

Function & Arbitrary Waveform Generator



4070A

The B+K Model 4070A represents the finest single source for signal generation to date. Combining the latest DSP and DSS technologies, the 4070A offers a number of operating modes, providing a versatile, cost-effective signal source. You will find the 4070A is the best value and most capable instrument for any bench.

Arbitrary Waveform Generator, Sweep Function Generator, Pulse, VCO, AM, FM, Φ Modulation, FSK and Burst Modes are all accessed quickly and easily from the front panel keypad. Being a true 12 bit arbitrary generator, the 4070A is stable, accurate and drift free. Unlike competitive models, the 4070A generates every data point independently of the repetition rate instead of a simple look-up table. Custom design waveforms on a PC, or download from a number of sources, spread sheet, oscilloscope or application program - the 4070A will perform like no other signal source.

■ Arbitrary Waveform Generation

Design custom waveforms on your PC and download for generation 40 MS/s max update rate 12 bit resolution, 32K buffer. Arbitrary waveforms may be designed with a graphical Windows®-based design tool, which is available for free download from www.bkprecision.com.

■ Function Generator

Generate Triangle, Ramp, Sinewave and others.

■ Pulse Generator

Digital waveforms with an adjustable duty cycle.

■ High Stability Timebase

Guarantee ± 5 ppm frequency over 32° to 104°F (0 to 40°C) range.

■ Modes

- Basic Sine/Square Wave
- Linear/Log Sweep (Free Run or Triggered)
- Internal/ External AM
- Internal/ External FM
- Internal/ External PM
- Internal/ External SSB
- Internal/ External BPSK
- Internal/ External FSK (Ext FSK to 3MHz)
- Burst (Int/Ext trigger)
- DTMF Generation
- DTMF Detection
- Power Measurement
- Dualtone Generation
- Arbitrary Waveform
- Function Generator
- Pulse Generator

The B+K Precision 4070A represents a major breakthrough in signal generation and analysis. This versatile instrument has capabilities that allow the engineer to use it in a broad range of that include communications, radio, telephony, analog/digital circuit design and test.

The 4070A is much more than a signal generator. Never before has so much versatility, capability and performance been packed into a single low-cost instrument. Its architecture is based on the latest advances in DSP and DDS technology which not only ensures calibrated and drift-free performance, but also gives the engineer signal analysis functions such as DTMF Detection and Power Level Measurement. The capabilities of the 4070A can continually be enhanced and expanded by downloading software upgrades to internal Flash memory.

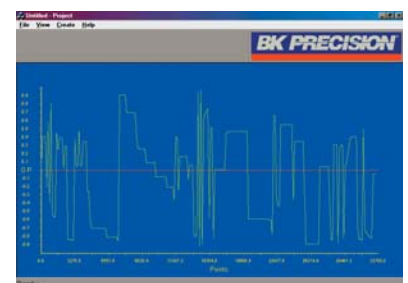
The 4070A delivers clean, fully synthesized, DC to 21.5MHz modulated or unmodulated waveforms with 0.01Hz frequency resolution. User-friendly features include a large, easy-to-read illuminated LCD display which allows the user to see all modulation parameters simultaneously and a full numeric keypad and encoder which provide direct editing of each parameter. No confusing submenus!

Arbitrary Waveform Generator

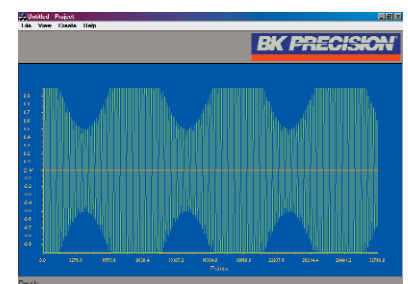
The Arbitrary Waveform Generator allows you to design custom waveforms on your personal computer and download them to the 4070A which generates them in real-time. The Arbitrary Waveform Generator system is also used to generate pulse waveforms with an adjustable duty cycle and a suite of pre-stored Function Generator waveforms. Arbitrary waveforms may either be designed with a graphical Windows®-based design tool or be generated point-by-point in a variety of data formats from your own application software. A floppy diskette with a data generator program, example waveforms, and a downloader utility are included with this option.



