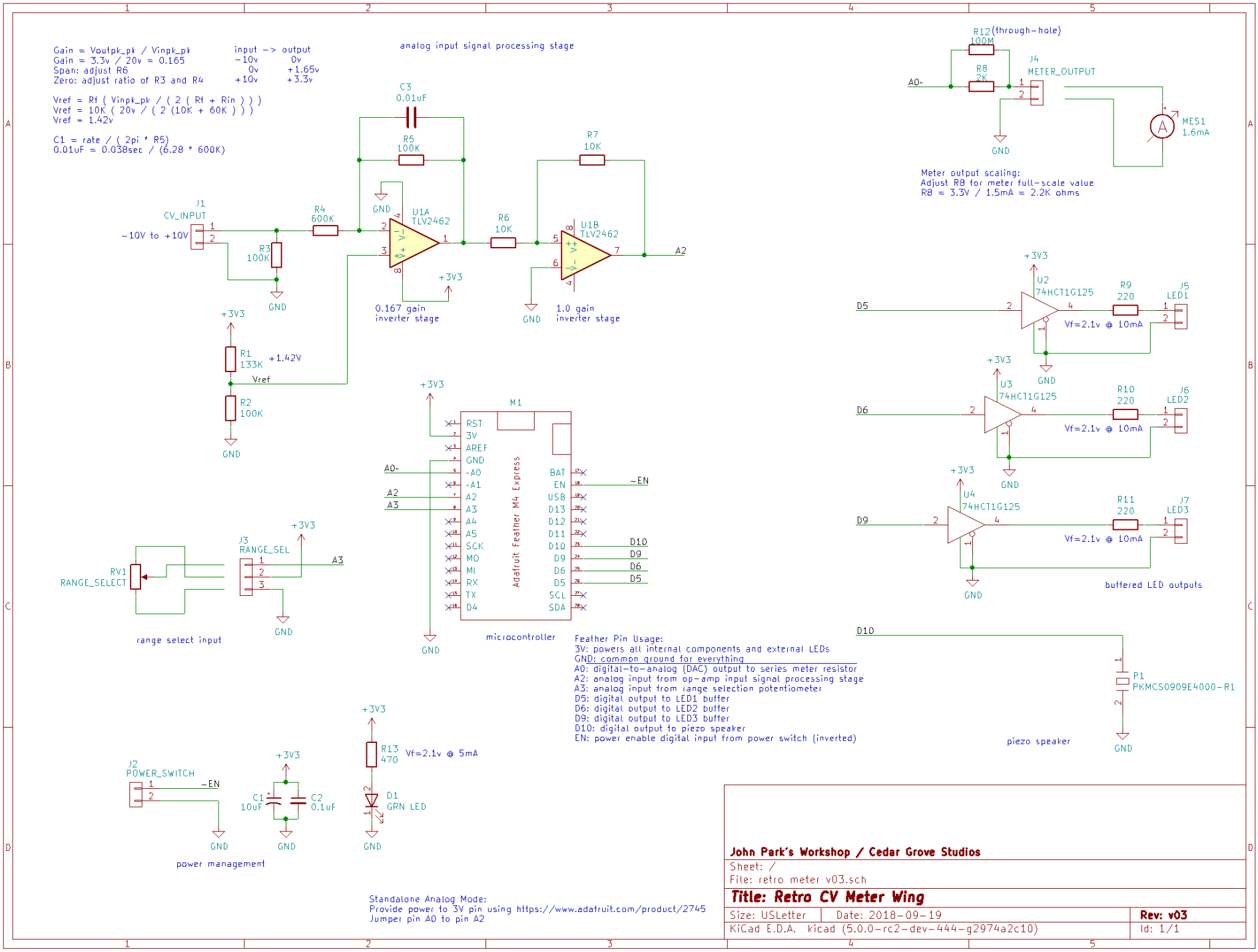
Gain = Voutpk_pk / Vinpk_pk
Gain = 3.3v / 20v = 0.165
Span: adjust R6
Zero: adjust ratio of R3 and R4
input -> output
-10v 0v
0v +1.65v
+10v +3.3v
Vref = Rf (Vinpk_pk / (2 (Rf + Rin)))
Vref = 10K (20v / (2 (10K + 60K)))
Vref = 1.42v
C1 = rate / (2pi * R5)
0.01uF = 0.038sec / (6.28 * 600K)
analog input signal processing stage
C3
0.01uF
R5
100K
R7
10K
J1
CV_INPUT
-10V to +10V
R4
600K
R3
100K
U1A
TLV2462
R6
10K
U1B
TLV2462
A2
GND
+3V3
0.167 gain
inverter stage
1.0 gain
inverter stage
R1
133K
+1.42V
Vref
R2
100K
R12(through-hole)
100M
R8
2K
A0-
J4
METER_OUTPUT
ME51
1.6mA
Meter output scaling:
Adjust R8 for meter full-scale value
R8 = 3.3V / 1.5mA = 2.2K ohms
U2
74HCT1G125
R9
220
J5
LED1
D5
Vf=2.1v @ 10mA
U3
74HCT1G125
R10
220
J6
LED2
D6
U4
74HCT1G125
R11
220
J7
LED3
D9
buffered LED outputs
M1
Adafruit Feather M4 Express
RST
3V
AREF
GND
A0
A1
A2
A3
A4
A5
SCK
MO
MI
RX
TX
D4
BAT
EN
USB
D13
D12
D11
D10
D9
D6
D5
SCL
SDA
-EN
microcontroller
Feather Pin Usage:
3V: powers all internal components and external LEDs
GND: common ground for everything
A0: digital-to-analog (DAC) output to series meter resistor
A2: analog input from op-amp input signal processing stage
A3: analog input from range selection potentiometer
D5: digital output to LED1 buffer
D6: digital output to LED2 buffer
D9: digital output to LED3 buffer
D10: digital output to piezo speaker
EN: power enable digital input from power switch (inverted)
RV1
RANGE_SELECT
J3
RANGE_SEL
range select input
P1
PKMCS0909E4000-R1
piezo speaker
J2
POWER_SWITCH
C1
10uF
C2
0.1uF
R13
470
Vf=2.1v @ 5mA
D1
GRN LED
power management
Standalone Analog Mode:
Provide power to 3V pin using https://www.adafruit.com/product/2745
Jumper pin A0 to pin A2
John Park's Workshop / Cedar Grove Studios
Sheet: /
File: retro meter v03.sch
Title: Retro CV Meter Wing
Size: USLetter
Date: 2018-09-19
Rev: v03
KiCad E.D.A. kicad (5.0.0-rc2-dev-444-g2974a2c10)
Id: 1/1