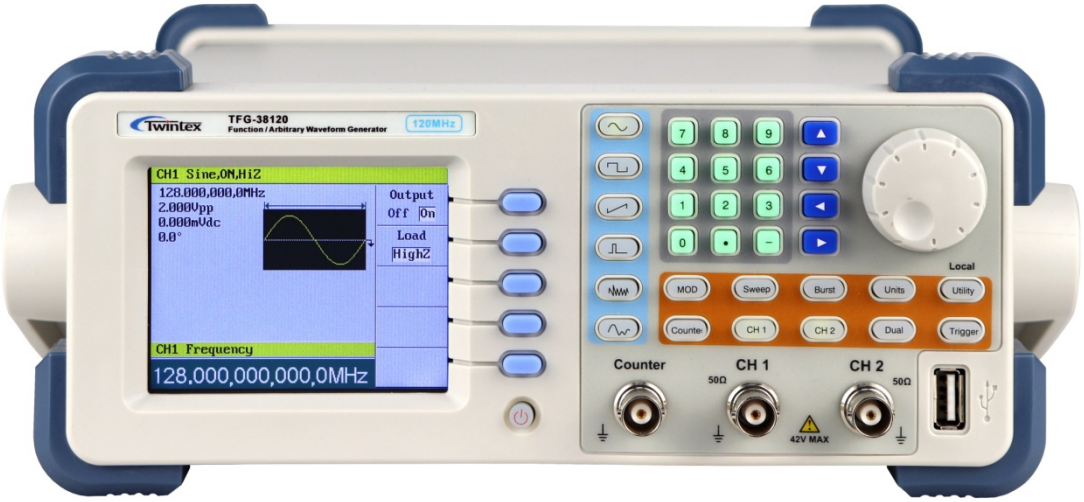
Function Generator

DDS Function/Arbitrary Waveform Generator TFG3800 Series



Features

- Adopt Direct Digital Synthesis (DDS) technology
- 3.5-inch QVGA color LCD display
- Two equivalent output channels
- Frequency range 1μHz~80/120/160MHz
- Vertical resolution 16 bits
- Embedded 400MSa/s arbitrary generator
- Low edge jitter ≤50ps rms
- Built-in 52 arbitrary waveforms
- Arbitrary waveform length 16384 points
- Sine wave distortion less than 0.2%
- Multiple modulations: AM, DSB-AM, FM, PM, PWM, FSK, PSK, Sweep, Burst
- Built-in 8 digits 1000MHz frequency counter
- USB Host and USB device interfaces, optional LAN and GPIB interface

Function Generator

3Specifications

Model		**TFG-3880**	**TFG-38120**	**TFG-38160**
Sampling rate		400Msa/s		
Output waveforms		Sine, Square, Pulse, Ramp, Noise, DC, Arbitrary		
Frequency				
Range	Sine	1μHz~80MHz	1μHz~120MHz	1μHz~160MHz
	Square	1μHz~40MHz		
	Pulse	1μHz~40MHz		
	Ramp	1μHz~4MHz		
	Noise	400MHz white noise		
	Arbitrary	1μHz~40MHz		
Resolution		1μHz		
Accuracy		±5x10^{-6}		
Stability		±1x10^{-6}		
Waveforms				
Sine		Distortion≤0.2% (1Vpp, DC<f≤20kHz)		
Square/Pulse		Duty cycle 0.1%~99.9% Resolution 0.1%		
Rise/Fall time		6ns~1μs Resolution 0.1ns		
Edge jitter		≤100ps rms		
Minimum pulse width		6ns		
Ramp symmetry		0.0%~100.0% Resolution 0.1ns		
Waveform length		16384 points		
Amplitude				
Range	50Ω	1mVpp~10Vpp f≤40MHz 1mVpp~5Vpp 40MHz<f≤100MHz	1mVpp~5Vpp 100MHz<f≤130MHz 1mVpp~3Vpp 130MHz<f≤160MHz	
	High Impedance	1mVpp~20Vpp f≤40MHz 1mVpp~10Vpp 40MHz<f≤100MHz	1mVpp~5Vpp 100MHz<f≤130MHz 1mVpp~3Vpp 130MHz<f≤160MHz	
Resolution		16 bits, 4 significant digit		
Accuracy		±1%, ±1mVpp, 1kHz		
Flatness		≤±0.2dB f≤10MHz ≤±0.8dB 60MHz<f≤100MHz ≤±0.4dB 10MHz<f≤60MHz ≤±1.0dB 100MHz<f≤160MHz		
Offset		Offset range: ±(10V DC~AC peak) (high impedance) Resolution: 16 bits, 4 significant digit Accuracy: ±1%, offset at ±0.25%, amplitude at ±2mV		
Modulation				
AM		Depth: 0.0%~120.0% Resolution: 0.1%		
FM		Deviation: Fc/2 Resolution: 1μHz		
PM		Deviation: 0.1°~360.0° Resolution: 0.1°		
PWM		Deviation: 0.0ns~width-12ns Resolution: 0.1ns		
FSK/PSK		Hopping rate: 1μHz~1MHz Resolution: 1μHz		
Sweep				
Sweep mode		Lin./Log.		
Sweep time		0.001s~3600s, resolution 1ms		
Hold time		0.001s~3600s, resolution 1ms		
Return time		0.001s~3600s, resolution 1ms		
Trigger source		Internal/External/Single		
Burst				
Burst mode		N cycles/gated		
Start phase		0°~360.0° resolution: 0.1°		
Cycles		1~100000000 resolution: 1		
Period		1μs~1000s resolution: 1μs		
Trigger source		Internal/External/Single		
Frequency counter				
Range		1Hz~1000MHz		
Resolution		8 digits		
General				
Accessories		BNC-BNC cable x1, Test lead x1, USB cable x1 , Software CD x1,Power cord x1, Manual x1		
Power supply		220VAC±10%,50Hz/60Hz±2Hz		
Dimension		260W×105H×390D mm		
Weight		2.5kg		

