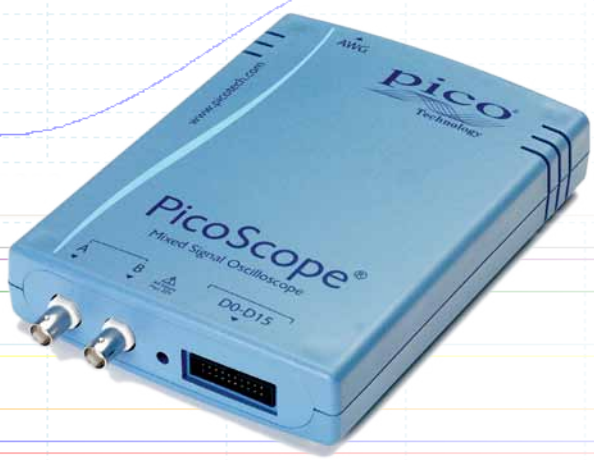
pico Technology

PicoScope® 2205 MSO

USB-POWERED MIXED SIGNAL OSCILLOSCOPE

Think logically...

2 ANALOG CHANNELS • 16 DIGITAL CHANNELS • AWG



- **25 MHz analog bandwidth**
- **100 MHz max. digital input frequency**
- **200 MS/s mixed signal sampling**
- **Advanced digital triggers**
- **SDK and example programs**

2+16 CHANNEL MSO

5 YEAR WARRANTY

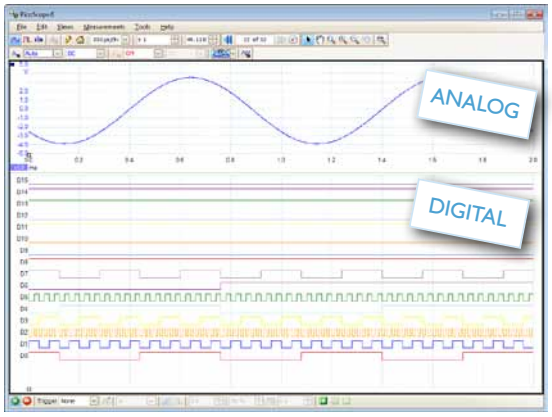
PICO TECHNOLOGY 1991 - 2011 20 YEARS LEADING THE WAY IN TEST AND MEASUREMENT

Supplied with a full SDK including example programs • Software compatible with Windows XP, Windows Vista and Windows 7 • Free Technical Support

...from a name you can trust

Introduction

The PicoScope 2205 MSO from Pico Technology is a 2+16 channel, 8-bit resolution oscilloscope. This means that along with 2 analog channels, the PicoScope 2205 MSO also has 16 digital inputs. The result? With the PicoScope 2205 MSO you can view your digital and analog signals simultaneously.

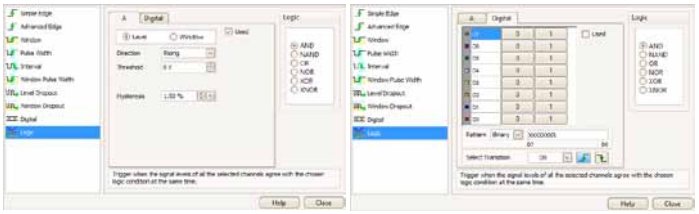


Full-featured oscilloscope

The PicoScope 2205 MSO, while featuring the 2+16 channel format, still remains a full-featured oscilloscope. A function generator and arbitrary waveform generator are built-in and include a sweep function. It also offers mask limit testing, math and reference channels, advanced digital triggering, serial decoding, automatic measurements and color persistence display.

Triggering

The PicoScope 2205 MSO offers a comprehensive set of advanced digital triggers including: pulse width, windowed and dropout triggers to help you capture the data you need. Digital triggering reduces timing errors and allows our oscilloscopes to trigger on the smallest signals, even at the full bandwidth. Trigger levels and hysteresis can be set with high resolution.



