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Find the *Tektronix AFG 5501* at our website: *Click HERE*

AFG 5101/AFG 5501

Function Generators

- ***Fully Programmable from Front Panel or GPIB***
- ***Standard and Arbitrary Waveform Generation from 1 µHz to 12 MHz***
- ***Two Non-Volatile, Selectable 8K Memories for Waveform Storage***
- ***Non-Volatile Storage for up to 99 Front Panel Settings***
- ***10 mV to 9.99 V p-p into 50 Ohms***
- ***0.2% Accuracy (0.005% with Synthesizer Option)***
- ***Sine, Square, Triangle, Ramp Up, Ramp Down, Arbitrary Waveforms, and DC***
- ***Linear, Logarithmic, and Arbitrary Sweep Capabilities***
- ***Convenient Creation and Modification of Waveforms with WaveWriter™ Software***

ORDERING INFORMATION

AFG 5101 Programmable Arbitrary/ Function Generator (plug-in) **$3,495**
Includes: Instrument manual (070-6759-00); Reference guide; Instrument Interfacing guide (070-6930-00).

AFG 5501 Programmable Arbitrary/ Function Generator (monolithic) **$4,125**
Includes: Instrument manual (070-6759-00); Reference guide; Instrument Interfacing guide (070-6930-00).

OPTIONS

Opt. 02 – Adds a frequency lock synthesizer **+$350**

ACCESSORY

Service Manual – Contact your local Sales Representative.

The PFG 5105 combines full-featured function generation with pulse generation in one convenient package. Both the AFG and the PFG can store up to 99 complete front panel settings. This feature accelerates the programming process for computer controlled applications and enhances benchtop capabilities.

Tektronix realizes the need for monolithic products in specific applications. The AFG 5501 and the PFG 5505 have been developed to meet these needs. Both products come with a dedicated power housing and carrying handle and do not require a TM mainframe.

The FG 5010 provides full GPIB programmability, accuracy within 0.1 of reading to 20 MHz, variable symmetry, complementary output, and a host of other features.

The FG 501A provides low distortion waveforms from 0.02 Hz to 2 MHz and is well suited to audio applications.

The FG 504 generates three basic waveforms from 0.001 Hz to 40 MHz. Its unique phase lock mode enables conversion of digital signals to high or low frequency sine waves, pulses, or triangles.

The FG 501A, FG 502, and FG 503 are lower frequency generators that provide a low cost alternative for straight forward applications in biological, geophysical and mechanical simulations.

EXTENDED FUNCTIONALITY

The DD 501 Digital Delay is an events-counting device that can be used with pulse, function and clock generators in such applications as precise digital delay between two related events, divide-by-N frequency divider, precision gate generator, counted burst output from a gated pulse or frequency generator, etc.

AFG 5101/AFG 5501

The AFG 5101/AFG 5501 combine the capabilities of standard analog and arbitrary waveform generation with the ability to generate virtually any sweep shape to allow accurate simulation of real-world functions.

Standard analog functions include sine, square and triangle waveforms, and DC with frequencies from 0.012 Hz to 12 MHz and amplitudes from 10 mV to 9.99 V p-p into 50 ohms. Waveforms can be continuous, triggered, gated, or burst. Trigger can be internally, manually, or GPIB supplied.

Arbitrary waveforms can be defined point by point, generated mathematically, transferred from computer graphics, or captured from an analog source and stored into one of two independently selectable 12 bit by 8K waveform memories for later use.

A sweep generator, from which linear, logarithmic, or user defined sweep shapes can be selected, allows complete customization of waveforms. (A mode exists on the AFG 5101/AFG 5501 which allows viewing and editing of the waveform as it is designed.)

BUILD A WAVEFORM LIBRARY

Once a waveform is generated, it can be stored in non-volatile internal memory. Or, through the GPIB, a complete library of calibration and stimulus waveforms and panel settings can be stored on disk. Up to 99 panel settings can also be stored in internal non-volatile memory.

CONFIGURATIONS

The AFG 5101 is a three-wide plug-in module that fits into the TM 5003 or TM 5006 Power Module Mainframe. The AFG 5501 is the AFG 5101 mounted in a three-wide GPIB power module. The AFG 5101 is at the heart of the EBS 5002 Programmable Arbitrary Stimulus/Measurement Package.

OPTIONS

Option 02 adds a frequency lock synthesizer that provides a stable output waveform by locking the output to an internal quartz crystal. This option operates in continuous mode only, from 12.1 Hz to 12 MHz.

CHARACTERISTICS

Waveforms – Sine, square, triangle, arbitrary, and dc.

