

Getting Started with the LabVIEW™ PDA Module for Windows Mobile

Version 8.2

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 8.2; 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 8.2 PDA Module

The LabVIEW 8.2 PDA Module features and changes include support for shared variables as well as expanded support for front panel controls.

Refer to the *LabVIEW Upgrade Notes*, available by selecting **Start» All Programs»National Instruments»LabVIEW 8.2»LabVIEW Manuals** and opening *LV_Upgrade_Notes.pdf* for more information about new features in LabVIEW 8.2.

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 8.2»Readme** and opening *readme_PDA.html* for known issues with version 8.2 of the PDA Module.

General

- **Shared variables**—You can use single-process and network-published shared variables to share data among VIs in the same PDA application or to read data from and write data to other network-published shared variables. If you are unfamiliar with using shared variables, refer to the *LabVIEW Help*, available by selecting **Help»Search the LabVIEW Help**, for information about shared variables. The PDA Module does not support hosting shared variables. Refer to the *Using Shared Variables* book, available by selecting **PDA Module»Creating PDA VIs** on the **Contents** tab of the *LabVIEW Help* for more information about using shared variables in PDA VIs.

- **PNG files**—You can use transparent .png files in PDA user interfaces you build with the PDA Module. The PDA Module does not support loading transparent .png files into a picture control. You must install support for .png images on the PDA device if the PDA VI contains .png images on the front panel. Navigate to and run `labview\PDA\Utilities\LVPNG\Setup.exe` to install .png support.
- **Bundling and unbundling elements in nested clusters**—You now can use a single Bundle By Name function to bundle elements into nested clusters. You now can use a single Unbundle By Name function to unbundle elements from nested clusters.
- **Microsoft Bluetooth driver support**—You can use the Bluetooth VIs and functions with the WIDCOMM or Microsoft Bluetooth driver to develop Bluetooth PDA applications. Do not install the WIDCOMM Bluetooth DLLs if you have the Microsoft Bluetooth driver. If you use the Microsoft Bluetooth driver, the Bluetooth RFCOMM Service Discovery VI does not return the **service name** in the **service list** output. All other outputs in this VI return the correct information.
- **Microsoft eMbedded Visual Tools**—You no longer need to download and install the eMbedded Visual Tools unless you need x86 emulator support.

Front Panel Controls and Indicators

- **Tree controls**—You can use single-column tree controls in PDA user interfaces.
- **Gauge control**—You can use gauge controls in PDA user interfaces.
- **Password display support for string controls**—PDA VIs support password display on string controls and indicators.
- **Transparency in Boolean controls**—The PDA Module supports transparency in front panel Boolean controls that are not based on the native Pocket PC and Windows Mobile built-in controls.
- **Ring controls**—You are no longer restricted to sequential numeric values in ring controls. Remove the checkmark from the **Sequential values** checkbox on the **Edit Items** tab of the **Ring Properties** dialog box to assign a specific numeric value to each item in a ring control.
- **Scroll bars in tables**—Vertical scroll bars on tables are now hidden in PDA applications if you hide scroll bars in the PDA VI.
- **Current VI's Path function**—If you use the Current VI's Path function, which is unsupported in PDA VIs, you now receive a broken **Run** button.

Newly Supported VIs and Functions

- **Invoke Node**—You can use the Invoke Node to invoke a method. The PDA Module supports a select collection of methods you can use with the Invoke Node. Refer to the *Supported Methods* topic, available by selecting **PDA Module»Creating PDA VIs** on the **Contents** tab of the *LabVIEW Help*, for more information about which methods are supported in PDA VIs.
- **Semaphore VIs**—The PDA Module supports the Semaphore VIs. Use the Semaphore VIs to limit the number of tasks that can simultaneously operate on a shared (protected) resource. You can use these VIs when you want certain VIs or parts of a block diagram to wait until another VI or part of a block diagram is finished with the execution of a critical section of code.
- **VISA support**—You can use the VISA VIs and functions in PDA VIs instead of the Serial Compatibility VIs if you install the VISA driver, which is available by selecting **Start»All Programs»National Instruments»VISA»Windows Mobile-CE Driver Installation**. The target must have a serial port to use the serial VISA VIs and functions. The target must be USB host-enabled to use the VISA USB VIs.

