

Getting Started with
LabChart[®]
For Teaching



LabChart

This guide will help you to quickly set up and start using LabChart with the PowerLab® data acquisition system. You will be guided through the software installation and how to set up and record your finger pulse using a pulse transducer with LabChart.

Detailed set up, analysis and troubleshooting information can be accessed from within the LabChart application:

- Help Menu – Provides access to detailed software and hardware information.
- Welcome Center – Step-by-step tutorials are available from the Getting Started tab in LabChart for Windows.

Please refer to Further Resources section at the end of this guide for more information.

System Requirements

Windows

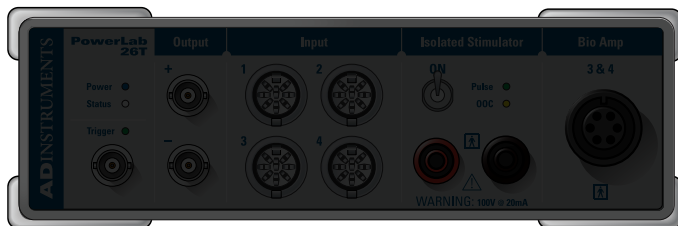
- Microsoft Windows 7 or Vista SP1, or later.
- Microsoft .NET Framework 2.0 SP2 or 3.5 SP1, or later.
- Microsoft Internet Explorer 7, or later.
- USB Interface.

Mac

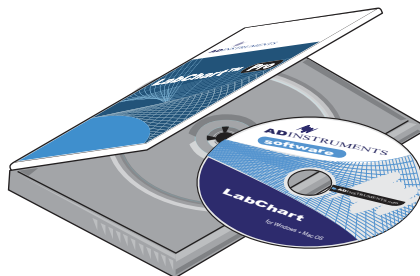
- Mac OS X 10.4, or later.
- USB Interface.

What You Will Need

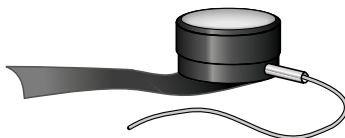
To follow this *Getting Started with LabChart* guide you will need the following components:



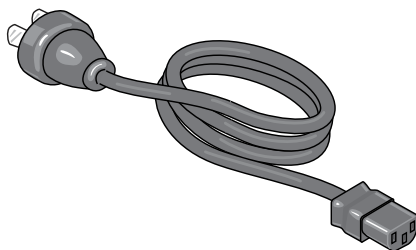
PowerLab



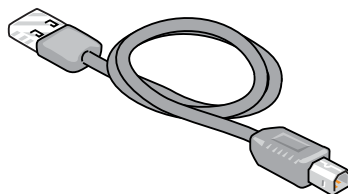
LabChart



Pulse Transducer



Power Cable



USB Cable

If any item on the packing list is missing or the PowerLab seems to be damaged in any way, please contact your authorized ADInstruments® representative.

Checklist

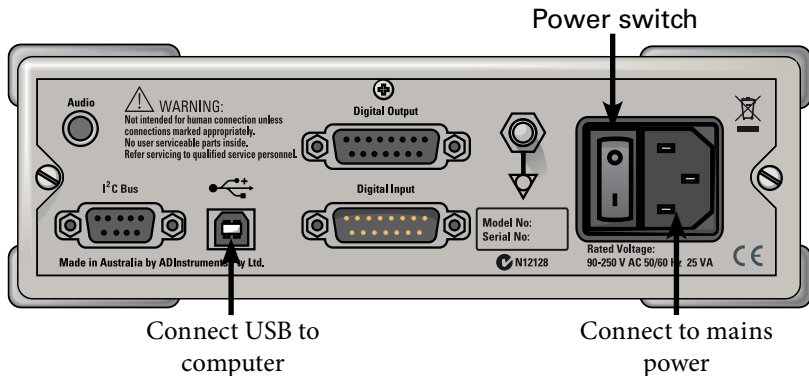
1. Install LabChart	<input type="checkbox"/>
2. Launch LabChart	<input type="checkbox"/>
3. LabChart Interface	<input type="checkbox"/>
4. Create a New Document	<input type="checkbox"/>
5. Recording Setup	<input type="checkbox"/>
6. Sampling	<input type="checkbox"/>
7. Display	<input type="checkbox"/>
8. Channel Calculations	<input type="checkbox"/>
9. Adding Comments	<input type="checkbox"/>
10. Saving/Export	<input type="checkbox"/>

