20 MHz Dual Channel Function / Arbitrary Generator
Model 4047B

The 4047B Dual Channel Function/Arbitrary Waveform Generator is capable of generating stable and precise sine, square, triangle, pulse, and arbitrary waveforms. CH1 and CH2 outputs are fully independent with individual on/off buttons and can both be varied from 0 to 10 Vpp into 50 ohms (up to 20 Vpp into open circuit). The generator provides linear and logarithmic sweep capabilities, AM/FM/PM/FSK/PWM modulation, and a continuously variable DC offset to inject signals directly into circuits at the correct bias level. Separate output amplitude and DC offset amplifiers let you set a large DC offset (e.g. ± 4.99 V) with a small amplitude output signal (e.g. 10 mV).

The 4047B seamlessly integrates with B&K Precision's waveform editing software WaveXpress, allowing users to generate complex arbitrary waveforms that can be output via the instrument's 14-bit, 125 MSa/s, 16 kpts arbitrary waveform generator.

Dual architecture design

The 4047B's dual architecture, a feature typically only found in more expensive generators, provides all the benefits of a DDS and a true point-by-point arbitrary waveform generator (AWG) combined, without any limitations imposed by either technology. The DDS chip produces standard sine and triangle waveforms with high frequency resolution and at a low cost. The true point-by-point AWG implementation (Fig 2) offers improved signal integrity for arbitrary waveforms by producing significantly less jitter and distortion compared to a DDS-based architecture. Custom arbitrary waveform generation is implemented with a variable clock signal to reproduce each point stored in memory without skipping or repeating data points, a problem typically found in DDS based designs with fixed reference clocks.

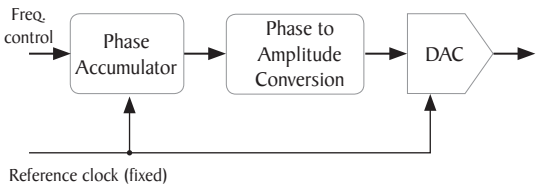


Fig 1 - DDS

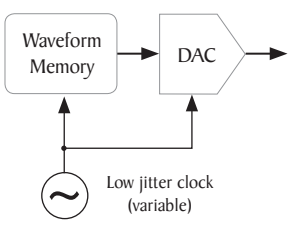


Fig 2 - point-by-point AWG

Features & Benefits

- Dual-channel operation with each channel providing the rated amplitude (10 Vpp) over the entire frequency range
- Sine and square waveforms up to 20 MHz
- True point-by-point 14-bit, 125 MSa/s, 16-kpt arbitrary waveform generator
- Bright color display with waveform preview
- Synchronize the phase of both channels with the push of a button
- Linear and logarithmic sweep
- AM, FM, PM, FSK, and PWM internal and external modulation capabilities
- Gate and burst mode
- Independent output and DC offset amplifiers allow for small amplitude output signals with large DC offsets
- Low-jitter square wave generation for simulating reliable clock signals, generating triggers, or validating serial data buses
- USB interface
- SCPI-compliant command set
- Internal/external triggering
- Built-in counter
- Short circuit protection for resistive and capacitive loads on outputs and overvoltage protection on inputs

Applications

This generator is suitable for a wide range of applications including electronic design, sensor simulation, functional test, or serial data bus validation.

