Sheet: Output Display

File: Output Display.sch

Sheet: Register XY

File: Register XY.sch

Sheet: Speed Control

File: Speed Control.sch

Sheet: Program Counter

File: Program Counter.sch

Sheet: Clock

File: Clock.sch

Sheet: PC/IF

File: PC_IF.sch

Sheet: Power-on Reset

File: Power-on Reset.sch

Sheet: Instruction RAM

File: Instruction RAM.sch

Sheet: Instruction ROM

File: Instruction ROM.sch

Sheet: Register A

File: Register A.sch

Sheet: Data RAM

File: Data RAM.sch

Sheet: Instruction Register

File: Instruction Register.sch

Sheet: Register B

File: Register B.sch

Sheet: Instruction Decoder

File: Instruction Decoder.sch

Sheet: ALU

File: ALU.sch

Sheet: Execute

File: Execute.sch

Sheet: Bus Display

File: Bus Display.sch

Sheet: Register D

File: Register D.sch

Sheet: Control Word Display

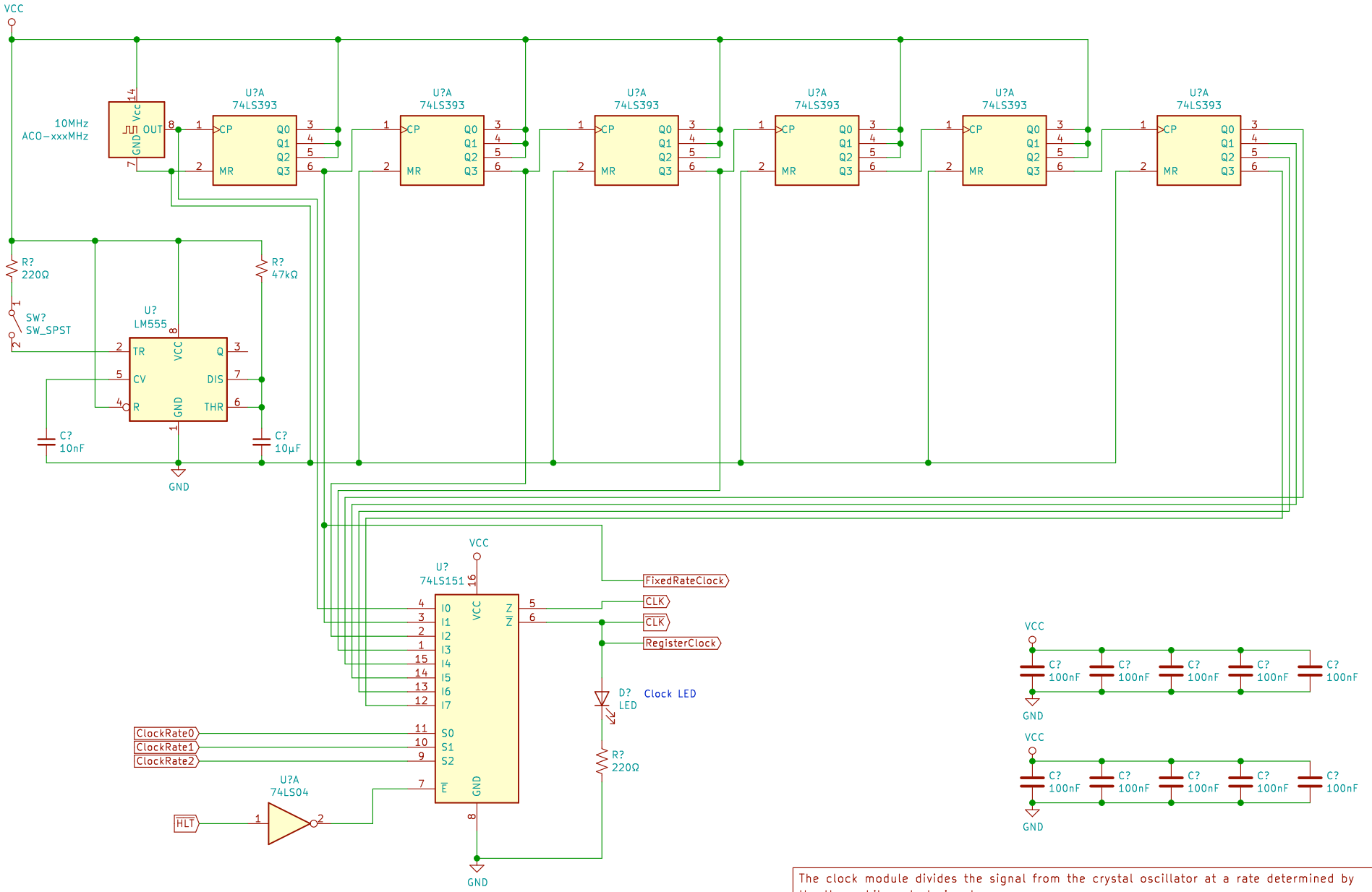
File: Control Word Display.sch

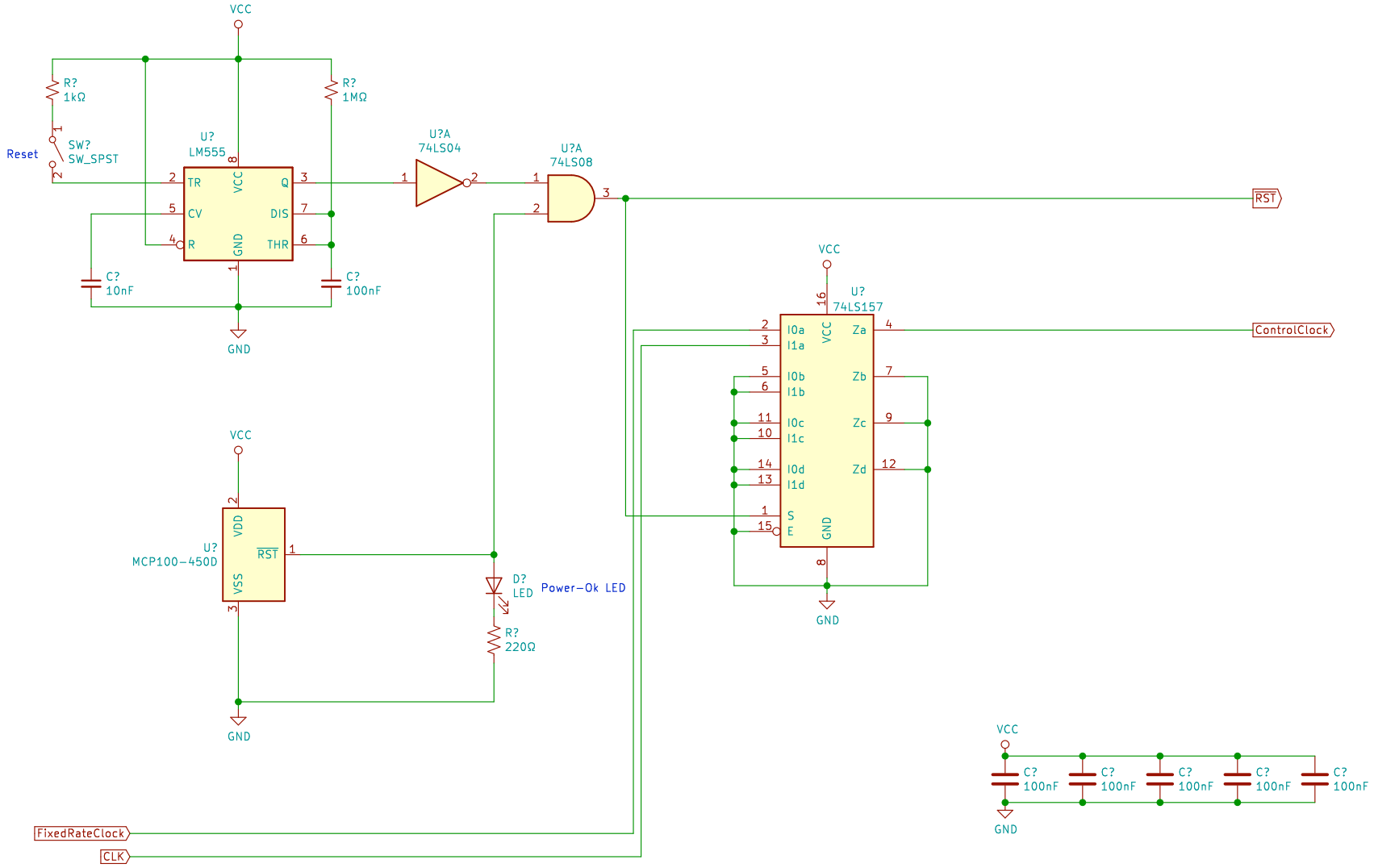
TTL microcomputer built from 74xx series logic chips.

Sheet: /
File: TurtleTTL.sch

Title: Turtle TTL

Size: A	Date:	**Rev:**
KiCad E.D.A. kicad (5.1.0-0)		Id: 1/20


VCC
10MHz
ACO-xxxMHz
U?A
74LS393
CP
MR
Q0
Q1
Q2
Q3
R?
220Ω
R?
47kΩ
SW?
SW_SPST
U?
LM555
TR
CV
R
VCC
GND
Q
DIS
THR
C?
10nF
C?
10µF
U?
74LS151
I0
I1
I2
I3
I4
I5
I6
I7
S0
S1
S2
E
Z
FixedRateClock
CLK
RegisterClock
D?
LED
Clock LED
ClockRate0
ClockRate1
ClockRate2
U?A
74LS04
HLT
C?
100nF
The clock module divides the signal from the crystal oscillator at a rate determined by the three-bit control signal.
Sheet: /Clock/
File: Clock.sch
Title: Clock
Size: A
Date:
Rev:
KiCad E.D.A. kicad (5.1.0-0)
Id: 2/20

