RELEASE NOTES

Measurement Studio

These release notes introduce Measurement Studio 2012. Refer to this document for information about installation requirements, driver support version information, installation instructions, deployment requirements, new features and functionality, and resources in Measurement Studio 2012.

For a complete introduction to Measurement Studio and to learn about Measurement Studio concepts, controls, and features, refer to the *Getting Started with Measurement Studio* guide. Select **Start»All Programs»National Instruments»<Measurement Studio>»Getting Started Guide** to access the guide.

For a list of fixed bugs and known issues, refer to the *Measurement Studio Readme*. There is a different *Measurement Studio Readme* for each supported version of Visual Studio. The *Measurement Studio Readme* files are available in the `Readme` folder under the root directory of your installation media and are linked from the Autorun application. After installing Measurement Studio 2012, select **Start»All Programs»National Instruments»<Measurement Studio>»Readme** to access the *Measurement Studio 2012 Readme*.

Note There are separate Start menu items for each version of Visual Studio support that you have installed.

About Measurement Studio

Measurement Studio is an integrated suite of tools and class libraries designed to help developers create measurement and automation Windows Forms, Windows Presentation Foundation (WPF), and Web Forms applications using Microsoft .NET technologies.

Measurement Studio provides object-oriented measurement hardware interfaces, advanced analysis libraries, scientific user interface controls, measurement data networking libraries, wizards, interactive code designers, and highly extensible .NET classes. You can use Measurement Studio to develop a complete measurement and automation application that includes data acquisition, analysis, and presentation functionalities.

What's New in Measurement Studio 2012

Measurement Studio 2012 includes the following new features:

- Windows Presentation Foundation (WPF) controls for Visual Studio 2010 support
- Windows Forms and Web Forms controls enhancements
  - Elapsed time format for graph and numeric pointer controls
  - New autoformats for the complex, intensity, scatter, and waveform graphs

  - Axis base line width customization for graph controls
  - Scale base line width customization for numeric pointer controls
- New classes and methods for Analysis .NET class libraries
- Additional improvements
  - New ComplexInt16 data type for Visual Studio 2010 support
  - Support for appending to waveform data types
  - Direct access to waveform data type buffers
  - Support for concurrent licensing
  - Bug fixes

Installation Requirements

Measurement Studio 2012 includes support for Visual Studio 2010, Visual Studio 2008, and Visual Studio 2005. The following are the installation requirements for each supported version of Visual Studio.

Installation Requirements for Visual Studio 2010 Support

To install and run Measurement Studio support for Visual Studio 2010, your computer must have the following:

- Microsoft operating system:
  - Windows 7 (32-bit or 64-bit), including Starter Edition (32-bit)
  - Windows Vista, Service Pack 1 (32-bit or 64-bit)
  - Windows XP, Service Pack 3 (32-bit)
  - Windows Server 2003 R2 (32-bit)
  - Windows Server 2008 R2 (64-bit)
- Microsoft .NET Framework 4.0
- Visual Studio 2010:
  - Ultimate Edition
  - Premium Edition
  - Professional Edition
  - Visual C# Express Edition
  - Visual Basic Express Edition
  - Visual Web Developer Express Edition
- Intel Pentium III class processor, 1.6 GHz or higher
- DirectX 9-capable video card running at 1024 x 768 or higher-resolution display
- 1 GB (32-bit) or 2 GB (64-bit) RAM
- 1.2 GB of free hard disk space
- Microsoft-compatible mouse
- Microsoft Internet Explorer 6.0

Installation Requirements for Visual Studio 2008 Support

To install and run Measurement Studio support for Visual Studio 2008, your computer must have the following:

- Microsoft operating system:
  - Windows 7 (32-bit or 64-bit), including Starter Edition (32-bit)
  - Windows Vista, Service Pack 1 (32-bit or 64-bit)
  - Windows XP, Service Pack 2 (32-bit)
  - Windows Server 2003 R2 (32-bit)
  - Windows Server 2008 R2 (64-bit)
- Microsoft .NET Framework 3.5
- Visual Studio 2008:
  - Team System Edition
  - Professional Edition
  - Standard Edition
  - Visual C# Express Edition
  - Visual Basic .NET Express Edition
  - Visual Web Developer Express Edition

Note You must have Visual Studio 2008 Service Pack 1 or later installed on your machine for Measurement Studio to function properly.

