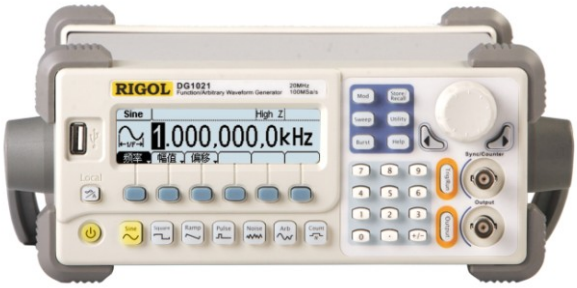
RIGOL

Data Sheet

DG10X1 Series Function/Arbitrary Waveform Generator

DG1021, DG1011



Product Overview

RIGOL DG10X1 adopt DDS technology, which enables to generate stable, high-precision, pure and low distortion signals.

Applications

- Analog Sensor
- Practical Environment Signals
- Circuit Function Test
- IC Chip Test

Easy to Use Design

- Multiple Display Modes
- Clear graphical interface
- Support for Chinese and English menu and input
- Push-help makes information getting more convenient.
- File management (support for U disc and local storage)

Main Features

- Adopt advanced DDS technology; 100 MSa/s sampling rate; 14 bits vertical accuracy
- Output 10 standard waveforms, DC and user-designed arbitrary waveforms
- Abundant modulation functions: AM, FM, PM, FSK, linear/logarithm sweep and burst
- Abundant output and input: waveform output; synchronous signal output; attached modulation source, attached clock reference 10 MHz input, external trigger input and internal 10MHz clock output
- Builit-in high precision, boardband frequency counter, which enables to measure frequency between 100 mHz and 200 MHz.
- Standard configuration interfaces: USB Device & USB Host, and support U-disc storage
- Seamlessly interconnect with DS1000 series digital oscilloscope
- Powerful arbitrary waveform editing software "UltraWave"
- Support remote control via a command line

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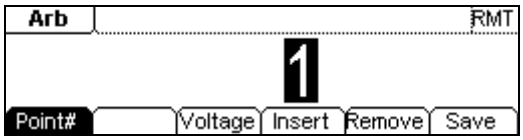
RIGOL Technologies, Inc.

➢ 10 Standard Waves, DC and Editable Arb Waves



10 Standard Waves and DC output: Enable to output Sine, Square, Ramp, Pulse, ExpRise, ExpFall, Sinc, Noise and DC waves.

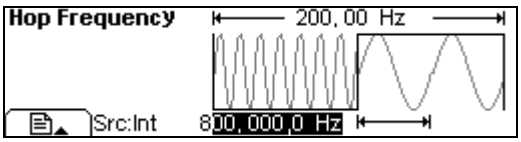
Editable Arb Waves: Enable to edit and output arbitrary wave up to 14bits and 512kpts. In addition, the instrument provides 4 nonvolatile memories for storing custom arbitrary waves. According to Ultrawave, more waves could be edited and saved, or perform analysis for the waves that has already been uploaded to it.

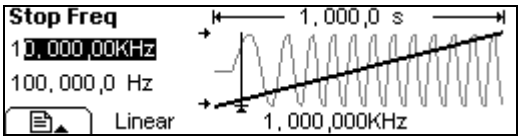
➢ Abundant Modulation Functions, Sweep, Burst

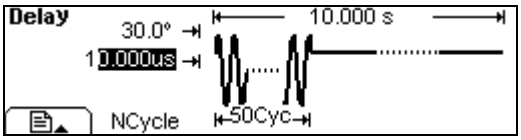
Abundant Modulation Functions: Support AM, FM, PM and FSK, the modulated waveforms are intuitively shown on the screen.

Sweep: It can output in the form of linearity or logarithm from the start frequency to the stop frequency during the sweep time (1 ms ~ 500 s) you specified. Sweeping can be generated by Sine, Square, Ramp or Arbitrary waveforms.

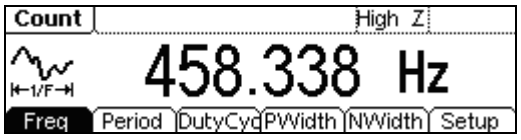
Burst: It can generate versatile waveforms in burst, which can last specific times of waveform cycle (N-Cycle Burst) or output gating pluse if applied external gating signal.







