QuickStart Instructions

Windows Embedded 2009

phyCORE Z500PT

Using Microsoft Windows Embedded Studio

Note: The PHYTEC Windows Embedded disc includes the electronic version of the English phyCORE® Z500PT Hardware Manual

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1 Introduction

5 min

This QuickStart provides general information on the PHYTEC phyCORE® Z500PT Single Board Computer (SBC). It gives you also an overview of Microsoft's Windows Embedded Studio and instructions on how to build and deploy your own Windows Embedded 2009 software package. Be aware that this is just a QuickStart, further readings and the in-detail explanation of Microsoft Windows Embedded Studio can be found on the DVD in the folder "PCM041_phyCore-Z500PT\Manual\Microsoft Windows Embedded Studio\".
There you'll find "Windows Embedded Standard 2009 Resource Kit.pdf", which contains advanced information.

Please refer to the phyCORE® Z500PT Hardware Manual for specific information on such board-level features as jumper configuration, memory mapping and pin layout. Selecting the links on the electronic version of this document leads to the respective section of the phyCORE® Z500PT Hardware Manual.

1.1 Rapid Development Kit Documentation

This "Rapid Development Kit" (RDK) includes the following electronic documentation on the enclosed "PHYTEC Windows Embedded phyCORE® disc":

- the PHYTEC phyCORE® Z500PT Hardware Manual
- controller User's Manuals and Data Sheets
- this QuickStart Instruction with general "Rapid Development Kit" description, software installation advice and an example project, enabling quick out-of-the box start-up of the phyCORE® Z500PT in conjunction with the Microsoft Windows Embedded Studio.

1.2 Professional Support Packages available

This Kit comes with free installation support. If you do have any questions concerning installation and setup, you are welcome to contact our support department.
For more in-depth questions, we offer a variety of custom tailored packages with different support options (e-mail, phone, direct contact to the developer) and different reaction times.

Please contact our sales team to discuss the appropriate support option if professional support beyond installation and setup is important to you.

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 project showing you how to build and deploy your personal Windows Embedded 2009 Image. It is structured as follows:

1) The “Getting Started” section demonstrates how to install Microsoft Windows Embedded Studio onto your developer PC.
2) The “Getting More Involved” section provides instructions on how to use and alter the existing Windows Embedded Image we provide. Further more you will learn how to create Components and how to use them.
3) The “Start a new Image” section gives some minor hints on how to create your own independent Image.
4) The “Necessary Steps for every Image” section gives a short overview of what you have to do in every Image-Building Process.

In addition to the dedicated data for this Rapid Development Kit, the PHYTEC Windows Embedded Kit CD-ROM contains supplemental information on embedded microcontroller design and development.

1.4 Conventions used in this QuickStart

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

Italic Used for file and directory names, program and command names, command-line options, menu items, URLs, and other terms that correspond the terms on your desktop.

Bold Used in examples to show commands or other text that should be typed literally by the user.

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

At this part you might leave the path of this Quick Start.

This is a warning. It helps you to avoid annoying problems.

Provides useful supplementary information about the topic.

At the beginning of each chapter you can find information of the time needed to pass that chapter.

You have successfully passed an important part of this Quick Start manual.

Provides information to solve common problems.

1.5 System Requirements

The use of this "Rapid Development Kit" requires:

- the PHYTEC phyCORE® Z500PT (Intel Atom)
- Windows Embedded Standard 2009 (Eval version)
- the PHYTEC phyCORE® Z500PT Windows Embedded disc for Windows Embedded Standard 2009
- an IBM-compatible host-PC (586 or higher running with Windows XP or higher and at least 10 GB free hard disc space)

For more information and example updates, please refer to the following sources:

http://www.phytec.de
support@phytec.de

1.6 Microsoft Windows Embedded Studio

Microsoft's Software development tool for Windows Embedded Operating systems provides everything you need to develop your own Microsoft Windows Embedded Image.

Windows Embedded Standard 2009 (WES2009) is Microsoft’s successor of the popular Windows Embedded XP. WES2009 allows you to build or change everything that is included in your Image. You can also alter the image provided by Phytec Messtechnik GmbH to your needs. Adding needed drivers or applications for your project is easily done in a short period of time. In short it enables you to do the following tasks:

- Create or alter an WES2009 Image
- Add or remove WES2009 features and applications
- Deploy an image using network boot options

The Windows Embedded Studio is available from your local Microsoft dealer. There is also an evaluation version available which is used in this Quickstart. You can fully use it to develop any kind of Windows Embedded images.

If you already have installed Windows Embedded Studio you can safely use your installation. Of course, you can skip the installation steps.

2 Getting Started

4-5 h

In this chapter you will install Microsoft Windows Embedded Studio on to your developer-PC.

2.1 Install Microsoft Windows Embedded Studio

In order to install the Microsoft Windows Embedded trial you have to fulfill several requirements.

System requirements when using Microsoft Windows XP SP2 or higher or Windows 2003 Server:

- 728 MHz or greater CPU
- 512 MB of RAM minimum; 1 GB or more recommended

System requirements when using Microsoft Windows Vista or Windows 2008 Server:

- 1 GHz or greater CPU
- 1 GB of RAM minimum

General System requirements:

- Windows Installer 3.1 or higher
- Microsoft SQL Server Express 2005 SP1 or higher

If you meet these requirements you can start the installation procedure by inserting the Phytec phyCORE® Z500PT Windows Embedded disc. Navigate to the subdirectory “Microsoft Windows Embedded trial” and start the “setup.exe”

The following screen appears:

Click on “Install” and follow the instructions of the setup program.

CAUTION

If you are missing some of the requirements you can install some of them by clicking “Prepare”.

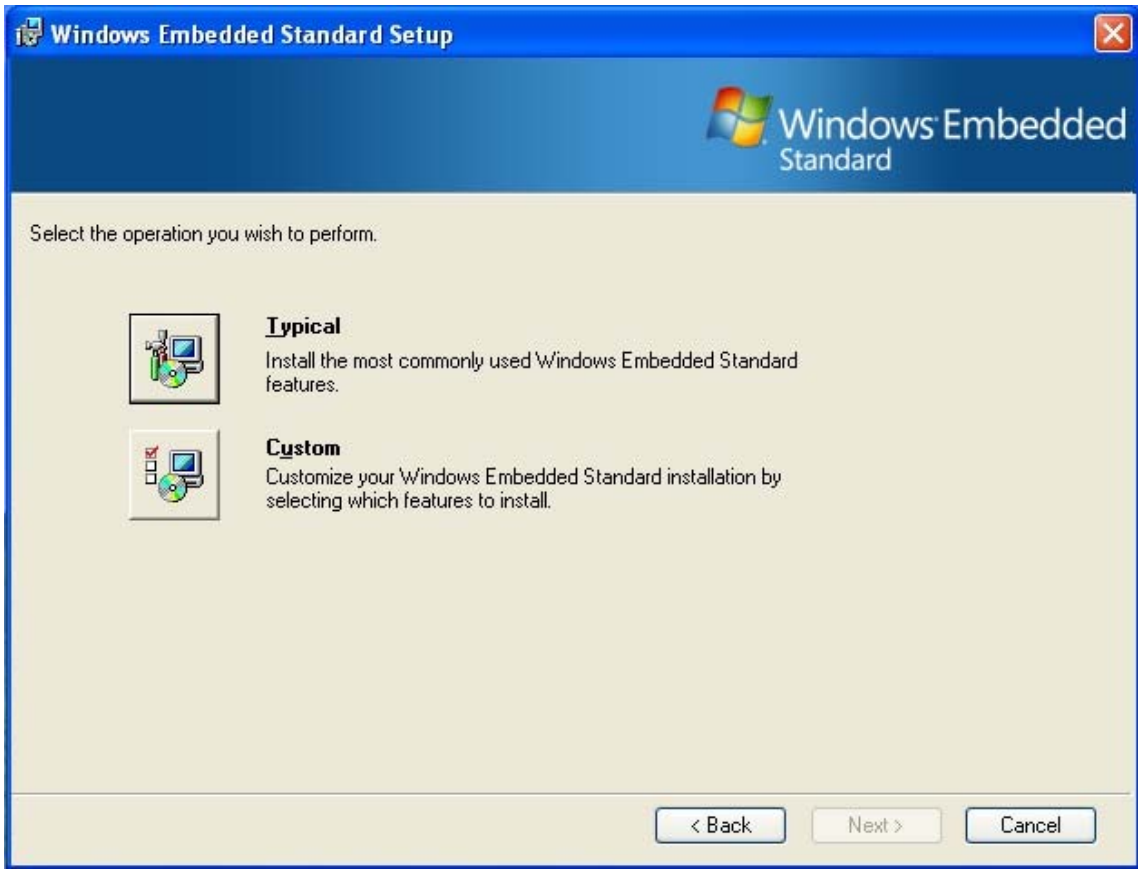
CAUTION

During the setup you have to enter a product activation key. You can request this key from the Microsoft Homepage.

