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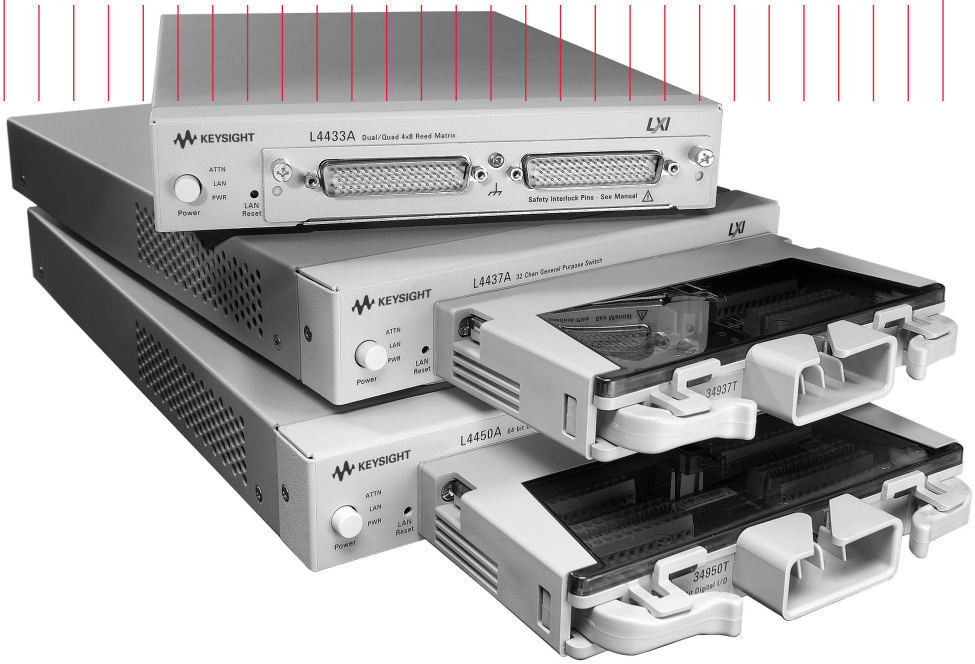
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Keysight L4451A

4-Channel Isolated D/A Converter with Memory

Data Sheet



KEYSIGHT TECHNOLOGIES

Introduction

4-Channel D/A Converter offers high-voltage analog outputs wherever your application needs it

The Keysight Technologies, Inc. L4451A is a high-performance 4-channel D/A converter that is LXI Class C compliant. With its small size and Ethernet connectivity, the D/A converter can be placed wherever your application needs it.

The Keysight L4451A has four isolated analog channels that are useful to source bias voltages to your device under test, to control your analog programmable power supplies, or use the outputs as setpoints for your control systems. You can use the standard waveforms provided or create your own with over 500,000 points. These points can be dynamically allocated among one or more channels and output as a point-to-point arb.

Using this LXI instrument, you'll get all the benefits of an Ethernet connection, built-in instrument web interface, standard software drivers and more. The LXI standard is supported by multiple vendors, enabling lower cost of test with accelerated test integration and development.

- LXI compliance includes built-in Ethernet connectivity
- Fully-featured graphical web interface
- Four isolated analog outputs
- Outputs up to ±16 V or ±20 mA DC
- 16-bits of resolution
- 200 kHz update rate
- Default standard waveforms
- Software drivers for most common programming environments

Isolated analog outputs can be stacked for higher voltage outputs

The L4451A has four independent, isolated channels that can output DC voltage up to ±16 V or DC current up to ±20 mA with 16 bits of resolution. The gain and offset can be adjusted while in operation. And since these are isolated channels, they can be stacked to create waveforms with higher output voltages.

Each channel can be controlled manually, or use the onboard memory to download a waveform. The 500 k global memory can store up to 32 waveforms. Any waveform can be dynamically allocated among one or more channels and output as a point-to-point arbitrary waveform generator at up to 200 k points/s. You can use the standard sine, square or ramp wave shapes provided or define your own wave shape using over 500,000 points and output to a device under test.

Synchronize your outputs with the CLK that can be divided down for each channel independently.

The L4451A is electronically calibrated using an external DMM and the CAL command.

