
i.MX25 PDK Windows Embedded CE 6.0 Quick Start Guide



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Chapter 1

About the Boards

This chapter provides detailed information about the three boards (CPU, Debug, Personality) and identifies the locations of the connectors and switches.

1.1 About the 3-Stack Platform System

Freescall introduces the 3-Stack Platform System, which is designed for developing multimedia and connectivity applications using the i.MX25 ARM9® Applications Processor and the MC34704 Power Management chip.

The 3-Stack Platform System decreases the time to market of products providing a near-to-final product design, which can be used as a hardware and software development platform.

The board support packages (BSP) for the 3-Stack Platform System, contain drivers optimized for multimedia operations using the i.MX25 and MC34704 devices.

Freescall's 3-Stack Platform System consists of three boards: CPU, Debug, and Personality.

- The CPU board contains the i.MX25 CPU, DDR2, and NAND Flash memories, and the MC34704 Power Management IC (PMIC).
- The Debug board provides debug interfaces, switches for selecting system boot options, and test points for system power measurements.
- The Personality board supports common multimedia applications. This board provides a 5.7-inch VGA display, image sensor camera, SD Card connector, USB OTG, USB Host, CE-ATA connector, CAN connector, Ethernet connector for an i.MX25 internal FEC, RCA Audio connectors, and jack audio connector, and other connectors.

1.2 CPU Board

Figure 1-1 illustrates the top and bottom of the CPU Board.

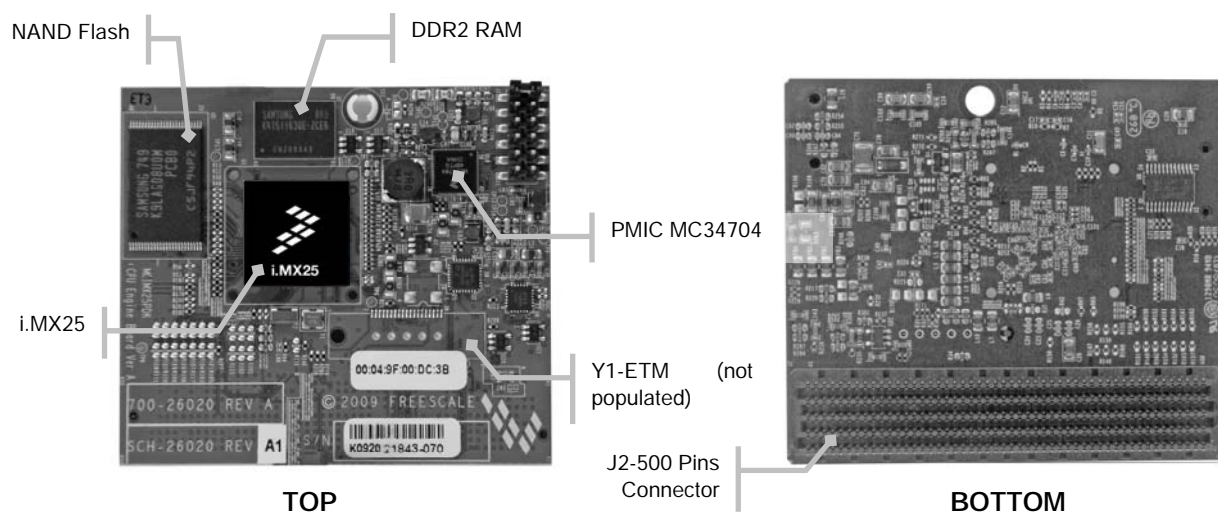


Figure 1-1 CPU Board, top and bottom

The J2 board-to-board 500 pin connector is used to connect the CPU board to the Personality board.

1.3 Debug Board

Figure 1-2 illustrates the top of the Debug Board. Table 1-2 provides the boot configuration for switches SW9 – SW10.

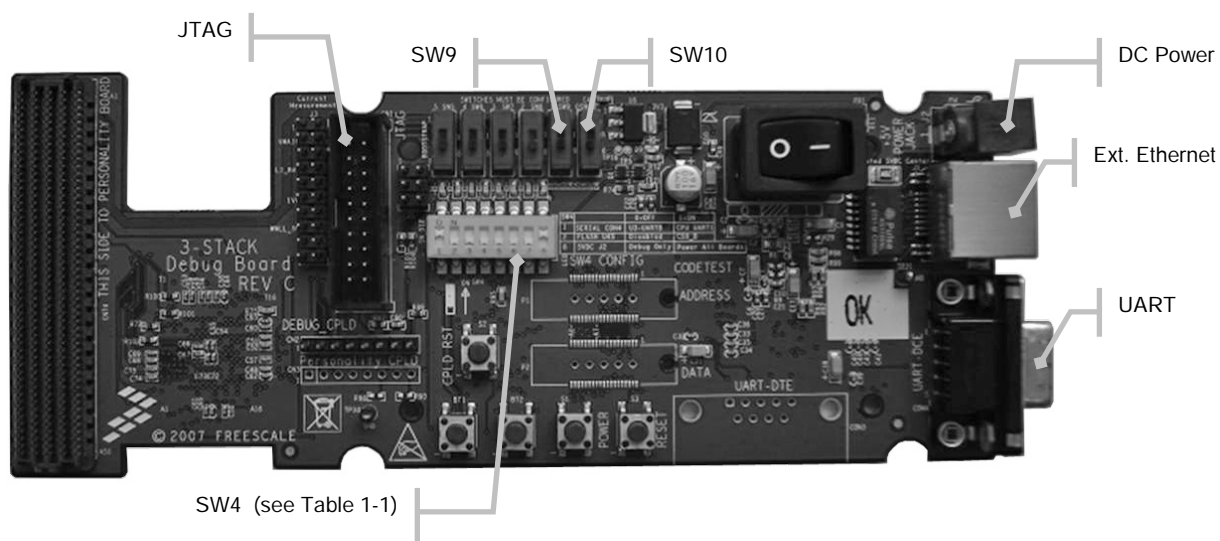


Figure 1-2 Debug Board, top

Figure 1-3 illustrates the bottom of the Debug Board.

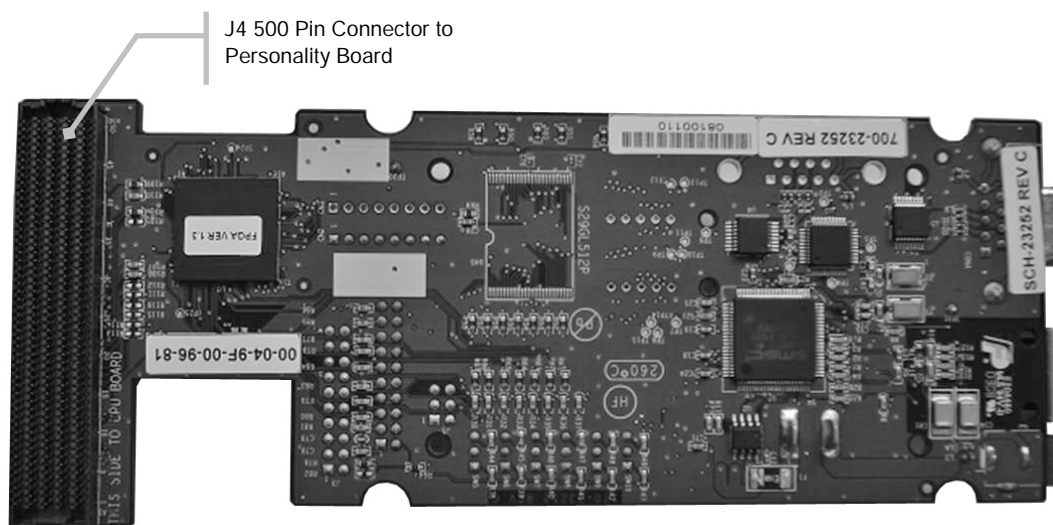


Figure 1-3 Debug Board, bottom

The Debug board provides three types of debugging interfaces, which can be used with the downloaded software to debug the hardware:

- UART-DCE + rJ45 connector
- JTAG connector
- Ethernet connector

You use the Debug board configuration switches in conjunction with the Personality board boot switches to select the various i.MX25 boot options. The Debug board can be powered up using the 5V regulator on the board, and the board includes power measurement test points for the board power circuits.

