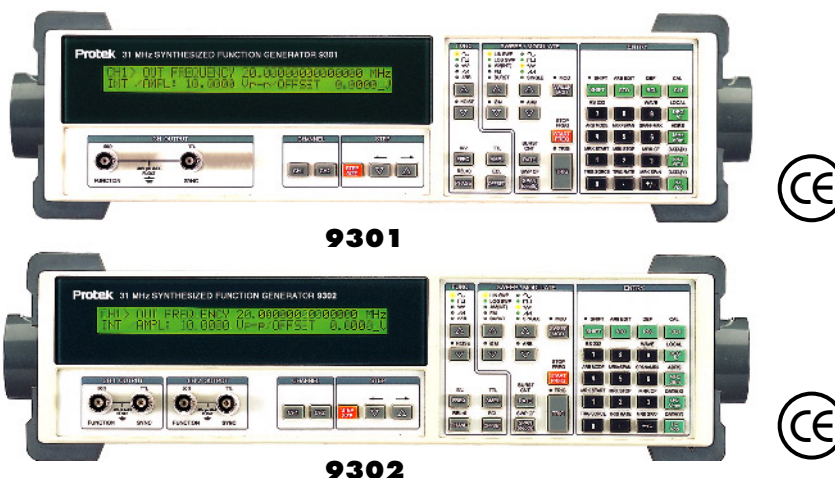


# 1 & 2 Channel Synthesized Function/Arbitrary Waveform Generator

- 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:** 46W (9301); 80W (9302)

**Supplied Accessories:** Manual, Line cord, Software, BNC cable

# 1 & 2 Channel Synthesized Function/Arbitrary Waveform Generator

9301 □ 9302

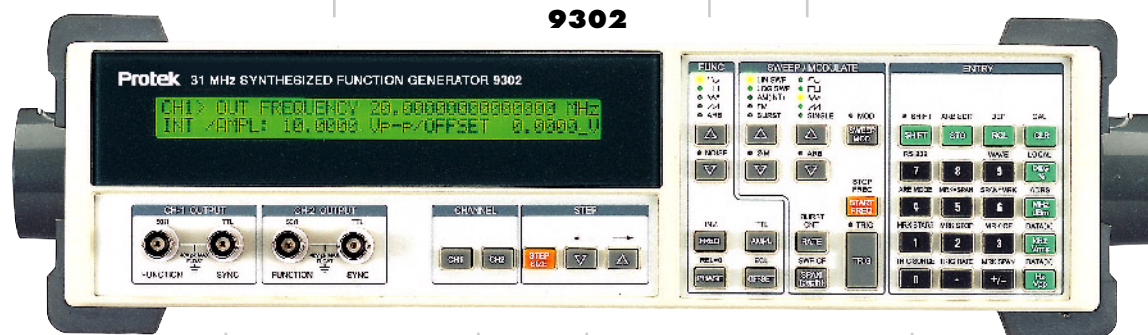
**LCD display** reads out waveform parameters for single or dual channel models

## 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

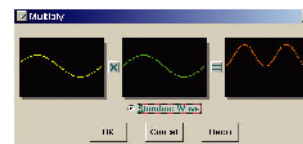
## SOFTWARE

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.



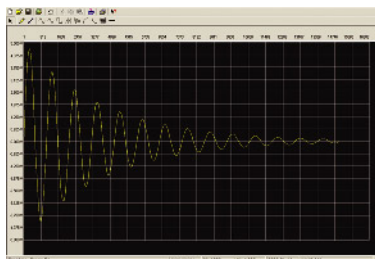
## Waveform creation menu:

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



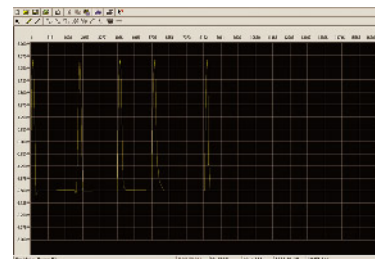
Math menu for creating complex waveforms.

## 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

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