

## Appnote: Creating a Web-Server on the DE2 Altera board.

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revision 0.1

Files: dm9000a folder  
dm9000a.vhd  
dm9000a\_hw.tcl  
pin\_assignments  
scripts  
webServer.vhd (sample top level)

This application note was made largely by referencing the following Simple Socket Server example:  
Download drivers & interface : <http://alteraforums.com/forum/showpost.php?p=111570&postcount=63>

With some help from the following post:  
<http://alteraforums.com/forum/showpost.php?p=109244&postcount=3>

The interface and drivers are from the generous person who created the Simple Socket server example above, and are (assumeably) free for anyone to use.

Create project, add dm9000a.vhd to the files list  
Add all components from lab 1

name cpu "cpu"

name on-chip memory "memory"

call systemid "sysid"

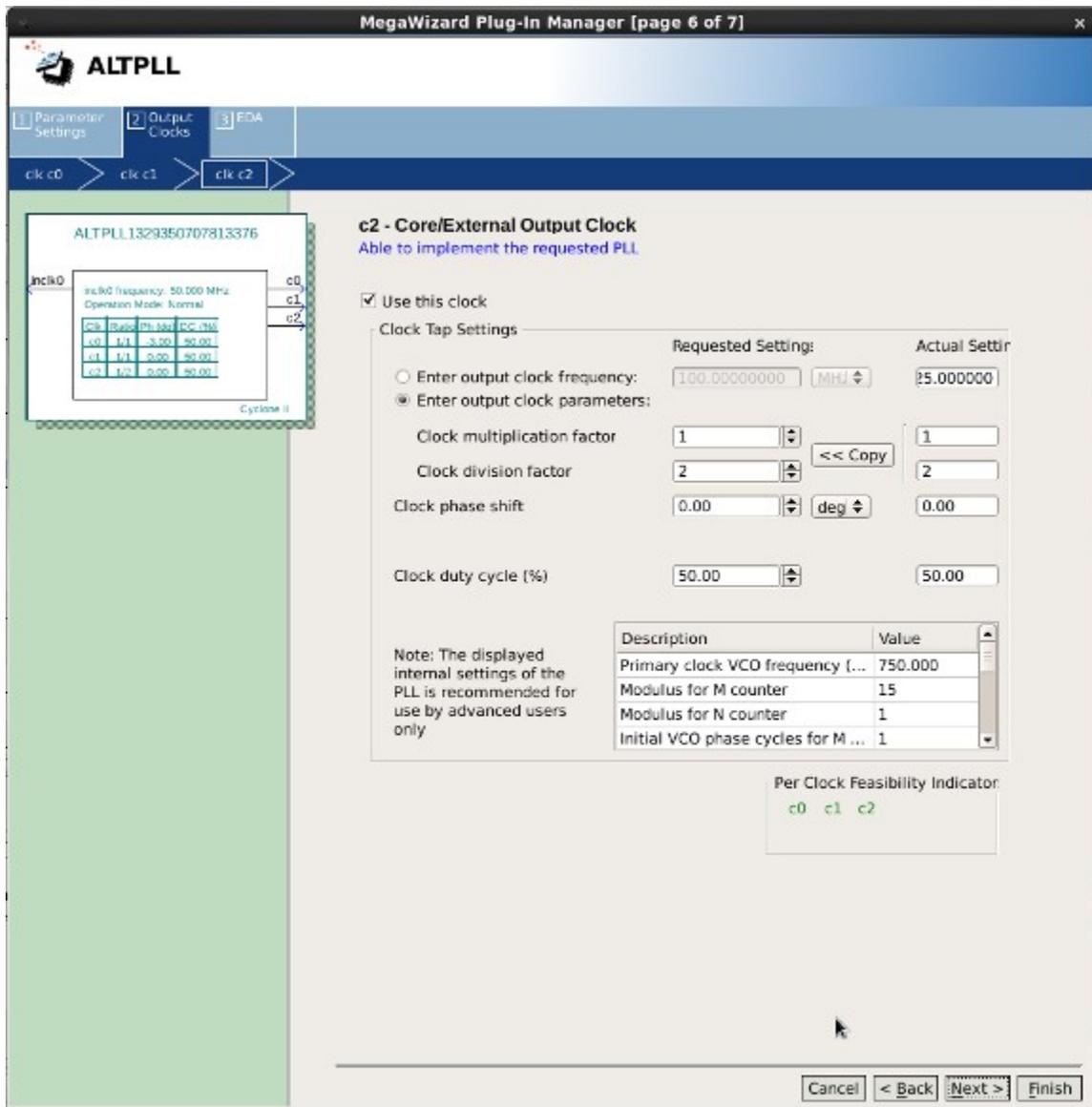
call interval timer "sys\_clk\_timer"

