QUICK START GUIDE

USING PFX ON AN

ULTRAZED ZUXEG

BOARD

BY BRETT BAUMBERGER

ASSET

Brett Baumberger

Brett Baumberger, Senior Applications Engineer at ASSET InterTech has over 30 years of experience in developing, debugging, testing embedded systems and product support. Brett has a proven history of solving complex problems in embedded systems hardware, software and systems integration. Brett has been a presenter at the Embedded Systems Conference. Prior to coming to ASSET InterTech, Brett held positions at Motorola, Hewlett-Packard, and Wind River Systems. Brett graduated from Mississippi State University with a Bachelor's Degree in Computer Engineering and from Jackson County Community College with an Associate's Degree in Electronics Technology.

SourcePoint™
Platform for Software Debug and Trace

ScanWorks®
Platform for Embedded Instruments

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Introduction

This guide is intended to take the user through the steps needed to run PFx tests on an UltraZed ZUxEG board.

Software Setup

The computer needs <u>one</u> of the following products installed and licensed depending on the action desired:

- ScanWorks® Processor-based Fast Programming for ARM 64-bit Processors
- ScanWorks® Processor-based Functional Test for ARM 64-bit Processors
- ScanWorks® Processor-based Functional Test DDR for ARM 64-bit Processors

Hardware Setup

A computer is connected to a hub or switch via an Ethernet cable. A RIC-1000 is connected to the hub or switch via an Ethernet cable. The Ethernet port on the UltraZed is connected to the hub or switch via an Ethernet cable. The RIC-1000 is connected to the UltraZed's JTAG port via a RIC-1000 UUT cable and an adapter for the Ultrascale JTAG port.
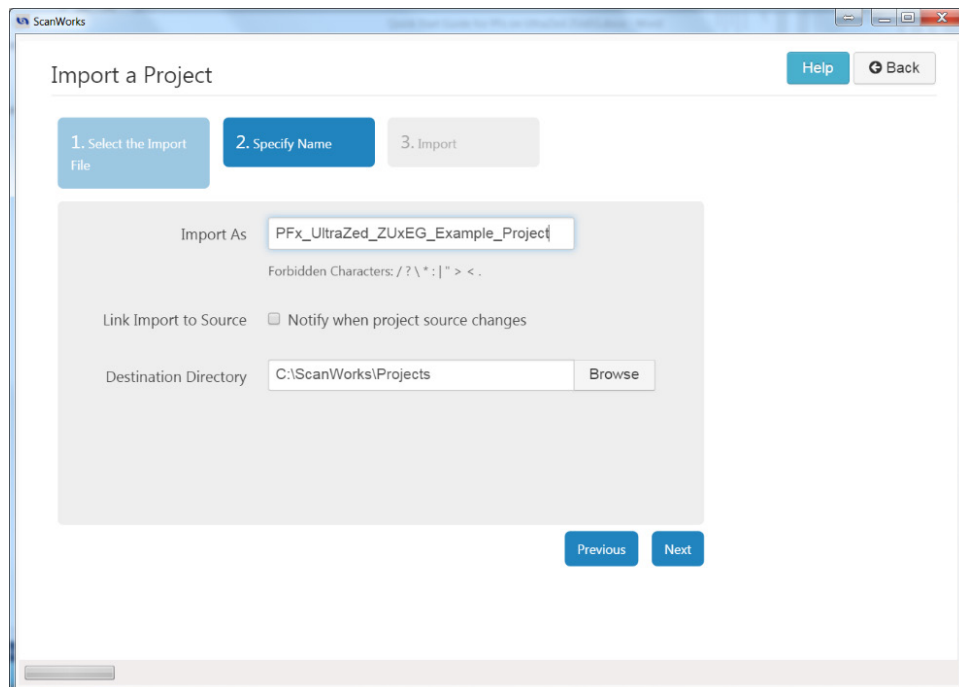
Examples in Developer Mode

1. Start ScanWorks.
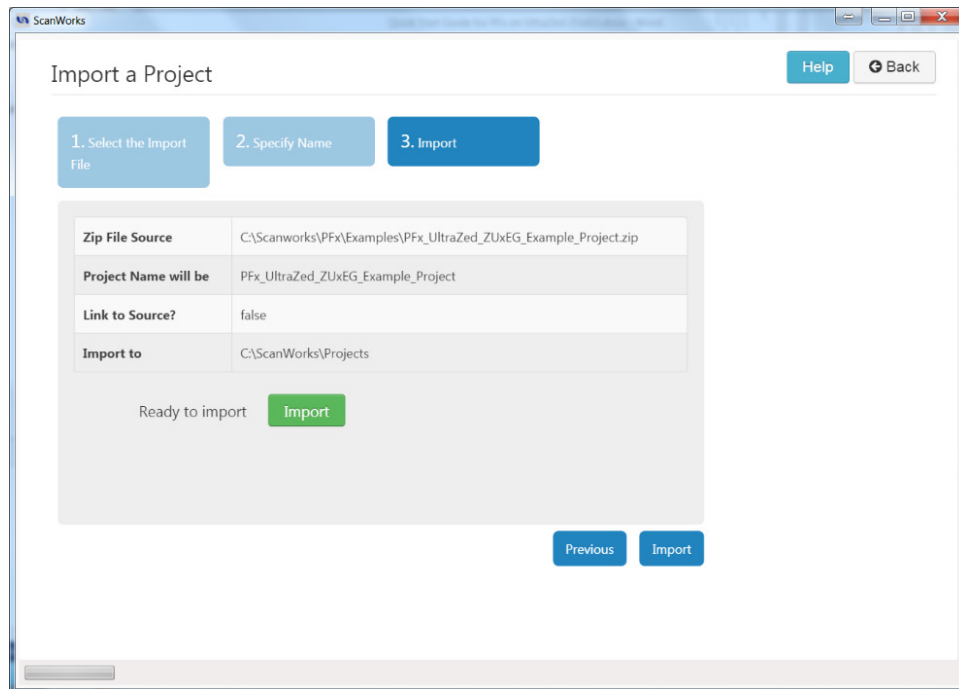2. Click on the Import Button.
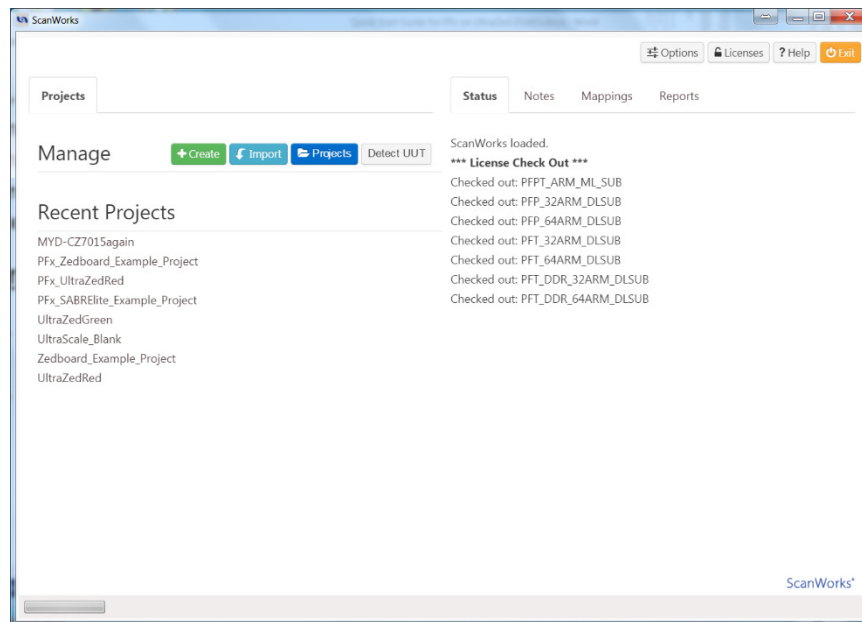
3. Click on Browse and browse to the file to be imported –
    C:\ScanWorks\PFx\Examples\PFx_UltraZed_ZUxEG_Example_Project.zip and click on
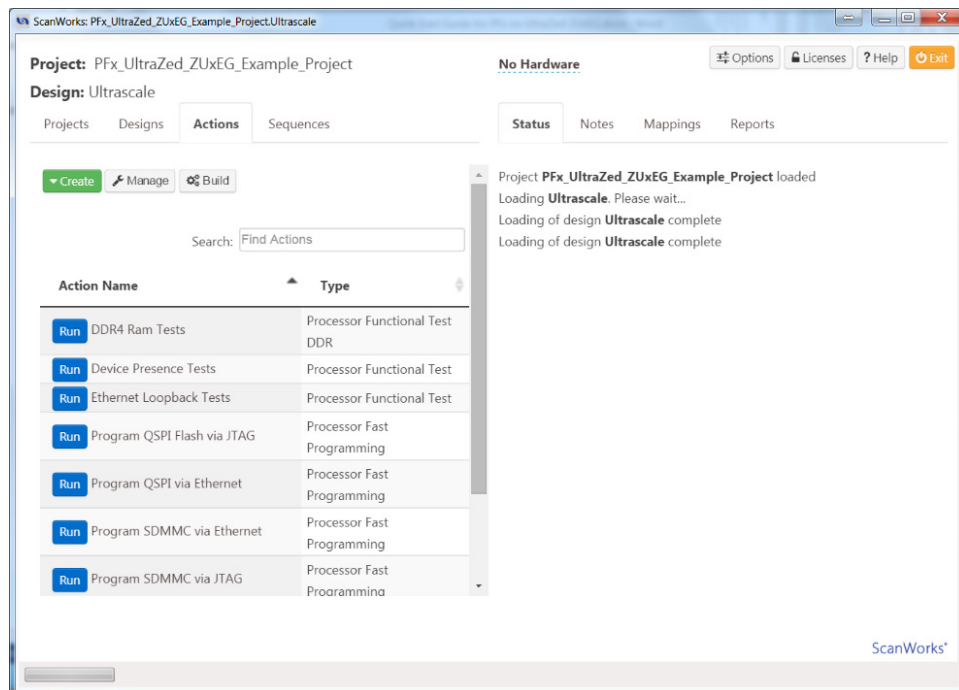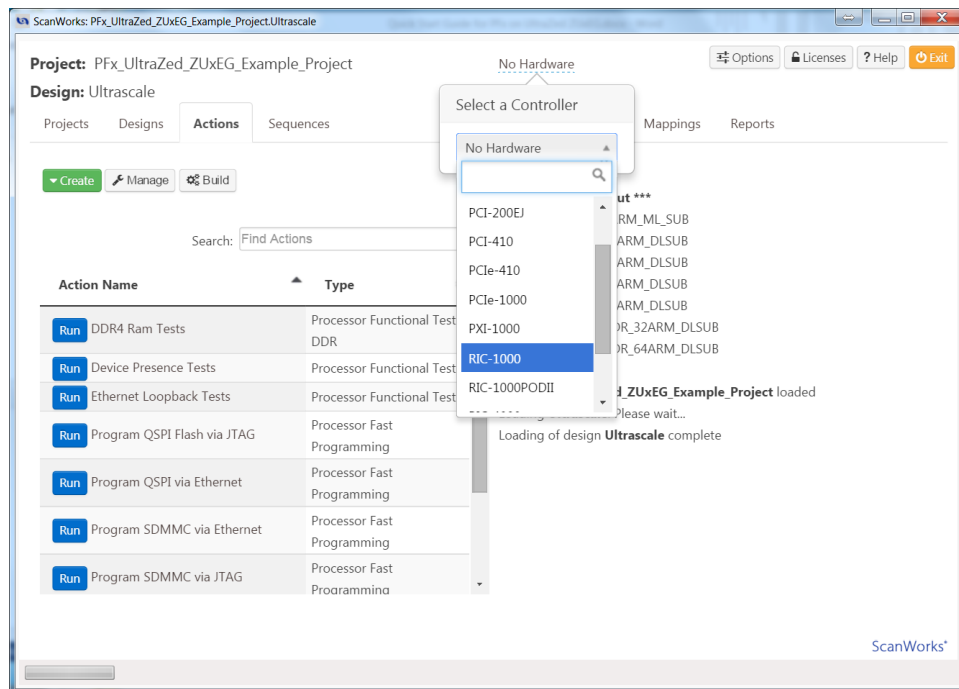   Open.
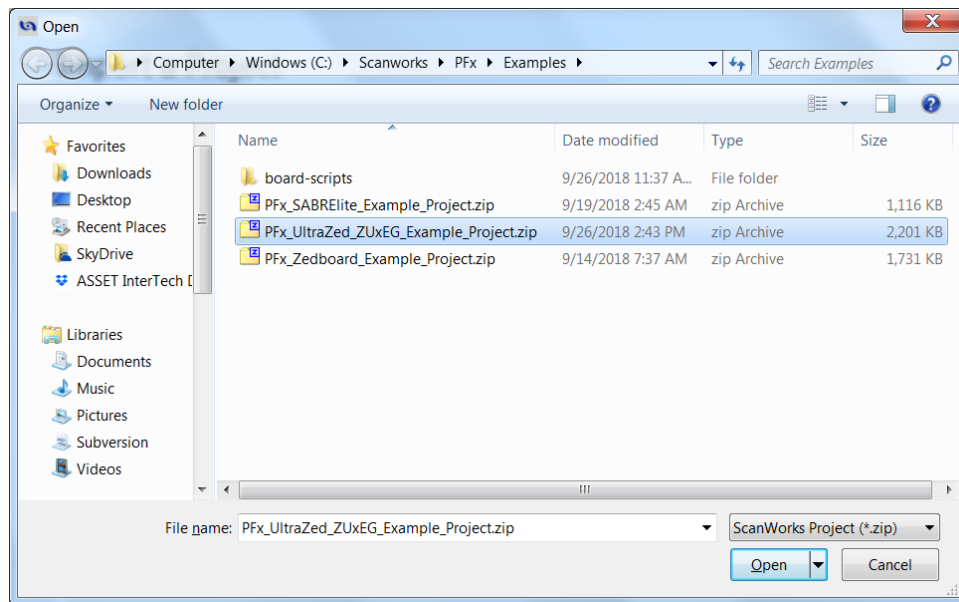
4. Click on the Next Button.

