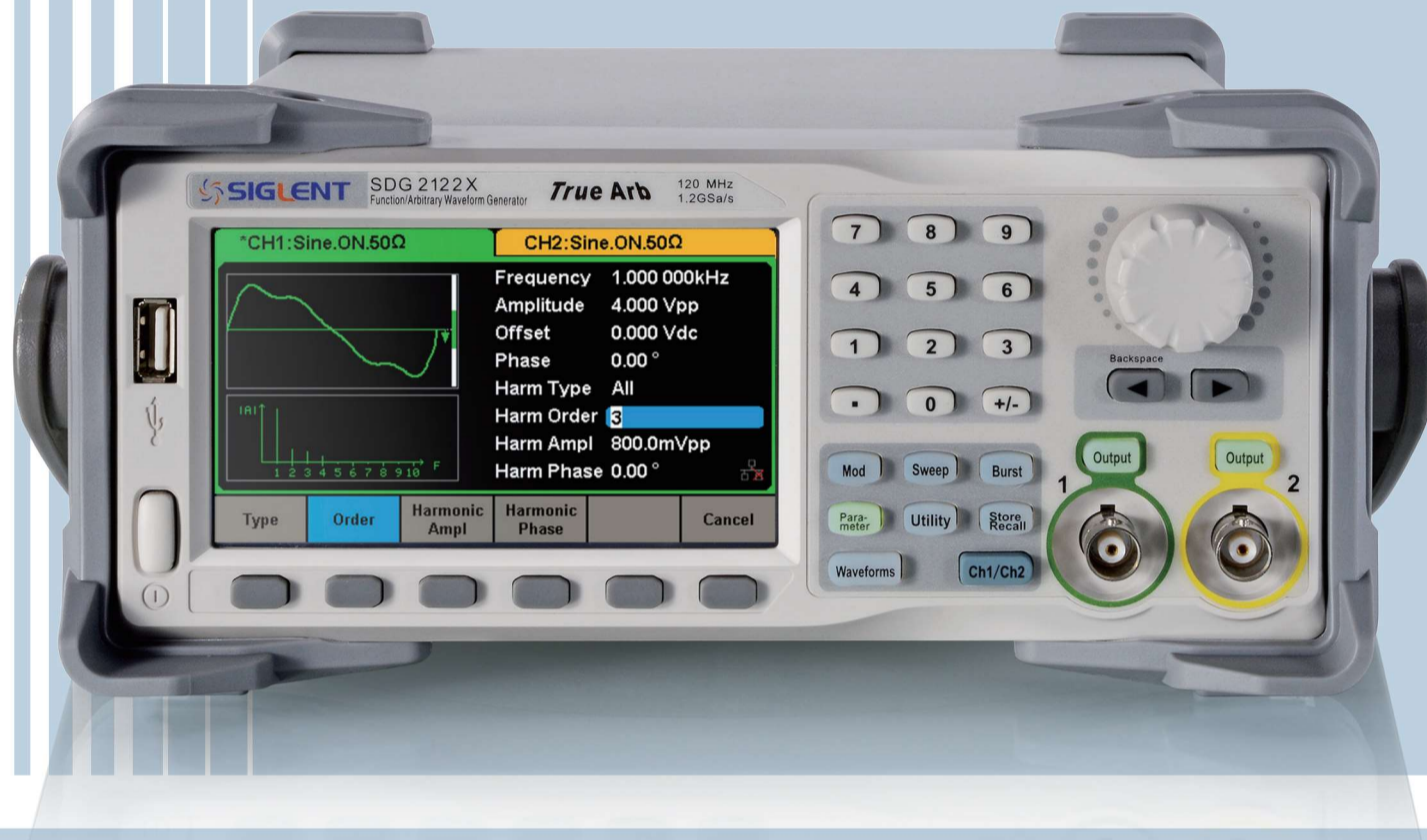# SDG2000X Series Function/Arbitrary Waveform Generator