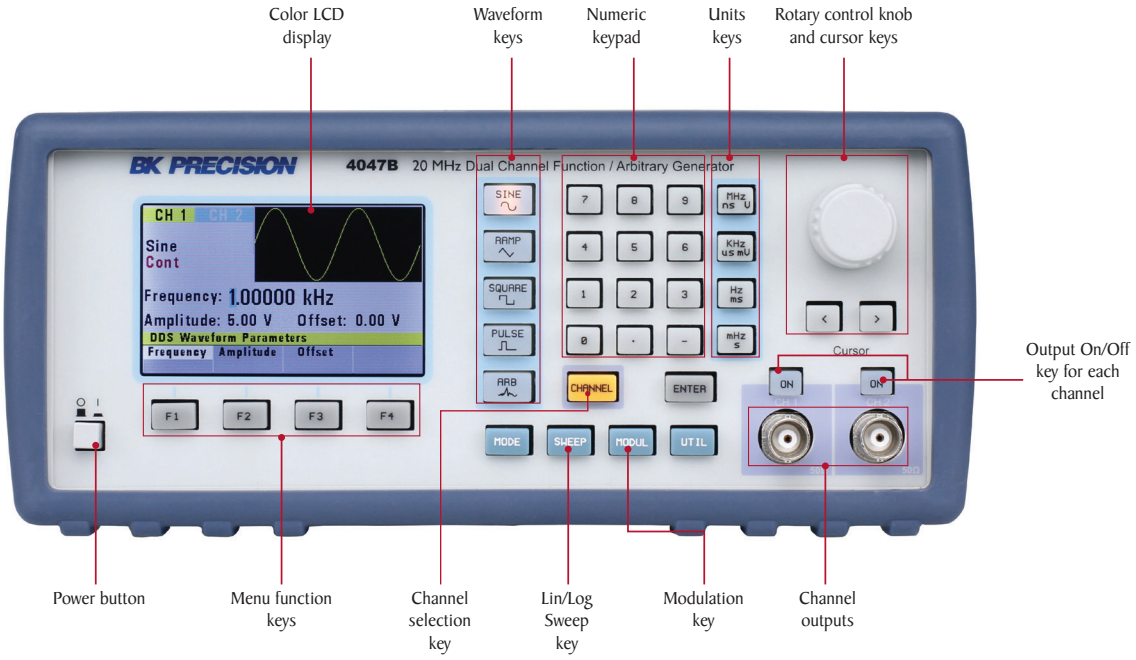
WaveXpress™ Compatible

For more information, visit www.bkprecision.com/WaveXpress

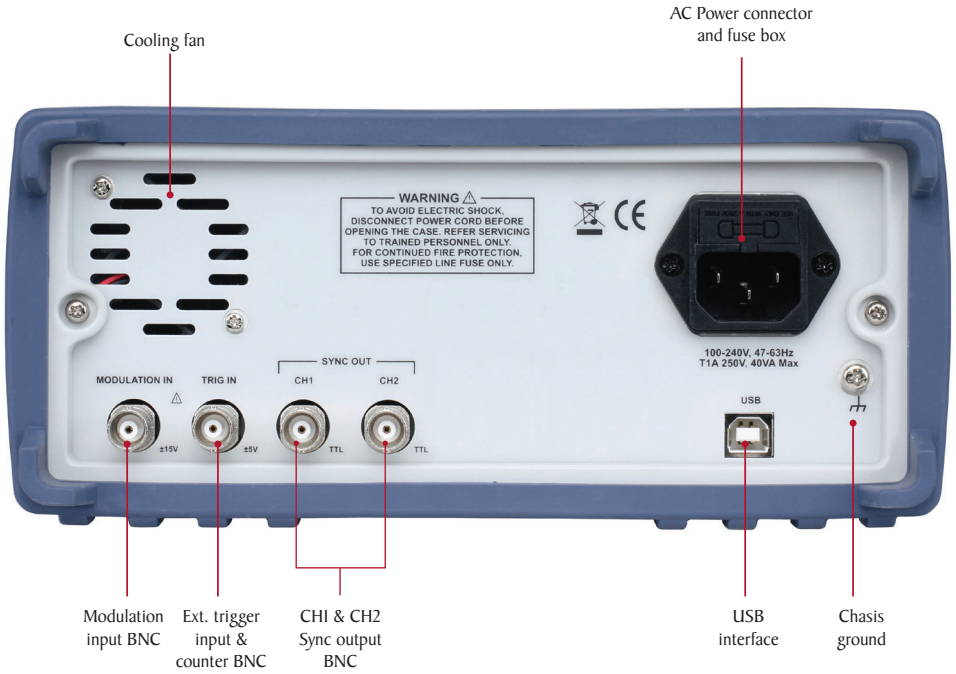
Front panel

Intuitive user interface

Easily adjust all waveform parameters using the intuitive menu-driven front panel keypad with dedicated channel selection keys, numeric keypad, and rotary control knob.

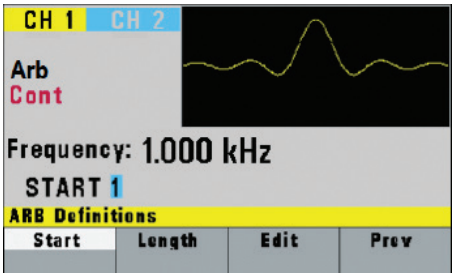


Rear panel



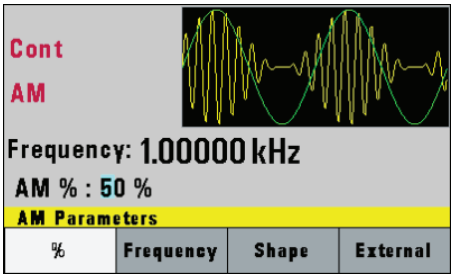
Flexible operation

Front panel arbitrary waveform generation



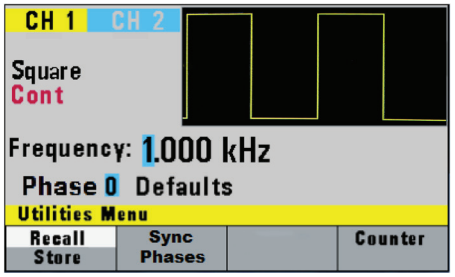
From the front panel, waveforms can be defined from scratch by entering data point-by-point or by loading and modifying predefined waveforms.

