

MOTION CONTROL MODULE FOR MEASUREMENT STUDIO™

Version 6.0

These release notes introduce the Motion Control Module for Measurement Studio version 6.0. Refer to this document for system requirements, installation instructions, and information about features and resources.

About the Motion Control Module

The Motion Control Module for Measurement Studio provides a single ActiveX control (NIMotion) for developing motion applications that use your National Instruments motion controller and Microsoft Visual Basic. Through the NIMotion ActiveX control's interactive property pages, you can quickly and easily configure moves, breakpoints, and captures. With the NIMotion control's methods and events, you can acquire and display the status of motion moves. While the Motion Control Module was developed for the Visual Basic environment, you can use it in other ActiveX control containers.

Contents

System Requirements.....	2
Installation Instructions.....	2
Loading the Control	3
Features	4
Moves.....	4
Breakpoints	4
Captures	4
Motion Status.....	5
Property Pages	5
Help Resources	6

Technical Support Resources	7
Web Support	7
NI Developer Zone	7
Customer Education	7
System Integration	7
Worldwide Support	8

System Requirements

To use the Motion Control Module for Measurement Studio, your computer must have the following:

- Pentium 90 MHz microprocessor
- Microsoft Windows 2000/NT/Me/9x (Windows NT users need NT 4.0 with Service Pack 3 or later)
- National Instruments 733x or 734x series controller and FlexMotion 5.0 or later driver software
- Memory requirements:
 - 24 MB for Microsoft Windows 95 or later (48 MB recommended)
 - 32 MB for Microsoft Windows NT (48 MB recommended)
 - 64 MB for Microsoft Windows 2000/Me
- 10 MB free hard disk space
- VGA resolution video adapter (16-bit color recommended)
- Microsoft-compatible mouse
- ActiveX control container such as Microsoft Visual Basic (32-bit version)

Installation Instructions

Unless you specify another location during installation, the Motion Control Module installation program copies files to `Program Files\National Instruments\MeasurementStudio\` after you complete the following steps:

1. Insert the Motion Control Module for Measurement Studio CD in the CD drive of your computer. If the CD startup screen does not appear, use Windows Explorer to run `SETUP.EXE` from your CD.
2. Install the Motion Control Module. Follow the instructions on your screen.
3. Install or update the FlexMotion driver software. To use the Motion Control Module, you must have FlexMotion 5.0 or later driver software installed.

4. If you have not installed your 733x or 734x series controller, install your hardware device. Refer to your hardware manual for more information.
5. Configure your device with National Instruments Measurement & Automation Explorer (MAX). After configuring your hardware, MAX contains information about the hardware that you need to use the Motion Control Module.

The setup program installs the following groups of files on your computer when you install the Motion Control Module for Measurement Studio:

- ActiveX control (.ocx) and associated files: \Windows\System
- Example programs for Visual Basic: Program Files\National Instruments\MeasurementStudio\Vb\Samples\Motion
- Help files (.chm), application notes, and this document in PDF format, which you can view with Adobe Acrobat Reader: Program Files\National Instruments\MeasurementStudio\Help
- Readme file: Program Files\National Instruments\MeasurementStudio\Vb



Note The Motion Control Module is an add-on toolkit for Measurement Studio. Some examples use additional Measurement Studio controls. If you installed the Motion Control Module on a machine that does not have Measurement Studio or ComponentWorks installed, the Analysis, User Interface, and 3D Graph ActiveX controls will function in evaluation mode. (The Measurement Studio controls were formerly known as ComponentWorks.)

Loading the Control

1. Launch Visual Basic.
2. Open a new Standard EXE project.
3. Right click on the Visual Basic Toolbox and select **Components**.
4. Select **National Instruments Motion Control Module**.
5. Click **OK**.

Features

The NIMotion control includes the following features:

Moves

You can configure many types of moves with the NIMotion control. The basic move types include circular arc, helical arc, point-to-point, spherical arc, and velocity moves. You also can create a sequence of moves, which can contain different types of moves. A motion task contains a specified number of axes on which a move or sequence is executed. You can simultaneously start multiple tasks, which provides your motion applications with greater flexibility. For more information, refer to the *NIMotionMoveTypes*, *Motion Task*, and *Motion Sequence* topics in the Measurement Studio Reference.

Because some motion profiles require precise positions that cannot be accomplished with the basic move types, you can use a contour move instead. You create contour moves with an array of positions spaced apart by a specific interval of time. For more information, refer to *Contour Move* in the Measurement Studio Reference.

Breakpoints

With the NIMotion control, you can configure breakpoints to provide external triggers at known encoder positions. You can use these trigger signals to synchronize other components in your motion system or to control actuators. You can create breakpoints for an individual move or any move in a task. For more information, refer to the *Breakpoint*, *Move Breakpoint*, and *Task Breakpoint* topics in the Measurement Studio Reference.

If you need multiple breakpoints on the same axis, use NIMotion buffered breakpoints. You can create an array of breakpoint positions and repeat the breakpoint position or update the array with new positions while the breakpoints are executing. For more information, refer to *Buffered Breakpoints* in the Measurement Studio Reference.

Captures

You can configure high-speed captures to acquire encoder positions when an external trigger occurs. If you need to record capture information for a single move in a sequence, use a move capture. Alternately, you can use a task capture when your application must record encoder positions throughout a sequence of moves. For more information, refer to the *Capture*, *Move Capture*, and *Task Capture* topics in the Measurement Studio Reference.

