

# Keysight U2751A

## USB Modular Switch Matrix

[Data Sheet](#)



## Features

- 32 2-wire crosspoints in a 4x8 configuration
- Allows any combination of rows and columns, even multiple channels concurrently
- Minimal crosstalk and insertion loss to 45 MHz
- 45 MHz bandwidth without terminal block
- Built-in relay cycle counter allows monitoring of relay lifetime and performance
- Hi-Speed USB 2.0 connectivity
- Dual-play operation: standalone and modular capability
- Bundled with easy-to-use Keysight Measurement Manager (KMM) software
- NEW! Control, automate and simplify with Keysight BenchVue software
- Compatible with a wide range of Keysight Development Environments (KDEs)

## Put a Bench in Your Bag

The next time you're called out to solve tough problems in electronic products or processes, leave the bulky transit cases behind. With Keysight Technologies, Inc.'s USB modular instrument (MI) family, you can easily carry powerful test gear in your bag along with your laptop PC.

Our line of MIs includes two oscilloscopes, a DMM, a function generator with arbitrary waveform capability, a source/measure unit and a 4x8 switch matrix. All provide USB 2.0 connectivity (with USBTMC-USB488) standard and plug-and-play simplicity for easy use on the go or on the bench.



## Keysight U2751A USB Modular Switch Matrix

The U2751A is a 4x8 2-wire switch matrix, the size of a typical novel, and flexibly operates as a standalone unit or as a modular unit in the U2781A USB modular product chassis. The optional U2922A terminal block extends the capability of the switch matrix for a wide variety of routing configurations and matrix topologies.



U2751A used as a standalone instrument



U2751A (with U2922A) used as a modular instrument



Keysight U2700A series USB Modular Instruments won Design News' Golden Mousetrap Award in the 2009 Best Products Category. Design News' Awards Program highlights engineering innovation and product design creativity, and honors the best designs of the past year.

## Control, Automate and Simplify with BenchVue – No Programming Needed

Keysight BenchVue software for the PC eliminates many of the issues around bench testing. By making it simple to connect, control instruments, and automate test sequences, you can quickly move past the test development phase and access results faster than ever before with just a few clicks. Dedicated instrument apps allow you to quickly configure the most commonly used measurements and setups for each instrument family. Rapidly build custom test sequences with the integrated Test Flow app to automate and visualize test results without the need for instrument programming. BenchVue supports hundreds of Keysight instrument types and models all from one easy to use application. Control, Automate, Simplify with BenchVue.

## Product outlook and dimensions

Front view



Rear view



Top view



## Product characteristics and general specifications

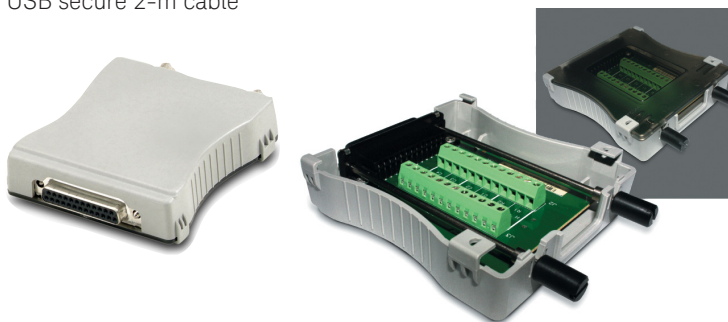
Remote interface	Hi-Speed USB 2.0 USBTMC-USB488 <sup>1</sup>
Power consumption	+12 VDC, 2 A maximum Installation Category II
Operating environment	Operating temperature from 0 °C to +50 °C Relative humidity at 20% to 85% RH (non-condensing) Altitude up to 2000 meters Pollution Degree 2 For indoor use only
Storage compliance	Storage temperature from -20 °C 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 Canada: ICES-001:2004 Australia/New Zealand: AS/NZS CISPR 11:2004
Measurement compliance	CAT II 300 V Over-voltage protection
Shock and vibration	Tested to IEC/EN 60068-2
IO connector	DSub 25 male
Dimension (w × d × h)	Module dimension: 120.00 mm × 183.00 mm × 44.00 mm (with bumpers) 105.00 mm × 175.00 mm × 25 mm (without bumpers)
Weight	480 g (with bumpers) 428 g (without bumpers)

