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TPC-2006

Getting Started with the LabVIEW™ Touch Panel Module for Windows CE

Version 8.2

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. 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.

The Touch Panel Module takes advantage of some of the features that debuted in LabVIEW 8.0 and the version 8.0 of the PDA Module. You use a LabVIEW project to define a Touch Panel target for which you can build, deploy, and run a Touch Panel application on a Touch Panel device.

If you previously used the LabVIEW PDA Module to program the NI TPC-2006, the Touch Panel Module provides the same graphical programming environment and similar features that you already use with LabVIEW and the PDA Module. You can use TCP, UDP, and serial to communicate with a Touch Panel target. If you have an ARM Touch Panel device, such as the NI TPC-2006, you can use shared variables to share data among VIs in the same Touch Panel application or to read data from and write data to other network-published shared variables. The NI TPC-2006 hardware now supports 3D front panel controls if you have the updated graphics driver. Refer to the National Instruments Web site at ni.com to download the driver.

This manual contains system requirements, installation instructions, and a tutorial that shows you how to create a LabVIEW project and build, run, deploy, and debug a Touch Panel application.

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System Requirements

The Touch Panel Module has the following requirements:

- A desktop computer with Windows 2000 with Service Pack 4.0 or later or Windows XP.
- LabVIEW 8.2 Base, Full, or Professional Edition.
- 2.5 GB available disk space.
- A Touch Panel device, such as the NI TPC-2006, running Windows CE 4.2 or 5.0.

Refer to the *LabVIEW Release Notes*, available by selecting **Start»All Programs»National Instruments»LabVIEW 8.2»LabVIEW Manuals** and opening *LV_Release_Notes.pdf*, for standard LabVIEW development system requirements.

Installing the Touch Panel Module

Complete the following steps to install the Touch Panel Module.

1. On Windows 2000/XP, log in as an administrator or as a user with administrator privileges.
2. Install LabVIEW 8.2, if not already installed. Refer to the *LabVIEW Release Notes*, available by selecting **Start»All Programs»National Instruments»LabVIEW 8.2»LabVIEW Manuals** and opening `LV_Release_Notes.pdf`, for standard LabVIEW installation instructions.
3. Install the LabVIEW 8.2 Touch Panel Module.
The Touch Panel Module includes Microsoft ActiveSync. Installing the Touch Panel Module could interfere with any existing installations of Visual Studio, Windows Embedded, or Windows CE toolkits.
4. Activate the Touch Panel Module.
You must activate the Touch Panel Module before you can build Touch Panel VIs into Touch Panel applications. The Touch Panel Module runs in evaluation mode if you do not activate it, which means you can create Touch Panel VIs, but you cannot build the Touch Panel VIs into Touch Panel applications. You have the option of activating the Touch Panel Module at the end of the installation. You also can use the NI License Manager, available by selecting **Start»All Programs»National Instruments»NI License Manager**, to activate National Instruments products. Refer to the *National Instruments License Manager Help*, available by selecting **Help»Contents** in the National Instruments License Manager, for more information about activating NI products.
5. Restart the computer when the installer completes.
6. Install the additional tools you need. Refer to the [Installing the Additional Tools](#) section for more information about the additional tools.

Uninstalling the Touch Panel Module

In addition to uninstalling the Touch Panel Module, you also must uninstall the following:

- Microsoft ActiveSync
- Microsoft Device Emulator version 1.0 - ENU
- Microsoft Visual C++ 2005 Redistributable

Installing the Additional Tools

You must install additional tools depending on the functionality you need.

Shared Variable Support

You must install support for shared variables on the Touch Panel target before you can run a Touch Panel application with shared variables.



Note Shared variables are supported only on ARM Touch Panel targets, such as the NI TPC-2006.

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

1. Connect the Touch Panel device to ActiveSync on the host computer.
2. Navigate to and run `labview\PDA\Utilities\Variables\Setup.exe`.

You also can right-click the Touch Panel target in the **Project Explorer** window and select **Install»Support for Shared Variables** from the shortcut menu.

PNG Image Support

You must install support for PNG images on the Touch Panel target if the Touch Panel VI contains PNG images on the user interface.

Complete the following steps to install or uninstall support for PNG images on a Touch Panel target.

1. Connect the Touch Panel device to ActiveSync on the host computer.
2. Navigate to and run `labview\PDA\Utilities\LVPNG\Setup.exe`.

