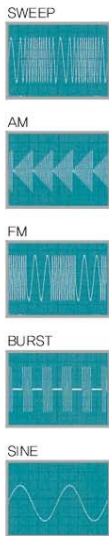


Arbitrary & Function Generator

Protek 9301/9302

Protek 9301/
 Protek 9302
 Various
 Waveforms



Main function BNC
 (CH1/CH2 Output)

- This output has an impedance of 50Ω
- If it is terminated into an impedance other than 50Ω, the output amplitude will be incorrect, and it may cause increased distortion



Step Keys

- The step keys permit the operator to increase or decrease the displayed parameter value.
- Every parameter key has an associated step size, pressing the STEP UP arrow

- Key adds the step size to the current value, While pressing the STEP DOWN arrow key subtracts the step size from the current value,
- Pressing [STEP SIZE] key again returns the display to the previous parameter.



Function Keys

- These keys select the main waveform output, The FUNCTION up/down arrow keys select the output waveform.
- If the output frequency is set beyond the allowable range of the waveform, () 2MHz for triangle and ramp, a message will be displayed and the frequency will be set to the maximum allowed for that function.



Sweep / Modulate Keys

- These keys control the Protek 9302's modulation and sweep capabilities. The left hand up/down arrow keys select the type of modulation or sweep.
- The Right hand up/down arrow keys select the modulating or sweep waveform.
- The [SWEEP MOD] key selects modulation ON and OFF. When the modulation is turned on the SWEEP MOD LED will light.
- If the modulation parameters are not permitted for the selected output function, an error message will be displayed and modulation will not be turned on.

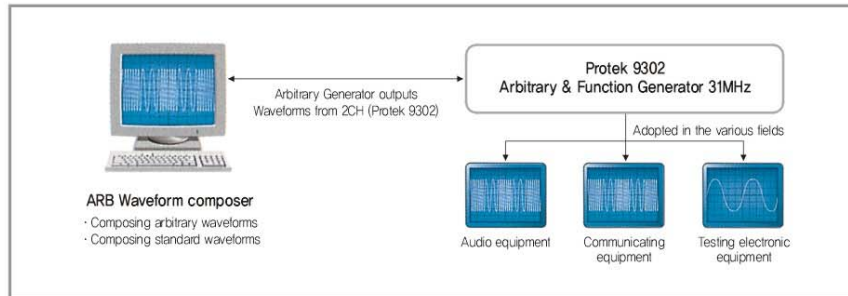
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Features

- DDS(Direct Digital Synthesizer) technology
- Function : Sine, Square, Triangle, Ramp, Noise and Arbitrary waveform
- Frequency Range : 0.00000001Hz to 31MHz
- Frequency Resolution : 0.00000001Hz
- Frequency Accuracy : ±3ppm
- Modulation : AM, FM, PM, Burst
- Arbitrary Waveform of 40M sample/sec, up to 16k sample point
- RS232 Interface (standard)
- GPIB Interface (standard)
- Arbitrary Waveform Composer (standard)

Applications

- Test of sounds, images, communication equipments and electronic parts
- Test of construction, civil engineering, machines and materials
- Standard generator of communication facilities
- Test of electronic equipments and measuring instruments
- Automotive, Industrial, Biomedical, Sensor simulation
- Manufacturing test



