

Quartus Project Setup

Last updated 7/24/23

Quartus Project Setup

- Quartus Prime – Project Setup
 - Before creating your first Quartus project:
 - Install the Quartus software – see “Quartus Software Setup”
 - Projects are created for a top level design
 - Create a project directory to keep all of your projects organized
 - Eg. .../HDL/Quartus_Projects
 - **Your project folder should be placed somewhere in your personal folder path – Not in the Quartus installation directory**

Quartus Project Setup

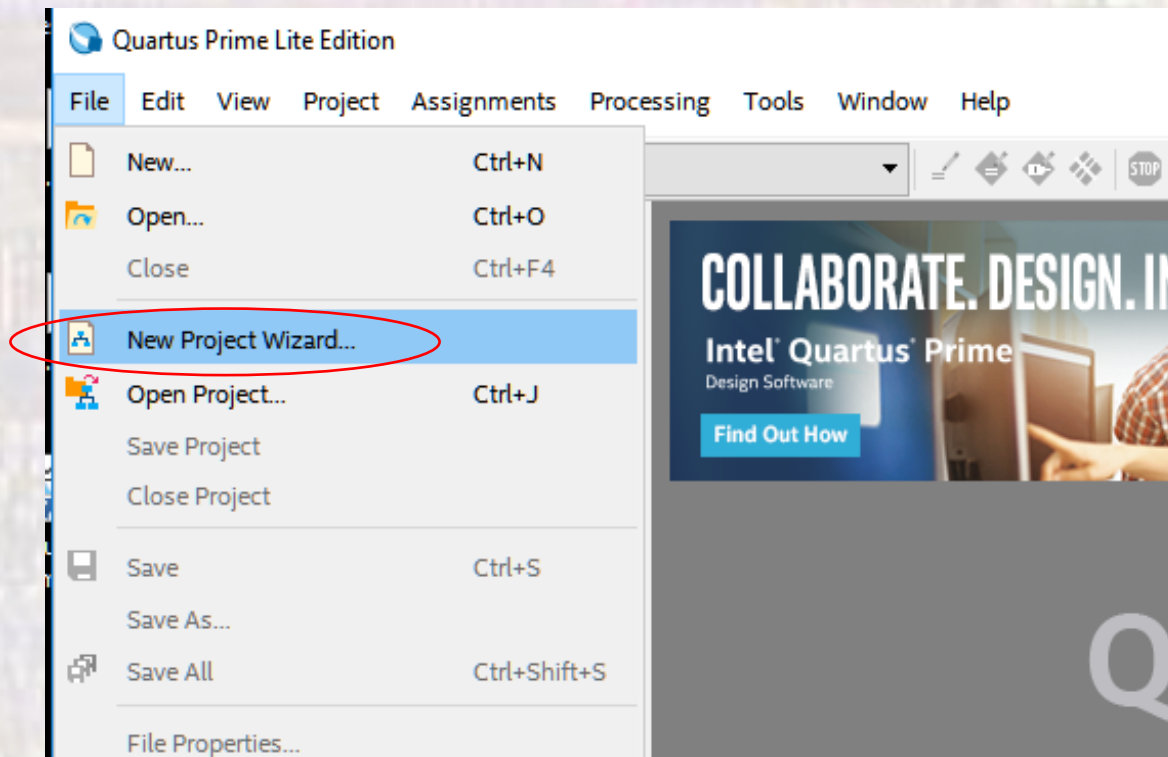
- Quartus Prime – Project Setup
 - Quartus uses directories to store projects in
 - Create a separate directory for each project
 - Eg. `.../HDL/Quartus_Projects/MyFirstDE10Project`

No spaces in the directory path

It's best to not use any special characters except `_` in the project folder name

