QuickStart Instructions

phyCORE®- LPC3250
Rapid Development Kit
Windows Embedded CE

Using Microsoft Visual Studio 2005
Software Development Tool Chain

Note: The phyCORE-LPC3250-Rapid Development Kit CD includes the electronic version of the English phyCORE®-LPC3250 Hardware Manual

Edition: December 2008

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5 min

3-4 h

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1   Introduction

This QuickStart provides general information on the PHYTEC phyCORE®-LPC3250 System on Module (SOM). It gives you also an overview of Microsoft's Visual Studio 2005 software development tool chain and instructions on how to run example programs on the phyCORE®-LPC3250, mounted on the PHYTEC phyCORE®-LPC3250 Carrier Board, in conjunction with Visual Studio 2005.

5 min

Please refer to the phyCORE®-LPC3250 Hardware Manual for specific information on such board-level features as jumper configuration, memory mapping and pin layout.

1.1   Rapid Development Kit Documentation

This Rapid Development Kit (RDK) includes the following electronic documentation on the enclosed phyCORE-LPC3250 Rapid Development Kit CD:

- the PHYTEC phyCORE®-LPC3250 Hardware Manual
- controller User's Manuals and Data Sheets
- this QuickStart Instruction with general Rapid Development Kit description, software installation advice and an example program, enabling quick out-of-the box start-up of the phyCORE®-LPC3250 in conjunction with the Microsoft Visual Studio 2005 software development tool chain

1.2   Professional Support Packages Available

PHYTEC backs up our Rapid Development Kits with a Start-Up Guarantee. We invite you to make use of our free Technical Support concerning installation and setup of QuickStart demos until any kit start-up problem you might encounter is resolved. For more in-depth questions, we offer technical support packages for purchase. Please contact our sales team at sales@phytec.com to discuss the appropriate support option if professional support beyond installation and setup is required.

1.3 Overview of this QuickStart Instruction

This QuickStart Instruction gives a general Rapid Development Kit description, as well as software installation advice and one example program enabling quick out-of-the box startup of the phyCORE®-LPC3250 in conjunction with Microsoft's Visual Studio 2005. It is structured as follows:

Section 1: The **Introduction** section provides an overview to this QuickStart Instruction, system requirements, kit contents, and kit CD installation instructions.

Section 2: In the **Getting Started** section you will install Rapid Development Kit software from Adeneo and prepare the phyCORE®-LPC3250, mounted on the Carrier Board, to interface to a host-PC. You will also learn how to download an example application from a host-PC using Active Sync and Visual Studio 2005.

Section 3: The **Getting More Involved** section provides step-by-step instructions on how to configure and build a new WinCE image, modify the example, create and build a new project and generate and download output files to the phyCORE®-LPC3250 using the Microsoft tools.

Section 4: The **Debugging** section demonstrates simple debug functions using Visual Studio 2005 debug environment.

Section 5: In the **Building an OS image** section you will learn how to add your own application to a WinCE project, create a new image and download this image on the LPC3250.

1.4 Conventions used in this QuickStart

The following is a list of the typographical conventions used in this book:

Bold	Commands or other text that should typed literally by the user
Bold Italic	File and directory names
Italic	Field and window names or titles, menu items, and other terms that correspond to items on the PC desktop
<u>Underline Blue</u>	Hyperlinks to documents, webpage URLs, or FTPs
Bold Red	Command line entries
`Fixed Width`	Source code listings and examples

Pay special attention to notes set apart from the text with the following icons:

At this point you might leave the sequential path of this QuickStart.

This warning will help you avoid problems.

Useful supplementary information about the topic.

Estimated completion time for the following section.

Completion of an important part of this QuickStart.

Helpful information for troubleshooting.

1.5   System Requirements

The following PHYTEC hardware components are included in the phyCORE-LPC3250 Windows Embedded CE Rapid Development Kit (part number KPCM-040-WinCE) and are necessary for completing the instructions in this QuickStart instruction:

- the PHYTEC phyCORE®-LPC3250 (PCM-040)
- the phyCORE®-LPC3250 Carrier Board (PCM-967)
- Bare PCB Expansion Board (PCM-988)[1]
- AC adapter supplying 5 VDC /3.2A adapter, center positive
- Straight Ethernet cable
- Serial cable (RS-232)
- USB Standard A to mini-B cable
- SOM extraction tool
- Hard copy schematics
- SD Card with eboot bootloader and Windows Embedded CE image
- PHYTEC Kit CD
- Windows Embedded CE 6.0 180-Day Evaluation Kit

1.6   Install the PHYTEC Kit CD

The PHYTEC Kit CD will auto install kit documentation, datasheets, and demo files for the phyCORE-LPC3250. When you insert the PHYTEC Kit CD into the CD-ROM drive of your host-PC, the CD should automatically launch a setup program. Otherwise the setup program (setup.exe) can be manually executed from the root folder of the CD.

All path and file statements within this QuickStart Instruction are based on the assumption that you keep *C:\PHYTEC* as the default path when installing the Kit CD to your hard drive.

1. Insert the PHYTEC Kit CD.
2. On the *Welcome to the phyCORE-LPC3250 Rapid Development Kit Setup Wizard* window, select **Next** to continue.

[1] The Bare PCB Expansion Board is not demonstrated in this QuickStart instruction.

3. Keep *C:\PHYTEC* as the installation path and select **Next** to continue.

4. On the *Ready to Install* window, select **Install**.

5. After the installation process is complete, select **Finish**.

The PHYTEC Kit CD installation path is *C:\PHYTEC\phyCORE-LPC3250* and the following five subfolders are located within the **phyCORE-LPC3250** directory:

Demos – This folder contains third party demos.

Documentation – This folder contains datasheets, hardware manual, QuickStarts, and other product related documentation.

Linux – This folder contains the Linux BSP and tools.

Stage1 Loader – This folder contains the Stage1 Bootloader for the LPC3250.

WinCE – This folder contains a binary Eboot Bootloader, Windows Embedded CE images, demo application for Visual Studio, and SDK.

1.7 Microsoft Visual Studio 2005 Development Tool Chain

Microsoft's Software development tools for the LPC3250 architecture aid every level of developer from the professional applications engineer to the student just learning about embedded software development.

Visual Studio 2005 is a new version of Microsoft's popular IDE that supports also embedded devices. The Platform Builder is now integrated in Visual Studio 2005. So it is now possible to customize the WinCE Image and write user applications with just one tool. Visual Studio 2005 combines project management, source code editing, program debugging, and target programming in a single, powerful environment. This QuickStart provides an overview of the most commonly used VS 2005 features including:

- Project management, device setup, and tool configuration
- Editor facilities for creating, modifying, and correcting programs
- Target debugging
- Building a new image

The VS 2005 editor offers many standard and advanced software editing features like:

- **Automatic completion** of code statements

- **Auto listing** of object members

- Detailed **Syntax Highlighting.** Colours are used in printed output.

- **Automatic indent** and **tab blocks** of code

The Visual Studio 2005 Tool chain is available from your local Microsoft dealer. There is also an evaluation version available which is used in this QuickStart. You can use it to develop standard WinCE applications, MFC WinCE applications and .NET Applications for WinCE.

If you already have installed another version of Visual Studio 2005, you can use this one. We recommend installing the evaluation version when working with this QuickStart.

2   Getting Started

In this chapter you will install all of the software tools necessary to begin development with Windows Embedded CE. You will also interface the phyCORE®-LPC3250, mounted on the Development Board, to a host-PC and download an example application from a host-PC using Active Sync and Visual Studio 2005.

3-4 h

2.1   Installation Sequence

It is important to install the software tools in the following sequence:

1. Visual Studio 2005

2. Windows Embedded CE 6.0 Platform Builder

3. Visual Studio 2005 Team Suite Service Pack 1

4. Windows Embedded CE 6.0 Platform Builder Service Pack 1

5. Windows Embedded CE 6.0 R2

6. Windows Embedded CE 6.0 QFE's

7. ActiveSync 4.5

8. phyCORE-LPC3250 SDK

2.2   Installing Visual Studio 2005

To install Visual Studio 2005 on your desktop PC insert the DVD labeled **Visual Studio 2005 Professional Edition** included in this kit in your DVD Rom drive. The setup should launch automatically. If not, open a Windows Explorer window, go to your DVD drive, change to the directory VS and start *setup.exe* manually.