1. Install LabChart

1. Run the LabChart Setup Installer from the supplied LabChart Software CD or the downloaded stand-alone installer.
2. The installer will guide you through the installation.
3. When installation is finished, click **Finish**.

Hardware Setup

1. Connect the PowerLab to the mains (AC) using the power cable.
2. Connect the PowerLab to your computer using the USB cable.
3. Turn on the PowerLab using the switch on the back panel.



Multiple Devices

LabChart can record from multiple PowerLabs simultaneously into a single LabChart document or independently into separate LabChart documents.

The Devices and Channels dialog allows you to choose which devices to use in a document and you can map LabChart channels to different input sources. See the Help for further information.

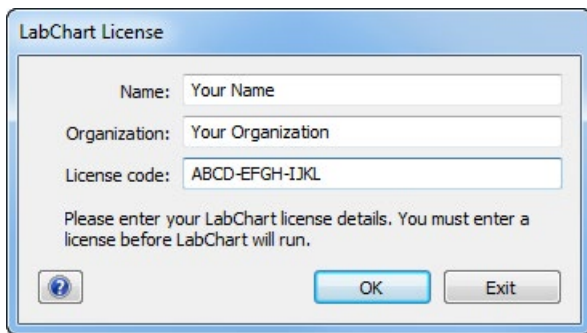
You only need one PowerLab to follow the instructions in this guide.

2. Launch LabChart

- On Windows, double-click on the LabChart 7 desktop shortcut or choose LabChart 7 from the Start menu.
- On Mac, click on the LabChart icon in the Dock or choose LabChart 7 from the applications folder.

License Registration

1. When you start LabChart for the first time, a dialog will appear asking you to enter your license code. Your license code can be found on the LabChart CD case.
2. Enter your license details.
3. You will also be asked to register your PowerLab. This gives you free access to software updates and other ADInstruments resources.



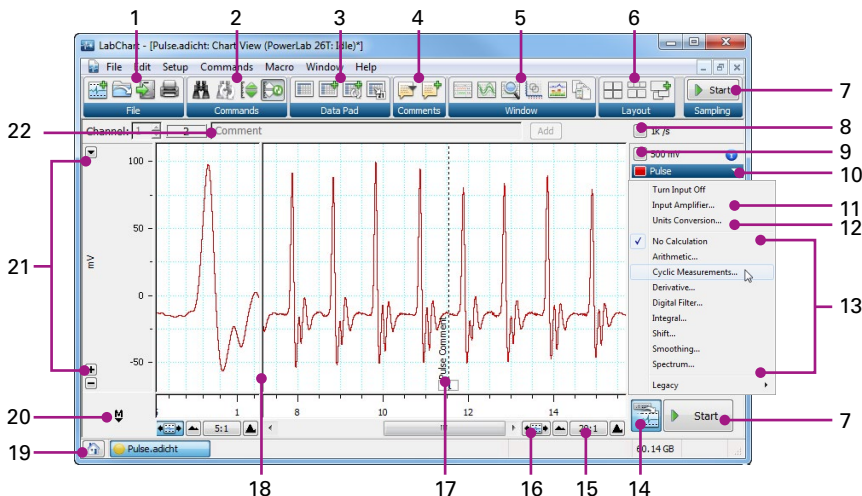
The image shows a Windows-style dialog box titled "LabChart License". It contains three text input fields: "Name:" with the placeholder text "Your Name", "Organization:" with the placeholder text "Your Organization", and "License code:" with the placeholder text "ABCD-EFGH-IJKL". Below the fields is a message: "Please enter your LabChart license details. You must enter a license before LabChart will run." At the bottom left is a help icon (a question mark in a circle), and at the bottom right are two buttons: "OK" and "Exit".

