

USER MANUAL FOR ALTERA CYCLONE

Manufactured By

Regd. Office & Works:

4A, Shree Sadgurunivas Soc.,16/5/1 Hingne

Khurd, Sinhgad Road, Pune- 411051

Ph.-020 24356456 / +91 99211 59583

Email: - support@logsun.com

Web: www.logsun.com | www.logsunonline.com

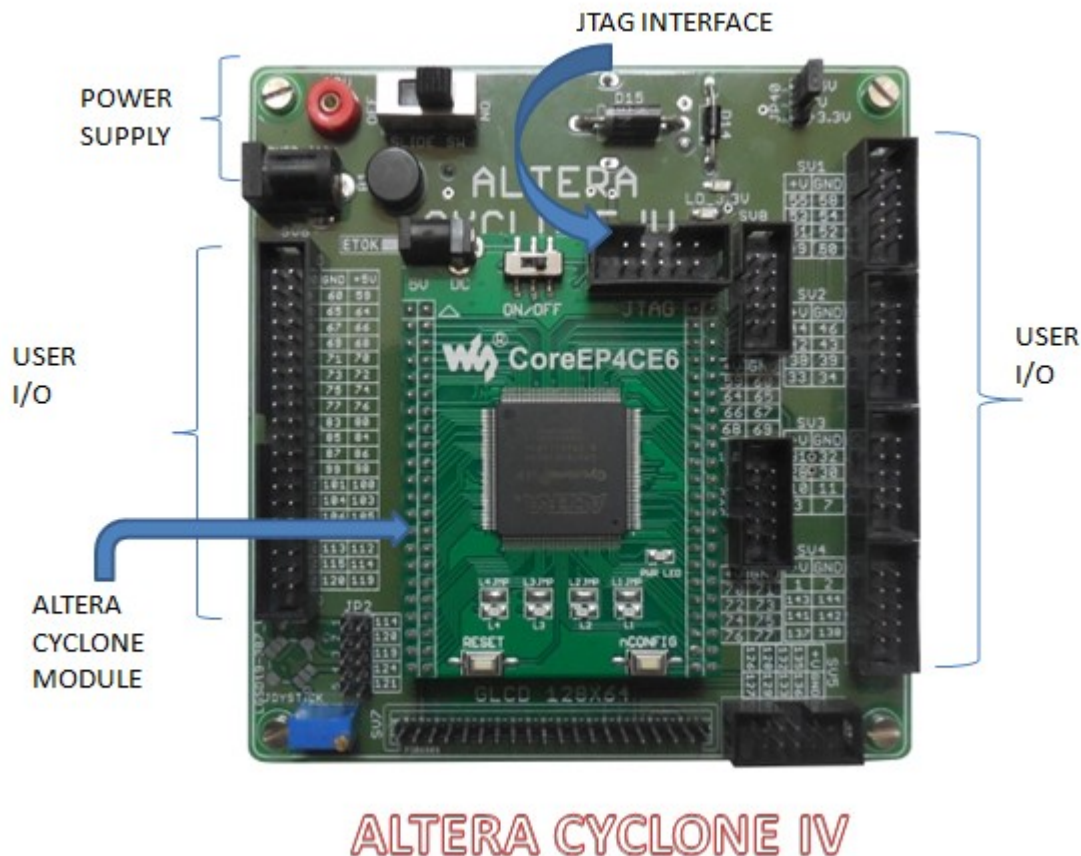
UNIVERSIAL EMBEDDED TRAINER WITH ALTERA CYCLONE IV

INDEX

SR NO.	TOPIC	PAGE NO
1	INTRODUCTION	3
2	What's On Board:	4
3	HOW TO CREATE AND UPLOAD THE PROGRAM INTO PROJECT BOARD	6
4	PIN CONFIGURATION	18
5	SCHEMATIC	21

A. ALTERA CYCLONE

A. INTRODUCTION:

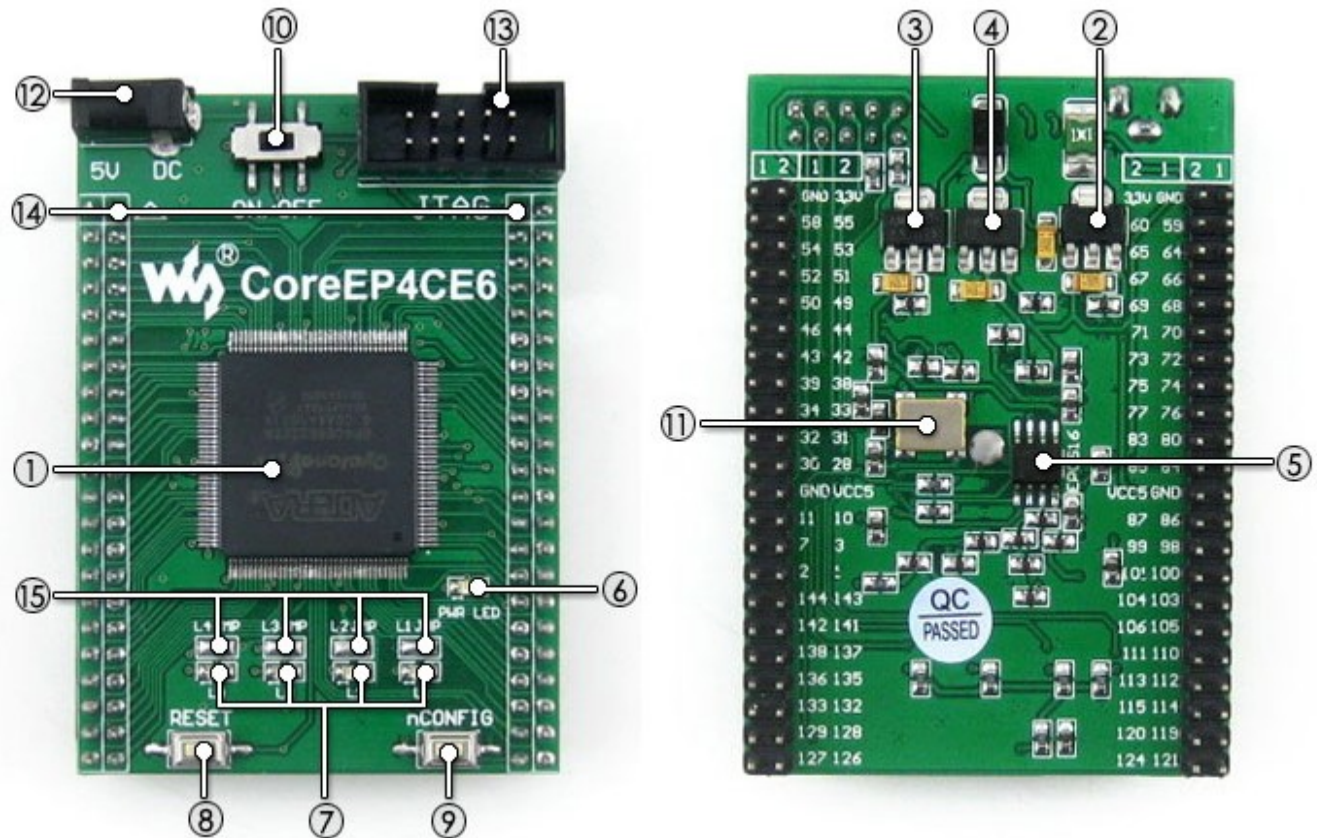


Specification:

CoreEP4CE6 is an FPGA core board that features an EP4CE6E22C8N device onboard, supports further expansion.

