SFG-20X

5 & 10 MHz Arbitrary/Function Signal Generators

Applications

The SFG-20X Series Signal Generators are ideally suited for applications where value and quality are equally important such as for:

- **Educational labs**
- **Technical schools**
- **Internal training facilities**
- **Hobbyists**

Overview

The Global Specialties SFG-20X Serieis are single channel function/arbitrary waveform generators, capable of generating a 10 MHz sine wave (SFG-210). They have an informative, easy-to-read color display, user-friendly controls and a numeric keypad which allows users to easily configure waveform properties. In addition, they features non-volatile built-in memory to create, store, and recall arbitrary waveforms up to 16,000 points with 14-bit vertical resolution. 46 predefined arbitrary waveforms are also available for output. A standard USB interface on the rear panel allows users to easily interface with application software to create and load arbitrary waveforms into the instrument.

Features

- **5 MHz Bandwidth (SFG-205)**
- **10 MHz Bandwidth (SFG-210)**
- **125 MSa/s sample rate**
- **14 bit vertical resolution**
- **3.5-inch TFT-LCD color display**
- **USB interface**
- **16k pts arbitrary waveform memory**
- **88 built-in predefined arbitrary waveforms**
- **Store/recall up to 10 instrument settings**
- **DDS technology**
- **5 standard output waveforms**
- **46 built-in arbitrary waveforms**
- **Modulations: AM, DSB-AM, FM, PM, FSK, ASK, PWM, Sweep, and Burst**
- **EasyWave arbitrary waveform editing software included**

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Specification

Model	SFG-205	SFG-210
Max. output frequency	5 MHz	10 MHz
Output channels	1	
Sample rate	125MSa/s	
Arbitrary waveform length	16kpts	
Frequency resolution	1μHz	
vertical resolution	14bits	
Waveform	Sine, Square, Ramp, Pulse, Gaussian Noise. 46 built-in arbitrary waveforms (including DC)	
Modulation	AM, DSB-AM, FM, PM, FSK, ASK, PWM, Sweep, Burst	
Standard interface	USB Host & USB Device	
Dimension	W x H x D=229mm x 105mm x 281mm	

Attention:

All specifications apply to the SFG-20X Series Function/Arbitrary Waveform Generator unless otherwise explanation. To satisfy these specifications, the following conditions must be met first:

1. The instrument has been operating continuously for more than 30 minutes within specified operating temperature range (18ºC~28°C.
2. The temperature variation does not exceed 5℃.

Note: All specifications subject to change.

Frequency Specification			
Model	SFG-205	SFG-210	
Waveform	Sine, Square, Ramp, Pulse, Noise, Arbitrary		
Sine	1μHz ~ 5MHz	1μHz ~ 10MHz	1μHz ~ 30MHz
Square	1μHz ~ 5MHz	1μHz ~ 10MHz	1μHz ~ 10MHz
Pulse	500μHz ~ 5MHz		
Ramp/Triangular	1μHz ~ 300kHz		
Gaussian White noise	>5MHz (-3dB)	>10MHz (-3dB)	>30MHz (-3dB)
Arbitrary	1μHz ~ 5MHz		
Resolution	1μHz		
Accuracy	Within 90days ±50ppm within 1 year ±100ppm		
Temperature Coefficient	<5ppm/°C		

Sine Wave	
Harmonic Distortion	DC~1MHz <-60dBc
	1MHz~10MHz <-55dBc
	10MHz~30MHz <-50dBc
Total Harmonic Waveform Distortion	DC~20kHz,1Vpp<0.2%
Spurious Signal (non-harmonic)	DC~1MHz<-70dBc 1MHz~10MHz<-60dBc 10MHz~30MHz<-55dBc
Phase Noise	10kHz Offset,–108dBc/Hz (typical value)

Square Wave	
Rise/fall time	<24ns(10% ~ 90%)
Overshoot	<5%(typical,1kHz,1Vpp)
Duty Cycle	20%~80%
Asymmetric (50% Duty Cycle)	1% of period+20ns(typical,1kHz,1Vpp)
Jitter	500ps + 0.001% of period

Ramp/Triangle Wave	
Linearity	<0.1% of Vpp(typical,1kHz,1Vpp,100% symmetric)
Symmetry	0%~100%

Pulse Wave	
Pulse width	16ns, Min. 1ns resolution
Rise/Fall time (10% ~ 90%,typical)	20ns~1.6ks
Duty Cycle	0.1%Resolution
Overshoot	<5%
Jitter(pk-pk)	500ps + 0.001% of period