Device Discovery


When LabChart starts, it will scan for compatible devices. If no devices are found, ensure that the PowerLab is properly connected and turned on and click **Device Scan**. You may need to reset the PowerLab by switching it off then on.

3. LabChart Interface

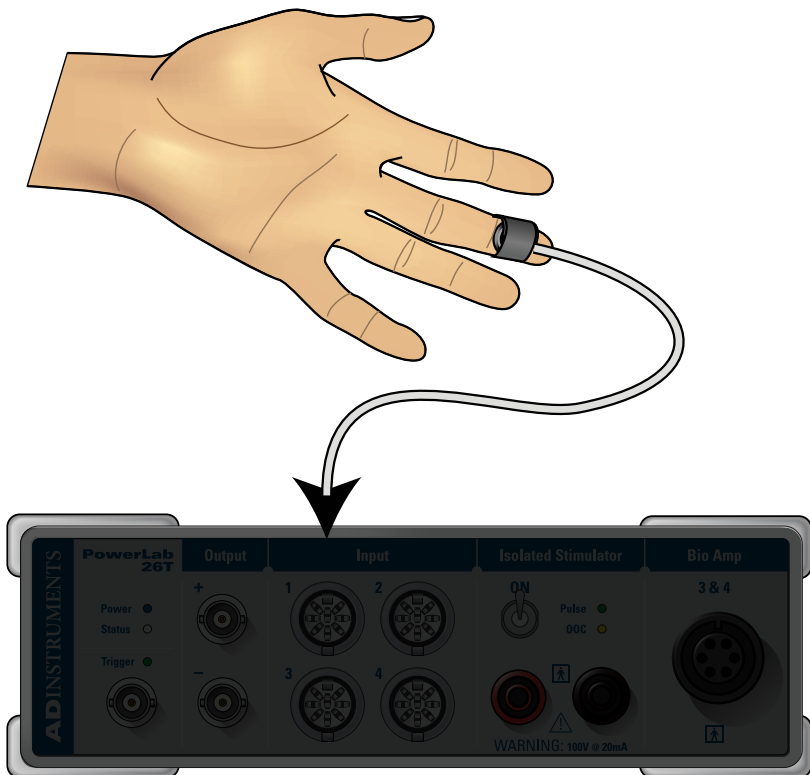
- File:** Create, open, save and print files.
- Commands:** Access find and select functions and autoscaling.
- Data Pad:** Extract and log data and statistics to the Data Pad spreadsheet.
- Comments:** Add and review text comments.
- Windows:** Access the different data views and the analysis manager.
- Layout:** Control window arrangement.
- Start/Stop:** Start and stop sampling.
- Sampling Rate:** Adjust the sampling rate.
- Range:** Adjust the sampling range.
- Channel Function Popup Menu:** Access all of the major channel functions.
- Input Amplifier:** Configure sampling settings and preview the signal in real-time.
- Units Conversion:** Calibrate the raw data of a channel and apply the appropriate units.
- Channel Calculations:** Apply calculations without losing the raw data.
- Record/Monitor:** Record and monitor sampled data.
- Time Axis Compression:** Compress or expand the horizontal axis.
- Scroll/Review:** Scroll through data while sampling.
- Comment:** Comments are displayed on your recording.
- Split Bar:** Split the Chart View to compare data recorded earlier with data being recorded in real-time.
- Welcome Center:** Open the Welcome Center.
- Marker:** Drag onto a waveform to mark relative time and amplitude values.
- Scaling:** Compress or expand the amplitude axis using the compression buttons or the scale popup menu.
- Comments Bar:** Quickly enter comments while sampling.



4. Create a New Document

1. Click the new document icon in the toolbar to create a LabChart document. 
2. Connect the pulse transducer to Input 1 on the PowerLab.
3. Place the pressure pad of the pulse transducer against the tip of the middle finger or thumb. Use the Velcro strap to attach it firmly.

