U2600A Series

USB Modular Isolated Digital I/O Devices

Introduction

The Keysight Technologies, Inc. U2600A Series USB Isolated Digital I/O devices are high-performance modules consisting of three models — the U2651A isolated 32-bit DI and 32-bit DO, U2652A isolated 64-bit DI, and U2653A isolated 64-bit DO. The U2600A Series provides up to eight channels with 64-bit high-density optoisolated digital input and digital output for USB 2.0 interface-based industrial applications, such as driving relays, actuators, or valves. The U2600A Series targets a wide range of applications both in industrial automation and education.

Features

- Hi-Speed USB 2.0 (480 Mbps)
- Functions as a standalone or modular unit
- Up to 64 optoisolated digital I/O lines with a maximum transient voltage of 1250 Vpeak protection
- Supports input voltage ranging from 10 to 24 V
- External supply voltage ranging from 5 to 35 V for external load
- Compatible with a wide range of Keysight Development Environments (KDEs)
- Supports SCPI and IVI-COM
- Command logger function
- USB 2.0 and USBTMC-USB488 standards
- Interrupt function
- Virtual Port grouping function
- Control, automate, and simplify with Keysight BenchVue software.

Various features of the U2600A Series

- Quick and easy USB setup
- High channel count to drive more actuators and control more sensors by using just one DIO device
- Opto-isolation for more reliable and improved signal quality
- High isolated transient voltage protection of the digital IO lines is able to protect your system from being damaged
- Wide input voltage range of 10 to 24 V to sense the status of external sensors
- High output voltage range of 5 to 35 V provides the capability to drive a wide array of actuators in industrial automation applications
- On-board isolated +5 V power supply enables simple application and function tests without the need for an external source
- SCPI and IVI-COM support and compatibility with a wide range of KDEs minimize work time and provides higher flexibility of software choices
- Interrupt function for automatic triggering of your system when a digital change of state occurs
- Virtual Port grouping function allows grouping of any eight input/output bits into one virtual port for simultaneous operations

High channel count with optoisolated digital input and digital output

The U2600A Series has a high channel count of up to 64-bit high-density optoisolated digital input and digital output that enhances its usability and reliability. With just one DIO device, you are able to drive more actuators and control more sensors. The U2600A Series' Optoisolated design also separates the electrical connection between circuits for better PC system protection.

High isolated transient voltage protection

Isolation prevents any potential harmful current that transient voltage spikes may induce from flowing through the digital IO lines to the system. The robust 1250 Vpeak transient isolation protection makes it safe for direct connection to a wide range of industrial sensors and actuators, making the U2600A suitable for most industrial applications.

High I/O voltage range

The U2600A Series has a high input/output voltage range suitable for demanding industrial applications such as driving relays and actuators, which require up to 24 V. Equipped with a wide input range of 10 to 24 V to sense the status of external sensors, it also has an external supply voltage ranging from 5 to 35 V, which enables the U2600A Series to drive a wide range of actuators.

Interrupt function

The U2600A Series has an interrupt function that automatically triggers your system when a digital change of state occurs. Unlike polling, this function minimizes the overheads of your PC system, especially when the U2600A Series is used in multitasking applications.

Virtual Port grouping function

The Virtual Port grouping function allows users to randomly select any eight input or output bits and group them into one channel as a virtual DIO port.

The following describes the key advantages of using the Virtual Port grouping function:

- You can control multiple bits simultaneously for the instantaneous control of multiple machines, such as emergency stop control.
- You can make changes to your port assignments whenever required, as the Virtual Port is easily programmable.
- It eliminates the need for you to rewire your hardware devices.

