Getting Started with the LabVIEW™ Mobile Module

The LabVIEW Mobile Module extends the LabVIEW graphical development environment to Mobile devices so you can create applications that run on Windows Mobile and Pocket PC. 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 installation instructions for additional tools you might need to use with the Mobile Module and a tutorial that shows you how to create a LabVIEW project and build, run, deploy, and debug a Mobile application. Refer to the *LabVIEW Mobile Module Readme*, available by opening `readme_Mobile.html` on the installation media, for system requirements and instructions about installing the Mobile Module.

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Installing Additional Tools

After installing the Mobile Module, you might need to 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 Mobile applications, you must install the latest version of shared variable support on the target.

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

1. Connect the device to the host computer using ActiveSync/FTP.
2. Navigate to and run `labview\PDA\Utilities\Variables\PocketPC\Setup.exe`.

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

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PNG Image Support

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

Complete the following steps to install or uninstall support for PNG images on a Mobile device using ActiveSync/FTP.

1. Connect the device to the host computer using ActiveSync/FTP.
2. Navigate to and run `labview\PDA\Utilities\LVPNG\PocketPC\Setup.exe`.

Tip You also can right-click the 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 target to use VISA in Mobile applications. If you did not install NI-VISA when you installed the Mobile Module, select **Start»All Programs»National Instruments»VISA»Windows Mobile Driver Installation**.

Tip You also can right-click the 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 Mobile device to run applications that use Bluetooth communication if you do not have the Microsoft Bluetooth driver.

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 device.

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

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

Note The Mobile 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.

LabVIEW SMS Client

You must install and run the LabVIEW SMS Client, which is located in `labview\PDA\Utilities\SMS\`*`device`*`\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 Mobile 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 target.

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

1. Perform a soft reset on the device. Refer to your device documentation for information about performing soft resets.
2. Connect the device to the host computer using ActiveSync.
3. Run `Setup.exe` on the host computer to install or uninstall the required DLLs.

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

NI-DAQmx Base

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

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

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

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

Windows Mobile Emulators

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

ARM Emulators

If you are using ARM-based emulators, you must install Virtual PC 2007.

(Windows Vista) If you want to use emulators on the host computer, you must download the Microsoft Device Emulator 2.0.

Download Virtual PC 2007 and the Microsoft Device Emulator 2.0 from the Microsoft Download Center at `www.microsoft.com/downloads`.

x86 Emulators

(Windows XP) On the host computer, the Mobile Module installs ARM targets, including emulators, for Windows Mobile and Pocket PC. 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 Mobile Project Wizard to create a LabVIEW project and build, run, and debug a Mobile application.

The VI in this tutorial simulates a sine wave with configurable offset and frequency values 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 Mobile VI into an application, and deploy the application to the target. You must use a project to build a Mobile VI into an application.

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

1. Launch LabVIEW. In the **Getting Started** window, select **Mobile Project** from the **Targets** pull-down menu. Click the **Go** button to launch the Mobile Project Wizard.
2. Define the project information as shown in Figure 1.
   a. Select **New Mobile 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 Mobile 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 `Mobile Tutorial.lvproj` in the **Project location** text box.
   c. Click the **Browse** button next to the **VI path** text box and navigate to `labview\examples\WindowsMobile\tutorial\Mobile Tutorial.vi` to select the VI to import. Click the **OK** button to add the VI to the project you are creating.

