RIGOL

DG1000Z Series
Function/Arbitrary Waveform Generator

SiFi

- SiFi (Signal Fidelity) for 100% waveform replication
- 2Mpts or 8Mpts/CH(std.), 16Mpts/CH (opt.) arbitrary waveform length
- Standard 2 full functional independent channels
- ±1ppm frequency stability, -125dBc/Hz phase noise, 200ps low jitter
- Built-in 8 orders harmonics generator
- Built-in 7 digits/s counter up to 200MHz
- 160 built-in pre-edited waveforms
- Intuitive arbitrary waveform editing software
- Full modulation supported: AM, FM, PM, ASK, FSK, PSK and PWM

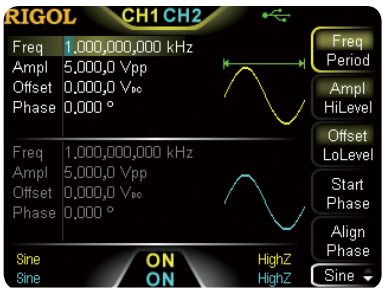
DG1000Z series function/arbitrary waveform generator is a multi-functional generator that combines many functions in one, including Function Generator, Arbitrary Waveform Generator, Noise Generator, Pulse Generator, Harmonics Generator, Analog/Digital Modulator and Counter. As a multi-functional, high performance and portable generator, it will be a new selection in education, R&D, production, test and etc.

DG1000Z Series Function/Arbitrary Waveform Generator

Dimensions: Width × Height × Depth=261.5mm × 112mm × 318.4mm
Weight: 3.2kg (without package)

