5 YEAR WARRANTY

pico® Technology

# PicoScope® 3000 Series

## 2-CHANNEL AND MIXED-SIGNAL USB OSCILLOSCOPES

USB 3.0 ON LATEST MODELS

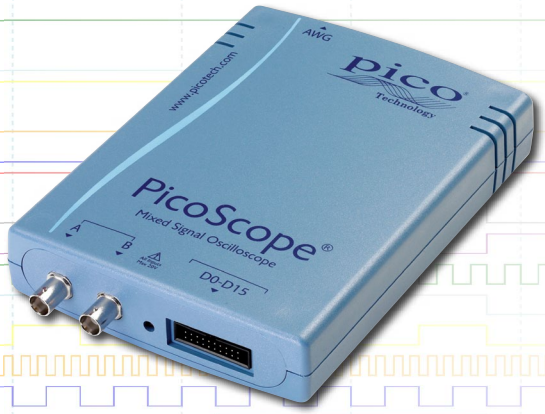
## Deep memory, high performance

ADVANCED TRIGGERS • SERIAL DECODING • MATH CHANNELS

2 ANALOG CHANNELS

### All scopes

- Up to 512 MS buffer memory
- Up to 250 MHz analog bandwidth
- Up to 1 GS/s real-time sampling
- Up to 10 GS/s equivalent-time sampling
- Up to 250 MHz spectrum analyzer
- Built-in function generator or AWG
- USB-connected and powered




2 ANALOG + 16 DIGITAL CHANNELS

### MSOs

- 16 digital inputs
- 100 MHz maximum input frequency
- 2 programmable thresholds

Supplied with SDK including example programs • Free technical support • Free updates
Software compatible with Windows XP, Windows Vista, Windows 7 and Windows 8

www.picotech.com

## PicoScope: power, portability and versatility

Pico Technology continues to push the limits of USB-powered oscilloscopes. The PicoScope 3000 Series offers the highest performance available from any USB-powered oscilloscope on the market today and includes the industry's first USB 3.0 oscilloscope.

Pico USB-powered oscilloscopes are small, light and portable. They easily slip into a laptop bag making them ideal for the engineer on the move. There is no need for an external power supply, making them ideal for field use in many applications, such as design, research, test, education, service and repair.

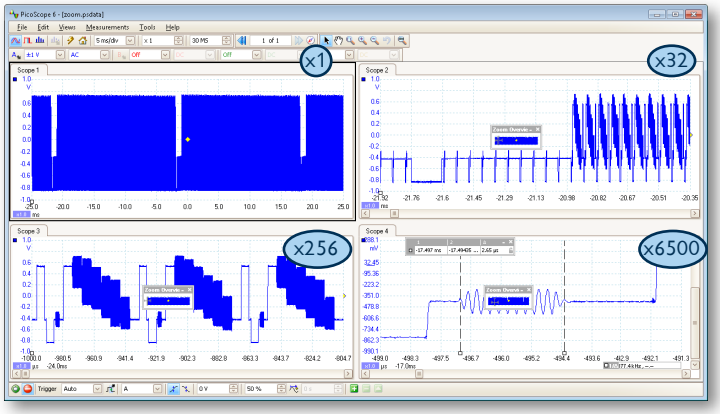
## High bandwidth, high sampling rate

With input bandwidths as high as 250 MHz, the PicoScope 3000 Series scopes can be used for a wide range of signal types from DC and baseband all the way up VHF. To avoid problems such as aliasing and loss of high-frequency detail, we recommend using a sampling rate of 4 or 5 times the signal bandwidth. Most USB-powered oscilloscopes have real-time sampling rates of only 100 or 200 MS/s, but the PicoScope 3000 Series offers up to 1 GS/s. For repetitive signals only, ETS (equivalent-time sampling) mode boosts the effective rate to 10 GS/s, allowing even more detailed display of high frequencies.

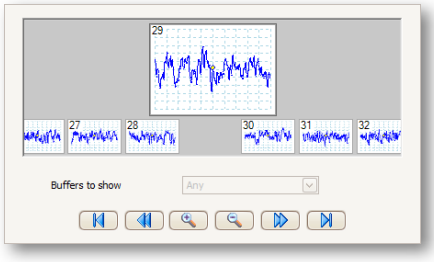
## Huge buffer memory

The PicoScope 3000 Series offers memory depths up to 512 million samples, more than any other oscilloscope in this price range.

Other oscilloscopes have high maximum sampling rates, but without deep memory they cannot sustain these rates on long timebases. Using its 512 MS buffer, the PicoScope 3207B can sample at 1 GS/s all the way down to 50 ms/div (500 ms total capture time).

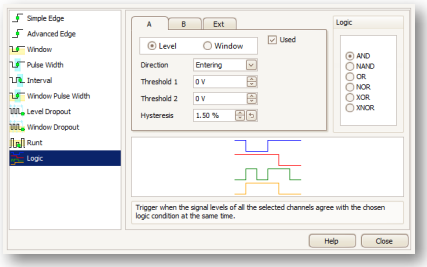



Managing all this data calls for some powerful tools. There's a set of zoom buttons, plus an overview window that lets you zoom and reposition the display by simply dragging with the mouse. Zoom factors of several million are possible.




Each captured waveform is stored in a segmented buffer so you can rewind and review up to 10,000 previous waveforms. No longer will you see a glitch on the screen only for it to vanish before you stop the scope. Combined with mask limit testing, the buffer navigator can be instructed to show only waveforms that are out of specification.

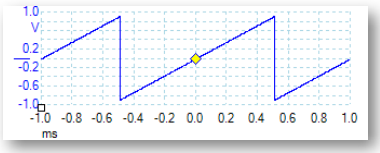
## Advanced triggers



As well as the standard range of triggers found on all oscilloscopes, the PicoScope 3000 Series offers an industry-leading set of advanced triggers including *pulse width*, *windowed* and *dropout* triggers to help you capture the data you need. All advanced trigger types have adjustable thresholds and hysteresis. The MSOs have a further set of *digital* triggers that can detect any data pattern with optional edge-sensitivity. The *logic* trigger applies the selected Boolean operation to any number of analog, EXT or MSO digital inputs.

