

Generators Overview

Selection Guide

	Frequency	Output Channel Number	External frequency Counter	Wobulation	Modulation	Arbitrary mode	Interface	Page
Pulse Generator	Sefram 4451	50 MHz	1			-	IEEE	3
	Sefram 4453	50 MHz	2			-	IEEE	3
DDS Function Generator	BK 4007 DDS	7 MHz	1	-	yes	-	-	8
	BK 4013 DDS	12 MHz	1	-	yes	-	-	8
	Sefram 4415	15 MHz	1	yes	yes	AM/FM	RS-232 / USB	9
	BK 4040 DDS	20 MHz	1	yes	yes	AM/FM	RS-232 / USB	8
	BK 4084	20 MHz	1	yes	yes	AM/FM/FSK/PSK	RS-232	6
	BK 4085	40 MHz	1	yes	yes	AM/FM/FSK/PSK	RS-232	6
	BK 4086	80 MHz	1	yes	yes	AM/FM/FSK/PSK	RS-232	6
	BK 4087	120 MHz	1	yes	yes	AM/FM/FSK/PSK	RS-232	6
Arbitrarily Waveform Generator	BK 4045	20 MHz	1	-	yes	AM/ FM	yes USB	9
	BK 4084 AWG	20 MHz	1	-	yes	AM/FM/FSK/PSK	yes RS-232	7
	BK 4075	25 MHz	1	-	yes	AM/FM/FSK	yes RS-232 / USB / IEEE	4
	BK 4078	25 MHz	2	-	yes	AM/FM/FSK	yes RS-232 / USB / IEEE	4
	BK 4076	50 MHz	1	-	yes	AM/FM/FSK	yes RS-232 / USB / IEEE	4
	BK 4079	50 MHz	2	-	yes	AM/FM/FSK	yes RS-232 / USB / IEEE	4
	BK 4086 AWG	80 MHz	1	-	yes	AM/FM/FSK/PSK	yes RS-232	7

selection guide



Pulse generators



Sefram 4451

The SEFRAM 4453 provides 2 independent outputs. Each output has the same characteristics as SEFRAM 4451.

Capabilities Sefram 4451/4453

- Generate pulse from 10ns to 10s
- Triggered, burst, gate operation
- Single or double pulse modes
- Delay mode
- Adjustable transition time
- GPIB interface
- SCPI programmable
- Memory up to 99 stored setups

Technical Specification

Sefram 4451/4453

4451 : 1 channel - 4453 : 2 channels

Function	Pulse : single or dual
Frequency	0,1Hz to 50MHz
Resolution	6 digits, 0,1ns min
Pulse width	10ns to 9,9s
Delay	0ns to 9,9s

Amplitude (50 ohm load)

High level	- 9,90V to +10V
Low level	- 10V to +9,90V
Amplitude	0,1V to +10V
Variable transition	6 ns to 10ms
Mode	Trigger, gate, burst
External Trigger	adjustable from - 9.99 to + 9.99 V

GENERAL SPECIFICATION

Setup memory	99 setups
Display	LCD with backlight
Power supply	100-240V, 48-66Hz
Consumption (4451)	50 VA max
Consumption (4453)	150 VA max
Dimensions (4451)	213 x 300 x 89 mm
Dimensions (4453)	213 x 420 x 133 mm
Weight	3kg (4451) and 3,5kg (4453)

Optional accessories : see page 44,45

Pulse generators

Function / Arbitrary Generators

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BK 4078

25 MHz DUAL CHANNEL GENERATOR
Sampling Rate. 100MS/s
Mem. 400 kpoints



BK 4079

NEW 2010

50 MHz DUAL CHANNEL GENERATOR
Sampling Rate. 125MS/s
Mem. 4 Mpoints

Capabilities

- Function Generator 25 MHz (sine, square) or 50MHz
- Arbitrary generator :
 - sampling rate : 100 MS/s
 - Memory : 400 kpoints or 4 Mpoints
 - Vertical resolution: 14 Bit
- Pulse generator : 10MHz
- Modulation : AM, FM, FSK (Internal and external)
- Sweep Linear and logarithmic
- Interface RS232 , USB (option), IEEE (factory option)
- Graphic Display with Backlight
- Fully automatic calibration
- WaveX software included



