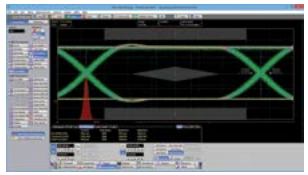
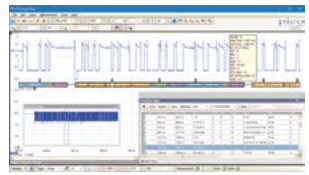
pico®
Technology

TEST & MEASUREMENT

PRODUCT CATALOG





Established in 1991, Pico Technology is a worldwide leader in the field of PC-based test equipment and data acquisition. Our products regularly win industry awards, with our past achievements including:

We offer all of our customers unbeatable technical support, with our team of experts on call to answer your query or to advise you on the best product to suit your need. Our stringent quality controls ensure that you receive the highest quality products with the very best level of service. We often get comments like this from our customers :

"I would like to add that in today's world and economic climate it is truly refreshing to learn that there are still companies in this country which market products like yours, and who you can call up and get met with the level of help and support which I have been shown." BC, UK.

Foreword

By Alan Tong, Founder and Managing Director, Pico Technology

When I started designing and building Pico oscilloscopes over 25 years ago, I could not have imagined how technology within the electronics industry would develop. Today I am proud that Pico is the market leader in PC-based oscilloscopes.

We work closely with our ever-growing customer base. Whether we are continuously developing the product range at our headquarters near Cambridge, UK, in our USA office in Texas, or with our RF design team in Vilnius, Lithuania, we are committed to meeting customers' needs through advances in technology. For example, PicoScope is now touchscreen compatible and works not only with Windows, but with Mac and Linux too. Our high-end features, SDK and excellent support mean that PicoScope is being embedded into more systems than ever before.

It's this heritage and innovation that allows us to create products for the electronics industry that continually grow in capability and have become well loved. We hope you find what you need within this catalog, as we show you our product range and demonstrate the ease of use and simplicity of our PicoScope 6 software.

CONTENTS

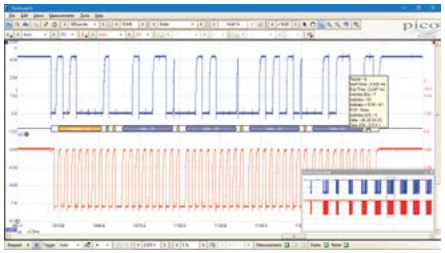
PICO TECHNOLOGY - WE GIVE YOU MORE

REAL-TIME OSCILLOSCOPES

Pico Technology is the market leader in PC Oscilloscopes — the modern alternative to the traditional benchtop oscilloscope. There is a wide range of real-time PicoScope® devices to choose from:

- 2-, 4- and 8-channel models, plus mixed signal models with 16 digital channels
- Bandwidths from 10 MHz to 1 GHz
- Resolution from 8 to 16 bits, including flexible resolution models that enable you to trade sampling speed for higher resolution
- The deepest capture memory oscilloscopes, to 2 gigasamples on the PicoScope 6000 Series
- Rich measurement features and extensive analysis capability, including decoders for 16 popular serial protocols

The PicoScope 6 software uses the power and display capability of the connected PC. Unlike a traditional benchtop scope, PicoScope 6 dedicates almost all the display area to the waveform, giving a larger, clearer view of your data.



DATA LOGGERS

PicoLog® data acquisition products provide a straightforward answer to your data logging needs. Our data loggers require no power supply and simply plug into a USB port on your PC, or an Ethernet port on your PC or network.

Every logger is supplied with PicoLog data acquisition software so you can measure, record and analyze your data. Models include:

- TC-08 8-channel thermocouple data logger
- PT-104 high-accuracy temperature data logger
- ADC-20 / ADC-24 high-accuracy voltage input data loggers
- PicoLog 1000 Series high-speed voltage data loggers
- DrDAQ – a unique data logger / oscilloscope / signal generator. Measures voltage, resistance, light, temperature, pH and more using plug-in sensors.

SAMPLING SCOPES & RF PRODUCTS

PicoScope 9000 Series sampling oscilloscopes address digital and telecommunications applications of 10 Gb/s and higher, microwave applications up to 20 GHz and timing applications with a resolution down to 64 fs.

Options include 11.3 Gb/s clock recovery and optical input to 9.5 GHz.

Time-domain reflectometry (TDR) enables test and validation of characteristic impedance of transmission lines including PCB backplanes, coax cable, connectors and RF switches.

The PicoConnect 900 family of high-performance, ultra low capacitance passive probes deliver low-invasive probing of high-speed data with lines up to 9 GHz bandwidth.

THERE'S A PICOSCOPE FOR EVERY APPLICATION

FLEXIBLE OPTIONS

PicoScope oscilloscopes offer a wide range of vertical resolution options from 8 to 16 bits. The higher the resolution, the greater the vertical accuracy. We also have a flexible resolution oscilloscope where our breakthrough ADC technology allows you to switch from 8 to 16 bits in one unit. Choose between 2, 4 or 8 channels, plus 16 digital channels on MSO models.

PRICED TO SUIT EVERY BUDGET

PicoScope oscilloscopes offer the most cost-effective way to get the specifications you want. Prices range from $115 / €95 / £79 for our 2-channel entry level scopes to $29 495 / €26 275 / £20 685 for our optical sampling oscilloscopes.

PICOSCOPE SOFTWARE SUPPLIED FREE WITH ALL OUR OSCILLOSCOPES

PicoScope 6 software is supplied free with all of our real-time PC oscilloscopes. We are continually seeking to improve our software with added functionality and useful features, which are available to download in software updates that are free for the life of the product. Our newsletter and website let you know when the latest software releases are available.

PicoScope 9000 Series sampling oscilloscopes come with their own software especially designed for use in high-speed serial bus analysis, signal characterization, and PCB/cable channel impedance measurement applications.

THERE'S A PICOSCOPE FOR EVERY APPLICATION

COMPACT AND PORTABLE UNITS
Unlike traditional benchtop instruments, Pico Technology's PC oscilloscopes are light and portable. When used with a laptop computer, a PC oscilloscope allows you to carry a complete electronics lab in the same bag as your PC.

NO UPGRADES NEEDED: HIGH-END SOFTWARE FEATURES INCLUDED IN BASE PRICE
Most traditional oscilloscope suppliers charge customers a high premium on top of the advertised base unit price for "optional" software upgrades. At Pico we don't believe in these optional extras and offer you everything you need in one price. Our standard software features include serial decoding, mask limit testing, advanced math and persistence display modes.

LIFETIME TECHNICAL SUPPORT
Free lifetime technical support is available for all customers, whether you would like one of our team to answer your query or to advise you on the best products to suit your needs.

A COMPLETE TEST AND MEASUREMENT LAB IN ONE
Every PicoScope has advanced analysis capability meaning it can be used as an oscilloscope, a spectrum analyzer and a serial protocol analyzer. Many models even include a built-in function generator, arbitrary waveform generator and, in MSO (mixed signal oscilloscope) models, a logic analyzer too. So with a Pico Technology PC oscilloscope you really do get a complete test and measurement lab in one cost-effective unit.

5-YEAR WARRANTY
We cover all oscilloscopes and data loggers with a 5-year warranty against manufacturing defects.

EASILY SHARE YOUR CAPTURED WAVEFORMS AND INSTRUMENT SETTINGS
Need to show your customer or colleague the signal you have captured? Just save the waveform and email it to them. They don't have a copy of the oscilloscope software? No problem – just export it as text, an image or in a binary format for use with third-party software.

USE YOUR PC MONITOR AS A LARGE AND DETAILED COLOR DISPLAY
The screen size of a traditional oscilloscope is limited by the physical size and resolution of the product. There is no such restriction with a PC oscilloscope since the display can be as large as your computer monitor, TV, or projector screen. This makes our scopes ideal for training and education where the waveform can be projected onto an interactive whiteboard, or anywhere that ideas need sharing with an audience.

FREE SOFTWARE UPDATES
If you're lucky you can return a traditional oscilloscope to the supplier for a firmware upgrade and maybe get improved functionality. With a PicoScope new features and improved functionality can be added at any time with an easy software update. These free software updates mean that a PicoScope is one of the few things that can actually become more powerful and useful with age.

MATCHED PROBES
Pico Technology offers the best probes to match and complement our oscilloscopes. For details on which probes are included with your chosen product see page 41.

PicoScope®

AFFORDABLE EXPERTISE
Pico Technology offers you a wide range of oscilloscopes to meet any requirement, all benefiting from over 25 years of expertise and with all features included in the price. PicoScope software is included in the price, with free upgrades for life.

HUGE CAPTURE MEMORY
These days most digital oscilloscopes have high sampling rates, but many of them let you down with a tiny capture memory which means that you can only use the maximum sampling rate on a few timebases. We offer memory options from 8 kS on our entry level PicoScope 2000 Series to an enormous 2 GS with our PicoScope 6000 Series. The 2 GS capture memory can hold two 200 ms captures at the maximum sampling rate of 5 GS/s. Managing all this data calls for some powerful tools, so our PicoScope software has a maximum zoom factor of several million. There is segmented memory to capture the information you need, without wasting memory between events when nothing is happening.

LARGE BANDWIDTH, FAST SAMPLING RATE
PicoScopes offer a range of bandwidth and sampling rate choices to suit any application. Bandwidth options range from 10 MHz to 20 GHz, and sampling rates from 100 MS/s to 5 GS/s. For the PicoScope 6404C and PicoScope 6404D the real-time 500 MHz analog bandwidth is complemented by a sampling rate of 5 GS/s, and ETS mode boosts the maximum sampling rate for repetitive signals to up to 50 GS/s.

SIGNAL INTEGRITY
When DC accuracy and dynamic performance are essential, you can rely on PicoScope oscilloscopes. For example our 8-bit resolution PicoScope 3000 Series scopes provide a typical SFDR of 52 dB, below 180 µV noise and over 400:1 crosstalk rejection, while the 16-bit resolution PicoScope 4262 has an SFDR of 96 dB, below 8.5 µV of noise and over 50 000:1 crosstalk rejection.

FUNCTION GENERATOR AND ARBITRARY WAVEFORM GENERATOR
Most PicoScope models have a built-in function generator that can produce a range of standard signals such as sine waves, square waves and more. Many units include an arbitrary waveform generator, which can produce standard signals as well as an unlimited range of user-defined waveforms.

REAL-TIME OSCILLOSCOPES

	PicoScope 2000 Series			PicoScope 3000 Series		
	2000A models	**2000B models**	**2000A & B MSO models**	**3000D models**	**3000D MSO models**	**4224 and 4424**
Description	Power and performance in your hand	Benchtop performance in a pocket-sized scope	Mixed signal oscilloscopes	Fast sampling with deep memory	Mixed signal oscilloscopes	High resolution oscilloscopes
Channels	2 or 4	2 or 4	2 analog + 16 digital	2 or 4 + EXT	2 or 4 analog + 16 digital	2 or 4
Outputs	FG + AWG 100 kHz / 1 MHz	FG + AWG 1 MHz	FG + AWG 1 MHz	FG + AWG 1 MHz	FG + AWG 1 MHz	None
Analog bandwidth	10 to 25 MHz	50 to 100 MHz	25 to 100 MHz	50 to 200 MHz	50 to 200 MHz	20 MHz
Sampling rate	100 to 500 MS/s	500 MS/s to 1 GS/s	500 MS/s to 1 GS/s	1 GS/s	1 GS/s	80 MS/s
Resolution (enhanced)	8 bits (12 bits)	8 bits (12 bits)	8 bits (12 bits)	8 bits (12 bits)	8 bits (12 bits)	12 bits (16 bits)
Capture memory	8 kS to 48 kS	32 MS to 128 MS	48 kS to 128 MS	64 MS to 512 MS	64 MS to 512 MS	32 MS
Power	USB	USB	USB	USB or AC adaptor	USB or AC adaptor	USB
Price from *	$115 €95 £79	$349 €299 £249	$609 €519 £429	$579 €489 £379	$819 €699 £589	$819 €699 £569

* See Ordering (page 61) for further details.

EXT: external trigger input, AUX: auxiliary trigger input, FG: function generator, AWG: arbitrary waveform generator.

OSCILLOSCOPES






PicoScope 4000 Series			PicoScope 5000 Series	PicoScope 6000 Series	PicoScope 9000 Series
PicoScope 4262	**PicoScope 4444**	**PicoScope 4824**			
Digital oscilloscope for the analog world	High-resolution differential oscilloscopes	8 channel oscilloscope	Flexible Resolution oscilloscopes	Highest performance real-time oscilloscopes	Sampling oscilloscopes
2 + EXT	4 true differential	8	2 or 4 + EXT	4 + AUX input	2 electrical (+ 1 optional optical), 4 electrical
AWG and low-distortion sine wave generator	Probe compensation signal	FG + AWG	FG or FG + AWG	FG or FG + AWG	PRBS, Clock, diff. TDR/ TDT
5 MHz	20 MHz	20 MHz	60 to 200 MHz	250 MHz to 1 GHz	12 or 25 GHz
10 MS/s	Up to 400 MS/s	80 MS/s	250 MS/s to 10 GS/s	5 GS/s	200 kS/s to 1 MS/s
16 bits (20 bits)	Flexible 12- or 14-bit	12 bits (16 bits)	8, 12, 14, 15 and 16 bits (up to 20 bits)	8 bits (12 bits)	16 bits
16 MS	256 MS	256 MS	8 to 512 MS	256 MS to 2 GS	4 kS to 32 kS
USB	USB	USB	USB or AC adaptor	AC adaptor	AC adaptor
$1235 €1045 £859	$1285 €1085 £899 **	$2305 €1955 £1735	$1155 €979 £799	$3295 €2795 £2275	$9895 €8815 £6935

* See Ordering (page 61) for further details.

EXT: external trigger input, AUX: auxiliary trigger input, FG: function generator, AWG: arbitrary waveform generator.

** Not including accessories. See page 21.

PICOSCOPE 6 SOFTWARE

PicoScope software dedicates almost all of the display area to the waveform. This ensures that the maximum amount of data is seen at once. With a large display area available you can create a customizable split-screen display, and view multiple channels or different views of the same signal at the same time. The software can even show multiple oscilloscope and spectrum analyzer traces at once. Additionally, each waveform shown works with individual zoom, pan, and filter settings for ultimate flexibility.

A Commonly-used controls such as voltage range selection, timebase, memory depth and channel selection are placed on the toolbars for quick access, leaving the main display area clear for waveforms.

B **Auto Setup button**: Configures the timebase, voltage ranges and trigger for a stable display of your signals.

C 

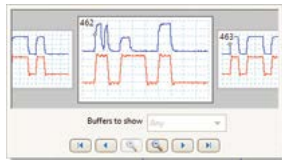
Channel Options: These give access to channel-specific settings such as custom probes, resolution enhancement, zero and offset controls and filtering.

D 

More advanced controls and functions are located in the **Tools menu**.

E 

Signal Generator: Allows the scope to generate standard signals or arbitrary waveforms. Includes frequency sweep and triggering options.

F 

Waveform Buffer Overview: PicoScope automatically records up to 10 000 of the most recent waveforms. You can quickly scan through to look for intermittent events. The buffer overview can be used with the mask test tools to display only failed waveforms.

G **Zoom and pan tools**: PicoScope provides a zoom factor of several million, which is necessary when working with deep memory scopes. Use the conventional zoom-in, zoom-out and pan tools, or try the zoom overview window for fast navigation.

H **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 a command to rearrange and rescale all the axes automatically.

I The PicoScope display can be as simple or as detailed 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.

PicoScope is carefully designed to make the best use of the display area. You can add new scope and spectrum views, all of which are fully adjustable in size.

J **Trigger marker**: Shows the level and time of the trigger event. Drag with the mouse to adjust.

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

L **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.

Built-in scope measurements: 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, Edge Count, Falling Edge Count and Rising Edge Count.

Built-in spectrum measurements: Frequency at peak, Amplitude at peak, Average amplitude at peak, Total power, THD (% and dB), THD+N, SFDR, SINAD, SNR and IMD.

M **Trigger toolbar**: Commonly-used controls are on the toolbar with more advanced trigger options available from a pop-up window.

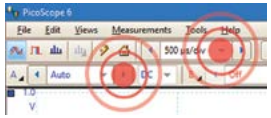
Also available but not shown:

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

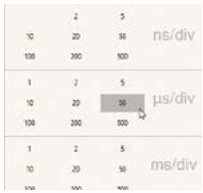
Spectrum views: One or more spectrum views can be added to show an FFT of the data in the scope view. Alternatively, PicoScope can be configured as a dedicated spectrum analyzer.

