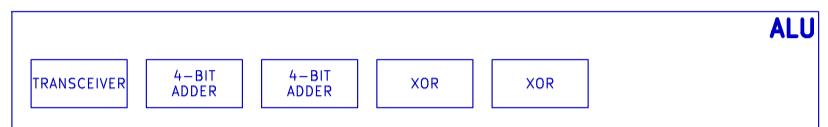
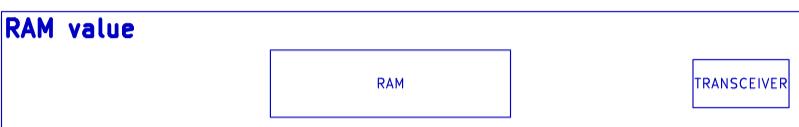
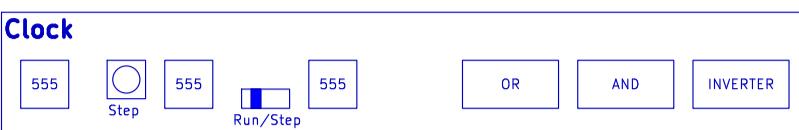


BUS VISUALIZER

**TBR Designs**

Sheet: /Breadboard Layout/  
File: breadboard-layout.kicad\_sch

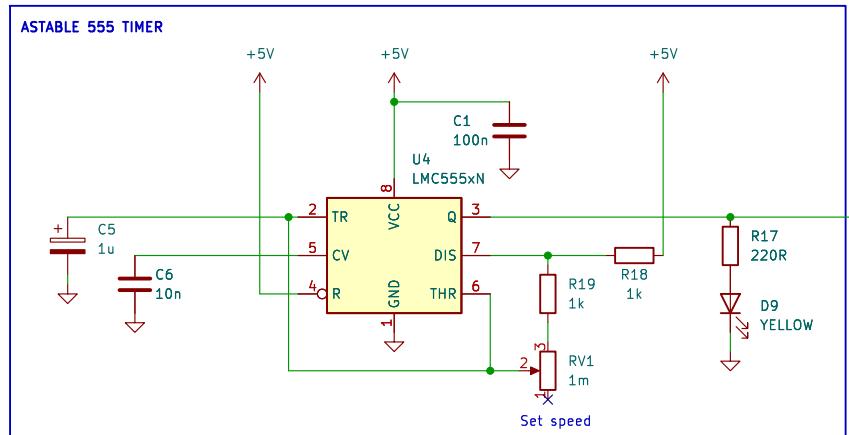
**Title: 8-bit CPU**

Size: A3 Date: 2023-11-28

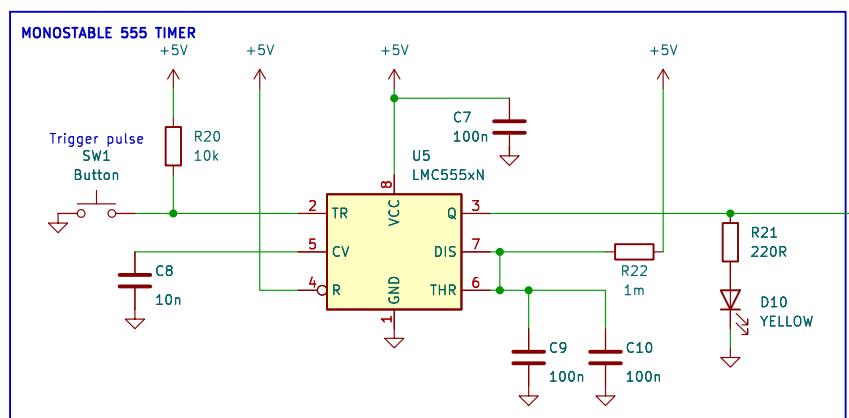
KiCad E.D.A. kicad 7.0.9

Rev: 1.0

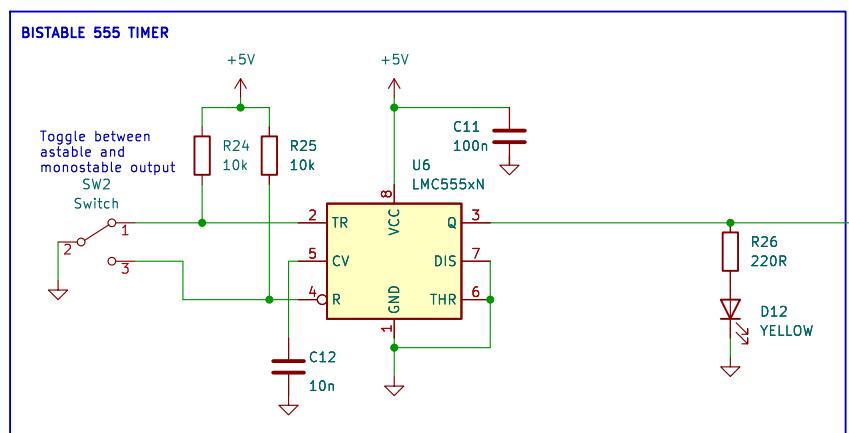
Id: 2/22



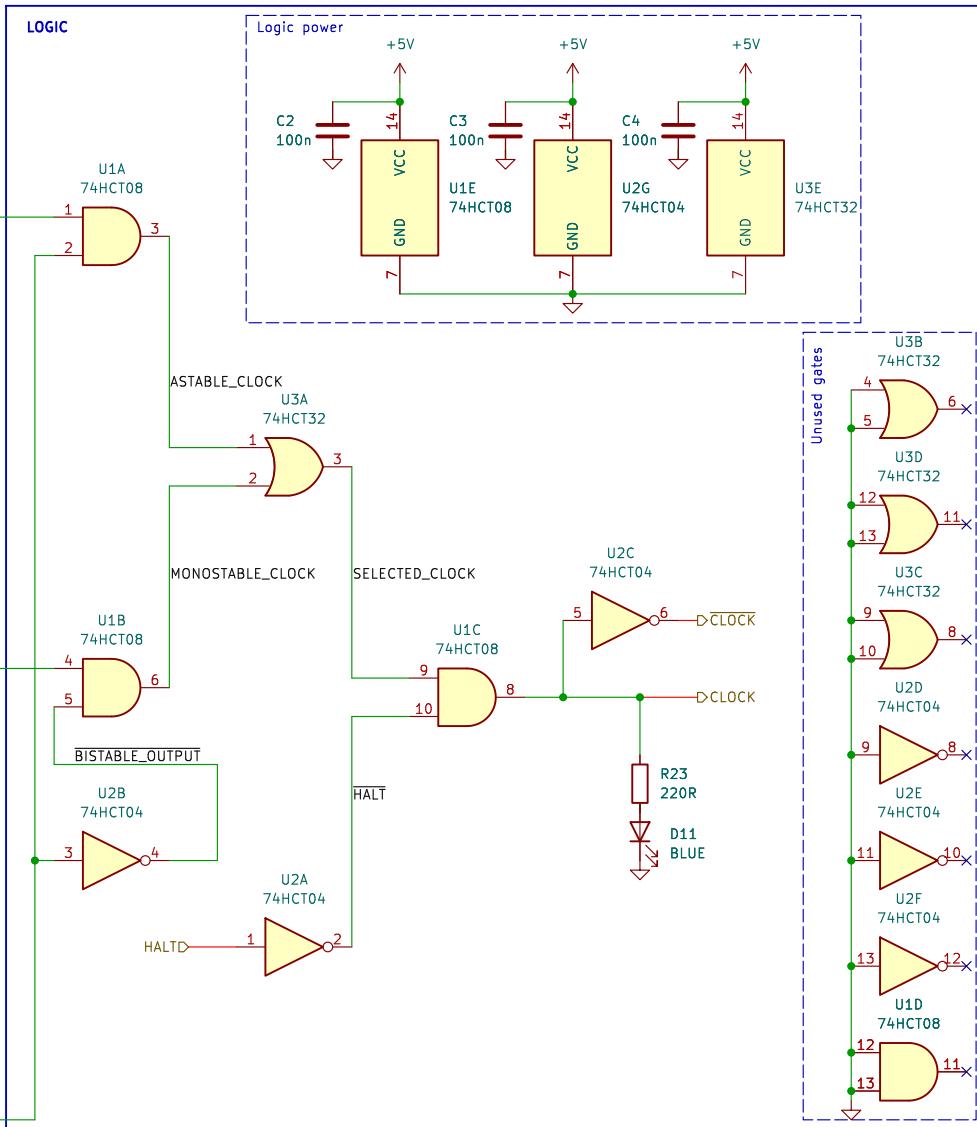
ASTABLE\_OUTPUT



MONOSTABLE\_OUTPUT



BISTABLE\_OUTPUT



Provides a clock pulse and inverted clock pulse.  
Speed can be set with the potentiometer.  
Manual pulse can be chosen with the switch and pulsed with the button.  
If HALT is HIGH no pulse is outputted.