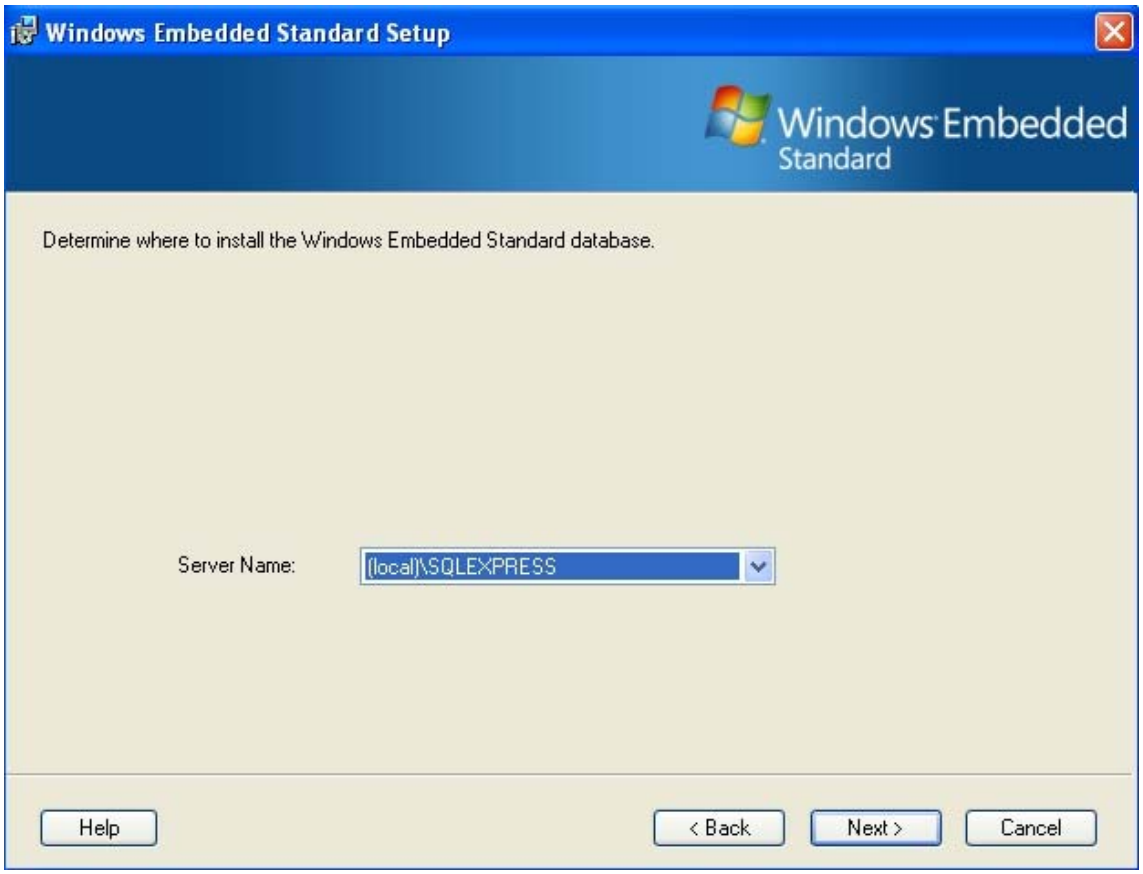
2.2 License Agreement

After starting the installation you are prompted to enter your license information.

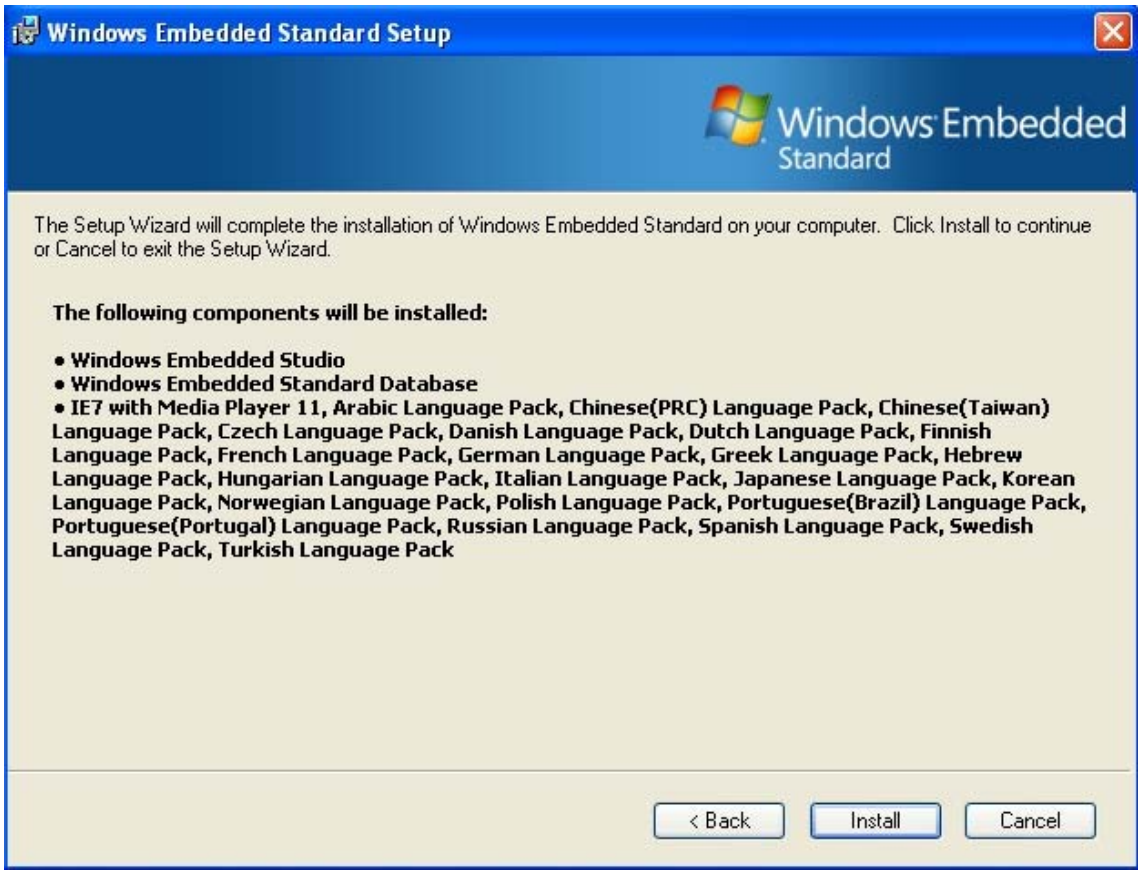
If you have not yet received your Windows Embedded Standard 2009 Trial Key you can order it on the Microsoft Homepage.



Choose “Custom” here to customize your installation.



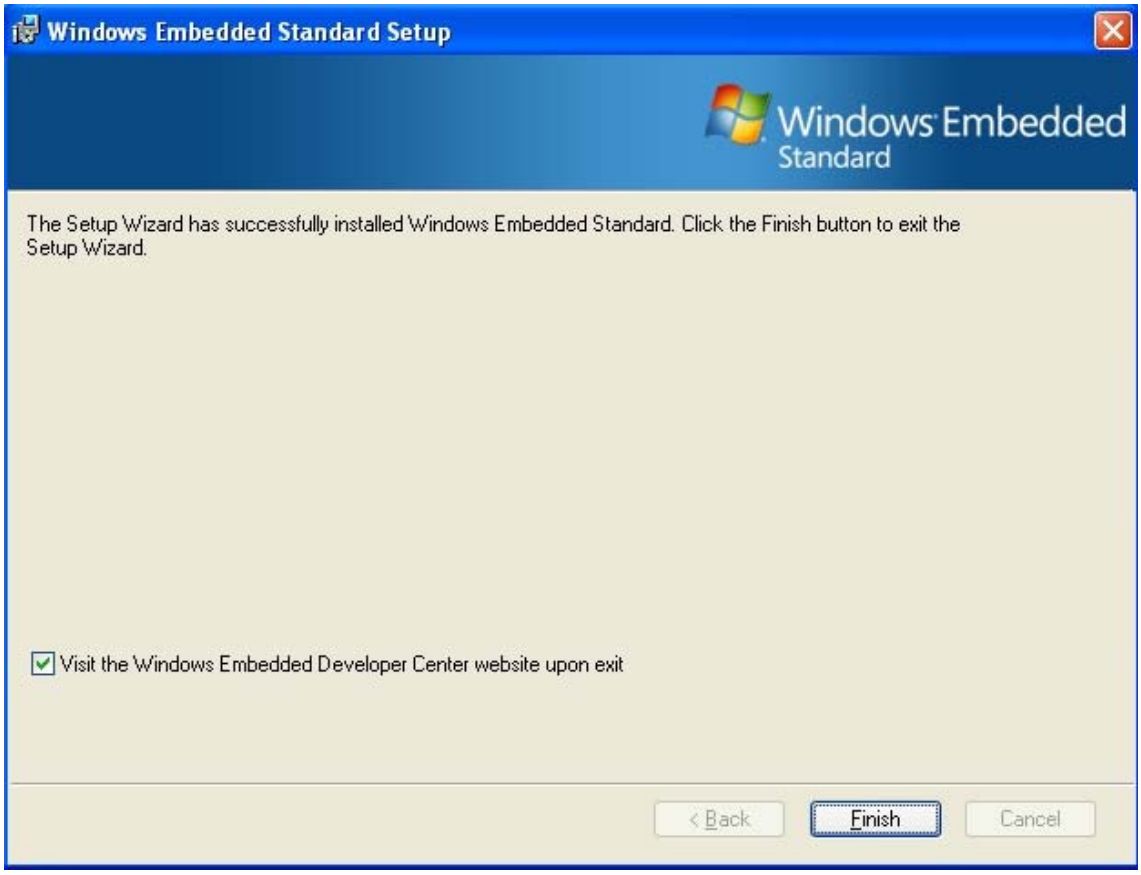
Select the Microsoft SQL Server you want to use.



