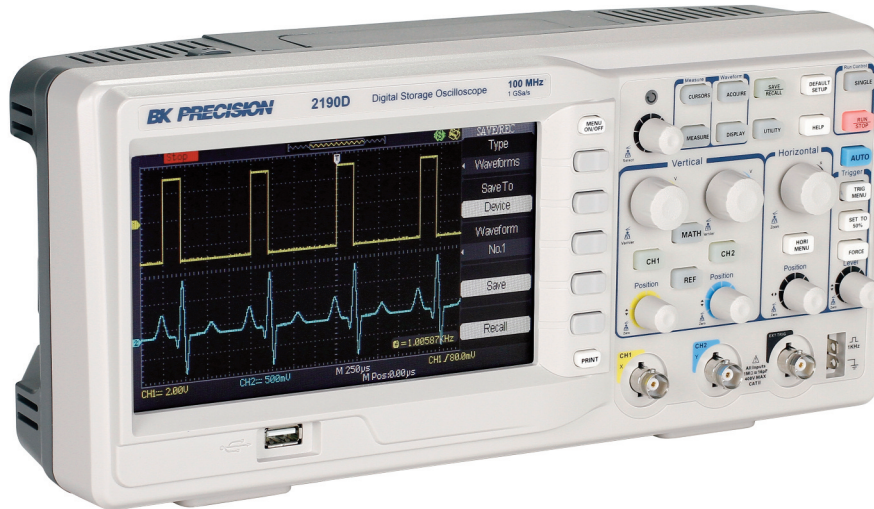


## Data Sheet

# Digital Storage Oscilloscope Model 2190D



The 2190D combines performance and value all in one portable solution. With advanced triggering capabilities, long waveform memory up to 40,000 points, and extensive features such as pass/fail limit testing, digital filtering, waveform recorder, and 32 automatic measurements, this oscilloscope offers powerful tools in a small affordable package.

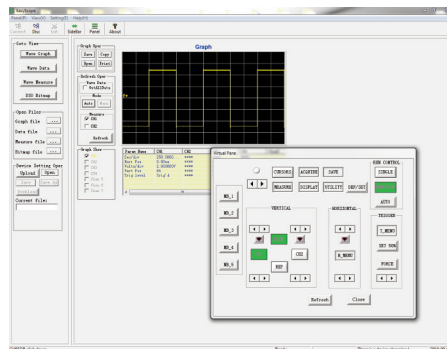
Engineered to allow you to see more of your signal under test, the 2190D widescreen 7" TFT display offers a significantly larger viewing area than typical economy oscilloscopes (5.7").

Maximize productivity with PC connectivity via RS232 and USB. The downloadable PC software lets you easily capture, save, and analyze measurement results. All oscilloscope parameters can be controlled via a PC without the need for programming.

The 2190D oscilloscope is ideal for applications in education, design and debug, service and repair.

**Distributed By:**  
**Signal Test, Inc**  
**1529 Santiago Ridge Way**  
**San Diego, CA 92154**  
**Tel. 1-619-575-1577 USA**  
**www.SignalTestInc.com**  
**Sales@SignalTestInc.com**

### PC connectivity



PC software is provided (free download at B&K Precision's website at [www.bkprecision.com](http://www.bkprecision.com)) for seamless integration between the oscilloscope and PC. Capture and transfer waveforms, screen images, setups and measurement results to a Windows PC via the USB device port on the back of the instrument. A USB host port on the front and rear allows for quick and easy screen saving.

### Features & Benefits

- 1 GSa/s sample rate
- Large, 7" widescreen color display
- Long waveform memory up to 40,000 points
- Five different math functions – Add, Subtract, Multiply, Divide, and FFT
- Versatile triggering capabilities including pulse width, line-selectable video, slope, and alternating trigger
- 32 automatic measurements
- Advanced tools include digital filter with adjustable limits, pass/fail testing, and waveform recorder mode
- 12 different language user interfaces and context sensitive help
- Front panel USB host port for saving and recalling waveform setups, data, and screen shots on a USB flash drive
- USBTMC compliant USB device port. Programmable with ASCII commands strings including SCPI commands

## Front panel

**Widescreen display**  
The 7" widescreen color display lets you see more of your signal.

**Menu On/Off button**  
Configure the menu parameters and hide the menu with the push of a button to view your signal in full screen.

**Waveform analysis with math and FFT**  
Analyze your signals with add, subtract, multiply, and divide functions. View the signal's frequency spectrum and perform harmonic distortion analysis.

**Context sensitive help**  
A pop up window will display the functionality of a control while help mode is active.

**Auto setup**  
Vertical, horizontal, and trigger controls are automatically adjusted for fast signal display.

**Advanced triggering**  
Isolate the signal with advanced triggering including pulse width and selectable video trigger.

**USB host port**  
Connect your USB flash drive to conveniently store and recall waveform data, setups, and screenshots.

**Print button**  
Simply press the Print button to save a screenshot in bitmap format to a USB flash drive.

**Intuitive channel operation**  
Both channels in the 2190D series are clearly indicated by their own color, labeled on the input, knobs, and display.

