

ADVANTECH

Enabling an Intelligent Planet

Plug-and-Play USB DAQ Modules

- Product Overview
- Product Features
- Application Scenarios
- Case Studies
- Product Selection Guide



Table of Content

■ Advantech Introduction	03
■ Plug-and-Play USB DAQ Modules Overview	04
■ Product Features	05
■ USB-5800 Watchdog Function	06
■ Application Scenarios	07
■ Case Studies	08
• High Integration USB DAQ for Industrial Measurement Systems	
• Reliable and Traceable Measurement Solution for High-Precision Dual-Channel Adhesive Dispensers	
• Compact-sized USB DAQ Solution for MRT Station	
■ Product Selection Guide	11
■ Appendix	13

ADVANTECH

Enabling an Intelligent Planet

Est. **1983**

Headquarters: Taipei, Taiwan

INDUSTRY SERVED



Industry 4.0, Industry IoT, Embedded Computing, Medical, Retail, Logistics



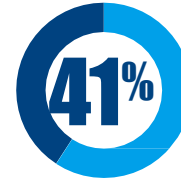
2000+
NEW PRODUCTS
PER YEAR

QUALITY SYSTEMS IN PLACE

- ISO9001
- ISO13485
- ISO27001
- TL9000
- WEEE
- ISO14001
- ISO17025
- ISO45001
- RoHS
- SONY GP

WORLD'S LARGEST IPC COMPANY

41% market share

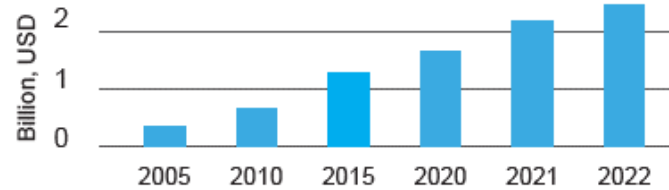


Advantech Other IPC Companies

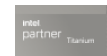
Source: OMDIA – Market Share estimates for Industrial PCs: World, 2022 Edition

\$2.31B 2022

REVENUE



KEY ECO-SYSTEM PARTNERS



1.8 MILLION+ sq.ft.

MANUFACTURING PLANTS



Linkou, Taiwan



Kunshan, China

- Total 19 SMT Lines
- Vertically integrated manufacturing (self contained)
- Full manufacturing redundancy (risk mitigation)
- Full BOM and lifecycle control (end-to-end control over quality)
- New manufacturing plant: Nogata, Japan



\$9.1B MARKET
CAP
2022

WORLDWIDE OFFICES



Manufacturing Centers	3
On-Site Service	4
Design Centers	11
CTOS Centers	16
Repair Centers	17
Logistics Centers	20
Offices More than	90

8800+
EMPLOYEES



Plug-and-Play USB DAQ Modules

Digital I/O

- Dedicated to digital I/Os
- Different Types of DIO
 - ✓ **TTL:** USB-4751, USB-4751L
 - ✓ **Isolation:** USB-4750, USB-5830, USB-5856
 - ✓ **Relay:** USB-4761, USB-5860, USB-5862
 - ✓ **PhotoMOS Relay:** USB-5850, USB-5855

Multi-function

- All functions are available in one module
 - ✓ **Analog I/O, Digital I/O, Counter**
- Multiplexed AI: USB-4702, USB-4704, USB-4711A, USB-4716
- Simultaneous AI: USB-5801

Analog Output

- Dedicated to analog output
- USB-5820



USB-5800

USB-4700

Analog Input

- Dedicated to analog input
- USB-5817

LEARN MORE



Features



Safety and Reliability

- Provides lockable USB cables to prevent them from being unplugged accidentally.
- Equipped with Level 3 electrostatic discharge (ESD) and surge protection. (USB-5800 series only)
- Features advanced functionalities, such as Auto Recovery, Output-Locker, and link reconnection, to ensure zero failures. (USB-5800 series only)



Ease of Use

- Bus powered/external redundant power selectable (USB-5800 series only)
- Detachable Screw Terminal with On-Module Pin Assignment Index
- The front-facing LED indicators, ID switch, and terminal blocks provide convenient access for easy installation and maintenance (USB-5800 series Only)



Expandability

- Support daisy chaining of up to five modules, which eliminates the need to adopt a USB hub to expand the system I/O. (USB-5800 series only)

