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Keysight Technologies
U2600A Series USB Modular Isolated Digital I/O Devices

Data Sheet



KEYSIGHT TECHNOLOGIES

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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 of high-density opto-isolated digital input and digital output for USB 2.0 interface-based industrial applications, such as driving relays, actuators, or valve. 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 standalone or modular unit
- Up to 64 opto-isolated digital I/O lines with 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
- Easy-to-use bundled Keysight Measurement Manager (KMM) software
- Command logger function
- USB 2.0 and USBTMC-USB488 standards
- Interrupt function
- Virtual Port grouping function



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 a higher flexibility of software choices
- Command logger function provided in the bundled KMM application software allows easy command conversion into snippets of VEE, VB, C++, and C# code
- 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

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High channel count with opto-isolated digital input and digital output

The U2600A Series has high channel count of up to 64-bit high-density opto-isolated 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' opto-isolated 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 may be induced by transient voltage spikes 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

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Product outlook and dimensions

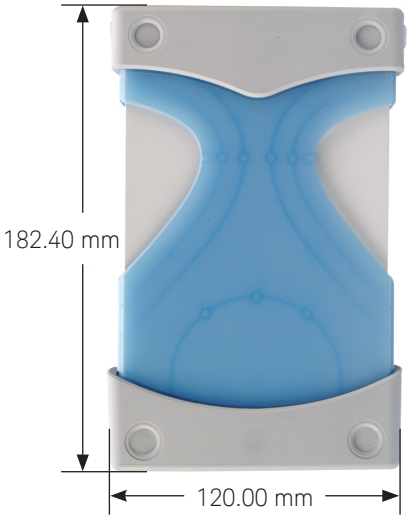
Front view



Rear view



Top view



Standard shipped accessories

- AC/DC Power adapter
- Power cord
- USB extension cable
  - L-Mount kit (used with modular product chassis)
  - Keysight USB Modular Products Quick Start Guide
  - Keysight Measurement Manager for U2600A Series Quick Start Guide
  - Keysight USB Modular Products Reference CD-ROM
  - Keysight Automation-Ready CD-ROM (contains the Keysight IO Libraries Suite)
- Certificate of Calibration

Optional accessories

- 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

Product Characteristics and General 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
–20 to 70 °C

SAFETY COMPLIANCE
Certified with:
- IEC 61010-1:2001/EN 61010-1:2001 (2nd Edition)
- USA: ANSI/UL 61010-1:2004
- Canada: CSA C22.2 No.61010-1:2004

EMC COMPLIANCE
- IEC 61326-1:2002/EN 61326-1:1997+A2:2001+A3:2003
- CISPR 11: 1990/EN 55011:1990-Group 1 Class A
- Canada: ICES-001:2004
- Australia/New Zealand: AS/NZS CISPR 11:2004

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)

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.

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Product Specifications

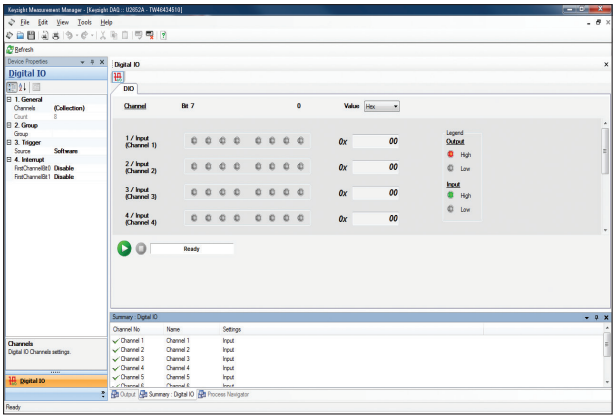
Model number	U2651A	U2652A	U2653A
Digital input			
Number of isolated bits	32-bit	64-bit	-
Input type	Opto-isolated	Opto-isolated	-
Maximum input voltage range[1]	24 V, non-polarity	24 V, non-polarity	-
Digital logic levels[2]	High: 10 to 24 V Low: 0 to 2 V	High: 10 to 24 V Low: 0 to 2 V	-
Input resistance	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 V_{peak}	1250 V_{peak}	-
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
On board 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		

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

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Keysight Measurement Manager

The Keysight Measurement Manager (KMM) is an application data viewer software that comes as standard with purchase of the U2600A Series USB Modular Isolated Digital I/O devices. This software is designed to help you perform quick device configuration,data logging and data acquisition using the products.



