Agilent U2300A Series Multifunction USB Data Acquisition

Quick Start Guide

Agilent Technologies

Safety Information

This data acquisition device is safety-certified in compliance with:

- IEC 61010-1:2001/EN 61010-1:2001
- USA: UL61010-1: 2004
- Canada: CSA C22.2 No. 61010-1:2004

WARNING

A WARNING notice denotes a hazard. It calls attention to an operating procedure, practice, or the like that, if not correctly performed or adhered to, could result in personal injury or death. Do not proceed beyond a WARNING notice until the indicated conditions are fully understood and met.

CAUTION

A CAUTION notice denotes a hazard. It calls attention to an operating procedure, practice, or the like that, if not correctly performed or adhered to, could result in damage to the product or loss of important data. Do not proceed beyond a CAUTION notice until the indicated conditions are fully understood and met.

WARNING

- **Do not use the device if it is damaged.Before you use the device, inspect the case. Look for cracks or missing plastic. Do not operate the device around explosive gas, vapor or dust.**
- **Do not apply more than the rated voltage (as marked on the device) between terminals, or between terminal and external ground.**
- **Always use the device with the cables provided.**
- **Observe all markings on the device before connecting to the device.**
- **Turn off the device and application system power before connecting to the I/O terminals.**
- **When servicing the device, use only specified replacement parts.**
- **Do not operate the device with the removable cover removed or loosened.**
- **Do not connect any cables and terminal block prior to performing self-test process.**

CAUTION

- Do not load the output terminals above the specified current limits. Applying excessive voltage or overloading the device will cause irreversible damage to the circuitry
- Applying excessive voltage or overloading the input terminal will damage the device permanently

Safety Symbols

	Direct current
	Warning

Regulatory Markings

	The CE mark shows that the product complies with all the relevant European legal Directives (if accompanied by a year, it signifies when the design was proven).
	The CSA mark is a registered trademark of the Canadian Standards Association. A CSA mark with the indicators "C" and "US" means that the product is certified for both the U.S. and Canadian markets, to the applicable American and Canadian standards.
	The UL Mark is a registered trademark of Underwriters Laboratories Inc. UL listing mark with the indicators "C" and "US indicates the product compliance with both Canadian and U.S. requirements.
	The C-tick mark is a registered trademark of the Spectrum Management Agency of Australia. This signifies compliance with the Australian EMC Framework regulations under the terms of the Radio Communications Act of 1992.
	This product complies with the WEEE Directive (2002/96/EC) marking equipment. The affixed product label indicates that you must not discard this electrical/electronic product in domestic household waste.

Additional Safety Information

For further information on safety, refer to **Safety Information** in the *Agilent U2300A Series Multifunction USB Data Acquisition User's Guide*.

Contents

Introduction

This quick start guide provides an overview of the product description and connections of the Agilent U2300A series multifunction USB data acquisition (DAQ). This includes the product specifications and software installation. High performance design technology makes U2300A series ideal for both industrial and scientific environments. The U2300A series is a dual play USB DAQ that can operate as standalone as well as modular when used in a chassis.

Checking the Contents

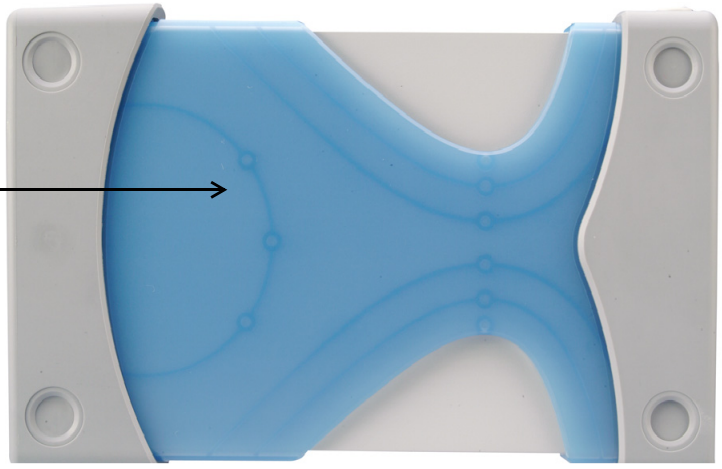
Inspect and verify the following items for the standard purchase of U2300A Series DAQ:

- DC power adaptor
- Power cord
- USB extension cable
- L-Mount kit (used with modular instrument chassis)
- Quick start guide
- Product Reference CD-ROM
- Agilent Automation-Ready CD
- Certificate of Calibration

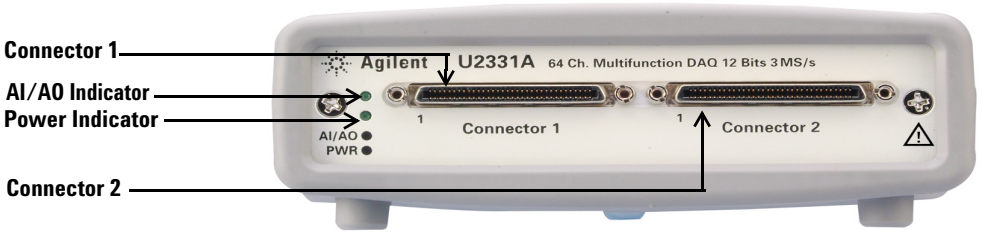
If there are missing items, contact the nearest Agilent Sales Office.

Product Outlook

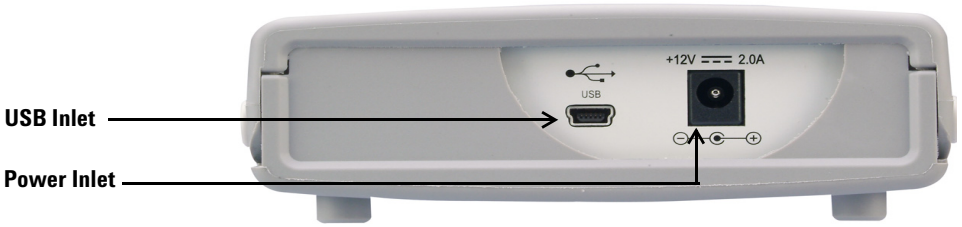
Top View



Front View



Rear View



General Specifications

REMOTE INTERFACE

- USB 2.0 High speed
- USBTMC Class Device

POWER CONSUMPTION

- +12 V DC, 550 mA maximum

OPERATING ENVIRONMENT

- Operating temperature from 0 °C to +55 °C
- Relative humidity at 15% to 85% RH (non-condensing)
- Altitude up to 2000 meters

STORAGE COMPLIANCE

- –20 °C to 70 °C

SAFETY COMPLIANCE

Certified with:

- IEC 61010-1:2001/EN 61010-1:2001 (2nd Edition)
- USA: UL61010-1: 2004
- Canada: CSA C22.2 No.61010-1:2004

EMC COMPLIANCE

- IEC/EN 61326-1 1998
- CISPR 11: 1990/EN55011:1991, Class A, Group 1
- CANADA: ICES-001: 1998
- Australia/New Zealand: AS/NZS 2064.1

SHOCK & VIBRATION

- Tested to IEC/EN 60068-2

IO CONNECTOR

- 68-pin female VHDCI Type

DIMENSION (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)
- 400 g (without plastic casing)

WARRANTY

- One year

Electrical Specifications

Basic Multifunction USB DAQ

Model Number	U2351A	U2352A	U2353A	U2354A
Analog Input				
Resolution	16 bits, no missing codes			
Number of channels	16 SE/8 DI (software selectable/ch)			
Maximum sampling rate	250 kSa/s		500 kSa/s	
Scan list memory	Up to 100 selectable channels entries			
Programmable bipolar input range	±10 V, ±5 V, ±2.5 V, ±1.25 V			
Programmable unipolar input range	0 to 10 V, 0 to 5 V, 0 to 2.5 V, 0 to 1.25 V			
Input coupling	DC			
Input impedance	1 GΩ / 100 pF			
Operational common mode voltage range	±7.5 V maximum			
Overvoltage protection	Power on: Continuous ±30 V, Power off: Continuous ±15 V			
Trigger sources	External analog/digital trigger, SSI/star trigger[1]			
Trigger modes	Pre- trigger, delay-trigger, post-trigger and middle-trigger			
FIFO buffer size	Up to 8 MSa			
Analog Output				
Resolution	16 bits	N/A	16 bits	N/A
Number of channels	2	N/A	2	N/A
Maximum update rate	1 MSa/s	N/A	1 MSa/s	N/A
Output ranges	0 to 10 V, ±10 V, 0 to AO_EXT_REF, ±AO_EXT_REF[2]	N/A	0 to 10 V, ±10 V, 0 to AO_EXT_REF, ±AO_EXT_REF[2]	N/A
Output coupling	DC	N/A	DC	
Output impedance	0.1 Ω Typical	N/A	0.1 Ω Typical	N/A
Stability	Any passive load up to 1500 pF	N/A	Any passive load up to 1500 pF	N/A
Power on state	0 V steady state	N/A	0 V steady state	N/A