You also can right-click the Touch Panel target in the **Project Explorer** window and select **Install»Support for PNG Images** from the shortcut menu.

If You Need x86 Target Support

The Touch Panel Module installs support for ARM Touch Panel targets. If you need support for x86 Touch Panel targets, 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 `pdaevc` for the most recent information about downloading and installing the Microsoft eMbedded Visual Tools.

Tutorial

Use this tutorial to learn how to use the Touch Panel Project Wizard to create a project and build, deploy, run, and debug a Touch Panel application.

The VI in this tutorial simulates a signal, computes the averaged auto power spectrum of the signal, and displays the result in a graph.

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 a Touch Panel application, and deploy the application to a Touch Panel device. You must use a project to build a Touch Panel VI into a Touch Panel application.

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

1. Launch LabVIEW. In the **Getting Started** window, click **New** to open the **New** dialog box.

2. Select **Project»Project from Wizard»Touch Panel Project** in the **Create New** list as shown in Figure 1.

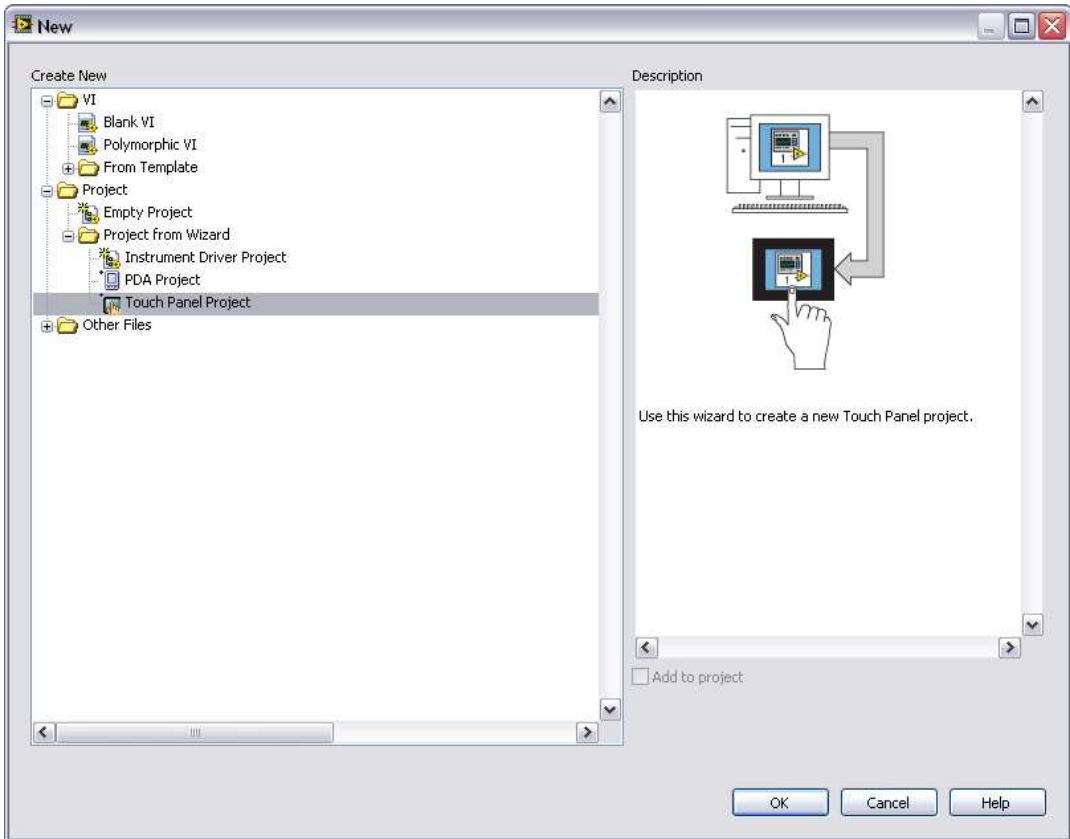


Figure 1. Launching the Touch Panel Project Wizard

3. Click the **OK** button to open the Touch Panel Project Wizard.

4. Define the project information as shown in Figure 2.
 - a. Select **New Touch Panel project, import VI** from the **Project type** list 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. The default location is C:\Document and Settings\\My Documents\LabVIEW Data\. The default project name is Untitled project.lvproj. For this tutorial, enter Touch Panel Tutorial 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 Touch Panel Tutorial VI to the project you are creating.

