

# FLEXMOTION™ 5.1

FlexMotion 5.1 is the motion control software and VIs for interfacing with all National Instruments FlexMotion series motion controllers.



**Caution** If you have developed motion control systems using a previous version of FlexMotion, you may need to recompile your code before it will work correctly with FlexMotion 5.1. Refer to the *FlexMotion Software Installation* section of this document for more information.

These release notes discuss compatibility issues, describe how to install FlexMotion 5.1 and related hardware, and summarize changes and improvements associated with this version. Topics include:

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## FlexMotion 5.1 Contents

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FlexMotion VI Library 5.1 is the motion control software for interfacing with all National Instruments FlexMotion series motion controllers using the National Instruments LabVIEW visual development environments.

The FlexMotion VI Library 5.1 is compatible with LabVIEW version 5.1 or later and LabVIEW RT 6.03 or later.

FlexMotion Software 5.1 is the motion control software for interfacing with all National Instruments FlexMotion series motion controllers using C/C++, LabWindows/CVI, or Visual Basic development platforms.

# Changes and Improvements

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There are several changes and improvements to the FlexMotion VI Library and Software functions that make them easier to use and expand their functionality. Code you have created and validated in the past still works with FlexMotion 5.1. A broad description of changes made in version 5.1 follows.

## LabVIEW RT 6.03 Support

The FlexMotion 5.1 software adds motion support to LabVIEW RT 6.03. There are now three levels at which you can use motion:

- Level one: motion programs running on a host system
- Level two: motion programs running on an embedded LabVIEW RT 6.03 system
- Level three: motion programs running on the motion controller itself

Level one offers ease of development but is only as reliable as your system. Level two offers the ease of development through LabVIEW and runs your program on a more robust real-time system. Level three offers the best response times since your program is running on the controller itself in its own real-time operating system.

To get started with LabVIEW RT, select **View Printed Real-Time Manuals** (PDF) from the **Help** menu. (See the *Using the Online Manuals* section in this document for more information on PDF files.) Next, select **LabVIEW RT User Manual**. This will tell you how to start running LabVIEW VIs, including FlexMotion VIs, on your embedded system.

For information on using the FlexMotion VIs for identifying and initializing the FlexMotion controllers in your embedded system, select **FlexMotion VI Online Help** from the **Help** menu, and view the **FlexMotion RT Support** topic.

## Stepper Generation Enhancement

The FlexMotion 5.1 software offers significant stepper-generation improvements over previous releases. The new step generation algorithm enhancements make stepper control smoother than ever at both high and low speeds.

The generation of step pulses has been improved to produce steps at more precise intervals, resulting in smoother stepper motor operation at all velocities. Also, when changing direction, the first step of a move is now generated after the direction signal changes, rather than at the same time. This will enhance compatibility with a wide variety of stepper motor drives.

## Servo Tune in MAX

Measurement & Automation Explorer (MAX) for NI-Motion 5.1 has a control loop gains tuning panel called Servo Tune. Servo Tune allows even novice users of motion control to use the MAX graphical interface to set tuning and behavioral aspects of their motion axes. You can manually tune the motor using step response and bode analysis tools, or you can automatically tune the control loop gain parameters using the **Auto Tune** option. Servo Tune is listed under **Calibration** in the MAX configuration tree.

## Breakpoint Window

The FlexMotion 5.1 software changes the way breakpoints are handled with a breakpoint window. In the past, you could get an unwanted breakpoint instantly at low velocity if the breakpoint was re-enabled without any delay. This occurred because the current position could still match the breakpoint position when it was re-enabled.

With the new version of FlexMotion, the breakpoint window attribute specifies a window of variable width around the breakpoint position. The current position must be outside this window for the breakpoint to be armed. This prevents unwanted breakpoints.

## Controllers

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The FlexMotion controllers and their respective bus types are listed in Table 1.

**Table 1.** FlexMotion Series Motion Controllers

<b>Controller</b>	<b>Bus Type</b>
PXI-7344	PXI/CompactPCI
PCI-7344	PCI
FW-7344*	IEEE-1394
* Windows 2000/Me/98 only.	

The FlexMotion 5.1 software is compatible with Windows 2000/NT/Me/9x.

# FlexMotion Software Installation

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Install the FlexMotion software before installing a FlexMotion series motion controller for the first time. If you are upgrading from a previous version of the FlexMotion software, you do not need to remove your FlexMotion controller before installing the upgrade. Your existing Windows configuration settings are not affected by the upgrade.

Complete the following steps to install your FlexMotion software:

1. Insert the NI-Motion 5.1 CD into your CD-ROM drive. The CD will automatically show the NI-Motion installation screen.
2. Click **FlexMotion 5.1 Installation** and then choose the **Install** option.
3. Follow the installer prompts through the rest of the installation.
4. Refer to the `ReadMe.txt` file after the installation is complete for last-minute information not contained in this document or the FlexMotion online help.

The FlexMotion software you selected is installed.

## Software Updates

You can find FlexMotion 5.1 updates and patches by visiting [ni.com/motion](http://ni.com/motion) and clicking on *Drivers & Downloads*.

## Hardware Installation

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If this is the first time that you have installed the FlexMotion software on your computer, then complete the following steps to install your FlexMotion series motion controller.



**Note** Refer to Chapter 2, *Configuration and Installation*, of your motion controller hardware user manual if you need additional hardware installation and handling instructions.

## PCI/PXI/FW Installation

Complete the following steps to install your PCI/PXI/FW motion controller:

1. Shut down your computer.
2. If you are installing a PCI or PXI controller, install the controller in an available slot in your computer. If you are installing the FW-7344, connect the controller to the IEEE-1394 port on your computer.
3. Restart your computer.

4. Click on the **Start** button on your Windows 2000/NT/Me/9x taskbar and select **Programs»National Instruments»Measurement & Automation** to launch MAX. You can also launch MAX by double clicking the MAX shortcut on your desktop.
5. Expand the **Devices and Interfaces** category in the configuration tree and select your installed FlexMotion controller. MAX automatically assigns the first available board ID to your controller.
6. Press F1 or select **Help»Help Topics»NI-Motion** to view the online help for MAX. The online help contains complete information on verifying your configuration, testing the installed FlexMotion controller, and downloading new firmware.

Your PCI/PXI/FW motion controller is successfully installed.

## Using the Online Manuals

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The FlexMotion software documentation is installed as a Windows online help file. The software documentation is also shipped with your software as Adobe Acrobat portable document format (PDF) files.

### Online Help

To view the online help, click on the **Start** button on the Windows taskbar and select **Programs»National Instruments»Motion»FlexMotion Software 5.1** and then the document you wish to view.

### PDF Documents

You must have Acrobat Reader installed on your computer in order to view PDF files.



**Note** If you do not already have Acrobat Reader version 4.0 or later installed on your system, you can install it from the FlexMotion Software CD. Run the `rs40eng.exe` file found in the CD's `Other/Adobe Acrobat/Win32` directory.

To view the installed PDF documents, click on the **Start** button on the Windows taskbar and select **Programs»National Instruments»Motion»FlexMotion** and then the document you wish to view. This automatically launches the Acrobat Reader and opens the selected PDF file. You can assemble your own printed manuals, printing either the entire documentation set or just the sections relevant to your application.

Click on any entry in the table of contents to jump directly to the corresponding manual page. You can jump to major sections within each document quickly and easily by clicking on the bookmarks.

When you choose the **View»Go To Page** option or are printing pages, you must use the page numbers in the lower left corner of the Acrobat window, not the number displayed in the bottom center of each manual page or listed in the contents and index. Acrobat assigns consecutive numbers to each page throughout the document and displays the page number. The numbers may not match those shown at the bottom center of each manual page.

## Using MAX Help

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Information on how to use MAX is available in three places: embedded help in the form of a task list, a pop-up “What’s This?” option that appears when you right-click a motion parameter, and the **Help** menu in the toolbar.

### Embedded Help

When you click on a motion device under **Devices and Interfaces** in the configuration tree, a task list appears on the right side of the MAX window. Click on the device in the configuration tree to display a task list containing the help information for the selected device. This task menu contains detailed step-by-step instructions for using the device.



**Note** You can display and hide the task menu help by clicking the **Show/Hide** button on the menu bar.

### Pop-Up Help

In the configuration view, which is the panel to the right of the configuration tree, you can view the help for each motion parameter by right-clicking the parameter and selecting “What’s This?” You can also view the help for each motion parameter by left-clicking the parameter and hitting the F1 key.

### Additional Help

For additional help, select **Help»Help Topics»NI-Motion»Motion Configuration Help**.