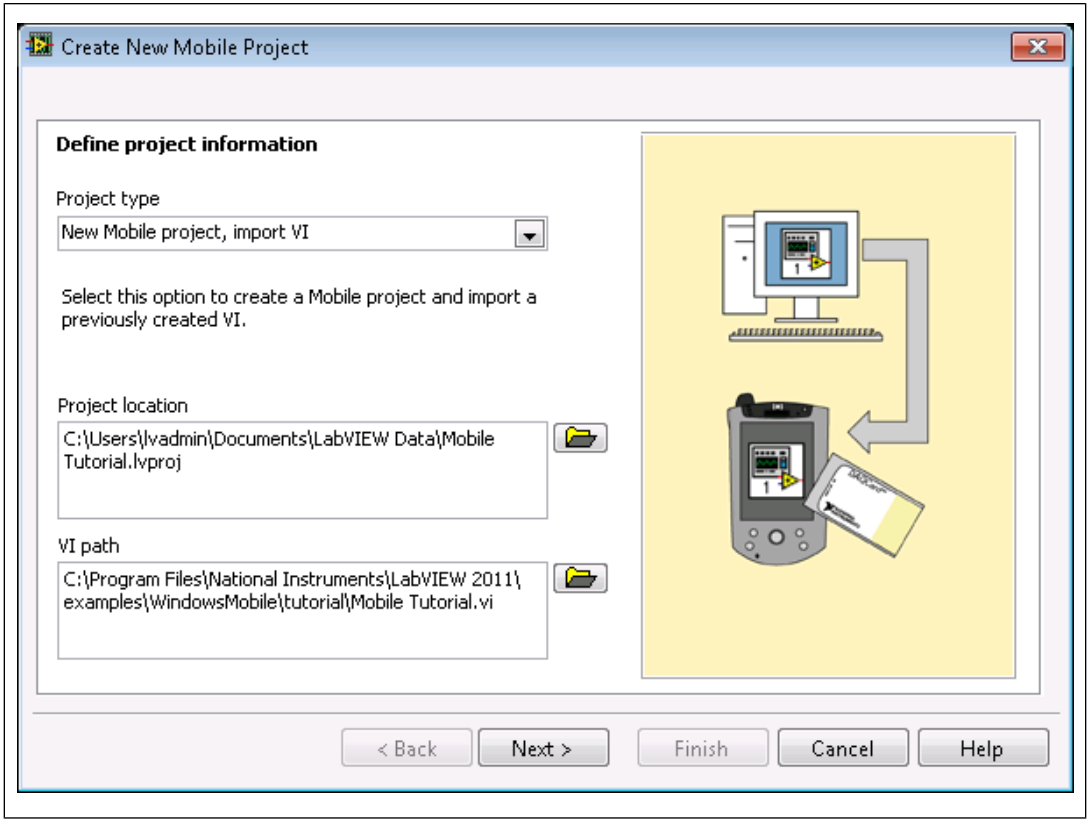

Figure 1. Defining the Project Information

3. Click the **Next** button.
4. Select **Windows Mobile 5.0 Pocket PC Emulator** from the **Device type** pull-down menu, as shown in Figure 2.