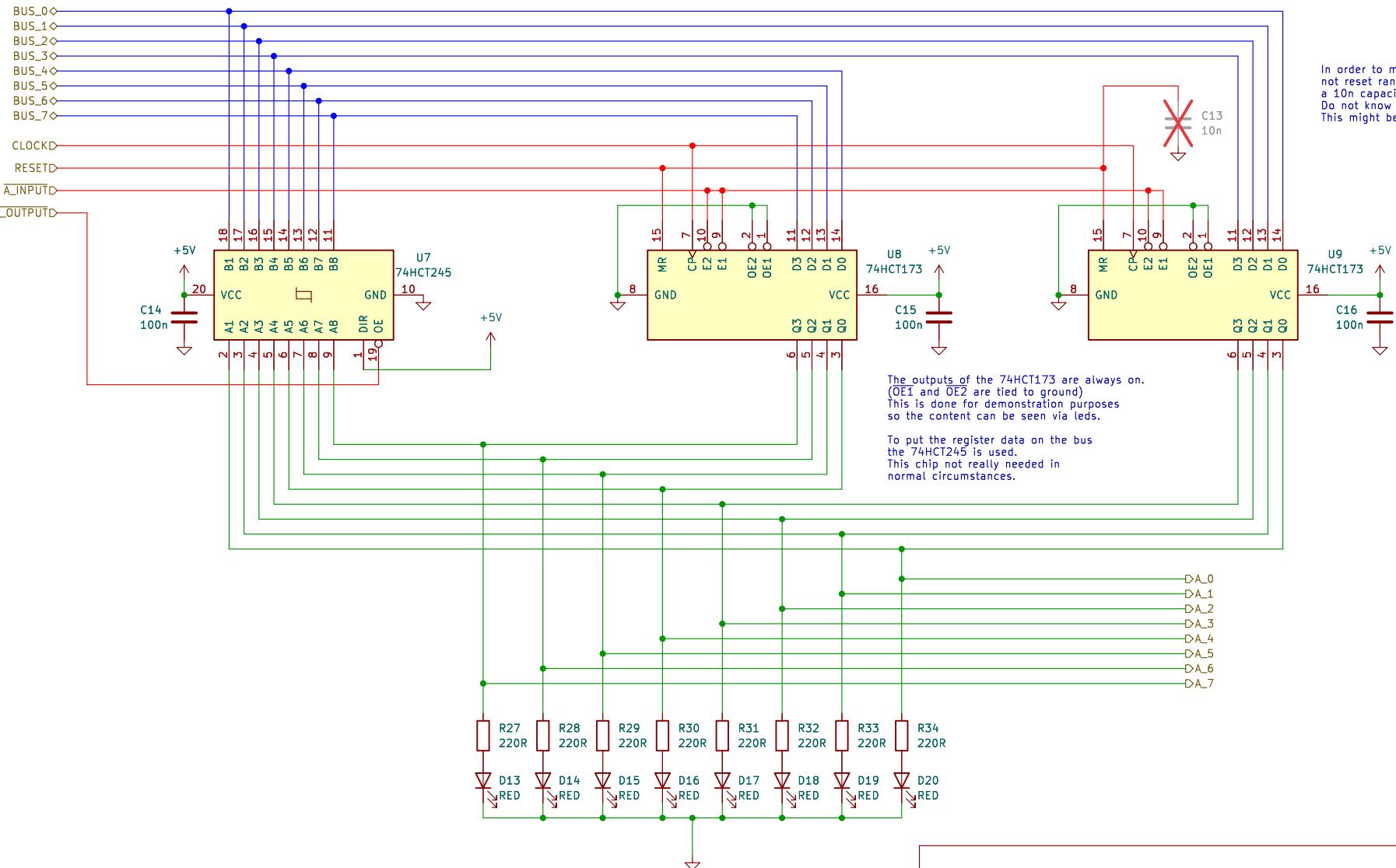
#### TBR Designs

Sheet: /Clock/  
File: clock.kicad\_sch

**Title: 8-bit CPU**

Size: A4 Date: 2023-11-28  
KiCad E.D.A. kicad 7.0.9

Rev: 1.0  
Id: 3/22



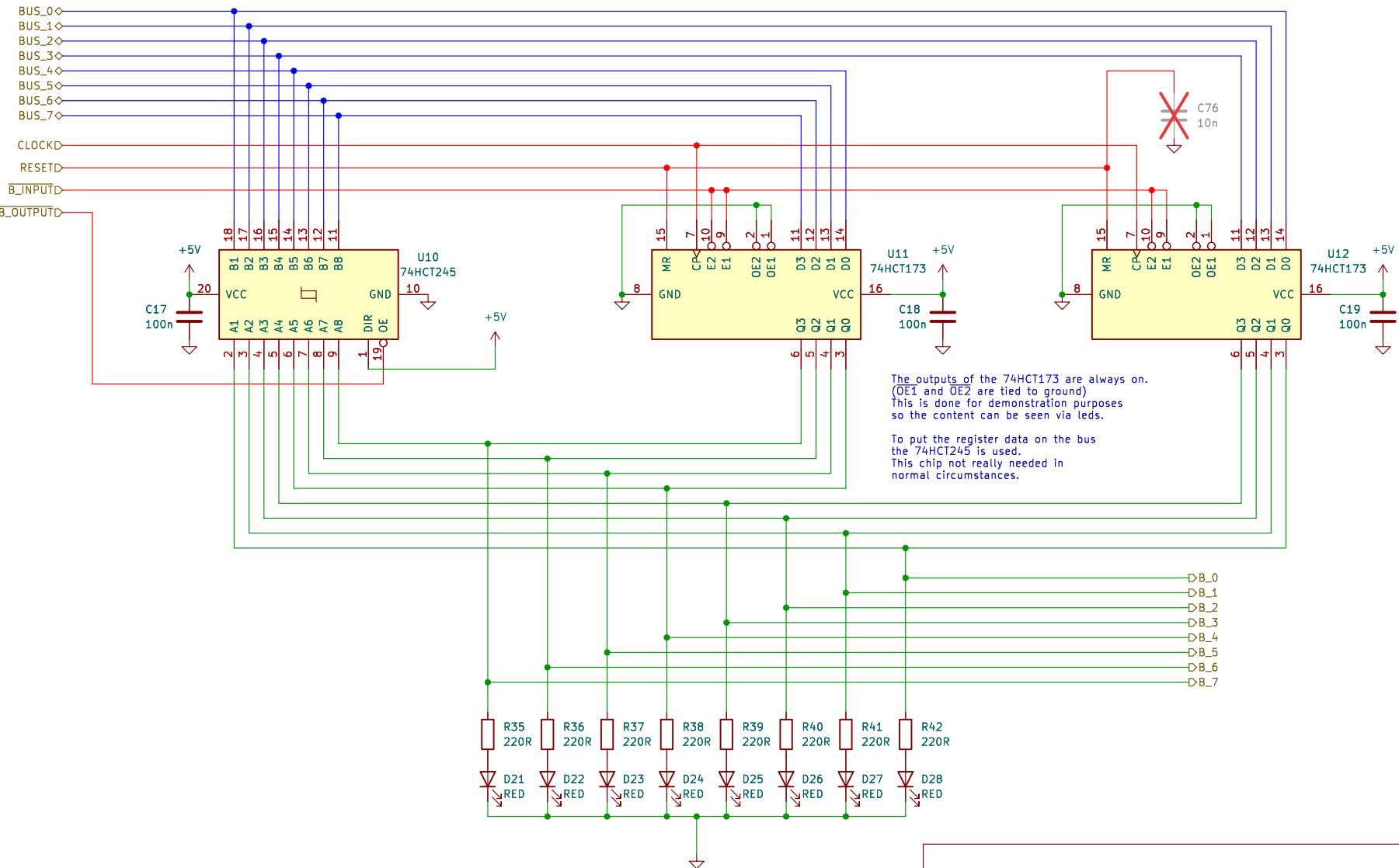
#### TBR Designs

Sheet: /A register/  