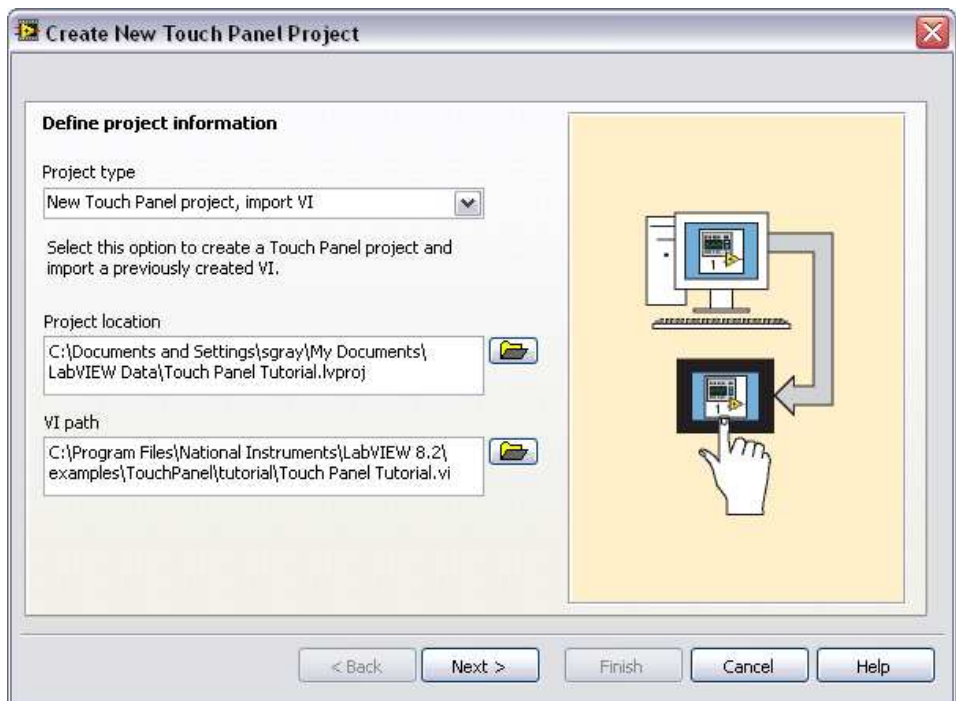


Figure 2. Defining the Project Information

5. Click the **Next** button.

6. Select the Touch Panel device you are using from the **Device type** drop-down list as shown in Figure 3.

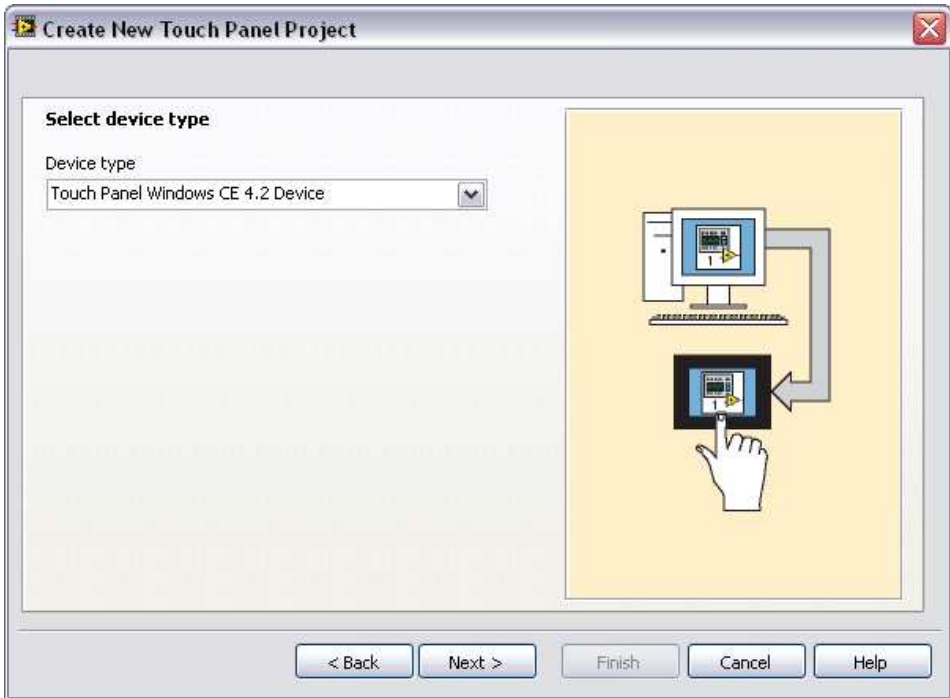


Figure 3. Selecting the Touch Panel Device Type

7. Click the **Next** button.
8. The **System preview** page, shown in Figure 4, 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 Touch Panel Build Specification](#) section for more information about creating build specifications.

