



PicoScope 3000A and B Series PC Oscilloscopes

User's Guide



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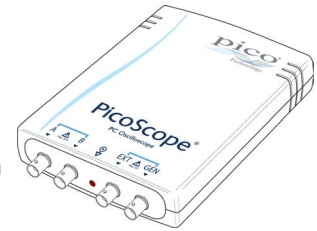
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1 Welcome

Thank you for buying a PicoScope 3000 Series oscilloscope from Pico Technology!

The new PicoScope 3000 Series of PC Oscilloscopes from Pico Technology is a range of high-specification, real-time measuring instruments that connect to the USB port of your computer. The oscilloscopes obtain their power supply through the USB cable, so they do not need an additional power supply and are therefore highly portable.



The new PicoScope 3000 Series* consists of six oscilloscopes, falling into two categories:

- 3204A, 3205A, 3206A A high speed portable oscilloscope, with a function generator.
- 3204B, 3205B, 3206B As the A series, featuring an arbitrary waveform generator and deeper memory.

Here are some of the benefits provided by your new PicoScope 3000 Series oscilloscopes:

- Portability: Take the unit with you and plug it in to any Windows PC.
- Performance: 500 MS/s sampling, with up to 200 MHz bandwidth and a 128 MS buffer.
- Programmability: The PicoScope 3000 Series SDK lets you write your own programs, in your chosen programming language, to control all the features of the scope.
- Long-term support: Software upgrades are available to download from our [website](#). You can also call our technical specialists for support. You can continue to use both of these services free of charge for the lifetime of the product.
- Value for money: You don't have to pay twice for all the features that you already have in your PC, as the PicoScope 3000 Series oscilloscope contains the special hardware you need and nothing more.
- Convenience: The software makes full use of the full-sized display, disk storage, user interface and networking built in to your PC.
- Five-year warranty: Your oscilloscope is covered for five years from the day of purchase against manufacturing faults. We don't charge a penny extra for this benefit.

*For further information on the new PicoScope 3000 Series, see the [comparison table for Models 3204A to 3206B](#)⁽⁷⁾. For information on other 3000 Series oscilloscopes, refer to the documentation on our [website](#).

2 Introduction

2.1 Safety symbols

Symbol 1: Warning Triangle



This symbol indicates that a safety hazard exists on the indicated connections if correct precautions are not taken. Read all safety documentation associated with the product before using it.

Symbol 2: Equipotential



This symbol indicates that the outer shells of the indicated BNC connectors are all at the same potential (shorted together). You must therefore take necessary precautions to avoid applying a potential across the return connections of the indicated BNC terminals as this may cause a large current to flow, resulting in damage to the product and/or connected equipment.

2.2 Safety warning

We strongly recommend that you read the general safety information below before using your oscilloscope for the first time. Safety protection built in to equipment may cease to function if the equipment is used incorrectly. This could cause damage to your computer, or lead to injury to yourself and others.

Maximum input range

The new PicoScope 3000 Series PC Oscilloscopes are designed to measure voltages in the range -20 V to +20 V. Inputs are protected to ± 100 V. Contact with voltages outside the protection range may cause permanent damage to the unit.

Mains (line) voltages

Pico Technology products are not designed for use with mains (line) voltages. To measure mains (or line) voltage, use a differential isolating probe specifically designed for that purpose.

Safety grounding

PicoScope 3000 Series PC Oscilloscopes connect direct to the ground of a computer through the interconnecting cable provided to minimize interference.

As with most oscilloscopes, avoid connecting the ground input to any potential other than ground. If in doubt, use a meter to check that there is no significant AC or DC voltage between the ground input of the oscilloscope and the point to which you intend to connect it. Failure to check may cause damage to your computer, or lead to injury to yourself and others.

You should not rely on the product to provide a protective safety earth.

Repairs

The oscilloscope contains no user-serviceable parts. Repair or calibration of the oscilloscope requires specialized test equipment and must be performed by Pico Technology.

2.3 FCC notice

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his or her own expense.

For safety and maintenance information see the [safety warning](#) .

