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**PCI-7344**

# FLEXMOTION™ SOFTWARE VERSION 4.5

FlexMotion Software 4.5 is the motion control software for interfacing with all National Instruments FlexMotion series motion controllers. The FlexMotion controllers and their respective bus types are listed in Table 1.

**Table 1.** FlexMotion Series Motion Controllers

Controller	Bus Type
PCI-FlexMotion-6C	PCI
PC-FlexMotion-6C	ISA
PXI-7344	PXI/CompactPCI
PCI-7344	PCI
FW-7344*	IEEE-1394 (FireWire)
*Windows 2000/98 only.	

The FlexMotion software is compatible with Windows 2000/NT/98/95.

These release notes discuss compatibility issues, describe how to install your FlexMotion software and hardware, and summarize changes and improvements associated with this version.

Instructions are also provided for updating firmware on your FlexMotion controller using National Instruments Measurement & Automation Explorer, as well as for using the new online documentation.

## Compatibility Issues

FlexMotion Software 4.5 is backward compatible with FlexMotion Software 4.0. Existing programs will continue to work.



**Note** In order for FlexMotion Software 4.5 to work with your existing FlexMotion controller, you must update your motion controller firmware.

See the [Updating Firmware](#) section of this document for information on how to update your FlexMotion controller firmware.

# Upgrading FlexMotion Software under Windows 98 or Windows 2000

If you were using FlexMotion Software 4.0 under Windows 98 or Windows 2000, refer to the following sections for operating system-specific information.

## Windows 98

The National Instruments motion control driver has been changed to use the new Windows Driver Model (WDM) for improved Power Management and Plug and Play support. If you have plug and play motion controllers, they will be automatically re-installed to use this new WDM driver. If you have non-plug and play (ISA bus) boards, you will have to re-install them using the Windows 98 Add New Hardware Wizard. Be sure to reboot your computer after installing the software and before adding any motion controllers.

## Windows 2000

After installing the FlexMotion software, described in the [Software Installation](#) section of this document, remove all plug and play motion controllers using the Windows 2000 Device Manager. As earlier versions of the motion control drivers did not have plug and play capability under Windows 2000, motion controllers appear in the Device Manager under **Other Devices** as **PCI Device**. Right-click on **PCI Device** and select **Uninstall**. When you restart your computer Windows 2000 will automatically re-install the motion controllers correctly.

If you have non-plug and play (ISA bus) boards, refer to the [ISA Installation \(PC-FlexMotion-6C Only\)](#) section of this document. You will have to re-install the ISA controllers using the Windows 2000 Add/Remove Hardware Wizard.

## Software Installation

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You must 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 configuration settings are not affected by the upgrade.

Complete the following steps to install your software:

1. If you have an earlier version of the FlexMotion software installed on your computer, remove it using the Add/Remove Programs feature in Windows. All of your configuration information for previously installed ValueMotion and FlexMotion controllers is preserved.
2. Insert the FlexMotion Software 4.5 CD into your CD-ROM drive.
3. Select **Install FlexMotion Software 4.5**.
4. Follow the installer prompts through the rest of the installation.
5. Refer to the `ReadMe.txt` file after the installation is complete for last-minute information.

The FlexMotion software is installed.

## FlexMotion ServoTune

The FlexMotion ServoTune application for tuning servo motors is provided free of charge on your FlexMotion Software CD in the `\Other\ServoTune` directory. To install the ServoTune application, run `setup.exe` from the `Disk1` subfolder.

If you are also installing the FlexMotion VI Library 4.5, you do not need to install ServoTune. The tuning VIs are included on the FlexMotion LabVIEW function palette.

The serial number for the ServoTune application, which you need during installation, is `f45m45454`.

## 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 for 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 your computer's IEEE-1394 port.

3. Restart your computer.
4. Click on the **Start** button on your Windows 2000/NT/98/95 taskbar and select **Programs»National Instruments Motion Control»Explore Motion Control** to launch Measurement & Automation Explorer. Click on the **Devices and Interfaces** icon and select your installed FlexMotion controller. Measurement & Automation Explorer automatically assigns the first available Board ID to your controller.
5. Press F1 or select **Help»Help Topics** to view the online help for Measurement & Automation Explorer. 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.

## ISA Installation (PC-FlexMotion-6C Only)

### Windows 2000/98/95

Complete the following steps to install your PC-FlexMotion-6C controller:

1. Click on the **Start** button on your Windows 2000/98/95 taskbar and select **Settings»Control Panel**.
2. Double-click on the **Add/Remove Hardware** (Windows 2000) or **Add New Hardware** (Windows 98/95) icon.
3. If you are installing your controller under Windows 98/95, go to step 5. If you are installing your controller under Windows 2000, select **Add/Troubleshoot a Device** and click on the **Next** button.
4. Select **Add a New Device** and click on the **Next** button.
5. Click on the **Next** button and select **No** when prompted to search for new hardware, and then click on the **Next** button.
6. Select the **National Instruments Motion Controllers** hardware type and click on the **Next** button.
7. Select the **PC-FlexMotion-6C** board type and click on the **Next** button again.
8. After Windows assigns resources to the board, make a note of the Input/Output range. Then click on the **Next** button.
9. Click the **Finish** button to complete the Add New Hardware Wizard.
10. Refer to Chapter 3, *Hardware Overview*, of the *FlexMotion-6C Hardware User Manual* for the proper DIP switch settings for the PC-FlexMotion-6C controller to match the address assigned by Windows.



**Note** There is no jumper to set for the interrupt number.

11. Shut down your computer.
12. Install the PC-FlexMotion-6C controller in an available ISA slot.
13. Restart your computer.
14. Click on the **Start** button on your Windows 2000/98/95 taskbar and select **Programs»National Instruments Motion Control»Explore Motion Control** to launch Measurement & Automation Explorer.
15. Click on the **Devices and Interfaces** icon and select your installed PC-FlexMotion-6C controller. Measurement & Automation Explorer automatically assigns the first available Board ID to your controller.
16. Press F1 or select **Help»Help Topics** to view the online help for Measurement & Automation Explorer. The online help contains complete information on verifying your configuration, testing the installed FlexMotion controller, and downloading new firmware.

Your PC-FlexMotion-6C motion controller is successfully installed.

## Windows NT 4.0

Complete the following steps to install your PC-FlexMotion-6C controller:

1. Restart your computer after installing the FlexMotion software, but do not install your PC-FlexMotion-6C controller yet.
2. Click on the **Start** button on your Windows NT taskbar and select **Programs»National Instruments Motion Control»Explore Motion Control** to launch Measurement & Automation Explorer.
3. Right-click on **Devices and Interfaces** in Measurement & Automation Explorer and select **Insert** from the pop-up menu. Select **National Instruments Motion Controllers** from the Insert New dialog box to launch the Add New Motion Control Board Wizard.
4. In the first dialog box of the Add New Motion Control Board Wizard, select your board and a board ID. Click **Next** to view the resources assigned to the board. To change the resource settings, select a resource and click **Change Settings** (these settings can be changed later using the Resources tab of the Properties dialog box).
5. Make a note of the Input/Output range assigned to your controller.
6. Refer to Chapter 3, *Hardware Overview*, of the *FlexMotion-6C Hardware User Manual* for the proper DIP switch settings for the PC-FlexMotion-6C controller to match the address assigned by Windows.



**Note** There is no jumper to set for the interrupt number.

7. Shut down your computer.
8. Install the PC-FlexMotion-6C controller in an available ISA slot.

- Restart your computer.
- Click on the **Start** button on your Windows NT taskbar and select **Programs»National Instruments Motion Control»Explore Motion Control** to launch Measurement & Automation Explorer.
- Click on the **Devices and Interfaces** icon and select your installed PC-FlexMotion-6C controller. Measurement & Automation Explorer automatically assigns the first available Board ID to your controller.
- Press F1 or select **Help»Help Topics** to view the online help for Measurement & Automation Explorer. The online help contains complete information on verifying your configuration, testing the installed FlexMotion controller, and downloading new firmware.

Your PC-FlexMotion-6C motion controller is successfully installed.

## Updating Firmware

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Before using your FlexMotion series motion controller, you need to verify that your controller is using the latest revision of each of its firmware components.

FlexMotion firmware files have the following extensions:

- The 68331 firmware files have a .cpu extension.
- The DSP firmware files have a .rbf extension.
- The FPGA1 firmware files have a .fp1 extension.
- The FPGA2 firmware files have a .fp2 extension.

The firmware files for the FlexMotion-6C and 7344 are different, even though they have the same extensions. All FlexMotion-6C firmware files start with “flex.” All 7344 files start with “7344.”



**Caution** In the case of the FlexMotion-6C controllers, downloading new FPGA1 firmware resets any parameters that you saved with the Save Default Parameters function to their default values. If you saved default values onboard, make a note of these values for firmware updating purposes.

You can check these revisions and perform required updates using Measurement & Automation Explorer as follows:

- Click on the **Start** button on your Windows 2000/NT/98/95 taskbar and select **Programs»National Instruments Motion Control»Explore Motion Control** to launch Measurement & Automation Explorer.
- Click on the plus sign next to **Devices and Interfaces**.

3. Right-click on your FlexMotion controller and select **Update Firmware**. You can compare the dates of the firmware sectors in the left pane, which are the firmware versions loaded on your controller, to the dates in the right pane, which are the current firmware revisions.
4. Right-click on the firmware sector that you want to update in the left pane of the download dialog box and select **Update Firmware Sector**. The firmware file corresponding to the sector in the right pane is then downloaded to the FlexMotion controller. If all the firmware sectors are out of date, right-click on the controller name in the left pane and select **Update All Firmware Sectors**. All the sectors on the controller are then updated with the firmware files in the right pane.



**Note** Once the FLASH memory on your FlexMotion controller is updated with the latest firmware, the controller automatically uses the upgraded firmware each time you power it up.

## Windows 3.1 and DOS Support

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The previous release of FlexMotion Software (version 4.0) supports Windows 3.1 and DOS with the PC-FlexMotion-6C controller. FlexMotion Software 4.0 is located in the `Other\Flex40` directory on the FlexMotion Software 4.5 CD. Installing under Windows 3.1 also installs the DOS support in the `Flexmotn\DOS` directory. To install FlexMotion 4.0 directly in DOS without Windows 3.1, run the batch file in the `Other\DOSSetup` directory on the FlexMotion Software 4.5 CD.



**Note** To use FlexMotion 4.0 software with a PC-FlexMotion-6C, you should download the 4.0 firmware files to the controller. If you recently purchased a PC-FlexMotion-6C controller, it may contain version 4.5 firmware. You will need to download the 4.0 firmware using the FlexCommander application that came with FlexMotion Software 4.0 in Windows 3.1 or Windows NT/98/95. Refer to the *Upgrade Your Firmware* topic in the *FlexMotion Software 4.0 Online Help* for information on downloading your firmware using FlexCommander.



# Summary of Changes and Improvements

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There are several changes and improvements to the FlexMotion software that make it easier to use and expand its functionality. However, code that you have created and validated in the past still operates with the new software. What follows is a broad description of changes in version 4.5.

Board configuration has been moved from the old Motion Board Configuration Utility to the new National Instruments Measurement & Automation Explorer, which you can access by selecting **Start» Programs»National Instruments Motion Control» Explore Motion Control**.

Firmware updating has also been moved from FlexCommander to Measurement & Automation Explorer. This change is explained in detail in the [Updating Firmware](#) section of this document.

## New Functions

The functions in Table 2 are new in FlexMotion Software Version 4.5.

**Table 2.** New FlexMotion Functions

<b>New Function</b>	<b>Description</b>
Configure PWM Output	Enables and disables PWM outputs and sets the PWM clock frequency.
Load PWM Duty Cycle	Sets the duty cycle for a PWM output.
Set ADC Range	Sets the voltage range for the analog to digital converters on a per-channel basis. This function is only supported by 7344 motion controllers.
Load Counts/Steps per Revolution	Loads the quadrature counts or steps per revolution for an axis. This function can accept values up to 268,435,455 counts or steps per revolution.
Select Signal	Specifies the source and destination of various motion signals, including high-speed capture inputs, breakpoint outputs, RTSI lines, and RTSI software ports. This function is only supported by 7344 motion controllers.
Set Encoder Frequency	Selects the maximum count frequency for an encoder channel by configuring its digital filter. This function is only supported by 7344 motion controllers.
Read Program Status	Reads the status of an onboard program.
Enable Gearing Single Axis	Enables a slave axis for master-slave gearing.

**Table 2.** New FlexMotion Functions (Continued)

<b>New Function</b>	<b>Description</b>
Check Move Complete Status	Checks the move complete status for an axis, vector space, group of axes, or group of vector spaces.
Check Blend Complete Status	Checks the blend complete status for an axis, vector space, group of axes, or group of vector spaces.
Wait for Move Complete	Waits up to the specified period of time for a move to be completed on an axis, vector space, group of axes, or group of vector spaces.
Wait for Blend Complete	Waits up to the specified period of time for a blend to be completed on an axis, vector space, group of axes, or group of vector spaces.
Reset Default Parameters	Resets the power-up defaults to the factory default settings.
Enable Auto Start	Allows you to automatically run a program when the controller powers up.
Enable Shutdown	Enables the shutdown functionality of the controller.
Load Base Velocity	Sets the base velocity used by the trajectory control circuitry for the axis specified.
Enable 1394 Watchdog	Enables or disables the watchdog timer on the 1394 motherboard. This function is only supported by FW-7344 motion controllers.

# Using the Online Manuals

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



**Note** If you do not already have Acrobat Reader version 3.0 or later installed on your system, you can install it from the FlexMotion Software CD. Run the `setup.exe` file found in the CD's `Other\Adobe Acrobat` directory. To view the installed PDF documents, click on the **Start** button on the Windows taskbar and select **Programs»National Instruments Motion Control»FlexMotion** and then the document that 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 only 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.

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