

L4421A 40-Channel Armature Multiplexer

40-channel multiplexer offers high-performance signal switching wherever your application needs it

The Keysight Technologies, Inc. L4421A is a high-performance 40-channel armature multiplexer that is LXI Class C compliant. With its small size and Ethernet connectivity, this switch can be placed wherever your application needs it.

The L4421A is a versatile multiplexer for general purpose scanning or, when using the module in a non-scanning mode, you can close as many channels as you wish. The low thermal offset characteristics and built-in thermo- couple reference on the terminal block, make it ideal for temperature measurements when used with an external DMM. The dense, multi-function switching with 100 channel/ second scan rates addresses a broad spectrum of data acquisition, design verification and functional test applications. The Ethernet connection also simplifies distributed data acquisition so that you can collect data from multiple locations.

Four additional fused inputs (channels 41- 44) can route up to 1 A of current to an external DMM, allowing for AC and DC current measurements without the need for external shunt resistors.

Using this LXI instrument, you'll get all the benefits of an Ethernet connection, 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.



Notice: Keysight will discontinue the L4421A 40-Channel Armature Multiplexer on June 1st, 2023. The last day to place an order for this product is May 31st, 2023. The closest replacement product for L4421A is a combination of 34980A Multifunction Switch / Measure Unit with 34921A 40-Channel Armature Multiplexer. The programming command of L4421A is compatible with 34921A. Keysight will continue to support these products for the standard period of 5 years.

Features

- LXI compliant includes built in Ethernet connectivity
- 40 2-wire latching armature relays
- Thermocouple reference junction for temperature measurements (requires external DMM)

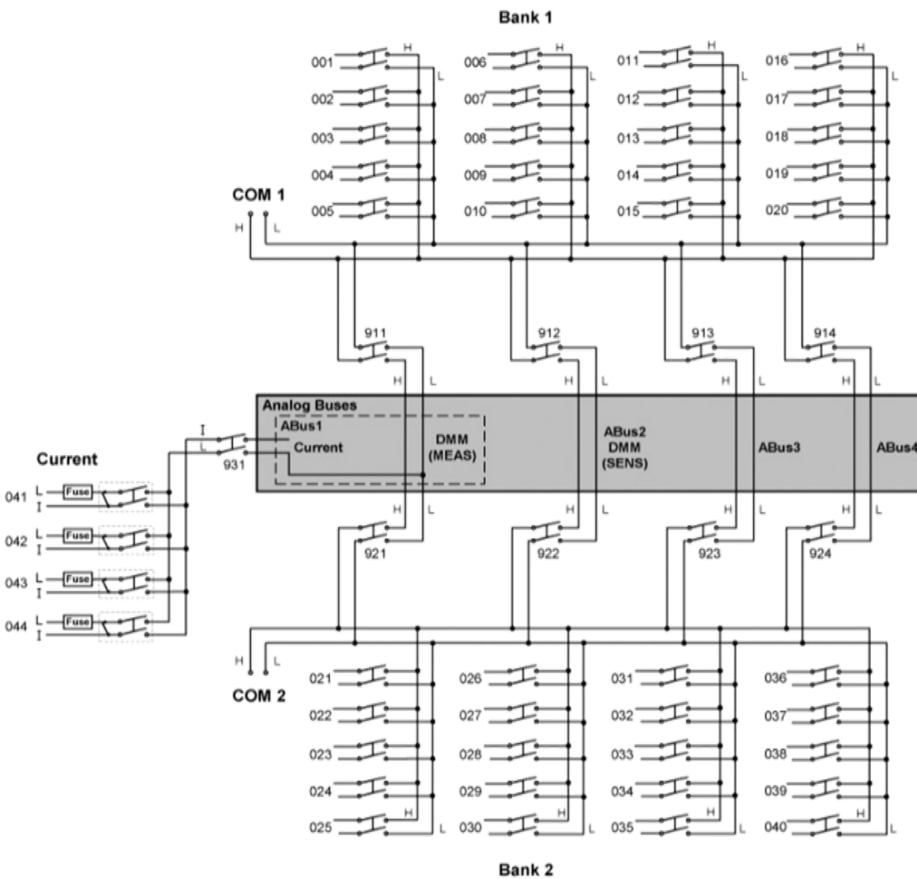


Figure 1. L4421A 40-channel armature multiplexer with low thermal offset (bank 2)

Switch features for flexible and reliable connection

Connect one of many different points to a single point or create your own custom configuration with multiple switch closures. When configured as a multiplexer, the L4421A features "break before make" connections to ensure that no two signals are connected to each other during a scan.

