

Xilinx MicroBlaze and PowerPC Processor Embedded Kit - Virtex-5 FX70T FPGA Edition

Getting Started Guide

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Revision History

The following table shows the revision history for this document.

Date	Version	Revision
07/28/09	1.0	Initial Xilinx release.
07/30/09	1.0.1	Minor update.

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About This Guide

The Xilinx MicroBlaze™ and PowerPC® Development Kit - Virtex®-5 FX70T Edition is designed to help you quickly and efficiently develop embedded systems using a fully integrated development platform.

Guide Contents

This manual contains the following chapter:

- [“Xilinx MicroBlaze and PowerPC Embedded Kit - Virtex-5 FX70T FPGA Edition”](#)

Additional Resources

To find additional documentation, see the Xilinx website at:

<http://www.xilinx.com/support/documentation/index.htm>.

To search the Answer Database of silicon, software, and IP questions and answers, or to create a technical support WebCase, see the Xilinx website at:

<http://www.xilinx.com/support/mysupport.htm>.

Conventions

This document uses the following conventions. An example illustrates each convention.

Typographical

The following typographical conventions are used in this document:

Convention	Meaning or Use	Example
Courier font	Messages, prompts, and program files that the system displays	<code>speed grade: - 100</code>
Courier bold	Literal commands that you enter in a syntactical statement	<code>ngdbuild design_name</code>
Helvetica bold	Commands that you select from a menu	File → Open
	Keyboard shortcuts	Ctrl+C

Convention	Meaning or Use	Example
Italic font	Variables in a syntax statement for which you must supply values	<code>ngdbuild design_name</code>
	References to other manuals	See the <i>Development System Reference Guide</i> for more information.
	Emphasis in text	If a wire is drawn so that it overlaps the pin of a symbol, the two nets are <i>not</i> connected.
Square brackets []	An optional entry or parameter. However, in bus specifications, such as <code>bus [7:0]</code> , they are required.	<code>ngdbuild [option_name] design_name</code>
Braces { }	A list of items from which you must choose one or more	<code>lowpwr = {on off}</code>
Vertical bar	Separates items in a list of choices	<code>lowpwr = {on off}</code>
Vertical ellipsis . . .	Repetitive material that has been omitted	IOB #1: Name = QOUT' IOB #2: Name = CLKIN' . . .
Horizontal ellipsis ...	Repetitive material that has been omitted	<code>allow block block_name loc1 loc2 ... locn;</code>

Online Document

The following conventions are used in this document:

Convention	Meaning or Use	Example
Blue text	Cross-reference link to a location in the current document	See the section “ Additional Resources ” for details. Refer to “ Title Formats ” in Chapter 1 for details.
Blue, underlined text	Hyperlink to a website (URL)	Go to http://www.xilinx.com for the latest speed files.

Xilinx MicroBlaze and PowerPC Embedded Kit - Virtex-5 FX70T FPGA Edition

Introduction

The Xilinx MicroBlaze™ and PowerPC® Development Kit - Virtex®-5 FXT70 Edition is designed to help you quickly and efficiently develop embedded systems using a fully integrated development platform.

This getting started guide provides a detailed description of what is included in the kit along with instructions on how to get started developing embedded systems using MicroBlaze or PowerPC processors with Virtex-5 FXT FPGAs.

Development Kit Contents

What's inside the Box

- Virtex-5 FX70T FPGA-based ML507 Board along with
 - ◆ Power supply
 - ◆ USB download/debug cable
 - ◆ Serial cable
 - ◆ Ethernet cable
 - ◆ DVI Adapter and SATA cross-over cable
 - ◆ CompactFlash card - 512 MB
- Xilinx ISE® Design Suite 11 DVD that includes
 - ◆ ISE Foundation with ISE Simulator
 - ◆ PlanAhead Design and Analysis Tool
 - ◆ Embedded Development Kit (EDK)
 - Xilinx Platform Studio (XPS)
 - Software Development Kit (SDK)
 - ◆ ChipScope Pro software
- Getting started guide

What's Available Online

- License for ISE® Design Suite 11 Embedded Edition
 - ♦ <http://www.xilinx.com/getproduct>
 - ♦ <http://www.xilinx.com/tools/faq.htm>
- Development Kit home page with Documentation and Reference Designs
 - ♦ <http://www.xilinx.com/v5embedded>
- Technical Support
 - ♦ <http://www.xilinx.com/support/>

Getting Started with Pre-Built Demos

This Virtex-5 FXT Embedded Kit comes with a number of pre-installed demos available on the provided CompactFlash card. You can run them before installing any additional tools to get an overview of the features of the ML507 development board using a PowerPC440® processor system in the Virtex-5 FX70T FPGA.