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Specifications in full details

Waveform Characteristics	
Waveform	Sine, Square, Pulse, Ramp, Noise, DC, Arbitrary
Frequency accuracy	Frequency error: ≤±5×10^{-6} Frequency stability: ≤±1×10^{-6}
Sine	Frequency range: 1μHz ~ 80MHz / 120MHz / 160 MHz Resolution: 1μHz Harmonic distortion: ≤ -50dBc (DC ≤ f ≤1MHz) ≤ -45dBc (1MHz ≤ f ≤10MHz) ≤ -35dBc (10MHz ≤ f ≤100MHz) ≤ -30dBc (100MHz ≤ f ≤160MHz) THD: ≤0.2% (1Vpp DC ≤ f ≤20 kHz) Phase noise (typical value): 100kHz offset -116dBc/Hz
Square	Frequency range: 1μHz ~ 40 MHz Resolution: 1μHz Lead edge/Trail edge: Fixed 5ns Duty cycle: 0.1% ~ 99.9% Resolution: 0.1% Overshoot: ≤3% Edge jitter: ≤50ps rms
Ramp	Frequency range: 1μHz ~ 4 MHz Resolution: 1μHz Symetry: 0.0% ~ 100.0% Resolution: 0.1% (0% is negative Ramp, 100% is positive Ramp, 50% is Triangle) Non-linearity: ≤0.1%
Pulse	Frequency range: 1μHz ~ 40 MHz Resolution: 1μHz Lead edge/Trail edge: 5ns ~ 1us independently variable Resolution: 0.1ns Duty cycle: 0.1% ~ 99.9% Resolution: 0.1% Pulse width: ≥ 12 ns Resolution: 0.1ns Overshoot:≤3% Edge jitter:≤100ps rms
Noise	400 MHz white noise (-3 dB) Repeat period: >20 years
Arbitrary	Frequency range: 1μHz ~ 40MHz Resolution: 1μHz Waveform length: 16384 Samples Amplitude resolution: 14 bits
Amplitude Characteristics	
Amplitude range	1mVpp~ 10Vpp f ≤40MHz (50 Ω) 1mVpp~ 5Vpp 40MHz < f ≤100MHz (50 Ω) 1mVpp~ 2.5Vpp 100MHz < f ≤130MHz (50 Ω) 1mVpp~ 1.5Vpp 130MHz < f ≤160MHz (50 Ω) When in HighZ, it is 2 times of above values. Resolution:±0.3dBm + 1mVpp
Flatness (Relative to 100kHz 1V)	≤±0.2 dB f ≤ 10MHz ≤±0.4 dB 10MHz < f ≤ 60MHz ≤±0.8 dB 60MHz < f ≤100MHz ≤±1.0 dB 100MHz < f ≤160MHz
Accuracy	±1% of setting ±1 mVpp at 1kHz
Offset Characteristics	
Offset level range	±(10 VDC –AC peak) (High Z) ±(5 VDC –AC peak) (50 Ω) Vpp ≤ 2(Vmax – |Voffset|) (Vmax is different in different frequency range)
Resolution	4-digit effective numbers
Accuracy	±1% of offset setting ±0.25% of amplitude setting ±2 mV
Amplitude Characteristics (AM/DSB)	
Carrier waveform	Sine Square Ramp Pulse Noise Arb
Modulation waveform	Sine Square Triangle upRamp dnRamp Noise Arb
Modulation frequency	Internal: 1μHz ~ 50kHz Resolution: 1μHz External: DC ~50 kHz (-3dB)
Modulation depth	0.0%~ 120.0% Resolution: 0.1% Accuracy: ±1.0%
Modulation source	Int/Ext
Frequency Modulation Characteristics (FM)	
Carrier waveform	Sine Square Ramp Pulse
Modulation waveform	Sine Square Triangle upRamp dnRamp Noise Arb
Modulation frequency	Internal: 1μHz ~ 50kHz Resolution: 1μHz

