Nixie Tube Clock

Description
A Nixie Tube Clock built using only discrete digital logic.

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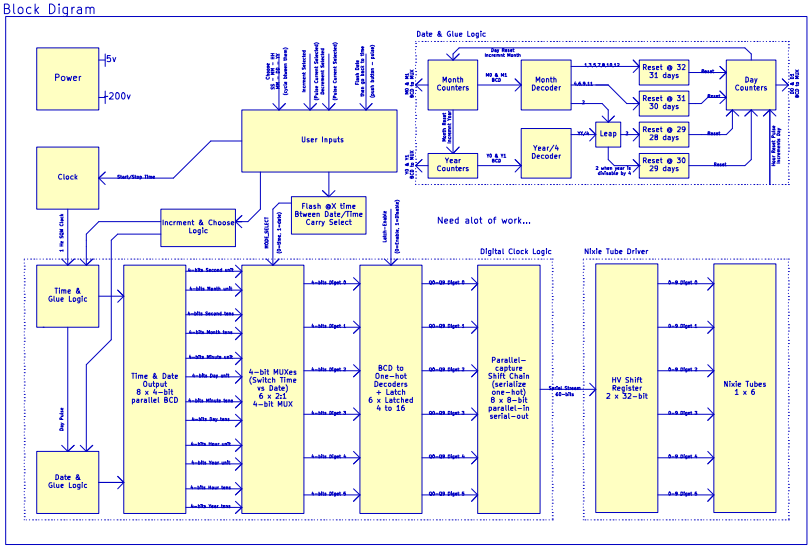
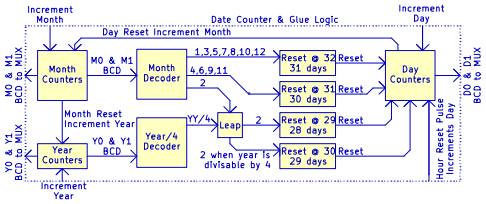
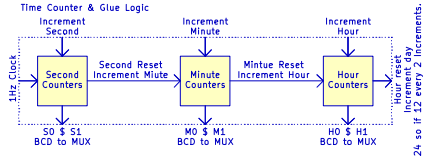
Non–BOM Items

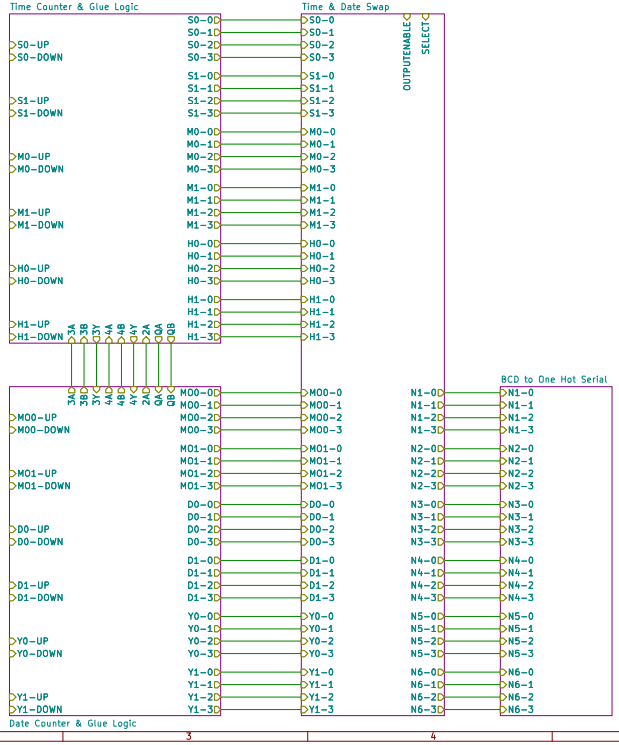
Additional BOM Items

Block Digram









User Inputs

File: User Inputs.kicad_sch

Increment–Decrement & Choose Logic

File: Increment–Decrement & Choose Logic.kicad_sch

Power Management

File: power_management.kicad_sch

Digital Clock Logic

File: digital_clock_logic.kicad_sch

Nixie Tube Driver

File: nixie_tube_driver.kicad_sch

Sheet: /
File: Nixie Tube Clock.kicad_sch

Title: Top Sheet

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Sheet: /Power Management/
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Title:

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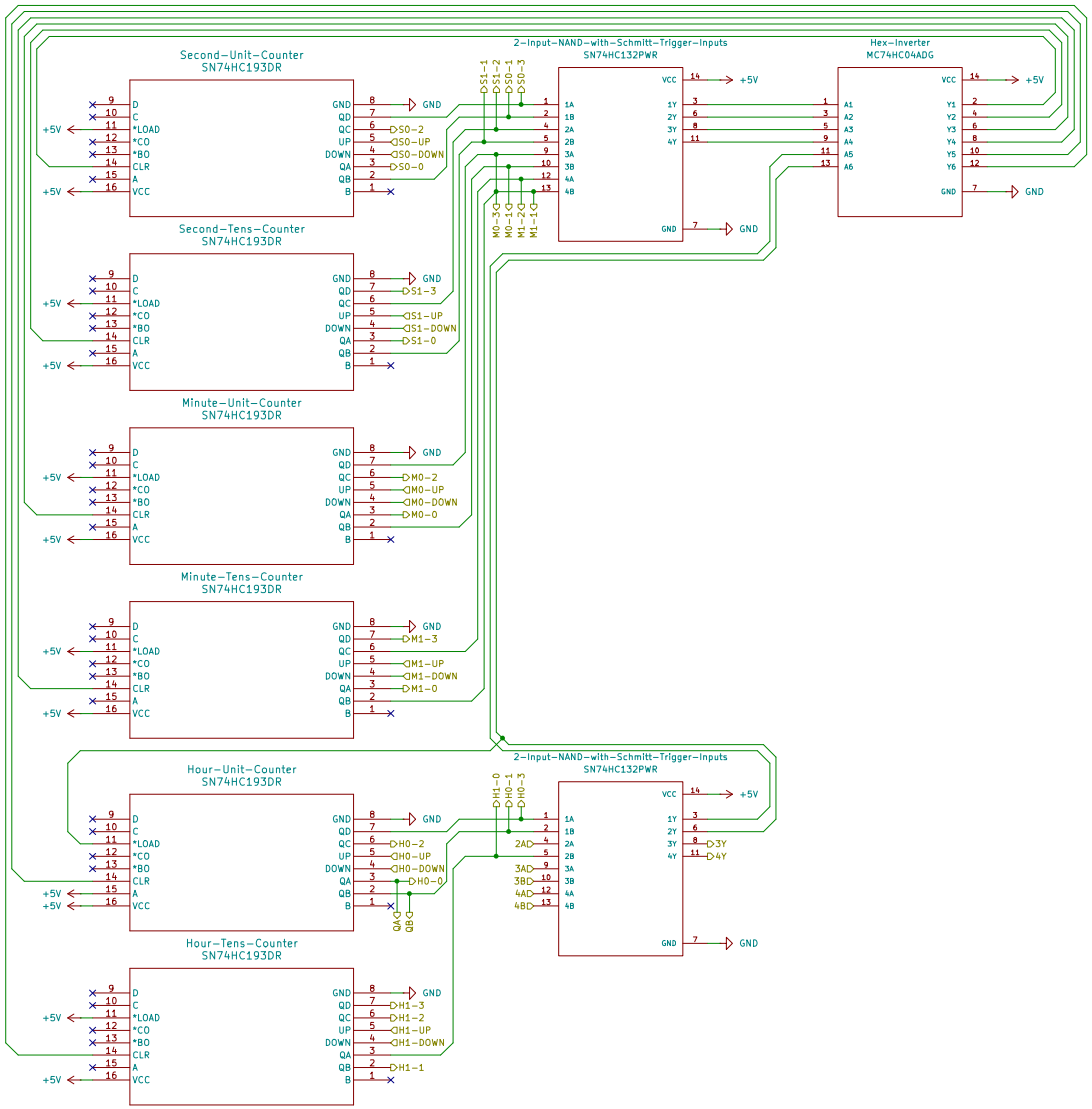


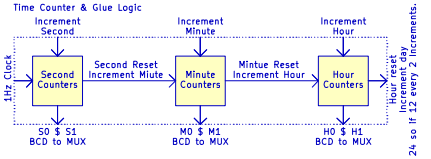
Notes

Counters for SS – MM – HH
Secounds and minutes are layed out using two counters each where each is reset and next is incremnted using 2 input schmitt NANDS into inverters.

Seconds go from 00–59 and reset at 60.
Minutes go from 00–59 and reset at 60.
and Hours go from 01–12 and reset at 11 to 1 by loading 0001 when resetting instead of clearing.

This is not inverted because load is active low.