The sequence feature defines switch sequences and controls complex signal routing to ensure the order of switch closures. Assign a sequence, give it a name and then execute it with the custom name you created. External trigger capabilities make it easy for you to time and synchronize measurements and other events. The external trigger can be used to determine the beginning or end of data to be acquired.

The L4421A also includes a relay counter to monitor and help predict when relays are nearing their end of life.

Easily route signals to an external DMM

The L4421A switches support signals up to 300 V and 1 A so that no external signal conditioning is required. The 34921T features a built-in thermocouple reference that allows for scanning temperature measurements with an external DMM. The analog bus connector can be used to easily route your multiplexed signals to an external DMM. Hardware handshake with an external DMM is supported through a channel closed trigger output and a channel advance trigger input.

System connections you can trust

The L4421A comes with 2 heavy duty 50-pin Dsub connectors that allow for simple, reliable connections. 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 L4421A ships with the Keysight E2094N I/O Libraries Suite making it easy for you to configure and integrate instruments into your system — even if your system includes instruments from multiple vendors.

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, trouble shoot, and monitor your instrument from remote locations.

- View and modify instrument setup
- Open or close switches
- Send, receive and view
- SCPI commands
- Define and execute switch sequences
- View error queue
- Get status reports on relay counts, firmware revisions, and more

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

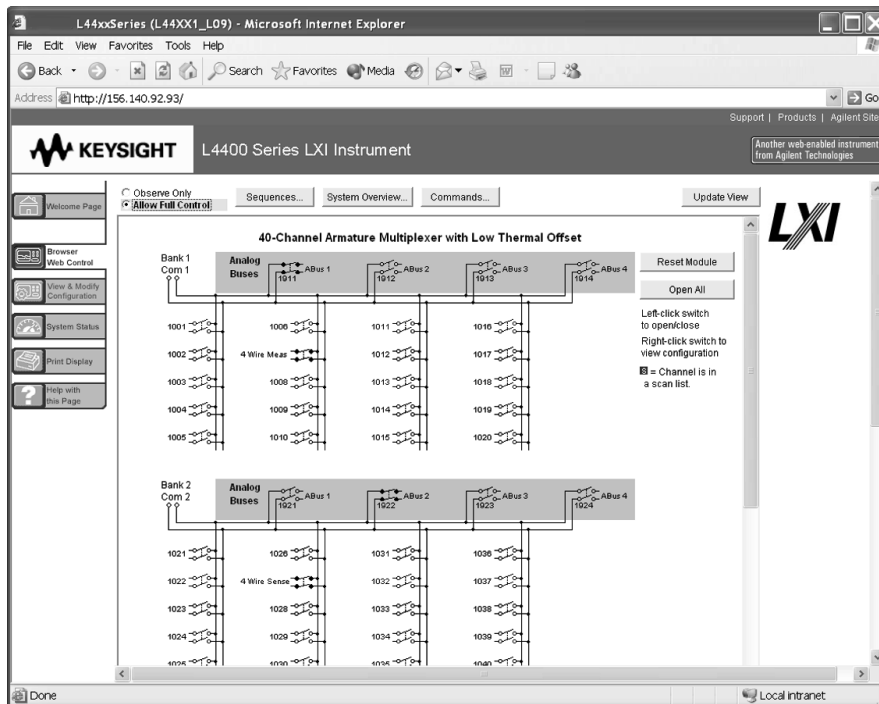


Figure 2. The web interface makes it easy to set up, troubleshoot and maintain your test remotely.

Software for most popular programming environments

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

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

High-Performance Switching Wherever Your Application Needs It



Status LEDs

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



Analog Bus for connection to other devices

External trigger to synchronize events

Product Specifications

Specifications and Characteristics

Channels/configurations		40 2-wire 20 4-wire 4-current (1.5 A fused)
Switch type		Armature Latching
Input characteristics (per channel)		
Max volts (DC, AC RMS) ¹		±300 V Pollution Degree 1 ±100 V Pollution Degree 2
Max current (DC, AC RMS) ⁸	Switch current Carry current (continuous current)	1 A 2 A
Power (W, VA) ⁴		60 VA
Maximum Transients		1000Vpk
Volt-Hertz limit		max 1x10 ⁸ V-Hz limit per channel.
Initial closed channel resistance ^{2,7}		< 1.5 Ω

General specifications

Offset voltage ²		<3 uV
DC Isolation (ch-ch, ch-earth)		>10 GΩ
T/C cold junction accuracy ^{2,7}		< 0.8 °C