Product Outlook and Dimensions

Front view

Rear view

44.00 mm

Top view

182.40 mm

120.00 mm
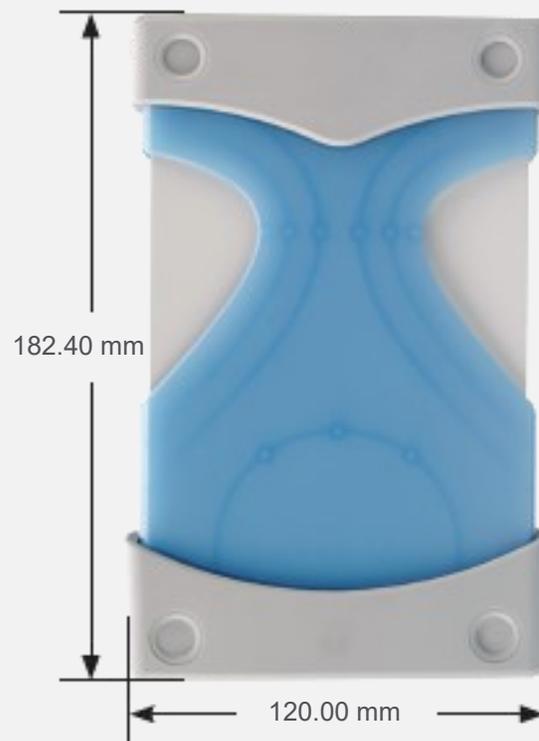
Product Characteristics and General Specifications

Specifications	
Remote Interface	• Hi-Speed USB 2.0 • USBTMC-USB488 [1]
Power Requirement	• +12 VDC (TYPICAL) • 2 A (MAX) input rated current • Installation Category II
Power Consumption	+12 VDC, 260 mA maximum
Operating Environment	• Operating temperature from 0 to +55 °C • Relative humidity at 15% to 85% at 40 °C (non-condensing) • Altitude up to 2000 meters • Pollution Degree 2 • For indoor use only
Storage Compliance	Storage temperature from –20 °C to 70 °C
Safety and EMC Compliance	Refer to Declaration of Conformity for the latest revisions of regulatory compliance at: www.keysight.com/go/conformity
Shock and Vibration	Tested to IEC/EN 60068-2
IO Connector	100-pin SCSI-II connector
Dimension (W × D × H)	Module dimension: • 120.00 × 182.40 × 44.00 mm (with plastic casing) • 105.00 × 174.54 × 25.00 mm (without plastic casing) Terminal block dimension: • 158.00 × 118.60 × 51.50 mm
Weight	• 565 g (with plastic casing) • 370 g (without plastic casing)

Note:
1. Compatible with Microsoft Windows operating systems only. Requires a direct USB connection to the PC so the appropriate driver can be installed in the USB DAQ module.

Product Specifications

Model number	U2651A	U2652A	U2653A
Digital input			
Number of isolated bits	32-bit	64-bit	-
Input type	Opto-isolated	Opto-isolated	-
Maximum input voltage range [1]	24 V, non-polarity	24 V, non-polarity	-
Digital logic levels [2]	High: 10 to 24 V Low: 0 to 2 V	High: 10 to 24 V Low: 0 to 2 V	-
Input resistance	24 kΩ at 0.75 W	24 kΩ at 0.75 W	-
Input current (maximum)	1.5 mA per bit	1.5 mA per bit	-
Maximum transient voltage [3]	1250 Vpeak	1250 Vpeak	-
Interrupt sources	DI_101.0/301 and DI_101.1/302	DI_101.0/301 and DI_101.1/302	-
Digital output			
Number of isolated bits	32-bit	-	64-bit
Output type	Open drain power MOSFET driver	-	Open drain power MOSFET driver
External supply voltage range	5 V to 35 V	-	5 V to 35 V
Voltage drop at MOSFET when on	VDrop < 1.0 V (Maximum)	-	VDrop < 1.0 V (Maximum)
Output sink current per bit	500 mA (100% duty cycle) per bit 400 mA (100% duty cycle) when full 32-bit loaded	-	500 mA (100% duty cycle) per bit 400 mA (100% duty cycle) when full 32-bit loaded
Maximum transient voltage	1250 Vpeak	-	1250 Vpeak

