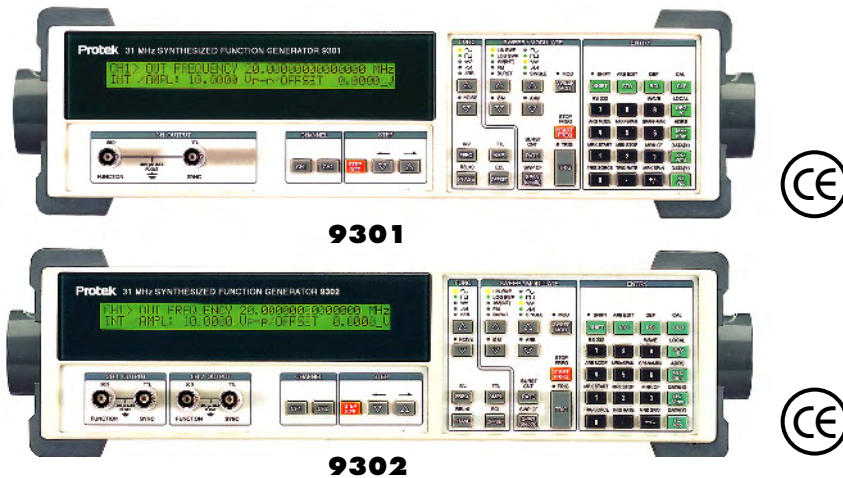


# 1 & 2 Channel Synthesized Function/Arbitrary Waveform Generator

- Log, linear, phase continuous sweeps
- Frequency to 31MHz
- 0.01μHz frequency resolution
- 16 to 16K points arbitrary waveform lengths
- Standard waveforms: Sine, Square, Triangle, Ramp and Noise
- Includes waveform design software
- Waveforms may be designed via front panel or software
- Dual independent channels (9302)
- Sweep times to 1000s
- AM, FM and phase modulation
- RS-232, GPIB and software interface



## SPECIFICATIONS

### Waveforms

Sine, Square, Triangle, Ramp Noise, Arbitrary

### Frequency

Sine and Square: 0.01μHz to 31MHz

Ramp and Triangle: 0.01μHz to 2MHz

Noise: 10MHz

### Output

Output: 9301: 1CH; 9302: 2CH

Output Volts: 20mV to 20V P-P, no load 10mV to 10V P-P, into 50Ω

Resolution: 3 digits

Best Accuracy: Sine wave: ±0.2dB (1μHz to 20MHz)

Square Wave: ±3% (0.01μHz to 100kHz)

Ramp, Triangle and Arbitrary: ±3%

### DC Offset

0 to ±10V (no load), 0 to ±5V DC (50Ω load)

Resolution: 3 digits

Accuracy: ±1.5% + 0.2mVDC

### Sine Wave

Sine Wave Spectral Purity Spurious: < -50dBc (non harmonic)

Phase Noise: < -50dBc in a 30kHz band

Subharmonics: < -50dBc

Harmonic Distortion: -45dBc: DC to 1MHz

-32dBc: 1kHz to 31MHz

### Square Wave

Rise/Fall Time: < 15ns from 10 to 90% of full amplitude

Asymmetry: < 1% of period + 4ns

Overshoot: < 5%

### Ramp, Triangle and Arbitrary

Rise and Fall Time: <35ns

Settling Time: <1μs

Linearity: ±0.5% FS

### Arbitrary Waveforms

Standard: Sine, Square, Triangle, Ramp, DC, Exponential Fall,

Noise, Freehand, Line, Damped Sine

Sample Rate: 40MS/s (Max)

Waveform Length: 16 to 16,384 points

Amplitude Resolution: 12 Bit

### Phase

Range: 9999.99°; Resolution: 0.01°; Rate: 0.001Hz to 10kHz

### Frequency Modulation

Source: Internal

Waveforms: Sine, Square, Ramp, Triangle, Ramp, Arbitrary

Rate: 0.001Hz to 10kHz

Span: 0.01Hz to 31MHz (2MHz for Triangle or Ramp)

### Amplitude Modulation

Source: Internal or external

Waveforms: Sine, Square, Ramp, Triangle, Arbitrary

Depth: 0 to 100%

Rate: Internal: 0.001Hz to 10kHz; External: 20kHz Max.

Distortion: < -35dB

DSB Carrier: < -35dB typical at 1kHz modulation rate

Ext. Input: 5V for 100% modulation

### Frequency Sweep

Type: Linear or log, phase continuous

Waveforms: Up, down, Up-down, Single sweep

Sweep Time: 100μs to 1000s (0.001Hz to 10kHz)

Span: 0.01μHz to 31 MHz (2MHz for Ramp and Triangle)

Markers: Two markers may be set between any sweep point

Sweep Output - 0 to 10V linear ramp signal synchronized to sweep

### Burst

Waveforms: Sine, Square, Triangle, Ramp, Arbitrary

Frequency: 2MHz Max for any waveform

Count: 1 to 65,000 cycles/burst

Phase Shift: ≤100kHz

### Trigger Generator

Source: CH 1: Single, Int rate, Pos Ext, Neg Ext 1, Line

CH 2: Int CH 1, Int rate, Pos Ext 2, Neg Ext 2 (9302 only)

Rate: 100μs to 999.99s

External: Positive or negative slope, TTL input

Output: TTL Level

### Timebase

Accuracy: ±3PPM (20 to 30°C)

Aging: ±3PPM/Yr

Input: 10MHz/N ±2PPM where N=1 to 8.1V P-P Min. input level

Output: > 1V P-P 10MHz sine wave into 50Ω

### General Specifications

Interface: RS-232 (baud rates from 2400 to 19.2k bps,

DCE) and GPIB

Size: 14.0" W × 3.5" H × 13.5" D; Weight: 22 lbs.

