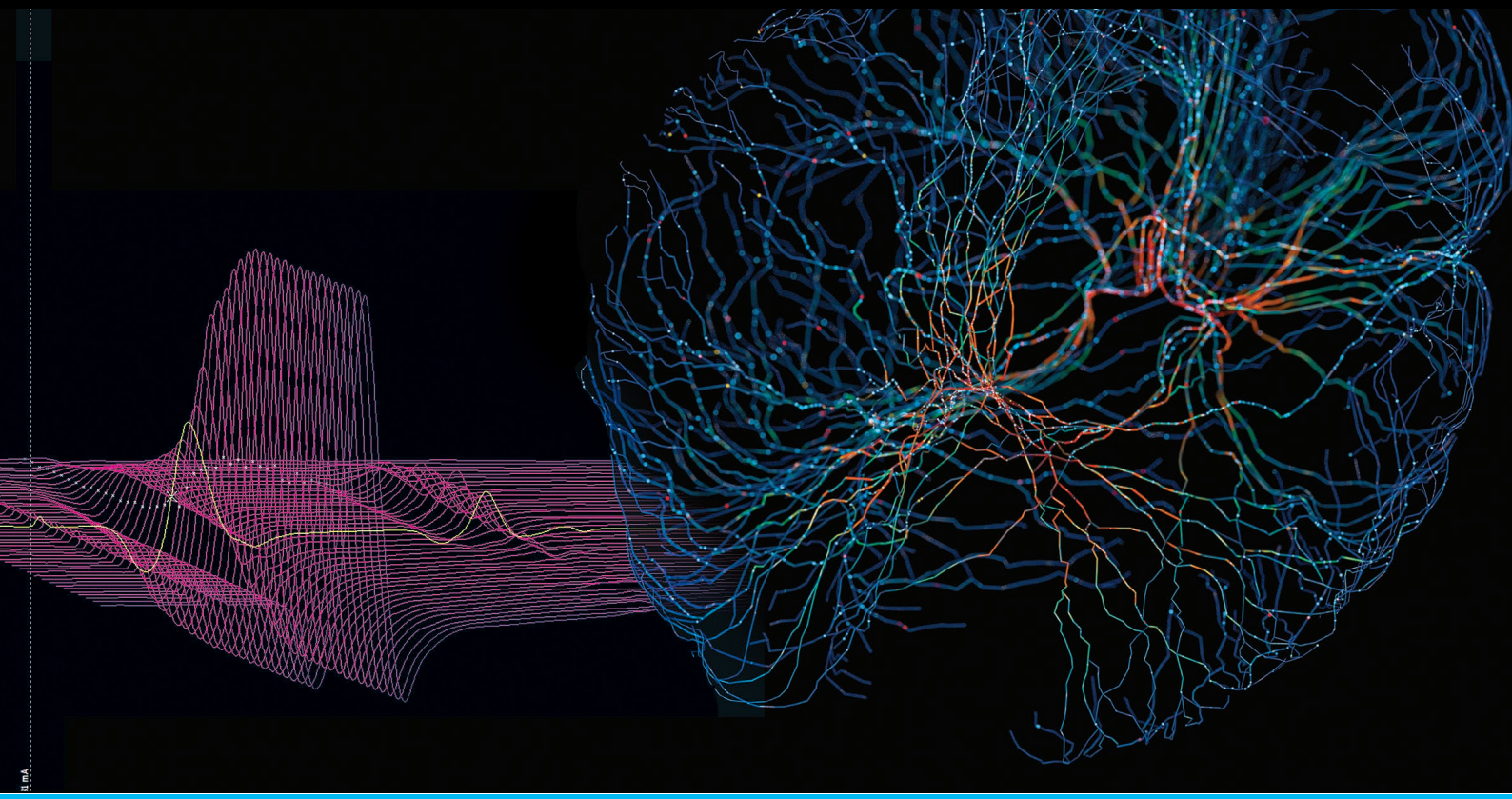
ADINSTRUMENTS
making science easier

Autonomic and Neuroscience Research

Animal Applications and Systems Overview



Create customized setups with cutting-edge technology and flexible analysis options for animal autonomic and neuroscience research.

Our PowerLab and LabChart software options integrate seamlessly with a huge range of third-party equipment to provide the flexibility and power you need for your research.

