Getting Started with the LabVIEW™ Touch Panel Module

The LabVIEW Touch Panel Module extends the LabVIEW graphical development environment to Touch Panel devices so you can create human-machine interface (HMI) applications for Touch Panel devices running Windows CE or Windows Embedded Standard. You can create custom touch panel displays to communicate with National Instruments embedded real-time platforms, such as Compact FieldPoint, CompactRIO, and Compact Vision System.

This manual contains installation instructions for additional tools you might need to use with the Touch Panel Module and a tutorial that shows you how to create a LabVIEW project and build, run, deploy, and debug a Touch Panel application. Refer to the *LabVIEW Touch Panel Module Readme*, available by opening `readme_TouchPanel.html` on the installation media, for system requirements and instructions about installing the Touch Panel Module.

Contents

Supported Touch Panel Targets

The Touch Panel Module supports the following targets:

Target	Processor	Use
NI TPC-2006	ARM	Use with NI TPC-2006 hardware

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Target	Processor	Use
NI TPC-2012	x86	Use with NI TPC-2012 hardware
NI TPC-2106/NI TPC-2106T	ARM	Use with NI TPC-2106 hardware or NI TPC-2106T hardware
NI TPC-2512	x86	Use with NI TPC-2512 hardware
NI TPC-2515	x86	Use with NI TPC-2515 hardware
NI TPC-2215	x86	Use with NI TPC-2215 hardware
NI TPC-2212	x86	Use with NI TPC-2212 hardware
NI TPC-2206	x86	Use with NI TPC-2206 hardware
Touch Panel Windows CE 4.2 Device	ARM or x86	Use with third-party touch panel computers running Windows CE 4.2
Touch Panel Windows CE 5.0 Device	ARM or x86	Use with third-party touch panel computers running Windows CE 5.0
Windows Embedded Standard Device	x86	Use with third-party touch panel computers running Windows Embedded Standard

Note   If you use the x86 Touch Panel Windows CE 4.2 Device Touch Panel target, you must manually download and install the eMbedded Visual Tools and Pocket PC 2003 SDK. Refer to the KnowledgeBase for information about how to download and install these tools.

Note   If you use the Windows Embedded Standard Device Touch Panel target, the device must include an .msi engine in order to install the LabVIEW Run-Time Engine. The LabVIEW Run-Time Engine is required to run Touch Panel applications. You also must install the NI TPC Service on the device to deploy, run, and debug Touch Panel applications. Install the NI TPC Service on the target from the `NI_TP_Service\NITPCService.msi`, which is located in the same directory as the LabVIEW installer `setup.exe` file.

Installing Additional Tools

After installing the Touch Panel Module, you might need to install additional tools on the target depending on the functionality you need.

NI-DAQmx Base

You can download the latest version of NI-DAQmx Base for use with Touch Panel devices from the National Instruments Web site. After you complete the NI-DAQmx Base installation, you must copy the driver files to the device.

Complete the following steps to install NI-DAQmx Base on the Touch Panel device.

1. Select **Start»Programs»National Instruments»NI-DAQmx Base»Utilities**.
2. Launch the Driver Installation utility that corresponds to the Touch Panel device.
3. Check the device screen to see if any additional steps are requested, such as replacing an older driver.

Refer to the *NI-DAQmx Base Readme* and the *NI-DAQmx Base 3.x Getting Started Guide* for more information about NI-DAQmx Base.

NI TPC Service Support

The NI TPC Service is an Ethernet-based service that you can use to deploy, run, and debug Touch Panel applications. Use the NI TPC Service instead of ActiveSync if you are using Ethernet and need to deploy a Touch Panel application to multiple Touch Panel targets. If you are using third-party devices or your NI Touch Panel device does not have the NI TPC Service installed, you must install the NI TPC Service on the device before you can use the NI TPC Service. Most NI Touch Panel devices include the NI TPC Service by default.

Windows CE Targets

Complete the following steps to install support for the NI TPC Service on a Touch Panel target.

1. Depending on which type of target you are using, use FTP or an external storage device to copy `NITPCService.CAB` from the `labview\PDA\Utilities\NITPCService\ARM` directory or `labview\PDA\Utilities\NITPCService\x86` directory to any location on the Touch Panel device.
2. Run the `.CAB` file on the Touch Panel device to install the NI TPC Service.
3. For NI TPC devices, use the default installation location. Tap the <Enter> key to accept the default installation location. For third-party devices, install the service in a non-volatile directory on the device.

Third-Party Windows Embedded Standard Targets

You must install the LabVIEW Run-Time Engine on the Touch Panel target before you can install the NI TPC Service. An installer for the LabVIEW Run-Time Engine is located on the LabVIEW DVD or CD. Refer to the National Instruments Web site to download the latest version and other versions of the LabVIEW Run-Time Engine.

After you install the LabVIEW Run-Time Engine on the Touch Panel target, install the NI TPC Service from `NI_TP_Service\NITPCService.msi`, which is located in the same directory as the `setup.exe` you used to install the Touch Panel Module.

Shared Variable Support (Windows CE)

If you are using third-party devices or your NI Touch Panel device does not have shared variable support, you must install the latest version of shared variable support on the device before you can use front panel data binding and Shared Variable nodes in Touch Panel applications.

✏️ **Note** Most NI Touch Panel devices include the latest version of shared variable support, so you do not need to complete the following steps. If you have an NI TPC-2006 device and you downloaded the improved display driver from the National Instruments KnowledgeBase at ni.com, you also do not need to complete the following steps.

✏️ **Note** Shared variables are not supported on Windows CE 4.x x86 Touch Panel targets. Shared variables are supported on Windows CE 5.0 and later x86 targets.

Using ActiveSync/FTP

Complete the following steps to install or uninstall support for shared variables on a Touch Panel target using ActiveSync/FTP.

1. Connect the device to the host computer using ActiveSync/FTP.

2. Navigate to and run `labview\PDA\Utilities\Variables\ARM\Setup.exe` or `labview\PDA\Utilities\Variables\x86\Setup.exe`, depending on which type of target you are using.
3. For NI TPC devices, use the default installation location. For third-party devices, install the service in a non-volatile directory on the device.

Using the NI TPC Service

Complete the following steps to install or uninstall support for shared variables on a Touch Panel target using the NI TPC Service.
1. In LabVIEW, right-click the Touch Panel target in the **Project Explorer** window and select **Install»Support for Shared Variables (ARM)** from the shortcut menu.
2. For NI TPC devices, use the default installation location. For third-party devices, install the service in a non-volatile directory on the device.

PNG Image Support (Windows CE)

If you are using third-party devices or your NI Touch Panel device does not support PNG images, you must install support for PNG images on the device if the VI contains PNG images in the user interface.

> **Note** Most NI Touch Panel devices include support for PNG images, so you do not need to complete the following steps. If you have an NI TPC-2006 device and you downloaded the improved display driver from the National Instruments KnowledgeBase at ni.com, you also do not need to complete the following steps.

Using ActiveSync/FTP

Complete the following steps to install or uninstall support for PNG images on a Touch Panel device using ActiveSync/FTP.
1. Connect the device to the host computer using ActiveSync/FTP.
2. Navigate to and run `labview\PDA\Utilities\LVPNG\ARM\Setup.exe` or `labview\PDA\Utilities\LVPNG\x86\Setup.exe`, depending on which type of target you are using.
3. For NI TPC devices, use the default installation location. For third-party devices, install the service in a non-volatile directory on the device.

> **Tip** You also can right-click the target in the **Project Explorer** window in LabVIEW and select **Install»Support for PNG Images (ARM)** from the shortcut menu.

Using the NI TPC Service

Complete the following steps to install or uninstall support for PNG images on a Touch Panel target using the NI TPC Service.
1. In LabVIEW, right-click the Touch Panel target in the **Project Explorer** window and select **Install»Support for PNG Images (ARM)** from the shortcut menu.
2. For NI TPC devices, use the default installation location. For third-party devices, install the service in a non-volatile directory on the device.

NI-VISA Support (Windows CE)

You must install NI-VISA on the target to use VISA in Touch Panel applications. If you did not install NI-VISA when you installed the Touch Panel Module, select **Start»All Programs»National**

Instruments»VISA and select **Windows CE for ARM Driver Installation** or **Windows CE for x86 Driver Installation**, depending on which type of target you are using.

> 💡 **Tip** You also can right-click the target in the **Project Explorer** window in LabVIEW and select **Install»Support for NI-VISA (ARM)** from the shortcut menu.

x86 Target Support for Third Parties (Windows CE)

The Touch Panel Module installs support for ARM Touch Panel targets and Windows CE 5.0 x86 Touch Panel targets. If you need support for x86 Touch Panel targets running Windows CE 4.2, install the following Microsoft eMbedded Visual Tools:

- Microsoft eMbedded Visual C++ 4.0
- Microsoft eMbedded Visual C++ SP 4 or later
- SDK for Windows Mobile 2003-based Pocket PCs

Refer to the National Instruments KnowledgeBase at `ni.com/info` and enter the Info Code `tpcevc` for the most recent information about downloading and installing the Microsoft eMbedded Visual Tools.

Windows CE Tutorial

Use this tutorial to learn how to configure a Touch Panel Windows CE device to use the NI TPC Service; how to use the Touch Panel Project Wizard to create a project; and how to build, deploy, run, and debug a Touch Panel application.

The VI in this tutorial simulates setting a temperature, displaying the current temperature in a graph and on a thermometer, and indicating if the temperature is not in range.

Configuring the Windows CE Device to Use the NI TPC Service

> 📝 **Note** If you want to use ActiveSync instead of the NI TPC Service, you must use a USB or serial connection to connect the Touch Panel device to the host computer. If you use a serial cable, connection time is longer.

Complete the following steps to configure the Touch Panel device to use the NI TPC Service.

1. Ensure the host and target are on the same subnet.
2. Enable FTP on the Touch Panel device. Refer to the National Instruments Web site at `ni.com/info` and enter the Info Code `ex6pwq` for the most recent information about configuring NI TPC devices to use FTP. For third-party devices, refer to your device documentation.
3. Install the NI TPC Service on the Touch Panel target. Refer to the *NI TPC Service Support* section for more information about installing the NI TPC Service on Touch Panel targets.
4. Use the NI TPC Service Manager to configure the service to run on the Touch Panel target.
   a. Select **Start»All Programs»National Instruments»NI TPC Service»NI TPC Service Manager** to launch the NI TPC Service Manager. The manager checks the status of the NI TPC Service and displays the status information.
   b. Tap the **Start** button to start the NI TPC Service if the NI TPC Service is not running.

Creating the LabVIEW Project

Use LabVIEW projects to group together LabVIEW files and non-LabVIEW files, create build specifications for building a Touch Panel VI into an application, and deploy the application to the target. You must use a project to build a Touch Panel VI into an application.

Using the Touch Panel Project Wizard, complete the following steps to create a LabVIEW project, add the target, and add an existing VI to the project.

1. Launch LabVIEW. In the **Getting Started** window, select **Touch Panel Project** from the **Targets** pull-down menu. Click the **Go** button to launch the Touch Panel Project Wizard.

2. Define the project information as shown in Figure 1.

    a. Select **New Touch Panel project, import VI** from the **Project type** pull-down menu to create the LabVIEW project using an existing VI.