5. Click on either Import Button.

6. Click on **No Hardware** to select the hardware controller.

7. Select RIC-1000 as the controller.

8. Configure the RIC-1000's ip address, and select a TCK Frequency of 30 MHz. Note that flash programming performance over JTAG is directly affected by the TCK frequency. The higher the TCK Frequency, the better the programming performance. Click OK.
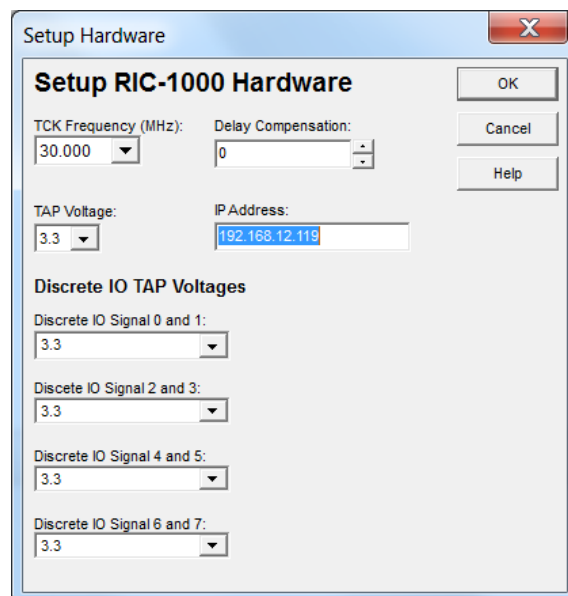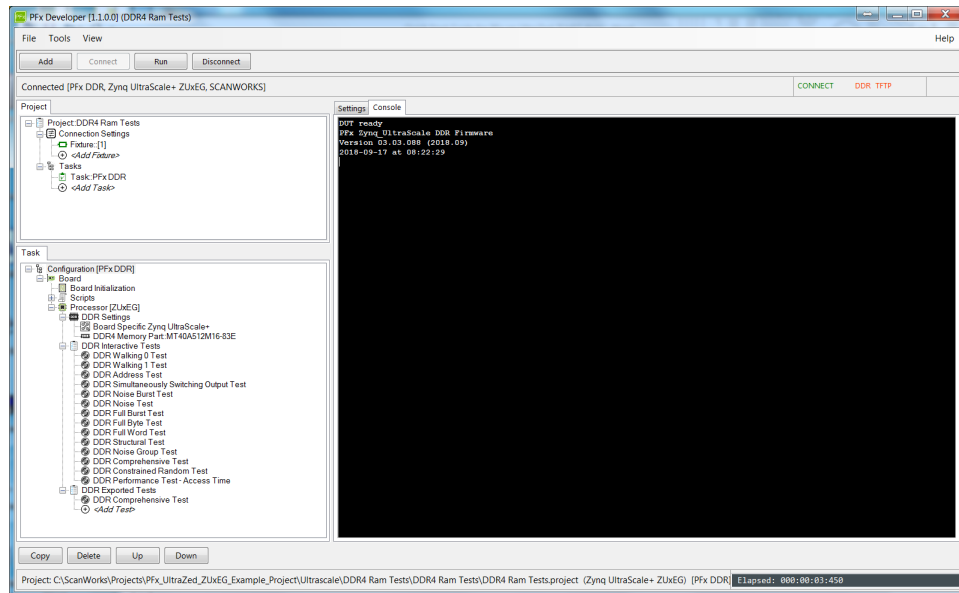
9. Now let's run the DDR4 Ram Tests Action from within Edit mode.
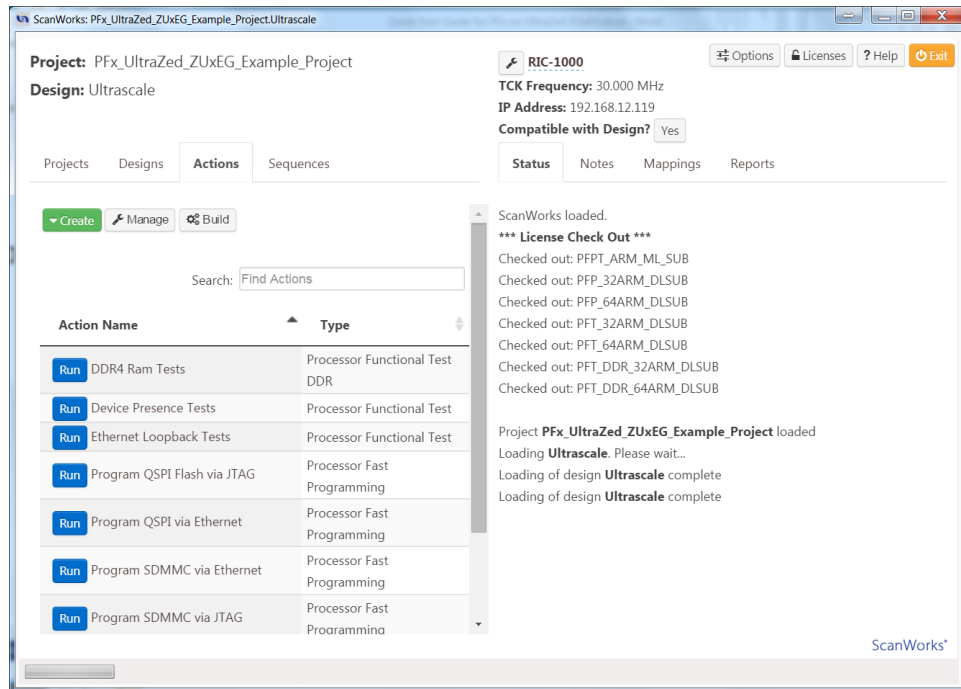
10. Right Click on DDR4 Ram Tests. This will launch the PFx Developer interface.
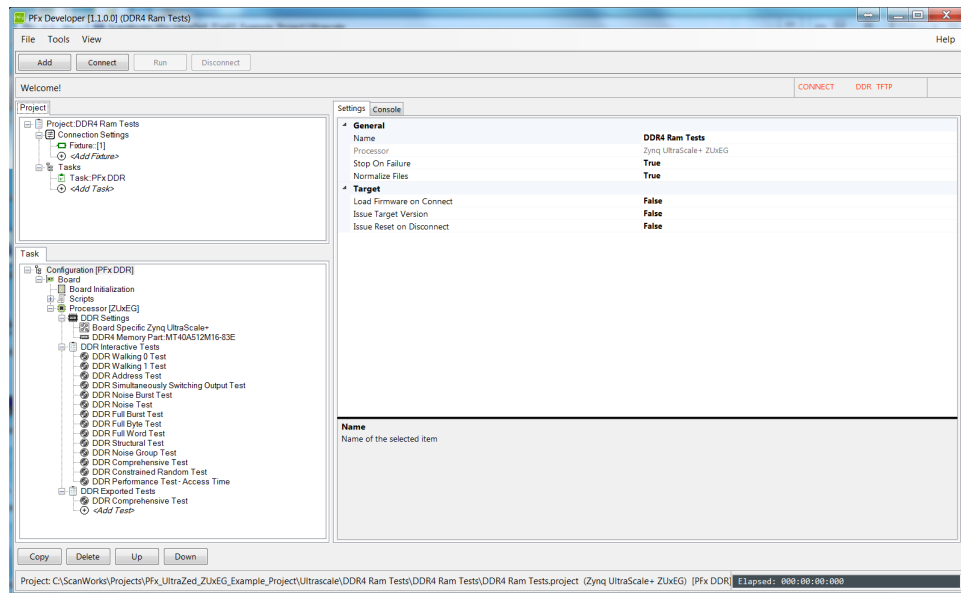
11. Click on the Connect Button. This will download a target agent to the UltraZed and begin communicating with the target agent.


