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Data Sheet

Arbitrary/Function GeneratorsModels 4084AWG & 4086AWG

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 ImV - 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: Generate 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 (Fig. 1).

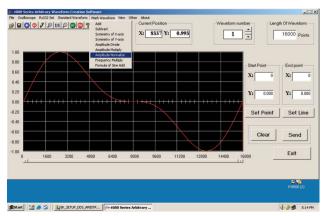


Fig. 1 Arbitrary Waveform Generation Software



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

Models	4084AWG	4086AWG
Frequency Characteristics		
Sine	IμHz ∼ 20MHz	1μHz ~ 80MHz
Square	IµHz ~ 20MHz	IμHz ~ 40MHz
All Other waveforms		: ~ 100kHz
Frequency Stability		5 (22°C ±5°C)
Resolution	1μHz	
Accuracy	$\leq \pm 5 \times 10^6 (22^{\circ}\text{C} \pm 5^{\circ}\text{C})$	
Data entry Units	s, ms, Hz, kHz, MHz	
Waveform Characteristics	3, 1113, 1	IZ, KIIZ, IVIIIZ
Main Waveforms (Sine, Square)		
Amplitude resolution		12 bits
Sample Rate		
Sine	200MSa/s	
Harmonic Distortion of	< 50dBc (f	requency < 5MHz)
Sine Wave*	≤ - 50dBc (frequency ≤ 5MHz)	
Sine wave	≤ - 45dBc (frequency ≤ 10MHz)	
	≤ - 40dBc (frequency ≤ 20MHz)	
	 ≤ - 35dBc (frequency ≤ 40MHz) ≤ - 30dBc (frequency > 40MHz) 	
TUD*		
THD*	0.1% (2)	0Hz ~ 100kHz)
Square		
Rise and fall time*		≤ 15ns
* = Note: Test conditions for harm		2500 - 500
	2Vp-p, Environmental temperatur	e: 25°C±5°C
Others built-in waveforms		
27 build-in standard and		Positive Ramp, Falling Ramp,
complex waveforms		se, Negative Pulse, Positive
	_	ave, Coded Pulse, Full wave
		ed, Sine transverse cut, Sine
		se modulation, Logarithmic,
	Exponential, Half-round, S	Sinx/x, Square root, Tangent,
	Cardiac, Earthquake, Com	bination
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 - 1	OV (high impedance)
DC Accuracy	≤ ±5% of setting	+ 10mV (high impedance)
Arbitrary	5	
Non volatile memory	8 waveforms	
Waveform length	8~16000 points	
Amplitude resolution	10 bits	
Frequency range	IμHz∼100kHz	
Sample rate	20	00MSa/s
Amplitude Characteristics		
Amplitude Range (open circuit)	Freq≤ 40MHz: 2mV ~	20 Vpp , ImV \sim 10Vpp (50Ω)
		~ 4Vp-p, ImV ~ 2Vpp (50Ω)
Resolution		circuit), $I\mu Vpp$ (50 Ω)
Accuracy		ne wave relative to 1kHz)
Stability		5 % /3 hours
Flatness		
For amplitude ≤ 2Vpp	±3% (freo≤ 5MHz). ±	: 10% (5MHz <freq≤ 40mhz)<="" td=""></freq≤>
For amplitude > 2Vpp:		: 10% (5MHz < freq≤ 20MHz)
		quency>20MHz)
		equency>40MHz)
Output Impedance	= 1 dbill (lit	50Ω
Output Units	Vnn mVnn	Vrms, mVrms, dBm
DC Offset Characteristics	, vpp, 111vpp,	·····o, mvimo, abiii
Offset Range (open circuit)	Freq ≤ 40MHz: ±10Vpk ac+dc	(Offset < 2 x nk to nk amplitude)
onset range (open circuit)	Freq > 40 MHz: ± 2 Vpk ac+dc (
Offset Resolution		circuit), $1\mu V$ (50 Ω)
Offset Error		Ampl. ≤ 2 Vpp into open circuit)
Oliset EITOI		mpl. > 2Vpp into open circuit)
	±3% of setting ±2011V (Al	mpi. – zvpp into open circuit)
Modulation		
Modulation AM Characteristics		
AM Characteristics	· ·	on Couono
Carrier Waveforms		or Square
Modulation Source		al or external
Internal Modulating Waveform		ngle, Rising/Falling Ramp
Frequency of modulating signal	100μ1	Hz ∼ 20kHz

