

High Speed Data Acquisition System with Printer



The Model 8460 is a versatile high-speed data acquisition recorder with an integrated thermal printer. Measurement results can be viewed on the I5.4" touchscreen display, saved to the large internal hard drive, and printed on continuous 270mm wide-format paper.

With 3 slots for dedicated input modules, this system can be configured to your specific application. Choose any combination of universal, isolated high voltage, multiplexed, or strain gauge input modules for up to 36 analog inputs.

For capturing high speed or transient signals, the 8460 can simultaneously acquire and record 18 inputs at 1 MSa/s in memory mode. A variety of start and stop conditions are available including trigger on analog channel(s) level or edge, logic channel high or low, or through a designated date and time. You can also choose from a variety of actions to be performed when the recording is stopped including sending emails, printing data in memory, and changing the setup file. Additionally, the secondary file function allows you to record low and high-speed data in separate files to reduce file sizes and minimize storage usage.

The intuitive user interface makes setup easy, and measurement results can be viewed graphically or numerically on the display while data is simultaneously recorded or printed. Built-in analysis tools include a mathematical function editor and dedicated power quality analysis mode for analyzing single and 3-phase power networks. Display options include measured voltages and currents, calculated values, vector diagrams, and harmonics.

For integrating with external systems and devices, the 8460 provides digital inputs and alarm outputs. Logic inputs can be recorded with analog data, or used to start and stop recording. Alarms can be configured based on any combination of analog or logic channels, and can be used to control external devices or send email notifications. The 8460 also supports common synchronization protocols including IRIG, NTP, and PTP (client mode or Server mode with IRIG option installed).

Connect to the 8460 remotely via the built-in LAN interface or optional USB WiFi. You can remotely control the unit, transfer data and configuration files, and view live data on a PC.

Features and benefits:

- Integrated 270 mm thermal paper printer
- 6-36 analog channels
- Up to I MSa/s sampling rate
- 4 measurement board types:
 - Universal (6 ch)
 - Multiplexed (12 ch)
 - Strain Gauge (6 ch)
 - High Voltage (6 ch)
- Temperature measurements with thermocouples and RTDs (PtI00, Pt200, Pt500, & PtI000)
- 500 GB internal hard drive
- Power Analysis mode for 50 Hz, 60 Hz, 400 Hz, and I kHz single and 3-phase electrical networks
- Advanced calculations and user defined math functions
- 16 logic input channels
- Wide I5.4" touchscreen display
- Optional IRIG synchronization
- 4 USB host ports, I LAN interface, & I VGA output
- WiFi monitoring and control

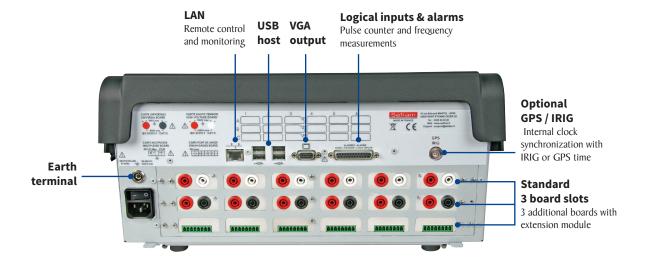
Applications

- Printed record of event activity with date and time stamp
- Measure signals ranging from strain gauge signals to large electrical systems
- Maintenance and failure analysis
- Power analysis of single and three phase systems

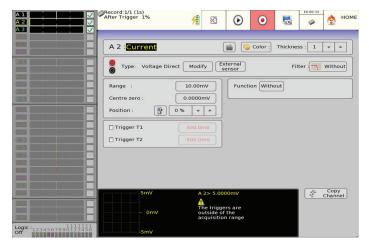
Front panel



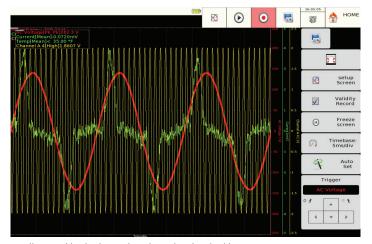
Top panel



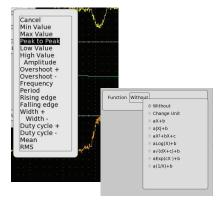
Operation highlights



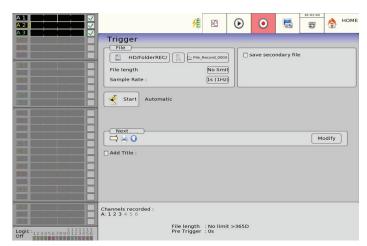
Channel setup displays parameters for up to 12 channels on a single screen