- Onboard Serial Configuration Device EPCS16SI8N
- Integrated FPGA basic circuit, such as clock circuit
- Onboard nCONFIG button, RESET button, 4 x LEDs
- All the I/O ports are accessible on the pin headers
- Onboard JTAG debugging/programming interface
- 2.54mm header pitch design, suitable for being plugged-in your application system

B. What's On Board:



1. EP4CE6E22C8N: the ALTERA Cyclone IV FPGA device which features:

- **Operating Frequency:** 50MHz
- **Operating Voltage:** 1.15V~3.465V
- **Package:** QFP144
- **I/Os:** 80
- **LEs:** 6K
- **RAM:** 270kb
- **PLLs:** 2
- **Debugging/Programming:** supports JTAG

2. AMS1117-3.3, 3.3V voltage regulator

3. AMS1117-2.5, 2.5V voltage regulator

4. AMS1117-1.2, 1.2V voltage regulator

5. EPCS16, onboard serial FLASH memory, for storing code

6. Power indicator

7. LEDs

8. Reset button

9. nCONFIG button: for re-configuring the FPGA chip, the equivalent of power resetting

10. Power switch

11. 50M active crystal oscillator

12.5V DC jack

13.JTAG interface: for debugging/programming

14.FPGA pins expander, VCC, GND and all the I/O ports are accessible on expansion connectors for further expansion

15.LED jumpers



Fig. Programming connections

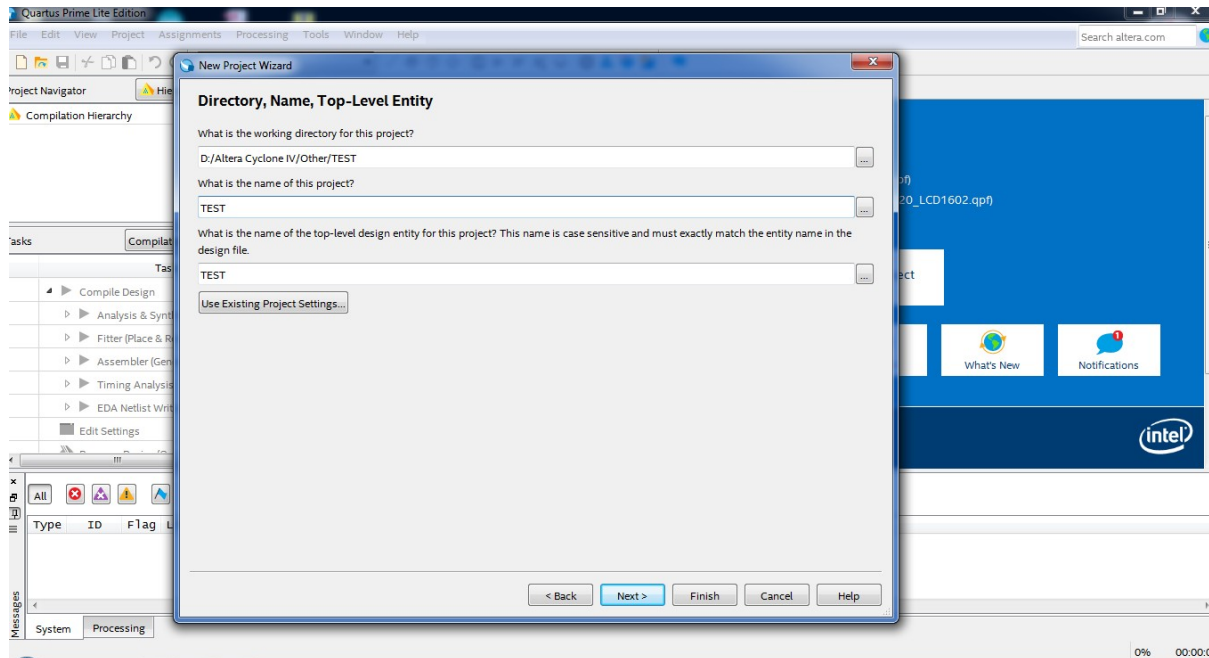
JTAG Interface:

TCK	1	2	GND
TDO	3	4	VCC(TRGT)
TMS	5	6	NC
NC	7	8	NC
TDI	9	10	GND

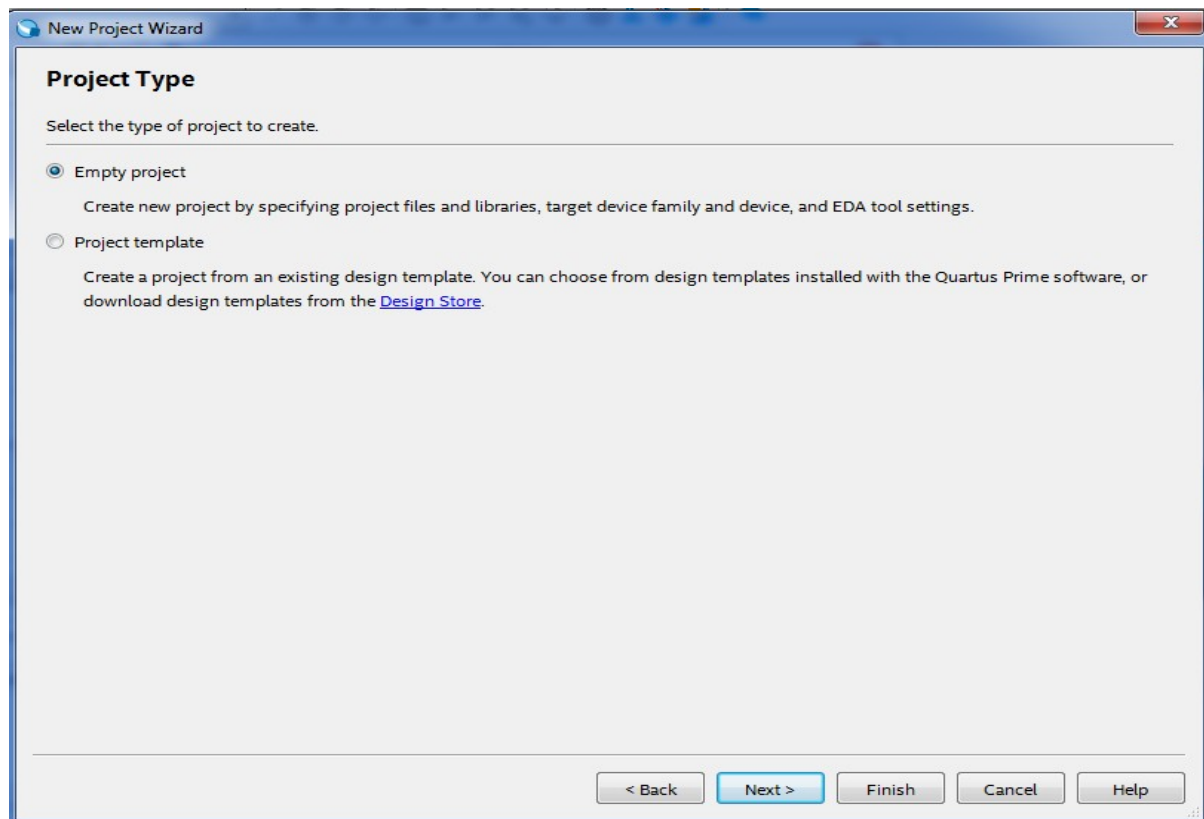
Figure: JTAG Header Pin out

C. HOW TO CREATE AND UPLOAD THE PROGRAM INTO PROJECT BOARD:

1. Open Quartus prime software → go into file menu → open new project wizard



2. Give working directory path and enter project name and click on next.
3. In next window select project type as Empty Project and click on next.



4. In next window, options to add design files will be shown up. don't add any file. click on 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: Cyclone IV E

Device: All

Target device

☐ Auto device selected by the Fitter

☒ Specific device selected in 'Available devices' list

☐ Other: n/a

Show in 'Available devices' list

Package: TQFP

Pin count: 144

Core speed grade: 8

Name filter:

☒ Show advanced devices

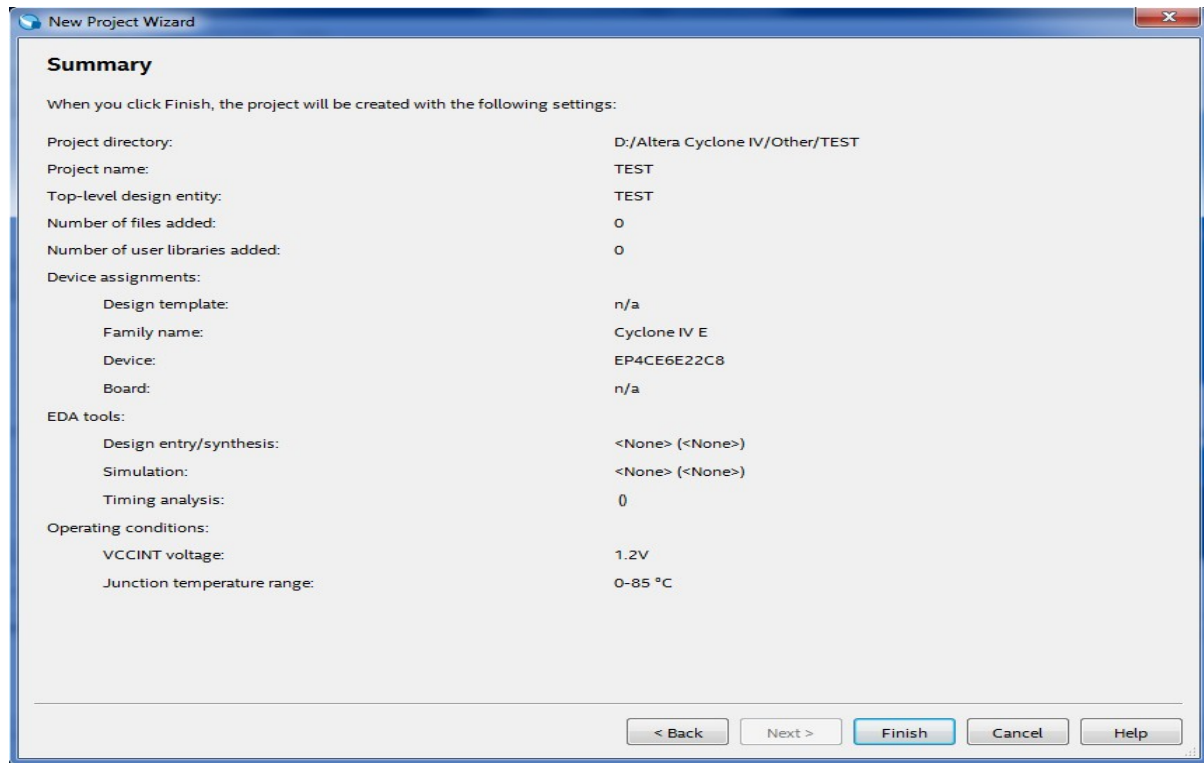
Available devices:

Name	Core Voltage	LEs	Total I/Os	GPIOs	Memory Bits	Embedded multiplier 9-bit elem
EP4CE6E22C8	1.2V	6272	92	92	276480	30
EP4CE10E22C8	1.2V	10320	92	92	423936	46
EP4CE15E22C8	1.2V	15408	82	82	516096	112
EP4CE22E22C8	1.2V	22320	80	80	608256	132

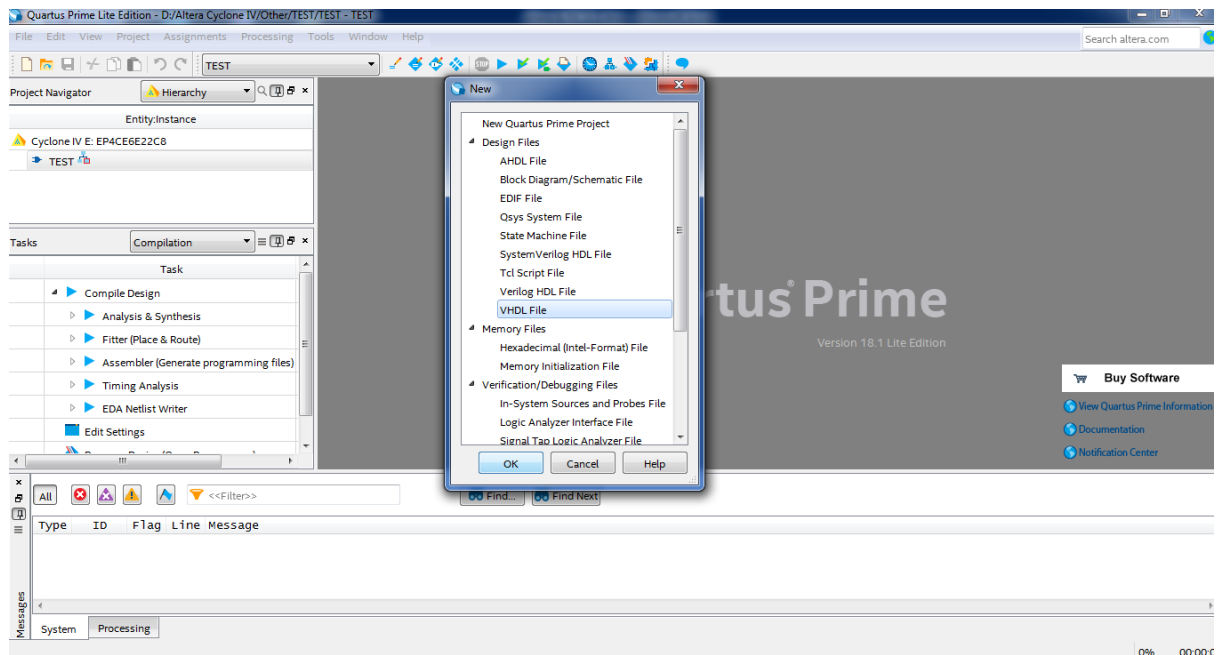
< Back | Next > | Finish | Cancel | Help

5. In EDA tool Setting Window, Click on Next.

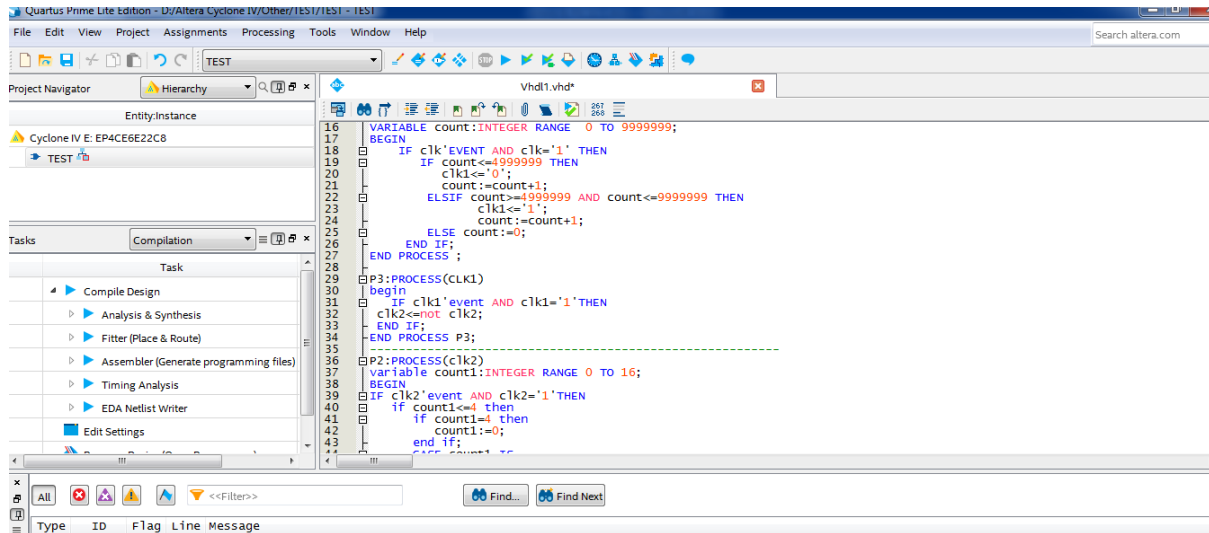
6. Next window of Summary will be shown up. Click on Finish.



