Getting Started with the LabVIEW™ PDA Module for Windows Mobile

Version 8.5

The LabVIEW PDA Module extends the LabVIEW graphical development environment to PDA devices so you can create PDA applications that run on Pocket PC and Windows Mobile devices. Use the PDA Module to build applications that run in the smaller memory space common to PDA devices. You can create portable solutions for a wide spectrum of applications, such as field test systems, remote control and monitoring systems, and portable data acquisition systems.

This manual contains new features for version 8.5, system requirements, installation instructions, and a tutorial that shows you how to create a LabVIEW project and build, run, deploy, and debug a PDA application.

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What's New in the LabVIEW 8.5 PDA Module

The LabVIEW 8.5 PDA Module features and changes include support for front panel data binding as well as expanded support for front panel controls and indicators.

Refer to the *LabVIEW Upgrade Notes*, available by selecting **Start» All Programs»National Instruments»LabVIEW 8.5»Manuals** and opening `LV_Upgrade_Notes.pdf` for more information about new features in LabVIEW 8.5.

Refer to the **PDA Module** book on the **Contents** tab of the *LabVIEW Help*, available by selecting **Help»Search the LabVIEW Help** in LabVIEW, for more information specific to the PDA Module and PDA applications.

Refer to the PDA Module Readme file, available by selecting **Start» All Programs»National Instruments»LabVIEW 8.5»Readme** and opening `readme_PDA.html` for known issues with version 8.5 of the PDA Module.

General

The LabVIEW 8.5 PDA Module includes the following enhancements and new features:

- **Reading and writing front panel data using data binding**—You can use data binding to read or write front panel data for network-published shared variables. You can use data binding with any front panel control or indicator that the PDA Module supports.

Note When you use front panel data binding in a PDA subVI, LabVIEW closes data binding connections when the subVI finishes execution.

(PDA Emulators) The PDA Module does not support reading or writing shared variable values on x86 emulators. Prior to reading or writing shared variable values on ARM emulators, cradle the emulator and configure the IP address for the emulator. You must install support for shared variables after you cradle the emulator. Refer to the *Shared Variable Support* section for more information about installing shared variable support. Refer to the National Instruments Developer Zone at `ni.com/info` and enter the info code `pdasvem` for the most recent information about using shared variables with PDA emulators.

For more information about data binding, refer to the *Reading and Writing Front Panel Data Using Data Binding* topic in the *LabVIEW Help*. Select **Help»Search the LabVIEW Help** in LabVIEW to display the *LabVIEW Help*. For more information about using shared variables in PDA VIs, refer to the *Using Shared Variables in PDA and Touch Panel VIs* topic in the *LabVIEW Help*. Refer to the Shared Variable Intro - Pocket PC.lvproj in the labview\ examples\PDA\shared variable directory for an example of using front panel data binding.

- **LabVIEW Aliases File Editor**—In previous versions of the PDA Module, you changed the IP address of the shared variable host in the aliases file and manually downloaded the aliases file to the same directory as the corresponding application on the PDA target. You now can use the LabVIEW Aliases File Editor to edit the aliases file on the target.

  Tap **Start»Programs»LabVIEW Aliases File Editor** to launch the LabVIEW Aliases File Editor on the target. Tap the browse button to browse to and open an aliases file.

- **Large application optimizations**—For large applications with numerous front panel controls and indicators, the time it takes to build applications is significantly less than in previous versions. The PDA Module also generates significantly less C code for large applications.

- **Call by Reference Node supports local references**—You now can use a local reference with the Call by Reference Node. Select the **Source Files** category of the **PDA Build Specification Properties** dialog box to include any VIs that the Call by Reference Node calls locally in the project.

- **Expression folding**—Expression folding optimizes performance by collapsing groups of nodes into single expressions in the generated code that are easily recognized by C compilers. Place a checkmark in the **Expression folding** checkbox on the **Application Information** page of the **PDA Build Specification Properties** dialog box to enable expression folding. You cannot debug a PDA VI while using expression folding because expression folding eliminates some wires on the block diagram.

- **Expression Node supports clusters and arrays**—You now can use arrays or clusters as inputs to an Expression Node.

- **New VISA examples**—The PDA Module includes new VISA examples, which are located in the `labview\examples\PDA\comm\VISA` directory.

Front Panel Controls and Indicators

- **Blinking Boolean controls and indicators**—The PDA Module supports blinking for all Boolean controls and indicators except system controls. Use a Property Node with the Blinking property to enable blinking.

- **Boolean mechanical action**—The PDA Module now supports the six types of mechanical action for Boolean controls, which include **Switch when pressed**, **Switch when released**, **Switch until released**, **Latch when pressed**, **Latch when released**, and **Latch until released**.

- **Control labels inside arrays**—Labels on front panel controls and indicators that you place inside arrays are now visible in PDA applications. Right-click the control or indicator and select **Visible Items»Label** from the shortcut menu to display the label.

- **Resizing and changing the color of increment and decrement buttons**—You now can resize and change the color of the increment and decrement buttons for numeric controls, enumerated type controls, and time stamp controls.

- **Scroll bar control**—The PDA Module supports scroll bar controls, which include vertical and horizontal scroll bars that you can add to any front panel control or indicator with scrollable data. Use a Property Node to associate a scroll bar control with a front panel control or indicator.

