pico®
Technology
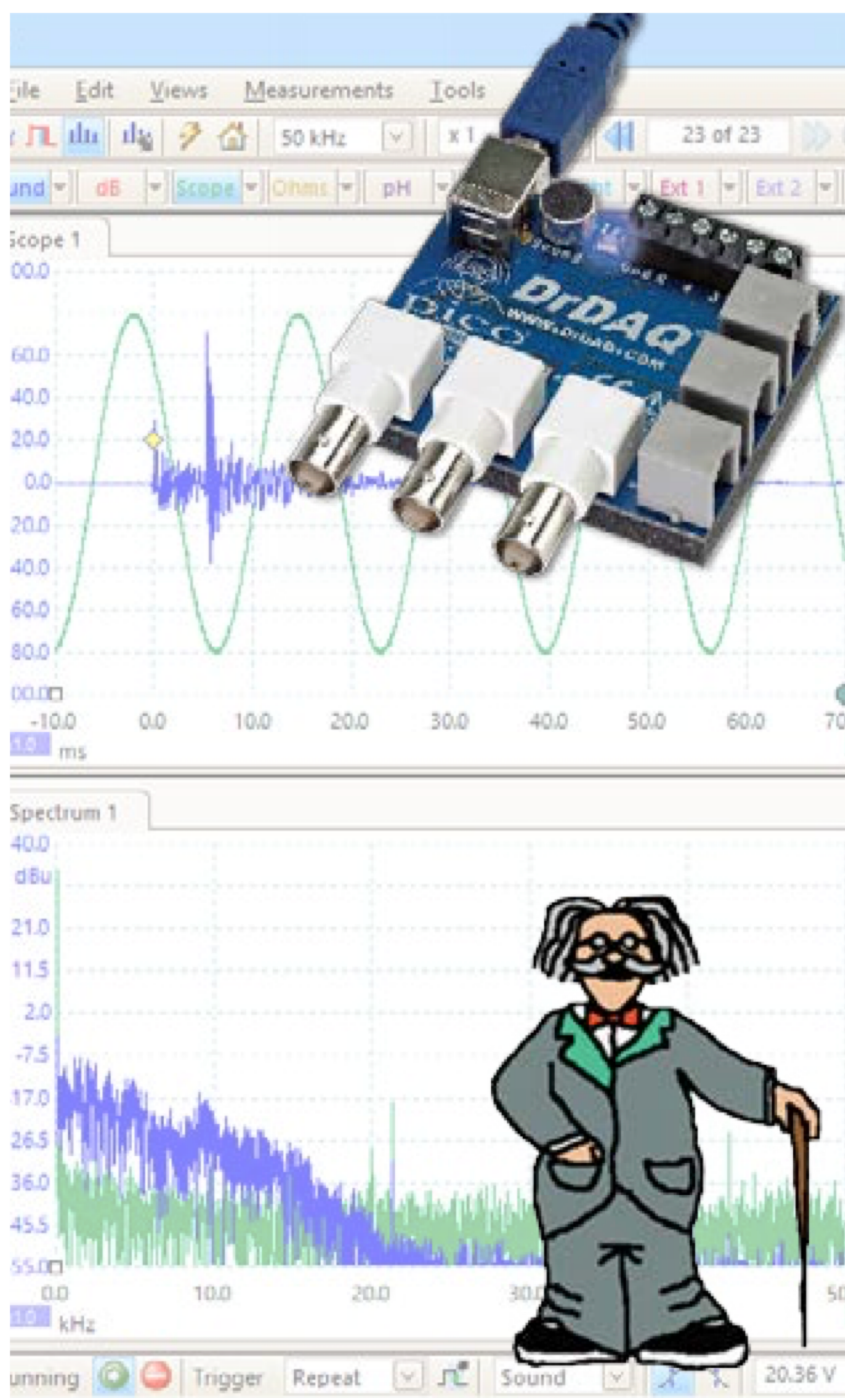
USB DrDAQ®
VERSATILE DATA ACQUISITION

Data logger
Oscilloscope
Spectrum analyzer
Signal generator

Write your own software
Use the built-in sensors for light, sound,
and temperature
Measure pH using standard electrodes
Add external sensors and digital devices
Control up to 20 DrDAQs from one PC

USB connected and powered
Free SDK includes example programs
Free technical support
Free software updates

WWW.PICOTECH.COM

SENSORS

You can start using your USB DrDAQ Data Logger straight out of the box; it features built-in sensors for light, sound and temperature, and an RGB LED that you can program to show any one of 16.7 million colours.