The following screen appears:

- Click on **Install Visual Studio 2005** and follow the instructions of the setup program.

You will require activation keys for both Visual Studio and Platform Builder. You can request these keys from Microsoft. Please read the inside of the Windows Embedded CE6.0 R2 DVD package for information.

2.3 Installing Windows Embedded CE 6.0 Platform Builder

- To install the Platform Builder Plug-in for Visual Studio 2005, please insert the DVD labeled **Windows Embedded CE6.0** in your DVD drive. The setup should start automatically. If not, open windows file explorer, go to your DVD drive and start "setup.exe" manually.

- When the following dialog appears, be sure to select **Platform Builder** and under *CE 6.0 Operating System* the files for **ARMV4I**.
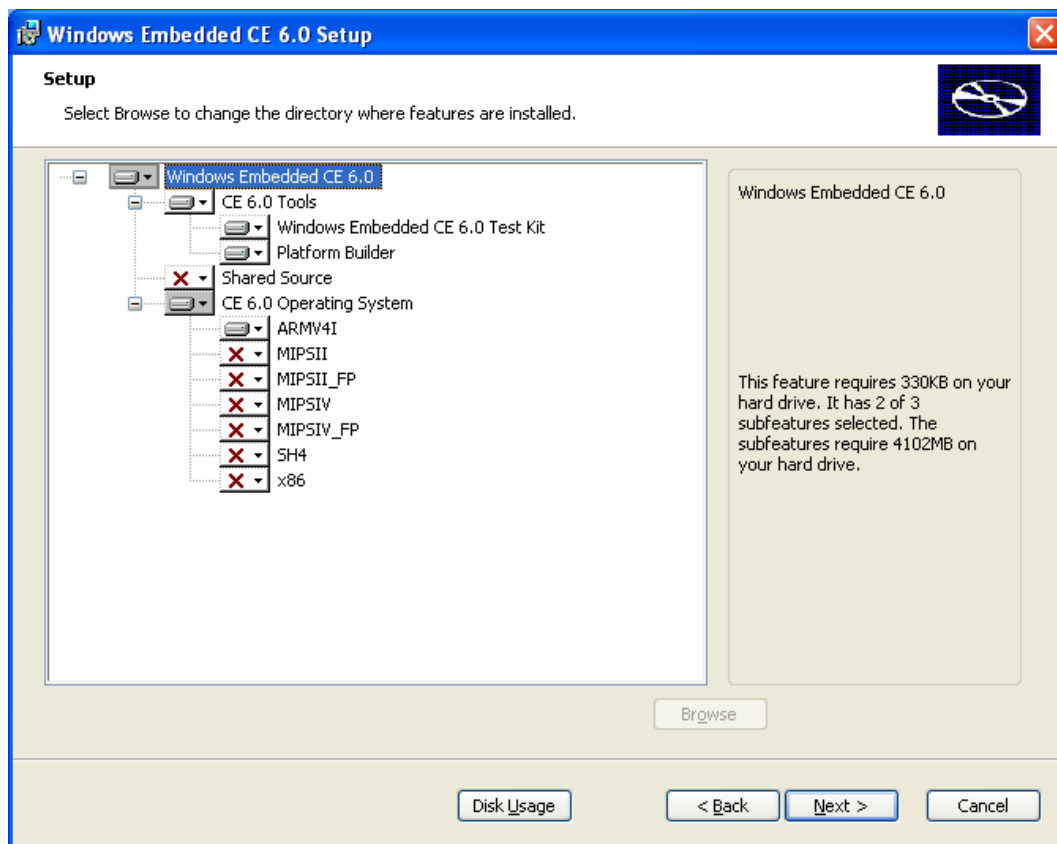
2.4   Installing Service Packs and Windows Embedded CE6.0 Platform Builder R2

These updates are required for this QuickStart.

- Insert the DVD labeled **Windows Embedded CE6.0 R2** in your DVD drive. The *install.htm* should start automatically. If not, open a Windows file explorer, go to your DVD drive and start *install.htm*.

1. Install Microsoft Visual Studio 2005 Team Suite Service Pack 1.
2. Install Windows Embedded CE 6.0 Platform Builder Service Pack 1.
3. Install Windows Embedded CE 6.0 R2.

2.5   Install Windows Embedded CE 6.0 QFE's

- Go to:

  http://msdn.microsoft.com/en-us/embedded/aa731256.aspx

- Download and install the **Armv4I** versions of the updates in order from oldest to newest, starting with the cumulative 2007 update package.

2.6   Installing Microsoft Active Sync 4.5

To be able to upload the software you are developing to your LPC3250 device you need Microsoft Active Sync 4.5. When your PC is connected to your LPC3250 device via a USB cable this software allows you to create a direct connection to your device.

- From the DVD labeled **Windows Embedded CE6.0 R2** browse to *:\ACTIVESYNC4.5\WWE* and execute *setup.exe*.

2.7   Installing phyCORE-LPC3250 SDK

The LPC3250 SDK for WinCE is needed for writing target-oriented applications. It will integrate in the Visual Studio IDE, offering a new target device for code generation. The SDK includes all functionality that is included in the demo image that runs on the LPC3250. Therefore using the SDK allows the compiler to check that all functionality needed in the application will be present in the image. The absence of specific features is therefore recognized at "compile-time" not at "runtime".

- To install the LPC3250 SDK open a file manager and navigate to:

  C:\PHYTEC\phyCORE-LPC3250\WinCE\SDK.

- Open *LPC3250_SDK.msi* and install the SDK. Accept the default installation path:

  C:\Program Files\Windows CE Tools\wce600\LPC3250-SDK

You have successfully installed the software for the phyCORE-LPC3250 WinCE Kit. You can find the programs you will need to develop own applications for the target on your host system. All necessary configurations were done by the setup program.

2.8 Boot Windows Embedded CE OS on the phyCORE®-LPC3250

A Windows Embedded CE image was pre-installed to the phyCORE-LPC3250 on-board Flash memory.

The Windows Embedded CE image pre-installed on the phyCORE-LPC3250 does not support USB-Host. For USB-Host support, follow the instructions in Appendix B to download the NK_HOST.bin image found on the SD card included in your kit.

- Connect the 5 V AC/DC adapter with the power supply connector (X10) on your board.

Only use the included power supply with 5 VDC output, center positive.

If Windows CE does not start within 1 minute, you may have a kit without the OS image preinstalled. See appendix A and B for instructions for loading the bootloader and OS image, or contact support@phytec.com

When Windows CE has loaded it will first run an LCD touch calibration screen. After calibration a Windows Embedded CE 6.0 desktop will appear on the LCD screen.

2.9   Establishing an Active Sync Connection

The LPC3250 device should already be running Windows CE 6.0 OS as described in chapter 2.7.

ActiveSync should already be running after the installation in chapter 2.5.

- Connect the USB A/mini-B cable with the USB OTG connector (X17) on the target to a free USB port on your host.

Ensure to use the USB A/mini-B cable included in this kit.

Establishing the connection might take a few seconds. Once the connection has been established Active Sync will show a screen with status information.
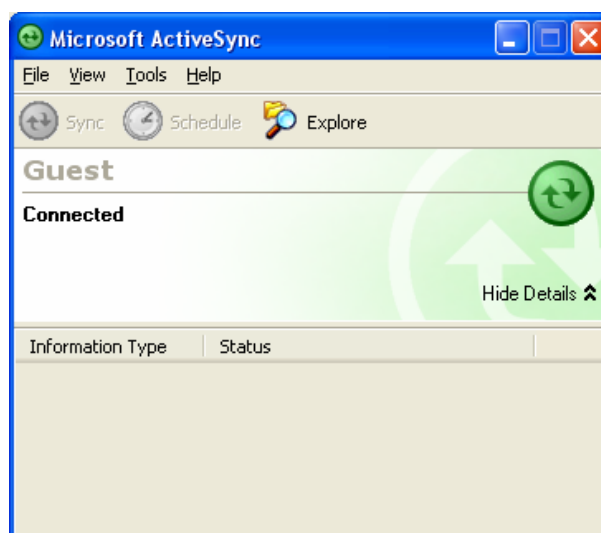
Your PC is now connected to the LPC3250 Rapid Development Kit.

