

TEKTRONIX

AWG510

The Tektronix AWG510 is a high-performance Arbitrary Waveform Generator belonging to the AWG500 Series. It is designed to generate complex, real-world signals for applications such as disk drive testing, serial data communication, baseband/IF modulation, and biomedical simulations. Featuring a sample rate of up to 1 GS/s, 10-bit vertical resolution, and 4 MS of standard waveform memory, it provides sophisticated signal creation, editing, triggering, and real-time sequencing capabilities.

SPECIFICATIONS

General

Interfaces	GPIO (IEEE 488.2), LAN (10Base-T RJ-45), PC Keyboard (PS/2), Floppy Drive (3.5-inch)
Display	9.5-inch color TFT LCD, 640 × 480 pixels

Physical

Power Supply	100 to 240 VAC, 47 to 63 Hz, 330 W max
Operating Temperature	10 to 40 °C
Dimensions (W×H×D)	426 × 245 × 490 mm
Weight	19.0 kg kg

Channel Configuration & Core Architecture

Number of Channels	1 (with complementary output)
DAC Resolution	10 bits
Maximum Sample Rate	1 GS/s
Minimum Sample Rate	50 kS/s
Run Modes	Continuous, Triggered, Gated, Enhanced

Arbitrary Waveform Performance

Waveform Memory Depth	4 MS (standard), 8 MS (with Option 01)
Minimum Waveform Length	32 points
Sample Rate Resolution	4 digits
Rise/Fall Time	≤ 1.5 ns (20% to 80% at 1 Vp-p)

Output Characteristics

Output Impedance	50 Ω
Amplitude Range (into 50 Ω)	20 mVp-p to 2 Vp-p
Amplitude Range (into Open Circuit)	40 mVp-p to 4 Vp-p
DC Offset Range (into 50 Ω)	-1.000 V to +1.000 V
DC Offset Resolution	1 mV
Amplitude Resolution	1 mV

Sequencing & Modulation

Maximum Number of Sequences	up to 8,000 steps
Maximum Loop Count	1 to 65,536 or infinite

Trigger & Synchronization

Trigger Sources	Internal, External, Manual
External Trigger Input Impedance	50 Ω or 1 k Ω
External Trigger Threshold Range	-5.0 V to +5.0 V
External Trigger Threshold Resolution	0.1 V
External Reference Input Frequency	10 MHz (within ± 10 ppm)
External Reference Input Range	0.2 Vp-p to 3.0 Vp-p
Reference Output Frequency	10 MHz
Reference Output Amplitude	1.2 Vp-p into 50 Ω
Marker Outputs	2 (Marker 1, Marker 2)
Marker Output Amplitude	-1.0 V to +2.4 V into 50 Ω
Marker Output Resolution	0.05 V

System Connectivity & Control

Keyboard Connector	PS/2
Floppy Drive	3.5-inch, 1.44 MB MS-DOS format

Power & Environmental Specifications

Storage Temperature Range	-20 $^{\circ}\text{C}$ to 60 $^{\circ}\text{C}$
Operating Humidity Range	20% to 80% RH (non-condensing)
Storage Humidity Range	5% to 90% RH (non-condensing)
Operating Altitude	up to 3,000 m (10,000 ft)
Storage Altitude	up to 12,000 m (40,000 ft)

Physical Characteristics & Compliance

Form Factor	Benchtop
Safety Certifications	UL 3111-1, CAN/CSA-C22.2 No. 1010.1, EN 61010-1
Electromagnetic Compatibility (EMC)	EN 55011, EN 50082-1

Performance

Normal Output Bandwidth	≥ 230 MHz (-3 dB)
Direct Output Bandwidth	≥ 1.0 GHz (-3 dB)
Direct Output Rise/Fall Time	≤ 280 ps (10% to 90%)
Waveform Length Increment	1 point
Internal Reference Frequency Accuracy	± 1.0 ppm (10 °C to 40 °C)
Internal Reference Frequency Stability	± 1.0 ppm/year

Spectral Purity

Normal Output Harmonic Distortion	≤ -50 dBc (at 1 GS/s, 10 MHz)
Direct Output Harmonic Distortion	≤ -40 dBc (at 1 GS/s, 10 MHz, 0.1 Vp-p)
Normal Output Non-Harmonic Spurious	≤ -58 dBc (at 1 GS/s, 10 MHz, excluding harmonics)
Direct Output Non-Harmonic Spurious	≤ -50 dBc (at 1 GS/s, 10 MHz, excluding harmonics)
Phase Noise	≤ -90 dBc/Hz at 10 kHz offset (10 MHz output, typical)

Clock & Reference

External Clock Input Frequency Range	10 MHz to 1.0 GHz
External Clock Input Amplitude Range	0.4 Vp-p to 2.0 Vp-p
External Clock Input Impedance	50 Ω (AC coupled)

Inputs & Outputs

Analog Add Input Impedance	50 Ω (DC coupled)
Analog Add Input Range	± 1 V
Analog Add Input Bandwidth	DC to > 100 MHz
Marker Output Rise/Fall Time	≤ 400 ps (10% to 90%, into 50 Ω)
Marker to CH1 Delay Range	-1.0 ns to +2.5 ns
Marker to CH1 Delay Resolution	50 ps

Digital Outputs

Digital Data Outputs	10-bit (with Option 03)
Digital Data Output Level	ECL (differential, with Option 03)
Digital Data Output Connector	68-pin mini-D (with Option 03)

Storage

Internal Storage (Hard Disk)	≥ 2.1 GB IDE (production-date dependent)
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Output Performance

Normal Output Amplitude Accuracy	$\pm(1.5\%$ of amplitude + 2 mV) at 1 MHz with 0 V offset
Normal Output DC Offset Accuracy	$\pm(1.0\%$ of offset + 10 mV) at 20 mV amplitude

Marker Outputs

Marker Output Impedance	50 Ω
Marker Output High Level Range	-1.0 V to +2.4 V (into 50 Ω)
Marker Output Low Level Range	-2.2 V to +1.2 V (into 50 Ω)

Sequencer

Maximum Sequence Steps	8,000
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Trigger

External Trigger Minimum Pulse Width	10 ns
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Options

Option 01 Waveform Memory Expansion	Increases waveform memory depth to 8 MS
Option 03 Digital Data Output	Provides 10-bit digital data output

APPLICATIONS

Test and Measurement, Disk Drive Testing, Serial Communication, Baseband/IF Modulation Testing, Biomedical Simulations

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