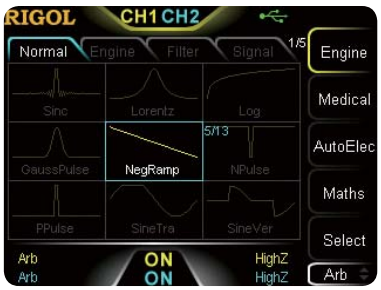
Feature and Benefits

Standard 2 full functional channels

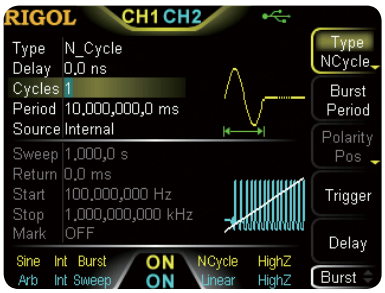


Arbitrary waveform function with innovative SiFi technology

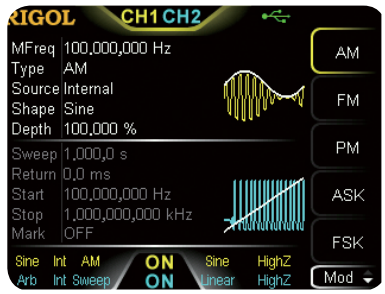
Up to 160 built-in waveforms



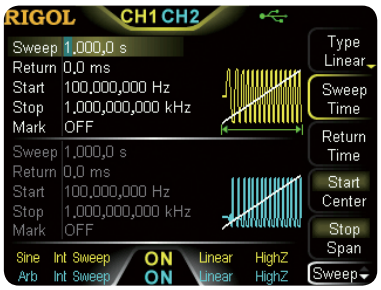
Burst function



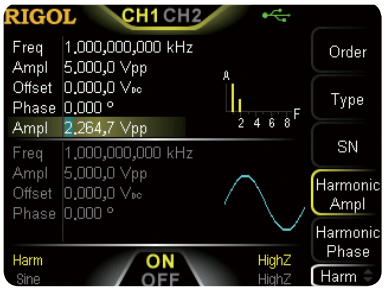
Multiple analog and digital modulations



Sweep function

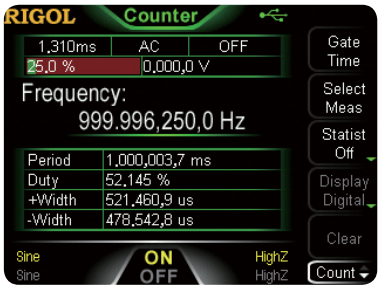


Standard harmonic generator

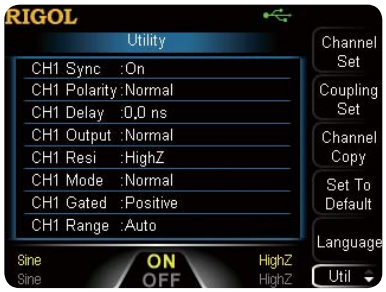


Waveform summing function

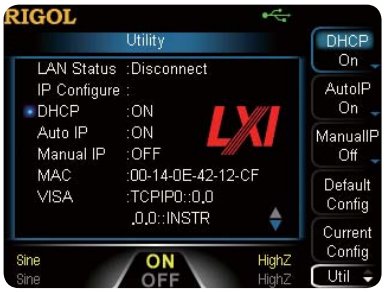
Standard 7 digits/s full function frequency counter with 200MHz bandwidth



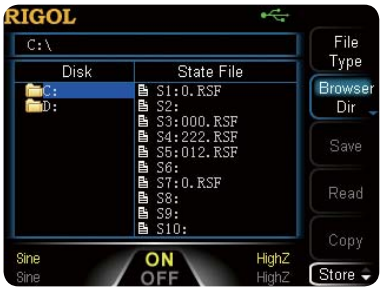
Channels and system setting



In line with LXI Core 2011 Device



File Management Function



Specifications

All the specifications can be guaranteed if the following two conditions are met unless where noted.
· The generator is within the calibration period and has performed self-calibration.
· The generator has been working continuously for at least 30 minutes under the specified temperature (18℃ ~ 28℃).
All the specifications are guaranteed unless those marked with “typical”.

Model	DG1022Z	DG1032Z	DG1062Z
Channel	2	2	2
Max Frequency	25 MHz	30 MHz	60 MHz
Sample Rate	200 MSa/s		

Waveform	
Basic Waveform	Sine, Square, Ramp, Pulse, Noise
Built-in Arbitrary Waveform	160 kinds, including Sinc, Exponential Rise, Exponential Fall, ECG, Gauss, HaverSine, Lorentz, Dual-Tone, etc.

Frequency Characteristics			
Sine	1 μHz to 25 MHz	1 μHz to 30 MHz	1 μHz to 60 MHz
Square	1 μHz to 25 MHz	1 μHz to 15 MHz	1 μHz to 25 MHz
Ramp	1 μHz to 500 kHz	1 μHz to 500 kHz	1 μHz to 1 MHz
Pulse	1 μHz to 15 MHz	1 μHz to 15 MHz	1 μHz to 25 MHz
Harmonic	1uHz to 10 MHz	1 μHz to 10 MHz	1uHz to 20 MHz
Noise (-3dB)	25 MHz bandwidth	30 MHz bandwidth	60 MHz bandwidth
Arbitrary Waveform	1 μHz to 10 MHz	1 μHz to 10 MHz	1 μHz to 20 MHz
Resolution	1 μHz		
Accuracy	±1 ppm of the setting value, 18℃ to 28℃		

Sine Wave Spectrum Purity	
Harmonic Distortion	Typical (0 dBm) DC-10 MHz (included): <-65 dBc 10 MHz to 30 MHz (included): <-55 dBc 30 MHz to 60 MHz (included): <-50 dBc
Total Harmonic Distortion	<0.075% (10 Hz to 20 kHz, 0 dBm)
Spurious (non-harmonic)	Typical (0 dBm) ≤10 MHz: <-70 dBc >10 MHz: <-70 dBc + 6 dB/octave
Phase Noise	Typical (0 dBm, 10 kHz offset) 10 MHz: <-125 dBc/Hz