> 💡 **Tip** The blank VI project type creates a project with a new Touch Panel template VI rather than importing an existing VI.

    b. Specify a project name and the location where you want to save the project and the VI in the **Project location** text box. Save the project to a location other than the default location so you do not overwrite the shipping example with your changes. The default project name is `Untitled project.lvproj`. For this tutorial, name the project `Touch Panel Tutorial.lvproj` in the **Project location** text box.

    c. Click the **Browse** button next to the **VI path** text box and navigate to `labview\examples\TouchPanel\tutorial\Touch Panel Tutorial.vi` to select the VI to import. Click the **OK** button to add the VI to the project you are creating.
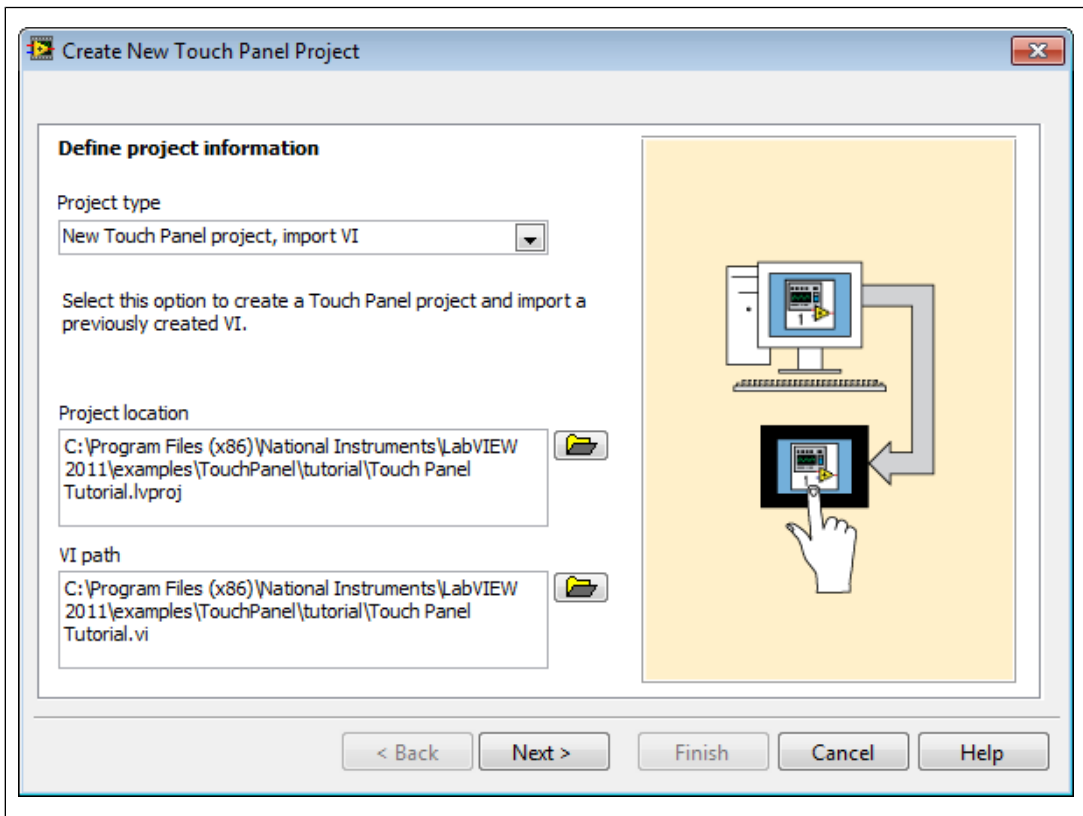

Figure 1. Defining the Project Information

3. Click the **Next** button.
4. Select the Touch Panel device you are using from the **Device type** pull-down menu, as shown in Figure 2.
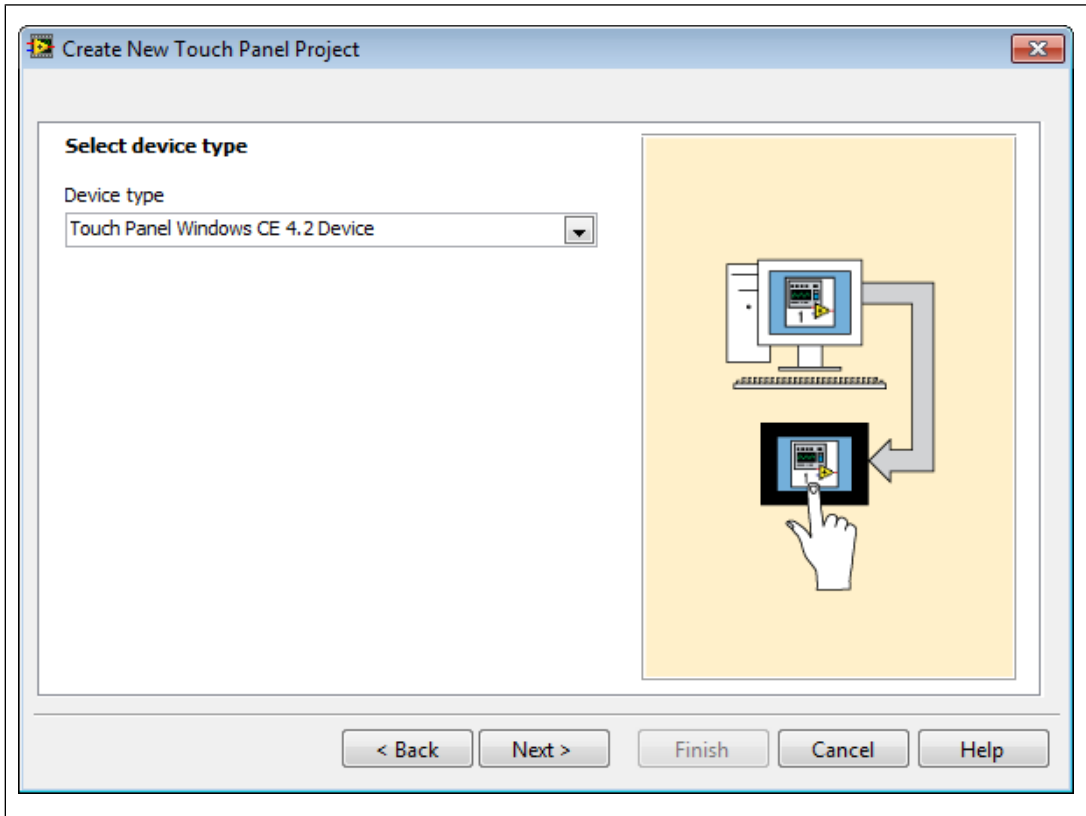

Figure 2. Selecting the Target

5. Click the **Next** button.
6. Configure connection information for the device as shown in Figure 3.
    a. Select **NI TPC Service (TCP/IP)** from the **Connection** pull-down menu if you configured the device to use the NI TPC Service.
    b. Enter the IP address for the device in the **Touch Panel device IP address** text box.
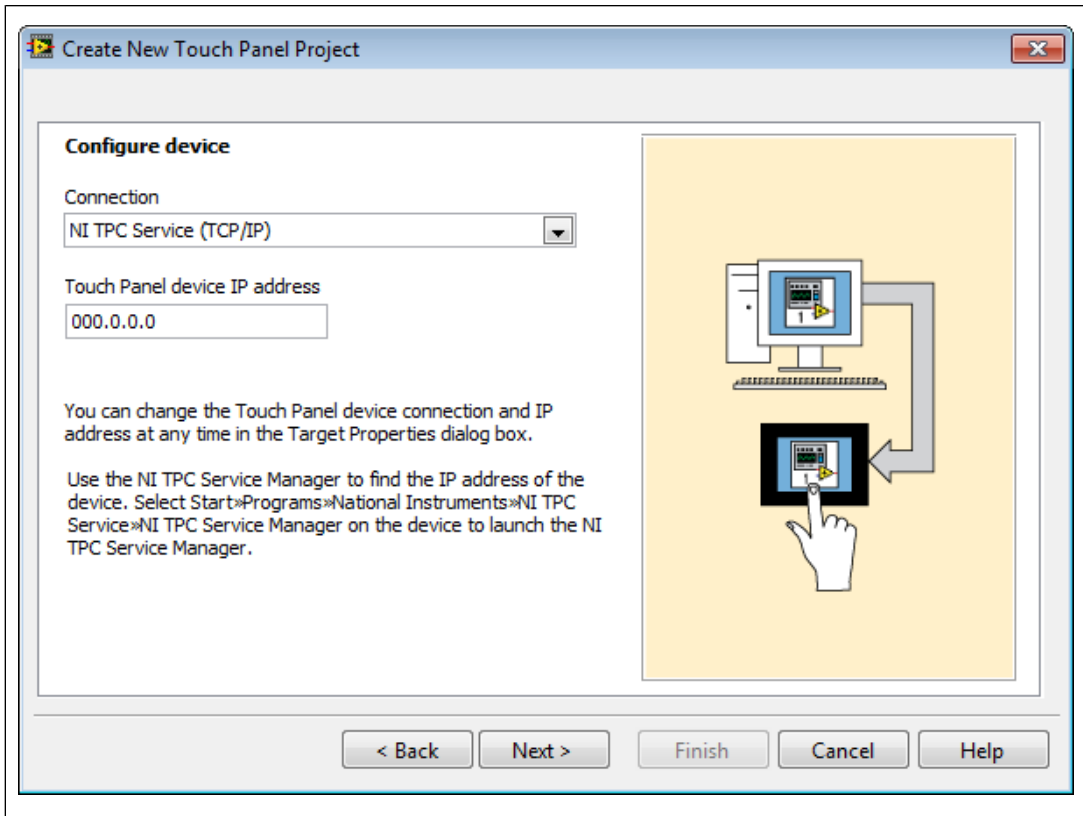
Figure 3. Configuring the Device

7. Click the **Next** button.
8. Click the **Finish** button. Because the **Create a build specification** checkbox contains a checkmark, as shown in Figure 4, the **Touch Panel Build Specification Properties** dialog box opens. Refer to the *Creating the Build Specification* section for more information about creating a build specification.
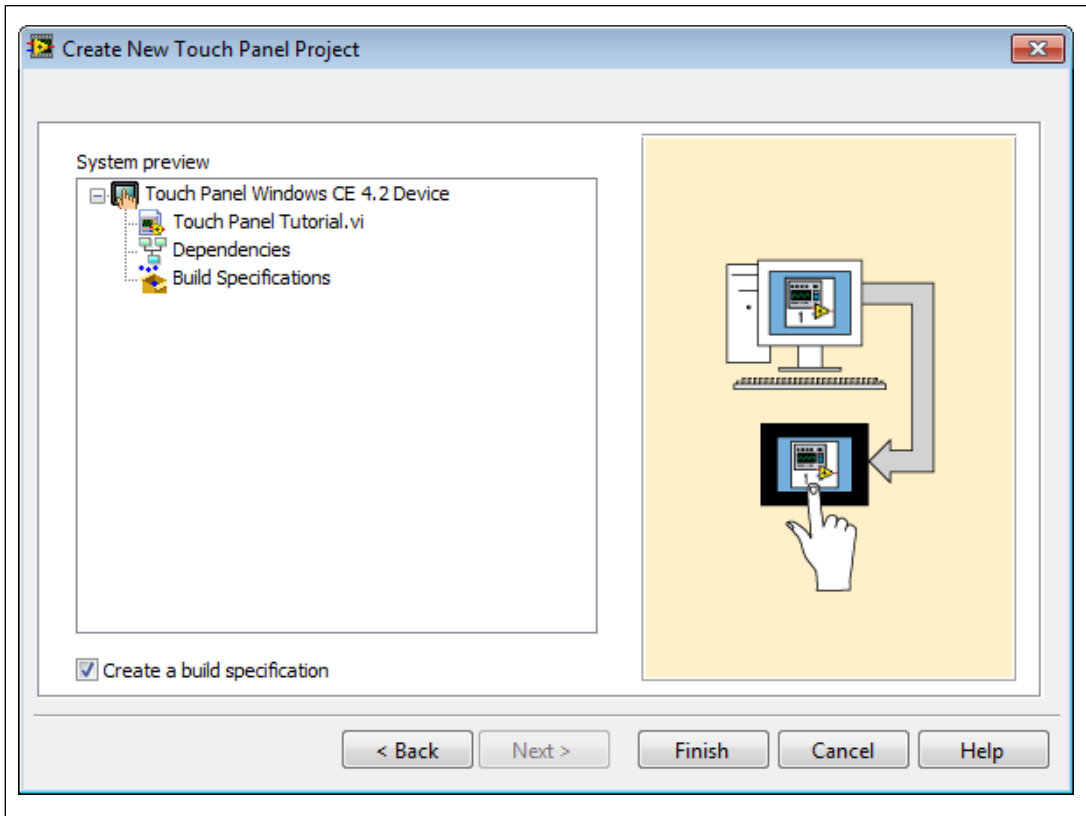
Figure 4. Previewing the Project

Creating the Build Specification

Build specifications contain the build settings and code generation options to use when you build a Touch Panel VI into an application. You can create the build specification when you create a project or wait until you are ready to build the application. You must create a build specification before you can build a Touch Panel VI into an application.