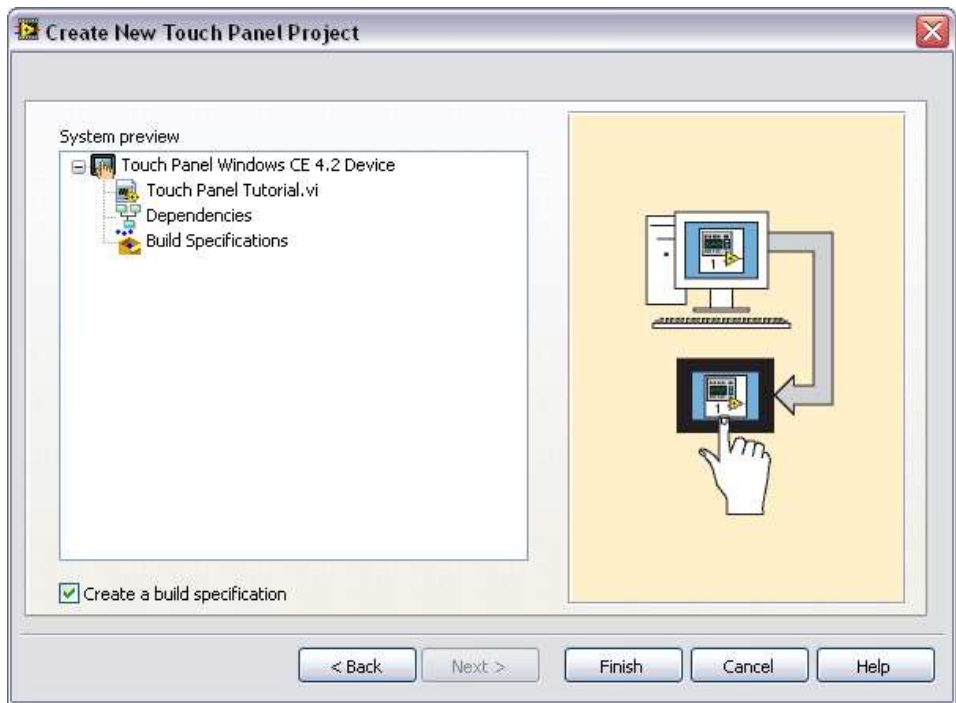


Figure 4. Previewing the Project

9. 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 when you click the **Finish** button.

Creating the Touch Panel Build Specification

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

You must create a build specification before you can build a Touch Panel VI into a Touch Panel application.



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 the Touch Panel target in the **Project Explorer** window and selecting **New»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 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. (Optional) By default, the name of the Touch Panel application is the same as the top-level Touch Panel VI. If you do not want to use the top-level Touch Panel VI name for the Touch Panel 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 Touch Panel 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 Touch Panel application on the Touch Panel target in the **Remote path for target application** text box.

