

# **QUICK START GUIDE**

## **USING PFX ON A ZYNQ-7000 ZEDBOARD**



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## Introduction

This guide is intended to take the user through the steps to needed run PFX (Processor-based Functional Test or Processor-based Fast Programming) tests on a Zynq-7000 ZedBoard.

## Software Setup

The computer needs one of the following products installed and licensed:

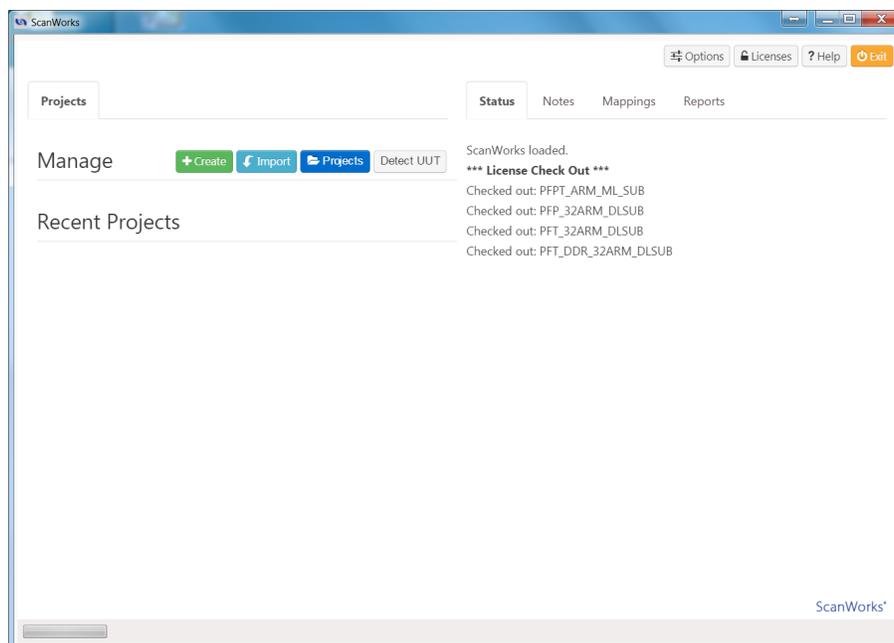
- ScanWorks® Processor-based Fast Programming for ARM 32-bit Processors
- ScanWorks® Processor-based Functional Test for ARM 32-bit Processors
- ScanWorks® Processor-based Functional Test DDR for ARM 32-bit Processors

## Hardware Setup

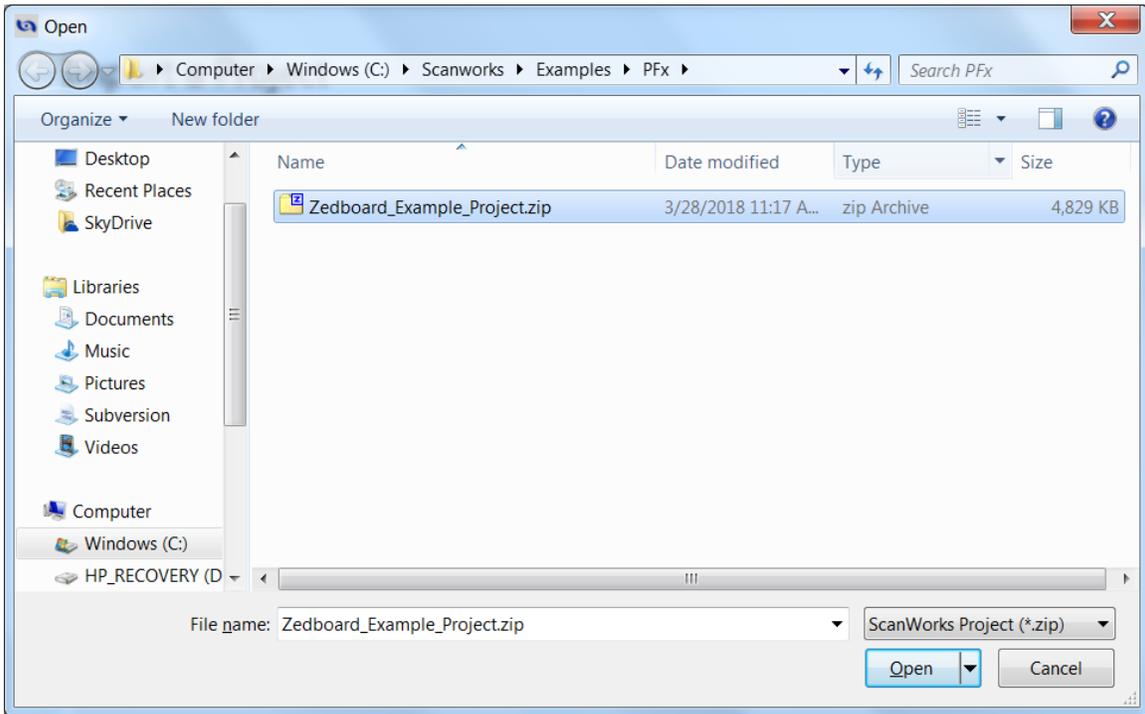
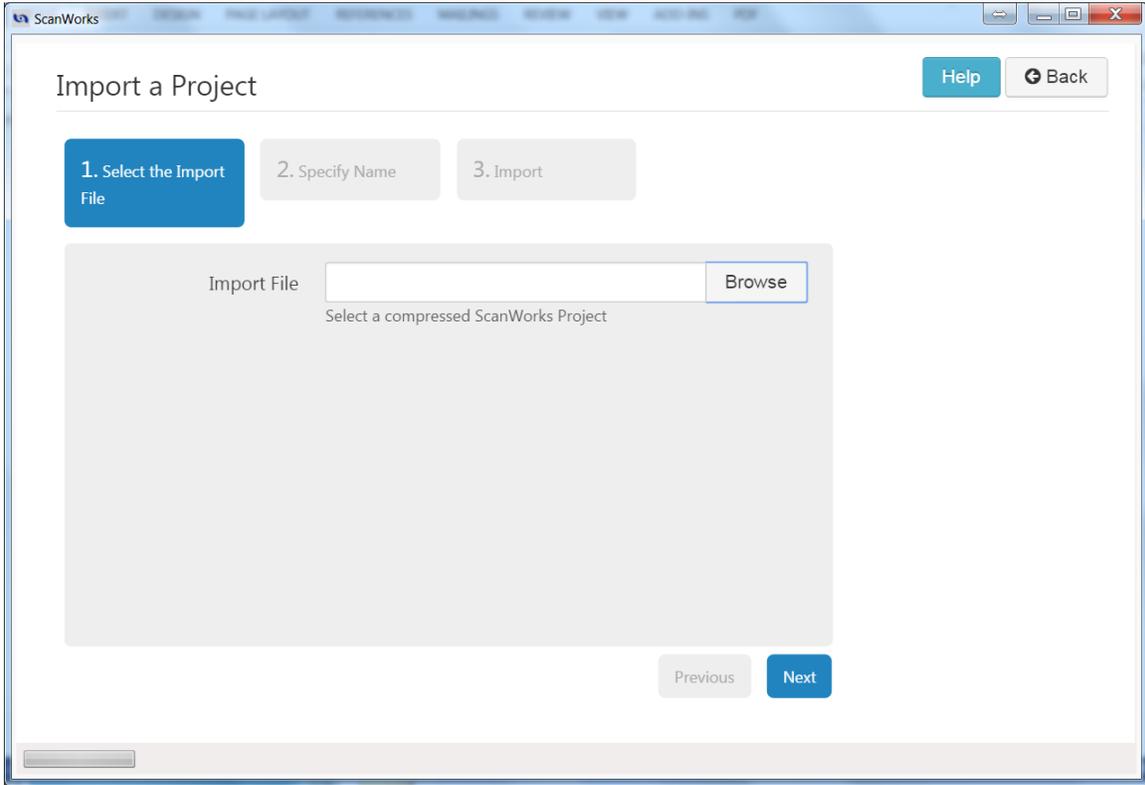
A computer is connected to a hub or switch via an Ethernet cable. A ScanWorks Remote Instrumentation Controller (RIC-1000) is connected to the hub or switch via an Ethernet cable. The Ethernet port on the ZedBoard is connected to the hub or switch via an Ethernet cable. The RIC-1000 is connected to the ZedBoard's JTAG port via a RIC-1000 UUT cable and an adapter for the Zynq JTAG port.

## Examples in Development Mode

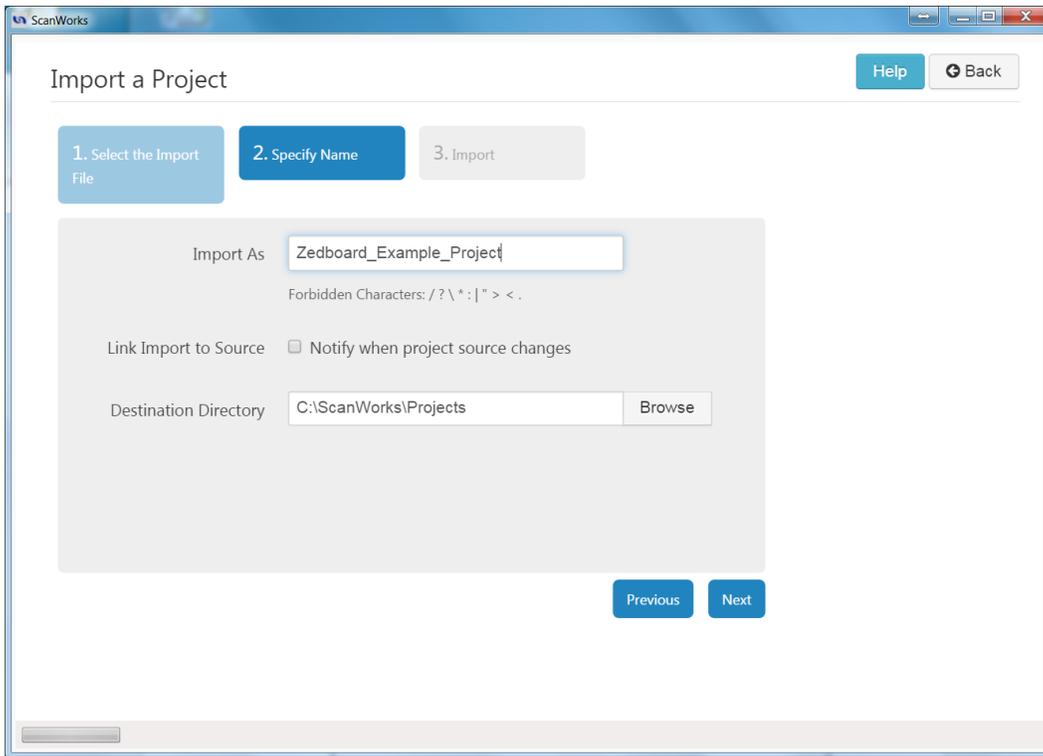
1. Start ScanWorks.
2. Click on the Import Button.



