2MS/s Arbitrary Waveform Generator

2411B

- ■ **Very High-Fidelity Waveform Generator**
    - 0.005% Waveform Distortion
- ■ **Systems-Ready**
    - RS-232 and GPIB (optional)
    - Cursor-controlled Front Panel
    - 4 Programmable Sync Outputs
- ■ **Complete Set of Tools**
    - Front-panel Waveform-editing Tools
    - Waveform Creation Software (optional)
    - Sequence Generator (optional)
- ■ **Value and Outstanding Support**
    - Best Value and Superb Technical Assistance

Comprehensive Features

For superior fidelity and wide dynamic range the 2411B offers outstanding performance having 16-bit vertical resolution, with 65,536 points. Use the optional WaveWorks Pro Plus software to create or import your application waveform files. For instant recall, store all your waveforms in nonvolatile memory. Front panel edit and stored settings enhance the ease of using the 2411B. Whether dealing with sensor simulations, automatic airbag triggering, multi-tone audio signals, cardiac or respiratory devices, the generator will provide the signals you require.

Extensive User Tools

Immediate access to 20 standard, parameter-controlled waveforms offer function generator simplicity. All 100 user-defined waveforms are available for direct playback or may be edited from the front panel. Complete memory partitioning freedom offers maximum flexibility and optimizes memory use. Optional sequence generator provides for extremely long waveform patterns using the loop-and-link routine. The sequence generator will store up to 100 predefined sequence programs. WaveWorks Pro Plus provides 31 standard functions, waveform manipulation, sequence programming, FFT and IFFT capability for both time- and frequency-domain synthesis.

Signal Integrity

Your waveforms will always be consistent and repeatable because the 2411B uses the raster scan technique with sequential addressing of waveform memory. Other generators using phase accumulator based addressing produce precession and inaccurate successive scans. Total harmonic distortion plus noise of -86 dB for the 2411B enhancing its usefulness for multi-tone studies or harmonic synthesis which require wide dynamic range signals.

System Compatibility

The RS-232C serial port offers a direct, easy programming capability. GPIB, IEEE-488.2 remote control interface is optional and is a higher-speed, more sophisticated interface. For convenience, WaveWorks Pro Plus is functional in both interfaces. Multiple units may be synchronized to obtain coherent signals using the available trigger and timing inputs.

Performance and value

The waveform fidelity, resolution and price of the 2411B make it a leader in the industry. As a Pragmatic customer you are assured technical support both before and after the sale. We pride ourselves on responding personally to all questions when you call. Our phone, fax and e-mail are available 24 hours or just visit our website for both company and product information.

To provide an effective solution for your application is our highest priority.

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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 (+32767,-32768).
Sampling Rate:
   Range: 0.1Hz to 2MHz (10s to 500ns).
   Resolution: 4 digits
   Accuracy: ±50ppm
Waveform 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 sinewave, 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 1 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
OUTPUT: Front-panel main waveform outputs. 50Ω impedance.
Sync Outputs: All fully programmable.
  SYNC OUT: Front-panel (TTL). Also, one address and width programmable. (50Ω)
  SYNC 2 OUT: Rear panel BNC (TTL).
  SYNC 3 OUT: Rear panel BNC (TTL). Also, RUN OUT.
  SYNC 4 OUT: Rear panel BNC (TTL). Also, END BLOCK OUT.
CLOCK IN/OUT: Rear panel waveform sample clock input or output (TTL).
REF IN/OUT: Rear panel internal 10MHz reference output or external 10MHz input (TTL).

Sync Trigger Out: Rear-panel BNC (TTL) for multiple unit operation.

Inputs
SUM IN: Front-panel input allows external signal to be added to output. Gain = +1 open circuit at 10kΩ input impedance.
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 Generator: 0.02 to 10 seconds.
Manual Trigger: Front-panel button.
External Trigger Input: Rear-panel BNC connector.

Creation Tools
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.
Waveform Software: WaveWorks Pro+ (optional)

Stored Settings
Setups: 20 settings

Computer Interface
RS-232C: 19.2 kBaud, max.
GPIB: IEEE Std. 488.2-1987 (Optional)

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

Weight and dimensions are approximate. Errors and omissions excepted. Prices and specifications subject to change without notice.

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