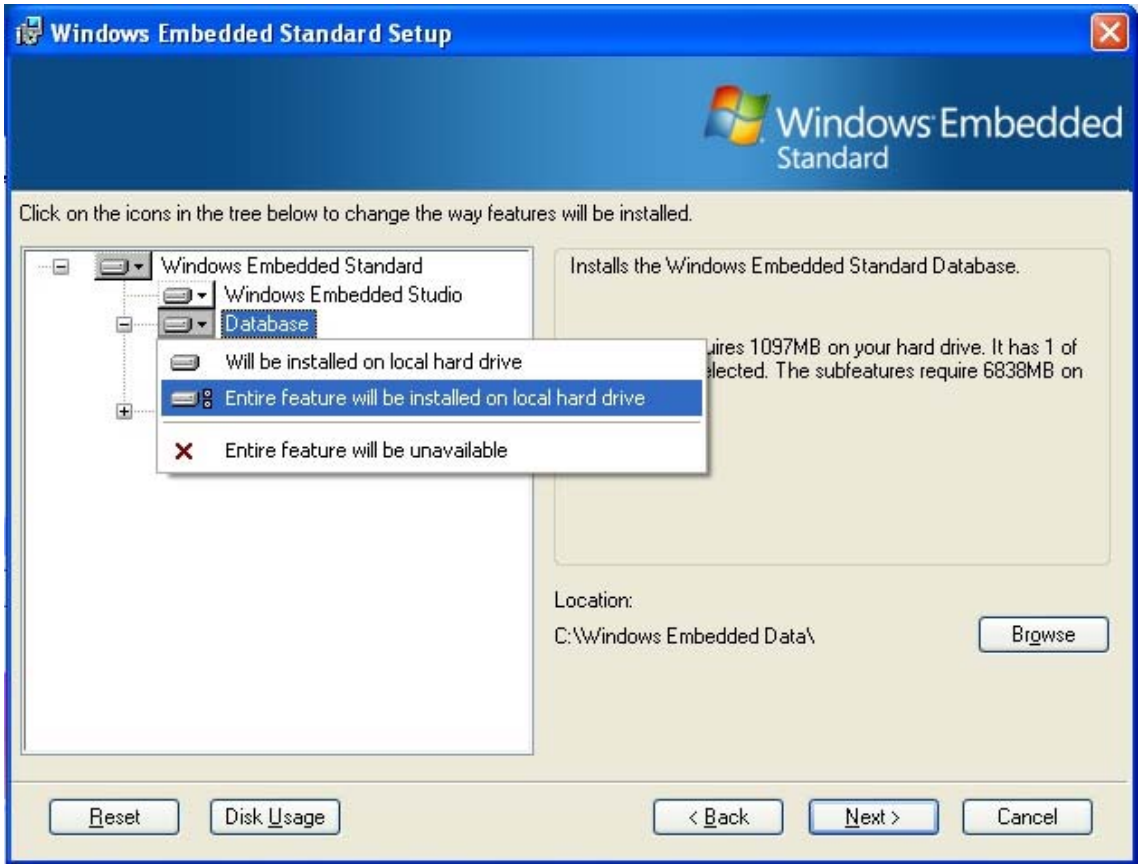
Click “Install” to start the installation process.

CAUTION

Please note that the installation process can take up to an hour depending on your hardware specifications.



When the setup has finished, click the “Finish” Button to close the setup.



Left click on the hard-disk-icon near “Database” and choose “Entire feature will be installed on local hard drive” to ensure that you have all data available.

3 Getting More Involved

30 min

3.1 Configure the phyCORE® Z500PT project

In order to modify the phyCORE® Z500PT image you need to create a copy of the images project file on your local disk because you can't write any changes to the DVD-Drive.

Before you can start developing with the Image you need to copy the project file to your hard drive because the DVD which is shipped with the phyCORE® Z500PT StarterKit is write protected.

Browse to the folder "phyCore Z500PT disc\projectfiles" and copy the folder "full image" anywhere onto your local disk.
After that also copy the "Components" folder, we need it later in the tutorial.

Start up the Windows Embedded Target Designer (Start→All Programs→Microsoft Windows Embedded Studio→Target Designer).
Click File→Open and browse to the folder where you copied the phyCORE® Z500PT project file.
Double click the "KPCM-041-WINEMB.slx" file to open to open the project.

It may take several minutes to load and activate the configuration, depending on your hardware.

After the Configuration has successfully loaded you will see several Error Messages like in the picture below.

```
Starting configuration activation at: 1/23/2010 10:06:14 AM...
CFDB: 106.42 secs, 158 reqs. LAB: 80.17 secs, 125 reqs, 0% hits, 0 entries
Activation complete, elapsed time: 188.77 seconds
No errors or warnings

Error    1101: Missing component in database during upgrade of : "Intel(R) Gigabit CT Desktop Adapter (Version 11.4.7.0, R3)"
Error    1117: Cannot upgrade : "Intel(R) Gigabit CT Desktop Adapter (Version 11.4.7.0, R3)"
Error    1101: Missing component in database during upgrade of : "Intel Corporation US15 Embedded Graphics Chipset Function 0 (Version 10.0.0.1335, R3)"
Error    1117: Cannot upgrade : "Intel Corporation US15 Embedded Graphics Chipset Function 0 (Version 10.0.0.1335, R3)"
Error    1101: Missing component in database during upgrade of : "Full XP Pro WES2009 - Printer & Imaging (Version 1.0, R6)"
Error    1117: Cannot upgrade : "Full XP Pro WES2009 - Printer & Imaging (Version 1.0, R6)"
Error    1101: Missing component in database during upgrade of : "Full XP Pro WES2009 - OEM System Extensions (Version 1.0, R6)"
Error    1117: Cannot upgrade : "Full XP Pro WES2009 - OEM System Extensions (Version 1.0, R6)"
Error    1101: Missing component in database during upgrade of : "Full XP Pro WES2009 - Multimedia Graphics (Version 1.0, R6)"
Error    1117: Cannot upgrade : "Full XP Pro WES2009 - Multimedia Graphics (Version 1.0, R6)"
Error    1101: Missing component in database during upgrade of : "Full XP Pro WES2009 - MISC (Version 1.0, R6)"
Error    1117: Cannot upgrade : "Full XP Pro WES2009 - MISC (Version 1.0, R6)"
Error    1101: Missing component in database during upgrade of : "Full XP Pro WES2009 - Management (Version 1.0, R7)"
Error    1117: Cannot upgrade : "Full XP Pro WES2009 - Management (Version 1.0, R7)"
Error    1101: Missing component in database during upgrade of : "Full XP Pro WES2009 - International (Version 1.0, R7)"
Error    1117: Cannot upgrade : "Full XP Pro WES2009 - International (Version 1.0, R7)"
Error    1101: Missing component in database during upgrade of : "Full XP Pro WES2009 - Accessibility (Version 1.0, R6)"
Error    1117: Cannot upgrade : "Full XP Pro WES2009 - Accessibility (Version 1.0, R6)"
Error    1101: Missing component in database during upgrade of : "Full XP Pro WES2009 (Version 1.0, R6)"
Error    1117: Cannot upgrade : "Full XP Pro WES2009 (Version 1.0, R6)"
Error    1101: Missing component in database during upgrade of : "Full XP Pro WES2009 - Network & Communications (Version 1.0, R6)"
Error    1117: Cannot upgrade : "Full XP Pro WES2009 - Network & Communications (Version 1.0, R6)"
Error    1101: Missing component in database during upgrade of : "Full XP Pro WES2009 - User Interface (Version 1.0, R6)"
Error    1117: Cannot upgrade : "Full XP Pro WES2009 - User Interface (Version 1.0, R6)"
Error    1101: Missing component in database during upgrade of : "Full XP Pro WES2009 - System (Version 1.0, R7)"
Error    1117: Cannot upgrade : "Full XP Pro WES2009 - System (Version 1.0, R7)"
Error    1101: Missing component in database during upgrade of : "Full XP Pro WES2009 - Storage & File System (Version 1.0, R6)"
Error    1117: Cannot upgrade : "Full XP Pro WES2009 - Storage & File System (Version 1.0, R6)"
Error    1101: Missing component in database during upgrade of : "Full XP Pro WES2009 - Security (Version 1.0, R6)"
Error    1117: Cannot upgrade : "Full XP Pro WES2009 - Security (Version 1.0, R6)"
Error    1101: Missing component in database during upgrade of : "High Definition Audio Driver Package - KB888111 (Version 1.0, R7)"
Error    1117: Cannot upgrade : "High Definition Audio Driver Package - KB888111 (Version 1.0, R7)"
```

There is no reason to worry about these message, they appear because your newly installed Windows Embedded Database doesn't have all the components you need to build the image.

We are going to fix that right away.

