OMAP35x Windows Embedded CE 6.0 BSP User Manual
BSP Documentation

Logic PD // Products
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Revision History

REV	EDITOR	DESCRIPTION	APPROVAL	DATE
A	CTB, JCA	-Moved content from the Zoom OMAP35x Development Kit User Manual (PN 1010047) -Updated for Windows CE BSP version 2.0.0 release	EF	08/13/10
B	JCA	-Section 2.2: Updated listing of sub-directories	JCA	10/20/10
C	JCA	-Throughout: Updated name format for BSP download; -Section 5.3: The step recommending a "Rebuild and Sysgen" has been changed to "Clean Sysgen"; removed associated steps that only pertained to the Rebuild and Sysgen action.	JCA	03/11/11
D	GLJ	-Section 5.2: Step #4; revised important note for deleting specific folders	JCA	05/27/11

Table of Contents

1   Introduction

This User Manual provides information pertaining to Logic PD's OMAP35x Windows Embedded CE 6.0 Board Support Package (BSP).

1.1   Document Notes

Nomenclature

The OMAP35x Windows CE 6.0 Source BSP is compatible with both the OMAP35x SOM-LV and OMAP35x Torpedo SOM platforms. Within this User Manual, "OMAP35x Development Kit" is used to refer to both the Zoom™ OMAP35x (SOM-LV) Development Kit and the Zoom OMAP35x Torpedo Development Kit. Where information only pertains to one kit, the individual kit name will be used to make that clear.

Note on Images

The images of screen captures included in this User Manual exist only as examples of what may appear on your PC display during software installation and use of the BSP; please note that version numbers, file names, and other items may differ from the current release.

2   Download Windows CE Source BSP

The first step in using Logic PD's Windows CE BSP is to download the most current source BSP release from Logic PD's website.

2.1   Prerequisites

- OMAP35x Development Kit registered on Logic PD's website
    - □   Registration is required to grant you access to your product's download page from where the BSP can be downloaded
- Host PC
- Internet connection

2.2   Download Steps

1. Depending on the OMAP35x Development Kit you are using, click on the appropriate link below to open a web browser to the downloads page. (If you are not already logged in, you will need your username and password that was setup during registration to access the downloads page.)

    Zoom OMAP35x (SOM-LV) Development Kit Downloads Page
    Zoom OMAP35x Torpedo Development Kit Downloads Page

2. Under the *Windows CE* category, click on *OMAP35x Windows CE 6.0 Source BSP* to begin the download.

3. Save the file to your PC.

4. After the download completes, locate the *101xxxx_OMAP35x_WinCE600_x_x_x_Source.zip* archive on your PC.

5. Unzip the *101xxxx_OMAP35x_WinCE600_x_x_x_Source.zip* archive to a directory of your choice.

6. After unzipping *101xxxx_OMAP35x_WinCE600_x_x_x_Source.zip*, visually verify that the following sub-directories and files have been created:

```
logic_som_omap35xx_source_readme.txt
Windows CE Development Prerequisites.txt
.\Binaries
        \<OS Design Name>
                \<Platform Name>
                        \several NK.bin files
        \LogicLoader_Scripts
.\Documentation
        Driver Description documents for specific components
        Feature Matrix
.\OSDesigns
        \<OS Design Name>
.\PLATFORM
        \COMMON\SRC\SOC\<SOC Name>
                Several subfolders and files
        \<Platform Name>
                Several subfolders and files
```

7. Take special note of the two text files at the root level:
    logic_som_omap35xx_source_readme.txt and *Windows CE Development Prerequisites.txt*.
    Both of these files will be referenced later in this User Manual.

2.3   Next Steps

From this point, you can continue through this User Manual in order or, based on the following descriptions, you can jump to the section that is most appropriate for your use.

■   Section 3 "Sample Pre-Built Images" describes how you can use the pre-built NK.bin binary files (included in the BSP download) to evaluate the BSP on the OMAP35x Development Kit. These NK.bin files are loaded to the OMAP35x Development Kit via an external source (SD card, CompactFlash card, or Ethernet).

■   Section 4 "Prepare for Windows CE Development" walks you through installing the evaluation version of Windows Embedded CE 6.0 on your host PC, including Visual Studio 2005 and Platform Builder. If you already have these programs installed on your PC, you can skip this section.

■   Section 5 "Build Logic PD's Windows CE Source BSP" describes how to begin Windows CE development using Logic PD's BSP and OMAP35x Development Kit. Visual Studio 2005 and Platform Builder must be installed on your host PC before proceeding with this section.

3 Sample Pre-Built Images

This section describes how to load a Windows CE pre-built image (NK.bin) on the OMAP35x Development Kit using three different methods: SD card, CompactFlash card, and Ethernet.

Sample NK.bin binary files allow you to evaluate Logic PD's BSP on the OMAP35x Development Kit. They are also useful for application development since each image includes helpful libraries and a variety of drivers. Logic PD's sample NK.bin images are not meant for production and should not be regarded as production-ready.

3.1 Prerequisites

■ Tera Term terminal emulator (or equivalent).

■ The most current Windows CE Source BSP release, as described in Section 2.

■ An SD card or CompactFlash card with a capacity of at least 32 MB—this card must be large enough to store the sample NK.bin file.

■ An Ethernet cross-over cable.

3.2 Load Pre-Built Image via SD Card

This section describes how to load the NK.bin image from an SD card using LogicLoader and then boot the image.

1. Locate the *101xxxx_OMAP35x_WinCE600_x_x_x_Source* file that you extracted in Section 2.

2. Read through the *logic_som_omap35xx_source_readme.txt* to learn of any dependencies specific to the most current release.

3. Navigate to the *.\Binaries\<OS Design Name>* directory and you will find several NK.bin files.

4. Copy the *<SOM_Type>_NK.bin* file from that directory to an SD card. (Make sure to copy the appropriate file for your OMAP35x Development Kit.)

5. Insert the SD card into the OMAP35x Development Kit's SD card slot. **NOTE:** For the OMAP35x Torpedo Development Kit, use the primary SD card slot (J21) located closer to the middle of the baseboard edge.

6. Verify the OMAP35x Development Kit is connected to the host PC via serial cable and is connected to the power supply. (Detailed instructions for these connections can be found in the respective OMAP35x Development Kit User Manuals.)

7. Launch Tera Term on the host PC.

8. In Tera Term, select Setup > Serial port... from the menu bar. Set the Baud rate to **115200**, Data to **8 bit**, Parity to **none**, Stop to **1 bit**, and Flow control to **none**.
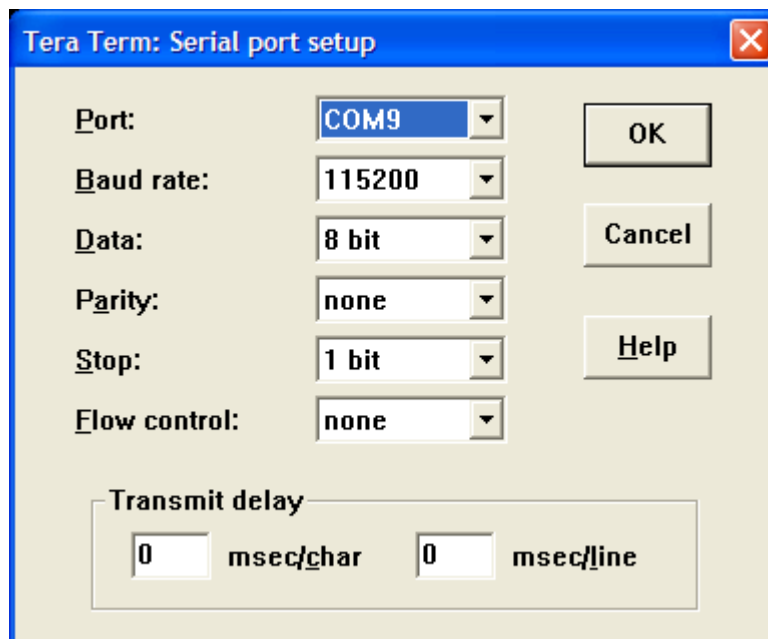
9. Power on the OMAP35x Development Kit and verify the LogicLoader prompt appears in the terminal emulator window.

10. Mount the SD card in LogicLoader by typing: `mount fatfs /dev/sdmmc0a /sd`
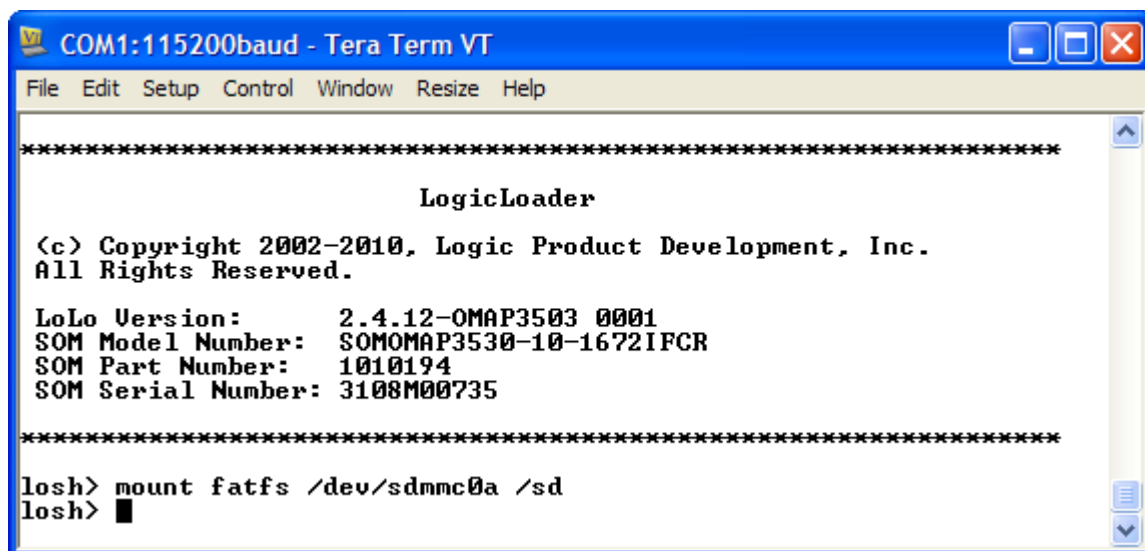
11. Type `cd /sd` and press the Enter key to change directories to the SD card.

12. Type `ls` to list the contents of your SD card and confirm the *<SOM_Type>_NK.bin* file is on the card.

```
*****************************************************************
losh> mount fatfs /dev/sdmmc0a /sd
losh> cd /sd
losh> ls
     :                    SOM_LV_NK.bin 28032595
losh> █
```

13. Type `load bin` *<SOM_Type>*`_NK.BIN` (use the correct NK.bin filename) and press the Enter key to load the NK.bin into RAM. **IMPORTANT:** LogicLoader is case sensitive, so be sure to type the filename the same way it appears in LogicLoader after using the `ls` command.

```
*****************************************************************
losh> mount fatfs /dev/sdmmc0a /sd
losh> cd /sd
losh> ls
     :                    SOM_LV_NK.bin 28032595
losh> load bin SOM_LV_NK.bin
```
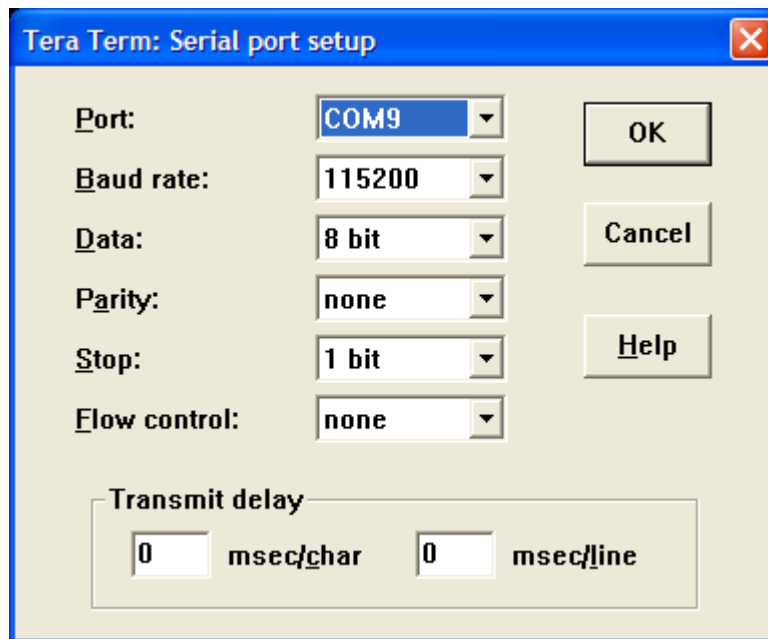
```
COM1:115200baud - Tera Term VT
File   Edit   Setup   Control   Window   Resize   Help
................................................................
................................................................
................................................................
................................................................
................................................................
................................................................
..........................
image launch addr: 0x8120a0e0

Verifying checksums: >>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
Checksums good.
file loaded
losh>
```

14. When the losh> prompt returns after displaying `Checksums good. file loaded`, your NK.bin has been successfully loaded into system RAM and is ready to boot.

   NOTE: The sample NK.bin images provided on Logic PD's website run from system RAM and cannot be burned to system flash. Since the sample NK.bin images are volatile, they need to be loaded from a external source (like an SD card) after every power cycle.

15. Type **exec** and press the Enter key to boot the NK.bin.

16. Immediately, the kit LCD should turn on. In Tera Term, you will see a message stating
    Starting Kernel... and then other output messages.

17. After allowing time for the image to boot, the kit LCD may prompt you to calibrate the
    touchscreen by pressing a stylus to the center of cross-hairs on the screen. If necessary,
    follow the onscreen instructions and the NK.bin will boot and display the Windows Embedded
    CE 6.0 GUI on the kit LCD.

3.3   Load Pre-Built Image via CompactFlash Card

NOTE: This section only applies to OMAP35x (SOM-LV) Development Kit; the OMAP35x
Torpedo Development Kit does not have a CompactFlash card slot.

The process for loading a sample image via CompactFlash card is very similar to the SD card.

1. Locate the *101xxxx_OMAP35x_WinCE600_x_x_x_Source* file that you extracted in Section
   2.

2. Read through the *logic_som_omap35xx_source_readme.txt* to learn of any dependencies
   specific to the most current release.

3. Navigate to the .*Binaries\<OS Design Name>* directory and you will find several NK.bin files.

4. Copy the *SOM_LV_NK.bin* file from that directory to a CompactFlash card.

5. Insert the CompactFlash card into the OMAP35x Development Kit's CompactFlash card slot.

6. Verify the OMAP35x Development Kit is connected to the host PC via serial cable and is connected to the power supply. (Detailed instructions for these connections can be found in the Zoom OMAP35x Development Kit User Manual.)

7. Launch Tera Term on the host PC.

8. In Tera Term, select Setup > Serial port... from the menu bar. Set the Baud rate to **115200**, Data to **8 bit**, Parity to **none**, Stop to **1 bit**, and Flow control to **none**.

9. Power on the OMAP35x Development Kit and verify the LogicLoader prompt appears in the terminal emulator window.

10. Mount the CompactFlash card in LogicLoader by typing: `mount fatfs /dev/ata0a /cf`

11. Type `cd /cf` and press the Enter key to change directories to the CompactFlash card.

12. Type `ls` to list the contents of your SD card and confirm the *SOM_LV_NK.bin* file is on the card.

13. Type `load bin SOM_LV_NK.BIN` and press the Enter key to load the NK.bin into RAM.
IMPORTANT: LogicLoader is case sensitive, so be sure to type the filename the same way it appears in LogicLoader after using the `ls` command.
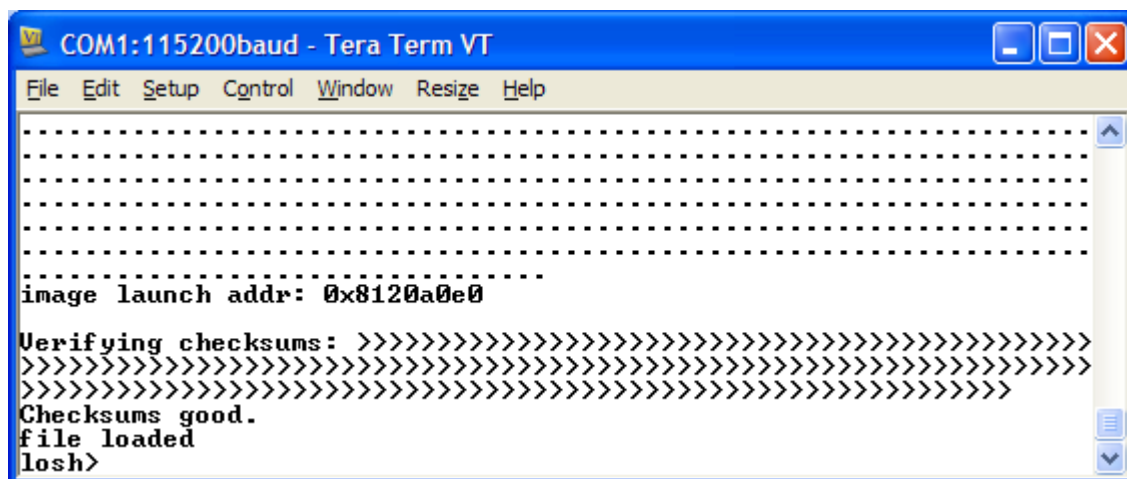
14. When the losh> prompt returns after displaying `Checksums good. file loaded`, your NK.bin has been successfully loaded into system RAM and is ready to boot.

    NOTE: The sample NK.bin images provided on Logic PD's website run from system RAM and cannot be burned to system flash. Since the sample NK.bin images are volatile, they need to be loaded from an external source (like an SD card) after every power cycle.

15. Type **exec** and press the Enter key to boot the NK.bin.

16. Immediately, the kit LCD should turn on. In Tera Term, you will see a message stating `Starting Kernel...` and then other output messages.

17. After allowing time for the image to boot, the kit LCD may prompt you to calibrate the touchscreen by pressing a stylus to the center of cross-hairs on the screen. If necessary, follow the onscreen instructions and the NK.bin will boot and display the Windows Embedded CE 6.0 GUI on the kit LCD.
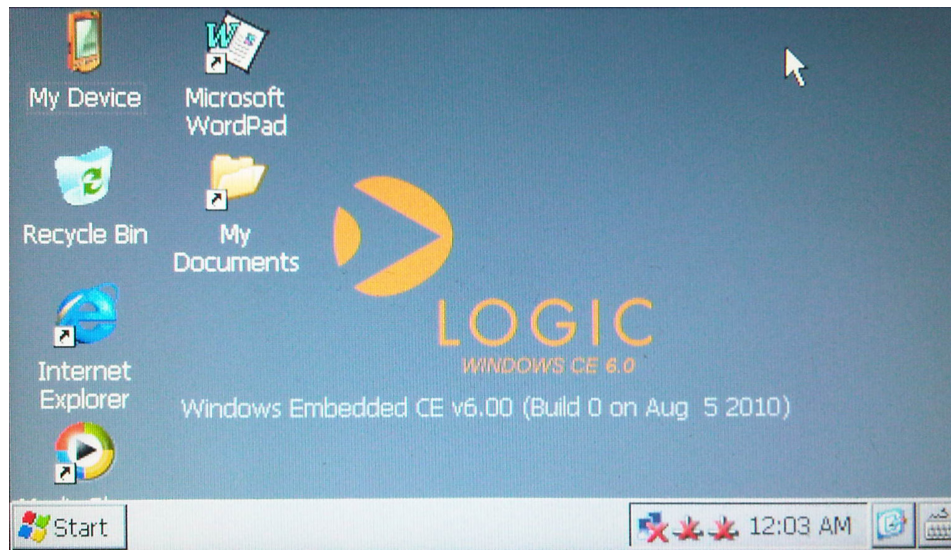
3.4 Load Pre-Built Image via Ethernet

This section describes how to download the OS image via Ethernet in LogicLoader (LoLo). It is assumed that a TFTP program has been installed on your PC.

1. Place the *<SOM_TYPE>_NK.bin* file in your TFTP folder.

2. Launch your TFTP program.
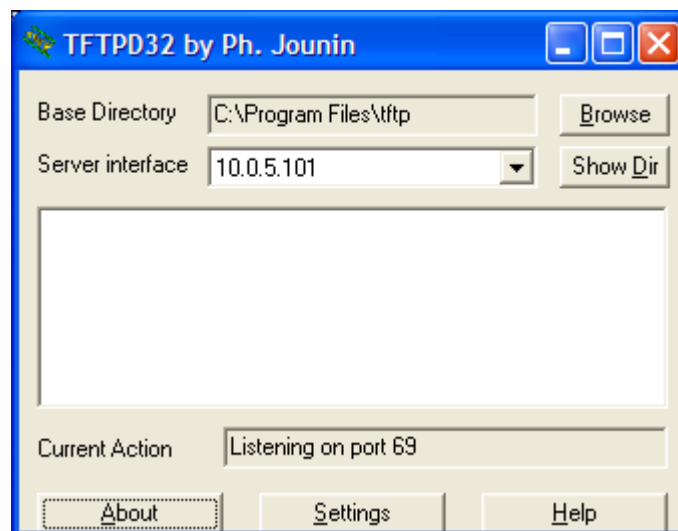
3. Start Tera Term type `ifconfig` and press the Enter key to initialize the Ethernet port.

4. Then type `ifconfig sm0 dhcp` and press the Enter key to start DHCP.

5. Finally type `ifconfig` and press the Enter key to obtain an IP address.

```
Tera Term - COM1 VT

File  Edit  Setup  Control  Window  Help

*******************************************************************
                        LogicLoader

 (c) Copyright 2002-2008, Logic Product Development, Inc.
 All Rights Reserved.
 Version 2.4.2-OMAP3503 0001
*******************************************************************

losh> ifconfig

sm0: up   100M full-duplex  (25)
sm0:      mac: 00:08:ee:02:38:79 ip: 0.0.0.0
          mask: 0.0.0.0   gw: 0.0.0.0
losh> ifconfig sm0 dhcp
Starting DHCP on sm0 .
losh> ifconfig

sm0: up   100M full-duplex  (25)
sm0:      mac: 00:08:ee:02:38:79 ip: 10.0.5.119
          mask: 255.255.252.0    gw: 10.0.4.1
losh>
```

6. Type `load bin /tftp/`**`<x.x.x.x>:<SOM_TYPE>`**`_NK.bin` (use the correct IP address and NK.bin filename for your setup) and press the Enter key.

```
Tera Term - COM1 VT

File  Edit  Setup  Control  Window  Help

losh> load bin /tftp/10.0.5.101:NK_release.bin
loading from /tftp/10.0.5.101:NK_release.bin:
R
..................................................................
..................................................................

..................................................................
..................................................................
.....................
image launch addr: 0x801094b8

Verifying checksums: >>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
>>>>>>>>>>>>>>
Checksums good.
...done
file loaded
losh> █
```

7. Type `exec` and press the Enter key to boot the NK.bin.

```
Tera Term - COM1 VT

File  Edit  Setup  Control  Window  Help

Verifying checksums: >>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
>>>>>>>>>>>>>>
Checksums good.
...done
file loaded
losh> exec
Windows CE Kernel for ARM (Thumb Enabled) Built on Feb  5 2008 at 10:48:36
PlatfromInit: DONE!!!
--- High Performance Frequecy is 32768 khz---
█
```

8. After allowing time for the image to boot, the kit LCD may prompt you to calibrate the touchscreen by pressing a stylus to the center of cross-hairs on the screen. If necessary, follow the onscreen instructions and the NK.bin will boot and display the Windows Embedded CE 6.0 GUI on the kit LCD.

4   Prepare for Windows CE Development

This section describes the steps required to prepare your PC for Windows CE development.

4.1   Prerequisites

- Host PC with DVD drive (DVD drive only required if using the *Windows Embedded CE 6.0 180-Day Evaluation Kit*).

- A current version of Internet Explorer, Firefox, or other web browser and access to the Internet.

- *Windows Embedded CE 6.0 180-Day Evaluation Kit* included with your OMAP35x (SOM-LV) Development Kit or equivalent downloads from the Microsoft Windows Embedded CE website.

- *Windows CE Development Prerequisites.txt* file included with the Logic PD Windows CE source BSP release.

4.2   Installation Overview

This section will walk you through the recommended installation steps for Visual Studio 2005 and Platform Builder. The following is a high-level look at the installation process:

1. Update your PC using Windows Update.

2. Install Visual Studio 2005 from the *Windows Embedded CE 6.0 180-Day Evaluation Kit* provided with the OMAP35x (SOM-LV) Development Kit or from the Microsoft Windows Embedded CE website.

3. Update Visual Studio from the Windows Update website, which includes the Visual Studio 2005 Service Pack 1.

4. Install Platform Builder from the Evaluation Packet.

5. Update Platform Builder.

   NOTE: Different versions of Logic PD's Windows CE BSP may require specific Microsoft Platform Builder updates. Since Microsoft releases monthly patches to Windows CE, please refer to the *Windows CE Development Prerequisites.txt* file to determine which updates pertain to your BSP version. This text file is located in the base directory of the Logic PD Windows CE BSP source package.

6. Run Visual Studio 2005.

7. Run the QFE Check tool from Visual Studio 2005

IMPORTANT NOTE: This document is written assuming the use of the Windows XP operating system. Other Windows operating systems, such as Vista and Windows 7, may require additional updates or installations. Please refer to the Microsoft website for necessary details.

4.3   Evaluation DVD vs. Downloads from Microsoft Website

The instructions in the following sections are written from the perspective of using the Evaluation DVD. It should be assumed that wherever the instruction exists to insert the DVD into your PC, you can access the equivalent installation files on the Microsoft Windows Embedded CE website.

