CBS
Cigar Box Sequencer

A 3-to-8-step sequencer built into a cigar box

2015-November

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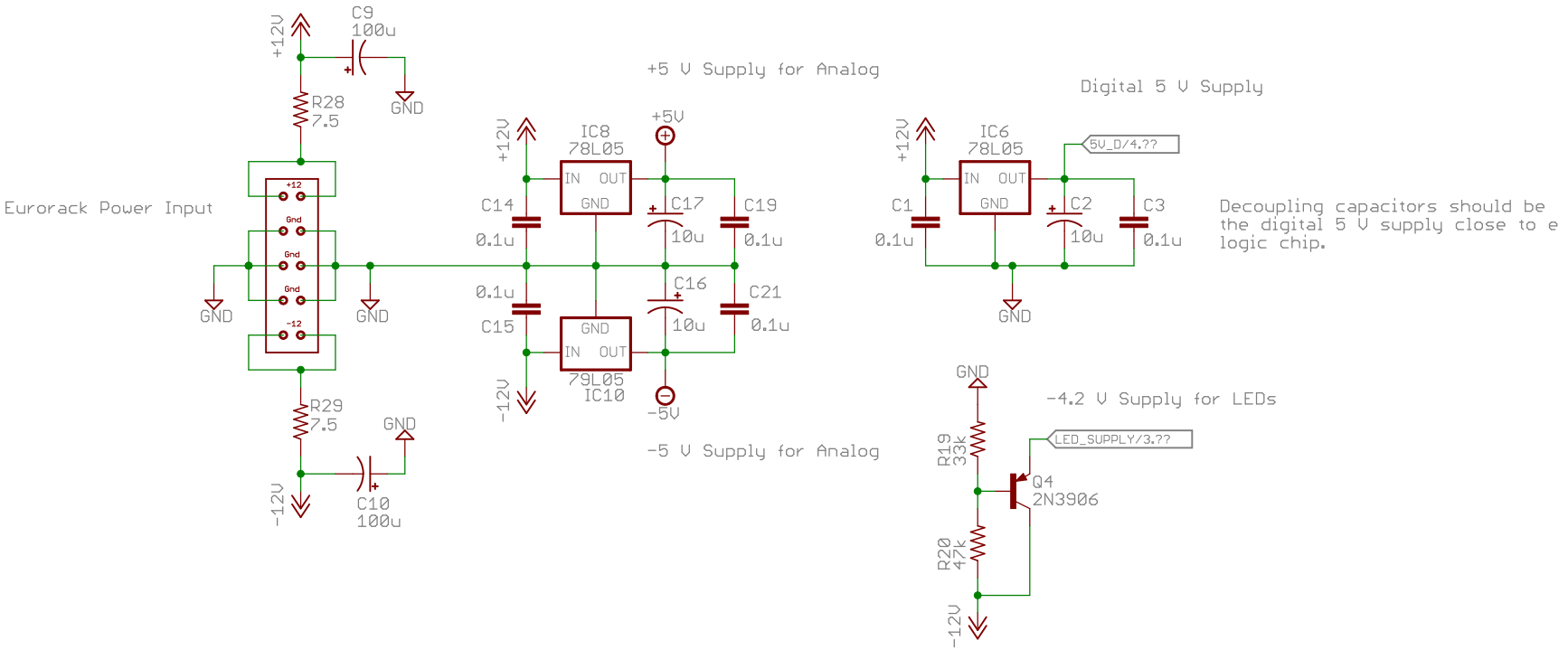
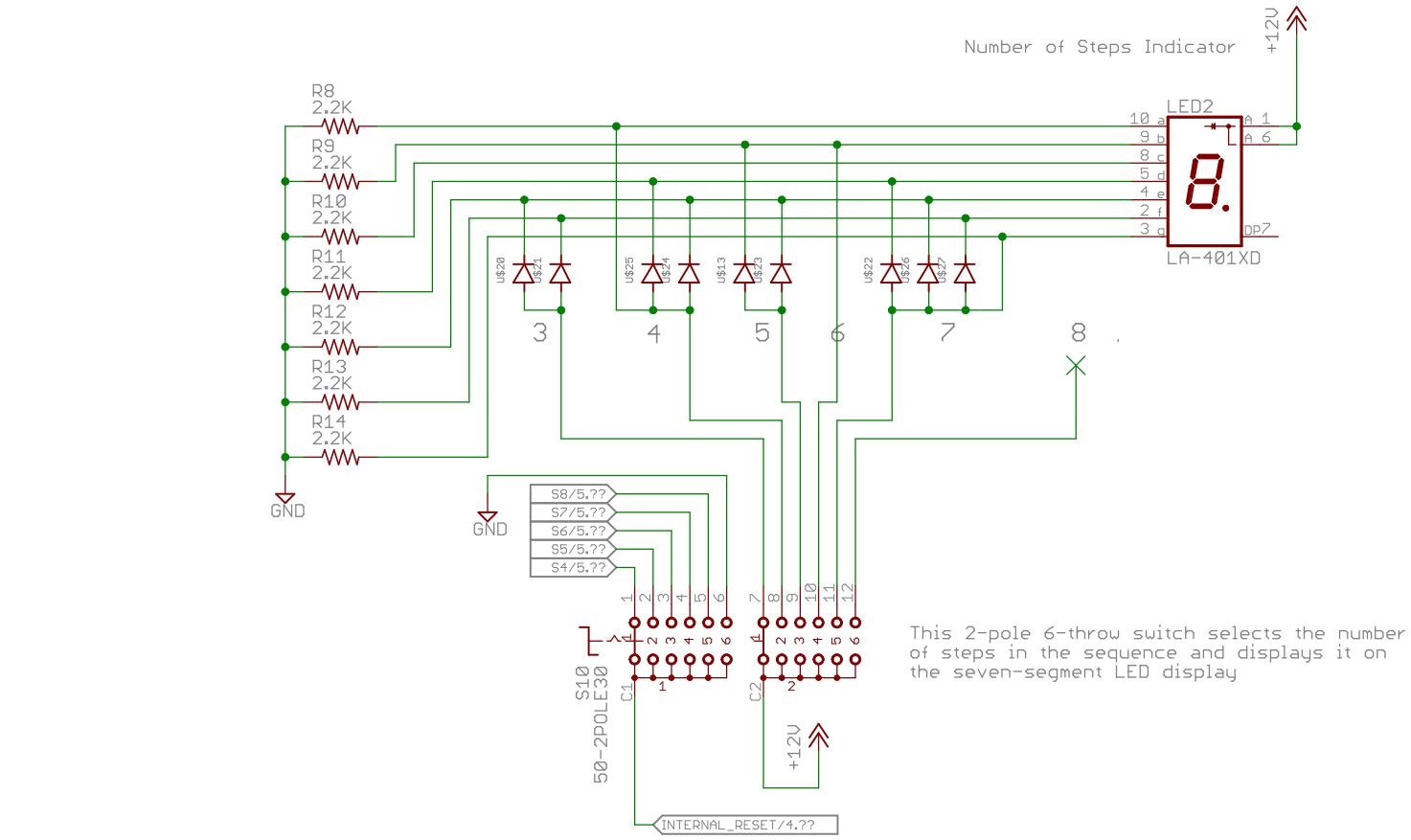
