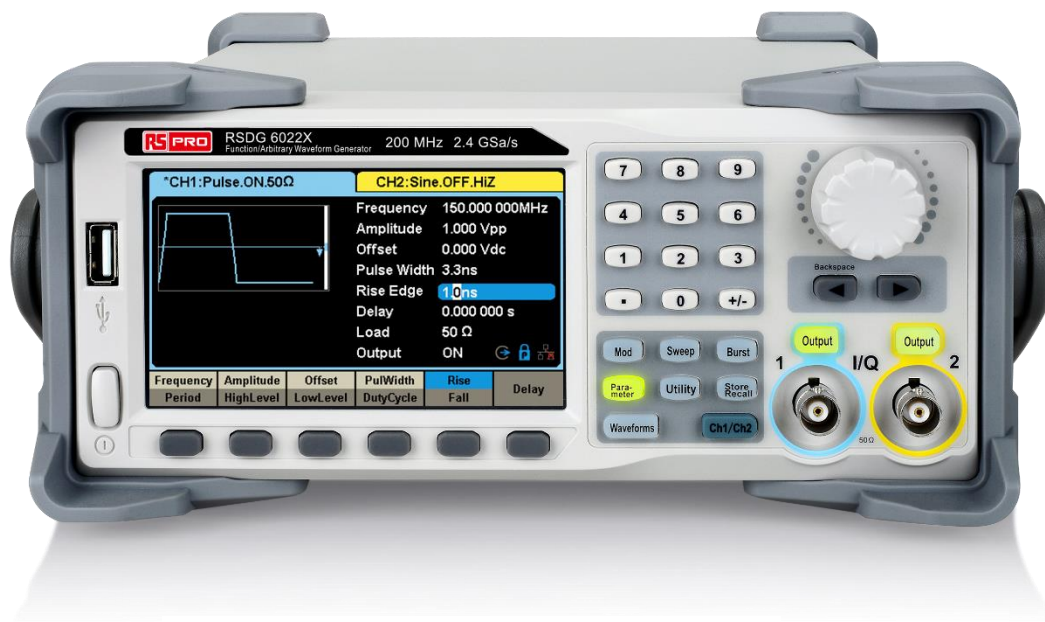Product Datasheet

Stock No: **1882475**

Model Name: RSDG6022X

RS Pro PULSE/ARBITRARY WAVEFORM GENERATOR RSDG6000X SERIES
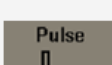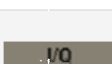
RSDG6022X

Overview

RDG6000X is a series of dual-channel function/arbitrary waveform generators with specifications of up to 200MHz maximum bandwidth, 2.4GSa/s sampling rate and 16-bit vertical resolution. They also include proprietary TrueArb & EasyPulse technology that help to solve the weaknesses inherent in traditional DDS generators when generating arbitrary, square and pulse waveforms.

Key Features

- Dual-channel, 200MHz maximum bandwidth, 20Vpp maximum output amplitude, high fidelity output with 80dB dynamic range

- High-performance sampling system with 2.4GSa/s sampling rate and 16-bit vertical resolution. No detail in your waveforms will be lost

- Multi-function signal generator, meeting requirements in wide range

Sine	Continuous Wave Generator	**Up** to 200 MHz sine wave, supporting sweep and user-defined harmonics. Low cost replacement of RF signal generators below 200 MHz
Pulse	Pulse Generator	**Up** to 80 MHz Pulse, with finely adjustable width, rising edge and falling edge; 3.3 ns minimum width and 1 ns minimum edge at full frequency range
Arb	Function Arbitrary Waveform Generator	**Basic** Function/Arbitrary Waveform Generator and complex signals generating capability including modulation, sweep, burst and waveform combination.
I/Q	IQ Signal Generator (optional)	**Base** Band and IF IQ signals supporting basic modulation and an arbitrary symbol rate between 250 Symb/s ~ 37.5 MSymb/s
Noise	Noise Generator	**Up** to 200 MHz bandwidth White Gaussian Noise with adjustable bandwidth
PRBS	PRBS Generator	**Up** to 160 Mbps PRBS3 ~ PRBS32 with fine bit rate and edge adjustments

- Sweep and Burst function

- Harmonic function

- Waveform Combining function

- 196 built-in arbitrary waveforms

- High precision Frequency Counter

- Standard interfaces: USB Host, USB Device（USBTMC）, LAN （VXI-11） Optional interface: GPIB

- 4.3" touch screen display for easier operation

Models and Key Specifications

Product Model	RSDG6022X		
Bandwidth	200MHz		
Sampling rate	2.4 GSa/s (2X Interpolation)		
Vertical resolution	16 bit		
Num. of channels	2		
Max. amplitude	±10V		
Display	4.3" touch screen display, 480 x 272 x RGB		
Interface	Standard: USB Host, USB Device, LAN Optional: GPIB (USB-GPIB adaptor)		