External sensor sockets also allow you extend the functionality of your DrDAQ. With external sensors your DrDAQ can measure humidity, oxygen levels, external temperatures and much more. Pico Technology provide you with everything you need to know to connect, use, and even design your own sensors.

MORE THAN JUST A DATA LOGGER

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

DIGITAL INPUT/OUTPUTS

The USB DrDAQ includes 4 digital input/outputs. As inputs these give you even more monitoring options, and when used as outputs they enable you to use your DrDAQ to control external devices. Two of the digital I/Os include a pulse-counting function when used as inputs, and a pulse-width modulation (PWM) output capability.

But that's not all. Your DrDAQ also includes a signal generator which can be used as both a standard function generator and an arbitrary waveform generator (AWG). The AWG function enables you to create your own waveforms.
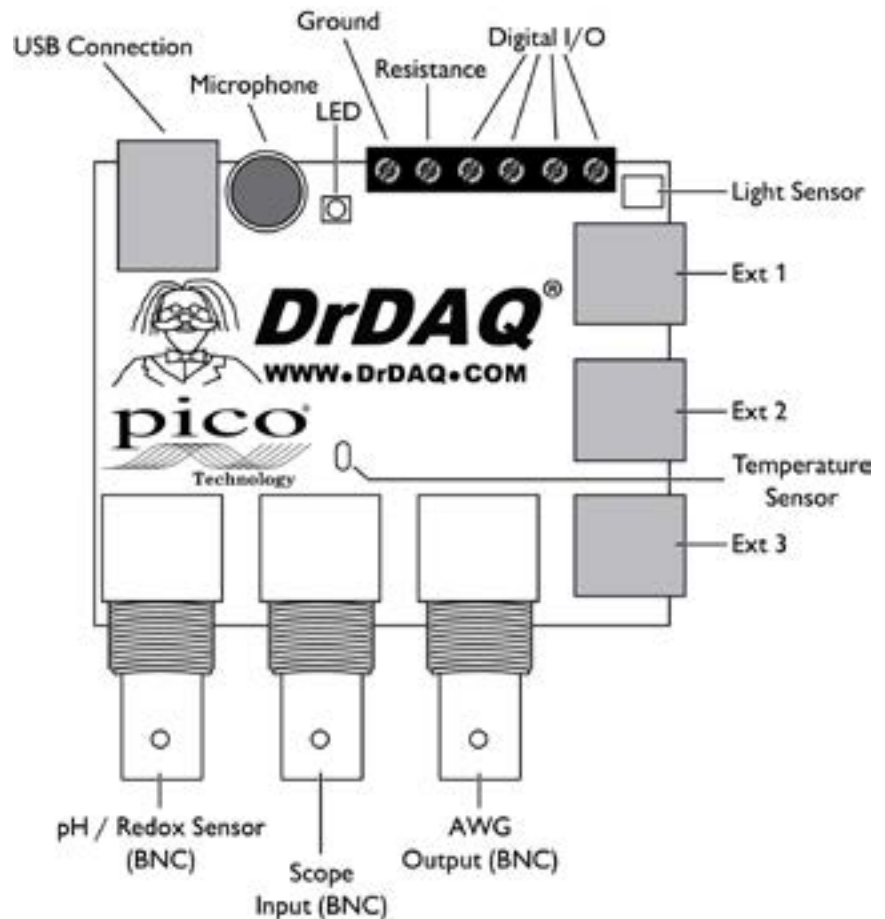
Hobbyist, student or professional: DrDAQ is all you need

The USB DrDAQ Data Logger has something for everyone: whether you're a teacher looking for a fun way to perform data logging experiments in the classroom, a student wanting an inexpensive introduction to data logging and oscilloscopes, a programmer who wants to use C++ to monitor and control the inputs and outputs of real-world devices, a hobbyist who wants to monitor and control their environment, or a professional wanting to measure pH under laboratory conditions — DrDAQ has everything you need.