4.4   Update Windows Operating System

Before beginning the installation of Visual Studio 2005, Platform Builder, or any Windows CE 6.0 components, verify that your Windows operating system has all of the most recent updates from Microsoft.
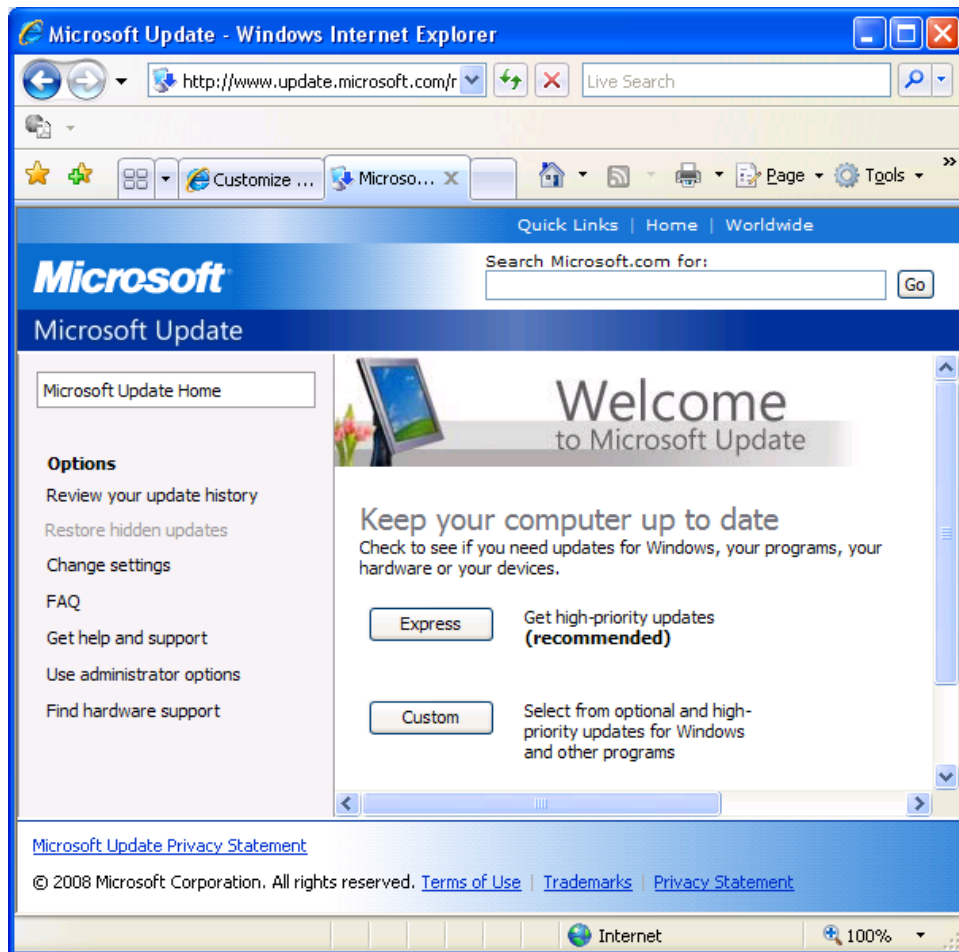
4.5   Obtain Product Key(s)

1. To obtain the Product Key for your Evaluation Kit, go to the URL specified on the sticker on the insider of your Evaluation Packet or click on the link to the Microsoft Windows Embedded CE website.

2. Under the *Get a Product Key* heading, click on the link for *Windows Embedded CE*.

3. Sign in with your Windows Live ID or sign up for a Windows Live ID. (**NOTE:** If you sign-up for a Windows Live ID during this step, an email will be sent to you to complete the activation process for your Windows Live ID. Complete this activation process before continuing with the next step.)

4. Fill in the online form and click the Continue button at the bottom of the page.

5. At the completion of the registration process, you will be presented with your Product Key(s) and you will also be emailed the Product Key(s). Have these available during the installation process below.

IMPORTANT NOTE: The emails sent from Microsoft in the steps above may get caught in any spam filter(s) associated with your email program. If the emails do not appear in your inbox, be sure to check your spam folders.

4.6 Install Visual Studio 2005

1. Insert the *Visual Studio 2005* DVD into your PC's DVD drive.

2. The "Visual Studio 2005 Setup" window will appear. Click on "Install Visual Studio 2005".

3. Visual Studio 2005 will begin loading installation components on your PC.
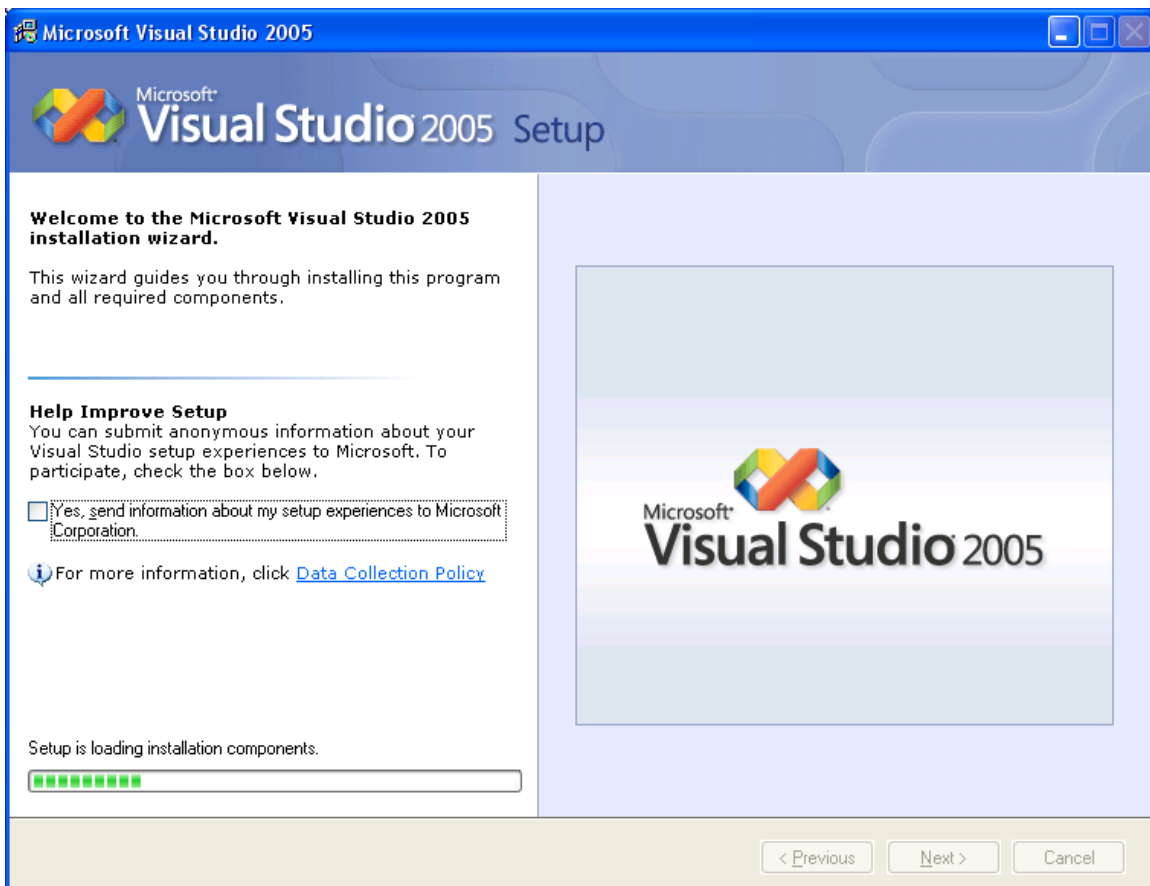
4. When the "Welcome to the Microsoft Visual Studio 2005 installation wizard" window appears, click the "Next>" button.
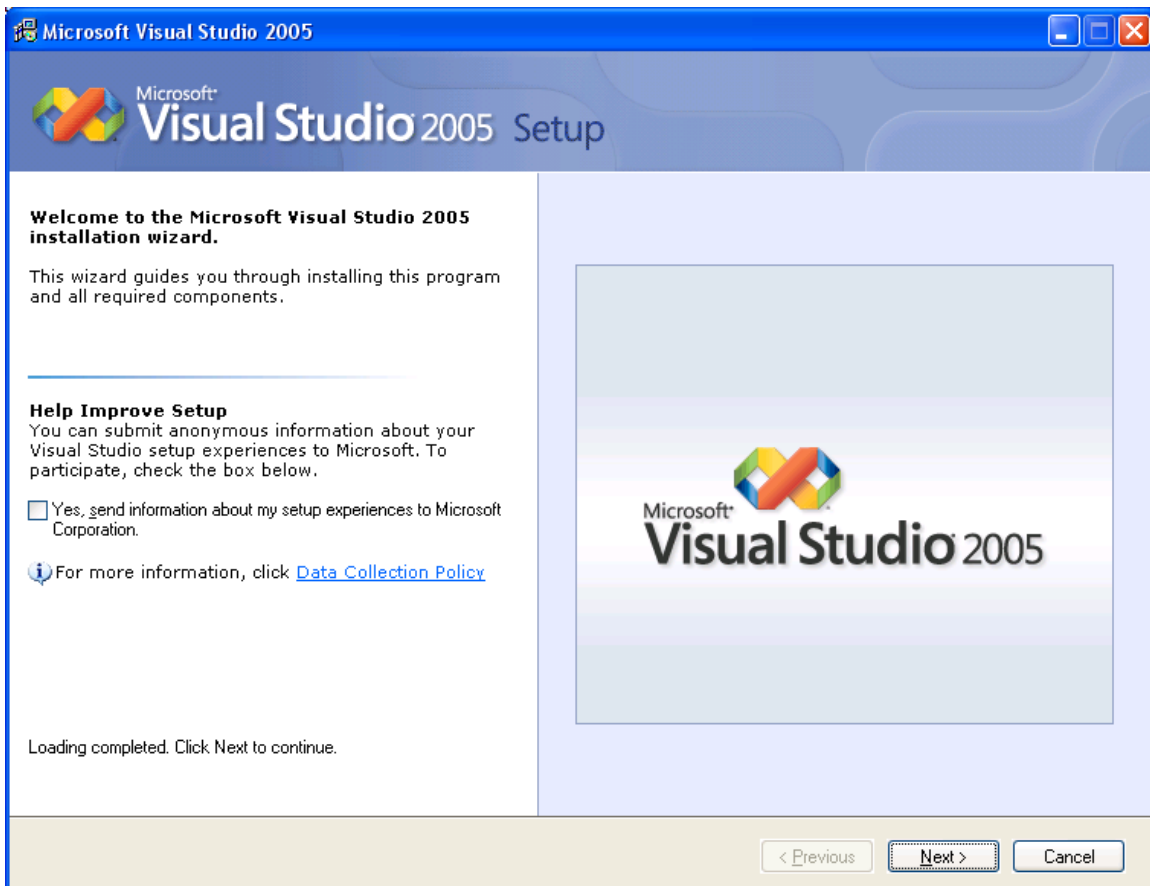
5. On the next screen, check the box to accept the terms of the License Agreement.

6. Enter the product key for your Visual Studio 2005 in the proper fields.

7. Enter your name in the proper field and then click the "Next>" button.
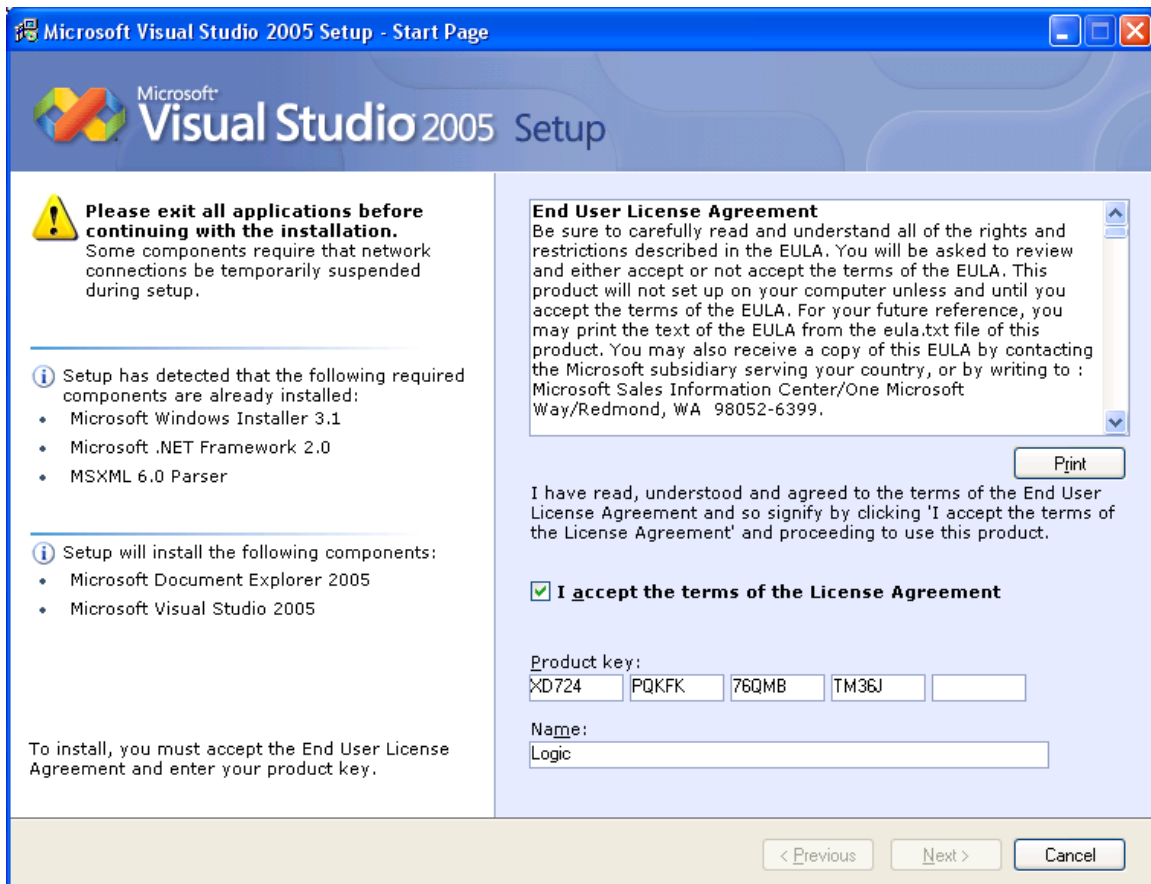
8. A warning prompt will open reminding you that you are installing a trial edition of Visual Studio. Click the "OK" button.
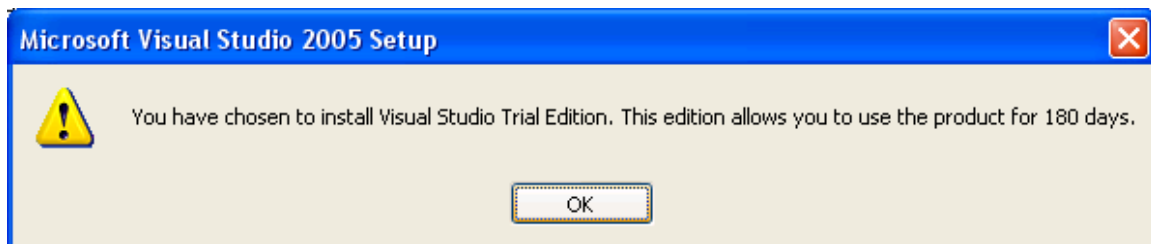
9. You will be asked to select which features to install. Select "Default".

10. It is recommended to use the default "Product install path". If this location is not appropriate for your PC, click the "Browse…" button and select a different install location.

11. Click the "Install" button.
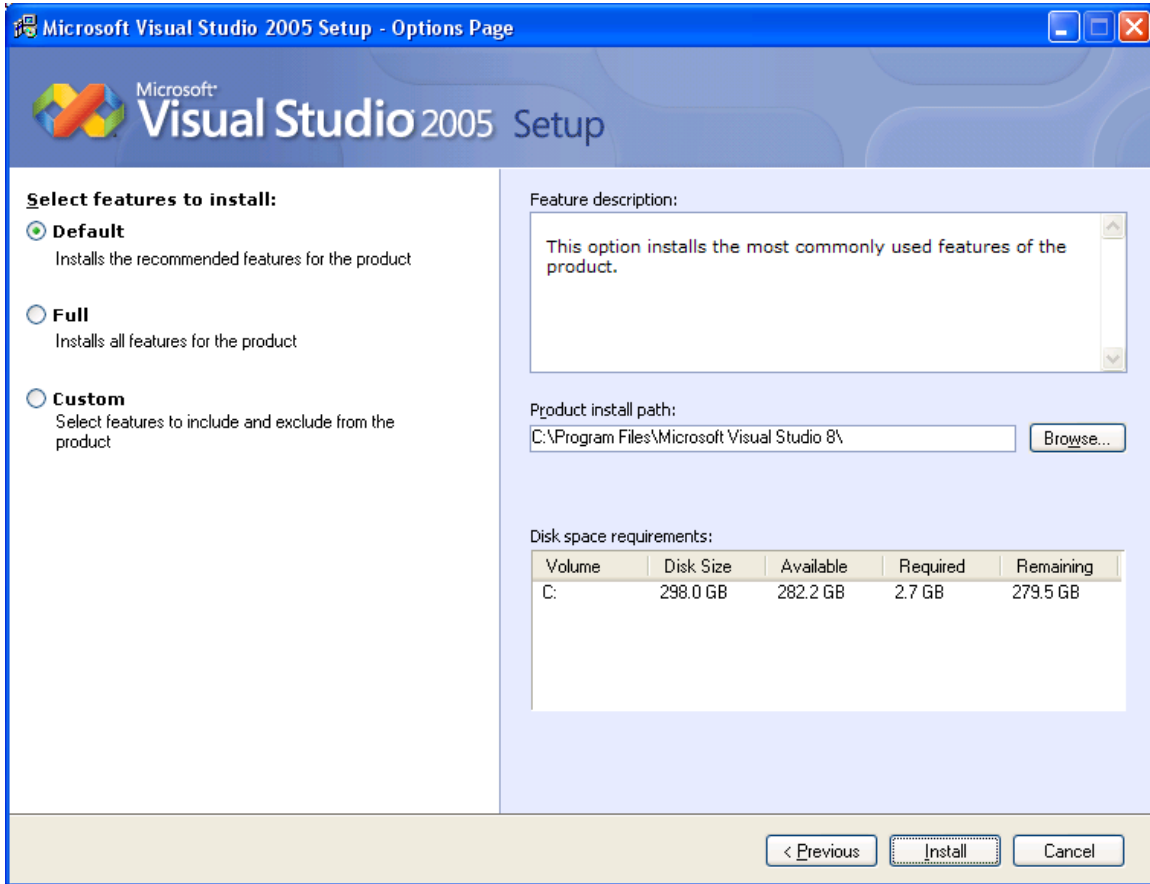
12. Visual Studio 2005 will begin installing on your PC. This may take quite some time depending upon the performance capabilities of your PC.

13. You will receive a "Success" notification when the installation process has completed. Click the "Finish" button to return to the main "Visual Studio 2005 Setup" window.
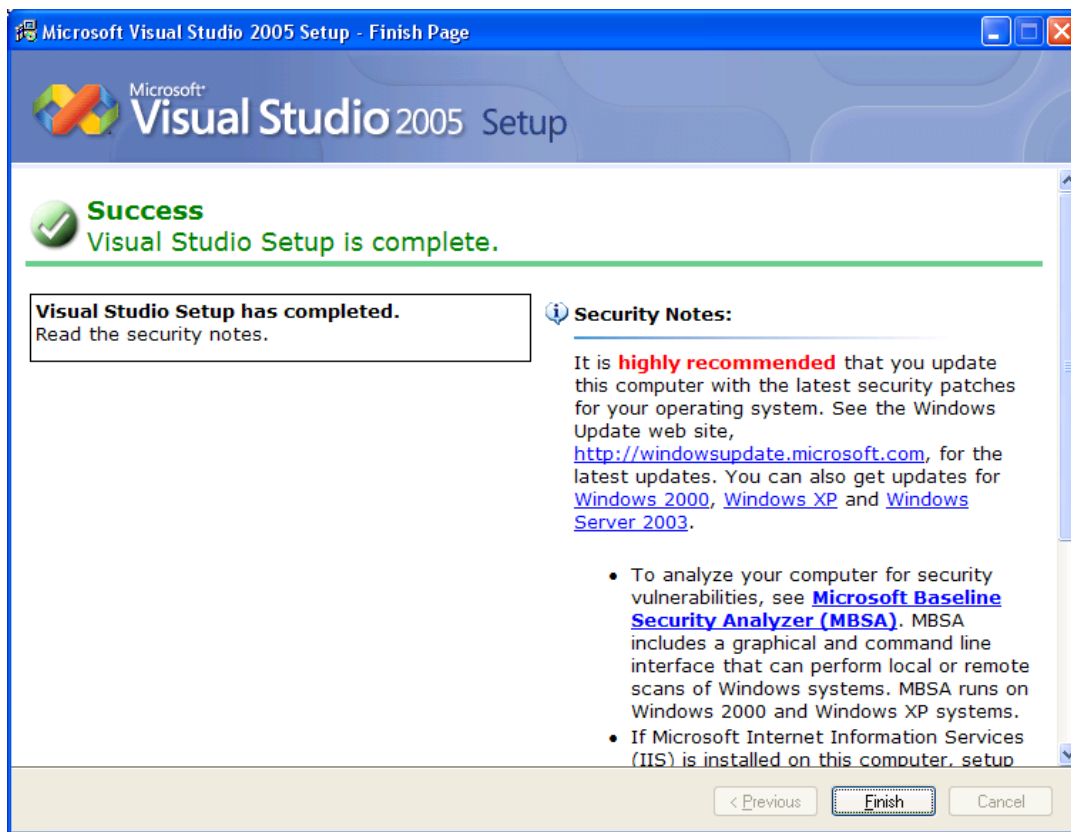
14. Click "Exit" and remove DVD from your PC.

4.7   Install Visual Studio 2005 Service Pack 1

1. Insert the "Windows Embedded CE 6.0 R2" DVD into your PC.

2. A web browser window will open with the contents of the DVD.

3. Click on the line that states: "Click Here to Install the Microsoft Visual Studio 2005 Team Suite Service Pack 1".
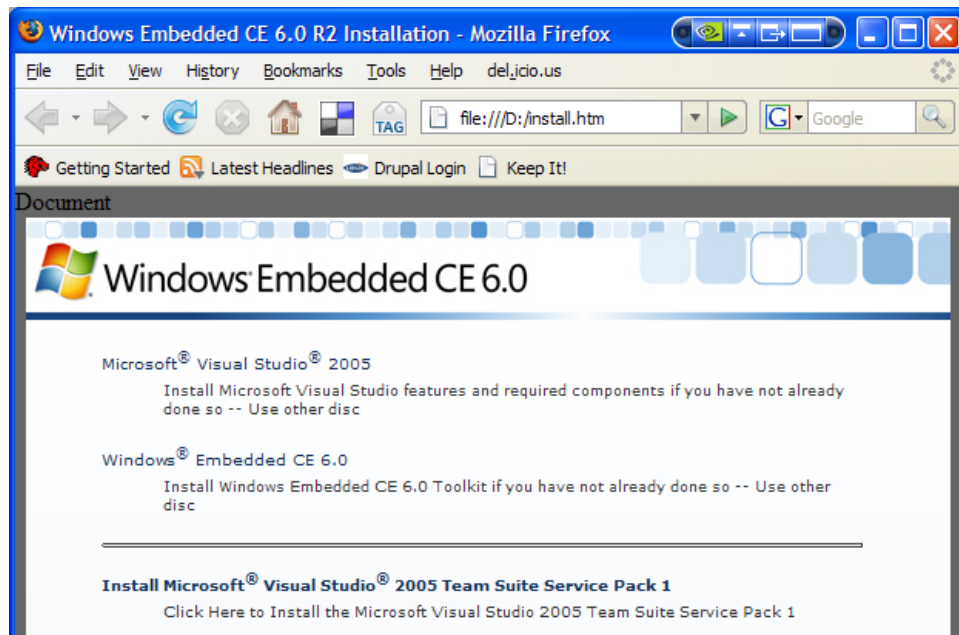

4. Click the "Save File" button to save the download to your local drive.
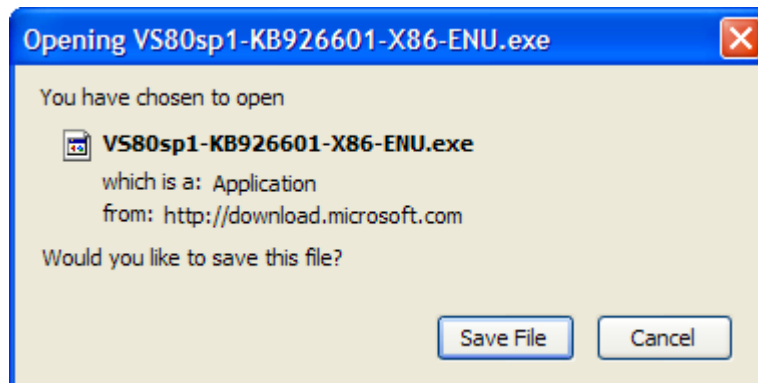
5. After the download has completed, locate the .exe file on your local drive and double-click to open it.