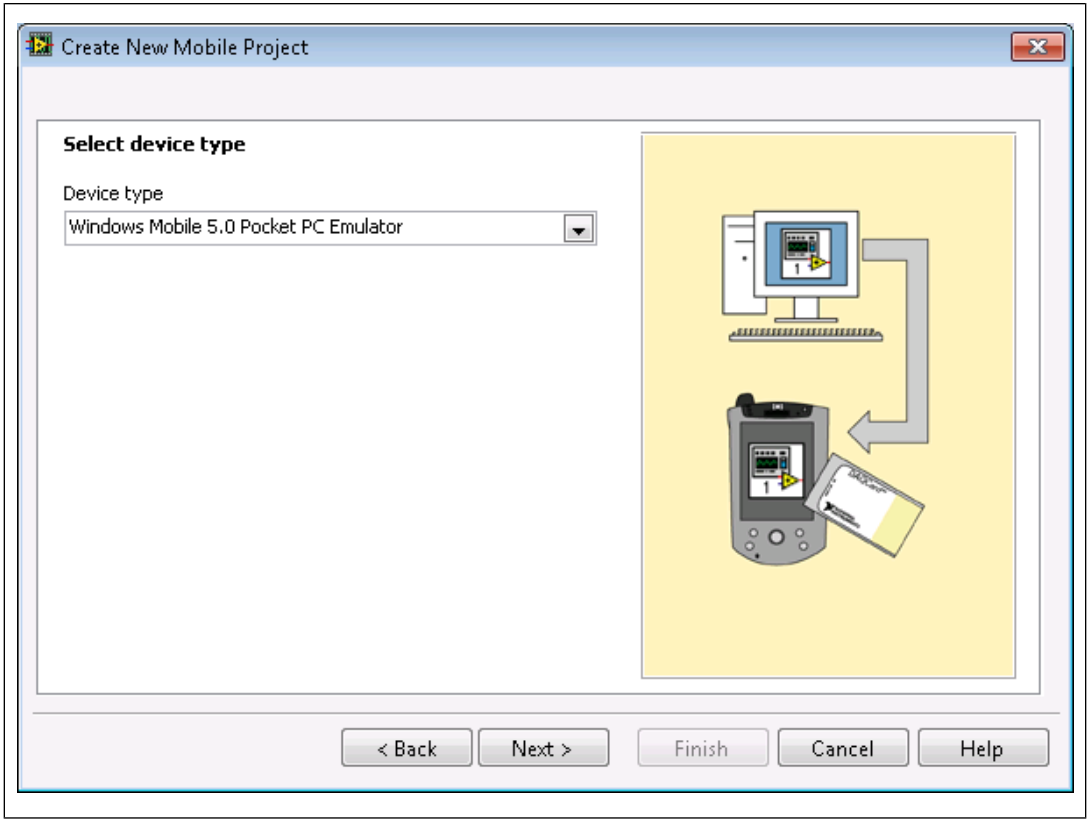

Figure 2. Selecting the Target

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

5. Click the **Next** button.
6. Click the **Finish** button. Because the **Create a build specification** checkbox contains a checkmark, as shown in Figure 3, the **Mobile Build Specification Properties** dialog box opens. Refer to the *Creating the Build Specification* section for more information about creating a build specification.

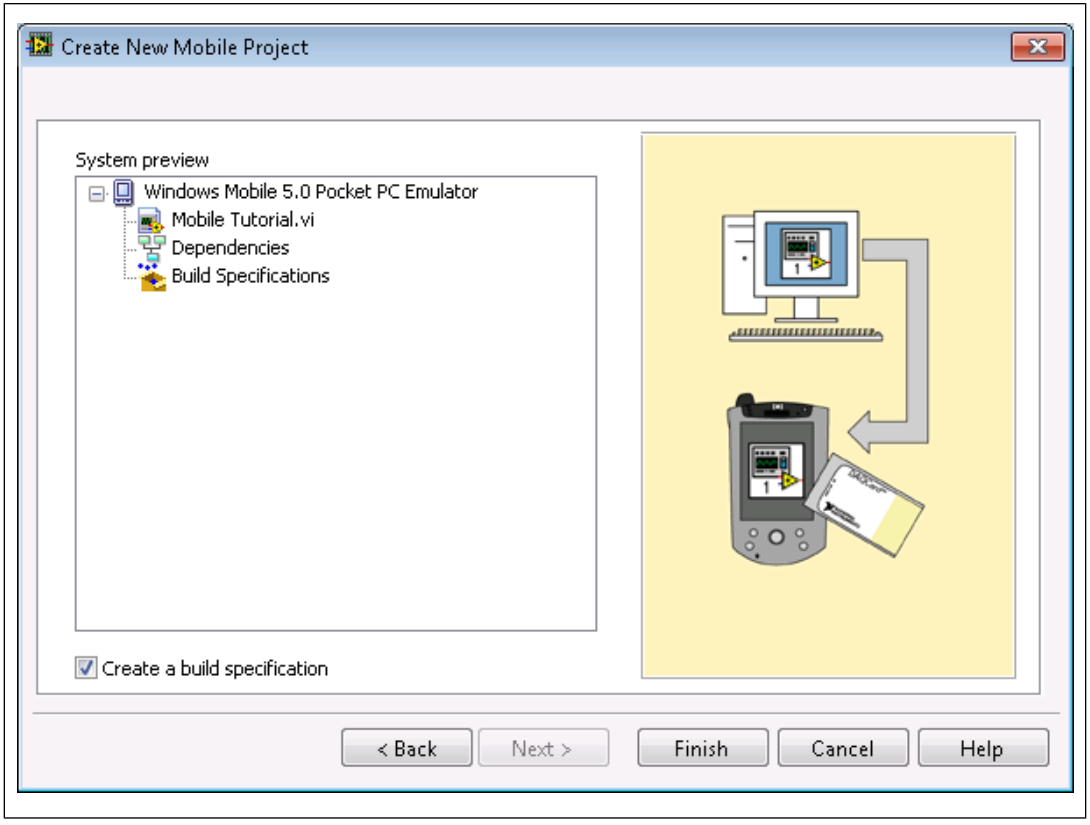

Figure 3. Previewing the Project

Creating the Build Specification

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

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

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

Complete the following steps to create a Mobile build specification.

