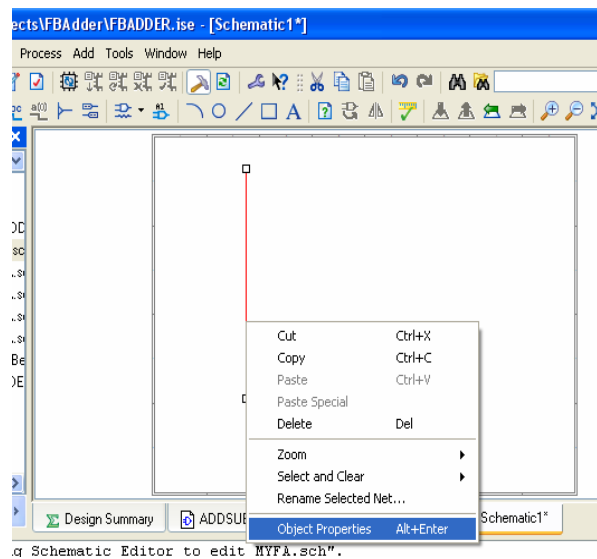


Tutorial: Bus and Bus Taps

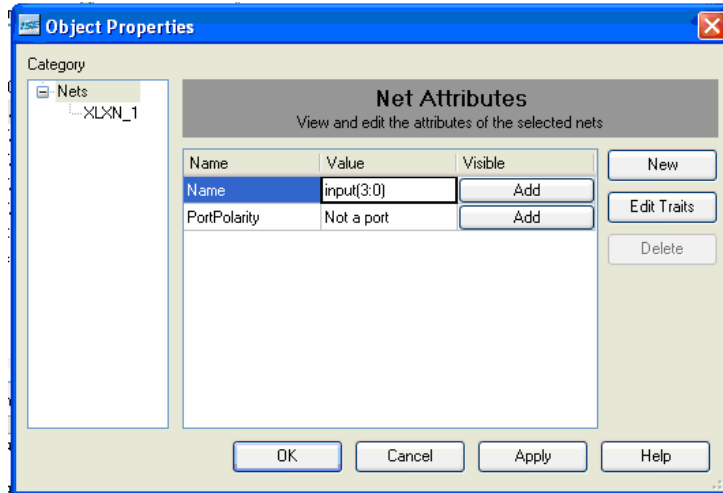
In Xilinx a group of two or more signals that carry closely associated values is considered a bus. A bus is usually used to wire multiple bits of signals. For instance, in the lab of a four bit adder, we have two four bit inputs and one seven bit output. Instead of wiring each of the individual bits separately, we will use buses to group them together.

1. Drawing Buses

A bus can be created by simply renaming a wire. First draw a wire on the schematic where we want the bus to be. Then right click on the wire and select Object Properties:

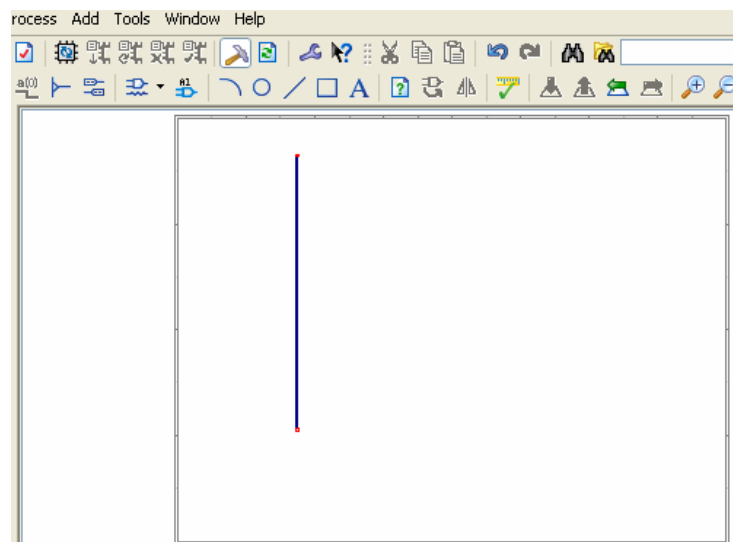


A pop up window will appear. Under the name field, type in a name for this bus and use parentheses to indicate how many signals you want to include in the bus. For instance, if we want to name the bus input that is four bit long:



Note: you can either make the bus go from 3 to 0 or from 0 to 3. The first type means that the left most bit is the most significant and the second type means the right most bit is the most significant bit. You should always pick one type and keep it consistent AT ALL TIMES (it is recommended to use the first indication given it is more intuitive)

