



# Nios Embedded Processor

## Quick Start Guide

August 2000, ver. 1

### Contents

The Excalibur™ Development Kit, featuring the Nios™ embedded processor ships in a bookshelf box with four separate boxes containing hardware and software. These boxes are as follows:

- Nios Embedded Processor Box
  - Nios Embedded Processor and Documentation CD-ROM
  - *Nios Embedded Processor Quick Start Guide* (this document)
- Quartus™ Programmable Logic Development Tools Software Box
  - Quartus Software for PCs CD-ROM
  - *Quartus Installation & Licensing for PCs Manual*
  - *Quartus Tutorial Manual*
  - ModelSim® LeonardoSpectrum™ PC CD-ROM
- Nios Development Board Box
  - Nios Development Board
  - LCD Module Kit
  - 9-V DC Power Supply
  - 4 Power Cables (for the United States, Japan, UK, and Europe)
  - 6' 9-Pin Serial Cable
  - 9-Pin to 25-Pin Serial Cable Adapter
  - 6' 25-Pin Parallel Port Extension Cable
  - ByteBlasterMV™ Cable
  - *ByteBlasterMV Parallel Port Download Cable Data Sheet*
  - *Nios Soft-Core Development Board User Guide*
- GNUPro® Nios Software Development Tools Box
  - GNUPro Toolkit Manual
  - *GNUPro QuickStart Guide*
  - GNUPro Nios Software Development Tools CD-ROM

### Software Installation

Install the following software:

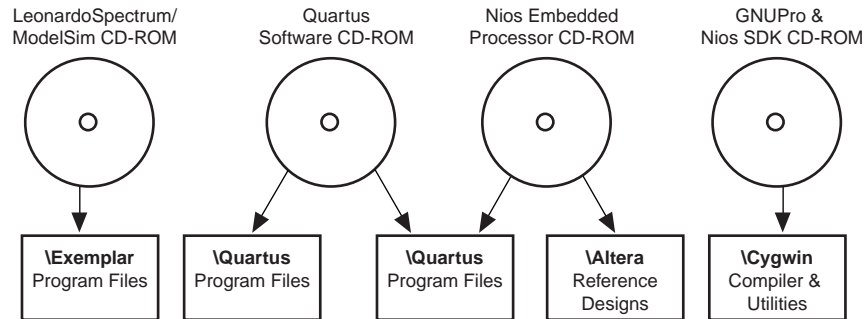
- Quartus software version 2000.05
- LeonardoSpectrum software
- Nios embedded processor
- GNUPro Nios software development tools
- HyperTerminal (if not already installed)

The development kit includes these software programs, excluding HyperTerminal, which is shipped with the Windows 98/2000/NT operating system. Figure 1 shows the directory in which the software on each CD-ROM is installed.



If you already have the latest versions of the Quartus and LeonardoSpectrum software installed, you do not need to reinstall them.

**Figure 1. Included CD-ROMs & Top-Level Directories Created**



After installing the software, follow the instructions on the letter enclosed with the Quartus software to obtain and install licenses for the Quartus software and the LeonardoSpectrum software.

## Hardware Setup

To set up the hardware, perform the following steps.

1. Remove the Nios development board from its anti-static shipping bag. Take care not to expose the board to electrostatic discharge during setup or use.
2. Connect the 9-pin serial cable to the serial connector on the Nios board (marked J3) and to a serial port on your PC.
3. Connect the 25-pin parallel cable to the parallel port on your PC and to the ByteBlasterMV download cable.
4. Connect the ByteBlasterMV cable to the JTAG port on the board (marked JP3). Refer to the *Nios Embedded Processor Hardware Quick Start Guide* for further instructions.
5. Connect the LCD module to JP12 on the Nios development board using the 14-pin ribbon cable provided in the kit. Pin 1 on JP12 should connect to pin 1 on the LCD module.



Pin 3 on the LCD module has been removed.

6. Connect the 9-V DC power-supply to the Nios development board at J1. Use the power cord appropriate to your location.

## Communicating with the Nios Embedded Processor

Once you have finished connecting the hardware, LED 7 and LED 3 illuminate, the 7-segment LED display displays 88, and one row of the display on the LCD module shows black squares.

After the hardware is set up and the development board is working with the factory default settings, the next step is to communicate with the board using HyperTerminal or a similar terminal communications program.

### Configuring HyperTerminal

Configure HyperTerminal to use the COM port that is connected to the Nios development board. In the **COM Port Properties** dialog box, configure the COM port for 115,200 baud, 8 data bits, no parity, 2 stop bits, and set flow control to None.

In the HyperTerminal **Properties** dialog box choose the **Settings** tab. Turn on VT100 emulation. Click the **ASCII Setup** button. In the **ASCII Setup** page, turn on *Append line feeds to incoming line ends* in the **ASCII Receiving** box and turn off *Wrap lines that exceed terminal width*.

### Talking to the Boot Monitor

In HyperTerminal, press the Enter key on your keyboard several times. If you are communicating with the Nios development board, you should receive the first few lines of the boot monitor program running in the ROM on the APEX device. For example:

```
#0000: 9800 3500 9800 6C00 7FC0 3000 694E 736F+
```

### Downloading a Program to the Nios Development Board

You can download a pre-compiled program to run in the Nios embedded processor. This program can display messages on the LCD module at regular intervals (for example, based on the timer peripheral attached to the Nios embedded processor).

To download a new program to the Nios development board, follow these steps:

1. In HyperTerminal, choose **Send Text File** (Transfer menu).
2. In the **File to send** dialog box, click **Browse** to locate the file you wish to send. For example, choose the **lcd\_demo1.srec** file in the `\cygwin\usr\altera\excalibur\nios-sdk\examples\` directory.
3. Click **OK**.

HyperTerminal sends the SREC data and it runs in the Nios embedded processor. The LCD screen should display various messages. When you press SW4 through SW7, the messages are replaced with a timer count. You now have a working Nios embedded processor system.

## Additional Information

For the most up-to-date documentation, go to the Excalibur Literature pages on the Altera web site (<http://www.altera.com>). The web site contains several PDF documents and schematics that give more detailed information about the Excalibur Nios development board. For technical support, contact Altera Applications at (800) 800-EPLD.



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