

VCU128 Restoring Flash Contents

May 2019



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.

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Overview

- > Xilinx VCU128 Board
- > Software Requirements
- > VCU128 Setup
- > Restoring VCU128 QSPI Flash
- > Run Flash Designs
- > References

VCU128 Restoring Flash Contents Description

> **Description**

- » Vivado is used to restore the onboard non-volatile memories with the factory contents for the QSPI Flash

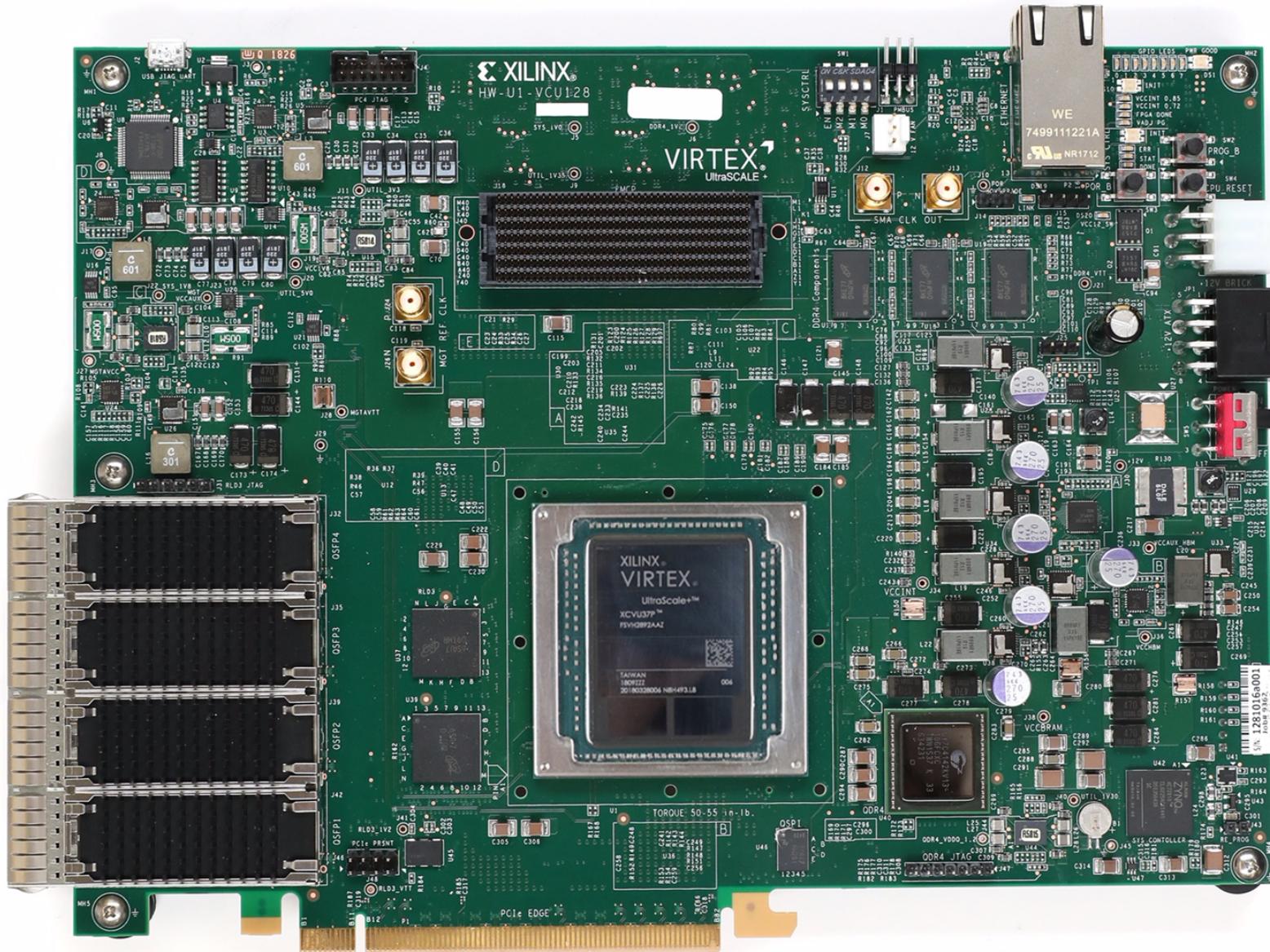
> **Reference Design Source and Applications**

