Instruction of using DE2 "build" files
Last updated 8/25/2012

General

This directory contains the FPGA configuration files (generated from Quartus II) and software image files (generated from EDS) for the DE2 board. It includes:

- p34_top_de2.sof: the device configuration file for the Nios II system discussed in Section 17.10.2, which contains the main IP cores of Parts III and IV.
- nios_p34_de2.sopcinfo: the Nios II system information file for the Nios II system discussed in Section 17.10.2.
- *.elf: software image files from Chapters 17 to 22.

These files are board specific and thus can only be use with the DE2 board

Usage 1: software development

The Nios II system discussed in Section 17.10.2 contains the main IP cores of Parts III and IV. It can be used for software development without invoking Quartus II synthesis software. The basic steps are

- Download the p34_top_de2.sof configuration file to FPGA device on DE2 board (i.e., program the FPGA device). The Quartus II Programmer utility can be invoked directly from the "Nios II" menu of Eclipse GUI.
- Create a BSP with nios_p34_de2.sopcinfo.
- Create an application project, copy the software drivers to the project directory and develop the main program.

Usage 2: quick demonstration

The device configuration file and software image files can be downloaded to the DE2 board by using simple command line shell to demonstrate the operation of the main testing programs in Parts III and IV. In Windows 7, the basic steps are (tested in EDS version 10.1 sp1):

- Copy the p34_top_de2.sof and *.elf files to a directory (say c:/tmp/build)
- Invoke the command shell by selecting
     Start → Altera → Nios II EDS 10.1sp1 → Nios II 10.1 Command Shell
     and a command window appears.
- In command shell prompt, enter "cd c:/tmp/build" to move to the directory.
- Optionally, enter "ls" or "dir" to verify the existence of configuration and image files.
- Enter "nios2-configure-sof" to download the configuration file to the FPGA device. Note that no file name is needed.
- Enter "nios2-download –g file_name.elf" to download the software image file to memory. The file_name is the name of the desired elf file. The "–g" is for "go", which starts the processor after the image file is downloaded.
- Enter "nios2-terminal". This command establishes the stdin and stdout channels with the JTAG UART module of the processor. Use Ctrl-C to exit.

At the time of writing, the stdin channel does not work. While the command window displays output, it does not take any input data.

Additional information about the command line usage can be found in the "*Nios II Command-Line Tools*" chapter of the manual.

The following is the screen capture of a sample session. Note that the command prompt is "bash-3.1$"

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Altera Nios II EDS 10.1sp1 [gcc4]                                    _ □ X

bash-3.1$ cd c:/tmp/build
bash-3.1$
bash-3.1$ ls
ch16_ps2_de2.elf  ch18_audio_de2.elf  ch20_gcd_de2.elf      ch22_ddfs_de2.elf
ch17_vga_de2.elf  ch19_sdc_de2.elf    ch21_fractal_de2.elf  p34_top_de2.sof
bash-3.1$
bash-3.1$ nios2-configure-sof
Searching for SOF file:
in .
   p34_top_de2.sof

Info: ******************************************************************
Info: Running Quartus II Programmer
Info: Command: quartus_pgm --no_banner --mode=jtag -o p;p34_top_de2.sof
Info: Using programming cable "USB-Blaster [USB-0]"
Info: Using programming file p34_top_de2.sof with checksum 0x008811E5 for device
  EP2C35F672@1
Info: Started Programmer operation at Fri Oct 07 18:24:36 2011
Info: Configuring device index 1
Info: Device 1 contains JTAG ID code 0x020B40DD
Info: Configuration succeeded -- 1 device(s) configured
Info: Successfully performed operation(s)
Info: Ended Programmer operation at Fri Oct 07 18:24:38 2011
Info: Quartus II Programmer was successful. 0 errors, 0 warnings
    Info: Peak virtual memory: 110 megabytes
    Info: Processing ended: Fri Oct 07 18:24:38 2011
    Info: Elapsed time: 00:00:02
    Info: Total CPU time (on all processors): 00:00:01
bash-3.1$
bash-3.1$ nios2-download -g ch17_vga_de2.elf
Using cable "USB-Blaster [USB-0]", device 1, instance 0x00
Pausing target processor: OK
Initializing CPU cache (if present)
OK
Downloaded 95KB in 1.6s (59.3KB/s)
Verified OK
Starting processor at address 0x008001B4
bash-3.1$
bash-3.1$ nios2-terminal
nios2-terminal: connected to hardware target using JTAG UART on cable
nios2-terminal: "USB-Blaster [USB-0]", device 1, instance 0
nios2-terminal: (Use the IDE stop button or Ctrl-C to terminate)

Fractal test
VGA video controller test:

key/sw: 2/1
```