*Easy Pulse*

True Arb

Key Features

- Dual-channel, 120 MHz maximum bandwidth, 20 Vpp maximum output amplitude, high fidelity output with 80 dB dynamic range
- High-performance sampling system with 1.2 GSa/s sampling rate and 16-bit vertical resolution. No detail in the waveforms will be lost
- Innovative TrueArb technology, based on a point-by-point architecture, supports any 8 pts~8 Mpts Arb waveform with a sampling rate in range of 1 μSa/s~75 MSa/s
- Innovative EasyPulse technology, capable of generating lower jitter Square or Pulse waveforms, brings a wide range and extremely high precision in pulse width and rise/fall times adjustment
- Plenty of analog and digital modulation types: AM、DSB-AM、FM、PM、PSK、FSK、ASK and PWM
- Practical functions: Channel Copy, Channel Coupling, Channel Track, harmonic generator, overvoltage protection function
- Sweep and Burst function, Harmonics mode supported
- High precision Frequency Counter
- Standard interfaces: USB Host, USB Device（USBTMC）, LAN（VXI-11）
- Optional interface: USB-GPIB
- 4.3" touch screen display for easier operation
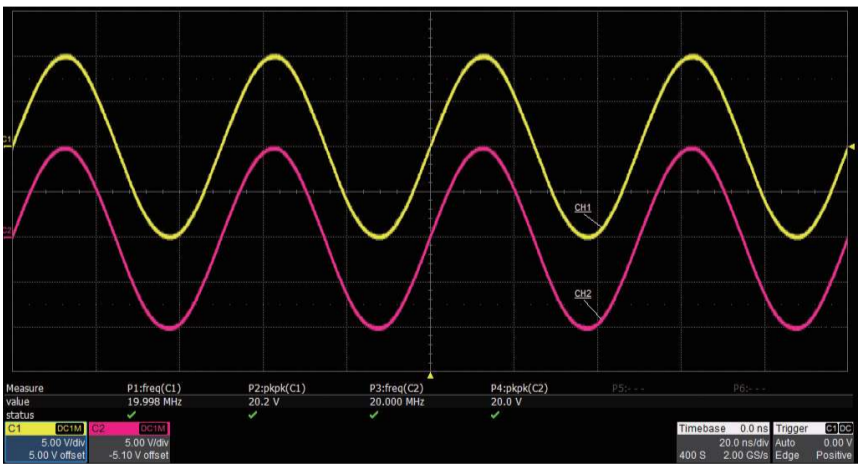
Characteristics