Processor System Used for the Demos

The pre-installed demos use a pre-built Virtex-5 FPGA design with the following features (Figure 1):

- PowerPC440 processor
- External DDR2 memory interface
- External memory controller (EMC) for ZBT SRM
- On-chip memory (block RAM)
- Networking (Ethernet)
- UART
- Interrupt controller (INTC) and timer
- CompactFlash (System ACE interface)
- GPIO (LEDs, LCD, switches)

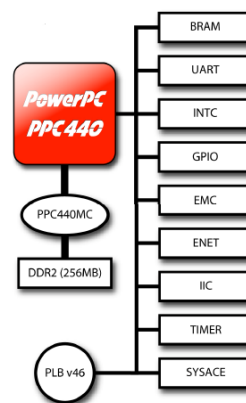


Figure 1: Processor System

Demo Hardware Setup Instructions

1. Connect the ML507 power supply
2. Connect the Xilinx platform cable USB (Figure 2) to the ML507 Board and the host PC



Figure 2: Platform Cable USB

3. Connect the RS-232 null modem cable (Figure 3) to the ML507 Board and the host PC



Figure 3: RS-232 Null Modem Cable

4. Connect either a DVI monitor to the ML507 board or use the provided DVI/VGA adapter (Figure 4) to connect to a VGA monitor



Figure 4: DVI/VGA Adapter

5. Connect a USB keyboard (Figure 5)



Figure 5: USB Keyboard

6. Confirm the following ML507 jumper settings for Ethernet connection
 - ◆ Set both J22 and J23 to positions 1-2 ([Figure 6](#))

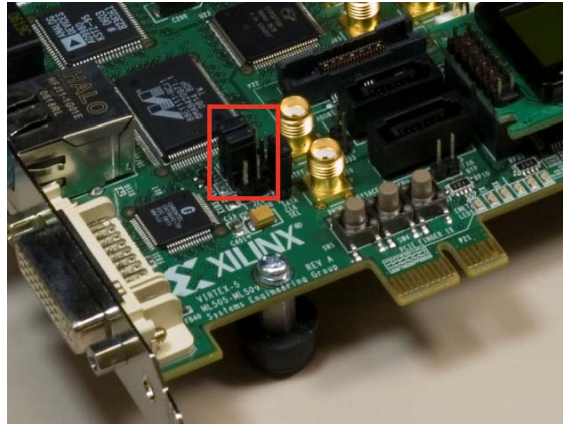


Figure 6: ML507 Jumper Settings

7. Insert the provided CompactFlash card into the board ([Figure 7](#)) as shown in (1) below
8. Set the Front DIP switches (SW3) to 00010101 (1=ON) as shown in (2) below
9. Set the Back DIP switches (SW6) to 11001010 as shown in (3) below

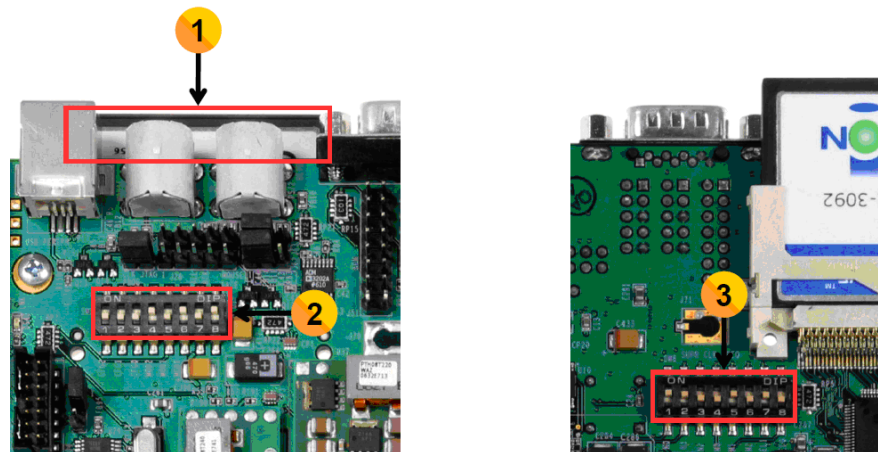


Figure 7: CompactFlash Card and Switch Settings

10. Start a serial communication program like HyperTerminal or TeraTerm (Figure 8) on the host PC with the following settings
 - ◆ Baud rate: 9600
 - ◆ Data bits: 8
 - ◆ Parity: None
 - ◆ Stop bits: 1
 - ◆ Flow control: None