## Digital triggering

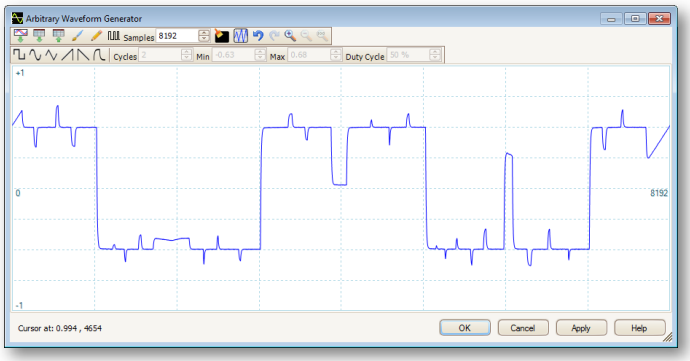
Most digital oscilloscopes sold today still use an analog trigger architecture based on comparators. This can cause time and amplitude errors that cannot always be calibrated out. The use of comparators often limits the trigger sensitivity at high bandwidths.



In 1991 we pioneered the use of fully digital triggering using the actual digitized data. This technique reduces trigger errors and allows our oscilloscopes to trigger on the smallest signals, even at the full bandwidth. Trigger levels and hysteresis can be set with high precision and resolution.

Digital triggering also reduces re-arm delay and this, combined with the segmented memory, allows the triggering and capture of events that happen in rapid sequence. At the fastest timebase you can use rapid triggering to collect 10,000 waveforms in under 20 milliseconds (USB 2.0) or 10 milliseconds (USB 3.0). Our mask limit testing function can then scan through these waveforms to highlight any failed waveforms for viewing in the waveform buffer.

## Arbitrary waveform and function generator

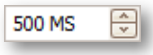



All units have a built-in function generator with at least sine, square, triangle and DC modes. As well as basic controls to set level, offset and frequency, more advanced controls allow you to sweep over a range of frequencies and trigger the generator from a specified event. Combined with the spectrum peak hold option, this becomes a powerful tool for testing amplifier and filter responses.

The PicoScope 3000 Series B and MSO models include additional built-in waveforms, such as white noise and PRBS, as well as an arbitrary waveform generator (AWG). Waveforms can be created or edited using the built-in AWG editor, copied from oscilloscope traces, or loaded from a spreadsheet.

## Hardware acceleration

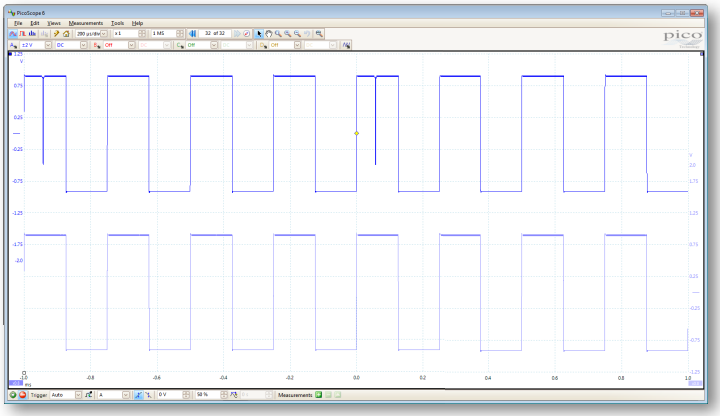
Almost all PC oscilloscopes collect data faster than USB transfer speeds, so data has to be stored in high-speed memory on the device. However, even deep-memory devices are expected to have fast waveform update rates. As an example, the PicoScope 3207B can sample at 1 GS/s for timebases as long as 20 ms/div and still update several times per second.




Today's PCs cannot process the raw data from a high-performance oscilloscope without becoming a bottleneck, whether this is the user's PC connected to a USB oscilloscope or the embedded PC in a bench-top oscilloscope. In both cases, hardware acceleration is required to avoid having the PC's CPU process every sample.

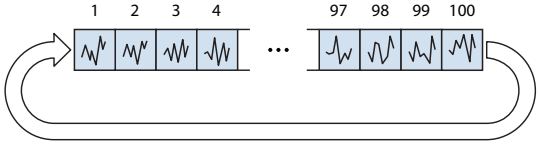
The main task of hardware acceleration is to intelligently compress the raw ADC data stored in the oscilloscope's memory before transferring it to the PC for display. Consider a waveform with 100 million samples being displayed on a PC monitor with a horizontal resolution of 1000 pixels. Some oscilloscopes perform a simple decimation where every *nth* sample is transferred. This is easy to do but results in lost data and missing high-frequency information. 99.999% of the data is never displayed.

PicoScope oscilloscopes with deep memory perform data aggregation, where dedicated logic divides the memory into (for example) 1000 blocks of 100,000 samples. The minimum and maximum values of each 100,000 sample block are transferred to the PC, preserving the high-frequency data. If you now draw an area on the screen to zoom in and view in more detail, the oscilloscope will again serve up 1000 min/max pairs of data but from just the zoomed area of interest.



*Both waveforms show the same signal using different types of hardware acceleration. Top waveform: using aggregation, high-frequency spikes are preserved. Bottom waveform: using decimation, signal data is lost.*

If the full memory is not used for the waveform, the memory is automatically configured as a circular buffer. For example, if only 1 million samples are captured per waveform, the last 500 or so waveforms are always stored in oscilloscope memory for review. Tools such as mask limit testing can then be used to scan through each waveform to identify any anomalies.




As the hardware acceleration is performed within an FPGA, we are able to continue to make improvements through software upgrades even after the product has been purchased. In parallel with the data aggregation, other data such as average values are also returned to speed up measurements and to reduce the number of occasions where we do have to use the PC's processor.

## USB 3.0 oscilloscopes

In the 1990s most PC oscilloscopes connected to the PC through the 25-pin parallel port connector. The move to USB 2.0 in the early 2000s was a significant step forward for PC oscilloscopes, increasing transfer rates by over 100 times and allowing many devices to be powered by the USB port.

