



BlueRiver platform

How-To:

BlueRiver Chipset Initial Programming

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Revision History

Version	Date	Revision
2.1	April 17, 2018	Modified reference to the BlueRiver Manager GUI, new version now available.
2.0	March 31, 2018	Migrate to the Semtech format and update to include changes appropriate for 3.5 release.
1.1	August 15, 2017	Updated screen shots in section 3.1.2 and modified step 12.
1.0	July 18, 2017	Merge previous application notes (an_0001 / an_0014 / an_0015) into single document. Updated with latest data and procedures.

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1 Purpose

This How-To guide outlines the procedures required to initially program a BlueRiver NT1000 or NT2000 chipset with either the Kintex7 160 or Aquantia- AQLX107 device vehicle after they have been placed onto a PCB but are currently in a maiden/blank state and never been programmed.

The target audience for this application note includes personnel that would manually be completing the initial update of BlueRiver transmitters or receivers, such as hardware designers, quality assurance and project engineers.

Note: This application note is aimed at completing this initial write during the development stage of the hardware or early production stage ~~在...之前~~ prior to mass production. Once the design is fully tested and ready for production it is likely the initial programming would be completed in bulk using an External Programmer.

2 Introduction

This How-To application note ~~帮助~~ assists the user with the step-by-step process of completing the initial programming of a BlueRiver chipset and its associated device vehicle.

Based on whether the initial programming of the BlueRiver chipset will be completed using the 10GbE or 1GbE device interface and whether the Kintex-7 160T or AQLX107 device vehicle has been implemented, this procedure outlines ~~交替~~ alternate methods available to complete the process.

Be sure to follow the appropriate procedure, as well as to apply the correct update file. If you are unsure of which update file is required, confirm with the Semtech AptoVision Products Group support team that you have the appropriate file.

For reference the table below outlines the BlueRiver chipset and device vehicle referencing the Semtech BlueRiver hardware reference design they are used in by default.

Table 1 BlueRiver chipset in relation to Reference Design

Reference Design	Chipset	Copper/Fiber	Device vehicle	Comment
Duchess	NT1000	Fiber	Kintex-7 160T	Minimalistic reference design for fiber. Lowest cost, smallest BOM.
Princess	NT1000	Copper	Aquantia AQLX107	Minimalistic reference design for copper. Lowest cost, smallest BOM.
Taizi	NT2000	Both	Aquantia AQLX107	Recommended reference design on which to base new projects.
Duke	NT2000	Both	Kintex-7 160T	Original reference design. Not recommended for new design projects.

Caution! If planning to use the 10GbE interface it is important to note that the programming needs to be completed via a 10GbE Switch.

Notes:

- i. Using an External Programmer during manufacturing to program the BlueRiver chipset prior to installing it on a PCB is not covered in this document. For this method contact the Semtech AptoVision Products Group support team to request a copy of all required compatible files (example .mcs) for the programmer, as well as a checksum for each file.
- ii. If there is no suitable network interface available on the hardware, an additional method is outlined in section 8 Initial Programming using JTAG Interface, that can be utilized for this scenario.
- iii. Using the JTAG interface is not the recommended process due to potentially long update times. In fact, this method introduces limitations on the version of files that can be used to write to the BlueRiver chipset and may not be supported by all hardware designs. Refer to section 8.1 JTAG Interface Limitations for details.

The following reference table outlines the section number and name to refer to when performing the steps required for this How-To document. The table also provides a link to the listed sections, click on the section title to automatically be taken to it.

Table 2 Enabling and Initializing procedure to use for 1GbE or 10GbE Interface

Device	Enable 1GbE Interface	Enable 10GbE Interface	Initial Programming via 1GbE Interface	Initial Programming via 10GbE Interface
Kintex-7 160T	4.1.1 Enable Kintex-7 1GbE	5.1.1 Enable Kintex-7 10GbE	6 Initial BlueRiver chipset configuration	6 Initial BlueRiver chipset configuration
AQLX107	4.1.2 Enable AQLX107 1GbE	5.1.2 Enable AQLX107 10GbE Interface	6 Initial BlueRiver chipset configuration	6 Initial BlueRiver chipset configuration

3 Required tools and files

3.1 Tools

There are some tools that are required to be obtained prior to beginning the update process, (Lab Tools, USB Configuration Cable and BlueRiver Manager (Demo Client)). Retrieving these items are outlined below.

3.1.1 ISE Design tools: Lab Tools

This initialization procedure requires ISE Design Tools to be installed on the computer that will be used to complete this procedure.

Only Lab Tools is required. Version 14.5 or higher may be used.

Download the required files and then follow Xilinx's installation instructions.

Below is link to the necessary installation files:

<http://www.xilinx.com/support/download/index.html/content/xilinx/en/downloadNav/design-tools.html>

3.1.2 Xilinx USB Configuration Cable

A Xilinx USB Configuration Cable is required to execute the update procedures outlined in this document.

The Xilinx Cable USB II has been validated:

<http://www.xilinx.com/products/boards-and-kits/hw-usb-ii-g.html>

3.1.3 BlueRiver Manager (Demo Client) software

In addition, the BlueRiver Manager (Demo Client) software v2.30 or higher is needed to program the firmware for the first time using the .apz file.

Contact Semtech AptoVision Products Group support to obtain this software if you do not presently have a copy.

Note: After initial programming, the BlueRiver Manager (Demo Client) is used to update BlueRiver device firmware (.apz).

3.2 Files

To complete the update procedure, the following files are required, they are included in the .apz update file provided by Semtech.

The actual files applied is dependant on whether the 1GbE or 10GbE interface is used to complete the initial programming of the BlueRiver chipset. Required files can be obtained from the Semtech AptoVision Products Group support team.

Required files include:

- .apz: File required to complete the manual initial programming or update firmware of a BlueRiver chipset.
- .bit: Used with the Xilinx **Impact** tool to enable the 1GbE interface.
- _config.mcs: Used with the Xilinx **Impact** tool to enable the 10GbE interface. This file is only required if 10GbE interface is being used to complete the initial update of the BlueRiver chipset.
- .mcs: Used during the manufacturing production process to program the BlueRiver chipset and vehicle device for the first time. Is not used when manually programming a unprogrammed BlueRiver chipset.

4 Enabling the BlueRiver 1GbE Interface

The procedure outlined below, uses the BlueRiver device 1GbE interface to program the BlueRiver chipset for the first/initial programming. Since the BlueRiver chipset is in a virgin state (never been programmed), the Network interfaces are not active on power up.

Notes:

- i. BlueRiver hardware reference designs include either the Aquantia AQLX107 or the Kintex-7 160T device vehicle. Be sure to refer to the correct sub-section for the appropriate procedure to be completed.
- ii. A 1GbE interface is included only in the BlueRiver NT2000 hardware reference design documentation.
- iii. Although not included by default in the BlueRiver NT1000 hardware reference designs it is possible for a hardware designer to have added a 1GbE interface to their design.

Since the Ethernet interface is not configured up on a virgin BlueRiver chipset, it is required to first enable the chipset's 1GbE interface. This is completed via the JTAG interface. Once enabled the 1GbE interface can be used to complete the BlueRiver chipset initial programming configuration.

Reminder: This document refers to manually initializing a single virgin BlueRiver chipset and is not likely the procedure that would be used during manufacturing processes. An automated process has likely been adapted by BlueRiver clients for programming bulk virgin chipsets.

Notes:

- i. Completing the initial programming of a BlueRiver chipset using the JTAG interface is potentially time consuming.
- ii. It is therefore recommended, after the network interface is enabled, to complete the initial BlueRiver chipset programming via the either the 1GbE or 10GbE interface and not with the JTAG interface. Refer to section 8 Initial Programming using JTAG Interface for further details and limitations.
- iii. The procedure outlined here is for the initial programming of a BlueRiver chipset. For details on updating a device after the initial programming has been completed, refer to section 7 Updating the BlueRiver chipset after Initial Programming later in this document.

4.1 Enabling the 1GbE Interface

4.1.1 Enable Kintex-7 1GbE Interface

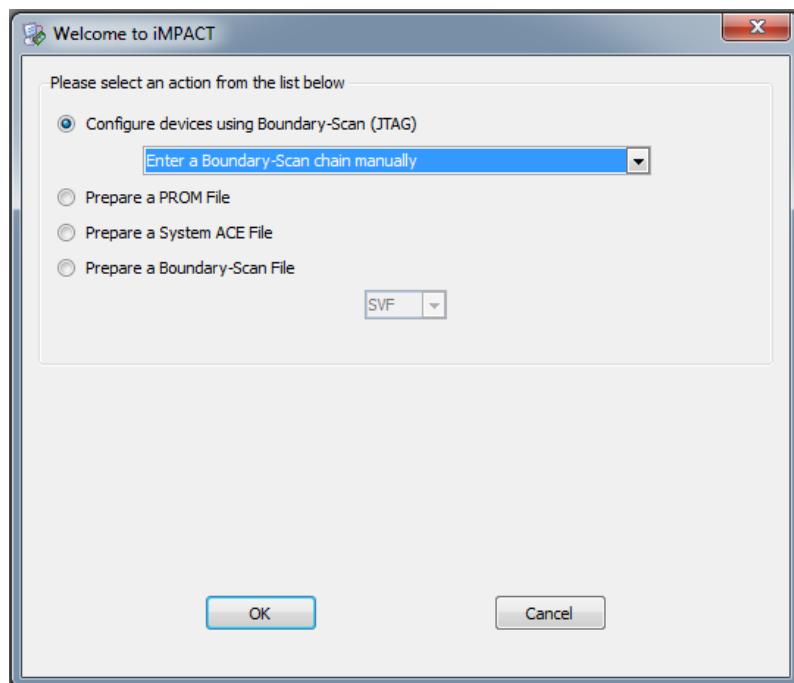
This is the procedure to use to enable/program the 1GbE interface on the BlueRiver Duke hardware reference design, which uses the Kintex-7 160T device. Applies also to the Duchess design if a 1GbE interface is present.

Prior to being able to program the BlueRiver chipset itself using the 1GbE interface, it is necessary to first enable the BlueRiver network interface.

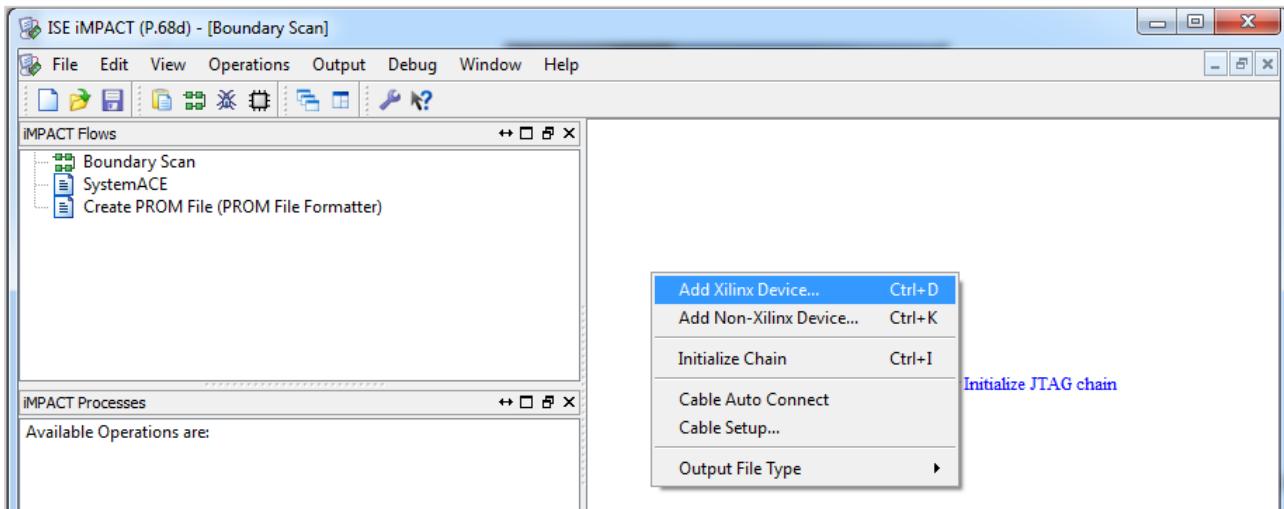
Note: This step only enables the BlueRiver network interface. There is no other BlueRiver functionality enabled until the chipset is fully programmed (section 6).

This task is completed using the Xilinx Impact tool.

1. Connect the Xilinx Configuration Cable.
2. The required driver will automatically install. Wait for this installation to complete.
3. Connect JTAG header to JTAG connector on the PCB board itself.
Comment: Depending on the PCB implementation, JTAG connector can take many forms.
4. Power-up the BlueRiver device that is using the Kintex-7 160T device vehicle.
5. Confirm that the Xilinx cable successfully connected. Indicator will become green.
6. Open Xilinx Impact tool.
 - a. A pop-up appears, asking you if you want to Create a New Project.
 - b. Select Yes.
7. The Welcome to IMPACT window appears.
8. Select the JTAG option as outlined below:
 - a. If not currently selected, select Configure devices using Boundary Scan (JTAG) radio button.
 - b. Then select Enter a Boundary-Scan chain manually from drop down list.
 - c. Click OK.



9. The ISE iMPACT (Boundary Scan) window loads.
10. In the ISE Impact Boundary Scan window, right click select Add Xilinx Device...



11. In the window that opens, browse and select the appropriate ".bit" file and then click Open.

Default naming format of file is: blueriver_xx_yyyy_zzzz.bit

- Replace **xx** with TX or RX to specify if device is an Encoder (TX) or Receiver (RX).
- **yyyy** is replaced by the BlueRiver platform. i.e. fiber or copper and version if appropriate.
- **zzzz** by the vehicle device type, Aquantia AQLX107 or Kintex-7 160T.

Example, if you are configuring:

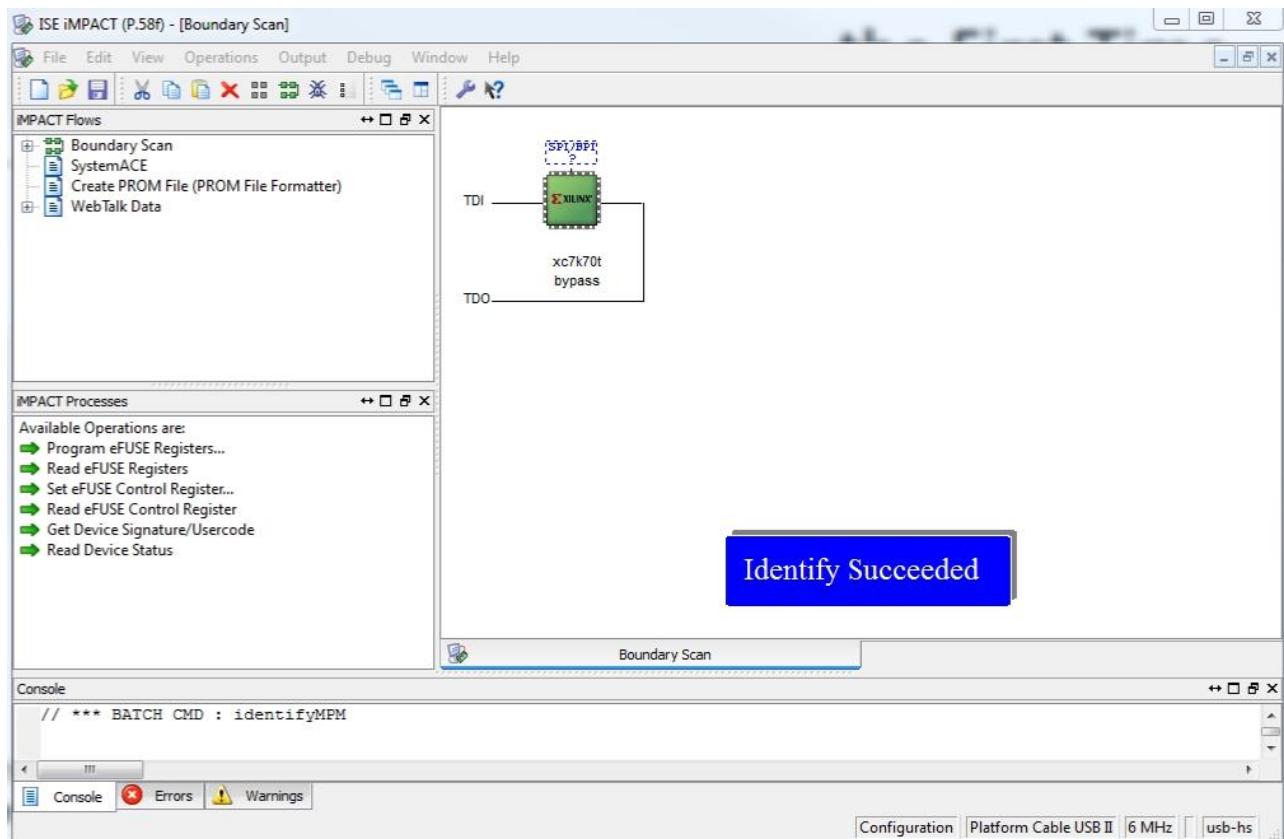
- RX device
- Running on fiber ver2 platform.
- Using chipset XC7K160T.

