Quick Start Guide

MEASUREMENT COMPUTING™

Quick Start Guide

Measurement Computing Data Acquisition

MEASUREMENT COMPUTING

Document Revision 12, November, 2008

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About Measurement Computing data acquisition software

This Quick Start Guide contains the latest information on installing the *Measurement Computing Data Acquisition Software* you received with your Measurement Computing hardware. Please read this booklet completely before you install any software or hardware.

Measurement Computing's data acquisition software includes the following software packages:

- ***Insta*Cal & Universal Library** — Installation, calibration, and test utility, and programming library for Measurement Computing data acquisition hardware.
- **TracerDAQ** — Professional-grade Strip Chart, Oscilloscope, Function Generator, and Rate Generator applications.
- **Universal Library for LabVIEW™** — LabVIEW drivers for Measurement Computing data acquisition hardware.
- **Hardware User's Guides** — Hardware user's guides for Measurement Computing data acquisition hardware.

You select the packages that you want to install from the software installation dialog.

System requirements

You can install this *Measurement Computing Data Acquisition Software* package on a computer running one of these operating systems:

- Windows 2000 with Service Pack 4 (SP4)
- Windows XP with Service Pack 2 (SP2)
- Windows VISTA 32-bit version (only PCI and USB Measurement Computing hardware currently supported)

These operating systems are the only requirements for running *Insta*Cal.

The hardware and software requirements for the other packages are listed next.

Universal Library

Application development software that supports one or more of these 32-bit languages.

- **Microsoft® Windows® languages:** Visual Basic and Visual C/C++
- **.NET languages**: VB .NET, C# .NET (Visual Studio® 2003 and 2005)
- **Borland® Windows languages:** Borland C++, Borland C++ Builder®, Delphi®

TracerDAQ

You can run TracerDAQ on a computer running one of the following operating systems and software.

- Microsoft® Windows 2000 (SP4), Windows XP (SP2), Windows Vista
- Microsoft .NET® Framework 2.0
- DirectX 9.0c
- Measurement Computing's *Insta*Cal

TracerDAQ installation automatically installs the Microsoft .NET® Framework 2.0 and DirectX 9.0c if these applications are not already installed.

Hardware requirements

- Video card with 16 MB of memory and support for Direct3D Acceleration
- Minimum screen resolution of 1024 x 768
- Computer with Pentium® 4 processor and 256 MB of RAM
- A Microsoft-compatible mouse
- Supported Measurement Computing data acquisition hardware—PCI Series, USB Series, WLS Series, or PC-CARD devices

Universal Library for LabVIEW

- *Insta*Cal & Universal Library
- LabVIEW 6.0 or later

Hardware User's Guides

Software requirements:

Adobe® Reader®

Adobe Reader is automatically selected if you select to install the hardware user's guides and do not have this program currently installed.

If you do not install the Measurement Computing hardware user's guides during the DAQ software installation, you can open or copy these documents from the *ICalUL/Documents/UsersGuides* folder on the Measurement Computing DAQ Software CD.

To use Measurement Computing DAQ software with a Measurement Computing device, install the latest Windows Update. You can run Windows Update from http://update.microsoft.com/windowsupdate/v6/default.aspx?ln=en-us.

For more information…

If you have questions that you cannot answer by reading this booklet, refer to these resources:

- web site – www.mccdaq.com
- TracerDAQ technical support is available via email at freesupport@mccdaq.com. TracerDAQ online help is also available.
- Measurement Computing user's guides (PDF) at www.mccdaq.com/manuals.html and Measurement Computing hardware specifications (PDF) at www.mccdaq.com/specs.html
- Tech support contact information:

  Email: info@mccdaq.com

  Phone: 508-946-5100 and follow the instructions for reaching Tech Support.

  Fax: 508-946-9500 to the attention of Tech Support

  Users forum: http://forums.mccdaq.com

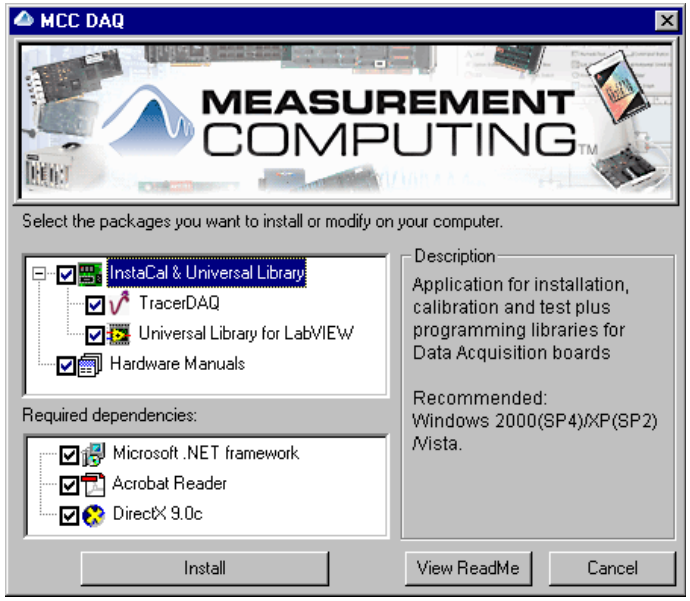
Installing the Measurement Computing DAQ software

The DAQ Software installation program consists of a series of easy-to-follow dialogs that lead you through the installation procedure. To install the Measurement Computing DAQ software, do the following.

1. Insert the *Measurement Computing Data Acquisition Software* CD in your CD drive and wait for the installation program to start.

   If the installation program does not start automatically, use Windows Explorer to browse to the root of the CD, and double-click on Install.exe.

   The **MCC DAQ** dialog opens.



   All software packages are selected for installation (☑) by default if the requirements for the package are met.

   - When you click on a package, a brief description of it appears in the **Description** frame, along with the requirements to install that package.
   - After you click on a package, you can click on the **View ReadMe** button to view the readme file for that package.

2. If you do not want to install a software package, click on the check box next to it to uncheck it (☐).

   The **Required dependencies** area of the dialog lists the software packages needed to run the Measurement Computing DAQ software you selected to install. This area may be blank, or may list one or more of the following packages.

