Data Sheet

Function/Arbitrary Waveform Generator
SDG1000 Series

Features & Benefits

- DDS technology, dual channel output
  125 MSa/s sample rate, 14 bit vertical resolution.
- 5 types of standard output waveform., internal
  48 arbitrary waveforms
- Complete set of modulation functions: AM、
  FM、PM、FSK、ASK
  Output linear/logarithmic sweep, burst
- Wide range of input/output: waveform output,
  Synchronous signal output, External Modulation source input,
  10MHz clock input/output, external trigger input
- Unique channel coupling and duplication function
- Built-in accurate frequency counter enables to measure ranges
- 100MHz-200MHz (single channel)
- Standard interface: USB Device，USB Host，
  Optional interfaces: GPIB, LAN
- High precision clock（1ppm & 10ppm）is optional
- Supplied with powerful arbitrary editable software
- Remote control support

Application fields:

- Analog transducer
- Simulation environment signals
- Circuit function test
- IC chip test
- Researching and teaching

Reasonable price; outstanding performance

SDG1000 series Function/Arbitrary Generator is a new family member of SIGLENT with friendly design: 3.5 inch TFT-LCD display; Built-in English language; online help function; Support USB and internal storage, facilitate Files management; special connection terminal

Edit arbitrary waveform

It Enables edition of 14-bits 16kpts arbitrary output waveforms. Arbitrary editable software provides 9 types of standard waveforms: Sine, Square, Ramp, Pulse, ExRise, ExpFall, Sinc, Noise and DC, which meets all engineers' basic needs; In addition, it provides users' ways of manual drawing, point-to-point line drawing and arbitrary point drawing. It facilitates to create complex waveforms; Multi-file screen management enables users to edit multiple-waveform simultaneously. It provides 10 Storage in non-volatile RAM. You can edit and store more waveforms by PC software.

Arbitrary waveform output

Built-in 48 types of arbitrary waveform (include DC), including, math, engineering and other commonly-used waveforms.

Complete set of modulation functions, sweep output, burst output

Supports AM、 FM、PM、FSK、ASK， allows display of modulated waveforms which is especially suitable for education and schools.

- Complete set of modulation functions: AM, FSK, DSB-AM, FM, PM, ASK,, the modulation waveform can be observed directly, thus it is suitable for education and training;
- Sweep output: linear/logarithmic changing output waveform from starting frequency to ending one within sweeping time. Sweeping time range: 1 ms ~ 500 s. It realizes to output sweep waveform generated by Sine, Square, Triangle and Arbitrary waveforms.
- Burst output: It can continually generate output waveforms, providing the so called burst output. External application control signal is also possible.

Dual-channel Coupling,

Duplicating function

- Channel coupling: after setting base channel and coupling frequency/ phase difference, the frequency/phase of the other channel will change according to base channel, keeping set coupling frequency/phase difference the same.
- Channel duplicating: allows to duplicate parameters from one CH to another without changing output waveform。

Built-in frequency counter

Measurement range: 100 mHz ~ 200 MHz. Measurable parameters: frequency, cycle, duty, positive pulse width, negative pulse width Manual and automatic setting:

- Automatic setting: it sets coupling means, trigger level and high frequency inhibition switch automatically.
- Manual setting: it can set DC/AC,, trigger level and high frequency inhibition switch.

Specification

Model	SDG1005	SDG1010	SDG1020	SDG1025	SDG1050
Max. output frequency	5MHz	10MHz	20MHz	25MHz	50MHz
Output channels	2				
Sample rate	125 MSa/s				
Arbitrary waveform length	16 kpts				
Frequency resolution	1 μHz				
vertical resolution	14 bits				
Waveform	Sine, Square, Triangular, Pulse, Gaussian Noise. 48 types of arbitrary waveform				
Sine	1μHz ~ 5MHz	1μHz ~ 10MHz	1μHz ~20MHz	1μHz ~ 25MHz	1μHz ~ 50MHz
Square	1μHz ~ 5MHz	1μHz ~ 10MHz	1μHz ~20MHz	1μHz ~ 25MHz	1μHz ~ 25MHz
Pulse	500μHz ~ 5MHz	500μHz~10MHz	500μHz~10MHz	500μHz ~ 10MHz	500μHz ~ 10MHz
Ramp/Triangular	1μHz ~ 300KHz	1μHz ~ 300KHz	1μHz ~ 300KHz	1μHz ~ 300KHz	1μHz ~ 300KHz
Gaussian white noise	5MHz (-3dB)	10MHz (-3dB)	20MHz (-3dB)	25MHz (-3dB)	50MHz (-3dB)
Arbitrary waveform	1μHz ~ 5MHz	1μHz ~ 5MHz	1μHz ~5MHz	1μHz ~ 5MHz	1μHz ~ 5MHz