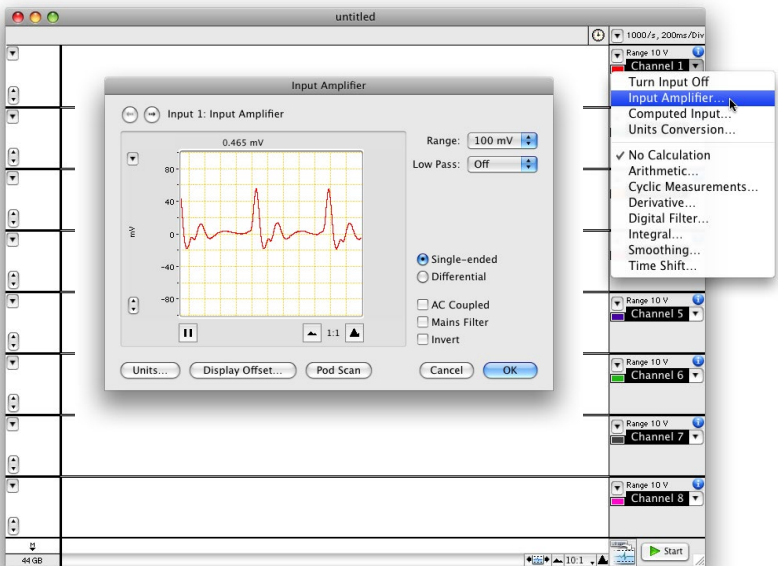
If the strap is too loose the signal will be weak or noisy. If the strap is excessively tight it will reduce blood flow to the finger, causing discomfort and weakening of the signal.



5. Recording Setup

The Input Amplifier allows you to set up the recording parameters and preview the signal using your chosen settings.

1. Click on the Channel 1 Function Popup Menu.
2. From the popup menu, choose **Input Amplifier...** to open the Input Amplifier dialog.
3. Use the **Range** drop-down list to adjust the sensitivity of the recording. Choose a range that provides you with a signal that fills 25-75% of the full scale.
4. Click **OK** to accept your settings.

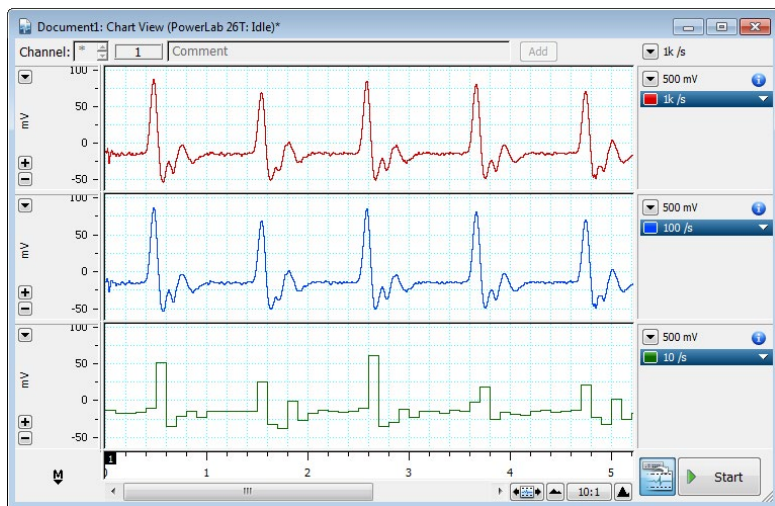
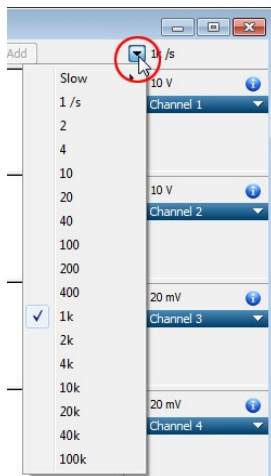


6. Sampling

When the PowerLab digitizes a signal, it records the voltage of the analog signal at discrete instants of time. The number of times that this happens per second is known as the sampling rate.