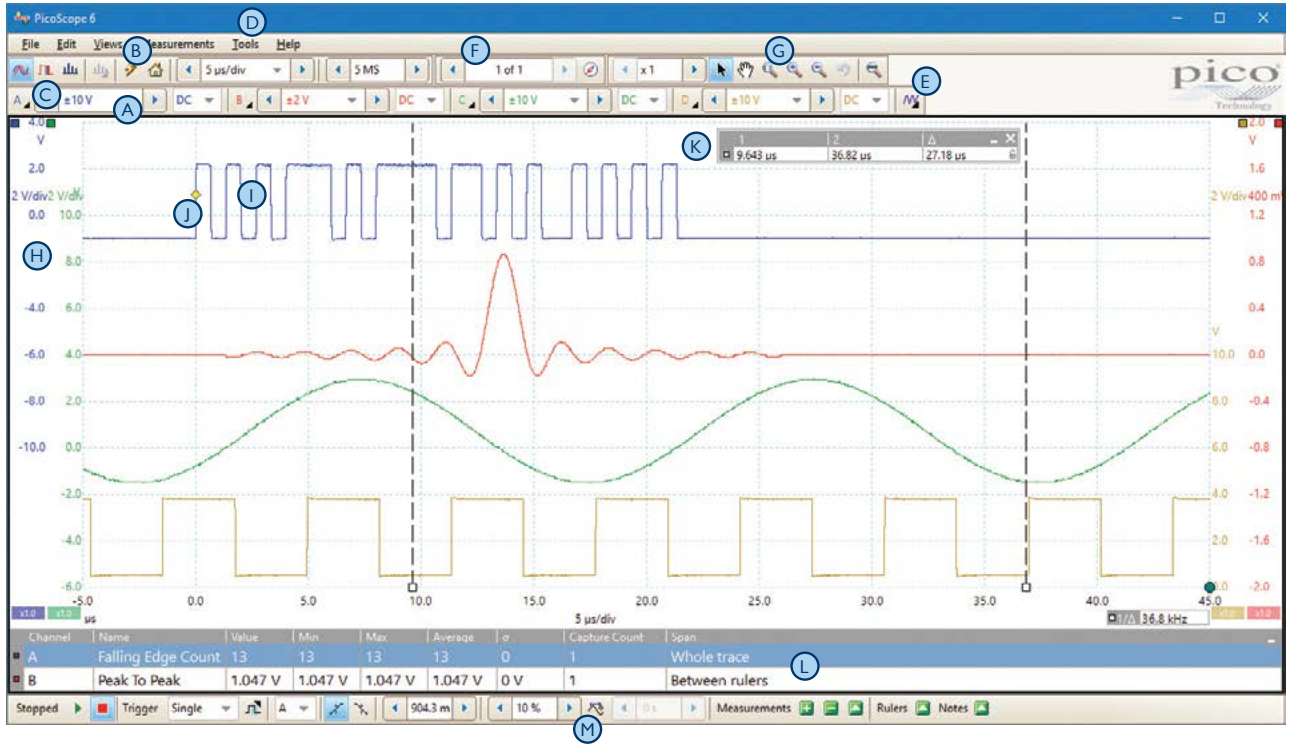
Zoom overview: When a scope or spectrum view is zoomed in, the overview window allows fast navigation using the mouse.

Touchscreen-friendly buttons: For incremental control of horizontal and vertical oscilloscope functions.



Control setting grids: Allow faster control of primary oscilloscope functions.





Software compatible with Windows 7, 8 and 10, 32 and 64 bit. Mac OS X and Linux support.

PICOSCOPE 6 SOFTWARE

SERIAL BUS DECODING

Serial communication buses are used extensively in modern electronic designs. Serial buses offer significant cost advantages and some performance improvements over parallel bus communications. First off, there are fewer signals to route on the board, so PCB costs are lower. Less I/O pins on each device are needed, which simplifies component packaging and so reduces component cost. Some serial buses use differential signalling which improves noise immunity.

PicoScope can decode 1-Wire, ARINC 429, CAN, CAN FD, DCC, DMX512, Ethernet, FlexRay, I²C, I²S, LIN, PS/2, SENT, SPI, UART (RS-232 / RS-422 / RS-485), and USB 1.1 protocol data as standard, with more protocols in development and available in the future with free-of-charge software upgrades.

Multiple protocols can be captured and decoded, the only limit being the number of available channels (18 for MSO models). The ability to observe data flow across a bridge (for example CAN bus in, LIN bus out) is incredibly powerful.

Graph format shows decoded data in a bus format, aligned with the analog waveform, on a common time axis, with error frames outlined in red. Frames can be zoomed and correlated with acquired analog channels to investigate timing errors or other signal integrity issues that are root cause of data errors. The data packets are broken down into their component fields, and each packet field is assigned a different color: in the CAN bus example shown, the address is colored orange, the DLC green and the data content indigo.

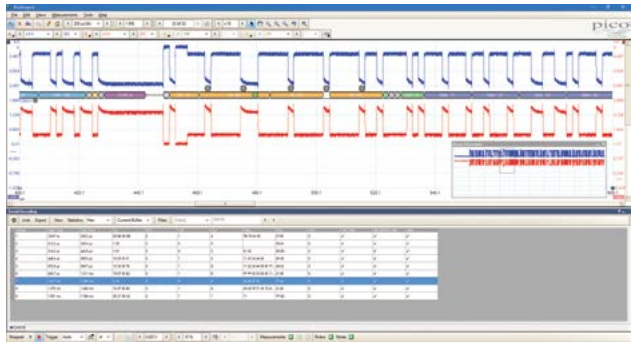
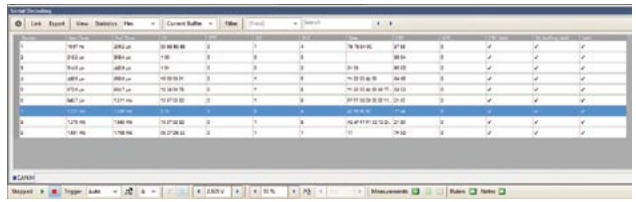


Table format shows a list of the decoded frames, including the data and all flags and identifiers. You can set up filtering conditions to display only the frames you are interested in, search for frames with specified properties, or define a start pattern to signal when the program should list the data.



PROTOCOL ANALYSIS

PicoScope deep-memory oscilloscopes can capture hundreds or even thousands of serial data packets, so it is important to be able to search and analyze the acquired packets to isolate the specific packets of interest. You can do this by using search, filter, statistics, a link file and export.

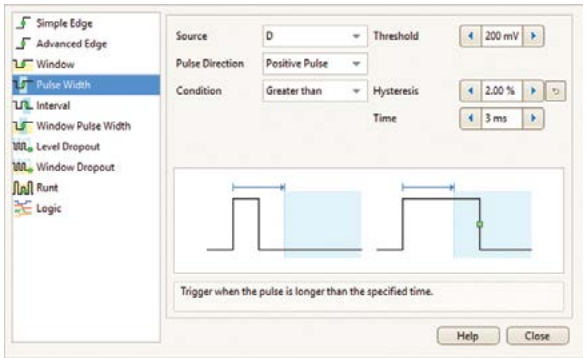
You can find out more about this and related topics on our website.

PICOSCOPE 6 SOFTWARE

ADVANCED DIGITAL TRIGGERING

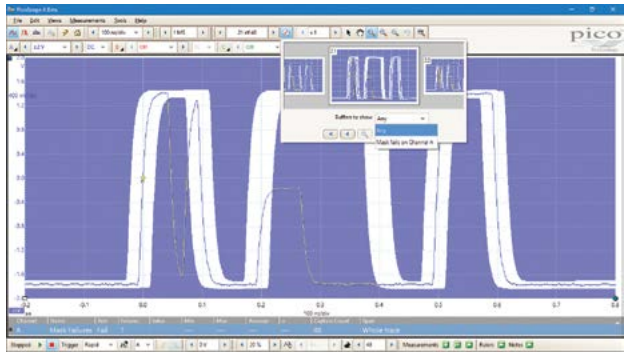
A simple edge trigger monitors the incoming signal and waits for the voltage to cross a set threshold, which causes the scope to capture and display the waveform. This method is adequate when the signal consists of repetitive pulses or cycles like a pure sine or square wave.

Advanced trigger types enable you to capture a stable waveform with complex signals. This is ideal for troubleshooting glitches, timing violations, overvoltages and dropouts in analog and digital circuits. Advanced triggers include Pulse width, Runt, Drop-out, Logic, and Digital modes.



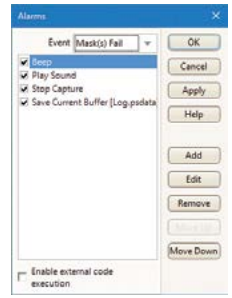
MASK LIMIT TESTING

Mask limit testing allows you to compare live signals against known good signals, and is designed for production and debugging environments. Simply capture a known good signal, draw a mask around it, and then probe the system under test.



PicoScope will check for mask violations and perform pass/fail testing, capture intermittent glitches, and can show a failure count and other statistics in the Measurements window.

PICOSCOPE ALARMS SETUP



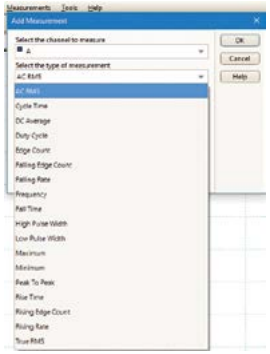
PicoScope can be programmed to execute actions when certain events occur. Events that can trigger an alarm include mask limit fails, trigger events and full buffers. The actions that PicoScope can execute include saving a file, playing a sound, executing a program or triggering the signal generator. Alarms, coupled with mask limit testing, help create a powerful and time-saving waveform monitoring tool. Capture a known good signal, auto-generate a mask around it and then use the alarms to automatically save any waveform, complete with a time stamp, which does not meet your specification.

WAVEFORM BUFFER AND NAVIGATOR

Ever spotted a glitch on a waveform, but by the time you've stopped the scope it has gone? With PicoScope you no longer need to worry about missing glitches or other transient events. PicoScope can store the last ten thousand oscilloscope or spectrum waveforms in its circular waveform buffer. The buffer navigator provides an efficient way of navigating and searching through waveforms, effectively letting you turn back time. You can also scan through waveform buffers, looking just for mask limit test failures.

MEASUREMENTS

Making measurements in PicoScope is easy. A large number of measurements are possible thanks to the automated measurement system. Using the Measurements menu you can select what measurements you want PicoScope to make, and PicoScope will then automatically display a table of their values.



Using PicoScope's built-in measurement statistics you can see the average, standard deviation, maximum and minimum of each measurement as well as the live value. This is invaluable for production testing and for characterizing new devices.

For on-the-spot measurements you can also use the rulers. Each channel has independent movable rulers for amplitude measurement. Vertical rulers can measure time, frequency, percent (for duty cycle) or phase in degrees.

RESOLUTION ENHANCEMENT

Resolution enhancement is a technique for increasing the effective vertical resolution of the scope at the expense of high-frequency detail. It is useful for resolving small signal details and for reducing unwanted noise. Unlike waveform averaging it can be used on single-shot signals.

REFERENCE WAVEFORMS

With PicoScope you can display stored waveforms alongside live traces. You can apply all the same functions to the reference waveforms as you can to live waveforms, such as automatic and manual measurements, scaling and offset, and exporting to a file. Reference waveforms are especially useful for production testing and diagnostics, where they allow you to compare waveforms from the device under test with known good waveforms.

PICOSCOPE CUSTOM PROBE DEFINITION

The custom probes feature allows you to correct for gain, attenuation, offsets and nonlinearities in probes, sensors or transducers that you use with your PicoScope. This could be used to scale the output of a current probe so that it correctly displays the results in amperes. A more advanced use would be to scale the output of a nonlinear temperature sensor using the table lookup function.

LOGIC ANALYZER / MIXED SIGNAL CAPABILITY

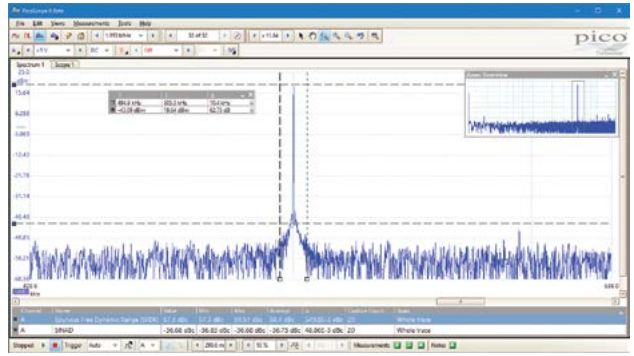
PicoScope MSO mixed signal models include 16 digital inputs so that you can view digital and analog signals simultaneously.

The digital inputs can be displayed individually or in named groups with binary, decimal or hexadecimal values shown in a bus-style display. A separate logic threshold can be defined for each 8-channel 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 to enable complex mixed-signal triggering.

SPECTRUM ANALYZER

The FFT spectrum view plots amplitude against frequency, revealing details that would otherwise be hidden in the oscilloscope view. It is ideal for finding noise, crosstalk or distortion in signals.

You can display multiple spectrum views alongside oscilloscope views of the same data. A comprehensive set of automatic frequency-domain measurements can be added to the display, including THD, THD+N, SNR, SINAD and IMD. A mask limit test can be applied to a spectrum and you can even use the AWG and spectrum mode together to perform swept scalar network analysis. FFTs of up to 1 million points can be computed in milliseconds giving superb frequency resolution. The high number of points in an FFT also lowers the noise floor, revealing otherwise hidden signals.



FUNCTION GENERATOR

Electronic designs require a variety of stimulus signals during test. All PicoScope models include a function generator that can deliver standard waveforms such as sine, square, triangle, sin(x)/x and more.

With sweep mode activated, the function generator produces a frequency that changes steadily between the selected Start Frequency and Stop Frequency. You can set the Sweep Type to Up (increasing frequency) or Down (decreasing frequency).

By default, the signal generator runs continually when the Signal On box is ticked. On many models, you can use triggers to start and stop the signal generator on command. Trigger Source can be:

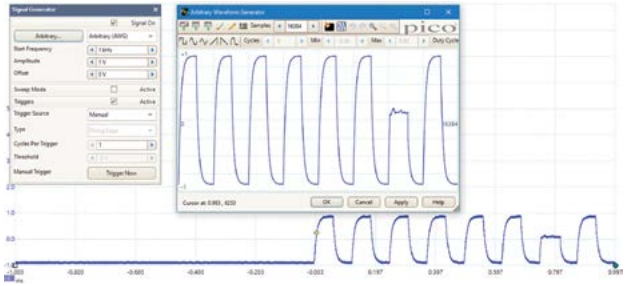
- Scope - the signal generator starts when the scope is triggered
- Manual - starts when you click Trigger Now
- Ext Input - started by a signal on the EXT input

You can specify the number of cycles of the waveform to be produced after each trigger event.

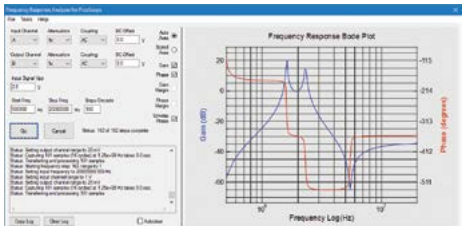
ARBITRARY WAVEFORM GENERATOR (AWG)

Many PicoScope models include an AWG, which supports a wide range of application needs. You can program the AWG from a text file or use the built-in AWG editor. You can even capture a waveform using the PicoScope, modify it, if needed, using the AWG editor, and then play it back using the AWG.

SOFTWARE DEVELOPMENT KIT (SDK)



The SDK allows you to write your own software and includes drivers for Microsoft Windows, Apple Mac (OS X) and Linux, including Raspberry Pi and BeagleBone. Example code shows how to interface to third-party software packages such as Microsoft Excel, National Instructions LabVIEW and MathWorks MATLAB. There is also an active community of PicoScope users who share code and applications on both the forum and PicoApps sections of the **picotech.com** web site. The Frequency Response Analyzer shown below is one of the most popular third-party applications.

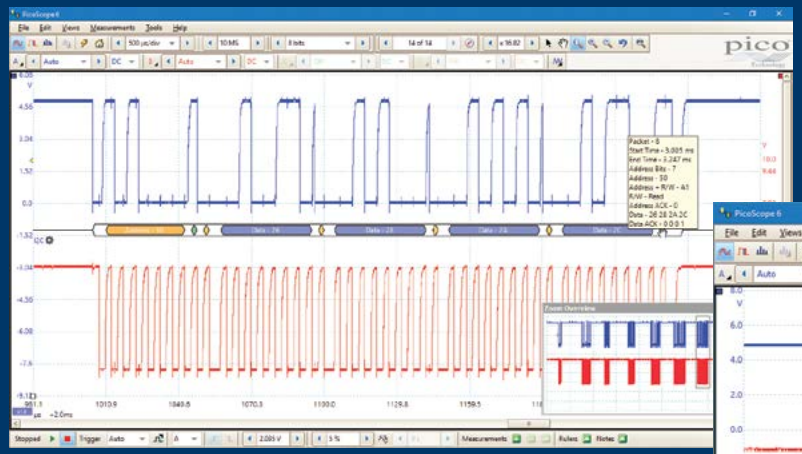


LATEST RELEASE: PICOSCOPE 6.12.7

The latest release of the PicoScope software now features:

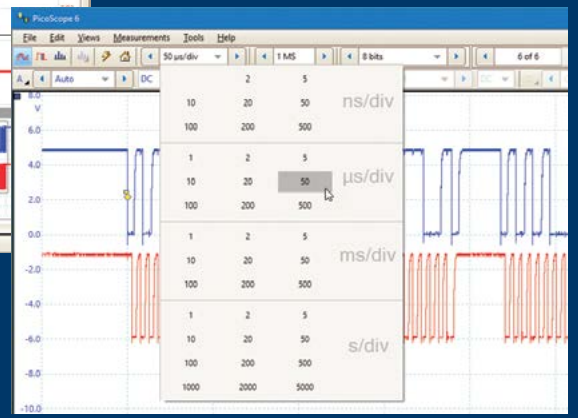
- Larger control buttons for improved touchscreen instrument control
- Nudge buttons for incremental control of horizontal and vertical oscilloscope functions
- Control settings grids for faster control of primary oscilloscope functions
- Edge count measurements
- Color-coded field identifiers in the serial decoders
- CAN FD serial decoding

NEW



New features released in the latest software update

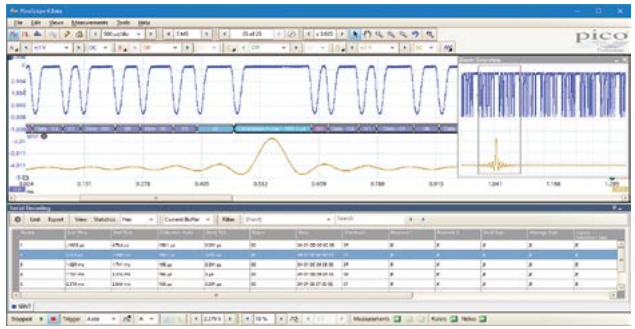
Nudge buttons



Faster grid controls

PICOSCOPE 2000 SERIES

THE COMPACT ALTERNATIVE TO A BENCHTOP OSCILLOSCOPE



ALL-INCLUSIVE SCOPES AT GREAT PRICES
The PicoScope 2000 Series offers a choice of 2- and 4-channel models, plus mixed-signal oscilloscopes (MSOs) with 2 analog + 16 digital inputs. All models feature spectrum analyzers, function generators, arbitrary waveform generators and serial bus analyzers, and the MSO models also function as logic analyzers.