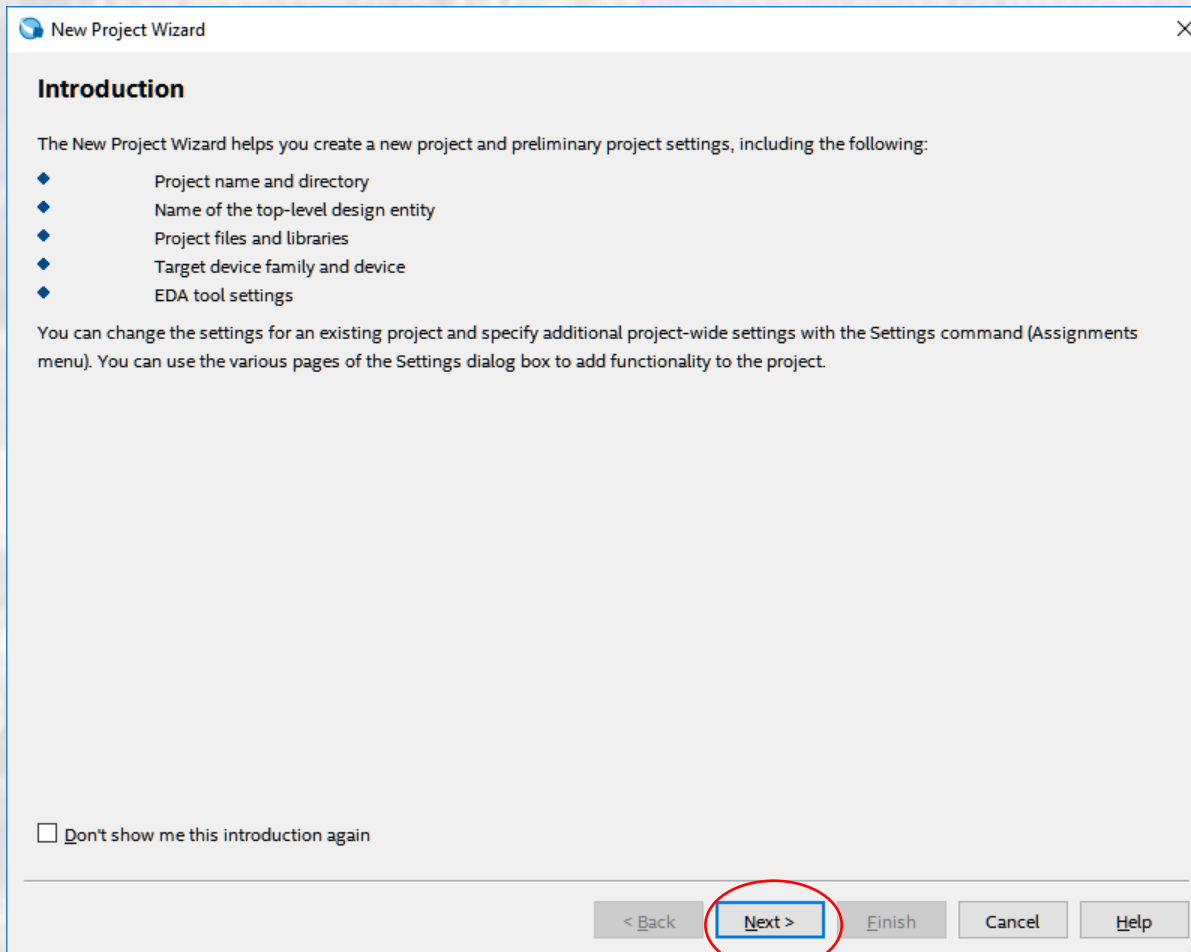
Quartus Project Setup

- Quartus Prime – Project Setup
 - Start the Quartus software
 - Under **File** – select **New Project Wizard ...**



Quartus Project Setup

- Quartus Prime – Project Setup
 - Select **Next**



Quartus Project Setup

- Quartus Prime – Project Setup
 - Select your project directory
 - Name your project
 - Your project name and top level entity name should be the same

New Project Wizard

Directory, Name, Top-Level Entity

What is the working directory for this project?

C:/.../Projects/MyFirstDE10Project

What is the name of this project?

MyFirstCounter

What is the name of the top-level design entity for this project? This name is case sensitive and must match the name of the design file.

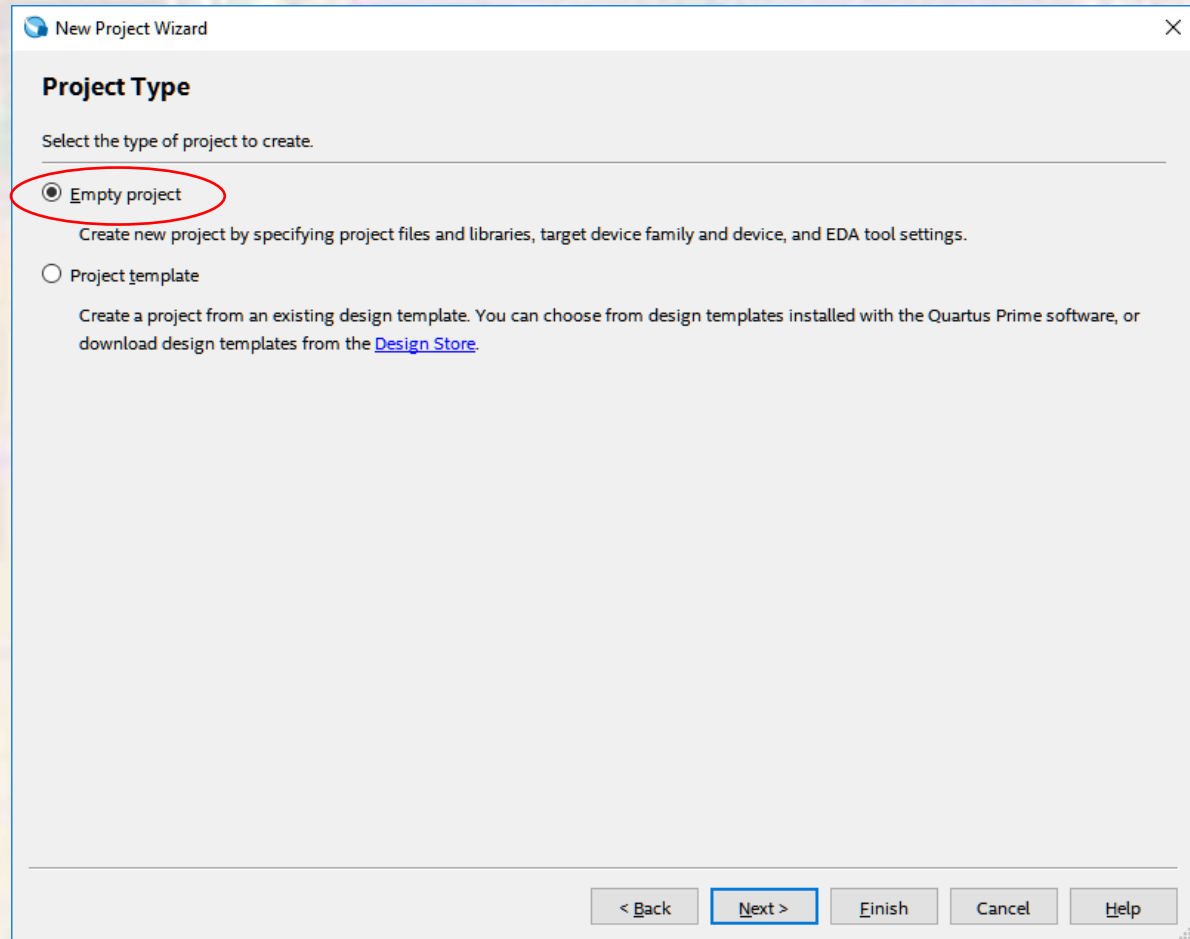
MyFirstCounter

[Use Existing Project Settings...](#)