AC characteristics

Bandwidth at terminal block ³		45 MHz
Crosstalk at terminal block (ch-ch) ³	300 kHz	-75 dB
	1 MHz	-75 dB
	20 MHz	-50 dB
	45 MHz	-40 dB
Capacitance at terminal block	HI-LO	150 pF
	LO – earth	150 pF

General characteristics

Relay life (typical)	No load	100 M
	10 V, 100 mA	10 M
	Rated load =	100 k
Scanning speeds ⁵		100 ch/s
Open /close time, typical		4 ms/4 ms
Analog bus connection		Yes

Command Execution Time in msec:

	GPIOB	LAN
Open or Close	4.7	5.3
Init/*WAI	1.9	3
Close/Init/Open	12.4	14

Scanning rates with external DMM

(includes switch, DMM measure time and I/O time with Keysight 34401A, 34410A, 34411A)

	GPIOB ch/s	LAN (w/ VXI 11) ch/s
Scanning channels	100	100
Scanning DCV or Ohms	75	75
Scanning ACV	100	100

Scan triggering

Source	Interval, external, software
Scan count	1 to 50,000 or continuous
Scan interval	0 to 99 hours; 1 ms step size

Channel delay	0 to 60 seconds per channel; 1 ms step size
External trig delay	< 2ms
External trig jitter	< 2ms

Memory

States	5 instrument states with user label in non-volatile memory
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General system specifications

Power supply	Universal 100 V to 240 V
Power line frequency	50 Hz to 60 Hz automatically sensed
Power consumption	50VA
Operating environment (Indoor use only)	Full accuracy for 0°C to 55 °C Maximum Relative Humidity (non-condensing) ⁹ : 80%RH up to 40°C, decreases linearly to 37%RH at 55°C. IEC 61010-1 Pollution degree 1 40 channels, 300V rms or DC, 1A, 60 VA/channel IEC 61010-1 Pollution degree 2 40 channels, 100V rms or DC, 1A, 60 VA/channel Altitude up to 2,000 meters Installation CAT II
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	3.8 kg, 8.4 lbs
Safety and EMC	Refer to Declaration of Conformity for the latest revisions of regulatory compliance at: www.keysight.com/go/conformity

Software

Keysight connectivity	Keysight I/O Libraries Suite 14 or greater (E2094N) software included
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Computer interfaces

	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
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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. DC or AC RMS voltage, channel-to-channel or channel-to-earth
2. At analog bus connector
3. 50 Ohm source, 50 Ohm load, differential measurements verified with 4-port network analyzer (Sdd21)
4. Limited to 6 W of channel resistance power loss per module
5. Speeds are with an external DMM with 4-1/2 digits, delay 0, display off, autozero off, and within bank
6. Includes 0.5°C error temperature reference sensor and 0.3°C terminal block isothermal gradient error. See User's Guide for information on supported external reference sensors.
7. Channel resistance is typically <1.5 Ω but can go as high as 50 Ω if a channel is used in a measurement application with <10 mA load current. Increased relay channel resistance for measurements with load currents below 10 mA can occur on cards that have been out of service or following relay inactivity for periods of greater than 1 week. Switching relays for 2 K cycles prior to use may reduce the variation in channel resistance. Keysight recommends the use of 4-wire Ohms for resistance measurements. For high accuracy voltage measurements, select the DMM input resistance setting of >10 GΩ to minimize the impact of relay contact resistance.
8. DC or Peak AC current Measurement Accuracy For accuracy measurement specification, combine the DMM offset with the switch offset. Bandwidth of the switch may offset the accuracy of the AC measurement.
9. From 40°C to 55°C, the maximum % Relative Humidity follows the line of constant dew point.

Ordering Information

Product model	Description
L4421A	40-chan armature multiplexer.
Option -GPIB	Adds GPIB interface
Connection Options	Select terminal block for discrete wiring, cables or connector kits. Cables and connector kits require 2 per instrument.
34921T	Terminal block with temp reference for 34921A and L4421A 40-Ch Multiplexer
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
Y1139A	Solder cup connector kit with female 50-pin Dsub

Other Accessories

Options	Description
Y1160A	Rack mount kit for L4400 series instruments racks 2 instruments side-by-side on sliding tray Note: When using the L4400 Series Rack Mount Kit, use the Y1139A solder cup connector rather than the 34921T terminal block.
34307A	10-pack of J-type thermocouples
34308A	5-pack of 10 k thermistors

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