Models 4084AWG & 4086AWG

Arbitrary/ Function Generators

Data Sheet

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The B+K Precision® 4084AWG and 4086AWG are high performance laboratory grade synthesized function generators with arbitrary capability. Direct digital synthesis (DDS) techniques are used to create stable, accurate output signals for all 27 built-in standard and complex (arbitrary) waveforms The generators produce high purity, low distortion sine waves up to 80 MHz, square waves up to 40 MHz and a stable output of very small signals down to the 1mV - 10mV range. The instrument also provides a built-in 100 MHz Universal Counter with frequency measurement and totalize function.

Unmatched affordability and excellent performance make models 4084AWG & 4086AWG a perfect fit for many applications in Electronic Test and Design, Sensor Simulation and Education and Training.

Custom waveform generation made easy

In addition to the built-in complex waveforms, you can use the 4084AWG & 4086AWG to generate custom arbitrary waveforms with 10 bit vertical resolution, 16k memory depth and a sample rate of 200MSa/s. Increase your productivity with the included intuitive Windows Software: Create and edit waveforms and download them to the instrument with a single click. Waveforms can be generated in many ways: Draw waveforms freehand, import them from a text file or start out with standard functions and customize them with the provided math functions (fig1).

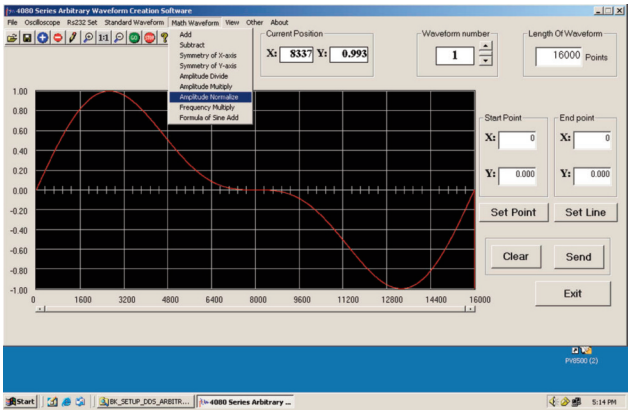

Fig1 Arbitrary Waveform Generation Software

Additionally, the software provides a direct interface to Tektronix® TDS1000, TDS2000 TPS2000 and TDS3000 series digital storage oscilloscopes. Users can easily import waveforms originating from the DSO's display or internal memory and download and "replay" them on the instrument.

Versatile modulation and trigger capabilities

The generators provide extensive modulation capabilities including AM, FM, FSK, PSK, pulse modulation and linear/logarithmic sweep. Internal and external modulation sources, as well as internal, external and gated trigger sources are supported. Modulation parameters can be set precisely and are adjustable over a wide range. For instance, burst count is programmable in 1 burst increments up to 10000 bursts and burst phase is adjustable in 0.1° increments.

Convenient user interface and operation

You can adjust parameters via knob or numeric keypad. Enter amplitude values directly in Vpp, mVpp, Vrms, mVrms or dBm, and display the correct voltage by entering the actual output configuration used (terminated with 50 Ohm or open circuit). You can enter frequency in terms of frequency or seconds using time values s, ms, Hz, kHz or MHz. Submenus are used for modulation modes and other complex functions. The generators are fully programmable via the standard RS232 interface, using SCPI commands. The instrument also provides 10 memories to store and recall instrument settings. Additionally the current state is saved at power off and can be restored at power up.

Specifications subject to change without notice

Specifications

	models 4084AWG	4086AWG
Frequency Characteristics		
Sine	1μHz ~ 20MHz	1μHz ~ 80MHz
Square	1μHz ~ 20MHz	1μHz ~ 40MHz
All Other waveforms	1μHz ~ 100kHz	
Frequency Stability	±1x10^{-6} (22°C ±5°C)	
Resolution	1μHz	
Accuracy	≤ ± 5x10^{-6} (22°C ±5°C)	
Data entry Units	s, ms, Hz, kHz, MHz	
Waveform Characteristics		
Main Waveforms (Sine, Square)		
Amplitude resolution	12 bits	
Sample Rate	200MSa/s	
Sine		
Harmonic Distortion of Sine Wave*	≤ - 50dBc (frequency ≤ 5MHz) ≤ - 45dBc (frequency ≤ 10MHz) ≤ - 40dBc (frequency ≤ 20MHz) ≤ - 35dBc (frequency ≤ 40MHz) ≤ - 30dBc (frequency > 40MHz)	
THD*	0.1% (20Hz ~ 100kHz)	
Square		
Rise and fall time*	≤ 15ns	
* = Note: Test conditions for harmonic distortion, sine distortion, rise/fall time Output Amplitude 2Vp-p, Environmental temperature: 25°C±5°C		
Others built-in waveforms		
27 build-in standard and complex waveforms	Sine, Square, Triangle, Positive Ramp, Falling Ramp, Noise, Pulse, Positive Pulse, Negative Pulse, Positive DC, Negative DC, Stair wave, Coded Pulse, Full wave rectified, Half-wave rectified, Sine transverse cut, Sine vertical cut, Sine phase modulation, Logarithmic, Exponential, Half-round, Sinx/x, Square root, Tangent, Cardiac, Earthquake, Combination	
Waveform Length	4096 dots	
Amplitude Resolution	10 bits	
Pulse		
Duty Cycle	0.1% ~ 99.9% (below 10kHz), 1% ~ 99% (10kHz ~ 100kHz)	
Rise/Fall Time	≤ 100ns (Duty Cycle 20%)	
DC signal characteristics		
DC range	≤ 10mV – 10V (high impedance)	
DC Accuracy	≤ ±5% of setting +10mV (high impedance)	
Arbitrary		
Non volatile memory	8 waveforms	
Waveform length	8~16000 points	
Amplitude resolution	10 bits	
Frequency range	1μHz~100kHz	
Sample rate	200MSa/s	
Amplitude Characteristics		
Amplitude Range (open circuit)	Freq ≤ 40MHz: 2mV ~ 20Vpp , 1mV ~ 10Vpp (50Ω) Freq > 40MHz: 2mV ~ 4Vp-p, 1mV ~ 2Vpp (50Ω)	
Resolution	2μVpp (open circuit), 1μVpp (50Ω)	
Accuracy	± 1%+0.2mV (sine wave relative to 1kHz)	
Stability	±0.5 % /3 hours	
Flatness		
For amplitude ≤ 2Vpp	±3% (freq≤ 5MHz), ±10% (5MHz<freq≤ 40MHz)	
For amplitude >2Vpp:	±5% (freq≤ 5MHz), ±10% (5MHz<freq≤ 20MHz) ±20% (frequency>20MHz) ±1dBm (frequency>40MHz)	
Output Impedance	50Ω	
Output Units	Vpp, mVpp, Vrms, mVrms, dBm	
DC Offset Characteristics		
Offset Range (open circuit)	Freq ≤ 40MHz): ±10Vpk ac+dc (Offset ≤ 2 x pk to pk amplitude) Freq >40MHz): ±2Vpk ac+dc (Offset ≤ 2 x pk to pk amplitude)	
Offset Resolution	2μV (open circuit), 1μV (50Ω)	
Offset Error	±5% of setting +10mV (Ampl. ≤ 2Vpp into open circuit) ±5% of setting +20mV (Ampl. > 2Vpp into open circuit)	
Modulation		
AM Characteristics		
Carrier Waveforms	Sine or Square	
Modulation Source	Internal or external	
Internal Modulating Waveform	Sine, Square, Triangle, Rising/Falling Ramp	
Frequency of modulating signal	100μHz ~ 20kHz	
Distortion	≤ 2%	

