DATA SHEET

EMX-2500

GIGABIT ETHERNET REMOTE CONTROLLER FOR PXI EXPRESS MAINFRAMES

FEATURES

SYSTEM LEVEL FUNCTIONALITY

Industry's first gigabit Ethernet Remote controller for PXI express mainframes

Up to 100 MB/s sustained throughput

Allows remote access to VTI's SentinelEX family of PXIe instruments from anywhere in the world on any internet enabled device

Multi-chassis synchronization using precision IEEE-1588-2008 standard time source

Easy to set up for distributed data acquisition systems
Simplified instrument discovery and usage using IP Address

IVI drivers supporting wide variety of Application Development Environments and Operating Systems

REST HTTP protocol for cloud support and advanced web applications

VTI Instruments
www.vtiinstruments.com

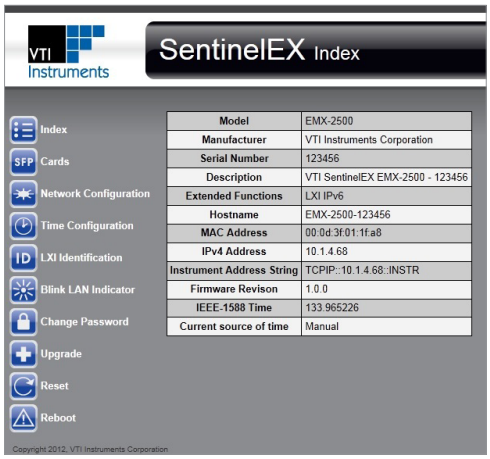
OVERVIEW

The EMX-2500 is the first gigabit Ethernet based PXI Express interface. This combines Ethernet's widespread usage and robust architecture with instrumentation-specific functionality, such as wired trigger bus and IEEE-1588-2008, and extends it for use in PXI Express mainframes, making it an ideal solution for data acquisition applications.

The Ideal Solution for Data Acquisition Applications

SIMPLIFIED INSTRUMENT DISCOVERY AND USAGE

When a mainframe with the EMX-2500 is connected to a local network, the EMX-2500 automatically assigns an IP address to the mainframe , allowing the chassis and the plugin cards to be accessed easily with the IP address. Any internet enabled device connected the local network can act as a host including desktops, laptops, tablets, and smart phones.



Model	EMX-2500
Manufacturer	VTI Instruments Corporation
Serial Number	123456
Description	VTI SentinelEX EMX-2500 - 123456
Extended Functions	LXI IPv6
Hostname	EMX-2500-123456
MAC Address	00:0d:3f:01:1f:a8
IPv4 Address	10.1.4.68
Instrument Address String	TCPIP::10.1.4.68::INSTR
Firmware Revison	1.0.0
IEEE-1588 Time	133.965226
Current source of time	Manual

PRECISION TIMING AND SYNCHRONIZATION

The EMX-2500 contains a high-precision IEEE-1588 source for timestamping data and synchronizing modules within 100ns accuracy.

The precision timing sources can not only be used to synchronize modules within a single mainframe, they can also be used to synchronize data across multiple mainframes in a distributed data acquisition system. When multiple mainframes are connected on a local network, the mainframe with the most accurate clock source will automatically become the master, and other mainframes will derive their clock from the master, simplifying data synchronization across multiple units.

HIGH DATA TRANSFER RATES – UP TO 100 MB/S SUSTAINED THROUGHPUT

The EMX-2500 uses gigabit Ethernet to achieve up to 100 MB/s sustained data transfer rate from the PXI express mainframe.

SIMPLIFIED LOW COST CABLING

Communication with the host processor is achieved using standard, low cost CAT5e Ethernet cable. In addition, standard Wi-Fi routers can be used along with the EMX-2500 to wirelessly control the mainframe. .