Work with our team of experienced scientists to tailor the perfect solution for your needs. With simple, streamlined software options, specialized support and the highest quality data integrity, ADInstruments provides easily customizable systems for all your animal autonomic and neuroscience needs.

Benefits of Autonomic and Neuroscience research with ADInstruments:

- Blood pressure analysis tailored for our range of high fidelity transducers
- Analyze your ECG and heart rate in real time with Cyclic Measurements
- Compare nerve recordings with physiological function
- Mix and match products for a custom solution
- Integrate multiple data streams in one place
- High quality hardware and software for accurate timing
- Fast and robust averaging and artifact rejection

TOP 100 WORLDWIDE

ADInstruments equipment is used in the top 100 institutions for Life Science worldwide and is cited in more than 30,000 peer-reviewed papers.

Typical studies:

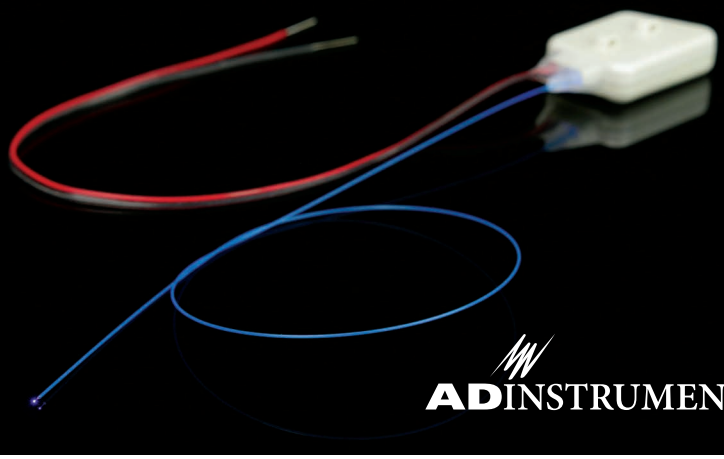
- Sleep and seizure studies
- Learning and memory
- Classic and operant conditioning
- Baroreflex sensitivity
- Vascular resistance
- Shock
- Stroke
- Heart rate variability
- Exercise and metabolic studies
- Monitoring peripheral circulation
- Neural respiratory control
- Magnetic stimulation
- Peripheral motor neural activity
- Sensory functions

Applications include:

Blood Pressure • ECG • Evoked Responses and Stimulation • Extracellular Recording • HRV

KAHA SCIENCES

A new standard in quality and power



ADINSTRUMENTS

Small Animal Telemetry

The use of telemetry in animal research is a recommended industry practice for improved animal welfare. Continuously record data over extended periods with conscious, freely moving animals, and reduced stress artifacts in your research data.

For the wireless recording of a variety of biological signals in small animals, ADInstruments offers our telemetry brand, Kaha Sciences. Kaha systems combine high fidelity digital telemetry with patented wireless power technology to create high-quality solutions for your physiological monitoring needs. Paired with PowerLab and LabChart, this solution sets the new standard in quality and power for implantable, wireless telemetry in rats and mice.

Power

- Wireless power
- Higher sampling rate - 2 kHz
- Continuous recordings
- Unique signal technologies

Quality

- Millar solid-state pressure sensors
- ISO-9001 Certified
- Durable, biocompatible hard-shell casing

Signal Options

Pressure	Biopotentials (i.e. ECG, EMG, EEG)	Sympathetic Nerve Activity (SNA)	Tissue Oxygen	Temperature (output in all telemeters)	Optogenetic Stimulation and Recording	Biopotentials (i.e. ECG, EMG, EEG)	Index of Activity
Rat						Mouse	

Simple and Customizable System Setup

Configure a telemetry system to meet your exact needs. A typical setup requires one telemeter and one SmartPad (rats) or tBase (mice) per animal. Each lab requires one Configurator System for all equipment. Pair with PowerLab and LabChart 8 or LabChart Lightning. Select from up to 40 independent transmission channels with no interference.

Rat Telemetry

Data transmission range up to 5 m with telemeter battery back-up and *in vivo* recharging. Cohousing feature for two animals in one cage or two implants in one animal (>350 g).

