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cRIO-9014

GETTING STARTED

NI SMD-7620/7621 Stepper Drives and NI 9512 C Series Modules

📝 **Note** If you are a new user of LabVIEW or are unfamiliar with LabVIEW, refer to the *Getting Started with LabVIEW* manual for information about LabVIEW and LabVIEW terminology.

This document explains how to install and configure the NI SMD-7620/7621 stepper drives for use with the NI 9512 C Series drive interface module.

Contents

What You Need to Get Started

You need the following items to get started.

Hardware

☐ NI 9512 C Series stepper drive interface module

☐ NI real-time controller

   – CompactRIO controller and chassis that support the RIO Scan Interface

   💡 **Tip** To determine if your controller and chassis support the RIO Scan Interface go to ni.com/info and enter the Info Code rdsoftwareversion.

   or

   – NI 9144 distributed chassis and compatible RT controller

☐ +24 V power supply (such as the NI PS-15) for the CompactRIO controller (NI part number 781093-01)

☐ Separate +24 V power supply for the NI 9512 (such as the NI PS-15)

☐ NI SMD-7620/7621 stepper drive

☐ NI or third-party stepper motor

   📝 **Note** NI offers stepper motors matched to the NI SMD-7620/7621. Refer to ni.com/motion for motor options. National Instruments highly recommends using these motors for the best user experience.

☐ (Optional) ENC-7741 encoder for ST23 motors (NI part number 748992-01) or ENC-7742 encoder for ST34 motors (NI part number 748993-01)

☐ NI-7748 encoder cable to connect the encoder to the NI 951x terminal block (NI part number 748994-01)

☐ Ethernet connection and cable for the CompactRIO controller

☐ Ethernet connection and cable for the NI SMD-7620/7621

☐ AC input cable for the NI SMD-7620/7621

☐ NI 951x Cable and Terminal Block bundle (NI part number 780553-01)

Software

☐ LabVIEW 2010 or later

☐ LabVIEW 2010 Real-Time Module or later

☐ LabVIEW 2010 NI SoftMotion Module or later

☐ NI-RIO 3.5.1 or later

☐ NI Stepper Configuration Utility

Figure 1 shows a simplified connection diagram.

Figure 1. NI 9512 to NI SMD-7620/7621 Connections
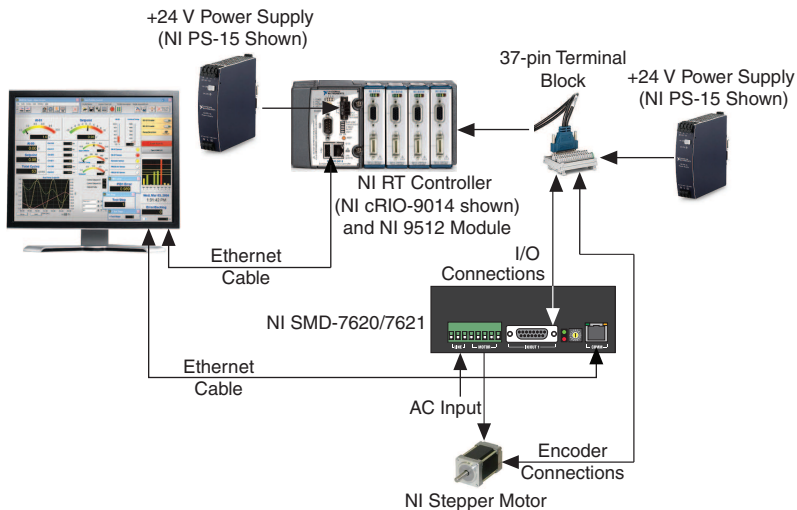
Related Documentation

The following documents contain additional information that you may find helpful. All referenced documents ship with the product and are available at ni.com/manuals.

• Operating instructions for the controller and C Series module.

• *NI SMD-7620/7621 User Manual*

• *LabVIEW NI SoftMotion Module Help*—Use this help file to learn about using the NI SoftMotion Module in LabVIEW including information about function blocks and using the NI SoftMotion Module with the LabVIEW Project. To access this help file from LabVIEW, select **Help»LabVIEW Help**, then expand the *LabVIEW NI SoftMotion Module* book on the **Contents** tab.

• *LabVIEW Help*—Use the *LabVIEW Help* to access information about LabVIEW programming concepts, step-by-step instructions for using LabVIEW, and reference information about LabVIEW VIs, functions, palettes, menus, tools, properties, methods,

events, dialog boxes, and so on. The *LabVIEW Help* also lists the LabVIEW documentation resources available from National Instruments. Access the *LabVIEW Help* by selecting **Help»LabVIEW Help**.

- *Getting Started with LabVIEW*—Use this document as a tutorial to familiarize yourself with the LabVIEW graphical programming environment and the basic LabVIEW features you use to build data acquisition and instrument control applications. Access the *Getting Started with LabVIEW* PDF by selecting **Start»All Programs»National Instruments» LabVIEW»LabVIEW Manuals»LV_Getting_Started.pdf**.