Trigger sources	External analog/digital trigger, SSI/star trigger[1]	N/A	External analog/digital trigger, SSI/star trigger[1]	N/A
Trigger modes	Post-trigger and delay-trigger	N/A	Post-trigger and delay-trigger	N/A
FIFO buffer size	1 channel: Maximum 8 MSa 2 channels: Maximum 4 MSa/ch	N/A	1 channel: Maximum 8 MSa 2 channels: Maximum 4 MSa/ch	N/A
Function generation mode	Sine-wave, square-wave, triangle, sawtooth and noise waveform	N/A	Sine-wave, square-wave, triangle, sawtooth and noise waveform	N/A
Digital I/O				
Number of bits	24-bit programmable input/output			
Compatibility	TTL			
Input voltage	V_{IL} = 0.7 V max, I_{IL} = 10 µA max V_{IH} = 2.0 V min, I_{IH} = 10 µA max			
Input voltage range	–0.5 V to +5.5 V			
Output voltage	V_{OL} = 0.45 V max, I_{OL} = 8 mA max V_{OH} = 2.4 V min, I_{OH} = 400 µA max			
General Purpose Digital Counter (GPC)				
Maximum count	(2^{31}-1) bits			
Number of channels	2 independent up/down counter			
Compatibility	TTL			
Clock source	Internal or external			
Base clock available	48 MHz			
Maximum clock source frequency	12 MHz			
Input frequency range	0.1 Hz to 6 MHz at 50% duty cycle			
Pulse width measurement range	0.167 µs to 178.956 s			
Analog trigger				
Trigger source	All analog input channels, External analog trigger(EXTA_TRIG)			
Trigger level	±Full Scale for internal; ±10 V for external			
Trigger conditions	Above high, below low and window (software selectable)			
Trigger level resolution	8 bits			
Bandwidth	400 kHz			
Input Impedance for EXTA_TRIG	20 kΩ			
Coupling	DC			
Overvoltage Protection	Continuous for ± 35 Vmaximum			

Digital Trigger	
Compatibility	TTL/CMOS
Response	Rising or falling edge
Pulse width	20 ns minimum
Calibration[3]	
On board reference voltage	5 V
Temperature drift	±2 ppm/°C
Stability	±6 ppm/1000 hrs
General	
Remote interface	USB 2.0 High Speed
Device class	USBTMC Class Device
Programmable interface	Standard Commands for Programmable Instruments (SCPI) and IVI-COM

[1] System Scynchronous Interface (SSI) and star trigger commands are used when modular devices are used in instrument chassis.

[2] Maximum external reference voltage for analog output (AO_EXT_REF) is ±10 V.

[3] 20 minutes warm-up time is recommended.