• **Excellent Analog Channel Performance**
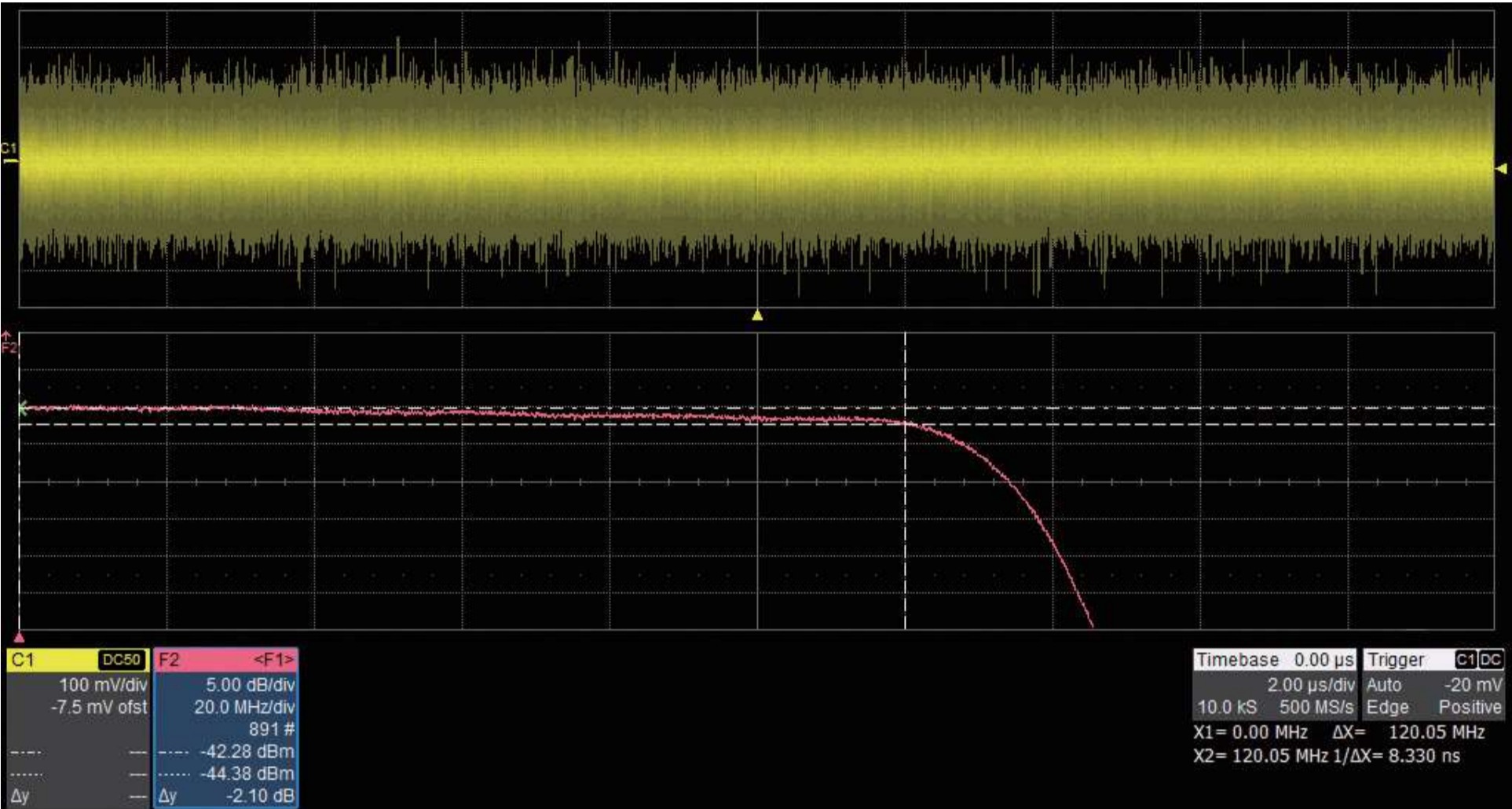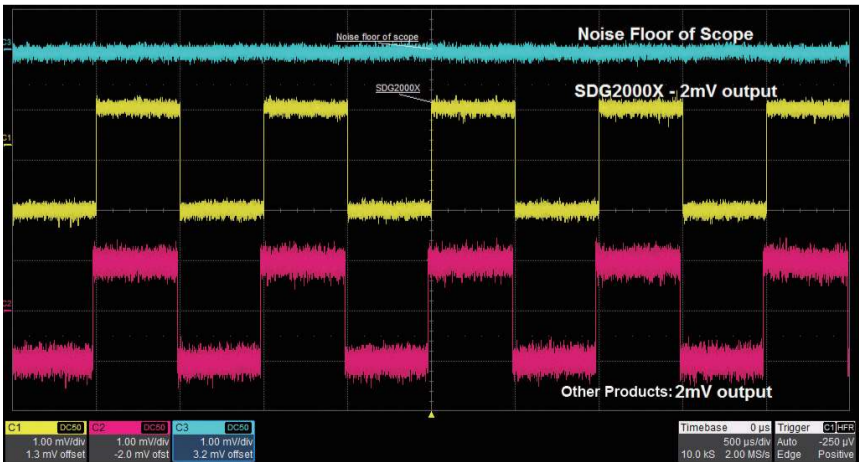