- Click **Next**

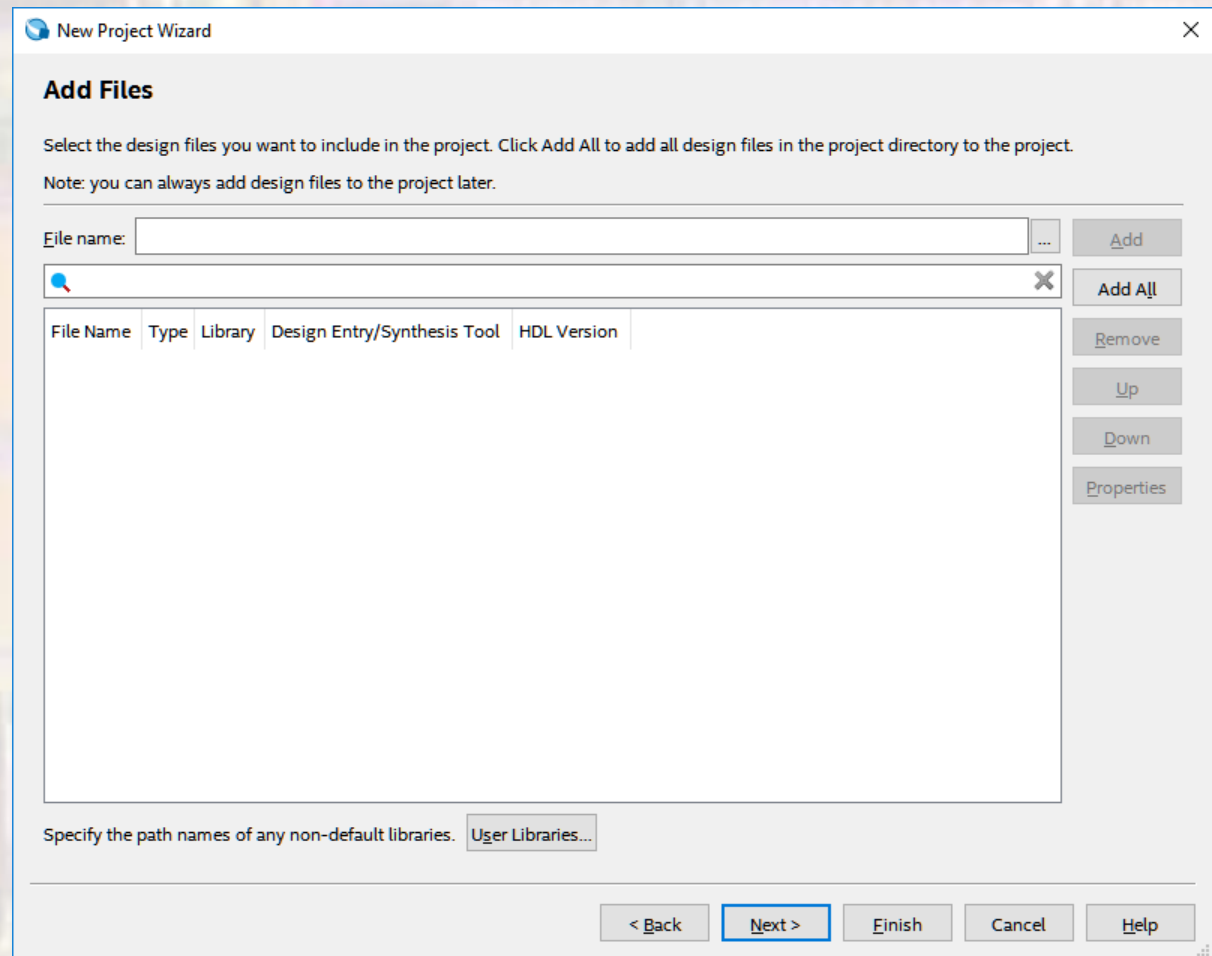
Quartus Project Setup

- Quartus Prime – Project Setup
 - Select **Empty project**
 - Click **Next**



Quartus Project Setup

- Quartus Prime – Project Setup
 - We will not add any files right now
 - Click **Next**



Quartus Project Setup

- Quartus Prime – Project Setup
 - Select **Max 10 (DA/DF/DC/SA/SC)** under Family
 - Select **Max 10 DA** under Device
 - Select **10M50DAF484C7G** under Available devices
 - Click **Next**

New Project Wizard

Family, Device & Board Settings

Device Board

Select the family and device you want to target for compilation.
You can install additional device support with the Install Devices command on the Tools menu.

To determine the version of the Quartus Prime software in which your target device is supported, refer to the [Device Support List](#) webpage.

Device family

Family: MAX 10 (DA/DF/DC/SA/SC)

Device: MAX 10 DA

Target device

Auto device selected by the Fitter

Specific device selected in 'Available devices' list

Other: n/a

Show in 'Available devices' list

Package: Any

Pin count: Any

Core speed grade: Any

Name filter:

Show advanced devices

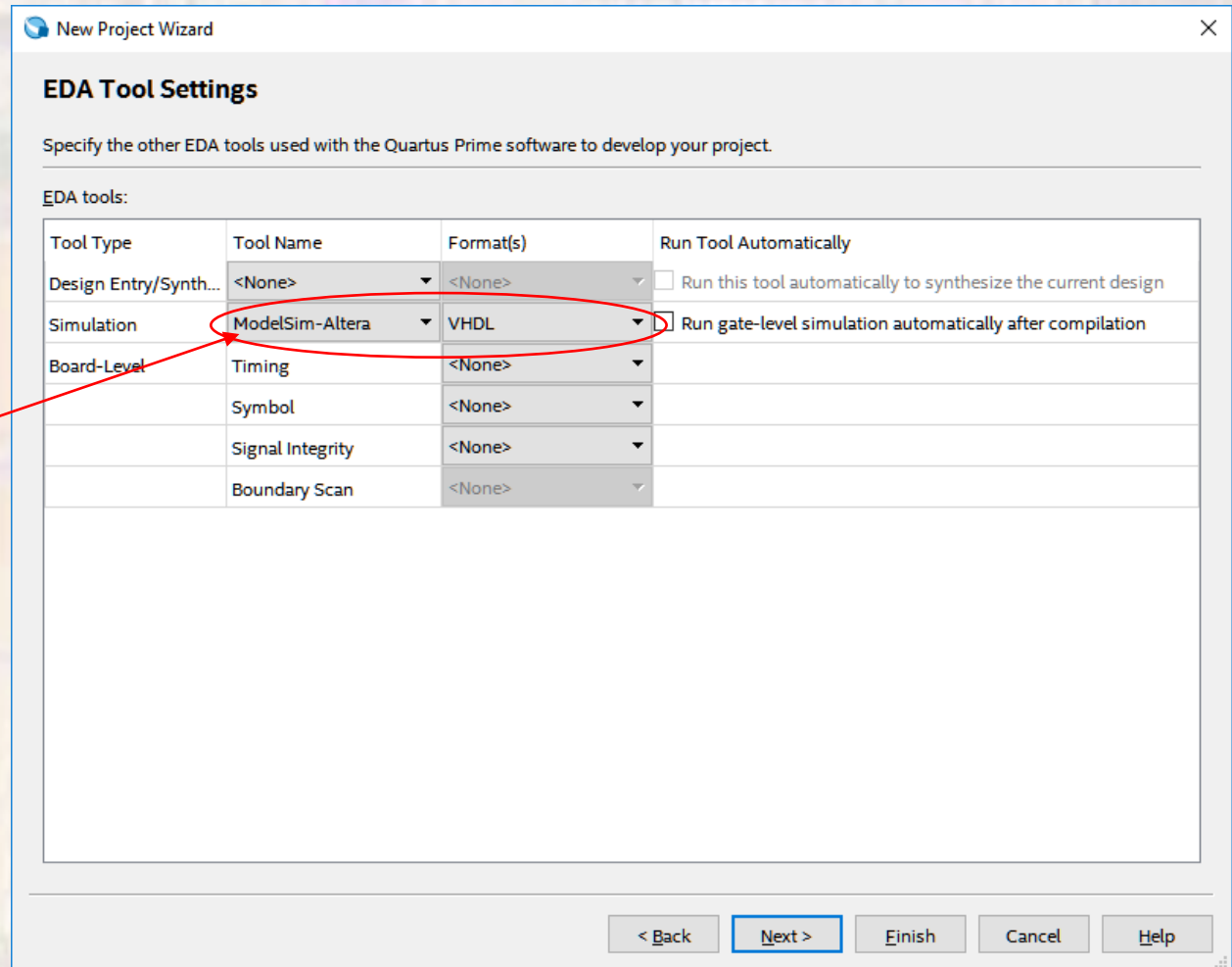
Available devices:

Name	Core Voltage	LEs	Total I/Os	GPIOs	Memory Bits	Embedded multiplier
10M50DAF484C7G	1.2V	49760	360	360	1677312	288

< Back Next > Finish Cancel Help

Quartus Project Setup

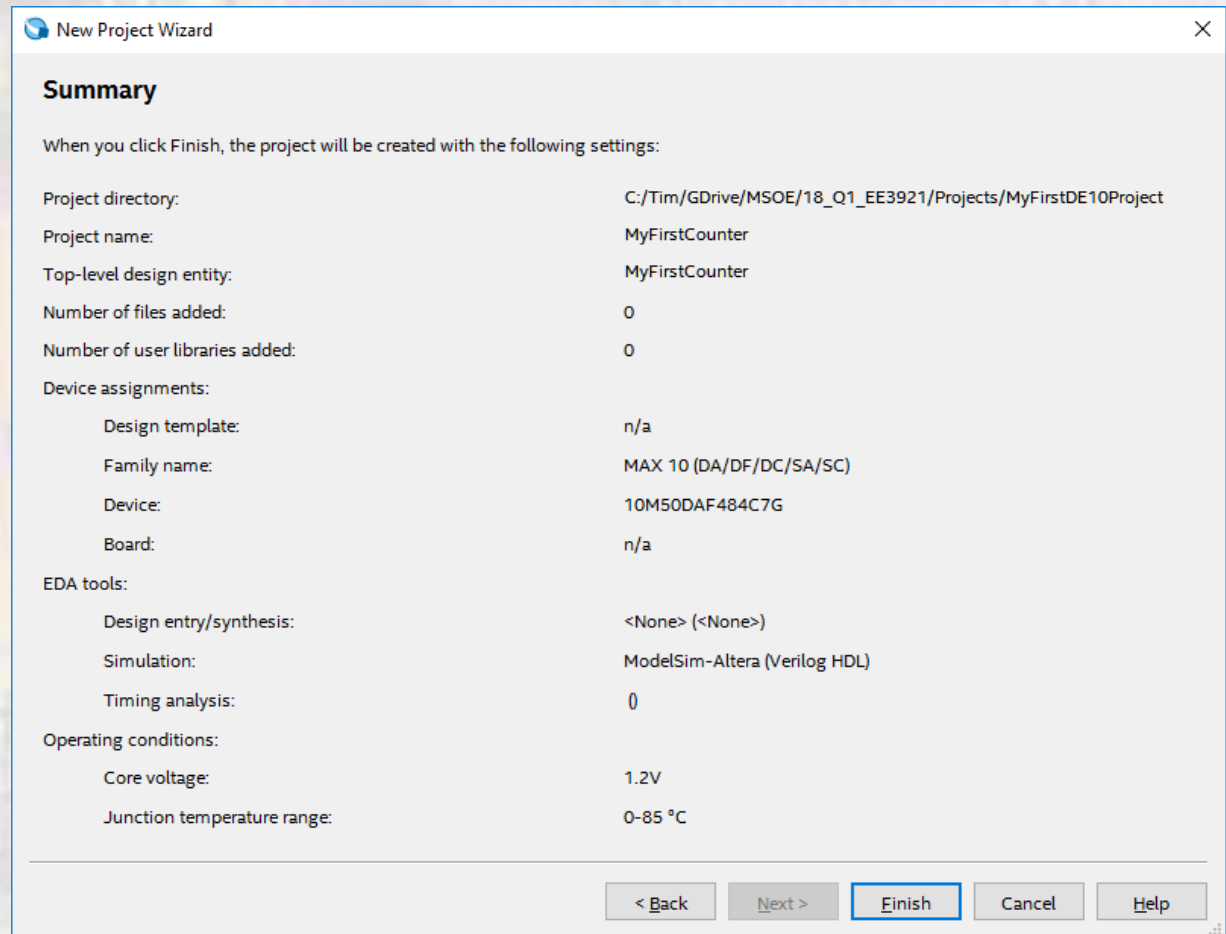
- Quartus Prime – Project Setup
 - Under simulation – select **ModelSim-Altera** and **VHDL**
 - Click **Next**