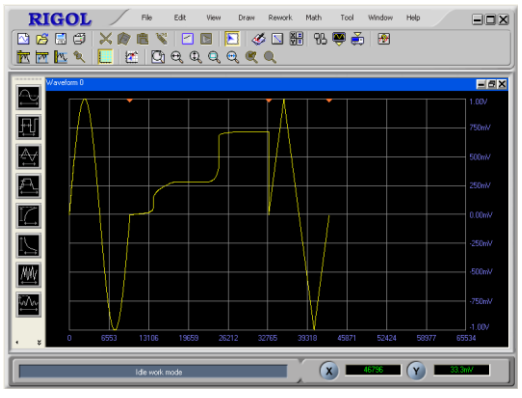
➢ Built-in Frequency Counter



The counter coulde be used to measure these parameters: frequency, period, duty cycle, positive and negative pulse width within the range of 100 mHz to 200 MHz. Two modes of counter are available:
Auto mode: The trigger level, sensitive, the switch of high frequency reject, the frequency of measured signal and others could be set automatically.
Manual mode: DC/AC, sensitive (low, mid, high), trigger level, the switch of high frequency reject and other parameters could be set manually.

➢ Powerful Waveform Editing Software "UltraWave"

In order to meet the most basic needs of users, UltraWave provides 9 standard waveforms. In addition, hand drawing, line (point by point) drawing and arbitrary points drawing are also offered to make it easier to create complex waveforms and to edit multiple waves simultaneously through the multi-file management interface.



Specifications

All the specifications below apply to DG10X1 Series Function/ Arbitrary Waveform Generator unless where noted. To come up to these specifications, two conditions must be met firstly:

- The instrument must have been operated continuously for 30 minutes under the specified operating temperature.
- Do perform Self-Calibration through the Utility menu if the range of operating temperature variations up to or more than 5°C.

Note: All specifications are guaranteed unless where marked "typical".

Specifications

Frequency (DG1021)		
Waveforms	Sine, Square, Ramp, Triangle, Pulse, Noise, DC, Arb	
Sine	1μHz ~ 20MHz	
Square	1μHz ~ 5MHz	
Pulse	500μHz ~ 3MHz	
Ramp	1μHz ~ 150kHz	
White Noise	5MHz bandwidth (typical)	
Arb.	1μHz ~ 5MHz	
Resolution	1 μHz	
Accuracy	±50 ppm in 90 days ±100 ppm in 1 year 18°C~28°C	
Temperature Coefficient	< 2 ppm/°C	
Frequency (DG1011)		
Waveforms	Sine, Square, Ramp, Triangle, Pulse, Noise, DC, Arb	
Sine	1μHz ~ 15MHz	
Square	1μHz ~ 4MHz	
Pulse	500μHz ~ 2MHz	
Ramp	1μHz ~ 100kHz	
White Noise	5MHz bandwidth (typical)	
Arb.	1μHz ~ 4MHz	
Resolution	1 μHz	
Accuracy	±50 ppm in 90 days ±100 ppm in one year 18°C~28°C	
Temperature Coefficient	< 2 ppm/°C	
Sine Wave Spectrum Purity		
Harmonic Distortion		**< 1 V_{PP}** **> 1 V_{PP}**
	DC ~ 20 kHz	-70 dBc -70 dBc
	20 kHz ~ 100 kHz	-65 dBc -60 dBc
	100 kHz ~ 1 MHz	-50 dBc -45 dBc
	1 MHz ~ 10 MHz	-40 dBc -35 dBc
Total Harmonic Distortion	DC ~ 20 kHz, 1 V_{PP}	< 0.2%
Spurious Signal (non-harmonic)	DC ~ 1 MHz	< -70 dBc
	1 MHz ~ 10 MHz	< -70 dBc + 6 dB/octave

