1 GS/sec Arbitrary Waveform Generator

AWG 2041

Features

AWG 2041

- 1.024 GS/sec Clock Rate Provides up to 500 MHz Waveforms
- 1 MB Record Length (4 MB with Opt. 01)
- Region Shift Function Provides 10 ps Edge Placement
- 8-Bit (1/256) Vertical Resolution
- Direct DSO Waveform Transfers
- Optional 8-Bit 1 GHz Digital Data Generator
- Built-in 1.4 MB 3.5 in. Floppy Disk
- FFT Editor (Option 09)
  - Frequency Domain Editing
- Real Time Waveform Sequencer Creates Automatic Test Sequences or Extremely Long Patterns Almost Infinitely
- Formula Entry of Waveforms
- Fully Programmable from Front Panel, RS-232, or GPIB (IEEE 488.2)
- CE Certified

Applications

- Video
- Network
- Physical Layer Test
- Navigation
- Radar
- Computer Peripherals
- Data Storage
- Electronic Warfare Simulation
- Converter Testing
- Filter Design
- Semiconductor/Logic (ASIC/DAC/FPGA)
- CCD
- LCD (STN/TFT/MIM)

For your local Tektronix representative see the list in the back of this catalog or outside the U.S. call: 1-503-627-1933, inside the U.S. call: 1-800-426-2200.

See Tektronix on the World Wide Web: http://www.tek.com
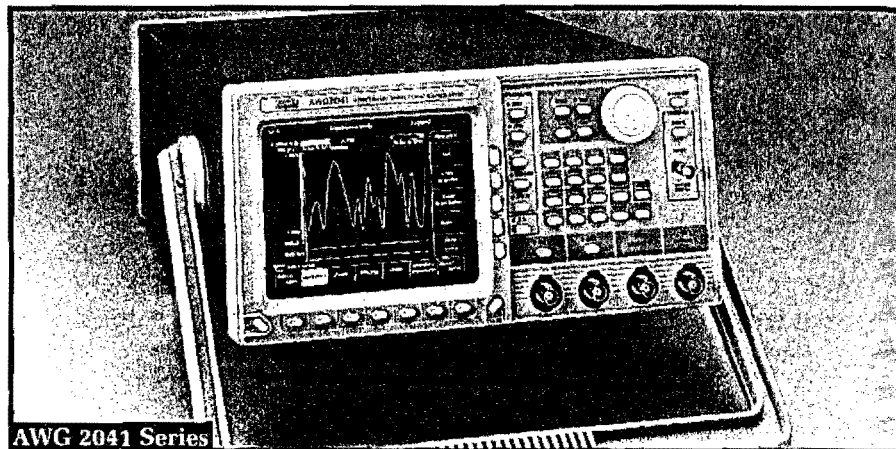
AWG 2041 Series Arbitrary Waveform Generator

The AWG 2041 is the world's fastest and deepest memory Arbitrary Generator with its 1 GS/s sample rate and 1 MB execution memory (4 MB, Option 01). As with the entire 2000 Series family, the graphical user interface allows on-screen viewing of waveform editing and simplifies "what-if" test scenarios by easily allowing the creation of composite signals.

The standard AWG 2041 configuration provides up to 2 V output or 4 V with the complementary output, each with 8-Bits vertical resolution. Option 03 adds a 8-Bit-wide ECL digital data port which can be used in conjunction with the marker outputs for data generation up to 10-Bits wide at up to 1 GHz. The AWG 2041 supports true Real Time Sequencing capability similar to the AWG 2021.

The Real Time waveform sequencer extends the effective record length output to over a billion points! The built-in frequency domain (FFT) editor (Option 09) is a perfect addition for customers performing modulation simulations, filter design or testing physical layer jitter tolerance, or for pulse mask testing.

The AWG 2041 easily simulates signals where fine point definition and long records are required for simulating very complex waveform conditions. Direct waveform transfer capability makes the AWG 2041 the perfect accessory for Tektronix DSOs.

