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Industrial USB I/O Modules

Advantech USB Data Acquisition Series

Introduction

USB data acquisition products are becoming very popular in the field. Many customers in Asia have utilized our plug-in data acquisition, motion control and communication cards to develop machines, and then distribute them to China, Thailand, Vietnam … and so forth. So far the machine builders needed to bring many tools & spare parts to the end-customer for after service work

Now we offer a better solution, Engineers can just use a Notebook and a USB data acquisition module to do the job. Because all the specifications are the same, engineers can directly evaluate the program and troubleshoot on their notebooks.

Besides, the embedded controller is well proved by several industrial applications, and now can provide faster fanless low-power CPU with USB 2.0 interface. The idea is coming to separate computing platform and data acquisition interface into two parts.

The technology of computing platform is always changing. People can enjoy high-stability and high-performance computing platform by leverage those latest embedded technology, also to save the maintenance cost and system upgrade effort.

On the other hand, the data acquisition and control interface technology is not changing frequently. Most of the time those interface will comes together with cable and terminal board, engineer intend to keep the same configuration to provide the stable and reliable data acquisition and control system. That means its life cycle is longer than computing platform, and engineer can reduce the effort by maintain two parts separately.

The transmission rate of USB 2.0 is 480Mb/s, which can provide the same performance as general purpose PCI-bus data acquisition and control cards. With Advantech's innovative designed on the screw-type USB connection cable, the Advantech USB-based data acquisition and control modules are the next generation solution for industrial test and measurement applications.

Portable, Easy to Install & Use

The Key Benefits of USB DAQ Modules Are:

- **Plug & Play**
  - Advantech USB data acquisition series features the plug & play function that users can install/setup the devices and ready to go within seconds.
- **Single Cable Connection with PC**
  - The USB series connects to the user's host system via a shielded USB cable and are powered through this cable, which saves users from the annoying wiring and extra accessory costs.
- **Best Mate for Notebook**
  - The bus-powered design and compact size make Advantech USB data acquisition series the best mate for the notebook.

Features

- USB 2.0 Hub and data acquisition & control modules
- Full family extend compatible with PCI-bus data acquisition & control cards
- Versatile mounting methods – wall, panel, DIN-rail, and VESA
- Palm sized and bus-powered
- Wiring terminal on modules
- Ready-to-Use software & drivers

- **480 Mb/s Transmission Rates**
  - High speed data transmission realizes the high-performance and high-accuracy on the USB dada acquisition.

Design Concepts

- **Efficient**
  - Advantech USB data acquisition series needs no external power source and can get rig of the power cord and adapters, give users the most convenience on the field side applications.
- **Portable**
  - The palm-sized and light-weight USB data acquisition series is suitable for hand carry when you travel to exhibitions or business shows.
- **Fast**
  - 480Mbps data transmission rate is 20000 times faster than traditional RS-485 based I/O, make the USB series possible to achieve heavy-loaded tasks.
- **Integrated**
  - All the analog input, analog out, digital input, and digital output functions are integrated into the USB series. Users can get multiple functions by getting only module on hand.
- **Convenient**
  - The built-in wiring terminals facilitate the operations without using any wiring cables or terminal boards.

| Efficient | Portable | Speedy | Integrated | Convenient |

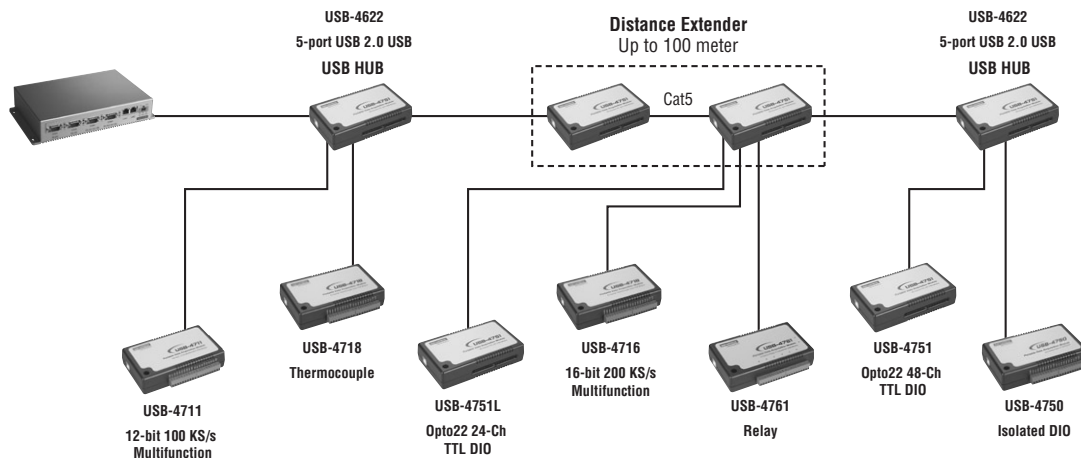### Extending Benefits to PCI Card Users

Our concept is to keep same specification as our existed PCI-bus data acquisition cards.

- Same specifications and drivers as PCI cards
- For R&D, easy to develop and diagnose the system
  - The same H/W and S/W between development and run-time
  - Save time and effort on simulation and troubleshooting

USB Module	PCI Card	Functions
USB-4711	PCI-1711	100kS/s, 12-bit multifunction
USB-4716	PCI-1716	200kS/s, 16-bit multifunction
USB-4750	PCI-1750	32-ch Isolated Digital IO
USB-4751	PCI-1751	48-ch TTL Digital IO
USB-4761	PCI-1761	8-ch Relay and 8-ch Isolated DI
USB-4671	PCI-1671	GPIB device

*Note: For more detailed specifications, please refer to the respective product pages.