File: a-register.kicad\_sch

**Title: 8-bit CPU**

Size: A4 Date: 2023-11-28  
KiCad E.D.A. kicad 7.0.9

Rev: 1.0  
Id: 4/22



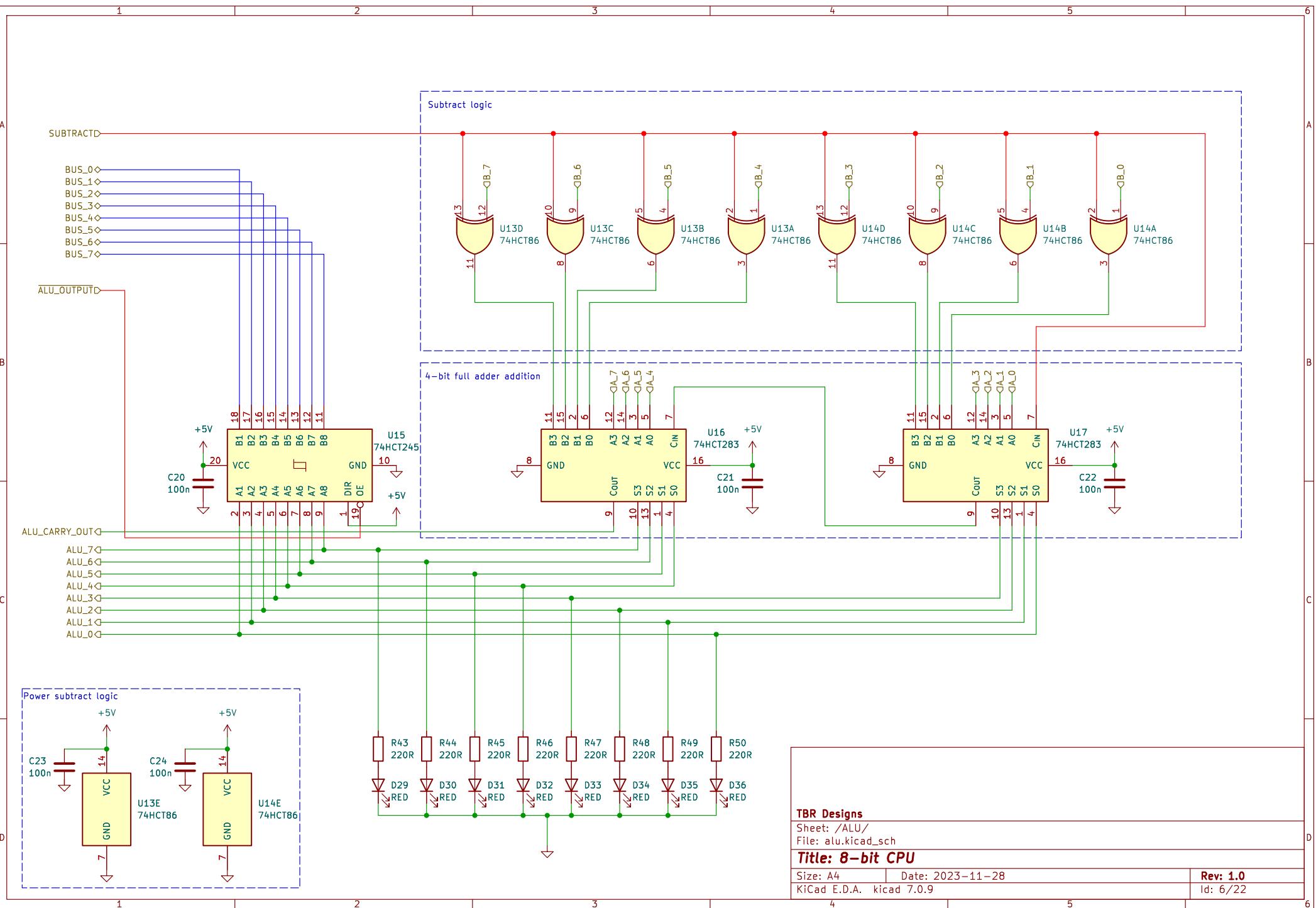
#### TBR Designs

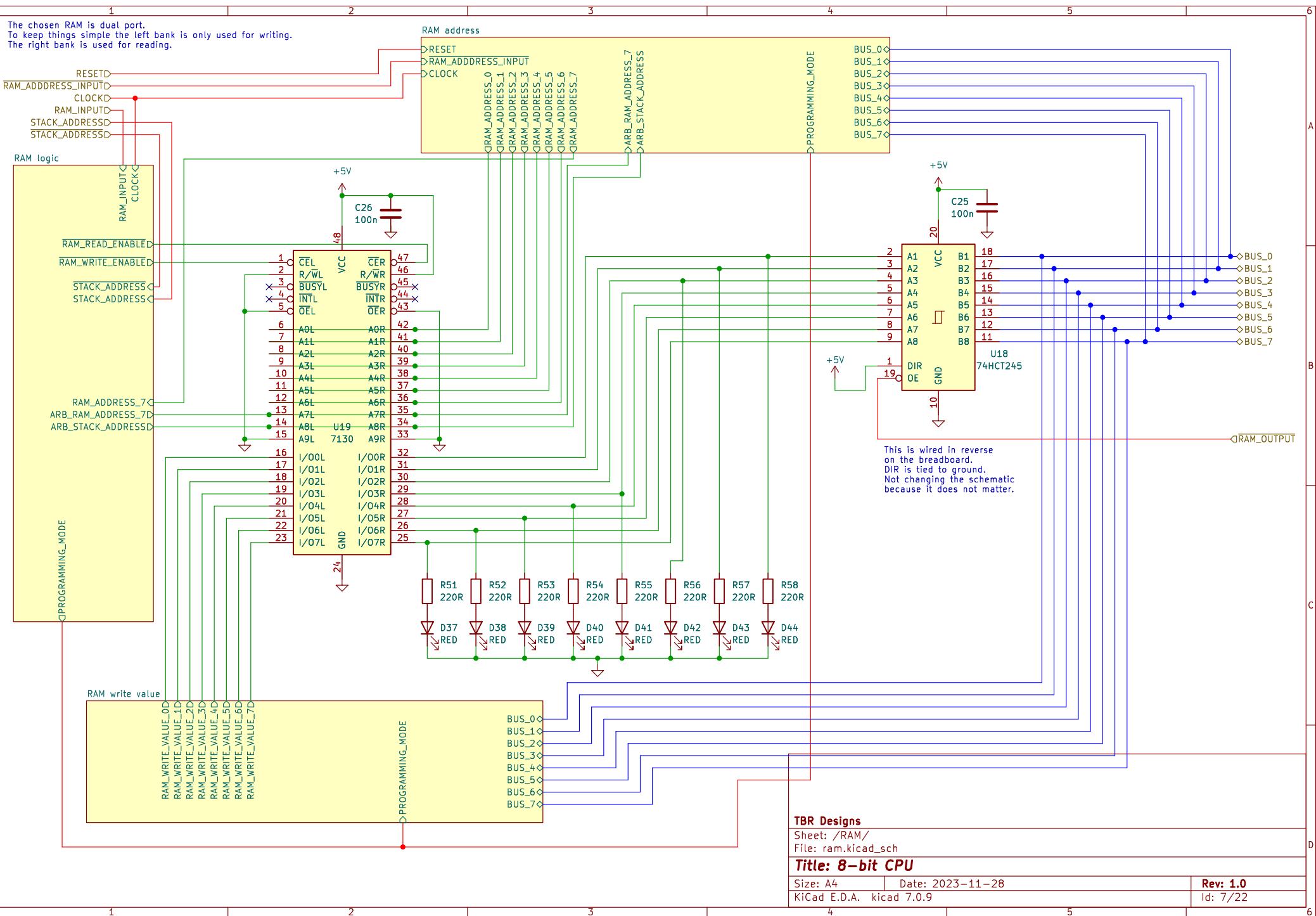
Sheet: /B register/  
File: b-register.kicad\_sch