- » BlinkBIST XTP530

> **Files for Flash Restoration**

- » RDF0494 - VCU128 Restoring Flash Design Files (2019.1 C) ZIP file

Xilinx VCU128 Board



VCU128 Software Install and Board Setup

- > Complete setup steps in XTP535 – VCU128 Software Install and Board Setup:
 - » Software Requirements
 - » VCU128 Board Setup

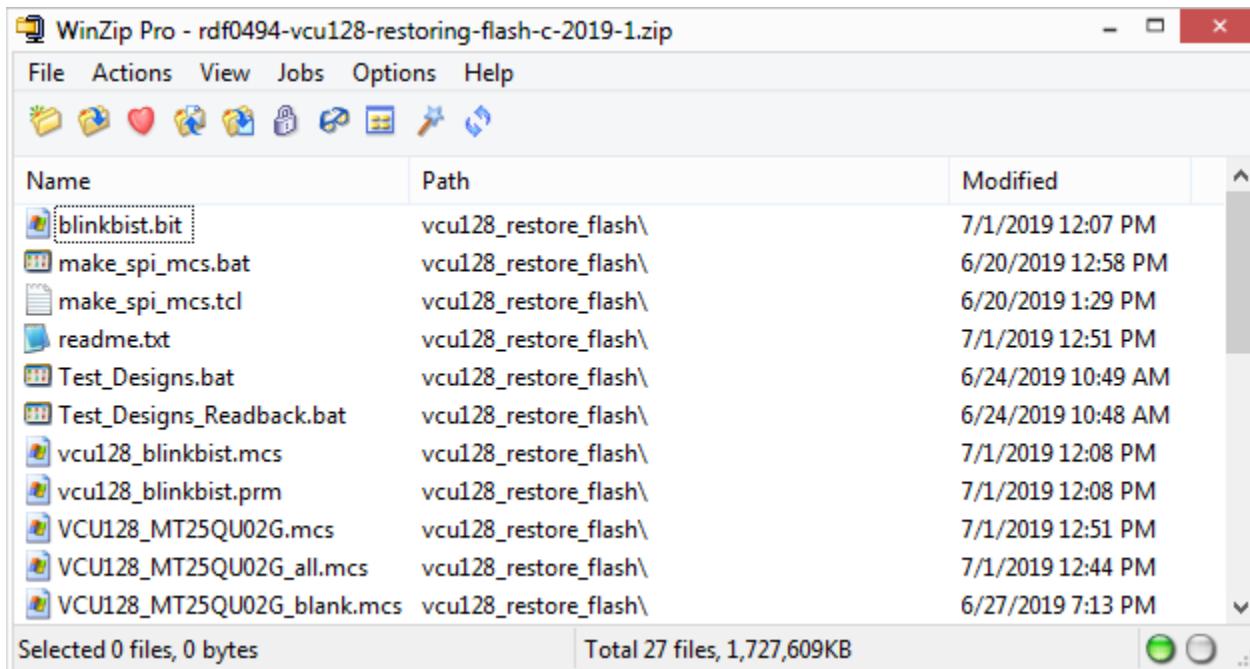


Restoring VCU128 QSPI Flash



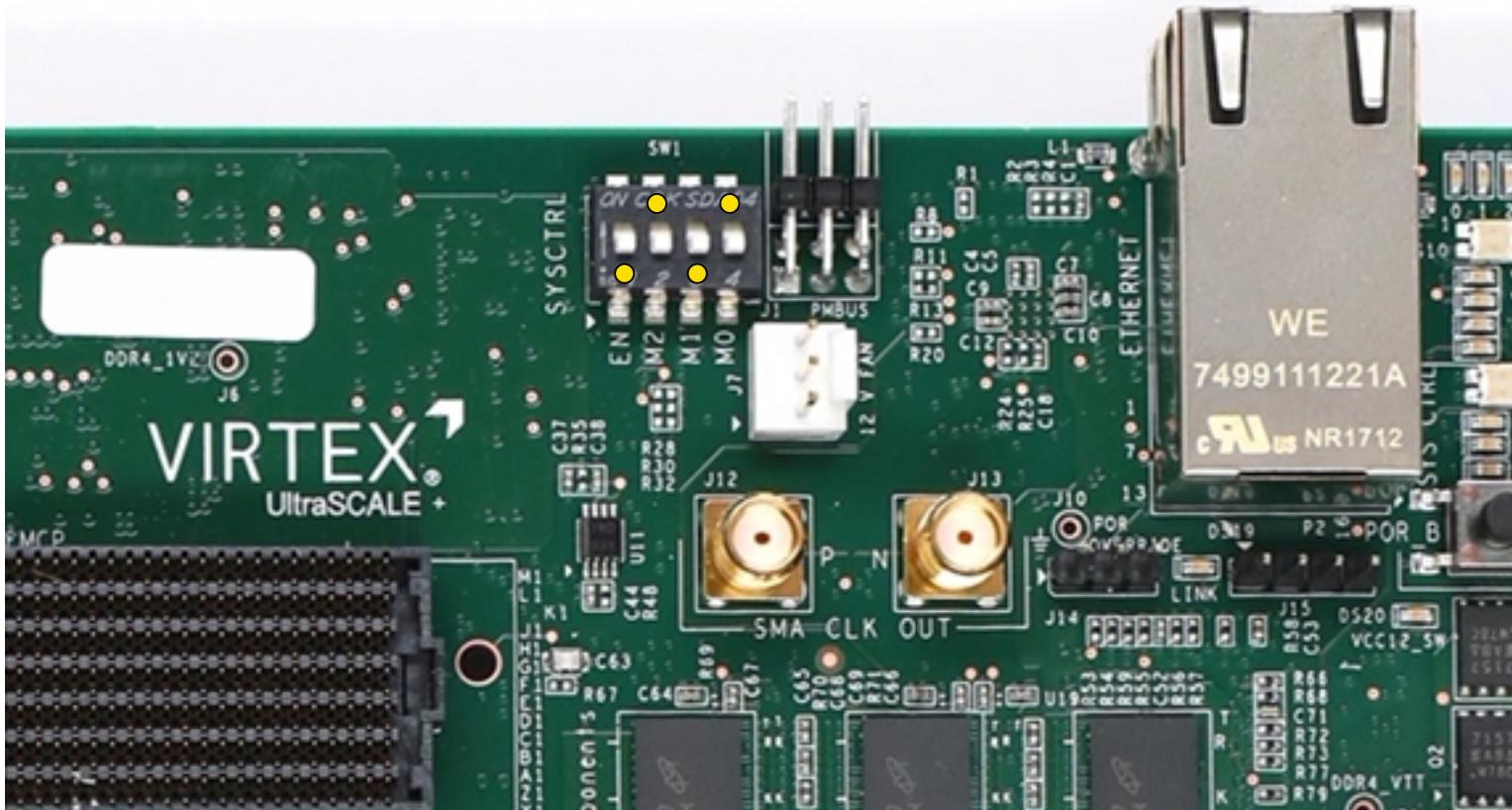
Restoring VCU128 QSPI Flash

- > Unzip the RDF0494 - VCU128 Restoring Flash Design Files (2019.1 C) ZIP file to your C:\ drive
 - » Available through <http://www.xilinx.com/vcu128>