RESTFUL HTTP FOR CLOUD SUPPORT AND ADVANCED WEB APPLICATIONS

The EMX-2500 can deliver advanced data access and storage services throughout an organization using cloud data management services to stream data to remote servers. Data streamed to these servers can be accessed in a secure manner from any internet enabled device, anywhere in the world. In addition multiple mainframes can write time-stamped data to the same remote server, allowing widely distributed data acquisition systems.

This is made possible by the RESTful HTTP protocol implementation in the EMX-2500 which allows instrument control using a standard HTTP interface with JSON. In addition to IVI drivers which allow application programming in a wide variety of development environments like Labview, C/C++, C#, and Visual Basic, the RESTful HTTP implementation allows the use of popular web programming languages like Java, PHP, Python, Ruby, and Perl.

With built in support for HTTP and JSON serialization, the EMX-2500 transforms the mainframe into a cloud service that can be integrated with cloud databases and cloud computing services. For example, acquired data can be streamed to Amazon EC2™ or Microsoft Azure ™ servers where virtually unlimited processing power is available for data processing and analysis, and data can be shared in a secured manner with any web enabled device worldwide. The PXI Express mainframe and instruments can be addressed like any other device that's part of the web.

Multiple Mainframes, Common Host

Unlike traditional embedded host controllers, the EMX-2500 allows multiple mainframes to be controlled by a common host.

COST SAVINGS

Embedded controllers are typically more expensive than the EMX-2500. When considering a distributed data acquisition systems with multiple mainframes, large cost savings can be achieved by eliminating embedded host controller on each mainframe and using EMX-2500s along with a single host instead.

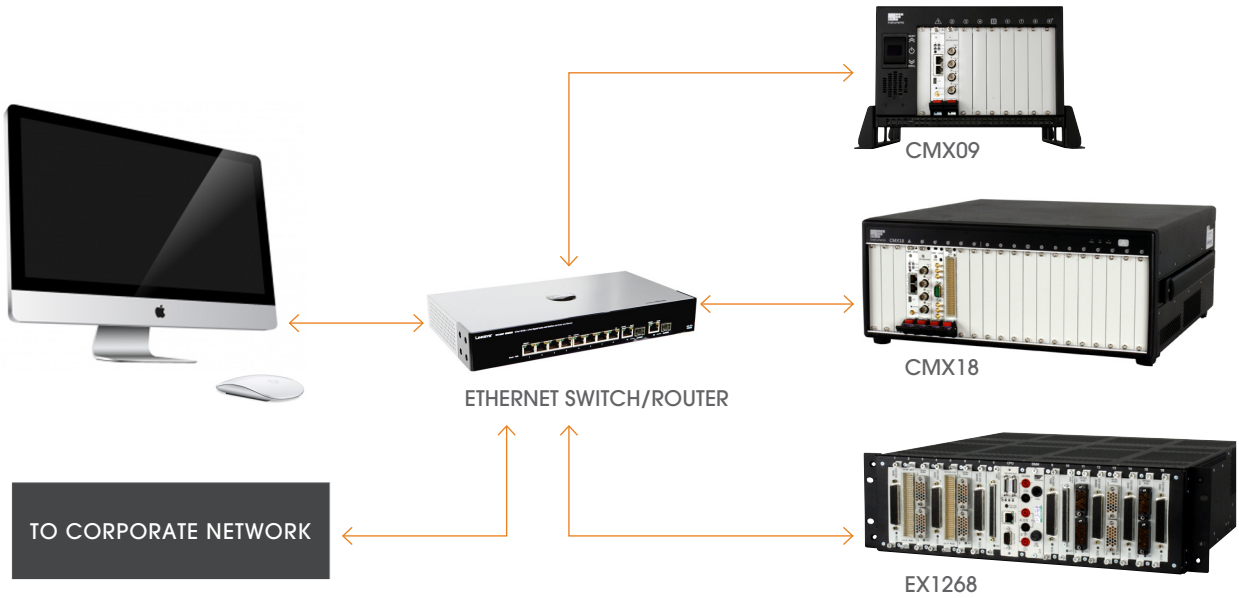
EASY SCALABILITY

Unlike the embedded controller approach where multiple mainframes would each have to run their own application software, a single host approach allows application software for all mainframes to be run on a single machine. This makes it easy to add to the application software when scaling the data acquisition systems by adding additional mainframes.

