PCI interrupts fit into a PC architecture before listing the devices that use them.

PCI Interrupts

PCI interrupts can be shared by multiple devices and are therefore more flexible than ISA interrupts. They do not actually connect to the processor directly; they are instead mapped through ISA interrupts in the system I/O module. The interrupt handler for a particular ISA interrupt must know if it will be acknowledging a PCI device.

Resource Tables

The tables in this section describe where system resources are assigned. Table B-1 lists how the ISA interrupts are allocated on the VXIpc 700 Series and whether they are driven by a PCI interrupt. Table B-2 lists DMA channel allocation, and Table B-3 gives the I/O address map.

Table B-1. VXIpc 700 Series ISA Interrupt Resource Allocations

ISA Interrupt	PCI Interrupt	Device
NMI	None	Parity
0	None	Timer
1	None	Keyboard
2	None	IRQ Expansion (8-15)
3	None	PCMCIA Slot
4	None	COM1

Table B-1. VXIpc 700 Series ISA Interrupt Resource Allocations (Continued)

ISA Interrupt	PCI Interrupt	Device
5	INTD	PCMCIA
6	None	Floppy Drive
7	None	PCMCIA Slot
8	None	RTC
9	None	Ethernet
10	INTC	VXI
11	None	GPIB
12	None	PCMCIA Slot
13	None	FPERR
14	INTD	IDE
15	None	PCMCIA Slot

Table B-2. VXIpc 700 Series DMA Channel Resource Allocations

DMA Channel	Device
0	Free
1	Free
2	Floppy Drive
3	Free
4	Free
5	GPIB
6	Free
7	Free

Table B-3. VXIpc 700 Series I/O Address Map

I/O Address	Device
000-00F	8237 DMA #1
020-021	8259 PIC #1
040-043	8253 Timer
060-066	8742 Controller
070-077	CMOS RAM & NMI Mask Reg
078-07B	BIOS Timer
080-090	DMA Page Registers
092	Reserved
094-09F	DMA Page Registers
0A0-0A1	8259 PIC #2
0B2-0B3	Advanced Power Management
0C0-0DF	8237 DMA #2 (word mapped)
0F0-0FF	Numeric Processor Error Reg
170-177	Reserved
1F0-1F7	IDE
200-270	Free
278-27F	Free
280-2DF	Free
2C0-2DF	GPIB
2E8-2EF	COM*
2F8-2FF	COM*
300-30F	Ethernet
310-36F	Free
370-377	Reserved
378-37F	Free
380-3B0	Free

Table B-3. VXIpc 700 Series I/O Address Map (Continued)

I/O Address	Device
3BC-3BF	Free
3E8-3EF	COM*
3F0-3F7	Floppy
3F8-3FF	COM*
* Relocatable	

C

LED Indicators

This appendix describes how to read the LEDs on the front panel to interpret the status of the VXIpc 700 Series.

VXIbus Interface Status LEDs

The VXIbus interface status LEDs are located at the top of the module and include four LEDs: **FAILED**, **SYSFAIL**, **ONLINE**, and **TEST**. They indicate the various stages of initialization that occur as the VXIpc-700 boots. The following paragraphs describe each LED.

SYSFAIL LED

The **SYSFAIL** LED lights when the VMEbus SYSFAIL signal is asserted. It does not necessarily indicate that the VXIpc 800/700 is asserting SYSFAIL, only that there is a device in the system asserting SYSFAIL.

FAILED LED

The **FAILED** LED lights when the VXIpc-700 is driving the SYSFAIL signal. The VXIpc-700 asserts SYSFAIL when the PASSED bit in its VXIbus status register is clear. The PASSED bit is set by the power-on self configuration circuitry (POSC) when it has completed initializing the VXIbus interface.

ONLINE LED

The **ONLINE** LED lights when the Resource Manager has successfully completed and the VXIbus interface is ready for application programs.

TEST LED

The **TEST** LED lights when the power-on self configuration circuitry is configuring the VXIbus interface.

LEDs and System Startup Cycle

Table C-1 shows a system startup cycle and possible points of failure, up to and including the state in which the **ONLINE** LED is asserted.

Table C-1. LEDs and System Startup Status

Step	LEDs Lit	Status	Possible Problem If VXIpc-700 Fails
1	None	Machine just turned on.	The VXIpc-700 is not receiving power.
2	**FAILED**, **SYSFAIL**	Now asserting SYSFAIL because VXIbus interface has not been initialized yet.	Power-on self configuration (POSC) cannot execute because of problems with system reset or because the POSCEN switch is incorrectly configured.
3	**FAILED**, **TEST**	VXI interface is being initialized by MITE power-on self configuration (POSC) circuitry.	POSC has stalled.
4	**TEST**	POSC circuitry has initialized VXI interface, setting PASSED and DONE bits.	POSC stalled before clearing the **TEST** LED.
5	None	POSC cycles are complete. VXI port is ready to respond to Resource Manager inquiries.	POSC completed successfully; however, the Resource Manager either hung or was not executed.
6	**ONLINE**	Resource Manager has been executed, indicating that the VXI software can now communicate with the VXI circuitry.	Resource Manager interface initialized successfully.

If either the **SYSFAIL** or **FAILED** LED remains lit, perform the following steps.

1. Power off the mainframe.
2. Remove all other modules from the mainframe.
3. Make sure that the VXIpc-700 jumper settings are correct.
4. Make sure that the VXIpc-700 is seated properly in the mainframe.
5. Power on the mainframe and observe whether the **SYSFAIL** and **FAILED** LEDs become unlit some time before the operating system boots.

Board Access LEDs

The board access LEDs—**ACCESS** and **DRIVE**—indicate when board resources have been accessed. The following paragraphs describe these LEDs.

ACCESS LED

When lit, the **ACCESS** LED indicates that the VXIpc-700 MODID line is asserted or that another VXIbus master is accessing VXIbus shared registers or shared memory.