12. You can manually run any of the tests in the DDR Interactive Tests group by right clicking on it and selecting Run. Click on the Run Button near the top of the window to run the test(s) that are in the DDR Exported Tests group.
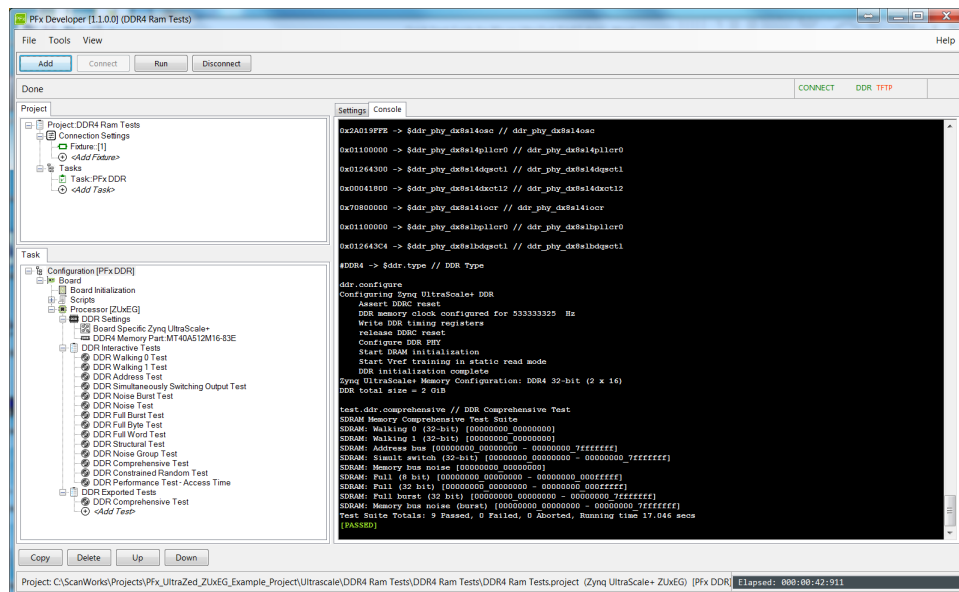
13. Add a test to the DDR Exported Tests group by right clicking on <*Add Test*> beneath DDR Comprehensive Test. Select DDR Performance Test from the list of tests. Then hit File->Save to save the updated project. Hit the Run button at the top of the interface.
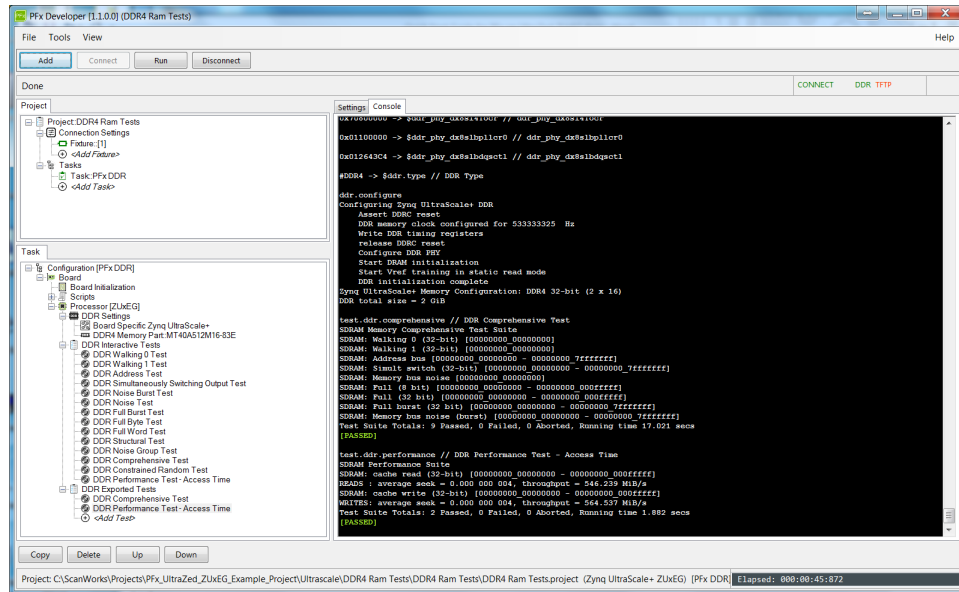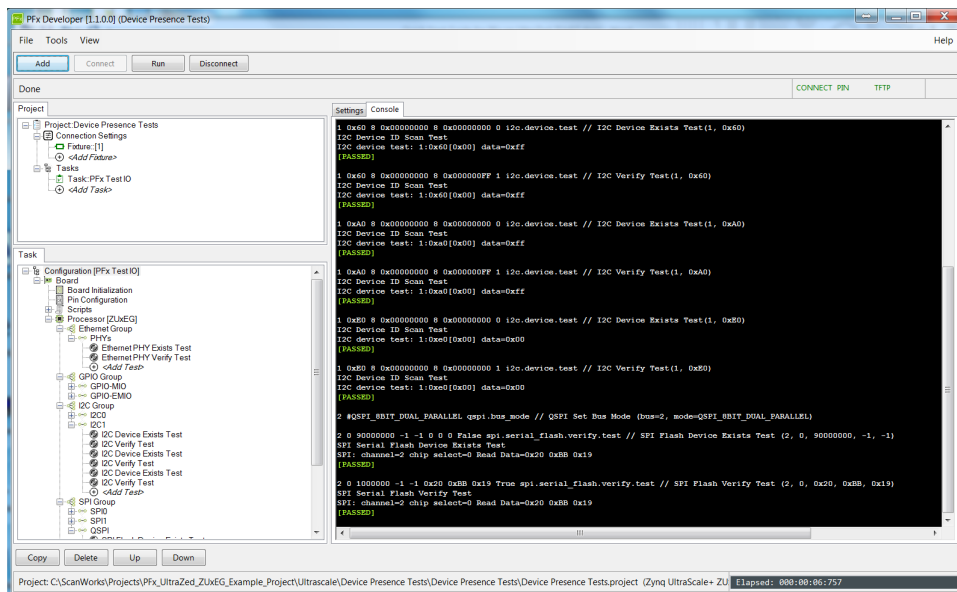