- If the *Set Up a Partnership* window pops up, select **No** and then **Next**.

If you are not able to establish an ActiveSync connection, the phyCORE may have the "USB Host" version of the NK.bin WinCE image, which does not support ActiveSync. Refer to Appendix B for instructions to install the ActiveSync version of NK.bin

2.10   Downloading Application Code with Active Sync

To download the demo application provided on the PHYTEC Kit CD, you need to have Active Sync running on your PC to be able to establish a connection to your LPC3250 device as described in the chapter 2.9.

- Click on *Tools* in the menu bar of Active Sync and select *Explore Device*. An Explorer window called *Mobile Device* will open that will show you the folder structure of the Windows CE installation on your LPC3250 device.
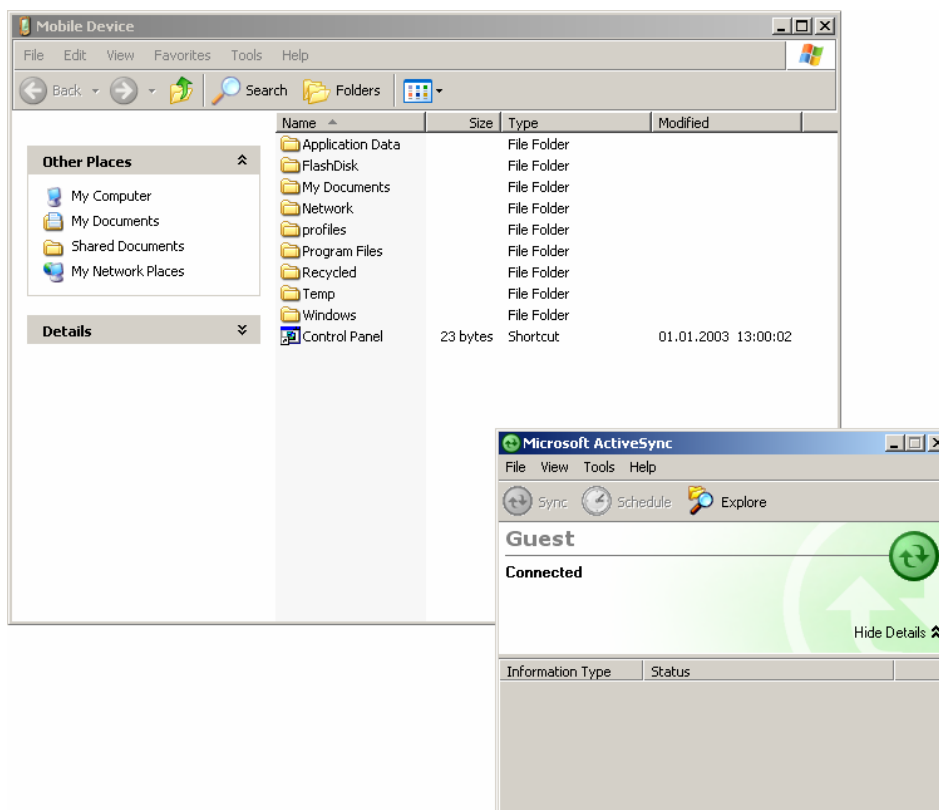
- Open a file manager and navigate to:
  C:\PHYTEC\phyCORE-LPC3250\WinCE\Demo Application\HelloWorld\ LPC3250-SDK (ARMV4I)\Debug
- Select *HelloWorld.exe* and copy it to the *Mobile Device* window in the folder *Program Files* using drag and drop.

The program has now been copied to your LPC3250 device. You will be able to access it by double-clicking the **My Device** icon on your LPC3250 device. This opens a window that will show you the file structure of your device. You should be able to find *HelloWorld.exe* at the location where it was copied. Double-click *HelloWorld.exe* to execute the program. A window will open on your LPC3250 device that will print a "Hello World" message.

2.11   Downloading Application Code with Visual Studio 2005

PHYTEC provides you with example code to learn about downloading code onto your LPC3250 device. This code has already been copied to your local hard drive by the setup in section 1.6.

- Start the tool chain by selecting *Microsoft Visual Studio 2005* from the programs group: *Start\Programs\Microsoft Visual Studio 2005*.

After starting Visual Studio 2005 the window shown below will appear. Here you can create projects, edit files, configure tools, assemble, link and start the debugger.

The HelloWorld example downloads a program to your device that, when executed, prints the text "Hello World" on the display of your phyCORE® Development Board LPC3250.

- To open the HelloWorld project select *File/Open/Project/Solution* from the Visual Studio 2005 menu bar.

- Browse to the folder *C:\PHYTEC\phyCORE-LPC3250\WinCE\Dem_ Application\HelloWorld*

- Select the HelloWorld project *HelloWorld.vcproj*.

- Click **Open**.

- In the *Solution Platform* pull-down menu make sure that the **LPC3250-SDK (ARMV4I)** configuration is selected. Also make sure that **LPC3250-SDK ARMV4I Device** is selected in the *Target device* menu.
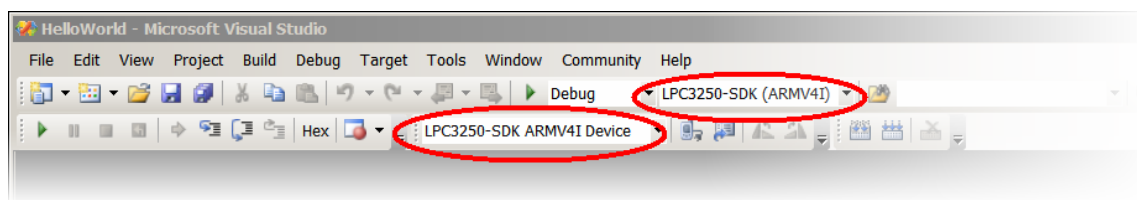
If these menus are not shown in your Visual Studio IDE, move your mouse to an empty space on the toolbar, press the right mouse button and select from the pop up menu the menus *Target* and *Device.*

- Build the target by either selecting the *Build* icon on the build toolbar or in the main menu bar select *Build / Build HelloWorld.*

- If any source file of the project contains any errors, they will be shown in the *Output Window - Build* tab. Use the editor to correct the error(s) in the source code, save the file and repeat the build.

- If there are no errors, the code can be downloaded to your LPC3250 device. For this to work you need to have established an Active Sync connection between your PC and your LPC3250 device as described in section 2.9. When the connection is established select *Build/Deploy HelloWorld* from the main menu bar.

- The individual steps of the download procedure can be viewed in the *Output Window - Build* tab.

- Wait until the download is complete.

- The newly created application was now deployed on your LPC3250 device. To start it select *My Device* on the target platform and go to the folder *Program Files/Helloworld* and double tap on *Helloworld*

- A window will open on your LPC3250 device that will print a "Hello World" message.

- Click on the **Close** icon in the window to close the application.

You have successfully passed the Getting Started part of this QuickStart. In this chapter you learned how to open a project, build an executable and transfer and run this executable on the target hardware.

3 Getting More Involved

In this chapter you will learn how to configure the Visual Studio 2005 IDE (Integrated Development Environment), modify the source code from our example, create a new project and build and download a machine-readable output file to the target hardware.

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3.1 Creating a New Project

- To create a new project file select *File / New / Project* from the Visual Studio 2005 menu. This opens a dialog that will ask about the kind of project you wish to create.

- Open the *Visual C++* tree and select *Smart Device*.

- In the *Templates* window select *Win32 Smart Device Project*.