DRIVE LED

The **DRIVE** LED indicates that an access to the internal hard disk drive is occurring.

D

Front Panel and Connectors

This appendix describes the front panel and connectors on the VXIpc 700 Series. This material contains the information relevant to VXI*plug&play* Specification VPP-8, *VXI Module/Mainframe to Receiver Interconnection*.

☞ **Note** ***The illustrations in this appendix show the mating face of the connectors. An asterisk suffix (*) on a signal name indicates that the signal is active low.***

Table D-1. VXIpc 800/700 Series Connectors

Connector	VXIpc-740	VXIpc-745
RS-232 Serial	✓	✓
VGA Controller	✓	✓
IEEE 488.2		✓
10BaseT Ethernet		✓
Trigger Output	✓	✓
Trigger Input	✓	✓
PS/2-Style Keyboard	✓	✓

Front Panel

Figures D-1 and D-2 show the front panel layout of the VXIpc-745 and VXIpc-740. The drawings show dimensions relevant to key elements on the front panel. Dimensions are shown in inches and millimeters, with millimeter dimensions in square brackets. The front panel thickness for all models in the VXIpc 700 Series is 2.49 mm (0.098 in.).

Figure D-1 shows the front panel layout of the VXIpc-745.

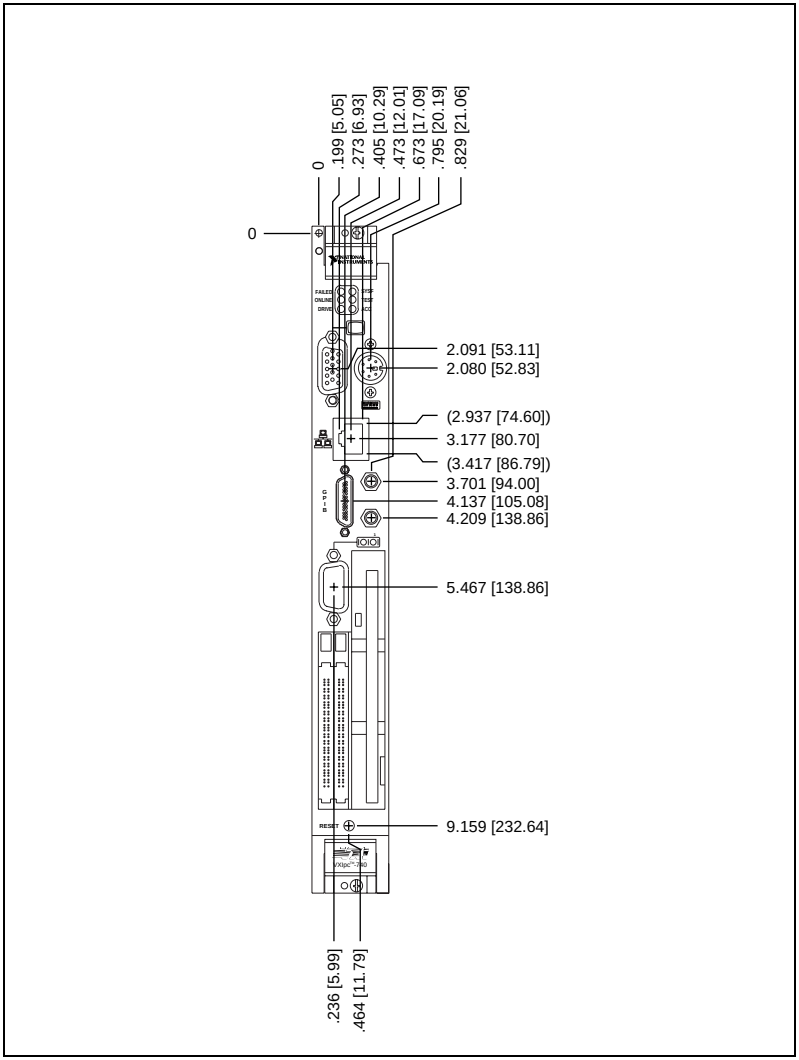


Figure D-1. VXIpc-745 Front Panel Layout and Dimensions

Figure D-2 shows the front panel layout of the VXIpc-740.

