UMassAmherst

Installing and Using EDS and Linux
ECE636: Reconfigurable Computing

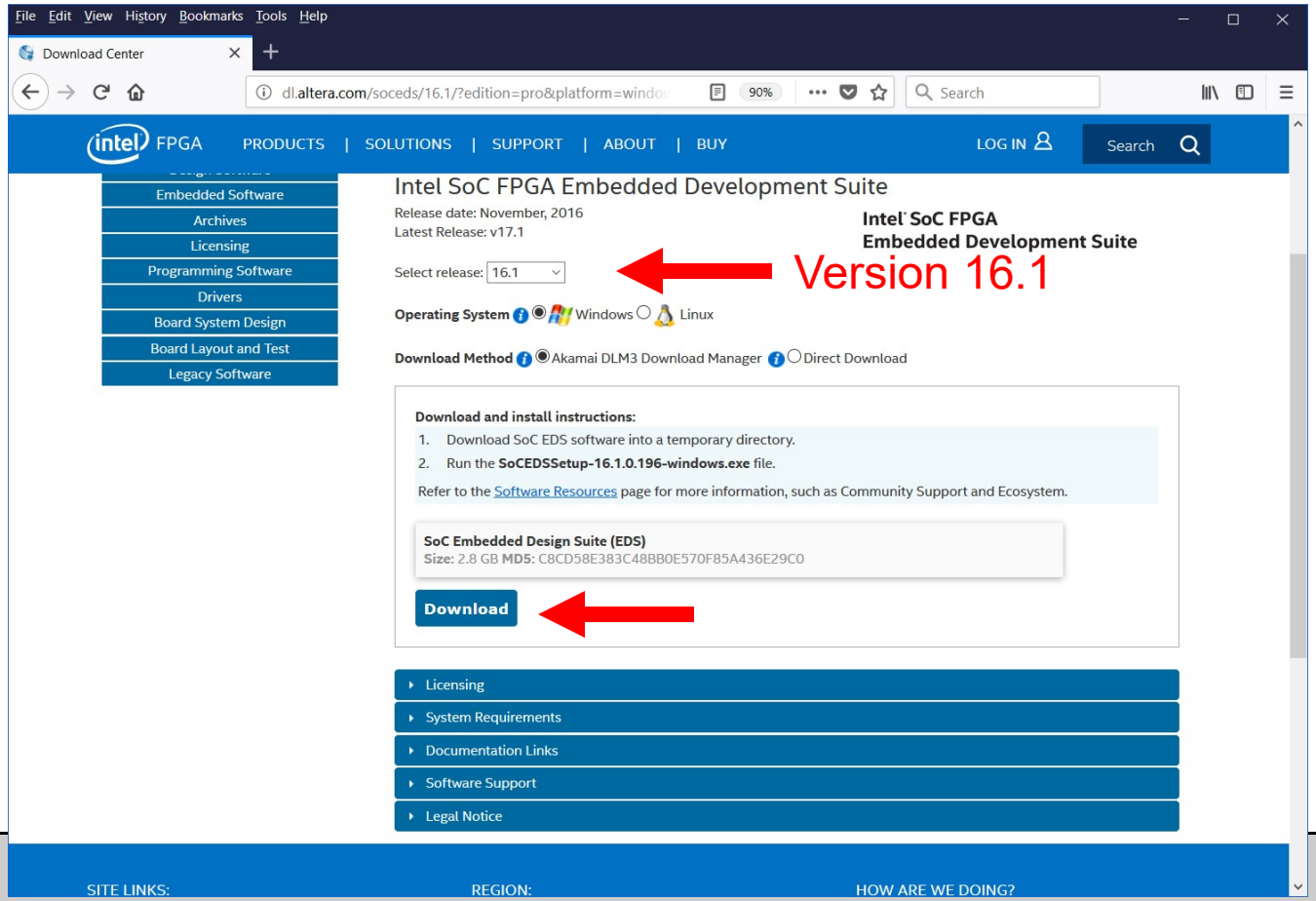
Electrical and Computer Engineering
University of Massachusetts, Amherst

Overview of Slides

- **These slides will provide step-by-step details on downloading, installing and using the Embedded Design Suite. Detailed directions on downloading and installing Linux on a microSD card for the DE1-SOC will also be provided.**
- **It is assumed that the steps described in the Assignment 3 slides (pset3-guide.ppt) have already been taken**
- **Step 1: Download and install EDS**
- **Step 2: Download and install microSD card writing software**
- **Step 3: Download and install Linux for the DE1-SoC on the microSD card**
- **Step 4: Compile a sample program using EDS**
- **Step 5: Transfer the compiled binary to the DE1-SOC board using Ethernet and run it**

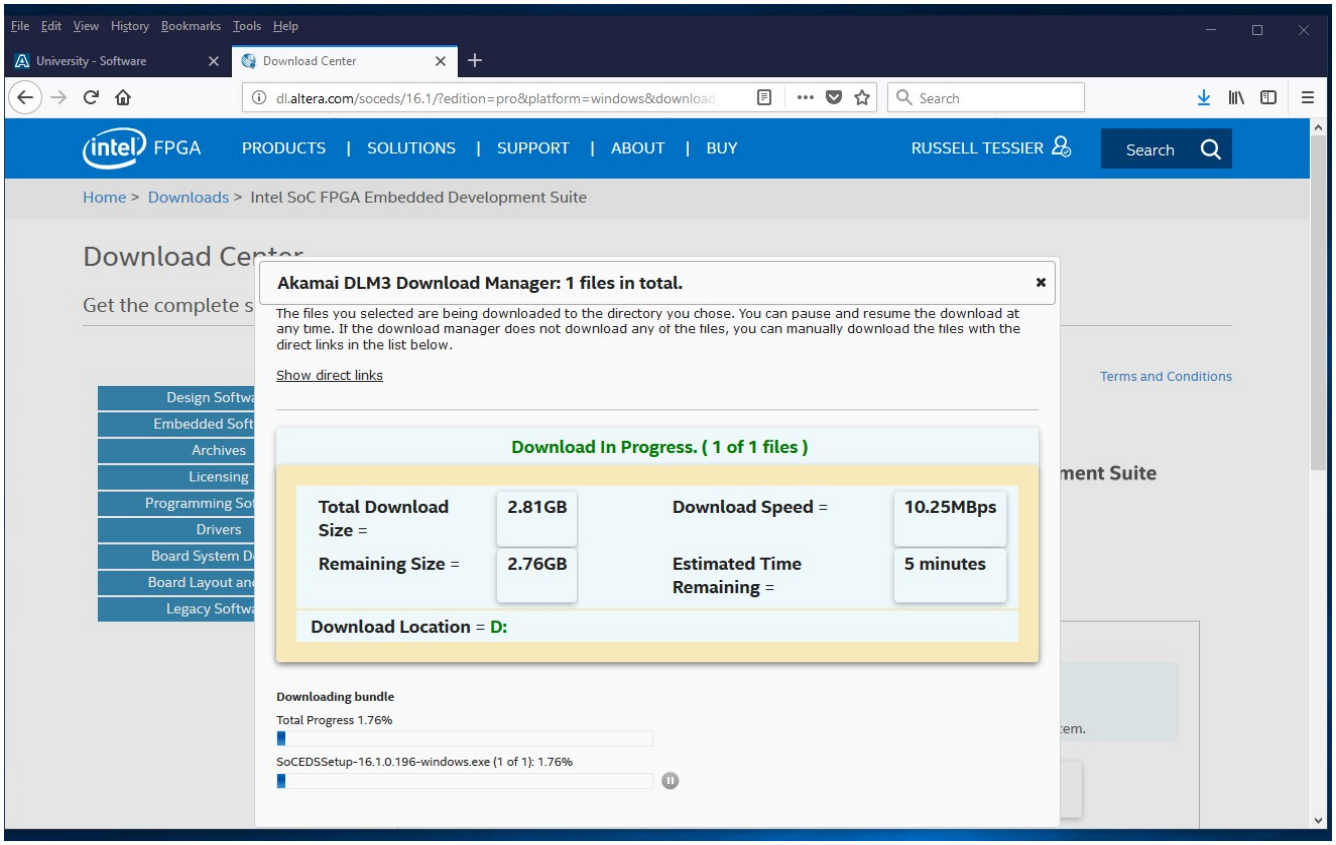
Download and Install EDS

- **A detailed discussion of installing EDS can be found in Section 2.3 of the "Getting Started" guide.**
- **https://www.altera.com/download/software/soc-eds**

