LED VU METER by Daniel Fraser

This circuit simulates a VU meter , but with much faster rise time which allows a person to monitor peak levels. This circuit also draws a fraction of the current used by other designs. This reduction in current consumption is due to operating the LED's in series, driven by a constant current source. The LEDs are held off when there is no signal, by the action of Q1-Q8, which are held on by the fact that the output of each comparitor is low. When the voltage applied to the non-inverting input of each comparitor rises above the voltage on the inverting input, the output of that comparitor goes high, shutting off its respective transistor. When the voltage on pin 11 of IC3 rises above the voltage on pin 10, Q8 is switched off, allowing current to flow through the first LED, through Q7 to +Vcc. When the voltage on the input goes still higher, the next comparitor fires, shutting off Q7, and the second LED is turned on, by the current flow through Q6 to the +Vcc line. As the input goes still higher, Q6 through Q1 shut off, allowing the LEDs to light sequentially.

IC1, a 741, is wired as an ideal diode, to convert the input signal to a DC level for the comparitors. C2 is the storage for the peak reading, and R1, nominally 10K, sets the decay time. If this is made larger, a longer decay time is produced. The frequency response of the rectifier drops above 14KHz, and if you want a better frequency response, a faster op amp must be used, such as an LM318.

If a different scale calibration is desired, one has to plug in different values for R5-R11, which can be ~~easily~~ calculated through the use of Ohms Law with little difficulty.

IC's 2 and 3 may be either the LM339, or the cheaper uA3302. If the 339 is used, a supply voltage of up to 36 Volts may be used, and D1 replaced by a piece of wire. If the 3302 is used, D1 is included to allow operation with up to a 36 Volt supply. Otherwise, a supply voltage of 28 Volts would be the maximum permitted. The minimum supply voltage useable is 24VDc.
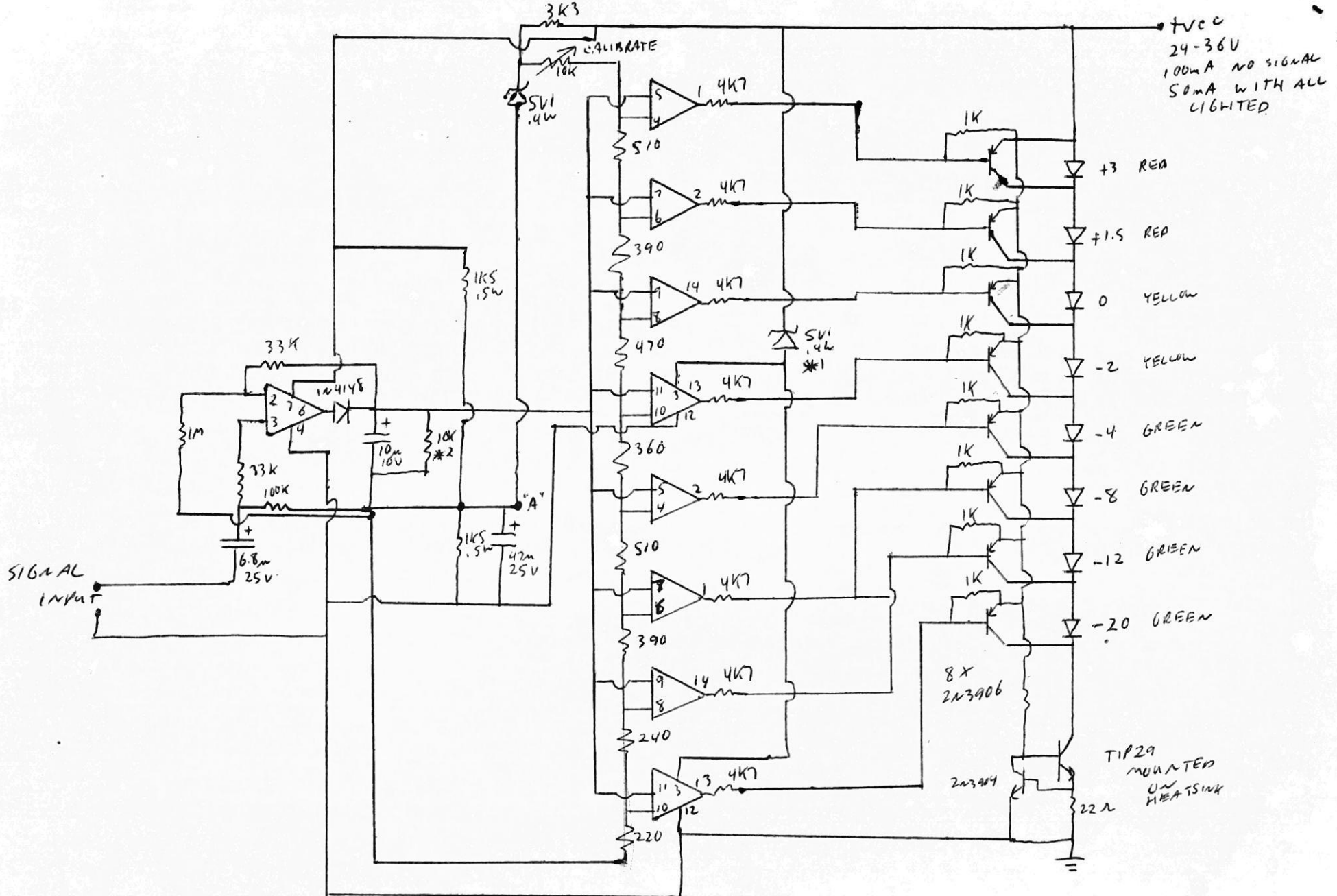
As presented, the meter uses a single polarity supply, but if a dual polatity supply is available, this may be used also. To do this, one connects +Vcc to the + supply rail, and the Ground line to the negative supply rail, and point"A" to ground. One can then remove R3,

R4, R12, R13, C1, and C3.

R2, the calibration control is a subminiature ~~trimpot~~ trim pot, set so that the Odb light just lights when the input voltage rises to .775V RMS at 1KHz.

This circuit has worked extremely well for me and when properly assembled, it is much more rugged than any conventional meter movement.

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Edmonton, Alberta, Canada.

+Vcc
24-36V
100mA NO SIGNAL
50mA WITH ALL
LIGHTED.

3K3

CALIBRATE
10K

5VI
.4W

4K7   +3 RED
1K

4K7   +1.5 RED
1K

4K7   0 YELLOW
1K

5VI
.4W
*1

4K7   -2 YELLOW
1K

4K7   -4 GREEN
1K

4K7   -8 GREEN
1K

4K7   -12 GREEN
1K

4K7   -20 GREEN
1K

510
390
470
360
510
390
240
220

1K5
.5W

33K
1N4148

2 7 6
3   4

1M
33K
100K

+
10u
10V

10K
*2

+
6.8u
25V

SIGNAL
INPUT

1K5
.5W

"A"

+
42u
25V

8X
2N3906

2N3904

TIP29
MOUNTED
ON
HEATSINK
22Ω

*2 - SETS
DECAY TIME
10K NOM - ADJUST
TO SUIT TASTE

TRIM POT SET
FOR "0" ~~LED~~ JUST
LED
LIT WHEN .775V
RMS IS FED INTO
INPUT TERMINALS.

FOR SPLIT SUPPLY
CONNECT GROUND TO
-Vcc AND POINT "A"
TO GROUND
AND OMIT THE
TWO 1K5 AND THE 42u 25V CAP.

IC= 2 X
uA3302.
LM339

*1 OMIT IF USING LM339 AND USE JUMPER.