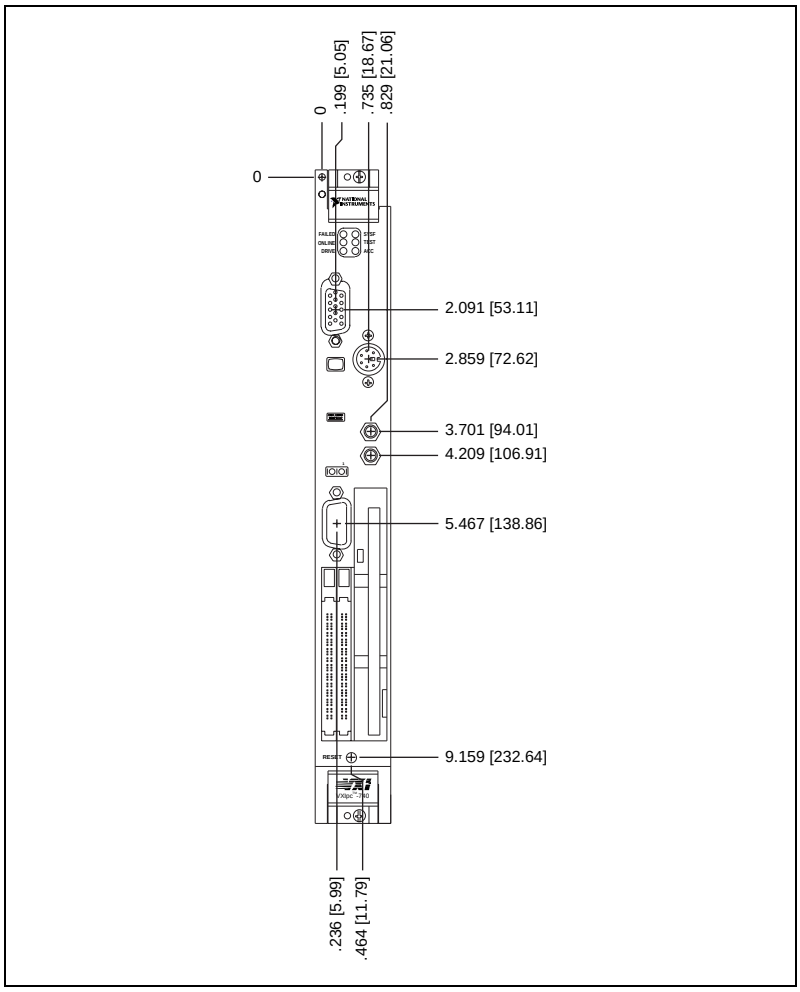


Figure D-2. VXIpc-740 Front Panel Layout and Dimensions

Keyboard

Figure D-3 shows the location and pinouts for the keyboard connector on the VXIpc 700 Series. Table D-2 gives the name and description for the keyboard connector signals.

Amp manufactures a mating connector with part numbers 212437-4 (housing), 212435-7 (ferrule), and 66735-4 (pin contact).

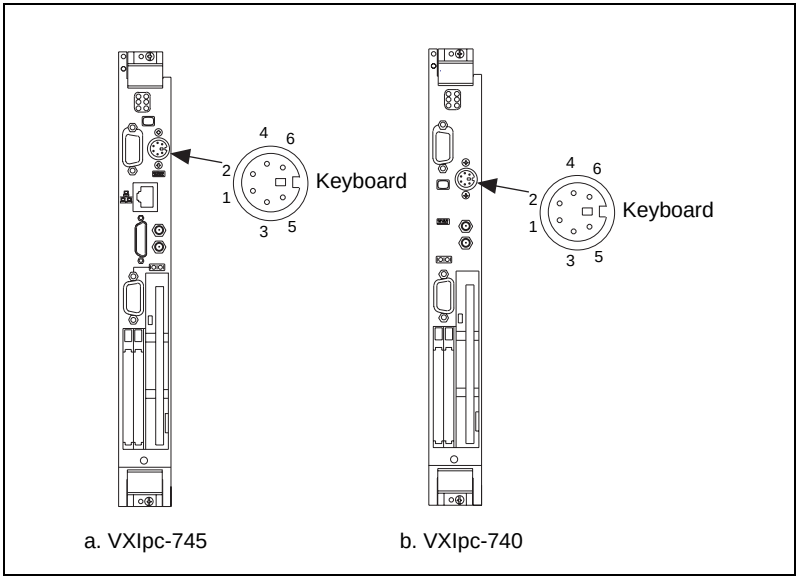


Figure D-3. Keyboard Connector Location and Pinout

Table D-2. Keyboard Connector Signals

Pin	Signal Name	Signal Description
1	DATA	Data
2	NC	Not Connected
3	GND	Ground
4	+5V	+5 Volts
5	CLK	Clock
6	NC	Not Connected

VGA

Figure D-4 shows the location and pinouts for the VGA connector on the VXIpc 700 Series. Table D-3 gives the name and description for the VGA connector signals.

Amp manufactures a mating connector with part numbers 748364-1 (housing) and 748333-2 (pin contact).

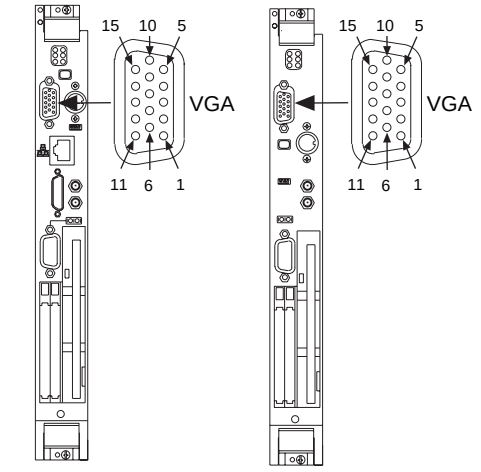


Figure D-4. VGA Connector Location and Pinout

Table D-3. VGA Connector Signals

Pin	Signal Name	Signal Description
1	R	Red
2	G	Green
3	B	Blue
4	NC	Not Connected
5	GND	Ground
6	GND	Ground
7	GND	Ground

Table D-3. VGA Connector Signals (Continued)

Pin	Signal Name	Signal Description
8	GND	Ground
9	+5 VDC	+5 VDC
10	GND	Ground
11	NC	Not Connected
12	SD	Serial Data
13	HSync	Horizontal Sync
14	VSync	Vertical Sync
15	SC	Serial Clock

Ethernet

Figure D-5 shows the location and pinouts for the Ethernet connector on the VXIpc-745. Table D-4 gives the name and description for the Ethernet connector signals.

Amp manufactures a mating connector, part number 554739-1.

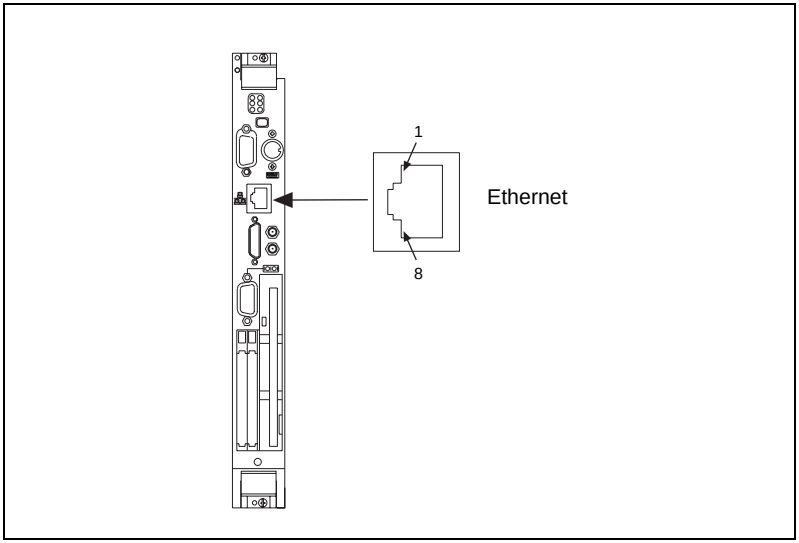


Figure D-5. Ethernet Connector Location and Pinout

Table D-4. Ethernet Connector Signals

Pin	Signal Description
1	Differential Transmit
2	Differential Transmit
3	Differential Receive
4	NC
5	NC
6	Differential Receive
7	NC
8	NC

