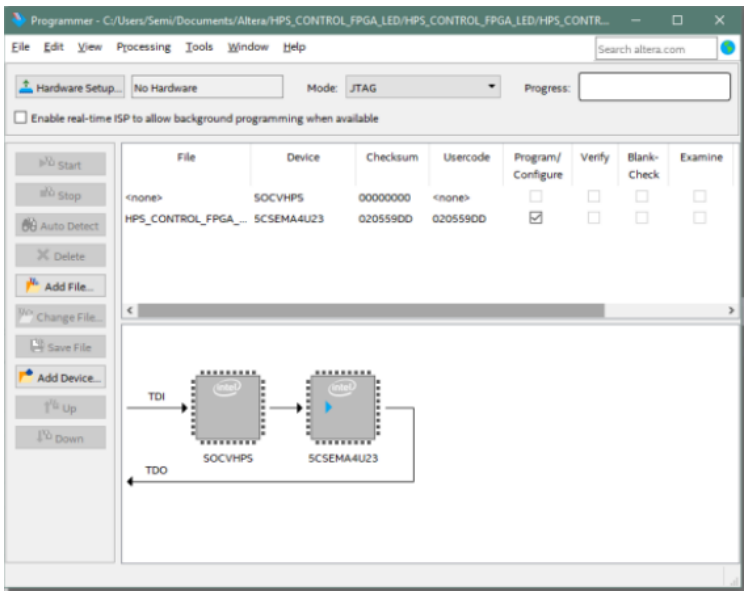
Program the FPGA

First you need to connect your FPGA to the alimentation and the USB blaster (for FPGA programming) to the USB port of your PC:

To program the FPGA just click on Tools/Programmer, when the project is open in Quartus. This will open the tool to program the FPGA:1



In case, you don't see the FPGA (Hardware setup), click on Hardware Setup and you should be able to see it and add it.

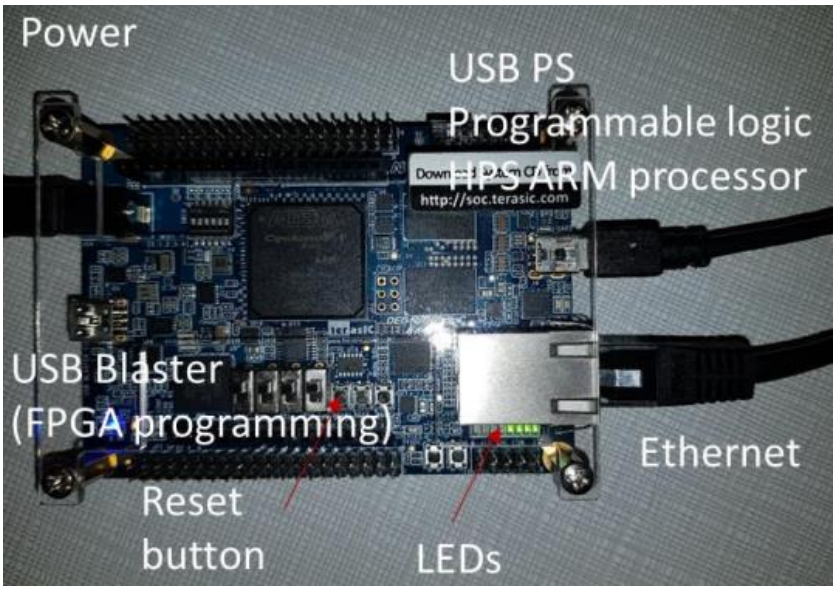
To program the FPGA you need to open the programming file **soc_system.sof**. (click on Add File and select the file)

To program the FPGA, now just click the Start button.

If the programming is correct you will see the message 100% successful.