You can have multiple build specifications for the same target. For example, you might want one build specification that generates debugging information and another build specification that does not generate this extra information.

✎ **Note** This tutorial creates the build specification through the Touch Panel Project Wizard. You also can create a build specification at any time by right-clicking **Build Specifications** under the target in the **Project Explorer** window and selecting **New»Touch Panel Application (EXE)** from the shortcut menu.

Complete the following steps to create a Touch Panel build specification.

1. Define the settings for the Touch Panel application, as shown in Figure 5.

   a. Enter `Touch Panel Tutorial` in the **Build specification name** text box. This is the name that appears under **Build Specifications** in the **Project Explorer** window.

b. (Optional) By default, the name of the application is the same as the top-level VI. If you do not want to use the top-level VI name for the application name, remove the checkmark from the **Same as top-level VI** checkbox and enter a name in the **Target filename** text box.

c. Browse to and select the destination directory for the application on the host computer, which is where LabVIEW saves the .exe, in the **Destination directory** text box.

d. Enter the destination directory for the application on the target in the **Remote path for target application** text box.
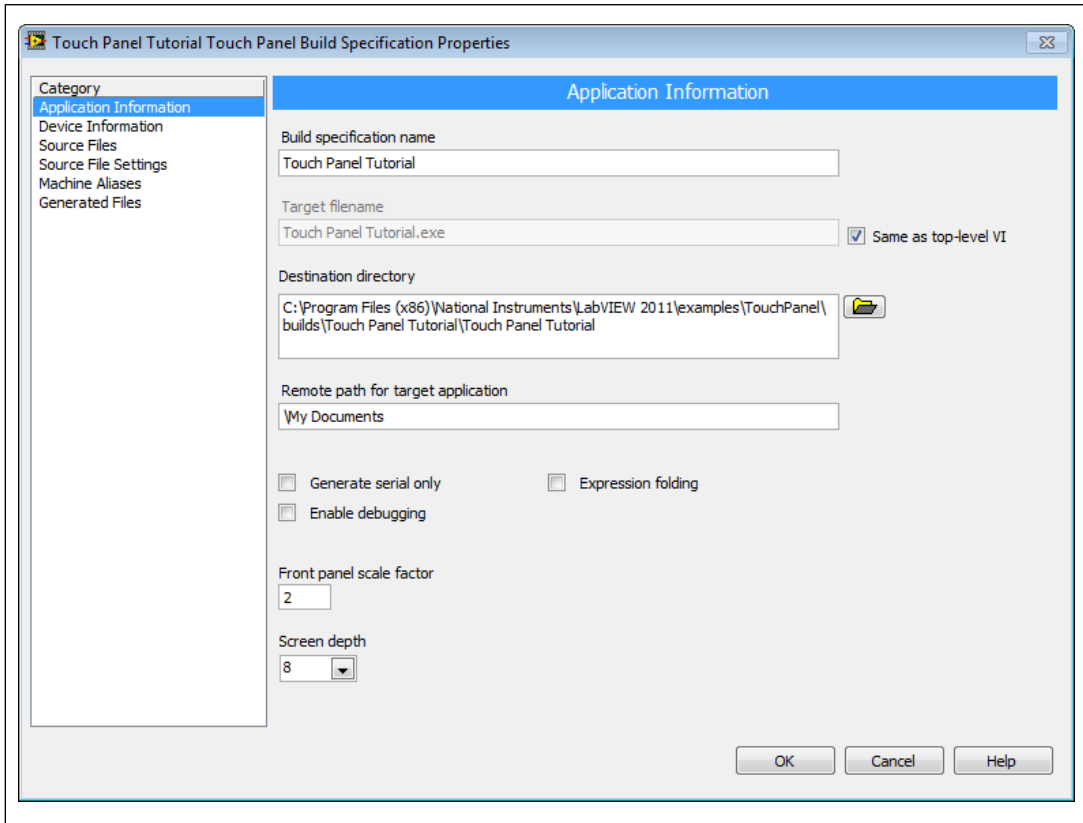

Figure 5. Defining the Application Information

> **Note** Although it is common to use the same name for the VI, application, and build specification, you are not required to do so.

2. (Optional) Click the **Help** button to open the *LabVIEW Help* and read a description of each build setting.

3. Select the **Device Information** category to view which target and processor this build specification applies to.

4. Select the **Source Files** category to select the source files to include when you build the VI into an application. When you use the Touch Panel Project Wizard to create a build specification, LabVIEW automatically uses the VI you import as the top-level VI. When you create build specifications outside of the wizard, you must manually select the top-level VI and click the blue arrow button

to move the VI to the **Top-level VI** text box, as shown in Figure 6. Touch Panel applications can have only one top-level VI.
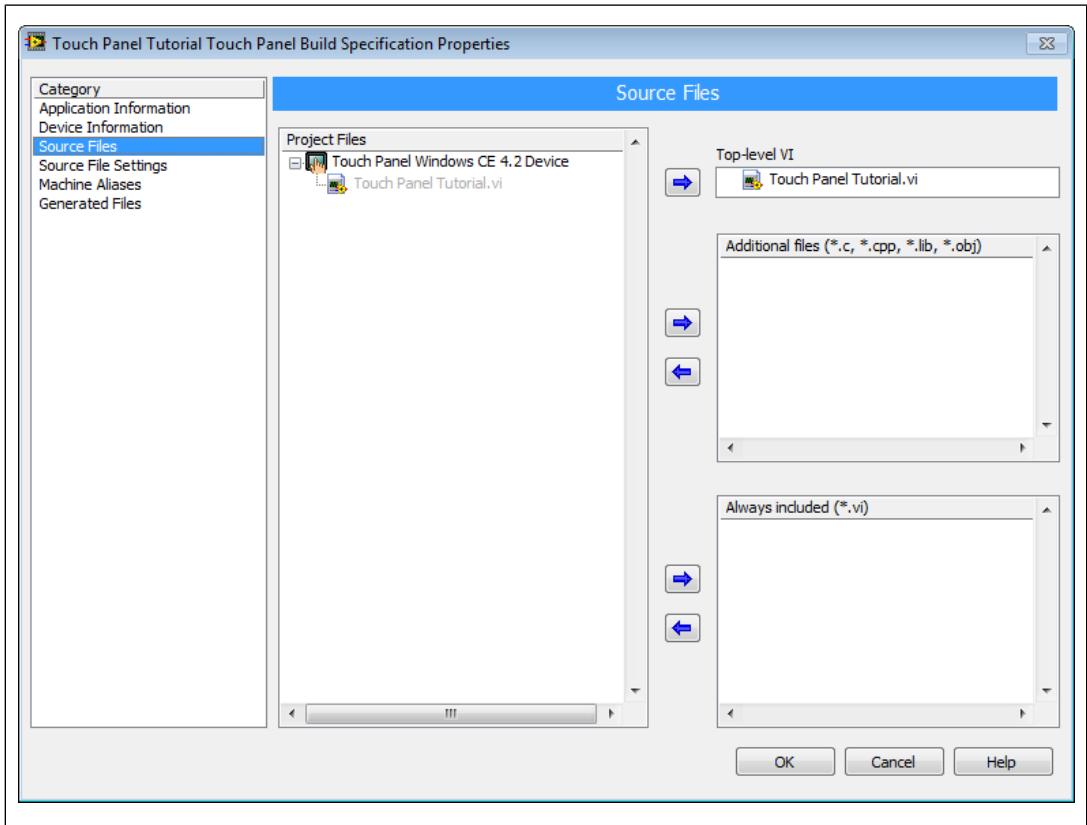

Figure 6. Selecting the Source Files

✎ **Note** The **Source File Settings** and **Machine Aliases** categories are not used in this tutorial. You use the **Source File Settings** page to view and set VI-level code generation options. You use the **Machine Aliases** page to overwrite the default IP address of a target hosting shared variables so you can move the shared variables to a different host without rebuilding the application. Refer to the *Using Shared Variables (Touch Panel Module)* topic in the *LabVIEW Help* for more information about using shared variables.

5. Select the **Generated Files** category to view the filenames and paths to the files the Touch Panel Module generates when you build the VI into an application.

6. Click the **OK** button. The build specification you just created appears in the **Project Explorer** window under the Touch Panel target, as shown in Figure 7.
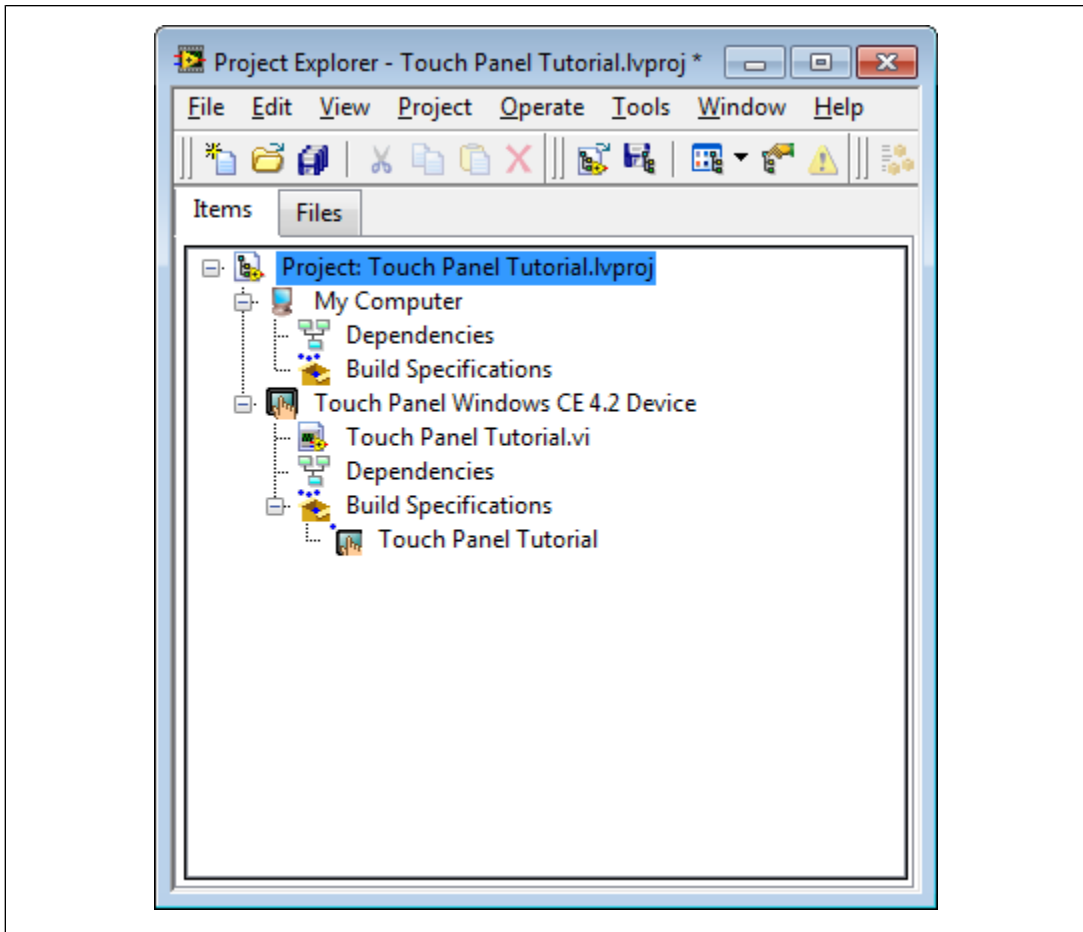
Figure 7. Project Explorer Window

7. Select **File»Save Project** in the **Project Explorer** window to save the project. LabVIEW saves any build specifications with the project.