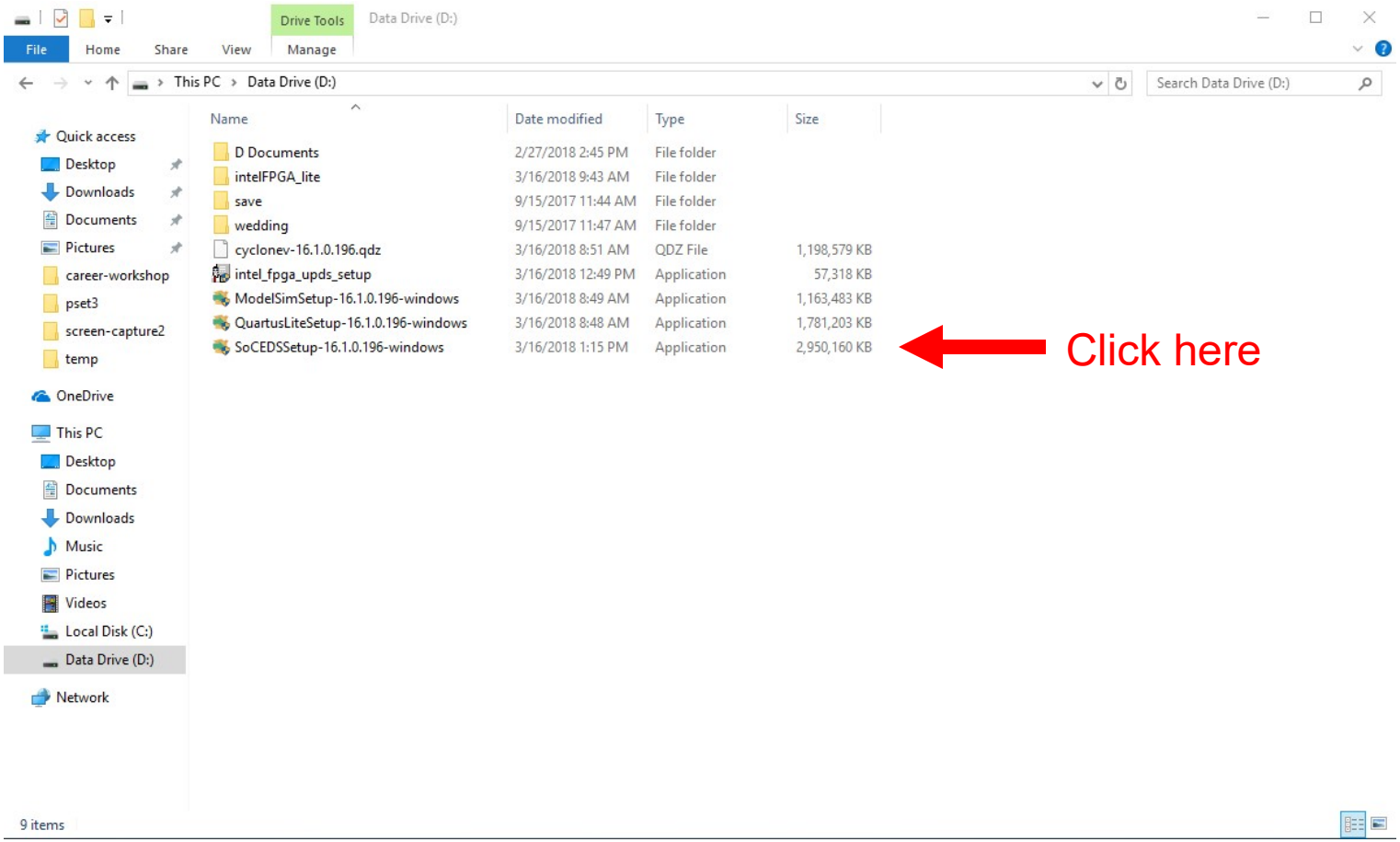


Download EDS

- **Note: It is assumed that the Akamai Download Manager is already installed on your computer from the Quartus download**



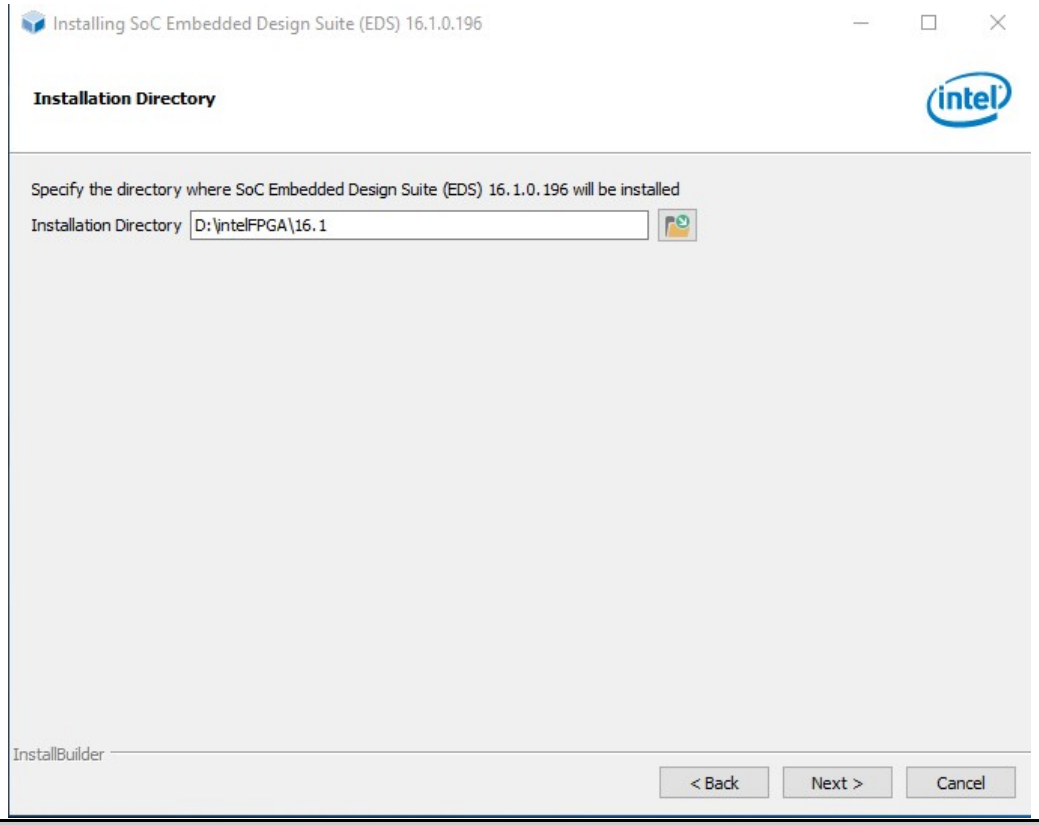
Locating the EDS Files



- Locate downloaded EDS file and click it to start installation

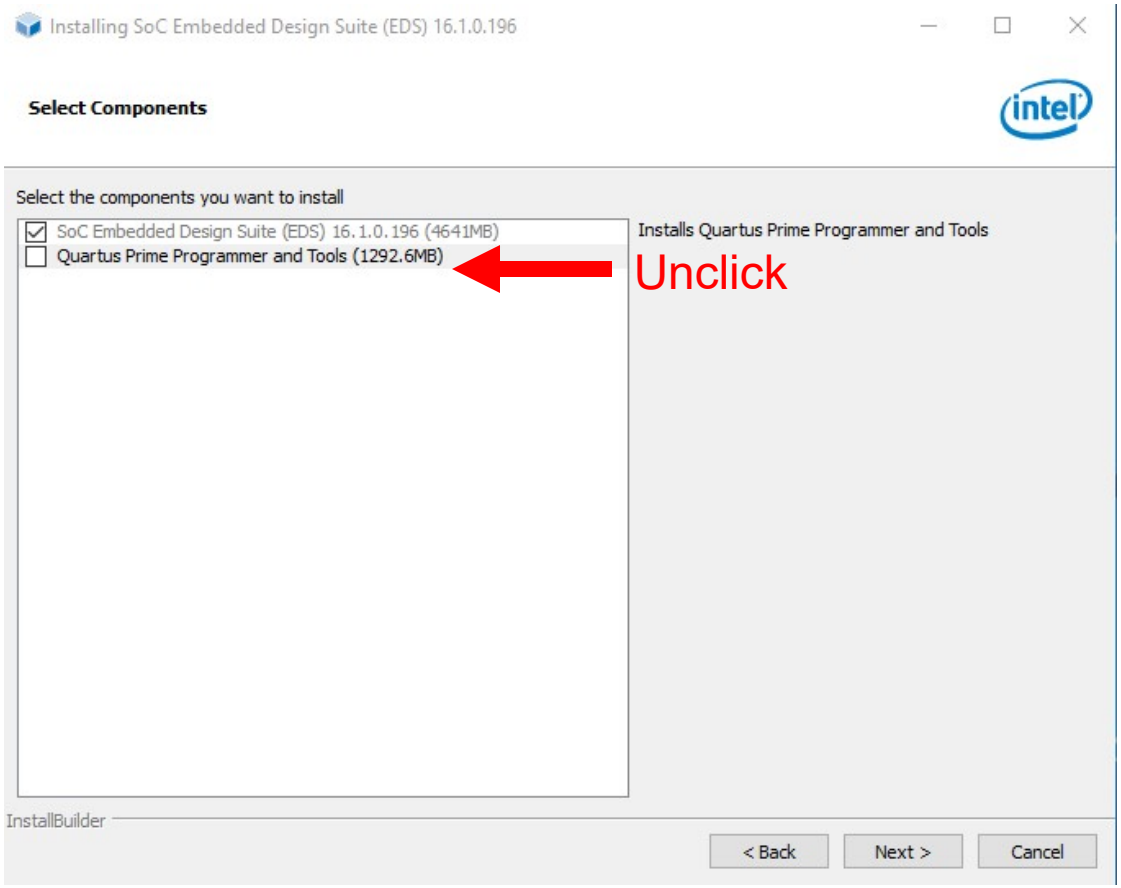
Install EDS

- Select a directory for the EDS software
- I suggest selecting a different directory than the one used for Quartus