14. Close the Developer window, and return to the ScanWorks Actions view. Click on the Run Button to the left of DDR4 Ram Tests to run the DDR Exported Tests as a ScanWorks Action.
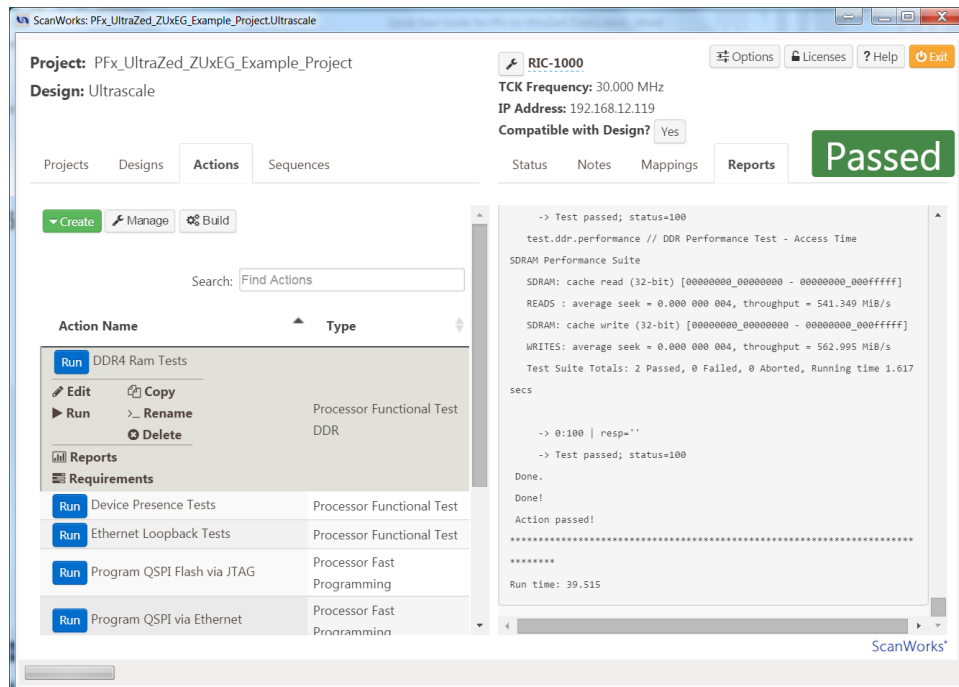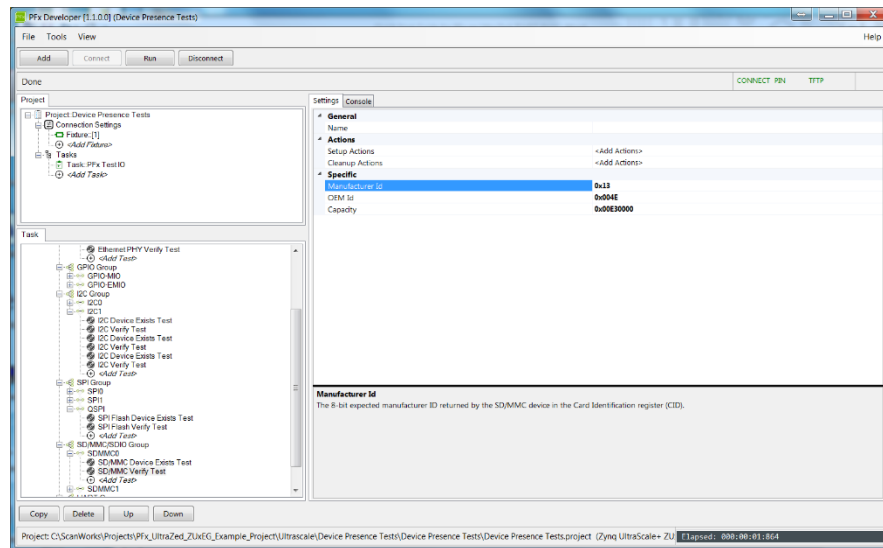
15. Right Click on Device Presence Tests to enter the Developer interface for the Device Presence Tests.
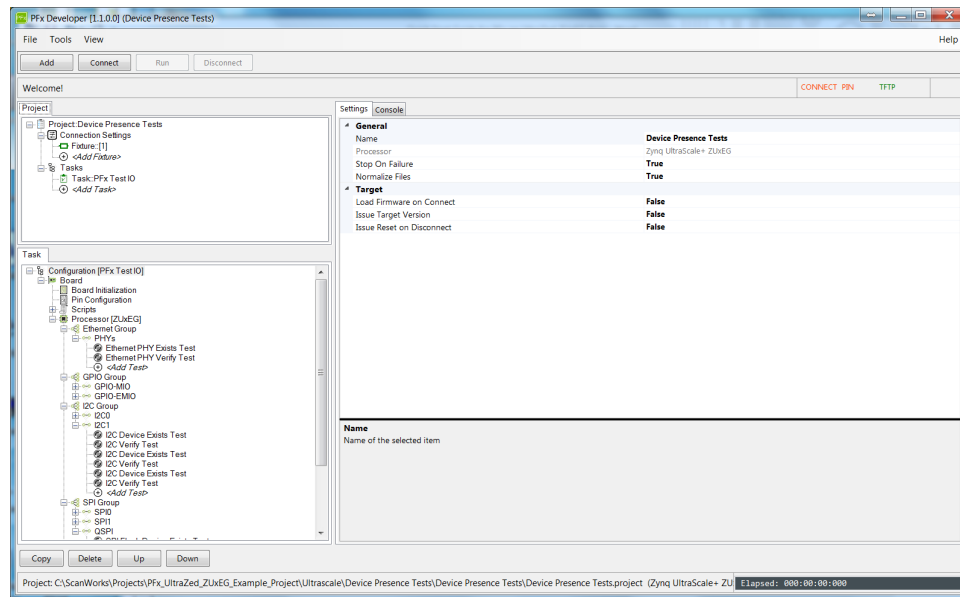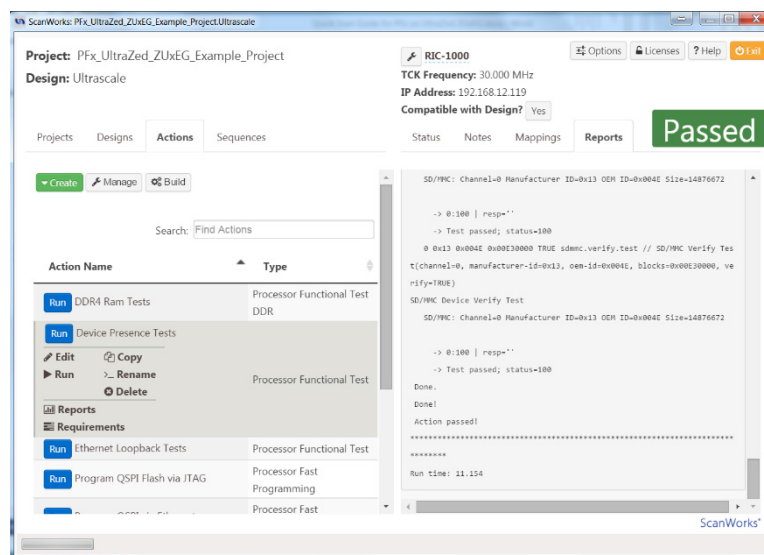

16. This action checks for the presence of the Ethernet PHY, The flash device on the QSPI port, I2C devices and the presence of the MMC device. Click on the Connect button, then the Run button.

17. If the SD/MMC Verify test fails, the most likely cause is the SD/MMC card in your UltraZed is a different make/model than the one used when creating this guide. To update the settings for your SD Card, Click on SD/MMC Verify test and then change the Manufacturer ID, OEM ID and size fields to match your SD card. Note that the size of the SD/MMC card is printed out in decimal in the test, but the input field is expecting a hexadecimal entry. Save the Project. Hit the Run button to verify the change in settings have corrected the problem.
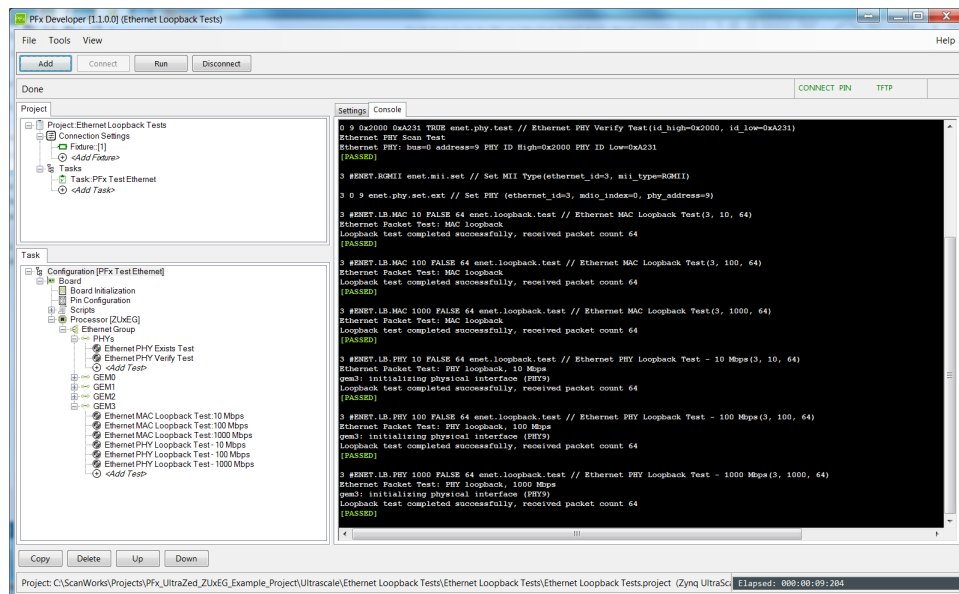

18. Close the Developer window, and return to the ScanWorks Actions view. Click on the Run Button to the left of Device Presence Tests to run the Device Presence Tests as a ScanWorks Action.

19. Right click on the Ethernet Loopback Tests action to open the Developer interface for the Ethernet Loopback Tests.
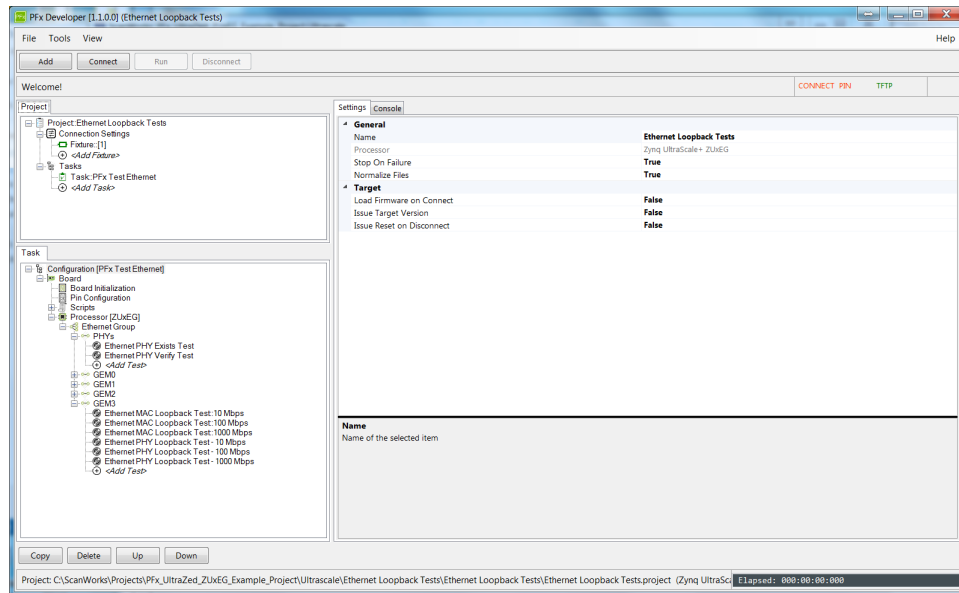

20. This action tests for the presence of the Ethernet PHY, does loopback tests on the ethernet MAC and loopback tests on the Ethernet PHY. Click on Connect and then on Run.