Watchdog Function

Communication Monitoring



Detect the Disconnection



01

Output Locker



1. Lock the Output
2. Choose to:
 - a. Keep the last status
 - b. Set to safe status

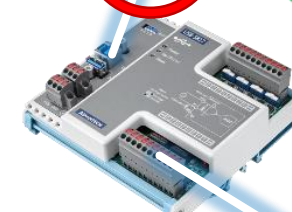


02

Auto Recovery



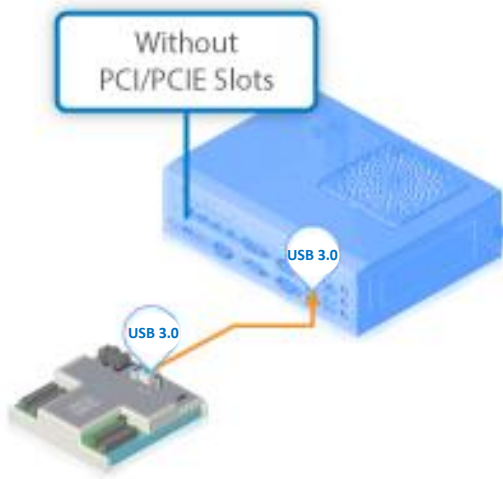
Reconnect the Module



03

Application Scenarios

System Without PCI/PCIE Slot



01

PCI/PCIE Slots Are All Occupied



02

Palm-sized Design for Small Cabinets



03



Overview

Volatile organic compounds (VOCs) comprise a broad range of carbon-based chemicals, some of which are dangerous to human health and the environment. As a result, the growing interest in indoor air quality in the workplace is stimulating the development of measuring instruments for detecting VOC emissions in enclosed atmospheres, such as laboratories, semiconductor clean rooms, and production line environments.

In general, quality measuring instruments must be able to receive a variety of sensor signals, and may even feature advanced functions for controlling related devices. The collection of accurate data and successful execution of controls is largely dependent on the instrument hardware. Multi-brand hardware products increase the complexity of system integration by necessitating time consuming compatibility testing, thereby delaying installation and implementation.

Challenges / Requirements:

- Limited installation space
- Multiple types of signal to be acquired at the same time

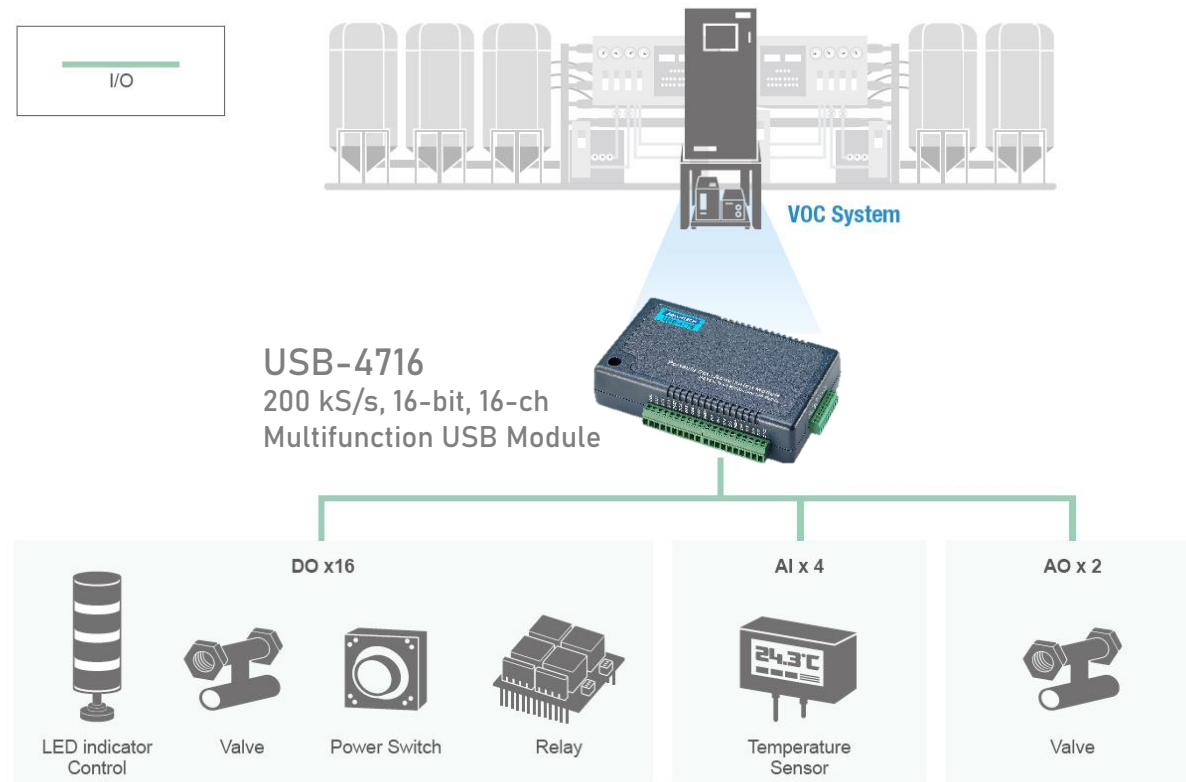
Solution:

- External plug-and-play USB module
- All-in-one multifunction measurement module with analog I/O, as well as digital I/O functions

Benefits:

- One stop measurement for all the signal sources
- Smaller space consuming
- Plug-and-play, ease of maintenance

System Diagram



Advantech's Reliable and Traceable Measurement Solution for High-Precision Dual-Channel Adhesive Dispensers



Overview

For manufactured products requiring the application of industrial adhesives, paints, and other liquids, high precision dispensers are employed to accurately dispense, inject, smear, or drip the substance in specific locations, typically as a point or in a line, circle, or arc. Adhesive dispensers are widely used in electronics, lighting, automotive, power generation, and other industries; in fact, they are one of the most basic types of equipment found in product manufacturing.

Challenges / Requirements:

- Data acquisition from current type displacement (LVDT) and weight sensors (load cell)
- High speed data acquisition (>1kS/s)
- External device control (indicators/valves/cylinders)

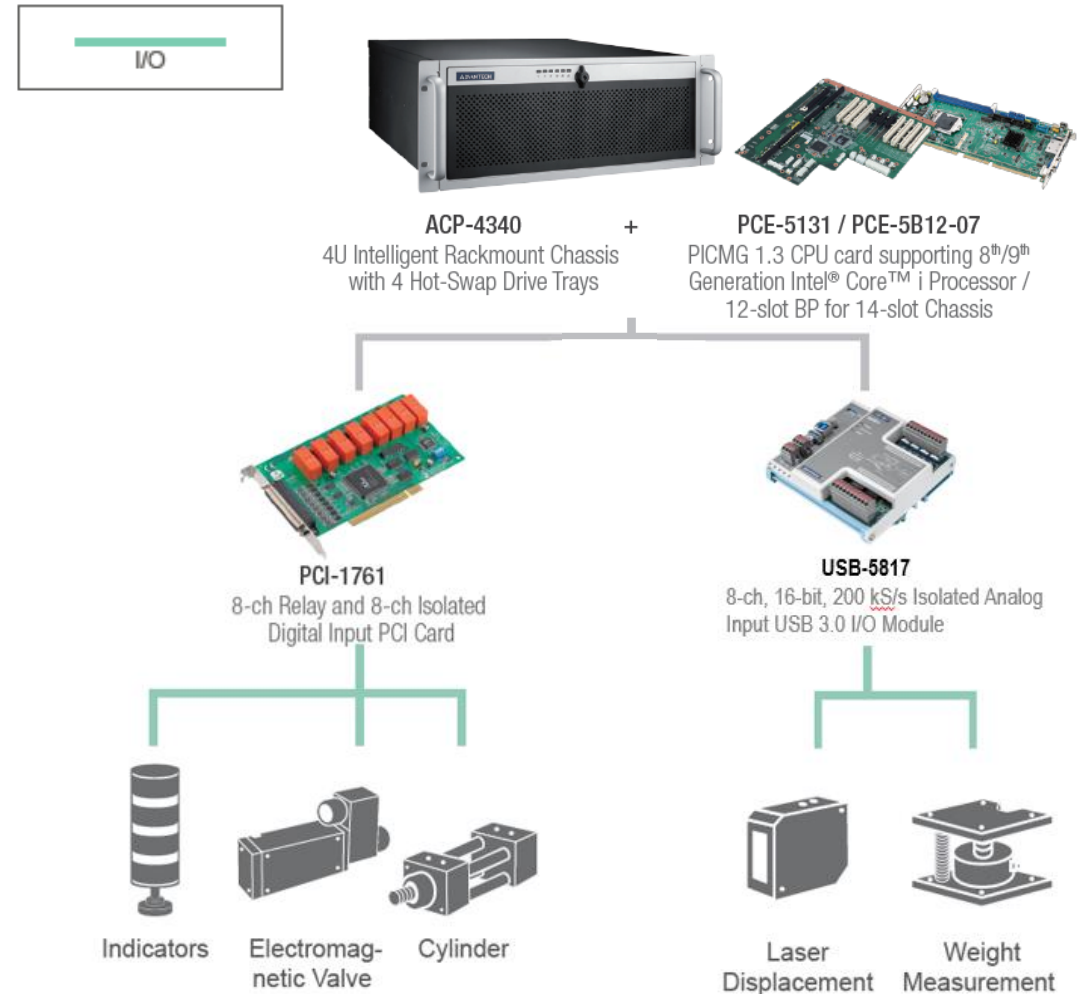
Solution:

- USB-5817 solution for current measurement, with maximum 200kS/s sampling rate
- Relay output control solution by PCI card

Benefits:

- Higher protection level, high reliability
- Ease of signal connection, smaller space consuming
- Plug-and-play, easy maintenance

System Diagram





Overview

Digital I/Os exist in various automation controls and daily lives. They can be applied to lamp indicator controlling, gate open/close and alarm buzzing ...etc. Whenever one would like to employ a automated system, digital I/Os would play an important role within the context.

Challenges / Requirements:

- Numerous digital I/Os to be read/set @ 24V_{DC} level
- Small cabinet to install all the control devices
- Front accessible, plug and play, ease of maintenance
- All the digital I/O channels are isolation protected

Solution:

- USB-5830 provides 16 digital inputs and 16 digital outputs, with maximum 40VDC I/O as well as 2500V_{DC} isolation
- Plug-and play, front accessible USB module

Benefits:

- Higher protection level, high reliability
- Ease of signal connection, smaller space consuming
- Plug and play, easy maintenance

System Diagram



USB-5830

16-ch Isolated DI and 16-ch Isolated DO USB 3.0 I/O Module



Gates

...



LED



Alarm

Selection Guide

Comparison Table

Model	USB Type	USB Transmission Speed	Sampling Rate	Watchdog & Auto Recovery	Isolation	Expandability	Cable Connection
USB-4700 (Basic)	USB 2.0	480 Mbps	200 KS/s	-	-	-	Side
USB-5800 (Advanced)	USB 3.0	5 Gbps	800 KS/s	V	2500 V _{DC}	Daisy chain up to 5 modules	Front

Selection Strategy

		USB-4700	USB-5800
Wiring		Side	Front
Protection Level (power)		--	Level 3 ESD, Surge Protection
USB Version		2.0*	3.0
External Redundant Power Input		--	Yes
Application Focus	DI/O	<u>Low EMI/ESD environment</u> KIOSK, Commercial, Consumer electronic, Multi-media, Laboratory	<u>Heavier EMI/ESD environment</u> Medical, Machine Vision, Surveillance
	AI/O	<u>Functionalities aren't overlapped</u> Laboratory, IEM, Condition Monitoring, Electric Testing, Automotive ...	