Time Counter & Glue Logic



Fixed hour count from 1–11 to 1–12 utlized date nand

Sheet: /Time Counter & Glue Logic/		
File: Time Counter & Glue Logic.kicad_sch		
Title: Time Counter & Glue Logic		
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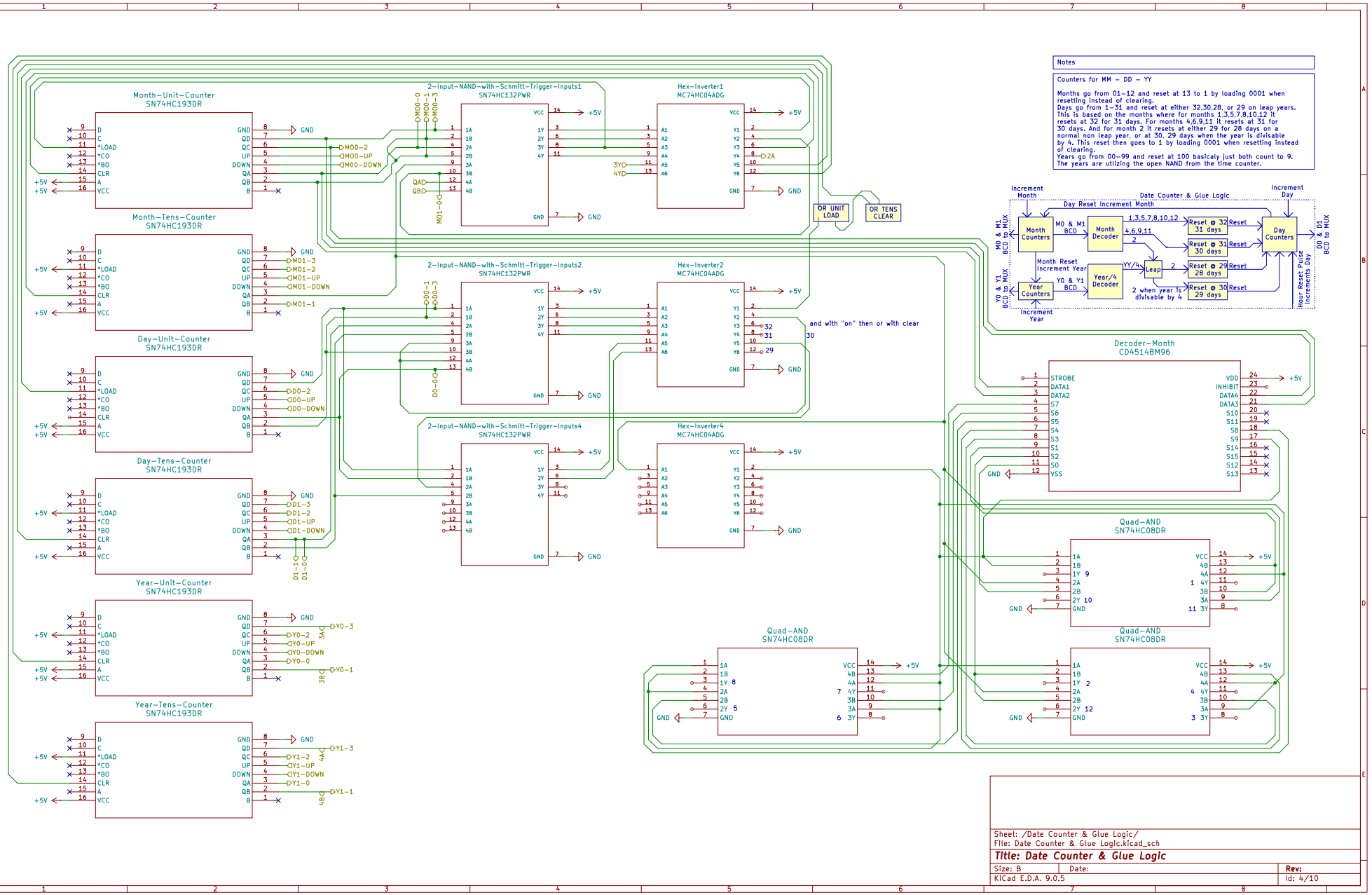
Month-Unit-Counter
SN74HC193DR
Month-Tens-Counter
SN74HC193DR
Day-Unit-Counter
SN74HC193DR
Day-Tens-Counter
SN74HC193DR
Year-Unit-Counter
SN74HC193DR
Year-Tens-Counter
SN74HC193DR
2-Input-NAND-with-Schmitt-Trigger-Inputs1
SN74HC132PWR
2-Input-NAND-with-Schmitt-Trigger-Inputs2
SN74HC132PWR
2-Input-NAND-with-Schmitt-Trigger-Inputs4
SN74HC132PWR
Hex-Inverter1
MC74HC04ADG
Hex-Inverter2
MC74HC04ADG
Hex-Inverter4
MC74HC04ADG
OR UNIT LOAD
OR TENS CLEAR
and with "on" then or with clear
30
Notes
Counters for MM - DD - YY
Months go from 01-12 and reset at 13 to 1 by loading 0001 when resetting instead of clearing.
Days go from 1-31 and reset at either 32,30,28, or 29 on leap years.
This is based on the months where for months 1,3,5,7,8,10,12 it resets at 32 for 31 days. For months 4,6,9,11 it resets at 31 for 30 days. And for month 2 it resets at either 29 for 28 days on a normal non leap year, or at 30, 29 days when the year is divisable by 4. This reset then goes to 1 by loading 0001 when resetting instead of clearing.
Years go from 00-99 and reset at 100 basicaly just both count to 9.
The years are utilizing the open NAND from the time counter.
Increment Month
Date Counter & Glue Logic
Increment Day
Day Reset Increment Month
Month Counters
Month Decoder
Day Counters
Year Counters
Year/4 Decoder
Leap
Month Reset Increment Year
Increment Year
Hour Reset Pulse Increments Day
Decoder-Month
CD4514BM96
Quad-AND
SN74HC08DR
Quad-AND
SN74HC08DR
Quad-AND
SN74HC08DR
Sheet: /Date Counter & Glue Logic/
File: Date Counter & Glue Logic.kicad_sch
Title: Date Counter & Glue Logic
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Sheet: /User Inputs/
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Sheet: /Increment-Decrement & Choose Logic/
File: Increment-Decrement & Choose Logic.kicad_sch