Versatile features



The 4047B provides AM, FM, PM, FSK, and PWM modulation along with linear/logarithmic sweep and built-in counter capabilities. Internal and external sources can be used for triggering and modulating the signal.

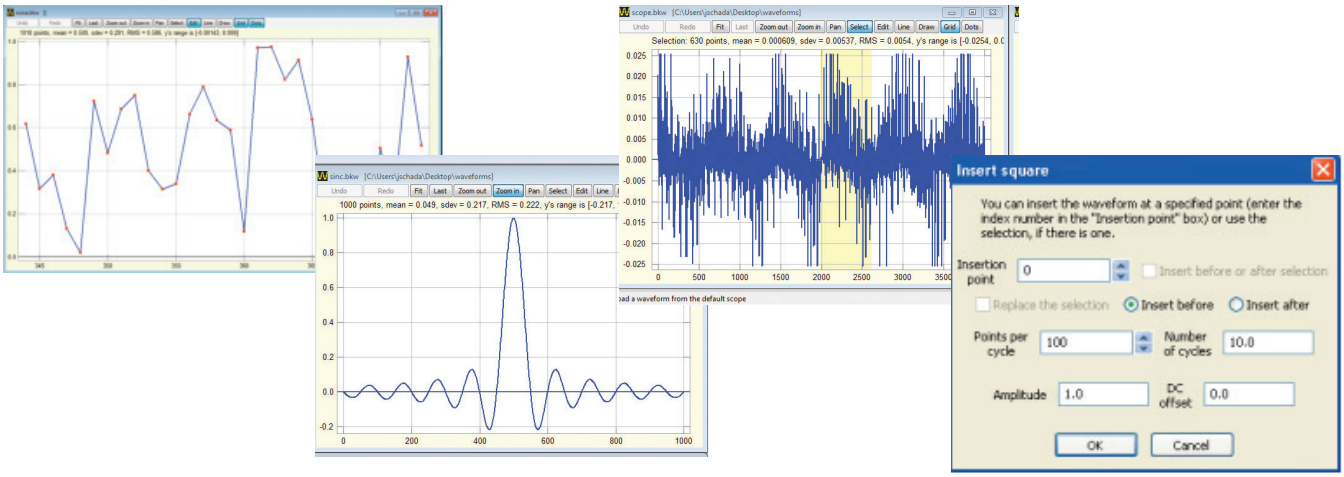
Channel phase synchronization



Easily synchronize the phase of both channels with the push of the Sync Phases button to ensure the desired output signal timing.

Powerful waveform editing tool

WaveXpress



WaveXpress is a comprehensive stand-alone application allowing users to easily generate, edit, and upload custom arbitrary waveforms to the generator via the remote interface. Use the software to generate waveforms by importing a csv file or define via freehand, point draw, and waveform math functions.

Features & Benefits

- Import waveforms from B&K scopes
- Autoscan function automatically detects instruments connected via RS232, USB, or GPIB
- Insert commonly used waveforms and different types of noise
- Numerous transformations for changing a waveform. User-defined transformations can be added in the python programming language
- Dialog settings are remembered for faster repetitive work
- Undo/redo functions allow quick experimentation

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Specifications	4047B
Channels	2
Frequency Characteristics	
Sine	0.01 Hz - 20 MHz
Square	0.01 Hz - 20 MHz
Triangle	0.01 Hz - 2 MHz
Pulse	0.01 Hz - 20 MHz
Resolution	up to 8 digits
Accuracy	0.001% (10 ppm) at < 500 Hz: 0.001% + 0.006 Hz
Output Characteristics	
Amplitude Range	10 mVpp to 10 Vpp (into 50 Ω); 20 mVpp to 20 Vpp (open circuit)
Amplitude Resolution	3 digits (1,000 counts)
Amplitude Accuracy	± 2% ± 20 mV of programmed output from 1.01 V - 10 V
Flatness	± 0.5 dB to 1 MHz ± 1 dB to 20 MHz
Offset Range	-4.99 V to 4.99 V (into 50 Ω)
Offset Resolution	10 mV, 3 digits
Offset Accuracy	± 2% ± 10 mV (into 50 Ω)
Output Impedance	50 Ω ± 2%
Output Protection	Protected against short circuit or accidental voltage practically available in electronic laboratories, applied to the main output connector
Waveform Characteristics	
Harmonic Distortion (3 Vp-p into 50 Ω)	0 - 1 MHz, < -60 dBc 1 MHz - 5 MHz, <-50 dBc 5 MHz - 12 MHz, <-45 dBc 12 MHz - 20 MHz, < 50 dBc
Rise/Fall Time (square, pulse)	≤ 20 ns (10% to 90% at full amplitude into 50 Ω)
Variable Duty Cycle/Symmetry	Square: 20% - 80% to 1 MHz Triangle: 1% - 99% in 1% steps, up to 200 kHz
Symmetry Accuracy at 50%	± 1%
Pulse Width (period 100 s - 50 ns)	10 ns to <(Period - 10 ns), 10 ns resolution
Variable Edge Time	100 ns to Width/0.625 (50 % duty cycle) 10 ns resolution
Jitter (square, pulse)	< 50 ps rms (cycle-to-cycle, typical)
Arbitrary Waveform Characteristics	
Sampling Rate	8 ns to 100 s
Vertical Resolution	14 bits
Accuracy	0.001%
Resolution	4 digits
Waveform Length	2 to 16,382 points
Jitter	< 50 ps rms (cycle-to-cycle, typical)
Operating Modes	
Continuous	Output continuous at programmed parameters
Triggered	Output quiescent until triggered by an internal or external trigger, at which time one waveform cycle is generated to programmed parameters. Frequency of waveform cycle is limited to 1 MHz.
Gate	Same as triggered mode, except waveform is executed for the duration of the gate signal. The last cycle started is completed.
Burst	2-65535 cycles
Trigger Source	Trigger source may be internal, external, or manual. Internal trigger rate 0.1 Hz - 1 MHz (1 us - 10 s)