▲ The bandwidth of analog channels proves to be greater than 120 MHz, via doing a frequency response test with white noise.
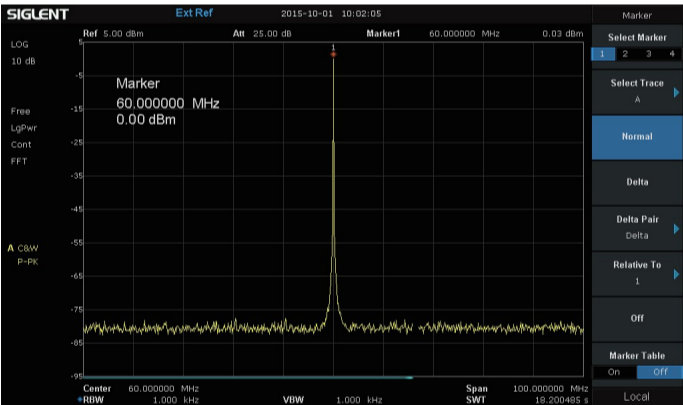
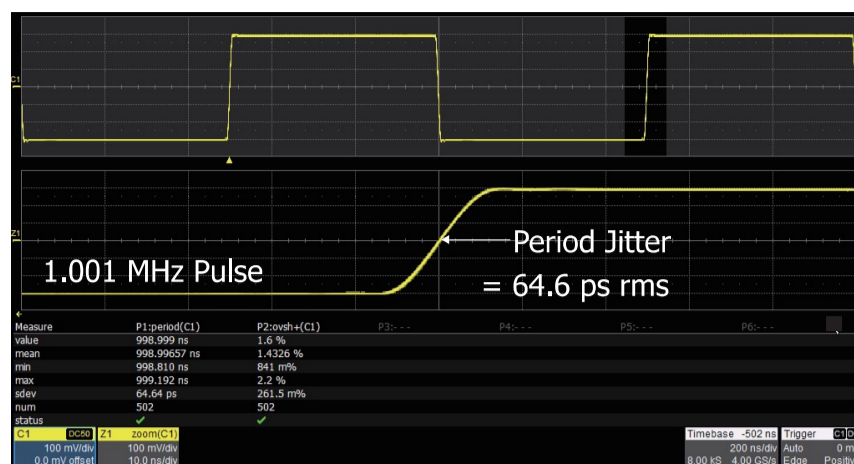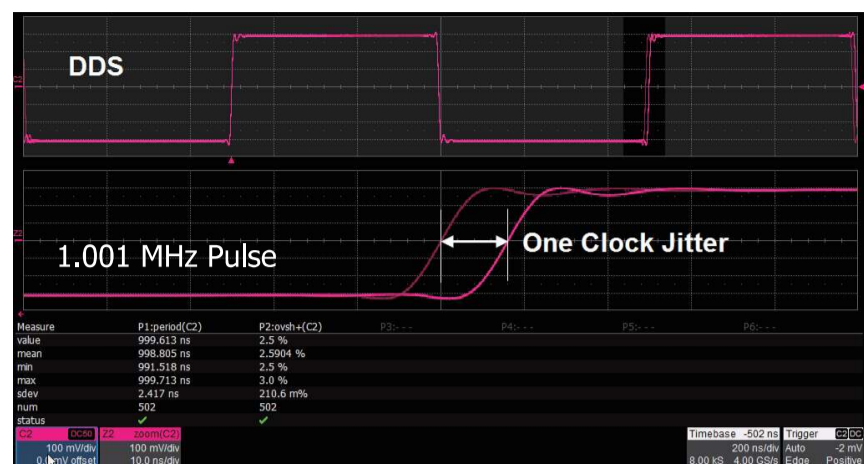◁ High fidelity sine output. Almost no spurious observed @60 MHz, 0 dBm.

▷ Capacity of outputting large signal at high frequency. Dual-channel, 20 Vpp amplitude can be guaranteed even @20 MHz.


▷ Low noise floor, improves signal-noise ratio.

Waveform Generator

• Innovative EasyPulse Technology

When a Square/Pulse waveform is generated by DDS, there will be a one-clock-jitter if the sampling rate is not an integer-related multiple of the output frequency. SDG2000X EasyPulse technology successfully overcomes this weakness in DDS designs and helps to produce low jitter Square/Pulse waveforms.
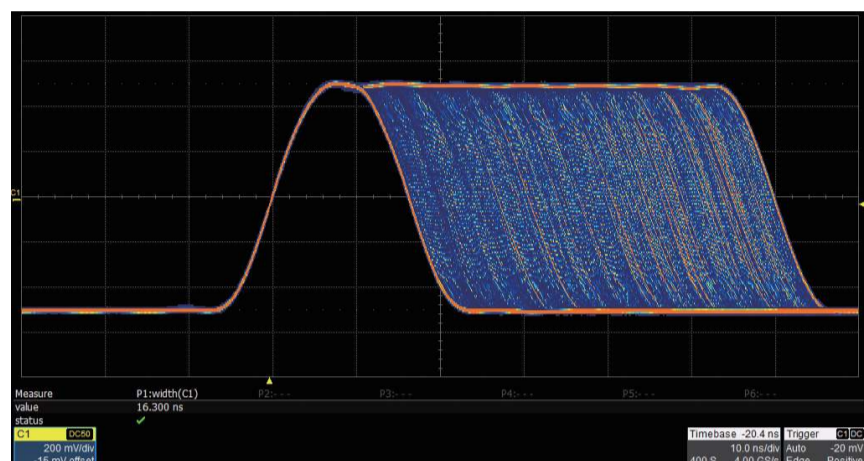