The PicoScope 3207A and B are the world's first PC oscilloscopes with a USB 3.0 interface. USB 3.0 offers a tenfold increase in theoretical transfer speeds over USB 2.0. As explained above under 'Hardware acceleration', PicoScope USB 2.0 deep-memory oscilloscopes are already optimized to transfer data efficiently, but USB 3.0 has the potential to make this process even faster. On many USB 3.0 systems, performance will depend on your PC's CPU and chipset rather than being limited by the USB port.

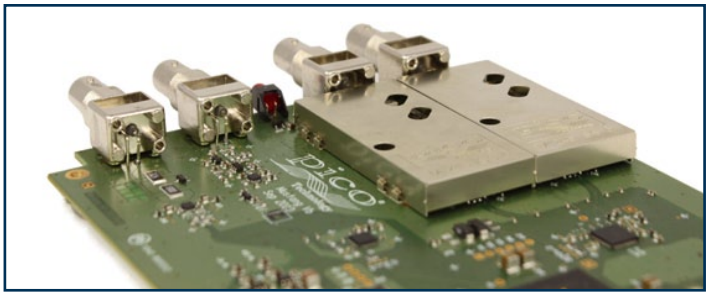
USB 3.0 has some immediate benefits: if your PC has a fast SSD drive, the saving of large waveforms will be quicker. Another benefit is faster gap-free continuous streaming of data to the PC. As CPU speeds continue to increase, the full performance benefits of USB 3.0 for oscilloscopes will be realised.

## High signal integrity

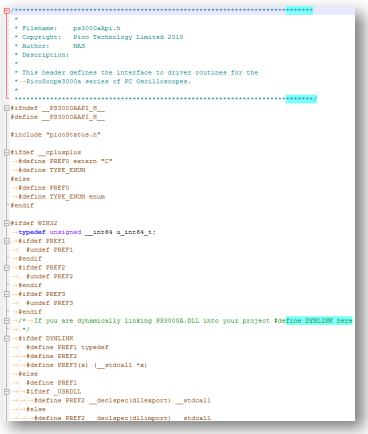
Most oscilloscopes are built down to a price; ours are built up to a specification.

Careful front-end design and shielding reduces noise, crosstalk and harmonic distortion. Years of oscilloscope experience leads to improved pulse response and bandwidth flatness.

We are proud of the dynamic performance of our products and publish these specifications in detail. The result is simple: when you probe a circuit, you can trust in the waveform you see on the screen.



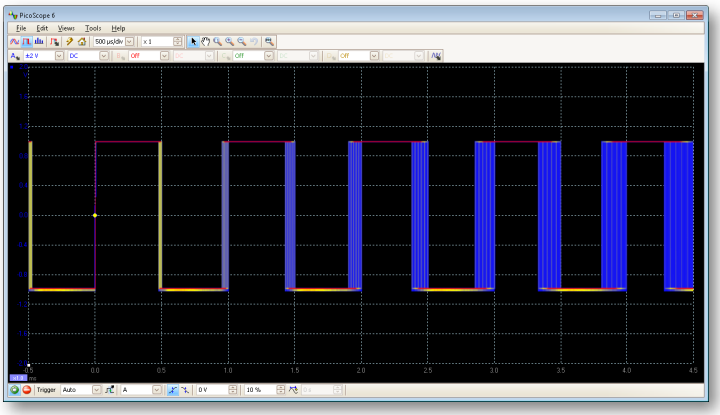
## High-speed data acquisition and digitizer



The drivers and software development kit supplied allow you to write your own software or interface to popular third-party software packages such as LabVIEW.

If the 512 MS record length isn't enough, the driver supports data streaming, a mode that captures gap-free continuous data through the USB port directly to the PC's RAM or hard disk at a rate of over 10 MS/s (maximum speed is PC-dependent).

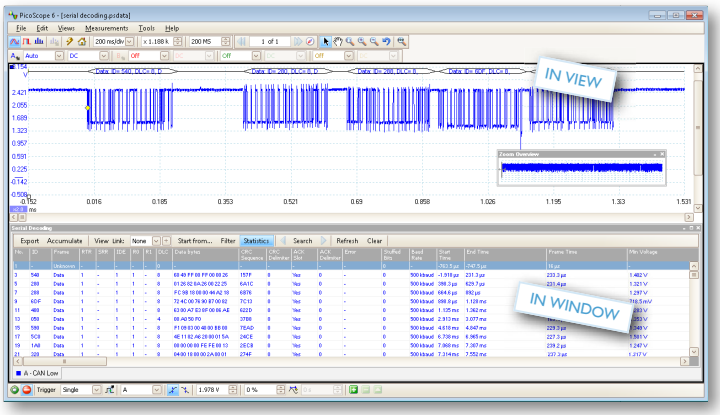
## Persistence display modes



See old and new data superimposed, with new data in a brighter color or shade. This makes it easy to see glitches and dropouts and to estimate their relative frequency. Choose between analog persistence and digital color, or create a custom display mode.

The design of the PicoScope software ensures that maximum display area is available for waveform viewing. Even with a laptop you have a much bigger viewing area and higher resolution than a typical benchtop scope.

## Serial decoding



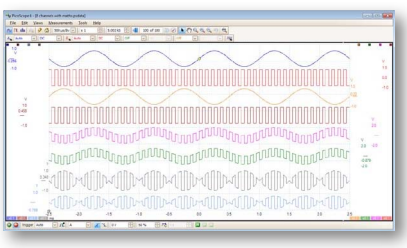

The PicoScope 3000 Series, with its deep memory, is ideal for serial decoding as it can capture thousands of frames of uninterrupted data. Protocols currently included are I²C, I²S, SPI, RS232/UART, CAN, LIN and FlexRay. Expect this list to grow with free software updates.

PicoScope displays the decoded data in the format of your choice: in-view, in-window, or both at once. The in-view format shows the decoded data beneath the waveform on a common time axis, with error frames marked in red. You can zoom in on these frames to look for noise or distortion on the waveform.

In-window format shows a list of the decoded frames, including the data and all flags and identifiers. You can set up filtering conditions to display only the frames you are interested in, search for frames with specified properties, or define a start pattern that the program will wait for before listing the data. You can also create a spreadsheet to fully decode the hex data into plain text.