**Title: 8-bit CPU**

Size: A4 | Date: 2023-11-28  
KiCad E.D.A. kicad 7.0.9

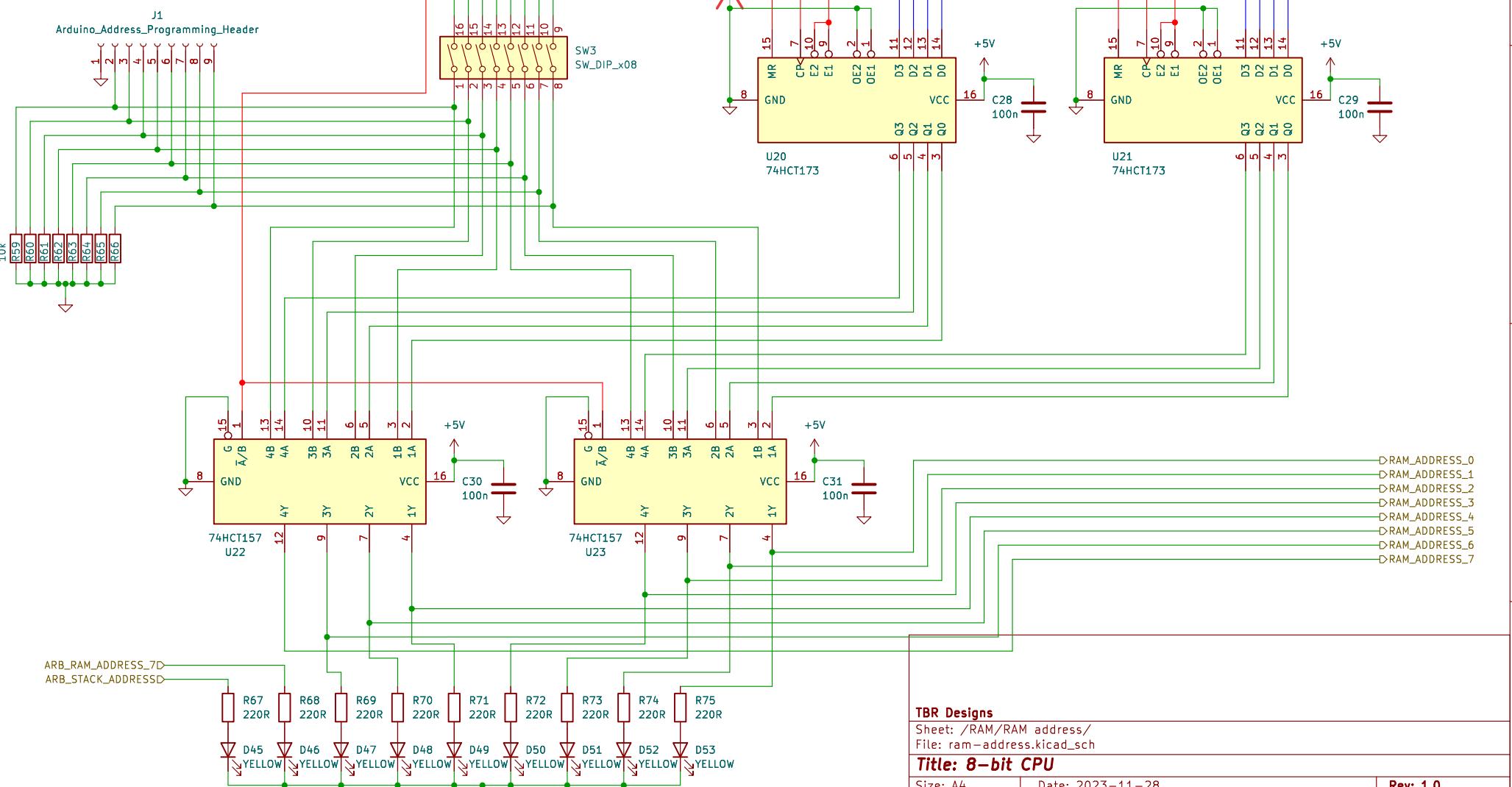
**Rev: 1.0**  
Id: 5/22





A word on the RESET line.  
 On my breadboards this is giving me a lot of problems.  
 When there are 4 or more lines high on the RAM value  
 and I toggle between RAM\_OUTPUT and not RAM\_OUTPUT  
 the RAM address gets RESET for some reason.  
 After trying everything I could think of (pull ups, pull downs,  
 disconnecting the bus, replacing chips, replacing wires, ...)  
 I got nowhere. So I decided to disconnect the RESET line from the  
 flip flops and just tie them to GND.  
 RESET for the RAM address is not really needed given the program  
 loads the first address from the program counter which is 0.  
 I might hook it up again and see once all the control  
 signals are connected.  
 This is not reflected in the schematic because I do not know if  
 it is related to the breadboards or not.  
 Scratch all that. See what I did for the A register.  
 Same was done here.

When in programming mode the  
 value from the dip-switches is selected.  
 Otherwise the values from the flip flops are selected.



#### TBR Designs

Sheet: /RAM/RAM\_address/  
 File: ram-address.kicad\_sch

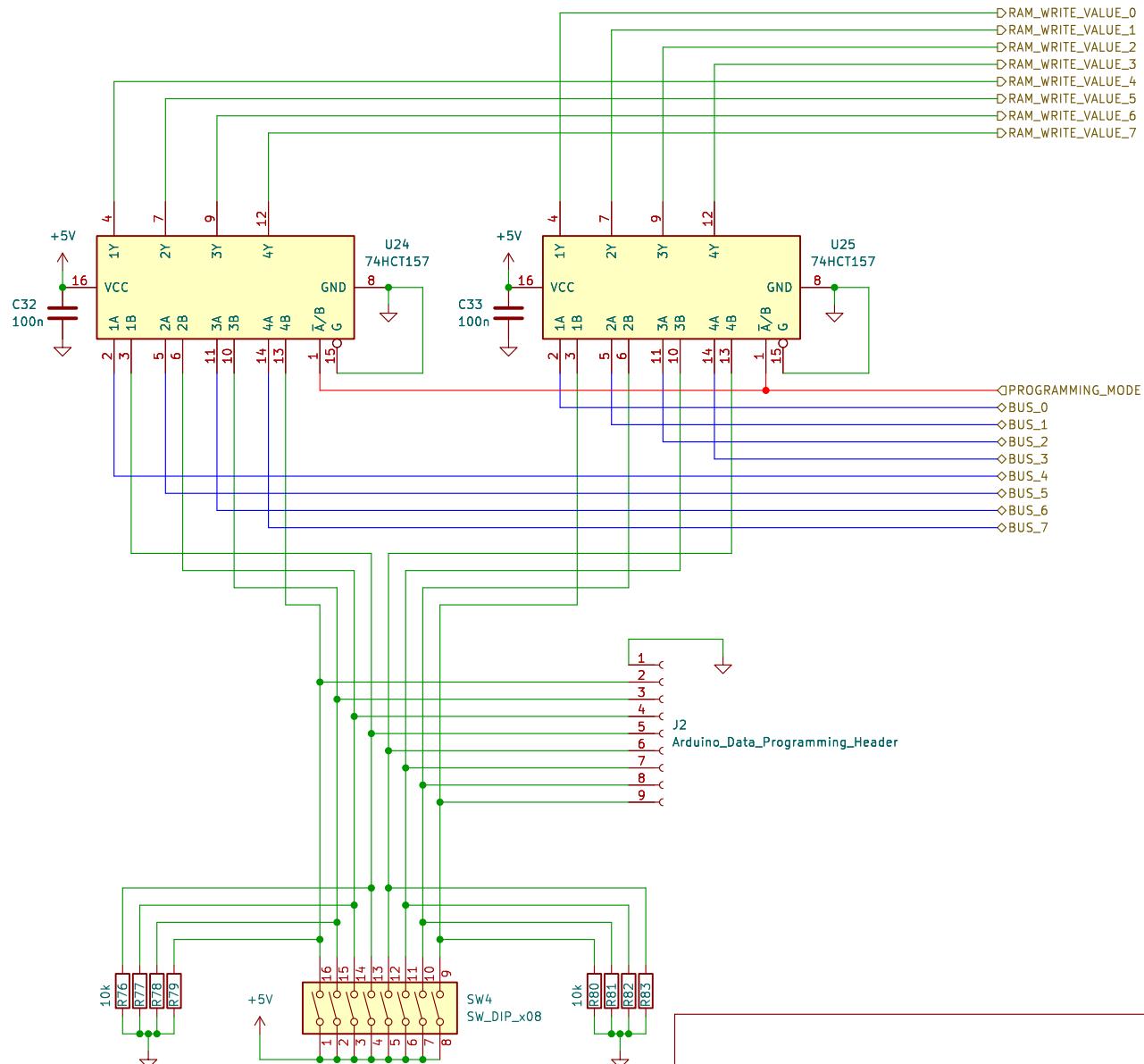
#### Title: 8-bit CPU

Size: A4 Date: 2023-11-28  
 KiCad E.D.A. kicad 7.0.9

Rev: 1.0  
 Id: 8/22

1 2 3 4 5 6

When in programming mode the value from the dip-switches is selected.  
Otherwise the value from the bus is selected.



#### TBR Designs

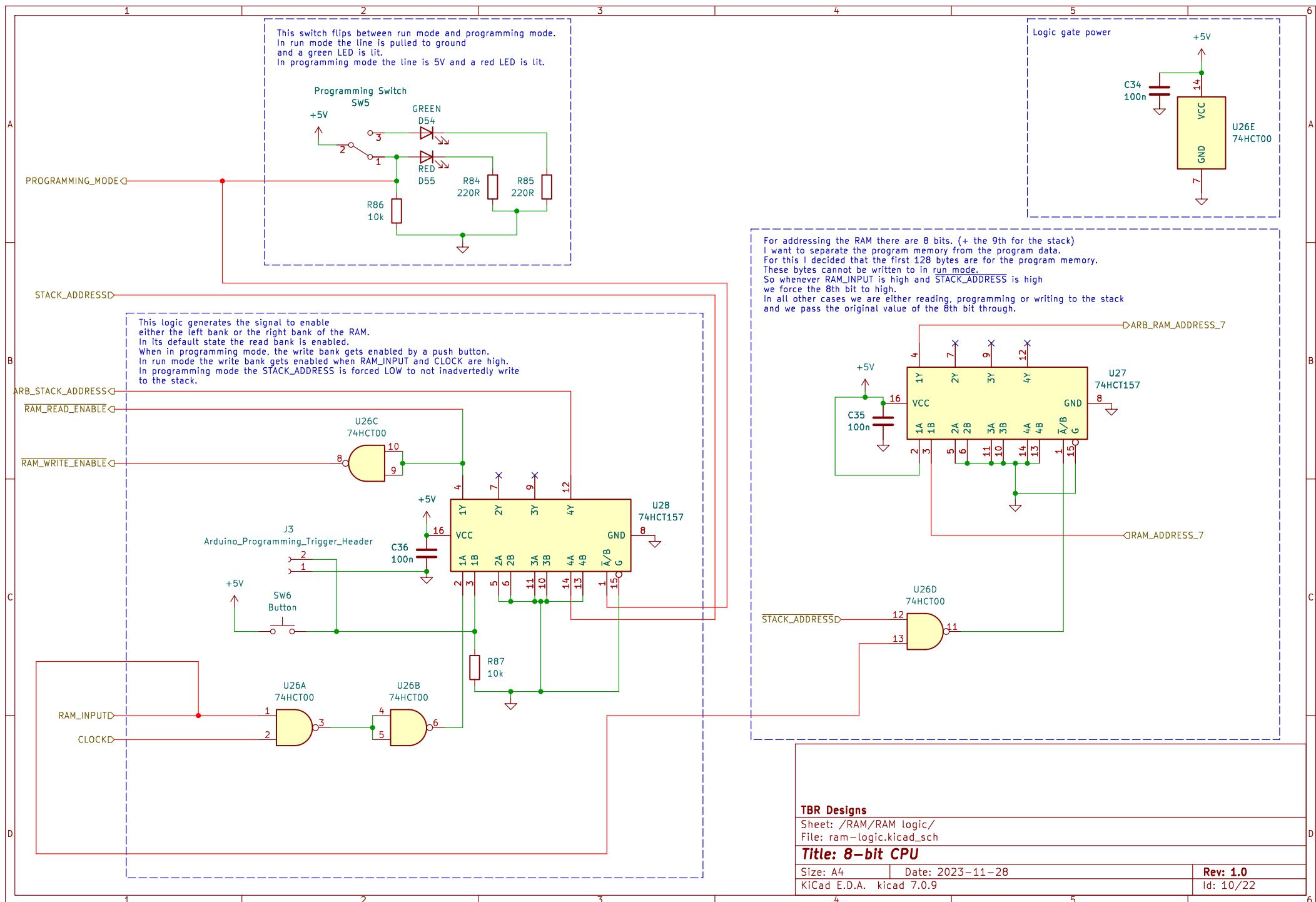
Sheet: /RAM/RAM write value/  
File: ram-write-value.kicad\_sch