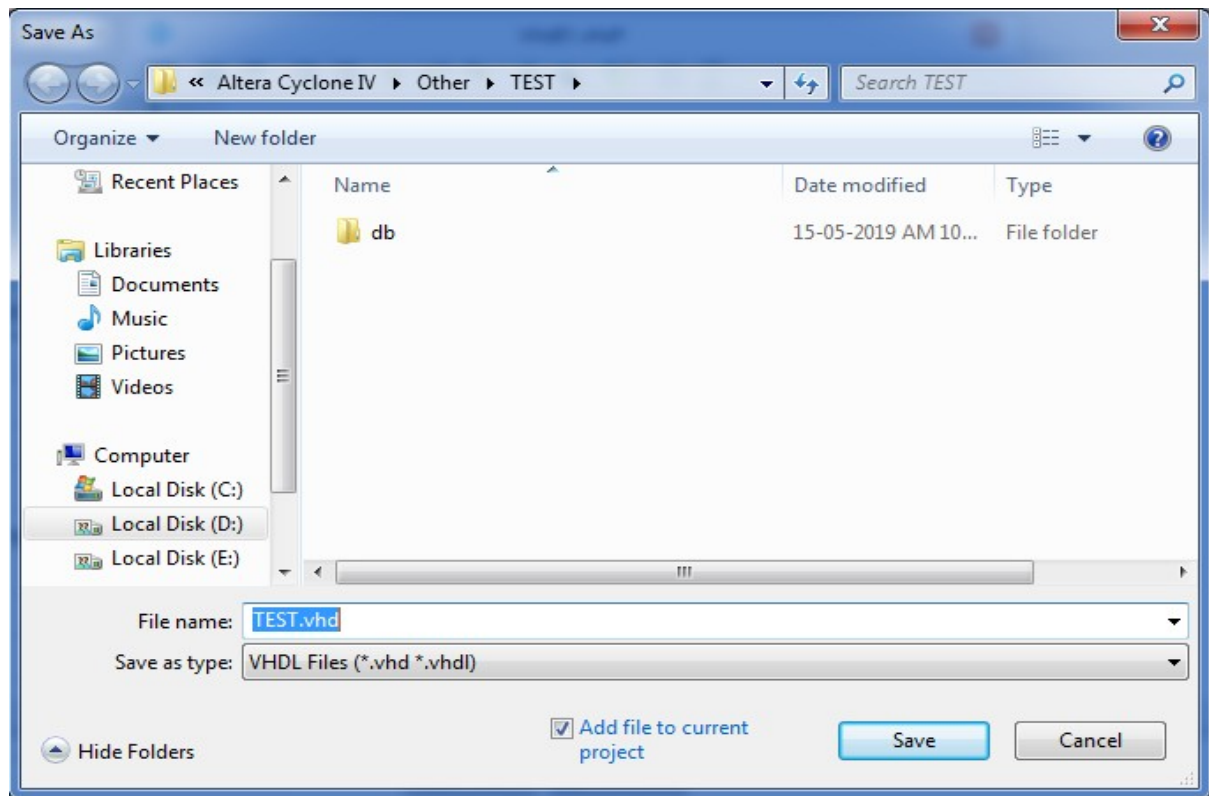
7. Click on New file menu, Select VHDL file & click OK.



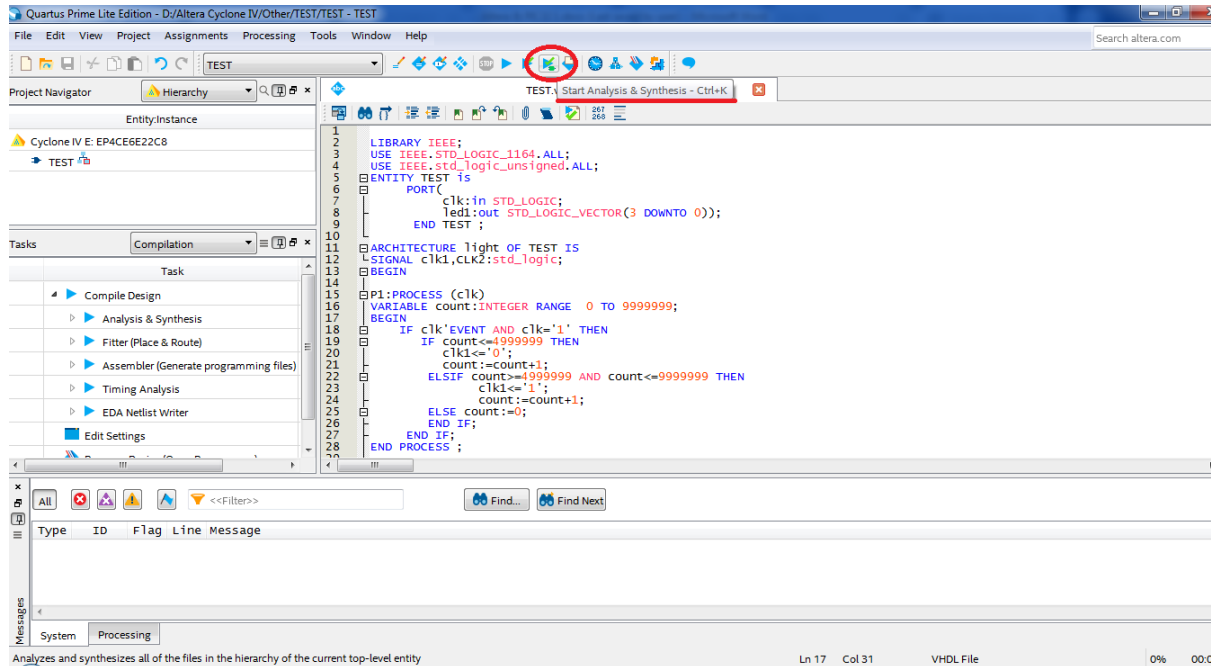
8. Write VHDL code here with the same entity name while creating project.



9. Once done, go to File menu → Click on Save as → Give any name to file (e.g. TEST.vhd). Extension should be .vhd only.

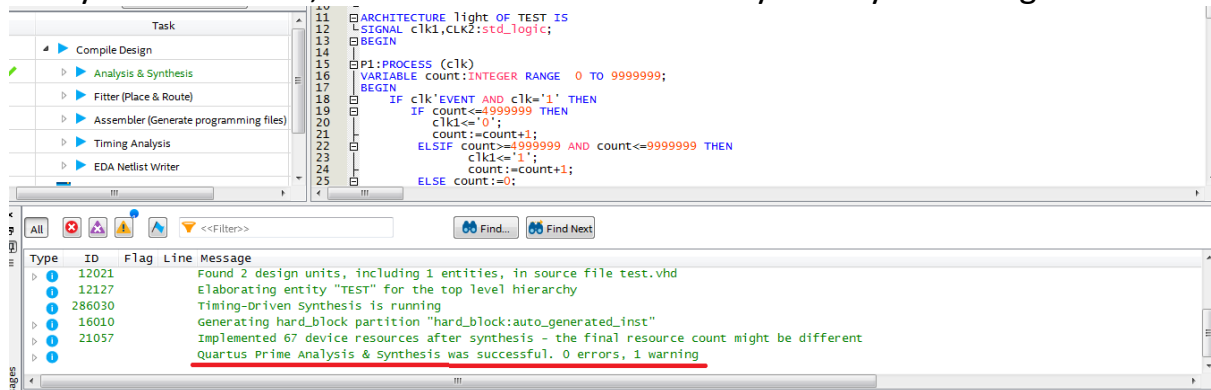


10. After saving file, click on Start Analysis & Synthesis Button. Or press Ctrl+K

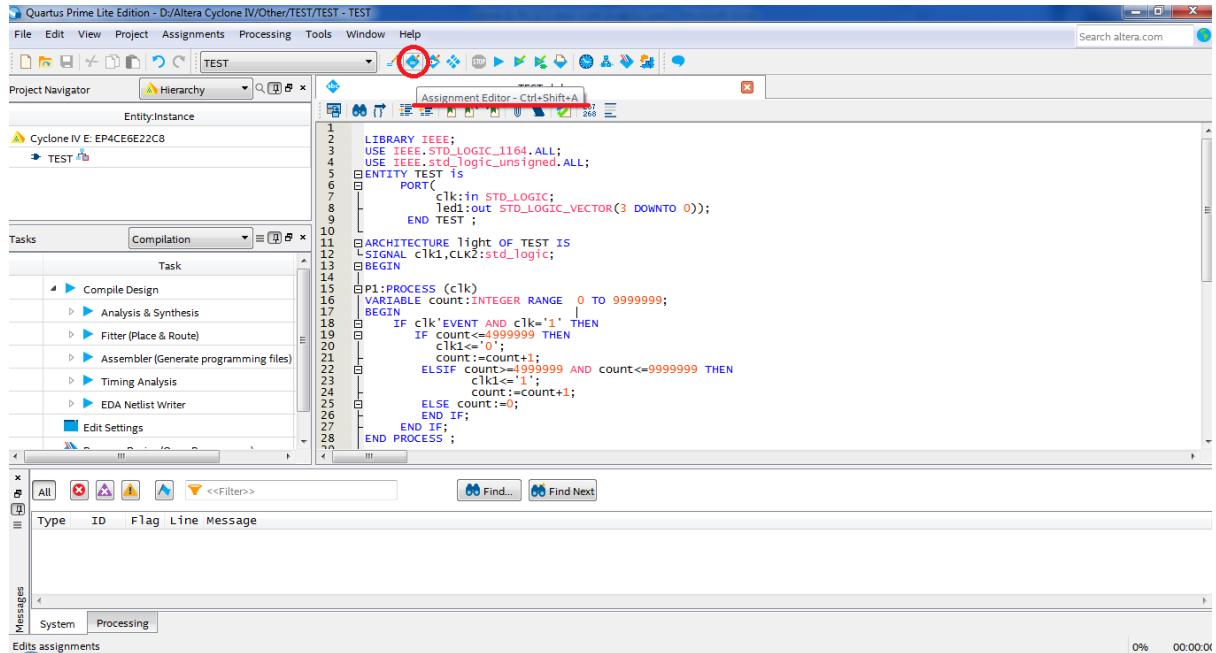


11. Once Analysis & Synthesis gets started, Compilation Reports window gets opened automatically. Watch for Quartus Prime Analysis & Synthesis was successful message.

