Product Information – Picotest G5100A Arbitrary Waveform Generator

The G5100A 50MHz Function / Arbitrary Waveform Generator uses DDS (Direct Digital Synthesis) Technology. Compared with the competition, the G5100A offers higher frequency performance, faster rise and fall times, larger memory (256Kx14 bit) a 16 bit digital pattern generator, standard 10MHz synchronization and better stability. Like all Picotest products, it's backed by our 3 year warranty and 30 day refund policy.

KEY FEATURES:

- **14 bit, 125 MSa/s, 256K-point Arbitrary Waveform**
- **50 MHz Sine, 25 MHz Square & 10MHz Arbitrary Waveforms**
- **Pulse, Ramp, Triangle, Noise & DC waveforms**
- **Linear & Log Sweeps as well as Burst modes**
- **AM, FM, PM (PSK), FSK and PWM Modulation**
- **Remote control via USB, LAN and GPIB**
- **Graph mode for visual verification of settings**
- **16-bit Data pattern out and synchronized clock**
- **10MHz synchronization input/output is included FREE**
- **Free Wavepatt application software®**

Detailed Specifications – Picotest G5100A Arbitrary Waveform Generator

The new Picotest G5100A Waveform Generator uses direct digital synthesis (DDS) techniques to create a stable, accurate output signal for clean, low distortion sine waves. The G5100A offers 10 standard waveforms and user defined arbitrary waveforms with 14 bits resolution. It also provides you 16 bits pattern out and a synchronized clock. Moreover, the external frequency reference lets you synchronize to an external 10 MHz clock. The G5100A has intuitive panel operation; the menu is structured and convenient. All shortcut keys are fast and easy to access. The G5100A provides you the flexibility to create the waveforms you need. Also you can store up to 4 waveforms (4 x 256K points) in nonvolatile memory.

Key Features and Specifications

1. Controls use optically coupled knobs
2. Standard Waveforms: Sine, Square, Ramp, Pulse, Noise, DC
3. Built-in Arbitrary: exponential rise/fall, Neg. Ramp, Sin (x)/x, Cardiac
4. Sine Frequency Range: 1µHz to 50MHz
5. Square Frequency Range: 1µHz to 25MHz
6. Ramp Triangle Frequency Range: 1µHz to 200kHz
7. Pulse Frequency Range: 500µ to 10MHz
8. Pulse Width (period <10s): 20ns minimum, 10ns resolution
9. Noise Bandwidth: 20MHz typical

10. Arbitrary Frequency range: 1µHz to 10MHz
11. Waveform Length: 256K points max.
12. Vertical Resolution: 14 bits (including sign)
13. Sample Rate: 125 MS/s
14. Interface: USB, LAN and GPIB

Easy-To-Use Functions

- Internal modulations of AM, FM, PM (PSK), FSK & PWM for waveform adjustment.
- Built-in linear and logarithmic sweeps from 1ms to 500 s.
- The burst mode has a selectable number of cycles per period of time.
- Using remote control via USB, LAN and GPIB interface.
- The programmability by SCPI commands under the remote control connection.
- Precise phase adjustments and calibrations can be done from the front panel or via a PC.

User Friendly Operation

The front-panel operation of G5100A is simple and user friendly. Users can enter all functions with a single key or two, and use knob or numeric keypad to adjust frequency, amplitude, offset and other parameters. Otherwise, users can also directly input voltage values in Vpp, Vrms, dBm or high & low levels. Timing parameters can be entered in Hertz (Hz) or second.
Users can easily use the following functions.

Functions and Waveforms

The Picotest G5100A 50 MHz Function / Arbitrary Waveform Generator can create stable, precise, clean and low distortion sine waves by using DDS (Direct Digital Synthesis) Technology. With fast rise and fall times up to 25 MHz for square waves and 200 KHz for linear ramp waves, the G5100A also can reach users demand on waveforms. It can also generate variable-edge-time pulses up to 10 MHz. With variable period, pulse width and amplitude the G5100A is perfectly suited to applications requiring a flexible pulse signal.

Pulse Generation

If a unique Waveform is needed, the G5100-A can generate variable-edge-time pulses up to 10 MHz. With variable period, pulse width and amplitude the G5100A is perfectly suited to applications requiring a flexible pulse signal.