Mouse Telemetry

Accurately measure biopotential parameters in mice that are traditionally restricted to acute or tethered experiments with a sampling rate up to 2 kHz with unmatched data quality.

Cohousing Example Setup

Your Choice of Telemeters

Rat | Mouse

The ADInstruments Bio Amp range

ECG/EKG

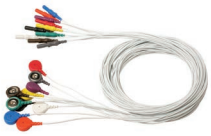
Examine heart rate, heart rate variability, analysis of the waveform morphology, surgical monitoring and other similar functions using surface or needle electrodes. Easily sample ECG along with nerve activity blood pressure or other signals as part of your integrative physiology protocols.

Bio Amps (single, dual and octal)

Our range of isolated, high performance differential biological amplifiers are optimized for measuring biological signals such as ECG, EKG, EMG, EOG, and EEG.

Needle Electrodes

Surface Electrodes



Stimulation

Define and deliver customizable stimulation protocols using our software-controlled, constant-current stimulus generators. Designed to work with PowerLab C (purchased separately) via a Front End Interface.

Stimulus Isolator FE180

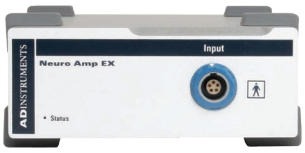
Designed for direct stimulation of tissue samples *in vitro*. Electronic isolation means it is also suitable for *in vitro* applications in humans and animals.

Stimulator HC FE155

Designed for direct or field stimulation of tissue samples *in vitro*.

Neuro Amp EX FE285

Measure nerve activity using the microneurography technique with the Neuro Amp EX in combination with a PowerLab system. The Neuro Amp EX is a low noise, high gain neural amplifier that is fully isolated and suitable for both animal and human use. It also provides audio output to listen to neurological signals.



Supplied with:

- Neuro Amp EX Headstage
- Six male Amphenol Connectors for customization of microelectrodes adapters *(microelectrodes not supplied)*

Extracellular Recording

Extracellular recordings measure and characterize the external electrical properties of cells and tissues, particularly neurons and neuronal tissue; and can include single unit, multi unit, field potential or amperometry recordings. We offer high-quality hardware that are paired with LabChart and specialized LabChart Pro software features for these recordings. They include Spectrum, Scope View, Peak Analysis, and Spike Histogram, which provide powerful analysis tools, including ultra fast sampling, a variety of filtering options and artifact rejection.

Extracellular Amplifier

The low noise two-channel differential amplifier with headstages that can be used with metal or glass microelectrodes (purchased separately), provides great signal stability and improved timing response. It also provides capacitance compensation and the option to connect to a compatible external stimulator (purchased separately), which allows switching between stimulation and recording at the recording site. It can connect to LabChart software via a PowerLab C or a C Series Instrument Interface.

Invasive Blood Pressure

The ability to measure continuous arterial and vascular pressure signals directly at the source through invasive blood pressure recordings provides a high level of data accuracy and sensitivity to support your cardiovascular research. Ideal for beat-to-beat monitoring of acute cardiovascular measurements, invasive pressure recordings also allow for assessment of time variance and dynamics of change in data over time.

Typical studies:

- Pulmonary hypertension • Hypertrophy, cardiomyopathy, infarction, and other disease models • Intracranial studies
- Tumor research • Systemic circulation or ventricular studies • Acute or chronic cardiovascular monitoring

Mikro-Tip™ BP Foundation System

The Mikro-Tip™ BP Foundation System provides gold standard measurement of systolic and diastolic blood pressure in small to large animals. Choose from a wide range of Mikro-Tip™ pressure catheters that allow you to place the sensor in an artery or heart to measure blood pressure directly.

PowerLab COMPATIBLE

+ select your choice of Millar Mikro-Tip™ Pressure Catheters

LARGE ANIMALS | RATS | MICE

Each system includes:

- C Series Front End Interface • Bridge Amp • LabChart Pro software • Applicable interface cables

Non-Invasive Blood Pressure

Non-invasive blood pressure (NIBP) recording allows you to capture intermittent blood pressure data in awake or anaesthetized rats or mice over long sampling periods easily and unobtrusively with a high standard of care.