Onboard isolated +5 V power supply			
Output voltage (Typical)	+5 V	-	+5 V
Output current (Typical)	150 mA	-	150 mA
Maximum power	0.85 W	-	0.85 W
General			
Power consumption	+12 V at 235 mA (Typical)	+12 V at 115 mA (Typical)	+12 V at 260 mA (Typical)
Relative humidity	Operating: 15% to 85% at 40 °C (non-condensing) Non-operating: 90% RH at 65 °C for 24 hours		
Storage temperature	–20 to +70 °C		
Operating temperature	0 to +55 °C		
Connector type	100-pin SCSI-II connector		
Dimensions (W × D × H)	120.00 × 182.40 × 44.00 mm (with plastic casing) 105.00 × 174.54 × 25.00 mm (without plastic casing)		
Remote interface	Hi-Speed USB 2.0		

Notes:
1. The maximum input voltage is 24 V with reference to DI_{COM}.
2. Voltage level with reference to DI_{COM}.
3. Maximum transient voltage between DI_{in} and DI_{COM}.

USB Modular DAQ within BenchVue

BenchVue software for the PC makes it simple to connect, control, capture, and view multiple Keysight instruments simultaneously with no additional programming. You can derive answers faster than ever by easily viewing, logging, and exporting measurement data and screen images with a few clicks from a single environment.

- Visualize multiple measurements simultaneously
- Easily log data, screenshots, and system state
- Rapidly prototype custom test sequences
- Recall past states of your USB Modular DAQ device to replicate results
- Export measurement data in the desired format fast
- Quickly access manuals, drivers, FAQs, and videos
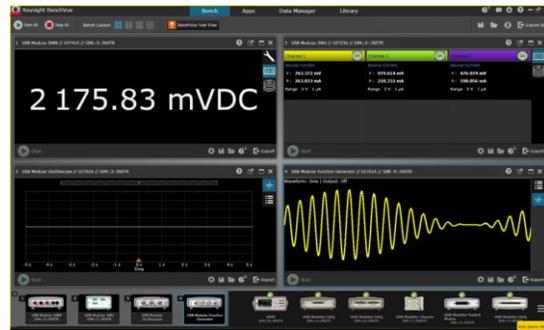
Figure 1. View measurements across USB DAQ, modular, and bench instruments all on one BenchVue interface.

The USB Modular DAQ App within BenchVue allows you to quickly configure and control any USB DAQ devices to perform data logging and visualize measurements. With six different display options, including grids and strip charts, zooming in to details the way you want is so much easier — so you can nail that measurement error in no time. You can also record measurements and export results to popular PC-friendly applications such as Microsoft Excel and Microsoft Word for further analysis in just a few clicks.

Get started with BenchVue, downloadable at no cost at www.keysight.com/find/benchvue.
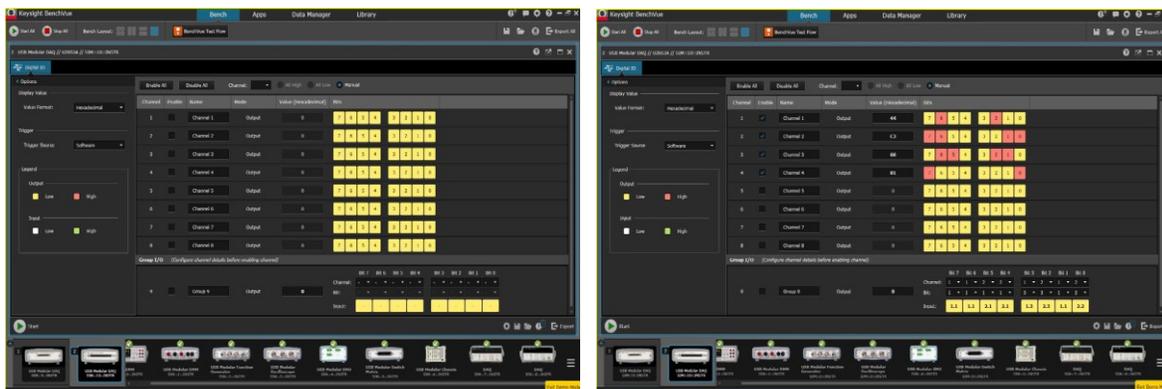

Figure 2. Configure and visualize measurements flexibly and easily on BenchVue's modern interface.