COM1

Figure D-6 shows the location and pinouts for the COM1 connector on all models in the VXIpc 700 Series. You can plug a serial mouse into this connector. Table D-5 gives the name and description for the COM1 connector signals.

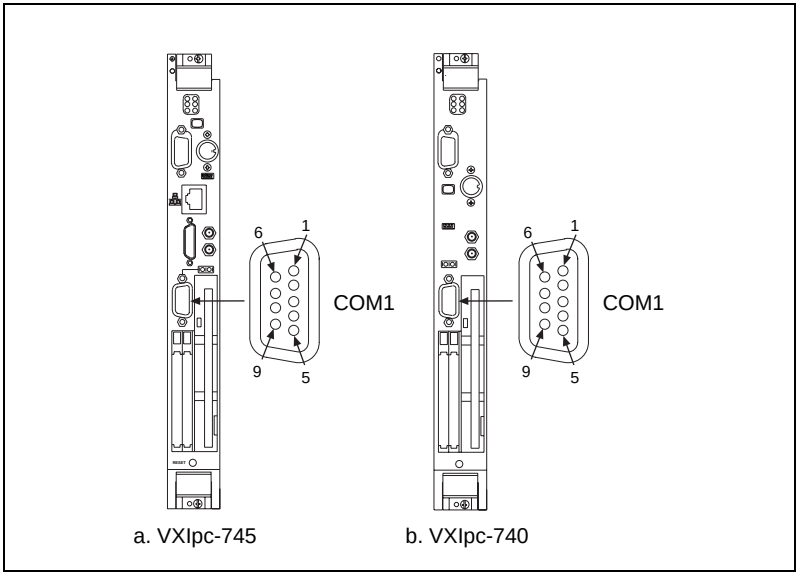


Figure D-6. COM1 Connector Location and Pinout

Table D-5. COM1 Connector Signals

Pin	Signal Name	Signal Description
1	DCD*	Data Carrier Detect
2	RXD*	Receive Data
3	TXD*	Transmit Data
4	DTR*	Data Terminal Ready
5	GND	Ground
6	DSR*	Data Set Ready
7	RTS*	Ready to Send

Table D-5. COM1 Connector Signals (Continued)

Pin	Signal Name	Signal Description
8	CTS*	Clear to Send
9	RI*	Ring Indicator

GPIB (IEEE-488.2)

Figure D-7 shows the location and pinouts for the GPIB connector on the VXIpc-745. Table D-6 gives the name and description for the GPIB connector signals.

ITT Cannon manufactures a GPIB mating connector, part number MDSM-255C-Z11.

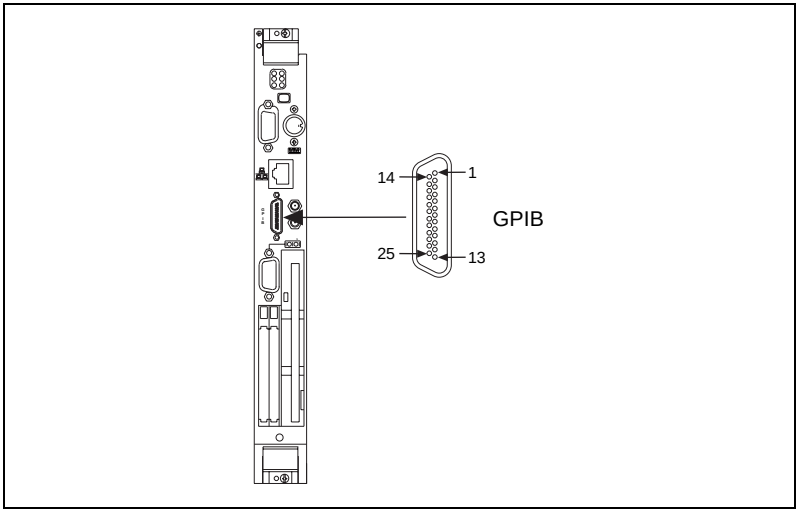


Figure D-7. GPIB Connector Location and Pinout

Table D-6. GPIB Connector Signals

Pin	Signal Name	Signal Description
1	DIO1*	Data Bit 1
2	DIO2*	Data Bit 2
3	DIO3*	Data Bit 3
4	DIO4*	Data Bit 4
5	EOI*	End or Identify
6	DAV*	Data Valid
7	NRFD*	Not Ready for Data
8	NDAC*	Not Data Accepted

Table D-6. GPIB Connector Signals (Continued)

Pin	Signal Name	Signal Description
9	IFC*	Interface Clear
10	SRQ*	Service Request
11	ATN*	Attention
12	SHIELD	Chassis ground
13	DIO5*	Data Bit 5
14	DIO6*	Data Bit 6
15	DIO7*	Data Bit 7
16	DIO8*	Data Bit 8
17	REN*	Remote Enable
18-25	GND	Logic Ground

External SMBs

Figure D-8 shows the location and pinouts for the SMB connectors on the VXIpc-700. The SMB connectors are used for an external clock signal and TTL trigger input and output. Table D-7 gives the name and description for the SMB connector signals. Also see Table D-8 for a description of the signal characteristics for the SMB connections.

