# 第五章 Windows CE.NET 应用开发

# 5.1 Windows CE.NET OS的定制

## 共享源代码

- 超过2百万行源代码
- 适用于所有版本的 Windows CE .NET
- 适合于理论教育

# Windows CE .NET开发工具

- 操作系统开发(定制）工具
  - Platform Builder
    - 开发、调试、配置操作系统映像
- 应用程序开发
  - eMbedded Visual C++ 4.0 SP3
    - “本地”应用程序开发
    - C,，C++，MFC（微软基础类），ATL（活动模板库）
  - Visual Studio.NET 2003
    - Visual Basic .NET，C# .NET
    - .NET Compact Framework

# Windows CE 开发周期

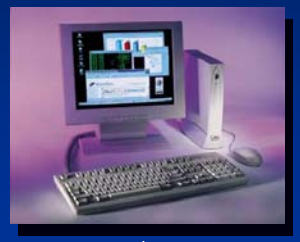
**配置 OS**
- CPU支持
- OS组件
- 设备驱动

**创建OS映象**
- 设备特定的 OS
- 设备特定的 Bootloader
- 设备特定的 OAL

**下载到目标设备**
- 串口连接
- 以太网连接

**调试OS**
- 内核调试
- 应用调试
- 源代码级调试
- 硬件辅助级调试

# Windows CE.NET开发过程



工作站

特定的Windows CE OS下载到设备

导出SDK

Platform Builder

- OAL
- OS Components
- Device Drivers

eMbedded Visual Tools

- eMbedded Visual C++®
- Visual Studio .NET

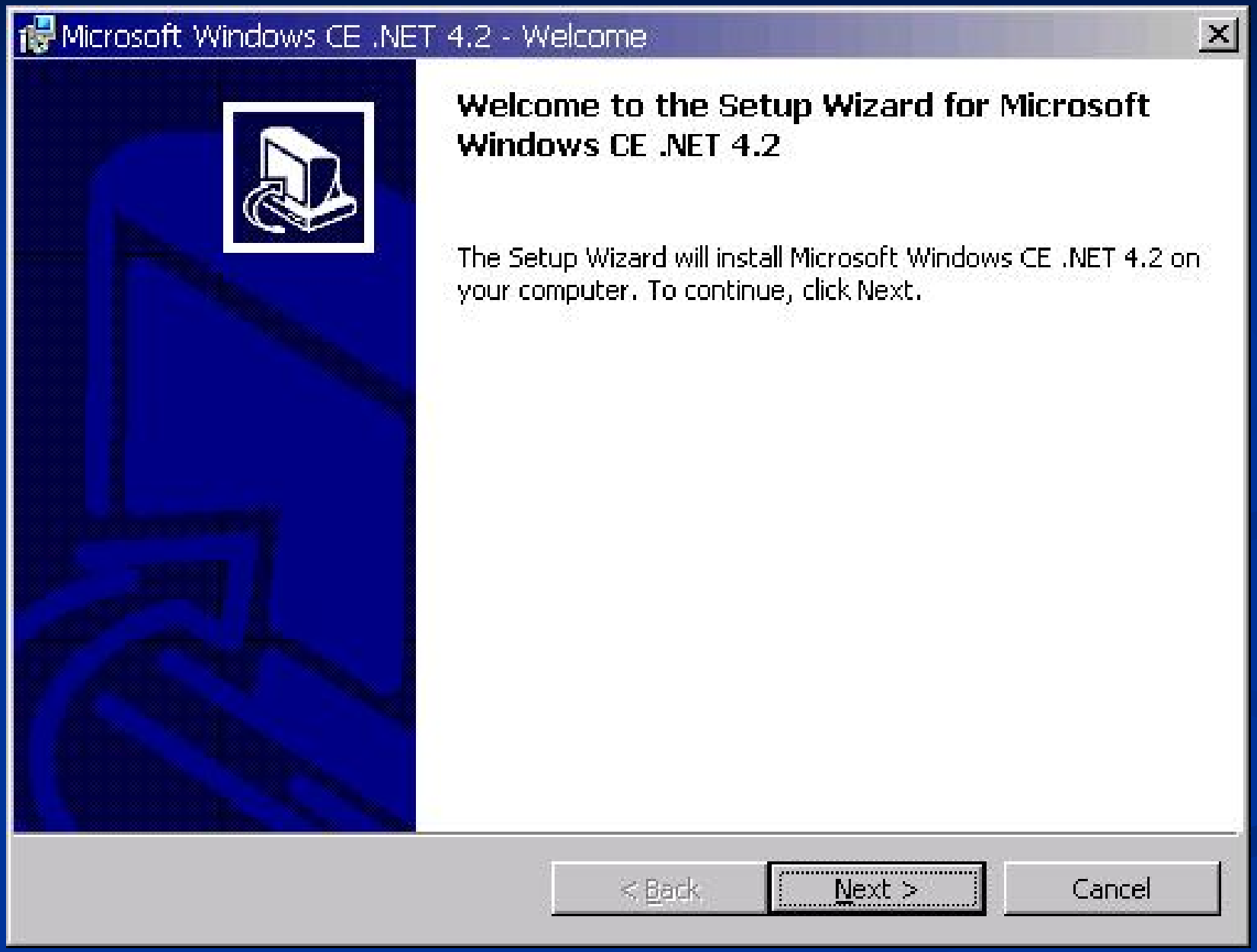
目标设备

开发

# 安装Platform Builder 4.2

演示

# 欢迎界面


Microsoft Windows CE .NET 4.2 - Welcome
Welcome to the Setup Wizard for Microsoft Windows CE .NET 4.2
The Setup Wizard will install Microsoft Windows CE .NET 4.2 on your computer. To continue, click Next.
< Back
Next >
Cancel

# 接受许可

Microsoft Windows CE .NET 4.2 - License Agreement

**License Agreement**

Please read the following license agreement carefully.

**END-USER LICENSE AGREEMENT FOR MICROSOFT SOFTWARE**

**MICROSOFT WINDOWS CE .NET 4.2**

END-USER LICENSE AGREEMENT FOR MICROSOFT SOFTWARE

IMPORTANT-READ CAREFULLY: **This End-User License Agreement ("EULA") is a legal agreement between you (either an individual or a single entity) and Microsoft Corporation ("Microsoft")**

- (•) I accept the terms in the license agreement
- ( ) I do not accept the terms in the license agreement (Exit Setup)

InstallShield

Print | < Back | Next > | Cancel

# 输入用户名、制造商、序列号

Microsoft Windows CE .NET 4.2 - Customer Information

**Customer Information**

Please enter your information.

User Name:

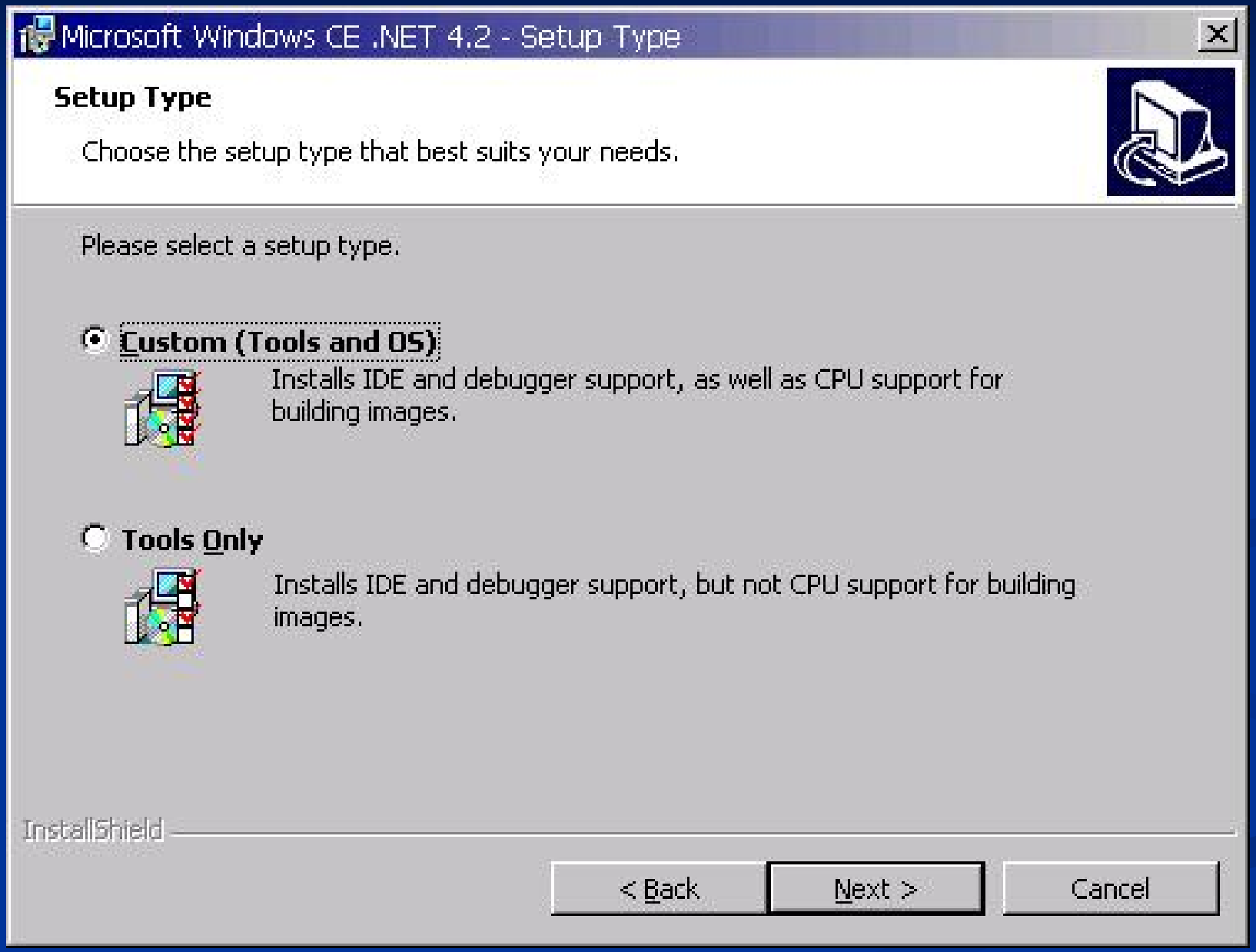
Organization:

Please enter the product key:

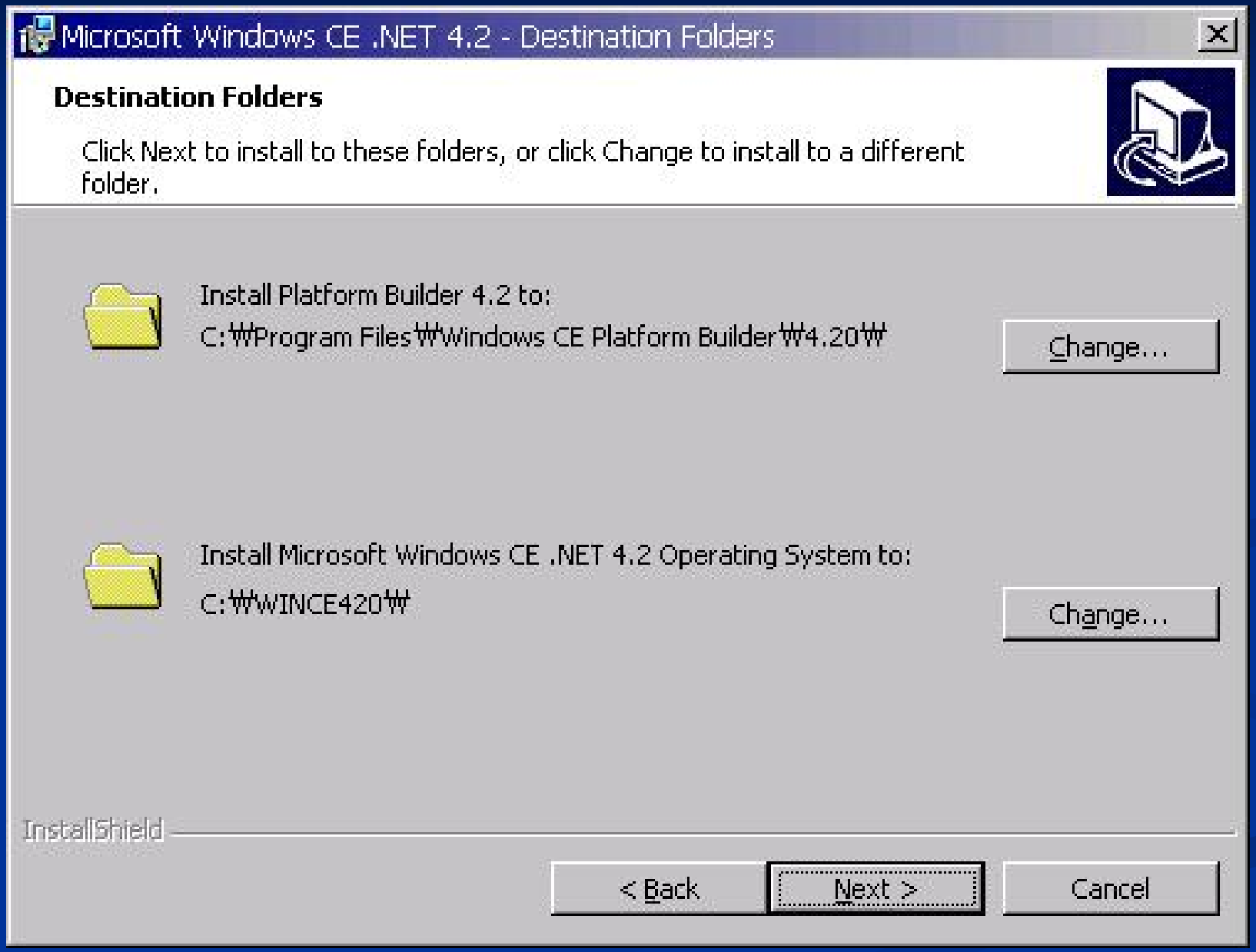
InstallShield

< Back | Next > | Cancel

# 选择安装类型


Microsoft Windows CE .NET 4.2 - Setup Type
Setup Type
Choose the setup type that best suits your needs.
Please select a setup type.
Custom (Tools and OS)
Installs IDE and debugger support, as well as CPU support for building images.
Tools Only
Installs IDE and debugger support, but not CPU support for building images.
InstallShield
< Back
Next >
Cancel

# 选择安装目录


Microsoft Windows CE .NET 4.2 - Destination Folders
Destination Folders
Click Next to install to these folders, or click Change to install to a different folder.
Install Platform Builder 4.2 to:
C:₩Program Files₩Windows CE Platform Builder₩4.20₩
Change...
Install Microsoft Windows CE .NET 4.2 Operating System to:
C:₩WINCE420₩
Change...
InstallShield
< Back
Next >
Cancel

# 选择CPU类型

Microsoft Windows CE .NET 4.2 - Custom Setup

**Custom Setup**

Select the program features you want installed.

Click on an icon in the list below to change how a feature is installed.

- Platform Builder
- Shared Source for Windows CE .NET 4.2
- Windows CE .NET 4.2 Test Kit
- Windows CE .NET 4.2 Operating System
  - Emulator
  - x86
  - ARMV4
  - ARMV4I
  - MIPSII
  - MIPSII_FP

Feature Description

ARM 72X, ARM92X, and ARM102X cores, Intel StrongARM and XScale, Motorola DragonBall MX1, NeoMagic NMS72XX, Samsung S3C24XX, Texas Instruments OMAP

This feature requires 1725MB on your hard drive.

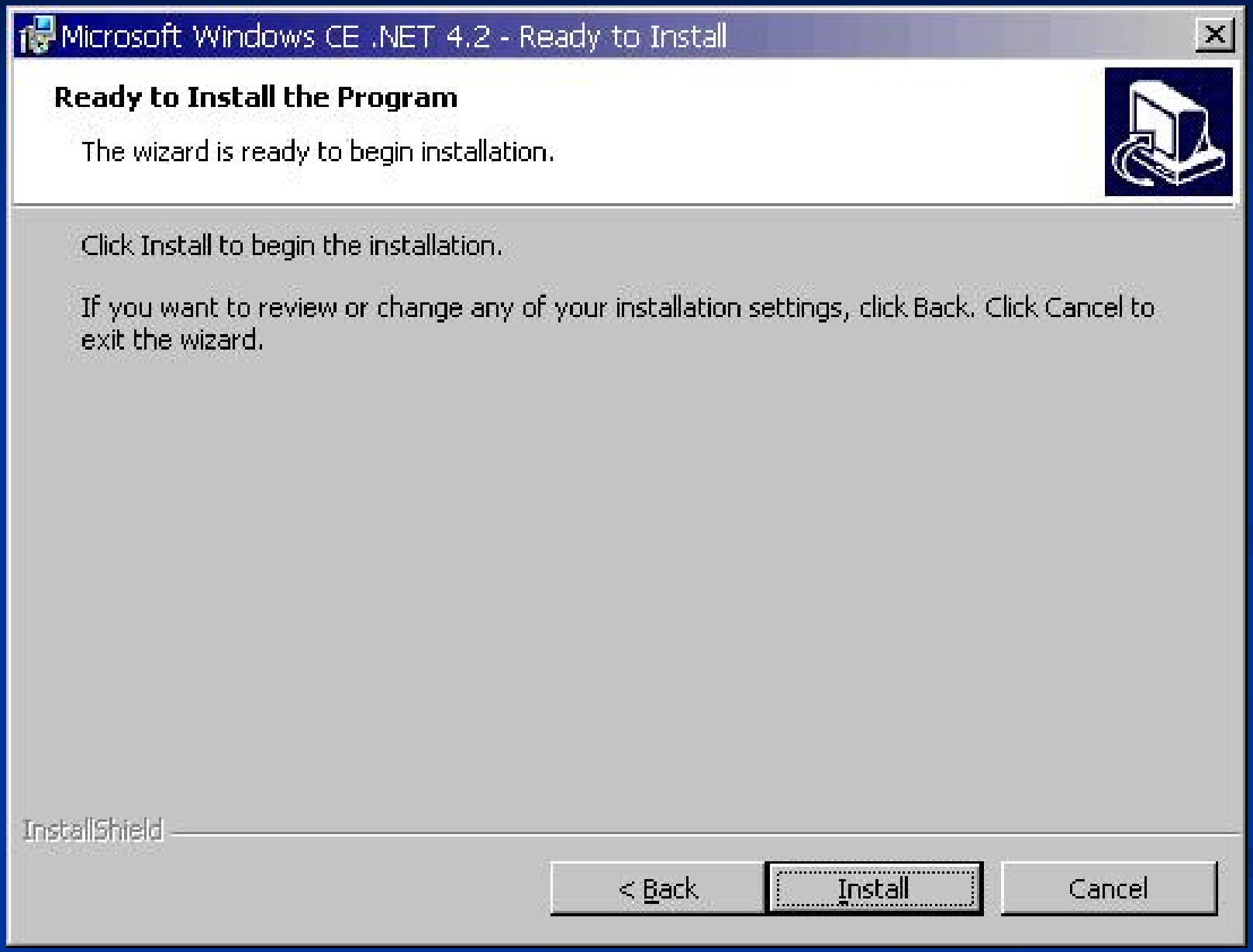
Install to:

C:₩WINCE420₩

InstallShield

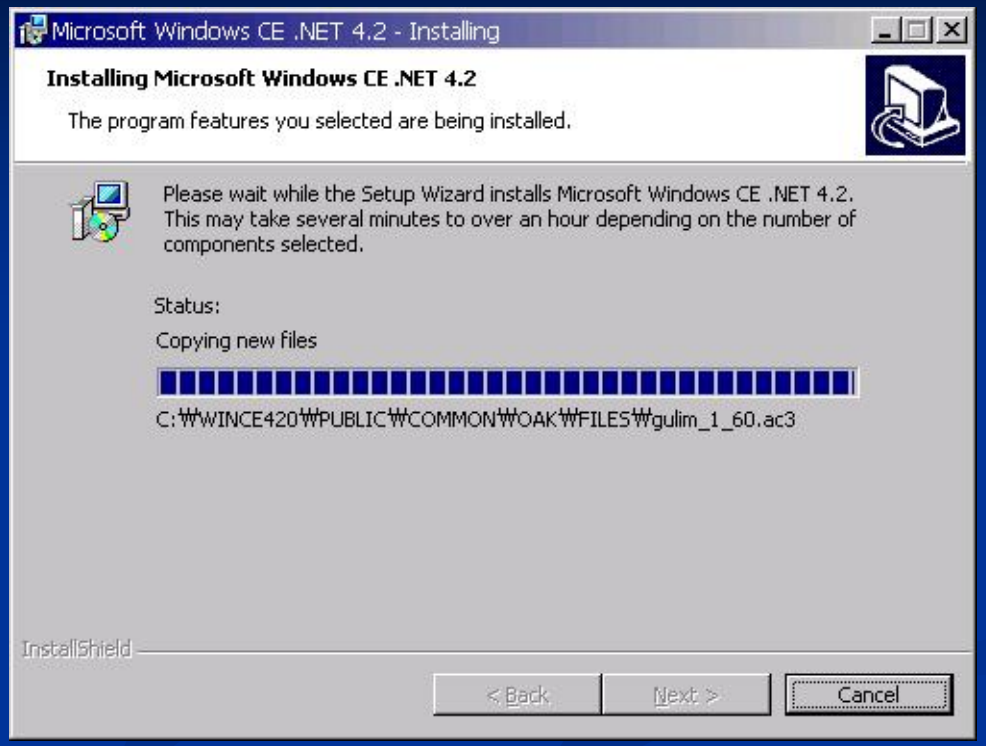
Help | Space | < Back | Next > | Cancel

# 开始安装


Microsoft Windows CE .NET 4.2 - Ready to Install
Ready to Install the Program
The wizard is ready to begin installation.
Click Install to begin the installation.
If you want to review or change any of your installation settings, click Back. Click Cancel to exit the wizard.
InstallShield
< Back
Install
Cancel

# 安装过程

Microsoft Windows CE .NET 4.2 - Installing
Installing Microsoft Windows CE .NET 4.2
The program features you selected are being installed.
Please wait while the Setup Wizard installs Microsoft Windows CE .NET 4.2. This may take several minutes to over an hour depending on the number of components selected.
Status:
Setup is preparing to install...
InstallShield
< Back
Next >
Cancel

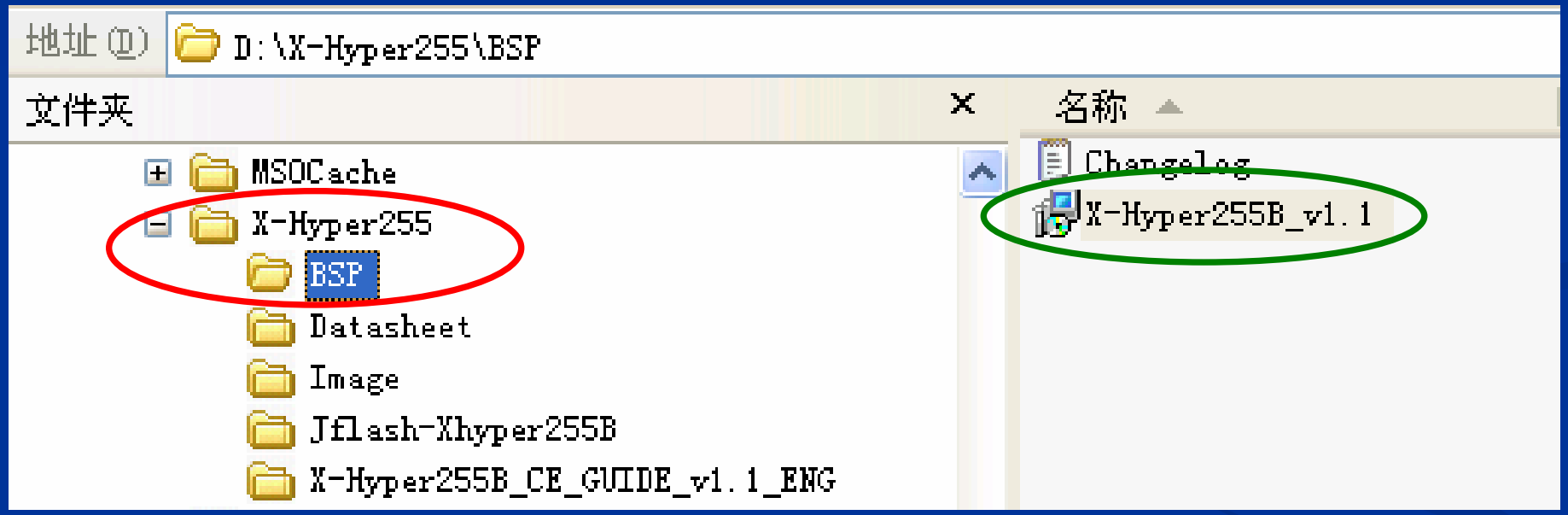

Microsoft Windows CE .NET 4.2 - Installing
Installing Microsoft Windows CE .NET 4.2
The program features you selected are being installed.
Please wait while the Setup Wizard installs Microsoft Windows CE .NET 4.2. This may take several minutes to over an hour depending on the number of components selected.
Status:
Copying new files
C:₩WINCE420₩PUBLIC₩COMMON₩OAK₩FILES₩gulim_1_60.ac3
InstallShield
< Back
Next >
Cancel

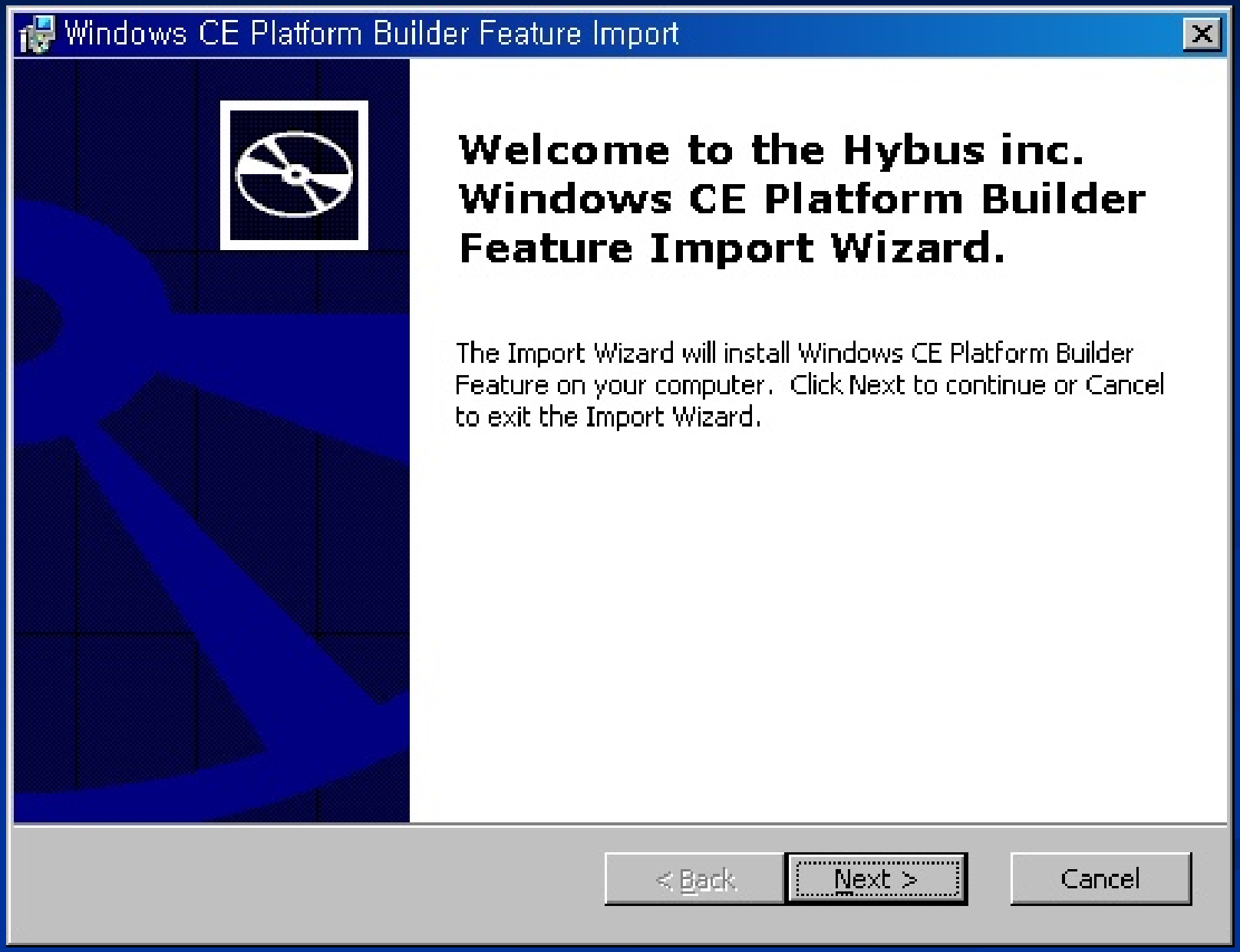
# 安装完成

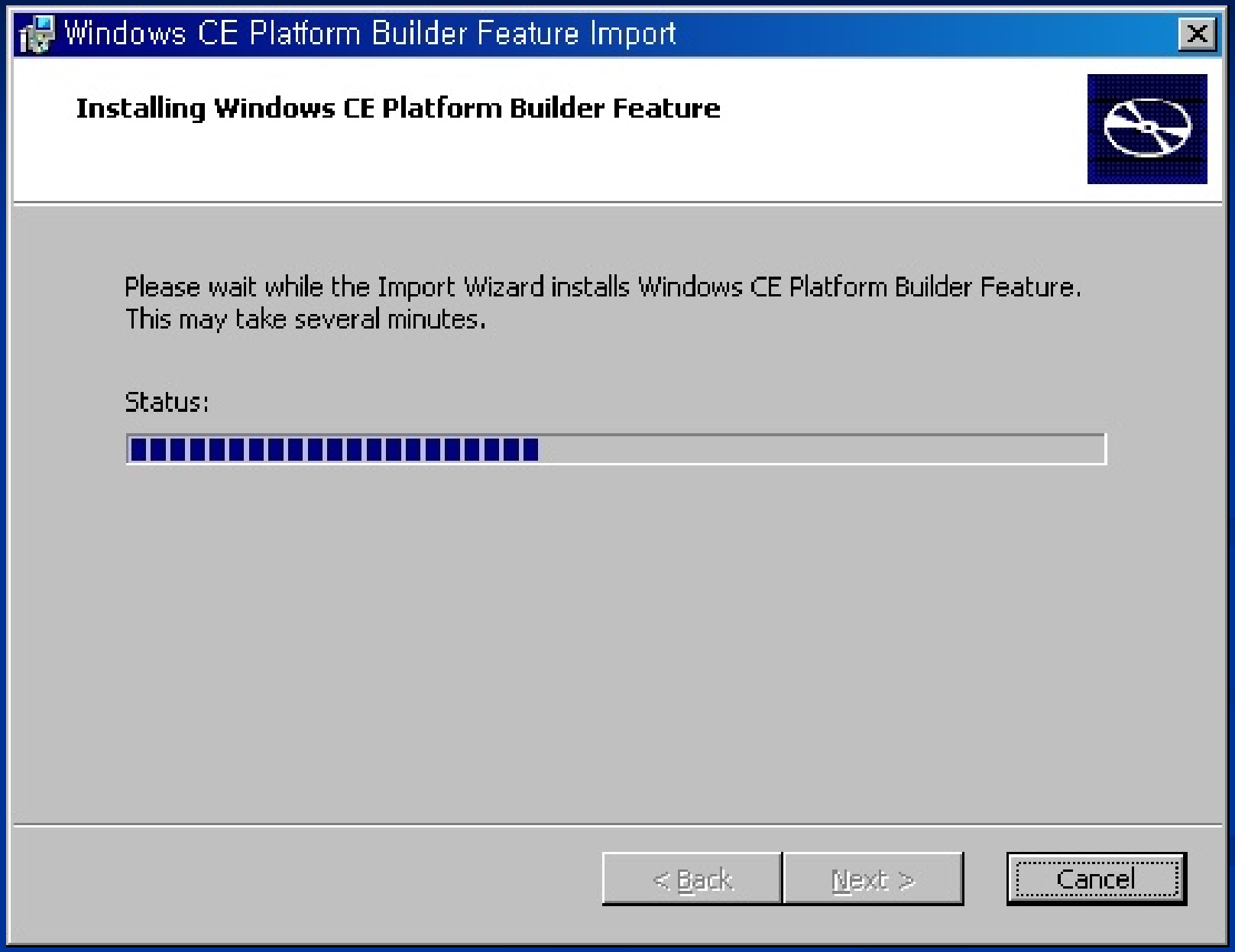
Microsoft Windows CE .NET 4.2 - Completed
Setup Wizard Completed
The Setup Wizard has successfully installed Microsoft Windows CE .NET 4.2. Click Finish to exit the wizard.
< Back
Finish
Cancel

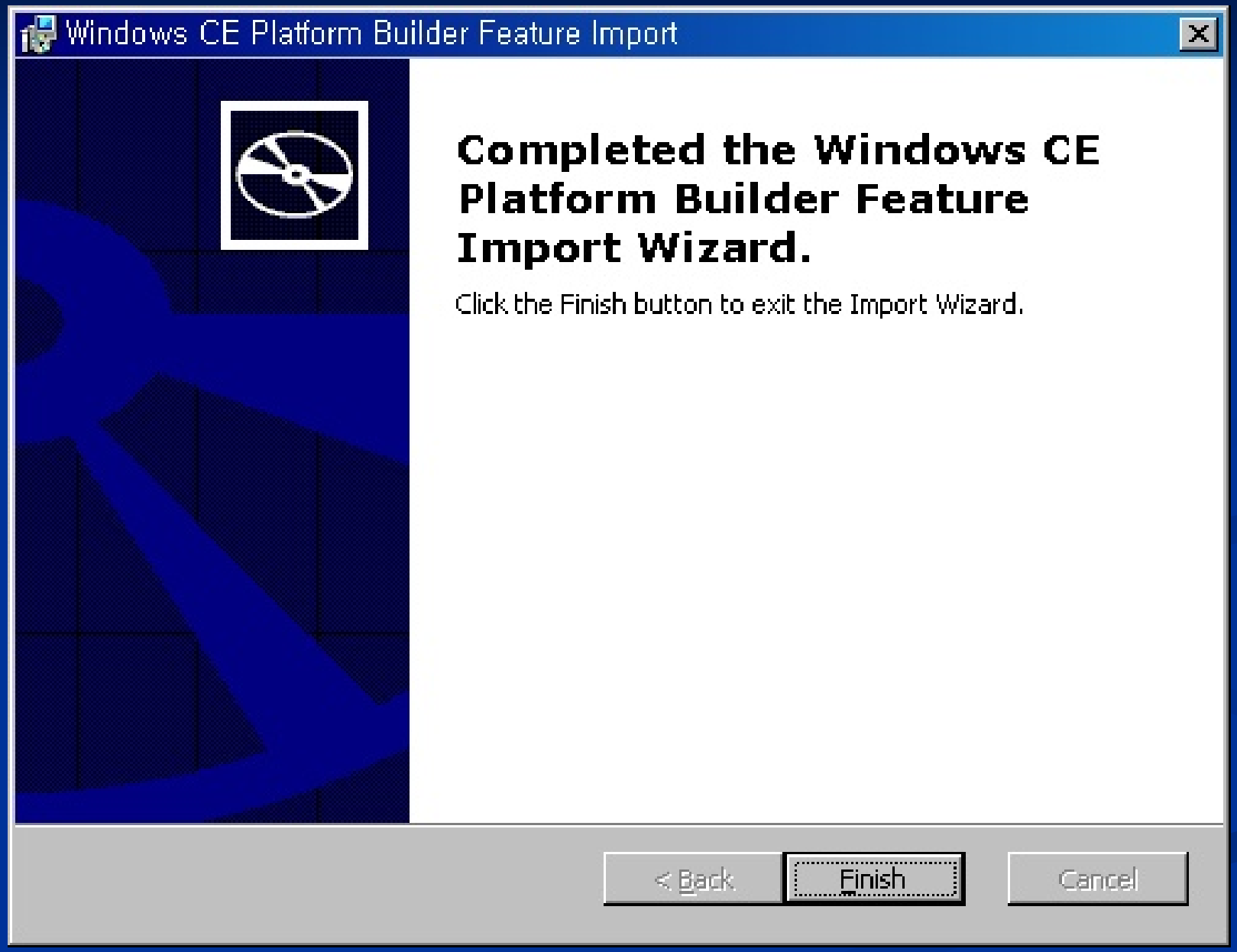
# 安装X-Hyper255B BSP

BSP（Board Support Package）：板支持包

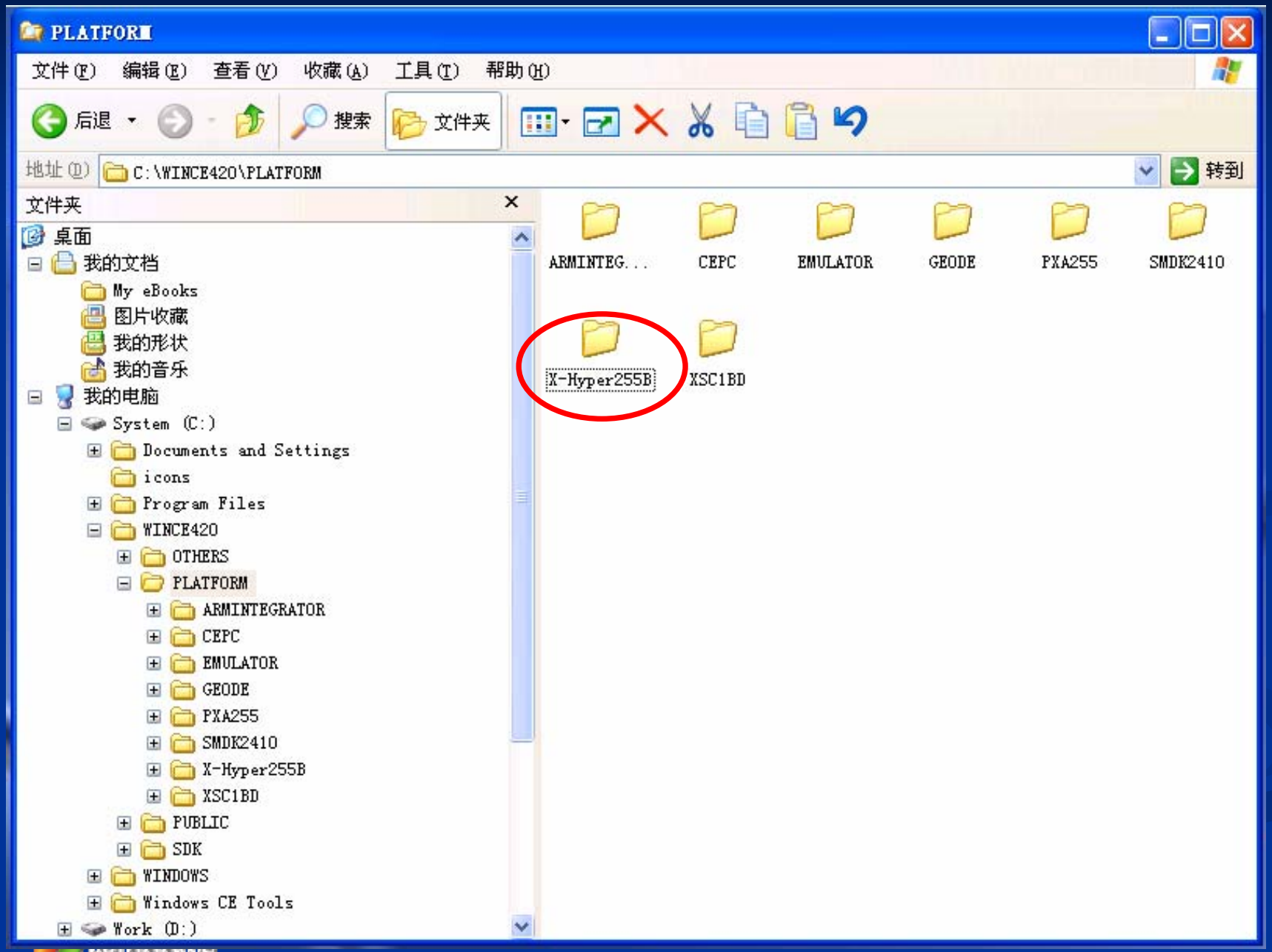



Windows CE Platform Builder Feature Import
Welcome to the Hybus inc. Windows CE Platform Builder Feature Import Wizard.
The Import Wizard will install Windows CE Platform Builder Feature on your computer. Click Next to continue or Cancel to exit the Import Wizard.
< Back
Next >
Cancel