Use Table 1-1 and Table 1-2 to configure the switches on the Debug board. See Table 1 3 for the NAND, SD/MMC, and SPI Flash boot options.

Table 1-1 Debug Board SW4 Switch

Switch	Setting	Effect
SW4-1 UART Port Select	ON	Selects serial port UART (DCE) CON4
SW4-8 Power Enable	ON	Power is supplied to all three boards.
	OFF	Power is only supplied to the Debug board.

Table 1-2 Boot Mode Setting (SW5 - SW10)

Boot Mode Device	SW5	SW6	SW7	SW8	SW9	SW10
UART/USB bootloader	X	0	0	0	1	1
NAND, SD/MMC and SPI Flash	X	0	0	0	0	0

1.4 Personality Board

Figure 1-4 illustrates the top of the Personality board. For SW21 and SW22 boot configuration settings, see Table 1-3.

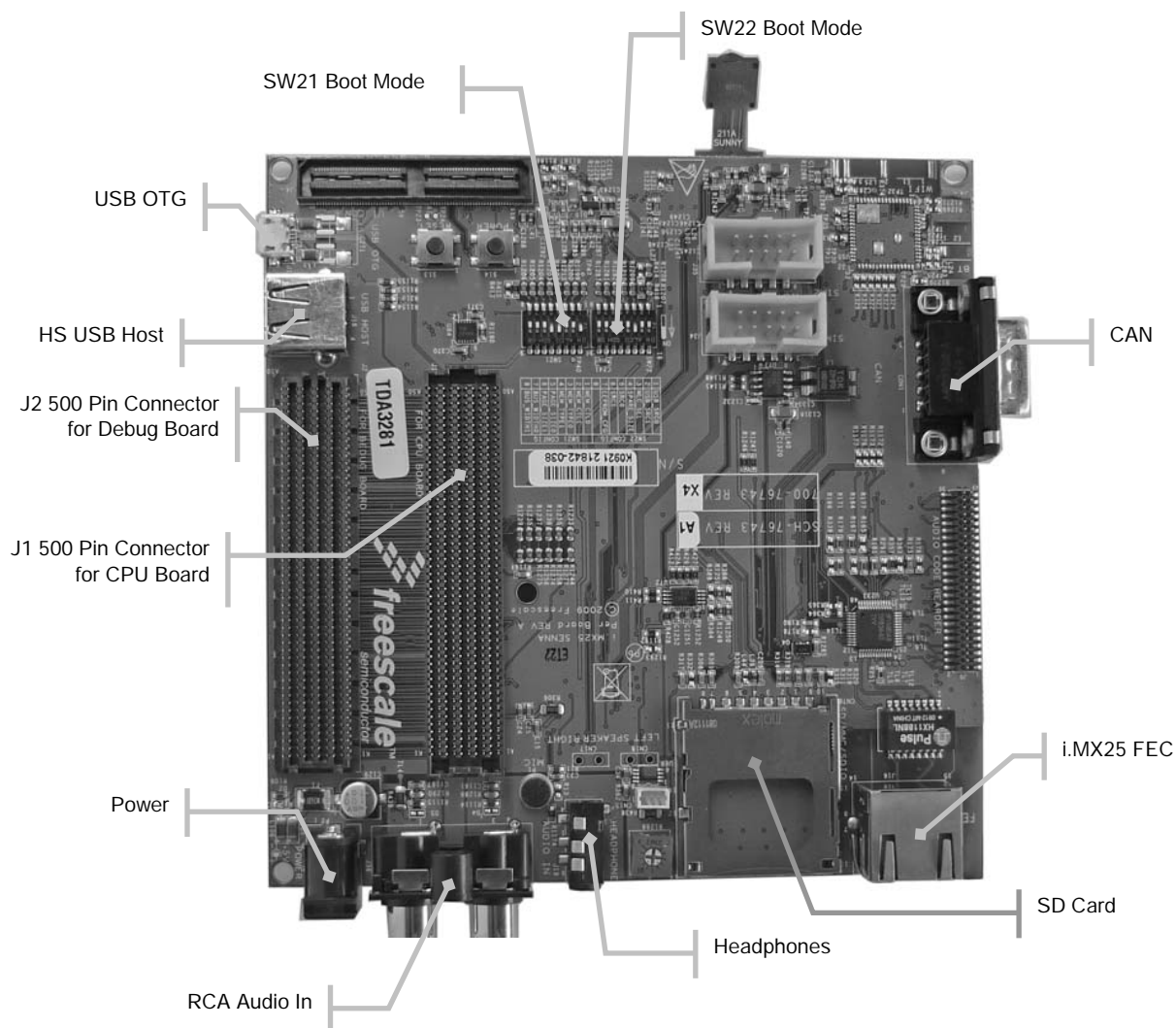


Figure 1-4 Personality Board, top

Figure 1-5 illustrates the bottom of the Personality board.

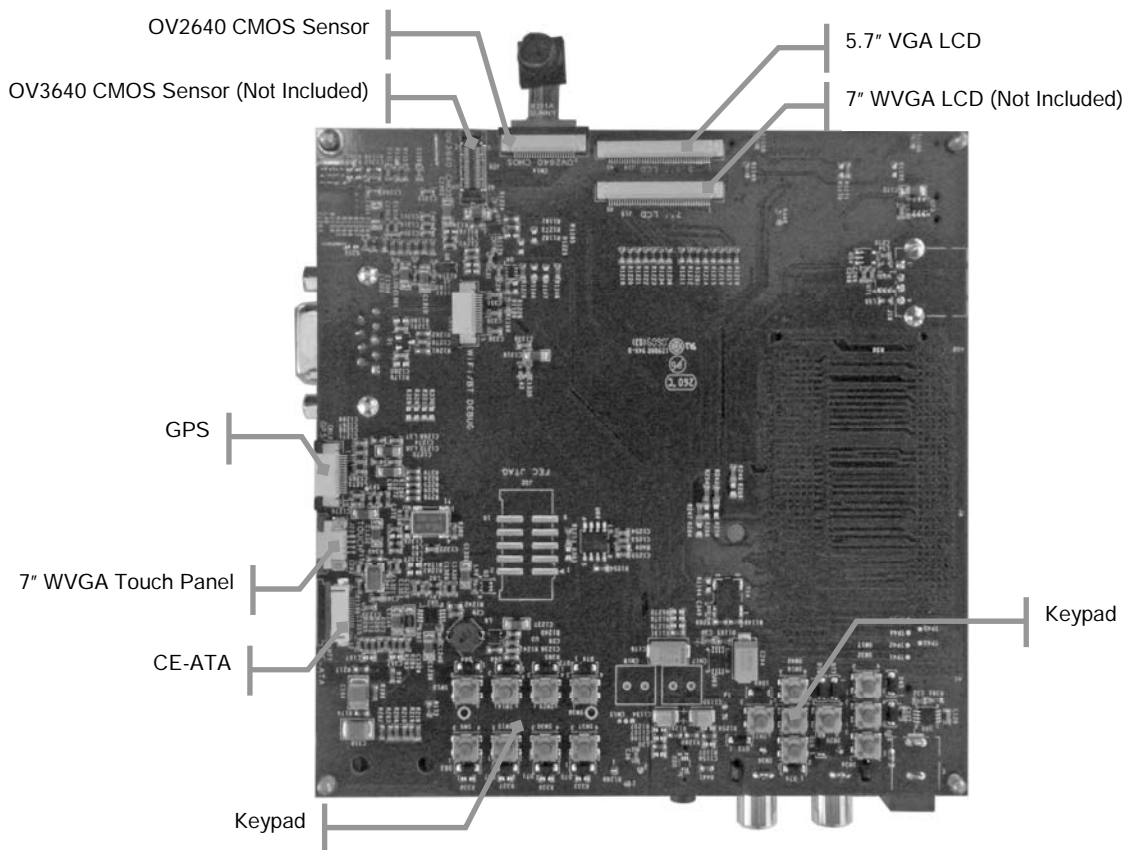


Figure 1-5 Personality Board, bottom

The Personality board contains most of the functionality of the 3-Stack system. The board provides interface connectors for the peripherals: LCD, FEC, USB Host, USB OTG, CAN, GPS, CMOS Camera, CE ATA and SD Card connectors, and others that are used for secondary devices or debugging.