Characteristics

Continuous Wave
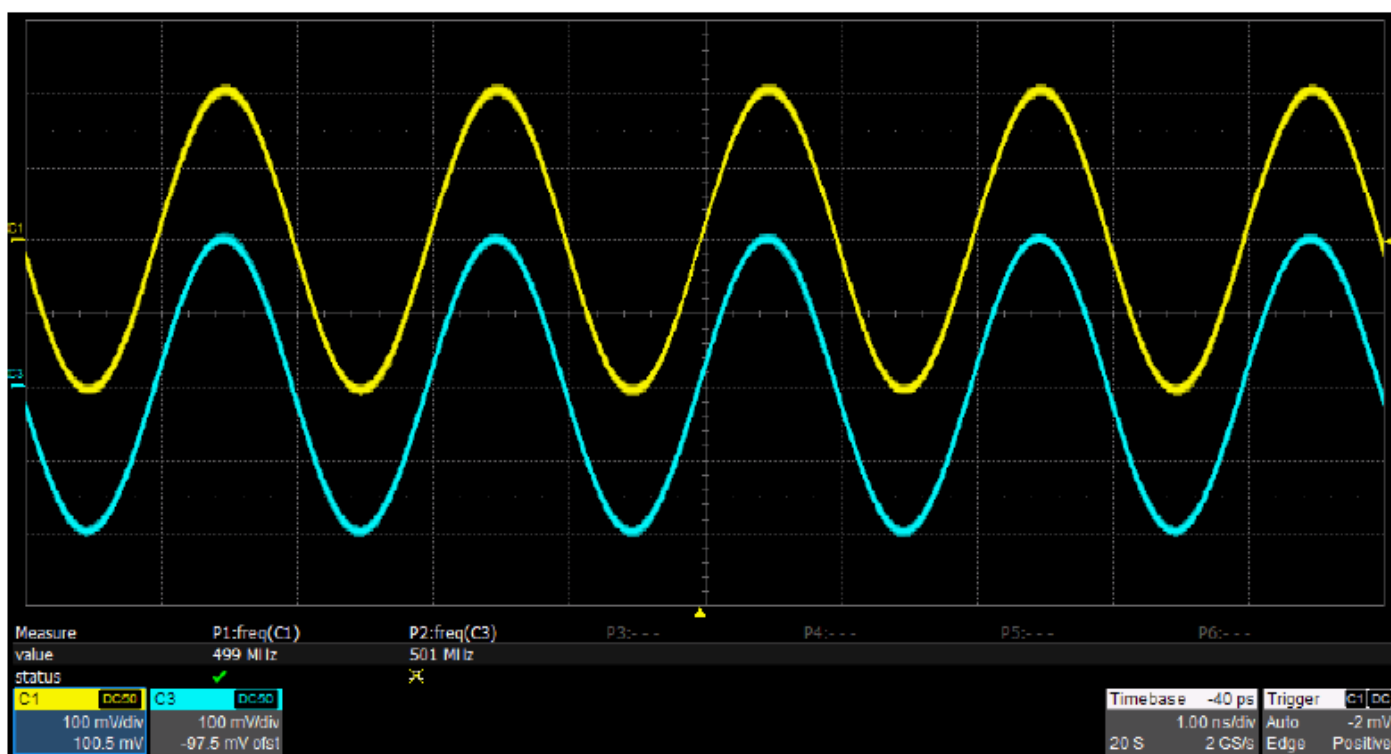
Up to 500MHz continuous sine wave.
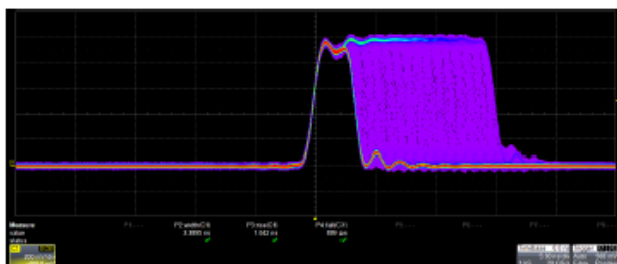
Pulse

Adjustable Pulse Width

The pulse width can be fine-tuned to the minimum of 3.3ns with an adjustment step as small as 100 ps, at any frequency.

◁ **Adjustable Edge**

The rise/fall times can be set independently to the minimum of 1ns at any frequency with a minimum adjustment step as small as 100 ps.