The PicoScope 2000A models all deliver unbeatable value for money, with excellent waveform visualization and measurement for a range of analog and digital electronic and embedded system applications. They are ideal for education, hobby and field service use.

The PicoScope 2000B models have the added benefits of deep memory (up to 128 MS), higher bandwidth (up to 100 MHz) and faster waveform update rates, giving you the performance you need to carry out advanced analysis of your waveform, including serial decoding and plotting frequency against time.

MIXED-SIGNAL CAPABILITY
The PicoScope 2000 Series MSO oscilloscopes all have 2 analog channels and 16 digital inputs, allowing you to view your digital and analog signals simultaneously. The digital inputs can be displayed individually or in arbitrary groups.

POWERFUL, PORTABLE AND SUPER-SMALL
All PicoScope 2200 Series oscilloscopes have built-in function generators with sine, square, triangle, DC level and many more standard waveforms.

These handy, low-cost oscilloscopes offer the powerful performance and reliability of a PicoScope, in an exceptionally small form factor. They fit easily into your laptop bag along with all their probes and are ideal for a wide range of applications including design, test, education, service, monitoring, fault-finding and repair: perfect for engineers on the move.

SERIAL DECODING AND MORE
The PicoScope 2000 Series oscilloscopes include serial decoding capability as standard, supporting up to 15 serial protocols, including 1-Wire, CAN, CAN FD, I^2C, I^2S, LIN, SENT, SPI and UART/RS-232.

Other advanced features such as resolution enhancement, mask limit testing, advanced triggering, automatic measurements, math channels (including the ability to plot frequency and duty cycle against time), XY mode and segmented memory are also included.

PicoScope	2204A	2205A	2206B	2207B	2208B	2405A	2406B	2407B	2408B	2205A MSO	2206B MSO	2207B MSO	2208B MSO
Channels	2					4				2 analog + 16 digital			
Bandwidth	10 MHz	25 MHz	50 MHz	70 MHz	100 MHz	25 MHz	50 MHz	70 MHz	100 MHz	25 MHz	50 MHz	70 MHz	100 MHz
Sampling rate	100 MS/s	200 MS/s	500 MS/s	1 GS/s	1 GS/s	500 MS/s	1 GS/s	1 GS/s	1 GS/s	500 MS/s	1 GS/s	1 GS/s	1 GS/s
Capture memory*	8 kS	16 kS	32 MS	64 MS	128 MS	48 kS	32 MS	64 MS	128 MS	48 kS	32 MS	64 MS	128 MS
Input ranges:	±50 mV to ±20 V in 9 ranges		±20 mV to ±20 V in 10 ranges										
Resolution : 8 bits (12 bits enhanced). Power: USB. Warranty: 5 years													
Trigger	Modes: None, auto, repeat, single Advanced: Edge, window, pulse width, window pulse width, dropout, window dropout, interval, logic		Modes: None, auto, repeat, single, rapid (segmented memory) Advanced: Edge, window, pulse width, window pulse width, dropout, window dropout, interval, runt pulse, logic										
Part number - includes probes	PP906	PP907	PQ012	PQ013	PQ014	PQ015	PQ016	PQ017	PQ018	PQ008	PQ009	PQ010	PQ011
Price	$139 €119 £99	$225 €189 £159	$349 €299 £249	$499 €419 £349	$679 €579 £479	$449 €389 £319	$599 €509 £419	$829 €699 £579	$1125 €949 £789	$449 €389 £319	$609 €519 £429	$769 €649 £539	$999 €849 £699
Part number - scope only	PP917	PP966											
Price	$115 €95 £79	$199 €169 £139											

* Shared between active channels

PICOSCOPE 3000 SERIES

2- OR 4- CHANNEL OSCILLOSCOPES AND MSOS

USB 3.0

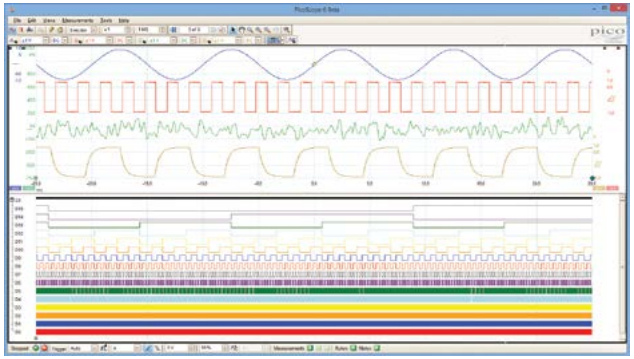
POWER, PORTABILITY, AND PERFORMANCE

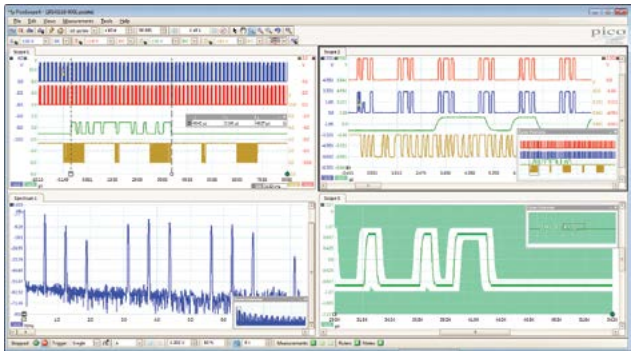
The PicoScope 3000 Series PC oscilloscopes are small, light, and portable, while offering the high-performance specifications required by engineers in the lab or on the move.
These oscilloscopes offer 2 or 4 analog channels, plus an additional 16 digital channels on the MSO models. The flexible, high-resolution display options enable you to view and analyze each signal in fine detail.

Operating together with the PicoScope 6 software, these devices offer an ideal, cost-effective package for many applications, including embedded systems design, research, test, education, service, and repair.

PicoScope	3203D	3203D MSO	3204D	3204D MSO	3205D	3205D MSO	3206D	3206D MSO	3403D	3403D MSO	3404D	3404D MSO	3405D	3405D MSO	3406D	3406D MSO
Channels *	2A	2A+16D	2A	2A+16D	2A	2A+16D	2A	2A+16D	4A	4A+16D	4A	4A+16D	4A	4A+16D	4A	4A+16D
Bandwidth	50 MHz		70 MHz		100 MHz		200 MHz		50 MHz		70 MHz		100 MHz		200 MHz	
Sampling rate	1 GS/s															
Capture memory **	64 MS		128 MS		256 MS		512 MS		64 MS		128 MS		256 MS		512 MS	
Resolution (enhanced)	8 bits (12 bits)															
Outputs	AWG and function generator															
Input ranges	±20mV to ±20V in 10 ranges															
Trigger	Modes: None, auto, repeat, single, rapid (segmented memory) Trigger types: Edge, window, pulse width, window pulse width, dropout, window dropout, interval, logic, runt pulse ETS mode (channel A only): Rising edge, falling edge Digital inputs: Pattern, edge, combined pattern and edge, pulse width, dropout, interval, logic															
Power	USB								USB or AC adaptor							
Warranty	5 years															
Part number - includes probes	PP958	PP956	PP959	PP931	PP960	PP932	PP961	PP933	PP962	PP957	PP963	PP934	PP964	PP935	PP965	PP936
Price	$579 €489 £379	$819 €699 £589	$739 €629 £519	$989 €839 £699	$989 €839 £679	$1235 €1045 £879	$1405 €1185 £979	$1645 €1395 £1155	$909 €769 £599	$1155 €979 £809	$1155 €979 £799	$1405 €1185 £989	$1565 €1325 £1085	$1805 €1535 £1275	$2135 €1815 £1475	$2385 €2025 £1675

For full product specification please visit www.picotech.com * A=analog and D=digital ** Shared between active channels





HIGH BANDWIDTH AND SAMPLING RATE

Despite their compact size and low cost, there is no compromise on performance. With input bandwidths up to 200 MHz, the PicoScope 3000 Series scopes can measure a wide range of signal types, from DC and baseband into RF and all the way up to VHF.

A real-time sampling rate of 1 GS/s allows detailed display of high frequencies. For repetitive signals, the maximum effective sampling rate can be boosted to 10 GS/s using equivalent time sampling (ETS) mode. With a sampling rate of at least five times the input bandwidth, PicoScope 3000 Series oscilloscopes are well equipped to capture high-frequency signal detail.

DEEP MEMORY

The PicoScope 3000 Series oscilloscopes offer a huge buffer memory, allowing them to sustain high sampling rates across long timebases. For example, using the 512 MS buffer, the PicoScope 3206 and 3406 models can sample at 1 GS/s all the way down to 50 ms/div (500 ms total capture time).

Powerful tools are included to allow you to manage and examine all of this data. As well as functions such as mask limit testing and color persistence mode, the PicoScope 6 software enables you to zoom into your waveform by several million times.

ADVANCED DISPLAY

The PicoScope software provides advanced detail and clarity for viewing your signals. The majority of the display area is dedicated to the waveform, ensuring that a huge amount of data can be seen at once. Even with a laptop, the viewing area for a PicoScope USB oscilloscope delivers superior size, resolution, and flexibility when compared to a typical benchtop oscilloscope.

PICOSCOPE 4224 & 4424

HIGH-RESOLUTION OSCILLOSCOPES

A POWERFUL HIGH-RESOLUTION OSCILLOSCOPE

The 2-channel PicoScope 4224 and the 4-channel PicoScope 4424 are high-resolution oscilloscopes that are suitable for general, scientific and field-service use. With 12-bit resolution (adjustable up to 16 bits in enhanced resolution mode) and 1% vertical accuracy they also make an excellent choice for noise, vibration and mechanical analysis.

MEASURE SMALL SIGNALS TO LARGE VOLTAGES

The PicoScope 4000 Series have input ranges from ±50 mV to ±100 V so you can measure small signals from sensors as well as higher voltages from power supply circuits and motor drives.

DEEP MEMORY

The 32 MS buffer is always on. There is never a compromise between buffer size and waveform update rate, because the PicoScope 4000 Series always maximizes both at the same time. Now you can capture every waveform with full detail.

PicoScope	4224	4424
Channels	2	4
Bandwidth	20 MHz	
Sampling rate	80 MS/s	
Capture memory *	32 MS	
Resolution (enhanced)	12 bits (16 bits)	
Input ranges	±50 mV to ±100 V in 11 ranges	
Trigger	Modes: Auto, repeat, single, rapid, none Advanced: Rising edge, falling edge, edge with hysteresis, pulse width, runt pulse, dropout, windowed, save to file on trigger	
Power	USB	
Warranty	5 years	
Part number - scope only	PP492	PP493
Price	$819 €699 £569	$1315 €1115 £909
Part number - includes probes	PP478	PP479
Price	$859 €729 £599	$1365 €1165 £949

* Shared between active channels

PICOSCOPE 4262

A DIGITAL OSCILLOSCOPE FOR THE ANALOG WORLD

16 BITS

LOW NOISE, LOW DISTORTION

The PicoScope 4262 is a 2-channel, 16-bit high-resolution oscilloscope with a built-in low-distortion signal or function generator. With its 5 MHz bandwidth, it can easily analyze audio, ultrasonic and vibration signals, characterize noise in switched mode power supplies, measure distortion, and perform a wide range of precision measurement tasks.

FULL-FEATURED OSCILLOSCOPE

The PicoScope 4262 is a full-featured oscilloscope, with a function generator and arbitrary waveform generator that includes a sweep function to enable frequency response analysis. It also offers mask limit testing, math and reference channels, advanced digital triggering, serial decoding, automatic measurements and color persistence display modes.

DESIGNED FOR THE ANALOG WORLD

When used in spectrum analyzer mode, the scope provides a menu of 11 automatic frequency-domain measurements such as IMD, THD, SFDR and SNR. Its performance is so good that it rivals many dedicated audio analyzers and dynamic signal analyzers costing several times the price. Most digital oscilloscopes have been designed for viewing fast digital signals, and the trend has been to use new technology solely to increase sampling rate and bandwidth. With the PicoScope 4262 we have focused on what's important for measuring analog signals: increasing the resolution, improving dynamic range, and reducing noise and distortion.

PicoScope	4262
Channels	2 + external trigger
Bandwidth	5 MHz (4 MHz on ±20 mV range, 3 MHz on ±10 mV range)
Sampling rate	10 MS/s
Capture memory *	16 MS
Resolution (enhanced)	16 bits (20 bits)
Outputs	AWG and low-distortion sine wave generator
Input ranges	±10 mV to ±20 V in 11 ranges
Trigger	Modes: None, auto, repeat, single, rapid (segmented memory) Advanced: Rising edge, falling edge, window, pulse width, dropout, interval, logic, runt pulse
Power	USB
Warranty	5 years
Part number - includes probes	PP799
Price	$1235 €1045 £859

* Shared between active channels

PICOSCOPE 4444

SEE THE DIFFERENCE

NEW

1000 V CAT III probes available

THE PICOSCOPE 4444: A NEW STANDARD IN DIFFERENTIAL MEASUREMENT

With four true differential inputs, 12- to 14-bit resolution and wide differential and common-mode voltage ranges, the PicoScope 4444 and its accessories offer accurate and detailed measurement for a multitude of applications, from low-amplitude biomedical and electronic uses to 1000 V CAT III design and test.

The scope's 9-pin D-type connectors create an intelligent true differential probe interface and allow the PicoScope software to automatically identify the probe and select the appropriate display settings. These Pico D9 connectors also mean that probes that would usually require battery packs or power supplies can draw their power through the scope device instead.

PICOCONNECT 441 1:1 DIFFERENTIAL PROBES MEASURE SIGNALS STARTING FROM ±10 mV

With the PicoConnect 441 1:1 differential voltage probe, the PicoScope 4444 allows the freedom to connect to and visualize signals that are off-limits to a single-ended oscilloscope. Connect directly to current-sensing resistors and differential signals, or across non-grounded components in a signal path.

The PicoConnect 441 probe does not attenuate your signal and is well suited to numerous electronics applications, as well as biomedical and other scientific research, as it allows high-speed high-resolution measurements on signals between ±10 mV and ±50 V in the presence of common mode voltages and noise.

PICOCONNECT 442 25:1 1000 V CAT III DIFFERENTIAL PROBES

The PicoConnect 442 probe has a 25:1 attenuation ratio and is ideal for testing hazardous voltages up to 1000 V CAT III without reference to ground, including distribution boards, circuit breakers, junction boxes, fixed socket outlets and power supplies.

For multichannel differential measurements, the PicoScope 4444 and PicoConnect 442 probes bring significant cost savings compared to using a conventional single-ended oscilloscope with active differential probes. They're more convenient too, as these passive probes don't need battery packs or power supplies.

A CHOICE OF ACCESSORIES

The convenient preconfigured kits supplied by our distributors each include three differential voltage probes with Pico D9 connectors, and a single-ended D9-BNC adaptor. These and a range of current measurement probes are also available separately, or you can configure your own kit on the Pico Technology website.

All the accessories listed on the right have Pico D9 connectors. The TA271 and TA299 D9-BNC adaptors allow you to use the PicoScope 4444 with conventional BNC-connected probes.

PicoScope	4444
Channels	4 (Pico D9)
Bandwidth	20 MHz
Sampling rate	400 MS/s
Capture memory *	256 MS
Resolution (enhanced) **	Flexible 12- or 14-bit (up to 16- or 18-bit)
Outputs	Probe compensation signal
Input ranges	±10 mV to ±20 V in 11 ranges
Trigger	Modes: None, auto, repeat, single, rapid (segmented memory) Types: Edge, window, pulse width, window pulse width, dropout, window dropout, interval, runt pulse, logic
Power	USB
Warranty	5 years
Price	$1285 €1085 £899 +

* Shared between active channels
** Maximum effective resolution is limited on the lowest voltage ranges: see data sheet for details.
+ Not available separately; must be purchased with at least one of the Pico D9 accessories listed right.

ACCESSORIES

	PicoConnect 441 differential 1:1 probe $42 €36 £29
	PicoConnect 442 1000 V CAT III probe $179 €149 £125
	TA271 D9-BNC adaptor $18 €15 £12
	TA299 D9-dual BNC adaptor $26 €22 £18
	TA300 current probe 40 A AC/DC D9 connector $329 €279 £235
	TA301 current probe 200/2000 A AC/DC D9 connector $199 €169 £139

PICOSCOPE 4824

8 CHANNELS, HIGH RESOLUTION

8-CHANNEL OSCILLOSCOPE

The PicoScope 4824 is a low-cost, portable solution for multi-input applications.

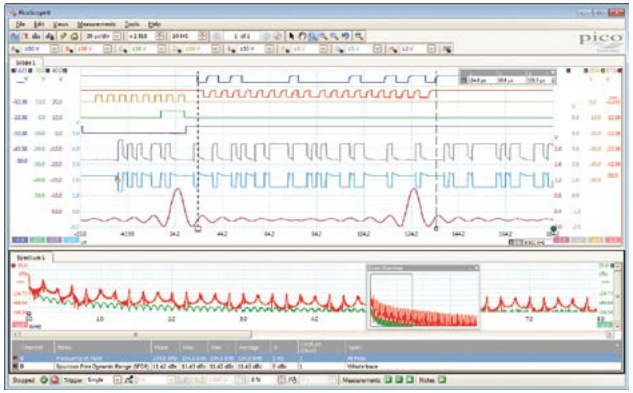
With 8 high-resolution analog channels you can easily analyze audio, ultrasonic, vibration and power waveforms, check timing of complex systems, and perform a wide range of precision measurement tasks on multiple inputs at the same time. All of this fits into the same small footprint as the PicoScope 3000 and 5000 Series. The BNC connectors still accept the vast majority of probes and accessories with ample spacing of 20 mm.

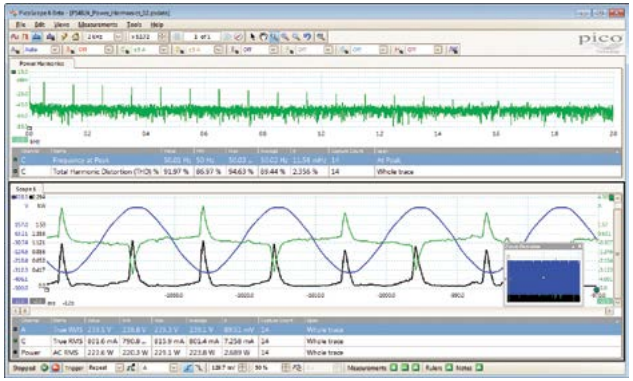
Featuring a high 12-bit vertical resolution, a bandwidth of 20 MHz, 256 MS buffer memory, and a fast sampling rate of 80 MS/s, the PicoScope 4824 has the power and functionality to deliver accurate results. It also features a deep memory to analyze multiple serial buses such as UART, I^2C, SPI, CAN and LIN plus control and driver signals.