BK 4078 :
Two Independent channels



SI 641 : USB Interface for the 4 models



BK 4075



BK 4076

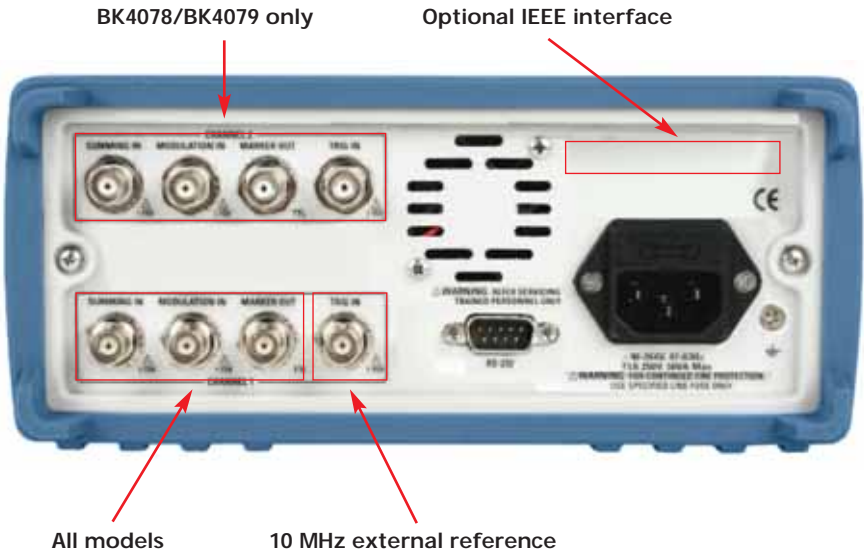
Single channel output model

Technical Specification	BK4075	BK4078	BK4076	BK4079
Arbitrary Mode				
Number of channel1	1	2	1	2
Sampling rate	100MS/s		125 MS/s	
Vertical resolution	14 bits		14 bits	
Horizontal resolution	400 kpoints		4 Mpoints	
External synchronisation	yes		yes	
External pilot input	yes (10MHz)		yes (10MHz)	
Predefined waveform	yes		yes	
Function generator mode				
Resolution	12 digits		12 digits	
Sinus	1µHz - 25MHz		10µHz - 50MHz	
Square	1µHz - 25MHz		10µHz - 50MHz	
Triangle	1µHz - 5MHz		10µHz - 5MHz	
Pulse	1mHz - 10MHz		1mHz - 10MHz	
Amplitude	10mV - 10V (50 ohms)		10mV - 10V (50 ohms)	
Offset	±5V (50 ohms)		±5V (50 ohms)	
Sweep	lin and Log		lin and Log	
Modes	trigger, gate, burst, phase		trigger, gate, burst, phase	
AM Modulation	0,01Hz - 20KHz		0,01Hz - 20KHz	
FM Modulation	0,01Hz - 20KHz		0,01Hz - 20KHz	
FSK Modulation	0,01Hz - 1MHz		0,02Hz - 1MHz	
Symmetry	variable 20% to 80%		variable 20% to 80%	
GENERAL SPECIFICATION				
Set up memory	50 setups			
Interface	RS-232, USB (option) and IEEE (factory option)			
Display	LCD graphic with backlight			
power supply	85-265V - 50/60Hz / 40VA			
Size	213 x 210 x 88mm			
Weight	3kg			

Optional accessories : see page 44,45

Function / Arbitrary Generators

Rear panel



Flexible interface

Built-in 10 MHz external reference is included at no extra cost (both models). This input/output let's you synchronize with another BK4075 / BK4076 / BK4078 / BK4079 generator or to an external 10 MHz clock for precise phase adjustment.

Connect the programmable marker output to the trigger input of additional generators to create complex polyphase scenarios.