OPERATING MODES

Continuous – Output continuous at programmed frequency, amplitude, and offset.

Triggered – Output quiescent until triggered by an internal, external, GPIB, or manual trigger; then generates one cycle at programmed frequency, amplitude, and offset.

Gated – Same as triggered mode except waveform is executed for the duration of the gated signal. The last cycle started is completed.

NBurst – Same as triggered mode for programmed number of cycles from 1 to 9999, as set by the NBurst function.

Sweep – Internal, programmable start frequency, stop frequency, rate (time per step) and marker frequency. Linear, logarithmic, and arbitrary sweep shapes can be continuous, triggered, gated, or burst seleted

Modulation – The analog generator can be frequency and amplitude modulated. Arbitrary waveforms can be amplitude modulated only.

Increment – Frequency, amplitude, offset, rate, sweep marker, and NBurst can be manually incremented/ decremented by a settable Increment delta. Step rate is 2 steps/s for first 3 steps, then 10 steps/s for successive steps for one continuous keystroke.

FREQUENCY

Range – 0.012 Hz to 12.0 MHz.

Resolution – 3 1/2 digits (1200 counts). Optional synthesizer mode: 4 1/2 digits (12,000 counts).

Accuracy – ±0.2% of reading from 121 Hz to 5 MHz in continuous mode. ±0.5% of reading from 5 to 12 MHz in continuous mode. ±5% of reading from 0.1 to 120 Hz in continuous mode. ±0.005 in optional synthesizer mode, 12.1 Hz to 12 MHz

Jitter – < 0.1% to 5 MHz.

Stability – ±0.2% in continuous mode for all time intervals. ±0.005% in optional synthesizer mode, 12.1 Hz to 12 MHz. ±0.5 for 24 hours in other modes.

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Repeatability – ±1% for 24 hours in other than continuous mode., ±0.005% in optional synthesizer mode, 12.1 Hz to 12 MHz.

OUTPUT

Amplitude Range – 10 mV to 9.99 V p-p into 50 Ω (20 mV to 19.98 V p-p into open circuit). (Open circuit values are 2 times the displayed values.)

Amplitude Resolution – 10 mV from 1 V to 9.99 V p-p into 50 Ω; 1 mV from 0.1 V to 0.999 V p-p into 50 Ω. 1 mV from 10 mV to 0.99 mV p-p into 50 Ω.

Amplitude Accuracy – ±2% ±20% mV of programmed value for 1.0 V to 9.99 V output at 20 to 30°C; ±3% ±5 mV for 10 mV to 999 mV output, specified for a sine, square, or triangle wave output at 1 kHz.

Repeatability – ±1% for 24 hours.

Amplitude Flatness – 0.5 dB from 0.012 Hz to 120 kHz, ±2 dB to 1.2 MHz, ±3 dB to 12 MHz referenced to 1 kHz sine, square, or triangle wave.

Offset Plus Peak Amplitude – Absolute peak amplitude plus offset is limited to a maximum that is dependent on the signal amplitude range. 4.99 V maximum for 1 V to 9.99 V range; 0.499 V maximum for 0.1 V to 0.999 V range; 0.049 V maximum for 0.01 V to 0.099 V range.

Offset Resolution – 3 digits; 1 mV when p-p amplitude is < 999 mV; 10 mV when p-p amplitude is > 1 V (into 50 Ω).

Offset Accuracy – ±0.6% ±20 mV (into 50 Ω).

Repeatability – ±1% ±20 mV for 24 hours

Output Impedance – 50 Ω.

Output Protection – The instrument is non-destructively protected against short circuits or accidental voltage of up to ±100 V (dc plus peak ac) applied to the main output connector.

WAVEFORM

Sine Distortion – < 0.6% THD (RMS), 121 Hz to 120 kHz at 5 V p-p amplitude at 20 to 30°C. < 1% THD (RMS), 12 Hz to 120 kHz at full temperature and amplitude range. (All harmonics less than –20 dB below fundamental from 121 kHz and above.)

Square Wave Time Symmetry – < 0.5% 121 Hz to 120 kHz; ±1% 0.012 kHz to 1.200 MHz; ±5% 1.21 MHz to 12.0 MHz.

Square Wave Transition Time – < 15 ns 10 to 90% at full output amplitude; elsewhere, < 20 ns, 10 to 90%.

Square Wave Aberrations – < 8% of p-p amplitude ±20 mV from 3.4 to 9.99 V p-p output amplitude. < 10% of p-p amplitude below 3.34 V p-p output amplitude.