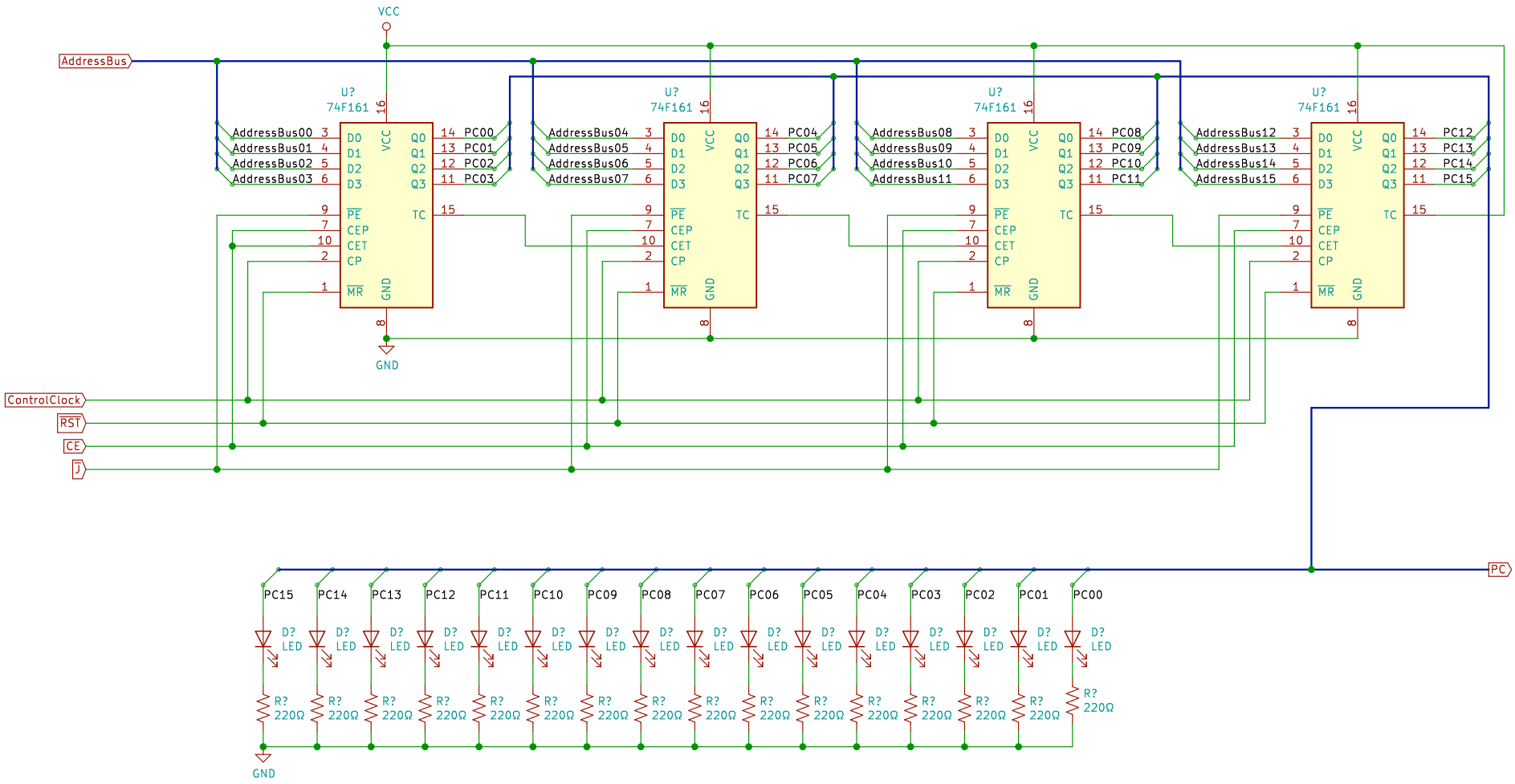


The MCP100 provides Power-on Reset functionality.
A button is also provided to manually reset the machine.
During reset, the control clock is pulsed repeatedly to flush the pipeline.

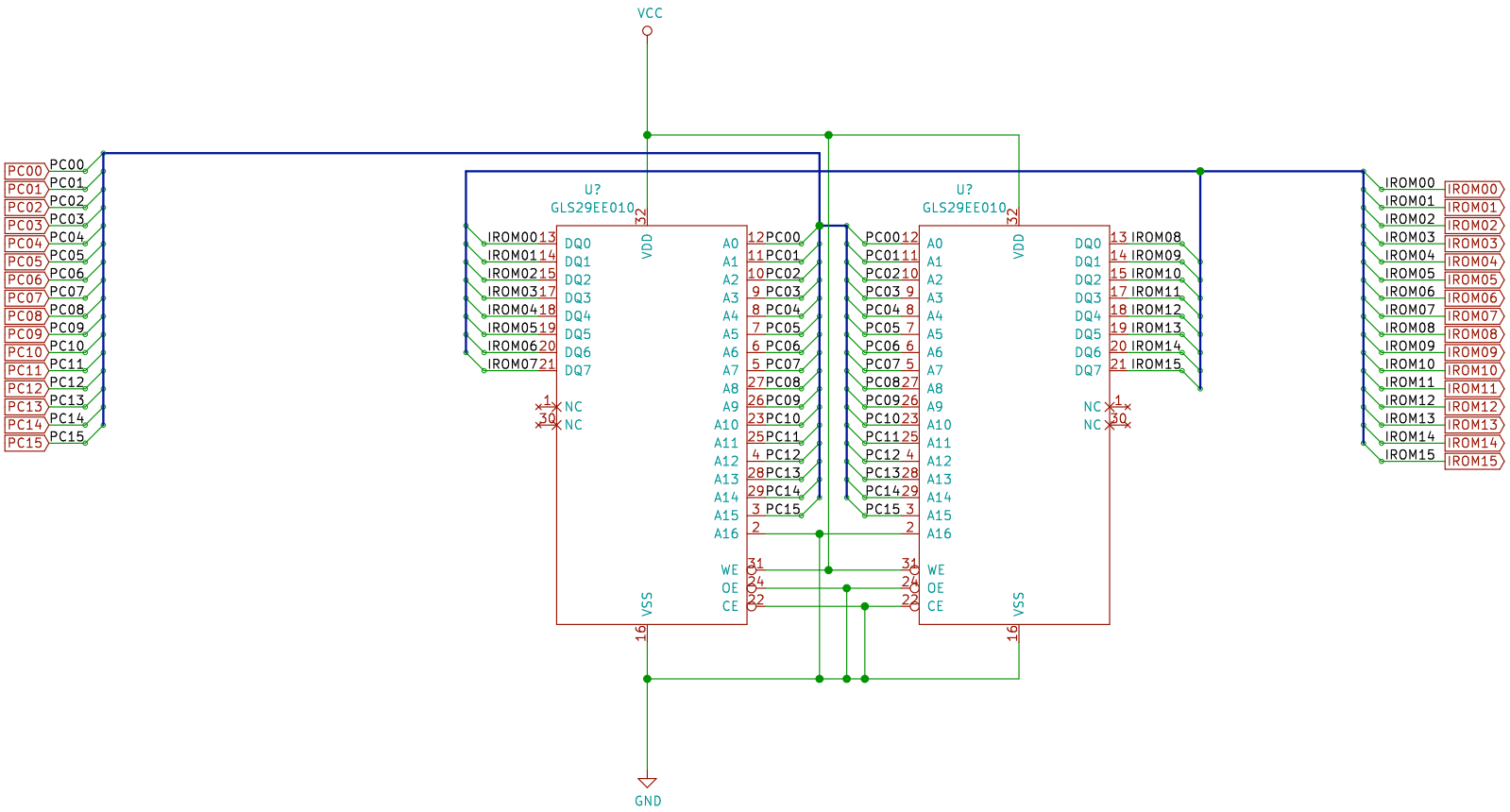
Sheet: /Power-on Reset/
File: Power-on Reset.sch

Title: Power-on Reset

Size: A	Date:	Rev:
KiCad E.D.A. kicad (5.1.0-0)		Id: 3/20



Sheet: /Program Counter/		
File: Program Counter.sch		
Title: Program Counter		
Size: A	Date:	**Rev:**
KiCad E.D.A. kicad (5.1.0-0)		Id: 4/20



16-bit instructions are read from ROM at the address specified by the Program Counter.