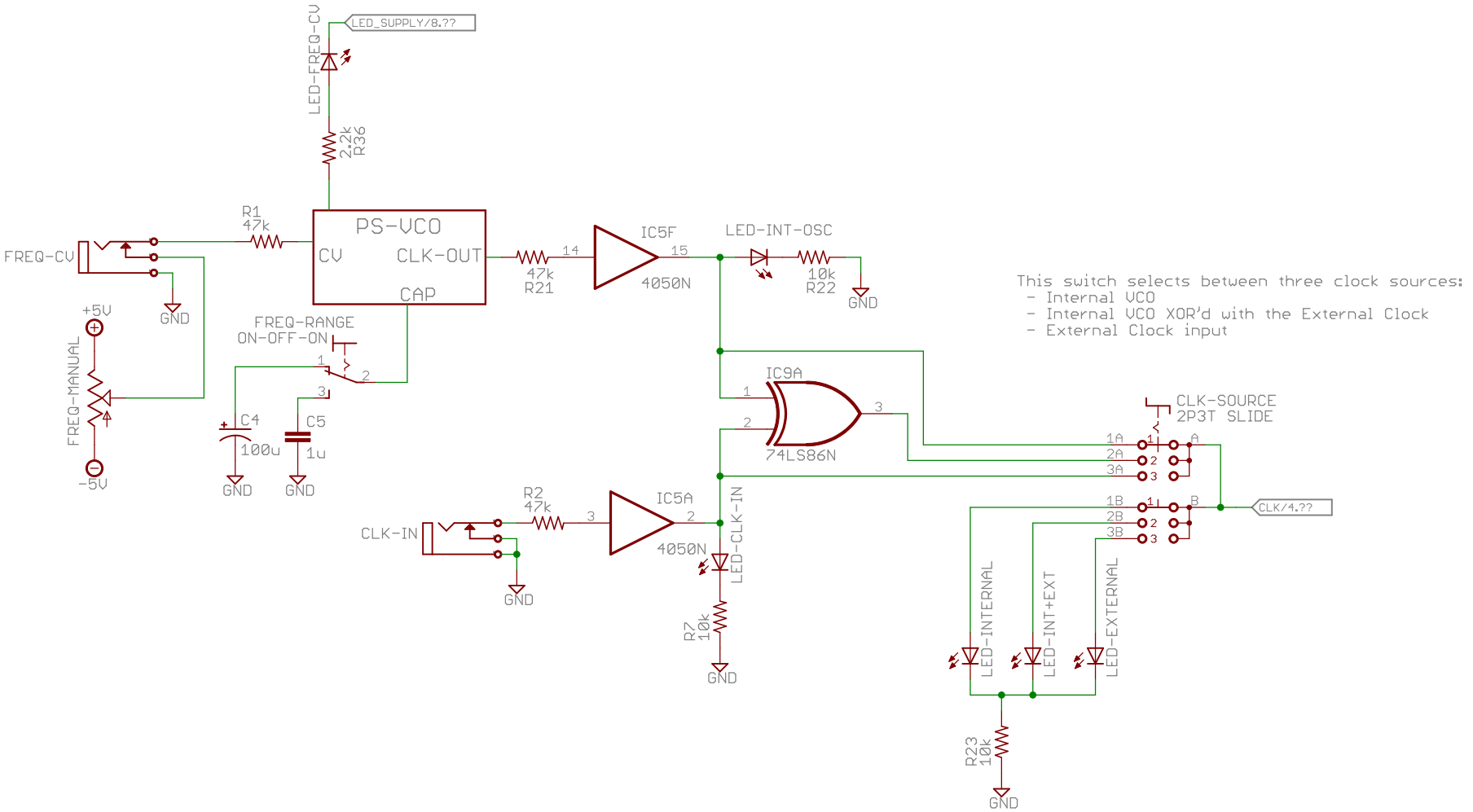
