Agilent

U2722A USB Modular Source Measure Unit

Data Sheet

Agilent Technologies

Features and capabilities

- **Three-channel SMU**

- **Four-quadrant operation (±20 V)**

- **Maximum current output of 120 mA per channel**

- **High measurement sensitivity of 100 pA with 16-bit resolution**

- **0.1% basic accuracy**

- **Low current measurement capability down to nA levels**

- **Voltage and current programming/readback**

- **Hi-Speed USB 2.0 (480 Mbps)**

- **Bundled software—Agilent Measurement Manager (AMM)**

- **Command logger function**

- **Wide range of Application Development Environments (ADEs) compatibility**

- **Standalone and modular**

- **SCPI and IVI-COM supported**

- **USBTMC 488.2 standards**

Agilent U2722A USB Modular Source Measure Unit

The Agilent U2722A USB modular source measure unit (SMU) is more than just a power supply—it has fast response time, and has voltage and current programming/readback with high accuracy measurement capabilities. The U2722A is capable of four-quadrant operation, acting as current source and also as current sink (load) with both polarities of the output voltage.

Increases productivity and accuracy in automated testing

- Four-quadrant operations well suited for a wide range of test applications with just a single SMU

- High measurement sensitivity of 100 pA with 16-bit resolution allowing you to source and measure down to pico levels

- 0.1% accuracy for getting more accurate analysis and measurement results

- Flexible standalone or modular capability enables you to have lower startup cost

- SCPI and IVI-COM supported and a wide range of ADEs compatibility minimize your work time and increase software options

- Easy-to-use AMM software that includes the command logger function that helps you easily convert SCPI commands into snippets of VEE, VB, C++, and C# code

---

Four-quadrant operations with high measurement sensitivity and accuracy

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

Quick and easy to begin with

The USB 2.0 interface provides easy connectivity and setup that allows automatic detection of the U2722A. With quick and easy USB connectivity, the U2722A is simple enough for R&D application but robust and versatile enough for electronic functional test applications. The USBTMC 488.2 standard makes the U2722A compatible with any system that comes with USB ports.

Supports SCPI and IVI-COM, compatible with wide range of ADEs
With the offered IVI-COM driver, you are able to program the U2722A with any popular ADE that is available in the market, while allowing you to pick the programming language that you are most familiar with. The compatibility of U2722A with a wide range of ADEs minimizes the time required to set up your devices in different software environments, as they can be programmed directly using SCPI commands.

The following list contains some of the popular development environments that the U2722A is compatible with:
• Agilent VEE and Agilent T&M Toolkit
• Microsoft® Visual Studio® .NET™, C/C++ and Visual Basic®
• LabVIEW®
• MATLAB®

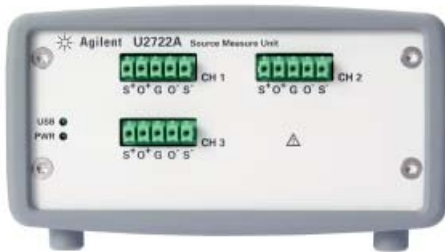**Flexible Standalone or Modular Capability**
The U2722A is uniquely designed to function flexibly as a standalone or modular unit. You can easily reduce your startup cost by simply using it as standalone unit. On the other hand, you can use the U2722A as a modular unit to expand your application system by slotting in various units into the the Agilent U2781A USB modular instrument chassis.

Easy-to-use bundled software and the command logger function
The AMM application software provides you with quick and easy means to configure and control your SMU without requiring any programming work. Simplifying this further is the command logger function offered in the AMM that allows you to capture configuration commands and easily convert them to snippets of VEE code. Other supported languages are VB, C++, and C#.

Product Outlook and Dimensions

Front View

Rear View

Dimensions

183.0 mm

66.0 mm

120.0 mm

System Requirements

PROCESSOR
1.6 GHz Pentium® IV or higher

OPERATING SYSTEM
- Windows® XP Professional or Home Edition (Service Pack 1 or later), or
- Windows 2000 Professional (Service Pack 4 or later)

BROWSER
Microsoft Internet Explorer 5.01 or higher

AVAILABLE RAM
512 MB or higher recommended

HARD DISK SPACE
1 GB

VIDEO
Super VGA 800×600 (1024×768 recommended)

PREREQUISITES
- Agilent IO Libraries Suite 14.2 or higher (version 15.0[1] recommended),
- Agilent T&M Toolkit Runtime version 2.1[2],
- Agilent T&M Toolkit Redistributable Package 2.1 patch[2],
- Microsoft .NET Framework version 1.1 and 2.0[2]

---

1 Available on Agilent Automation-Ready CD.

2 Bundled with Agilent Measurement Manager software installer.

Product Characteristics

REMOTE INTERFACE
- Hi-Speed USB 2.0
- USBTMC 488.2 Class device

POWER CONSUMPTION
- +12 VDC, 3 A maximum
- Isolated 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 COMPLIANCE
Certified with:
- IEC 61010-1:2001/EN61010-1:2001 (2nd Edition)
- Canada: CAN/CSA-C22.2 No. 61010-1-04
- USA: ANSI/UL 61010-1:2004

