DATA SHEET

U2722A/U2723A USB Modular Source Measure Unit



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.





Features

- Four-quadrant operation (± 20 V,± 120 mA)
- 100 pA measurement sensitivity with 16-bit resolution
- 0.1% basic accuracy
- Embedded test script (for U2723A, details on Page 3)
- IV Curve application support (for U2723A, on KMM and BenchVue)
- Hi-Speed USB 2.0 connectivity
- Dual-play operation: standalone and modular capability
- NEW! Control, automate and simplify with Keysight BenchVue software. Now included.
- Compatible with a wide range of Keysight Development Environments (KDEs)



Keysight U2722A/U2723A USB Modular Source Measure Unit (SMU)

The U2722A and U2723A are 3-channel SMUs, the size of a typical novel, and flexibly operate as standalone units or as modular units in the U2781A USB modular product chassis. Each SMU provides voltage and current programming/readback with

high-accuracy measurement capabilities. Each of the three channels may be configured separately or in a matrix – in series or parallel. These versatile SMUs allow you to perform sweep and measurement with just a single device, without extra configurations.



Figure 1. U2722/3A used as a standalone instrument



Figure 2. U2722/3A used as a modular instrument

Control, Automate and Simplify with BenchVue — No Programming Needed (Now Included)

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. BenchVue supports hundreds of Keysight instrument types and models all from one easy to use application. Control, Automate, Simplify with BenchVue.



Keysight U2700A series USB Modular Instruments won Design News' Golden Mousetrap Award in the 2009 Best Products Category.



Keysight U2723A USB SourceMeasure Unit won the 20th Annual Electronic Design, Strategy, News (EDN) Innovation Award in the DC and Low-Frequency Test category.

Increase the efficiency of your tests

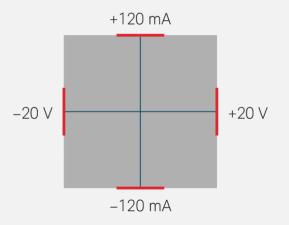
With a high measurement sensitivity of 100 pA at 16-bit resolution for pico-level measurement and 0.1% accuracy, the U2722A/U2723A USB Modular Source Measure Unit provides detailed and accurate analysis and measurement results. The U2722A/U2723A supports SCPI and IVI-COM, and is compatible with a wide range of Keysight Development Environments. Both choices of application software, the Keysight Measurement Manager (KMM) software and BenchVue USB Modular SMU App, help kickstart and simplify your SMU measurements.

Pre-define test configurations and execute commands automatically

The U2723A USB Modular SMU provides an embedded test script to help you pre-define test configurations or duplicate tests easily without spending too much time on programming. Each channel in the U2723A is allocated two memory lists, each capable of storing up to 200 commands and results individually. Stored commands in active memory will be executed accordingly while the measurement results obtained are automatically stored in the result buffer.

Four-quadrant operations with high measurement sensitivity and accuracy

The U2722A/U2723A SMU is a versatile device that allows you to perform sweep and measurement from different operating regions without needing extra configurations. The four-quadrant operation (± 20 V, ± 120 mA) makes the U2722A/U2723A SMU well suited for a wide range of test applications, including leakage measurement, solar cell measurement, forward/reverse voltage and curve tracer transistors. The U2722A/U2723A SMU also offers high measurement sensitivity with 16-bit resolution and accuracy that allows you to obtain more accurate analysis and measurement results.



Fixture and upgraded software for semiconductor testing

The Keysight U2941A Parametric Test Fixture is designed to complement usage of the Keysight U2722A/U2723A USB Modular SMU in the testing of pin-through-hole semiconductor components, including SMT and DIP ICs. The U2941A comes with three input channels, a common ground, and five types of socket modules of various pin configurations.

The included Parametric Measurement Manager software allows easy set-up of the U2722A/U2723A and U2941A for parametric test, simplifies testing and enables recording of data. The software also supports the U2751A USB Modular Switch Matrix when used with the U2722A/U2723A SMU.

A purchasable upgraded software, the Keysight Parametric Measurment Manager Pro (U2942A), analyzes discrete semiconductor and plots the results in an IV curve. See page 9 for more information on the PMM Pro software.