Install EDS

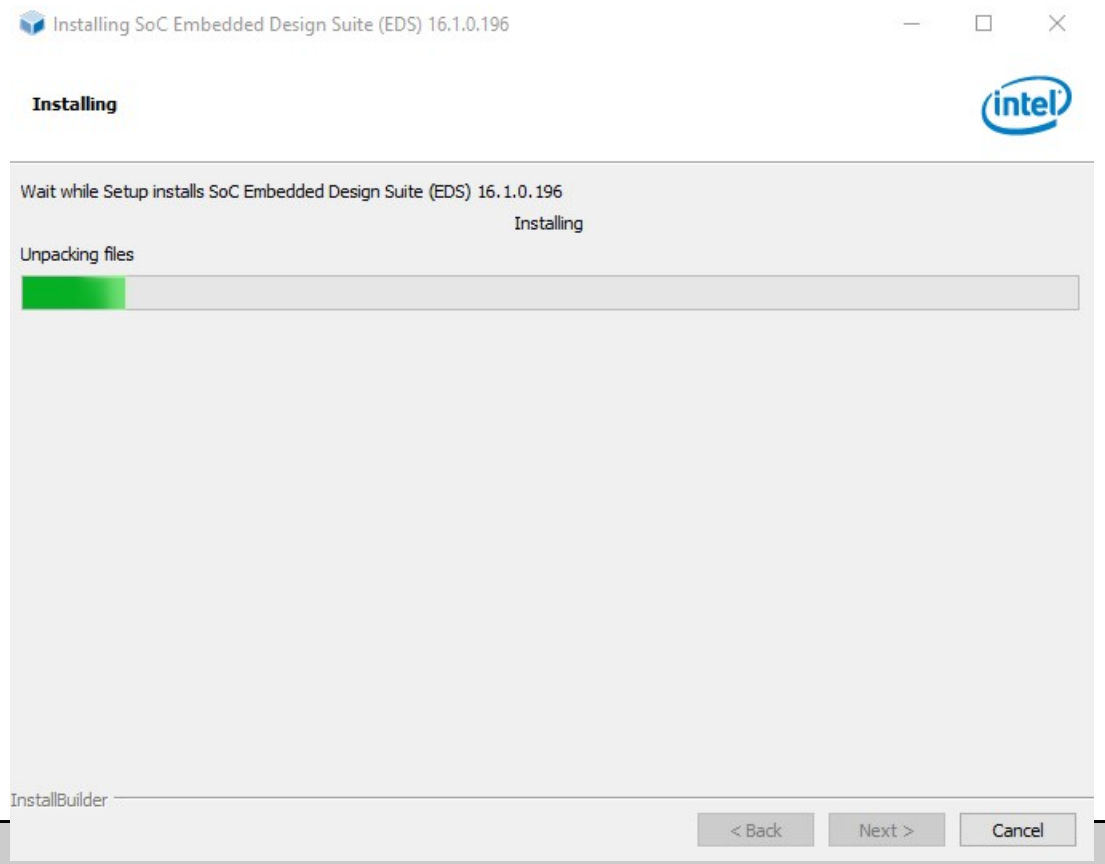
- Do not reinstall the programmer. It was already installed for Quartus



Install EDS

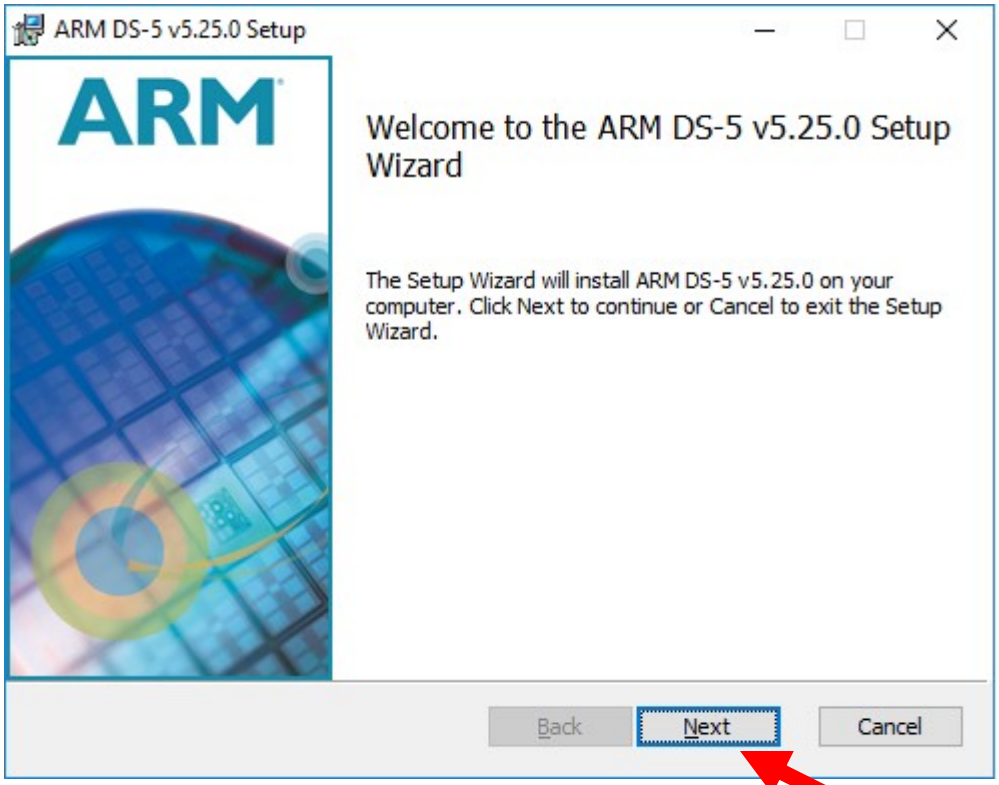
- When the installation finishes you may be prompted to install these two items
  - FTDI drivers – DO NOT INSTALL THE DRIVERS AT THIS STEP
  - DS-5 compiler – Do install the DS-5 compiler