Note: ModelSim-Altera
not ModelSim

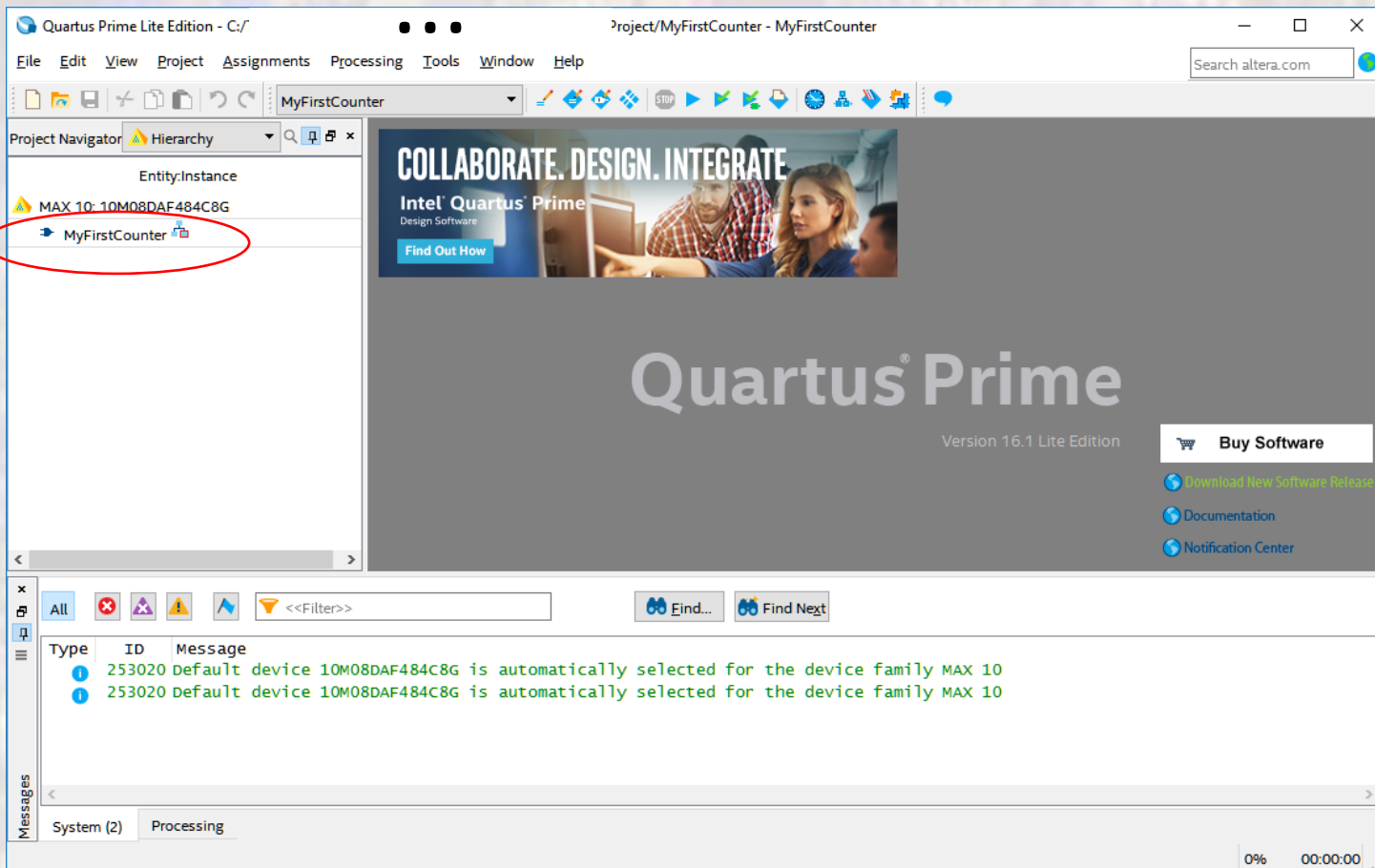
Quartus Project Setup

- Quartus Prime – Project Setup
 - You will get a summary window
 - Click **Finish**



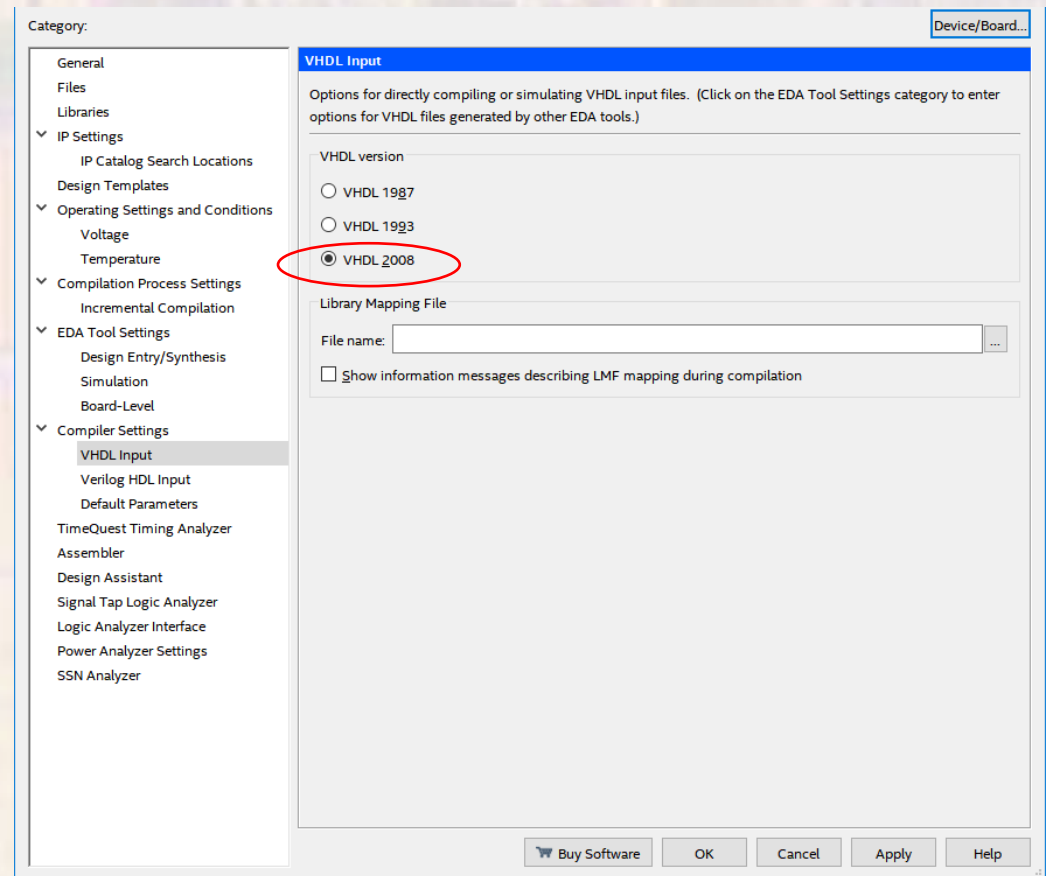
Quartus Project Setup

- Quartus Prime – Project Setup
 - Your project will now appear in the Project Navigator window



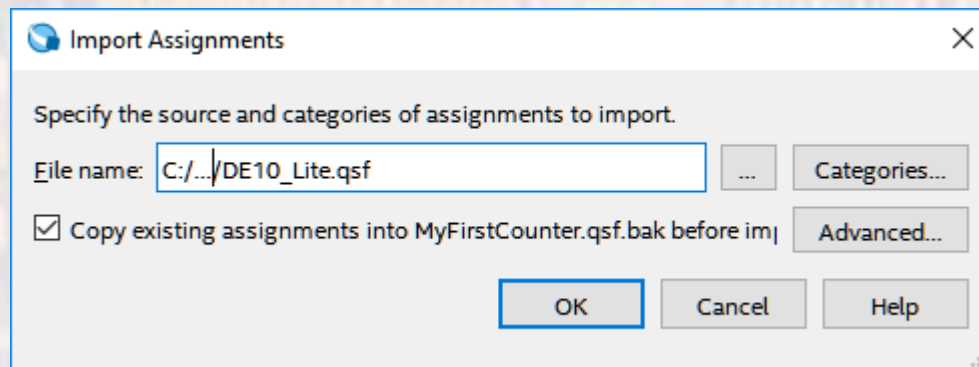
Quartus Project Setup

- Quartus Prime – Project Setup
 - We will be using the 2008 version of VHDL
 - Assignments -> Settings -> Compiler Settings -> VHDL Input
 - Select VHDL 2008



Quartus Project Setup

- Quartus Prime – Project Setup
 - If you plan to run the project on the DE10 and
 - you want to use the assigned pin names (**recommended**)
 - you need to import the DE10_Lite.qsf file from the web page
 - right click the link and **save link as** (DE10_Lite.qsf, QSF file type) in the project directory
 - **Assignments -> Import Assignments**
 - Point to your downloaded DE10_Lite.qsf file

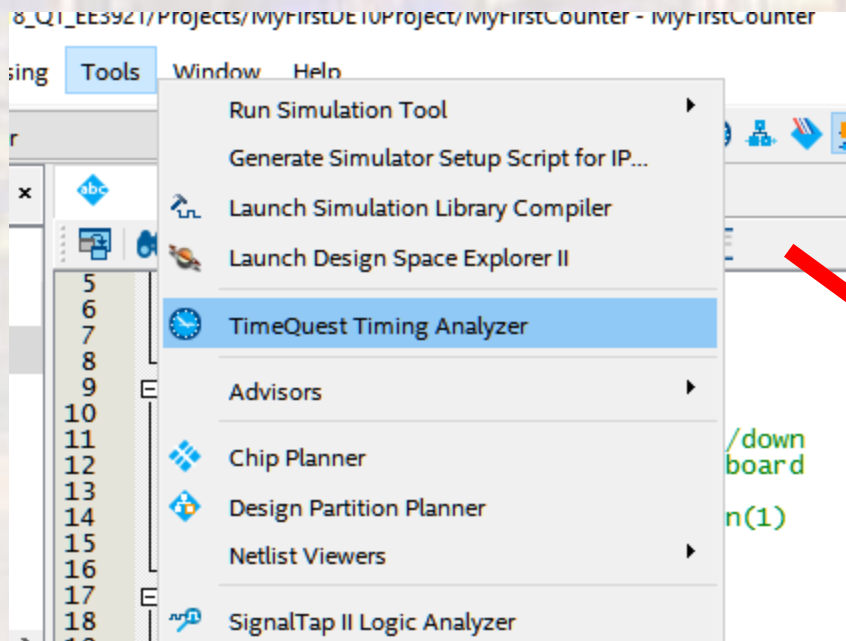


Quartus Project Setup

- Quartus Prime – Project Setup
 - Proper placement and routing requires that the design meets a set of timing requirements
 - A very basic set of timing requirements is available in the file `Basic_SDC.sdc` on the web site
 - You will use this as a starting point for each project you create

Quartus Project Setup

- Quartus Prime – Project Setup
 - Select **Tools** -> **TimeQuest Timing Analyzer**

A screenshot of the TimeQuest Timing Analyzer interface. The main window displays a 'Getting Started' page with the title 'Welcome to the TimeQuest Timing Analyzer'. Below the title, there is a paragraph of introductory text. The interface is divided into several panes: a 'Report Pane' on the left showing a table of report items, a 'Tasks Pane' on the left showing a list of tasks, and a 'View Pane' on the right showing a table of timing data. A 'Console' pane at the bottom shows command-line output. Red arrows point from text labels to these panes.

Report Pane
Lists generated report panels.

Tasks Pane
Lists common tasks you can perform. You can double-click a command to start a process in the flow.

View Pane
Displays selected report panels. You can split the View pane into sub-panes by dragging the splitter control in the upper right corner of the pane.

