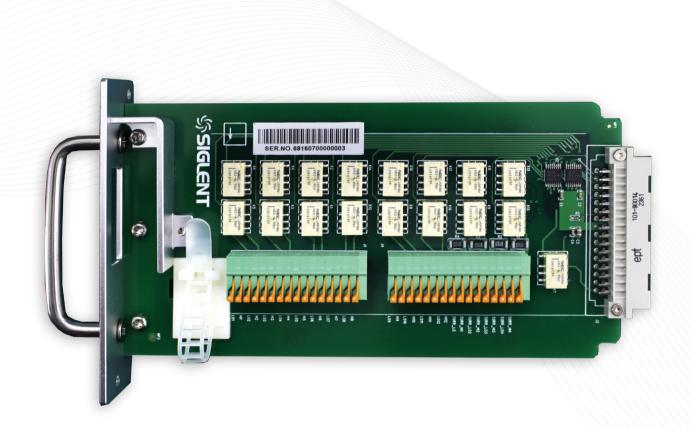
# SC1016 User's Guide



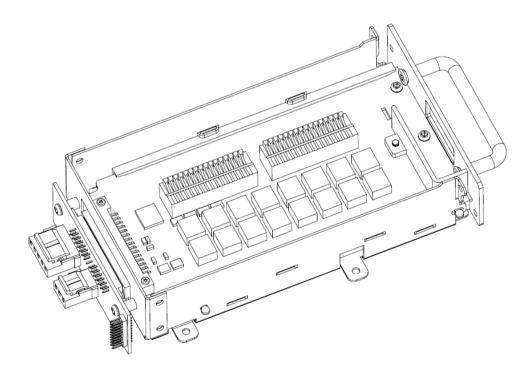


SIGLENT TECHNOLOGIES CO.,LTD

# SIGLENT Digital Multimeter SC1016 User's Guide

# **Product Overview**

The SIGLENT SC1016 is a multiplexer that provides multi-point measurement capabilities to the SDM3000 series of digital multimeters. The scanner features 12 multi-purpose + 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.



# Safety

SIGLENT thanks you for purchasing the SC1016 module. To achieve the best performance from the product, please read this guide carefully. To avoid electrical shock and personal injury, please don't use the product to measure signals that exceed the published specification.

# **Specifications**

Max AC Voltage	125V rms or 175V peak, 100kHz,							
Max AC Voltage Maximum DC Voltage Contact Life Contact Resistance Actuation Time Maximum switching voltage	0.3 A switched, 125VA (resistive load)							
Maximum DC Voltage	110V, 1A switched, 30VDC (resistive load)							
Contact Life Contact Resistance Actuation Time	> 100000 operations, at 1A 30VDC(at 0.5 Hz)							
Contact Life	> 100000 operations, at 0.3A 125VDC (at 0.5 Hz)							
Contact Resistance	75 m $\Omega$ (maximum at 6VDC, 1A)							
Actuation Time	5ms maximum on/off							
5	250 VAC, 220 VDC							
Maximum switching power	62.5VA / 30W							
Insulation Resistance	Minimum 1G ohm (500VDC)							
Connector Type	Clamp terminal, #24 AWG wire size							
Departient To sucid busching	the product places do not pull it away from multimeter when measurement is executed							

Prenotion: To avoid breaking the product, please do not pull it away from multimeter when measurement is executed.

# **Channel Capabilities**

Item	No. of wires	No. of channels
DCV, ACV <sup>[1]</sup>	2 wires (H, L)	12 (CH1~CH12)
DCI, ACI <sup>[2]</sup>	2 wires (H, L)	4 (CH13~CH16) (2A Range)
2W Resistance	2 wires (H, L)	12 (CH1~CH12)
4W Resistance	4 wires (Input H, L + sense H, L)	6 pairs (CH1 [input] & CH7 [sense], 2&8, •••, 6&12)
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) Temp (RTD)	2 wires (H, L) 2 wires (H, L)	12 (CH1~ CH12) 12 (CH1~ CH12)

Remarks:

[1]Voltage range : <125VAC, 110VDC

[2] For continuous current < 2.2A, Accuracy  $\pm$  (% 3 (reading) + 0.02% (range)).