   Adobe Reader - Adobe Reader is required to read the hardware user's guides. If you do not have Adobe Reader installed, it is selected in the **Required dependencies** area.

   If you have an earlier version already installed, installing the latest version is optional. Deselect the **Adobe Reader** check box to keep your currently installed version.

   Microsoft .NET framework - The .NET Framework 2.0 is required to install TracerDAQ and the hardware user's guides. If the framework is not detected on your PC, this package is listed and the checkbox checked. In this case, it is recommended that you leave the **Microsoft .NET framework** check box checked. If you uncheck the **Microsoft .NET framework** check box, the **TracerDAQ** and **Hardware Manuals** check boxes become disabled, the **Adobe Reader** check box becomes unchecked, and these software packages do not get installed.

3. Click on the **Install** button and follow the instructions on the installation dialogs.

   If **Microsoft .NET framework** was listed and checked in the **Required dependencies** area, the install program installs version 2.0 of the .NET framework before launching the *Insta*Cal & Universal Library installation program. The installation program automatically installs each selected software product in succession. After all of the selected Measurement Computing DAQ components are installed, a dialog opens which allows you to install Adobe Acrobat Reader.

Installation of *Insta*Cal & Universal Library requires you to restart your computer after installing. You are prompted to restart your computer after all of the selected products are installed.

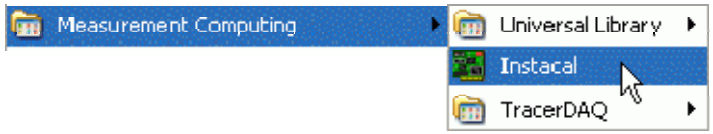
Running *Insta*Cal and adding your hardware

This section contains hands-on examples that show you how to configure and test your hardware using *Insta*Cal and the DEMO-BOARD, which is a virtual ISA data acquisition board.

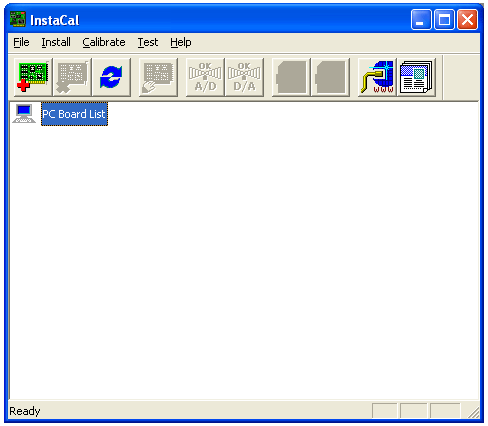
Run *Insta*Cal and add the DEMO-BOARD

This section explains how to run *Insta*Cal and add the DEMO-BOARD to the *Insta*Cal configuration.

1. To run *Insta*Cal, click on **Start►All Programs►Measurement Computing►InstaCal**.



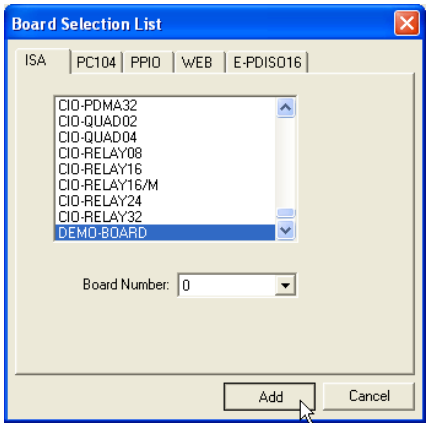
*Insta*Cal's main form opens.



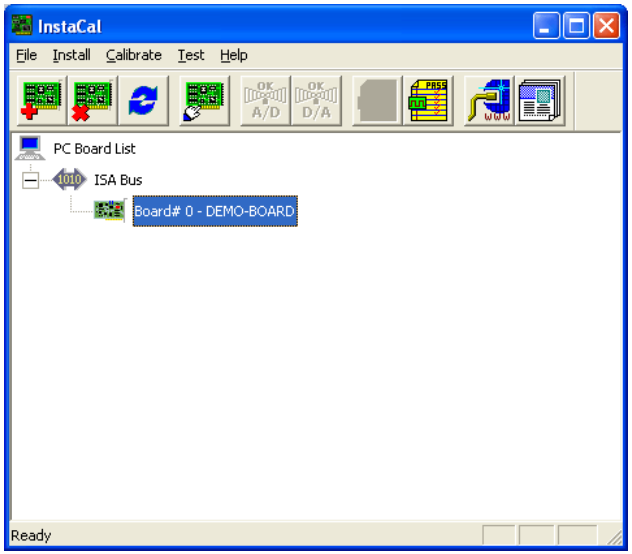
2. Click the right mouse button on the **PC Board List**, and select **Add Board...** from the popup menu.

The **Board Selection List** dialog opens.

3. Click on the **ISA** tab.
4. Scroll down to select *DEMO-BOARD*, and then click on the **Add** button.



The DEMO-BOARD is added to *Insta*Cal's main form.



Now that you have added the DEMO-BOARD you can use this form to configure and test the DEMO-BOARD.

Configuring and testing the DEMO-BOARD with *Insta*Cal

You can configure and test the DEMO-BOARD with *Insta*Cal.

For other Measurement Computing devices, the available configuration settings and testing options vary depending on the type of device and the features it offers.

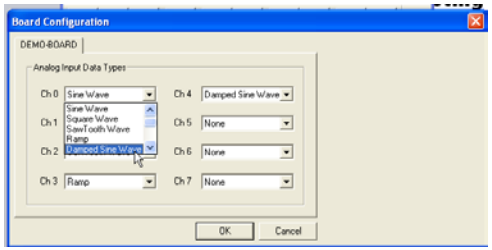
Configuring channel 0 on the DEMO-BOARD

In the following example, you use *Insta*Cal to change the configuration of channel 0 on the DEMO-BOARD.

1. On the **PC Board List**, double-click on the *DEMO-BOARD* item.

   The **Board Configuration** dialog for the DEMO-BOARD opens.

2. Change the input type for channel 0 from *Sine Wave* to *Damped Sine Wave*, and click on the **OK** button to close the dialog.



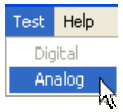
Now, you can run a test using *Insta*Cal to make sure the DEMO-BOARD's channel 0 generates a damped sine wave.