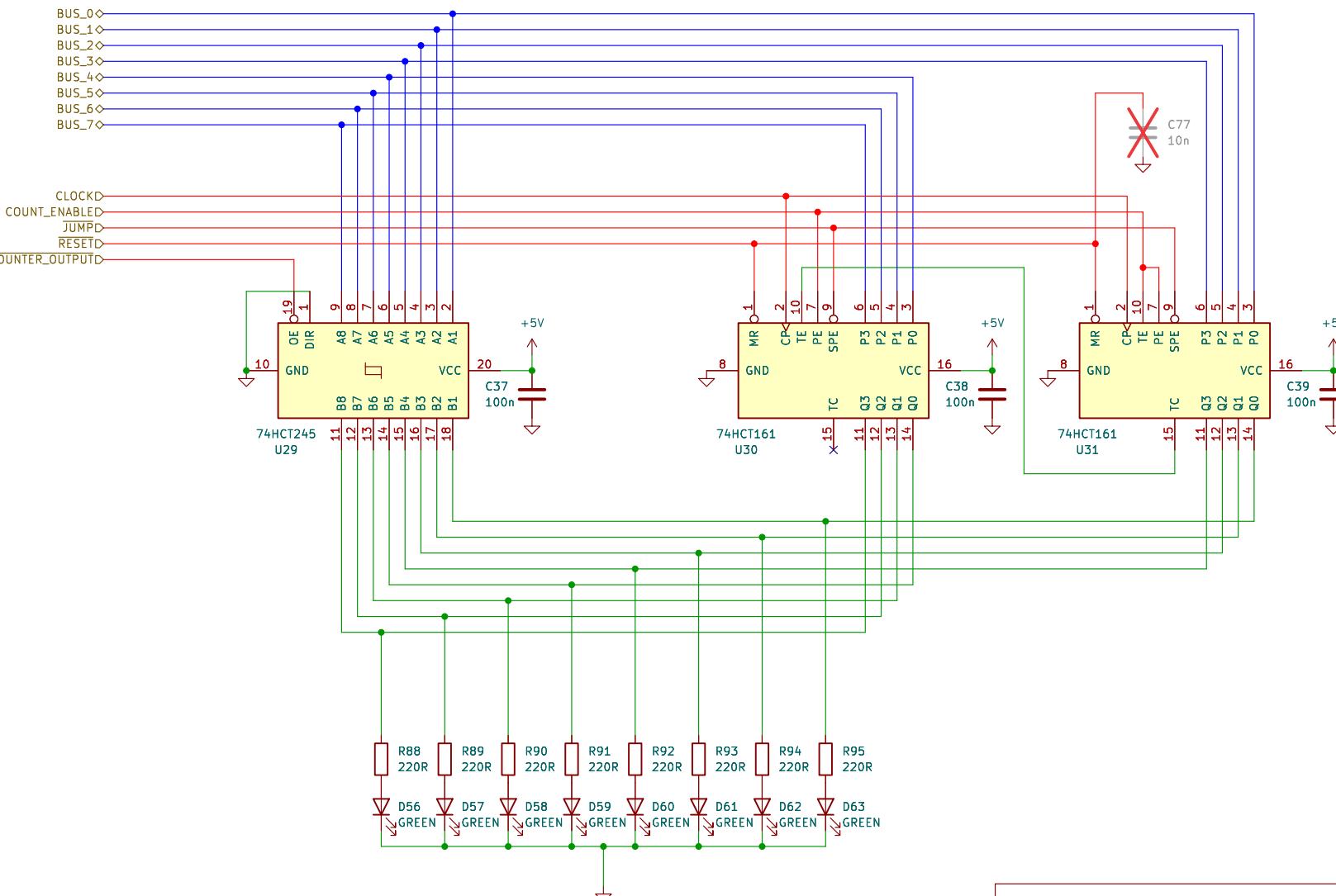
**Title: 8-bit CPU**

Size: A4 Date: 2023-11-28  
KiCad E.D.A. kicad 7.0.9

Rev: 1.0  
Id: 9/22

1 2 3 4 5 6





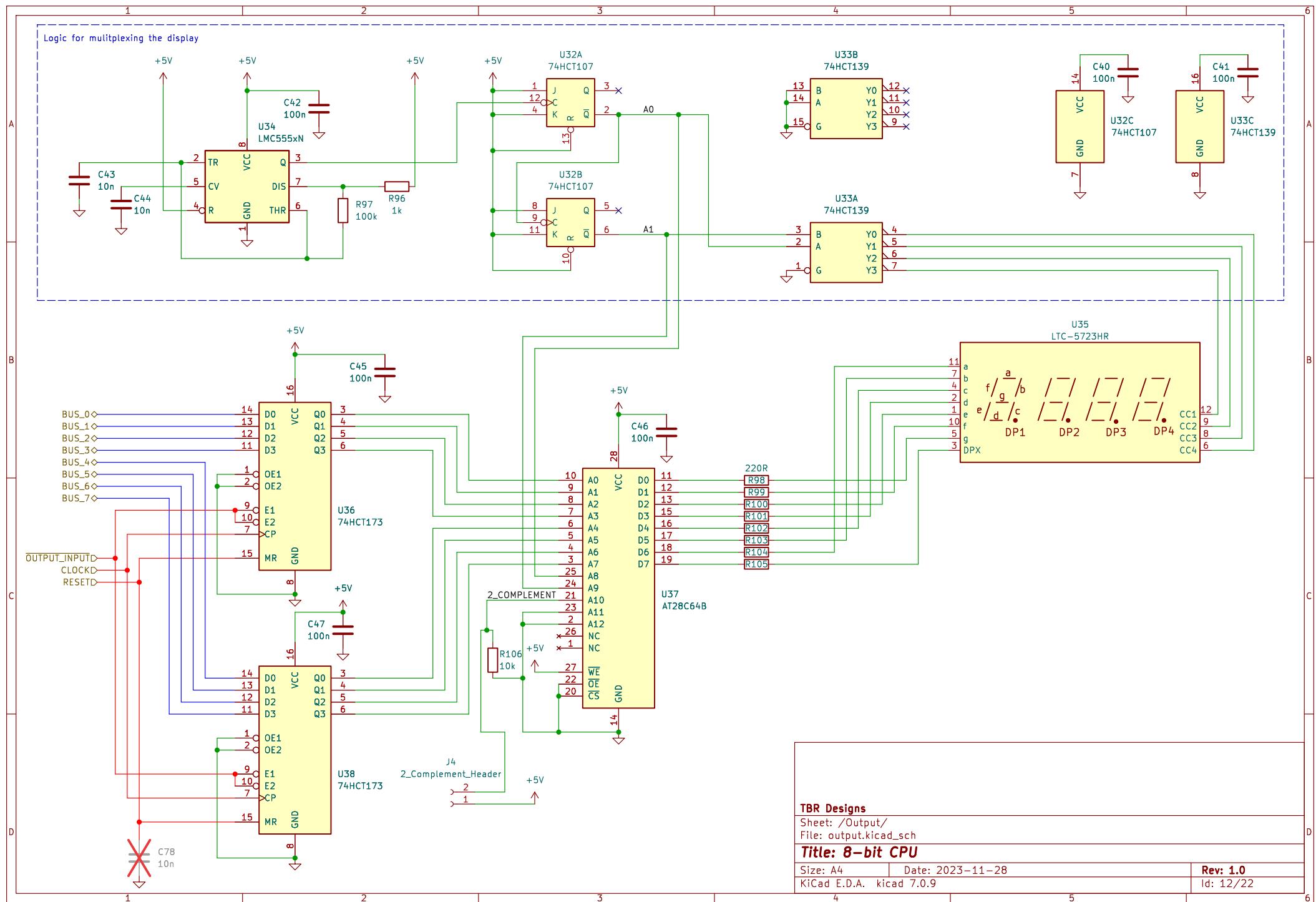
#### TBR Designs

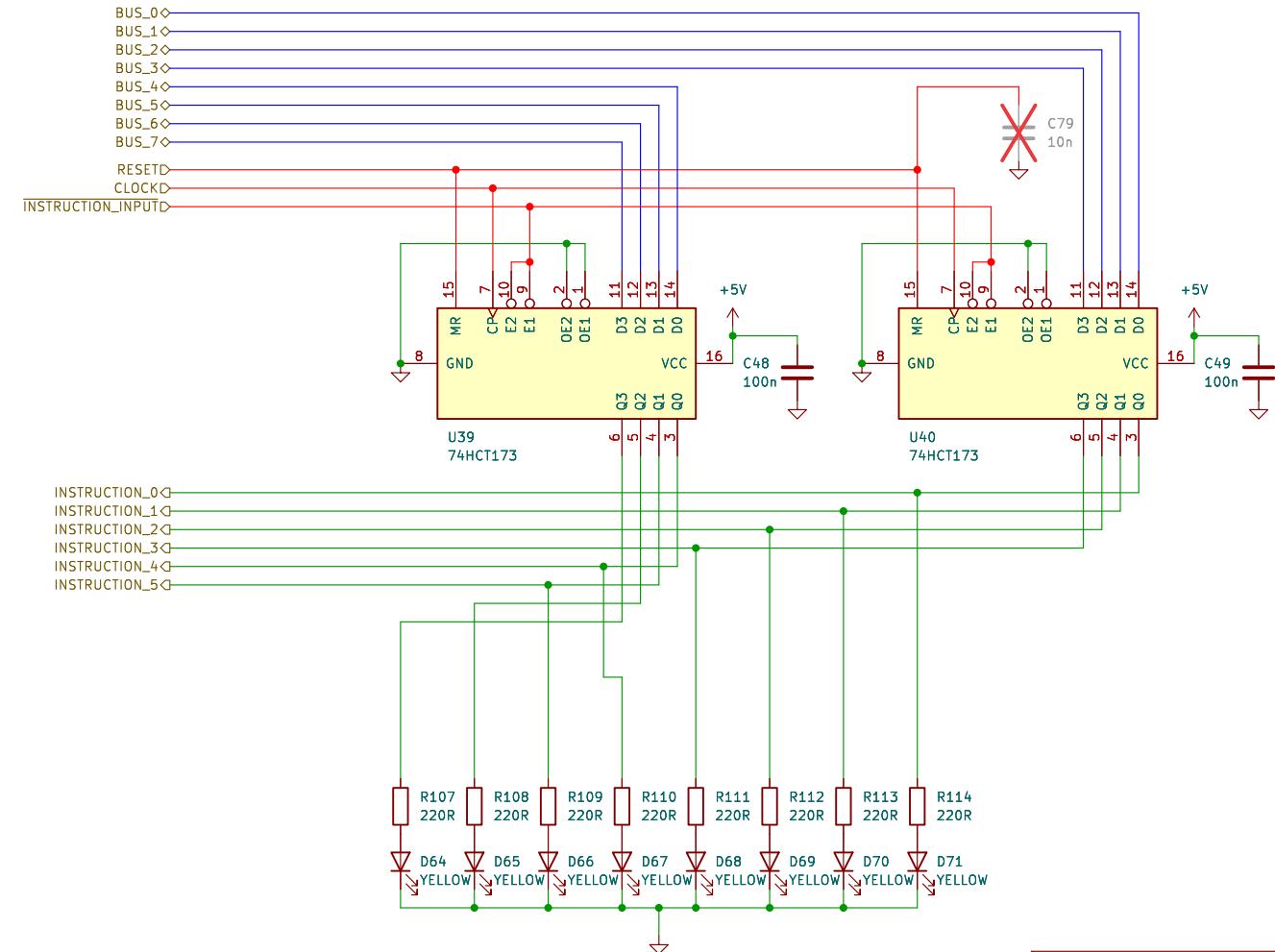
Sheet: /Program Counter/  
File: program-counter.kicad\_sch