**Protek 9301/
 Protek 9302
 Various
 Waveforms**

SQUARE



TRIANGLE



RAMP



ARBITRARY



Specifications

Waveform Specifications		Reception Frequency		Signal Characteristics Specifications	
Standard Function	Sine, Square, Triangle, Ramp, Noise, Arbitrary			Rise / Fall Time	< 16 ns (10% to 90%)
AWC Software	Windows 95, 98, 2000, NT, ME			Asymmetry	< 1% of period + 4 ns
AWC Function	Sine, Square, Triangle, Ramp, DC, Noise, Damped Sine, Exponential Rise, Exponential Fall, Freehand, Line			Overshoot	< 5%
Waveform Length	16 to 16, 383 points			Rise / Fall Time	35 ns
Amplitude Resolution	12 bits			Linearity	0,5% of full scale output
Sampling Rate	40 M samples/sec			Modulation Characteristics Specifications	
Frequency Characteristics Specifications				Source	Internal (sine, square, triangle, ramp or arbitrary) or External
Sine, Square	0,01Hz to 31MHz			Depth	0 to 100% AM or $\pm 100%$ DSBSC
Ramp, Triangle	0,01Hz to 2MHz			Rate	0,001Hz to 10kHz internal, 20kHz max external
Noise	10MHz (64BITS M type)			Distortion	< -35dB at 1kHz, 80% depth
Output Characteristics Specifications				DSB Carrier	< -35dB typical at 1 kHz modulation rate (DSBSC)
Output	Protek9301 [1 Channel], Protek9302 [2 Channel]			External Input	± 5 V for 100% modulation, 100k Ω impedance
Source Impedance	50 Ω Floating			Source	Internal (sine, square, triangle, ramp or arbitrary)
Output Units	V _{pp} , V _{rms} , dBm, %			Rate	0,001 Hz to 10 kHz
Sync Output	Front - Panel TTL Output for each channel			Span	0,01 μ s to 31MHz (2MHz for triangle, ramp)
Inter Channel Crosstalk	< 0,05% [Protek9302 only]			Source	Internal (sine, square, triangle, ramp or arbitrary)
DC Offset				Rate	0,001Hz to 10kHz
Range	± 5 V (limited such that V _{ac peak} + V _{dc} ≤ 5 V)			Span	9999,99°
Accuracy	$\pm 2%$ of setting + 1 mV (DC only)			Waveform	sine, square, triangle, ramp or arbitrary
Amplitude Range	± 80 mV depending on AC and DC settings			Frequency	2MHz to sine, square, triangle, ramp, ARB
1. Sine Wave Amplitude Accuracy (0 V DC Offset)				Count	1 to 65,000 cycles / burst
	0,01 μ s ~ 100kHz	100kHz ~ 20MHz	20MHz ~ 25MHz	Phase Shift	≤ 100 kHz
	~ 100 kHz	~ 25 MHz	~ 31 MHz	Type	Linear or Log
5-10V _{pp}	$\pm 0,2$ dB	$\pm 0,3$ dB	$\pm 0,6$ dB	Time	0,001Hz to 10kHz
0,05-5V _{pp}	$\pm 0,4$ dB	$\pm 0,4$ dB	$\pm 0,8$ dB	Span	0,01 μ s to 31MHz (2MHz for triangle, ramp)
2. Square Wave Amplitude Accuracy				Marker Output	Two markers may be set at any sweep point (TTL output)
	0,01 μ s ~ 100kHz	100kHz ~ 20MHz	20MHz ~ 31MHz	Sweep Output	0-10 V linear ramp signal, synchronized to sweep
5-10V _{pp}	$\pm 3%$	$\pm 6%$	$\pm 15%$	Source	CH1 : INT RATE, Single, POS EXT1, NEG EXT1, Line
0,05-5V _{pp}	$\pm 5%$	$\pm 8%$	$\pm 16%$	CH1 : INT Ch1, INT RATE, POS EXT2, NEG EXT2	
3. Triangle, Ramp, Arbitrary Amplitude Accuracy				Rate	0,0001s ~ 999,99s
	0,01 μ s ~ 100kHz	100kHz ~ 2MHz		External Input	\pm edge, TTL Output
5-10V _{pp}	$\pm 4%$	$\pm 8%$		Output	TTL Output
0,05-5V _{pp}	$\pm 5%$	$\pm 9%$		Accuracy	± 3 ppm (20°C to 30°C)
Sine Wave Spectral Purity Specifications				Aging	± 3 ppm/year
Spurious Components	DC to 2MHz : < -65dBc [non-harmonic]			Input	10MHz/N ± 2 ppm, N=1 to 8, 1V _{p-p} minimum input level
	2MHz to 31MHz : < -65dBc + 6dBc/octave [non-harmonic]			Output	10MHz, > 1 V _{p-p} sine into 50 Ω
Subharmonic	< -50 dBc [Sine, 5V _{pp}]			Operating Temperature	5°C to 40°C
Harmonic Distortion	: Harmonically related signals will be less than :			Operating Humidity	35% to 80%
	DC to 1MHz [Sine, 1V _{pp}] : < -45 dBc			Weight	Protek9301 : 8,2kg, Protek9302 : 8,7kg
	1MHz to 31MHz [Sine, 1V _{pp}] : < -32 dBc			Dimensions	363mm[W] x 109mm[H] x 386mm[D]
				Interfaces	RS-232 (2400 to 19,200 bps) and GPIB (Optional)
				Power Supply	100 / 120 / 220 / 230 VAC [$\pm 10%$] 50 / 60 Hz
				Power Consumption	Protek9301 : 46W, Protek9302 : 80W

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