VCU128 System Controller GUI Tutorial

May 2019

XILINX

XTP534

Revision History

Date	Version	Description
05/29/19	2.0	Updated for 2019.1. For Production Silicon boards.
12/10/18	1.0	Initial version.

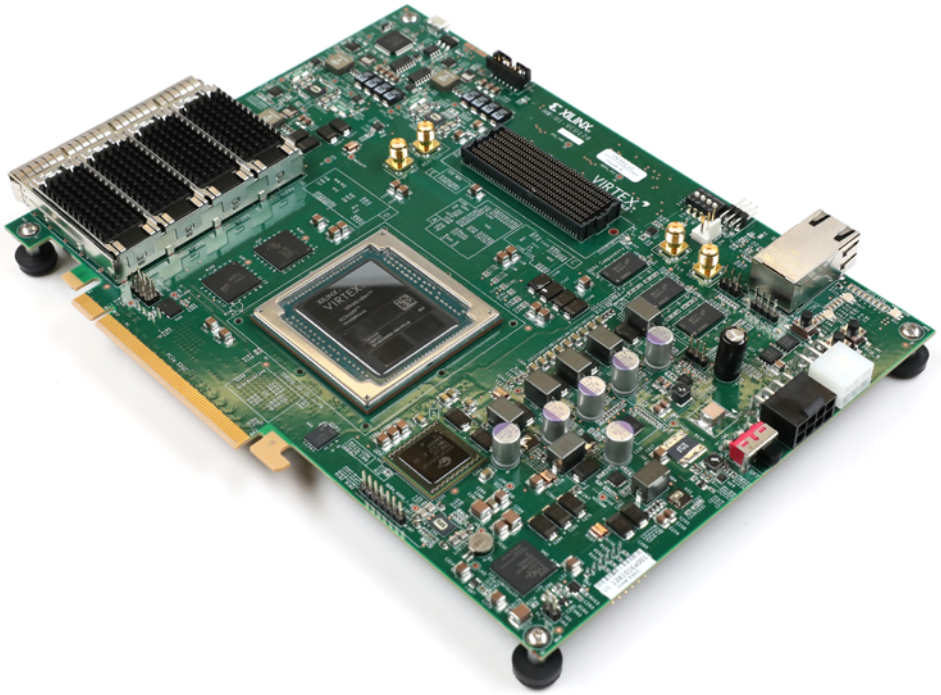
Overview

- **Xilinx VCU128 Board**
- **VCU128 SCUI**
  - Clocks
  - Voltages
  - Power
  - FMC
  - GPIO Expander
  - EEPROM Data
  - About
- **Programming Firmware**
- **References**

Note: Presentation applies to the VCU128

VCU128 Software Install and Board Setup

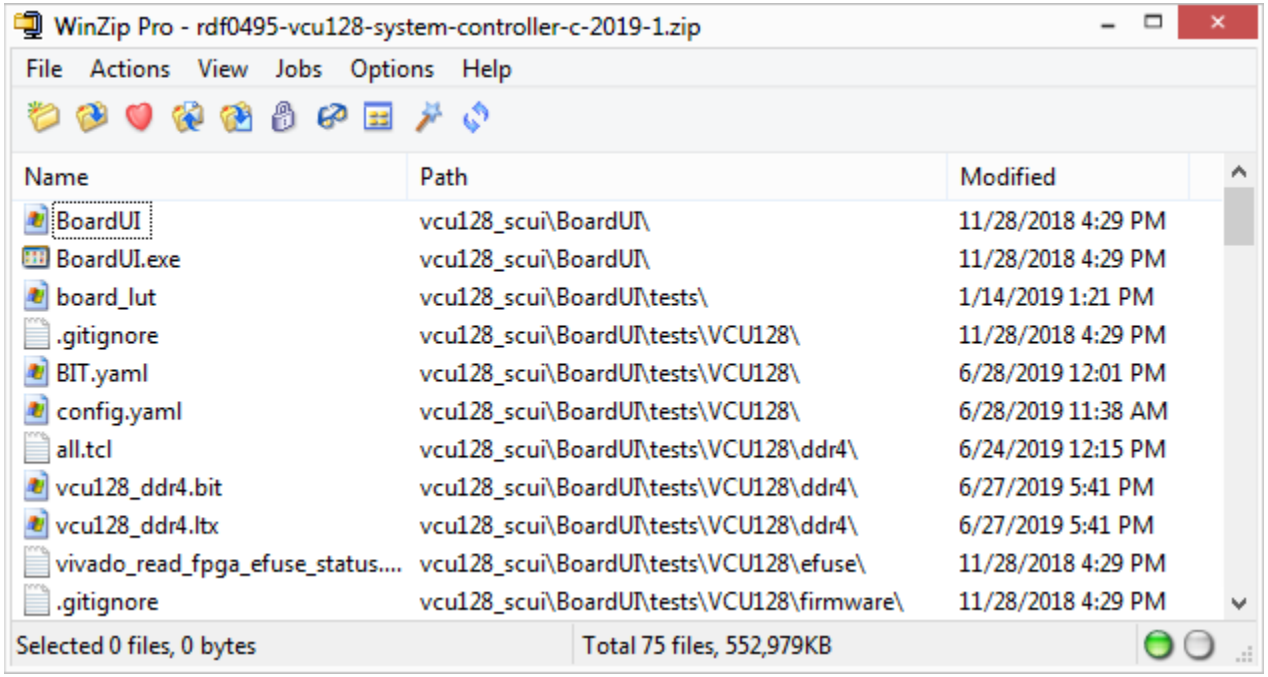
- **Complete setup steps in XTP535 – VCU128 Software Install and Board Setup:**
  - Software Requirements
  - VCU128 Board Setup
  - UART Driver Install
  - Ethernet Setup



Note: Presentation applies to the VCU128

VCU128 System Controller

- **Open the RDF0495 – VCU128 System Controller GUI (2019.1 C) ZIP file**
  - Extract these files to your C:\ drive



Note: Presentation applies to the VCU128

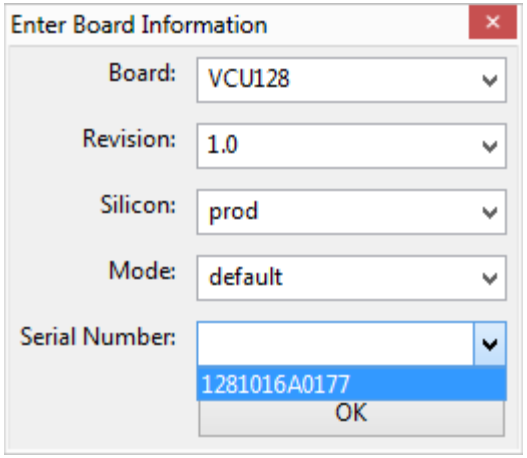
Running the Board Interface Test

- **From C:\vcu128_scui/BoardUI, double click on BoardUI.exe**

Note: Executable requires 64-bit Windows

Basic Board Interface Test

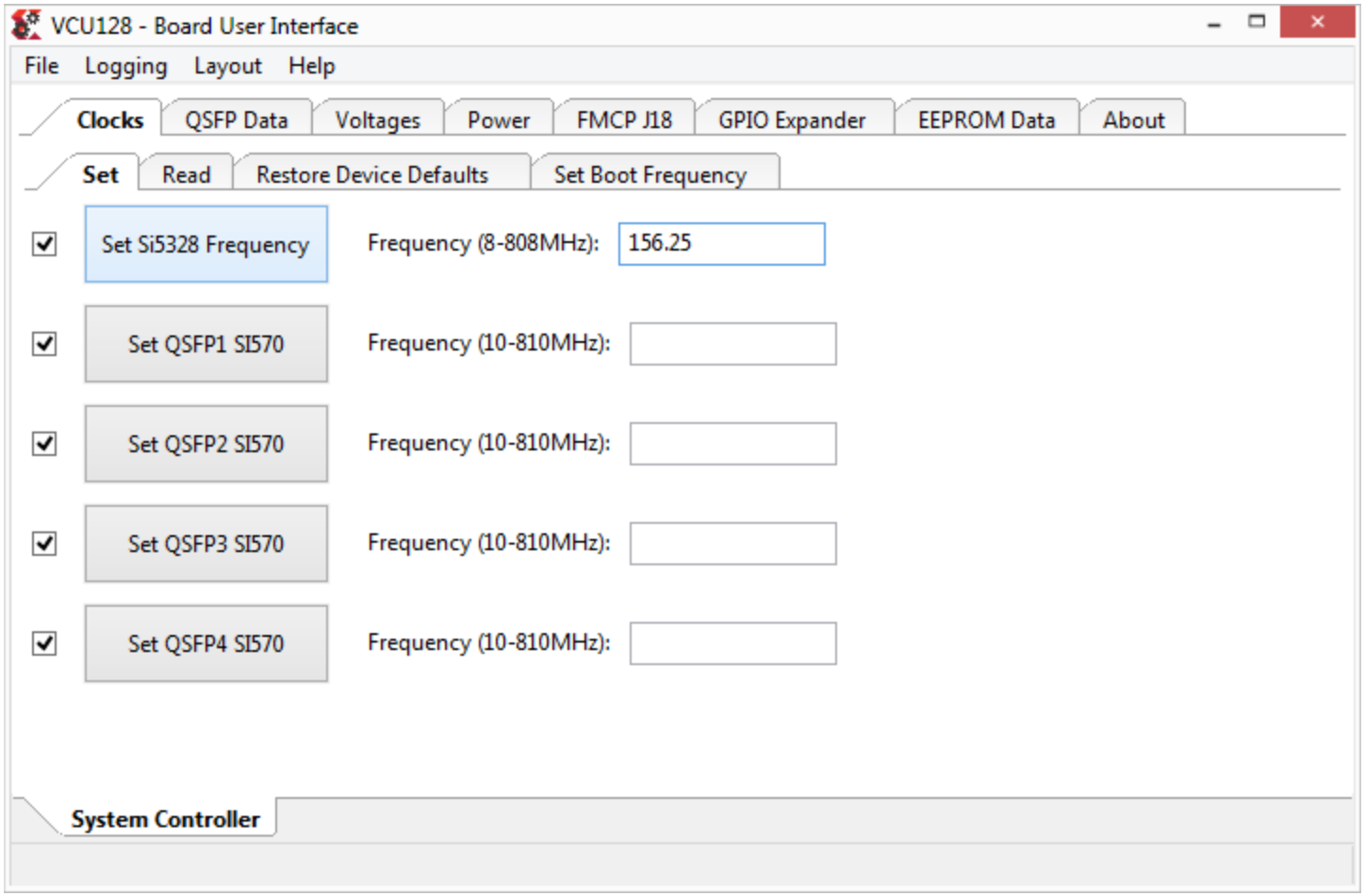
- **Select the Board Serial Number from the pulldown and click OK**



