

Overview of FPGA Editor

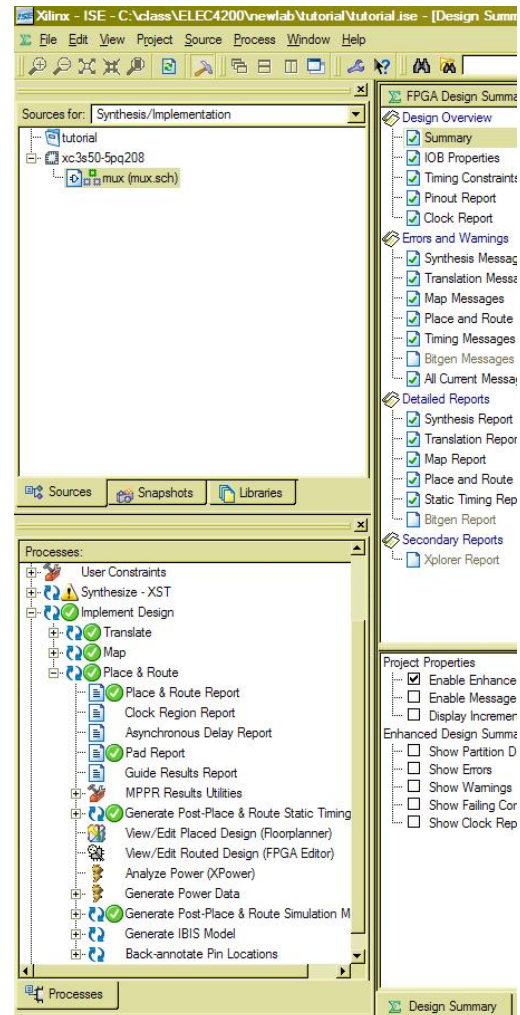
FPGA Editor is a graphical editing tool for physical (layout and routing) designs implemented in Xilinx FPGAs. Once you have *Synthesized* and *Implemented* your design, you can access FPGA Editor in the ISE Processes window, as shown in the figure to the right by double clicking on “View/Edit Routed Design (FPGA Editor)”. This will bring up the FPGA Editor tool with your design as it is implemented in the Spartan 3 device, as illustrated in Figure 1. Some of the useful menu buttons are highlighted in Figure 1 and discussed below according to the highlighted color:

The menu buttons shown in the orange ellipse in Figure 1 control what resources are displayed in the big picture of the chip. Moving along the buttons from left to right, these include the programmable routing resources of different lengths, switch boxes, and routing resources used in your design. You should click these buttons on and off to get a feel for what is and is not displayed in each case (the more that is displayed, the slower the processing time as you move around the design).

The menu buttons shown in the red ellipse in Figure 1 control the windows display with the left most button getting you back to the default combination of windows you see in Figure 1.

The menu buttons shown in the blue ellipse in Figure 1 control zooming in and out of the design for better viewing. The left most button takes you back to the full screen view illustrated in Figure 1. The second button from the left will allow you to define the zoom area by clicking that button first, then moving your mouse to one corner of the zoom area, holding the left mouse button down while you move to the opposite corner of the view area, and releasing the mouse button to perform the zoom. Figure 2 illustrated the result after zooming. The remaining buttons in the blue ellipse in Figure 1 allow you to zoom in (the magnifying glass with the +) or out (the magnifying glass with the -). Once you have zoomed in as shown in Figure 2, you can pan up, down, left, or right using the scroll bars shown in the green ellipses, or you can hold down the right mouse button and pan by moving the mouse.

The list on the right hand side is a list of components used in your design. You can select one by clicking on that item in the list. This component will be highlighted in red in the bottom window to show you its relative position in the chip with respect to your viewing window as illustrated by the yellow ellipses in Figure 2. You can zoom directly to that component by clicking the zoom button with the red square in to “zoom to highlighted component”.



