Non-Pipelined CPU

Fetch Stage

U? program counter
- override_enable
- offset[12]
- reset
- clk
- address[9]

U? program memory
- address[9]
- instruction[16]

U? decoder
- instruction[16]
- addr_opA
- addr_opB
- alu_op_code
- w_a_regfile
- w_a_statusReg[8]
- regfile_immediate
- alu_immediate
- immediate_value[8]
- w_a_dataMem
- alu_dm_mux
- program_counter_force_override
- program_counter_override_offset[12]
- statusReg_override
- statusReg_override_op[8]
- stackpointer_operation
- stackpointer_use

U? register file
- addr_a[5]
- addr_b[5]
- write_enable
- data_in[8]
- data_a[8]
- data_b[8]
- clk

U? rf_alu_immediate_mux
- 0
- 1

U? alu
- data_a[8]
- data_b[8]
- op[x]
- sreg[8]
- output[8]
- new_sreg[8]

U? alu_immediate_mux
- 0
- 1

U? sreg
- override_value[8]
- override
- new_status[8]
- write_enable
- current_sreg
- clk

U? ALU-DataMem Mux

addr_a == 30 && write_enable
- 0[x]
- 1[x]
- out

U? z_addr
- r30_we
- r31_we
- z_data_val
- reset
- clk
- z_addr_out

addr_a == 31 && write_enable
- 0[x]
- 1[x]
- out

src: rf_data_a, dec_immediate_value or alu/dm mux

U? data_memory
- write_enable
- z_addr[10]
- z_data_in[8]
- clk
- data[8]

U? mux stackpointer and z_addr

U? stackpointer
- sp_op
- sp_use
- clk
- addr[10]
- overflow

U? data_mem_io
- write_enable
- data[8]
- z_addr[10]
- pina_lo
- pina_in[8]
- pinb_in[8]
- clk
- portb[8]
- ports[8]
- is_io_addr
- ser[8]
- ser0[8]
- ser1[8]
- ser2[8]
- ser3[8]

U? 7seg_view_Controller
- ser[8]
- seg0[8]
- seg1[8]
- seg2[8]
- seg3[8]
- reset
- clk
- seg[7]
- an[4]
- dp