1. Define the settings for the Mobile application, as shown in Figure 4.
   a. Enter `Mobile Tutorial` in the **Build specification name** text box. This is the name that appears under **Build Specifications** in the **Project Explorer** window.

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

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

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

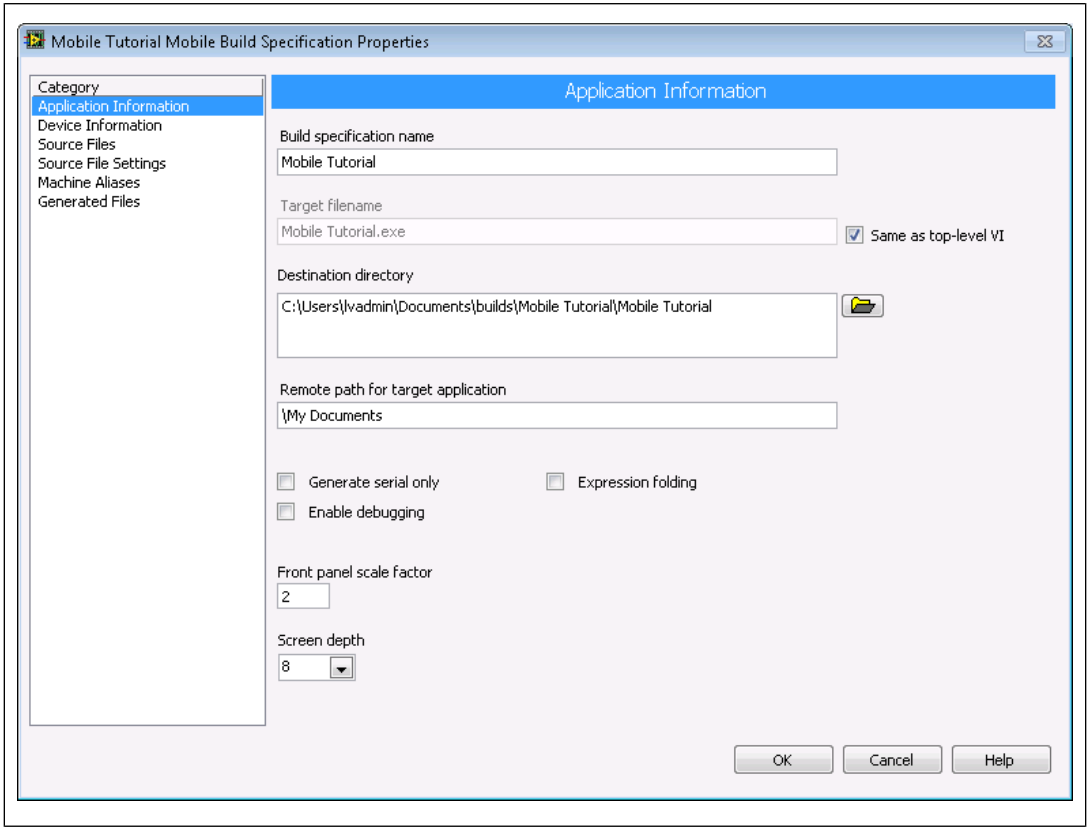

Figure 4. Defining the Application Information

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

2. (Optional) Click the **Help** button to open the *LabVIEW Help* and read a description of each build setting.
3. Select the **Device Information** category to view which target and processor this build specification applies to.
4. Select the **Source Files** category to select the source files to include when you build the VI into an application. When you use the Mobile Project Wizard to create a build specification, LabVIEW automatically uses the VI you import as the top-level VI. When you create build specifications outside of the wizard, you must manually select the top-level VI and click the blue arrow button

to move the VI to the **Top-level VI** text box, as shown in Figure 5. Mobile applications can have only one top-level VI.