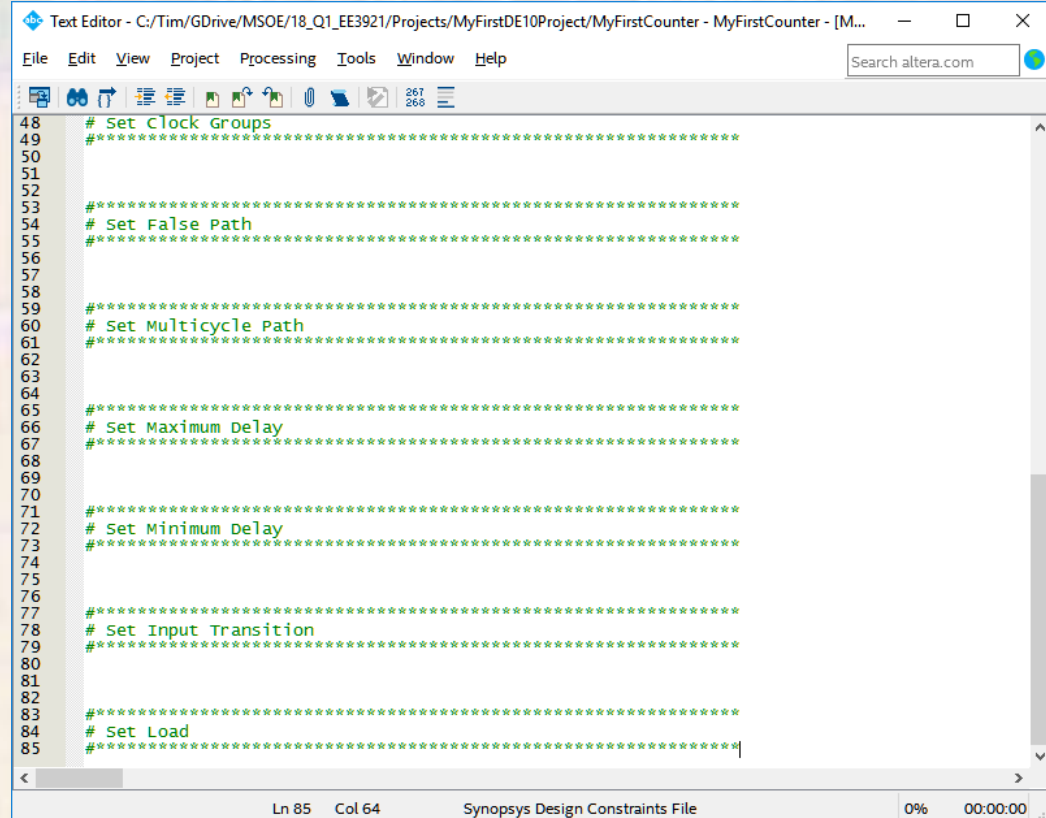
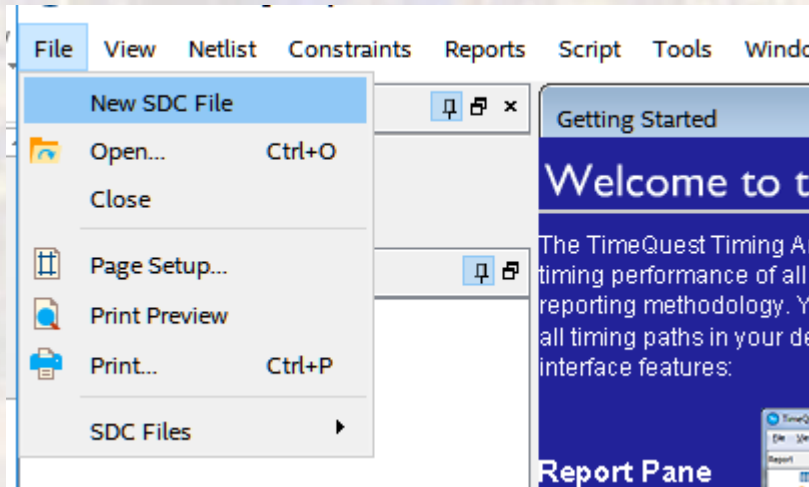
Console
Displays SDC and Tcl commands executed by the GUI or command-line.

Pin	I/O Standard	Max. Rise/Fall Time	Max. Delay	Max. Setup	Max. Hold
1	LVCMOS33	10.0 ns	0.0 ns	0.0 ns	0.0 ns
2	LVCMOS33	10.0 ns	0.0 ns	0.0 ns	0.0 ns
3	LVCMOS33	10.0 ns	0.0 ns	0.0 ns	0.0 ns
4	LVCMOS33	10.0 ns	0.0 ns	0.0 ns	0.0 ns
5	LVCMOS33	10.0 ns	0.0 ns	0.0 ns	0.0 ns
6	LVCMOS33	10.0 ns	0.0 ns	0.0 ns	0.0 ns
7	LVCMOS33	10.0 ns	0.0 ns	0.0 ns	0.0 ns
8	LVCMOS33	10.0 ns	0.0 ns	0.0 ns	0.0 ns
9	LVCMOS33	10.0 ns	0.0 ns	0.0 ns	0.0 ns
10	LVCMOS33	10.0 ns	0.0 ns	0.0 ns	0.0 ns
11	LVCMOS33	10.0 ns	0.0 ns	0.0 ns	0.0 ns

```
quartus_open -force "C:/altera/15.1/quartus/qdesigns/fir_filter/fir_filter.qpf" -rt -  
qu create_timing_netlist -mode slow  
[parallel compilation is enabled and will use 2 of the 2 processors detected]  
Low junction temperature is -40 degrees c  
High junction temperature is 100 degrees c  
All
```

Quartus Project Setup

- Quartus Prime – Project Setup
 - Select **File -> New SDC File**
 - Copy and paste the contents of Basic_SDC.sdc into the file



