Text Editor - D:/MyCSE2441Labs/Lab12/ControlUnit - ControlUnit - [ControlUnit.v]*

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```
module ControlUnit (
    input trig,
    input [3:0]value,
    input clk,
    input clear_e,
    input clr,
    output reg reset,
    output reg loadA,
    output reg loadB,
    output reg AddSub,
    output reg loadR,
    output reg iuau

);
    reg[2:0]state, nextstate;
always@(posedge trig, negedge clr) begin
    if(clr == 0)state <= 0;
    else state <=nextstate;

       case(state)
       0: if(~trig) nextstate <= 1'b1; else nextstate <= 0;
       1: if(~trig  && (value[3:0] == 4'b1010 || value[3:0] == 4'b1011))
                          nextstate <= 2;
             else nextstate <= 1;
       2: if (~trig) nextstate <= 3;
       else nextstate <= 2;
       3: if (~trig && (value[3:0] == 4'b1111))
                                nextstate <= 4;
                           else nextstate <= 3;
       4: if (~trig)  nextstate <= 4; else nextstate <= 4;
       default: nextstate <= 0;
    endcase

    if (clr == 0)
     AddSub <= 0;
    else if (state == 1 && value == 4'b1011)
       AddSub <= 1;
    else
    AddSub <= AddSub;

end

always @(*) //combinational logic
    case (state)
       0: begin reset = 0; loadA = 1; loadB = 1; loadR =1; iuau = 0; end
       1: begin reset = 1; loadA = 0; loadB = 1; loadR =1; iuau = 0; end
```

```
    if (clr == 0)
     AddSub <= 0;
    else if (state == 1 && value == 4'b1011)
       AddSub <= 1;
    else
    AddSub <= AddSub;

end

always @(*) //combinational logic
    case (state)
       0: begin reset = 0; loadA = 1; loadB = 1; loadR =1; iuau = 0; end
       1: begin reset = 1; loadA = 0; loadB = 1; loadR =1; iuau = 0; end
       2: begin reset = 1; loadA = 1; loadB = 1; loadR =1; iuau = 0; end
       3: begin reset = 1; loadA = 1; loadB = 0; loadR =1; iuau = 0; end
       4: begin reset = 1; loadA = 1; loadB = 1; loadR =0; iuau = 1; end
       default: begin reset = 0; loadA = 1; loadB = 1; loadR =1; iuau = 1;end
    endcase
endmodule
```

```
ControlUnit ControlUnit_inst
(
        .trig(trig_sig) ,       // input  trig_sig
        .value(value_sig) ,     // input [3:0] value_sig
        .clk(clk_sig) , // input  clk_sig
        .clear_e(clear_e_sig) , // input  clear_e_sig
        .clr(clr_sig) , // input  clr_sig
        .reset(reset_sig) ,     // output  reset_sig
        .loadA(loadA_sig) ,     // output  loadA_sig
        .loadB(loadB_sig) ,     // output  loadB_sig
        .AddSub(AddSub_sig) ,   // output  AddSub_sig
        .loadR(loadR_sig) ,     // output  loadR_sig
        .iuau(iuau_sig)         // output  iuau_sig
);
```

<<new>> | Filter on node names: * | Category: All

	tatu	From	To	Assignment Name	Value	Enabled	Entity	Comment	Tag
1	✔		clear_e	Location	PIN_A7	Yes			
2	✔		clk	Location	PIN_P11	Yes			
3	✔		clr	Location	PIN_B8	Yes			
4	✔		iuau	Location	PIN_C13	Yes			
5	✔		loadA	Location	PIN_A9	Yes			
6	✔		loadB	Location	PIN_A10	Yes			
7	✔		loadR	Location	PIN_D13	Yes			
8	✔		reset	Location	PIN_A8	Yes			
9	✔		trig	Location	PIN_AB5	Yes			
10	✔		value[0]	Location	PIN_C10	Yes			
11	✔		value[1]	Location	PIN_C11	Yes			
12	✔		value[2]	Location	PIN_D12	Yes			
13	✔		value[3]	Location	PIN_C12	Yes			
14	✔		AddSub	Location	PIN_B10	Yes			
15		<<new>>	<<new>>	<<new>>					