Please note



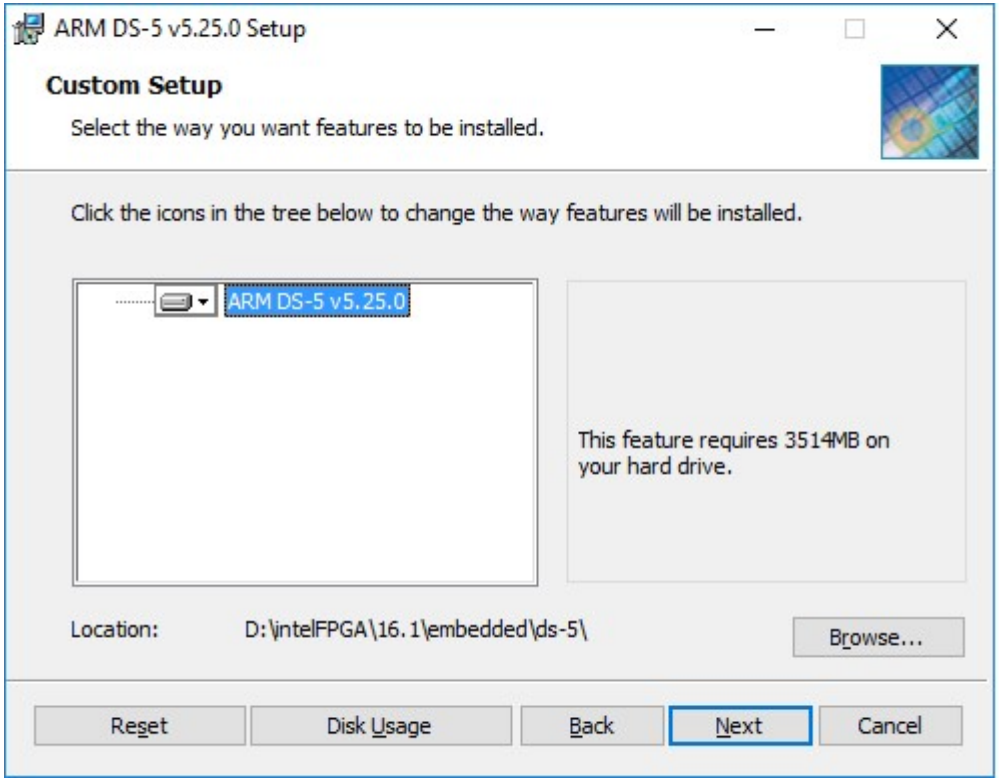
Install DS-5 Compiler

- The DS-5 compiler compiles programs for the ARM C9 processor on the DE1-SOC



Install DS-5 Compiler

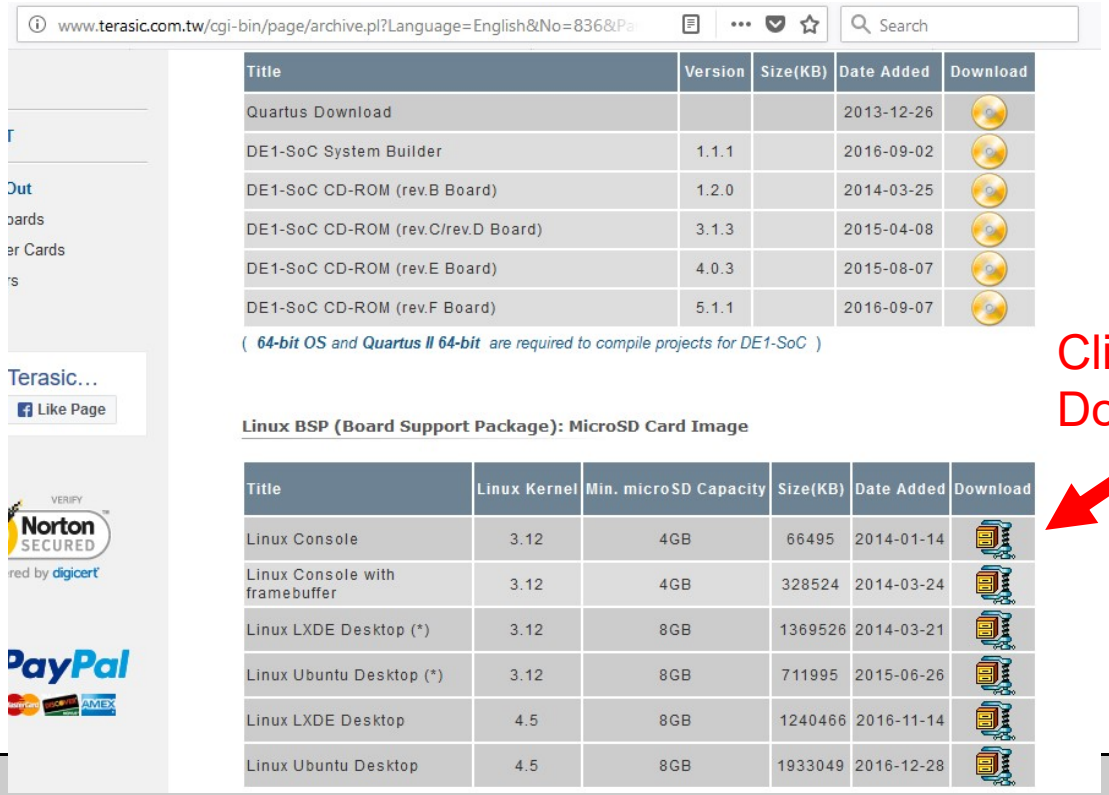
- The compiler allows you to compile complex C programs



Downloading and Installing Linux for DE1-SOC

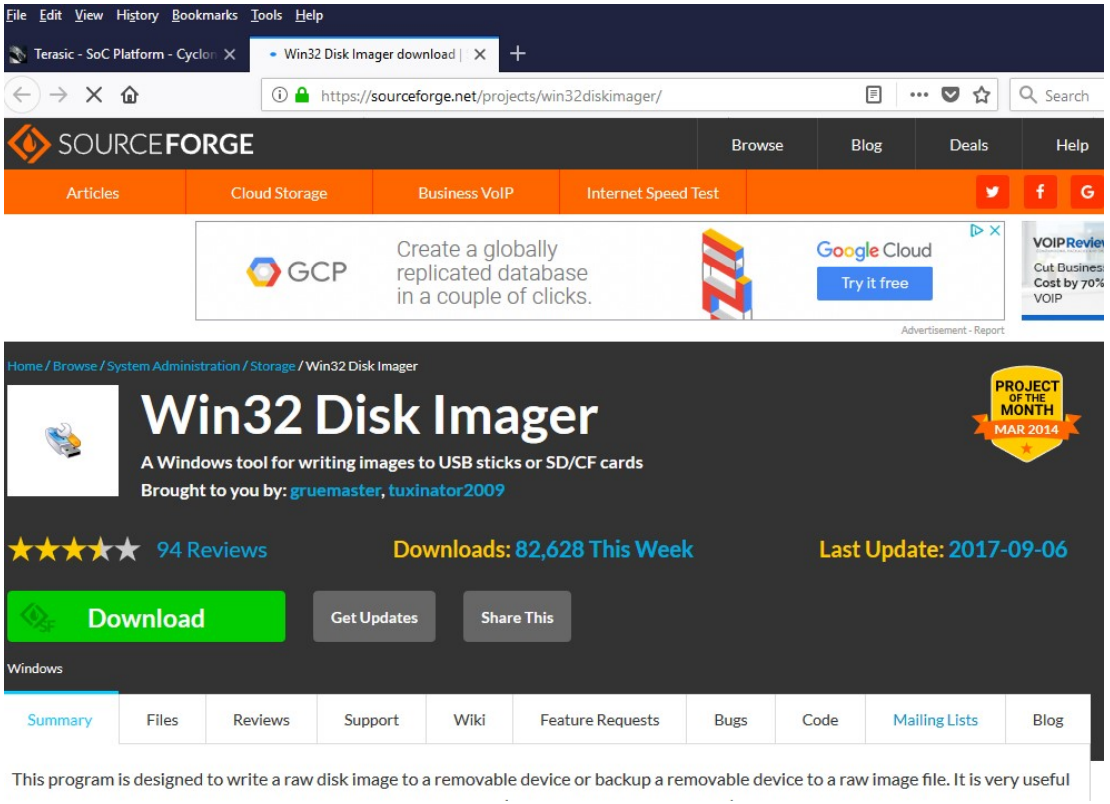
- It is easy to install Linux on a microSD card, insert it into the microSD slot on the board, and then boot up Linux when the on button is pressed on the board.
- In the next few slides, the steps to perform these actions are detailed
- More details on Linux installation can be found in Chapter 5 of the “Getting Started” guide

http://cd_de1-soc.terasic.com/



Downloading and Installing Linux for DE1-SOC

- Download Win32 Disk Imager: http://sourceforge.net/projects/win32diskimager/
- Unzip DE1_SoC_SD.img

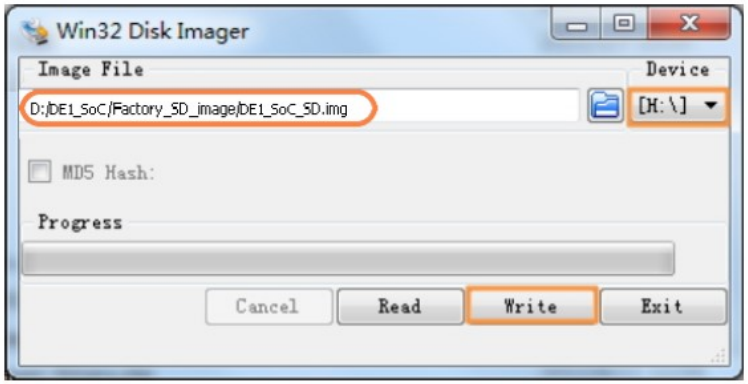


Install the Disk Imager and Burn Image onto microSD card

- Click on win32diskimager-1.0.0-install to install the disk imager software on your PC
- Plug the microSD card into your PC (You may need to use an SD card adapter)
- Follow these directions from Chapter 5 of the “Getting Started” guide

The SD card image file needs to be programmed to a microSD card before it can be used. The steps below present how to create microSD card on a windows machine using Win32DiskImager.exe.