Optional Accessories

U2903A/U2904A — Terminal block and SCSI-II 100-pin connector with 1-meter/2-meter cable

The U2903A/U2904A is a terminal block and SCSI-II 100-pin connector with a 1-meter cable or 2-meter cable that can be used in conjunction with the U2600A Series

Terminal block overview

Front view

85.20 mm

103.00 mm

Side view

42.96 mm

28.40 mm
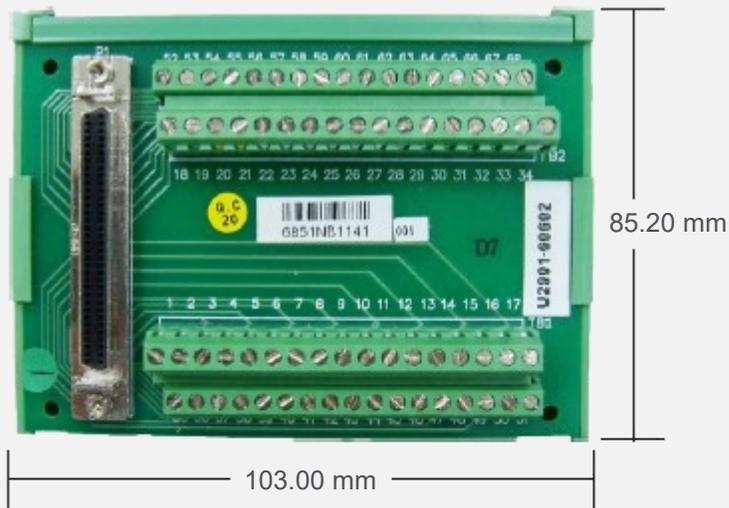
Other Products in the Keysight USB Modular Data Acquisition (DAQ) Family

U2300A Series USB modular multifunction DAQ

Features:

- High analog input sampling rate coverage of up to 3 MSa/s for a single channel

- High analog input up to 64 channels

- High-speed USB 2.0

- Multifunction capabilities — analog input (AI), analog output (AO), digital input-output (DIO), and counter

For more information: www.keysight.com/find/U2300A

U2500A Series USB modular simultaneous sampling multifunction DAQ

Features:

- High analog input sampling rate coverage of up to 2 MSa/s for each channel

- High-speed USB 2.0

- Simultaneous acquisition of multiple data points

- Multifunction capabilities — analog input (AI), analog output (AO), digital input-output (DIO), and counter

For more information: www.keysight.com/find/U2500A

U2781A USB modular product chassis

Features:

- Expansion of channels for each modular product

- Multiple instrument synchronization

- Internal and external 10 MHz reference clock

- High-speed USB 2.0

- SSI/Star trigger bus synchronization between external trigger source and modules

For more information: www.keysight.com/find/U2781A

Ordering Information

Model	Description
U2651A	32 Input, 32 Output USB modular digital I/O
U2652A	64 Input USB modular digital I/O
U2653A	> 64 Output USB modular digital I/O

Optional accessories

Model	Description
U2903A	Terminal block and SCSI-II 100-pin connector with 1-meter cable
U2904A	Terminal block and SCSI-II 100-pin connector with 2-meter cable

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Learn more at: www.keysight.com

For more information on Keysight Technologies' products, applications, or services, please contact your local Keysight office. The complete list is available at: www.keysight.com/find/contactus

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