You would select the file named:

blueriver_rx_fiber_ver2_xc7k160tfg484_2.bit

12. If the cable is correctly connected and the BlueRiver device is connected, the BlueRiver chipset is detected automatically by Impact.

TIP: If BlueRiver chipset is not detected verify the cable connection.



13. When asked to attach an SPI flash, click No.
14. Right click on the component and from the menu that appears select Program.
15. Wait for the progress bar to indicate the write has completed.
16. The BlueRiver chipset 1GbE network interface is now enabled.

Important! This is a volatile configuration and if power is removed or recycled the configuration is lost.

17. Proceed to program the BlueRiver chipset. Refer to section 6 Initial BlueRiver chipset configuration for details on completing this procedure.

4.1.2 Enable AQLX107 1GbE Interface

This is procedure to use to enable/program the 1GbE interface on the Prince hardware design, which uses the Aquantia AQLX107 device. Applies also to the Princess design if a 1GbE interface was added to hardware design.

Prior to being able to program the BlueRiver chipset using the 1GbE interface, it is necessary to first enable the network interface.

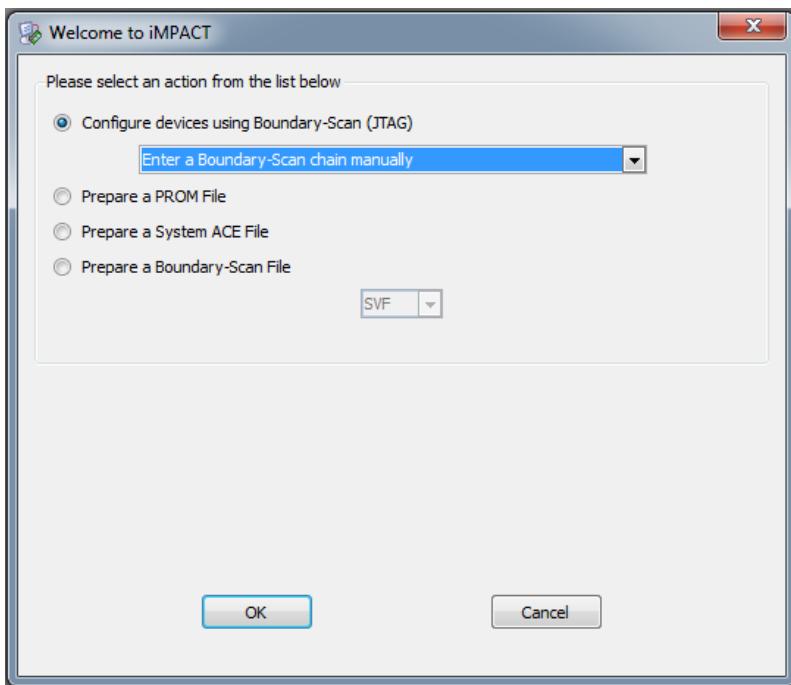
Note: This step only enables the BlueRiver network interface. There is no other BlueRiver functionality enabled until the chipset is fully programmed (next section).

This task is completed using the Xilinx Impact tool.

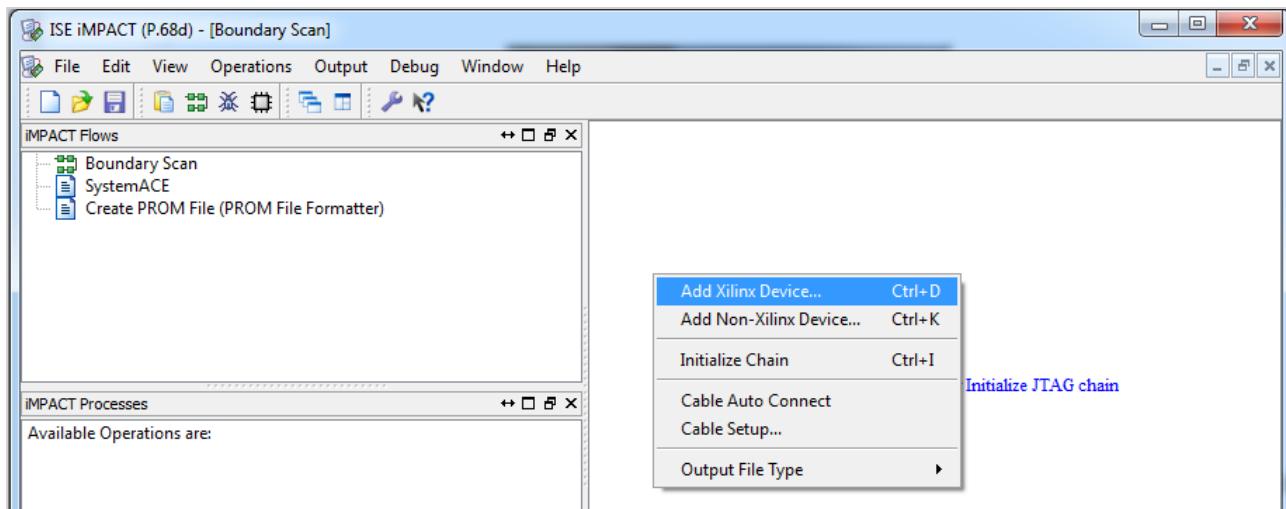
1. Connect the Xilinx Configuration Cable.
2. The required driver will automatically install. Wait for this installation to complete.
3. Connect JTAG header to JTAG connector on the PCB board itself.

Comment: Depending on the PCB implementation, JTAG connector can take many forms.

4. Power-up the BlueRiver device that is using the Aquantia AQLX107 device vehicle.
5. Open Xilinx Impact tool.
 - a. A pop-up appears, asking you if you want to Create a New Project.
 - b. Select Yes.
6. The Welcome to IMPACT window appears.



7. In the Welcome window, select the JTAG option as outlined below:
 - a. If not currently selected, select the Configure devices using Boundary Scan (JTAG) radio button.
 - b. Then select Enter a Boundary-Scan chain manually from drop down list.
 - c. Click OK.
8. The Impact Boundary Scan window loads.
9. In the Impact Boundary Scan window, right click and select Add Xilinx Device...



10. Select appropriate ".bit" file and then click Open.

Default naming format of file is: blueriver_xx_yyyy_zzzz.bit

- Replace xx with TX or RX to specify if device is an Encoder (TX) or Receiver (RX).
- yyyy is replaced by the BlueRiver platform, fiber or copper and version if appropriate.
- zzzz by the vehicle device type, Aquantia AQLX107 or Kintex-7 160T.

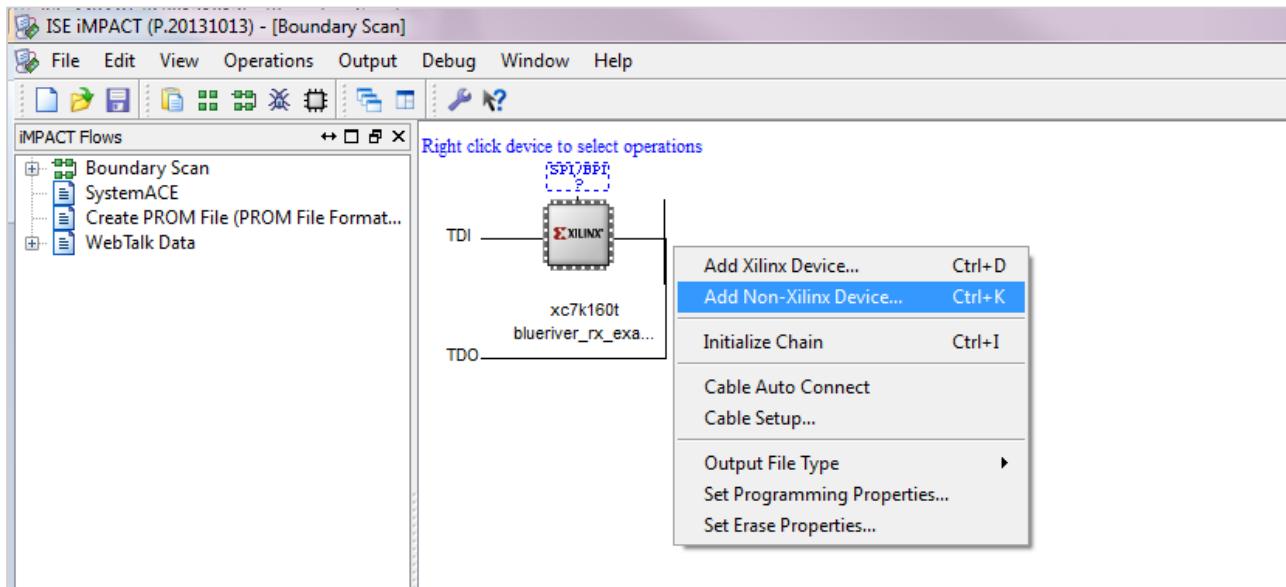
Example, if you are configuring:

- RX device
- Running on fiber ver2 platform
- Using chipset aqlx107

You would select the file named:

blueriver_rx_fiber_ver2_aqlx107_2.bit

11. In the ISE Impact Boundary Scan window, right click on the SPI/BPI box and select Add Non-Xilinx Device...

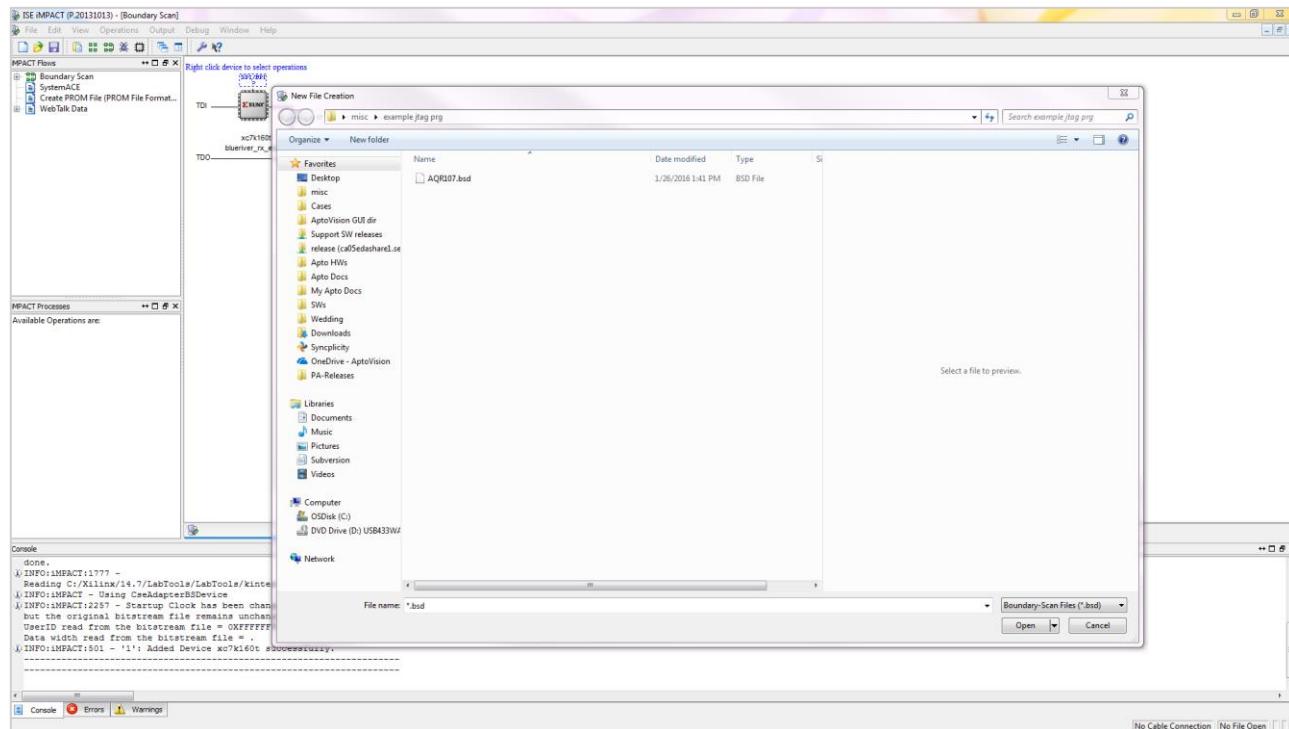


12. The BSDL Query popup will appear, click Yes.



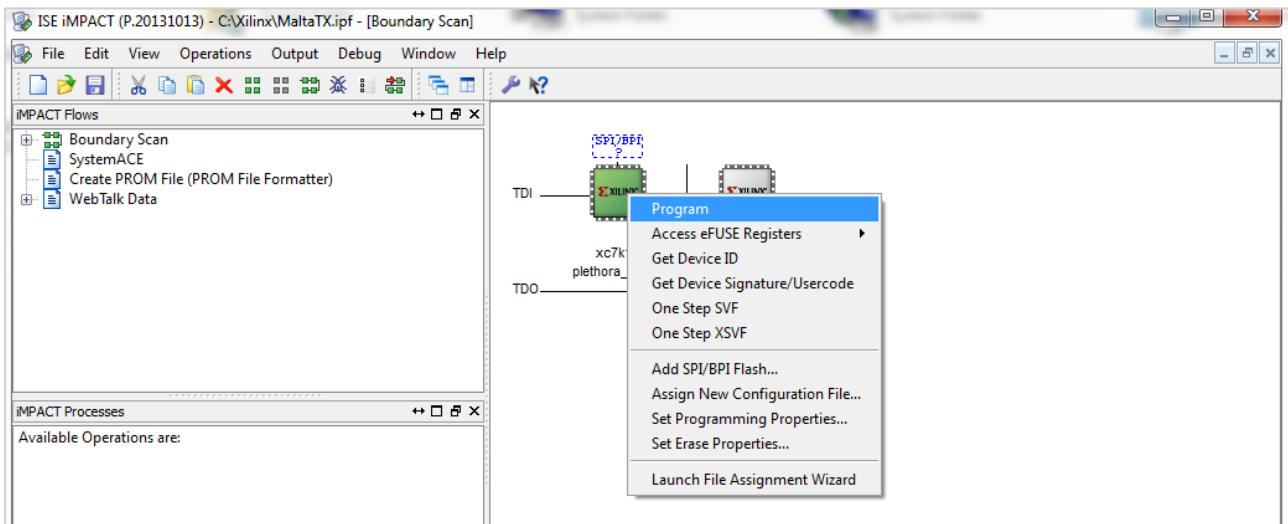
13. A new pop-up appears, it is labeled New File Creation.