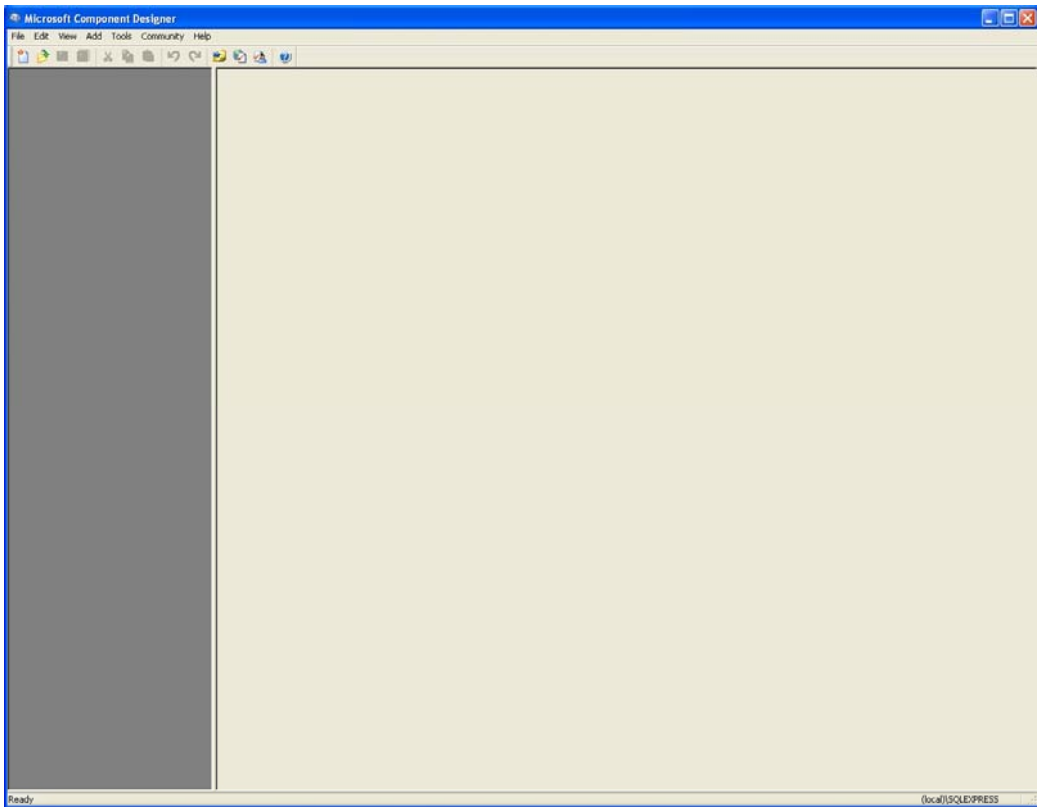
3.2 Create your first Component

In this chapter of the tutorial you will learn how to create, import and activate a Component to be used with Microsoft Windows Embedded Standard 2009.

To make things clear we concentrate on the “Intel Corporation US15 Embedded Graphics Chipset Function 0“ which is the driver for the Onboard Graphics Card.

How to create this Component?

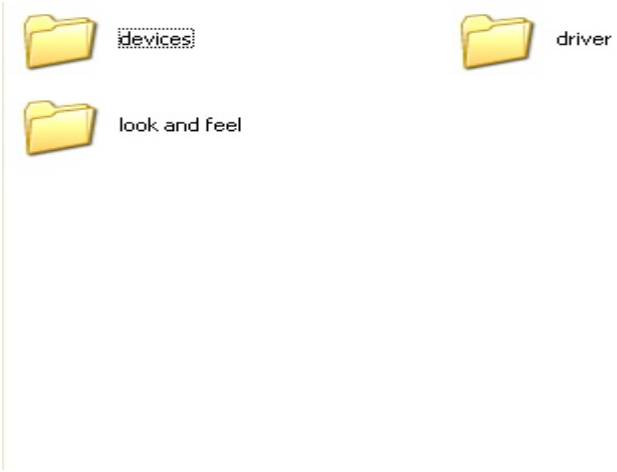
In order to create any Component you might want to create you need the “Microsoft Component Designer”. Start it by clicking Tools → “Component Designer” in the Toolbar of the Microsoft Target Designer.



The Component Designer is the tool you will need the most. Here you can create or alter any component for your Windows Embedded Image, be it a driver component or an application you might want to add to the Operating System.

Ok, so we want to add the driver for the Onboard Graphics Card.
In order to do that we first need the matching drivers for our device, in this example we need the Intel IEGD driver package, which is available on the Intel Developer Homepage.
Of course, we have added all drivers that are necessary for the phyCORE® Z500PT Windows Embedded Image to our DVD.
Along with the project file we are currently working with, you've copied the components to your local hard disk.

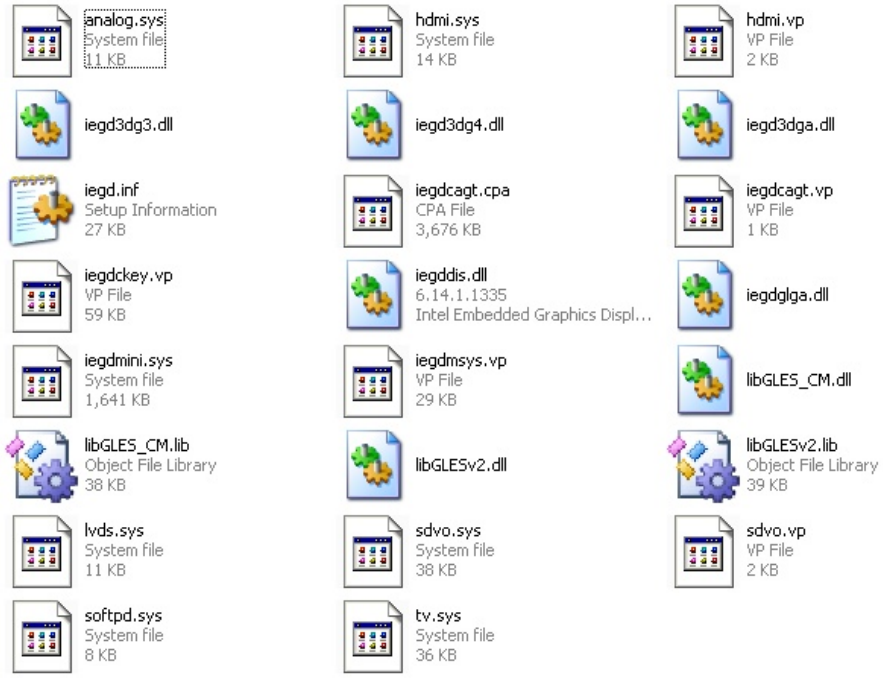
Browse to that folder now.



You will see 3 subdirectories.

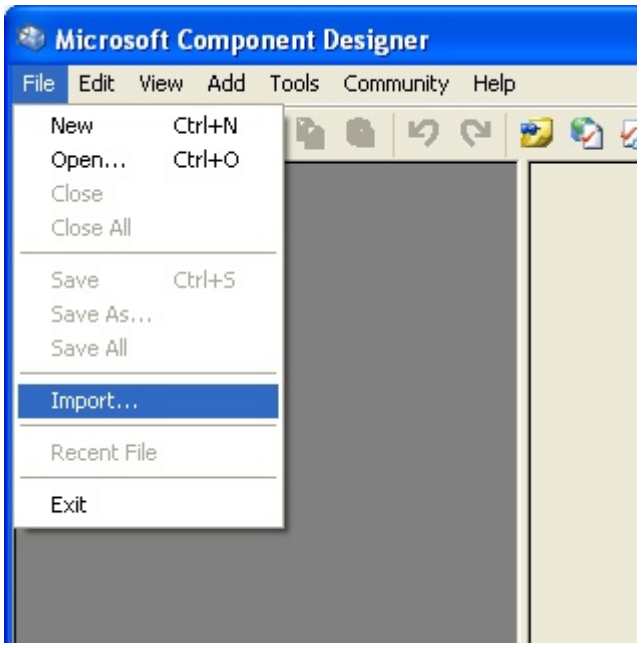
- "devices" – contains a file representing all hardware devices on the phyCORE® Z500PT.
- "driver" – contains all driver components needed
- "look and feel" – contains OPTIONAL components to make Windows Embedded Standard 2009 look better and feel more like a full Windows Operating System. "look and feel" is in no way required, if you need an Image as small as possible you are free not to include it in your image.

Now browse further to "driver → Graphics → Driver"



In this folder you find the driver we need to build our component.

Switch back to the Component Designer to start the creation process.

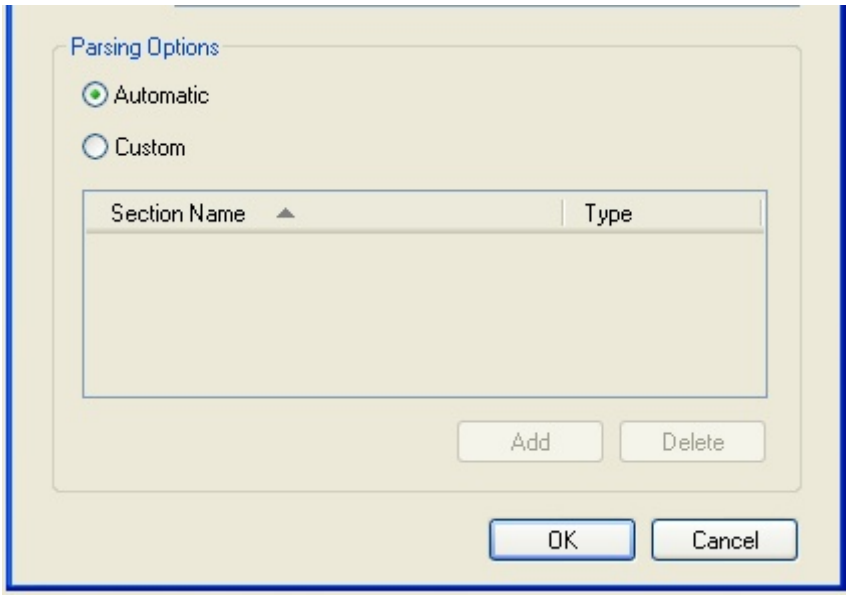


Click “File → Import…”.
In the appearing “Choose File for Import”-Window browse to your components folder, you’ve copied earlier. Head down the road to driver → Graphics → Driver.

