

# Agilent E8491B IEEE-1394 PC Link to VXI, C-Size

## Data Sheet

- **C-size, 1-slot, message-based commander**
- **Industry standard PC-to-VXI interface**
- **High-performance data block transfers**
- **Ease of configuration with hot plug-in capability**
- **Supports multiple mainframes with one PC**
- **Timing and triggering to external devices/mainframes**

### Description

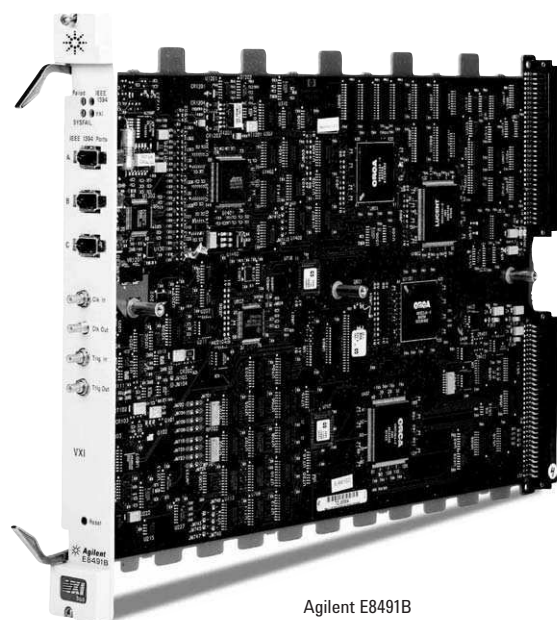
The Agilent Technologies E8491B IEEE-1394 PC Link to VXI is a **C-size, 1-slot, message-based VXI module**, providing a direct connection from your PC to a VXI mainframe via the industry standard IEEE-1394 bus (FireWire).

The E8491B is a high-speed C-size device with Resource Manager and Slot 0 capability. Its logical address is 0, therefore it is always the mainframe's Resource Manager and is typically installed in mainframe Slot 0. The high speed is accomplished, in part, through the use of small signals (200 mV) that are transmitted differentially over the twisted-pair wire set with controlled-impedance characteristics. The differential signal provides high-noise immunity.

The E8491B includes a C-size VXI Slot 0 module and a 4.5-meter cable. Ease of configuration is achieved with automatic recognition of a new IEEE-1394-based device without powering down the PC, known as "hot plug-in".

The E8491B Option 001 is an OHCI-based IEEE-1394/PCI host adapter card. It is a PC plug-in card capable of transferring data at up to 400 Mbits/second. The card has three external 1394 ports. If required, the OHCI-based IEEE-1394/PCI card can supply 12V at up to 1.5A for IEEE-1394 devices that require power.

Refer to the Agilent Technologies Website ([www.agilent.com/find/vxi](http://www.agilent.com/find/vxi)) for recent product updates, if applicable.



Agilent E8491B



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## IEEE-1394 Applications

The E8491B is well suited for data acquisition applications moving large blocks of data, and it is a cost-effective choice for test applications when used with Agilent's E84XX mainframe series. For multiple VXI mainframe systems, one E8491B is installed into each mainframe and these are interconnected via the cable in a daisy-chain, tree or star configuration. Up to 16 mainframes can be supported from one PC. This reduces the system cost further since an additional OHCI-based IEEE-1394/PCI card is not needed for each added mainframe.

The E8491B includes clock and triggering capabilities, plus complete SICL/VISA I/O library software for the Windows® 95/98/Me/NT® 4.0/2000 environments. The interface also supports 32-bit Interpreted SCPI (I-SCPI).

### What is IEEE-1394?

“FireWire”, “IEEE-1394”, “IEC 1883”... These titles refer to a high-speed serial bus that is literally a new standard for transmitting data between PCs and consumer electronics. “FireWire”, as named by its inventors at Apple Computer Inc., was born out of the need for a low-cost, consumer oriented connection for applications where large amounts of digital audio and video data is recorded, edited, stored, and transferred between devices. The bus' performance, flexibility, and ease-of-use resulted in an implementation as an I/O interconnect (Agilent E8491B) between external PCs and C-size VXI mainframes.

IEEE-1394's reduction in cost is, in part, achieved through serial data transfer, which uses a simplified cable design. The IEEE-1394 cable medium allows up to 16 physical connections (cable hops) on one bus segment, each up to 4.5 meters in length. (The cable supplied with the E8491B is 4.5 meters.) This gives a system using IEEE-1394 a total cable distance of 72 meters. The data is transmitted over one of the cables' twisted-pair sets, while the other twisted-pair set is used for the clock. The clock makes a transition when the data line does not, allowing a simple, exclusive-OR gate to be used for clock recovery.