Signal Characteristics			
Square			
Rise/Fall Time	Typical (1 Vpp) <10ns		
Overshoot	Typical (100 kHz, 1 Vpp) ≤5%		
Duty Cycle	0.01% to 99.99% (limited by the current frequency setting)		
Non-symmetry	1% of the period + 5 ns		
Jitter (rms)	Typical (1 Vpp) ≤5 MHz: 2 ppm + 200 ps > 5 MHz: 200 ps		
Ramp			
Linearity	≤1% of peak output (typical, 1 kHz, 1 VPP, 100% symmetry)		
Symmetry	0% to 100%		
Pulse			
Pulse Width	16ns to 999.999 982 118ks (limited by the current frequency setting)		
Duty Cycle	0.001% to 99.999% (limited by the current frequency setting)		
Rising/Falling Edge	≥10 ns (limited by the current frequency setting and pulse width setting)		
Overshoot	Typical (1 Vpp) ≤5%		
Jitter (rms)	Typical (1 Vpp) ≤5 MHz 2 ppm + 200 ps > 5 MHz 200 ps		
Arbitrary Waveform			
Waveform Length	2Mpts (std.) 16Mpts (opt.)	8Mpts (std.) 16Mpts (opt.)	8Mpts (std.) 16Mpts (opt.)

Vertical Resolution	14 bits
Sample Rate	200MSa/s
Min Rise/Fall Time	Typical (1 Vpp) <10 ns
Jitter (rms)	Typical (1 Vpp) ≤5 MHz: 2 ppm + 200 ps > 5 MHz: 200 ps
Editing Mode	Point Edit, Block Edit, Insert Waveform
Harmonic Output	
Harmonic Order	≤8
Harmonic Type	Even Harmonic, Odd harmonic, Order Harmonic, User
Harmonic Amplitude	The amplitude of each order of harmonic can be set
Harmonic Phase	The phase of each order of harmonic can be set

Output Characteristics	
Amplitude (into 50 Ω)	
Range	≤10 MHz: 1.0 mVpp to 10 Vpp ≤30 MHz: 1.0 mVpp to 5.0 Vpp ≤60 MHz: 1.0 mVpp to 2.5 Vpp
Accuracy	Typical (1 kHz sine, 0 V offset, >10 mVpp, auto) ±(1% of the setting value) ±1 mV
Flatness	Typical (sine, 2.5 Vpp) ≤10 MHz: ±0.1 dB ≤60 MHz: ±0.2 dB
Unit	Vpp, Vrms, dBm
Resolution	0.1mVpp or 4 digits
Offset (into 50 Ω)	
Range (Peak ac+dc)	±5Vpk ac+dc
Accuracy	±(1% of the setting value + 5mV + 0.5% of the amplitude)
Waveform Output	
Output Impedance	50 Ω (typical)
Protection	Short-circuit protection, automatically disable the waveform output when overload occurs

Modulation Characteristics	
Modulation Type	AM, FM, PM, ASK, FSK, PSK, PWM
AM	
Carrier Waveform	Sine, Square, Ramp, Arb (except DC)
Source	Internal/External
Modulating Waveform	Sine, Square, Ramp, Noise, Arb
Modulation Depth	0% to 120%
Modulating Frequency	2 mHz to 1 MHz
FM	
Carrier Waveform	Sine, Square, Ramp, Arb (except DC)
Source	Internal/External
Modulating Waveform	Sine, Square, Ramp, Noise, Arb
Modulating Frequency	2 mHz to 1 MHz
PM	
Carrier Waveform	Sine, Square, Ramp, Arb (except DC)
Source	Internal/External
Modulating Waveform	Sine, Square, Ramp, Noise, Arb
Phase Deviation	0° to 360°
Modulating Frequency	2 mHz to 1 MHz
ASK	
Carrier Waveform	Sine, Square, Ramp, Arb (except DC)
Source	Internal/External
Modulating Waveform	Square with 50% duty cycle
Key Frequency	2 mHz to 1 MHz
FSK	
Carrier Waveform	Sine, Square, Ramp, Arb (except DC)
Source	Internal/External
Modulating Waveform	Square with 50% duty cycle
Key Frequency	2 mHz to 1 MHz
PSK	
Carrier Waveform	Sine, Square, Ramp, Arb (except DC)
Source	Internal/External