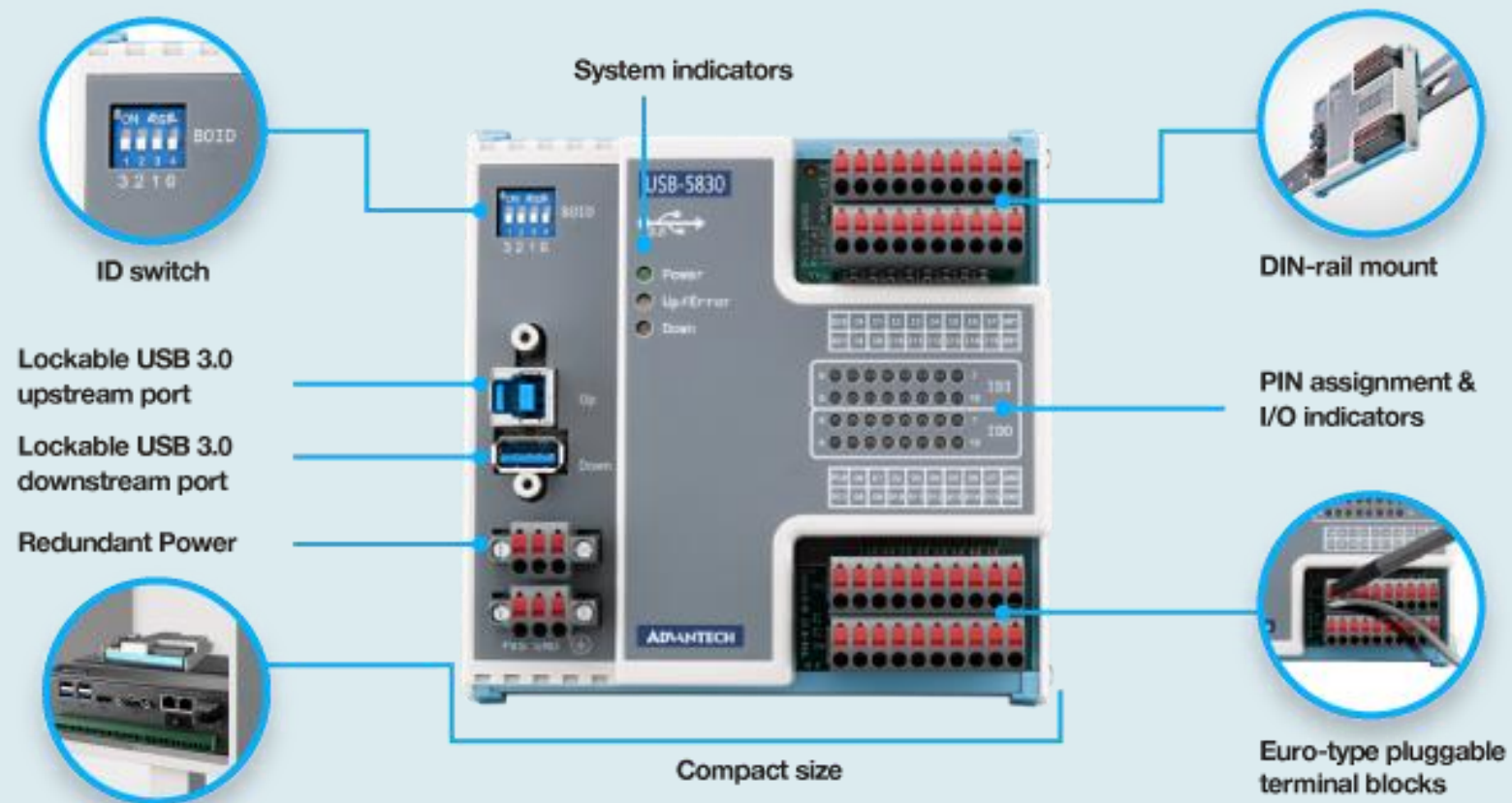
* USB-4711A/USB-4716 uses USB3.0 after new revision (USB-4711A-BE and USB-4716-BE)