Deprecated VIs

The following VIs have been deprecated in version 8.2 of the PDA Module:

- **Configure PDA XY Scales**—Use a Property Node with the Range, Range:Maximum, and Range:Minimum properties instead.
- **PDA Set Listbox Strings**—Use a Property Node with the Item Names property instead.
- **PDA Set Ring Strings**—Use a Property Node with the Strings [] property instead.
- **Read PDA XY Scales**—Use a Property Node with the Mapping Mode, Range:Maximum, and Range:Minimum properties instead.
- **Show or Hide Control**—Use a Property Node with the Visible property instead.



Note Deprecating these VIs does not break existing PDA VIs that use them.

System Requirements

The PDA 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 PDA device running Pocket PC 2003 or Windows Mobile 5.0.



Note The PDA Module no longer supports Palm OS.

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 PDA Module

Complete the following steps to install the PDA 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 PDA Module.

The PDA Module includes Microsoft ActiveSync and ARM Windows Mobile emulators. Installing the PDA Module could interfere with any existing installations of Visual Studio, Windows Embedded, or Windows CE toolkits.

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, which means you can create PDA VIs, but you cannot build the PDA VIs into PDA applications. 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. 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:

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

Installing 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 PDA target before you can run a PDA application with shared variables.

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\Setup.exe`.

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 PC Network Driver. Download the installer from the Windows Mobile 5.0 Web site at www.microsoft.com/windowsmobile.

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\Setup.exe`.

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

Complete the following steps to install the WIDCOMM Bluetooth DLLs.



Note 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.

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\Pocket PC\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 useful 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

If you are using ARM-based emulators, which are the emulators the PDA Module installs, you must install the Virtual PC Network Driver. Download the installer from the Windows Mobile 5.0 Web site at www.microsoft.com/windowsmobile.

x86 Emulators

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 create a LabVIEW project and build, run, and debug a PDA 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.



Tip You also can use the PDA Project Wizard to create the project, the PDA target, and the PDA build specification. Refer to the *Creating a Project Using the PDA Project Wizard* topic in the *LabVIEW Help*, available by selecting **Help»Search the LabVIEW Help**, for information about the PDA Project Wizard.

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.

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 **Empty Project** to open an empty LabVIEW project in the **Project Explorer** window as shown in Figure 1. LabVIEW creates an empty project with a Windows target, shown in Figure 1 as **My Computer**.

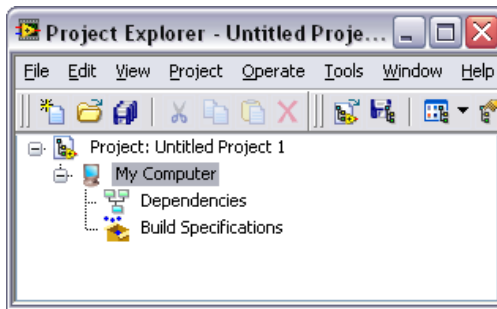


Figure 1. Project Explorer Window

2. Right-click the project, which is **Project:Untitled Project 1** in Figure 1, in the **Project Explorer** window and select **New»Targets and Devices** from the shortcut menu to open the **Add Targets and Devices and Devices** dialog box as shown in Figure 2.