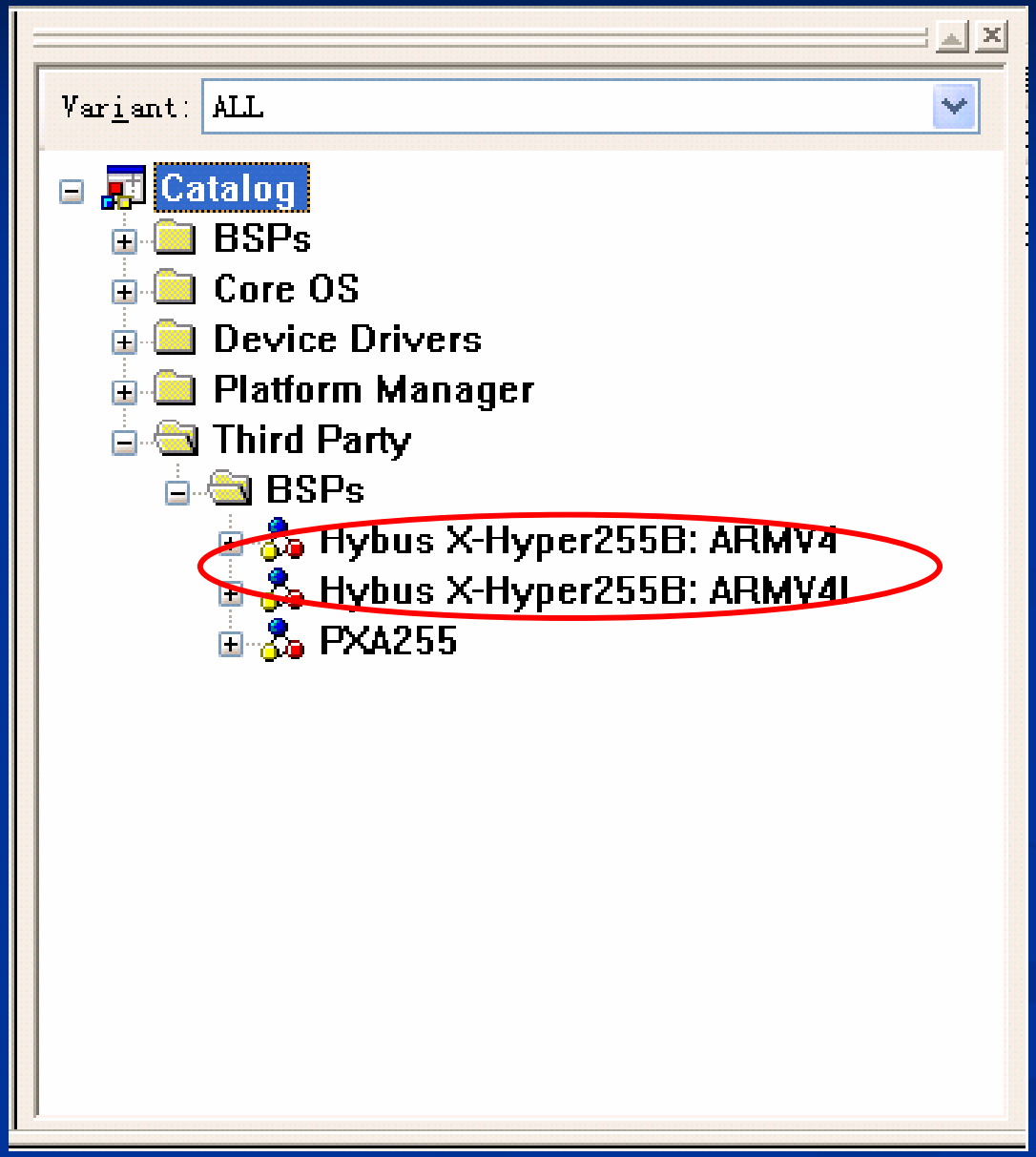

Windows CE Platform Builder Feature Import
Installing Windows CE Platform Builder Feature
Please wait while the Import Wizard installs Windows CE Platform Builder Feature.
This may take several minutes.
Status:
< Back
Next >
Cancel


Windows CE Platform Builder Feature Import
Completed the Windows CE Platform Builder Feature Import Wizard.
Click the Finish button to exit the Import Wizard.
< Back
Finish
Cancel

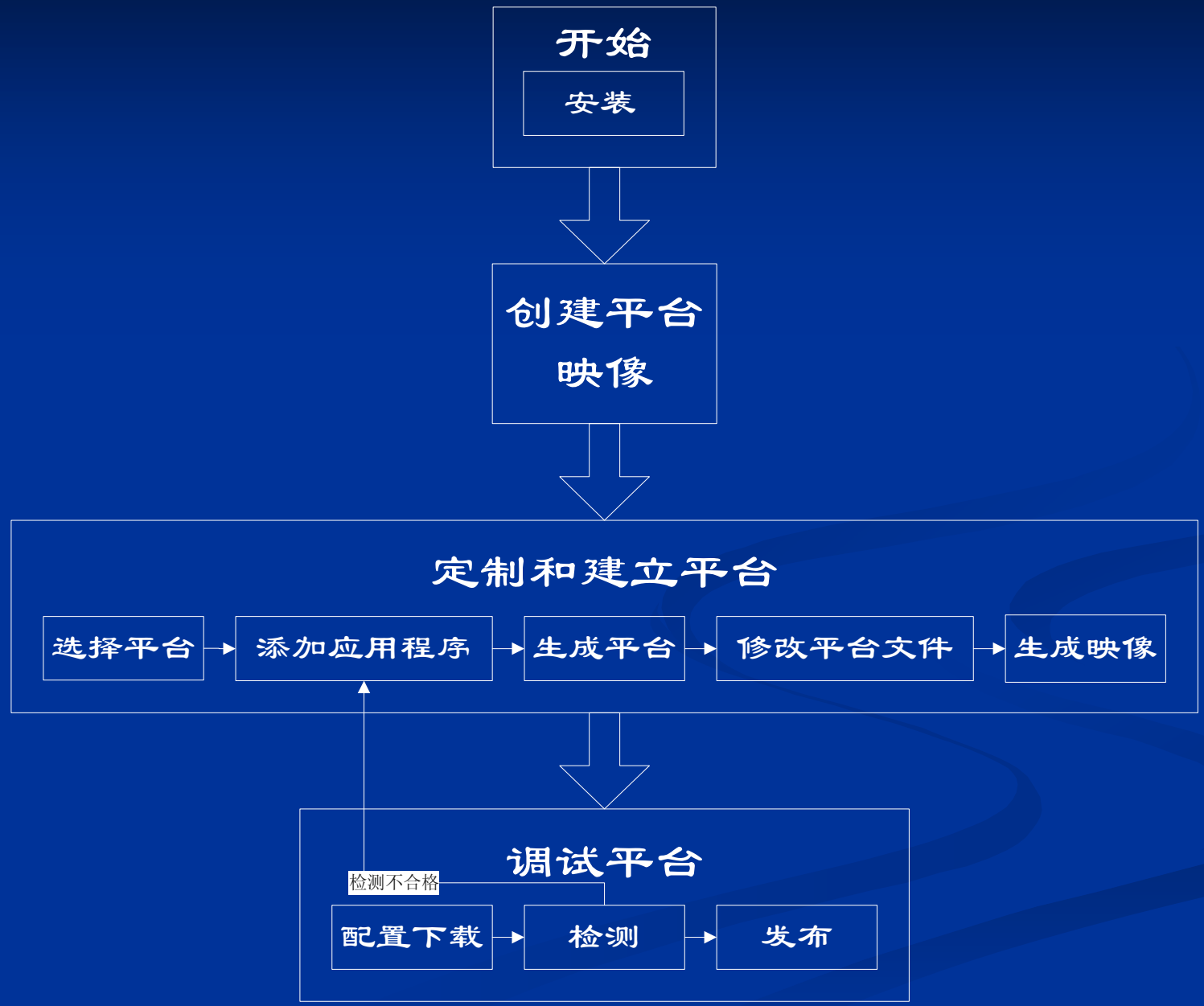
# 在Platform目录下



# 在PB中生成第三厂商

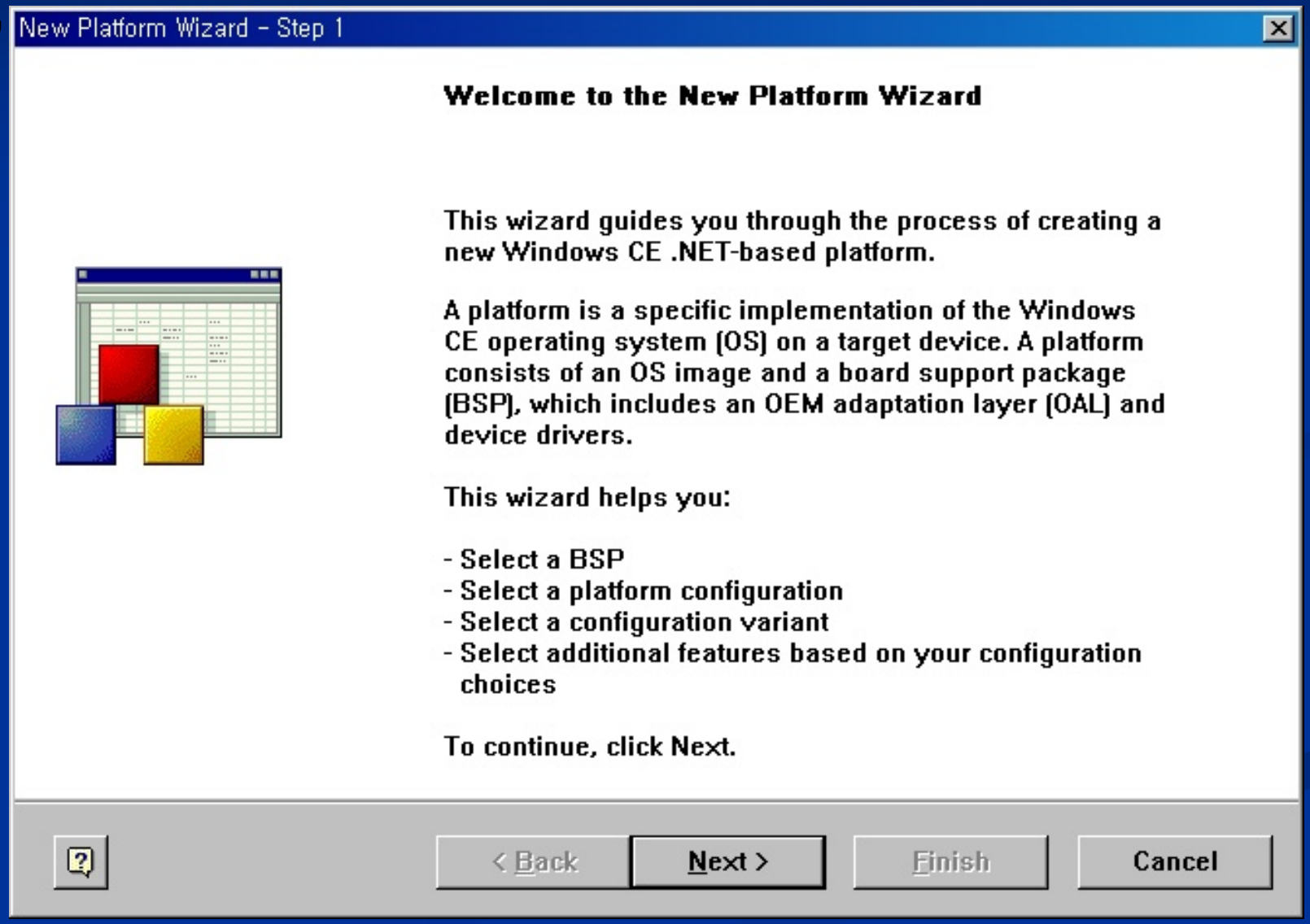

Variant: ALL
Catalog
BSPs
Core OS
Device Drivers
Platform Manager
Third Party
BSPs
Hybus X-Hyper255B: ARMV4
Hybus X-Hyper255B: ARMV4I
PXA255

# 5.1.1 定制Windows CE OS映像



# 创建新平台

选择File->New Platform to 启动 “New Platform Wizard.”



# 选择“X-HYPER255B: ARMV4”

New Platform Wizard - Step 2

**Board Support Packages (BSPs)**

A BSP Catalog feature (.cec) file contains the default set of device drivers that are added to your platform when your platform is created.

Available BSPs:

- ARM INTEGRATOR AP: ARMV4I
- ☑ HYBUS X-HYPER255B: ARMV4
- HYBUS X-HYPER255B: ARMV4I
- INTEL DBPXA250 DEV PLATFORM:ARMV4
- INTEL DBPXA250 DEV PLATFORM:ARMV4I
- SAMSUNG SMDK2410: ARMV4
- SAMSUNG SMDK2410: ARMV4I

Select one or more BSPs for your new platform.

Intel PXA255 Evaluation Board X-Hypr255B

Note: Only BSPs supported by installed CPUs are displayed in the list.

< Back | Next > | Finish | Cancel

# 选择典型应用平台

New Platform Wizard - Step 3

**Platform Configuration**

A platform configuration defines the default Windows CE features and available options you can select to include in your platform.

Available configurations

- Digital Media Receiver
- Enterprise Terminal
- Enterprise Web Pad
- Gateway
- Industrial Controller
- Internet Appliance
- IP Phone
- Mobile Handheld
- Mobile Phone
- Set-Top Box
- Tiny Kernel
- Windows Thin Client

Custom configuration

Select the platform configuration that most closely matches your device.

Provides the starting point for a browser-based consumer Internet appliance with a fixed display, such as CRT or LCD, and a keyboard.

Platform name:

XHYPER255B_TEST

Location:

E:\WINCE420\PUBLIC\XHYPER255

< Back | Next > | Finish | Cancel

# 平台设置

Platform Settings

Settings For:

HYBUS X-HYPER255B: ARMV4 W

- XHYPER255B_TEST
  - Hybus X-Hyper255B: ARM
    - Device Drivers
      - ADS7843 Touch C
      - Audio
      - Display
      - Input Devices
      - Networking
      - PCMCIA for X-Hyp
      - Power Button
      - Printer Devices
      - Storage Devices
      - USB Function
      - ernet Bootloader (
      - t Appliance [Displa

General | Build Options | Locale | Environment

Build Options:

- [ ] Enable CE Target Control Support
- [x] Enable Eboot Space in Memory
- [ ] Enable Event Tracking During Boot
- [x] Enable Full Kernel Mode
- [ ] Enable Image for Flash
- [ ] Enable Images Larger than 32MB
- [ ] Enable Kernel Debugger
- [ ] Enable KITL
- [ ] Enable Profiling
- [ ] Enable Ship Build
- [ ] Flush Events to Release Directory

OK | Cancel

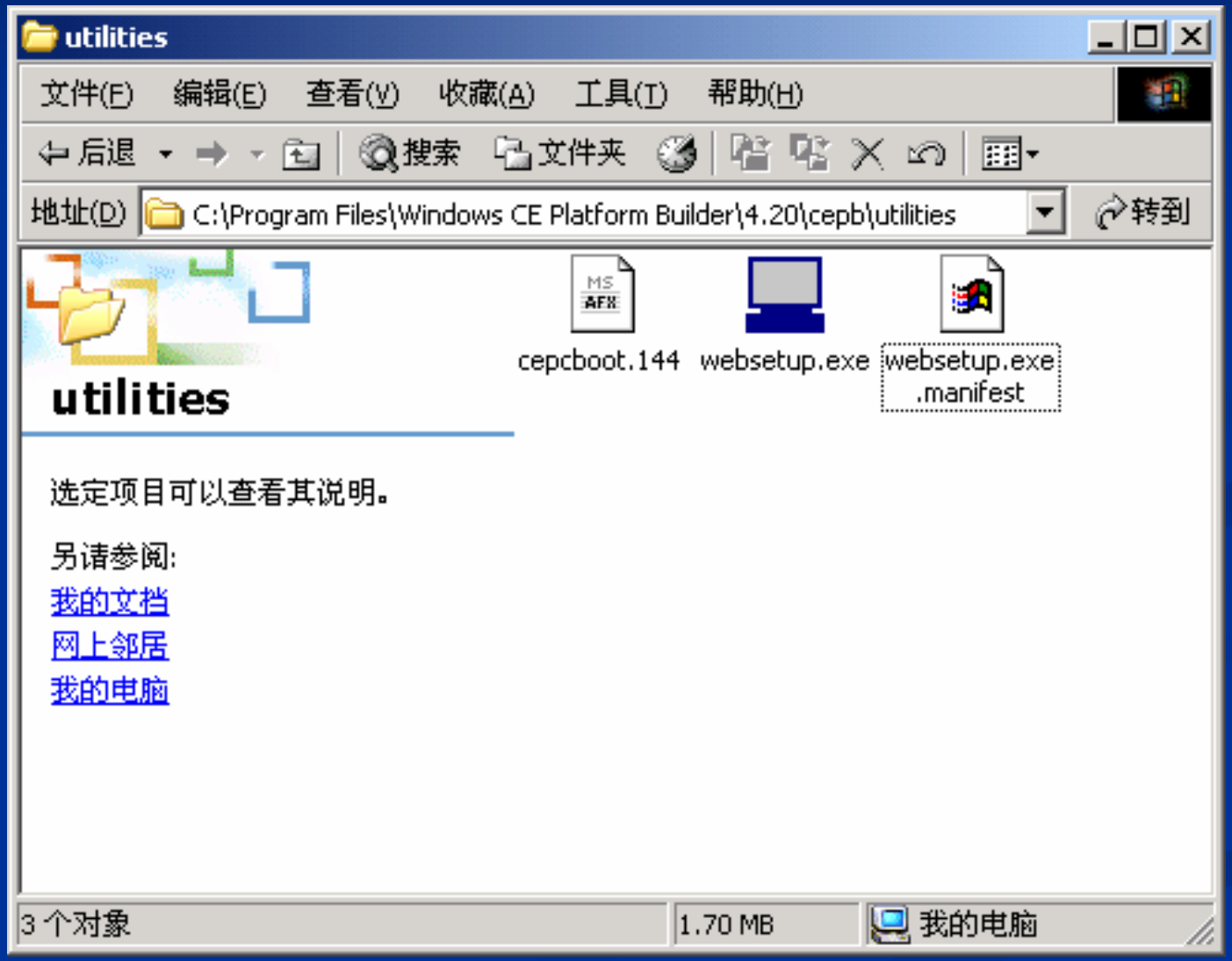
Platform | Target | Build | Tools | Window | Help

- Resolve Feature(s)...
- Anchor Feature(s)
- Refresh Features
- Review Special Notifications...
- Insert
- Feature Dependencies...
- Settings...
- Configure SDK...

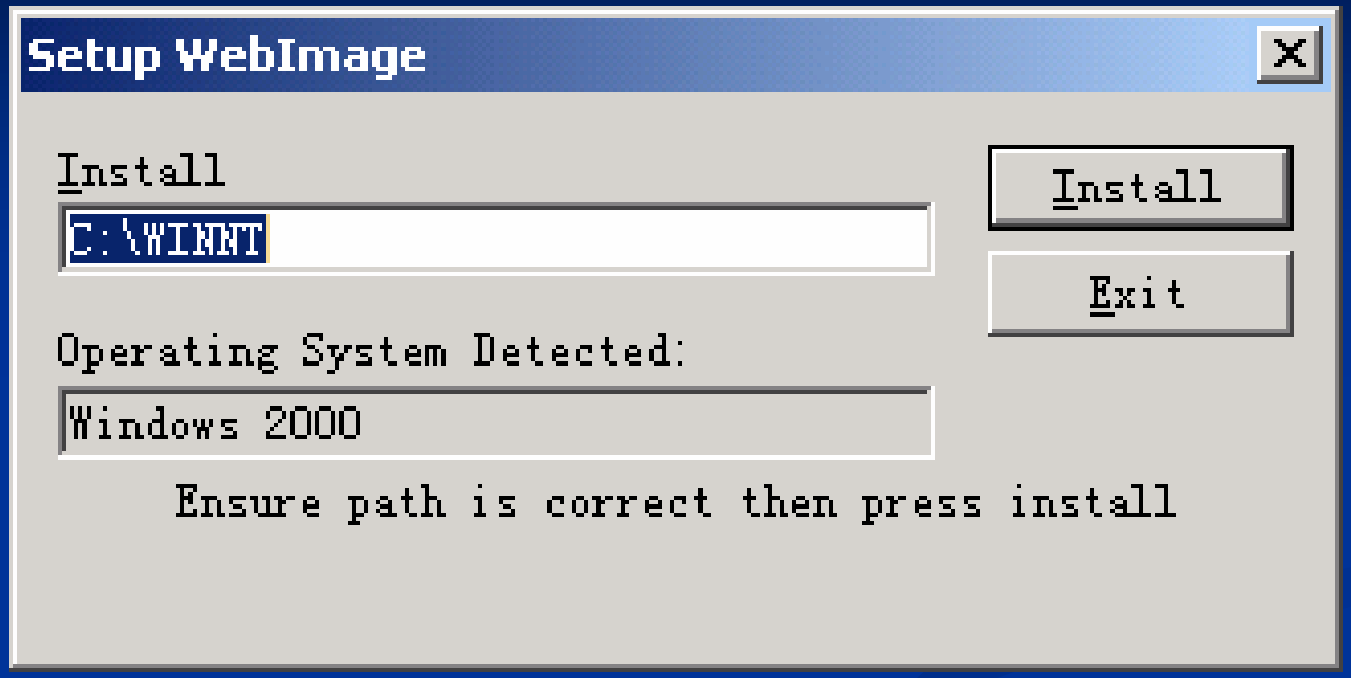
即可开始Build平台

# 5.1.2 Eboot（Bootloader）

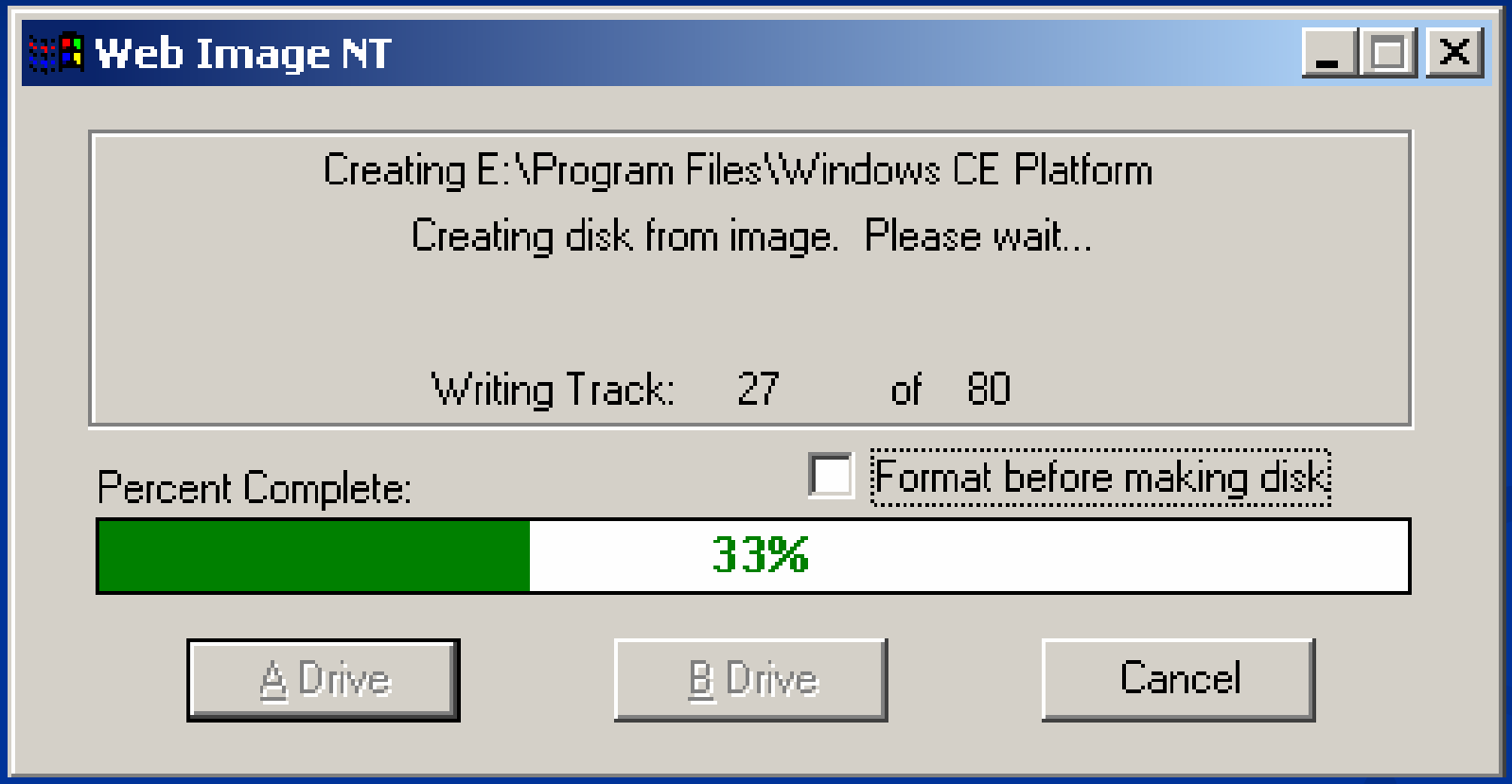
## 1. CEPC 客户端启动盘制作方法



# 运行websetup.exe，单击Install按钮。



# 插入一张软盘，运行cepcboot.144，单击A Drive按钮。



# 在A盘的AUTOEXEC.BAT文件上单击右键，选择编辑。

AUTOEXEC.BAT - 记事本

文件(F) 编辑(E) 格式(O) 帮助(H)

```
REM !! specified IRQ value.                                  !!
REM !!                                                       !!
REM !! NET_IP can be set to specify a static IP              !!
REM !! address or left blank to use DHCP to obtain           !!
REM !! an IP address.  Format of set should be:              !!
REM !!       set NET_IP=10.0.0.1                             !!
REM !!
REM !!!!
```

# 2. X-hyper255B Eboot方法

- 开启实验平台电源
- 在命令行（CMD）下执行Jflash Eboot.nb0
- 在开发主机端利用超级终端观察目标平台的运行状态，并可修改目标平台的配置
- 要求开发机与目标平台必须处于同一网段！

# 配置远程连接方式

Target Build Tools Window Help

- Download / Initialize Ctrl+Shift+D
- Connect
- Disconnect
- Reset Device
- Run Programs... Alt+Shift+R
- CE Debug Zones...
- CE Target Control
- CE Processes
- CE Threads
- CE Modules and Symbols
- CE Exceptions...
- Configure Remote Connection... Ctrl+Shift+C

**Configure Remote Connection**

Services | Settings

Active named connection

XHYPER255B_TEST | Add New ... | Delete

Services for active named connection

Download:

Ethernet | Configure...

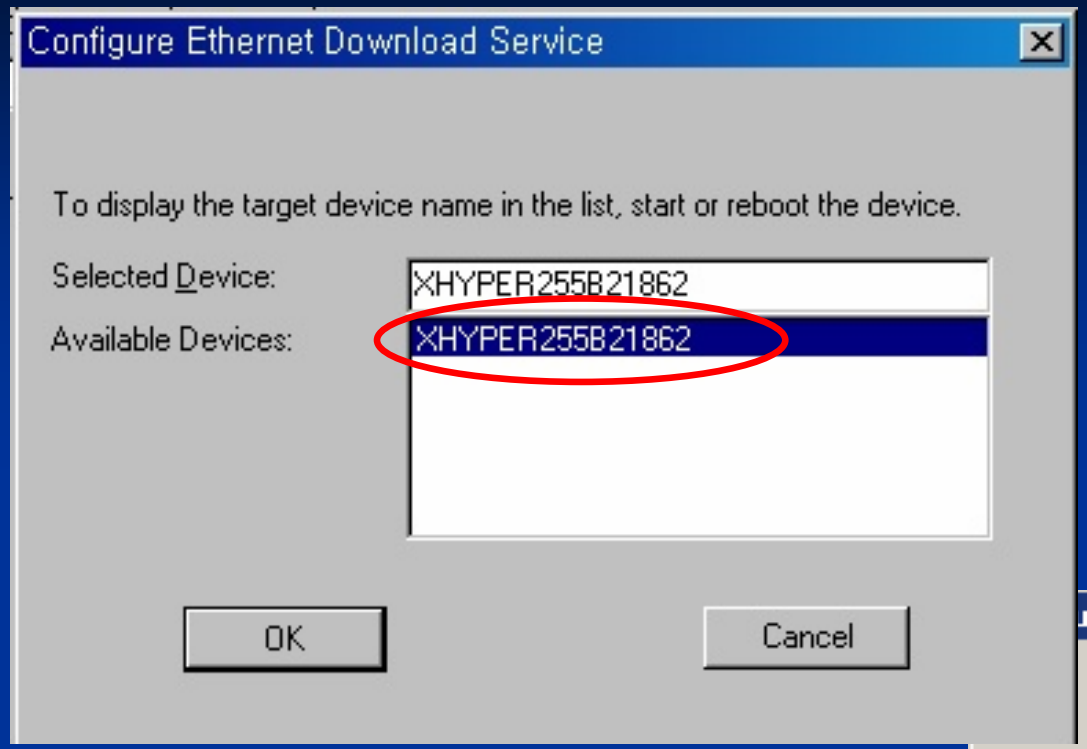
Kernel

Ethernet | Configure...

Use Hardware Debugger

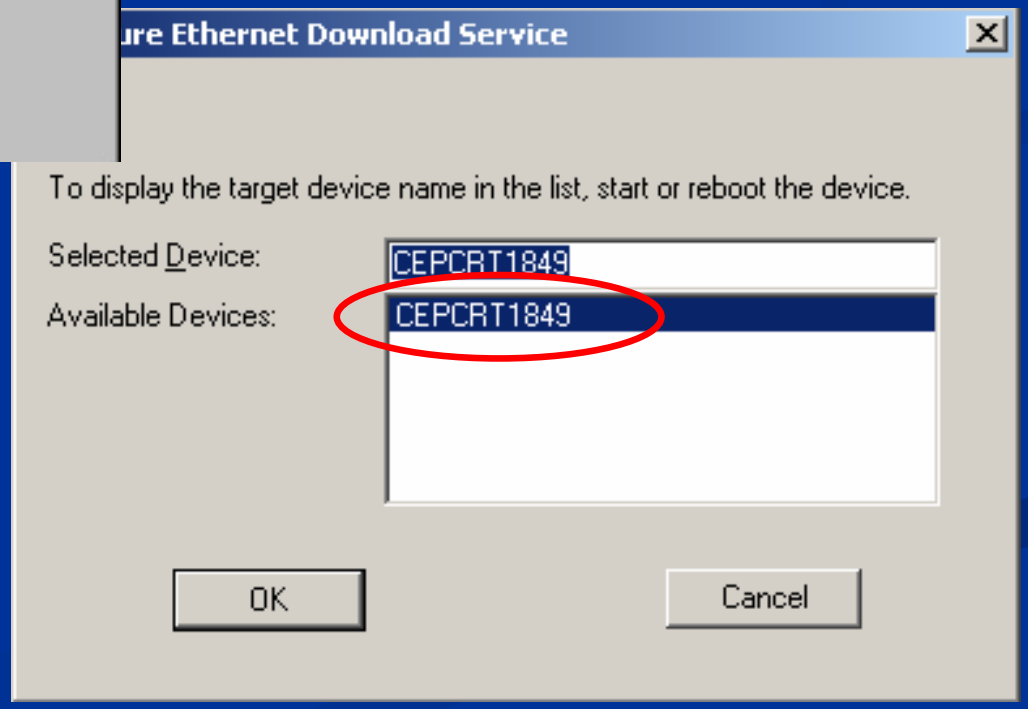
Select EXDI Driver:

确定 | 取消 | 应用 (A) | 帮助




X-HYPER255B

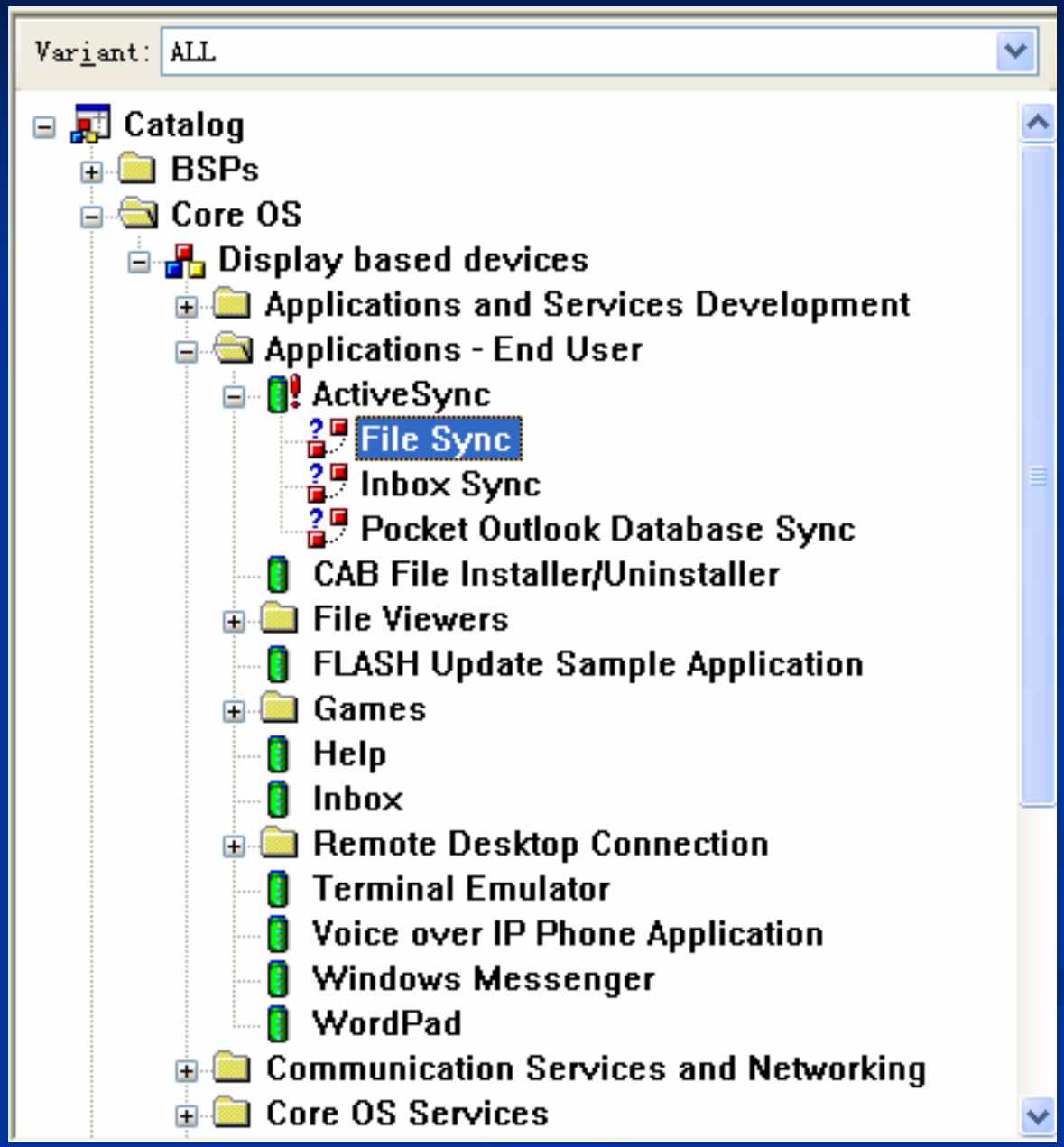
CEPC



# 将“肌肤”修改为XP风格

- File Systems and Data Store
- Fonts
- International
- Internet Client Services
- Multimedia Technologies
- Security
- Shell and User Interface
  - Shell
  - User Interface
    - Accessibility
    - Controls Option B
    - Customizable UI
      - Windows XP-like Sample Skin
    - Menu Tool Tip
    - Mouse
    - Network User Interface
    - Overlapping Menus
    - Quarter VGA Resources - Portrait Mode
    - Software Input Panel
    - Speech Interface
    - Touch Display (Stylus)

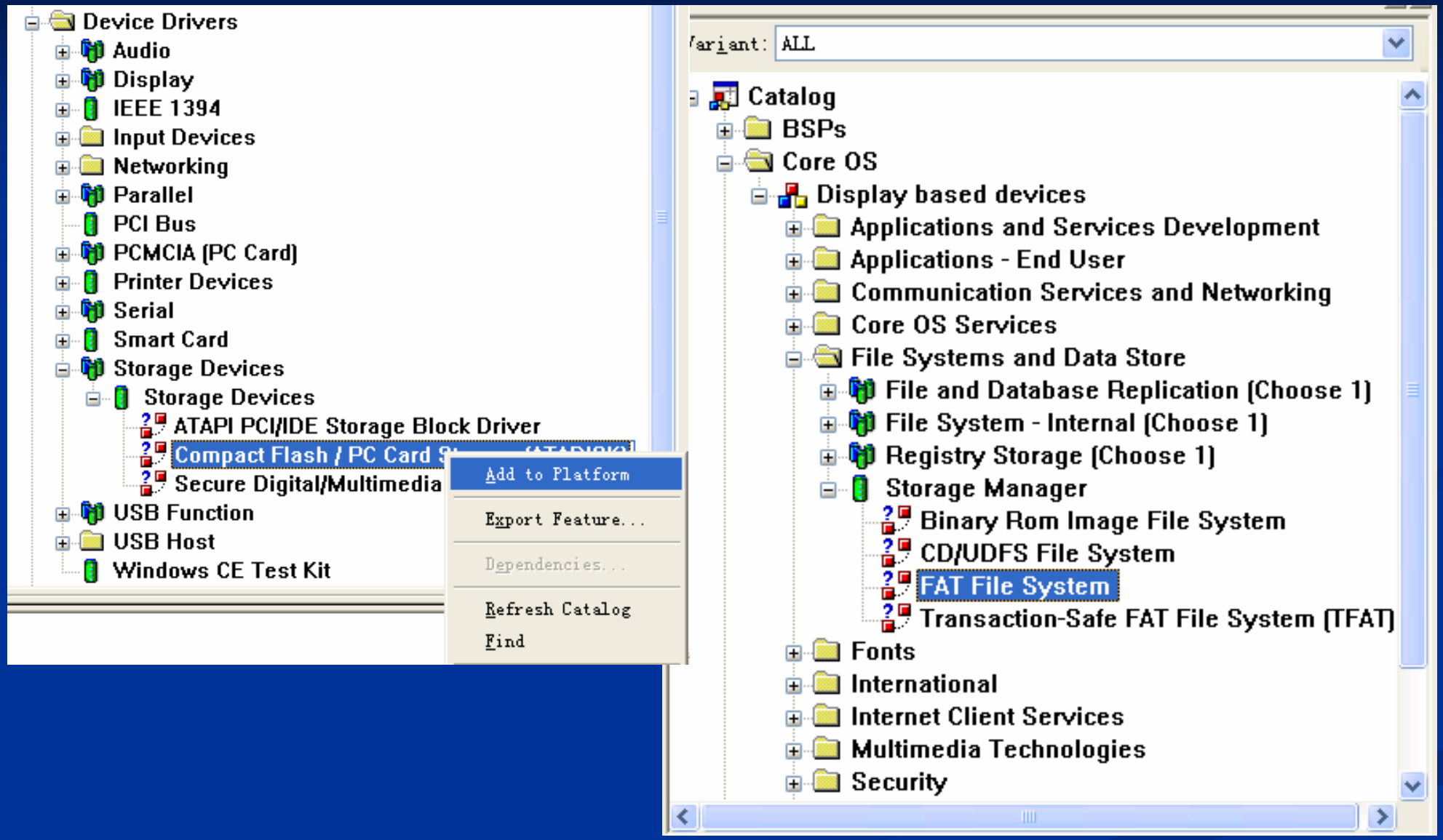
# 文件同步服务


Variant: ALL
Catalog
BSPs
Core OS
Display based devices
Applications and Services Development
Applications - End User
ActiveSync
File Sync
Inbox Sync
Pocket Outlook Database Sync
CAB File Installer/Uninstaller
File Viewers
FLASH Update Sample Application
Games
Help
Inbox
Remote Desktop Connection
Terminal Emulator
Voice over IP Phone Application
Windows Messenger
WordPad
Communication Services and Networking
Core OS Services

