



*Department of Electrical & Computer Engineering*

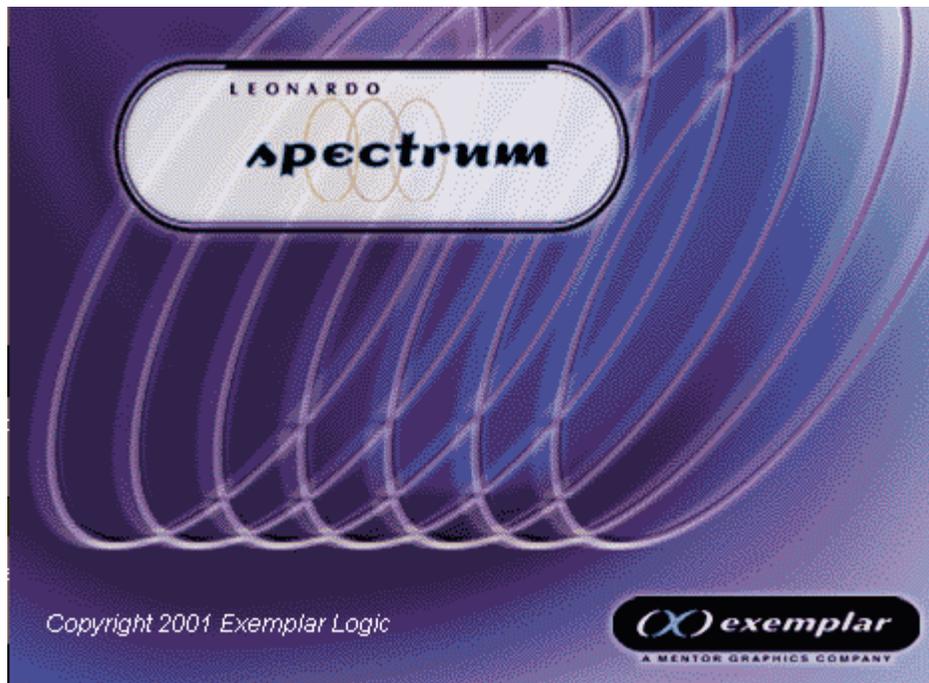
# LeonardoSpectrum Tutorial

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## LeonardoSpectrum Features

LeonardoSpectrum runs on Windows 95/98/2000/NT/XP and UNIX Sun and HP platforms. The tool suite can be configured into three different levels of capability. and, a native Windows graphical user interface (GUI) is common to all three levels. The following features are common to all three levels:

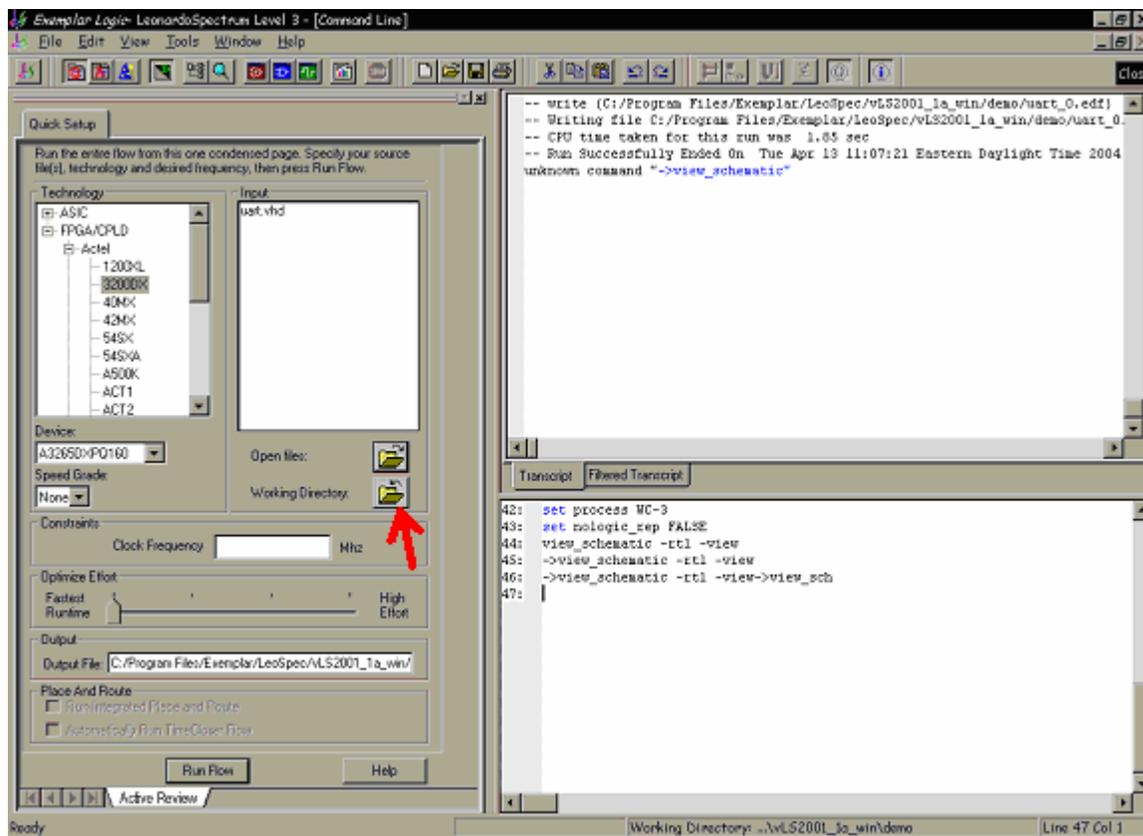
- The same “look and feel”
- Windows editing, dragging, and dropping attributes are available
- Synthesis Wizard, Quick Setup, and Advanced FlowTabs guide you through your design process
- Embedded, interactive, and filtered windows extend task information
- Quick file changes with right mouse button (RMB) actions
- Popups and pull downs menus are prevalent
- Pertinent information is parsed for quick reading
- Clickable buttons assign tasks

There are 3 levels in Leonardo Spectrum: The design methodology and control mechanisms become more detailed with each successive level: Level 1 produces the basic netlist, Level 2 adds more refined design control capabilities; and Level 3 contributes the ultimate in interactive, advanced features.

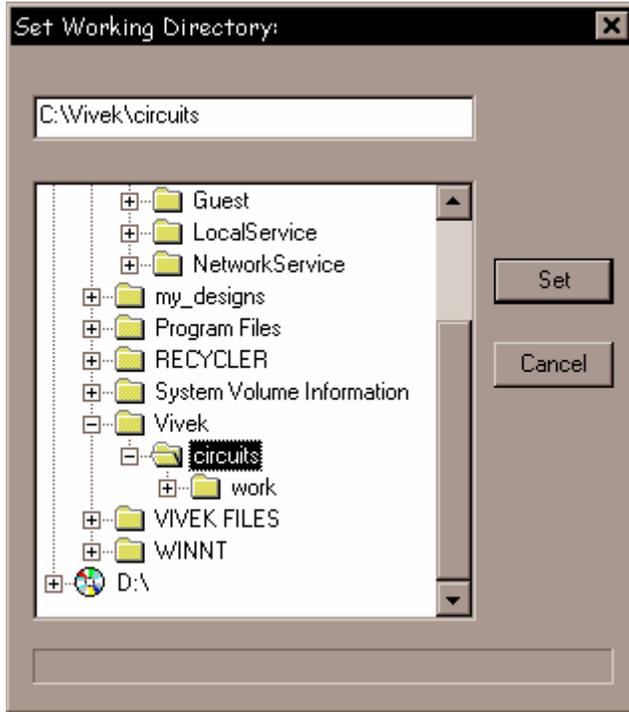
Start LeonardoSpectrum by clicking on the shortcut on the Desktop as shown in the figure:



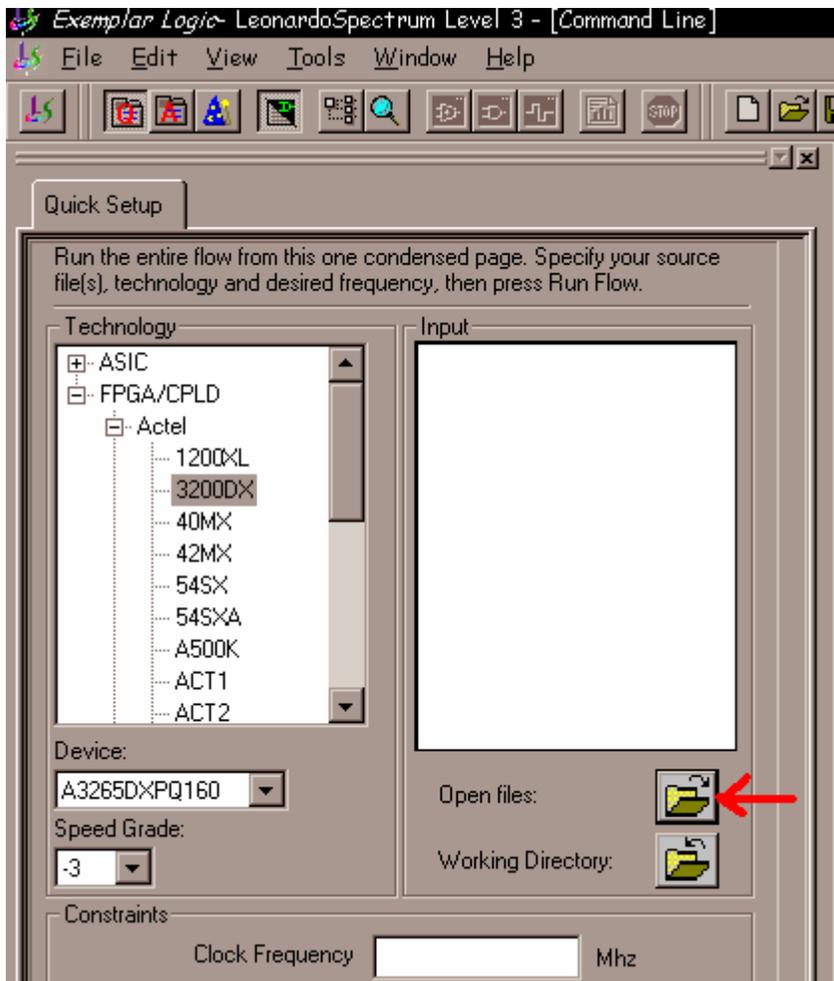
Upon opening LeonardoSpectrum, if prompted, select Level 3 and proceed to see the following window:



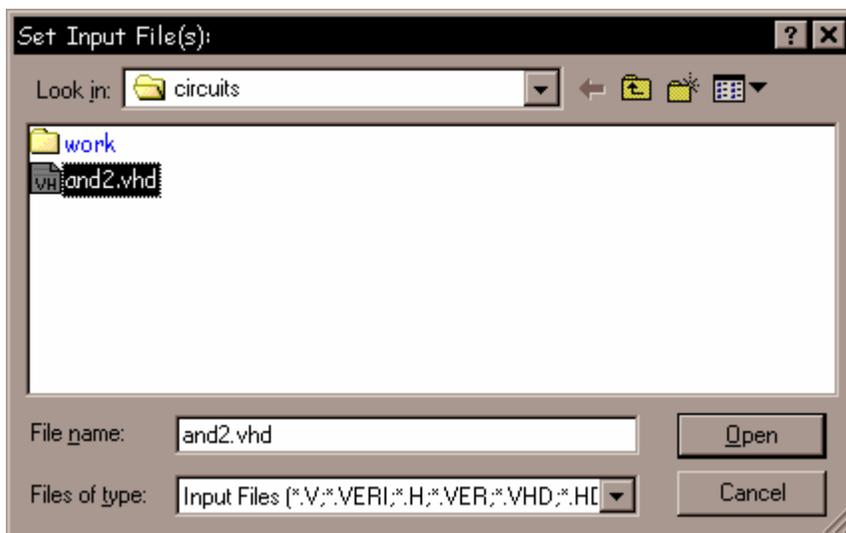
Click on the Working directory and set the directory of the example being synthesized. In our example the working directory is as shown:



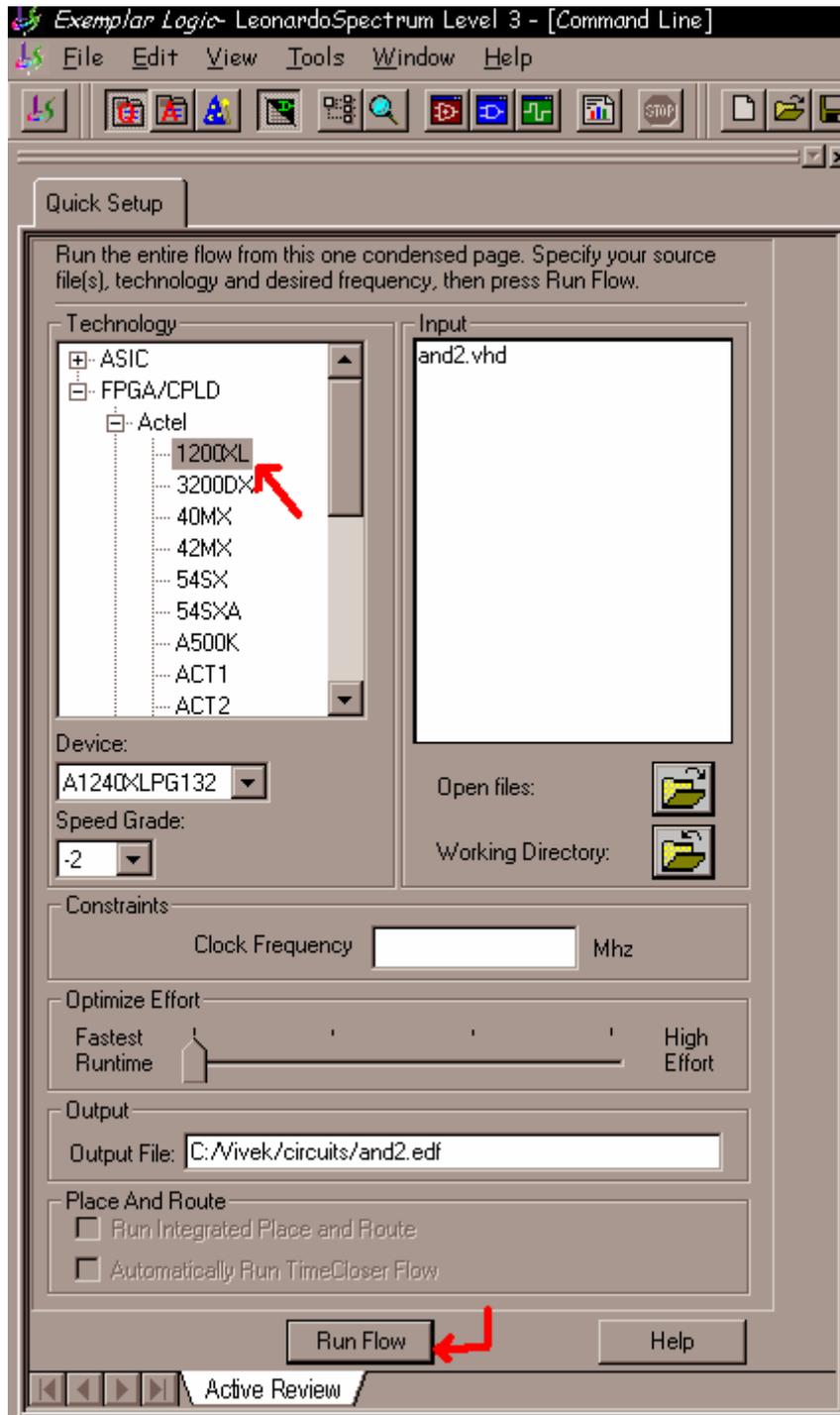
Then, click on "Set file" icon and set the file to be synthesized.



