Data Sheet

Function/Arbitrary Waveform Generator
SDG5000 Series

◆ DDS technology, dual-channel output, 500MSa/s sample rate, 14bit vertical resolution.

◆ The 2ppm high-frequency stability, -116dBc/Hz low phase noise(SSB) signal output

◆ Has the outstanding signal fidelity,512k waveform length,can output complicated signals,can display signals user define more accurately,

◆ Adopt unipue EasyPulse technology,can output the pulse signal which is low jitter and very small duty cycle,the edge and pulse width can adjust a wide rang and fine

◆ Complete set of modulation functions: AM, DSB-AM,FM, PM, FSK, ASK, PWM, linear/logarithmic sweep and burst

◆ Built-in accurate frequency counter enables to measure ranges 100mHz-200MHz (single channel)

◆ Standard interfaces: USB Device, USB Host

◆ The TFT graphics of big screen,

◆ higher-resolution and high brightness,support the intuitionistic operations and setting parameters

◆ Supplied with powerful arbitrary editing software，remote control support.

Signal fidelity

SDG5000 series Function/Arbitrary Wavefom Generator has high stability time base and 512kpts arbitrary waveforms storage length,can output more complicated and more accurate arbitrary,User can get more fedelity signal by the Function/Arbitrary Wavefom Generator.

Edit arbitrary waveform

Enables edition of 14-bit,512kpts /16kpts arbitrary output waveforms, Arbitrary editing software EasyWave provides 9 standard waveforms: Sine, Square, Ramp, Pulse, ExRise, ExpFall, Sinc, Noise and DC, which meets all engineers' basic needs; In addition, it provides plenty of ways of manual drawing, point-to-point line drawing and arbitrary point drawing. It facilitates to create complex waveforms; Multi-file screen management helps users to edit multiple-waveform simultaneously. It provides 10 Storage in non-volatile RAM.

Outstanding Performance

SDG5000 series Function/Arbitrary Waveform Generator is a new family member of SIGLENT with friendly design: 4.3 inch TFT-LCD display; Built-in Chinese/English language; Online help function; Support USB and internal storage, facilitate files management; Special connection terminal for grounding.

● Specification

Model	SDG5162	SDG5122	SDG5082
Max. output frequency	160MHz	120MHz	80MHz
Output channels	2		
Sample rate	500 MSa/s		
Arbitrary waveform length	CH1:16 kpts CH2:512 kpts		
Frequency resolution	1 µHz		
vertical resolution	14 bit		
Waveform	Sine, Square, Ramp, Pulse, Gaussian Noise, DC, Built-in arbitrary waveforms		
Modulation	AM、DSB-AM、FM、PM、FSK、ASK、PWM、Sweep、Burst		
Frequency counter	Frequency range:100mHz~200MHz		
Standard interface	USB Host & Device		
Dimension	Width×Heigth×Depth=261mm×105mm×344mm		

● Attention:

All these specifications apply to the SDG5000 Series Function/Arbitrary Waveform Generator unless otherwise explanation. To satisfy these specifications, the following conditions must be met first:

1. The instrument has been operating continuously for more than 30 minutes within specified operating temperature range (18ºC~28°C).
2. The temperature variation does not exceed 5℃.
3. Unless otherwise stated,all specifications apply with a 50Ω resistive load and auto range ON.

Note: all specifications are guaranteed unless where noted 'typical'.
Typical:The characteristic performance,which 80% or more of manufactured instruments will meet,This data is not warranted,does not include measurement uncertainty,and is vaild only at room temperature(approximately 23°C)。

● **Frequency Specification**

Model	SDG5162	SDG5122	SDG5082
Waveform	Sine, Square, Ramp, Triangle, Pulse, Noise, Arb		
Sine	1μHz ~ 160MHz	1μHz ~ 120MHz	1μHz ~ 80MHz
Square	1μHz ~ 50MHz	1μHz ~ 40MHz	1μHz ~ 30MHz
Pulse	1μHz ~ 40MHz	1μHz ~ 30MHz	1μHz ~ 20MHz
Ramp/Triangular	1μHz ~ 4MHz	1μHz ~3MHz	1μHz ~ 2MHz
Gaussian white noise	100MHz（-3dB）	100MHz（-3dB）	100MHz（-3dB）
Arbitrary	1μHz ~ 40MHz	1μHz ~ 30MHz	1μHz ~ 20MHz
Resolution	1 μHz	1 μHz	1 μHz
Temperature coefficient	1 year，18°C ~ 28°C，±1ppm		
Temperature Coefficient	±1ppm，0℃~55℃		

● **Sine Spectrum Purity**

Harmonic Distortion	DC ~ 1 MHz	<-56dBc
	1 MHz ~ 10 MHz	<-46 dBc
	10 MHz ~ 100 MHz	<-35 dBc
	100 MHz ~ 160 MHz	<-26 dBc
Total harmonic waveform distortion	DC ~ 20kHz,1Vpp<0.2%	
Spurious signal (non-harmonic)	DC ~ 160MHz : <-70dBc+20dB/spectrum phase	
Phase noise	100kHz Offset, –116dBc/Hz(typical)	