8. If you configured the Touch Panel device to use the NI TPC Service, ensure that the NI TPC Service is running on the device.

   a. Right-click the Touch Panel target in the **Project Explorer** window and select **Properties** from the shortcut menu to display the **Touch Panel Target Properties** dialog box.

   b. On the **General** page, click the **Test** button to confirm that the NI TPC Service is running on the target.

Building the VI into an Application and Deploying

After you develop the VI on the host computer, you build the VI into an executable application that you can run on a target. Select one of the options in the *Using the Shortcut Menu* section or the *Using the Run Button* section of this manual to build, deploy, and run the application.

Using the Shortcut Menu

Right-click the build specification in the **Project Explorer** window and select one of the following options from the shortcut menu:

- **Deploy**—Builds the VI into an application, if necessary, and deploys the application to the target. This option does not run the application automatically.
- **Run**—Builds the VI into an application, if necessary; deploys the application to the target; and runs the application automatically.
- **Build**—Builds the VI into an application. This option does not deploy or run the application automatically.

> **Note** An **Application Builder Information** dialog box may appear when you deploy, run, build or debug the application. By default, the Application Builder configures new build specifications to include compiler optimizations that optimize the run-time performance of your build application. However, if the target for your build specification does not support SSE2 instructions, you must remove the checkmark from the **Enable SSE2 optimization** checkbox on the **Advanced** page of the **Properties** dialog box for the relevant build specification. For more information about enabling and disabling SSE2 optimizations, refer to the *Verifying That Target Hardware Supports SSE2 Instructions* topic in the *LabVIEW Help*.

Using the Run Button

When you run a VI under the Touch Panel target in the **Project Explorer** window, the **Run** button behaves differently from when you run a VI under My Computer in the **Project Explorer** window:

- **If you want to build, deploy, and run**—Click the **Run** button in a VI to build the VI into an application, deploy the application to the target, and run the application on the target.
- **If you want to build without deploying or running**—Press the <Ctrl> key while you click the **Run** button in a VI to build the VI into an application without deploying or running the application.

> **Note** LabVIEW prompts you to create a build specification if you do not have an existing build specification for the VI. If you have multiple build specifications, LabVIEW prompts you to select a build specification in the **Select a Build Specification** dialog box. Alternatively, you can specify a default build specification by right-clicking a build specification in the **Project Explorer** window and selecting **Set as Default** from the shortcut menu. LabVIEW indicates the default build specification with a green square around the build specification glyph in the **Project Explorer** window.

Closing the Application

Tap the **Exit** button in the application on the Touch Panel target to close the application.

Debugging the Application

You must create a build specification that enables debugging before you can debug a Touch Panel application. Enabling debugging generates extra debugging information and can significantly increase the size of the application.

When LabVIEW on the host computer connects to the Touch Panel target, the application runs on the target. The front panel is fully functional on the target. However, the front panel controls have no effect on the application, and the indicators in the VI on the host computer do not reflect the execution of the application on the target.

The block diagram acts as a conduit between the application running on the target and the VI running on the host computer, where you can probe signals, set breakpoints, and step through code as you do in any other VI.

> 💡 **Tip** You can modify an existing build specification by double-clicking the build specification in the **Project Explorer** window or right-clicking the build specification and selecting **Properties** from the shortcut menu. This tutorial creates a second build specification for debugging.

Creating a Debugging Build Specification

Complete the following steps to create a debugging build specification.

1. Right-click **Build Specifications** under the Touch Panel target and select **New»Touch Panel Application (EXE)** from the shortcut menu to open the **Touch Panel Build Specification Properties** dialog box.
2. Enter `(Debug) Touch Panel Tutorial` in the **Build specification name** text box.
3. Remove the checkmark from the **Same as top-level VI** checkbox so you can change the application name.
4. Enter `(Debug) Touch Panel Tutorial.exe` in the **Target filename** text box.
5. Place a checkmark in the **Enable debugging** checkbox to generate debugging information when you build the VI into an application, as shown in Figure 8.
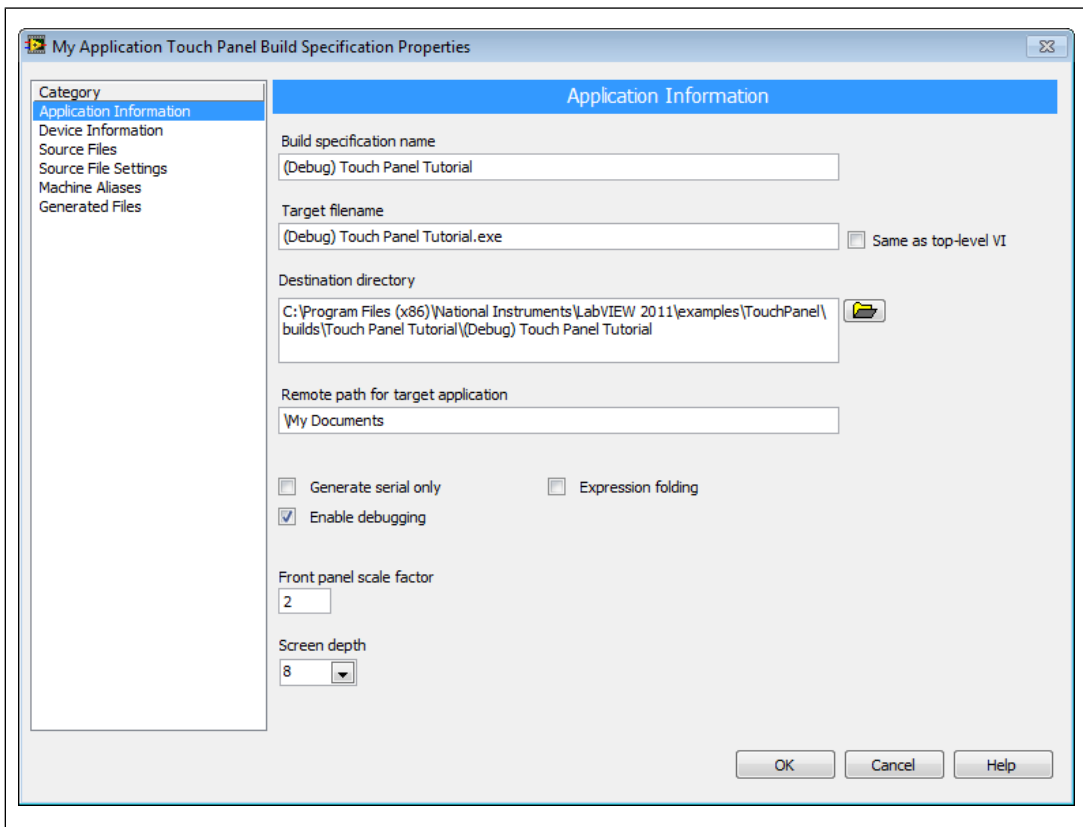

Figure 8. Creating the Debugging Build Specification

6. Select **Source Files** from the **Category** list and select **Touch Panel Tutorial.vi** in the **Project Files** list. Click the blue right arrow button to move the VI from the **Project Files** list to the **Top-level VI** text box.

7. Click the **OK** button. The build specification you just created appears in the **Project Explorer** window, as shown in Figure 9.
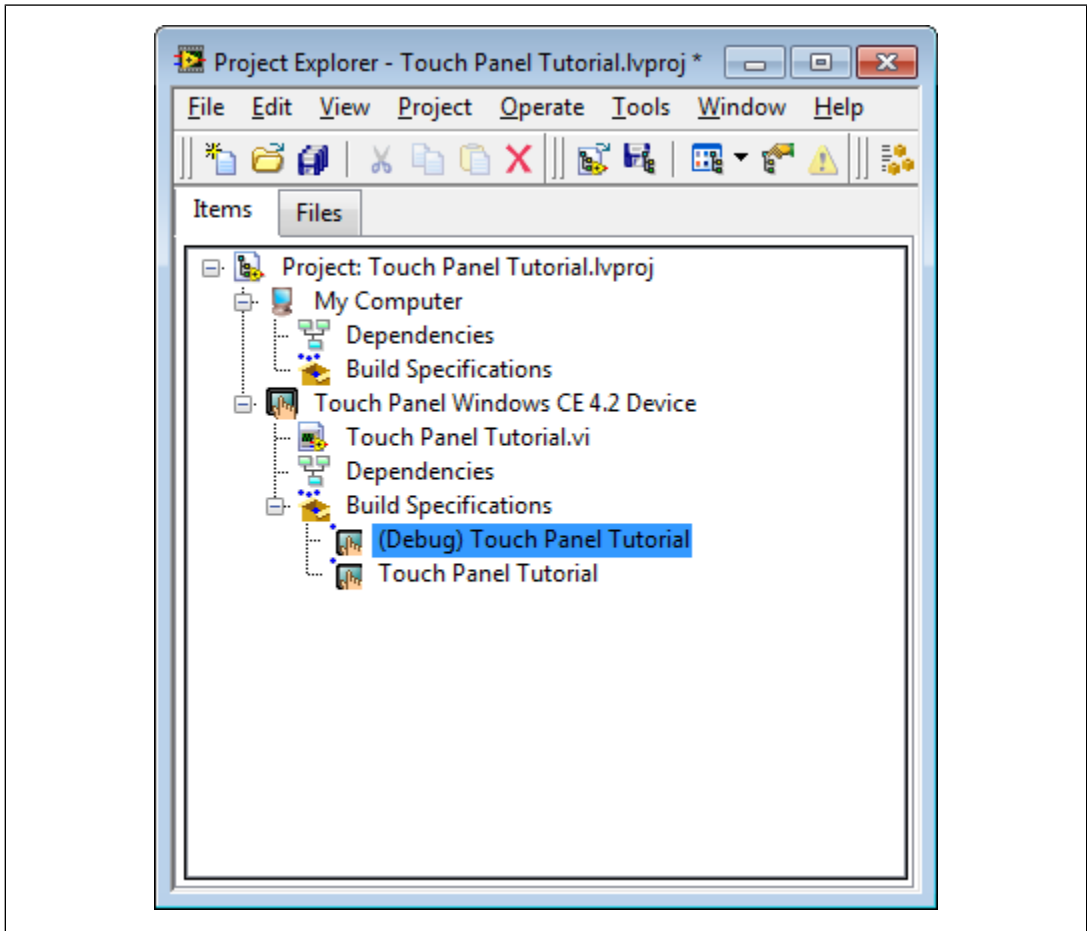

Figure 9. Two Build Specifications in the Project Explorer Window

Adding a Probe to the VI

Probes display information about the data that passes through a wire. As you interact with the application on the target, you can see the data passing through the wire in the corresponding VI on the host computer.