Sheet: /Instruction ROM/
File: Instruction ROM.sch

Title: Instruction ROM

Size: A	Date:	Rev:
KiCad E.D.A. kicad (5.1.0-0)		Id: 5/20

Sheet: /Instruction RAM/
File: Instruction RAM.sch

Title: Instruction RAM

Size: A	Date:	**Rev:**
KiCad E.D.A. kicad (5.1.0-0)		Id: 6/20

Sheet: /Instruction Decoder/
File: Instruction Decoder.sch

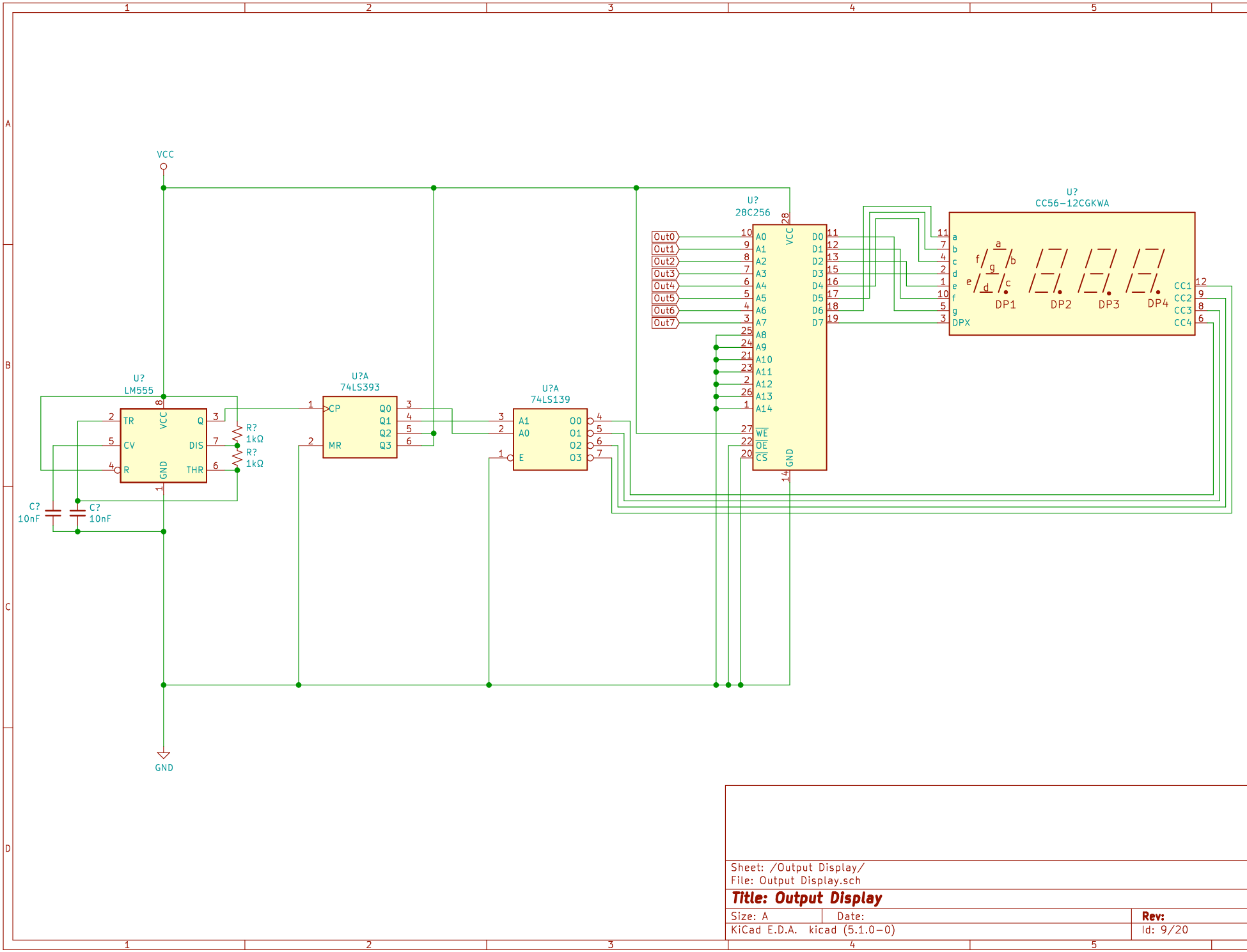
Title: Instruction Decoder

Size: A	Date:	**Rev:**
KiCad E.D.A. kicad (5.1.0-0)		Id: 7/20

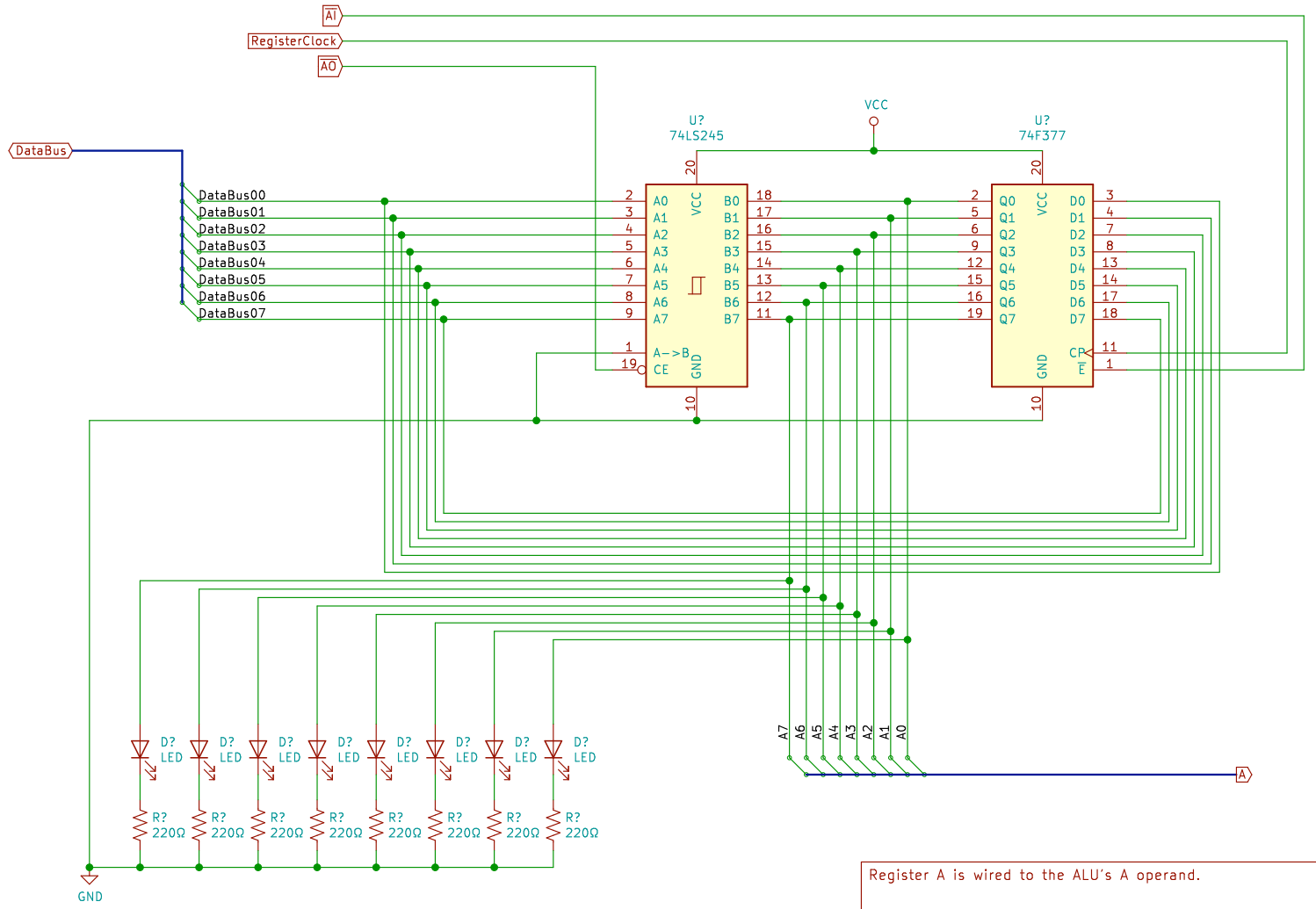
Sheet: /Execute/
File: Execute.sch

Title: Execute

Size: A	Date:	**Rev:**
KiCad E.D.A. kicad (5.1.0-0)		Id: 8/20



Sheet: /Output Display/	
File: Output Display.sch	
Title: Output Display	
Size: A	Date:
KiCad E.D.A. kicad (5.1.0-0)	Rev: Id: 9/20



Register A is wired to the ALU's A operand.