.....hobbyist   .....student   .....professional

DATA LOGGING AND OSCILLOSCOPE SOFTWARE

A PC-based data logger is only as good as its software — that's why the USB DrDAQ comes with a complete software package that enables you to use your DrDAQ not only as a data logger but also as an oscilloscope and arbitrary waveform generator. Pico Technology's PC-based programs are easy and intuitive to use and offer superior viewing quality, making them ideal for education and training. Data can easily be saved, printed, emailed, and exported to spreadsheets and databases.

Both PicoLog and PicoScope benefit from free upgrades, technical support, and international language versions, and are compatible with Microsoft Windows XP (SP3), Windows Vista, Windows 7, and Windows 8 (not Windows RT) 32- and 64- bit versions.

PICOLOG

PicoLog data acquisition software is a powerful yet flexible program for collecting, analyzing and displaying data in real time.

- Show multiple views of data as graphs, spreadsheets, or text
- Scale parameters to convert raw data into standard engineering units
- Use mathematical equations to calculate additional parameters
- Set programmable alarm limits for each channel
- Save multiple setups for different tests and experiments
- Support up to 20 USB DrDAQs on the same PC
- Transfer measurements via a LAN or the internet using IP networking
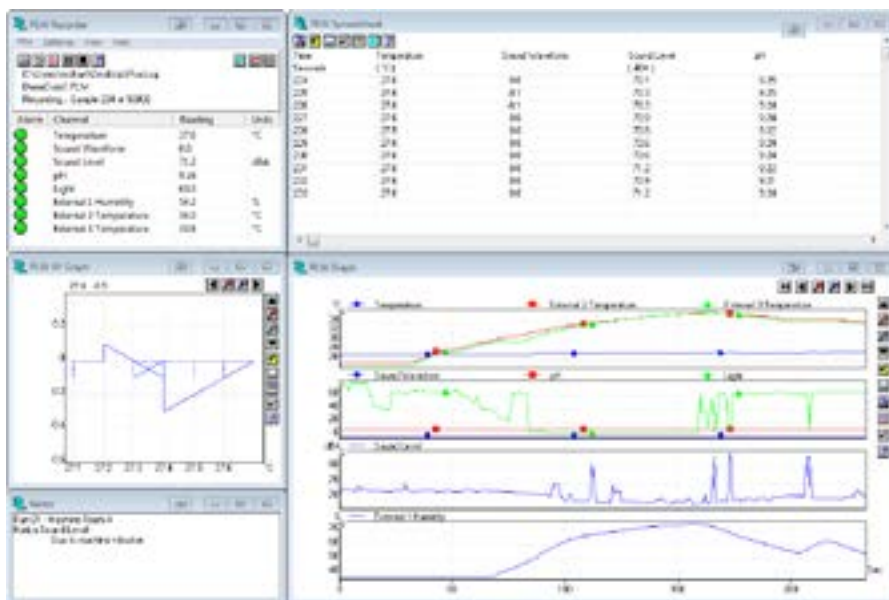
PICOSCOPE

PicoScope is your complete test and measurement lab in a single application. Using the PicoScope software you can use your DrDAQ Data Logger as an oscilloscope or spectrum analyzer, and control the integrated signal generator, RGB LED, and digital outputs.