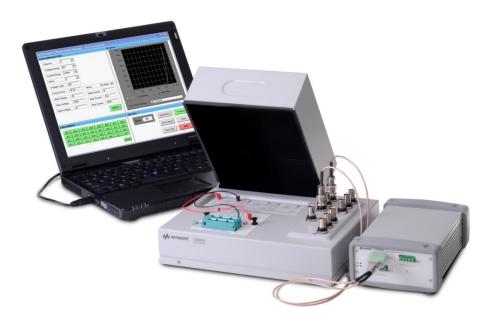


Figure 3. Download specifications for the U2941A parametric test fixture from www.keysight.com/find/U2941A.

U2722A/U2723A USB Modular Source Measure Unit

Product characteristics and gene	ral specifications
Remote interface	Hi-Speed USB 2.0USBTMC-USB4881
Power consumption	+12 VDC, 3 A maximumIsolated ELV supply source
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	–20 °C to 70 °C
Safety & EMC compliance	Refer to Declaration of Conformity for the latest revisions of regulatory compliance at: www.keysight.com/go/conformity
Shock and vibration	Tested to IEC/EN 60068-2
IO connector	Output connectors
Dimension (W × D × H)	Module dimension: • 120.00 mm x 183.00 mm x 66.00 mm (with bumpers) • 105.00 mm x 175.00 mm x 50.00 mm (without bumpers)
Weight	Module dimension: • 700 g (with bumpers) • 650 g (without bumpers)

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 outlook and dimensions

Front view

KEYSIGHT U2722A Source Measure Unit 0 •• ... CH 2 CH 1 GOS s*0* GOS S 0 USB 🕥 • PWR O \wedge сн з G 0' S'

Rear view

			6
re f ritting	•~	+12V 3.0 A	6

Top view



Specifications

Model	U2722A/U2723A
Number of outputs	3

Output ratings (at 0 °C to 50 °C)			
Voltage	-20 V to 20 V		
Current	-120 mA to 120 mA		

Performance specification					
U2722A/U2723A	Range	Accuracy ¹	Resolution		
Voltage programming	± 2 V	0.075% + 1.5 mV	0.1 mV		
12 months (at 25 °C \pm 3 °C), \pm (% of output + offset)	± 20 V	0.05% + 10 mV	1 mV		
Current programming	± 1 µA	0.085% + 0.85 nA	100 pA		
12 months (at 25 °C \pm 3 °C), \pm (% of output + offset)	± 10 μΑ	0.085% + 8.5 nA	1 nA		
	± 100 µA	0.075% + 75 nA	10 nA		
	± 1 mA	0.075% + 750 nA	100 nA		
	± 10 mA	0.075% + 7.5 μA	1 µA		
	± 120 mA	0.1% + 100 µA	20 µA		
Voltage readback	± 2 V	0.075% + 1.5 mV	0.1 mV		
12 months (over USB with respect to the actual output at 25 $^{\circ}C \pm 3 ^{\circ}C$), \pm (% of output + offset)	± 20 V	0.05% + 10 mV	1 mV		
Current readback	± 1 μΑ	0.085% + 0.85 nA	100 pA		
12 months (over USB with respect to the actual output r^{25} $(C + 2)$ $(C + 2)$	± 10 μΑ	0.085% + 8.5 nA	1 nA		
at 25 °C \pm 3 °C), \pm (% of output + offset)	± 100 µA	0.075% + 75 nA	10 nA		
	± 1 mA	0.075% + 750 nA	100 nA		
	± 10 mA	0.075% + 7.5 μA	1 µA		
	± 120 mA	0.1% + 100 µA	20 µA		

¹ Accuracy measurements are based on NPLC 10.

Product Characteristics

Performance characteristics							
Rise/fall time (ms) ¹		U2722A	U2723A				
For resistive measurement ²	±1 μΑ	170.0	15.0				
	± 10 μΑ	18.0	5.0				
	± 100 μΑ	6.0	1.0				
	± 1 mA	1.0	1.0				
	± 10 mA	1.0	1.0				
	± 120 mA	1.0	1.0				

Remote sense operating range	Ensure that the maximum voltage between the OUTPUT+ and SENSE+, OUTPUT–, wand SENSE– does not exceed 3 V
Temperature coefficient	Maximum change in output/readback per $^\circ\mathrm{C}$ after a 30-minute warm-up is 0.15
Guard output resistance	0.2 kΩ
Noise 10 Hz to 20 MHz (peak-peak)	100 mV typical into a resistive load (floating mode)
Output voltage overshoot, ±(% of output + offset)2	During turn-on or turn-off, the output plus overshoot < 0.1% + 10 mV
Programming language	SCPI (Standard Commands for Programmable Instruments)
Maximum sense lead resistance	1 M Ω for rated accuracy
Voltage line regulation	0.01% of range
Voltage load regulation	0.01% + 100 µV
Current line regulation	0.04% of range
Current load regulation	0.04% + 100 μA
Recommended calibration interval	One year
Maximum input capacitance load	10 nF

¹ Drive 50% of 1 V or 10 V output with a resistive load. Rise time is from 10% to 90% of program voltage change at maximum current. Fall time is from 90% to 10% of program voltage change at maximum current.
² Measurements obtained are per default bandwidth setting.