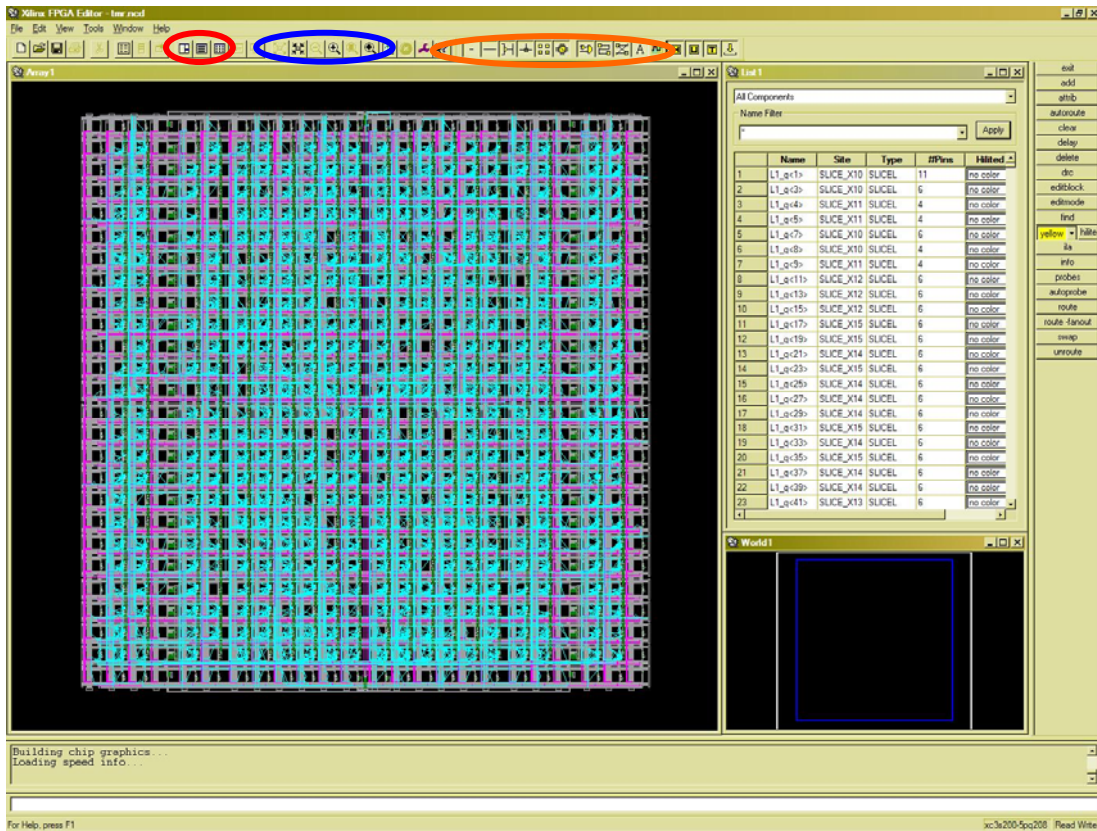


Figure 1. FPGA Editor with Spartan 3 design implementation.

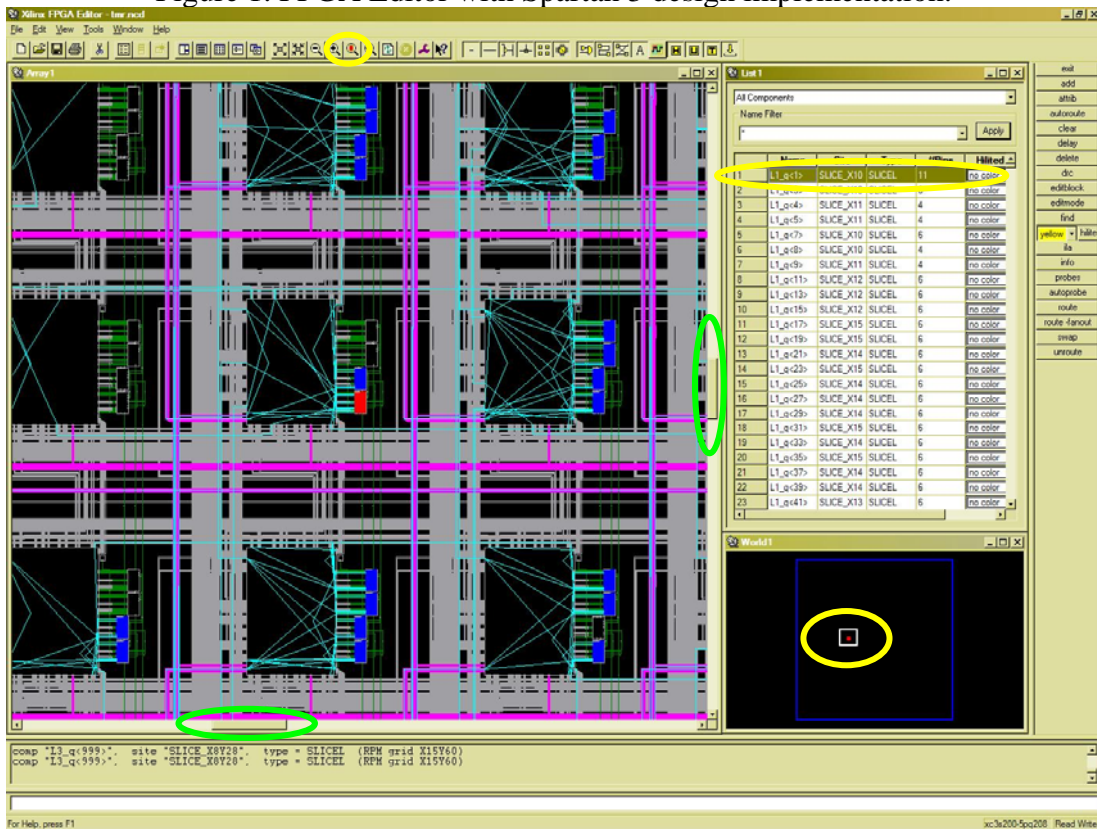


Figure 2. View of FPGA Editor after zooming in and selecting one slice in a PLB.