6. Click the "OK" button if warned about opening an executable file.
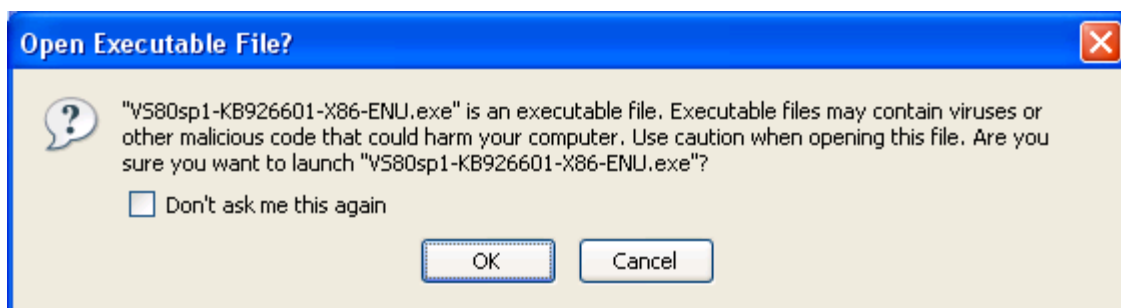
7. The service pack update will extract itself and then ask if you want to install "ENU Service Pack 1". Click the "OK" button.
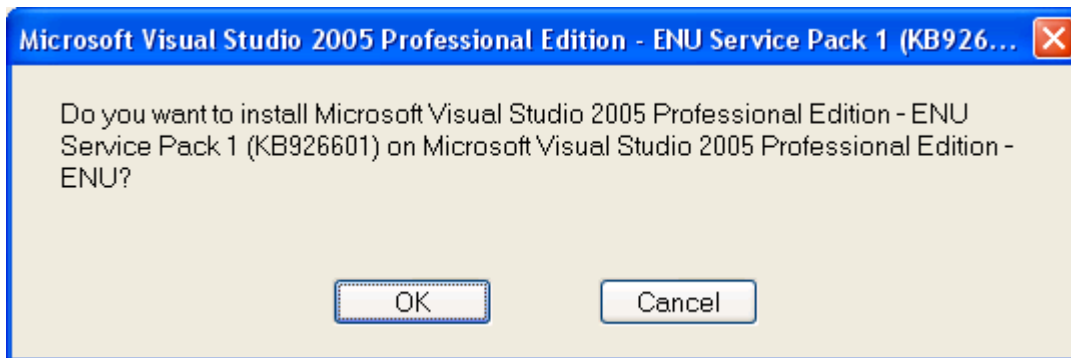
8. A window containing the End User License Agreement (EULA) will appear. Read the EULA and click the "I accept" button to continue.
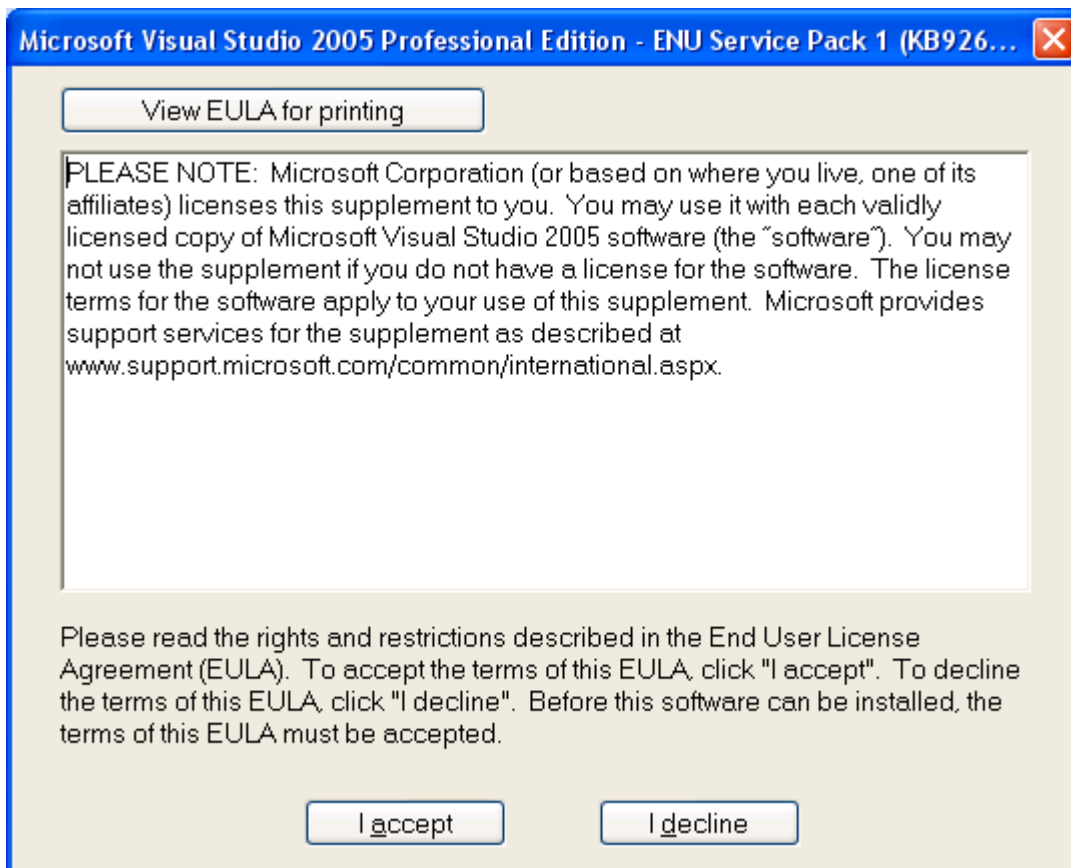
9. ENU Service Pack 1 will install on your PC and you will receive a notification when installation has completed. Click the "OK" button to close the window.
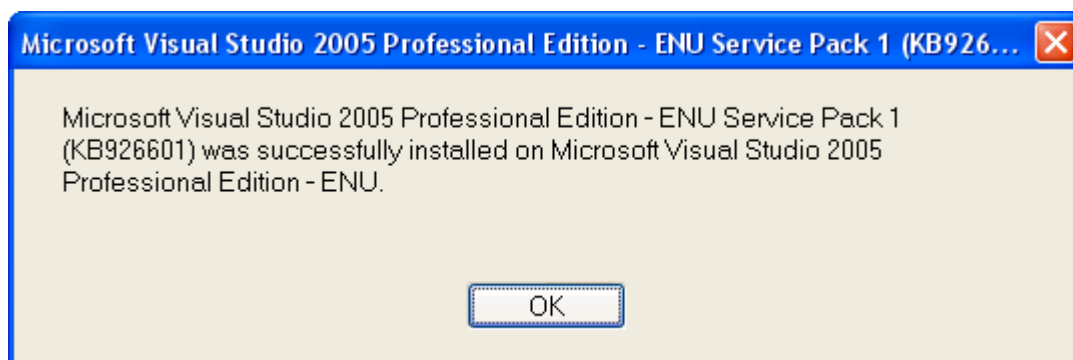
10. Remove the "Windows Embedded CE 6.0 R2" DVD from your PC's drive.
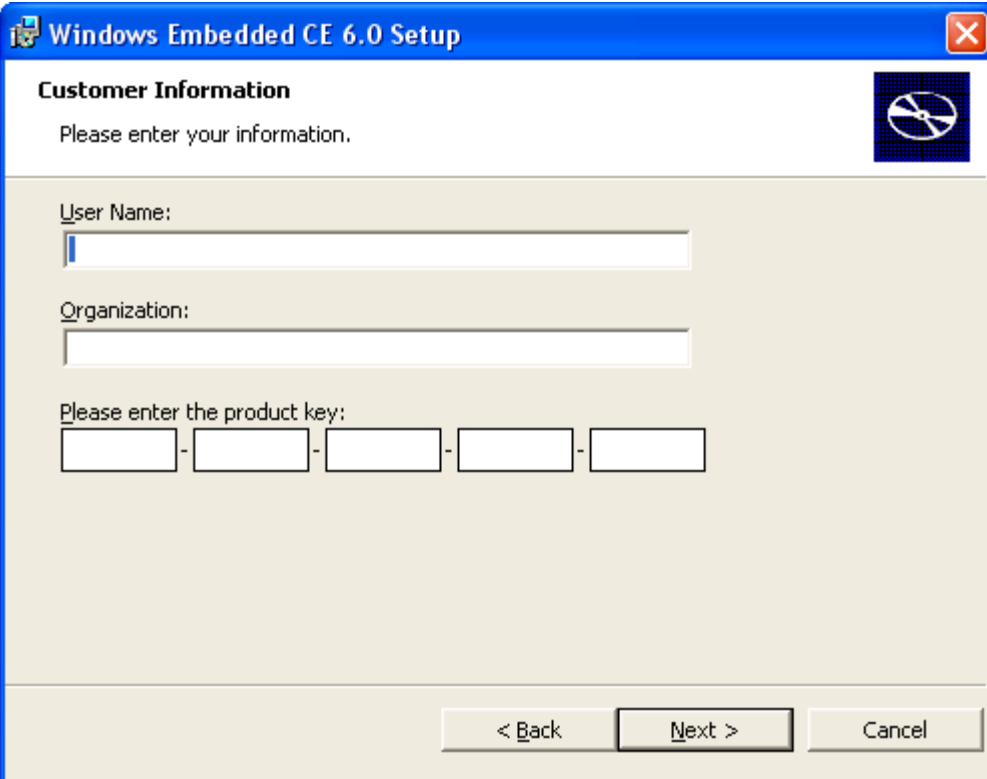
4.8 Install Platform Builder

This section will describe how to install the Platform Builder Plug-in for Microsoft Visual Studio 2005.

1. Insert the DVD named "Windows Embedded CE 6.0" containing the "Platform Builder Plug-in for Microsoft Visual Studio 2005" into your PC's DVD drive.

2. When the "Welcome to the Windows Embedded CE 6.0 Setup Wizard" window appears, click the "Next>" button.

3. Enter your name and organization in the appropriate fields.

4. Enter the product key (obtained in Section 4.5 above) for Windows Embedded CE 6.0 in the appropriate fields.

5. Read the License Agreement and select "I accept…" if you agree to the terms. Click the "Next>" button to continue.

6. In the Setup window that appears, select the features that you want installed. By default, the "CE 6.0 Tools" ("Windows Embedded CE 6.0 Test Kit" and "Platform Builder") and the "CE 6.0 Operating System" for "ARMV4I" are selected. These default features are required for development.

7. Click the "Next>" button.
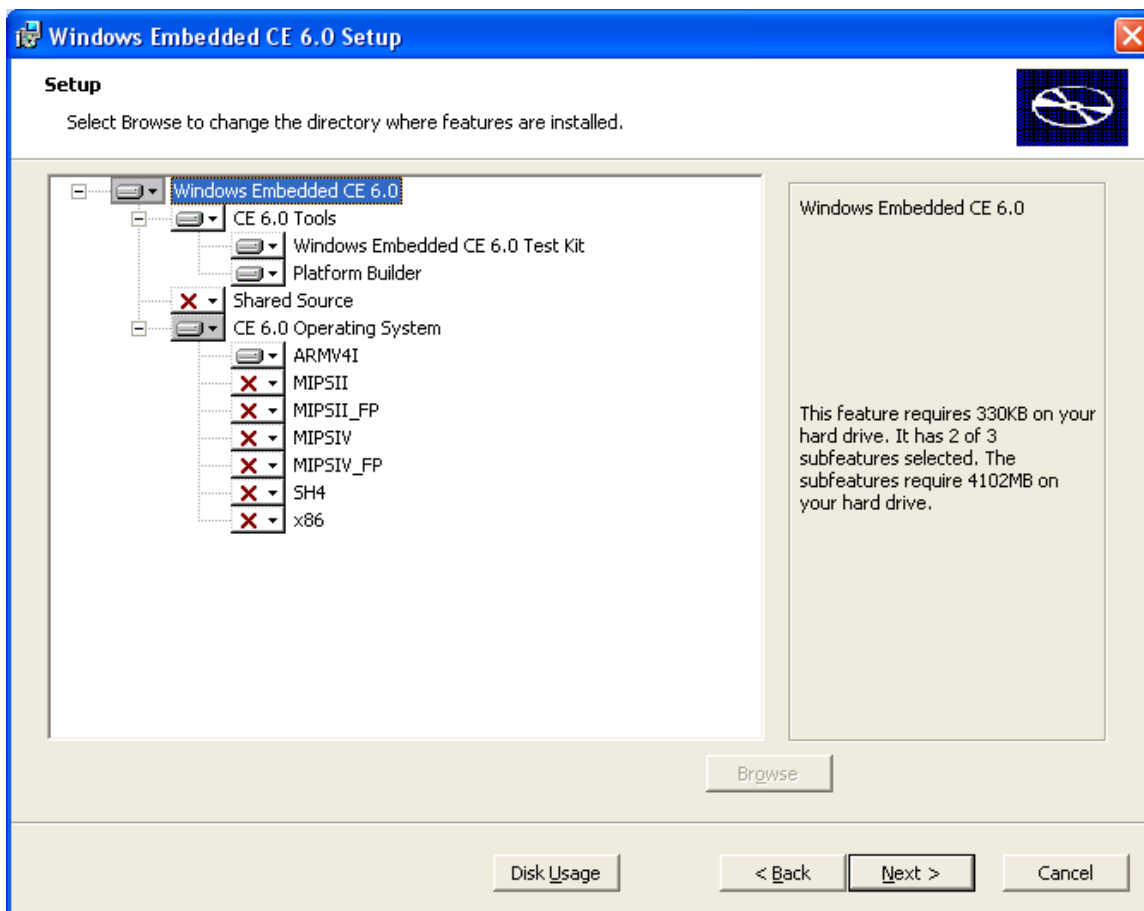
8. If your PC is missing any "Prerequisites" in order to complete the installation, a warning window will appear listing the missing components. Once your PC has all the prerequisites, a "Ready to Install" window will appear.

9. Click the "Install" button to begin the installation.
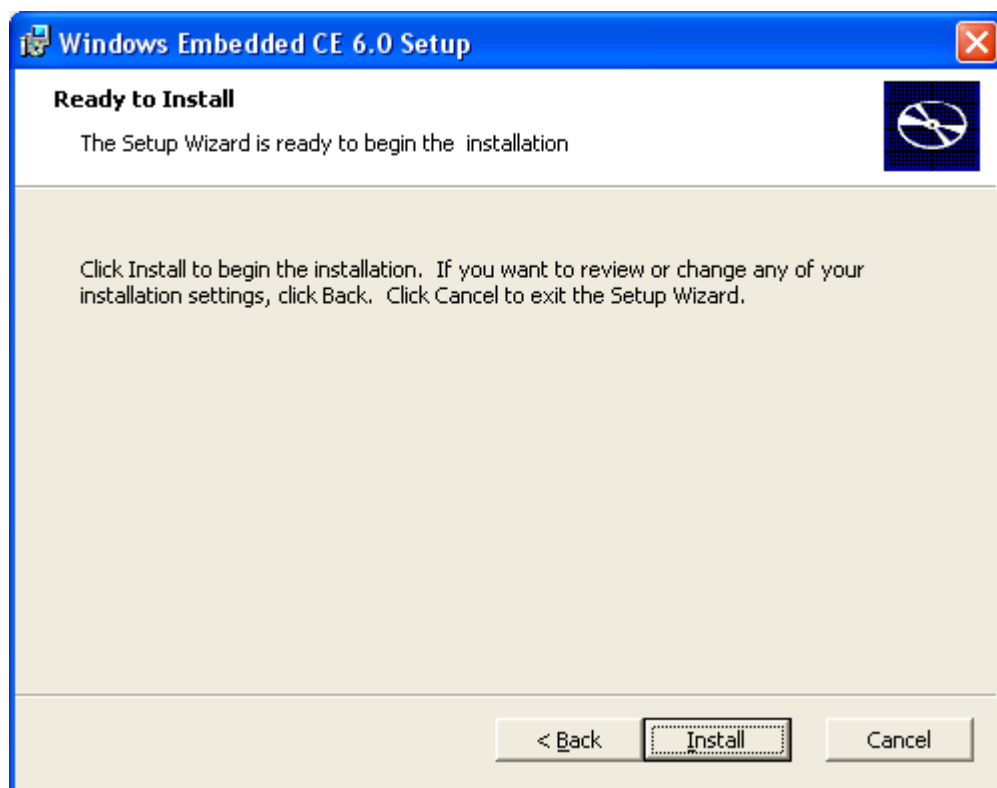
10. Windows Embedded CE 6.0 will begin installing on your PC. This may take quite some time depending upon the performance capabilities of your PC.
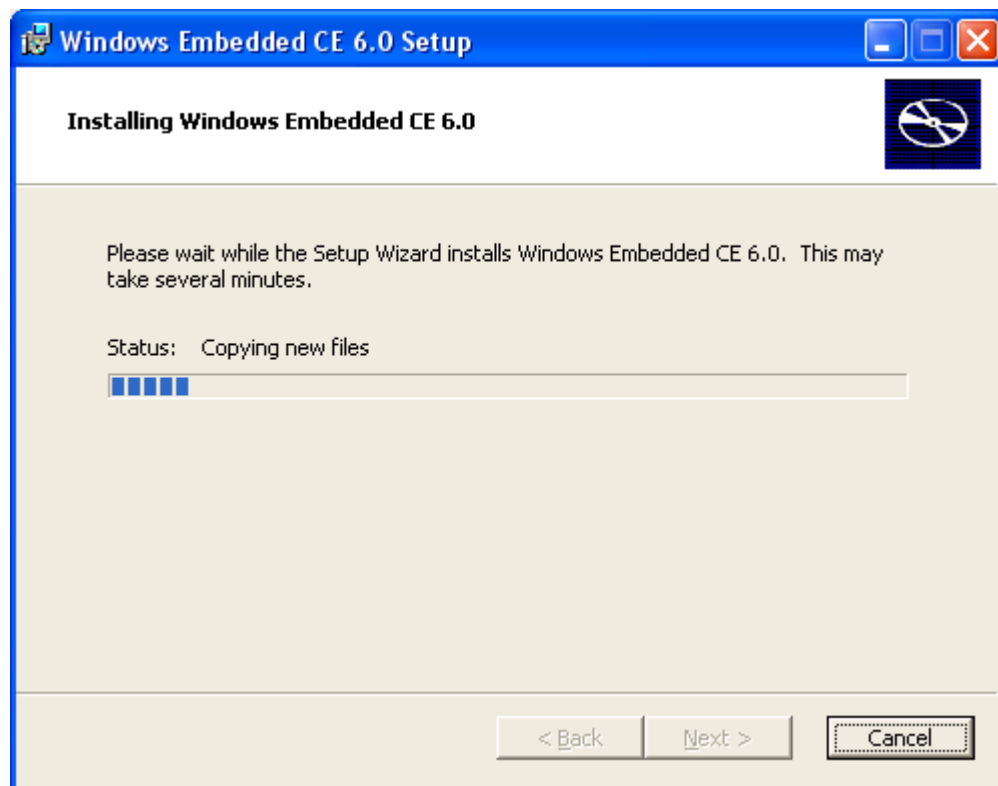
11. Click the "Finish" button to exit Windows Embedded CE 6.0 Setup.
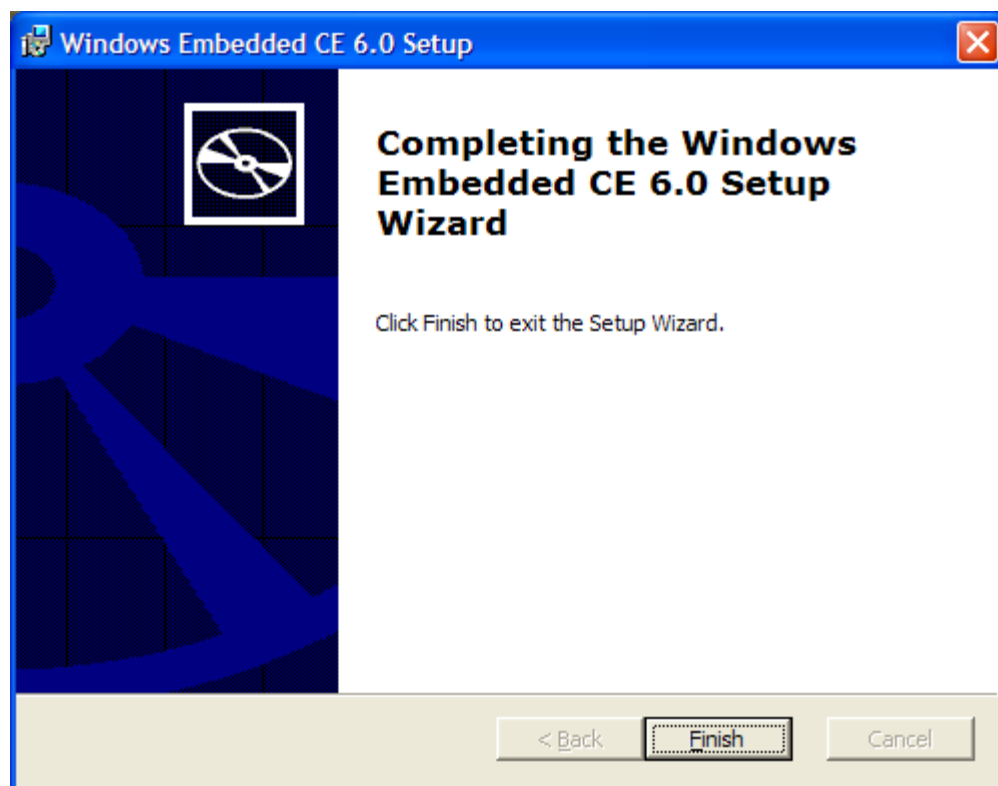
12. Remove the "Windows Embedded CE 6.0" DVD from your PC's drive.

4.9 Install Platform Builder Service Pack 1

1. Once again, insert the "Windows Embedded CE 6.0 R2" DVD into your PC's drive.

2. A web browser window will open with the contents of the DVD.

3. Click on the line that states: "Click Here to Install Windows Embedded CE 6.0 Platform Builder Service Pack 1".
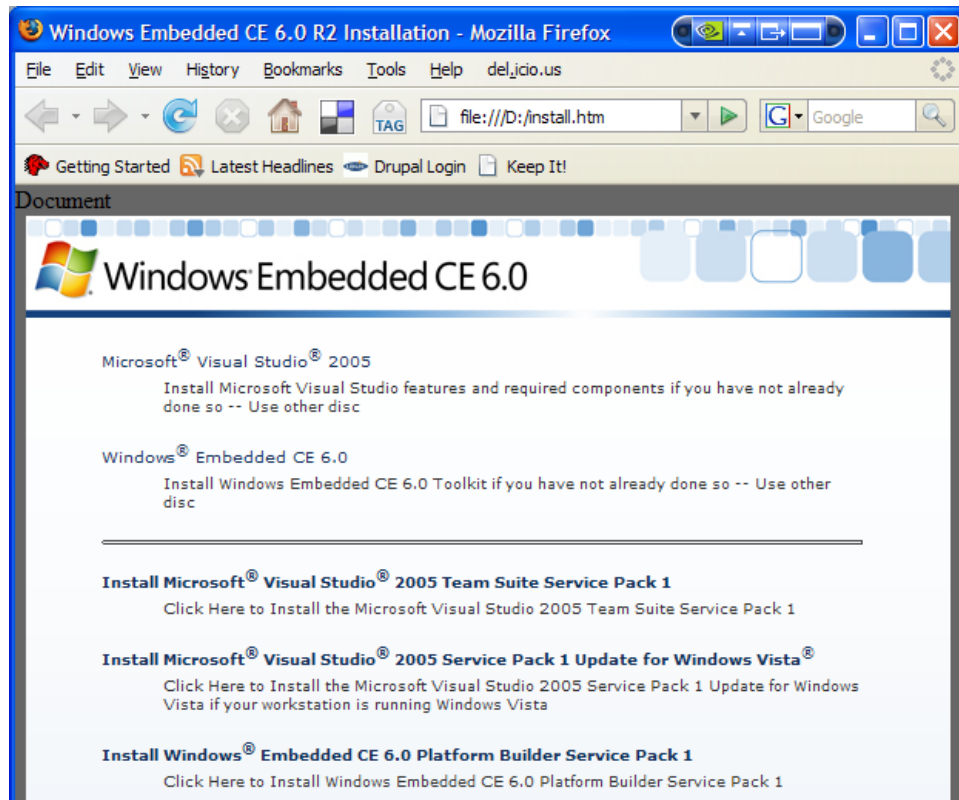
4. Click the "Save File" button to save the download to your local drive.
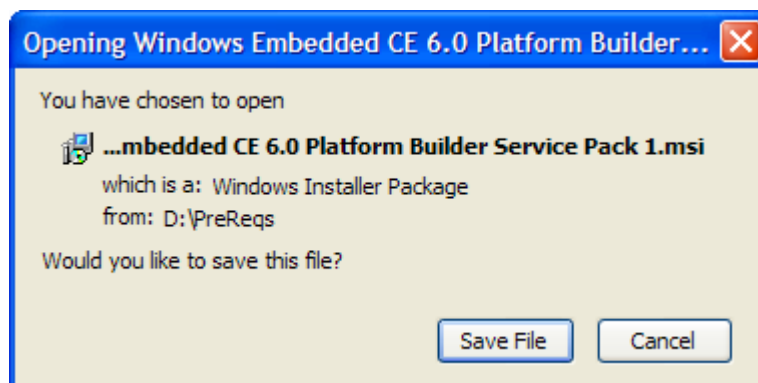
5. After the download has completed, locate the .msi file on your local drive and double-click to open it.

