2010 CASPER Workshop

General ROACH Instructions

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1 Using VNC to connect to the servers

Speak to a one of the tutorial instructors for help with creating a VNC session to the servers. There are different resolutions available for your laptop ('cause it's annoying to have two levels of scrollbars!)

2 Transferring your bitstream to the ROACH board

Your compliation would have generated 2 bitstream files, a *.bit and a *.bof file. You will find your bitstreams inside the subdirectory called *bit_files*. The filenames are <design_name>_<start_compile_time>.XXX. Appending the start time guarantees that you will not overwrite existing bitstreams when recompiling your same design.

The *.bit* is the raw FPGA bitstream that you could load manually using a Xilinx JTAG programmer. Of interest to us now is the *.bof* file. This is a BORPH executable. We will transfer this to your ROACH board now.

To transfer files to ROACH, you can use any standard Linux scheme. For example, use the scp command to transfer your file to the correct server/folder or under Windows you can use *WinSCP*. We will use *WinSCP* which is a GUI program capable of doing *SCP* transfers (Secure Copy over SSH Protocol).

You will then login to the Linux server **paper2** which boots the ROACH boards and hosts their filesystem. The ROACH filesystem lives in */srv/roach_boot/current_filesystem/boffiles/.*

Username: guest
Password: c45p3r!

ROACH boards look in here for executable BORPH files (this filesystem is network mounted across all ROACH boards in the lab). You will need to transfer your bof file into this directory and make it executable. You can make it executable by checking the flag in *WinSCP*, or else doing *chmod +x <bof_file_name>*.

3   Connecting to your ROACH board

3.1   SSH'ing into your ROACH

You can connect to your ROACH board by SSH'ing directly into it. Windows does not include an SSH client natively, but you can use Putty. From linux just run:

ssh root@roach<SerialNumber>

You will be greeted with a dialog box which will ask you for the hostname. Our server assigns roaches IP addresses and hostnames based on the serial number. Complete **roach<SerialNumber>**. There is a sticker on the front of your ROACH with its 6-digit serial number. For example, if it is 020112, then complete *roach020112*. Leave everything else default. Click *Open*.

There is no root password required on the roach.

`root@roach020112:~#`

We are now ready to start working with the ROACH board.

3.2 Booting your ROACH (Serial Port)

This is for information only as the ROACH boards in this lab do not have their serial ports connected.

To watch ROACH boot, we can connect to it using a serial port. Double-click on *roach_serial.ht* on your desktop. This will open HyperTerminal (a serial terminal program) and set it to connect to *com1* at 115200 baud, 8N1 with no flow control. Turn the ROACH on. You will be greeted with a printout similar to this one:

```
U-Boot 2008.10-svn2205 (Aug  3 2009 - 09:31:45)

CPU:   AMCC PowerPC 440EPx Rev. A at 495 MHz (PLB=165, OPB=82, EBC=82 MHz)
       No Security/Kasumi support
       Bootstrap Option H - Boot ROM Location I2C (Addr 0x52)
       32 kB I-Cache 32 kB D-Cache
Board: Roach
I2C:   ready
DTT:   1 is 28 C
DRAM:  (spd v1.2) 512 MB
FLASH: 64 MB
USB:   Host(int phy) Device(ext phy)
Net:   ppc_4xx_eth0

Roach Information
Serial Number:    020112
Monitor Revision: 7.3.0
CPLD Revision:    7.5.1556

type run netboot to boot via dhcp+tftp+nfs
type run soloboot to run from flash without network
type run usbboot to boot using filesystem on usb
type run mmcboot to boot using filesystem on MMC or SD card
type run bit to run tests

Hit any key to stop autoboot: 10
```

This is ROACH's version of a BIOS along with some basic PPC health printouts. Press any key here to stop the automatic boot process. This is the state of the ROACH boards when shipping. You can configure it differently should you please.

You have four boot options: network, onboard flash, USB or MMC/SD. See the ROACH getting started guide on the CASPER wiki for details of these options. If you do not interrupt it, the default is to boot off FLASH. Our filesystem is on a network computer, so type *run netboot* to initiate a network boot.

It will acquire an IP address along with a bunch of DHCP options which define where to find the filesystem. The lab's server is pre-configured to provide this info. After Linux has completed its boot process, you will be greeted with a Debian prompt.

```
Debian GNU/Linux 4
.0 roach020112 ttyS0

roach020112 login:
```