Instruction of using DE1 "build" files
Last updated 6/10/2012

General

This directory contains the FPGA configuration files (generated from Quartus II) and software image files (generated from EDS) for the DE1 board. It includes:

- p34_top.sof: the device configuration file for the Nios II system discussed in Section 17.10.3, which contains the main IP cores of Parts III and IV.
- nios_p34.sopcinfo: the Nios II system information file for the Nios II system discussed in Section 17.10.3.
- *.elf: software image files from Chapters 17 to 23.

These files are board specific and thus can only be use with the DE1 board

Usage 1: software development

The Nios II system discussed in Section 16.10.2 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.sof configuration file to FPGA device on DE1 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.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 DE1 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.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$"

```
Altera Nios II EDS 10.1sp1 [gcc4]

bash-3.1$ cd c:/tmp/build
bash-3.1$
bash-3.1$ ls
ch16_ps2.elf   ch18_audio.elf   ch20_gcd.elf    ch22_fractal.elf   p34_top.sof
ch17_vga.elf   ch19_sdc.elf     ch21_ddfs.elf   nios_p34.sopcinfo
bash-3.1$
bash-3.1$ nios2-configure-sof
Searching for SOF file:
in .
  p34_top.sof

Info: ********************************************************************
Info: Running Quartus II Programmer
Info: Command: quartus_pgm --no_banner --mode=jtag -o p;p34_top.sof
Info: Using programming cable "USB-Blaster [USB-0]"
Info: Using programming file p34_top.sof with checksum 0x00726C47 for device EP2
C20F484@1
Info: Started Programmer operation at Thu Sep 29 14:17:27 2011
Info: Configuring device index 1
Info: Device 1 contains JTAG ID code 0x020B30DD
Info: Configuration succeeded -- 1 device(s) configured
Info: Successfully performed operation(s)
Info: Ended Programmer operation at Thu Sep 29 14:17:29 2011
Info: Quartus II Programmer was successful. 0 errors, 0 warnings
    Info: Peak virtual memory: 117 megabytes
    Info: Processing ended: Thu Sep 29 14:17:29 2011
    Info: Elapsed time: 00:00:02
    Info: Total CPU time (on all processors): 00:00:00
bash-3.1$
bash-3.1$ nios2-download -g ch17_vga.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)

VGA video controller test:
```