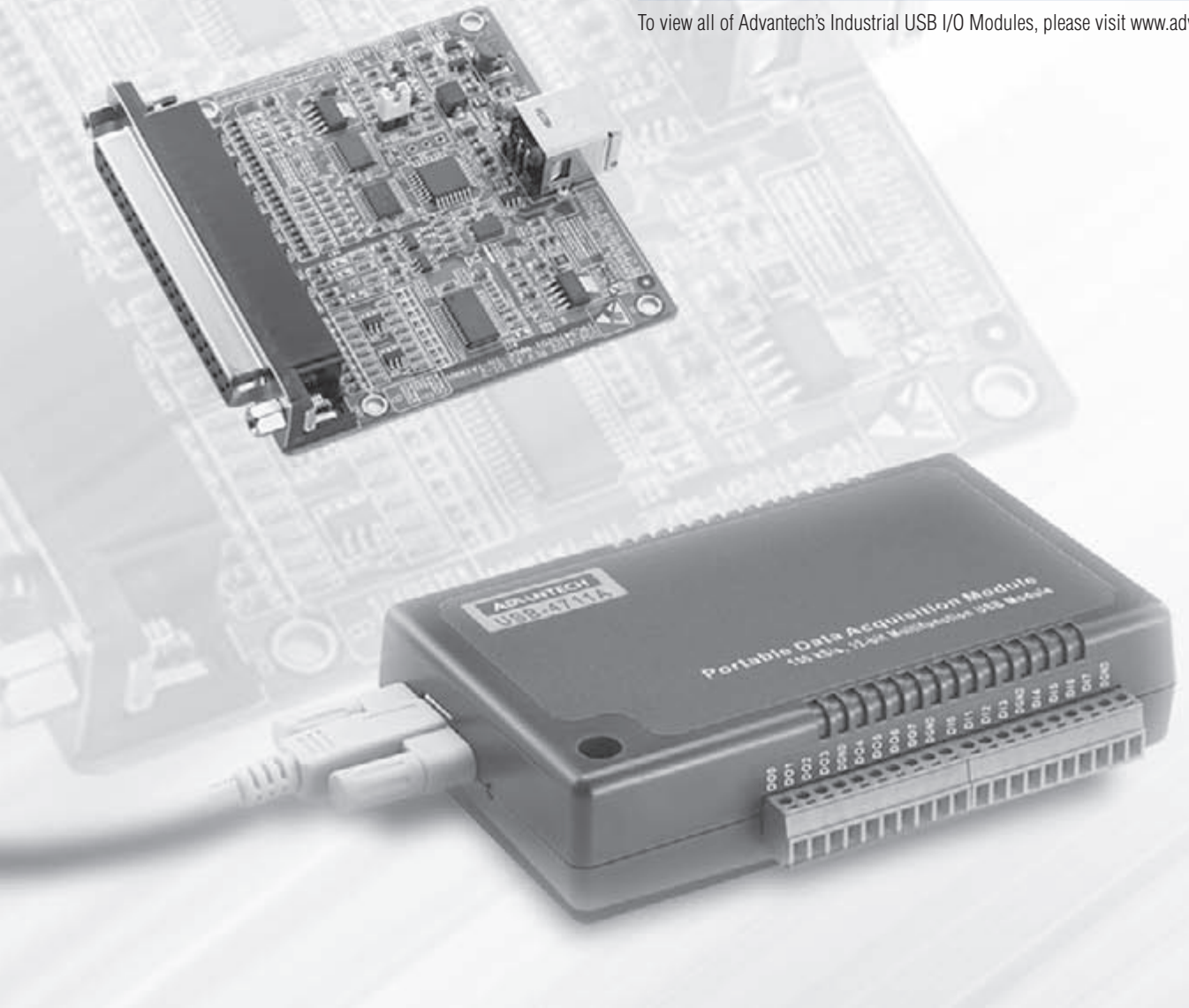
18

Industrial USB I/O Modules

To view all of Advantech's Industrial USB I/O Modules, please visit www.advantech.com/products.



USB Data Acquisition (DAQ) Series Overview

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 and 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 interfaces come together with cable and terminal board, engineers 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 engineers can reduce the effort by maintain two parts separately.