- In the N*ame* field, enter the name of the project you wish to create, e.g. *myHelloWorld*.
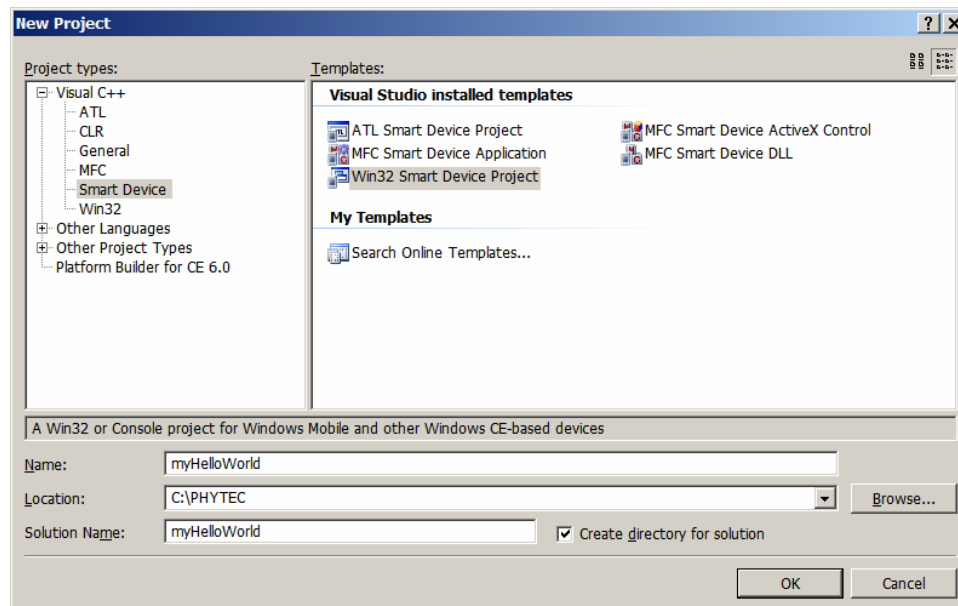
- Click *OK*.
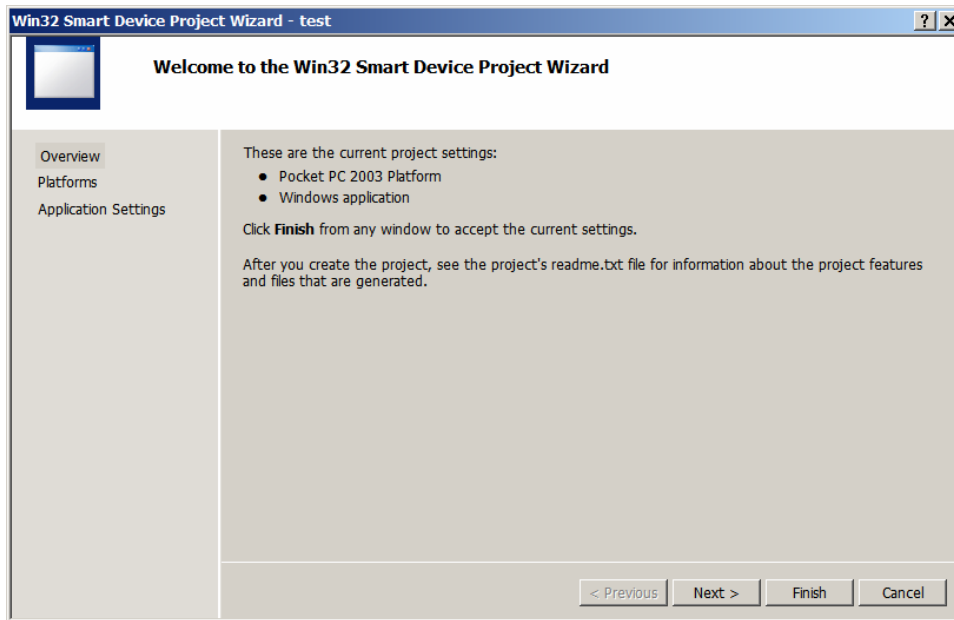
- Click *Next*.

- Click on the entry *LPC3250-SDK* in the field *Installed SDKs:* and press the *>* button to add the selected platform SDK to the project. The *LPC3250-SDK* will appear in the *Selected SDKs* field.

- Select *Pocket PC 2003* in the field *Selected SDKs* and press the < button. This removes the Pocket PC 2003 SDK from the list of selected SDKs.
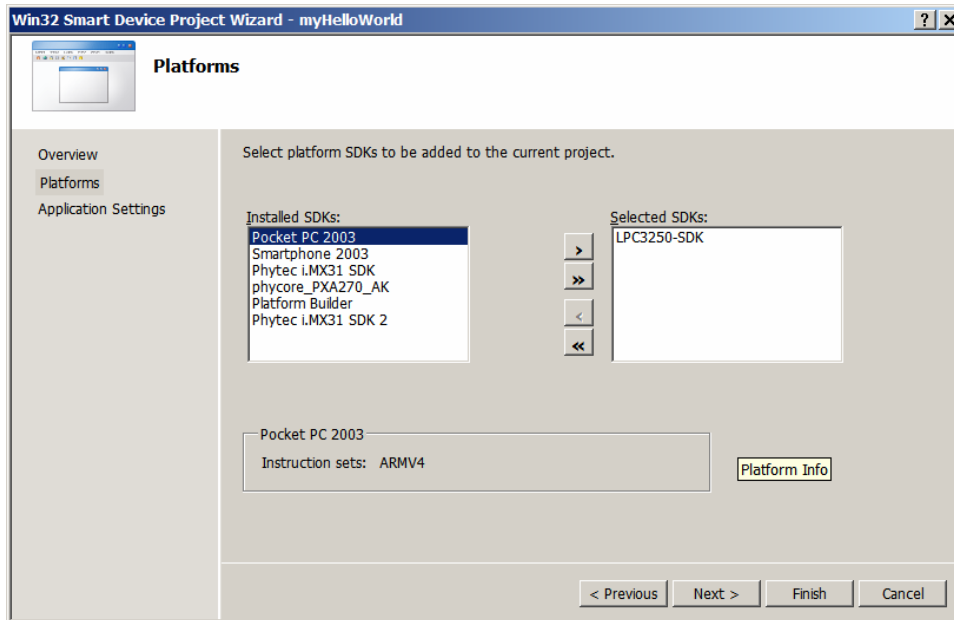
- Click *Next*
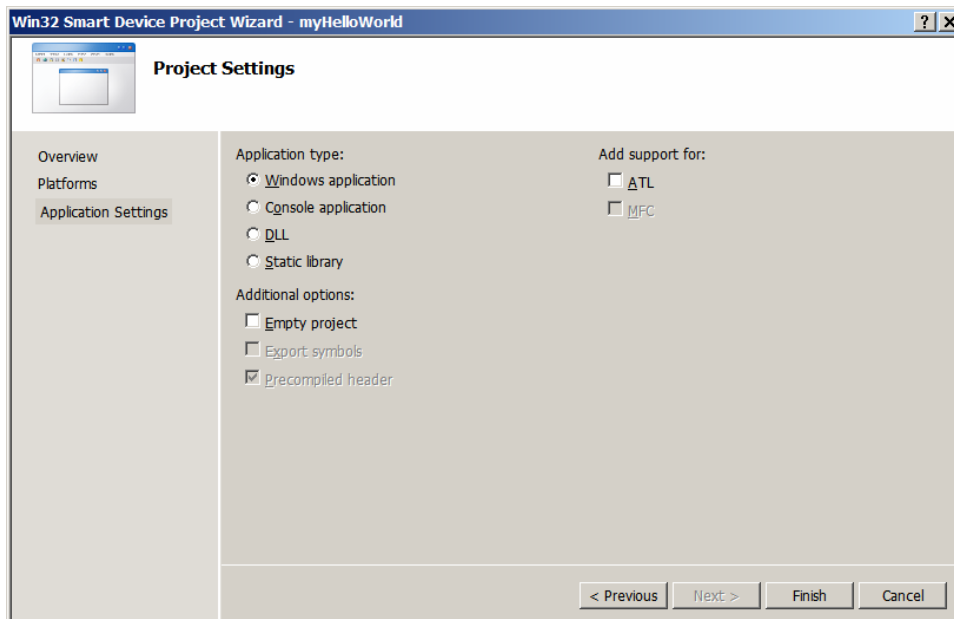
- Don't change the settings in this window and press *Finish.*

At this point you have created a new project for the LPC3250 board. The next step is to modify the C source file before building your project. This includes compiling, linking, locating and creating the executable.