- **Text justification and underlining text for controls and indicators**—You now can set the justification of text and underline text for buttons; enumerated type controls; and string, time stamp, and numeric controls and indicators.

  Select the **Limit to Single Line** option from the shortcut menu for the string control to disable justification.

- **Events and overlapping controls**—When controls overlap each other, the control with the higher tabbing order number no longer receives the event. The topmost control now receives the event.

- **Free labels and decorations inside cluster controls and indicators**—You now can use free labels and decorations inside cluster controls and indicators.

- **Decorations inside tab controls**—Decorations on one page of a tab control no longer appear on all the pages of the tab control.

- **Decimal values in ring controls**—You now can use decimal values for items in a ring control.

Newly Supported VIs and Functions

- **Get Special Folder Path**—You can use the Get Special Folder Path VI to return the path to the application or directories that applications frequently use.

- **Inline C Node**—You can use the Inline C Node to add inline C code to the block diagram. The Inline C Node is similar to the Formula Node with additional support and functionality for low-level programming and header files without the overhead of a function call. Use the Inline C Node for short blocks of code that you cannot easily implement in VIs.

- **PDA Picture to Pixmap**—You can use the PDA Picture to Pixmap VI to convert a picture to a cluster of image data that you can use to perform certain tasks with the image, such as writing customized pictures to file.

- **Run Application**—You can use the Run Application VI to run a specified PDA application.

- **Show Hide Input Panel**—You can use the Show Hide Input Panel VI to display or hide the input panel for PDA devices.

- **Static VI Reference** —You can use the Static VI Reference function to maintain a static reference to a VI. You can configure the Static VI Reference function to output a generic or strictly typed VI reference. After you place the Static VI Reference function on a block diagram, double-click the function to display a file dialog box in which you can select a VI.

- **XML functions**—The PDA Module now includes the Escape XML, Flatten To XML, Read From XML File, Unescape XML, Unflatten From XML, and Write to XML File VIs and functions. You can use these VIs and functions to manipulate LabVIEW data in XML format.

Newly Supported Properties

- **Cluster properties**—The PDA Module includes the following new cluster properties that you can use with cluster controls: Cluster Size, Cluster Size:Height, Cluster Size:Width, and Controls[]. You can use a Property Node with these properties to set the size of cluster controls and get references to cluster elements.

  The PDA Module also includes the following new cluster properties that you can use with radio buttons controls: Cluster Size, Cluster

Size:Height, Cluster Size:Width, and Color. You can use a Property Node with these properties to set the size and color of radio buttons controls.

- **Data binding properties**—The PDA Module includes the following new data binding properties: Data Binding:Binding Type, Data Binding:LED Visible, Data Binding:Mode, Data Binding:Path, and Data Binding:Status. You can use a Property Node with these properties to return information about the data connection, configure the mode of the data connection, and show or hide the data binding indicator.

- **Text property**—You can use the Text property to read from or write to a string control or indicator.

- **Waveform graph cursor properties**—You can use the Allow Drag and Cursor Legend Visible properties with waveform graphs. Use a Property Node with the Allow Drag property to allow users to move the cursor in the plot area. Use a Property Node with the Cursor Legend Visible property to display the cursor legend for the waveform graph.

System Requirements

The PDA Module has the following requirements:

- A desktop computer with Windows Vista/XP or Windows 2000 with Service Pack 4.0 or later.
- LabVIEW 8.5 Base, Full, or Professional Edition.
- 2.5 GB available disk space.
- A PDA device running Pocket PC 2003 or Windows Mobile 5.0.

Note For more information about PDA software requirements and supported devices, refer to *KnowledgeBase 3ANADAKN: LabVIEW PDA Module Software Requirements and Supported Devices* at ni.com.

Refer to the *LabVIEW Release Notes*, available by selecting **Start» All Programs»National Instruments»LabVIEW 8.5»LabVIEW Manuals** and opening LV_Release_Notes.pdf, for standard LabVIEW development system requirements.

Installing the PDA Module

Complete the following steps to install the PDA Module.

1. On Windows Vista/XP/2000, log in as an administrator or as a user with administrator privileges.

2. Install LabVIEW 8.5, if not already installed. Refer to the *LabVIEW Release Notes* for standard LabVIEW installation instructions.

3. Install the PDA Module.

   The PDA Module includes Microsoft tools, such as Microsoft ActiveSync on Windows XP/2000 and ARM Windows Mobile emulators. Some of these Microsoft tools might interfere with any existing installations of Visual Studio, Windows Embedded, or Windows CE toolkits.

   Note **(Windows XP/2000)** The PDA Module installs ActiveSync 4.2 if you do not already have ActiveSync 4.2 or later installed. The PDA Module works with ActiveSync 4.2 or later.

4. Activate the PDA Module.

   You must activate the PDA Module before you can build PDA VIs into PDA applications. The PDA Module runs in evaluation mode if you do not activate it. In evaluation mode, you can create PDA VIs, but any PDA applications you build run only for five minutes. You have the option of activating the PDA 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. **(Windows Vista)** You must install Windows Mobile Device Center to use the PDA Module. Refer to the Microsoft Web site at www.microsoft.com to download Windows Mobile Device Center.

7. Install the additional tools you need. Refer to the *Installing Additional Tools* section for more information about the additional tools.