The transmission rate of USB 2.0 is 480 Mb/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 Companion 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
- Detachable screw terminal on modules
- Ready-to-Use software and drivers

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

Design Concepts

- **Efficient**
  - Advantech USB data acquisition series needs no external power source and can get rid 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.
- **Speedy**
  - 480Mbps data transmission rate is 20,000 times faster than traditional RS-485 based I/O, making the USB series possible to achieve heavy-loaded tasks.
- **Integrated**
  - All the analog input, analog output, 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 the same specification as our existed PCI data acquisition cards.

- The 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-4716	PCI-1716	200 kS/s, 16-bit Multifunction
USB-4750	PCI-1750	32-ch Isolated Digital I/O
USB-4751	PCI-1751	48-ch Digital I/O
USB-4761	PCI-1761	8-ch Relay and 8-ch Isolated Digital Input
USB-4671	PCI-1671UP	GPIB Device

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

Mounting Scheme of USB DAQ Modules

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

- **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.
- **Wall/Panel Mount**
  - The wallmount kit can help users hang their modules on the wall or other flat surfaces.
- **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 flat panel monitors (FPM series).

DIN-rail Mount

Wall/Panel Mount

VESA Mount

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 invests R&D effort to provide screw-type USB connection cable. With this innovative cable, the USB-based data acquisition module can be connected firmly.

* Note: USB-4702 and USB-4704 do not support this feature.

Robust & Anti-vibration (P/N: USB-Lock cable)

Advantech also provides another innovated accessory for making 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.

Lockable Casing for Type A USB Connector

Software Support for the USB DAQ Series

Advantech provides five software solutions 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 extends 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 DAQ devices and 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/XP/Vista.

USB I/O Module Selection Guide





Category			Multifunction				Analog Input
Bus			USB				
Model			USB-4702	USB-4704	USB-4711A	USB-4716	USB-4718
Analog Input	General Spec.	Resolution	12 bits	14 bits	12 bits	16 bits	16 bits
		Channels	8 S.E./4 Diff.	8 S.E./4 Diff.	16 S.E./8 Diff.	16 S.E./8 Diff.	8 Diff.
		Onboard FIFO	512 samples	512 samples	1,024 samples	1,024 samples	-
		Sampling Rate	10 kS/s	48 kS/s	150 kS/s	200 kS/s	10 S/s
	Input Ranges	Unipolar Inputs (V)	-	-	-	0 ~ 10, 0 ~ 5, 0 ~ 2.5, 0 ~ 1.25	J,K,T,E,R,S,B types
		Bipolar Inputs (V)	S.E.: ± 10 Diff.: ±1, ±1.25, ± 2, ± 2.5, ±4, ±5, ±10, ±20	S.E.: ± 10 Diff.: ±1, ±1.25, ± 2, ± 2.5, ±4, ±5, ±10, ±20	±10, ±5, ±2.5, ±1.25, ±0.625	±10, ±5, ±2.5, ±1.25, ±0.625	-
		Configurable Per-Channel	✓	✓	✓	✓	✓
	Trigger Mode	Pacer/Software/ External Pulse	✓	✓	✓	✓	Software
	Data Transfer Mode	Software	✓	✓	✓	✓	✓
		DMA	-	-	-	-	-
Analog Output	Resolution		12 bits	12 bits	12 bits	16 bits	-
	Channels		2	2	2	2	-
	Output Range (V)		0~5	0~5	0 ~ 5, 0 ~ 10, ±5, ±10	0 ~ 5, 0 ~ 10, ±5, ±10	-
	Output Rate		Static update	Static update	Static update	Static update	-
Digital I/O	Input Channels		8	8	8	8	8 (Isolated)
	Output Channels		8	8	8	8	8 (Isolated)
Timer/ Counter	Channels		1	1	1	1	-
	Resolution		32 bits	32 bits	32 bits	32 bits	-
	Max. Input Frequency		5 MHz	5 MHz	1 kHz	1 kHz	-
Isolation Voltage			-	-	-	-	2,500 V_{DC}
BoardID Switch			-	-	Software	Software	Software
Dimensions (mm)			70 x 70	132 x 80 x 32	132 x 80 x 32	132 x 80 x 32	132 x 80 x 32
Connector			1 x DB37	Onboard screw terminal	Onboard screw terminal	Onboard screw terminal	Onboard screw terminal
Windows 2000/XP DLL Driver			✓	✓	✓	✓	✓
Windows Vista DDL Driver			✓	✓	✓	✓	✓
Windows 2000/XP SDK			✓	✓	✓	✓	✓
Win CE 5.0/6.0 Driver			-	-	✓	✓	✓
Linux Driver			-	-	✓	✓	✓
ActiveDAQ/ ActiveDAQ Pro			✓	✓	✓	✓	✓
Labview I/O Drivers			✓	✓	✓	✓	✓
Page			18-7	18-8	18-9	18-10	18-11

