

Hello World! Demo

i.MX31 PDK 1.4 Windows CE 5.0

Hello World Application Note

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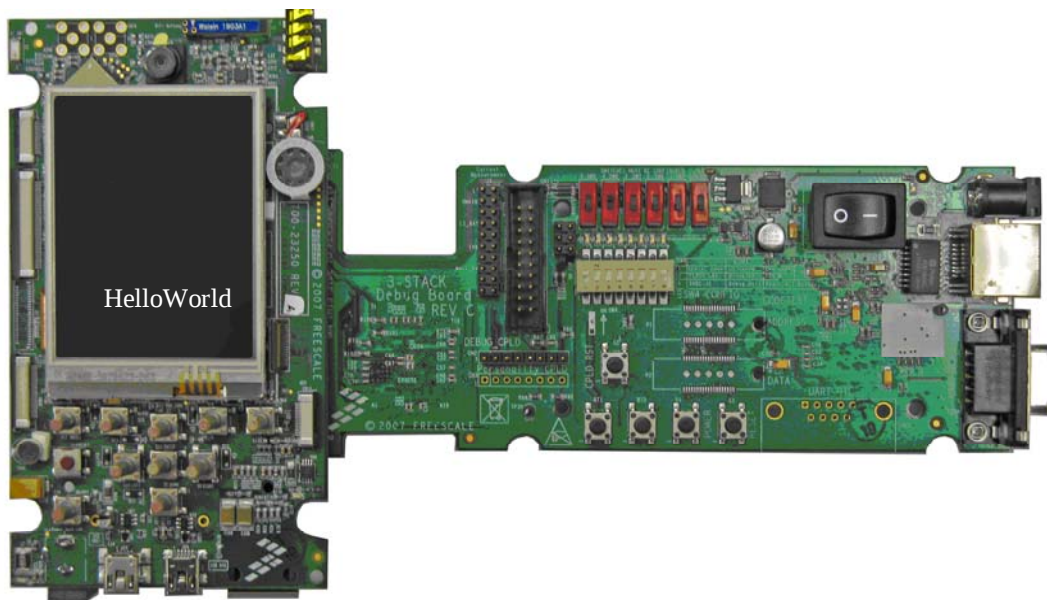
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This document shows you how to create a simple demonstration application for the i.MX31 3-Stack BSP for Windows CE 5.0, using the Platform Builder wizard. You also use this basic approach to create your own applications for Windows CE 5.0 platforms.



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Installation and Setup

In order to install and use the i.MX31 PDK, you will need the following:

- i.MX31 PDK source code (from the CD)
- i.MX31 PDK documentation set (from the CD)
- Installation of the trial version of Platform Builder
- Installation of updates to Platform Builder

To install Platform Builder, use these steps:

1. Insert the Windows CE 5.0 installation disk, or download Platform Builder from the following link:
<http://www.microsoft.com/downloads/details.aspx?familyid=486E8250-D311-4F67-9FB3-23E8B8944F3E&displaylang=en>
<http://www.microsoft.com/downloads/details.aspx?FamilyID=7E286847-6E06-4A0C-8CAC-CA7D4C09CB56&displaylang=en>
2. From the Start menu of the installation disk, click **Install** (Figure 1).
3. Follow the installation wizard until you see the “Setup Type” window, and then select **Custom**.
4. Select the destination for the Platform Builder installation.
5. At the Custom Setup window, select the options shown in Figure 2.

NOTE

Be sure to select the ARM® compiler option from the Windows CE 5.0 Operating System folder. This is very important, because the SDK uses this to compile the BSP files.

6. Follow the installation wizard until the installation is complete.

Install the Updates to Platform Builder

You need to install the Platform Builder updates because these patches are required by the i.MX31 PDK Windows CE 5.0 SDK. To install the updates, use the following links:

Windows CE 5.0 Platform Builder Cumulative Product Update Rollup Package (through 12/31/2007)

<http://www.microsoft.com/downloads/details.aspx?FamilyID=a54779d5-f4a5-49f0-9e36-979d461f536c&DisplayLang=en>