Amp manufactures an SMB mating connector, part number 1-413985-0.

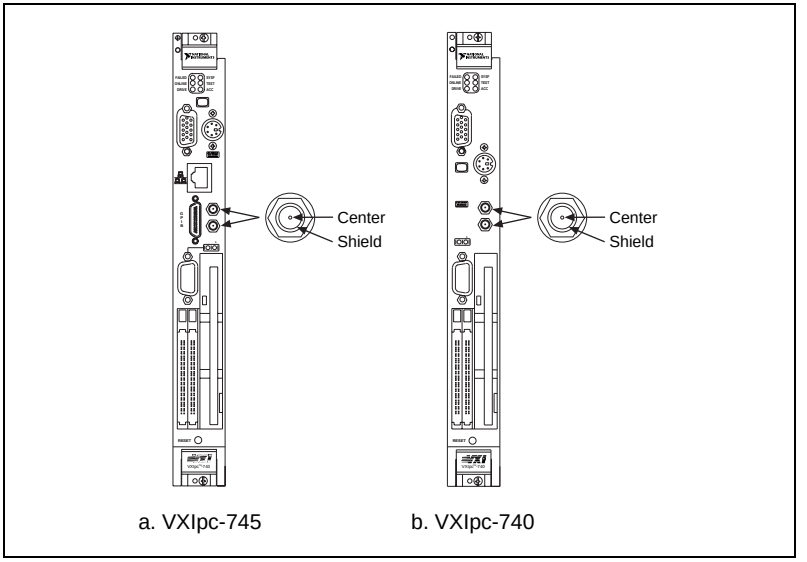


Figure D-8. SMB Connectors Location and Pinout

Table D-7. SMB Connector Signals

Pin	Signal Description
Center	TTL Trigger or Clock Signal
Shield	Ground

Signal Characteristics

Refer to the relevant standard for the signal characteristics for VGA, Ethernet, keyboard, serial, and GPIB.

Table D-8 shows the signal characteristics for the SMB connections.

Table D-8. Signal Characteristics for SMB Connections

Signal	Voltage Range	Maximum Current	Frequency Range
SMB (TRIG out, CLK out)	0 to 3.4 V	200 mA	DC-10 MHz
SMB (TRIG in)	0 to 5 V	100 mA†	DC-10 MHz
† with 50 Ω termination			

VXIbus P1 and P2

Figure D-9 shows the location and pinouts for the VXIbus connector on the VXIpc 700 Series. Table D-9 gives the name and description for the VXIbus P2 connector signals. Table D-10 gives the name and description for the VXIbus P1 connector signals.

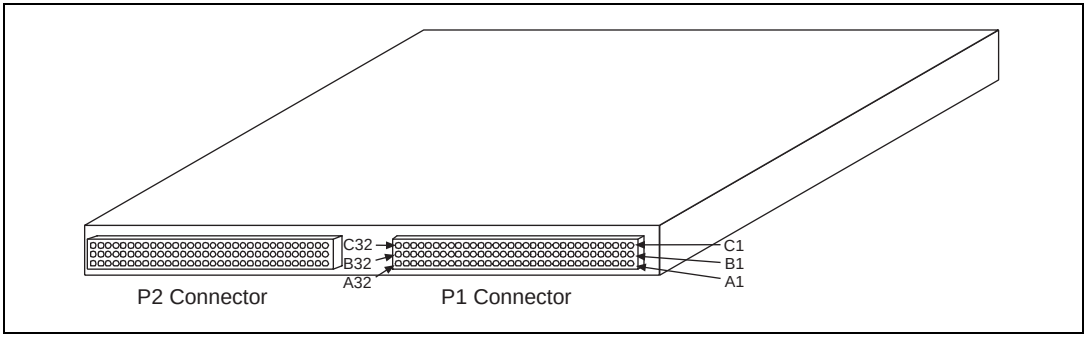


Figure D-9. VXIbus Connectors Location and Pinout

Table D-9. VXIbus P2 Connector Signals

Pin	Row C	Row B	Row A
1	CLK10+	+5 V	ECLTRG0
2	CLK10–	GND	–2 V
3	GND	Not Connected	ECLTRG1
4	–5.2 V	A24	GND
5	Not Connected	A25	MODID12
6	Not Connected	A26	MODID11
7	GND	A27	–5.2 V
8	Not Connected	A28	MODID10
9	Not Connected	A29	MODID09
10	GND	A30	GND
11	Not Connected	A31	MODID08
12	Not Connected	GND	MODID07
13	–2 V	+5 V	–5.2 V

Table D-9. VXIbus P2 Connector Signals (Continued)

Pin	Row C	Row B	Row A
14	Not Connected	D16	MODID06
15	Not Connected	D17	MODID05
16	GND	D18	GND
17	Not Connected	D19	MODID04
18	Not Connected	D20	MODID03
19	–5.2 V	D21	–5.2 V
20	Not Connected	D22	MODID02
21	Not Connected	D23	MODID01
22	GND	GND	GND
23	TTLTRG1*	D24	TTLTRG0*
24	TTLTRG3*	D25	TTLTRG2*
25	GND	D26	+5 V
26	TTLTRG5*	D27	TTLTRG4*
27	TTLTRG7*	D28	TTLTRG6*
28	GND	D29	GND
29	Not Connected	D30	Not Connected
30	GND	D31	MODID00
31	Not Connected	GND	GND
32	Not Connected	+5 V	Not Connected

