

ADInstruments Training Series for Scientists



Two Day LabChart Software Training Course

ADInstruments North America Training Center
Colorado Springs, CO, Boston, MA, San Francisco, CA, and Chicago, IL

Course Overview:

This two-day comprehensive training program covers all three levels of ADInstruments LabChart Software Training Courses to include:

- Level I – The Basics of Data Acquisition
- Level II – Improving Signal Processing & Data Analysis
- Level III – Automation and Advanced Analysis

Attendees will have access to an individual computer and hardware terminal to ensure a hands-on educational experience. Learning-by-doing amongst our experienced staff is the quickest method by which to master the PowerLab system. This course will leave you confident and ready to apply your new skills and knowledge to existing and future experimental protocols.

Who Should Attend:

The curriculum assumes no prior experience with PowerLab systems or LabChart software, and is suited for life scientists seeking a structured, intensive, hands-on training program to quickly master successful PowerLab integration in their research laboratory to include:

- Post-graduate students, researchers and laboratory technicians new to LabChart software and PowerLab systems
- Educators new to PowerLab systems who wish to create customized teaching experiments in LabChart software
- Any life scientist seeking to understand the fundamental principles of computerized data acquisition or needing to revisit PowerLab

Registration Includes:

Two 8-hour days of hands-on instruction, take-home materials, lunches, and snack breaks.

Training Course Program



Level I Data Acquisition Basics:

This session will take you step-by-step through the initial stages of computerized data acquisition - from connecting your hardware to choosing appropriate settings for your signal. You will become familiar with data acquisition and LabChart terminology and understand the importance of accurate data collection.

Learning Objectives

At the end of this training session, you will be able to:

- **Manage Files** - Store and easily access files
- **Set Up LabChart** - Set up channels for incoming data and choose settings for optimal signal display in both Chart and Scope Views
- **Set Sampling Rates** - Calculate the optimum rate at which to sample your data and understand the problems associated with under-sampling and aliasing
- **Adjust Range** - Choose the correct range to capture your data with the best resolution and signal-to-noise ratio
- **Filter & Amplify** - Decide if a signal needs amplification, and choose an appropriate hardware or software filter
- **Save** - Use the different options for saving LabChart data and setting files

Training Topics Include:

Sampling Rates

- PowerLab Sampling Rates
- Nyquist Frequency
- Undersampling/oversampling and aliasing

Range

- Determine the correct range
- Signal resolution and signal-noise ratio

Amplification & Filtering

- Input Amplifier Settings
- Hardware versus Software filters

Setting Up PowerLab & LabChart

- PowerLab hardware overview
- LabChart configuration options

Visual Features in LabChart

- Scaling options
- Compression features
- Split Screen
- Digital Volt Meters
- Smart Tiling & Customizing Layouts

Data Saving, Export, and Import Options

- Save As File Type Options
- Saving, Printing, Appending and Exporting Data
- Extracting Images
- File Export Extensions

LabChart File & Software Feature Management

- LabChart Welcome Center
- Accessing recently used files
- Cloning existing files
- Creating ADI package files
- Feature Manager

Software Upgrades & Updates

Trouble Shooting Basics

Software Forum

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Level II: Improving Signal Processing & Data Analysis

Discover LabChart's data analysis tools and functions to enhance your research and speed up reporting.

Learning Objectives

At the end of this training session, you will be able to:

- **Calibrate Data** - Display the incoming voltage signal as a meaningful unit
- **Process Signals** - Obtain and display useful variables (eg. rate, maximum, integral and derivatives) from raw data, and apply smoothing and arithmetic calculations
- **Use Oscilloscope Functions** - Overlay and average waveforms in a single channel based on time or event
- **Extract Numerical Data** - Extract numerical values from your data into a spreadsheet either manually or automatically
- **Export Data** - Export data into other applications (ie. Microsoft Excel) for further analysis, and extract images to illustrate reports
- **Improve LabChart Functionality** - Quickly and easily find relevant LabChart features and software updates

Training Topics Include:

Data Calibration

- Units Conversion

Annotating Data

- Adding comments during and after recording
- Comment navigation
- Editing Comments
- Preset Comments

Signal Processing

- Cyclic Measurements
- Integral Function
- Derivative Function
- Smoothing Function
- Arithmetic Function
- Digital Filters
- Analog Filters

Oscilloscope Functions

- Scope View Overview
- Application Considerations

Data Pad

- Setting up Data Pad
- Using Data Pad Manually
- Multiple Add to Data Pad
- Timed Add to Data Pad
- OLE Linking to Excel

Spectrum

- Distinguish component waveforms
- Isolate electrical noise components
- Calculate spectrum parameters in real time
- Extract spectrum data to Data Pad
- Display Power Spectral Density & Spectrogram

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Level III: Automation and Advanced Analysis

This session will guide you through a selection of LabChart's advanced functions. As well as finding ways to automate your data collection and analysis, this course will help you use LabChart functionality to apply more complex processing to your signals. You will also learn how to maximise integration with other instrumentation.

Learning Objectives

At the end of this training session, you will be able to:

- **Automate Recording** - Use external triggers, signal waveforms or time-based events to start LabChart
- **Control Stimulators & Other Instruments** - Use LabChart to control PowerLab's analog output and digital inputs and outputs and trigger external instruments
- **Perform Signal Calculations** - Apply filters, smoothing and other calculations to incoming or recorded data and customise detection setting in cyclic measurements
- **Automate Analysis** - Use advanced Data Pad options including linking with Excel, use the Select and Find options to navigate data and write macros to combine analysis steps
- **Edit Macros** - Adjust or write new macros with the Macro Editor

Training Topics Include:

Automate Recording

- Software options to trigger recording
- Using the external trigger
- Write macros to initiate and pause recording

Controlling External Instruments

- Analog Outputs
- Digital Outputs
- Digital Inputs
- Fast Response Output Extension

Stimulator

- Customize stimulus waveforms
- Modify waveform parameters on the fly
- Generate two independent stimulus waveforms

Macros

- Writing & editing macros
- Importing & exporting

Analysis Modules

- Blood Pressure
- ECG Analysis
- PV Loop
- HRV Analysis
- Peak Analysis
- Spike Histogram
- Dose Response
- Video Capture
- GLP 21 CFR Part 11

One-on-One Instructor Time

- Receive specialized instruction for your application needs
- Bring data files to learn key analysis tips

NOTE: Training Center events will only focus on hardware and software equipment options along with research application theory. Animal surgical demonstrations will not be provided at ADInstruments' Training Centers. However, surgical training is available through ADInstruments Experimental Techniques Workshop Series. Noninvasive research applications will be demonstrated on humans where applicable (e.g. biopotentials, psychophysiology, NIBP, metabolic studies, etc.)