Complete the following steps to add a probe to the Touch Panel Tutorial VI.

1. Select **Window»Show Block Diagram** in the VI to open the block diagram if it is not visible.

> **Tip** Double-click the VI in the **Project Explorer** window to open the VI if the VI is not already open.

2. Right-click the wire flowing from the **Set Temperature** control and select **Probe** from the shortcut menu.

A floating **Probe Watch Window** appears when you create a probe. LabVIEW numbers the probes automatically and displays the same number in a glyph on the wire you probe, as shown in Figure 10.
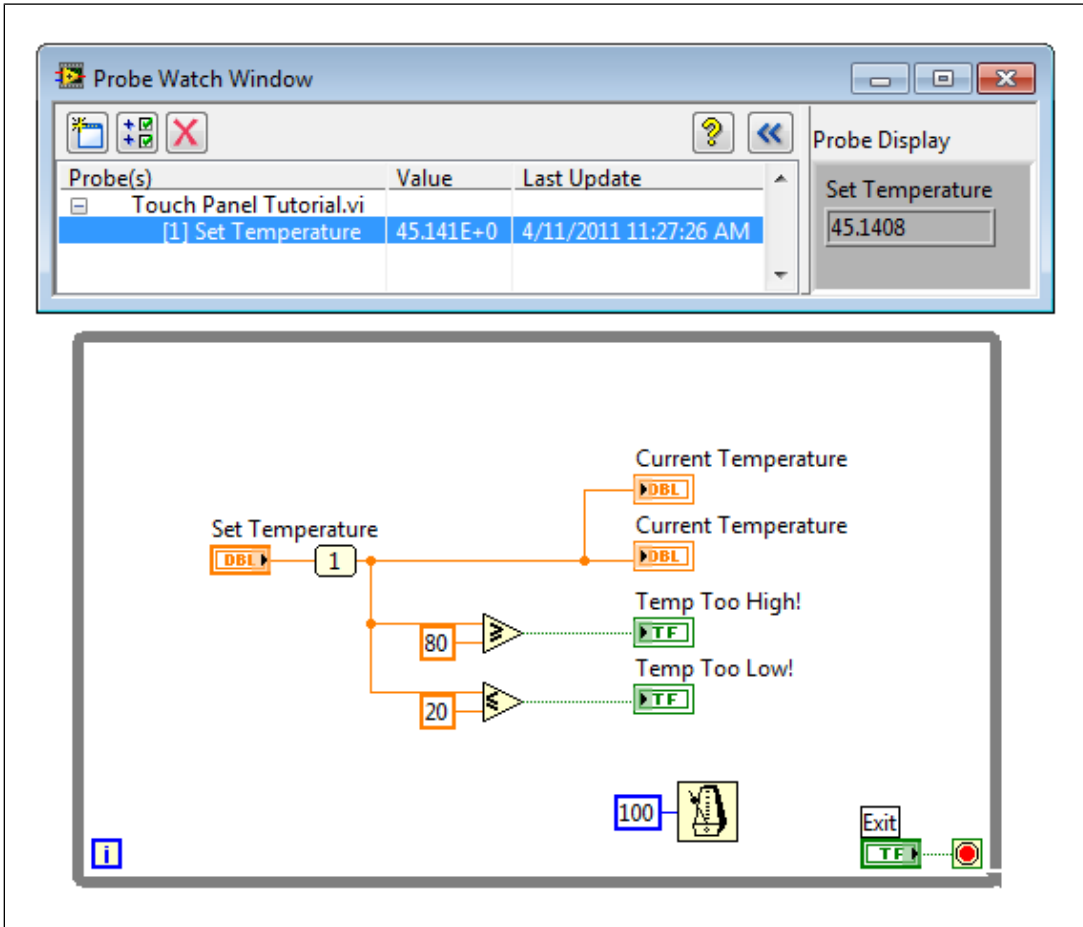

Figure 10. Adding a Probe to the Block Diagram

Deploying and Debugging a Touch Panel Application

You must use the debugging build specification to deploy the application, which contains debugging information, to the target before the probe in the VI on the host computer can update the values passing through the wire.

Complete the following steps to deploy and debug the Touch Panel application.

1. Right-click the debugging build specification you want to build and deploy and select **Debug** from the shortcut menu. Save any VIs if prompted.

LabVIEW builds the VI into an application, deploys the application to the target, and runs the application on the target.

2. Change the value of the **Set Temperature** knob in the application running on the target. The value in the **Probe Watch Window** on the block diagram on the host computer updates as you change the value of the knob in the application.

> **Note** Any changes you make on the front panel of the VI on the host computer have no effect on the application running on the target.

3. Tap the **Exit** button in the application on the target to stop the application and end the debugging session.

Windows Embedded Standard Tutorial

Use this tutorial to learn how to configure a Touch Panel Windows Embedded Standard device to use the NI TPC Service; how to use the Touch Panel Project Wizard to create a project; and how to build, deploy, run, and debug a Touch Panel application.

The VI in this tutorial simulates setting a temperature, displaying the current temperature in a graph and on a thermometer, and indicating if the temperature is not in range.

Creating the LabVIEW Project

Use LabVIEW projects to group together LabVIEW files and non-LabVIEW files, create build specifications for building a Touch Panel VI into an application, and deploy the application to the target. You must use a project to build a Touch Panel VI into an application.

Using the Touch Panel Project Wizard, complete the following steps to create a LabVIEW project, add the target, and add an existing VI to the project.

1. Launch LabVIEW. In the **Getting Started** window, select **Touch Panel Project** from the **Targets** pull-down menu. Click the **Go** button to launch the Touch Panel Project Wizard.

2. Define the project information, as shown in Figure 11.

   a. Select **New Touch Panel project, import VI** from the **Project type** pull-down menu to create the LabVIEW project using an existing VI.

   > **Tip** The blank VI project type creates a project with a new Touch Panel template VI rather than importing an existing VI.

   b. Specify a project name and the location where you want to save the project and the VI in the **Project location** text box. Save the project to a location other than the default location so you do not overwrite the shipping example with your changes. The default project name is `Untitled project.lvproj`. For this tutorial, name the project `Touch Panel Tutorial.lvproj` in the **Project location** text box.

   c. Click the **Browse** button next to the **VI path** text box and navigate to `labview\examples\TouchPanel\tutorial\Touch Panel Tutorial.vi` to select the VI to import. Click the **OK** button to add the VI to the project you are creating.
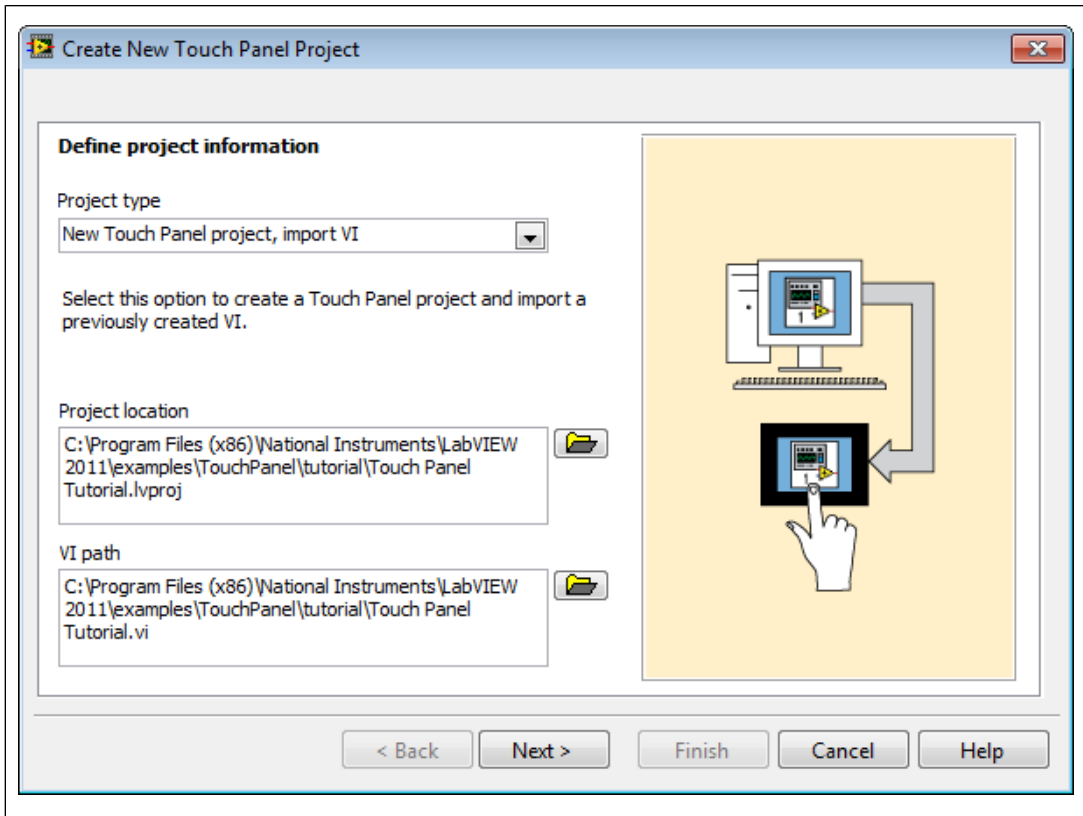
Figure 11. Defining the Project Information

3. Click the **Next** button.
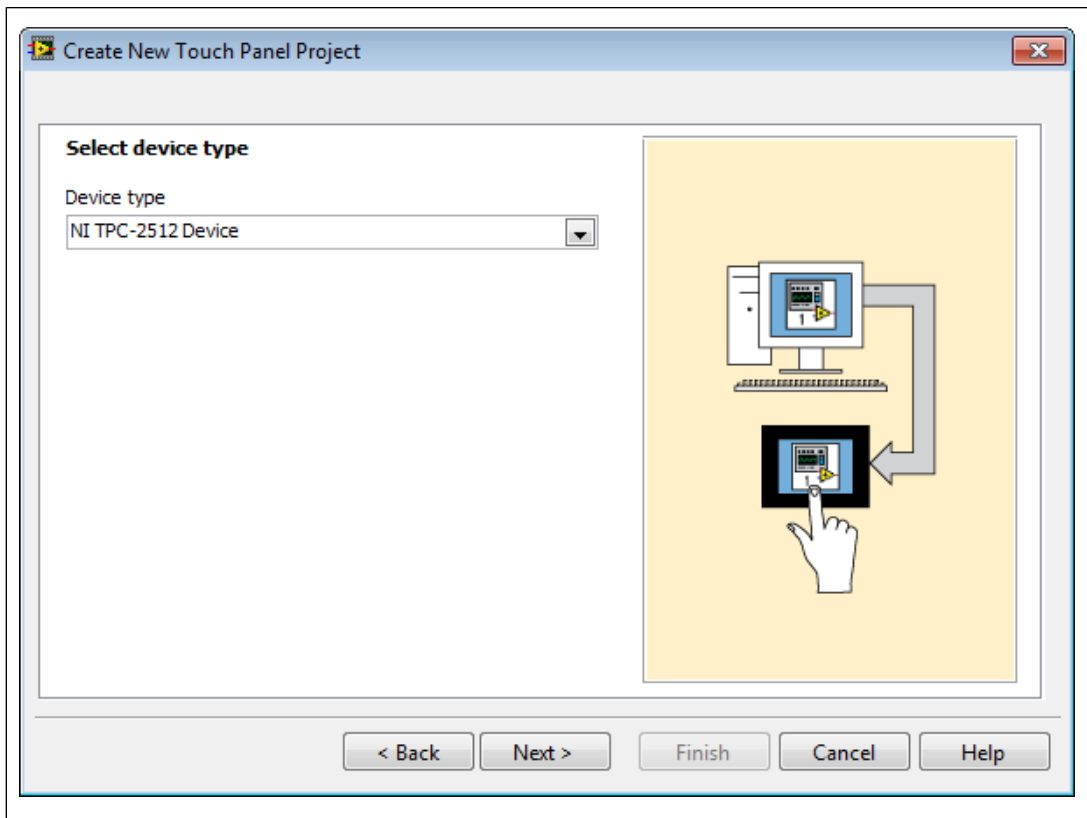4. Select **NI TPC-2512 Device** from the **Device type** pull-down menu, as shown in Figure 12.