Modulating Waveform	Square with 50% duty cycle		
Key Frequency	2 mHz to 1 MHz		
PWM			
Carrier Waveform	Pulse		
Source	Internal/External		
Modulating Waveform	Sine, Square, Ramp, Noise, Arb		
Width Deviation	0% to 100% of the pulse width		
Modulating Frequency	2 mHz to 1 MHz		
External Modulation Input			
Input Range	75 mVRMS to ±5 Vac + dc		
Input Bandwidth	50 kHz		
Input Impedance	10KΩ		

Burst Characteristics			
Carrier Waveform	Sine, Square, Ramp, Pulse, Noise, Arb (except DC)		
Carrier Frequency	2mHz to 25MHz	2mHz to 30MHz	2 mHz to 60 MHz
Burst Count	1 to 1,000,000 or Infinite		
Start/Stop Phase	0° to 360°, 0.1° resolution		
Internal Period	1 μs to 500 s		
Gated Source	External Trigger		
Trigger Source	Internal, External or Manual		
Trigger Delay	0 ns to 100 s		

Sweep Characteristics		
Carrier Waveform	Sine, Square, Ramp, Arb (except DC)	
Type	Linear, Log or Step	
Direction	Up or Down	
Start/Stop Frequency	The same with the upper/lower limit of the corresponding carrier frequency	
Sweep Time	1 ms to 500 s	
Hold/Return Time	0 ms to 500 s	
Trigger Source	Internal, External or Manual	
Marker	Falling edge of the sync signal (programmable)	

Frequency Counter			
Function	Frequency, Period, Positive/Negative Pulse Width, Duty Cycle		
Frequency Resolution	7 digits/second (Gate Time = 1s)		
Frequency Range	1 μHz to 200 MHz		
Period Measurement	Measurement Range	5ns to 16 days	
Voltage Range and Sensitivity (non-modulating signal)			
DC Coupling	DC Offset Range	±1.5 Vdc	
	1μHz to 100 MHz	50 mVRMS to ±2.5 Vac + dc	
	100 MHz to 200 MHz	100 mVRMS to ±2.5 Vac + dc	
AC Coupling	1 μHz to 100 MHz	50 mVRMS to ±2.5 Vpp	
	100 MHz to 200 MHz	100 mVRMS to ±2.5 Vpp	
Pulse Width and Duty Cycle Measurement			
Frequency and Amplitude Ranges	1 μHz to 25 MHz	50 mVRMS to ±2.5 Vac + dc	DC Coupling
Pulse Width	Min Pulse Width	≥20 ns	
	Pulse Width Resolution	5 ns	
Duty Cycle	Measurement Range (display)	0% to 100%	
Input Characteristics			
Input Signal Range	Breakdown Voltage	±7Vac+dc	Input Impedance = 1 MΩ
Input Adjustment	Coupling Mode	AC	DC
	High-frequency Rejection	On: Input Bandwidth = 250 kHz; Off: Input Bandwidth = 200 MHz	
Input Trigger	Trigger Level Range	-2.5V to +2.5V	
	Trigger Sensitivity Range	0% (about 140 mV hysteresis voltage) to 100% (about 2 mV hysteresis voltage)	
Gate Time	GateTime1	1.310ms	
	GateTime2	10.48ms	
	GateTime3	166.7ms	
	GateTime4	1.342s	
	GateTime5	10.73s	
	GataTime6	>10s	

Trigger Characteristics	
Trigger Input	
Level	TTL-compatible
Slope	Rising or falling (selectable)
Pulse Width	>100ns
Latency	Sweep: <100 ns (typical) Burst: <300 ns (typical)
Trigger Output	
Level	TTL-compatible
Pulse Width	> 60 ns (typical)
Maximum Frequency	1 MHz

