Arbitrary Function Generators

▶ AFG310 • AFG320

▶ *AFG300 Series.*

AFG300 Series Delivers Five Functions in One Tool

Function Generator

The AFG300 Series is an excellent 16 MHz function generator with built-in arbitrary waveform, burst, sweep, and modulation capabilities. The instruments support standard waveforms including sine, square, triangle, ramp, pulse, DC and noise. Its sweep function includes Linear and Logarithmic (up or down) while operating in the Continuous, Triggered, and Burst modes.

Arbitrary Waveform Generation

With a sample rate of 16 MS/s, 12-Bit vertical resolution and a non-volatile memory that holds four 16,384-point waveforms, the AFG300 Series are powerful tools for simulating complex waveforms. Waveforms can be downloaded directly from selected Tektronix oscilloscopes and arbitrary waveform generators via GPIB, created with the standard WaveWriter waveform editing software package, or entered via the front panel.

▶ Features & Benefits

Five Functions in One Instrument
- Function Generator
- Arbitrary Waveform Generator
- Burst Generator
- Sweep Generator
- Modulation Source

AFG320 Offers Two Independent Channels

Load Waveforms Directly from Selected Tektronix Digital Oscilloscopes via the GPIB Interface

Windows-based WaveWriter™ Waveform Editing Software Package Included for Convenient Creation and Editing of Arbitrary Waveforms

All Functions Including Waveform Creation and Editing Accessible via the Front Panel

Optional Rackmount Kit for System Applications

▶ Applications

Design and Test

Automotive

Education

Industrial

Biomedical

Sensor Simulation

Manufacturing Test

▶ Characteristics

Output Channels –
AFG310: 1.
AFG320: 2.

Standard Waveforms – Sine, Square, Triangle, Ramp, Pulse, DC and Noise.

User Waveforms – (Preprogrammed samples)
- USR1: Sin (X)/X.
- USR2: Double Exponential Pulse.
- USR3: Damped Sine Wave.
- USR4: NRZ Random Signal.

Arbitrary Waveforms –
Waveform Length: 10 to 16384 points.
Vertical Resolution: 12-Bit.
Sample Rate: 16 MS/s.
Nonvolatile Memory: Four 16 k waveforms.

Output Frequency –
Sine, Square: 0.01 Hz to 16 MHz.
Triangle, Ramp, Pulse: 0.01 Hz to 100 kHz.
Noise (Gaussian): Maximum 8 MHz bandwidth.
Arbitrary Waveform:
- Repetition Rate: 0.01 Hz to 1.6 MHz.

Resolution: 7 digits.
Accuracy: 50 ppm.

Output Characteristics –
Amplitude (into 50 Ω): 50 mV_{p-p} to 10 V_{p-p}.
- Accuracy: ±(1% of setting + 5 mV) at 1 kHz, no offset.

Flatness (at 1 V amplitude relative to 1 kHz):
- <100 kHz: ±1%.
- 100 kHz to 1 MHz: ±1.5%.
- 1 MHz to 16 MHz: ±3%.

Offset (into 50 Ω):
- 505 mV_{p-p} to 10 V_{p-p} amplitude: peak amplitude + offset is limited to +5 V or –5 V.
- 50 mV_{p-p} to 500 mV_{p-p} amplitude: –0.75 V to +0.75 V.
- Accuracy: ±(1% of setting +5 mV).

Resolution: 5 mV.
Output Impedance: 50 Ω.
Isolation: 42 V peak maximum relative to earth ground.
Phase:
- Range: ±360º.
- Resolution: 1º.

Sine Wave Spectral Purity –
Harmonic Distortion:
- DC to 20 kHz: –65 dBc.
- 20 kHz to 100 kHz: –60 dBc.
- 100 kHz to 1 MHz: –45 dBc.
- 1 MHz to 16 MHz: –35 dBc.

Total Harmonic Distortion:
- 20 kHz: 0.05% at 1 V amplitude.

Signal Characteristics –
Square:
- Rise/Fall Time: ≤20 ns.
- Overshoot: <<2%.

Pulse:
- Rise/Fall Time: <<100 ns.
- Duty Cycle: 1% to 99% of period.

Triangle, Ramp, Pulse, Arbitrary:
- Jitter: 2 ns at 100 kHz.