Testing channel 0 on the DEMO-BOARD

*Insta*Cal includes options to test the analog and/or digital features of your Measurement Computing hardware.

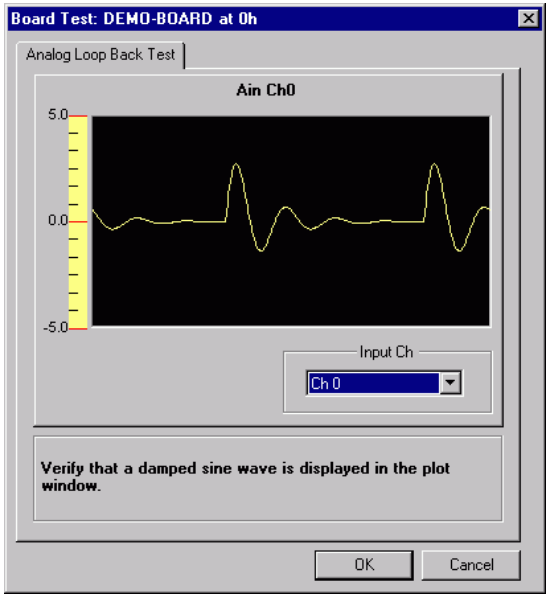
For the DEMO-BOARD, you can run an analog loop back test to make sure a channel is generating the proper waveform.

1. Make sure the *DEMO-BOARD* is still selected on the **PC Board List**.
2. From the **Test** menu, select **Analog**.



The **Board Test: DEMO-BOARD at 0h** dialog opens.

3. Make sure *Ch 0* is selected in the **Input Ch** drop-down list, and a damped sine wave shows on the display. Then click on the **OK** button to close the dialog.



4. From the **File** menu, select **Exit** to close the *Insta*Cal.

Next, you will learn how to run TracerDAQ's Strip Chart application to acquire, plot, and log data from four channels on the DEMO-BOARD.

Plotting and generating data with TracerDAQ

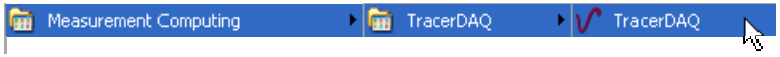
TracerDAQ includes the following applications:

- Strip Chart with data logging functionality
- Oscilloscope
- Function Generator
- Rate Generator.

Hands-on examples for each TracerDAQ application are included in the following sections.

After you configure and test your hardware with *Insta*Cal, you can run TracerDAQ and use the DEMO-BOARD with the Strip Chart and Oscilloscope.

To run TracerDAQ, click on **Start►Programs►Measurement Computing►TracerDAQ►TracerDAQ**.

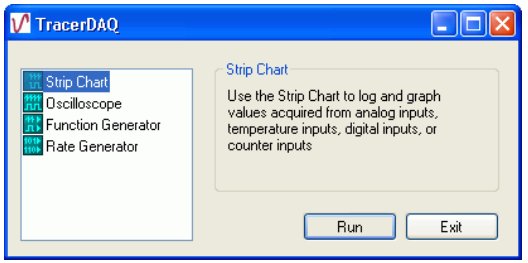


The **TracerDAQ** dialog opens. You can run any of the four TracerDAQ applications from this dialog.

Acquiring and logging data with the Strip Chart

Use the Strip Chart to acquire and log data from up to eight analog input, temperature input, digital input, or event counter channels

To run the Strip Chart, highlight it on the application list, and then click the **Run** button.

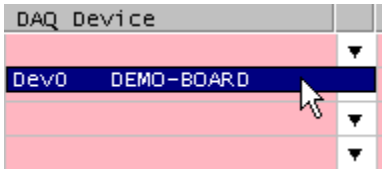


The **Strip Chart** window opens.

Configuring the Strip Chart

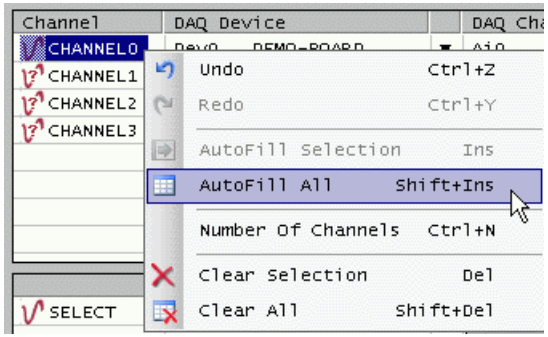
Once the **Strip Chart** window is open, you need to select the hardware, channel(s), and data range used as the data source.

1. From the **File** menu, select **New...**. The **DAQ Hardware Settings** dialog opens.
2. From the first row of the **DAQ Device** column, select the **DEMO-BOARD** from the list-box.



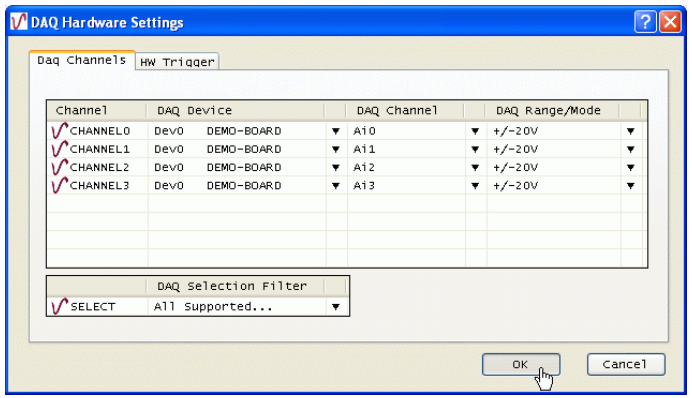
   The drop-down list shows the device ID and device name for all boards that are configured by *Insta*Cal. When you select a device, the first channel and range supported by the device appear in the **DAQ Channel** and **DAQ Range/Mode** columns.

3. Right-mouse click on the first column, and select **AutoFill All** from the popup menu. This automatically configures the **DAQ Device**, **DAQ Channel** and **DAQ Range/Mode** for the remaining channels on the dialog.



