

For full programmability and IEEE-488 compatibility, select the new FG 5010 Microprocessor based 20 MHz function generator featuring: 10 complete stored front panel setups, counted burst and phase lock capabilities as well as programmable symmetry and phase. Basic frequency accuracy is 0.1% and all signals can be AM and FM modulated.

For applications demanding logarithmic or linear sweep the FG 507 offers an accurate and versatile solution. The low distortion of the FG 507 (0.25%), combined with log and lin sweep is particularly useful in audio and communications-oriented applications.

For low-frequency function generator applications, set the FG 501A, FG 502, FG 503, or FG 507 to work on biological, geophysical and mechanical simulations or on servo systems.

Applying an external ramp to the vcf (Voltage Controlled Frequency) input, allows our function generators to double as sweep generators. The vcf input fed from a low-level modulating signal can produce a frequency-modulated carrier. The FG 507 and FG 504 have sweep capabilities conveniently built in that simplify setting up start and stop frequencies in addition to providing logarithmic sweep.

Sweeping wide frequency ranges (100:1 or greater), with logarithmic sweep allows you to spread out lower octaves, sweep a full range in less time, and produce easy-to-read Bode plots and graphs.

You can control the starting phase of a waveform with the FG 501A, FG 504, FG 507 and FG 5010 in the gated (burst) or triggered mode. A gated or triggered waveform efficiently tests tone-controlled systems, loud speaker transient response characteristics, automatic gain control circuits, or other amplitude sensitive systems.

The FG 504's phase lock mode feature lets you convert digital signals to high or low voltage sine waves, pulses, or triangles; ideal for locking the function generators output to a house or system frequency standard. With the DD 501 Digital Delay Generator in the "divide by n" mode, the FG 504 can be locked to your frequency reference at a lower frequency.

When your test and measurement problems require more waveforms for more applications, the high performance TM 500 Function Generators are a versatile solution singly or in combination with one another.

FG 501A

FG 507

Waveforms	Sine, Square, Triangle, Pulse & Ramp with variable symmetry	
Symmetry	≤5% to ≥95% Variable	≤5% to ≥95% Variable
Frequency Range	0.002 Hz to 2 MHz 200 kHz ±10% with variable symmetry on	0.002 Hz to 2 MHz 200 kHz ±10% with variable symmetry on
Dial Accuracy (% of Full Scale)	Within 3%	Within 3% Within 5% in sweep mode ²
Custom Frequency Range	NO	NO
Frequency Stability (% of Full Scale)	≤0.05% for 10 min., ≤0.1% for 1 hour, ≤0.5% for 24 hours, constant temperature	
Amplitude: Open Circuit	30 V p-p	30 V p-p
Into 50 Ω	15 V p-p	15 V p-p
Attenuator	0 to -60 dB in 20 dB Steps >20 dB additional with AMPL control	
Offset: Open Circuit	±13 V dc, Step attenuator decreases offset	
Into 50 Ω	±6.5 V dc, Step attenuator decreases offset	
Pk Sig + Offset: Open Circuit	±15 V	±15 V
Into 50 Ω	±7.5 V	±7.5 V
Output Impedance	50 Ω	
Amplitude Flatness (10 kHz ref, 50 Ω load)	Sine wave ±0.1 dB 20 Hz to 20 kHz ±0.5 dB 20 kHz to 1 MHz ±1 dB 1 MHz to 2 MHz	±0.1 dB 20 Hz to 20 kHz ±0.5 dB 20 kHz to 1 MHz ±1 dB 1 MHz to 2 MHz
	Triangle ±0.5 dB 20 Hz to 200 kHz ±2 dB 200 kHz to 2 MHz	±0.5 dB 20 Hz to 200 kHz ±2 dB 200 kHz to 2 MHz
	Square wave ±0.5 dB 20 Hz to 2 MHz	±0.5 dB 20 Hz to 2 MHz
Sine wave Distortion (Maximum output, 50 Ω load)	≤0.25% 20 Hz to 20 kHz ⁽¹⁾ ≤0.5% 20 kHz to 100 kHz Harmonics ≤ -30 dB, 100 kHz to 2 MHz	≤0.25% 20 Hz to 20 kHz ⁽¹⁾ ≤0.5% 20 kHz to 100 kHz Harmonics ≤ -30 dB, 100 kHz to 2 MHz
Square Wave Response	≤25 ns rise/fall ≤3% p-p aberrations	≤25 ns rise/fall ≤3% p-p aberrations
Triangle Linearity (10% to 90%)	≥99% 20 Hz to 200 kHz ≥97% 200 kHz to 2 MHz	≥99% 20 Hz to 200 kHz ≥97% 200 kHz to 2 MHz
Trigger Output	≥ +4 V from 50 Ω	
External Input	Impedance ≈2 kΩ Trigger threshold level +1 V ±20%	
Trigger	±90° variable start phase control	
Gate	±90° variable start phase control	
Phase Lock	NO	
Counted Burst	With DD 501	
Internal Sweep	NO	Logarithmic or Linear, Separate Start/Stop Dials
Duration	1 ms to 100 s	
External Trigger	+1 V ±20% trigger level ≈2 KΩ input impedance	
Ramp Output	NA	≤0.3 V to +10 V from 1 KΩ ±5%
Gate Output	≥ +4 V from 50 Ω	
Other Modes	Manual Sweep Trig Manual Sweep Sweep and Hold	
Amplitude Modulation	NO	
Voltage Controlled Frequency (FM)	Up to 1000: 1 Frequency change with 10 V external signal. Slew rate ≥0.3 V/ms, 10 kΩ input impedance.	
Nominal Hz/Volt sensitivity	2 x Frequency MULTIPLIER setting	4 x Frequency MULTIPLIER
Output Hold Mode	NO	
Temperature ⁽⁴⁾	0°C to +50° Operating, -55°C to +75°C non-operating	