- Intel Pentium III class processor, 1.6 GHz or higher
- Video display—1024 × 768
- 512 MB of RAM (1024 MB or more recommended)
- 800 MB of free hard disk space
- Microsoft-compatible mouse
- Microsoft Internet Explorer 6.0

Installation Requirements for Visual Studio 2005 Support

To install and run Measurement Studio support for Visual Studio 2005, your computer must have the following:

- Microsoft operating system:
  - Windows 7 (32-bit or 64-bit), including Starter Edition (32-bit)
  - Windows Vista, Service Pack 1 (32-bit or 64-bit)
  - Windows XP, Service Pack 2 (32-bit)

  - Windows Server 2003 R2 (32-bit)
  - Windows Server 2008 R2 (64-bit)

Note Measurement Studio class libraries are designed to work on 64-bit operating systems. However, Measurement Studio class libraries for Visual Studio 2005 cannot be used to create 64-bit applications. To use Measurement Studio class libraries for Visual Studio 2005 on a 64-bit operating system, you must configure your projects to build 32-bit applications or libraries.

- Microsoft .NET Framework 2.0
- Visual Studio 2005:
  - Team System Edition
  - Professional Edition
  - Standard Edition
  - Visual C# Express Edition
  - Visual Basic .NET Express Edition
  - Visual Web Developer Express Edition
- Intel Pentium III class processor, 1.6 GHz or higher
- Video display—1024 × 768
- 512 MB of RAM (1024 MB or more recommended)
- 800 MB of free hard disk space
- Microsoft-compatible mouse
- Microsoft Internet Explorer 6.0

Installation Notes

- Measurement Studio does not support:
  - Windows Vista Starter Edition
  - Non-R2 editions of Windows Server
- Microsoft Visual Studio Express Editions do not support Measurement Studio Visual Studio-integrated tools.
- This version of Measurement Studio supports, and was tested with, the latest Visual Studio service pack and the latest operating system service pack that was available at the time this version of Measurement Studio was released. National Instruments strongly recommends using Measurement Studio with the latest Visual Studio service pack and the latest operating system service pack.
- If you want to upgrade your operating system from one major version to another, National Instruments recommends first uninstalling all National Instruments software, including application software and drivers. This is typically not necessary when installing an operating system service pack.

- There are additional considerations for installing the Measurement Studio Help for Visual Studio 2010. Refer to the *Installation Notes for Integrated Visual Studio 2010 Help* section of this document for more information.
- Some National Instruments components require Microsoft Silverlight 4.0. If you use a component that requires Silverlight, a dialog box prompts you to install Silverlight from the Internet. Microsoft Silverlight 4.0 is available from the Microsoft Web site at `www.microsoft.com/silverlight`. Measurement Studio does not contain Silverlight controls.

Driver Support

To use .NET class libraries that interface to National Instruments device drivers, you must install the underlying device drivers in addition to the .NET class libraries. You can run the underlying device driver installers from the NI Device Drivers DVD included with Measurement Studio or download the latest version of the NI Device Drivers by selecting `NI Device Drivers` from `ni.com/drivers`.

Note The DAQ Assistant and the Instrument I/O Assistant are installed from the NI Device Drivers DVD. You must install the NI Device Drivers DVD to use the assistants.

Use the following table to determine what drivers are supported for each version of Visual Studio, whether the driver supports 32-bit or 64-bit applications, and the location of the installer files.

Driver	Visual Studio version	Bitness		Installer Download Location
		32-bit	64-bit	
NI-DAQmx	2005	Yes	No	NI Device Drivers DVD - or - `ni.com/drivers`
	2008	Yes	Yes, available in NI-DAQmx 8.9.5 and later	
	2010	Yes	Yes, available in NI-DAQmx 9.2.3 and later	
NI-VISA	2005	Yes	No	NI Device Drivers DVD - or - `ni.com/drivers`
	2008	Yes	Yes, available in NI-VISA 4.5.1 and later	
	2010	Yes	Yes, available in NI-VISA 5.0.3 and later	

Driver	Visual Studio version	Bitness		Installer Download Location
		32-bit	64-bit	
NI-488.2	2005	Yes	No	NI Device Drivers DVD - or - ni.com/drivers
	2008	Yes	Yes, available in NI-488.2 2.7.1 and later	
	2010	Yes	Yes, available in NI-488.2 2.8.1 and later	
NI-SCOPE	2005	Yes	No	ni.com/drivers
	2008	Yes	No	
NI-IMAQ	2008	Yes	No	ni.com/drivers
NI-IMAQdx	2008	Yes	No	ni.com/drivers
NI-Vision	2008	Yes	No	ni.com/drivers
MAX (Measurement & Automation Explorer)	2005	Yes	No	NI Device Drivers DVD - or - ni.com/drivers
	2008	Yes	Yes, available in MAX 4.6 and later	
	2010	Yes	Yes, available in MAX 4.7.2 and later	
NI-DMM	2010	Yes	No	NI Device Drivers DVD (for underlying driver support) - and - ni.com/drivers (for .NET class libraries)
NI-RFSA	2010	Yes	Yes	NI Device Drivers DVD (for underlying driver support) - and - ni.com/drivers (for .NET class libraries)
NI-RFSG	2010	Yes	Yes	NI Device Drivers DVD (for underlying driver support) - and - ni.com/drivers (for .NET class libraries)

Installation Instructions

Complete the following steps to install Measurement Studio. These steps describe a typical installation. Please carefully review all additional licensing and warning dialog boxes.

National Instruments recommends that you exit all programs before running the Measurement Studio installer. Applications that run in the background, such as virus scanning utilities, might cause the installer to take longer than necessary to complete.

Installing Measurement Studio

Complete the following steps to install Measurement Studio:

1. Log on as Administrator or as a user with administrator privileges.
2. Launch `Autorun.exe`, either from the installation media or from the location to which you extracted the downloaded disc image. Select **Install Measurement Studio 2012**.
3. In the Select Installation Option window, you can choose to activate Measurement Studio if you have a serial number, or you can choose to evaluate Measurement Studio.
4. Select Measurement Studio 2012 support for the version or versions of Visual Studio you want to install support for.
5. Follow the instructions that appear on the screen.
6. Install hardware drivers and configure your hardware, if necessary.

Tip You can use a spec file to programmatically control the Measurement Studio installer for a single distribution or for the entire suite. An example spec file for a single distribution is located on your installation media at `<drive>:Distributions\Measurement Studio for VS20xx\Bin\template_spec.txt`. For more information, refer to *KnowledgeBase Article 4CJDP38M: Automating the Installation of a Single Installer* on `ni.com`. Alternately, you can generate a spec file for the entire Measurement Studio suite. Refer to *KnowledgeBase Article 4GGGDQH0: Automating the Installation of a Suited Installer* on `ni.com` for instructions on how to generate a spec file for your suite.

Activating Measurement Studio Licenses

If you did not activate Measurement Studio during installation, you can use the NI Activation Wizard to activate the software after installation. To activate Measurement Studio, you need the serial number printed on the Certificate of Ownership included in your software kit. Refer to the *Licensing, Evaluation, and Activation* topic in the *NI Measurement Studio Help* for more information about how to activate Measurement Studio.

National Instruments offers a variety of Measurement Studio licenses, with certain licensed features available for each license type: Standard Edition, Professional Edition, and Enterprise Edition. Refer to the *Measurement Studio Editions* topic in the *NI Measurement Studio Help* for more information on Measurement Studio editions, and the *Licensing Measurement Studio* topic in the *NI Measurement Studio Help* for more information about licensing Measurement Studio.

Note To move to a different Measurement Studio edition, you can activate the new edition by using NI License Manager. Select **Start»All Programs» National Instruments»NI License Manager** to access NI License Manager.

For general license activation information, refer to `ni.com/activate`. Refer to `ni.com/mstudio` to purchase a Measurement Studio license. Contact a local National Instruments representative at `ni.com/contact` for more information or for questions about specific licensing needs.

Concurrent Licensing

Measurement Studio 2012 supports concurrent licensing as part of a volume license agreement. If your software is a part of a Volume License Agreement (VLA), contact your VLA administrator for installation and activation instructions.

Installation Notes for Integrated Visual Studio 2010 Help

To view NI Measurement Studio 2012 help, you must install the Microsoft Developer Network (MSDN) documentation for Visual Studio 2010 **before** you install the Measurement Studio help. If you installed Measurement Studio without first installing MSDN documentation for Visual Studio 2010, install MSDN help and then either run the Measurement Studio installer in Repair Mode or use the Help Configuration Utility to reinstall the Measurement Studio help.

To run the Measurement Studio installer in repair mode:

1. Launch the standard Windows Control Panel utility for adding and removing programs.
2. Select **National Instruments Software** and click **Change/Remove**.
3. In the National Instruments Software dialog box, select **NI Measurement Studio 2012 for VS2010**.
4. Click **Repair**.

If you choose to view the Microsoft Visual Studio 2010 help online, the help viewer launches the Microsoft Developer Network (MSDN) Web site, which does not include the *NI Measurement Studio Help*. To view the Measurement Studio help, select **Start»All Programs»National Instruments»Measurement Studio 2012 for Visual Studio 2010»Measurement Studio Documentation**.

Configuring the Measurement Studio Help

By default, Visual Studio 2010 installs the Microsoft Help Library to the English locale. Measurement Studio provides a tool, `HelpConfigurationUtility.exe`, which you can use to install Measurement Studio for Visual Studio 2010 documentation to other Microsoft documentation locales. You can also use the Help Configuration Utility to uninstall or reinstall Measurement Studio documentation for Visual Studio 2010. For more information on how to use this utility, refer to the *Help Configuration Utility Readme* located at `[National Instruments Installdir]\Shared\MeasurementStudio\Help Configuration Utility`, where `[National Instruments Installdir]` refers to the directory where you installed National Instruments software.

To use the Help Configuration Utility:

1. Navigate to the following directory: `[National Instruments Installdir]\Shared\MeasurementStudio\Help Configuration Utility`.
2. Double-click **HelpConfigurationUtility.exe** to launch the utility.
3. Select the checkbox for the available Measurement Studio help components you want to install. National Instruments recommends you always install all Measurement Studio help components. Installing Measurement Studio help components separately could cause unexpected results when viewing the help.
4. Select the Microsoft Help Library Locale where you want to install the Measurement Studio documentation.
5. Click **Install** to install the documentation.

Installing the Current Version of Measurement Studio over Previous Versions of Measurement Studio

You can have only one version of Measurement Studio installed on a system for each version of Visual Studio or the .NET Framework installed on the system. For example, you can have Measurement Studio 2012 for Visual Studio 2010 installed on the same system as Measurement Studio 2012 for Visual Studio 2008, but you cannot have Measurement Studio 2012 for Visual Studio 2010 installed on the same system as Measurement Studio 2010 for Visual Studio 2010.

If you install a newer version of Measurement Studio on a machine that has a prior version of Measurement Studio installed, the newer version installer replaces the prior version functionality, including class libraries. However, the prior version assemblies remain in the global assembly cache (GAC); therefore, applications that reference the prior version continue to use the prior version .NET assemblies.

Note `NationalInstruments.Common.dll` uses a publisher policy file to redirect applications to always use the newest version of `NationalInstruments.Common.dll` installed on the system, for each version of the .NET Framework. However, prior versions of `NationalInstruments.Common.dll` remain in the GAC after you install a newer version of Measurement Studio. National Instruments exerts extra effort to ensure that `NationalInstruments.Common.dll` is backward-compatible so that applications built against prior versions of Measurement Studio continue to work as expected.

Deployment Requirements

To deploy an application built with Measurement Studio .NET class libraries, the target computer must have a Windows 7/Vista/XP/Server 2003 and 2008 (R2 editions) operating system and the .NET Framework version 4.0 for Visual Studio 2010, the .NET Framework version 3.5 for Visual Studio 2008, or the .NET Framework version 2.0 for Visual Studio 2005.

Deploying 64-bit Applications

To facilitate use in Visual Studio Setup projects, all Measurement Studio class libraries that support 64-bit include both 32-bit and 64-bit deployment merge modules. This is true regardless of whether the class library includes platform-specific (i.e., x86 or x64) or platform-agnostic (i.e., Any CPU) assemblies. Refer to *Deploying Windows Applications* in the *NI Measurement Studio Help* for more information on using 64-bit merge modules.

New Features in Measurement Studio 2012

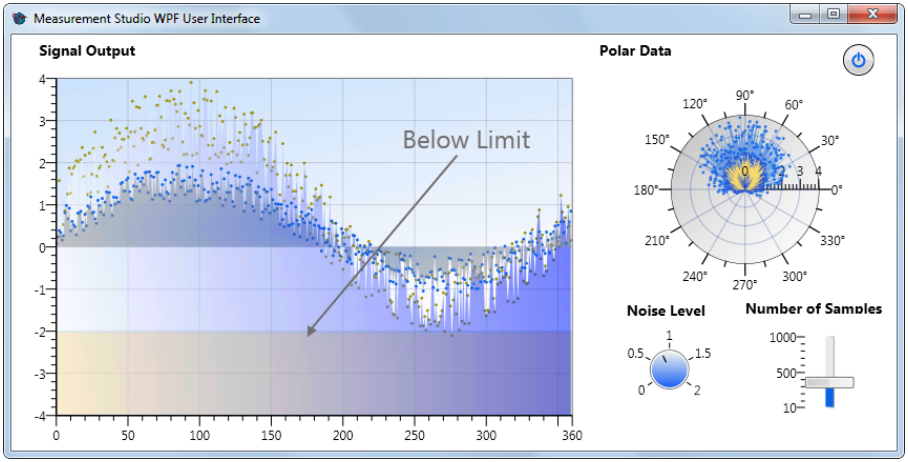
Windows Presentation Foundation (WPF) Controls for Visual Studio 2010 Support

Measurement Studio 2012 introduces a new set of Windows Presentation Foundation (WPF) user interface controls.

The new Measurement Studio WPF controls offer the following benefits:

- Templates and styles to customize the look and feel of the controls
- Extensive support for multiple data sources, including arrays, waveforms, and .NET collections; and an extensibility system to support custom data types
- Integration with Visual Studio 2010, including a new WPF project template, toolbox integration, and the Add/Remove Class Libraries Wizard
- Native support for DateTime, TimeSpan, PrecisionDateTime, PrecisionTimeSpan, and all primitive data types, plus Complex, Point, and Point3D data for graphs
- Reusable primitive components, such as scales
- Rich design-time experience, including multi-level context menus, and increased functionality for smart tags

Figure 1. Measurement Studio WPF User Interface



New WPF User Interface Controls

Graph Controls

Measurement Studio WPF graph controls include support for customizing the appearance of graphs, customizable annotations, and cursor, plot, legend, and axis features. Additionally, specific WPF graph controls include the following functionality:

- **Graph**—Use this graph to display 2D Cartesian data that requires two axes. You can plot and chart with the graph control, and you can display data using lines, points, bars, and areas. The graph control supports multiple plots.
- **WritableGraph**—Use this graph to provide your end users with the ability to draw data into the graph. As with the graph control, you can plot and chart data, and you can display written data using lines, points, bars, and areas. This graph supports multiple plots. The written data and plots are controlled by the `InputData` and `InputPlots` properties, separate from the `Data` and `Plots` properties inherited from the graph.
- **IntensityGraph**—Use this graph to display 3D data on a 2D plot, with color representing the third dimension. You specify the three-dimensional data as a 2D array of singleton values. The graph renders each value as a rectangle filled with the color that is associated with that value from the intensity graph `ColorScale` class. The size of the plot area and the ranges of the x and y axes determine the size of the rectangles. You can plot and chart with the intensity graph control.
- **PolarGraph**—Use this graph to display 2D complex or point data composed of angle and radius values. This graph supports multiple plots. You can use the `PolarAngularAxis` to specify whether the circle is in degrees or radians.

Numeric Controls

The new Measurement Studio WPF numeric controls provide the following functionality:

- **NumericTextBoxDouble** and **RadixNumericTextboxInt32**—Store and display numerical data types using the NumericTextBoxDouble and the RadixNumericTextboxInt32 controls.
- **KnobDouble**, **GaugeDouble**, and **MeterDouble**—Interact with and display numeric values in a radial scale using the KnobDouble control, and display numeric values in a radial scale using the GaugeDouble and MeterDouble controls.
- **SliderDouble** and **TankDouble**—Interact with and display numeric values in a linear scale using the SliderDouble control, and display numeric values in a linear scale using the TankDouble control.

Note You can change the type of data that each Numeric control acts upon by right-clicking on the control on the design surface, selecting **Data Type**, then choosing a new data type for the control. For example, if you drop a TankDouble control from the Visual Studio Toolbox, but you want the tank control to take a UInt32 data type, you can right-click the TankDouble on the design surface and change the data type to **UInt32**. Changing the data type on the design surface updates your code to instantiate a TankUInt32 control.

Boolean Controls

You can use the following new Measurement Studio WPF Boolean controls to display and edit Boolean data:

- BooleanButton
- BooleanContentButton
- ArrowButton
- Switch
- LED
- PowerButton

Related Documentation

- Conceptual help—Refer to the *Using Measurement Studio WPF Controls* topic in the installed Measurement Studio help.
- Function reference—Refer to the `NationalInstruments.Controls` namespace in the installed Measurement Studio help.

Windows Forms and Web Forms Controls Enhancements

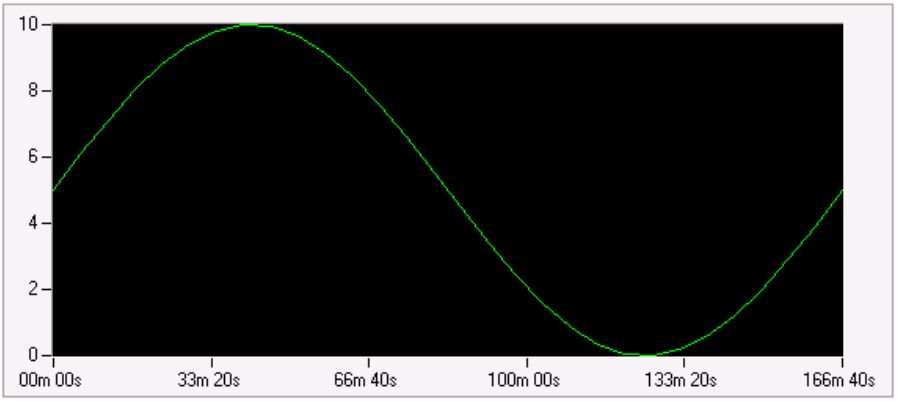
Elapsed Time Format for Graph and Numeric Pointer Controls

To display the amount of time that has passed since an event on the graph or numeric pointer controls, you can use elapsed time formats. You configure the intensity graph, complex graph, scatter graph, and waveform graph to display axes labels in elapsed time formats. Also, you can configure the gauge, knob, meter, slide, tank, and thermometer controls to display in elapsed time formats.

You can use standard elapsed time formats included in the Format String Editor dialog box, or you can create custom elapsed time formats. To programmatically create a custom elapsed time format, you create a `FormatString` object that takes two parameters, *mode* and *format*. You must specify the *mode* as `FormatStringMode.ElapsedTime`. For *format*, you must use a valid elapsed time format.

The following screenshot shows a waveform graph configured with an elapsed time format of `"E:mm\m\ ss\s"` on the x axis.

Figure 2. Waveform Graph with Elapsed Time Format



Related Documentation

- Conceptual help—Refer to the *Using Format Strings with Measurement Studio Windows Forms Controls* and *Using Format Strings with Measurement Studio Web Forms Controls* topics in the installed Measurement Studio help.
- Examples—Refer to the LabelFormats example project for a demonstration of this feature. Refer to the *Where to Find Examples* topic in the installed *NI Measurement Studio Help* for information on finding example application code.

New Autoformats for the Complex, Intensity, Scatter, and Waveform Graphs

You can use the Auto Format dialog box to configure the axes of the complex, scatter, and waveform graphs in the following formats:

- Date Time on X Axis
- Date Time on Y Axis
- Elapsed Time on X Axis
- Elapsed Time on Y Axis

Related Documentation

Refer to the following topics for more information about configuring axes using the Auto Format dialog box:

- Conceptual help—Refer to the *Auto Formatting Measurement Studio Windows Forms Controls* and *Auto Formatting Measurement Studio Web Forms Controls* topics in the installed Measurement Studio help.

Axis Base Line Width Customization for Graph Controls

You can customize the width of the axis base line for the complex, intensity, scatter, and waveform Windows Forms and Web Forms graphs. You set the axis base line thickness with `ComplexAxis.BaseLineWidth`, `IntensityAxis.BaseLineWidth`, or `Scale.BaseLineWidth`. You must set `BaseLineVisible to` **true** for the graph to display your baseline width changes. The default line thickness is 1. You can also change the axis width at design time, using the Property Grid for the axis.

Related Documentation

Refer to the following topics for more information about customizing the width of the axis base line for the complex, intensity, scatter, and waveform graphs:

- Function Reference—Refer to the `BaseLineWidth` property documentation in the installed Measurement Studio help.

Scale Base Line Width Customization for Numeric Pointer Controls

You can customize the scale base line for all radial and linear numeric pointer Windows Forms and Web Forms controls: gauge, knob, meter, slide, tank, and thermometer.
You set the scale base line thickness with `WindowsForms.NumericPointer.ScaleBaseLineWidth`WebForms.NumericPointer.ScaleBaseLineWidth. You must set `BaseLineVisible to` **true** for the graph to display your baseline width changes. The default line thickness is 1. You can also change the scale width at design time, using the Property Grid for the numeric pointer.

Related Documentation

Refer to the following topics for more information about customizing the scale base line for radial and linear numeric pointer controls:

- Function Reference—Refer to the `NumericPointer.ScaleBaseLineWidth` property documentation in the installed Measurement Studio help.

New Classes and Methods for Analysis .NET Class Libraries

Measurement Studio 2012 introduces new classes and methods to support the following features:

- Complex filtering classes for continuous IIR cascade filtering and continuous FIR filtering, including:
  - Bessel complex filtering
  - Butterworth complex filtering
  - Chebyshev complex filtering
  - Inverse Chebyshev complex filtering
  - Elliptic complex filtering
  - EquiRipple complex filtering
  - Narrowband FIR filtering (complex and real)

- Signal generation classes, including:
  - BernoulliNoiseSignal
  - BinomialNoiseSignal
  - GammaNoiseSignal
  - HaltonSequence
  - PeriodicNoiseSignal
  - PoissonNoiseSignal
  - RichtmeyerSequence
- Signal operations, spectral analysis, and waveform analysis features, including new static entry points
- Basic level trigger detection
- Narrowband FIR filtering
- Windowing for arrays of complex data

Related Documentation

- Conceptual help—Refer to *Key Measurement Studio Analysis .NET Library Concepts* and *How Do I Generate Signals in the Analysis .NET Library?* in the installed Measurement Studio help.
- Function reference—Refer to the `SignalGeneration` namespace in the installed Measurement Studio help for more information on signal generation.

Additional Improvements

Measurement Studio 2012 also introduces the following new improvements:

- **New ComplexInt16 Data Type for Visual Studio 2010 Support**—Measurement Studio 2012 introduces a new `ComplexInt16` structure data type that you can use to acquire and analyze data returned from .NET hardware class libraries, such as NI-RFSG. `ComplexWaveform` now supports the `ComplexInt16` data type in addition to `ComplexDouble`. You can use `DataConverter` to convert `ComplexInt16` values to `ComplexDouble` values to plot `ComplexInt16` values on the complex graph.
- **Support for Appending to Waveform Data Types**—You can use the new `Append` methods to append data or waveforms to an existing analog or complex waveform.
- **Direct Access to Waveform Data Type Buffers**—You can use the waveform data buffer methods, `GetBuffer`, `GetWritableBuffer`, `GetTimeStampBuffer`, and `GetPrecisionTimeStampBuffer`, to read data and time stamps from and write data to analog waveforms and complex waveforms without making a copy of the data.
- **Support for Concurrent Licensing**—With concurrent licensing, your volume license administrator can use a set number of licenses for an unlimited number of users by allowing each user to check out a license as needed. You must have a volume license agreement to use concurrent licensing.
- **Bug Fixes**—Measurement Studio 2012 includes many fixes for previously reported bugs. Refer to the *Measurement Studio Bug Fix Information* Web page on `ni.com` for a complete listing of the bugs fixed in Measurement Studio 2012.

Legacy Languages and Frameworks

NI Measurement Studio 2009 was the last version of Measurement Studio to support Visual Studio 6.0, Visual Studio 2003, and Visual C++ MFC.

As a result, Measurement Studio 2012 does **not** provide new feature support for Visual Studio 6.0, Visual Studio 2003, and Visual C++ MFC.

However, legacy support is available in the following products:

- *NI Measurement Studio for Legacy Environments/Languages (Measurement Studio LEL)*, which includes support for:
  - Visual Studio 2008 (Visual C++ MFC)
  - Visual Studio 2005 (Visual C++ MFC)
  - Visual Studio 2003 (Visual C++ MFC, Visual C#, Visual Basic .NET)
  - Visual Studio 6.0 (Visual Basic 6.0, Visual C++ 6.0)
- *Measurement Studio C++ MFC for Visual Studio 2010 (Measurement Studio MFC 10)*, which includes support for:
  - Visual Studio 2010 (Visual C++ MFC)

To qualify to receive these products, you must meet one of the following criteria:

1. You must maintain an active Measurement Studio Standard Service Program (SSP) contract; or
2. You must have purchased the most recent version of Measurement Studio.

Refer to `ni.com/mstudio/legacysupport` for additional information on *NI Measurement Studio for Legacy Environments/Languages* and *Measurement Studio C++ MFC for Visual Studio 2010*, including installation and configuration information, or contact a Technical Sales Representative at `ni.com/contact`.

Learning Measurement Studio

As you work with Measurement Studio, you might need to consult additional resources. For detailed Measurement Studio help, including function reference and in-depth documentation on developing with Measurement Studio, refer to the *NI Measurement Studio Help* within the Visual Studio environment. The *NI Measurement Studio Help* is fully integrated with the Visual Studio help.

You can launch the *NI Measurement Studio Help* in the following ways:

- From the Windows Start menu, select **Start»All Programs»National Instruments»<Measurement Studio>»Measurement Studio Documentation**.
- In Visual Studio 2005 and 2008, select **Help»Contents** to view the Visual Studio table of contents. In Visual Studio 2010, select **Help»View Help** to view the Visual Studio table of contents. The *NI Measurement Studio Help* is integrated into the Visual Studio help.
- In Visual Studio, select **Measurement Studio»NI Measurement Studio Help**.

Where to Go Next

The following resources are also available to provide you with information about Measurement Studio.

- Getting Started information—Refer to the *Measurement Studio Core Overview* topic for an introduction to Measurement Studio. For a list of Measurement Studio resources, refer to the *Using the Measurement Studio Help* topic in the *NI Measurement Studio Help*.
- Examples—Measurement Studio installs examples organized by class library, depending on the component, the version of Visual Studio or the .NET Framework that the example supports, the version of Measurement Studio installed on the system, and the operating system. For more information on example locations, refer to the *Where to Find Examples* topic in the *NI Measurement Studio Help*.
- Measurement Studio Web site, `ni.com/mstudio`—Contains Measurement Studio news, support, downloads, white papers, product tutorials, and purchasing information.
- NI Developer Zone, `zone.ni.com`—Provides access to online example programs, tutorials, technical news, and Measurement Studio discussion forums.
- Review the information from the Microsoft Web site on using Visual Studio.

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