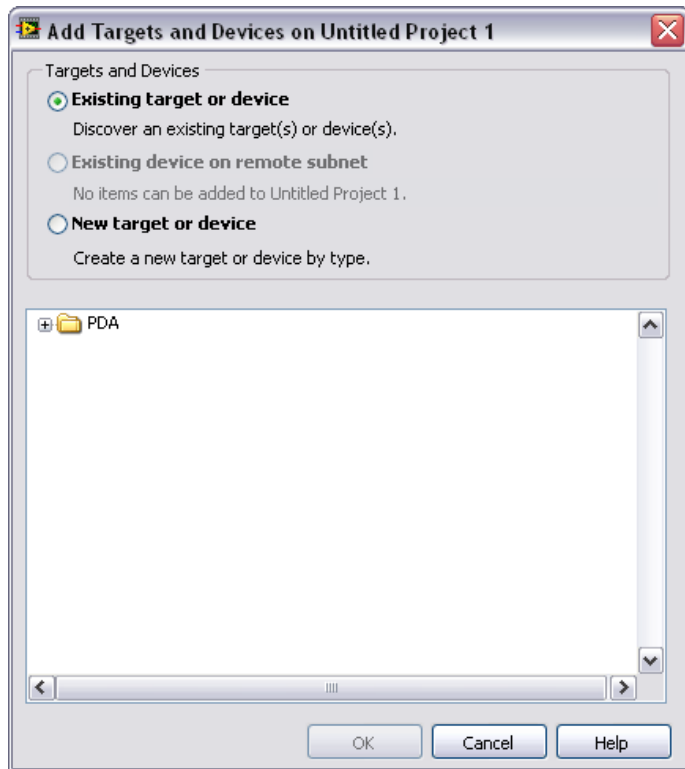


Figure 2. Add Targets and Devices Dialog Box

- Expand the **PDA** folder and select **Windows Mobile 5.0 Pocket PC Emulator** as shown in Figure 3.



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

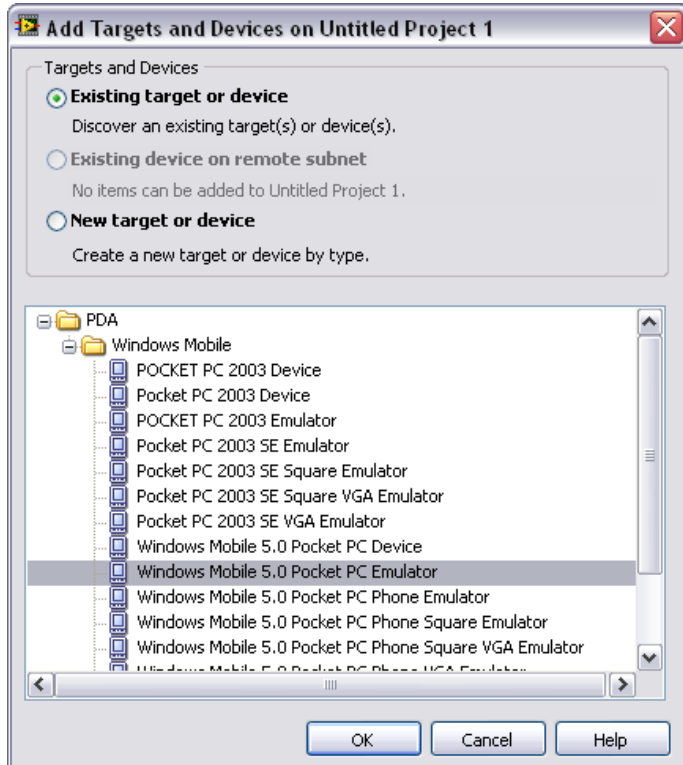


Figure 3. Adding a New Device

- Click the **OK** button to add the target to the project. The target appears in the **Project Explorer** window as shown in Figure 4.

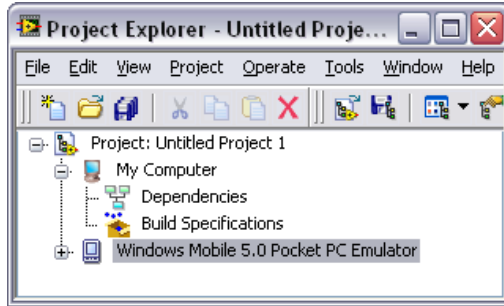


Figure 4. Adding the Windows Mobile 5.0 Pocket PC Emulator to the Project Explorer Window

- Expand the PDA target. In Figure 5, the PDA target is **Windows Mobile 5.0 Pocket PC Emulator**. LabVIEW automatically adds **Dependencies** and **Build Specifications** under the target. SubVIs appear under **Dependencies** when you add a VI that contains subVIs to a project. Build specifications you create for a target in a project appear under **Build Specifications** in the **Project Explorer** window. Refer to the [Creating the PDA Build Specification](#) section for more information about creating a build specification.

