1 Programming an brand New SRU's Serial Number Register

SRU's unique Serial Number (SN) is stored in a **32-bit non-volatileeFUSE** register in the FPGA. It is **one-time programmable. Once it is burnt, it cannot be changed.** It must be externally programmed through **JTAG**. It can be read from the SRU register **0x1**.

When you program the SRU's SN register:

- FPGA device must be in the chain in the Boundary Scan window of **iMPACT**.
- The **ST6**must be**shorted**. (Note: ST6 is probably at the place close to the FPGA).

1. In the Boundary Scan window, select the Virtex-6 FPGA device.
2. Select **Operations > Access eFUSE Registers > Program eFUSE Registers**.
3. In the Program eFUSE Registers dialog box, fill in the following:
   User register (Enter 8 HEX digits) –If selected, you will program the user register.Enter the 8 hex digits of SRU SN into the box provided.For instance: **0x20120006** means **Year: 2012, SN: 0006**. SN is the last four number printed on the SRU paper label near COAX connectors.
4. Click **OK**.
5. A warning dialog box appears, reminding you that eFUSE registers are one-time programmable. If you are ready to program the selected registers, click **YES**.

When you finishprogram the SRU's SN register

The **ST6**must be**disconnected (un-shorted)**.

2 Programming an brand New SRU's IP address

SRU's IP address is stored as **two 16-bit words** in the **non-volatileFlash**. They are programmable. It is programmed through a series of DCS commands. It can be read from SRU register 0x2.

When you program SRU's IP address:

The **SRU3BootCode12091902_IP121.bit** must be programmed to the FPGA through JTAG. This firmware has a pre-defined fixed IP address: **10.160.132.121**

1. **Eraseflash** block where the IP address is stored:
   [pcemcal002] /home/emcaldaq/FanSRUArchive/EraseIPFlash.txt
2. **Write Higher 16-bit word**:
   [pcemcal002] /home/emcaldaq/FanSRUArchive/WIPHtoFlash.txt
3. **Write Lower 16-bit word**:
   [pcemcal002] /home/emcaldaq/FanSRUArchive/WIPLtoFlash.txt

3 Programming Boot-Code to SRU's PROM with iMPACT

The SRU Boot Code **SRU3BootCode12091917.mcs** is stored in the SRU PROM. It must be externally programmed through **JTAG**. It **automatically gets the IP address from the Flash** just after it is loaded from the PROM to the FPGA.

To program the Boot-Code with **iMPACT**:

1. Assign **SRU3BootCode12091917.mcs** file to the Platform Flash PROM in the JTAG chain.
2. Select the PROM device**>Right Click > Set Programming Properties>Advanced PROM Programming Properties >During Configuration: PROM is Configuration Master >**Check to **Select clock source > Internal clock (20 MHz). >**click **OK.**
3. **Program** the PROM.

4 Programming User-Code to SRU's Flash with Flash Programming Tool

1. Install the Flash tool on a windows platform.
2. Download SRU firmware (.hex file).
3. Program .hex file to the SRU flash via Flash tool.

Note:

1. All files can be downloaded from the website below:
https://twiki.cern.ch/twiki/bin/view/Sandbox/FanZhangSRUFiles
2. You can learn how to use the Flash tool user via Using_the_SRU_Flash_Tool.avi