Altera Embedded Systems Development Kit, Cyclone III Edition

from *Altera Corporation*

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The Altera® Embedded Systems Development Kit, Cyclone® III FPGA Edition is a complete development platform for proto-typing embedded systems on Altera's low-cost, low-power FPGAs.

Development hardware

- Cyclone III base board with high-speed mezzanine connectors (HSMCs) to interface to a wide range of daughter cards
- LCD multimedia HSMC to interface to common peripherals such as standard definition (SD) card, LCD color touch panel, etc.
- Multipurpose HSMC card for software debugging and developing interfaces for USB 2.0 and Santa Cruz daughter cards

Design examples

- Prebuilt processor systems
    - Nios® II 3C120 General Purpose Microprocessor System
    - Nios II 3C120 Microprocessor System with LCD Controller
- Ready-to-run demos for quickly evaluating processor systems, intellectual property (IP), and operating systems
- Example software applications with source code to accelerate software development

Out-of-box experience

This board is, in itself, an embedded system. On power-up, a menu of "ready-to-run" demo applications can be loaded. When connected to a network port, the Board Update Portal webpage is served. From there, the board can be remotely updated with a new design. See user guide for details.

This design is provided as a prebuilt processor system called Nios II 3C120 Microprocessor System with LCD Controller.

Figure 1. Altera Embedded Systems Development Kit, Cyclone III Edition

Ordering information

Tables 1 and 2 show the ordering code and pricing information for the Altera Embedded Systems Development Kit, Cyclone III Edition and the Embedded IP Suite.

Table 1. Altera Embedded Systems Development Kit, Cyclone III Edition Ordering Code and Pricing Information		
Ordering Code	**Price**	**Ordering Information**
DK-EMB-3C120N	$1995	In the United States and Canada, call 1-888-800-0631. Outside the United States and Canada, contact your local distributor.

Licensing

Software

The Altera Embedded Systems Development kit comes with Quartus® II Web Edition Software and the Nios II Embedded Design Suite.

Intellectual Property

IP licenses are sold separately. You may still install and start designing with any Altera IP core via the OpenCore Plus (PDF) simulation and hardware evaluation feature.

Table 2. Embedded IP Suite		
Ordering Code	**Price**	**Ordering Information**
IPS-EMBEDDED	$995	This IP suite includes all the IP you need to ship a standard Nios II processor design. Upgrade your kit with this perpetual use, royalty-free license bundle for embedded design. • Nios II Processor • Triple Speed Ethernet MegaCore® Function • DDR/DDR2 High-Performance Memory Controllers • NicheStack TCP/IP Network Stack, Nios II Edition This contents of this IP suite, valued at over $3500, are offered for the discounted price of just $995. Contact your local distributor to place your order.

Available documentation

Table 3. Documents Available for the Altera Embedded Systems Development Kit, Cyclone III Edition

Document	File Format	Download	Language
User Guide	Adobe PDF	[Via FTP](#)	English
Reference Manuals	Adobe PDF		
Board Assemblies	Adobe PDF		
Board Mechanicals	Adobe PDF		
Board Schematics	Adobe PDF		
Bill of Materials	Microsoft Excel		

Example processor systems

Table 4. Additional Downloads for the Altera Embedded Systems Development Kit	
Download	**Description**
Data Sheet: *Nios II 3C120 Microprocessor System with LCD Controller*	Full system description of the Nios II 3C120 Microprocessor System with LCD Controller
Altera Embedded Systems Development Kit, Cyclone III Edition CD	Contents CD that ships with the kit. Includes board design files, demos, documentation, examples and factory recovery image.