Triangle Linearity – 98% to 100 kHz measured from 10 to 90% on waveform.

DC Range – ±10 mV to ±4.99 Vdc from 50 Ω (into 50 Ω).

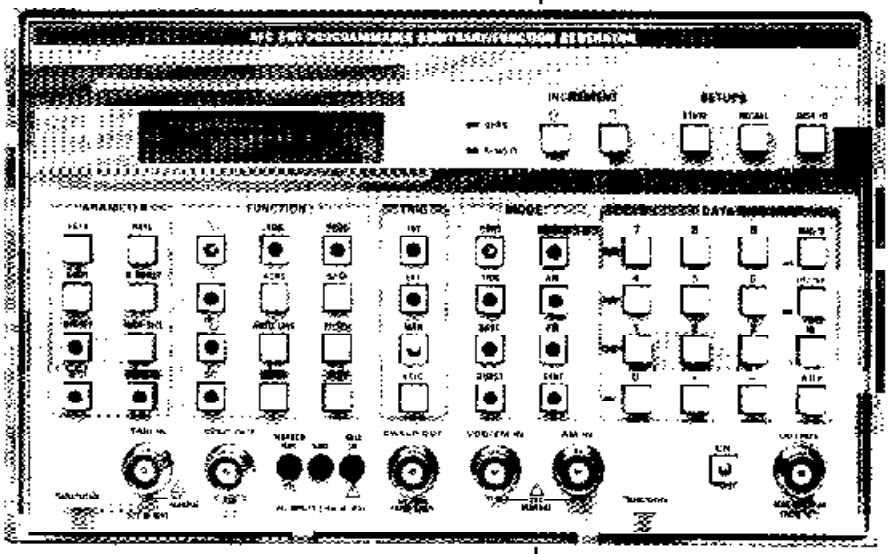
DC Accuracy – ±0.6% ±20 mV in DC function only, (into 50 Ω).

INTERNAL TRIGGER ANALOG FUNCTIONS ONLY

Range – Repetition rate 100 ns to 999.9 sec.

Resolution – 4 digits, 1 ns maximum.

Accuracy – 0.01%.



AFG 5101 Arbitrary Function Generator

GPIB* IEEE-488

** The AFG 5101/AFG 5501 comply with IEEE Standard 488.1-1987 and with Tektronix Standard Codes and Formats.*

ARBITRARY WAVEFORM

Functions – User defined, or predefined sine, square, triangle, ramp up, and ramp down with 0.01% frequency accuracy. From 0.001 Hz to 10 kHz (1000 point predefined waveforms only).

Horizontal Resolution – 8192 points for each of two independently selectable non-volatile waveform storage memories.

Vertical Resolution – 12 bits.

Output Accuracy – ±2.5% ±20 mV of programmed p–p amplitude when arbitrary data point peak values are ±2047 to –2047 at waveform frequencies of 1 kHz with predefined waveform functions.

Point Duration – 100 ns to 999.9 sec with 4 digits resolution. Accuracy typically better than 0.01%.

Risetime – <150 ns, 10 to 90% (with no filtering).

Setting Time – <300 ns to within 1% of final value with a full scale step (with no filtering).

Waveform Execution – Buffer: 8192 points, volatile. Filters: 4 selectable, single pole filters (3 dB cutoff frequency).

0 – Filter off.
1 – Typically 1 MHz ±20%.
2 – Typically 100 kHz ±20%.
3 – Typically 11 kHz ±20%.
4 – Typically 1.3 kHz ±20%.

FREQUENCY SWEEP

Sweep Types – Linear, logarithmic, arbitrary.

Sweep Time – 100 ns to 999.9 sec per point; 1 ns maximum resolution.

Sweep Width – 1200 – 1 maximum; start and stop frequencies must be in the same range.

Sweep Ranges – 10 kHz to 12 MHz; 1 kHz to 1.2 MHz; 100 Hz to 120 kHz; and so on until 0.012 Hz to 12 Hz.

Start/Stop Frequency Accuracy – ±5% of upper frequency.

Marker accuracy – ±5% of upper frequency

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INPUTS AND OUTPUTS

VCO/FM Input – 5 V p-p for a 500:1 frequency change.

Trigger In – TTL compatible. Nominal impedance: 10 kΩ. Maximum rate: 6 MHz. Minimum width: 20 ns.

AM Input – Input resistance: 10 kΩ nominal. 5 V p-p (0 V to + 5 Vdc) for 100% modulation. Bandwidth: DC to 20 kHz minimum. (AM limited to 30% at certain amplitude levels.)

Input Protection – All inputs protected against up to ±50 V (dc plus peak ac) accidental input.