● **Square Specification**

Rise/fall time		6 ns(10% ~ 90%)
Overshoot		< 3%
Duty Cycle	≤10 MHz	20% ~ 80%
	10 MHz- 40MHz	40% ~ 60%
	40 MHz-50MHz	50%
Asymmetric (50% Duty Cycle)		1% of period+5ns(typical,1kHz,1Vpp)
Jitter(cycle-to-cycle)		DC ~ 1MHz,≤200ps+2ppm
		1MHz ~ 50MHz,≤500ps

● **Ramp/Triangle Specification**

Linearity	<0.1% of Peak value output （typical,1kHz,1Vpp，100% symmetry）
Symmetry	0% ~ 100%

● Pulse Specification

Period	1000000s,Max. 25ns, Min.
Pulse width	≥12ns,100ps resolution
duty	0.0001% ~ 99.9999%
Rise/Fall time (10% ~ 90%)	6ns ~ 6s,100ps resolution
Overshoot	< 3%
Jitter(cycle to cycle)	DC ~ 1MHz, ≤200ps+2ppm 1MHz ~ 50MHz, ≤500ps

● Arbitrary Specification

Output	CH1	CH2
Waveform length	16Kpts	16Kpts /512Kpts
Vertical resolution	14 bits	14 bits
Sample rate	500 MSa/s	500 MSa/s
Min. Rise/Fall time	6 ns	6 ns
Jitter(cycle to cycle)	DC ~ 40MHz, ≤2.1ns±10ppm	
Storage in Non-volatle RAM memory	8 waveforms @ 512Kpts;24 waveform @16Kpts	

● Output Specification

Output	CH1	CH2

Amplitude	50Ω : DC ~ < 40MHz:
	    1mVpp-10Vpp(50Ω)
	    40MHz ~ <100MHz:
	    1 mVpp ~ 5 Vpp
	    100MHz ~ 160MHz:
	    1 mVpp ~1.5 Vpp
	Hi_Z: DC ~ < 40MHz:
	    1mVpp~20Vpp
	    40MHz ~ <100MHz:
	    1 mVpp ~ 10 Vpp
	    100MHz ~ 160MHz:
	    1 mVpp ~3 Vpp
		50Ω : DC ~ < 40MHz:
		    1mVpp-10Vpp(50Ω)
		    40MHz ~ <100MHz:
		    1 mVpp ~ 5 Vpp
		    100MHz ~ 160MHz:
		    1 mVpp ~1.5 Vpp
		Hi_Z: DC ~ < 40MHz:
		    1mVpp~20Vpp
		    40MHz ~ <100MHz:
		    1 mVpp ~ 10 Vpp
		    100MHz ~ 160MHz:
		    1 mVpp ~3 Vpp

Vertical accuracy [1,2] (spec)	±1% of setting ±1mVpp at 10KHz	±1% of setting ±1mVpp at 10KHz
Amplitude flatness (100 kHz sine,5Vpp)	≤80MHz ±0.2 dB ≤160MHz ±0.8dB	≤80MHz ±0.2 dB ≤160MHz ±0.8 dB
Output Current Max only	±200mA	±200mA
Cross talk	<-60dB	
Output Connector	BNC	

1. **Add 1/10th of the output amplitude and offset accuracy specification per ℃ for operation at temperatures beyond 23℃±5℃**
2. **Auto range ON**

● **DC Offset Specification**

Output	CH1	CH2
Range(DC)	±5V(50Ω) ±10V(high impedance)	±5V(50Ω) ±10V(high impedance)
Offset accuracy	±(|setting offset value|*1%+1mV)	±(|setting offset value|*1%+1mV)
Resolution	1mV	1mV

● **Waveform Output**

Impedance	50Ω(typical) ,Hz
Protection	short-circuit protection
Isolation	Connector shells for channel output(s),Sync,and Mod In are connected together but isolated from the instrument's chassis,Maximum allowable voltage on isolated connector shells is ±42Vpk

● **AM / DSB-AM Modulation（CH1/CH2）**

Carrier	Sine, Square, Ramp, Arbitrary(except DC)
Source	Internal/External
Modulation waveform	Sine, Square, Ramp, Noise, Arbitrary
Modulation depth	0%~120%
Modulation Frequency	1mHz-50kHz

● **FM Modulation（CH1/CH2）**

Carrier	Sine, Square, Ramp, Arbitrary(except DC)
Source	Internal/External
Modulation waveform	Sine, Square, Ramp, Noise, Arbitrary
Modulation Frequency	1mHz-50kHz

● **PM Modulation（CH1/CH2）**

Carrier	Sine, Square, Ramp, Arbitrary(except DC)
Source	Internal/External
Modulation waveform	Sine, Square, Ramp, Noise, Arbitrary
Phase Deviation	0~360° ,0.1°Resolution
Modulation Frequency	1mHz-50kHz

● FSK Modulation（CH1/CH2）

Carrier	Sine, Square, Ramp, Arbitrary(except DC)
Source	Internal/External
Modulation waveform	50% duty-cycle square waveform
Modulation Frequency	1mHz-1MHz