Reference designs

Table 5. Reference Designs Available for the Altera Embedded Systems Development Kit, Cyclone III Edition		
Design	**Vendor**	**Description**
Application Selector Factory Default	Altera	Default application for in-system and remote system update
Mandelbrot Hardware Acceleration	Altera	Hardware acceleration using the Nios II C-to-Hardware Acceleration Compiler
SLS USB 2.0 Reference Design	SLS	Reference design showcasing USB 2.0 IP
More Designs	Altera	Additional designs available from Altera

Demonstration designs

Table 6. Demo Designs Available for the Altera Embedded Systems Development Kit, Cyclone III Edition		
Design	**Vendor**	**Description**
TES DAVE 2D Graphics Demo	TES	Vector graphics engine showcasing sub-pixel accuracy, anti-aliasing, alpha blending, bit blitting and 2.5 D imaging
Photo Frame by PlanetWeb	PlanetWeb	Displays pictures and on the LCD color touch panel in slide show, thumb nail and other modes
SpectraWorks GUI Demo	PlanetWeb	Showcases graphics, text and instant re-branding capabilities of PlanetWeb Spectra Core Graphics IP
Menu Demo by PlanetWeb	PlanetWeb	Demonstrates menu rendering and instant re-branding

Development kit contents

The Altera Embedded Systems Development Kit, Cyclone III Edition is comprised of the Cyclone III FPGA development board, LCD multimedia HSMC board, and HSMC to Santa Cruz / USB / Mictor card. The kit is RoHS compliant and features:

- Cyclone III development board
  - Cyclone III EP3C120F780 FPGA
  - Embedded USB-Blaster™ circuitry (including an Altera MAX® II CPLD) allowing download of FPGA configuration files via the flash device or the host computer
- Memory
  - 256 Mbytes of dual-channel DDR2 SDRAM with ECC

- ○ 8 Mbytes of pseudo SRAM
- ○ 64 Mbytes of flash
- Communication ports
  - ○ 10/100/1000 Ethernet
  - ○ USB 2.0
- Power and analog devices from Linear Technology
  - ○ Switching power supply LTM4601
  - ○ Switching and step-down regulators LT1931, LT3481, and LTC3418
  - ○ Analog to digital converter LTC1865
  - ○ LDO regulators LT1963 and LT1761
- Clocking
  - ○ 50-MHz and 125-MHz on-board oscillators
  - ○ SMA inputs/outputs
- Inputs/outputs for the two HSMCs
- Various buttons, switches, and indicators
- Display
  - ○ 128 x 64 graphics LCD
  - ○ 2-line x 16-character LCD
- Connectors
  - ○ Two HSMCs
  - ○ USB type B
- Debug tools
  - ○ Three HSMC debug cards (two loop-back and a debug header)
- Cables and power/analog
  - ○ 14-V–20-V DC input
  - ○ On-board power measurement circuitry
  - ○ 19.8 W per HSMC interface
  - ○ Power cord with plug adapters (US, UK, EU)

LCD multimedia HSMC card

- LCD Touch-screen Display
  - ○ 800 X 480 pixel size
- Audio Codec
- SD Flash
- 10/100 Ethernet physical layer/media access control (PHY/MAC)
- Connectors
  - ○ VGA output
  - ○ Composite digital TV in
  - ○ Serial connector (RS-232 DB9 port)
  - ○ PS/2
  - ○ Ethernet connector (RJ 45)

HSMC to Santa Cruz / USB / Mictor card

- Santa Cruz header
- Mictor connector for software debugging
- Adjustable logic levels between HSMC and SC interface signals
- Hi-Speed USB 2.0 On-The-Go transceiver
- SMA connector for external clock input
- SD card Socket

Altera Embedded Systems Development Kit, Cyclone III Edition CD-ROM

- Design examples, demos, and prebuilt processor systems
- Tutorials (hardware and software)
- Board documentation

Cables and accessories

- 14-V – 20-V DC input
- Power cord with plug adapters (US, UK, EU)
- SD card and USB to SD card reader
- USB-Blaster™ download cable

- One serial cable (RS-232)
- 16-V power supply
- Ethernet (RJ-45) cable (7 ft.)

Altera complete design suite DVD

- Quartus II Web Edition (FPGA design software)
- ModelSim®-Altera Web Edition (FPGA simulation software from ModelSim)
- Nios II Embedded Design Suite, Evaluation Edition (32-bit microprocessor software)
- MicroC/OS-II real-time operating system evaluation
- Nios II C-to-Hardware (C2H) Acceleration Compiler evaluation
- NicheStack TCP/IP Network Stack, Nios II Edition evaluation
- MegaCore IP (library of IP cores)

Related links

- Design examples
- Reference designs
- Training resources
- Embedded user community