Model 2411B

ARBITRARY WAVEFORM GENERATORS

- Very High-Fidelity - 0.005% Waveform Distortion
- 16-Bit (0.0015%) Resolution
- 0.1S/s to 2MS/s Adjustable Sample Rate
- 4 Fully-Programmable Sync Outputs
- 20 Standard Waveforms
- 64k Waveform Memory
- Stores 100 Custom Waveforms
- Summing Input
- RS-232C
- Options
  - 1000 Step Sequence Generator
  - WaveWorks Pro+™ Waveform Creation Software
  - GPIB Communications
  - Rack Mount Kit

16-Bit True AWG

Signal Integrity

Waveforms will always be consistent and repeatable because the 2411B is a true arb. It uses the raster scan technique with sequential addressing of waveform memory and a variable sample clock rate to adjust the output frequency. Other generators use phase accumulator-based addressing, which can skip or repeat waveform data points. The typical THD (total harmonic distortion plus noise) of the 2411B is -86 dB making it ideal for applications requiring wide dynamic range signals.

Comprehensive Features

The 2411B has outstanding performance, offering 16-bit vertical resolution and over 64k of horizontal memory. Standard or arbitrary waveforms are created through the front panel or optional WaveWorks Pro+™software. The adjustable sample clock ranges from 0.1S/s to 2MS/s. The 2411B's superior fidelity and wide dynamic range make it ideal for applications involving high precision, low voltage or signal amplification. Some applications include micro miniature machine stimulation (MEMS), sensor simulations, sonar, automatic airbag triggering, multi-tone audio signals, cardiac and respiratory device testing.

Function Generator Simplicity

Keypad access to 20 standard waveforms, with adjustable parameters, provides function generator simplicity for general lab applications. For custom signal applications, up to 100 unique waveforms may be defined and stored in waveform memory using the keypad or optional WaveWorks Pro+™ software. All programmed waveforms are available for recall and editing from the front panel, RS-232C, or GPIB (optional) interfaces.

Programmable Synchronous Outputs

Each 2411B is equipped with four independently controlled, synchronous outputs.

Sync outputs allow external instruments, including additional 2411B units, to be hardware triggered by waveform events. Because each output is fully programmable, multiple sync pulses can be defined at any width or location within waveform memory. Hardware sync is more precise than software sync, enhances system performance, and reduces development time.

Facilitates the Design of Complex Test Systems

The RS-232C and optional IEEE-488.2 offer direct, easy, programming. The 2411B has numerous triggering and timing inputs/outputs for precise, multi-phase operation of several instruments. Up to four slave arbs may be triggered by a single master 2411B. With four sync outputs available from each slave (16 total outputs), numerous instruments can be simultaneously triggered by a single waveform event. Further expansion is limited only by propagation delay.

Extensive User Tools

Expand the 2411B's memory up to 30,000 times with the optional sequence generator. Each sequence program can have up to 1,000 steps, which can link to any of the 2411B's 100 user-defined waveforms. Each waveform may be looped up to 1 million times per step. Up to one hundred unique sequence programs may be stored in the sequencer's non-volatile memory.

WaveWorks Pro+™ software (optional) is a total software solution for importing, exporting, creation and editing waveform data in up to seven formats including the common ASCII formats .CSV, and .PRN. See the WaveWorks Pro+™ data sheet for more information.

Warranty

The Model 2411B is backed by a full 3-year warranty and TEGAM's 30-day no risk trial.



Prices and specifications subject to change without notice.

TEGAM®

YOUR GLOBAL SOURCE FOR TEST AND MEASUREMENT SOLUTIONS

Model 2411B

16-BIT TRUE AWG

Specifications

Output Waveforms
Up to 100 High-definition custom waveforms, Sine, Square, Triangle, ±Sawtooth, DC, ±Pulse, ±Exponential, AM, SCM, FM, Lin/Log Sweep, Sin x/x (Sinc), Gaussian, Haversine, Circle, Noise.
4 programmable sync signals per waveform.