Title:

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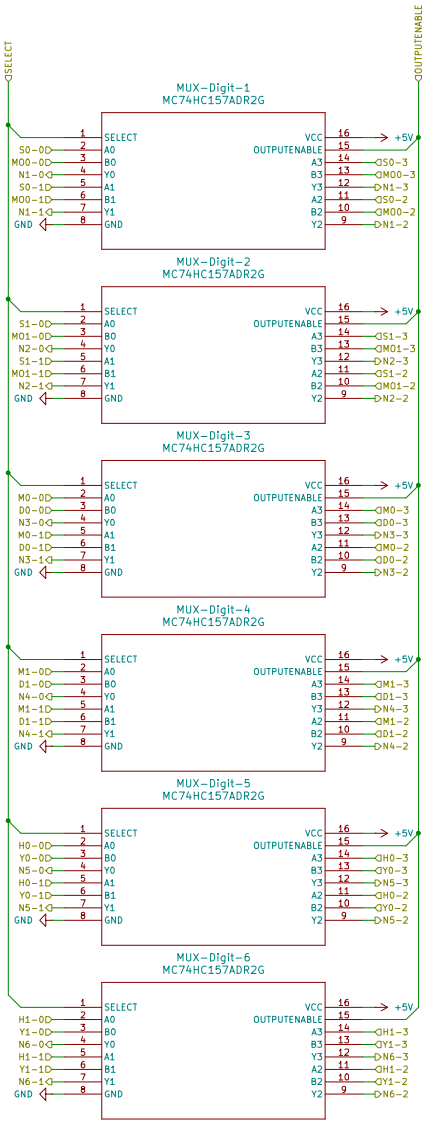

Notes

4-Bit 2:1 MUXs for selecting btween time and date.