Uninstalling the PDA Module

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

- **(Windows XP/2000)** Microsoft ActiveSync

- Microsoft Device Emulator version 1.0 – ENU

- Microsoft Visual C++ 2005 Redistributable

Installing Additional Tools

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

Shared Variable Support

To use front panel data binding and Shared Variable nodes in your PDA applications, you must install the latest version of shared variable support on the PDA target.

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

1. Connect the PDA device to ActiveSync on the host computer.

2. Navigate to and run `labview\PDA\Utilities\Variables\PocketPC\Setup.exe`.

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

(PDA Emulators) You also must install the Virtual Machine Network Driver on host computers with Windows XP/2000 or install Virtual PC 2007 on host computers with Windows Vista. Download the appropriate installer from the Microsoft Download Center at www.microsoft.com/downloads.

PNG Image Support

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

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

1. Connect the PDA device to ActiveSync on the host computer.

2. Navigate to and run `labview\PDA\Utilities\LVPNG\ PocketPC\Setup.exe`.

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

NI-VISA Support

You must install NI-VISA on the PDA target to use VISA in your applications. Select **Start»All Programs»National Instruments» VISA»Windows Mobile Driver Installation** to install NI-VISA.

Tip You also can right-click the PDA target in the **Project Explorer** window and select **Install»Support for NI-VISA** from the shortcut menu.

WIDCOMM Bluetooth DLLs

You can use the WIDCOMM Bluetooth DLLs on a PDA device to run PDA applications that use Bluetooth communication if you do not have the Microsoft Bluetooth driver.

Note The PDA Module supports the WIDCOMM BTW-CE 1.4 or later driver.

Do not install the WIDCOMM Bluetooth DLLs if you are using the Microsoft Bluetooth driver or you receive an error when you use the Bluetooth VIs and functions. If your device uses the Broadcom Bluetooth driver, install the LabVIEW WIDCOMM Bluetooth driver by manually copying `LVBtw.dll` from the `labview\PDA\Utilities\Bluetooth` directory to the `Windows` directory. Do not run `Setup.exe` and do not copy `BtCoreIf.dll` or `BtSdkCE30.dll` if they already exist on the device.

Complete the following steps to install the WIDCOMM Bluetooth DLLs.

1. Connect to ActiveSync on the host computer.

2. On the host computer, run `labview\PDA\Utilities\Bluetooth\ Setup.exe` to install the DLLs on the PDA device.

Refer to `readme.txt`, located in the `labview\PDA\Utilities\ Bluetooth` directory, for more information about manually installing the WIDCOMM Bluetooth DLLs.

LabVIEW SMS Client

You must install and run the LabVIEW SMS Client, which is located in `labview\PDA\Utilities\SMS\Setup.exe`, on the host computer to receive Short Message Service (SMS) messages or to use the Request Make Call VI. The LabVIEW SMS Client notifies the PDA application if there is an incoming SMS message and stores the incoming message in `LVSMSClient.dat`, which is located in the `\Program Files\ National Instruments\labview\SMS` directory on the PDA target.

Complete the following steps to install or uninstall the LabVIEW SMS Client on a PDA target.

1. Perform a soft reset on the PDA target. Refer to your PDA device documentation for information about performing soft resets.

2. Connect the PDA target to ActiveSync on the host computer.

3. Run `Setup.exe` on the host computer to install or uninstall the required DLLs.

You also can right-click the PDA target in the **Project Explorer** window and select **Install»Support for SMS Client** from the shortcut menu.

PDA Emulators

Emulators are tools you can use during development to quickly run and test PDA VIs without having to download the PDA application to the PDA device.

ARM Emulators

(Windows XP/2000) If you are using ARM-based emulators, which are the emulators the PDA Module installs, you must install the Virtual Machine Network Driver. Download the installer from the Microsoft Download Center at www.microsoft.com/downloads.

(Windows Vista) If you are using ARM-based emulators, you must install Virtual PC 2007. Download the installer from the Microsoft Download Center at www.microsoft.com/downloads.

(Windows Vista) If you want to use emulators with the PDA Module on host computers that use Windows Vista, you must download the Microsoft Device Emulator 2.0. Download the installer from the Microsoft Download Center at www.microsoft.com/downloads.

x86 Emulators

On host computers with Windows XP/2000, the PDA Module installs ARM Pocket PC and Windows Mobile targets, including the emulators. If you need x86 emulator 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 PDA Project Wizard to create a LabVIEW project and build, run, and debug a PDA application.

The VI in this tutorial simulates a sine wave with configurable offset and frequency 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 PDA VI into a PDA application, and deploy the PDA application to a PDA device or emulator. You must use a project to build a PDA VI into a PDA application.