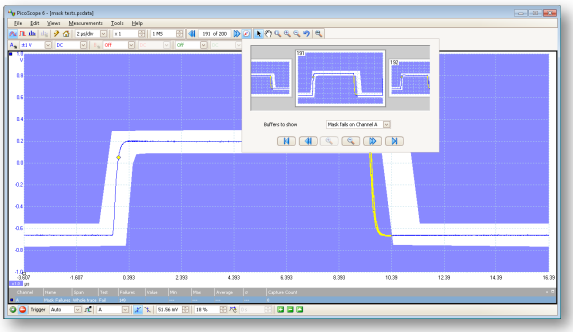
## Math channels

Create new channels by combining input channels and reference waveforms. Choose from a wide range of arithmetic, logarithmic, trigonometric and other functions.



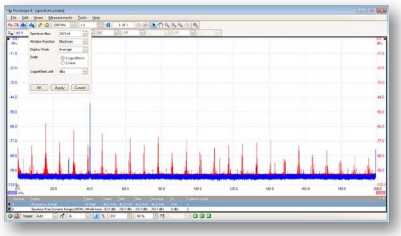
## Mask limit testing

This feature is specially designed for production and debugging environments. Capture a signal from a known working system, and PicoScope will draw a mask around it with your specified tolerance. Connect the system under test, and PicoScope will highlight any parts of the waveform that fall outside the mask area. The highlighted details persist on the display, allowing the scope to catch intermittent glitches while you work on something else. The measurements window counts the number of failures, and can display other measurements and statistics at the same time.



The numerical and graphical mask editors can be used separately or in combination, allowing you to enter accurate mask specifications and to modify existing masks. You can import and export masks as files.

## Spectrum analyzer



With a click of a button, you can display a spectrum plot of the selected channels with a maximum frequency up to 250 MHz. A full range of settings gives you control over the number of spectrum bands, window types and display modes: instantaneous, average, or peak-hold.

You can display multiple spectrum views with different channel selections and zoom factors, and see these alongside time-domain waveforms of the same data. A comprehensive set of automatic frequency-domain measurements, including THD, THD+N, SNR, SINAD and IMD, can be added to the display.

## Custom probe settings

The custom probes feature allows you to correct for gain, attenuation, offsets and nonlinearities in special probes, or to convert to different units of measurement (such as current, power or temperature). You can save definitions to disk for later use.

## High-end features as standard

Buying a scope from some companies is a bit like buying a car. By the time you have added all the optional extras you need, the price has gone up considerably. With the PicoScope 3000 Series, high-end features such as mask limit testing, serial decoding, advanced triggering, measurements, math, XY, digital filtering and segmented memory are all included in the price.

To protect your investment, both the PC software and firmware inside the unit can be updated. We have a long history of providing new features for free as software downloads. Other companies make vague promises about future enhancements but we deliver on our promises year after year. Users of our products reward us by becoming lifelong customers, frequently recommending us to their colleagues.

**PicoScope:** the display can be as simple or as complex as you need. Begin with a single view of one channel, and then expand the display to include any number of live channels, math channels and reference waveforms.

**Tools > Serial decoding:** Decode multiple serial data signals and display the data alongside the physical signal or as a detailed table.

**Tools > Reference channels:** Store waveforms in memory or on disk and display them alongside live inputs. Ideal for diagnostics and production testing.

**Tools > Masks:** Automatically generate a test mask from a waveform or draw one by hand. PicoScope highlights any parts of the waveform that fall outside the mask and shows error statistics.

**Channel options:** Filtering, offset, resolution enhancement, custom probes and more.

**Auto setup button:** Configures the timebase and voltage ranges for stable display of signals.

**Trigger marker:** Drag to adjust trigger level and pre-trigger time.

**Oscilloscope controls:** Commonly-used controls such as voltage range, channel enable, timebase and memory depth are placed on the toolbar for quick access, leaving the main display area clear for waveforms.

**Signal generator:** Generates standard signals or (on selected scopes) arbitrary waveforms. Includes frequency sweep option.