Sheet: /Time & Date Swap/
File: Time & Date Swap.kicad_sch

Title: Time & Date Swap

Size: B	Date: 2025-11-05	**Rev: 1**
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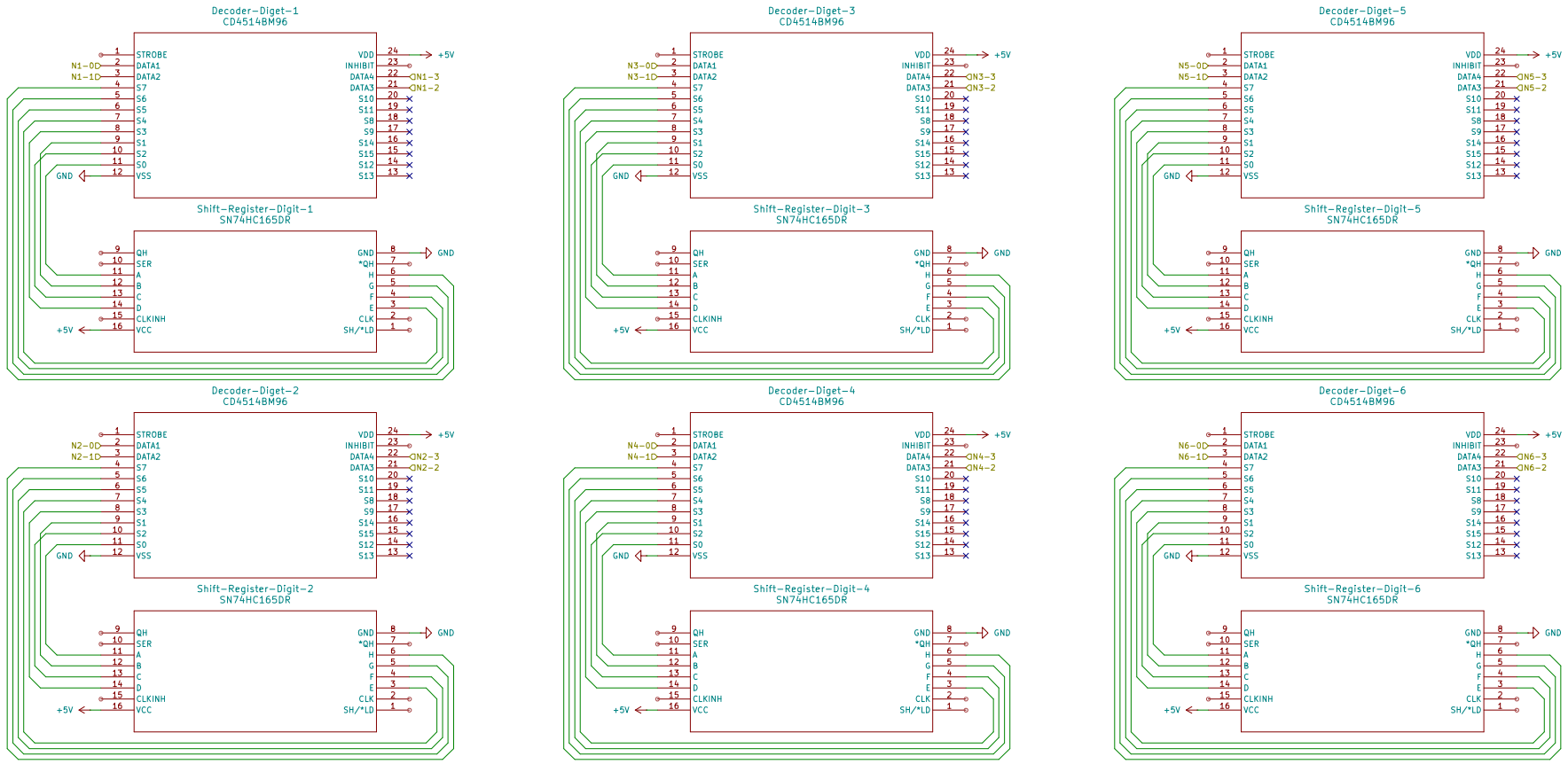

This only is doing 8 1 hot not 10....

Sheet: /BCD to One Hot Serial/		
File: BCD to One Hot Serial.kicad_sch		
Title: BDC to One Hot Serial		
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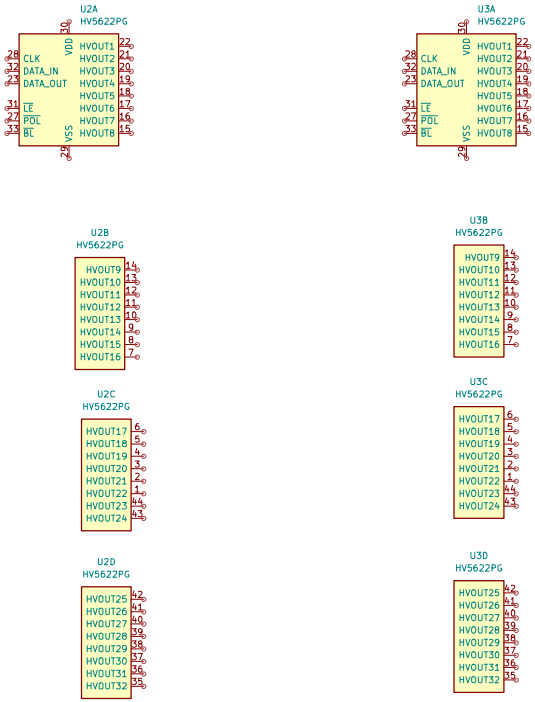

Sheet: /Nixie Tube Driver/		
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Sheet: /Digital Clock Logic/
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