ModelSim - INTEL FPGA STARTER EDITION 2020.1

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ColumnLayout Default

C:/Users/DELL/3D Objects/verilog/tb_ring_counter.v (/tb_self_starting_ring_counter) - Default

```
Ln#
 1  module tb_self_starting_ring_counter;
 2
 3      reg clk;
 4      wire [3:0] count;
 5
 6      // Instantiate the self-starting ring counter
 7      self_starting_ring_counter uut (
 8          .clk(clk),
 9          .count(count)
10      );
11
12      // Generate clock signal
13      initial begin
14          clk = 0;
15          forever #5 clk = ~clk;  // 10 time units clock period
16      end
17
18      // Test sequence
19      initial begin
20          // Let the counter run for some time
21          #100;  // Run for 100 time units
22
23          // End the simulation
24          #10 $finish;
25      end
26
27      // Monitor count value
28      initial begin
29          $monitor("Time: %0d, Count: %b", $time, count);
30      end
31
32  endmodule
33
34
```

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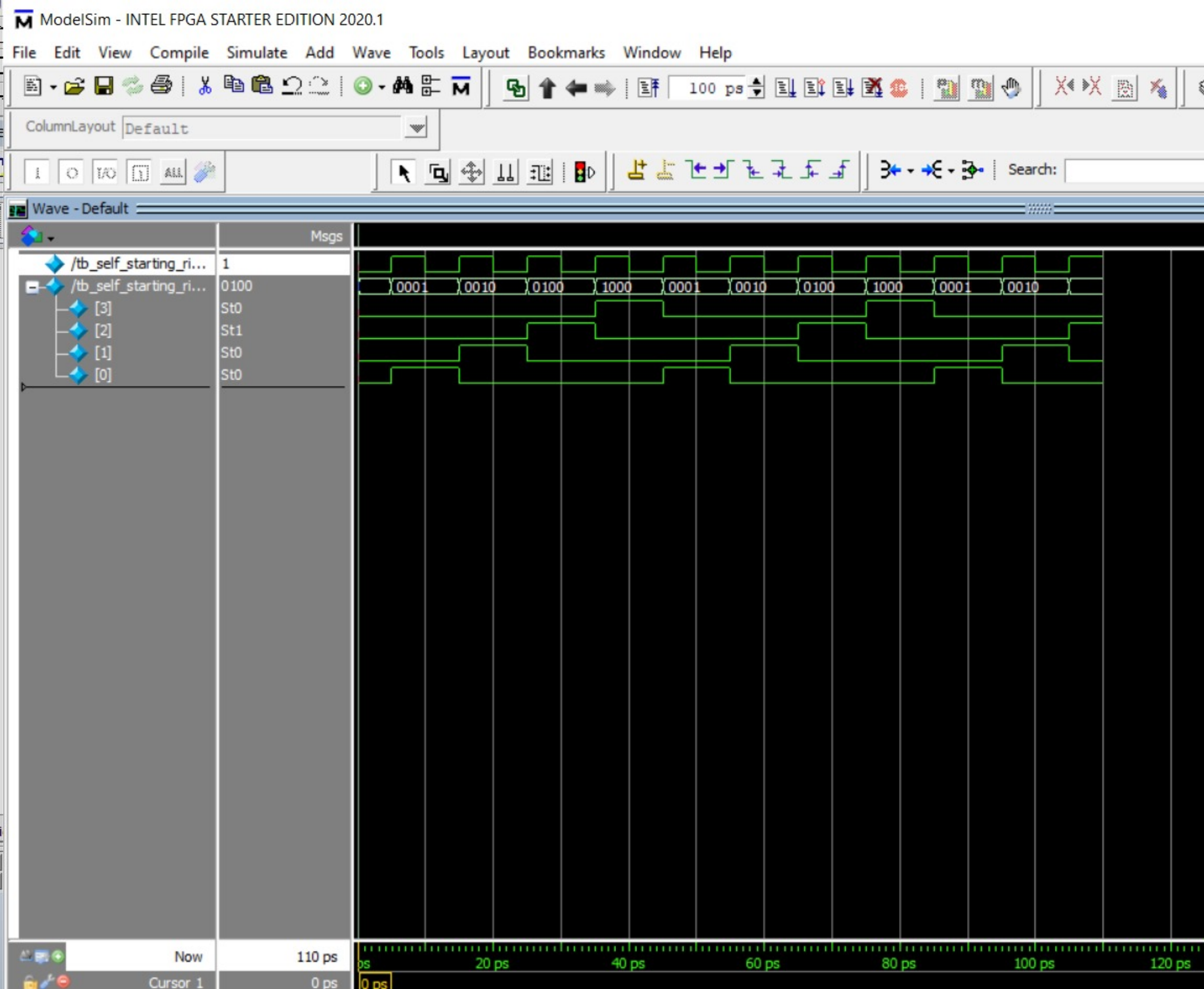
C:/Users/DELL/3D Objects/verilog/ring_counter.v (/tb_self_starting_ring_counter/uut) - Default

Ln#

```
1  module self_starting_ring_counter (
2      input clk,                // Clock input
3      output reg [3:0] count    // 4-bit output count
4  );
5      initial begin
6          count = 4'b0000; // Start with '0000'
7      end
8
9      always @(posedge clk) begin
10         // NOR gate logic to prevent the state '0000'
11         if (~count[0] & ~count[1] & ~count[2]) begin
12             count <= 4'b0001; // Reset to '0001' if all FFs are '0'
13         end else begin
14             // Shift the '1' through the count
15             count <= {count[2:0], count[3]}; // Rotate the bits (left shift)
16         end
17     end
18
19 endmodule
```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File Edit View Compile Simulate Add Wave Tools Layout Bookmarks Window Help
100 ps
ColumnLayout Default
Search:
Wave - Default
Msgs
/tb_self_starting_ri... 1
/tb_self_starting_ri... 0100
[3] St0
[2] St1
[1] St0
[0] St0
0001 0010 0100 1000 0001 0010 0100 1000 0001 0010
Now 110 ps
Cursor 1 0 ps
20 ps 40 ps 60 ps 80 ps 100 ps 120 ps