Power Consumption: 46Ω (9301); 80Ω (9302)

Supplied Accessories: Manual, Line cord, Software,

BNC cable

# 1 & 2 Channel Synthesized Function/Arbitrary Waveform Generator

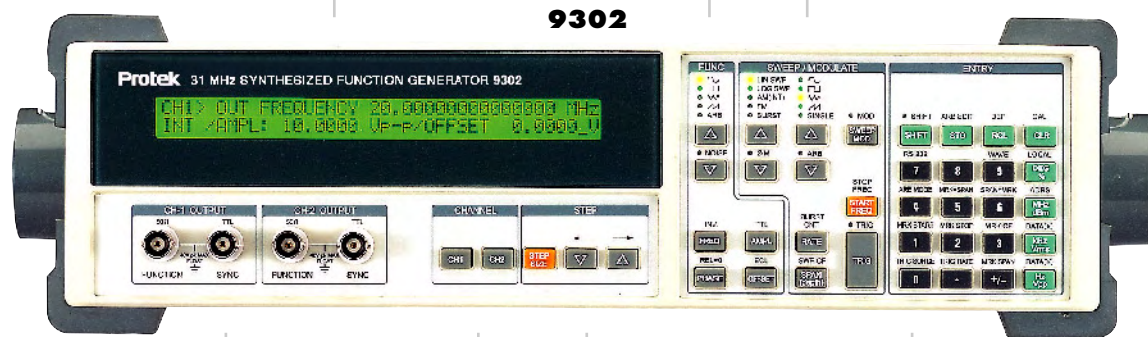
9301 □ 9302

LCD display reads out waveform parameters for single or dual channel models

**Function**  
Sine, Square, Triangle, Ramp, Arbitrary or Noise may be selected along with their frequency, amplitude and offset values and displayed on the LCD

**Sweep / Modulate**

- Log and Lin sweep
- AM, FM, Phase or burst modulation of Sine, Square, Triangle, Ramp and Arbitrary waves
- Bursts may be from 1 to 65,666 waveforms and internally or externally triggered



**Output**

- Single (9301) or Dual independent outputs (9302) with 10V P-P in to a 50-Ohm load
- TTL compatible Sync output

**Channel**

Displays CH 1 or CH 2 (9302) parameters on the LCD

**Step**

All waveform parameters may be changed in any increment or decrement value

**Keyboard entry**

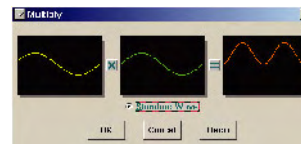
- Amplitude in RMS, P-P or dB units
- Frequency in Hz, kHz or MHz
- Arbitrary waveform data point editing
- Store and Recall waveforms in 16 memory locations
- Setting marker values
- Enabling RS-232 and GPIB Interface

## SOFTWARE

The Protek Waveform composer software allows the user to design a waveform on a computer monitor and then download it to the ARB. The software has 8 standard waveforms: Sine, Square/Pulse, Triangle/Ramp DC, Exponential rise, Exponential fall, Noise and Damped Sine wave, plus Freehand and Line. These standard waveforms, selected from the tool bar are 2K points long and 5 Volts P-P. More complex waveforms of up to 16K points in length may be created using the Waveform and Math menu as shown below.

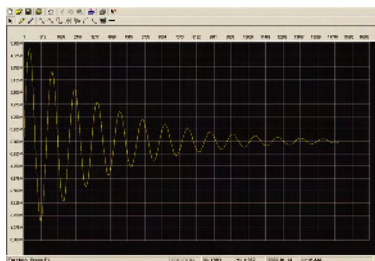


**Waveform creation menu:**  
Allows you to create a 16 to 16,384 point, multi cycle waveform with Phase Shift, DC Offset and Amplitudes of 0 to  $\pm 5V$  P-P



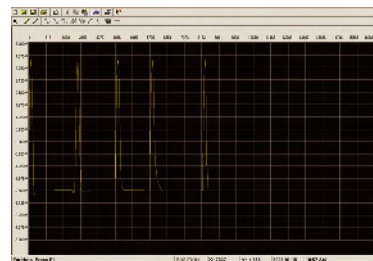
**Math menu for creating complex waveforms.**

## WAVEFORMS



Waveform tool bar for selecting standard waveforms and drawing custom waveforms

Waveforms from 16 to 16,000 points width and amplitude of up to  $\pm 5$  volts may be created and edited.



Example of a custom waveform