While cabled PCIe remote controllers enable high data throughput rates between the instrumentation mainframe and the host PC, they limit scaling because the hosts typically have a small, fixed number of PCIe slots. With the EMX-2500's Ethernet interface, the system could be expanded to hundreds of mainframes with just one host.

OBSOLESCENCE PROTECTION

Embedded controllers make use commercial PC technology which is fast changing and therefore leads to short product life-cycles. Ethernet on the other hand is a robust and widely adopted interface that can mitigate obsolescence issues for instrumentation. Host controllers can be easily upgraded to the latest PC technology without impacting the EMX-2500 based instrumentation system.



Software

Industry standard, drivers and programming interfaces provide the flexibility and freedom of choice to select the application programming environment best suited for the application and specific development requirements.

All major programming environments are supported including C/C++, C#, Visual Basic, Java, Python, Matlab, Labview and LabWindows™/CVI. VTI's innovative approach to driver development provides true OS independence without sacrificing the convenience that instrument drivers deliver. An IVI-like API can be imported into Linux and other operating systems. The intuitive APIs simplify programming. Therefore, low-level coding is not required to access the full capability of the instrument.

In addition, depending on the application requirements, a wide variety of turn-key software solutions are available for use with the EMX-2500 and sentinelEX hardware. For more information, refer to http://www.vtiinstruments.com/software.aspx

Note:
The EMX-2500 can only be used with VTI's SentinelEX family of PXI Express modules providing a scaleable, distributed data acquisition system time-tagged with IEEE-1588.

Detailed Specifications

GENERAL	
SLOT REQUIREMENT	1-slot, 3U PXI Express System Controller Plugin Module
INTERFACE/PORTS	
Ethernet	Two 10/100/1000BASET Gigabit Ethernet Ports, RJ-45 connector One port (ETH-A) for instrument control and data transfer
SMB Connector	For high-precision triggering on PXI trigger lines
MAXIMUM DATA THROUGHPUt	100 MB/s sustained streaming
PCIE/PXIE CONFIGURATION	Four links (1 link x2 lanes, 3 links x1lane)
CLOCK SPECIFICATIONS	
CLOCK OSCILLATOR ACCURACY	+ 50 ppm
TIMESTAMP RESOLUTION	10 ns
MECHANICAL SPECIFICATIONS	
FRONT PANEL CONNECTORS	Dual RJ45 Ethernet, USB MiniAB
TEMPERATURE	
OPERATING TEMPERATURE	0˚ C to 55˚ C
STORAGE TEMPERATURE	-40˚ C to 70˚ C
HUMIDITY	5% to 95% (non-condensing)
ALTITUDE	Up to 3,000 m
SHOCK AND VIBRATION	Conforms to MIL-PRF-28800F, Paragraphs 4.5.5.3.1 (random vibration test), 4.5.5.3.2 (sinusoidal vibration test), and 4.5.5.4.1 (functional shock test)
MISCELLANEOUS SPECIFICATIONS	
POWER CONSUMPTION	
+3.3 V	3 A
+12 V	2 A
+5 V	500 mA

Notes:

1) All specifications are typical unless otherwise stated as a minimum or maximum.

2) For current detailed specification please refer to the on-line manual at www.vtiinstruments.com.

3) All specifications subject to change without notice.

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Ordering Information

	PART NUMBER	
EMX-2500	70-0409-007R	Gigabit Ethernet PXIe Interface
PXIE MAINFRAMES		
CMX09A	70-0698-000R	9-slot PXI Express chassis with 1 system controller slot, 7 PXIe Hybrid slots and 1 PXIe timing slot
CMX18A	70-0699-000R	18-slot PXI Express chassis with 1 system controller slot, 6 PXIe slots, 10 PXIe hybrid slots, and 1 PXIe timing slot

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