Selection Guide

Advantech USB DAQ Selection Matrix		Analog Input							Analog Output			Digital I/O						Counter									
Product	Description	Bus	Sampling Method	Channel	Resolution (Bit)	Sampling Rate (S/s)	Current	IEPE	Channel	Resolution (Bit)	Update Rate (S/s)	Isolated DI	Isolated DO	Mechanical Relay	SSR	TTL DI	TTL DO	Channel	Pulse Counting	Frequency Measurement	PWM In	PWM Out	Pulse Gen.	Tacho meter	Resolution (Bit)	Frequency (MHz)	OS support
USB-4702-AE	4-ch, 12-bit, 10kS/s Multi-function USB Module	USB	Scan	4	12	10k	-	-	2	12	-	-	-	-	-	8	8	1	Yes	Yes	-	-	-	-	32	5	Windows Linux
USB-4704-AE	4-ch, 14-bit, 48kS/s Multi-function USB Module	USB	Scan	4	14	48k	-	-	2	12	-	-	-	-	-	8	8	1	Yes	Yes	-	-	-	-	32	5	
USB-4711A-BE	16-ch, 12-bit, 150kS/s Multi-function USB Module	USB	Scan	16	12	150k	-	-	2	12	-	-	-	-	-	8	8	-	-	-	-	-	-	-	-	-	
USB-4716-BE	16-ch, 16-bit, 200kS/s Multi-function USB Module	USB	Scan	16	16	200k	-	-	2	16	-	-	-	-	-	8	8	-	-	-	-	-	-	-	-	-	
USB-4750-CE	32-ch Isolated Digital I/O USB Module	USB	-	-	-	-	-	-	-	-	-	16	16	-	-	-	-	2	Yes	Yes	-	-	-	-	32	8	
USB-4751-AE	48-ch Digital I/O USB Module	USB	-	-	-	-	-	-	-	-	-	-	-	-	-	48	2	Yes	Yes	-	Yes	Yes	-	-	32	8	
USB-4751L-AE	24-ch Digital I/O USB Module	USB	-	-	-	-	-	-	-	-	-	-	-	-	-	24	2	Yes	Yes	-	Yes	Yes	-	-	32	8	
USB-4761-CE	8-ch Relay and 8-ch Isolated Digital Input USB Module	USB	-	-	-	-	-	-	-	-	-	8	-	8	-	-	-	-	-	-	-	-	-	-	-	-	
USB-5801-AE	4-ch, 24-bit, 192 kS/s DSA USB3.0 module	USB	Simul. Sample	4	24	192K	-	2mA	2	24	192k	4	4	-	-	-	-	2	-	-	-	-	-	Yes	32	10	
USB-5817-AE	8-ch,16-bit,200 kS/s Isolated AI USB3.0 module	USB	Scan	8	16	200k	Yes	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
USB-5820-AE	4-ch, 16-bit, 200 kS/s Isolated AO USB3.0 module	USB	-	-	-	-	-	-	4	16	200k	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
USB-5830-AE	16-ch IDI & 16-ch IDO USB3.0 I/O module	USB	-	-	-	-	-	-	-	-	-	16	16	-	-	-	-	-	-	-	-	-	-	-	-	-	
USB-5850-AE	16-ch IDI & 8-ch PhotoMOS USB3.0 I/O module	USB	-	-	-	-	-	-	-	-	-	16	-	-	8	-	-	-	-	-	-	-	-	-	-	-	
USB-5855-AE	32-ch IDI & 16-ch PhotoMOS USB3.0 I/O module	USB	-	-	-	-	-	-	-	-	-	32	-	-	16	-	-	-	-	-	-	-	-	-	-	-	
USB-5856-AE	32-ch IDI & 32-ch IDO USB3.0 I/O module	USB	-	-	-	-	-	-	-	-	-	32	32	-	-	-	-	-	-	-	-	-	-	-	-	-	
USB-5860-AE	8-ch IDI & 8-ch Relay USB3.0 I/O module	USB	-	--	-	-	-	-	-	-	-	8	-	8	-	-	-	-	-	-	-	-	-	-	-	-	
USB-5862-AE	16-ch IDI & 16-ch Relay USB3.0 I/O module	USB	-	-	-	-	-	-	-	-	-	16	-	16	-	-	-	-	-	-	-	-	-	-	-	-	