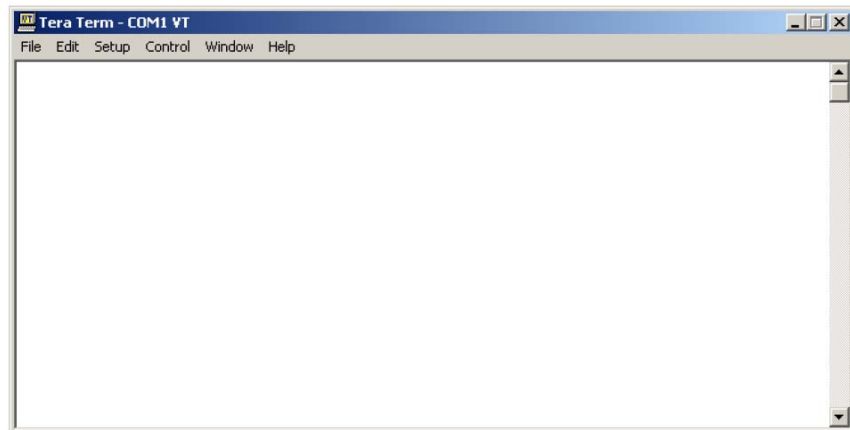


Figure 8: Serial Communication Program Window

Now you are ready to run the pre-installed Demos with this kit. Follow the next set of instructions to run the demos

Running the Demos

1. Power on the ML507 board
 - ◆ You will see the messages on the LCD screen and the Terminal program (Figure 9) as shown below
 - ◆ You can select a specific demo by pressing the push buttons on the board or by typing on the Terminal program

Note: After each demo, press the SysACE reset to return to the demo menu

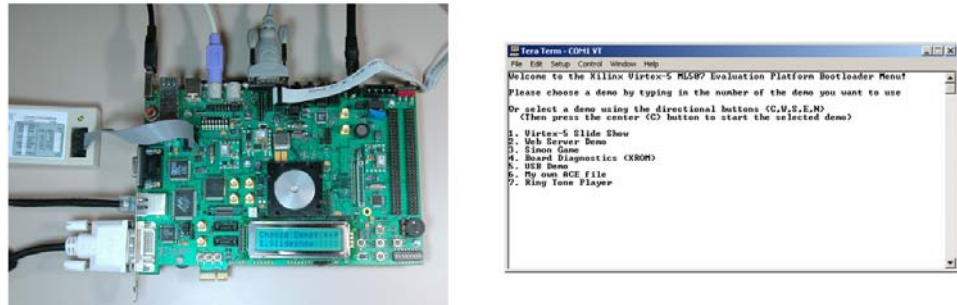


Figure 9: ML507 Board and Demo Window

2. Type 1 in the Terminal program to load the slideshow demo program (Figure 10)
 - ◆ You will see the following messages on the Terminal & LCD screens
 - ◆ On the DVI or VGA monitor, you will see a series of slides as shown below



Figure 10: Load the Slideshow Demo Program

You can run through the other pre-installed demos in a similar manner. For detailed demo instructions, please read the "ML507 QuickStart" document in the following page:

http://www.xilinx.com/products/boards/ml507/reference_designs.htm

You have now run some demos using the ML507 board with Virtex-5 FX70T FPGA and MicroBlaze & PowerPC440 processors. Since you are using an FPGA, you can fully customize these processor systems or create your own designs for the Virtex-5 FXT FPGA. In order to do that, you need to install the ISE Design Suite 11 tools on your computer. The next section of this document will guide you through those steps.