6. Click the "Next>" button to continue installation.
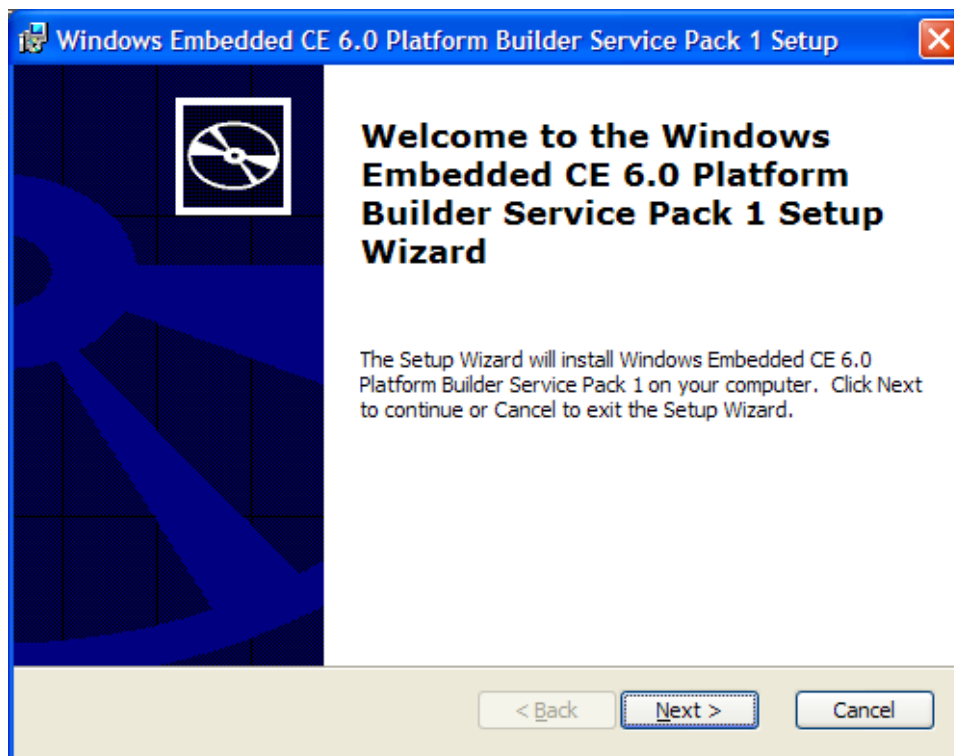
7. Read the License Agreement and select "I accept…" if you agree to the terms. Click the "Next>" button to continue.
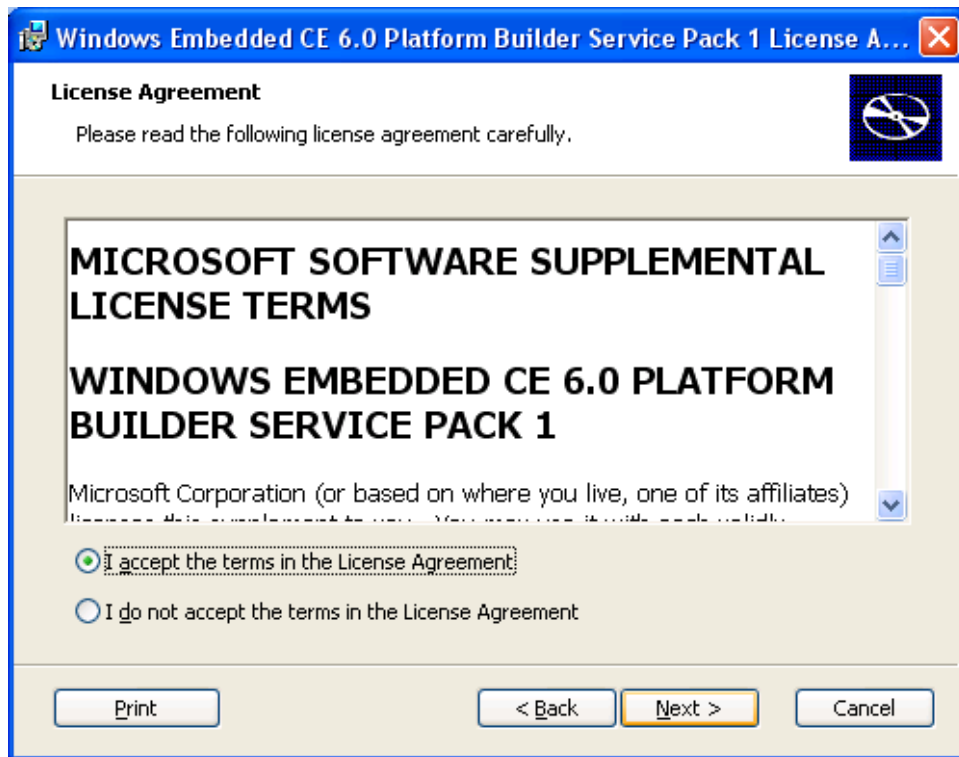
8. Click the "Install" button to being installing Platform Builder Service Pack 1.
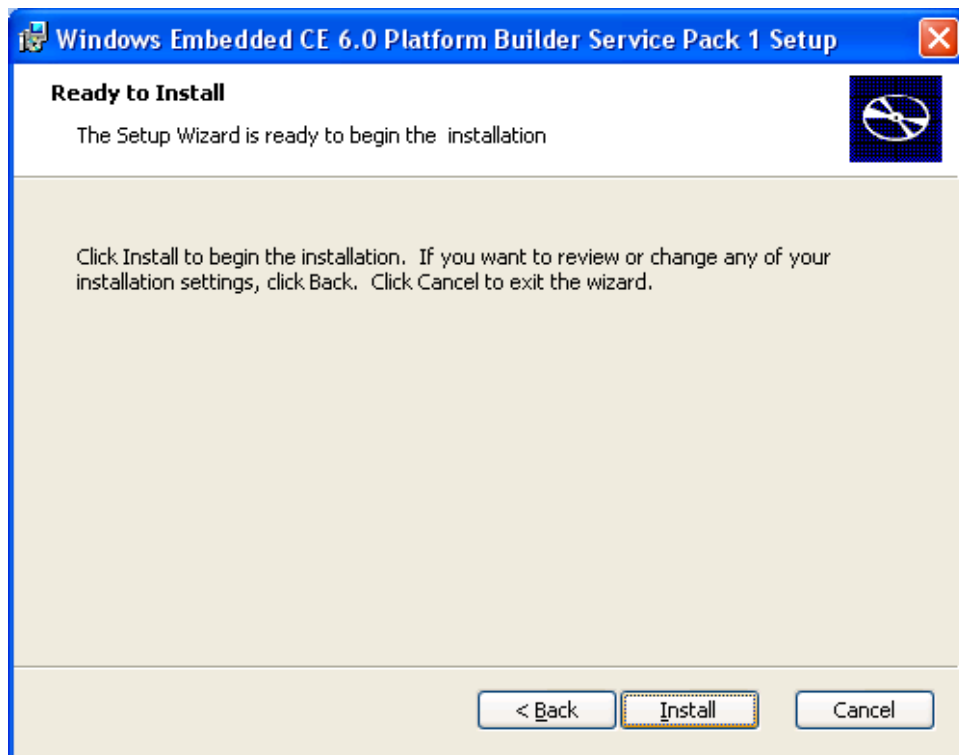
9. When the Service Pack has finished installing, you will see a "Completed" window. Click "Finish" to exit the Setup Wizard.
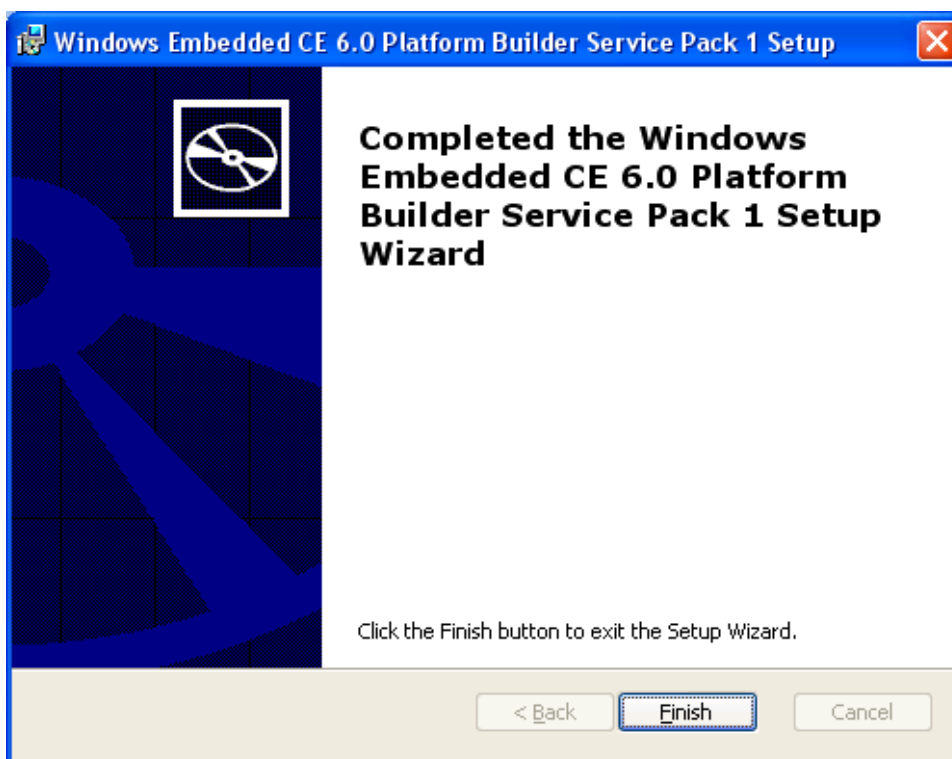
4.9.1 Install the Windows Embedded CE 6.0 R2 Update

1. Navigate to "My Computer". Right-click on DVD icon for "CE6R2" and select "Open" from the menu.
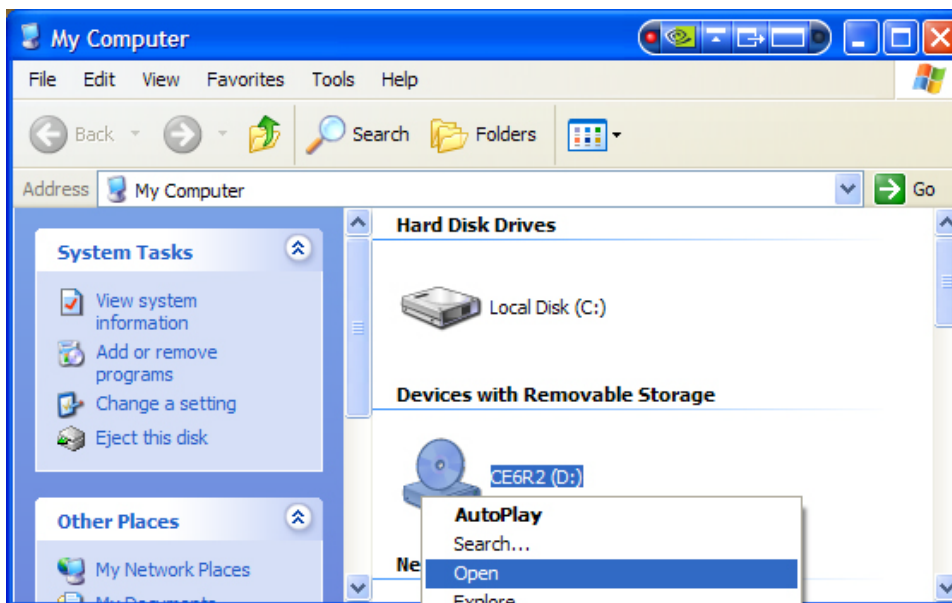
2. Locate the "setup.exe" file and double-click on it.
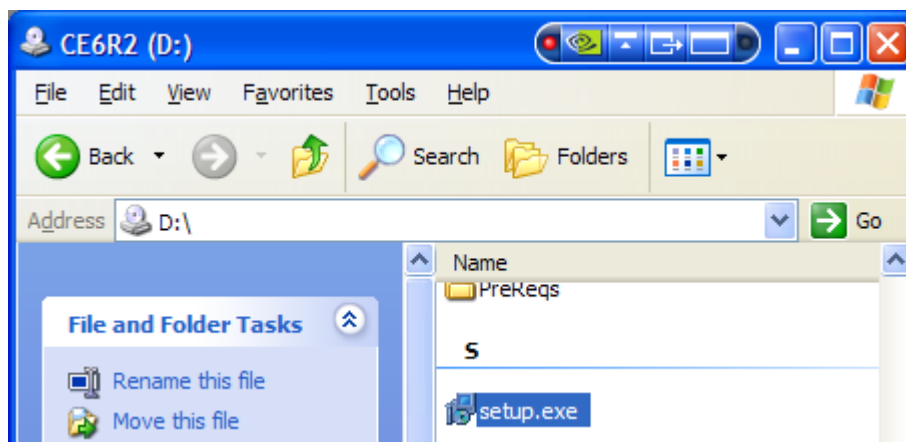
3. A "Welcome to the Windows Embedded CE 6.0 R2 Setup Wizard" window will appear. Click the "Next>" button to continue.
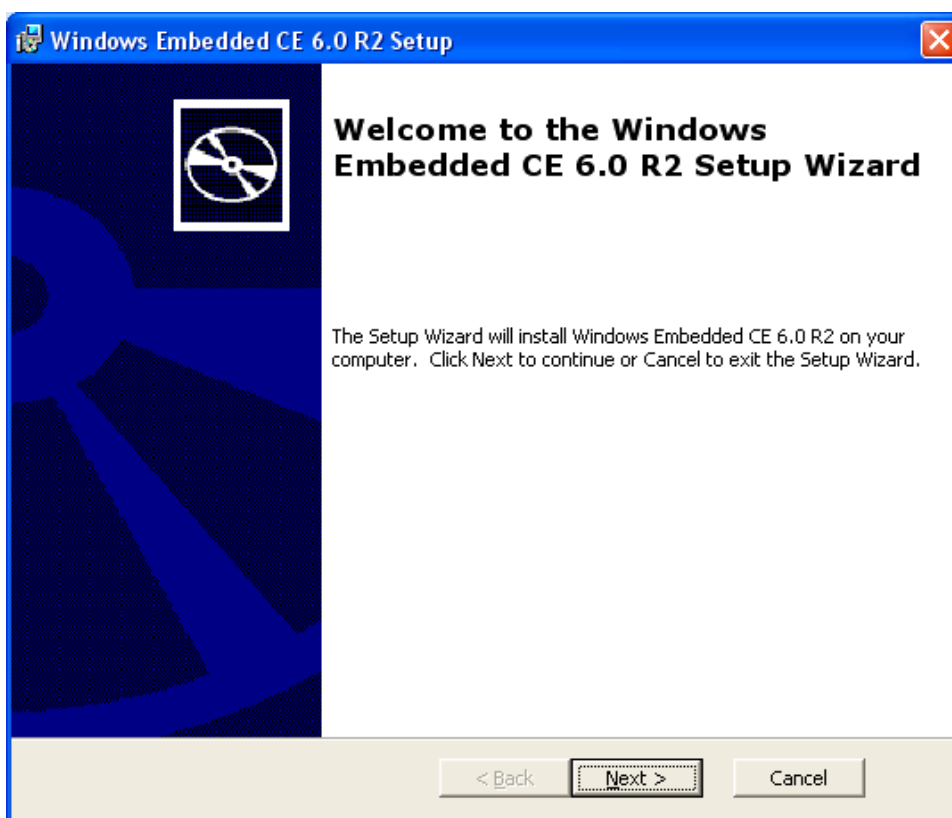
4. Read the License Agreement and check "I accept the terms in the License Agreement" if you agree to them. Click the "Next>" button to continue the setup process.
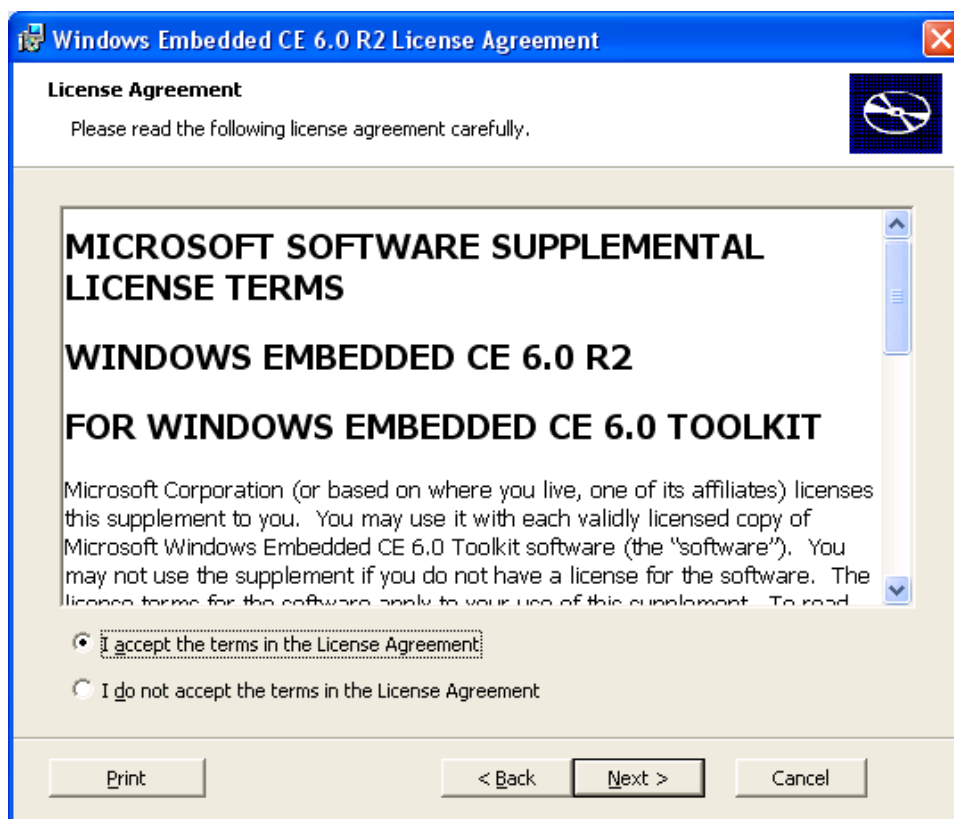
5. The Setup program has to determine the disk space requirements on your PC. There is no status window for this, so you may receive the following notice when you try to click "Next>".
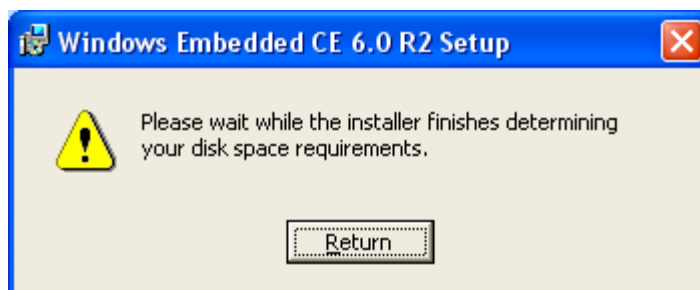
6. Eventually, the following screen will appear. Keep the defaults set as they are and click the "Next>" button.
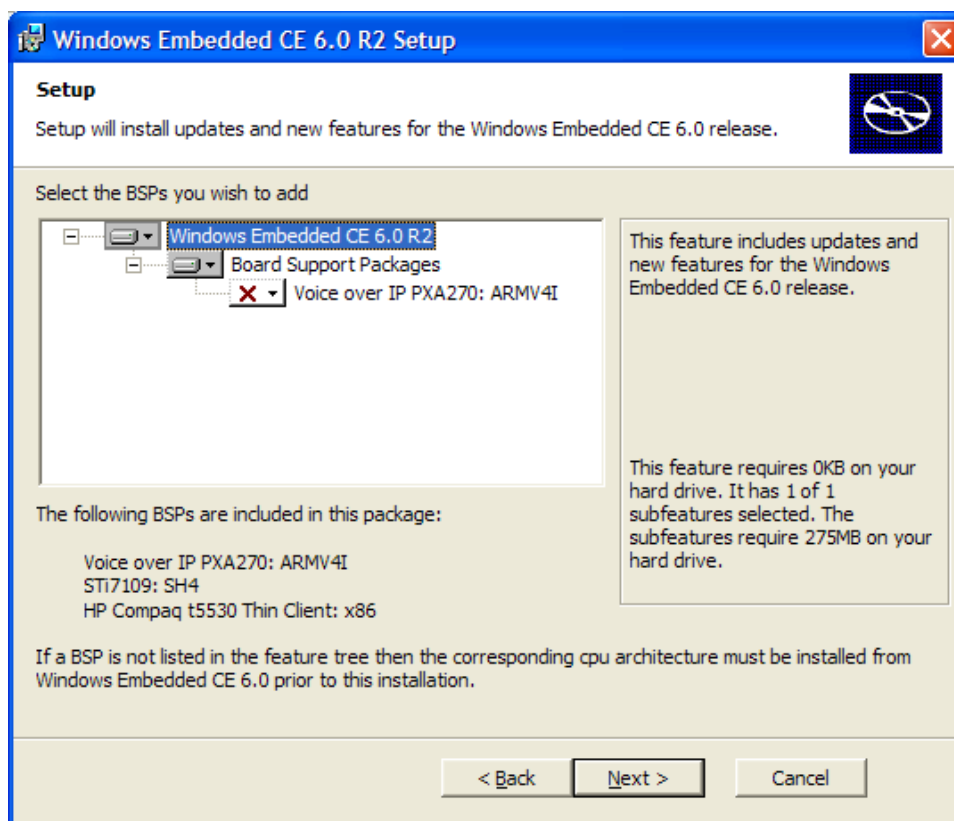
7. Click the "Install" button to being the installation process.
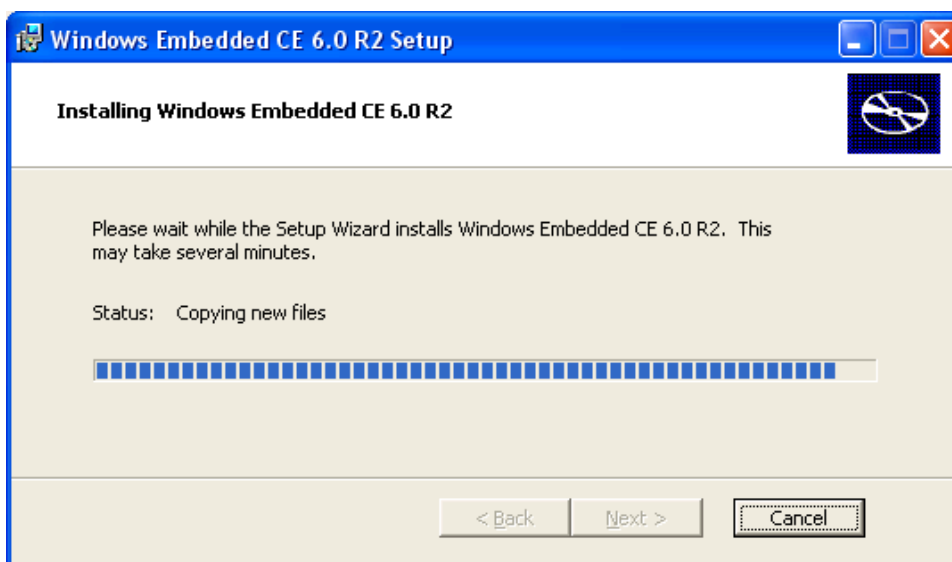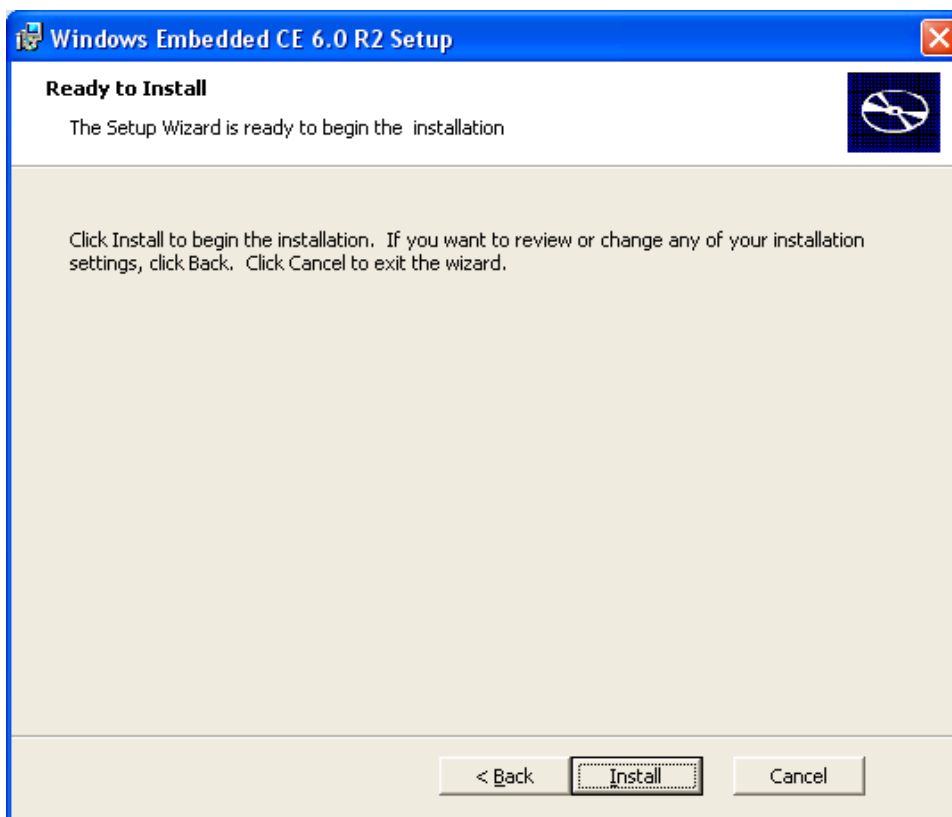
8. When the installation has concluded, a "Completed" window will appear. Click the "Finish" button to exit the Setup Wizard.
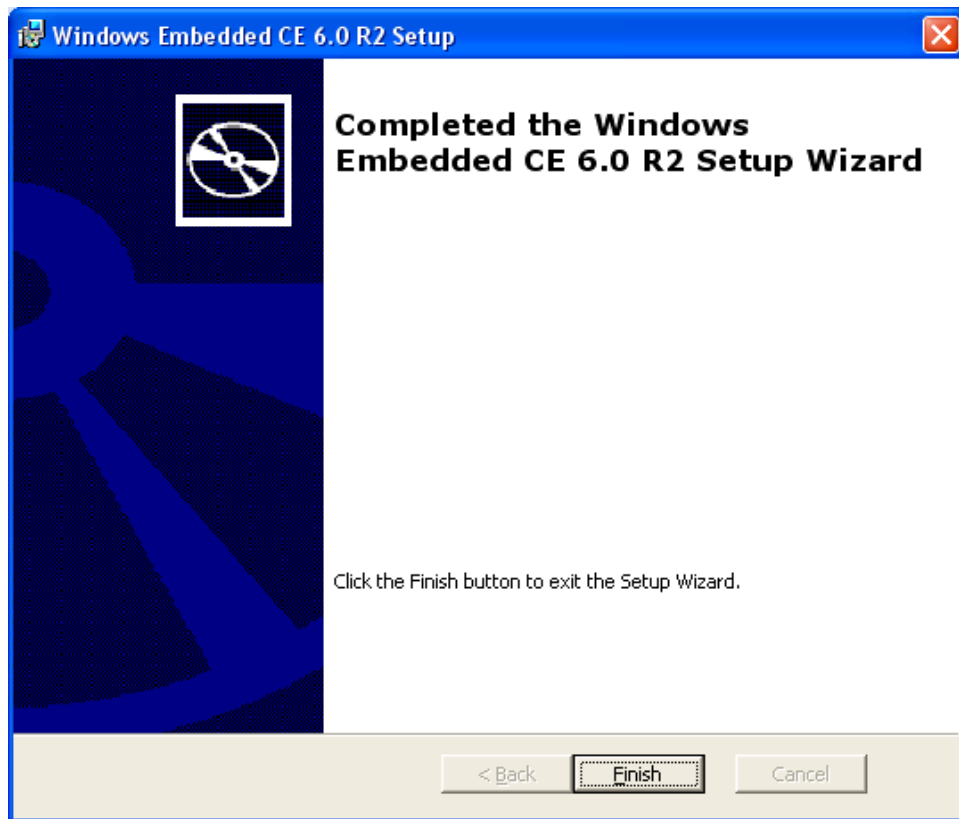
4.9.2 Updated Releases

Since the publication of this User Manual, additional service packs may have been released from Microsoft (e.g., *Embedded CE 6.0 R3*). Please refer to the *Windows CE Development Prerequisites.txt* file included with the Logic PD Windows CE BSP release to ensure you have the latest updates required for that release. Installation steps will be similar to those written in this User Manual.

4.9.3 Use QFE Patches to Update Windows Embedded CE 6.0

This section will describe how to install Quick Fix Engineering (QFE) patches from Microsoft. Installing each QFE patch is a similar process, so we will only document the first patch and you can repeat the steps for each required QFE patch.

4.9.3.1 Download QFE Patches

1. Return to the web browser window that shows the contents of the DVD and click on the link to "Check for Updates".
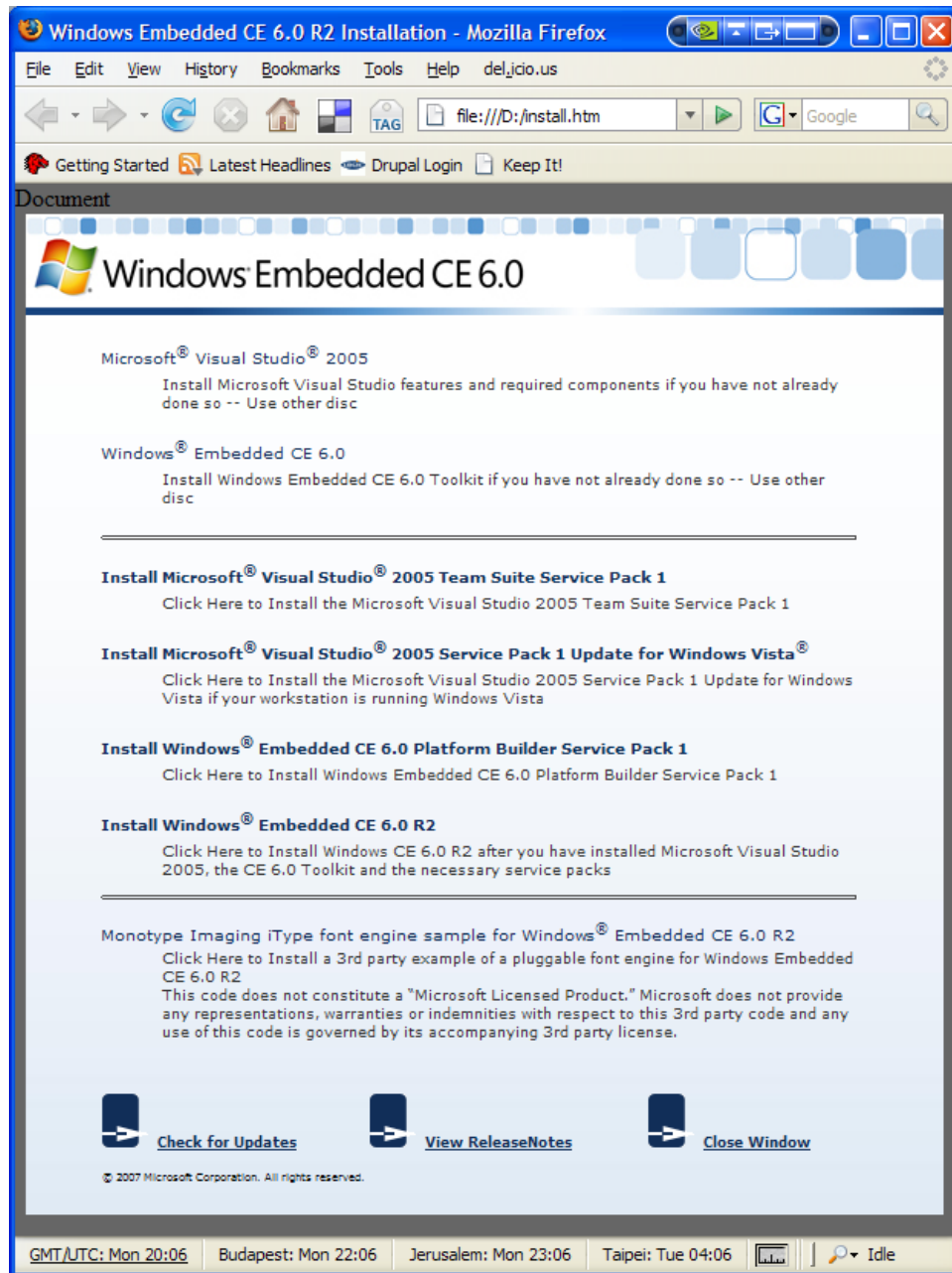
2. You will be taken to Microsoft's Download Center website. Because there are several update files that will be required from Microsoft's website, we recommend that you download all of the files to your local drive before actually running the updates. The following steps will explain the download process.