Table D-10. VXIbus P1 Connector Signals

Pin	Row C	Row B	Row A
1	D08	BBSY*	D00
2	D09	BCLR*	D01
3	D10	ACFAIL*	D02
4	D11	BG0IN*	D03
5	D12	BG0OUT*	D04
6	D13	BG1IN*	D05
7	D14	BG1OUT*	D06
8	D15	BG2IN*	D07
9	GND	BG2OUT*	GND
10	SYSFAIL*	BG3IN*	SYSCLK
11	BERR*	BG3OUT*	GND
12	SYSRESET*	BR0*	DS1*
13	LWORD*	BR1*	DS0*
14	AM5	BR2*	WRITE*
15	A23	BR3*	GND
16	A22	AM0	DTACK*
17	A21	AM1	GND
18	A20	AM2	AS*
19	A19	AM3	GND
20	A18	GND	IACK*
21	A17	Not Connected	IACKIN*
22	A16	Not Connected	IACKOUT*
23	A15	GND	AM4
24	A14	IRQ7*	A07
25	A13	IRQ6*	A06
26	A12	IRQ5	A05
27	A11	IRQ4	A04

Table D-10. VXIbus P1 Connector Signals (Continued)

Pin	Row C	Row B	Row A
28	A10	IRQ3	A03
29	A09	IRQ2	A02
30	A08	IRQ1	A01
31	+12 V	Not Connected	–12 V
32	+5 V	+5 V	+5 V

E

Common Questions

This appendix answers common questions you may have when using the VXIpc 700 Series.

What do the LEDs on the front of the VXIpc-700 mean?

Refer to Appendix C, *LED Indicators*, for a description of the front panel LEDs.

Is something wrong with the VXIpc-700 if the red SYSFAIL and FAILED LEDs stay lit after booting the VXIpc-700?

If either the **SYSFAIL** or **FAILED** LED remains lit, refer to Appendix C, *LED Indicators*, for troubleshooting steps.

Can I access 32-bit registers in my VXIbus system from the VXIpc-700?

Yes. The VXIpc-700 uses the 32-bit PCI bus to interface to the VXIbus. In fact, the VXIbus circuitry on the VXIpc-700 also supports the new VME64 standard for D64 accesses. Refer to your VXI software manual for more information.

What is the accuracy of the CLK10 signal?

The CLK10 signal generated by the VXIpc-700 is ±100 ppm (0.01%) as per the VXIbus specification.

If I boot the computer without video, and then plug in the video, why is it in black and white?

When the computer first boots, the video chips try to synchronize with the monitor. If the monitor is not there, the video chips cannot synchronize and establish color. You need to have the monitor attached at boot time to get color.

What type of video interface is onboard the VXIpc-700? What video drivers are included with the VXIpc-700? Can I use Super VGA with my VXIpc-700? If my application requires a special type of video display, how do I configure my VXIpc-700?

The VXIpc-700 uses the Trident Microsystems TGUI96*xx* chip family, a combination graphics accelerator and RAMDAC. The TGUI9660 is the first chip used from this family. Subsequent pin-compatible chips will follow. The chips in this family are compatible with the Standard VGA video output MS Windows video driver, as well as the Trident Microsystems video driver. For more information on the video driver, refer to the `c:\images\manuals` directory.

What kind of monitor can I use with the VXIpc-700?

VXIpc-700 computers that use Super VGA video output will work only with monitors having a horizontal scan rate of at least 50 kHz and a vertical scan rate of 60 Hz.

Caution ***Make sure that your monitor meets this specification. Enabling the Super VGA option on a monitor that does not meet this specification will damage your monitor.***

What if my keyboard connector does not fit into the keyboard port on the VXIpc-700?

You can plug keyboards that have a 6-pin Mini DIN PS/2 type connector directly into the VXIpc-700. You can use the keyboard adapter cable that is included with every VXIpc-700 kit to adapt the larger AT keyboard connector to the 6-pin Mini DIN connector.

How do I add RAM to the VXIpc-700? What is the maximum amount of RAM that I can have on the VXIpc-700?

For information about adding RAM to the VXIpc-700, refer to Appendix A, *Specifications*.

Which interrupt levels are free to be used by ISA bus boards? Which area of upper memory (adapter space) is free for use by ISA bus boards or expanded memory manager software programs?

See Appendix B, *VXIpc 700 Series System Resources*, for information on the available port I/O register space, upper memory area, interrupts, and DMA channels.

How do I install the VXIpc-700 in a slot other than Slot 0?

The VXIpc-700 automatically detects whether it is in Slot 0 of a VXIbus mainframe. You do not need to change jumper settings to install the VXIpc-700 in a slot other than Slot 0 unless you have defeated the first slot detector (FSD) circuitry by changing the appropriate jumper setting on the VXIpc-700.

Refer to Chapter 3, *VXIpc 700 Series Configuration and Installation*, for information on enabling and defeating the FSD circuitry.

How do I check the configuration of the memory, floppy drive, hard drive, time/date, and so on?

You can view these parameters in the BIOS setup. To enter the BIOS setup, reboot the VXIpc-700 and press the <DEL> key during the memory tests. Refer to Chapter 4, *BIOS*, for more information.

My CMOS is corrupted. How do I set it back to default?

1. Enter the BIOS setup program as described in Chapter 4, *BIOS*.
2. Select **Auto Configuration with Optimal Settings**.
3. Answer **Y** (Yes) to the verification prompt.
4. Select **Save Settings and Exit**.

F

Customer Communication

For your convenience, this appendix contains forms to help you gather the information necessary to help us solve your technical problems and a form you can use to comment on the product documentation. When you contact us, we need the information on the Technical Support Form and the configuration form, if your manual contains one, about your system configuration to answer your questions as quickly as possible.

National Instruments has technical assistance through electronic, fax, and telephone systems to quickly provide the information you need. Our electronic services include a bulletin board service, an FTP site, a fax-on-demand system, and e-mail support. If you have a hardware or software problem, first try the electronic support systems. If the information available on these systems does not answer your questions, we offer fax and telephone support through our technical support centers, which are staffed by applications engineers.