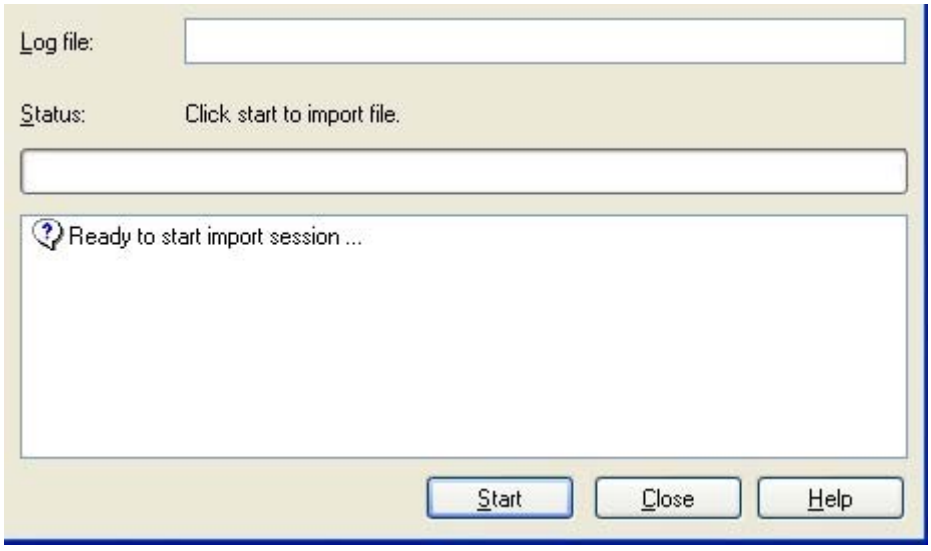
As you can see you see nothing. //change?

Use the dropdown menu at the bottom of this windows to change “Target Analyzer files (*.pmq)” to “Setup information files (*.inf)”.

Immediately the “iegd.inf” file appears, double click it to open it.

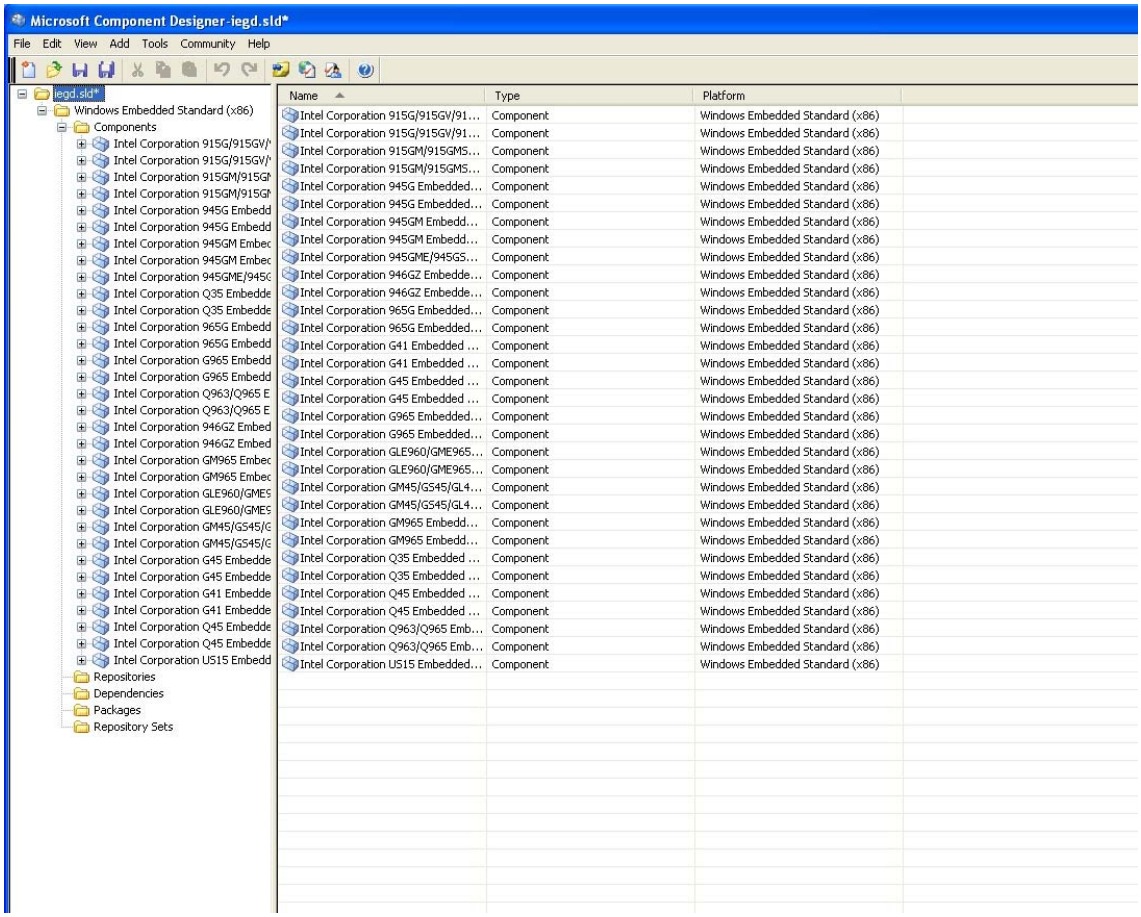


The “INF Processing Options” window pops up. Be sure that you choose the “Automatic”-Mode and click “OK” to start the import.



Optionally you can specify a log file where the import process will be documented. In case of an Error you can find out what went wrong with your import by considering the output messages. Do so if you like and press Start.

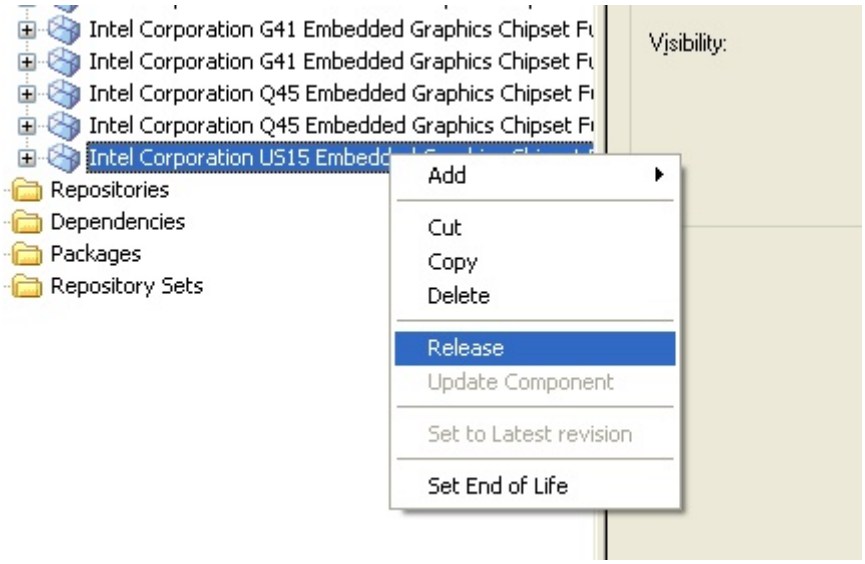
It may take several minutes to import a driver into the Component Designer depending on your hardware.



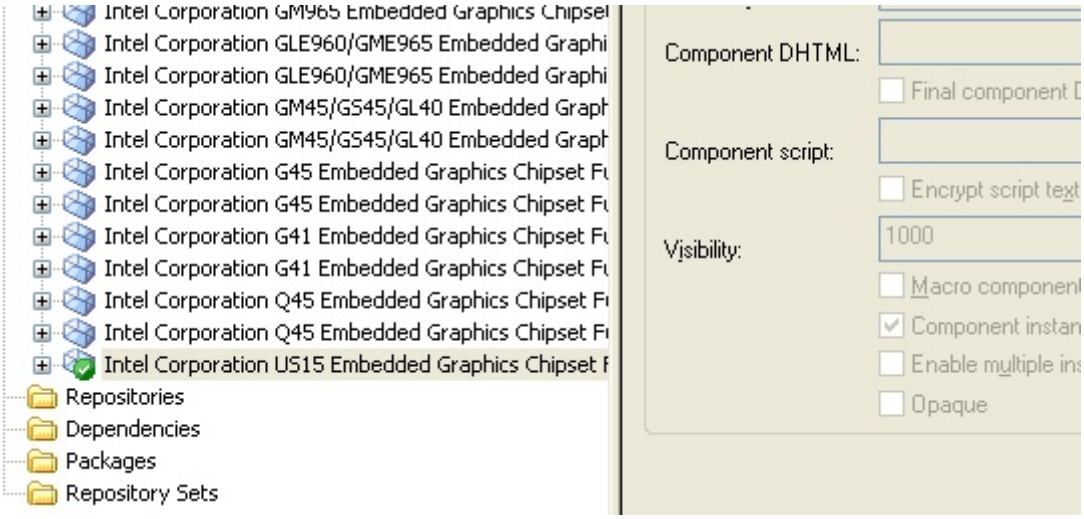
Ok, the IEGD driver obviously offers more drivers than we really need. To get to know which device we have to use, we need to have a short look at the hardware manual of the phyCORE® Z500PT.

Open up the hardware manual and do a quick search for “Graphic”. The first occurrence of “Graphic” is found on Page 20. Reading this passage we learn about some features of the chip and of course its name, what is the most important fact for us: “**SCH US15WP(T) (U2)**”

As our hardware manual talks about an US15 Chipset, we go back to the Component Designer searching for “US15”.



To enable the US15 Chipset driver just rightclick on the “Intel Corporation US15 Embedded Graphics Chipset Function 0” and choose “Release”.