◁ **Low Jitter**

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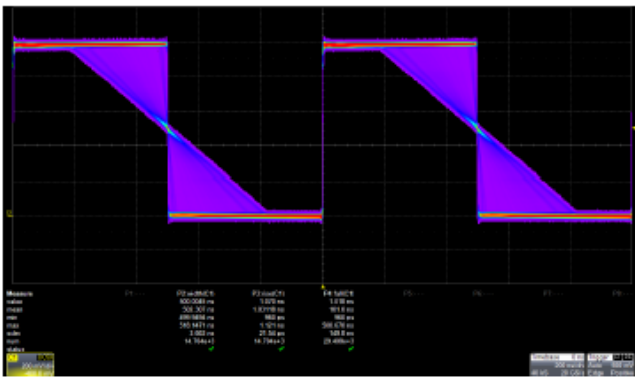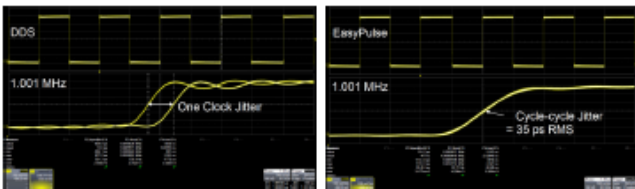nteger-related multiple of the output frequency. EasyPulse technology successfully overcomes this weakness in DDS designs and helps to produce low jitter Square/Pulse waveforms.

⎓ Arbitrary Waveform

Traditional DDS designs can lead to additional jitter and distortion when sourcing arbitrary waveforms. The SIGLENT TrueArb design minimizes jitter and distortion to help deliver high fidelity arbitrary waveforms.
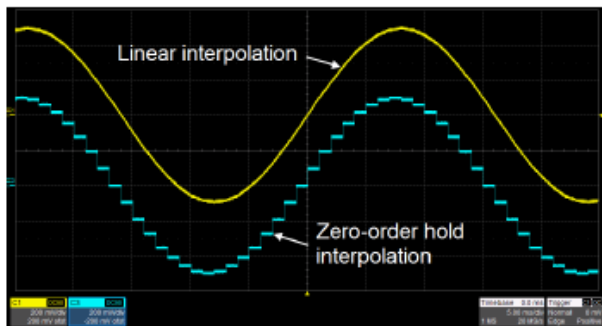
Point by Point Output

TrueArb generates arbitrary waveforms point-by-point. It never skips any point so that it can reconstruct all the details of the waveform, as defined. Two interpolation modes are available: linear and zero-order hold.
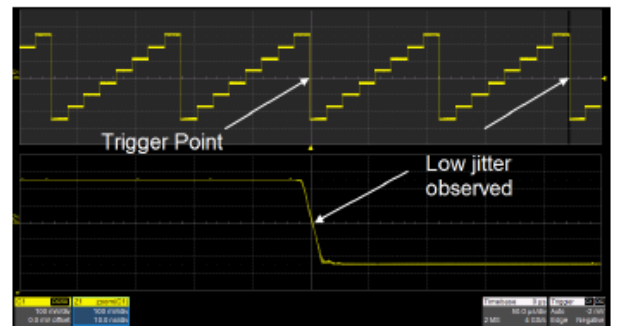
Low Jitter

As with EasyPulse, TrueArb effectively overcomes the clock jitter that can effect traditional DDS generators.
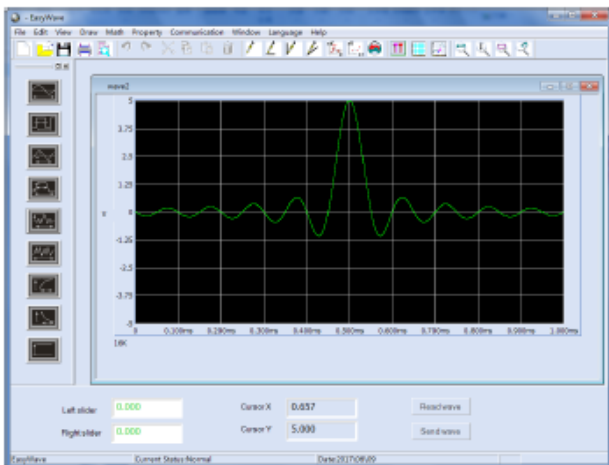
◁ **Arbitrary Waveform Software EasyWave**

EasyWave is an arbitrary waveform software platform that supports waveform creation and editing. It features manual drawing, as-well-as line, equation, and coordinate editing modes. It is also a convenient way for users to edit their own arbitrary waveforms.

Noise
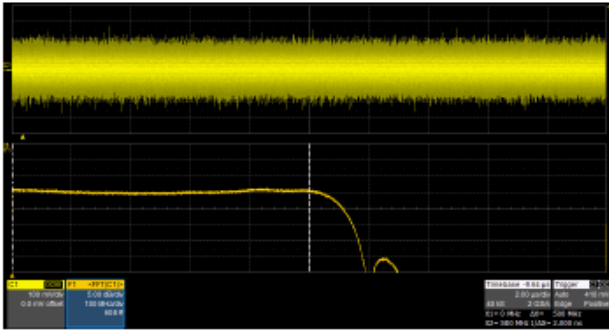
Gaussian noise with bandwidth up to 500 MHz. The repetition period is more than 100 years, and the bandwidth is adjustable.
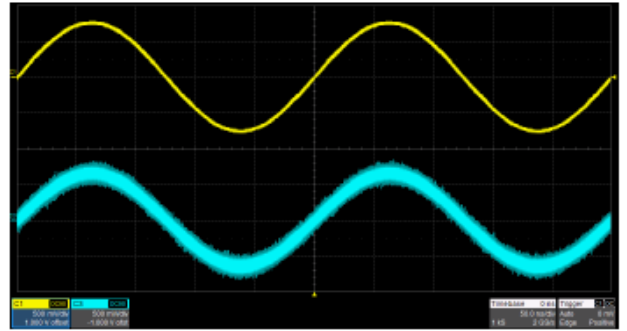
Wideband Gaussian noise can be easily added to other waveforms to simulate real-world scenarios in which the signal contains a large degree