(1) +15°C to +35°C ambient

(2) +20°C to +30°C ambient

(3) 20 Hz to 20 kHz modulation frequency

(4) FG 504 requires forced air circulation above +40°C

(5) Fully Programmable

(6) IEEE 488 Compatible

(7) Percent of indicated frequency

(8) Absolute voltage accuracy

(9) Separate FM function provided (1%/V)

COMPARISON OF CHARACTERISTICS

FG 504	FG 502	FG 503	NEW FG 5010 ^(*) (*)
Sine, Square, Triangle, Pulse & Ramp with variable symmetry	Sine, Square, Triangle Pulse, or Ramp	Sine, Square, Triangle	Sine, Square, Triangle, Pulse & Ramp with variable symmetry
7% to 93% Variable	5%, 50%, 95% Fixed	50% Fixed	10% to 90%, 1% steps
0.001 Hz to 40 MHz 4 MHz nominal with var symm on	0.1 Hz to 11 MHz Pulse & Ramp, 1.1 MHz	1.0 Hz to 3 MHz Usable 0.01 Hz to 5 MHz	0.002 Hz to 20 MHz
Within 3% to 4 MHz ¹ Within 6% to 40 MHz ¹	Within 3% to 1 MHz Within 5% to 10 MHz	Within 5%	Within 0.1% Digital LED Display
Shipped with capacitor for 20 Hz to 20 kHz	NO	With user-installed capacitor	NA
$\leq 0.05\%$ for 10 min., $\leq 0.1\%$ for 1 hour, $\leq 0.5\%$ for 24 hours, constant temperature			$\leq 0.05\%$ for 1 hr., 0.05% for 24 hrs. ($\leq 1\%$ in trigger, gate, burst mode > 200 Hz) ⁽⁷⁾
30 V p-p	10 V p-p	20 V p-p	20 V p-p
15 V p-p	5 V p-p	10 V p-p	10 V p-p
0 to -5 dB in 10 dB steps < 10 mV p-p with VAR control	Variable control only	Variable control only	Digital Control of fixed and Var. 10 mV p-p into 50 Ω
± 7.5 V dc	± 5 V dc	± 7.5 V dc	± 7.5 V dc
± 3.75 V dc	± 2.5 V dc	± 3.75 V dc	± 3.75 V dc
± 20 V	± 10 V	± 15 V	± 15 V
± 11.25 V	± 5 V	± 6 V	± 7.5 V
50 Ω	50 Ω	50 Ω	50 Ω
± 0.5 dB 0.001 Hz to 40 kHz	± 0.5 dB 20 Hz to 20 kHz ± 1.5 dB 0.1 Hz to 11 MHz	± 0.5 dB 20 Hz to 20 kHz ± 2 dB 0.1 Hz to 3 MHz	$\pm 3.0\%$ to 5 MHz ⁽⁸⁾⁽¹⁾ $\pm 5\%$ -10% to 20 MHz ⁽¹⁾
± 2 dB 40 kHz to 40 MHz	± 3 dB referenced to Sine wave	± 1 dB referenced to Sine wave	$\pm 2\%$ to 500 kHz ⁽⁸⁾⁽¹⁾ $+2\%$, -3.5% to 1 MHz ⁽¹⁾ $+3\%$, -5% to 5 MHz ⁽¹⁾ $+5\%$, -20% to 20 MHz ⁽¹⁾
± 0.5 dB to 20 MHz ± 2 dB to 40 MHz			$\pm 2\%$ to 1 MHz ⁽⁸⁾⁽¹⁾ $\pm 3\%$ to 5 MHz ⁽¹⁾ $\pm 5\%$ to 20 MHz ⁽¹⁾