Flexible memory management

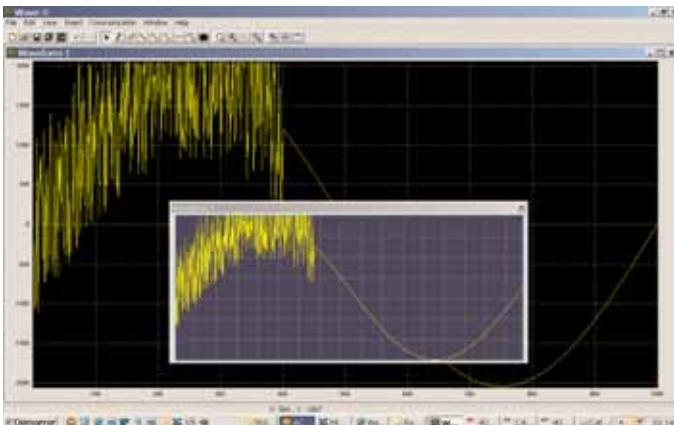
Unlike other comparable generators, which typically contain only a few fixed-size memory locations for waveform storage, the BK4076 and BK4079 give users more freedom - the 4,000,000 points flash memory can be allocated to one large waveform or up to 50 different waveforms, each with a customizable length.

Versatile noise generation

In Arb mode you can conveniently add noise to your waveform directly from the front panel and precisely adjust the scale of the noise amplitude.

Programmable Markers

Models BK4075 / BK4076 / BK 4078 and BK4079 provide fully programmable markers, allowing you to generate a positive TTL level output signal at the points specified by address and length up to 4000 points. This feature is available in Arbitrary mode and can not be found in other comparable waveform generators. It could be used for applications requiring polyphase signal generation, e.g. simulation of a real world 3 phase AC network where one of the phases is degraded with spikes or noise.



Generate waveforms with ease

The included PC Software allows you to easily generate, edit and download custom arbitrary waveforms. Generate waveforms by importing a text file, or define via freehand, point draw or waveformmath. Waveforms can also be uploaded from the generator for documentation purposes.

Function/arbitrary generators

DDS Function generators

A complete range from 20MHz to 120MHz



BK 4084

20MHz, 40MHz, 80MHz and 120MHz
DDS function generators

Capabilities (all models)

- Sine, square, ramp function generator
- 27 predefined waveforms
- Modulation : AM, FM, FSK, PM
- Burst mode
- Lin / Log sweep
- Counter / frequencymeter: 100MHz
- RS-232 interface and USB (with optional accessory)
- 10 setup memory

Technical Specification	BK 4084	BK 4085	BK 4086	BK 4087
Function generator mode				
Resolution				
Sine	1µHz to 20MHz	1µHz to 40MHz	1µHz to 80MHz	1µHz to 120MHz
Square	1µHz to 20MHz	1µHz to 40MHz	1µHz to 40MHz	1µHz to 40MHz
Triangle		1µHz to 100kHz		
Pulse		1µHz to 100kHz		
Duty cycle		from 0,1% to 99%		
Predefined waveforms		27 predefined waveforms (4096 dots, 10 bit, 200Ms/s)		
Amplitude		1mV to 10Vpp (under 50 ohm)		
Offset		±10V, limited to 2 x amplitude pp		
Symmetry		variable 20% to 80%		
Sweep		lin and log		
Modes		1ms to 800s (lin.) and 100ms to 800s (log)		
AM Modulation		triggered, gate, burst		
FM Modulation		from 100µHz to 20kHz		
FSK Modulation		from 100µHz to 10kHz		
PSK Modulation		internal or external		
Burst mode		internal or external		
External frequencymeter		1 to 10000 cycles		
Range		1Hz to 100MHz		
Resolution		8 digit max.		
Sensitivity		50mVrms Typical		
Coupling		AC		
GENERAL SPECIFICATION				
Setup memory		10, non volatile		
Interface		RS-232		
Display		VFD		
Power supply		198-242V - 47/63Hz / 40VA		
Dimensions		255 x 100 x 370mm		
Weight		3kg		

Supplied with : BNC cable, RS232 cable

Optional accessories : Interface RS232/USB P/N : ITE-132. see page 44, 45

Function / Arbitrary Generators

DDS 20 MHz
ARBITRARY: 200 Ms/s



BK 4084AWG

Capabilities

- 20MHz DDS function generator (sine and square)
- 27 predefined waveforms
- Arbitrary mode : 200Ms/s, 16k memory
- Modulation: AM, FM, FSK, PM
- Burst mode
- Lin / Log sweep
- Counter / frequencymeter: 100MHz
- RS-232 interface and USB (with optional accessory)
- 10 setup memory