Product Characteristics (continued)

NOTE:

- All channels are isolated from the ground and from each other. Isolation is +60 VDC, Category 1.
- All specifications are based on a three-hour warm-up time.
- The measurement accuracy value is x (1 + a * y), where,
 - x = accuracy specification at room temperature,
 - a = temperature coefficient, and
 - y = temperature change from room temperature in °C

Noise 10 Hz to 20 MHz (Peak-peak)

Voltage range	Current range							
	1 µA	10 µA	100 µA	1 mA	10 mA	120 mA		
2 V	50 mV	50 mV	50 mV	50 mV	30 mV	30 mV		
20 V	50 mV	50 mV	50 mV	50 mV	30 mV	30 mV		

USB Modular SMU 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.

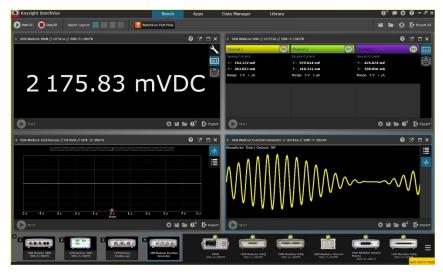


Figure 4. Download specifications for the U2941A parametric test fixture from www.keysight.com/find/U2941A.

- 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 SMU App within BenchVue allows you to quickly control the U2722A/U2723A SMU to visualize measurements, perform data logging and annotate captured data. With BenchVue, you can visualize multiple SMU channels simultaneously, in addition to performing the following:

- Configure SMU channels in serial or parallel to achieve higher throughput
- Configure voltage and current source, range and limit for each channel
- Display source and measure concurrently for each channel
- Plot IV Curve (with U2723A)

In just a few clicks, you can also record measurements and export results to popular PC-friendly applications such as Microsoft Excel and Microsoft Word for further analysis. Get started with BenchVue, downloadable at no cost at www.keysight.com/find/benchvue.