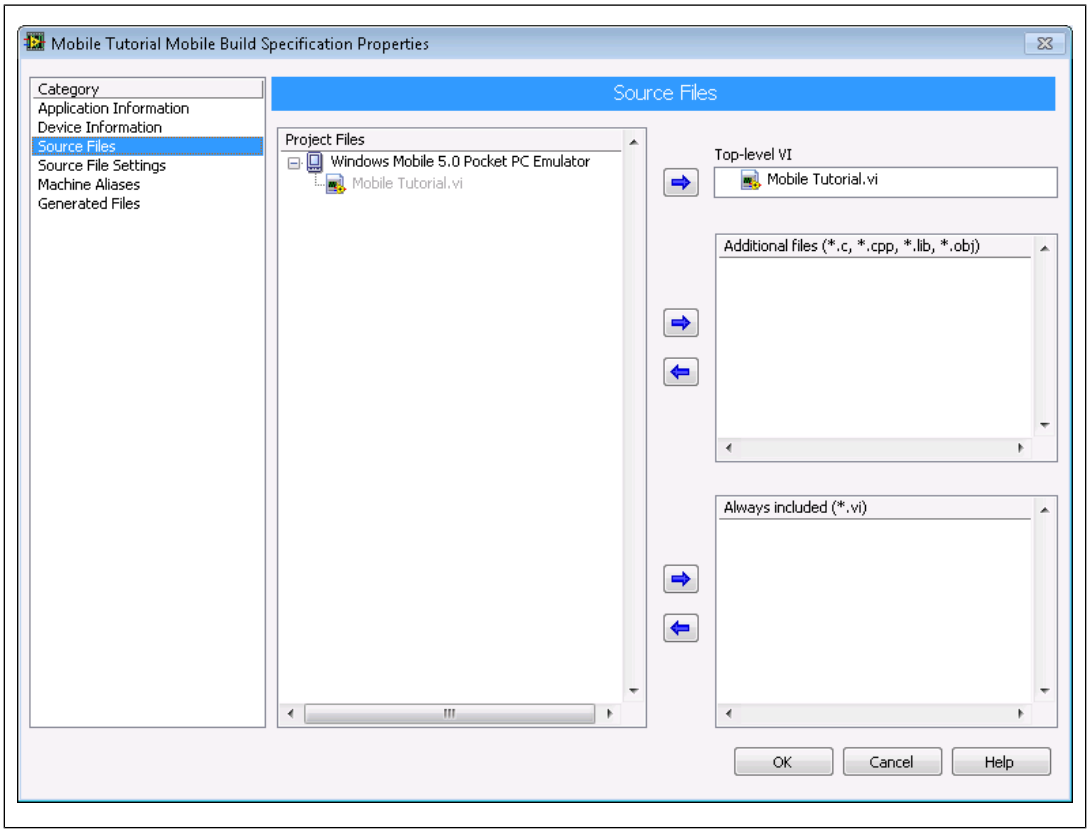

Figure 5. Selecting the Source Files

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

5. Select the **Generated Files** category to view the filenames and paths to the files the Mobile Module generates when you build the VI into an application.
6. Click the **OK** button. The build specification you just created appears in the **Project Explorer** window under the Mobile target, as shown in Figure 6.

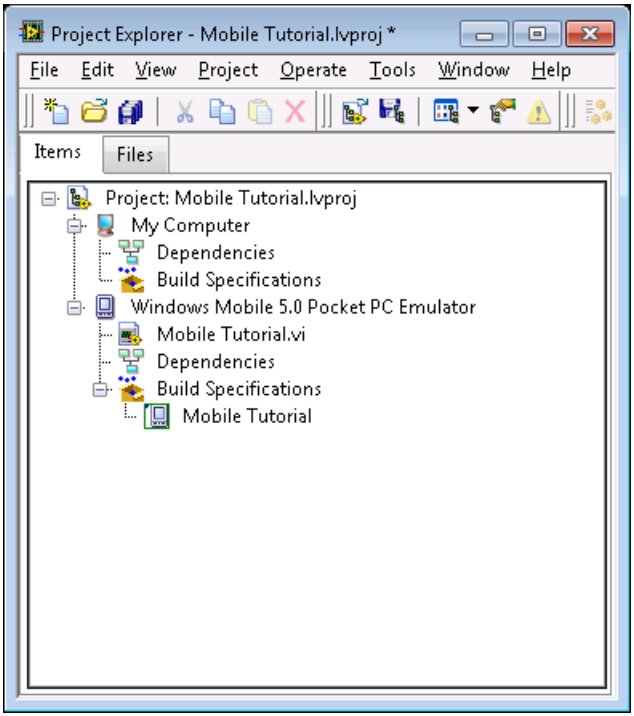

Figure 6. Project Explorer Window

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

Building the VI into an Application and Deploying

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

Click the **Run** button in the application on the target to start simulating the sine wave.