Note: Presentation applies to the VCU128

Setting the clocks

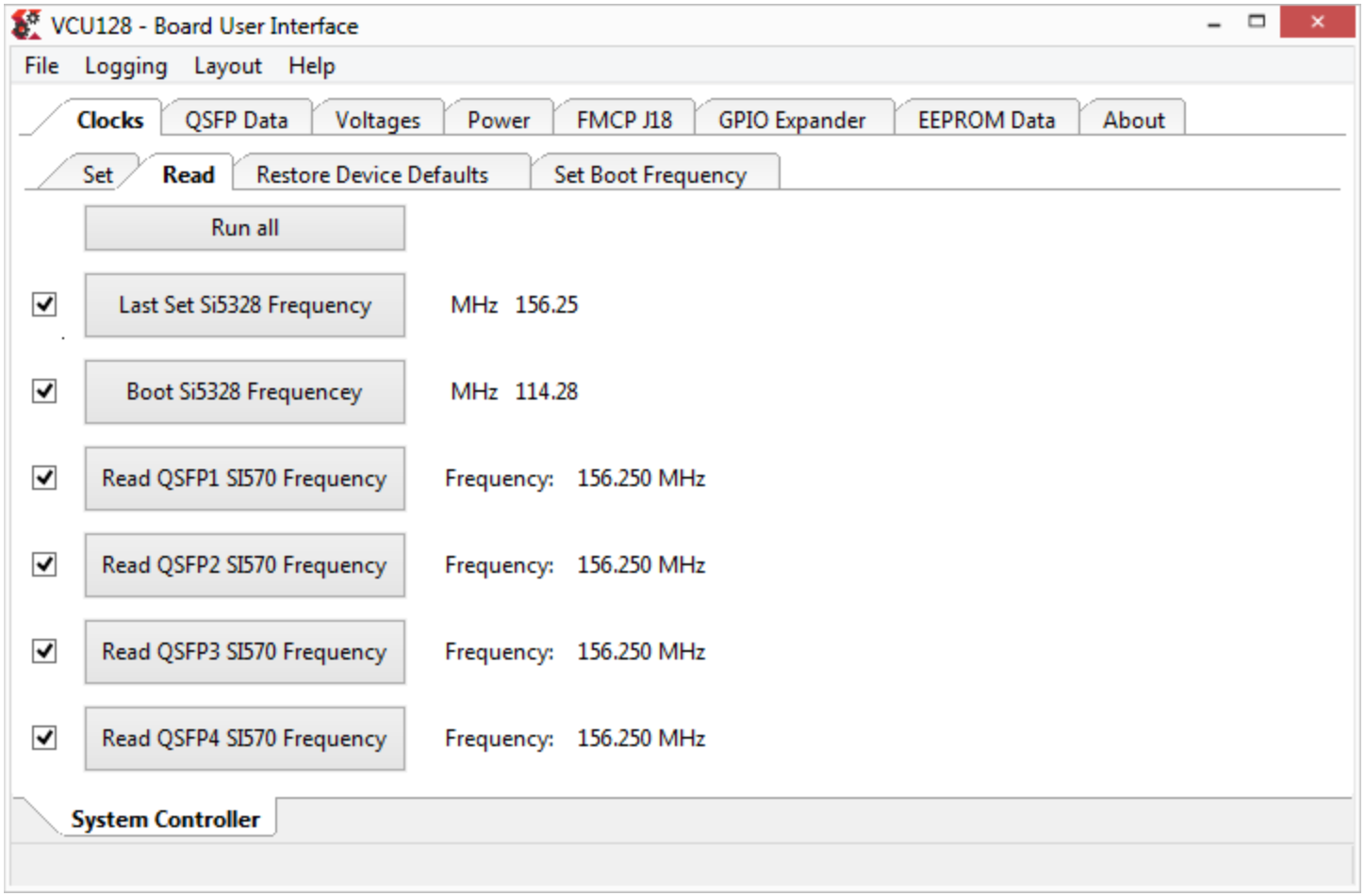
- Select the Set tab underneath the Clocks tab
- Enter 156.25 for the Si5328 and click the Set Si5328 Frequency button



Note: Presentation applies to the VCU128

Reading the clocks

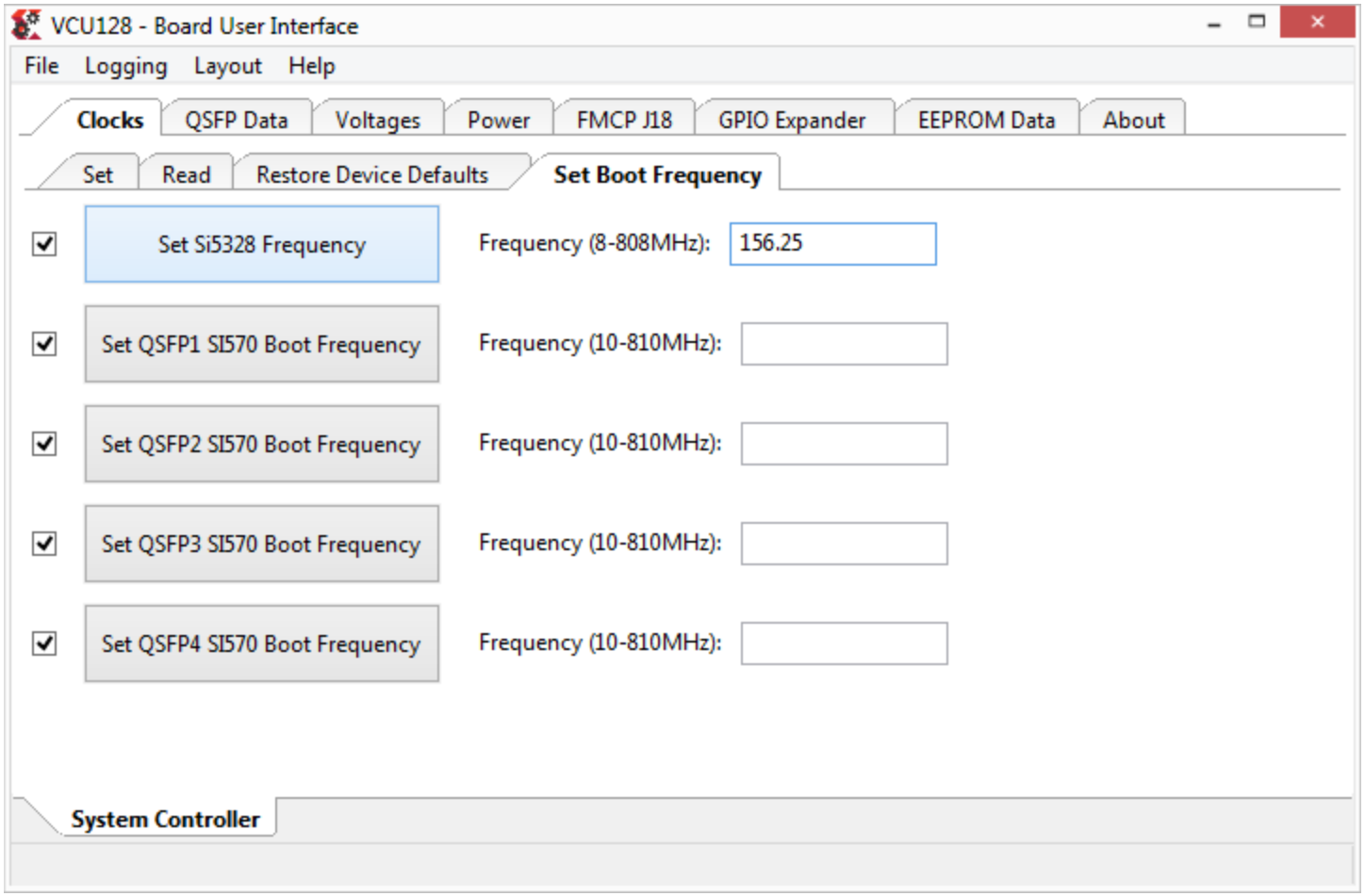
- Select the Read tab
- Click each of the Read buttons and verify the frequencies are set as shown



Note: Presentation applies to the VCU128

Setting Clock Boot Frequencies

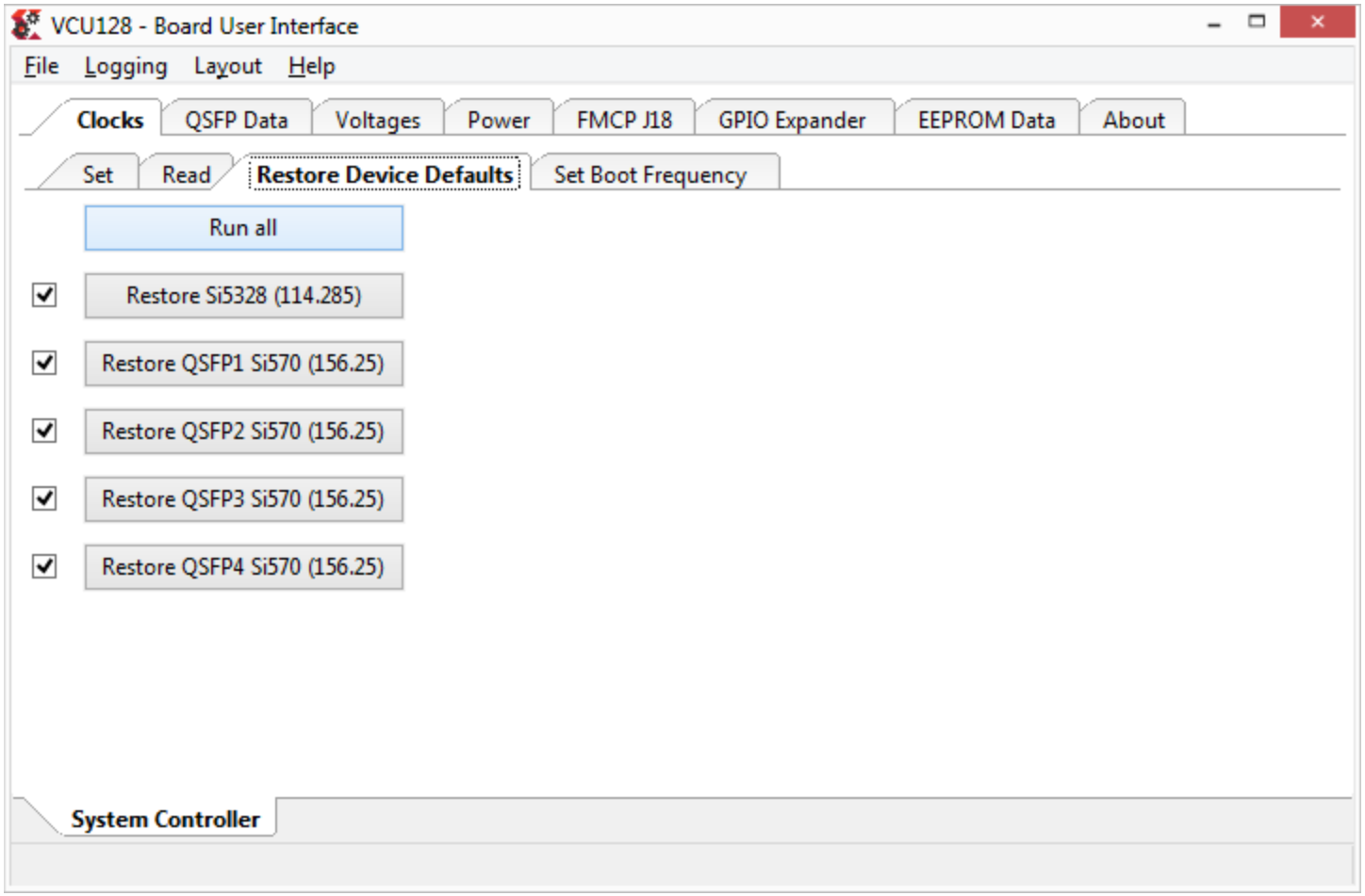
- Select the Set Boot Frequency tab
- Type in your desired boot-up frequency and click the corresponding Set button