Modulation –
AM:
- Source: External only.
- Carrier: Up to 16 MHz.
- Modulation: Any internal waveform plus Arb.
- Frequency: DC to 200 kHz.
- Depth:
  - 1 V: 100%.
  - 0 V: 50%.
  - –1 V: 0%.
  - 2 V_{p-p} for 100% modulation.

FM:
- Source: Internal only.
- Modulation: Sine, Square, Triangle, Arb.
- Frequency: 0.01 Hz to 10 kHz.
- Deviation: 0.01 Hz to 8 MHz.

FSK (frequency shift keying):
- Source: Internal only.
- Mode: Trigger, Burst.
- Frequency Range: 0.01 Hz to 16 MHz.
- Key Rate: 0.01 Hz to 50 kHz.
- Number of Keys: 2.

Frequency Sweep –
Type: Linear or logarithmic.
Direction: Up or down.
Start/Stop Frequency: 0.01 Hz to 16 MHz.
Time: 1 ms to 100 s.
Mode: Continuous, Trigger, Burst.

Operating Mode –
Continuous: The selected waveform is output continuously.
Triggered: One period of the selected waveform is output each time a trigger occurs.
Trigger source: Manual, external.
Burst: The selected waveform is output with a specified number of cycles each time a trigger occurs.
Carrier Frequency: Up to 1 MHz.
Count: 1 to 60,000 cycles/burst (100 s maximum except sine wave or square wave) or infinite.
Start phase: –360 to +360º.
Trigger Source: Manual, external.

Inputs/Outputs –
Front Panel:
Main Output: Ch 1, Ch 2 (AFG320 only).
External Trigger (Burst) Input:
TTL input.
Pulse-width: 1 µs minimum.
10 kΩ input impedance.
Rear Panel:
Sync Output: TTL level.
External AM Modulation:
2 V_{p-p} = 100% modulation.
10 kΩ input impedance.
GPIB Interface (IEEE-488.2).

Memory –
Type: Non-volatile.
Setup Storage: 20.
Arbitrary Waveform Storage: 4.

Environmental, EMC, Safety

Temperature Range –
Operating: 0 ºC to +50 ºC.
Nonoperating: –20 ºC to +60 ºC.

Humidity –
Operating:
At or below +40 ºC: 0 to 95%.
+40 ºC to +50 ºC: 0 to 75%.

Random Vibration –
Operating: 0.31 G_{RMS} from 5 to 500 Hz, 10 minutes.
Nonoperating: 2.46 G_{RMS} from 5 to 500 Hz, 10 minutes.

Shock –
Nonoperating: 294 m/s^2 (30 G), half-sine, 11 ms duration.

EMC Compliance –
Meets intent of Directive 89/396/EEC for Electromagnetic Compatibility.
Australian AN/NZS 2064.1/2.

Safety –
UL1244, CSA231, EN61010-1, IEC61010-1.

Power

Line Voltage –
90 to 132 V AC, 180 to 250 V AC.

Line Frequency –
90 to 250 V: 48 to 63 Hz.
90 to 127 V: 48 to 440 Hz.

Physical Characteristics

Dimensions	mm	in.
Height	99	3.9
Width	214	8.4
Depth	411	16.2
Weight	**kg**	**lbs.**
Net: AFG310	5.4	11.9
Net: AFG320	5.6	12.3

▶ Ordering Information

AFG310

Single-channel Programmable Arbitrary Function Generator.

AFG320

Dual-channel Programmable Arbitrary Function Generator.

Includes: User manual, Calibration Certificate, power cord, WaveWriter™ Software and manual.

Please specify power plug when ordering.

Recommended Accessories

Rackmount Kit – Order 016-1674-00.

Power Plug Options

Opt. A0 – North America Power.

Opt. A1 – Universal EURO Power.

Opt. A2 – United Kingdom Power.

Opt. A3 – Australia Power.

Opt. A4 – 240 V, North America Power.

Opt. A5 – Switzerland Power.

Service

Tektronix CAL and REP Service programs allow you to pre-purchase genuine Return to Tektronix Service. Ask your Distributor for details.

Opt. C3 – Calibration Service 3 Years.

Opt. D1 – Calibration Data Report.

Opt. D3 – Calibration Data Report 3 Years (with Option C3).

Warranty

Three years parts and labor.

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Our most up-to-date product information is available at:
www.tektronix.com

Product Area Assessed: The planning, design/development and manufacture of electronic Test and Measurement instruments.

Product(s) complies with IEEE Standard 488.1-1987, RS-232-C, and with Tektronix Standard Codes and Formats.

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