2.4 CE notice

The PicoScope 3000 Series PC Oscilloscopes meet the intent of the EMC directive 89/336/EEC and have been tested to EN61326-1:2006 Class A Emissions and Immunity standard.

The product also meets the intent of the Low Voltage Directive and has been designed to meet the BS EN 61010-1:2001 Safety requirements for electrical equipment for measurement, control, and laboratory use standard.

2.5 Licence conditions

The software supplied with this product is licensed, not sold. Pico Technology Limited grants a licence to the person who installs this software, subject to the conditions listed below.

Access

The licensee agrees to allow access to this software only to persons who have been informed of these conditions and agree to abide by them.

Usage

The software in this release is for use only with Pico products or with data collected using Pico products.

Copyright

Pico Technology Limited claims the copyright of, and retains the rights to, all material (software, documents etc.) contained in this release. You may copy and distribute the entire release in its original state, but must not copy individual items within the release other than for backup purposes.

Liability

Pico Technology and its agents shall not be liable for any loss, damage or injury, howsoever caused, related to the use of Pico Technology equipment or software, unless excluded by statute.

Fitness for purpose

Because no two applications are the same, Pico Technology cannot guarantee that its equipment or software is suitable for a given application. It is your responsibility, therefore, to ensure that the product is suitable for your application.

Mission-critical applications

This software is intended for use on a computer that may be running other software products. For this reason, one of the conditions of the licence is that it excludes usage in mission-critical applications; for example, life-support systems.

Viruses. This software was continuously monitored for viruses during production, but you are responsible for virus-checking the software once it is installed.

Support. If you are dissatisfied with the performance of this software, please contact our technical support staff, who will try to fix the problem within a reasonable time. If you are still dissatisfied, please return the product and software to your supplier within 14 days of purchase for a full refund.

Upgrades. We provide upgrades, free of charge, from our web site at www.picotech.com. We reserve the right to charge for updates or replacements sent out on physical media.

2.6 Trademarks

Windows is a registered trademark of Microsoft Corporation in the USA and other countries.

Pico Technology Limited, and *PicoScope* are trademarks of Pico Technology Limited registered in the United Kingdom and other countries.

2.7 Warranty

Pico Technology warrants upon delivery, and for a period of 5 years unless otherwise stated from the date of delivery, that the Goods will be free from defects in material and workmanship.

Pico Technology shall not be liable for a breach of the warranty if the defect has been caused by fair wear and tear, willful damage, negligence, abnormal working conditions or failure to follow Pico Technology's spoken or written advice on the storage, installation, commissioning, use or maintenance of the Goods or (if no advice has been given) good trade practice; or if the Customer alters or repairs such Goods without the written consent of Pico Technology.

2.8 Company details

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Sales: sales@picotech.com

Web site: www.picotech.com

2.9 Minimum system requirements

To ensure that your PicoScope 3000 Series PC Oscilloscope operates correctly, you must have a computer with at least the minimum system requirements to run one of the supported operating systems, as shown in the following table. The performance of the oscilloscope will be better with a more powerful PC, and will benefit from a multi-core processor.

Item	Absolute minimum	Recommended minimum	Recommended full specification
Operating system	Windows XP SP2 Windows Vista Windows 7		
	32 bit and 64 bit versions supported		
Processor	As required by Windows	300 MHz	1 GHz
Memory		256 MB	512 MB
Free disk space*		1.5 GB	2 GB
Ports	USB 1.1 compliant port	USB 2.0 compliant port	

* The PicoScope software does not use all the disk space specified in the table. The free space is required to make Windows run efficiently.

3 Product information

With the PicoScope software you can use PicoScope 3000 Series as oscilloscopes and spectrum analyzers. Alternatively, using the API functions, you can develop your own programs to collect and analyze data from the oscilloscope. Refer to the Programmer's Guide (ps3000abpg.en) for more information.

A PicoScope 3000 A and B Series PC Oscilloscope is supplied with the following items:

- USB cable, for use with any standard USB 1.1 or 2.0 port
- Software and Reference CD
- Installation Guide
- 2 x Probes (see below for probe details)

3.1 Comparison table for Models 3204A to 3206B

For full specifications, refer to the 3000 Series data sheet on your Software and Reference CD or to the 3000 Series page on www.picotech.com.