EMC COMPLIANCE
- IEC 61326-2002/EN61326: 1997+A1:1998+A2:2001+A3:2003
- Canada: ICES-001: 2004
- Australia/New Zealand: AS/NZS CISPR11: 2004

SHOCK AND VIBRATION
Tested to IEC/EN 60068-2

I/O Connector
Output connectors

DIMENSIONS (W x D x H)
- 117.0 × 180.0 × 66.0 mm (With bumpers)
- 105.0 × 175.0 × 50.0 mm (Without bumpers)

WEIGHT
- 700 g (with bumpers)
- 650 g (without bumpers)

WARRANTY
One year

Product Specifications

General

	U2722A
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

	Range	Accuracy[1]	Resolution
Voltage programming 12 months (at 25 °C ± 3 °C), ±(% of output + offset)	±2 V	0.075% + 1.5 mV	0.1 mV
	±20 V	0.05% + 10 mV	1 mV
Current programming 12 months (at 25 °C ± 3 °C), ±(% of output + offset)	±1 µA	0.085% + 0.85 nA	100 pA
	±10 µA	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 12 months (over USB with respect to the actual output at 25 °C ± 3 °C), ±(% of output + offset)	±2 V	0.075% + 1.5 mV	0.1 mV
	±20 V	0.05% + 10 mV	1 mV
Current readback 12 months (over USB with respect to the actual output at 25 °C ± 3 °C), ±(% of output + offset)	±1 µA	0.085% + 0.85 nA	100 pA
	±10 µA	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

---

1   Accuracy measurements are based on NPLC 10.

Performance Characteristics

Rise/fall time (ms)[2]		
For resistive measurement[3]	±1 µA	170.0
	±10 µA	18.0
	±100 µA	6.0
	±1 mA	1.0
	±10 mA	1.0
	±120 mA	1.0
For short circuit load[3]	±1 µA	38.0
	±10 µA	6.0
	±100 µA	2.0
	±1 mA	1.0
	±10 mA	1.0
	±120 mA	1.0

Remote sense operating range	Ensure that the maximum voltage between the OUTPUT+ and SENSE+, OUTPUT–, and SENSE– does not exceed 3 V.
Temperature coefficient	Maximum change in output/readback per °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)[3]	During turn-on or turn-off, the output plus overshoot < 0.1% + 10 mV.
Programming language	SCPI (Standard Commands for Programmable Instruments)
Recommended calibration interval	One year

NOTE
- All channels are isolated from the ground and from each other. Isolation is +60 VDC, Category 1.
- All specifications are based on three hours 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

---

2   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.

3   Measurements obtained are per default bandwidth setting.

Agilent Email Updates

www.agilent.com/find/emailupdates
Get the latest information on the products and applications you select.

Agilent Direct

www.agilent.com/find/agilentdirect
Quickly choose and use your test equipment solutions with confidence.

Agilent Open

www.agilent.com/find/open
Agilent Open simplifies the process of connecting and programming test systems to help engineers design, validate and manufacture electronic products. Agilent offers open connectivity for a broad range of system-ready instruments, open industry software, PC-standard I/O and global support, which are combined to more easily integrate test system development.

Microsoft, Windows, and Visual Studio are registered trademarks of Microsoft Corporation in the United States and/ or other countries.

MATLAB is a U.S. registered trademark of the Math Works, Inc.

www.agilent.com

For more information on Agilent Technologies' products, applications or services, please contact your local Agilent office. The complete list is available at:

www.agilent.com/find/contactus

Americas
Canada	(877) 894-4414
Latin America	305 269 7500
United States	(800) 829-4444

Asia Pacific
Australia	1 800 629 485
China	800 810 0189
Hong Kong	800 938 693
India	1 800 112 929
Japan	0120 (421) 345
Korea	080 769 0800
Malaysia	1 800 888 848
Singapore	1 800 375 8100
Taiwan	0800 047 866
Thailand	1 800 226 008

Europe & Middle East
Austria	0820 87 44 11
Belgium	32 (0) 2 404 93 40
Denmark	45 70 13 15 15
Finland	358 (0) 10 855 2100
France	0825 010 700*
	*0.125 € fixed network rates
Germany	01805 24 6333**
	**0.14€/minute
Ireland	1890 924 204
Israel	972-3-9288-504/544
Italy	39 02 92 60 8484
Netherlands	31 (0) 20 547 2111
Spain	34 (91) 631 3300
Sweden	0200-88 22 55
Switzerland (French)	41 (21) 8113811 (Opt 2)
Switzerland (German)	0800 80 53 53 (Opt 1)
United Kingdom	44 (0) 118 9276201

Other European Countries:
www.agilent.com/find/contactus

Revised: October 24, 2007

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

© Agilent Technologies, Inc. 2008
Printed in USA, March 26, 2008
5989-7705EN

Agilent Technologies