ARBITRARY WAVEFORM AND FUNCTION GENERATORS

In addition, the PicoScope 4824 has a built-in low-distortion, 1 MHz, 14-bit arbitrary waveform generator (AWG), which can be used to emulate missing sensor signals during product development, or to stress-test a design over the full intended operating range. Waveforms can be imported from PicoScope data files or created and modified using the graphical AWG editor. A function generator is also included, with sine, square, triangle, DC level and many more standard waveforms. As well as level, offset and frequency controls, advanced options allow you to sweep over a range of frequencies. Combined with the spectrum peak hold option, this creates a powerful tool for testing amplifier filter and control system responses.

USB 3.0





EXAMPLE APPLICATION: COMPLEX EMBEDDED SYSTEMS

When debugging an embedded system with a scope, you can quickly run out of channels. You may need to look at an I^2C or SPI bus at the same time as multiple power rails, DAC outputs and logic signals. With eight channels, the PicoScope 4824 can cope with all of this. Choose whether to decode up to eight serial buses, with analog waveforms and decoded data both visible, or a combination of serial buses and other analog or digital signals. PicoScope provides advanced triggering on all channels, so you can search for runt pulses, drop-outs and noise as well as looking for data patterns using the 4-input Boolean logic trigger.

PicoScope	4824
Channels	8
Bandwidth	20 MHz (±50 mV to ±50 V) 10 MHz (±10 mV and ±20 mV ranges)
Maximum sampling rate	80 MS/s (1 to 4 channels in use)
Capture memory *	256 MS
Resolution (enhanced)	12 bits (16 bits)
Signal generator	AWG and function generator
Input ranges	±10 mV to ±50 V full scale in 12 ranges
Trigger	Edge, window, pulse width, interval, dropout, runt, logic
Power	USB
Warranty	5 years
Part number - scope only	PP916
Price	$2305 €1955 £1735

* Shared between active channels

PICOSCOPE 5000 SERIES

FLEXIBLE RESOLUTION, HIGH PERFORMANCE AND HIGH SPEED

FLEXIBLE RESOLUTION - FROM 8 TO 16 BITS

Most digital oscilloscopes gain their high sampling rates by time-interleaving multiple 8-bit ADCs. Despite careful design, the interleaving process introduces errors that always make the dynamic performance worse than the performance of the individual ADC cores.

The PicoScope 5000 Series scopes have a significantly different architecture in which multiple high-resolution ADCs can be applied to the input channels in different time-interleaved and parallel combinations to boost either the sampling rate or the resolution.

In time-interleaved mode, the ADCs are interleaved to provide 1 GS/s at 8 bits. Interleaving reduces the performance of the ADCs, but the resulting 60 dB SFDR is still much better than oscilloscopes that interleave 8 bit ADCs. This mode can also provide 500 MS/s at 12 bits resolution (see Figure 1).

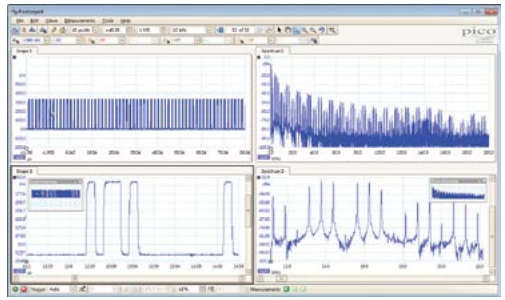
In parallel mode, multiple ADCs are sampled in phase on each channel to increase the resolution, improve dynamic performance and reduce noise. Using parallel mode, resolution is increased to 14 bits at 125 MS/s per channel (70 dB SFDR). If only two channels are required then resolution can be increased to 15 bits, and in single-channel mode all the ADCs are combined to give a 16 bit mode at 62.5 MS/s. The software gives the choice of selecting the resolution or leaving the scope in “Auto resolution” mode where the highest resolution possible is used for the chosen settings.

FRONT END DESIGN

Pico has over 25 years’ experience in the design of high-resolution oscilloscopes but, even so, developing a new analog front end to support an oscilloscope that can be switched between different resolutions was a significant challenge. Careful attention was required to support the high-resolution modes (with low noise, low distortion and bandwidth flatness) while maintaining the bandwidth, slew rate and pulse response necessary for the faster 8-bit mode.

PORTABILITY AND POWER

Pico Technology oscilloscopes are small, light and portable. In 2-channel mode the 5000 Series scopes can be powered from USB only, making them ideal for the engineer on the move. The external power supply is only needed when using 3 or 4 channels.



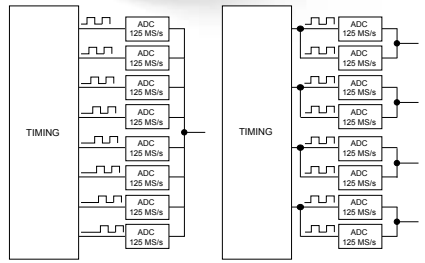


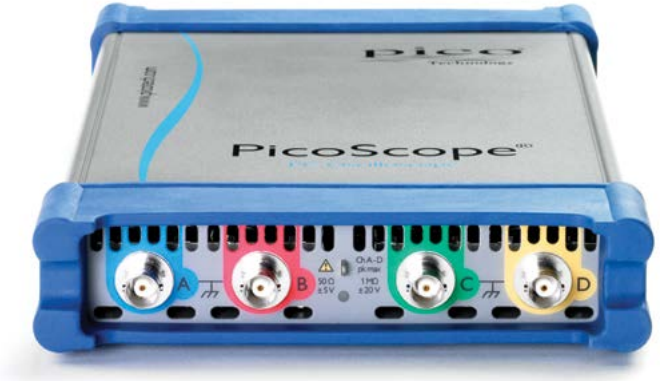
Figure 1
The PicoScope 5000 Series scopes use multiple high-resolution ADCs in either interleaved or simultaneous mode to give low-noise sampling at resolutions from 8 bits to 16 bits.

PicoScope	5242A	5442A	5242B	5442B	5243A	5443A	5243B	5443B	5244A	5444A	5244B	5444B
Channels	2	4	2	4	2	4	2	4	2	4	2	4
Bandwidth	All modes: 60 MHz				8 to 15 bit modes: 100 MHz 16 bit mode: 60 MHz				8 to 15 bit modes: 200 MHz 16 bit mode: 60 MHz			
Sampling rate Any 1 channel	8 bit mode 1 GS/s		12 bit mode 500 MS/s		14 bit mode 125 MS/s		15 bit mode 125 MS/s		16 bit mode 62.5 MS/s			
Sampling rate (repetitive sampling)	2.5 GS/s				5 GS/s				10 GS/s			
Capture memory (8-bit) *	16 MS		32 MS		64 MS		128 MS		256 MS		512 MS	
Capture memory (≥ 12-bit) *	8 MS		16 MS		32 MS		64 MS		128 MS		256 MS	
Resolution (enhanced) * *	8 bits, 12 bits, 14 bits, 15 bits, 16 bits (12 bits, 16 bits, 18 bits, 19 bits, 20 bits)											
Outputs	Function generator		AWG and FG		Function generator		AWG and FG		Function generator		AWG and FG	
Input ranges	±10 mV to ±20 V full scale in 11 ranges											
Trigger	None, Auto, Repeat, Single, Rapid (segmented memory) Trigger types: Edge, window, pulse width, window pulse width, dropout, window dropout, interval, runt pulse, logic											
Power	USB or AC adaptor											
Warranty	5 years											
Part number - includes probes	PP863	PP869	PP864	PP870	PP865	PP871	PP866	PP872	PP867	PP873	PP868	PP874
Price	$1155 €979 £799	$1565 €1325 £1085	$1315 €1115 £909	$1805 €1535 £1245	$1485 €1255 £1035	$2055 €1745 £1415	$1645 €1395 £1135	$2305 €1955 £1595	$1805 €1535 £1245	$2545 €2165 £1765	$1975 €1675 £1365	$2795 €2375 £1925

* Shared between active channels

** Maximum effective resolution is limited on the lowest voltage ranges: ±10 mV = 8 bits • ±20 mV = 12 bits. All other ranges can use full resolution.

PICOSCOPE 6000 SERIES



HIGH BANDWIDTH, HIGH SAMPLING RATE
With a 250 MHz to 500 MHz analog bandwidth complemented by a real-time sampling rate of 5 GS/s, the PicoScope 6000 Series scopes can display single-shot pulses with 200 ps time resolution. ETS mode boosts the maximum sampling rate to 50 GS/s, giving higher timing resolution for repetitive signals.

ULTRA-DEEP BUFFER MEMORY, MORE THAN ANY OTHER OSCILLOSCOPE
The PicoScope 6000 Series gives you the deepest buffer memory available as standard on any oscilloscope. Other oscilloscopes have high maximum sampling rates, but without deep memory they cannot sustain these rates on long timebases.

ADVANCED TRIGGERS
As well as the standard range of triggers found on most oscilloscopes, the PicoScope 6000 Series scope has a built-in set of advanced triggers to help you capture the data you need. Digital triggering gives access to the full bandwidth and vertical resolution of each input channel.

FAST DATA TRANSFERS
The USB 3.0 interface delivers data to your PC even faster than before, giving higher throughput for the advanced data processing features in the PicoScope software.

PICOSCOPE 6000 SERIES

THE HIGHEST PERFORMANCE PC OSCILLOSCOPE AVAILABLE

ULTIMATE PERFORMANCE

The PicoScope 6404C and 6404D have the highest bandwidth and sampling rate of any real-time USB oscilloscope available, for much less than the cost of a comparable benchtop oscilloscope. High sampling speed means that they can display single-shot pulses with a time resolution as short as 200 ps. Waveform capture rates in excess of 100 000 per second are enabled in Fast Persistence mode, which helps to capture intermittent and elusive glitches.

DEEP MEMORY

The PicoScope 6404D also has the deepest buffer memory available as standard on any oscilloscope. Deep memory allows the scope to sample at higher speeds for longer periods without gaps. For example, even at the maximum sampling rate of 5 GS/s, the PicoScope 6404D can capture 200 ms of uninterrupted data. Zoom, pan and buffer overview tools in the PicoScope software make it easy to find details of interest.

PicoScope	6402C	6402D	6403C	6403D	6404C	6404D
Channels	4					
Bandwidth	250 MHz		350 MHz		500 MHz	
Sampling Rate	5 GS/s					
Capture memory *	256 MS	512 MS	512 MS	1 GS	1 GS	2 GS
Resolution (enhanced)	8 bits (12 bits)					
Outputs	Function generator	AWG and FG	Function generator	AWG and FG	Function generator	AWG and FG
Input ranges	±50 mV to ±20 V in 9 ranges					
Trigger	Modes: Auto, rapid, repeat, single, none. Trigger types: Rising edge, falling edge, edge with hysteresis, logic level, pulse width, runt pulse, dropout, window, interval, level, window dropout, window pulse width, delayed, save to file on trigger					
Power	AC adaptor					
Warranty	5 years					
Part number - includes probes	PP884	PP885	PP886	PP887	PP888	PP889
Price	$3295 €2795 £2275	$4115 €3495 £2835	$4945 €4195 £3415	$5765 €4895 £3985	$6595 €5595 £4555	$7415 €6295 £5125

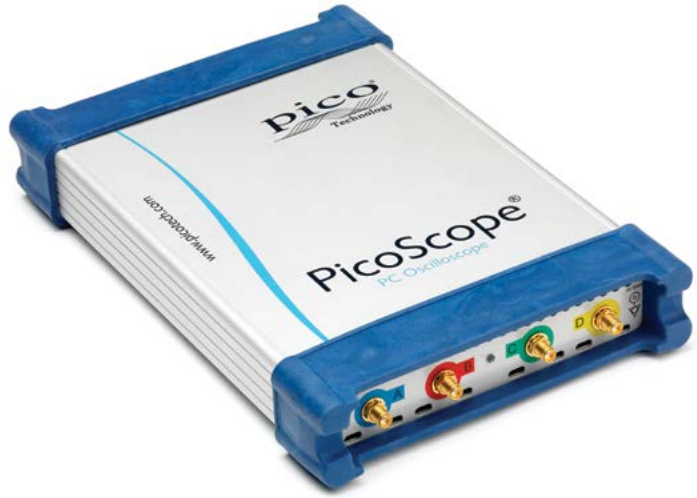
* Shared between active channels

PICOSCOPE 6407

1 GHz BANDWIDTH
HIGH-PERFORMANCE USB DIGITIZER

PicoScope	6407
Channels	4 (SMA)
Bandwidth	1 GHz
Sampling rate	5 GS/s
Capture memory *	1 GS
Resolution (enhanced)	8 bits (12 bits)
Outputs	AWG and function generator
Input range	±100 mV **
Trigger	Modes: Auto, rapid, repeat, single, none, Advanced: Rising edge, falling edge, edge with hysteresis, logic level, pulse width, runt pulse, dropout, window, delayed, save to file on trigger
AUX trigger bandwidth	25 MHz
Power	AC adaptor
Warranty	5 years
Part number	PP795
Price	$9895 €8395 £6835

** If your input signal is larger than ±100 mV, connecting an external 50 Ω attenuator to the input SMA connector will expand the analog input range. Choose one of our SMA attenuators from page 47.



HIGH-SPEED DATA ACQUISITION
The PicoScope 6407 Digitizer is a compact USB plug-in device that turns your PC or laptop into a high-speed digitizer. It can easily digitize a 1 GHz sine wave with a timing resolution of 200 ps.

HUGE BUFFER MEMORY
The PicoScope 6407 digitizer has a memory depth of 1 billion samples. Other digitizers have high maximum sampling rates, but without deep memory they cannot sustain these rates on long timebases. The PicoScope 6407 can sample at 5 GS/s at timebases all the way down to 20 ms/div, giving a total acquisition time of 200 ms, using the PicoScope software included.

The large buffer enables the use of segmented memory. Each captured waveform segment is stored in the buffer so you can rewind and review thousands of previous waveforms. No longer will you see a glitch on the screen only for it to vanish before you stop the scope.

ADVANCED TRIGGERS
As well as the standard range of triggers found on all oscilloscopes, the PicoScope 6407 offers a comprehensive set of advanced triggers including pulse width, window and dropout triggers to help you capture the data you need.

SOFTWARE DEVELOPMENT KIT
Use the free SDK to develop custom applications. The driver allows the capture of unlimited datasets at over 10 MS/s. Example code for LabVIEW, MATLAB and C-compatible languages is included.

12, 20 & 25 GHz BANDWIDTH
SAMPLING OSCILLOSCOPES

PicoScope 9000 Series

THE NEW FACE OF SAMPLING OSCILLOSCOPES

SAMPLING OSCILLOSCOPES

THE ULTIMATE IN PRICE AND PERFORMANCE
If you need to measure high-speed signals, the PicoScope 9000 sampling oscilloscopes deliver the ultimate in bandwidth and performance. The PicoScope 9000 Series oscilloscopes are designed to look at repetitive signals and are therefore not suitable for real-time or single-shot applications. They are ideal for gigabit data, precision timing and phase, signal integrity and characterization applications.

TDR models are suited for electrical signal path characterization on PCBs and electrical cables and more general network analysis.

Pico Technology offer two ranges of sampling scopes:
The PicoScope 9200 Series sampling oscilloscopes have a bandwidth of 12 GHz with prices starting from under $10 000. The PicoScope 9300 Series of sampling oscilloscopes have bandwidths of 20 GHz and 25 GHz with prices starting from under $15 000.

This is less than half the price of comparable sampling oscilloscopes. Unlike other manufacturers, all software functionality is included in the cost of the oscilloscope, and software updates are provided free of charge for the life of the product.

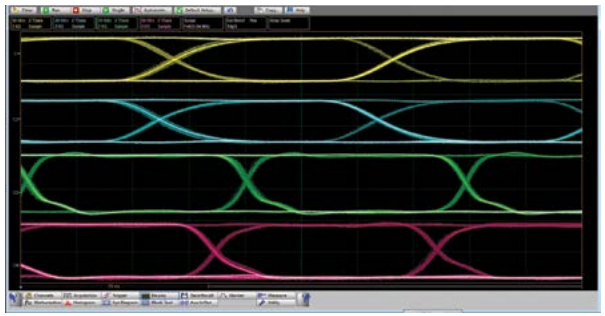
SAMPLING OSCILLOSCOPES COMPARED TO REAL-TIME OSCILLOSCOPES:

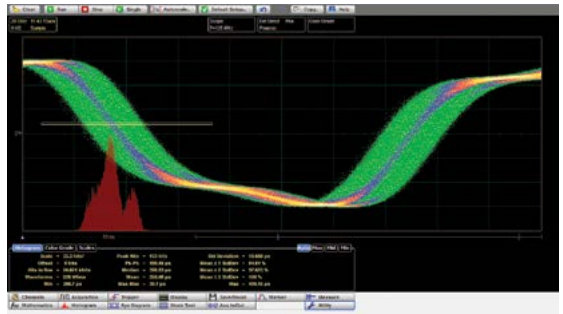
- Can only capture repetitive or clocked data waveforms
- Have lower sampling rate but extremely high effective sampling rate
- Wider bandwidth for lower budget
- Lower intrinsic jitter and very high time and voltage resolution
- Lower cost of ownership compared to benchtop sampling scopes

Certain models include integrated precision optical to electrical convertor, TDR/TDT pulse generation and clock from data recovery.