Typical Studies:

- Drug screening
- Surgical Monitoring
- Hyper / Hypotension
- Nephrology
- Phenotyping
- Sepsis and Toxicology
- Endocrinology
- Obesity

Rodent NIBP CODA® Monitor Sets

ADInstruments Rodent NIBP CODA® Monitor Sets are a streamlined solution using the precision of Kent Scientific's Volume Pressure Recording (VPR) technology to accurately and reliably measure NIBP. Data is streamed directly from the CODA® Monitor into LabChart, automatically detecting systolic, diastolic, mean blood pressure and heart rate.

CODA® Sets Overview

ADInstruments CODA® Monitor *(Controller)*

CODA® Rodent Cuff Kit *(includes Occlusion Cuffs and VPR Cuff Sensors)*

2 x Rodent NIBP CODA® RightTemp Sensors

Far Infrared Warming Pad

LabChart

LabChart 8 for Windows *(required - sold separately)*

CODA® Monitor Device Enabler Software

Infrared Thermometer with LaserSight

Set Accessories *(sold separately)*

Sets can be expanded with additional tail cuffs to cater to different animal sizes and species (mouse or rat).

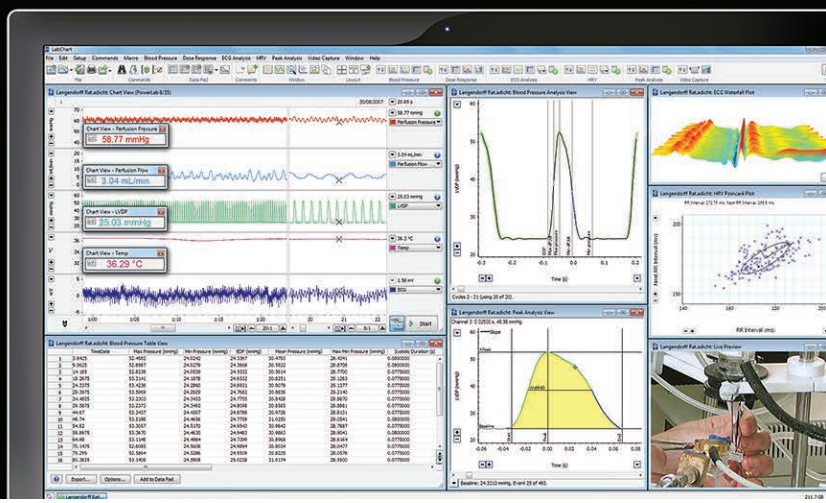
For studies on conscious animals, specialised cylindrical rodent holders featuring an adjustable nose piece are also available to safely secure animals during experimentation.

Mouse holders (S, M, L) and rat holders (S, M, L, XL)

Additional VPR Cuff Sensors and Occlusion Cuffs (XS - XL)

LabChart

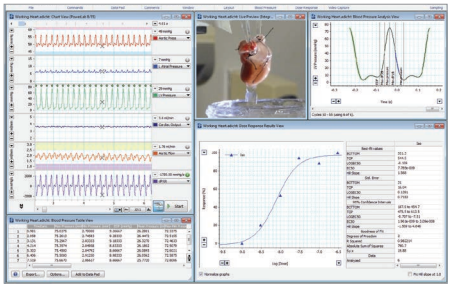
All your analysis in one place



LabChart 8, our traditional data analysis software provides a streamlined platform for all of your recording devices to work together, so you can acquire signals from multiple sources simultaneously.

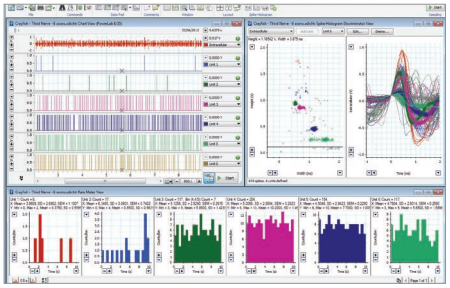
LabChart tracks every recorded action and never modifies your raw data, allowing you to easily analyze your recorded data and apply advanced calculations as your experiments unfold. We've built LabChart to be easily adapted and customized to your needs.

