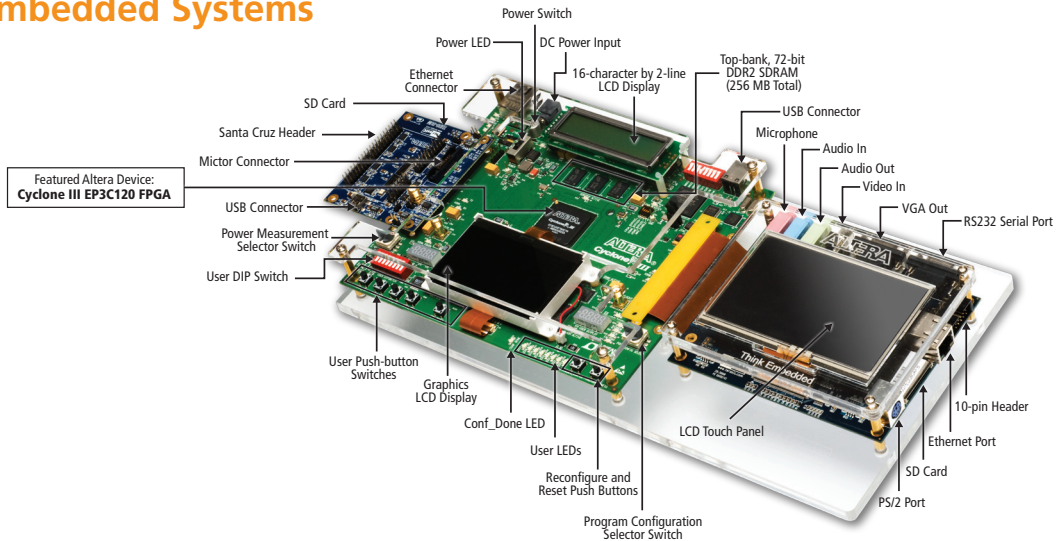# ALTERA

Embedded Systems Development Kit, Cyclone III Edition
Quick Start Guide

A Complete Development Platform for Prototyping Embedded Systems

What's in the Box

- Cyclone® III FPGA development board
  - Altera's Cyclone III EP3C120 FPGA with 120,000 logic elements (LEs)
  - Embedded USB-Blaster™ circuitry
  - 256-megabyte (MB), 8-MB PSRAM, 64-MB flash memory
  - USB 2.0, 10/100/1000 Ethernet, high-speed mezzanine card (HSMC) connectors
- LCD multimedia HSMC
  - 800 x 480 touch-screen LCD display
  - 24-bit CD-ROM quality audio coder/decoder (CODEC)
  - 10/100 Ethernet
  - SD/MMC card connector
  - VGA out (10-bit DAC), composite video input
  - RS232 and PS/2 mouse/keyboard
- HSMC to Santa Cruz/Mictor/USB/Mictor board (H2SUM)
  - USB 2.0 connector, SD card connector, and Mictor connector
  - Santa Cruz header
- Cables and accessories
  - SD card
  - USB-Blaster download cable
  - Loopback board
  - Debug header board
  - 14-V to 20-V power supply, international power cords
  - Ethernet (RJ-45) cable (7 feet), Ethernet crossover adapter

Experienced users can go directly to **www.altera.com/esdk** to download the development kit installer. You can order the Quartus® II software DVD and the Development Kit Installations DVD from the Literature section of the Altera® website at **www.altera.com/literature/lit-index.html**.

Introduction

The Altera Embedded Systems Development Kit, Cyclone III Edition is a complete development platform for prototyping embedded systems on Altera's low-cost, low-power FPGAs. As part of this development kit, you'll find everything you need to accelerate your embedded system development: hardware, example processor systems, software applications, FPGA, software development tools, and documentation.