APPLICATIONS

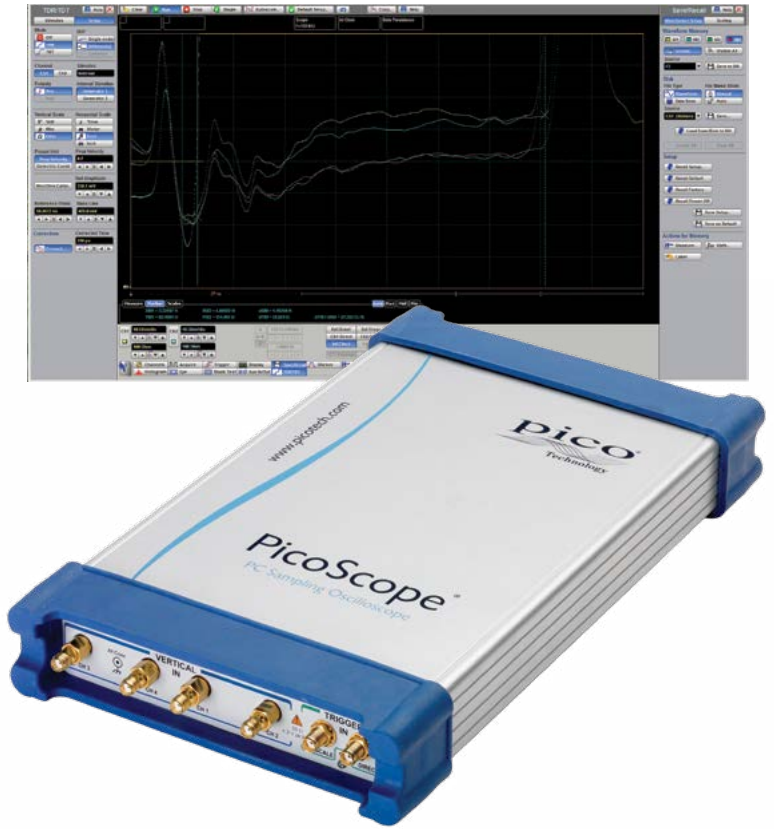
Serial data pre-compliance testing
to 10 Gb/s and higher
Telecom service and manufacturing
High-resolution timing and phase analysis
Digital system and transmission measurements
Automated pass/fail mask test
Fast pulse and logic characterization
Semiconductor characterization
TDR/TDT network analysis
Eye diagram analysis with mask testing





PICOSCOPE 9300 SERIES

- **20 AND 25 GHz BANDWIDTH (17.5 / 14 ps RISE TIME – CALCULATED)**
- **2 OR 4 CHANNELS**
- **UP TO 1 MS/s SAMPLE RATE, UP TO 32 kS TRACE LENGTH**
- **15 TS/s EFFECTIVE SAMPLE RATE (64 fs RESOLUTION)**
- **UP TO 15 GHz PRESCALED & 2.5 GHz DIRECT TRIGGER**
- **PATTERN TRIGGER OF LENGTH 7 TO 2^{23} – 1**
- **JITTER <1.8 ps RMS + 20 ppm DELAY**
- **16 BIT, 60 dB DYNAMIC RANGE**
- **ACTIVEX REMOTE CONTROL OF ALL FUNCTION AND RESULTS**



At 20 and 25 GHz bandwidth the PicoScope 9300 sampling oscilloscopes address digital and telecommunications applications of 10 Gb/s and higher, microwave applications up to 25 GHz and timing applications with a resolution down to 64 fs. Optional 11 Gb/s clock recovery, optical to electrical converter or differential, de-skewable time domain reflectometry sources (40 or 60 ps) complete a formidable, small footprint and cost-effective measurement package.

The PicoScope 9300 Series oscilloscopes use triggered sequential sampling to capture high-bandwidth repetitive or clock-derived signals without the expense or jitter of a very high-speed clocked sampling system such as a real-time oscilloscope. The 20 GHz bandwidth allows measurement of down to 14 ps transitions, while the very low sampling jitter enables a time resolution as short as 64 fs. The sequential sampling rate of up to 1 MS/s, unsurpassed by any other sampling oscilloscope, allows the fast building of waveforms, eye diagrams and histograms.

These units occupy very little space on your workbench and are small enough to carry with your laptop for on-site testing, but that's not all. Instead of using remote probe heads attached to a large bench-top unit, you can now position the scope right next to the device under test. Now all that lies between your scope and the DUT is a short, low-loss coaxial cable or one of our microwave gigabit oscilloscope probes: PicoConnect 900 or Tetris active.

Everything you need is built into the oscilloscope, with no expensive hardware or software add-ons to worry about.

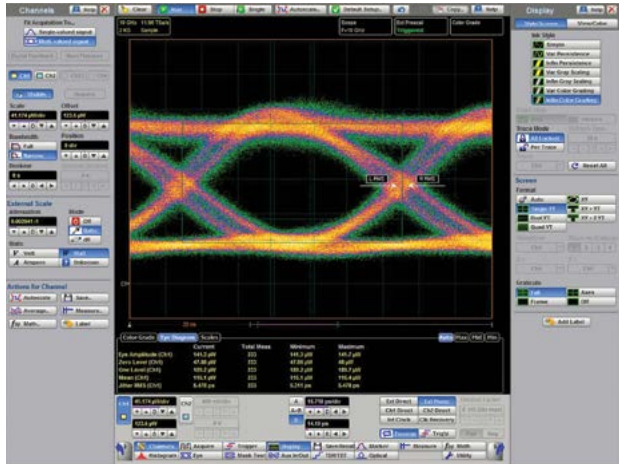
SPECIFICATIONS: PICOSCOPE 9300 SERIES

VERTICAL	20 GHz	All Models	25 GHz
Channels	2 (4 on 9341)		
Bandwidth	DC to 20 GHz		DC to 25 GHz
Rise time (calculated)	17.5 ps		14 ps
Resolution	16 bits		
RMS noise	1.5 mV typical		1.9 mV typical
Vertical gain accuracy	±2 %		
Input range	±1 V		
HORIZONTAL	All Models		
Dual timebase	5 ps/div to 3.2 ms/div		
Resolution	64 fs minimum		
Trace length	Up to 32 kS (shared)		
TRIGGER	20 GHz	All Models	25 GHz
Direct trigger bandwidth		DC to 2.5 GHz	
Prescaled trigger bandwidth	14 GHz		15 GHz
Trigger RMS jitter		<1.8 ps + 20 ppm of delay setting, typical	
TDR/TDT	9311 and 9312		
Modes	2 x Single ended, Differential, Normal		
Vertical scales	Volts, Rho (10 mrho/div to 2 rho/div), Ohm (1 ohm/div to 100 ohm/div)		
Horizontal scale	Time or distance (meters, feet, inches)		
FUNCTION GENERATOR	All		
Modes	Step, coarse timebase, pulse, NRZ, RZ, pulse, PRBS, 500 MHz clock and trigger out		

OPTICAL - ELECTRICAL CONVERTER	9321
Unfiltered bandwidth	DC to 9.5 GHz typical
Effective wavelength range	750 nm to 1650 nm
Fiber input	Single-mode (SM) or multi-mode (MM)
Input return loss	SM: 24 dB, typical. MM: 16 dB, typical
UTILITY	Autoscale, automatic calibration, demo signals
GENERAL	Weight: 1.2 kg Size: 170 x 40 x 260 mm

	9301	9302	9311	9312	9321	9341
20 GHz electrical inputs		3	3	2	2	4
25 GHz inputs	2					4
Differential electrical TDR/TDT capability			60 ps	40 ps		
External TDR/TDT pulse heads				•		
9.5 GHz optical-electrical converter					•	
Clock recovery trigger		•			•	
Pattern sync trigger	•	•	•	•	•	•
Basic PRBS and clock generator	•	•	•	•	•	•
USB port and LAN port	•	•	•	•	•	•

Model	Order code	Price		
		USD	EUR	GBP
PicoScope 9301 - 25	PQ094	$16 785	€14 235	£11 765
PicoScope 9302	PP891	$18 985	€16 915	£13 315
PicoScope 9311	PP892	$18 985	€16 915	£13 315
PicoScope 9312	PP893	$22 395	€19 955	£15 705
PicoScope 9321	PP894	$29 495	€26 275	£20 685
PicoScope 9341	PP895	$22 395	€19 955	£15 705
PicoScope 9341 - 25	PQ097	$26 235	€22 275	£18 405



TDR/TDT

Time-domain reflectometry/time-domain transmission testing is used for network analysis, or measuring impedance and discontinuities and determining their physical location along a transmission line.

The PicoScope 9311 and 9312 are supplied with a time-domain reflectometry (TDR) and time-domain transmission (TDT) accessory and calibration kit. These are used with the unit's built-in step generators (60 ps 7 V in PicoScope 9311) or extended pulse heads (40 ps 200 mV with PicoScope 9312).

Measure impedance and discontinuities in circuit boards, cables and transmission lines, connectors and IC packages with a horizontal resolution of typically around 1.6 cm or fault detect down to a few millimeters. The results can be displayed as volts, ohms or reflection coefficient (rho) against time or distance for either single-ended or differential transmission lines.

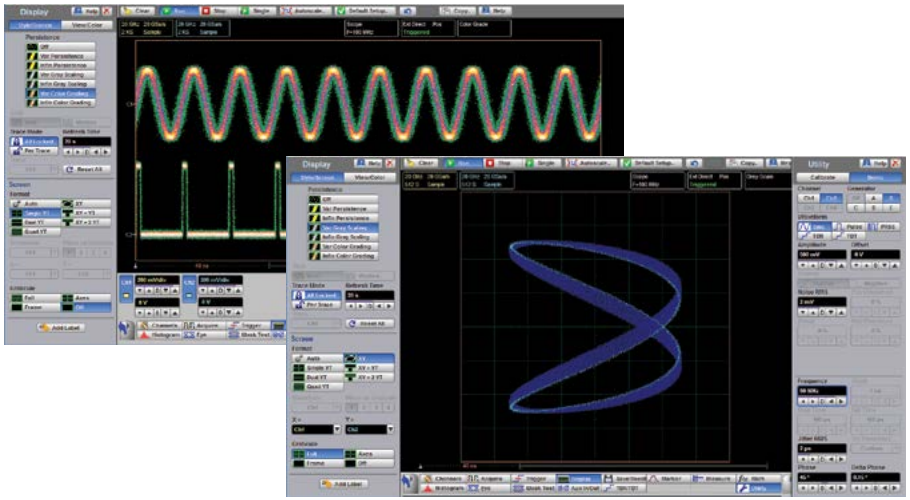
All PicoScope 9300 models can support TDR/TDT functionality when partnered with any of the PG900 pulse generators (see page 39).

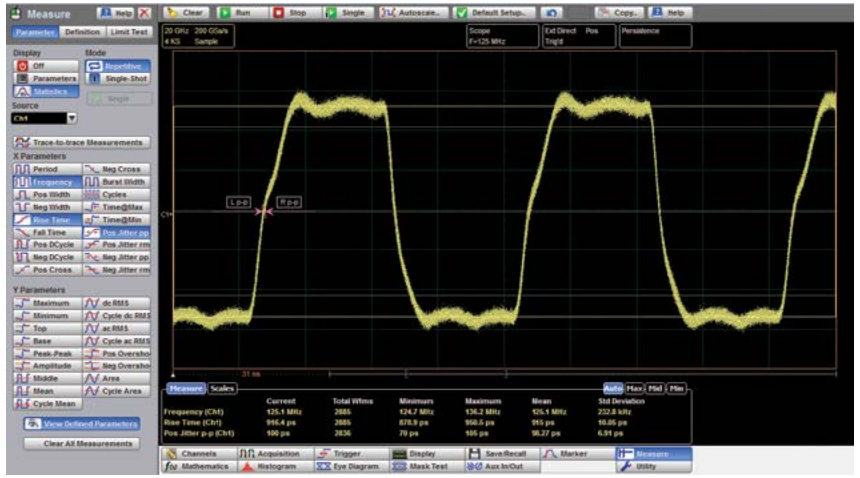
9.5 GHZ OPTICAL MODEL

The PicoScope 9321 includes a built-in, precision optical-to-electrical converter. With the converter output routed to one of the scope inputs (optionally through an SMA pulse shaping filter), the PicoScope 9321 can analyze standard optical communications signals such as OC48/STM16, 4.250 Gb/s Fibre Channel and 2xGB Ethernet. The scope can perform eye pattern measurements with automatic measurement of optical parameters including extinction ratio, S/N ratio, eye height and eye width. With its integrated clock recovery module, the scope is usable to 11.3 Gb/s.

The converter input accepts both single-mode (SM) and multi-mode (MM) fibers and has a wavelength range of 750 to 1650 nm.

PICOSAMPLE 3 SOFTWARE





DESIGNED FOR EASE OF USE

The PicoSample 3 workspace takes full advantage of your available display size and resolution. You decide how much space to give to the trace display and the measurements display, and whether to open or hide the control menus. The user interface is fully touch- or mouse-operable, with grabbing and dragging of traces, cursors, regions and parameters. There are enlarged parameter controls for use on smaller touch displays. To zoom, either draw a zoom window or use the more traditional dual timebase, delay and scaling controls.

A CHOICE OF SCREEN FORMATS

When working with multiple traces, you can display them all on one grid or separate them into two or four grids. You can also plot signals in XY mode with or without additional voltage-time grids. The persistence display modes use color-coding or shading to show statistical variations in the signal. Trace display can be in either dots-only or vector format.

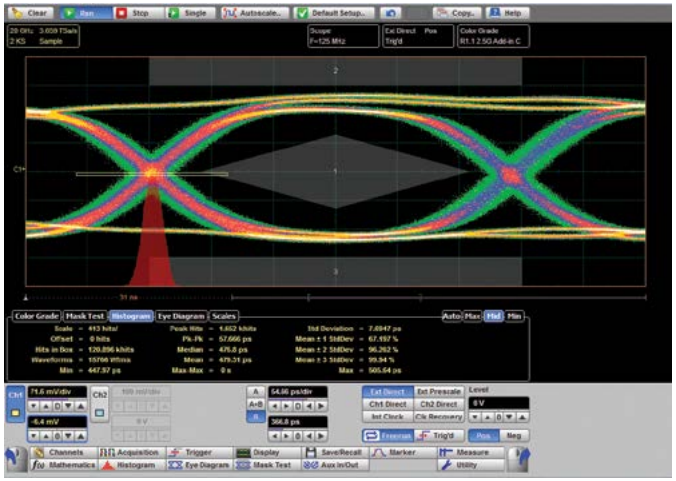
CLOCK AND SIGNAL CHARACTERIZATION

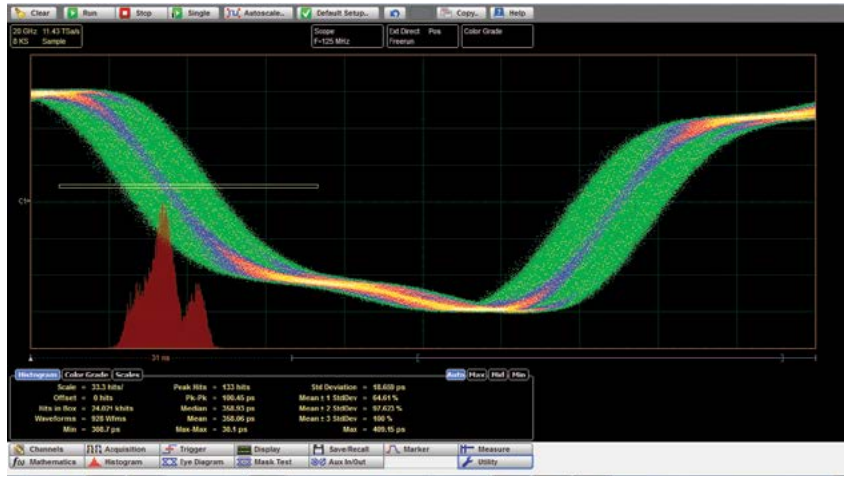
Easily measure up to 25 GHz electrical or 9.5 GHz optical signal characteristics such as jitter, noise, rise time and overshoot in your circuits, connectors, cables and PCBs.

Use up to 4 simultaneous channel math functions on live waveforms, waveform memory or even other functions.

FFT analysis: View any signal in the frequency domain for analyzing crosstalk or distortions, identifying the source of noise and interference, and testing impulse responses of systems.

Quickly define parameters with over 50 built-in pulse measurements. Up to 10 standard or statistical measurements can be displayed simultaneously.





MASK TESTING

The PicoSample™ 3 software includes a comprehensive selection of standard masks and allows mask editing and margin adjustment.

The display can be gray-scaled or color-graded to aid in analyzing noise and jitter in eye diagrams. There is also a statistical display showing the number of failures in both the original mask and the margin.

Standard electrical and optical masks supplied: SONET/SDH, Ethernet, Fibre Channel, PCI Express, InfiniBand, XAUI, RapidIO, SATA, ITU G.703, ANSI T1.102, G.984.2, USB.

Custom masks can be automatically generated and modified using the graphical editor. A specified margin can be added to any mask to facilitate stress testing of your data path.

HISTOGRAM ANALYSIS

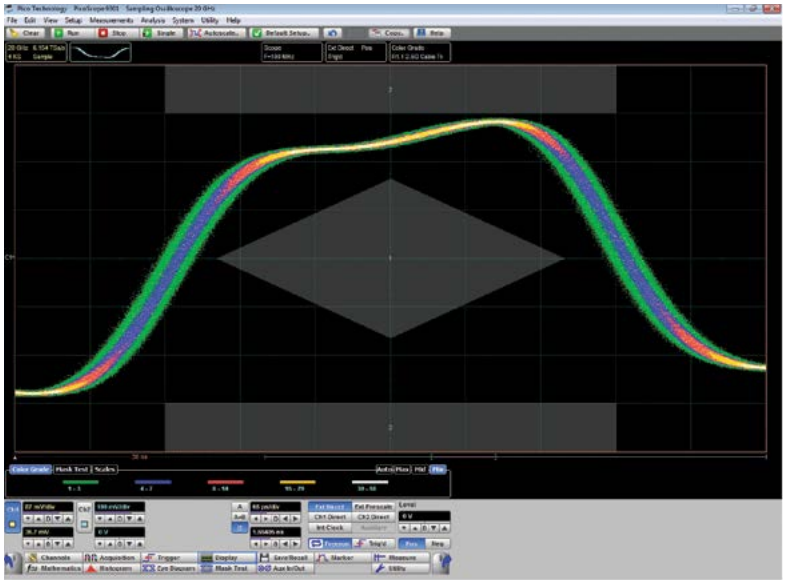
The histogram is a probability distribution of the acquired data within a user-defined window or slice. This is a powerful signal analysis tool and such statistics form the basis of many of the automatic measurements that are provided.