a wedda'r Swa 27 U22					© ଅଟ×								
Inclument Settings	🛱 DAD LODAY 📩 WORK												
110		Charact 2	6	O send 2	6								
ce Ouriere		Neuros Curroro		Source Current									
P96	207.275 mV	voltage:	998.169 mV	voltages	199.829 mV								
at	91.5527 nA	Corneol:	61.0352 nA	Convert:	-915.527 nA								
SW 1 ml		Banga 2.V. Lints		Bange D.V. (Dro									
table Auto Range		Easting Autor Dange		Crashe Pate	large.								
		Soluge Hunger 2.V			24 1								
		Current Ranges L mil		Ormet Barrow	1.00								
and the		CLEAR STATES	Keysight, Benchivie	Darmer Kansoc			6 = 0 0						
						Library							
			🕑 Met Al 🛛 🔳 Mes Al		📰 🔜 🔛 Bendivise Teet Foer		H & O D:	Espert Al					
			1. 1155, Mod Ltr. 5581 of 107720-0	/ I Gi (rette more 5			0 2	-7 × [
			A Sattimer Satting				V 2						
				-									
e control		nesistance control	Chical Settings		(in Term Land (2) Measured (V) Subject (V) Measured (V) Prove () Start (2)-499-2012 (4:3):(0.1990) 2013/00/070 (446) (52 mm - 10.100 mm - 1.4201 (46 m) (10.100 mm - 1.4201 (46 m))								
III Hesktanoe			Note Park	(·)	and average intribution produce we provide the second second and the merid	nii		-1					
		Hinimum Kesksone In Shat Bruit:	Values Brown 2.9		niw 17 may 2017 14:30:00:355 200.0000 vv 196.2020 mit 10.1000 mit 410.2516 mit 132 mi	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~							0 = 0 (
		Natmanilaistanse Station for Oper Close	Carren Serge 21 ma		rand invites 2017/14/36:00:543-200.0200/a/V-109.02251/a/V-10.1000/a/A-315.5273/A-185/A	N		Uerch	Apps Data Hanager	Library			0.000
			Diable Asky Turge	Re Pre	esivi 47.464-2417.14-36:02:731.200.0300.499.200.0437.499.10.1000.663.4.3225.jut. 855.66		22 88 📰 🔳 🔡 Entre	ruo Tost Film					H H O I
					na w 187-966-3817 1.6.30.003618 300.4000 m/r 186.0391 m/r 16.1000 m/r 418.2018 n/r 132 m/r na w 187-966-2817 1.6.30.010185 300.0100 m/r 200.0122 m/r 10.1000 m/r 305 1258 n/r 161 m/r								0 5
			(Convert)		nie 17-86-2017 14:36:00:00 300-000 000 2000 27 mm 10.100 ma 405-164-54 64 76 nie 17-86-2017 14:36:00:00 1200-000 000 200.047 mm 10.1000 mA 2.1362 pA 407 mA								
10. m.			Test Protection	. Pro	esivel #2.465v.281.2.14:38:03:493.200.0300.esv.200.3470.esv.10.1000.esa.415.5223.ea. 183.es								
N No.54 a 1942			Drive Carriert 100 y		new #7-8w-381714-36:63:680 380.000 m/r 194.096 m/r 10.1000 mA 6.0000 A 0.0000		Diarted 1 Charles 2 Cr	1006.3					
			an NT C Mercennet		esive #2.869 2017 14:30:001667 200.000 w/v 199.0901 evr. 10.1000 esa. 2.1362 p.A. 407 eA		R R 1 1 1 1 1						
			NRC 0		nder 47-96-2017 (4.20204)355 200,000 mit 194,0241 mit 10,1000 mit 2,1262 p.4 407 mit name er en state 14,260 mit 201,000 mit 10,000 mit 10,000 mit 2,4404 p.4 400 mit	~	Elerrgie Number	Side	2006 00100	Measured (V)	Overal 14	Pressent (7)	Even (A)
			Literate 2		Field W-Warder-CHT96.00299 200.0000 mV 199.0001 mV 10.000 mA 2.4464 (A 460 A relief 87-99-201714-20194-499 200.0000 mV 199.0791 mV 10.000 mA 1.5229 aA 305 mV		1	Source Durrent	2017-03-07 14:08:51.522 203.000 mV	205.360 mV	10.0000 mA	-915.527 65	188.928 HW
			Separ Protection 200 m		ana er-Ma-200716/2010/0007 200.0200 m/ 100.0902 m/ 10.1000 mA 410.2010 mA 112/mA			Source Current Source Current	2017-03-02 14:05:5: 364 203.000 mV 2017-03-02 14:05:5: 367 203.000 mV	205,543 eV 205,482 eV	10.0000 mA	-915.527 AA 105 L76 NA	120.095 HW
			Drive Current 14 ma	Pro Pro	new #2-8w-2017 14-30:04:005 200.0300 mV 200.0427 mV 10.1000 mA 415.5273 nA 183 mA			Source Domain	2017-03-07 14:08:51.870 205.000 mV	201.421 mV	10.000 mA		63.1947 VW
			the ME C Version and	- N	nalial 107-04a-2017 14-301001391 2003300 m/t 2003221 m/t 201300 m/t 91312273 n/t 20170 Newszaniartis filólódos			Source Current	2017-03-07 14:00:01:473 203.000 mV 2017-09-07 14:06:02:675 203.000 mV	205.645 IVV 205.648 IVV	10.0000 mA	0.00000 A 915.522 A4	6.02002 W 189.375 IW
						Immet at dy with Stop Button		Source Durners	2017-03-07 14:09:5276 203.000 mV 2017-03-07 14:09:5270 203.000 mV	205.726 HV	10.0000 mA	-610.252 mA	126.175 HW
			MLC U		yse No take Hin Take Hin Take Hin Star Take Kar Take Rega 191.6.175 eV 07-86-2017 14:35-3.2012 200.2479 eV 07-99-2017 14:05:00:403	atter Report Time:		Source Current	2317 03 07 11:05:32.384 233.083 mV	201. 121 miv	10.0000 mA	630,352.68	125-089 HW
			Grannel B		uriert +415.3273 nA 07-Mar-0017 14-36:101242 3.4802 pA 07-Mar-0117 14-36:08:741	20 HI NR 20 00 00 00 30	10	Source Current Source Current	2017-03-07 14:00:02:467 200.000 mV 2017-03-07 14:00:02:590 200.000 mV	200,501 mV 205,299 mV	Am 0000.02	303.176 RA	63.0505 IW
			() tot			Sample Decad			2017-05-07-14105192.859 - 201000 mm		10.0000 mA		185.076 W
			U and			Himar	13	Source Current Source Current	2017-03-07-14:05:02:796 200.000 mV 2017-03-07-14:05:57:899 200.000 mV	205.229 HV 205.482 HV	A= 0000.01	-915.527.64 -305.176.65	168.872 +W 61,0131 +W
						06 101 MP 44 44 00 1 00 1 00 1 00 1 53	15	Store Corrent Scarce Corrent	2012-03-02 14:00:53.002 203.000 HV 203-03-07 14:00:53.002 203.000 HV	201.004 WV	10.0000 mA	105.176 MA	61.0901 +W
							16 1/		2017-03-07 14:09:533.208 203.000 mV	205.260 HV			
			USE HIGHN SHU Kakawa rana				16	Source Current Source Domain	2017-03-02 14:05:53.311 203.000 HV 2017-03-02 14:05:53.311 203.000 HV	201,421 mV 205,2391	10.0000 mA	0.00000 6 .015.527 eA	6.03003 W
							Neeninerseta Stelation	sector testan.	212030-10090401 22100290	.05.79716	100000004		156.872 190
							Two: Minivolu: Min	Time	Nox Volue Max line				