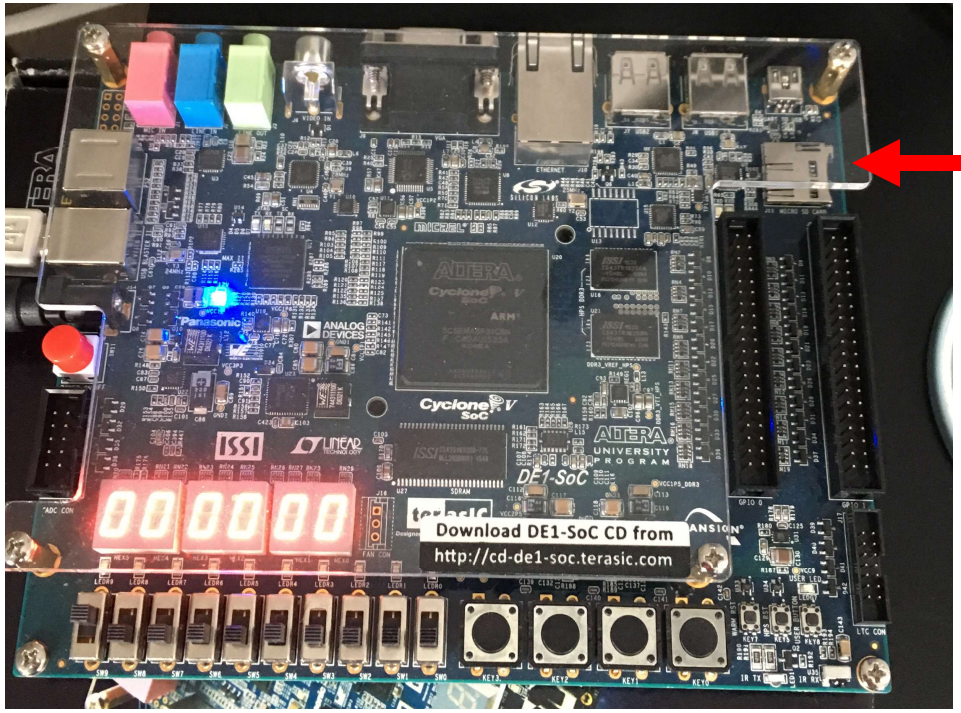
1. Connect the microSD card to a Windows PC
2. Execute Win32DiskImager.exe
3. Select the image file for microSD card
4. Select the microSD card device



5. Click “write” to start writing the image file to the microSD card. Wait until the image is written successfully.

Insert microSD card with Linux into microSD slot

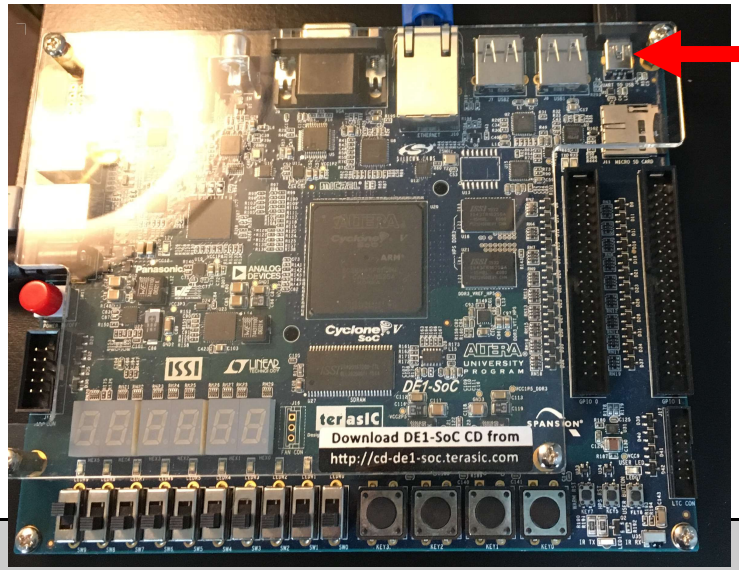
- Insert card into slot when the board is powered down
- Linux will automatically boot up on the ARM C9 processor every time the board is turned on
- Note: Intel Monitor Program will not work if the Linux card is inserted in the board



Setting Up the UART Terminal

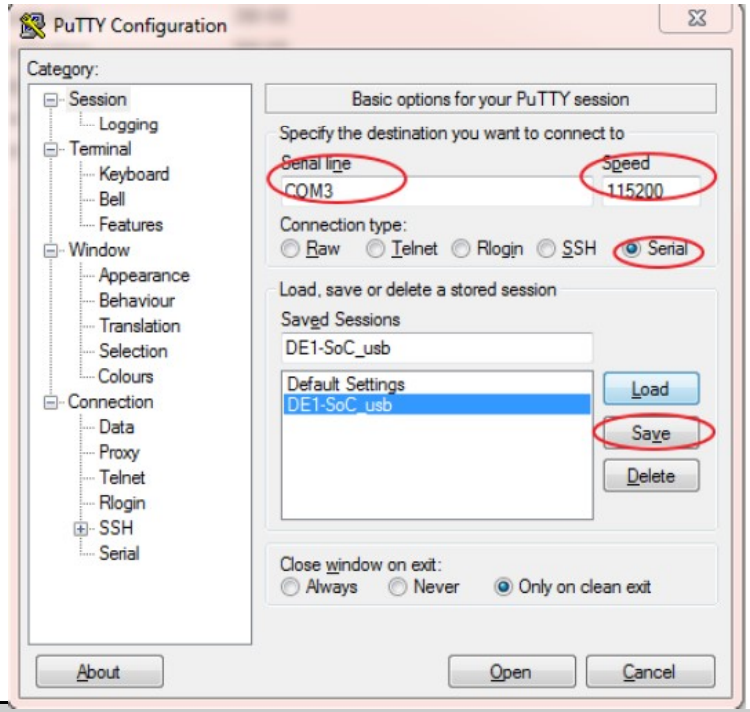
- Connect micro USB cable to PC and DE1-SOC
- If necessary, perform these steps from Section 5.3 of the "Getting Started" guide
  - Power on the board then open the computer device manager in Windows. You will find an unrecognized FT232R USB UART
  - Select the FT232R USB UART to update the driver software. The driver can be downloaded from http://www.ftdichip.com/Drivers/VCP.htm
  - After the driver has been installed correctly, the USB Serial Port is recognized as a port such as COM3 (Open the device manager to know which COM port assigned in your computer)

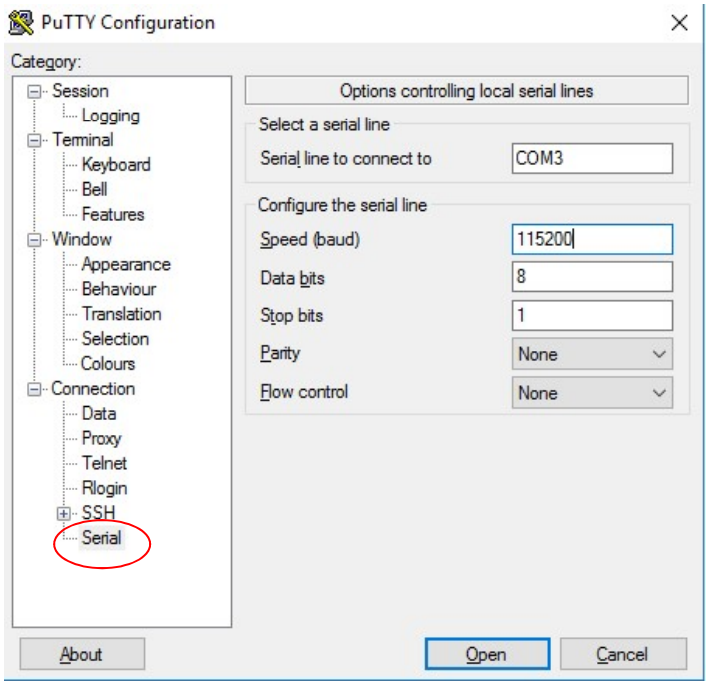
Note: I did not need to install the driver to get the connection working with my PC