Advantech USB-based Data Acquisition and Control Solution Architecture

1 PAC & Software
2 BAS
3 UNO
4 RS-485 I/O
5 Ethernet I/O
6 TPC
7 IPPC
8 FPM
9 AWS
10 Plug-in I/O
11 CompactPCI
12 Signal Conditioning
13 USB I/O
14 Motion Control I/O
15 Ethernet Switch
16 EDG
17 ICOM

USB-4622
5-port USB 2.0 USB
USB HUB

Distance Extender
Up to 100 meter

USB-4622
5-port USB 2.0 USB
USB HUB

Cat5

USB-4718
Thermocouple

USB-4716
16-bit 200 KS/s
Multifunction

USB-4751
Opto22 48-Ch
TTL DIO

USB-4711
12-bit 100 KS/s
Multifunction

USB-4751L
Opto22 24-Ch
TTL DIO

USB-4761
Relay

USB-4750
Isolated DIO

Mounting Scheme of USB DAQ Modules

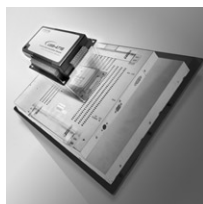Advantech has provides versatile mounting methods to fit the demand in the field.

- **Wall/panel mount**
  - The wallmount kit can help users hang their modules on the wall or other flat surfaces.
- **DIN-rail mount**
  - Advantech's USB DAQ modules come with a bracket that facilitates the DIN-rail mounting onto some streamlined system with Industry standards
- **VESA mount**
  - The VESA bracket can mount the USB data acquisition module to the VESA-ready appliances, such as Advantech's touch panel computers (TPC series) and the flal panel monitors (FPM series).

DIN-rail Mounting   **Panel/Wall**   **VESA Mounting**

Lockable USB Connector

The standard USB cable is designed for easy plug and remove, but it's not suitable in industrial application. However the USB 2.0 is one of the high-speed and high-reliable extension interface, Advantech invest R&D effort to provide screw-type USB connection cable. With this innovative cable, the USB-based data acquisition module can be connected firmly.

Robust & Anti-vibration

Advantech also provide another innovated accessory for make the other end of USB cable can be connected to UNO and TPC's USB port firmly. We provide the complete embedded data acquisition and control solution.

Software Support for the USB DAQ Series

Advantech has provides five software solution for USB-based data acquisition and control modules.

- **WaveScan**
  - Wavescan is a real-time waveform display utility capable of displaying on the screen and storing the incoming data into users' HDD. In the Version 2.0, moreover, Wavescan extend its support list to all our PCI cards. The ActiveDAQ-based design concept gives more flexibility to the users by designing their own Wavescan edition.
- **ActiveDAQ Pro**
  - ActiveDAQ Pro is a collection of ActiveX controls for performing I/O operations within any compatible ActiveX control container, such as Visual Basic, Delphi, etc. You can easily perform the I/O operations through properties, events and methods. With ActiveDAQ Pro, you can perform versatile I/O operations to control your Advantech devices.
- **LabVIEW driver**
  - Advantech 32-bit LabVIEW drivers enable you to use Advantech plug-in I/O cards with LabVIEW software. The LabVIEW driver forms an interface between Advantech DA&C device DLL drivers, which contain all the relevant functions to control Advantech plug-in I/O cards and the LabVIEW software. LabVIEW driver forms a VI (virtual instrument) in the LabVIEW package, which enables other applications to be used in conjunction with Advantech plug-in I/O cards
- **DLL driver**
  - For Windows programmers, Advantech provides the complete set of Windows platform DLL drivers and OCX support for Windows 2000 and XP.
- **GeniDAQ**
  - Advantech GeniDAQ is a 32-bit Microsoft Windows-based graphical application software for data acquisition. It supports Windows NT and Windows 95/98, as well as Windows CE for Runtime applications. This software features multi-threaded technology for optimizing application performance, OPC (OLE for Process Control) standard compliant driver interface for connecting diverse I/O devices, and TCP/IP networking for integrating real time data between Windows NT and Windows CE platforms.

