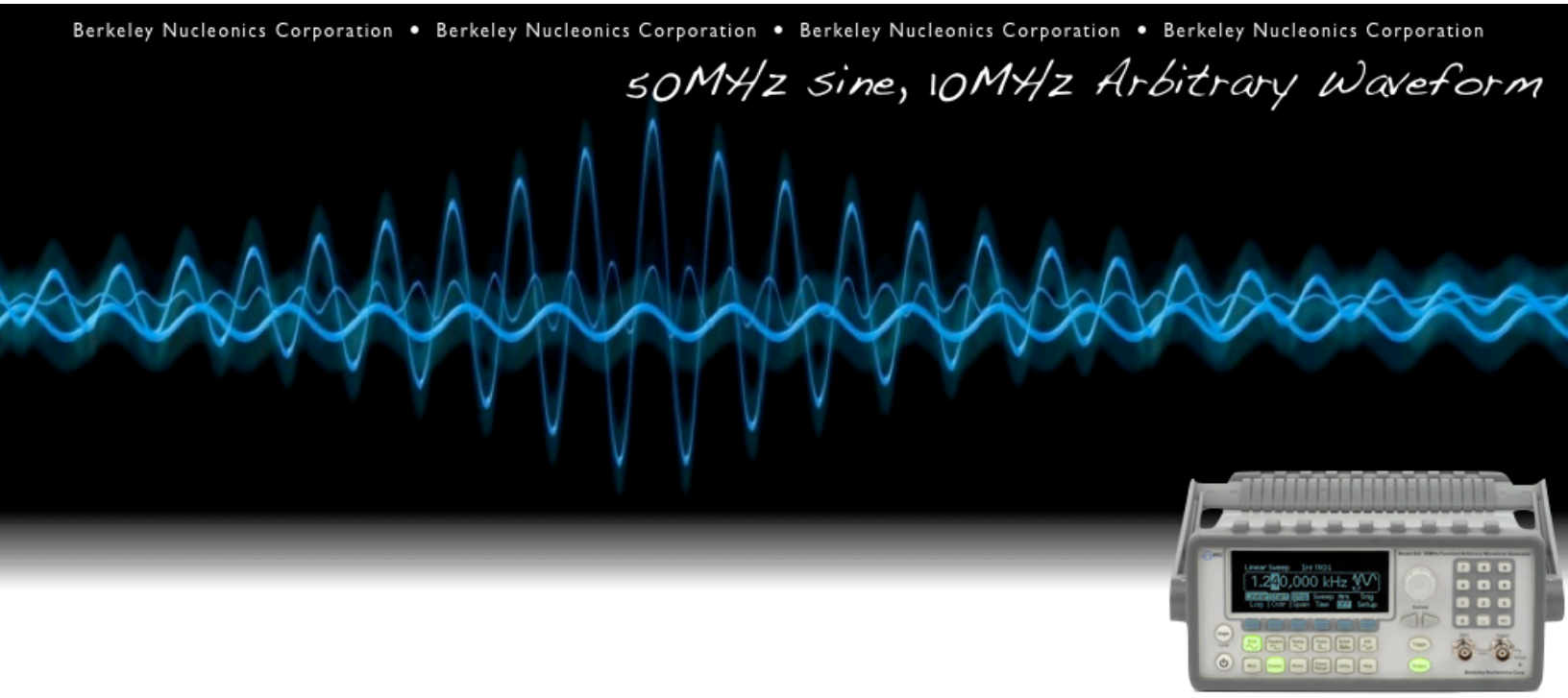
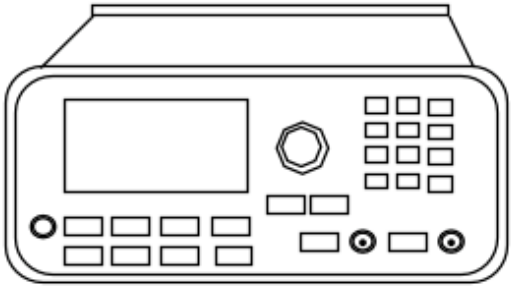
50MHz Arbitrary Waveform/Function Generator