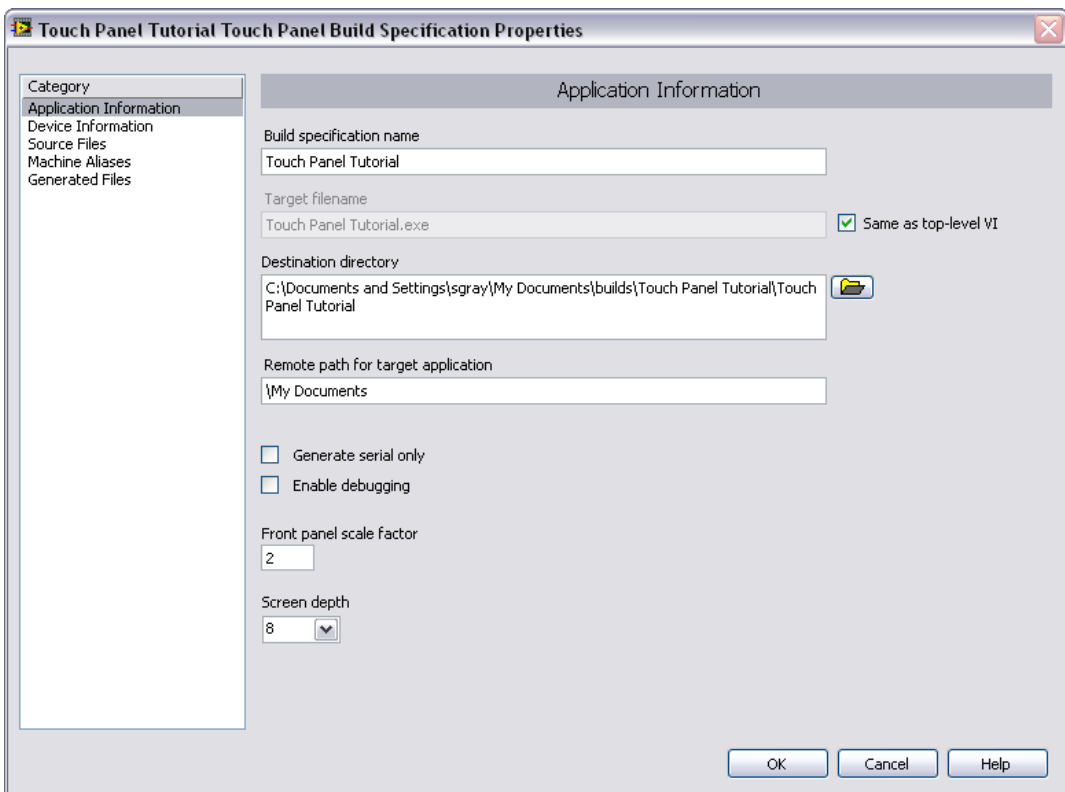


Figure 5. Defining the Touch Panel Application Information



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. 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 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 top-level VI. When you create build specifications outside of the wizard, you must manually select the Touch Panel Tutorial VI and click the blue arrow button, shown at left, to move the VI to the **Top-level VI** text box as shown in Figure 6. Touch Panel VIs can have only one top-level VI.

