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VXIbus Interface Kits for PXI

NI VXI-PXI80xx



- VXIplug&play compliance
- Complete interface to VXI from any PCI-based computer or workstation
- VXI Slot 0 capability, including Resource Manager
- Word-serial (message-based) communication
- Register-based communication
- Maximum throughput across MXIbus: 33 MB/s burst, 23 MB/s sustained
- Optional dual-ported DRAM expansion: 64 MB maximum on VXI-MXI-2, 16 MB maximum on PCI-MXI-2
- Direct trigger and interrupt control
- Direct access to VXI memory space
- High-performance DMA transfers using the MITE ASIC
- Expandable to several VXI or VME mainframes using MXIbus
- C-size and B-size options

Overview

NI VXI-PXI80xx interface kits link any PXI system directly to the VXIbus using the high-speed MXI-2 bus. These kits make your PXI system perform as if it were plugged directly into the VXI backplane. VXI-PXI80xx kits feature VXIplug&play compliance and integrated software, including intuitive tools for troubleshooting and debugging VXI systems. With the comprehensive NI-VXI/NI-VISA software and programming libraries, you can program multiple mainframe configurations yet maintain software compatibility across a variety of VXI controller platforms.

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Requirements and Compatibility

OS Information

- Linux®
- Windows

Driver Information

- NI-VISA
- NI-VXI

Software Compatibility

- LabVIEW
- LabWindows/CVI
- Measurement Studio

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Application and Technology

Hardware

Each VXI-PXI80xx kit includes the NI PXI-8320, which is installed in an available PXI slot in your PXI chassis; one C-size or B-size NI VXI-MXI-2 Slot 0 module that plugs directly into your VXI mainframe; a flexible MXI-2 cable; and NI-VXI/NI-VISA VXIbus interface software. Because a VXI-PXI80xx comes with NI-VXI/NI-VISA, you do not need to modify your applications written with NI-VXI and/or NI-VISA.

With a VXI-PXI80xx, you achieve superior performance by incorporating the MITE ASIC on the PXI-8320 and VXI-MXI-2 devices. National Instruments developed the MITE custom ASIC to streamline the connection between PCI computers and workstations to both the MXI and VXI buses. Using the MITE, you can transfer data between the local computer memory and VXI devices at a 33 MB/s burst rate. You can consistently realize a 23 MB/s sustained throughput rate for data transfers across the MXIbus.

The PXI-8320 is a 32-bit 3U-style CompactPCI compatible plug-in circuit module that plugs into one of the peripheral slots of your PXI or CompactPCI chassis. It links your PXI/CompactPCI-based computer directly to the MXIbus and vice versa. Because the PXI-8320 uses the same communication register set that other VXIbus message-based devices use, other MXIbus devices view the PXI-8320 as a VXIbus device. The PXI-8320 can also function as the MXIbus System Controller and can terminate the MXIbus signals directly on the PXI-8320. In addition, you can install up to 16 MB of onboard DRAM on the PXI-8320 that the module can either share with the MXIbus and VXI/VMEbus or use as a dedicated data buffer.

The VXI-MXI-2 module installed in your VXI mainframe has VXI Slot 0 capability. The Slot 0 functions include a MODID register and a CLK10 source. The VXI-MXI-2 works with register-based Slot 0 functions, which the Resource Manager software in your PC uses to bring up the mainframe and begin normal operation. The VXI-MXI-2 can also reside in Non-Slot 0, meaning that you can also insert the VXI-MXI-2 into any slot in the VXI chassis. The VXI-MXI-2 incorporates automatic Slot 0 detection so that you can move the VXI-MXI-2 from Slot 0 to Non-Slot 0 without configuring any jumpers or switches.

The VXI-PXI80xx series is a flexible, high-performance solution for integration of PXI and VXI systems.

Software

VXI-PXI80xx kits come with NI-VXI/NI-VISA software, making them completely compliant with VXIplug&play Systems Alliance specifications. You can run all the latest VXIplug&play software, including executable soft front panels, with which you can operate the instrument immediately, and standardized LabVIEW and Measurement Studio instrument drivers to simplify your programming tasks.