1. Click on the pop-up menu beside the Rate/Time display to open the Rate pop-up menu.
2. The sampling rates available are listed here.
3. Click **Start** and record for about 20 seconds at the default 1k/s sampling rate.
4. Repeat using sampling rates of 100 and 10 samples per second.

The sampling rate should be set high enough to capture all significant changes in the signal, but low enough to avoid excessive over-sampling.



Data recorded at 1k/s, 100/s and 10/s simultaneously into three separate channels.

7. Display

The scroll bar can help you move backwards and forwards through your file. In addition to the scroll bar, are the horizontal compression controls. The horizontal scroll and compression controls are the buttons in the bottom part of the Chart View, just to the right of the horizontal scroll bar.



The scale of the (vertical) amplitude axis of each channel can be independently shifted, stretched, compressed or set exactly for optimum data display.

- You can auto scale the axes in all channels simultaneously.
- You can manually set scale appearance options using the scale popup menu, accessed either by right-clicking on the vertical axis or clicking the button located at the top left of each channel's amplitude axis.
- Each axis has scaling buttons and the axis can be dragged in various ways.



- You can also continually auto scale the amplitude axes while recording or while reviewing data files by toggling the Continuous Auto Scale toolbar item.

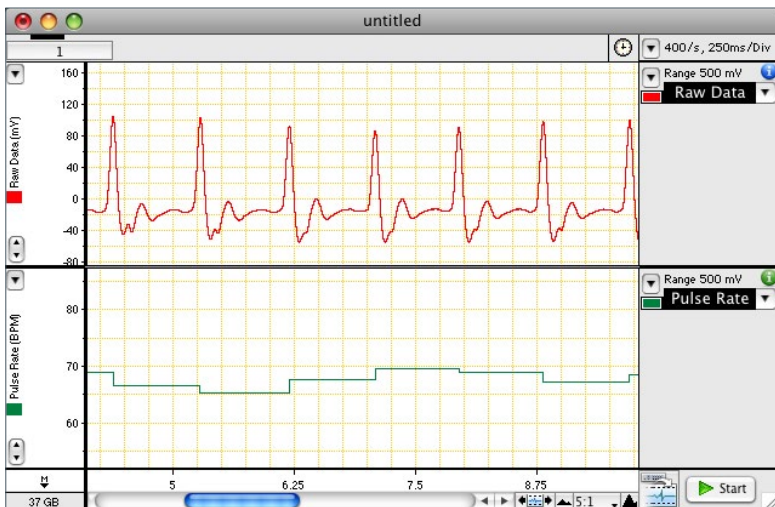
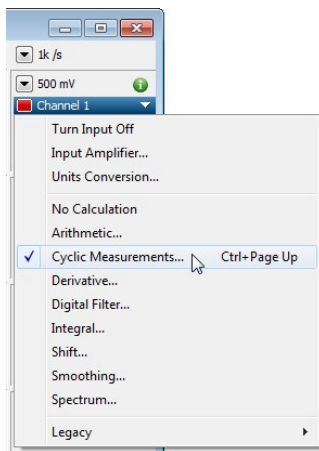


8. Channel Calculations

LabChart allows you to apply calculations to channels of recorded data. The calculated data are generated and displayed dynamically, so that they can be created, modified and removed as necessary.

In this exercise you will use Cyclic Measurements to calculate the heart rate from the raw pulse data in Channel 1.

