

Product Datasheet - Technical Specifications



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SDM4055A SDM4055A-SC Digital Multimeter



Data Sheet EN01A



SIGLENT TECHNOLOGIES CO.,LTD

SDM4055A SDM4055A-SC

Product Overview

SDM4055A is a 5½ digits digital multimeter, with outstanding measurement accuracy and touchable screen, is a product designed for high-precision, multifunctional, and automatic measurement needs.

Main Functions

Basic Measurement Functions

- DC Voltage Measurement
- DC Current Measurement
- True-RMS AC Voltage Measurement
- True-RMS AC Current Measurement
- 2/4-Wire Resistance Measurement
- Capacitance Measurement
- Continuity Test
- Diode Test
- Frequency Measurement
- Period Measurement
- Temperature Measurement

Math Functions

Max, Min, Average, Standard Deviation, dBm/dB, Limits

Data Log Function

 $0.1 \text{ s} \sim 3600 \text{ s}$ interval time can be set. Up to 2M points can be logged to Memory and 360M points can be logged to File(s). Up to 100 hours of logging time

Application fields

- Research Laboratory
- Development Laboratory
- Repair and Maintenance
- Calibration Laboratory
- Automatic Production Test

Main Features

- 5-inch TFT-LCD display with a resolution of 800 * 480, paired with a touchable screen and a brand-new UI
- Real 5½ digit (220,000 count) readings resolution
- Reading rate from 5 rdgs/s to 4.8k rdgs/s, and support: Fast, Medium and Slow mode
- 512MB RAM, capable of saving up to 2M readings for caching, support timestamp
- 256MB Nand Flash, supports storage of various types of files such as readings, images, configuration files
- 4 trigger modes: auto trigger, single trigger, external trigger and level trigger
- 4 display modes: numerical, bar meter, trend chart and histogram
- True-RMS AC Voltage and AC Current Measurements
- Support automatic switching between 10 A high current and 3 A low current measurement modes, and can test up to 30 A when paired with an external shunt
- Support RTD, thermocouple and user-defined sensor
- Support dual display and probe hold functions
- Support SCPI remote control commands
- Equipped with EasyDMM-X host computer control and sampling software
- Communications interface: USB Device (optional USB-GPIB adapter), USB Host, LAN
- Other interface: VMC output, Trigger input
- Remote access support for VNC, web servers
- Chinese and English menu, and built-in help system for easy information retrieval

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Model and Key Specifications

Model	SDM4055A	SDM4055A-SC ^[1]	
Number of Digits	5½		
DCV Basic Accuracy	150 ppm		
Max Reading Rate	4,800 rdgs/s		
Memory	Up to 2 million readings		
Support Scanner	No	Yes	
DCV Range	200 mV ~ 1000 V		
ACV Range	200 mV ~ 750 V, 20 Hz ~ 100 kHz		
DCI Range	200 uA ~ 10 A		
ACI Range	20 mA ~ 10 A, 20 Hz ~ 10 kHz		
2/4-Wire Resistance Range	200 Ω ~ 100 ΜΩ		
Continuity / Diode	Buzzer, 4 V max		
Frequency / Period Range	20 Hz ~ 1 MHz		
Temperature	RTD, thermocouple		
Capacitance Range	2 nF ~ 10 mF		
Ю	USB Host, USB Device, LAN, GPIB (optional)		
External Interface	Exit trigger, VMC out		
Display Screen	5-inch TFT touchable display screen		

Note:

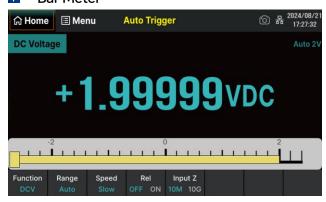
[1] For policy and regulatory reasons, this scanner model is not available in some regions, please contact the local distributor for more information.

