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Find the *National Instruments VME-MXI-2* at our website: *Click HERE*

VMEbus Extender

VME-MXI-2

Extends VME to several mainframes
Bidirectional VMEbus transfers
Up to 8 VXI or VME chassis can be connected using MXIbus
Transparent interrupts between mainframes
DMA transfers at rates up to 38 Mbytes/s using D64
Interfaces external MXIbus-equipped computers for direct control of the VMEbus
Automatic MXIbus cable termination eases multiple mainframe expansion
Automatic leftmost slot detection
Completely software configurable
Optional dual-ported DRAM expansion up to 64 MB
Usable in B-Size VXI Systems



Overview

The VME-MXI-2 interface board is a 6U, single-slot VMEbus extender based on the new MXI-2 technology. You can install the VME-MXI-2 board in the leftmost slot of a VME chassis to be the VMEbus system controller or in any other slot of a VMEbus chassis. The VME-MXI-2 extends the VMEbus architecture outside of a VME chassis via the high-performance MXI-2 cable link. The MXIbus was derived from the VMEbus, and is essentially VME on a cable.

One application of the VME-MXI-2 is to interconnect multiple VME chassis so they operate as a single VME system, shown in (Figure 19 on page 22). A VME-MXI-2 is installed into each VME chassis and the chassis are connected together using MXI-2 cables. Because the MXIbus is a 32-bit, multimaster system bus that interconnects devices at the hardware bus level, no special software is required for communication between chassis. The chassis can operate as a single, large VME chassis or as separate and independent multichassis VME subsystems on the same MXIbus link. Whether your VME controller is embedded or external, the VME-MXI-2 can extend your system to include multiple VME chassis.

The VME-MXI-2 is also a solution for VME systems that need high-performance control of VME using an external computer, as shown in (Figure 16 on page 21). With the VME-MXI-2, external computers can control the VME backplane directly. This approach delivers the benefits of an embedded computer, such as high-performance data transfers, shared memory communication, and direct control of the VMEbus, while still maintaining the advantages of an external computer, such as flexibility, a wide selection of price and performance, and efficient use of only one VMEbus slot

National Instruments offers a number of MXI-2 interface boards for a variety of computer buses, such as PCI and ISA. These solutions are available in kits that include the MXI-2 computer interface board, a VME-MXI-2 interface board, a MXI-2 cable, and comprehensive software. You can add more mainframes by using additional VME-MXI-2 boards. You can also add VXI chassis to your system by using the C-size or B-size VXI-MXI-2 module.

VME-MXI-2 Architecture

The VME-MXI-2 is a 6U VME module that requires only one VMEbus slot. It has a well-defined register set that conforms to the VXIbus specification. These registers operate in A16 space from the VMEbus as defined in the VXIbus specification and are implemented with D16 capability. All of the registers are accessible from both the VMEbus and the MXIbus.

Address Mapping Windows

The VME-MXI-2 operates by implementing four address windows using custom hardware ASICs. These windows map portions of the VME address spaces (A32, A24, and A16) plus a dedicated window for mapping the VXI configuration space (upper 16 KB of A16 space). You can configure each to map a range of VME addresses in the corresponding address space out to the MXIbus. For each window, all addresses that are not mapped out of the mainframe to the MXIbus are mapped into the mainframe from the MXIbus. You can therefore

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VMEbus Extender

independently distribute each VME address space between mainframes, so all devices in all mainframes view the overall system address map in the same way.

VME-MXI-2 Operation

You can use the VME-MXI-2 with any VMEbus controller with a multiframe Resource Manager (RM) that conforms to the VXIbus Mainframe Extender Specification (VXI-6) standardized by the VXIbus Consortium. On power up, all VME-MXI-2 mapping windows are disabled. The RM software routine brings up the multimainframe system by simply writing to each VME-MXI-2 to enable its windows. Typically for VME systems, the RM executes on a remote MXI-equipped computer. After the VME-MXI-2 extenders are enabled, all VME devices can communicate without any special software.

The RM can completely configure all address mapping windows for any arbitrary VME system with several mainframes. The configuration can include a number of MXI-2 cables, with up to eight devices on each MXI link. You can install more than one VME-MXI-2 in a mainframe to add another MXI link to the system.

VMEbus and MXIbus Interface Compatibility

The VME-MXI-2 has both master and slave for A32, A24, A16, D64 (using VME64), D32, D16, and D08 (EO) to or from the VMEbus to translate the data cycles. Because the MXIbus features integrated block-mode transfer capability for very high-speed transfers, the VME-MXI-2 can translate MXIbus block-mode transfers to VMEbus block-mode transfers and vice versa. If the VME slave device does not handle VMEbus block-mode transfers, the VME-MXI-2 can still use block mode on the MXIbus while automatically generating nonblock-mode cycles on the VMEbus.

External Interrupt Handling

The seven VXIbus interrupt lines are bused across the MXI-2 cable to all MXI devices. This enables an external MXI-equipped computer to detect VXI interrupts and service them directly with minimum latency. Embedded VXI controllers in one mainframe can also detect, assert, and service interrupts in other mainframes. A single interrupt handler in one mainframe can also acknowledge interrupts from interrupters in other mainframes. Because the MXI-2 cable extends all seven interrupt lines, interrupts are serviced across multiple mainframes with no special software programming.

Onboard DRAM

Optional DRAM is available for the VME-MXI-2. You can use this DRAM as additional shared memory on the VMEbus, eliminating the need for expensive, stand-alone memory cards.

Ordering Information

VME-MXI-2 777243-01

DRAM Options

4 MB.....920112-04
8 MB.....920112-08
16 MB.....920112-16
32 MB.....920112-32
64 MB.....920112-64

Specifications

Typical for 25 °C unless otherwise noted.

Performance

Address access	*A32, A24, A16*
Transfer width (Master/Slave)	*D64, D32, D16, D08 (EO)*
VME block transfer	*Yes*
MXIbus automatic termination	*Yes*
Automatic Slot 0 detection	*Yes*
Read modify write cycles	*Yes*
Front panel indicators	*VME accessed, MXI accessed, and failed LEDs, external RESET pushbutton*
Size	*6U*
Number of slots	*1*
Maximum MXI Cable Length	*20 m*
DRAM options	*4, 8, 16, 32, 64 MB*

Physical

Dimensions	*23.3 by 16.0 cm (9.2 by 6.3 in.)*
Weight	*332 g (0.7 lb)*

Power Consumption	Typical	Maximum
+5 VDC	2.5 A	3.5 A
-2 VDC	80 mA	100 mA
-5.2 VDC	180 mA	225 mA

Operating Environment

Temperature	*0 to 55 °C*
Relative humidity	*10% to 90% noncondensing*

Storage Environment

Temperature	*-40 to 85 °C*
Relative humidity	*0% to 95% noncondensing*

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