Control Panel



Freehand Waveform



Amplitude Modulation Waveform

Specifications

model
4070A

STANDARD FEATURES

DC offset capability

- TTL/CMOS sync output available in all modes
- RS232 remote control (Easy to use) Code examples included.
- External logic input for gating or output signal and triggering.
- Easy software updates via Flash memory.
- Configuration save/restore: 10 complete front panel setups.

MAIN OUTPUT

- Frequency: DC to 21.500000 MHz, 0.01 Hz steps
- Level: 4 mVp-p to 10.000 Vp-p, 1 mV steps (into 50 Ω) or -44 dBm to +24 dBm, 0.1 dBm steps (into 50 Ω)
- Level Accuracy: $\pm 1\%$
- Sinewave Distortion: $< 1\%$
- Flatness: ± 0.2 dB (DC-21.5 MHz) Level 5V @50 Ω
- DC offset: 0V to ± 6 V, 1 mV steps (into 50 Ω)
- Output impedance: 50 Ω
- Freq. accuracy: ± 10 ppm (.001%), ± 5 ppm optional (@50 Ω)
- Phase Noise: < -55 dBc in a 30 kHz band
- Spectral Purity: DC to 100 kHz: > -50 dBc
100 kHz to 1 MHz: > -45 dBc
1 MHz to 12 MHz: > -40 dBc
12 MHz to 21.5 MHz: > -35 dBc

SYNC OUTPUT

- Amplitude: 0V to +5V (TTL/CMOS comp.)
- Fall Time: 3 ns.
- Rise Time: < 8 ns. 10% to 90%
- Output current: ± 24 mA.

RS232 PORT

- Asynchronous, no parity, 1 start bit, 1 stop bit.
- Baud rate: Adjustable, 300 bps to 115,200 bps.
- Remote operation from a terminal or host computer.

EXTERNAL MODULATION INPUT

- Maximum full scale input: ± 5 V (10 Vp-p)
- Input Impedance: 30 k Ω

EXT. TRIGGER/GATING/FSK/BPSK INPUT

- Input impedance: 80 k Ω
- Max. input level: ± 10 V
- Max. gating freq: 3 MHz

EXT. ARB CLOCK INPUT

- Input level: TTL/CMOS
- Max. clock freq: 40 MHz

OPERATING MODES

- The carrier frequency for all modulation modes is 0 Hz to 21.500000 MHz, 0.01 Hz steps.
- All internal modulation frequencies are synthesized and are accurate to 0.01%.

BASIC SINEWAVE (CW) MODE

- Output frequency: 0 Hz to 21.500 MHz, 0.01 Hz steps

FREQUENCY MODULATION (FM) MODE

- Int. modulation freq: 0 Hz to 10 kHz, 1 Hz steps
- Ext. modulation freq: DC to 35 kHz
- Peak frequency deviation: 0 Hz to ± 5.0 MHz, 1 Hz steps

PHASE MODULATION (PM) MODE

- Int. modulation freq: 0 Hz to 10 kHz, 1 Hz steps
- Ext. modulation freq: DC to 35 kHz
- Peak phase deviation: 0 to $\pm 180^\circ$, 1 $^\circ$ steps

SWEEP MODE

- Start/Stop freq: 0 Hz to 21.500 MHz, .01 Hz steps
- Linear or Log sweep. Up or Down sweep direction
- Continuous or Int/Ext Triggered sweep
- Sweep time: 1 ms to 60 sec. 1 ms steps.

VOLTAGE CONTROLLED OSCILLATOR MODE

- Endpoint frequencies: 0 Hz to 21.500 MHz, 0.01 Hz steps
- Control input range: -5.0V to +5.0V
- Control signal bandwidth: DC to 35 kHz

BURST MODE

- Continuous or Triggered from Front Panel, RS232, or Ext. TTL
- On Time: 1 ms to 99.999 Sec, 1 ms steps
- Off Time: 0 ms to 99.999 Sec, 1 ms steps

DUAL TONE MULTI FREQUENCY (DTMF) GENERATE MODE

- Dialing digits generated: 0 to 9, #, *, A, B, C, D
- Duration: 1 ms to 10.000 Sec, 1 ms steps