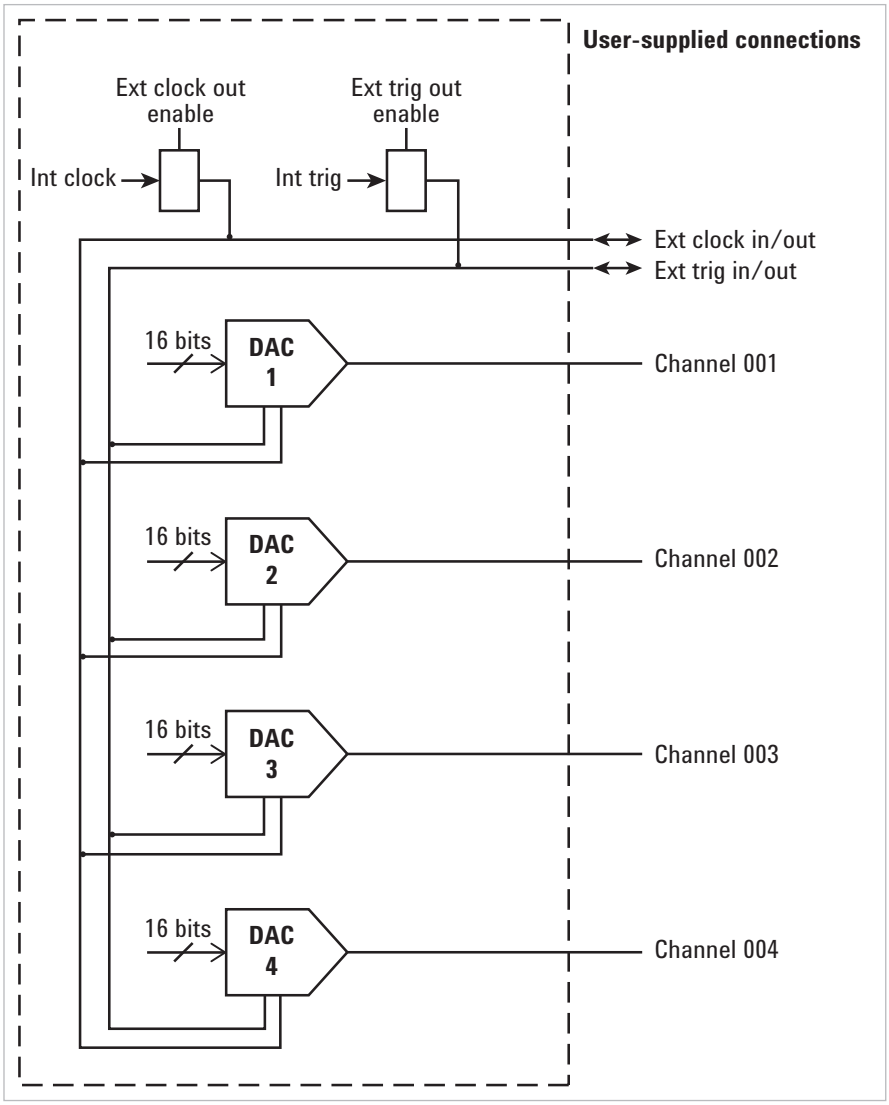


Figure 1. L4451A 4-channel isolated D/A converter.

System connections you can trust

The L4451A comes with 1 heavy duty 50-pin Dsub connector that allows for simple, reliable connection options. Each connector uses 30 micro-inches of gold to ensure a repeatable, accurate measurement. Other connection options include:

- Detachable terminal blocks with strain relief
- Low-cost, standard 50-pin Dsub connector kits and cables
- Mass interconnect solutions

Ethernet connectivity enables simple connection to the network and remote access to measurements

The Ethernet interface offers high-speed connections that allow for remote access and control. You can set up a private network to filter out unwanted LAN traffic and speed up the I/O throughput, or take advantage of the remote capabilities and distribute your tests worldwide. Monitor, troubleshoot, or debug your application remotely. Ethernet communication also can be used with the support of LAN sockets connections.

The optional GPIB interface has many years of proven reliability and can be used for easy integration into existing applications.