Sheet: /Register A/
File: Register A.sch

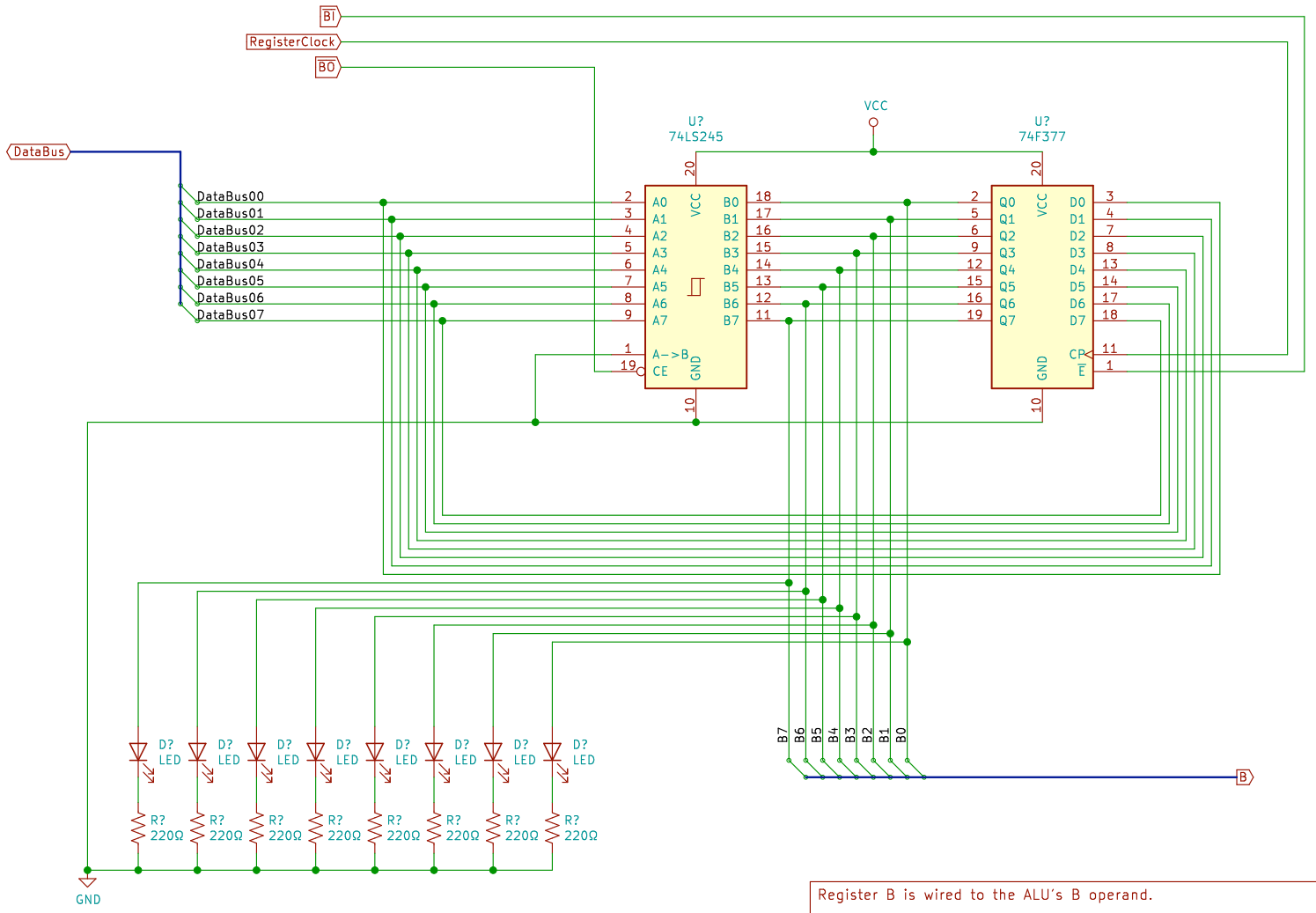
Title: Register A

Size: A	Date:	Rev:
KiCad E.D.A. kicad (5.1.0-0)		Id: 10/20

Sheet: /ALU/
File: ALU.sch

Title: ALU

Size: A	Date:	**Rev:**
KiCad E.D.A. kicad (5.1.0-0)		Id: 11/20



Register B is wired to the ALU's B operand.