Key Features for Neuroscience



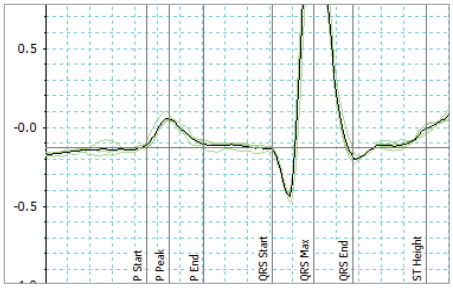
Blood Pressure

Automatically detects, analyzes, and reports on parameters from arterial or ventricular pressure recordings.



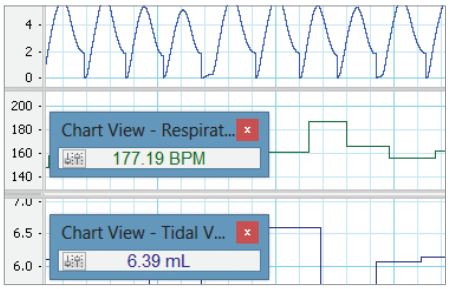
Spike Histogram

Detects, discriminates and analyzes extracellular spike activity generating a range of plots and statistics.



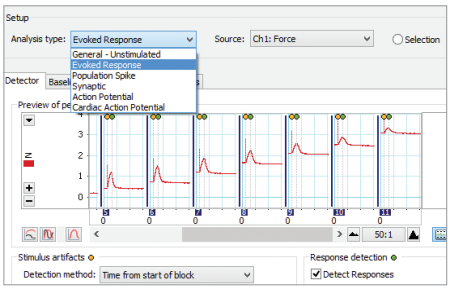
ECG Analysis

Detects and reports the onset, amplitude and interval times of PQRST from human and animal ECG signals.



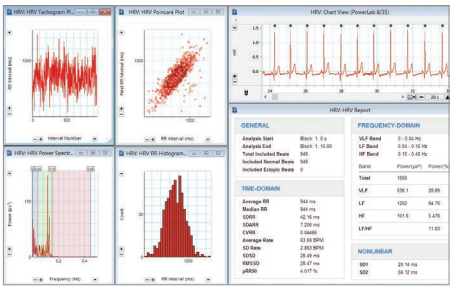
Cyclic Measurements

Easy analysis for periodic waveforms. Find HR, systolic pressure, respiratory rate, integrate a waveform over a cycle.



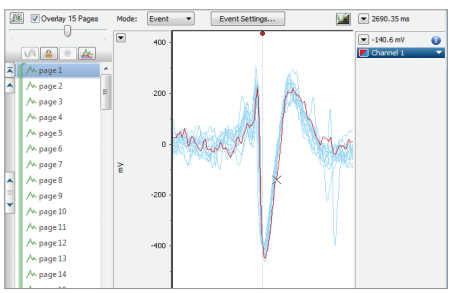
Peak Analysis

Automatic detection and analysis of multiple (non-overlapping) signal waveforms from a recording. Use in real-time or with pre-recorded data.



HRV

Analyze beat-to-beat interval variation in your ECG recordings. Can be performed during recording or on a previously recorded file.



Scope View

Display, overlay, average and analyze periodic or evoked waveforms in real time.

Additional Features and Modules*

We've built LabChart to be easily adapted and customized to your needs. As your research grows, Add-Ons and customizations allow LabChart to grow with you.

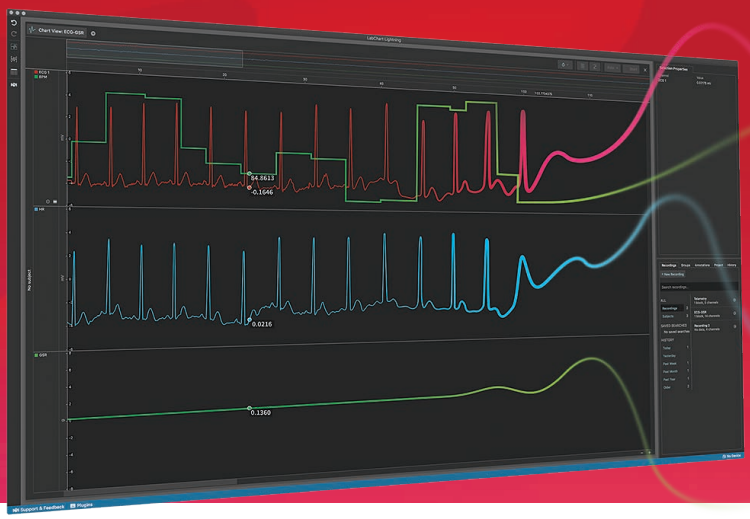
- Spectrum
- Stimulator
- Macros
- Video Capture*
- Cardiac Output*
- Metabolic*
- Dose Response*
- Heart Rate Variability*
- DMT Normalization*
- PV Loop*