Catagory			Non-Isolated Digital I/O		Isolated Digital I/O	
Bus			USB			
Model			USB-4751	USB-4751L	USB-4750	USB-4761
TTL DI/O	Input	Channels	48	24	-	-
	Output	Channels			-	-
		Sink Current	8 mA @ 0.4 V	8 mA @ 0.4 V	-	-
		Source Current	4 mA @ 2.4 V	4 mA @ 2.4 V	-	-
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 V_{AC} @ 0.25 A
Timer/Counter	Channels		2	2	2	-
	Resolution		32 bits	32 bits	32 bits	-
	Max. Input Frequency		10 MHz	10 MHz	1 MHz	-
Advanced Function	Output Status Read Back		✓	✓	✓	✓
Isolation Voltage			-	-	2,500 V_{DC}	2,500 V_{DC}
BoardID Switch			Software			
Dimensions			132 x 80 x 32	132 x 80 x 32	132 x 80 x 32	132 x 80 x 32
Connector			2 x opto-22 compatiable box header	1 x opto-22 compatiable box header	Onboard screw terminal	Onboard screw terminal
Windows 2000/XP DLL Driver			✓	✓	✓	✓
Windows Vista DDL Driver			✓	✓	✓	✓
Windows 2000/XP SDK			✓	✓	✓	✓
Win CE 5.0/6.0 Driver			✓	✓	✓	✓
Linux Driver			✓	✓	✓	✓
ActiveDAQ/ ActiveDAQ Pro			✓	✓	✓	✓
Labview I/O Drivers			✓	✓	✓	✓
Page			18-13	18-13	18-12	18-14

USB-4620
USB-4622

5-port Full-speed Isolated USB 2.0 Hub

5-port High-speed USB 2.0 Hub

NEW

USB-4620

USB-4622

Features

- 5 downstream USB 2.0 ports
- Compatible with USB 2.0 Full-speed
- 3,000 V_{DC} voltage isolation for each downstream port
- Suitable for DIN-rail mounting
- One lockable USB cable included
- 10 ~ 30 V_{DC} power input (power adapter not included*)

Specifications

Connectivity

- **Ports** Upstream x 1 (Type B) Downstream x 5 (Type A)
- **Compatibility** USB 2.0 Full-speed
- **Transfer Speed** 12 Mbps
- **Supply Current** 500 mA max. per channel

General

- **Housing** Plastic (ABS+PC)
- **Dimensions (L x W x H)** 132 x 80 x 32 mm
- **DC Input** 10 ~ 30 V_{DC}
- **Power Consumption** 24 V @ 36 mA
- **Operating Temperature** 0 ~ 60° C (32 ~ 140° F)
- **Storage Temperature** -20 ~ 70° C (-4 ~ 158° F)
- **Storage Humidity** 5 ~ 95% RH non-condensing

Protection

- **Isolation Protection** 3,000 V_{DC}

Ordering Information

- **USB-4620** 5-port Full-speed Isolated USB 2.0 Hub
- **PWR-242** DIN-rail Power Supply
- **1960004544** Wallmount Bracket
- **1960005788** VESA Mount Bracket
- **USB-LOCKCABLE-AE** 1.8 M Lockable USB 2.0 Cable with Screw Kit

Features

- 5 downstream USB 2.0 ports
- Compatible with USB 2.0 High-speed, USB 2.0 Full-speed, USB 1.0
- 480 Mbps high-speed data transfer
- LED indicator
- Suitable for DIN-rail mounting
- One lockable USB cable included
- 10 ~ 30 V_{DC} power input (power adapter not included*)

Specifications

Connectivity

- **Ports** Upstream x 1 (Type B) Downstream x 5 (Type A)
- **Compatibility** USB 2.0 High-speed, USB 2.0 Full-speed, USB 1.0
- **Transfer Speed** 480 Mbps/12 Mbps/1.5 Mbps
- **Supply Current** 500 mA max. per channel