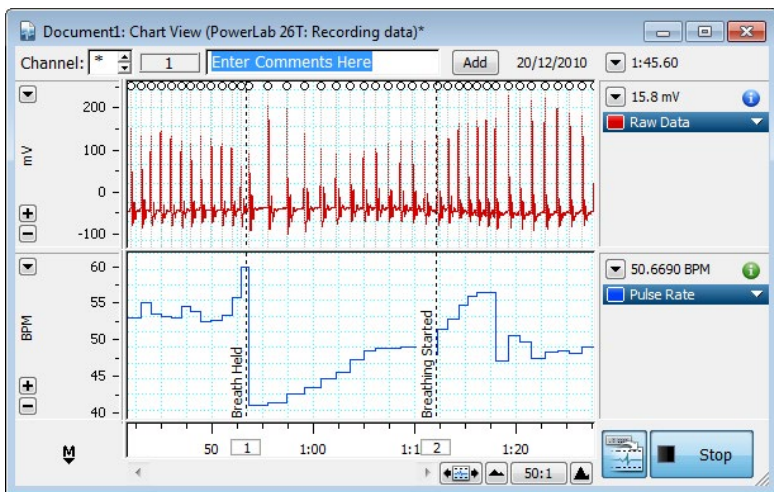
1. In Channel 2, select **Cyclic Measurements...** from the Channel Function pop-up menu.
2. In the Cyclic Measurements dialog choose the **Cardiovascular - Finger Pulse** preset from the detection settings panel.
3. Ensure that source is set to **Channel 1**, and measurement is set to **Rate**.
4. Click **Ok**.



9. Adding Comments

Comments allow you to annotate your data and they provide a quick and accurate method of locating places of interest.

1. Click **Start** to begin sampling.
2. Click the **Add** button to add a comment with the text in the comment bar. A vertical dotted line appears in the Chart View which marks the comment.
3. Type “*Breath Held*” into the comments bar.
4. After a few seconds of recording, take in a large breath and hold your breath and press the Enter key or click **Add**.
5. After 15-30 seconds of breath holding, start breathing and press the Enter key or click **Add** to add a blank comment.
6. After a few more seconds click **Stop**.
7. Choose **Window > Comments** to open the comments window. The comments window displays a list of all the comments and you can review, edit, delete and find comments.

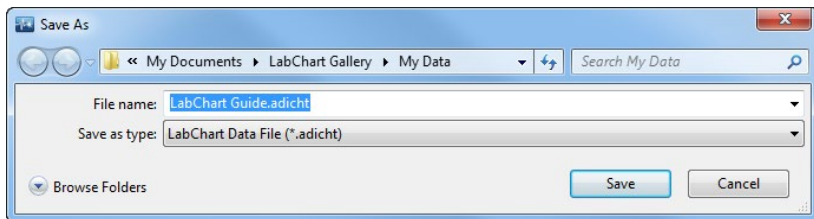


10. Saving/Export

To save the current LabChart file:

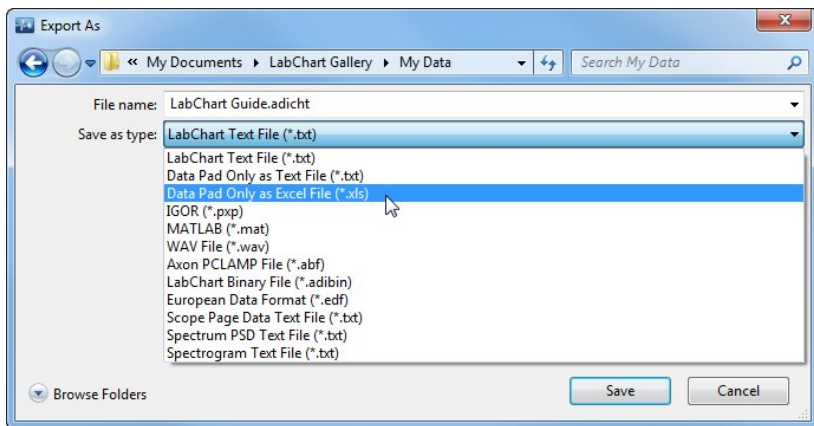
1. Choose **File > Save**.
2. Save your data as a LabChart data file.

Files saved into the LabChart Gallery will appear in the Welcome Center.



Exporting Data

1. Choose **File > Export...** (Windows) or **File > Save As...** (Mac)
2. Choose the file type to export from the drop-down list.
3. Choose an appropriate name and location and click save.