** All Modules are included with LabChart Pro, or download and purchase separately.*

Find out more: adi.to/labchart

LabChart LIGHTNING

Data acquisition and analysis re-imagined



LabChart Lightning is the latest iteration of our 34 year history of creating easy to use data acquisition and analysis software. LabChart Lightning empowers innovative researchers to make unique scientific discoveries with unlimited freedom and flexibility.

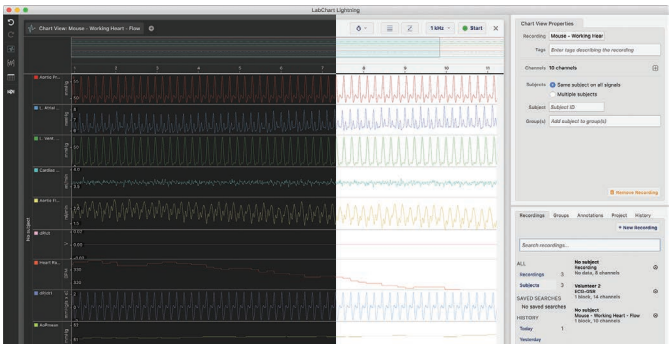
Unlimited Channels and Overlays

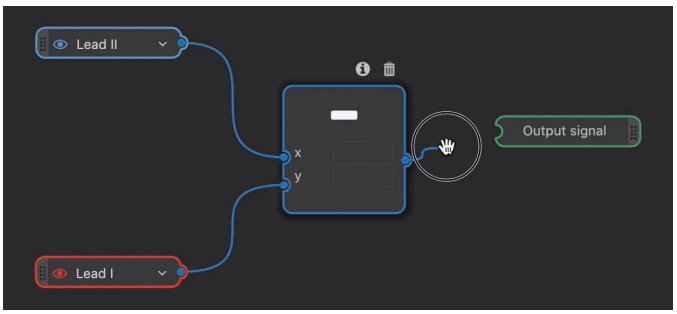
Record data into an unlimited number of channels. Create as many calculated signals as you like. Overlay signals by dragging and dropping them between channels.

Overlay channels with drag and drop.

Dark View and Light View

Switch between dark view and light view to help reduce eye strain and for research applications where controlled lighting is important.





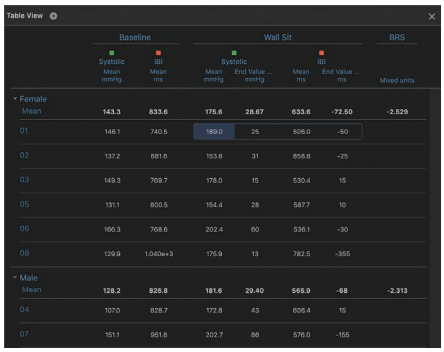
Custom Calculations

Create custom calculations by dragging and dropping functions from our extensive function library. See the effect of custom calculations on your original data. Optimize and share your calculations with colleagues.

Cross-Recording Analysis

Analyze data across multiple recordings within a project. Organize recordings and channels by subjects or groups. Convert time-based data from recordings to discrete values to use in statistical analysis.

Organize data by groups and subjects and assign group data by regions.



More Features

- Cross Platform
- Readouts
- PowerLab integration
- User based licensing
- Import / export
- History and autosave
- Data tagging annotations and regions

Third-Party Device Integration

LabChart Lightning enables the integration of multiple devices for data acquisition and analysis. Device manufacturers can follow our SDK available on GitHub to create a TypeScript plugin for their device to sample directly into LabChart Lightning. There is also the option of customized scripts, comments, and UI for device configuration and control. This flexibility provides researchers an avenue for limitless combinations of data, signals, and results!