Note ARM emulators for Windows Mobile require a few minutes to load the OS before you see the application running on the emulator target.

Using the Shortcut Menu

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

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

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

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

Using the Run Button

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

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

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

Closing the Application

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

Debugging the Application

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

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

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

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

Creating a Debugging Build Specification

Complete the following steps to create a debugging build specification.

1. Right-click **Build Specifications** under the Mobile target and select **New»Mobile Application (EXE)** from the shortcut menu to open the **Mobile Build Specification Properties** dialog box.
2. Enter `(Debug) Mobile Tutorial` in the **Build specification name** text box.
3. Remove the checkmark from the **Same as top-level VI** checkbox so you can change the application name.
4. Enter `(Debug) Mobile Tutorial.exe` in the **Target filename** text box.
5. Place a checkmark in the **Enable debugging** checkbox to generate debugging information when you build the VI into an application, as shown in Figure 7.

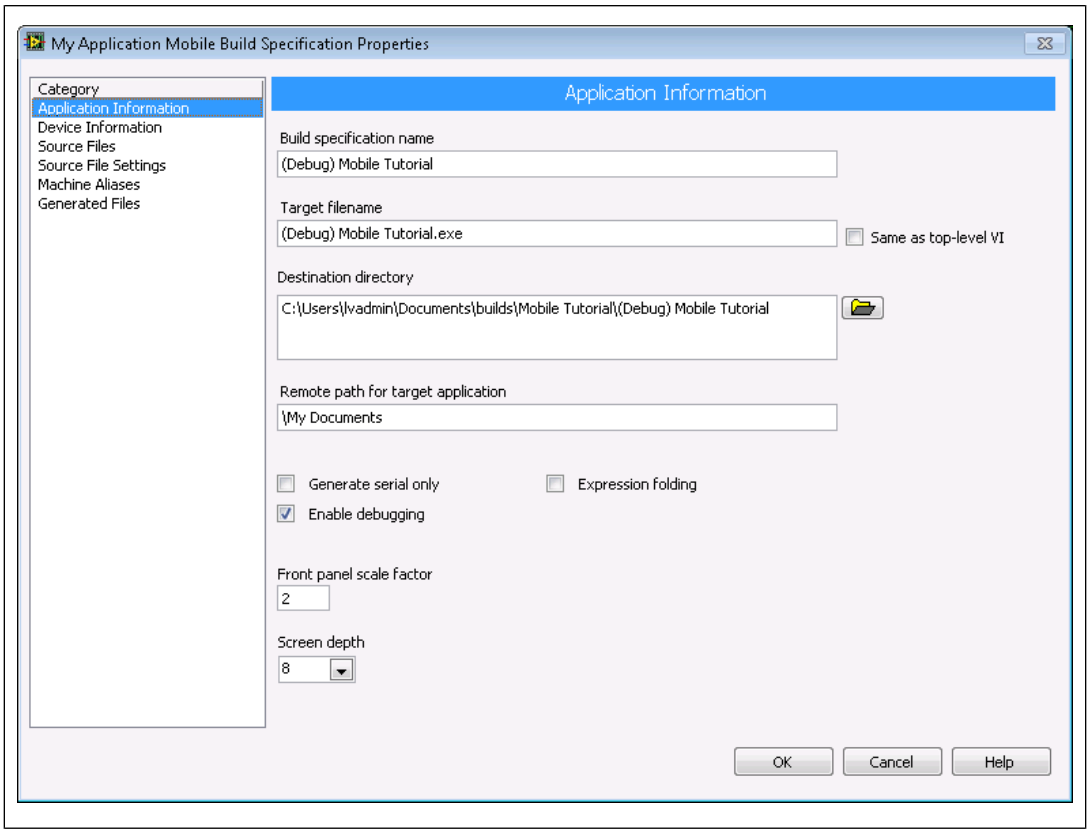

Figure 7. Creating the Debugging Build Specification

6. Select **Source Files** from the **Category** list and select **Mobile Tutorial.vi** in the **Project Files** list. Click the blue right arrow button to move the VI from the **Project Files** list to the **Top-level VI** text box.
7. Click the **OK** button. The build specification you just created appears in the **Project Explorer** window, as shown in Figure 8.