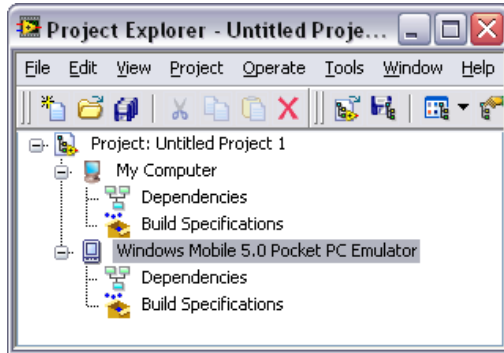


Figure 5. Expanding the PDA Target in the Project Explorer Window

- Right-click the PDA target and select **Add File** from the shortcut menu to open a file dialog box.

7. Add the PDA Tutorial - Pocket PC VI to the project by navigating to `labview\examples\PDA\PocketPC\tutorial` and selecting `PDA Tutorial - Pocket PC.vi`. Click the **Add File** button to add the VI to the project. The VI appears in the **Project Explorer** window under the PDA target as shown in Figure 6.

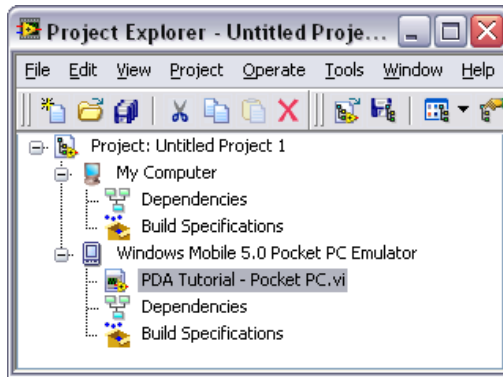


Figure 6. Adding a VI to the Project

8. Double-click the VI in the **Project Explorer** window to open the VI.

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 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.

Complete the following steps to create a build specification.

1. Right-click **Build Specifications** under the PDA target and select **New»Application (EXE)** from the shortcut menu.
2. LabVIEW prompts you to save the project. Click the **Save** button when prompted and save the project as `PDA Tutorial - Pocket PC`.
3. Click the **Help** button to open the *LabVIEW Help* and read a description of each build setting.