- Oscilloscope, spectrum, and persistence modes
- Advanced zoom controls
- Auto-arranged axes
- Automated measurements
- Automatic setup
- Digital persistence mode
- Mask limit testing
- Math functions
- Reference waveforms
- Export data formats: CSV, TXT, BMP, GIF, PNG, and MATLAB
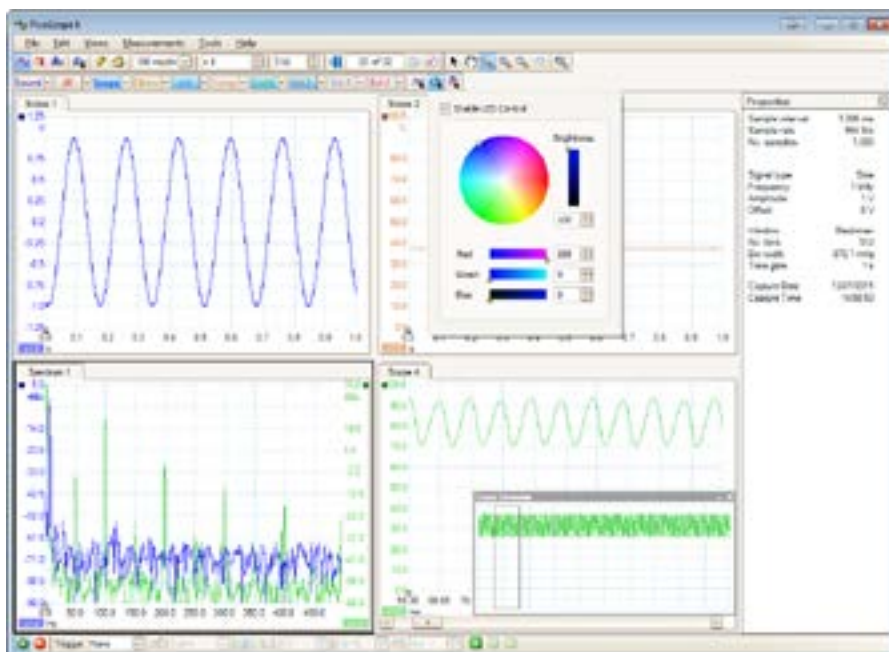
SOFTWARE DRIVERS

For users who wish to write their own software or use our products with third-party software we provide, free of charge, a range of software drivers and examples. Drivers are included for Windows XP (SP3), Windows Vista, Windows 7 and Windows 8 (32 and 64 bit). Programming examples are supplied for C, C++, LabVIEW, and Excel.

PRODUCT SPECIFICATIONS

VERTICAL

Number of channels	14
Bandwidth	100 kHz
Resolution	8 bits
Input characteristics	BNC connector, 1 MΩ, DC coupled
Input ranges	±1.25 V, ±2.5 V, ±5 V, ±10 V
DC accuracy	±3 %
Input sensitivity	10 µs/div to 200 s/div
Input overvoltage protection	±30 V

HORIZONTAL

Maximum sampling rate*	1 MS/s
Maximum sampling rate (continuous USB streaming)*	1 kS/s (Using PicoLog and PicoScope software) 100 kS/s (Using the supplied API)
Buffer memory*	16 kS
Buffer memory (continuous USB streaming)*	1 MS Unlimited using API

* Shared between active channels

FUNCTION GENERATOR/ARBITRARY WAVEFORM GENERATOR

Connector	1 x BNC
Standard output signals	Sine, square, triangle, DC voltage, ramp
Standard signal frequency	DC to 20 kHz
Output voltage range	±1.5 V amplitude plus ±1.5 V offset
AWG update rate	2 MS/s
AWG buffer size	4096 samples
AWG resolution	10 bit

GENERAL

PC connectivity	USB 2.0 (USB 1.1 compatible)
Dimensions	77 x 70 x 23 mm (3 x 2.7 x 0.9 in approx.) including BNC connectors
Weight	60 g (2.1 oz approx.)
Power requirements	Powered from USB connection
Temperature	Operating: 0 °C to 70 °C (20 °C to 30 °C for stated accuracy). Storage: -20 °C to 80 °C.
Humidity	Operating: 5% to 80% RH, non-condensing. Storage: 0% to 95% RH, non-condensing.
Compliance	FCC (EMC), CE (EMC and LVD), RoHS compliant
Languages - PicoLog	English, French, German (full support). Italian, Spanish, Swedish (software only).
Languages - PicoScope	English, Chinese (Simplified), Chinese (Traditional), Czech, Danish, Dutch, Finnish, French, German, Greek, Hungarian, Italian, Japanese, Norwegian, Polish, Portuguese, Romanian, Russian, Spanish, Swedish, Turkish
Kit contents	DrDAQ data logger, USB 2.0 cable, user manuals, software CD