Figure 12. Selecting the Target

> **Note** If you are using a third-party Windows Embedded Standard device, select **Windows Embedded Standard Device** from the **Device type** pull-down menu instead.

5. Click the **Next** button.
6. Configure connection information for the device. Enter the IP address for the device in the **Touch Panel device IP address** text box, as shown in Figure 13.
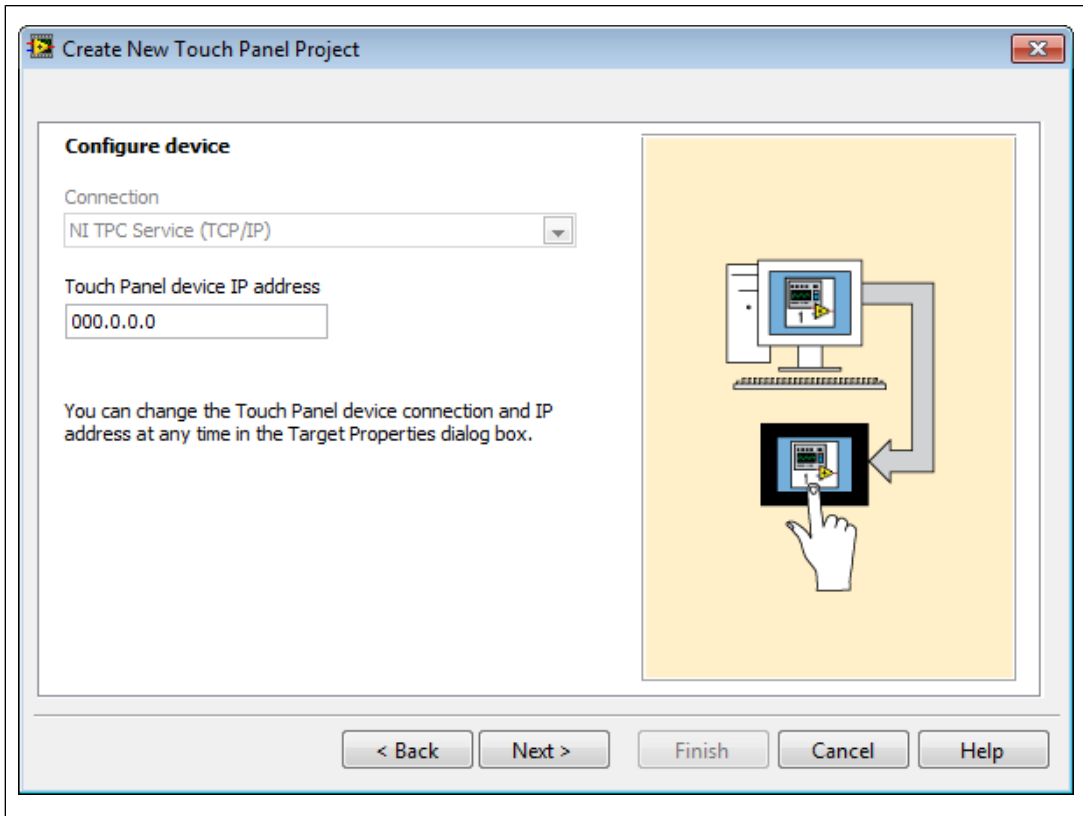
Figure 13. Configuring the Device

7. Click the **Next** button.
8. The **System preview** page, shown in Figure 14, shows a preview of the project the wizard creates when you click the **Finish** button. Notice the checkmark in the **Create a build specification** checkbox. This checkmark indicates you want to create a build specification immediately after you create the project. Refer to the *Creating the Build Specification* section for more information about creating a build specification.
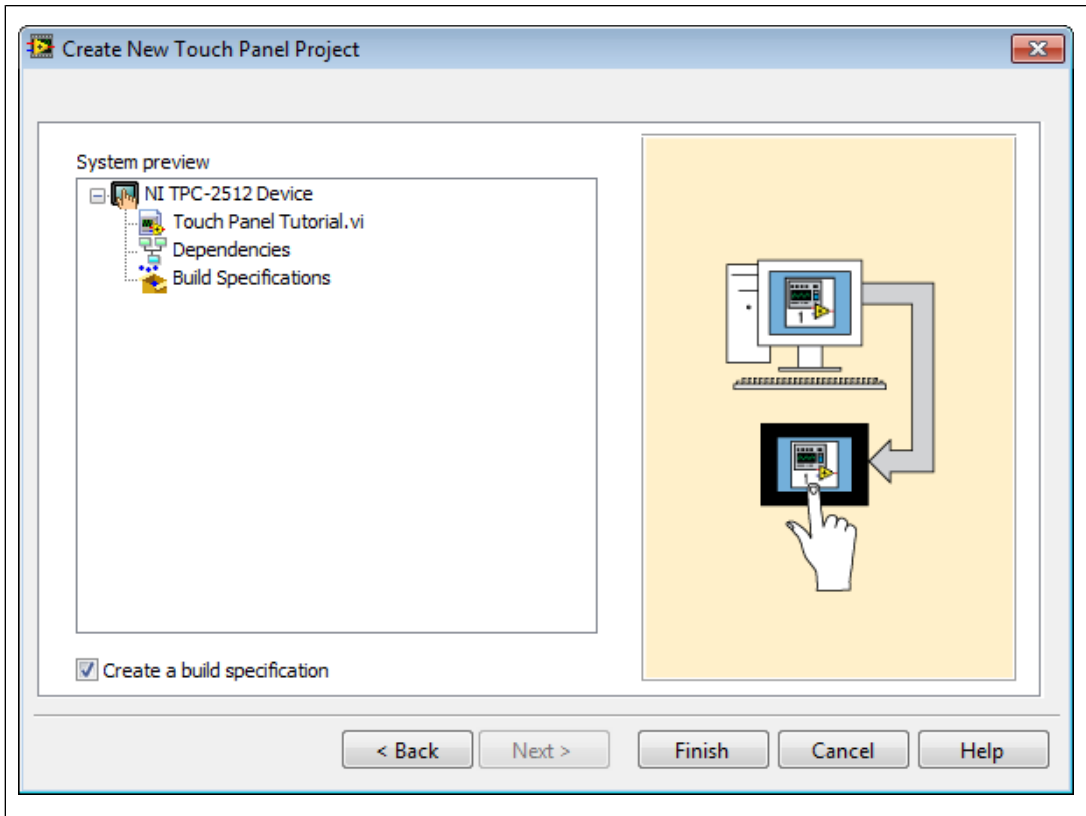
Figure 14. Previewing the Project

9. Click the **Finish** button.

Because the **Create a build specification** checkbox contains a checkmark as shown in Figure 14, the **Application Properties** dialog box opens when you click the **Finish** button.

Creating the Build Specification

Build specifications contain the build settings and code generation options to use when you build a Touch Panel VI into an application. You can create the build specification when you create a project or wait until you are ready to build the application. You must create a build specification before you can build a Touch Panel VI into an application.

You can have multiple build specifications for the same target. For example, you might want one build specification that generates debugging information and another build specification that does not generate this extra information.

✎ **Note** This tutorial creates the build specification through the Touch Panel Project Wizard. You also can create a build specification at any time by right-clicking **Build Specifications** under the target in the **Project Explorer** window and selecting **New»Touch Panel Application (EXE)** from the shortcut menu.

Complete the following steps to create a Touch Panel build specification.

1. Define the settings for the Touch Panel application, as shown in Figure 15.

   a. Enter a name for the build specification in the **Build specification name** text box. This is the name that appears under **Build Specifications** in the **Project Explorer** window.

   b. Enter name for the application in the **Target filename** text box. For this tutorial, name the application `Touch Panel Tutorial.exe`.

   c. Browse to and select the destination directory for the Touch Panel application on the host computer, which is where LabVIEW saves the `.exe`, in the **Local destination directory** text box.

   d. Enter the destination directory for the Touch Panel application on the Touch Panel target in the **Target destination directory** text box.
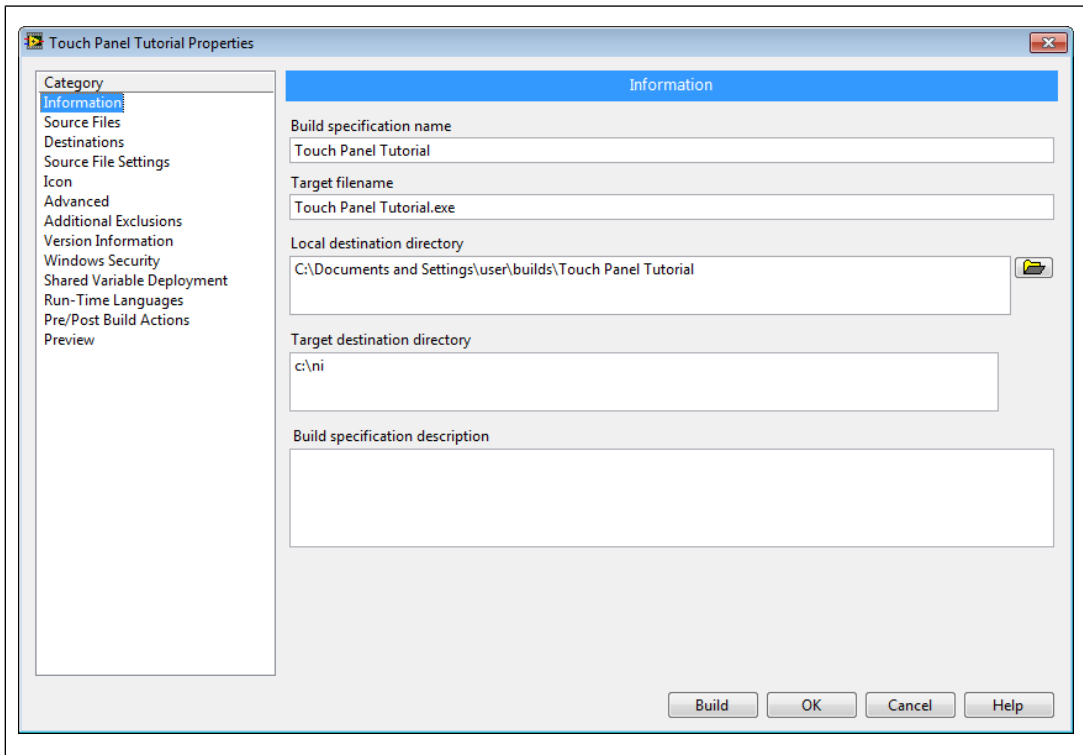

Figure 15. Defining the Application Information

> **Note** Although it is common to use the same name for the Touch Panel VI, application, and build specification, you are not required to do so.