14. Browse to locate the AQR107.bsd file and then click Open.



15. Once the device is created an icon will appear represent the aq107.

16. Right click on the XILINX box and select Program....



17. Xilinx Impact shows a progress bar, once done will show complete status.

18. The BlueRiver chipset 1GbE network interface is now enabled.

Important! This is a volatile configuration and if power is removed or recycled the configuration is lost.

Note: It is possible to save the Impact project and reuse it for other boards of the same type (TX / RX) by repeating step 11 and 15.

19. Proceed to program the BlueRiver chipset. Refer to section 6 Initial BlueRiver chipset configuration for details on completing this procedure.

5 Enabling the BlueRiver 10GbE interface

The procedures outlined below, uses the BlueRiver device 10GbE interface to program the BlueRiver chipset for the first/initial time. Since the BlueRiver chipset is in a virgin state (never been programmed) the 10GbE interface is not active on power up.

Notes:

- i. BlueRiver hardware reference designs include either the Aquantia AQLX107 or the Kintex-7 160T device vehicle. Be sure to refer to the correct sub-section for the appropriate procedure to be completed.
- ii. Completing the initial programming of a BlueRiver chipset using the JTAG interface is potentially time consuming.
- iii. It is therefore recommended, after the network is enabled, to complete the initial BlueRiver chipset programming via the either the 1GbE or 10GbE interface and not with the JTAG interface. Refer to section 8 Initial Programming using JTAG Interface for further details and limitations.

The procedure outlined here is for the initial programming of a BlueRiver chipset. For details on updating a device after the initial programming has been completed, refer to section 7 Updating the BlueRiver chipset after Initial Programming later in this document.

Since the Ethernet interface is not active on a virgin BlueRiver chipset, it is required to first enable the network interface of the BlueRiver chipset. This is completed via the JTAG interface. Once enabled the 10GbE interface can then be used to complete the BlueRiver chipset initial programming configuration.

5.1 Enabling the 10GbE Interface

5.1.1 Enable Kintex-7 10GbE Interface

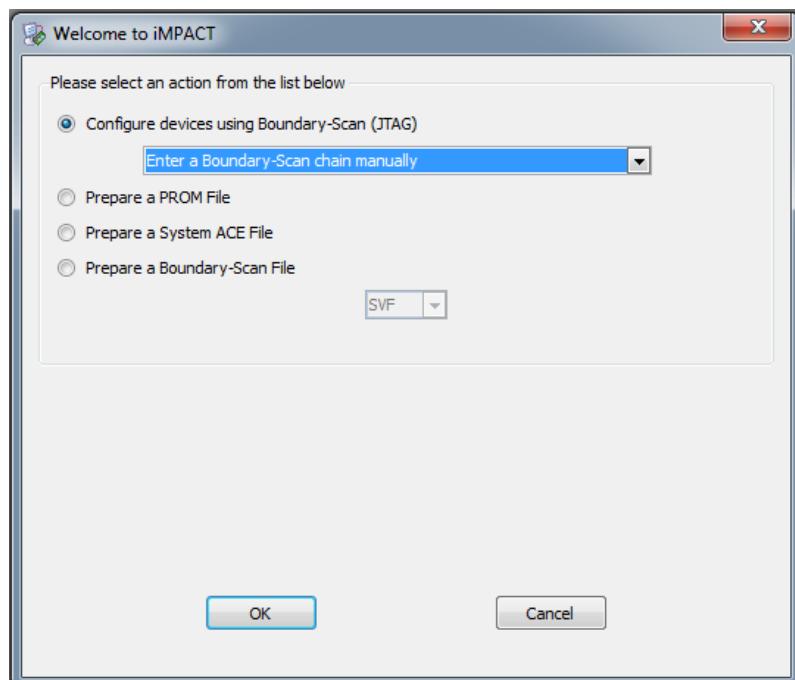
The following procedure is used to enable/program the 10GbE interface on the BlueRiver Duchess and Duke designs, which use the Kintex-7 160T device.

Prior to being able to program the BlueRiver chipset using the 10GbE interface, it is necessary to first enable the BlueRiver network interface.

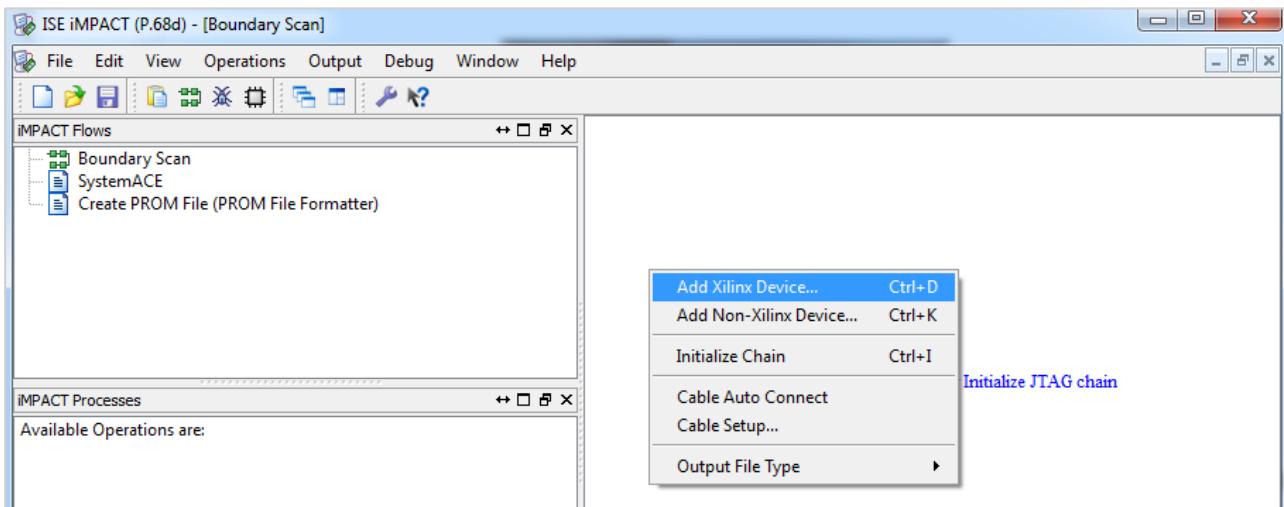
Note: This step only enables the BlueRiver network interface. There is no other BlueRiver functionality enabled until the chipset is fully programmed (next section).

This task is completed using the Xilinx Impact tool.

1. Connect the Xilinx Configuration Cable.
2. The required driver should automatically install. Wait for this installation to complete.
3. Connect JTAG header to JTAG connector on the PCB board itself.
Comment: Depending on the PCB implementation, JTAG connector can take many forms.
4. Power-up the BlueRiver device that is using the Kintex-7 160T device vehicle.
5. Open Xilinx Impact tool.
 - a. A pop-up appears, asking you if you want to Create a New Project.
 - b. Select Yes.
6. The Welcome to IMPACT window appears.
7. Select the JTAG option as outlined below:
 - a. Select Configure devices using Boundary Scan (JTAG) check box.
 - b. Confirm Enter a Boundary Scan chain manually is selected from drop down list.
 - c. Click OK.



8. In the ISE Boundary Scan window, right click and select Add Xilinx Device...



9. Select the appropriate .bit file and then click Open.

Default naming format for file is: blueriver_xx_YYYY_zzzz_multi.bit

- Replace **xx** is by TX or RX to specify if device is an Encoder (TX) or Receiver (RX).
- **yyyy** is replaced by the BlueRiver platform, fiber or copper and version if appropriate.
- **zzzz** by the vehicle device type, Aquantia AQLX107 or Kintex-7 160T.

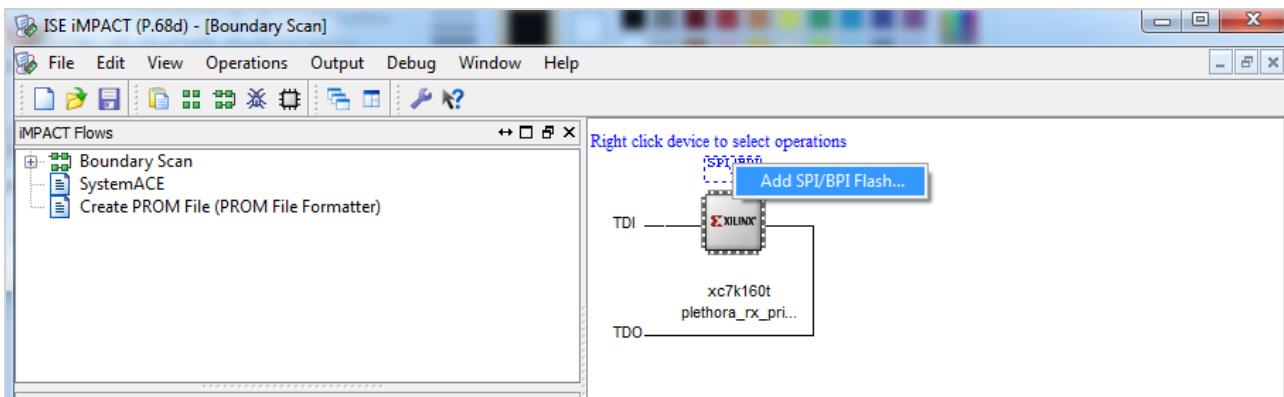
Example, if you are configuring:

- RX device
- Running on fiber ver2 platform
- Using chipset XC7K160T

You would select the file named:

blueriver_rx_fiber_ver2_XC7K160TFBG484_2.bit

10. In the ISE Impact Boundary Scan window, right click on the SPI/BPI box and select Add SPI/BPI flash....



11. Select the appropriate _config.mcs file and click Open.

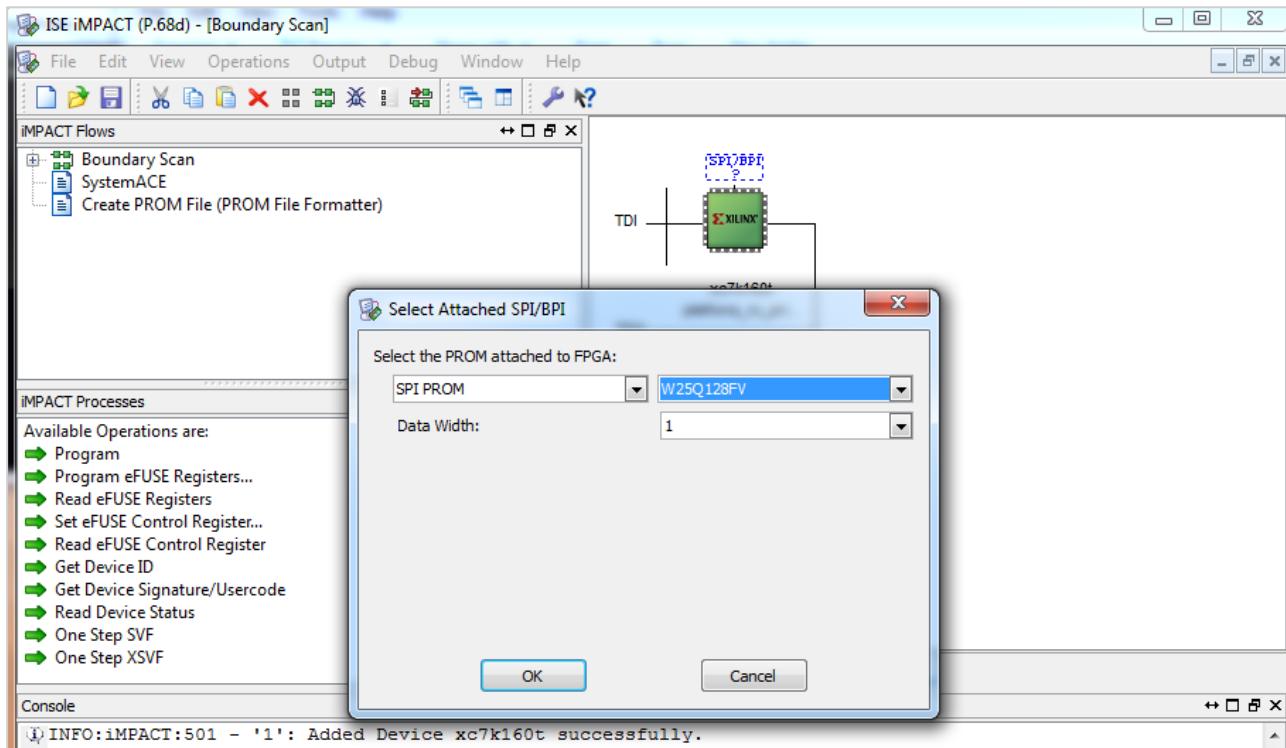
Example: blueriver_xx_YYYY_zzzz_config.mcs

As with previous step:

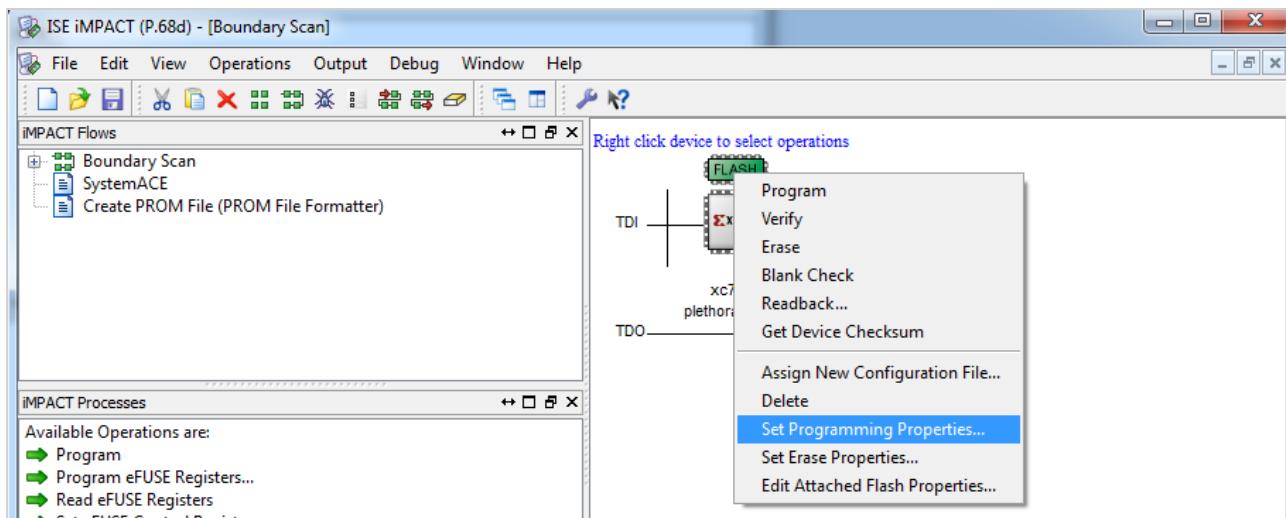
- Replace **xx** is by TX or RX to specify if device is an Encoder (TX) or Receiver (RX).
- **yyyy** is replaced by the BlueRiver platform, fiber or copper and version if appropriate.
- **zzzz** by the vehicle device type, Aquantia AQLX107 or Kintex-7 160T.