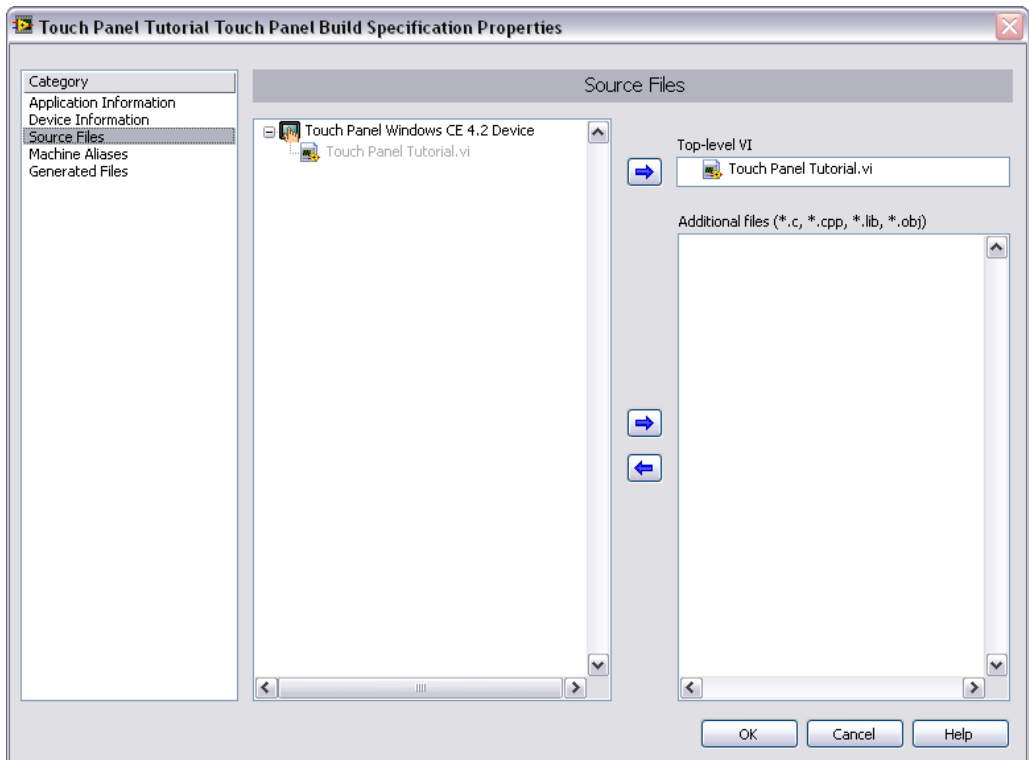


Figure 6. Selecting the Source Files



Note The **Machine Alias** category is not used in this tutorial. You use the **Machine Alias** category to overwrite the default IP address of a shared variable host target so you can

move the shared variable to a different host without rebuilding the application. Refer to the *Using Shared Variables in PDA and Touch Panel VIs* topic in the *LabVIEW Help* for more information about using shared variables.

5. Select the **Generated Files** category to view the filenames and path to the files the Touch Panel Module will generate when you build the Touch Panel VI into a Touch Panel 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.

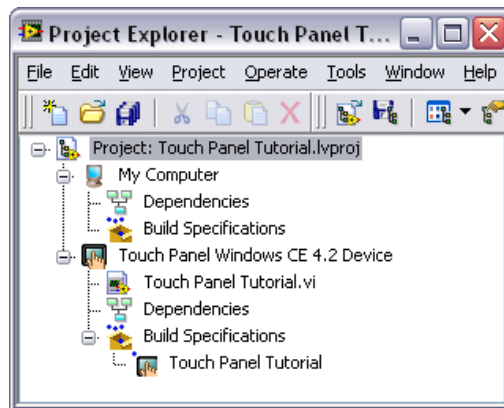


Figure 7. Project Explorer Window

7. Click **File»Save Project** in the **Project Explorer** window to save the project. Build specifications are saved with the project.

Building the Touch Panel VI into a Touch Panel Application and Deploying

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

Using the Shortcut Menu

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

- **Deploy**—Builds the Touch Panel VI into a Touch Panel application, if necessary, and deploys the application to the Touch Panel target. This option does not automatically run the Touch Panel application.

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

Using the Run Button

The behavior of the **Run** button differs from LabVIEW for Windows:

- **If you want to build, run, and deploy**—Click the **Run** button in a Touch Panel VI to build the Touch Panel VI into a Touch Panel application, deploy the Touch Panel application to the Touch Panel target, and run the Touch Panel application on the Touch Panel target. LabVIEW prompts you to create a build specification if you do not have an existing build specification for the Touch Panel VI. If you have multiple build specifications, LabVIEW uses the default build specification, which the Touch Panel Module indicates with a green square around the Touch Panel build specification glyph in the **Project Explorer** window.
- **If you want to build without deploying or running**—Press the <Ctrl> key while you click the **Run** button in a Touch Panel VI to build the Touch Panel VI into a Touch Panel application without deploying or running the Touch Panel application. LabVIEW prompts you to create a build specification if you do not have an existing build specification for the Touch Panel VI. If you have multiple build specifications, LabVIEW uses the default build specification, which the Touch Panel Module indicates with a green square around the Touch Panel build specification glyph in the **Project Explorer** window.

Closing the Touch Panel Application

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

Debugging the Touch Panel 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 Touch Panel application.

When LabVIEW on the host computer connects to the Touch Panel target, the Touch Panel application runs on the Touch Panel target. The front panel is fully functional on the Touch Panel target. However, the front panel

controls have no effect on the Touch Panel application, and the indicators of the Touch Panel VI on the host computer do not reflect the execution of the Touch Panel application on the Touch Panel target.

The block diagram acts as a conduit between the Touch Panel application running on the Touch Panel 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.



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 as shown in Figure 8.

1. Right-click **Build Specifications** under the Touch Panel target and select **New»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 Touch Panel 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 Touch Panel VI into a Touch Panel target.