Phase Noise	10kHz Offset –115 dBc / Hz, (typical)	
Square Wave		
Rise/Fall Time	< 20 ns (10% ~ 90%) (typical, 1kHz, 1 V_{PP})	
Overshoot	< 2%	
Duty Cycle	1μHz (including) ~ 3MHz (including)	20% ~ 80%
	3MHz (not contain) ~ 4MHz (including)	40% ~ 60%
	4MHz (not contain)~ 5MHz (including)	50%
Asymmetry (below 50% Duty Cycle)	1% of period + 50ns	
Jitter	6ns + 100ppm of period	
Ramp Wave		
Linearity	< 0.1% of peak output (typical, 1 kHz, 1 V_{PP}, 100% Sysmmetry)	
Symmetry	0% to 100%	
Ramp Wave		
Linearity	< 0.1% of peak output (typical, 1 kHz, 1 V_{PP}, 100% Sysmmetry)	
Symmetry	0% to 100%	
Pulse Wave		
Pulse Width	2000 s max period; 8 ns min period; 1 ns resolution	
Overshoot	< 2%	
Jitter	6ns + 100 ppm100 ppm of period	
Arb Wave		
Waveform Length	4k points	
Vertical Resolution	14 bits (including sign)	
Sampling Rate	100MSa/s	
Minimum Rising /Falling Time	35ns, (typical)	
Jitter (RMS)	6 ns + 30ppm	
Nonvolatile Storage	4 waveforms	
Output Characteristics		
Amplitude [2]	2m V_{PP} ~ 10 V_{PP} (50 Ω) 4 m V_{PP} ~ 20 V_{PP} (High Z)	
Vertical Accuracy (1 kHz Sine)	± (1% of setting + 1 m V_{PP})	
Amplitude Flatness (1 kHz Sine)	<100kHz 0.1 dB	
	100KHz ~ 5MHz 0.15 dB	
	5MHz ~ 20MHz 0.3 dB	
DC Offset		
Range (peak value AC＋ DC)	±5V (50Ω) ±10 V (High Z)	
Offset Accuracy	± (2%of the |Offset Setting| + 0.5% of the amplitude+ 2 mV)	
Resolution	4 bits	
Waveform Output		
Impedance	50 Ω (typical)	
Protection	Short-circuit protection; alto inputing disable if over loading	
AM		
Carrier Waveforms	Sine, Square, Ramp, Arb	
Source	Internal/ External	
Modulation Waveforms	Sine, Square,Ramp, Noise, Arb (2 mHz to 20 kHz)	

Modulation Depth	0% ~ 120%
PM	
Carrier Waveforms	Sine, Square, Ramp, Arb
Source	Internal/ External
Modulation waveforms	Sine, Square,Ramp, Noise, Arb (2 mHz to 20 kHz)
Phase Deviation	DC~ 7.5 MHz（DG1011） DC~ 10 MHz（DG1021）
PM	
Carrier Waveforms	Sine, Square, Ramp, Arb
Source	Internal/ External
Modulation waveforms	Sine, Square,Ramp, Noise, Arb (2 mHz to 20 kHz)
Phase Deviation	0° ~ 360°
FSK	
Carrier Waveforms	Sine, Square, Ramp, Arb (except DC)
Source	Internal/External
Modulation Waveforms	50% duty cycle square (2 mHz to 50 kHz)
Sweep	
Carrier Waveforms	Sine, Square, Ramp, Arb
Type	Linear or Logarithmic
Sweep Time	1 ms ~ 500 s ± 0.1%
Trigger Source	Manual/Internal/External
Burst	
Waveforms	Sine, Square, Ramp, Pulse, Noise, Arb
Types	Count (1 ~ 50,000Cyc), infinite, gated
Start Phase	-360° ~ +360°
Internal Period	1 μs ~ 500s ± 1%
Gate Source	External Trigger
Trigger Source	Manual/Internal/External
Rear Panel Connector	
External AM Modulation	± 5 Vpk = 100% modulation 5kΩ input impedance
Input/Output Frequency Range	10MHz± 500Hz
Input/Output Level Range	1.5 V_{PP} ~5 V_{PP} /3 V_{PP} (typical)
Input/Output Impedance	2 kΩ/1 kΩ (typical, AC coupled)
Time	< 2s
External Trigger	TTL compatible
Trigger Input	
Input Level	Input Level
Slope	Slope
Pulse Width	Pulse Width
Input Impedance	Input Impedance
Linear Sweep	Linear Sweep
Delay Time of Pulse	< 500 ns (typical)
Trigger Output	
Electrical Level	TTL compatible >1kΩ
Pulse Width	> 400ns (typical)