High Density Multifunction USB DAQ

Model Number	U2355A	U2356A	U2331A
Analog Input			
Resolution	16 bits, no missing codes		12 bits, no missing codes
Number of channels	64 SE/32 DI (software selectable/ch)		
Maximum sampling rate	250 kSa/s	500 kSa/s	3 MSa/s (single channel) 1 MSa/s (multi channels)
Scan list memory	Up to 100 selectable channels entries		
Programmable bipolar input range	±10 V, ±5 V, ±2.5 V, ±1.25 V		±10 V, ±5 V, ±2.5 V, ±1.25 V, ±1 V, ±0.5 V, ±0.25 V, ±0.2 V, ±0.05 V
Programmable unipolar input range	0 to 10 V, 0 to 5 V, 0 to 2.5 V, 0 to 1.25 V		0 to 10 V, 0 to 5 V, 0 to 4 V, 0 to 2.5 V, 0 to 2 V, 0 to 1 V, 0 to 0.5 V, 0 to 0.4 V, 0 to 0.1V
Input coupling	DC		
Input impedance	1 GΩ / 100 pF		
Operational common mode voltage range	±7.5 V maximum		
Overvoltage protection	Power on: Continuous ±30 V, Power off: Continuous ±15 V		
Trigger sources	External analog/digital trigger, SSI/star trigger[1]		
Trigger modes	Pre-trigger, delay-trigger, post-trigger, middle-trigger		
FIFO buffer size	Up to 8 MSa		
Analog Output			
Resolution	12 bits		
Number of channels	2		
Maximum update rate	1 MSa/s		
Output ranges	0 to 10 V, ±10 V, 0 to AO_EXT_REF, ±AO_EXT_REF[2]		
Output coupling	DC		
Output impedance	0.1 Ω Typical		
Stability	Any passive load up to 1500 pF		
Power on state	0 V steady state		
Trigger sources	External analog/digital trigger, SSI/star trigger[1]		
Trigger modes	Post-trigger and delay-trigger		
FIFO buffer size	1 channel: Maximum 8 MSa 2 channels: Maximum 4 MSa/ch		
Function generation mode	Sine-wave, square-wave, triangle, sawtooth and noise waveform		

Digital I/O	
Number of bits	24-bit programmable input/output
Compatibility	TTL
Input voltage	V_{IL} = 0.7 V max, I_{IL} = 10 µA max V_{IH} = 2.0 V min, I_{IH} = 10 µA max
Input voltage range	–0.5 V to +5.5 V
Output voltage	V_{OL} = 0.45 V max, I_{OL} = 8 mA max V_{OH} = 2.4 V min, I_{OH} = 400 µA max
General Purpose Digital Counter (GPC)	
Maximum count	(2^{31}-1) bits
Number of channels	2 independent up/down counter
Compatibility	TTL
Clock source	Internal or external
Base clock available	48 MHz
Maximum clock source frequency	12 MHz
Input frequency range	0.1 Hz to 6 MHz at 50% duty cycle
Pulse width measurement range	0.167 µs to 178.956 s
Analog trigger	
Trigger source	All analog input channels, External analog trigger(EXTA_TRIG)
Trigger level	±Full Scale for internal; ±10 V for external
Trigger conditions	Above high, below low and window (software selectable)
Trigger level resolution	8 Bits
Bandwidth	400 kHz
Input Impedance for EXTA_TRIG	20 kΩ
Coupling	DC
Overvoltage Protection	Continuous for ±35 V maximum
Digital Trigger	
Compatibility	TTL/CMOS
Response	Rising or falling edge
Pulse width	20 ns minimum
Calibration[3]	
On board reference	5 V
Temperature drift	±2 ppm/°C
Stability	±6 ppm/1000 hrs

General	
Remote interface	USB 2.0 High Speed
Device class	USBTMC Class Device
Programmable interface	Standard Commands for Programmable Instruments (SCPI) and IVI-COM

[1] System Scynchronous Interface (SSI) and star trigger commands are used when modular devices are used in instrument chassis.

[2] Maximum external reference voltage for analog output (AO_EXT_REF) is ±10 V.

[3] 20 minutes warm-up time is recommended.

Installation

System Requirements

Prior to installing the Agilent Measurement Manager software and the USB DAQ driver, make sure your PC meets the following minimum system requirements:

Processor 500 MHz Pentium III or higher required (1 GHz is recommended)

Operating system Windows 2000/XP

Browser Microsoft Internet Explorer 5.01 or higher

Available RAM 256 MB or higher is recommended

Hard disk space 1 GB

Pre-installation The Agilent IO Libraries Suite version 14.2 or higher is recommended. If possible, always use the latest version of the Agilent IO Libraries Suite. Alternatively, you can install the Agilent IO Libraries Suite with the required version directly from the accompanying *Agilent Automation-Ready CD*.