Sequence Generator (Optional)

Waveform:	Transient-free Loop-and-Link
Repetitions:	Loop: 1,048,575 times Link: 100 waveforms
Program:	1000 Steps total
File:	100 Sequences

Waveform

Storage:	100
Resolution:	Horizontal Points: 65,504 max Vertical Points:16 bits, 65,536 (+32,767,-32,768)
Sample Rate:	0.1Hz to 2MHz (10s to 500ns) 4-digit resolution ±50ppm accuracy
Transition Time:	< 150ns

(Tested with square wave, filter off, 10Vp-p, 50Ω termination.).

Spectral Purity: (THD + Noise): -86 dB typical

(Tested with 80kHz measurement bandwidth, 2MHz clock, 2 kHz sine wave, 1000 points, filter on, full amplitude, 50Ω termination.)

Amplitude and Offset

Range	Resolution	Accuracy
±1.00 to 10V	10mV	1% of setting + 20mV
±100mV to 999mV	1mV	3% of setting + 5mV
±10mV to 99.9mV	100µV	5% of setting + 1mV

Note: 50Ω source impedance, measured at open circuit tested with l kHz sinewave plus DC offset.

Analog Filter
User-selectable 700kHz 7th order, 40kHz 3rd order

Operational Modes
Continuous, Triggered, Gated, Burst (1 to 1,048,575), Toggled, Hold, RTS (Return to start).

Outputs

Main Output:	Front-panel/50Ω impedance.
Sync Outputs:	SYNC 1-SYNC; 4 All fully programmable addresses & widths.
SYNC 1 OUT:	Front-panel (TTL)/50Ω.
SYNC 2 OUT:	Rear panel BNC (TTL).
SYNC 3 OUT:	Rear panel BNC (TTL).
SYNC 4 OUT:	Rear panel BNC (TTL).
CLOCK IN/OUT:	Rear panel sample clock I/O (TTL).
REF IN/OUT:	Rear panel internal or external 10MHz reference (TTL).
Sync Trigger Out:	Rear-panel BNC (TTL) for multiple unit operation.

Inputs

SUM IN:	SUM IN allows external signal to be added to output. Gain = +1 open circuit at 10kΩ input Z.
TRIG IN:	Rear-panel TTL trigger input for triggered, gated, toggled, and burst modes.
CLOCK IN:	Rear-panel sample clock input (TTL, ≤ 4MHz).
REF IN:	Rear-panel 10 MHz reference input. The internal crystal-controlled oscillator will phase-lock to the input.
HOLD IN:	Rear-panel TTL input to stop waveform.
RTS IN:	Rear-panel TTL input to initiate RTS mode.

Trigger Sources

Internal Trigger:	0.02 to 10 seconds
Manual Trigger:	Front-panel button
Ext. Trigger Input:	Rear-panel BNC connector

Creation Tools (Internal)

Waveform Editing:	Point Mode, Line Mode, Vertex Mode; Insert Function, Sum Function, Dump Function, Digital Amplitude/Offset, Smooth, Copy/Paste, Waveform Math (A+B, A-B, AxB).
Pointing Device:	Front-panel keys and knob.
Software:	WaveWorks Pro+™ (Optional)

Stored Settings

Setups:	20 instrument settings

Computer Interface

RS-232C:	19.2k Baud, max.
GPIB:	IEEE Std. 488.2-1987 (Optional)

General

Temperature Range:	(73.4°F +/-5.4°F) 23°C +/-3°C for specified accuracy
Operates:	32°F to 122°F (0°C to +50°C)
Storage:	-4°F to 140°F (-20°C to +60°C)
Dimensions:	10.14" X 4.53" X 11.81" (25.8 X 11.5 X 30 cm) W x H x D
Weight:	11 lbs (5.0kg)
Power:	55VA; 45W (max) 100/120/220/240VAC, +5%, -10%; 48 to 63Hz.

This data sheet was current when it was produced. However, products are constantly being updated and improved. Because of this some differences may occur between the descriptions herein and the current product. Prices and specifications may be changed without notice.

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