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


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 ± 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): ± (1% of offset + 5 mV).

**Rise Time:**
Amplitude >1.0 V, </= 2.5 ns.
Amplitude </= 1.0 V, </= 1.5 ns.

**Fall Time:**
Amplitude >1.0 V, </= 2.5 ns.
Amplitude </= 1.0 V, </= 1.7 ns.

**Aberrations (at 500 MHz BW):**
Amplitude >1.0 V, within ± 10%.
Amplitude </= 1.0 V, within ± 7%.

**Flatness:** Within ± 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: </= 45 dBc, DC to 400 MHz.
Noise: </= 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 ± 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.
**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: ± 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% x Level + 0.1 V).
Pulse Width: 10 ns minimum (0.2 V amplitude).
Sensitivity: 0.2 V minimum (1 MHz square wave).
Maximum Input: ± 10 Vp-p when 1 kilohm selected; ± 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 ± 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 10.000000 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.


**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**

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


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. 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