Modulation	AM、FM、PM、FSK、ASK、Sweep、Burst
Frequency counter	Frequency range：100mHz～ 200MHz
Standard interface	USB Host & Device
Optional interfaces	GPIB(IEEE-488)，LAN
Dimension	W x H x D=229mm x 105mm x 281mm

Attention:

All these specifications apply to the SDG1000 Series Function/Arbitrary Waveform Generator unless otherwise explanation. To satisfy these specifications, the following conditions must be met first:

1. The instrument have been operating continuously for more than 30 minutes within specified operating temperature range (18℃ ~ 28°C）.
2. You must perform the Self Cal operation if the operating temperature changes by more than 5℃ .

Note: all specifications are guaranteed except noted “typical value”.

Frequency Specification

	SDG1005	SDG1010	SDG1020	SDG1025	SDG1050
Waveform	Sine, Square, Ramp, Triangle, Pulse, Noise, Arb				
Sine	1μHz ~ 5MHz	1μHz ~ 10MHz	1μHz ~ 20MHz	1μHz ~ 25MHz	1μHz ~ 50MHz
Square	1μHz ~ 5MHz	1μHz ~ 10MHz	1μHz ~ 20MHz	1μHz ~ 25MHz	1μHz ~ 25MHz
Pulse	500μHz ~ 5MHz	500μHz ~ 10MHz	500μHz ~ 10MHz	500μHz ~ 10MHz	500μHz ~ 10MHz
Ramp/Triangular	1μHz ~ 300kHz	1μHz ~ 300kHz	1μHz ~ 300kHz	1μHz ~ 300kHz	1μHz ~ 300kHz
Gaussian white noise	5MHz (-3dB)	10MHz (-3dB)	20MHz (-3dB)	25MHz (-3dB)	50MHz (-3dB)
Arbitrary waveform	1μHz ~ 5MHz	1μHz ~ 5MHz	1μHz ~ 5MHz	1μHz ~ 5MHz	1μHz ~ 5MHz
resolution	1 μHz				
Accuracy	Within 90daysv±50 ppm within 1 year ±100 ppm 18°C ~ 28°C				
Temperature coefficient	<5 ppm/°C				

Sine Wave Spectrum Purity				
Harmonic Distortion	CH1		CH2	
	≤1 Vpp	>1 Vpp	≤1 Vpp	>1 Vpp
DC-1 MHz	-55 dBc	-45 dBc	-55 dBc	-45 dBc
1 MHz - 5 MHz	-55 dBc	-40 dBc	-55 dBc	-40 dBc
5 MHz - 25 MHz	-50 dBc	-35 dBc	-50 dBc	-35 dBc
Total harmonic waveform distortion	DC ~ 20 kHz，1 Vpp <0.2%			
Spurious signal（non-harmonic）	DC ~ 1 MHz < -70 dBc 1 MHz ~ 10 MHz < -70 dBc + 6 dB/spectrum phase			
Phase noise	10kHz Offset，–108 dBc / Hz （typical value）			

Square Wave			
Rise/fall time （10% ~ 90%，typical value，1 kHz，1 Vpp）		SDG1005	< 12 ns
		SDG1010	< 12 ns
		SDG1020	< 12 ns
		SDG1025	< 12ns
		SDG1050	< 12 ns
Overshoot		< 5%（typical value，1kHz，1 Vpp）	
Duty Cycle	1 μHz ~ 10 MHz	20% ~ 80%	
	10 MHz（exclude）~ 20 MHz	40% ~ 60%	
	20 MHz（exclude））~ 25 MHz	50%	
Asymmetric（50% Duty Cycle）		Cycle 1% + 20 ns（typical value，1 kHz，1 Vpp）	
Jitter		6 ns +cycle 0.1%（typical value，1 kHz，1 Vpp）	