In our example, select "and2.vhd" and click on "Open".

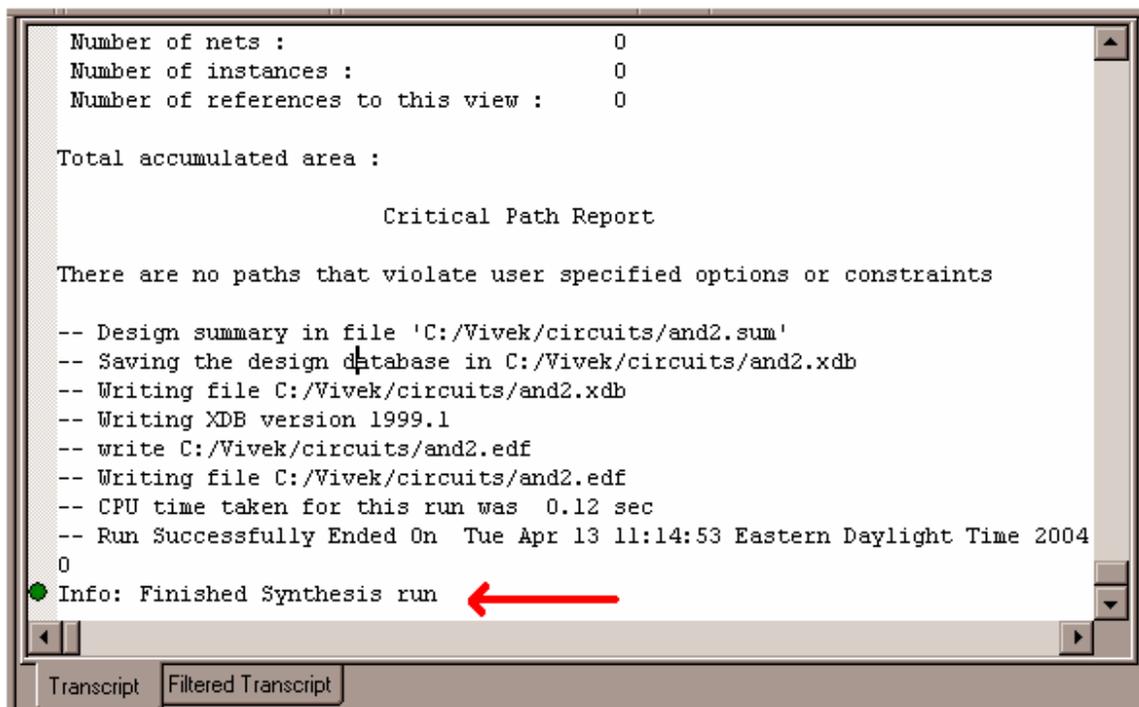


Select the technology on which the current module has to be synthesized by clicking on either "ASIC" or "FPGA" as shown in figure below and select the vendor and target device. In our example, we have selected "FPGA/CPLD → Actel → 1200XL" and click on "Run" to start synthesis operation.



Once the synthesis is completed, you will get "Finished synthesis run" message in the transcript window, if there is no error in the design. Error will be displayed in "Red" dots and will take you to the respective source code file where that particular code is written. Warnings will be displayed in "Blue" colored dots. These colors can be changed using LeonardoSpectrum toolbar settings.