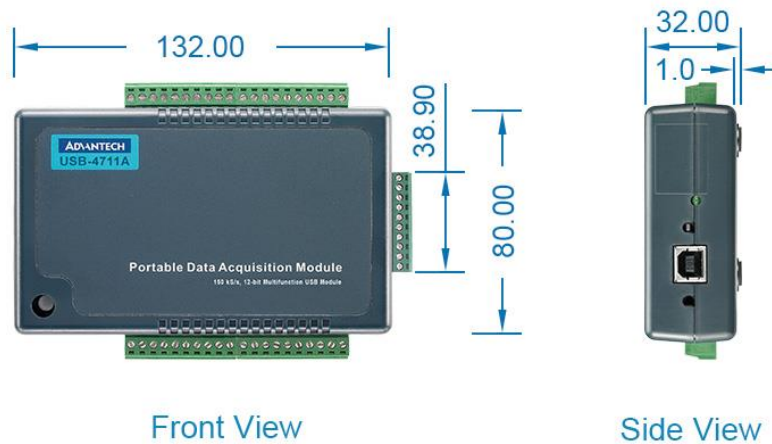
Appendix

USB-5800 Hardware Overview



Product Dimensions

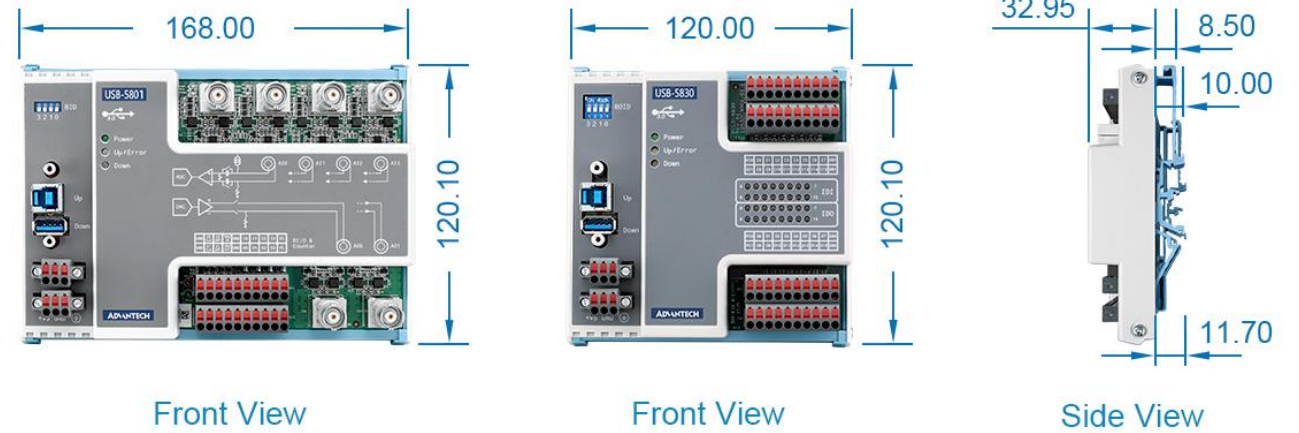
USB-4700 Series



Front View

Side View

USB-5800 Series



Front View

Front View

Side View

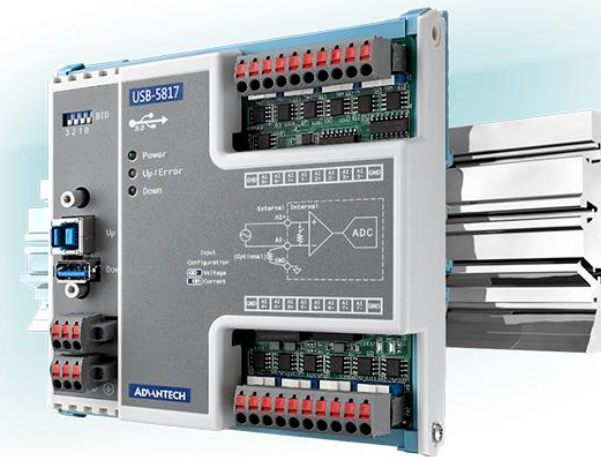
Mounting Method

Both series of USB DAQ modules provide easy-to-install DIN-rail mounting methods.