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

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

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

   a. Select **New Pocket PC 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 PDA 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 `PDA Tutorial - Pocket PC.lvproj` in the **Project location** text box.

c. Click the **Browse** button next to the **VI path** text box and navigate to `labview\examples\PDA\tutorial\PDA Tutorial - Pocket PC.vi` to select the VI to import. Click the **OK** button to add the VI to the project you are creating.
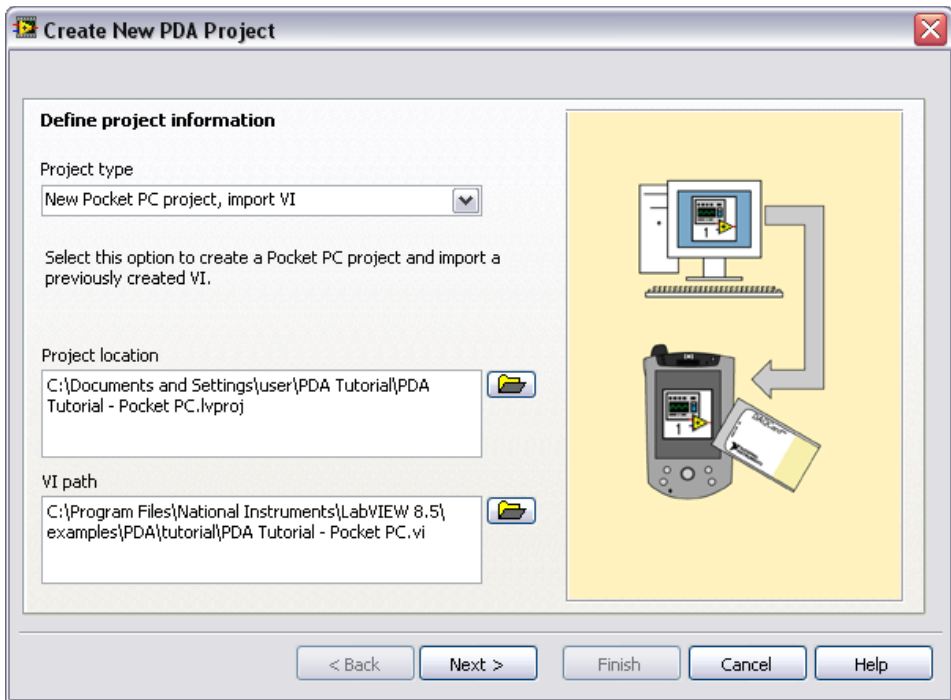
Figure 1. Defining the Project Information

3. Click the **Next** button.

4. Select the **Windows Mobile 5.0 Pocket PC Emulator** from the **Device type** pull-down menu as shown in Figure 2.
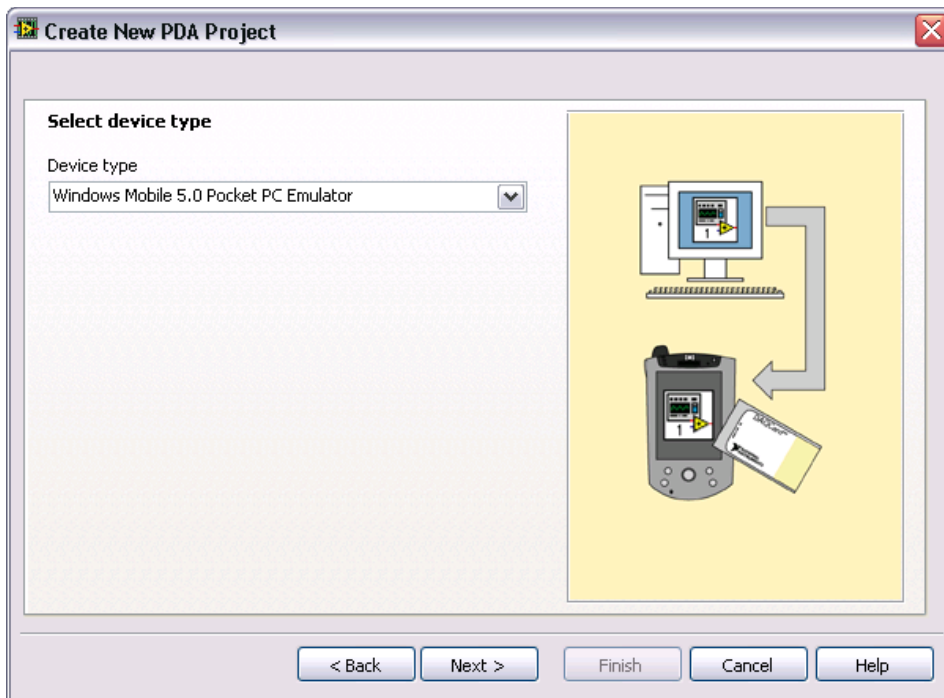
Figure 2. Selecting the PDA Device Type

Note You might see additional Pocket PC and/or Windows Mobile targets if you configure additional devices through the Microsoft Device Emulator Manager.

