

Arbitrary Waveform Generator

AWG 2040

This product is no longer carried in our catalog.



Features

- 1.024 GS/sec Clock Rate Provides up to 500 MHz Waveforms
- 1 MB Record Length (4 MB with Opt. 01)
- 8-Bit (1/256) Vertical Resolution
- Direct Waveform Transfers from DSO
- Optional 8-Bit Digital Pattern Generator
- Built-in 1.4 MB PC-compatible 3.5 in. Floppy Disk for Storage and Transfer
- FFT Editor (Opt. 09) Allows Editing in the Frequency Domain
- Easily Create Automatic Test Sequences with Waveform Sequencing
- Formula Entry of Parameters for Mathematically Precise Waveforms
- Fully Programmable from Front Panel, RS-232, or GPIB (IEEE 488.2)

Applications

- Broadcast Telecom Test
- Network Test
- Computer Peripherals
- Electronic Warfare Simulation



All 2000 Series Arbs comply with IEEE Standard 488.1-1987, and with Tektronix Standard Codes and Formats.

For additional information or to order, contact your local Tektronix representative.

Characteristics

Standard Waveshapes

Sine, square, triangle, ramp, pulse, arbitrary, linked sequence, and DC.

Arbitrary Waveforms

Memory

Waveform: 1 Mwords x 8-Bits (4 Mwords x 8-Bits with Option 01).

Marker: 1 Mwords x 2-Bits (4 Mwords x 2-Bits with Option 01).

Data Points of Waveform: 32 to 1 M (4 M with Option 01) in multiples of 32.

Clock Generator

Frequency Range: 1.000000 kHz to 1.024000 GHz.

Resolution: 7 digits.

Stability: 1 ppm/year (+15 to \pm 25 degrees C).

Operating Modes

Continuous: Output waveform/sequence continuous at programmed waveshape, frequency, amplitude, and offset.

Triggered: Output quiescent until triggered by an external, GPIB, or manual trigger; generates a waveform/sequence only one time.

Burst: Output quiescent until triggered by an external, GPIB, or manual trigger; then generates a waveform/sequence up to 65,536 times.

Gated: Same as continuous mode except period is executed only for the duration of the gated signal until the sequence started is completed.

Waveform Advance: Output quiescent until triggered by an external, GPIB, or manual trigger, then generates the waveform/sequence in the Sequence file. When the scan count reaches value, output stops and waits for next trigger.

Auto Step: Continuously outputs the waveform/sequence in the Auto Step file; the next Auto Step Trigger (rear panel) advances the waveform/sequence.

Slave: Receives clock from a master arbitrary waveform generator for parallel operation.

Main Output

Digital-to-Analog Converter Resolution: 8-Bits.

Output Impedance: 50 ohm

Output Voltage: -2.0 V to +2.0 V into 50 ohm.

Amplitude:

Range: 20 mV to 2 V into 50 ohm.

Resolution: 1 mV.

Offset:

Range: -1.000 V to 1.000 V into 50 ohm.

Resolution: 1 mV.

Accuracy (20 mV Amplitude, 7F waveform data): \pm (1% of offset + 5 mV).

Rise Time:

Amplitude >1.0 V, \leq 2.5 ns.

Amplitude \leq 1.0 V, \leq 1.5 ns.

Fall Time:

Amplitude >1.0 V, \leq 2.5 ns.

Amplitude \leq 1.0 V, \leq 1.7 ns.

Aberrations (at 500 MHz BW):

Amplitude >1.0 V, within \pm 10%.

Amplitude \leq 1.0 V, within \pm 7%.

Flatness: Within \pm 3% after 50 ns from rise/fall edges.

Sinewave Characteristics (1 GHz clock, 32 waveform points, 31.25 MHz frequency, 1.0 V amplitude, no offset, no filter):

Harmonics: \leq 45 dBc, DC to 400 MHz.

Noise: \leq 50 dBc, DC to 400 MHz.

Phase Noise: -90 dBc/Hz at 10 kHz offset.

Filters

Type: Bessel low pass.

Risetime:

10 MHz: 35 ns.

20 MHz: 17 ns.

50 MHz: 7.0 ns.

100 MHz: 3.5 ns.

Delay from Marker:

10 MHz: 42 ns.

20 MHz: 22 ns.

50 MHz: 12 ns.

100 MHz: 7.0 ns.

Through: 2.5 ns.

Auxiliary Outputs**Marker:**

Number of Markers: 2.

Level: Hi/Lo, -2.0 V to 2.0 V into 50 ohm -4.0 V to 4.0 V into 1 Megohm;

Resolution: 0.1 V.

Accuracy: within \pm 0.1 V.

Rise/Fall Time: <1 ns (at 1 Vp-p).

Connector: BNC.

Busy:

Level: Positive TTL pulse (0 V to 5.0 V into 1 Megohm).

Delay: <60 ns from Ext. Trig; <150 ns from CH 1.

Output Resistance: 51 ohm.

Connector: SMB.

Sync:

Level: Positive TTL pulse (0 V to 5.0 V into 1 Megohm).

Delay: <60 ns from Ext. Trig.

Duration: 100 ns.

Output Resistance: 51 ohm.

Connector: SMB.

Master Clock:

Level: ECL compatible (-1.620 to -0.810 into 50 ohm).

Connector: SMB.

8-Bit ECL Digital Out (Option 03):

Output Signals: D0 to D7, Clock.

Level: Differential ECL compatible (-1.81 V to -0.810 V into 50 ohm).

Skew Between Data: \pm 250 ps.