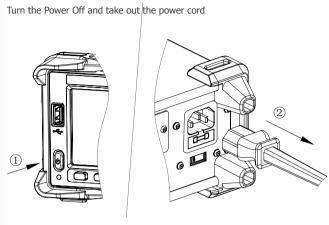
# Steps

# 1.Operations

# WARNING

The SC1016 is not designed to be "hot swappable". Remove power from all inputs and turn the instrument power off before installation or removal of the scanner card. Hot swapping the card could cause damage and is not covered under the warranty.

# 1.Power Off

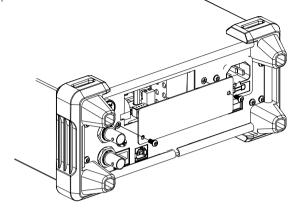


#### 3.Connection

Turn the clamp and insert the wire.

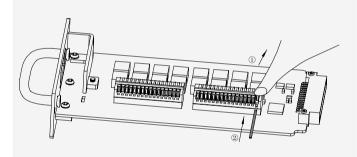
# 2.Open the SDM rear panel slot

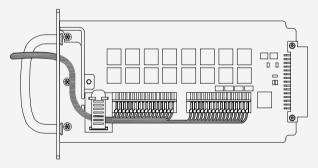
Take off the two screws on the slot corners to remove the optional slot cover. Keep the screws for later reuse



#### 4. Tighten cable

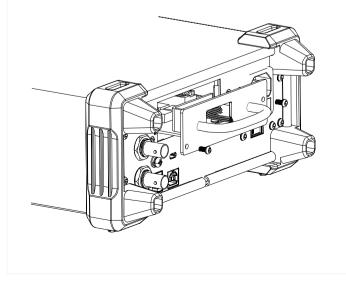
Route wiring through strain relief and Cable tie rap Wrap





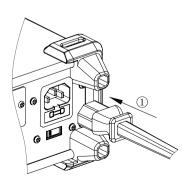
## 5.Insert the SC1016

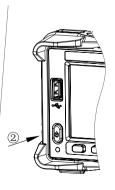
Insert the SC1016 bottom-side-up. Close the cover by tightening the screws.



# 6.Power On

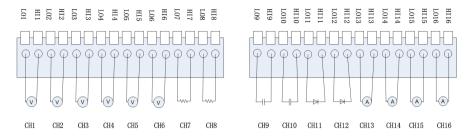
Connect the power cord and turn On the power





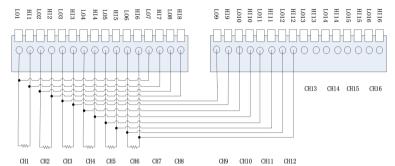
## 2.Application of 16 Channels

(1) 2-Wired Application <sup>[1]</sup>(DCV/ DCI/ ACV/ ACI 2WR/ 4WR/ CAP/ FREQ/ DIODE/ CONT / TEMP)



Remarks: [1] CH1 to CH12 can be used to measure DCV /ACV/ 2WR/ 4WR/ CAP/ FREQ/ DIODE/ CONT / TEMP. CH13 to CH16 can only be used for current measurements, less-than 2.4A

(2) 4-Wire Resistance Applications<sup>[1]</sup>



Remarks: [1] To minimize voltage errors, the remote sense connections (CH7,CH8 etc..) should be made as close to the device-under-test (DUT) as possible.

#### **3.Front Panel operations**

Press shift and to enter the operating menu of Utility function, as the following diagram shows.