3. Locate "Windows Embedded CE 6.0 Cumulative Product Update Rollup Package (through 12/31/2009)" and click on the link.

4. Click on the "Download files below" link.

5. Locate the file named "WinCEPB60-091231-Product-Update-Rollup-Armv4I.msi" and click on the "Download" button next to the file name.

6. Click "Save File" to download the update file to your local drive.
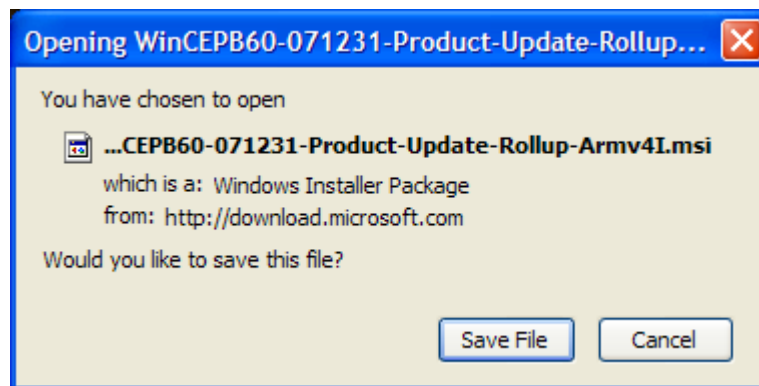
7. Once that file has finished downloading, use the back button in your web browser to return to the Microsoft Download Center page with "Results for – 'Windows Embedded CE 6.0" displayed.

8. Repeat Steps 3 through 6 until all of the required updates are installed.

IMPORTANT NOTE: More QFE patches may be required depending on the BSP source you are using. Please refer to the *Windows CE Development Prerequisites.txt* file included with Logic PD's Windows CE source BSP download to see which QFE patches are required. More information about Logic PD's Windows CE source BSP will be covered in the next section of this document.

4.9.3.2   Install the QFE Patches

1. On your local drive where you saved all the downloads from Microsoft's website, locate the "WinCEPB60-091231-Product-Update-Rollup-Armv4I.msi" file and double-click on it to begin installing the Cumulative Product Update Rollup for 2009.

2. Click the "Next>" button to continue.
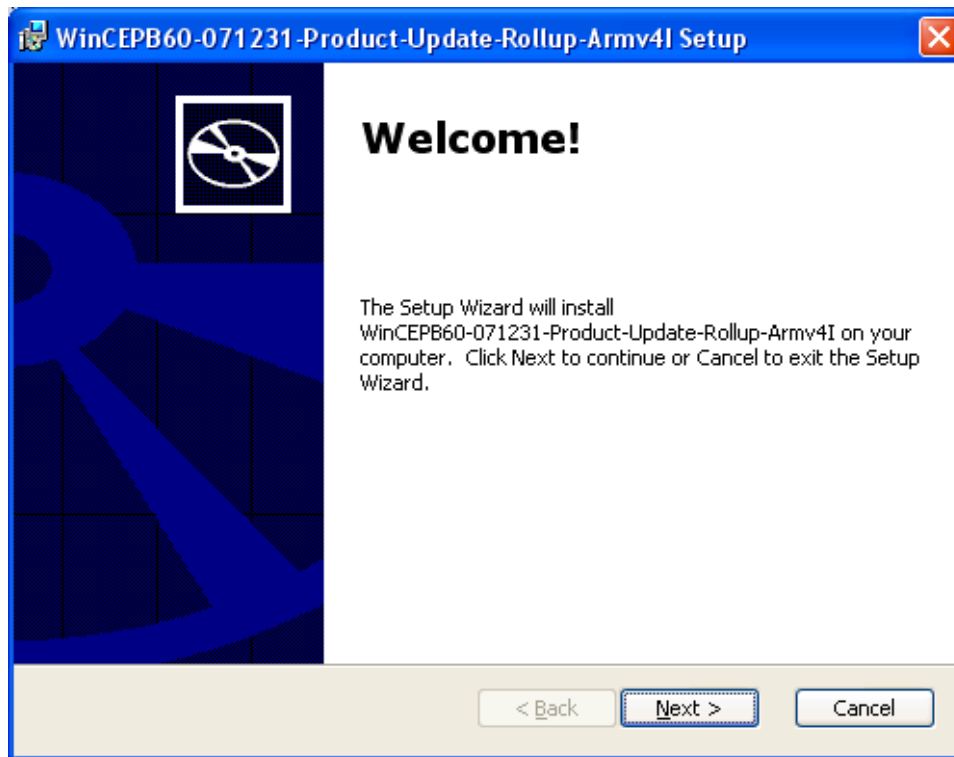
3. Read the License Agreement and check "I accept the terms of the License Agreement" if you agree. Click the "Next>" button to continue.
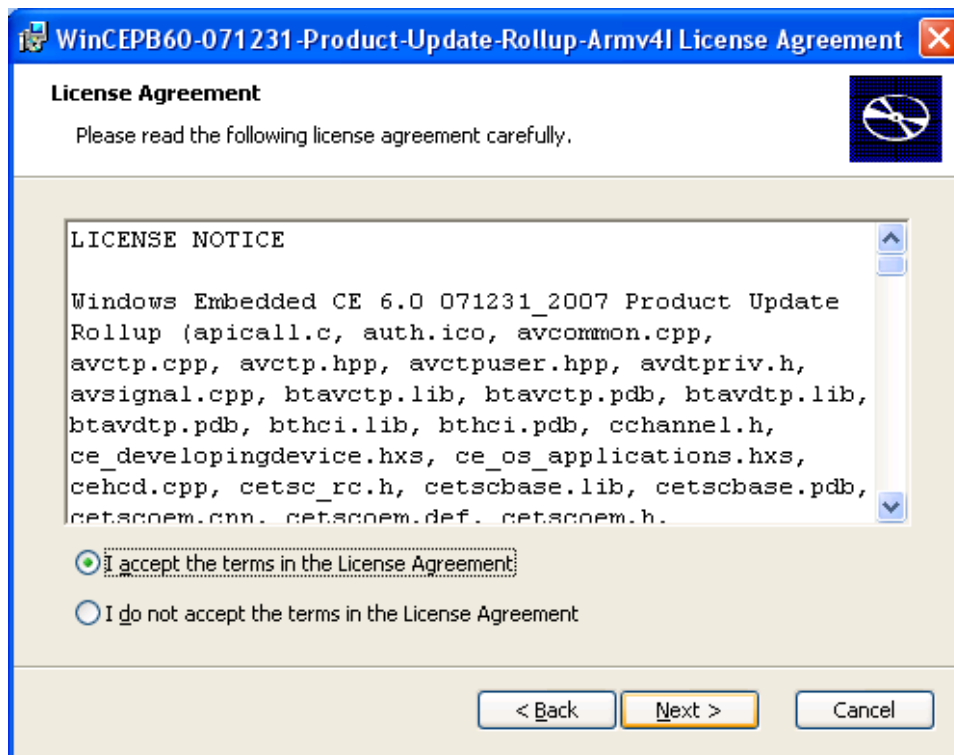
4. You will be notified of the source code files that will be overwritten during this installation process. Check "I accept" and click the "Next>" button to continue.

WinCEPB60-071231-Product-Update-Rollup-Armv4I Public Source Ag...

Public Source Code Change Agreement

The following source code file(s) will be overwritten. They will be copied to the Backup folder if file(s) Backup is selected.

```
private\winceos\coreos\nk\kernel\kdriver.c
private\winceos\coreos\nk\kernel\apicall.c
private\winceos\coreos\nk\kernel\thread.c
private\winceos\coreos\nk\kernel\process.c
private\winceos\coreos\nk\kernel\vm.c
private\winceos\coreos\nk\kernel\loader.c
private\winceos\coreos\nk\kernel\arm\mdarm.c
private\winceos\coreos\nk\kernel\arm\vmarm.c
private\winceos\coreos\nk\kernel\mips\mdsched.c
private\winceos\coreos\nk\kernel\sh\mdsh3.c
```

⊙ I accept
○ I do not accept

< Back   Next >   Cancel
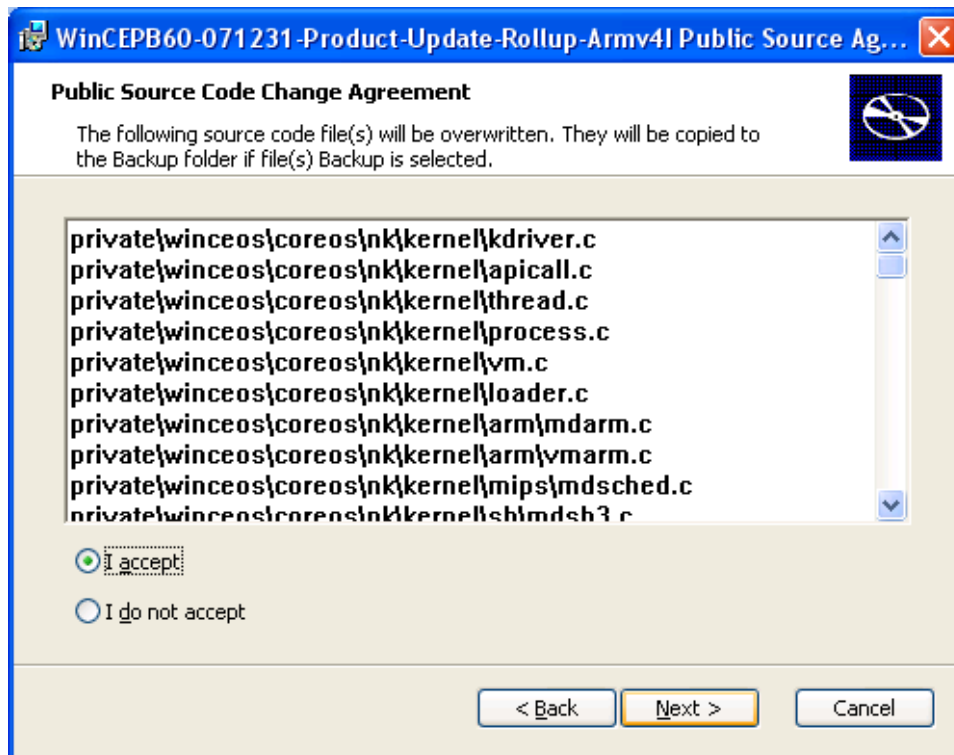
5. You will be presented with the option to customize the installation. We recommend you keep the defaults set as they are. Click the "Next>" button to continue.

WinCEPB60-071231-Product-Update-Rollup-Armv4I Setup

Custom Setup

Select the way you want features to be installed.

Click on the icons in the tree below to change the way features will be installed.

WinCEPB60-071231-Product-Up
Platform Builder files
Create Backup

WinCEPB60-071231-Product-Update-Rollup-Armv4I

This feature requires 8581KB on your hard drive.

Install to: C:\WINCE600\   Browse

Reset   Disk Usage   < Back   Next >   Cancel

6. Click the "Install" button to begin the installation.
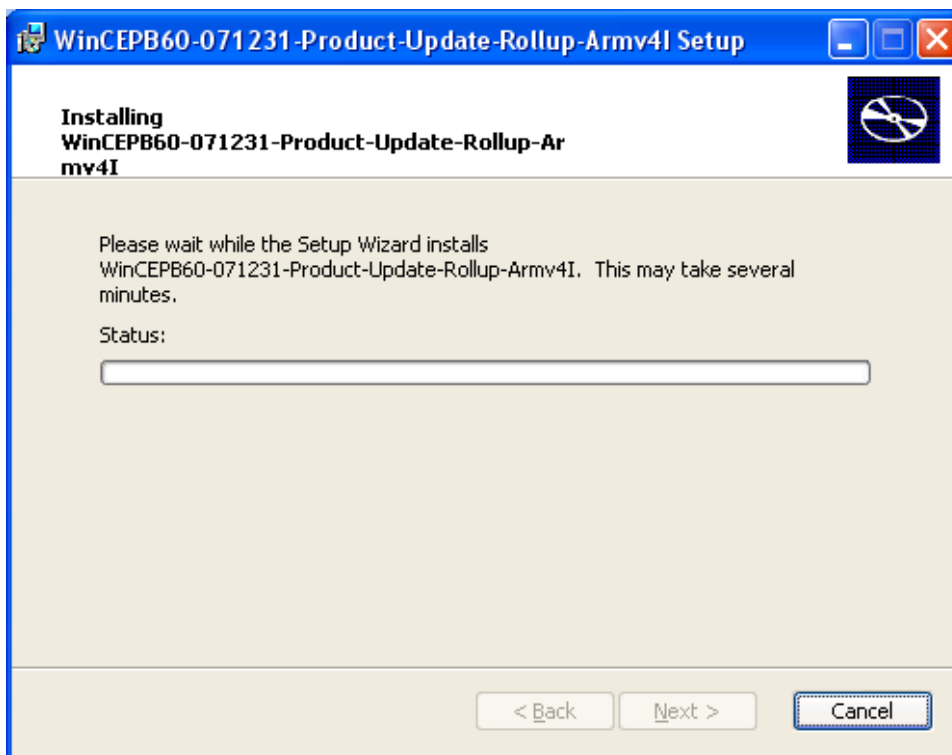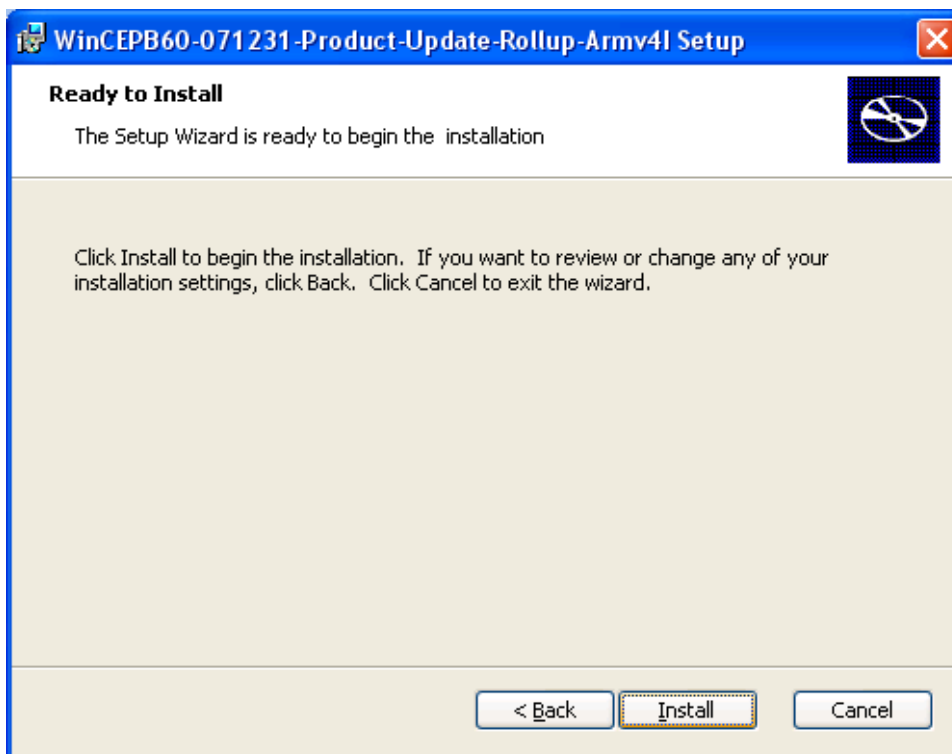
7. When the installation nears completion, you will see the following window explaining that the update has source code files associated with it. (**NOTE:** This window will often open behind the other windows on your desktop. If it appears that the installation process has stalled, see if this window is hiding behind the others.) Click the "OK" button and a web browser will open showing the associated Readme document.
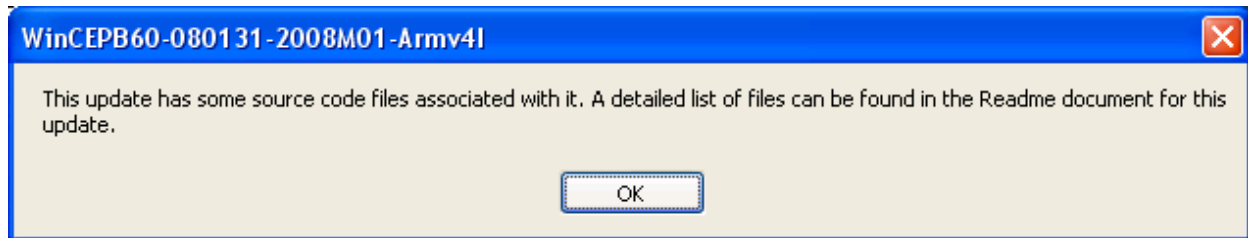
8. The QFE patch has finished installing when you see the following window. Click the "Finish" button to exit the Setup Wizard.
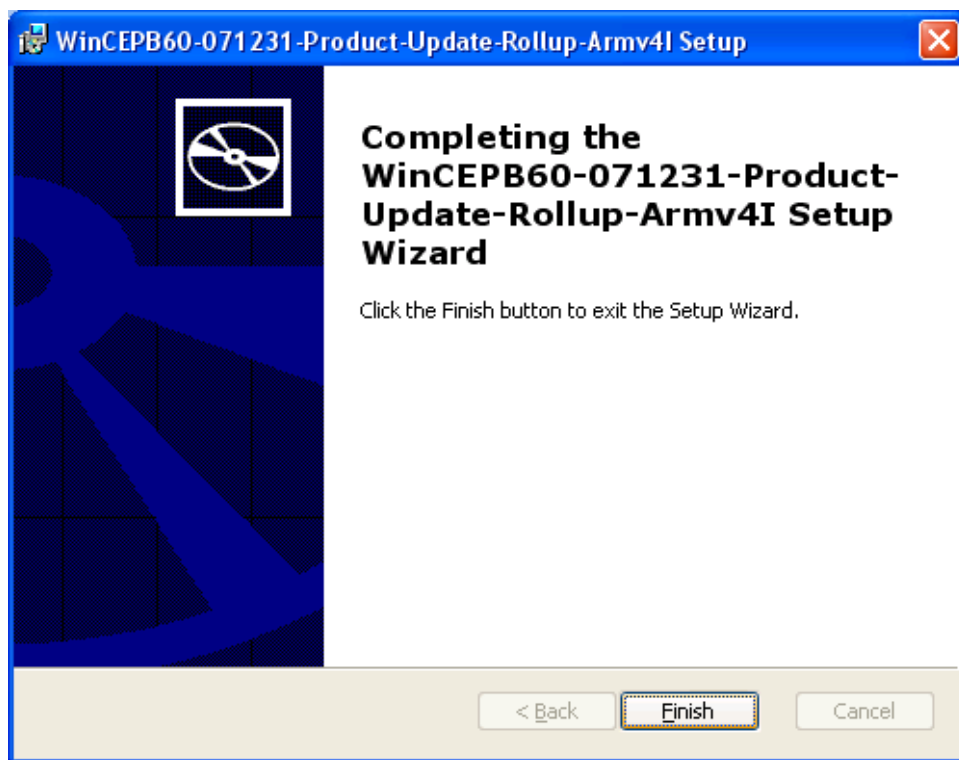
9. Repeat Steps 1 through 8 for each of the remaining QFE patches.

4.9.4 Verify the QFE Patch Installations

To verify that you have installed all the necessary QFE patches, you will have to launch the Visual Studio 2005 application.

1. Launch Visual Studio 2005 by going to: Start Menu > All Programs > Microsoft Visual Studio 2005 > Microsoft Visual Studio 2005

2. If this is the first time you've launched Visual Studio 2005, you will have to specify your default development environment. Click on "Platform Builder Development Settings" and then click the "Start Visual Studio" button to continue.
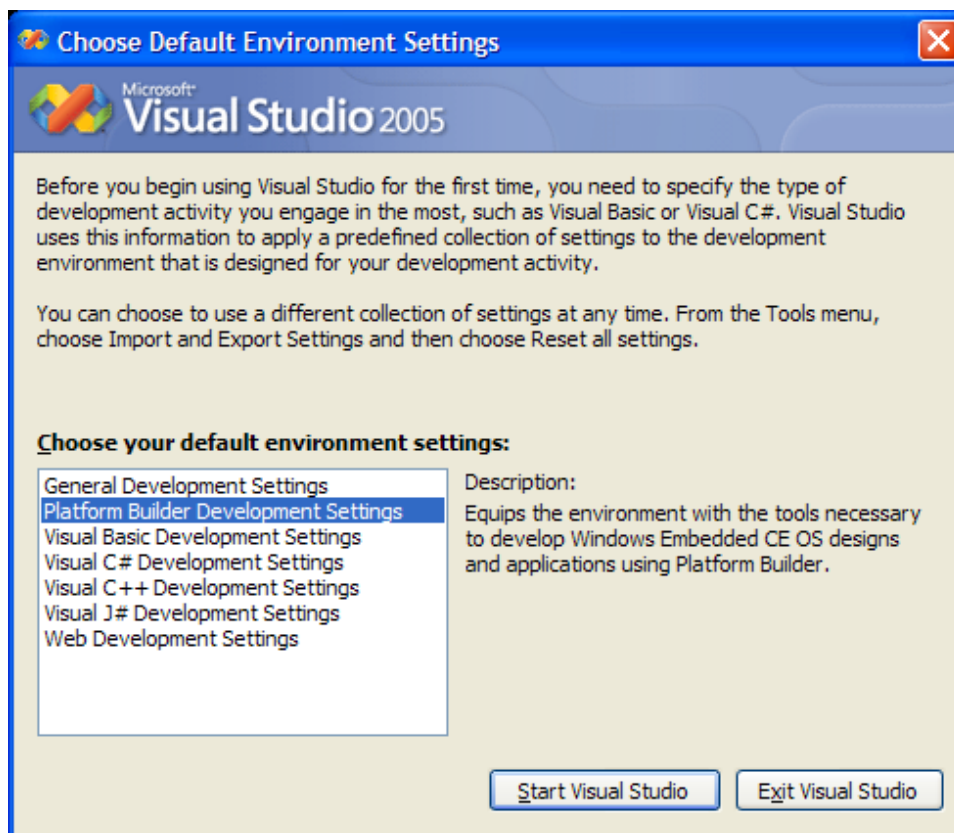
3. When Visual Studio 2005 has started, click on the "Tools" menu heading and select "Platform Builder for CE 6.0" and then select "CE Update Check".
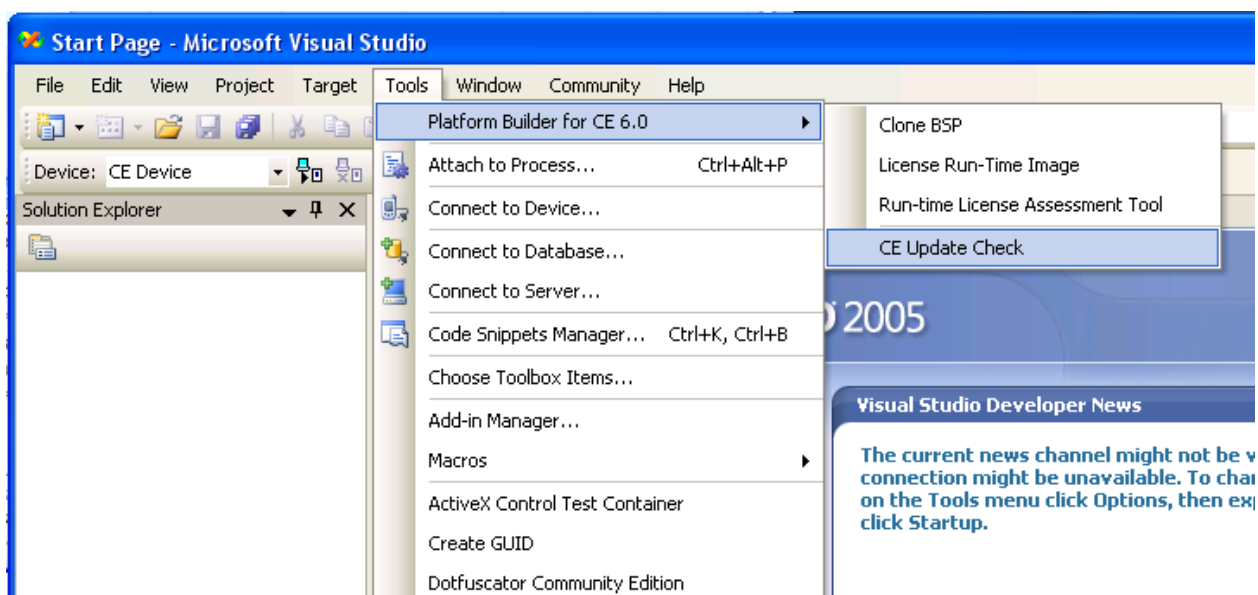
4. In the CEUpdateCheck window, click the "Verify Updates" button.
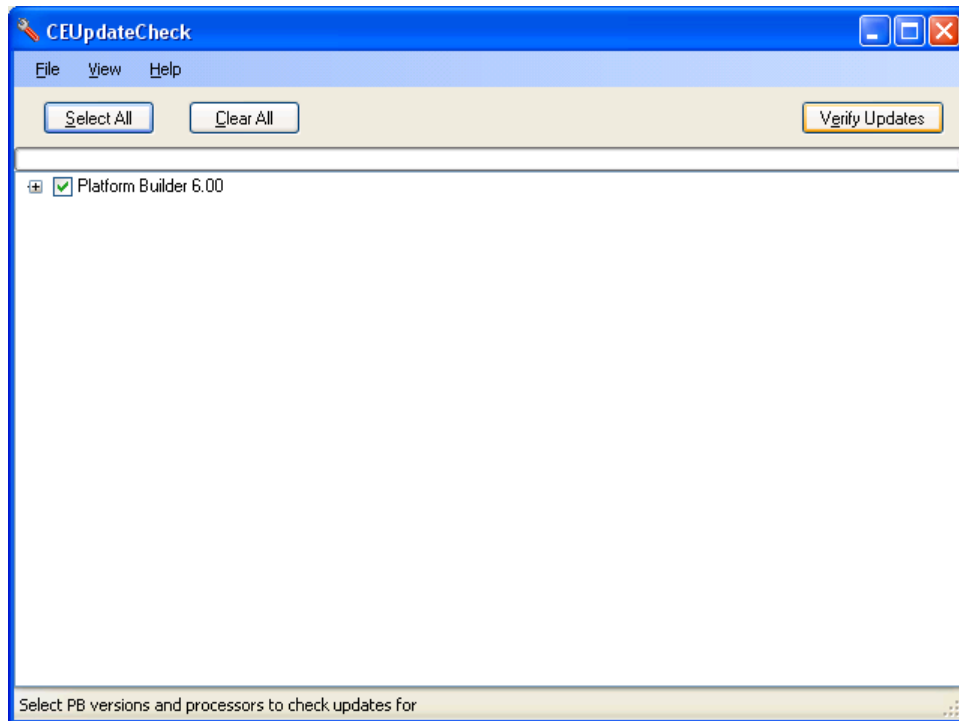
5. CEUpdateCheck will tell you all of the updates that you have installed on your PC compared with the updates that have been released to date.
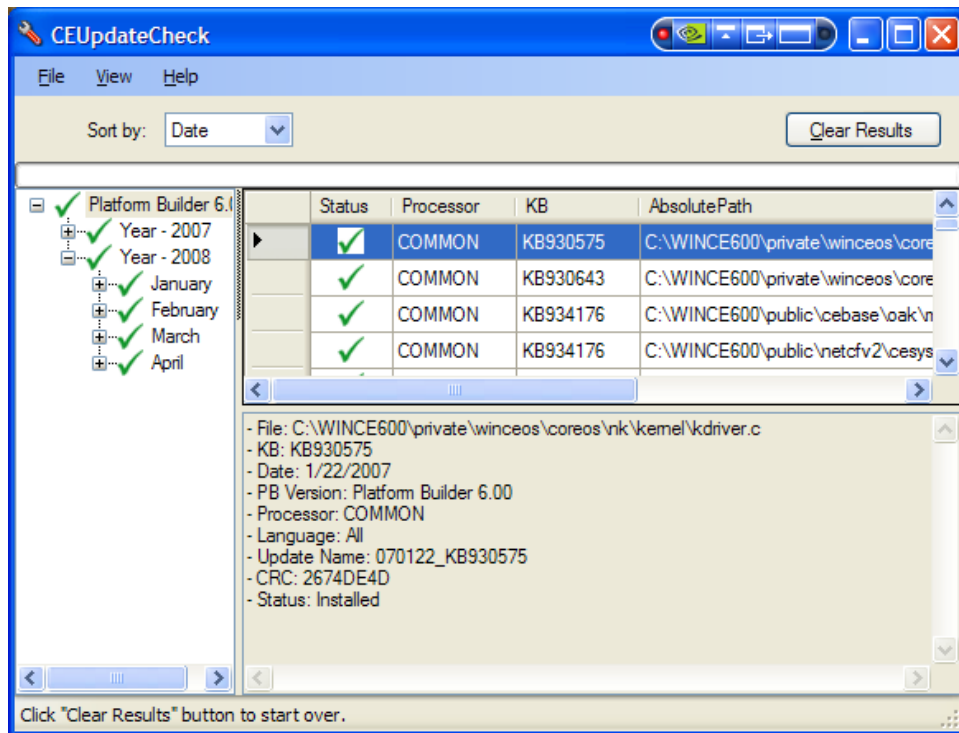
6. Your PC now has all the necessary tools to being Windows CE development.

