DAQ-2500X

Fiberbyte

Synchronous Multi-function Data Acquisition

- **16 analogue inputs, 16 digital I/O, and digital triggers with 500V isolation protection**
- **4 discrete 16 bit 100 kS/s ADCs providing 400 kS/s for true simultaneous sampling applications**
- **1 MB of on-board FIFO buffer memory**
- **Advanced synchronization & timing enables modular channel expansion using standard USB hub architecture**
- **Synchronously control, trigger and sample multiple DAQ modules from a single USB port**
- **Software includes Real-Time User Interface, LabVIEW driver and COM Server for flexible user configurations**

Synchronous and Deterministic USB

USB-inSync™ is an evolutionary technology which adds highly accurate timing and synchronization to the already powerful USB bus. The enhanced capability of USB-inSync™, while preserving all the features of USB, creates new applications and solutions never before possible. USB-inSync™ has transformed the standard conceptions of USB.

Traditional USB devices operate independently of each other and without any synchronization between devices. A timing reference in one USB device cannot be synchronized to another device over the USB cable. Hence multi-channel synchronous data acquisition via USB is limited to the number of I/O channels available on a single USB device. This is not a limitation of USB any more.

USB-inSync™ technology can synchronize up to 127 discrete devices within +/- 5 ns of each other. All USB-inSync™ devices will be locked together and act as a single device would without requiring any additional equipment. USB-inSync™ is able to provide added functionality utilizing standard USB cables, ports and hubs because the technology is embedded in every Fiberbyte device. Additionally any device can be used as a timing reference to control external equipment.

Fiberbyte has combined USB-inSync™ technology with 16 bit analogue inputs, 16 bit digital I/O, and digital triggers to create multifunction data acquisition modules. For the first time the USB port is capable of multi-device synchronization and time deterministic functionality traditionally associated with embedded systems. The DAQ2500X is the solution of choice for PC I/O.

The DAQ-2500X offers continuous single-channel sampling rates up to 100kS/s. Multiple-channel rates are 400kS/S with an isochronous mode setting for an impressive 1MBS/s. The 16 channel fully programmable digital I/O allow users to customize the DAQ-2500X for many applications.

Using the DAQ-2500X is simple with Fiberbytes software suite. The DAQ control Center™ graphical user interface will control multiple devices for users with no programming experience. For experienced users the DAQ-2500X COM Server provides interfacing capability for most modern programming languages and software applications.

USB inSync™

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Analog Input Specifications

Analog Inputs

Number of discrete ADCs	4 (successive approximation)
Number of inputs	16 single-ended 8 differential 4 true simultaneous sampled (software selectable)
Resolution	16 bits, (1 part in 65,536)
Maximum sample rate	100kS/s per channel

Input Characteristics

Input Ranges	± 10V, ± 5V, ± 2.5V, ± 1.25V
Input	DC
Input Impedance	100MΩ, 12pf (on)
Input Bias Current	± 150nA
Common Mode Rejection	> 74 dB
ESD Input Protection	protected to 2000V (JESD22)
Over-voltage protection	(each input should remain within ± 11V of common)
Power on	± 25 V
Power off	± 40 V

Transfer Characteristics

Relative accuracy	± 2.0 LSB maximum
Differential nonlinearity (DNL)	± 1.2 LSB maximum
No missing codes	16 bits, guaranteed
Settling time	<5us
Total Noise	< 0.9 LBS_{rms}
Crosstalk (DC to 100kHz)	
Adjacent Inputs	-80dB
Adjacent Channels	-90dB

Accuracy

Offset	
Without auto-cal	+/- 2 mV
With auto-calibration	+/- 200uV
Drift	
Zero	(50 µV*Gain/°C)
Gain	± 300 pmm/°C

Digital I/O Specifications

I/O Configuration

Number of channels	16 input/output
Direction Control	software configurable
Compatibility	
Inputs	TTL / CMOS
Outputs	Open drain - 50V breakdown
Logic Levels	
Low Input	1.5V
High Input	3.5V
Synchronous Capability	Trigger Sync output (software configurable)
ESD Protection	protected to 2000V (JESD22)

Digital Input Trigger

Purpose	Start acquisition
Response	Rising, falling edge (Software Selectable)
Compatibility	5V TTL
Pulse width	100 ns minimum

Calibration Specifications

Recommended warm-up	15 minutes
Calibration interval	1 year
Onboard calibration reference	
Absolute Level	4.096 V ± 0.8mV (across full temperature range) Value stored in EEPROM
Temperature coeff.	± 1ppm/C (typ)
Long term stability	± 20 ppm/1000Hr

Data Handling

Data transfer modes	Bulk, isochronous
Data Throughout	1MB/s
Configuration memory	64 kbit
FIFO buffer size	10^6 bytes (>1 sec of data – four channels sampling at 100kS/s each)

All specificaitons are at 25 C and 10V input range unless noted.