4. Enter **PDA Tutorial - Pocket PC** in the **Build specification name** text box as shown in Figure 7.

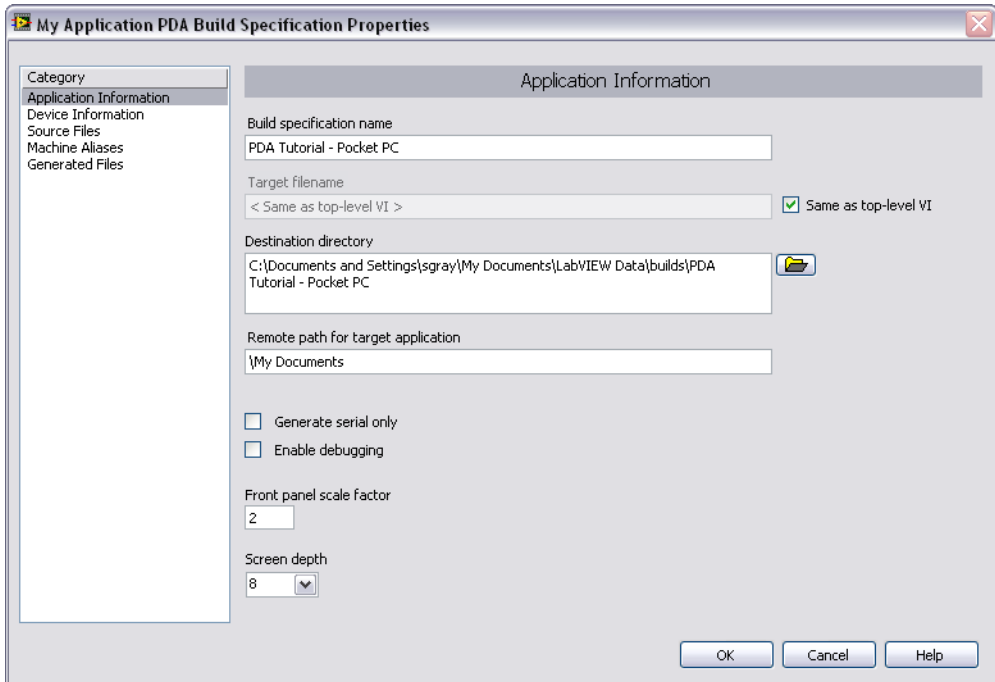


Figure 7. Creating the Build Specification



5. 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 as shown in Figure 8.

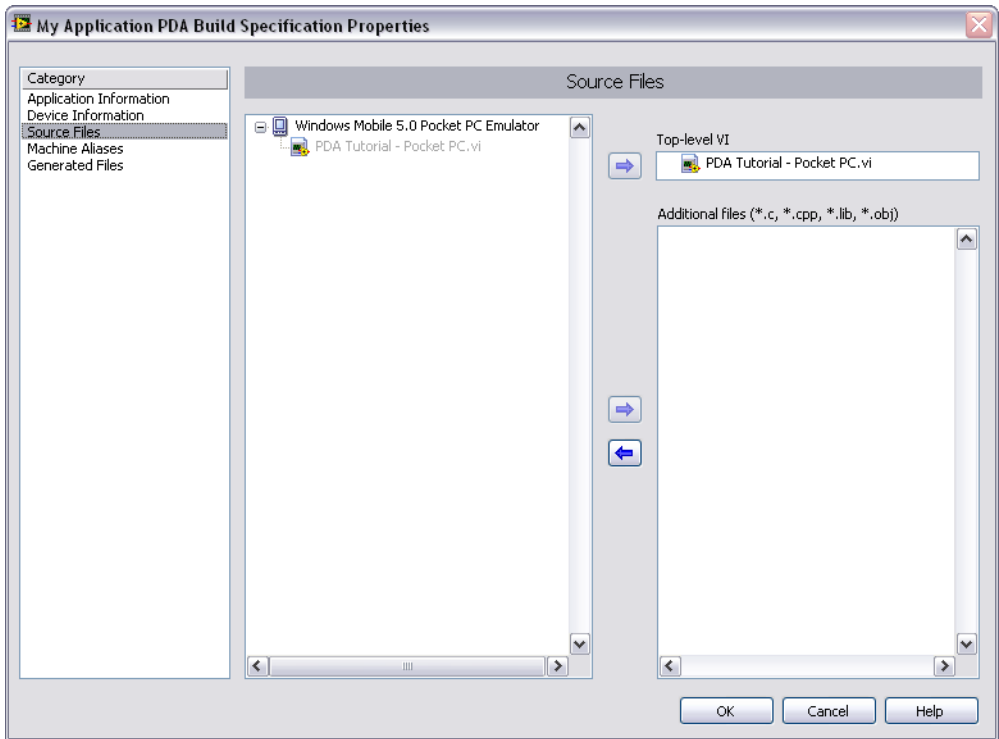


Figure 8. Selecting the Top-Level VI for the Build Specification



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.

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

- Click the **OK** button. The build specification you just created appears in the **Project Explorer** window under the PDA target as shown in Figure 9.

