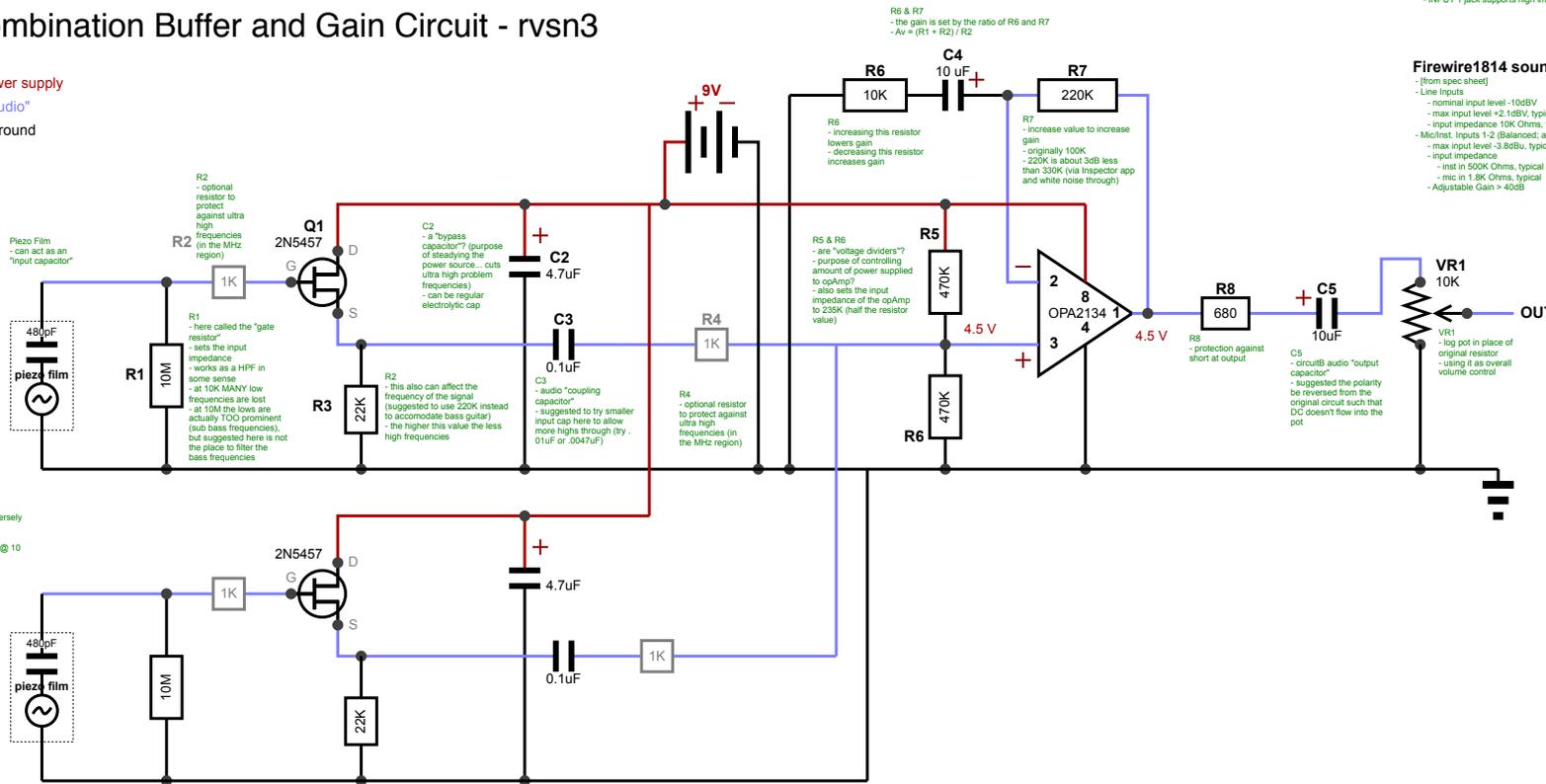


Combination Buffer and Gain Circuit - rvsn3

red = power supply
 blue = "audio"
 black = ground



CircuitA - Buffer Circuit

CircuitB - Gain Circuit
 (in "non-inverting mode")

Piezo Films - LDT-0-028K
 - each can act as an "input capacitor" [LDT datasheet]
 - 480pF source capacitance [DTSeries datasheet]
 - Min. impedance- 1MΩ, recommended 10MΩ
 - Output voltage- mV to 100's of volts
 - the capacitance is proportional to the area and inversely proportional to the thickness of the element [Technical Manual" referring to D11]
 - Capacitance: 1.35 nF; Dissipation Factor of 0.018 @ 10 KHz; Impedance of 12 KΩ @ 10 KHz
 - formula for piezos in parallel (from only one single source online, another source says the impedance remains consistent in parallel wiring)
 $Z_{tot} = 2/Z2 / (Z1 + Z2)$
 $Z_{tot} = Z/2$ (for identical piezos)

UA22 soundcard
 - [from spec sheet]
 - input impedance
 - INPUT 1, 2 (XLR type): 4 kΩ (balanced)
 - INPUT 1, 2 (1/4-inch TRS phone type): 34 kΩ (balanced)
 - INPUT 1 jack supports high impedance

Firewire1814 soundcard
 - [from spec sheet]
 - Line inputs
 - nominal input level -10dBV
 - max input level +2.1dBV, typical
 - input impedance 10K Ohms, typical
 - Mic/Inst. Inputs 1-2 (Balanced; at Minimum Gain)
 - max input level -3.8dBu, typical
 - input impedance
 - inst in 500K Ohms, typical
 - mic in 1.8K Ohms, typical
 - Adjustable Gain > 40dB

R6 & R7
 - the gain is set by the ratio of R6 and R7
 $-A_v = (R1 + R2) / R2$

R6
 - increasing this resistor lowers gain
 - decreasing this resistor increases gain

R7
 - increase value to increase gain
 - originally 100K
 - 220K is about 3dB less than 330K (via Inspector app and white noise through)

R5 & R6
 - are "voltage dividers"?
 - purpose of controlling amount of power supplied to opAmp?
 - also sets the input impedance of the opAmp to 255K (half the resistor value)

R8
 - protection against short at output

C5
 - circuitB audio "output capacitor"
 - suggested the polarity be reversed from the original circuit such that DC doesn't flow into the pot

VR1
 - log pot in place of original resistor
 - using it as overall volume control