5 Build Logic PD's Windows CE Source BSP

This section will describe how to begin Windows CE development with the OMAP35x Development Kit.

5.1 Prerequisites

■ Tera Term terminal emulator (or equivalent).

■ The most current Windows CE Source BSP release, as described in Section 2.

■ Before installing Logic PD's Windows CE source BSP, please ensure that Visual Studio 2005 and Windows Embedded CE 6.0 Platform Builder are installed on your PC. This information is covered in-depth in the previous section of this User Manual.

## 5.2 Install Logic PD's Windows CE 6.0 Source BSP

1. Locate the *101xxxx_OMAP35x_WinCE600_x_x_x_Source* file you unzipped in Section 2.

2. Open the *Windows CE Development Prerequisites.txt* file and verify that you have all the QFE patches installed that are required for this release of the source BSP. If you need to install new QFE patches, please do so before continuing onto the next step.

3. Review the *logic_som_omap35xx_source_readme.txt* file. This contains important information that applies to this release of the source BSP.

4. Copy the contents of the *.\PLATFORM* directory to the *x:\WINCE600\PLATFORM* directory of the Windows CE installation. **IMPORTANT NOTE:** Before copying these contents, delete the following two folders (and sub-folders):

   □ *C:\WINCE600\PLATFORM\COMMON\SRC\SOC\OMAP35xx_TPS659XX_TI_V1*
   □ *C:\WINCE600\PLATFORM\LOGIC_SOM_OMAP35x*

5. Copy the contents of the *.\OSDesigns* directory to the *x:\WINCE600\OSDesigns* directory of the Windows CE 6.0 installation. **IMPORTANT NOTE:** Before copying these contents, move or delete any pre-existing directories that remain from previous BSP installations if they have the same name as the most current release. If an *OSDesigns* directory does not exist in the Windows CE installation directory, create one.

5.3 Build Logic PD's Windows CE 6.0 Source BSP

1. Launch the Visual Studio 2005 application. Click on File > Open > Project/Solution...
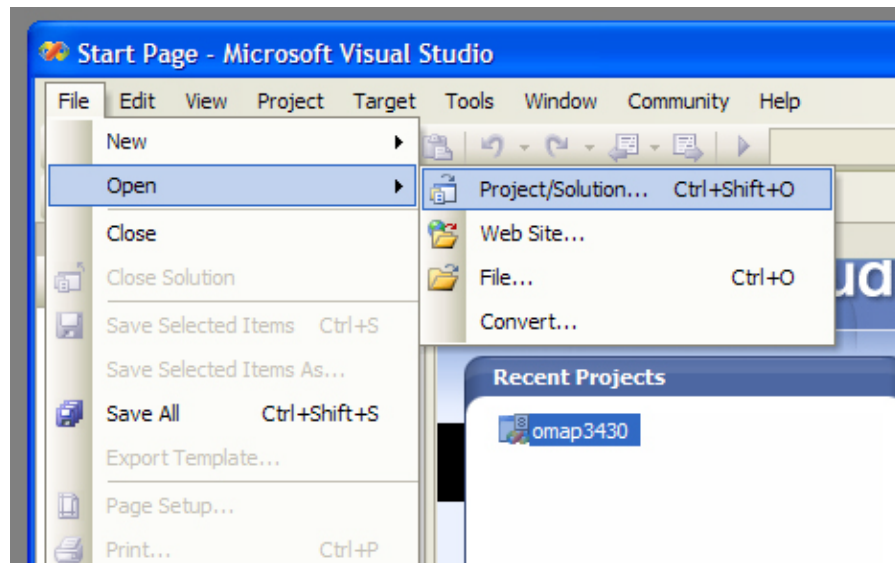

2. Browse to the *.\WINCE600\OSDesigns\<OS Design Name>* directory.

3. Select the *<OS Design Name>.sln* file and click the "Open" button.

4. The following window may appear, if it does please click the "OK" button to continue.
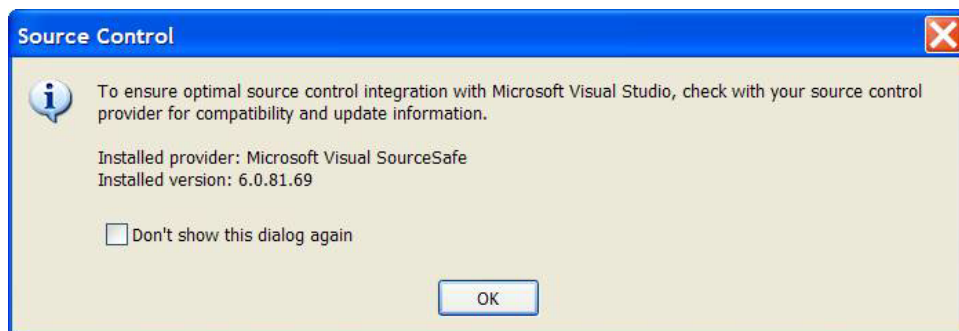
5. Choose the correct Platform in the Catalog Item View. **NOTE:** Select the "Catalog Items View" tab to show the list of current catalog items. If the tab is not available, click on View > Other Windows > Catalog Items View. The catalog item view displays a "tree" of all features that can be added or removed from your custom Windows CE build.

Make sure to choose the correct platform that you are using (e.g., OMAP35x Torpedo Development Kit vs. OMAP35x SOM-LV Development Kit). The radio buttons indicate that only *one* item within that folder may be selected (also indicated by the note to 'choose one').
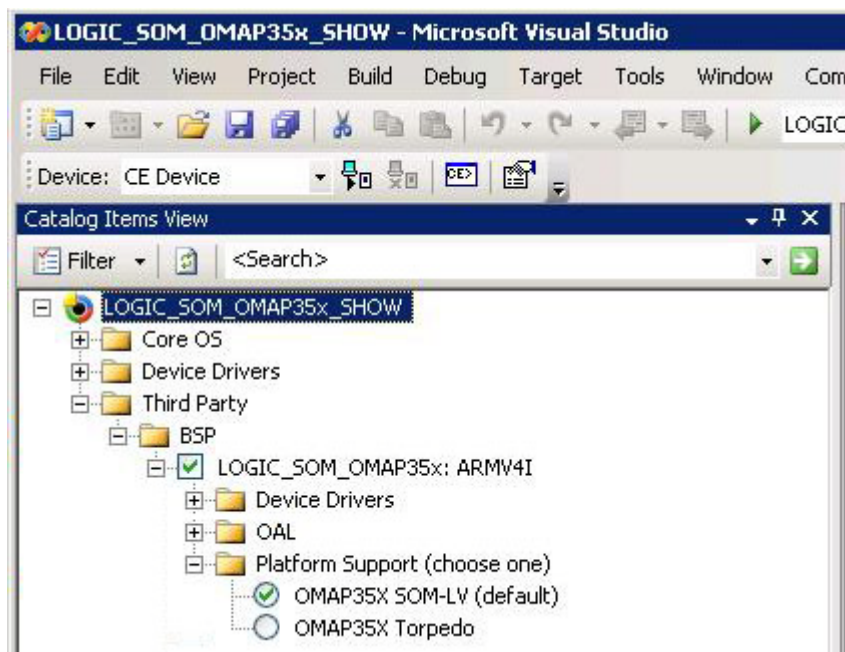
6. To build a solution for the first time in Windows CE 6.0, click on Build > Advanced Build Commands > Clean Sysgen.

7. The build will start and messages from the build system will appear in Visual Studio's output window. **NOTE:** This can take an hour or longer, depending on your host PC specifications.

8. The build has finished when you see `Build succeeded` in the bottom status window and the words `build complete` in the Output window.
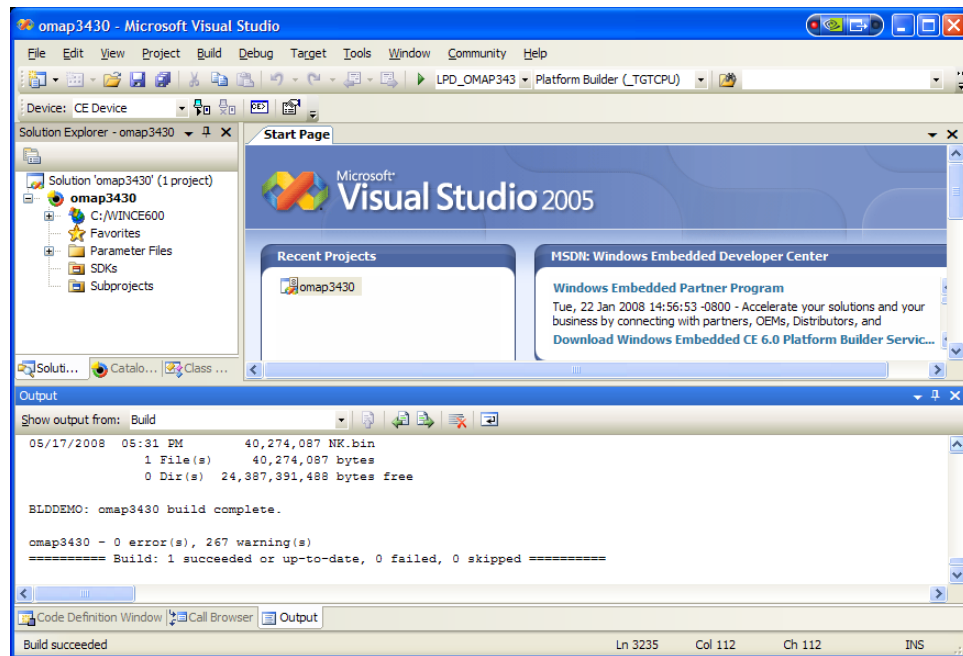
5.3.1 Build Option Use Scenarios

Build Options	Usage
Sysgen	Use when Microsoft components have been added or removed
	Selecting new BSP drivers may require additional Microsoft components
	Will also build the BSP source files
Clean Sysgen	Also performs a clean prior to Sysgen
Build and Sysgen	Use when any OS source files are modified
Rebuild and Clean Sysgen	Use immediately after installing new QFE package(s)
Build Current BSP and Subprojects	Use when any BSP source files are modified or BSP registry changes have been made
Rebuild Current BSP and Subprojects	Also performs a clean prior to "Build Current BSP and Subprojects"

NOTE: In the menu, click on Build > Global Build Settings. In the window that appears, make sure that both *Copy Files to Release Directory* and *Make Run-Time Image* options are selected.

5.4 Run Logic PD's Windows CE 6.0 Source BSP

Please follow the steps below to download the newly created Windows Embedded CE image to your OMAP35x Development Kit (the steps in this section assumes the download method is via Ethernet).

1. Connect the OMAP35x Development Kit to the Ethernet network.

2. Connect the OMAP35x Development Kit to your PC using the null-modem serial cable included with the kit.

3. Launch the Tera Term application on your PC.

4. Power on your OMAP35x Development Kit.

5. Initialize LogicLoader's TCP/IP stack using the `ifconfig` command. Type **`ifconfig sm0 dhcp`** and press the Enter key to obtain an IP address from a DHCP server on the network.

```
Tera Term - COM1 VT
File  Edit  Setup  Control  Window  Help

NoLo Version : 2.4.2-OMAP3503 0001
NoLo Build   : LPD386 Fri May 16 13:44:27 CDT 2008
NoLo Compiler: gcc version 4.2.1
Found        : Non-YAFFS file


*******************************************************************

                      LogicLoader

 (c) Copyright 2002-2008, Logic Product Development, Inc.
 All Rights Reserved.
 Version 2.4.2-OMAP3503 0001
*******************************************************************

losh> ifconfig sm0 dhcp
Starting DHCP on sm0 .
losh>
```

6. Verify the device received an IP address by typing `ifconfig` with no parameters and pressing the Enter key. Note that the `ifconfig` command also displays the system MAC address. Occasionally, there is a brief delay before a kit obtains an IP address. Please verify that your development kit has received a valid IP address before proceeding to the next step.

```
Tera Term - COM1 VT
File  Edit  Setup  Control  Window  Help

*******************************************************************

                      LogicLoader

 (c) Copyright 2002-2008, Logic Product Development, Inc.
 All Rights Reserved.
 Version 2.4.2-OMAP3503 0001
*******************************************************************

losh> ifconfig sm0 dhcp
Starting DHCP on sm0 .
losh> ifconfig

sm0: up    100M full-duplex   (25)
sm0:     mac: 00:08:ee:02:38:79 ip: 10.0.5.119
         mask: 255.255.252.0      gw: 10.0.4.1
losh>
```
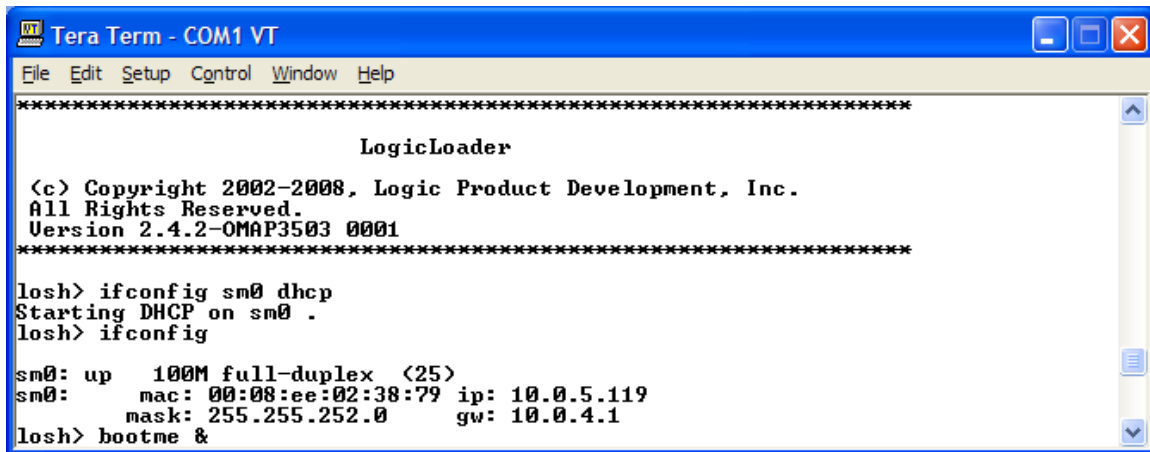
7. Start the download process by typing `bootme &` pressing the Enter key.

   The `bootme &` command sends UDP packets over the LAN to a host PC. The packets are recognized by Microsoft Platform Builder as coming from a device waiting to download a Windows Embedded CE image. Technically, the command is simply `bootme`; however, the `&` is needed to launch this command in the background so you may still interact with the LogicLoader shell.

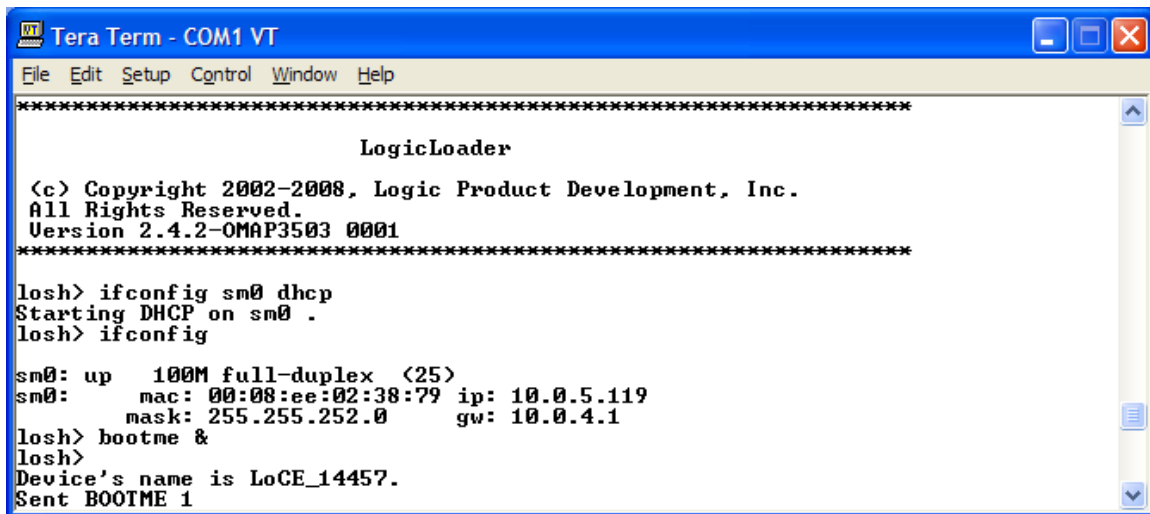8. The `bootme &` command outputs the name that the device will use to communicate with Platform Builder and then starts outputting network packets as shown in the figure below.

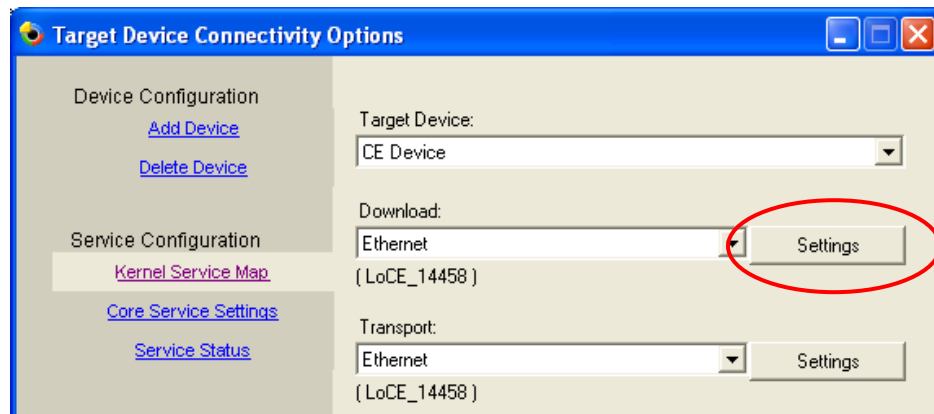9. Switch to the Visual Studio 2005 application. Click on Target > Connectivity Options. In the window that opens, select **Ethernet** in the drop-down boxes for both *Download* and *Transport.*

10. Click the "Settings" button next to *Download*.

11. Select the device's name that LogicLoader output in Step 8 above. It may take several seconds for the name to show up in the list of *Active target devices*. When the name appears,
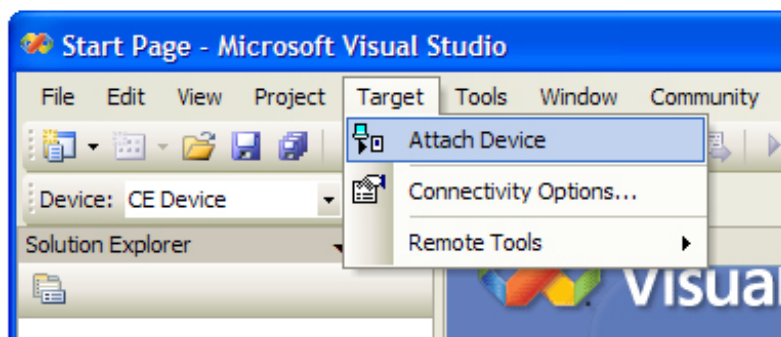
select it and then click the "OK" button. **NOTE:** The name of your device will almost certainly be different than the image below.
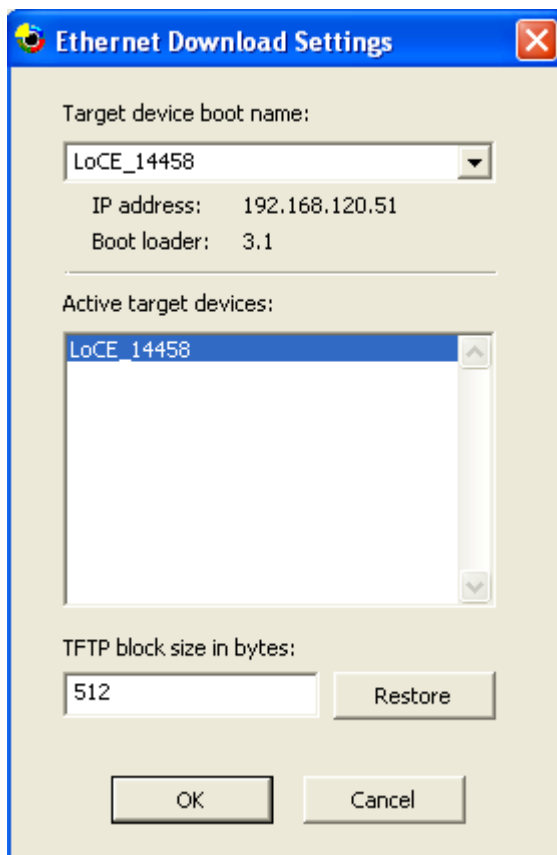

12. Click the "Apply" button in the *Target Device Connectivity Options* window. Then click the "Close" button to close the window.
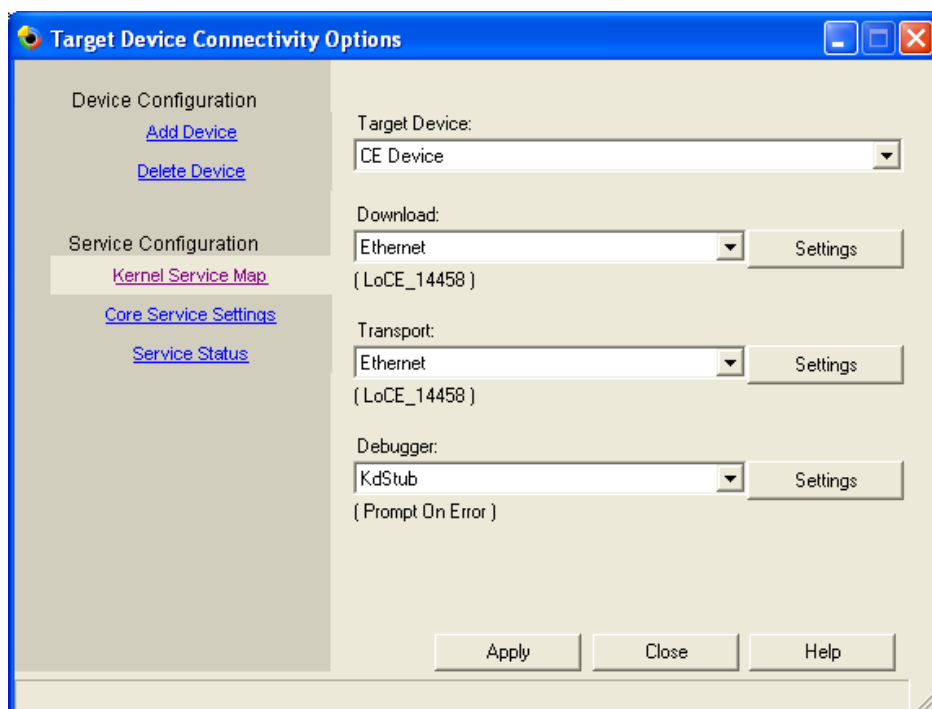
13. Click on Target > Attach Device to download the Windows Embedded CE image to the OMAP35x Development Kit.

14. Platform Builder will download the new image to the OMAP35x Development Kit. This may take some time depending on the network.