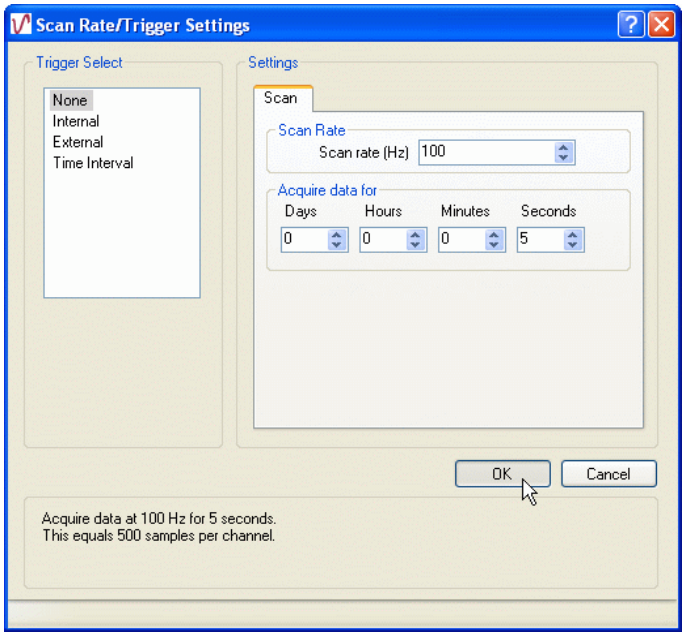
The dialog automatically becomes configured to acquire data from four channels on the DEMO-BOARD.

4. Click on the **OK** button to save the settings and close the dialog.



5. From the **Edit** menu, select **Scan Rate/Trigger Settings…**. The **Scan Rate/Trigger Settings** dialog opens.

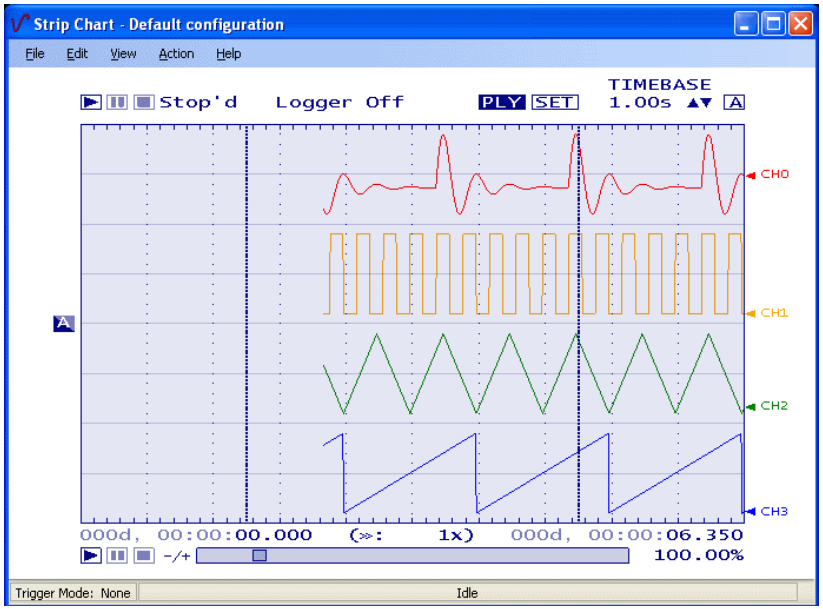
6. Change the **Acquire data for**.settings so that the scan runs for 5 seconds, and then click on the **OK** button to save the settings and close the dialog.



7. To view plots that don't overlap, click on the scan mode hotspot () on the upper right side of the strip chart window until it turns to  (non-overlap mode).

8. Click the **Run** button (▶) on the Strip Chart to acquire data from the DEMO-BOARD.

   The Strip Chart acquires and displays data from the first four channels (0 -3) of the DEMO-BOARD.



That's all there is to it! The Strip Chart provides many options for working with Strip Chart data and customizing the Strip Chart display. To learn more about the Strip Chart, select **TracerDAQ Help** from TracerDAQ's **Help** menu.

Additional features available in TracerDAQ Pro's Strip Chart

If you upgrade to TracerDAQ Pro, you can also:

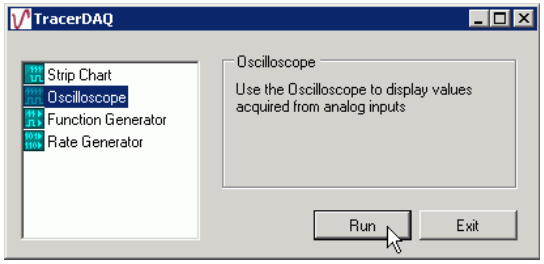
- acquire and plot data from up to 32 channels
- acquire and plot up to 1 million samples per channel
- set alarm conditions
- set software, hardware, and time-of-day triggering
- apply linear scaling

To learn about these and other Strip Chart features available only with TracerDAQ Pro, refer to www.mccdaq.com/TDPro

Acquiring data with the Oscilloscope

Use the Oscilloscope to acquire and plot data from up to two analog input channels.

To run the Oscilloscope, highlight it on the application list, and then click the **Run** button.

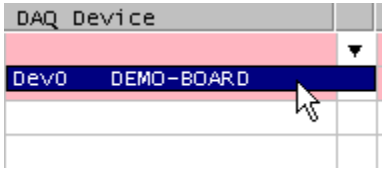


The **Oscilloscope** window opens.

Configuring the Oscilloscope

Once the **Oscilloscope** window is open, you need to select the hardware, channel(s), and data range used as the data source.