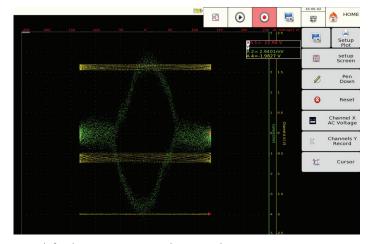
Oscilloscope like display mode with 100 kHz bandwidth



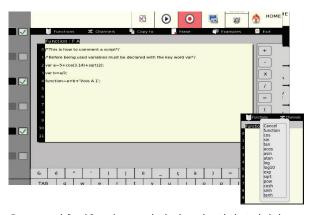
Use measurement calculations for on screen display, or software defined formulas on individual channels



Comprehensive triggering capabilities: Configure triggers on analog and logic channels. Select from multiple combinations of thresholds, channels and conditions.



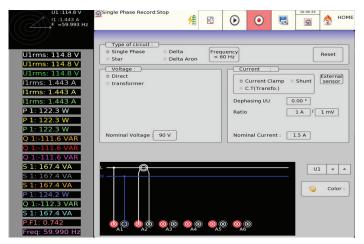
XY mode for plotting one varying signal versus another

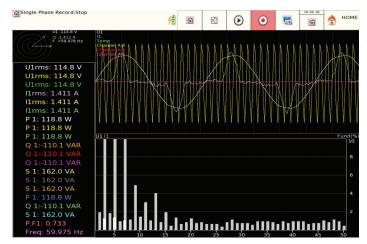


Create user defined formulas on multiple channels with the included text editor for even greater control. The results are shown as dedicated virtual channels for ease of measurement.

The tools you need

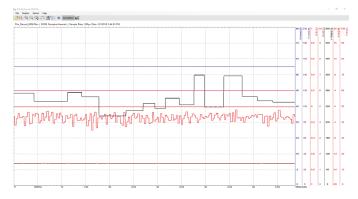
Energy / Power Analysis





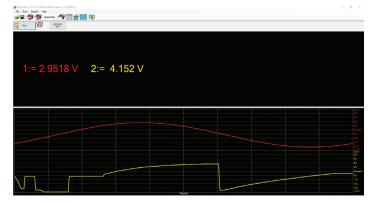
Analyze up to 4 power networks simultaneously in three phase configurations Delta, Delta (Aron), or Star. The real time display of Fresnel diagram, oscilloscope mode, and harmonics (up to 50th) measure and display voltage, current and frequency up to I kHz.

Sefram Viewer and Pilot for 8460 are license free software that can be downloaded from www.bkprecision.com. The software tools provide the following features:



Sefram Viewer

- Post acquisition analysis
- Display measurement results in graphical or numerical format
- 7 math functions such as y=ax+b, y=ln(x)+b, and y=exp(cx)+b

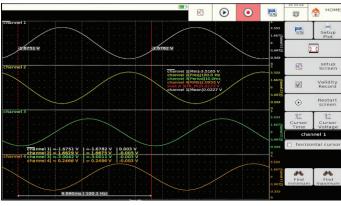


Sefram Pilot for 8460

- Remote control and setup
- Start and stop recording
- Channel and trigger configuration
- Real time display
- Export measurement data to a computer

Virtual Network Computing (VNC) capability

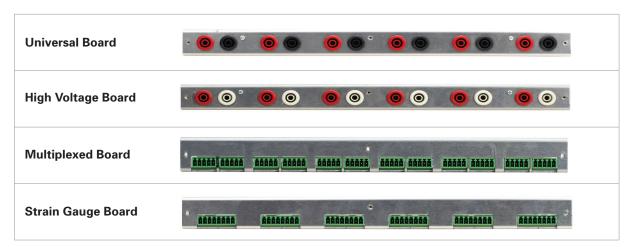
The recorder's built-in VNC provides a graphical desktop system to remotely control the instrument from a computer with a full graphical interface that replaces the instrument's front panel using a mouse and keyboard



Full control of the Data Acquisition System on a computer or mobile device

Measurement Boards

Configure the 8460 to fit your needs with any combination of module boards with up to 3 in the base unit.



asurement Boards				
	Universal	High Voltage	Multiplexed	Strain Gauge
Channels	6	6	12	6
Maximum Voltage	± 500 V or 424 VRMS	± 1000 V or 1000 VRMS	± 25 VDC	± 25 VDC
RMS Voltage	V	\checkmark	-	-
Resolution	I4 bit	I4 bit	I6 bit	I6 bit
Sampling Rate	I MSa/s	I MSa/s	5 kSa/s	100 kSa/s
Voltage	V	√	V	$\sqrt{}$
Current	V	V	V	-
Frequency	V	V	-	-
Thermocouple	V	-	V	\checkmark
Counter	V	V	-	-
Power Analysis	√	V	-	-
PRT Sensor	-	-	Pt100/Pt200/Pt500/Pt1000	Pt100/Pt1000

Included accessories

Also included: AC mains adapter 100 / 240 V, 25 pin male connector and backshell, soft wipe, stylus, screwdriver.