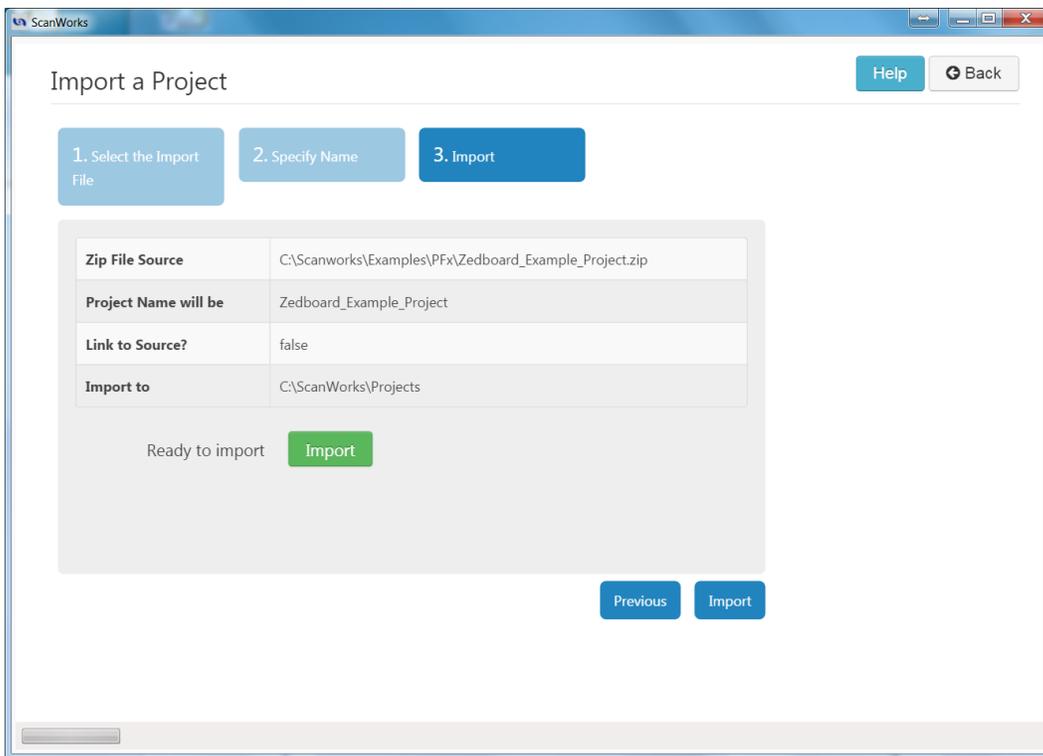
3. Click on Browse and browse to the file to be imported –  
C:\ScanWorks\Examples\PFX\ZedBoard Example Project.zip and click on Open.



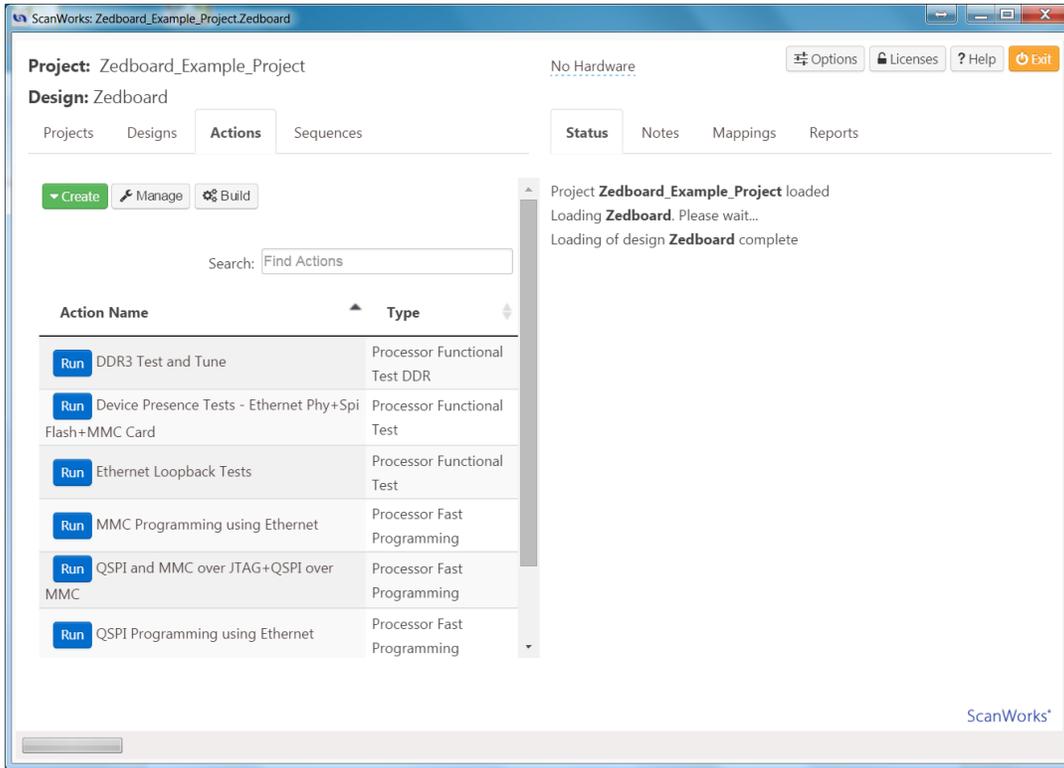
4. Click on the Next Button.



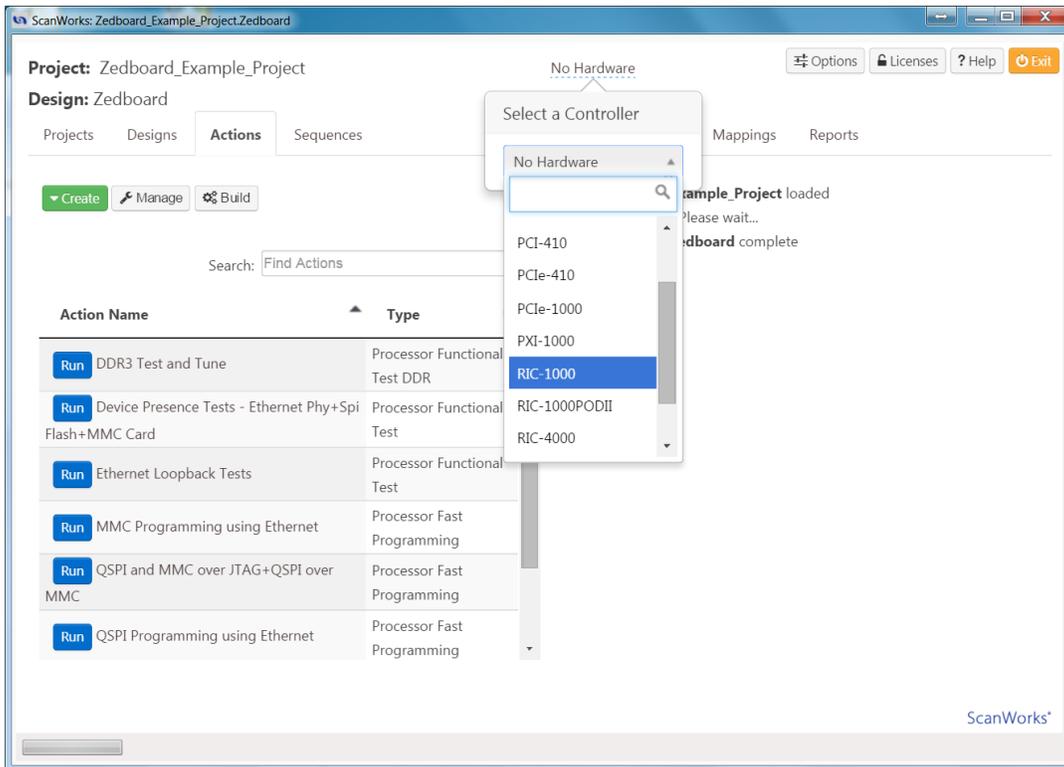
5. Click on either Import Button.



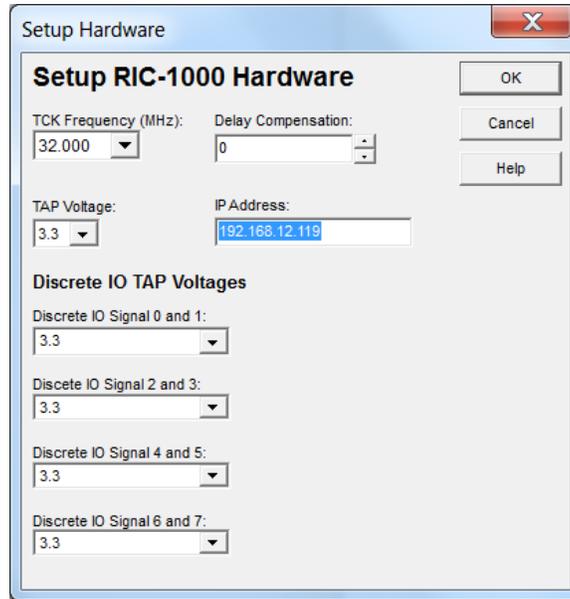
6. Click on *No Hardware* to select the hardware controller.