Hardware Installation and Configuration

This section covers the hardware setup for the CompactRIO system, NI 9512 C Series module, and NI SMD-7620/7621 stepper drive.

Step 1: Set Up the CompactRIO System

Complete the following steps to set up the CompactRIO hardware.

1. Install the real-time CompactRIO controller on the chassis if you are not using an integrated controller and chassis.

   📝 **Note** Write down the controller serial number before installing the controller onto the chassis. You will be unable to read the serial number after you install the controller.

   a. Make sure that no power is connected to the controller or the chassis.

b. Align the controller with the chassis as shown in Figure 2.

Figure 2. Installing the Controller on the Chassis (Eight-Slot Chassis Shown)
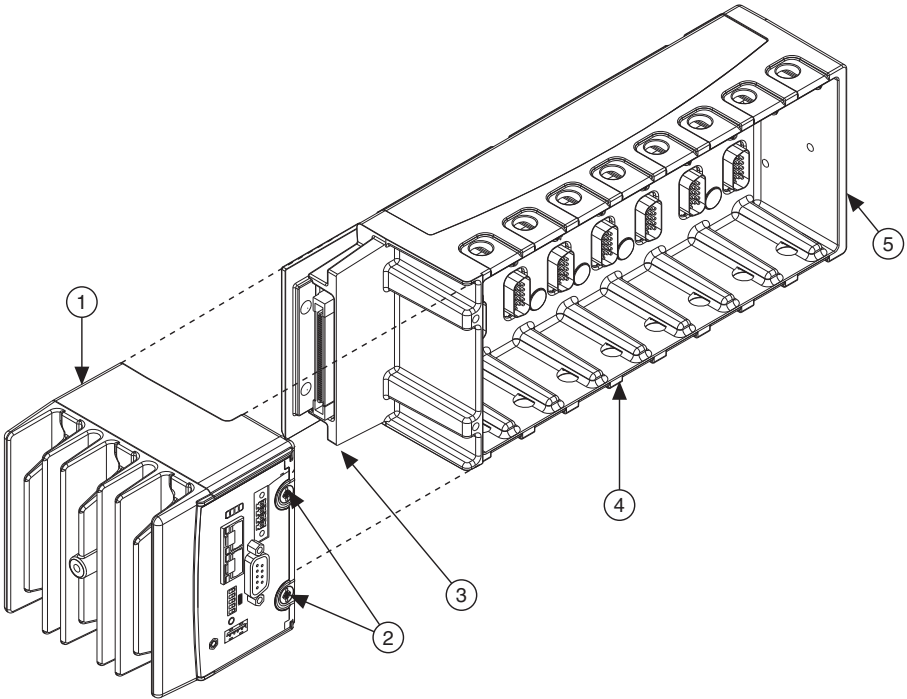
1	Controller	4	Reconfigurable Embedded Chassis
2	Captive Screws	5	Grounding Screw
3	Controller Slot		

c. Slide the controller onto the controller slot on the chassis. Press firmly to ensure the chassis connector and the controller connector are mated.

d. Using a number 2 Phillips screwdriver, tighten the two captive screws on the front of the controller.

2. Connect the controller to a power supply and an Ethernet network on the same subnet as the development computer. Refer to the controller operating instructions for information about wiring the controller to the power supply and Ethernet network.

   Note Do not plug in or turn on any power to the system until after you complete *Step 11: Power on the Drive and Verify Connections*.

3. Install the NI 9512 module in slot 1, 2, 3, or 4 of the chassis.

Step 2: Connect the NI 9512 to the 37-Pin Terminal Block

1. Connect the MDR and DSUB connectors on the NI 951x Y-cable to the MDR and DSUB connectors on the NI 9512 module.
2. Connect the 37-pin DSUB to the DSUB connector on the NI 951x terminal block.

Figure 3 shows the 37-pin terminal block pin assignments.

Figure 3. NI 9512 37-Pin Terminal Block Pin Assignments

Forward Limit	1	19		Digital Output 1†
Home	2	20		Reverse Limit
COM	3	21		Reserved
Digital Input 0	4	22		V_{sup}
COM	5	23		Reserved
Encoder 0 Index+	6	24		COM
Encoder 0 Index–	7	25		Encoder 0 Phase A+
COM	8	26		Encoder 0 Phase A–
+5V OUT	9	27		Encoder 0 Phase B+
Position Compare	10	28		Position Capture
Reserved	11	29		Encoder 0 Phase B–
Reserved	12	30		Reserved
Digital Output 0†	13	31		Reserved
V_{sup}†	14	32		COM†
Digital Input 1†	15	33		Drive Enable†
Direction (CCW)+†	16	34		Digital Input 3†
COM†	17	35		Direction (CCW)–†
Step (CW)+†	18	36		Digital Input 2†
Shield	GND	37		Step (CW)–†

† Indicates DSUB connector signals.