Characteristics

Numerical Display



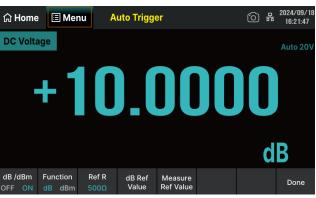
Bar Meter



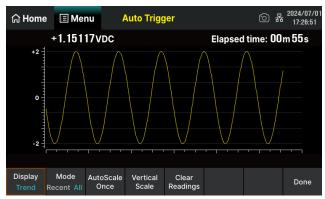
Probe Hold



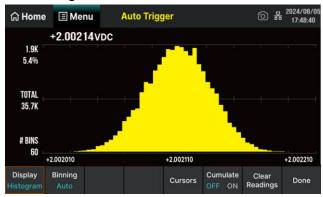
dB/dBm Calculator



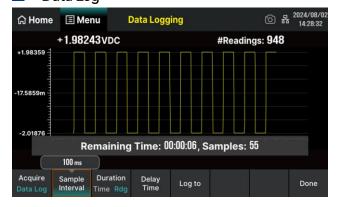
Trend Chart



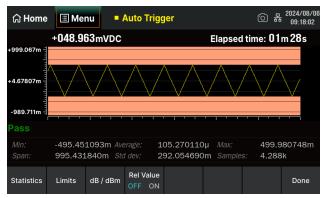
Histogram



Data Log



Statistics and Limits



Specifications

DC Characteristics

Accuracy: ± (% of Reading + % of Range) [1] Temperature Coefficient **Test Current or Load** 1 Year 0 °C ~ (TCAL °C-5 °C) **Function** Range [2] TCAL °C ±5 °C Voltage (TCAL °C+5 °C) ~ 50 °C 200 mV 0.015 + 0.0040.0015+0.0005 2 V 0.015+0.003 0.0010+0.0005 DC Voltage 20 V 0.015+0.004 0.0020+0.0005 200 V 0.015 + 0.0030.0015+0.0005 1000 V 0.015+0.003 0.0015+0.0005 < 8 mV 200 μΑ 0.055+0.005 0.003 + 0.0012 mA $< 80 \, \text{mV}$ 0.055+0.005 0.002+0.001 20 mA < 0.05 V0.095+0.020 0.008 + 0.001DC Current 200 mA < 0.5 V0.070 + 0.0080.005 + 0.0012 A < 0.1 V0.170 + 0.0200.013+0.001 10 A [4] < 0.3 V0.250 + 0.0100.008 + 0.001 200Ω 1 mA 0.030 + 0.0050.0030 + 0.0006 $2 k\Omega$ 1 mA 0.020 + 0.0030.0030 + 0.000520 kΩ 100 μΑ 0.020+0.003 0.0030+0.0005 Resistance [3] $200 \, k\Omega$ 10 μΑ 0.020 + 0.0100.0030 + 0.0005 $2 M\Omega$ 1 μΑ 0.040 + 0.0040.0040+0.0005 10 MΩ 200 nA 0.250 + 0.0030.0100+0.0005 $200 \text{ nA} \parallel 10 \text{ M}\Omega$ 1.75+0.004 0.2000+0.0005 $100 \, \text{M}\Omega$ $2.0 V^{[5]}$ 1 mA 0.05 + 0.010.0050 + 0.0005Diode Test 4 V 100 μΑ 0.05 + 0.010.0050 + 0.0005

Notes:

Continuity Test

[1] Specifications are for 0.5 hour warm-up, "Slow" measurement rate and calibration temperature 18 $^{\circ}$ C ~ 28 $^{\circ}$ C.

1 mA

[2] 10% over range on all ranges except for DCV 1000 V and DCI 10 A range.

 2000Ω

[3] Specifications are for 4-wire resistance measurement or 2-wire resistance measurement using "Ref" operation. Without "Ref" operation, add 0.2Ω additional error in 2-wire resistance measurement.

0.05 + 0.01

0.0050+0.0005

- [4] 30 seconds OFF after 30 seconds ON is recommend for the continuous current that over DC 7 A or AC 7 Arms.
- [5] Accuracy specifications are only for voltage measuring at input terminal. The typical value of current source is 1 mA. Voltage drop at diode junction may vary with current source.