21. Close the Developer window, and return to the ScanWorks Actions view. Click on the Run Button to the left of Ethernet Loopback Tests to run the Ethernet Loopback Tests as a ScanWorks Action.
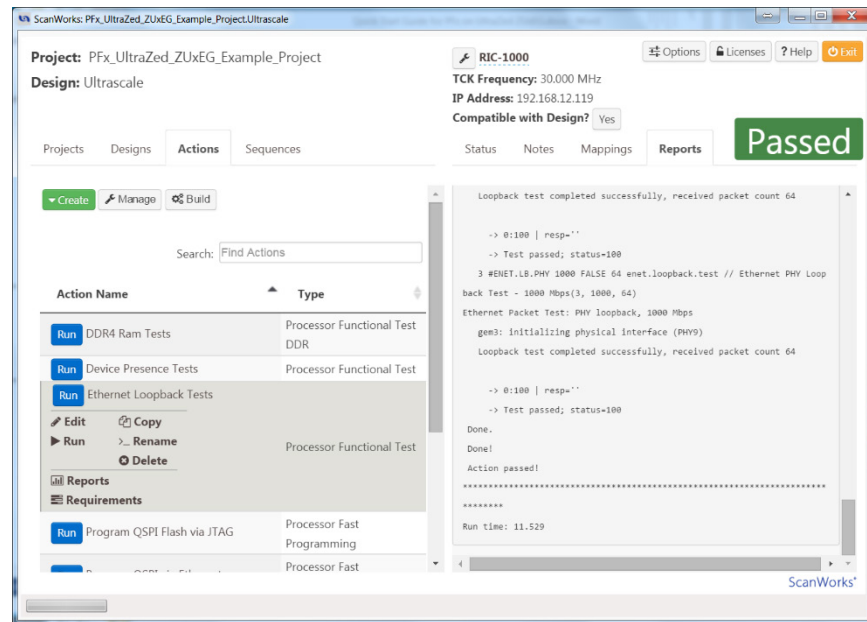

22. Right click on QSPI Programming via Ethernet to open Developer interface for the QSPI using Ethernet action. This action tests for the presence of a flash memory device on the QSPI port, Erases the flash, does a blank check on the flash, Programs the flash with a test file over Ethernet, and then tests the checksum of the range of flash memory that was programmed.
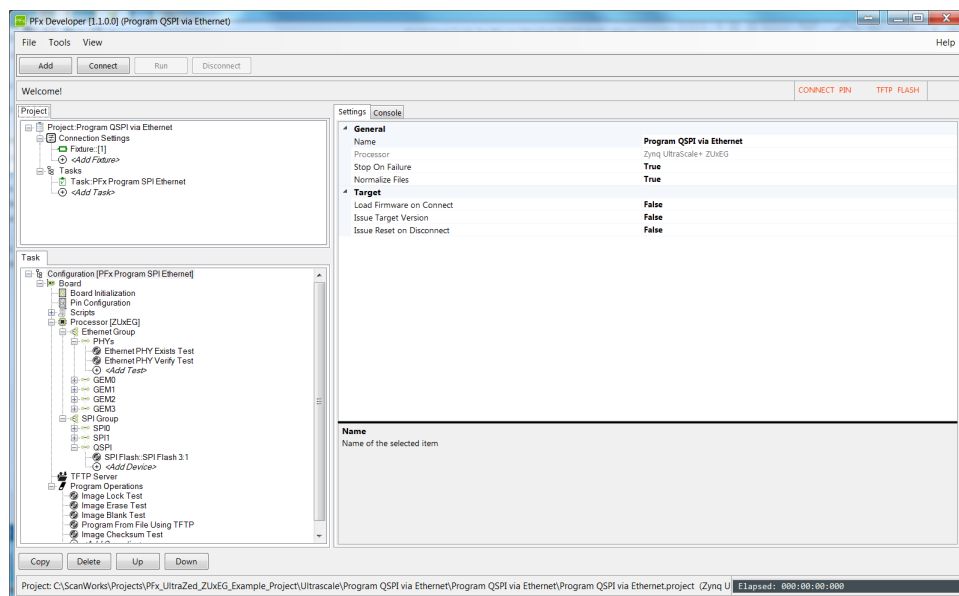
23. To use the ethernet port on the UUT as the data pipe, the ethernet on the UUT must be configured, and a TFTP client must be configured. Click on TFTP Server under the Task tab to configure the UUT's ipaddress and the TFTP client settings. Clicking on the pull down to the right side of TFTP Server Address will show a list of available addresses to use. Use the ipaddress of your computer as the ipaddress of the TFTP Server.
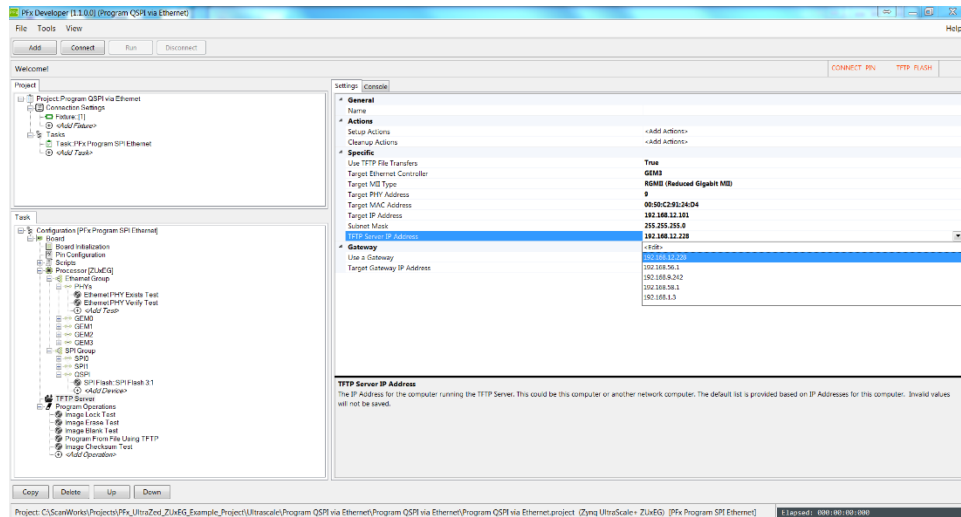

24. Now configure the ipaddress of the UUT by entering the desired value in the field to the right of Target IP Address. Configure the subnet mask. Save the project.
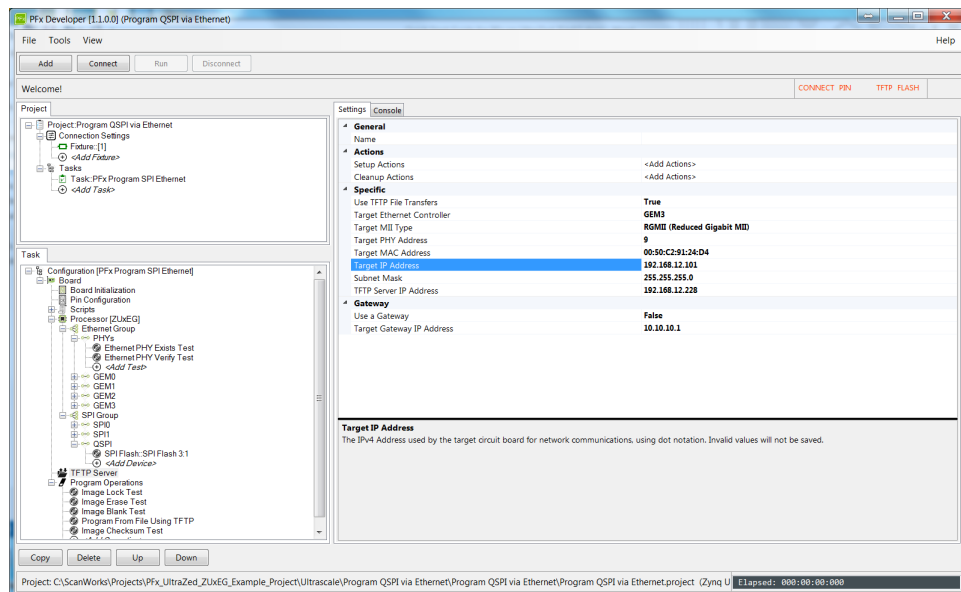
25. Now that the TFTP Server is configured, The TFTP Server needs to be started. From the top menu bar of the Developer interface, Use the Tools pulldown and select Tools-> Start TFTP Server. You can tell the TFTP Server is running when TFTP is shown in green in the upper right hand corner of the Developer Interface.
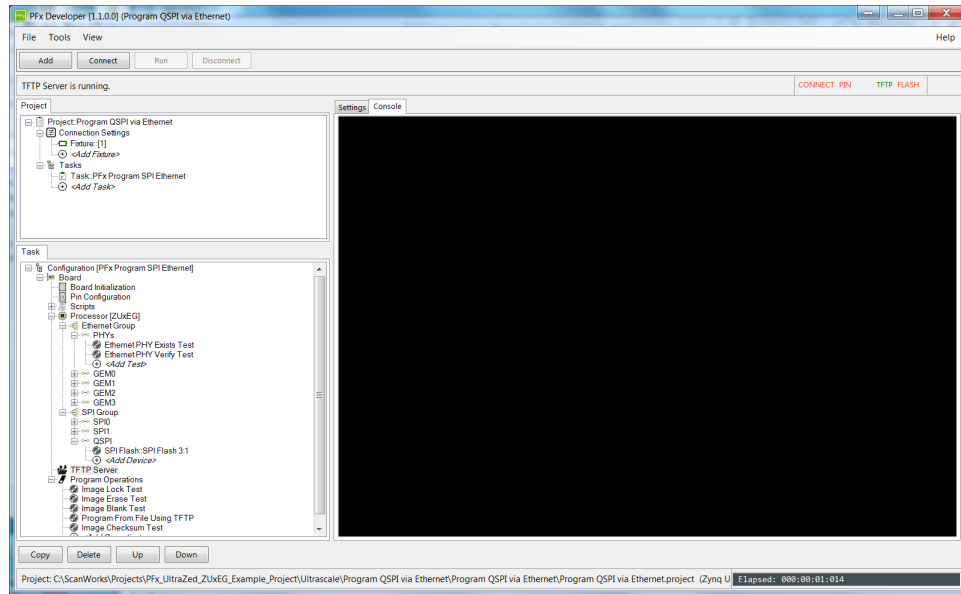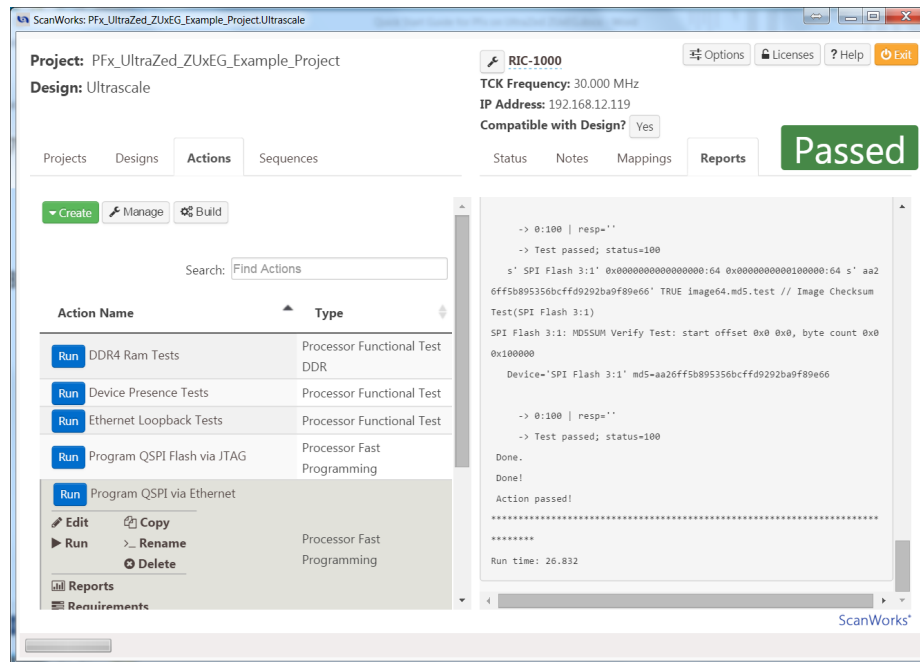