Figure 5. Visualize all 3 channels simultaneously and configure your SMU easily on BenchVue's modern interface.

U2722A	USB modular source measure unit
U2723A	USB modular source measure unit with embedded test scripts
U2941A	Parametric test fixture, shipped with:
	Assembly PTFE plate
	28-pin dual-in-line package (DIP) socket module
	0.1-inch universal socket module
	0.075-inch universal socket module
	0.05-inch universal socket module
	Pin plug-to-pin plug cables, black (4 pcs)
	Pin plug-to-pin plug cables, red (4 pcs)
	Pin plug-to-pin plug cables, blue (4 pcs)
	Pin plug-to-miniature clip cables, black (4 pcs)
	• Pin plug-to-miniature clip cables, red (4 pcs)
	• Pin plug-to-miniature clip cables, blue (4 pcs)
	PCB jumper pin
	BNC to two-wire cable, 1 m (3 pcs)
	• Keysight Parametric Measurement Manager CD (includes installation and operation guide)

Ordering Information

Optional Accessories for the U2700 Series

U2921A-101 USB secure cable, 2 m

Optional Accessories for the U2941A Parametric Test Fixture

U2941A-101	Pin plug-to-pin plug cable, black
U2941A-102	Pin plug-to-pin plug cable, red
U2941A-103	Pin plug-to-pin plug cable, blue
U2941A-104	Pin plug-to-miniature clip cables, black
U2941A-105	Pin plug-to-miniature clip cables, red
U2941A-106	Pin plug-to-miniature clip cables, blue
U2941A-107	BNC to two-wire, 1 m
U2941A-201	Assembly PTFE plate
	 Insulation board with minimal leakage current; suitable for extremely low-current measurement
U2941A-202	28-pin dual-in-line package (DIP) socket module
	Lever actuated zero insertion force (ZIF) socket
U2941A-203	0.1-inch universal socket module
	0.1-inch pitch; suitable for virtually any device such as components, DIP IC or small scale circuit
U2941A-204	0.075-inch universal socket module
	0.075-inch pitch; suitable for virtually any device such as components, DIP IC or small scale circuit
U2941A-205	0.05-inch universal socket module
	• 0.05-inch pitch; suitable for any device such as components, DIP IC or small scale circuit

Other Products in the Keysight USB Modular Test Instruments Family



U2701A/U27012A 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

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

U2751A USB modular switch matrix

Features

- Minimal cross-talk of -30 dB at 45 MHz wide bandwidth
- High bandwidth at 45 MHz without terminal block
- Capability to test up to four devices-under-test (DUTs)
- · Works with other Keysight instruments for multi-point testing

For more information: www.keysight.com/find/U2751A

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





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

Learn more at: www.keysight.com

For more information on Keysight Technologies' products, applications, or services, please contact your local Keysight office. The complete list is available at: www.keysight.com/find/contactus



X-ON Electronics

Largest Supplier of Electrical and Electronic Components

Click to view similar products for Source Measure Units - SMUs category:

Click to view products by Keysight manufacturer:

Other Similar products are found below :

B2912B B2901B U2722A/2PS/903 U2723A/2PS/903 2401 U2722A