AC Characteristics

	Accuracy: ± (% of Reading + % of Range				
Function	Range ^[2]	Frequency Range	1 Year TCAL ℃ ± 5 ℃	Temperature Coefficient $0 ^{\circ}\text{C} \sim (\text{TCAL} ^{\circ}\text{C} - 5 ^{\circ}\text{C})$ $(\text{TCAL} ^{\circ}\text{C} + 5 ^{\circ}\text{C}) \sim 50 ^{\circ}\text{C}$	
		20 Hz ~ 45 Hz	1.5+0.10	0.01+0.005	
	200 mV	45 Hz ~ 20 kHz	0.2+0.05	0.01+0.005	
	2001110	20 kHz ~ 50 kHz	1.0+0.05	0.01+0.005	
		50 kHz ~ 100 kHz	3.0+0.05	0.05+0.010	
		20 Hz ~ 45 Hz	1.5+0.10	0.01+0.005	
	2 V	45 Hz ~ 20 kHz	0.2+0.05	0.01+0.005	
	2 V	20 kHz ~ 50 kHz	1.0+0.05	0.01+0.005	
		50 kHz ~ 100 kHz	3.0+0.05	0.05+0.010	
		20 Hz ~ 45 Hz	1.5+0.10	0.01+0.005	
True-RMS	20 V	45 Hz ~ 20 kHz	0.2+0.05	0.01+0.005	
AC Voltage [3]	20 V	20 kHz ~ 50 kHz	1.0+0.05	0.01+0.005	
		50 kHz ~ 100 kHz	3.0+0.05	0.05+0.010	
		20 Hz ~ 45 Hz	1.5+0.10	0.01+0.005	
	200 V	45 Hz ~ 20 kHz	0.2+0.05	0.01+0.005	
	200 V	20 kHz ~ 50 kHz	1.0+0.05	0.01+0.005	
		50 kHz ~ 100 kHz	3.0+0.05	0.05+0.010	
		20 Hz ~ 45 Hz	1.5+0.10	0.01+0.005	
	750.1/	45 Hz ~ 20 kHz	0.2+0.05	0.01+0.005	
	750 V	20 kHz ~ 50 kHz	1.0+0.05	0.01+0.005	
		50 kHz ~ 100 kHz	3.0+0.05	0.05+0.010	
		20 Hz ~ 45 Hz	1.5+0.10	0.015+0.015	
	20 mA	45 Hz ~ 2 kHz	0.50+0.10	0.015+0.006	
		2 kHz ~ 10 kHz	2.50+0.20	0.015+0.006	
		20 Hz ~ 45 Hz	1.5+0.10	0.015+0.005	
	200 mA	45 Hz ~ 2 kHz	0.50+0.10	0.015+0.005	
True-RMS AC Current [4]		2 kHz ~ 10 kHz	2.50+0.20	0.015+0.005	
		20 Hz ~ 45 Hz	1.5+0.20	0.015+0.005	
	2 A	45 Hz ~ 2 kHz	0.50+0.20	0.015+0.005	
		2 kHz ~ 10 kHz	2.50+0.20	0.015+0.005	
		20 Hz ~ 45 Hz	1.5+0.15	0.015+0.005	
	10 A [5]	45 Hz ~ 2 kHz	0.50+0.15	0.015+0.005	
		2 kHz ~ 10 kHz	2.50+0.20	0.015+0.005	

Additional Error in AC Measurement

Additional Crest Factor Errors (not sine) [6]			
Wave Crest Coefficient Error (% Range)			
1-2	0.05		
2-3	0.3		

Notes:

- [1] Specifications are for 0.5 hour warm-up, measurement speed "Slow", and calibration temperature 18 °C ~ 28 °C.
- [2] 10% over range on all ranges except for ACV 750 V and ACI 10 A range.
- [3] Specifications are for sine wave amplitude > 5% of range. For inputs within 1% to 5% of range and frequency < 50 kHz, add 0.1% of range additional error.
- [4] Specifications are for sine wave amplitude > 5% of range. For inputs within 1% to 5% of range, add 0.1% of range additional error.
- [5] 30 seconds OFF after 30 seconds ON is recommend for the continuous current that over DC 7 A or AC 7 Arms.
- [6] Specifications are for frequency < 100 Hz.

Frequency and Period Characteristics

Accuracy: ± (% of Reading+ % of Range) [1]				
Function	Range	Frequency Range	1 Year TCAL °C±5 °C	Temperature Coefficient 0 °C ~ (TCAL°C-5 °C) (TCAL °C+5 °C) ~ 50 °C
Frequency, Period	200 mV ~ 750 V ^[2]	20 Hz ~ 2 kHz	0.01+0.003	0.002+0.001
		2 kHz ~ 20 kHz	0.01+0.003	0.002+0.001
		20 kHz ~ 200 kHz	0.01+0.003	0.002+0.001
		200 kHz ~ 1 MHz	0.01+0.006	0.002+0.002

- [1] Specifications are for 0.5 hour warm-up.
- [2] Except for special marks, the AC input voltage is 15% to 110% of range when < 100 kHz and 30% to 110% of range when > 100 kHz. 750 V range is limited to 750 Vrms. The accuracy is 10 times of reading accuracy in table when the AC voltage is at 200 mV range.