The Pulse width can be fine-tuned to the minimum of 16.3 ns with the adjustment step as small as 100 ps.
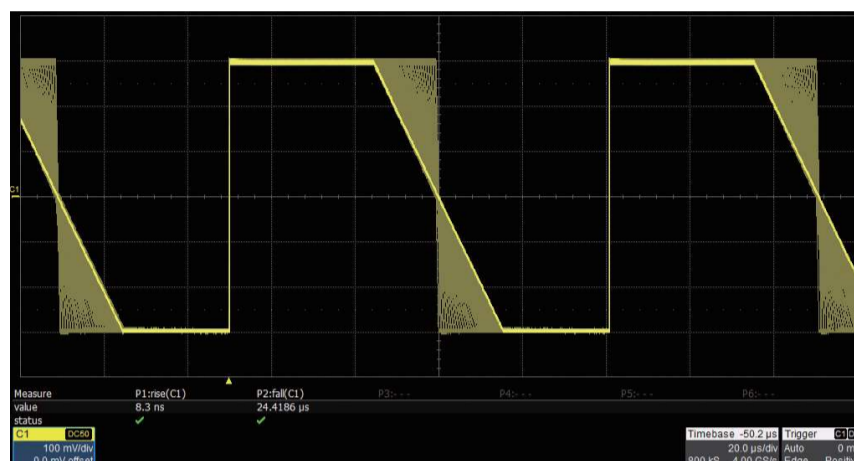
The rise/fall times can be set independently to the minimum of 8.4 ns at any frequency and to the maximum of 22.4 s. The adjustment step is as small as 100 ps.

• Innovative TrueArb Technology

For arbitrary waveforms, TrueArb not only has all the advantages of traditional DDS, but also eliminates the probability that DDS may cause serious jitter and distortion.
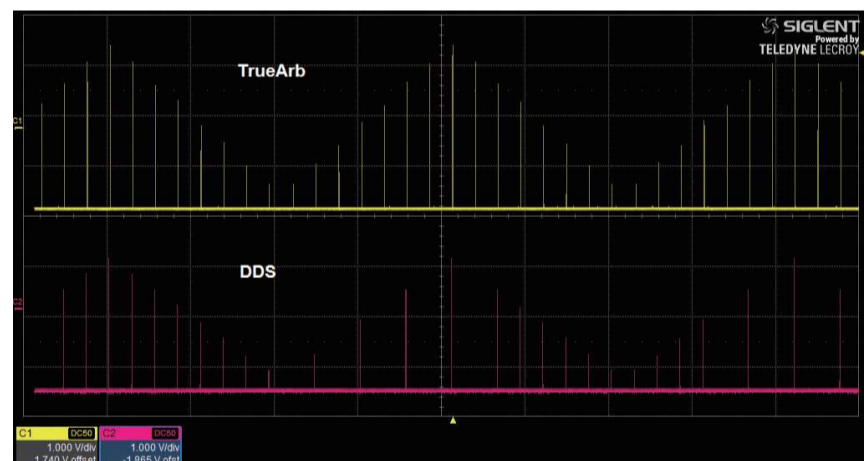
TrueArb generates arbitrary waveforms point by point, never skips any point so that it can reconstruct all the details of the waveform as defined.
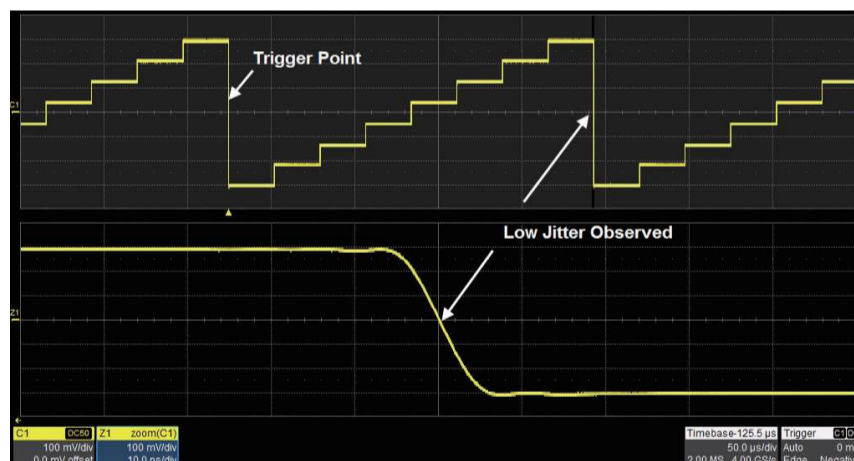
As with EasyPulse, TrueArb effectively overcomes the defect that DDS may cause the one-clock-jitter in arbitrary waveforms.