Delay: Data to Marker: 2.0 ns;

Clock to Data: 2.5 ns. Connector: SMB.

Auxiliary Inputs**Trigger:**

Threshold: Level, -5 V to +5 V;

Resolution: 0.1 V; Accuracy: $-(5\% \times \text{Level} + 0.1 \text{ V})$.

Pulse Width: 10 ns minimum (0.2 V amplitude).

Sensitivity: 0.2 V minimum (1 MHz square wave).

Maximum Input: \pm 10 Vp-p when 1 kilohm selected; \pm 5 V when 50 ohm selected.

Impedance: 1 kilohm or 50 ohm.

Trigger Holdoff: 500 ns maximum.

Stop Trig:

Threshold Level: TTL Level. Pulse.

Width: 100 ns minimum.

Maximum Input Volts: +5 V to 0 V.

Delay: 100 ms maximum.

Impedance: 10 kilohm.

Connector: SMB.

Auto Step Trig:

Threshold Level: TTL Level.

Pulse Width: 100 ns minimum.

Maximum Input Volts: +5 V to 0 V.

Delay: 100 ms maximum. Impedance: 10 kilohm.

Connector: SMB.

External Clock:

Sensitivity: 400 mVp-p (-4.0 dBm).

Maximum Input Volts: 1.0 Vp-p (+4.0 dBm) DC \pm 20 V.

Frequency: 10 MHz to 1.0 GHz.

Delay External Clock to Marker: 13 ns.

Slave Clock:

Threshold: ECL compatible (100 K).

Maximum Input Volts: -2.0 V to 0.0 V.

Frequency: DC to 1.0 GHz.

Delay External Clock to Marker: 13 ns.

Function Generator**Waveform Shape (predefined 100-point waveforms):**

Sine, Triangle, Square, Ramp, Pulse (1 MHz filter is inserted when Sine is selected).

Frequency: 1.000000 Hz to 10.00000 MHz. Accuracy: 1 ppm.

Amplitude: 20 mV to 2 V into 50 ohm.

Offset: -1.000 V to 1.000 V into 50 ohm.

Polarity: Normal, Invert.

Duty Cycle: 0% to 100%, Pulse only.

Sine Flatness: Within -1 dB referenced to 100 kHz.

Programmable Interface

GPIB: IEEE 488.2-1987 compatible.

RS-232: 9-Pin D connector.

Environmental

Temperature:

Operating: +10 to +40 degrees C.

Nonoperating: -20 to +60 degrees C.

Humidity:

Operating: 20% to 80% (no condensation).

Nonoperating: 5% to 90% (no condensation).

Altitude:

Operating: To 4.5 km (15,000 ft.). Maximum operating temperature decreases 1 degrees C for each 300 m above 1.5 km.

Nonoperating: To 15 km (50,000 ft.).

Vibration: Operating: 0.33 mm p-p, 10 Hz to 55 Hz for 15 minutes.

Shock: Nonoperating: 30 g (1/2 sine) 11 ms duration.

Bench Handling: Operating: Drop from 10 cm (4 in.) tilt or 45 degrees, whichever is less.

EMC: Emissions: Within limits of FCC CFR 47, Part 15, Subpart B, Class A; VFG 243; EN55022, B;EN6055-2. Immunity: Within limits of IEC 801-3, IEC 801-2, IEC 801-4.

Electrical Discharge: Operating Max Test Voltage: 15 kV (150 pF through 150 ohm).

Safety: Designed to meet UL 1244 and CSA 22.2 No. 231.EEC certified.

Power

Source Power:

Voltage Ranges: 90 to 127 VAC or 90 to 250 VAC.

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

Maximum Current: 4 A at 50 Hz, 90 V.

Maximum Power Dissipation: 300 W.

Fuse Rating: UL 198.6 (3 AG): 6 AFAST, 250 V. IEC 127:5 A (T), 250 V.

Physical Characteristics

Dimensions:

Width (with handle): 362 mm 14.3 inch

Height (with feet): 164 mm, 6.4 inch

Length (with front cover): 491 mm, 19.25 inch

Length (with handle extended): 576 mm, 22.2 inch

Net Weight: 10.7 kg, 23.6 lb.

Ordering Information

AWG 2040 1 GS/s Arbitrary Waveform Generator

Includes: User/Programmer's Manual, GPIB Programming Examples Disk, Sample Waveform Library Disk, Power Cable.

Opt. 01: Increase Memory to 4 Mwords (Overseas Only)

Opt. 03: IGBPS, ECL Level Digital Output

Opt. 09: Add FFT Editor. Allows Editing Waveforms in the Frequency Domain

Opt. 1R: Rackmount. Floppy drive access moved to front.

Opt. 1S: Adds WaveWriter S/W

Opt. B1: Service Manual

Service Assurance Options

Opt. R2: Adds two years of post-warranty Repair Protection

Opt. C5: Adds five years of Calibration Services

International Power Plug Options

Opt. A1: Universal Euro 220 V, 50 Hz

Opt. A5: Switzerland 220 V, 50 Hz

Accessories

Accessory Pouch: Order 016-1159-00

Front Cover: Order 200-3232-00

RS-232-C Cable: 9-Pin to 25-Pin. Order 174-1453-00

Service Manual: Order 070-8963-00

Rackmount Kit: Order 016-1189-00

GPIB Cable: Order 012-0991-00

SMB to BNC Cable: Order 012-1459-00

SMB to BNC Adapter: Order 015-0554-00

SMB Cable: Order 012-1342-00



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