IQ (optional)

IQ Data Flow
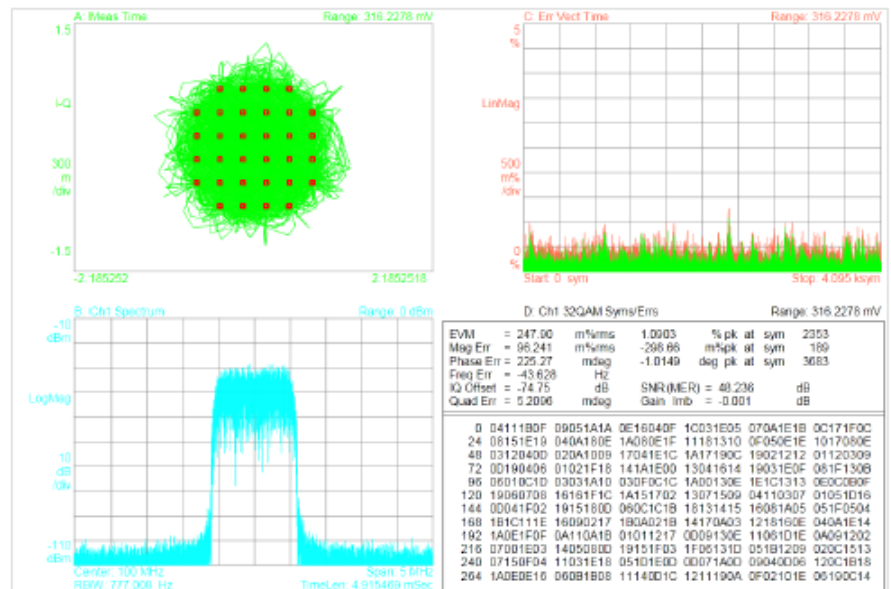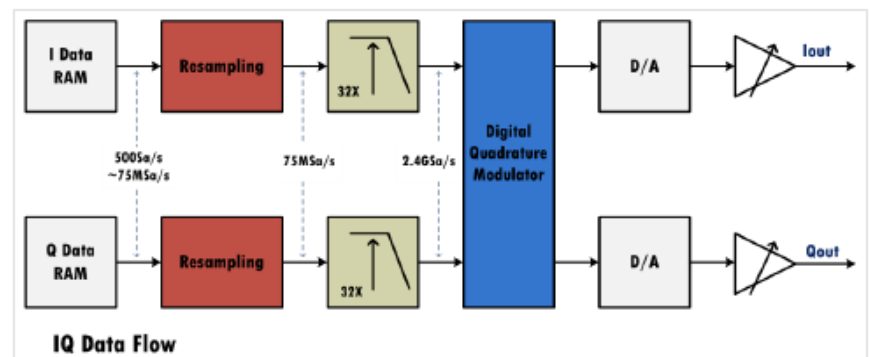
The RSDG6000X supports popular modulation types such as ASK, FSK, PSK, and QAM. Proprietary resampling technology provides excellent EVM performance at arbitrary symbol rates between 250 Symb/s ~ 37.5 MSymb/s. Built-in digital quadrature modulator provides the possibility to generate IQ signals from baseband to 500 MHz intermediate frequency.
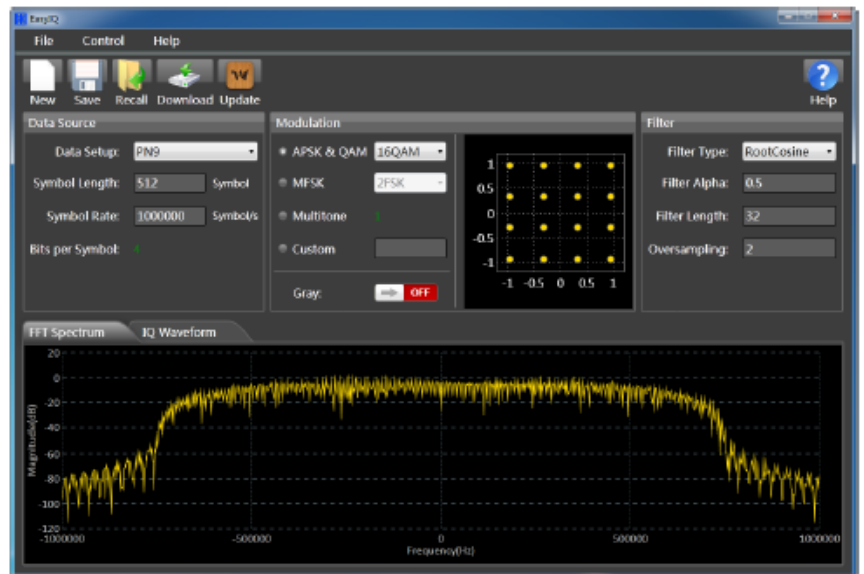
IQ waveforms can be generated by the PC software EasyIQ.