Model	Bandwidth	Sampling	Memory	Waveform Output	Probes Supplied
3204A	60 MHz	500 MS/s	4 MS	Function generator	2 x 60 MHz
3204B	60 MHz	500 MS/s	8 MS	Function generator and AWG	2 x 60 MHz
3205A	100 MHz	500 MS/s	16 MS	Function generator	2 x 150 MHz
3205B	100 MHz	500 MS/s	32 MS	Function generator and AWG	2 x 150 MHz
3206A	200 MHz	500 MS/s	64 MS	Function generator	2 x 250 MHz
3206B	200 MHz	500 MS/s	128 MS	Function generator and AWG	2 x 250 MHz

3.2 Installation Instructions

Important:
Do not connect your PicoScope 3000 Series PC Oscilloscope to the PC until you have installed the software.

Procedure

- Follow the instructions in the Installation Guide included with your product package.
- Connect your PC Oscilloscope to the PC using the USB cable supplied.
- There is no need for an additional power supply, as the unit obtains its power from the USB port.

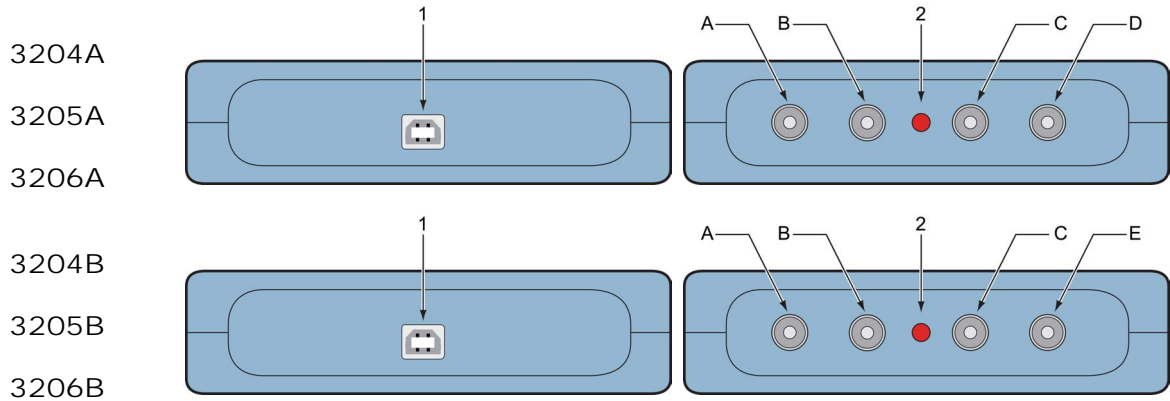
Checking the installation

Once you have installed the software and connected the PC Oscilloscope to the PC, start the PicoScope software. The software should now display any signal connected to the scope inputs. If you have a probe connected to your oscilloscope, you should see a small 50 or 60 hertz signal in the oscilloscope window when you touch the probe tip with your finger.

Standard oscilloscope connectors

The new PicoScope 3000 Series PC Oscilloscopes have standard oscilloscope connectors. The input impedance is also standard, so the x10 function on scope probes works correctly.

Connector diagrams



1 USB port

2 LED: flashes when the oscilloscope is sampling data

A: Input channel A

B: Input channel B

C: External trigger input

D: A series = function generator output

E: B series = function generator and AWG output

Moving your PicoScope PC Oscilloscope to another USB port

Windows XP

When you first installed the PicoScope 3000 Series PC Oscilloscope by plugging it into a USB port, Windows associated the Pico driver with that port. If you later move the oscilloscope to a different USB port, Windows will display the "New Hardware Found Wizard" again. When this occurs, just click "Next" in the wizard to repeat the installation. If Windows gives a warning about Windows Logo Testing, click "Continue Anyway". As all the software you need is already installed on your computer, there is no need to insert the Pico Software CD again.

Windows Vista and Windows 7

The process is automatic. When you move the device from one port to another, Windows displays an "Installing device driver software" message and then a "PicoScope 3000 Series PC Oscilloscope" message. The PC Oscilloscope is then ready for use.