5. Click the **Next** button.

6. The **System preview** page, shown in Figure 3, 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 PDA Build Specification* section for more information about creating a build specification.
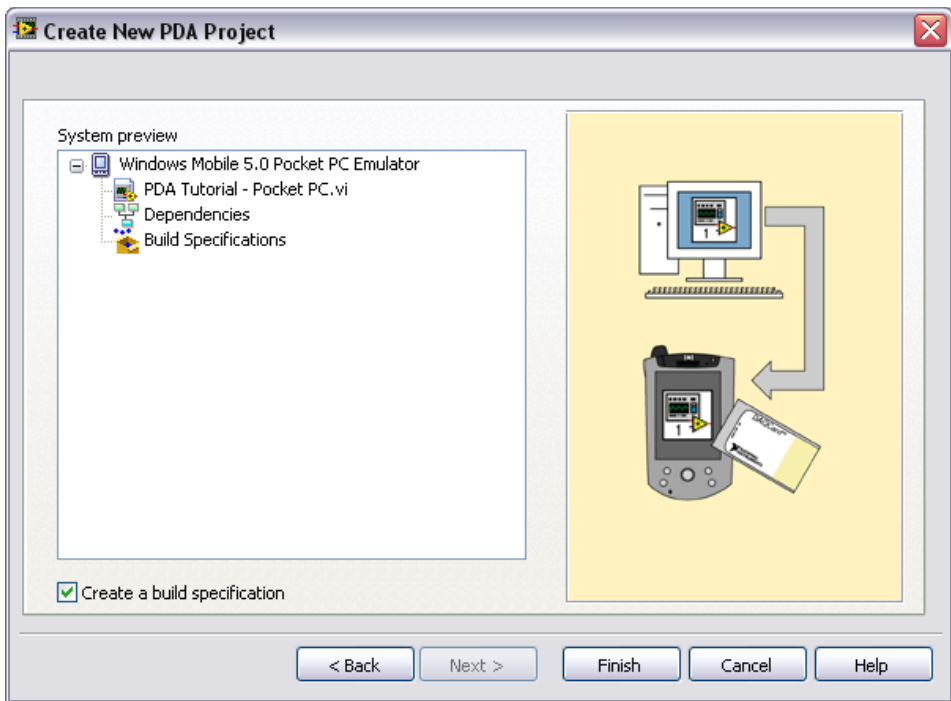
Figure 3. Previewing the Project

Because the **Create a build specification** checkbox contains a checkmark as shown in Figure 3, the **PDA Build Specification** dialog box opens when you click the **Finish** button.

Creating the PDA Build Specification

Build specifications contain the build settings and code generation options to use when you build a PDA VI into a PDA application. You can create the build specification when you create a project or wait until you are ready to build the PDA VI into a PDA application. You must create a build specification before you can build a PDA VI into a PDA 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 PDA Project Wizard. You also can create a build specification at any time by right-clicking **Build Specifications** in the **Project Explorer** window and selecting **New»Application (EXE)** from the shortcut menu.

Complete the following steps to create a PDA build specification.

1. Define the settings for the PDA application as shown in Figure 4.

    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 PDA application is the same as the top-level PDA VI. If you do not want to use the top-level PDA VI name for the PDA 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 PDA 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 PDA application on the PDA target in the **Remote path for target application** text box.
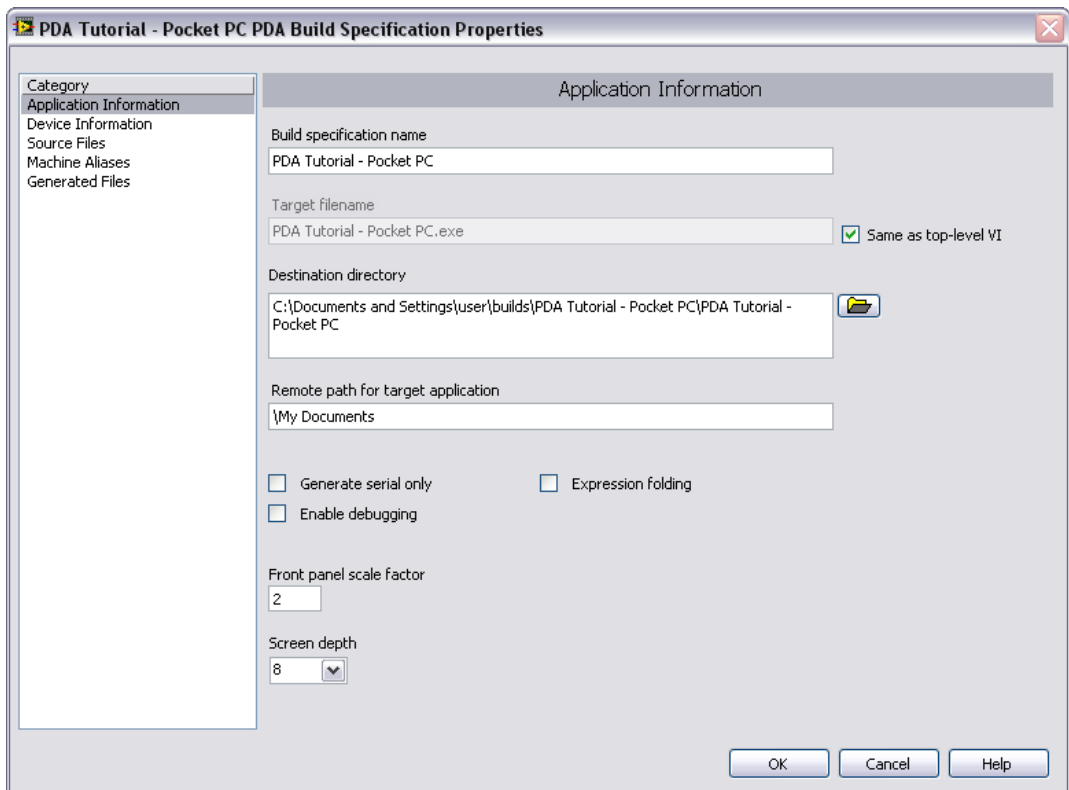