⎍ PRBS
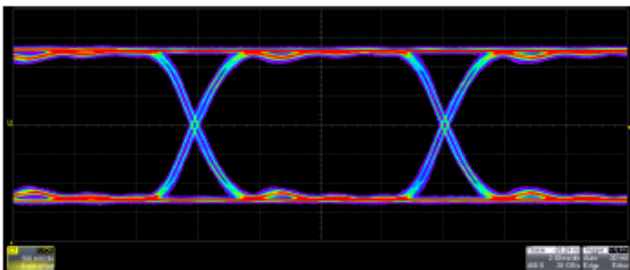
PRBS3 ~ PRBS32 with finely adjustable 10^{-6} bps ~ 300 Mbps bit rate and 1 ns ~ 1us edge.
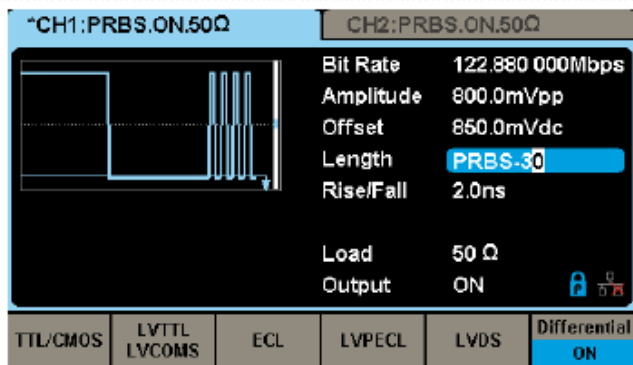
Preset common logic levels such as TTL, LVCMOS, LVPECL and LVDS. An added differential mode provides an easy way to generate differential signals using the both channels.
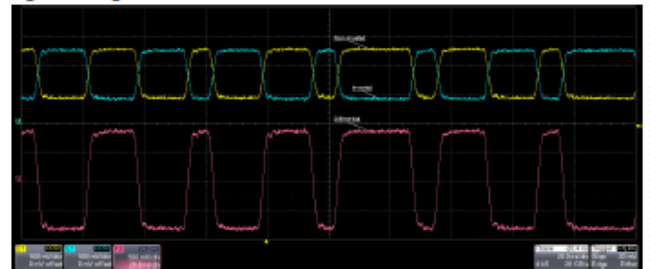
⎍ High Fidelity Output with 80dB Dynamic Range
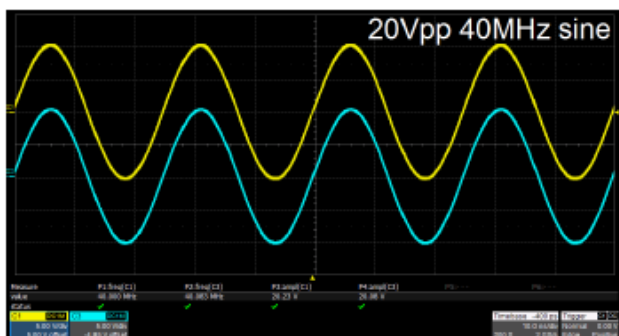
Large Signals at High Frequencies
Dual-channel, 20 Vpp amplitude sine wave guaranteed at up to 40 MHz.
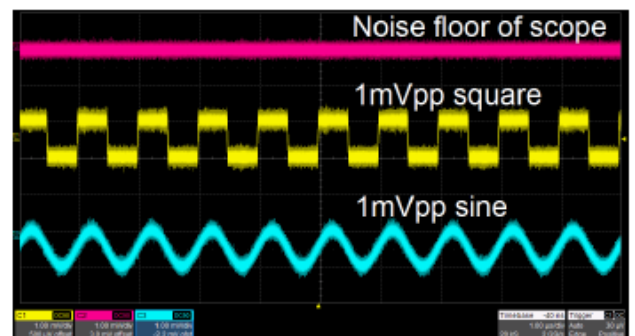
Small Signals
Low noise floor, improves signal-to-noise ratio.