Characteristics

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

ARBITRARY WAVEFORMS
Execution Memory – Waveform: 1 Mwords (4 Mwords with Option 01). Marker: (2) 1 Mwords (4 Mwords x 2-Bits with Option 01). Waveform size: 32 points to 1 M (4 M with Option 01) in multiples of 32.

Real Time Sequencer Memory – 8 K individual waveforms.

Loop Counter –
Waveform: 1 to 64 K
Sequence: 1 to 64 K repeats.

CATALOG MEMORY CLOCK
Frequency Range – 1.000000 kHz to 1.024000 GHz.

Resolution – 7 digits.

Stability – 1 ppm/year (+15°C to ±25°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.

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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 OUTPUTS – CH 1 & COMPLIMENT
Digital-to-Analog Converter Resolution – 8-Bits.

Output Impedance – 50 Ω.

Output Voltage – –2.0 V to +2.0 V into 50 Ω (L/V differential).

Amplitude – Range: 20 mV to 2 V into 50 Ω. Resolution: 1 mV.

Offset – Range: –1.000 V to 1.000 V into 50 Ω. 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 full 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 Ω, –4.0 V to 4.0 V into 1 MΩ; Resolution, 0.1 V Accuracy: within ±0.1 V. Rise/Fall Time: <1 ns (at 1 V p-p). Connector: BNC.

Busy – Level: Positive TTL pulse (0 V to 5.0 V into 1 MΩ). Delay: <60 ns from Ext. Trig; <150 ns from CH 1. Output Resistance: 51 Ω. Connector: SMB.

Sync – Level: Positive TTL pulse (0 V to 5.0 V into 1 MΩ). Delay: <60 ns from Ext. Trig. Duration: 100 ns. Output Resistance: 51 Ω. Connector: SMB.

Master Clock – Level: ECL compatible (–1.620 to –0.810 into 50 Ω). Connector: SMB.

8-Bit ECL Digital Out (Option 03) –
Output Signals: D0 to D7, Clock.
Level: ECL compatible (–1.81 V to –0.810 V into 50 Ω). 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 V p-p when 1 kΩ selected; ±5 V when 50 Ω selected. Impedance: 1 kΩ or 50 Ω. 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 kΩ. 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 kΩ. Connector: SMB.

External Clock – Sensitivity: 400 mV p-p (–4.0 dBm). Maximum Input Volts: 1.0 V p-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: 650 MHz to 1.0 GHz. Delay External Clock to Marker: 13 ns.

FUNCTION GENERATOR
Waveform Shape (predefined 100-point waveforms) – Sine, Triangle, Square, Ramp, Pulse (50 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 Ω. Offset: –1.000 V to 1.000 V into 50 Ω. 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.

See page 393 for Environmental Characteristics.

ORDERING INFORMATION

AWG 2041
1 GS/s Arbitrary Waveform Generator.
Includes: User/Programmer's Manual 070-8657-04, GPIB Programming Examples Disk, Cal. Certificate, Sample Waveform Library Disk, Power Cable.

Opt. 01 – Increase Memory to 4 M words.

Opt. 03 – ECL Digital Data 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™ Software.

Opt. B1 – Service Manual.

Opt. 95 – Cal Data Report.

MEASUREMENT SERVICE OPTIONS
Opt. C3 – Three years of Calibration Services.

Opt. C5 – Five years of Calibration Services.

Opt. R3 – Repair warranty extended to cover three years.

Opt. R5 – Repair warranty extended to cover five years.

INTERNATIONAL POWER PLUG OPTIONS
Opt. A1 – Opt. A5.

ACCESSORIES
Accessory Pouch – Order 016-1159-00.

Front Cover – Order 200-3232-01.

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

Service Manual – Order 070-8963-00.

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.

UPGRADE KITS
4 MB Memory – Order 040-1446-00.

FFT – Order 040-1445-00.

Rackmount Kit – Order 040-1444-00.