One set of bare wire to banana adapters per channel

Ordering information

Description Base Unit	Measurement Boards				Options		
	Universal	High voltage	Multiplexed	Strain gauge	GPS	IRIG	
Part Number	8460	984401000	916006000	984402000	984402500	984602500	984603000

The 8460 base can be ordered with any combination of up to 3 measurement boards and any number of options.

Specifications, Base UnitNote: All specifications apply to the unit after a temperature stabilization time of 30 minutes over an ambient temperature range of 23 $^{\circ}$ C \pm 5 $^{\circ}$ C.

Power Analysis Function			
Networks Single phase, 3 phase			
Frequency	50-60 Hz, 400 Hz, 1000 Hz		
Display	Fresnel diagram, oscilloscope, data		
Measurements	Mean value, RMS, peak, crest factor, THD and DF for voltage & current, active, reactive and apparent power, power factor (ø)		
Harmonics	Calculated up to rank 50, with display and record		

Logic Input and Alarms			
Channels	16		
TTL Maximum Voltage	24 V		
Sampling Interval	I μs (I MSa/s) each channel		
Sensor Supply	9 to 15 VDC		
Alarms	A & B, 0 to 5 V output		

IRIG Option			
Accuracy	5 ms		
Sampling Time Accuracy	10 E -12 (only for sampling rate \geq 200 μ s)		
IRIG Formats	IRIG-AI33, AI32, A003, A002, BI23, BI22, B003, B002 and AFNOR NFS 87-500		
IRIG Signal Amplitude Range	600 mVpp to 8 Vpp		
Input Impedance	50 Ω		

GPS Option		
Output Accuracy	$< \pm 100$ ns (TCXO, OCXO LQ) $< \pm 50$ ns (OCXO MQ, OCXO HQ)	
Output Frequency	IO MHz TTL	
Resolution	100 ns	
Generated Time Codes	B002, B122, B003, B123, B006, B126, B007, B127, IEEE1344, C37.118, AFNOR	
Input Impedance	50 Ω	

Data Acquisition System				
M M	Fastest sampling rate*	I MSa/s up to 36 channels		
Memory Mode	Memory	I28 M words		
File Mode	Fastest sampling rate*	I MSa/s up to 6 channels		
(SSD disk streaming)	Internal SSD memory	500 GB (2 TB option)		

^{*} Universal and high voltage measurement board

	Printer				
	Paper Width 270 mm				
	Direct mode	I mm/hr to 200 mm/sec			
Paper	Mixed mode	I mm/hr to 50 mm/sec			
Speed	Transcription mode	I0 mm/sec			
	External control mode	50 mm/sec			
	Y axis	8 dots/mm			
Resolution	X axis	16 dots/mm			
	XY mode	8 dots/mm (both axis)			

General				
Internal Solid State Memory	500 GB (2 TB optional)			
Operating Temperature	0 to 40 °C			
Storage Temperature	-20 to 60 °C			
Display	15.4" TFT LCD 1280 x 800 dots			
Power Supply	99 VAC to 264 VAC, 47 to 63 Hz (80 VA max)			
Interfaces	4 USB host ports, VGA, LAN			
Weight (one card installed)	24.25 lbs (II kg)			
Dimensions (W x H x D)	I5.57" x I7.32" x 7.68" (370 x 440 x 195 mm)			
Warranty	2 Years			
Supplied Accessories	Power cord, 25 pin male connector and backshell, rugged carrying case, bare wire to banana adapters, multiplexed board connectors (12), strain gauge board connectors (6), Stylus, soft wipe, screwdriver, calibration certificate and test report			

Specifications, Measurement BoardsNote: All specifications apply to the unit after a temperature stabilization time of 30 minutes over an ambient temperature range of 23 $^{\circ}$ C \pm 5 $^{\circ}$ C.