● ASK Modulation（CH1/CH2）

Carrier	Sine, Square, Ramp, Arbitrary(except DC)
Source	Internal/External
Modulation waveform	50% duty-cycle square waveform
Modulation Frequency	1mHz-1MHz

● PWM Modulation（CH1/CH2）

Carrier	Pulse
Source	Internal/External
Modulation waveform	Sine, Square, Ramp, Arbitrary(except DC)
Modulation Frequency	1mHz-50kHz

● Sweep（CH1/CH2）

Carrier	Sine, Square, Ramp, Arbitrary(except DC)
Type	linear/logarithmic
Direct	Up/down
Sweep time	1 ms ~ 500 s ± 0.1%
Trigger source	Manual, external, internal
Sweep Range@Max Sample Rate	1uHz to Bandwidth frequency @ 500 MSa/s

● Burst（CH1/CH2）

Waveform	Sine, Square, Ramp, Pulse, Arbitrary(except DC)
Carrier Frequency	2mHz~100MHz
Type	Count(1 ~ 1,000,000 periods),infinite, Gated
Start/Stop phrase	0° ~360°
Internal period	1 μs ~ 1000 s ± 1%
Trigger delay	280ns~34s
Gated source	External trigger
Trigger source	Manual, External or Internal

● **External modulation**

Connector	Rear-panel BNC,isolated from chassis
Voltage level	±(4.5~5)V= 100% modulation >10kΩ input impedance

Note: The external input voltage can't be over ±5Vpk, otherwise instrument gets damaged.

● **Trigger Input**

Connector	Rear-panel BNC,chassis-referenced
Voltage Level	CMOS compatible
Slope	Up or down (optional)
Pulse width	> 50 ns
Input impedance	> 5kΩ,DC coupling
Reaction time	380ns(typical)
Tigger Input period of external burst	>160ns
Input Latency	CH1 -366±30nS CH2 -386±30nS

● **Trigger Output**

Connector	Rear-panel BNC,chassis-referenced
Voltage level	CMOS compatible
Pulse width	> 60 ns(typical)
Output impedance	50Ω(typical)
Max Frequency	1 MHz
Output Connector	Through Rear Panel :Ext Trig/Gate/FSK/Burst

● **SYNC Output**

Connector	Rear-panel BNC,isolated from chassis
Voltage level	VOH(min)>4.5V,VOL(max)<0.5V;(IOL/IOH=8mA)
Pulse width	> 50 ns(typical)
Output impedance	50Ω(typical)
Max Frequency	10MHz

● **Frequency reference input**

Connector	Rear-panel BNC,isolated from chassis and all connector.
Frequency range	10MHz±1kHz
Min Voltage level	2.3V

● **Frequency reference output**

Connector	Rear-panel BNC,chassis-referenced
Frequency	10MHz
Voltage level	>1Vpp
Output impedance	50Ω AC-coupled

● **Frequency Counter**

Measurement	Frequency, Period, Positive/negative pulse width, duty cycle
Frequency range	Single Channel:100mHz~200MHz
Frequency resolution	6bit/s
Voltage range (non-modulated signal)	

Manual	DC coupling	DC offset range	±1.5VDC
		100mHz~100MHz	50mVrms~±2.5V
		100MHz~200MHz	100mVrms~±2.5V
	AC coupling	1Hz~200MHz	100mVrms~5Vpp

Pulse width and duty-cycle measurement	1Hz~10MHz(50mVrms~5Vpp)

Input adjustment	Input impedance	1MΩ
	Coupling mode	AC,DC
	High-frequency rejection	ON/OFF

Trigger level range	-3V~ 1.8V

● **General Specification**

Display	
Display type	4.3inch'TFT-LCD
Resolution	480×272, (RGB)
Color depth	24bit
Contrast Ratio	500:1(typical)
Luminance	300cd/m^2(typical)
Power	
Voltage	100-240 Vrms(±10%)，50/60 Hz 100-120 Vrms(±10%)，400 Hz
Consumption	MAX 50W
Fuse	1.25A,250V
Environment	
Temperature	Operation:0°C~40°C Storage:-20°C~60°C
Humidity range	Below +35℃:≤90% relative humidity +30℃~+40℃:≤60% relative humidity
Altitude	Operation: below 3,048 meters Storage: below 15,000 meters
Electromagnetic Compatibility	2004/108/EC Directive Applicable standards EN 61326-1:2006 EN 61000-3-2:2006 + A2:2009 EN 61000-3-3:2008
Safety	2006/95/EC Low Voltage Directive EN 61010-1:2010
Others	
Dimension	Width:261mm Height:105mm Depth:344mm
Weight	N.W: 2.8kg
IP protection	
IP2X	
Calibration Cycle	
1year	

● **Purchase Information**

Product Name

SIGLENT SDG5000 Function/Arbitrary Waveform Generator

Models:

SDG5162   160MHz

SDG5122   120MHz

SDG5082   80MHz

Standard Accessories

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

Optional Accessories

● BNC cable
● GPIB-USB Adapter

Contact SIGLENT

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