BNC | model 645



Variable-Edge-Time Pulses Up to 10MHz

- 50MHz ARB with 14 bit, 125M samples/sec
- Display – Illustrates Active Waveform
- Sync multiple units together, or to external clock
- Sine, Square, Ramp, Triangle, Pulse, Noise, DC

BNC model 645

The BNC Model 645 50MHz Function/Arbitrary Waveform Generator delivers many advanced features and user modes than our previous models, with a price that is designed to meet tough economic constraints. New DDS+ technology embraces advancements in the semiconductor industry and leverages state-of-the-art components for both standard and complex functions. The resulting design is a box for every bench, far more capable than the ARBs and Function Generators of the past. We have even incorporated IP support, so a web browser can control the instrument over LAN.

The Model 645 has some significant advances over our 20MHz and 30MHz models. The speed, sample rates, and memory are expanded. The storage of custom waveforms is increased, and the tactile front panel controls are easy to manipulate. We understand the broad range of applications and can now provide you, our demanding customers, a product loaded with functionality and representing an excellent value. Start your 30 day trial today.

Pulse Generation

The Model 645 can generate variable-edge pulses at rates up to 10MHz. From the front panel or through remote communications, the user may vary the period, pulse width and amplitude. The pulse parameters may be stored in the unit or on your computer for later recall. If you have multiple units in your experiment, you may elect to save the setup and upload the pulse properties to multiple Model 645s. For adjustability and routing pulsing tests, see the flexible nature of the Model 645.

Custom Waveform Generation

Many research activities requiring a variety of custom pulses, the Model 645 allows users to generate complex custom waveforms on a computer and download the waveform properties into the ARB. The custom nature of the device lends itself well to R&D activities with a range of variable tests that need to be performed. The Model 645 offers 14-bit resolution and a 125 MSa/s sampling rate, giving users enough control of their waveforms for most applications. The Model 645 will storage of up to 5 waveforms concurrently (4 waveforms (4 x 256K points) in nonvolatile memory and 1 waveform in volatile memory.

Graph mode

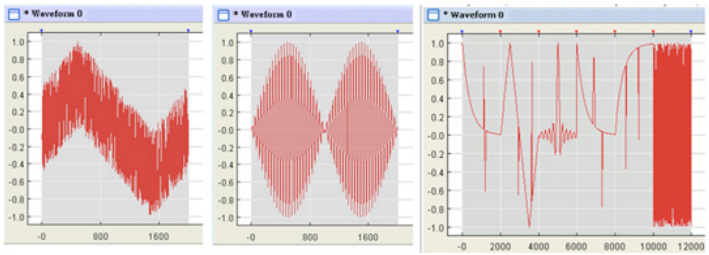
In graph mode, user can easily visual verify the signal settings. Also, user can always see the selected function on the upper left corner of display.

Data Transmission via Pattern Out

The Model 645 offers users the ability to create and store 16-bit data for later retrieval. The data can be transmitted via a “Pattern Out” from the Model 645 rear panel as a source of control signals for your experiment.

BNC Waveform Editing Software: WaveCrafter

BNC WaveCrafter allows users to create, edit and download complex waveforms into their Model 645 quickly and efficiently. Storage of complex waveforms can be done on the PC, or emailed among colleagues. In addition, users can retrieve waveforms from a number of Digital and Mixed-Signal Oscilloscope (such as the Agilent MSO 8104) using WaveCrafter in capture mode.