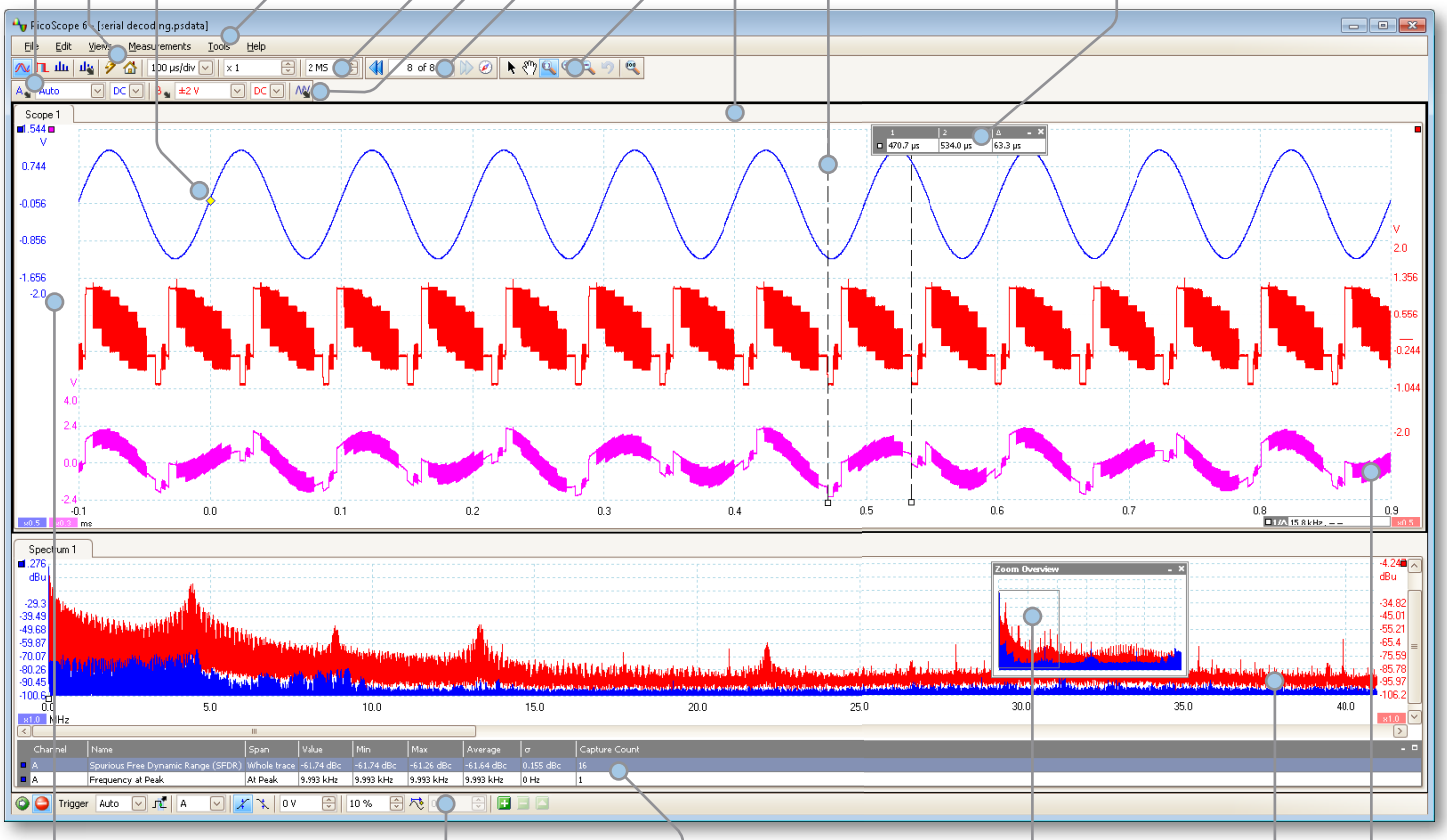
**Waveform replay tools:** PicoScope automatically records up to 10,000 of the most recent waveforms. You can quickly scan through to look for intermittent events, or use the **Buffer Navigator** to search visually.

**Zoom and pan tools:** PicoScope allows a zoom factor of up 100 million, which is necessary when working with the deep memory of the 3000 Series scopes. Either use the zoom-in, zoom-out and pan tools, or click and drag in the zoom overview window for fast navigation.

**Views:** PicoScope is carefully designed to make the best use of the display area. You can add new scope and spectrum views with automatic or custom layouts.

**Rulers:** Each axis has two rulers that can be dragged across the screen to make quick measurements of amplitude, time and frequency.

**Ruler legend:** Absolute and differential ruler measurements are listed here.




**Movable axes:** The vertical axes can be dragged up and down. This feature is particularly useful when one waveform is obscuring another. There's also an **Auto Arrange Axes** command.

**Trigger toolbar:** Quick access to main controls, with advanced triggers in a pop-up window.

**Automatic measurements:** Display calculated measurements for troubleshooting and analysis. You can add as many measurements as you need on each view. Each measurement includes statistical parameters showing its variability.

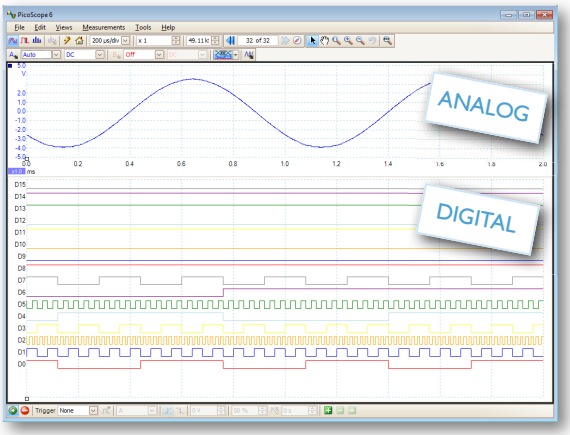
**Zoom overview:** Click and drag for quick navigation in zoomed views.

**Spectrum view:** View FFT data alongside scope view or independently.

**Math channels:** Combine input channels and reference waveforms using simple arithmetic, or create custom equations with trigonometric and other functions.

## Mixed-signal capability

The PicoScope 3000 Series MSOs from Pico Technology are 2+16 channel, 8-bit resolution oscilloscopes. Along with 2 analog channels, the PicoScope 3000 Series MSOs also have 16 digital inputs, so you can view your digital and analog signals simultaneously.



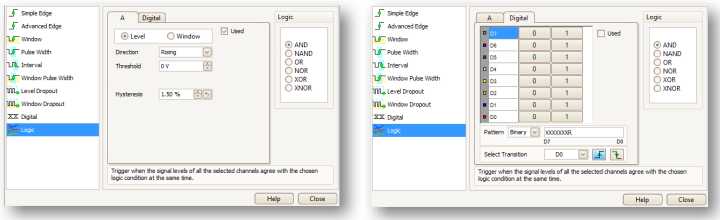

## Full-featured oscilloscope

The PicoScope 3000 Series MSOs with 2+16 input channels include all the features of standard oscilloscopes. An arbitrary waveform generator is built-in and includes a sweep function. The oscilloscopes also offer mask limit testing, math and reference channels, advanced triggers, serial decoding, automatic measurements and color persistence display.

## Triggering

The PicoScope 3000 Series MSOs offer a comprehensive set of advanced triggers including pulse width, windowed and dropout triggers to help you capture the data you need. Digital triggering reduces timing errors and allows these oscilloscopes to trigger on the smallest signals, even at the full bandwidth. Trigger levels and hysteresis can be set with high resolution.

Digital triggering reduces re-arm delay and, combined with the segmented memory, allows the triggering and capture of events that happen in rapid sequence. For analog inputs the mask limit testing function can then scan through the buffer to highlight failed waveforms for viewing in the buffer navigator.