Step 3: Connect the 37-Pin Terminal Block to the +24 V Power Supply

📝 **Note** Do not plug in or turn on the power supply until after you complete *Step 11: Power on the Drive and Verify Connections*.

1. Connect the V+ terminal from the 24 V power supply to one of the two V_{sup} inputs on the 37-pin terminal block. The 37-pin terminal block provides a V_{sup} input for the NI 9512 on pin 14 and pin 22.
2. Connect the V- terminal from the 24 V power supply to one of the COM terminals on the 37-pin terminal block. The 37-pin terminal block provides COM on pins 3, 5, 8, 17, 24, and 32.

Step 4: Connect the Drive Command Signals

Complete the following steps to connect the Drive Command signals to the NI 9512 terminal block.

1. Connect the SMD-7620/7621 X1/STEP- terminal (pin 2) to the 37-pin terminal block Step (CW)+ terminal (pin 18).

2. Connect the SMD-7620/7621 X2/DIR- terminal (pin 4) to the 37-pin terminal block Direction (CCW)+ terminal (pin 16).

3. Connect the SMD-7620/7621 X1/STEP+ terminal (pin 1) and X2/DIR+ terminal (pin 3) to the 37-pin terminal block +5V OUT terminal (pin 9).

Figure 4 shows the SMD-7620/7621 Drive Command and I/O Connector location and pinout.

Figure 4. SMD-7620/7621 Drive Command and I/O Connector
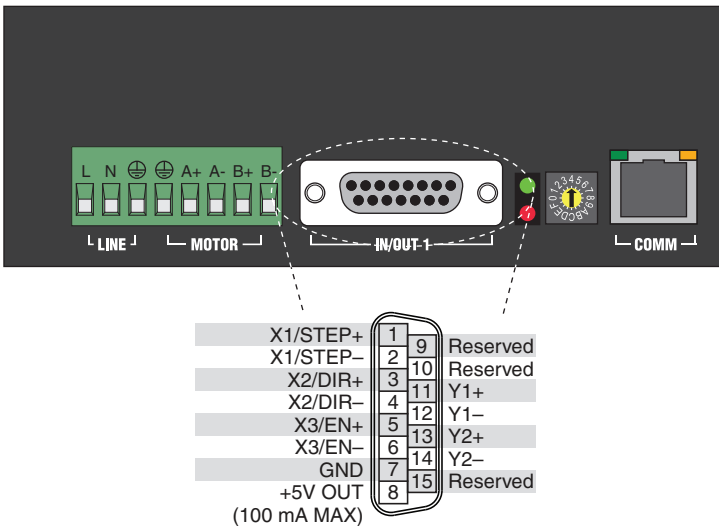
Step 5: Connect the Drive Enable Signal

Complete the following steps to connect the Drive Enable signal, which controls the enable function of the drive:

1. Connect the X3/EN- terminal (pin 6) to the 37-pin terminal block COM terminal (pin 5).

2. Connect the X3/EN+ terminal (pin 5) to the 37-pin terminal block Drive Enable terminal (pin 33).

Step 6: (Optional) Connect the Drive Fault Signal

Complete the following steps to map an NI 9512 digital input to the SMD-7620/7621 Y1 programmable output signal to monitor the NI SMD-7620/7621 stepper drive for faults:

1. Connect the Y1+ terminal (pin 11) to the 37-pin terminal block Vsup terminal (pin 22).

2. Connect the Y1- terminal (pin 12) to the 37-pin terminal block DI 0 terminal (pin 4).

Step 7: (Optional) Connect the Encoder Signals

If your motor includes an encoder, complete the following steps to connect the encoder to the NI 951x terminal block:

1. Connect one end of the encoder cable to the encoder.
2. Cut the 15-pin DSUB connector off of the other end of the cable and expose the encoder wires.
3. Connect the encoder wires to the 37-pin terminal block as indicated in Table 1.
4. Insulate any unused wires.

Table 1. NI SMD-7620/7621 to 37-Pin Terminal Block Connections

Encoder Signal Name	Encoder Cable Wire Color	37-Pin Terminal Block Pin Number	37-Pin Terminal Block Signal Name
CH A	blue	25	Encoder 0 Phase A+
CH A-	blue/white	26	Encoder 0 Phase A-
CH B	yellow	27	Encoder 0 Phase B+
CH B-	yellow/white	29	Encoder 0 Phase B-
INDEX	orange	6	Encoder 0 Index+
INDEX-	orange/white	7	Encoder 0 Index-
GND	black	8	COM
+Vcc	red	9	+5V OUT

Step 8: Connect the NI SMD-7620/7621 to AC Power

Note Do not apply power until after you complete *Step 11: Power on the Drive and Verify Connections*.

Complete the following steps to connect the NI SMD-7620/7621 to AC power.