Capacitance Characteristics

Accuracy: ± (% of Reading + % of Range) 1				
Function	Range ^[2]	Max Test Current	1 Year TCAL °C ±5 °C	Temperature Coefficient 0 °C ~ (TCAL °C-5 °C) (TCAL °C +5 °C) ~ 50 °C
Capacitance	2 nF	200 nA	3+1.0	0.08+0.002
	20 nF	200 nA	1+0.5	0.02+0.001
	200 nF	2 μΑ	1+0.5	0.02+0.001
	2 μF	10 μΑ	1+0.5	0.02+0.001
	200 μF	100 μΑ	1+0.5	0.02+0.001
	10 mF	1 mA	2+0.5	0.02+0.001

Notes:

- [1] Specifications are for 0.5 hour warm-up and "Ref" operation. Using of non-film capacitor may generate additional errors.
- [2] Specifications are for from 1% to 110% on 2 nF range and from 10% to 110% on other ranges.

Temperature Characteristics

Accuracy: ± (% of Reading + % of Rang					Reading + % of Range) [1]
Function	Probe Type	Probe Model	Working Temperature Range ^[2]	1 Year TCAL °C ± 5 °C	Temperature Coefficient 0°C ~ (TCAL°C-5°C) (TCAL°C+5°C) ~ 50°C
	RTD [3]	$\alpha = 0.00385$	-200 °C ~ 660 °C	0.16 ℃	0.08+0.002 ℃
	TC ^{[4] [5]}	В	0 ℃ ~ 1820 ℃	0.76 ℃	0.14 °C
		E	-150 °C ~ 1000 °C	0.5 ℃	0.02 ℃
		J	-150 °C ~ 1200 °C	0.5 ℃	0.02 ℃
Temperature		K	-100 °C ~ 1372 °C	0.5 ℃	0.03 ℃
		N	-100 °C ~ 1300 °C	0.5 ℃	0.04 °C
		R	300 ℃ ~ 1768 ℃	0.5 ℃	0.09 ℃
		S	400 °C ~ 1768 °C	0.6 ℃	0.11 ℃
		Т	-100 °C ~ 400 °C	0.5 ℃	0.03 ℃

- [1] Specifications are for 0.5 hour warm-up, not include probe error.
- [2] The temperature measurement function can also be applied outside the optimum range, but the measurement accuracy has certain errors.
- [3] Specifications are for 4-wire measure or 2-wire measure under "Ref" operation.

- [4] Relative to cold junction temperature, accuracy is based on ITS-90. Built-in cold junction temperature refers to the temperature inside the banana jack and its accuracy is ± 3.5 °C.
- [5] During calibration and verification, "Ref Temp-Ext" is preferred for measurement.

Data Log

Function	Specification	
Data Source	DCV, ACV, DCI, ACI, Resistance, Capacitance, Frequency, Period, Temperature	
Sample Interval	1 ms ~ 3600 s	
Log Sample Capacity	Log to Memory: up to 2,000,000 points. Log to File: up to 360,000,000 points	
Duration	Up to 100 hours	
Delay	Up to 100 hours	

Measuring Method and other Characteristics

DC Voltage		
Input Decistores	200 mV and 2V ranges: 10 M Ω or > 10 G Ω selectable	
Input Resistance	20 V, 200 V and 1000 V ranges: 10 M Ω ± 2%	
Input Bias Current	< 90 pA, 25 °C, typical	
Input Protection	1000 V on all ranges	
CMRR	120 dB. For the 1 K Ω unbalanced resistance in LO lead, max ± 500 VDC peak	
NMRR	60 dB at "slow" measurement rate	
Resistance		
Testing Method	2-wire resistance or 4-wire resistance selectable	
Input Protection	1000 V on all ranges	
DC Current		
	200 μA range sampling voltage < 8 mV	
Shunt Resistor	20 mA range sampling voltage < 8 mV	
Shufft Resistor	1 Ω for 20 mA, 200 mA ranges	
	0.01 Ω for 2 A, 10 A ranges	
Input Protection	Internal 10 A, 1000 V Time-Lag fuse	
Continuity / Diode Test		
Measurement Method	1 mA ±5% constant-current source or open-circuit voltage	
Beeper	Yes	
Continuity Threshold	Adjustable	
Input Protection	1000 V on all ranges	