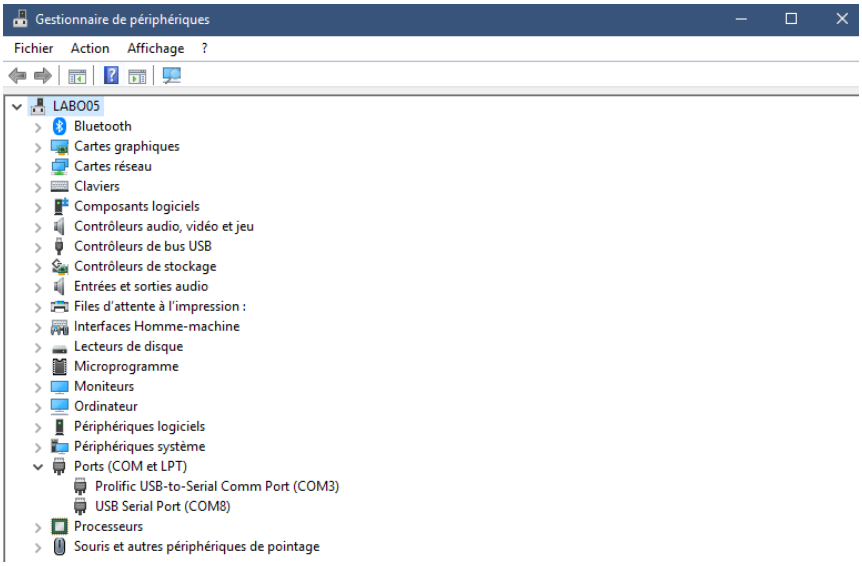
Program the Processor HPS PS ARM

If you have only one USB cable, just unplug the USB Blaster and connect it to the HPS PS USB port (do not unplug the Power cable):

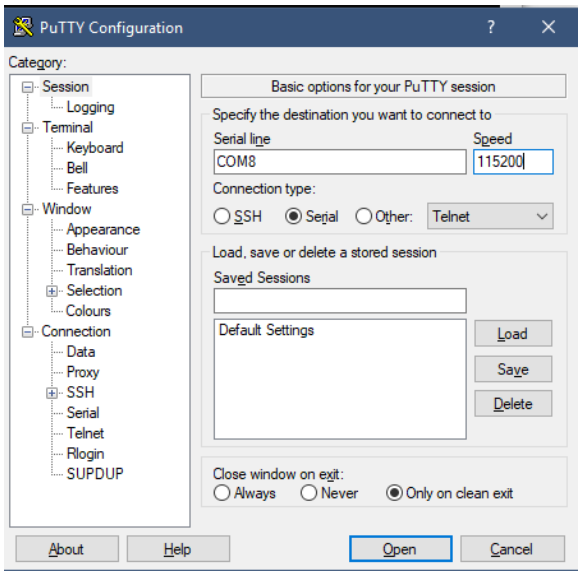


To program the processor you need to transfer your application program to your home directory in linux. The Linux OS is already installed on the SD card of the Board. To login you can do it using a USB port connected to your PC (Serial Terminal using Putty) or the Ethernet cable (SSH Terminal using Putty). In the second case you also need the IP address. For that, just connect another USB port (at the opposite site of your board) to your PC. Then run Putty using the COM and 115200 baudrate.

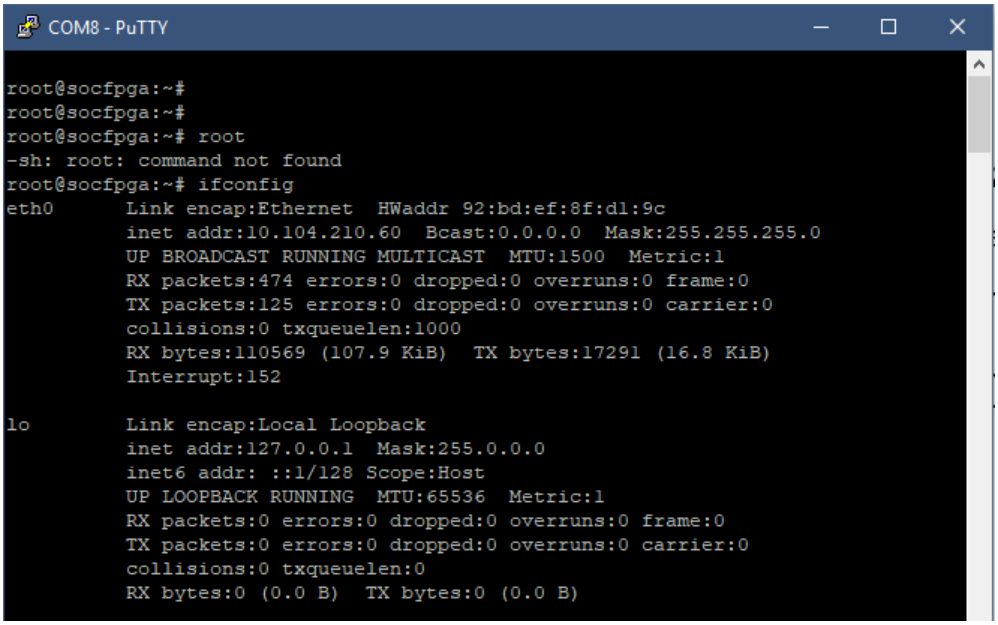
To see the port just start Gestionaire de Peripheriques (on windows) and see the ports (see the port name available COMXXX):



Then you can start Putty, Serial, Port name COMXXX, and baudrate 115200, and click Open.