1. Connect an AC input cable to the line, neutral, and protective earth connectors as shown in Figure 5.
2. (Optional) Install a fuse on the AC input line as shown. The SMD-7620 contains an internal 8 A fast acting fuse. The SMD-7621 contains an internal 3.5 A fast acting fuse. If an external fuse is desired, National Instruments recommends a 6 A fast acting fuse for the SMD-7620 and a 3 A fast acting fuse for the SMD-7621 version.
3. (Optional) If your application requires EMC compliance, install a Corcom 6ET1 line filter in series with the AC input as shown.

Note Refer to the *NI SMD-7620/7621 User Manual* for more information about connecting to AC power.

Figure 5 shows the SMD-7620/7621 Power and Motor Connector location and pinout, with optional fusing and line filters.

**Figure 5.** SMD-7620/7621 Power and Motor Connector
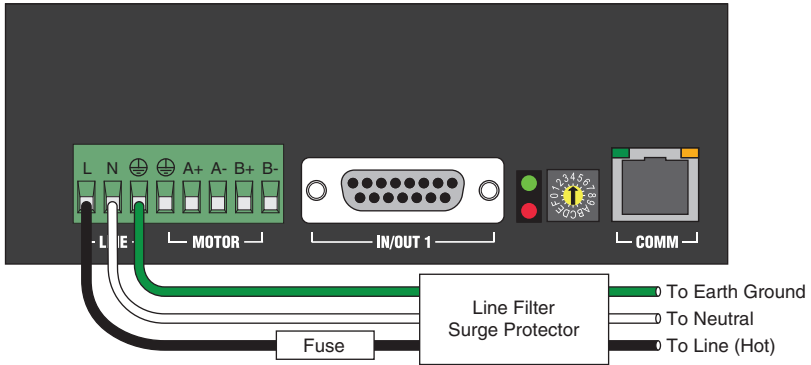
Step 9: Connect the SMD-7620/7621 to the Motor

Caution Do not connect or disconnect the motor when the power is on.
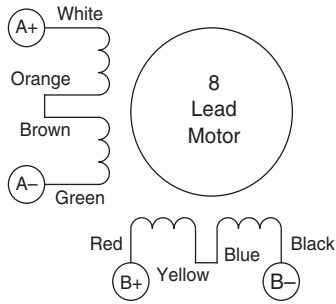
NI offers NEMA 23 and NEMA 34 stepper motors matched to the SMD-7620/7621. When connecting these motors to the SMD-7620, connect them in parallel as shown in Figure 6.

Figure 6. Eight Lead Motor Parallel Connection
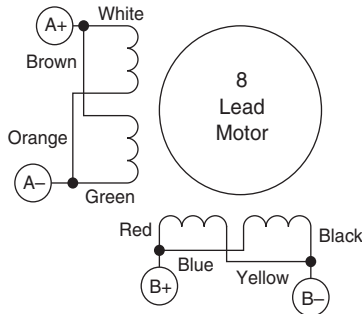
When connecting these motors to the SMD-7621, connect them in series as shown in Figure 7.
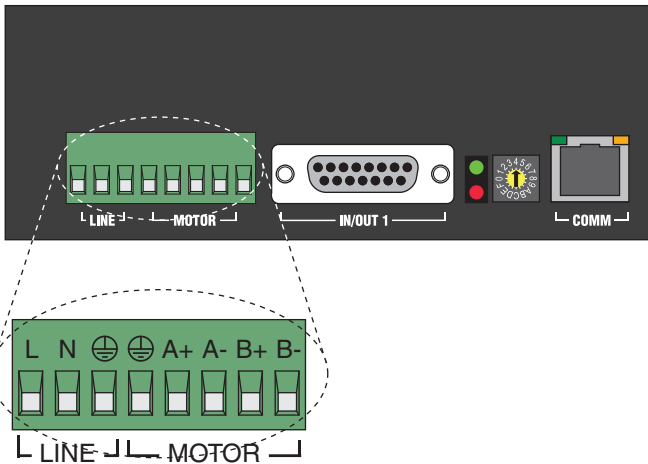
Figure 7. Eight Lead Motor Series Connection

📝 **Note** For information about connecting third-party motors, refer to the *NI SMD-7620/7621 User Manual*.

Figure 8 shows the NI SMD-7620/7621 motor connections.

Figure 8. NI SMD-7620/7621 Motor Connector Terminal

# Step 10: Connect the NI SMD-7620/7621 to the Network

1. Connect the NI SMD-7620/7621 to an Ethernet network on the same subnet as the development computer.

2. Set the rotary switch to one of the preset IP addresses or to the F position to configure the drive to use DHCP.

✍ **Note** This document assumes you have configured the drive for DHCP. For information about other settings refer to the *NI SMD-7620/7621 User Manual*.

Figure 9 shows the NI SMD-7620/7621 NI SMD-7620/7621 IP address selection switch and Ethernet connector.