	Uni	versal Input Board	
Number of Channels		6	
Voltage			
Maximum Input Voltage		± 500 VDC or 424 VRMS	
Accuracy		± 0.1% of the full scale	
DC Voltage Ranges		± 0.5 mV to ± 500 V	
AC Voltage Rang	es	200 mV to 500 V	
RMS Voltage Accu	racy	1% of full range	
Response Time		100 ms typical (40 ms to 50 Hz)	
Crest Factor		2	
Input Impedance (I	OC)	I M Ω for ranges > I V, 25 M Ω for ranges < I V	
Input Capacitano	e	ISO pF	
High Input Impedance	Option	10 M Ω for ranges > 1 V, 25 M Ω for ranges < 1 V	
Channel Isolatio	n	> 100 MΩ at 1500 VDC	
Safety		CAT III 500 V	
Bandwidth and Filter	s		
Bandwidth (-3 dB)		I00 kHz	
True RMS Bandwi	dth	5 Hz to 500 Hz	
Analog Filters		100 Hz, I kHz, 10 kHz	
Slope		40 dB/decade	
Digital Filters		< 100 Hz	
Sensitivity		IOO mV RMS min.	
Duty Cycle		10%	
Frequency Rang	e	l Hz to 100 kHz	
Basic Accuracy		0.02% of full scale	
Data Acquisition			
Resolution		I4 bits	
Sampling Interva	al	I μs (I MSa/s) each channel	
RMS Sampling Inte	erval	200 μs (5 kSa/s) each channel	
Temperature with Th	ermocou	ple	
	J	-346 °F to 2l92 °F (-2l0 °C to l200 °C)	
	K	-418 °F to 2498 °F (-250 °C to 1370 °C)	
	Т	-328 °F to 752 °F (-200 °C to 400 °C)	
Concor Dongo hu	S	-58 °F to 3200 °F (-50 °C to 1760 °C)	
Sensor Range by Type (cold junction	В	392 °F to 3308 °F (200 °C to I820 °C)	
compensation: ± 1.25 °C)	E	-418 °F to 1832 °F (-250 °C to 1000 °C)	
	N	-418 °F to 2372 °F (-250 °C to 1300 °C)	
	С	32 °F to 4208 °F (0 °C to 2320 °C)	
	L	-328 °F to I652 °F (-200 °C to 900 °C)	
	R	-40 °F to 2732 °F (-40 °C to I500 °C)	

High Voltage Board				
Number of Channels	6			
Voltage				
Maximum Input Voltage	± 1000 VDC or 1000 VRMS			
Accuracy	± 0.2% of the full scale			
DC Voltage Ranges	± 50 mV to ± 1000 V			
AC Voltage Ranges	I00 mV to I000 VRMS			
RMS Voltage Accuracy	I% of full range			
Response Time	100 ms typical (40 ms to 50 Hz)			
Crest Factor	2.2			
Input Impedance	II M Ω for ranges < 10 V, 25 M Ω for ranges \geq 1 V			
Input Capacitance	I50 pF			
Channel Isolation	> 100 MΩ at 1500 VDC			
Safety	CAT III 1000 V and CAT IV 600 V			
Bandwidth and Filters				
Bandwidth	26 kHz			
True RMS Bandwidth	5 Hz to 500 Hz			
Analog Filters	100 Hz, I kHz, 10 kHz			
Slope	40 dB/decade			
Digital Filters	< 100 Hz			
Sensitivity	300 mV RMS min.			
Duty Cycle	10%			
Frequency Range	10 to 100 kHz			
Basic Accuracy	0.2% of full scale			
Data Acquisition				
Resolution	I4 bits			
Sampling Interval	I μs (I MSa/s) each channel			
RMS Sampling Interval	200 μs (5 kSa/s) each channel			

Specifications, Measurement boards (cont.)Note: All specifications apply to the unit after a temperature stabilization time of 30 minutes over an ambient temperature range of 23 $^{\circ}$ C $_{\pm}$ 5 $^{\circ}$ C.