⚡ Complex Signals Generation
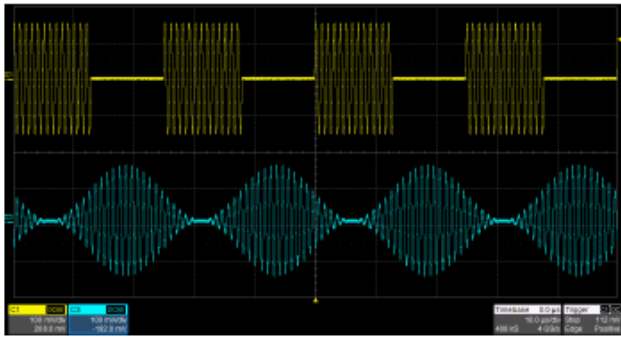
Modulation

Plenty of modulation types, such as AM, FM, PM, FSK, ASK, PSK, DSB-AM, PWM are supported. The modulation source can be configured as "Internal" or "External".
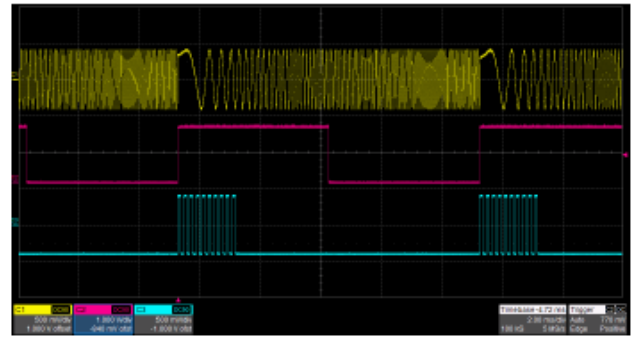
Sweep and Burst

Sweep modes include "Linear" and "Log". Burst modes includes "N cycle" and "Gated". Both Sweep and Burst can be triggered by "Internal" , "External" or "Manual" source.

Waveform Combining

The waveform combining function superimposes CH1 and CH2 waveforms internally and provides the combined waveform to a user-selected output. Easily combine basic waveforms, random noise, modulation signals, sweep signals, burst signals, EasyPulse waveforms and TrueArb waveforms
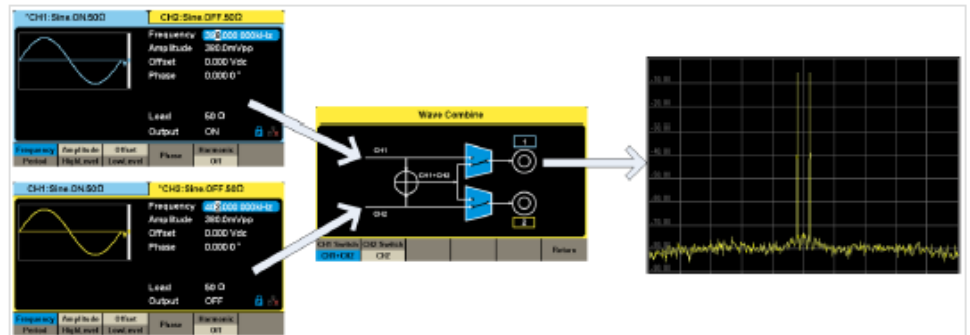
Harmonics Function

Harmonics function gives you the ability to add higher-order elements to your signal.
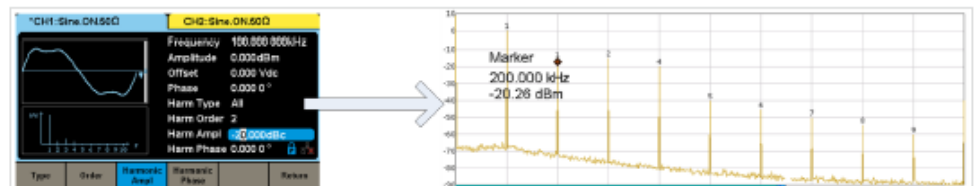
⚡ Two Dual-channel Operation Mode

"Phase-Locked" mode automatically aligns the phases of each output. While "Independent" mode permit the two channels to be used as two independent generators. Independent mode also smoothes parameter (frequency, amplitude) changes made to an active channel.

⚡ Frequency Counter

8-digit hardware frequency counter with statistics function and input range of 0.1 Hz ~ 400 MHz.

Specifications

All specifications apply to both channels. Unless otherwise stated, all specifications are not guaranteed unless the following conditions are met:

- The generator is within calibration period of validity
- The generator has been working continuously for at least 30 minutes at a specified temperature (18℃ ~ 28℃).