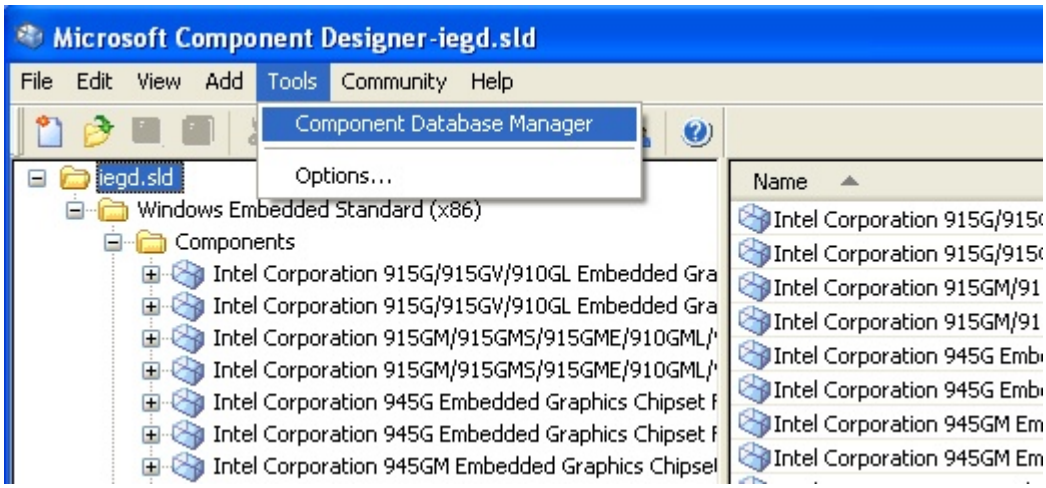
You see that your Component is activated now.

We have now finished the creation and activation of our first Component, the US15 Chipset driver.

3.3 Import and activate your first Component

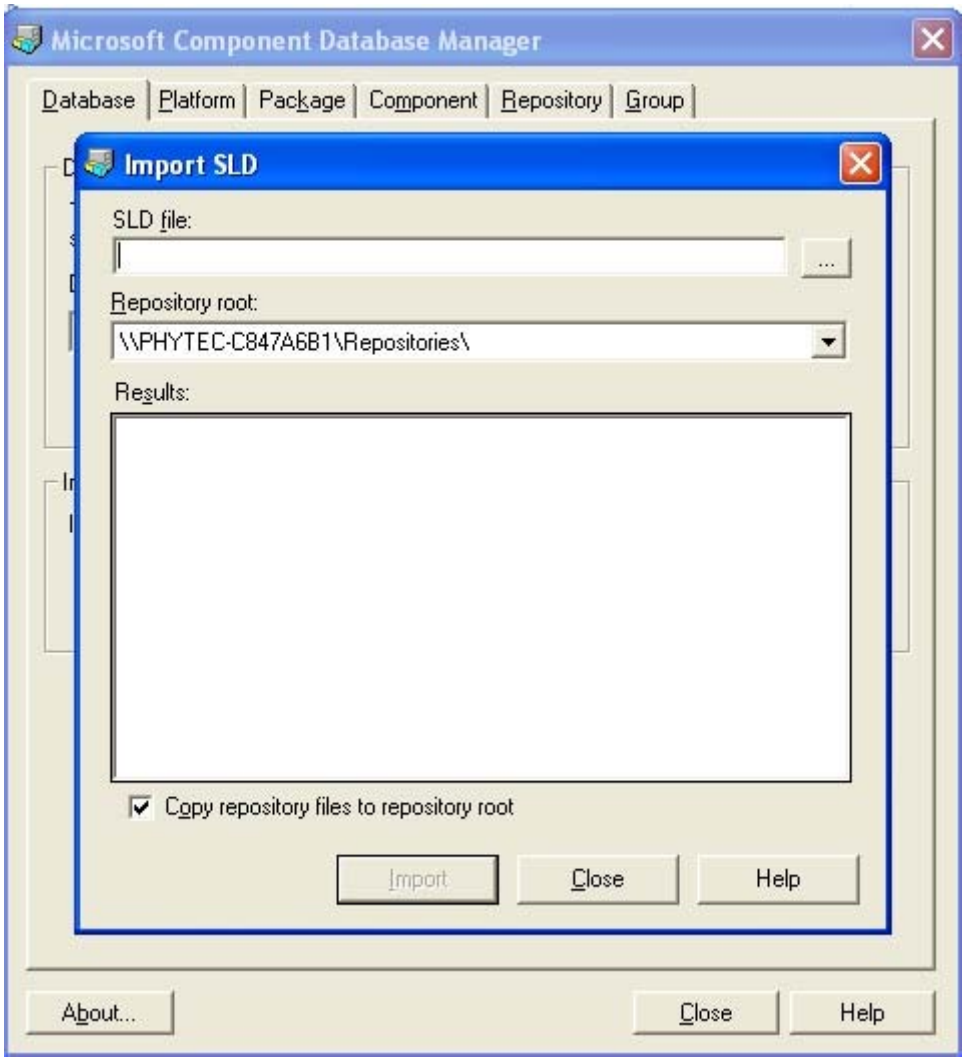
The next Step is to add your Component to the Windows Embedded Database.
To do so please first save your work!
Choose File → Save As… in the Component Designer, browse to your desired location and give the file a meaningful name.
In this tutorial we chose "iegd.sld" and saved it to the Users desktop.

Head back to the Component Designer, click Tools → Component Database Manager.



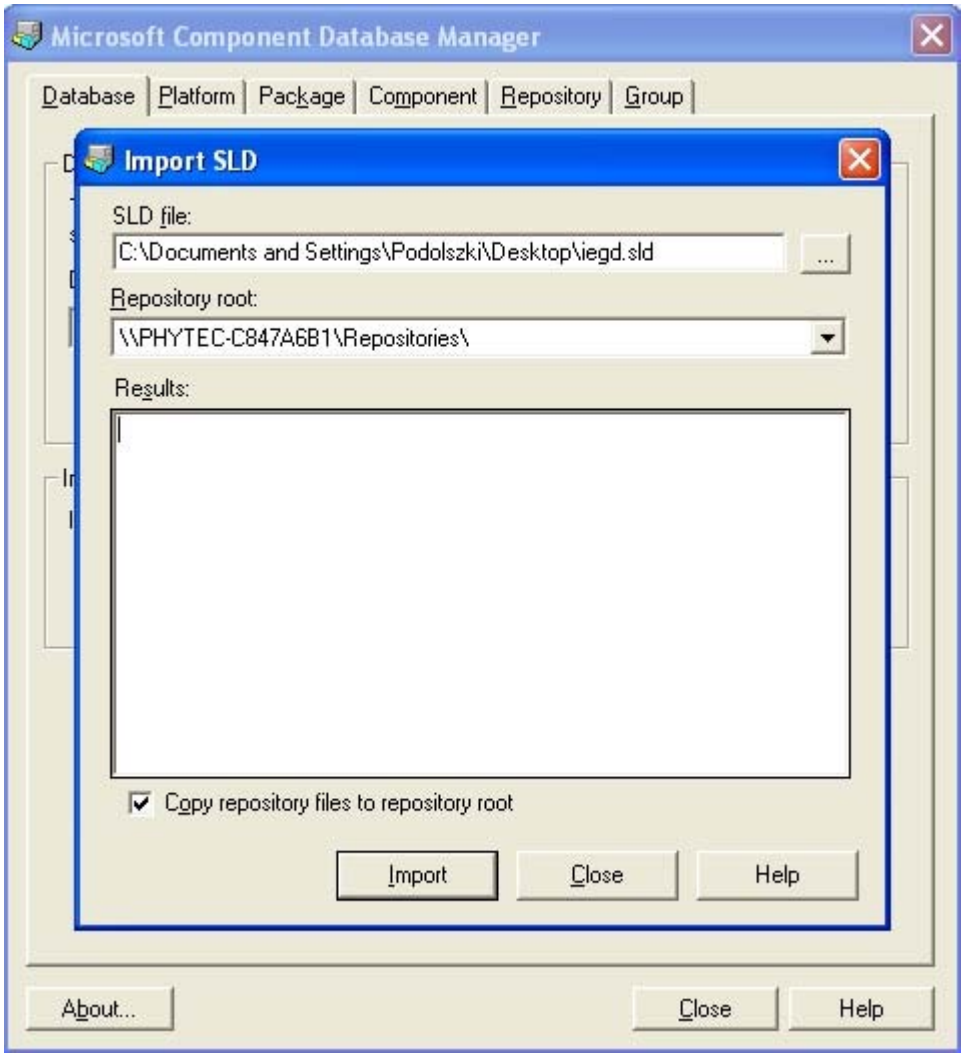
The main screen of the Microsoft Component Database Manager comes up and although it has several functions and options for adjustment of your database, we are currently only interested in the "Import…" Button on the Database Tab.

Clicking on this Button brings up the following screen.



Click the "…" Button and navigate to the "iegd.sld" (if you named the file differently choose the appropriate filename accordingly) and double click it.

Your screen will show something similar to this.



Clicking “Import” will start the automatic import.

