IEEE 1394 (FireWire) VXIbus Interface Kit for PCI

NI VXI-1394 Kit

- VXI*plug&play*-compliant
- Complete VXI interface from any PCI computer
- VXI Slot 0 capability, including Resource Manager
- Optimized for register-based communication
- Word-serial (message-based) communication
- Direct trigger and interrupt control
- Direct access to VXI memory space
- Bidirectional VXI transfers
- High-performance DMA transfers using the MITE ASIC
- 12 MB/s sustained throughput across FireWire and VXI
- Capable of routing VXI-compliant external CLK10 source to the backplane

Operating Systems
- Windows 2000/NT/XP/Me/98

Recommended Software
- LabVIEW
- LabWindows/CVI
- Measurement Studio

Driver Software (included)
- NI-VXI/NI-VISA

Overview

The National Instruments VXI-1394 Kit links any PCI-based computer directly to the VXIbus using the IEEE 1394 or FireWire high-speed serial bus. The NI VXI-1394 Kit makes your computer perform as if it were plugged directly into the VXI backplane, giving your external computer the capability of an embedded computer. The VXI*plug&play*-compliant VXI-1394 Kit comes with the NI-VXI/NI-VISA software for Windows 2000/NT/XP/Me/98 to ease your VXI system development. NI-VXI/NI-VISA software features intuitive tools for troubleshooting and debugging VXI systems and programming libraries compatible with hundreds of industry-standard instrument drivers.

You can use the VXI-1394 Kit in any PCI-based computer running Windows 2000/NT/XP/Me/98. You gain flexibility, performance, and value by using a desktop PC for control of your VXI system. Each VXI-1394 Kit includes one PCI-1394 board that plugs into your PC; one VXI-1394 Slot 0 module that plugs directly into your VXI mainframe; a flexible IEEE 1394 cable; and NI-VXI/NI-VISA VXI bus interface software. Because the VXI-1394 Kit comes with NI-VXI/NI-VISA, all applications you write with NI-VXI and/or NI-VISA execute on the VXI-1394 without modifications.

Hardware

The VXI-1394 Kit interfaces your PCI-based desktop computer to the VXIbus using the FireWire high-speed serial bus, a serial bus technology used to connect external peripheral devices to the PC. FireWire also features "hot plug-in" capability so that you can easily add and configure FireWire devices such as the VXI-1394 interface to your PC without needing to power down your system. The VXI-1394 interface combines the FireWire technology with the MITE and MANTIS custom ASICs, which feature high-speed DMA and direct interrupt and trigger control to provide a low-cost, easy-to-use, and powerful VXI control solution.

The PCI-1394 board and the VXI-1394 Slot 0 module are connected using a thin, very flexible FireWire cable for easy installation and configuration of rack-mount systems. The FireWire cable is a 6-wire shielded cable with a maximum length of 4.5 m. You can connect up to 16 FireWire devices for a maximum length of 72 m.

NATIONAL INSTRUMENTS

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Performance

Using FireWire technology, the VXI-1394 Kit can achieve a speed of 400 Mb/s across the FireWire link. Because FireWire was designed for streaming devices such as digital cameras, the VXI-1394 interface achieves a faster block throughput rate than GPIB-to-VXI controllers, but slower than MXI-2 or MXI-3 transfer speeds. Thus, for typical instrument control applications, the VXI-1394 interface is comparable to GPIB-to-VXI controllers – not MXI-2 or MXI-3. The VXI-1394 interface achieves a data transfer rate between the local computer memory and the VXIbus at rates up to 12 MB/s sustained throughput rate.

VXI Slot 0 Functionality

The single-slot, C-size VXI-1394 module is installed in Slot 0 in your VXI mainframe. The VXI-1394 module provides all Slot 0 capabilities including slot identification and bus management responsibilities. The VXI-1394 uses register-based Slot 0 functions, which the Resource Manager software in your PC uses to bring up the mainframe and begin normal operation.

VXI Triggers and Interrupts

With the VXI-1394 Kit, your computer can detect and service all VXIbus interrupt lines and VXI triggers in any or all VXI mainframes to which it is connected.

Shared Memory

With the VXI-1394 Kit installed, your computer can share system RAM over the VXIbus so other VXI devices can send data directly to your computer. Shared or dual-ported memory turns the system RAM in your computer into VXI memory and makes it appear as memory residing on a VXI device installed in the mainframe. The VXI-1394 Kit was optimized so you can increase system performance by transferring data directly to your PC from VXI instruments with DMA.
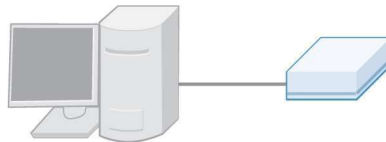

Figure 1. VXI-1394 Configuration