Sync Output – TTL level squarewave at programmed frequency or at the end of each sweep or arbitrary cycle.

Sweep Output – Source resistance 600 Ω; same wave shape as selected sweep. (Amplitude depends on start and stop frequency and a 5 V limit.)

Arbitrary Hold/Reset Input – TTL compatible.

Marker Out – Positive TTL level pulse, when the output frequency equals provided marker frequency.

IEEE STANDARD 488.1-1987 INTERFACE FUNCTION

Subsets Implemented – SH1, AH1, T6, L4, SR1, RL1, DC1, DT1, E2.

GENERAL

Environmental – Operating: 0 to 50°C. Non-operating: -55 to +75°C.

Power Consumption – 50 VA maximum, limited by internal fuse.

Power Dissipation – AFG 5101: 30 W AFG 5501: 90 W

Memory – Non-volatile, stores up to 99 complete front panel settings. Two selectable 8192 arbitrary waveform memories

Display – 2 line alphanumeric, 16 character LCD. Provides for descriptive error messages. Variable back lighting and contrast.

PHYSICAL CHARACTERISTICS

	AFG 5101		AFG5501	
Dimensions	mm	in	mm	in
Width	233	8.0	234	9.2
Height	127	5.0	141	5.5
Depth	279	11.0	432	17.0

PFG 5105/PFG 5505

Pulse/Function Generators

- ***0.012 Hz to 12 MHz; Accuracies to 0.005 with Synthesizer Option***
- ***Programmable Width and Delay***
- ***10 mV to 9.99 V p-p into 50 Ohms***
- ***Continuous, Triggered, Gated and Burst, AM, VCF and Linear Sweep Modes***
- ***Non-Volatile Storage for 99 Front Panel Settings***

ORDERING INFORMATION

PFG 5105 Function Generator **$2,995**
Includes: Instrument manual (070-7331-00); Reference guide; Instrument interface guide (070-7329-00).

PFG 5505 Function Generator **$3,595**
Includes: Instrument manual (070-7331-00); Reference guide; Instrument interface guide (070-7329-00).

PFG 5105/PFG 5505

The PFG 5105/PFG 5505 Programmable Pulse/Function Generators combine the advantages of pulse generation with the versatility of full-featured function generation and complete programmability. Its waveform generation capabilities include pulse, double pulse, sine, triangle, square, and dc outputs from 0.012 Hz to 12 MHz in continuous, triggered, gated, burst, swept, and AM/VCF modes. A synthesizer option is available that locks the output to an internal quartz crystal for frequency accuracies of 0.005% (continuous mode only).

An additional internal-rate trigger clock is provided for allowing the creation of unique sequences of waveforms. This can be especially useful for creation of custom burst sequences.

In addition to complete programmability, the PFG 5105 has the ability to store up to 99 front panel settings which can be called up either from the front panel or through the GPIB. This feature reduces programming time and enhances standalone bench applications.

FLEXIBLE FRONT PANEL

A SPCL function key extends the functions of the front panel, letting you change the GPIB address and/or terminators, or alter the contrast and back-lighting of the front panel. Use the INCREMENT keys to scroll through the SPCL codes for the desired operation.

CONVENIENT LCD DISPLAY

The PFG 5105 features a two-row LCD display with 16 characters in each row. Character mnemonics describe the function or parameter being displayed, with its current value and its units of measure. Errors are displayed as 3-digit code numbers (same as GPIB code) with an accompanying description. Pressing the INST ID key causes instant display of the generator's GPIB address and EOI / LF termination.

PAIRED PULSE GENERATION

Double pulse generation is very convenient when evaluating a circuit's ability to differentiate between two closely spaced pulses. Paired pulses can be generated at selected repetition rates with the delay control determining the time between the two pulses.

TM 5000 SERIES COMPATIBILITY

As a member of the Tektronix TM 5000 family of programmable modular test instruments, the PFG 5105 is fully GPIB compatible and adheres to Tek Standard Codes and Formats, insuring ease of configurability and communication for integrated systems use configurations.

PFG 5105 occupies three slots in any TM 5000 Mainframe and can be combined with any of the TM 5000 instruments to form completely programmable stimulus and measurement systems.

PFG 5505 is a standalone version of the PFG 5105.

OPTIONS

Opt. 02 adds a frequency lock synthesizer that provides a stable output waveform by locking the output to an internal quartz crystal. This option operates in continuous mode only, from 12.1 Hz to 12 MHz

CHARACTERISTICS

Waveforms – Sine, square, triangle, pulse, double pulse, and dc.

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