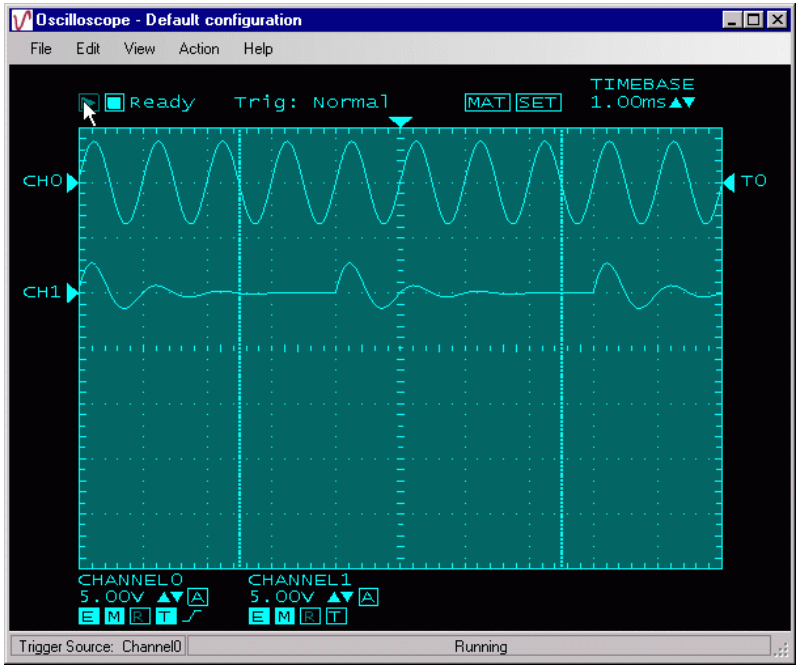
1. From the **File** menu, select **New...**. The **DAQ Hardware Settings** dialog opens.
2. From the first row of the **DAQ Device** column, select the **DEMO-BOARD** from the list-box.



   The drop-down list shows the device ID and device name for all boards that are configured by *Insta*Cal. When you select a device, the first channel and the default range supported by the device appear in the **DAQ Channel** and **DAQ Range/Mode** columns.

3. Right-mouse click on the first column, and select **AutoFill All** from the pop up menu. This automatically configures the **DAQ Device**, **DAQ Channel** and **DAQ Range/Mode** for the remaining channel on the dialog.

4. Click on the **DAQ Range/Mode** column's down arrow and select *+/-5V*. The range automatically updates for both channels.
5. On the **Oscilloscope** window, click on the Start button ( ).
6. The Oscilloscope acquires and displays data from the first two channels (0 - 2) of the DEMO-BOARD.



7. To stop the scan, click on the **Stop** button ( ).

That's all there is to it! The Oscilloscope provides many options for working with Oscilloscope data and customizing the Oscilloscope display. To learn more about the Oscilloscope, select **TracerDAQ Help** from TracerDAQ's **Help** menu.

Additional features available in TracerDAQ Pro's Oscilloscope

If you upgrade to TracerDAQ Pro, you can also:

- acquire and plot data from up to four analog input channels
- set up a reference and math channel

To learn about these and other Oscilloscope features available only with TracerDAQ Pro, refer to www.mccdaq.com/TDPro.

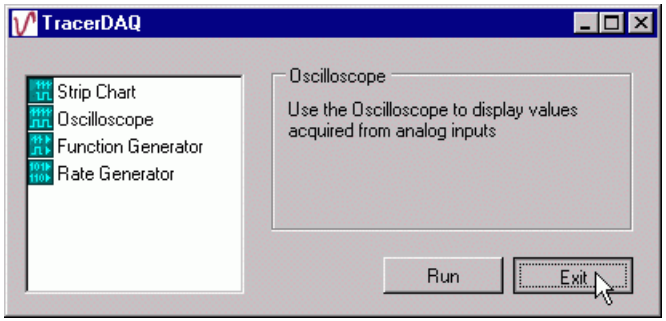
Generating waveforms with the Function Generator

Use the Function Generator to output sine wave data to one analog output channel.

To use TracerDAQ's Function Generator application, you first need to install a Measurement Computing device with analog output channels and add it to *Insta*Cal.

In order for the Function Generator to detect this device, you must add it to *Insta*Cal when TracerDAQ is not running.

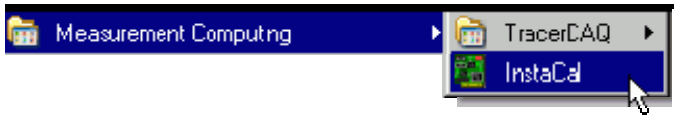
1. If you are running any TracerDAQ application, close the application by selecting **Exit** from the **File** menu.
2. Close TracerDAQ by clicking on the **Exit** button on the main **TracerDAQ** dialog.



Adding a Measurement Computing analog output device to *Insta*Cal

This section explains how to run *Insta*Cal and add an analog output device to the *Insta*Cal configuration.

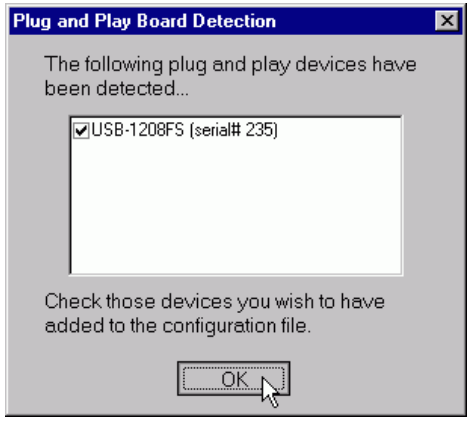
1. Follow the steps in the analog output device's user guide to install the device in your computer.
2. Run *Insta*Cal by selecting **Start►All Programs►Measurement Computing►InstaCal**.



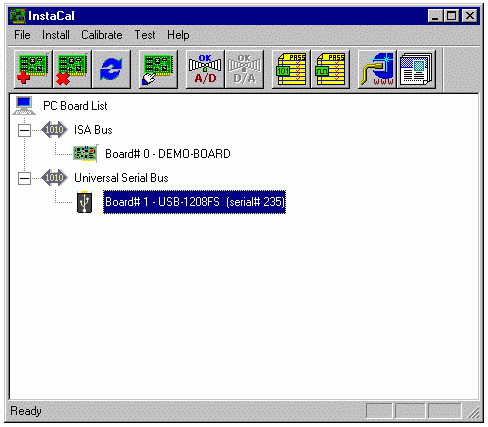
The **Plug and Play Hardware Detection** dialog opens with the analog output device listed.

3. Select the analog output device you want to add to the *Insta*Cal configuration file, and then click on the **OK** button.

   This example shows the USB-1208FS.



   The **Plug and Play Hardware Detection** dialog closes, and the *Insta*Cal main form becomes active.