NI-VXI/NI-VISA software features a VXIbus interface library that works with several popular programming environments and compilers, including Microsoft Visual C++, Borland C++, Microsoft Visual Basic, NI Measurement Studio, and NI LabVIEW. Application software developed using a VXI-PCI80xx and NI-VXI/NI-VISA bus interface software is compatible with many other VXI controller platforms, including embedded controllers and computers equipped with MXI interfaces. NI-VXI and NI-VISA I/O software compatibility across platforms protects your software investment in the future. You can easily port VXI software to other platforms as your controller requirements change or expand in the future.

The shipping kits work with Windows 7, Windows Vista, and Windows XP OSs. For alternate OSs, NI-VXI is available online under [Drivers and Updates](#). These older drivers work with the VXI-PXI80xx kits.

Multiple-Mainframe Systems

Because the MXIbus is a full 32-bit multimaster system bus that interconnects several devices at the hardware bus level, you can easily add more mainframes to a VXI-PXI80xx configuration in a software-transparent fashion using VXI-MXI-2 mainframe extenders. These additional mainframes are daisy chained to your computer and first mainframe using MXIbus cables up to 20 m in length. If your system requires VME boards, you can even integrate one or more VME chassis into your system using the NI VME-MXI-2 chassis extender. This is often much more cost-effective than using adapter brackets to install VME boards into valuable VXI slots. Your computer has full Slot 0 control of each mainframe; all devices in all mainframes can communicate with each other as if in a single mainframe, with no special programming requirements.

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Ordering Information

For a complete list of accessories, visit the product page on ni.com.

Products	Part Number	Recommended Accessories	Part Number
NI VXI-MXI-2 for PXI			
VXI-PXI8015, Windows, with PXI-8320, VXI-MXI-2, and Without Cable	777589-32	No accessories required.	
VXI-PXI8015, Windows, with PXI-8320, VXI-MXI-2, and MXI-Cable	777589-02	No accessories required.	
PXI-8320, MXI-2 System Extender, Board Only Kit	777573-01	No accessories required.	

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- **Support** - Visit [ni.com/support](#) to access the NI KnowledgeBase, example programs, and tutorials or to contact our applications engineers who are located in NI sales offices around the world and speak the local language.
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- **Online Community** - Visit [community.ni.com](#) to find, contribute, or collaborate on customer-contributed technical content with users like you.

Repair

While you may never need your hardware repaired, NI understands that unexpected events may lead to necessary repairs. NI offers repair services performed by highly trained technicians who quickly return your device with the guarantee that it will perform to factory specifications. For more information, visit [ni.com/repair](#).

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Extended Warranty

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Alliance

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Detailed Specifications

This appendix lists various module specifications of the PCI-MXI-2, PCI-MXI-2 Universal, PXI-8320, VXI-MXI-2 (C-size and B-size), and VME-MXI-2, such as physical dimensions and power requirements.

PCI-MXI-2

This section lists the specifications for the PCI-MXI-2 module.

MXIbus Capability Descriptions

- Master-mode A32, A24, and A16 addressing
- Master-mode block transfers and synchronous block transfers
- Slave-mode A32, A24, and A16 addressing
- Slave-mode block transfers and synchronous block transfers
- Master-mode D32, D16, and D08 data sizes
- Slave-mode D32, D16, and D08 data sizes
- Optional MXIbus System Controller
- Can be a fair MXIbus requester
- Can lock the MXIbus for indivisible transfers
- Can terminate the MXIbus
- MXIbus master retry support
- MXIbus slave retry support
- Interrupt handler for levels 7 to 1
- Interrupt requester for levels 7 to 1
- MXIbus D32, D16, D08(O) interrupt handler
- MXIbus D32, D16, D08(O) interrupter
- Release on Acknowledge or Register Access interrupter
- MXIbus bus timer (programmable limit)
- Automatic MXIbus System Controller detection