The Personality board also contains switches SW21 and SW22, which are used in combination with switches SW9-SW10 on the Debug board to configure the various boot options for the i.MX25 3-Stack system (see Table 1-3).

For more information about the hardware implementation, see the *i.MX25 PDK Hardware Users Guide*, which is included in the documentation package of this release.

Table 1-3 Boot Mode Settings (SW21-SW22 & SW9-SW10)

Switch Setting	Configuration
NAND Flash Boot Configuration	
SW9 on Debug Board	0
SW10 on Debug Board	0
SW21 on Personality Board	1, 4 and 6 ON the rest OFF
SW22 on Personality Board	3 and 4 ON the rest OFF
SD/MMC Card Boot Configuration	
SW9 on Debug Board	0
SW10 on Debug Board	0
SW21 on Personality Board	1 and 2 ON the rest OFF
SW22 on Personality Board	All OFF
SPI Flash Boot Configuration	
SW9 on Debug Board	0
SW10 on Debug Board	0
SW21 on Personality Board	1,2,3,4 and 7 ON the rest OFF
SW22 on Personality Board	All OFF
Bootstrap Mode Configuration (Used by ATK and RV-ICE)	
SW9 on Debug Board	1
SW10 on Debug Board	1
SW21 on Personality Board	Ignored
SW22 on Personality Board	Ignored

Chapter 2 Getting Started

2.1 Unpack the Kit

The 3-Stack Platform System is shipped with the items listed in Table 2-1.

Table 2-1 3-Stack Development Kit Contents

Item	Description
Boards	<ul style="list-style-type: none">• i.MX25 CPU board• i.MX25 Debug board• i.MX25 Personality board
Cables	<ul style="list-style-type: none">• RS-232 serial cable• Ethernet straight cable• Cable microUSB B to type A Male
Power Supply	<ul style="list-style-type: none">• 5.0V/5.0A universal power supply kit
Paperwork	<ul style="list-style-type: none">• CD: Software and Documentation Content• End-User License Agreement• Quick Start Guide (this document)• Warranty card• Freescale Support card• DVD: Windows Embedded CE 6.0 180 days evaluation kit

Verify that all of the items are contained in the package. See Figure 2-1.

Remove the three boards from their anti-static bags and check the boards for any visible damage.

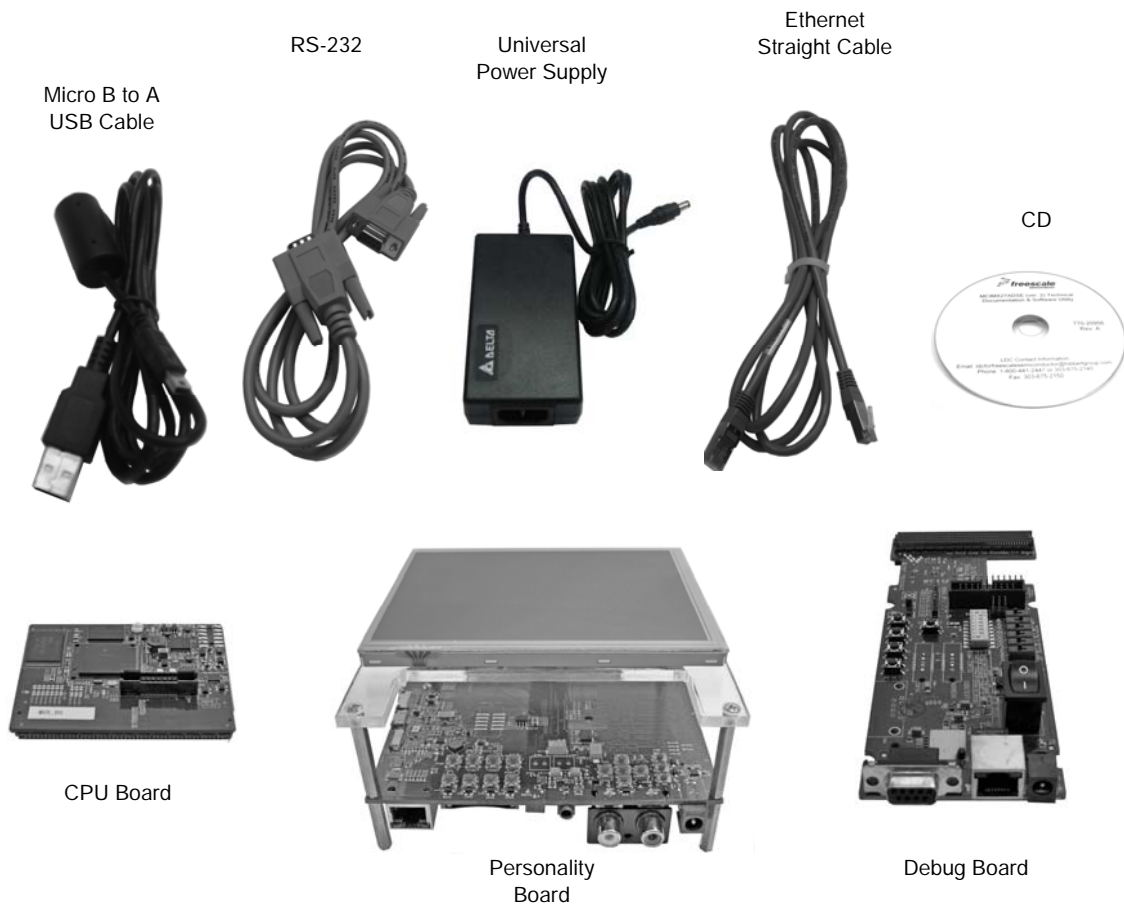


Figure 2-1 PDK Kit Contents

2.2 CD Contents

The CD contains the links to download the documentation and software for the i.MX25 PDK board. Table 2-2 identifies the items on the CD.

Table 2-1 CD Contents

Type	Requirement
Product Documentation	<ul style="list-style-type: none">• Schematics, and Gerber files for CPU Board, Personality Board, and Debug Board• i.MX Advanced ToolKit Release Notes• i.MX Advanced ToolKit User's Guide• i.MX25 PDK Hardware User's Guide• i.MX25 PDK Windows Embedded CE 6.0 Demo Image Readme• i.MX25 PDK Windows Embedded CE 6.0 Quick Start Guide (this document)• i.MX25 PDK Windows Embedded CE 6.0 Release Notes• i.MX25 PDK Windows Embedded CE 6.0 User's Guide• i.MX25 PDK Windows Embedded CE 6.0 Reference Manual• i.MX25 PDK Windows Embedded CE 6.0 Hello World Application Note
Software Development Tools	<ul style="list-style-type: none">• Windows Embedded CE 6.0 180 days evaluation kit• Windows Embedded CE 6.0 SDK installation file• Windows Embedded CE 6.0 SDK Demo Image• Advanced ToolKit (ATK) software

2.3 Development PC Requirements

To develop applications using the 3-Stack development kit, you need a PC with the requirements shown in Table 2-3.