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Physical Specifications

Enclosure

Dimensions	200 x 132 x 34 mm (7.9 x 5.2.x 1.3 in.)
Weight	< 0.7 kg
I/O connectors	Pluggable Screw Terminals

Bus Interface

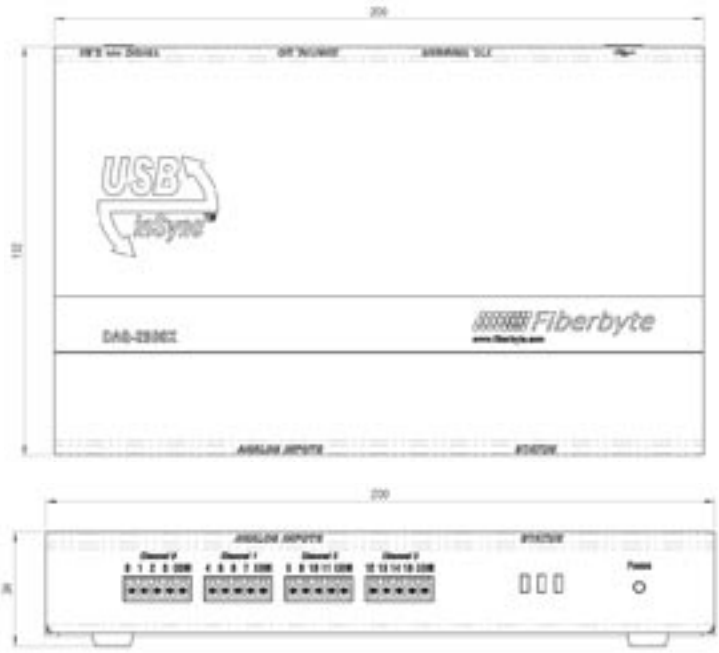
Type	USB 2.0 Compliant

Power (I/O system)

Voltage	11.5 – 13.5V DC
Power consumption	< 3W

Environment

Operating temperature	10 to 45 C, non-condensing
Storage temperature	0 to 45 C, non-condensing



USB-inSync™ Platform

USB-inSync™	Automatic clock synchronisation
Software platform	Windows 2000 / XP
Device clock	
Frequency	12MHz ± 1% (locked to host PC)
DC clock jitter	< 5ns
DC phase error	± 5ns (between any two devices on same hub) (between any two distributed devices, using Fiberbyte's Master control hub)
Device enumeration	< 5 sec
Synchronisation lock time	< 5 sec
Bus speed	12Mb/s
Max No. devices	127 (including expansion hubs)

Certifications and Compliance

FCC Class A Compliance

CE Mark Compliance

C-Tick Compliance

Common Applications

The DAQ-2500X is ideally suited for a wide variety of applications. The portability, accuracy and expansion possibilities open up a wide range of applications, including:

- Portable data logging
- Test system synchronization
- Design verification
- Field monitoring - environmental data
- Industrial monitoring
- Sound and vibration analysis
- Biomedical applications
- R&D laboratories
- Academic lab use

Custom USB-inSync™ Applications

USB-InSync™ is 100% compatible with other USB devices, but only USB-inSync™ enabled devices will have synchronous and deterministic features. However Fiberbyte is able to integrate any I/O device with our technology creating an unending number of applications. Contact us today to explore what USB-inSync™can do for you.