Frequency Characteristics

Parameter	Min.	Typ.	Max.	Unit	Condition
Resolution			1μ	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	1μ		200M	Hz	RSDG6022X
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

Square Characteristi

Parameter	Min.	Typ.	Max.	Unit	Condition
Frequency	1μ		80M	Hz	
Rise/fall times			2.4	ns	10% ~ 90%, 1 Vpp, 50ΩLoad
Overshoot			3	%	100 kHz, 1 Vpp, 50ΩLoad
Duty cycle	10		90	%	Limited by frequency setting
Jitter (rms), Cycle to cycle			100	ps	1 Vpp, 50Ω Load

Pulse Characteristics

Parameter	Min.	Typ.	Max.	Unit	Condition
Frequency	1μ		80M	Hz	
Pulse width	3.4			ns	
Pulse width accuracy			±(0.01%+0.3ns)		
Rise/fall times	2n			s	10% ~ 90%, .
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			100	ps	1 Vpp, 50Ω Load

Noise Characteristic

Parameter	Min.	Typ.	Max.	Unit	Condition
-3dB bandwidth		200		MHz	
Bandwidth setting range	1M		BW	Hz	BW is the max. frequency

Specifications

Ramp Characteristics

Parameter	Min.	Typ.	Max.	Unit	Condition
Frequency	1μ		5M	Hz	
Symmetry	0		100	%	
Linearity			1	%	Percentage of peak-peak output, 1kHz, 1Vpp, 100% symmetry

Arbitrary Wave

Parameter	Min.	Typ.	Max.	Unit	Condition
Frequency	1μ		50M	Hz	
Waveform length	2		20M	pts	
Sampling rate	1μ		300M	Sa/s	TrueArb mode
	1.2G			Sa/s	DDS mode
Vertical solution	16			bit	
jitter (rms)			100	ps	1 Vpp, 50Ω Load, TrueArb mode

DC

Parameter	Min.	Typ.	Max.	Unit	Condition
Range	-10		10	V	HiZ load
	-5		5	V	50Ωload
Accuracy			±(1%+2mV)		HiZ load

Output

Parameter	Min.	Typ.	Max.	Unit	Condition & Note
Accuracy	±(1%+1mVpp)				10 kHz sine, 0 V offset
Amplitude flatness	-0.3		+0.3	dB	50Ω load, 0.5 Vpp, compare to 1MHz Sine
Output impedance	49.5	50	50.5	Ω	100 kHz sine
Output current	-200		200	mA	
Crosstalk			-60	dBc	CH1=CH2=0 dBm, Sine, 50 Ω load
Protection	Current limiting, Over voltage protection				
Current-limit threshold		±200		mA	
Over voltage protection threshold	±3.5	±4	±4.5	V	The amplitude of the generator <3.2Vpp and the DC offset <|2VDC|
	±10.5	±11	±11.5	V	The amplitude of the generator ≥3.2Vpp or the DC offset ≥|2VDC|

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

Modulation Characteristics

AM

Parameter	Min.	Typ.	Max.	Unit	Condition
Carrier	Sine, Square, Ramp, Arb				
Modulation Source	Internal/External				
Modulating wave	Sine, Square, Ramp, Noise, Arb				
Modulation depth	0		120	%	
Modulation frequency	1m		1M	Hz	While modulation source is "Internal"

FM

Parameter	Min.	Typ.	Max.	Unit	Condition
Carrier	Sine, Square, Ramp, Arb				
Modulation Source	Internal/External				
Modulating wave	Sine, Square, Ramp, Noise, Arb				
Frequency deviation	0		0.5*BW		BW is the max. output frequency Limited by frequency setting
Modulation frequency	1m		1M	Hz	While modulation source is "Internal"

Specifications

Modulation Characteristics

PM

Parameter	Min.	Typ.	Max.	Unit	Condition
Carrier	Sine, Square, Ramp, Arb				
Modulation Source	Internal/External				
Modulating wave	Sine, Square, Ramp, Noise, Arb				
Phase deviation	0		360	°	
Modulation frequency	1m		1M	Hz	While modulation source is "Internal"

ASK

Parameter	Min.	Typ.	Max.	Unit	Condition
Carrier	Sine, Square, Ramp, Arb				
Modulation Source	Internal/External				
Modulating wave	Square with 50% duty cycle				
Keying frequency	1m		1M	Hz	Limited by frequency setting while modulation source is "Internal"

FSK

Parameter	Min.	Typ.	Max.	Unit	Condition
Carrier	Sine, Square, Ramp, Arb				
Modulation Source	Internal/External				
Modulating wave	Square with 50% duty cycle				
Modulation frequency	1m		1M	Hz	While modulation source is "Internal"

PSK

Parameter	Min.	Typ.	Max.	Unit	Condition
Carrier	Sine, Square, Ramp, Arb				
Modulation Source	Internal/External				
Modulating wave	Square with 50% duty cycle				
Modulation frequency	1m		1M	Hz	While modulation source is "Internal"

PWM

Parameter	Min.	Typ.	Max.	Unit	Condition
Carrier	Pulse				
Modulation Source	Internal/External				
Modulating wave	Sine, Square, Ramp, Noise, Arb				
Modulation frequency	1m		1M	Hz	While modulation source is "Internal"
Pulse width deviation resolution	6.67			ns	