Installation and Licensing of ISE Design Suite 11

Installing the Tools

- Run the ISE Design Suite 11 Installer
 - ◆ Option 1: Insert the ISE Design Suite 11 DVD included in this kit into your computer
 - If the Installer does not start automatically, run the "xsetup" executable from the DVD drive
 - ◆ Option 2: Run the Web Installer that you can download from <http://www.xilinx.com/support/download/index.htm>
- Follow the steps presented by the installer (Figure 11)
- Make sure you select the ISE Design Suite Product including the ISE Design Tools, Embedded Development Kit (EDK), and ChipScope Pro for installation as shown in Figure 11
- Follow the rest of the steps presented by the installer to complete the installation

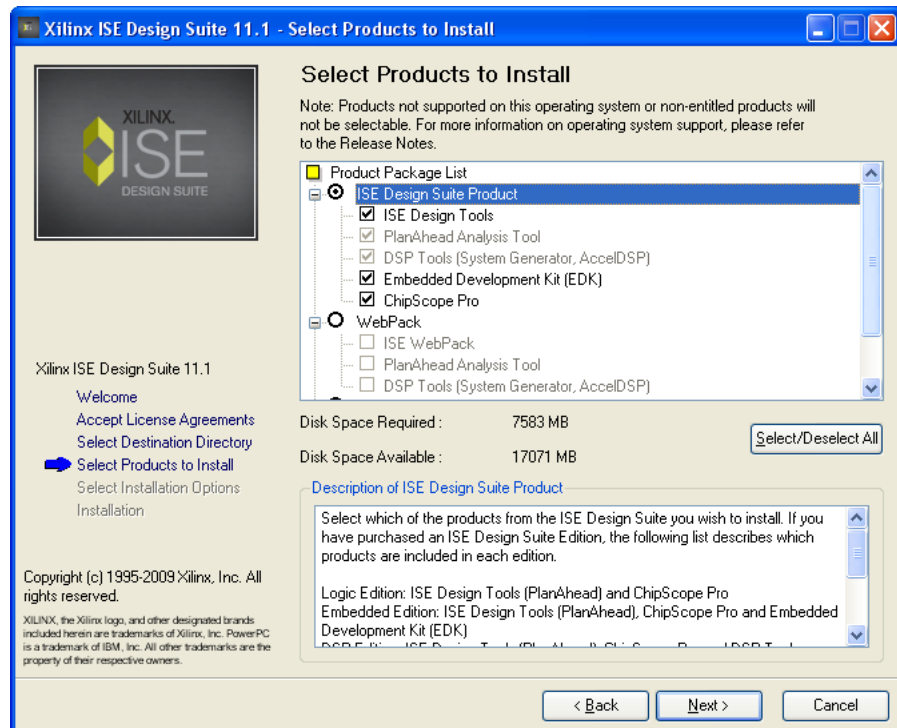


Figure 11: ISE Design Suite Installer

Note: This might take about 1 hour for the DVD installation or about 3 to 10 hours for the Web installation based on internet download speeds.

Note: You do not need to install any additional ISE Design Suite 11 updates for the initial evaluation of this kit.

Downloading and Installing Tool Licenses

This development kit comes with *entitlement* to a Node-Locked License to the ISE Design Suite: Embedded Edition and all associated updates for a one-year period.

Following are the key steps to download and install the ISE Design Suite licenses for your PC:

1. Visit the Xilinx software registration and entitlement site at <http://www.xilinx.com/getproduct>
2. Click on Generate Node-Locked License and follow the instructions to generate the license by providing your Host OS information and Host ID (Disk Serial number or Ethernet MAC address).