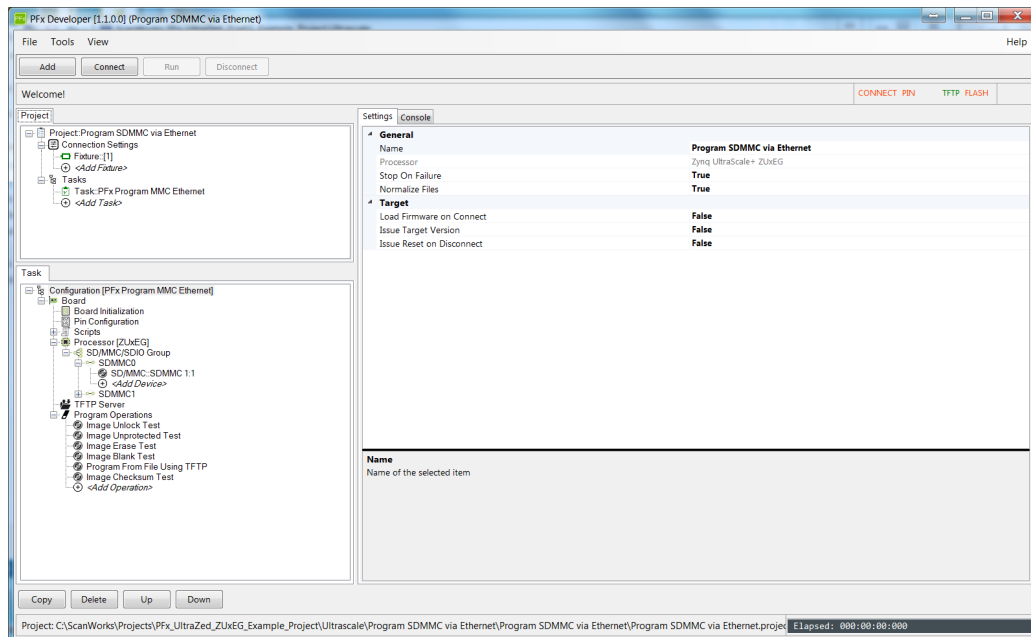26. Click on Connect and then click on Run.
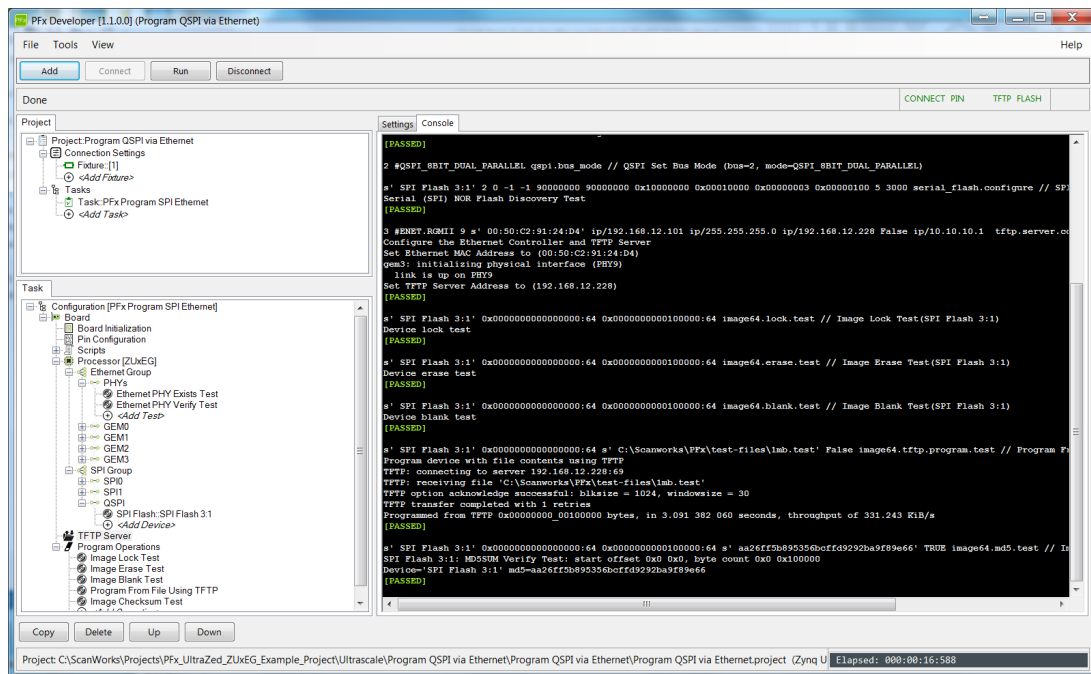
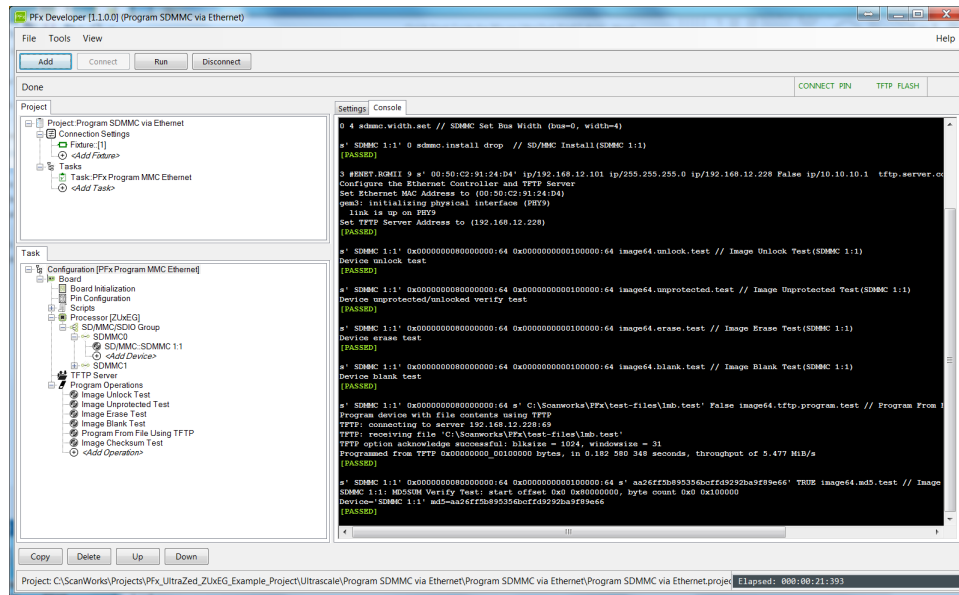27. In the example above, the flash memory was programmed at a rate of 331 KiB/second. Close the Developer interface, and click on the Run button to the left of QSPI Programming via Ethernet to run the action from ScanWorks.


28. Right click on the SDMMC Programming via Ethernet to open the Developer interface for the MMC Programming action.
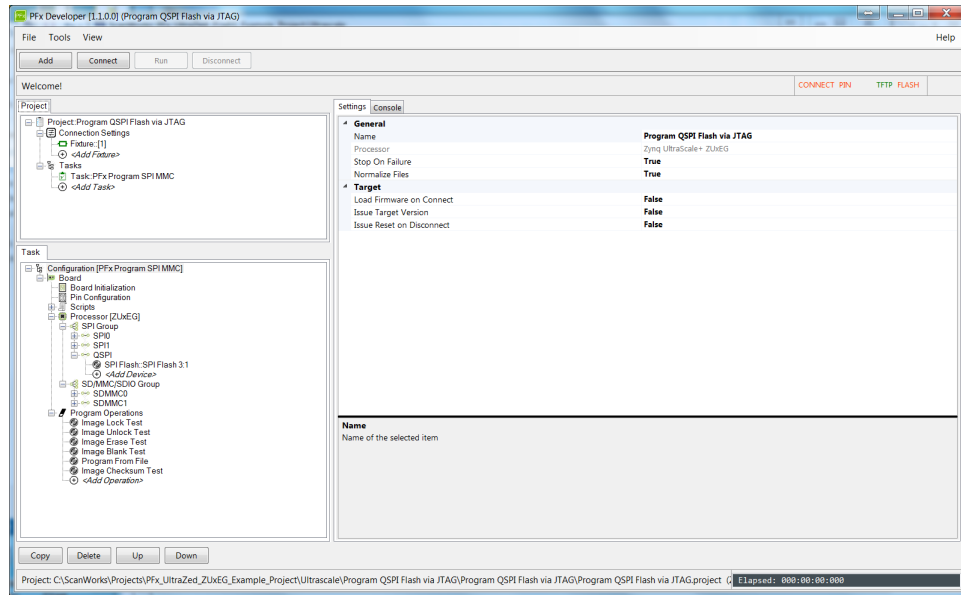
29. This action tests for the presence of the SD/MMC card, erases a portion, performs a blank check on the portion, programs the SD/MMC card with a file using the ethernet as the data pipe, and runs a checksum on the portion programmed. Configure the TFTP ipaddresses as shown in the QSPI Programming using Ethernet TFTP Server setup. Save the Project. Note that the TFTP Server does not have to be started again. Click on Connect and Run.
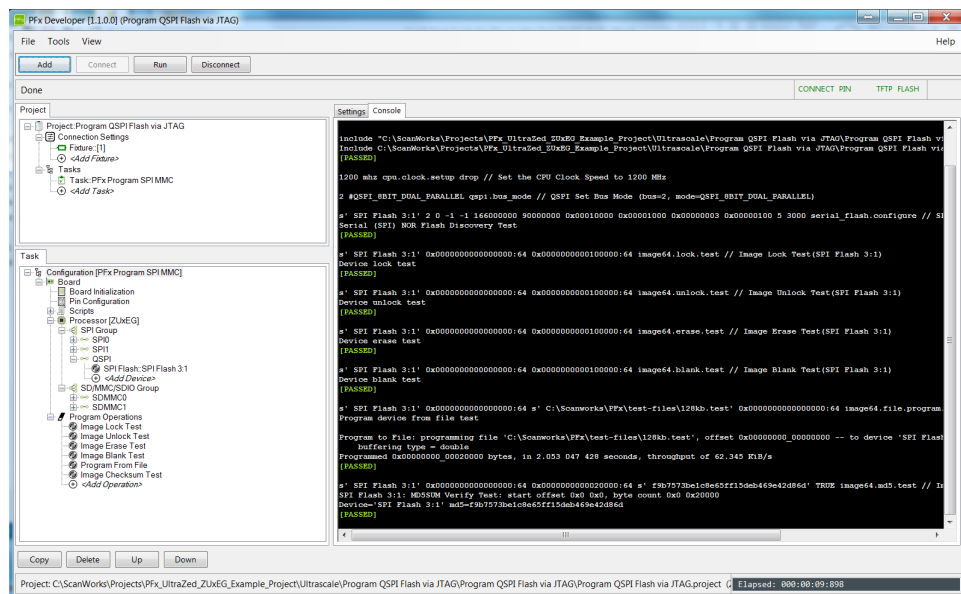