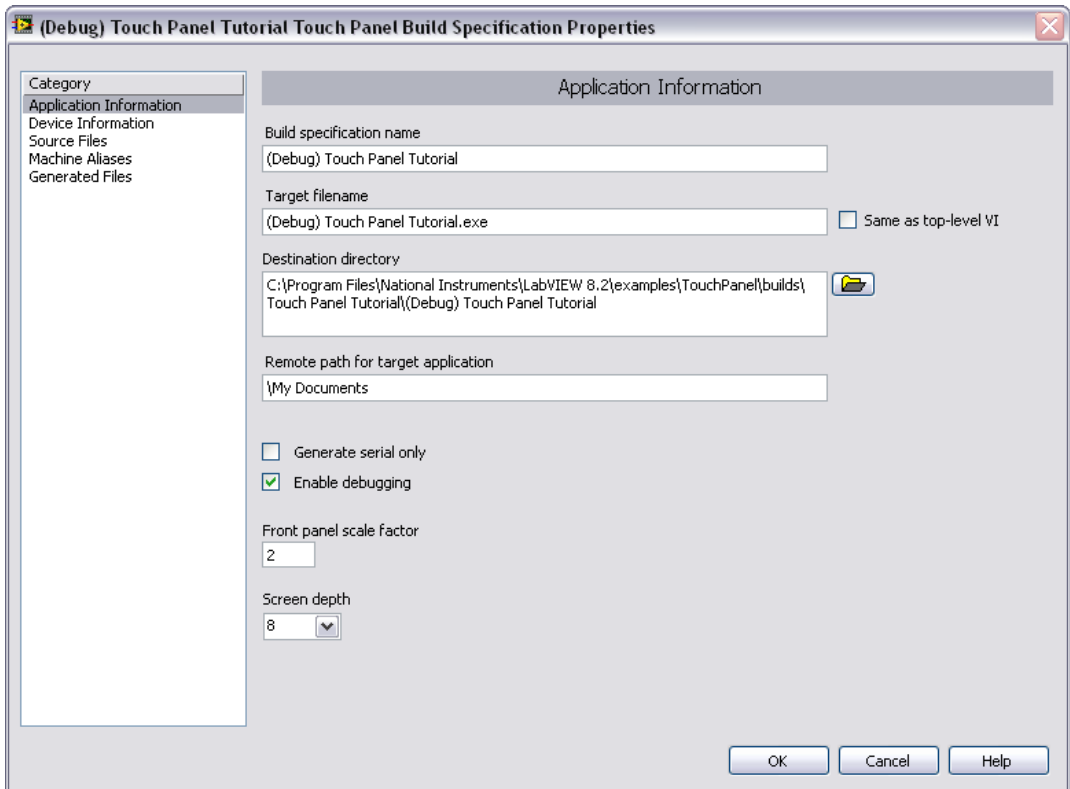


Figure 8. Creating the Debugging Build Application

6. Select the **Source Files** category to select the source files to include when you build the Touch Panel VI into a Touch Panel application. Select the Touch Panel Tutorial VI and click the button, shown at left, to move the VI 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.

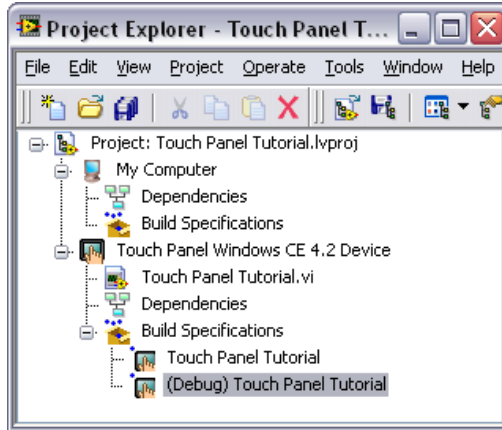


Figure 9. Two Touch Panel Build Specifications in the Project Explorer Window

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 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.

The block diagram acts as a conduit between the Touch Panel application running on the Touch Panel target and the Touch Panel VI running on the host computer.

2. Change the event case in the Event structure to **“Frequency”: Value Change**.

3. Right-click the wire flowing into the **frequency** input of the Sine Waveform VI and select **Probe** from the shortcut menu.

A floating **Probe** window appears after you create a probe. LabVIEW numbers the **Probe** windows automatically and displays the same number in a glyph on the wire you probe as shown in Figure 10.