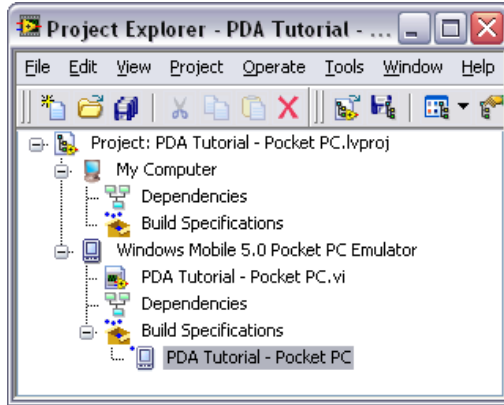


Figure 9. PDA Build Specification in the Project Explorer Window

- Select **File»Save Project** in the **Project Explorer** window to save the project. Build specifications are saved 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, if necessary; 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

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 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, 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, 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 10.

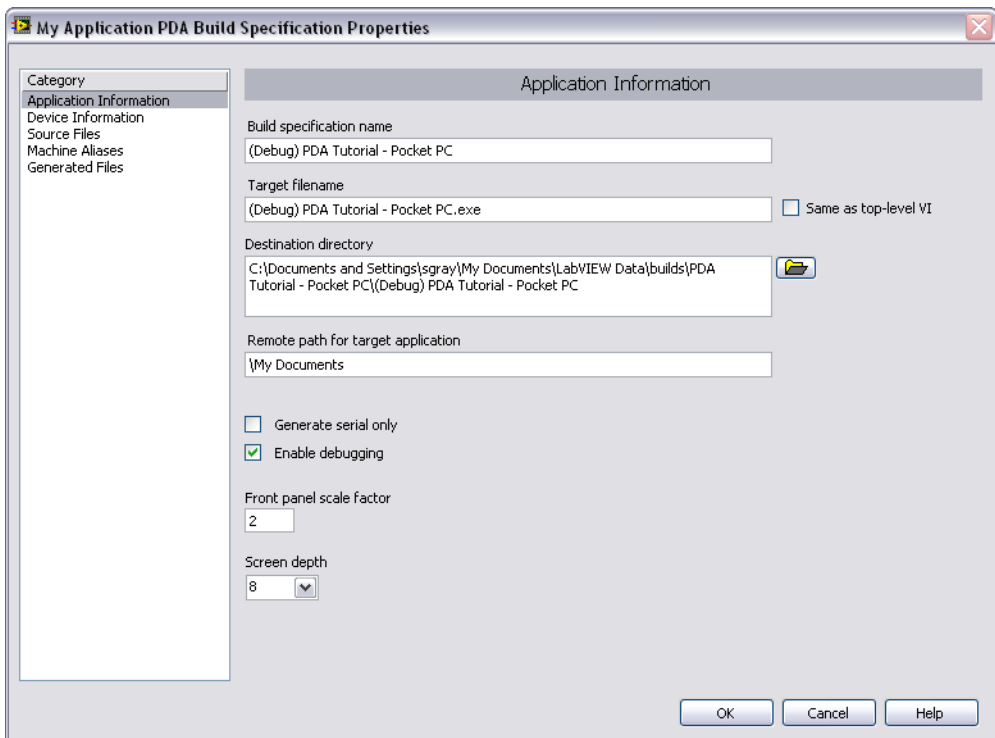


Figure 10. Creating the Debugging Build Specification



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 11.

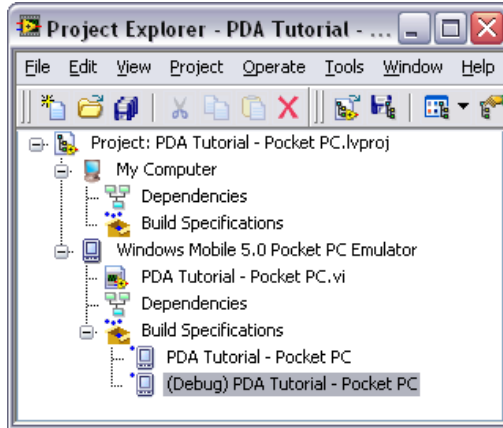


Figure 11. Two PDA Build Specifications in the Project Explorer Window

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. 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 12.