General

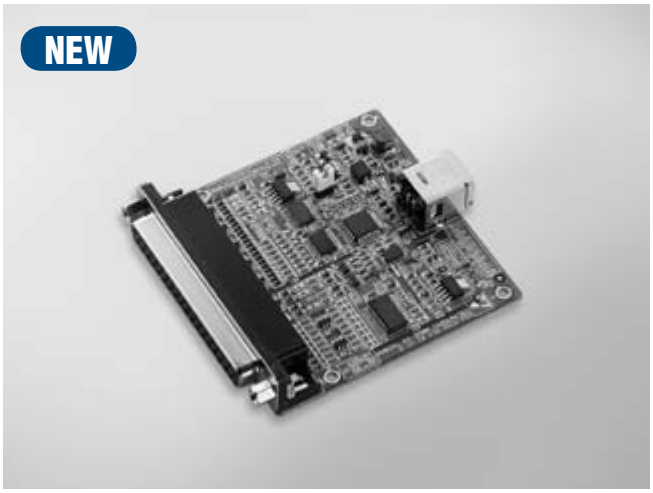
- **Housing** Plastic (ABS+PC)
- **Dimensions (L x W x H)** 132 x 80 x 32 mm
- **DC Input** 10 ~ 30 V_{DC}
- **Power Consumption** 24 V @ 36 mA
- **Operating Temperature** 0 ~ 60° C (32 ~ 140° F)
- **Storage Temperature** -20 ~ 70° C (-4 ~ 158° F)
- **Storage Humidity** 5 ~ 95% RH non-condensing

Ordering Information

- **USB-4622** 5-port High-speed USB 2.0 Hub
- **PWR-242** DIN-rail Power Supply
- **1960004544** Wallmount Bracket
- **1960005788** VESA Mount Bracket
- **USB-LOCKCABLE-AE** 1.8 M Lockable USB 2.0 Cable with Screw Kit

USB-4702

10 kS/s, 12-bit, 8-ch Multifunction USB Module



Features

- Supports USB 2.0
- Bus-powered
- 8 analog input channels
- 12-bit resolution AI
- Sampling rate up to 10 kS/s
- 8-ch DI/8-ch DO, 2-ch AO and one 32-bit counter

Introduction

USB-4702 is a low-cost USB data acquisition module. You no longer need to open the chassis to install DAQ modules. Just plug in the module, then get the data. It's easy and efficient. The USB-4702 is the perfect way to add measurement and control capability to any USB capable computer. It obtains all required power from the USB port, so no external power connection is ever required. With the features of USB-4702, it is your most cost effective choice of lab or production line test & measurement tool.

Specifications

Analog Input

- **Channels** 8 single-ended/4 differential (software programmable)
- **Resolution** 12 bits
- **Max. Sampling Rate** 10 kS/s max.
- **FIFO Size** 512 samples
- **Overvoltage Protection** 30 Vp-p
- **Input Impedance** 127 kΩ
- **Sampling Modes** Software, onboard programmable pacer, and external
- **Input Range** (V, software programmable)
  Single ended: ± 10
  Differential: ±1, ±1.25, ± 2, ± 2.5, ±4, ±5, ±10, ±20

Analog Output

- **Channels** 2
- **Resolution** 12 bits
- **Output Rate** Static update
- **Output Range** (V, software programmable) 0~5
- **Slew Rate** 0.7 V/μs
- **Driving Capability** 5 mA
- **Output Impedance** 51 Ω
- **Operation Mode** Single output
- **Accuracy** Relative: ±12 LSB
  Differential non-linearity: ±5 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.@ 4 mA (sink)
  Logic 1: 3.5 V min.@ 4 mA (source)

Counter

- **Channels** 1
- **Resolution** 32 bits
- **Compatibility** 3.3 V/TTL
- **Max. Input Frequency** 5 MHz

General

- **Bus Type** USB 2.0
- **I/O Connector** 1 x DB37 female connector
- **Dimensions (L x W)** 70 x 70 mm (2.76" x 2.76")
- **Power Consumption** Typical: 5 V @ 100 mA
  Max.: 5 V @ 500 mA
- **Operating Temperature** 0 ~ 55° C (32 ~ 131° F)
- **Storage Temperature** -20 ~ 70° C (-4 ~ 158° F)
- **Storage Humidity** 5 ~ 95% RH non-condensing (refer to IEC 68-2-3)