Sheet: /Register B/
File: Register B.sch

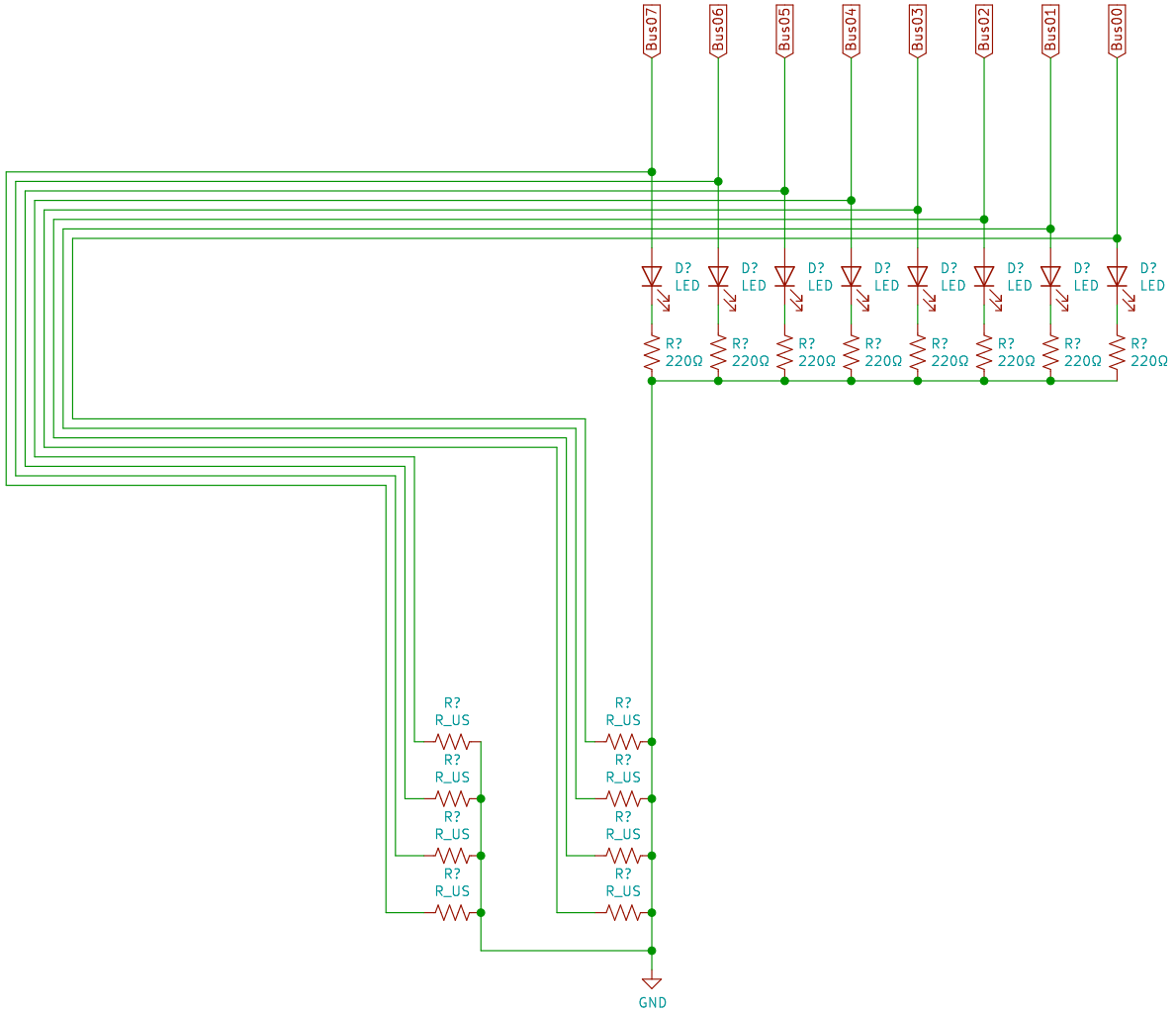
Title: Register B

Size: A	Date:	Rev:
KiCad E.D.A. kicad (5.1.0-0)		Id: 12/20

Sheet: /Data RAM/
File: Data RAM.sch

Title: Data RAM

Size: A	Date:	**Rev:**
KiCad E.D.A. kicad (5.1.0-0)		Id: 13/20

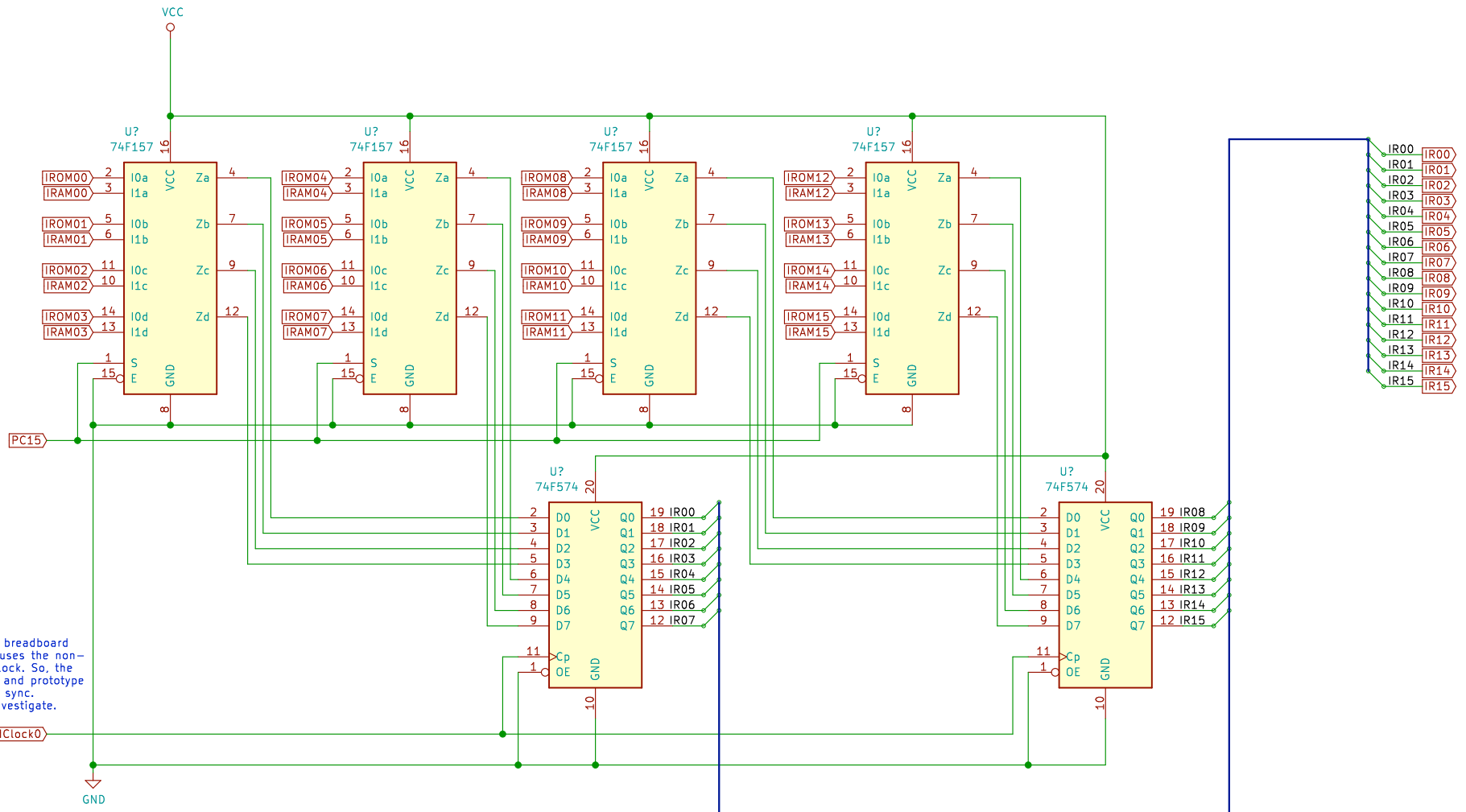


Sheet: /Bus Display/		
File: Bus Display.sch		