## Rear panel

**Security loop**  
Use the built-in security loop to secure your instrument to your location.

**Kensington security slot**  
Helps to secure your oscilloscope and prevent theft.

**Communication**  
RS232 and USB ports enable remote control from a PC

**WARNING**  
TO AVOID ELECTRIC SHOCK THE POWER CORD PROTECTIVE GROUNDING CONDUCTOR MUST BE CONNECTED TO GROUND. HAZARDOUS VOLTAGE INSIDE. DO NOT REMOVE THE COVER UNLESS BY SPECIFIED PERSONNEL.

COLOR OSCILLOSCOPE

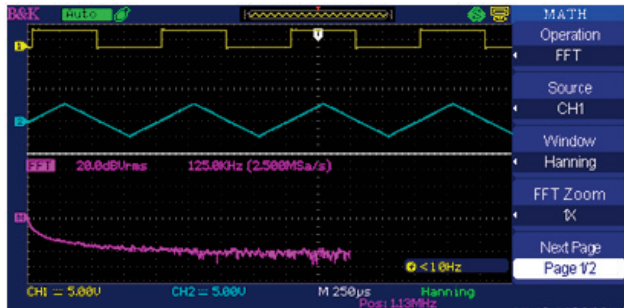
VOLTAJE RANGE 100 - 240 V rms  
FREQUENCY 50/60/400 Hz  
POWER 50W MAX

Pass/Fail Out

RS-232  
USB DEVICE

## The tools you need

### Powerful measurement functions



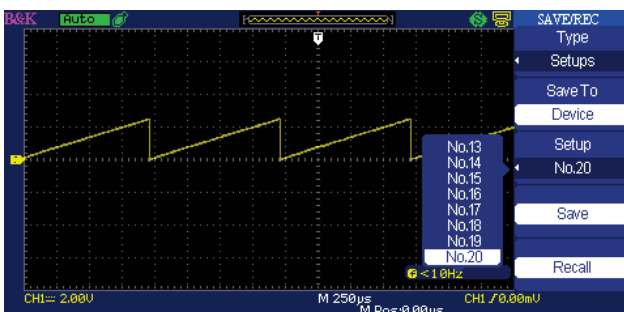
Display and measure the input signal's frequency spectrum. Select one of the 4 FFT windows: Rectangular, Hanning, Hamming, and Blackman. Use cursors to measure the spectral component's magnitude and frequency.

### Waveform recorder



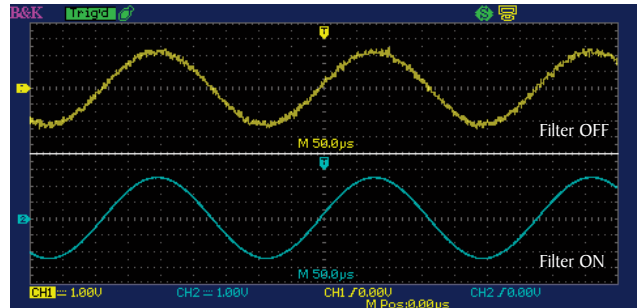
Monitor and analyze long-term signal behavior by recording data continuously over an extensive period of time and playing it back for post acquisition analysis. Data is recorded in a sequence of up to 2500 frames.

### Large internal storage



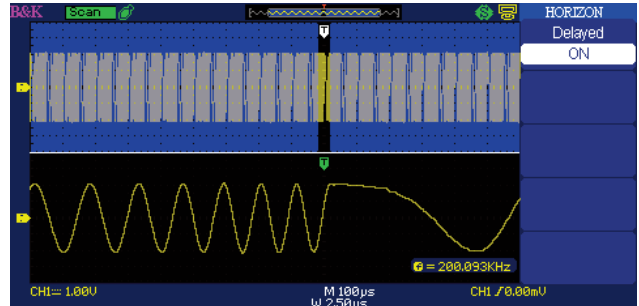
Minimize debug time by saving and recalling setups and waveforms from internal memory. Save and recall up to 20 different oscilloscope setups and 20 different waveforms.

### Digital filtering



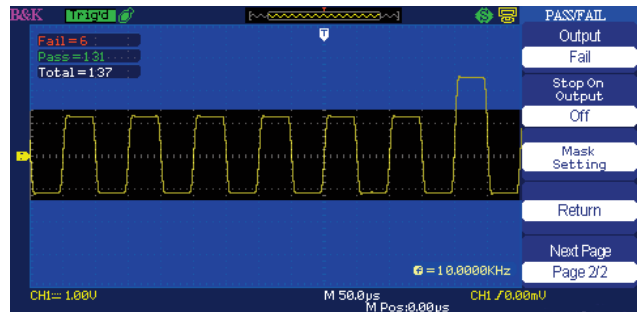
Filter out unwanted signal components such as various types of noise with built-in digital filters. Choose from Low-Pass, High-Pass, Band-Pass, and Band-Stop filters.

### Delayed sweep/zoom



Use the oscilloscope's delayed sweep feature to zoom in a particular area of a signal in real time while viewing the entire captured waveform simultaneously.