Specifications (Cont.)	Models 4084AWG & 4086AWG
Modulation Depth	1% ~ 120%, 1% ~ 80% (frequency>40MHz, Ampl > 2Vpp into open circuit)
Modulation Error	± 5%+0.2% (100μHz < frequency ≤ 10kHz) ±10%+2% (10kHz < frequency ≤ 20kHz)
Max. Amplitude of ext. input signal	3Vp-p (-1.5V~ +1.5V)
FM Characteristics	
Carrier Waveforms	Sine or Square
Modulation Source	Internal or external
Internal Modulating Waveform	Sine, Square, Triangle, Rising/Falling Ramp
Frequency of modulating signal	100μHz ~ 10kHz
Deviation	Max. 50% of carrier frequency for internal FM Max 100kHz (carrier frequency≥ 5MHz) for external FM, with input signal voltage 3Vp-p (-1.5V~+1.5V)
FSK Characteristics	
Carrier Waveform	Sine or Square
Control Model	Internal or external trigger (external: TTL level, low level F1, high level F2)
FSK Rate	0.1ms ~ 800s
PSK Characteristics	
Carrier Waveform	Sine or Square
PSK	Phase 1 (P1) and Phase 2 (P2), range: 0.0 ~ 360.0°
Resolution	0.1°
PSK rate	0.1ms ~ 800s
Control Mode	Internal or external trigger (external: TTL level, low level P1, high level P2)
Burst Characteristics	
Waveform	Sine or Square
Burst Counts	1 ~ 10000 cycles
Time interval between bursts	0.1ms ~ 800s
Control Mode	Internal, single or external gated trigger
Frequency Sweep Characteristics	
Waveform	Sine or Square
Sweep Time	1ms ~ 800s (linear), 100ms ~ 800s (log)
Sweep Mode	Linear or Logarithmic
Start/ Stop Frequency	Same as frequency range of Sine & Square
External trigger signal frequency	DC ~ 1kHz (linear) DC~10Hz (log)
Control Mode	Internal or external trigger
Inputs/ Outputs	
Main Output	
Impedance	50Ω
Protection	Short circuit and overload protected
Output MOD OUT	
Frequency	100Hz ~ 20kHz
Waveform	Sine, Square, Triangle, Rising/Falling Ramp
Amplitude	5Vp-p ± 5%
Output Impedance	600Ω
Modulation IN	3Vpp = 100% Modulation
External Input Trig/FSK/Burst	Level - TTL
Universal Counter, Key Specs*	
Frequency Range	
Frequency Measurement	1Hz ~ 100MHz
Totalize mode	50MHz max
* For the full specification of the counter section refer to www.bkprecision.com	
General	
Power Supply	198~242V or 99~121V, Frequency: 47~ 63Hz
Power Consumption	<35VA
State Storage Memory	
Storage Parameters	frequency, amplitude, waveform, DC offset values, modulation parameters
Storage Capacity	10 user configurable stored states
Dimensions (W x H x D)	10" x 3.93" x 14.56" (255 mm x 100 mm x 370 mm)
Weight	6.6lbs (3 kg)
Remote Interface	RS232
Safety designed according to	EN61010
EMC tested according to	EN55022, EN55024, EN61326, EN601000

Accessories

One Year Warranty

Accessories Included	BNC to alligator cable, BNC to BNC cable, RS232 communication cable, power line cord, test report, spare fuse, software installation disk.

NOTE: Specifications and information are subject to change without notice. Please visit www.bkprecision.com for the most current product information.