Agilent
U2600A Series USB Isolated Digital I/O Devices

Data Sheet

Agilent Technologies

Features

- **Hi-Speed USB 2.0 (480 Mbps)**
- **Functions as standalone or modular unit**
- **Up to 64 opto-isolated digital I/O lines**
- **Up to 1250 V_{rms} isolation protection**
- **Supports input voltage ranging from 10 V to 24 V**
- **External supply voltage ranging from 5 V to 35 V for external load**
- **Compatible with a wide range of ADEs**
- **Supports SCPI and IVI-COM**
- **Easy-to-use bundled software**
- **Command logger function**
- **USBTMC 488.2 standards**
- **Interrupt function**
- **Virtual Port grouping function**

Overview

The Agilent U2600A Series USB isolated digital I/O devices are high-performance modules that consist of three models—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.

Various features to meet industrial demands

- 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
- Robust 1250 V_{rms} isolation protection that protects your system from damage and preserves data integrity
- Wide input voltage range of 10 V to 24 V to sense the status of external sensors
- High output voltage range of 5 V 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 supports and compatibility with a wide range of ADEs minimize work time and provides a higher flexibility of software choices
- Command logger function provided in the bundled 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

Quick and easy setup

The built-in USB 2.0 interface allows easy connectivity, setup, and automatic detection of the U2600A Series. Setting up or troubleshooting the DIO device by physically removing the PC casing is not required unlike PCI cards. Besides, when using the U2600A Series in modular mode, you do not need an extra controller card like the PXI, thus providing lower startup cost.

Based on the USBTMC 488.2 standards, the U2600A Series is compatible with any system that provides USB connectivity. Due to the quick-and-easy USB connectivity, the U2600A Series is simple enough for academic applications but robust and versatile enough for industrial laboratory applications.

High channel count with opto-isolated digital input and digital output
The U2600A Series has high channel count with up to 64-bit high-density opto-isolated digital input and digital output that increases its usability. With just one DIO device, you are able to drive more actuators and control more sensors. Furthermore, opto-isolation separates the electrical connection between circuits for better PC system protection. Thus, making the U2600A Series more reliable with its opto-isolated digital input and digital output.

Flexible Standalone or Modular Capability
The U2600A Series is uniquely designed for the flexibility of functioning as a standalone or modular unit. When using the U2600A Series as a standalone unit, your startup cost will be lower. Whereas, using the U2600A Series as a modular unit increases the expandability in terms of channel count and functionality by slotting in various modular units into the U2781A to fit your desired application system.

Robust 1250 V_{rms} isolation protection
Isolation prevents any potential harmful current that may be induced by transient voltage spikes from flowing through the system by physically separating the electrical connection between circuits. Thus, isolation protects your PC system from any damage and preserves data integrity. The robust 1250 V_{rms} isolation protection allows the U2600A Series to have 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 that is suitable for demanding industrial applications such as driving relays and actuators, which require up to 24 V. The U2600A Series has a wide input range of 10 V to 24 V to sense the status of external sensors. It also has an external supply voltage that is ranging from 5 V to 35 V, which enables the U2600A Series to drive a wide range of actuators.

Supports SCPI and IVI-COM, compatible with wide range of ADEs
IVI-COM enables you to program with any of the popular Application Development Environments (ADEs) in the market. Thus, you can choose the programming language that you are most familiar with. Because the U2600A Series is compatible with a wide range of ADEs, it minimizes the time required to set up the devices in different software environments as they can be programmed directly using the SCPI commands.

The following list contains some of the popular development environments that the DIO device is compatible with:
- Agilent VEE and Agilent T&M Toolkit
- Microsoft® Visual Studio® .NET™, C/C++ and Visual Basic®
- LabVIEW®
- MATLAB®

Easy-to-use bundled software and the command logger function
The Agilent Measurement Manager, which is bundled with the purchase of the U2600A Series, provides you with a quick and easy means to configure and control the DIO device without requiring any programming work. Simplifying this further is the command logger function that captures the configuration commands that can be easily converted to snippets of VEE code. Other supported programming languages are VB, C++, and C#.

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.