**Note: Remember to include test bench programs in the file to be synthesized.** (Test benches are stimulus files and cannot be synthesized as many keywords used in writing test benches are not synthesizable)



```
Number of nets :                0
Number of instances :           0
Number of references to this view : 0

Total accumulated area :

                          Critical Path Report

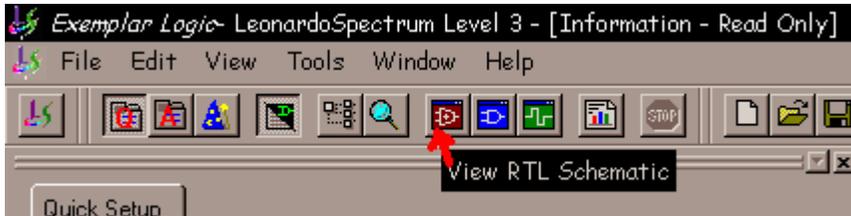
There are no paths that violate user specified options or constraints

-- Design summary in file 'C:/Vivek/circuits/and2.sum'
-- Saving the design database in C:/Vivek/circuits/and2.xdb
-- Writing file C:/Vivek/circuits/and2.xdb
-- Writing XDB version 1999.1
-- write C:/Vivek/circuits/and2.edf
-- Writing file C:/Vivek/circuits/and2.edf
-- CPU time taken for this run was  0.12 sec
-- Run Successfully Ended On  Tue Apr 13 11:14:53 Eastern Daylight Time 2004
0
● Info: Finished Synthesis run
```

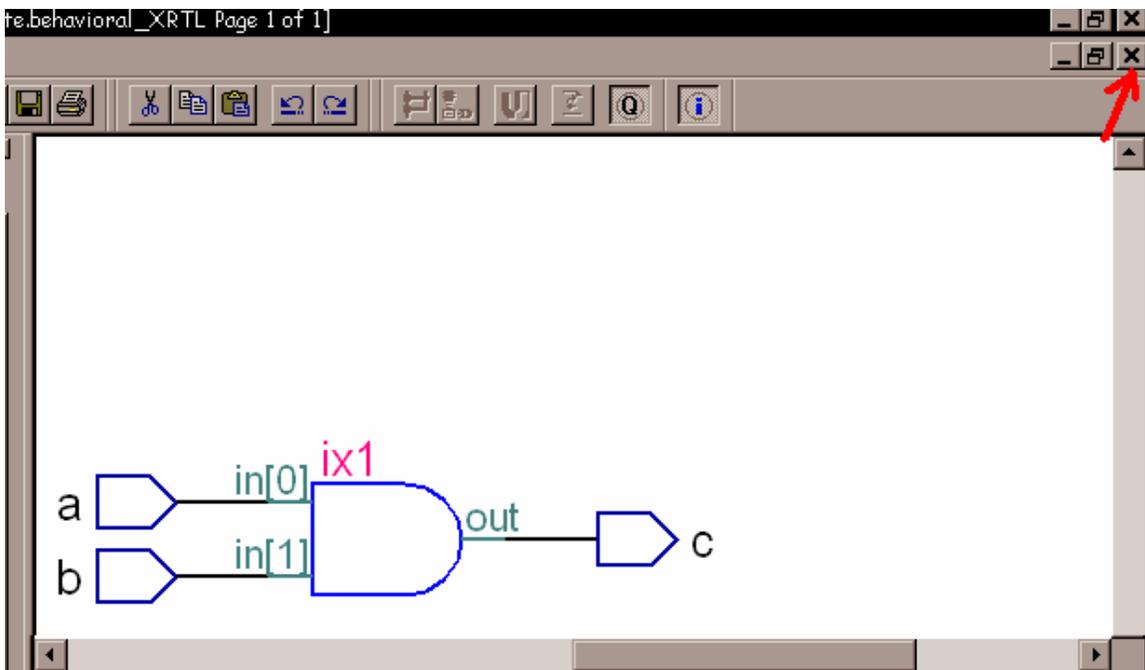
Transcript Filtered Transcript

## View RTL Schematic

To view RTL schematic, click on the Red button shown in the figure below.



RTL Schematic will be displayed as shown in the transcript window. Clicking on the 'x' button as shown closes RTL schematic window.



We can see "Technology Schematic" by clicking on "Blue" icon and "Critical path schematic" by clicking on "Green" icon.



Finally, clicking on "File" and select "Save Project as" saves the synthesized project into the current working directory. Project name has to be specified.