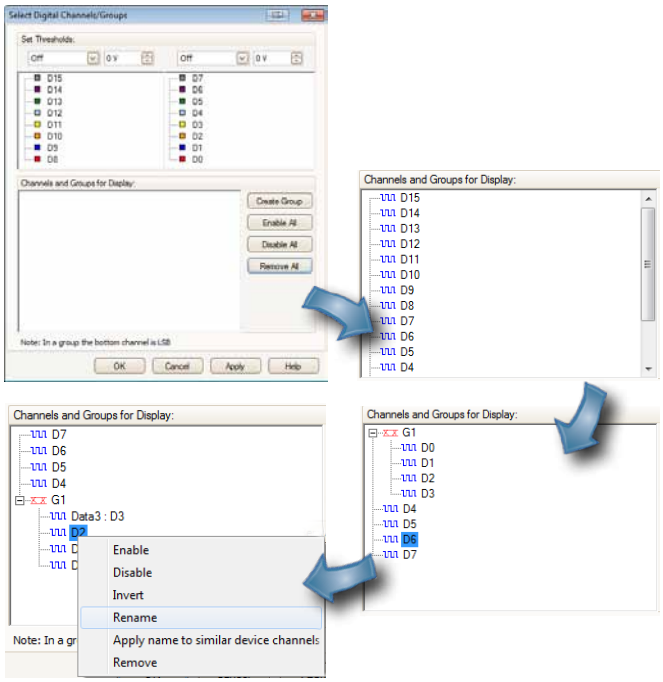
Digital triggering reduces re-arm delay and combined with the segmented memory allows the triggering and capture of events that happen in rapid sequence. Our Mask limit testing function can then scan through these waveforms to highlight failed waveforms for viewing in the waveform buffer.

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

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

Selecting digital channels, or groups

Selecting the digital channels in the software couldn't be easier. Just open the user interface (), and then drag-and-drop to add the channels you want to see. These channels can be arranged into any order, grouped, renamed, and even temporarily disabled if required.



Arbitrary waveform and function generator

The unit has a built-in signal generator (sine, square, triangle, DC level). As well as basic controls to set level, offset and frequency, more advanced controls allow you to sweep over a range of frequencies.

Also included is a fully programmable arbitrary waveform generator with a 8 k-sample buffer.

Our commitment

To protect your investment, both the API and the firmware inside the unit can be updated. We have a long history of providing new features for free via our software downloads. Other companies make vague promises about future enhancements but we deliver on our promise of free updates, year after year.

Users of our products reward us by becoming lifelong customers, frequently recommending us to their colleagues.

PicoScope 2205 MSO Specifications

VERTICAL (Analog)	Number of Channels	2
	Input connectors	BNC
	Bandwidth (-3 dB)	25 MHz
	Rise time	14 ns
	Resolution	8 bits
	Input impedance	1 MΩ ±1 % || 14 pF ±2 pF
	Input coupling	AC/DC
	Input sensitivity	10 mV/div to 4 V/div (10 vertical divisions)
	Input ranges	±50 mV, ±100 mV, ±200 mV, ±500 mV, ±1 V, ±2 V, ±5 V, ±10 V, ±20 V
	DC accuracy	±3 % of full scale
	Noise count	≤ 3 counts
	Overvoltage protection	±100 V (DC + AC peak)
VERTICAL (Digital)	Number of channels	16
	Input connectors	2.54 mm, 10 x 2 way connector
	Maximum input frequency	100 MHz
	Input impedance (with TA136 cable)	200 kΩ ±2 % || 8 pF ±2 pF
	Digital threshold range	±5 V
	Input dynamic range	±20 V
	Overvoltage protection	±50 V
	Threshold grouping	Two independent threshold controls - Port 0: D7-D0 and Port 1: D15-D8
	Threshold selection	TTL, CMOS, ECL, PECL, User Defined
	Threshold accuracy	±100 mV
	Minimum input voltage swing	500 mV
	Channel-to-channel skew	< 5 ns
	Minimum input slew rate	10 V/µs
HORIZONTAL	Max Sampling rate Ch A / Ch A + 1 digital port: 1 or 2 digital ports: All other combinations:	 200 MS/s, 200 MS/s, 100 MS/s
	Maximum equivalent sampling rate (repetitive signals)	4 GS/s
	Maximum sampling rate (continuous USB streaming)	1 MS/s on all scope channels and digital ports in PicoScope 6 (equals 4 MS/s) > 20 MS/s using supplied SDK (PC dependent)
	Buffer memory	48 kS shared between active channels and ports
	Buffer memory (continuous streaming)	20 MS in PicoScope software. Up to available PC memory when using supplied SDK
	Waveform buffer: PicoScope software PicoScope software (rapid trigger mode) SDK SDK (user's software)	 10,000 software segments 32 hardware segments 32 hardware segments Unlimited
	Timebase ranges	50 ns/div to 1000 s/div (*ETS mode: 2 ns/div to 1000 s/div)
	Timebase accuracy	±100 ppm
	Sample jitter	< 300 ps RMS
DYNAMIC PERFORMANCE (typical)	Crosstalk	> 200:1 up to full bandwidth for equal voltage ranges
	Harmonic distortion	< -55 dB @ 100 kHz full scale input
	SFDR	> 55 dB @ 100 kHz full scale input
	Noise	≤ 3 counts (all ranges)
	Linearity	≤ 1 LSB
	Pulse response	< 7% overshoot
	Bandwidth flatness	-3 dB, +0.3 dB from DC to full bandwidth