Sign up for a 30-day free trial at adi.to/lightning

PowerLab

High-performance data acquisition hardware

PowerLabs are capable of high speed sampling and are compatible with instruments, signal conditioners, and transducers supplied by ADInstruments and many other leading brands.

Developed in 1985, PowerLab has been a reliable data acquisition tool for an entire generation of scientists and educators. It has always offered a simple and flexible solution for almost all types of analog physiological data acquisition. With the addition of PowerLab C for research, we are excited to continue supporting a whole new generation of scientists with unparalleled flexibility for both analog and digital data acquisition.

PowerLab C and C Series Interfaces

PowerLab C is a digital data acquisition device that provides adaptive mains filtering, power management for peripheral devices (max 100W via USB-PD) and sub-µS time synchronization for up to four C Series compatible USB-C devices.

Front End Interface

Converts analog data from ADInstruments Front-Ends such as Bridge Amps and Bio Amps so that they can be digitally sampled by the PowerLab C.

Instrument Interface

Provides 4 channels of input capability from any analog instrument to PowerLab C.

Configuration Options

Both C Series interfaces are designed to work with PowerLab C for adaptive mains filtering and sub-µS time synchronization with other C Series compatible devices. Alternatively, for simple setup requirements, you can connect them directly to a computer.

Modular system

Powerful and portable

Analog compatible

Digital framework for the future

26 Series PowerLabs

Highly functional and adaptable for even the most demanding of applications, there is a research PowerLab to suit your requirements. Available in 2 and 4 channels, PowerLab can sample from virtually any analog signal.

PowerLab 2/26

PL2602

For those who require minimal channels the 2/26 is an ideal entry option. Maximum sampling rate of 100 kHz per channel. Independent ADCs for each channel to keep data perfectly in sync.

PowerLab 4/26

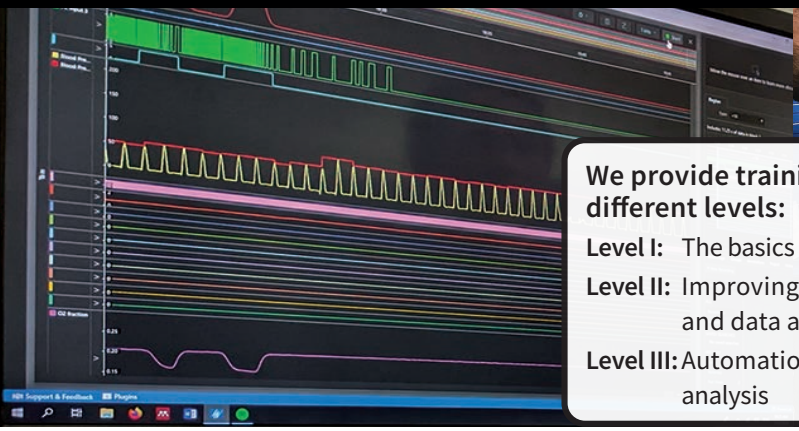
PL2604

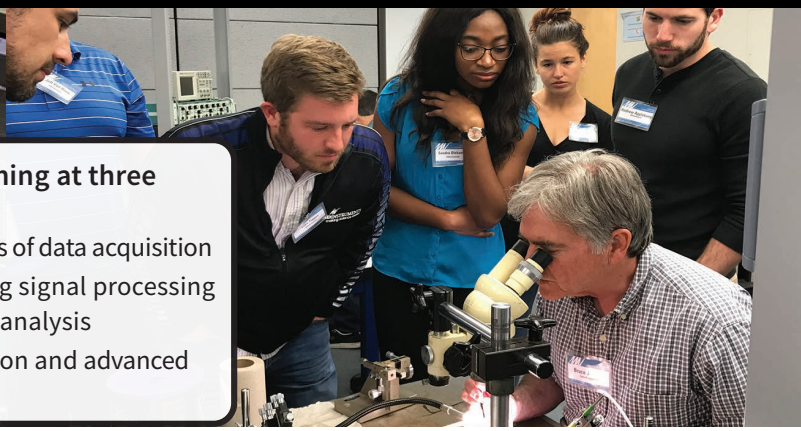
Our entry level research grade DAQ system, the 4/26 provides 4 analog input channels and has a maximum sampling rate of 10 0kHz per channel. Independent ADCs for each channel to keep data perfectly in sync.