Function & Arbitrary Waveform Generator

Delay:	0 ms to 10.000 Sec, 1 ms steps
CUSTOM DUAL TONE GENERATE MODE	
Tone 1, Tone 2 Frequency:	DC to 10.000 kHz, 1 Hz steps
Phase Offset:	0 deg. to 359 deg., 1 deg. steps
Output ON time:	Cont. or 1 ms to 10.000 sec, 1 ms steps
Output OFF time:	0 ms to 10.000 sec, 1 ms step.
AMPLITUDE MODULATION (AM) MODE	
Int. modulation freq:	0 Hz to 10 kHz, 1 Hz steps
Ext. modulation freq:	DC to 35 kHz
Percentage modulation:	Variable 0% to 100%, 1% steps
SINGLE SIDEBAND (SSB) MODE	
Int. modulation freq:	0 Hz to 1.0 MHz, 1 Hz steps
Ext. modulation freq:	DC to 8500 Hz
Upper or Lower Sideband selectable	
FREQUENCY SHIFT KEYING (FSK) MODE	
Int. modulation freq:	0 Hz to 130 kHz, 1 Hz steps
Ext. modulation freq:	0 Hz to 3 MHz
Mark/Space freqs:	0 Hz to 21.5 MHz, 0.01 Hz steps
DATA MODULATION MODE	
Baud Rate:	0 Hz to 130 kHz, 1 Hz steps
Message length:	1 to 960 bits. Nonvolatile storage: 10 locations
Mark/Space frequencies:	0 Hz to 21.5 MHz, 0.01 Hz steps
POWER & VOLTAGE MEASUREMENT MODE	
Input signal level:	± 5 V max. (10Vp-p)
Input signal bandwidth:	DC to 50 kHz
Power calc. impedance:	Variable from 1 to 999 Ω
BINARY PHASE SHIFT KEYING (BPSK) MODE	
Int. modulation freq:	0 Hz to 130 kHz, 1 Hz steps
Ext. modulation freq:	0 Hz to 10 kHz
DUAL TONE MULTI FREQUENCY (DTMF) DETECT MODE	
DTMF digits detected:	0 to 9, #, *, A, B, C, D
Detection range:	10 Vp-p max., 20 mVp-p min.
Detection time:	100 ms
ARBITRARY WAVEFORM GENERATOR MODE	
Vertical Resolution:	12 bits
Sample Rate:	Variable from 0Hz to 40 Msamples/Sec. in .1 Hz steps
Sample Buffer Depth:	32,768 data points
Data Formats Supported:	Floating Point, Decimal, Hexadecimal, Integer, Binary, Digital, CSV and PRN formats
Nonvolatile waveform storage:	1 location, 32,768 points
FUNCTION GENERATOR MODE	
Waveforms:	Pos. Ramp, Neg. Ramp, Triangle, Pos. Exponential, Inverted Pos. Exponential, Neg. Exponential, Inverted Neg. Exponential, Random (noise), Sinewave
Repetition Rate:	0 Hz to 2 MHz in 1 Hz steps, all functions
Run Mode:	Continuous or Internal/External Triggered
PULSE GENERATOR MODE	
Frequency:	0 Hz to 2 MHz in 1 Hz steps
Duty Cycle:	Variable 0% to 100% in 1% steps
Run mode:	Continuous or Int/Ext Triggered
Output:	Variable in amplitude and offset, A TTL/CMOS output is simultaneously provided.
GENERAL	
Power:	100-240 VAC 47-63 Hz, 30W, 3 prong IEC conn.
Display:	2 line by 40 character, LCD, backlit.
Weight:	Approx. 3.5 lbs. (1.6 kg)
Dimensions (H x W x L):	5.5 x 11.75 x 10.375" (140 x 298 x 264mm)
Operating Temperature:	32 $^\circ$ to 104 $^\circ$ F (0 $^\circ$ to 40 $^\circ$ C) ambient.
Stored instrument setups:	10, including 1 power-up state

Accessories

Two Year Warranty

Carrying Case (not included): LC-40