PCI Functionality

PCI initiator (master) capability	supported
PCI target (slave) capability	supported
Data path	32 bits
Card voltage/type	5 V only; 32-bit half-size card
Parity generation/checking, error reporting	supported
Target decode speed	medium (one clock)
Target fast-back-to-back capability	supported
Resource locking	supported as a master and slave
PCI interrupts	interrupts passed on INTA# signal
Base address registers	BAR 0 dedicated to local registers, BAR 1–3 size configurable from 256 B to 4 GB
Expansion ROM	8 KB
PCI master performance (ideal maximum)	132 Mbytes/s (16 Dwords maximum)
PCI slave performance (ideal maximum)	33 Mbytes/s (to local registers)

Environmental

Temperature	0 to 55 °C operating; –40 to 85 °C storage
Relative humidity	0 to 95% noncondensing, operating; 0 to 95% noncondensing, storage

EMI	FCC Class A verified
Requirements	
Memory space	32 KB minimum, programmable
Physical	
Board dimensions	174.63 by 106.68 mm (6.875 by 4.2 in.)
Connectors	single fully implemented MXI-2 connector
Slot requirements	single PCI slot
MTBF	157,172 hours
Weight	0.18 Kg (0.4 lb) typical (no DRAM installed)
Electrical	
+5 VDC source	2.2 A typical, 3.5 A maximum
Performance	
Peak MXI transfer rate	33 Mbytes/s
Sustained MXI transfer rate	23 Mbytes/s

PCI-MXI-2 Universal

This section lists the specifications for the PCI-MXI-2 Universal module.

MXIbus Capability Descriptions

- Master-mode A32, A24, and A16 addressing
- Master-mode block transfers and synchronous block transfers
- Slave-mode A32, A24, and A16 addressing
- Slave-mode block transfers and synchronous block transfers
- Master-mode D32, D16, and D08 data sizes
- Slave-mode D32, D16, and D08 data sizes
- Optional MXIbus System Controller
- Can be a fair MXIbus requester
- Can lock the MXIbus for indivisible transfers
- Can terminate the MXIbus
- MXIbus master retry support
- MXIbus slave retry support
- Interrupt handler for levels 7 to 1
- Interrupt requester for levels 7 to 1
- MXIbus D32, D16, D08(O) interrupt handler
- MXIbus D32, D16, D08(O) interrupter
- Release on Acknowledge or Register Access interrupter
- MXIbus bus timer (programmable limit)
- Automatic MXIbus System Controller detection

PCI Functionality

PCI initiator (master) capability	supported
PCI target (slave) capability	supported
Data path	32 bits
Card voltage/type	3.3 or 5 V; 32-bit half-size card
Parity generation/checking error reporting	supported
Target decode speed	medium (one clock)
Target fast-back-to-back capability	supported
Resource locking	supported as a master and slave
PCI interrupts	interrupts passed on INTA# signal
Base address registers	BAR 0 dedicated to local registers, BAR 1–3 size configurable from 256 B to 4 GB
Expansion ROM	8 KB
	132 Mbytes/s (16 Dwords maximum)

PCI master performance (ideal maximum)	
PCI slave performance (ideal maximum)	33 Mbytes/s (to local registers)
Environmental	
Temperature	0 to 55 °C operating; –20 to 70 °C storage
Relative humidity	10 to 90% noncondensing, operating; 5 to 95% noncondensing, storage
Requirements	
Memory Space	32 KB minimum, programmable
Physical	
Board dimensions	174.63 by 106.68 mm (6.875 by 4.2 in.)
Connectors	single fully implemented MXI-2 connector
Slot requirements	single PCI slot
MTBF	contact factory
Weight	0.18 Kg (0.4 lb) typical (no DRAM installed)
Electrical	
+3.3 VDC source	50 mA typical, 80 mA maximum
+5 VDC source	2.2 A typical, 3.5 A maximum
Performance	
Peak MXI transfer rate	33 Mbytes/s
Sustained MXI transfer rate	23 Mbytes/s

PXI-8320

This section lists the specifications for the PXI-8320 module.