12. The Select Attached SPI/BPI window loads.

13. Choose the options SPI PROM and W25Q128FV as shown in figure below and then click OK.

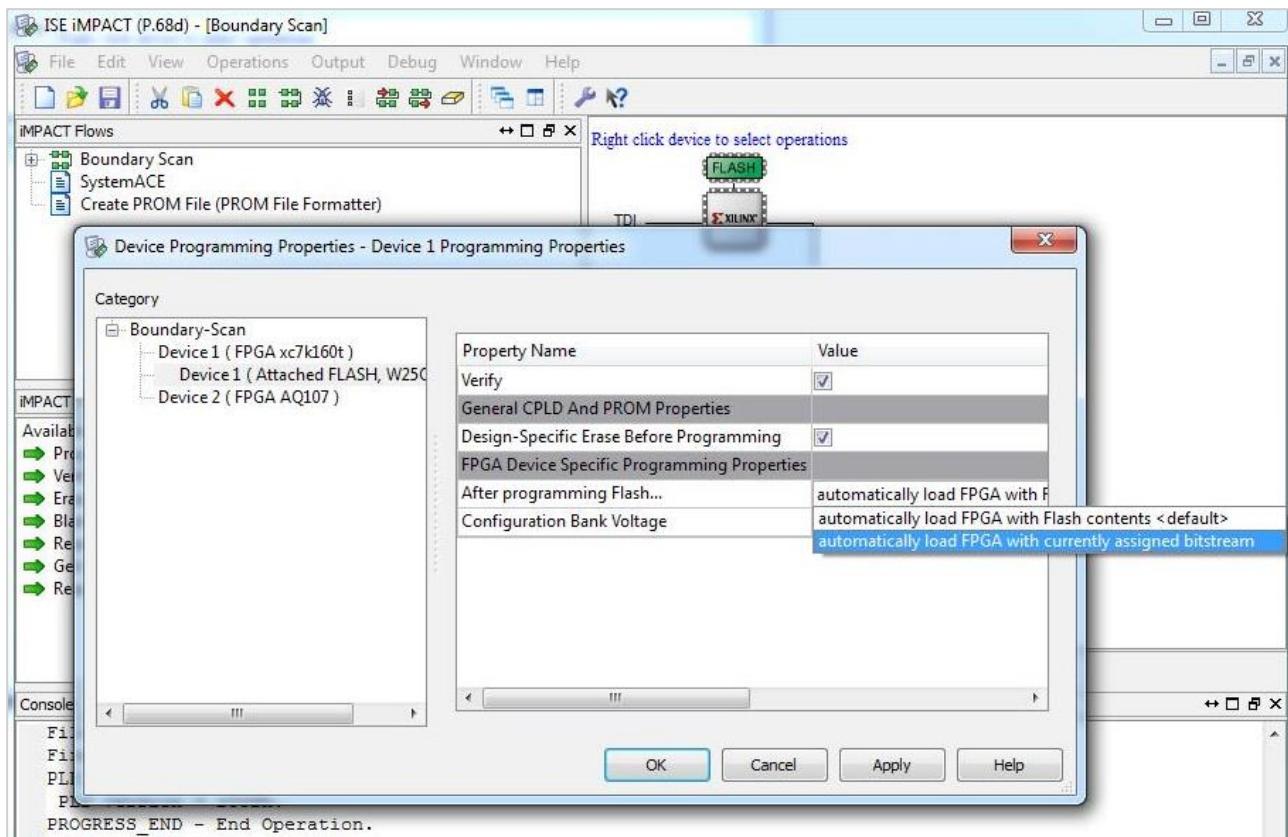


14. In the Impact Boundary Scan window, right click on the FLASH box and select the Set Programming Properties... option.

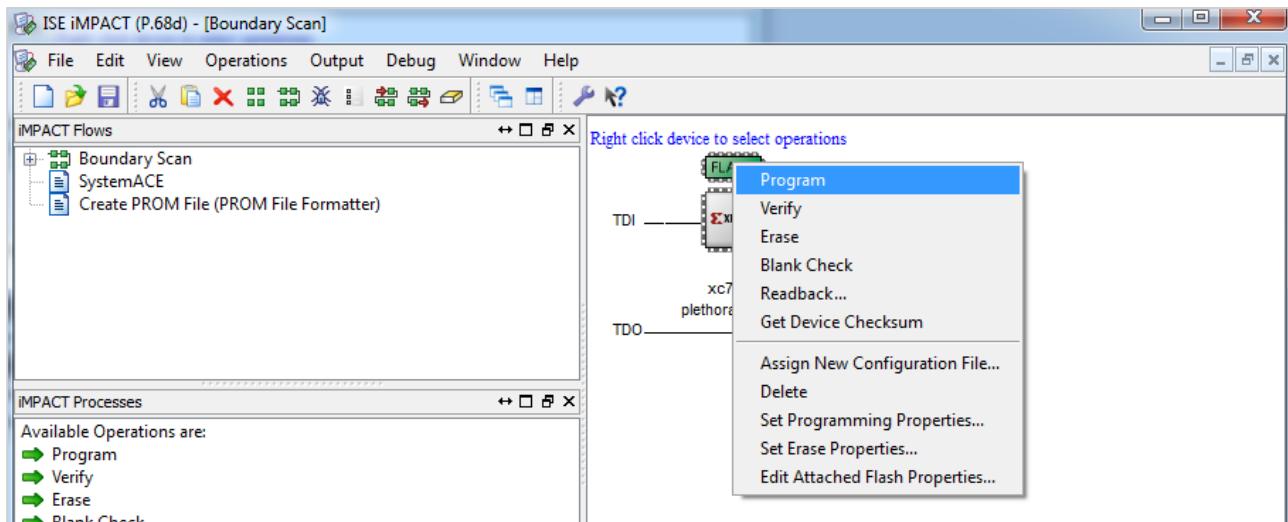


15. Then in the Device Programming Properties window, beside the After programming Flash... chose the option automatically load FPGA with currently assigned bitstream.

16. Next click OK.

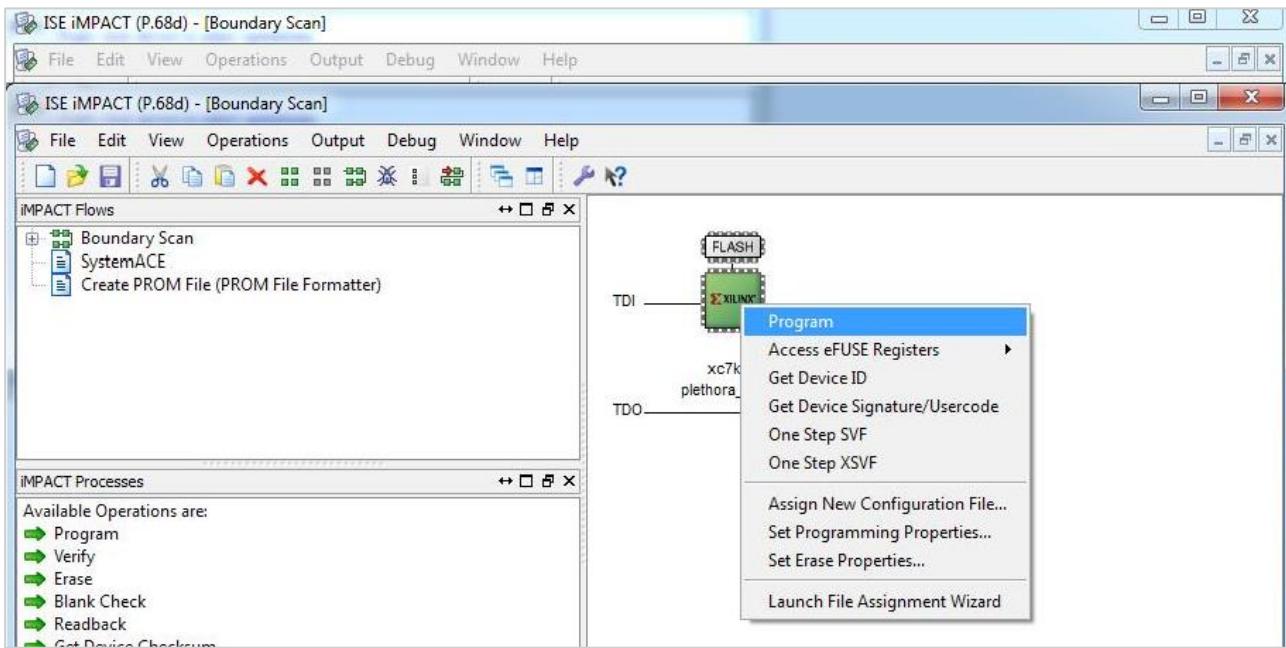


17. In the Impact Boundary Scan window, right click on the FLASH box and from the menu that loads select Program.



18. Wait for the progress bar to indicate the write has completed.

19. Once completed, click on the Xilinx box, right mouse click and select Program...



20. A progress bar appears, one done it will indicate programming complete.

21. The BlueRiver chipset 10GbE network interface is now enabled.

Important! The .bit file is a *volatile* configuration and if power is removed or recycled the .bit file will need to be reapplied. The _config.mcs is non-volatile so not required to be repeated. Also, note that this step is only useful to enable the network interface. There is no other BlueRiver functionality enabled until the BlueRiver chipset is fully programmed (section 6 Initial BlueRiver chipset configuration).

22. Proceed to program the BlueRiver chipset. Refer to section 6 Initial BlueRiver chipset configuration for details on completing this procedure.

Comment: You can save the Impact project and reuse it for other boards of the same type (TX / RX) by repeating steps 17 through 19.

5.1.2 Enable AQLX107 10GbE Interface

The following procedure is used to enable/program the 10GbE interface on the BlueRiver Taizi, Prince and Princess hardware designs, which use the Aquantia AQLX107 device.

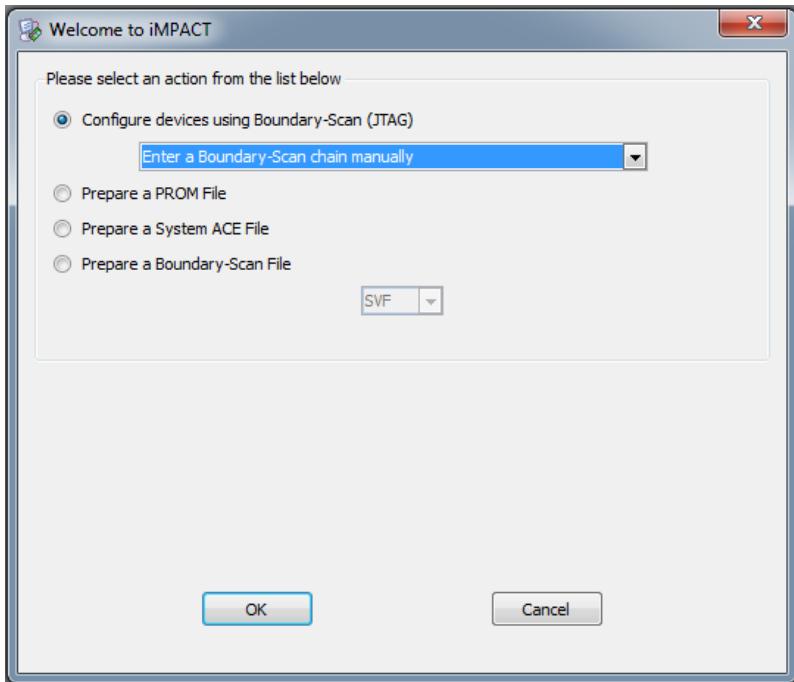
Prior to being able to program the BlueRiver chipset using the 10GbE interface, it is necessary to first enable the BlueRiver network interface.

Note: This step only enables the BlueRiver network interface. There is no other BlueRiver functionality enabled until the chipset is fully programmed (next section).

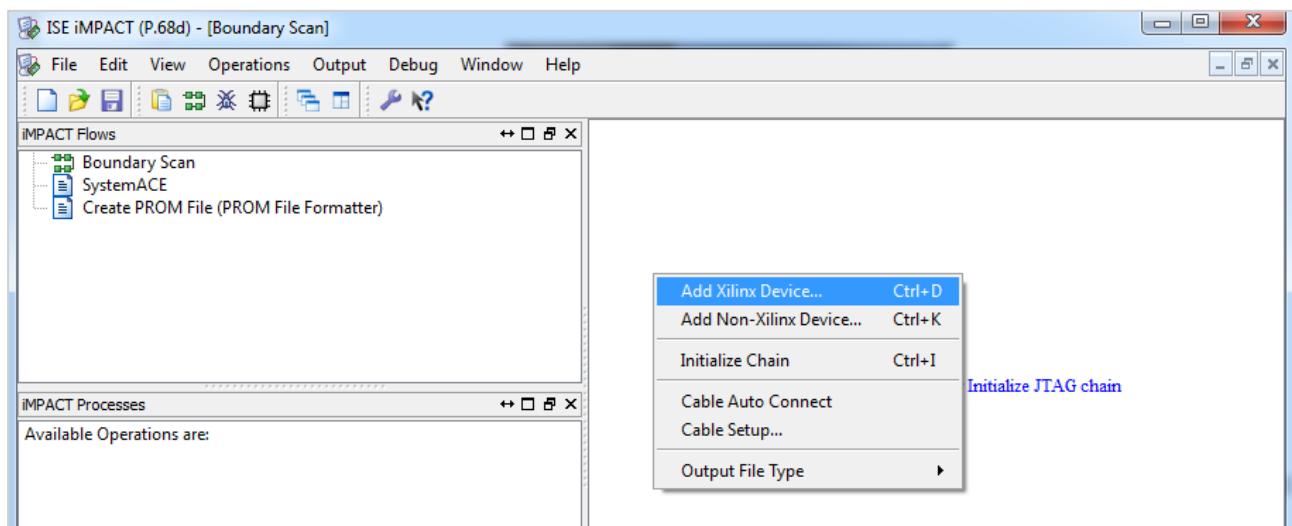
This task is completed using the Xilinx Impact tool.

1. Connect the Xilinx Configuration Cable.
2. The required driver should automatically install. Wait for this installation to complete.
3. Connect JTAG header to JTAG connector on the PCB board itself.
Comment: Depending on the PCB implementation, JTAG connector can take many forms.
4. Power-up the BlueRiver device that is using the Aquantia AQLX107 device vehicle.

5. Open Xilinx Impact tool.
 - a. A pop-up appears, asking you if you want to Create a New Project.
 - b. Select Yes.
6. The Welcome to IMPACT window appears.
7. Select the JTAG option as outlined below:
 - a. Select Configure devices using Boundary Scan (JTAG) check box.
 - b. Confirm Enter a Boundary Scan chain manually is selected from drop down list.
 - c. Click OK.



8. In the Impact Boundary Scan window, right click and select Add Xilinx Device...



9. Select the appropriate .bit file and then click Open.

Default naming format of file is: blueriver_xx_yyyy_zzzz_multi.bit

- Replace xx with TX or RX to specify if device is an Encoder (TX) or Receiver (RX).
- yyyy is replaced by the BlueRiver platform, fiber or copper and version if appropriate.
- zzzz by the vehicle device type, Aquantia AQLX107 or Kintex-7 160T.