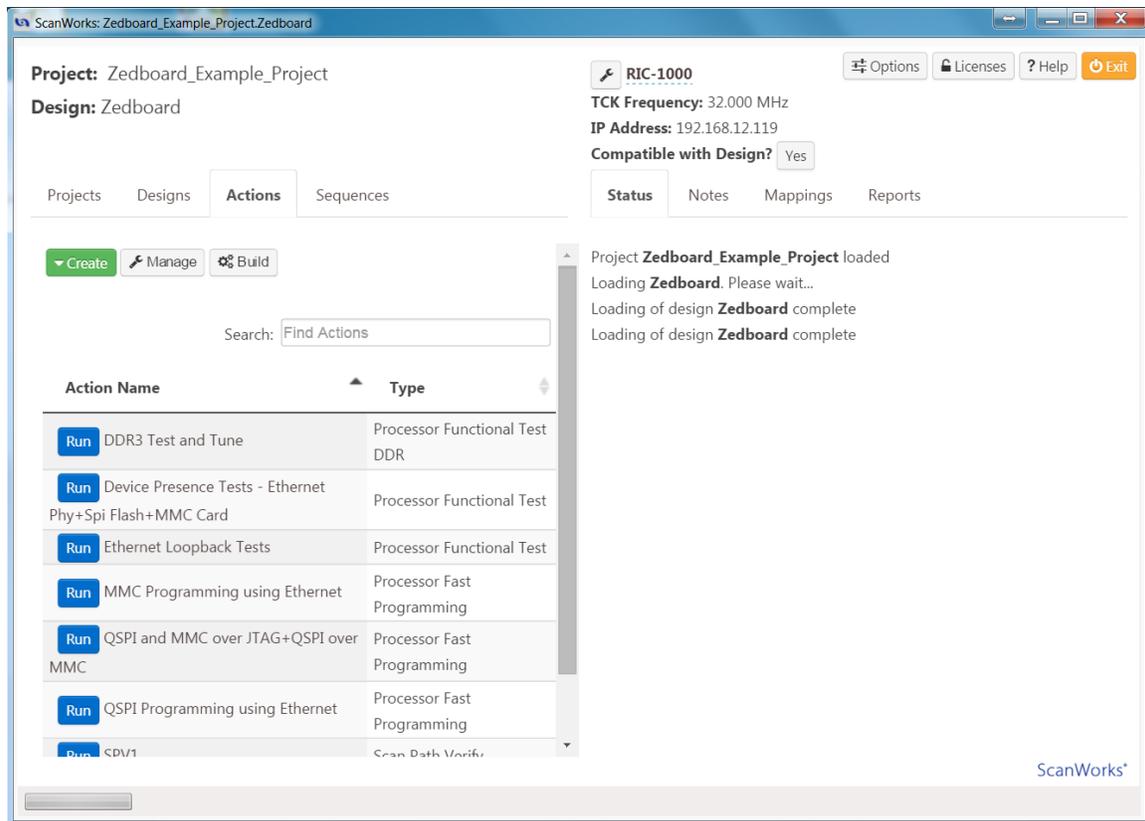
7. Select RIC-1000 as the controller.



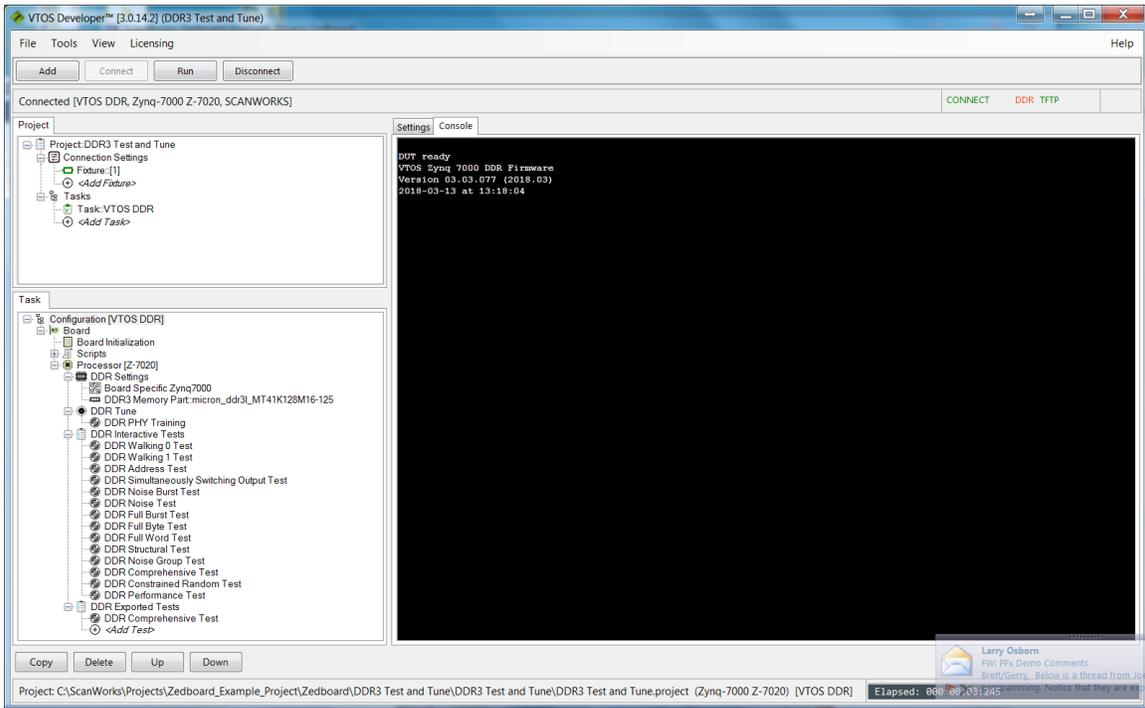
- Configure the RIC-1000's ip address, and select a TCK Frequency of 32 MHz. Note that flash programming performance over JTAG is directly affected by the TCK frequency. The higher the TCK Frequency, the better the programming performance. Click OK.



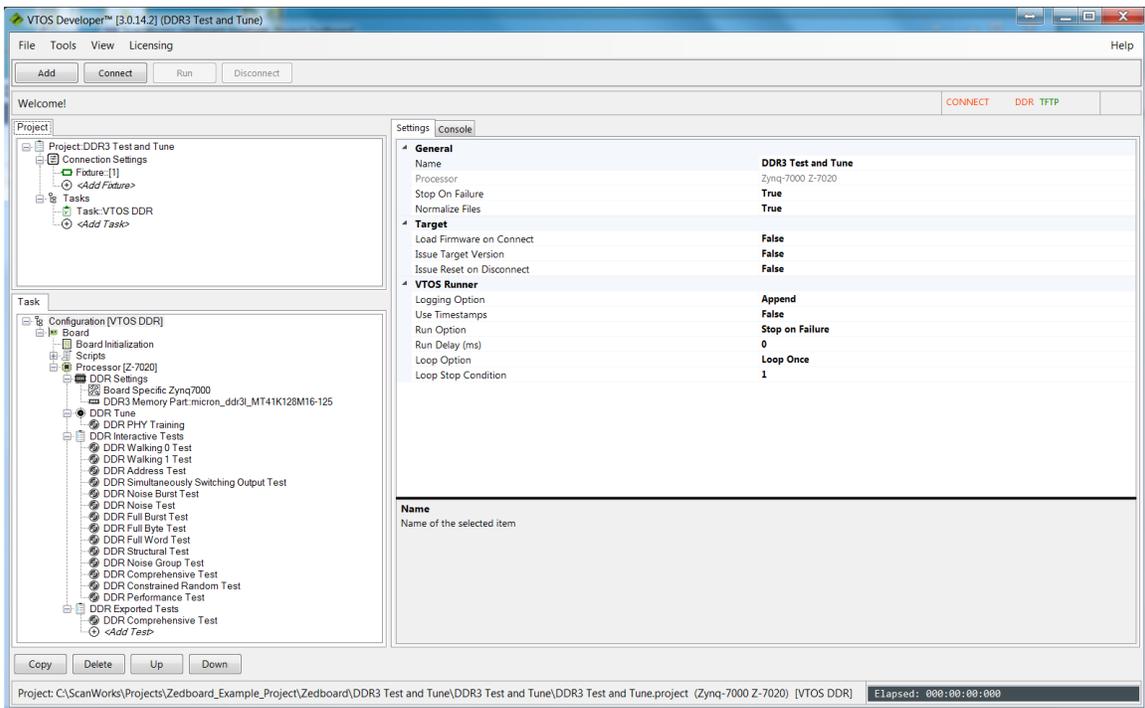
- Now let's run the DDR3 Test and Tune Action from within Edit mode.



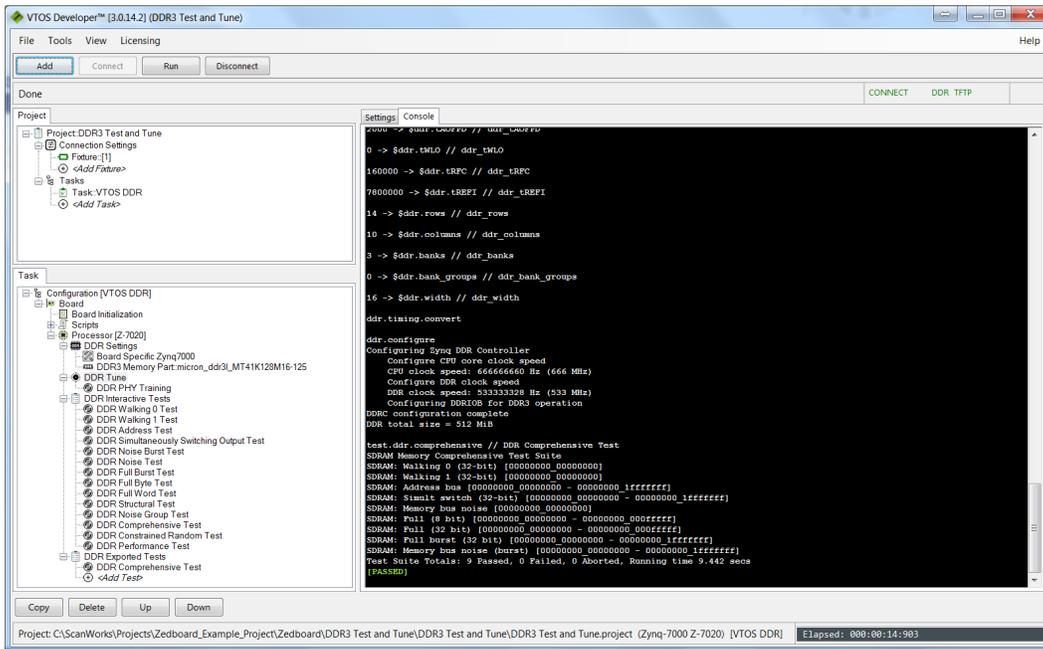
10. Right Click on DDR3 Test and Tune. This will launch the Development interface.



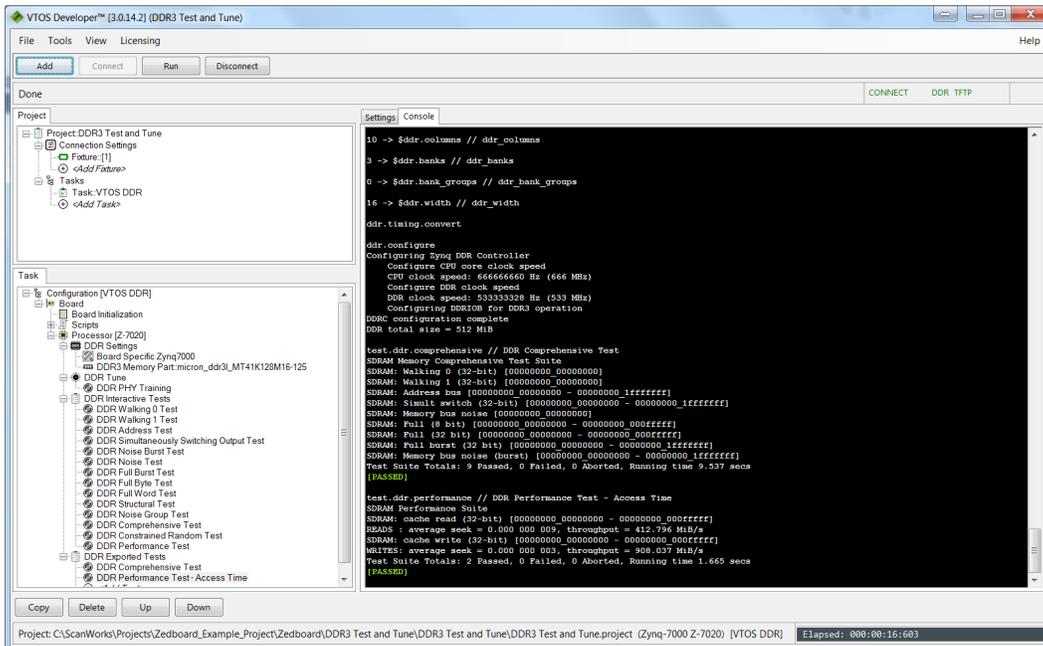
11. Click on the Connect Button. This will download a target agent to the ZedBoard and begin communicating with the target agent.