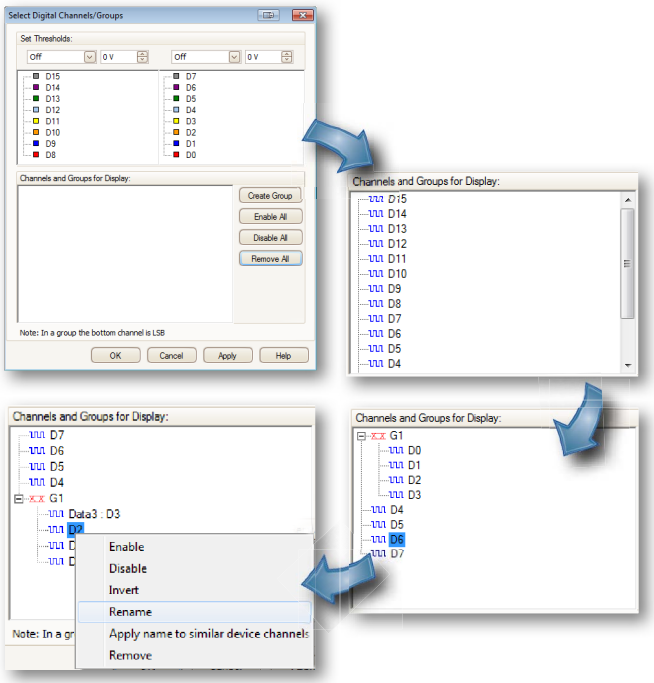
## Digital channels

The 16 digital inputs can be displayed individually or in arbitrary groups labelled with binary, decimal or hexadecimal values. A separate logic threshold from –5 V to +5 V can be defined for each 8-bit input port. The digital trigger can be activated by any bit pattern combined with an optional transition on any input.

Advanced logic triggers can be set on either the analog or digital input channels, or both.

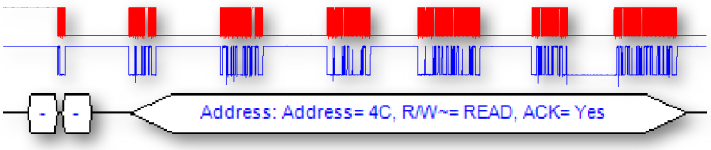
## Selecting digital channels and groups

Selecting the digital channels in the software couldn't be easier. Just click the digital channels button and then drag and drop to add the channels you want to see. These channels can be arranged into any order, grouped, renamed or disabled.




## Serial decoding

The PicoScope 3000 Series MSOs bring extra power to the serial decoding feature in PicoScope. You use decode serial data on all analog and digital inputs at the same time, giving you up to 18 channels of data with any combination of serial protocols!






| MODEL | ANALOG BANDWIDTH | DIGITAL MAX. FREQ. | MAX. SAMPLING RATE | BUFFER SIZE | FUNCTION GENERATOR | AWG | PROBES SUPPLIED | USB INTERFACE |
|---|---|---|---|---|---|---|---|---|
| PicoScope 3204A | 60 MHz | - | 500 MS/s | 4 MS | ✓ | × | 2 x MI007 60 MHz | 2.0 |
| PicoScope 3204B | | | | 8 MS | | ✓ | | |
| PicoScope 3204 MSO | | 100 MHz | | | | ✓ | | |
| PicoScope 3205A | 100 MHz | - | | 16 MS | | × | 2 x TA132 150 MHz | |
| PicoScope 3205B | | | | 32 MS | | ✓ | | |
| PicoScope 3205 MSO | | 100 MHz | | | | ✓ | | |
| PicoScope 3206A | 200 MHz | - | | 64 MS | | × | 2 x TA131 250 MHz | |
| PicoScope 3206B | | | | 128 MS | | ✓ | | |
| PicoScope 3206 MSO | | 100 MHz | | | | ✓ | | |
| PicoScope 3207A | 250 MHz | - | 1 GS/s | 256 MS | | × | 2 x TA160 250 MHz | 3.0 |
| PicoScope 3207B | | | | 512 MS | | ✓ | | |

| VERTICAL (analog) | PicoScope 3204A/B/MSO | PicoScope 3205A/B/MSO | PicoScope 3206A/B/MSO | PicoScope 3207A/B |
|---|---|---|---|---|
| Bandwidth (-3 dB) | 60 MHz | 100 MHz | 200 MHz | 250 MHz |
| Rise time (calculated, 10% to 90%) | 5.8 ns | 3.5 ns | 1.75 ns | 1.4 ns |
| Input connectors | BNC | | | |
| Resolution | 8 bits | | | |
| Input characteristics | 2 channels, 1 MΩ ±1%, in parallel with 12 to 13 pF | | | |
| Input coupling | AC/DC | | | |
| Input sensitivity | 10 mV/div to 4 V/div (10 vertical divisions) | | | |
| Input ranges | ±50 mV to ±20 V in 9 ranges | | | |
| DC accuracy | ±3% of full scale | | | |
| Analog offset range | ±250 mV (50 mV to 200 mV ranges), ±2.5 V (500 mV to 2 V ranges), ±20 V (5 V to 20 V ranges) | | | |
| Analog offset accuracy | < ±1% | | | |
| Overvoltage protection | ±100 V (DC + AC peak) | | | |

| VERTICAL (digital) | PicoScope 3204 MSO | PicoScope 3205 MSO | PicoScope 3206 MSO | |
|---|---|---|---|---|
| Number of channels | 16 | | | |
| Input connectors | 2.54 mm pitch, 10 x 2 way connector | | | |
| Maximum input frequency | 100 MHz | | | |
| Minimum detectable pulse width | 5 ns | | | |
| Input impedance (with TA136 cable) | 200 kΩ ±2 % \|\| 8 pF ±2 pF | | | |
| Digital threshold range | ±5 V | | | |
| Input range | ±20 V | | | N/A |
| Overvoltage protection | ±50 V | | | |
| Threshold grouping | Two independent threshold controls: port 0 (D7-D0) and port 1 (D15-D8) | | | |
| Threshold selection | TTL, CMOS, ECL, PECL, user-defined | | | |
| Threshold accuracy | ±100 mV | | | |
| Minimum input voltage swing | 500 mV | | | |
| Channel-to-channel skew | < 5 ns | | | |
| Minimum input slew rate | 10 V/µs | | | |