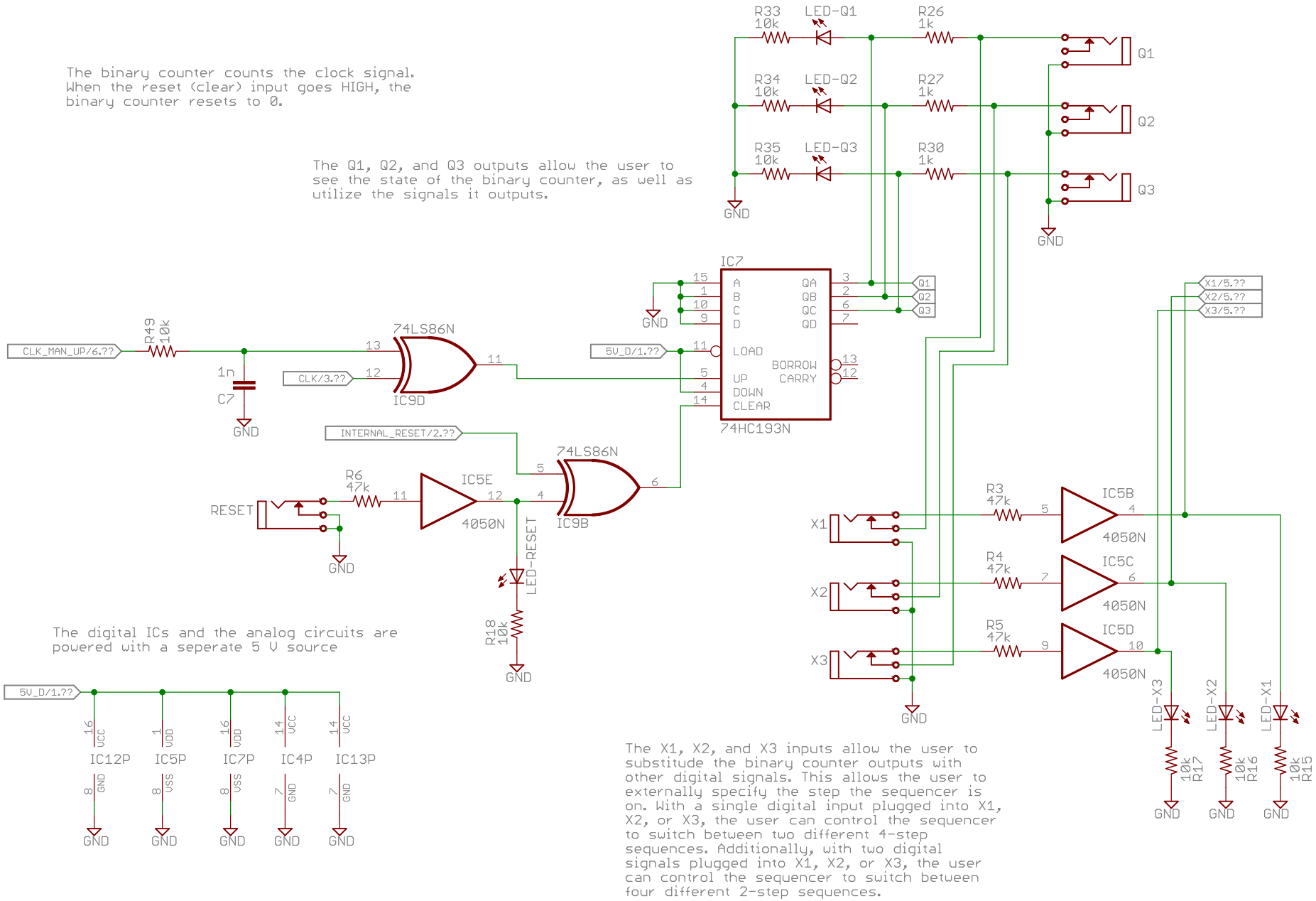
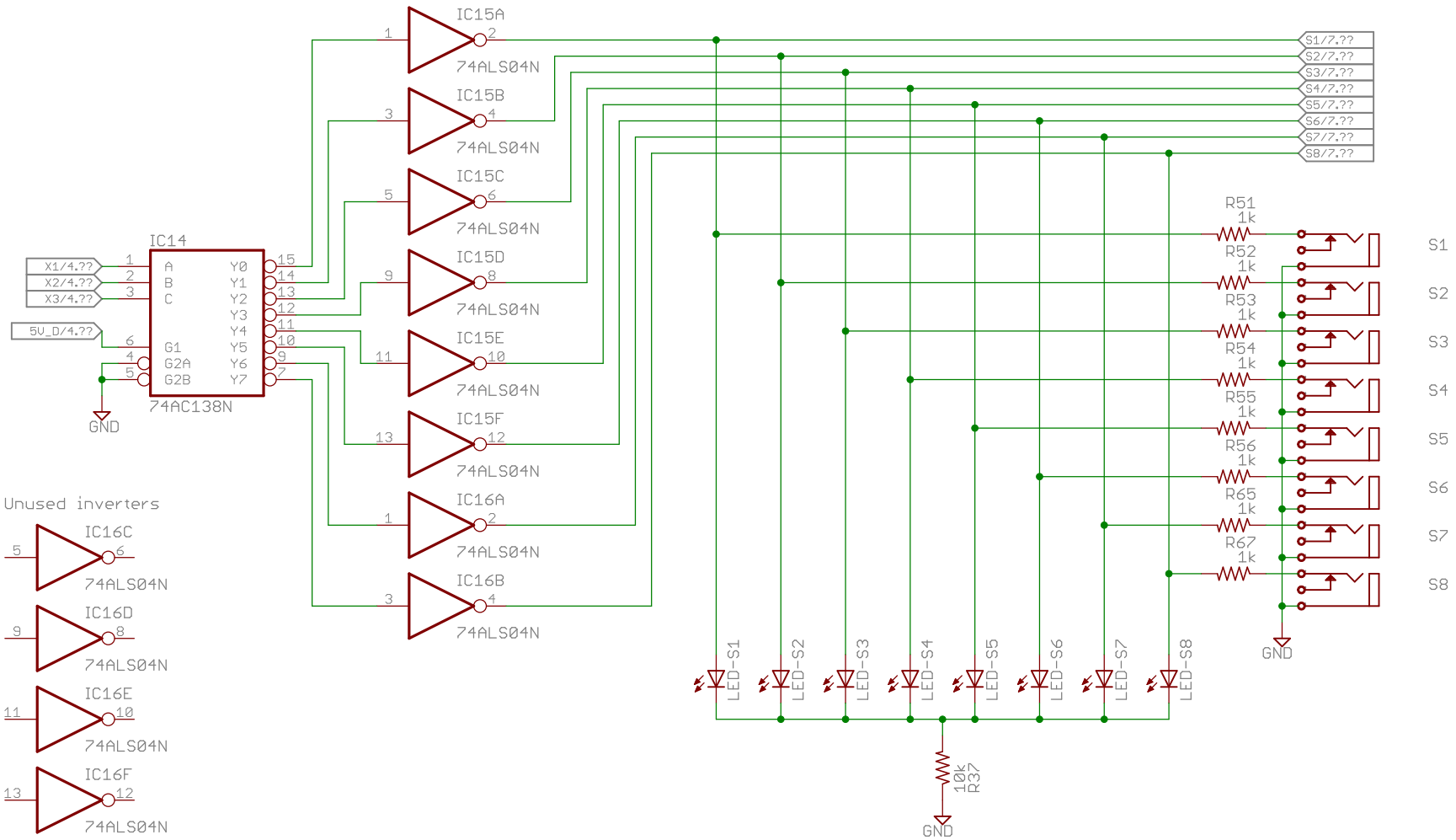



Number of Steps Indicator
+12V
R8
2.2K
R9
2.2K
R10
2.2K
R11
2.2K
R12
2.2K
R13
2.2K
R14
2.2K
LED2
LA-401XD
DP7
GND
GND
3
4
5
6
7
8
S8/5.??
S7/5.??
S6/5.??
S5/5.??
S4/5.??
S10
50-2POLE30
C1
C2
+12V
INTERNAL_RESET/4.??
This 2-pole 6-throw switch selects the number of steps in the sequence and displays it on the seven-segment LED display

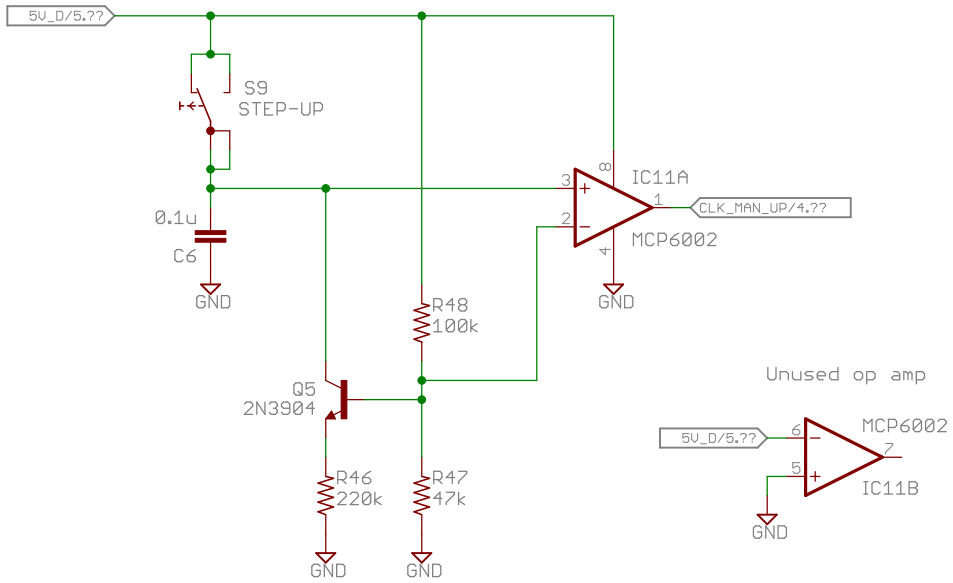

LED-FREQ-CV
LED_SUPPLY/8.??
2.2k
R36
R1
47k
PS-VCO
CV
CLK-OUT
CAP
FREQ-CV
GND
+5V
FREQ-MANUAL
-5V
FREQ-RANGE
ON-OFF-ON
C4
100u
C5
1u
GND
GND
47k
R21
14
IC5F
15
4050N
LED-INT-OSC
10k
R22
GND
This switch selects between three clock sources:
- Internal VCO
- Internal VCO XOR'd with the External Clock
- External Clock input
IC9A
74LS86N
CLK-SOURCE
2P3T SLIDE
1A
2A
3A
1B
2B
3B
CLK/4.??
R2
47k
IC5A
4050N
CLK-IN
GND
LED-CLK-IN
R7
10k
GND
LED-INTERNAL
LED-INT+EXT
LED-EXTERNAL
R23
10k
GND


The binary counter counts the clock signal. When the reset (clear) input goes HIGH, the binary counter resets to 0.
The Q1, Q2, and Q3 outputs allow the user to see the state of the binary counter, as well as utilize the signals it outputs.
R33 10k
LED-Q1
R26 1k
Q1
R34 10k
LED-Q2
R27 1k
Q2
R35 10k
LED-Q3
R30 1k
Q3
GND
IC7
74HC193N
A
B
C
D
QA
QB
QC
QD
LOAD
BORROW
CARRY
UP
DOWN
CLEAR
5V_D/1.??
CLK_MAN_UP/6.??
R49 10k
1n
C7
74LS86N
IC9D
CLK/3.??
INTERNAL_RESET/2.??
74LS86N
IC9B
R6 47k
IC5E
4050N
RESET
LED-RESET
R18 10k
X1/5.??
X2/5.??
X3/5.??
X1
X2
X3
R3 47k
R4 47k
R5 47k
IC5B
IC5C
IC5D
4050N
LED-X3
LED-X2
LED-X1
R17 10k
R16 10k
R15 10k
The digital ICs and the analog circuits are powered with a seperate 5 V source
IC12P
IC5P
IC7P
IC4P
IC13P
VCC
VDD
VSS
GND
The X1, X2, and X3 inputs allow the user to substitude the binary counter outputs with other digital signals. This allows the user to externally specify the step the sequencer is on. With a single digital input plugged into X1, X2, or X3, the user can control the sequencer to switch between two different 4-step sequences. Additionally, with two digital signals plugged into X1, X2, or X3, the user can control the sequencer to switch between four different 2-step sequences.

The demultiplexer converts the three digital binary lines (where all each of the three lines can be either HIGH or LOW) into eight digital output lines (where only a single output is "SELECTED"). This circuit converts the binary encoding into a selection of a single step of the sequencer.