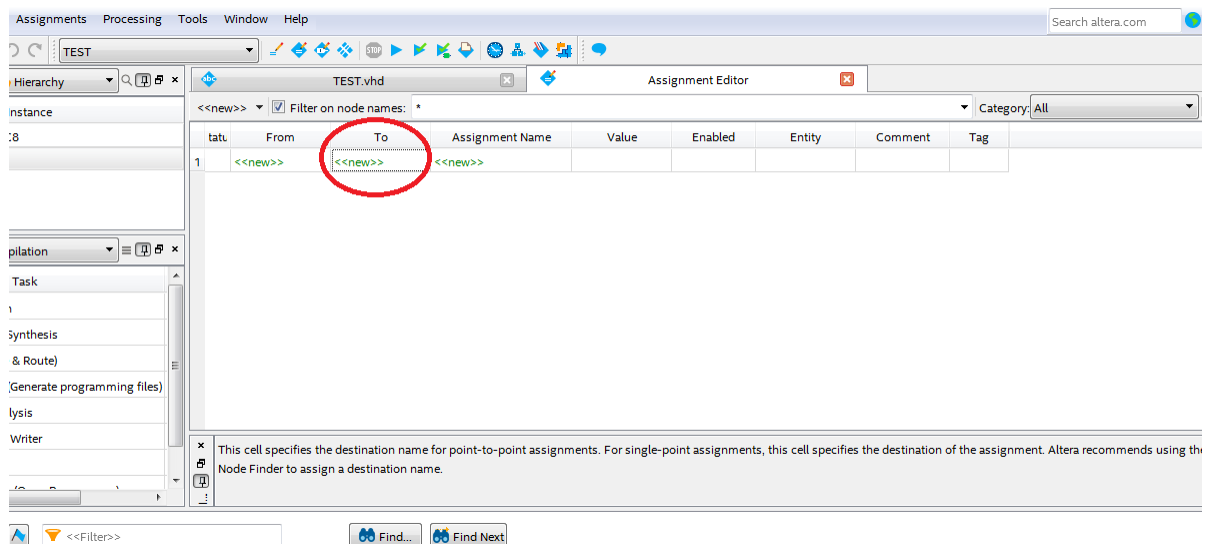
12. If any error is found, solve that error & Start Analysis & Synthesis again.



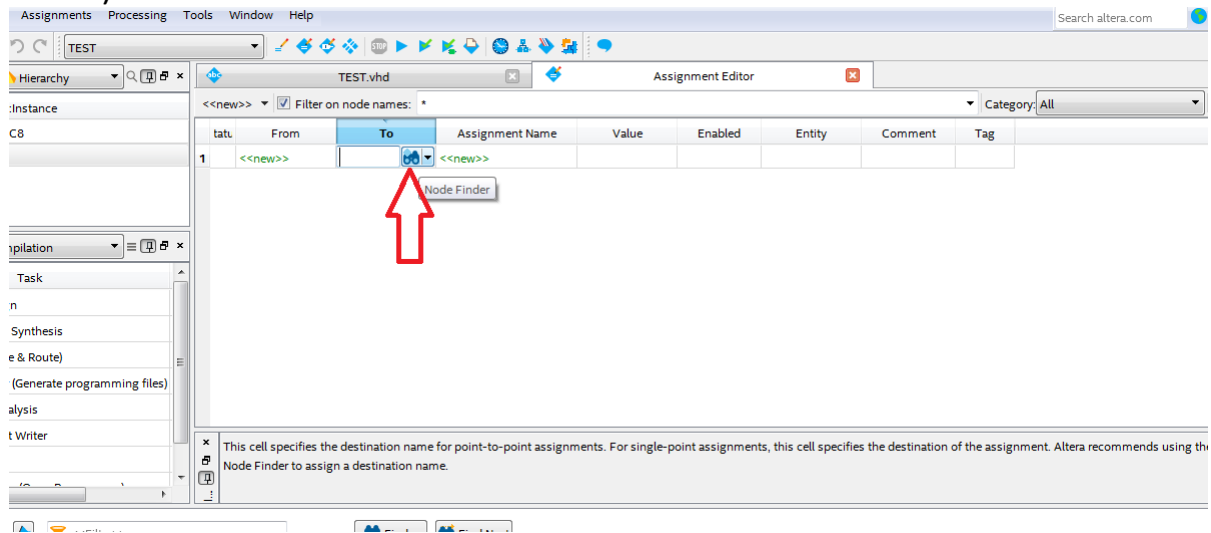
13.Once done, click on Assignment Editor Button.



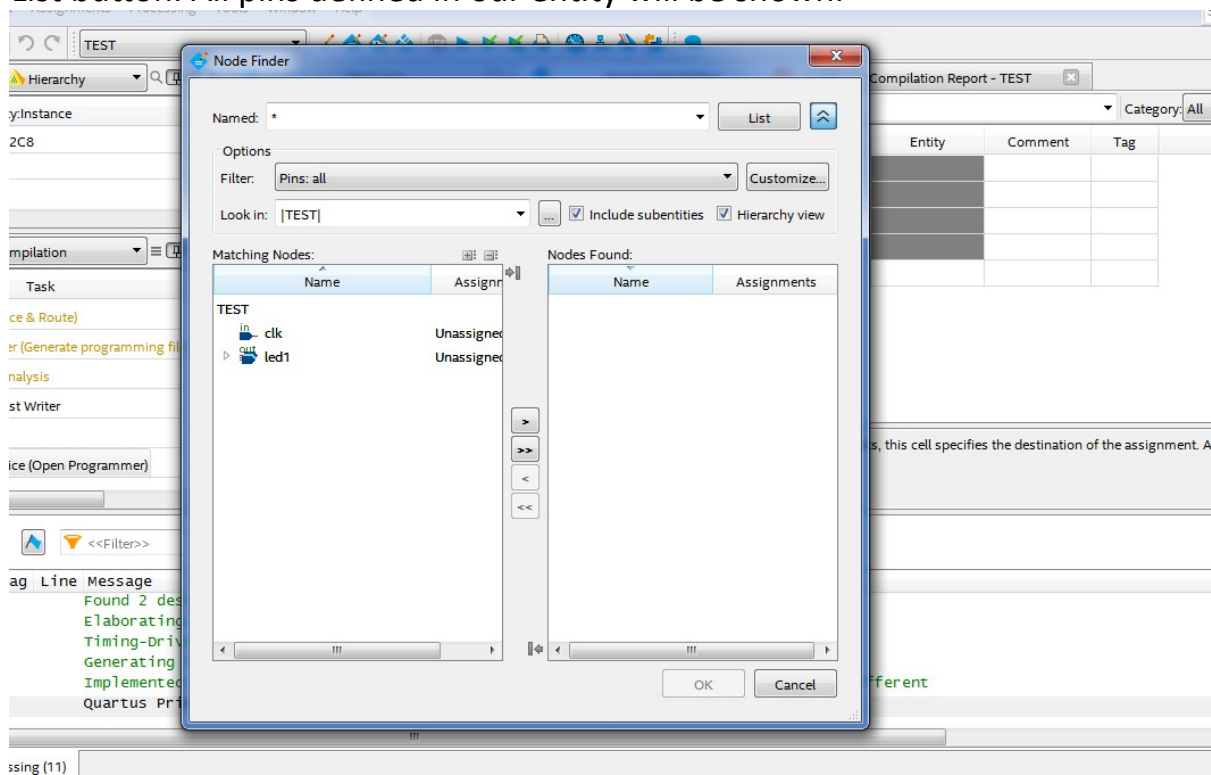
14.Following window will get opened. Double click on <<new>> option below To.