Table 2-3 Development PC Requirements

Type	Requirement
Operating System	Windows XP Professional with Service Pack 1 or Windows 2000 Professional with Service Pack 4
Network	Internet access
Software Tools	<ul style="list-style-type: none">• Microsoft ® .NET Framework, version 1.1
PC HW	<ul style="list-style-type: none">• 933 MHz Pentium II or later processor;• 2 GHz processor recommended• 512 MByte of RAM; 1 GByte recommended• 1 GByte of available space required on system drive• 18 GByte of available hard-disk space• DVD ROM drive• 1024x768 or higher resolution display with 256 colors

Chapter 3

Building the Platform

This chapter explains how to assembly the 3-Stack board as a development platform (Personality board + CPU board + Debug board), and how to connect the 3-Stack platform to your PC.

The maximum allowable angle for connecting the three boards is 10 degrees, to avoid damaging the connectors (Figure 3-1).

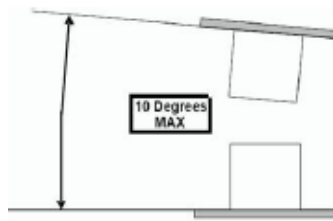


Figure 3-1 Maximum Angle of 10 Degrees

The CPU and Personality boards in your development kit may already be assembled. To properly assemble your system in the two different configurations, see the procedures in the following sections.

3.1 Building a Development Platform: 3 Board Assembly

This section explains how to connect the Personality, Debug, and CPU boards.

The Personality board connects to both the Debug board and the CPU board using 500-pin connectors. The connectors are keyed to avoid misconnection, so there is only one way to connect these boards.

- Connect the CPU board to the J1 connector.
- Connect the Debug board to the J2 connector.

The J1 and J2 connectors are located on the top layer of the Personality board.

Connect the 5.7" VGA display provided in the kit to the J14 connector, which is located on the bottom layer of the Personality board. See Figure 3-2 to locate the connectors.

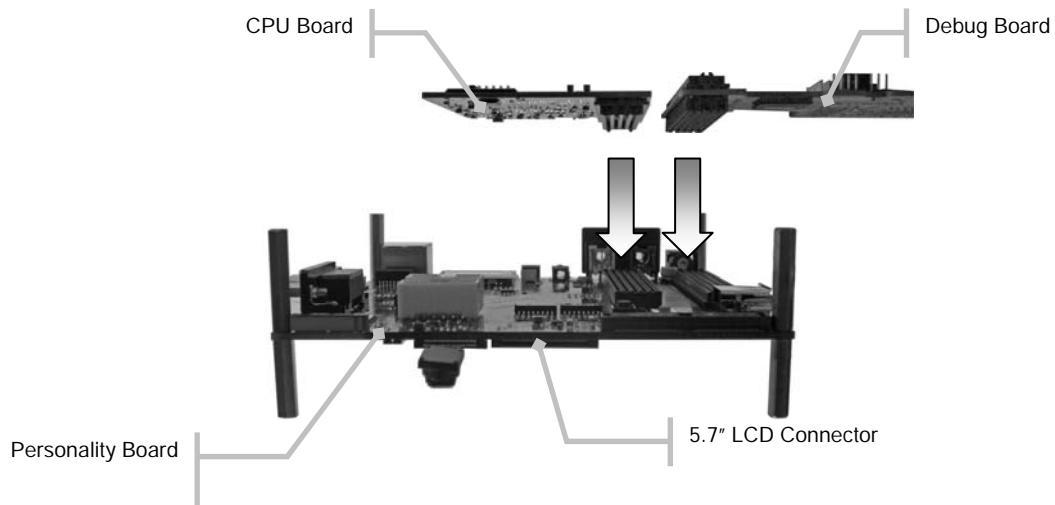


Figure 3-2 CPU and Debug Connection

The assembled boards are shown in Figure 3-3.

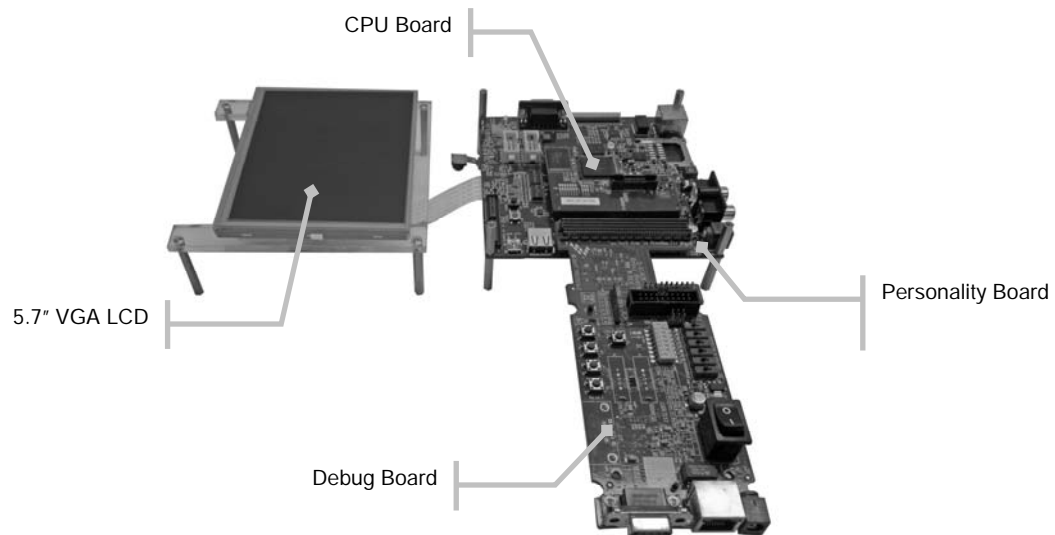


Figure 3-3 Debug Assembly

3.2 Connect Development Platform to PC; Run Preloaded Image

Figure 3-4 illustrates the components and locations indicated in the steps that follow.