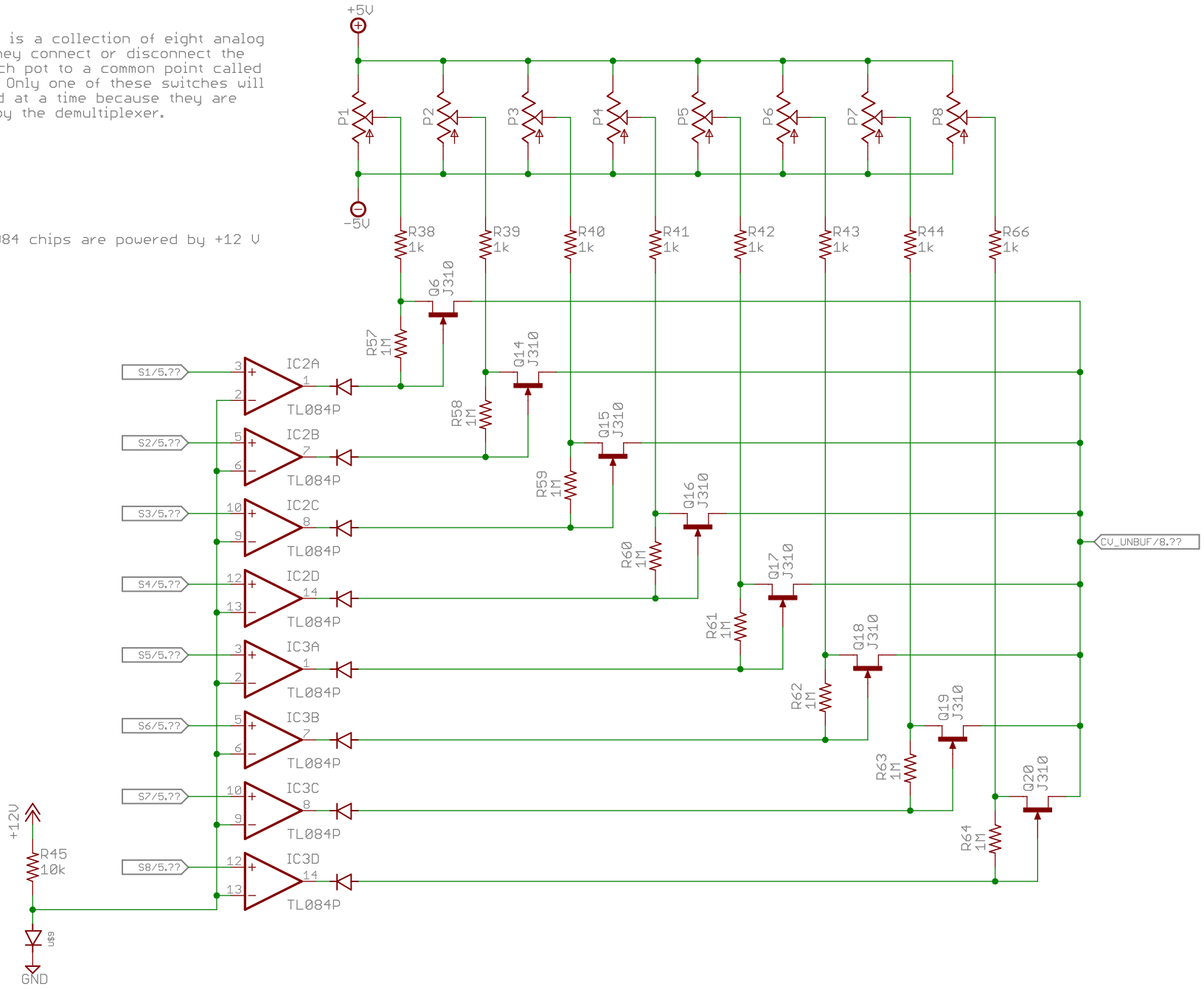


This switch allows the user to manually advance through the steps of the sequencer. The circuitry around the switch debounces the signal to prevent the rapid addition of counts that occurs when a noisy switch is fed into a digital logic device.

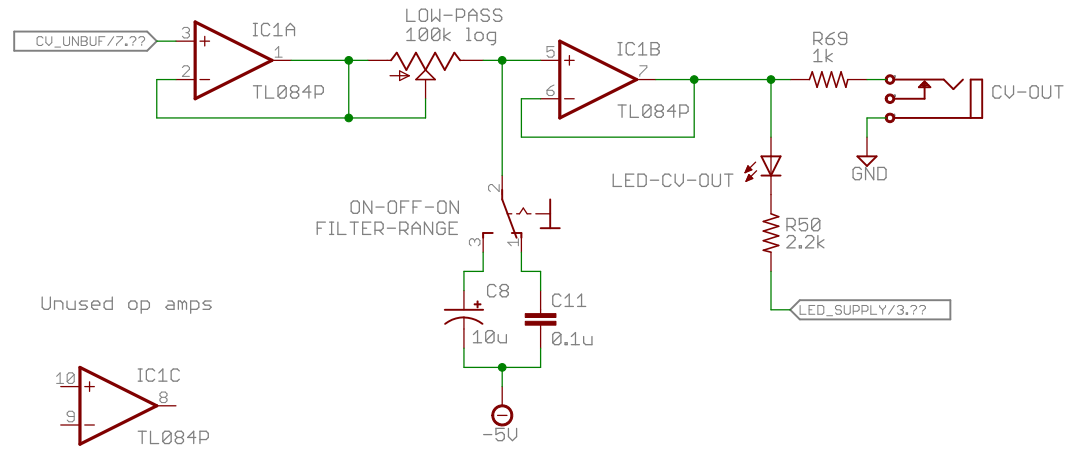


This circuit is a collection of eight analog switches. They connect or disconnect the wiper of each pot to a common point called "CV_UNBUF". Only one of these switches will be activated at a time because they are controlled by the demultiplexer.