Figure 4. Defining the PDA Application Information

Note Although it is common to use the same name for the PDA 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 PDA VI into a PDA application. When you use the PDA 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, shown at left, to move the VI to the **Top-level VI** text box as shown in Figure 5. PDA applications can have only one top-level VI.
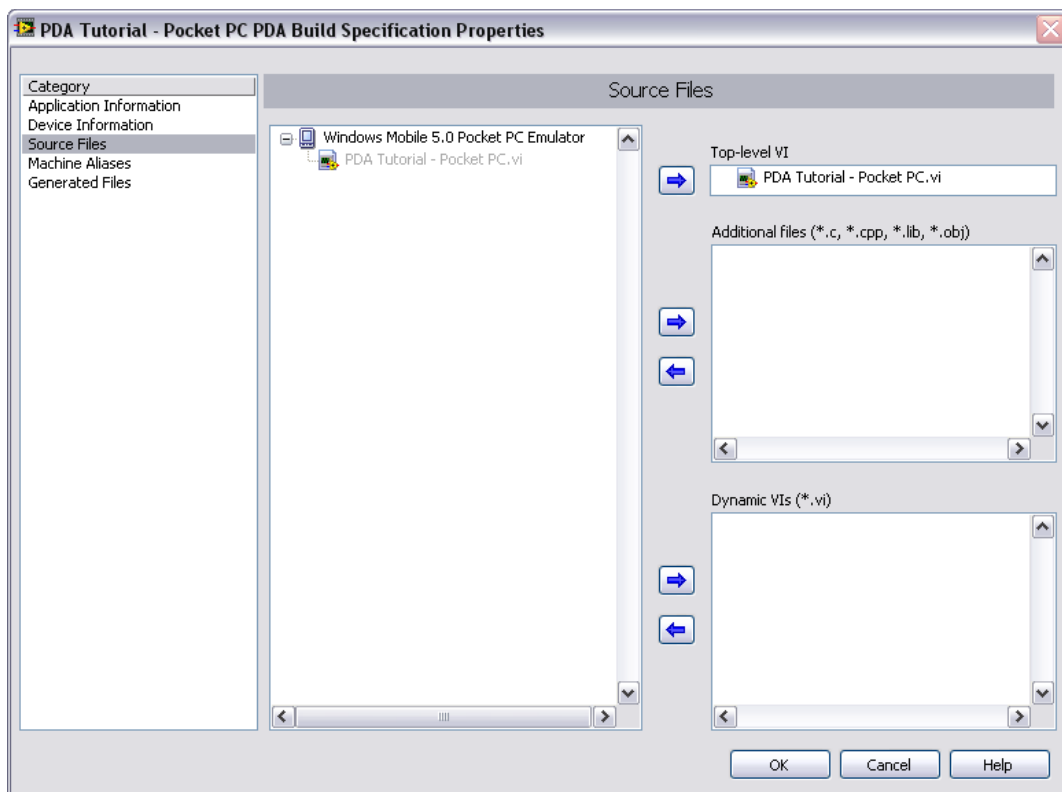

Figure 5. Selecting the Source Files

Note The **Machine Aliases** category is not used in this tutorial. You use the **Machine Aliases** category 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 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 paths to the files the PDA Module will generate when you build the PDA VI into a PDA application.

6. Click the **OK** button. The build specification you just created appears in the **Project Explorer** window under the PDA target as shown in Figure 6.
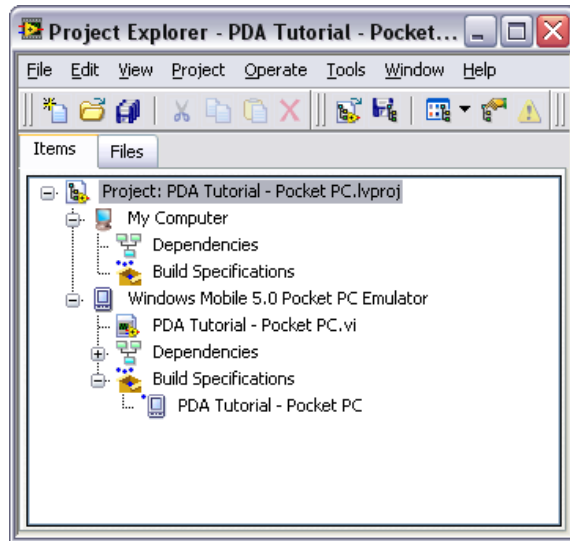

Figure 6. Project Explorer Window

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

Building the PDA VI into a PDA Application and Deploying

After you develop the PDA VI on the host computer, you build the PDA VI into an executable PDA application that you can run on a PDA 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 PDA application.

✎ **Note** ARM PDA emulators require a few minutes to load the OS before you see the PDA application running on the emulator target.

Using the Shortcut Menu

Right-click the build specification and select one of the following from the shortcut menu:

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

- **Run**—Builds the PDA VI into a PDA application, if necessary; deploys the application to the PDA target, and automatically runs the PDA application.

- **Build**—Builds the PDA VI into a PDA application. This option does not deploy or automatically run the PDA application.

Using the Run Button

When you run a PDA VI under a PDA 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 PDA VI to build the PDA VI into a PDA application, deploy the PDA application to the PDA target, and run the PDA application on the PDA target. LabVIEW prompts you to create a build specification if you do not have an existing build specification for the PDA 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. The PDA Module uses the default build specification, which the PDA Module indicates with a green square around the PDA 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 PDA VI to build the PDA VI into a PDA application without deploying or running the PDA application. LabVIEW prompts you to create a build specification if you do not have an existing build specification for the PDA 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. The PDA Module uses the default build specification, which the PDA Module indicates with a green square around the PDA build specification glyph in the **Project Explorer** window.