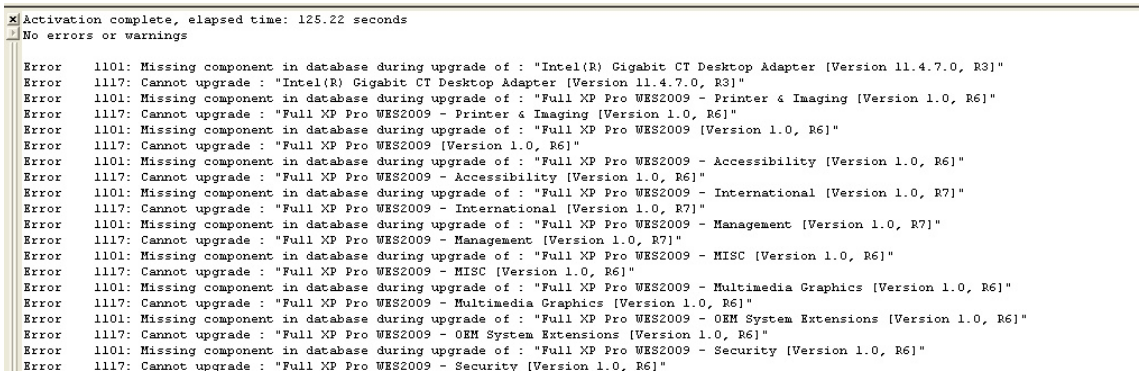
Be sure that, after the import has finished, the Database Manager tells you “Import Succeeded” and “Changes to the database have been committed”.

We have now finished the import of this driver to our database.

3.4 Use your first Component

You hopefully remember the Errors we got when we first started the "KPCM-041-WINEMB.slx" in the Target Designer.

We do that again now. Start up the Target Designer if it's not already open, and click File → Open…, select the "KPCM-041-WINEMB.slx" file in the "full Image" folder and click Open.
Again, it takes some time to open the configuration.
When the Target Designer has finished opening the project file, you'll see something similar to this:



There are still errors, of course, we haven't added all of the necessary components, we've added just one, the US15 chipset component.
And exactly this component is missing in the error list now.

With our first component created, imported and activated, you have successfully passed this step in the tutorial.

To add the missing Components to your Database you have 2 possibilities.
You can either create the components yourself, or you can just import the components shipped on the CD of the phyCORE® Z500PT.

If you choose option one, which we recommend, for at least one component, because of the learning effect, you proceed the same way as we did with the US15 Chipset driver.

Using the second choice you can just import the *.sld files stored on the DVD.

They are located at: “PCM041_phyCore-Z500PT\Windows-Kit\BSP\Components\drivers”.

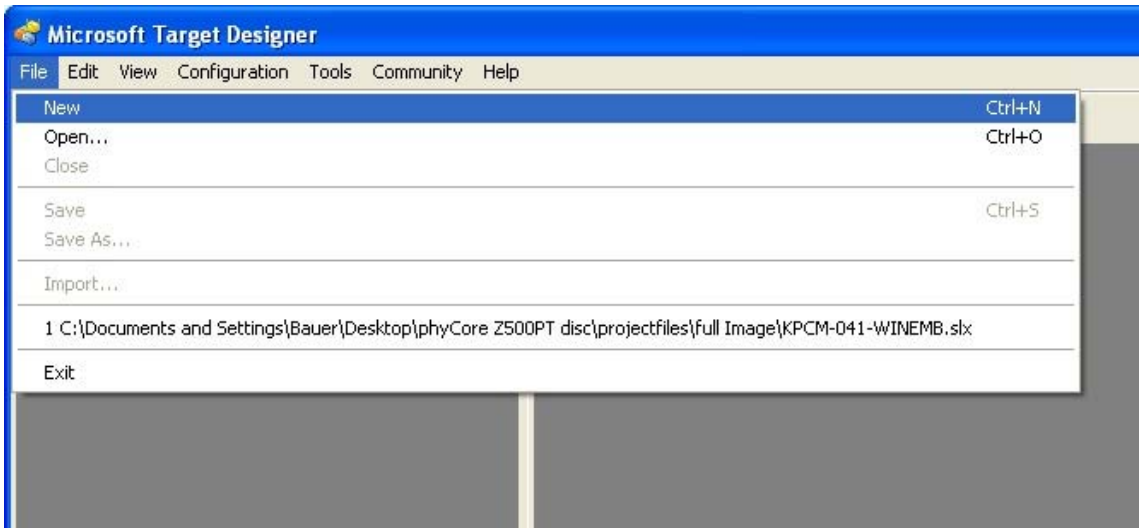
In order to import these components you can easily follow part 3.4 of the tutorial, where you have learned how to import a created component.

4 Start a new Image

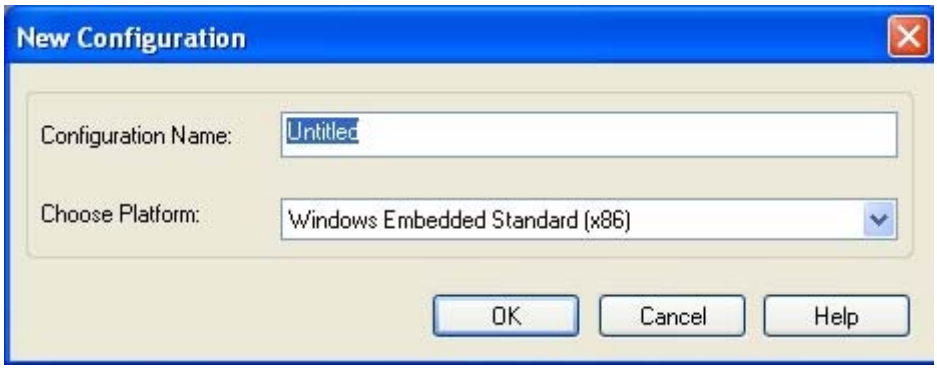
40 min

4.1 Creation of your Project

To begin developing your own custom Image, first start up the “Microsoft Target Designer”.
“Start → All Programs → Microsoft Windows Embedded Studio → Target Designer”
Then go to “File → New”.



In the upcoming “New Configuration” Dialog please enter a Configuration Name that describes your project.

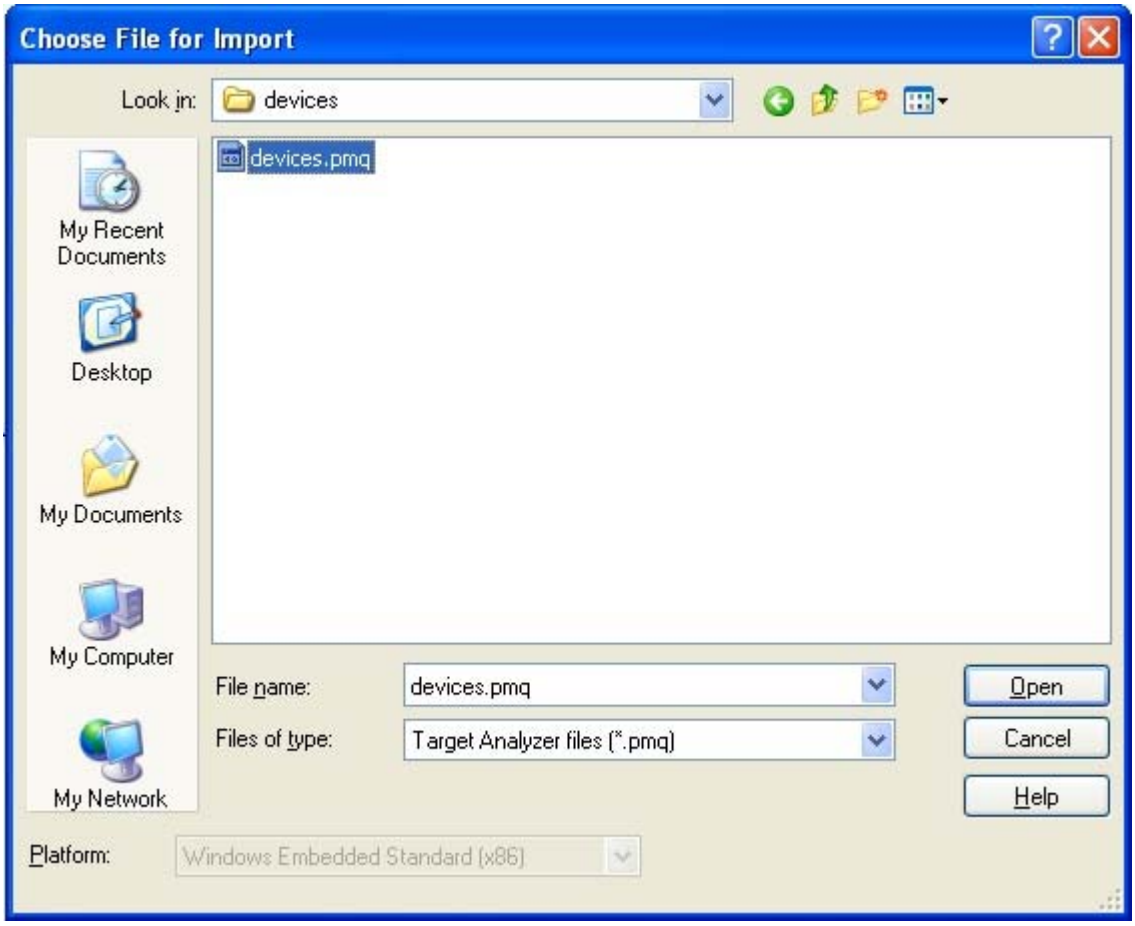


TIP

For this tutorial I named the Project “Embedded Quickstart”.