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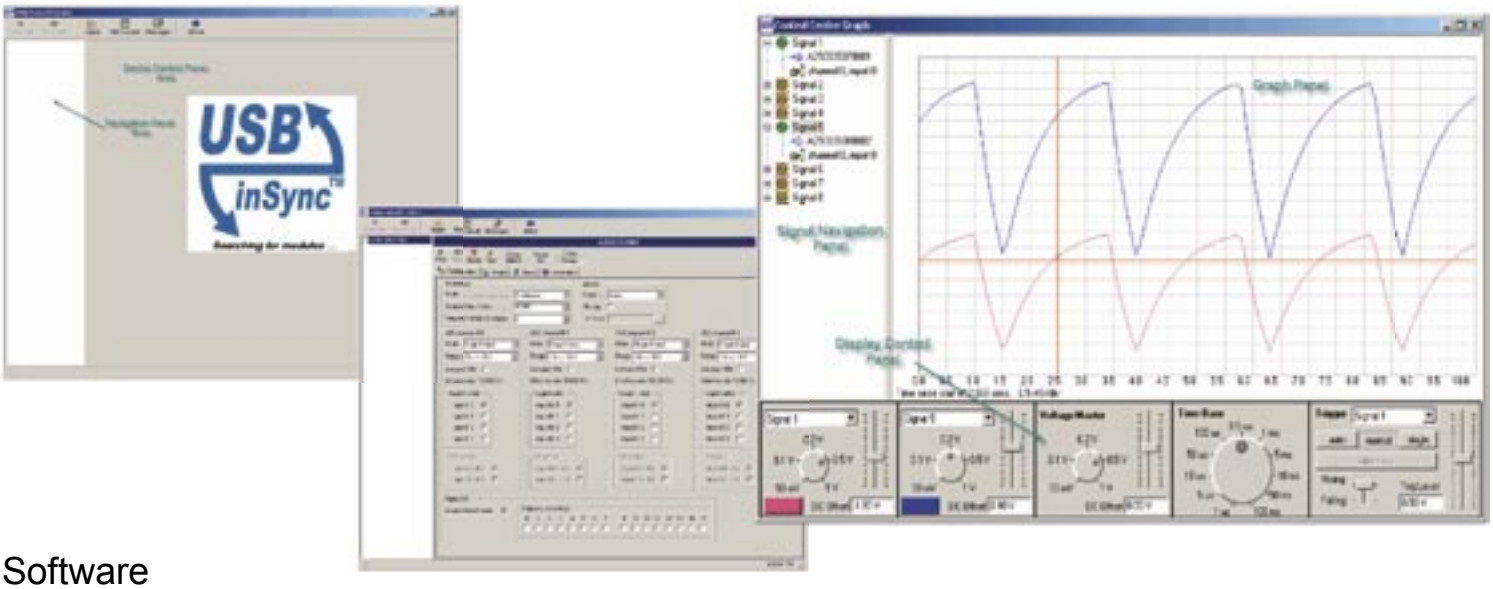
DAQ Control Center Software

The DAQ-2500X is supplied with the DAQ Control Center™ application Graphical User Interface (GUI) which provides a simple interface to the functionality of the device. The COM Server interface and associated DLLs provide more flexible control opportunities for the software programmer and the LabVIEW interface allows graphical programming within National Instruments LabVIEW application.

The DAQ Control Center™ user interface is designed as a intuitive interface that allows the user to configure and start taking measurements within minutes of opening the box. The basic functionality of the system is presented in an intuitive Windows style format.



Software

The DAQ-2500X is supplied with the USB-inSync™ software suite:

- USB-inSync™ API
- DAQ Control Center™ - Graphical User Interface
- COM Server
- LabVIEW Drivers
- Programing Examples

The DAQ-2500X is set apart from other USB-based DAQ devices by the revolutionary multi-device synchronization capabilities of USB-inSync™ technology. As a result, data can be acquired on multiple devices and then compared on the one graph because each device acquires its data "inSync" with the other devices in the system. The Control Center Graph allows the user to view multi-device information in on easy to navigate window.

The Control Center Graph is broken up into three main window areas for easy navigation. The left hand panel is the Signal Navigation Panel. This allows the user to see all signals present on the system and to enable them to be displayed on the graph. The right hand plane is the graph display area or Graph Panel while the bottom panel, the Graph Control Panel contains graph display controls. This panel allows users to highlight signals that are acquired from all attached devices for immediate analysis.

Fiberbyte is making it possible to take multi-device measurements right out of the box. There is not complicated software to use or programs to create. We are making DAQ simple.

COM Server

The functionality of Fiberbyte's USB-inSync™ technology is available to the end user through our COM server. The "Fiberbyte DAQ Server" allows the user to communicate with the USB-inSync™ Software Engine through standard Component Object Model (COM) protocol. This provides the user with unlimited flexibility to create custom applications that control USBinSync™ devices from common programming languages. All USB-inSync functionality can be accessed from any programming language that supports COM. Developers using Visual Basic, Visual C/C++, Visual Studio.Net, LabVIEW, Delphi, C++ Builder, VB, even Microsoft Office applications can now embed and control Fiberbyte USB-inSync™ DAQ devices directly in their own applications.

This custom applications is now in the hands of the developer. The DAQ-2500X is under your control and the power of USB-inSync can be fully unleased.

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