Closing the PDA Application

Click the **Exit** button in the PDA application on the PDA target to close the PDA application.

Debugging the PDA Application

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

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

The block diagram acts as a conduit between the PDA application running on the PDA target and the PDA 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 PDA target and select **New»Application (EXE)** from the shortcut menu.

2. Enter `(Debug) PDA Tutorial - Pocket PC` in the **Build specification name** text box.

3. Remove the checkmark from the **Same as top-level VI** checkbox so you can change the PDA application name.

4. Enter `(Debug) PDA Tutorial - Pocket PC.exe` in the **Target filename** text box.

5. Place a checkmark in the **Enable debugging** checkbox to generate debugging information when you build the PDA VI into a PDA application as shown in Figure 7.
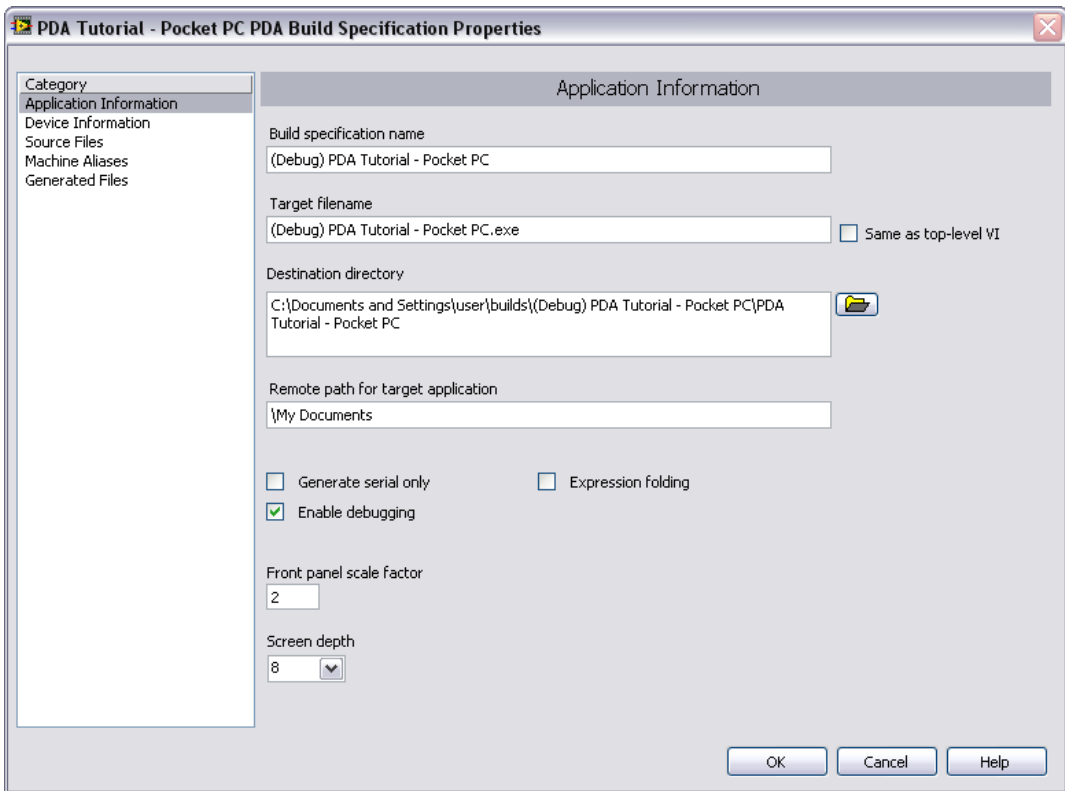

Figure 7. Creating the Debugging Build Specification

6. Select **Source Files** from the **Category** list and select **PDA Tutorial - Pocket PC.vi** in the source files list. Click the blue right arrow button, shown at left, to move the VI from the source 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 8.
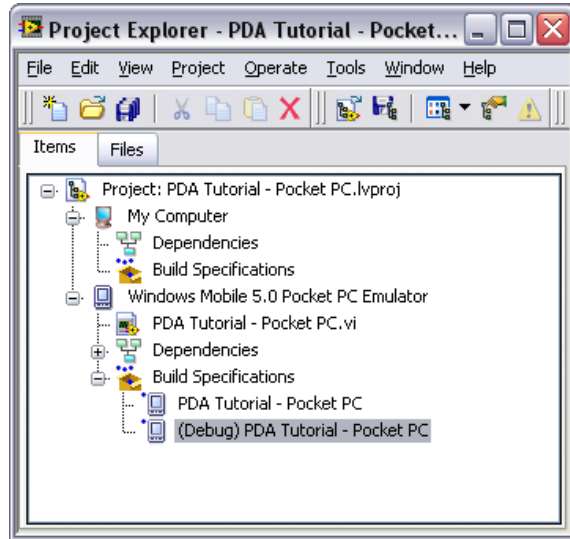

Figure 8. Two PDA Build Specifications in the Project Explorer Window

Adding a Probe to the PDA VI

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

Complete the following steps to add a probe to the PDA VI.

