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

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

Arbitrary waveform output

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

Application fields:

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

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.

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℃ ~ 28℃				
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	50 Ω （typical value）
Max. frequency	1 MHz

SYNC Output

Voltage level	TTL compatible
Pulse width	> 50 ns （typical value）
Output impedance	50 Ω （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

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