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1  `timescale 1ns / 1ps
2  /*****
3   * File Name: TSI.v
4   * Project: UART_TSI
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7   * Rev. Date: 14 May, 2018
8   *
9   * Purpose: Technology Specific Instantiations—this block is a buffer
10  *           for our class's full UART design. It will work only specifically
11  *           with our UART design.
12  *
13  * Notes:    - This module has a synchronous reset input.
14  *
15  *****/
16  module TSI(input clk_i, rst_i, Rx_i, eight_i, pen_i, ohel_i,
17             input [3:0] baud_i,
18             input [15:0] leds_i,
19             input Tx_i,
20             output clk_o, rst_o, Rx_o, eight_o, pen_o, ohel_o,
21             output [3:0] baud_o,
22             output [15:0] leds_o,
23             output Tx_o);
24
25
26
27     BUFG BUFG_inst    (.O(clk_o), //1-bit output: clock output
28                       .I(clk_i)  //1-bit input: clock input
29                       );
30
31     IBUF #            (.IBUF_LOW_PWR("TRUE"), //Low power (TRUE) vs. performance
32 (FALSE)
33                                     //setting for referenced I/O
34 standards
35     .IOSTANDARD("DEFAULT") //Specify the I/O standard
36     ) rst (.O(rst_o), //Buffer output
37           .I(rst_i) //Buffer input (connect directly to
38 top-level port)
39           );
40
41     IBUF #            (.IBUF_LOW_PWR("TRUE"), //Low power (TRUE) vs. performance
42 (FALSE)
43                                     //setting for referenced I/O
44 standards
45     .IOSTANDARD("DEFAULT") //Specify the I/O standard
46     ) Rx (.O(Rx_o), //Buffer output
47           .I(Rx_i) //Buffer input (connect directly to
48 top-level port)
49           );
50
51     IBUF #            (.IBUF_LOW_PWR("TRUE"), //Low power (TRUE) vs. performance
52 (FALSE)
53                                     //setting for referenced I/O
54 standards
55     .IOSTANDARD("DEFAULT") //Specify the I/O standard
56     ) eight (.O(eight_o), //Buffer output
57             .I(eight_i) //Buffer input (connect directly to

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top-level port)
50                                     );
51
52     IBUF #                          (.IBUF_LOW_PWR("TRUE"), //Low power (TRUE) vs. performance
(FALSE)
53                                     //setting for referenced I/O
standards
54     .IOSTANDARD("DEFAULT")          //Specify the I/O standard
55     ) pen (.O(pen_o),               //Buffer output
56     .I(pen_i)                       //Buffer input (connect directly to
top-level port)
57                                     );
58
59     IBUF #                          (.IBUF_LOW_PWR("TRUE"), //Low power (TRUE) vs. performance
(FALSE)
60                                     //setting for referenced I/O
standards
61     .IOSTANDARD("DEFAULT")          //Specify the I/O standard
62     ) ohel (.O(ohel_o),             //Buffer output
63     .I(ohel_i)                     //Buffer input (connect directly to
top-level port)
64                                     );
65
66     IBUF #                          (.IBUF_LOW_PWR("TRUE"), //Low power (TRUE) vs. performance
(FALSE)
67                                     //setting for referenced I/O
standards
68     .IOSTANDARD("DEFAULT")          //Specify the I/O standard
69     ) baud[3:0] (.O(baud_o[3:0]),   //Buffer output
70     .I(baud_i[3:0])                //Buffer input (connect
directly to top-level port)
71                                     );
72
73
74     OBUF #                          (.DRIVE(12),           //Specify the output drive strength
75     .IOSTANDARD("DEFAULT"),         //Specify the output I/O standard
76     .SLEW("SLOW")                  //Specify the output slew rate
77     ) leds[15:0] (.O(leds_o[15:0]), //Buffer output (connect
directly to top-level port)
78     .I(leds_i[15:0])               //Buffer input
79     );
80
81     OBUF #                          (.DRIVE(12),           //Specify the output drive strength
82     .IOSTANDARD("DEFAULT"),         //Specify the output I/O standard
83     .SLEW("SLOW")                  //Specify the output slew rate
84     ) Tx (.O(Tx_o),                //Buffer output (connect directly to
top-level port)
85     .I(Tx_i)                       //Buffer input
86     );
87
88
89 endmodule
90
```