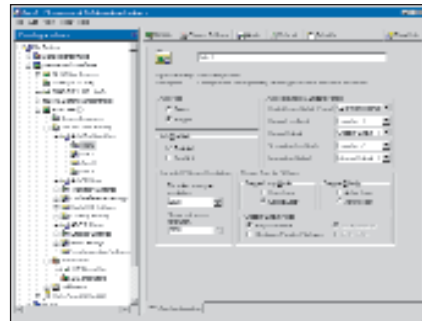


# Motion Control Software Overview

One of the key components of any motion control system is software. Motion control software needs to be flexible, easy to use, and integrate well with other I/O pieces in your machine. The flexibility of your software helps determine the types of applications you can create and the ease of use helps you determine how fast you can create those applications. NI Motion software tools offer an ideal combination of flexibility and ease-of-use for helping you solve a large variety of motion control applications.

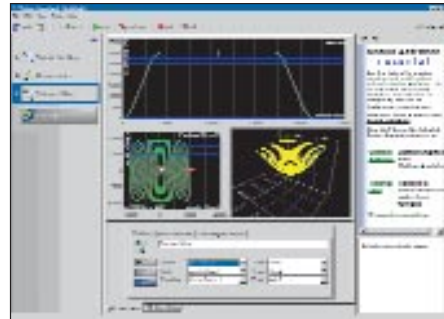
## 1. Configure – Measurement & Automation Explorer

One of the challenges in creating a motion system is testing each of the components without creating custom programs. Using the National Instruments Measurement & Automation Explorer configuration environment, you can easily test and configure your system without any programming, reducing setup time. Some of the parameters you can configure and test include limit switch settings, motor types, trajectory settings, velocity, and acceleration. Once you configure these parameters, you can save your configuration for use in your application.



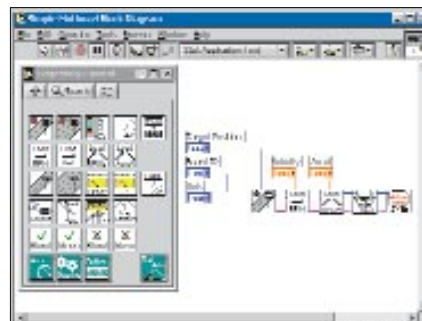
## 2. Prototype – NI Motion Assistant

NI Motion Assistant is the newest tool available to help you develop and prototype motion applications. NI Motion Assistant has an interactive environment where you can create motion profiles specifying parameters such as the type of move (for example, linear or circular), velocity, and position. When you complete your sequence of moves, you then can generate a LabVIEW block diagram that performs the sequence you configured. With this feature, you can quickly develop motion applications and then integrate them with the rest of your system. NI Motion Assistant also generates a “code recipe” that lists all of the functions as well as the parameters you would need to create the same motion sequence in other programming languages, such as LabWindows/CVI and Measurement Studio for Visual Basic and Visual C/C++.



## 3. Program and Integrate – NI-Motion Driver Software

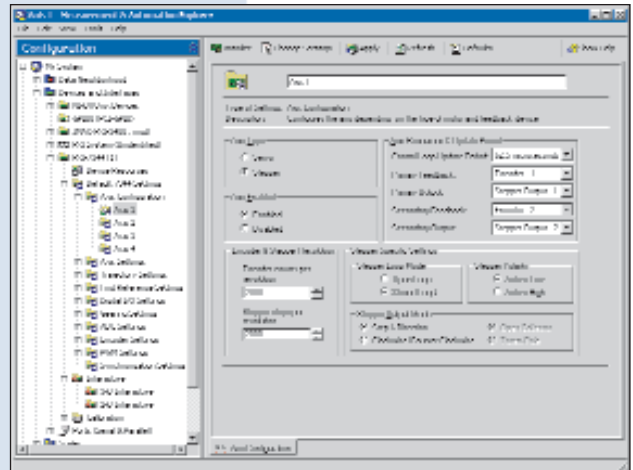
With National Instruments motion controllers and NI-Motion driver software, you can easily develop and implement complex motion control applications in the LabVIEW graphical programming environment. The motion VIs include a wide range of fully functional single and multi-axis examples that you can link together and customize to meet the specific needs of your application. You also can construct and customize user interfaces and advanced motion control applications by combining the motion VI tools with LabVIEW on-screen virtual controls and displays. Using this wide range of tools, you can easily integrate motion control, data acquisition, process control, manufacturing, and image processing systems.



# Motion Control Configuration Software

## NI Measurement & Automation Explorer

- Configure axes
- Configure motion I/O
- Configure digital I/O
- Tune servo motors with Servo Tune
- Test configuration using Interactive 1D or 2D environment
- Use single function call to call saved configurations in LabVIEW
- Included with all National Instruments motion controllers



## Overview

National Instruments Measurement & Automation explorer is the single software environment where you can configure all of your National Instruments hardware ranging from motion control to data acquisition. This special configuration environment helps you both set up and test each component of your automation system without any programming.

## Interactive Motion Control Testing Environment

One of the challenges in creating a motion system is testing each of the components without creating custom programs. Using the Measurement & Automation Explorer configuration environment, you can easily test and configure your system without any programming, reducing setup time. Some of the parameters you can configure and test include limit switch settings, motor types, trajectory settings, velocity, and acceleration. Once you configure these parameters, you can save your configuration for use in your application.

## Autotuning in Measurement & Automation Explorer

Measurement & Automation Explorer includes Servo Tune, a control-loop tuning panel. Using the Auto Tune feature included with Servo Tune, you can automatically have the software jog your rotary servo motor and determine the proper control-loop gains for your system. You can then manually fine tune your motor using step response and Bode analysis tools.

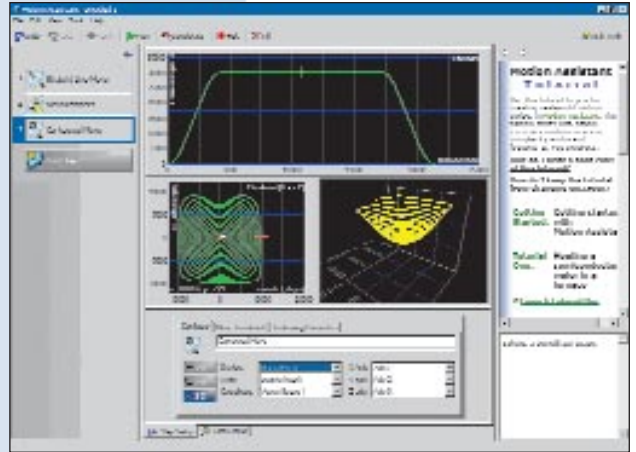
Panel	Available Parameters
Axis Configuration	Axis type settings Axis resource and update period Encoder settings Stepper-specific settings
Axis Settings	Home and limit switch settings Software limit settings Trigger input settings Inhibit output settings Position breakpoint settings
Trajectory Settings	Default move settings Advanced move settings
Find Reference Setting	Find home settings Find index settings Find center settings
Digital I/O Settings	I/O port direction I/O port polarity Output state
Gearing Settings	Gearing mode Gearing enable Slave settings
ADC Settings	Set ADC range
Encoder Settings	Filter frequency
PWM Settings	Clock frequency Duty cycle
Interactive	Interactive 1D Interactive 2D
Calibration	Servo Tune

Figure 1. Summary of Parameters Available in Measurement and Automation Explorer

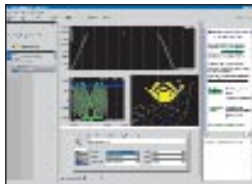
# Motion Control Prototyping Software

## NI Motion Assistant

- Point-and-click user interface for linear interpolated moves, circular moves, contouring moves, and position-velocity-time moves
- Tutorial and solutions wizard
- Automatic LabVIEW VI creation
- Code recipes for LabWindows/CVI, Measurement Studio, Visual Basic, and C/C++
- Preview windows for easy visualization
- Free evaluation version at [ni.com/motion](http://ni.com/motion)



Configurable to Programmable



NI Motion Assistant



LabVIEW Code Created  
Using NI Motion Assistant

## LabVIEW Code Generation

One of the key features of NI Motion Assistant is its automatic LabVIEW VI creation. With its ability to create code, NI Motion Assistant saves you programming time. You also can quickly develop code recipes for non-LabVIEW programming languages such as Measurement Studio. Combined with LabVIEW, LabWindows/CVI, or Measurement Studio for Visual Basic and Visual C++, NI Motion Assistant can help you quickly prototype your motion control system.

In addition, you have the ability to graphically edit motion paths, as well as a 3D preview window to view your moves before you execute them. For your integrated systems with motion, vision, and data acquisition, NI Motion Assistant features an integration step that works as a placeholder to help facilitate your complete application.

## Overview

National Instruments Motion Assistant, a flexible and easy-to-use development tool for building and prototyping motion applications, gives you the ability to quickly develop motion control systems. You can use this software tool in a variety of industries, from biotech to optoelectronics. NI Motion Assistant creates a flexible environment for developing motion applications, whether they entail simple, single-axis motion or demanding, multi-axis motion. Using the NI Motion Assistant point-and-click interface, you can quickly program and prototype motion systems, reducing your development time. NI Motion Assistant also works with NI motion controllers for blended motion trajectory control and fully coordinated circular, linear, point-to-point, and coordinate space control.

## Ordering Information

NI Motion Assistant.....778553-01

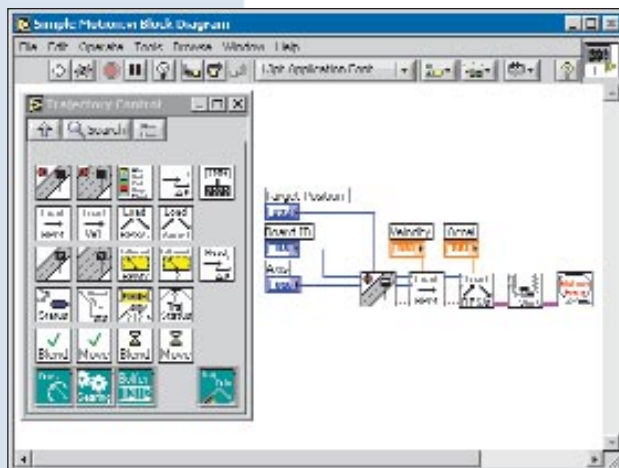
### **BUY ONLINE!**

Visit [ni.com/info](http://ni.com/info) and enter *motionassist*.

# Motion Control Driver Software

## NI-Motion

- Controls each National Instruments motion controller
- Powerful VIs for LabVIEW
- Wide range of LabVIEW examples showing both simple single-axis to coordinated multi-axis motion control
- Programming examples for LabVIEW, LabWindows/CVI, Visual Basic, and C/C++
- Included with all NI motion controllers



## Overview

NI-Motion driver software is a set of high-level software commands for communicating with NI Motion controllers. This software includes a variety of LabVIEW VIs and examples to help you quickly create your motion control application. Using just two icons, you can create motion in a single axis. With the addition of just a few icons, this code can expand to do multi-axis coordinate motion.

## NI-Motion and Motion Assistant

NI Motion Assistant uses the NI-Motion driver software to interface with LabVIEW. Using NI Motion Assistant, you define your sequence of motion profiles and then generate LabVIEW code. The LabVIEW code generated by NI Motion Assistant is easily edited using the NI-Motion driver software to give you the ultimate combination of flexibility and ease of use.

## NI-Motion and LabVIEW Real-Time

Making embedded motion control applications is now easier than ever using NI-Motion driver software and LabVIEW Real-Time. Using this software combination with one of the NI PXI RT Series motion controllers, you can create powerful, remote automation systems running under a real-time operating system.