Figure 9. NI SMD-7620/7621 IP Selection and Ethernet Connector
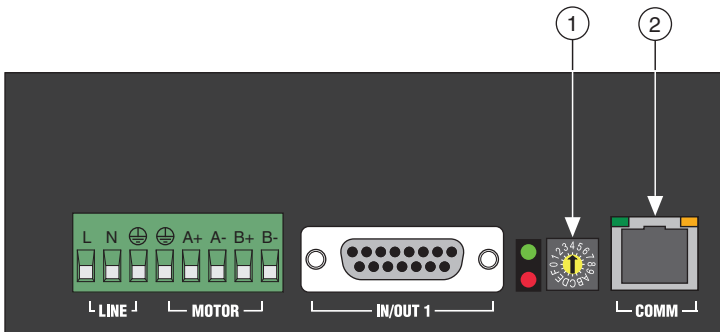

| 1 | IP Address Selection Switch | 2 | Ethernet connector |

Step 11: Power on the Drive and Verify Connections

After all hardware connections have been made complete the following steps to confirm the hardware setup.

1. Turn on all power supplies and apply AC power.
2. Verify that the Drive Status LED on the NI SMD-7620/7621 flashes or is solid green. Figure 10 shows the location of the Drive Status LED.

Figure 10. Drive Status LED Location
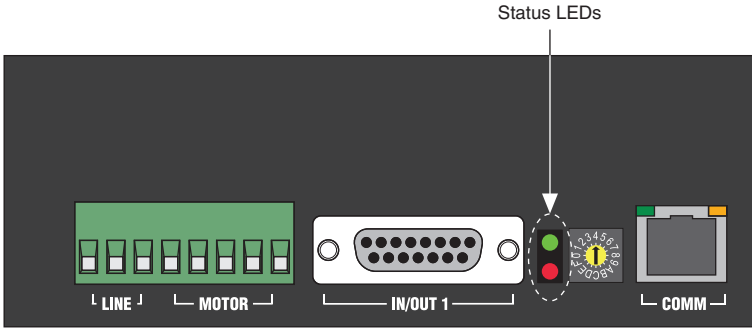
If the Drive Status LED does not flash or turn solid green, turn off all power, verify the connections, and try again. Refer to the *Worldwide Support and Services* section for additional tips.

Software Installation and Configuration

This section covers installing and configuring software for the NI 9512 C Series module.

> **Note**   These instructions assume you have installed all required software from the *What You Need to Get Started* section on your development machine.

Step 1: Install Software on and Configure the NI RT Controller

Complete the following steps to configure the controller and install software on it.

> **Note**   The Measurement & Automation Explorer (MAX) user interface may not match these steps exactly depending on which version of MAX you are using.

Verify the NI RT Controller

1. Launch Measurement & Automation Explorer (MAX) on the development computer by clicking the MAX icon on the desktop ( ), or by szelecting **Start»All Programs» National Instruments»Measurement & Automation**.

2. Expand the **Remote Systems** tree.

3. Highlight the system.

📝 **Note** If you do not see the controller, you may need to disable the firewall on the development computer. Go to ni.com/info and enter RIOMAXTroubleshoot for more information.

4. Verify that the **Serial Number** in the **General Settings** section matches the serial number on the device.

If you do not want to format the disk on the controller, eliminating all installed software and files, skip to *Install Software on the NI RT Controller*.

Reformat the NI RT Controller (Optional)

1. Set the **Safe Mode** switch on the controller to the **On** position.

2. Power on the controller. If it is already powered on, press the **Reset** button on the controller to reboot it.

3. Right-click the controller under **Remote Systems** in the **Configuration** pane in MAX and select **Format Disk**.

4. (Optional) Enable the **Keep Network Settings** checkbox if you want to retain the same target name and IP address.

5. Click **Format** to start formatting the disk.

6. When MAX finishes formatting the disk, set the **Safe Mode** switch to the **Off** position and click **OK**.

7. Select the **System Settings** tab on the bottom and type a descriptive name for the system in the **Hostname** field.

8. (Optional) Complete this step only if the target has an empty IP address (0.0.0.0). Select the **Network Settings** tab and select **DHCP or Link Local** from the **Configure IPv4 Address** list to assign an IP address or select the **Static** to specify a static IP address in the **IPv4 Address** section.

9. Click **Save** on the toolbar and let MAX reboot the system. You may not need to complete this step if you did not change the IP address or name.

Install Software on the NI RT Controller

1. When the new system name appears under **Remote Systems**, expand the controller item in the tree, right-click **Software**, and select **Add/Remove Software**.

2. Select a recommended software set that includes NI-RIO 3.5.1 or later.

3. Click **Next**.

4. Select **LabVIEW NI SoftMotion Module** from the add-ons list.

📝 **Note** If you are using NI SoftMotion Module 2010 SP1 or earlier, also select **LabVIEW NI SoftMotion Module Scan Engine Support** from the list.

5. Click **Next** to install the selected software on the controller. Click **Help** if you need information about installing recommended software sets.