Output Impedance	50Ω (typical)		
Maximum Frequency	1 MHz		
Counter Specification			
Function		Frequency, period, positive/negative Pulse width, Duty cycle	
Frequency Range		Single channel: 100 mHz ~ 200 MHz	
Frequency Resolution		6 digits/second	
Voltage Range and Sensitivity (non-modulation signal)			
Auto mode	1Hz ～ 200MHz		200 m V_{PP} ~ 5 V_{PP}
Manual mode	DC coupled	DC offset range	±1.5 V_{DC}
		100mHz ~ 100MHz	20m V_{RMS} ~ ±5 Vac+dc
		100MHz ~ 200MHz	40m V_{RMS} ~ ±5 Vac+dc
	AC coupled	1Hz ~ 100MHz	50m V_{PP} ~ ±5 V_{PP}
		100MHz ~ 200MHz	100m V_{PP} ~ ±5 V_{PP}
Pulse width and Duty cycle Measure	1Hz ~ 10MHz（100m V_{PP} ~ 10 V_{PP}）		
Input adjust	Input impedance	1 MΩ	
	Coupling mode	AC, DC	
	High frequency restrain	High frequency noise restrain (HFR) On or Off	
	sensitivity	Low, Medium, High	
Trigger mode	The trigger level can adjust manually/ automatically		
	Trigger level range: ±3 V (0.1% to 100%)		
	Resolution: 6 mV		

General Specifications

Display	
Display Type	Black and White LCD Screen
Display Resolution	256 Horizontal x 64 Vertical
Grey Degree	4 Level Grey
Display Contrast (typical)	150 : 1
Backlight Brightness (typical)	300 nit

Power Supply	
Supply Voltage	100 ~ 240 VAC_{RMS}, 45 ~ 440 Hz, CAT II
Power Consumption	Less than 40 W
Fuse	2 A, T Level, 250 V

Environment	
Ambient Temperature	Operation: 10℃ ~ +40℃
	Non-operation: -20℃ ~ +60℃
Cooling Method	Natural cooling
Humidity Range	Below +35℃: ≤90％ relative humidity
	+35℃~+40℃: ≤60％relative humidity
Height above sea level	Operation: below 3,000m
	Non-operation: below 15,000m

Mechanism		
Dimension	Width	232 mm
	Height	108 mm
	Depth	288 mm
Weight	Net Weight	2.65 kg
	Gross Weight	4 kg
IP Protection		
IP2X		
Calibration Interval		
One year suggested		

Ordering Information

Name of Product

RIGOL DG10X1 Series Function/Arbitrary Waveform Generator

Model Frequency

DG1021	20MHz
DG1011	15MHz

Standard Accessories

- A Power Cord that fits the standard of destination country
- An USB Data Cable
- An User's Guide
- Ultrawave software

Optional Accessories

- BNC Cable

Warranty

Very thank you for choosing **RIGOL** products!

RIGOL Technologies, Inc. warrants that this product will be free from defects in materials and workmanship from the date of shipment. If a product proved defective within the respective period, **RIGOL** will provide repair or replacement as described in the complete warranty statement.

For the copy of complete warranty statement or maintenance, please contact with your nearest **RIGOL** sales and service office.

RIGOL do not provide any other warranty items except the one being provided by this summary and the warranty statement. The warranty items include but not being subjected to the hint guarantee items related to tradable characteristic and any particular purpose. **RIGOL** will not take any responsibility in cases regarding to indirect, particular and ensuing damage.

Contact Us

If you have any problem or requirement during using our products, please contact **RIGOL** Technologies, Inc. or the local distributors.

Domestic: Please call

Tel: (86-10) 8070 6688
Fax: (86-10) 8070 5070

Service & Support Hotline: 800 810 0002
9:00 am –5: 00 pm from Monday to Friday

Or by e-mail:
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Or mail to:
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Post Code: 102206

Overseas: Contact the local **RIGOL** distributors or sales office.
For the latest product information and service, visit our website: http://www.rigolna.com/