Technical Specification

BK 4084AWG

Function generator mode	
Resolution	
Sine	1µHz to 20MHz
Square	1µHz to 20MHz
Triangle	1µHz to 100kHz
Pulse	1µHz to 100kHz
Duty cycle	from 0,1% to 99%
Predefined waveforms	27 predefined waveforms (4096 dots, 10 bit, 200Ms/s)
Amplitude	1mV to 10Vpp (under 50 ohm)
Offset	±10V, limited to 2 x amplitude pp
Symmetry	variable from 20% to 80%
Sweep	lin and log 1ms to 800s (lin.) and 100ms to 800s (log)
Modes	triggered, gate, burst
AM Modulation	from 100µHz to 20kHz
FM Modulation	from 100µHz to 10kHz
FSK Modulation	internal or external

Supplied with : BNC cable, RS232 cable and external software p/n : 408x
Optional accessories : Interface RS232/USB P/N : ITE-132. see page 44, 45

Technical Specification

BK 4084AWG

PSK Modulation	internal or external
Burst mode	1 to 10000 cycles
Arbitrary mode	
Sampling rate	200Ms/s
Vertical resolution	10 bit
Memory	8 ~16000 points
External synchro	yes
External frequencymeter	
Range	1Hz to 100MHz
Resolution	8 digit max.
Sensitivity	50mVrms Typical
Coupling	AC

General Specification

Setup memory	10, non volatile
Interface	RS-232
Display	VFD
Power supply	198-242V - 47/63Hz / 40VA
Dimensions	255 x 100 x 370mm
Weight	3kg

DDS 80 MHz
ARBITRARY: 200 Ms/s



BK 4086AWG

Capabilities

- 80MHz DDS function generator (sine) and 40MHz (square)
- 27 predefined waveforms
- Arbitrary mode : 200Ms/s, 16k memory
- Modulation: AM, FM, FSK, PM
- Burst mode
- Lin / Log sweep
- Counter / frequencymeter: 100MHz
- RS-232 interface and USB (with optional accessory)
- 10 setup memory

Technical Specification

BK 4086AWG

Function generator mode	
Resolution	
Sine	1µHz to 80MHz
Square	1µHz to 40MHz
Triangle	1µHz to 100kHz
Pulse	1µHz to 100kHz
Duty cycle	from 0,1% to 99%
Predefined waveforms	27 predefined waveforms (4096 dots, 10 bit, 200Ms/s)
Amplitude	1mV to 10Vpp (under 50 ohm) 1mV to 2Vpp, F>40MHz
Offset	±10V, limited to 2 x amplitude pp ±2V, limited to 2 x amplitude pp, F>40MHz
Symmetry	variable from 20% to 80%
Sweep	lin and log 1ms to 800s (lin.) and 100ms to 800s (log)
Modes	triggered, gate, burst
AM Modulation	from 100µHz to 20kHz
FM Modulation	from 100µHz to 10kHz
FSK Modulation	internal or external
PSK Modulation	internal or external

Supplied with : BNC cable, RS232 cable and external software p/n : 408x
Optional accessories : Interface RS232/USB P/N : ITE-132. see page 44, 45

Technical Specification

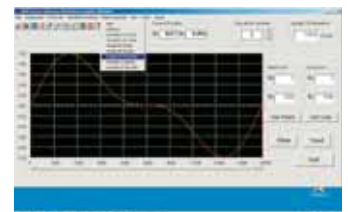
BK 4086AWG

Burst mode	1 to 10000 cycles
Arbitrary mode	
Sampling rate	200Ms/s
Vertical resolution	10 bit
Memory	8 ~16000 points
External synchro	yes
External frequencymeter	
Range	1Hz to 100MHz
Resolution	8 digit max.
Sensitivity	50mVrms Typical
Coupling	AC

General Specification

Setup memory	10, non volatile
Interface	RS-232
Display	VFD
Power supply	198-242V - 47/63Hz / 40VA
Dimensions	255 x 100 x 370mm
Weight	3kg

Custom Waveform generation made easy. 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 customise them with the provided math functions.