MXIbus Capability Descriptions

- Master-mode A32, A24, and A16 addressing
- Master-mode block transfers and synchronous block transfers
- Slave-mode A32, A24, and A16 addressing
- Slave-mode block transfers and synchronous block transfers
- Master-mode D32, D16, and D08 data sizes
- Slave-mode D32, D16, and D08 data sizes
- Optional MXIbus System Controller
- Can be a fair MXIbus requester
- Can lock the MXIbus for indivisible transfers
- Can terminate the MXIbus
- MXIbus master retry support
- MXIbus slave retry support
- Interrupt handler for levels 7 to 1
- Interrupt requester for levels 7 to 1
- MXIbus D32, D16, D08(O) interrupt handler
- MXIbus D32, D16, D08(O) interrupter
- Release on Acknowledge or Register Access interrupter
- MXIbus bus timer (programmable limit)
- Automatic MXIbus System Controller detection

PCI Functionality

PCI initiator (master) capability	supported
PCI target (slave) capability	supported
Data path	32 bits
Card voltage/type	5 V only; 32-bit 3U-size card
Parity generation/checking error reporting	supported
Target decode speed	medium (one clock)
Target fast-back-to-back capability	supported

Resource locking	supported as a master and slave
PCI interrupts	interrupts passed on INTA# signal
Base address registers	BAR 0 dedicated to local registers, BAR 1–3 size configurable from 256 B to 4 GB
Expansion ROM	8 KB
PCI master performance (ideal maximum)	132 Mbytes/s (16 Dwords maximum)
PCI slave performance (ideal maximum)	33 Mbytes/s (to local registers)
Environmental	
Temperature	0 to 55 °C operating; –40 to 85 °C storage
Relative humidity	0 to 95% noncondensing, operating; 0 to 95% noncondensing, storage
EMI	FCC Class A verified
Requirements	
Memory space	32 KB minimum, programmable
Physical	
Board dimensions	160 mm by 100 mm (6.3 by 3.94 in.)
Connectors	single fully implemented MXI-2 connector
Slot requirements	single CompactPCI/PXI Peripheral Slot
MTBF	290,596 hours
Weight	0.18 Kg (0.4 lb) typical (no DRAM installed)
Electrical	
+5 VDC source	2.2 A typical, 3.5 A maximum
Performance	
Peak MXI transfer rate	33 Mbytes/s
Sustained MXI transfer rate	23 Mbytes/s

VXI-MXI-2

This section lists the specifications for the VXI-MXI-2 module. These specifications apply equally to the VXI-MXI-2/B unless otherwise noted.

MXIbus Capability Descriptions

- Master-mode A32, A24, and A16 addressing
- Master-mode block transfers and synchronous block transfers
- Slave-mode A32, A24, and A16 addressing
- Slave-mode block transfers and synchronous block transfers
- Master-mode D32, D16, and D08 data sizes
- Slave-mode D32, D16, and D08 data sizes
- Optional MXIbus System Controller
- Can be a fair MXIbus requester
- Can lock the MXIbus for indivisible transfers
- Can terminate the MXIbus
- MXIbus master retry support
- MXIbus slave retry support
- Interrupt handler for levels 7 to 1
- Interrupt requester for levels 7 to 1
- MXIbus D32, D16, D08(O) interrupt handler
- MXIbus D32, D16, D08(O) interrupter
- Release on Acknowledge or Register Access interrupter
- MXIbus bus timer (programmable limit)
- Automatic MXIbus System Controller detection
- Automatic MXIbus termination detection

VMEbus Capability Codes

Capability Code	Description
A32, A24, A16 (master)	VMEbus master A32, A24, and A16 addressing

Capability Code	Description
A32, A24, A16 (slave)	VMEbus slave A32, A24, and A16 addressing
D32, D16, D08(EO) (master)	VMEbus master D32, D16, and D08 data sizes
D32, D16, D08(EO) (slave)	VMEbus slave 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
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 to 1
I(7–1)	Interrupt requester for levels 7 to 1
D32, D16, D08(O) (Interrupt Handler)	VMEbus D32, D16, D08(O) interrupt handler
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)

