Serial CRC

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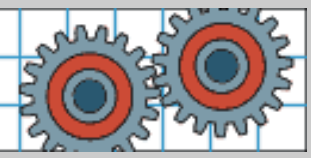

Serial CRC

Below code is 16-bit CRC-CCITT implementation, with following features

- Width = 16 bits
- Truncated polynomial = 0x1021
- Initial value = 0xFFFF
- Input data is NOT reflected
- Output CRC is NOT reflected
- No XOR is performed on the output CRC

```
1  //----------------------------------------------------
2  // Design Name : serial_crc_ccitt
3  // File Name   : serial_crc.v
4  // Function    : CCITT Serial CRC
5  // Coder       : Deepak Kumar Tala
6  //----------------------------------------------------
7  module serial_crc_ccitt (
8  clk     ,
9  reset   ,
10 enable  ,
11 init    ,
12 data_in ,
13 crc_out
14 );
15 //-----------Input Ports---------------
16 input clk     ;
17 input reset   ;
18 input enable  ;
19 input init    ;
20 input data_in ;
21 //-----------Output Ports---------------
22 output [15:0] crc_out;
23 //------------Internal Variables--------
24 reg   [15:0] lfsr;
25 //-------------Code Start-----------------
26 assign crc_out = lfsr;
27 // Logic to CRC Calculation
28 always @ (posedge clk)
29 if (reset) begin
30   lfsr <= 16'hFFFF;
31 end else if (enable) begin
32   if (init) begin
33     lfsr <=  16'hFFFF;
34   end else begin
35     lfsr[0]  <= data_in ^ lfsr[15];
36     lfsr[1]  <= lfsr[0];
37     lfsr[2]  <= lfsr[1];
38     lfsr[3]  <= lfsr[2];
39     lfsr[4]  <= lfsr[3];
40     lfsr[5]  <= lfsr[4] ^ data_in ^ lfsr[15];
41     lfsr[6]  <= lfsr[5];
42     lfsr[7]  <= lfsr[6];
43     lfsr[8]  <= lfsr[7];
44     lfsr[9]  <= lfsr[8];
45     lfsr[10] <= lfsr[9];
46     lfsr[11] <= lfsr[10];
47     lfsr[12] <= lfsr[11] ^ data_in ^ lfsr[15];
48     lfsr[13] <= lfsr[12];
49     lfsr[14] <= lfsr[13];
50     lfsr[15] <= lfsr[14];
51   end
52 end
53
54 endmodule
```