Setting Up the USB Interface

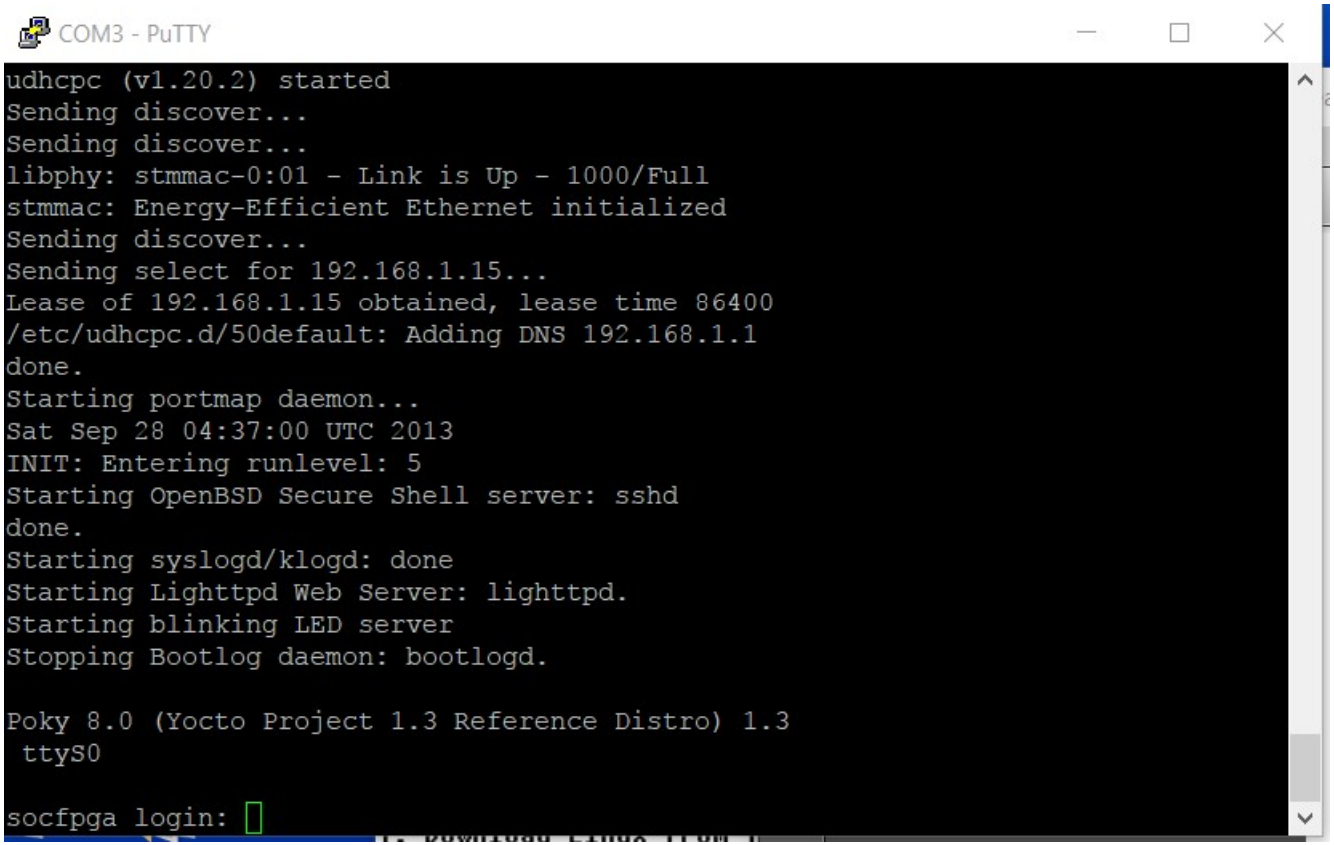
- Download the serial interface (Putty) from the following web site: http://the.earth.li/~sgtatham/putty/latest/x86/putty.exe
- Open putty.exe, click Serial go to a serial configure interface
- Configure the windows like the following pictures and click save button to save the configuration.





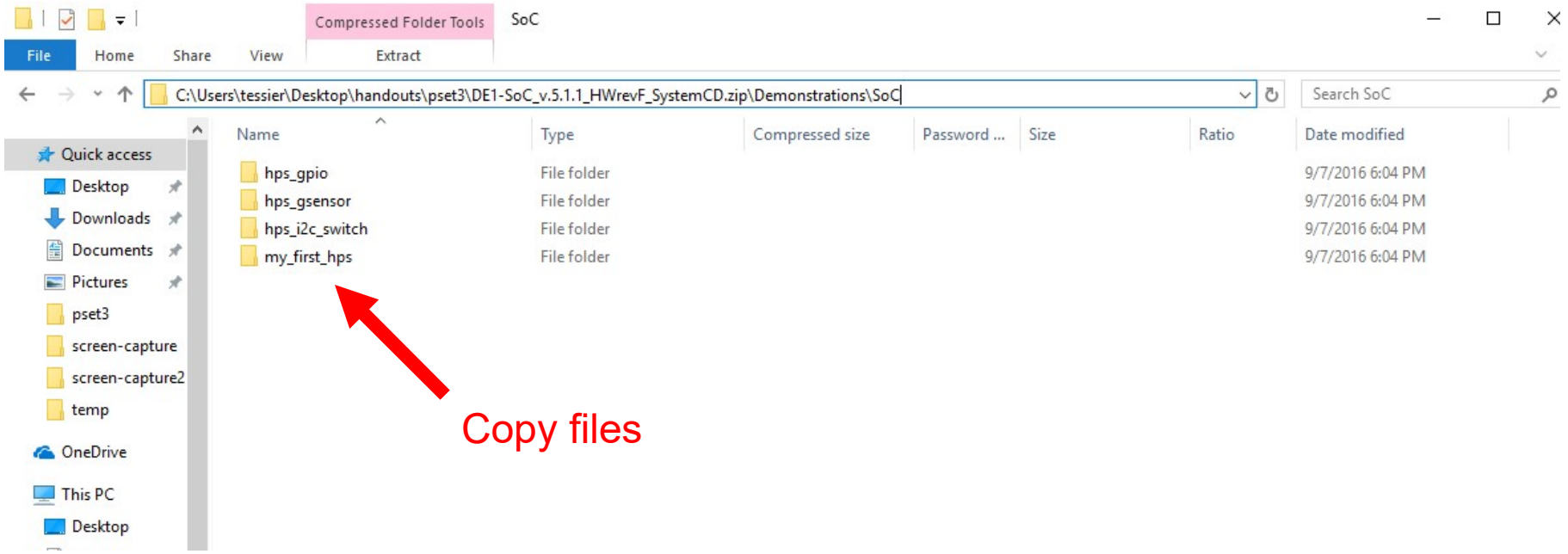
Booting Up Linux

- If you did everything correctly, you should see the following messages in the putty terminal on your computer when you turn on the DE1-SOC



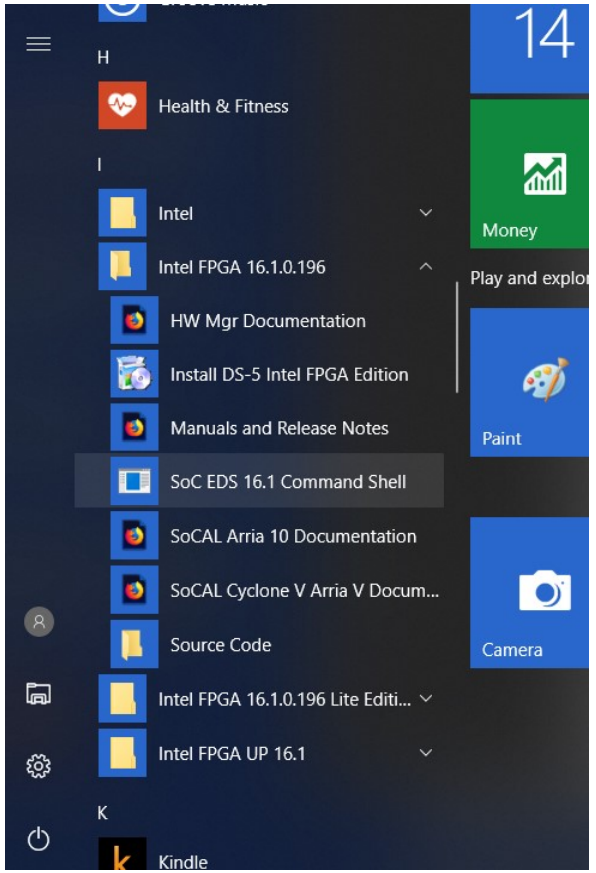
Compiling an Application Using EDS

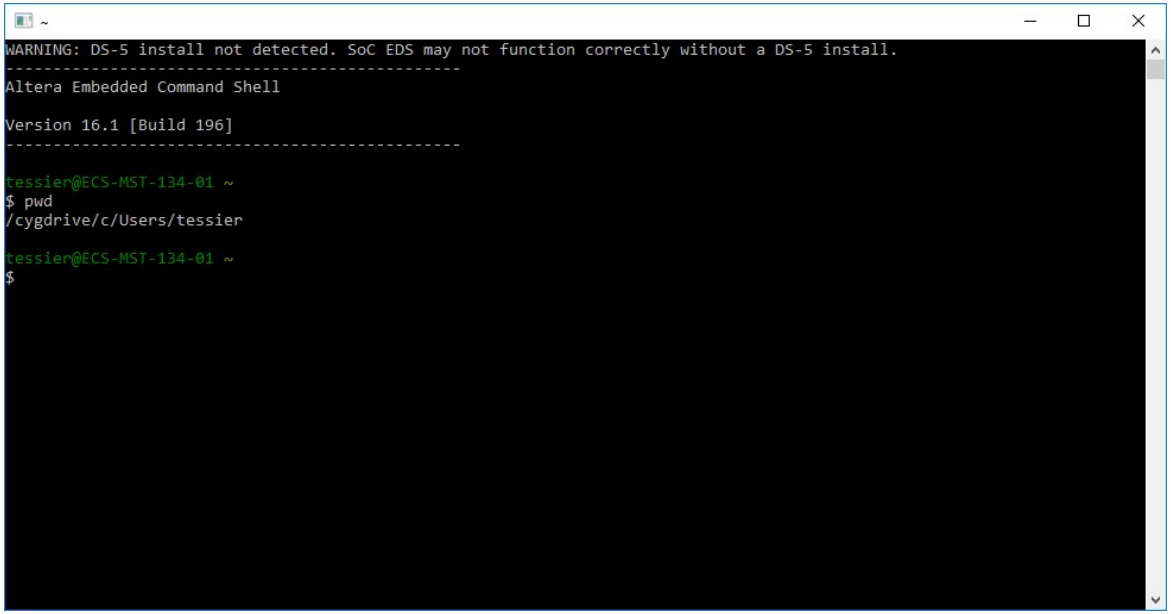
- The next step in this exercise is compiling a program using EDS.
- For this exercise, we use the my_first_hps program located on the DE1-SOC CD-ROM. Make a copy of these files, as shown below
- Additional information about this exercise can be found in Chapter 6 of the DE1-SOC User's Guide Manual