Requirements

VXIbus configuration space	64 B
A24 or A32 space	16 KB minimum (programmable)
Environmental	
Temperature	0 to 55 °C operating; –40 to 85 °C storage
Relative humidity	0 to 95% noncondensing, operating; 0 to 95% noncondensing, storage
EMI	FCC Class A verified
Physical	
C-Size VXI-MXI-2	
Board dimensions	fully enclosed, shielded VXI C-size board, 233.35 by 340 mm (9.187 by 13.386 in.)
Connectors	single fully implemented MXI-2 bus connector and three SMB connectors
Slot requirements	single VXI C-size slot
Compatibility	fully compatible with VXI specification
VXI keying class	class 1 TTL
MTBF	contact factory
Weight	1.027 Kg (2.26 lb) typical (no DRAM installed)
B-Size VXI-MXI-2/B	
Board dimensions	VXI B-size board, 233.35 by 160 mm (9.187 by 6.2999 in.)
Connectors	single fully implemented MXI-2 bus connector and three SMB connectors
Slot requirements	single VXI B-size slot
Compatibility	fully compatible with VXI specification
VXI keying class	class 1 TTL
MTBF	contact factory
Weight	0.36 Kg (0.79 lb) typical (no DRAM installed)
Electrical	

+5 VDC source	2.5 A typical, 3.5 A maximum
-5.2 VDC source	180 mA typical, 225 mA maximum
-2 VDC source	80 mA typical, 100 mA maximum
Performance	
Peak VME transfer rate	33 Mbytes/s
Sustained VME transfer rate	23 Mbytes/s

VME-MXI-2

This section lists the specifications for the VME-MXI-2 module.

MXIbus Capability Descriptions

- Master-mode A32, A24 and A16 addressing
- Master-mode block transfers and synchronous block transfers
- Slave-mode A32, A24, and A16 addressing
- Slave-mode block transfers and synchronous block transfers
- Master-mode D32, D16, and D08 data sizes
- Slave-mode D32, D16, and D08 data sizes
- Optional MXIbus System Controller
- Can be a fair MXIbus requester
- Can lock the MXIbus for indivisible transfers
- Can terminate the MXIbus
- MXIbus master retry support
- MXIbus slave retry support
- Interrupt handler for levels 7 to 1
- Interrupt requester for levels 7 to 1
- MXIbus D32, D16, D08(O) interrupt handler
- MXIbus D32, D16, D08(O) interrupter
- Release on Acknowledge or Register Access interrupter
- MXIbus bus timer (programmable limit)
- Automatic MXIbus System Controller detection
- Automatic MXIbus termination detection

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
D32, D16, D08(E0) (master)	VMEbus master D32, D16, and D08 data sizes
D32, D16, D08(E0) (slave)	VMEbus slave 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
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 to 1
I(7-1)	Interrupt requester for levels 7 to 1
D32, D16, D08(O) (Interrupt Handler)	VMEbus D32, D16, D08(O) interrupt handler
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)

Requirements

A16 space

64 B

A24 or A32 space	16 KB minimum (programmable)
Environmental	
Temperature	0 to 55 °C operating; -40 to 85 °C storage
Relative humidity	0 to 95% noncondensing, operating; 0 to 95% noncondensing, storage
EMI	FCC Class A verified
Physical	
Board dimensions	VMEbus double-height board, 233.36 by 160 mm (9.187 by 6.2999 in.)
Connectors	single fully implemented MXI-2 bus connector
Slot requirements	single VMEbus double-height slot
Compatibility	fully compatible with VMEbus specification
MTBF	184,366 hours
Weight	0.33 Kg (0.73 lb) typical (no DRAM installed)
Electrical	
+5 VDC source	2.2 A typical, 3.2 A maximum
Performance	
Peak VME transfer rate	33 Mbytes/s
Sustained VME transfer rate	23 Mbytes/s

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