Title: Bus Display		
Size: A	Date:	**Rev:**
KiCad E.D.A. kicad (5.1.0-0)		Id: 14/20

Sheet: /Control Word Display/
File: Control Word Display.sch

Title: Control Word Display

Size: A	Date:	**Rev:**
KiCad E.D.A. kicad (5.1.0-0)		Id: 15/20

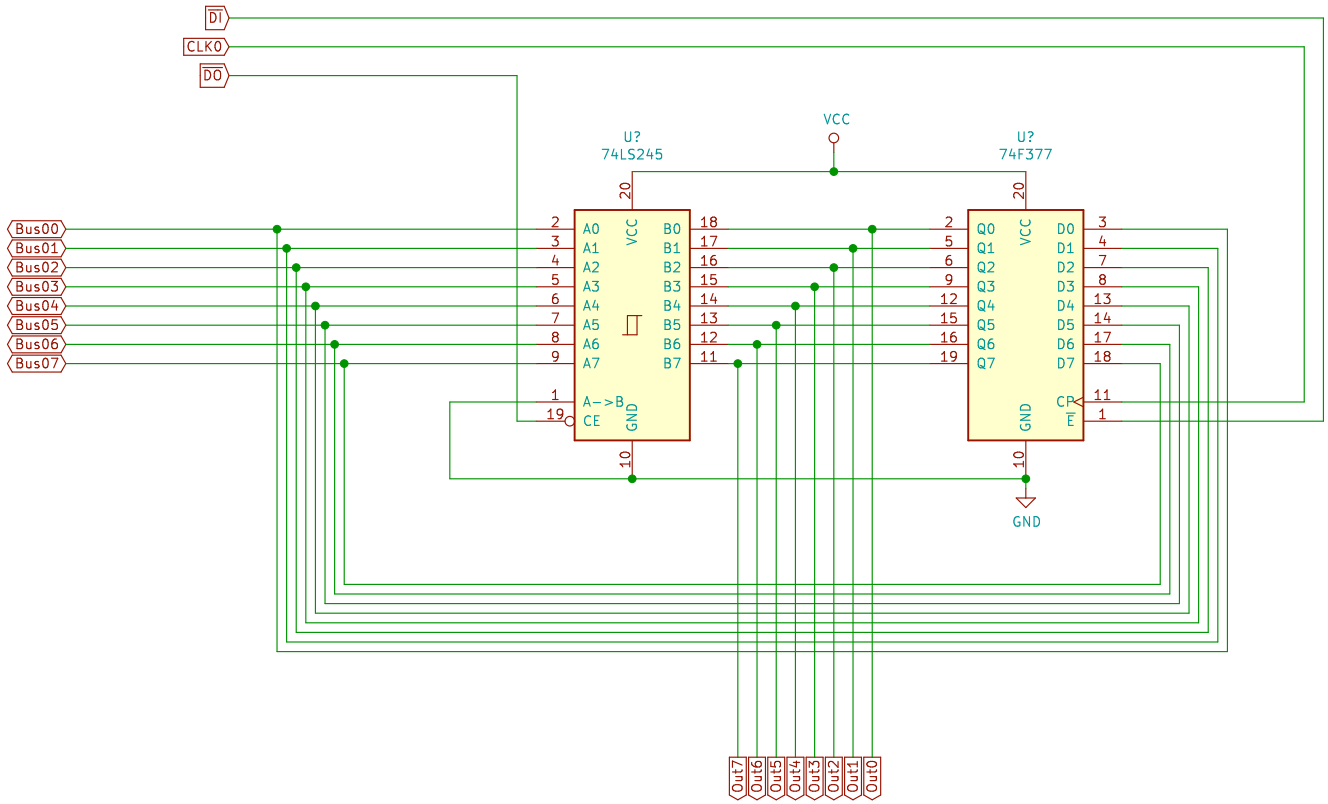


The Instruction Register receives input from either Instruction ROM or Instruction RAM.