3.2   Modifying the Source Code

- Open up the *myHelloWorld* tree and *Source Files*. Double-click on *myHelloWorld.cpp* to open the file in the source code editor.
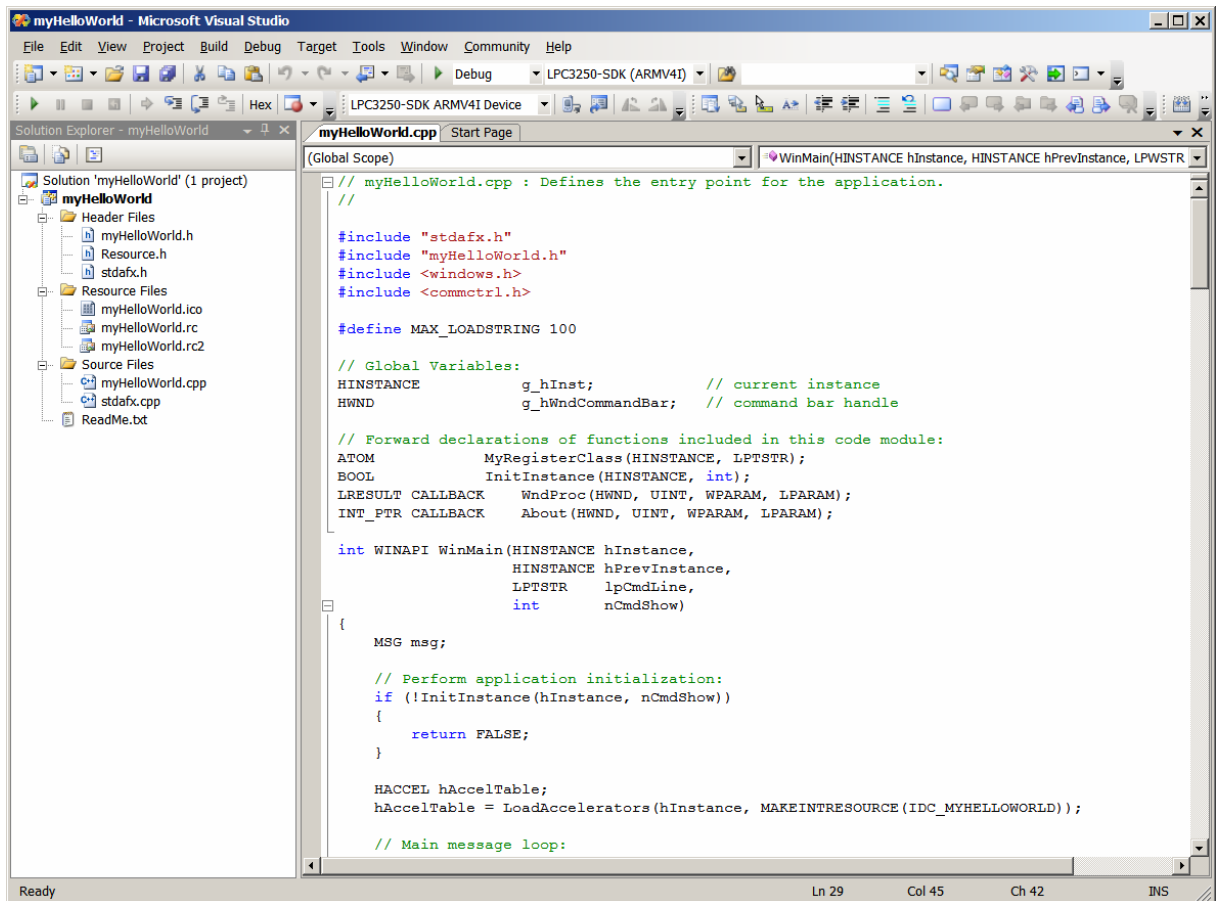
- Locate the following code section at line 163:

```
case WM_PAINT:
            hdc = BeginPaint(hWnd, &ps);
```

- If line numbers are not displayed, go to *Tools / Options*. Under the *Text Editor* tree, select *C/C++* and check the "Line numbers" option under *Display* options.
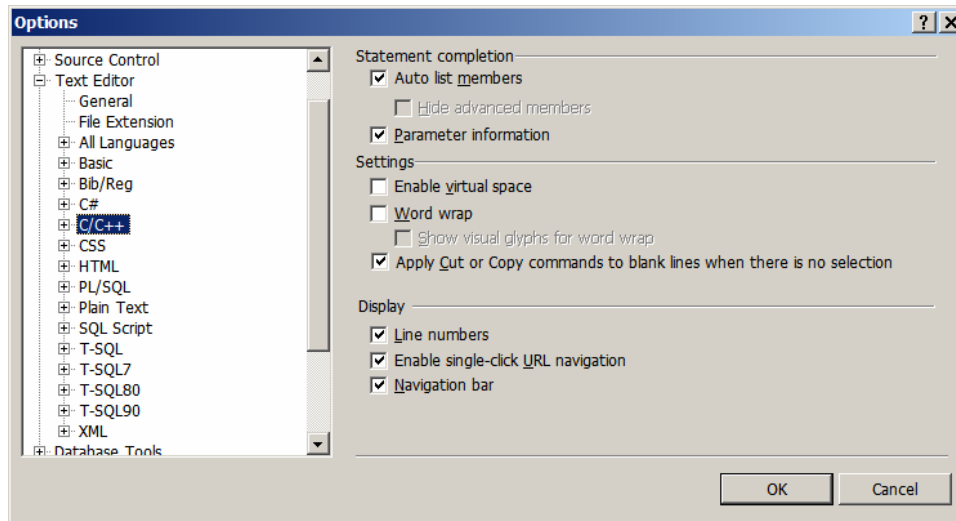
- Edit the source code to make the HelloWorld program print the text **Hello World!** 5 times instead of just one by replacing the code at line 163 and 164 with the code below:

```
case WM_PAINT:
    RECT rt;
    hdc = BeginPaint(hWnd, &ps);
    GetClientRect(hWnd, &rt);
    int i;
for(i = 1; i <= 5 ; i++)
{
    rt.top = rt.top + 30;
    DrawText(hdc, _T("Hello World!"), 12, &rt,
        DT_SINGLELINE | DT_VCENTER | DT_CENTER);
}
    EndPaint(hWnd, &ps);
    break;
```

- Save the modified file by choosing *File / Save* or by clicking the *floppy disk* icon .

3.3 Building the Project

You are now ready to run the compiler and linker.

- Build the target by either selecting the *Build* icon on the build toolbar or in the main menu bar select *Build / Build myHelloWorld*.

- If any source file of the project contains any errors, they will be shown in the *Output Window - Build* tab. Use the editor to correct the error(s) in the source code, save the file and repeat the build.

- If there are no errors, the code can be downloaded to your LPC3250 device. For this to work you need to have established an Active Sync connection between your PC and your LPC3250 device as described in *section 2.8*. When the connection is established select *Build/Deploy myHelloWorld* from the main menu bar.

- The individual steps of the download procedure can be viewed in the *Output Window - Build* tab.

- Wait until the download is complete, this may take a couple minutes.

- The newly created application was now deployed on your LPC3250 device. To start it select *My Device* on the target platform and go to the folder *Program Files/myHelloworld* and double tap on **myHelloworld**

A window will open on your LPC3250 device that will print 5 "Hello World" message.

You have now modified source code, recompiled the code, created a downloadable file, and successfully executed this modified code.