Custom Waveform Generation

The G5100A can generate complex custom waveforms. With 14-bit resolution and a 125 MSa/s sampling rate, the G5100A gives users the flexibility to create waveforms. It also allows users to store up to 5 waveforms, 4 (4 x 256k Points) in nonvolatile memory and 1 in volatile memory.

The G5100A's Waveform Editor Software allows users to create, edit and download complex waveform. In addition, by using the software, users can retrieve waveforms from Agilent MSO 8104 oscilloscope.

Support External Freq. Synchronization

The G5100A's external frequency reference allows users to synchronize an external 10MHz clock to another G5100A, or to any other unit which can support 10MHz frequency-input function.

Data Transmission via Pattern Out

The WavePatt software adheres to the waveform editor. It allows users to create and store 16-bit data in the G5100A's nonvolatile or volatile memory. Then, according to application purposes, users can transmit data via Pattern Out, located in the rear panel.

Specifications			
Display	Graph mode for visual verification of signal settings		
Capability	Standard waveforms	Sine, Square, Ramp, Triangle, Pulse, Noise, DC	
	Built-in Arbitrary	Exponential Rise and Fall, Negative Ramp, Sin(x)/x, Cardiac	
Waveform Characteristics			
Sine	Frequency	1 µHz to 50 MHz	
	Amplitude Flatness[1,2] (Relative to 1 KHz)	0.1dB(<100 KHz)	
		0.15dB(<5 MHz)	
		0.3dB(<20 MHz)	
		0.5dB(<50 MHz)	
	Harmonic Distortion[2,3] (unit: dBc)	DC to 20 KHz	-70 (< 1Vpp) -70 (≥ 1Vpp)
		20 KHz to 100 KHz	-65 (< 1Vpp) -60 (≥ 1Vpp)
		100 KHz to 1 MHz	-50 (< 1Vpp) -45 (≥ 1Vpp)
		1 MHz to 20 MHz	-40 (< 1Vpp) -35(≥ 1Vpp)
		20 MHz to 50 MHz	-35 (< 1Vpp) -30(≥ 1Vpp)
	Total Harmonic Distortion[2,3]	DC to 20 KHz, Output ≥ 0.5 Vpp	THD+N ≤ 0.06%
	Spurious[2,4] (non-harmonic)	DC to 1 MHz	-70 dBc
		1 MHz to 50 MHz	
		-70 dBc + 6 dB/Octave	
	Phase Noise (10K Offset)	-115/dBC/Hz, Typical	When F ≥ 1 MHz, V ≥ 0.1 Vpp
Square	Frequency	1 µHz to 25 MHz	
	Rise/Fall Time	< 10ns	
	Overshoot	< 2%	
	Variable Duty Cycle	20% to 80% (to 10 MHz)	
		40% to 60% (to 25 MHz)	
	Asymmetry	1% of period + 5ns (@ 50% duty)	

	Jitter (RMS)	200 ps	When F ≥ 1MHz, V ≥ 0.1 Vpp
Ramp, Triangle	Frequency	1 µHz to 200 KHz	
	Linearity	< 0.1% of peak output	
	Symmetry	0.0% ~ 100.0%	
Pulse	Frequency	500 µHz to 10 MHz	
	Pulse width	20 ns minimum	
		10 ns res. (period ≤ 10s)	
	Variable Edge Time	< 10 ns to 100 ns	
	Overshoot	< 2%	
	Jitter (RMS)	200 ps When F ≥ 50 KHz, V ≥ 0.1 Vpp	
Noise	Bandwidth	20 MHz Typical	
Arbitrary	Frequency	1 µHz to 10 MHz	
	Length	2 to 256K	
	Resolution	14 bits (including sign)	
	Sample Rate	125 MSa/s	
	Min Rise/Fall Time	30ns typical	
	Linearity	<0.1% of peak output	
	Settling Time	<250ns to 0.5% of final value	
	Jitter (RMS)	6ns + 30ppm	
	Non-Volatile Memory	4 waveforms * 256K Points	
Common Characteristic			
Frequency	Resolution	1uHz	
Amplitude	Range	10mVpp to 10Vpp in 50Ω	
		20mVpp to 20Vpp in Hi-Z	
	Accuracy[1,2] (at 1KHz)	±1% of setting ± 1mVpp	