Selection Guide

Category			Multifunction			Analog Input
Bus			USB	USB	USB	USB
Model			USB-4711	USB-4711A	USB-4716	USB-4718
Analog Input	**General Spec.**	Resolution	12 bits	12 bits	16 bits	16 bits
		Channels	16 SE	16 S.E./ 8 Diff.	16 SE/8 Diff	8 Diff
		Onboard FIFO	1024 samples	1024 samples	1024 samples	10 S/s
		Sampling Rate	100 kS/s	150 kS/s	200 kS/s	10 S/s
		Auto Channel Scanning	v	v	v	
	Input Ranges	Unipolar Inputs (V)	-	-	-	J,K,T,E,R,S,B types
		Bipolar Inputs (V)	±10, 5, 2.5, 1.25, 0.625 V	±10, 5, 2.5, 1.25, 0.625 V	±10, 5, 2.5, 1.25, 0.625 V 0 ~ 10 V, 0 ~ 5 V, 0 ~ 2.5 V, 0 ~ 1.25 V	-
		Configurable Per-Channel	v	v	v	v
	Trigger Mode	Pacer/Software/ External Pulse	v	v	v	Software
	Data Transfer Mode	Software	v	v	v	v
		DMA	-	-	-	-
Analog Output		Resolution	12 bits	12 bits	16 bits	-
		Number of Channels	2	2	2	-
		Output Range (V)	0 ~ 5, 0 ~ 10, ±5, ±10	0 ~ 5, 0 ~ 10, ±5, ±10	0 ~ 5, 0 ~ 10, ±5, ±10	-
		Throughput	Static update	Static update	Static update	-
Digital I/O		Input Channels	8	8	8	8 (Isolated)
		Output Channels	8	8	8	8 (Isolated)
Timer/Counter		Channels	1	1	1	-
		Resolution	16 bits	16 bits	16 bits	-
		Time Base	1 kHz	1 kHz	1 kHz	-
Isolation Voltage			-	-	-	2,500 V_{DC}
Auto Calibration			v	v	v	v
BoardID Switch			Software	Software	Software	Software
Dimensions (mm)			132 x 80 x 32	132 x 80 x 32	132 x 80 x 32	132 x 80 x 32
Connector			Onboard screw terminal	Onboard screw terminal	Onboard screw terminal	Onboard screw terminal
Windows 2000/XP DLL Driver			v	v	v	v
Windows 2000/XP Test Utility			v	v	v	v
VC++, VB & Delphi Examples			v	v	v	v
Advantech ActiveDAQ/ActiveDAQ Pro			v	v	v	v
Labview I/O Drivers (Ver. 6i and 7.0)			v	v	v	v
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Catagory			Non-Isolated DI/O		Isolated DI/O	
Bus			USB	USB	USB	USB
Model			USB-4751	USB-4751L	USB-4750	USB-4761
TTL DI/O	Input Channels		48	24	-	-
	Output Channels				-	-
	Output Channel	Sink Current	0.4 V @ 8 mA	0.4 V @ 8 mA	-	-
		Source Current	2.4 V @ 4 mA	2.4 V @ 4 mA	-	-
Isolated DI/O	Input	Channels	-	-	16	8
		Isolation Voltage	-	-	2,500 V_{DC}	2,500 V_{DC}
		Input Range	-	-	5 ~ 50 V_{DC}	5 ~ 30 V_{DC}
	Output	Channels	-	-	16	8 x Form C
		Isolation Voltage	-	-	2,500 V_{DC}	2,500 V_{DC}
		Output Range	-	-	5 ~ 40 V_{DC}	-
		Max. Sink Current	-	-	100 mA max. per channel	30 V_{DC} @ 1A, 240 VAX @ 0.25 A
Timer/Counter		Channels	3	3	1	-
		Resolution	16 bits	16 bits	32 bits	-
		Time Base	10 MHz	10 MHz	1 MHz	-
Advanced Function	Output Status Read Back		v	v	v	v
Dimensions			132 x 80 x 32	132 x 80 x 32	132 x 80 x 32	132 x 80 x 32
Connectors			2 x opto-22 compatiable box header	1 x opto-22 compatiable box header	Ob board screw terminal	Ob board screw terminal
Windows 2000/XP DLL Driver			v	v	v	v
Windows 2000/XP Test Utility			v	v	v	v
VC++, VB & Delphi Examples			v	v	v	v
Advantech ActiveDAQ/ActiveDAQ Pro			v	v	v	v
Labview I/O Drivers (Ver. 6 AND 7.0)			v	v	v	v
Mathworks Matlab & Simulink Data Acquisition Tool Box x 2.5.1			-	-	-	-
KW Win32 Driver			-	-	-	-
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1 PAC & Software
2 BAS
3 UNO
4 RS-485 I/O
5 Ethernet I/O
6 TPC
7 IPPC
8 FPM
9 AWS
10 Plug-in I/O
11 CompactPCI
12 Signal Conditioning
13 USB I/O
14 Motion Control I/O
15 Ethernet Switch
16 EDG
17 ICOM

USB-4622

Features

- 5 downstream USB 2.0 port (Type A)
- Compatible with USB 2.0/1.1/1.0
- 480Mbit/s high-speed data transfer
- LED indicators
- Suitable for DIN-rail mounting
- Lockable USB cable for rigid connection

Introduction

USB-4622 is a USB 2.0 hub capable of connecting at most 5 USB salve modules. It supports the USB 2.0 high-speed mode that can achieve 480Mbps data transmitting rate, realizing the USB-4700 series' high performance for heavy-loaded applications. The Advantech's unique lockable cable design secures the slave module connections, preventing the cable from being unplugged accidently.

Specifications

- **Ports**   Upstream x 1 (TypeB)/Downstream x 5(TypeA)
- **Compatibility**   Universal Serial Bus Specification Rev. 2.0/1.1/1.0 Compliant
  Advanced Configuration and Power Interface (ACPI), OnNow and USB power management requirements
- **Transfer Speed**   480 Mbit/s (High Speed Mode)
  12 Mbit/s (Full-speed Mode)
  1.5 Mbit/s (low-speed mode)
- **Supply Current**   500 mA max. per channel

General

- **Housing**   Plastic (ABS+PC)
- **Dimensions**   132 x 80 x 32 mm (L x W x H)
- **Power Consumption**   +5 V @ 2.5A max.
- **Operating Temperature**   0 ~ 60° C (32 ~ 140° F) (refer to IEC 68-2-1, 2)
- **Storing Temperature**   -20 ~ 70° C (-4 ~ 158° F)
- **Storing Humidity**   5 ~ 95% RH non-condensing (refer to IEC 68-2-3)

Ordering Information

- **USB-4622**   5-port USB 2.0 Hub (Power adapter included)