Modulation Characteristics		
Amplitude Modulation (AM)	Carrier	Sine, Square, or Triangle
	Source	Internal, External
	Internal Modulation	0.1 Hz - 20 kHz
	Depth	0% to 100%
Frequency Modulation (FM)	Carrier	Sine, Square, or Triangle
	Source	Internal, External
	Internal Modulation	0.01 Hz - 20 kHz
	Deviation	1 µHz to max frequency/2
Frequency Shift Keying (FSK)	Carrier	Sine, Square, or Triangle
	Source	Internal, External
	Rate	≤ 100 kHz
Phase Modulation (PM)	Carrier	Sine, Square, or Triangle
	Source	Internal, External
	Internal Modulation	0.1 Hz - 20 kHz
	Deviation	0 - 360 °,0.1 ° resolution
Pulse Width Modulation (PWM)	Source	Internal, External
	Width	1% to 99%
	Internal Modulation	0.01 Hz - 100 kHz
Sweep Characteristics		
Sweep Shape		Linear or Logarithmic, up or down
Sweep Time		10 ms to 100 s
Input and Output		
Trigger IN		TTL compatible Maximum rate 1 MHz Minimum width > 50 ns Input impedance 1 kΩ
Sync OUT		TTL pulse at programmed frequency; 50 Ω source impedance
Modulation IN		5 Vp-p for 100% modulation 10 kΩ input impedance DC to > 20 kHz minimum bandwidth
Counter Characteristics		
Range		50 Hz to 50 MHz
Resolution		Auto ranging, up to 8 digits
Accuracy		± 0.02% ± 2 digits
Sensitivity		25 mVrms typical
General		
Memory Storage		20 instrument settings
Arbitrary Memory		16,382 points in flash memory
Power Requirements		100 V - 240 V AC ± 10%, 47-63 Hz
Max. Power Consumption		< 30 VA
Operating Temperature		32 °F to 122 °F (0 °C to 50 °C)
Storage Temperature		14 °F to 158 °F (-10 °C to 70 °C)
Humidity		95% R.H. 0 °C to 30 °C
Dimensions (W x H x D)		8.39" x 3.46" x 8.27" (213 x 88 x 210 mm)
Weight		5.5 lbs (2.5 kg)
Safety and EMC Standards		EN55011 for radiated and conducted emissions EN55082, EN61010, CE approved
		Three-Year Warranty
Included Accessories		Power cord, USB (type A to B) interface cable, certificate of calibration

Note: All specifications apply to the unit after a temperature stabilization time of 15 minutes over an ambient temperature range of 23 °C ± 5 °C.
Specifications are subject to change without notice.

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- Поставка более 17-ти миллионов наименований электронных компонентов;
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- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
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- Лицензия ФСБ на осуществление работ с использованием сведений, составляющих государственную тайну;
- Поставка специализированных компонентов (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Aeroflex, Peregrine, Syfer, Eurofarad, Texas Instrument, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits,General Dynamics и др.);

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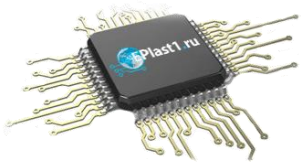
- Подбор оптимального решения, техническое обоснование при выборе компонента;
- Подбор аналогов;
- Консультации по применению компонента;
- Поставка образцов и прототипов;
- Техническая поддержка проекта;
- Защита от снятия компонента с производства.



Как с нами связаться

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