Figure 1 Start Menu of the Windows CE 5.0 Disk

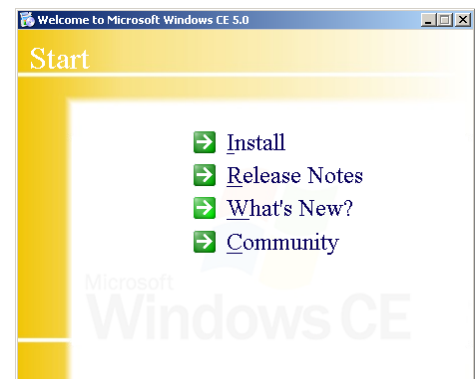
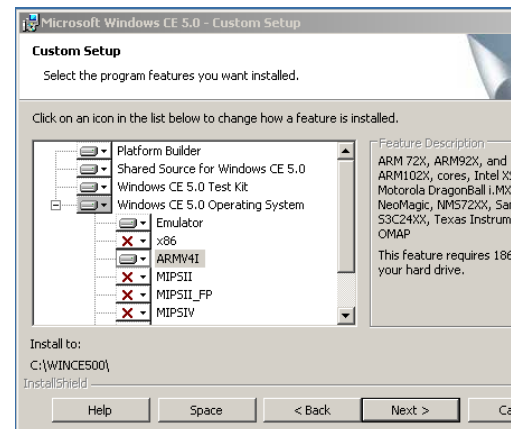


Figure 2 Custom Setup Options



Windows CE 5.0 Platform Builder Monthly Update (January 2008)

<http://www.microsoft.com/downloads/details.aspx?FamilyId=98F0906A-45C6-4792-91FE-47A0E073A998&displaylang=en>

Install the i.MX31 SDK1.3 for Windows CE 5.0

To install the SDK1.3, use a CD-ROM or download the Windows CE 5.0 SDK for the 3-Stack board platform from the following URL:

http://www.freescale.com/webapp/sps/download/mod_download.jsp?colCode=IMX31_WSDK_1_3_SRC

To install the SDK, use these steps:

1. Using either the CD or the downloaded, unzipped package, run the SDK1.3_WinCE500_BSP.msi file.
2. Follow the instructions in the installation wizard.

NOTE

This SDK will install different versions of the drivers on the same folders as the ones used by previous Freescale i.MX31 BSPs. To avoid this, remove all previous versions of the i.MX31 processor BSPs, such as the MCIMX31ADSE Windows CE BSP or any previous version of the i.MX31 3-Stack SDK.

Recompiling the SD Card Drivers

The updates for Platform Builder will modify the SD Card drivers from Microsoft, and you must recompile the SD Card drivers in order for the SDK to function.

To re-compile the drivers, use these steps:

1. Open a Platform Builder 5.0 session.
2. Open a Platform Builder's Workspace for the i.MX31 3-Stack board. The BSP provides a sample workspace that can be used for this example.
3. On the File View tab, right-click on:
`\WINCE500\PUBLIC\COMMON\OAK\DRIVERS\SDCARD`
4. Select Clean Before Building, and then select Build Current Project (see Figures 3 and 4.)

Figure 3 Recompiling the SD Card Drivers

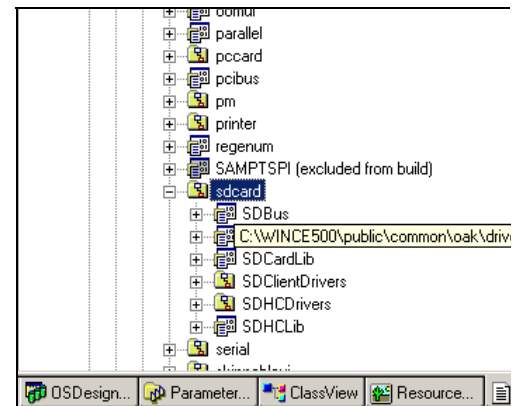
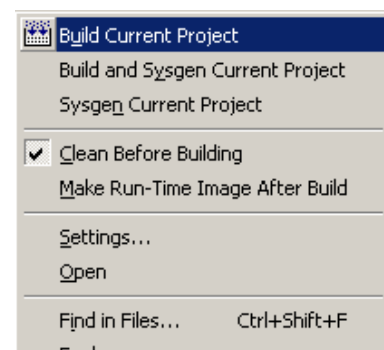


Figure 4 Recompiling the SD Card Drivers



Creating a New Application

Platform Builder provides a wizard application that you can use to easily create a simple application for Windows CE 5.0.