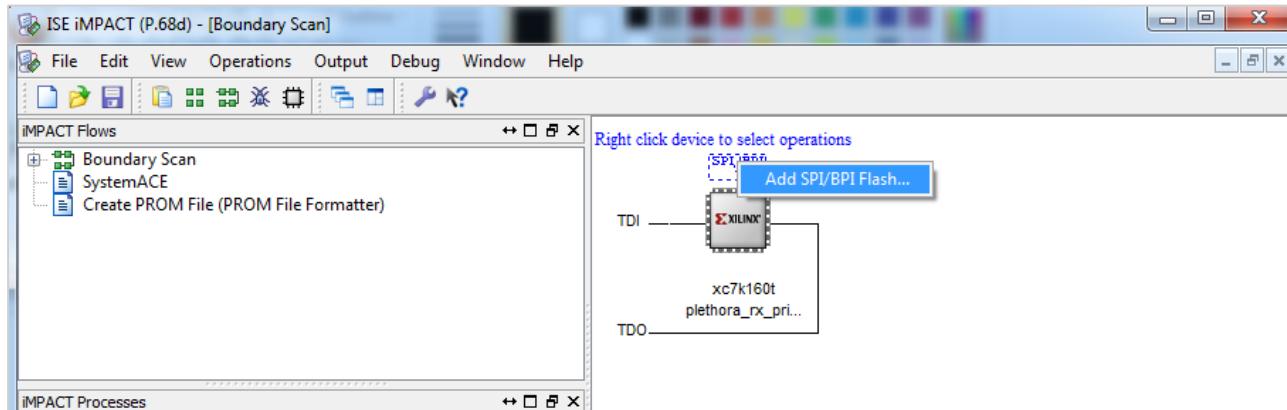
Example, if you are configuring:

- RX device
- Running on fiber ver2 platform
- Using chipset aqlx107

You would select the file named:

blueriver_rx_fiber_ver2_aqlx107_2.bit

10. In the ISE Impact Boundary Scan window, right click on the SPI/BPI box and select Add SPI/BPI Flash...



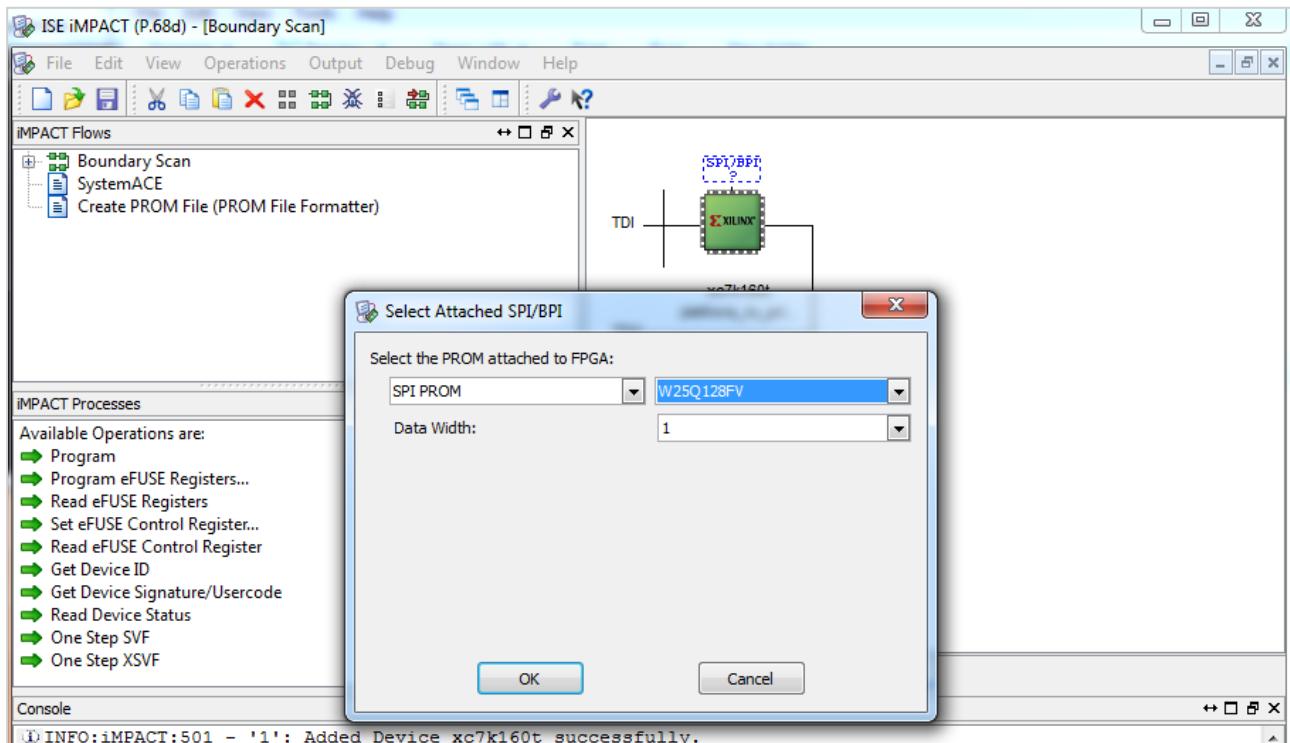
11. Next select the appropriate .mcs file, and click Open.

Example: blueriver_xx_yyyy_zzzz_config.mcs

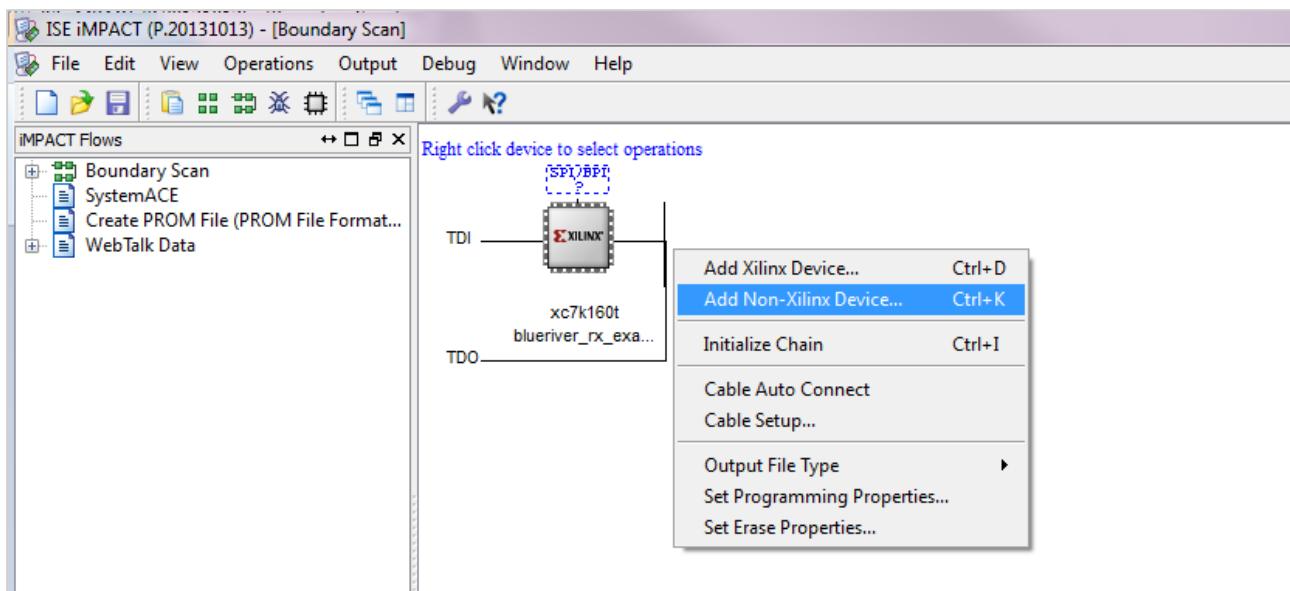
As with previous step:

- Replace xx is by TX or RX to specify if device is an Encoder (TX) or Receiver (RX).
- yyyy is replaced by the BlueRiver platform, fiber or copper and version if appropriate.
- zzzz by the vehicle device type, Aquantia AQLX107 or Kintex-7 160T.

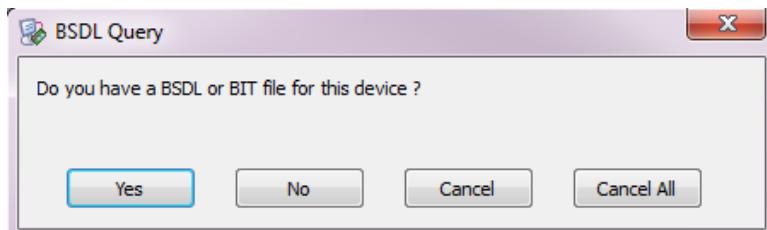
12. In the Select Attached SPI/BPI window, choose the options SPI PROM and W25Q128FV as shown in figure below and then click OK.



13. In the ISE Impact Boundary Scan window, right click and select Add Non-Xilinx Device.

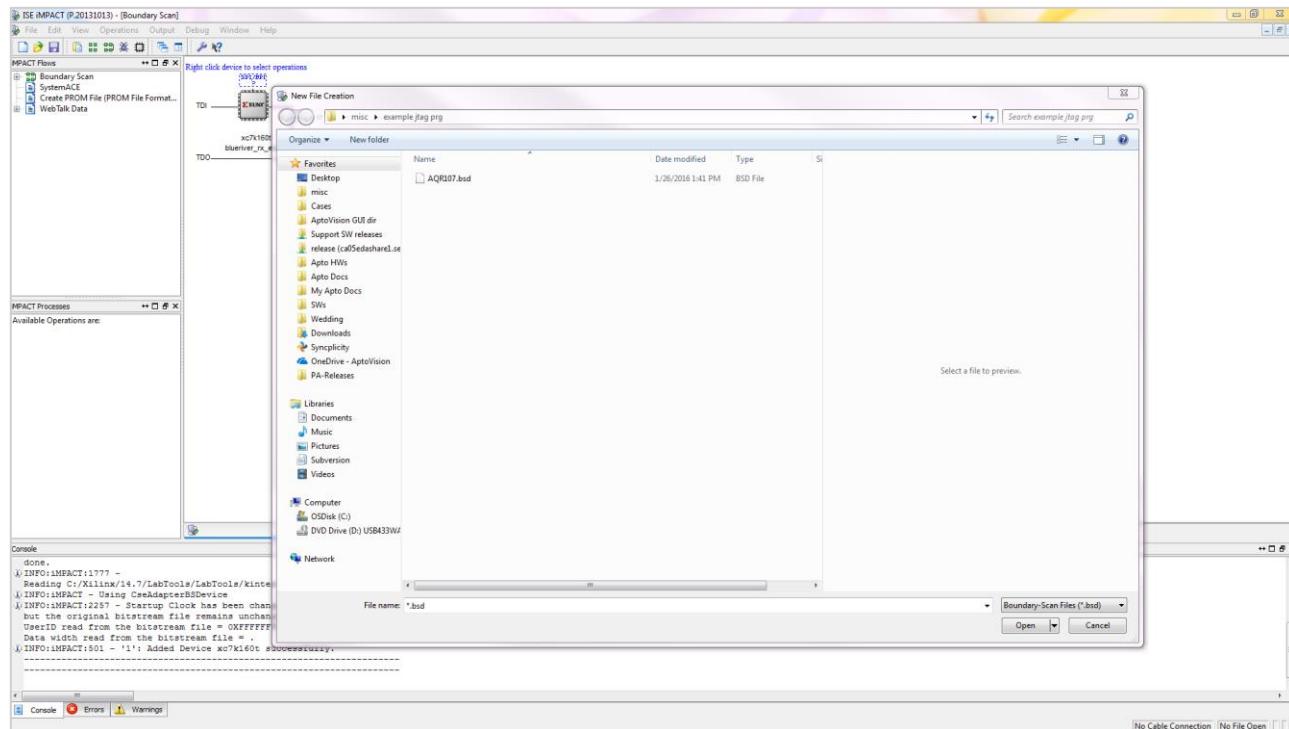


14. The BSDL Query popup will appear, click Yes.



15. A new pop-up appears, it is labeled New File Creation.

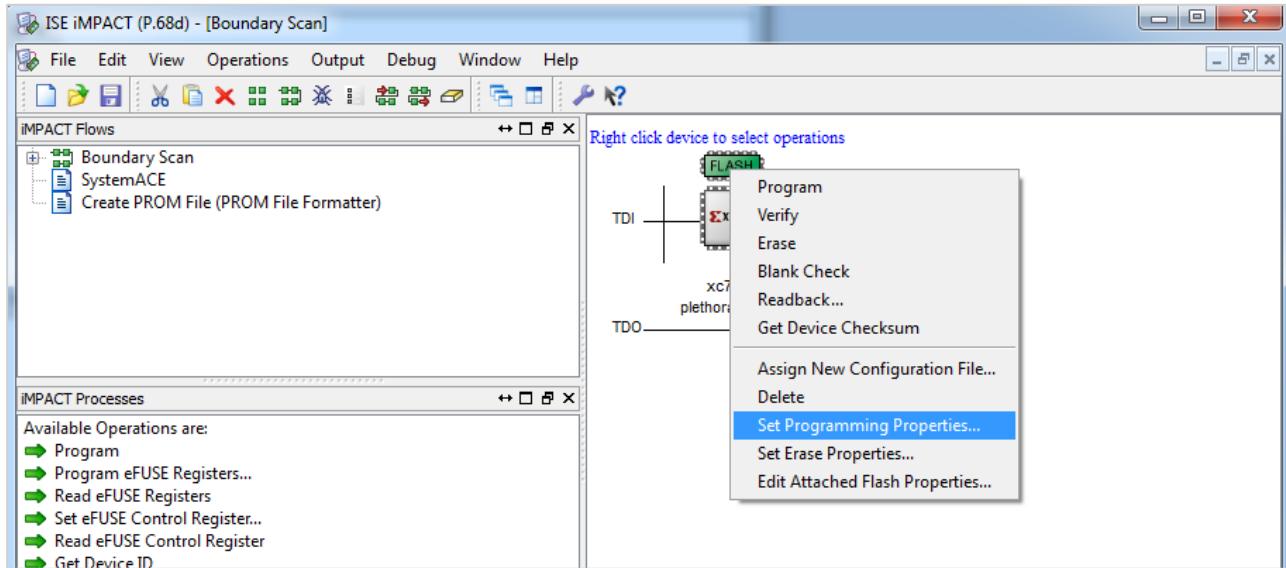
16. Browse to locate the AQR107.bsd file and then click Open.



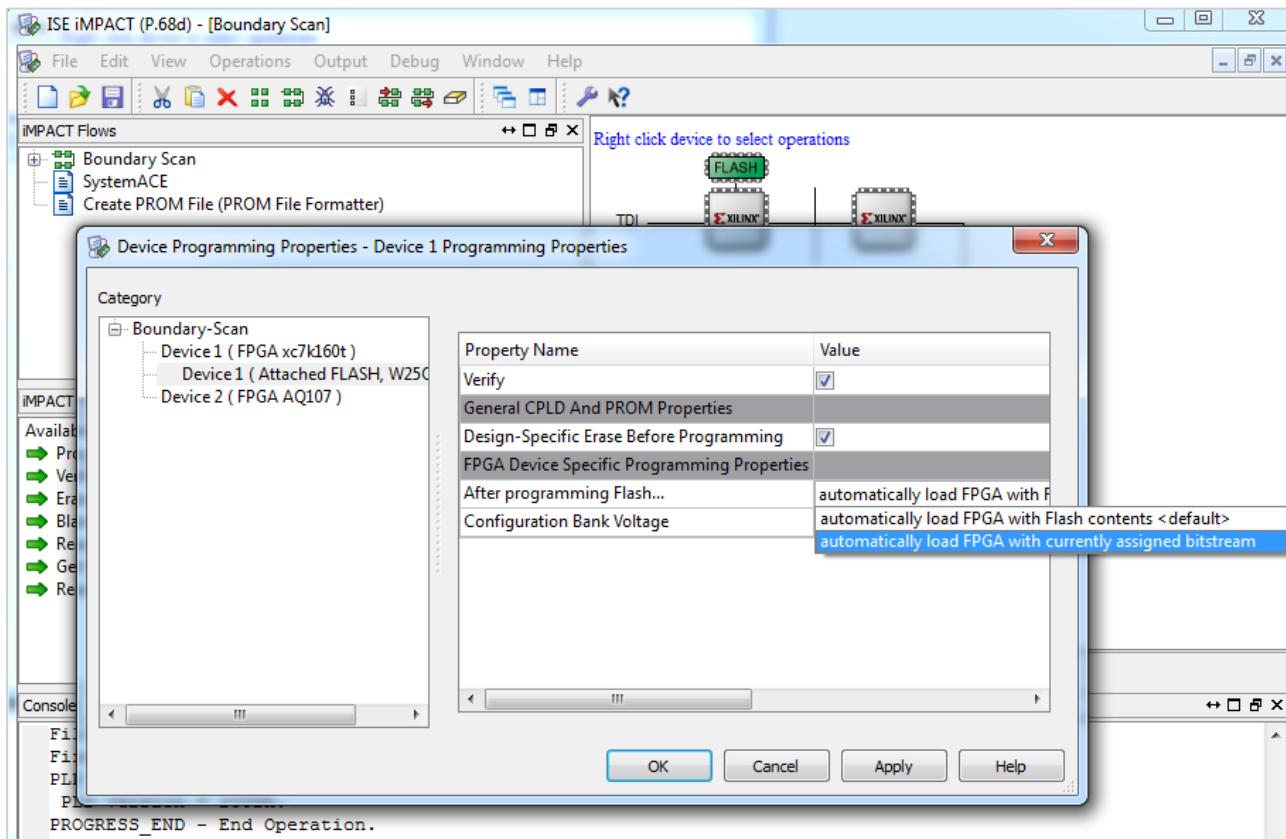
17. Once the device is created an icon will appear represent the aq107.

18. In Impact Boundary Scan window, right click on the FLASH box.

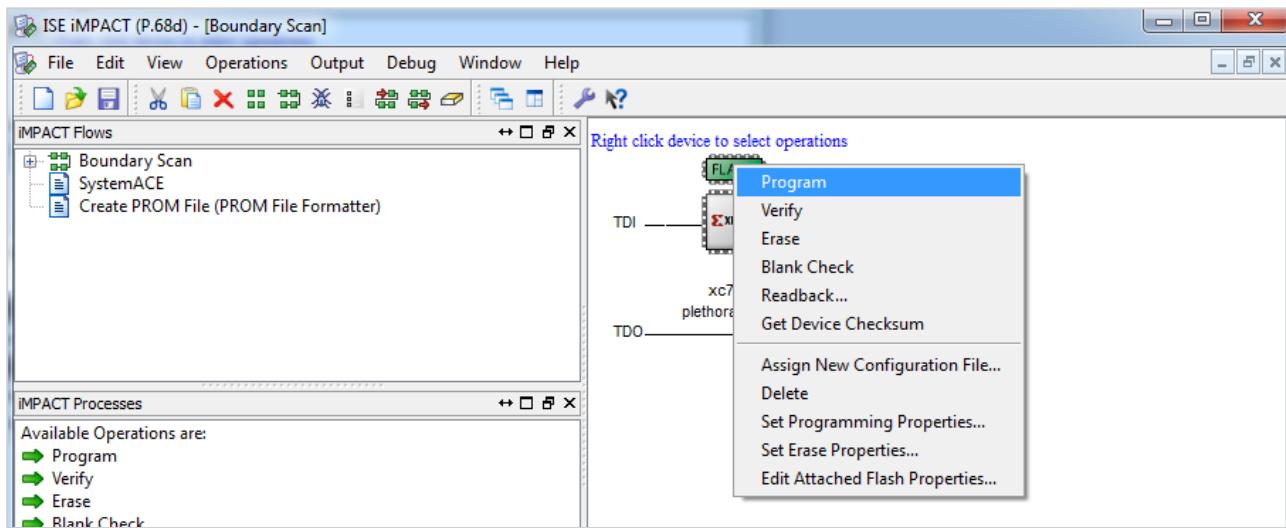
19. From the menu that appears select Set Programming Properties.



20. In the Device Programming Properties window, chose Automatically load FPGA with currently assigned bitstream as showed in figure below and then click OK.

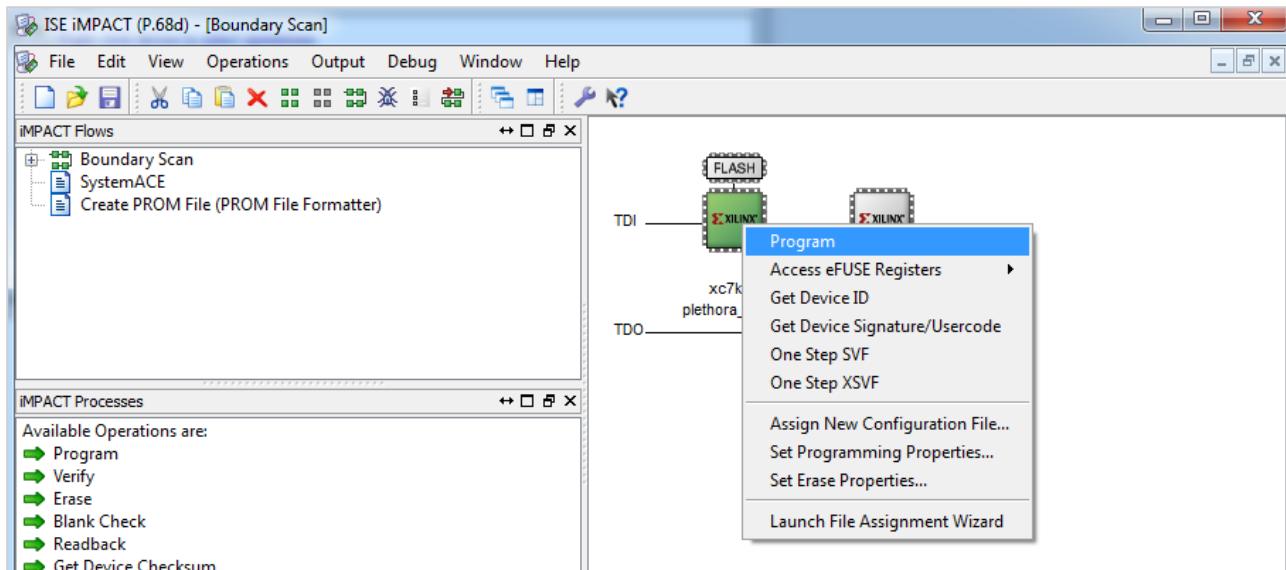


21. In the Impact Boundary Scan window, right click on the FLASH box and then select Program.



22. Wait for the progress bar to indicate the write has completed.

23. Once completed, in the Impact Boundary Scan window, click on the Xilinx box, right mouse click and select Program . . .



24. The BlueRiver chipset 10GbE network interface is now enabled.

Important! This is a **volatile** configuration and if power is removed or recycled the configuration is lost. Also, note that this step is only useful to enable the 10GbE interface. There is no other BlueRiver functionality enabled until the BlueRiver chipset is fully programmed (next section).

Comment: You can save the Impact project and reuse it for other boards of the same type (TX / RX) by repeating steps 18 through 20.

25. Proceed to program the BlueRiver chipset. Refer to section 6 Initial BlueRiver chipset configuration for details on completing this procedure.

6 Initial BlueRiver chipset configuration

Once either the 1GbE or 10GbE interface is enabled for the appropriate vehicle device type, proceed with the following procedure.

Comment: The following procedure should be completed immediately after the procedure outlined the network interface has been enabled. If power is removed or recycled the .bit file is required to be reapplied prior to proceeding with this task.

1. Connect the computer that is hosting the BlueRiver Manager (Demo Client) to the 1GbE interface of the BlueRiver NT1000 or NT2000 device to be configured.
2. Launch the BlueRiver Control Server and BlueRiver Manager (Demo Client) software in advanced mode.

To launch the BlueRiver Manager (Demo Client) in advanced mode it is necessary to run the `blue_river_manager.exe` file through either a command prompt or by creating a shortcut pointing to this .exe file with the `-a` option included.

- a. Open a command prompt and change to the directory where the BlueRiver Manager executable (`blueriver_manager.exe`) file is located.

Example: `C:\Program Files (x86)\Semtech\`

- b. Then launch the BlueRiver Manager (Demo Client) in advanced mode.

This is done by adding `-a` to the executable, so type at the command prompt:

```
blueriver_manager.exe -a
```

Notes:

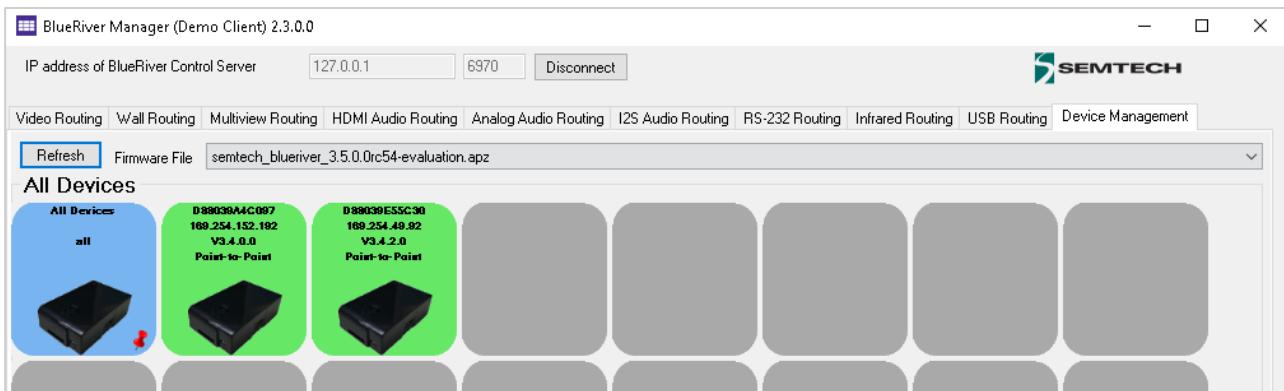
- i. If the BlueRiver Manager (Demo Client) is to be used frequently in the advanced mode it is possible to create a desktop shortcut to launch it in this mode.
- ii. Be sure to create the shortcut using `blueriver_manager.exe -a`.

Example if installed in default folder the shortcut path is:

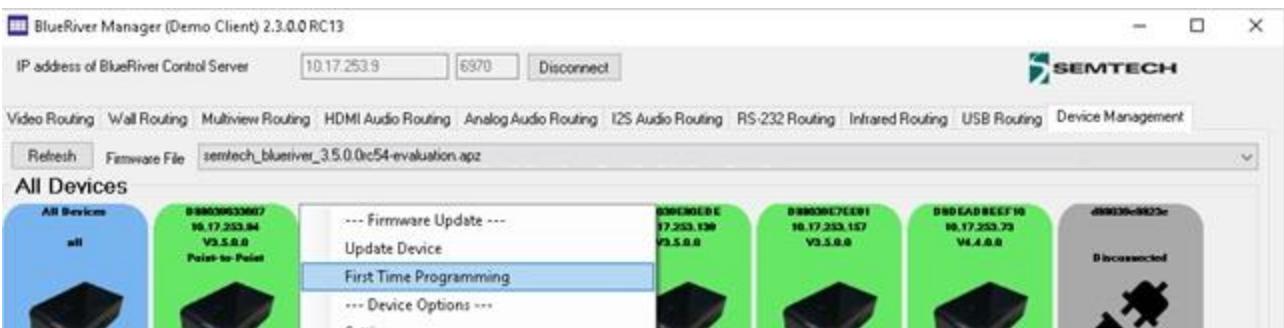
```
"C:\Program Files (x86)\Semtech\blueriver_manager.exe" -a
```

- iii. Do not use the BlueRiver shortcut created when the BlueRiver Evaluation kit was installed. This shortcut points to a different .exe file that launches the BlueRiver Manager, BlueRiver Control Server and BlueRiver External Component Updater simultaneously.
- iv. If not running it is necessary to start the BlueRiver Control Server and the BlueRiver External Component Updater. Refer the BlueRiver Manager (Demo Client) User Guide (ug-0016) for details.

3. The BlueRiver Manager (Demo Client) will load in the advanced mode allowing access to advanced options.
4. Select the Device Management tab.
5. All discovered BlueRiver devices will load, all online devices are represented by green tiles.
6. Next click the drop-down arrow next to heading, Firmware File button and select the apz file for the firmware that is to be applied to the BlueRiver chipset.

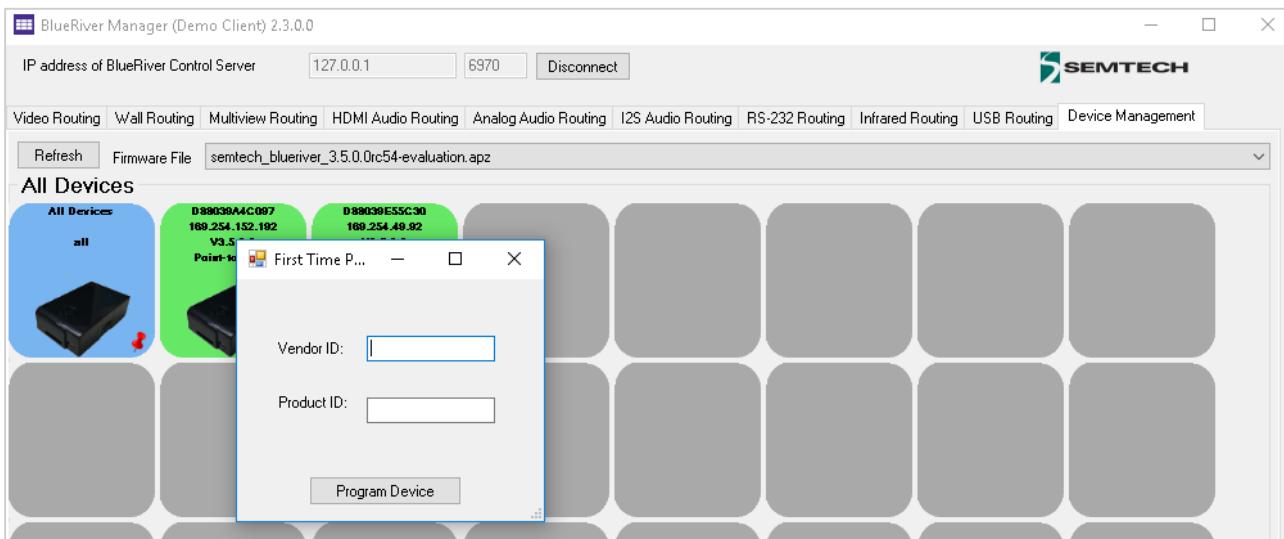


- Right mouse click over the BlueRiver device tile that is to have initial programming completed and select First Time Programming from the menu presented.



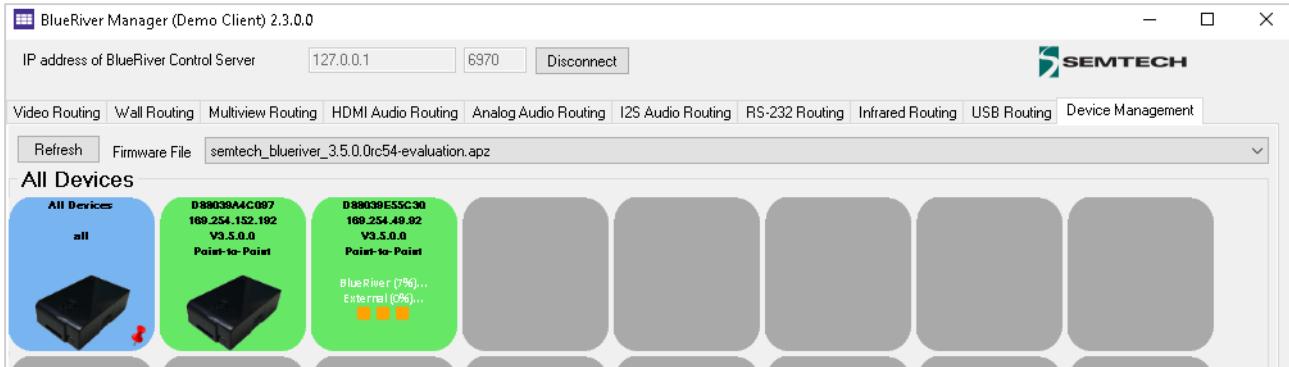
- The First Time Programming window appears.
- Enter the Vendor ID and Product ID for the BlueRiver chipset that is to be programmed and then click the Program Device button.

WARNING! Be sure to enter the correct Vendor ID and Product ID for the BlueRiver device that is to be programmed. Applying the incorrect firmware file to a BlueRiver device could result in the device becoming unresponsive.



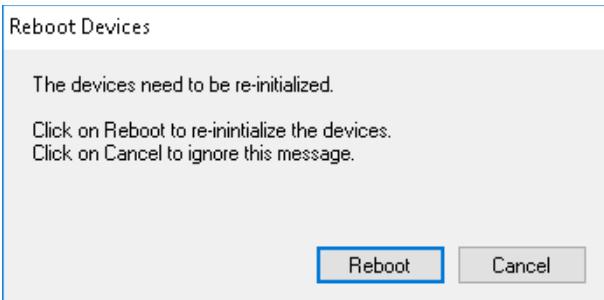
10. The initial programming of the BlueRiver chipset begins.

11. The BlueRiver device tile indicates the progress of the initial programming.



12. Once completed, the Reboot Devices window appears, requesting that the device be rebooted. Click on the Reboot button to complete the programming.

Note: It is also acceptable to power recycle the BlueRiver device to complete the programming.



13. During the reboot the BlueRiver device will indicate it is disconnected and then once it reconnects will return to green state. This indicates the procedure was successful

7 Updating the BlueRiver chipset after Initial Programming

This section outlines how to update the BlueRiver device firmware using the BlueRiver Manager (Demo Client) software AFTER the initial programming of the BlueRiver chipset has been performed.

Note: BlueRiver Manager (Demo Client) software can be used to perform firmware updates after the initial programming has been completed. Should be noted that the update file needs to be a .apz file. If you do not have a copy of the file, contact the Semtech AptoVision Products Group BlueRiver support team.

Comment: Details on the use of the BlueRiver Manager software is available in the Semtech BlueRiver Manager (Demo Client) User Guide (ug-0016). This document and a copy of the BlueRiver Manager (Demo Client) software can be requested from BlueRiver support.

7.1 Performing Device Firmware Update

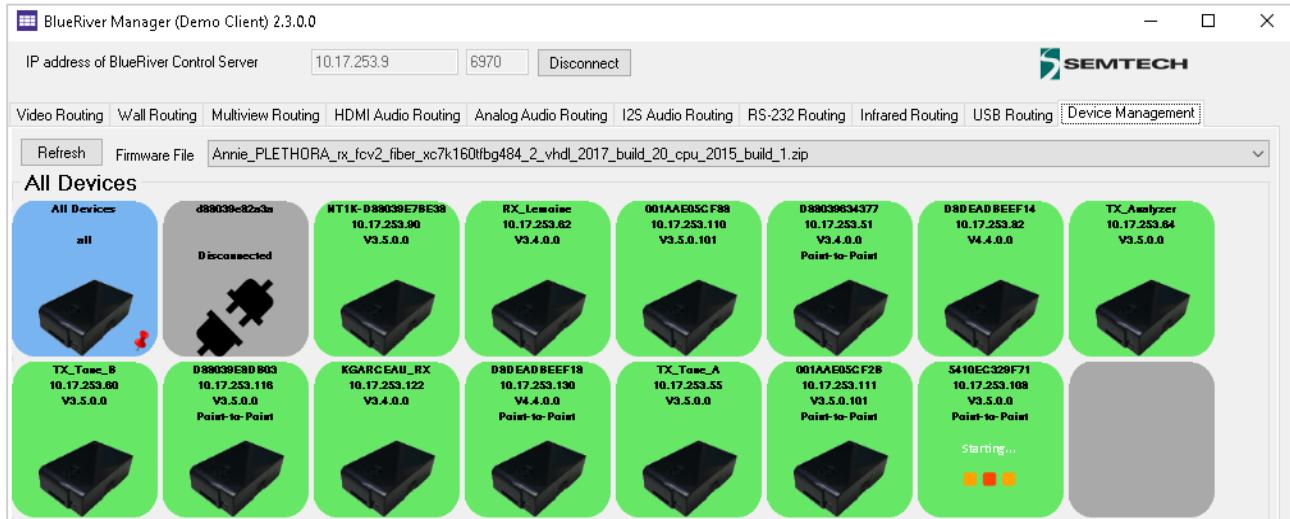
To update BlueRiver device firmware follow the step by step procedure outlined below:

1. If not already completed, copy the new BlueRiver update file (.apz) containing the firmware update into the update folder.
 - Contact Semtech AptoVision Products Group support team for latest version of firmware.

2. By default, the update folder is in the same directory as the BlueRiver Control Server (API) executable.

Important! If the update folder does not exist, it is necessary create it.

3. Then select the Firmware Update tab in the BlueRiver Manager (Demo Client).
4. The BlueRiver Manager (Client Demo) will automatically discover all devices currently active on the network. These devices are not divided by function but all shown under heading All Devices.



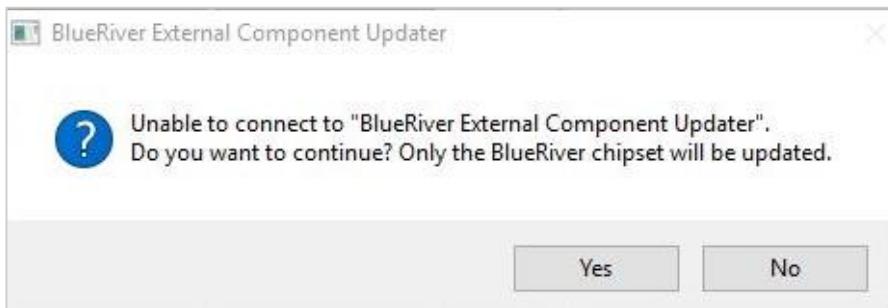
5. Select the BlueRiver firmware update file (*.apz).

 - a. Select update file from the drop-down box, located in the Device Management tab beside the heading Firmware File,

Example: semetch_blueiver_3.5.0.0rc54-evaluation.apz

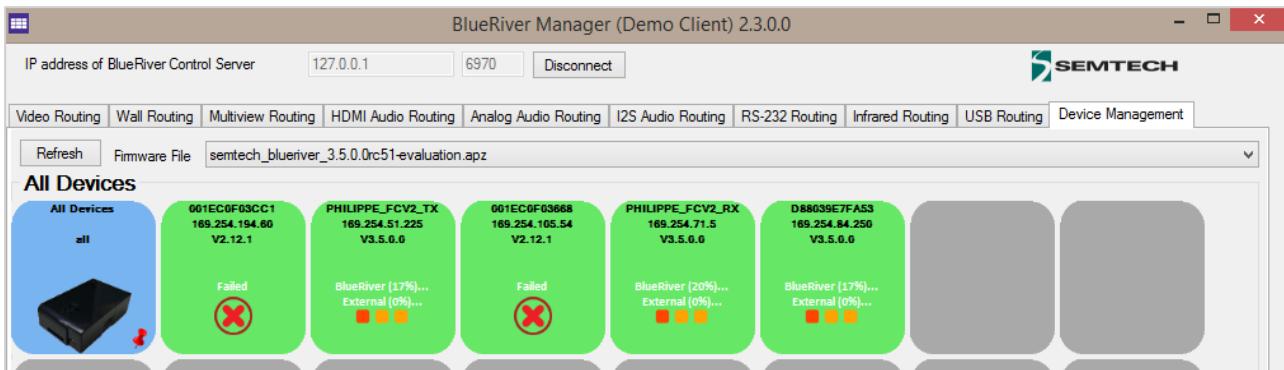
6. From the BlueRiver Manager (Demo Client) right click over the tile that represents the BlueRiver device that is to be updated.
7. Begin the device update:
 - a. To trigger upgrade of individual device, right-click over its associated device tile and select Update Device.
 - b. To update all devices, right click over the blue tile labeled All Devices and select Update Device.

Tip: If the error "Unable to connect to BlueRiver External Component Updater" is received, click Yes to proceed with the update.

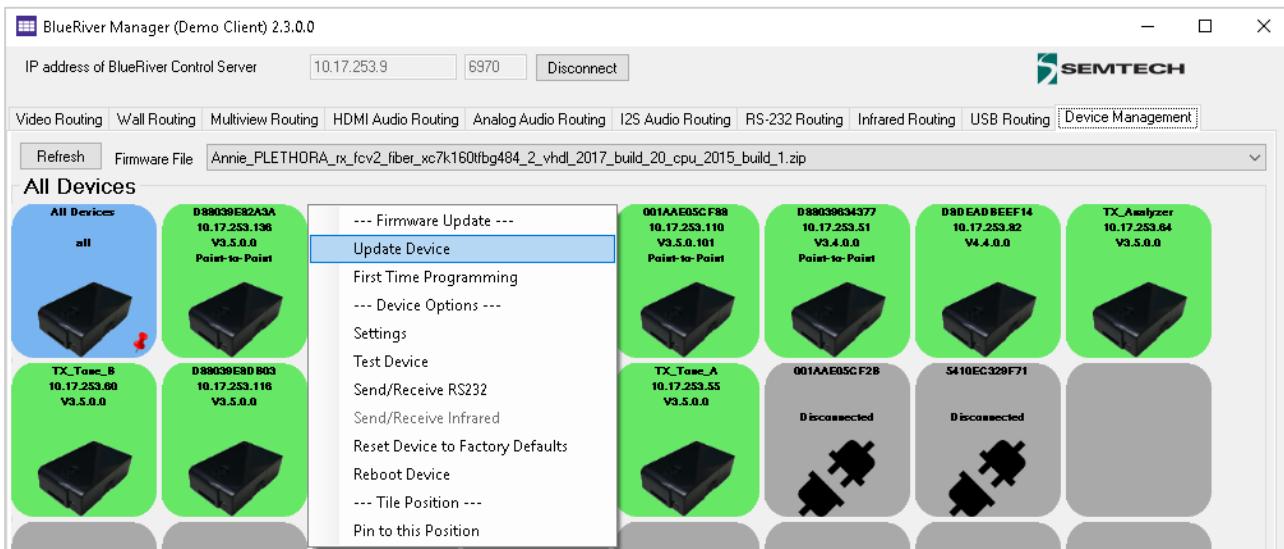


8. Selected device(s) will immediately begin to update their firmware.

If a device is selected to be programmed that is not compatible with the version selected, an error will be returned and device will fail to be programmed.



9. The device tiles will show the progress of the update.
10. When the firmware update completes, the devices will provide a message to automatically initiate a reboot of all updated units.
11. Click on the Reboot button to initiate the reboot and apply the new firmware.
12. Once back on line verify the firmware version shown on the tile is the correct version.



Tips:

- If BlueRiver devices do not automatically appear in BlueRiver Manager, verify the network configuration of the computer. Specifically verify it is configured in same network range and subnet as the devices.
- By default, DHCP is enabled for all BlueRiver devices.
- If there's a DHCP server present in the network, the IP configuration is automatically applied.
- If a DHCP server is not present, by default all BlueRiver devices are assigned IP addresses using the Automatic Private IP Addressing (APIPA scheme) within the 169.254.X.X address range and a subnet mask of 255.255.0.0.
- For further information on the supported IP range and other communication information related to the BlueRiver platform refer to the BlueRiver Technical Overview Guide (ug-0022).
- For details on modifying the default IP range refer to the BlueRiver Control Server User Guide (ug-0017).

8 Initial Programming using JTAG Interface

This section describes how to perform the initial configuration of the BlueRiver chipset using only Xilinx's Impact Tool. This procedure is outlined using ISE Design Suite, version 14.5.

Note: A newer release of this tool should successfully complete this procedure as well.

8.1 JTAG Interface Limitations

The procedure outlined in this section is recommended only for the rare case that there is no network available to complete the initial programming.

Should be noted that this is not the recommended procedure to use for the initial programming of a BlueRiver chipset.

- This is due to the potential long firmware download times that could be encountered.
- The download of the device firmware for each device would be from 30 minutes per device.
- It is recommended to use the 1GbE or 10GbE interface to perform the initial programming.

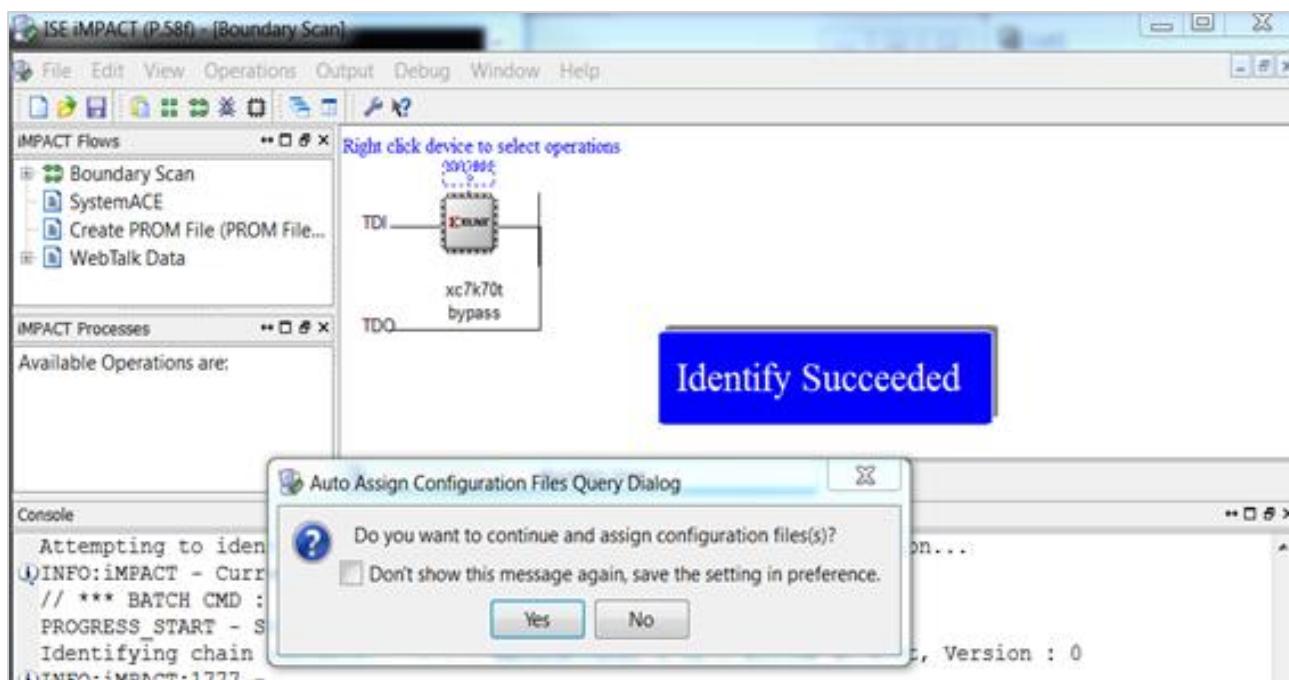
Warning! Important to note that the JTAG interface procedure outlined below cannot be used to perform the initial flash programming for PCBs based on the NT2000 Duke hardware reference design.

8.2 Programming Instructions

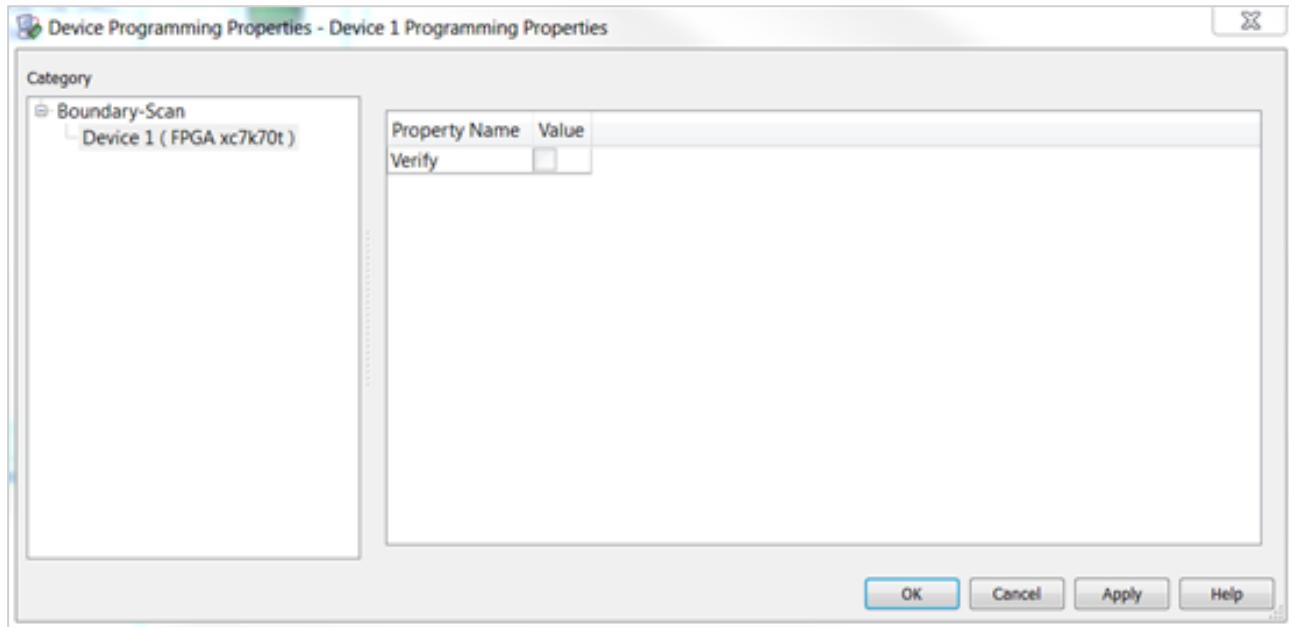
1. Connect the Xilinx USB cable to the JTAG connector.
2. Then on the computer launch Impact.

Start > Xilinx Design Tools > ISE Design Suite 14.5 > ISE Design Tools > 64-bit Tools >IMPACT

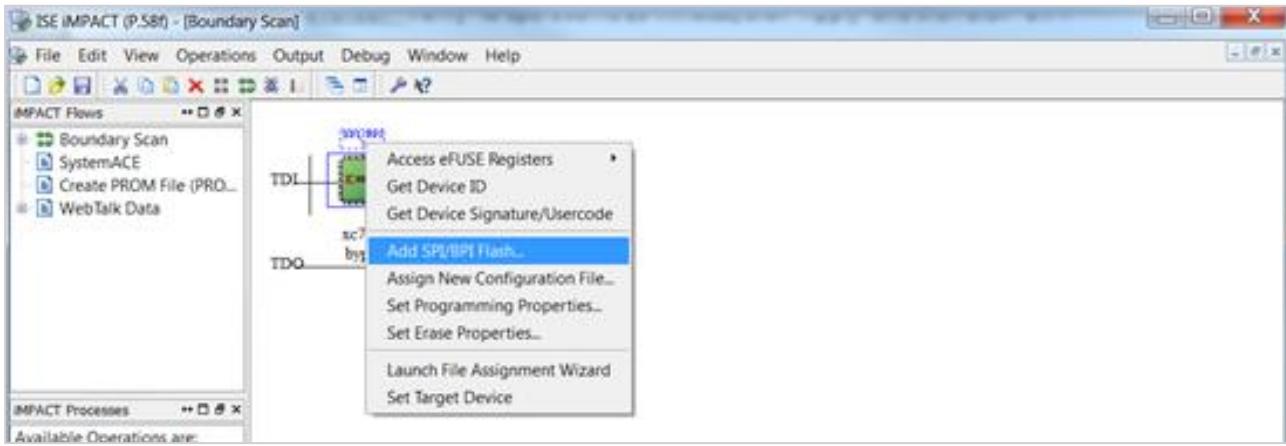
3. When the New IMPACT Project window opens, select Create a New Project.
4. The Welcome to IMPACT window launches.
 - a. Select the option Configure devices using Boundary-Scan from the drop-down list.
 - b. Click Ok.
5. The Auto Assigned Configuration Files Query Dialog window then appears.
 - a. Select No.



6. If the Device Programming Properties window opens, confirm that the Verify checkbox is **not** selected/enabled.
 - a. Confirm the Verify option is unselected.
 - b. Then click Apply and OK.



7. In the ISE Impact Boundary Scan window, right click on the dashed rectangle labelled SPI/BPI and select Add SPI/BPI Flash.



8. Select the .mcs file that needs to be transferred to the BlueRiver chipset.

Default naming format of file is: blueriver_xx_YYYY_zzzz.mcs

- Replace xx with TX or RX to specify if device is an Encoder (TX) or Receiver (RX).
- YYYY is replaced by the BlueRiver platform. i.e. fiber or copper and version if appropriate.
- zzzz by the vehicle device type, Aquantia AQLX107 or Kintex-7 160T.

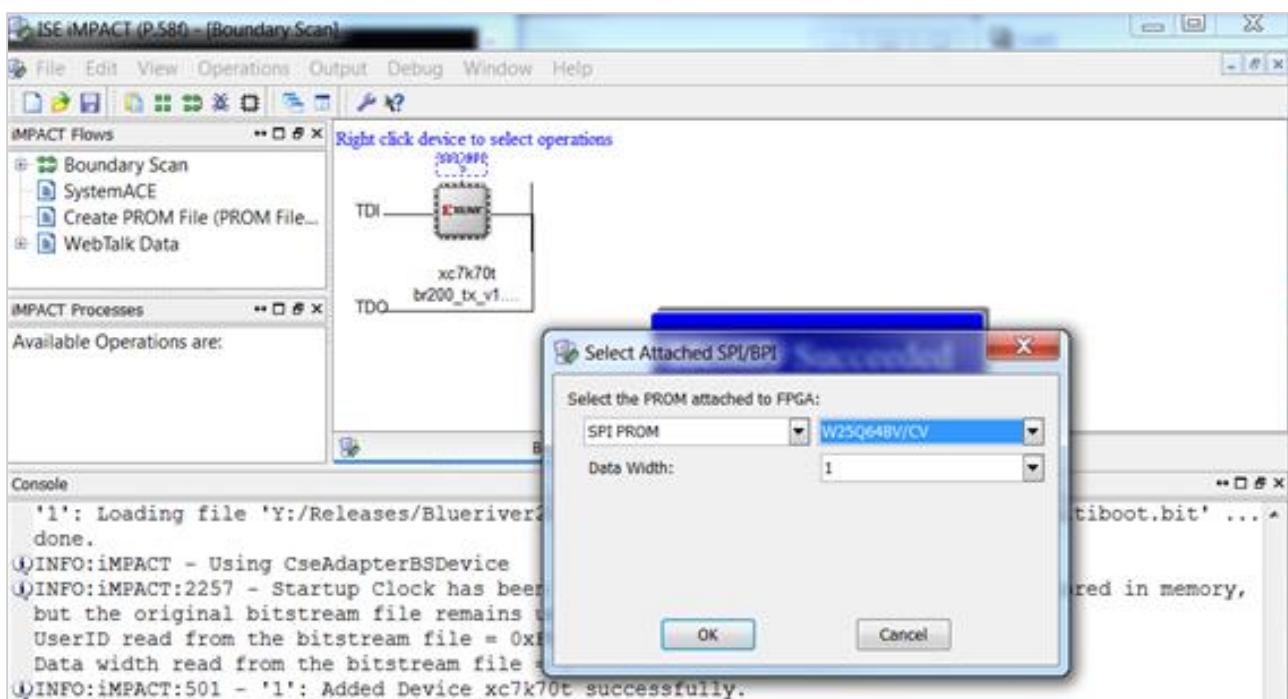
Example, if you are configuring:

- RX device
- Running on fiber ver2 platform.
- Using chipset XC7K160T.

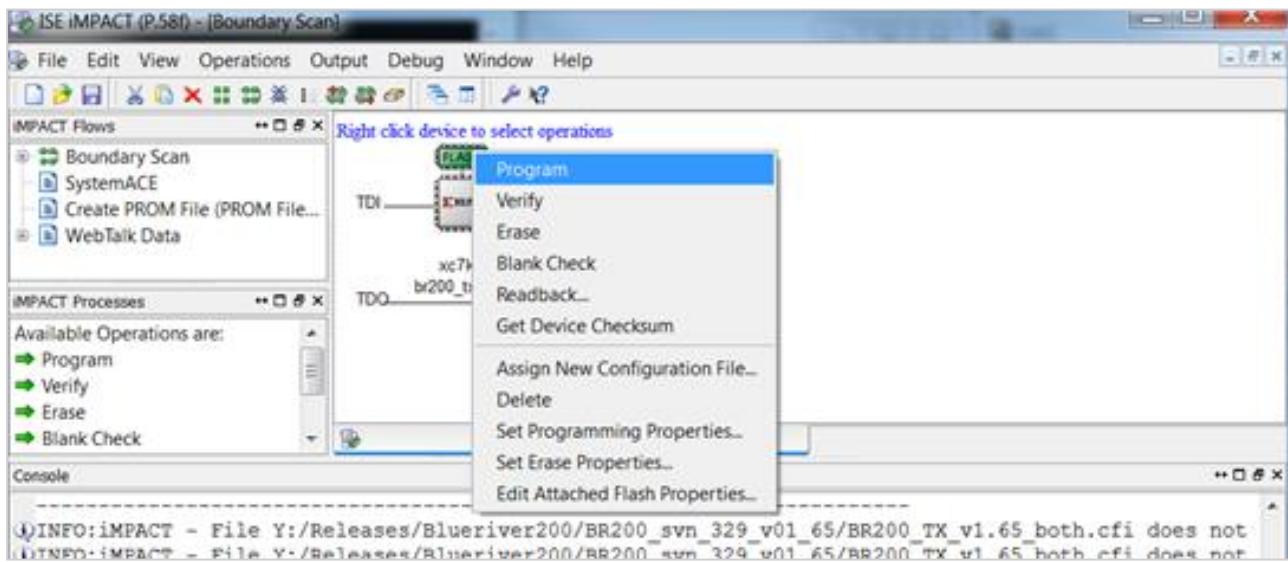
You would select the file named:

blueriver_rx_fiber_ver2_xc7k160tfg484_2.mcs

- The Select Attached SPI/BPI window opens.
- In this window, choose the options SPI PROM and W25Q64BV/CV as shown in the figure below and then click OK.

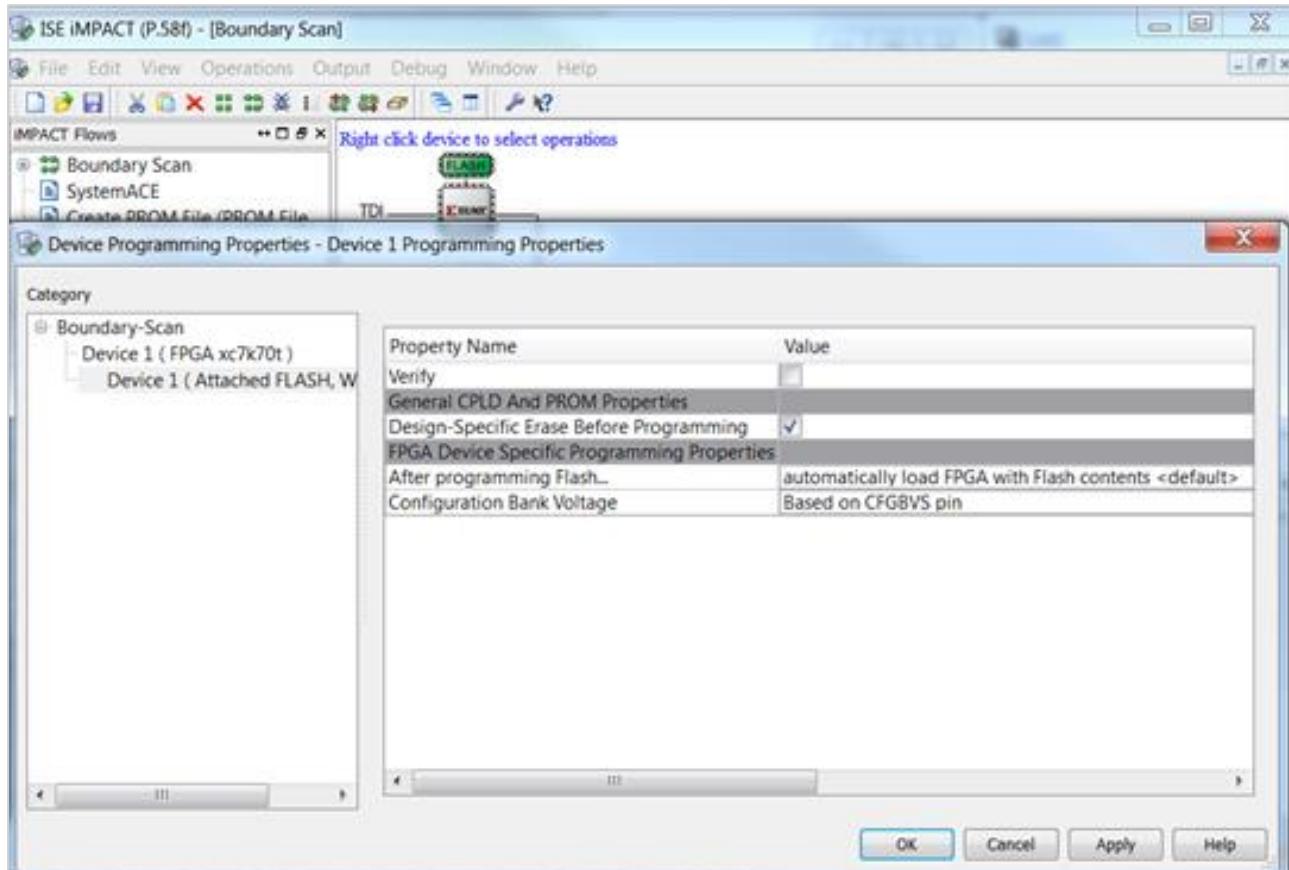


- In the ISW Impact Boundary Scan window, right click on the FLASH component and select Program.



12. The Device Programming Properties window opens, confirm that the Verify checkbox is **not** selected/enabled.

- a. Confirm the Verify option is unselected.
- b. Then click Apply and OK.



13. The program configuration will begin.

14. Wait for the configuration to complete.

Notes:

- i. The procedure will take a long time to complete, estimated 1-2 hours.
- ii. Length is dependent on the BlueRiver hardware being configured.
- iii. It should be completed when the progress bar displays 50%.

9 Troubleshooting Tips

This section outlines some tips that can be applied to attempt to resolve an issue if a problem should be encountered during either the process of enabling a network interface or during the initial programming of a device.

Suggested to try these suggestions prior to contacting the Semtech AptoVision Products Group BlueRiver support team.

Comment: If problems are encountered or you have questions regarding the Xilinx Impact tool please contact Xilinx for support.

9.1 If Error occurs during enabling a Network Interface

The tips listed in this section apply when using the JTAG connector to enable the 1GbE or 10GbE BlueRiver interface and the procedure fails. The error is a red square with a "fail" message contained.

These tips also apply if the JTAG is being used to initialize a virgin BlueRiver chipset.

Summary:

- These tips apply if the problem occurs during enabling a the BlueRiver network interface (1GbE or 10GbE); or
- While using the JTAG to initialize the BlueRiver chipset.
- Also, should be noted applies to both the Kintex-7 160T and Aquantia AQLX107 vehicle device types.

If a red square appears with a "fail" message contained, try the following:

1. Disconnect JTAG cable and reconnect it.
2. Reset the BlueRiver device.
3. Reboot the computer that is hosting the Xilinx software.

9.2 If Error occurs during Initial Programming of a BlueRiver chipset

If a problem is encountered during the initial programming of a BlueRiver chipset flash, using either a Kintex-7 160T or Aquantia AQLX107 vehicle device type, try the following:

1. Check the network status.
2. Retry programming the device.
3. Reset the device.



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