* (ETS is for analog channels only)

Specifications continued...

TRIGGER (Main features)	Trigger modes	None, Auto, Repeat, Single, Rapid (segmented memory)
	Max. pre-trigger capture	100% of capture size
	Max. post-trigger delay	4 billion samples
	Trigger re-arm time	< 2 µs on fastest time base
	Max. trigger rate	32 waveforms in a 100 µs burst
TRIGGER (Analog)	Source	Ch A, Ch B
	Trigger types	Rising, falling
	Advanced triggers	Edge, Window, Pulse width, Window pulse width, Dropout, Window dropout, Interval, Runt pulse, Logic
	Trigger sensitivity	Digital triggering provides 1 LSB accuracy up to full bandwidth of scope. ETS mode: Typical 10 mV p-p, at full bandwidth
TRIGGER (Digital)	Source	D15 to D0
	Trigger types	Combined Level and Edge
	Advanced triggers	Data pattern (can be grouped by user)
TRIGGER (Logic)	Source	Ch A, Ch B, and D15 to D0
	Trigger types	Logic trigger across analog and digital inputs (using “AND”, “NAND”, “OR”, “NOR”, “XOR”, “XNOR”)
FUNCTION GENERATOR/ ARBITRARY WAVEFORM GENERATOR	Connector	Rear panel, BNC
	Standard Waveform	Sine, square, triangle, DC voltage, ramp, sinc, gaussian, half-sine, white noise
	Standard signal frequency	DC to 100 kHz
	Sweep modes	Up, down, dual with selectable start / stop frequencies and increments
	Output frequency resolution	< 0.01 Hz
	Output voltage range	±2 V
	Output voltage adjustment	Signal amplitude and offset adjustable in 1 mV steps within overall ±2 V range
	Amplitude flatness	< 1 dB to 100 kHz
	DC accuracy	±1 % of full scale
	SFDR	> 55 dB @ 1 kHz, full scale sine wave
	Output resistance	600 Ω
	Overvoltage protection	±10 V
	AWG update rate	2 MS/s
	AWG buffer size	8 k samples
	AWG resolution	12 bits
	AWG bandwidth	100 kHz
	AWG rise time (10-90 %)	< 2 µs
	Buffer index mode	Repeat
	Phase accumulator	32 bits
	Pk-pk output range	±250 mV to ±2 V
	Arbitrary Waveform	Downloadable user defined waveforms. 1 sample to 8 k samples (user selectable)
SPECTRUM ANALYZER	Frequency range	DC to 25 MHz
	Display modes	Magnitude, average, peak hold
	Windowing functions	Rectangular, Gaussian, triangular, Blackman, Blackman-Harris, Hamming, Hann, flat-top
	Number of FFT points	Selectable from 128 to half available buffer memory in powers of 2
MATH CHANNELS	Functions	+, −, *, /, sqrt, ^, exp, ln, log, abs, norm, sign, sin, cos, tan, asin, acos, atan, sinh, cosh, tanh, derivative, integral, freq, min, max, average, peak
	Operands	A, B (input channels), T (time), reference waveforms, constants, Pi
AUTOMATIC MEASUREMENTS	Oscilloscope	AC RMS, true RMS, DC average, cycle time, frequency, duty cycle, falling rate, fall time, rising rate, rise time, high pulse width, low pulse width, maximum, minimum, peak to peak
	Spectrum	Frequency at peak, amplitude at peak, average amplitude at peak, total power, THD %, THD dB, THD plus noise, SFDR, SINAD, SNR, IMD
	Statistics	Minimum, maximum, average and standard deviation
SERIAL DECODING	Protocols	CAN Bus, I²C, SPI, UART
MASK LIMIT TESTING	Statistics	Pass/fail, failure count, total count
DISPLAY	Interpolation	Linear
	Persistence modes	Digital color, analog intensity, custom, or none

