**Tutorial 2**

**Loading Firmware (.ace files)**

*February 2022*

This tutorial describes how to load firmware in the form of .ace files.

There is a tool called AceProgrammer that allows users to load firmware in the desired module. Firmware can either be loaded from the PROM of the FPGA (faster, can be used after a fw is finalized) or from a directory in the machine(generally used during testing versions).

1. **Log into sbcpix**

Ssh into the sbcpix machine of the crate corresponding to where the required module is located. For example, here we want to work with slot 7 in crate1, so

ssh sbcpix-sr1-01

(01 is the crate number. Change to 03 if modules in crate 3 are being used)

Remember to source this otherwise subsequent actions it will not work

source /tbed/user/<USERNAME>/repos/oks/setup\_everything.sh

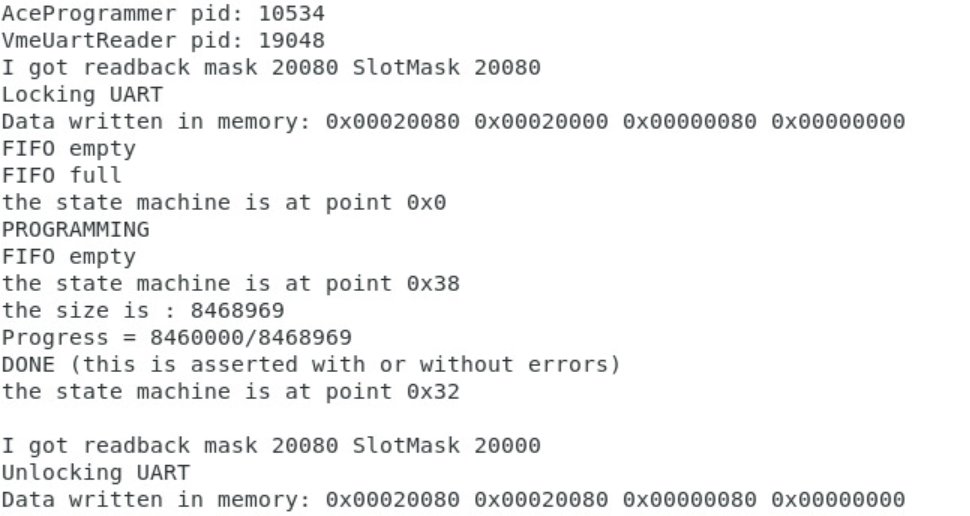
1. **Load firmware either from location in machine or PROM in FPGA**

**2.1 To load ace file stored in a location**

AceProgrammer <SLOT NUMBER> <PATH TO ACE FILE>

AceProgrammer 7 /det/pix/fw/test/ROD/Slaves/TopMerger/rodSlave\_top\_calibration\_boot\_e925784d3e12264492e6bfe9285c283291e56a7f\_pixel.ace

(make sure there is “/” before location)



Make sure that the process has completely gone through

**2.2 Load ace file stored on PROM of FPGA**

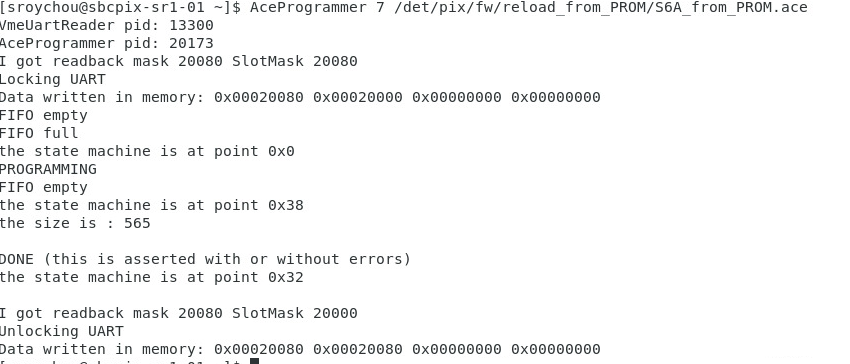
This is the firmware version from 2018. It is stored in the FPGA PROM.

The firmware for the 2 slaves is being loaded in separate steps

S6A- Spartan 6, slave A; S6B – Spartan 6 slave B

AceProgrammer 7 /det/pix/fw/reload\_from\_PROM/S6B\_from\_PROM.ace

AceProgrammer 7 /det/pix/fw reload\_from\_PROM/S6A\_from\_PROM.ace

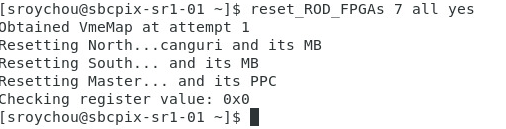


1. **Reset**

Make sure to reset before starting a run. This command resets the MicroBlaze and PPC .

reset\_ROD\_FPGAs <SLOT NUMBER> all yes

reset\_ROD\_FPGAs 7 all yes



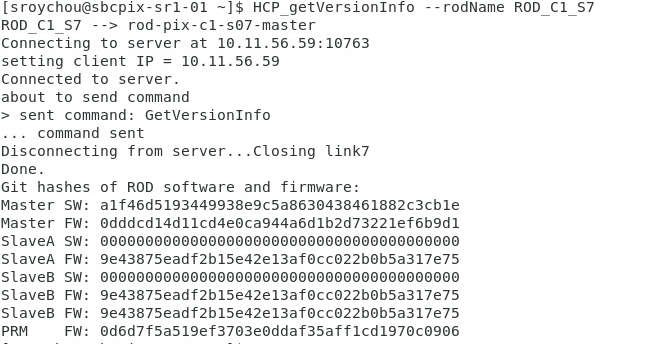
1. **Check version loaded in FPGA**

Run this command after resettling the FPGAs.

HCP\_getVersionInfo --rodName <NAME>

HCP\_getVersionInfo --rodName ROD\_C1\_S7

This gives the git hash of the firmware and software loaded into the Master, Slave and PRM of the ROD.



Now it can be seen that the correct slave firmware has been loaded into the ROD FPGAs.

Always ensure that the git hash is coming up correctly before starting a run. If the hash isn’t being read back, it indicates that something is wrong with the PPC. It is possible that the booting hasn’t been completed, so make sure to wait for a few minutes (usually 3-5 min) after loading and resetting to see the correct hash.