BUILT-IN SENSORS/OUTPUTS

Type	Range	Resolution	Accuracy
Sound waveform	±100	±0.2	Not calibrated
Sound level	55 dB to 100 dB	1 dB	5 dB
Temperature	-10 to +70 °C (+14 to +158 °F)	0.1 °C @ 25 °C (0.18 °F @ 77 °F)	2 °C @ 25 °C (3.6 °F @ 77 °F)
Light	0 to 100	0.1	Not calibrated
RGB LED	16.7 million colours	8 bit x 3	Not applicable

ANALOG INPUTS

Type	Channel	Range	Resolution	Accuracy
pH	BNC (shared)	0 to 14 pH	0.02 pH	Sensor-calibration dependent
Redox/ORP (Oxidation/Reduction)		±2 V @10^{12} Ω	1.2 mV	Sensor-calibration dependent
Resistance	screw terminal	0 to 1 MΩ	250 Ω @ 10 k	5%
External sensors	3 x FCC68 4/4	Measure 0 to 2.5V (Also supply power to external sensors and identify sensor type via ID resistor)	1 mV	1%

DIGITAL I/O, CONFIGURABLE

Channels	4 (screw terminals)
Input characteristics	0 to 5 V (Low: Ground to 0.8 V, High: 2 to 5.5 V), TTL compatible.
Output characteristics	3.3 V, 2.2 kΩ output impedance
PWM output	Period and Pulse: < 65535 µs. Resolution: 1 µs.
Pulse counting	up to 65535 counts @ 1 MHz

EXTERNAL SENSORS AND PROBES

As well as the built-in sensors, USB DrDAQ has sockets for optional external sensors. When a sensor is plugged in the software detects it and will automatically scale the readings. For example, when a temperature sensor is plugged in the readings are displayed in °C, and for a humidity sensor the readings are displayed in % RH.

DD100 TEMPERATURE SENSOR

A high-accuracy general purpose temperature sensor with a 2 metre lead. Suitable for air, surface, or liquid measurements.

Range	-10 °C to +105 °C (14°F to +221°F)
Resolution (at 25°C)	0.1 °C (0.18 °F)
Accuracy (at 25°C)	0.3 °C (0.54 °F)

DD011 pH ELECTRODE

A robust epoxy-bodied pH electrode ideal for educational use. The pH sensor consists of a standard electrode capable of measuring the full 0 to 14 pH range, and comes complete with a small bottle of storage solution to help prevent it from drying out.

Size	12 x 120 mm
Operating temperature	0 to 60 °C (32 °F to +140 °F)
Resolution	0.02 pH

PP163 HUMIDITY SENSOR

A sensor which measures humidity using a 'non-condensing' technique. It has a short response time and plugs into the external sensor connections of USB DrDAQ.

Size	72 x 45 x 28 mm
Operating range	20% to 90% Relative Humidity
Overall accuracy	Reading ± 10%
Operating temperature	0 - 60 °C (32°F to +140°F)
Resolution	0.2% Relative Humidity
Minimum response time	60 seconds with vigorous air movement
Maximum response time	60 minutes in still air

DD103 OXYGEN SENSOR

A sensor which can be used to measure the percentage of oxygen in a gas.

Sensor type	Galvanic Cell (lead-oxygen with weak acid electrolyte)
Input range	0 to 100% oxygen
Accuracy (calibrated)	±3.0% over operating conditions range
Response times	< 15 seconds for 90% response < 25 seconds for 97% response
Humidity	0 to 95% Non-condensing
Operating temperature	5 °C to 40 ° C (41 °F to +104 °F)
Storage temperature	-15 °C to 50 ° C (5 °F to +122 °F)

MI007 SCOPE PROBE

A high quality, general purpose oscilloscope probe with a 60 MHz bandwidth. A slide switch allows attenuation of either x1 or x10 to be selected.

	x1	x10
Attenuation	1:1	10:1
Bandwidth	DC to 15 MHz	DC to 60 MHz
Rise time	23.3 ns	5.8 ns
Input resistance	1 MΩ	10 MΩ
Input capacitance	46 pF plus oscilloscope	Approx 15 pF
Cable length	1.2 m (approx 4ft)	

PP216 MAGNETIC INDUCTION KIT

Over 170 years ago British scientist Michael Faraday discovered electromagnetic induction - the "induction" or generation of electricity in a wire by means of the electromagnetic effect of a current in another wire. Now with this kit you too can perform your own electromagnetic induction experiments.