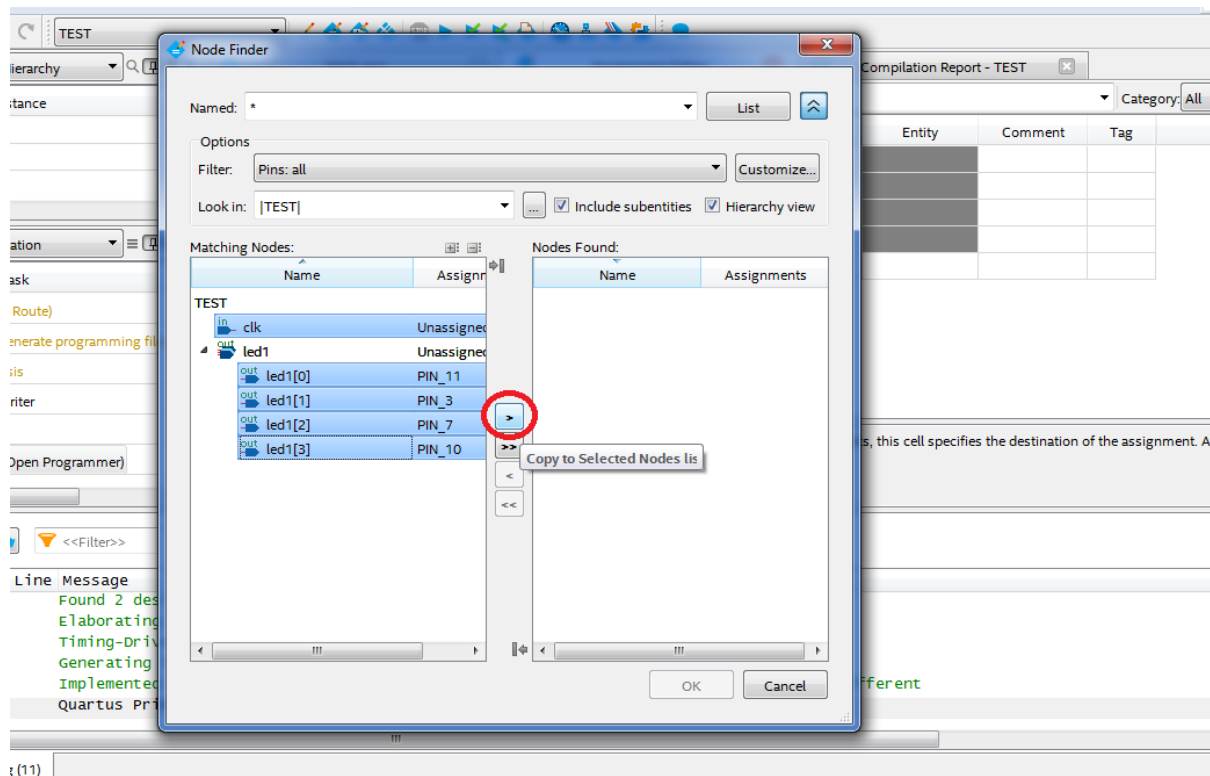
15. Node Finder Button will get appeared. Click on that Node Finder button (not drop down arrow).



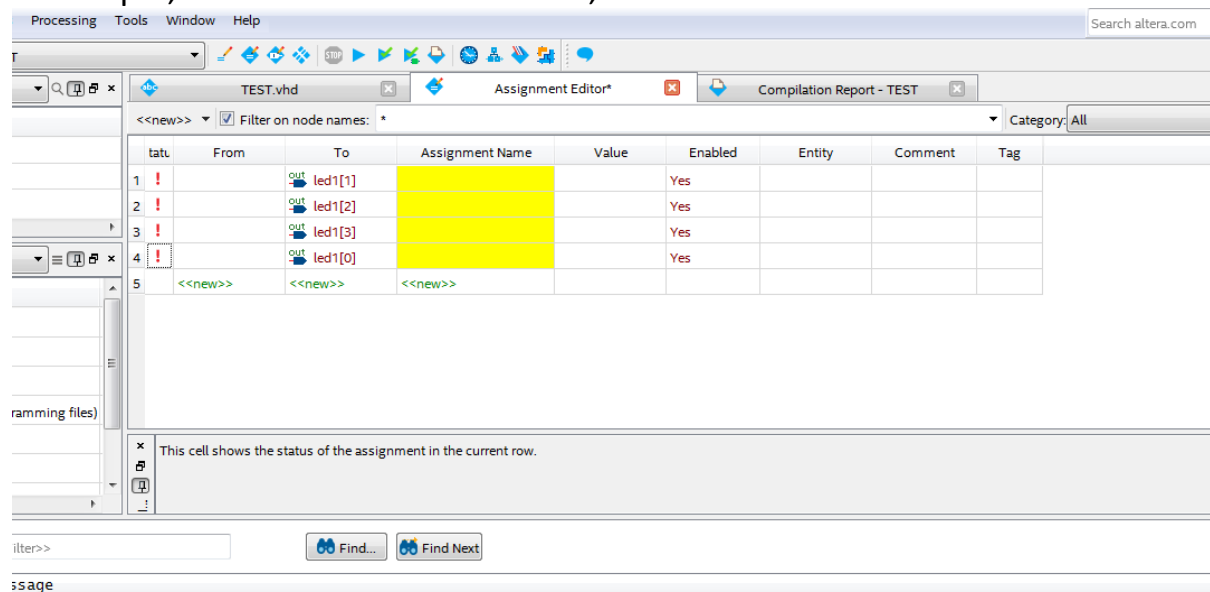
16. Following window will get opened. In that window, Select Filter to Pins: all & Click on List button. All pins defined in our entity will be shown.



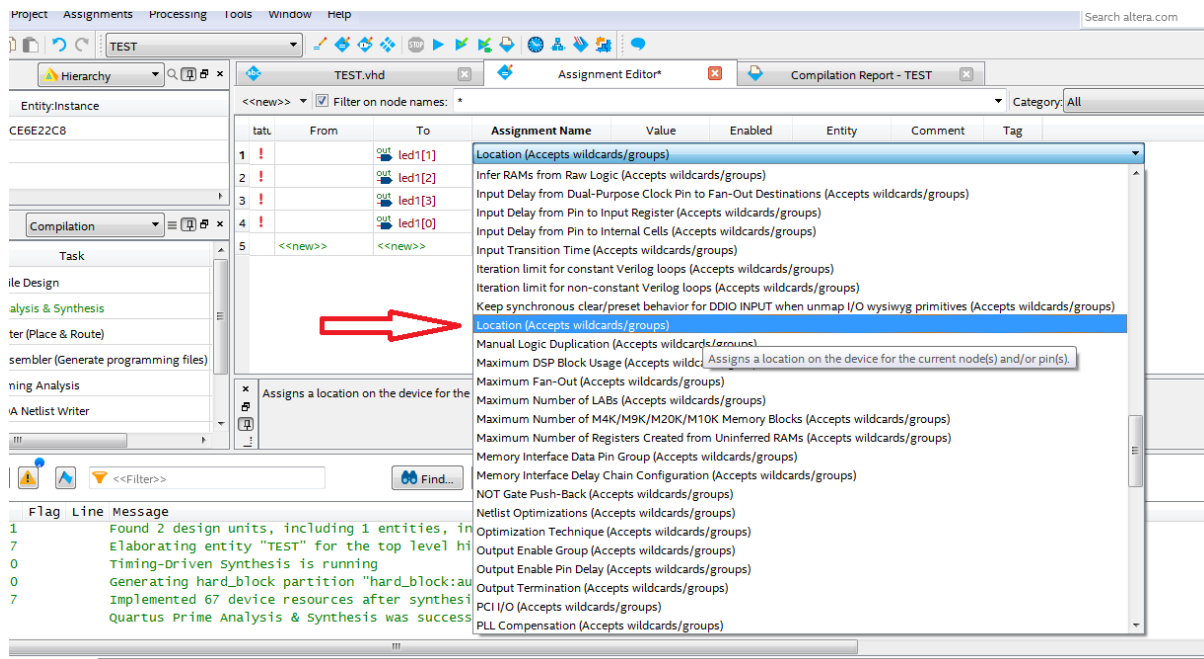
17. Select Pins one by one by pressing Shift +Left Click Button of Mouse. & Click > button at the middle. Click OK.