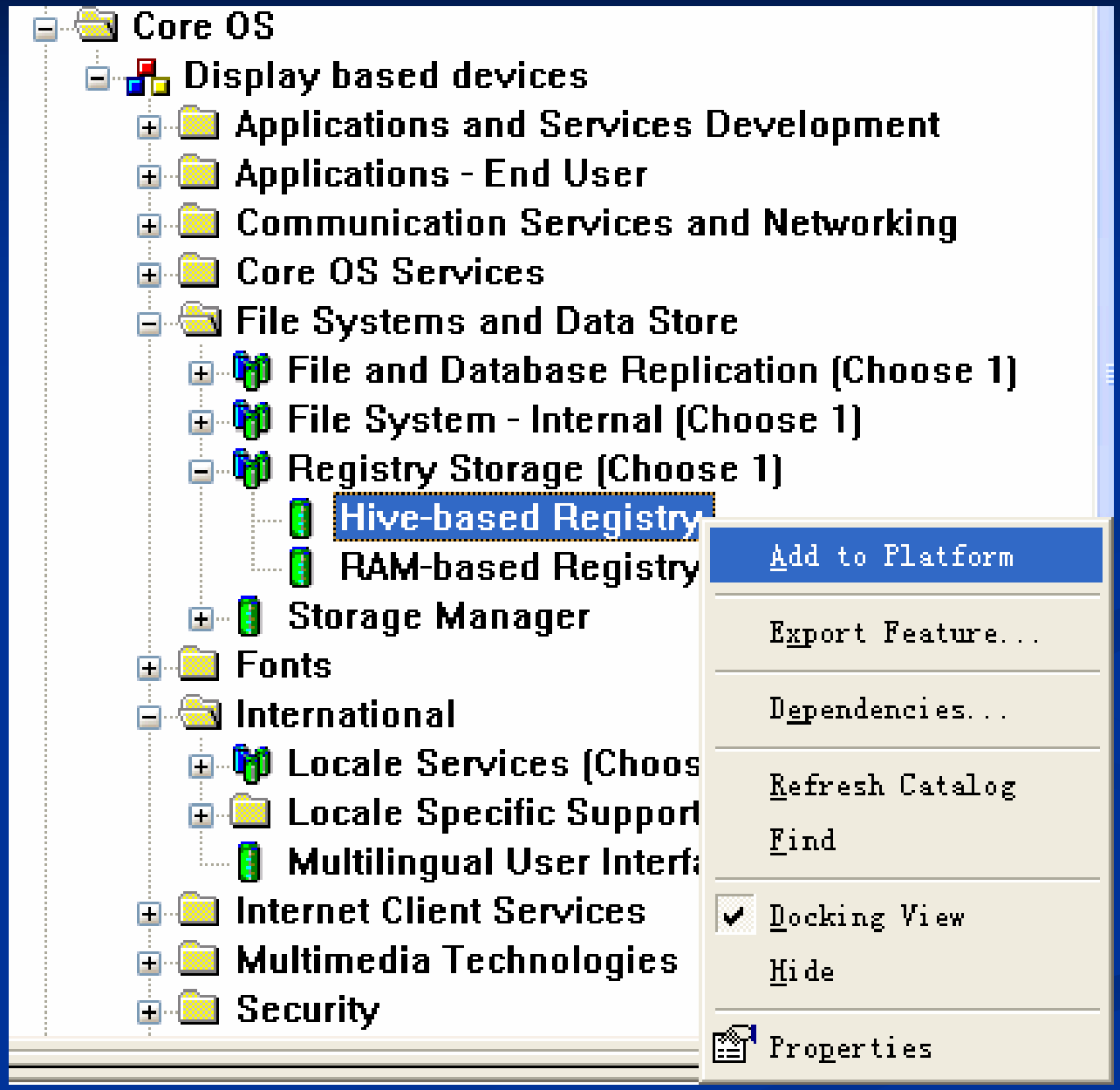
# 添加软键盘

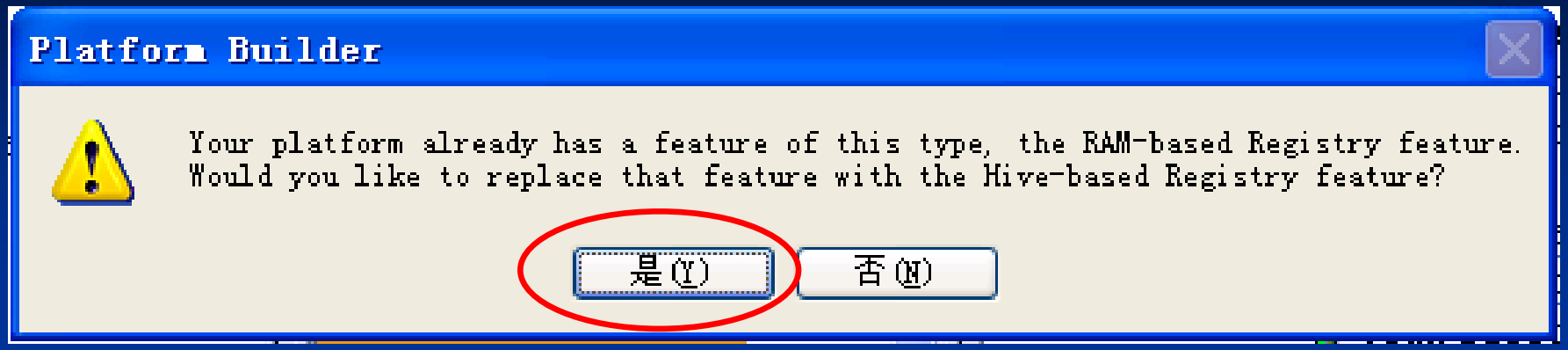
- Internet Client Services
- Multimedia Technologies
- Security
- Shell and User Interface
  - Shell
  - User Interface
    - Accessibility
    - Controls Option B
    - Customizable UI
    - Menu Tool Tip
    - Mouse
    - Network User Interface
    - Overlapping Menus
    - Quarter VGA Resources - Portrait Mode
    - Software Input Panel
      - Software-based Input Panel Driver
      - Software-based Input Panel (SIP) (Choos
        - SIP for Large Screens
        - SIP for Small Screens
    - Speech Interface
    - Touch Display (Stylus)

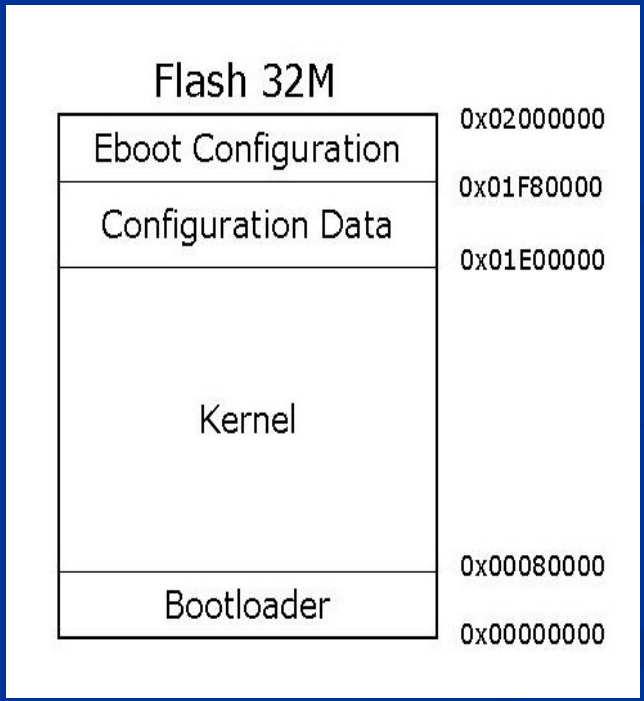
# 添加CF存储卡

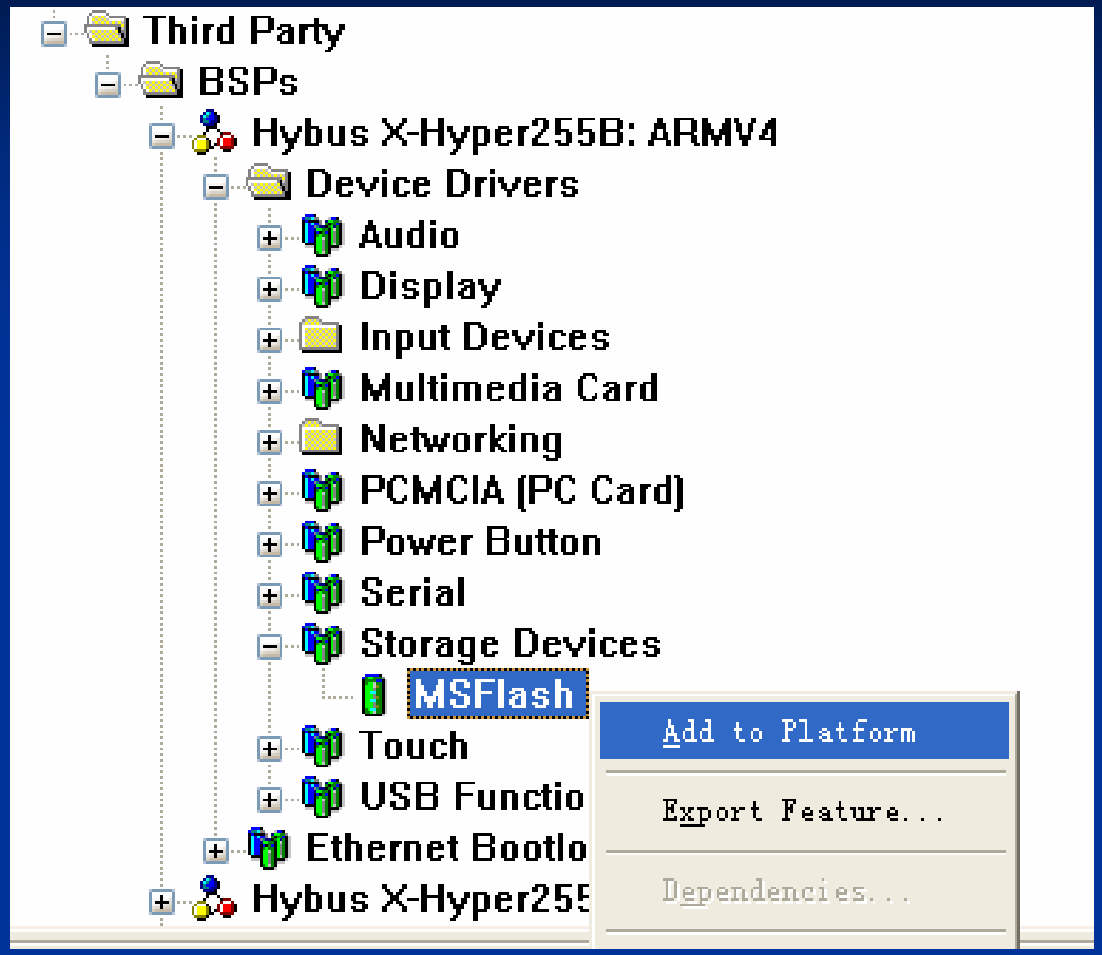

Device Drivers
Audio
Display
IEEE 1394
Input Devices
Networking
Parallel
PCI Bus
PCMCIA (PC Card)
Printer Devices
Serial
Smart Card
Storage Devices
Storage Devices
ATAPI PCI/IDE Storage Block Driver
Compact Flash / PC Card S
Secure Digital/Multimedia
USB Function
USB Host
Windows CE Test Kit
Add to Platform
Export Feature...
Dependencies...
Refresh Catalog
Find
Variant: ALL
Catalog
BSPs
Core OS
Display based devices
Applications and Services Development
Applications - End User
Communication Services and Networking
Core OS Services
File Systems and Data Store
File and Database Replication (Choose 1)
File System - Internal (Choose 1)
Registry Storage (Choose 1)
Storage Manager
Binary Rom Image File System
CD/UDFS File System
FAT File System
Transaction-Safe FAT File System (TFAT)
Fonts
International
Internet Client Services
Multimedia Technologies
Security

# 添加蜂窝注册表（Hive-based Registry）




Platform Builder
Your platform already has a feature of this type, the RAM-based Registry feature.
Would you like to replace that feature with the Hive-based Registry feature?
是(Y)
否(N)


Flash 32M
Eboot Configuration
Configuration Data
Kernel
Bootloader
0x02000000
0x01F80000
0x01E00000
0x00080000
0x00000000

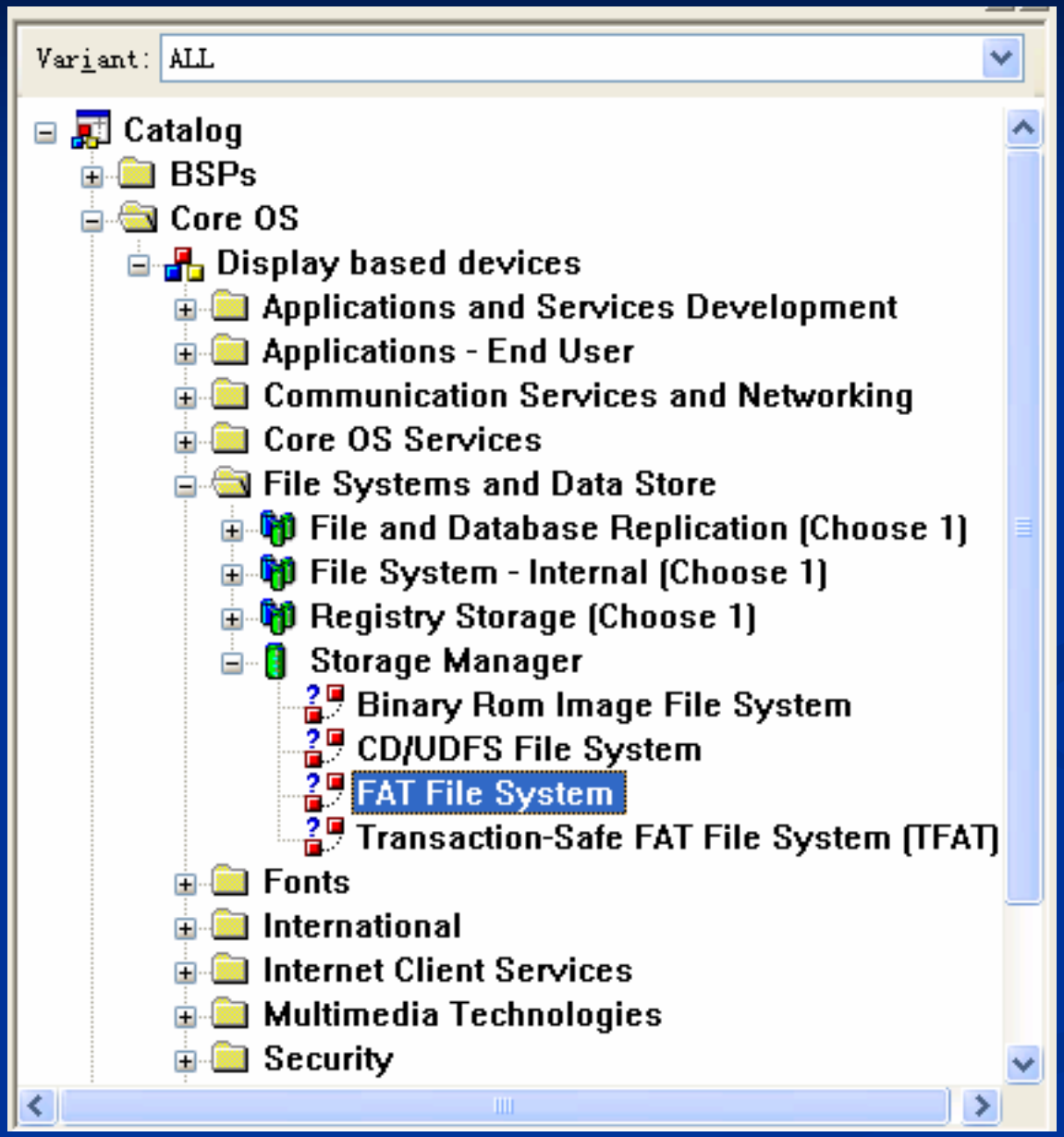



## 添加后在输出窗口会出现：

Warning PB2012: Failed to add the PCI NAND Flash Driver (SDNPCID) feature (SYSGEN_MSFLASH) to the platform.

1 warnings found. Not all features or drivers could be added. The build system will automatically include these when you build the platform.

**此警告可忽略**




1. Rebuild
2. 下载
3. 修改一些配置
4. 挂起
5. 开机后察看配置是否保存

# 添加中文输入法

Variant: ALL

- Display based devices
  - Applications and Services Development
  - Applications - End User
  - Communication Services and Networking
  - Core OS Services
  - File Systems and Data Store
  - Fonts
  - International
    - Locale Services (Choose 1)
    - Locale Specific Support
      - Chinese (Simplified)
        - Agfa AC3 Font Compression
        - Fonts
        - GB18030 Data Converter
        - Input Method Editor
          - MSPY2 for Windows CE
          - MSPY2 for Windows CE Database
          - Pocket IME
        - Input Methods
      - Chinese (Traditional)
      - English (U.S.)
      - English (Worldwide)

Variant: ALL

- Display based devices
  - Applications and Services Development
  - Applications - End User
  - Communication Services and Networking
  - Core OS Services
  - File Systems and Data Store
  - Fonts
  - International
    - Locale Services (Choose 1)
    - Locale Specific Support
      - Chinese (Simplified)
        - Agfa AC3 Font Compression
        - Fonts
        - GB18030 Data Converter
        - Input Method Editor
          - MSPY2 for Windows CE
          - MSPY2 for Windows CE Database (Choose 1)
            - 1.1 MB - Minimal Database
            - 1.3 MB - Compact Database
            - 1.7 MB - Standard Database
          - Pocket IME
        - Input Methods

MSPY2_DB_3

# 5.1.3 在映像中添加文件

- 将要添加的文件拷贝到平台目录，如：C:\WINCE420\PUBLIC\XHYPER255B_TEST\RelDir\HYBUS_X-HYPER255B_ARMV4Release下，如将WinXP-m.bmp添加到Windwos CE的Windows目录用以改变CE的壁纸
- 在Build菜单中，单击Open Build Release Directory，打开平台命令行
- 在命令行中输入，notepad shell.bib，打开shell.bib

```
Release Directory(_FLATRELEASEDIR): C:\WINCE420\PUBLIC\XHYPER255B_TES...
*****************************************************************
This command window is set up for running CESH or other debug tools
*****************************************************************

C:\WINCE420\PUBLIC\XHYPER255B_TEST\RelDir\HYBUS_~1>notepad shell.bib_
```

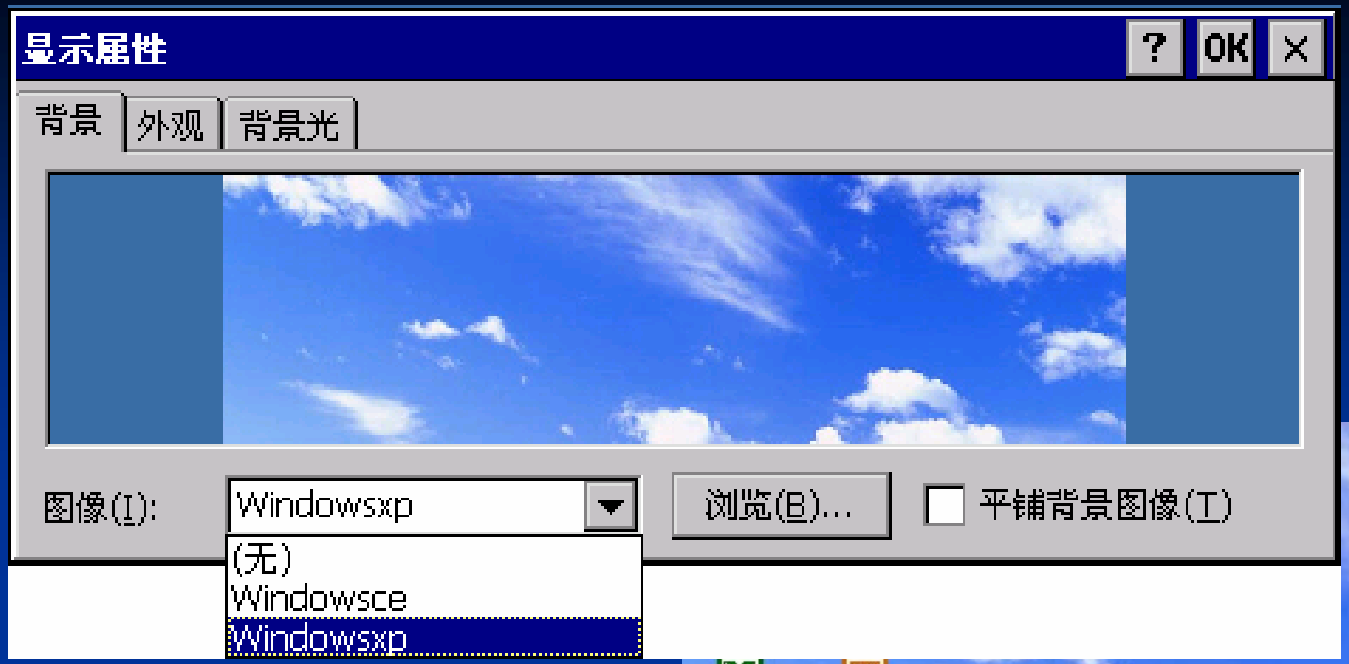
shell.bib - 记事本

文件(F) 编辑(E) 格式(O) 帮助(H)

```
; RDP
; @CESYSGEN IF RDP_MODULES_CETSC
  cetsc.lnk          $(_FLATRELEASEDIR)\cetsc.lnk                    NK SH
; @CESYSGEN ENDIF

; WCESHELLFE
; @CESYSGEN IF WCESHELLFE_MODULES_CONTROL
   control.lnk       $(_FLATRELEASEDIR)\control.lnk                  NK SH
; @CESYSGEN ENDIF WCESHELLFE_MODULES_CONTROL

; @CESYSGEN ENDIF SHELL_MODULES_EXPLORER

   windowsxp.bmp          $(_FLATRELEASEDIR)\winxp-m.bmp              NK S
```

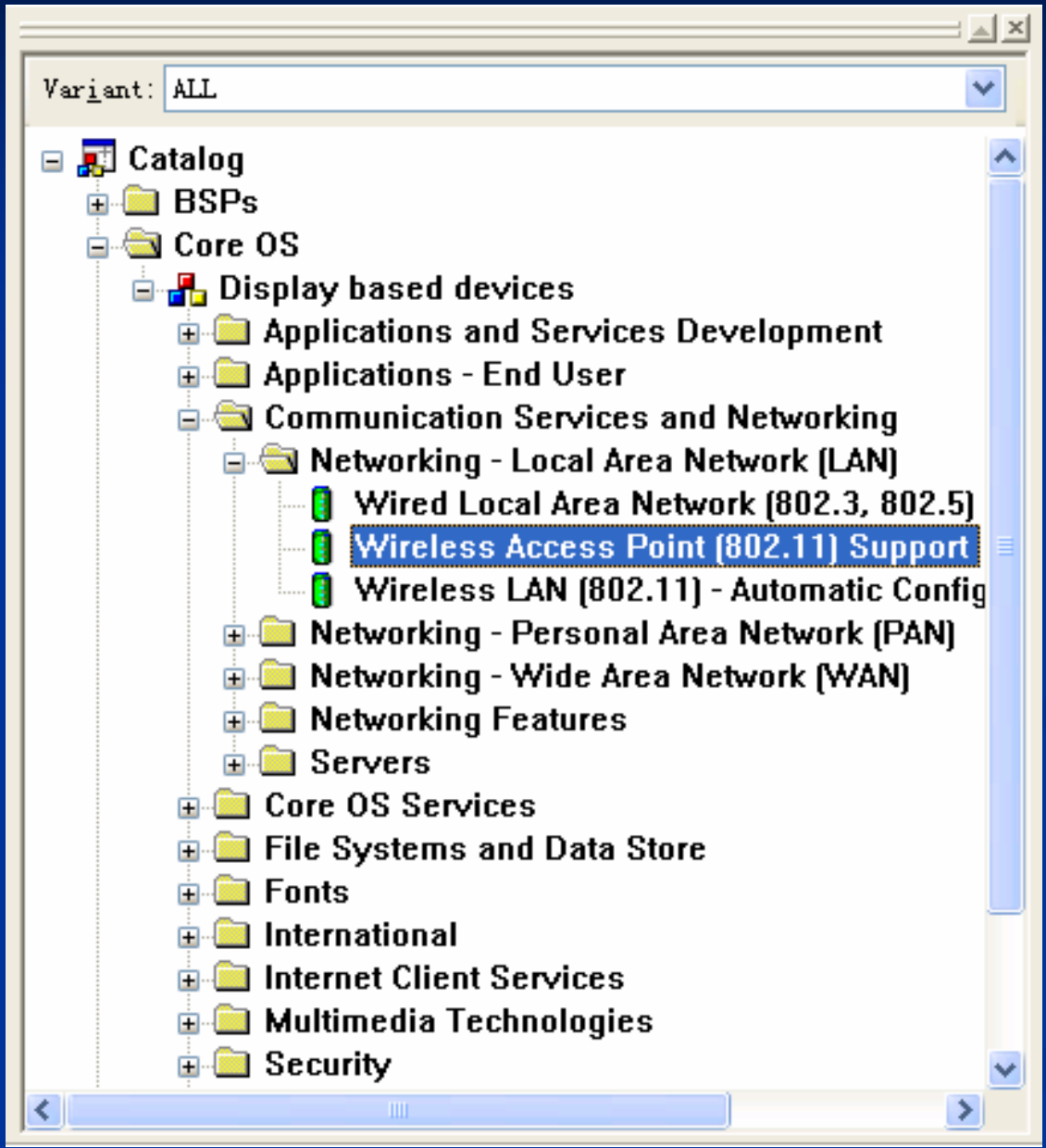
在Build菜单中，单击Make Image，重新制作平台映像

把映像下载到终端中。系统启动后，单击右键，选择属性则看到Windowsxp.bmp已经成功添加了


显示属性
?
OK
背景
外观
背景光
图像(I):
Windowsxp
浏览(B)...
平铺背景图像(T)
(无)
Windowsce
Windowsxp

Excel Viewer
PowerPoint Viewer
Image Viewer
Word Viewer
Internet Explorer
收件箱
Media Player
远程桌面连接
Messenger
Microsoft WordPad
开始
23:04

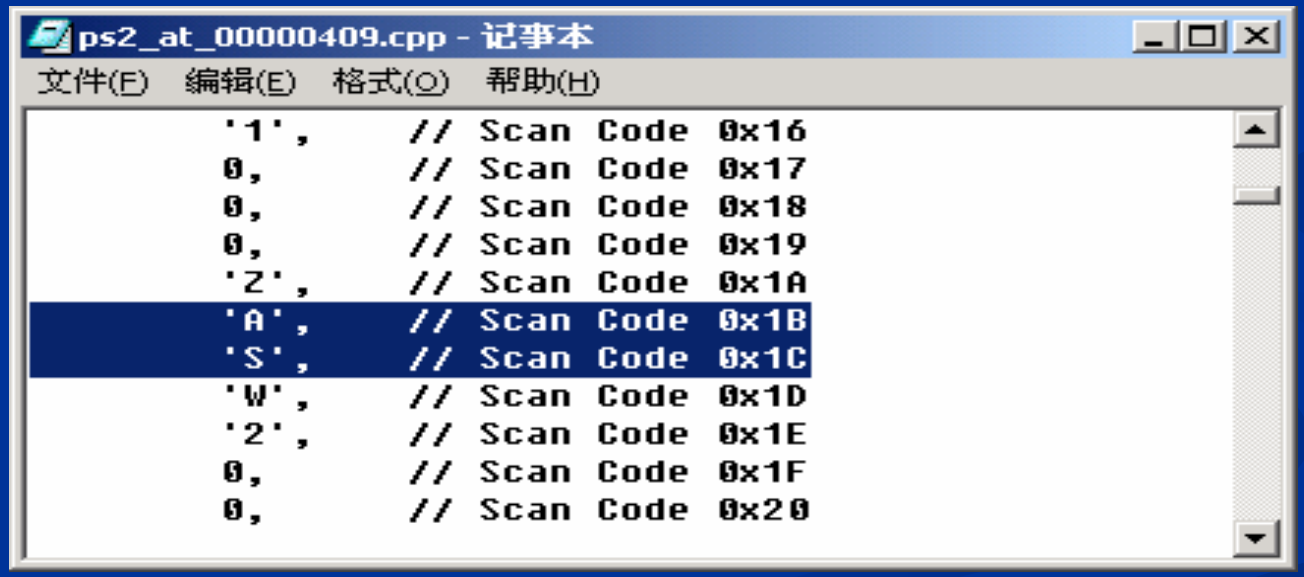
# 添加802.11无线访问点

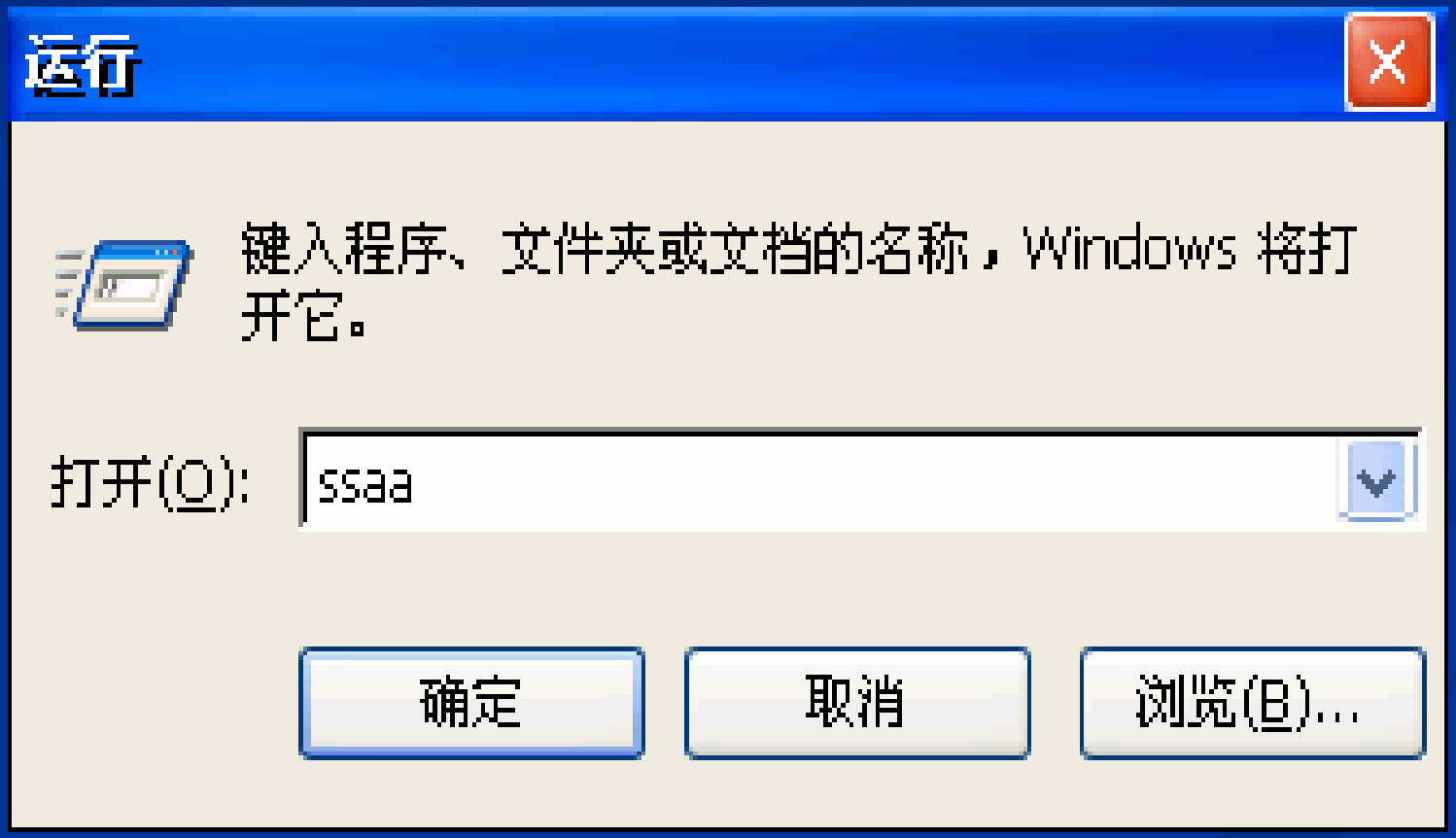



- Rebuild
- ActiveSync
- 安装相应CF卡的驱动程序（演示）

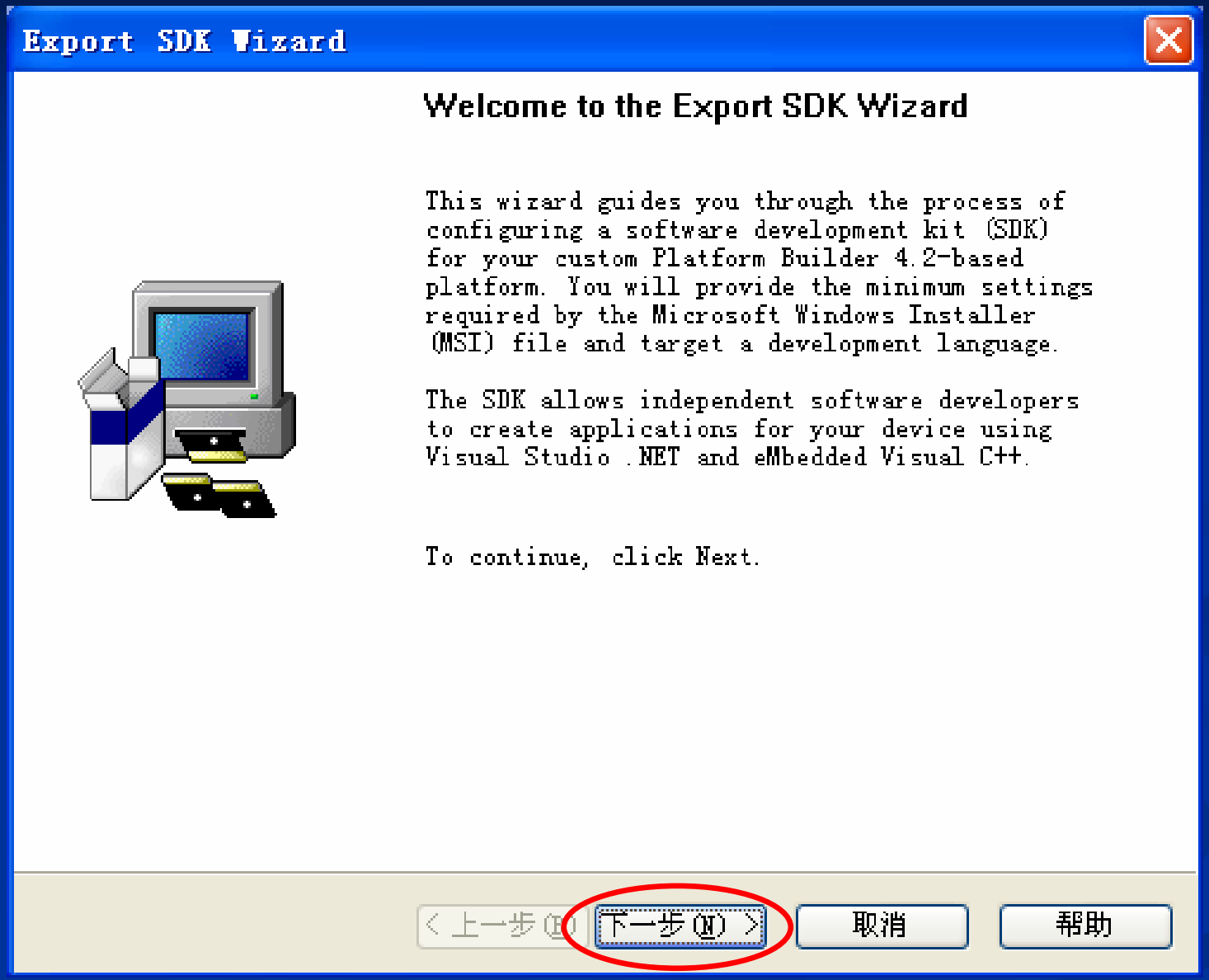
# 定制输入设备

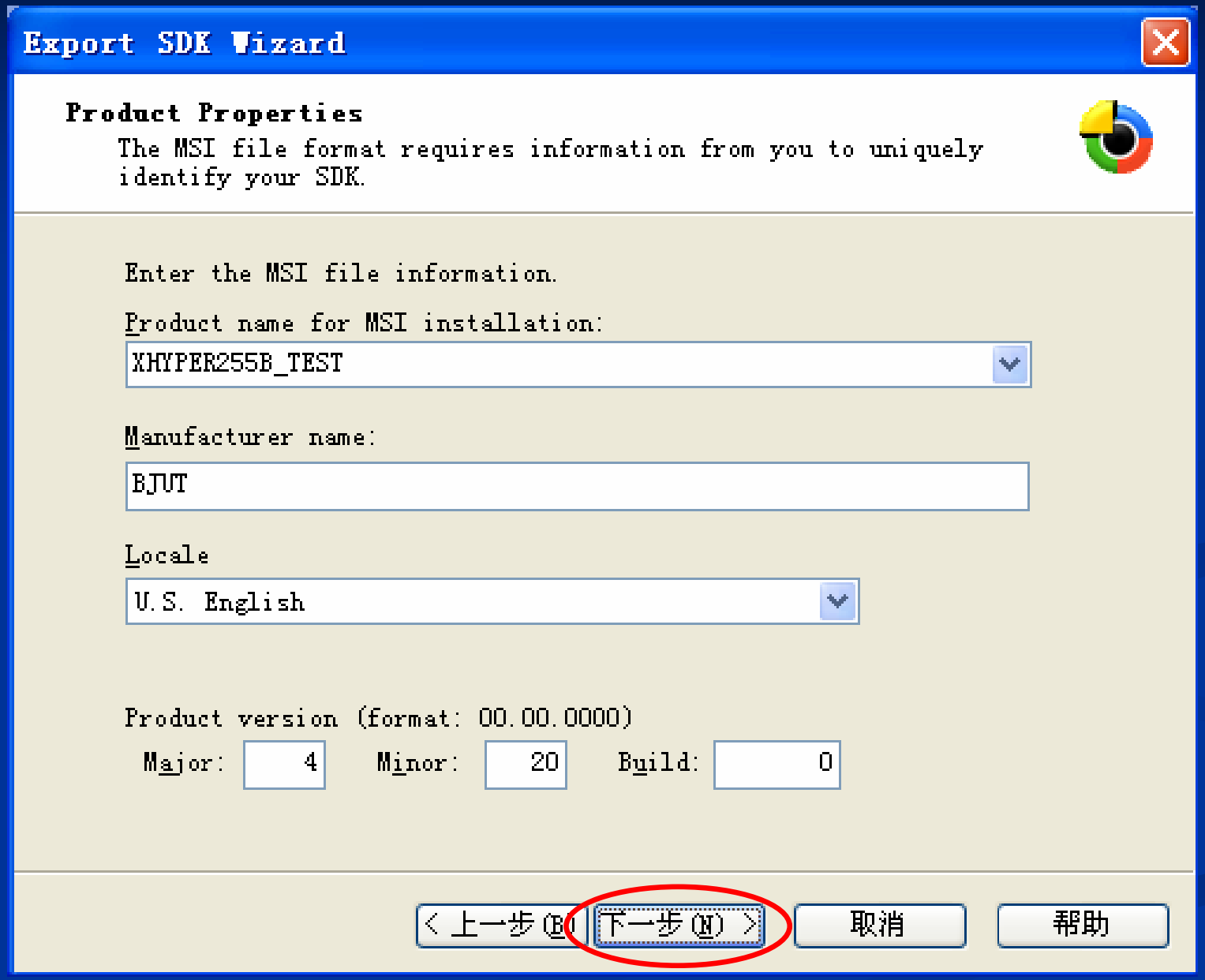
- X:\WINCE420\PUBLIC\COMMON\OAK\DRIVERS\KEYBD\DEVICELAYOUTS\PS2_AT\00000409\ps2_at_00000409.cpp文件中,把'S'与'A'，调换位置
- 编译源文件，重新编译平台
- 下载映像，可以看到现象

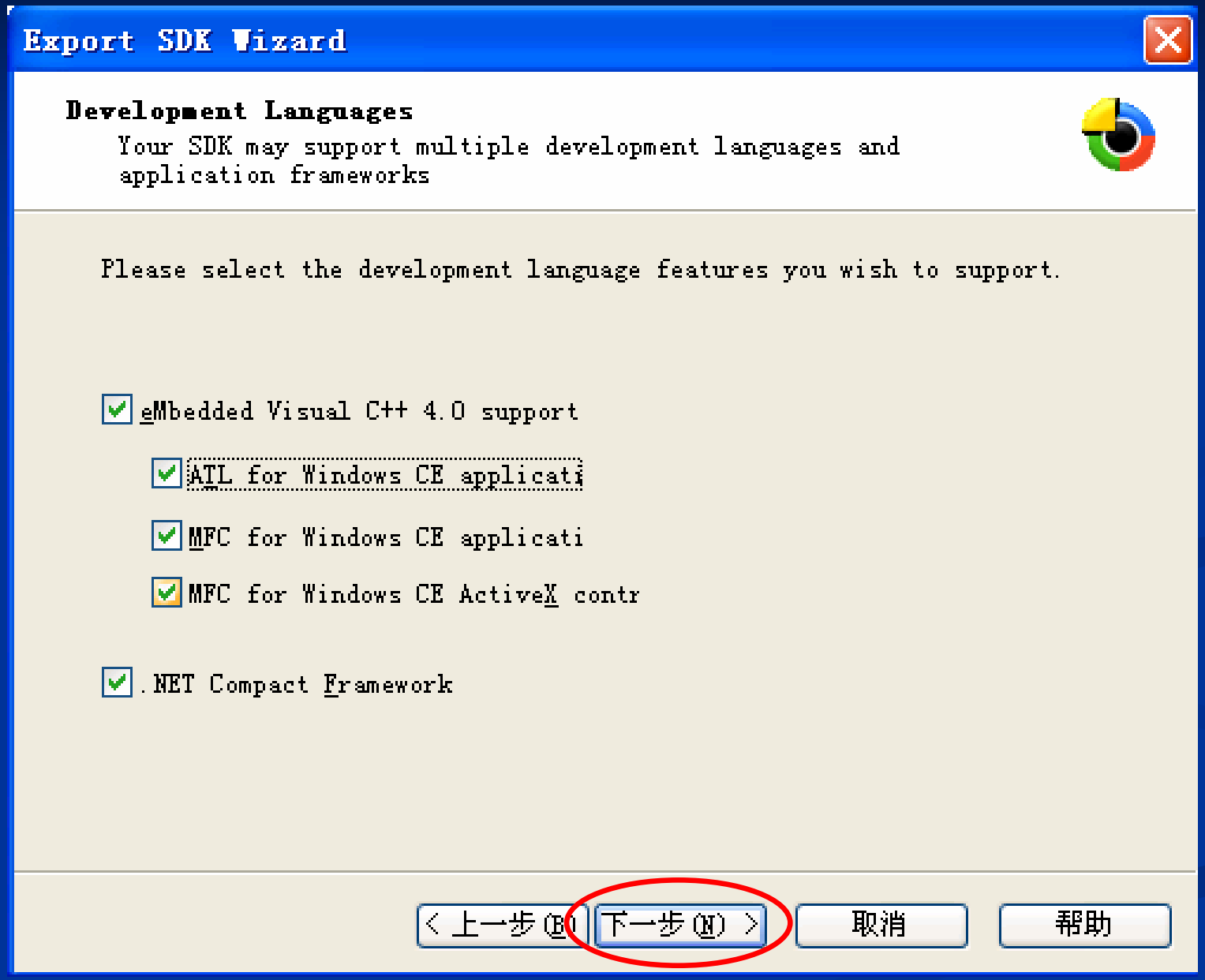



运行
键入程序、文件夹或文档的名称，Windows 将打开它。
打开(O):
ssaa
确定
取消
浏览(B)...