## Standard shipped accessories

- 12 V, 2 A AC/DC Power adapter
- Power cord
- Plug-in connectors and cable casing
- USB Standard-A to Mini-B interface cable
- L-Mount kit (used with modular product chassis)
- Keysight USB Modular Products Quick Start Guide
- Keysight Measurement Manager Quick Reference Card
- Keysight USB Modular Products Reference CD-ROM
- Keysight Automation-Ready CD-ROM (contains the Keysight IO Libraries Suite)
- Certificate of Calibration

## Optional accessories

- U2922A 32-channel terminal block
- USB secure 2-m cable



Implement a variety of test topologies with the U2922A terminal block.

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 modular instrument.

## Product specifications

Model	U2751A	
	Without U2922A terminal block	With U2922A terminal block
Channels/configuration	4 × 8, 2-wire	
Switch type	Armature latching	
<b>Input characteristics (per channel)</b>		
Max working voltage <sup>1</sup>		
– Standalone	42 VDC/35 Vrms	
– Modular (Used with U2781A)	180 VDC/180 Vrms	
Max transient voltage	300 Vrms	
Max current		
– Switch current	2 A	
– Carry current	2 A	
Power (W, VA) <sup>2</sup>	60 W, 62.5 VA	
Volt-Hertz limit	108	
<b>General specification</b>		
Thermal emf (differential)	< 3 $\mu$ V	
Initial closed channel resistance	< 1.5 $\Omega$	
DC isolation (ch-ch, ch-earth)	> 10 G $\Omega$	
<b>AC characteristics</b>		
Bandwidth <sup>3</sup>	45 MHz	30 MHz
Insertion loss		
– 100 kHz	0.2 dB	0.2 dB
– 1 MHz	0.3 dB	0.3 dB
– 10 MHz	< 2 dB	< 2 dB
– 45 MHz	< 3 dB	< 4.5 dB
Capacitance		
– HI-LO	55 pF	85 pF
– LO-Earth	35 pF	45 pF
Crosstalk at terminal block (ch-ch) <sup>[3]</sup>		
– 300 kHz		-70 dB
– 1 MHz		-60 dB
– 20 MHz		-35 dB
– 45 MHz		-30 dB
<b>General characteristics</b>		
Relay life, typical		
– No load		100 M
– 10 V, 100 mA		10 M
– Related load		100 k
Open/close time	4 ms/4 ms	

1. DC or AC rms, channel-to-channel or channel-to-earth.

2. Limited to 6 W channel resistance power loss per module.

3. 50  $\Omega$  source, 50  $\Omega$  load, differential measurements verified with a 4-port network analyzer (Sdd21).