4 Glossary

API. Application Programming Interface. A set of function calls that give programmers access to the PicoScope 3000 Series driver.

Bandwidth. The input frequency at which the measured signal amplitude is 3 decibels below its true value.

Buffer size. The size of the oscilloscope buffer memory, measured in samples. In block mode, the buffer memory is used by the oscilloscope to store data temporarily. This allows the oscilloscope to sample data independently of the speed at which it can transfer data to the computer.

Device Manager. Device Manager is a Windows program that displays the current hardware configuration of your computer. Right-click on 'My Computer,' choose 'Properties', then click the 'Hardware' tab and the 'Device Manager' button.

Driver. A program that controls a piece of hardware. The driver for the new PicoScope 3000 Series PC Oscilloscopes is supplied in the form of a 32-bit Windows DLL, ps3000a.dll. This is used by the PicoScope software, and by user-designed applications, to control the oscilloscopes.

External trigger. This is the BNC socket marked EXT on the new PicoScope 3000 Series PC oscilloscopes. It can be used to start a data collection run but cannot be used to record data.

Maximum sampling rate. A figure indicating the maximum number of samples the oscilloscope can acquire per second. Maximum sample rates are usually given in MS/s (megasamples per second) or GS/s (gigasamples per second.) The higher the sampling rate of the oscilloscope, the more accurate the representation of the high-frequency details in a fast signal.

PC Oscilloscope. The instrument formed by connecting a PicoScope 3000 Series PC Oscilloscope to a computer running the PicoScope software application.

PicoScope 3000 Series. An oscilloscope range comprising the PicoScope 3204A/B, 3205A/B, and 3206A/B, PC Oscilloscopes.

PicoScope software. This is a software product that accompanies all our oscilloscopes. It turns your PC into an oscilloscope, spectrum analyzer, and meter display.

Signal generator. A built-in circuit that generates signals suitable for driving an external device under test. The signal generator output is the BNC socket marked GEN on the oscilloscope. If you connect a BNC cable between this and one of the channel inputs, you can send a signal into one of the channels. Consult the full specifications detailed in the 3000 Series data sheet on your Software and Reference CD, or to the 3000 Series page on www.picotech.com for further details.

5 Appendix A: Declaration of Conformity



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EC Declaration of Conformity

Pico Technology declares that the following products comply with the requirements of the specified Directives and Standards as listed below. Technical documentation required to demonstrate compliance to the standards is available for inspection by the relevant enforcement authorities. Products carry the CE mark.

Products covered by this Declaration:

PicoScope 3204 A & B **2 channel USB oscilloscopes.**
PicoScope 3205 A & B **2 channel USB oscilloscopes.**
PicoScope 3206 A & B **2 channel USB oscilloscopes.**

EU Directives covered by this Declaration:

2004/108/EC Electromagnetic Compatibility Directive.
 2006/95/EC Low Voltage Equipment Directive.

The Basis on which Conformity is being Declared:

EN61010-1:2001	Safety requirements for electrical equipment for measurement, control and laboratory use, general equipment requirements.
EN61326-1:2006	EMC Immunity and Emissions for measurement, control and laboratory equipment - general requirements. Test limits and frequencies are specified in CISPR11 and EN61000-4.
CISPR11:2006	Industrial, scientific and medical equipment – radio frequency disturbance characteristics – limits and methods of measurement. Radiated and Conducted emissions. Class A emissions.
CFR 47:2009	Code of Federal Regulations FCC: part 15 Subpart B – Frequency devices – unintentional Radiators. Radiated emissions standard. Class A emissions.
EN61000-4 EN61000-4-2:1995 +A1:1998 +A2:2001	Radiated and Conducted Immunity, including Electrostatic Discharge.
EN61000-4-3:2006	Radiated RF.
EN61000-4-4:2004	Electrical fast transients and bursts.
EN61000-4-6:2007	Conducted RF

Alan Tong
 Managing Director
 Dec 2010

Signed

Pico Technology Limited is an internationally registered trade mark
 Registered in England and Wales No. 2626181

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