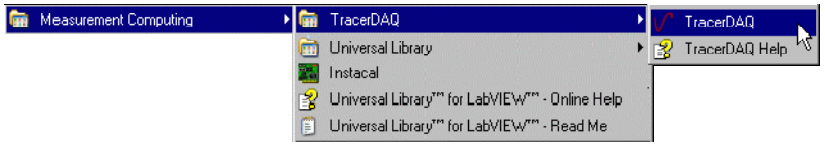
4. Use *Insta*Cal to perform any configurations and tests on the device. When you are done, close *Insta*Cal by selecting **Exit** from the **File** menu.

Configuring and running the Function Generator

Now that your analog output device has bee added to *Insta*Cal, you can run TracerDAQ and access the device from the Function Generator.

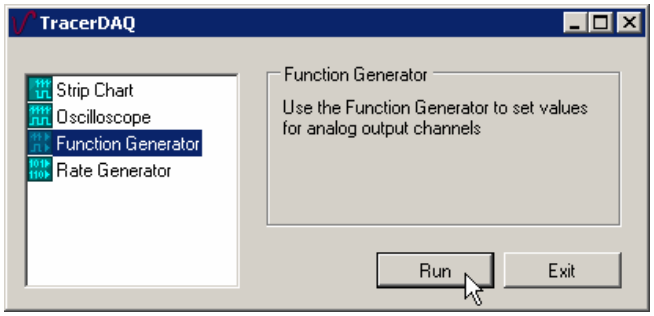
To generate a waveform with the Function Generator:

1. Run TracerDAQ by selecting **Start►Programs►Measurement Computing►TracerDAQ►TracerDAQ**.

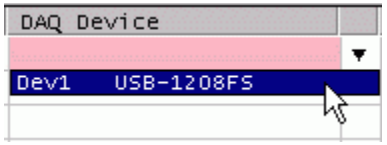


   The **TracerDAQ** dialog opens.

2. To run the Function Generator, highlight it on the application list, and then click the **Run** button.



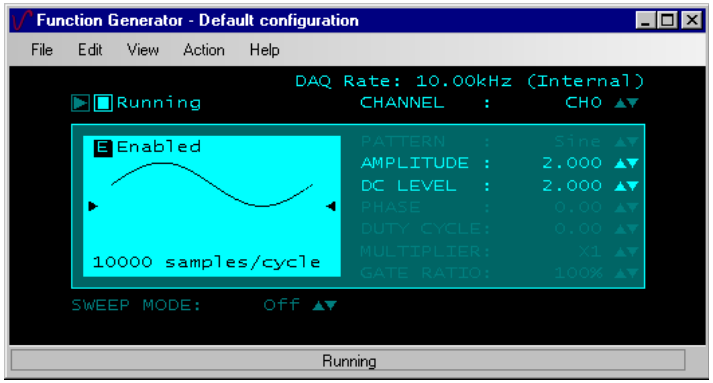
3. The **Function Generator** window opens.
4. Select **New...** from the **File** menu. The **DAQ Hardware Settings** dialog opens.
5. From the first row of the **DAQ Device** column, select the analog output device from the list-box. A USB-1208FS is used for this example.



   The drop-down list shows the device ID and device name for all analog output devices that are configured by *Insta*Cal. When you select a device, the first analog output channel and the default range supported by the device appear in the **DAQ Channel** and **DAQ Range/Mode** columns.

6. Click on the **OK** button to save the settings and close the dialog.
7. Click the **Run** button ( ) on the Function Generator to start an output scan that sends waveform data to the configured channel. The USB-1208FS requires a positive DC level setting equal to the amplitude setting to avoid clipping the waveform at 0 volts.

   The Function Generator sends a sine wave pattern with the amplitude and DC level option settings shown in the example below.



8. To stop the scan, click on the **Stop** button ( ).

That's all there is to it! The Function Generator provides many options that let you change the properties of the waveform, DAQ hardware, and the Function Generator display. To learn more about the Function Generator, select **TracerDAQ Help** from TracerDAQ's **Help** menu.

Additional features available in TracerDAQ Pro's Function Generator

If you upgrade to TracerDAQ Pro, you can also:

- generate square, triangle, flat, pulse, ramp, random, and arbitrary waveforms from a text file (.csv or .txt)
- set duty cycle, phase, gate ratio, and rate multiplier options
- enable a linear or exponential sweep of the waveform

For more information on TracerDAQ Pro, refer to www.mccdaq.com/TDPro

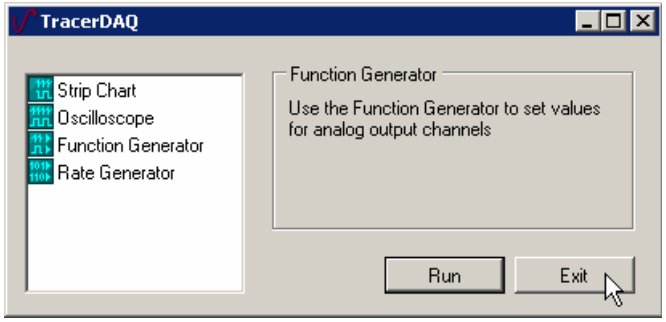
Generating waveforms with the Rate Generator

Use the Rate Generator to output data to one counter output channel.

To use TracerDAQ's Rate Generator application, you first need to install a Measurement Computing counter output device and configure it in *Insta*Cal.

In order for the Rate Generator to detect this device, you must add it to *Insta*Cal when TracerDAQ is not running.

1. If you are running any TracerDAQ application, close the application by selecting **Exit** from the **File** menu.
2. Close TracerDAQ by clicking on the **Exit** button on the main **TracerDAQ** dialog.



Adding a Measurement Computing counter output device to *Insta*Cal

This section explains how to run *Insta*Cal and add a counter output device to the *Insta*Cal configuration.