15. When the download is complete, Platform Builder will wait for LogicLoader to connect.
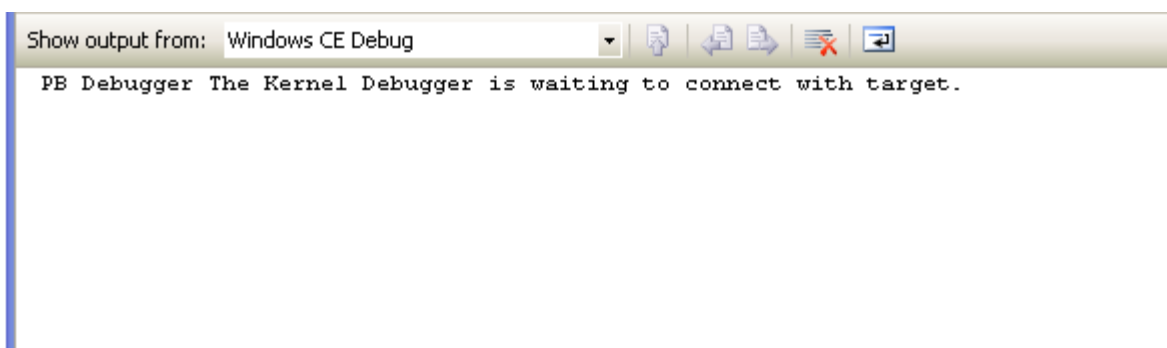
16. Once the image has been transferred, LogicLoader verifies the checksums and then returns to the losh> prompt.
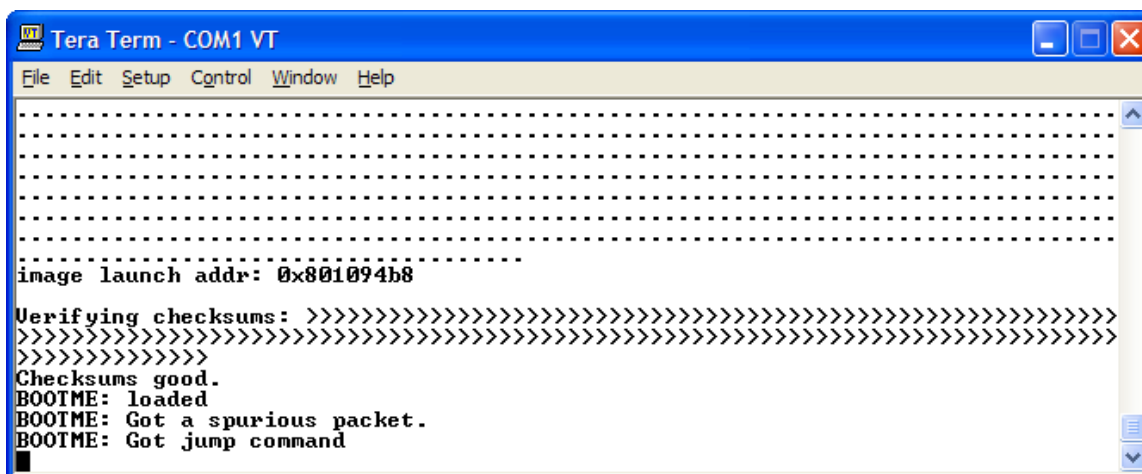
17. Type **exec** and press the Enter key.

18. LogicLoader will boot the BSP. The output you see should look similar to the series of continuous screenshots presented in the figures below. Depending on the build options, you may see additional output; if not, wait for the image to boot and proceed with step 19 below.

```
Tera Term Web 3.1 - COM1 VT
File  Edit  Setup  Web  Control  Window  Help
DeviceId................. LoCE_
pArgs->flags............. 0x25
pArgs->devLoc.IfcType.... 0
pArgs->devLoc.LogicalLoc. 0xC000000
pArgs->devLoc.PhysicalLoc 0x0
pArgs->devLoc.Pin........ 0
pArgs->ip4address........ 0
pDevice->Name............  s
pDevice->ifcType......... 0
pDevice->id.............. 0xC000000
pDevice->resource........ 0
pDevice->type............ 2
pDevice->pDriver......... 0x8281B018
+OALKitlFindDevice(0/0/ 8x, 0x 8x)
-OALKitlFindDevice(pDevice = 0x 8x((▌▌), PhysicalLoc = 0x 8x)
+OEMKitlInit(0x82859A20)
+OALKitlEthInit(' ', 'LoCE_', 0x 8x, 0x 8x)
xLAN921xInit: SMSC LAN9211 Ethernet conroller is detected
                                     Chip Id: 9211 Revision: 0
LAN921x: reset PHY...DONE
LAN921x: PHY id1: 7 id2: c0c3
+LAN921xAutoNegotiate: 0x1
LAN921x: Auto-negotiation complete!
LAN921x: Link is 100 Mbps full-duplex...
MAC Address: 0:8:ee:2:38:7a
-LAN921xInit(mac = 00:08:ee:02:38:7a, rc = 1)
+OALKitlCreateName(' s', 0x 4x, 0x 8x)
-OALKitlCreateName(pBuffer = ' s')
KITL: *** Device Name LoCE_14458 ***
KITL: using sysintr 0x12
KITL: DHCP get/renew device IP: 1
-OALKitlEthInit(rc = 1)
Shared ethernet is enabled!
Initializing VBridge.
VBridge:: built on [May 13 2008] time [11:44:16]
VBridgeInit()...TX = [16384] bytes -- Rx = [16384] bytes
Tx buffer [0xA2850EC0] to [0xA2854EC0].
Rx buffer [0xA2854EE0] to [0xA2858EE0].
VBridge:: NK add MAC: [0-8-EE-2-38-7A]
VBridge initialized. (800 2EE 7A38)
-OEMKitlInit(rc = 1)
Connecting to Desktop
+KitlEthGetDevCfg(0x 8x, 0x 8x->-2105175034)
-KitlEthGetDevCfg(rc = 1)
KITL: Connected host  IP: 1  Port: 4147
 KeyIndex 0 = -1
 KeyIndex 1 = -1
 KeyIndex 2 = -1
 KeyIndex 3 = -1
 KeyIndex 4 = -1
 KeyIndex 5 = -4194305
 KeyIndex 6 = -4194305
 KeyIndex 7 = -1
+KITLRegisterDfltClient, service:0
+KITLRegisterDfltClient, service:1
-OALKitlInit(rc = 1)
-OALKitlStart(rc = 1)
```

19. The kit LCD may ask you to calibrate the screen by using a stylus to touch the center of several crosshairs.
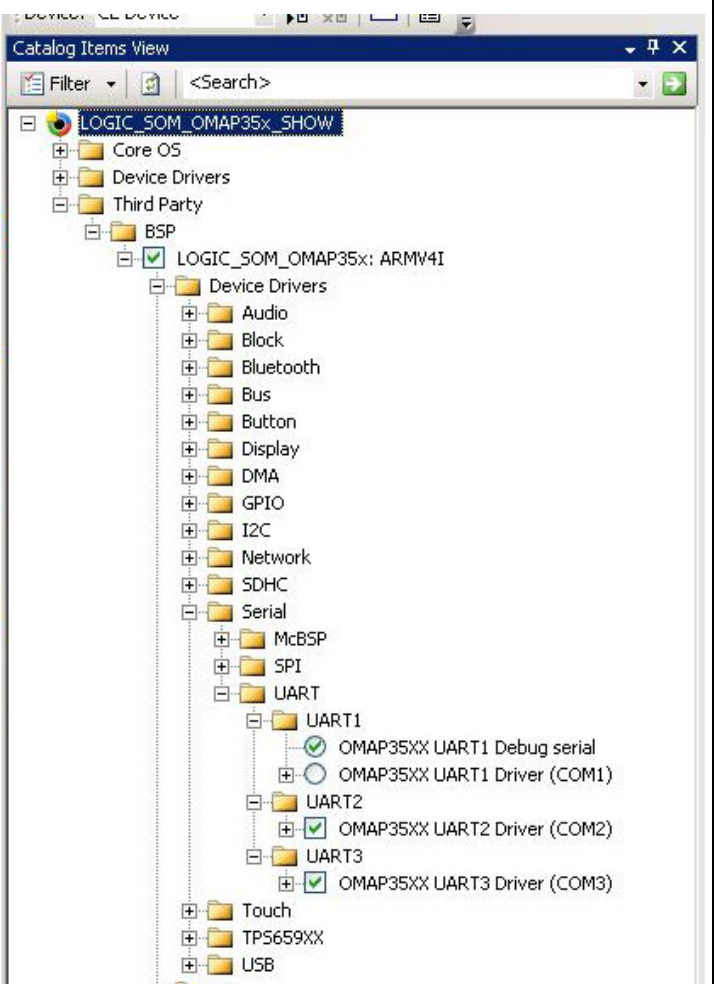
20. Once the screen has been calibrated, tap anywhere on the screen and your OMAP35x Development Kit will boot into Windows Embedded CE 6.0.

5.5 Enable/Disable Drivers

The table below provides information on how to enable and disable drivers with the Logic PD OMAP35x Windows CE BSP. Implementing any driver changes will require you to perform a Build > Advance Build Commands > Rebuild Current BSP and Subproject for the changes to take effect; the only exception is for enabling or disabling VFPU Support which requires a clean Sysgen (Build > Rebuild Solution).

This section will show the basics of enabling and disabling a driver in the OMAP35x BSP by walking through enabling and disabling the UART driver. Please refer to the individual driver documentation (found in the *101xxxx_OMAP35x_WinCE600_x_x_x_Source\Documentation* directory of the source BSP) for more details on using and customizing the OMAP35x Development Kit drivers.

Driver	Action	Display
UART	**Enable Driver:** Select catalog item for desired UART(S) under Third Party > BSP > LOGIC_SOM_OMAP35x: ARMVI > Device Drivers > Serial > UART UART1 UART2 UART3 **Disable Driver:** Deselect catalog item. **Note:** In this example, you will see that 'UART1' has a radio button selection for either 'UART1 Debug serial' or 'UART1 Driver (COM1)'. If you choose 'UART1 Debug serial', then Windows CE **will not** have access to "COM1:" for serial communication. If you choose 'UART1 Driver (COM1)', then Windows CE will have access to UART1 as the standard "COM1:" serial port. Debug serial is used to show debug messages from Windows CE and any of its drivers or applications that are running.	

5.6 Customizing Your Windows CE Image

This section describes how to customize Logic PD's OMAP35x Windows CE BSP with built-in features.
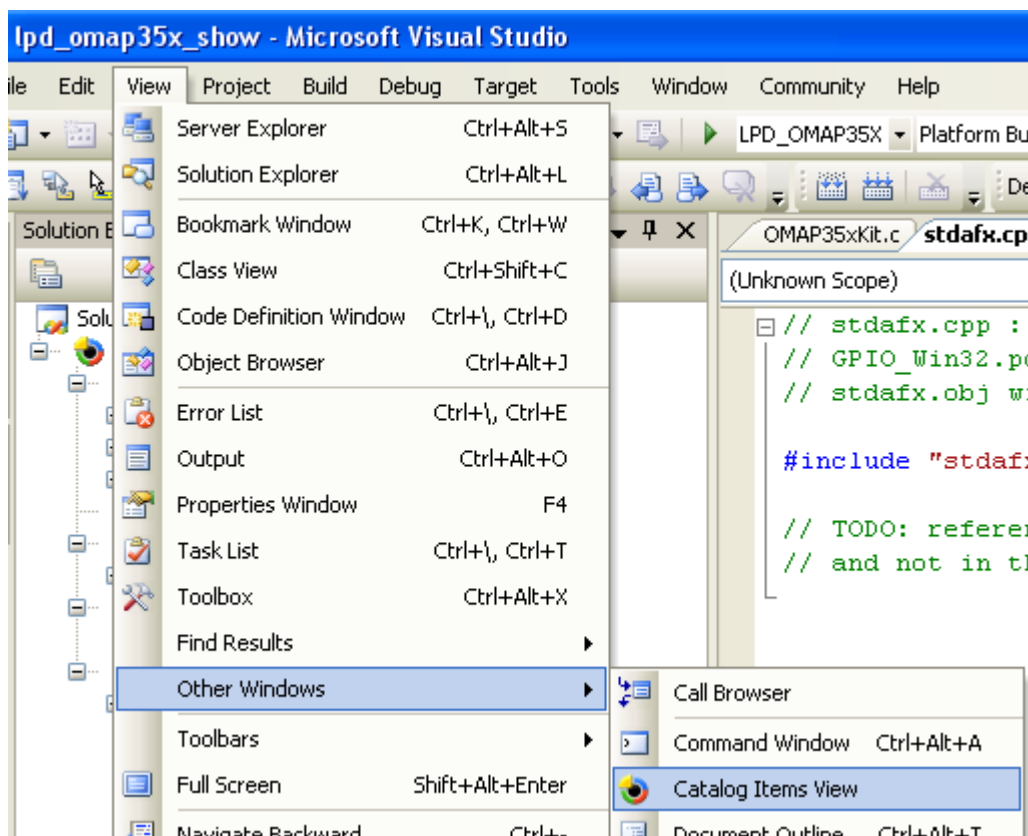
5.6.1 Using Onboard Bluetooth

NOTE: This section only applies to OMAP35x (SOM-LV) Development Kit; the OMAP35x Torpedo Development Kit does not support Bluetooth.

This section will provide an example for how to connect a keyboard and mouse using the onboard Bluetooth module.

Requirements:

■ This example uses the show image project that is part of the OMAP35x SOM-LV Release.

■ This section assumes the developer is already familiar with building Logic PD's Windows CE BSP as described at the beginning of Section 5.

1. Load the show image project file into VS2005.

2. Open the CATALOG windows in your VS2005 by clicking on View > Other Windows > Catalog Items View.

3. Add Bluetooth HID Device Support by clicking the checkbox. In this example both *Bluetooth HID – Keyboard* and *Bluetooth HID – Mouse* have been selected.
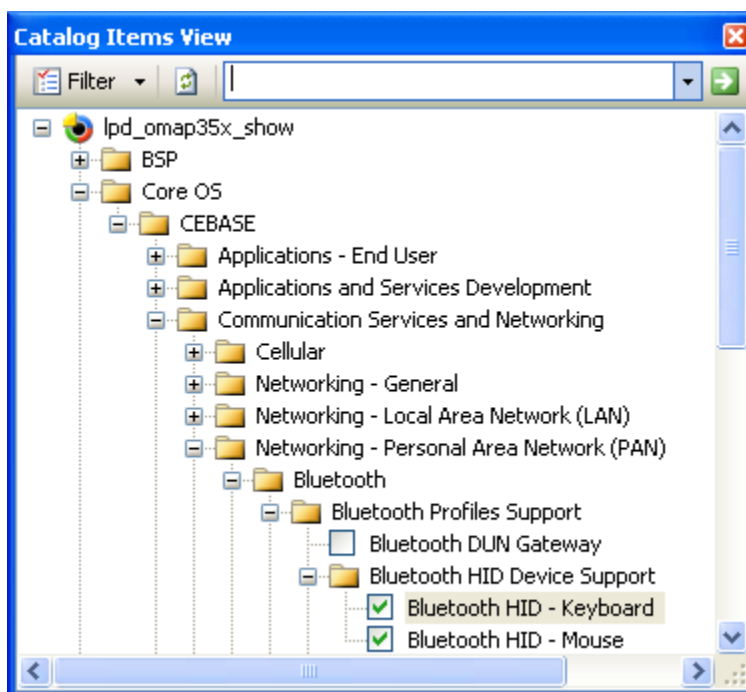
4. Verify that the *BFR6300 Bluetooth Driver* within the BSP is also selected.
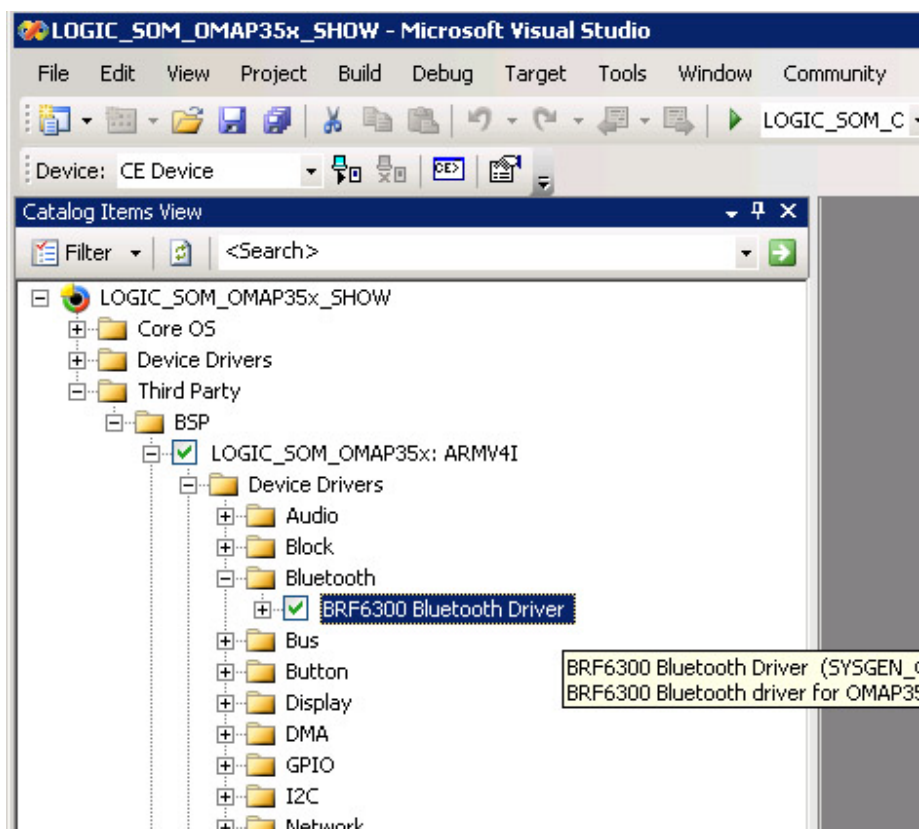
5. Perform a Build > Build Solution when including Core OS Catalog components.

    NOTE: Whenever a change is made in the Core OS Catalog components, a "Build Solution" is required; selecting "Build Current BSP and Subprojects" **will not** work in this case.

6. Connect the antenna that comes with your OMAP35x SOM-LV Development kit to the J3 SMA connector on your OMAP35x SOM-LV Module.

7. After loading your Windows CE image click on Start > Settings > Control Panel.
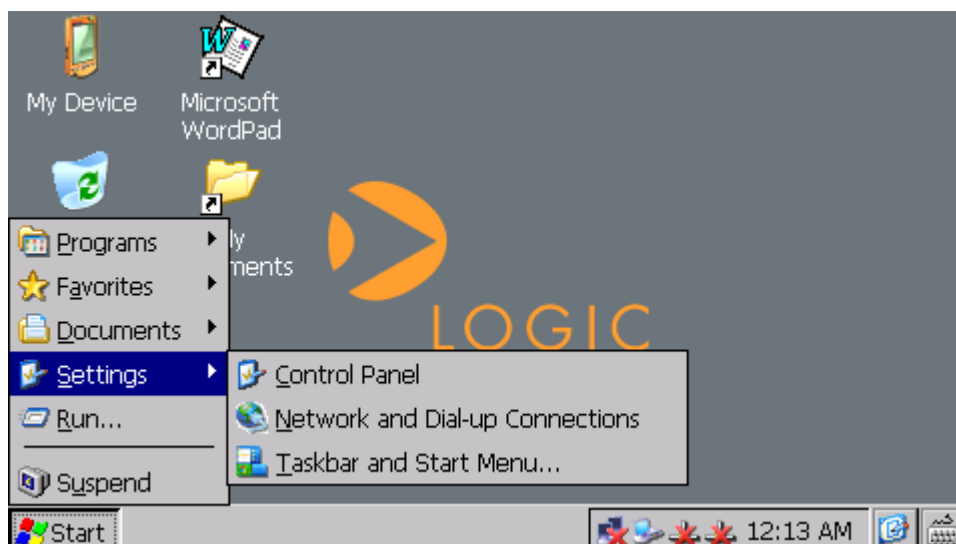
8. Double-Click on the Bluetooth Device Properties icon.
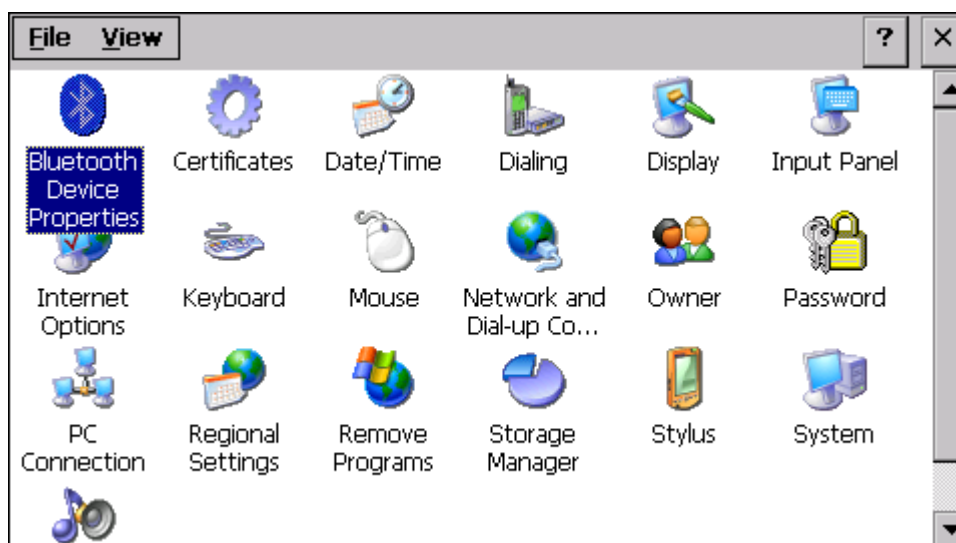
9. Click on the Scan Device button.
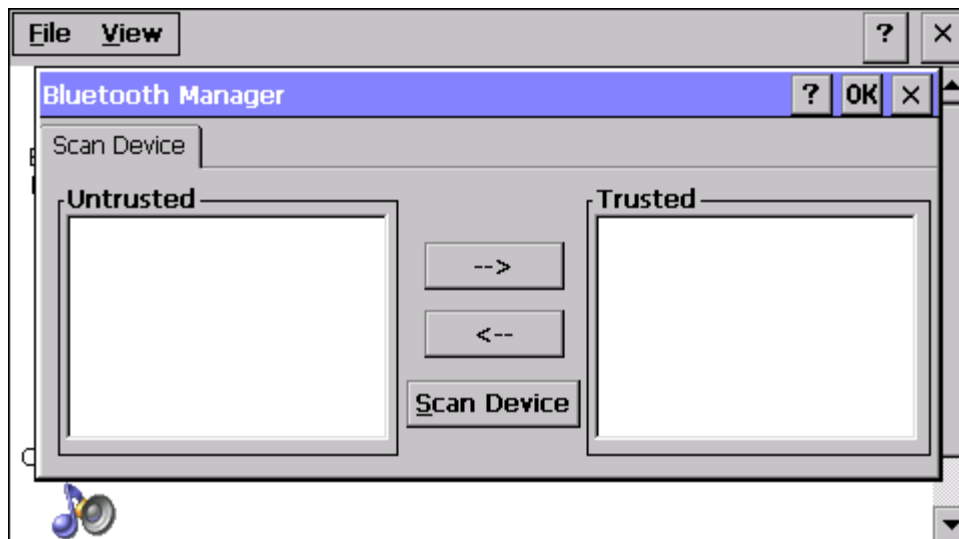
10. On the Bluetooth device you want to connect to your OMAP35x Development Kit, press the pairing button.