4   Debugging

This Debugging section provides a basic introduction to the debug functions included in Visual Studio 2005. The most important features are described by using an existing example. For a more detailed description of the debugging features, please refer to the appropriate manuals provided by Microsoft.
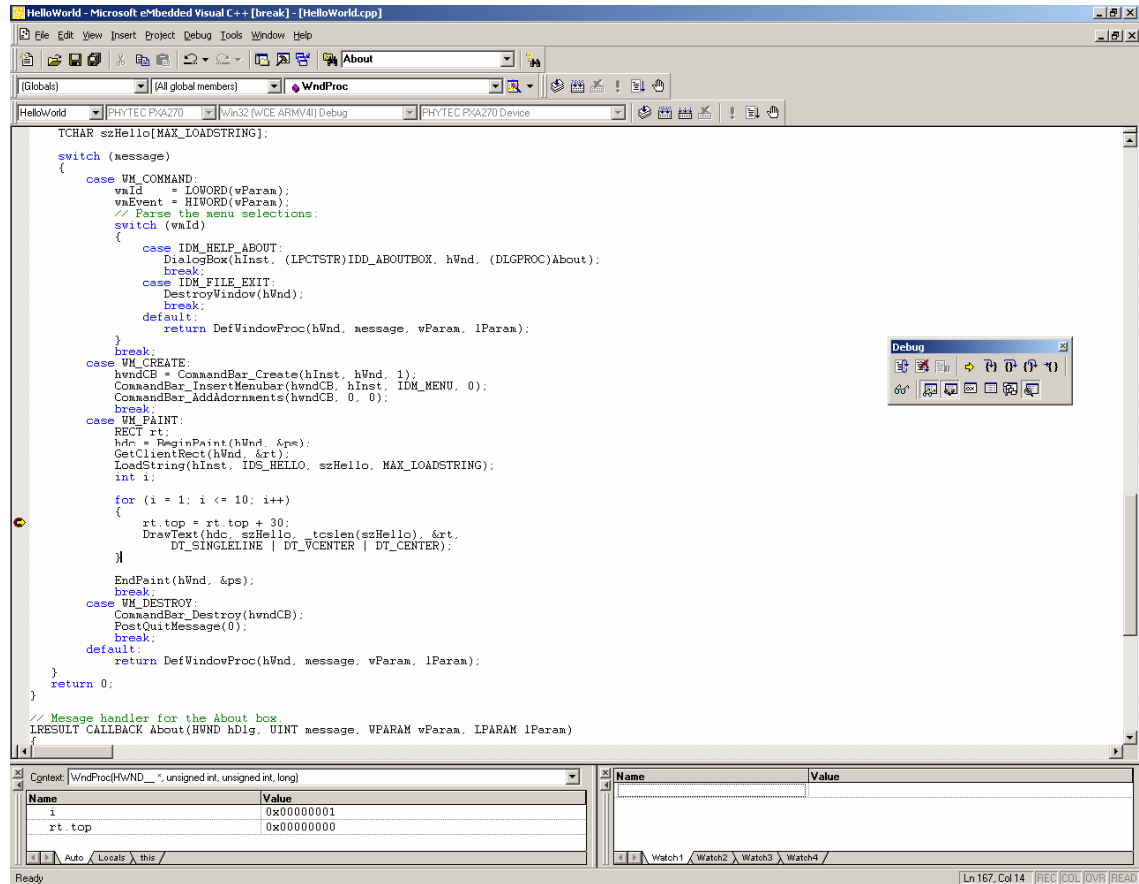
40 min

4.1   Starting the Debugger

- Make sure that **Debug** is selected in the *Solution Configurations* pull-down menu.
- Open up the *myHelloWorld* tree and *Source Files.* Double-click on the *myHelloWorld.cpp* file to open the file in the source code editor.
- Locate the following code section on line 170 and select the line.

```
rt.top = rt.top + 30;
```

- Select *Debug/Toggle Breakpoint* on the main menu bar or press F9 to set a breakpoint here or double click in the grey bar to the left of the code. The red marker on the left-hand side of the selected line indicates the breakpoint.
- To start debugging with Visual Studio 2005, select *Debug/Start Debugging* or press F5.
- A progress bar will indicate the download process of the debug program.

If a problem occurs during data transfer, an error message will be displayed. If this should occur, make sure you have established a connection between your PC and your LPC3250 device as described in section 2.9.

If data transfer was successful, a screen similar to the one shown below will appear. The debug toolbar is displayed. In the lower part of the debug screen you will see the *Variables* and *Watch* windows.

You may need to open, resize and/or move some windows to make your screen look similar to the screen capture. You can open inactive windows by choosing the desired window from the *Debug/Windows* pull-down menu.

The debugger will run up to the code section you have marked with a breakpoint and stop automatically. Notice the yellow arrow pointing to that breakpoint

You can click on *Debug/Toggle Breakpoint* or press F9 again to remove the breakpoint you have set.
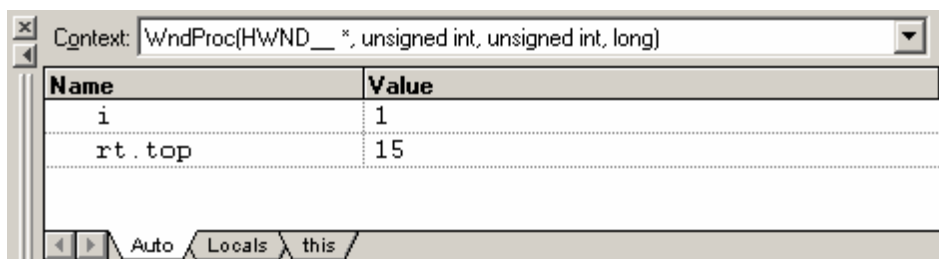
4.2   Visual Studio 2005 Debug Features

- The *Debugger* window toolbar gives access to the following debug commands: *Restart, Stop Debugging, Break Execution, Show Next Statement, Step Into, Step Over, Step Out and Run to Cursor.*

- The first button on the debugger toolbar is the *Start Debugging* button. This starts or continuous debugging.

- The *Break All* halts execution and the editor shows the current source code line.

- The *Stop Debugging* button stops the debugger and will lead you back to your project screen.

- The *Restart* button restarts the execution of the program from the beginning.

- The *Show Next Statement button* allows you to go through your program code line by code line.

- The first button allowing exact control of the program execution is the *Step Into* button. The *Step Into* command performs the execution of the command line to which the *Current-Statement Arrow* points. This can be a C command line or a single assembler line, depending on the current display mode. If the command line is a function call, *Step Into* jumps to the C function or subroutine, enabling you to explore the code contained in the accessed subroutine.

- The *Step Over* button is next on the debugger toolbar. The *Step Over* command executes the command line, to which the *Current-Statement Arrow* points. This can be a C command line or a single assembler line, depending on the current display mode. If the command line is a function call, the function will be executed without single stepping into the function.

- The next button is the *Step Out* button. *Step Out* is used to exit a function you are currently in. *Step Out* is very useful if you find yourself in a function you are not interested in and need to return quickly to your intended function.

- The *Hex* button toggles the display style of watch variables between hexadecimal and decimal.

- The last button pops up a menu where you can choose different windows useful for debugging, like watch windows, process information, memory information and calling stack.

4.3 Using the Visual Studio 2005 Debug Features

- The *Variables window – Auto* tab automatically shows the value of the local variable **i**. You can change the number base from decimal to hexadecimal by right clicking on the variable and selecting Hexadecimal Display.

Context: WndProc(HWND__ *, unsigned int, unsigned int, long)	
Name	**Value**
i	1
rt.top	15

Auto / Locals \ this /

- Click *Step Over* several times and watch the value of **i** count up.
- As you can see in the source code, the *for{}* loop will end if **i** becomes equal to 5. To leave the *for{}* loop, change the value of **i** by selecting the value, changing it to **10** and pressing **Enter**. Now repeat clicking on *Step Over* until you leave the loop.
- Remove the breakpoint by clicking into the source code line that has the breakpoint and press F9 or the *Insert/Remove Breakpoint* icon.
- Click in the source code, at **return 0**; and choose *Run to Cursor* from the *debug* toolbar. Your program will be executed until it reaches this line.