call jtag\_uart "jtag\_uart"

**rename Character LCD "lcd\_display"**

rename LED Pio to "led\_pio"

Create pll  
rename altpll\_0 to "altpll\_inst" and set speed grade to 6  
add clock c2, set to 2 division (25MHz)  
This will drive the ethernet adaptor



rename sdram\_0 to "sdram"

add a flash memory interface, give it address width 22, data width 8

give it setup time 40, wait time 160, hold time 40 ns

name it "ext\_flash"

add an Avalon-MM Tristate Bridge:

call it "tri\_state\_bridge"

connect its tristate\_master to ext\_flash s1

add a PIO, give it width 16, Output

call it seven\_seg\_pio

Create an interval timer, set its period to be 10 us

32 bit counter size, Full-featured preset (readable snapshot checked)

call it high\_res\_timer

Add a DM9000a series ethernet (Project > Ethernet)

**call it dm900a\_inst**

set jtag\_uart IRQ priority to 0

set sys\_clk\_timer IRQ priority to 1

set high\_res\_timer IRQ priority to 2

set dm9000a\_inst IRQ priority to 3

Generate

import pin assignments

Create top level

See example top level:

Notice: link ETH\_CLK to pll clock c2

Hardwire flash reset (FL\_RST\_N) to 1 (off)

Compile design, program to board.

Open SOPC builder, under NIOS II select **Nios II Software Build Tools For Eclipse**

set the workspace to the software folder

File > New > Nios II Application and BSP from template

Select the sopcinfo file for your project

call the project webServer (or whatever)

From the template, select Web Server (not RGMII)

Click Finish

A project will be created for you, with accompanying bsp project

Now we need to get the webserver files onto the flash. In your project is a zip file (in system) with the

html and images for the sample website.

Under the Nios II menu, select Flash Programmer

File > New

Select **Get flash programmer system details from SOPC Information file**

Select the sopcinfo file for your project

It should come up with **ext\_flash** next to **Flash Memory:** (unless you named your flash something else)

Click **Ok**

Click **Add** on the right

select the zip file (**ro\_zipfs.zip**) in the system folder in your project

set the **Flash offset** to 0x100000

Click **Start**

Now that zip file will have been written onto the flash chip. Click **Exit**

Right click on the <project name>\_bsp project in Eclipse and select Nios II > BSP Editor

Select the **Software Packages** tab

Change the **ro\_zipfs\_base** to whatever the base address of your Flash Memory Interface is in the SOPC builder (mine is 0x01400000)

Click **Generate**

Click **Exit**

Build the project (Right click on the non-bsp project and click Build Project)

If you want to make your server have a static IP:

Open system.h (under <project name>\_bsp).

Comment out the line **#define** DHCP\_CLIENT under `altera_iniche configuration`

Open web\_server.h

Set the values of IPADDR0, IPADDR1, IPADDR2, IPADDR3 to the 3 parts of the IP address you want

Do similar for GWADDR# for the Gateway address

Rebuild the project

It is a good idea to set the IPADDR and GWADDR numbers as a backup if the DHCP doesn't work

Right click on the project and select Run as > Nios II Hardware

Connect the ethernet board to a router or to a computer with a crossover cable

On a computer on the network, go to the IP address that comes up in the console (and on the LCD display)

Congratulations! You should now be viewing a website hosted on your board! Hopefully.

Good luck.