



Getting Started with EDK

Summary

This document introduces the Xilinx® Embedded Development Kit (EDK). It contains the following:

- “EDK Contents”
- “Requirements”
- “Supported Platforms”
- “Development Boards”
- “Installation on Windows”
- “Installation on Solaris”
- “Installation on Linux”
- “Third Party Tools”
- “Installation Directory Structure”
- “Documentation”
- “Other Information”

EDK Contents

Xilinx distributes the Embedded Development Kit as a single, media-installable DVD image.

The components of EDK are:

- Hardware IP for the Xilinx embedded processors and their peripherals
- Drivers, Libraries and a MicroKernel for Embedded Software Development
- Xilinx Platform Studio (XPS) tools
- Software Development Kit (SDK), Eclipse-based IDE
- GNU Compiler and Debugger for C development for MicroBlaze™ and PowerPC™
- Documentation
- Sample projects

© 2007 Xilinx, Inc. All Rights Reserved. XILINX, the Xilinx logo, and other designated brands included herein are trademarks of Xilinx, Inc. All other trademarks are the property of their respective owners.

NOTICE OF DISCLAIMER: Xilinx is providing this design, code, or information "as is." By providing the design, code, or information as one possible implementation of this feature, application, or standard, Xilinx makes no representation that this implementation is free from any claims of infringement. You are responsible for obtaining any rights you may require for your implementation. Xilinx expressly disclaims any warranty whatsoever with respect to the adequacy of the implementation, including but not limited to any warranties or representations that this implementation is free from claims of infringement and any implied warranties of merchantability

EDK does not include printed documentation material. Refer to the “[Documentation](#)” section for list of electronic documents included. Also not included but available as separate products are an FPGA development board and the Xilinx FPGA implementation tools package, ISE™ 9.1i. Refer to the “[Requirements](#)” and the “[Development Boards](#)” sections for further details.

Requirements

Several other products are required in addition to EDK:

- Xilinx ISE 9.1i Service Pack 1
 - ◆ The Xilinx FPGA design implementation tools, ISE 9.1i (WebPACK or Foundation), are required to implement embedded designs generated with the Platform Studio tools of EDK.
 - ◆ Several tools from EDK use functionality delivered with tools contained in ISE 9.1i.

Note: Updates to ISE 9.1i including service packs are available at <http://www.xilinx.com/support/mysupport.htm>.

- Development Board

To test your MicroBlaze or PowerPC system on an FPGA, you must have access to a development board which contains a Xilinx FPGA and several other components as well as standard download, configuration and debug connectors.

Operating system specific requirements:

- Solaris and Linux – Bash shell

Supported Platforms

Operating Systems

EDK is available for the following operating system platforms:

- Windows 2000 (Service Pack 2)
- Windows XP
- Solaris 2.8/2.9
- Red Hat Enterprise Linux 3.0

Xilinx FPGA Families

EDK supports designing MicroBlaze embedded processor systems for several FPGA families:

- Xilinx Spartan™-II FPGAs (XC2S50 or larger devices)
- Xilinx Spartan-IIE FPGAs
- Xilinx Spartan-3 FPGAs
- Xilinx Spartan-3E FPGAs
- Xilinx Spartan-3A FPGAS

- Xilinx Virtex™/E FPGAs (XCV50 or larger devices)
- Xilinx Virtex-II FPGAs (XC2V250 or larger devices)
- Xilinx Virtex-4 LX and SX FPGAs
- Xilinx Virtex-5 LX and LXT FPGAs

EDK also supports designing MicroBlaze and PowerPC embedded processor systems for the following:

- Xilinx Virtex-II Pro FPGAs
- Xilinx Virtex-4 FX FPGAs

Development Boards

Several development boards are available from Xilinx partners. Xilinx boards that are currently available include:

- Xilinx ML300 Board
- Xilinx ML310 Board
- Xilinx ML401 Board
- Xilinx ML402 Board
- Xilinx ML403 Board
- Xilinx ML405 Board
- Xilinx ML410 Board
- Xilinx ML501 Board
- Xilinx Spartan-3 Starter Kit
- Xilinx Spartan-3E Starter Kit
- Xilinx AFX Board

Contact your local Xilinx FAE for more information about the boards mentioned above.

Contact your local Avnet, Memec, Nu Horizons or other authorized distributor to obtain any partner board.

Installation on Windows

This section summarizes the EDK installation process on the Windows platform.

Registration

You must have a software registration ID to install EDK. You can get one online at http://www.xilinx.com/products/design_resources/design_tool/index.htm. Log in and provide software product information (including product ID). Xilinx e-mails the software registration ID to the address you provided during login.

Installing EDK

You must use the "Administrator" login when installing EDK on the Windows Platform. Xilinx also recommends using the "Administrator" login when running EDK on Windows.