Specifications continued...

GENERAL	PC connectivity		USB 2.0 hi-speed
	Dimensions		200 x 140 x 40 mm (including connectors)
	Weight		< 0.5 kg
	Power requirements		Powered from USB port
	Operating:	Temperature range Humidity range	0 °C to 50 °C (20 °C to 30 °C for stated accuracy) 5% to 80% RH, non-condensing
	Storage:	Temperature range Humidity range	−20 °C to +60 °C 5% to 95% RH, non-condensing
	Safety approvals		Designed to EN 61010-1:2010
	EMC approvals		CE: Tested to EN61326-1:2006. FCC: Tested to part 15 subpart B
	Environmental approvals		RoHS and WEEE compliant
	Software/PC requirements		PicoScope 6, SDK and example programs. Microsoft Windows XP, Vista or Windows 7 (32-bit or 64-bit).
	Languages (software and manuals)		English, French, German, Italian, Spanish
	Languages (software only)		Chinese (Simplified), Chinese (Traditional), Czech, Danish, Dutch, Finnish, Greek, Hungarian, Japanese, Norwegian, Polish, Portuguese, Romanian, Russian, Swedish, Turkish

Product packs and accessories

Product Packs

The following Product Packs are available for the PicoScope 2205 MSO:

PP798

- PicoScope 2205 MSO
- TA136 digital cable
- 2 x TA139 pack of 10 test clips
- 2 x MI007 probes
- PicoScope probe pouch
- Software and Reference CD
- Quick Start Guide
- USB cable

PP823

- PicoScope 2205 MSO
- Software and Reference CD
- Quick Start Guide
- USB cable

Accessories

The following accessories for the PicoScope 2205 MSO are also available separately:

PP787

- 2 x MI007 Probes
- PicoScope probe pouch

TA136

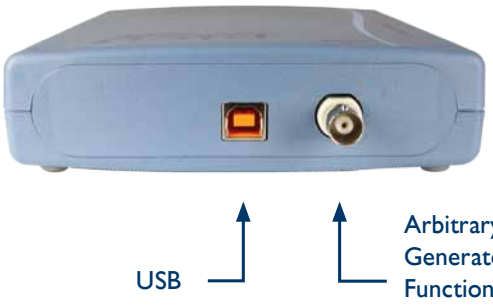
- 20-way 25 cm digital cable

TA139

- Pack of 10 test clips

PicoScope 2205 MSO Connections

The front panel of the PicoScope 2205 MSO has two BNC analog input channels and a 20-way connection for up to 16 digital signals.



The rear panel of the PicoScope 2205 MSO has two connections: a USB port for connection to the PC, and a BNC for the AWG/Function Generator connection.

Have you seen our PicoScope 2000 Series data sheet?

It shows the full range of features available with the PicoScope software, making your PicoScope 2000 Series oscilloscope even more powerful. This includes how to use your 2000 Series oscilloscope as a spectrum analyzer. All of these capabilities are included in the price of your oscilloscope.

Ordering Information

ORDER CODE	PART DESCRIPTION	GBP	USD*	EUR*
PP823	PicoScope 2205 MSO	349	576	422
PP798	PicoScope 2205 MSO Kit	399	658	483
TA136	25 cm Digital Cable	10	17	12
TA139	Pack of 10 clips	18	30	22
PP787	2 x 60 MHz MI007 probes, with probe pouch.	30	50	36

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

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