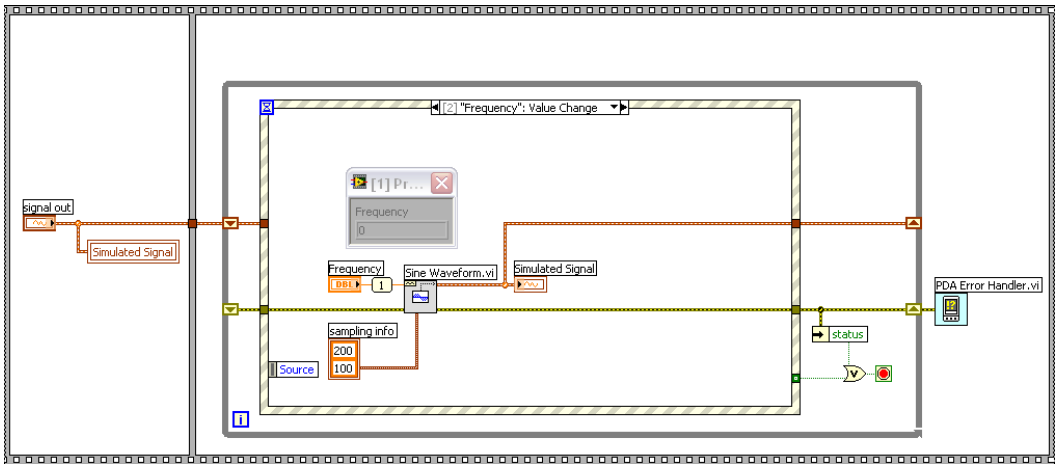


Figure 10. Adding a Probe to the Block Diagram

Deploying and Debugging a Touch Panel Application

You must use the debug 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 Touch Panel VI you want to build and deploy, which is **(Debug) Touch Panel Tutorial** in Figure 9, and select **Debug** from the shortcut menu. Save any VIs if prompted.

The Touch Panel Module builds the Touch Panel VI into a Touch Panel application, deploys the Touch Panel application to the Touch Panel target, and runs the Touch Panel application on the Touch Panel.



Tip You also can start a debugging session by clicking the **Step Over** or **Step Into** buttons or by clicking the **Pause** button and then clicking the **Run** button on the block diagram toolbar.

2. Move the **Frequency** slider in the Touch Panel application running on the Touch Panel target. The value in the **Probe** window on the block

diagram on the host computer updates as you move the slider in the Touch Panel application.



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

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

Related Documentation

LabVIEW includes extensive online and print 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»Search the 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. *LabVIEW Help* uses (TPC) in the index to indicate Touch Panel-specific topics.
- Touch Panel Module Readme—Refer to the Touch Panel Module Readme file, available by selecting **Start»All Programs»National Instruments»LabVIEW 8.2»Readme** and opening `readme_TPC.html`, for known issues with version 8.2.
- LabVIEW PDFs—In addition to this document, the *Getting Started with LabVIEW* manual, *LabVIEW Quick Reference Card*, *LabVIEW Fundamentals* manual, *LabVIEW Release Notes*, and *LabVIEW Upgrade Notes* are available as PDFs by selecting **Start»All Programs»National Instruments»LabVIEW 8.2»LabVIEW Manuals**.



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- Documentation for the Touch Panel target you use.

Where to Go for Support

The National Instruments Web site is your complete resource for technical support. At ni.com/support you have access to everything from troubleshooting and application development self-help resources to email and phone assistance from NI Application Engineers.

National Instruments corporate headquarters is located at 11500 North Mopac Expressway, Austin, Texas, 78759-3504. National Instruments also has offices located around the world to help address your support needs. For telephone support in the United States, create your service request at ni.com/support and follow the calling instructions or dial 512 795 8248. For telephone support outside the United States, contact your local branch office:

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Czech Republic 420 224 235 774, Denmark 45 45 76 26 00,
Finland 385 0 9 725 725 11, France 33 0 1 48 14 24 24,
Germany 49 0 89 741 31 30, India 91 80 41190000,
Israel 972 0 3 6393737, Italy 39 02 413091, Japan 81 3 5472 2970,
Korea 82 02 3451 3400, Lebanon 961 0 1 33 28 28,
Malaysia 1800 887710, Mexico 01 800 010 0793,
Netherlands 31 0 348 433 466, New Zealand 0800 553 322,
Norway 47 0 66 90 76 60, Poland 48 22 3390150,
Portugal 351 210 311 210, Russia 7 095 783 68 51,
Singapore 1800 226 5886, Slovenia 386 3 425 4200,
South Africa 27 0 11 805 8197, Spain 34 91 640 0085,
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