Electronic Services

Bulletin Board Support

National Instruments has BBS and FTP sites dedicated for 24-hour support with a collection of files and documents to answer most common customer questions. From these sites, you can also download the latest instrument drivers, updates, and example programs. For recorded instructions on how to use the bulletin board and FTP services and for BBS automated information, call 512 795 6990. You can access these services at:

United States: 512 794 5422
Up to 14,400 baud, 8 data bits, 1 stop bit, no parity

United Kingdom: 01635 551422
Up to 9,600 baud, 8 data bits, 1 stop bit, no parity

France: 01 48 65 15 59
Up to 9,600 baud, 8 data bits, 1 stop bit, no parity

FTP Support

To access our FTP site, log on to our Internet host, `ftp.natinst.com`, as `anonymous` and use your Internet address, such as `joesmith@anywhere.com`, as your password. The support files and documents are located in the `/support` directories.

Fax-on-Demand Support

Fax-on-Demand is a 24-hour information retrieval system containing a library of documents on a wide range of technical information. You can access Fax-on-Demand from a touch-tone telephone at 512 418 1111.

E-Mail Support (Currently USA Only)

You can submit technical support questions to the applications engineering team through e-mail at the Internet address listed below. Remember to include your name, address, and phone number so we can contact you with solutions and suggestions.

`support@natinst.com`

Telephone and Fax Support

National Instruments has branch offices all over the world. Use the list below to find the technical support number for your country. If there is no National Instruments office in your country, contact the source from which you purchased your software to obtain support.

Country	Telephone	Fax
Australia	03 9879 5166	03 9879 6277
Austria	0662 45 79 90 0	0662 45 79 90 19
Belgium	02 757 00 20	02 757 03 11
Brazil	011 288 3336	011 288 8528
Canada (Ontario)	905 785 0085	905 785 0086
Canada (Quebec)	514 694 8521	514 694 4399
Denmark	45 76 26 00	45 76 26 02
Finland	09 725 725 11	09 725 725 55
France	01 48 14 24 24	01 48 14 24 14
Germany	089 741 31 30	089 714 60 35
Hong Kong	2645 3186	2686 8505
Israel	03 6120092	03 6120095
Italy	02 413091	02 41309215
Japan	03 5472 2970	03 5472 2977
Korea	02 596 7456	02 596 7455
Mexico	5 520 2635	5 520 3282
Netherlands	0348 433466	0348 430673
Norway	32 84 84 00	32 84 86 00
Singapore	2265886	2265887
Spain	91 640 0085	91 640 0533
Sweden	08 730 49 70	08 730 43 70
Switzerland	056 200 51 51	056 200 51 55
Taiwan	02 377 1200	02 737 4644
United Kingdom	01635 523545	01635 523154
United States	512 795 8248	512 794 5678

Technical Support Form

Photocopy this form and update it each time you make changes to your software or hardware, and use the completed copy of this form as a reference for your current configuration. Completing this form accurately before contacting National Instruments for technical support helps our applications engineers answer your questions more efficiently.

If you are using any National Instruments hardware or software products related to this problem, include the configuration forms from their user manuals. Include additional pages if necessary.

Name _____

Company _____

Address _____

_____

Fax (___) _____Phone (___) _____

Computer brand_____ Model _____ Processor_____

Operating system (include version number) _____

Clock speed _____MHz RAM _____MB Display adapter _____

Mouse ___yes ___no Other adapters installed_____

Hard disk capacity _____MB Brand_____

Instruments used _____

_____

National Instruments hardware product model _____ Revision _____

Configuration _____

National Instruments software product _____ Version _____

Configuration _____

The problem is: _____

_____

_____

_____

_____

List any error messages: _____

_____

_____

The following steps reproduce the problem: _____

_____

_____

_____

_____

Hardware and Software Configuration Form

Record the settings and revisions of your hardware and software on the line to the right of each item. Complete a new copy of this form each time you revise your software or hardware configuration, and use this form as a reference for your current configuration. Completing this form accurately before contacting National Instruments for technical support helps our applications engineers answer your questions more efficiently.

National Instruments Products

VXIpc 700 Series Hardware Settings

Model Number _____

Part Number _____

Serial Number _____

Processor Speed_____

DRAM SIMMs Installed_____

Hard Drive Size_____ Video Memory _____

Slot Location _____

W1 Setting: Slot 0 Detection_____

W3 Setting: CMOS _____

W6 Setting: Ethernet EEPROM _____

W7 Setting: MITE User/Factory Configuration _____

W10 Setting: MITE Self-Configuration _____

W12 Setting: External Trigger Input Termination _____

Other Products

Mainframe Make and Model _____

Microprocessor _____

Clock Frequency or Speed _____

Type of Video Board Installed _____

Operating System Version _____

Operating System Mode _____

Programming Language _____

Programming Language Version _____

Other Boards in System _____

Monitor (manufacturer, model)_____

Mouse (manufacturer, model)_____

Keyboard (manufacturer, model) _____

Other Peripherals (manufacturer, model) _____

_____

_____

_____

Documentation Comment Form

National Instruments encourages you to comment on the documentation supplied with our products. This information helps us provide quality products to meet your needs.

Title: *VXIpc™ 700 Series User Manual*

Edition Date: December 1997

Part Number: 321745A-01

Please comment on the completeness, clarity, and organization of the manual.

_____

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If you find errors in the manual, please record the page numbers and describe the errors.

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Thank you for your help.

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Glossary

Prefix	Meanings	Value
n-	nano-	10^{-9}
µ-	micro-	10^{-6}
m-	milli-	10^{-3}
k-	kilo-	10^{3}
M-	mega-	10^{6}
G-	giga-	10^{9}

A

A	Amperes
address	Character code that identifies a specific location (or series of locations) in memory
address space	A set of 2^n memory locations differentiated from other such sets in VXI/VMEbus systems by six addressing lines known as address modifiers. *n* is the number of address lines required to uniquely specify a byte location in a given space. Valid numbers for *n* are 16, 24, and 32. In VME/VXI, because there are six address modifiers, there are 64 possible address spaces.
ANSI	American National Standards Institute
ASIC	application-specific integrated circuit

B

b	bits
B	bytes

backplane	An assembly, typically a printed circuit board, with 96-pin connectors and signal paths that bus the connector pins. A C-size VXIbus system will have two sets of bused connectors called J1 and J2. A D-size VXIbus system will have three sets of bused connectors called J1, J2, and J3.
BERR*	Bus error signal
BIOS	Basic Input/Output System. BIOS functions are the fundamental level of any PC or compatible computer. BIOS functions embody the basic operations needed for successful use of the computer's hardware resources.
bus error	An error that signals failed access to an address. Bus errors occur with low-level accesses to memory and usually involve hardware with bus mapping capabilities. For example, nonexistent memory, a nonexistent register, or an incorrect device access can cause a bus error.