USB-4711
USB-4711A

100 kS/s, 12-bit Multifunction USB Module

150 kS/s, 12-bit Multifunction USB Module

1 PAC & Software
2 BAS
3 UNO
4 RS-485 I/O
5 Ethernet I/O
6 TPC
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8 FPM
9 AWS
10 Plug-in I/O
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12 Signal Conditioning
13 USB I/O
14 Motion Control I/O
15 Ethernet Switch
16 EDG
17 ICOM

Features

- Supports USB 2.0
- Portable
- Bus-powered
- 16 analog input channels
- 12-bit resolution AI
- Sampling rate up to 150 kS/s
- 8 DI/8 DO, 2 AO and one 32-bit event counter
- Wiring terminal on modules
- Suitable for DIN-rail mounting
- Lockable USB cable for rigid connection

Introduction

The USB-4700 series consists of true Plug & Play data acquisition modules. No more opening up your computer chassis to install boards. Just plug in the module, then get the data. It's easy and efficient. Reliable and rugged enough for industrial applications, yet inexpensive enough for home projects, the USB-4711 is the perfect way to add measurement and control capability to any USB capable computer. The USB-4711 is fully USB Plug & Play and easy to use. It obtains all required power from the USB port, so no external power connection is ever required.

Specifications

Analog Input

- **Channels**   USB-4711: 16 Single-ended
                            USB-4711A: 16 Single-ended/8 Differential
                            (SW selectable)
- **Resolution**   12 bits
- **Max. Sampling Rate***   USB-4711: 100k S/s max.
                            USB-4711A: 150k S/s max.
- **FIFO Size**   1024 samples
- **Overvoltage Protection** 30 Vp-p
- **Input Impedance**   USB-4711: 2 MΩ
                            USB-4716: 1 GΩ
- **Sampling Modes**   Software, onboard programmable pacer, or external
- **Input Range**   (V, software programmable)

Bipolar	± 10	± 5	± 2.5	± 1.25	± 0.625
Accuracy (% of FSR ±1LSB)	0.1	0.1	0.2	0.2	0.4

*Note:
The sampling rate and throughput depends on the computer hardware architecture and software environment. The rates may vary due to programming language, code efficiency, CPU utilization and so on.

Analog Output

- **Channels**   2
- **Resolution**   12 bits
- **Output Rate**   Static update
- **Output Range**   (V, software programmable)

Internal Reference	Unipolar	0 ~ 5, 0 ~ 10
	Bipolar	±5, ±10

- **Slew Rate**   USB-4711: 0.7 V/μs
                            USB-4711A: 0.15 V/μs
- **Driving Capability**   USB-4711: 3 mA @ 10 V
                            USB-4711A: 2 mA @ 10 V
- **Output Impedance**   0.5 Ω
- **Operation Mode**   Single output
- **Accuracy**   Relative: ±1 LSB
                            Differential Non-linearity: ±1 LSB

Digital Inputs

- **Channels**   8
- **Compatibility**   3.3 V/5 V/TTL
- **Input Voltage**   Logic 0: 0.8 V max.
                        Logic 1: 2.0 V min.

Digital Outputs

- **Channels**   8
- **Compatibility**   3.3 V/TTL
- **Output Voltage**   Logic 0: 0.8 V max.@ 4 mA (sink)
                        Logic 1: 2.0 V min.@ 4 mA (source)

Event Counter

- **Channels**   1
- **Compatibility**   3.3 V/TTL
- **Max. Input Frequency** 1 kHz

General

- **Bus Type**   USB 2.0
- **I/O Connector**   On board screw terminal
- **Dimensions (L x W x H)** 132 x 80 x 32 mm
- **Power Consumption**   Typical: +5 V @ 340 mA
                            Max: +5 V @ 440 mA
- **Operating Temperature** 0 ~ 60° C (32 ~ 140° F) (refer to IEC 68-2-1, 2)
- **Storing Temperature**   -20 ~ 70° C (-4 ~ 158° F)
- **Storing Humidity**   5 ~ 95% RH non-condensing (refer to IEC 68-2-3)

Ordering Information

- **USB-4711**   100 kS/s, 12-bit Multifunction USB Module, one 1.8 m
                    USB 2.0 cable included
- **USB-4711A**   150 kS/s, 12-bit Multifunction USB Module, one 1.8 m
                    USB 2.0 cable included

USB-4716

200 kS/s, 16-bit Multifunction USB Module

Features

- Supports USB 2.0
- Portable
- Bus-powered
- 16 analog input channels
- 16-bit resolution AI
- Sampling rate up to 200 kS/s
- 8DI/8DO, 2 AO and 1 32-bit counter (USB-4716L w/o AO)
- Wiring terminal on modules
- Suitable for DIN-rail mounting
- Lockable USB cable for rigid connection

Introduction

The USB-4700 series consists of true Plug & Play data acquisition devices. No more opening up your computer chassis to install boards–just plug in the module, then get the data. It's easy and efficient. USB-4716 offers 16SE/8Diff. inputs with 16-bit resolution, up to 200 kS/s throughput, 16 digital I/O lines and 1 user counter, and 16-bit analog outputs.

Reliable and rugged enough for industrial applications, yet inexpensive enough for home projects, the USB-4716 is the perfect way to add measurement and control capability to any USB capable computer. The USB-4716 is fully USB Plug & Play and easy to use. It obtains all required power from the USB port, so no external power connection is ever required.