Find out more at adi.to/powerlab

ADInstruments Training and Support

Our global support and flexible training options mean that there is always help at hand to streamline your experiments and reach your research goals faster. Whether you are already a career scientist or just starting out, we can help you master best practice techniques for your research.





We provide training at three different levels:

Level I: The basics of data acquisition

Level II: Improving signal processing and data analysis

Level III: Automation and advanced analysis

Software Training

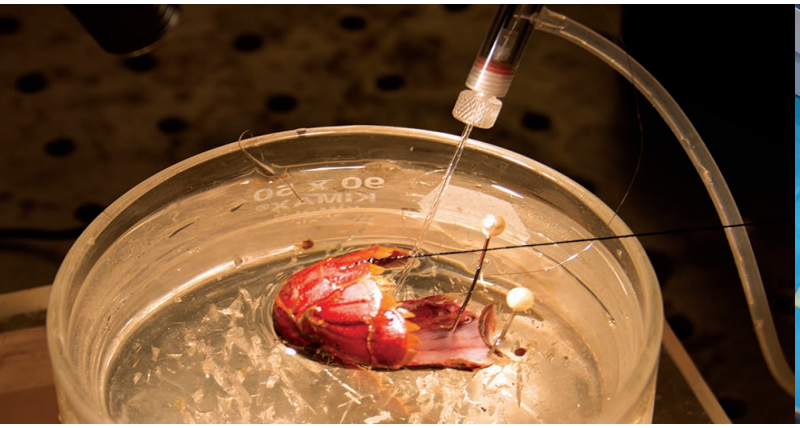
Our software training courses are designed to get you up to speed with relevant, useful skills and knowledge, as quickly as possible.

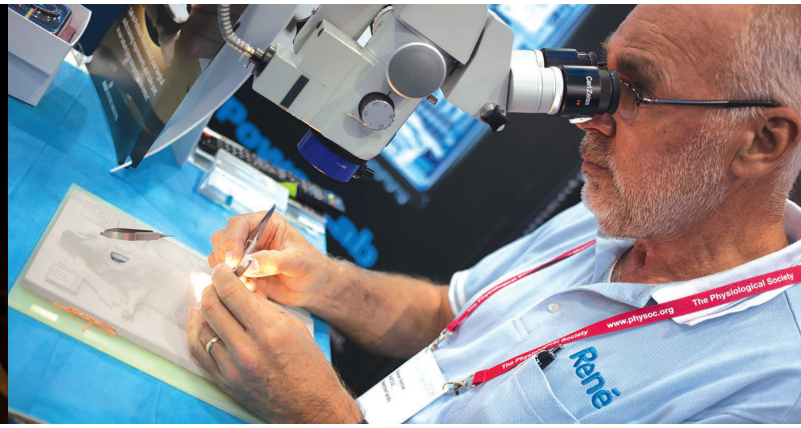
Training courses are hands-on and delivered by our team of experienced scientists and teach professional best practices to immediately improve data accuracy, problem solving, workflow, and efficiency.

Customized Onsite Training

Increase efficiency with tailored training courses, delivered at your facility. We can customize our curriculum to suit your needs, and teach the hardware and software best practices for your unique requirements.

Our hands-on training fast-tracks learning, to immediately improve output and efficiency, so you can achieve your research goals, sooner.





Application Workshops

ADInstruments partners with world class universities, institutes and leading researchers to develop training directed at specific protocols, techniques and applications.

Our hands-on workshops teach you to use our systems in the most relevant, effective and efficient way for your needs.

Live Product Demonstration

Showcasing powerful and flexible solutions for research. Experience how our integrated hardware and software solutions could help enhance your work.

Take the opportunity to talk to one of our expert team about how we could help you reach your specific goals.

WEBINARS

A comprehensive range of product, application, and customer webinar videos are available from our online library. Visit **adi.to/training** to sign up for one of our upcoming live webinars.

Visit **adinstruments.com** or contact your local ADInstruments representative for more information

Australia | Brazil | Europe | India | Japan | China | Middle East | New Zealand | North America | Pakistan | South America | South East Asia | United Kingdom

adinstruments.com

ADINSTRUMENTS