Note: Presentation applies to the VCU128

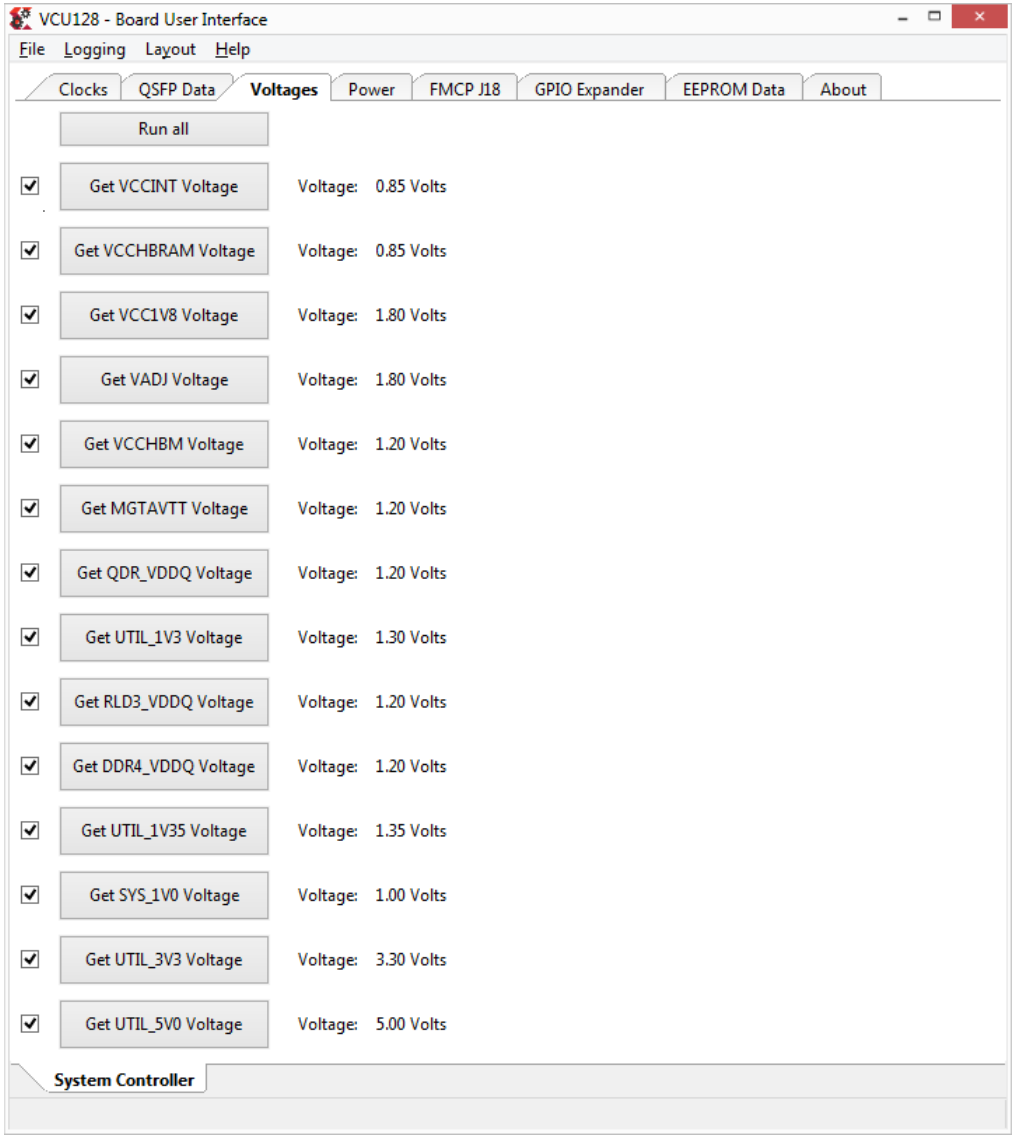
Setting the clocks

- Select the Restore Device Defaults tab
- Click Run All to restore all to the factory settings
- Set the Si5328 back to 156.25 after this step



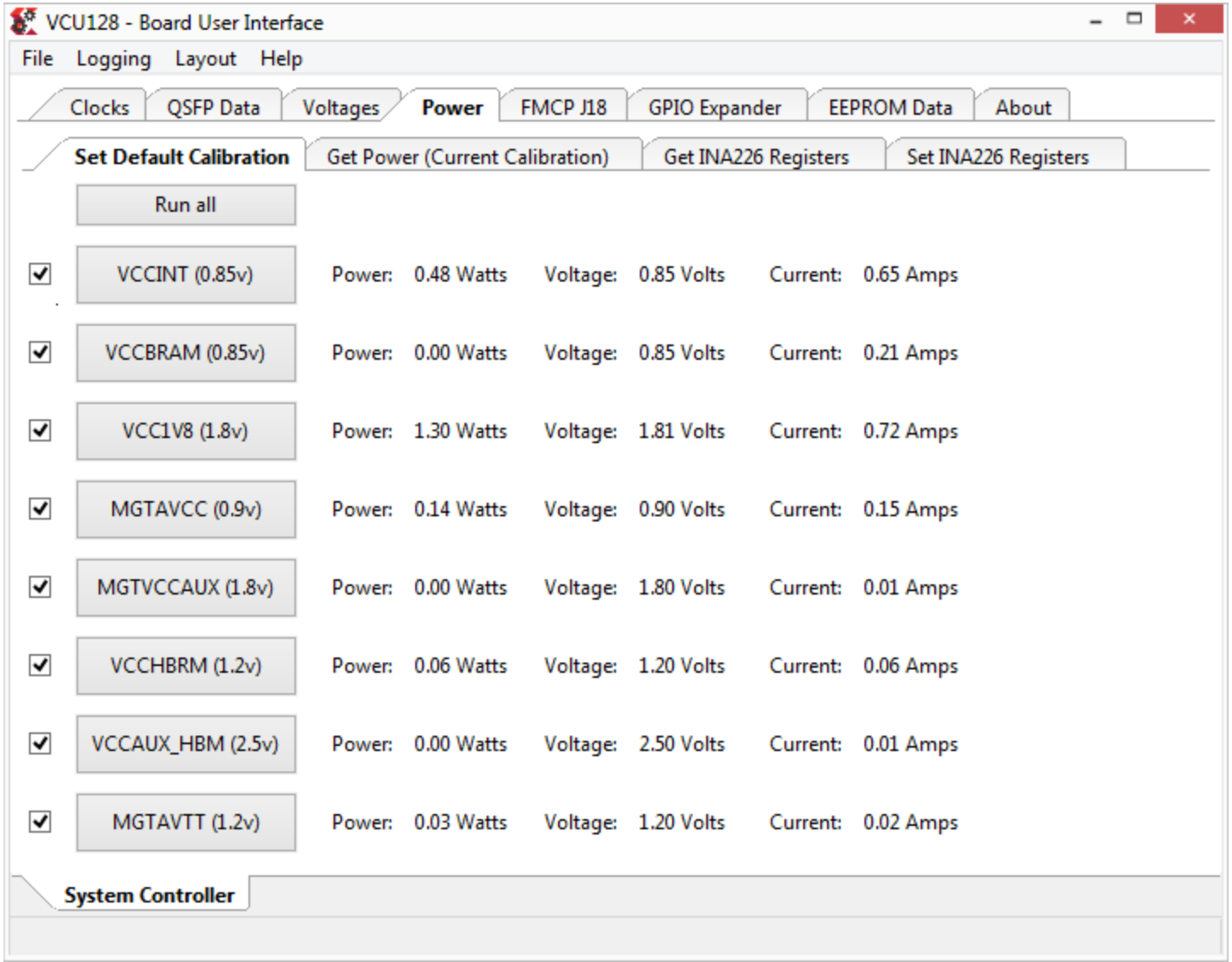
Reading onboard VCU128 voltages

- Select the Voltages tab
- Click the Run all



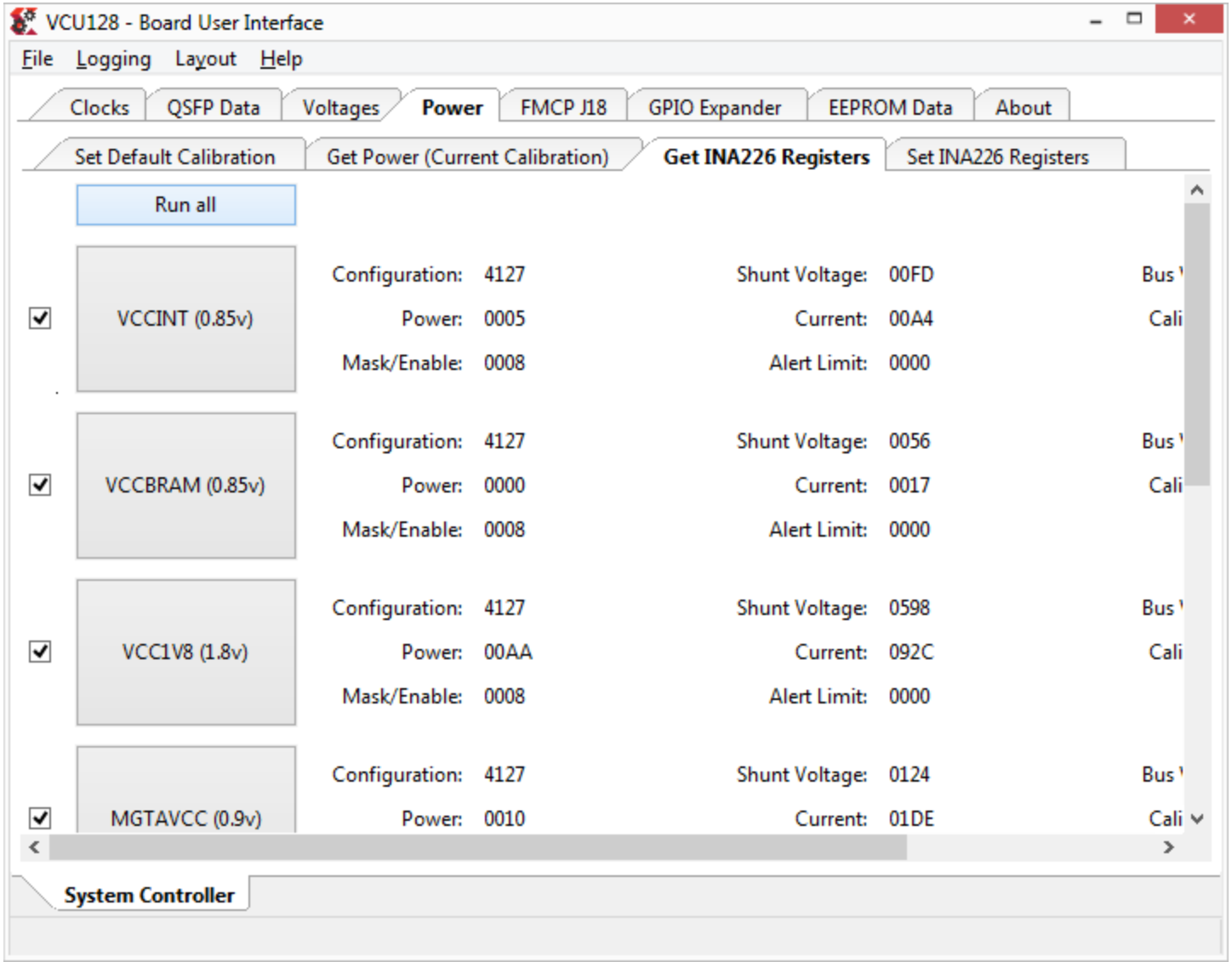
Reading power values using default calibration

- Select the Set Default Calibration tab underneath Power and click Run all
- This sets the default calibration and returns the calibrated power values



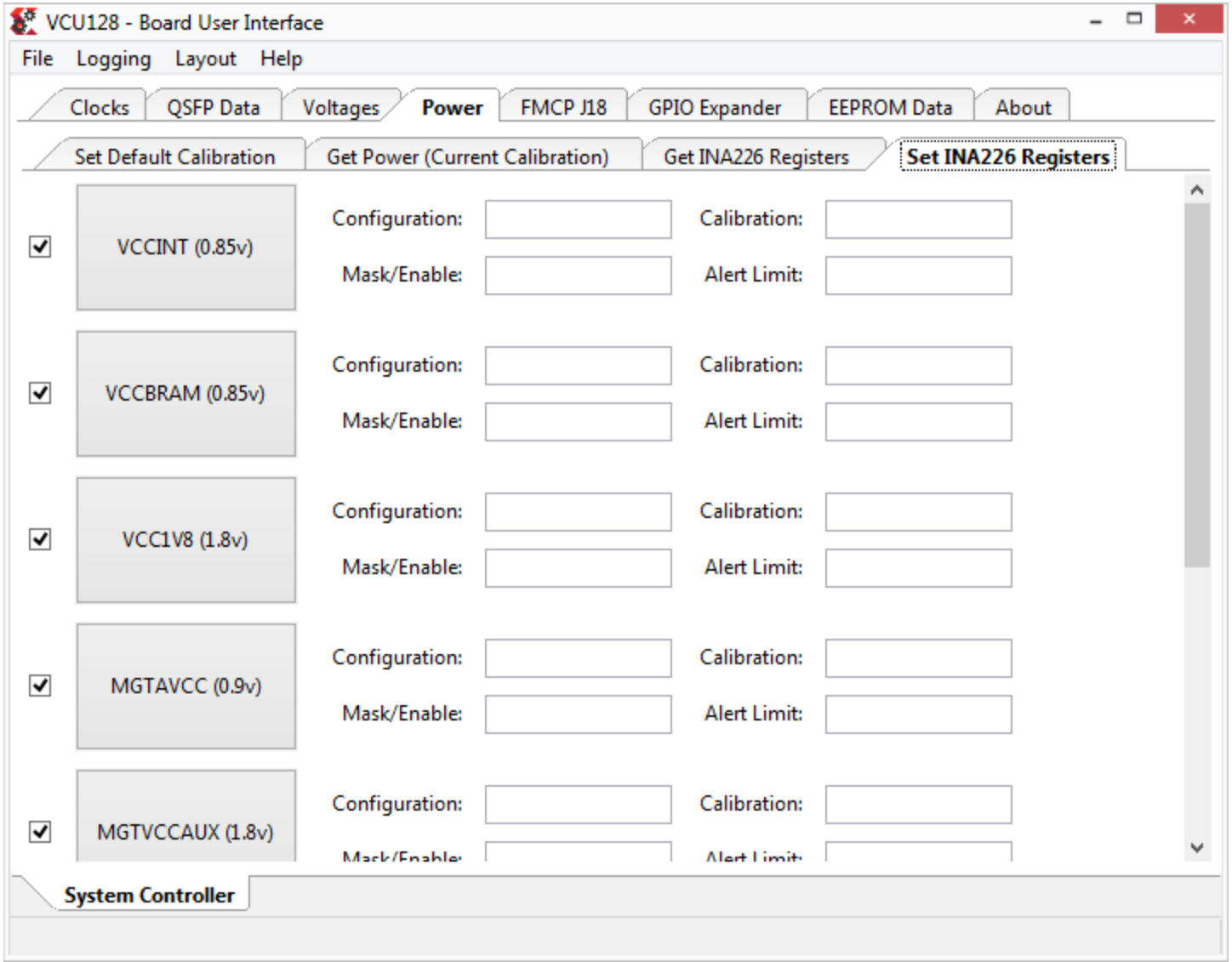
Read INA226 Registers

- Select the Get INA226 Registers tab and click Run all
- Observe the INA226 Registers settings



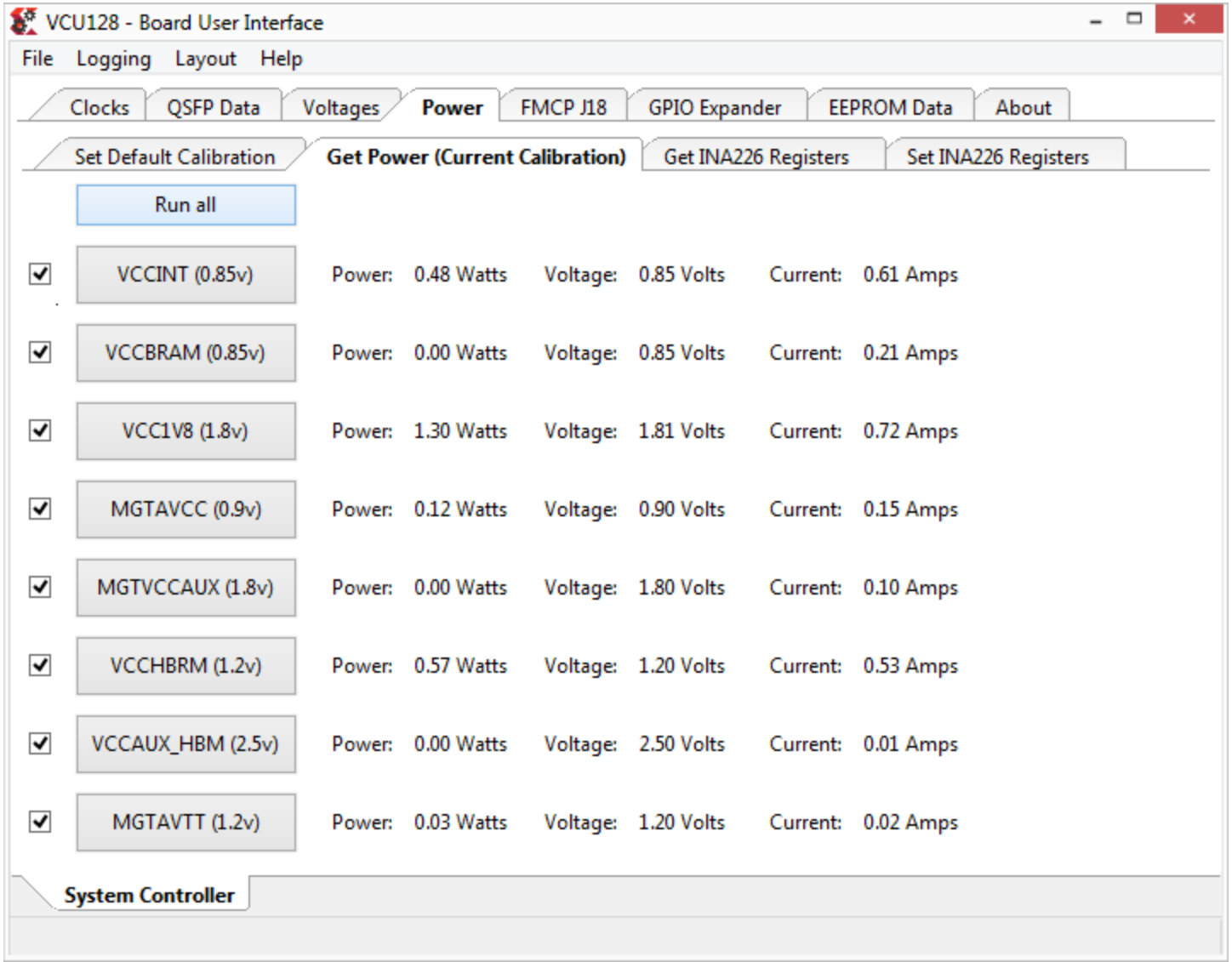
Set INA226 Registers

- Select the Set INA226 Registers tab
- Review TI INA226 documentation before making changes



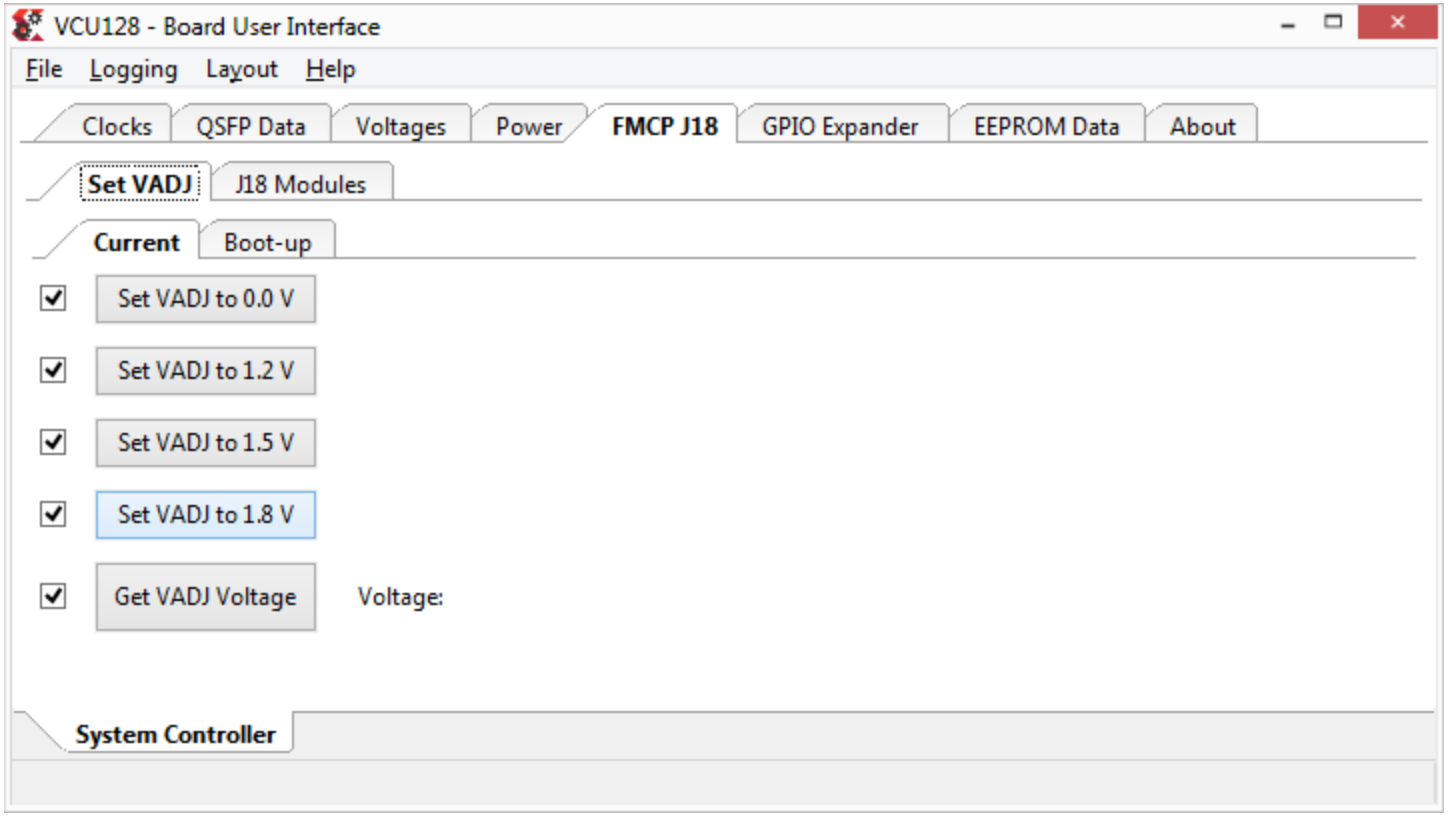
Reading power values using current calibration

- Select the Get Power (Current Calibration) tab and click Run all
- Observe readings (no calibrations were entered in this example)



Set VADJ

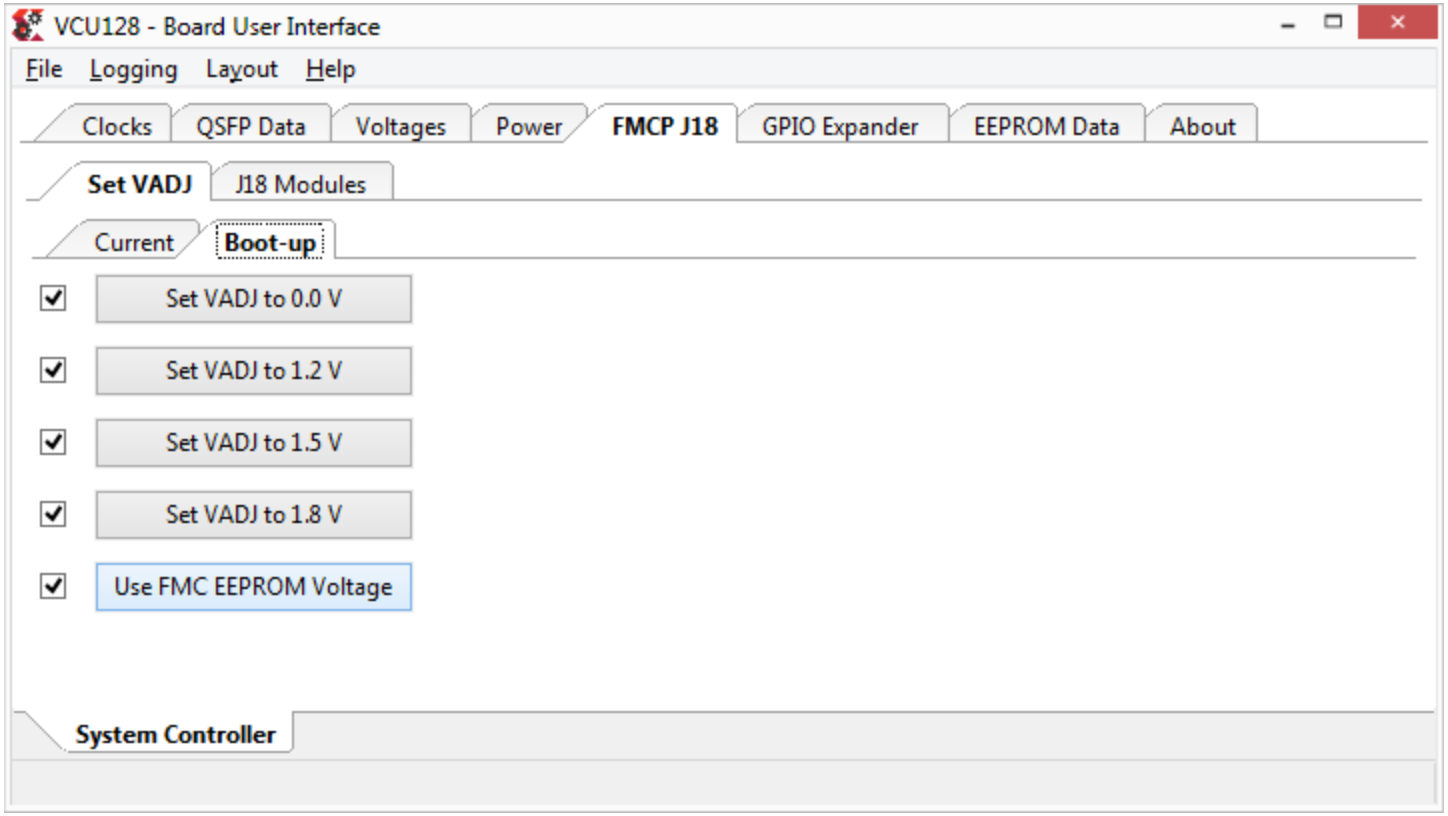
- Select the Set VADJ tab underneath the FMC J18 tab
- Under the Current tab, select the desired VADJ voltage
- Some BIT tests expect 1.8 V



Note: Presentation applies to the VCU128

Set Boot-Up VADJ

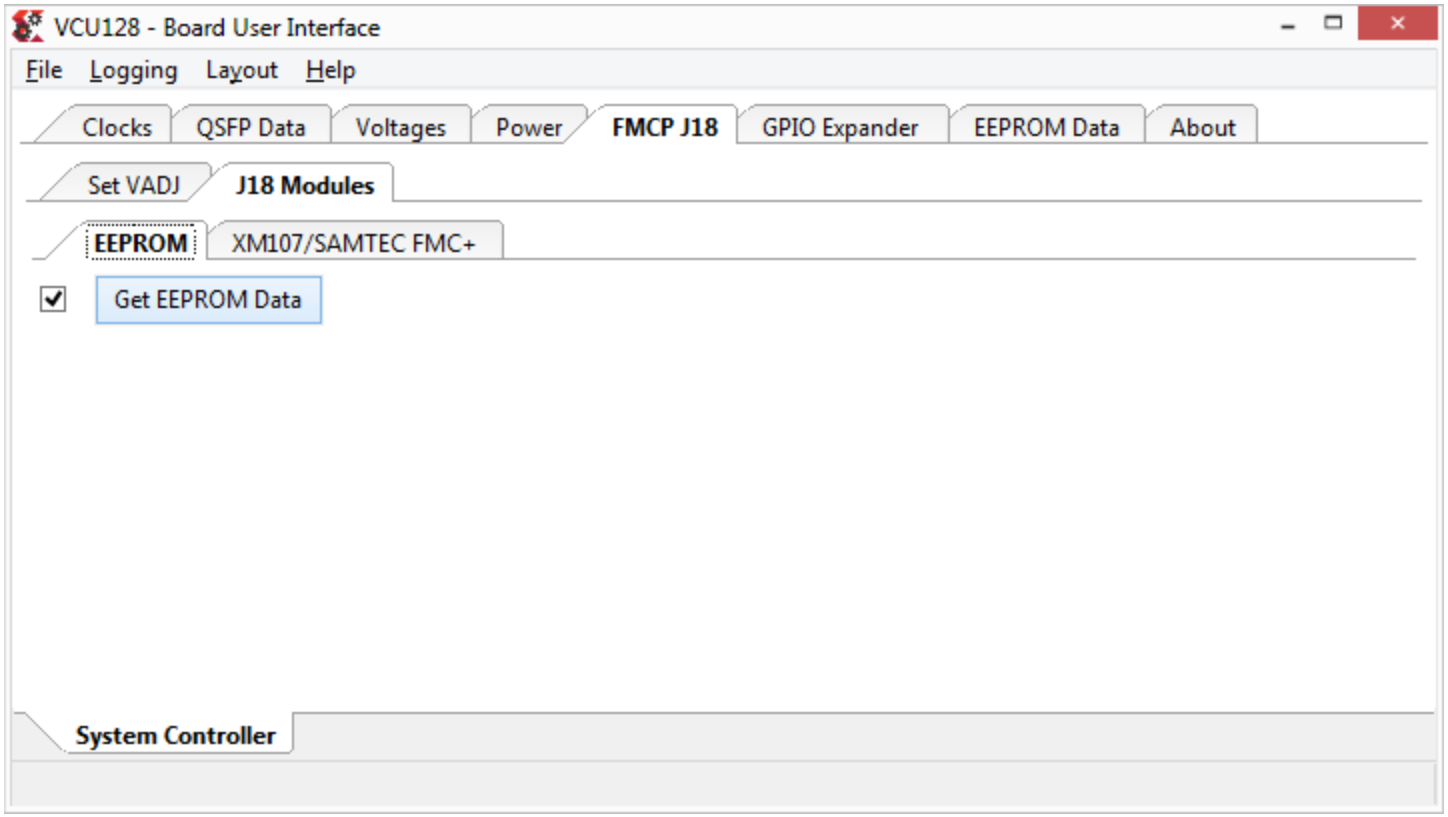
- Select the Boot-up tab and choose the desired power-on voltage
- The default, Use FMC EEPROM Voltage, will set 1.8 V unless you attach an FMC card with a different setting



Note: Presentation applies to the VCU128

Reading FMC EEPROM

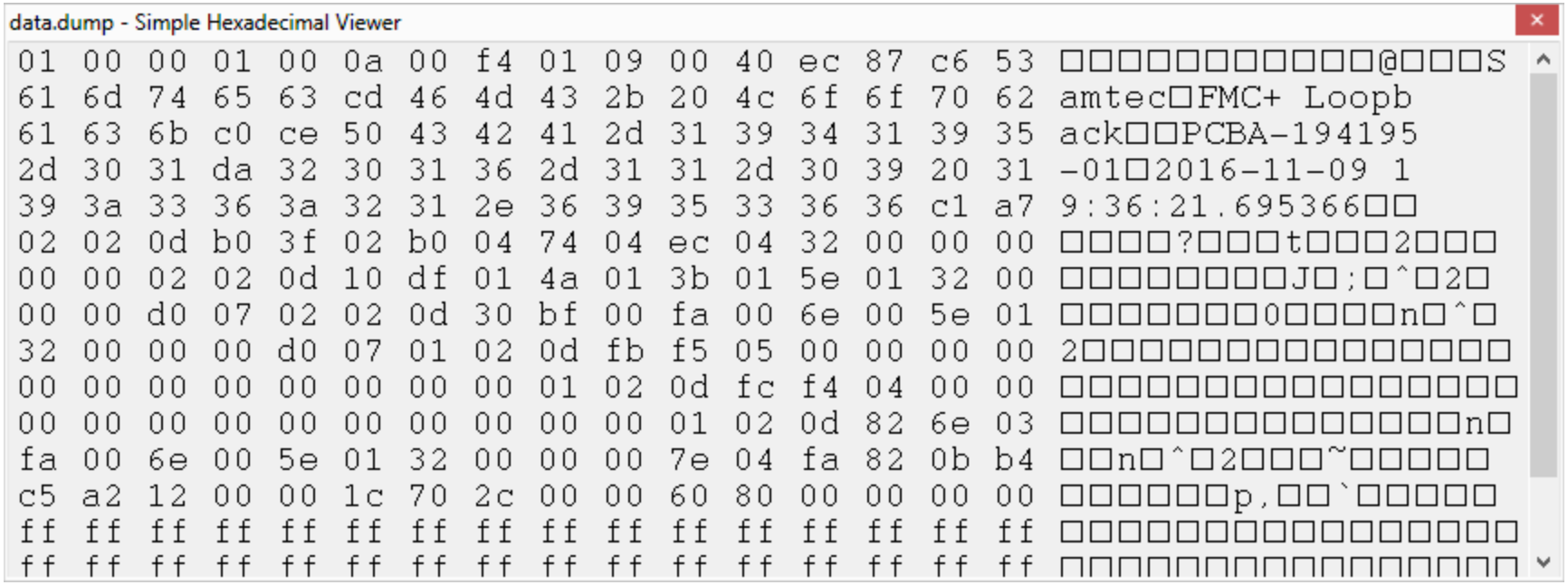
- Select the J18 Modules tab
- Click the Get EEPROM Data button