C

CLK10	A 10 MHz, ±100 ppm, individually buffered (to each module slot), differential ECL system clock that is sourced from Slot 0 of a VXIbus mainframe and distributed to Slots 1 through 12 on P2. It is distributed to each slot as a single-source, single-destination signal with a matched delay of under 8 ns.
CMOS	Complementary Metal Oxide Semiconductor; a process used in making chips

D

DIN	Deutsches Institut für Normung—German Standards Institute
DMA	Direct Memory Access; a method by which data is transferred between devices and internal memory without intervention of the central processing unit
DRAM	Dynamic RAM (Random Access Memory); storage that the computer must refresh at frequent intervals

E

ECL	Emitter-Coupled Logic
EDO	Extended Data Out; a DRAM architecture that shortens overall access latency, improving performance
EEPROM	Electronically Erasable Programmable Read Only Memory
embedded controller	An intelligent CPU (controller) interface plugged directly into the VXI backplane, giving it direct access to the VXIbus. It must have all of its required VXI interface capabilities built in.
EMC	Electromagnetic Compliance

F

fair requester	A VXIbus device that will not arbitrate for the VXIbus after releasing it until it detects the bus request signal inactive. This ensures that all requesting devices will be granted use of the bus.
FPERR	Floating Point Error

G

GPIB	General Purpose Interface Bus (IEEE 488)

H

hex	hexadecimal; the numbering system with base 16, using the digits 0 to 9 and letters A to F
Hz	hertz; cycles per second

I

IDE	Integrated Drive Electronics. Denotes the most common interface to the hard drive on PCs.
IEEE	Institute of Electrical and Electronics Engineers

in.	inches
I/O	input/output; the techniques, media, and devices used to achieve communication between machines and users
instrument driver	A set of routines designed to control a specific instrument or family of instruments, and any necessary related files for LabWindows/CVI or LabVIEW
INT	interrupt
INTA	PCI interrupt A
INTB	PCI interrupt B
INTC	PCI interrupt C
INTD	PCI interrupt D
interrupt	A means for a device to request service from another device
interrupt handler	A VMEbus functional module that detects interrupt requests generated by interrupters and responds to those requests by requesting status and identify information
interrupt level	The relative priority at which a device can interrupt
IRQ*	Interrupt signal
ISA	Industry Standard Architecture; denotes a common expansion bus used in PCs

K

KB	kilobytes of memory

L

LED	Light-emitting diode

M

m	meters
master	A functional part of a VME/VXIbus device that initiates data transfers on the backplane. A transfer can be either a read or a write.
MB	megabytes of memory
MITE	A National Instruments custom ASIC, a sophisticated dual-channel DMA controller that incorporates the Synchronous MXI and VME64 protocols to achieve high-performance block transfer rates
MODID	Module ID Lines. Used in VXI to geographically locate boards and to dynamically configure boards
MTBF	Mean Time Between Failure

N

NI-VISA	The National Instruments implementation of the VISA standard; an interface-independent software that provides a unified programming interface for VXI, GPIB, and serial instruments
NI-VXI	The National Instruments bus interface software for VME/VXIbus systems
NMI	NonMaskable Interrupt
Non-Slot 0 device	A device configured for installation in any slot in a VXIbus mainframe other than Slot 0. Installing such a device into Slot 0 can damage the device, the VXIbus backplane, or both.

P

PCI	Peripheral Component Interconnect. The PCI bus is a high-performance 32-bit or 64-bit bus with multiplexed address and data lines.
PCMCIA	Personal Computer Memory Card International Association
PEM	Penn Engineering Manufacturing Corporation. A manufacturer of nuts pressed into metal

POSC	Power-On Self Configuration. A process by which the MITE chip programs its own registers from EEPROMs at power up
PWB	Printed Wire Board

R

Resource Manager	A message-based Commander located at Logical Address 0, which provides configuration management services such as address map configuration, Commander and Servant mappings, and self-test and diagnostic management

S

s	seconds
SIMM	Single In-line Memory Module
slave	A functional part of a VME/VXIbus device that detects data transfer cycles initiated by a VMEbus master and responds to the transfers when the address specifies one of the device's registers
Slot 0 device	A device configured for installation in Slot 0 of a VXIbus mainframe. This device is unique in the VXIbus system in that it performs the VMEbus System Controller functions, including clock sourcing and arbitration for data transfers across the backplane. Installing such a device into any other slot can damage the device, the VXIbus backplane, or both.
SMB	Sub Miniature Type B connector that features a snap coupling for fast connection

T

trigger	Either TTL or ECL lines used for intermodule communication
TTL	Transistor-Transistor Logic

V

V	Volts
VISA	Virtual Instrument Software Architecture. This is the general name given to VISA and its associated architecture.
VME	Versa Module Eurocard or IEEE 1014
VMEbus System Controller	A device configured for installation in Slot 0 of a VXIbus mainframe or Slot 1 of a VMEbus chassis. This device is unique in the VMEbus system in that it performs the VMEbus System Controller functions, including clock sourcing and arbitration for data transfers across the backplane. Installing such a device into any other slot can damage the device, the VMEbus/VXIbus backplane, or both.
VXIbus	VMEbus Extensions for Instrumentation

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