Restoring VCU128 QSPI Flash

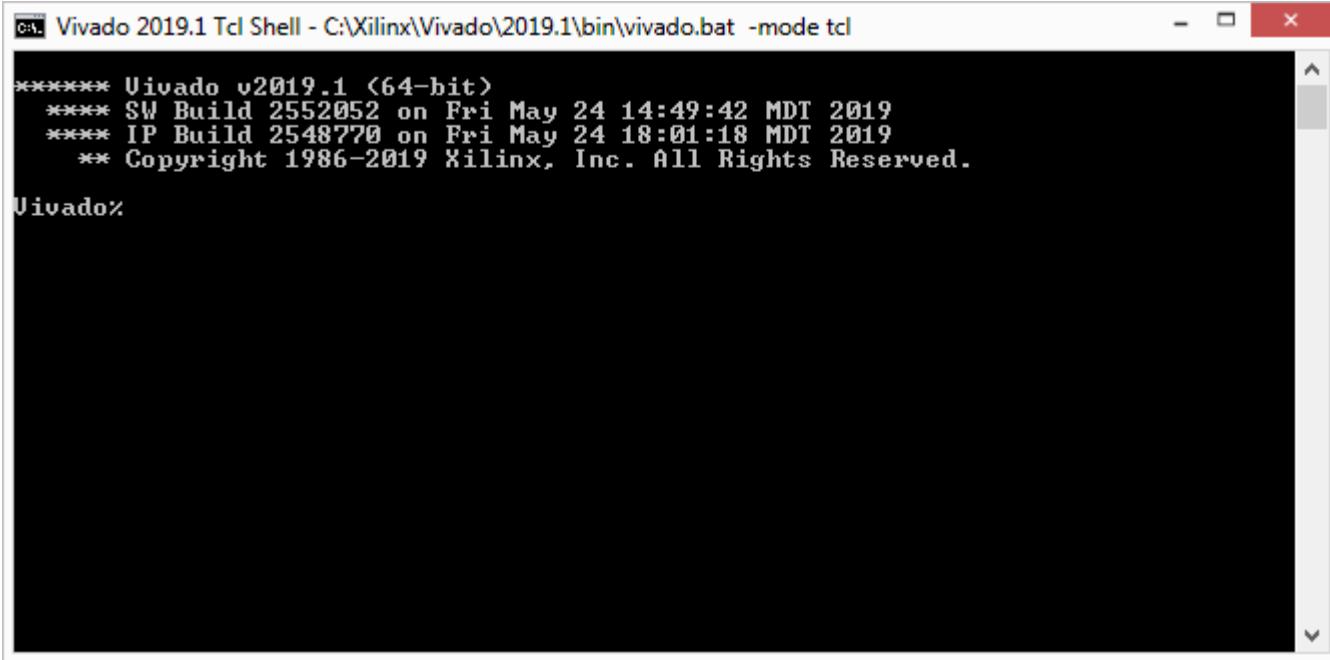
- > Set JTAG mode ($M[2:0] = 101$) to program QSPI Flash
- > Disable System Controller booting (Position 1 off)
- > Set SW1 to 0101 (1 = on, Position 1 → Position 4)



Restoring VCU128 QSPI Flash

> Open a Vivado Tcl Shell:

Start → All Programs → Xilinx Design Tools → Vivado 2019.1 →
Vivado 2019.1 Tcl Shell