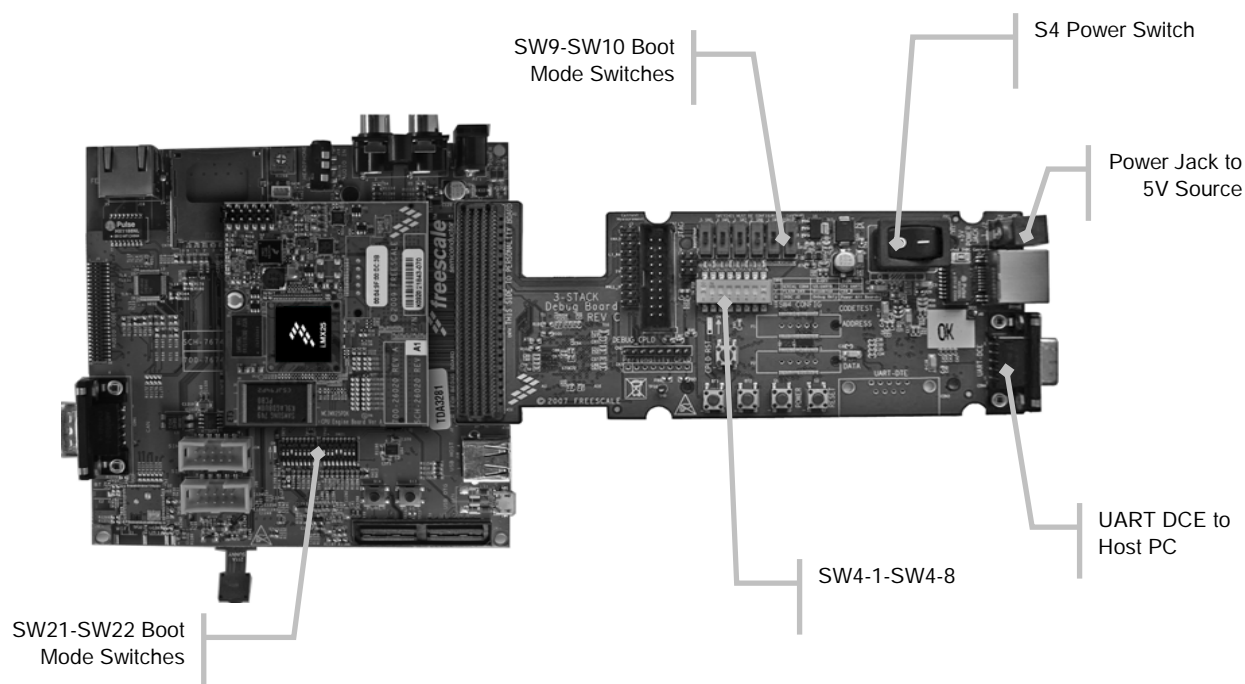


Figure 3-4 PDK Debug Assembly

To connect the 3-Stack platform to your host PC, use these steps:

1. Connect one end of an RS-232 serial cable (included in the kit) to the serial port connector (CON4) on the Debug board, and connect the other end to a COM port on the host PC.
 - Configure SW4-1 to ON.
 - Make sure that SW4-8 is ON, to supply power to all three boards.
 - Configure SW4-2 to OFF.

2. Confirm that the boot mode switches (SW9–SW10 on the Debug board and SW21-SW22 on the Personality board) are set for NAND boot. See Table 3-1.

Table 3-1 NAND Boot Mode Switch Settings

Switch Setting	Configuration
SW9 on Debug Board	0
SW10 on Debug Board	0
SW21 on Personality Board	1, 4 and 6 ON the rest OFF
SW22 on Personality Board	3 and 4 ON the rest OFF

NOTE

For more information about the different boot modes supported by the i.MX25 3-Stack board, see Table 1-3.

3. Connect the regulated 5V power supply to the appropriate power adapter. Plug the power adapter into an electrical outlet, and plug the 5V line connector into the J2 (5V POWER JACK) connector on the Debug board. See Figure 3-4.
4. Start a serial console application on your host PC. Use the configuration shown in Table 3-2.

Table 3-2 Serial Console Configuration

Baud Rate	115200
Data Bits	8
Parity	None
Stop Bits	1
Flow Control	None

5. On the Debug board, set the power switch (S4) to 1.

The OS image is pre-loaded in the 3-Stack board boots. Debug messages from the bootloader should now appear on the serial console application on your PC.

3.3 Building a Demo Platform: 2 Boards Assembly

To make a demonstration platform, connect the CPU board directly to the Personality board using the 500-pin connector(see Figure 3-5); the Debug board is not used. After connecting the boards, run the preloaded demo.

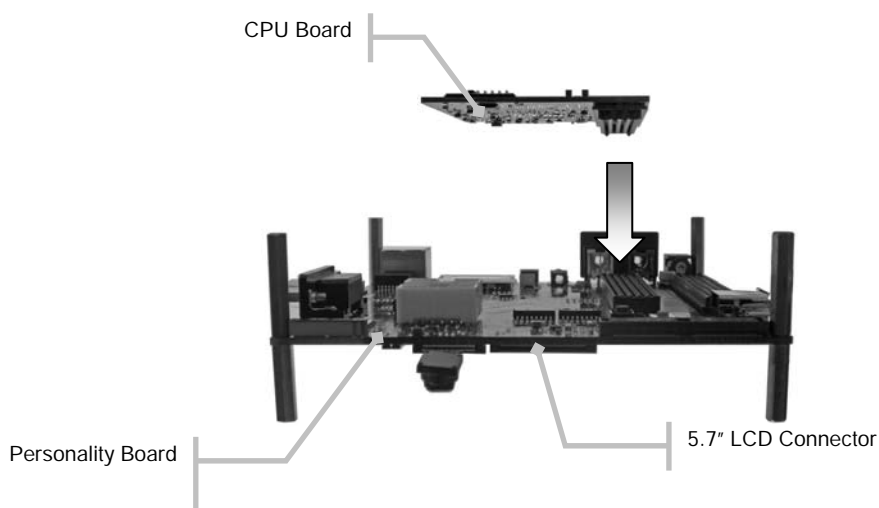


Figure 3-5 CPU Connection

NOTE

If your system is already configured as a development platform (using all three boards), disconnect the Debug board from the Personality board.

The connector is keyed to avoid a misconnection, so there is only one method for connecting the CPU board to the Personality board.

Use these steps:

1. Connect the regulated 5V power supply to the appropriate power adapter.
2. Make sure that SW21 and SW22 switches on the Personality board are configured to boot from NAND, use Table 3-1. See Figure 3-6 to locate the switches on the Personality board.
3. If the 5.7" LCD is not assembled on the Personality board, remove the stand-offs of the Personality board, connect the LCD to the 5.7" LCD connector and fix the LCD with the Personality board stand-offs. At the end of the procedure, the board should look as in Figure 3-7.