Type ENTER several times on the terminal to see the login. If the login doesn't appear, then press the reset button on the board and you will see the Linux reset then the login. In our case, we will login as root (password terasic, but it is not needed in Serial mode).



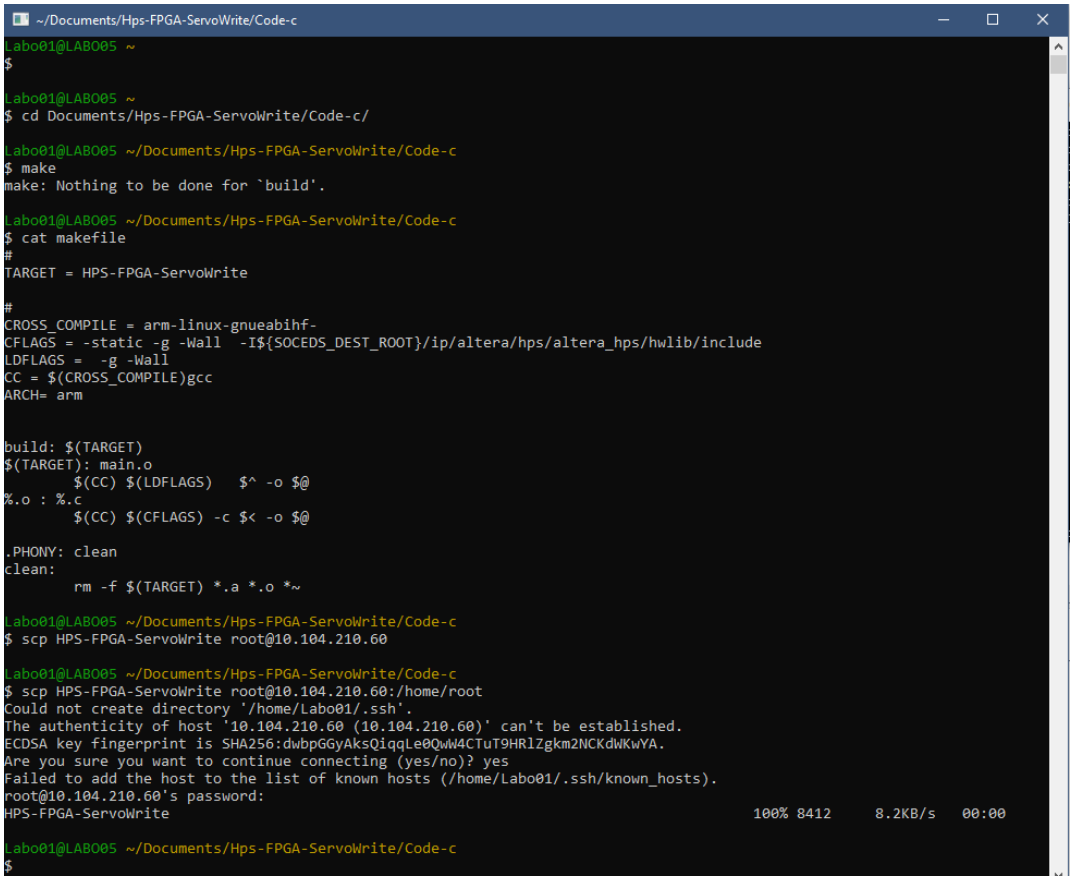
As you have the Ethernet cable connected to the board, you can now get the IP address by typing ifconfig. With that IP address, you can create an SSH connection login to transfer you application program to that address.

In the case that your application program is not available (check the files using ls), we will need to copy the executable using ssh copy. For that we will use the **SoC EDS shell**, that is used to compile your application program, but also to transfer the executable to your board. Just start EDS:

- Access the directory where the code is.
- Type **make** to see if you need to compile the program (sometimes the source code was modified and the executable must be updated). If the program is already updated, make will

show the message Nothing to be done. Otherwise, the make will execute and compile the application program for the ARM processor.

- When done, the executable will be ready to be sent to the board. The generated program is names **HPS-FPGA-ServoWrite**, (you can see the name by typing **cat Makefile** and checking the target executable.
- Now that you know the IP address of your Linux and you have the executable, just copy the executable to your account on the board by using the command **scp 'nom_d_executable' root@'adresse_ip':/home/root**. In our case, **scp HPS-FPGA-ServoWrite root@10.104.210.60:/home/root.**



Once transferred, you just execute the application program. Just type the name of the application program in Putty.