Berkeley Nucleonics Corporation, 2955 Kerner Blvd., San Rafael CA 94901 U.S.A
Phone: 800.234.7858 Fax: 415.453.9956 E-mail: info@berkeleynucleonics.com

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Modulation		
Modulation Type	AM, FM, PM, FSK, PWM, Sweep and Burst	
AM	Carrier	Sine, Square, Ramp, Arb
	Source	Internal / external
	Internal Modulation	Sine, Square, Ramp, Triangle, Noise, Arb
	Frequency (Internal)	2mHz to 20KHz
	Depth	0.0% ~ 120.0%
FM	Carrier	Sine, Square, Ramp, Arb
	Source	Internal / external
	Internal Modulation	Sine, Square, Ramp, Triangle, Noise, Arb
	Frequency (Internal)	2mHz to 20KHz
	Deviation	DC ~ 25MHz
PM	Carrier	Sine, Square, Ramp, Arb
	Source	Internal / external
	Internal Modulation	Sine, Square, Ramp, Triangle, Noise, Arb
	Frequency (Internal)	2mHz to 20KHz
	Deviation	0.0° to 360°
PWM	Carrier	Pulse
	Source	Internal / external
	Internal Modulation	Sine, Square, Ramp, Triangle, Noise, Arb
	Frequency (Internal)	2mHz to 20KHz
	Deviation	0% ~ 100% of pulse width
FSK	Carrier	Sine, Square, Ramp, Arb
	Source	Internal / external
	Internal Modulation	50% duty cycle Square
	Frequency (Internal)	2mHz to 100KHz
External Modulation Input[8]	Voltage Range	±5V full scale
	Input Resistance	8.7KΩ typical
	Bandwidth	DC to 20KHz
SWEEP	Waveforms	Sine, Square, Ramp, Arb
	Type	Linear or logarithmic
	Direction	up or down
	Sweep Time	1 ms ~ 500 Sec
	Trigger	Internal , External or Manual
	Marker	falling edge of sync signal (programmable frequency)
BURST[7]	Waveforms	Sine, Square, Ramp, Triangle, Noise, Arb
	Type	Counted (1 to 50000 cycles), Infinite, Gated
	Start/Stop Phase	-360° to +360°
	Internal Period	1uS ~ 500Sec
	Gated Source	External trigger
	Trigger Source	Internal , External or Manual
Trigger Input	Level	TTL compatible
	Slope	Rising or Falling (Selectable)
	Pulse width	> 100 ns
	Impedance	> 10KΩ, DC coupled
	Latency	< 500 ns
Trigger Output	Level	TTL compatible into ≥ 1 KΩ
	Pulse width	> 400 ns
	Output Impedance	50 Ω typical
	Maximum rate	1MHz
	Fan-out	≤ 4 Picotest G5100As

Pattern Mode CHARACTERISTIC		
Clock	Maximum rate	50MHz
Output	Level	TTL compatible into ≥ 2 KΩ
	Output Impedance	110 Ω typical
Pattern	Length	2 to 256 K

Display	Graph mode for visual verification of signal settings	
Capability	Standard waveforms	Sine, Square, Ramp, Triangle, Pulse, Noise, DC
	Built-in arbitrary waveforms	Exponential Rise and Fall, Negative ramp, Sin(x)/x, Cardiac

General	
Power Supply	CAT II 110 – 240V AC ±10%
Power Cord Freq.	50Hz to 60Hz
Power Consumption	50VA max
Operating Environment	0°C to 55°C
Storage Temperature	-30°C to 70°C
Interface	(Standard) USB, LAN, (Optional) GPIB
Language	SCPI-1993, IEEE-488.2
Dimensions	107 (H) x 224 (W) x 380 (D) mm
Weight	4.08 Kg
Safety Designed to	IEC61010-1,EN61010-1,UL61010-1
EMCTested to	EN61326, IEC61000-3, IEC61000-4
Warm-up Time	1 hour
Warranty	1 Year

[1] Add 1/10th of output amplitude and offset spec per °C for operation outside the range of 18°C to 28°C

[2] Autorange enabled

[3] DC offset set to 0V

[4] Spurious output at low amplitude is -75 dBm typical

[5] Add 1 ppm/°C average for operation outside the range of 18°C to 28°C

[6] FSK uses trigger input (1 MHz maximum)

[7] Sine and square waveforms above10MHz are allowed only with an "infinite" burst count