• 4.3" Touch Screen Display
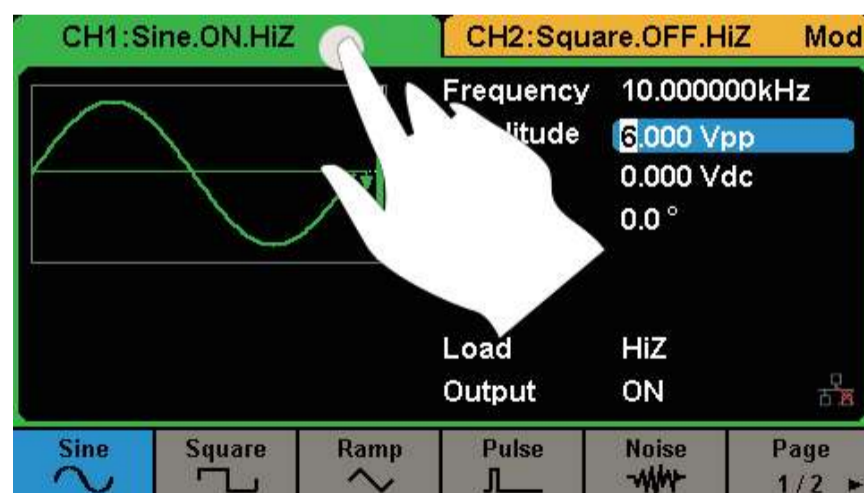
4.3" touch screen display, makes operation much more convenient.

• Arbitrary Waveform Software EasyWave
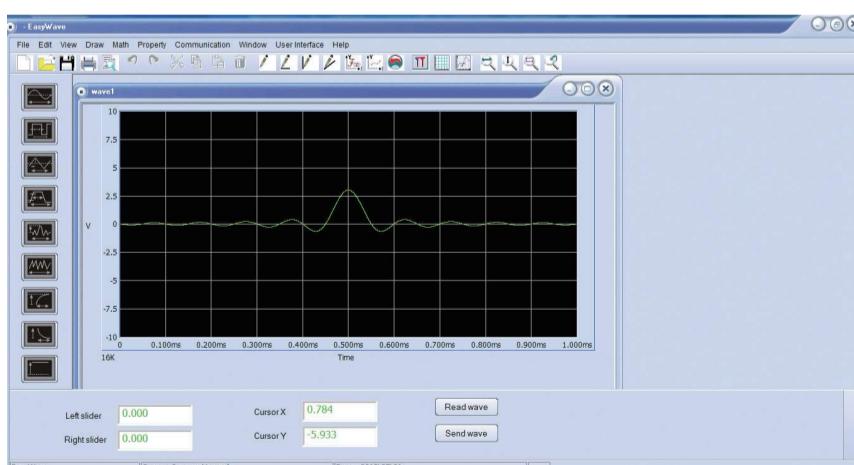
EasyWave is a powerful arbitrary waveform editing software that supports several ways to generate arbitrary waveform such as manual drawing, line-drawing, equation-drawing, coordinate-drawing, etc. It is quite convenient for users to edit their own arbitrary waveforms through EasyWave.

Characteristics

● High-performance Sampling System

Benefiting from a 1.2 GSa/s and 16-bit sampling system, SDG2000X achieves extremely high accuracy performance in both time domain and amplitude, which results in more accurately reconstructed waveforms and lower distortion.