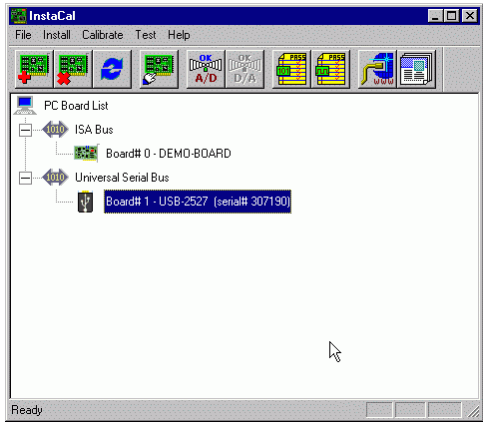
1. Follow the steps in the counter output device's user guide to install the device in your computer.
2. Run *Insta*Cal by selecting **Start►All Programs►Measurement Computing►InstaCal**.

The **Plug and Play Hardware Detection** dialog opens with the counter output device listed.

3. Select the analog output device you want to add to the *Insta*Cal configuration file, and then click on the **OK** button.

   This example shows the USB-2527.

The **Plug and Play Hardware Detection** dialog closes, and the *Insta*Cal main form becomes active.



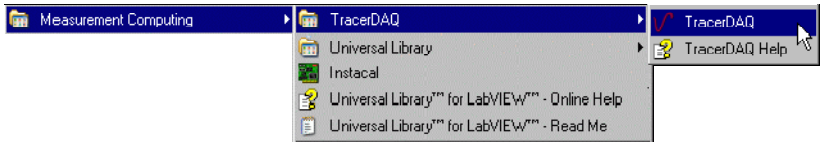
4. Use *Insta*Cal to perform any configurations and tests on the device. When you are done, close *Insta*Cal by selecting **Exit** from the **File** menu.

Configuring and running and the Rate Generator

Now that your counter output device has been added to *Insta*Cal, you can run TracerDAQ and access the device from the Rate Generator.

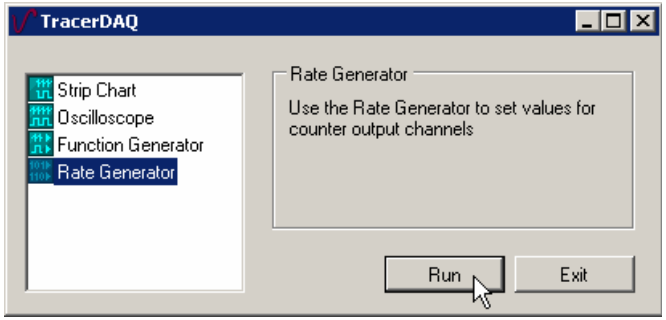
To generate a square waveform with the Rate Generator:

1. Run TracerDAQ by selecting **Start►Programs►Measurement Computing►TracerDAQ►TracerDAQ**.

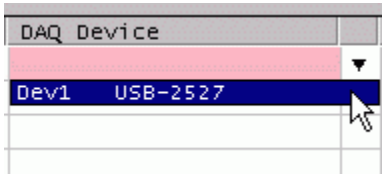


   The **TracerDAQ** dialog opens.

2. To run the Rate Generator, highlight it on the application list, and then click the **Run** button.



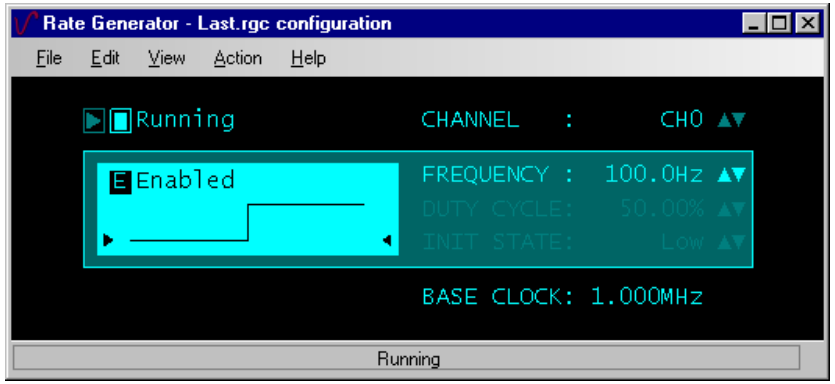
3. The **Rate Generator** window opens.
4. Select **New...** from the **File** menu. The **DAQ Hardware Settings** dialog opens.
5. From the first row of the **DAQ Device** column, select the counter output device from the list-box. A USB-2527 is used for this example.



The drop-down list shows the device ID and device name for all counter output devices that are configured by *Insta*Cal. When you select a device, the device's first counter output channel appears in the **DAQ Channel** column. The **DAQ Range/Mode** column is disabled.

6. Click on the **OK** button to save the settings and close the dialog.
7. Click the **Run** button ( ) on the Rate Generator to start an output scan that sends waveform data based on the frequency option settings to the default channel.

   By default, the Rate Generator sends a square wave pattern with the option settings shown in the example below.



8. To stop the scan, click on the **Stop** button ( ).

That's all there is to it! The Rate Generator provides many options that let you change the properties of the waveform, DAQ hardware, and the Rate Generator display. To learn more about the Rate Generator, select **TracerDAQ Help** from TracerDAQ's **Help** menu.

Additional feature available in TracerDAQ Pro's Rate Generator

If you upgrade to TracerDAQ Pro, you can generate waves for up to 20 counter output channels.

For more information on TracerDAQ Pro, refer to www.mccdaq.com/TDPro

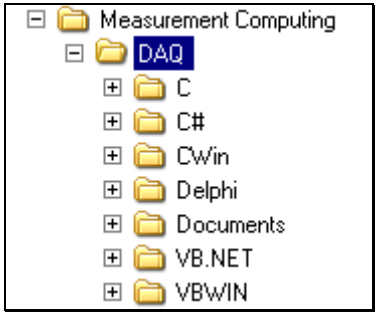
Getting started with the Universal Library

The Universal Library provides a programming library you can use to develop applications that control Measurement Computing hardware.

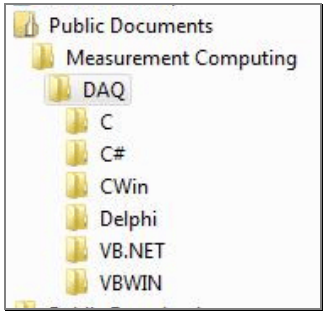
The Universal Library supports programming in Visual Basic, VB .NET Visual C/C++, C# .NET, Borland C++, Delphi, and other languages.