Table 1. Scanner Function Menu Description

Function Menu	Settings	Description
Mode	Scan/Step	Set the operation mode
Time	0ms~999.999s	Sets the duration between each scan loop (Scan mode) or between each scanned channel (Step mode)
Cycles	Auto/Man	Sets the number of scan operations
Channel Setup		Sets the scanned channel range, measurement function, and measurement parameters
Start	On/Off	Start or stop scan operation
Exit		Exit the scanner function

#### 1.Operation mode setup

•Scan: Measures all specified channel ranges (Channel MIN~MAX) for each trigger event. Time settings are applied between each scan for the whole channel range. •Step: Measures a single channel in the specified range (Channel MIN~MAX) at each trigger event. Time settings are applied for each channel.

#### 2.Time setup

Use the direction keys to set the duration between each scan loop (Scan mode) or between each scanned channel (Step mode)

## 3.Cycles

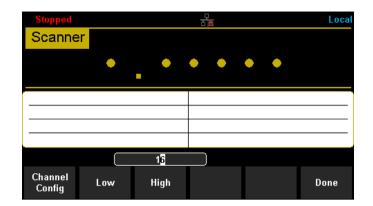
•Auto: The instrument will scan specified channel circularly after the scan operation start and you should stop the operation manually.

•Manual: Sets the number of scan operations by direction keys. The range of the setting is from 1 to 999. After starting the scan operation the instrument will not stop scanning until reaches cycle number.

WWW.SIGLENT.COM

## 4.Channel setup

Press the [Channel Setup] to enter the setup interface.



#### Table 2. Scanner Function Menu Description

Description
Open/close the channel and set the measurement function, measurement parameters of specified channel.
Set the low value of scanned channel range.
Set the high value of scanned channel range.

Press the [Channel Setup] to enter the channel configuration interface and set the channel switch, function, range and speed...

Scanner	Channel Con	figure :		
Channel	Switch	Function	Range	Speed
1	Open	DCV	Auto	Slow
2	Open	DCV	Auto	Slow
3	Open DCV		Auto	Slow
4	Open	DCV	Auto	Slow
5	Open	DCV	Auto	Slow
6	Open	DCV	Auto	Slow
7	Open	DCV	Auto	Slow
				Done

The range setting is applicable for the following functions: DC/AC Voltage (DCV/ACV), 2/4 Wire Resistance (2W/4W), Capacitance (CAP), Frequency (FRQ).

Table 3. Available Range for different measurement function

Measurement Function	Available Range
DCV/ACV/ FRQ	Auto, 200mV, 2V, 20V, 200V
DCI/ACI	2A (fixed)
2W/4W	Auto, 200 $\Omega$ , 2k $\Omega$ , 20k $\Omega$ , 200k $\Omega$ , 2M $\Omega$ (1M $\Omega$ for SDM3065X), 10M $\Omega$ , 100M $\Omega$
САР	Auto, 2nF, 20nF, 200nF, 2μF, 20μF, 200μF, 10000μF (2mF, 20mF, 100mF for SDM3065X)

The scanner function provides two measurement speeds: Fast (50 reading/s) and Slow (5 reading/s). (Fast: 1PLC, Slow: 10 PLC for SDM3065X)

The speed setting is applicable for the following functions: DC/AC Voltage (DCV/ACV), 2/4 Wire Resistance (2W/4W)

#### **Operating instructions:**

• Move the cursor to choose the wanted parameter by direction keys and the background color of cursor's position turns to gray.

• Select the current item by pressing "OK" key and the background color of the selected item turns to green.

- Set the parameter by up and down direction keys.
- Press "OK" key again to store the setting of the selected item of which the background turns back to gray. Move the cursor and repeat the prior steps to set the next parameter.

• Press [Done] to save the current settings and return to the higher level menu.

#### 5.Channel range setting

Select [High] or [Low] and then input numerical value by direction keys. Note: The upper limit value should be always bigger than the lower limit value.