Ordering Information

- **USB-4702** 10 kS/s, 12-bit, 8-ch Multi. USB Module
- **PCL-10137-1** DB37 Cable, 1m
- **PCL-10137-2** DB37 Cable, 2m
- **PCL-10137-3** DB37 Cable, 3m
- **ADAM-3937** DB37 DIN-rail Wiring Board

USB-4704

48 kS/s, 14-bit, 8-ch Multifunction USB Module

NEW

Features

- Supports USB 2.0
- Portable
- Bus-powered
- 8 analog input channels
- 14-bit resolution AI
- Sampling rate up to 48 kS/s
- 8-ch DI/8-ch DO, 2-ch AO and one 32-bit counter
- Detachable screw terminal on modules
- Suitable for DIN-rail mounting

Introduction

The USB-4700 series consists of true Plug & Play data acquisition modules. You no longer need to open the chassis to install DAQ modules. 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-4700 series module is the perfect way to add measurement and control capability to any USB capable computer. The USB-4700 series is fully Plug & Play and with onboard terminal block for easy usage. It obtains all required power from the USB port, so no external power connection is ever required. USB-4704 is a multifunction module, with 8-ch Analog Input, 2-ch Analog Output, 16-ch Digital I/O and counter channel which is able to output a constant frequency square wave. With the features of USB-4700 series, USB-4704 is your most cost effective choice of lab or production line test & measurement tool.

Specifications

Analog Input

- **Channels** 8 single-ended/4 differential (software programmable)
- **Resolution** 14 bits
- **Max. Sampling Rate** 48 kS/s max.
- **FIFO Size** 512 samples
- **Overvoltage Protection** 30 Vp-p
- **Input Impedance** 127 kΩ
- **Sampling Modes** Software, onboard programmable pacer, and external
- **Input Range** (V, software programmable)
  Single ended: ± 10
  Differential: ±1, ±1.25, ± 2, ± 2.5, ±4, ±5, ±10, ±20

Analog Output

- **Channels** 2
- **Resolution** 12 bits
- **Output Rate** Static update
- **Output Range** (V, software programmable) 0~5
- **Slew Rate** 0.7 V/μs
- **Driving Capability** 5 mA
- **Output Impedance** 51 Ω
- **Operation Mode** Single output
- **Accuracy** Relative: ±12 LSB
  Differential non-linearity: ±5 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.@ 4 mA (sink)
  Logic 1: 3.5 V min.@ 4 mA (source)

Counter

- **Channels** 1
- **Resolution** 32 bits
- **Compatibility** 3.3 V/TTL
- **Max. Input Frequency** 5 MHz

General

- **Bus Type** USB 2.0
- **I/O Connector** Onboard screw terminal
- **Dimensions (L x W x H)** 132 x 80 x 32 mm
- **Power Consumption** Typical: 5 V @ 100 mA
  Max.: 5 V @ 500 mA
- **Operating Temperature** 0 ~ 55° C (32 ~ 131° F)
- **Storage Temperature** -20 ~ 70° C (-4 ~ 158° F)
- **Storage Humidity** 5 ~ 95% RH non-condensing (refer to IEC 68-2-3)

Ordering Information

- **USB-4704** 48 kS/s, 14-bit, 8-ch Multi. USB Module
- **1960004544** Wallmount Bracket
- **1960005788** VESA Mount Bracket

USB-4711A

150 kS/s, 12-bit, 16-ch Multifunction USB Module

Features

- Supports USB 2.0
- Portable
- Bus-powered
- 16 analog input channels
- 12-bit resolution AI
- Sampling rate up to 150 kS/s
- 8-ch DI/8-ch DO, 2-ch AO and one 32-bit counter
- Detachable screw terminal on modules
- Suitable for DIN-rail mounting
- One lockable USB cable for secure connection included

Introduction

The USB-4700 series consists of true Plug & Play data acquisition modules. You no longer need to open the chassis to install DAQ modules. 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-4700 series module is the perfect way to add measurement and control capability to any USB capable computer. The USB-4700 series is fully Plug & Play and with onboard terminal block for easy usage. It obtains all required power from the USB port, so no external power connection is ever required. USB-4711A is a multifunction module, with 16-ch Analog Input, 2-ch Analog Output, 16-ch Digital I/O and counter channel which is able to output a constant frequency square wave. With the features of USB-4700 series; USB-4711A is your most cost effective choice of lab or production line test & measurement tool.