30. Note that in the example above, the SD/MMC card was programmed at a rate of 5.47 MiB/second. Close the Developer interface, and click on the Run button to the left of MMC Programming using Ethernet.
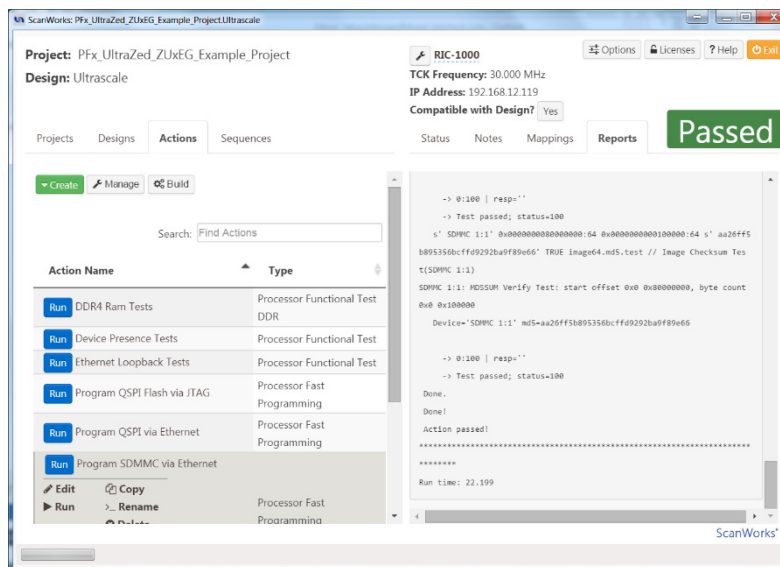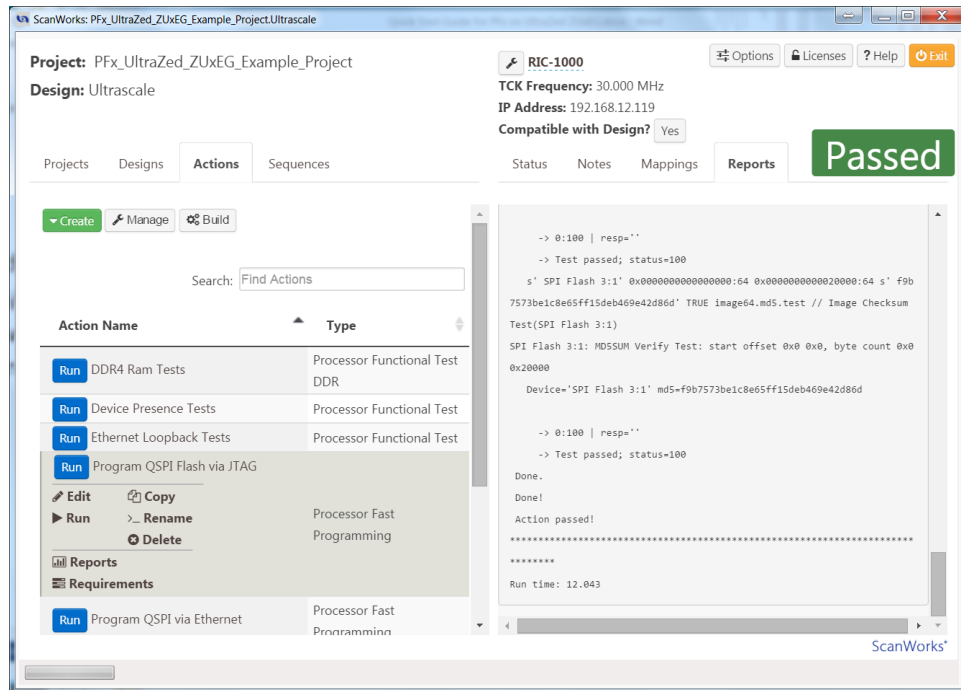
31. Right click on the Program QSPI Flash via JTAG to open the Developer interface for the programming action.
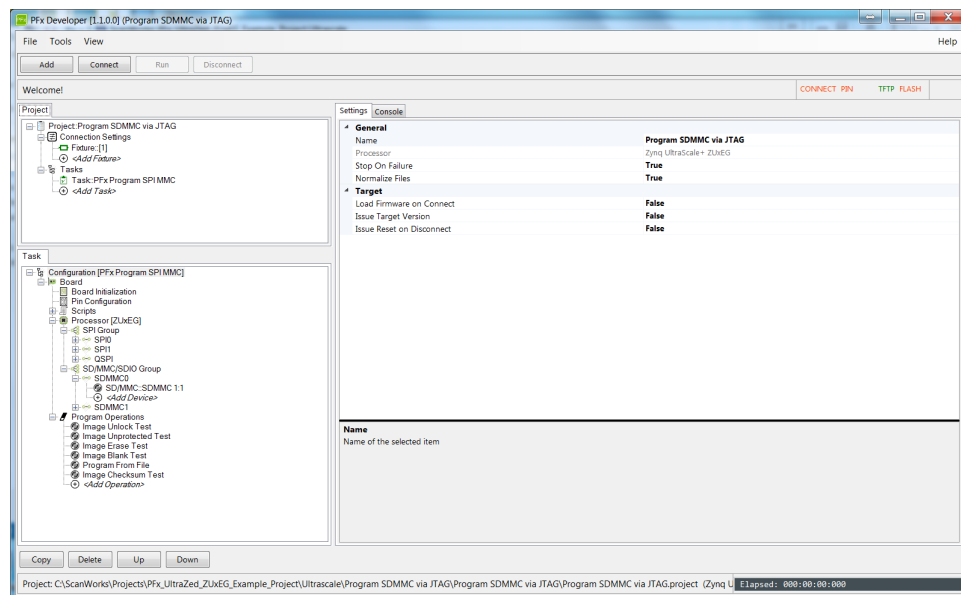

32. This action tests for the presence of a flash memory device on the QSPI port, Erases the flash, does a blank check on the flash, Programs the flash with a test file over JTAG, and then tests the checksum of the range of flash memory that was programmed.
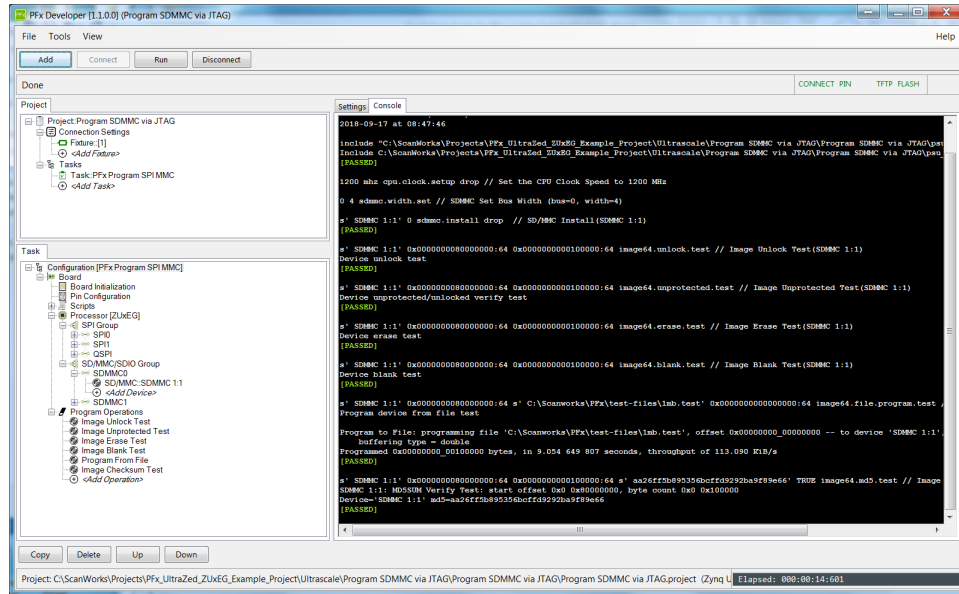
33. In the example above, the QSPI flash is programmed over JTAG at a rate of 62.9 KiB/second. Close the Developer interface, and click on the Run button to the left of QSPI Programming via JTAG to run the action from ScanWorks.