The Universal Library is automatically installed with *Insta*Cal. The default installation directory is *\Program Files\Measurement Computing\DAQ*.

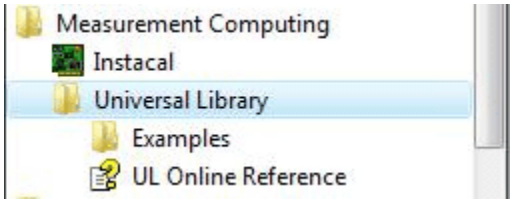
- If you are running Windows 2000 or XP, and chose to install the Universal Library examples, they are installed in individual sub-folders in the *DAQ* folder, as shown here.



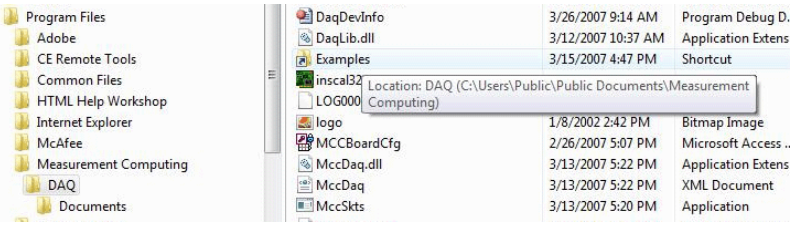
- If you are running Windows Vista, and chose to install the Universal Library examples, they are installed in individual sub-folders in the *Users\Public\PublicDocuments\Measurement Computing\DAQ* folder, as shown here.



There are shortcuts to this folder on the Windows Vista Start menu…



…and in the *\Program Files\Measurement Computing\DAQ* folder.



To learn about the Universal Library functions and how to use them with Measurement Computing hardware, refer to the Universal Library help file (ULHelp.chm) located in the *DAQ* folder.

For information on your specific Measurement Computing device, use the **Search** tab in the help file. The help topic for your device shows the subset of Universal Library functions that your device supports.

Getting started with the Universal Library for LabVIEW

The Universal Library for LabVIEW provides drivers that enable you to create LabVIEW applications that control Measurement Computing hardware.

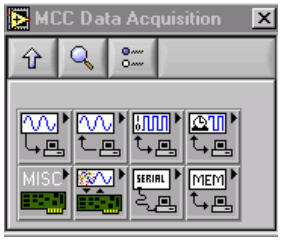
If you installed the Universal Library for LabVIEW, example programs are installed by default to the *\Program Files\National Instruments\LabVIEW X.x/examples/Universal Library* folder (where *X.x* is the version of LabVIEW you have installed).

To build an application from scratch, launch LabVIEW, create a new project, and then do the following:

1. Make the **Diagram** window of the project the active window. If the **Panel** window is currently active, select the **Show Diagram** option from the **Window** menu.
1. From the **Diagram** window, select the **Show Functions Palette** option from the **Window** menu to open the **Functions** palette.
2. From the **Functions** palette, click on the **User Libraries** icon to open the **User Libraries** palette.

3. From the **User Libraries** palette, click on the **MCC** icon to open the **MCC Data Acquisition** palette.

4. Select the VI you want to use by clicking on the appropriate icon. Move the cursor back to the **Diagram** window and click to place the VI.



After placing the VIs you want to use on the **Diagram** window, you can wire them together. Save the application prior to testing.

Refer to the help for information on each VI and its input and output parameters.

To learn about the Universal Library for LabVIEW VIs, refer to the Universal Library for LabVIEW help file (ULLVHelp.chm) located by default in the *\Program Files\National Instruments\LabVIEW X.x\menus\Universal Library* folder.

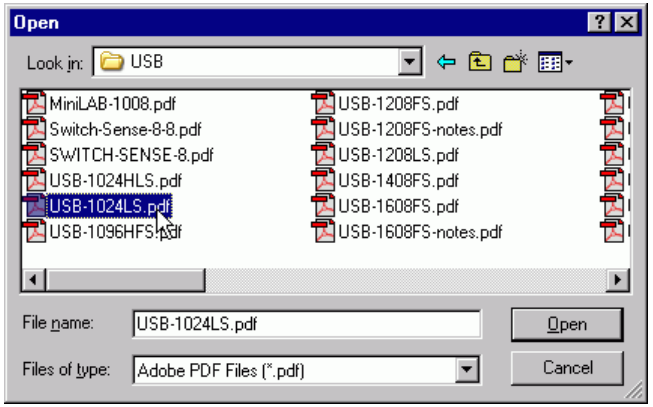
Opening your Measurement Computing hardware user's guides

If you installed the Measurement Computing hardware user's guides during the DAQ software installation, you can open your hardware manual right from within *Insta*Cal.

You need Adobe® Reader® to open the user's guides. You can install this software from the *AcrobatReader* folder on the CD.

1. Select **User's Guides** from *Insta*Cal's **Help** menu.

2. From the **Open** dialog, double-click on the folder for the type of board whose manual you want to install (*USB*, *PCI*, and so on).
3. Double-click on the PDF hardware manual you want to open.



Accessing hardware user's guides from the Measurement Computing DAQ Software CD

If you did not install the Measurement Computing hardware user's guides during the DAQ software installation, you can open or copy these documents from the *ICalUL/Documents/UsersGuides* folder on the Measurement Computing DAQ Software CD.

Problems installing or running your Measurement Computing DAQ software?

For software and hardware questions:

Email: info@mccdaq.com

Phone: 508-946-5100 and follow the instructions for reaching Tech Support.

Fax: 508-946-9500 to the attention of Tech Support

Users forum: http://forums.mccdaq.com

Customers outside of the U.S. should contact their local Measurement Computing distributor for support. Refer to the web page below to locate the distributor near you.

http://www.mccdaq.com/sales.asp

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Measurement Computing Corporation
10 Commerce Way
Suite 1008
Norton, Massachusetts 02766
(508) 946-5100
Fax: (508) 946-9500
E-mail: info@mccdaq.com
www.mccdaq.com

Measurement Computing Corporation
10 Commerce Way
Norton, MA 02766
Tel: (508) 946-5100 **Fax:** (508) 946-9500
www.mccdaq.com