DDS function generators

A complete range from 7MHz to 20MHz

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BK 4007DDS

DDS 7 MHz

Technical Specification

	BK 4007DDS
Max. frequency	7MHz (sine, square), 100kHz (triangle)
DC, sine, square, triangle	yes
Amplitude (under 50 ohms)	up to 10V pp.
Offset	yes
Sweep	Lin, Log
Variable symmetry	yes
Auxiliary output	TTL
Display	frequency, with symbols and units
Display type	LCD
Dimensions, weight	213 x 210 x 88mm, 2kg

Optional accessories : see page 44,45

Capabilities

- DDS (Direct Digital Synthesis) function generator
- Max. frequency: 7MHz
- Variable amplitude, offset and symmetry
- Lin / Log sweep
- LCD display
- TTL output

Technical Specification

	BK 4013DDS
Max. frequency	12MHz (sine, square), 100kHz (triangle)
DC, sine, square, triangle	yes
Amplitude (under 50 ohms)	up to 10V pp.
Offset	yes
Sweep	Lin, Log
Variable symmetry	yes
Auxiliary output	TTL
Display	frequency, with symbols and units
Display type	LCD
Dimensions, weight	213 x 210 x 88mm, 2kg

Optional accessories : see page 44,45



BK 4013DDS

DDS 12 MHz

Capabilities

- same as 4007DDS
- Max. frequency: 12MHz



BK 4040DDS

DDS 20 MHz

Technical Specification

	BK 4040DDS
Max. frequency	20MHz (sine, square), with 5 digit max. display
DC, sine, square, triangle	yes
Amplitude (under 50 ohms)	50mV to 10V pp
Offset	yes
Sweep	Lin, Log
Modulation	AM, FM (internal, external)
Frequencymeter	50MHz
Variable symmetry	yes
Auxiliary output	Trigger, Sync (out), Modulation (in)
Interface	RS-232, USB option
Display type	LCD, graphic with backlight
Dimensions, weight	213 x 210 x 88mm, 2,5kg

Optional accessories : see page 44,45

Capabilities

- DDS (Direct Digital Synthesis) function generator
- Max. frequency: 20MHz
- Variable amplitude, offset and symmetry
- Frequencymeter: 50MHz (external)
- Lin / Log sweep
- AM, FM modulation
- Gate and triggered modes
- Graphic LCD with backlight
- RS-232 interface
- USB interface with SI 641 (option)

DDS function generators

A complete range from 7MHz to 20MHz



DDS 15 MHz

Sefram 4415

Capabilities

- DDS (Direct Digital Synthesis) function generator
- Max. frequency: 15MHz
- Variable amplitude, offset and symmetry
- Frequency meter: 100MHz (external)
- Lin / Log sweep
- AM, FM modulation
- Gate and triggered modes
- Graphic LCD with backlight
- RS-232 interface
- USB interface with SI641 (option)

Technical Specification

	Sefram 4415
Max. frequency	15MHz, with 6 digit display max.
DC, sine, square, triangle	yes
Amplitude (under 50 ohms)	20mV to 10V pp
Offset	yes
Sweep	Lin, Log
Fréquency meter	100MHz
Variable symmetry	yes
Auxiliary output	Trigger, Sync (out), Modulation (in)
Interface	RS-232
Display	LCD, graphic with backlight
Dimensions, weight	213 x 210 x 88mm, 2,5kg

Optional accessories : see page 44,45

20 MHz GENERATOR
Sampling Rate. 50MS/s
Mem. 1kpoints



BK 4045

Capabilities

- DDS (Direct Digital Synthesis) function generator
- Max. frequency: 20MHz
- Variable amplitude, offset and symmetry
- Lin / Log sweep
- AM, FM modulation
- Gate and triggered modes
- Graphic LCD with backlight
- Arbitray mode: 50MS/s, 1k memory
- USB interface

Technical Specification

	BK 4045
Max. frequency	20MHz, with 6 digit display max.
DC, sine, square, triangle	yes
Amplitude (under 50 ohms)	20mV to 10V pp
Offset	yes
Sweep	Lin, Log
Fréquency meter	100MHz
Variable symmetry	yes
Auxiliary output	Trigger, Sync (out), Modulation (in)
Interface	USB
Display	LCD, graphic with backlight
Dimensions, weight	213 x 210 x 88mm, 2,5kg

Supplied with : WaveX software

Optional accessories : see page 44,45

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