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

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

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

2. Right-click the wire flowing from the **Frequency** control to the For Loop 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 9.
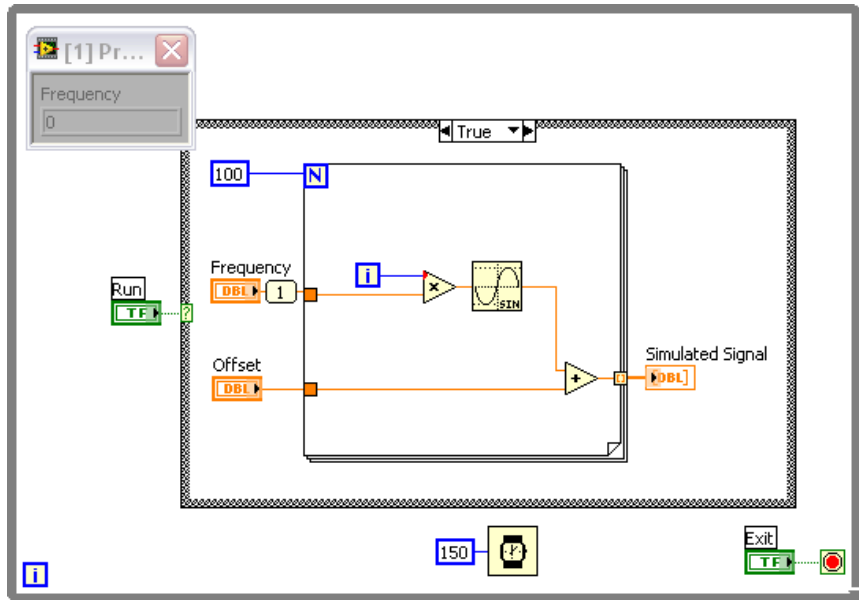

Figure 9. Adding a Probe to the Block Diagram

Deploying and Debugging a PDA Application

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

Complete the following steps to deploy and debug the PDA application.

1. Right-click the build specification for the PDA VI you want to build and deploy, which is **(Debug) PDA Tutorial - Pocket PC** in Figure 8, and select **Debug** from the shortcut menu. Save any VIs if prompted.

The PDA Module builds the PDA VI into a PDA application, deploys the PDA application to the PDA target, and runs the PDA application on the PDA target as shown in Figure 10.

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.
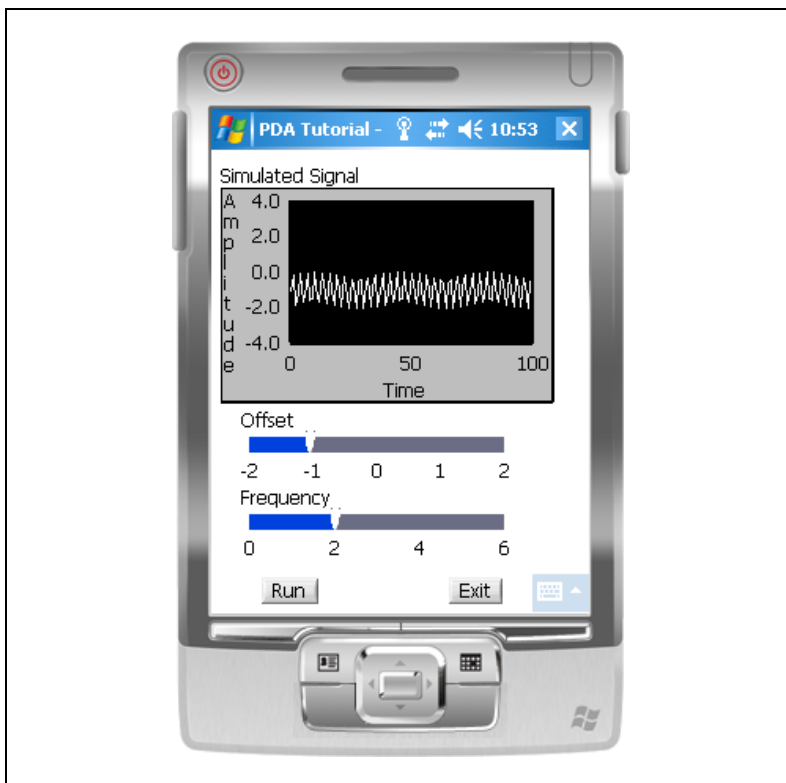

Figure 10. Running the PDA Application on the PDA Emulator

2. Click the **Run** button in the PDA application.

3. Move the **Frequency** slider in the PDA application running on the PDA target and click the **Run** button again. The value in the **Probe** window on the block diagram updates as you move the slider in the PDA application.

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

4. Click the **Exit** button in the PDA application on the PDA target to stop the PDA 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 PDA 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 **PDA Module** book on the **Contents** tab of the *LabVIEW Help* for information specific to the PDA Module and PDA applications. *LabVIEW Help* uses **(PDA)** in the index to indicate PDA-specific topics.

- PDA Module Readme—Refer to the PDA Module Readme file, available by selecting **Start»All Programs»National Instruments» LabVIEW 8.5»Readme** and opening `readme_PDA.html`, for last-minute information and known issues with version 8.5.

- Documentation for the PDA target you use.

- 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 8.5»LabVIEW Manuals**.

✎ **Note** You must have Adobe Reader with Search and Accessibility 5.0.5 or later installed to view the PDFs. You must have Adobe Reader with Search and Accessibility 6.*x* or later installed to search PDF versions of these manuals. 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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