#### 6.Start scan operation

Set the [Start] to on to start the scan operation

Auto Trig Frequency				Local
Auto 200mV	+50.0	035		Hz
CH1: -000.669	mVDC	CH5: +0.1	93 nF	
CH2: +019.383	mVAC	CH6: +50.	035 Hz	
CH3: overload	Ω	CH7: ope	n Ω	
CH4: overload	Ω	CH8: +10.	.167 °C	
			Start On Off	Exit

The upper part of the interface displays the function, range, and result of the current channel. The table below records the measurement result of each channel.

## 7.Enter trend chart and statistics mode (optional operation)

Press shift and Math to open trend chart and statistics function.

Auto Trig	+099.	.298mVI	DC) 윰 <sub>교</sub>		Local
+200m			+ ‡	+ + +	
0					
-200m 🛓			+ <u>‡</u>		
		Elapse	d Time: 1m	30s	
Min: +98.817	m	Average:	+99.298m	Max: +99.98	2m
Span: +1.164	m	Elapsed Time: 1m 30s Average: +99.298m Max: +99.982m Std dev: +0.1127m Samples: 98 1	3		
		1			
		Inquire Channel			Done

Set the [Inquire Channel] by direction keys and the interface displays the minimum, average, maximum, span, standard deviation, samples and trend chart of measurement results of the setting channel during the scan operation.

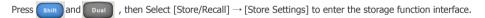
Press [Done] to return to higher level menu.

#### 8.Stop scan operation

Set the [Start] to off to stop the scan operation.

If the [Cycles] is set to manual, then the instrument will stop scan when it reaches the cycle number

## 9.Store measurement data (optional operation)



Current P	Current Path: /internal										
File Name: csv_data_1											
	Browse	File Name	Type .xml .csv	Store Data	Done						

#### Table 4. Storage Function Menu Description

Function Menu	Settings	Description
Browse		Choose the location that file will be saved.
File Name		Input a file name.
Туре	.xml / .csv	Choose the type that the file is saved. .xml: configuration of scan function .csv: measurement data
Store Data		Save the file with the file name input to the current selected location.
Done		Return to the higher level menu.

#### **Remote operations**

The SDM3000 series can be controlled remotely by using the SIGLENT EasyDMM software. It allows users to easily select the measurement function and range for each channel and start acquiring measurement data. With a rich online help system, the user is able to create a virtual instrument on the PC for data collection and instrument control. During the scanning period, the measurement data can be viewed directly on the screen or viewed graphically using trend chart, bar and histogram graph types. The data can then be automatically or manually saved to a database or exported as a CSV files

# **Channel Configuration**

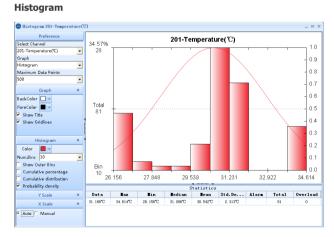
						EasyD										-
Digit	tal Multimeter Scan														Ab	out
New Open	Save Import Export (	Device 1	Manager )	2 Trend 0	Chart (Z Bar )	2 Histogram										
	Configuration-1				Graph											
DMM Explore	w 4	Mea	sure Cont	figure Ch	annels Sca	in Data Scan Trer	d Chart	Scan Bar	Scar	Hist	ogram					
Name	Status Mode		Instr		e Channel		azurement			5	caling(	KX+B)	A	arn Lin	it	
SDM3055X	Alive Scan	.⊿	Channel	Scan	Name	Function	Range	Speed	Lore		Gain(K)	0ffs	Node	Low	High	
			⊟ samaoesa													
				hanzel Sci	state:											
			101	2		Temperature		Sler		11	1	0	110	0	0	
	SEM3065X		102	2		4 Wire Besistance	kute	Slew		<u>E</u>	1	0	0ff	0	0	
	Alive		103	2		Temperature		Slew		П	1	0	0ff	0	0	
	USBTMC		104			2 Nire Resistance	kute	Slow		П	1	0	Off	0	0	
	1030::0xF4BC::0xEE3		105	2		AC Voltage	kute	Slev		1	1	0	110	0	0	
	SEM362A3160003		106	N.		Capacitance	Auto	Slew		圓	1	0	0££	0	0	
	3.01.01.02		107	2		DC Voltage	kuto	Slew		Щ	1	0	Off	0	0	
	Sena.	•	108		102	4 Wire Besistance	kute	Sler			1	0	Off	0	0	
Module	16 Channel Scanner		109	2		Frequency	kute	Slev		0	1	0	130	0	0	
			110	2		Pariod	kute	Slew		1	1	0	0ff	0	0	
			111	[ <b>X</b> ]		Centinuity		Slew		п	1	0	Off	0	0	
		_	112	2		Diode		Sler		1	1	0	110	0	0	
			113	2		AC Current	2A	Slew		<u>E</u>	1	0	0ff	0	0	
			114	<b>X</b>		DC Current	2A	Slew		1	1	0	Off	0	0	
			115	2		AC Current	2A	Sler		1	1	0	Off	0	0	
			116	2		DC Current	2A	Slev		10	1	0	110	0	0	