6. When the software installation completes, click **Finish** to reboot the controller.

7. Close MAX.

Step 2: Create a Project in Scan Interface Mode

Scan Interface mode enables you to use C Series modules directly from LabVIEW Real-Time. Modules that you use in Scan Interface mode appear directly under the chassis item in the **Project Explorer** window. Unlike most C Series modules, NI 951x modules are not directly configurable from the **Project Explorer** window and no I/O variables are directly available under the module.

💡 **Tip** Refer to the *Select Programming Mode Dialog Box* topic of the *CompactRIO Reference and Procedures (Scan Interface)* help file for more information about Scan Interface mode.

Use a LabVIEW project to manage VIs, targets, and I/O modules on the development computer. Complete the following steps to create a LabVIEW project.

1. Launch LabVIEW.

2. Select **File»Create Project** or **Project»Create Project** to display the **Create Project** dialog box. You can also click the **Create Project** button on the Getting Started window. The **Create Project** dialog box includes a list of templates and sample projects you can use to ensure that the project you create uses reliable designs and programming practices.

3. Select **Blank Project** from the list of templates.

4. Click **Finish**.

5. Select **Help** and make sure that **Show Context Help** is checked. You can refer to the context help throughout the tutorial for information about items on the block diagram.

Step 3: Add Resources to the Project

1. Right-click the top-level project item in the **Project Explorer** window and select **New» Targets and Devices** from the shortcut menu to display the **Add Targets and Devices** dialog box.

2. Make sure that the **Existing target or device** radio button is selected.

3. Expand **Real-Time CompactRIO**.

4. Select the CompactRIO controller to add to the project and click **OK**.

5. If you have LabVIEW FPGA installed, the **Select Programming Mode** dialog box appears. Select **Scan Interface** to put the system into Scan Interface mode.

💡 **Tip** Use the **CompactRIO Chassis Properties** dialog box to change the programming mode in an existing project. Right-click the CompactRIO chassis in the **Project Explorer** window and select **Properties** from the shortcut menu to display this dialog box.

6. Click **Discover** in the **Discover C Series Modules?** dialog box if it appears.

7. Click **Continue**.

8. Right-click the controller item in the **Project Explorer** window and select **Properties** from the shortcut menu to display the **RT Target Properties** dialog box. Select **Scan Engine** from the **Category** list to display the Scan Engine page.

9. Set the **Scan Period** to 5 ms, then click **OK** to close the **RT Target Properties** dialog box.

10. Right-click the controller item in the **Project Explorer** window and select **New» NI SoftMotion Axis** from the shortcut menu to open the **Axis Manager** dialog box, shown in Figure 11.

11. Click **Add New Axis** to create an NI SoftMotion axis associated with the NI 9512 module. Axes are automatically bound to an available module. You can double-click the axis name to rename the axis and give it a descriptive name.

Figure 11. Axis Manager Dialog Box
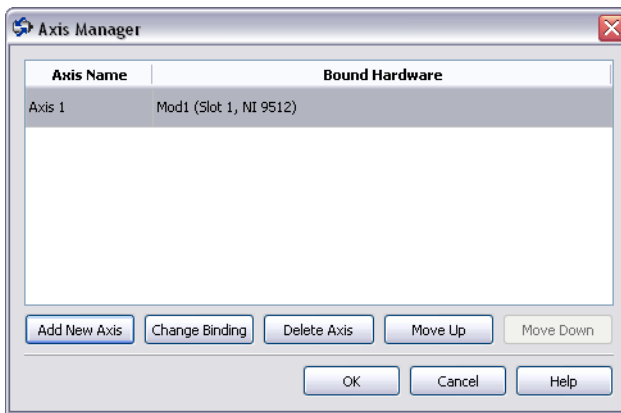
12. Click **OK** to close the **Axis Manager** dialog box. The new axis is added to the **Project Explorer** window.

Note You cannot associate more than one axis with the same C Series module.

When you have finished these steps your LabVIEW project should look similar to the image in Figure 12.

Figure 12. Project Explorer Window with Modules in Scan Interface Mode
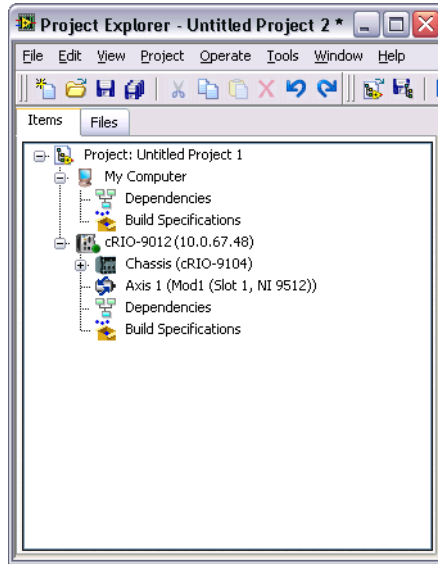
Step 4: Configure the NI 9512 Axis

The **Axis Configuration** dialog box includes configuration options for stepper drive command signals, feedback devices, motion and digital I/O, trajectory, and axis setup. Figure 13 shows the parts of the **Axis Configuration** dialog box for the NI 9512 C Series module. Refer to the *NI SoftMotion Module* book of the *LabVIEW Help* for detailed information about each configuration option.