Specifications

Analog Input

- **Channels** 16 single-ended/8 differential (software programmable)
- **Resolution** 12 bits
- **Max. Sampling Rate*** 150 kS/s max.
- **FIFO Size** 1,024 samples
- **Overvoltage Protection** 30 Vp-p
- **Input Impedance** 1 GΩ
- **Sampling Modes** Software, onboard programmable pacer, and 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** 0.15 V/μs
- **Driving Capability** 2 mA @ 10 V
- **Output Impedance** 0.5 Ω
- **Operation Mode** Single output
- **Accuracy** Relative: ±1 LSB
  Differential non-linearity: ±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: 0.8 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** Onboard 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)
- **Storage Temperature** -20 ~ 70° C (-4 ~ 158° F)
- **Storage Humidity** 5 ~ 95% RH non-condensing (refer to IEC 68-2-3)

Ordering Information

- **USB-4711A** 150 kS/s, 12-bit, 16-ch Multi. USB Module
- **1960004544** Wallmount Bracket
- **1960005788** VESA Mount Bracket

USB-4716

200 kS/s, 16-bit, 16-ch 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
- 8-ch DI/8-ch DO, 2-ch AO and one 32-bit counter
- Detachable screw terminal on modules
- Suitable for DIN-rail mounting
- One lockable USB cable for secure connection included

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 16 single-ended/ 8 differential inputs with 16-bit resolution, up to 200 kS/s throughput, 16 digital I/O lines and 1 user counter, add two 16-bit analog outputs. The high performance makes USB-4716 your best choice for test & measurement applications in the production line or in the lab.

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-4700 series is fully 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/ 8 differential (software programmable)
- **Resolution** 16 bits
- **Max. Sampling Rate*** 200 kS/s (for USB 2.0)
- **FIFO Size** 1,024 samples
- **Overvoltage Protection** 30 Vp-p
- **Input Impedance** 1 GΩ
- **Sampling Modes** Software, onboard programmable pacer, or external
- **Input Range** (V, software programmable)

Gain Code		4	0	1	2	3
Gain		0.5	1	2	4	8
Input Range	Bipolar	±10	±5	±2.5	±1.25	±0.625
	Unipolar	N/A	0 ~ 10	0 ~ 5	0 ~ 2.5	0 ~ 1.25

***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, ±10

- **Slew Rate** 0.7 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: 1.0 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: 6 mA (sink)
  Source: 6 mA (source)

Event Counter

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

General

- **Bus Type** USB 2.0
- **I/O Connector** Onboard screw terminal
- **Dimensions (L x W x H)** 132 x 80 x 32 mm
- **Power Consumption** Typical: 5 V @ 360 mA
  Max.: 5 V @ 450 mA
- **Operating Temperature** 0 ~ 60° C (32 ~ 158° F) (refer to IEC 68-2-1, 2)
- **Storage Temperature** -20 ~ 70° 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, 16-ch Multi. USB Module
- **1960004544** Wallmount Bracket
- **1960005788** VESA Mount Bracket

USB-4718

8-ch Thermocouple Input USB Module with 8-ch Isolated Digital Input

Features

- Supports USB 2.0
- Supports voltage, current, and thermocouple inputs
- Bus-powered
- 8 thermocouple input channels
- 2,500 V_{DC} isolation
- Supports 4 ~ 20 mA current input
- Detachable screw terminal on modules
- 8-ch isolated DI and 8-ch isolated DO
- Suitable for DIN-rail mounting
- One lockable USB cable for secure connection included

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. Portable design makes the USB-4718 suitable for the field research. Also the input channels can be set separately make it possible handling multiple types of sensor with only one USB-4718 module.