To create a Hello World application, use these steps:

1. Open a Platform Builder's Workspace for the i.MX31 3-Stack board. The BSP provides a sample workspace that can be used for this example.
2. In the Catalog pane, select and add the Console Window option from the Windows CE 5.0 catalog, which can be found in the following location (see [Figure 5](#)):
CoreOS > Windows CE Devices > Shell and User Interface > Shell > Command Shell folder
3. Build a run-time OS image with Platform Builder, using the procedures in the Platform Builder documentation. For information, see the "Building a Run-Time Image" topic in the Platform Builder Help. Note that during this step, you will select the "Make a Run-Time Image after Build" option.
4. When you have built a run-time OS image in the workspace, set up the project by clicking **File > New Project or File** (see [Figure 6](#)). The New Project or File screen is displayed.
5. Click the Projects tab, and then select **WCE Console Application** (see [Figure 7](#)).
6. In the Project name field, enter a name for the project, such as "Hello World".
By default, the project folder will be placed in:
WINCE500\Pbworkspaces\<workspace_name>\<project_name>. To change this location, click the button in the Location field and select a new location.
7. Select Workspace project.
8. Click **OK**.

Figure 5 Adding a Console Window to the Project

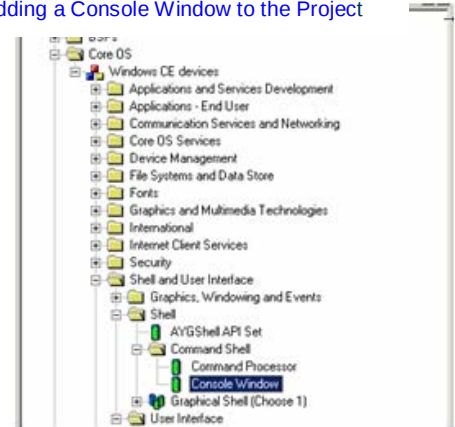


Figure 6 Creating a New Project

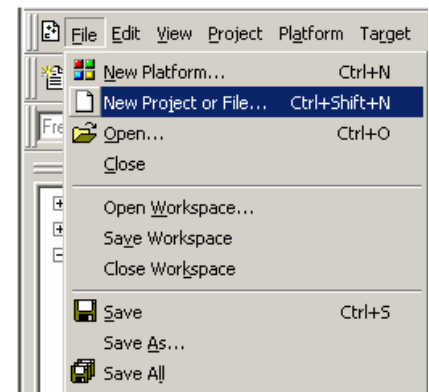
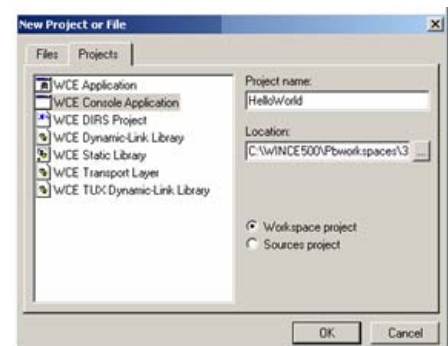


Figure 7 Selecting the Project and Name



9. The next screen is the New Project Wizard general information configuration screen. This information is **optional** and can be bypassed. You may enter information in the fields you want, or leave the fields blank.
10. Click **Next**. The Console Application selection window is displayed (see [Figure 8](#)).
11. For this demo, select **A typical "Hello World!" application**, and then click **Finish**.

The new project is added to the workspace. To confirm the project, expand the Projects tree and view the added project name (see [Figure 9](#)).

The wizard creates all of the necessary files to compile the application, and also sets the `.exe` file to run under Windows CE.

12. To compile and create the `.exe` file for the application, right-click on the project folder at the workspace's **File** -> **View**.
13. Select **Make Run-Time Image After Build**, and then select **Build Current Project** (see [Figure 10](#)).

When the application is compiled, Platform Builder creates a new run-time image with the `<app name>.exe` file included in it.

For example, if the application is named **HelloWorld**, a file named `HelloWorld.exe` is added to the run-time image. The file is placed by default in the following folder:

```
\WINCE500\ Pbworkspaces\<workspace>\RelDir\
3DS_ARMV4I_Release
```

14. When the application is compiled and the new run-time image with the application is created, download the run-time image to the 3-Stack board.

For instructions, see Chapter 5 of the *i.MX31 PDK Windows CE 5.0 User's Guide*.

