

TEKTRONIX

AWG7122B

The Tektronix AWG7122B is an advanced Arbitrary Waveform Generator from the AWG7000B Series, designed to meet the rigorous demands of high-speed serial communications and wideband RF applications. Featuring dual output channels, a standard sample rate of up to 12 GS/s (interleaving up to 24 GS/s), and up to 10-bit vertical resolution, the AWG7122B provides unmatched signal synthesis capabilities, extreme timing accuracy with minimal jitter, and flexible sequencing for complex electronic design verification, characterization, and debugging.

SPECIFICATIONS

General

Interfaces	GPIB, LAN (10/100/1000Base-T Ethernet), 6x USB 2.0 (2 front, 4 rear), DVI-D, VGA, PS/2, Audio (Line In, Line Out, Mic)
Display	10.4-inch color TFT-LCD, XGA (1024 x 768) resolution, with integrated touch screen

Physical

Power Supply	100 to 240 V AC, 47 to 63 Hz, power consumption 450 W maximum
Operating Temperature	10 to 40 °C °C
Dimensions (W×H×D)	435 mm x 245 mm x 462 mm mm
Weight	19.5 kg kg

Channel Configurations

Number of Channels	2
Interleave Mode Support	Yes (with Option 06, combines 2 channels into 1)
Output Type	Differential or Single-Ended
Output Connector Type	SMA (front panel)

Sampling & Resolution

Standard Sample Rate	10 MS/s to 12 GS/s
Interleaved Sample Rate	12 GS/s to 24 GS/s (with Option 06)
DAC Resolution (Without Markers)	10 bits
DAC Resolution (With Markers)	8 bits

Waveform Memory & Sequencing

Standard Record Length	32.4 MSamples per channel (32,400,000 points)
Maximum Record Length	64.8 MSamples per channel (64,800,000 points, with Option 01)
Minimum Waveform Length (Standard Mode)	240 points
Minimum Waveform Length (Interleaved Mode)	480 points
Waveform Granularity (Standard Mode)	1 point
Waveform Granularity (Interleaved Mode)	2 points
Maximum Number of Waveforms	32,000
Sequence Steps	1 to 16,000 steps
Sequence Loop Counter	1 to 65,536 or Infinite
Sub-sequencing Levels	1 (no nesting)

Analog Output Characteristics

Output Impedance	50 ohms
Amplitude Range (Normal Path, Differential)	50 mVp-p to 2.0 Vp-p
Amplitude Range (Normal Path, Single-Ended)	50 mVp-p to 1.0 Vp-p
Amplitude Range (Direct Path, Differential)	50 mVp-p to 1.0 Vp-p
Amplitude Range (Direct Path, Single-Ended)	50 mVp-p to 0.5 Vp-p
Amplitude Resolution	1 mV
Analog Bandwidth (Direct Path)	5.0 GHz (7.5 GHz with Option 06)
Analog Bandwidth (Normal Path)	3.5 GHz (5.3 GHz with Option 06)
Rise/Fall Time (Direct Path, 20% to 80%)	35 ps (typical, at 0.5 Vp-p)
Rise/Fall Time (Normal Path, 20% to 80%)	45 ps (typical, at 1.0 Vp-p)
Inter-channel Skew Control Range	±100 ps
Inter-channel Skew Control Resolution	1 ps
Delay Control Range	-150 ps to 150 ps (with Option 02 or Option 06)
Delay Control Resolution	100 fs (with Option 02 or Option 06)
Edge Timing Shift Control Resolution	100 fs (with Option 02 or Option 06)

Signal Purity & Spectral Quality

Total Jitter (Direct Path)	20 ps p-p (typical, at 10 ⁻¹² BER)
Total Jitter (Normal Path)	30 ps p-p (typical, at 10 ⁻¹² BER)
Effective RF Frequency Output	9.6 GHz

Run Modes

Run Modes	Continuous, Triggered, Gated, Sequence
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Clock & Reference System

Internal Clock Frequency Accuracy	±1 ppm
External Reference Input Frequency	10 MHz, 20 MHz, 100 MHz (within ±0.2 ppm)
External Reference Input Amplitude	0.2 Vp-p to 3.0 Vp-p, 50 ohms
External Clock Input Frequency Range	10 MHz to 12 GHz
External Clock Input Amplitude	0.4 Vp-p to 2.0 Vp-p, 50 ohms
Reference Output Frequency	10 MHz
Reference Output Amplitude	1.2 Vp-p into 50 ohms (typical)

Trigger & Auxiliary Inputs/Outputs

Trigger Input Impedance	1 kilohm or 50 ohms
Trigger Input Threshold Voltage Range (50 Ohms)	-2.0 V to +2.0 V
Trigger Input Threshold Voltage Range (1 Kilohm)	-5.0 V to +5.0 V
Marker Outputs per Channel	2 (available at 8-bit resolution)
Marker Output Level Range	-1.0 V to +2.4 V into 50 ohms
Marker Output Amplitude Range	0.5 Vp-p to 2.0 Vp-p into 50 ohms
Marker Output Rise/Fall Time (20% to 80%)	45 ps (typical)
Marker Output Delay Control Range	0 to 300 ps
Marker Output Delay Resolution	1 ps