2. (Optional) Click the **Help** button to open the *LabVIEW Help* and read a description of each build setting.

3. Select the **Source Files** category to select the source files to include when you build the Touch Panel VI into a Touch Panel application. When you use the Touch Panel Project Wizard to create a build specification, LabVIEW automatically uses the VI you import as the startup VI. When you create build specifications outside of the wizard, you must select the startup VI manually and click

the blue arrow button to move the VI to the **Startup VIs** list box, as shown in Figure 16. You must define at least one VI as the startup VI for the application.
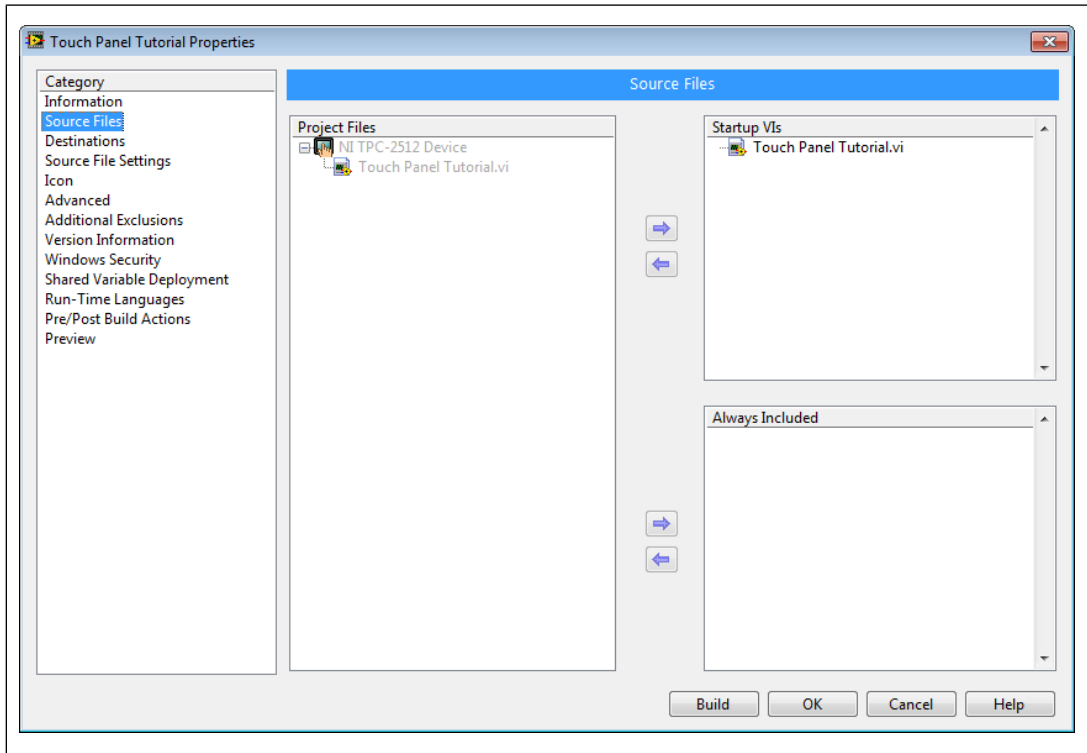

Figure 16. Selecting the Source Files

4. In this tutorial, you can use the default settings for the following categories:

   - **Destinations**—Specifies destination settings, adds destination directories for the application, and indicates whether LabVIEW adds the files to a new project library.
   - **Source File Settings**—Specifies destinations and properties for individual files and folders in the application.
   - **Icon**—Specifies the icon file to associate with the application.
   - **Advanced**—Configures advanced settings for the application.
   - **Additional Exclusions**—Configures settings to disconnect type definitions, removes unused polymorphic VI instances, and removes unused members of project libraries to reduce the size of the application.
   - **Version Information**—Specifies the version number and other application information.
   - **Run-Time Languages**—Sets the language preferences for the application.

5. Select the **Preview** category and click the **Generate Preview** button to view the filenames and paths to the files the Touch Panel Module generates when you build the Touch Panel VI into a Touch Panel application.

6. Click the **OK** button. The build specification you created appears in the **Project Explorer** window under the Touch Panel target, as shown in Figure 17.
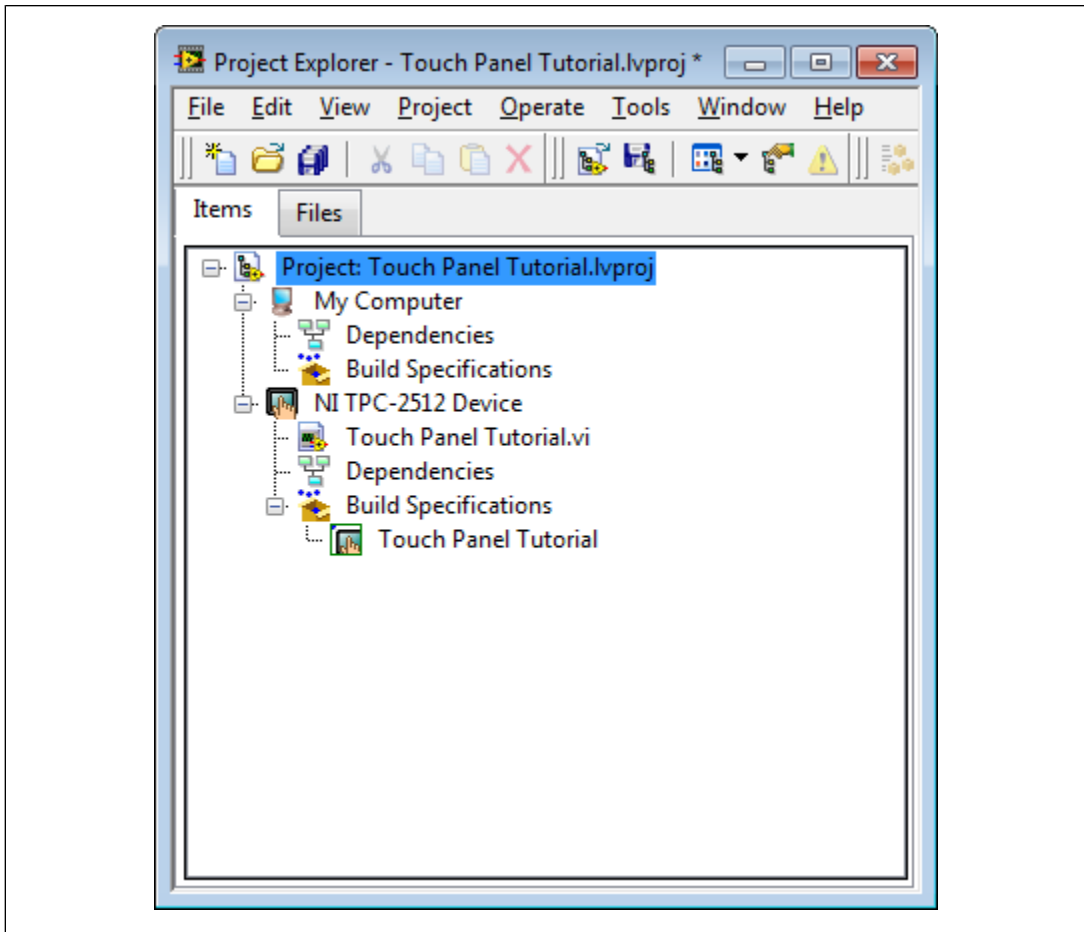
Figure 17. Project Explorer Window

7. Select **File»Save Project** in the **Project Explorer** window to save the project. LabVIEW saves any build specifications with the project.
8. Ensure that the NI TPC Service is running on the device.
   a. Right-click the Touch Panel target in the **Project Explorer** window and select **Properties** from the shortcut menu to display the **Touch Panel Target Properties** dialog box.
   b. On the **General** page, click the **Test** button to confirm that the NI TPC Service is running on the target.

Building the VI into an Application and Deploying

After you develop the VI on the host computer, you build the VI into an executable application that you can run on a target. Select one of the options in the *Using the Shortcut Menu* section or the *Using the Run Button* section of this manual to build, deploy, and run the application.

Using the Shortcut Menu

Right-click the build specification in the **Project Explorer** window and select one of the following options from the shortcut menu:

- **Deploy**—Builds the VI into an application, if necessary, and deploys the application to the target. This option does not run the application automatically.
- **Run**—Builds the VI into an application, if necessary; deploys the application to the target; and runs the application automatically.
- **Build**—Builds the VI into an application. This option does not deploy or run the application automatically.

✎ **Note** An **Application Builder Information** dialog box may appear when you deploy, run, build or debug the application. By default, the Application Builder configures new build specifications to include compiler optimizations that optimize the run-time performance of your build application. However, if the target for your build specification does not support SSE2 instructions, you must remove the checkmark from the **Enable SSE2 optimization** checkbox on the **Advanced** page of the **Properties** dialog box for the relevant build specification. For more information about enabling and disabling SSE2 optimizations, refer to the *Verifying That Target Hardware Supports SSE2 Instructions* topic in the *LabVIEW Help*.

Using the Run Button

When you run a VI under the Touch Panel target in the **Project Explorer** window, the **Run** button behaves differently from when you run a VI under My Computer in the **Project Explorer** window:

- **If you want to build, deploy, and run**—Click the **Run** button in a VI to build the VI into an application, deploy the application to the target, and run the application on the target.
- **If you want to build without deploying or running**—Press the <Ctrl> key while you click the **Run** button in a VI to build the VI into an application without deploying or running the application.

✎ **Note** LabVIEW prompts you to create a build specification if you do not have an existing build specification for the VI. If you have multiple build specifications, LabVIEW prompts you to select a build specification in the **Select a Build Specification** dialog box. Alternatively, you can specify a default build specification by right-clicking a build specification in the **Project Explorer** window and selecting **Set as Default** from the shortcut menu. LabVIEW indicates the default build specification with a green square around the build specification glyph in the **Project Explorer** window.

Debugging the Touch Panel Application

You must create a build specification that enables debugging before you can debug a Touch Panel application.

When LabVIEW on the host computer connects to the Touch Panel target, the application runs on the Touch Panel target. The front panel is fully functional on the Touch Panel target. The front panel controls affect the Touch Panel application, and the indicators in the Touch Panel VI on the host computer reflect the execution of the application on the Touch Panel target.

The block diagram acts as a conduit between the Touch Panel application running on the target and the Touch Panel VI running on the host computer, where you can probe signals, set breakpoints, and step through code as you do in any other VI.

Debugging Touch Panel applications for Windows Embedded Standard targets is similar to debugging stand-alone applications that you create with the Application Builder. For more information about

debugging stand-alone applications, refer to the *Debugging Applications and Shared Libraries* topic in the *LabVIEW Help*.

💡 **Tip** You can modify an existing build specification by double-clicking the build specification in the **Project Explorer** window or right-clicking the build specification and selecting **Properties** from the shortcut menu. This tutorial creates a second build specification for debugging.

Creating a Debugging Build Specification

Complete the following steps to create a debugging build specification.