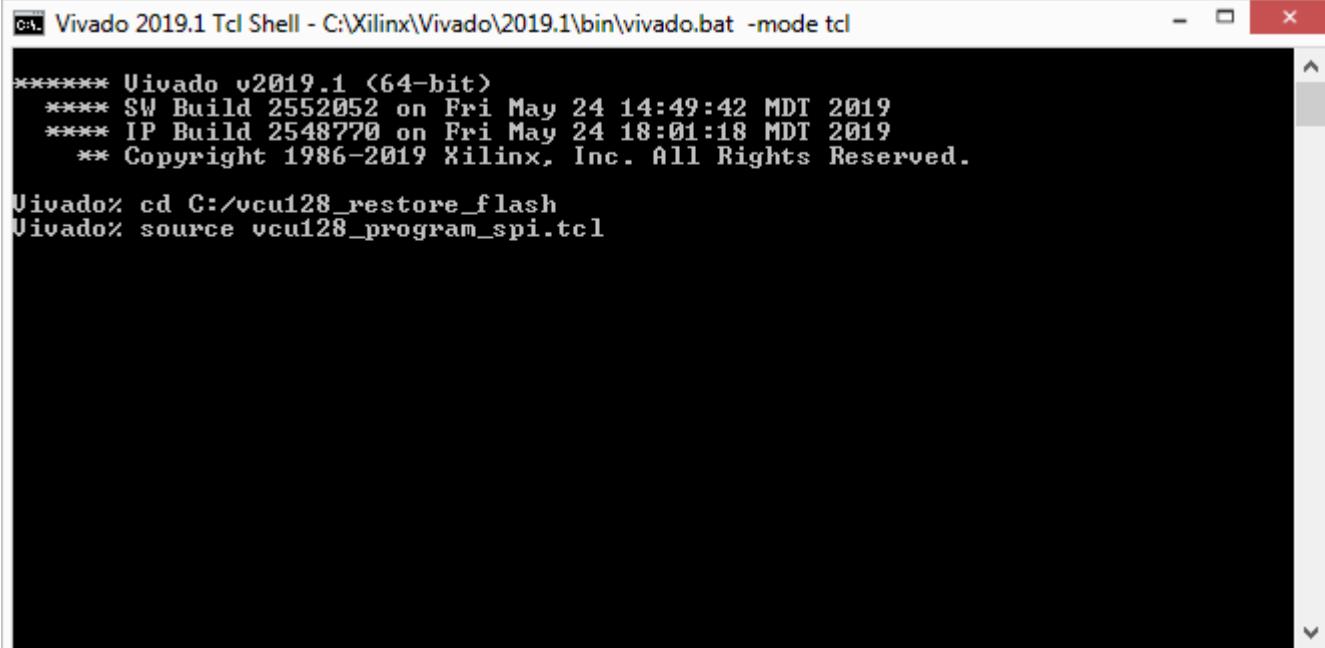


The screenshot shows a Windows command-line interface window titled "Vivado 2019.1 Tcl Shell - C:\Xilinx\Vivado\2019.1\bin\vivado.bat -mode tcl". The window displays the following text:
***** Vivado v2019.1 (64-bit)
**** SW Build 2552052 on Fri May 24 14:49:42 MDT 2019
**** IP Build 2548770 on Fri May 24 18:01:18 MDT 2019
** Copyright 1986-2019 Xilinx, Inc. All Rights Reserved.
Vivado>

Restoring VCU128 QSPI Flash

- > In the Vivado Tcl Shell type:

```
cd C:/vcu128_restore_flash  
source vcu128_program_spi.tcl
```



The screenshot shows a Windows command-line interface window titled "Vivado 2019.1 Tcl Shell - C:\Xilinx\Vivado\2019.1\bin\vivado.bat -mode tcl". The window displays the following text:

```
***** Vivado v2019.1 (64-bit)  
***** SW Build 2552052 on Fri May 24 14:49:42 MDT 2019  
***** IP Build 2548770 on Fri May 24 18:01:18 MDT 2019  
** Copyright 1986-2019 Xilinx, Inc. All Rights Reserved.  
  
Vivado> cd C:/vcu128_restore_flash  
Vivado> source vcu128_program_spi.tcl
```