If you need multiple captures on the same axis, use NIMotion buffered captures. You can acquire an array of captures. For more information, refer to *Buffered Captures* in the Measurement Studio Reference.

Motion Status

Use the NIMotion control methods and events to return the status of many motion operations. For example, use the `GetCurrentPosition` method to return an array containing the current position on each axis for a task. Use the `GetCurrentVelocity` method to return the current velocity for an entire task. For more information, refer to the *GetCurrentPosition* and *GetCurrentVelocity* methods in the Measurement Studio Reference.

Events notify you of the move, axis, breakpoint, capture, and error status of your motion applications. Events are automatically generated depending on how the task, axes, and moves are configured. For example, use the `MoveCompleted` event to display the name of the last move completed. Or, you can use the `BreakpointProgress` event to identify the active breakpoint. For buffered breakpoints, this event also returns the number of completed breakpoints and the number of new breakpoints you can write to the buffer. For more information about events, refer to the *AxisStateChanged*, *BlendCompleted*, *BreakpointProgress*, *CaptureProgress*, *MoveCompleted*, *MoveProgress*, and *TaskCompleted* events in the Measurement Studio Reference.

The NIMotion control also includes the `MotionError` event, which you can use to return error descriptions and codes. Use the `ErrorEventMask` property to specify the contexts in which the control generates errors. Refer to the *MotionError* event and the *ErrorEventMask* property in the Measurement Studio Reference.

Property Pages

Use the custom property pages to interactively configure properties for the NIMotion control. To access the property pages, right click on the control and select **Properties**. If you need help with properties on the property pages, right click on the property and select **What's This?**. Or click the **Help** button to launch the Measurement Studio Reference, which provides complete function reference.

When you interactively configure moves, tasks, and sequences with the NIMotion control, take advantage of the control's interactive preview window. As you configure settings in the NIMotion property pages, the preview window dynamically changes to display trajectory and velocity. Additionally, the preview window indicates different move types within a sequence of moves.

If you have three-dimensional moves, you can pan, zoom, and rotate the preview window. To rotate the preview window, click on the graph and drag the graph. To pan the preview window, press and hold the <Shift> key and click and drag on the graph. To zoom the preview window, press and hold the <Alt> key and click and drag the graph.

Help Resources

How can I get started?

Read the *Developing Motion Systems in Measurement Studio for Visual Basic* application note. This application note provides an overview of the NIMotion control and a step-by-step tutorial you can use to create motion applications with Measurement Studio. A PDF of this application note is installed in the `Program Files\National Instruments\MeasurementStudio\Help` directory. You also can search National Instruments Developer Zone at ni.com for the most up-to-date copy of this application note and other Measurement Studio and FlexMotion documentation.

You can view the PDF with Adobe Acrobat 3.0 or later. You can install a free copy of Acrobat Reader from the Adobe Web site at www.adobe.com.

Where can I get more information about known issues and late-breaking information?

The Motion Control Module installs a Readme, which you can access from **Start»Programs»National Instruments»Measurement Studio»Readme Files**.

Where can I find reference information?

The Measurement Studio Reference contains complete function reference on all the properties, methods, and events that you can use to specify the behavior of the NIMotion control. You also can find basic concepts, distribution information, error code descriptions, and links to tutorials on using Measurement Studio ActiveX controls. You can launch the reference from **Start»Programs»National Instruments»Measurement Studio»Help**.

Where can I find examples?

The Motion Control Module installs example programs in the `Program Files\National Instruments\MeasurementStudio\Vb\Samples\Motion` directory. You also can visit National Instruments Developer Zone at ni.com for the most up-to-date examples.

Where can I find additional Measurement Studio resources?

Visit the Measurement Studio Web site and National Instruments Developer Zone at ni.com for the most up-to-date information. You can search Developer Zone for documentation on advanced motion and Measurement Studio concepts.

Technical Support Resources

Web Support

National Instruments Web support is your first stop for help in solving installation, configuration, and application problems and questions. Online problem-solving and diagnostic resources include frequently asked questions, knowledge bases, product-specific troubleshooting wizards, manuals, drivers, software updates, and more. Web support is available through the Technical Support section of ni.com.

NI Developer Zone

The NI Developer Zone at ni.com/zone is the essential resource for building measurement and automation systems. At the NI Developer Zone, you can easily access the latest example programs, system configurators, tutorials, technical news, as well as a community of developers ready to share their own techniques.

Customer Education

National Instruments provides a number of alternatives to satisfy your training needs, from self-paced tutorials, videos, and interactive CDs to instructor-led hands-on courses at locations around the world. Visit the Customer Education section of ni.com for online course schedules, syllabi, training centers, and class registration.

System Integration

If you have time constraints, limited in-house technical resources, or other dilemmas, you may prefer to employ consulting or system integration services. You can rely on the expertise available through our worldwide network of Alliance Program members. To find out more about our Alliance system integration solutions, visit the System Integration section of ni.com.

Worldwide Support

National Instruments has offices located around the world to help address your support needs. You can access our branch office Web sites from the Worldwide Offices section of ni.com. Branch office Web sites provide up-to-date contact information, support phone numbers, e-mail addresses, and current events.

If you have searched the technical support resources on our Web site and still cannot find the answers you need, contact your local office or National Instruments corporate.



323164A-01

Aug01