Specifications

Analog Input

- **Channels**   16 single-ended/ 8differential (SW programmable)
- **Resolution**   16 bits
- **Max. Sampling Rate***   200 kS/s max. (For USB 2.0)
- **FIFO Size**   1024 samples
- **Overvoltage Protection** 30 Vp-p
- **Input Impedance**   Off: 100 MΩ/10 pF, On: 100 MΩ/100 pF
- **Sampling Modes**   Software, onboard programmable pacer, or external
- **Input Range**   **(V, software programmable)**

Bipolar	± 10	± 5	± 2.5	± 1.25	± 0.625
Accuracy (% of FSR ±1LSB)	0.15	0.03	0.03	0.05	0.1

*Note:
The sampling rate and throughput depends on the computer hardware architecture and software environment. The rates may vary due to programming language, code efficiency, CPU utilization and other factors.

Analog Output

- **Channels**   2
- **Resolution**   16 bits
- **Output Rate**   Static update
- **Output Range**   **(V, software programmable)**

Internal Reference	Unipolar	0 ~ 5 , 0 ~ 10
	Bipolar	±5 V, ±10 V

- **Slew Rate**   0.125 V/μs
- **Driving Capability**   5 mA
- **Output Impedance**   0.1 Ω max.
- **Operation Mode**   Single output
- **Accuracy**   Relative: ±1 LSB

Digital Input

- **Channels**   8
- **Compatibility**   3.3 V/5 V/TTL
- **Input Voltage**   Logic 0: 0.8 V max.
                            Logic 1: 2.0 V min.

Digital Output

- **Channels**   8
- **Compatibility**   3.3 V/TTL
- **Output Voltage**   Logic 0: 0.4 V max.
                            Logic 1: 2.4 V min.
- **Output Capability**   Sink: 4 mA (sink)
                            Source: 4 mA (source)

Event Counter

- **Channels**   1
- **Compatibility**   3.3 V/5 V/TTL
- **Max. Input Frequency** 0.1~1K while using FAI; 0,1~10K while using SWAI

General

- **Bus Type**   USB V2.0
- **I/O Connector**   On board screw terminal
- **Dimensions (L x W x H)** 132 x 80 x 32 mm
- **Power Consumption**   Typical +5 V @ 340 mA
                            Max.: +5 V @ 440 mA
- **Operating Temperature** 0 ~ 60° C (32 ~ 158° F) (refer to IEC 68-2-1, 2)
- **Storing Temperature**   -20 ~ 85° C (-4 ~ 158° F)
- **Operating Humidity**   5 ~ 85% RH non-condensing(refer to IEC 68-1, -2, -3)
- **Storage Humidity**   5 ~ 95% RH non-condensing (refer to IEC 68-1, -2, -3)

Ordering Information

- **USB-4716**   200 kS/s, 16-bit Multifunction USB Module, one 1.8 m USB 2.0 cable included

USB-4718

8-ch Thermocouple Input USB Module

1 PAC & Software
2 BAS
3 UNO
4 RS-485 I/O
5 Ethernet I/O
6 TPC
7 IPPC
8 FPM
9 AWS
10 Plug-in I/O
11 CompactPCI
12 Signal Conditioning
13 USB I/O
14 Motion Control I/O
15 Ethernet Switch
16 EDG
17 ICOM

Features

- Supports USB 2.0
- Support voltage, current, and thermocouple inputs
- Bus-powered
- 8 thermocouple input channels
- 2,500 V_{DC} isolation
- Support 4 ~ 20 mA current output
- Wiring terminal on modules
- 8-ch isolated DI and 8-ch isolated DO
- Suitable for DIN-rail mounting
- Lockable USB cable for rigid connection

Introduction

The USB-4700 series consists of true Plug & Play data acquisition devices. No more opening up your computer chassis to install boards–just plug in the module, then get the data. It's easy and efficient. USB-4718 offers 8 thermocouple inputs with 16-bit resolution, up to 0.1% input range accuracy, or 4 ~ 20 mA inputs.

Reliable and rugged enough for industrial applications, yet inexpensive enough for home projects, the USB-4718 is the perfect way to add measurement and control capability to any USB capable computer. The USB-4718 is fully USB plug and play and easy to use. It obtains all required power from the USB port, so no external power connection is ever required.

Specifications

Analog Input

- **Accuracy** ±0.1% for voltage input
- **Bandwidth** 13.1 Hz @ 50 Hz, 15.72 Hz @ 60 Hz
- **Channels** Eight differential
- **Ch. Independent Conf.** Yes
- **CMR @ 50/60 Hz** 92 dB min.
- **Resolution** 16 bits
- **Input Impedance** 20 MΩ
- **Input Range** 0 ~ 15 mV, 0 ~ 50 mV, 0 ~ 100 mV, 0 ~ 500 mV, 0 ~ 1 V, 0 ~ 2.5 V, 0 ~ 20 mA, 4 ~ 20 mA
- **Input Types** Thermocouple, mV, V, mA
- **Sampling Rate** 10 samples/sec. (total)
- **Span Drift** ±25 ppm/° C
- **T/C Type and Temperature Ranges**

J	0 ~ 760° C	R	500 ~ 1750° C
K	0 ~ 1370° C	S	500 ~ 1750° C
T	-100 ~ 400° C	B	500 ~ 1800° C
E	0 ~ 1000° C		

- **TVS/ESD Protection** Built-in
- **Zero Drift** ±3 µV/° C

Isolated Digital Input

- **Channels** 8
- **Input Voltage** Logic 0: 2 V max. Logic 1: 5 V min. (30 V max.)
- **Isolation Protection** 2,500 V_{DC}
- **Opto-Isolator Response** 25 µs

Isolated Digital Output

- **Channels** 8
- **Output Type** Sink (NPN)
- **Isolation Protection** 2,500 V_{DC}
- **Output Voltage** 5 ~ 30 V_{DC}, 1.1 A max/total
- **Sink Current** 200 mA max./channel
- **Opto-isolator Response** 25 µs