Restoring VCU128 QSPI Flash

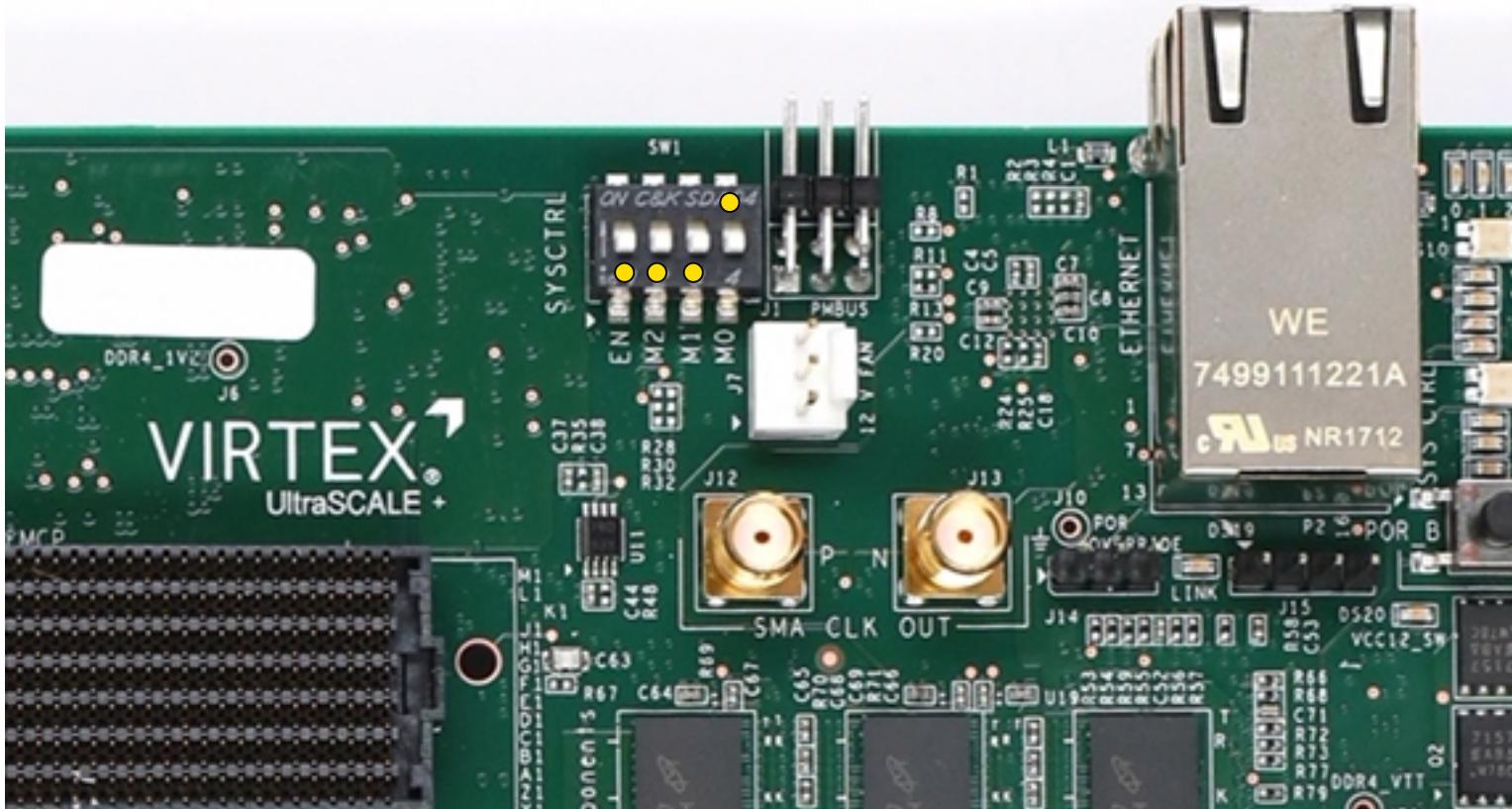
- > Operation complete, QSPI Flash programmed

```
C:\ Vivado 2019.1 Tcl Shell - C:\Xilinx\Vivado\2019.1\bin\vivado.bat -mode tcl
index [get_hw_devices] 0] [get_property PROGRAM.HW_CFGMEM_BITFILE [ lindex [get_hw_devices] 0]]; program_hw_devices [lindex [get_hw_devices] 0]; };
WARNING: [Xicom 50-99] Incorrect bitstream assigned to device. Bitstream was generated for part xcvu37p-fsvh2892-1-e-es1, target device <with IDCODE revision 1> is compatible with production revision bitstreams.
INFO: [Labtools 27-3164] End of startup status: HIGH
program_hw_devices: Time <s>: cpu = 00:00:09 ; elapsed = 00:00:10 . Memory (MB):
peak = 1521.043 ; gain = 22.828
# program_hw_cfgmem -hw_cfgmem [get_property PROGRAM.HW_CFGMEM [lindex [get_hw_devices] 0 ]]
Mfg ID : 20    Memory Type : bb    Memory Capacity : 22    Device ID 1 : 0    Device
ID 2 : 0
Performing Erase Operation...
Erase Operation successful.
Performing Program and Verify Operations...
Program/Verify Operation successful.
INFO: [Labtoolstcl 44-377] Flash programming completed successfully
program_hw_cfgmem: Time <s>: cpu = 00:00:14 ; elapsed = 00:15:16 . Memory (MB):
peak = 1579.191 ; gain = 58.148
# close_hw_target [current_hw_target [get_hw_targets */xilinx_tcf/*/*]]
INFO: [Labtoolstcl 44-464] Closing hw_target localhost:3121/xilinx_tcf/Xilinx/09
1847100789A
# disconnect_hw_server localhost:3121
# close_hw
Vivado%
```

Run Flash designs

> Set SW1 to 0001 (1 = on, Position 1 → Position 4)

- » This sets QSPI mode ($M[2:0] = 001$) to load FPGA from Flash
- » This disables System Controller booting (Position 1 off)