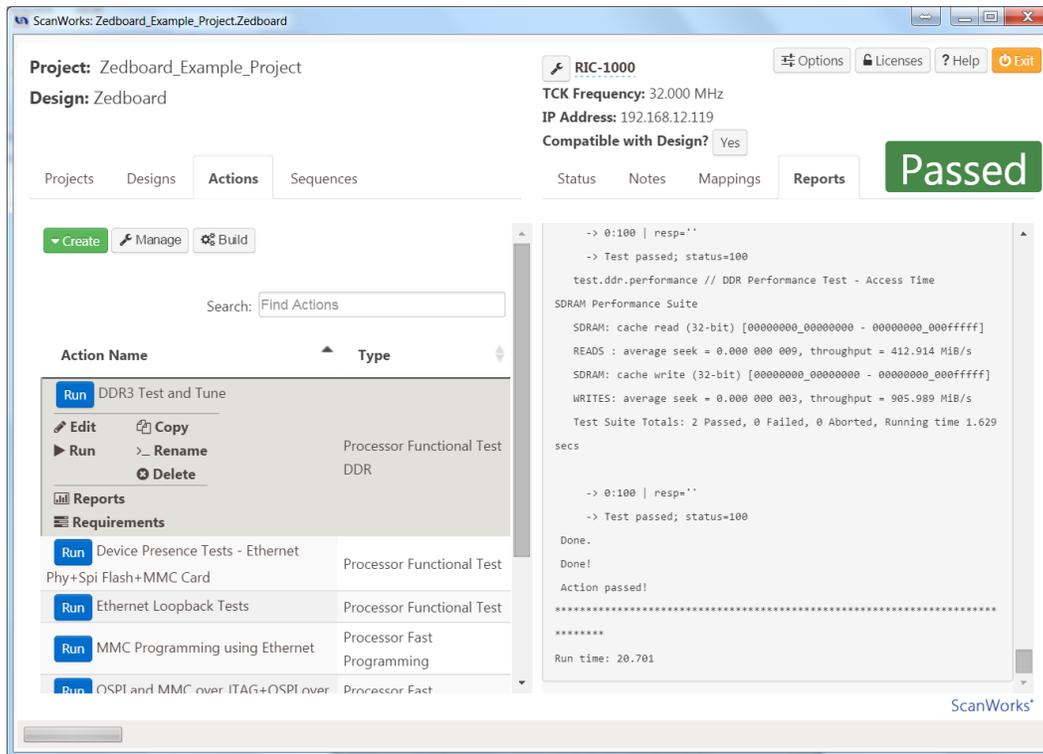
- You can manually run any of the tests in the DDR Interactive Tests group or the DDR Tune Task by right clicking on it and selecting Run. Click on the Run Button near the top of the window to run the test(s) that are in the DDR Exported Tests group.



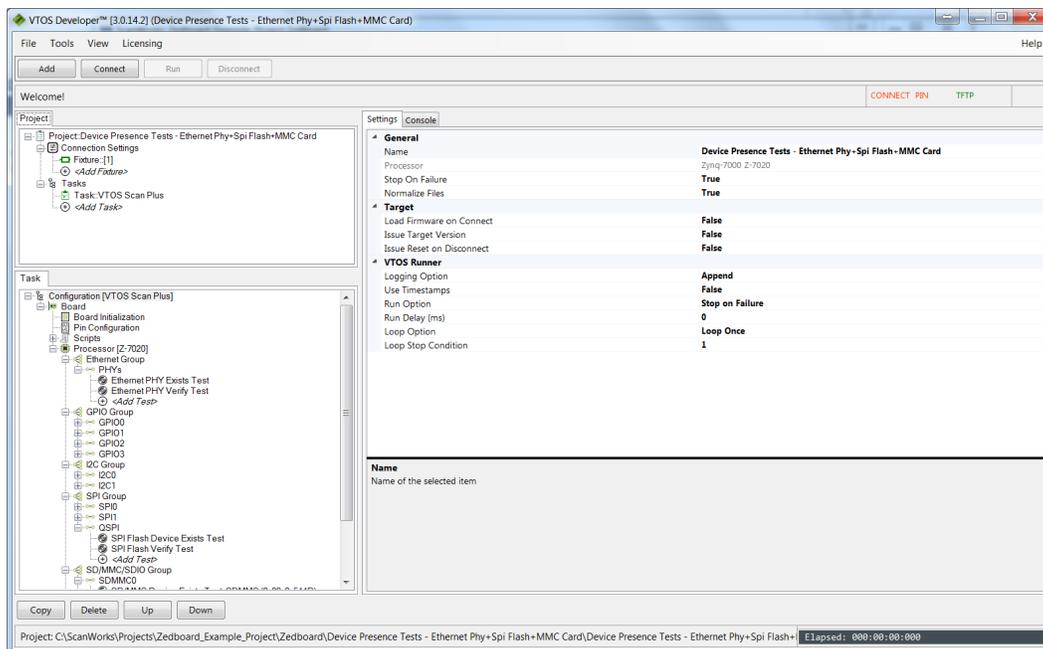
- Add a test to the DDR Exported Tests group by right clicking on <Add Test> beneath DDR Comprehensive Test. Select DDR Performance Test from the list of tests. Then hit File->Save to save the updated project. Hit the Run button at the top of the interface.



- Close the Development window, and return to the ScanWorks Actions view. Click on the Run Button to the left of DDR3 Test and Tune to run the DDR Exported Tests as a ScanWorks Action.

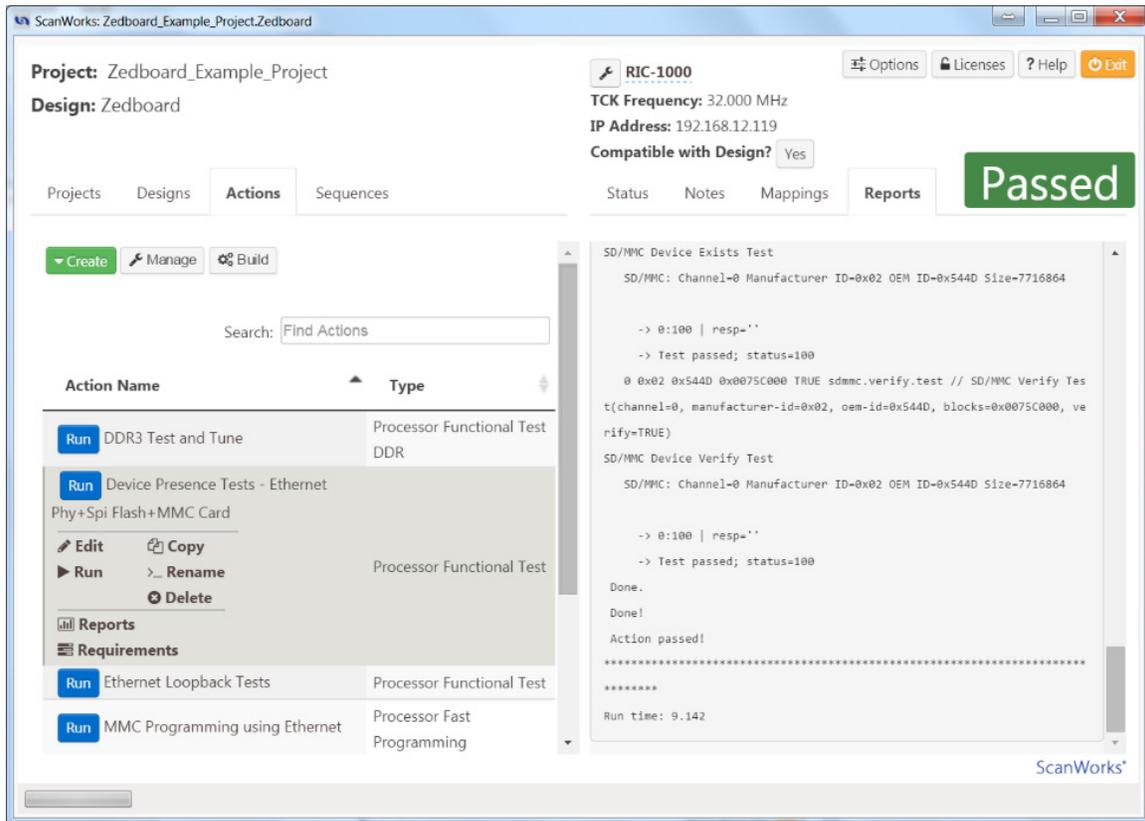


- Right Click on Device Presence Tests – Ethernet Phy+Spi Flash+MMC Card to enter the Development interface for the Device Presence Tests.