Compiling an Application Using EDS

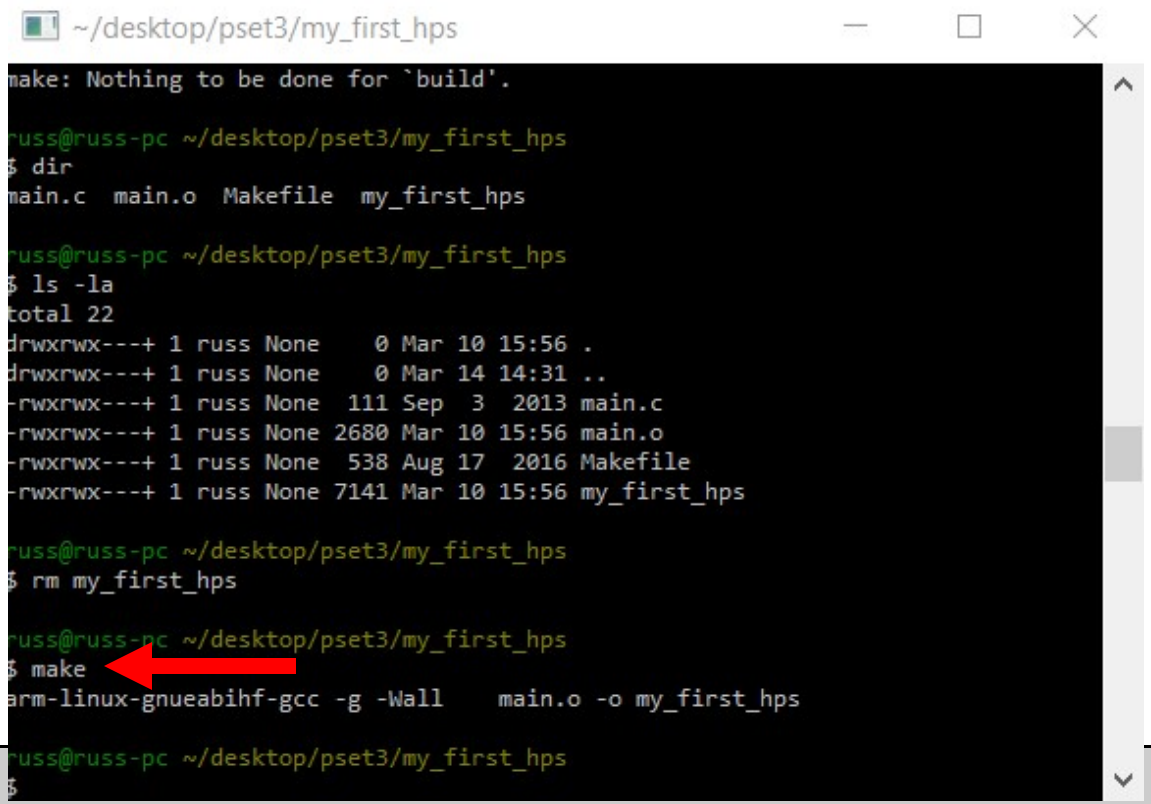
- Start the compilation process by selecting the SoC EDS 16.1 Command Shell
- This action will open up a text-based command shell





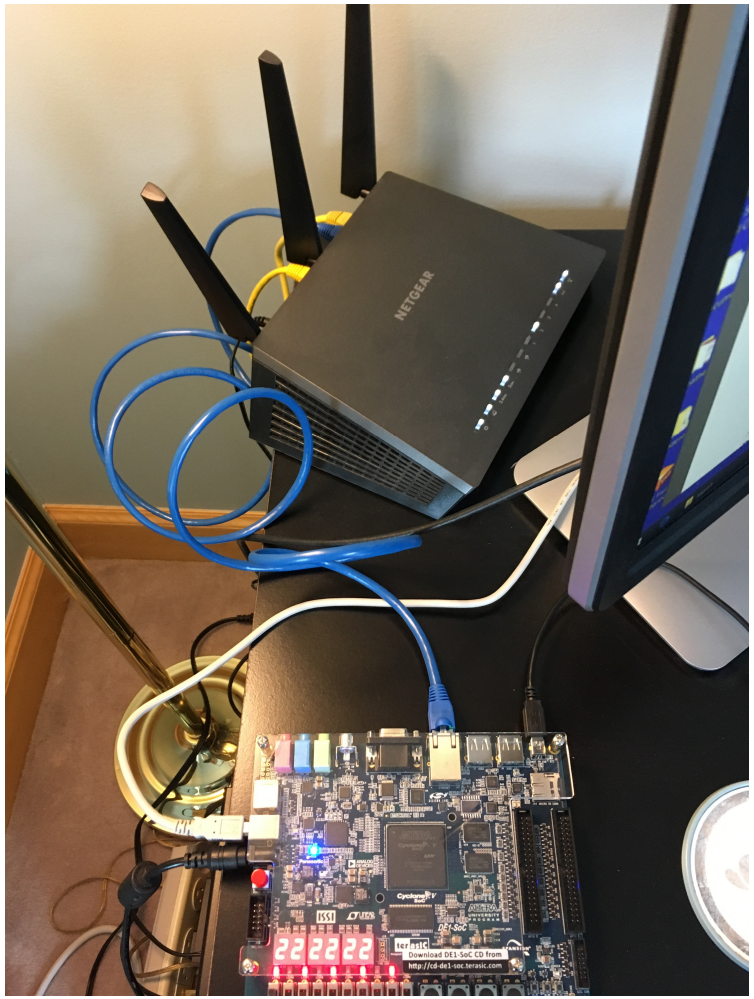
Compiling an Application Using EDS

- Using the Linux “cd” command, change directories until you reach the my_first_hps directory
- Type “make” to create the binary for the “main.c” application.



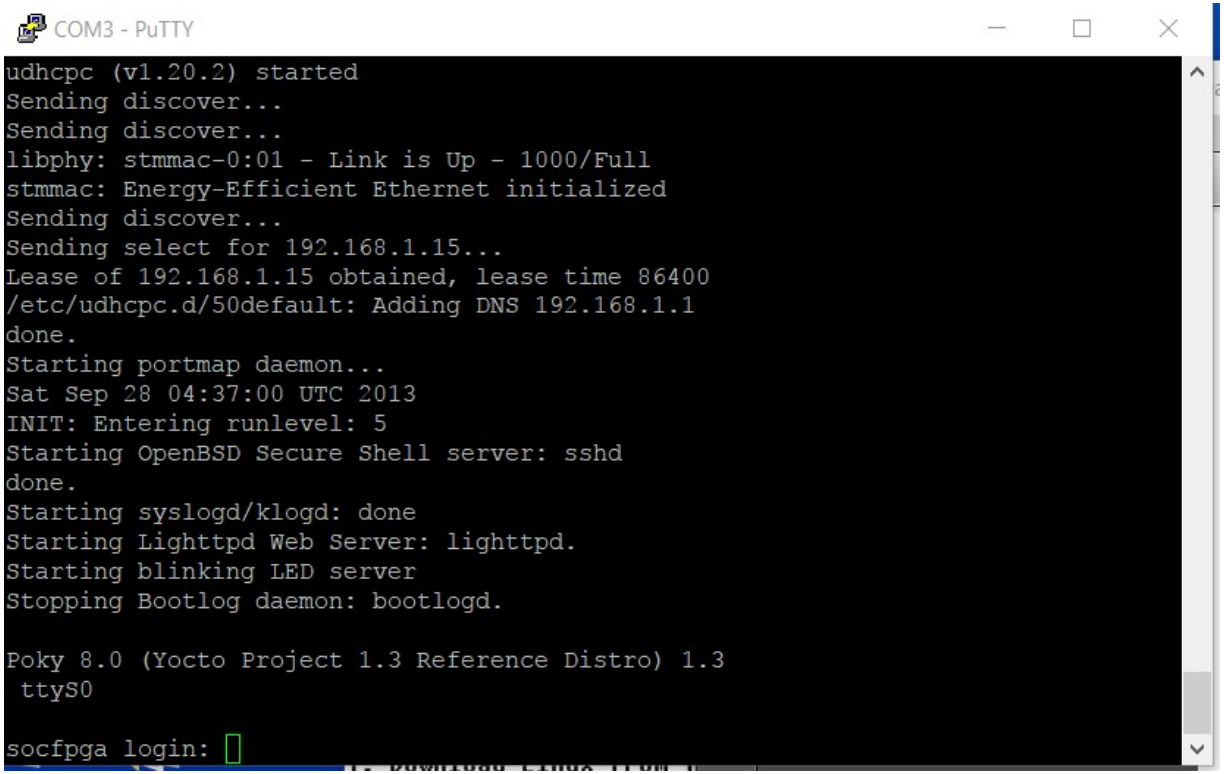
Transferring the Compiled File to the DE1-SoC