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-4700 series is fully 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** 8 differential
- **Ch. Independent Conf.** Yes
- **CMR @ 50/60 Hz** 92 dB min.
- **Resolution** 16 bits
- **Input Impedance** 1.8 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 S/s (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** ±0.3 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
- **Watchdog Timer** 1.6 sec. (system)
- **Operating Temperature** 0 ~ 60° C (32 ~ 140° F) (refer to IEC 68-2-1, 2)
- **Storage Temperature** -20 ~ 70° C (-4 ~ 158° F)
- **Storage Humidity** 5 ~ 95% RH non-condensing (refer to IEC 68-2-3)

Ordering Information

- **USB-4718** 8-ch Thermocouple Input USB Module
- **1960004544** Wallmount Bracket
- **1960005788** VESA Mount Bracket

USB-4750

32-ch Isolated Digital I/O USB Module

Features

- Compatible with USB 1.1/2.0
- Bus-powered
- 16 isolated DI and 16 isolated DO channels
- High voltage isolation on all channels (2,500 V_{DC})
- High sink current on isolated output channels (100 mA/Channels)
- Supports 5 ~ 60 V_{DC} isolated input channels
- Interrupt handling capability
- Timer/counter capability
- Suitable for DIN-rail mounting
- One lockable USB cable for secure connection included

CE FCC RoHS

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. 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. (60 V 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** 100 mA max. per channel
Total 1.1 A max.

Isolated Counter

- **Channels** 2
- **Resolution** 32-bit
- **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)
- **Storage Temperature** -20 ~ 70° C (-4 ~ 158° F)
- **Storage Humidity** 5 ~ 95% RH, non-condensing (refer to IEC 68-2-3)

Ordering Information

- **USB-4750** 32-ch Isolated Digital I/O USB Module
- **1960004544** Wallmount Bracket
- **1960005788** VESA Mount Bracket

USB-4751
USB-4751L

48-ch Digital I/O USB Module

24-ch Digital I/O USB Module

CE FCC RoHS

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 the 8255
- Interrupt handling capability
- Timer/Counter interrupt capability
- Supports both dry and wet contact
- 50-pin Opto-22 compatible box header
- Suitable for DIN-rail mounting
- One lockable USB cable for secure connection included

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** USB-4751: 48 (shared with output)
  USB-4751L: 24 (shared with output)
- **Compatibility** 5 V/TTL
- **Input Voltage** Logic 0: 0.8 V max.
  Logic 1: 2 V min.

Digital Output

- **Channels** USB-4751: 48 (shared with input)
  USB-4751L: 24 (shared with input)
- **Compatibility** 5 V/TTL
- **Output Voltage** Logic 0: 0.5 V max.
  Logic 1: 3.8 V min.
- **Output Capability** Sink: 12 mA @ 0.5 V
  Source: 12 mA @ 3.8 V for single channels
  5 mA @ 3.8 V for all channels in high status

Counter/Timer

- **Channels** 2
- **Resolution** 32-bit
- **Max. Input Frequency** 10 MHz

General

- **Bus Type** USB 1.1/2.0
- **I/O Connectors** 50-pin box headers, 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 @ 500 mA
- **Operating Temperature** 0 ~ 60° C (32 ~ 140° F) (refer to IEC 68-2-1, 2)
- **Storage Temperature** -20 ~ 70° C (-4 ~ 158° F)
- **Storage Humidity** 5 ~ 95% RH, non-condensing (refer to IEC 68-2-3)

Ordering Information

- **USB-4751** 48-ch Digital I/O USB Module
- **USB-4751L** 24-ch Digital I/O USB Module
- **1960004544** Wallmount Bracket
- **1960005788** VESA Mount Bracket
- **PCL-10150-1.2** 50-pin Flat Cable, 1.2 m
- **ADAM-3950** 50-pin DIN-rail Flat Cable Wiring Board
- **PCLD-782B** 24-ch IDI Board w/ 20-pin & 50-pin Flat Cables
- **PCLD-785B** 24-ch Relay Board w/ 20- pin & 50-pin Flat Cables

USB-4761

8-ch Relay and 8-ch Isolated Digital Input USB Module

Features

- Compatible with USB 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
- Detachable screw terminal on modules
- Suitable for DIN-rail mounting
- One lockable USB cable for secure connection included

CE FCC RoHS

Introduction

The USB-4761 is a relay actuator and isolated digital input 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: 5 V min. (30 V max.)
- **Isolation Protection** 2,500 V_{DC}
- **Opto-Isolator Response** 25 µs

Relay Output

- **Channels** 8
- **Relay Type** SPDT (8 x Form C)
- **Contact Rating** 240 V_{AC} @ 0.25 A, or 30 V_{DC} @ 1 A
- **Relay on Time** 5 ms max.
- **Relay off Time** 4 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)
- **Storage Temperature** -20 ~ 70° C (-4 ~ 158° F)
- **Storage Humidity** 5 ~ 95 % RH, non-condensing (IEC 68-2-3)

Ordering Information

- **USB-4761** 8-ch Relay/Isolated Digital Input USB Module
- **1960004544** Wallmount Bracket
- **1960005788** VESA Mount Bracket

USB-4671

GPIB USB Module

Features

- Supports USB 2.0
- Convenient portable design
- Bus-powered
- Complete IEEE 488.1 & 488.2 compatibility
- Full driver, library, and example support, including; Visual C++®, Visual C#®, Visual Basic®, Visual Basic .NET®, Delphi®, and LabView
- 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 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.