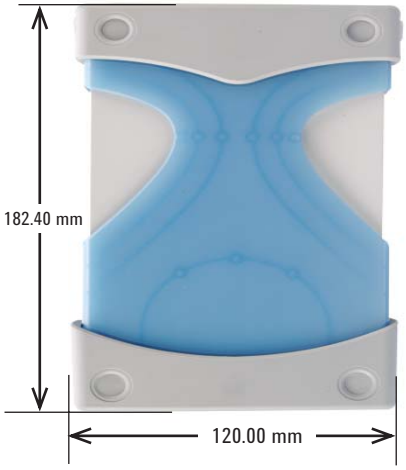
The following describes the key advantages of using the Virtual Port grouping function:
- You can control multiple bits simultaneously for the instantaneous control of multiple machines, such as emergency stop control.
- You can make changes to your port assignments whenever required as the Virtual Port is easily programmable.
- It eliminates the need for you to rewire your hardware devices to different bits for different applications. This makes the U2600A Series suitable for research and development applications, which require on-going testing that involves many hardware setup changes.

Product Outlook and Dimension

Front View

Rear View

Top View



Standard Shipped Items

- AC/DC Power Adapter
- Power Cord
- USB Extension Cable
- L-Mount Kit (used with modular instrument chassis)
- Agilent U2600A Series USB Isolated Digital I/O Devices Quick Start Guide
- Agilent Measurement Manager for U2600A Series Quick Start Guide
- Agilent USB Modular Products Reference CD-ROM
- Agilent Automation-Ready CD (contains the Agilent 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
- U2781A 6-slot USB modular instrument chassis

Product Characteristics and General Specifications

REMOTE INTERFACE
- Hi-Speed USB 2.0
- USBTMC class device

POWER REQUIREMENTS
- +12 VDC (Typical)
- 2 A (Maximum) input rated current
- Installation Category II

POWER CONSUMPTION
- +12 V, 260 mA (Maximum)

OPERATING ENVIRONMENT
- Operating temperature from 0 °C to +55 °C
- Relative humidity of 15% to 85% at 40 °C (non-condensing)
- Maximum altitude of up to 2000 meters
- Pollution Degree 2
- For indoor use only

STORAGE COMPLIANCE
–20 °C to 70 °C

SAFETY COMPLIANCE
Certified with:
- IEC 61010-1:2001/EN 61010-1:2001 (Second Edition)
- Canada: CAN/CSA-C22.2 No.61010-1-04
- USA: ANSI/UL 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

I/O CONNECTOR
100-pin SCSI-II connector

DIMENSIONS (WxDxH)
- 120.00 mm x 182.40 mm x 44.00 mm (with plastic casing)
- 105.00 mm x 174.54 mm x 25.00 mm (without plastic casing)

WEIGHT
- 565 g (with plastic casing)
- 370 g (without plastic casing)

WARRANTY
Three years

System Requirements

PROCESSOR
1.6 GHz Pentium IV or higher

OPERATING SYSTEM
One of the following Microsoft Windows® versions:
- Windows XP Professional or Home Edition (Service Pack 1 or later)
- Windows 2000 Professional (Service Pack 4 or later)

BROWSER
Microsoft Internet Explorer 5.01 or higher

AVAILABLE RAM
512 MB or higher recommended

HARD DISK SPACE
1 GB

VIDEO
Super VGA (800x600) 256 colors or higher

PREREQUISITES
- Agilent IO Libraries Suite 14.2 [1] or higher
- Agilent T&M Toolkit 2.1 Runtime version [2]
- Microsoft .NET Framework version 1.0 and 2.0 [2]

[1] Available in Agilent Automation-Ready CD
[2] Bundled with Agilent Measurement Manager software application installer

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 V to 24 V • Low: 0 V to 2 V	• High: 10 V to 24 V • Low: 0 V 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	–
Isolation voltage	1250 V_{rms}	1250 V_{rms}	–
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	V_{Drop} < 1.0 V (Maximum)		V_{Drop} < 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 64-bit loaded
Isolation voltage	1250 V_{rms}	–	1250 V_{rms}
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 °C to +70 °C		
Operating temperature	0 °C to +55 °C		
Connector type	100-pin SCSI-II connector		
Dimensions	• 120.00 mm x 182.40 mm x 44.00 mm (with plastic casing) • 105.00 mm x 174.54 mm x 25.00 mm (without plastic casing)		
Remote interface	Hi-Speed USB 2.0		

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