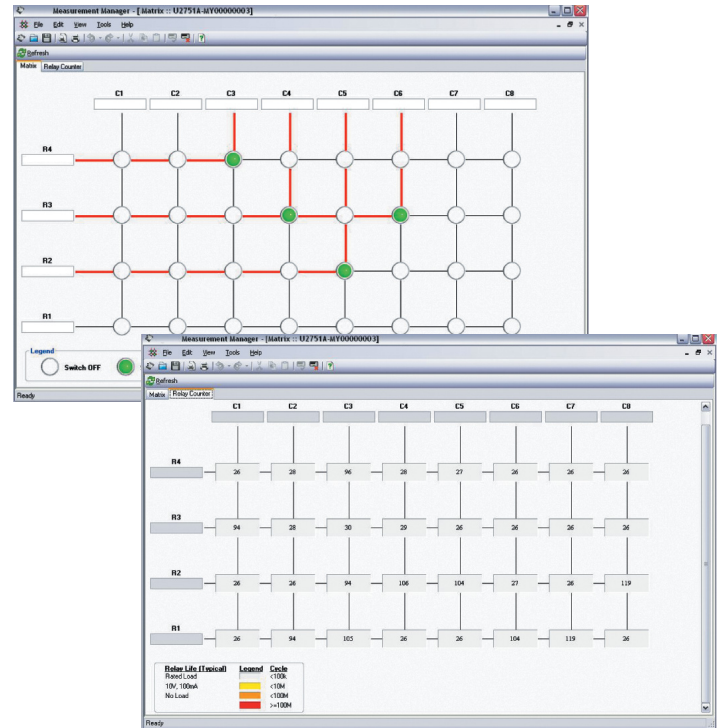
## Keysight Measurement Manager

The Keysight Measurement Manager (KMM) is an application data viewer software that comes with the standard purchase of the U2700A Series USB modular instruments. This software is designed to help you perform quick device configuration, data logging and data acquisition with the modular instruments.

Supported features found in the U2751A Modular Switch Matrix:

- Command Logger and Code Converter
- Self-test
- Option to save the current instrument configuration to a file

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) <sup>1</sup>	Windows Vista (32-bit) Service Pack 1 and 2 <sup>2</sup>	Windows 7 (32-bit and 64-bit) <sup>3,4</sup>
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 <sup>5</sup>	Support for DirectX 9 graphics with 128 MB graphics memory recommended <sup>5</sup>
CD-ROM drive or DVD-ROM drive <sup>6</sup>	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 Manager for Windows 7 64-bit support is a 32-bit application running on a WOW64 (Windows-on-Windows 64-bit) emulator
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<sup>1</sup>

Keysight T&M Toolkit Runtime version 2.1<sup>2</sup>

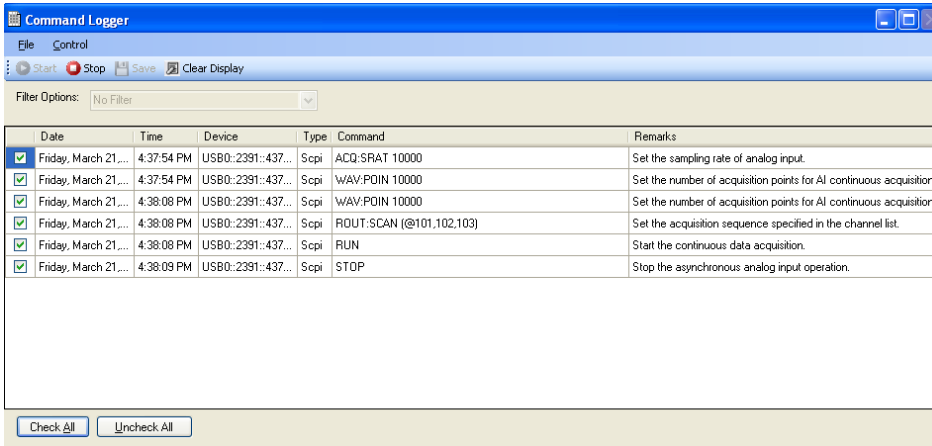
Keysight T&M Toolkit Redistributable Package 2.1 patch<sup>2</sup>

Microsoft .NET Framework version 2.0<sup>2</sup>

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

## Command logger

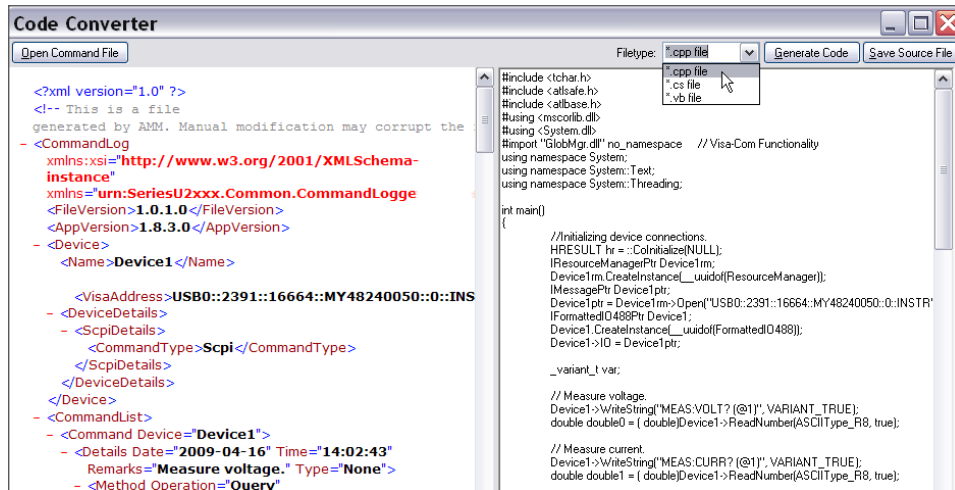
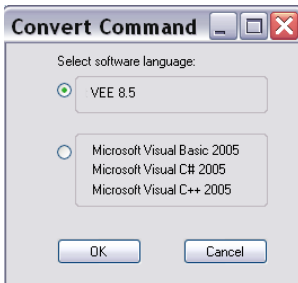
The Command Logger function allows users to log SCPI or IVI-COM command sequences used to control your Keysight USB modular product. The function also captures the time each command is executed. Review the configuration commands at your own pace, or convert the commands to other programming languages with the KMM's Code Converter.