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

General

- **Bus Type** USB 2.0
- **I/O Connectors** 1 x 24-pin IEEE 488
- **Storage Temperature** -20 ~ 70° C (-4 ~ 158° F)
- **Operating Humidity** 10 ~ 90% RH, non-condensing
- **Dimensions (L x W x H)** 107 x 66 x 26 mm

Ordering Information

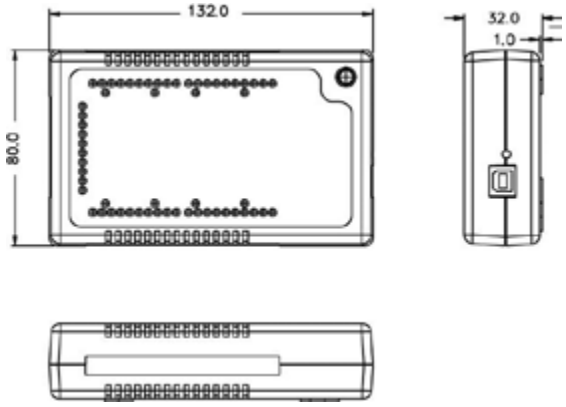
- **USB-4671** GPIB USB Module
- **PCL-10488-2** IEEE-488 Cable, 2 m

USB Installation Guide

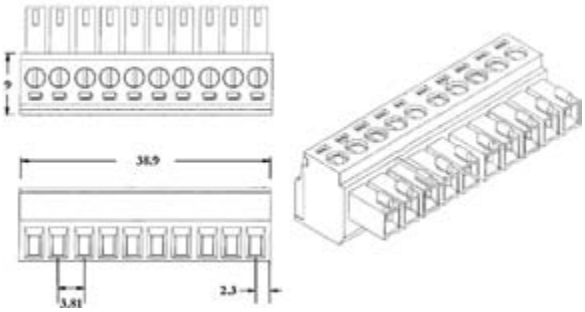
Advantech USB Data Acquisition (DAQ) Series Installation Guide

The unique design of Advantech's USB Data Acquisition (DAQ) Series can fulfill demands on secure 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

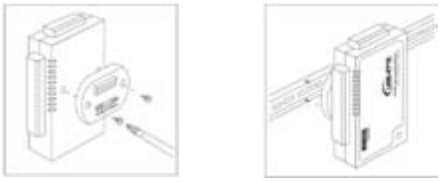
You may need to remove the modules' outer casing to access the jumpers inside the module. To remove the casing, you'll have to first remove the rubber padding covering the screws, and then remove the two screws holding the casing in place, as shown below.

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.

Attaching the DIN-rail Bracket

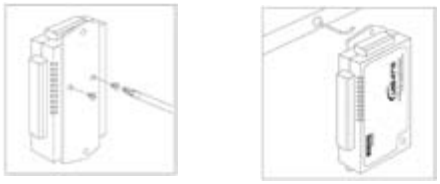
Advantech's USB DAQ modules come with a bracket that facilitates the industry standard DIN-rail mounting. To attach, simply place the bracket firmly on the back, and secure it by attaching the two screws into the holes as shown below.



***Note:** Every Advantech's USB data acquisition/hub module comes with a DIN-rail kit, except USB-4702.

Attaching the Wallmount Bracket (Optional)

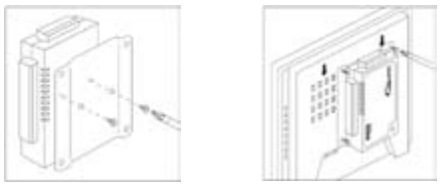
The wallmount kit can help you hang your modules on the wall or other flat surfaces. To attach the wallmount bracket, remove all 4 rubber pads on the rear of the module, and secure it by attaching the two screws into the holes as shown below.



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