Figure 8 Selecting the Console Application Type

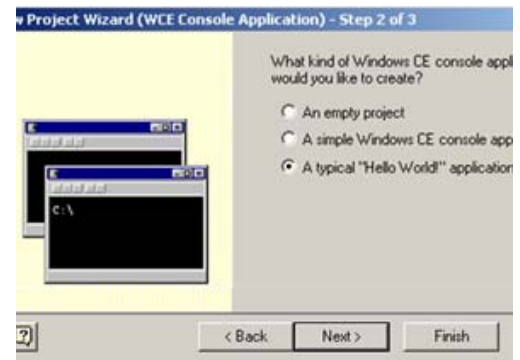
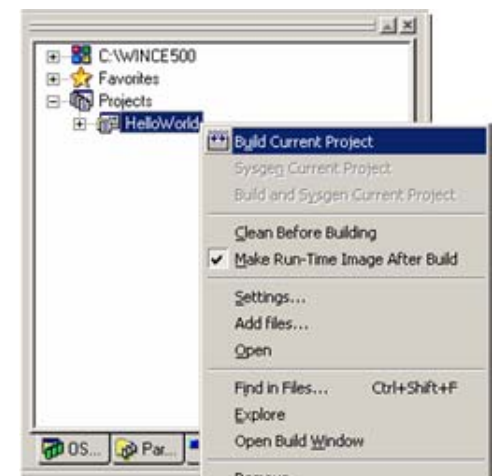


Figure 9 Verifying the Addition of the Project to the Workspace



Figure 10 Compiling and Building the Application



15. Once the OS image is loaded in the 3-Stack board, reset the board.
16. Enter the EBOOT menu (see Figure 11).
17. Use the steps in the next section to select the correct method for running the application. There are two methods; the one you select will depend on whether KITL is already enabled.

Figure 11 EBOOT Menu

```

Boot Loader Configuration:
0> IP address: 192.168.1.1
1> Subnet Mask: 255.255.255.0
2> Boot delay: 3 seconds
3> DHCP: Enabled
4> Reset to factory default configuration
5> Autoboot: NK from NAND
6> MAC address: 0-0-0-0-0-0
7> Format OS NAND region.
8> Format ALL NAND regions.
I> Kitl interrupt mode: Disable
P> Kitl passive mode: Enable
C> L2 cache enable: Enable
W> L2 cache mode: WriteThrough
B> AHB Clock freq: 133M
A> ARM Clock freq: 532M
T> DPTC mode: Disable
F> DDFS mode: Disable
U> SW2 Voltage: 1.8V
X> PowerPolicy: Disable
R> USB KITL: Disable
S> Save configuration
D> Download image from ethernet now
U> Download image from USB now
L> Launch existing flash resident image

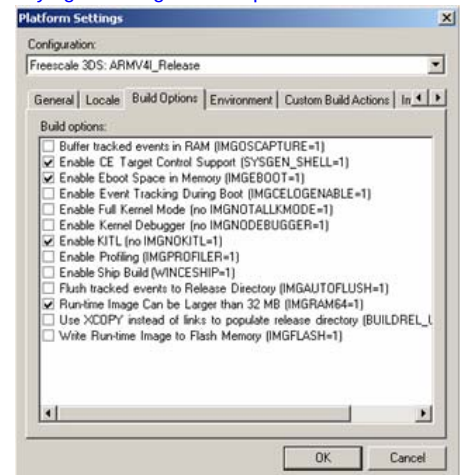
```

Choosing a Method for Running the Application

There are two methods for running the Hello World application on the 3-Stack board. The method you choose depends on whether the KITL (Kernel Independent Transport Layer) option is enabled for the run-time image. Use the following instructions to determine whether the KITL option is enabled.

1. In Platform Builder, click **Platform > Settings**.
2. On the Build Options tab, locate **Enable KITL** (no IMGNOKITL=1) (see Figure 12):
 - If KITL is selected, go to **Method 1** to run the application.
 - If KITL is NOT selected, go to **Method 2** to run the application.
3. Click **OK**. The next screen is the New Project Wizard general information configuration screen. This information is optional. You may enter information in the fields you want, or leave the fields blank.

Figure 12 Verifying OS Image Build Options



Method 1: Running the Application using a KITL- Enabled OS

1. Ensure that your 3-Stack board has Ethernet connectivity with Platform Builder on your host PC.

To verify the connection, use the procedure described in Chapter 5 of the *i.MX31 PDK Windows CE 5.0 User's Guide*.

2. At the EBOOT menu, confirm that **P) KITL passive mode** is set to **Disabled**.
3. Launch the OS image from the EBOOT menu by pressing **L**.
4. In Platform Builder, select **Target > Attach Device** (CTRL+SHIFT+D). The New Project or File screen is displayed.

This activates the Platform Builder debug options, and establishes the KITL connection with the 3-Stack board.