4. Plug the 5V line into the P2 (5V POWER JACK) connector on the Personality board. See Figure 3-6.

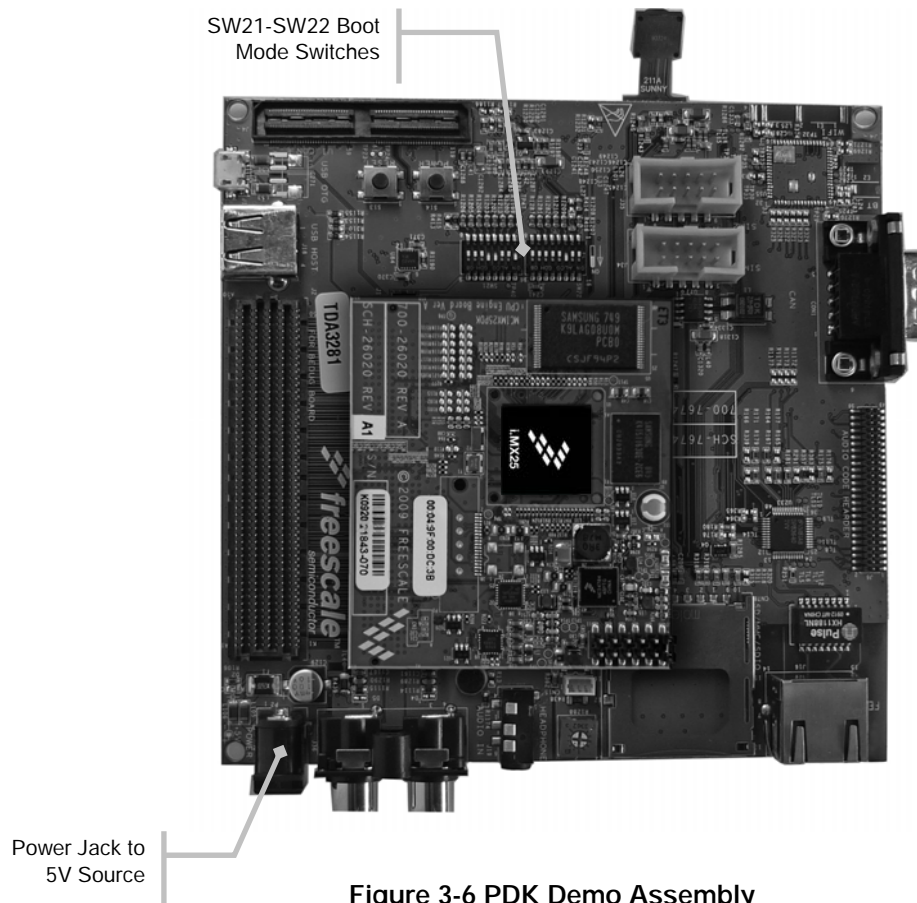
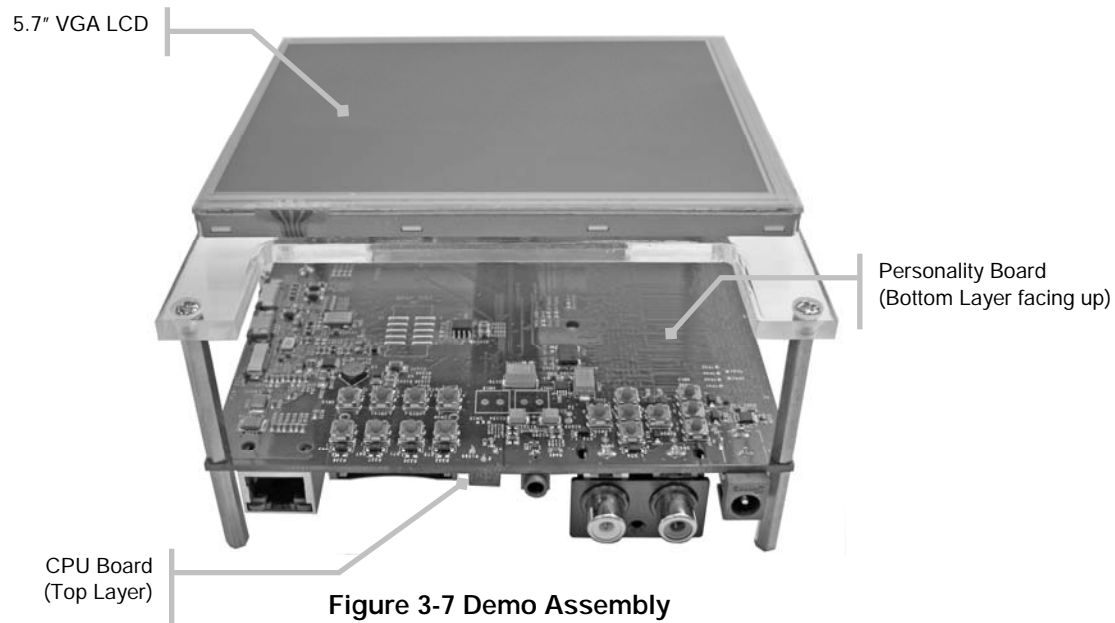


Figure 3-6 PDK Demo Assembly

The OS image pre-loaded in the 3-Stack should boot and the Windows Embedded CE 6.0 operating system should appear at the Personality board's LCD display.



Chapter 4

Using the Demo Image

This chapter explains how to use the touch panel and stylus to load the multimedia content to the 3-Stack platform, using the provided demo image.

4.1 Multimedia Codecs Content

The Windows Embedded CE 6.0 Demo Images contain a set of multimedia codecs that support various use cases. These codecs are optimized to run on the i.MX25 platform.

For a list of the provided codecs, see *i.MX25 PDK Windows Embedded CE 6.0 Demo Image Readme*.

For more information about the multimedia codecs, contact a Freescale sales representative or distributor.

4.2 Touch Pad Calibration Tool

After you have assembled and powered on the 3-Stack board, the Windows Embedded CE 6.0 image that was loaded to the board boots up. The first image displayed is the touch pad calibration tool, which displays a cross in the center, as shown in the partial screen image in Figure 4-1.

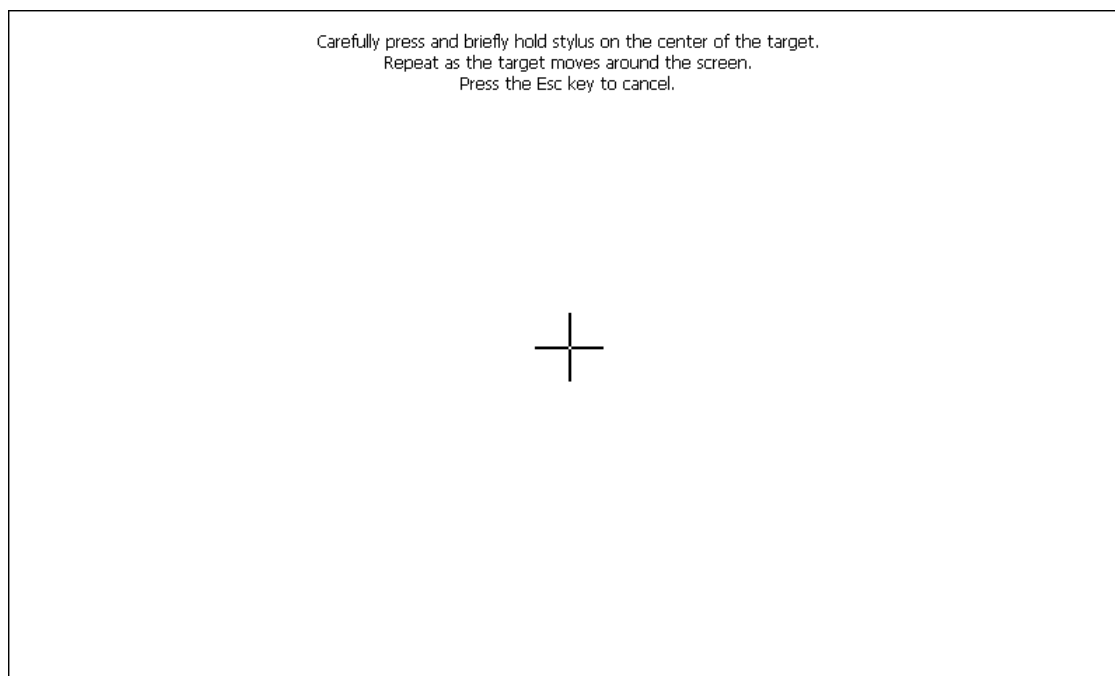
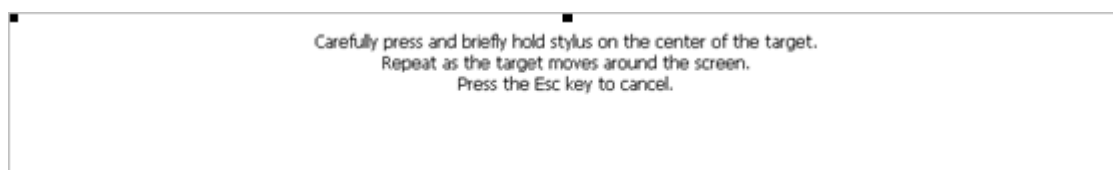


Figure 4-1 Touch Pad Calibration Tool

To calibrate the Touch Panel, use these steps:

1. Using the stylus pen, click on the cross.

The cross moves to the four corners of the screen. If the calibration error is too large, the program will reset and the process must be repeated. When the touch panel calibration is successful, the following message is displayed:



2. Tap with the stylus pen in any part of the screen.

The Windows CE desktop is displayed (Figure 4-2.)