| HORIZONTAL | PicoScope 3204A/B/MSO | PicoScope 3205A/B/MSO | PicoScope 3206A/B/MSO | PicoScope 3207A/B |
|---|---|---|---|---|
| Max. sampling rate<br>Ch A or B<br>Ch A or B + 1 digital port (MSO only)<br>1 or 2 digital ports (MSO only)<br>All other combinations (all models) | <br>500 MS/s<br>500 MS/s<br>500 MS/s<br>250 MS/s | <br>500 MS/s<br>500 MS/s<br>500 MS/s<br>250 MS/s | <br>500 MS/s<br>500 MS/s<br>500 MS/s<br>250 MS/s | <br>1 GS/s<br>-<br>-<br>500 MS/s |
| Sampling rate (repetitive sampling) | 2.5 GS/s | 5 GS/s | 10 GS/s | 10 GS/s |
| Sampling rate (cont. USB streaming) | Up to 10 MS/s in PicoScope software. PC-dependent using SDK. | | | |
| Timebase ranges | 2 ns/div to 1000 s/div | 1 ns/div to 1000 s/div | 500 ps/div to 1000 s/div | 100 ps/div to 1000 s/div |
| Buffer memory* (A models) | 4 MS | 16 MS | 64 MS | 256 MS |
| Buffer memory* (B/MSO models) | 8 MS | 32 MS | 128 MS | 512 MS |
| Buffer memory (streaming) | 100 MS in PicoScope software. All available memory with SDK. | | | |
| Waveform buffer (no. of segments) | 1 to 10,000 | | | |
| Timebase accuracy | ±50 ppm | | | ±2 ppm ±1 ppm/year |
| Sample jitter | < 5 ps RMS | | | |

* Shared between active channels

| DYNAMIC PERFORMANCE (typical; analog channels) | |
|---|---|
| Crosstalk | Better than 400:1 up to full bandwidth (equal voltage ranges) |
| Harmonic distortion | < –50 dB at 100 kHz full scale input |
| SFDR | 52 dB typical |
| ADC ENOB | 7.6 bits |
| Noise | 180 µV RMS (on most sensitive range) |
| Bandwidth flatness | (+0.3 dB, –3 dB) at scope input, from DC to full bandwidth |

| TRIGGERING | | | |
|---|---|---|---|
| Main features | Trigger modes | None, auto, repeat, single, rapid (segmented memory) | |
| | Pre-trigger capture | Max. 100% of capture size | |
| | Post-trigger delay | Max. 4 billion samples | |
| | Trigger re-arm time | < 2 µs on fastest timebase | < 1 µs on fastest timebase |
| | Max. trigger rate | Up to 10,000 waveforms in a 20 ms burst | ... in a 10 ms burst |
| On analog inputs | Source | Ch A, Ch B | |
| | Trigger types | Rising/falling edge, window, pulse width, window pulse width, dropout, window dropout, interval, runt pulse, logic | |
| | Trigger sensitivity | Digital triggering provides 1 LSB accuracy up to full bandwidth of scope.<br>ETS mode: typical 10 mV p-p at full bandwidth | |
| On digital inputs (MSO only) | Source | D15 to D0 | N/A |
| | Trigger types | Combined level and edge | |
| | Advanced triggers | Data pattern (adjustable grouping) | |
| Logic trigger | Source | Ch A, Ch B, EXT (not MSOs), D15 to D0 (MSOs only) | |
| | Logic | AND, NAND, OR, NOR, XOR or XNOR of all inputs | |

| EXTERNAL TRIGGER INPUT | PicoScope 3204A/B | PicoScope 3205A/B | PicoScope 3206A/B | PicoScope 3207A/B |
|---|---|---|---|---|
| Trigger types | Edge, pulse width, dropout, interval, logic, delayed | | | |
| Input characteristics | Front panel BNC, 1 MΩ ±1% in parallel with 13 pF ±1 pF | | | |
| Bandwidth | 60 MHz | 100 MHz | 200 MHz | 250 MHz |
| Voltage range | ±5 V, DC coupled | | | |
| Overvoltage protection | ±100 V (DC + AC peak) | | | |

| FUNCTION GENERATOR | PicoScope 3204A/B/MSO | PicoScope 3205A/B/MSO | PicoScope 3206A/B/MSO | PicoScope 3207A/B |
|---|---|---|---|---|
| Standard output signals | All models: Sine, square, triangle, DC voltage. B/MSO models: ramp, sinc, Gaussian, half-sine, white noise, PRBS. | | | |
| Standard signal frequency | DC to 1 MHz | | | |
| Bandwidth | > 1 MHz | | | |
| Output frequency accuracy | ±50 ppm | | | ±2 ppm ±1 ppm/year |
| Output frequency resolution | < 0.01 Hz | | | |
| Output voltage range | ±2 V with ±1% DC accuracy | | | |
| Output voltage adjustment | Signal amplitude and offset adjustable in approx. 1 mV steps within overall ± 2 V range | | | |
| Amplitude flatness | < 0.5 dB to 1 MHz, typical | | | |
| SFDR | > 60 dB, 10 kHz full scale sine wave | | | |
| Connector type | BNC, 600 Ω output impedance | | | |
| Overvoltage protection | ±10 V | | | |
| Sweep modes | Up, down, or alternating, with selectable start/stop frequencies and increments | | | |

| AWG (B/MSO models only) | | | | |
|---|---|---|---|---|
| Update rate | 20 MS/s | | | 100 MS/s |
| Buffer size | 8 kS | 8 kS | 16 kS | 32 kS |
| Resolution | 12 bits (output step size approx. 1 mV) | | | |
| Standard signal frequency | DC to 1 MHz | | | |
| Bandwidth | > 1 MHz | | | |
| Rise time (10% to 90%) | < 120 ns | | | |

| SPECTRUM ANALYZER | | | | |
|---|---|---|---|---|
| Frequency range | DC to 60 MHz | DC to 100 MHz | DC to 200 MHz | DC to 250 MHz |
| Display modes | Magnitude, average, peak hold | | | |
| Windowing functions | Rectangular, Gaussian, triangular, Blackman, Blackman-Harris, Hamming, Hann, flat-top | | | |
| Number of FFT points | Selectable from 128 to 1 million in powers of 2 | | | |