True-RMS AC Voltage		
Measurement Method	AC-Coupled True-RMS measurement with up to 1000 V DC of bias on any range	
Wave Crest Factor	≤ 3 at full scale	
Input Impedance	1 M Ω ± 2% in parallel with < 100 pF capacitance on all ranges	
AC Filter Bandwidth	20 Hz ~ 100 kHz	
CMRR	60 dB. For the 1 K Ω unbalanced resistance and common mode frequency < 60 Hz in LO lead, max \pm 500 VDC peak	
True-RMS AC Current		
Measurement Method	DC Coupled to the fuse and shunt; AC Coupled the True-RMS measurement (measure the AC components only)	
Wave Crest Factor	≤ 3 at full scale	
Max Input	< 10 Arms (RMS current including DC component)	
Shunt Resistor	1 Ω for 20 mA, 200 mA ranges	
Shart Nesistor	$0.01~\Omega$ for 2 A, 10 A ranges	
Input Protection	Internal 10 A, 1000 V Time-Lag fuse	
Frequency / Period		
Measurement Method	Reciprocal-counting technique, AC-Coupled input using AC voltage measurement function	
Measurement Considerations	All frequency counters are susceptible to error when measuring low-voltage, low-frequency signals	
Considerations	Shielding inputs from external noise pickup is critical for minimizing measurement errors	
Capacitance Measuring		
Measurement Method	Measure the rate of change of voltage generated during the current flowing the capacitance	
Connection Type	2-wire	
Input Protection	1000 V on all ranges	
Temperature Measuring		
Measurement Method	Support for TC and RTD types of sensors	
Measurement Considerations	The built-in cold junction temperature tracks the temperature inside the banana jack. The change of the temperature in banana jack may cause additional error. When using the built-in cold junction compensation, connect the sensor terminal of the thermocouple to the banana jack and allow it warm up for more than 3 minutes to minimize the error	
Trigger and Memory		
Samples / Trigger	1 ~ 10000	
Trigger Delay	6 ms ~ 10000 ms optional	
	Input Level: 5 V TTL compatible (High level when the input terminal is opening)	
External Trigger Input	Trigger Condition: rising and falling selectable	
	Input Impedance: \geq 20 k Ω //500 pF	

	Min Pulse: 500 μs		
VMC Output	Level: 5 V TTL compatible		
	Output Polarity: positive and negative optional		
	Output Impendence: 200 Ω, typical		
Math Functions			
Min / Max / Average / Standard deviation, dBm, dB, Limits			

General Specifications

Power Supply		
AC 100 V ~ 120 V	50/60 Hz	
AC 200 V ~ 240 V	50/60 Hz	
Consumption	30 VA max	
Mechanism		
Dimension (length * width * height)	379*260*103 mm	
Weight	3.8 kg	
Other Characteristics		
Display Screen	5-inch TFT display screen with resolution 800*480	
	Full accuracy for 0 °C to 50 °C; Full accuracy to 40 °C, 80% RH, non-condensing	
Operation Environment	Storage temperature: -20 °C ~ 70 °C	
	Altitude: up to 2000 meters	
Remote Interface	LAN, USB Device, USB Host, GPIB (optional)	
Programmer Language	SCPI-compliant with the latest widely used multimeter command sets	
Warm-up Time	30 minutes	

Standard					
	Compliant with EMC directive (2014/30/EU), compliant with or superior to IEC 61326-1:2020/EN61326-1:2021 (basic requirements)				
	Conducted Emission	CISPR 11/EN 55011	CLASS A group 1, 150 kHz ~ 30 MHz		
	Radiated Emission	CISPR 11/EN 55011	CLASS A group 1, 30 MHz ~ 1 GHz		
Electromagnetic Compatibility	Electro-Static Discharge (ESD)	IEC 61000-4-2/EN 61000-4-2	4.0 kV (touch), 8.0 kV (air)		
	RF Electromagnetic Field Immunity	IEC 61000-4-3/EN 61000-4-3	10 V/m (80 MHz to 1 GHz) 3 V/m (1.4 GHz to 2 GHz) 1 V/m (2.0 GHz to 2.7GHz)		
	Electrical Fast Transient (EFT)	IEC 61000-4-4/EN 61000-4-4	2 kV (AC input port)		
	Surge	IEC 61000-4-5/EN 61000-4-5	1 kV (Line to Line) 2 kV (Line to Earth)		
	RF Continuous Conduction Immunity	IEC 61000-4-6/EN 61000-4-6	3 V, 0.15 ~ 80 MHz		
	Voltage Dips and Short Interruptions	IEC 61000-4-11/EN 61000-4-11	Voltage Dips: 0% UT during 1 cycle		