	Units	Vpp, Vrms, dBm
	Resolution	4 digits
DC Offset	Range (Peak AC +DC)	±5V in 50Ω
		±10V in Hi-Z
	Accuracy[1,2]	±2% of offset setting ±0.5% of amplitude setting
	Resolution	4 digits
Main Output	Impedance	50 Ω typical
	Isolation	42 Vpk maximum to earth
	Protection	short-circuit protected; overload automatically disables main output
Internal Frequency reference Accuracy[5]		±10ppm in 90 days
		±20ppm in 1 year
External Frequency reference	Standard /Option	Standard
External	Lock Range	10 MHz ± 500 Hz
Frequency Input	Level	100mVpp ~5Vpp
	Impedance	1KΩ typical, AC coupled
	Lock Time	< 2 Sec
External Frequency Output	Lock Range	10 MHz
	Level	632mVpp (0dBm), typical
	Impedance	50Ω typical, AC coupled
Phase Offset	Range	-360º to +360º
	Resolution	0.001º
	Accuracy	8ns
Modulation		
Modulation Type	AM, FM, PM, FSK, PWM, Sweep and Burst	
AM	Carrier	Sine, Square, Ramp, Arb

	Source	Internal / external
	Internal Modulation	Sine, Square, Ramp, Triangle, Noise, Arb
	Frequency (Internal)	2mHz to 20KHz
	Depth	0.0% ~ 120.0%
FM	Carrier	Sine, Square, Ramp, Arb
	Source	Internal / external
	Internal Modulation	Sine, Square, Ramp, Triangle, Noise, Arb
	Frequency (Internal)	2mHz to 20KHz
	Deviation	DC ~ 25MHz
PM	Carrier	Sine, Square, Ramp, Arb
	Source	Internal / external
	Internal Modulation	Sine, Square, Ramp, Triangle, Noise, Arb
	Frequency (Internal)	2mHz to 20KHz
	Deviation	0.0º to 360º
PWM	Carrier	Pulse
	Source	Internal / external
	Internal Modulation	Sine, Square, Ramp, Triangle, Noise, Arb
	Frequency (Internal)	2mHz to 20KHz
	Deviation	0% ~ 100% of pulse width
FSK	Carrier	Sine, Square, Ramp, Arb
	Source	Internal / external
	Internal Modulation	50% duty cycle Square
	Frequency (Internal)	2mHz to 100KHz

External Modulation Input[6]	Voltage Range	±5V full scale
	Input Resistance	8.7KΩ typical
	Bandwidth	DC to 20KHz
SWEEP	Waveforms	Sine, Square, Ramp, Arb
	Type	Linear or logarithmic
	Direction	up or down
	Sweep Time	1 ms ~ 500 Sec
	Trigger	Internal , External or Manual
	Marker	falling edge of sync signal (programmable frequency)
BURST[7]	Waveforms	Sine, Square, Ramp, Triangle, Noise, Arb
	Type	Internal / external
	Start/Stop Phase	-360º to +360º
	Internal Period	1uS ~ 500Sec
	Gated Source	External trigger
	Trigger Source	Internal , External or Manual
Trigger Input	Level	TTL compatible
	Slope	Rising or Falling (Selectable)
	Pulse width	> 100 ns
	Impedance	> 10KΩ, DC coupled
	Latency	< 500 ns
Trigger Output	Level	TTL compatible into ≥ 1 KΩ
	Pulse width	> 400 ns
	Output Impedance	50 Ω typical
	Maximum rate	1MHz
	Fan-out	≤ 4 Picotest G5100As
Pattern Mode CHARACTERISTIC		
Clock	Maximum rate	50MHz
Output	Level	TTL compatible into ≥ 2 KΩ

	Output Impedance	110 Ω typical
Pattern	Length	2 to 256 K

[1] Add 1/10th of output amplitude and offset spec per ºC for operation outside the range of 18 ºC to 28ºC.
[2] Autorange enabled.
[3] DC offset set to 0V.
[4] Spurious output at low amplitude is -75 dBm typical.
[5] Add 1 ppm/ ºC average for operation outside the range of 18 ºC to 28 ºC.
[6] FSK uses trigger input (1 MHz maximum).
[7] Sine and square waveforms above 10 MHz are allowed only with an “infinite” burst count.

Specifications are subject to change without notice.
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