1.2 GSa/s Sampling Rate, 16-bit Resolution-SDG2000X
300 MSa/s Sampling Rate, 14-bit Resolution

Specifications

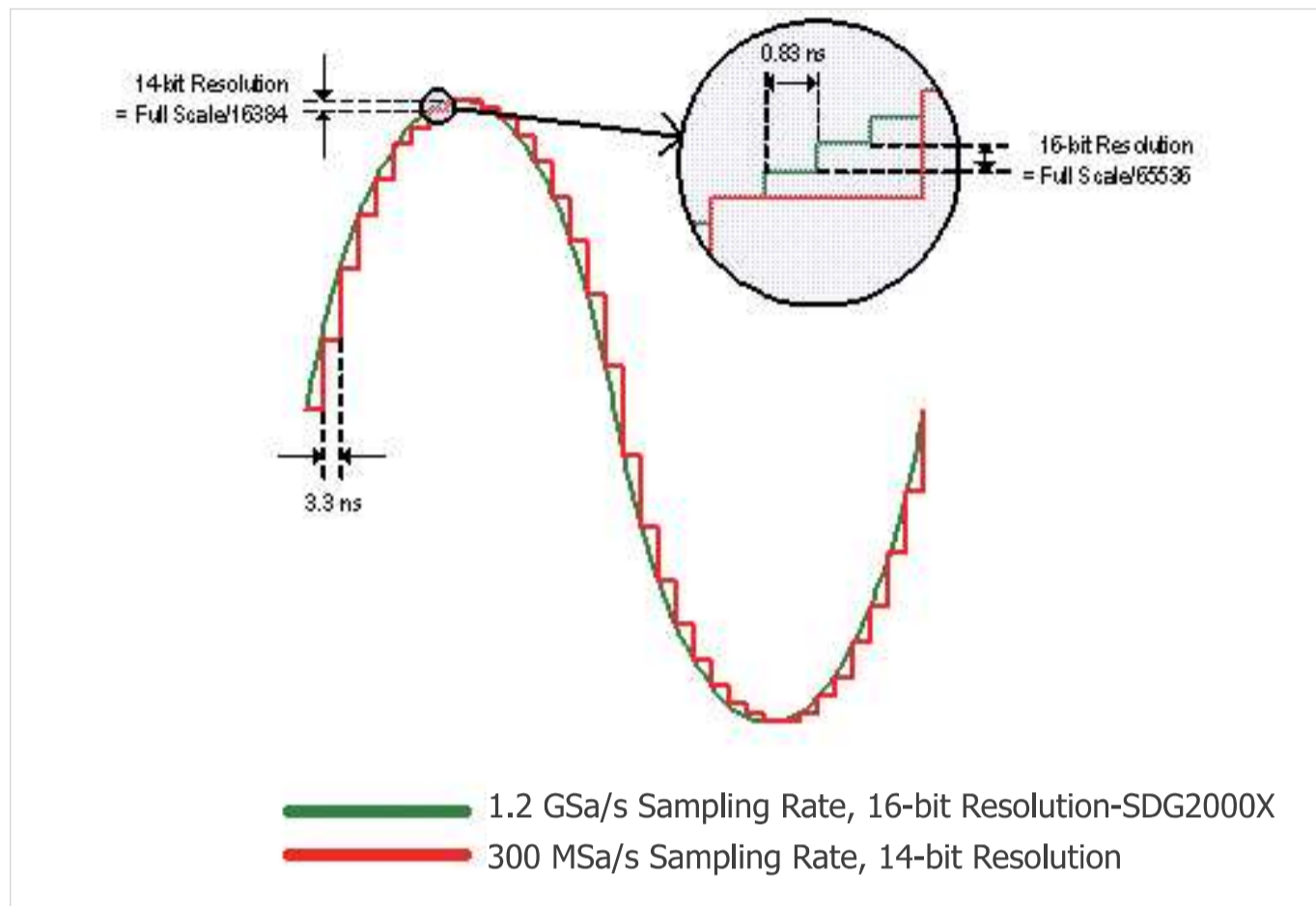| Product Model	SDG2042X		SDG2082X		SDG2122X
Bandwidth	40 MHz		80 MHz		120 MHz
Sampling rate	1.2 GSa/s (4 X Interpolation)				
Vertical resolution	16 bit				
Num. of channels	2				
Max. amplitude	±10 V				
Display	4.3" touch screen display, 480 x 272 x RGB				
Interface	Standard: USB Host, USB Device, LAN Optional: GPIB (USB-GPIB adaptor)				