Histograms can be constructed on waveforms on either the vertical or horizontal axes. The most common use for a vertical histogram is measuring and characterizing noise, while the most common use for a horizontal histogram is measuring and characterizing jitter.

PATTERN SYNC TRIGGER AND EYE LINE MODE

When a repeating data pattern such as a pseudorandom bit sequence is present, an internal trigger divider can lock to it. You can then use eye-line mode to move the trigger point, and view point, along the whole pattern, bit by bit.

Eye-line scan mode is also available to build an eye diagram from a user-selected range of bit intervals through to the whole pattern. These features are useful for analyzing data-dependent waveshapes.



POWERFUL MATHEMATICAL ANALYSIS

The PicoScope 9300 Series scopes support up to four simultaneous mathematical combinations and functional transformations of acquired waveforms.

You can select any of the mathematical functions to operate on either one or two sources. All functions can operate on live waveforms, waveform memories or even other functions. There is an equation editor for creating custom functions.

PICOSCOPE 9200 SERIES

- **12 GHz BANDWIDTH ON 2 CHANNELS**
- **DUAL TIMEBASES DOWN TO 10 ps/DIV**
- **UP TO 10 GHz TRIGGER BANDWIDTH**
- **OPTICAL AND ELECTRICAL INPUTS**
- **ACTIVEX REMOTE CONTROL FOR ALL FUNCTIONS AND RESULTS**

If you're looking for an affordable way to measure high-speed electrical signals, you can't do better than the PicoScope 9000 Series of PC Sampling Oscilloscopes.

Designed specifically for the complex task of analyzing high-speed electrical signals, PicoScope 9000 Sampling Oscilloscopes are ideal for many advanced applications including: signal analysis, timing analysis, testing and design of high-speed digital communication systems, network analysis, semiconductor testing, and research and development.

Typical applications include:

- Electrical standards compliance testing
- Semiconductor characterization
- Telecom service and manufacturing
- Timing analysis
- Digital system design and characterization
- TDR/TDT measurement and analysis (PicoScope 9211A and 9231A only)
- Automatic pass/fail limit testing
- High-speed serial bus pulse response

PICOSCOPE 9000 SOFTWARE

The PicoScope 9000 software molds to your application by presenting only the feature controls that you need. Select the control panels you need with a single left or right click on the controls bar at the bottom of the display. Display your waveforms on a single, dual or quad graticule; persisted, colour or intensity graduated, vectored or as dots.

SPECIFICATIONS: PICOSCOPE 9200 SERIES

VERTICAL	All Models
Channels	2
Bandwidth	DC to 12 GHz
Rise time	29.2 ps
Resolution	16 bits
RMS noise	<2.0 mV
Vertical gain accuracy	±2 %
Input range	±1 V
HORIZONTAL	All Models
Dual timebase	10 ps/div to 50 ms/div
Time interval accuracy	±0.2% ±15 ps
Resolution	200 fs minimum
Buffer size	Up to 4 kS/channel
TRIGGER	All Models
Direct trigger bandwidth	DC to 1 GHz
Prescaled trigger bandwidth	10 GHz
Trigger RMS jitter	<3.5 ps + 20 ppm of delay setting, typical
TDR/TDT	9231A
Channels	2 x Single ended
Vertical scales	Volts, Rho (2 mrho/div to 2 rho/div), Ohm (1 ohm/div to 100 ohm/div)
Horizontal scale	Time or distance (meters, feet, inches)
FUNCTION GENERATOR	9231A
Modes	Step, Coarse timebase, Pulse, NRZ and RZ
Rise time	100 ps (typ) for Step (TDR)

MEASUREMENTS AND ANALYSIS	All Models
Markers	Horizontal and vertical bars or waveform markers (x and +)
Automatic measurements	Up to 40
FFT	Up to two FFTs simultaneously
OPTICAL - ELECTRICAL CONVERTER	9231A
Unfiltered bandwidth	DC to 8 GHz typical
Effective wavelength range	750 nm to 1650 nm
Fiber input	Single-mode (SM) or multi-mode (MM)
Input return loss	SM: 24 dB, typical. MM: 16 dB, typical
UTILITY	Autoscale, automatic calibration, demo signals
GENERAL	Weight: 1 kg Size: 170 x 40 x 255 mm

	9201A	9211A	9231A
12 GHz sampling oscilloscope	•	•	•
USB port	•	•	•
LAN port		•	•
Clock recovery trigger		•	•
Pattern sync trigger		•	•
Dual signal generator outputs		•	•
Electrical TDR/TDT capability		•	•
8 GHz optical-electrical converter			•

Model	Order code	Price		
		USD	EUR	GBP
PicoScope 9201A	PP463	$9 895	€8 815	£6 935
PicoScope 9211A	PP473	$12 365	€11 015	£8 675
PicoScope 9231A	PP664	$23 095	€20 575	£16 195

PICOSOURCE® PG900 Series

USB DIFFERENTIAL PULSE GENERATORS

A fast-transition pulse can stimulate a transmission path, device, or network with a broad-spectrum signal in a single instant. These signals, combined with differential capability, are valuable for making high-speed broadband measurements in many fields such as time-domain reflectometry, semiconductor testing, gigabit interconnect and port testing, and in radar systems.

Typical applications include:

- TDR/TDT network and match analysis
- Spectral and flatness measurements
- Timing, jitter and crosstalk determinations

The PicoSource PG900 Series pulse generators use PicoSource 5 software for Windows. They partner the PicoScope 9300 Series sampling oscilloscopes in these applications.

High-speed differential data is becoming the dominant measurement challenge in digital, computing, interconnect and telecommunications systems. Despite this need, cost-effective, fast-transition differential pulse generators were hard to find ... until now.

KEY SPECIFICATIONS

PicoSource PG911 and PG914

- Integrated 50 Ω SMA(f) step recovery diode outputs
- < 60 ps single-ended pulse transition time
- Two 2.5 V to 6 V variable amplitude outputs
- ±1 ns timing deskew in 1 ps steps
- 20 dB 10 GHz SMA(m-f) attenuators supplied fitted to SRD pulse outputs

PicoSource PG912 and PG914

- External 50 Ω N(m) positive and negative tunnel diode pulse heads
- < 40 ps pulse transition time
- Fixed 200 mV output amplitude
- ±500 ps timing deskew in 1 ps steps
- Inter-series N(f)–SMA(m) adaptors included with pulse heads

All PicoSource PG900 models

- Differential, deskewable outputs
- 200 ns to 4 µs pulse width
- Adjustable 1 µs to 1 s internal clock period
- Typical 3.0 ps RMS jitter relative to external trigger

	PicoSource PG911	PicoSource PG912	PicoSource PG914
	50 Ω SMA(f) < 60 ps differential pulse outputs, 2.5 V to 6 V variable amplitude	50 Ω N(m) < 40 ps positive and negative tunnel diode pulse heads, 200 mV fixed amplitude	Dual-mode generator with both of the previous outputs
Part Number	PP977	PP978	PP979
Price	$8095 €7215 £5675	$10585 €9435 £7425	$13075 €11645 £9175

Oscilloscope Accessories

PASSIVE PROBES

Our range of oscilloscope accessories has been carefully chosen for use with PicoScope oscilloscopes

MI007 60 MHz HIGH-IMPEDANCE PASSIVE PROBE
This high-quality general-purpose oscilloscope probe has a 60 MHz bandwidth. A two-position slide switch selects attenuation of either 1:1 or 10:1.

TA132 150 MHz HIGH-IMPEDANCE PASSIVE PROBE
TA131 250 MHz HIGH-IMPEDANCE PASSIVE PROBE
These high-quality general-purpose oscilloscope probes have a 150 MHz or 250 MHz bandwidth. A two-position slide switch selects attenuation of either 1:1 or 10:1.

TA150 350 MHz HIGH-IMPEDANCE PASSIVE PROBE
TA133 500 MHz HIGH-IMPEDANCE PASSIVE PROBE
These high-quality general-purpose oscilloscope probes have 350 MHz and 500 MHz bandwidths. Each probe is supplied with a range of accessories for convenient, accurate measurements. Fixed 10:1 attenuation.

TA062 LOW-IMPEDANCE PASSIVE PROBE (BNC)
TA061 LOW-IMPEDANCE PASSIVE PROBE (SMA)
These very high-bandwidth 1.5 GHz low-impedance probes are suitable for use with high-speed oscilloscopes and spectrum analyzers. Available with either an SMA or a BNC connector.

Our passive oscilloscope probes are available in bandwidths from 60 MHz up to 1.5 GHz. The table below shows their characteristics:

SPECIFICATION	MI007		TA132		TA131		TA150	TA133	TA061	TA062
Attenuation	1:1	10:1	1:1	10:1	1:1	10:1	10:1	10:1	10:1	10:1
Bandwidth	DC to 15 MHz	DC to 60 MHz	DC to 10 MHz	DC to 150 MHz	DC to 10 MHz	DC to 250 MHz	DC to 350 MHz	DC to 500 MHz	DC to 1.5 GHz	DC to 1.5 GHz
Rise time	23.3 ns	5.8 ns	35 ns	2.33 ns	35 ns	1.4 ns	1 ns	700 ps	240 ps	240 ps
Input resistance	1 MΩ	10 MΩ	1 MΩ	10 MΩ	1 MΩ	10 MΩ	10 MΩ	10 MΩ	500 Ω	500 Ω
Input capacitance	46 pF	15 pF	57 pF	15 pF	57 pF	15 pF	9.5 pF	9.5 pF	2 pF	2 pF
Overvoltage rating	600 V pk CAT I		600 V pk CAT I		600 V pk CAT I		300 V RMS CAT II	300 V RMS CAT II	12 V pk	12 V pk
Connector	BNC		BNC		BNC		BNC	BNC	SMA	BNC
Price	$25 €21 £18		$33 €28 £23		$42 €35 £29		$199 €169 £139	$209 €179 £149	$329 €279 £225	$339 €289 £239
Included in the kit with PicoScopes:	2204A 2205A 2205A MSO 2405A 2206B 2206B MSO 2406B 2205 MSO 3203D 3203D MSO 3403D 3403D MSO 4224 4424 4262 5242A/B 5442A/B		2207B 2207B MSO 2407B 2208B 2208B MSO 2408B 3205D 3405D 3204D 3204D MSO 3205D MSO 3404D 3404D MSO 3405D MSO 5243A/B 5443A/B		3206D 3406D 3206D MSO 3406D MSO 5244A/B 5444A/B		6402C/D 6403C/D	6404C/D		
Recommended for use with PicoScopes:									9200 Series 9300 Series	6402C/D 6403C/D 6404C/D

PICOCONNECT™ 900 SERIES

GIGABIT, RF, MICROWAVE AND PULSE PASSIVE PROBES

NEW

THE SHAPE OF PROBES TO COME
The PicoConnect 900 Series low-invasive, high-frequency passive probes are designed for microwave and gigabit applications up to 9 GHz and 18 Gb/s. They deliver unprecedented performance and flexibility at a low price.

These browser probes employ a unique (patent pending) in-PCB construction to realize extremely low capacitance, coplanar microwave integrity, robust reliability and very low cost. The result is a family of miniature interchangeable passive probe heads that cover a range of division ratios, bandwidths and coupling types.

USE WITH A WIDE RANGE OF INSTRUMENTATION
The PicoConnect 900 Series passive probes are designed for use with any instrument having 50 Ω inputs, including oscilloscopes, spectrum analyzers, modulation analyzers and counters, without regard to manufacturer.

INTERCHANGEABLE DIVISION RATIO
Interchangeable probe heads provide three division ratios to suit each application. The 5:1 ratio is a particularly attractive, high-speed option when probing low-swing logic.

PHENOMENAL VALUE FOR MONEY
Held in the fingertips or soldered in, these probes at last permit convenient and cost-effective multichannel probing of microwave and gigabit signals.

PicoConnect Models	Description	Price
911 to 916	4 to 5 GHz RF and microwave passive probes Attenuation 5:1, 10:1, 20:1, AC or DC coupled	from $699 €579 £459
921 to 926	6 to 9 GHz gigabit passive probes Attenuation 5:1, 10:1, 20:1, AC or DC coupled	from $1005 €839 £659
910	Set of all six models of RF and microwave probe heads (for the price of four) with two cables	$3095 €2595 £2045
920	Set of all six models of gigabit probe heads (for the price of four) with two cables	$5105 €4285 £3375

THREE-AXIS ACCELEROMETER AND OSCILLOSCOPE INTERFACE

The PP877 is a MEMS-based three-axis accelerometer and oscilloscope interface. It is supplied with three short BNC to BNC cables which plug directly into any PicoScope oscilloscope with three or more analog channels. High-resolution oscilloscopes such as the PicoScope 4000 Series are recommended to take advantage of their increased sensitivity.

- ± 5 g measurement range
- DC to 350 Hz frequency range
- Mounting magnet included
- 3 x BNC to BNC cables included

$409 €349 £289

PP877 Three-axis accelerometer specifications	
Weight (interface/vibration sensor)	120 g / 80 g
Dimensions Sensor interface (inc. BNCs) Magnet (inc. fitted grub screw)	105 mm x 65 mm x 27 mm 12 mm x ø18 mm
Battery (lithium primary cell)	CR123(A) included
Maximum measurable acceleration	±5 g
Output BNC	0-2 V DC coupled
Vibration frequency (3 dB)	DC to 350 Hz
BNC overvoltage protection	30 V
Shock survivability (sensor head)	10,000 g
Temperature range (operating) Sensor head	–40° C to 85 °C
Thread mounting (sensor)	1/4" x 28 UNF
EMC approvals	CE: Meets EN61326-1:2006
Output scaling	99 to 122 mV/g
0 g output (all axes)	0.85 to 1.15 V

CURRENT PROBES

Current probes offer a safe, cost-effective, simple and accurate way to take current measurements. They enable you to measure currents without breaking the electric circuit. Current probes are designed with sensors that can be opened, placed around the conductor and securely fastened to form a loop around the conductor.

The Pico current probes listed below can be used with Pico oscilloscopes and data loggers, as well as with all major brands of oscilloscopes and multimeters.

SPECIFICATION	30 A	60 A	600 A	2000/200 A	30/300/3000 A	30/300/3000 A
Probe type	Clamp	Clamp	Clamp	Clamp	Flexible	Flexible
Range	1 mA to 30 A	10 mA to 60 A	0 to 600 A	0 to 2000 A	0 to 3000 A	0 to 3000 A
Coupling mode	AC or DC	AC or DC	AC or DC	AC or DC	AC	AC
Frequency range	DC to 100 kHz	DC to 20 kHz	DC to 400 Hz	DC to 20 kHz	10 Hz to 20 kHz	10 Hz to 20 kHz
Max. conductor size	25 mm	9 mm	30 mm	32 mm	181 mm	181 mm
Operational temp. and humidity	0 °C to 50 °C, 70% RH	0 °C to 50 °C, 70% RH	0 °C to 50 °C, 70% RH	0 °C to 50 °C	–20 °C to +65 °C, 15% to 85% RH	–20 °C to +65 °C, 15% to 85% RH
Part number - BNC connector	TA189	TA018	TA019	TA167	TA325	TA326
Price	$459 €389 £319	$159 €139 £115	$159 €139 £115	$259 €219 £185	$769 €649 £499	$369 €309 £239
Part number - 4 mm connectors		TA009	MI077			
Price		$129 €109 £95	$129 €109 £95			

ACTIVE PROBES

HIGH BANDWIDTH ACTIVE PROBES

SPECIFICATION	TA045	TA058
Attenuation	10:1	10:1
Bandwidth	200 MHz	50 MHz
Common-mode voltage range	±60 V	±700 V or 600 V RMS
Differential voltage range	±20 V	±70 V or 70 V RMS
Battery power	Optional (TA047)	Optional (TA047)
Input impedance	500 kΩ / 7 pF	1.6 MΩ / 7 pF
Safety rating	60 V CAT I	600 V CAT I
Price	$1055 €889 £739	$479 €399 £339

The TA058 is a 70 V CAT I rated differential oscilloscope probe that can measure up to ±70 V.

The TA045 is a 60 V CAT I rated differential oscilloscope probe that can measure up to ±20 V.

SPECIFICATION	TA046
Attenuation	10:1
Bandwidth	800 MHz
Common-mode range	±30 V
Differential voltage range	±15 V
Input impedance	100 kΩ / 2 pF
Price	$1205 €1025 £839

ACTIVE DIFFERENTIAL PROBE 15 V, 800 MHz, 10:1

The TA046 is a high-bandwidth differential probe. It is ideal for measuring high-speed differential signals.

TETRIS® HIGH-IMPEDANCE ACTIVE OSCILLOSCOPE PROBES

Pico Technology presents a unique Inline Probing System – the TETRIS® active probe. The unique design of the TETRIS family of active probes allows for contact to adjacent square pins in 2.54 mm pitch simultaneously. This is possible due to the probe's T-shaped housing allowing many probes to be positioned next to each other, permitting multiple measurements to be taken at the same time.

The TETRIS probes are independent of any particular system, and with their standard BNC connector, they can be plugged into any measuring instrument with a 50 Ω input. With an input resistance of 1 MΩ and an input capacitance of 0.9 pF the TETRIS probes are suitable for measurements in all frequency ranges. Unlike passive probes the TETRIS active probes offer a high input impedance into the GHz range. These characteristics make them the ideal probes for most of your daily measurements.