IEEE-1394's reduction in cost and ease of use are also attained through simplified electronics. Its transmitters and receivers, which are available as a standard chip set, handle addressing, initialization, arbitration and protocol. The plug-and-play nature of the IEEE-1394 bus is also achieved in this chip set. Node addresses, for example, are assigned to devices on the bus upon power-up.

Data transfer over the IEEE-1394 bus can be either Asynchronous or Isochronous. Both types can occur on the same bus. Isochronous data transfers broadcast variable amounts of data to multiple “channels” at a regular intervals with no acknowledgment. Asynchronous data transfers use a “fair arbitration” protocol to ensure each IEEE-1394 device has equal access to the bus. The E8491B supports asynchronous data transfers to secure equal access for each VXI mainframe.

### Large Block (>64 Kbytes) Data Transfer Rate

	D16 Read Kbytes/s	D16 Write Kbytes/s	D32 Read Kbytes/s	D32 Write Kbytes/s
<b>Agilent E8491B FireWire</b>	8600	10200	12000	14000
<b>Agilent E1406A GPIB</b>	700	700	N/A (Not supported)	N/A (Not supported)
<b>Agilent E6235A 200 MHz Embedded VXI PC</b>	8500	1600	14000	3100

## Product Specifications

### Interface Characteristics

<b>Operating system:</b>	Windows 95/98/Me/NT 4.0/2000
<b>Controllers:</b>	PC based
<b>I/O Library:</b>	SICL/VISA
<b>PC backplane:</b>	PCI 2.1 with latest BIOS
<b>Max. sustained data transfer:</b>	
16 bit:	14 MB/sec
32 bit:	14 MB/sec
<b>Max. backplane burst rate:</b>	
16 bit:	13 MB/sec
32 bit:	27 MB/sec
64 bit:	53 MB/sec
<b>Languages:</b>	C/C++, Visual Basic, Agilent VEE, LabVIEW/VISA, LabWindows/VISA

### General Characteristics

<b>Interface:</b>	IEEE-1394
<b>Slot 0 functions:</b>	Yes
<b>Resource manager:</b>	Yes
<b>Extended VXIbus resource manager:</b>	Yes
<b>CLK10:</b>	Yes

<b>CLK10</b>	
<b>Input:</b>	TTL
<b>Output:</b>	TTL
<b>Stability:</b>	± 100 ppm

<b>Trigger Input</b>	
<b>Levels:</b>	TTL, ECL, CMOS, ± 30 V
<b>Input load:</b>	55 k Ω, 50 pF
<b>Maximum rate:</b>	2 MHz
<b>Minimum pulse width:</b>	200 ns
<b>Maximum trigger delay:</b>	300 ns

<b>Trigger Output</b>	
<b>Max level:</b>	+ 30 V

<b>Cable Length</b>	
<b>Maximum lengths:</b>	4.5 m between devices
<b>Bus maximum length:</b>	72 m total per system
<b>Maximum number of mainframes per system:</b>	16

## General Specifications

<b>VXI Characteristics</b>	
<b>VXI device type:</b>	Message-based commander
<b>Data transfer bus:</b>	A16, A24, A32, D08, D16, D32, D64
<b>Size:</b>	C
<b>Slots:</b>	1
<b>Connectors:</b>	P1/P2
<b>Shared memory:</b>	128 kB
<b>VXI buses:</b>	TTL Trigger Bus, ECL Trigger Bus

<b>Module Current</b>		
	<b>I<sub>PM</sub> (A)</b>	<b>I<sub>DM</sub> (A)</b>
<b>+5 V:</b>	2.5	0.001
<b>+12 V:</b>	0.35	0.050
<b>-12 V:</b>	0.015	0.001
<b>+24 V:</b>	0	0
<b>-24 V:</b>	0	0
<b>-5.2 V:</b>	0.180	0.001
<b>-2 V:</b>	0.360	0.001

<b>Cooling/Slot</b>	
<b>Watts/slot:</b>	20
<b>ΔP mm H<sub>2</sub>O:</b>	0.10
<b>Air flow liter/s:</b>	2.0

## Ordering Information

<b>Description</b>	<b>Product No.</b>
IEEE-1394 PC Link to VXI, C-Size	E8491B
OHCI-Based IEEE-1394/PCI Card	E8491B 001
E8491B Front Panel (See Note 1)	E8491-00202
FireWire Cable, 4.5 m (See Note 2)	E8491-61603

**Note 1:** Upgrade existing E8491A to E8491B performance with E8491B Opt. UP1 Upgrade Kit. This kit includes OHCI-based IEEE-1394/PCI card and E8491B software. To upgrade E8491A to E8491B physical appearance, install E8491B Front Panel (part number E8491-00202) and new 4.5 m FireWire Cable (part number E8491-61603). Original Agilent E8491A warranty remains in place after upgrade.

**Note 2:** FireWire cables are available in other lengths and can be ordered from: Molex, Inc., Telephone: (800) 78-MOLEX <http://www.molex.com>.

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