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WAVEFORM CHARACTERISTIC		
Sine	Frequency	1 µHz to 50 MHz
	Amplitude Flatness [1][2] (Relative to 1KHz)	0.1dB(<100KHz)
		0.15dB(<5MHz)
		0.3dB(<20MHz)
		0.5dB(<50MHz)
	Harmonic distortion [2][3] (unit: dBc)	DC to 20 KHz -70(< 1Vpp) -70(≥ 1Vpp)
		20 KHz to 100 KHz -65(< 1Vpp) -60(≥ 1Vpp)
		100 kHz to 1 MHz -50 (< 1Vpp) -45 (≥ 1Vpp)
		1 MHz to 20 MHz -40 (< 1Vpp) -35 (≥ 1Vpp)
		20 MHz to 50 MHz -35 (< 1Vpp) -30 (≥ 1Vpp)
	Total Harmonic distortion [2][3]	DC to 20 KHz, Output ≥ 0.5Vpp THD+N ≤ 0.06%
	Spurious [2][4] (non-harmonic)	DC to 1 MHz -70 dBc
		1 MHz to 50 MHz
		-70 dBc + 6 dB/octave
	Phase Noise (10K Offset)	-115/dBC/Hz, typical when f ≥ 1MHz, V ≥ 0.1Vpp
Square	Frequency	1 µHz to 25 MHz
	Rise/Fall time	< 10 ns
	Overshoot	< 2%
	Variable Duty Cycle	20% to 80% (to 10 MHz)
		40% to 60% (to 25 MHz)
	Asymmetry	1% of period + 5 ns (@ 50% duty)
	Jitter (RMS)	200 ps when f ≥ 1MHz, V ≥ 0.1Vpp
Ramp, Triangle	Frequency	1 µHz to 200 KHz
	Linearity	< 0.1% of peak output
	Symmetry	0.0% ~ 100.0%
Pulse	Frequency	500 µHz to 10 MHz
	Pulse width	20 ns minimum
		10 ns res. (period ≤ 10s)
	Variable Edge Time	< 10 ns to 100 ns
	Overshoot	< 2%
	Jitter (RMS)	200 ps when f ≥ 50KHz, V ≥ 0.1Vpp
Noise	Bandwidth	20 MHz typical
Arbitrary	Frequency	1 µHz to 10 MHz
	Length	2 to 256 K
	Resolution	14 bits (including sign)
	Sample Rate	125 MSa/s
	Min Rise/Fall Time	30ns typical
	Linearity	< 0.1% of peak output
	Settling Time	< 250ns to 0.5% of final value
	Jitter(RMS)	6ns + 30ppm
	Non-volatile Memory	4 waveforms * 256K Points

COMMON CHARACTERISTIC		
Frequency	Resolution	1µHz
Amplitude	Range	10mVpp to 10Vpp in 50Ω
		20mVpp to 20Vpp in Hi-Z
	Accuracy [1][2] (at 1KHz)	±1% 0f setting ± 1mVpp
	Units	Vpp, Vrms, dBm
	Resolution	4 digits
DC Offset	Range (Peak AC +DC)	±5V in 50Ω
		±10V in Hi-Z
	Accuracy [1][2]	±2% of offset setting ±0.5% of amplitude setting
	Resolution	4 digits
Main Output	Impedance	50 Ω typical
	Isolation	42 Vpk maximum to earth
	Protection	short-circuit protected; overload automatically disables main output
Internal Frequency reference Accuracy [5]		±10ppm in 90 days
		±20ppm in 1 year
External Frequency reference	Standard /Option	Standard
External Frequency Input	Lock Range	10 MHz ± 500 Hz
	Level	100mVpp ~5Vpp
	Impedance	1KΩ typical, AC coupled
	Lock Time	< 2 Sec
External Frequency Output	Lock Range	10 MHz
	Level	632mVpp (0dBm), typical
	Impedance	50Ω typical, AC coupled
Phase Offset	Range	-360° to +360°
	Resolution	0.001°
	Accuracy	8ns