Additional Information

Chart View

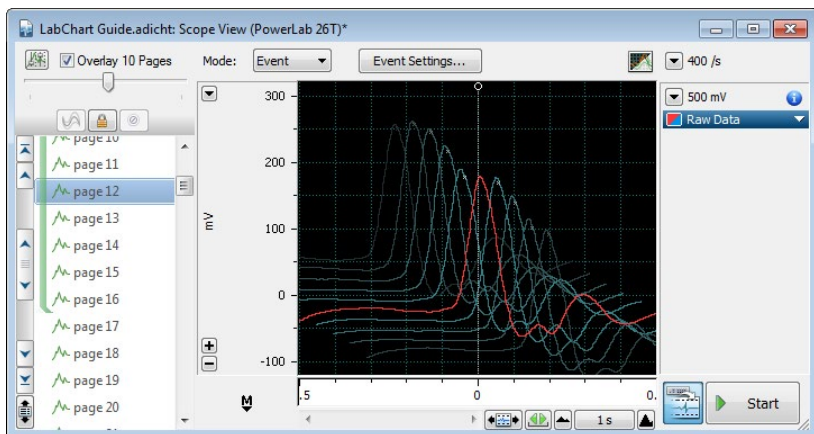
The Chart View is the main window in which data can be viewed in LabChart. The Chart View provides its own Start button, replicating the Start button in the toolbar. The Chart View can display up to 32 channels of data, with up to 16 input channels per PowerLab. LabChart allows you to apply calculations to recorded data and display the result in a separate channel. The calculated channel data is not actually stored in the file, but generated and displayed dynamically, so they can be updated and changed as necessary. See the Help for further information.

To open the Chart View, choose **Window > Chart View** from the menu.

Scope View

The Scope View provides a different way of looking at the same underlying data that the Chart View displays. Scope View presents data in a similar way to the sweeps of an oscilloscope. Each sweep is recorded to a different page, creating a pad of recorded waveforms, that can be averaged and overlaid. Scope View can generate pages based on blocks, events or comments. See the Help for further information.

To open the Scope View, choose **Window > Scope View** from the menu.



Additional Software

Extensions and Modules

LabChart extensions and modules are software additions to the LabChart application that add extra functionality, such as file translation capability or analysis capabilities for special areas of physiology. For example, the Metabolic Module, which calculates and displays a range of human metabolic variables using data recorded with LabChart, a PowerLab and appropriate front-end signal conditioners.

LabChart modules and Extensions can be downloaded using Feature Manager or through the ADInstruments online store.

LabChart Pro

The LabChart Pro package includes full-versions of all the latest LabChart modules for Windows and Mac OS.

LabChart Reader

LabChart Reader for Windows and Mac OS is a free viewer for files created with the LabChart application. LabChart Reader allows you to open and view LabChart data files, and to perform most of the same analysis that can be done with the full LabChart application.

LabChart Reader allows you to:

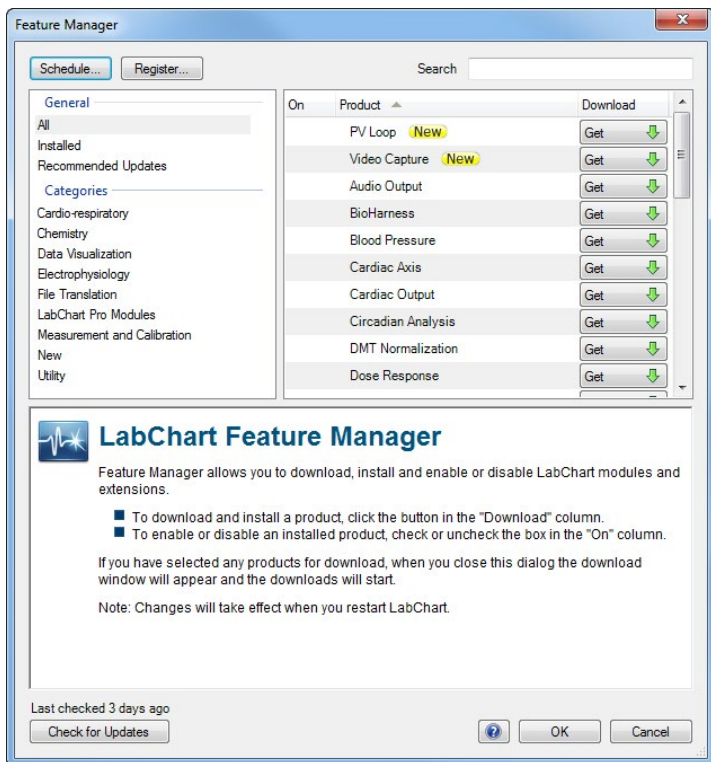
- Open and view LabChart data files as well as other formats.
- Share data with colleagues around the world for comment and discussion on the results and analysis.
- Provide research LabChart data for students to view and analyze in the laboratory/classroom.
- Display and analyze data during research and teaching presentations.
- Upload data files to websites and allow viewing of your data worldwide.

Feature Manager

The Feature Manager allows you to:

- Download and install LabChart software extensions and modules.
- Check for updates of LabChart software and any installed extensions and modules.
- Enable or disable any installed LabChart extensions and modules.
- Browse and search for new software from ADInstruments.

The Feature Manager can be accessed directly by selecting **Help > Feature Manager...** (Windows) or **LabChart > Feature Manager** (Mac).



Welcome Center

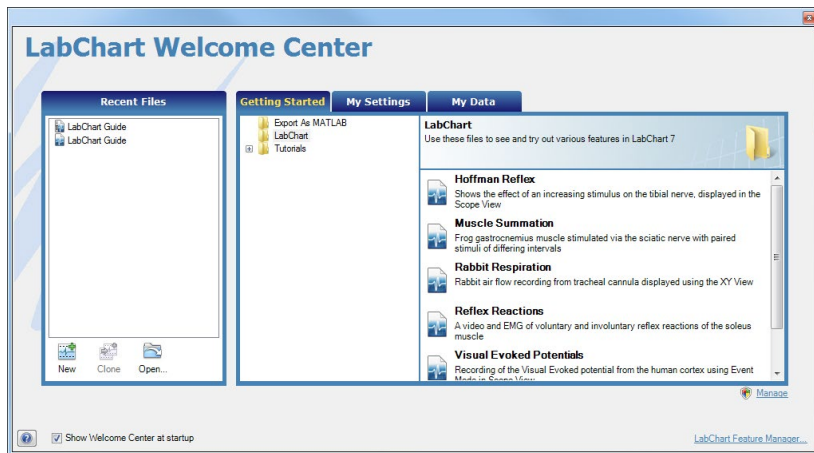
When you first open LabChart you will see the Welcome Center, which provides a convenient way to store and access LabChart data and settings files, as well as any related material such as documentation, text files or multimedia files. It also promotes good saving techniques, which is particularly useful when there are multiple users on a computer, such as students in a classroom laboratory.

Adding Files to the Gallery

The gallery integrates access to users' files with resource files from ADInstruments. When you create folders for the Welcome Center, these folders and their files appear in the gallery.

Files saved to the LabChart gallery folder will appear in the Welcome Center. There are two default LabChart gallery locations.

- User > Documents > LabChart Gallery > My Data
- User > Documents > LabChart Gallery > My Settings



You can open the Welcome Center by clicking on the home button in the bottom left-hand corner of the LabChart application window (Windows only) or by choosing **File > Welcome Center**.



Further Resources

There are many resources available to help you get the most from your LabChart system.

Help Menu

You can open the in-built LabChart help by choosing **Help > LabChart Help** from the menu. Each dialog in LabChart also has a help button that opens the help page for that topic. You can send feedback on help topics by clicking the send feedback link and entering your feedback in the form provided.

Forum

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