- The final step of the exercise is to transfer the compiled binary “my_first_hps” to the DE1-SoC board and to execute it.
- The easiest way to transfer the file is use Ethernet.
- Shut the DE1-SoC board off and connect an Ethernet cable from the board to your home router as shown here



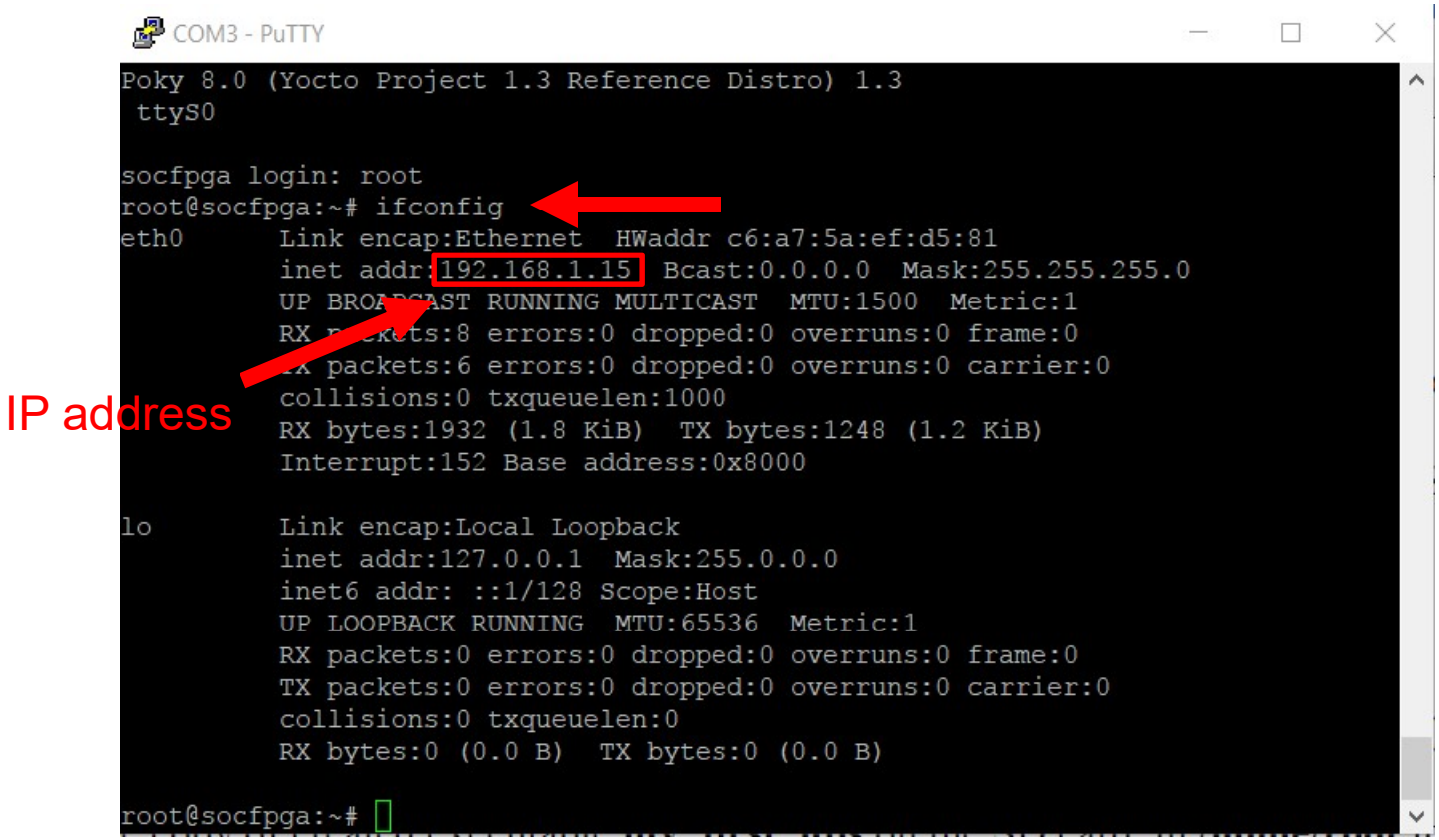
Transferring a File to the DE1-SOC

- At the login prompt in the COM3 window, type “root” and press enter



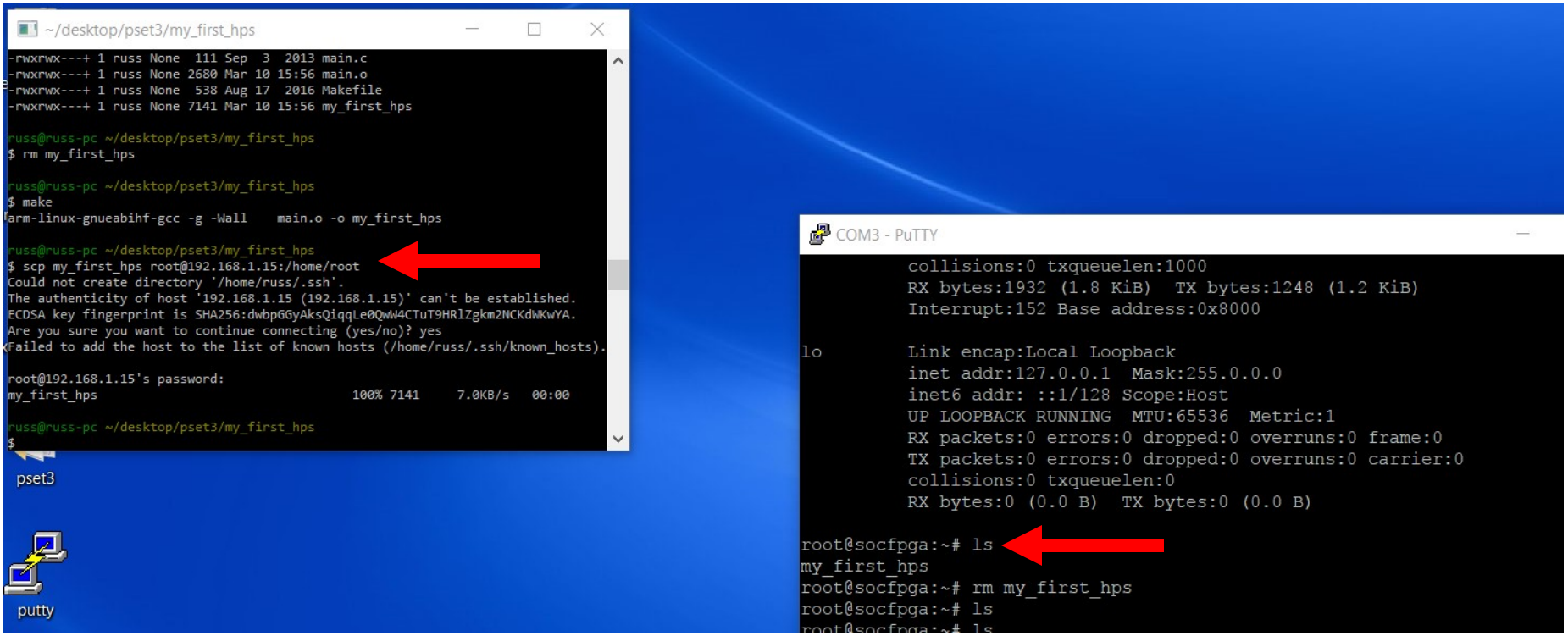
Transferring a File to the DE1-SOC

- In the COM3 putty window, type “ifconfig” to determine the IP address of your board. In this case it is 192.168.1.15



Transferring a File to the DE1-SOC

- In the EDS window (on the right below) type
  "scp my_first_hps root@192.168.1.15:/home/root"
- This action will copy the file from your PC to the DE1-SoC
- Type "ls" in the COM3 window to confirm that the file has been received



Running my_first_hps

- Type "./my_first_hps in the COM3 window and you should see the "Hello, World" message appear

- Other comments
  - In some cases, installing EDS will cause the USB Blaster II drivers to stop working preventing you from using the Intel Monitor Program.
  - You can reinstall the USB Blaster drivers using the DPInst.exe program