### Pass/Fail testing



Generate user-defined pass/fail limits to quickly identify go/no go test results.

Digital Storage Oscilloscope  
Model 2190D

Model	2190D
<b>Performance Characteristics</b>	
Bandwidth	100 MHz
Real Time Sampling Rate	Single Channel: 1 GSa/s Dual Channel: 500 MSa/s (for timebase faster than 250 ns/div)
Channels	2
Rise time	< 3.5 ns
Record Length	40,000 points when timebase is 2.5 ns to 50 ns, 20,000 points for 100 ns to 50 ms timebase and dual channel operation
Vertical Resolution	8 bit
Vertical Sensitivity	2 mV/div - 10 V/div (1-2-5 order)
DC Gain Accuracy	< ± 3.0%: 10 mV/div to 10 V/div in fixed gain ranges < ± 4.0%: 2 mV/div in variable gain ranges
Maximum input voltage	400 V (DC+AC pk-pk, 1 MΩ input impedance, X10), CAT I
Position Range	2 mV - 200 mV: ± 1.6 V 206 mV - 10 V: ± 40 V
Horizontal Scan Range	2.5 ns/div - 50 s/div Scan mode: 100 ms/div - 50 s/div (1 - 2.5 - 5 sequence)
Timebase Accuracy	± 100 ppm measured over 1ms interval
Input Coupling	AC, DC, GND
Input Impedance	1 MΩ ± 2%    16 pF ± 3 pF
Vertical and Horizontal Zoom	Vertically or horizontally expand or compress a live or stopped waveform
I/O interface	USB host port on front panel supports USB flash drives RS-232 and USB (USBTMC compliant) device port for connection to PC Pass/Fail output
<b>Acquisition Modes</b>	
Sample	Display sample data only
Peak Detect	Capture the maximum and minimum values of a signal
Average	Waveform averaged, selectable from 4, 16, 32, 64, 128, 256
Scan Mode	For time base settings 0.1 s/div - 50 s/div
<b>Trigger System</b>	
Trigger Types	Edge, Pulse Width, Video*, Slope, Alternating  *Support signal Formats: PAL/SECAM, NTSC Trigger condition : odd field, even field, all lines, or line number
Trigger Modes	Auto, Normal, Single
Trigger Coupling	AC, DC, LF reject, HF reject
Trigger Source	CH1, CH2, EXT, EXT/S, AC Line
Pulse Width Trigger	Trigger Modes: (>, <, =) Positive Pulse Width, (>, <, =) Negative Pulse Width
Slope Trigger	(>, <, =) Positive slope, (>, <, =) Negative slope Time: 20 ns - 10 s

<b>Hardware Frequency Counter</b>	
Reading Resolution	6 digits
Accuracy	± 0.01%
Range	DC Couple, 10 Hz to 100 MHz
Signal Types	All trigger signals (except pulse width trigger and video trigger)
<b>Waveform Math and Measure</b>	
Math operation	Add, Subtract, Multiply, Divide, FFT
FFT	Window mode: Hanning, Hamming, Blackman, Rectangular Sampling points: 1024
Measure	Vpp, Vmax, Vmin, Vamp, Vtop, Vbase, Vavg, Mean, Crms, Vrms, ROV, FOV, RPRE, FPRE, FREQ, Period, Rise Time, Fall Time, BWid, + Wid, - Wid, + Duty, - Duty, Phase, FRR, FRF, FFR, FFF, LRR, LRF, LFR, LFF
<b>Display System</b>	
Display	7 in. Color TFT, 480 x 234 resolution, 64K color
Display Contrast (Typical state)	150:1
Backlight Intensity (Typical state)	300 nit
Display Area	8 x 18 div
Display Mode	Dots, Vector
Persistence	Off, 1 sec, 2 sec, 5 sec, Infinite
Menu Display Timer	2 sec, 5 sec, 10 sec, 20 sec, Infinite
Screen-Saver	Off, 1 min, 2 min, 5 min, 10 min, 15 min, 30 min, 1 hour, 2 hour, 5 hour
Waveform Interpolation	Sin(x)/x, Linear
Display Color Mode	Normal, Invert
<b>Environment</b>	
Temperature	Operating: 50° F to 104° F (10° C to 40° C) Not operating: -4° F to 140° F (-20° C to 60° C)
Humidity	Operating: 85% RH, 104° F (40° C) Not operating: 85% RH, 149° F (65° C)
Altitude	Operating: 9,842 ft (3,000 m) Not operating: 50,085 ft (15,266 m)
Electromagnetic Compatibility	EMC Directive 2004/108/EC, EN61326:2006
Safety	Low voltage directive 2006/95/EC, EN61010-1:2001
<b>General</b>	
AC Input	100-240 VAC, CAT II, 50 VA max, 45 Hz to 440 Hz
Dimension (WxHxD)	12.7 x 5.35 x 5.24 inches (323 x 136 x 157 mm)
Weight	5.5 lbs. (2.5 kg)
<b>Three-Year Warranty</b>	
Included Accessories	User Manual, 10:1 Probe Set (2 pieces), Power Cord, USB Interface Cable