11. Once the Bluetooth signal is detected from the device it will appear in the *Untrusted* window.
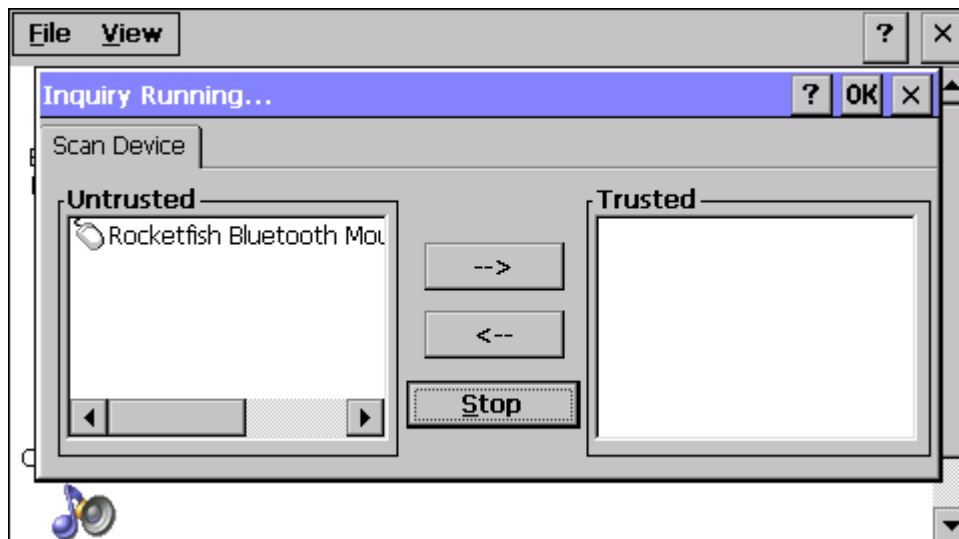
12. Click the '-->' button to move your Bluetooth device to the *Trusted* window. In this example, the device does not required authentication so click 'No'.
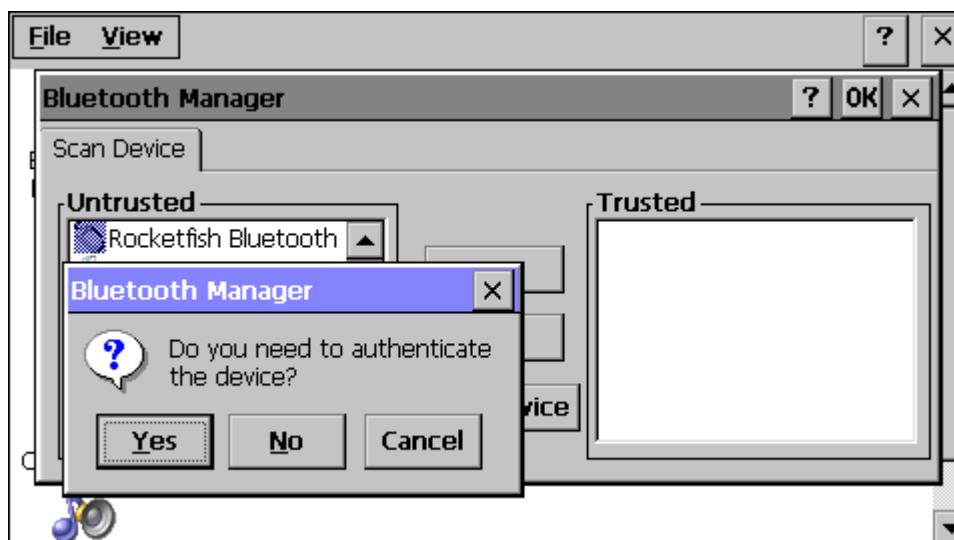

13. Double-click the Bluetooth device in the *Trusted* window and select **Active** to enable the device within Windows CE 6.0.
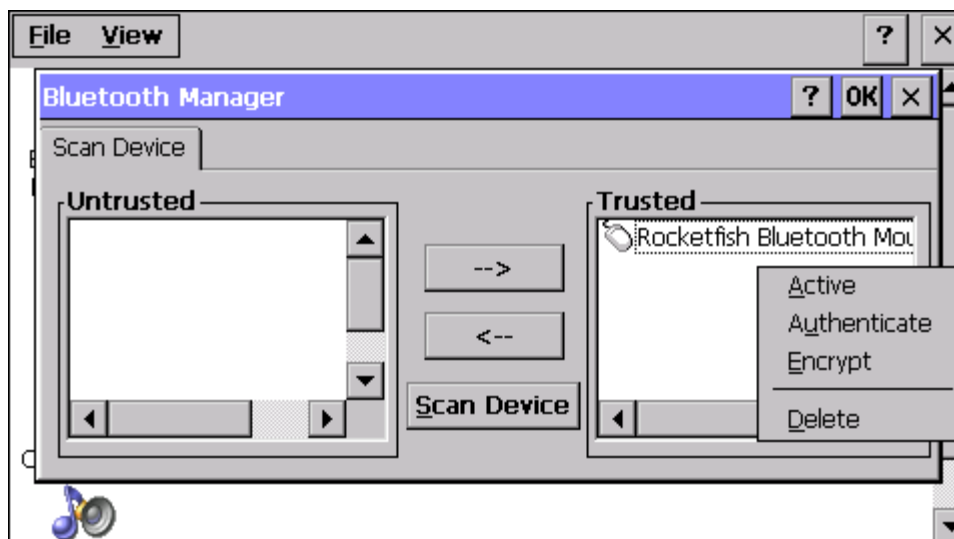
14. If the device successfully activates, there will be a red check mark on the device icon as seen below.
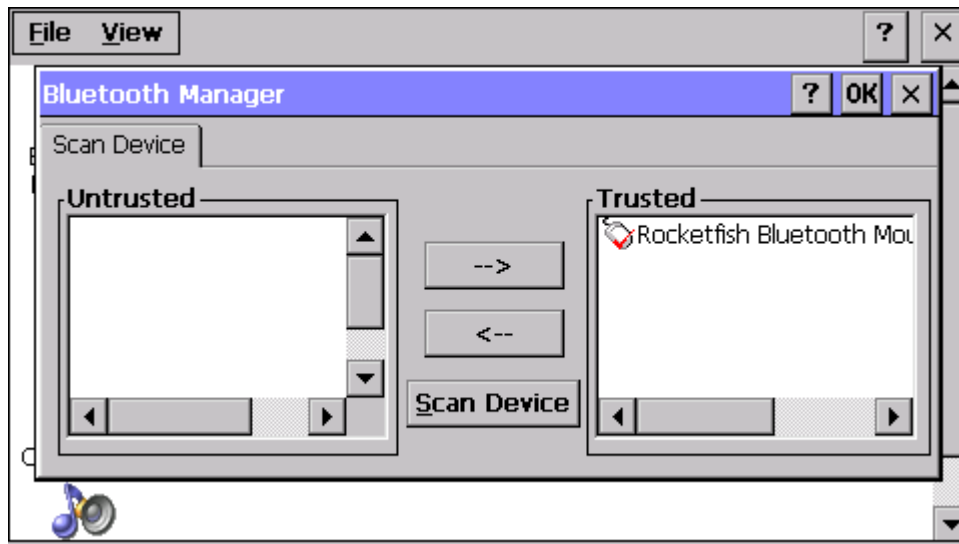
15. To add another Bluetooth device, follow the instructions above beginning with Step 9. The image below shows both a Bluetooth mouse and keyboard successfully enabled.
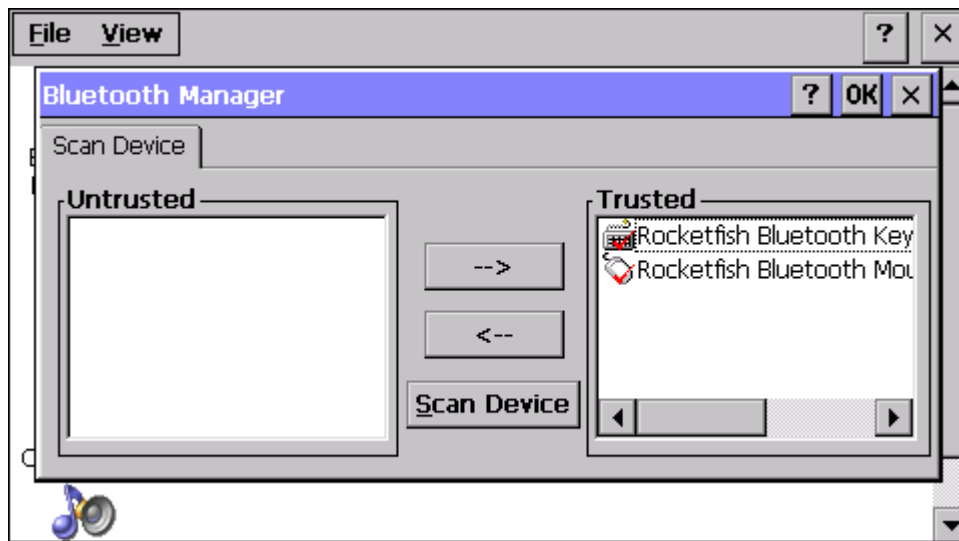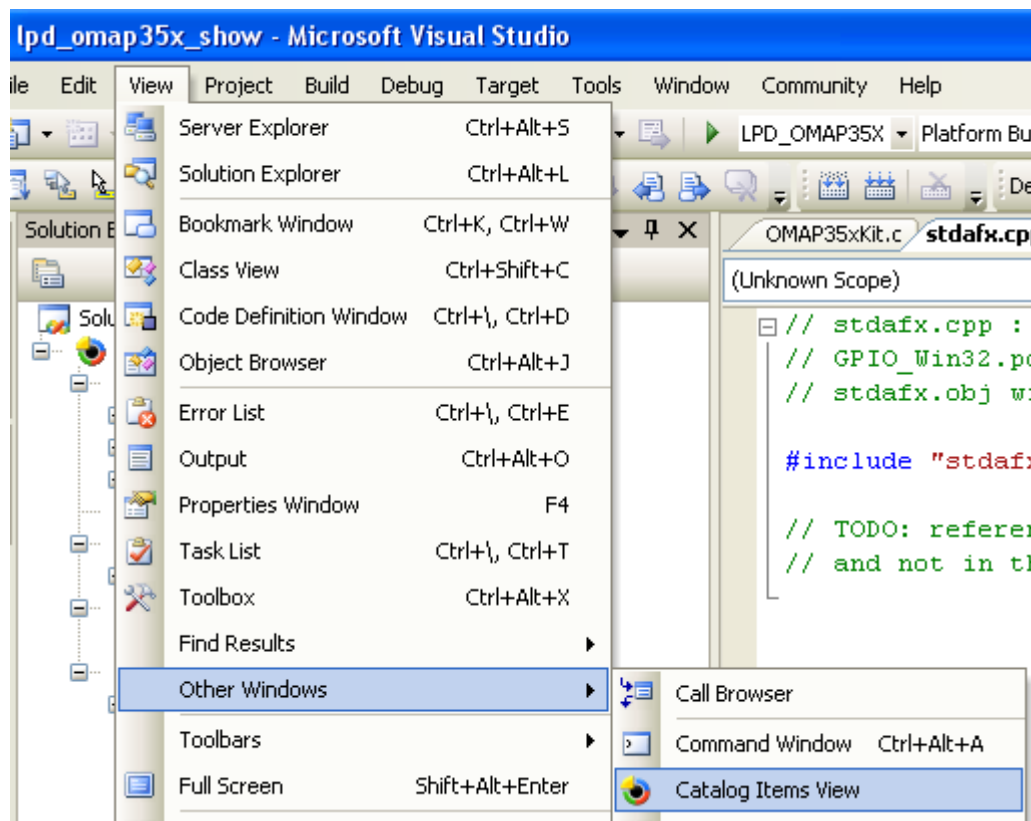
5.6.2 Using a USB Bluetooth Dongle

This section will provide an example of how to configure the BSP to use a USB Bluetooth dongle and not the onboard Bluetooth module.

Requirements:

■ This example uses the show image project that is part of the OMAP35x SOM-LV Release.

■ This section assumes the developer is already familiar with building Logic PD's Windows CE BSP as described at the beginning of Section 5.

1. Load the show image project file into VS2005.

2. Open the CATALOG windows in your VS2005 by clicking on View > Other Windows > Catalog Items View

3. Add Bluetooth HID Device Support by clicking the checkbox. In this example both *Bluetooth HID – Keyboard* and *Bluetooth HID – Mouse* have been selected. Also select *Bluetooth Stack with Integrated USB Driver*; this is required when using a USB Bluetooth dongle.
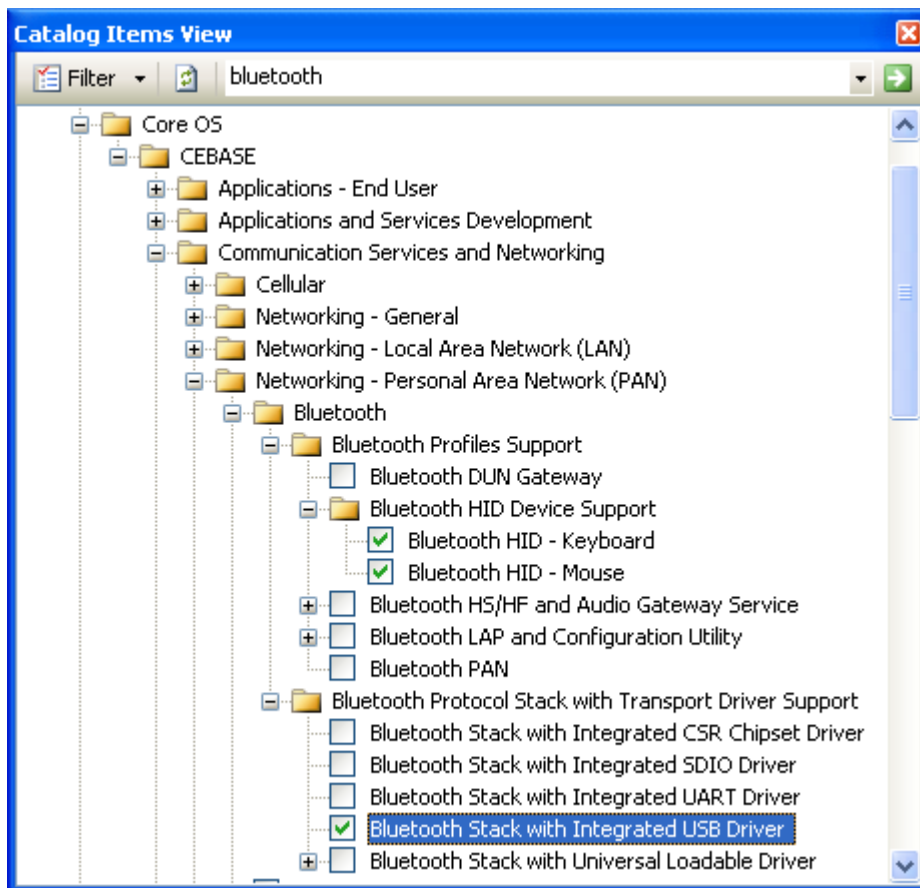
4. Verify that the *BFR6300 Bluetooth Driver* within the BSP is **not** selected; Windows CE 6.0 only supports one Bluetooth controller at a time.
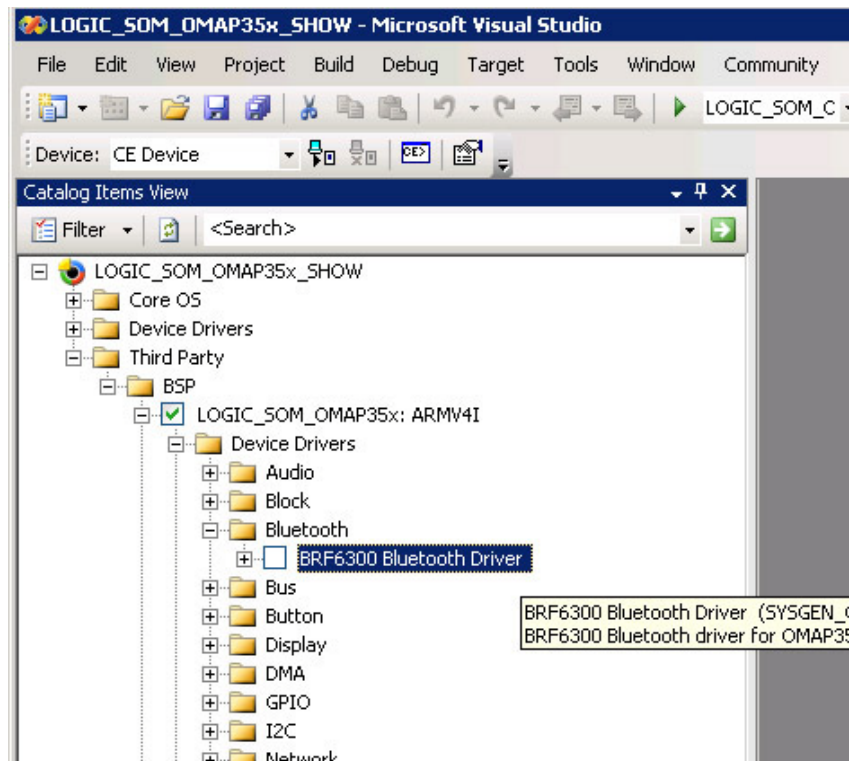

5. Verify that the appropriate USB Host driver is selected, if applicable. Refer to the driver documentation to determine the appropriate drivers to select to enable USB Host support for your platform (individual driver documents are located in the *101xxxx_OMAP35x_WinCE600_x_x_x_Source\Documentation* directory of the source BSP).
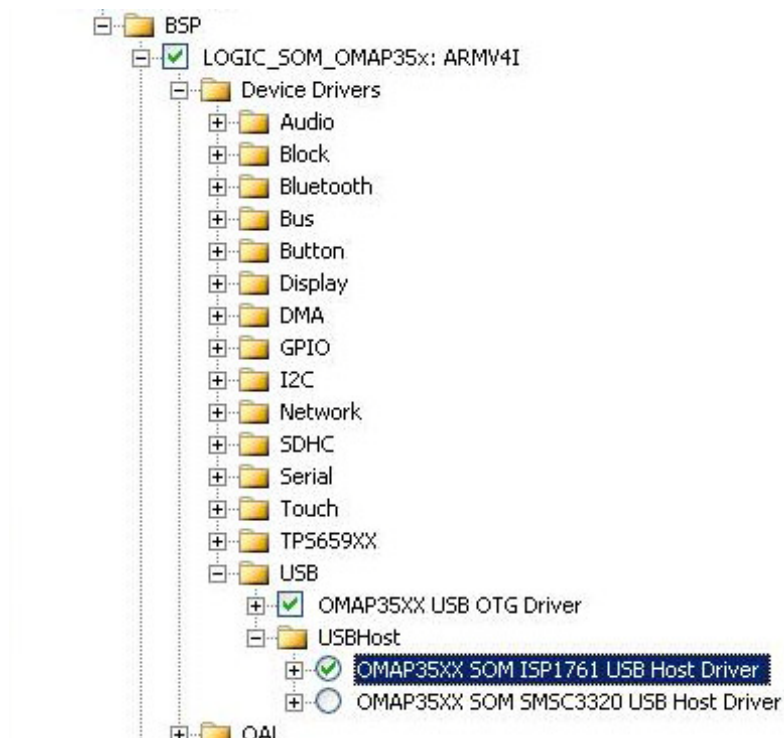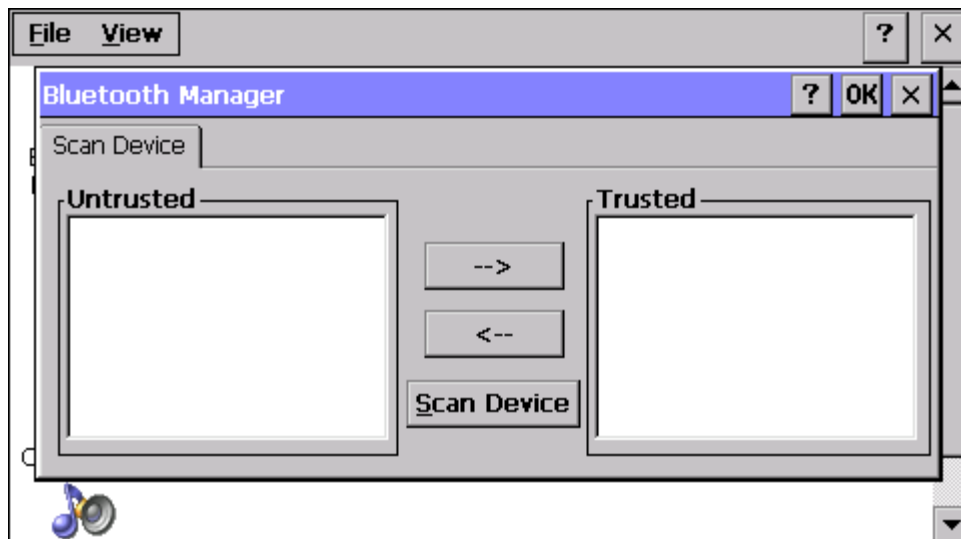
6. Perform a Build > Build Solution when changing Core OS Catalog components.

7. After the Windows CE image has loaded, connect the USB Bluetooth dongle to the USB Host port on the OMAP35x Development Kit.

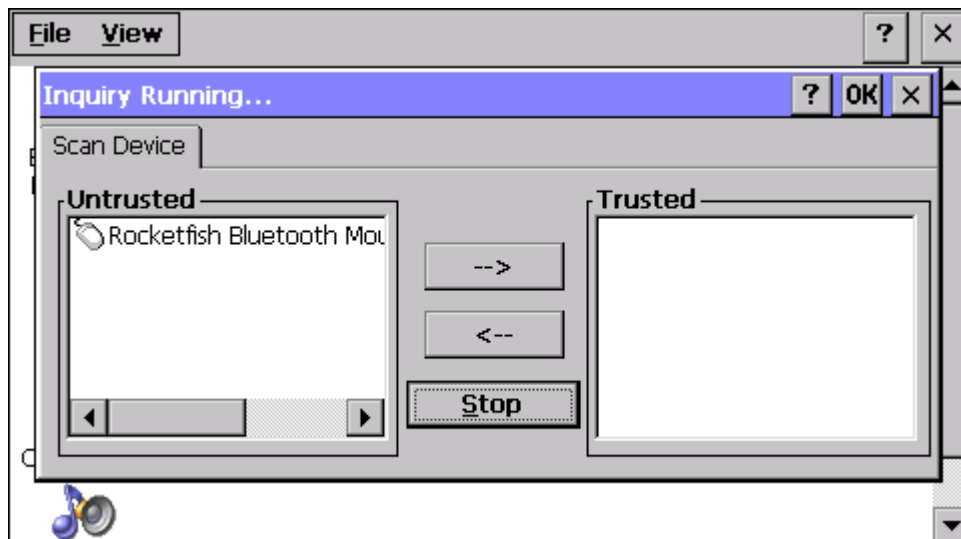8. Select Start > Settings > Control Panel.

9. Double-Click on the Bluetooth Device Properties icon.
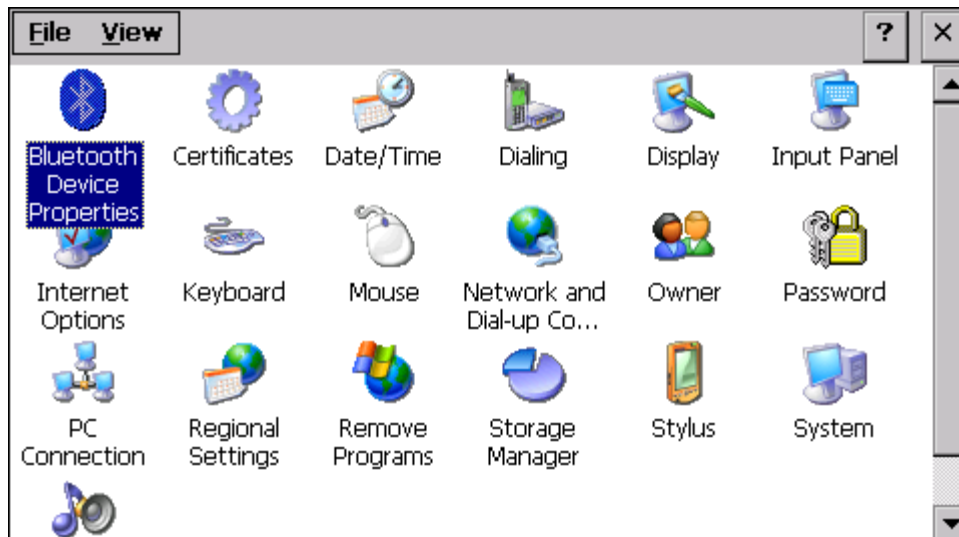
10. Click on the Scan Device button.

11. On the Bluetooth device you want to connect to your OMAP35x Development Kit, press the pairing button.

12. Once the Bluetooth signal is detected from the device it will appear in the *Untrusted* window.
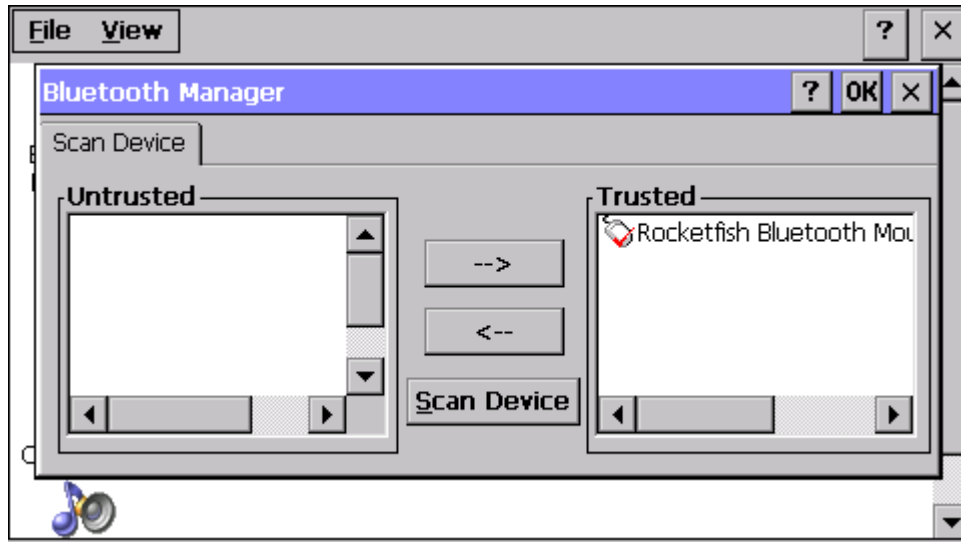
13. Click the '-->' button to move your Bluetooth device to the *Trusted* window. In this example, the device does not require authentication so select 'No.'
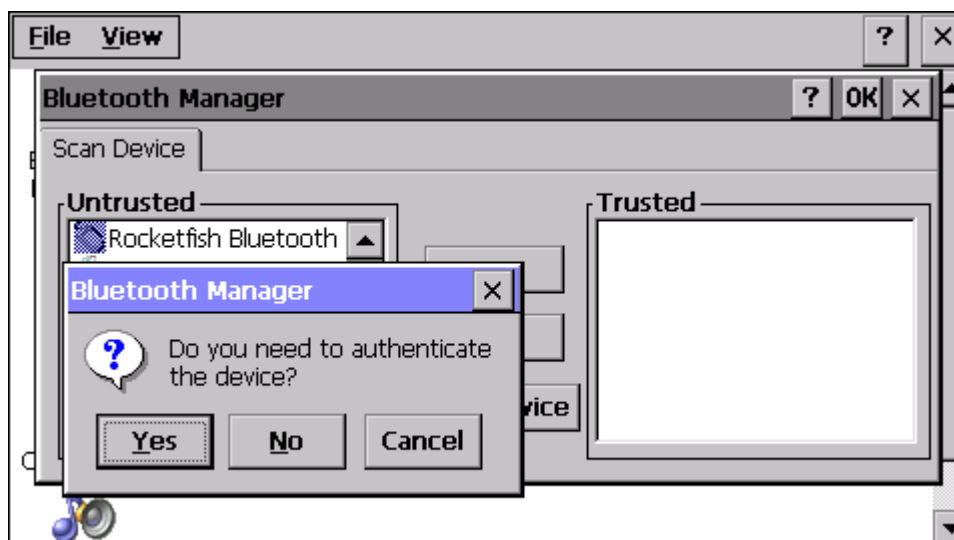
14. Double-click the Bluetooth device in the *Trusted* and select **Active** to enable the device within Windows CE 6.0.
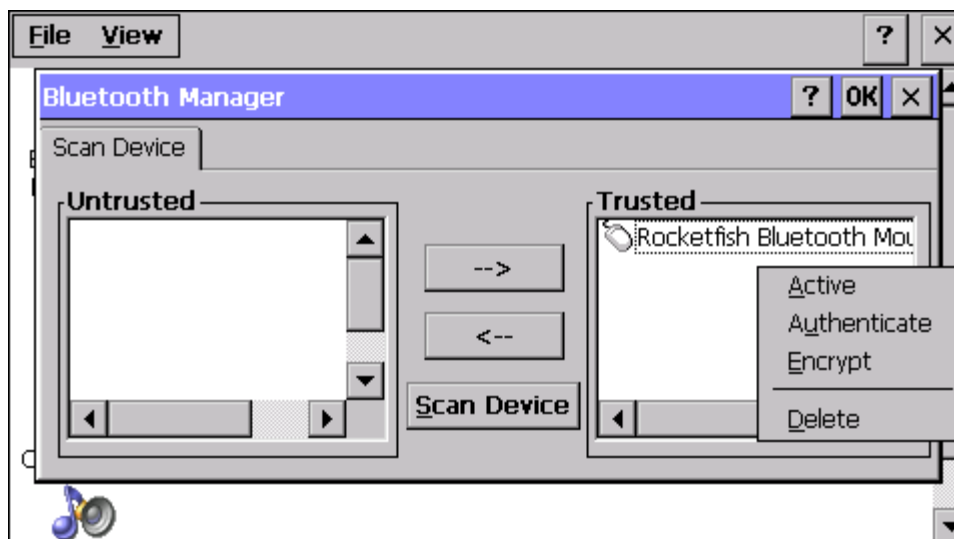
15. If the device successfully activates, there will be a red check mark on the device name as seen below.

16. To add another Bluetooth device, follow the instructions above beginning with Step 10. The image below shows both a Bluetooth mouse and keyboard successfully enabled.