	TA223 TETRIS 2500 2.5 GHz high-impedance active oscilloscope probe 10:1 SMA(m) Interface with BNC(m) Adaptor $2005 €1785 £1405
	TA222 TETRIS 1500 1.5 GHz high-impedance active oscilloscope probe 10:1 SMA(m) Interface with BNC (M) Adaptor $1085 €969 £759
	TA112 TETRIS 1000 1 GHz high-impedance active oscilloscope probe 10:1 SMA(m) Interface $989 €839 £679

HIGH-VOLTAGE ACTIVE DIFFERENTIAL PROBES

SPECIFICATION	TA042	TA043	TA044
Description	100 MHz 1400 V differential probe	100 MHz 700 V differential probe	70 MHz 7000 V differential probe
Attenuation	100:1, 1000:1	10:1, 100:1	100:1, 1000:1
Bandwidth	100 MHz	100 MHz	70 MHz
Rise time	3.5 ns	3.5 ns	5 ns
Differential voltage ranges	140 V DC + peak AC 100 V RMS	70 V DC + peak AC 70 V RMS	700 V DC + peak AC 500 V RMS
	1400 V DC + peak AC 1000 V RMS	700 V DC + peak AC 500 V RMS	7000 V DC + peak AC 5000 V RMS
Common-mode range	1400 V DC + peak AC 1000 V RMS	700 V DC + peak AC 500 V RMS	7000 V DC + peak AC 2500 V RMS
Input impedance	4 MΩ/7 pF each side to ground	4 MΩ/7 pF each side to ground	10 MΩ/10 pF each side to ground
Power requirements	4 x AA cells (supplied)	4 x AA cells (supplied)	4 x AA cells (supplied)
Safety rating	1000 V CAT III	1000 V CAT III	2500 V CAT I
Price	$609 €519 £419	$659 €559 £459	$919 €779 £639

ACTIVE DIFFERENTIAL PROBES 700 TO 7000 V, 70 TO 100 MHz

The TA042, TA043 and TA044 are active differential oscilloscope probes. They let you use a conventional earthed oscilloscope to measure signals that are not referenced to ground, including mains voltages with the TA042 and TA043. They can also be used to measure and observe the waveforms of three-phase supplies or the gate and control signals of semiconductor circuits. They are ideal for investigating motor speed controls, uninterruptible power supplies, switch mode power supplies and process controllers.

ACTIVE DIFFERENTIAL PROBE 700 V OR 1400 V CAT III

The TA041 and TA057 probes permit a conventional earthed oscilloscope to measure signals that are not referenced to earth, enabling mains voltages to be tested. Ideal for investigation of motor speed controls, uninterruptible power supplies, switch mode power supplies and process controllers.

SPECIFICATION	TA041	TA057
Attenuation ranges	10:1, 100:1	20:1, 200:1
Bandwidth	DC to 25 MHz (-3 dB)	DC to 25 MHz (-3 dB)
Differential voltage ranges	±70 V or 70 V RMS ±700 V or 700 V RMS	±140 V or 1000 V RMS ±1400 V or 1000 V RMS
Common-mode voltage range	±700 V or 700 V RMS	±1400 V or 1000 V RMS
Input impedance	4 MΩ / 5.5 pF	4 MΩ / 5.5 pF
Safety rating	1000 V RMS CAT III	1000 V RMS CAT III
Price	$379 €319 £269	$379 €319 £269

ACCESSORIES FOR ACTIVE PROBES

The TA047 is an optional 4AA battery pack for the TA045 and TA058 active differential probes. We also offer power supplies should you need to buy a new one. The PS008 is a 9 V power supply for all differential probes except TA046. The PS009 is a 15 V power supply for the TA046 only.

TA047
Price $81 €69 £56

PS008 & PS009
Price $25 €21 £18

CABLES, CONNECTORS AND GENERAL ACCESSORIES

BNC TO 4 mm CABLE (1.8 m)
Test lead - BNC plug to 4 mm plugs.
MI029 $17 €14 £12

BNC TO CROCODILE CLIPS CABLE (1.8 m)
Test lead - BNC plug to crocodile clips
MI031 $9 €7 £6

BNC TO BNC CABLE (1.2 m)
Test lead - BNC plug to BNC plugs.
MI030 $14 €12 £9

BNC TO 4 mm ADAPTOR
The BNC to 4 mm adaptor converts two 4 mm ("banana") plugs to a BNC plug.
MI078 $20 €17 £15

USB CABLES
A range of high-quality Pico blue USB cables made especially for PicoScopes.

USB 2.0 cable A-B 1.8 m
MI106 $9 €7 £6

USB 2.0 cable A-B 4.5 m
MI121 $17 €14 £12

USB 2.0 cable A-B 1.8 m double-headed
TA146 $10 €9 £7

USB 3.0 cable A-B 1.8 m
TA155 $14 €12 £10

ATTENUATOR SET: BNC 50 Ω, 1 W, 1 GHz, 3, 6, 10 AND 20 dB

The TA050 attenuator set consists of four coaxial attenuators designed for use with signals up to 1 GHz. Each attenuator has a male and a female BNC connector.

SPECIFICATION	TA050
Attenuation	3, 6, 10, 20 dB
Bandwidth	DC to 1 GHz
Max. power dissipation	1 W
Input impedance	50 Ω
Output impedance	50 Ω
VSWR	1.5:1 or better
Dimensions	56 x 20 x 17 mm
Connectors	BNC, 1 male + 1 female
Price	$65 €55 £45

FEED-THROUGH TERMINATOR

SPECIFICATION	TA051
Bandwidth	DC to 1 GHz
Max. power dissipation	1 W
Input impedance	50 Ω
Dimensions	56 x 20 x 17 mm
Connectors	BNC, 1 male + 1 female
Price	$17 €14 £12

The TA051 feed-through terminator is a coaxial terminator with BNC connectors. It is useful for connecting signals from 50 Ω sources into instruments with high-impedance inputs, such as oscilloscopes.

RF & MICROWAVE ACCESSORIES

	TA237 14 GHz 25 ps TDR Kit 18 GHz, 50 Ω SMA(m-m) within series adaptor 18 GHz, SMA(f) reference short 18 GHz, SMA(f) reference load $329 €289 £229
	TA238 14 GHz Power Divider Kit 18 GHz 50 Ω SMA(f-f-f) 3-resistor 6 dB power divider 2x 10 cm precision coaxial SMA(m-m) cable $539 €479 £379
	TA170 18 GHz 50 Ω SMA(m-f) connector saver adaptor $20 €18 £14
	Attenuator SMA to SMA Bandwidth DC to 10 GHz Attenuator 3 dB. TA181 $75 €67 £53 Attenuator 6 dB. TA261 $75 €67 £53 Attenuator 10 dB. TA262 $75 €67 £53 Attenuator 20 dB. TA173 $75 €67 £53
	TA172 N (f)-SMA (m) inter-series adaptor $129 €119 £92
	TA239 4 GHz Power Divider Kit: Precision coax cable 30 cm Precision coax cable 80 cm 4 GHz 50 Ω SMA(f-f-f) 3-resistor 6 dB power divider $409 €369 £289

	REFERENCE OPTICAL RECEIVER BESSEL-THOMSON FILTERS. Terminated with 50 Ω SMA (m-f) connectors All $129 €119 £92	TA120 51.8 Mb/s (OC1/STM0) TA121 155 Mb/s (OC3/STM1) TA122 622 Mb/s (OC12/STM4) TA123 1.250 Gb/s (GBE) TA124 2.488 Gb/s (OC48/STM16)
	TA265 Precision sleeved coaxial cable (30 cm 1.3 dB @ 13 GHz) $65 €58 £46	
	TA312 Precision sleeved coaxial cable 60 cm SMA(m-m) 2.2 dB loss @ 13 GHz $70 €59 £47	
	TA264 Precision high-flex unsleeved coaxial cable (30 cm 1.1 dB @ 13 GHz) $65 €58 £46	
	TA263 Precision high-flex unsleeved coaxial cable (60 cm 1.9 dB @ 13 GHz) $75 €67 £53	

PicoLog®

DATA LOGGERS

Data logging products from Pico Technology provide a straightforward answer to your data logging requirements.

WHAT IS A DATA LOGGER?
A data logger is an electronic device that is used to record measurements over time. Pico Technology data loggers require no external power supply and simply plug into an Ethernet or USB port on your PC.

WHAT CAN I MEASURE?
By connecting suitable sensors, Pico Technology data acquisition products can be used to measure temperature, pressure, relative humidity, light, resistance, current, power, speed, vibration... in fact, any physical parameter.

WHAT SOFTWARE DO I NEED?
Pico Technology data loggers are supplied complete with PicoLog software. This powerful but flexible data acquisition software allows you to collect, analyze and display data. With PicoLog the data is viewable both during and after data collection, in both spreadsheet and graphical format. You can also export the data for use in other applications.

PICO DATA LOGGER RANGE
Along with voltage-input data loggers, the Pico Technology data logger range also includes loggers designed for specific applications:

- For measuring temperature, loggers such as the TC-08 thermocouple data logger and PT-104 temperature data logger offer an accurate solution.
- Current monitoring can be carried out by our PicoLog CM3 3-channel current data logger, which is suitable for single or three-phase alternating current.
- pH can be measured using the DrDAQ pH Kit. This kit allows you to measure the full pH scale with automated temperature compensation.

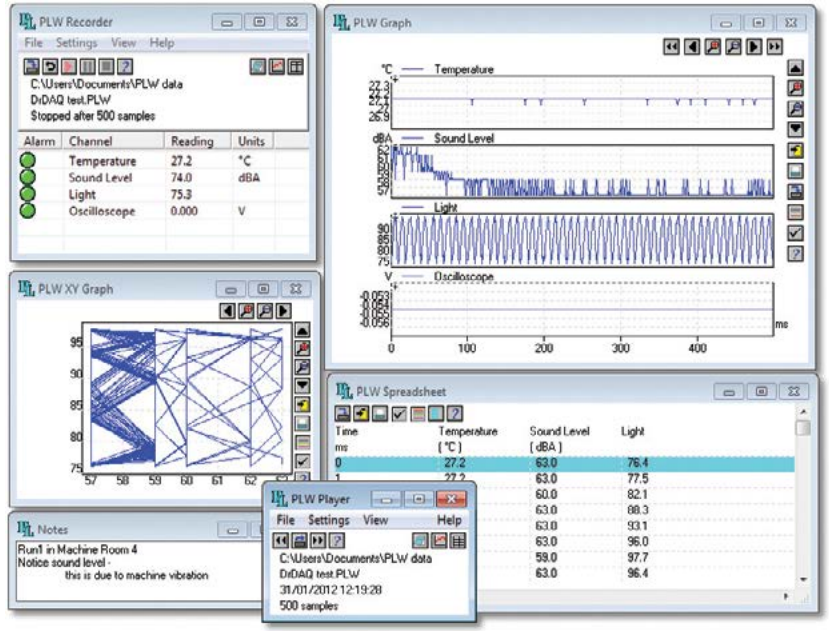
Whatever your data logging requirements, a Pico Technology data logger gives you an easy-to-use and accurate solution at a competitive price.

PICOLOG SOFTWARE

PicoLog is a powerful and flexible program for collecting, analyzing and displaying data.
It can be used with all Pico Technology data acquisition and data logging products.

Some of the features of PicoLog are listed here. To see for yourself just how good it is, download your free demo copy.

- Collects up to 1 million samples
- Easy and intuitive to use
- Free upgrades and technical support
- Supports 32-bit and 64-bit versions of Windows 7, 8 and 10
- International language versions (French, Italian, German, Spanish, Czech and Swedish)
- Easy to set up and use, with online help
- Real-time data collection, analysis and display
- Programmable alarm limits can be set for each channel
- Data can be exported to spreadsheets and databases
- Save multiple setups for different tests and experiments
- Can be used with desktop or laptop PCs
- Supports multiple loggers on the same PC
- Uses PC monitor to give large color display, ideal for education and training
- Waveforms can be saved, printed, faxed or e-mailed from your PC
- Scaling, filtering
- IP networking



PROGRAM MODES

PicoLog for Windows works in two modes: player mode for displaying previously recorded data, and recorder mode for recording new data. You can have more than one copy of PicoLog running at once, so you can use the player to analyze old data while recording new data.

PicoLog can collect data from up to 20 converters at the same time. This not only allows a mix of voltage input units to be used on the same PC, but also allows other PC-based instruments such as the TC-08 thermocouple data logger to be used at the same time.

EXPORTING DATA

Data can easily be transferred (either as graphs or raw data) to other Windows applications by using the clipboard (copy and paste). Graphs can also be saved to disk as bitmaps, and data from the spreadsheet can be saved in text format. Current readings can be transferred using Dynamic Data Exchange (DDE).

MULTIPLE VIEWS
PicoLog displays data in a number of views, which can be activated as and when required, both during and after data collection.

RECORDER VIEW
Enables you to start and stop recording and specify recording files. It shows the current readings and alarm conditions for each channel. All settings such as scaling, channels and sampling are controlled from the recorder view.

XY GRAPH VIEW
Displays one parameter against another. Useful for plotting voltage against current, for example.

SPREADSHEET VIEW
Displays text data in a format that can be easily copied and pasted into other applications. Data can also be saved to disk in standard text format.

GRAPH VIEW
Graphs can be displayed both during and after data collection. Each channel can be displayed in its own graph, or multiple channels can be displayed in the same graph. Axes can be set up manually, automatically or in chart recorder mode. Multipliers allow you to magnify areas of interest. Graphs can be copied into the clipboard and then pasted into reports.

NOTES VIEW
Notes view allows you to attach notes to data.

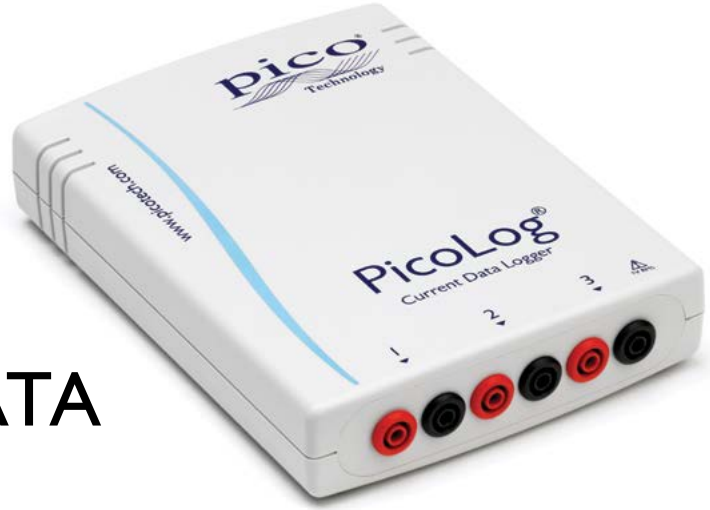
PLAYER VIEW
Displays previously recorded data. It enables you to scroll quickly through stored files to compare results on successive runs. The player can be used to examine old data while new data is still being recorded.

PARAMETER SCALING
Can be used to convert raw data into standard engineering units. A wide range of equation and table lookup scaling options are provided.

ADDITIONAL PARAMETERS
For example, to calculate power output from a boiler, you can multiply a flow reading from one channel by the temperature difference between two further channels.

ALARM LIMITS
Can be set for each channel to alert the user should a parameter go out of a specified range.

IP NETWORKING
PicoLog data acquisition software supports IP networking. This enables remote data collection from Pico Technology's full range of data acquisition products.



CURRENT DATA LOGGER

PICOLOG CM3

- **3-CHANNEL CURRENT DATA LOGGER**
- **SUITABLE FOR SINGLE OR THREE-PHASE ALTERNATING CURRENTS**
- **LOW CONVERSION TIME**
- **HIGH RESOLUTION AND ACCURACY**

The PicoLog CM3 USB/Ethernet Current Data Logger is a compact, easy-to-use instrument for measuring the current consumption of buildings and machinery. With three channels, high accuracy and low noise, it is ideal for recording data from both single-phase and three-phase AC supplies. The logger is supplied complete with three AC current clamps and all necessary software. The USB and Ethernet interfaces allow the logger to be used as a USB-only device, as a USB-powered device with Ethernet interface, or as a Power-over-Ethernet (PoE) device. Using the Ethernet interface, the PicoLog CM3 can be located anywhere on a LAN or on the internet.

DATA COLLECTION

PicoLog is a powerful but flexible data acquisition program designed for collecting, analyzing and displaying data over long or short periods of time. Data can be viewed both during and after data collection in spreadsheet or graphical format. If required, the data can also be easily exported to other applications.

PicoLog	CM3
Channels	3
Range (voltage input)	0 to 1 V AC RMS
Accuracy (voltage input)	±1 % (to 200 mV), ±2.5 % (to 1 V)
Range (current clamp)	0.1 to 200 A AC RMS
Accuracy (current clamp)	±2 %, ±0.5 A
Resolution	24 bit ADC
Reading rate	<1 second per conversion
Input connectors	4 mm socket
PC connection	USB or Ethernet
Dimensions	184 x 135 x 36 mm
Part number - Logger only	PP815
Price	$409 €349 £289
Part number - Kit with 3 current clamps	PP803
Price	$579 €489 £399

VOLTAGE DATA LOGGERS

PICOLOG 1000 SERIES

- **UP TO 16 UNIPOLAR ANALOG INPUT CHANNELS**
- **UP TO 12-BIT RESOLUTION WITH 0.5% ACCURACY**
- **UP TO 4 SOFTWARE-CONFIGURABLE DIGITAL OUTPUT LINES**
- **UP TO 1 MS/s SAMPLING RATE**

A DISTINGUISHED PEDIGREE

The PicoLog 1000 Series is the result of a distinguished lineage that goes back to the release of our first multi-channel data logger — the ADC-11 — in 1993. The original ADC-11, and its successor the USB ADC-11, proved to be the perfect choice for users wanting a low-cost way to measure and record multiple signals. The PicoLog 1000 Series builds on this success to give you the same low-cost data acquisition but with greater power and performance. (Because the ADC-11 was so popular we've also added a USB ADC-11 compatibility mode, which allows you to use your PicoLog 1000 logger as a direct replacement for the USB ADC-11.)

AN EXPANDABLE DATA ACQUISITION SYSTEM

The budget PicoLog 1012 model has 12 input channels. The more powerful PicoLog 1216 has 16. Need more channels? No problem. Using PicoLog you can connect up to 20 Pico data loggers to one PC — giving you a potential 250 channel PicoLog 1000 Series data acquisition system, or the ability to use your PicoLog 1000 logger with other devices such as the USB TC-08 thermocouple data logger.

PICOLOG 1000 TERMINAL BOARD

This external terminal board with screw terminals lets you easily and quickly connect your sensors to the logger. The board also has solder pads on which you can fit resistors to widen the measuring range for each input.