| MATH CHANNELS | |
|---|---|
| Functions | −x, x+y, x−y, x*y, x/y, x^y, sqrt, exp, ln, log, abs, norm, sign, sin, cos, tan, $\sin^{-1}$, $\cos^{-1}$, $\tan^{-1}$, sinh, cosh, tanh, delay |
| Operands | A, B (input channels), T (time), reference waveforms, constants, pi |

| AUTOMATIC MEASUREMENTS | |
|---|---|
| Oscilloscope | AC RMS, true RMS, DC average, cycle time, frequency, duty cycle, falling rate, fall time, rising rate, rise time, high pulse width, low pulse width, maximum, minimum, peak to peak |
| Spectrum | Frequency at peak, amplitude at peak, average amplitude at peak, total power, THD %, THD dB, THD+N, SFDR, SINAD, SNR, IMD |
| Statistics | Minimum, maximum, average and standard deviation |

| SERIAL DECODING | |
|---|---|
| Protocols | $I^2C$, $I^2S$, SPI, RS232/UART, CAN, LIN, FlexRay |

| MASK LIMIT TESTING | |
|---|---|
| Statistics | Pass/fail, failure count, total count |

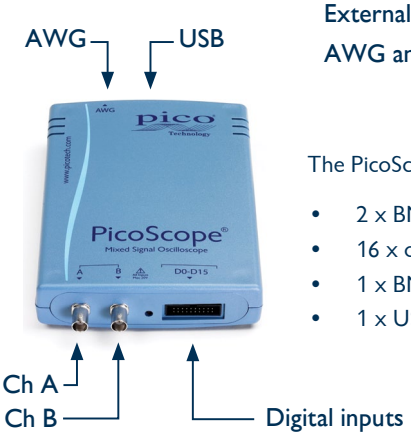
| DISPLAY | |
|---|---|
| Interpolation | Linear or sin(x)/x |
| Persistence modes | Digital color, analog intensity, custom, or none |

| GENERAL | | |
|---|---|---|
| PC connection | USB 2.0 Hi-Speed | USB 3.0 SuperSpeed |
| | Use above port for best performance. All scopes are compatible with USB 1.1, USB 2.0 and USB 3.0 ports. | |
| Power requirements | Powered from USB port | |
| Dimensions | A/B models: 200 x 140 x 40 mm (including connectors). MSOs: 210 x 140 x 40 mm (including connectors). | |
| Weight | < 0.5 kg | |
| Temperature range | Operating: 0 °C to 50 °C (20 °C to 30 °C for stated accuracy). Storage: –20 °C to 60 °C. | |
| Humidity range | Operating: 5 %RH to 80 %RH non-condensing. Storage: 5 %RH to 95 %RH non-condensing. | |
| Environment | Dry locations only; up to 2000 m altitude | |
| Safety approvals | Designed to EN 61010-1:2010 | |
| EMC approvals | Tested to EN61326-1:2006 and FCC Part 15 Subpart B | |
| Environmental approvals | RoHS and WEEE compliant | |
| Software/PC requirements | PicoScope 6, SDK and example programs included. Requires Microsoft Windows XP SP3, Windows Vista, Windows 7 or Windows 8 (Windows RT not supported). | |
| Accessories | USB cable(s), 2 probes in probe case. (MSO only: digital cable and 2 packs of 10 test clips.) | |
| Languages (full support): | English, French, German, Italian, Spanish | |
| Languages (UI only): | Chinese (Simplified and Traditional), Czech, Danish, Dutch, Finnish, Greek, Hungarian, Japanese, Korean, Norwegian, Polish, Portuguese, Romanian, Russian, Swedish, Turkish | |

## Connections

The analog-input PicoScope 3000 Series oscilloscopes have:

- 2 x BNC analog input channels
- 1 x BNC external trigger input
- 1 x BNC AWG/function generator output
- 1 x USB port




The PicoScope 3000 Series MSOs have:

- 2 x BNC analog input channels
- 16 x digital input channels
- 1 x BNC AWG output
- 1 x USB port

## Kit contents and accessories

Your PicoScope 3000 Series oscilloscope kit contains the following items:

- PicoScope 3000 Series oscilloscope
- 2 x probes in carrying case
- USB 2.0 cable
- USB 3.0 cable (USB 3.0 oscilloscopes only)
- Quick Start Guide
- Software and Reference CD

In addition to the above, the MSO kits include:

- TA136 digital cable
- 2 x TA139 pack of 10 test clips

## Ordering information

| ORDER CODE | DESCRIPTION | GBP | USD* | EUR* |
|---|---|---|---|---|
| PP708 | PicoScope 3204A 60 MHz oscilloscope | 399 | 658 | 483 |
| PP709 | PicoScope 3204B 60 MHz oscilloscope with AWG | 499 | 823 | 604 |
| PP859 | PicoScope 3204 MSO 60 MHz mixed-signal oscilloscope with AWG | 649 | 1070 | 785 |
| PP710 | PicoScope 3205A 100 MHz oscilloscope | 599 | 988 | 725 |
| PP711 | PicoScope 3205B 100 MHz oscilloscope with AWG | 699 | 1153 | 846 |
| PP860 | PicoScope 3205 MSO 100 MHz mixed-signal oscilloscope with AWG | 849 | 1400 | 1028 |
| PP712 | PicoScope 3206A 200 MHz oscilloscope | 799 | 1318 | 967 |
| PP713 | PicoScope 3206B 200 MHz oscilloscope with AWG | 899 | 1483 | 1088 |
| PP861 | PicoScope 3206 MSO 200 MHz mixed-signal oscilloscope with AWG | 1049 | 1730 | 1270 |
| PP875 | PicoScope 3207A 250 MHz USB 3.0 oscilloscope | 1099 | 1813 | 1330 |
| PP876 | PicoScope 3207B 250 MHz USB 3.0 oscilloscope with AWG | 1199 | 1978 | 1451 |

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*Prices are correct at the time of publication. Please contact Pico Technology for the latest prices before ordering.

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