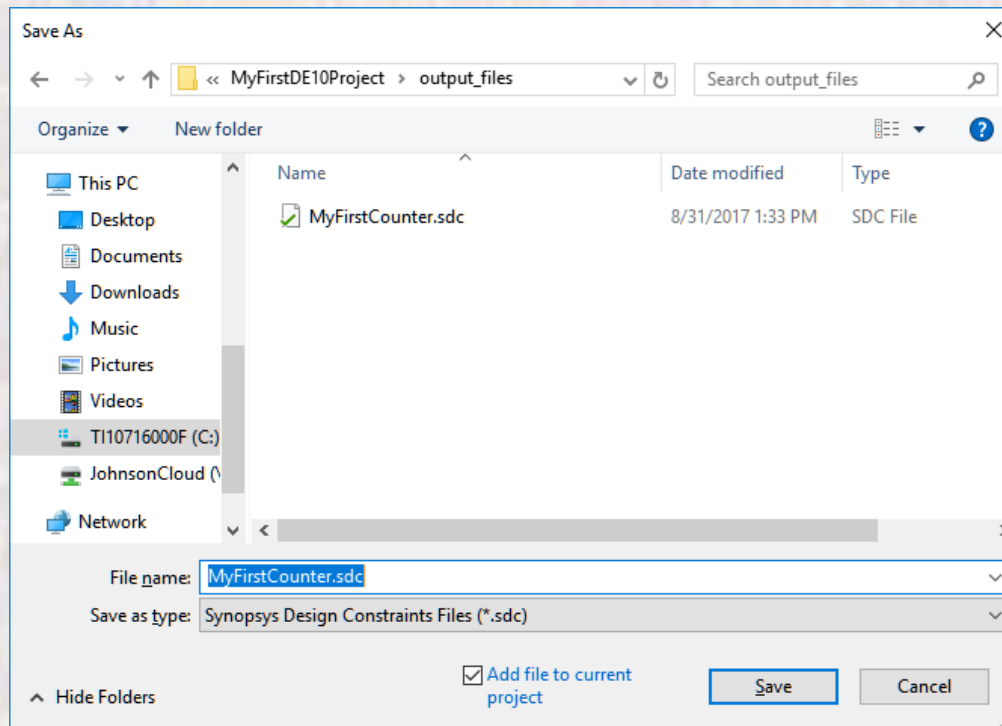
```
48 # Set Clock Groups
49 #*****
50
51
52
53 # Set False Path
54 #*****
55
56
57
58 # Set Multicycle Path
59 #*****
60
61
62
63
64 #*****
65 # Set Maximum Delay
66 #*****
67
68
69
70
71 #*****
72 # Set Minimum Delay
73 #*****
74
75
76
77
78 # Set Input Transition
79 #*****
80
81
82
83 #*****
84 # Set Load
85 #*****
```

The screenshot shows a text editor window titled 'Text Editor - C:/Tim/GDrive/MSOE/18_Q1_EE3921/Projects/MyFirstDE10Project/MyFirstCounter - MyFirstCounter - [M...'. The editor contains a Synopsys Design Constraints File with the following content:



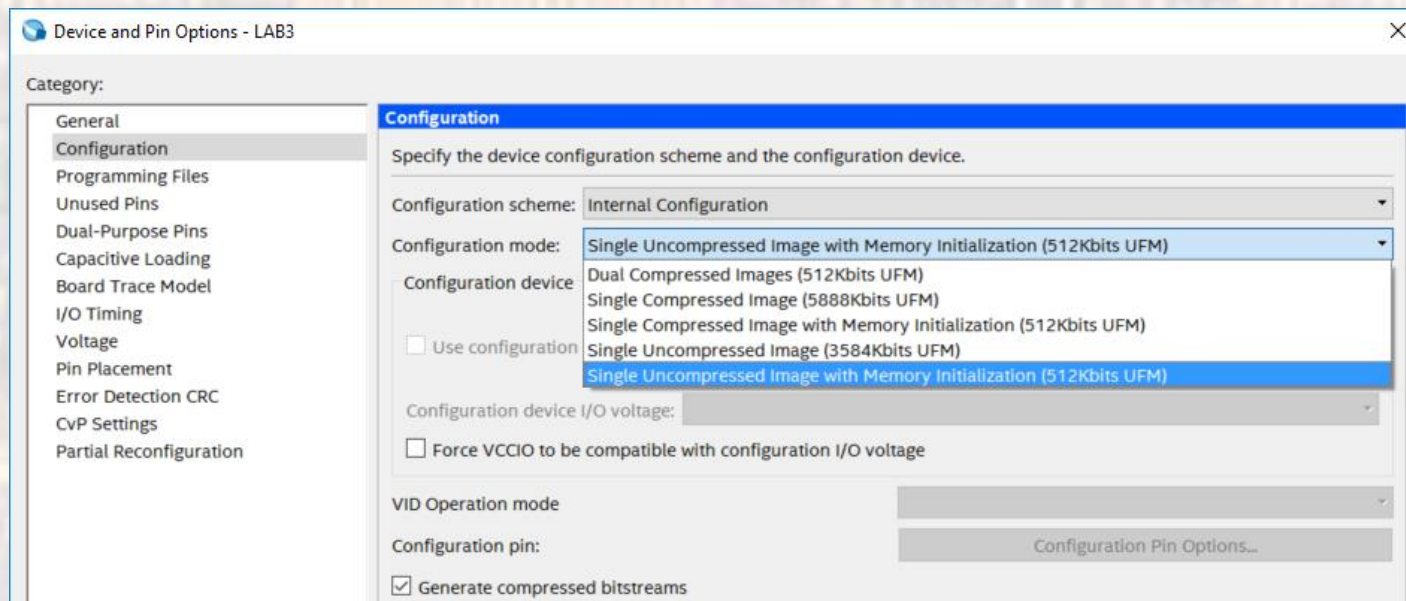
Quartus Project Setup

- Quartus Prime – Project Setup
 - Select **File** -> **Save As**
 - Name the file the same as your project name
 - It should default to your output files directory
 - Save and close the TimeQuest window



Quartus Project Setup

- Quartus Prime – Project Setup
 - Configure the tools for the DE10_Lite board
 - Assignments -> Device -> Device and Pin Options -> Configuration -> Configuration Mode
- and select
- single uncompressed Image with Memory Initialization



Quartus Project Setup

- Quartus Prime – Project Setup
- Your project is ready to use