Terminal board PP545 $25 €21 £18

PicoLog	1012	1216
Channels	12	16
Resolution	10 bits	12 bits
Input ranges	0 to 2.5 V	0 to 2.5 V
Part number - with terminal board	PP546	PP547
Price	$179 €149 £129	$259 €219 £185

VOLTAGE DATA LOGGERS

ADC-20 AND ADC-24

- **UP TO 8 TRUE DIFFERENTIAL OR 16 SINGLE-ENDED INPUTS**
- **24-BIT RESOLUTION**
- **ACCURATE TO WITHIN 0.1%**
- **FAST CONVERSION TIME**

ADC-20 AND ADC-24 TERMINAL BOARD
This external terminal board provides screw terminals to allow you to quickly connect and disconnect different sensors.

Terminal board PP310 $42 €35 £29

THE ULTIMATE IN RESOLUTION AND ACCURACY
With up to 24 bits resolution, the ADC-20 and ADC-24 USB data loggers are able to detect the smallest signal changes. Features such as true differential inputs, galvanic isolation and software selectable sampling rates all contribute to a superior noise-free resolution, and ensure that your measurements are reliable and accurate to within 0.1%.

FLEXIBLE MULTI-CHANNEL ACQUISITION
Both the ADC-20 and ADC-24 feature true differential inputs for excellent noise rejection. Each differential input can also be configured as 2 single-ended inputs. With up to 8 differential or 16 single-ended inputs on the ADC-24, this flexibility gives you complete control over the type of inputs you use. For example, you may configure the ADC-24 to use 4 differential and 8 single-ended inputs, or 2 differential and 12 single-ended inputs; and so on: the choice is yours.

With up to 7 bipolar voltage ranges, the ADC-20 and ADC-24 are also versatile enough to be used with a wide range of sensors and signal types.

Model	ADC-20	ADC-24
Channels	4 diff/8 single-ended	8 diff/16 single-ended
Resolution	20 bits	24 bits
Voltage ranges	±2500 mV ±1250 mV	±2500 mV, ±1250 mV ±625 mV, ±312 mV ±156 mV, ±78 mV ±39 mV
Part number logger with terminal board	PP311	PP312
Price	$359 €309 £249	$689 €589 £479

TEMPERATURE DATA LOGGERS

TC-08

- **8-CHANNEL THERMOCOUPLE DATA LOGGER**
- **MEASURES FROM –270 °C TO +1820 °C**
- **AUTOMATIC COLD-JUNCTION COMPENSATION**
- **HIGH RESOLUTION AND ACCURACY**

WIDE TEMPERATURE RANGE
The TC-08 thermocouple data logger is designed to measure a wide range of temperatures using any thermocouple that has a miniature thermocouple connector. Additionally, the TC-08 can measure other sensors using a 70 mV range.

Featuring built-in cold-junction compensation (CJC), the TC-08 has an effective temperature range of –270 °C to +1820 °C (the actual temperature range depends on the thermocouple being used).

ALL THE BENEFITS OF USB
The TC-08 connects to the USB port of a Windows-based PC and enables the host PC to automatically detect the TC-08, avoiding the need for any complex setup procedures. The USB connection also allows the TC-08 to be powered directly by the USB port, eliminating the need for an external power supply and making the TC-08 ideal for measuring temperatures both in the lab and in the field.

TC-08 TERMINAL BOARD
This is an optional terminal board for the TC-08. The screw terminals allow wires to be attached to the data logger without soldering and enable the TC-08 to measure voltages from 0 to +5 V, or 4-20 mA loop current.

Terminal board PP624 $30 €26 £21

Model	TC-08
Channels	8
Resolution	20 bits
Voltage input range	±70 mV
Conversion time	100 ms
Temperature accuracy	Sum of ±0.2 % of reading and ±0.5°C
Voltage accuracy	Sum of ±0.2 % of reading and ±10 µV
Power	PC connection - USB
Thermocouple types supported	B, E, J, K, N, R, S, T
Part number	PP222
Price	$409 €349 £289

THERMOCOUPLES

Pico Technology offers a range of popular type K thermocouples for use with the TC-08 thermocouple data logger and other suitable temperature measuring devices.

Please contact our technical support team if you require any further information on thermocouples that are suitable for your application.

TYPE K THERMOCOUPLES

	(EXPOSED WIRE, FIBERGLASS INSULATED)			(EXPOSED WIRE, PTFE INSULATED)				AIR PROBE	INSERTION PROBE	RIBBON SURFACE PROBE
	SE001	SE030	SE031	SE000	SE027	SE028	SE029	SE002	SE003	SE004
Tip diameter	1.5 mm			1.5 mm				4.5 mm	3.3 mm	8 mm
Tip temperature	-60 to +350 °C			-75 to +250 °C				-50 to +250 °C	-50 to +250 °C	-10 to +250 °C
Probe length	NA			NA				120 mm	120 mm	120 mm
Cable length	1 m	2 m	5 m	1 m	2 m	3 m	10 m	1 m	1 m	1 m
Price	$10 €9 £7	$14 €12 £9	$20 €17 £15	$10 €9 £7	$14 €12 £9	$15 €13 £10	$30 €26 £21	$48 €41 £33	$40 €34 £28	$48 €41 £33

TEMPERATURE DATA LOGGERS

PT-104 PRT DATA LOGGER

- **MEASURES TEMPERATURE, RESISTANCE AND VOLTAGE**
- **HIGH RESOLUTION AND ACCURACY**
- **CONNECT VIA USB OR ETHERNET PORT**

ACCURACY AND RESOLUTION

Although accurate temperature sensors are widely available, it has been difficult to find a measuring device that can take advantage of them without introducing excessive errors. The PT-104, however, is inherently accurate due to its novel design. Rather than relying on voltage references (which tend to be temperature-sensitive) it uses "reference" resistors which are extremely stable (low temperature coefficient and drift). The exact value of each resistor is stored in an EEPROM to provide the ultimate in accuracy (annual recalibration is recommended). To achieve the 0.001 °C resolution, a highly advanced ADC is used that can resolve to better than 1 part in 16 million.

TEMPERATURE

The PT-104 measures temperature using platinum resistance thermometers (PRTs). Both common industry standards (PT100 and PT1000) are supported. The unit is compatible with 2-, 3- and 4-wire sensors (4-wire PT100 sensors are recommended for accurate measurements). A wide range of PT100 sensors are available for use with the PT-104.

PT-104 SCREW TERMINAL ADAPTER

The PT-104 Screw Terminal Adapter allows PT100 probes that are not fitted with a mini-DIN connector to be used with the data logger without the need for soldering. Terminal adaptor PP660 $10 €9 £7

SPECIFICATION	Temperature	Resistance	Voltage
Sensor	PT100, PT1000	N/A	N/A
Range	-200 to 800 °C	0 to 375 Ω 0 to 10 kΩ	0 to 115 mV 0 to 2.5 V
Accuracy (Unit @ 23 ± 2 °C)	0.015 °C + 0.01% of reading	20 ppm @ 100 Ω	0.4%
Temperature coefficient		5 ppm/°C	100 ppm/°C
Resolution	0.001 °C	1 µΩ	0.156 µV
Number of channels	4		
Part number	PP682		
Price	$659 €559 £459		

PT100 TEMPERATURE SENSORS

GENERAL-PURPOSE LOW-COST PT100 PROBES

PT100 CLASS A SENSOR/SE011

PT100 GENERAL PURPOSE/SE019

SPECIFICATION	SE011	SE019
Temperature range	-30 to +350 °C	-75 to +260 °C
Accuracy	±0.15 °C @ 0 °C	±0.15 °C @ 0 °C
Dimensions	Length 200 mm Diameter 6 mm	Length 120 mm Diameter 3 mm
Cable	1 m	
Material	Stainless steel probe, PVC cable	
Handle	No	Yes
Price	$38 €33 £27	$48 €41 £33

IMMERSION PT100 PROBES

PT100 1/10 DIN SENSOR/SE012

PT100 IMMERSION PROBE/SE014

SPECIFICATION	SE012	SE014
Temperature range	-50 to +250 °C	-75 to +250 °C
Accuracy	±0.03 °C @ 0 °C	±0.15 °C @ 0 °C
Dimensions	Length 200 mm Diameter 4 mm	Length 120 mm Diameter 3.3 mm
Cable	1 m	
Material	Stainless steel probe, PTFE cable	Stainless steel probe, PVC cable
Handle	No	Yes
Price	$81 €69 £56	$75 €63 £52

INSERTION PT100 PROBES

PT100 INSERTION PROBE/SE015

PT100 INSERTION PROBE HEAVY DUTY/SE016

SPECIFICATION	SE015	SE016
Temperature range	-75 to +250 °C	-60 to +500 °C
Accuracy	±0.15 °C @ 0 °C	±0.3 °C @ 0 °C
Dimensions	Length 120 mm Diameter 3.3 mm	Length 150 mm Diameter 4 mm
Cable	1 m	
Material	Stainless steel probe, PVC cable	
Handle	Yes	
Price	$81 €69 £56	$81 €69 £56

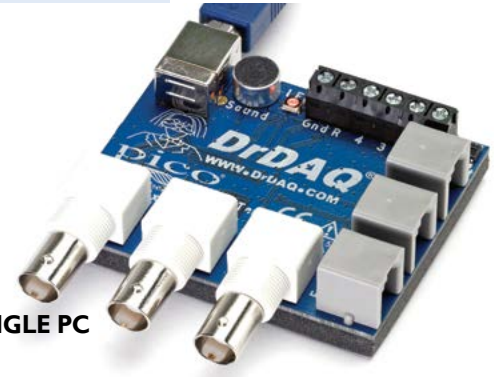
AIR PT100 PROBES

PT100 AIR PROBE FAST/SE017

PT100 AIR PROBE HIGH/SE018

SPECIFICATION	SE017	SE018
Temperature range	-75 to +250 °C	-60 to +500 °C
Accuracy	±0.15 °C @ 0 °C	±0.3 °C @ 0 °C
Dimensions	Length 120 mm Diameter 3.3 mm	Length 150 mm Diameter 4 mm
Cable	1 m	
Material	Stainless steel probe, PVC cable	
Handle	Yes	
Price	$75 €63 £52	$81 €69 £56

DrDAQ



- **16 INPUTS, OUTPUTS AND SENSORS**
- **USB-CONNECTED AND POWERED**
- **USE UP TO 20 USB DrDAQS ON A SINGLE PC**

Whether you're a teacher, student, hobbyist or professional, the USB DrDAQ Data Logger gives you an inexpensive entry into the world of PC-based data logging.

MORE THAN JUST A DATA LOGGER

Thanks to the power of PicoScope, you can also use your DrDAQ as an oscilloscope and spectrum analyzer. Just run the supplied PicoScope software and your DrDAQ becomes a single-channel scope with 100 kHz bandwidth, 8-bit resolution and the ability to measure voltages up to 10 V.

SENSORS, LED AND DIGITAL I/O

With its built-in sensors for light, sound and temperature, you can start using your USB DrDAQ data logger straight out of the box. The USB DrDAQ also has an RGB LED that you can program to show any of 16.7 million colors.

Your USB DrDAQ also includes 4 digital input/outputs. In input mode these give you even more monitoring options. When used as outputs they enable you to use your DrDAQ to control external devices.

SPECIFICATION	DrDAQ		
Oscilloscope input	100 kHz, 8 bit resolution, ±1.25 V to ±10 V input ranges, BNC input		
Sound waveform	±100 units, 0.2 unit resolution		
Sound level	55 to 100 dB, 1 dB resolution, 5 dB accuracy		
Temperature	-10 to +70 °C, 0.1° resolution, 2 °C accuracy		
Light sensor	0 to 100 units, 0.1 unit resolution		
RGB LED	16.7 million colors		
pH	0 to 14 pH, 0.02 pH resolution, accuracy sensor-dependent, BNC input		
Redox/ORP (Oxidation/reduction)	±2 V @10^{12} Ω, 1.2 mV resolution, accuracy sensor-dependent, BNC input shared with pH		
Resistance	0 to 1 MΩ, 250 Ω resolution @ 10 kΩ, screw terminal		
External sensors	0 to 2.5 V, 0.1 mV resolution, 1% accuracy, 3x FCC68 4/4		
Digital I/O	4 channels (screw terminals); 2 with 1 MHz pulse-counting input and PWM output; 0 to 5 V input, 3.3 V / 2.2 kΩ output		
Arbitrary waveform generator	DC to 20 kHz, 4 K samples, 10 bit resolution, BNC output		
Dimensions	77 x 70 x 23 mm (including BNC connectors)		
Part number	PP706 DrDAQ	PP707 kit	PP716 pH kit
Price	$129 €109 £95	$329 €279 £225	$199 €169 £139

For a full list of optional external sensors please visit www.drdaq.com

DD100
TEMPERATURE SENSOR

DD011
PH ELECTRODE

DD163
HUMIDITY SENSOR

PP066
REED SWITCH

DD103
OXYGEN SENSOR

PP216
MAGNETIC INDUCTION KIT

AUTOMOTIVE OSCILLOSCOPES

Did you know that Pico Technology is also the leading supplier of Automotive oscilloscopes worldwide? Our automotive equipment is used in both franchised dealerships and independent workshops. PicoScope can be used across a wide variety of sectors to diagnose and test:

- Electric and electronic systems
  - Ignition (primary & secondary)
  - Injectors & fuel pumps
  - Sensors (ABS, cam, crank etc.)
  - Starter & charging currents
  - Glow plugs/timer relays
  - FlexRay, CAN & LIN bus, and SENT digital data (with inbuilt decoding)
  - Relative compression
  - Batteries
- Mechanical problems
- Fluid pressures (low pressure and hydraulic) – with our WPS500X pressure transducer
- Noise, vibration and harshness – with our NVH diagnostics kit

Our equipment is used by thousands of technicians to minimize warranty issues by providing objective, repeatable and straightforward results with customer reports.

GLOBAL SUPPORT

The PicoScope 4225 and 4425 Automotive oscilloscopes are the most advanced automotive PicoScopes to date. With PicoScope, you also have access to many additional resources:

- Our PicoDiagnostics software, with a set of simple vehicle health checks that can be performed in minutes
- Our PicoScope software's Guided Tests, with technical information and automated setup for common component testing
- PicoScope's Waveform Library, with thousands of example waveforms you can use for reference and comparison

PicoScope allows a global network to quickly benefit from experience gained anywhere in the world. Our PC-based software is free to download and can display the information in over 20 languages. Your experts will have access to thousands of vehicle specific reference waveforms, provided by PicoScope users around the world.

This means that you can fix it the first time and reduce warranty claims.

For more information please visit www.picoauto.com.

CUSTOMER COMMENTS

Uses a 3204A for: Microcontroller development.
Perfect handling, reliability, small and lightweight, good software
10 out of 10

Uses a TC-08 Thermocouple Data Logger for: Temperature and vacuum data logging for aerospace composites curing, as required by the FAA.
Dollar for dollar, the best data logging system "out there". Affordable, easy to set-up & easy to use!!
10 out of 10

Uses a 2000 Series for: Troubleshooting RS-485 networks.
I like the size of the scope. I can carry the scope in my laptop bag.
10 out of 10

Uses a 2205 MSO for: General lab use.
This piece of kit paid for itself on the first day of use by helping to solve a diabolical I2C bus problem that we had on a new board. Very pleased - can't think what you could do better.
10 out of 10

Uses a 3204 for: General lab and off-site work.
Nice unit. Does what I need it to do. Simple, quick set up and with the software updates adding new functionality a really useful piece of kit.
10 out of 10

Uses a 3205B for: Hobby electronic. Programming microprocessor interfacing. Audio amplifier construction, including tube technics. Ham radio experimenting.
The device fulfills all my existing requirements. There are more features than I can ever use.
10 out of 10

Uses a 5203 for: General laboratory signal measurement.
What I like best about Pico products is the constant improvement to the software.
Pico Technology Rocks!
10 out of 10

Uses a 4424 for: Process control troubleshooting, serial comm. troubleshooting, three phase power quality checks, hobby.
Continuing development of the software, along with dedicated support; makes for a scope that delivers ever increasing capability = maximum performance for the investment.
10 out of 10

Uses a 3204 for: Electrical systems integration / development / fault-finding.
Like best: the portability / size of the products. I carry a laptop to site; with a PicoScope in my bag,
I have a 'scope (with a 15" display and full functionality) ready to use.
9 out of 10

Uses a 4262 for: a Senior Design project on electronic noise suppression for shot-noise limited dual-beam measurements.
The PicoScope software is incredibly easy to use. I found the controls and menus to be intuitive, simple, and elegant.
10 out of 10

Uses a 2205 MSO for: Debug low level software i2c, spi, serial in ultra low power application environments (Bluetooth 4.0)
I like the performance/price ratio!
10 out of 10

ORDERING

Pico Technology supports a network of distributors in over 60 countries worldwide who are helping to build and maintain our enviable reputation in the industry. Details of your local distributor who will be happy to help you can be found at www.picotech.com/distributors.

You can also place orders direct with Pico Technology at any time via our secure website, or by phone or fax (lines open 9 am to 5 pm Monday to Friday, UK time).

PAYMENT

We accept payment in US Dollars, Euros and Sterling. Payment is also accepted by credit card (Visa or MasterCard) or debit card (Visa or Maestro).

Please note that all sales are subject to our standard terms and conditions. Prices are correct at the time of printing, but are subject to change without notice. Please check all prices on our website before ordering.

Errors and omissions excepted.
Sales taxes not included.

www.picotech.com

UK global headquarters:

Pico Technology
James House
Colmworth Business Park
ST. NEOTS
PE19 8YP
United Kingdom

☎ +44 (0) 1480 396395
🖷 +44 (0) 1480 396296
✉ sales@picotech.com

North America regional office:

Pico Technology
320 N Glenwood Blvd
Tyler
Texas 75702
United States

☎ +1 800 591 2796
🖷 +1 620 272 0981
✉ sales@picotech.com

Asia-Pacific regional office:

Pico Technology
Room 2252, 22/F, Centro
568 Hengfeng Road
Zhabei District
Shanghai 200070
PR China

☎ +86 21 2226-5152
✉ pico.china@picotech.com