34. Right click on the Program SDMMC via JTAG to open the Developer interface for the programming action.

35. This action tests for the presence of the SD/MMC card, erases a portion, performs a blank check on the portion, programs the SD/MMC card with a file using JTAG as the data pipe, and runs a checksum on the portion programmed. Click on Connect and Run.


36. Note that in the example above, the SD/MMC card was programmed at a rate of 113.0 KiB/second. Close the Developer interface, and click on the Run button to the left of Program SDMMC Programming via JTAG. This concludes the Developer portion of this guide.
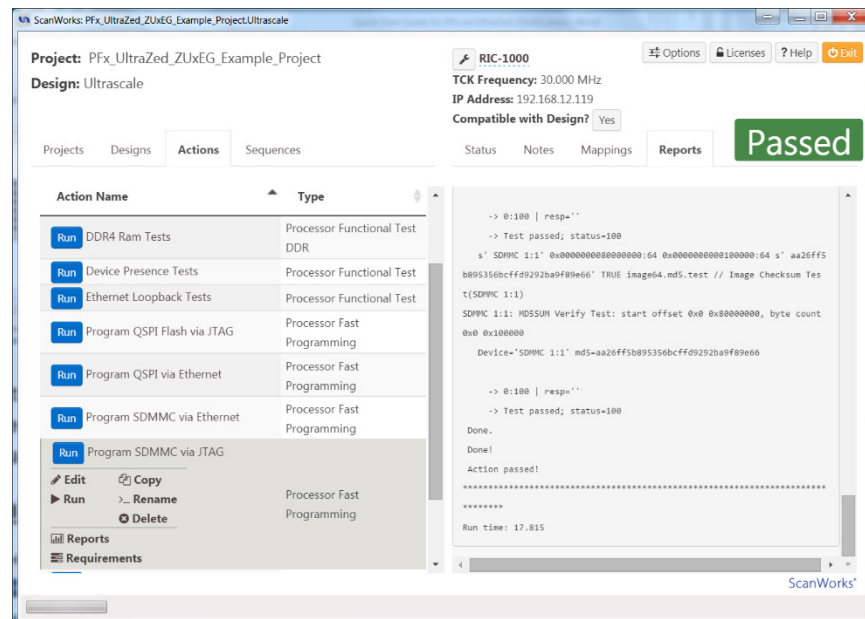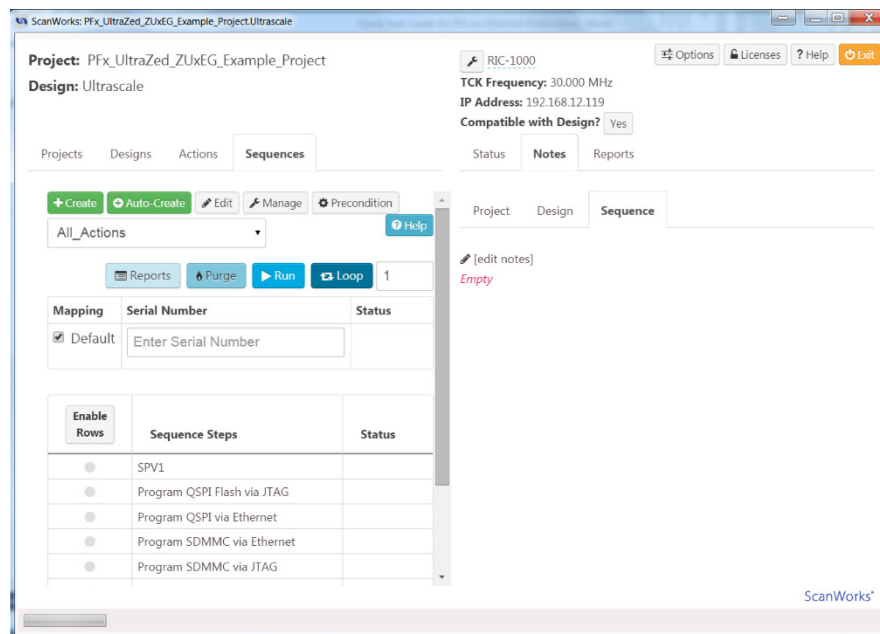
Putting it all together – Manufacturing Mode

When all the development is complete, and it is time to use PFx on a manufacturing line, it is desired to run all the actions with a single click. The mechanism for doing this is Sequencing. To run all the actions as a sequence:
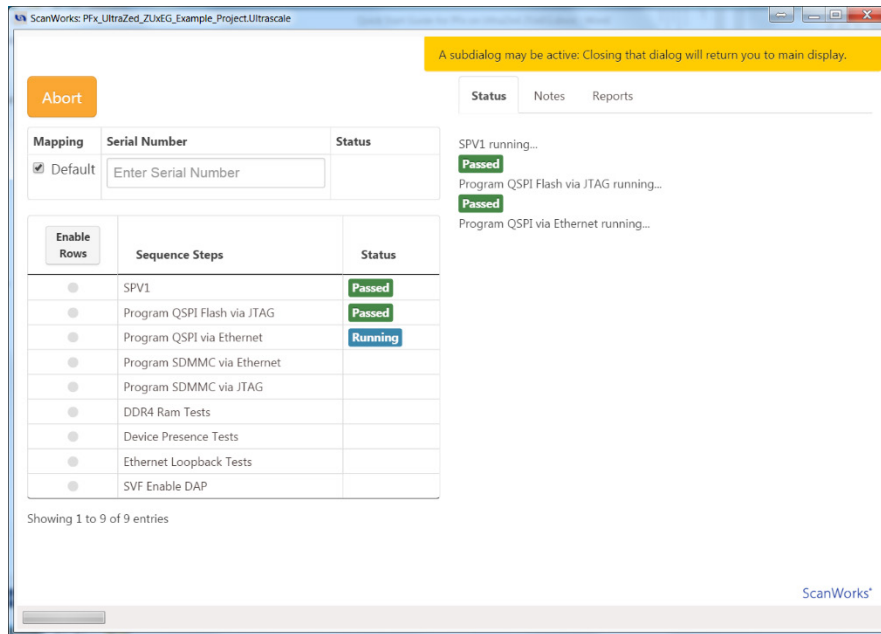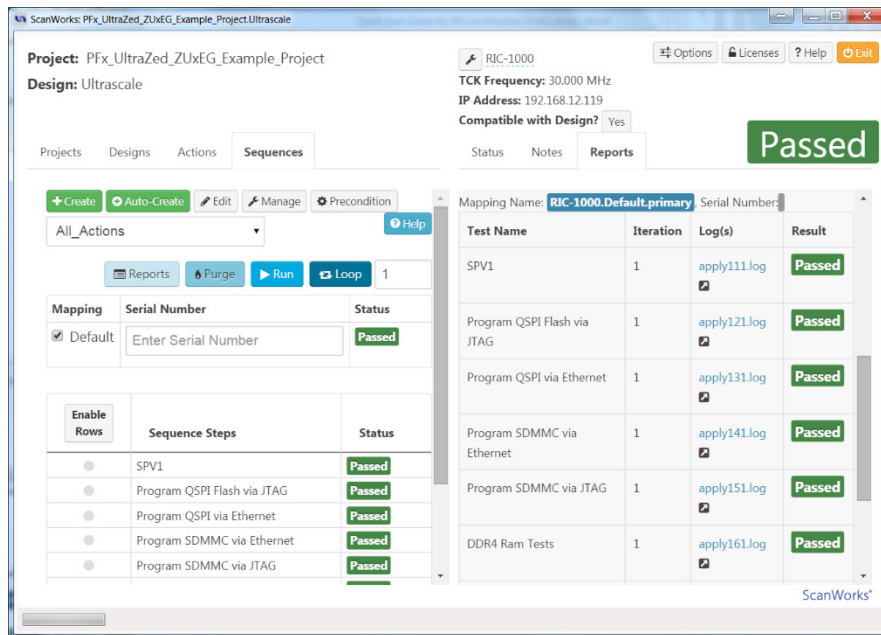
1. In ScanWorks, click on the Sequences tab.
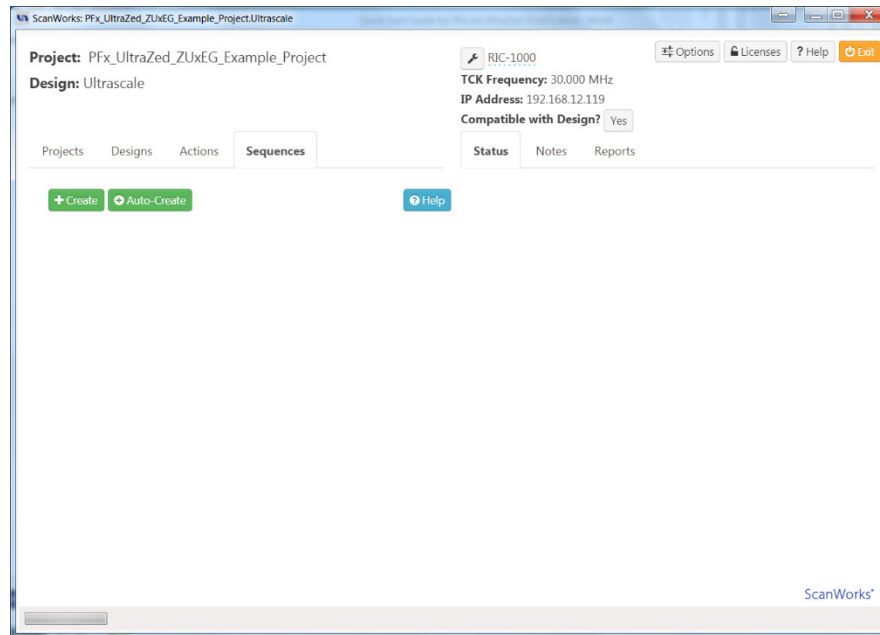
2. Click on the Auto-Create button.

3. Hitting the Run button causes all of the actions to be executed.

This concludes the Manufacturing portion of the guide.

Learn More

If you are interested in our products, please select one of the links below:

[ScanWorks Processor-based Flash Programming (PFP) for ARM 64-bit Processors](#)

[ScanWorks Processor-based Functional Test (PFT) for ARM 64-bit Processors](#)

[ScanWorks Processor-based Functional Test DDR (PDTDDR) for ARM 64-bit Processors](#)

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