# SDK导出向导


Export SDK Wizard
Welcome to the Export SDK Wizard
This wizard guides you through the process of configuring a software development kit (SDK) for your custom Platform Builder 4.2-based platform. You will provide the minimum settings required by the Microsoft Windows Installer (MSI) file and target a development language.
The SDK allows independent software developers to create applications for your device using Visual Studio .NET and eMbedded Visual C++.
To continue, click Next.
< 上一步(B)
下一步(N) >
取消
帮助


Export SDK Wizard
Product Properties
The MSI file format requires information from you to uniquely identify your SDK.
Enter the MSI file information.
Product name for MSI installation:
XHYPER255B_TEST
Manufacturer name:
BJUT
Locale
U.S. English
Product version (format: 00.00.0000)
Major: 4
Minor: 20
Build: 0
< 上一步(B)
下一步(N) >
取消
帮助


Export SDK Wizard
Development Languages
Your SDK may support multiple development languages and application frameworks
Please select the development language features you wish to support.
eMbedded Visual C++ 4.0 support
ATL for Windows CE applicati
MFC for Windows CE applicati
MFC for Windows CE ActiveX contr
.NET Compact Framework
< 上一步(B)
下一步(N) >
取消
帮助

Export SDK Wizard

## Completing the Export SDK Wizard

You have successfully completed the Export SDK Wizard.

You have created a software development kit (SDK).

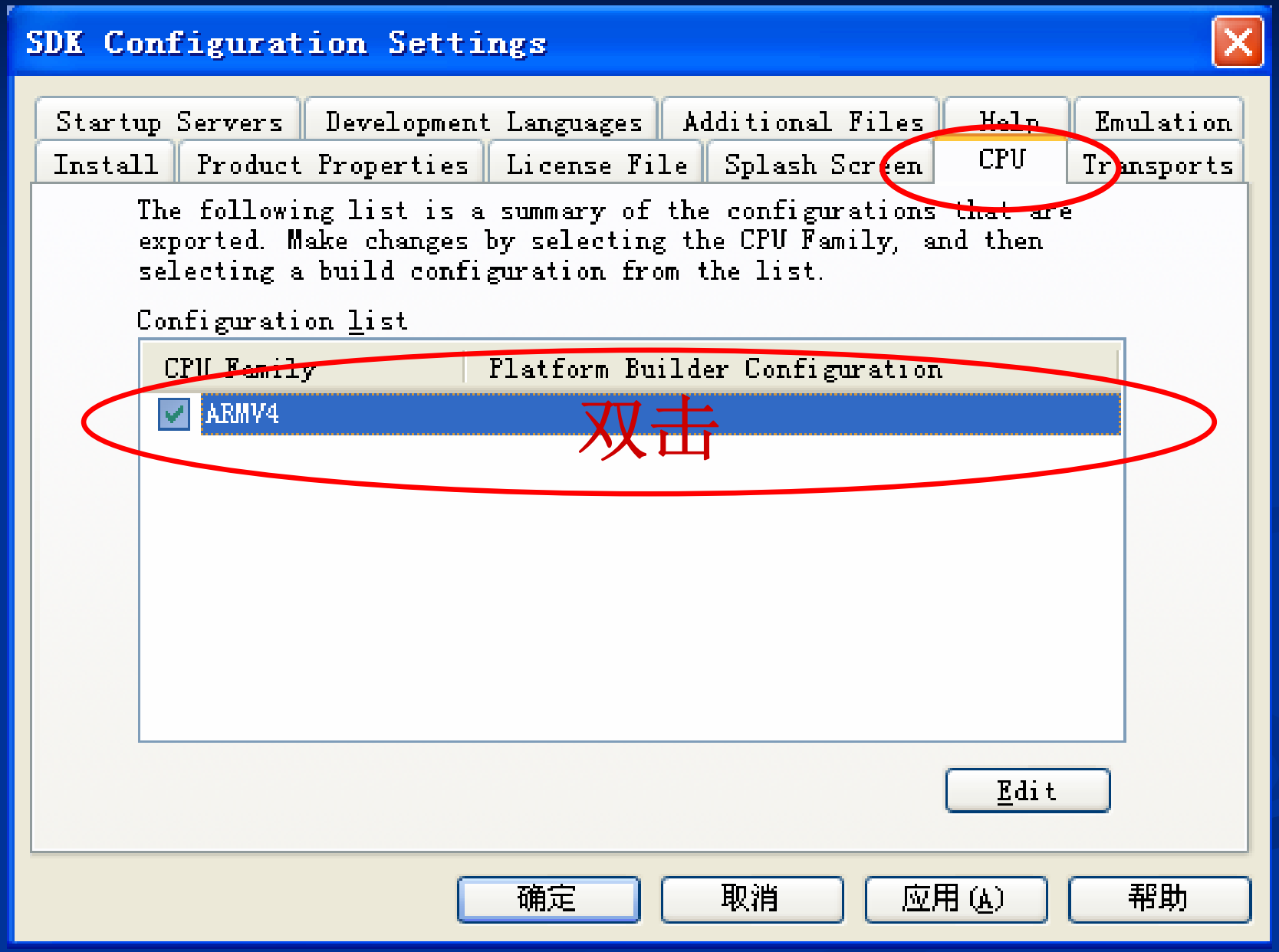
**Additional Actions:**

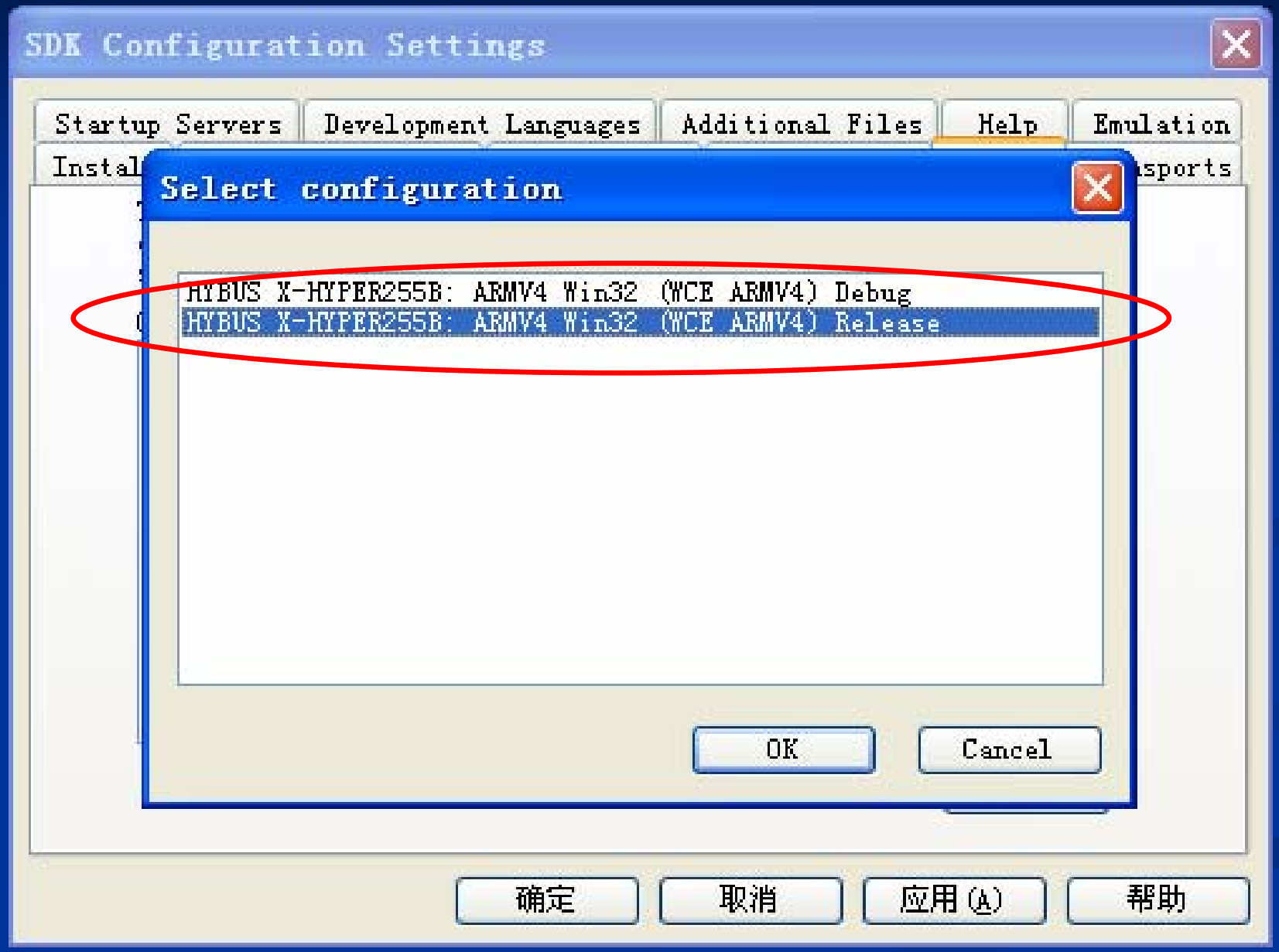
- Build your SDK when this wizard closes.
- Modify the configuration settings for your SDK when this wizard closes.

To close this wizard, click *Finish*.

< 上一步(B) | Finish | 取消 | 帮助

# 配置SDK——选择CPU


SDK Configuration Settings
Startup Servers
Development Languages
Additional Files
Help
Emulation
Install
Product Properties
License File
Splash Screen
CPU
Transports
The following list is a summary of the configurations that are exported. Make changes by selecting the CPU Family, and then selecting a build configuration from the list.
Configuration list
CPU Family
Platform Builder Configuration
ARMV4
双击
Edit
确定
取消
应用(A)
帮助


SDK Configuration Settings
Startup Servers
Development Languages
Additional Files
Help
Emulation
Select configuration
HYBUS X-HYPER255B: ARMV4 Win32 (WCE ARMV4) Debug
HYBUS X-HYPER255B: ARMV4 Win32 (WCE ARMV4) Release
OK
Cancel
确定
取消
应用(A)
帮助

# 配置SDK——选择模拟器

SDK Configuration Settings

Install | Product Properties | License File | Splash Screen | CPU | Transports
Startup Servers | Development Languages | Additional Files | Help | Emulation

Emulation

NONE

NONE
Emulator: x86 Win32 (WCE emulator) Release
Emulator: x86 Win32 (WCE emulator) Debug

Fixed screen resolution

Width: (pixels) 800 Height: (pixels) 600 Color: (bits) 16

Emulator skins

Skin Folder

Add...

Delete

确定 取消 应用(A) 帮助

SDK Configuration Settings

Install | Product Properties | License File | Splash Screen | CPU | Transports
Startup Servers | Development Languages | Additional Files | Help | Emulation

Emulation

Emulator: x86 Win32 (WCE emulator) Release

☑ Ethernet support

☑ Ports available to be configured  Memory (MB) 48

◉ Fixed screen resolution

Width: (pixels) 640  Height: (pixels) 480  Color: (bits) 16

○ Emulator skins

Skin Folder  Add...  Delete

确定 | 取消 | 应用(A) | 帮助

# 生成SDK

Platform Target Build Tools Window

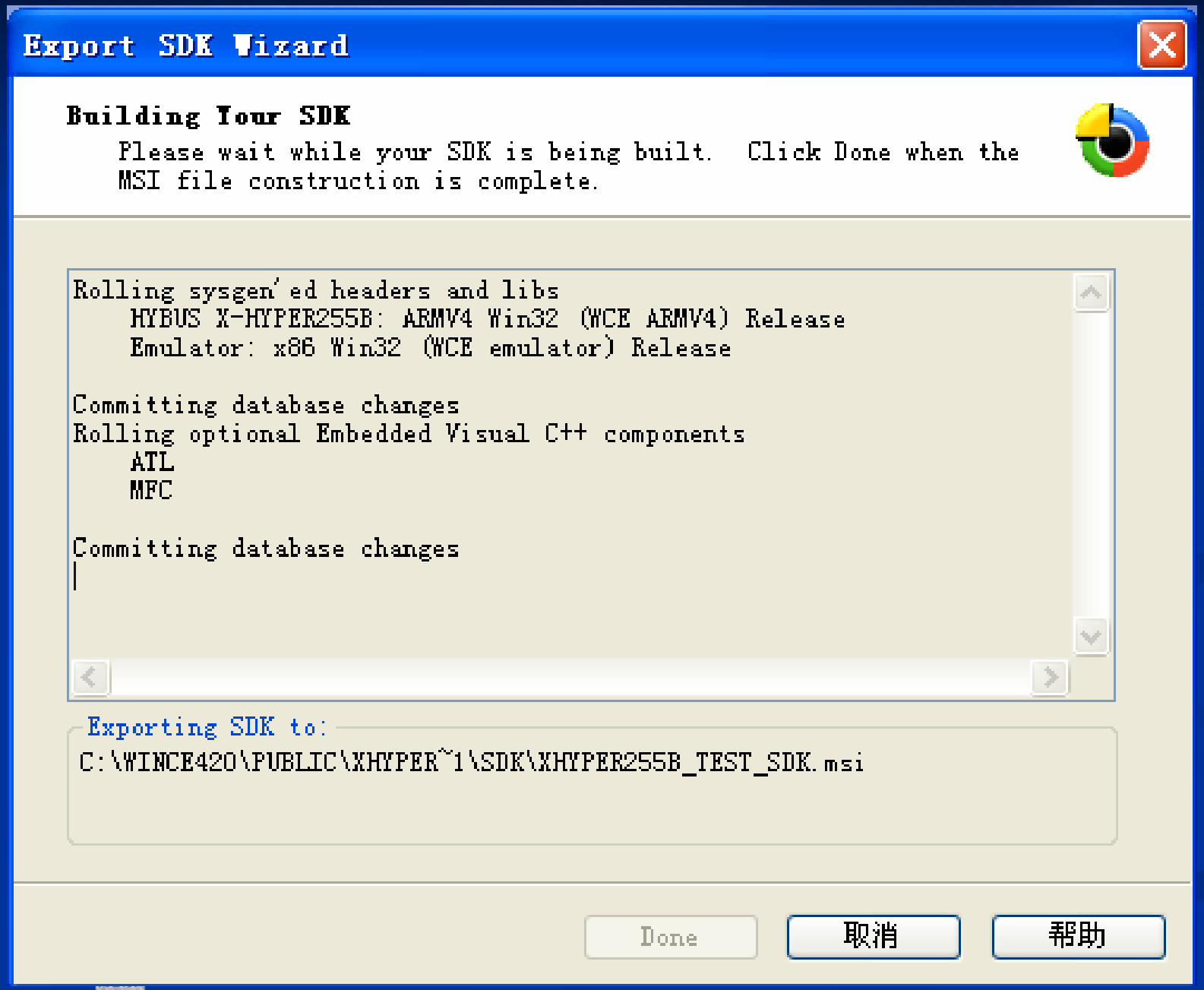
- Resolve Feature(s)...
- Anchor Feature(s)
- Refresh Features
- Review Special Notifications...
- Insert ▶
- Feature Dependencies...
- Settings...

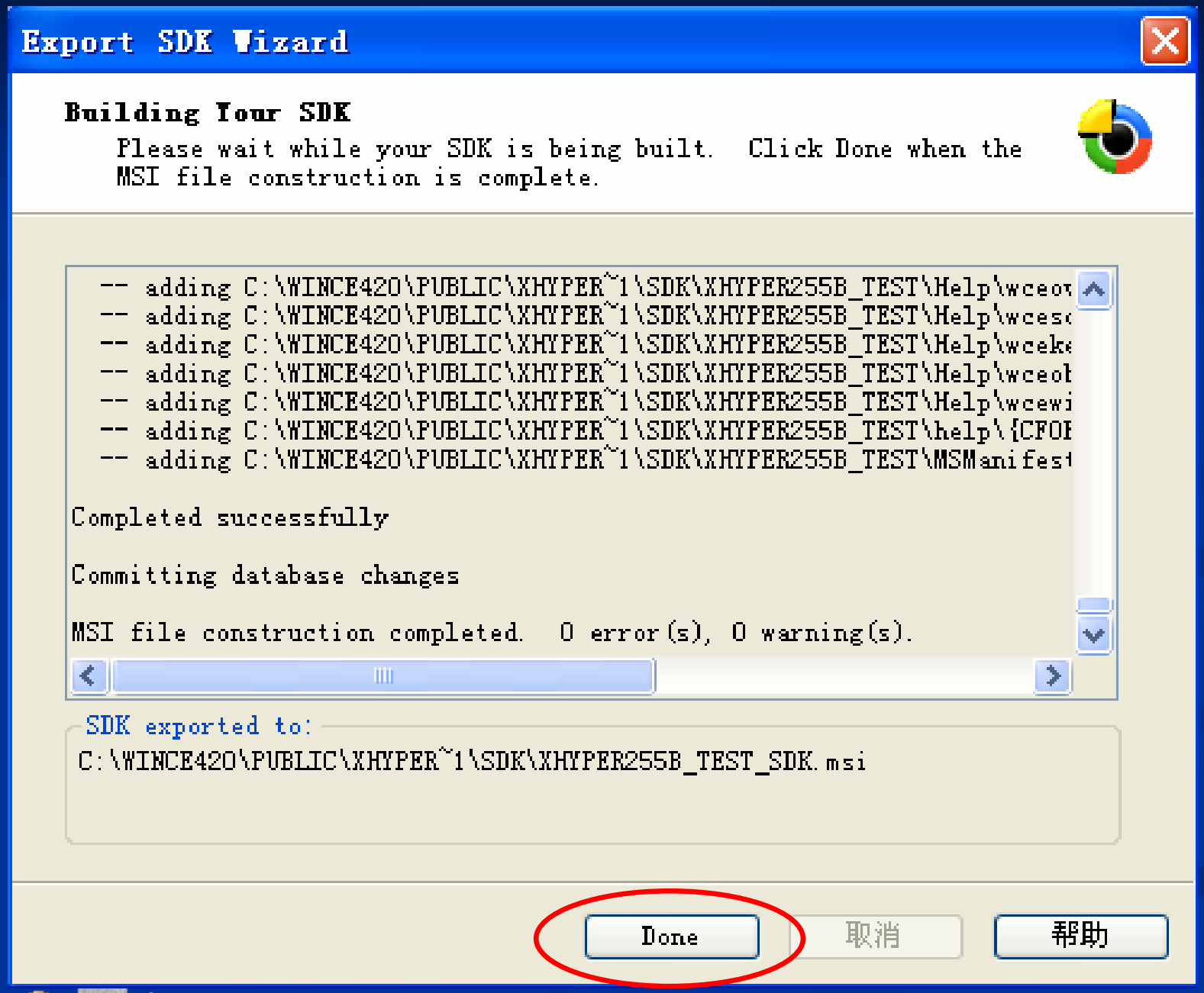
---

- Configure SDK...
- Build SDK...

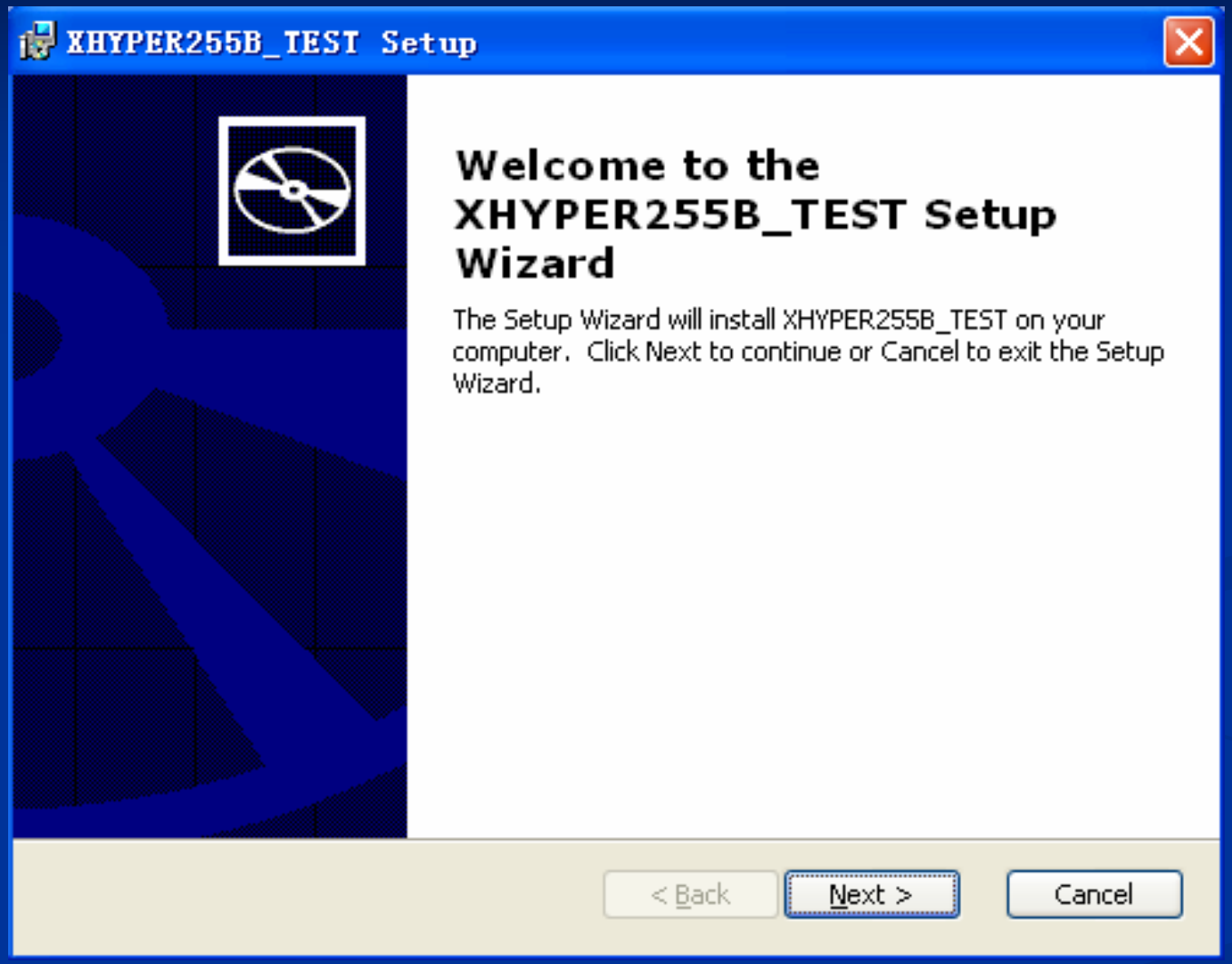
---

- BSP Wizard...
- Export Wizard...


Export SDK Wizard
Building Your SDK
Please wait while your SDK is being built. Click Done when the MSI file construction is complete.
Rolling sysgen'ed headers and libs
HYBUS X-HYPER255B: ARMV4 Win32 (WCE ARMV4) Release
Emulator: x86 Win32 (WCE emulator) Release
Committing database changes
Rolling optional Embedded Visual C++ components
ATL
MFC
Committing database changes
Exporting SDK to:
C:\WINCE420\PUBLIC\XHYPER~1\SDK\XHYPER255B_TEST_SDK.msi
Done
取消
帮助

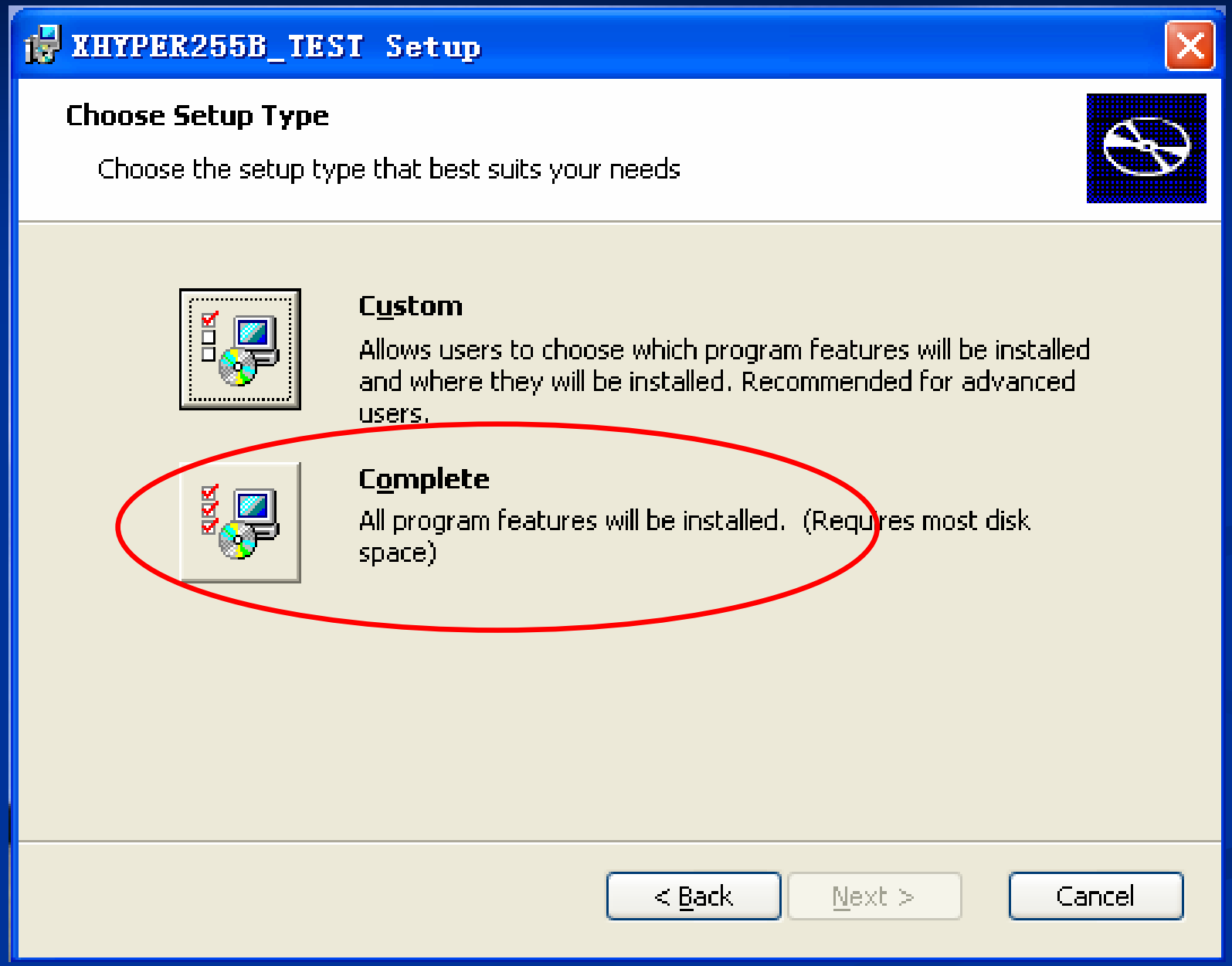

Export SDK Wizard
Building Your SDK
Please wait while your SDK is being built. Click Done when the MSI file construction is complete.
-- adding C:\WINCE420\PUBLIC\XHYPER~1\SDK\XHYPER255B_TEST\Help\wceov
-- adding C:\WINCE420\PUBLIC\XHYPER~1\SDK\XHYPER255B_TEST\Help\wces
-- adding C:\WINCE420\PUBLIC\XHYPER~1\SDK\XHYPER255B_TEST\Help\wcek
-- adding C:\WINCE420\PUBLIC\XHYPER~1\SDK\XHYPER255B_TEST\Help\wceo
-- adding C:\WINCE420\PUBLIC\XHYPER~1\SDK\XHYPER255B_TEST\Help\wcewi
-- adding C:\WINCE420\PUBLIC\XHYPER~1\SDK\XHYPER255B_TEST\help\{CFO
-- adding C:\WINCE420\PUBLIC\XHYPER~1\SDK\XHYPER255B_TEST\MSManifest
Completed successfully
Committing database changes
MSI file construction completed. 0 error(s), 0 warning(s).
SDK exported to:
C:\WINCE420\PUBLIC\XHYPER~1\SDK\XHYPER255B_TEST_SDK.msi
Done
取消
帮助

# 5.2 Windows CE应用程序的开发




为了连接目标设备应先安装SDK，运行：

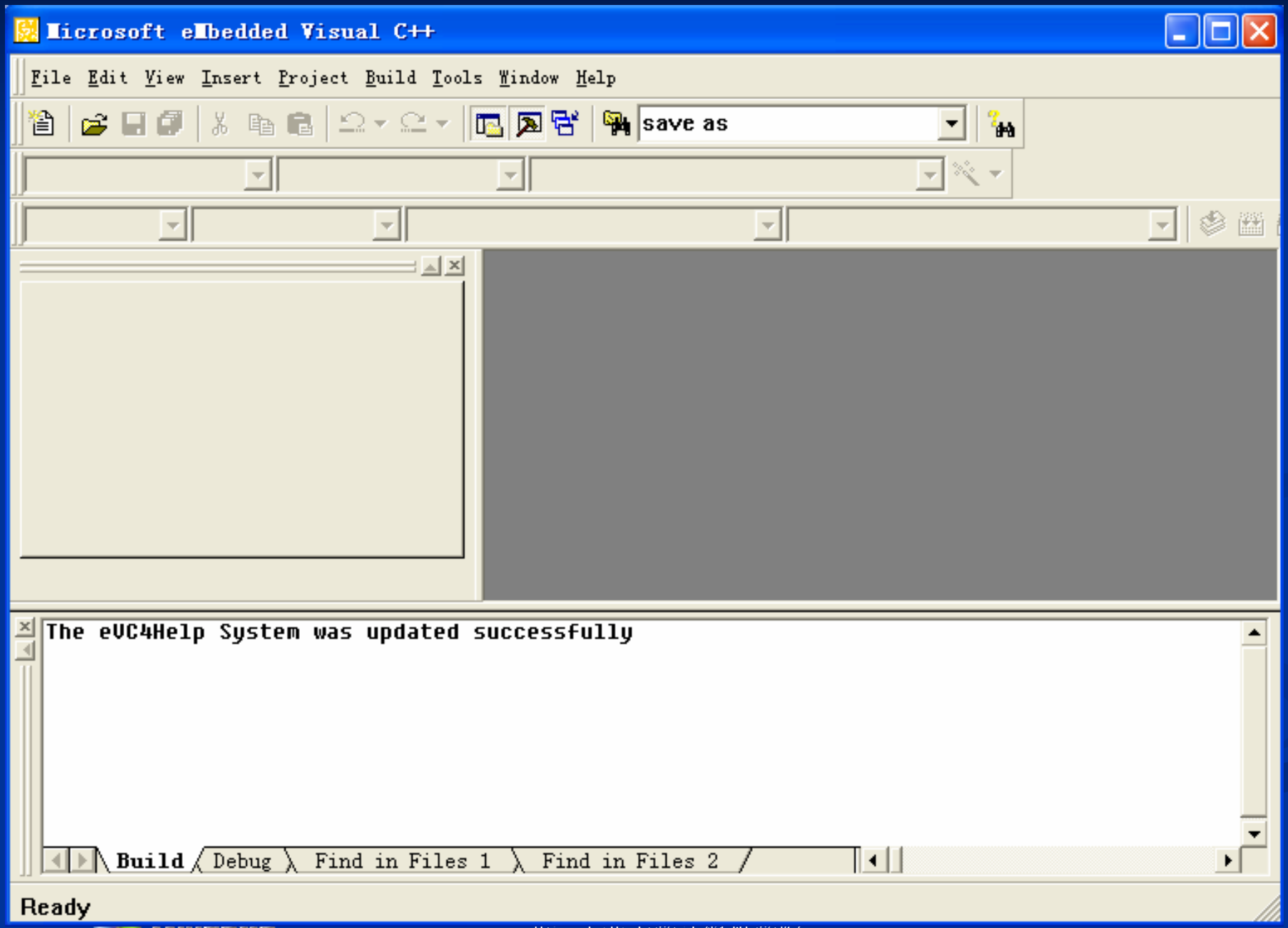
C:\WINCE420\PUBLIC\XHYPER255B_TEST\SDK目录下的XHYPER255B_TEST_SDK.msi


XHYPER255B_TEST Setup
Choose Setup Type
Choose the setup type that best suits your needs
Custom
Allows users to choose which program features will be installed and where they will be installed. Recommended for advanced users.
Complete
All program features will be installed. (Requires most disk space)
< Back
Next >
Cancel

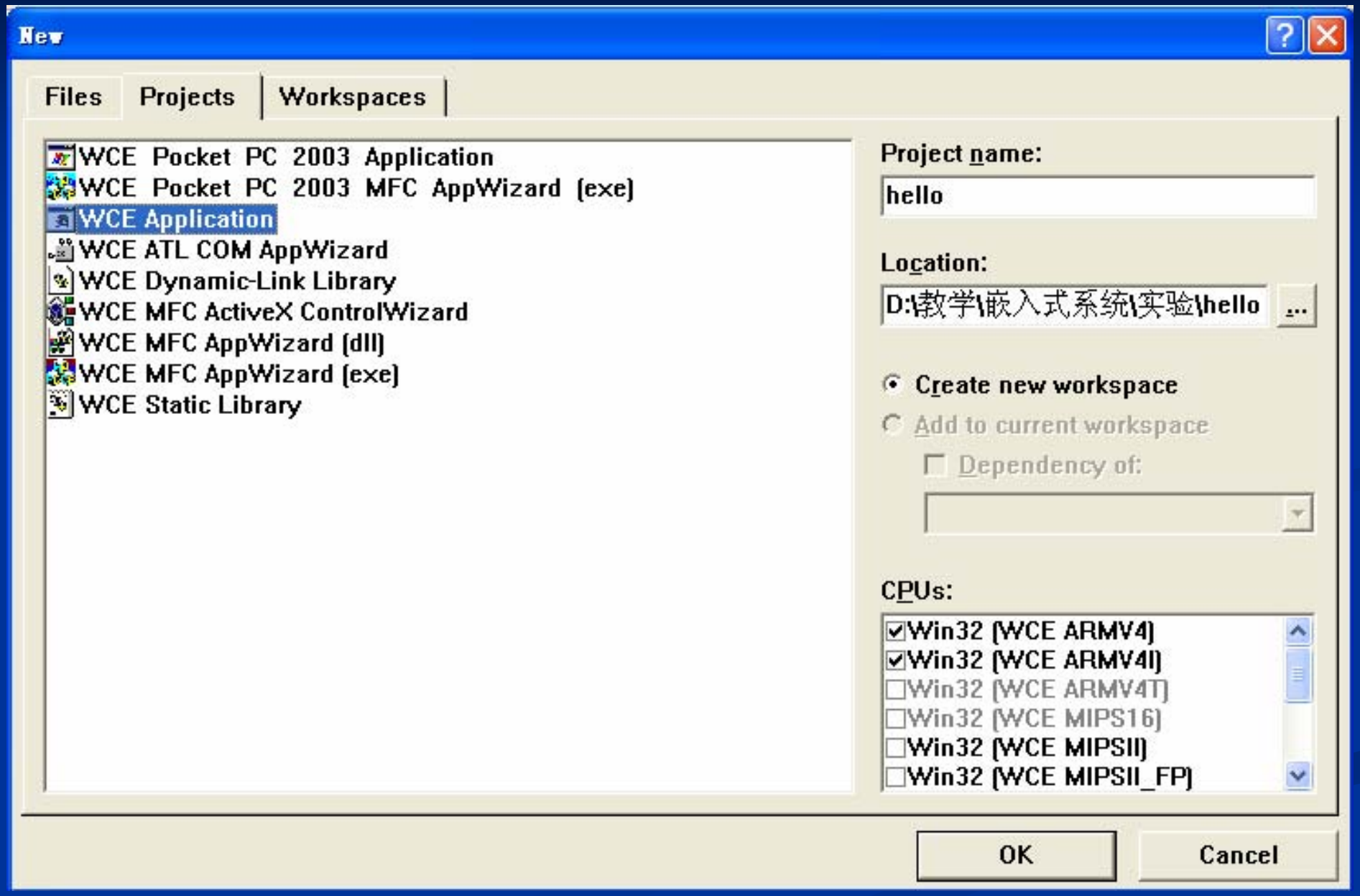
# 安装Pocket 2003 SDK

1. 运行Microsoft Pocket PC 2003 SDK
2. 运行Pocket PC 2003 SDK Chinese Simplified Emulation Images
3. 将C:\Program Files\Pocket PC 2003 Emulation \CHS\ Pocket_PC目录下PPC_2003_CHS.BIN更名为PPC_2003_WWE.BIN后，拷贝到C:\Program Files\Windows CE Tools\wce420\POCKET PC 2003\Emulation\PPC_2003_WWE.BIN