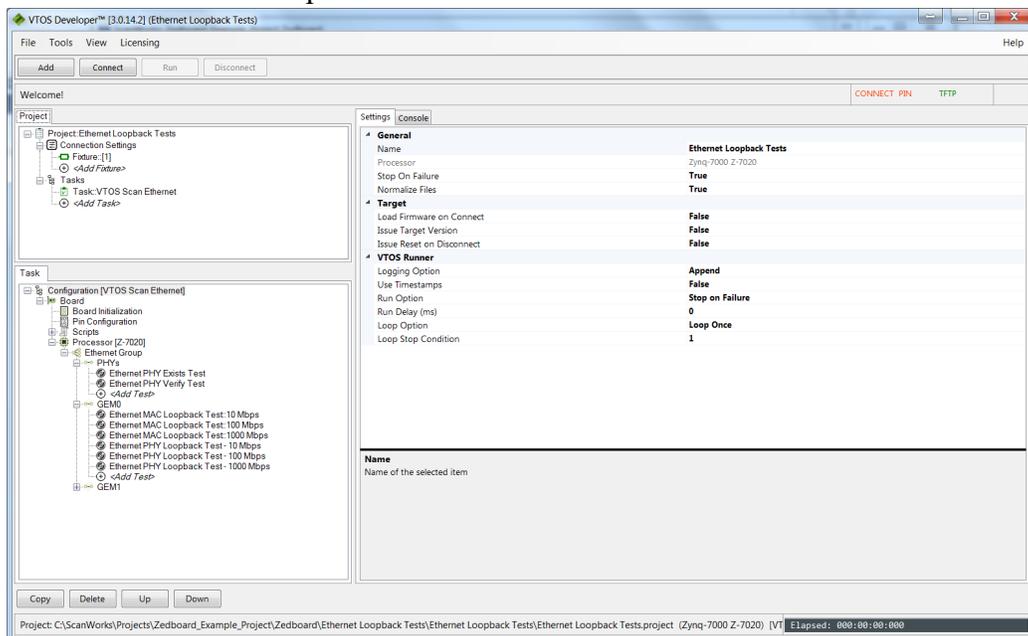




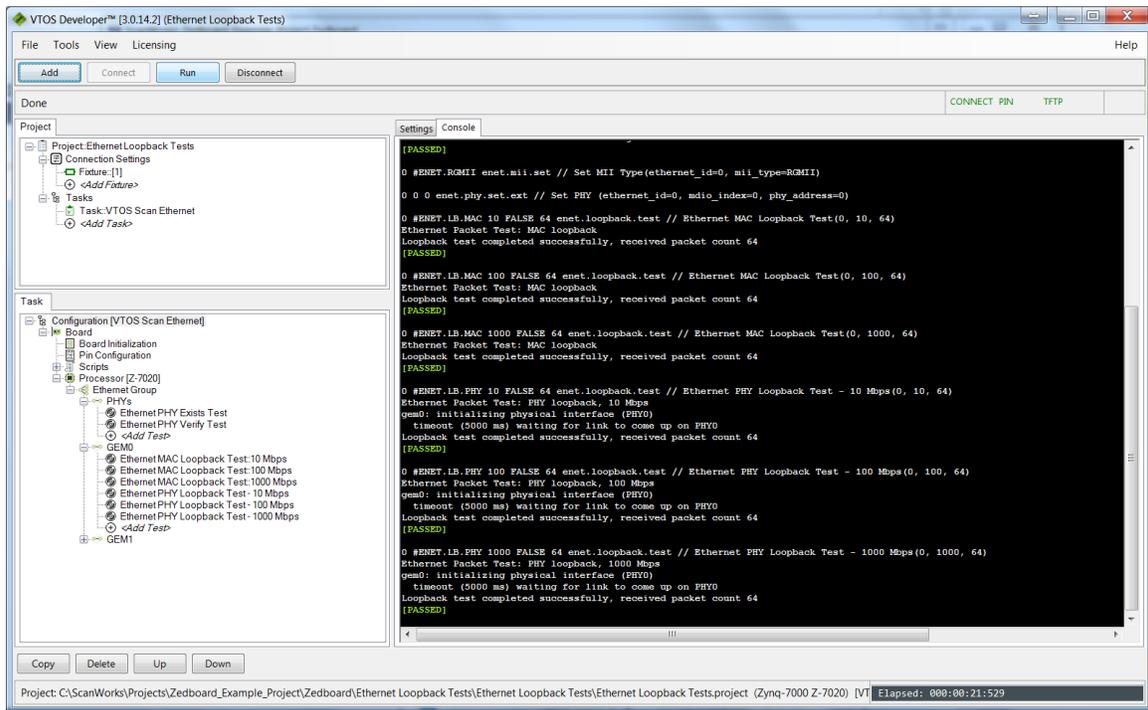
- Close the Development window, and return to the ScanWorks Actions view. Click on the Run Button to the left of Device Presence Tests – Ethernet Phy+Spi Flash+MMC Card to run the Device Presence Tests as a ScanWorks Action.



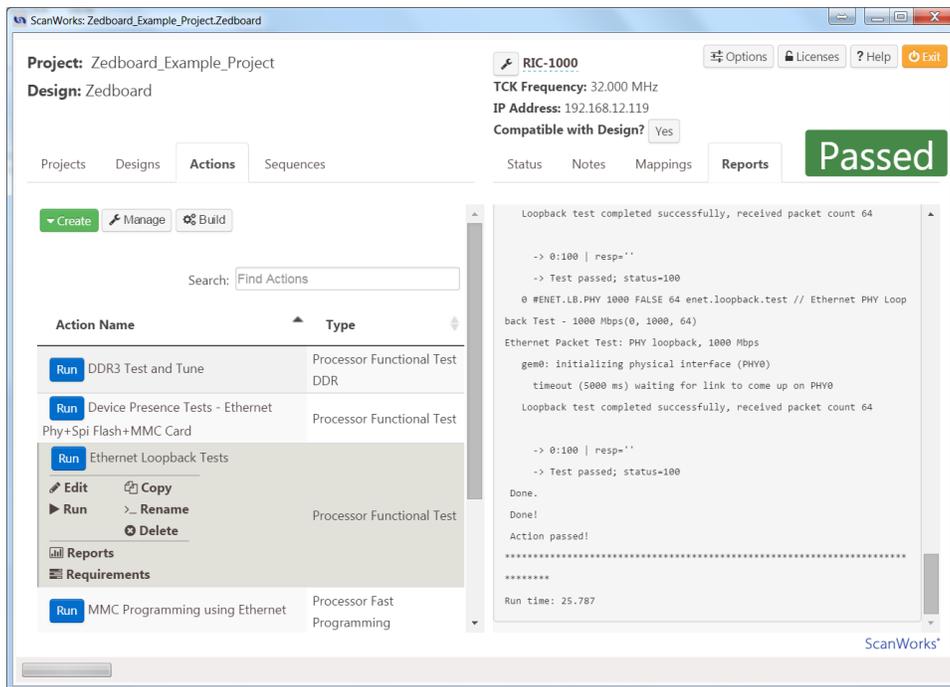
- Right click on the Ethernet Loopback Tests action to open the Development interface for the Ethernet Loopback Tests.



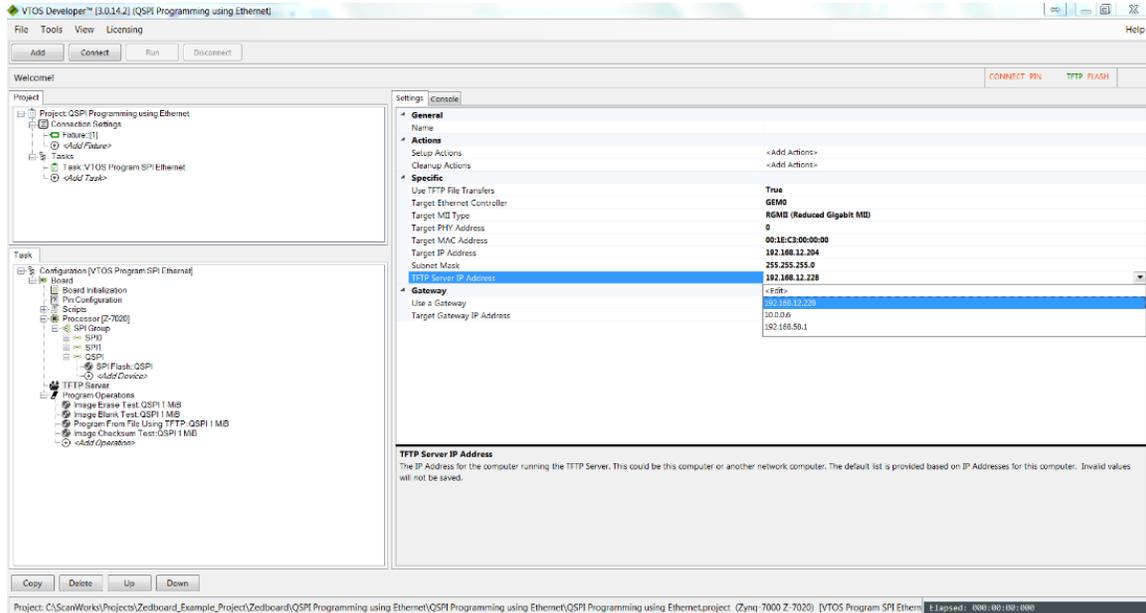
- This action tests for the presence of the Ethernet Phy, does loopback tests on the ethernet MAC and loopback tests on the ethernet phy. Click on Connect and then on Run.



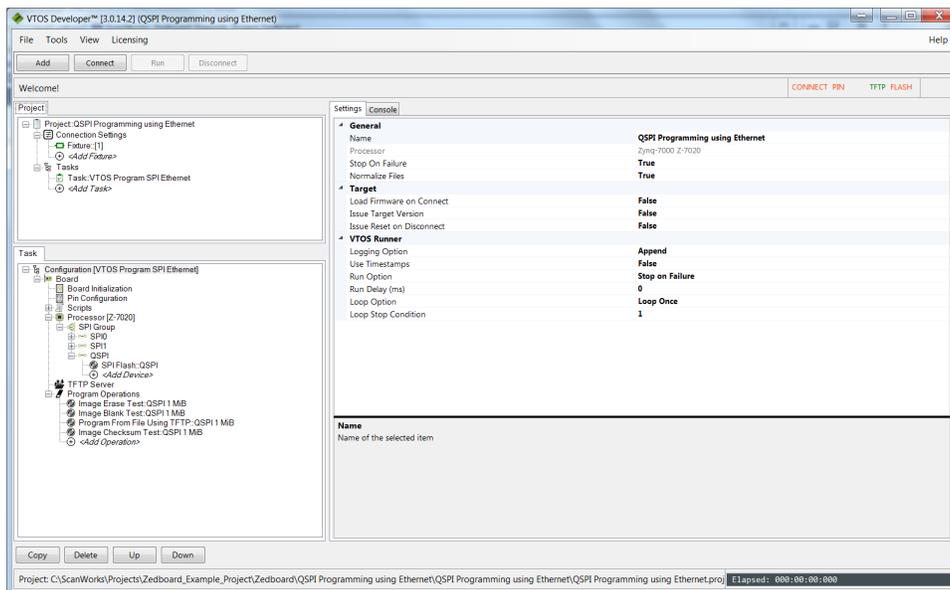
- Close the Development window, and return to the ScanWorks Actions view. Click on the Run Button to the left of Ethernet Loopback Tests to run the Ethernet Loopback Tests as a ScanWorks Action.