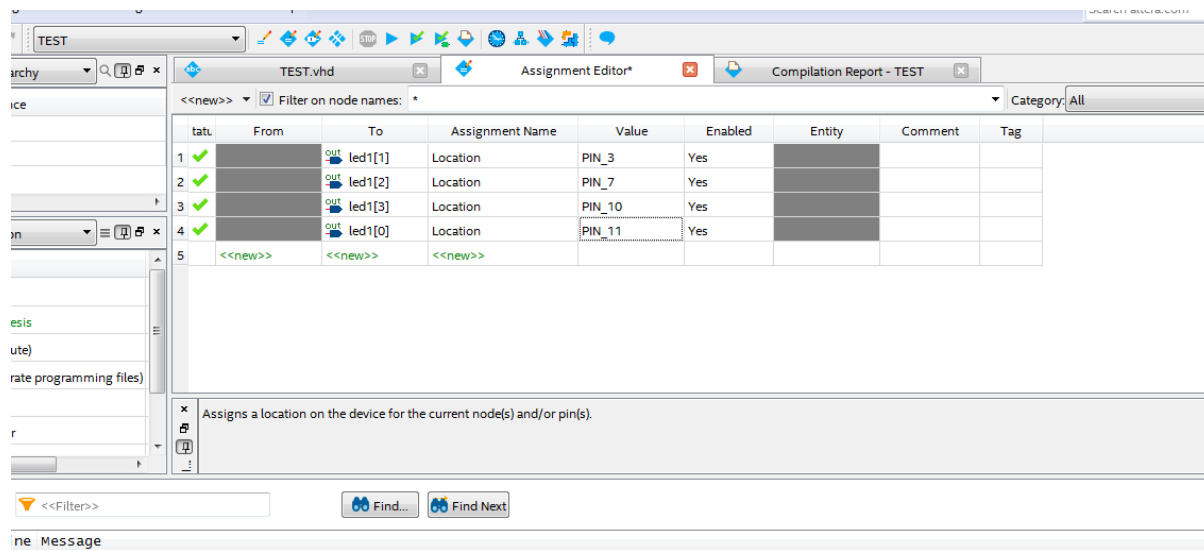
18. Pins will get added & following window will appear. Now, In Assignment Name Column of first pin, Double click on Yellow box,



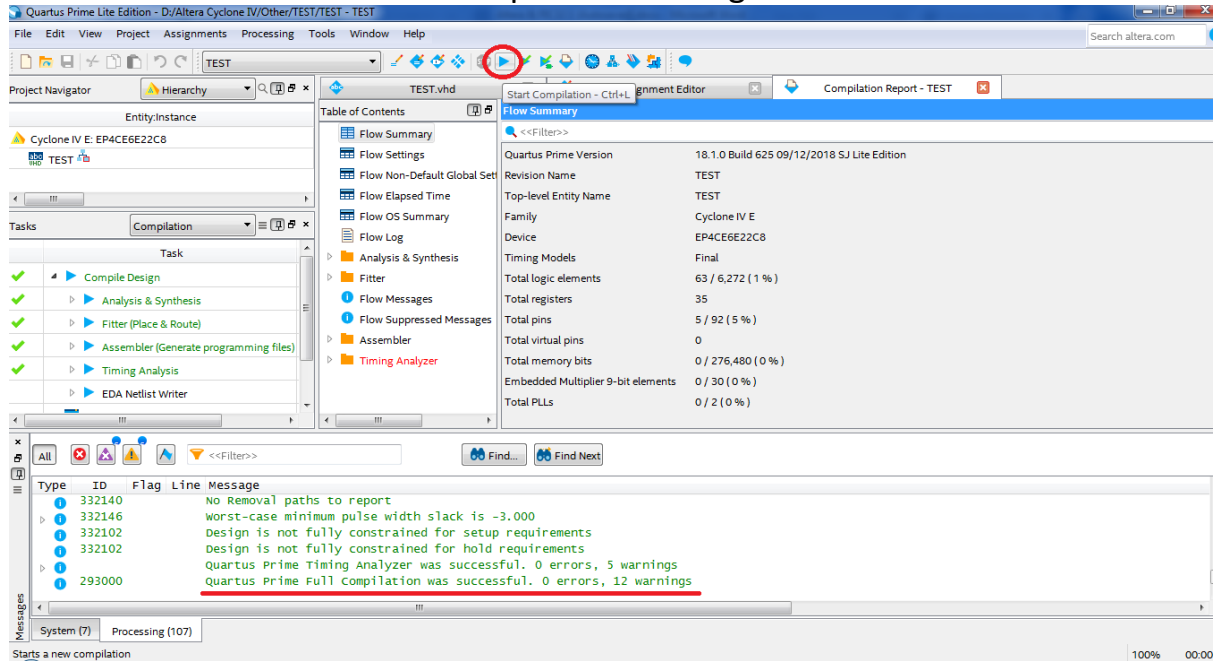
19. Drop down menu will appear. Select Location as an assignment name on all pins. Do this for all the pins.



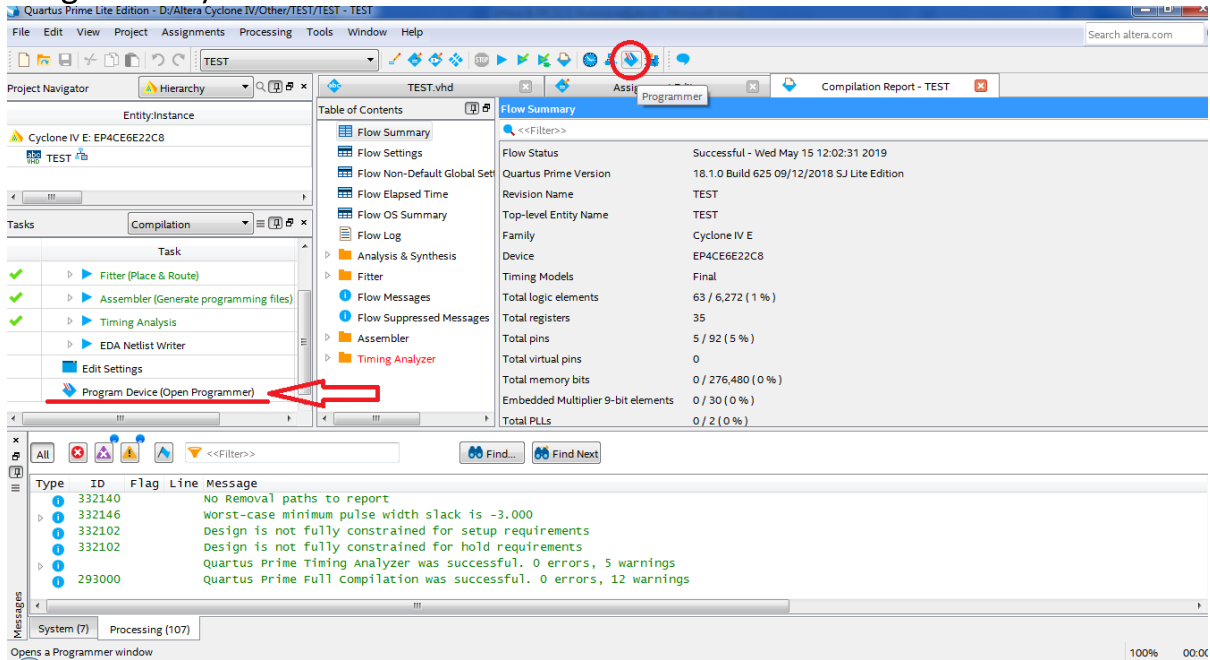
20. Now, in value column of all the pins, Type appropriate Pin number we want to assign.



