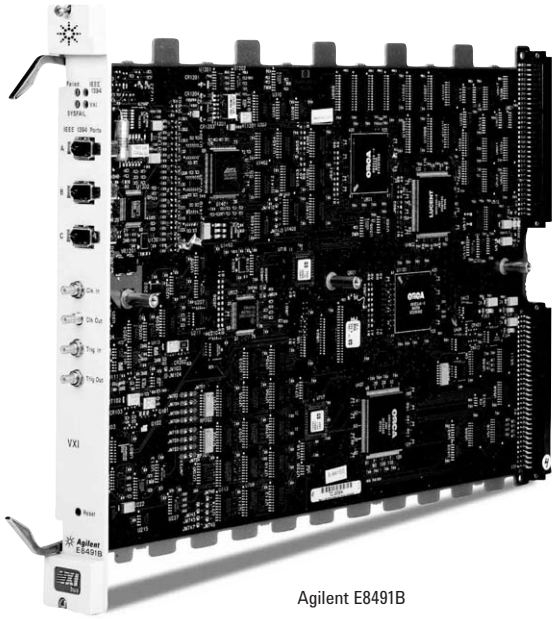
Agilent E8491B
IEEE-1394 PC Link to VXI, C-Size

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**



Agilent E8491B

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)* for recent product updates, if applicable.

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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
Agilent E8491B FireWire	8600	10200	12000	14000
Agilent E1406A GPIB	700	700	N/A (Not supported)	N/A (Not supported)
Agilent E6235A 200 MHz Embedded VXI PC	8500	1600	14000	3100

Product Specifications

Interface Characteristics

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

General Characteristics

Interface:	IEEE-1394
Slot 0 functions:	Yes
Resource manager:	Yes
Extended VXIbus resource manager:	Yes
CLK10:	Yes

CLK10

Input:	TTL
Output:	TTL
Stability:	± 100 ppm

Trigger Input

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

Trigger Output

Max level:	+ 30 V

Cable Length

Maximum lengths:	4.5 m between devices
Bus maximum length:	72 m total per system
Maximum number of mainframes per system:	16

General Specifications

VXI Characteristics

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

Module Current

	I_{PM} (A)	I_{DM} (A)
+5 V:	2.5	0.001
+12 V:	0.35	0.050
–12 V:	0.015	0.001
+24 V:	0	0
–24 V:	0	0
–5.2 V:	0.180	0.001
–2 V:	0.360	0.001

Cooling/Slot

Watts/slot:	20
ΔP mm H_2O:	0.10
Air flow liter/s:	2.0

Ordering Information

Description	Product No.
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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