1. Right-click **Build Specifications** under the Touch Panel target and select **New»Touch Panel Application (EXE)** from the shortcut menu to open the **Application Properties** dialog box.
2. Enter `(Debug) Touch Panel Tutorial` in the **Build specification name** text box.
3. Enter `(Debug) Touch Panel Tutorial.exe` in the **Target filename** text box, as shown in Figure 18.
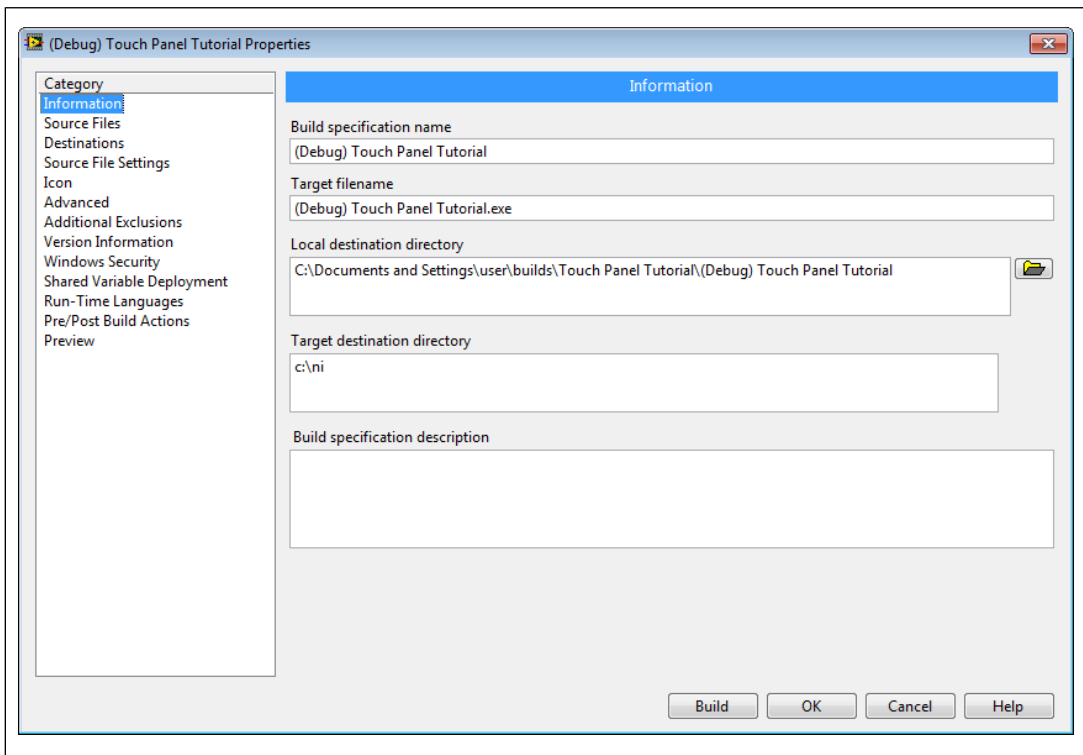

Figure 18. Creating the Debugging Build Specification

4. Select **Source Files** from the **Category** list and select **Touch Panel Tutorial.vi** in the **Project Files** list. Click the blue right arrow button to move the VI from the **Project Files** list to the **Startup VIs** list box.
5. Select **Advanced** from the **Category** list.
6. Place a checkmark in the **Enable debugging** checkbox to generate debugging information when you build the Touch Panel VI into an application.

7. Click the **OK** button. The build specification you created appears in the **Project Explorer** window, as shown in Figure 19.
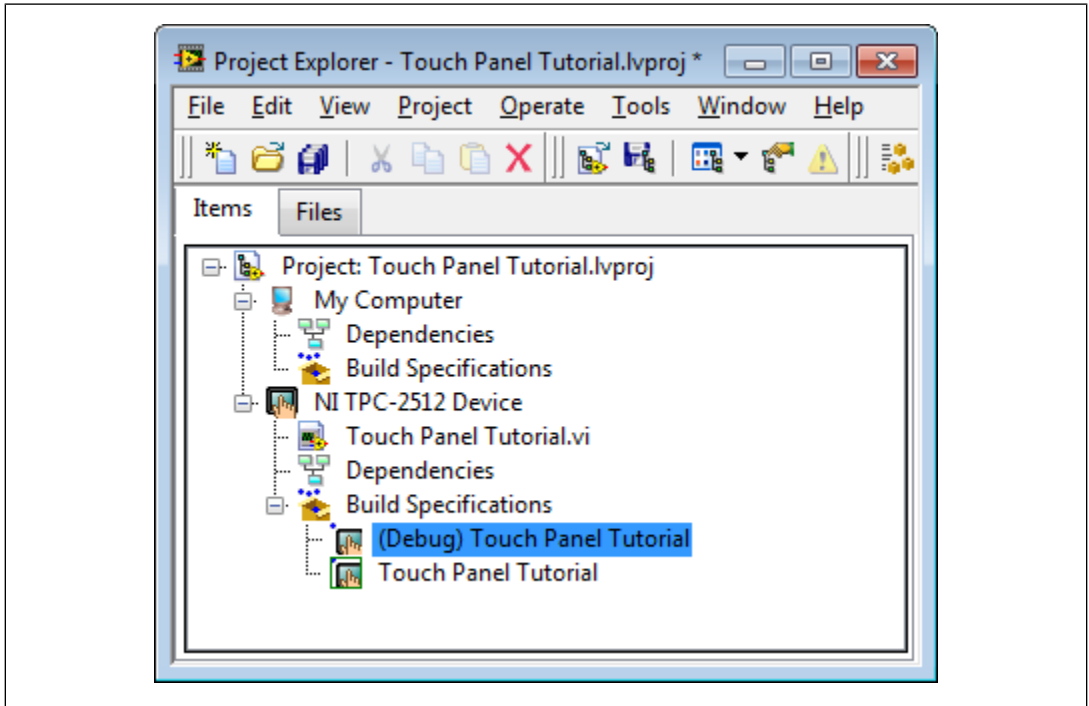

Figure 19. Two Build Specifications in the Project Explorer Window

Adding a Probe to the Touch Panel VI

Probes display information about the data that passes through a wire. As you interact with the Touch Panel application on the Touch Panel target, you can see the data passing through the wire in the Touch Panel VI on the host computer.

Complete the following steps to add a probe to the Touch Panel Tutorial VI.

1. Select **Window»Show Block Diagram** in the VI to open the block diagram if it is not visible.

    💡 **Tip** Double-click the VI in the **Project Explorer** window to open the VI if the VI is not already open.

2. Right-click the wire flowing from the **Set Temperature** control and select **Probe** from the shortcut menu.

    A floating **Probe Watch Window** appears when you create a probe. LabVIEW numbers the probes automatically and displays the same number in a glyph on the wire you probe, as shown in Figure 20.
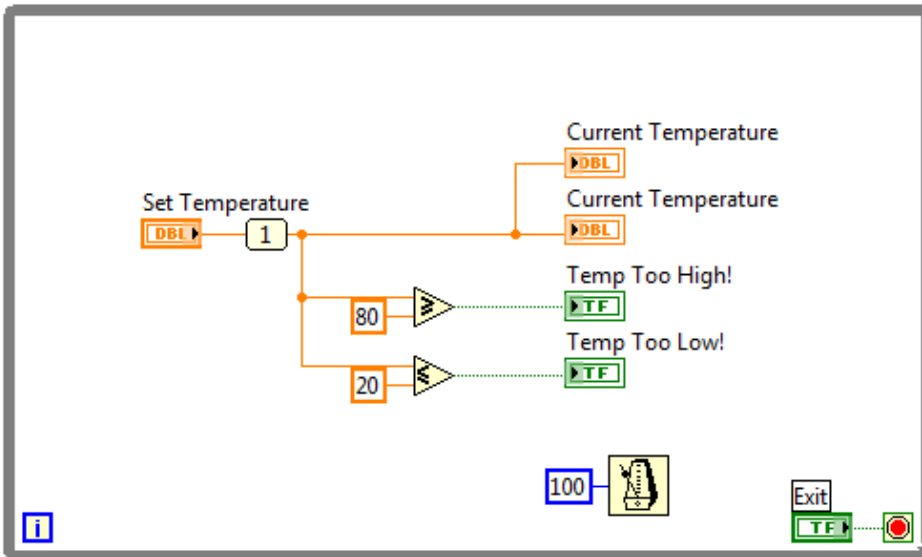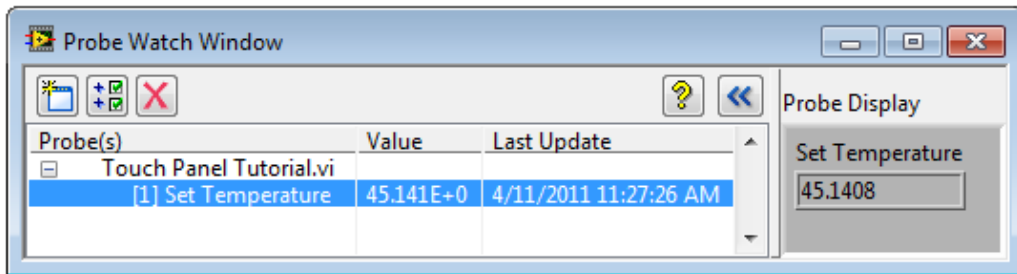
Figure 20. Adding a Probe to the Block Diagram

Deploying and Debugging a Touch Panel Application

You must use the debugging build specification to deploy the Touch Panel VI, which contains debugging information, to the Touch Panel target before the probe in the Touch Panel VI on the host computer can update the values passing through the wire.

Complete the following steps to deploy and debug the Touch Panel application.

1. Right-click the build specification for the VI you want to build and deploy and select **Debug** from the shortcut menu. Save any VIs if prompted.

   LabVIEW builds the VI into an application, deploys the application to the Touch Panel target, and runs the application on the target.

2. Change the value of the **Set Temperature** knob in the Touch Panel application running on the Touch Panel target. The value in the **Probe Watch Window** on the block diagram on the host computer updates as you change the value of the knob in the Touch Panel application.

3. Tap the **Exit** button in the application on the Touch Panel target to stop the application and end the debugging session.

Related Documentation

LabVIEW includes documentation for new and experienced LabVIEW users. The following documents contain information that you might find helpful as you use the Touch Panel Module:

- *LabVIEW Help*—Refer to the *LabVIEW Help*, available by selecting **Help»LabVIEW Help** in LabVIEW, for information about LabVIEW programming concepts, step-by-step instructions for using LabVIEW, and reference information about LabVIEW VIs, functions, palettes, menus, and tools. Refer to the **Touch Panel Module** book on the **Contents** tab of the *LabVIEW Help* for information specific to the Touch Panel Module and Touch Panel applications. The *LabVIEW Help* uses (TPC) in the index to indicate Touch Panel-specific topics.

- *LabVIEW Touch Panel Module Readme*—Refer to the *LabVIEW Touch Panel Module Readme*, available by selecting **Start»All Programs»National Instruments»LabVIEW»Readme** and opening readme_TouchPanel.html, for last-minute information and known issues.

- Touch Panel Module Examples—Use the Touch Panel Module examples to learn how to use certain VIs and functions as well as a starting point for developing your own Touch Panel VIs and applications. You can modify an example to fit an application, or you can copy and paste from one or more examples into a VI that you create. Browse or search the example VIs with the NI Example Finder by selecting **Help»Find Examples**.

- *NI-DAQmx Base 3.x Getting Started Guide*

- *NI-DAQmx Base Readme*

- Documentation for your device.

- LabVIEW PDFs—In addition to this document, the *Getting Started with LabVIEW* manual, *LabVIEW Quick Reference Card*, *LabVIEW Release Notes*, and *LabVIEW Upgrade Notes* are available as PDFs by selecting **Start»All Programs»National Instruments»LabVIEW»LabVIEW Manuals**.

Note You must have Adobe Reader installed to view the PDFs. Refer to the Adobe Systems Incorporated Web site at www.adobe.com to download Adobe Reader. Refer to the National Instruments Product Manuals Library at ni.com/manuals for updated documentation resources.

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