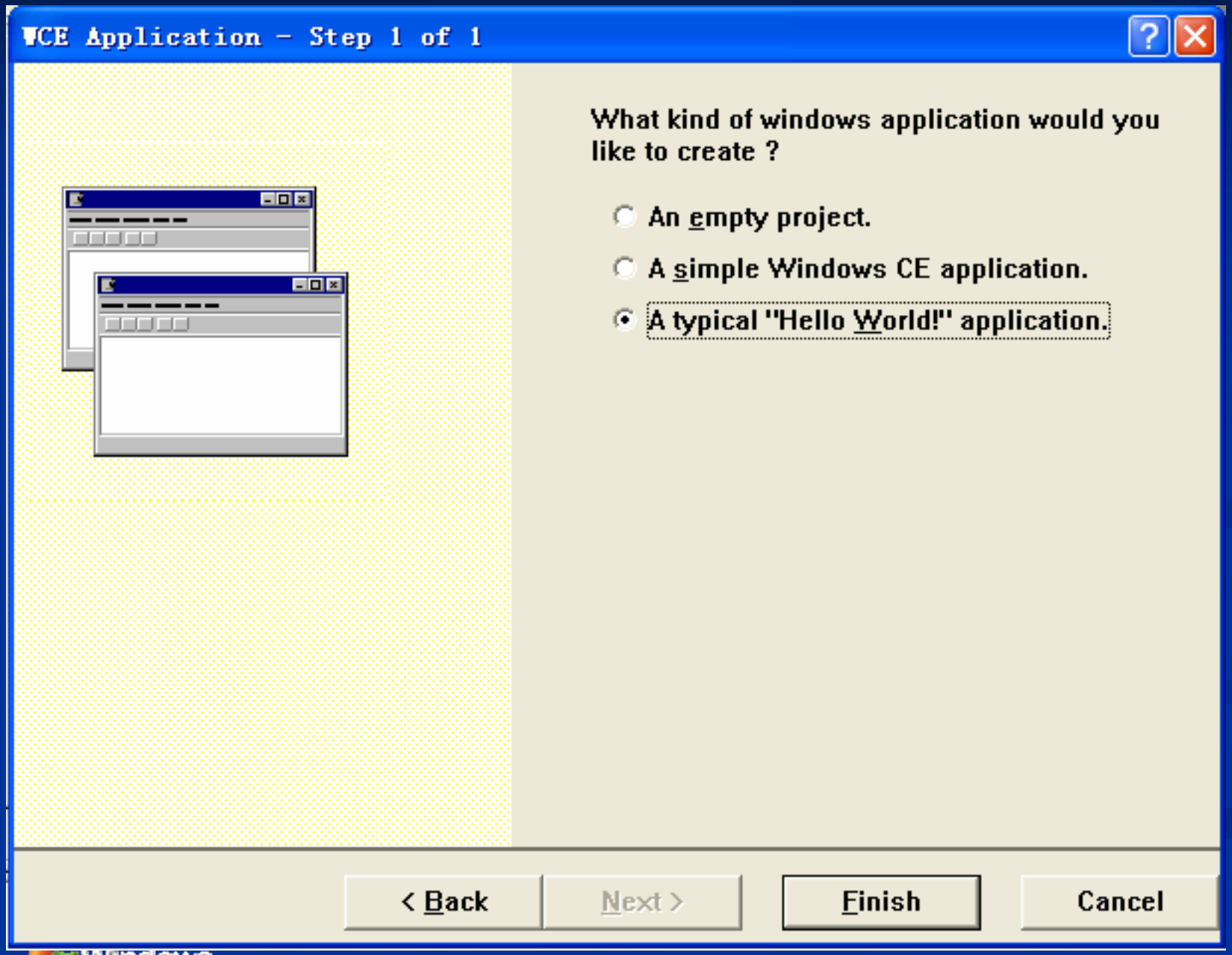
# 5.2.1 eMbedded Visual C++ 4.0



# 新建一个工程


New
Files
Projects
Workspaces
WCE Pocket PC 2003 Application
WCE Pocket PC 2003 MFC AppWizard (exe)
WCE Application
WCE ATL COM AppWizard
WCE Dynamic-Link Library
WCE MFC ActiveX ControlWizard
WCE MFC AppWizard (dll)
WCE MFC AppWizard (exe)
WCE Static Library
Project name:
hello
Location:
D:\教学\嵌入式系统\实验\hello
Create new workspace
Add to current workspace
Dependency of:
CPUs:
Win32 (WCE ARMV4)
Win32 (WCE ARMV4I)
Win32 (WCE ARMV4T)
Win32 (WCE MIPS16)
Win32 (WCE MIPSII)
Win32 (WCE MIPSII_FP)
OK
Cancel

# 选择一个典型的应用模板



# 配置平台管理器

Tools Window Help

- Source Browser... Alt+F12
- Close Source Browser File
- Error Lookup
- Remote Call Profiler (WCE420)
- Remote File Viewer (WCE420)
- Remote Heap Walker (WCE420)
- Remote Kernel Tracker (WCE420)
- Remote Performance Monitor (WCE420)
- Remote Process Viewer (WCE420)
- Remote Registry Editor (WCE420)
- Remote Spy++ (WCE420)
- Remote System Information (WCE420)
- Remote Zoomin (WCE420)
- Select Remote Tools
- Customize...
- Options...
- Macro...
- Record Quick Macro Ctrl+Shift+R
- Play Quick Macro Ctrl+Shift+P
- Configure Platform Manager...

Windows CE Platform Manager Configuration

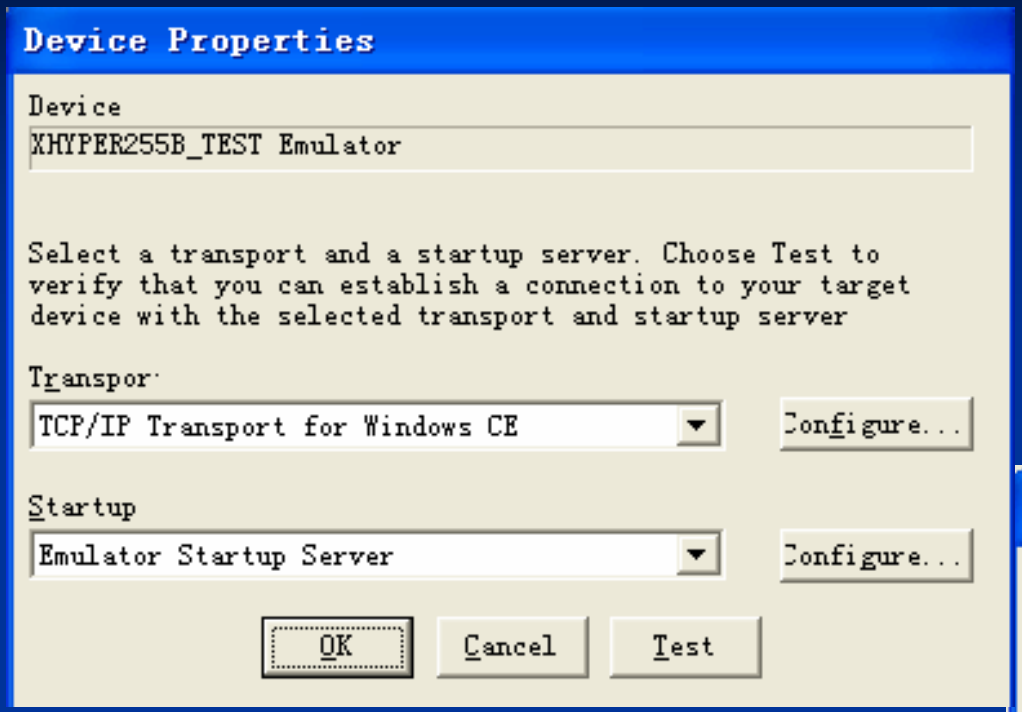
Select a platform or device to

- APP255
- DEMO
- HYBUS255
- POCKET PC 2003
- STANDARDSDK_420
- TESTGX
- Windows CE .NET Default Platform
- XHYPER255B_TEST
  - XHYPER255B_TEST Device
  - XHYPER255B_TEST Emulator

Add Device | Delete | Properties... | About

OK

# 测试连接


Device Properties
Device
XHYPER255B_TEST Emulator
Select a transport and a startup server. Choose Test to verify that you can establish a connection to your target device with the selected transport and startup server
Transport
TCP/IP Transport for Windows CE
Configure...
Startup
Emulator Startup Server
Configure...
OK
Cancel
Test

Testing Device Connection
Device
XHYPER255B_TEST Emulator
Connection to device established
TCP/IP Transport for Windows CE
OK

hello - Microsoft eMbedded Visual C++

File Edit View Insert Project Build Tools Window Help

save as

(Globals) | (All global members | About

hello | XHYPER255B_T | Win32 (WCE emulator) Debug | XHYPER255B_TEST Device

- hello resources
  - Accelerator
  - Dialog
    - IDD_ABOUTBOX [English (
  - Icon
  - Menu
  - String Table

ClassV... | Resour... | FileView

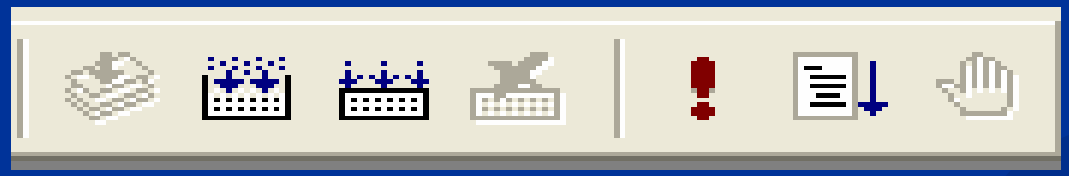
Build | Debug | Find in Files 1 | Find in Files 2

Ready

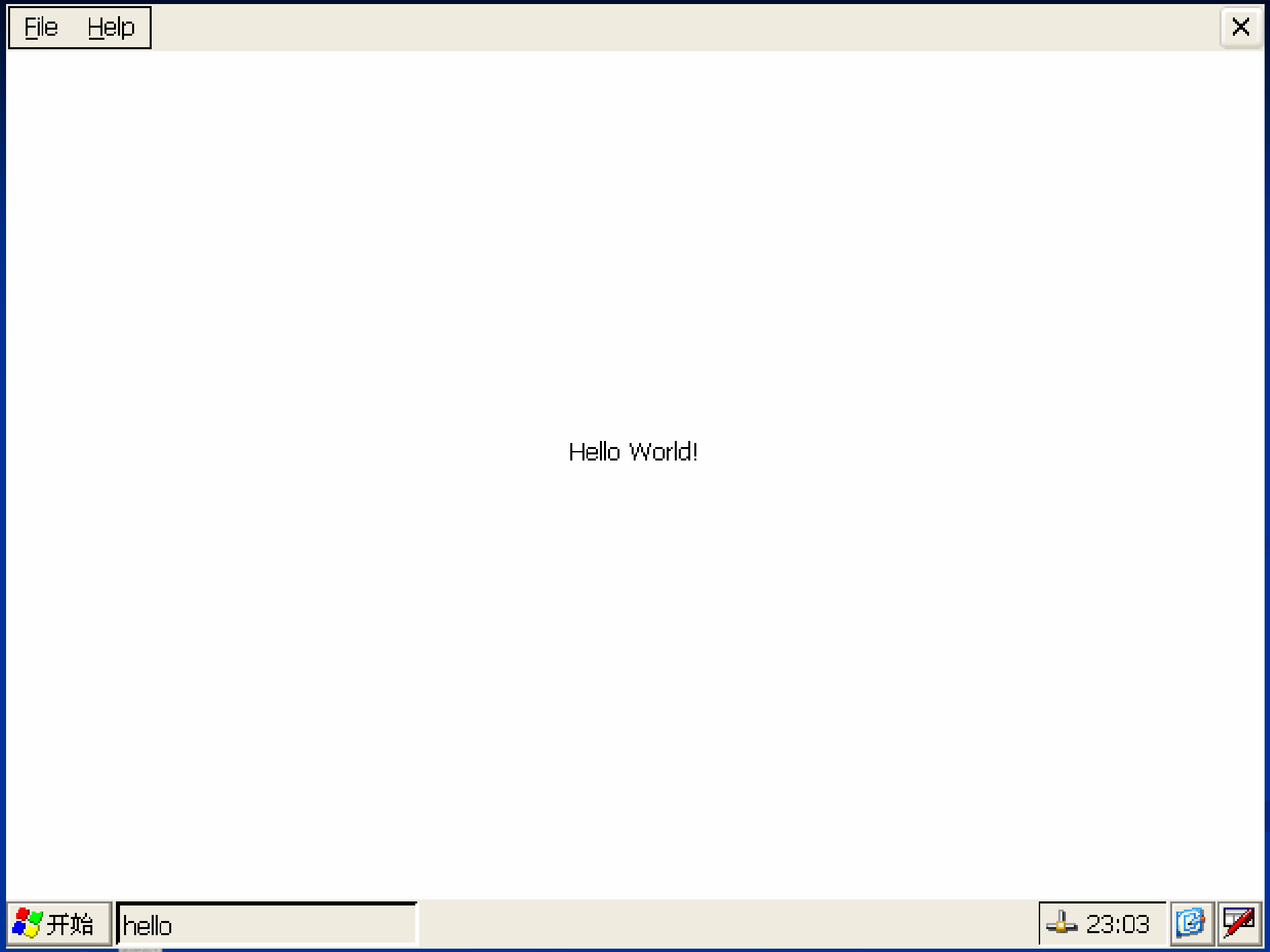
工程名　设备名

生成的可执行文件对应的CPU、版本（发布或调试）

设备类型



执行程序

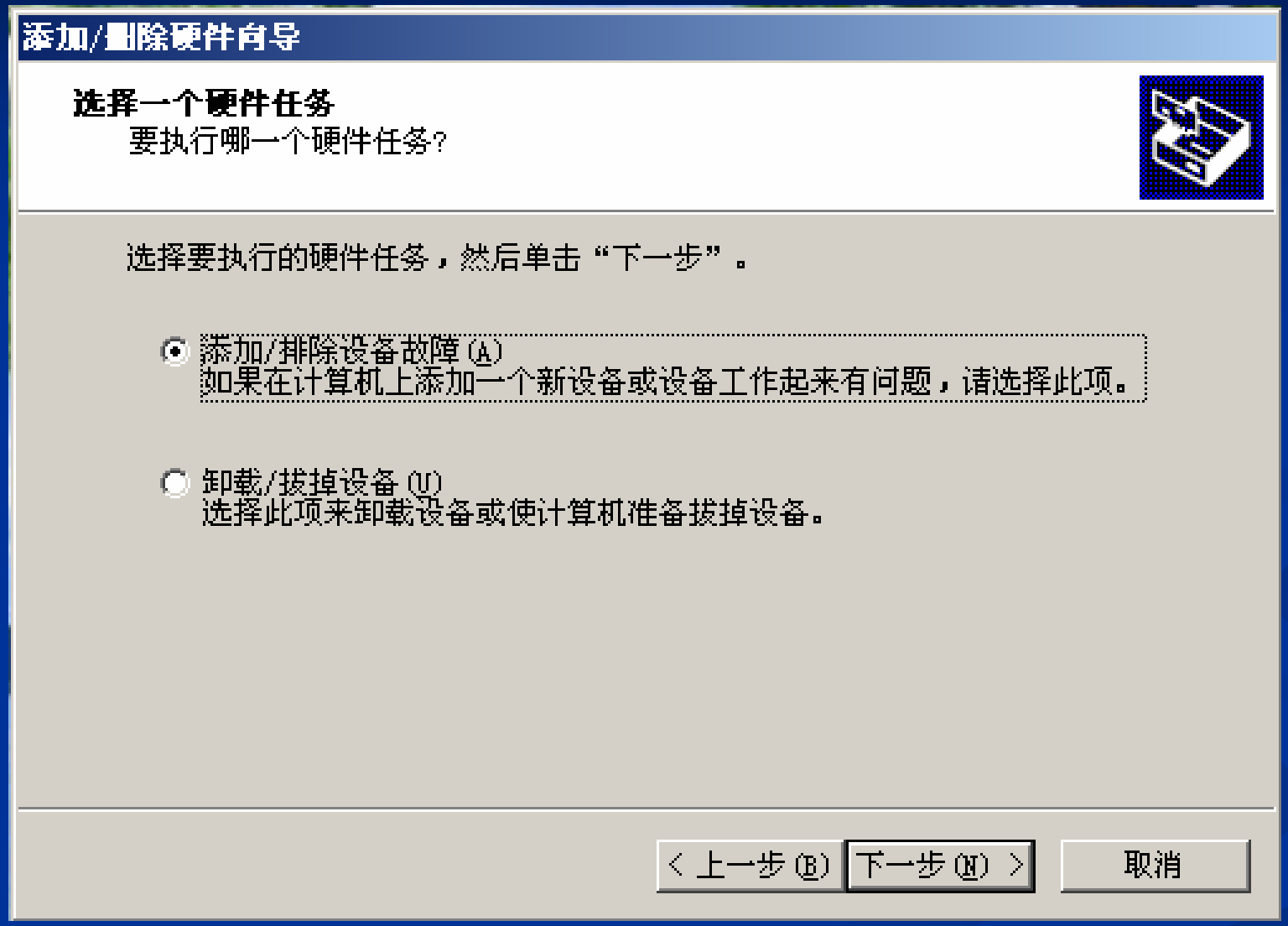

File Help
Hello World!
开始
hello
23:03

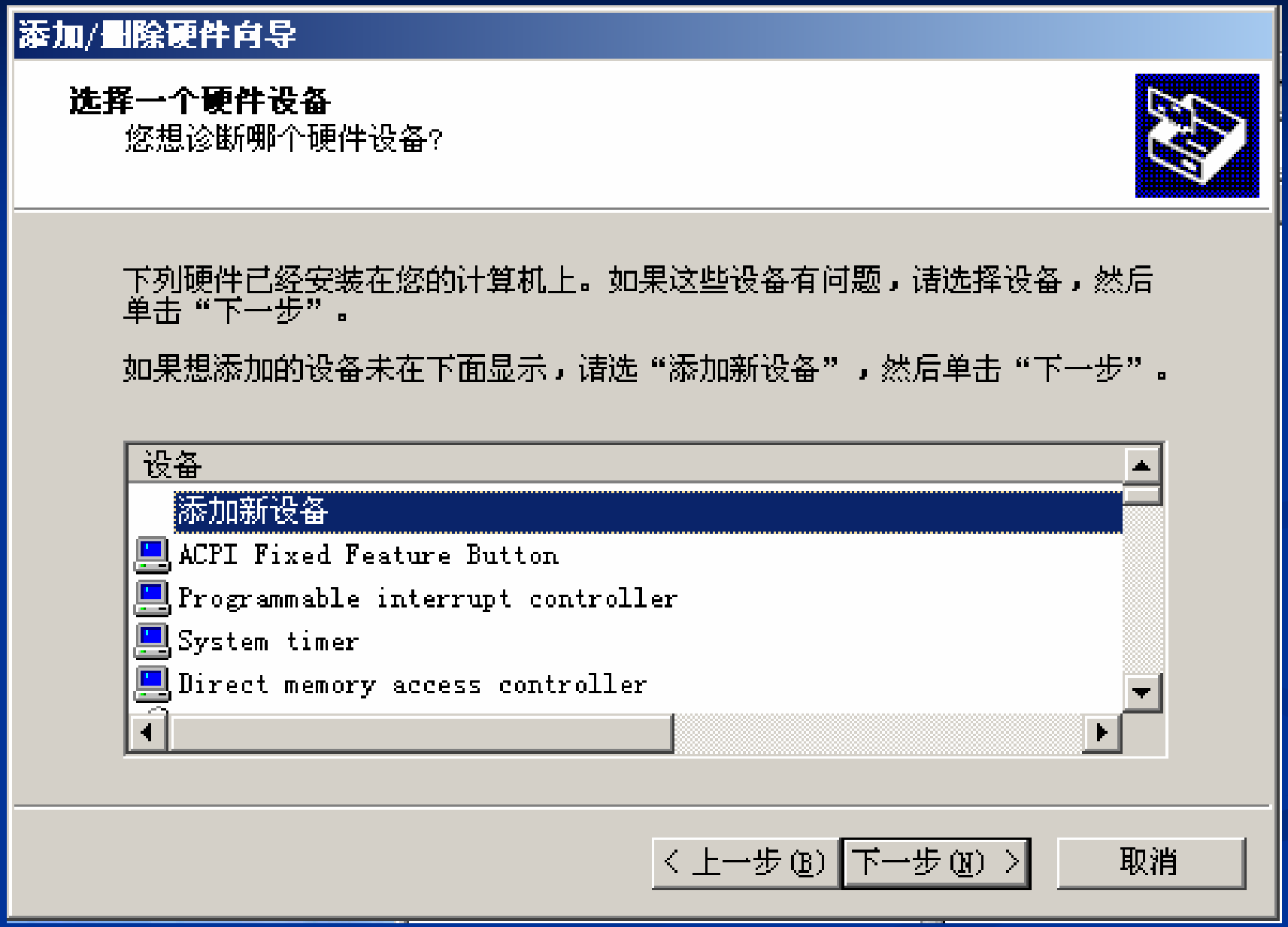
# 修改程序

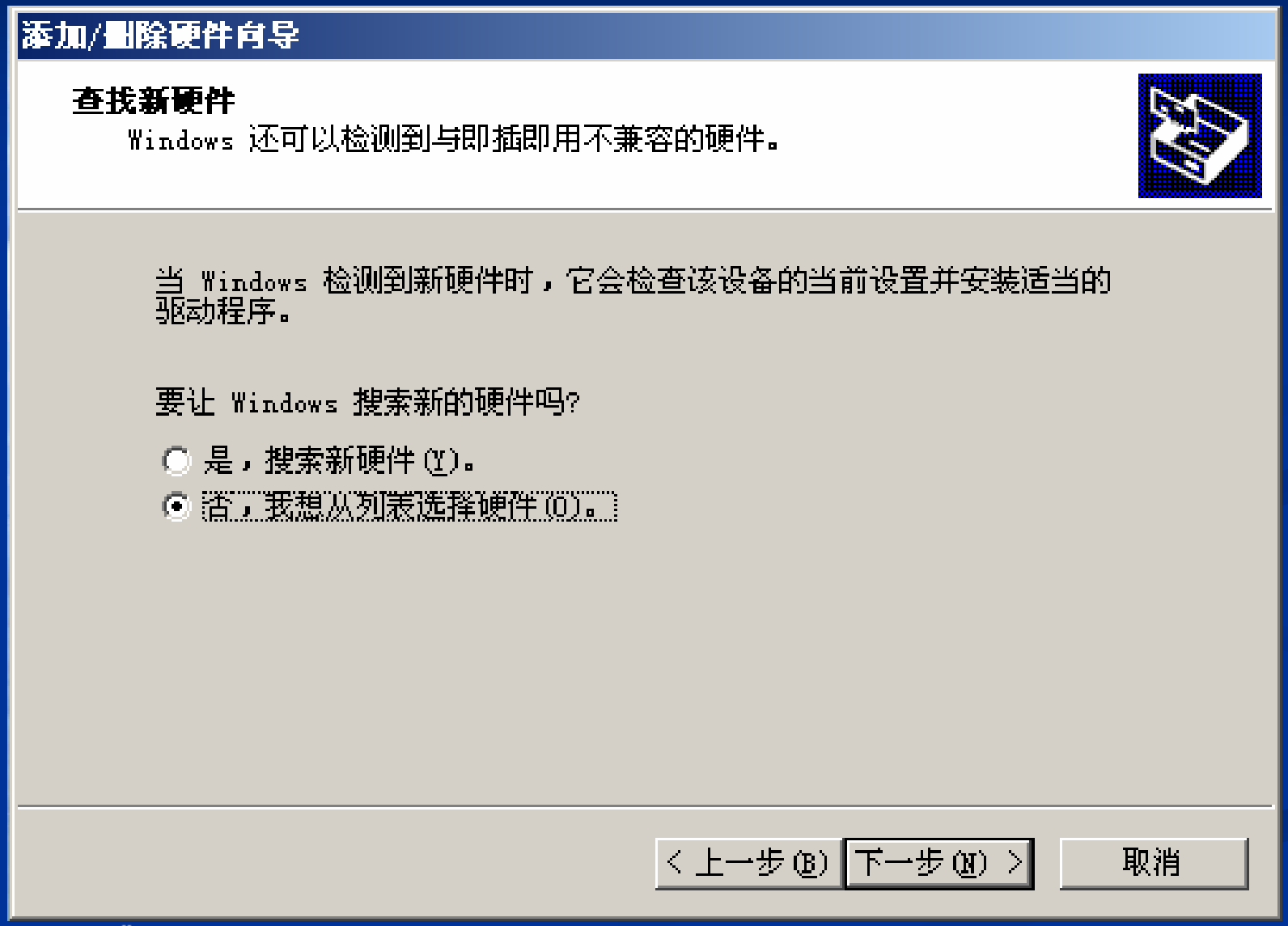
- 修改支持语言
- 修改图标
- 修改菜单
- 修改对话框

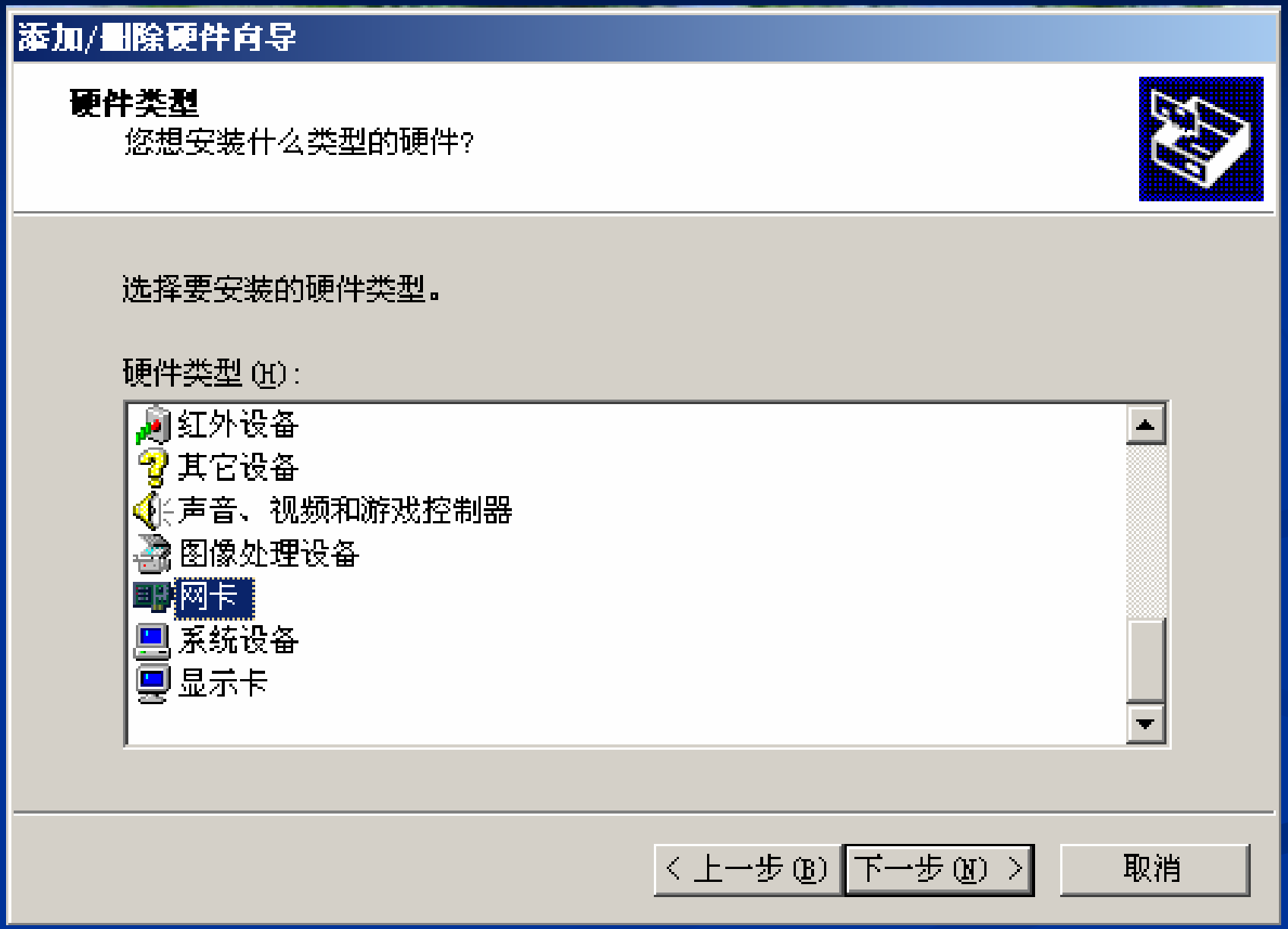
演示

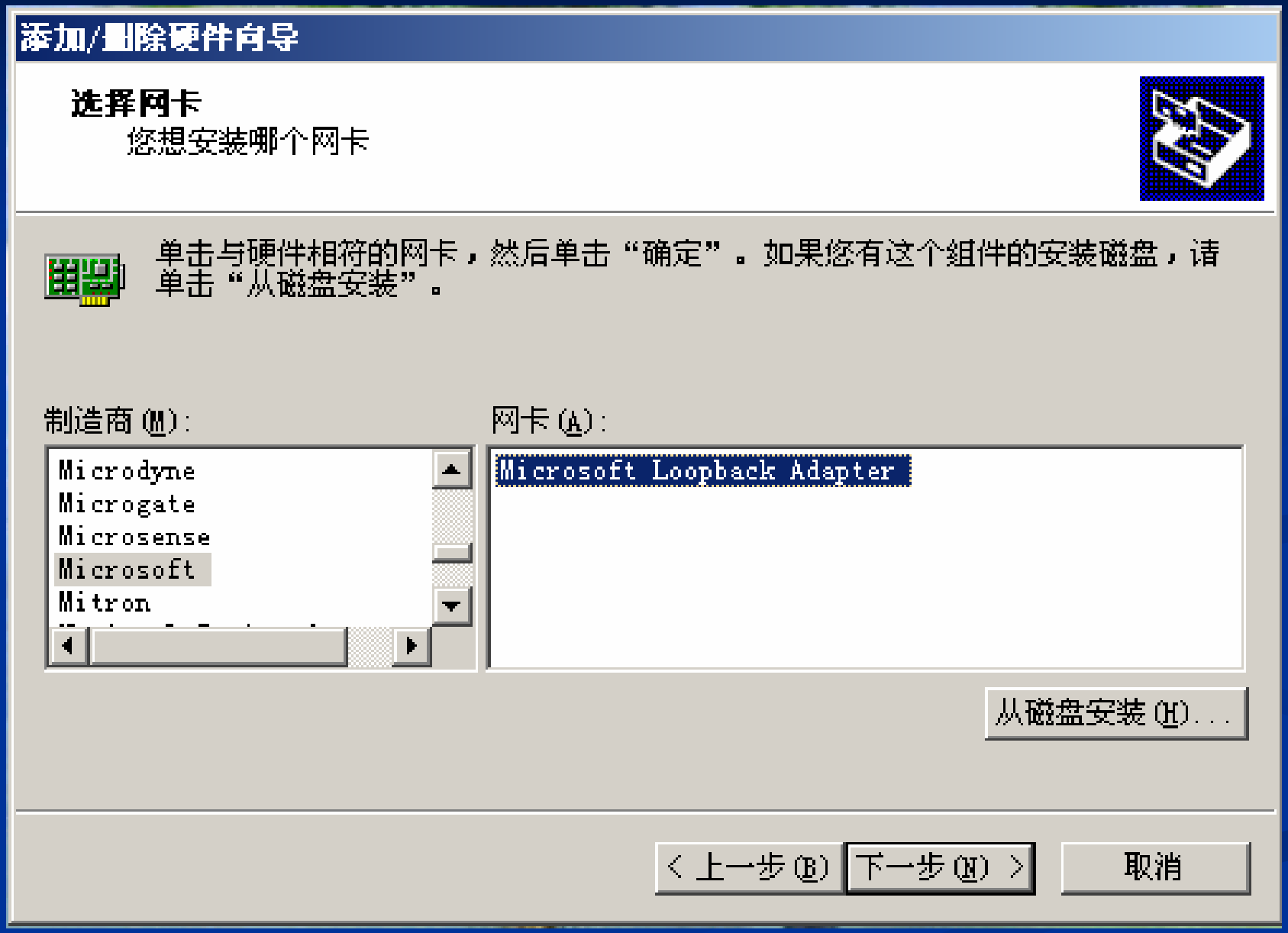
# Pocket PC模拟器需添加虚拟网卡

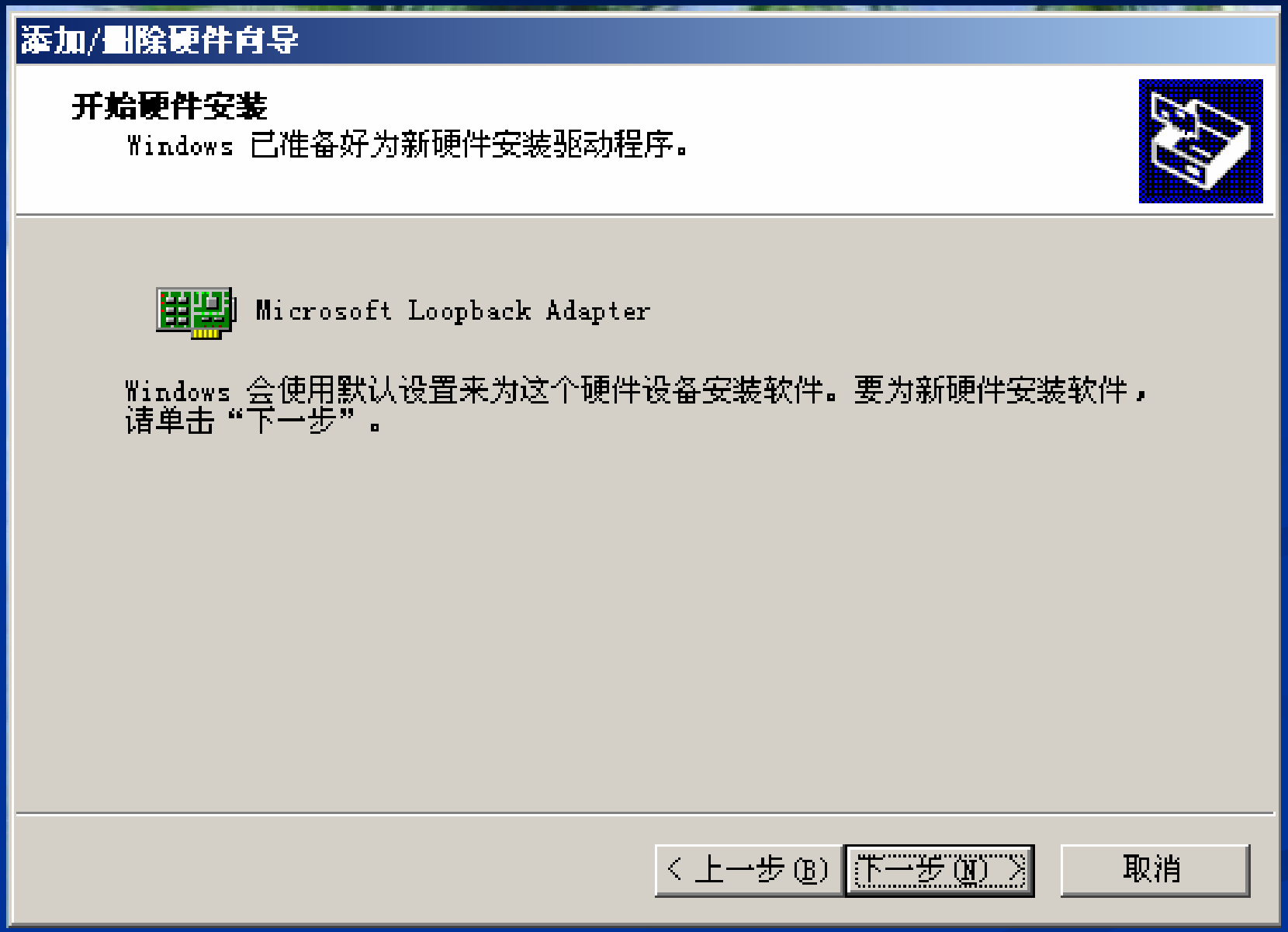


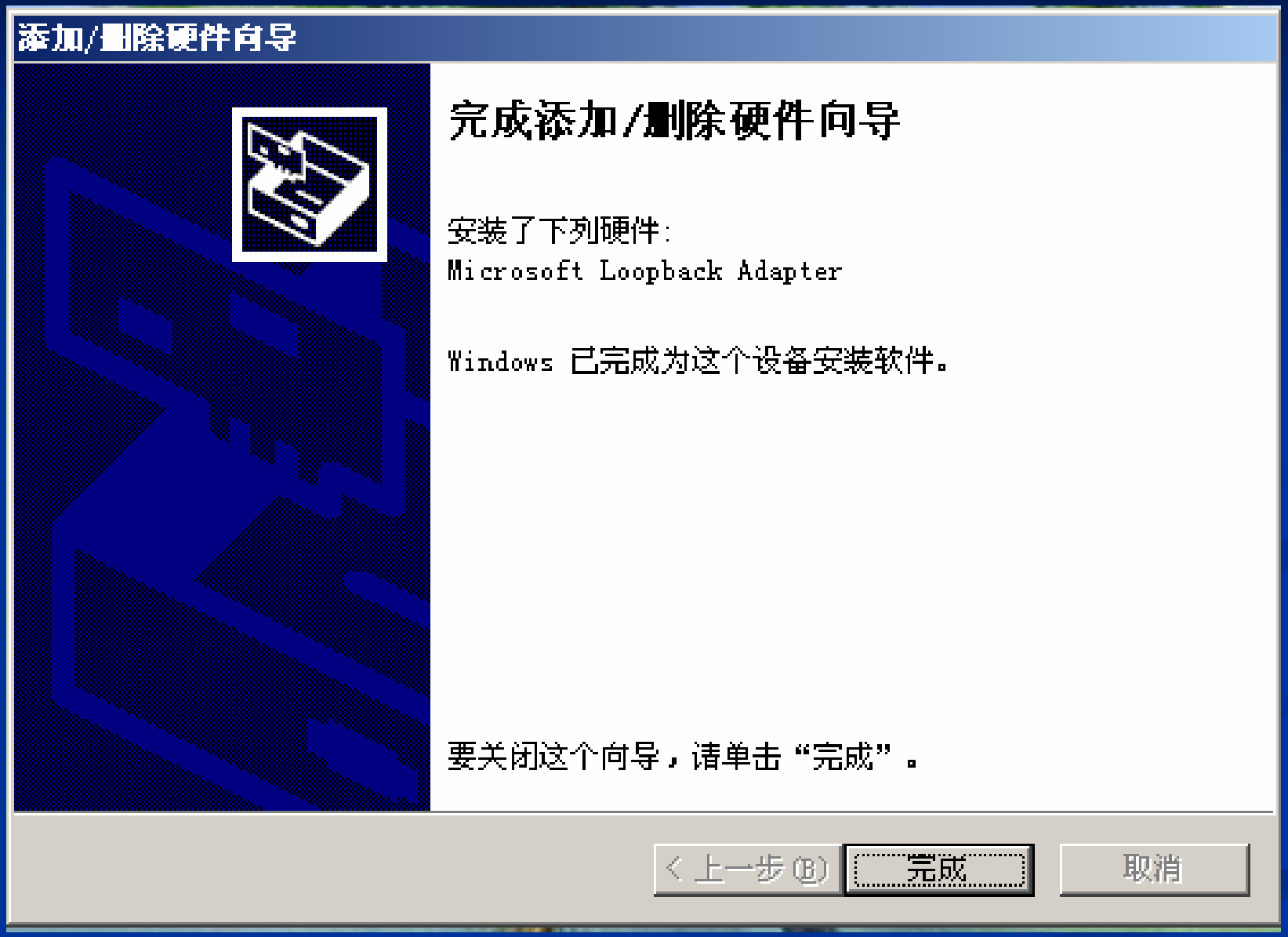

添加/删除硬件向导
选择一个硬件设备
您想诊断哪个硬件设备?
下列硬件已经安装在您的计算机上。如果这些设备有问题，请选择设备，然后单击“下一步”。
如果想添加的设备未在下面显示，请选“添加新设备”，然后单击“下一步”。
设备
添加新设备
ACPI Fixed Feature Button
Programmable interrupt controller
System timer
Direct memory access controller
< 上一步(B)
下一步(N) >
取消