Distortion			
Modulation Error	Distortion	≤ 2%	
Modulation Error	Modulation Depth	1% ~ 120%, 1% ~ 80% (frequency>40MHz,	
± 5%+0.2% (100µttz < frequency ≤ 10ktz)			
Max. Amplitude of ext. input signal 3Vp-p (-1.5V~ +1.5V) FM Characteristics Carrier Waveforms Modulating Waveform Frequency of modulating signal Deviation FM. with input signal voltage 3Vp-p (-1.5V~ +1.5V) FSK Characteristics Carrier Waveform FM. with input signal voltage 3Vp-p (-1.5V~+1.5V) FSK Characteristics Carrier Waveform Control Model Internal or external trigger (external: TTI. level. low level F1, high level F2) FSK Rate O. 1.ms ~ 800s PSK Characteristics Carrier Waveform Sine or Square Internal or external trigger (external: TTI. level. low level F1, high level F2) FSK Rate O. 1.ms ~ 800s PSK Characteristics Carrier Waveform FSK PSK PSK Phase 1 (P1) and Phase 2 (P2), range: 0.0 ~ 360.0° Resolution PSK PSK rate O. 1.ms ~ 800s O. 1.ms ~ 800s O. 1.ms ~ 800s Control Mode Internal or external trigger (external: TTI. level, low level P1, high level P2) Burst Characteristics Waveform Sine or Square Burst Counts In ~ 10000 cycles Time interval between bursts O. 1.ms ~ 800s Control Mode Internal single or external gated trigger Frequency Sweep Characteristics Waveform Sine or Square Sweep Time Imm ≈ 800s (linear), 100ms ~ 800s (log) Sweep Mode Linear or Logarithmic Start/ Stop Frequency External trigger signal frequency Same as frequency range of Sine & Square Sweep Time Imm ≈ 80s (linear), 100ms ~ 80s (log) Inputs/ Outputs Main Output Impedance Output MOD OUT Frequency Frequenc	Modulation Error		
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Modulation Source Internal or external Internal Modulating Waveform Sine, Square, Triangle, Rising/Falling Ramp Frequency of modulating signal 100μHz - 10kHz Max. 50% of carrier frequency for internal FM Max 100kHz (carrier frequency) 5 MHz 10 or external FM, with input signal voltage 3Vp-p (-1.5V~+1.5V)	FM Characteristics		
Internal Modulating Waveform Frequency of modulating signal 100μHz ~ 10kHz 10kHz ~ 10kHz	Carrier Waveforms	Sine or Square	
Frequency of modulating signal 100µHz ~ 10kHz Deviation Max. 50% of carrier frequency for internal FM Max 100kHz (carrier frequency 5 MHz) for external FM, with input signal voltage 3Vp-p (-1.5V~+1.5V)	Modulation Source		
Deviation Max 100k1z (carrier frequency) 5 MHzly for external FM Max 100k1z (carrier frequency) 5 MHzly for external FM, with input signal voltage 3Vp-p (-1.5V-+1.5V) FSK Characteristics Carrier Waveform Control Model Internal or external trigger (external: TTL level, low level F1, high level F2) FSK Rate 0.1 ms ~ 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 0.1 ms ~ 800s Control Mode Internal or external trigger (external: TTL level, low level P1, high level P2) Burst Characteristics Waveform Sine or Square Burst Counts I ~ 10000 cycles Time interval between bursts 0.1 ms ~ 800s Control Mode Internal or external gated trigger Frequency Sweep Characteristics Waveform Sine or Square Sweep Time I ms ~ 800s (Internal; single or external gated trigger Frequency Sweep Characteristics Same as frequency range of Sine & Square External trigger signal frequency Control Mode Internal or external trigger Imputs/ Outputs Main Output Main Output Main Output Frequency Frequen	Internal Modulating Waveform	Sine, Square, Triangle, Rising/Falling Ramp	
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PSK Rate D.1 ms ~ 800s	Control Model	Internal or external trigger (external: TTL level,	
PSK Characteristics Carrier Waveform Sine or Square		low level F1, high level F2)	
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Resolution			
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Three Year Warranty

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