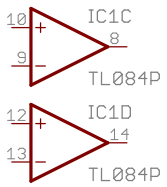
The two TL084 chips are powered by +12 V and -12 V.



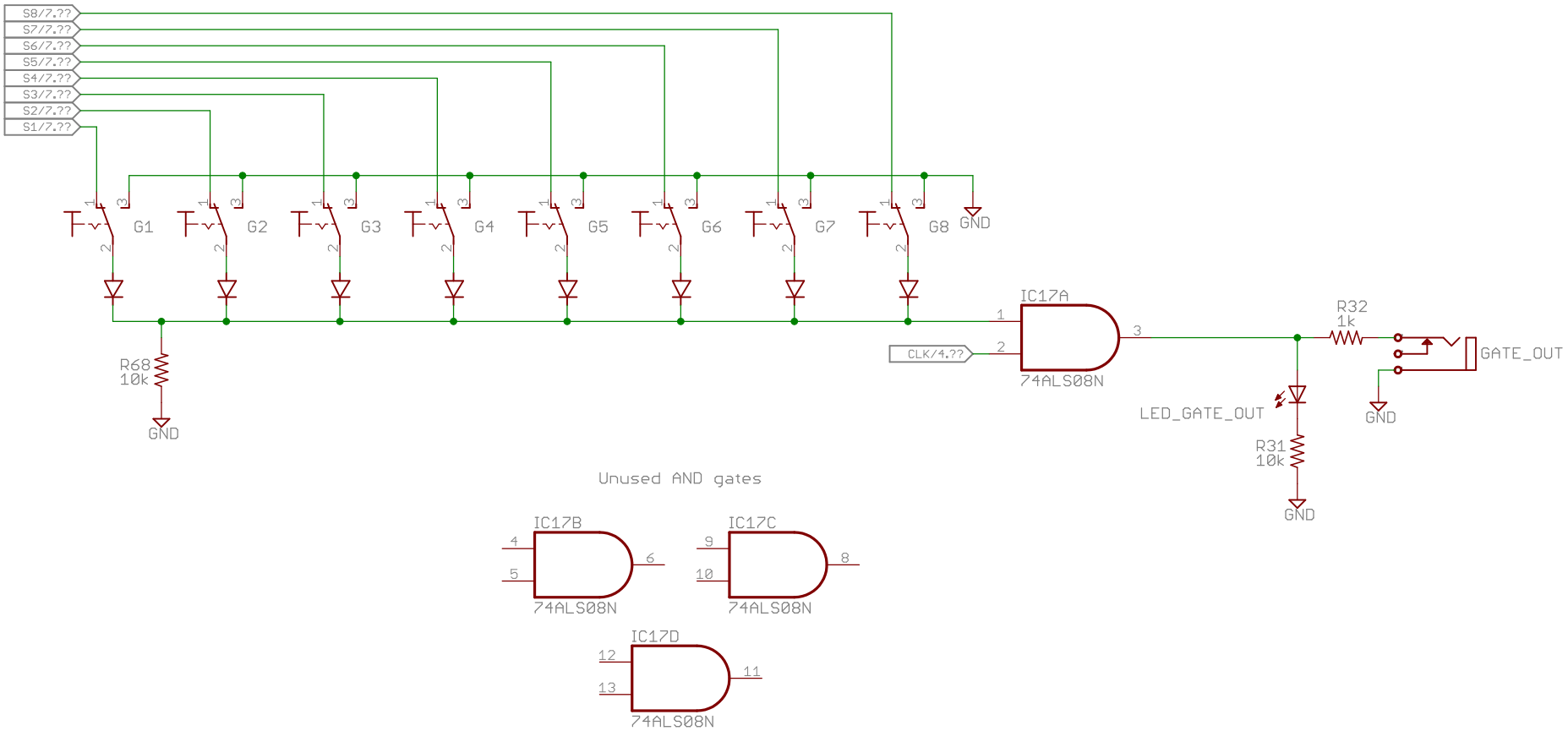
This circuit buffers the CV signal from the eight potentiometers. It also acts as an RC lowpass filter with a variable cutoff frequency (variable time constant).



Unused op amps



This circuit uses eight switches to generate GATE signals on the specified steps. It is useful for turning notes "ON" or "OFF" with the aid of external modules. The signals from the eight switches are combined with the clock source to achieve this.



Unused AND gates