Burst Characteristics

Parameter	Min.	Typ.	Max.	Unit	Condition
Carrier	Sine, Square, Ramp, Pulse, Noise, Arb				
Type	Count(1-1000000cycles), Infinite, Gated				
Carrier frequency	2m		BW	Hz	BW is the max. output frequency
Start/Stop phase	0		360	°	
Internal period	1μ		1000	s	
Trigger source	Internal, External, Manual				
Gated source	Internal/External				
Trigger delay			100	s	

Sweep Characteristics

Parameter	Min.	Typ.	Max.	Unit	Condition
Carrier	Sine, Square, Ramp, Arb				
Type	Linear, Log				
Direction	Up, Down				
Carrier frequency	1μ		BW	Hz	BW is the max. output frequency
Sweep time	1m		500	s	
Trigger source	Internal, External, Manual				

Specifications

Frequency Counter

Parameter	Min.	Typ.	Max.	Unit	Condition
Function	Frequency, Period, Positive/Negative pulse width, Duty cycle				
Coupling mode	AC, DC, HF REJ				
Frequency range	100m		400M	Hz	DC coupling
	10		400M	Hz	AC coupling
Input amplitude	100mVrms		±2.5V		DC coupling, < 100 MHz
	200mVrms		±2.5V		DC coupling, 100 MHz ~ 200MHz
	100mVrms		5 Vpp		AC coupling, < 100 MHz
	200mVrms		5 Vpp		AC coupling, 100 MHz ~ 200MHz
Input impedance		1M		Ω	

Reference Clock Input/Output

Reference Clock Input

Parameter	Min.	Typ.	Max.	Unit	Condition
Frequency		10M		Hz	
Amplitude	1.4			Vpp	
Input impedance	5			kΩ	AC coupling

Reference Clock Output

Parameter	Min.	Typ.	Max.	Unit	Condition
Frequency		10M		Hz	Synchronized to internal reference clock
Amplitude	2	3.3		Vpp	HiZ load
Output impedance		50		Ω	

Auxiliary In/Out Characteristics

Trigger Input

Parameter	Min.	Typ.	Max.	Unit	Condition
V_{IH}	2		5.5	V	
V_{IL}	-0.5		0.8	V	
Input impedance	100			kΩ	
Pulse width	100			ns	
Response time			100	ns	Sweep
			600	ns	Burst

Trigger Output

Parameter	Min.	Typ.	Max.	Unit	Condition
V_{OH}	3.8			V	$I_{OH} = -8$ mA
V_{OL}			0.44	V	$I_{OL} = 8$ mA
Output impedance		100		Ω	
Frequency			1	MHz	

Sync Output

Parameter	Min.	Typ.	Max.	Unit	Condition
V_{OH}	3.8			V	$I_{OH} = -8$ mA
V_{OL}			0.44	V	$I_{OL} = 8$ mA
Output impedance		100		Ω	
Pulse width		50		ns	
Frequency			10	MHz	

Modulation Input

Parameter	Min.	Typ.	Max.	Unit	Condition
Frequency	0		50	kHz	
Input impedance	10			kΩ	
Amplitude@ 100% Modulation depth	11	12	13	Vpp	

Specifications

General Characteristics

Power

Parameter	Min.	Typ.	Max.	Unit	Condition
Voltage	100 - 240 Vrms (± 10%), 50 / 60 Hz 100 - 120 Vrms (± 10%), 400 Hz				
Power consumption		25.5	50	W	Dual channels, Sine, 1kHz, 10Vpp, 50Ω load

Display

Parameter	Min.	Typ.	Max.	Unit	Condition
Color depth		24		bit	
Contrast ratio		350:1			
Luminance		300		cd/m^2	
Touch panel type	Resistive				

Environment

Parameter	Min.	Typ.	Max.	Unit	Condition
Operating temperature	0		40	℃	
Storage temperature	-20		60	℃	
Operating humidity	5		90	%	≤ 30 ℃
	5		50	%	40 ℃
Non-operating humidity	5		95	%	
Operating altitude			3048	m	≤ 30 ℃
Non-operating altitude			15000	m	

Calibration

Parameter	Min.	Typ.	Max.	Unit	Condition
Calibration interval		1		year	

Mechanical

Parameter	Min.	Typ.	Max.	Unit	Condition
Dimensions	W×H×D = 260.3mm×107.2mm×295.7mm				
Net weight		3.43		kg	
Gross weight		4.42		kg	

Compliance

LVD	IEC 61010-1:2010
EMC	EN61326-1:2013

Ordering Information

Product Description	RSDG6000X Series Function/Arbitrary Waveform Generator
Product code	Stock No: 1882475 Model Name: RSDG6022X 200MHz
Standard configurations	A Quick Start、A Power Cord、A USB Cable Software Package）、A Calibration Certificate, A BNC Coaxial Cable