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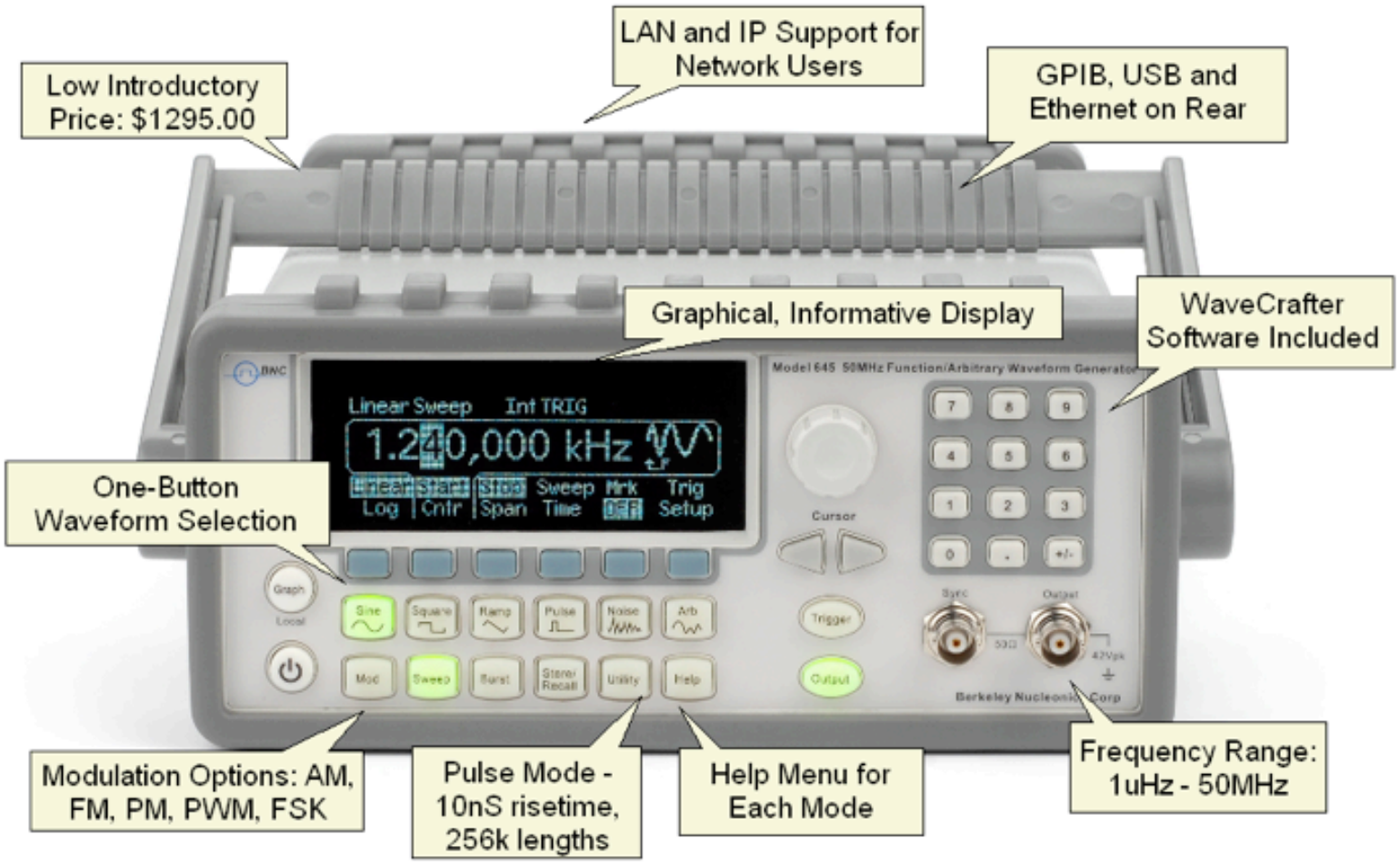

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