EXTERNAL SENSORS AND PROBES

PP066 REED SWITCH

The reed switch sensor can be used to detect the presence of a magnetic field such as from a bar magnet or an electromagnet. Alternatively, a simple external switch can be wired to the internal screw terminals. It has a fast response time of 2 ms so can be used as an alternative to a light gate for timing applications. Other uses include monitoring the amount of time a door is left open or a machine running.

TA019 600 A AC/DC CURRENT CLAMP

This high amp probe is a 600 A current clamp with a shielded cable for superior noise rejection.

The TA019 is terminated in a BNC connector and so can be connected directly to DrDAQ.

AVAILABLE KITS AND CONTENTS

The USB DrDAQ is available as a single unit or as part of a kit, as detailed below:

PP706 USB DrDAQ

• USB DrDAQ
• Software CD
• USB Installation Guide
• Cable: USB2 1.8m blue

PP716 USB DrDAQ pH LOGGING KIT

• USB DrDAQ
• pH Electrode
• DrDAQ 2m temperature sensor
• Software CD
• USB Installation Guide
• Cable: USB2 1.8m blue

PP707 USB DrDAQ DATA LOGGING KIT

• USB DrDAQ
• pH Electrode
• 2 DrDAQ 2m temperature sensors
• DrDAQ Humidity Sensor
• Software CD
• USB Installation Guide
• 3m sensor extension cable
• Scope probe x1/x10 switchable
• Cable: USB2 1.8m blue

External Sensors and Probes

While my DrDAQ unit comes with many built-in sensors, the optional sensors and probes detailed on these pages enable many other measurements to be taken, therefore allowing further experiments to take place! The kits mentioned above include some of the sensors and probes mentioned in this section, so why not take a look?

DRDAQ SCIENCE EXPERIMENTS

Our website has a number of suggested scientific experiments using the USB DrDAQ. The example below uses the addition of a pH probe to test the pH level of a range of common drinks.

EXAMPLE EXPERIMENT

Recently dentists have begun warning about the dangers of drinking acidic drinks. Teenagers, they suggest, who drink large amounts of fizzy 'pop' drinks suffer from tooth erosion whereby the enamel covering of the tooth is dissolved by the acid in the drink. Athletes are also at risk from drinking sports drinks.

The recommended 'safe' pH level for drinks is 5.5, and anything below this can promote tooth erosion. This experiment looks at the relative pH values of different drinks and can be used to determine whether a particular drink is 'safe' according to the above criteria. It can also be used as a good introduction to further studies into tooth decay and enamel stripping.

This experiment is suitable for ages 14+ and requires some knowledge of the pH measurement.

For further information on this experiment, please visit: picotech.com/library/experiment/ph-level-drinks-drdaq.

For the full list of experiments, please visit: picotech.com/library/experiments.

ORDERING INFORMATION

Details	Order code	USD*	EUR*	GBP*
USB DrDAQ	PP706	129	109	95
USB DrDAQ pH logger kit	PP716	199	169	139
USB DrDAQ data logger kit	PP707	329	279	225
Temperature sensor	DD100	25	21	18
pH electrode	DD011	58	49	41
Humidity sensor	PP163	81	69	56
Oxygen sensor	PP214	159	139	119
Scope probe	MI007	25	21	18
Magnetic induction kit	PP216	58	49	41
Reed switch	PP066	33	28	22
60 A AC/DC current clamp	TA018	159	139	115
600 A AC/DC current clamp	TA019	159	139	115

UK headquarters:

Pico Technology
James House
Colmworth Business Park
St. Neots
Cambridgeshire
PE19 8YP
United Kingdom

☎ +44 (0) 1480 396 395
📠 +44 (0) 1480 396 296
✉ sales@picotech.com

US headquarters:

Pico Technology
320 N Glenwood Blvd
Tyler
Texas 75702
United States

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

Kokyo 株式会社 光響
京都市下京区烏丸通四条下ル水銀屋町637番地
第5長谷ビル2階
TEL：070-6582-2430
FAX：075-320-1604
E-mail：info@symphotony.com
URL：https://www.symphotony.com/

www.picotech.com