Ramp Wave	
Linearity	< Peak value output0.1%，（typical value，1 kHz，1 Vpp, symmetric 100%）
Symmetry	0% to 100%

Pulse Wave Specification	
Pulse width	Max. 2000 s：Min. 20 ns，Min. resolution 1 ns
Rise/Fall time （10% ~ 90%，typical value，1 kHz，1 Vpp）	same as square waveform
Overshoot	< 5%
Jitter	6 ns + cycle 100 ppm

Arbitrary Waveform Specification		
Waveform length	16k points	16k points
Vertical resolution	14 bits（include symbol）	14 bits （include symbol）
Sample rate	125 MSa/s	125 MSa/s
Min. Rise/Fall time	20ns（typical value）	20ns（typical value）
Jitter（RMS）	6 ns + 30 ppm（typical value）	6 ns + 30 ppm（typical value）
Storage in non-volatile RAM memory (10 in total）	10 waveforms	10 waveforms

Output Specification		
Output	CH 1	CH 2
Amplitude	2 mVpp ~ 10 Vpp（50ohm，≤10MHz） 2 mVpp ~ 5 Vpp（50ohm，＞10MHz） 4 mVpp ~ 20 Vpp（high resistance，≤10MHz） 4 mVpp ~ 10 Vpp（high resistance，＞10MHz）	2 mVpp ~ 3 Vpp （50ohm） 4 mVpp ~ 6 Vpp （high resistance）
Vertical resolution （100 kHz sine waveform）	±（1%+1 mVpp of setting value）	±（1%+1 mVpp of setting value）
Amplitude flatness （compared to 100 kHz sine waveform，5 Vpp）	<100 kHz 0.1 dB	<100 kHz 0.1 dB
	100 kHz ~ 5 MHz 0.15 dB	100 kHz ~ 5 MHz 0.15 dB
	＞5 MHz 0.3 dB	＞5 MHz 0.3 dB
Isolate channel depth	＞60dB	

DC Offset		
Range（DC）	5 V （50ohm） 10 V （high resistance）	1.5 V （50ohm） 3 V （high resistance）
Offset accuracy	±（|setting offset value|1%+1 mV）	±（|setting offset value|1%+1 mV）

Waveform Output		
Impedance	50ohm(typical value）	50ohm(typical value）
Protection	short-circuit protection	short-circuit protection

AM Modulation（CH1/CH2）	
Carrier	Sine, Square，Ramp，Arbitrary（except DC）
Source	Internal/External
Modulation waveform	Sine，Square，RAMP, Noise，Arbitrary （2 mHz ~ 20 kHz）

Modulation depth	0% ~ 120%	
FM Modulation（CH1/CH2）		
Carrier	Sine, Square, Triangle, Arbitrary（except DC）	
Source	Internal/External	
Modulation waveform	Sine, Square, RAMP, Triangle, Gaussian Noise, Arbitrary（2 mHz ~ 20 kHz）	
Frequency deviation	SDG1005	0 ~ 2.5 MHz
	SDG1010	0 ~ 5 MHz
	SDG1020	0 ~ 10 MHz
	SDG1025	0 ~ 12.5 MHz
	SDG1050	0 ~ 25 MHz
PM Modulation（CH1/CH2）		
Carrier	Sine, Square, Triangle, Arbitrary（except DC）	
Source	Internal/External	
Modulation waveform	Sine, Square, RAMP, Triangle, Gaussian Noise, Arbitrary（2 mHz ~ 20 kHz）	
Deviation	0 ~ 360°	
FSK Modulation（CH1/CH2）		
Carrier	Sine, Square, Triangle, Arbitrary（except DC）	
Source	Internal/External	
Modulation waveform	50% duty square waveform（2 mHz ~ 50 kHz）	
ASK Modulation（CH1/CH2）		
Carrier	Sine, Square, Triangle, Arbitrary（except DC）	
Source	Internal/External	
Modulation waveform	50% duty square waveform（2 mHz ~ 50 kHz）	
Sweep（CH1/CH2）		
Carrier	Sine, Square, RAMP, Triangle, Arbitrary (except DC)	
Type	linear/logarithmic	
Direction	Up/ down	
Sweep time	1 ms ~ 500 s ± 0.1%	
Trigger source	Manual, external, internal	
Burst（CH1/CH2）		
Waveform	Sine, Square, RAMP, Pulse, Arbitrary(except DC)	
Type	Count（1 ~ 50,000 cycles），infinite，Gated	
Start/Stop phrase	0° ~ +360°	
Internal cycle	1 μs ~ 500 s ± 1%	
Gated trigger	External trigger	
Trigger source	Manuel, External or Internal	