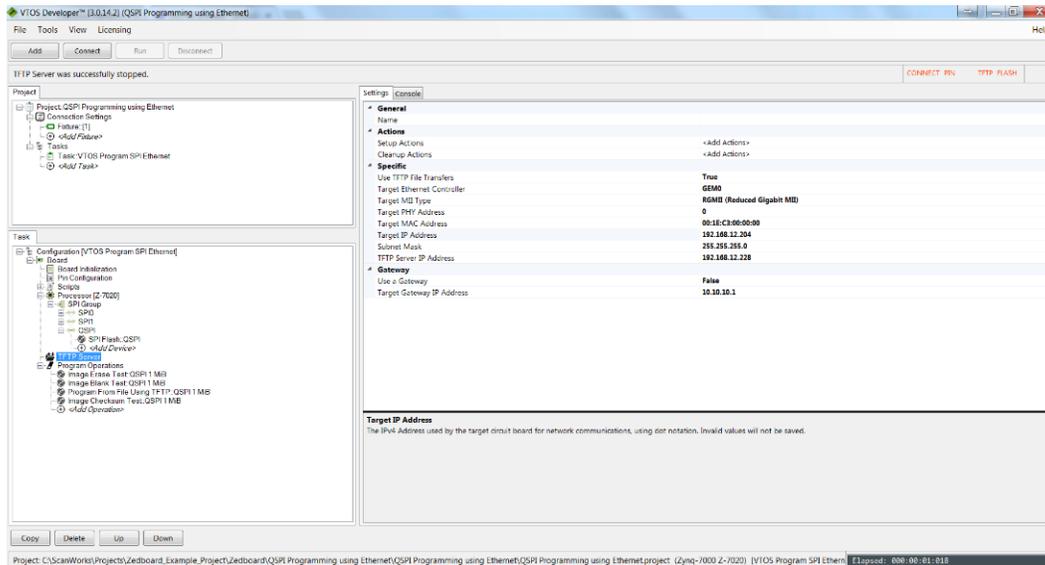
- Right click on QSPI Programming using Ethernet to open Development interface for the QSPI using Ethernet action. This action tests for the presence of a flash memory device on the QSPI port, Erases the flash, does a blank check on the flash, Programs the flash with a test file over Ethernet, and then tests the checksum of the range of flash memory that was programmed.



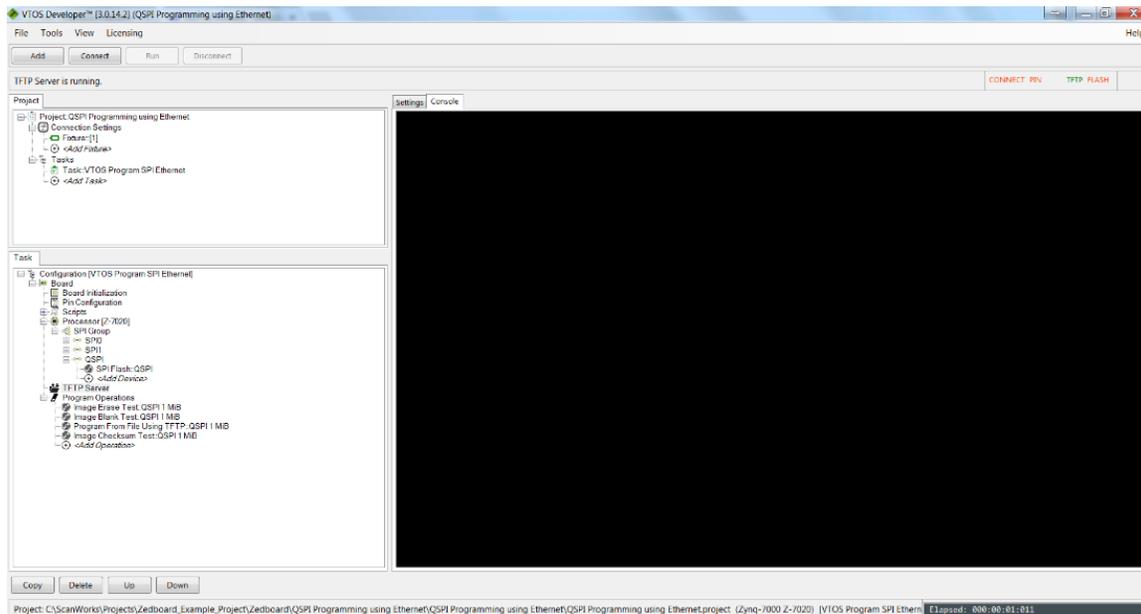
- To use the ethernet port on the UUT as the data pipe, the ethernet on the UUT must be configured, and a TFTP client must be configured. Click on TFTP Server under the Task tab to configure the UUT's ipaddress and the TFTP client settings. Clicking on the pull down to the right side of TFTP Server Address will show a list of available addresses to use. Use the ipaddress of your computer as the ipaddress of the TFTP Server.



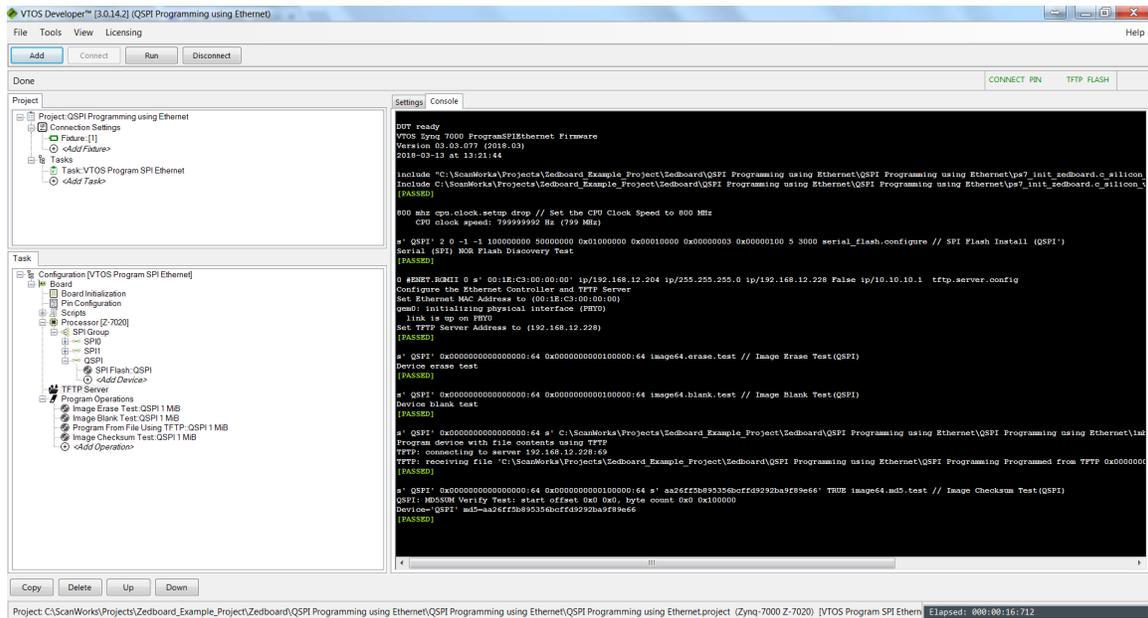
- Now configure the ipaddress of the UUT by entering the desired value in the field to the right of Target IP Address. The appropriate subnet mask will be calculated and entered automatically. Save the project.



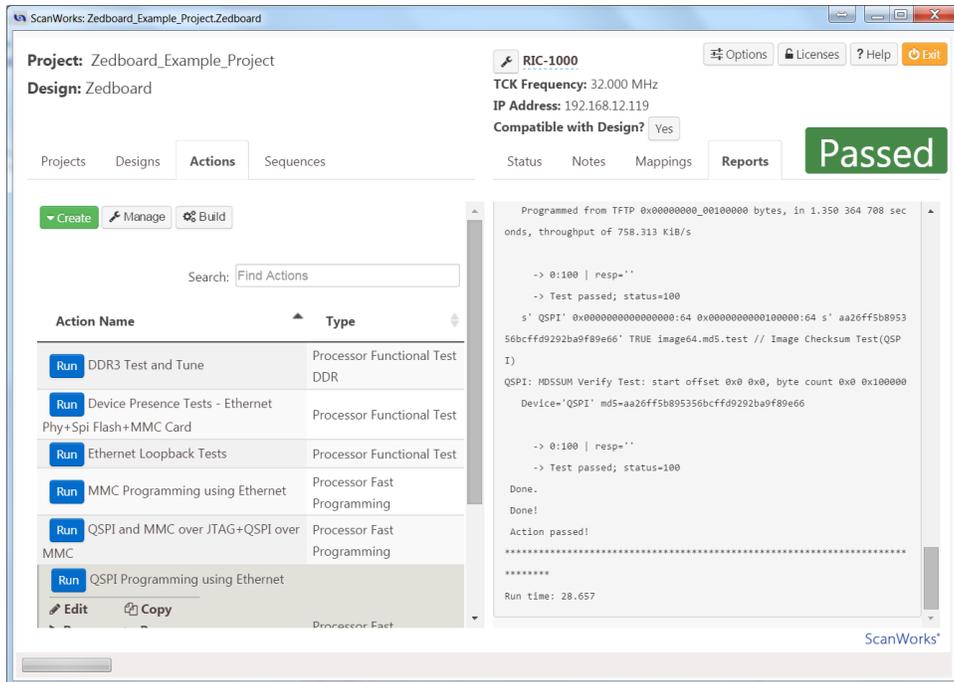
- Now that the TFTP Server is configured, The TFTP Server needs to be started. From the top menu bar of the Development interface, Use the Tools pulldown and select Tools-> Start TFTP Server. Note that the TFTP Server continues to run until it stopped via Tools->Stop TFTP Server or the computer is shut down. You can tell the TFTP Server is running when TFTP is shown in green in the upper right hand corner of the Development Interface.



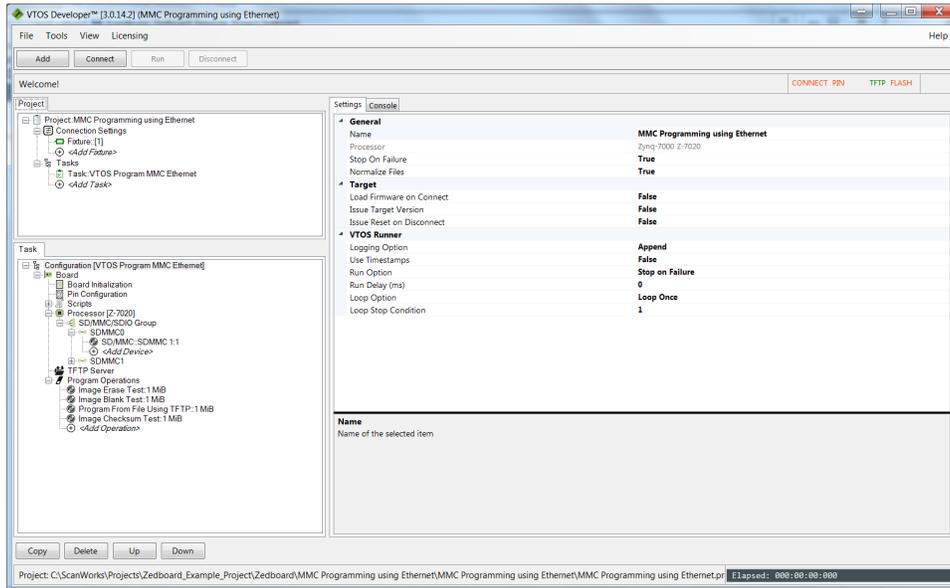
26. Click on Connect and then click on Run.