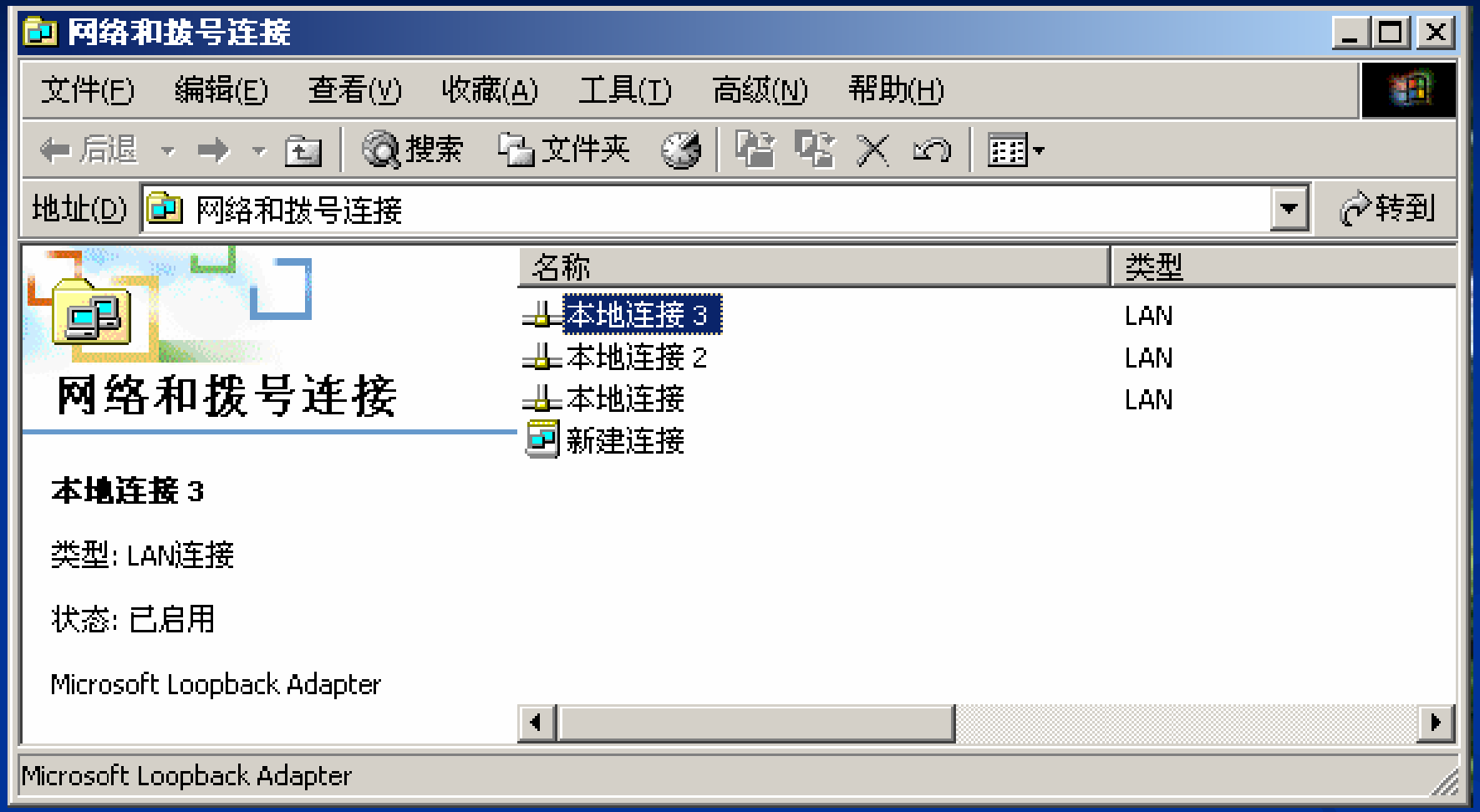

添加/删除硬件向导
查找新硬件
Windows 还可以检测到与即插即用不兼容的硬件。
当 Windows 检测到新硬件时，它会检查该设备的当前设置并安装适当的驱动程序。
要让 Windows 搜索新的硬件吗?
是，搜索新硬件(Y)。
否，我想从列表选择硬件(O)。
< 上一步(B)
下一步(N) >
取消


添加/删除硬件向导
硬件类型
您想安装什么类型的硬件?
选择要安装的硬件类型。
硬件类型(H):
红外设备
其它设备
声音、视频和游戏控制器
图像处理设备
网卡
系统设备
显示卡
< 上一步(B)
下一步(N) >
取消

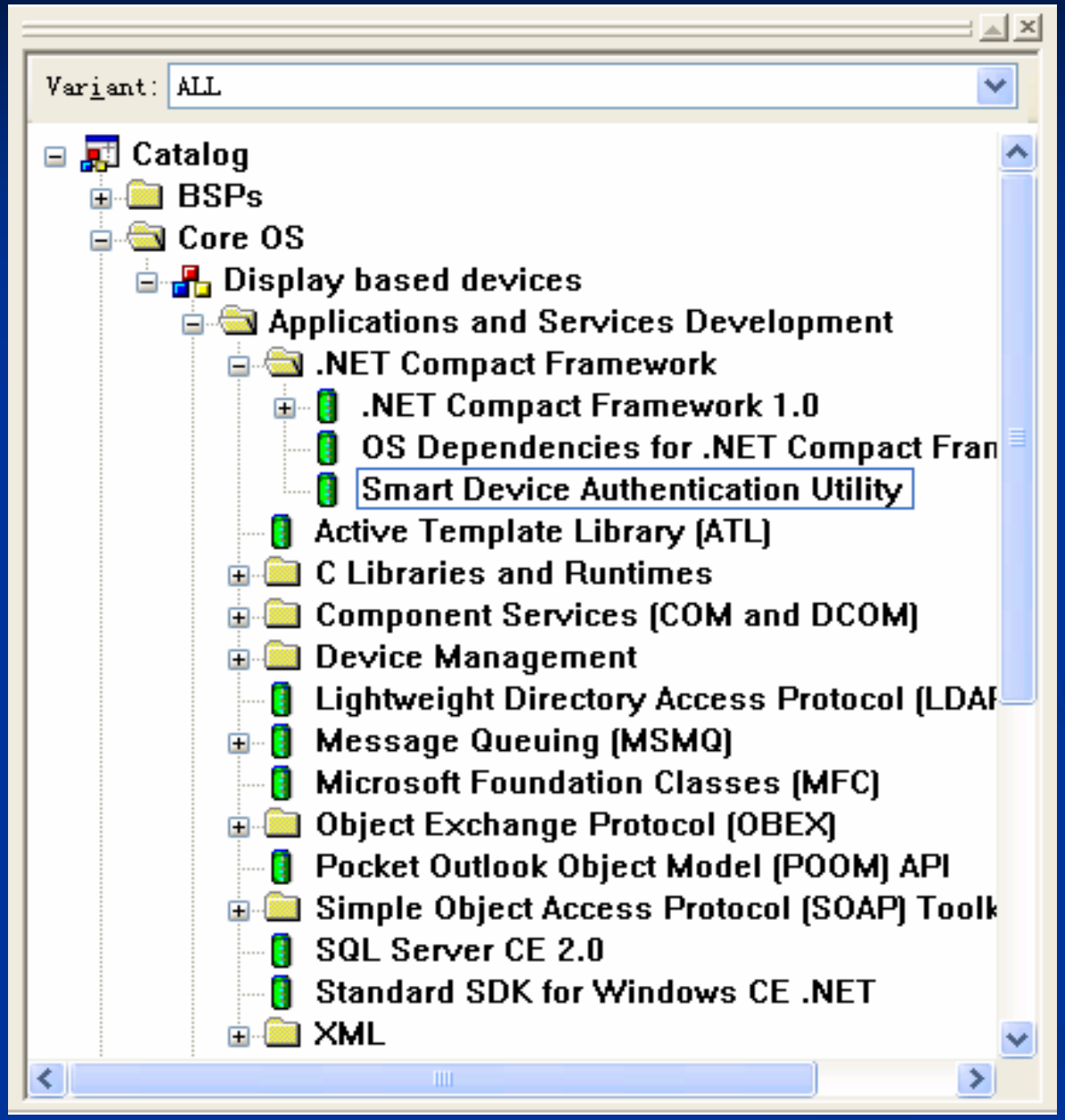

添加/删除硬件向导
选择网卡
您想安装哪个网卡
单击与硬件相符的网卡，然后单击“确定”。如果您有这个组件的安装磁盘，请单击“从磁盘安装”。
制造商(M):
Microdyne
Microgate
Microsense
Microsoft
Mitron
网卡(A):
Microsoft Loopback Adapter
从磁盘安装(H)...
< 上一步(B)
下一步(N) >
取消


添加/删除硬件向导
开始硬件安装
Windows 已准备好为新硬件安装驱动程序。
Microsoft Loopback Adapter
Windows 会使用默认设置来为这个硬件设备安装软件。要为新硬件安装软件，请单击“下一步”。
< 上一步(B)
下一步(N) >
取消


添加/删除硬件向导
完成添加/删除硬件向导
安装了下列硬件:
Microsoft Loopback Adapter
Windows 已完成为这个设备安装软件。
要关闭这个向导，请单击“完成”。
< 上一步(B)
完成
取消


网络和拨号连接
文件(F) 编辑(E) 查看(V) 收藏(A) 工具(T) 高级(N) 帮助(H)
后退 搜索 文件夹
地址(D) 网络和拨号连接
转到
网络和拨号连接
本地连接 3
类型: LAN连接
状态: 已启用
Microsoft Loopback Adapter
名称
类型
本地连接 3 LAN
本地连接 2 LAN
本地连接 LAN
新建连接
Microsoft Loopback Adapter

# 5.2.2 在VS2003下建立网线调试通道




目标机端：

- 在平台映像中添加“Smart Device Authentication Utility”
- Rebuild Platform
- Download
- 我的电脑下Windows目录下
- 查看-选项

# 将CE设备的IP地址与开发主机设在一个网段内

IP 地址 | 名称服务器

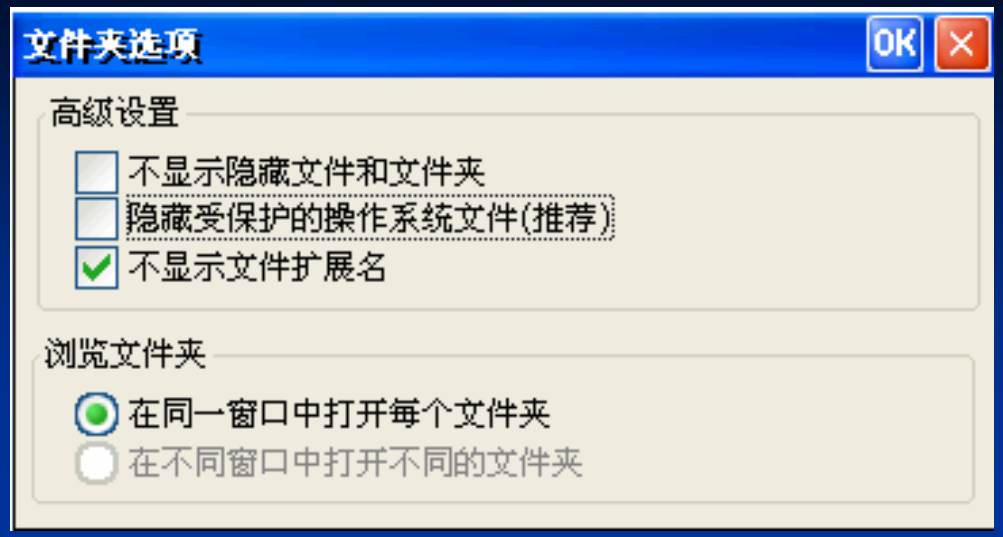
IP 地址可以自动分配给本计算机。如果您所在的网络不能自动分配 IP 地址，请向网络管理员申请一个地址，然后将该地址键入给定的空格内。

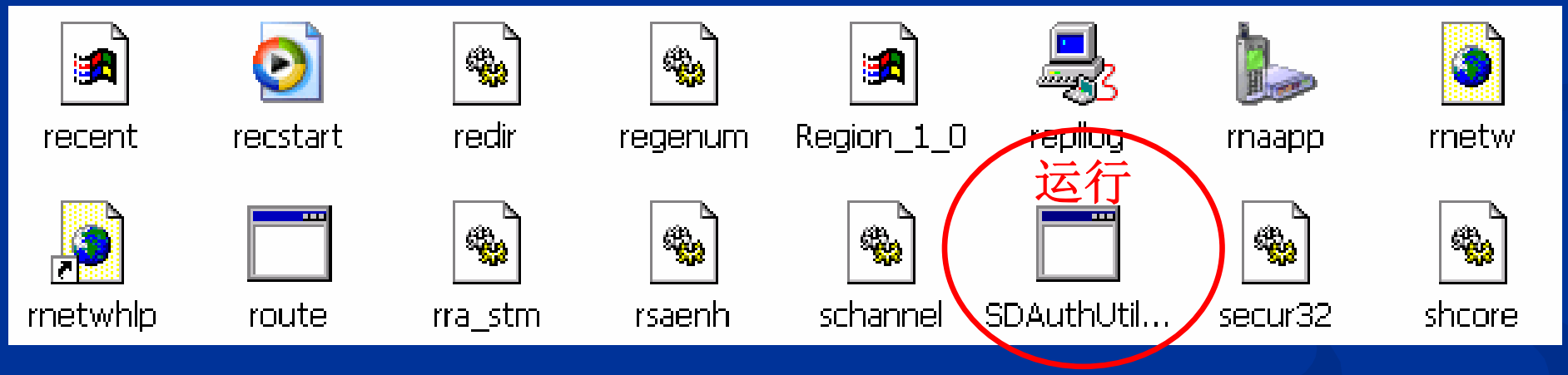
- ○ 通过 DHCP 获得 IP 地址(O)
- ◉ 指定一个 IP 地址(S)

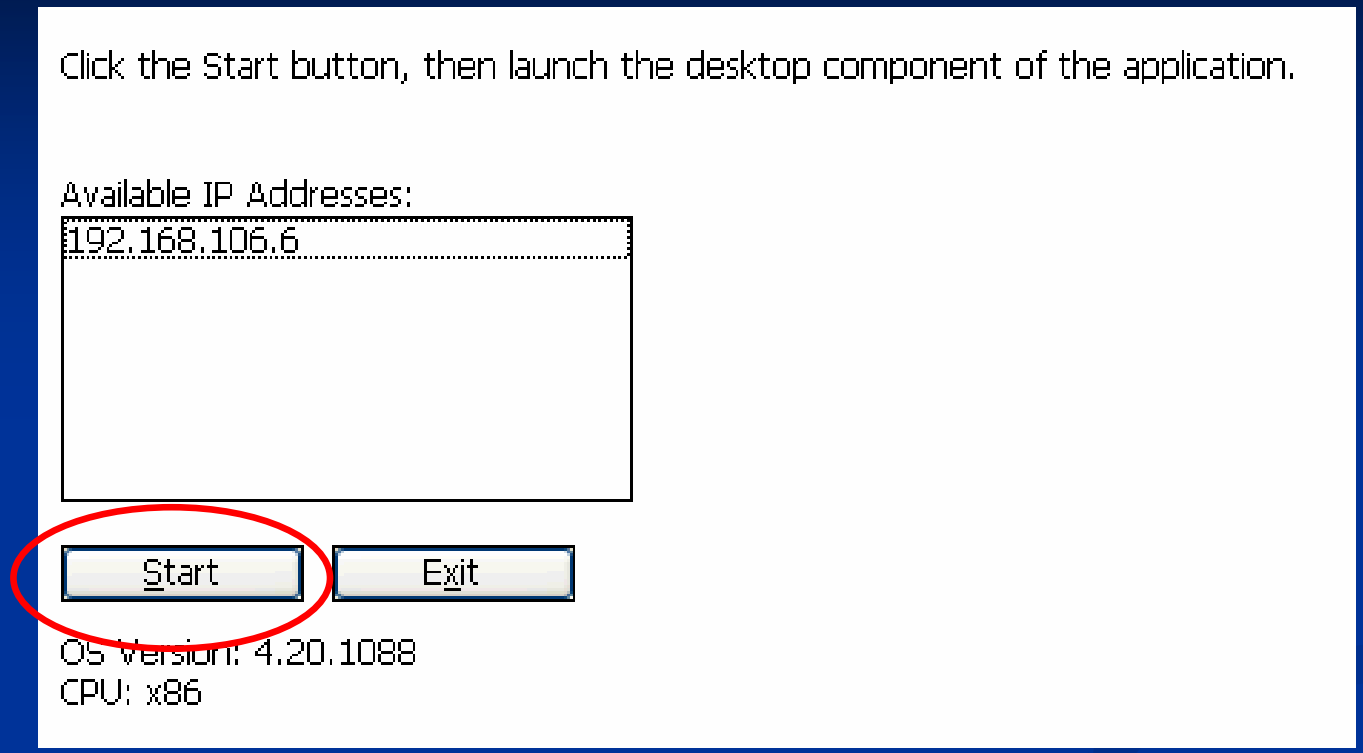
IP 地址(A): 192.168.106. 6

子网掩码(U): 255.255.255. 0

默认网关(G): . . .


文件夹选项
OK
高级设置
不显示隐藏文件和文件夹
隐藏受保护的操作系统文件(推荐)
不显示文件扩展名
浏览文件夹
在同一窗口中打开每个文件夹
在不同窗口中打开不同的文件夹

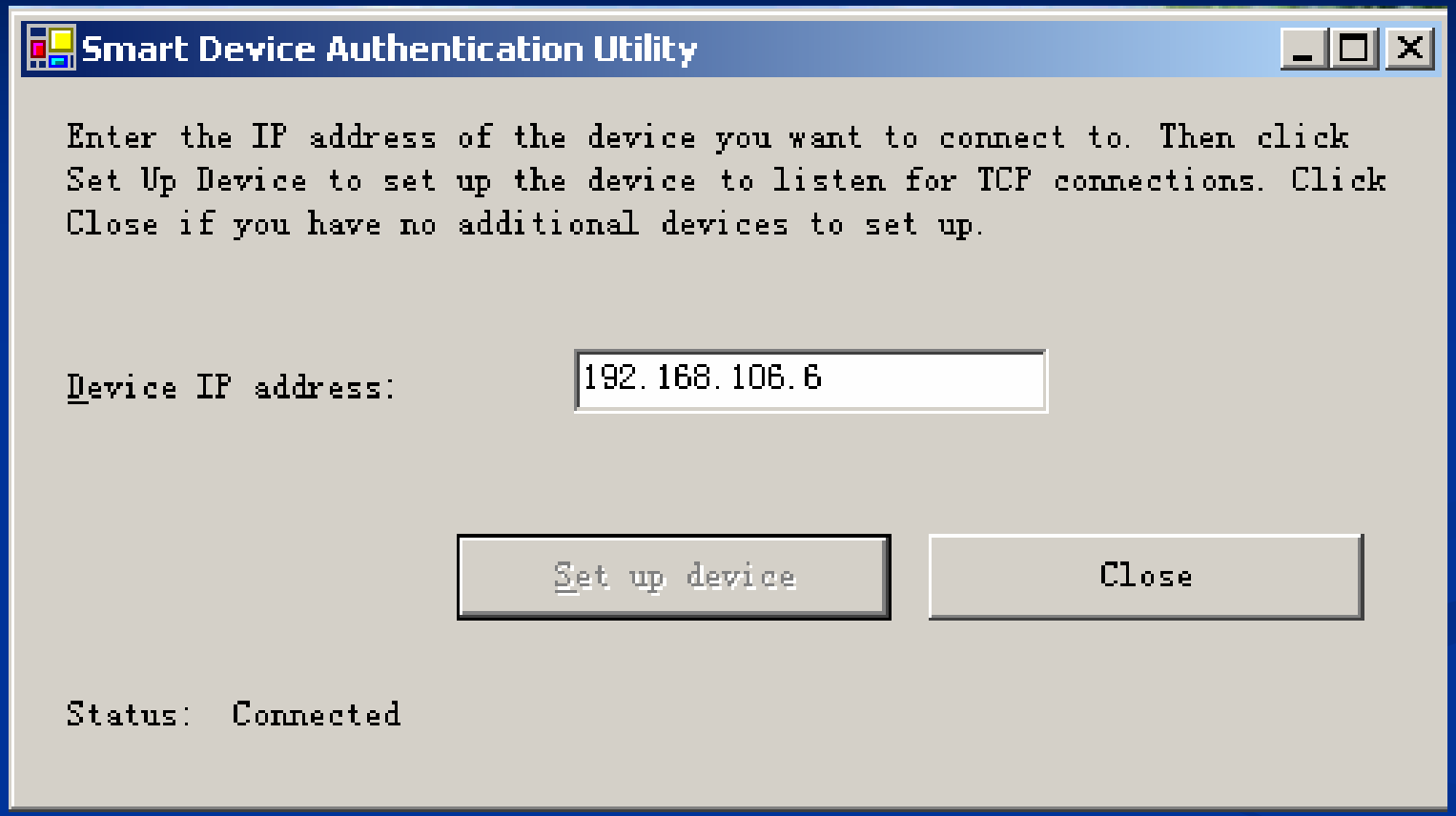

recent
recstart
redir
regenum
Region_1_0
replog
rnaapp
rnetw
运行
rnetwhlp
route
rra_stm
rsaenh
schannel
SDAuthUtil...
secur32
shcore


Click the Start button, then launch the desktop component of the application.
Available IP Addresses:
192.168.106.6
Start
Exit
OS Version: 4.20.1088
CPU: x86

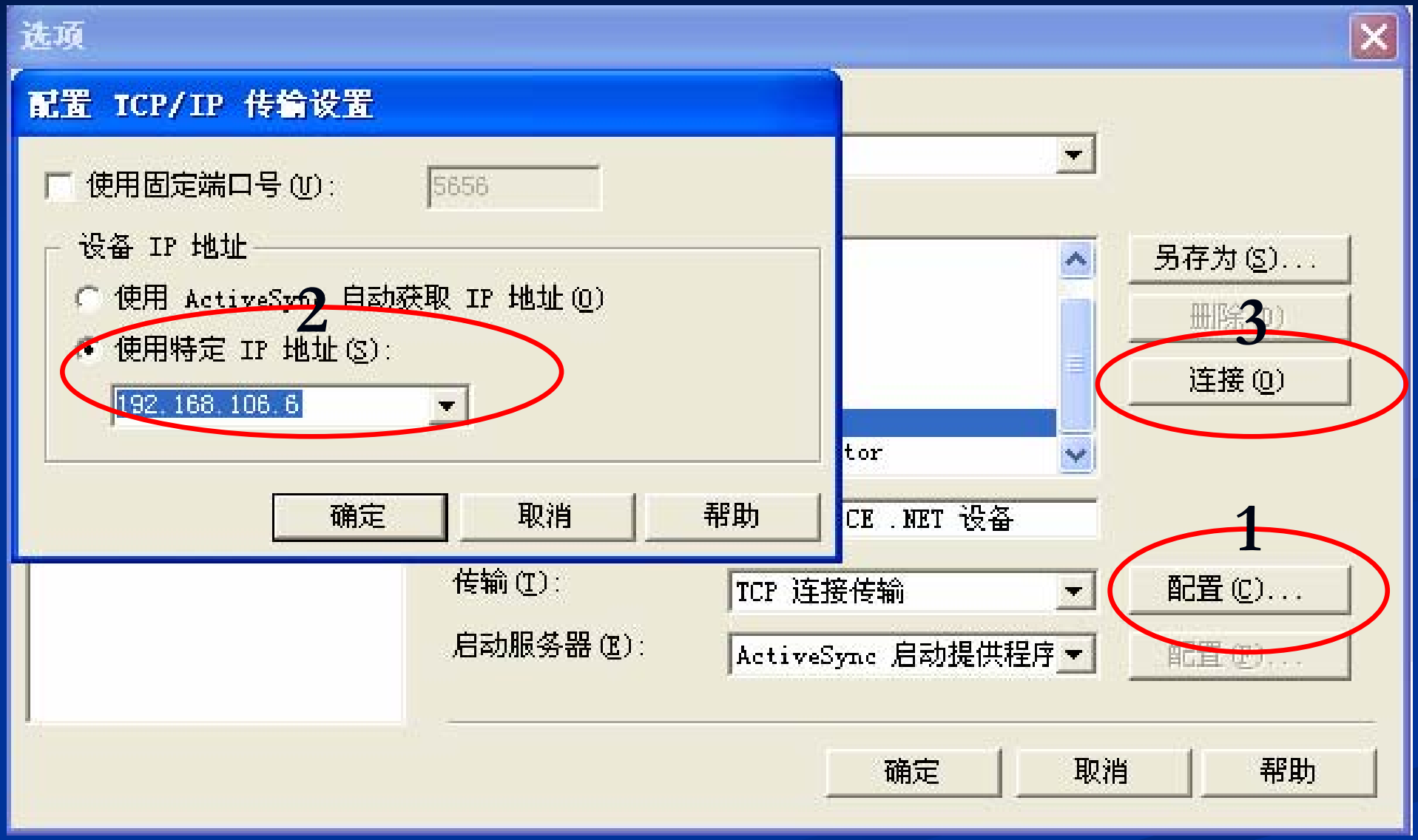
# 开发主机端

工具(T) 窗口(W) 帮助(H)

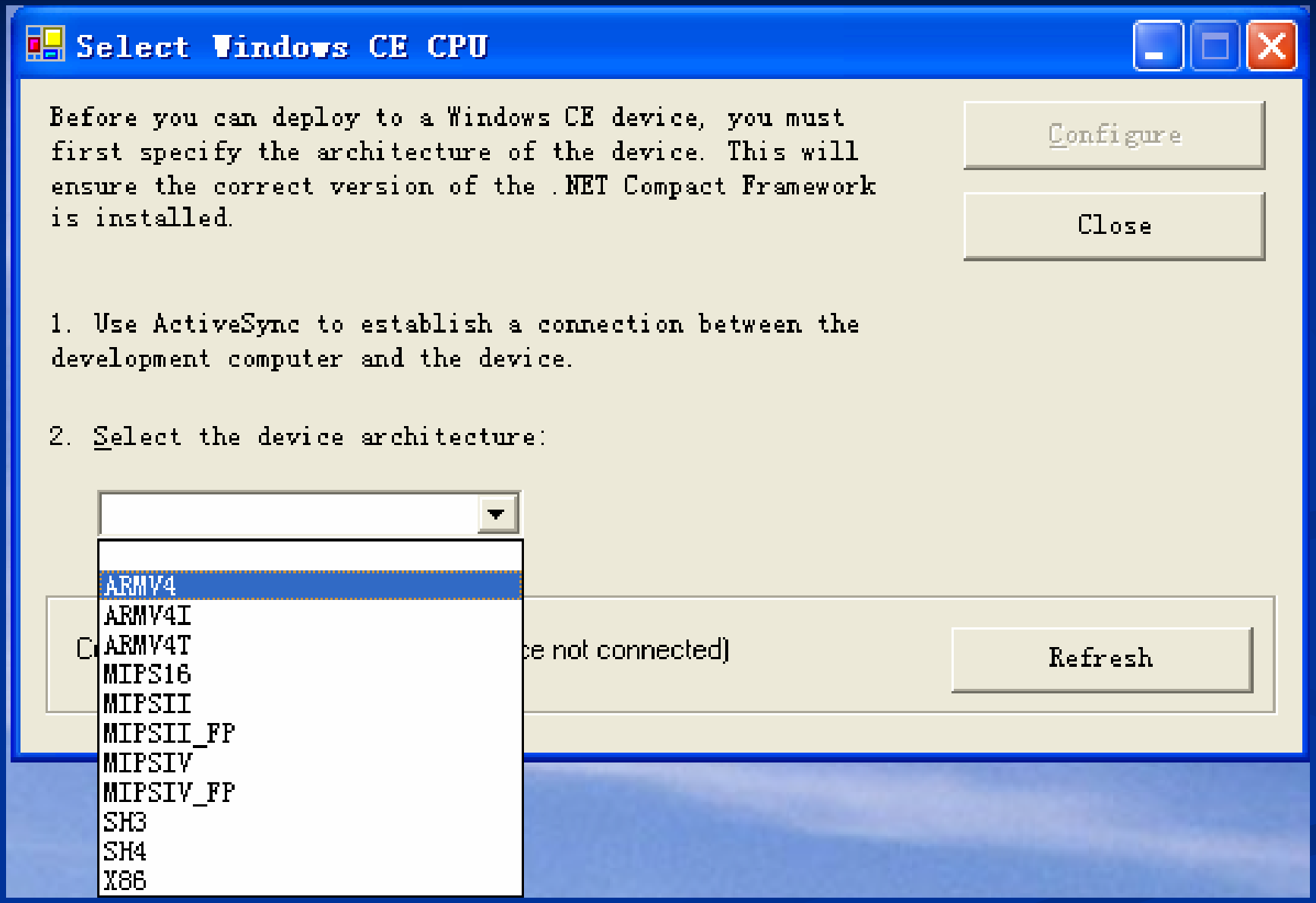
- 调试进程(P)... Ctrl+Alt+P
- 连接到设备(V)...
- 连接到数据库(D)...
- 添加/移除工具箱项(X)...
- 外接程序管理器(A)...
- 生成注释 Web 页(B)...
- 宏(M)
- ActiveX 控件测试容器(N)
- 创建 GUID(G)
- Dotfuscator Community Edition
- 错误查找(K)
- ATL/MFC 跟踪工具(T)
- OLE/COM 对象查看器(V)
- Spy++(L)
- Smart Device Authentication Utility
- Select Windows CE Device CPU
- 外部工具(E)...
- 自定义(C)...
- 选项(O)...

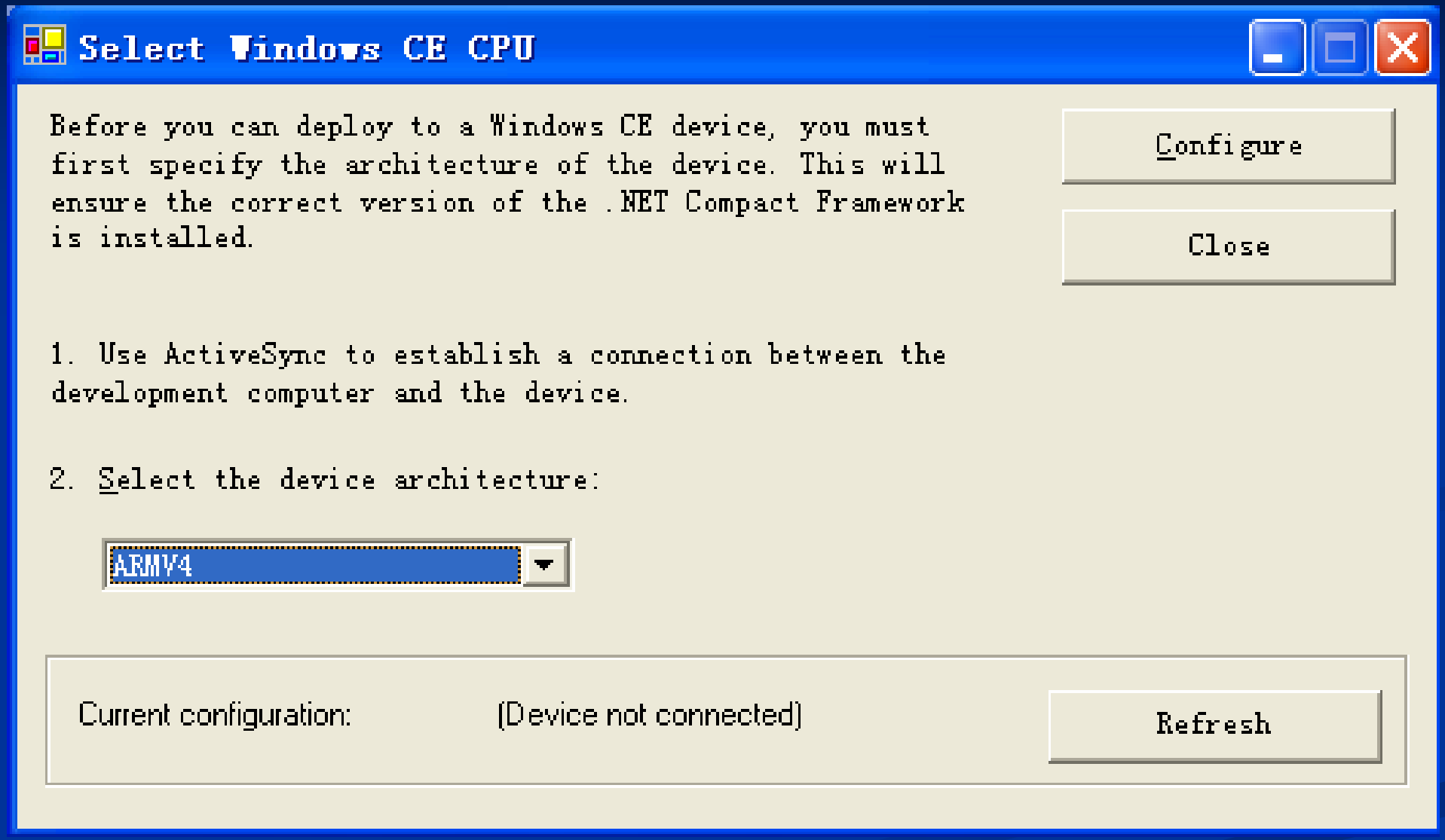

Smart Device Authentication Utility
Enter the IP address of the device you want to connect to. Then click Set Up Device to set up the device to listen for TCP connections. Click Close if you have no additional devices to set up.
Device IP address:
192.168.106.6
Set up device
Close
Status: Connected

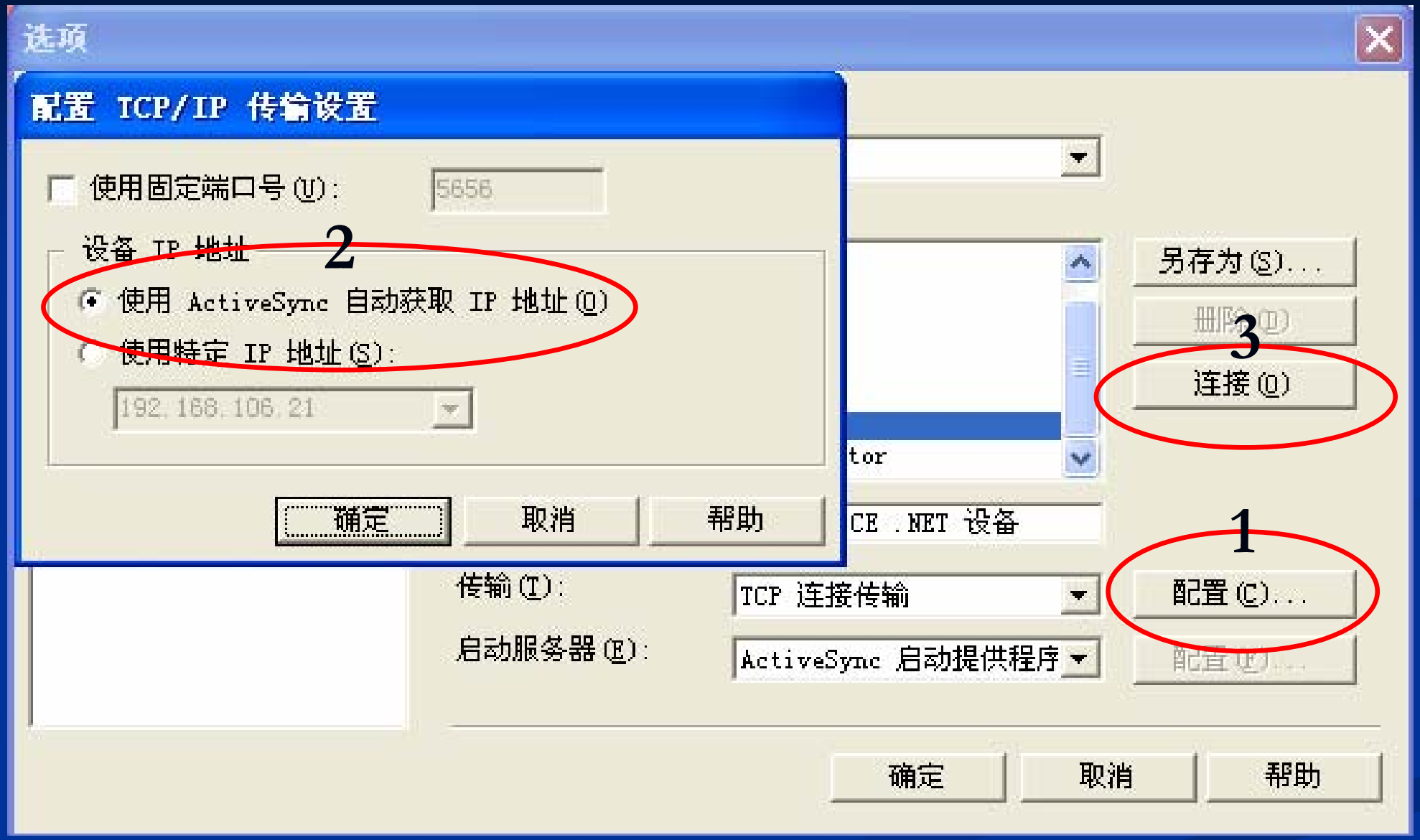
# 选择Windows CE.NET设备



# 5.2.3 在VS2003下建立USB调试通道


Select Windows CE CPU
Before you can deploy to a Windows CE device, you must first specify the architecture of the device. This will ensure the correct version of the .NET Compact Framework is installed.
Configure
Close
1. Use ActiveSync to establish a connection between the development computer and the device.
2. Select the device architecture:
ARMV4
ARMV4I
ARMV4T
MIPS16
MIPSII
MIPSII_FP
MIPSIV
MIPSIV_FP
SH3
SH4
X86
ce not connected)
Refresh