$\leq 0.5\%$ 20 Hz to 40 kHz ⁽¹⁾ Harmonics: ≤ -30 dB 40 kHz to 1 MHz ≤ -20 dB 1 MHz to 40 MHz	$\leq 0.5\%$ 10 Hz to 50 kHz ⁽²⁾ Harmonics ≤ -30 dB at all other frequencies	$\leq 0.5\%$ 1 Hz to 30 kHz $\leq 1.0\%$ 30 kHz to 300 kHz $\leq 2.5\%$ 300 kHz to 3 MHz	$\leq 0.5\%$ 20 Hz to 19.99 kHz ⁽¹⁾ $\leq 1.0\%$ 20 kHz to 99.99 kHz 100 kHz to 20 MHz Harmonic greater than -30 dB
≤ 6 ns rise/fall fixed 10 ns to 100 ms variable $\leq 5\%$ p-p $+30$ mV aberrations	≤ 20 ns rise/fall $\leq 3\%$ p-p aberrations	≤ 60 ns rise/fall $\leq 3\%$ p-p aberrations	≤ 10 ns rise/fall $\leq 5\%$ p-p aberrations
$\geq 99\%$ 10 Hz to 400 kHz $\geq 95\%$ 400 kHz to 40 MHz typ $\geq 98\%$ 0.001 Hz to 10 Hz	$\geq 99\%$ 0.1 Hz to 100 kHz $\geq 97\%$ 100 kHz to 1 MHz $\geq 95\%$ 1 MHz to 11 MHz	$\geq 99\%$ 1 Hz to 100 kHz $\geq 95\%$ 100 kHz to 3 MHz	$\geq 98\%$ to 2 MHz $\geq 90\%$ to 20 MHz
$\geq +2$ V from 50 Ω	$+2.5$ V to 50 Ω load	$+2.5$ V to 600 Ω load	$+2$ V from 50 Ω
Impedance ≥ 10 k Ω Sensitivity ≤ 1 V p-p Trigger level -1 V to $+10$ V	Impedance ≈ 1 k Ω $\geq +2$ V Gate Signal required	NO	1 M Ω /50 Ω internal setability 0.0 V/0.5 V internal setability
20 MHz maximum $\pm 80^\circ$ start phase control to 10 MHz	NO Fixed 0° start phase	NO NO	$\pm 90^\circ$ variable start phase control $\pm 90^\circ$ -variable start phase control
100 Hz to 40 MHz $\pm 80^\circ$ phase range	NO	NO	20 Hz to 20 MHz (Auto Scan)
With DD 501	With DD 501	NO	1-9999
Logarithmic or Linear, Separate Start/Stop Dials	NO	NO	NO
0.1 ms to 100 s	N/A	N/A	N/A
$+1$ V $+10$ V trigger level 1 V p-p sensitivity			
0 to $+10$ V from 1 k Ω $\pm 5\%$ to 1 ms, $\pm 10\%$ ≤ 1 ms			
NO			
Manual Sweep Trig			
100% with nominal 5 V p-p input Dc to 100 kHz modulation freq. $< 5\%$ distortion to 4 MHz @ 70% ⁽³⁾ $< 10\%$ distortion to 40 MHz @ 65% ⁽³⁾	NO	NO	100% with nominal 5 V p-p signal input Dc to 100 kHz mod frequency $< 2\%$ distortion to 2 MHz @ 70% $< 4\%$ distortion to 20 MHz @ 70%
Up to 1000: 1 Frequency change with 10 V external signal. Slew rate ≥ 0.3 V/ms, 10 k Ω input impedance.			Up to 1000: 1 frequency ⁽⁹⁾ change with 10 V external input
4 x Frequency MULTIPLIER	1.1 x Frequency MULTIPLIER	3 x Frequency MULTIPLIER	10% of selected range
0.001 Hz to 400 Hz	NO	NO	0.002 Hz to 200 Hz
0°C to $+50^\circ$ Operating, -55° C to $+75^\circ$ C Non-operating			