General

- **Bus Type** USB 2.0
- **I/O Connector** Onboard screw terminal
- **Dimensions (Lx W x H)** 132 x 80 x 32 mm
- **Power Consumption** 100 mA @ 5 V
- **Power Input** 5 V from USB line
- **Watchdog Timer** 1.6 sec. (system)
- **Operating Temperature** 0 ~ 60° C (32 ~ 140° F) (refer to IEC 68-2-1, 2)
- **Storing Temperature** -20 ~ 70° C (-4 ~ 158° F)
- **Storing Humidity** 5 ~ 95% RH non-condensing (refer to IEC 68-2-3)

Ordering Information

- **USB-4718** 8-ch Thermocouple Input USB Module, one 1.8 m USB 2.0 cable included

USB-4750

32-ch Isolated Digital I/O USB Module

NEW

FCC $C\epsilon$

Features

- Compatible with USB 1.1/2.0
- Bus-powered
- 16 isolated DI and 16 isolated DO channels
- High voltage isolation on all channels (2500 V$_{DC}$)
- High sink current on isolated output channels (100 mA/Channels)
- Supports 5 ~ 40 V$_{DC}$ isolated input channels
- Interrupt handling
- Timer/Counter capability
- Suitable for DIN-rail mounting
- Lockable USB cable for rigid connection

Introduction

The USB-4700 series consists of true Plug & Play data acquisition devices. No more opening up your computer chassis to install boards-just plug in the module, then get the data.

It's easy and efficient. USB-4750 is a 32-channel isolated digital I/O module for the USB bus. With isolation protection of 2,500 V$_{DC}$, and dry contact support, USB-4750 is ideal for industrial applications where high-voltage protection is required. Each I/O channel of the USB-4750 corresponds to a bit in an I/O port. This makes USB-4750 very easy to program. This module also offers a counter or timer and one digital input interrupt lines to a PC. So users can then easily do configurations by software.

Reliable and rugged enough for industrial applications, yet inexpensive enough for home projects, the USB-4750 is the perfect way to add measurement and control capability to any USB capable computer. The USB-4750 is fully USB Plug & Play and easy to use. It obtains all required power from the USB port, so no external power connection is ever required.

Specifications

Isolated Digital Input

- **Channels** 16
- **Input Voltage** Logic 0: 2 V Max
  Logic 1: 5 V Min (50 V$_{DC}$ Max) or dry contact
- **Interrupt Capable Ch.** 2
- **Isolation Protection** 2,500 V$_{DC}$

Isolated Digital Output

- **Channels** 16
- **Output Type** Sink (NPN)
- **Isolation Protection** 2,500 V$_{DC}$
- **Output Voltage** 5 ~ 40 V$_{DC}$
- **Sink Current** 200 mA max. per channel

Counter/Timer

- **Channels** 1
- **Resolution** 1 x 32-bit timer

1 x 16-bit Isolated Counter

- **Compatibility** 5 V/TTL
- **Max. Input Frequency** 1 MHz
- **Isolation Protection** 2,500 V$_{DC}$

General

- **Bus Type** USB 1.1/2.0
- **I/O Connectors** Onboard screw terminals
- **Dimensions (L x W x H)** 132 x 80 x 32 mm
- **Power Consumption**
  Typical: 5 V @ 200 mA
  Max: 5 V @ 300 mA
- **Operating Temperature** 0 ~ 60° C (32 ~ 140° F) (refer to IEC 68-2-1, 2)
- **Storing Temperature** -20 ~ 70° C (-4 ~ 158° F)
- **Storing Humidity** 5 ~ 95% RH, non-condensing (refer to IEC 68-2-3)

Ordering Information

- **USB-4750** 32-ch Isolated Digital I/O USB Module

USB-4751/4751L
48/24-ch TTL DI/O USB Modules

1 PAC & Software
2 BAS
3 UNO
4 RS-485 I/O
5 Ethernet I/O
6 TPC
7 IPPC
8 FPM
9 AWS
10 Plug-in I/O
11 CompactPCI
12 Signal Conditioning
13 USB I/O
14 Motion Control I/O
15 Ethernet Switch
16 EDG
17 ICOM

NEW

Features

- Compatible with USB 1.1/2.0
- Portable
- Bus-powered
- 48/24 TTL digital I/O lines
- Emulates mode 0 of 8255 PPI
- Buffered circuits for higher driving capacity than 8255
- Interrupt handling
- Timer/Counter interrupt capability
- Supports both dry and wet contact
- 50-pin Opto-22 compatible box header
- Suitable for DIN-rail mounting
- Lockable USB cable for rigid connection

Introduction

The USB-4700 series consists of true Plug & Play data acquisition devices. No more opening up your computer chassis to install boards-just plug in the module, then get the data. It's easy and efficient. USB-4751/4751L is a 48/24-bit digital I/O module for the USB bus. Its 48/24 bits are divided into six/three 8-bit I/O ports and users can configure each port as input or output via software. USB-4751/USB-4751L also provides one event counter and three 16-bit timers, which can be cascaded to become a 32-bit timer.

Specifications

Digital Input

- **Channels** 48/24 (shared with output)
- **Compatibility** 5 V/TTL
- **Input Voltage** Logic 0: 0.8 V max.
  Logic 1: 2 V min.