Select Windows CE CPU
Before you can deploy to a Windows CE device, you must first specify the architecture of the device. This will ensure the correct version of the .NET Compact Framework is installed.
Configure
Close
1. Use ActiveSync to establish a connection between the development computer and the device.
2. Select the device architecture:
ARMV4
Current configuration:
(Device not connected)
Refresh


选项
配置 TCP/IP 传输设置
使用固定端口号(U):
5656
设备 IP 地址
2
使用 ActiveSync 自动获取 IP 地址(O)
使用特定 IP 地址(S):
192.168.106.21
确定
取消
帮助
另存为(S)...
删除(D)
3
连接(O)
tor
CE .NET 设备
1
传输(T):
TCP 连接传输
配置(C)...
启动服务器(E):
ActiveSync 启动提供程序
配置(P)...
确定
取消
帮助

# 5.2.4 开机应用程序自启动的方法

- 在WINCE420\PUBLIC目录下建立components文件夹
- 建立hello.reg：

  [HKEY_LOCAL_MACHINE\init]

  “Launch80”=“hello.exe"

  "Depend80"=hex:14,00,1E,00

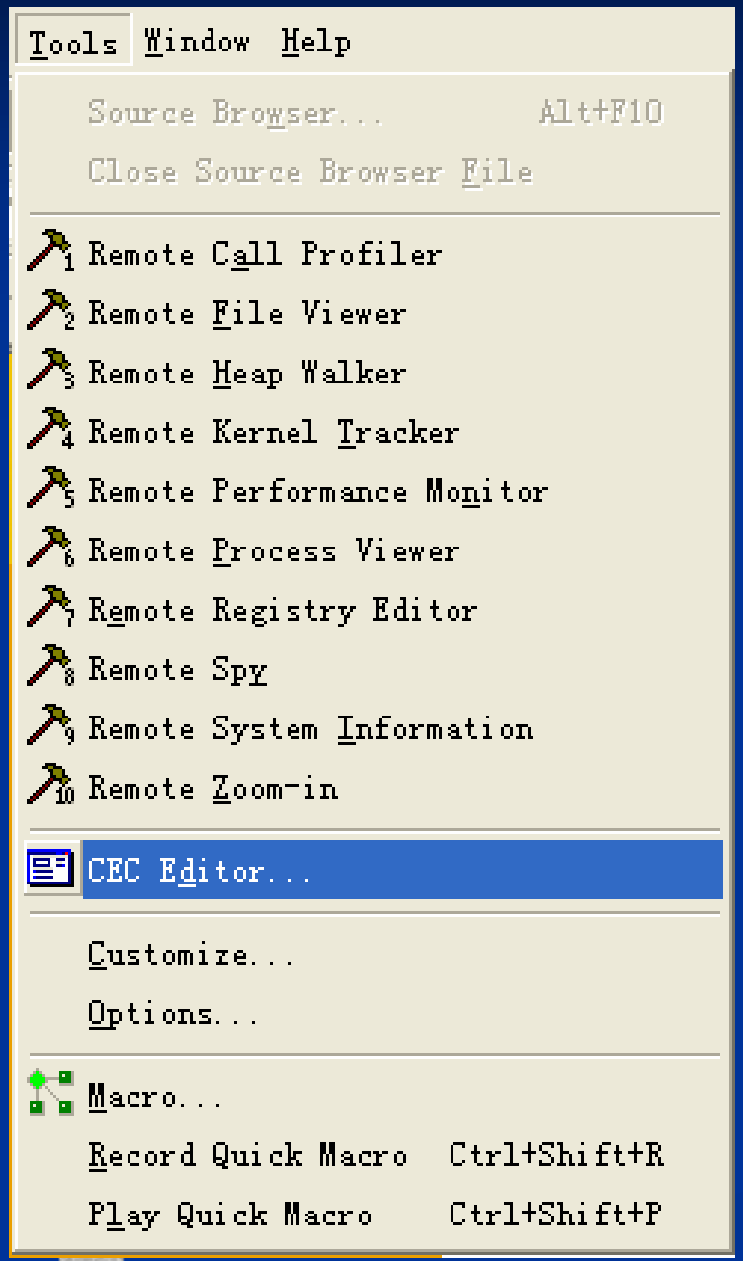
  从平台项目工程目录下查看COMMON.reg文件，可发现所依赖的device.exe和gwes.exe分别是：

  “Launch20”=“device.exe"

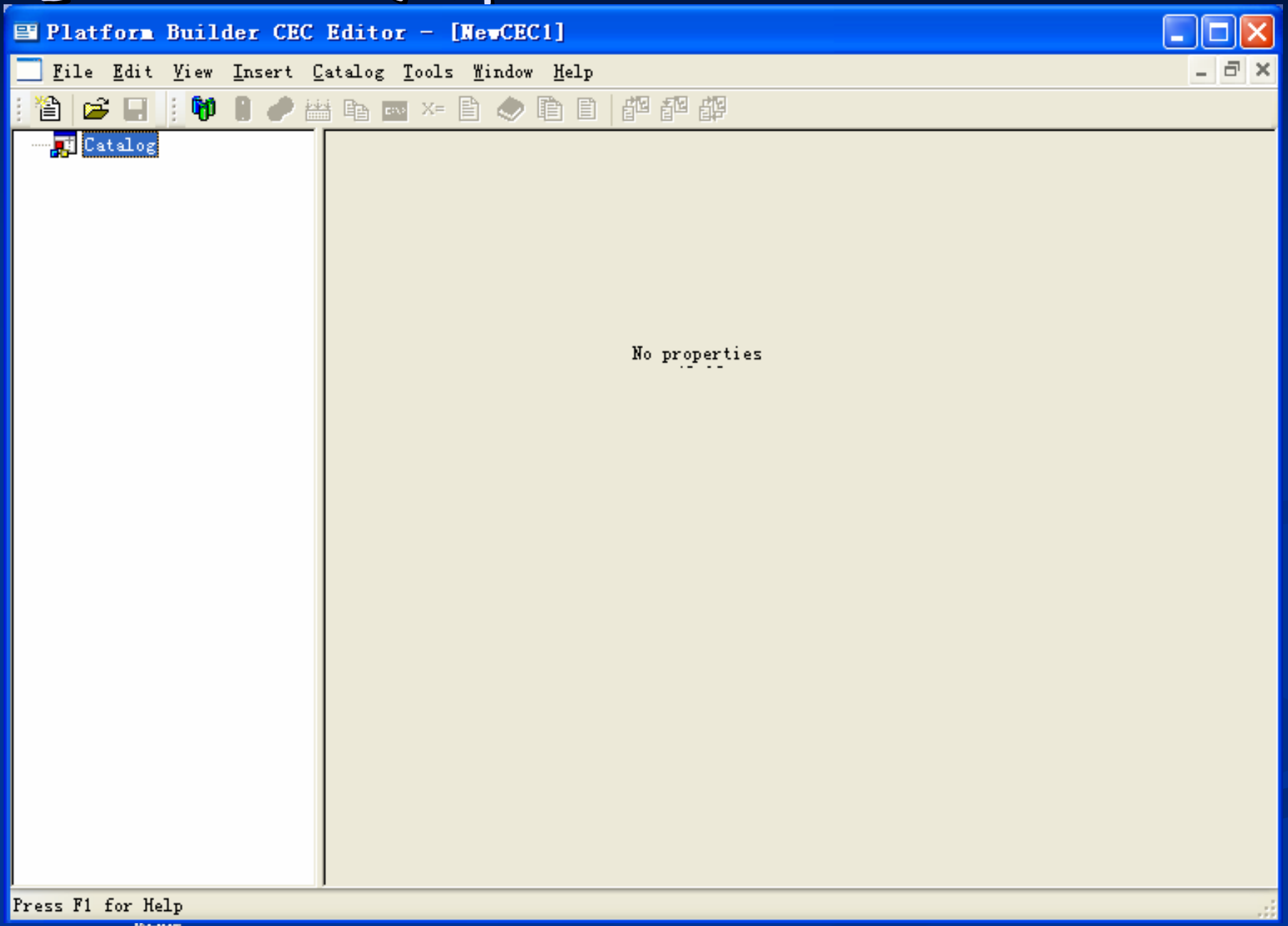
  “Launch30”=“gwes.exe"

  所以"Depend80"=hex:14,00,1E,00

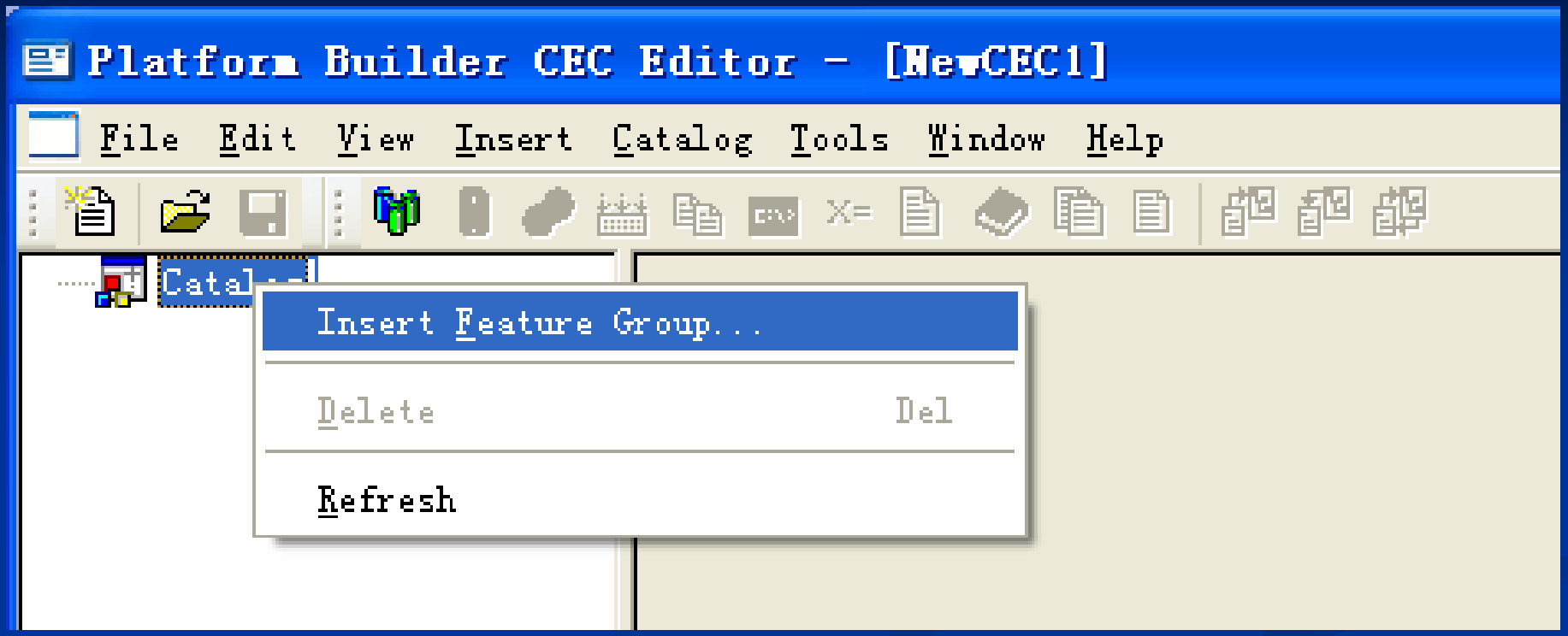
# 创建CEC文件（以模拟器为例）

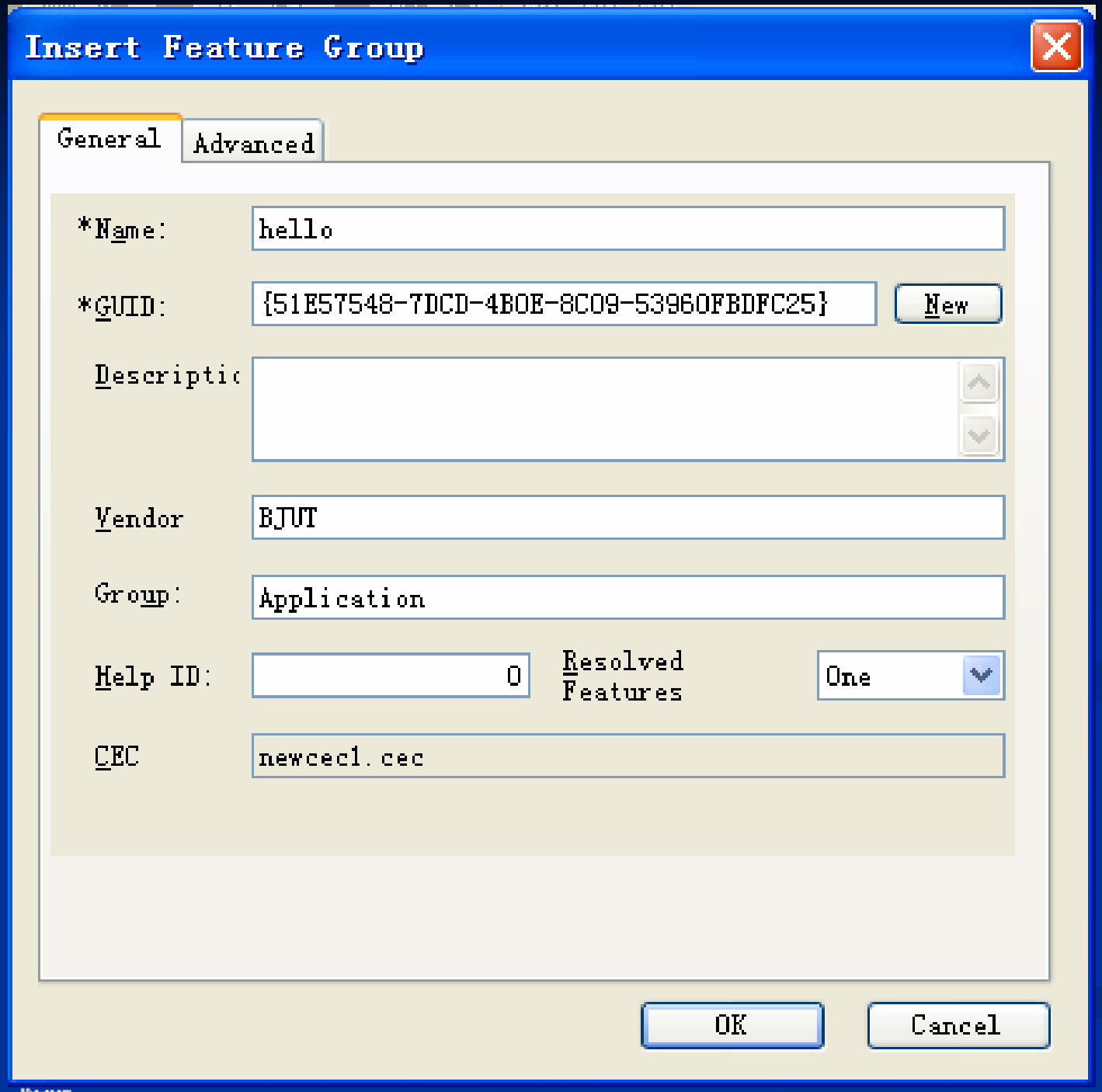


# 进入CEC编辑器


Platform Builder CEC Editor - [NewCEC1]
File Edit View Insert Catalog Tools Window Help
Catalog
No properties
Press F1 for Help

# 新建一个特性组


Platform Builder CEC Editor - [NewCEC1]
File Edit View Insert Catalog Tools Window Help
Insert Feature Group...
Delete Del
Refresh


Insert Feature Group
General
Advanced
*Name:
hello
*GUID:
{51E57548-7DCD-4B0E-8C09-53960FBDFC25}
New
Descriptic
Vendor
BJUT
Group:
Application
Help ID:
0
Resolved Features
One
CEC
newcec1.cec
OK
Cancel

# 加入一个特性

Platform Builder CEC Editor - [NewCEC1]

File Edit View Insert Catalog Tools Window Help

Catalog
Third Party
Application
hello

Insert Feature...
Delete Del
Refresh

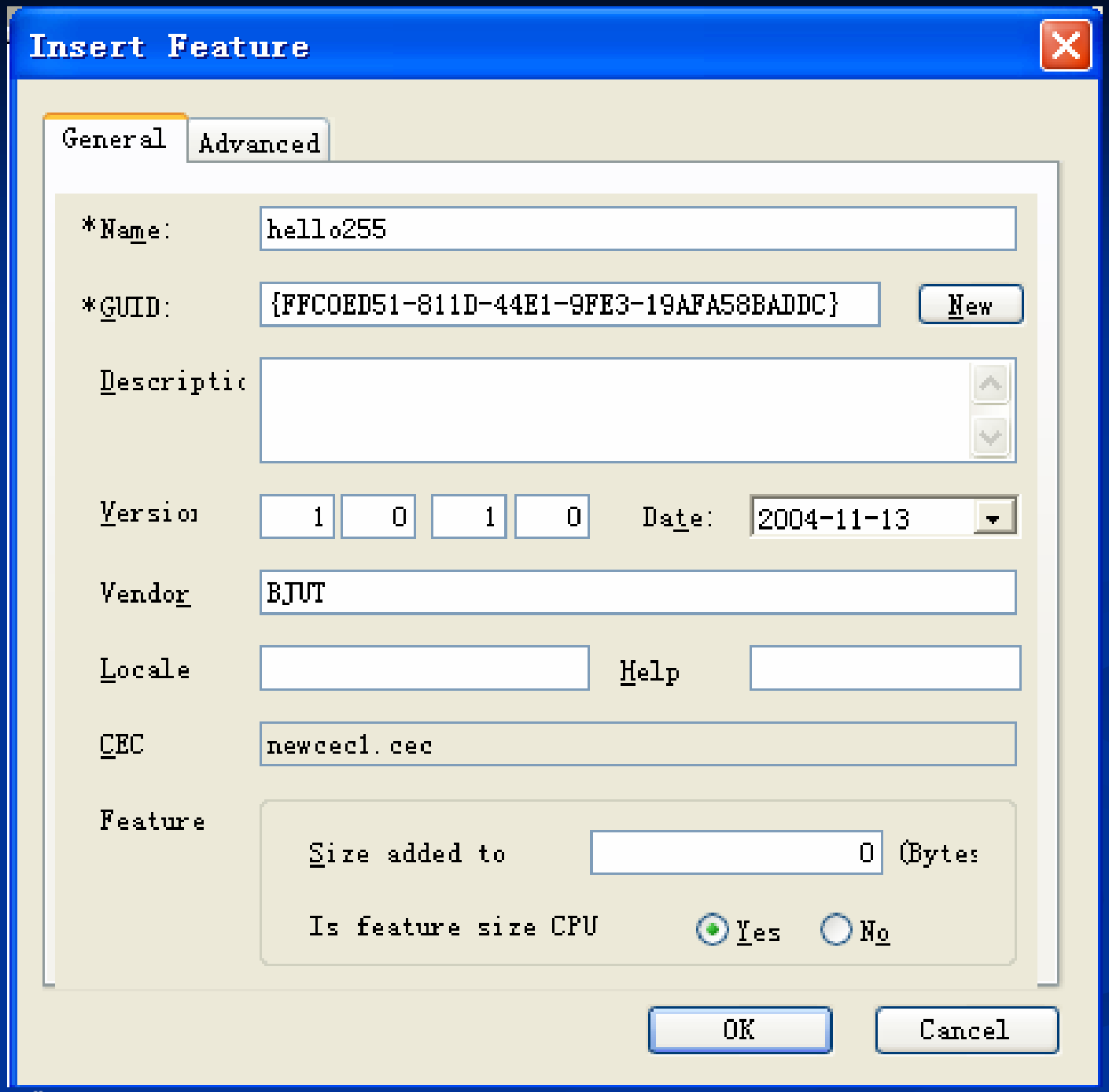
General Advanced

*Name: hello

3-7DCD-4B0E-8C09-53960FBDFC25} New

Vendor BJUT

Group: Application


Insert Feature
General
Advanced
*Name:
hello255
*GUID:
{FFC0ED51-811D-44E1-9FE3-19AFA58BADDC}
New
Descriptio
Versio
1
0
1
0
Date:
2004-11-13
Vendor
BJUT
Locale
Help
CEC
newcec1.cec
Feature
Size added to
0
(Bytes
Is feature size CPU
Yes
No
OK
Cancel

# 制定编译的方法

Platform Builder CEC Editor - [NewCEC1]

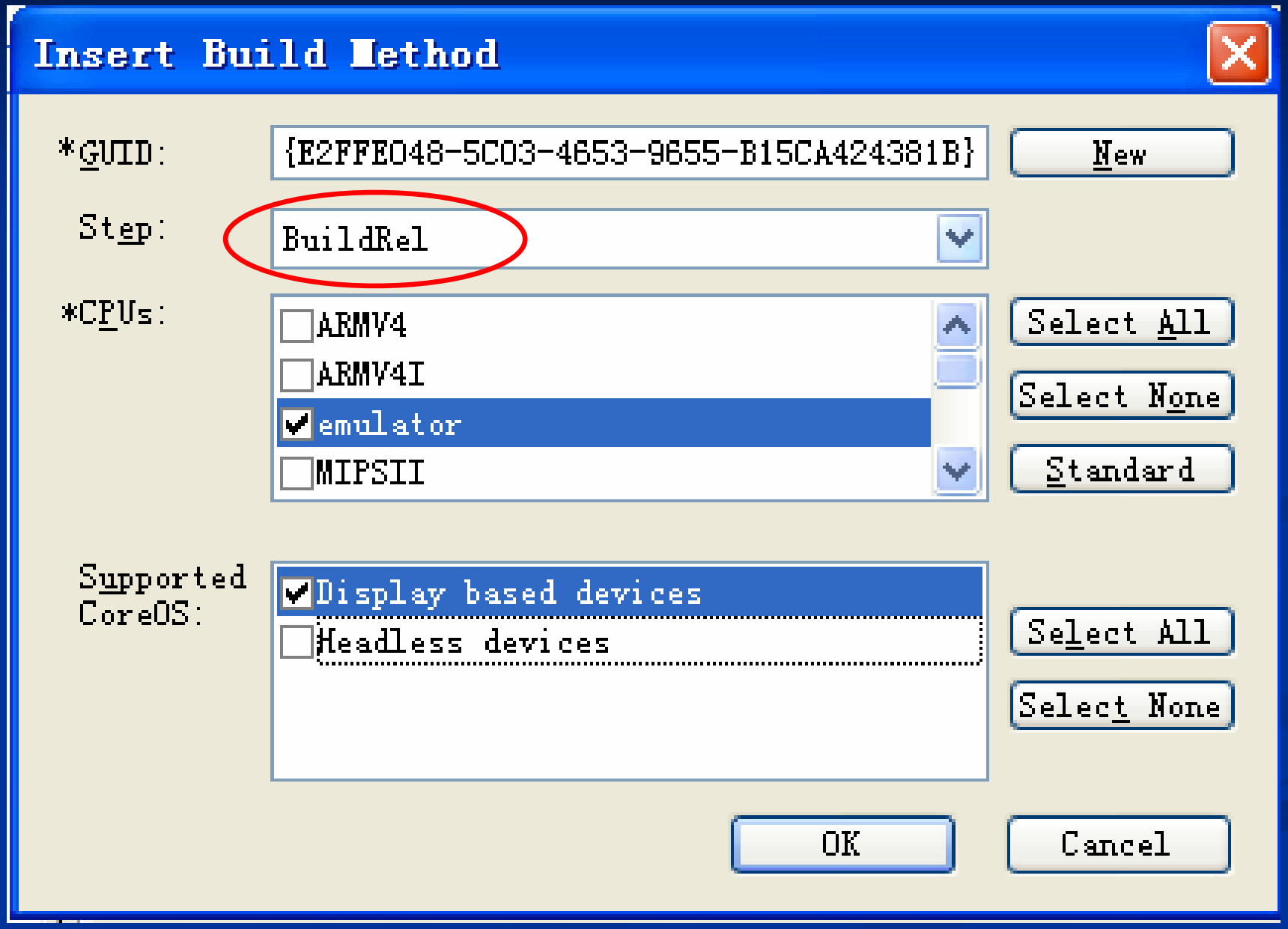
File Edit View Insert Catalog Tools Window Help

Catalog
- Third Party
  - Application
    - hello
      - hello255

General | Advanced

*Name: hello255

- Insert Build Method...
- Insert BIB File...
- Insert New Child Feature Group...
- Insert Existing Child Feature Group(s)...
- Delete Del
- Refresh


Insert Build Method
*GUID:
{E2FFE048-5C03-4653-9655-B15CA424381B}
New
Step:
BuildRel
*CPUs:
ARMV4
ARMV4I
emulator
MIPSII
Select All
Select None
Standard
Supported CoreOS:
Display based devices
Headless devices
Select All
Select None
OK
Cancel

# 将文件包含进NK.bin

Platform Builder CEC Editor - [NewCEC1]

File Edit View Insert Catalog Tools Window Help

Catalog
- Third Party
  - Application
    - hello
      - hello255
        - Bu

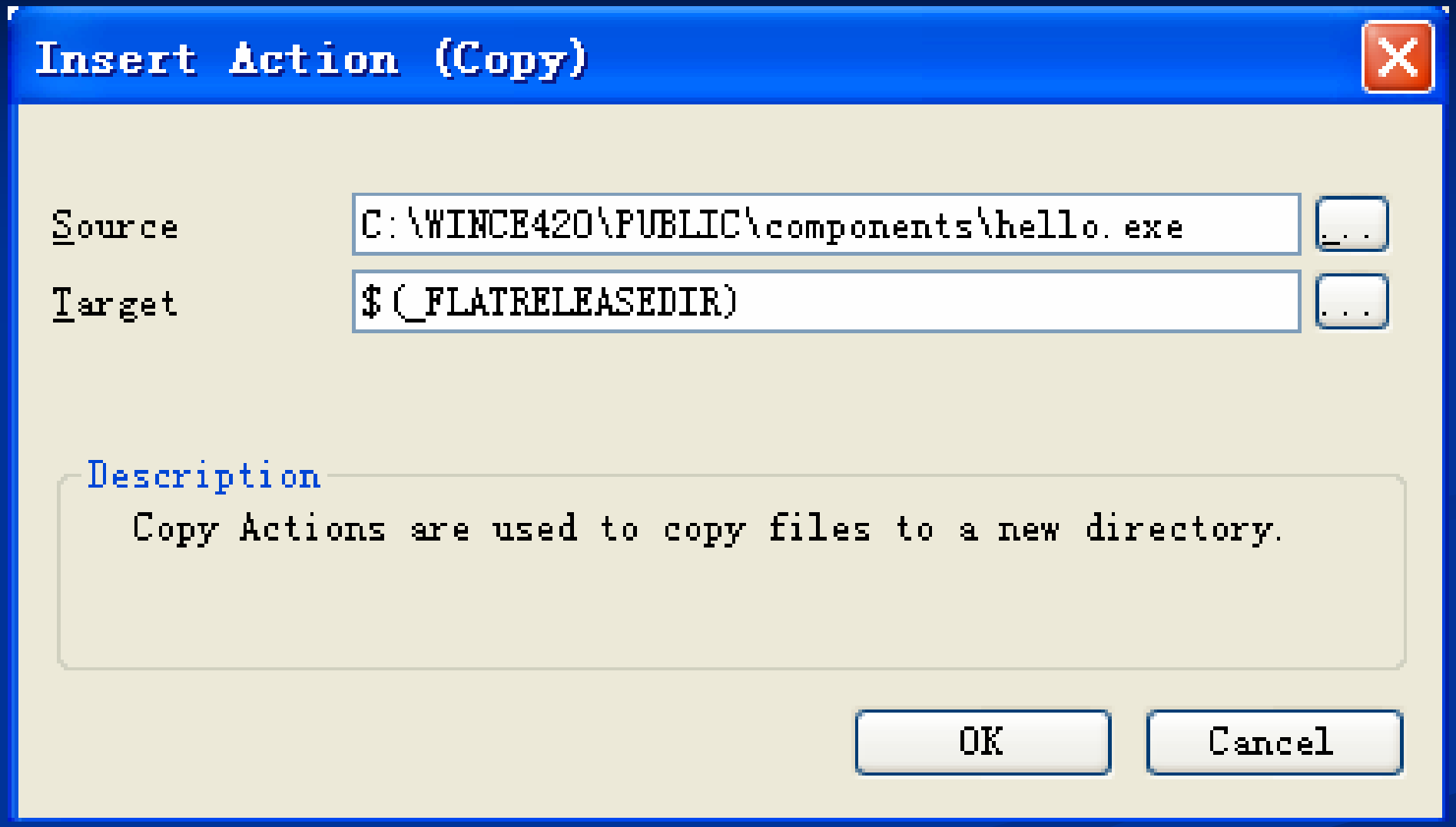
*GUID: {E2FFE048-5C03-4653-9655-B15CA424381B} New

Step: BuildRel

*CPUs: ARMV4 Select Al

Insert Action
Insert Documentation Setting
Delete Del
Refresh

Build...
Copy...
Custom...
Environment...
Source Browsing...


Insert Action (Copy)
Source
C:\WINCE420\PUBLIC\components\hello.exe
Target
$(_FLATRELEASEDIR)
Description
Copy Actions are used to copy files to a new directory.
OK
Cancel

# 用同样的方法包含注册表

Platform Builder CEC Editor - [NewCEC1]

File Edit View Insert Catalog Tools Window Help

Catalog
Third Party
Application
hello
hello255
Buildl
#C

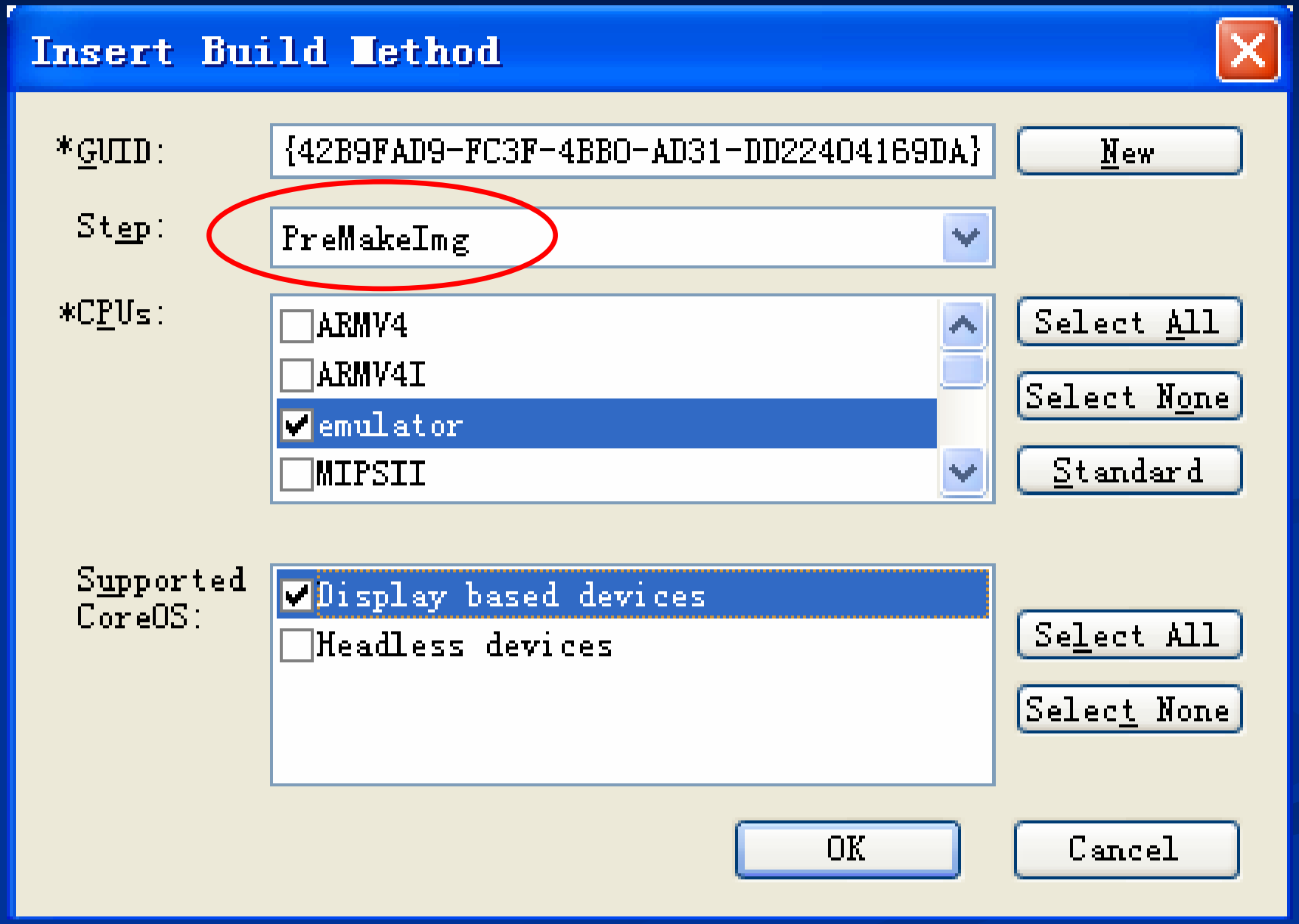
General Advanced

*Name: hello255

Insert Build Method...
Insert BIB File...
Insert New Child Feature Group...
Insert Existing Child Feature Group(s)...

Delete Del

Refresh


Insert Build Method
*GUID:
{42B9FAD9-FC3F-4BB0-AD31-DD22404169DA}
New
Step:
PreMakeImg
*CPUs:
ARMV4
ARMV4I
emulator
MIPSII
Select All
Select None
Standard
Supported CoreOS:
Display based devices
Headless devices
Select All
Select None
OK
Cancel

Platform Builder CEC Editor - [NewCEC1]

File Edit View Insert Catalog Tools Window Help

- Catalog
  - Third Party
    - Application
      - hello
        - hello255
          - BuildRe
            - #COP
          - PreMake

*GUID: {4E6AEB2E-2B91-4B72-AACF-FB76066A3E62} New

Step: PreMakeImg

*CPUs:
- [ ] ARMV4
- [ ] ARMV4I
- [x] emulator
- [ ] MIPSII

Select All
Select None
Standard

Insert Action (Copy)

Source: C:\WINCE420\PUBLIC\components\hello.reg ...

Target: $(_FLATRELEASEDIR) ...

Description

Copy Actions are used to copy files to a new directory.

OK Cancel

# 设置模块

Platform Builder CEC Editor - [NewCEC1]

File Edit View Insert Catalog Tools Window Help

Catalog
Third Party
Application
hello
hello255
Build
PreM

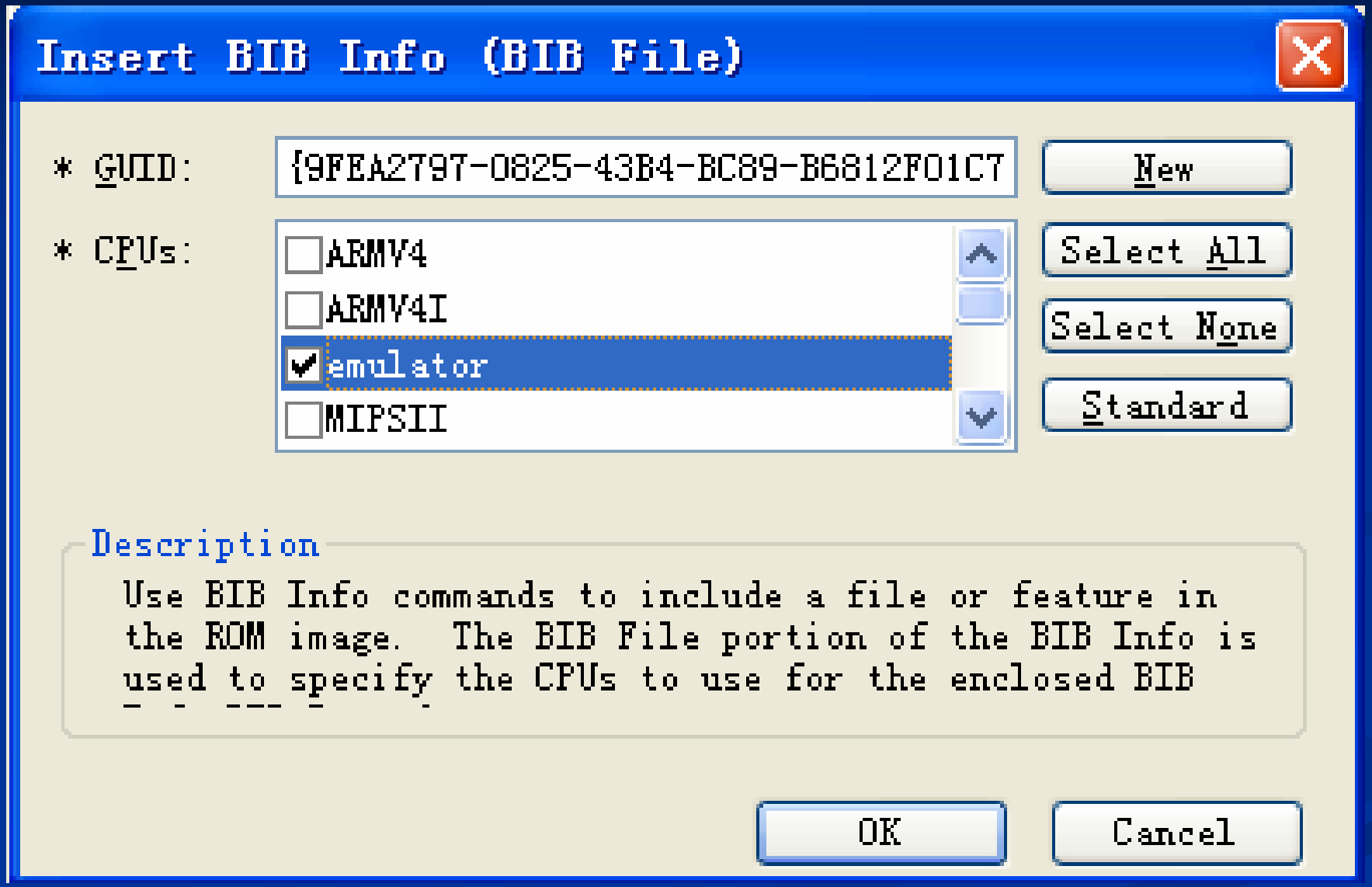
General Advanced

*Name: hello255

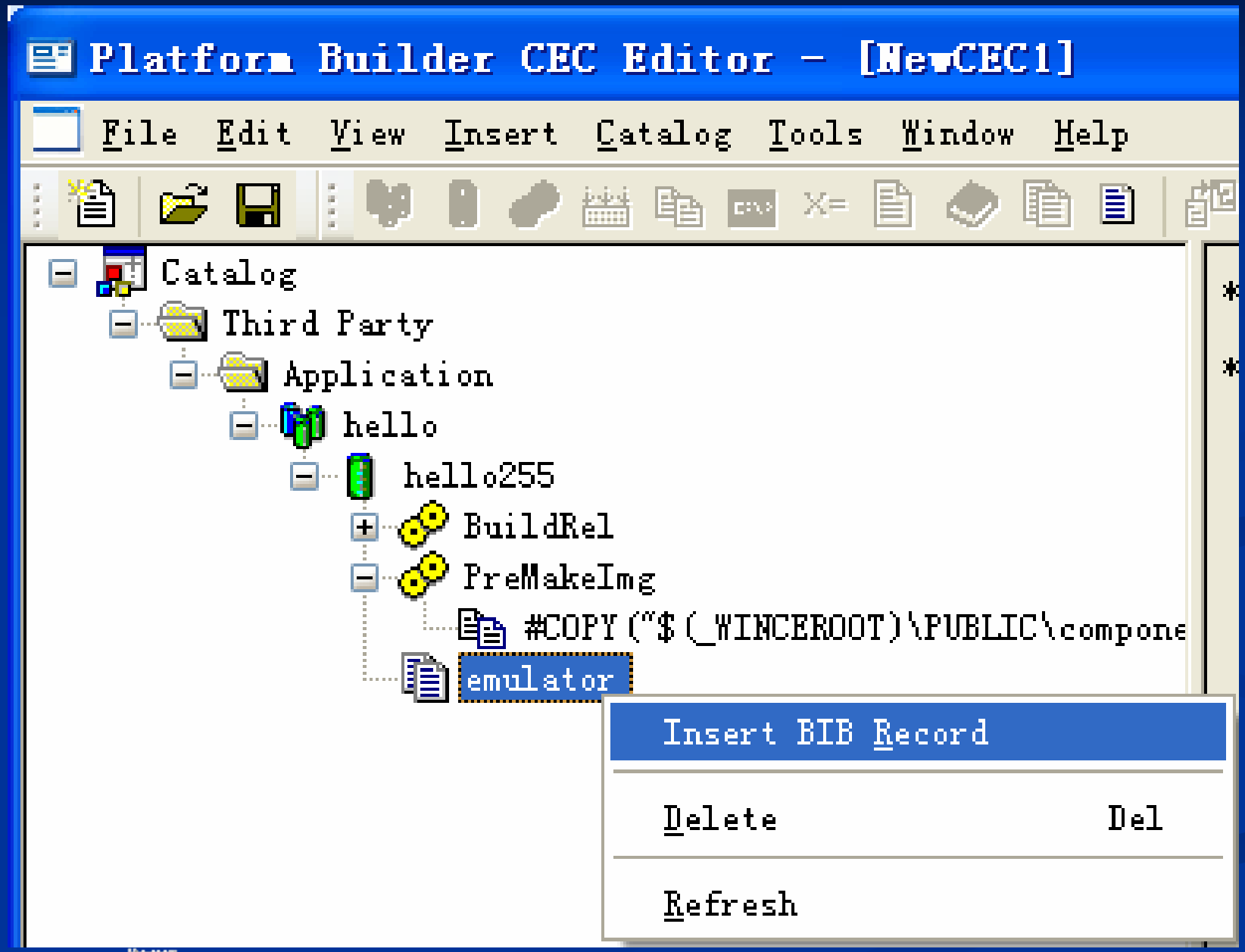
Insert Build Method...
Insert BIB File...
Insert New Child Feature Group...
Insert Existing Child Feature Group(s)...

