ELEX 2117

Lab 7 –
Asynchronous Serial Interface

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Code:

```
/* Brennan Pinette
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   Purpose: This program will send my BCIT number serially.

*/


module uart
  ( input logic clk, reset_n,
    input logic nextbit, nextchr,
    input logic [7:0] char,
    output logic txd ) ;

    typedef enum int unsigned
        { idle, startbit, b0, b1, b2, b3, b4, b5, b6, b7, stopbit } state_t ;
    state_t state = idle, state_next ;


    always_ff@(posedge clk) state = state_next ;

    assign state_next =
         !reset_n ? idle :
         nextchr ? startbit :
         nextbit ?
             (
             state == startbit ? b0 :
             state == b0 ? b1 :
             state == b1 ? b2 :
             state == b2 ? b3 :
             state == b3 ? b4 :
             state == b4 ? b5 :
             state == b5 ? b6 :
             state == b6 ? b7 :
             state == b7 ? stopbit :
             state
             ) :
          state ;


        assign txd =
            state == idle || state == stopbit ? 1 :
            state == startbit ? 0 :
            state == b0 ? char[0] :
            state == b1 ? char[1] :
            state == b2 ? char[2] :
            state == b3 ? char[3] :
            state == b4 ? char[4] :
            state == b5 ? char[5] :
            state == b6 ? char[6] :
            char[7] ;
      endmodule
```
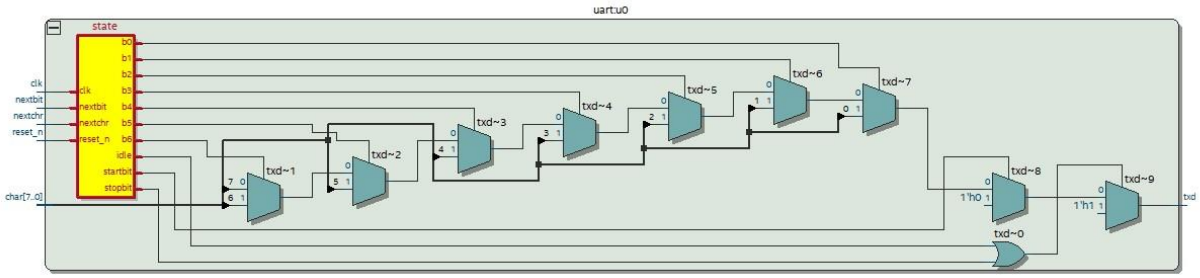
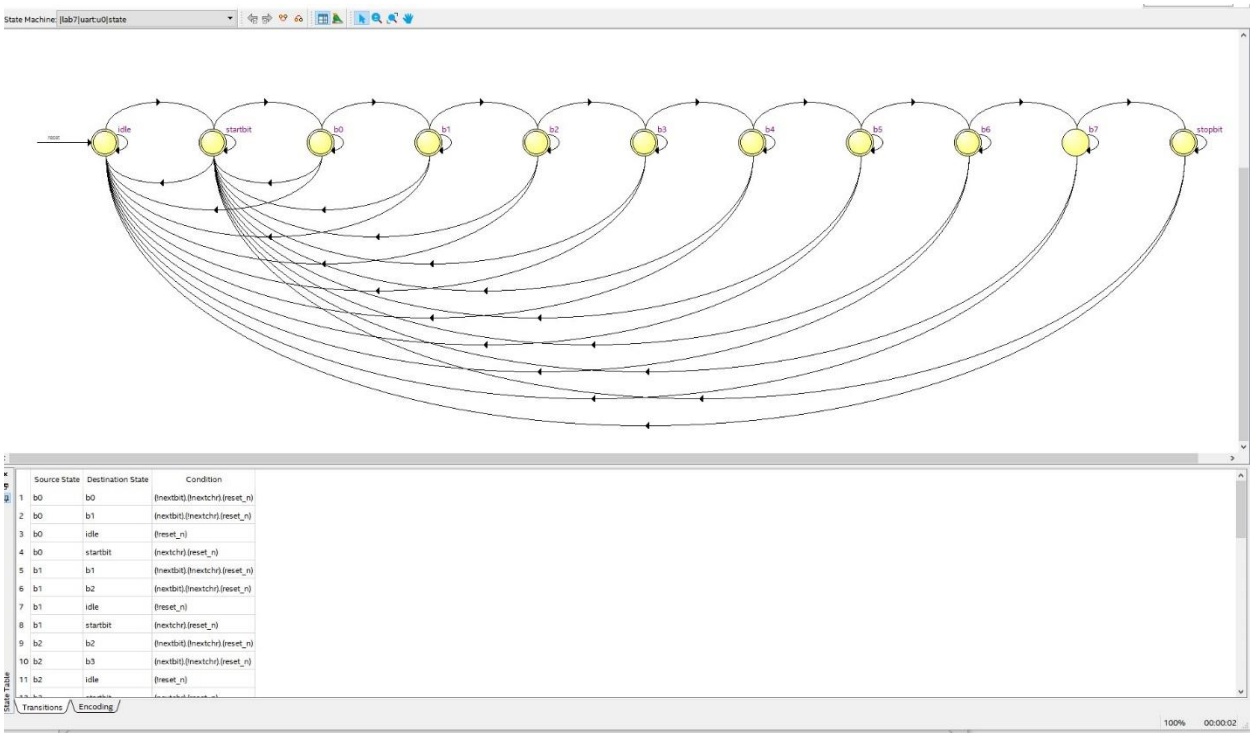
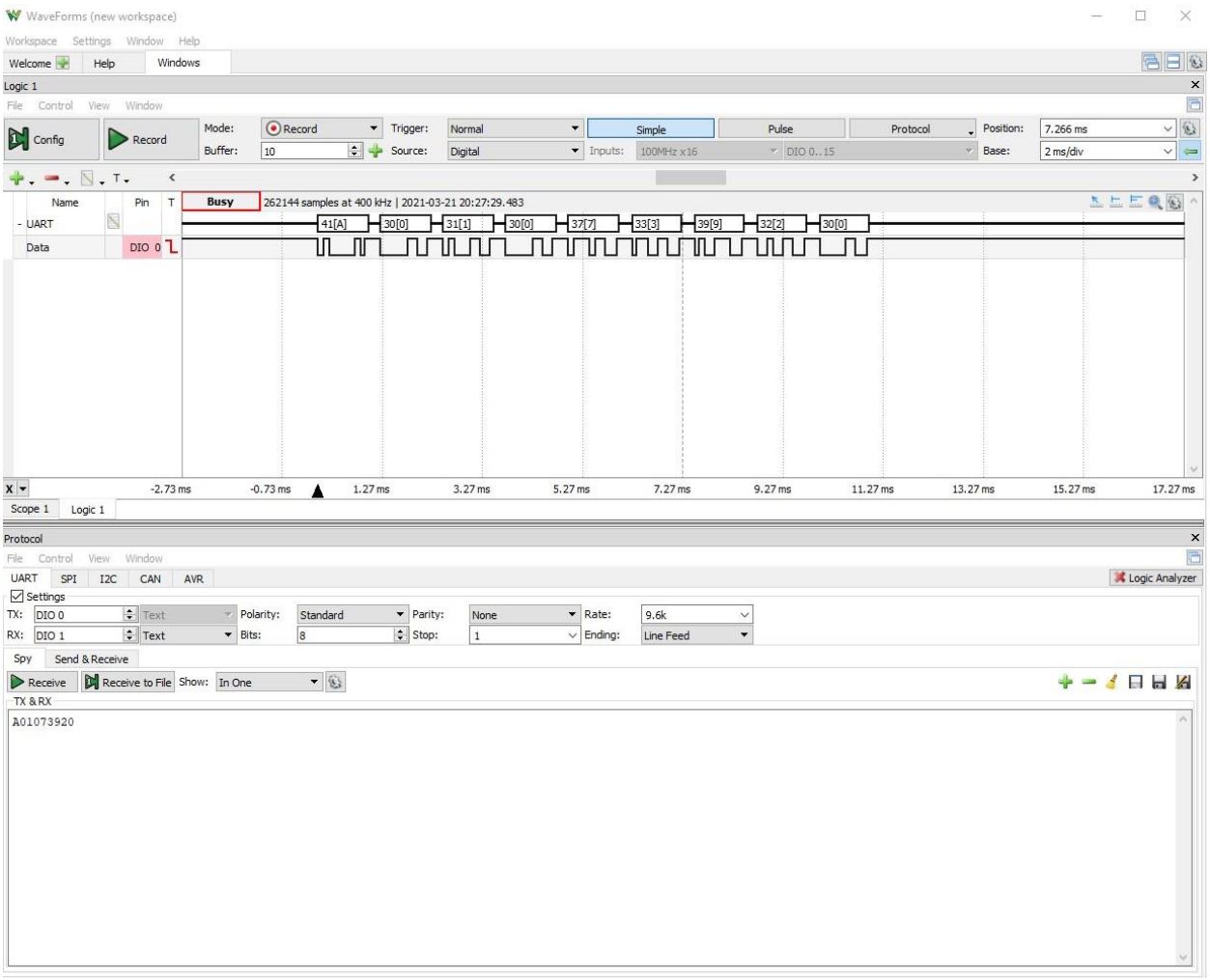

RTL:



State Transition:



Logic Analyzer:



Compilation Report: