

out of the **B** **X**

Flash Interface Guide

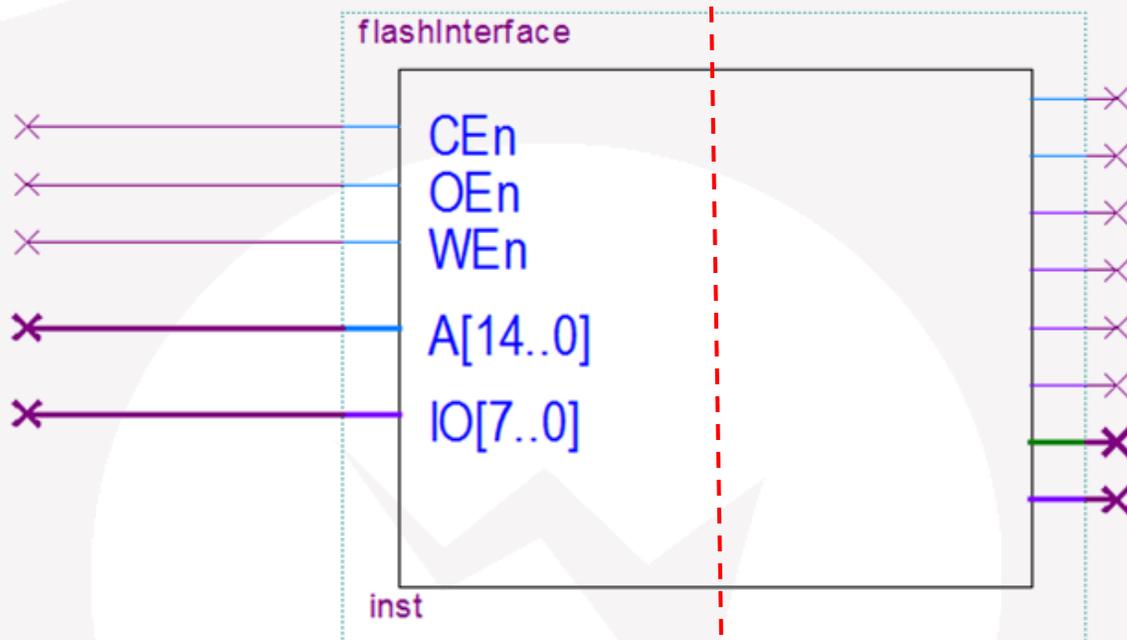
Last Updated October 18, 2016

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Overview



Above is the block symbol for the flash interface. It is divided vertically into two halves as shown by the dashed red line. The left side is the user interface. There the user may attach signals and busses to interface with the flash. The ports have been labeled to match the ATMEL AT28C256. The ports are as follows:

1. **CEn**
 - α. Active low chip enable.
2. **OEn**
 - α. Active low output enable.
3. **WEn**
 - α. Active low write enable.
4. **A[14..0]**
 - α. 15-bit address bus. Indexed base 0.
5. **IO[7..0]**
 - α. 8-bit Input/Output bus. Indexed base 0.

The right side of the symbol is the fabric interface. **Do not use any of the ports or remove any of the wires attached to the right side.** Doing so will cause the flash interface to not function properly.

How to use

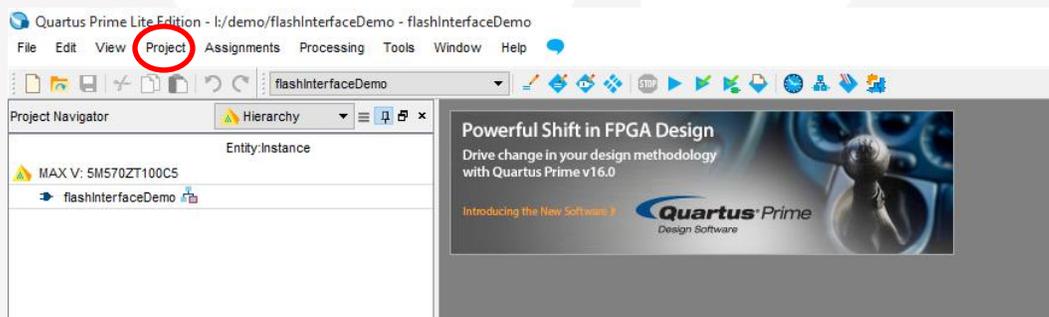
The Out of the Box Flash Interface (flashInterface) is designed as a drop solution for the Out of the Box MAX V Development Board. There are 3 steps to follow to integrate the flash interface into a Quartus project. The steps are included in the flashInterface directory. 1) import the block symbol 2) Import the port declarations 3) import the pin assignments.

Include the flashInterface directory

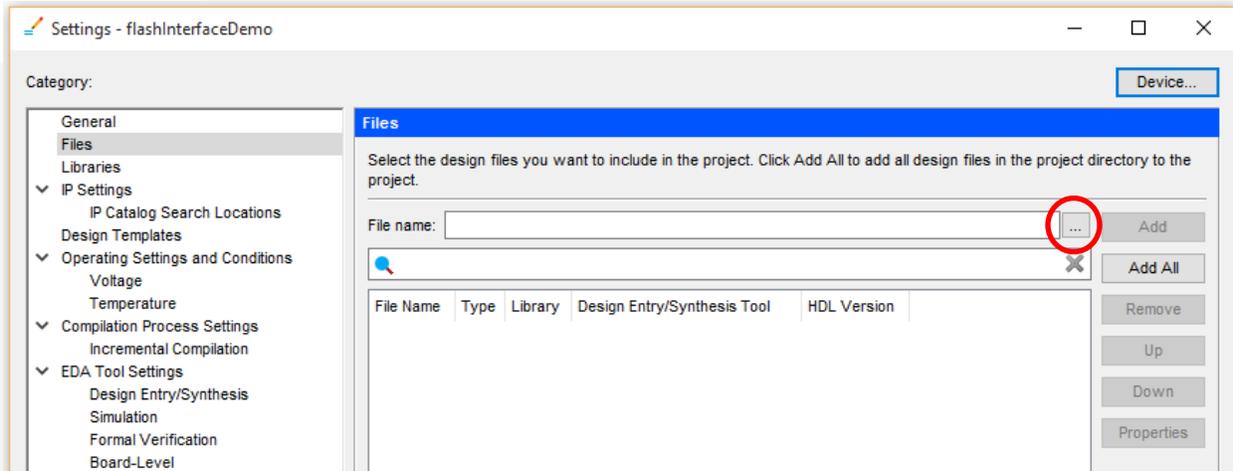
Before continuing, download the flashInterface directory from the website. There should be five files. The contents are as follows:

1. flashInterface.bsf
2. flashInterface.qsf
3. flashInterface.vhd
4. flashInterfaceBDF.bdf
5. SST39SF.vhd

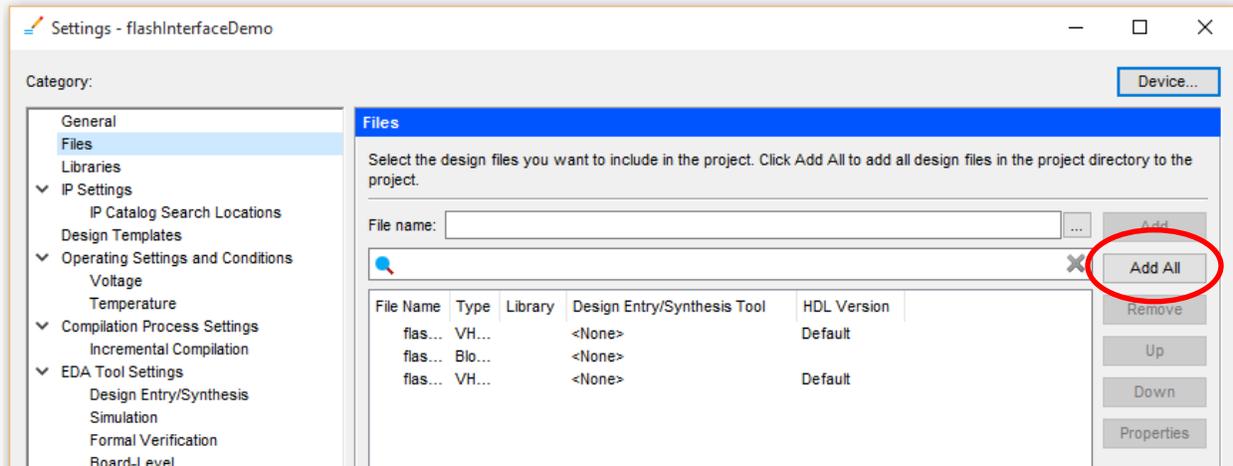
All of these files must be present for the interface to function properly. The flashInterface directory may be stored anywhere on the computer, though using the base directory of a new Quartus project is recommended. This guide will assume a new, empty, project has been made and the flashInterface directory is located in it's root directory.



Above shows an empty project. Select the Project tab circled above. Select the second option. It should be labeled "Add/Remove Files in Project".



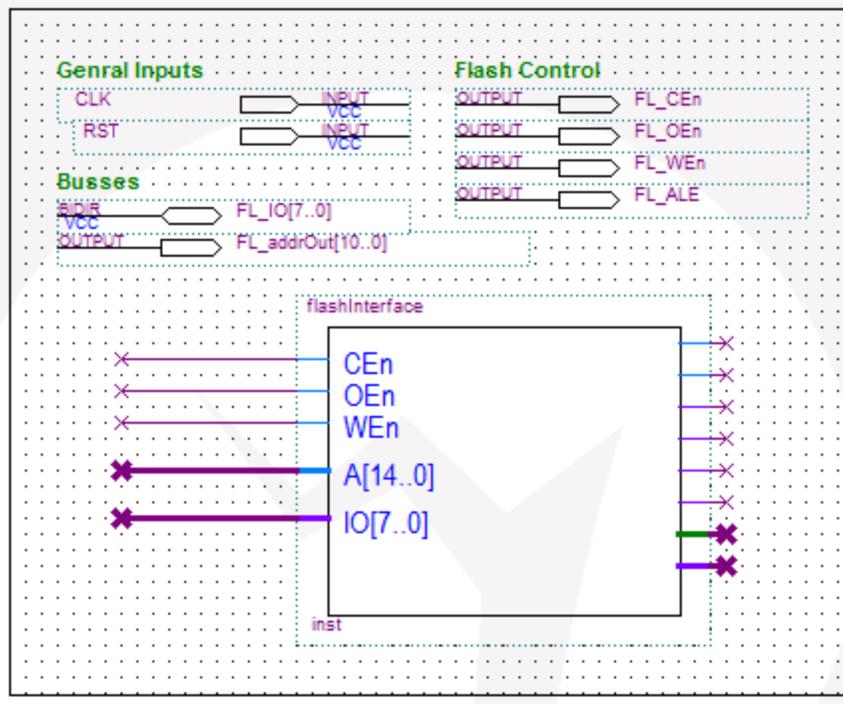
Once the window opens, locate the browse button. It is a small button with three periods in it, located to the right of the “File Name” box. It is circled in red in the figure above. Navigate to the flashInterface directory and enter it. Only three of the five files should be visible. Left click the top file. Hold shift and left click the bottom file to highlight all three files. Then hit open.



The three files should now be located in the larger open area. They are still not added to the project. At this point, click the “Add All” button located on the right. After that, click the “OK” button located at the bottom of the window. The flashInterface files are now added to the project.

Import Block Symbol and Port Declarations

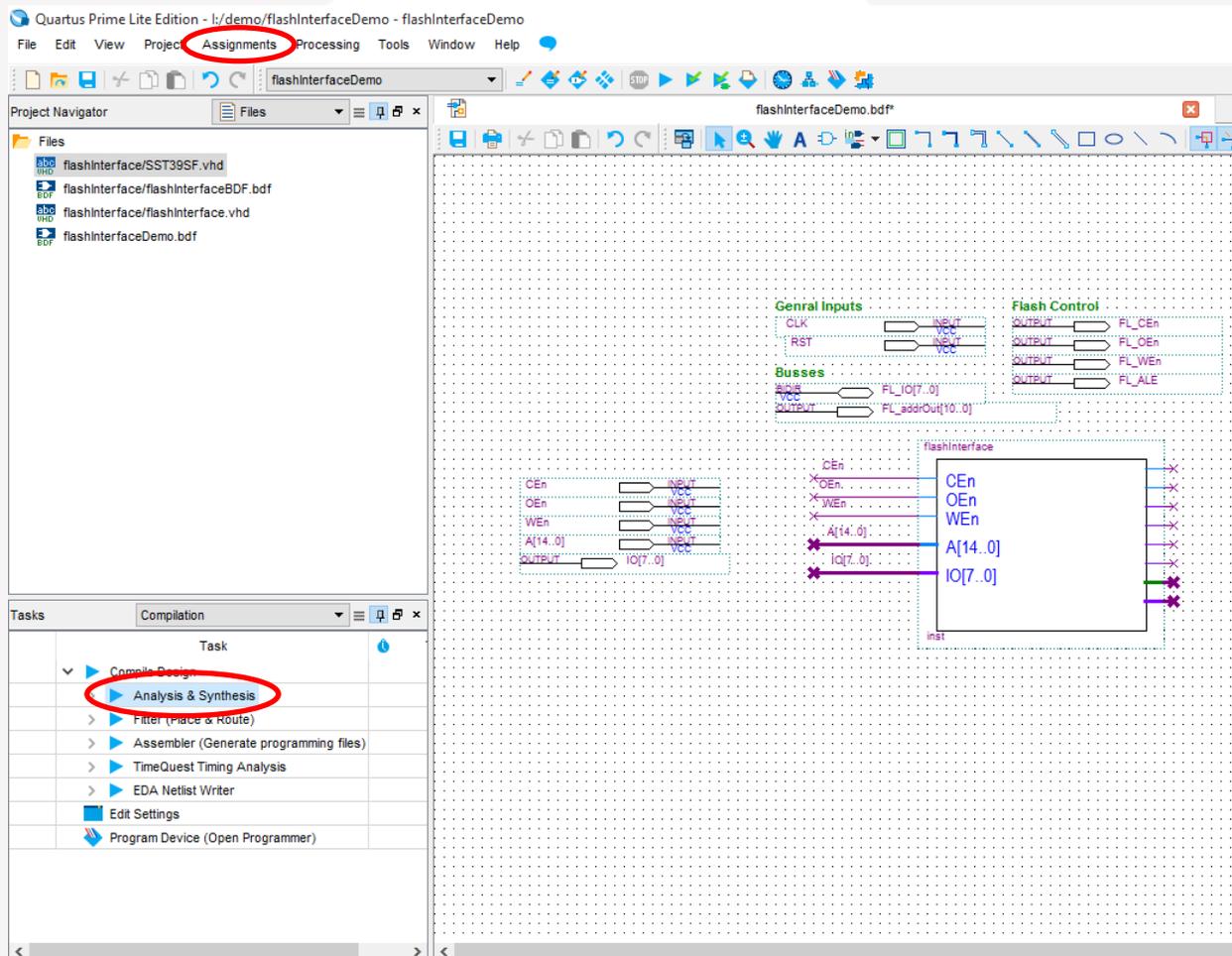
flashInterface BDF Sample



Above are the contents of flashInterfaceBDF.bdf. Importing the block symbol and port declarations is very simple. First select everything inside of the black box, and then hit CTRL+C. Next, navigate to the desired BDF, and hit CTRL+V. Ensure the contents of the black box are copied over as they are, in their entirety. Failure to do so may result in the block not functioning. **DO NOT ALTER THE PORT NAMES!** They must remain as they are to ensure proper functionality. The QSF file used to import pin assignments uses these names. If they are altered the pins will not be properly handled by Quartus, which in some cases could damage the hardware.

Import Pin Assignments

The final step is to import the pin assignments. To do this, the Analysis and Synthesis must be performed in order to assign pins. The easiest method to do this is to double click the button on the bottom right. It is circled in the figure below. Since this step requires all ports to be connected, this demo added some extra inputs to the project to finish connecting the interface.



The final step is to click the “Assignments” tab at the top of the window. It is circled in the figure above. Once open, select the “Import Assignments...” option. Hit the browse button, navigate to the flashInterface directory, and select “flashInterface.qsf”. Hit OK and it’s done. The pin assignments are now imported. It is important to note that importing the pin assignments will only affect the specific pins brought over with the flashInterface. All other assignments will be left alone.