Date	Time	Device	Type	Command	Remarks
Friday, March 21, 2009	4:37:54 PM	USB0:2391:437...	Scpi	ACQ:SRAT 10000	Set the sampling rate of analog input.
Friday, March 21, 2009	4:37:54 PM	USB0:2391:437...	Scpi	WAV:POIN 10000	Set the number of acquisition points for AI continuous acquisition.
Friday, March 21, 2009	4:38:08 PM	USB0:2391:437...	Scpi	WAV:POIN 10000	Set the number of acquisition points for AI continuous acquisition.
Friday, March 21, 2009	4:38:08 PM	USB0:2391:437...	Scpi	ROUT:SCAN (@101,102,103)	Set the acquisition sequence specified in the channel list.
Friday, March 21, 2009	4:38:08 PM	USB0:2391:437...	Scpi	RUN	Start the continuous data acquisition.
Friday, March 21, 2009	4:38:09 PM	USB0:2391:437...	Scpi	STOP	Stop the asynchronous analog input operation.

## Code converter

KMM Code Converter comes with two converters: the Keysight VEE Code Converter, and the Microsoft C#/C++/VB Code Converter, allowing you to convert logged SCPI/IVI-COM commands to snippets of VEE Pro, Visual Basic, C++ and C# codes. You can now convert SCPI commands without needing advanced programming skills, helping you program with ease and allowing you to integrate your programs seamlessly for automated tests.



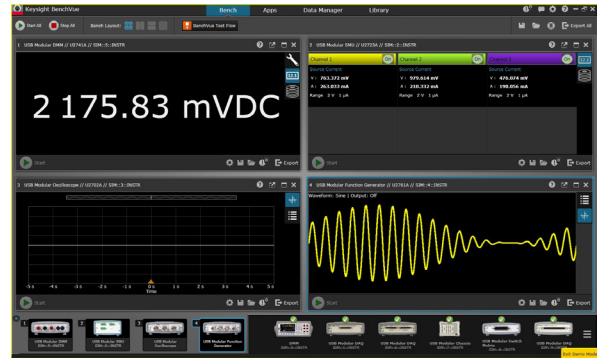


## USB Modular Switch Matrix App within BenchVue

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.