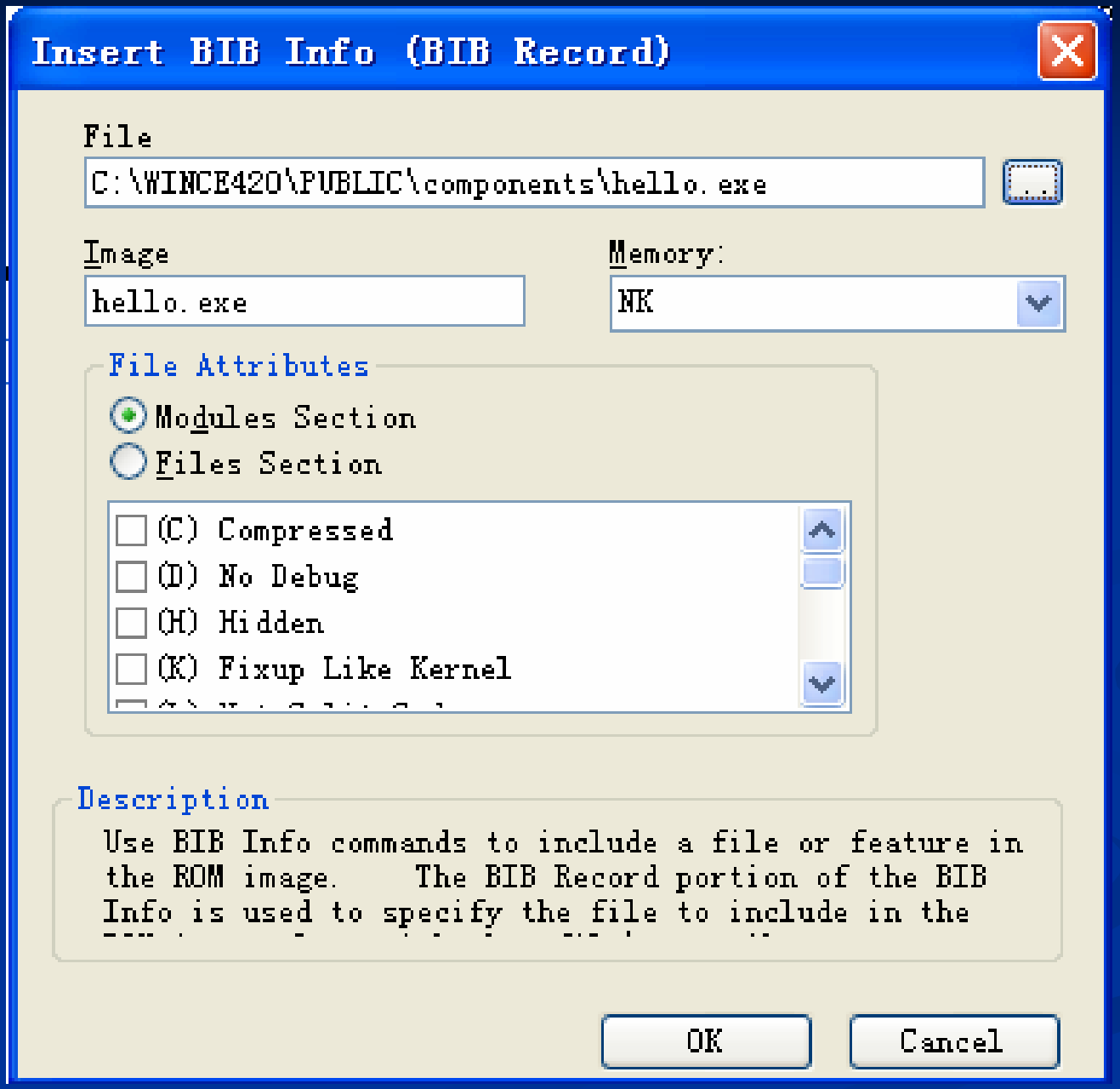
Delete Del

Refresh

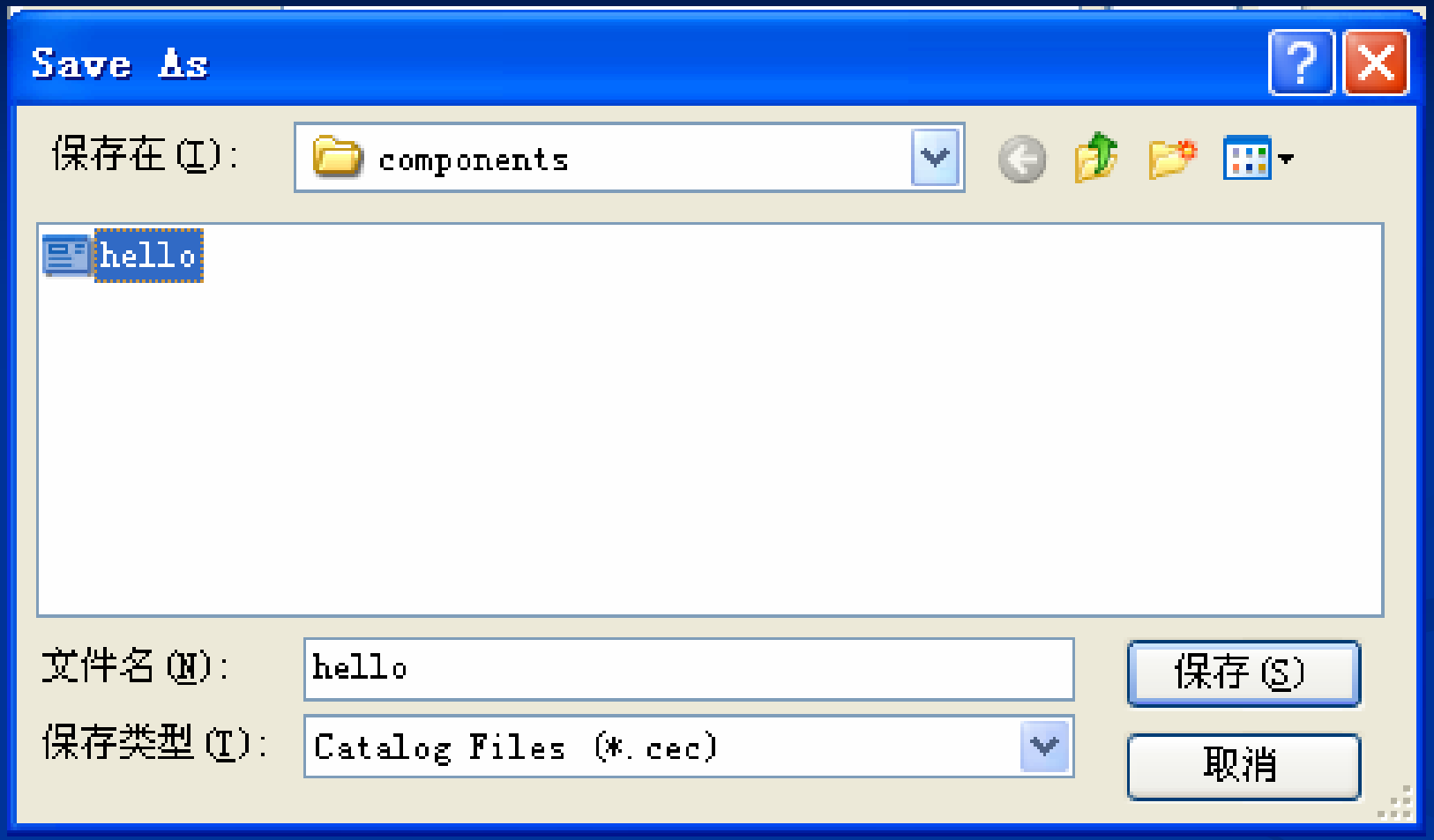

Insert BIB Info (BIB File)
* GUID:
{9FEA2797-0825-43B4-BC89-B6812F01C7
New
* CPUs:
ARMV4
ARMV4I
emulator
MIPSII
Select All
Select None
Standard
Description
Use BIB Info commands to include a file or feature in the ROM image. The BIB File portion of the BIB Info is used to specify the CPUs to use for the enclosed BIB
OK
Cancel

# 加入BIB记录


Platform Builder CEC Editor - [NewCEC1]
File Edit View Insert Catalog Tools Window Help
Catalog
Third Party
Application
hello
hello255
BuildRel
PreMakeImg
#COPY("$(_WINCEROOT)\PUBLIC\compone
emulator
Insert BIB Record
Delete Del
Refresh


Insert BIB Info (BIB Record)
File
C:\WINCE420\PUBLIC\components\hello.exe
Image
hello.exe
Memory:
NK
File Attributes
Modules Section
Files Section
(C) Compressed
(D) No Debug
(H) Hidden
(K) Fixup Like Kernel
Description
Use BIB Info commands to include a file or feature in the ROM image. The BIB Record portion of the BIB Info is used to specify the file to include in the
OK
Cancel

# 保存CEC文件


Save As
保存在(I):
components
hello
文件名(N):
hello
保存类型(T):
Catalog Files (*.cec)
保存(S)
取消

# 导入hello.CEC

File Edit View Project Platform Target B
New Platform... Ctrl+N
New Project or File... Ctrl+Shift+N
Open... Ctrl+O
Close
Open Workspace...
Save Workspace
Close Workspace
Save Ctrl+S
Save As...
Save All
Page Setup...
Print... Ctrl+P
Recent Files
Recent Workspaces
Manage Catalog Features...
License Binary Image...
Exit

## Manage Catalog Features

Imported catalog feature files:

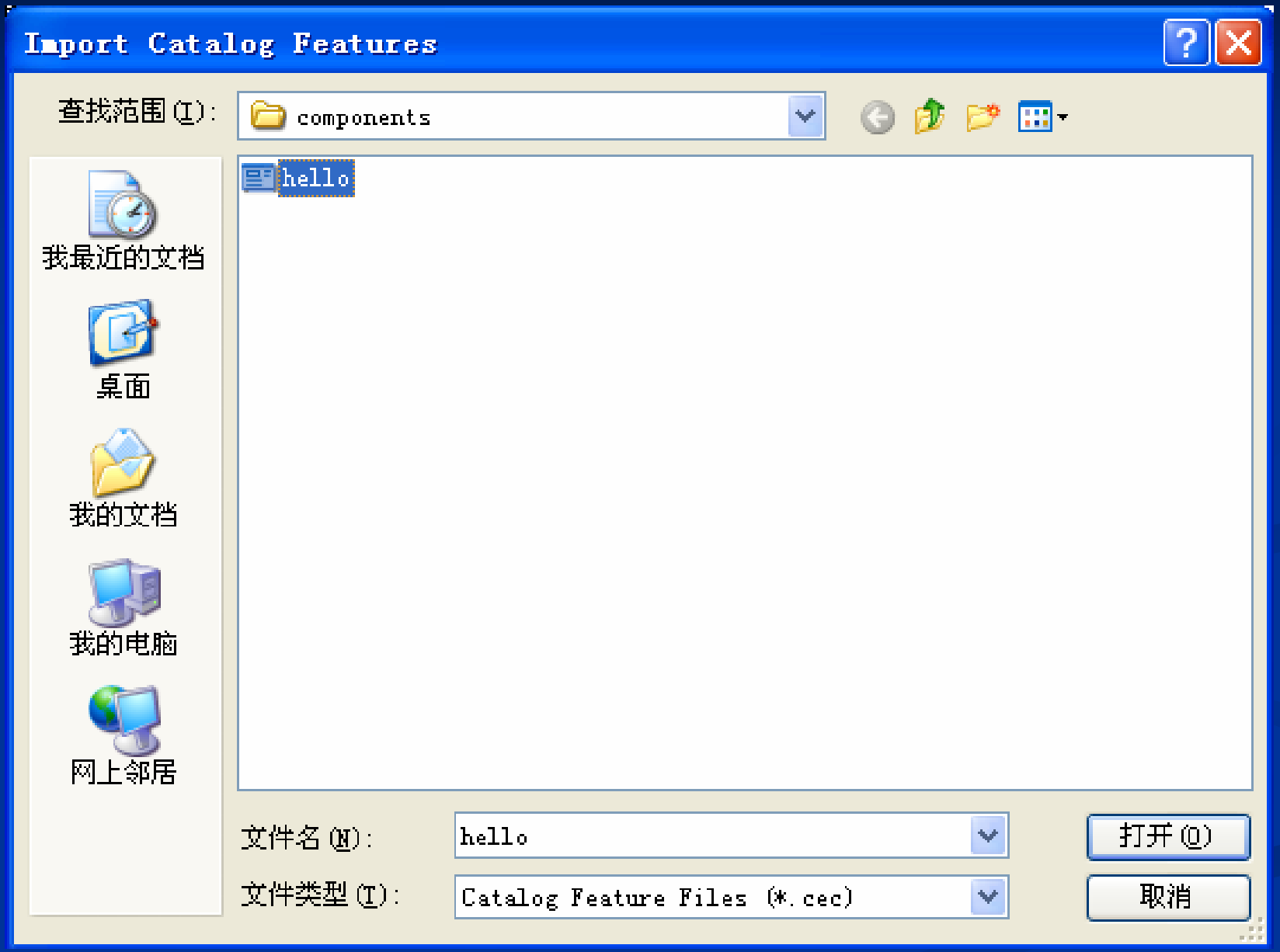
| File | Version | Vendor | Description |
|---|---|---|---|
| audio.cec | 4.20 | Microsoft | Audio Features |
| display.cec | 4.20 | Microsoft | Display Features |
| 1394.cec | 4.20 | Microsoft | IEEE 1394 Driver Support |
| keybmouse.cec | 4.20 | Microsoft | Keyboard and Mouse Features |
| netcard.cec | 4.20 | Microsoft | Ethernet Features |
| irda.cec | 4.20 | Microsoft | IrDA Features |
| parallel.cec | 4.20 | Microsoft | Parallel Port Features |
| pci.cec | 4.20 | Microsoft | PCI Bus Features |
| pcmcia.cec | 4.20 | Microsoft | PCMCIA Features |
| printing.cec | 4.20 | Microsoft | Printing and Printer Drivers |
| serial.cec | 4.20 | Microsoft | Serial Port Features |
| smartcard.cec | 4.20 | Microsoft | Smart Card Support and Dri... |
| storage.cec | 4.20 | Microsoft | Storage Device Support and... |
| usb.cec | 4.20 | Microsoft | USB Features |
| aspen.cec | 4.20 | Microsoft | Aspen BSP Features |

OK

Remove

Import...

Refresh


Import Catalog Features
查找范围(I):
components
hello
我最近的文档
桌面
我的文档
我的电脑
网上邻居
文件名(N):
hello
打开(O)
文件类型(T):
Catalog Feature Files (*.cec)
取消

## Manage Catalog Features

Imported catalog feature files:

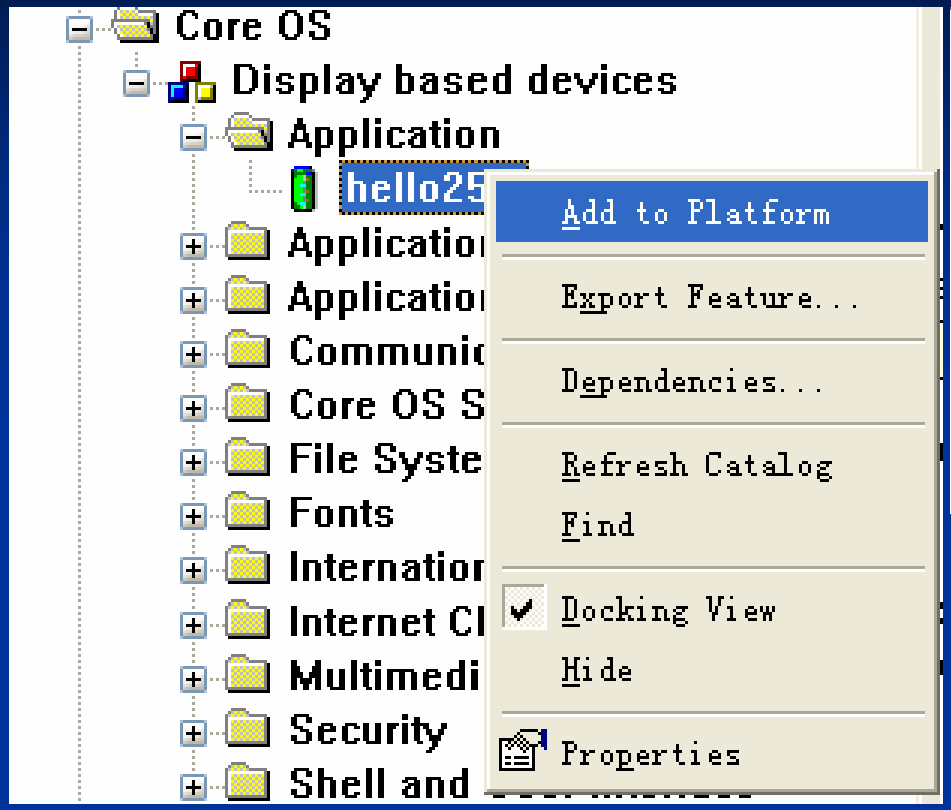
| File | Version | Vendor | Description |
|---|---|---|---|
| rockhopper... | 4.20 | Microsoft | Rockhopper BSP Features |
| cepc.cec | 4.20 | Microsoft | CEPC BSP Features |
| eagle.cec | 4.20 | Microsoft | Eagle BSP Features |
| emulator.cec | 4.20 | Microsoft | Emulator BSP Features |
| geode.cec | 4.20 | Microsoft | Geode BSP Features |
| integrator... | 4.20 | Microsoft | ARM Integrator BSP Features |
| keywest.cec | 4.20 | Microsoft | Keywest BSP Features |
| lubbock.cec | 4.20 | Microsoft | Lubbock BSP Features |
| smdk2410.cec | 4.20 | Microsoft | Samsung SMDK2410 Developme |
| iabase.cec | 4.20 | Microsoft | Display based and Headless |
| wcetk.cec | 4.20 | Microsoft | Windows CE Test Kit Client |
| platmgr.cec | 4.20 | Microsoft | Platform Manager Features |
| sourcetags... | 4.20 | Microsoft | Source code information fo |
| x-hyper255... | 4.20 | HyBus co... | Intel PXA255 Evaluation Bo |
| hello.cec | 4.20 | | |

OK
Remove
Import...
Refresh

Variant: ALL

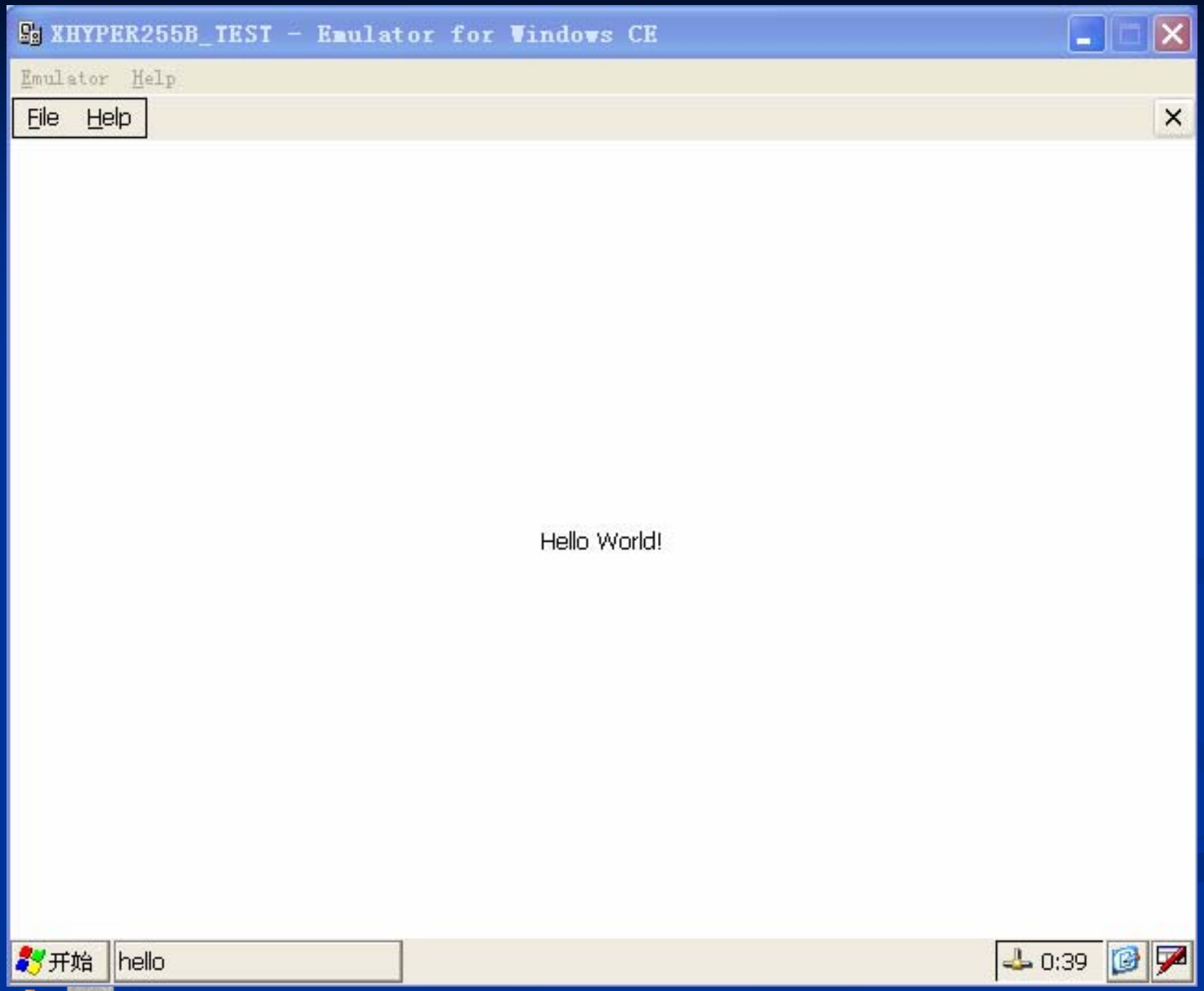
- Catalog
  - BSPs
  - Core OS
    - Display based devices
      - Application
        - hello255
      - Applications and Services Devel
      - Applications - End User
      - Commu Applications - End User
      - Core OS Services
      - File Systems and Data Store
      - Fonts
      - International
      - Internet Client Services
      - Multimedia Technologies
      - Security
      - Shell and User Interface

# 添加至目标平台



Rebuild Platform

Download观察现象


XHYPER255B_TEST - Emulator for Windows CE
Emulator Help
File Help
Hello World!
开始
hello
0:39

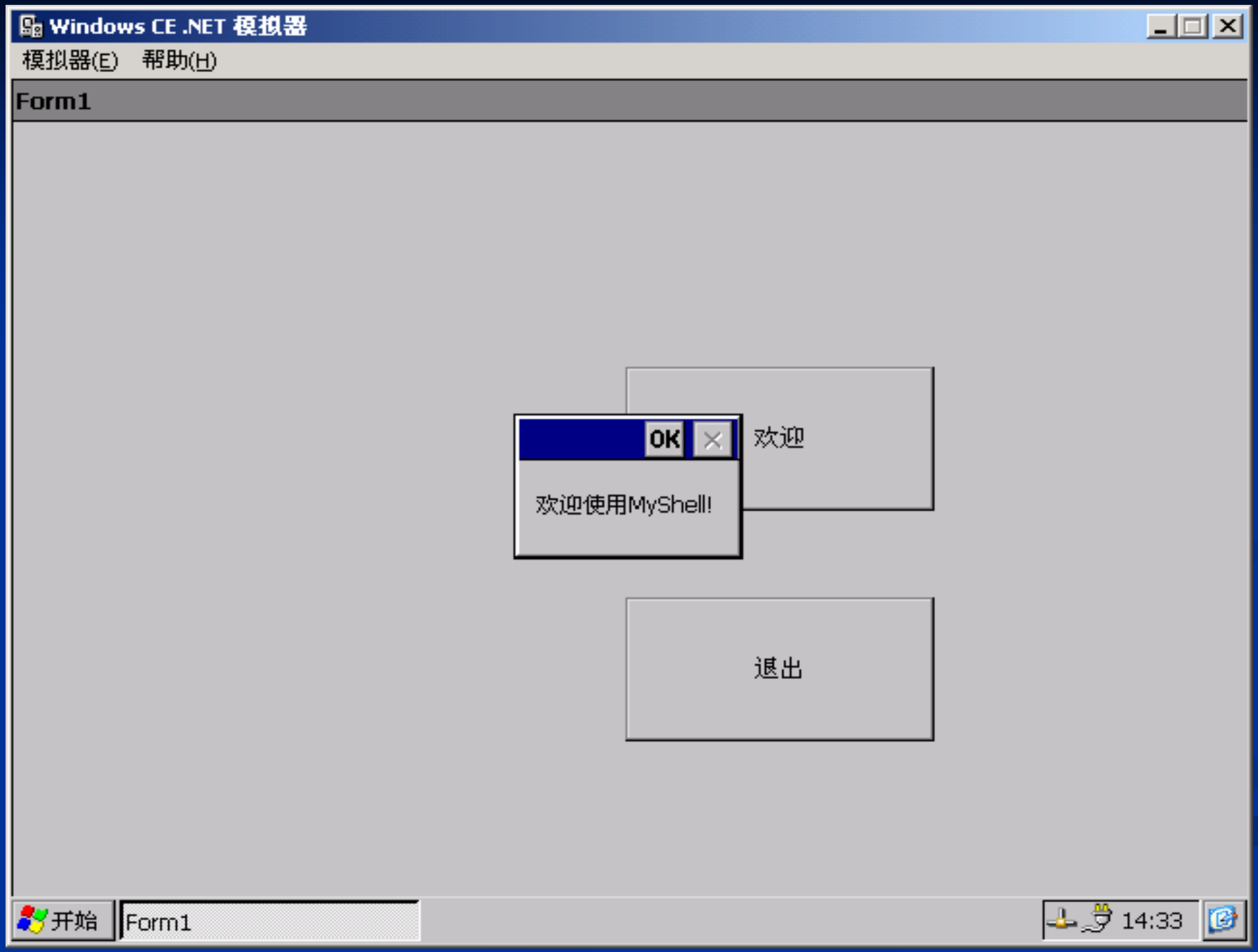
# 应用程序作为开机Shell

首先编写自己的应用实例，如在Visual Studio .net中建立新的shell程序

- 启动Visual Studio .net 2003
- 新建Windows CE项目
- 添加2个按钮，调整大小、位置
- 进入代码编辑器

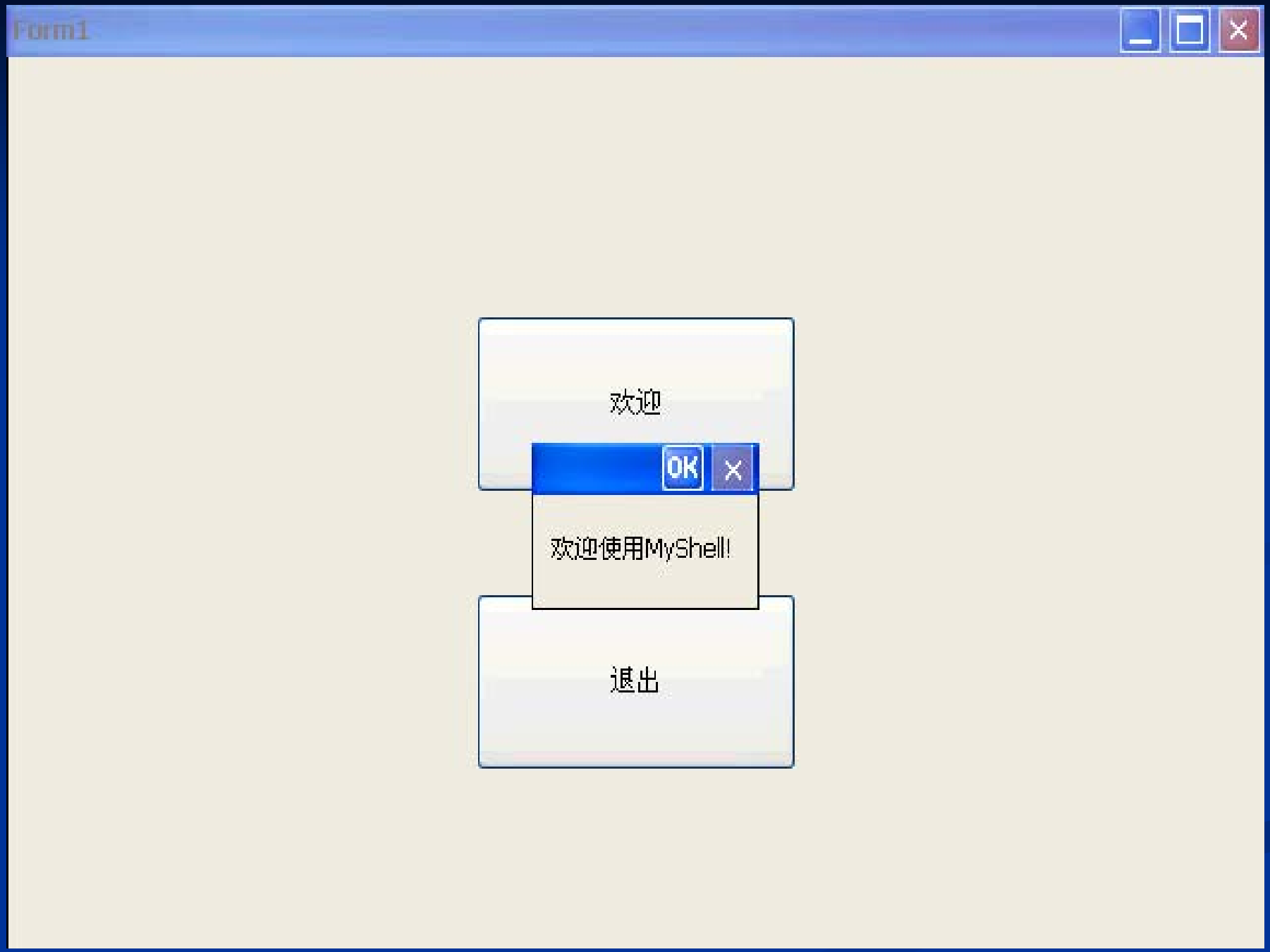
```
private void button1_Click(object sender, System.EventArgs e)
{
    MessageBox.Show ("欢迎使用MyShell!");
}
```

- 部署、预览程序运行效果


Windows CE .NET 模拟器
模拟器(E)
帮助(H)
Form1
OK
欢迎
欢迎使用MyShell!
退出
开始
Form1
14:33

# 在Platform builder中修改配置文件

- 把生成的 MyShell.exe 添加到映像中
- 在shell.reg中，把“Launch50”=“explorer.exe”替换成“Launch50”=“MyShell.exe”。
- 重新制作平台映像MakingIMG、
- 下载到终端中，可以看到新的Shell。


Form1
欢迎
OK
欢迎使用MyShell!
退出

# 5.3 Windows CE驱动程序的开发

Windows CE下的设备驱动程序将操作系统与硬件联系起来，使操作系统能够管理硬件设备，向应用程序提供使用硬件设备的功能调用。

驱动程序的开发的自由度很小，需按严格的规范编写。

与其它Windows操作系统一样，Windows CE的设备驱动程序是以DLL的方式动态加载的。

开发工具：

Platform Builder

Visual Studio.Net

# 5.3.1 流接口驱动和本地设备驱动

Windows CE的设备驱动模型有2种：

1. 本地设备驱动（NDD：Native Device Driver)

   平台内建设备的驱动程序，如键盘、显示设备和触摸屏等是本地设备驱动，它可**根据具体设备的需求提供相应的接口**。

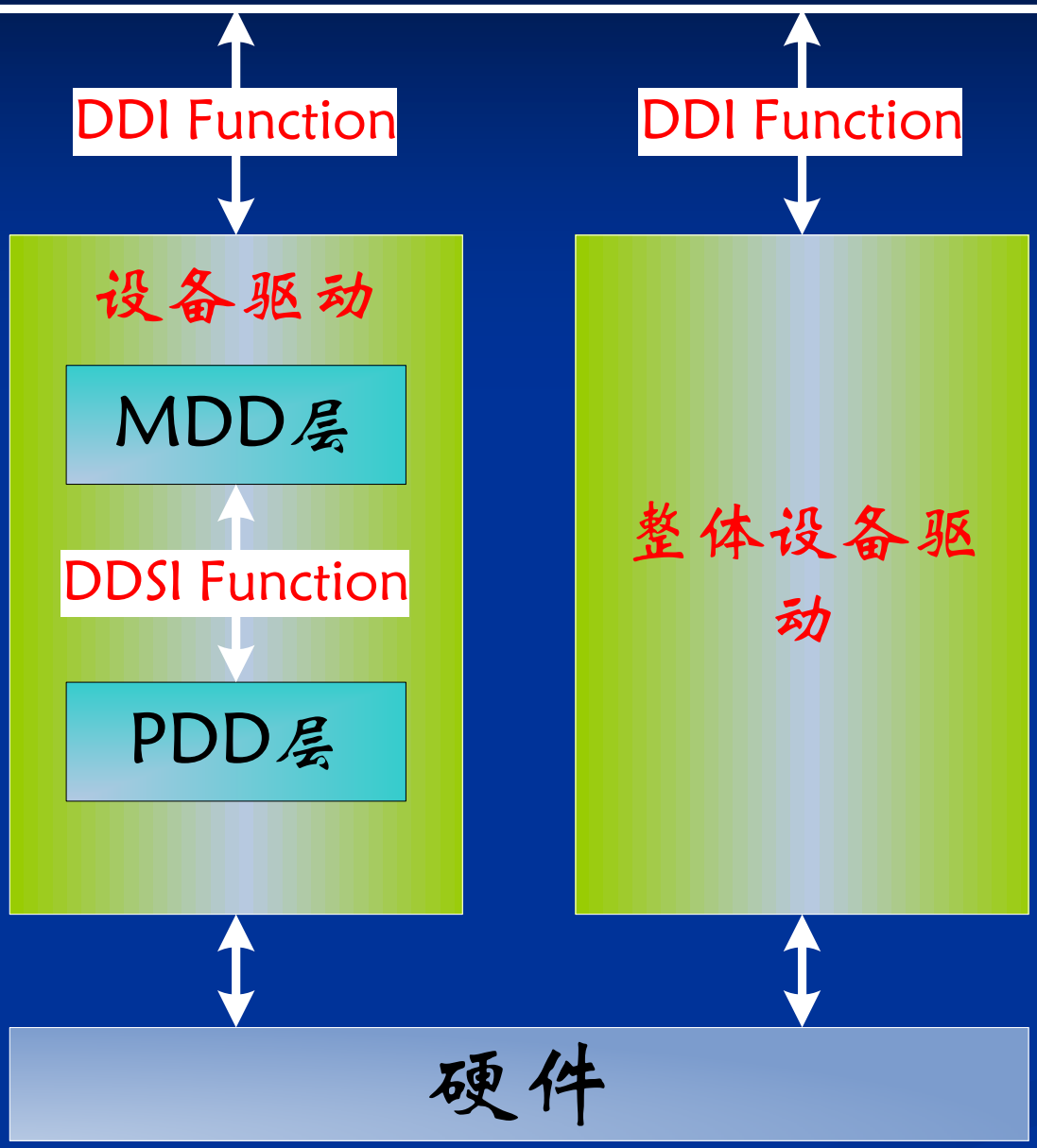
2. 流接口驱动（SID：Stream Interface Driver）

   **流接口提供一组通用的接口**，其向上提供的编程接口使应用程序可以用访问文件的方式访问设备。并非所有内建设备都是本地设备驱动，如串行接口就被实现为流接口驱动，因此访问串行口就如同访问文件一般。

# Windows CE下的部分驱动程序

| 加载方式 | 本地设备驱动 | 流接口驱动 |
| --- | --- | --- |
| Windows CE引导时由GWES加载 | 键盘<br>鼠标<br>触摸屏<br>显示器<br>电池<br>指示灯 | 无 |
| Windows CE引导时由设备管理器加载 | PCMCIA主控制器<br>USB主控制器<br>NDIS.DLL | 音频驱动<br>串行口驱动<br>并行口驱动<br>端口监视 |

# 5.3.2 驱动程序实现方式




无论流接口驱动还是本地设备驱动都可以分层实现方式和一体实现方式。

DDI（Device Driver Interface）：设备驱动接口

MDD（Model Device Driver）：原形设备驱动

PDD（Platform Dependent Device）：平台相关设备

DDSI（Device Driver Service Provider Interface）：设备驱动服务提供上接口

# 5.3.3 驱动程序开发流程

选择驱动程序接口：本地设备驱动或流接口驱动

↕

选择驱动程序实现方式：一体实现方式或分层实现方式

↕

设计并实现驱动程序：若选择本地设备驱动则需设计DDI；若分层实现方式则需设计MDD、PDD和DDSI等

↕

安装驱动程序

# 5.3.4 使用PB（EVC）开发驱动程序

- 优点：
  1. 可以使用内核调试器来实现真正的驱动调试；
  2. 可以开发并测试任何类型的驱动
  3. 可以把一个驱动程序打包或导出成.msi文件提供给其他的OEM厂商
  4. 可以把一个驱动程序打包或导出成.cab文件提供给目标设备的最终用户
  5. 可在多重硬件平台上使用并测试驱动
- 缺点：
  1. 许多芯片厂商对PB不熟悉
  2. 不能调试和测试基于Microsoft Pocket PC的设备
  3. 很难移植到Visual Studio

# 5.3.4 使用PB集成驱动程序

利用.cec（CE Catalog）文件将.DLL集成到Platform Builder IDE中。

样例参考5.2.4节中“开机自启动应用程序的方法将文件包含到Catalog中。