You can also select a component in the main viewing window by moving your cursor to that component and clicking the left mouse button, at which time the component will be highlighted in red. You can look inside that component by double clicking it. The inside view of a selected slice is shown in Figure 3. Note that the resources used in the slice are shown in blue and the net names for signals entering and exiting the component are in green. You can see the Boolean equations in each LUT by clicking the F= menu button in the light blue ellipse in Figure 3. The logic equations will appear in the lower portion of the screen. Note that the equations are in terms of variables A1-A4 which can be seen at the inputs to the LUTs while the external connections to the F and G LUTs are denoted F1-F4 and G1-G4 respectively. You can zoom and move around the internal view of the component in the same manner as the external view. When you want to go back to the external view, click the X in the upper right hand corner of the component window (be careful not to click the X of the FPGA Editor window or you will exit FPGA Editor).

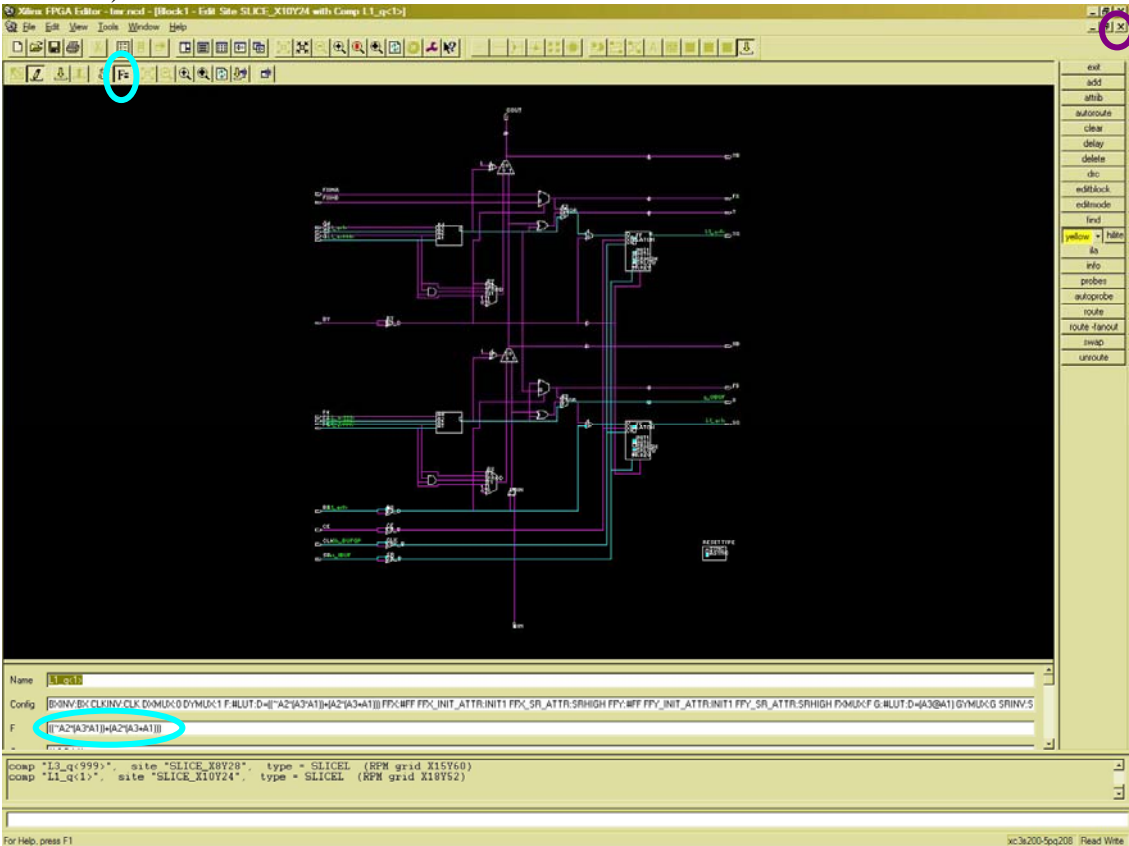


Figure 3. Internal view of selected slice.