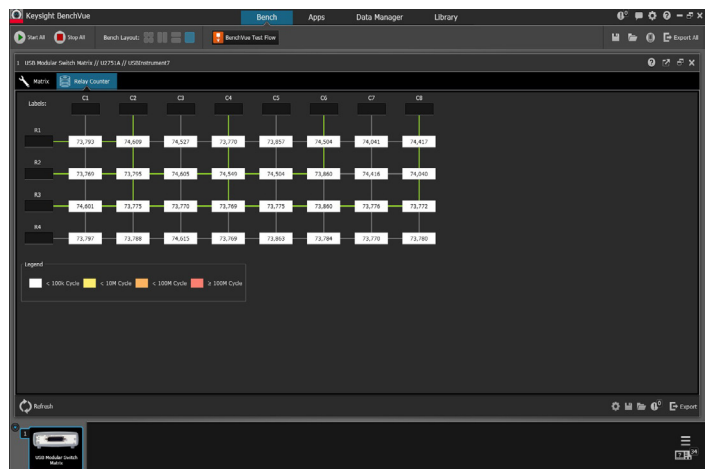
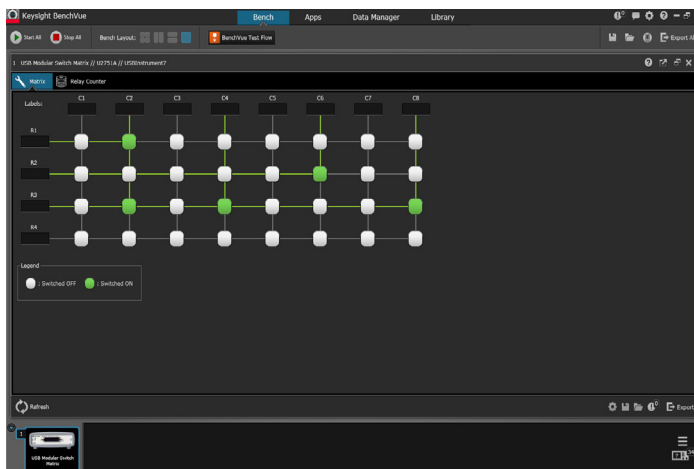
- Visualize multiple measurements simultaneously
- Easily log data, screen shots and system state
- Rapidly prototype custom test sequences
- Recall past states of your USB Modular to replicate results
- Export measurement data in the desired format fast
- Quickly access manuals, drivers, FAQs and videos

The USB Modular Switch Matrix App within BenchVue allows you to quickly configure and control the U2751A Switch Matrix across its 32 crosspoints, as well as visualize the number of times each relay is used.



View measurements across USB DAQ, modular and bench instruments all on one BenchVue interface.

Get started with BenchVue, downloadable at no cost at [www.keysight.com/find/benchvue](http://www.keysight.com/find/benchvue).



Configure and monitor your switch matrix easily on BenchVue's modern interface.

## Ordering Information

Model	Description
U2751A	USB modular switch matrix

## Optional Accessories

Model	Description
U2922A-201	32-channel terminal block
U2921A-101	USB secure cable 2 m

## Other products in the Keysight USB Modular Test Instruments Family



### U2722A/U2723A USB Modular Source Measure Unit

Features:

- Three-channel SMU with four-quadrant source/measure operation
- High measurement sensitivity of 100 pA with 16-bit resolution for all voltage and current ranges
- 0.1% basic accuracy
- Embedded test scripts (for U2723A)

For more information: [www.keysight.com/find/U2722A](http://www.keysight.com/find/U2722A)  
[www.keysight.com/find/U2723A](http://www.keysight.com/find/U2723A)



### U2741A USB Modular Digital Multimeter (DMM)

Features:

- Fast reading speed (up to 100 Sa/s)
- Wide range of basic measurement functions, including frequency and temperature measurements

For more information: [www.keysight.com/find/U2741A](http://www.keysight.com/find/U2741A)



### U2701A/U2702A USB Modular Oscilloscope

Features:

- High sampling rate up to 500 MSa/s, enabling accurate measurement analysis
- Up to 32 MB large memory
- Fast fourier transfer (FFT) and waveform math functions enables easy waveform calculation

For more information: [www.keysight.com/find/usbscope](http://www.keysight.com/find/usbscope)



### U2761A USB Modular Function/Arbitrary Waveform Generator

Features:

- Direct digital synthesis (DDS) waveform generator
- Pulse generator that can generate pulse signal as stimulus
- Easy customization with Arbitrary Waveform Editor
- Internal modulation capability simplifies test setup

For more information: [www.keysight.com/find/U2761A](http://www.keysight.com/find/U2761A)



### 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

For more information: [www.keysight.com/find/U2781A](http://www.keysight.com/find/U2781A)



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For other unlisted countries: [www.keysight.com/find/contactus](http://www.keysight.com/find/contactus) (BP-9-7-17)

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Unlocking Measurement Insights

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