Multiplexed Board				
Number of Chann	nels	12		
Voltage				
Maximum Input Vo	ltage	± 25 VDC		
DC Voltage Rang	ge	± 0.5 mV to ± 25 V		
Accuracy		± 0.1% of the full scale		
Input Impedance (DC)	I M Ω for ranges > 2 V, I0 M Ω for ranges < 2 V		
Input Capacitano	ce	I50 pF		
Bandwidth and Filter	rs			
Digital Filters		< 100 Hz		
Data Acquisition				
Resolution		I6 bits		
Sampling Interv	al	200 μs (5 kSa/s) each channel		
Temperature with Th	ermocou	ple		
	J	-346 °F to 2l92 °F (-2l0 °C to l200 °C)		
	K	-418 °F to 2498 °F (-250 °C to 1370 °C)		
	Т	-328 °F to 752 °F (-200 °C to 400 °C)		
Consor Dongo hu	S	-58 °F to 3200 °F (-50 °C to 1760 °C)		
Sensor Range by Type (cold junction	В	392 °F to 3308 °F (200 °C to 1820 °C)		
compensation:	Е	-418 °F to 1832 °F (-250 °C to 1000 °C)		
± 1.25 °C)	N	-418 °F to 2372 °F (-250 °C to 1300 °C)		
	С	32 °F to 4208 °F (0 °C to 2320 °C)		
	L	-328 °F to 1652 °F (-200 °C to 900 °C)		
	R	-40 °F to 2732 °F (-40 °C to I500 °C)		
Temperature with RTD				
	PtI00	I.O mA		
Current	Pt200	0.5 mA		
Current	Pt500	0.2 mA		
	PtI000	0.I mA		
Temperature Range		-392 °F to I562 °F (-200 °C to +850 °C)		
Measurements		2, 3, 4 wires		
Accuracy at 20 °C		± 0.03 °C		

		ain Gauge Board
Number of channels		6
Strain Gauge		
Units		μStr
Bridge Type		Full Bridge, Half Bridge
Bridge Voltage		± I V and ± 2.5 V
Accuracy		± 0.2% of the full scale
Ranges (µStr)		1,000, 2,000, 5,000, 10,000
Voltage		
Maximum Input Voltage		50 VDC
Accuracy		± 0.2% of the full scale
DC Voltage Range		I mV to 50 V
Input Impedance		2 M Ω for ranges < 1 V, 1 M Ω for ranges > 1 V
Bandwidth and Filter	s	
Bandwidth (-3 dB)		18 kHz
Analog Filters		I00 Hz, I kHz
Digital Filters		< 100 Hz
Data Acquisition		
Resolution		I6 bits
Sampling Interval		10 μs (100 kSa/s) each channel
Temperature with Th	ermocou	ple
Sensor Range by Type (cold junction compensation: ± 1.25 °C)	J	-346 °F to 2192 °F (-210 °C to 1200 °C)
	K	-418 °F to 2498 °F (-250 °C to 1370 °C)
	Т	-328 °F to 752 °F (-200 °C to 400 °C)
	S	-58 °F to 3200 °F (-50 °C to 1760 °C)
	В	392 °F to 3308 °F (200 °C to 1820 °C)
	Е	-418 °F to 1832 °F (-250 °C to 1000 °C)
	N	-418 °F to 2372 °F (-250 °C to 1300 °C)
	С	32 °F to 4208 °F (0 °C to 2320 °C)
	L	-328 °F to I652 °F (-200 °C to 900 °C)
	R	-40 °F to 2732 °F (-40 °C to I500 °C)
Temperature with RT	D	
Current	Pt100	I.O mA
	Pt200	0.5 mA
Temperature Range		-392 °F to I562 °F (-200 °C to +850 °C)
Measurements		2, 3, 4 wires
Accuracy at 20 °C		± 0.03 °C

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BK PRECISION

About B&K Precision

For more than 70 years, B&K Precision has provided reliable and value-priced test and measurement instruments worldwide.

Our headquarters in Yorba Linda, California houses our administrative and executive functions as well as sales and marketing, design, service, and repair. Our European customers are most familiar with B&K through our French subsidiary, Sefram. Engineers in Asia know us through our B+K Precision Taiwan operation. The independent service centers in Singapore and Brasil service customers in Singapore, Malaysia, Vietnam, Indonesia and South America, respectively.



B&K Precision group member Independent service center Service center location

Quality Management System

B&K Precision Corporation is an ISO9001 registered company employing traceable quality management practices for all processes including product development, service, and calibration.

ISO9001:2015

Certification body NSF-ISR Certificate number 6Z241-IS8



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http://www.youtube.com/user/BKPrecisionVideos

Product Applications

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About Sefram

Established in 1947, Sefram has been designing and manufacturing data recorders for more than 70 years. Sefram joined the test and measurement division of Schlumberger in 1978, and has been a subsidiary of B&K Precision since 2004. Certified ISO 9001, Sefram's strategy is to provide innovative and high-quality test and measurement products for electronic and electrical applications.