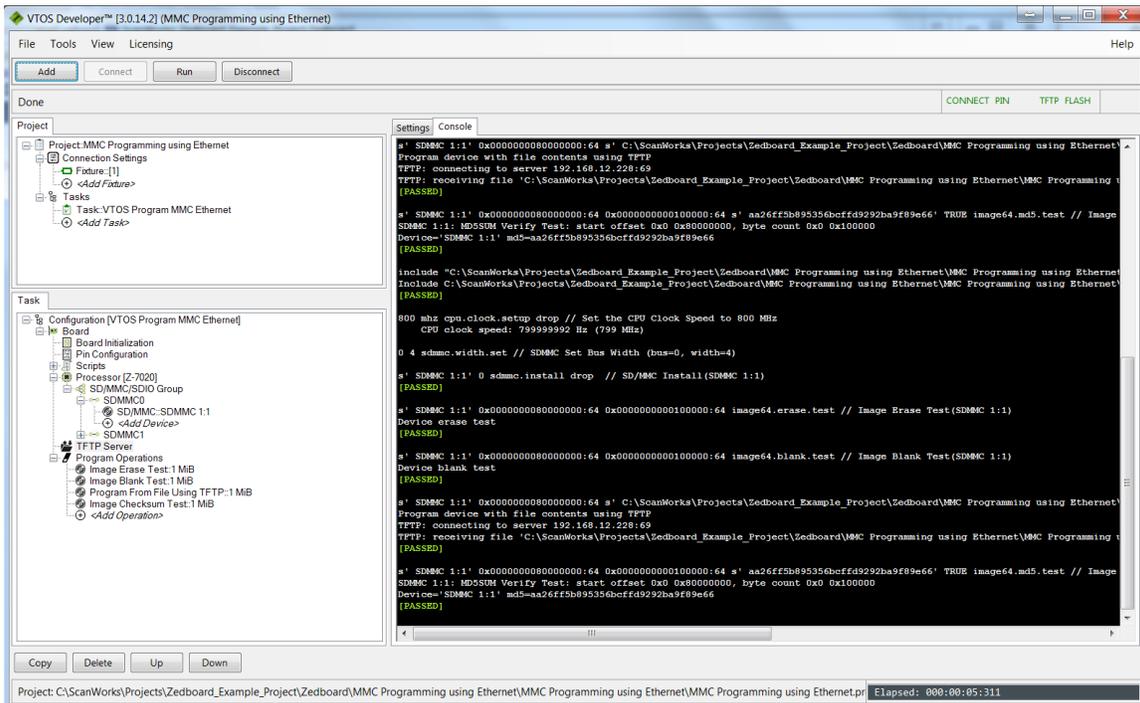
27. In the example above, the flash memory was programmed at a rate of 749 KiB/second. Close the Development interface, and click on the Run button to the left of QSPI Programming using Ethernet to run the action from ScanWorks.



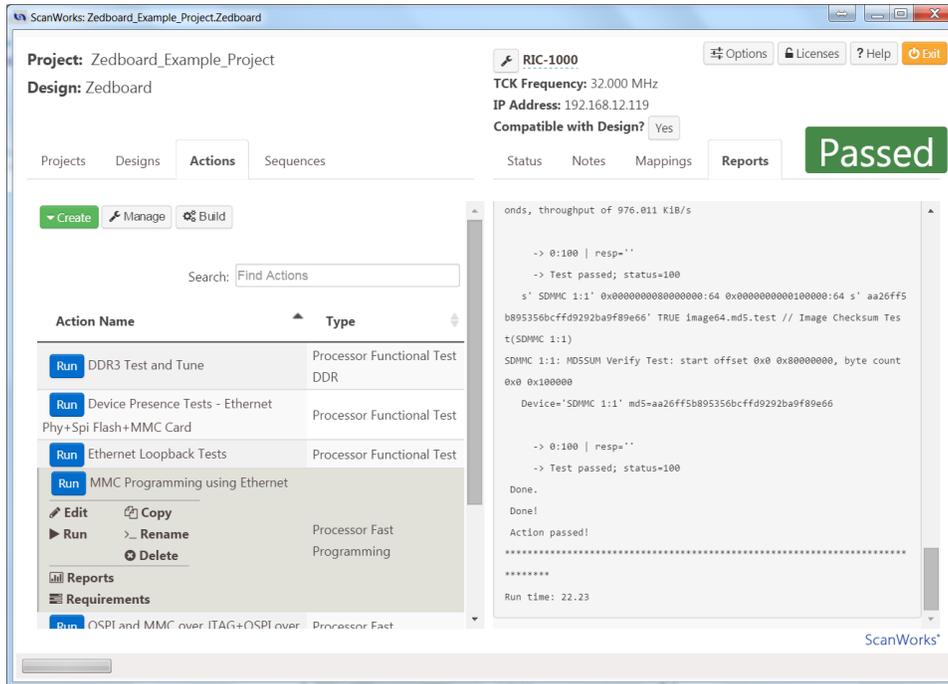
- Right click on the MMC Programming using Ethernet to open the Development interface for the MMC Programming action.



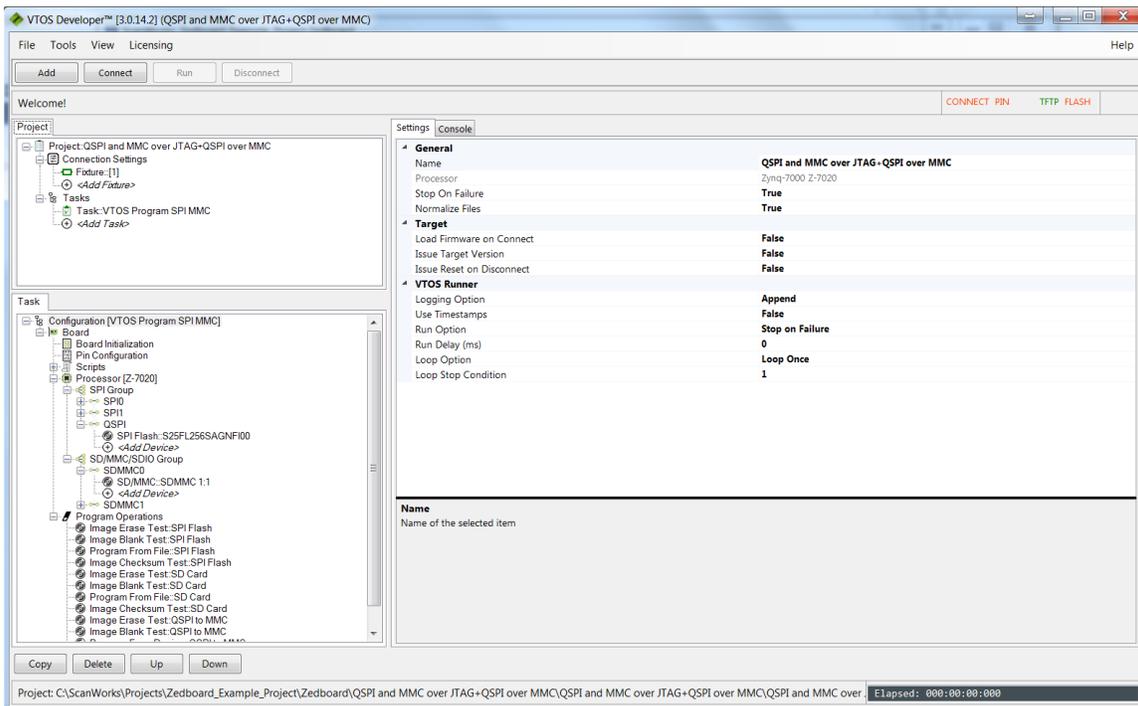
- This action tests for the presence of the SD/MMC card, erases a portion, performs a blank check on the portion, programs the SD/MMC card with a file using the ethernet as the data pipe, and runs a checksum on the portion programmed. Configure the TFTP ipaddresses as shown in the QSPI Programming using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



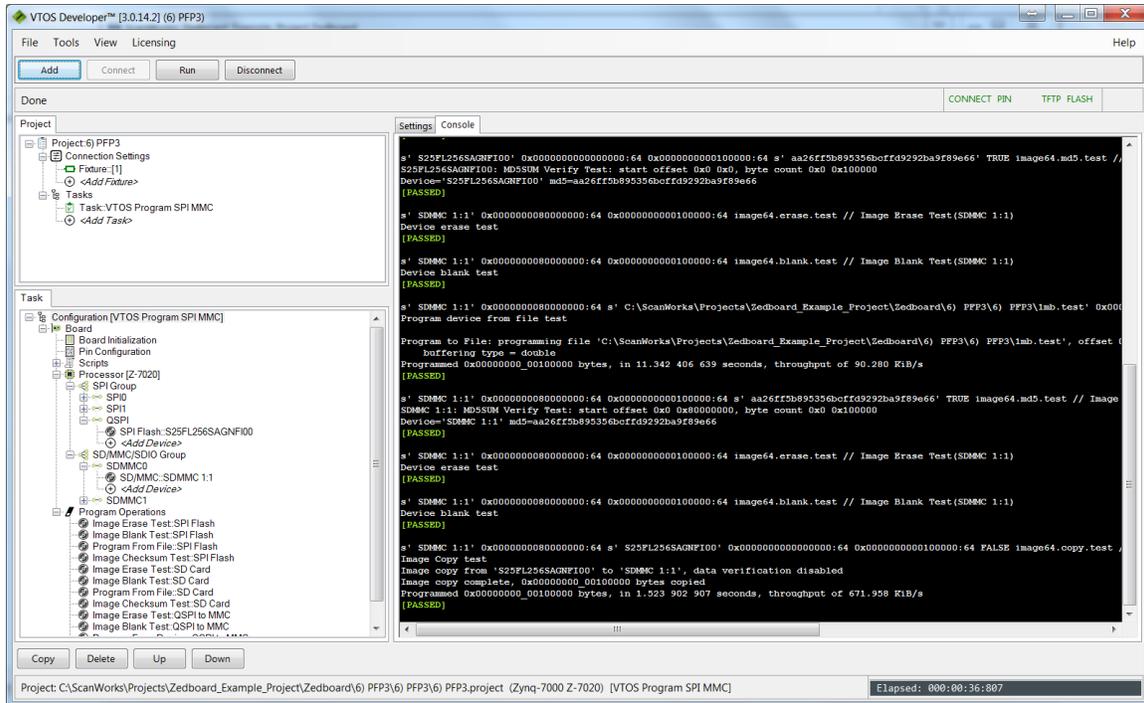
- Note that in the example above, the SD/MMC card was programmed at a rate of 1.03 MiB/second. Close the Development interface, and click on the Run button to the left of MMC Programming using Ethernet.