Sheet: /Instruction Register/
File: Instruction Register.sch

Title: Instruction Register

Size: A	Date:	Rev:
KiCad E.D.A. kicad (5.1.0-0)		Id: 16/20

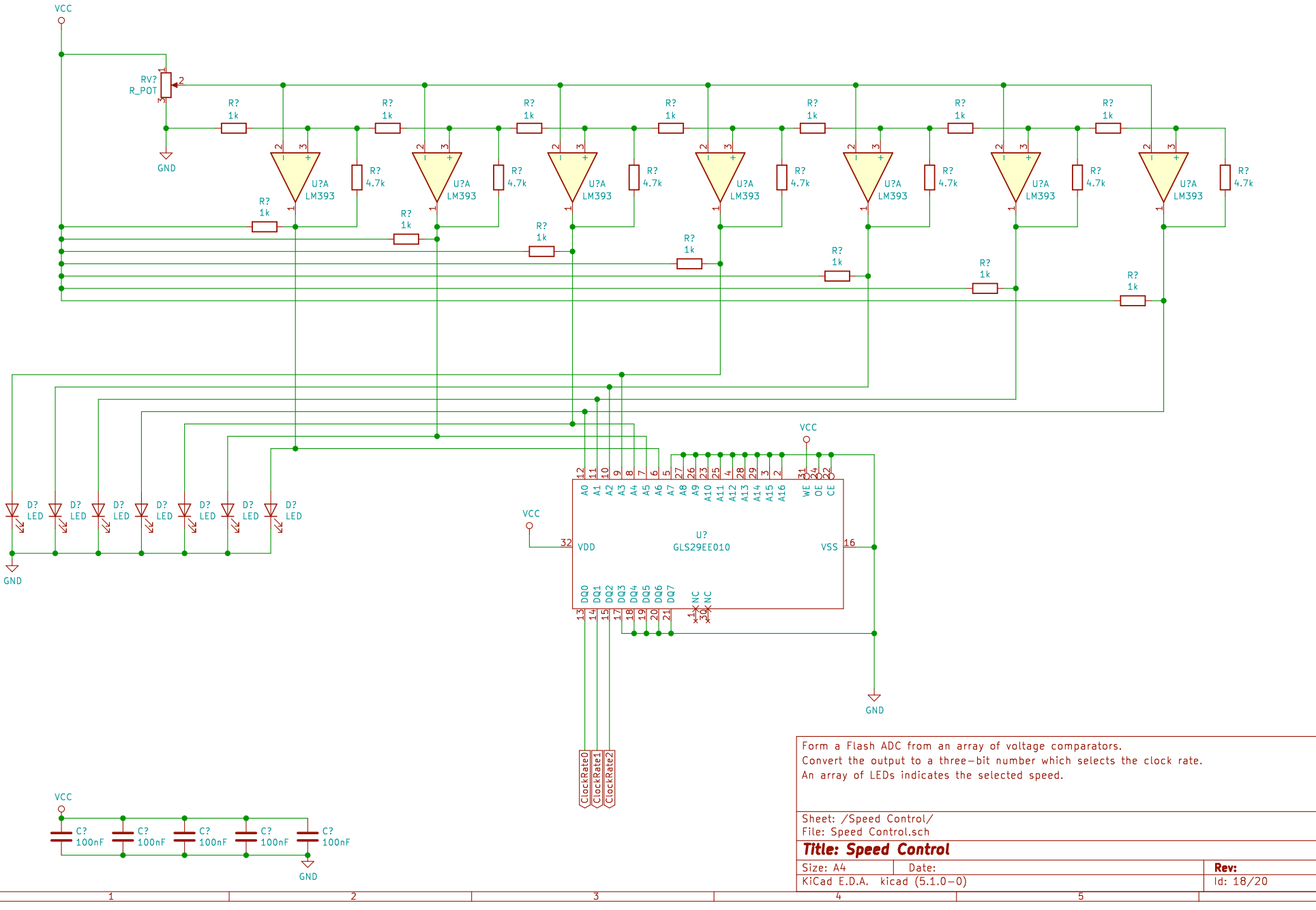


Register D is wired directly to the Output Display Module.

Sheet: /Register D/
File: Register D.sch

Title: Register D

Size: A	Date:	**Rev:**
KiCad E.D.A. kicad (5.1.0-0)		Id: 17/20


VCC
RV?
R_POT
GND
R?
1k
4.7k
U?A
LM393
D?
LED
U?
GLS29EE010
VDD
VSS
WE
OE
CE
NC
C?
100nF
ClockRate0
ClockRate1
ClockRate2
Form a Flash ADC from an array of voltage comparators.
Convert the output to a three-bit number which selects the clock rate.
An array of LEDs indicates the selected speed.
Sheet: /Speed Control/
File: Speed Control.sch
Title: Speed Control
Size: A4
Date:
Rev:
KiCad E.D.A. kicad (5.1.0-0)
Id: 18/20

Sheet: /Register XY/
File: Register XY.sch

Title:

Size: A4	Date:	**Rev:**
KiCad E.D.A. kicad (5.1.0-0)		Id: 19/20

Sheet: /PC/IF/
File: PC_IF.sch

Title:

Size: A4	Date:	**Rev:**
KiCad E.D.A. kicad (5.1.0-0)		Id: 20/20