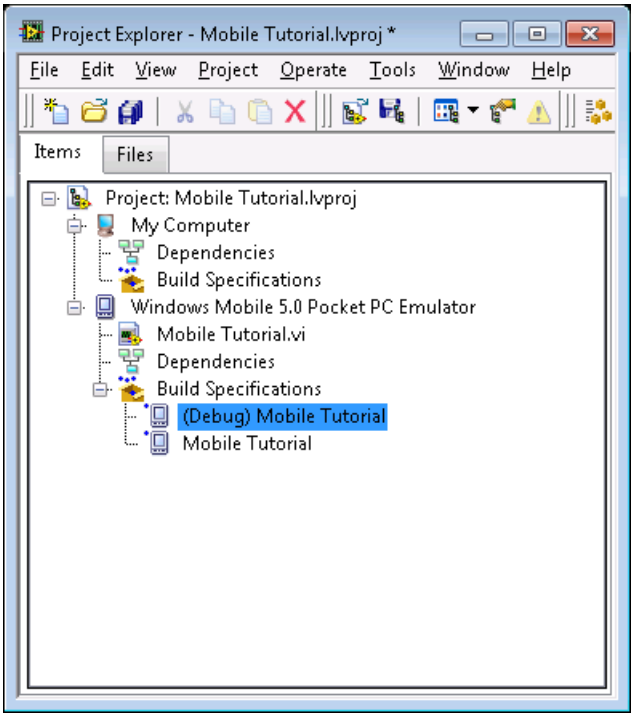

Figure 8. Two Build Specifications in the Project Explorer Window

Adding a Probe to the VI

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

Complete the following steps to add a probe to the Mobile Tutorial VI.

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

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

2. Right-click the wire connecting the **Frequency** control to the For Loop and select **Probe** from the shortcut menu.

   A floating **Probe Watch Window** appears when you create a probe. LabVIEW numbers the probes automatically and displays the same number in a glyph on the wire you probe, as shown in Figure 9.