	External: DC ~50 kHz (-3dB)
FM deviation	1uHz ~ Carrier Freq. Resolution: 1μHz
Modulation source	Int/Ext
Phase Modulation Characteristics (PM)	
Carrier waveform	Sine Square Ramp Pulse
Modulation waveform	Sine Square Triangle upRamp dnRamp Noise Arb
Modulation frequency	Internal: 1μHz ~ 50kHz Resolution: 1μHz External: DC ~50 kHz (-3dB)
Modulation depth	0.0° ~ 360.0° Resolution: 0.1°
Modulation source	Int/Ext
Pulse Width Modulation Characteristics (PWM)	
Carrier waveform	Pulse
Modulation waveform	Sine Square Triangle upRamp dnRamp Noise Arb
Modulation frequency	Internal: 1μHz ~ 50kHz Resolution: 1μHz External: DC ~50 kHz (-3dB)
Modulation depth	0.0ns ~ width-12 ns Resolution: 0.1ns
Modulation source	Int/Ext
FSK Characteristics	
Carrier waveform	Sine Square Ramp Pulse
Hopping frequency	1μHz ~ 80MHz / 120MHz / 160 MHz (Sine) 1μHz ~ 40 MHz (Square) 1μHz ~ 40 MHz (Pulse/Arb) 1μHz ~ 4 MHz (Ramp) Resolution: 1μHz
Alternate rate	1μHz ~1 MHz Resolution: 1μHz
Trigger source	Int/Ext
ASK Characteristics	
Carrier waveform	Sine Square Ramp Pulse
Alternate rate	1μHz ~50kHz Resolution: 1μHz
Trigger source	Int/Ext
BPSK Characteristics	
Carrier waveform	Sine Square Ramp Pulse Arb
Hopping phase	0.0° ~ 360.0° Resolution: 0.1°
Alternate rate	1μHz ~1 MHz Resolution: 1μHz
Trigger source	Int/Ext
Frequency Sweep Characteristics (Sweep)	
Carrier waveform	Sine Square Ramp Pulse
Start frequency	1μHz ~ 80MHz / 120MHz / 160 MHz (Sine) 1μHz ~ 50 MHz (Square) 1μHz ~ 40 MHz (Pulse/Arb) 1μHz ~ 4 MHz (Ramp) Resolution: 1μHz
Stop frequency	1μHz ~ 80MHz / 120MHz / 160 MHz (Sine) 1μHz ~ 50 MHz (Square) 1μHz ~ 40 MHz (Pulse/Arb) 1μHz ~ 4 MHz (Ramp) Resolution: 1μHz
Sweep mode	Linear/Log
Sweep time	0.001 s ~ 3600 s Resolution: 1mSec
Hold time	0.000 s ~ 3600 s Resolution: 1mSec
Return time	0.000 s ~ 3600 s Resolution: 1mSec
Trigger source	Int / Ext/ Single
Burst Characteristics	
Carrier waveform	Sine Square Ramp Pulse Arb
Burst mode	N Cycle/Gated
Start phase	0.0 ~ 360.0° Resolution: 0.1°
Burst number	1 ~ 100000000 Resolution: 1
Burst period	1μS ~ 1000 S Resolution: 1μS
Trigger source	Int / Ext/ Single

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Counter Characteristics	
Measurement function	Frequency, Period, Pulse width (positive), Duty Cycle
Input range	10Hz ~1000 MHz
Input coupling mode	AC / DC
Input filter	Filter: Cut-off frequency approx.100kHz In-band attenuation: ≤-3 dB Out-of-band attenuation: ≥-30 dB (Freq>1MHz)
Accuracy	8 digits/s
Sync Output Characteristics	
Output terminal	BNC
Input impedance	50 Ω
Output Terminal	
Output terminal	BNC
Input impedance	50 Ω overload protection
Trigger Input Characteristics (Trig In)	
Output terminal	BNC
Input impedance	10 kΩ DC coupling
Input voltage	Low level 0 V ~ 0.4 V, High level> 2.3 V, Max 3.3 V
Min pulse width	100ns
Modulation Input Characteristics (Mod In)	
Output terminal	BNC
Input impedance	5 kΩ
Output terminal	±6Vpk = 100% modulation
Input impedance	DC ~50 kHz (-3dB typical value)
Frequency Input Characteristics (10MHz In)	
Output terminal	BNC
Input impedance	1 kΩ || 20pF AC coupling (Nominal value)
Input frequency	10 MHz ± 50 Hz
Input voltage	1Vpp ~ 3.3 Vpp
Frequency Output Characteristics (10MHz Out)	
Output terminal	BNC
Input impedance	50 Ω AC coupling (Nominal value)
Output frequency	10 MHz (Nominal value)
Output level	>1Vpp (Nominal value)
Interface Characteristics	
Interface	USB, LAN (Optional), GPIB (Optional)
Arbitrary Waveform Length	
	16384 Points
Mechanic Characteristics	
Size	260mm(W) x 105mm(H) x 290mm(D)
Weight	2.5 kg
Temperature	Storage temperature -30˚C ~ 70˚C Operation temperature 0˚C ~ 55˚C
Humidity	5% ~ 80% Relative humidity
Warm-up	1 hour
External Power Source	
Power Source	198 ~ 242VAC 47 ~ 53Hz
Consumption	< 40 W