Install the Software

The Altera Embedded Systems Development Kit User Guide will guide you through the steps to:

1. Install the following software from the Altera web page: **www.altera.com/download**

   Install ALL of the following:

   • Quartus II design software
   • Altera MegaCore® IP Library
   • Nios® II Embedded Design Suite (EDS)

2. Go to the following Altera webpage to download the development kit installer of the Altera Embedded Systems Development Kit, Cyclone III Edition and install it to your computer: **www.altera.com/esdk**

   By default, these files will be installed to:

   /altera/<version>/kits/cycloneIII_3C120_ embedded

3. Optional: Purchase IP for embedded designs that ship with this kit at **www.altera.com/esdk**

Directory Structure

- 📁 cycloneIII_3c120_embedded
  - 📁 board_design_files
  - 📁 demos
  - 📁 documents
  - 📁 examples
  - 📁 factory_recovery

Perform Power-on Test

As you unpack the box, you will notice there is no USB-Blaster. The USB circuitry is on the board.

Ensure that only the LCD multimedia HSMC is connected to HSMC port B of the Cyclone III FPGA development board.

1. Ensure that the POWER switch (SW2) on the Cyclone III FPGA development board is in the OFF (or UP) position.

2. Connect the 16-V DC adapter to the development board and to a power source.

   • Only use the supplied 16-V power supply. Power regulation circuitry on the board could be damaged by supplies greater than 16 V.

3. Slide the POWER switch to ON. The nearby blue Power LED lights up. Confirm that user LEDs 0-7 light up.

4. A welcome screen will display.

Launch Ready-to-run Demo Applications

You can launch the demo applications included in the Altera Embedded Systems Development Kit using the LCD color touch panel.

1. The first time the kit is powered on, you will see a demo menu of ready-to-run applications.

2. Scroll through the available demos using the touch-panel LCD display. Press "Info" to learn about the demo. Touch to select, and press "LOAD" to launch the application.

3. Recycle the power switch to return to the application selector menu.

Get Started with Your Embedded Development

To accelerate your embedded development process, use the pre-generated example processor systems that are provided as starting points for your own design.

A data sheet of the Nios II 3C120 Microprocessor Systems with LCD Controller can be found at **www.altera.com/esdk**. You can also find the complete Quartus II project files in the installed directory under /altera/<version>/kits/ cycloneIII_3C120_embedded/examples/lcd.

The software and intellectual property (IP) included in this kit allow you to evaluate and modify the example processor system included without purchasing a license. If you wish to ship a design *based on your modifications*, you will need to first purchase an IP. To purchase IP, visit **www.altera.com/esdk** or contact your local Altera representative, or use the Altera tools support to order today.

Table 1-2. Installed Directory Contents

Directory Name	Description of Contents
Board_design_files	Schematic, layout, assembly, and bill of materials
Documents	Kit documentation, user guide, hardware, and software tutorials
Examples	Contains design examples consisting of example processor systems and example software applications
Demos	Contains ready-to-run SD card demos and other design examples primarily for demonstration purposes only
Factory_recovery	Files for the SD card and flash used to restore the board to the factory default state

Learning Resources

Learning Goal	Resource
Create an FPGA hardware design	My First FPGA Design – hardware tutorial
Take an online software tutorial	Training* • Developing Software for Nios II Processor • Using the Nios II Software
Develop applications using Nios II processors	Literature* • Nios II Software Developers Handbook • Nios II Processor Handbook • Software and hardware tutorials and application notes Design examples* • Source code provided for design examples

*Access resources at **www.altera.com/embedded**

Evaluate the Software Development Tools

The Nios II EDS is a complete design suite for all your embedded development needs. Additionally, the Nios II EDS includes a developer's license for third-party software. The following software are provided for evaluation purposes. Refer to the user guide for instructions on how to license these products.

Evaluation Software

Nios II EDS Component	Description
Micrium's MicroC-OS II RTOS	Evaluation version for real-time operating system
NicheStack TCP/IP Network Stack, Nios II Edition	Evaluation version of commercial-grade network stack
SLS 4-wire SD card controller	Evaluation version of SD card controller
Nios II C2H Compiler	Evaluation version of ANSI C-to-Hardware Acceleration Compiler

Download More Designs

To get the latest information about this kit including documentation and designs, visit **www.altera.com/esdk** to download the latest.

Refer to the user guide to learn how to download new designs to your kit.

Related Links

- Altera Embedded Systems Development Kit, Cyclone III Edition website: **www.altera.com/esdk**

- Altera embedded processing web page: **www.altera.com/embedded**

- Altera Forum: **www.alteraforum.com**

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