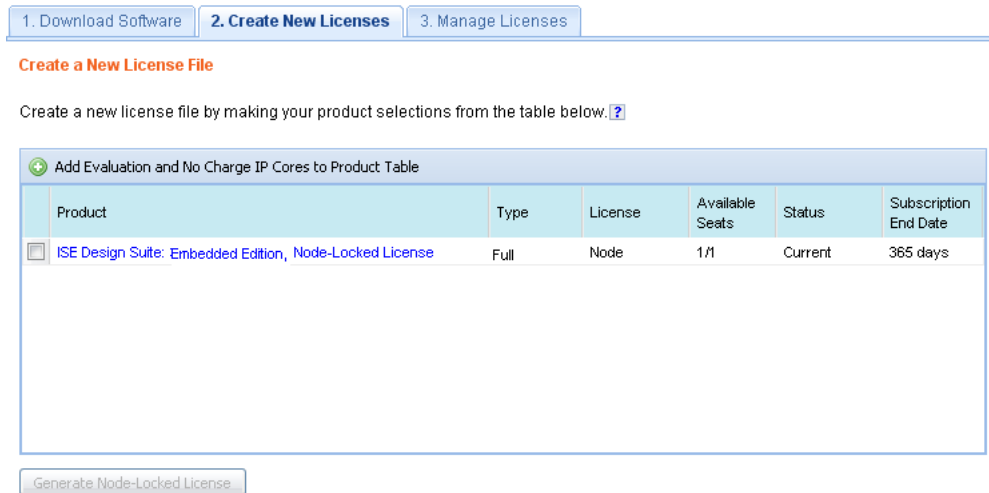


Figure 12: Download and Install Tool Licenses

3. Click on the Manage Licenses tab to download the license file or check your email for the license file attachment.
4. Start the Xilinx License Manager (Figure 13) (Start > Programs > ISE Design Suite 11 > Manage Xilinx Licenses) and click on "Copy License" to install the license on your computer.

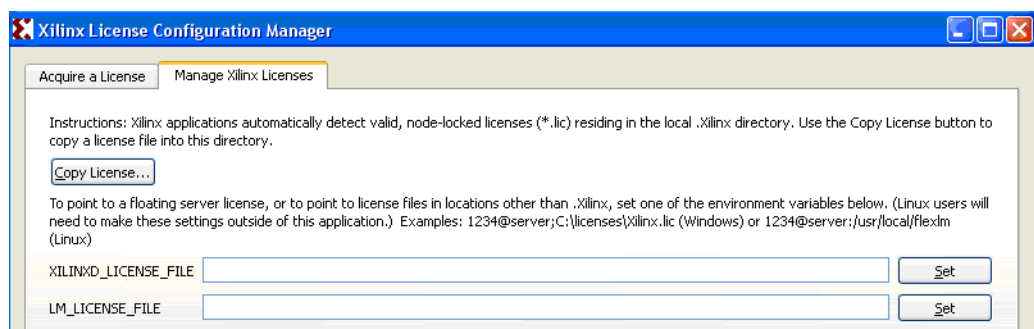


Figure 13: License Configuration Manager

Now you are ready to use Xilinx ISE Design Suite 11 Embedded Edition to create or modify your custom Embedded Systems using MicroBlaze or PowerPC440 processors.

For detailed information on licensing and installation, see the following guide: http://www.xilinx.com/support/documentation/sw_manuals/xilinx11/irn.pdf

You have now installed the ISE Design Suite 11 tools and setup the licenses for the Embedded Edition of the tools.

Next Steps

Now that you have run through some FPGA-based embedded processor demos and installed the ISE Design Suite Embedded Edition, you are ready to create custom embedded systems for the Virtex-5 FXT FPGA.

The following section provides pointers to various tutorials and reference designs that will help you get familiar with the embedded hardware and software tools needed to customize MicroBlaze and PowerPC440 designs for the Virtex-5 FXT FPGA.

All material below are accessible under the Reference Designs section from the Virtex-5 Embedded Kit home page: <http://www.xilinx.com/v5embedded>

Tutorials

- Base Processor Reference Design creation for PowerPC440 & MicroBlaze
http://www.xilinx.com/products/boards/ml507/ml507_11.1_1/bsb.htm#ml507_bsb_design
- Adding Standard EDK IP and Custom IP to the Base Processor Reference Design
http://www.xilinx.com/products/boards/ml507/ml507_11.1_1/bsb.htm#ml507_bsb_std_ip_design

Reference Designs

- PowerPC & MicroBlaze Base Processor Reference Designs
http://www.xilinx.com/products/boards/ml507/ml507_11.1_1/files/ml507_bsb_design.zip
http://www.xilinx.com/products/boards/ml507/ml507_11.1_1/files/ml507_bsb_design_ppc440.zip
- PowerPC & MicroBlaze Linux Reference Designs & Tutorial
http://www.xilinx.com/support/documentation/user_guides/ug511.pdf

Support

For questions regarding products within your online Product Entitlement Account, send an email message to your regional Customer Service Representative:

- Canada, USA and South America - isscs_cases@xilinx.com
- Europe, Middle East, and Africa - eucases@xilinx.com
- Asia Pacific including Japan - apaccase@xilinx.com

For Technical support, visit the site <http://www.xilinx.com/support> that contains the following resources:

- WebCase - Contact Technical Support via Web
 - ◆ Phone support information also available here
- Answer Browser - Quickly scan titles of Answers Database categories
- Forums - Discuss topics of interest in user communities
- Training - Select instructor-led classes and recorded e-learning options

Warranty

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