**Title: 8-bit CPU**

Size: A4 Date: 2023-11-28  
KiCad E.D.A. kicad 7.0.9

Rev: 1.0  
Id: 11/22





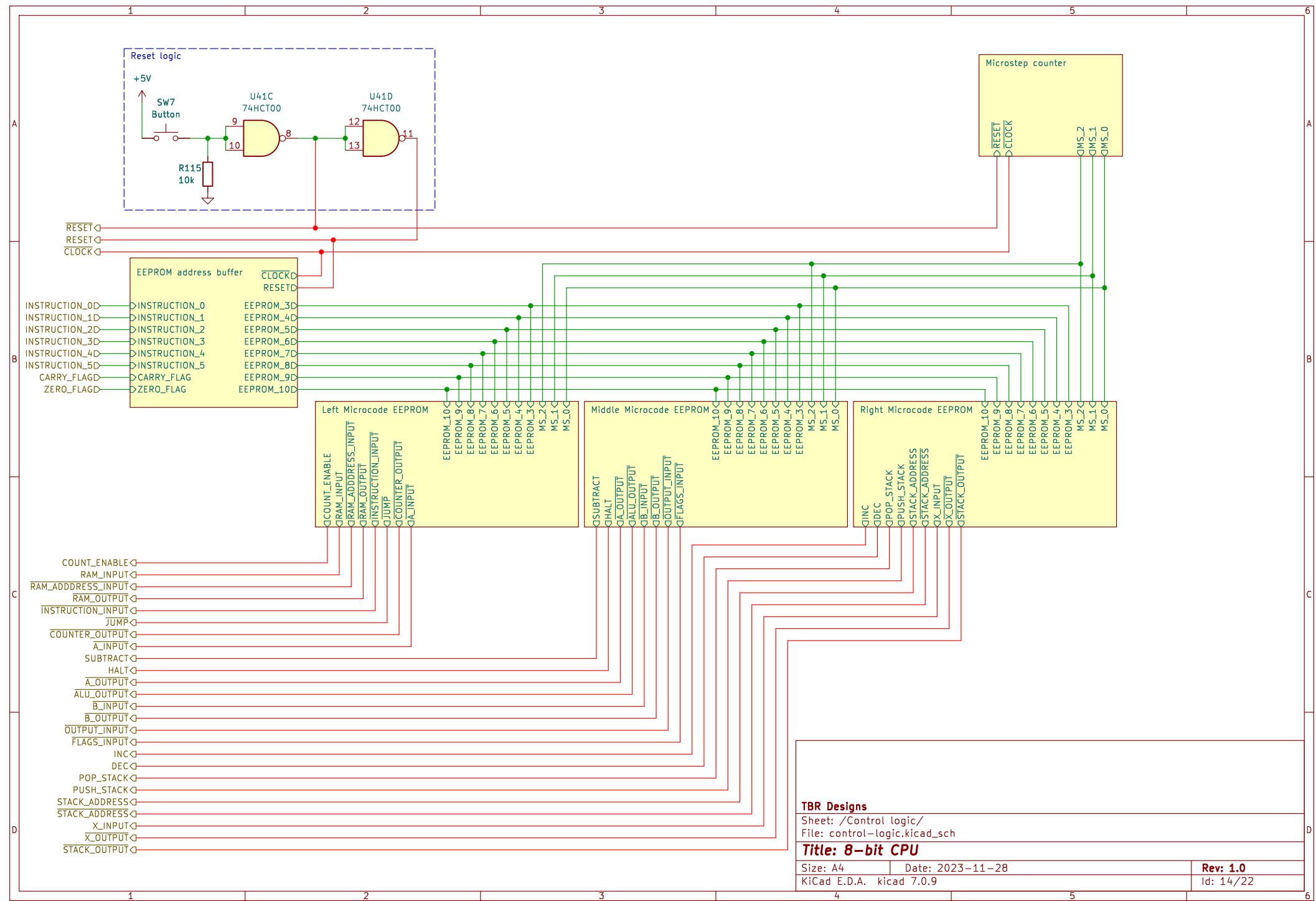
#### TBR Designs

Sheet: /Instruction register/  
 File: instruction-register.kicad\_sch

**Title: 8-bit CPU**

Size: A4 | Date: 2023-11-28  
 KiCad E.D.A. kicad 7.0.9

**Rev: 1.0**  
 Id: 13/22



This address buffer triggers on the inverted CLOCK.  
 I had to include this because during an address transition the outputs of the EEPROM's are undefined.  
 They vary wildly and random actions were triggered briefly.  
 Making the address change on the inverted CLOCK seems to solve this issue because all of the other logic is triggered on the CLOCK.

A

B

C

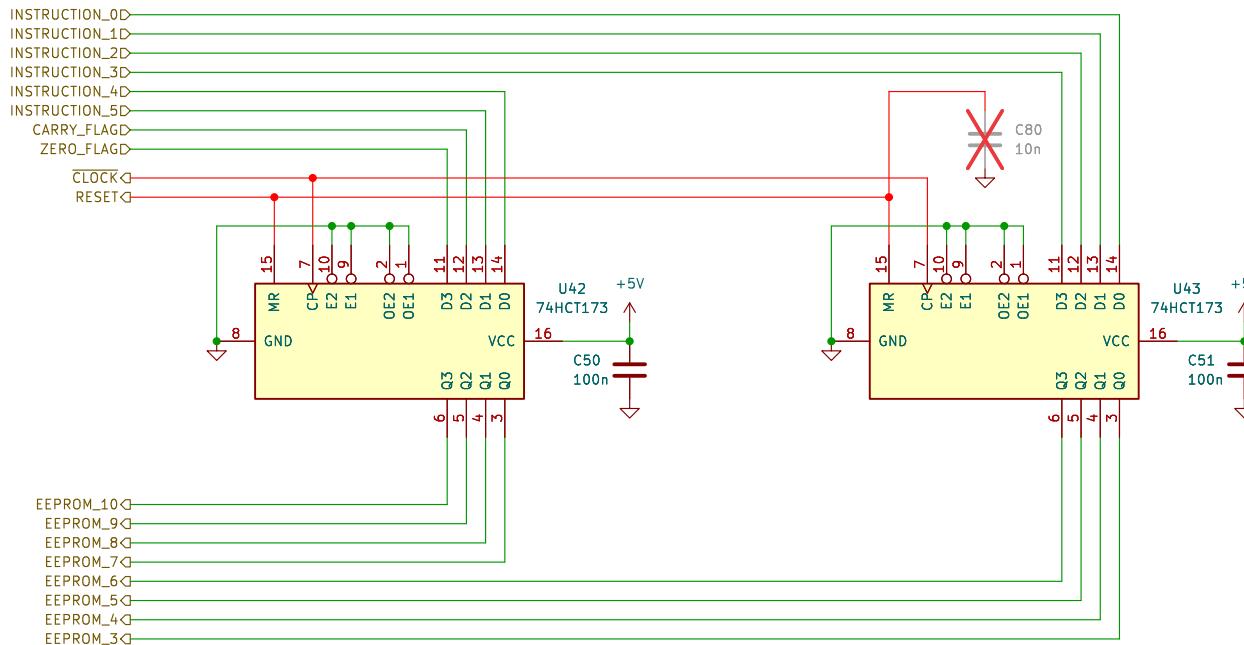
D

A

B

C

D



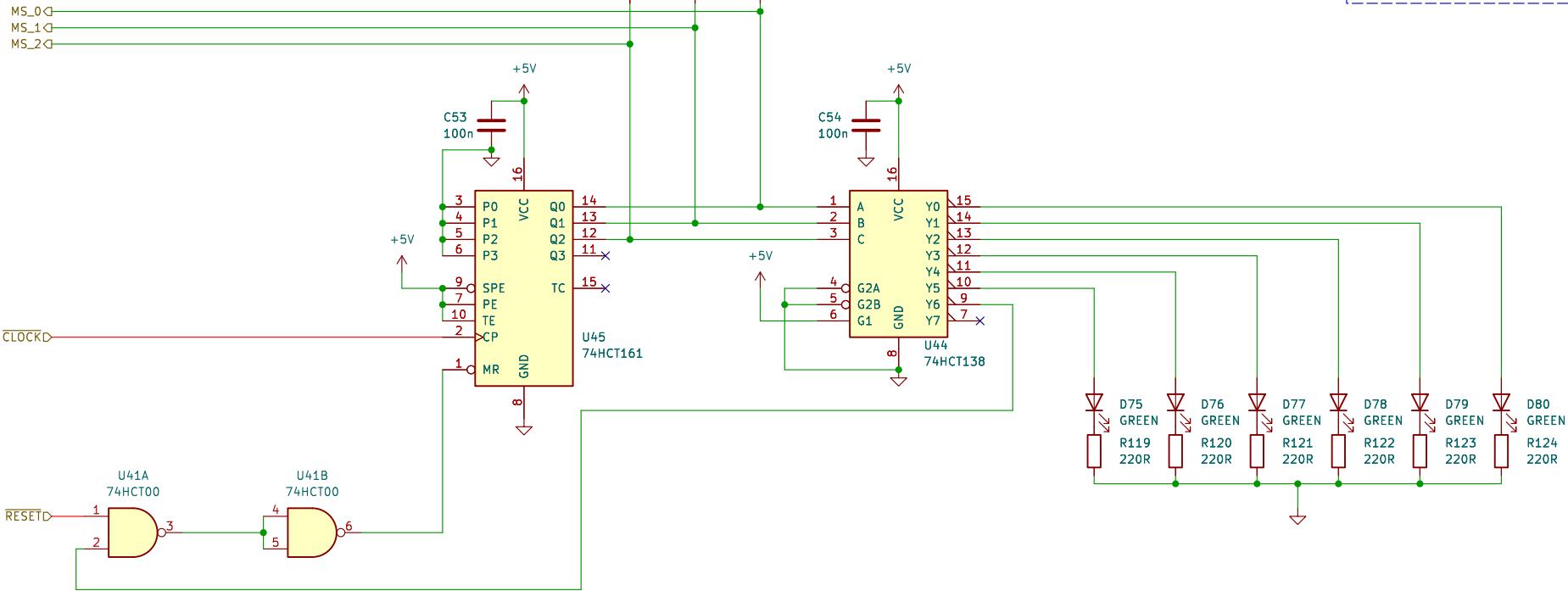
#### TBR Designs

Sheet: /Control logic/EEPROM\_address\_buffer/  
 File: eeprom-address-buffer.kicad\_sch