Note: Presentation applies to the VCU128

Reading FMC EEPROM

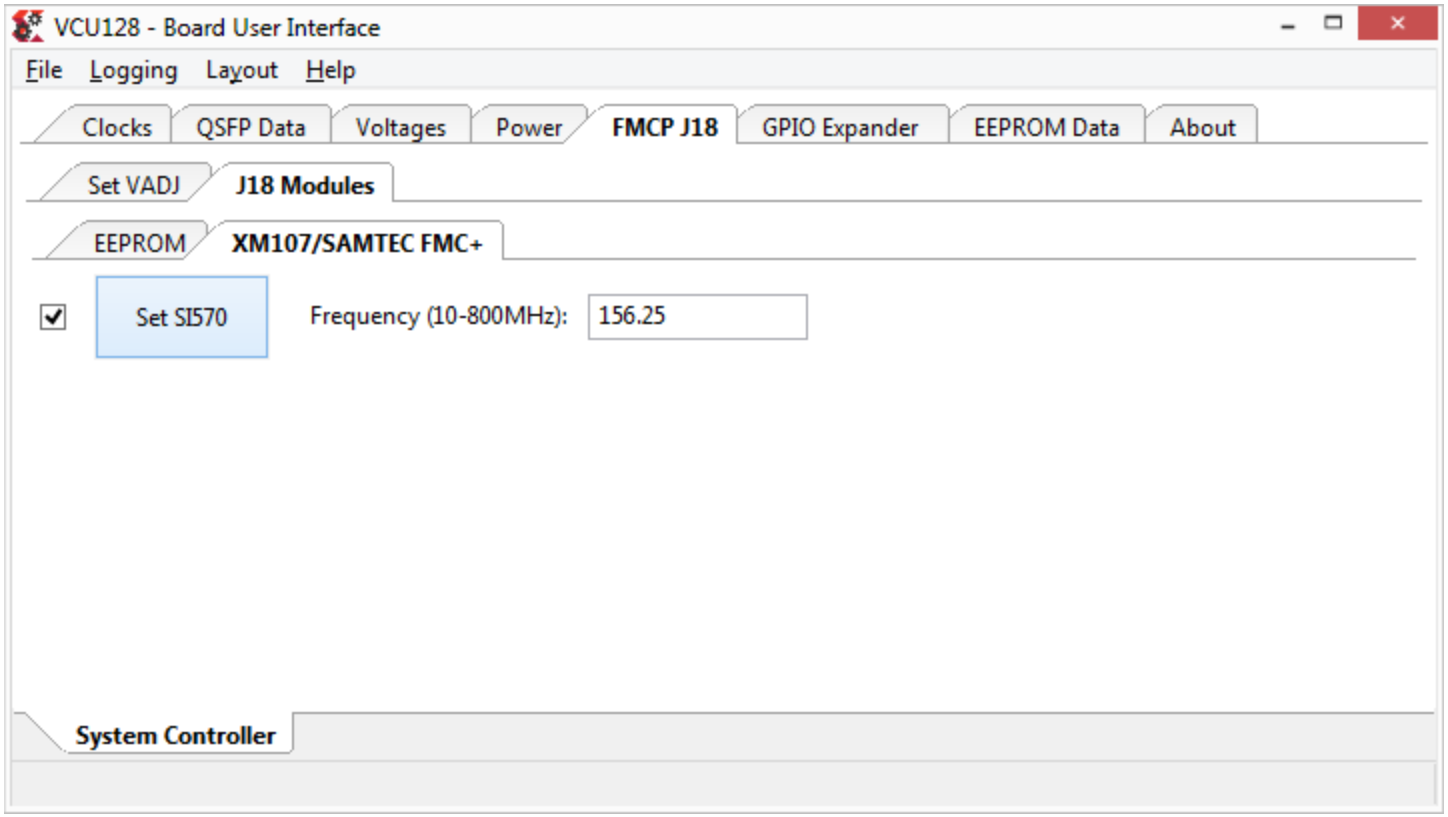
- **The EEPROM data will be displayed in a separate window (SAMTEC FMC+ loopback data shown)**



Note: Presentation applies to the VCU128

Setting FMC HPC clocks

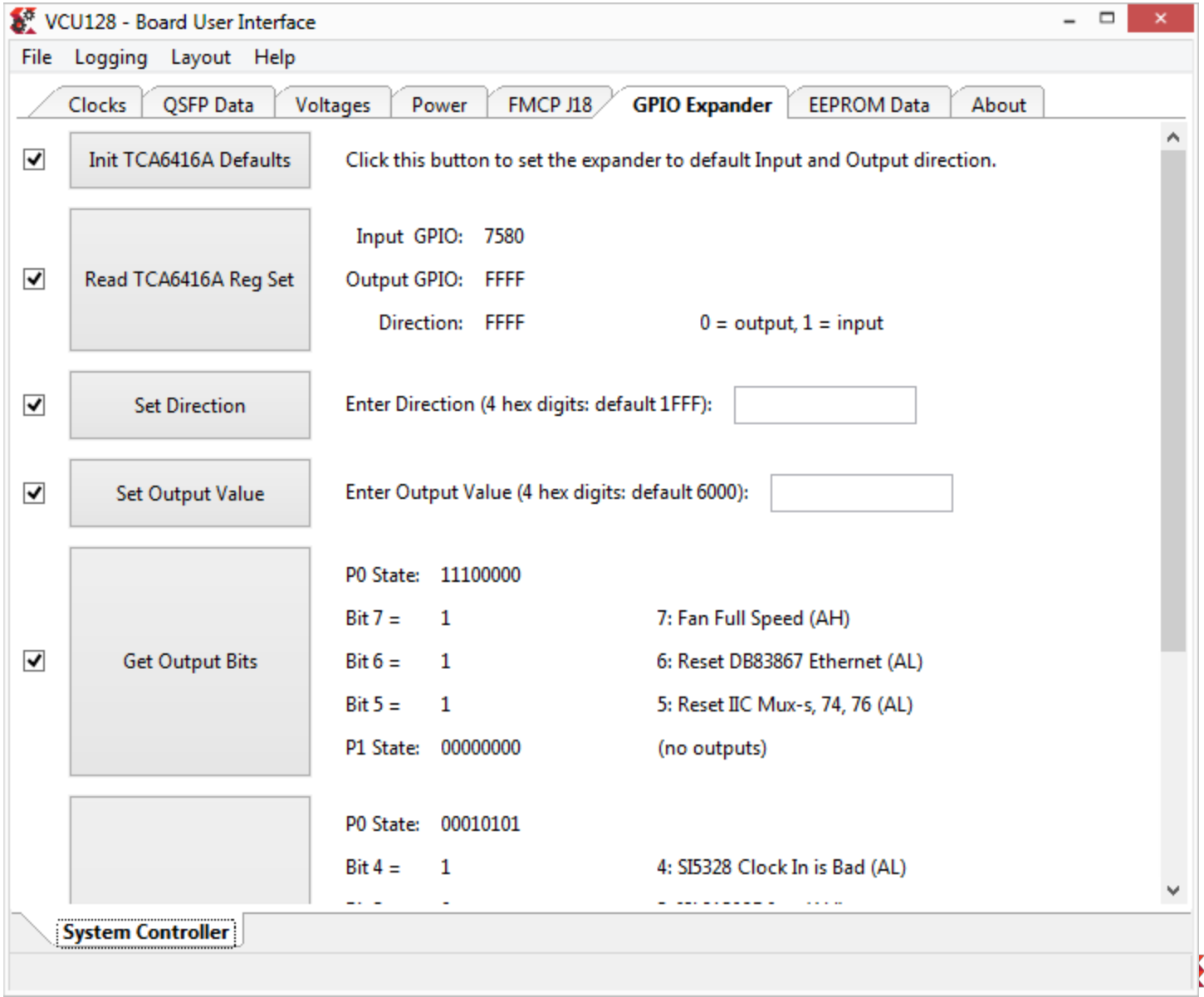
- With an XM107 or SAMTEC FMC+ card attached, select the XM107/SAMTEC tab
- For the IBERT FMC+ testing, set 156.25, and click the Set SI570 button