Frequency Characteristics

Parameter	Min.	Typ.	Max.	Unit	Condition
Resolution			1 μ	Hz	
Initial accuracy	-1		+1	ppm	25℃
	-2		+2	ppm	0~40℃
1st-year aging	-1		+1	ppm	25℃
10-year aging	-3.5		+3.5	ppm	25℃

Sine Characteristics

Parameter	Min.	Typ.	Max.	Unit	Condition
Frequency	1 μ		120 M	Hz	
Harmonic distortion			-65	dBc	0 dBm, 0~10 MHz (Included)
			-60	dBc	0 dBm, 10~20 MHz (Included)
			-55	dBc	0 dBm, 20~40 MHz (Included)
			-50	dBc	0 dBm, 40~60 MHz (Included)
			-45	dBc	0 dBm, 60~80 MHz (Included)
			-40	dBc	0 dBm, 80~100 MHz (Included)
			-38	dBc	0 dBm, 100~120 MHz (Included)
Total Harmonic Distortion			0.075	%	0 dBm, 10 Hz ~ 20 kHz
Non-harmonic spurious			-70	dBc	≤50 MHz
			-65	dBc	>50 MHz

Waveform Generator

Square Characteristics

Parameter	Min.	Typ.	Max.	Unit	Condition
Frequency	1 μ		25 M	Hz	
Rise/fall times			9	ns	10% ~ 90%, 1 Vpp, 50 Ω Load
Overshoot			3	%	100 kHz, 1 Vpp, 50 Ω Load
Duty cycle	0.001		99.999	%	Limited by frequency setting
Jitter (rms), Cycle to cycle			150	ps	1 Vpp, 50 Ω Load

Pulse Characteristics

Parameter	Min.	Typ.	Max.	Unit	Condition
Frequency	1 μ		25 M	Hz	
Pulse width	16.3			ns	
Pulse width accuracy			±(0.01%+0.3 ns)		
Rise/fall times	8.4 n		22.4	s	10% ~ 90%, 1 Vpp, 50 Ω Load, Subject to pulse width limits
Overshoot			3	%	100 kHz, 1 Vpp
Duty cycle	0.001		99.999	%	Limited by frequency setting
Duty cycle resolution	0.001			%	
Jitter (rms) cycle to cycle			150	ps	1 Vpp, 50 Ω Load

Arbitrary Wave characteristics

Parameter	Min.	Typ.	Max.	Unit	Condition
Frequency	1 μ		20 M	Hz	
Waveform length	8		8 M	pts	
Sampling rate	1 μ		75 M	Sa/s	TrueArb mode
	300			MSa/s	DDS mode
Vertical solution	16			bit	
jitter (rms)			150	ps	1 Vpp, 50 Ω Load, TrueArb mode

Output Characterisics

Parameter	Min.	Typ.	Max.	Unit	Condition
Range (Note 1)	2 m		20	Vpp	≤20 MHz, HiZ load
	2 m		10	Vpp	>20 MHz, HiZ load
	1 m		10	vpp	≤20 MHz, 50 Ω load
	1 m		5	vpp	>20 MHz, 50 Ω load
Accuracy	± (1%+1 mVpp)				10 kHz sine, 0 V offset
Amplitude flatness	-0.3		+0.3	dB	0~100 MHz (Included), 50 Ω load, 2.5 Vpp, compare to 10 kHz Sine
	-0.4		+0.4	dB	100~120 MHz (Included), 50 Ω load, 2.5 Vpp, compare to 10 kHz Sine
Output impedance	49.5	50	50.5	Ω	10 kHz sine
Output current	-200		200	mA	
Crosstalk			-60	dBc	CH1 - CH2/CH2 - CH1

Note 1: The specification will be divided by 2 while applied to a 50 Ω load.

Ordering Information

Product Description	SDG2000X Series Function/Arbitrary Waveform Generator
Product code	SDG2042X 40 MHz
	SDG2082X 80 MHz
	SDG2122X 120 MHz
Standard configurations	A Quick Start, A Power Cord, A USB Cable, A Calibration Certificate, A BNC Coaxial Cable
Optional configurations	USB-GPIB adapter