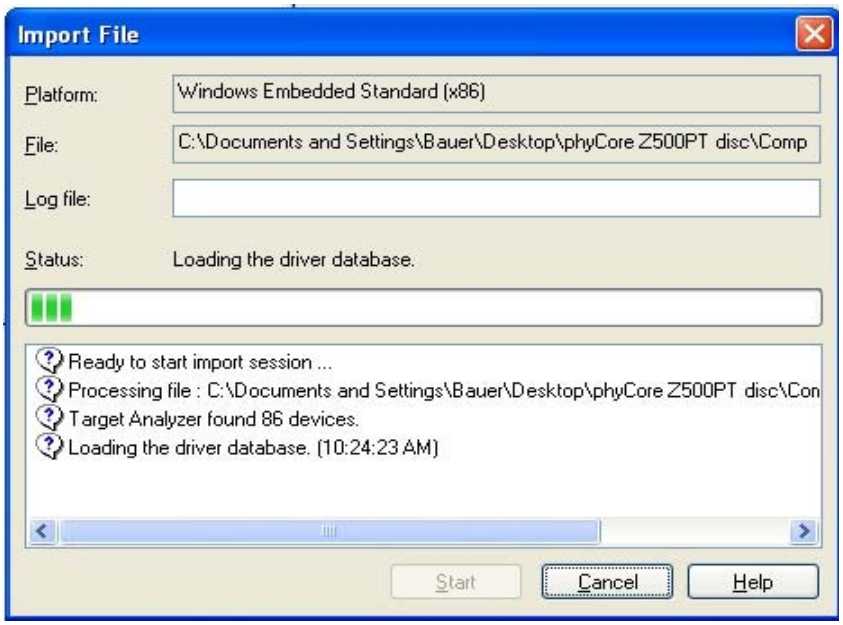
4.2 Important Components

To include all of the needed Hardware-Driver Components you need to import the “devices.mpq” found on the DVD. Click “File → Import…” in the Target Designer to bring up the “Choose File for Import”. Browse to “PCM041_phyCore-Z500PT\Windows-Kit\BSP\Components\devices\” and open “devices.mpq”.



You can optionally provide a name for a log file, if you want to get further information in case of an Error.

Click “Start” to start the import process.



How the “devices.mpq” is created, will be explained in Chapter **5.1**. For this tutorial we already have what we need.

During the Import you will see many warnings telling you that your repository is missing a file.

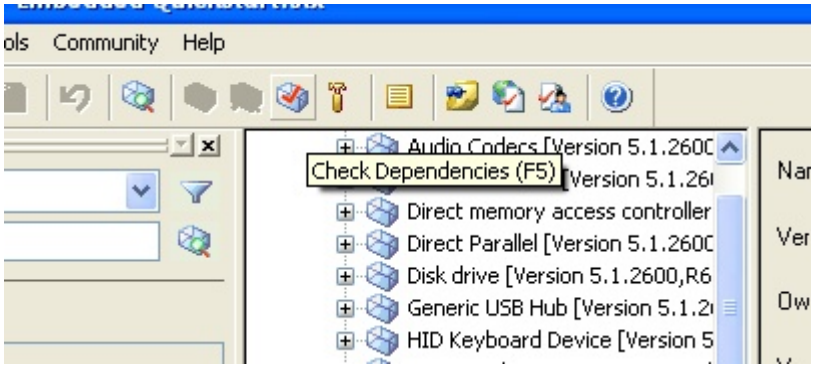
We concentrate on the following warning to make things clear.
To fix any other warning you will proceed accordingly.

Let’s take a look at the warning: “Can not find the resource pho-core.inf for Intel(R) SCH LPC Interface Controller - 8119”

You get this message when the Target Designer can’t find the specified file in its repository. This happens because our project-file includes some components you don’t have in your Component Database.

To fix this issue please import these Components as described in Chapter **3.3**.

4.3 Dependency Check and Build



Please use the “Check Dependencies” Button frequently.
It checks your Image for missing Components and adds these accordingly.
The Target Designer also wants you to check for dependencies everytime you build your Image.

5 Necessary Steps for every new Image

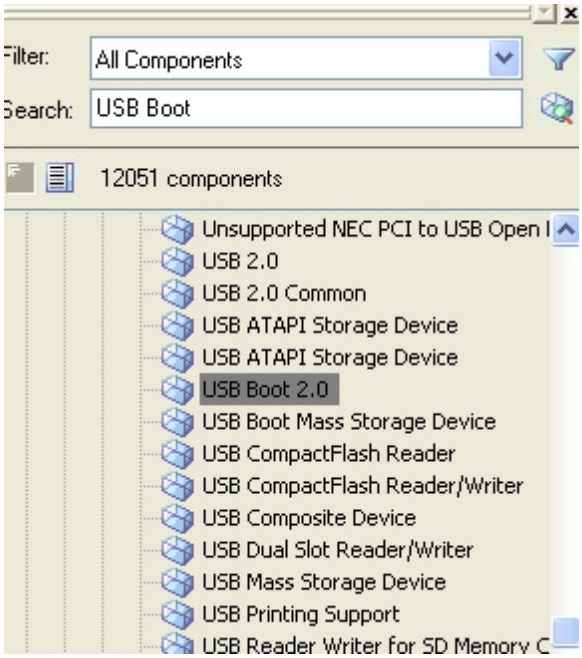
50 min

5.1 Build your devices.mpq

Every time you alter your hardware configuration you have to change your image. The “devices.mpq” will help you in that case because it lists every hardware component on your system. You can easily import your .mpq file and the Target Designer automatically adds the needed components for your hardware.
Microsoft added two small programs to the Windows Embedded Studio, to help getting all hardware information that is needed for your Image.
These are called “Ta.exe” and “Tap.exe” where “Ta.exe” is a 16-Bit executable and “Tap.exe” a 32-Bit executable.
The easiest was to use these tools is to install a standard Windows XP to your device and run “Tap.exe”. This will create your specific “devices.mpq” in the same folder.
This file can then be imported using the Target Designer, like we did in the “Getting More Involved” Part of the QuickStart.

5.2 Enable USB Boot in your Image

To get the possibility to boot your Image from an USB-Stick you need the "USB Boot 2.0" Component.



Run a "Dependency Check" afterwards to ensure all necessary requirements are added to your Image.
Afterwards you can copy your Image to an USB-Stick and boot from there.

5.3 Get your Image running on the phyCORE® Z500PT

When you have successfully built your Image you are ready to deploy it to the phyCORE® Z500PT.

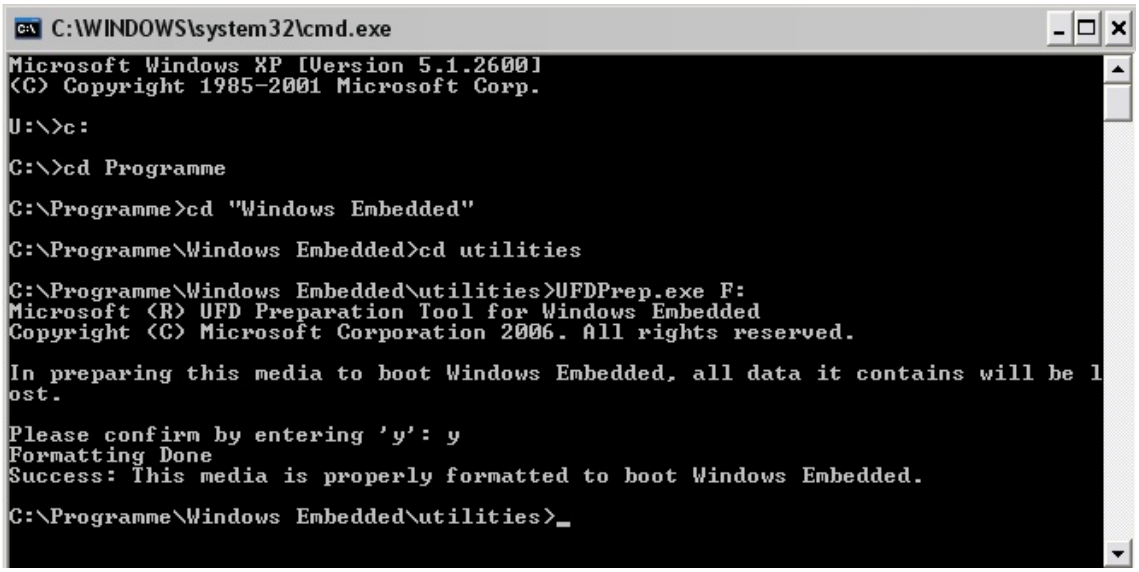
Alternatively you can use the pre-built Image on the phyCORE® Z500PT disc, located in the folder "PCM041_phyCore-Z500PT\Windows-Kit\BSP\Image".

To get you up and running, you just have to copy the content of the Image folder (standard: “c:\Windows Embedded Images”) onto a bootable device on your phyCORE® Atom-Kit. You can use either the internal SSD (Flash drive) or an external USB-Stick.

If you use an USB-Stick you first have to ensure that you enabled “USB-Boot” in your Image (see 5.3).
After that you need to prepare your USB-Stick with “UFDPrep.exe” located in “C:\Program Files\Windows Embedded\utilities\”.
Start UFDPrep.exe in a command line with your USB-Stick Drive letter as parameter.
For example: “UFDPrep.exe F:”

Caution! The Drive you enter as parameter will be formatted and all Data will be lost! Be sure that you enter the correct drive letter

After hitting “Enter” you will get asked if you really want to format this drive, confirm with “y”. The formatting will take some seconds, after which your USB-Stick is ready to boot your Image.



6 Summary

This QuickStart Instruction gave a general "Rapid Development Kit" description, as well as software installation advice and an example project enabling quick out-of-the box start-up of the phyCORE® Z500PT in conjunction with Windows Embedded Standard 2009.

In the Getting started section you learned how to install Microsoft Windows Embedded Studio, what you need to run the Development Environment and what requirements it needs.

In the Getting More Involved section you got a step-by-step instruction on how to include the phyCORE® Z500PT Image Components using Windows Embedded Studio.

In the Building an Image section you learned how to build a new image from scratch.

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Document number: **L-727e_1, March 2010**

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Did you find any mistakes in this manual? page

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