Two-channel Characteristics - Phase Offset	
Range	0° to 360°
Waveform Phase Resolution	0.03°

Reference Clock	
External Reference Input	
Lock Range	10 MHz ± 50 Hz
Level	250 mVpp to 5 Vpp
Lock Time	< 2 s
Input Impedance (Typical)	1 kΩ, AC coupling
Internal Reference Output	
Frequency	10 MHz ± 50 Hz
Level	3.3 Vpp
Input Impedance (Typical)	50 Ω, AC coupling

Sync Output	
Level	TTL-compatible
Impedance	50 Ω, nominal value

Overvoltage Protection

Occurred when:

- The instrument amplitude setting is greater than 2Vpp or the output offset is greater than $|2V_{DC}|$ and the input voltage is greater than ±11.5 × (1 ± 5%)V (<10kHz).
- The instrument amplitude setting is lower than or equal to 2Vpp or the output offset is lower than or equal to $|2V_{DC}|$ and the input voltage is greater than ±3.5 × (1 ± 5%)V (<10kHz).

General Specifications	
Power Supply	
Power Voltage	100 V to 240 V (45 Hz to 440 Hz)
Power Consumption	Lower than 40 W
Fuse	250 V, T3.15 A
Display	
Type	3.5-inch TFT LCD
Resolution	320 horizontal × RGB × 240 vertical resolution
Color	16 M color
Environment	
Temperature Range	Operating: 0℃ to 50℃ Non-operating: -40℃ to 70℃
Cooling Method	Fan cooling
Humidity Range	Lower than 30℃ : ≤95% relative humidity 30℃ to 40℃ : ≤75% relative humidity 40℃ to 50℃ : ≤45% relative humidity
Altitude	Operating: below 3000 meters Non-operating: below 15,000 meters
Mechanical	
Dimensions (W×H×D)	261.5 mm × 112 mm × 318.4 mm
Weight	Without Package: 3.2 kg With Package: 4.5 kg
Interfaces	USB Host, USB Device, LAN
IP Protection	IP2X
Calibration Interval	1 year recommended calibration interval

Certification Information		
EMC	in line with EN61326-1:2006	
	IEC 61000-3-2:2000	±4.0kV (contact discharge) ±4.0kV (air discharge)
	IEC 61000-4-3:2002	3 V/m (80 MHz to 1 GHz) 3 V/m (1.4 GHz to 2 GHz) 1 V/m (2.0 GHz to 2.7 GHz)
	IEC 61000-4-4:2004	1 kV power lines
	IEC 61000-4-5:2001	0.5kV (Phase to Neutral) 0.5kV (Phase to PE) 1 kV (Neutral to PE)
	IEC 61000-4-6:2003	3V,0.15MHz-80MHz
	IEC 61000-4-11:2004	Voltage dip: 0 % UT during half cycle 0 % UT during 1 cycle 70 % UT during 25 cycles Short interruption: 0 % UT during 1 cycle
Electrical Safety	Electrical Safety in line with USA:UL 61010-1:2012, Canada: CAN/CSA-C22.2 No. 61010-1-2012 EN 61010-1:2010	

▶ Ordering Information

	Description	Order Number
Model	DG1022Z (25MHz, Dual-channel)	DG1022Z
	DG1032Z (30MHz, Dual-channel)	DG1032Z
	DG1062Z (60MHz, Dual-channel)	DG1062Z
Standard Accessories	Power Cord	-
	USB Cable	CB-USBA-USBB-FF-150
	BNC Cable	CB-BNC-BNC-MM-100
	Quick Guide	-
	Resource CD (including User's Guide and etc.)	-
Options	16Mpts Memory for Arb	Arb16M-DG1000Z
	Rack Mount Kit (for single instrument)	RM-1-DG1000Z
	Rack Mount Kit (for dual instruments)	RM-2-DG1000Z
	40dB Attenuator	RA5040K
	10W Power Amplifier	PA1011
	USB-GPIB Converter	USB-GPIB

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