Control, Connectivity & Software

Internal Operating System	Windows XP Professional
Hard Drive Capacity	>=80 GB (removable SATA hard drive)
Built-in Optical Drive	DVD-RW
GPIO Interface Standard	IEEE 488.2
Programming Language Compatibility	SCPI-compliant
Waveform Creation Software	ArbExpress, SerialXpress, RFXpress

Physical Characteristics

Form Factor	Benchtop (rackmountable with optional slide-out kit)
Dimensions (Height)	245 mm (9.6 inches)
Dimensions (Width)	435 mm (17.1 inches)
Dimensions (Depth)	462 mm (18.2 inches)
Cooling Clearance	Minimum 15 cm (6 inches) on rear and sides

Environmental & Safety Compliance

Non-operating Temperature Range	-20 to +60 °C
Operating Humidity Range	8% to 80% relative humidity (non-condensing) at up to 30 °C
Operating Altitude Limit	Up to 3,000 m (10,000 feet)
Non-operating Altitude Limit	Up to 12,192 m (40,000 feet)
Safety Standards	UL 61010-1, CAN/CSA-C22.2 No. 61010-1, EN 61010-1
EMC Standards	EN 61326, Class A; AS/NZS 2064

Ordering Options & Upgrades

Memory Upgrade Option	Option 01 (expands to 64.8 MSamples per channel)
Interleave Option	Option 06 (enables 24 GS/s operation on 1 channel)

Power Supply

Power Consumption	450 W maximum (450 VA)
Input Voltage	100 to 240 V AC
Input Frequency	47 to 63 Hz

Clocks & Auxiliary I/O

Clock Output Frequency Range	50 MHz to 6.0 GHz
Clock Output Amplitude	0.5 V p-p to 1.0 V p-p (into 50 Ω)
Event Input Connector	BNC (rear panel)
Event Input Impedance	50 Ω or 1 k Ω (selectable)
Event Input Threshold Voltage Range	-5.0 V to +5.0 V
Event Input Minimum Pulse Width	20 ns
Analog Add Input Bandwidth	DC to 100 MHz (typical)
Analog Add Input Impedance	50 Ω
Analog Add Input Maximum Amplitude	± 1.0 V

Triggering & Timing

Trigger Jitter	50 ps p-p or less (typical)
Trigger Input Minimum Pulse Width	20 ns
Trigger Delay to Analog Output (Standard Mode)	240 ns (typical)
Trigger Delay to Analog Output (Interleaved Mode)	340 ns (typical, Option 06 dependent)

Dynamic Performance

SFDR (Standard Mode, 6 GS/s, 100 MHz Output)	-50 dBc (typical, Normal Path)
SFDR (Standard Mode, 6 GS/s, 1 GHz Output)	-34 dBc (typical, Normal Path)
SFDR (Interleaved Mode, 12 GS/s, 1 GHz Output)	-40 dBc (typical, Normal Path, Option 06 dependent)
SFDR (Interleaved Mode, 12 GS/s, 2 GHz Output)	-35 dBc (typical, Normal Path, Option 06 dependent)
SFDR (Interleaved Mode, 12 GS/s, 3 GHz Output)	-30 dBc (typical, Normal Path, Option 06 dependent)
SFDR (Interleaved Mode, 12 GS/s, 4 GHz Output)	-28 dBc (typical, Normal Path, Option 06 dependent)
Phase Noise (10 MHz Output, 10 kHz Offset)	-130 dBc/Hz (typical)
Phase Noise (1 GHz Output, 10 kHz Offset)	-95 dBc/Hz (typical)
Harmonic Distortion (12 GS/s, 1 to 2 GHz, 1 V p-p)	<-35 dBc (typical, Normal Path)
Non-Harmonic Spurious (12 GS/s, Up to 6 GHz)	<-50 dBc (typical, Normal Path)

Marker Performance

Marker Random Jitter	1.1 ps rms (typical)
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Interfaces & Connectivity

USB Ports	6× USB 2.0 (2 front, 4 rear)
LAN Interface	10/100/1000Base-T (RJ-45)
Video Output	VGA (D-Sub 15-pin)
Keyboard/Mouse Ports	2× PS/2

Environmental & Physical

Operating Vibration	0.33 Grms (5 to 500 Hz)
Non-Operating Vibration	2.28 Grms (5 to 500 Hz)
Non-Operating Shock	294 m/s ² (30 G), 11 ms, half-sine

Offset & Coupling

Normal Path Offset Range	-2.0 V to +2.0 V
Normal Path Offset Resolution	1 mV
Normal Path Coupling	DC
Direct Path Coupling	AC

Impedance & Coupling

Marker Output Impedance	50 Ω
External Reference Input Impedance	50 Ω (AC coupled)
External Clock Input Impedance	50 Ω (AC coupled)

Trigger & Event System

Trigger Input Range	-5.0 V to +5.0 V
Internal Trigger Generator Period Range	1.0 μ s to 10.0 s
Internal Trigger Generator Period Resolution	3 digits, 0.1 μ s minimum

Marker Outputs

Marker Output High Level Range	-1.4 V to +1.4 V (into 50 Ω)
Marker Output Low Level Range	-1.4 V to +1.4 V (into 50 Ω)

Auxiliary Inputs

Analog Add Input Gain	0.5 (Normal Path)
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TECHNOLOGY

Direct Synthesis (Arbitrary Waveform Generation)

APPLICATIONS

High-Speed Serial Communication, Wideband RF Signal Generation, Disk Drive Testing, Academic Research

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