

# Model 2711A

## ARBITRARY WAVEFORM GENERATORS

- **Very High-Fidelity - 0.005 % Waveform Distortion**
- **16-Bit (0.0015 %) Resolution**
- **0.1 S/s to 2 MS/s Adjustable Sample Rate**
- **Sync Trigger Output for Multi-Phase Operation**
- **Waveform Creation Software Included**
- **10 Standard Waveforms**
- **64 k Waveform Memory**
- **Stores 100 Custom Waveforms**
- **RS-232C and GPIB**
- **Options**
  - **100 Step Sequence Generator**
  - **Rack Mount Kit**

### Signal Integrity

Waveforms will always be consistent and repeatable because the 2711A is a true AWG. 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 2711A is -86 dB, which makes it ideal for applications sensitive to signal quality. No other arbitrary waveform generator matches the 2711A's price and performance.

## Low Cost, 16-Bit AWG

### Comprehensive Features

With superior fidelity and wide dynamic range, the 2711A has outstanding performance, offering 16-bit vertical resolution with over 64 k of horizontal memory. Standard or arbitrary waveforms are created through the front panel or waveform creation software. The adjustable sample clock ranges from 0.1 S/s to 2 MS/s. Superior fidelity, low cost, and wide dynamic range make the 2711A ideal for applications involving high precision, low voltage or signal amplification. These include power line harmonics, audio signals, automotive air bags, medical devices and a host of other applications.

### Multiple Unit Operation

Each 2711A is equipped with a synchronous trigger output. The synchronous output allows external instruments, including two or more 2711A units, to be hardware triggered by a master 2711A unit. This produces multiple-phase signals with highly accurate phase offsets. Because the 2711A uses the raster scan technique and sequential addressing, there is no need to recalibrate phase offsets every time a frequency change is made. DDS-type generators require this recalibration.

### Systems Ready

The Model 2711A is a low cost

version of the Model 2411B. It has the same basic performance capabilities but is designed specifically for systems applications where low cost and performance are valued higher than extended front panel functions. 2711A includes standard RS-232C and GPIB interfaces. WaveWorks™ Jr., wave creation software is also provided at no additional charge. Three multi-phase modes are available to synchronize multiple units for phase sensitive applications.

### Function Generator Operation

Direct front panel access to 10 standard waveforms with adjustable parameters provides function generator operation for basic lab use. For test applications where custom signals are required, up to 100 unique waveforms may be stored in waveform memory and recalled via the 2711A's front panel or the included WaveWorks™ Jr. wave creation software.

### Effective User Tools

Expand the 2711A's memory capabilities by adding an optional sequence generator. Each sequence program can have up to 100 steps, which can link to any of the 2711A's 100 user-defined waveforms. Each waveform may be looped over one million times per step. Ten unique sequence programs may be stored in the sequencer's non-volatile memory.

WaveWorks™ Jr. is a complete software solution for importing, exporting, creating, and editing waveform data in the common ASCII formats .CSV, and .PRN. Windows™ compatible, it allows full programming access to both the instrument and the sequence generator. WaveWorks™ Pro+, advanced wave creation software, is available as an upgrade. See the WaveWorks™ Pro+ data sheet for more details.

### Warranty

The Model 2711A is backed by a full 3-year warranty and TEGAM's 30-day no risk trial.



# Model 2711A

LOW COST 16-BIT AWG

## Specifications

### Output Waveforms

Up to 100 High-definition custom waveforms, Sine, Square, Triangle, Ramp, DC, Exponential, Haversine, Pulse, Gaussian, Sin x/x (Sinc).

### Waveform

Storage: 100 Waveforms  
Resolution: Horizontal Points: 65,500 max  
Vertical Points: 16 bits, 65,536 (+32,767 to -32,768)  
Sample Rate: 0.1 Hz to 2 MHz (10 s to 500 ns)  
4-digit resolution  
 $\pm 50$  ppm accuracy  
Transition Time: < 150 ns  
(Tested with square wave, filter off, 10 Vp-p, 50  $\Omega$  termination.)  
Spectral Purity: (THD + Noise): -86 dB typical  
(Tested with 80 kHz measurement bandwidth, 2 MHz clock, 2 kHz sine wave, 1000 points, filter on, full amplitude, 50  $\Omega$  termination.)

### Amplitude and Offset

Range	Resolution	Accuracy
$\pm 1.00$ to 10 V	10 mV	1 % of setting + 20 mV
$\pm 100$ mV to 999 mV	1 mV	3 % of setting + 5 mV
$\pm 10$ mV to 99.9 mV	100 $\mu$ V	5 % of setting + 1 mV

Note: 50  $\Omega$  source impedance, measured at open circuit tested with 1 kHz sinewave plus DC offset.

### Analog Filter

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

### Sequence Generator (Optional)

Waveform: Transient-free Loop-and-Link  
Repetitions: Loop: 1,048,575 times  
Link: 100 waveforms  
Program: 100 Steps total  
File: 10 Sequences

### Operational Modes

Continuous: Output runs continuously between selected memory address locations.  
Triggered: Output at start point until triggered, then runs once.  
Gated: As triggered except output is continuous until gate signal ends.  
Burst: Each trigger outputs a preprogrammed number of waveforms from 1 to 1,048,575.  
Toggled: Alternate triggers gate the output waveform.  
Master-Slave: For multi-unit operation.  
Cont-Sync: Multiple units run continuously in sync with the master unit.  
Trig-Sync: Multiple units run in sync with the master unit for one cycle when the master unit is triggered.  
Trig-Seq: A tail-chasing mode between the master and the slave unit initiated by triggering the master unit.

### Outputs

Main Output: Front-panel/50  $\Omega$  impedance.  
Sync Output: Front-panel TTL sync output, 50  $\Omega$  impedance.  
Clock Out: Rear panel AWG waveform sample clock output (TTL). X2 sample clock.  
Reference Out: Rear panel internal 10 MHz reference output (TTL).  
Sync Trigger Out: Rear-panel BNC (TTL) for multiple unit operation.

### Inputs

TRIG IN: Rear-panel TTL trigger input for triggered, gated, toggled, burst, and master slave modes.  
CLOCK IN: Rear-panel sample clock input (TTL,  $\leq 4$  MHz).  
REF IN: Rear-panel 10 MHz reference input. The internal crystal-controlled oscillator will phase-lock to the input.

### Trigger Sources

Manual Trigger: Front-panel button  
Ext. Trigger Input: Rear-panel BNC connector

### Creation Tools

WaveWorks™ Jr. for Windows™

Operating System: Windows 95, 98, XP, & 2000.  
PC Requirements: 486DX or better with 4 MB RAM.  
Interfaces: COM port or National Instruments AT-GPIB card or equivalent.  
Standard Functions: 21  
Math Operation: 6 Operators, 12 Transfer Functions  
Sequence Creation: Optional hardware required  
Waveform Analysis:  
Frequency Domain: FFT and IFFT; up to 500th harmonic, graphic display, and tabulation.  
Time Domain: Waveform and digital pattern.  
Edit: Point, Vertex, and Harmonics (FFT and IFFT).

### Computer Interface

RS-232C: 19.2 kBaud, max.  
GPIB: IEEE Std. 488.2-1987

### General

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



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