Supported features found in the U2600A Series USB modular devices:

- Averaging
- Command logger
- Self-test
- Option to save the current instrument configuration to a file
- Data logging and export feature to CSV, HTML and text only format files that can be printed
- Data viewer to load and review previously logged data
- Trigger settings between modules in the instrument chassis with Star trigger and Master/Slave trigger
- Synchronization display and data logging for modules in the instrument chassis

Prior to installing the Keysight Measurement Manager software, ensure that your PC meets the following minimum system requirements for installation and operation.

Requirement	Windows XP operating systems	Windows Vista operating systems	Windows 7 operating systems
Operating system	Windows XP Service Pack 3 (or later)[1]	Windows Vista (32-bit) Service Pack 1 and 2[2]	Windows 7 (32-bit and 64-bit)[3, 4]
Processor speed	600 MHz or higher required, 800 MHz recommended	1 GHz 32-bit (x86)	3 GHz 32-bit (x86)
Memory	256 MB minimum (1 GB or greater recommended)	1 GB minimum	2 GB minimum
Hard-disk space	1.5 GB minimum	1.5 GB minimum	1.5 GB minimum
Video	Super VGA (800 × 600) 256 colors or more	Support for DirectX 9 graphics with 128 MB graphics memory recommended[5]	Support for DirectX 9 graphics with 128 MB graphics memory recommended[5]
CD-ROM drive or DVD-ROM drive[6]	Required	Required	Required
Browser	Microsoft Internet Explorer 5.01 or greater	Microsoft Internet Explorer 7 or greater	Microsoft Internet Explorer 7 or greater

1. Supported Windows XP editions – Home or Professional
2. Supported Windows Vista (32-bit) editions – Home Basic, Home Premium, Business, or Ultimate
3. Supported Windows 7 (32-bit and 64-bit) editions – Home Basic, Home Premium, Professional, Enterprise, or Ultimate
4. Keysight Measurement Manger for Windows 7 64-bit support is a 32-bit application running on a WOW64 (Windows-on-Windows 64-bit) emulat
5. Super VGA graphics is supported for Windows Vista and Windows 7.
6. The type of media provided with the product determines whether a CD-ROM drive or DVD-ROM drive is required.

Software requirements
Keysight IO Libraries Suite 15.1 and above[1]
Keysight T&M Toolkit Runtime version 2.1[2]
Keysight T&M Toolkit Redistributable Package 2.1 patch[2]
Microsoft .NET Framework version 2.0[2]

1. Available on the Keysight Automation-Ready CD-ROM.
2. Bundled with Keysight Measurement Manager software application installer.

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USB Modular DAQ App 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.

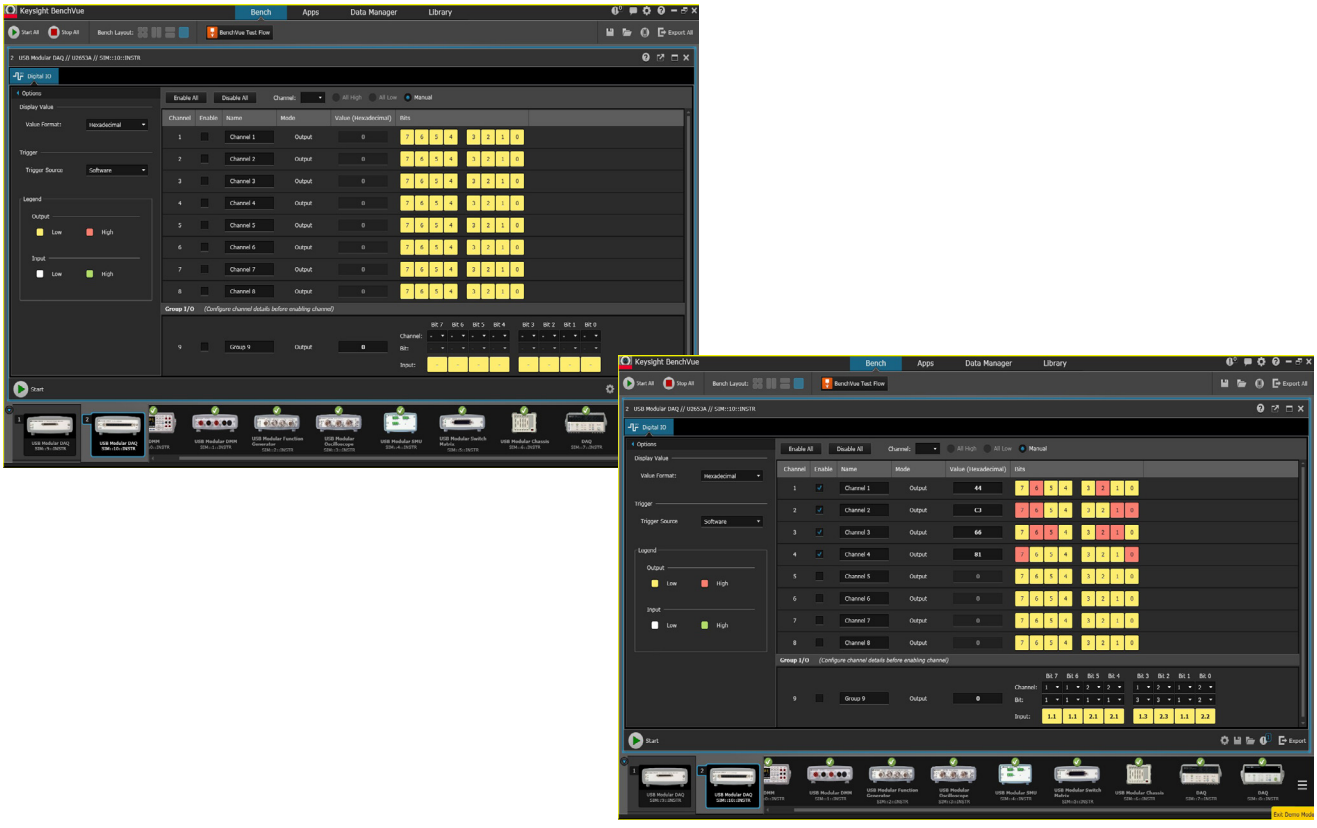
- Visualize multiple measurements simultaneously
- Easily log data, screen shots and system state
- Rapidly prototype custom test sequences
- Recall past states of your USB Modular DAQ device to replicate results
- Export measurement data in the desired format fast
- Quickly access manuals, drivers, FAQs and videos