#### Title: 8-bit CPU

Size: A4 Date: 2023-11-28  
 KiCad E.D.A. kicad 7.0.9

Rev: 1.0  
 Id: 15/22



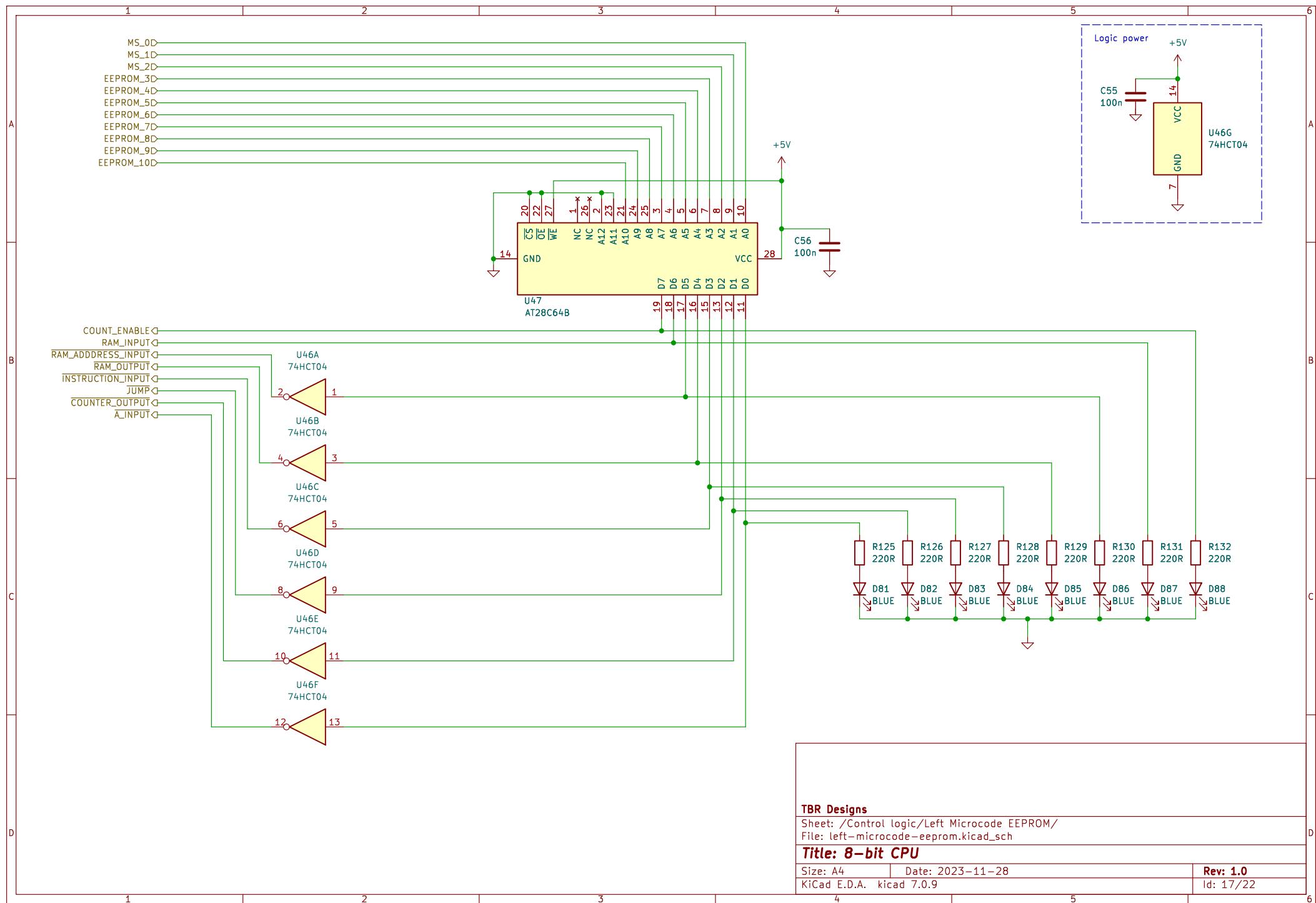
### TBR Designs

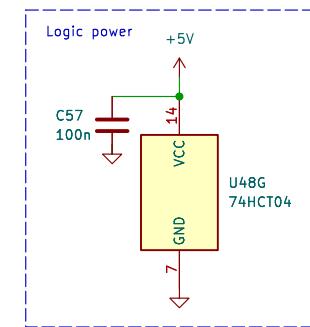
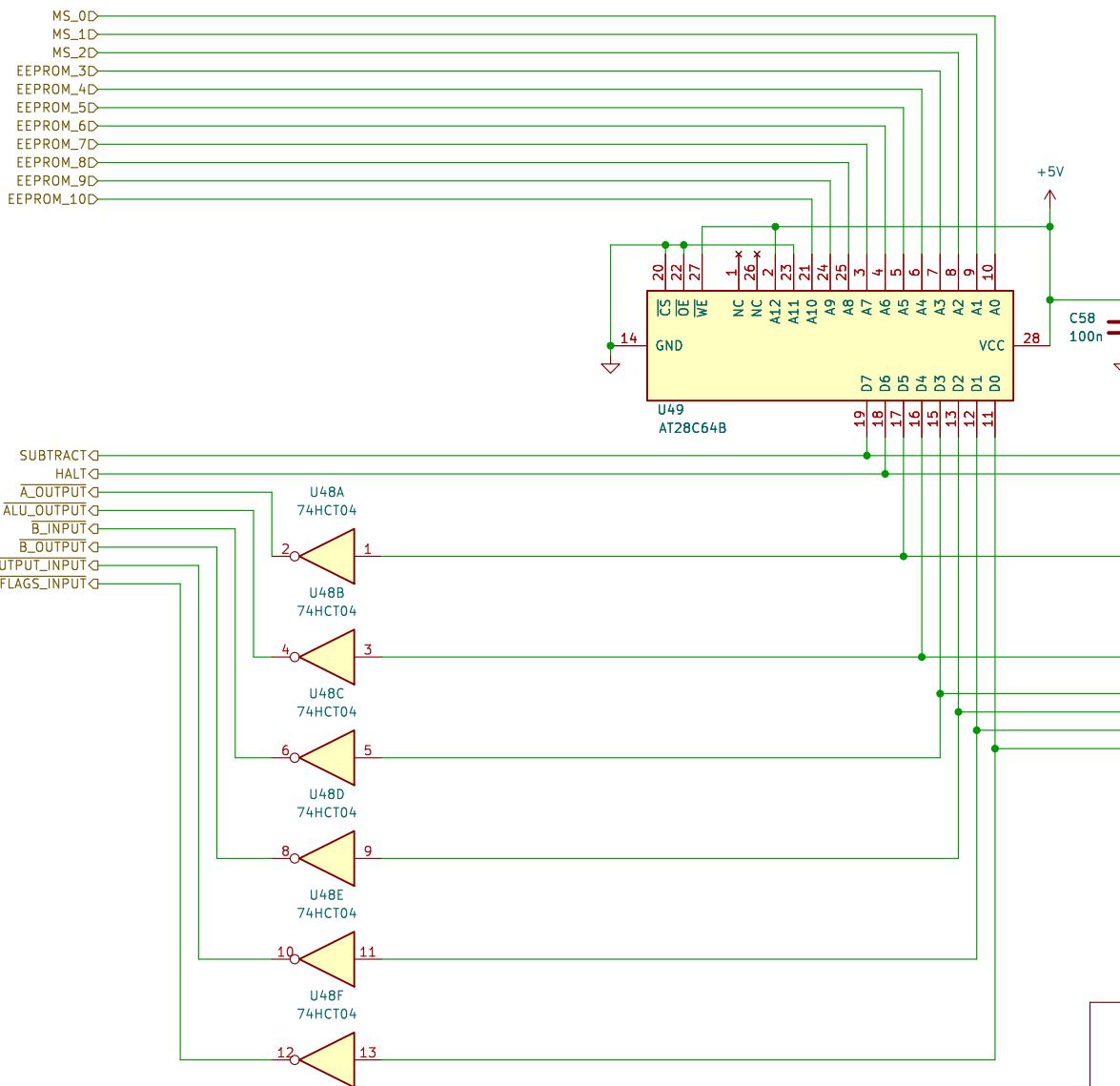
Sheet: /Control logic/Microstep counter/  
File: microstep-counter.kicad\_sch

**Title: 8-bit CPU**

Size: A4 Date: 2023-11-28  
KiCad E.D.A. kicad 7.0.9

Rev: 1.0  
Id: 16/22





### TBR Designs

Sheet: /Control logic/Middle Microcode EEPROM/  
File: middle-microcode-eeprom.kicad\_sch

**Title: 8-bit CPU**

Size: A4 Date: 2023-11-28  
KiCad E.D.A. kicad 7.0.9

Rev: 1.0  
Id: 18/22