Figure 13. Axis Configuration Dialog Box
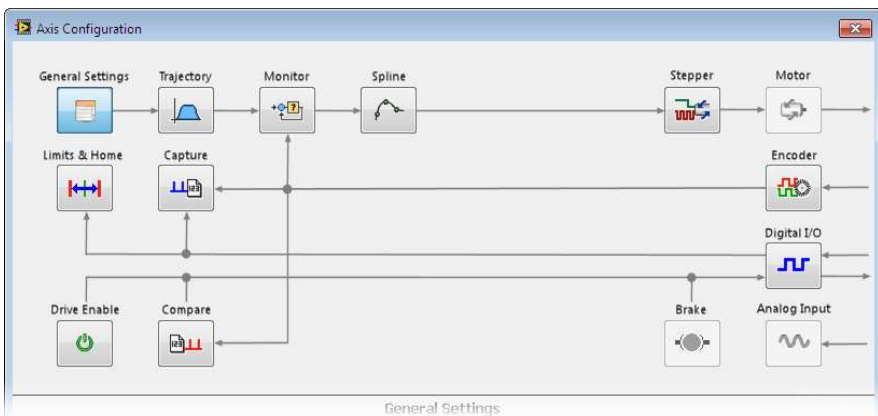
Complete the following steps to configure the axis I/O settings for use with the NI SMD-7620/7621 stepper drive.

1. Right-click the axis in the **Project Explorer** window and select **Properties** from the shortcut menu to open the **Axis Configuration** dialog box.

2. Configure the following settings on the **General Settings** page (▦).

   a. Confirm that **Loop Mode** is set to **Open-Loop**. Axes configured in open-loop mode produce step outputs but do not require feedback from the motor to verify position.

   b. Set **Feedback Source** to **Encoder 0**, if you have connected an encoder, or **None** if you do not have an encoder connected.

   c. Confirm that the **Axis Enabled** and **Enable Drive on Transition to Active Mode** checkboxes contain checkmarks. These selections configure the axes to automatically activate when the NI Scan Engine switches to Active mode.

Note Disable these options to prevent axes from automatically activating when the NI Scan Engine switches to Active mode.

3. If you have connected an encoder, click the Encoder button (⬚) and configure the Units and Counts Per Unit.

   a. In the **Active State** section set the **Line State** for **A**, **B**, and **Index** to **High**.

   b. In the **Index Reference Criteria** section set the **Line State** for **A** and **B** to **Inactive**.

   c. Select **rev** from the **Units** text box, or type **revolutions** if you prefer.

   d. Set the **Counts per rev** to 8,000. This setting is the encoder resolution in quadrature counts per revolution and corresponds to the encoder lines per revolution multiplied by four.

   When you are finished the Encoder Settings page will look similar to Figure 14.

Figure 14. Axis Configuration Encoder Page
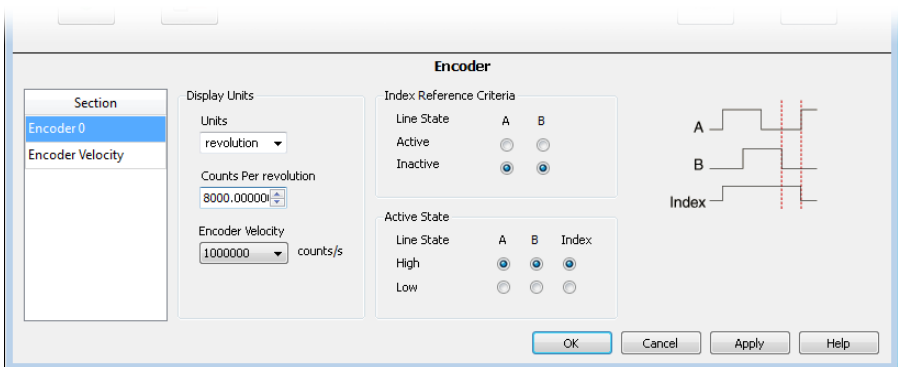
4. Click the **Stepper** button (🔧) to open the **Stepper** page.

    a. Ensure that the Stepper Output settings match the following:

        •   **Output Mode**—Step and Direction
        •   **Output Type**—Single-Ended
        •   **Active State**—Low

    b. Configure the Units and Steps Per Unit.

        •   Select **rev** from the **Units** text box, or type **revolutions** if you prefer.
        •   Set **Steps Per revolution** to 20,000.

📝 **Note** The **Stepper steps per revolution** setting *must* match the Steps/Rev setting in the NI Stepper Configuration Utility. The NI Stepper Configuration Utility settings are covered in *Step 5: Configure the Drive Using the NI Stepper Configuration Utility*.

    c. (Optional) Click the **Monitor** button (📝) and make the following changes to enable NI SoftMotion to disable the drive and turn off the Drive Enable signal when the specified position error limit is exceeded.