Digital Output

- **Channels** 48/24 (shared with input)
- **Compatibility** 5 V/TTL
- **Output Voltage** Logic 0: 0.4 V max.
  Logic 1: 2.4 V min.
- **Output Capability** Sink: 0.4 V @ 8 mA
  Source: 2.4 V @ 4 mA

Counter/Timer

- **Channels** 3
- **Resolution** 2 x 16-bit counters, or 1 x 32-bit counter
  1 x 16-bit event counter
- **Compatibility** 5 V/TTL
- **Max. Input Frequency** 10 MHz

General

- **Bus Type** USB 1.1/2.0
- **I/O Connectors** 50-pin IDC male connectors, pin assignments are fully compatible with Opto-22 I/O module racks
- **Dimensions (L x W x H)** 132 x 80 x 32 mm
- **Power Consumption** Typical: 5 V @ 200 mA
  Max: 5 V @ 300 mA
- **Operating Temperature** 0 ~ 60° C (32 ~ 140° F) (refer to IEC 68-2-1, 2)
- **Storing Temperature** -20 ~ 70° C (-4 ~ 158° F)
- **Storing Humidity** 5 ~ 95% RH, non-condensing (refer to IEC 68-2-3)

Ordering Information

- **USB-4751** 48-ch TTL Digital I/O USB Module
- **USB-4751L** 24-ch TTL Digital I/O USB Module

USB-4761

8-ch Relay/Isolated DI USB Module

Features

- Compatible with 1.1/2.0
- Portable
- Bus-powered
- 8 relay output channels and 8 isolated digital input channels
- LED indicators to show activated relays
- 8 Form C type relay output channels
- High-voltage isolation on input channels (2,500 V_{DC})
- High ESD protection (2,000 V_{DC})
- Wide input range (5 ~ 30 V_{DC})
- Interrupt handling capability
- Wiring terminal on Modules
- Suitable for DIN-rail mounting
- Lockable USB cable for rigid connection

Introduction

The USB-4761 is a relay actuator and isolated D/I module for USB bus. It provides 8 optically-isolated digital inputs with isolation protection of 2,500 V_{DC} for collecting digital inputs in noisy environments and 8 relay actuators for serving as on/off control devices or small power switches. For easy monitoring, each relay is equipped with one red LED to show its on/off status. The USB-4761's eight optically-isolated digital input channels are ideal for digital input in noisy environments or with floating potentials.

Rugged Protection

The USB-4761 digital input channels feature a rugged isolation protection for industrial, lab and machinery automation applications. It durably withstands voltage up to 2,500 V_{DC}, protecting your host system from any incidental harms. If connected to an external input source with surge-protection, the USB-4761 can offer up to a maximum of 2,000 V_{DC} ESD (Electrostatic Discharge) protection.

Specifications

Isolated Digital Input

- **Channels**   8
- **Input Voltage**   Logic 0: 2 V max.
  Logic 1: 10 V (30 V max.)
- **Isolation Protection**   2,500 V_{DC}
- **Opto-Isolator Response** 25 µs
- **Input Current**   30 V_{DC}/1 A

Relay Output

- **Channels**   8
- **Relay Type**   SPDT (8 x Form C)
- **Contact Rating**   250 V_{AC} @ 3 A, or 24 V_{DC} @ 3 A
- **Relay on Time**   15 ms max.
- **Relay off Time**   5 ms max.
- **Life Span**   2 x 10^7
- **Resistance**   Contact: 50 MΩ
  Insulation: 1 GΩ min. (at 500 V_{DC})

General

- **Bus Type**   USB 1.1/2.0
- **I/O Connectors**   Onboard screw terminal
- **Dimensions (L x W x H)** 132 x 80 x 32 mm
- **Power Consumption**   Typical: +5 V @ 60 mA
  Max: +5 V @ 400 mA
- **Operating Temperature** 0 ~ 60° C (32 ~ 140° F) (IEC 68-2-1, 2)
- **Storing Temperature**   -20 ~ 70° C (-4 ~ 158° F)
- **Storing Humidity**   5 ~ 95 % RH, non-condensing (IEC 68-2-3)

Ordering Information

- **USB-4761**   8-ch Relay/Isolated DI USB Module

USB-4671

Features

- Supports USB 2.0
- Convenient portable design
- Bus-powered
- Complete IEEE 488.2 compatibility
- Full driver, library, and example support, including; Visual C++®, C++ Builder®, Visual Basic®, and Delphi® drivers
- Provides powerful and easy-to-use configuration utility
- No GPIB cable required for instrument connection
- Plug & Play installation and configuration

Introduction

USB-4671 is a high-performance USB Module with a GPIB interface. The Module is fully compatible with IEEE 488.1 and 488.2 standards with its USB 2.0 bus specification. With two driver control modes: controller mode and slave mode; USB-4671 can perform basic the IEEE 488 talker, listener and controller functions required by IEEE 488.2. You can also connect up to 15 GPIB instruments. Therefore, USB-4671 is especially suitable for instrument measurements and control.

USB-4671 is available for Windows® 2000/XP, and it supports complete drivers and libraries. To make driver development easier, USB-4671 comes with example drivers programmed in: Visual C++, C++ Builder, Visual Basic, and Delphi.

Furthermore, USB-4671 also offers powerful testing features and a configuration utility that allows users to easily access and control instruments. USB-4671 offers a comprehensive supplementary controller driver database and provides standard IEEE-488 commands to help users develop applications. Users can use an interactive GPIB window interface to control devices directly without any need of programming.

Specifications

GPIB

- **Compatibility**   IEEE 488, 488.1, 488.2
- **GPIB Transfer Rate**   1.8 MB/s
- **OS Support**   Windows 2000/XP
- **Library Support**   Visual C++, C++ Builder, Visual Basic, Delphi
- **Max. GPIB Connections** 15

General

- **Bus Type**   USB 2.0
- **I/O Connectors**   1 x IEEE 488 standard 24-pin
- **Storing Temperature**   -20 ~ 70° C (-4 ~ 158° F)
- **Operating Humidity**   10 ~ 90% RH, non-condensing
- **Dimensions**   107 x 66 x 26 mm (4.2 x 2.6 x 1.0 in.)

Ordering Information

- **USB-4671**   GPIB USB Module
- **PCL-10488-1**   IEEE-488 Cable, 1 m
- **PCL-10488-2**   IEEE-488 Cable, 2 m
- **PCL-10488-4**   IEEE-488 Cable, 4 m

1 PAC & Software
2 BAS
3 UNO
4 RS-485 I/O
5 Ethernet I/O
6 TPC
7 IPPC
8 FPM
9 AWS
10 Plug-in I/O
11 CompactPCI
12 Signal Conditioning
13 USB I/O
14 Motion Control I/O
15 Ethernet Switch
16 EDG
17 ICOM

USB Assembly

## Advantech USB Data Acquisition Series Assembly Guide

The unique design of Advantech's USB Data Acquisition (DAQ) Series can fulfill demands on rigid connections between USB cables and the devices, as well as allow modules to be used with a variety of alternate mounting solutions. The following information will provide the necessary information and guide you through the basic operations of these kits.

Dimensions

(Device)

(Screw Terminal)
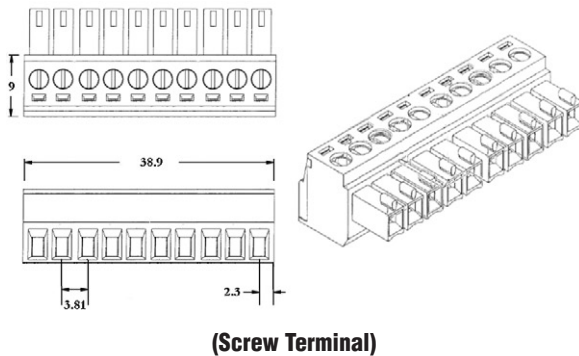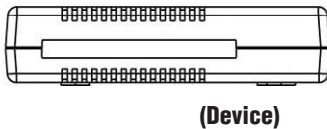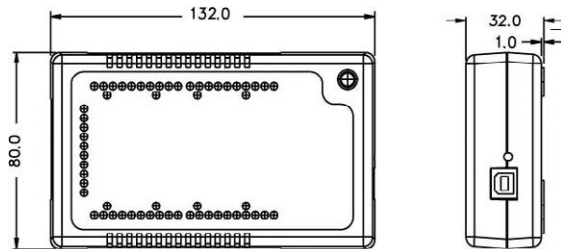
Removing the Casing

You may need to remove the modules' outer casing to access the jumpers inside the module. To remove the casing, you'll have to first remove the rubber padding covering the screws, and then remove the two screws holding the casing in place, as shown below.
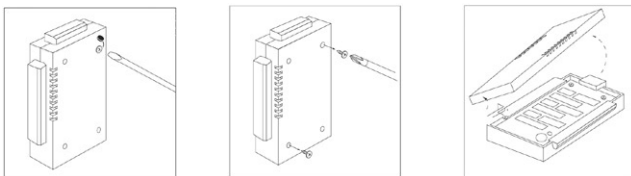

Attaching the Lockable USB Cable

Advantech USB DAQ series feature the lockable cable design to secure the device connection. To prevent the USB cable from being unplugged accidentally, please insert the cable into the module, and screw in the two fasteners as shown below.
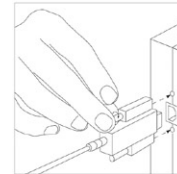
*Note: Every USB-4700 series data acquisition module comes with a 1.8m lockable USB cable.

Attaching the DIN-rail Bracket

Advantech's USB DAQ modules come with a bracket that facilitates the industry standard DIN-rail mounting. To attach, simply place the bracket firmly on the back, and secure it by attaching the two screws into the holes as shown below.
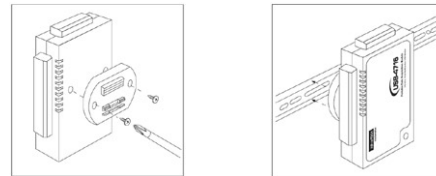
*Note: Every Advantech's USB data acquisition/hub module comes with a set of DIN-rail kit.

Attaching the Wallmount Bracket (Optional)

The wallmount kit can help you hang your modules on the wall or other flat surfaces. To attach the wallmount bracket, remove all 4 rubber pads on the rear of the module, and secure it by attaching the two screws into the holes as shown below.
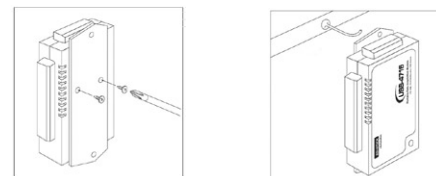
Wallmount kit part number: 1960004544

Attaching a VESA Bracket (Optional)

Use the VESA bracket to mount your module to the VESA-ready appliances, such as Advantech's TPC series. To attach, remove all 4 rubber pads on the back, and secure it by attaching the two screws into the holes as shown below.
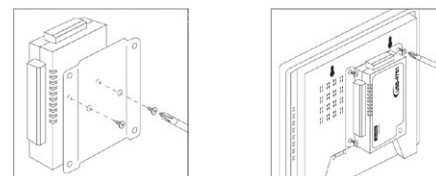
VESA bracket part number: 1960005788