Note: Presentation applies to the VCU128

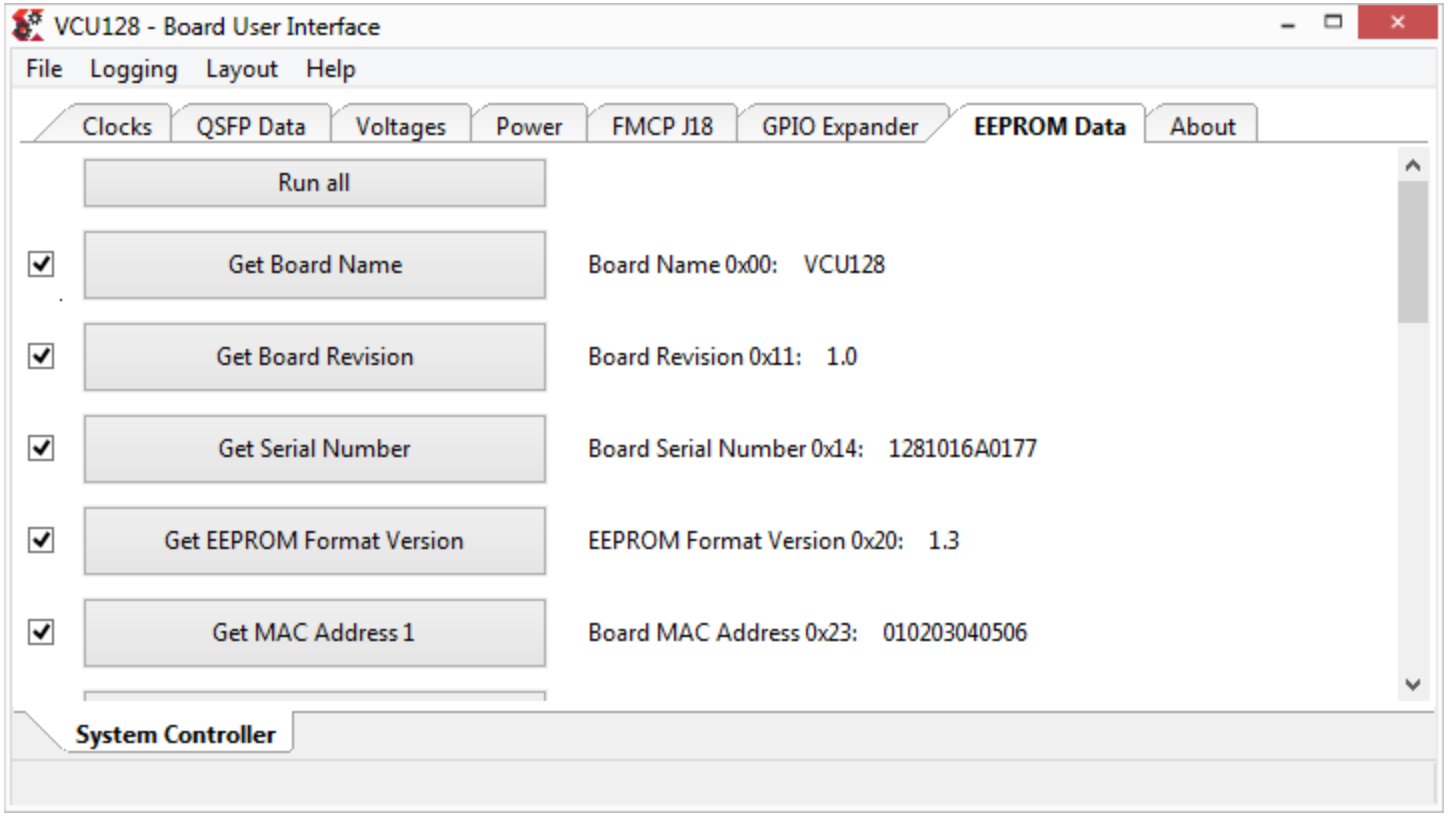
GPIO Expander

- **Various setting for the TCA6416 IIC expander**



Reading the Board EEPROM Data

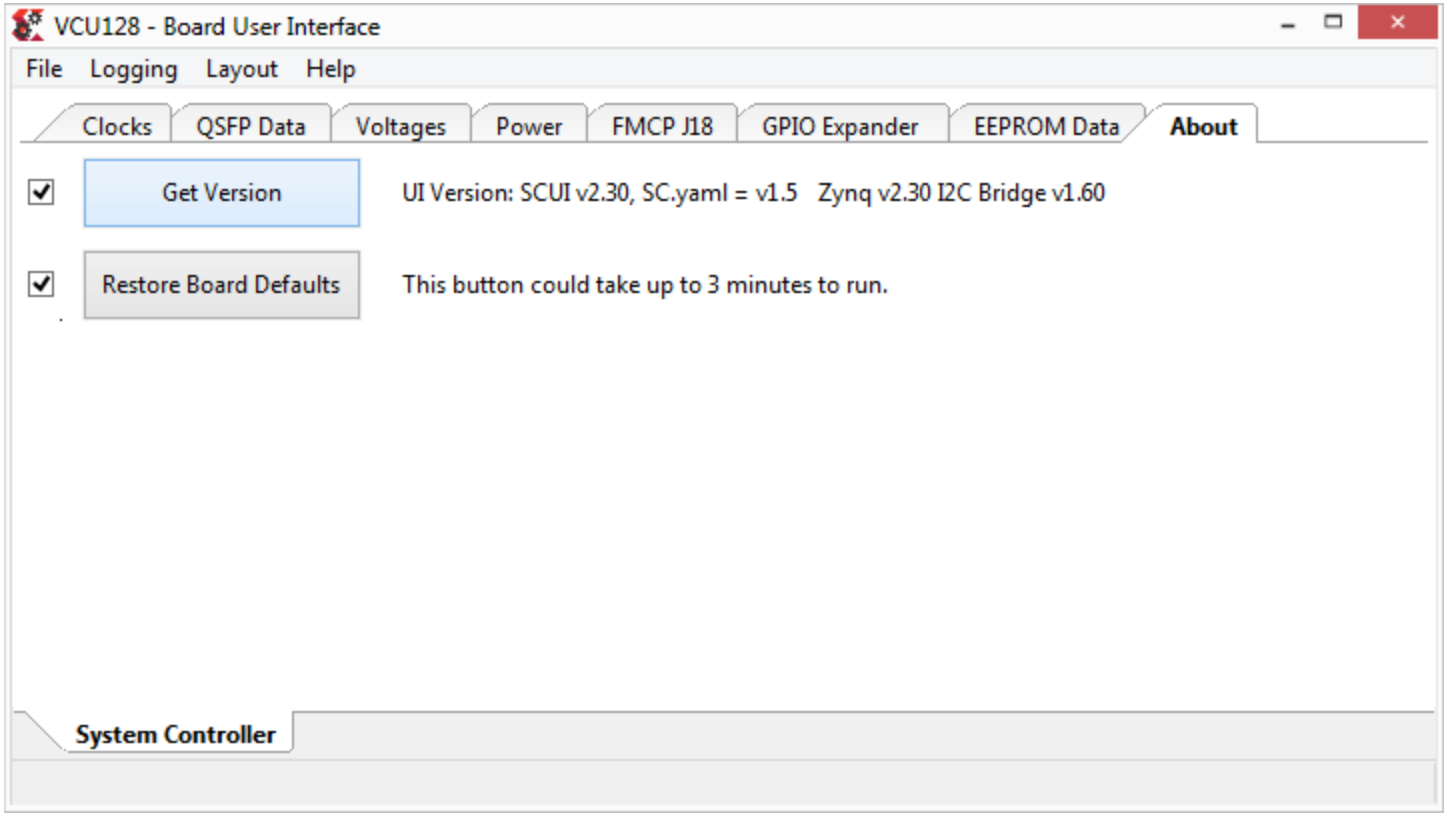
- Select the EEPROM Data tab
- Click the Run all button



Note: Presentation applies to the VCU128

Reading version information

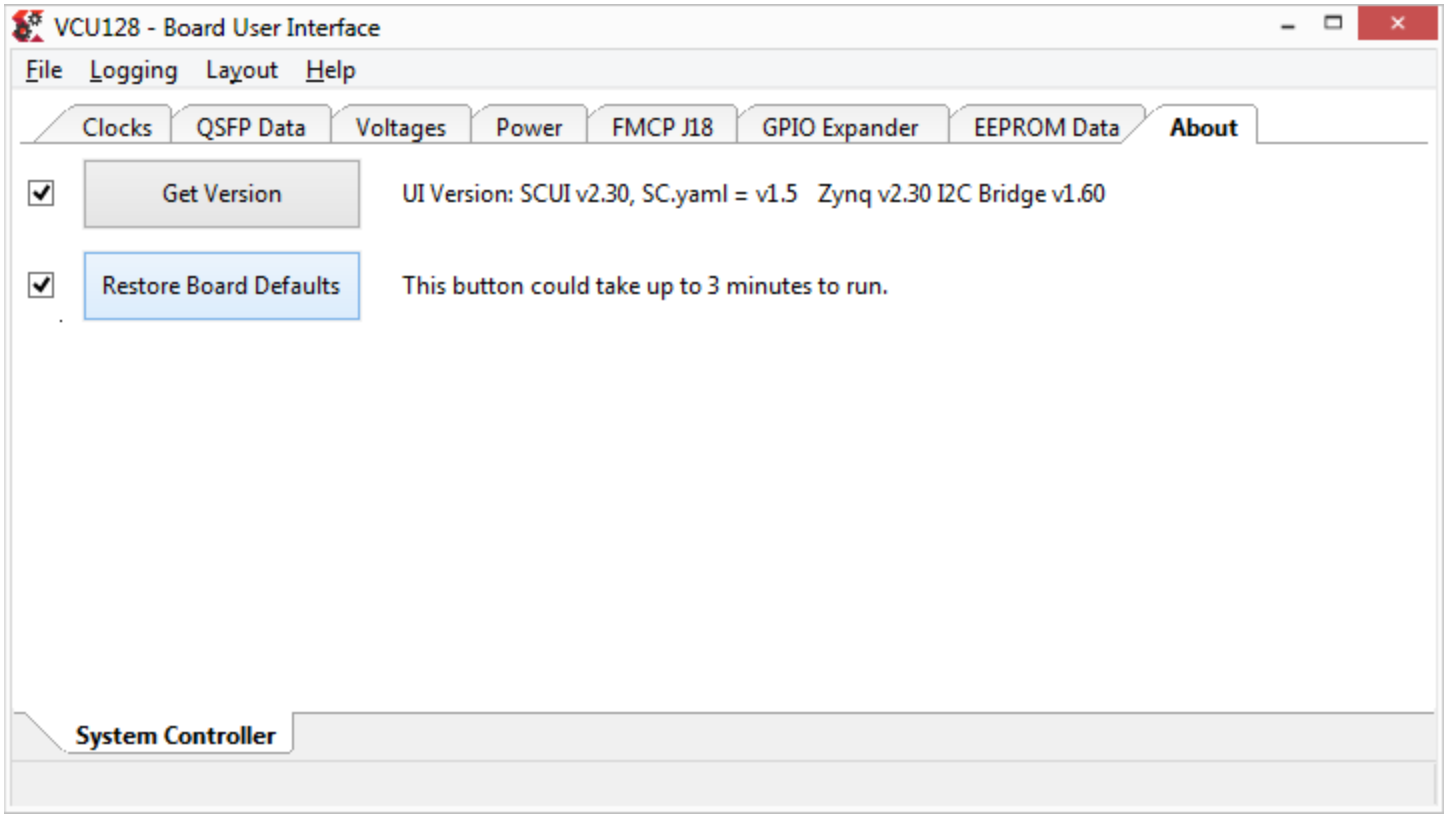
- Select the About tab
- Click the Get Version button to get MSP430 and SCUI GUI version information



Note: Presentation applies to the VCU128

Reading version information

- **Click the Restore Board Defaults button to reset initializations**
  - This restores the QSFP Si570s clocks to their default of 156.25 MHz
  - Si5328 is reset to Default of 114.285 MHz
  - The FMC VADJ is reset to Use FMC EEPROM Voltage

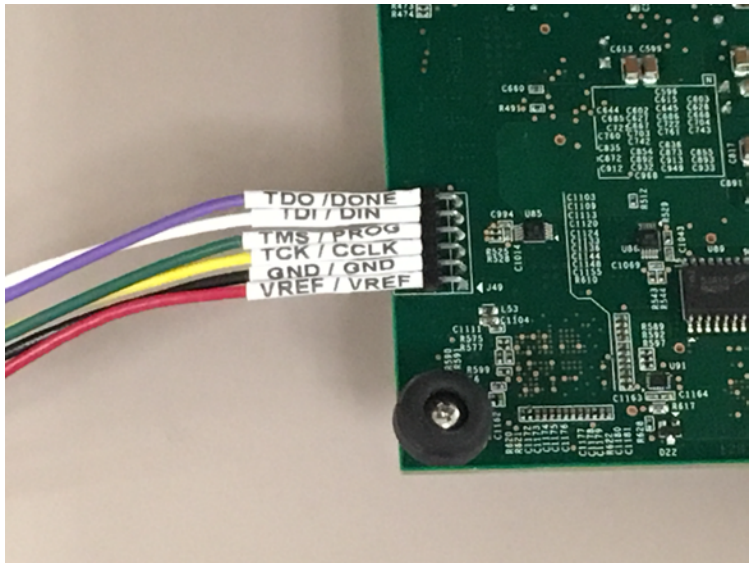


Note: This step stores values in the Zynq QSPI; it will no longer verify after this has been run