📝 **Note** The **Monitor** button is greyed out if **Feedback Source** on the **Axis Settings** page is set to **None**.

        •   Enable the **Enforce Position Error Limit** checkbox.
        •   Set **Position Error Limit** to a reasonable tolerance for your system, such as 1.

5. Click the **Drive Enable** button (⏻) and ensure that the Drive Enable settings match the following:

    •   **Output Type**—Sourcing
    •   **Active State**—Off
    •   **Safe State**—On

6. If you connected the Y1+/Y1- signal, click the Digital I/O button (🎛) and complete the following steps to configure the DI 0 signal:

    a. Double-click the text in the **Mapping** column and select **Drive Fault/Alarm** from the dropdown list.

    b. Ensure that the DI 0 settings match the following:

        •   **Input Type**—Sinking
        •   **Active State**—On
        •   **Digital Filter**—50 µs

7. Complete the following additional steps if you do not have limits and home connected at this time:

   a. Click the **Limits & Home** button ( ).

   b. In the **Forward Limit** and **Reverse Limit** sections ensure that the settings match the following:

   > 📝 **Note** These configuration settings disable limits for initial setup and testing purposes. National Instruments recommends connecting and enabling limits in your final application.

   - Clear the **Enable** checkbox from both **Forward Limit** and **Reverse Limit**.
   - Set the **Active State** for both **Forward Limit** and **Reverse Limit** to **Off**. This prevents a limit warning even though limits are turned off.

   c. Open the **Home** section and clear the **Enable** checkbox.

8. Configure any additional I/O settings according to your system requirements, such as position compare or position capture signals.

9. Click **OK** to close the **Axis Configuration** dialog box.

10. Right-click the controller item in the **Project Explorer** window and select **Deploy All** to deploy the axis information.

11. Select **File»Save Project** to save the project.

Step 5: Configure the Drive Using the NI Stepper Configuration Utility

1. Launch the NI Stepper Configuration utility.

2. Select **Drive»Drive Discovery**, verify that your host IP address is highlighted, then click **OK**.

3. When Drive Discovery detects a drive, click **Yes** in the confirmation dialog box.

4. Select the drive you are configuring from the **Drive** dropdown list.

5. Click the **I/O** button to launch the **I/O Configuration** dialog box.

   a. Enable the **close fault output (Y1)** option button to configure the fault signal.

   b. Enable the **When Enable input is (X3) is open** option button to configure the drive enable signal.

   c. (Optional) Configure additional I/O signals on the drive as necessary.

6. Click the **Motor** button to launch the **Motor** dialog box.

   a. Select your motor from the **Standard motor** dropdown list. If you are using a motor other than one of the standard motors, refer to the *NI Stepper Configuration Utility Help* for information about how to configure it for use with the NI SMD-7620/7621.

7. Click the **Motion** button to launch the **Pulse & Direction Control** dialog box.

    a. Set **Steps/Rev** to 20,000.

    b. (Optional) Set the **Step Smoothing Filter** and **Input Noise Filter** as appropriate for your application. Refer to the *NI Stepper Configuration Utility Help* for information about these settings.

8. Click **Download to Drive** to apply the updated settings to the drive.

Step 6: Enable and Test the Drive Using LabVIEW

Use the Interactive Test Panel to test and debug your motion system and configuration settings on the selected axis. With the Interactive Test Panel you can perform a simple straight-line move and monitor feedback position and position error information, move and I/O status information, change move constraints, get information about software errors and faults, and view position or velocity plots of the move.

Complete the following steps to test your setup after configuring the axis using the **Axis Configuration** dialog box.

1. Right-click the axis in the **Project Explorer** window and select **Interactive Test Panel** from the shortcut menu. Opening this dialog box sends the axis settings to the hardware and activates the I/O on the module.

2. On the **Move** tab set **Move Mode** to **Relative Position** and **Target Position** to 20 rev.

3. On the **Move Constraints** tab set **Velocity** to 2 rev/sec, **Acceleration** and **Deceleration** to 20 rev/sec^2, and **Acceleration Jerk** and **Deceleration Jerk** to 200 rev/sec^3. Using the encoder counts per revolution and stepper steps per revolution values specified in this tutorial the motor will move 20 revolutions at 120 rpm.

    Tip Click the **Help** button (?) on the bottom of the dialog box for detailed information about the items available in this dialog box.

4. Click the **Enable** button (⏻) on the bottom of the dialog box to enable the drive.

5. Click the **Start** button (▶) on the bottom of the dialog box to start the move with the configured options.

6. Use the **Status** and **Plots** tabs to monitor the move while it is in progress.

    Finalize your motion system setup by connecting and configuring additional I/O such as limits as required by your system using the 37-pin terminal block.

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