To install EDK on your Windows PC, perform the following steps.

1. Insert the EDK Installation DVD into your PC. The installer opens automatically.
If the installation process does not start on its own, open Windows Explorer and double-click `setup.exe` on the DVD.

The installation process prompts you to obtain the registration ID.
2. Once you have the registration ID, continue to install the product.
If the environment variable `XILINX_EDK` is set, the default directory for installation is the value of the variable `%XILINX_EDK%`. Otherwise, the default EDK installation directory is `c:\EDK`. You can change this to any other directory.

Note: The destination directory cannot have spaces in its name.

Environment Variables

The EDK installer creates or modifies the following variables on your machine. These variables are added to the system settings.

- ◆ `XILINX_EDK`
Sets the value of this variable to the installation directory.
- ◆ `PATH`
Prefixes the `PATH` environment variable with `%XILINX_EDK%\bin\nt`.

EDK tools require the Cygwin tools distributed by Red Hat. A copy of these tools is distributed with the EDK installation. When you run XPS, the SDK IDE, or Xilinx Shell, your registry is checked for the entry `My Computer\HKEY_CURRENT_USER\SOFTWARE\Cygnus Solutions\Cygwin`. If a compatible version of Cygwin is found pre-installed on your machine, the EDK tools use it. Otherwise, the registry is set up to point to the Cygwin tools distributed in the EDK installation area.

Network Installation

To install EDK for access on a network, perform the following steps.

1. Install the EDK software tools on a PC network server.
Make sure that your users know the location of the software tools and have access to the installation directory, and that they have administrator privileges for the following steps.
2. From the local client machine, browse to the following directory:
`network_install_location\bin\nt` and run `setXenv.bat`. Running this program sets up the environment and registry settings needed to run the Xilinx tools from the remote location.
3. Map a network drive, to
`\\name_of_your_server\network_install_location`.
4. Run `setXenv.bat`, in `mount_point:\bin\nt`.

Installation on Solaris

This section summarizes the EDK installation process on the Solaris platform.

Registration

You must have a software registration ID to install EDK. You can get one online at http://www.xilinx.com/products/design_resources/design_tool/index.htm. You must log in and provide software product information (including product ID). Xilinx e-mails the software registration ID to the address you provided during login.

Installing Xilinx EDK

To install EDK on your Solaris machine, perform the following steps.

1. Insert the DVD in your Solaris machine.
2. Change the directory to the DVD home.
3. Run `setup` to install EDK.

The installer prompts you for the registration ID that you obtained from the web site indicated above.

Note: If the variable `$XILINX_EDK` is set, its value is used as the default directory for installation. If the value of the variable is not set, the default directory for installation is `$HOME/EDK`. You can change the destination directory during installation.

Environment Variables

The EDK installer creates `settings.csh` and `settings.sh` files in the installation directory. These files set up the environment for using the EDK tools.

- ◆ `$XILINX_EDK`
Sets the value of this variable to the installation direction.
- ◆ `$PATH`
Prefixes the `$PATH` environment variable with
 - `$XILINX_EDK/bin/sol`
 - `$XILINX_EDK/gnu/microblaze/sol/bin`
 - `$XILINX_EDK/gnu/powerpc-eabi/sol/bin`
- ◆ `$LD_LIBRARY_PATH`— Prefixes the `$LD_LIBRARY` environment variable with `$XILINX_EDK/bin/sol`

Note: While executing the script, make sure that the `$XILINX_EDK/bin/sol` appears before `$XILINX/bin/sol` in the `$LD_LIBRARY_PATH` variable.

Installation on Linux

This section summarizes the EDK installation process on the Linux platform.

Registration

You must have a software registration ID to install EDK. You can get one online at http://www.xilinx.com/products/design_resources/design_tool/index.htm. You must log in and provide software product information (including product ID). Xilinx e-mails the software registration ID to the address you provided during login.

Installing Xilinx EDK

To install EDK on your Linux machine, perform the following steps.

1. Insert the DVD in your Linux machine.
2. Change the directory to the DVD home.
3. Run `setup` to install EDK.

The installer prompts for the Registration ID that you obtained from the web site indicated above.

Note: If the variable `$XILINX_EDK` is set, its value is used as the default directory for installation. If the value of the variable is not set, the default directory for installation is `$HOME/EDK`. You can change the destination directory during installation.

Environment Variables

EDK installer creates `settings.csh` and `settings.sh` files in the installation directory. These files set up the environment for using the EDK tools.