- Right click on the QSPI and MMC over JTAG+MMC over QSPI to open the Development interface for the programming action.



32. This action shows other capabilities of PFX. In this action, the Flash on the QSPI is tested for presence, the presence of the SD/MMC card is tested, the Flash is erased, a blank check is run on the flash, the flash is programmed over the JTAG port (useful if your UUT does not have an ethernet port) and the checksum test is run. The SD/MMC card is erased, blank checked, programmed via the JTAG port and the checksum is tested. After that is an example of programming the SD/MMC card using the flash on the QSPI port as the data source (device to device programming). Click on Connect and then Run.

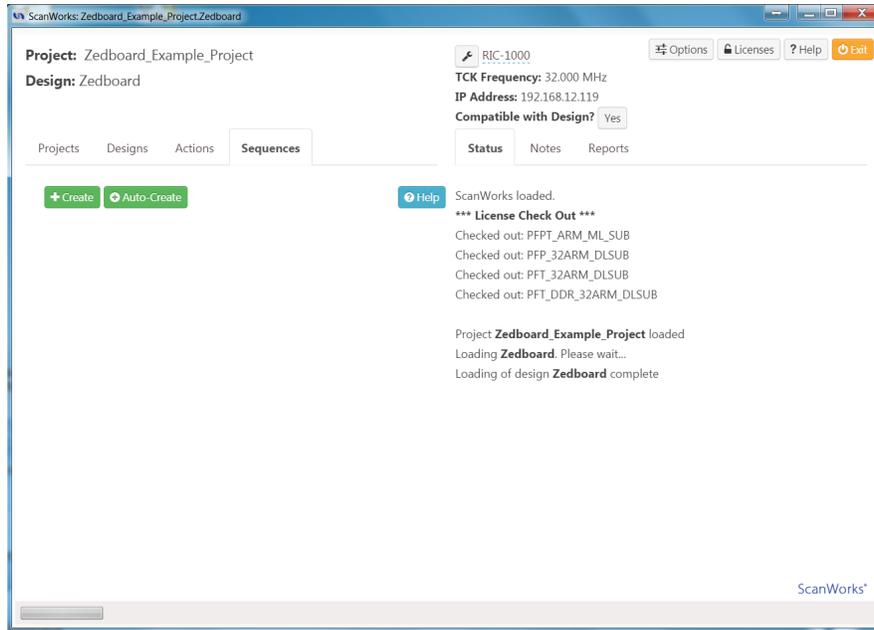


33. In the example above, the flash on the QSPI is programmed over JTAG at a rate of 81.1 KiB/second, the SD/MMC card is programmed over JTAG at a rate of 97.9 KiB/second, and the SD/MMC card is programmed from the Flash device on the QSPI at a rate of 1.44 MiB/second. Close the Development interface. This concludes the Development portion of the User's Guide.

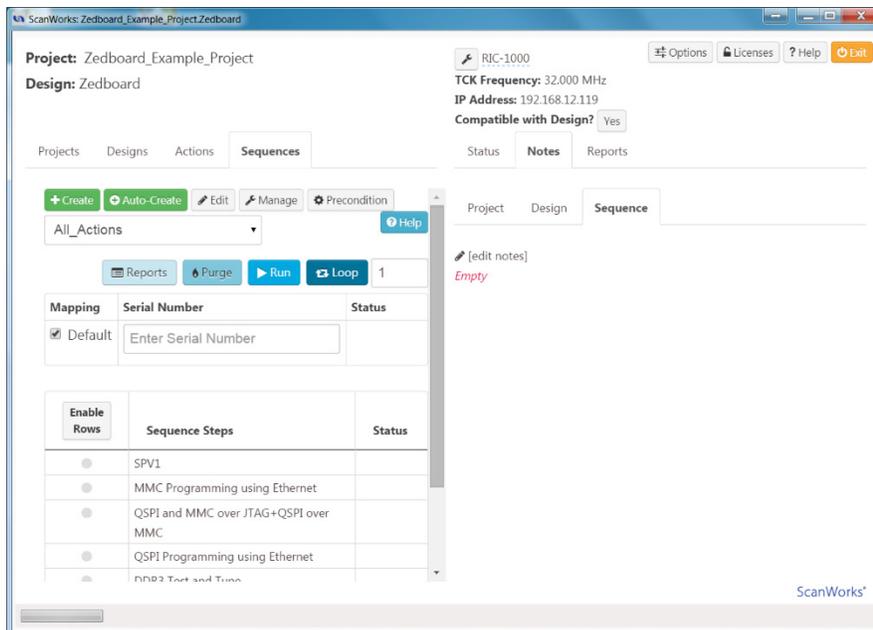
## Putting it all together – Manufacturing Mode

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:

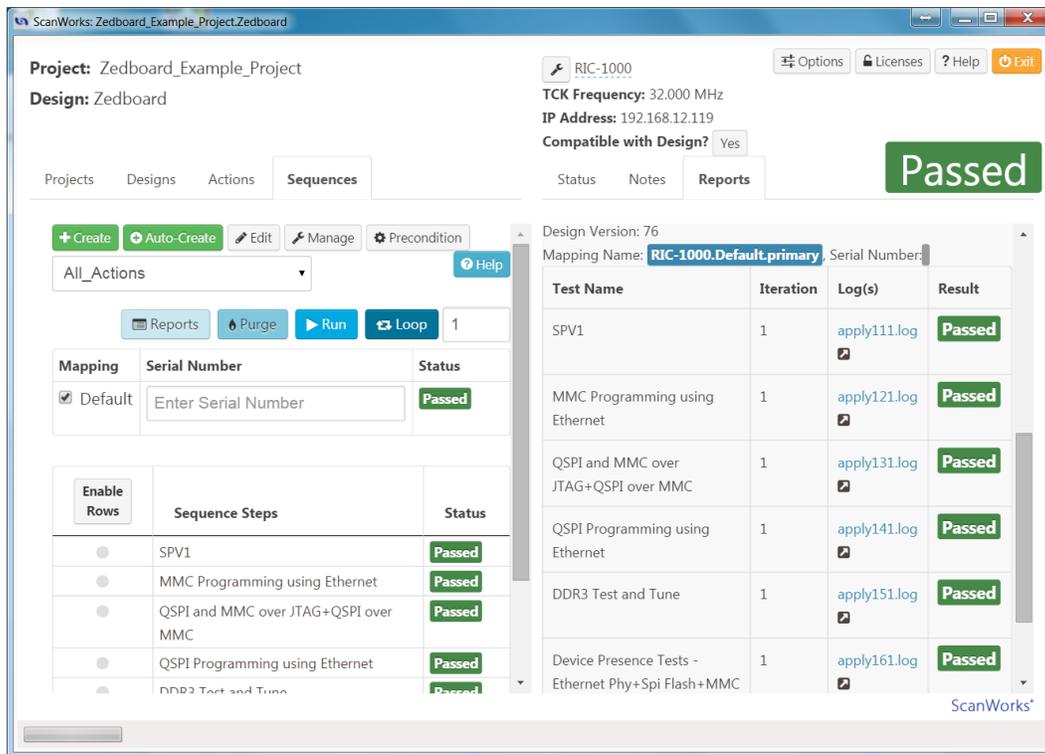
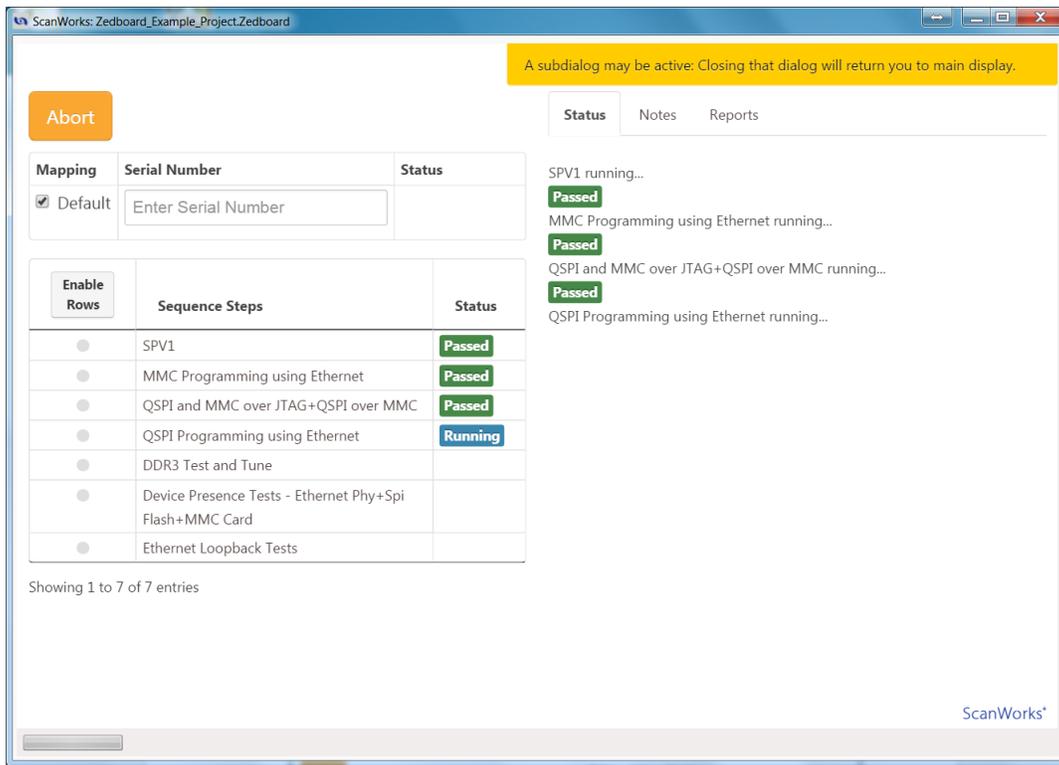
1. In ScanWorks, click on the Sequences tab.



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

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

[\*ScanWorks Processor-based Flash Programming \(PFP\) for ARM 32-bit Processors\*](#)

[\*ScanWorks Processor-based Functional Test \(PFT\) for ARM 32-bit Processors\*](#)

[\*ScanWorks Processor-based Functional Test DDR \(PDTDDR\) for ARM 32-bit Processors\*](#)

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