4.4 Running, Stopping and Resetting

- To run your program without stopping at any time, delete all breakpoints by clicking on the *Insert/Remove Breakpoint* icon.
- Click the *Go* button.
- "Hello World!" will be displayed on the screen of your LPC3250 device.
- You can use the *Stop Debugging* button to stop program execution at any time.

4.5   Changing Target Settings for the "Executable Version"

After successfully debugging the program, next change the project and the target settings in order to create an executable file that can then be downloaded to and executed out of the memory on the phyCORE®-LPC3250.

- Make sure the program execution is stopped.

- Exit the current debug session by selecting *Stop Debugging*.

- In the *Solution Configurations* pull down menu select **Release**.

- Build and execute your project as described in section 3.3.

You can now watch your final example execute and "Hello World!" being displayed on the LCD screen of your LPC3250 device.

You have successfully finished the debug section of this QuickStart. You learned how to set breakpoints, run your program to a specific line of code and inspect variables.

5   Building an OS Image

In this section you will learn how to add your own application to a WinCE project, create a new image and download this image on the LPC3250. We will use the application built and debugged in the previous chapters before as an example.

50 min

5.1   Download and Install the phyCORE-LPC3250 Binary BSP

Adeneo is the official partner of PHYTEC America for all Windows Embedded CE developments for the phyCORE-LPC3250.

*   Download the most current LPC3250 Binary BSP from Adeneo FTP. Find Adeneo FTP access information here:

http://www.adeneo-embedded.com/srt/en/document/show?location.id%3A=1353

Be sure to download the most current BSP. At the time this QuickStart was created, V1.0.2 was the most current BSP release from Adeneo.

*   Unzip the package and navigate to:
    PhyCore_LPC3250_BIN_EVAL_V1_0_2\BSP

*   Open ***PhyCore_LPC3250-DK_BIN_v102_rev1304.1.msi***

*   Click **Next** at the welcome page

*   Click **Next** to agree to User Licensing Agreement

*   Install the BSP at the default location ***C:\WINCE600\PLATFORM*** and click **Next**

*   Click **Next** to confirm installation

*   Click **Close** after successful installation

If you have Carrier Board PCB version 1305.0 or 1305.1 please call PHYTEC support.

5.2   Open the OSDesign

- From the zip package downloaded from Adeneo, navigate to: *PhyCore_LPC3250_BIN_EVAL_V1_0_2\OSDesigns\OSDesigns*.

- Copy the three subfolders:

  LPC3250-DK_BIN
  LPC3250-DK_BIN_ActiveSync
  LPC3250-DK_Bluetooth_BIN

  to: *C:\WINCE600\OSDesigns*.

- Browse to:
  C:\WINCE600\OSDesigns\LPC3250-DK_BIN_ActiveSync\LPC3250-DK.

- Open the OSDesign project *LPC3250-DK.pbxml*.

5.3   Build the Image

When the project is loaded you should see the project in the *Solution Explorer* window.
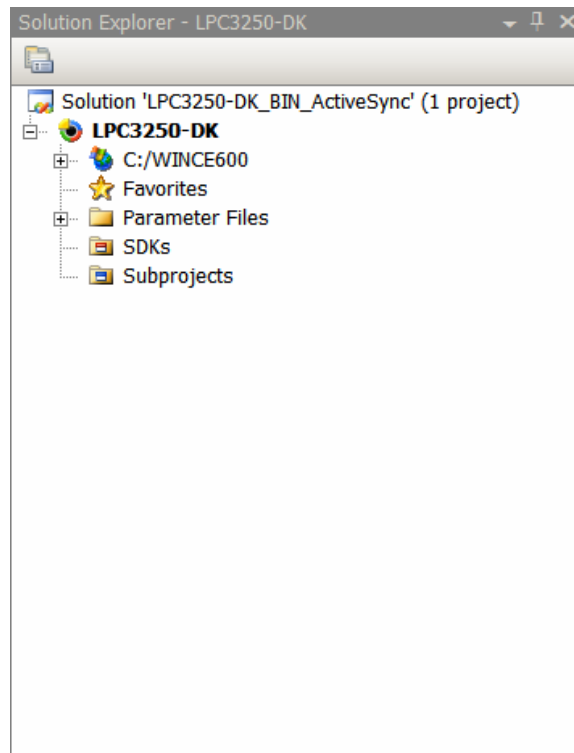
- From the *Solution Explorer* window open the Tree **LPC3250-DK\Parameter Files\Binary PhyCore_LPC3250_BIN: ARMV41 (Active)** and double click on *project.bib*. Under the Files section, add the following line:

HelloWorld.exe "C:\ PHYTEC\phyCORE-LPC3250\WinCE\Demo_ Application\HelloWorld\ LPC3250-SDK(ARMV4I)\Debug\HelloWorld.exe" NK

This will add the executable ***HelloWorld.exe*** to the Windows directory of the target. The path tells the platform builder where to find the executable that should be added to the image and the parameter NK specifies the name of the memory region where it should be added to.

- From the *Build* menu select *Configuration Manager*. From the pull down in the upper left corner of this window, select *PhyCore_LPC3250 ARMv41 Release*.
- Press **Close**.
- From the *Build* menu select *Build Solution.* The build process will take about 10-20 minutes, depending on your host platform hardware.

You don't always have to do a complete build. If you just want to add a file to the image like in the example before, you can do this by selecting Build\Copy Files to Release dir. This copies all necessary files to the Release directory. Then you can build the image with Build\Make Run-Time image. This takes only about 5 minutes. Please refer to the Visual Studio 2005/Platformbuilder documentation for more information.

5.4 Download an Image using Visual Studio

In the next step we want to download the image to the target.
For this step you need a terminal program like HyperTerminal.

- Connect the serial cable from the PC to the bottom DB-9 on the Carrier Board (P1 BTM = UART5).

- Start a Hyperterminal session with the following COM settings:

> **115200 bps**
> **8 bit**
> **No parity**
> **1 bit stop**
> **No flow control**

- Power up the board.

You should see at the following (Build date may be different):

```
        Microsoft Windows CE Bootloader Common Library Version
1.4 Built Sep 18 2008 14:14:22
        Microsoft Windows CE 6.0 Ethernet Bootloader
        Adaptation for the LPC3250 performed by ADENEO (c) 2008
        WARNING : LoadEBootCFG: No valid Eboot configuration
found.
        INFO : Loading default bootloader settings
        Press [ENTER] to download a runtime image now or
[SPACE] to    cancel.
        Initiating image download  in 4 seconds
```

- Enter the eBoot menu by pressing [**SPACE**]

```
        Ethernet Boot Loader Configuration :

        0) Mac address .......... (02:03:04:06:06:07)
        1) Ip address ........... (192.168.111.115)
        2) Subnet Mask address .. (255.255.255.0)
        3) DHCP ................. (Enabled)
        4) Boot delay (seconds).. (5)
        5) ETHERNET KITL
        6) Download image to SDRAM
        7) Download new image at startup
        8) Download source: Ethernet
        9) SDCard file name: NK.bin

        l) Launch flash resident image now
        d) Download from SD Card now
        s) Save configuration now
        r) Restore default configuration and save now
        n) Image flash menu
        >
```

- Connect the Ethernet cable to connector X7 on the Rapid Development board and the network card of your host PC.

- If you have a DHCP server installed on the host PC you can skip the next 2 steps.

- Press '**3**' to disable DHCP.

- Press '**0**' to set the IP address of the device and '**1**' to change the network mask. Be sure these settings will fit to the network settings on your PC IP address.

- Press '**6**' to choose between **Download image to SDRAM** to **Download image to Flash**.

