ML310-Session Tutorial

September 25, 2007

1 Objective

The goal of this tutorial is to explain how to use ML310-Session to program the FPGA with your bistream and to download your application. This is the final step in the series of tutorials, if you have not completed the previous tutorials refer back to them before continuing.

2 ML310-Session Tutorial

- From the project directory, go the implementation directory:

```
cd implementation
```

- Run xmd with a genace script:

    This will create a .ace file which is like a binary for hardware and includes both the bitstream and program

```
xmd -tcl $XILINX_EDK/data/xmd/genace.tcl -jprog \
-hw download.bit -ace lab01.ace -board ml310
```

The message

SystemACE file 'lab01.ace' created successfully.

indicates that you have built a base system.

Booting the Base System

There are four ML-310 boards directly connected to rsass-rcs (marge). For this assignment, you will remotely connect to one of the four boards via *ml310-session*. To acquire a board you must do the following (this assumes you have already generated an ACE file from above):

1. Login to Homer

```
ssh -Y rsass-homer.uncc.edu
```

2. Login to Marge

```
ssh -Y marge
```

3. Change Directory to your project directory where your ACE file is located

4. Use the ml310-session command to acquire a board (if one is available) and download your ACE file

```
ml310-session <acefile> ''<description>''
```

Example: ml310-session lab01.ace "Andy's Not So Live Hello World Demo"

Adding a Description is very handy since everyone in the class is creating a lab01.ace file, this is a chance to add a little bit of identifying information to help ensure that you are booting your ACE file (not one that was just left on the compactflash).

It should take about 25 seconds to boot to a menu that will give you details about what ACE files are currently installed on the compact flash. Below is a typical boot menu. ML310-Session will first load a default linux system followed directly by uploading your ACE file.

```
   _/_/_/       _/_/_/     _/_/_/       _/                _/
   _/     _/   _/         _/           _/     _/_/_/   _/_/_/
  _/_/_/     _/            _/_/       _/   _/     _/   _/     _/
  _/     _/   _/                _/     _/   _/     _/   _/     _/
  _/     _/     _/_/_/   _/_/_/         _/     _/_/_/   _/_/_/

  slot ace file (description; md5sum)
  ---- -------------------------------------------------

   (0) bootctl.ace (RCS Lab Remote Boot; e73146104f23e3b6c72c37c089d2051f)
   (1) ml310_pci_linux.ace (Linux w/PCI; af289410060b99c1dc901e61c9beae3f)
   (2) ml310_diags.ace (Original POST; 6886e8a3929c4f0ffdf1f4011e3d692c)
   (3) <no ace file>
   (4) <no ace file>
   (5) <no ace file>
   (6) <no ace file>
==> (7) <Some one else's ace file, this will be replaced with yours shortly>

Enter slot number, 'b' to boot, 'h' to halt:
```

The upload command will take several seconds and when it is finished, the screen on the ML-310 session will refresh. In this case, slot 7 should say,

```
   (7) lab01.ace (Andy's Test; 106af7203aae9ba2ed568d9338ebfbab)
```

The string of 40-hex characters is an md5sum checksum. If you type (on Marge)

```
rsass-rcs% md5sum lab01.ace
```

you will get a checksum. When the ACE file was uploaded, the ML-310 also computed a checksum. If these two numbers match, then it highly probable that there were no errors in transmission.

From the menu, one can select the next slot to boot (type a number between 0 and 7 and hit *enter*), boot a new ACE file, or halt (shutdown) the board.

Now it is time for you to boot your ACE file. In the ML-310 session window, type 7 (and hit *enter*) and then b (and hit *enter*). The boot menu program will do a soft reset on the ML-310 and everything after the `Restarting system.` line is the new ACE file.

After verifying that your program worked, you want to turn off the board. This is accomplished by exiting your ml310-session. Type *control-A* and then hit *X*. It will ask you if you want to Exit without Reset. Hit *enter* to confirm Yes.

The window will disappear, the ML-310 board will be turned off, and the board will be free for someone else to use it.

NOTES:

- Whenever you have the option, always halt the board before leaving your ml310 session. This is not possible for stand-alone C programs (like today's assignment) but this is the only case.

- Make sure you actually close and release the lock on the board. ML310-Session should do this automatically; however, if an error occurs it is possible it did not release the lock. You can check by typing:

  ```
  rcc list
  ```

- The four ML310s in the lab are named:

  shemp (pdu2 port 21)

  moe (pdu2 port 20)

  curly (pdu2 port 19)

  larry (pdu2 port 18)