Rear Panel Connector

External modulation	±6 Vpk= 100% modulation 5kohm input impedance
External trigger	TTL compatible
The external input voltage can't be over ±6V, otherwise instrument gets damaged.	

Trigger Input

Voltage level input	TTL compatible
Slope	Up or down (optional)
Pulse width	> 100 ns
Input impedance	> 5 kΩ, DC coupling
Response time	Sweep:< 500 μs （typical value）
Burst	< 500ns （typical value）

Trigger Output

Voltage level	TTL compatible
Pulse width	> 400 ns （typical value）
Output impedance	50Ω （typical value）
Max. frequency	1 MHz

SYNC Output

Voltage level	TTL compatible
Pulse width	> 50 ns （typical value）
Output impedance	50Ω （typical value）
Max. frequency	2MHz

Frequency Counter

Measurement		Frequency, Cycle, Positive/negative pulse width, duty cycle	
Frequency range		Single Channel: 100 mHz ~ 200 MHz	
Frequency resolution		6 bits/s	
Voltage range and sensitivity(non-modulated signal）			
Auto	1 Hz ~ 200 MHz		200 mVpp ~ 5 Vpp
Manual	DC coupling	DC deviation range	±1.5 VDC
		100 mHz ~ 100	20m VRMS ~ ±5 Vac+dc

		MHz	
		100 MHz ~ 200 MHz	40m VRMS ~ ±5 Vac+dc
	AC coupling	1 Hz ~ 100 MHz	50m Vpp ~ ±5 Vpp
		100 MHz ~ 200 MHz	100m Vpp ~ ±5 Vpp
Pulse width and duty measurement	1 Hz ~ 10 MHz（100 mVpp ~ 10 Vpp）		
Input adjustment	Input impedance		1 MΩ
	Coupling methods		AC、DC
	High-frequency inhibition		High-frequency noise inhibition(HFR)open or close
	Sensitivity		Three levels: low, middle, high
Trigger method	Trigger voltage level range：±3 V （0.1%~ 100%）		
	Resolution：6 mV		
	Adjust trigger voltage level manually/automatically		

General Specification

Display	
Display type	3.5'TFT-LCD
Resolution	320×RGB×240
Contrast（typical value）	350:1
Backlight intensity (typical value)	300cd/m^2
Power	
Voltage	100~240 VAC_{RMS}，45~440 Hz，CATII
Consumption	＜30W
Fuse	1A，250V
Environment	
Temperature	Operation：0°C--40°C
	Storage：-20°C--60°C
Cooling method	natural cooling down
Temperature range	Below +35℃：≤90% relative humidity
	+35℃ ~ +40℃：≤60% relative humidity
Altitude	Operation: below 3,000 meters
	Storage: below 15,000 meters
Others	
Dimension	Width：229mm
	Height：105mm
	Depth：281mm
Weight	N.W: 2.8 Kg
	G.W: 4.2 Kg

IP protection
IP2X
Calibration Cycle
1 year

Purchase informations

Product Name

SIGLENT SDG1000 Function/Arbitrary Waveform Generator

Models:

SDG1050 50MHz

SDG1025 25MHz

SDG1020 20MHz

SDG1010 10MHz

SDG1005 5MHZ

Standard Accessories

- An User Manual
- A Certification
- A Guaranty Card
- An CD(including EasyWave2.0 computer software system)
- A Power Cord that fits the standard of destination country
- An USB Cable

Optional Accessories

- BNC cable
- GPIB and LAN interfaces

Contact SIGLENT

MTR Add：Building A8, Tanglang Industrial zone, Xili, Nanshan, Shenzhen, 518055, P.R.China.
Service Hotline：800-999-0807
Tel：+86-755-36615186
Fax：+86-755-33591582
Post Code：518101
E-mail：support@siglent.com
http://www.siglent.com