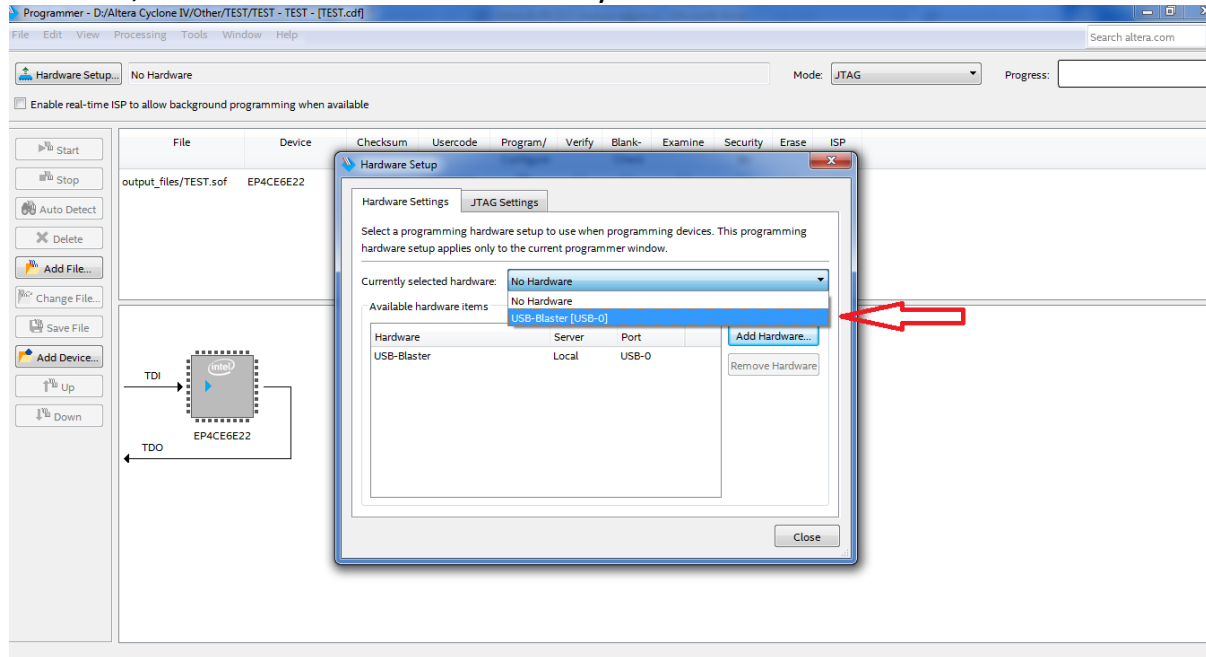
21. Once done, Save the progress by Pressing Ctrl+S. Now, Click on Start Compilation button. Check for Successful compilation message.



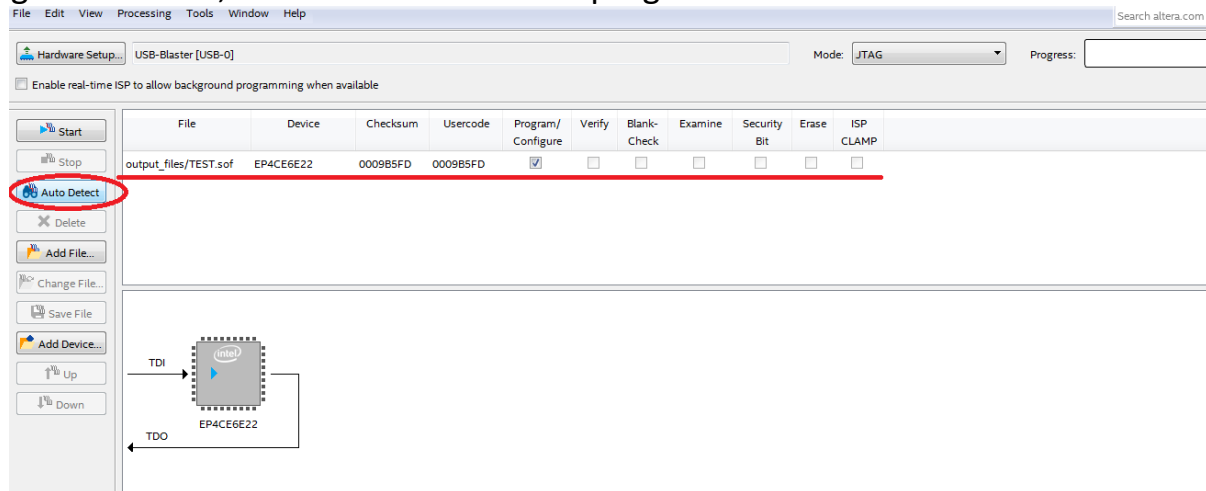
22. Now click on Programmer button on top or double click on Program Device (Open Programmer) in task window.



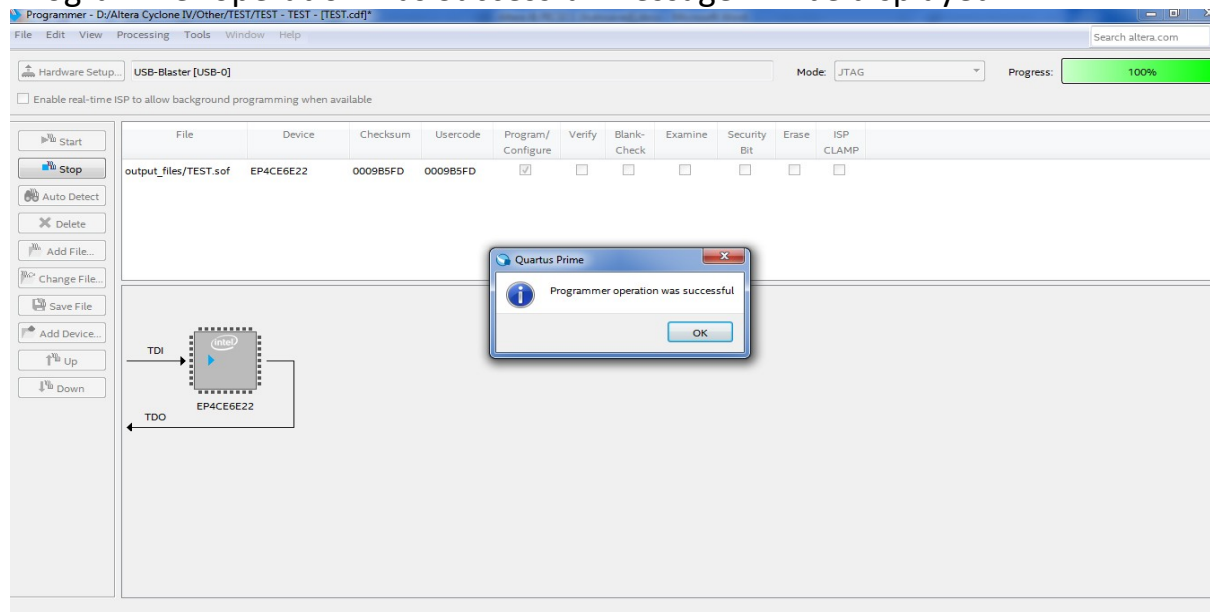
23. Programmer window will open. Click on Hardware Setup button on top left. In that window, select USB-Blaster in Currently Selected Window. & Close.



24. Now, Click on Auto Detect to detect the connected device automatically. Once device gets detected, click on Start button to program.



25. Programmer operation was Successful Message will be displayed.



D. PIN CONFIGURATION:

SV1:

VCC	GND
55	58
53	54
51	52
49	50

SV2:

VCC	GND
44	46
42	43
38	39
33	34

SV3:

VCC	GND
31	32
28	30
10	11
3	7

SV4:

VCC	GND
1	2
143	144
141	142
137	138

SV5:

VCC	GND
135	136
132	133
128	129
126	127

SV8:

VCC	GND
59	60
64	65
66	67
68	69

SV9:

VCC	GND
70	71
72	73
74	75
76	77

SV6:

GND	VCC
60	59
65	64
67	66
69	68
71	70
73	72
75	74
77	76
83	80
85	84
87	86
99	90
101	100
104	103
106	105
111	110
113	112
115	114
120	119

SV7 GLCD 128X64:

1	GND
2	+5V
3	POT
4	+5V
5	73
6	75
7	77
8	83
9	85
10	87
11	99
12	101
13	104
14	106
15	111
16	113
17	115
18	POT
19	+5V
20	GND