NOTE For more information, refer to the Agilent IO Libraries Suite Getting Started Guide at http://www.agilent.com/find/iolib.

USB DAQ Driver

NOTE The USB DAQ driver only compatible with Windows 2000 and Windows XP.

NOTE Ensure that the U2300A series USB DAQ is disconnected from PC before installing the driver.

Please ensure that Agilent IO Libraries Suite is installed before proceeding.

1. Unpack the U2300A series USB DAQ
2. Ensure that the U2300A USB DAQ is disconnected from your PC.
3. Insert the *Product Reference CD-ROM* into the CD-ROM drive.
4. Installer will automatically execute the Agilent U2300 Series Installation Menu. Click **Hardware Driver** to begin the installation of USB DAQ driver.
5. If it does not auto execute, go to **Start > Run** and type `<drive>:\Driver\Hardware\setup_hw.exe`, where <drive> is your CD-ROM drive. Click **OK** to begin installation.
6. Install the USB DAQ driver and click **Finish** when installation completed.
7. Once installation completed, connect the power cord to the AC/DC power adapter. The AC/DC power adapter requirement is 110 V/240 VAC, 50/60 Hz, with output voltage of +12 VDC.
8. Insert the DC output plug from the AC/DC power adapter to the power jack on the rear panel of USB DAQ device.
9. Connect the Agilent U2300A series DAQ to any PC USB ports with the bundled USB cable.
10. The Agilent U2300A series USB DAQ is now ready for usage.

Installation of Agilent Measurement Manager Software

1. Close all other applications on your PC. Insert the *Product Reference CD-ROM* into your CD-ROM drive.
2. Click **Measurement Manager** on the Agilent U2300 Series Installation Menu to begin the installation of Agilent Measurement Manager Software.
3. If the installation menu does not appear after a few seconds, select **Start > Run** (on the Windows Start menu) and type `<drive>:\autorun.exe`, where `<drive>` is your CD-ROM drive.
4. Click **OK** to begin installation.
5. A shortcut for this software will be created on your desktop after the Agilent Measurement Manager software is successfully installed.

NOTE USING THE LICENSED MATERIALS INDICATES YOUR ACCEPTANCE OF THE LICENSE TERMS. IF YOU DO NOT AGREE TO ALL OF THESE TERMS, YOU MAY RETURN ANY UNOPENED LICENSED MATERIALS FOR A FULL REFUND. IF THE LICENSED MATERIALS ARE BUNDLED OR PRE-LOADED WITH ANOTHER PRODUCT, YOU MAY RETURN THE ENTIRE UNUSED PRODUCT FOR A FULL REFUND.

Installation of IVI-COM

Please ensure that Agilent IO Libraries Suite is installed before proceeding.

1. Click **IVI-COM Driver** on the Agilent U2300 Series Installation Menu to install the IVI-COM.
2. Ensure that IVI Shared Components version 1.2.1.0 and above is installed before installing the driver. You can find the IVI Shared Components on the IVI website at http://www.ivifoundation.org.
3. When the Agilent U235x IVI-COM Driver Setup Wizard begin, follow the installation wizard and select **Typical** to install the most common program features.
4. Click **Install** to begin installation.
5. Click **Finish** when installation completed.

www.agilent.com

Contact us

To obtain service, warranty or technical support assistance, contact us at the following phone numbers:

United States:
(tel) 800 829 4444 (fax) 800 829 4433
Canada:
(tel) 877 894 4414 (fax) 800 746 4866
China:
(tel) 800 810 0189 (fax) 800 820 2816
Europe:
(tel) 31 20 547 2111
Japan:
(tel) (81) 426 56 7832 (fax) (81) 426 56 7840
Korea:
(tel) (080) 769 0800 (fax) (080) 769 0900
Latin America:
(tel) (305) 269 7500
Taiwan:
(tel) 0800 047 866 (fax) 0800 286 331
Other Asia Pacific Countries:
(tel) (65) 6375 8100 (fax) (65) 6755 0042

Or visit Agilent worlwide web at:
www.agilent.com/find/assist

Product specifications and descriptions in this document subject to change without notice.

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