USB-4700 Series



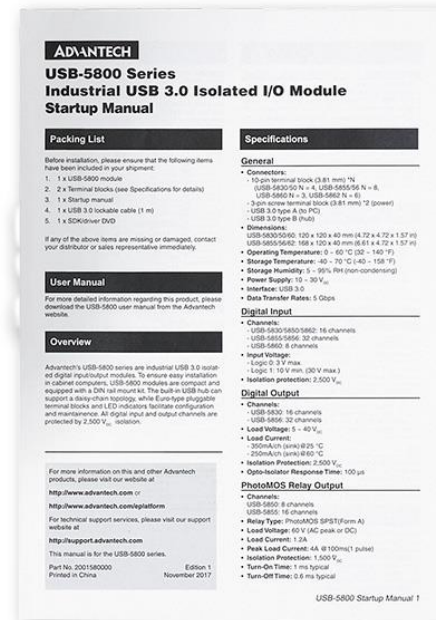
USB-5800 Series



Inside the Box



Packing



User Guide



USB DAQ Module

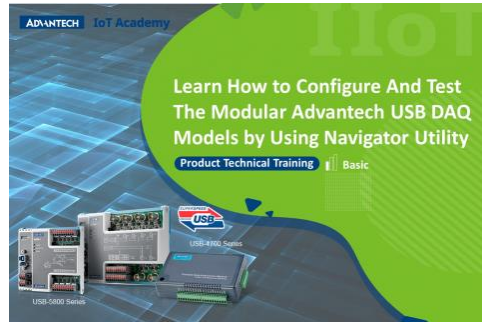


Terminal Blocks



Cable

Discover More



【IoT Academy】

[Learn how to configure and test the modular Advantech USB DAQ models by using Navigator Utility](#)



【Product 360° Video】

[USB-5801: USB 3.0 I/O Module](#)



【IoT Academy】

[Benefits of Advantech USB DAQ modules, USB-5800 series](#)

Regional Service and Customization Centers

China | Kunshan
86-512-5777-5666

Taiwan | Taipei
886-2-2792-7818

Netherlands | Eindhoven
31-40-267-7000

Poland | Warsaw
00800-2426-8080

USA | Milpitas, CA
1-408-519-3898

Worldwide Offices

Asia Pacific

Taiwan

Toll Free 0800-777-111
Taipei & IoT Campus 886-2-2792-7818
Taichung 886-4-2372-5058
Kaohsiung 886-7-392-3600

China

Toll Free 800-810-0345
Beijing 86-10-6298-4346
Shanghai 86-21-3632-1616
Shenzhen 86-755-8212-4222
Chengdu 86-28-8545-0198
Hong Kong 852-2720-5118

Japan

Toll Free 0800-500-1055
Tokyo 81-3-6802-1021
Osaka 81-6-6267-1887
Nagoya 81-0800-500-1055
Nogata 81-949-22-2890

Korea

Toll Free 080-363-9494/5
Seoul 82-2-3660-9255

Singapore

Singapore 65-6442-1000

Malaysia

Kuala Lumpur 60-3-7725-4188
Penang 60-4-537-9188

Thailand

Bangkok 66-02-2488306-9

Vietnam

Hanoi 84-24-3399-1155
Hochiminh 84-28-3836-5856

Indonesia

Jakarta 62-21-751-1939

Australia

Toll Free 1300-308-531
Melbourne 61-3-9797-0100

India

Bangalore 91-94-4839-7300
Pune 91-94-2260-2349

Americas

North America

Toll Free 1-888-576-9668
Cincinnati 1-513-742-8895
Milpitas 1-408-519-3898
Irvine 1-949-420-2500
Ottawa 1-815-433-5100
Chicago 1-888-576-9668

Brazil

Toll Free 0800-770-5355
São Paulo 55-11-5592-5367

Mexico

Toll Free 1-800-467-2415
Mexico City 52-55-6275-2777

Europe

Netherlands

Eindhoven 31-40-267-7000
Breda 31-76-523-3100

Germany

Toll Free 00800-2426-8080/81
Munich 49-89-12599-0
Düsseldorf 49-2103-97-855-0

France

Paris 33-1-4119-4666

Italy

Milan 39-02-9544-961

UK

Newcastle 44-0-191-262-4844
London 44-0-870-493-1433

Spain

Madrid 34-91-668-86-76

Sweden

Stockholm 46-0-864-60-500

Poland

Warsaw 48-22-31-51-100

Russia

Moscow 8-800-555-01-50
St. Petersburg 8-812-332-57-27
8-921-575-13-59

Czech Republic

Ústí nad Orlicí 420-465-524-421

Ireland

Galway 353-91-792444

Middle East and Africa

Israel 072-2410527
Turkey 90-212-222-0422
Turkey-Bursa 90-224-413-3134

www.advantech.com

Please verify specifications before ordering. This guide is intended for reference purposes only.

All product specifications are subject to change without notice.

No part of this publication may be reproduced in any form or by any means, electronic, photocopying, recording or otherwise, without the prior written permission of the publisher.

without prior written permission of the publisher.

All brand and product names are trademarks or registered trademarks of their respective companies.

© Advantech Co., Ltd. 2024

ADVANTECH

Enabling an Intelligent Planet