5. When the OS image has booted up, in Platform Builder select **Target > Run Programs** (ALT+SHIFT+R). Click **OK**.

The Run Program window is displayed.

6. Select your application and click **Run** (see Figure 13).

In Platform Builder's debug window, the message "Hello World!" message is displayed (see Figure 14).

Figure 13 Running the Sample Program in Platform Builder

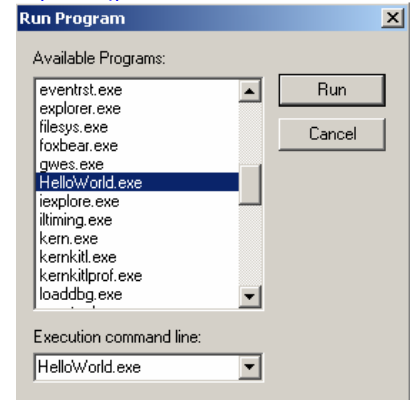


Figure 14 Sample Program Output in Platform Builder

```
Loaded symbols for 'C:\VINCES00\PBWORKSPACES\3DSMOBILITY\REL\
Loaded symbols for 'C:\VINCES00\PBWORKSPACES\3DSMOBILITY\REL\
Loaded symbols for 'C:\VINCES00\PBWORKSPACES\3DSMOBILITY\REL\
The Kernel Debugger has been disconnected successfully.
The Kernel Debugger is waiting to connect with target.
The Kernel Debugger has been disconnected successfully.
The Kernel Debugger is waiting to connect with target.
The Kernel Debugger has been disconnected successfully.
The Kernel Debugger is waiting to connect with target.
The Kernel Debugger has been disconnected successfully.
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The Kernel Debugger is waiting to connect with target.
The Kernel Debugger has been disconnected successfully.
The Kernel Debugger is waiting to connect with target.
The Kernel Debugger has been disconnected successfully.
The Kernel Debugger is waiting to connect with target.
0 PID:0 TID:0 -OALKitlStart(rc = 1)
0 PID:0 TID:0 Sp=ffff7cc
318 PID:afec6442 TID:afec641e OEMIoControl: Unsupported (
2275 PID:2fe8e000 TID:2fe8e9be ***** UfnMdd_Start:
2284 PID:2fe8e000 TID:2fe8e9be HCD PDD SREV register = 28
2496 PID:2fe8e000 TID:2fe8e9be HCD PDD SREV register = 28
2607 PID:2fe8e000 TID:2fe8e9be SREV register = 28
4632 PID:2fb971be TID:2fb7080a Running TouchCalibrate
Run Programs: = HelloWorld
```

Method 2: Running the Application using a KITL-Disabled OS

1. In the EBOOT menu, press **L** to launch the OS image.
2. Using the hand-held pointer, calibrate the touch panel and tap the screen to enter the Windows CE desktop
3. On the Windows CE desktop, select the Windows logo in the lower left corner.
4. Select **Programs > Command Prompt**.
5. On the Windows CE desktop, open the **Keyboard Input Panel** (click the second button from the right, at the right lower corner of the screen).
6. Place the pointer at the command prompt and type the name of your application, such as **HelloWorld** (the typed entry will not be case sensitive).

The message “Hello World!” message will be displayed at the Windows CE command prompt.

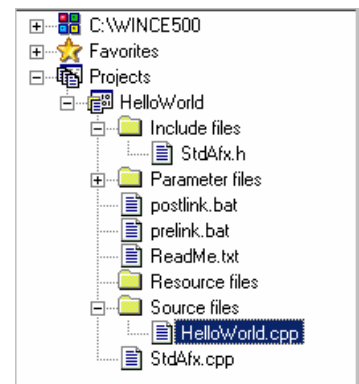
Modifying the Application to Create Your Own Projects

1. Edit the .cpp file, which is located in the Source Files folder of your project tree, in the following location (see [Figure 15](#)):

Workspace File > View tab, (Projects > <app name> > source files)

2. Follow the steps in this Application Note to run your application.

Figure 15 Hello World Application Source Files



Removing an Application from a Workspace

1. In your workspace File View tab, expand the Project tree.
2. Right-click on the project folder, and then click **Remove**.

The .exe file will be removed from your application the next time you build an OS Run-Time Image (see [Figure 16](#)).

3. To remove all of the related files, open Windows Explorer and then remove the Application folder from:

```
\PATH:>/WINCE500\Pbworkspaces\<workspace_name>\
```

Figure 16 Removing an Application from a Workspace