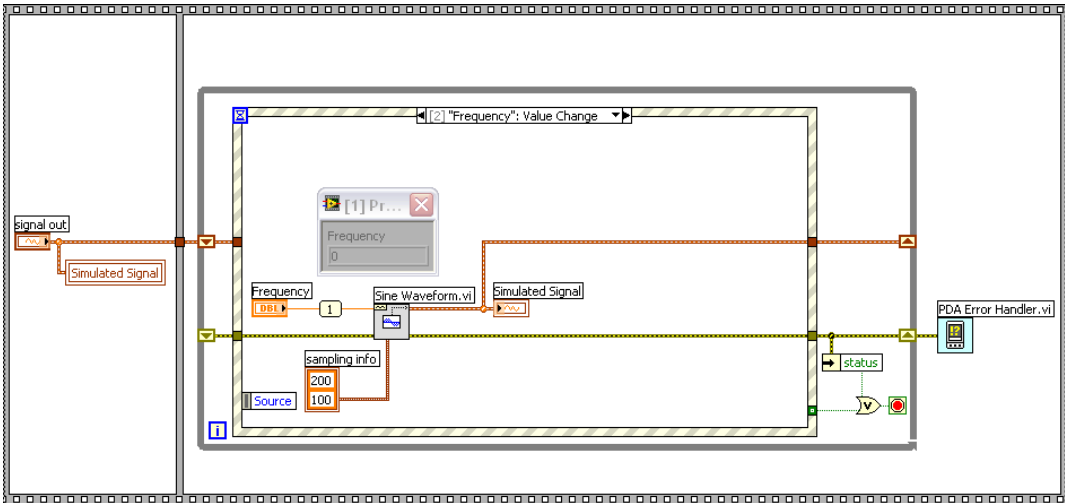


Figure 12. Adding a Probe to the Block Diagram

Deploying and Debugging a PDA Application

You must use the debug 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 11, 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 13.



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.

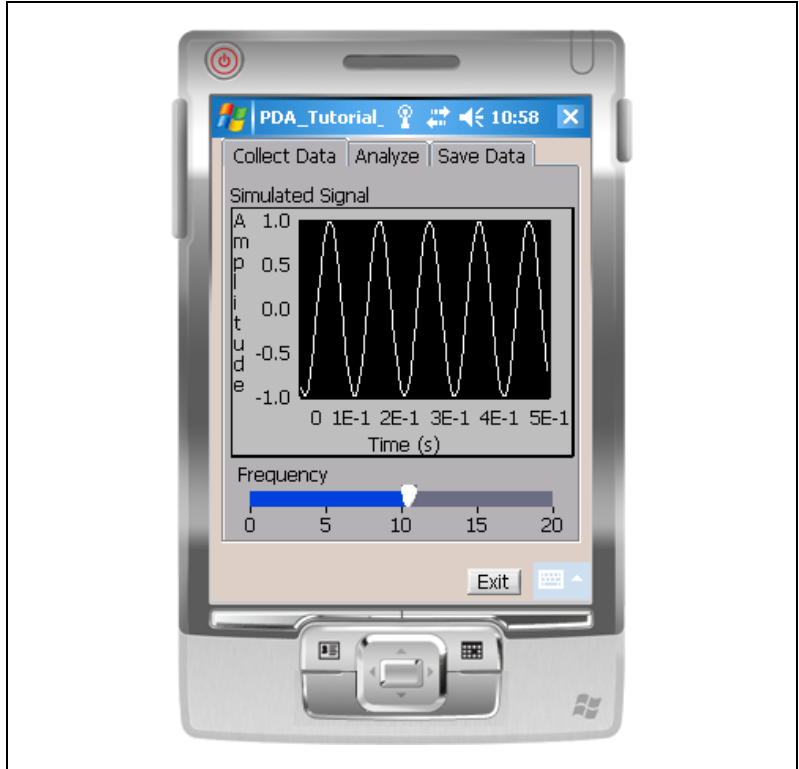


Figure 13. Running the PDA Application on the PDA Emulator

2. Move the **Frequency** slider in the PDA application running on the PDA target. 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.

3. 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 8.2»Readme** and opening `readme_PDA.html`, for last-minute information and 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**.



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.

- Documentation for the PDA 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.

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