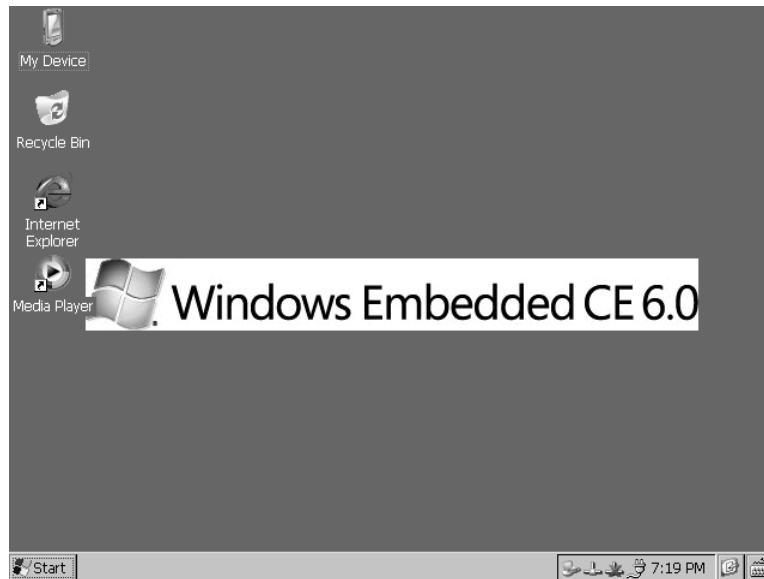


Figure 4-2 Windows Embedded CE Desktop

4.3 Downloading Multimedia to the 3-Stack Board

There are three ways to load multimedia content to the 3-Stack board using the Windows Embedded CE 6.0 image provided:

- Using ActiveSync®
- Using an SD Card
- Using a USB Card

4.3.1 Using ActiveSync

ActiveSync is a very useful tool to use with a Windows Embedded CE 6.0 device. To obtain the ActiveSync download and instructions, go to:

<http://www.microsoft.com/windowsmobile/activesync/activesync45.mspx/>

When ActiveSync is installed, you can set up communications between the 3-Stack board and your host PC.

To establish communications between the Host PC and the 3-Stack board, use these steps:

1. Ensure that the 3-Stack board is ON and running the Windows Embedded CE 6.0 image.
2. Ensure that ActiveSync is running on your host PC (the ActiveSync icon should appear gray on the Windows task bar).
3. Using the microUSB B to type A cable provided in your kit, connect the microUSB B end to the J10 USB OTG connector on the Personality board, and then connect the other end to the any available USB port on your Host PC.

Windows recognizes the 3-Stack board as a Windows Embedded CE 6.0 device, and the ActiveSync wizard is displayed on the Host PC (Figure 4-3).



Figure 4-3 Setting Up a Partnership

4. Select **Yes**, and then click **Next**. The Select Synchronization Settings options are displayed (Figure 4-4).

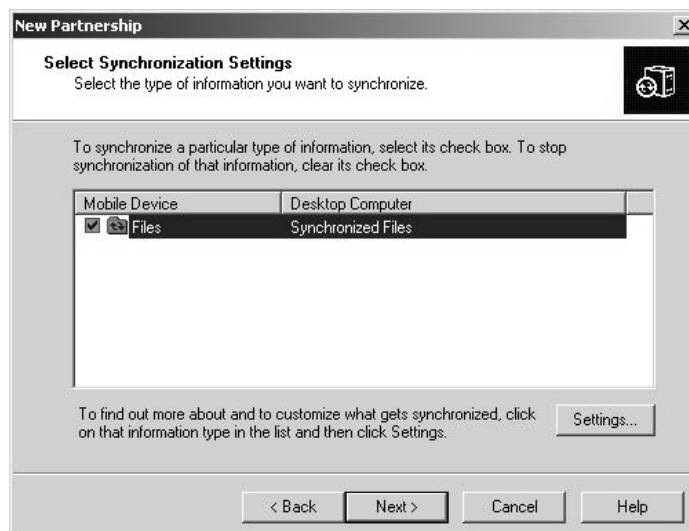


Figure 4-4 Selecting Synchronization Options

5. Select the **Files** option on the Select Synchronization Settings window (Figure 4-4).
The following message is displayed (Figure 4-5). The message notes that the program will create a folder to transfer files to the mobile device.

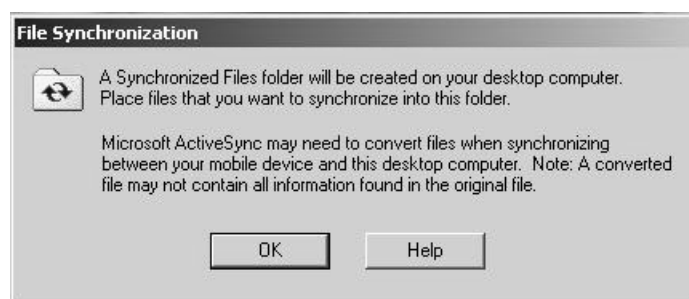


Figure 4-5 Warning from ActiveSync File Synchronization

6. Click **OK**.

7. Continue through the wizard until it is complete.

When ActiveSync establishes communications with the 3-Stack board, the ActiveSync main window (Figure 4-6) is displayed, noting the status of the connection.



Figure 4-6 Viewing the Connection Status

8. To browse the Mobile Device (3-Stack) folders, click the Explore icon in the ActiveSync window.

A new Windows Explorer window for your Mobile Device opens on the Host PC (Figure 4-7).

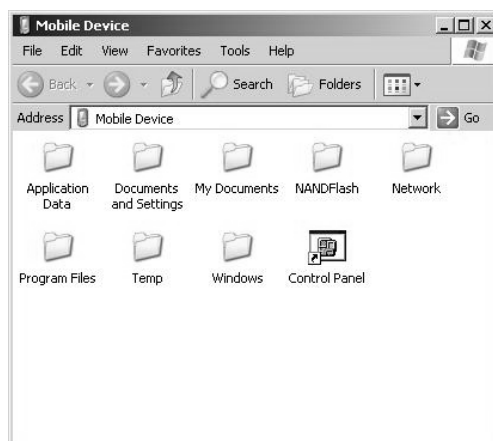


Figure 4-7 Windows Explorer for Mobile Device

9. To download a multimedia file, drag the file to the Mobile Device window.

The ActiveSync program transfers the file to the board and displays a message indicating that the file will be converted.

10. Click **OK**.

The download begins.

NOTE

For more information about the multimedia files supported by the Windows Embedded CE 6.0 image pre-loaded in the board, see *i.MX25 PDK Windows Embedded CE 6.0 Demo Image Readme*, which is included in the PDK documentation.

11. To access the files, double-click the My Device icon in the Windows Embedded CE 6.0 desktop (on the 3-Stack board).

A Windows Explorer window displays the content you downloaded with ActiveSync (Figure 4-8).

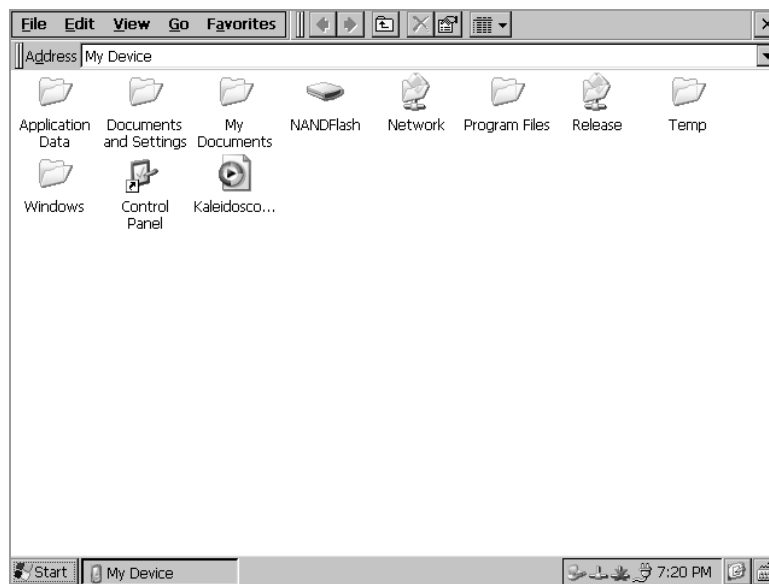


Figure 4-8 Downloaded Content

12. Plug the headphones into the J19 Audio/Video jack connector on the Personality board.
13. Double-click your multimedia file to play the file.