The L4451A ships with the Keysight E2094N I/O Libraries Suite, which enables connections for Keysight and non-Keysight modular and traditional instruments. This makes it easy to configure and integrate instruments into your system.

Fully-featured graphical web interface makes it easy to set-up and troubleshoot your tests from anywhere in the world

The built-in web interface provides remote access and control of the instrument via a Java-enabled browser such as Internet Explorer. Using the web interface, you can set up, troubleshoot, and monitor your instrument from remote locations.

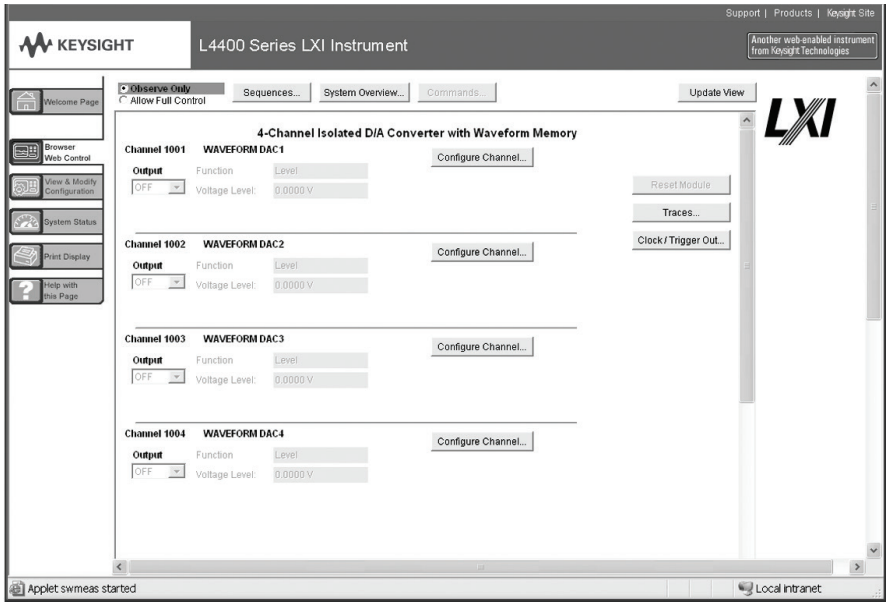


Figure 2. The Web interface makes it easy to set up, troubleshoot and monitor your test remotely.

- View and modify instrument setup
- Configure analog and clock outputs
- Define and output waveforms
- View error queue
- Get status reports, current configuration, firmware revisions, and more

Additionally, since the web interface is built into the instrument, you can access it on any operating system that supports a web browser without having to install any special software. Password protection and LAN lockout are also provided to limit access for additional security.

Software for most popular programming environments

Full support for standard programming environments ensures compatibility and efficiency. You can use direct I/O with your own software, or use standard IVI and LabVIEW software drivers that provide compatibility with the most popular development environments:

- National Instruments LabVIEW, LabWindows/CVI, TestStand, and Switch Manager
- Microsoft C/C++ and Visual Basic

High-performance switching wherever your application needs it



Power button

Status LEDs

Easy connection options with terminal blocks, standard 50-pin cables or connector kits



Optional GPIB

Built-in Ethernet

External trigger to synchronize events

Product specifications

Output characteristics		
	Maxiumum update rate:	200 kHz point-to-point
	Monotonic:	to 16-bits
	Isolation:	> 80 VDC/AC peak (channel-to-chassis or channel-to-channel)
	Synchronization:	Software commands or external trigger
	Internal/external CLK accuracy:	100 ppm
	AC accuracy:	Not specified
DC voltage		
	Amplitude:	±16 V up to 10 mA
	Resolution:	16-bit = 500 µV
	Amplitude accuracy (DC):	±(0.05% + 3.0 mV) (90 days, Tcal ±5 °C or Cal:MOD?: ±5°C)
	Ripple and noise:	< 2 mVrms, 20 Hz to 250 kHz into 10 kΩ load
	Settling time:	40 µs (-full scale to +full scale step, single channel, to rated accuracy)
	Output impedance:	< 1 Ω with the load sensed
DC current		
	Range:	±20 mA
	Resolution:	16-bit = 630 nA
	Accuracy:	±(0.09% + 5.0 µV) (90 days, Tcal ±5 °C or Cal:MOD?: ±5°C
	Ripple and noise:	< 2 µArms, 20 Hz to 250 kHz into 250 Ω
	Compliance voltage:	±12 V
	Max open circuit voltage	< ±22 V