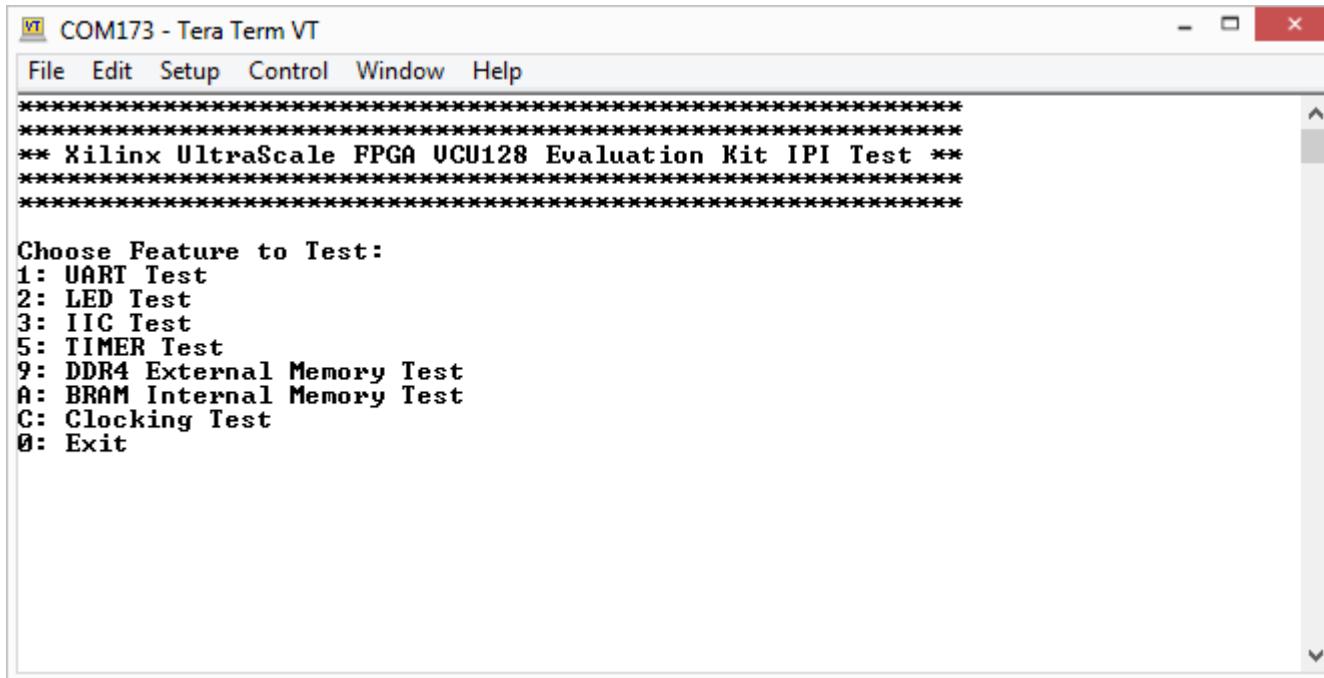


Run Flash designs – BIST

- > Cycle board power
- > No Quick Start Guide for the VCU128; here are the details
- > The BlinkBIST program in Flash loads and checks the following:
 - » LED7: Clocks (minimal set of always on, default clocks, assumes no attachments)
 - » LED6: DDR4
 - » LED5: BRAM
 - » LED4: Flash (Inherent)
 - » LED3: I2C (passes regardless of attachments inserted or not, e.g. FMC+, QSFP)
 - » LED2: N/A
 - » LED1: N/A
 - » LED0: N/A
- > All 8 LEDs should be lit at the end of the test
- > The VCU128 doesn't have any GPIO switches or push buttons, so last several tests are blank on purpose
- > Setting different Boot frequencies on the Si570s will cause Clocks test to fail
- > See IPI App Clocking test for testing full set of Clocks

Run Flash designs – BIST

- > After BIST completes, the IPI Application runs in the terminal window



References



References

- > **UltraScale Configuration**
 - » UltraScale Architecture Configuration User Guide – UG570
 - https://www.xilinx.com/support/documentation/user_guides/ug570-ultrascale-configuration.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>