## **Trend Chart**



#### Data Acquisition

							Easy	0					-	-
Digi	tal Multimeter Scar	n											Abo	out H
New Open Save Import Export Device Manage				lanager	2 Trend	Chart 🗵 Bar	🗹 Histogram							
	Configuration-1					Graph								
DMMExplore	ur.	a	Meas	ure Con	figure Ch	annels S	can Data Sci	in Trend Chart	Scan Bar Scan	Histogram				
Name	Status Mode						can Control		Data Contro	1		Scan St:	etuz	
SDM9065X	Alive Scan		Ins	trument	St	art	Interval	Stop	Save Data	Start/.	Status		Elapsed Time	
			SJ	#3065X	Inne	listely	1s I	User	Sec.s	08	Scenaing	1	00:00:32.031	
Name	53830653	-							Result					
	Alive			Instru	ent	Channel	Ieazuren	int Data		Iaz	Average	Total	Alara	
	INTERNE		• 0	SIM3068	53	101	Temperature	*C) 8.97a	8.974	8.97u	8.974	1		
	INRO DEPART DEFER		1	SIM3068	54	102	4 Vire Senis	e 0	0	0	0	1		
Serial Num	50836743160003		2	SIM3068	53	103	Temperature	°C) 31.988	31.988	31.988	31.968	1		
SW Ver.	3.01.01.02		3	SIMBOR	1	104	2 Vire Benin	t 6.804ik	6.804k	6. 804k	6. 804k	1		
	Scan		4	SIMBOS	52	105	AC Voltage	(V) 8.787a	8.787s	8.78Ta	8. 78Ta	1		
Module	16 Channel Scampar		5	SIMOOS	22	106	Capacitance	(Y) 10.204a	10.204a	10.2046	10.20%s	1		
			6	SIMOOS	22	107	DC Voltage	30 1.18e	1.10n	1.18a	1.18a	1		
			7	\$143064	22	109	Frequency 0	(z) 0	0	0	0	1		
			8	SIMOON	58	110	Period (5	1.513e	047. 399u	1.603e	1.32Te	53		
			9	SIM306	53	111	Centinuity	Ω) 8.792a	8.553a	8.9844	9.1364	53		
			10	SIM306	53	112	Diods (V)	1.197e	1.165e	1.681m	1.353e	53		
			11	SIMBOB	53	113	AC Current	A) 96.858u	88.811%	100. T32u	94.108 s	53		
			12	SIMBOB	54	114	DC Current	(A) 90.599u	87.917%	96.858 s	91.6T9s	53		
			13	SIMBOR	52	115	AC Current	(A) 90.003u	87.023%	95.865u	91.69a	53		
			14	STATION		116		(A) 89.105 g	86 T/Sn	95.953+	91.493*	53		



The latest version of EasyDMM can be downloaded for free from the SDM3000 series of digital multimeter. Take a look at www.siglent.com for more information.

#### WWW.SIGLENT.COM