- ◆ `$XILINX_EDK`—Sets the value of this variable to the installation direction.
- ◆ `$PATH`—Prefixes the `$PATH` environment variable with
 - `$XILINX_EDK/bin/lin`
 - `$XILINX_EDK/gnu/microblaze/lin/bin`
 - `$XILINX_EDK/gnu/powerpc-eabi/lin/bin/`
- ◆ `$LD_LIBRARY_PATH`— Prefixes the `$LD_LIBRARY` environment variable with `$XILINX_EDK/bin/lin`

Note: While executing the script, make sure that the `$XILINX_EDK/bin/lin` appears before `$XILINX/bin/lin` in the `$LD_LIBRARY_PATH` variable.

Third Party Tools

EDK is designed to work with some third party tools that you can separately obtain and set up. This section provides some information on these tools.

IBM CoreConnect Toolkit

EDK is designed to integrate seamlessly with the IBM[®] CoreConnect[™] Toolkit. This toolkit is not included with EDK, but is required if bus functional simulation is desired.

The toolkit provides a number of features that enhance design productivity. To obtain the toolkit, you must have a license for the IBM CoreConnect Bus Architecture. Licensing CoreConnect provides access to a wealth of documentation, Bus Functional Models, Hardware IP as well as the toolkit.

Xilinx provides a Web-based licensing mechanism that allows you to obtain CoreConnect from the Xilinx website. You can license CoreConnect online at http://www.xilinx.com/products/design_resources/proc_central/index.htm.

Once the request is approved, which typically takes 24 hours, you will receive an email granting access to the protected web site. You can then download the toolkit.

For further documentation on the CoreConnect Bus Architecture, refer to IBM's CoreConnect website at <http://www.ibm.com/chips/products/coreconnect>.

You can also get the CoreConnect license directly from IBM.

There are some differences between the IBM CoreConnect and the Xilinx implementation of CoreConnect. These are described in the *Embedded Processors IP Handbook*. Refer to *On-Chip Peripheral Bus V2.0 with OPB Arbiter* for differences in the OPB bus, *Processor Local Bus (PLB) V3.4* for differences in the PLB bus, and *Device Control Register Bus (DCR) V2.9* for differences in the DCR bus.

Installation Directory Structure

The installed image of EDK is organized into the following directories, where `<edk_install_dir>` is the location of the root of EDK image.

Table 1: EDK Directories

Directory	Description
<code><edk_install_dir>/</code>	This directory is the installed EDK root directory.
<code>bin/</code>	This directory contains Embedded System Tools (EST) application executables. The EDK installer has already set up your environment variables to include the executables of the EST tools that reside in the <code>bin</code> directory.
<code>boards/</code>	This directory contains board description files. The <code>boards</code> directory provides board files for Xilinx boards, which are required by the Base System Builder for creating embedded systems.
<code>doc/</code>	This directory contains the EDK documentation. All EDK-related documentation resides in the <code>doc</code> directory. Refer to "Documentation" on page 8.

Table 1: EDK Directories (Continued)

Directory	Description
data/	This directory has default option files required by ISE tools.
eclipse/	This directory contains files for the Platform Studio Software Development Kit (Eclipse based). Available only on Windows and Linux platforms.
gnu/	This directory contains the EST GNU Tools.
hw/	This directory contains MicroBlaze processor and peripheral hardware components. The hw directory contains the untailed sources of the hardware IP of the MicroBlaze processor and its peripheral components.
java/	This directory contains Java Runtime 1.4.2 required by SDK.
sw/	This directory contains drivers, BSPs and software services [Xilinx MicroKernel]. The sw directory contains the drivers required by the IP installed in the hw directory, the board support packages. It also contains the source for various modules of the Xilinx MicroKernel, such as the Networking library and the file system. Software libraries and initialization files are also contained in the sw directory.
third_party/	This directory contains IBM Instruction Set Simulator.
cygwin/	This directory contains emulation of UNIX shell. This is available only on Windows platforms. cygwin is a portability layer that is installed on all Windows platforms automatically.
EDKexamples/	This directory contains sample projects.

Documentation

EDK documentation is organized into several individual components, all of which are accessible from the EDK documentation directory, *edk_install_dir/doc*.

EDK Documentation PDF files

The EDK documentation has the following categories of information:

- Getting Started with EDK
- Tools and Processor IP Reference Guides
- Processor Reference Guides

The information in these documents has been arranged in such a way as to assist all users, from those who are new to EDK and embedded systems to experienced EDK developers, looking for specific information.

Getting Started with Xilinx EDK

Getting Started Guide with EDK (this document) presents the following:

- Description of all the required steps for installation on various platforms.
- Description of the third party tools that can be used along with the Xilinx EDK to increase productivity.
- Information about the documentation available in EDK.
- Miscellaneous information that you should be aware of before using EDK.