Arbitrary Wave	
Waveform length	16 kpoints
Vertical resolution	14 bits
Sample rate	125 MSa/s
Min. Rise/Fall time	8 ns (typical)
Jitter(pk-pk)	8 ns (typical)
Storage in non-volatile RAM memory (10 in total)	10 waveforms

Output Specification	
Amplitude	2mVpp~10Vpp(50Ω,≤10MHz) 2mVpp~5Vpp(50Ω,>10MHz) 4mVpp ~ 20 Vpp（High impedance, <10MHz） 4mVpp ~ 10Vpp（High impedance,>10MHz）
Vertical accuracy (100 kHz sine)	±(1mVpp +0.3dB of setting value)
Amplitude flatness (compared to 100 kHz sine,5Vpp)	±0.3 dB
Impedance	50Ω
Protection	short-circuit protection

DC Offset	
Range(DC)	±5V(50Ω) ±10V(High-Z)
Offset accuracy	±(|setting offset value|*1%+3mV)

AM Modulation	
Carrier	Sine, Square, Ramp, Arbitrary(except DC)
Modulation waveform	Sine, Square, Ramp, Noise, Arbitrary (2mHz ~ 20kHz)
Modulation depth	0% ~ 120%
DSB-AM Modulation	
Carrier	Sine, Square, Ramp, Arbitrary(except DC)
Modulation waveform	Sine, Square, Ramp, Noise, Arbitrary (2mHz ~ 20kHz)
Modulation depth	0% ~ 120%
FM Modulation	
Carrier	Sine, Square, Ramp, Arbitrary(except DC)
Modulation waveform	Sine, Square, Ramp, Noise, Arbitrary(2mHz~20kHz)
Frequency deviation	0 ~0.5*bandwidth 1mHz resolution

PM Modulation	
Carrier	Sine, Square, Ramp, Arbitrary(except DC)
Modulation waveform	Sine, Square, Ramp, Noise, Arbitrary (2mHz~20kHz)
Phase Deviation	0~360° ,0.1°Resolution
FSK Modulation	
Carrier	Sine, Square, Ramp, Arbitrary(except DC)
Modulation waveform	50% duty-cycle square waveform(2mHz~50kHz)
ASK Modulation	
Carrier	Sine, Square, Ramp, Arbitrary(except DC)
Modulation waveform	50%duty-cycle square waveform(2mHz~50kHz)
PWM Modulation	
Frequency	500μHz~20kHz
Modulation waveform	Sine, Square, Ramp, Arbitrary(except DC)
Sweep	
Carrier	Sine, Square, Ramp, Arbitrary(except DC)
Type	linear/logarithmic
Direct	Up/down
Sweep time	1ms~500s
Trigger source	Manual, external, internal
Burst	
Waveform	Sine, Square, Ramp, Pulse, Arbitrary(except DC)
Type	Count(1~50,000 periods),infinite, Gated
Start/Stop phrase	0°~360°
Internal period	1μs~500s
Gated source	External trigger
Trigger source	Manual, External or Internal

Trigger Input	
Input Level	TTL compatible
Slope	Up or down
Pulse width	>100ns
Input impedance	>5kΩ,DC coupling

SYNC Output	
Voltage level	TTL compatible
Pulse width	>50ns
Output impedance	50Ω(typical)
Max. frequency	2MHz

General Specification

Display	
Display type	3.5 inch TFT-LCD
Resolution	320×RGB×240
Color depth	24 bit
Contrast Ratio	350:1(typical)
Luminance	300 cd/m^2(typical)
Power	
Voltage	100~240 $VAC_{RMS,}$ 45~66Hz,CATII
	100~127 $VAC_{RMS,}$ 45~440Hz,CATII
Consumption	<30 W
Fuse	1.25 A,250 V
Environment	
Temperature	Operation:0°C~40°C
	Storage:-20°C~60°C
Humidity range	Below +35℃:≤90% relative humidity
	+35℃~+40℃:≤60% relative humidity
Altitude	Operation: below 3,000 meters
	Storage: below 15,000 meters
Electromagnetic Compatibility	2004/108/EC Directive
	Applicable standards EN 61326-1:2006
	EN 61000-3-2:2006 + A2:2009
	EN 61000-3-3:2008
Safety	2006/95/EC Low Voltage Directive
	EN 61010-1:2010
Others	
Dimension	Width: 229 mm
	Height: 105 mm
	Depth: 281 mm
Weight	N.W: 2.6 kg
	G.W: 3.4 kg
IP protection	
IP2X	
Calibration Cycle	
1year	

Standard Accessories

- Quick Start Guide (printed)
- Power Cord
- USB Cable
- EasyWave Software (download)
- User Manual (download)

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