4.3.2 Using an SD Card

If you have an SD Card with pictures or other multimedia content, you can use the 3-Stack Board to view its content.

To use the SD Card, follow these steps:

1. Ensure that the 3-Stack is powered on and running the Windows Embedded CE 6.0 demo image.
2. Insert the SD Card in the MMC/SD Card slot (CN78), which is located on the top layer of the Personality board.
3. Click the My Device icon located in the Windows Embedded CE 6.0 desktop.

A Windows Explorer window opens, displaying the SD Memory icon (Figure 4-9).

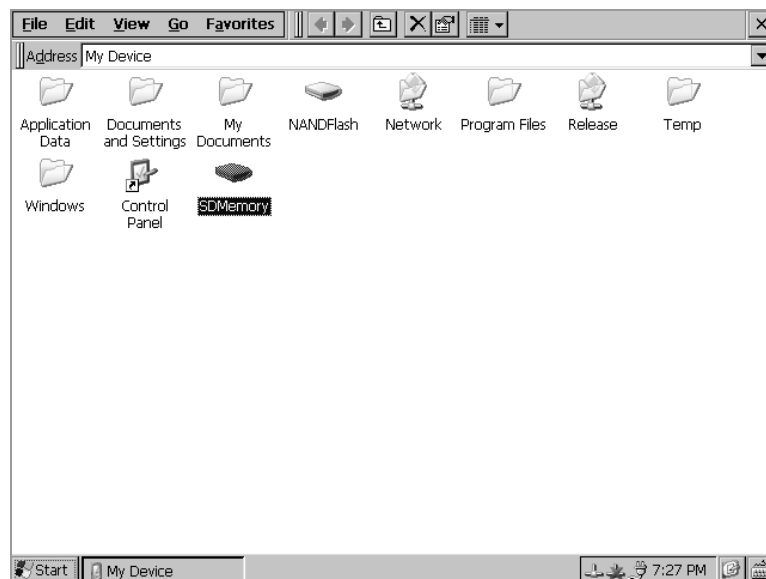


Figure 4-9 Viewing the SD Memory Icon

4. To access the SD Card content, double click the SD Memory icon.

4.3.3 Using a USB Memory Stick

To connect the USB memory stick to the 3-Stack board, you need a USB micro AB-to-A female connector.

Use these steps:

1. Ensure that the 3-Stack is ON and running the Windows Embedded CE 6.0 demo image.
2. Connect the adapter to J18 USB Host connector on the Personality board, and connect the USB memory stick to the adapter.
3. Click on the My Device icon in the Windows Embedded CE 6.0 desktop.

A Windows Explorer window opens, displaying the Hard Disk icon (Figure 4-10).

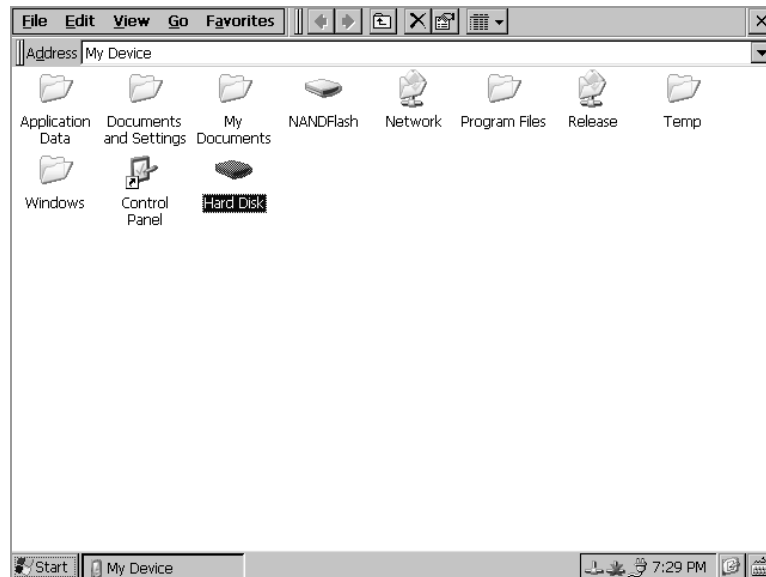


Figure 4-10 Viewing the Hard Disk Icon

4. Double-click the Hard Disk icon to view the files in the USB memory.

4.4 Running the Demo Applications

The Windows Embedded CE 6.0 image that is pre-loaded on the 3-Stack board includes the demo applications described in Table 4-1.

Table 4-1 Demo Applications Included in OS Demo Image

Application	Description
camapp.exe	Camera demo application. Application to demonstrate the OV2640 functionality.
switchusb2msc.exe	Application that enables the USB OTG as a mass storage device. Most have a storage device (such as NAND, SD Card, ATA .)
switchusb2rndis.exe	Application that enables the USB OTG as RNDIS device, to provide ETH access via USB OTG.
switchusb2serial.exe	Application that enables the USB OTG as a serial device; this mode is needed to use ActiveSync. By default the USB OTG is configured as a serial device.

To access the demo applications on the OS image, click the My Device icon on the 3-Stack board desktop. Open the Windows folder. The demo applications are displayed (Figure 4-11). To run an application, double-click the application icon.

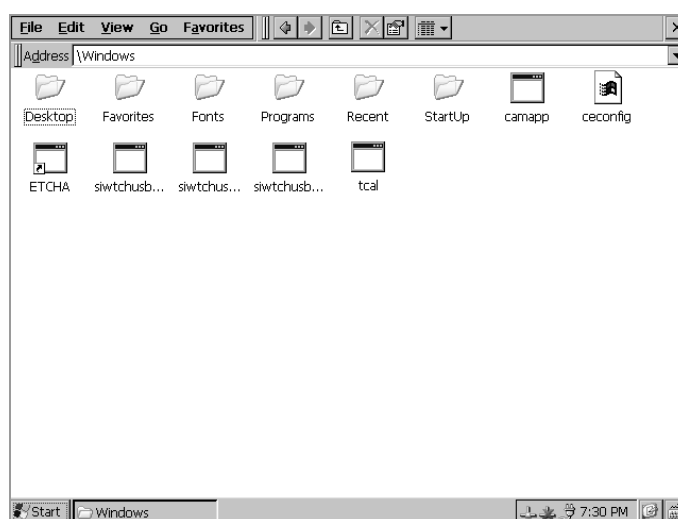


Figure 4-11 Demo Applications in Windows Folder

Chapter 5

Ready to Begin Your Development?

If you are ready to develop new applications using the i.MX25 PDK, use the following documents to locate the information required for your development:

- i.MX25 PDK Hardware User's Guide provides all of the hardware information for the 3-Stack board, including the connectors, switches, options, and pins.
- i.MX25 PDK Windows Embedded CE 6.0 Release Notes provides the tools needed to use the PDK, including the driver availability and known errors.
- i.MX25 PDK Windows Embedded CE 6.0 User's Guide explains how to build and modify a Windows Embedded CE 6.0 image and deploy the image to the 3-Stack board.
- i.MX25 PDK Windows Embedded CE 6.0 Reference Manual provides detailed information about the Windows BSP drivers, including functional information, dependencies, and building options for each driver.
- i.MX25 PDK Windows Embedded CE 6.0 Hello World Application Note explains how to create a simple Hello World application using Microsoft Platform Builder 6.0.

For additional information, see the support documentation in your i.MX25 PDK package.

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