Programming Firmware

Programming Firmware

- Connect a USB Platform Cable to J49 with the Flying Leads
- Shown here with board flipped over



Note: Presentation applies to the VCU128

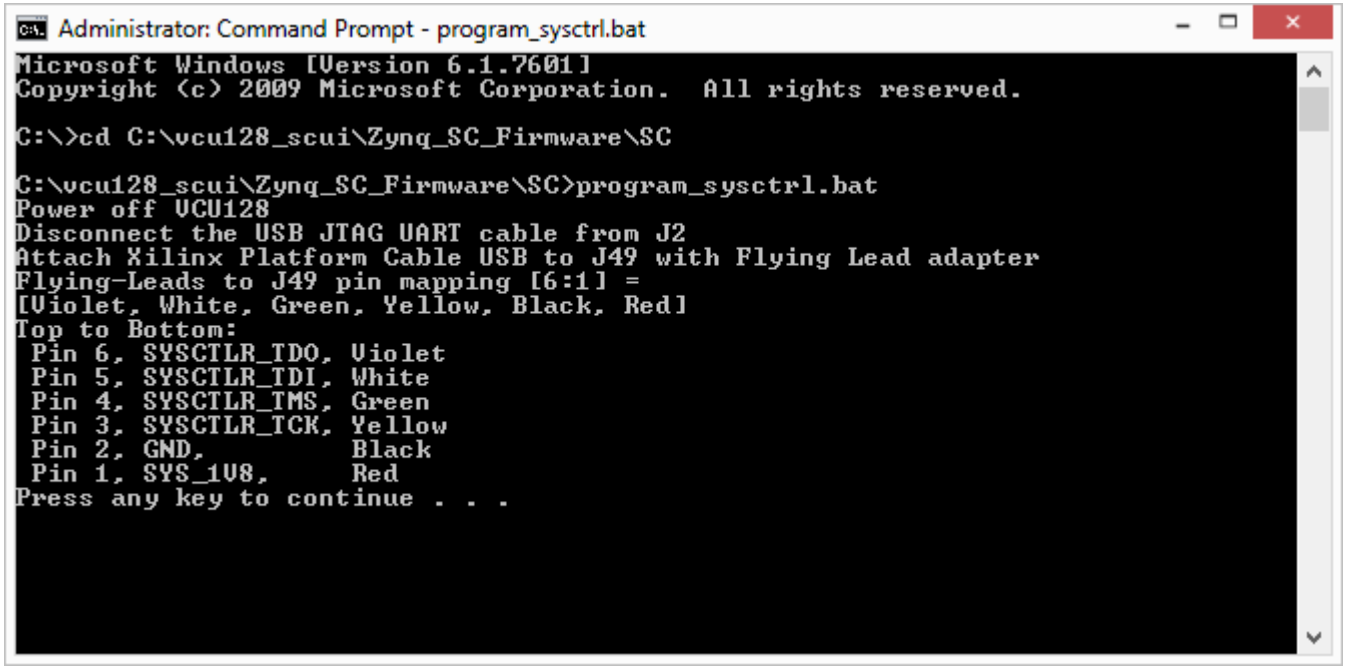
Programming Firmware

- **Script files are included to program the firmware**

Note: Presentation applies to the VCU128

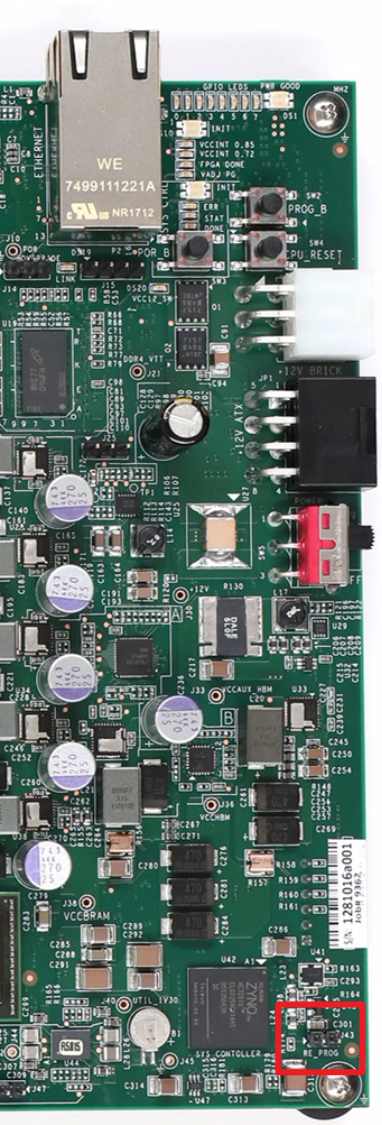
Programming Firmware

- The Programming BAT files will prompt you to connect the Flying Leads
- Press any key to continue…



Note: Presentation applies to the VCU128

Programming Firmware



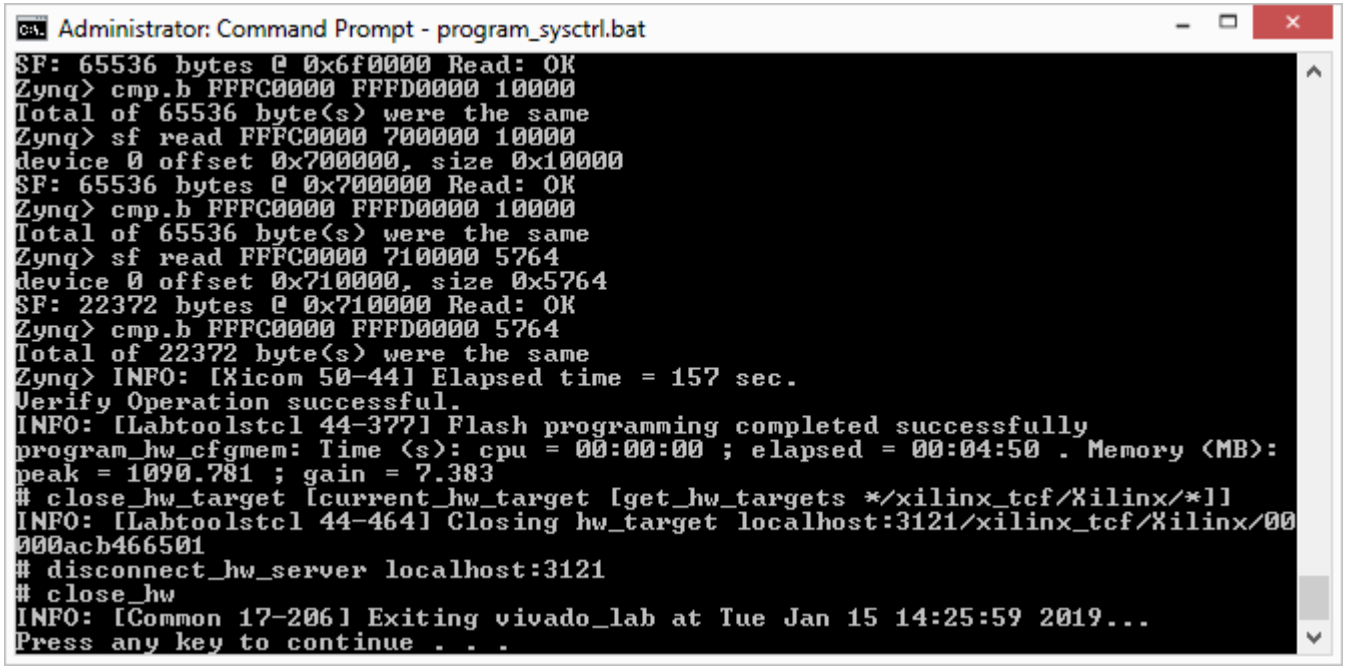
- **Important: The current System Controller must be disabled prior to programming**
- **Put a jumper on J43, cycle VCU128 power and remove the jumper and press any key to continue…**

```
Administrator: Command Prompt - program_sysctrl.bat
Microsoft Windows [Version 6.1.7601]
Copyright (c) 2009 Microsoft Corporation.  All rights reserved.

C:\>cd C:\vcu128_scui\Zynq_SC_Firmware\SC

C:\vcu128_scui\Zynq_SC_Firmware\SC>program_sysctrl.bat
Power off VCU128
Disconnect the USB JTAG UART cable from J2
Attach Xilinx Platform Cable USB to J49 with Flying Lead adapter
Flying-Leads to J49 pin mapping [6:1] =
[Violet, White, Green, Yellow, Black, Red]
Top to Bottom:
 Pin 6, SYSCTLR_TDO, Violet
 Pin 5, SYSCTLR_TDI, White
 Pin 4, SYSCTLR_TMS, Green
 Pin 3, SYSCTLR_TCK, Yellow
 Pin 2, GND,         Black
 Pin 1, SYS_1V8,     Red
Press any key to continue . . .
Put jumper on J43
Power on VCU128.
Remove jumper on J43.
Press any key to continue . . .
```

Note: Presentation applies to the VCU128

Programming Firmware

- Programming finished successfully
- Cycle VCU128 power to enable the System Controller



Note: Programming takes about 9 minutes

Programming Firmware

- **Use the Verify BAT files to check the BOOT.bin programmed into the Zynq QSPI**

Note: Verify will not pass after Restore Board Defaults has been run. This is the as-shipped condition. Safe to reprogram, verify, then perform Restore step.

References

References

- **Vivado Release Notes**
  - Vivado Design Suite User Guide - Release Notes – UG973
    - https://www.xilinx.com/support/documentation/sw_manuals/xilinx2019_1/ug973-vivado-release-notes-install-license.pdf
  - Vivado Design Suite 2019 - Vivado Known Issues
    - https://www.xilinx.com/support/answers/72162.html
- **Vivado Programming and Debugging**
  - Vivado Design Suite Programming and Debugging User Guide – UG908
    - https://www.xilinx.com/support/documentation/sw_manuals/xilinx2019_1/ug908-vivado-programming-debugging.pdf

Documentation

Documentation

- **Virtex UltraScale+ HBM**
  - Virtex UltraScale+ FPGA Family
    - https://www.xilinx.com/products/silicon-devices/fpga/virtex-ultrascale-plus.html
- **VCU128 Documentation**
  - Virtex UltraScale+ FPGA VCU128 Evaluation Kit
    - https://www.xilinx.com/products/boards-and-kits/vcu128.html
  - VCU128 Board User Guide – UG1302
    - https://www.xilinx.com/support/documentation/boards_and_kits/vcu128/ug1302-vcu128-eval-bd.pdf
  - VCU128 - Known Issues and Release Notes Master Answer Record
    - https://www.xilinx.com/support/answers/71849.html