			40% UT during 10/12 cycles 70% UT during 25/30 cycles
			Short Interruptions: 0% UT during 250/300 cycles
Safety	Compliant with: UL 61010-1:2012 Ed.3+R:06Jun2023 CSA C22.2#61010-1:2012 Ed.3+U1; UL 61010-2-030:2018 Ed.2 CSA C22.2#61010-2-030:2018 Ed.2; A1; U2; CE-LVD VOC/EN 61010-1:2010/A1:2019, EN IEC 61010-2-030:2021/A11:2021		

Scanner card SC1016

The scanner card SC1016 is a multiplexer that provides multi-point measurement capabilities to the SDM4055A-SC. The scanner features 12 multi-purposes + 4 current channels and supports the following measurement functions: DCV, ACV, DCI, ACI, 2WR, 4WR, CAP, FREQ, DIODE, CONT and TEMP (RTD and Thermocouple). It provides a convenient and versatile solution for test applications that require multiple measurement points or signals and is an ideal tool for R&D burn-in and production testing.



Specifications

To achieve the best performance from the product, please read this guide carefully.

Items [1][2]	Specifications
Max AC Voltage	125 rms or 175 V peak, 100 kHz, 0.3 A switched, 125 VA (resistive load)
Contact Life	> 100000 operations, at 1 A 30 VDC (at 0.5 Hz) > 100000 operations, at 0.3 A 125 VDC (at 0.5 Hz)
Contact Resistance	75 mΩ (maximum at 6 VDC, 1 A)
Channel to Channel Switching Time	280 ms (typical)
Maximum Switching Voltage	250 VAC, 220 VDC
Maximum Switching Power	62.5 VA / 30 W
Insulation Resistance	Minimum 1 GΩ
Connect Type	Clamp terminal, #24 AWG wire size

- [1] To avoid damage to the instrument, do not pull out the scanner card during instrument active, and wait until the instrument is powered off before performing the corresponding operation.
- [2] Keep the front panel inputs floating when using the scanner card to avoid damage to the switch and electrical shock from the front panel inputs.

Channel Capabilities

Function	No. of wires	No. of channels
DCV / ACV [1]	2 wires (H, L)	12 (CH1 ~ CH12)
DCI / ACI [2]	2 wires (H, L)	4 (CH13 ~ CH16) (2A Range)
2 W Resistance	2 wires (H, L)	12 (CH1 ~ CH12)
4 W Resistance	4 wires (H, L, HS, LS)	6 (CH1 ~ CH6 for HI/LO) (CH7~CH12 for HS/LS)
Capacitance	2 wires (H, L)	12 (CH1 ~ CH12)
Diode / Continuity	2 wires (H, L)	12 (CH1 ~ CH12)
Period / Frequency	2 wires (H, L)	12 (CH1 ~ CH12)
Temp (Thermocouple)	2 wires (H, L)	12 (CH1 ~ CH12)
Temp (RTD)	2 wires (H, L)	12 (CH1 ~ CH12)

- [1] Input signal is limited: < 125 VAC, 100 VDC.
- [2] Continuous current limited: < 2.2 A. Accuracy: ± (% 3 of reading+0.02% of range).

Ordering Information

Product Model	Description	
SDM4055A	5.5 digits high-precision multimeter	
SDM4055A-SC	5.5 digits high-precision multimeter with 16 channel scanner cards	

Standard Configurations	Quantity
Power Cord	1
Test Leads	2
Alligator Clips	2
USB Cable	1
Quick Start	1
Warranty Card	1
Upper Computer Software	Free download from official website

Optional Configurations	Model
USB-GPIB Adapter	USB-GPIB
30 A Diverter	SCD30A