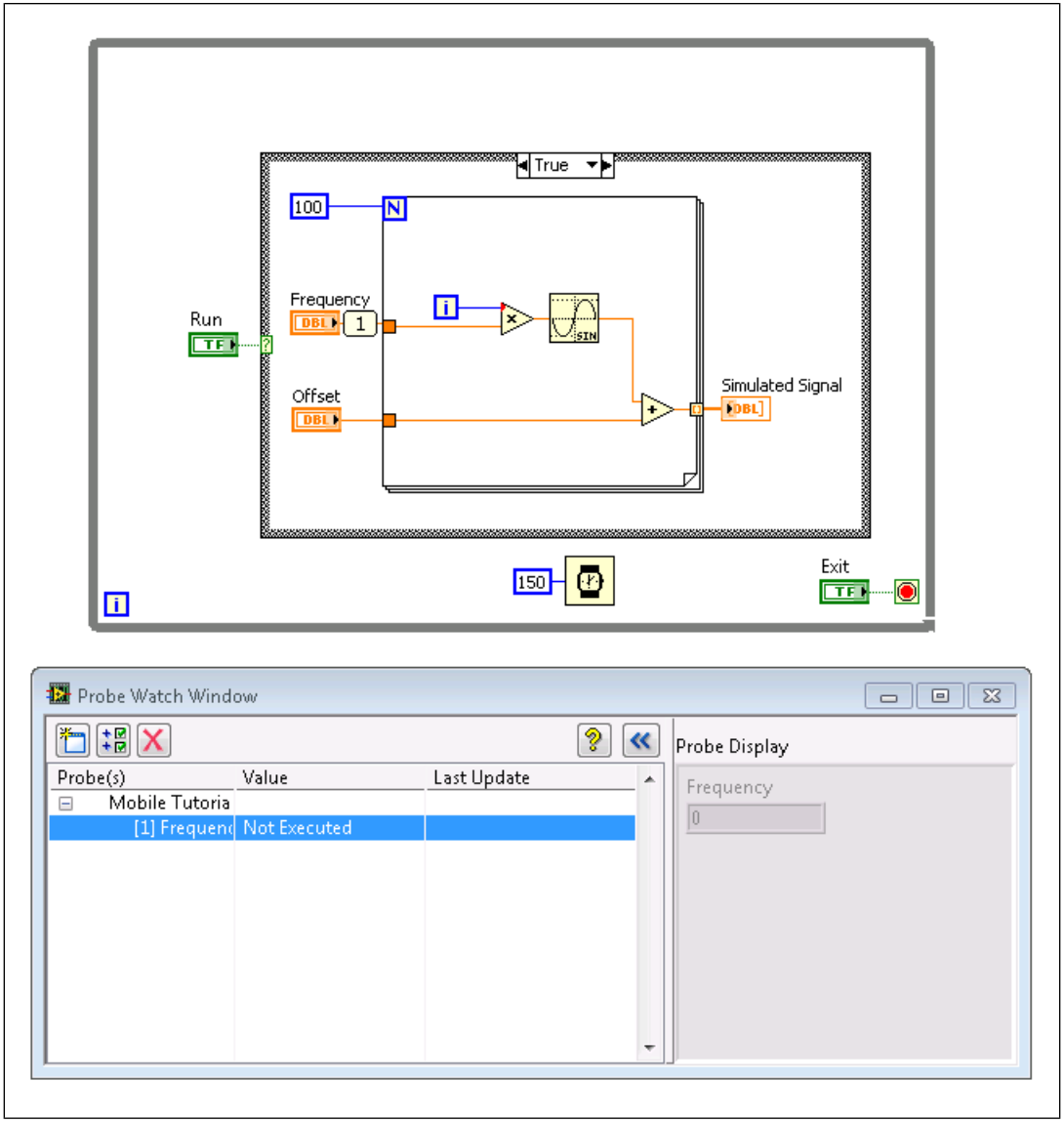

Figure 9. Adding a Probe to the Block Diagram

Deploying and Debugging a Mobile Application

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

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

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

LabVIEW builds the VI into an application, deploys the application to the target, and runs the application on the target as shown in Figure 10. A new instance of the emulator opens each time you build and deploy an application.

Figure 10. Running the Application on the Emulator

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

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

4. Click the **Exit** button in the application on the target to stop the application and end the debugging session.

Related Documentation

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

- *LabVIEW Help*—Refer to the *LabVIEW Help*, available by selecting **Help»LabVIEW Help** in LabVIEW, for information about LabVIEW programming concepts, step-by-step instructions for

using LabVIEW, and reference information about LabVIEW VIs, functions, palettes, menus, and tools. Refer to the **Mobile Module** book on the **Contents** tab of the *LabVIEW Help* for information specific to the Mobile Module and Mobile applications. The *LabVIEW Help* uses `(Mobile)` in the index to indicate Mobile-specific topics.

- *LabVIEW Mobile Module Readme*—Refer to the *LabVIEW Mobile Module Readme*, available by selecting **Start»All Programs»National Instruments»LabVIEW»Readme** and opening `readme_Mobile.html`, for last-minute information and known issues.
- Mobile Module Examples—Use the Mobile Module examples to learn how to use certain VIs and functions as well as a starting point for developing your own Mobile VIs and applications. You can modify an example to fit an application, or you can copy and paste from one or more examples into a VI that you create. Browse or search the example VIs with the NI Example Finder by selecting **Help»Find Examples**.
- *NI-DAQmx Base 3.x Getting Started Guide*
- *NI-DAQmx Base Readme*
- Documentation for your device.
- LabVIEW PDFs—In addition to this document, the *Getting Started with LabVIEW* manual, *LabVIEW Quick Reference Card*, *LabVIEW Release Notes*, and *LabVIEW Upgrade Notes* are available as PDFs by selecting **Start»All Programs»National Instruments»LabVIEW»LabVIEW Manuals**.

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

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