- Press '**7**' to change **Download new image at startup** to **Launch existing flash resident image at startup.**

- Switch back to Visual Studio 2005, from the menu bar select *Target/Connectivity Option.*

- Select Ethernet for the *Download* and *Transport* settings from the drop down box.
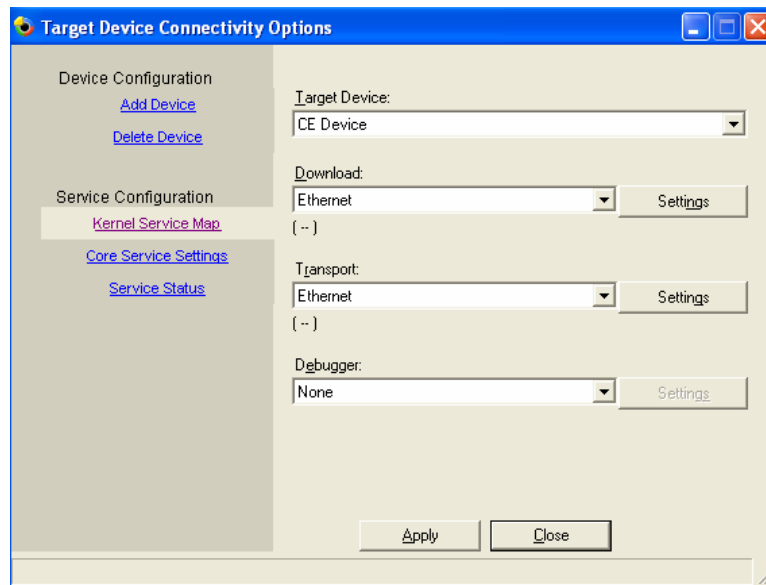
- Click on the *Settings* button on the right of the *Download* Drop down box. The *Ethernet download settings* window will appear. Leave this window open.
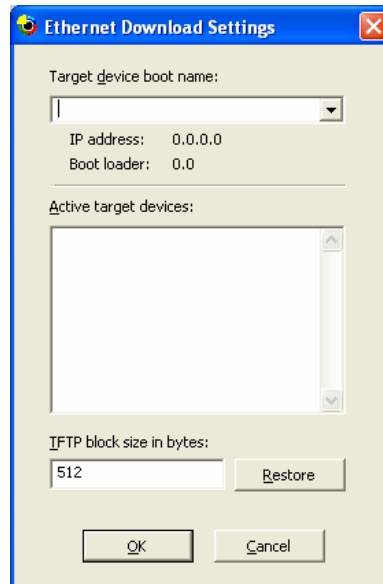
- Change to the HyperTerminal window and press '**d**' on the keyboard to start the download of the image

- You will see some output messages followed by a BOOTME message.

- Go back to Visual Studio. In the window *Ethernet download settings* a new entry should appear in the *Active target devices* list. Select the device and close the window.

- From the Visual Studio menu bar select *Target / Attach Device*. A download message with a status bar should appear and the download should start.

When the download is finished, the image should start. Calibrate the touch panel, and then navigate to the folder *MyDevice\Windows*. There you find your HelloWorld application that can be executed.

*The **NK.bin** OS image has now been successfully downloaded and resides in the phyCORE-LPC3250 on-board Flash memory.*

Appendix A: Install the bootloader (eboot.nb0) from SD Card

To download eboot, the phyCORE-LPC3250 must have **Stage 1 Loader** pre-installed (if this is not the case, contact PHYTEC support@phytec.com)

1. Connect the Serial cable from the PC to the bottom DB-9 on the Carrier Board (P1 BTM=UART5)

2. Start a Hyperterminal session following COM settings:

   115200 bps
   8 bit
   No parity
   1 bit stop
   No flow control

3. Power the board

4. Press any key during the Stage 1 Loader bootup, the following should be displayed in the Terminal output window:

   ```
   5
   Phytec LPC3250 board
   Build date: Jul 17 2008 14:03:53
   Autoboot in progress, press any key to stop
   PHY3250>
   ```

5. Insert the SD Card into the SD/MMC card socket (x15) on the Carrier Board.

6. Make sure eBoot.nb0 is present on the card by listing the content of the card. In the serial terminal, type the following:

   PHY3250>**ls**

You should see at the following files:
   ```
   EBOOT.NB0
   NK_ACSY.BIN
   NK_HOST.BIN
   ```

7. In the serial terminal, type the following (this step might take a few seconds):
   PHY3250>**load blk eboot.nb0 raw 0x80000000**
   File loaded successfully
   PHY3250>

8. Once the eboot.nbo has been loaded, type:

PHY3250>**nsave**
PHY3250>

9. Next type:

PHY3250>**prompt PHY3250> 1**
phy3250>

10. Next type:

phy3250>**aboot flash raw 0x80000000**
Autoboot configuration updated
phy3250>

*The **eBoot** loader has now been successfully downloaded and resides in the phyCORE-LPC3250 on-board Flash memory.*

Appendix B: Install an Image (NK.bin) from SD Card

To download an Nk.bin, the phyCORE-LPC3250 must have **eboot.nb0** pre-installed (if this is not the case see Appendix A)

The pre-installed WinCE binary image is the **_activesync_** version included with the BSP. The ActiveSync version is required for certain steps of this Quickstart. However, if you wish to use the phyCORE-LPC3250 as a USB host, use the **_usbhost_** version of the WinCE binary image.

The NK.bin image cannot exceed 61.5 MB.

1. Connect the Serial cable from the PC to the bottom DB-9 on the Carrier Board (P1 BTM=UART5)

2. Start a Hyperterminal session with the following COM settings:

    > **115200 bps**
    > **8 bit**
    > **No parity**
    > **1 bit stop**
    > **No flow control**

3. Power the board

4. Press any key during the Stage 1 Loader boot up, the following should be displayed in the Terminal output window:

    > Phytec LPC3250 board
    > Build date: Jul 17 2008 14:03:53
    > Autoboot in progress, press any key to stop
    >
    > phy3250>

5. Erase the block that will contain the image by using the following command:

    > phy3250>**erase 31 2016 0**
    > Starting block erase
    > phy3250>

6. Then insert the SDCard containing the nk.nb0 into the SD/MMC card slot. In order to check that the SDCard is readable, type the following:

    > phy3250>**ls**

You should see at the following files

EBOOT.NB0
NK_ACSY.BIN
NK_HOST.BIN

7. Now, launch eboot by typing the following

phy3250>**boot**

You should see at the following (Build date may be different):

Microsoft Windows CE Bootloader Common Library Version 1.4
Built Sep 18 2008 14:14:22
Microsoft Windows CE 6.0 Ethernet Bootloader
Adaptation for the LPC3250 performed by ADENEO (c) 2008
WARNING : LoadEBootCFG: No valid Eboot configuration
found.
INFO : Loading default bootloader settings
Press [ENTER] to download a runtime image now or
[SPACE] to   cancel.
Initiating image download in 4 seconds

8. Enter the eBoot menu by pressing [**SPACE**]

Ethernet Boot Loader Configuration :

0) Mac address .... (02:03:04:06:06:07)
1) Ip address .... (192.168.111.115)
2) Subnet Mask address .. (255.255.255.0)
3) DHCP .... (Enabled)
4) Boot delay (seconds).. (5)
5) ETHERNET KITL
6) Download image to SDRAM
7) Download new image at startup
8) Download source: Ethernet
9) SDCard file name: NK.bin

l) Launch flash resident image now
d) Download from SD Card now
s) Save configuration now
r) Restore default configuration and save now
n) Image flash menu

>

9. Press '**6**' to choose between **Download image to SDRAM** or to **Download image to Flash**

10. Press '**7**' to change **Download new image at startup** to **Launch existing flash resident image at startup**

11. Press '**8**' to change **Download source: Ethernet** to **Download source: SD Card**

12. Press '**9**' to change the **SDCard file name: NK.bin**

13. Enter the name of the Image you wish to download.

> Ensure the **SDCard file name** matches the file name of the actual Image on the SD card.

14. Press '**s**' to save your settings

15. Press '**d**' to download the image

When the download is finished, the image should start. The calibration application should appear. Calibrate the touch panel.

> *The **NK.bin** OS image has now been successfully downloaded and resides in the phyCORE-LPC3250 on-board Flash memory. Congratulations you have completed this QuickStart manual.*