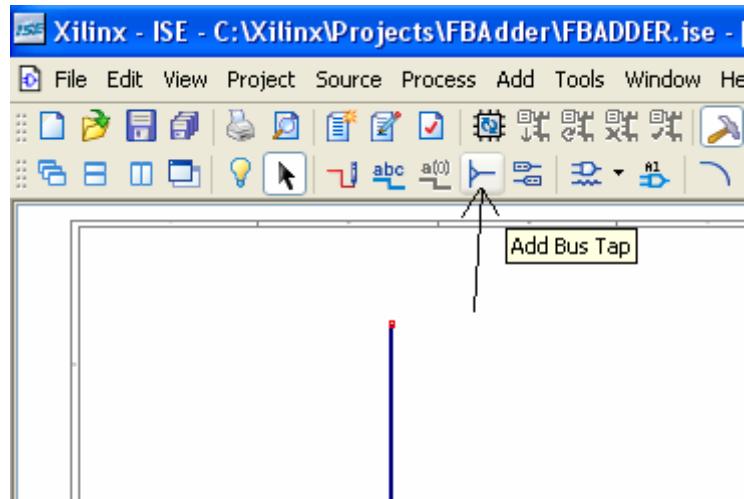
Then click okay to return to the schematic, we should notice now the wire had become much thicker:



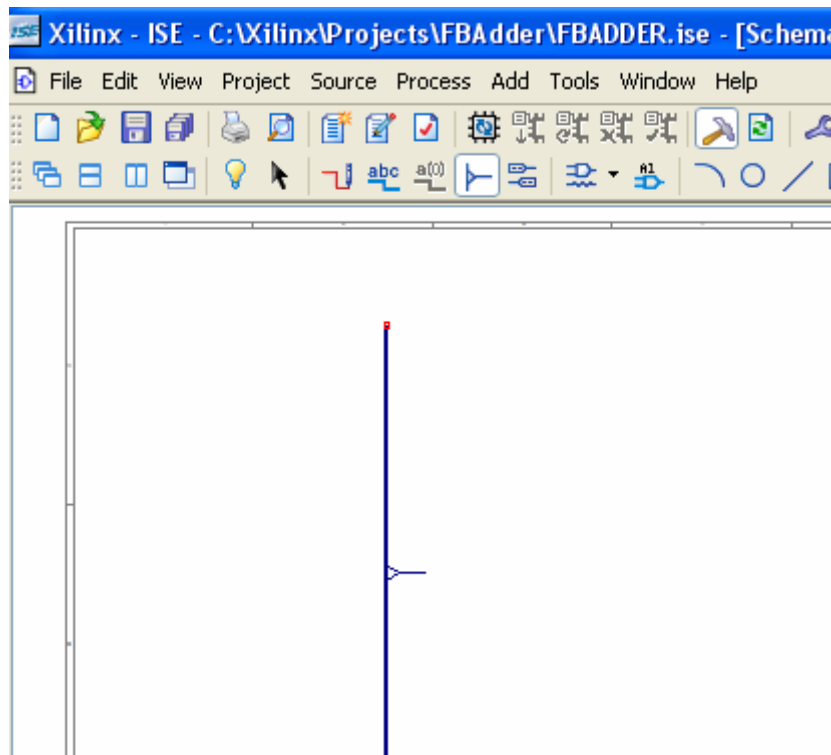
If we wish to make this bus an input or output, simply click on the I/O Marker symbol and click on an end of the bus. The input/output will automatically take the value of the bus.

2. Drawing Bus Taps:

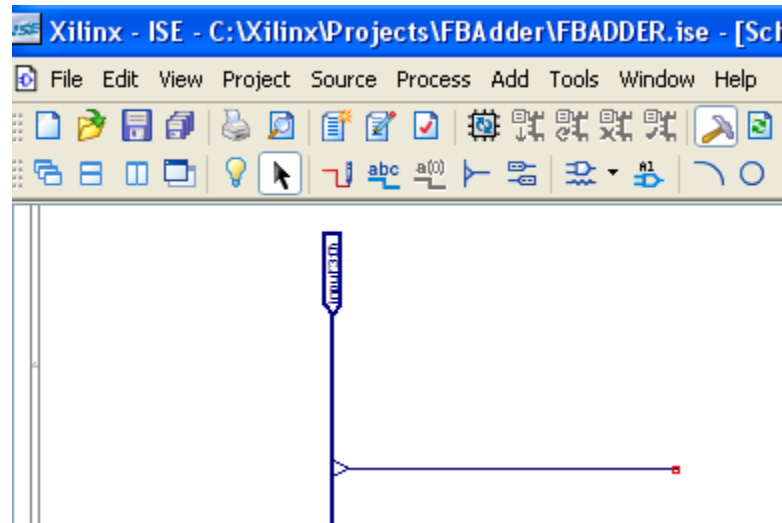
Bus Taps represent “branches” of the bus, which we can use to wire a specific signal from a bus to a destination. To draw a bus signal, first click on the “Add Bus Tap” on the tool bar to set the cursor in bus tap mode:



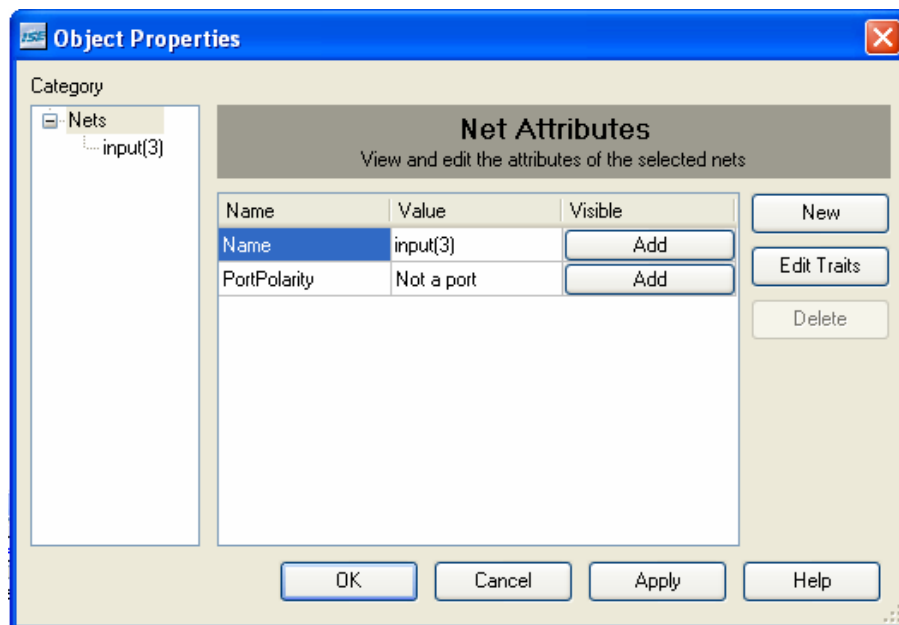
Then select where on the bus you should like to add the bus tap and single click, a bus tap should show up like this (notice how the end of the bus tap is exactly on the bus):



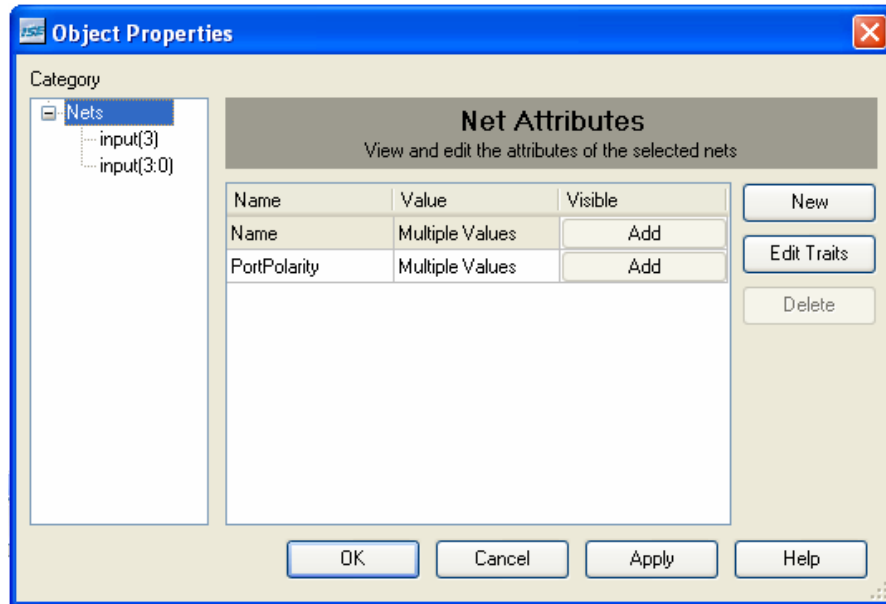
Now we have added the bus tap, but we need a wire to connect the bus tap to a certain destination, draw a wire from the bus tap:



To select which signal this wire would represent, right click on the wire and select Object Properties (like how we name the bus). Under the pop-up window, type in the name of the bus followed by a value within parentheses to select a particular signal:



This value is automatically carried over to the bus tap. To check that the bus tap is connected correctly, select Object Properties and the window should look like this:



Notice under the Nets, there are two values: the entire bus and the selected signal.

Caution: In order for the bus taps to work correctly, it must be connected to the bus and the name of the wire and the name of the bus must match exactly (case sensitive)