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 unique 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 range 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
- Supplied with powerful arbitrary editing software，remote control support

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. You can edit and store more

Signal fidelity

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

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×Height×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 valid 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
Accuracy	1 year，18°C ~ 28°C，±1ppm		
Temperature coefficient	0°C ~ 55°C，±1ppm		

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		6ns(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

Periods	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	6ns	6 ns
Jitter(cycle to cycle)	DC - 40MHz,≤2.1ns±10ppm	
Storage in Non-volatile RAM memory	8 waveforms @ 512Kpts;24 waveform @16Kpts	

● Output Specification

Output	CH1	CH2
Amplitude	DC - < 40MHz:1mVpp-10Vpp(50Ω) 40MHz - <100MHz:1 mVpp - 5 Vpp(50 Ω) 100MHz - 160MHz:1 mVpp -1.5 Vpp(50 Ω)	DC - < 40MHz:1mVpp-10Vpp(50Ω) 40MHz - <100MHz:1 mVpp - 5 Vpp(50 Ω) 100MHz - 160MHz:1 mVpp -1.5 Vpp(50Ω)
	DC - < 40MHz:1mVpp-20Vpp(Hi Z) 40MHz - <100MHz:1 mVpp - 10 Vpp(Hi Z) 100MHz - 160MHz:1 mVpp -3 Vpp(Hi Z	DC - < 40MHz:1mVpp-20Vpp(Hi Z) 40MHz - <100MHz:1 mVpp - 10 Vpp(Hi Z) 100MHz - 160MHz:1 mVpp -3Vpp(Hi Z)
Vertical accuracy [1,2] (spec)	±1% of setting ±1mVpp at 10KHz	±1% of setting ±1mVpp at 10KHz
Amplitude flatness (compared to 100 kHz sine,5Vpp)	≤80MHz ±0.2 dB	≤80MHz ±0.2 dB
	≤160MHz ±0.8dB	≤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℃**

● 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) , HiZ	50Ω(typical) , HiZ
Protection	short-circuit 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)
Trigger 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 Calibration Certificate
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- A Power Cord that fits the standard of destination country
- A USB Cable

Optional Accessories

- BNC cable

Contact SIGLENT

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