Platform Studio User Guide

The *Platform Studio User Guide* is no longer available. Its content has been redistributed as follows:

- Reference material, tool descriptions, and command line mode information were moved to the *Embedded System Tools Reference Manual*.
- Instructions on how to use the XPS GUI were moved to the XPS Help.

Tools and IP References

EDK provides reference guides that cover the basic usage of the various tools it provides.

Tools Reference Manuals

- *Embedded System Tools Reference Manual*
This manual provides detailed information about all the tools available in the EDK suite, including XPS, Xilinx Microprocessor Debugger (XMD), Libgen, Simgen, Platgen, GNU compiler (GCC) and debuggers.
- *IBM PowerPC ISS Reference Guide*
EDK provides a third party tool for simulation of PowerPC™ systems. The documentation for this is included in a separate guide, the *IBM PowerPC ISS Reference Guide*.

Libraries and Drivers Reference Documents

- *OS and Libraries Document Collection*
This set of documents details all the information about the libraries shipped as a part of EDK. It details the API and is required for customers who intend to use the provided libraries. The document collection includes a Standalone Board Support Package (BSP) document and an introduction to driver documentation.
- *Driver Reference Guide*
This guide provides detailed API and other information for each driver provided in the EDK installation. This guide is presented as a web page with links to a set of web-based documentation.

IP Reference Guide

- *Processor IP Reference Guide*

Processor IP is an important part of the EDK distribution. Its documentation consists of individual datasheets with important information about parameters and port connections for each IP. This information is required by hardware designers for designing their system. For systems created through the Base System Builder, some of the basic connections are done by a wizard, but for advanced connections and other peripherals, refer to the *Processor IP Reference Guide*.

This guide also provides easy access to the core data-sheet, modification history, architecture support information and ready access to purchase information for pay cores. It is presented as a web page with links to a set of web-based documentation.

Processor References

PowerPC

- *PowerPC Processor Reference Guide*

This document is intended to serve as a stand-alone reference for application and system programmers of the PowerPC 405D5 processor. This document also contains the API and the instruction set architecture of PowerPC405.

- *PowerPC 405 Processor Block Reference Guide*

This manual details the Xilinx implementation of PowerPC. It is targeted towards hardware and system designers.

- *PowerPC 405 Processor ISA Extensions for Virtex-4*

This is an addendum documentation listing the new instructions provided for the Fabric Co-processor Module interface in Virtex-4 FX FPGAs.

MicroBlaze

- *MicroBlaze Processor Reference Guide*

This document is intended to serve as a stand-alone reference for application and system programmers of the MicroBlaze processor. The detailed ISA and the ABI for the MicroBlaze processor are also described in this document.

Other Information

Migrating Old Projects

Use the IP Core Version Management Wizard to help migrate older projects to the current version of XPS. It will point out changes to the cores, and in some cases, help you upgrade to newer revisions of cores currently in your project.

Example User Constraint Files (UCFs)

There are certain IPs such as the PLB RapidIO LVDS and the OPB PCI, which need certain example UCFs to be available in your project area. When such IPs are used in an EDK project, tools give out the following ALERT message:

```
An example UCF is available for this core and must be modified for use
in the system. Please refer to the EDK Getting Started guide for the
location of this file.
```

The UCF file for the IP can be found at:

```
$XILINX_EDK/hw/XilinxProcessorIPLib/pcores/peripheral_name/data/
```

where \$XILINX_EDK is the installation area.

Setting Up the Simulation Environment

For simulation of embedded designs, you must set up your simulation environment. This is required every time you install a new release or a service pack of EDK. For information about setting up simulation environments, refer to the XPS Help.

Third Party Tool Requirements

EDK tools support ModelSim PE/SE & NCSim LDV/IUS versions as supported by ISE 9.1i tools. The verification of EDK tools and processor IP is done using:

- Modelsim SE/PE 6.1e or later
- NCSim IUS 05.7-s005 or later (NCSIM 5.7 is not available on Windows)

Using EDK with ChipScope Pro

EDK enables hardware designers to create processor systems rapidly using the ChipScope™ Pro CoreConnect Bus Analyzer cores and the Virtual IO (VIO) core. EDK supports the following ChipScope Pro cores:

- chipscope_icon
- chipscope_opb_iba
- chipscope_plb_iba
- chipscope_vio
- chipscope_ila

To instantiate these cores in an EDK design, you must have a valid ChipScope Pro Installation. A 60-day evaluation version of ChipScope Pro for Windows platforms is provided on the EDK DVD. After the evaluation period is over, you can continue to instantiate the ChipScope Cores and create designs, but to use the ChipScope Analyzer GUI after the evaluation period, you must obtain a full license of ChipScope Pro from Xilinx or Xilinx distributors.

For more information, refer to http://www.xilinx.com/ise/optional_prod/cspro.htm.