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 of the 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. In just a few clicks, you can also record measurements and export results to popular PC-friendly applications such as Microsoft Excel and Microsoft Word for further analysis. Upgrading to the Pro version (BV0025A) will provide you with unrestricted data logging with limit checking and alerts.

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



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

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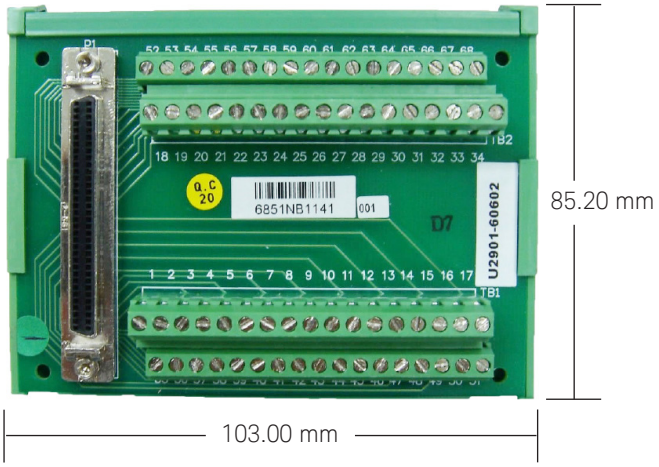
Optional Accessories

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

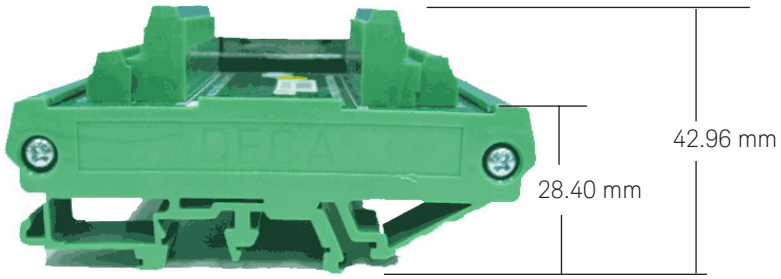
The U2903A/U2904A is a terminal block and SCSI-II 100-pin connector with 1 meter cable or 2 meter cable that can be used conjunction with the U2600A Series.

Terminal block overview

Front view



Side view



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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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: **http://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 a 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:

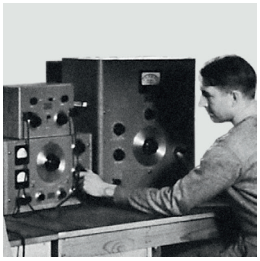
- Expansion of channels for each modular product
- Multiple instrument synchronization
- Internal and external 10 MHz reference clock
- High-speed USB 2.0
- SSI/Star trigger bus synchronization between external trigger source and modules

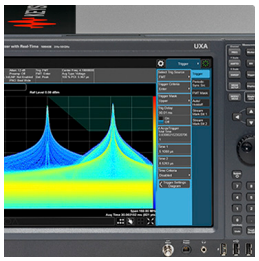
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