Measurement Studio

Version 2015

These release notes introduce Measurement Studio 2015. 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 2015.

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. To access the guide, select **Start**»**All Programs**»**National Instruments** »**Measurement Studio 2015 for Visual Studio <version>**»**Measurement Studio 2015 for <Visual Studio version> Documentation**»**Getting Started Guide** or, in Windows 8.0/8.1, select **NI Launcher**»**Measurement Studio 2015 for Visual Studio <version>**»**Measurement Studio 2015 for <Visual Studio version> Documentation**»**Getting Started 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 Microsoft 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 Measurement Studio installation splashscreen. After installing Measurement Studio 2015, select **Start**»**All Programs**»**National Instruments** »**Measurement Studio 2015 for Visual Studio <version>**»**Measurement Studio 2015 for <Visual Studio version> Documentation**»**Readme** or, in Windows 8.0/8.1, select **NI Launcher**»**Measurement Studio 2015 for Visual Studio <version>**» **Measurement Studio 2015 for <Visual Studio version> Documentation**»**Readme**.

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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 2015

Measurement Studio 2015 includes the following new features:

- .NET class library support for Visual Studio 2013
- Measurement Studio Installer Builder
- New WPF user interface controls:
  - Mixed graph
  - Digital graph
  - TimeStamp TextBox
- Additional improvements
  - Enabled simultaneous access to TDMS files
  - Support for newComplexSingle and ComplexWaveformCollection data types
  - Bug fixes

Installation Requirements

Measurement Studio 2015 includes support for Visual Studio 2013, Visual Studio 2012, and Visual Studio 2010. The following are the installation requirements for each supported version of Visual Studio:

Installation Requirements for Visual Studio 2013 Support

To install and run Measurement Studio support for Visual Studio 2013, your computer must have the following:

- Microsoft operating system:
    - Windows 8.1 (32-bit or 64-bit)
    - Windows 8.0 (32-bit or 64-bit)
    - Windows 7, Service Pack 1 (32-bit or 64-bit), including Starter Edition (32-bit)
    - Windows Server 2008 R2 (64-bit)
    - Windows Server 2012 R2 (64-bit)
- Microsoft Framework 4.5.1
- Visual Studio 2013:
    - Ultimate Edition
    - Premium Edition
    - Professional Edition
    - Express Edition for Web
    - Express Edition for Windows
- 1.6 GHz or faster processor
- 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

Installation Requirements for Visual Studio 2012 Support

To install and run Measurement Studio support for Visual Studio 2012, your computer must have the following:

- Microsoft operating system:
    - Windows 8.1 (32-bit or 64-bit)
    - Windows 8.0 (32-bit or 64-bit)
    - Windows 7, Service Pack 1 (32-bit or 64-bit), including Starter Edition (32-bit)
    - Windows Server 2008 R2 (64-bit)
    - Windows Server 2012 R2 (64-bit)
- Microsoft Framework 4.5
- Visual Studio 2012:
    - Ultimate Edition
    - Premium Edition
    - Professional Edition

- Express Edition for Web
- Express Edition for Windows Desktop
- 1.6 GHz or faster processor
- 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

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 8.1 (32-bit or 64-bit)
  - Windows 8.0 (32-bit or 64-bit)
  - Windows 7, Service Pack 1 (32-bit or 64-bit), including Starter Edition (32-bit)
  - Windows Vista, Service Pack 2 (32-bit or 64-bit)
  - Windows XP, Service Pack 3 (32-bit)
  - Windows Server 2003 R2 (32-bit)
  - Windows Server 2008 R2 (64-bit)
  - Windows Server 2012 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

  Note You must have Visual Studio 2010 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
- 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

Installation Notes

- Measurement Studio does not support:
  - Windows Vista Starter Edition
  - Non-R2 editions of Windows Server
- 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. NI 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, NI 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. Refer to the *Installation Notes for Integrated Help* section of this document for more information.

Driver Support

To use .NET class libraries that interface to NI 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 media included with Measurement Studio or you can download the device driver from *ni.com*. Refer to *National Instruments .NET Driver Support* for information on what drivers are supported for each version of the .NET Framework and the download location of the installer files.

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. The Instrument I/O Assistant is available only with Measurement Studio 2015 support for Visual Studio 2010.

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 disk image. Select **Install Measurement Studio 2015**.

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 2015 support for the version or versions of Visual Studio you want to install.

5. Select **NI Device Drivers** to install support for hardware.

6. Follow the instructions that appear on the screen.

> **Tip** You can use a spec file to programmatically control the Measurement Studio installer for a single distribution or for the entire suite. 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: How Do I Automate 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. Launch NI License Manager from the National Instruments folder in the Start menu or from NI Launcher in Windows 8.0/8.1.

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 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 Help

The *NI Measurement Studio Help* is integrated into the Visual Studio help. To view the integrated *NI Measurement Studio Help*, you must have the local Visual Studio help installed and your help settings set to launch the help in the local help viewer.

- In Visual Studio 2012 and Visual Studio 2013, you can use the Manage Content tab in the Help Viewer to install or uninstall Measurement Studio help content. Refer to the *Measurement Studio 2015 for Visual Studio 2012 Readme* or the *Measurement Studio 2015 for Visual Studio 2013 Readme* for more information on configuring the Measurement Studio help.
- In Visual Studio 2010, you can use the Help Configuration Utility to install Measurement Studio Help to locales other than English or to install or uninstall Measurement Studio help content. Refer to the *Measurement Studio 2015 for Visual Studio 2010 Readme* for more information on configuring the Measurement Studio help.

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 2013 for Visual Studio 2012 installed on the same system as Measurement Studio 2015 for Visual Studio 2013, but you cannot have Measurement Studio 2015 for Visual Studio 2010 installed on the same system as Measurement Studio 2013 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 using Measurement Studio .NET class libraries, refer to the following table to determine the operating system and .NET Framework version required by the target machine.

Measurement Studio Support Used to Build Application	Target Machine	
	Operating Systems	.NET Framework Version
Measurement Studio support for Visual Studio 2013	Windows 8.1/8/7/Server 2008 and 2012 (R2 editions)	4.0, 4.5, or 4.5.1
Measurement Studio support for Visual Studio 2012	Windows 8.1/8/7/Server 2008 and 2012 (R2 editions)	4.0 or 4.5
Measurement Studio support for Visual Studio 2010	Windows 8.1/8/7/XP SP3/ Server 2003, 2008, and 2012 (R2 editions)	4.0

Note Measurement Studio support for Visual Studio 2013, Visual Studio 2012, and Visual Studio 2010 uses the same `NationalInstruments.Common.dll` assembly, which is built against the .NET Framework version 4.0.

Deploying an Application

National Instruments recommends using the Measurement Studio Installer Builder to deploy your Measurement Studio application. For more information on deploying applications, refer to the *NI Measurement Studio Installer Builder Help*, which is accessible from within the Installer Builder application.

Deploying 64-bit Applications

All Measurement Studio class libraries that support 64-bit include both 32-bit and 64-bit deployment merge modules or runtime installers. 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 installed *NI Measurement Studio Help* for more information on using 64-bit merge modules or runtime installers.

New Features in Measurement Studio 2015

Measurement Studio 2015 introduces the following new features:

.NET Class Library Support for Visual Studio 2013

Measurement Studio 2015 introduces .NET support for Visual Studio 2013, including a complete set of .NET class libraries, example projects, and tools that integrate into Visual Studio 2013. To use these libraries, you can either create new projects in Visual Studio 2013 or use Visual Studio 2013 to upgrade your existing Visual Studio 2010 or Visual Studio 2012 projects that use Measurement Studio libraries.

In addition to new class libraries, Measurement Studio 2015 also includes documentation integrated into the Microsoft Help Viewer 2.1. You can view the *NI Measurement Studio Help* by selecting it in the Measurement Studio menu within the Visual Studio toolbar or by selecting **View Help** in the Visual Studio Help menu.

> **Tip** From within Visual Studio 2013, you can select **Help**»**Set Help Preference**»**Launch in Help Viewer** to configure the Help Viewer to view local help, including the integrated Measurement Studio help. If you have Launch in Browser selected, the Measurement Studio help does not appear.

Refer to the following topics for more information about Visual Studio 2013 support and working with different versions of Measurement Studio:

- Conceptual help—Refer to the following topics in the *NI Measurement Studio Help* for more information:
    - *Deploying Measurement Studio Windows Applications*
    - *Measurement Studio Year-Based and Major.Minor Version Equivalents*
    - *Measurement Studio .NET Class Library Versioning for Development and Deployment*
    - *Using the Measurement Studio Help*
- Web resources—Review the information from the Microsoft Web site on using Visual Studio 2013 at *www.microsoft.com/visualstudio*.

Measurement Studio Installer Builder

Measurement Studio Installer Builder helps you create an installer for your application that includes NI libraries and installers. Installer Builder helps identify the NI installers that are needed for proper run-time behavior of your deployed application.
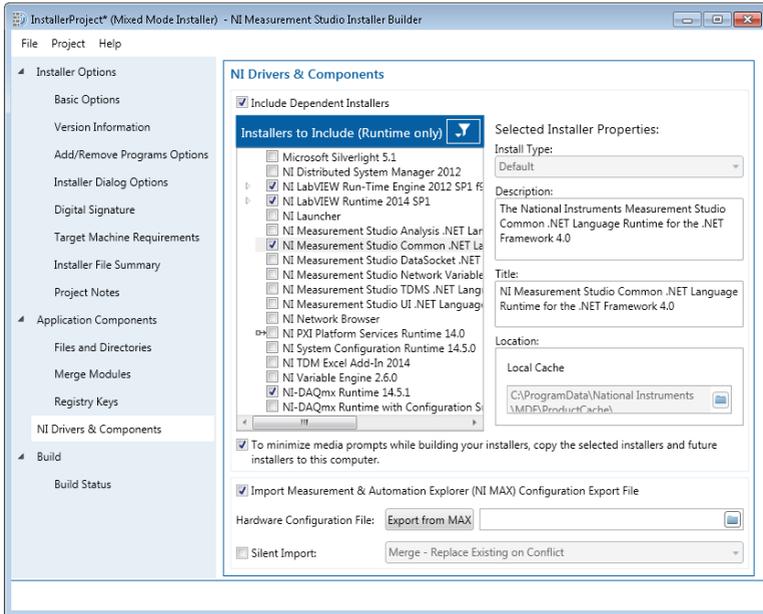
> **Note** You must have a valid Professional or Enterprise license for Measurement Studio to use Measurement Studio Installer Builder.

Installer Builder uses Microsoft Windows Installer (`.msi`) distribution technology. The Windows Installer technology packages all built libraries and executables along with any necessary files and registry keys into a single installer that can be run on a target machine. Windows installers include versioning information, which enforces correct behavior when performing upgrades, repairs, or reinstallations, and also provide a familiar install-time user interface.

Refer to the following topics for more information:

- Measurement Studio Installer Builder Help—You can launch the help by selecting **Help**» **Measurement Studio Installer Builder Help** from within the Installer Builder application.
- Measurement Studio conceptual help— *Deploying Measurement Studio Applications*

New WPF User Interface Controls

Measurement Studio 2015 introduces several new WPF user interface controls.

Mixed Graph

Use this graph to display both analog and digital data on the same graph. You can use the digital and horizontal axes to scale digital data, and the horizontal and vertical axes to scale analog data. The tree view allows you to hide signals if you are showing both groups and

signals simultaneously, and you can use properties to further configure the display. You can configure a graph to include multiple axes or independent ranges to ensure that the plot data fits the graph plot area, and you can configure the appearance of specific digital groups and states.
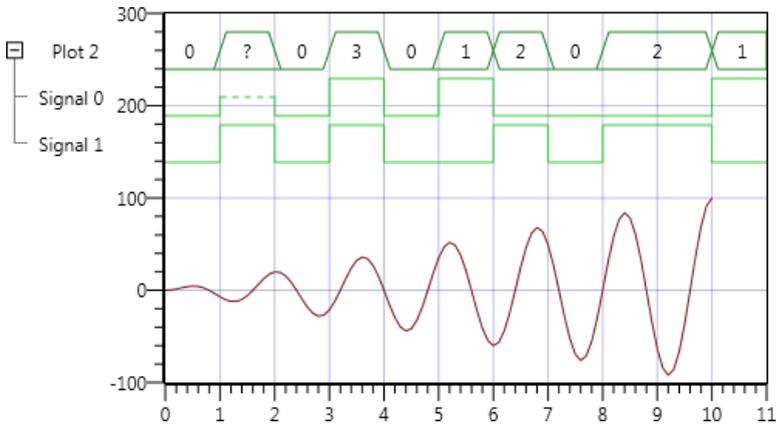
Refer to the following topics for more information:

- Task help—*How to: Plot and Chart with the Measurement Studio WPF Mixed Graph Control* and *How to: Configure Measurement Studio WPF Mixed Graph Control Axes and Cursors*
- Function reference—`NationalInstruments.Controls.MixedGraph`
- Examples—Refer to the `MixedGraph` example project for a demonstration of this feature.

Digital Graph

Use this graph to plot and chart digital waveform data. You can use the digital graph to plot collections of Boolean, integer, and digital state data, and data values can represent up to eight different digital states. The tree view allows you to hide signals if you are showing both groups and signals simultaneously, and you can use properties to further configure the display.
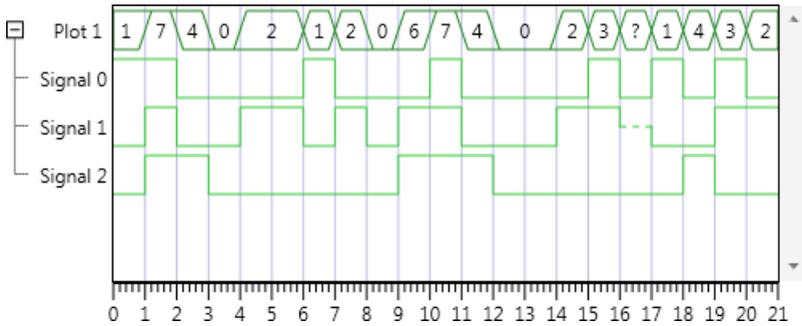
Refer to the following topics for more information:

- Task help—*How to: Plot and Chart with the Measurement Studio WPF Digital Graph Control* and *How to: Configure Measurement Studio WPF Digital Graph Control Axes and Cursors*
- Function reference—`NationalInstruments.Controls.DigitalGraph`
- Examples—Refer to the `DigitalGraph` example project for a demonstration of this feature.

TimeStamp TextBox

You can use this numeric control to display and manipulate DateTime and PrecisionDateTime values as text and also enable use of a calendar to select dates. Use the up and down buttons to increment and decrement timestamp values, and use standard .NET and custom numeric formats for all displayed timestamp values. Use PrecisionDateTime to represent a point in time with sub-attosecond accuracy.
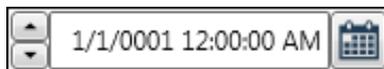
Refer to the following topics for more information:

- Conceptual help—*TimeStamp TextBox Overview*
- Function reference—
  `NationalInstruments.Controls.TimeStampTextBoxDateTime` or
  `NationalInstruments.Controls.TimeStampTextBoxPrecisionDateTime`
- Examples—Refer to the `TimeStampTextBox` example project for a demonstration of this feature.

Additional WPF Control Improvements

Measurement Studio 2015 also introduces the following additional improvements to the WPF control library:

- Per-plot graph phosphor effect—Use the phosphor effect to highlight the new data on individual plots by fading the color that represents older data through a color ramp you specify. This effect is supported by the WPF graph, the mixed graph, and the digital graph and is available in raster and hardware modes. For more information, refer to *Optimizing the WPF Graphs* and the NationalInstruments.Controls.Rendering.Phosphor documentation in the *NI Measurement Studio Help*.

  > **Note** If you used the global phosphor setting from a previous version of Measurement Studio, you must change that setting to apply to a brush used by the plots instead.

- Hardware-accelerated rendering—You can speed up the rendering of the graph and reduce CPU usage by using a DirectX 10 or better graphics card in Windows 7 or later. Hardware-accelerated rendering is enabled by default if you render enough data or you can explicitly set it. You cannot use hardware-accelerated rendering over remote desktop.

- Custom divisions—You can use custom divisions to add special values or decorations to an existing scale.

Additional Improvements

Measurement Studio 2015 also introduces the following new improvements:

- Enabled simultaneous access to TDMS files—You can now read from or write to multiple TDMS files at the same time using multiple threads. In prior versions of Measurement Studio, the TDMS library serialized calls from multiple threads.

- Support for new data types:
  - ComplexSingle—This data type represents a complex number of type Single that is composed of two single-precision floating-point numbers.
  - ComplexWaveformCollection—This data type represents a strongly typed collection of ComplexWaveform<TData> objects. This data type encapsulates raw complex data, scaling information, and timing information.

- Bug Fixes—Measurement Studio 2015 includes 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 2015.

Legacy Languages and Frameworks

Measurement Studio 2015 does not provide feature support for Visual Studio 2008, Visual Studio 2005, Visual Studio 2003, Visual Studio 6.0, and Visual C++ MFC . However, support for these versions of Visual Studio is obtained by requesting legacy versions of Measurement Studio.

To qualify to receive legacy versions of Measurement Studio, you must meet one of the following criteria:

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

Refer to *ni.com/mstudio/legacysupport* for additional information about Measurement Studio legacy support, 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 integrated into the Visual Studio help. To view the integrated *NI Measurement Studio Help*, you must have the local Visual Studio help installed and your Help settings set to launch the help in the local help viewer.

You can view the *NI Measurement Studio Help* from within Microsoft's Help Viewer by:

- Launching the Help Viewer from the Measurement Studio folder within the NI Launcher,
- Selecting **NI Measurement Studio Help** from the Measurement Studio menu within Visual Studio, or
- Selecting **Help**»**View Help** from the Visual Studio menu.

Where to Go Next

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

- Getting Started information—Refer to the installed *NI Measurement Studio Help* topic to get started with 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 website, *ni.com/mstudio*—Contains Measurement Studio news, support, downloads, white papers, and product tutorials.
- NI Technical Support, *ni.com/support*—Provides access to online example programs, tutorials, technical news, and Measurement Studio discussion forums.
- Review the information from the Microsoft website on using Visual Studio.