Product specifications (continued)

Phase-locking I/O trigger characteristics			
	Trigger input	Input level:	TTL compatible (3.3 V logic, 5 V tolerant)
		Slope:	Rising or falling, selectable
		Pulse width:	> 100 ns
		Input impedance:	> 10 kΩ, DC coupled
	Trigger output	Level:	TTL compatible into 1 kΩ (3.3 V logic)
		Output impedance:	50 Ω typical
	Clock input	Input level:	TTL compatible (3.3 V logic, 5 V tolerant)
		Input impedance:	> 10 kΩ, DC
		Maximum rate:	10 MHz
	Clock output	Level:	TTL compatible Into 1 kΩ (3.3 V logic)
		Output impedance:	50 Ω typical
		Maximum rate:	10 MHz
		Accuracy:	±100 ppm
Memory			
	Type	Volatile	
	Size	500 K for waveforms	
	States	5 instrument states with user label in non-volatile memory	
General system specifications			
	Power supply	Universal 100 V to 240 V ±10%	
	Power line frequency	50 Hz to 60 Hz ±10% automatically sensed	
	Power consumption	15 VA	
	Operating environment	Full accuracy for 0°C to 55°C Full accuracy to 80% R.H. at 40 °C	
	Storage environment	-40°C to 70°C	
	Dimensions (H x W x L)	40.9 x 212.3 x 379.3 mm 1.61 x 8.36 x 14.93 in	
	Weight	3.7 kg, 8.2 lbs	
	Safety conforms to	CSA, UL/IEC/EN 61010-1	
	EMC conforms to	IEC/EN 61326-1, CISPR 11	
	Warranty	3 years	

Product specifications (continued)

Software		
	Keysight connnectivity software included	Keysight I/O Libraries Suite 14 or greater (E2094N)
Minimum system requirements		
	PC hardware	Intel Pentium 100 MHz, 64 Mbyte RAM, 210 Mbyte disk space
		Display 800x600, 256 colors, CD-ROM drive
	Operating system [1]	Windows 98 SE/NT/2000/XP
Computer interface		
		Standard LAN 10BaseT/100BaseTx
		Optional IEEE 488.2 GPIB
Software driver support for programming languages		
	Software drivers	IVI-C and IVI-COM for Windows NT/2000/XP
		LabVIEW
	Compatible with programming tools and environments	
	Keysight	VEE Pro
	National Instruments	TestStand
		Measurement Studio
		LabWindows/CVI
		LabVIEW
		Switch Executive
	Microsoft	Visual Studio.NET
		C/C++
		Visual Basic 6

1 Load I/O Libraries Version M for Windows NT support or version 14.0 for Windows 98 SE support

Ordering information

L4451A 4-channel isolated D/A converter with memory

Includes User's guide on CD, power cord, and Quick Start package

Option -GPIB

Adds GPIB interface

Option 0B0

Deletes printed manual set, full documentation included on CD ROM

Option ABA

English printed manual set

Connection options

Select terminal block for discrete wiring, cables or connector kits. Cables and connector kits require 2 per instrument.

34951T

Terminal block for 34951A and L4451A 4-Ch D/A converter

Y1135A

1.5 m 50-pin Dsub, M/F twisted pair with outer shield cable – 300 V

Y1136A

3 m 50-pin Dsub, M/F twisted pair with outer shield cable – 300 V

Y1141A

Solder cup connector kit with male 50-pin Dsub

Other accessories

Y1160A

Rack mount kit for L4400 series instruments-racks 2 instruments side-by-side with sliding tray

Note: when using the L4400 Series Rack Mount Kit, use the Y1139A solder cup connector kit rather than the 34921T terminal block.

For additional information please visit:
http://www.keysight.com/find/L4451A

Related literature

Data sheets

5988-6302EN, *Keysight VEE Pro*

5989-1441EN, *Keysight W1130B T&M Toolkit 2.1 with Test Automation*

5989-1439EN, *Keysight E2094N I/O Libraries Suite 15.5*

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