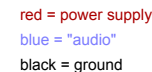# Combination Buffer, Mixer, Gain Circuit - vrsn2.0

R3
- 33K was suggested online for a different circuit (see "JFET buffer and more" post/pdf... for an acoustic mag pickup)

- after the rest of circuit is decided, try different input resistors for HPF at input
  - 11M = 30Hz cutoff
  - 5M = 66Hz cutoff
  - 2M = 166Hz cutoff
  - 1M = 332Hz cutoff

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

9V
- suggested to use 2x 9volts to improve the headroom
this circuit _(in single amp mode at least, though SHOULD be same in double amp mode?) draws 10.84mA

High

R2 22M

R3 1K
R3
- to block rf, called an RF "choke"

Q1 & Q2
- Q2 needs to have a lower IDSS than Q1 or else it will "forward bias" (sounds like mild "phase effect")

480pF piezo film

C1 1pF
C1
- suggested to shunt RF

R1 22M
R1 & R2
- set the input impedance (for two 22M, the input impedance is 11M)
- with the piezo capacitance, work as a HPF (here the cutoff freq is 30Hz, but its a gentle rolloff, so there are LOTS of low frequencies beyond this)
- (suggested here is not the place to filter the bass frequencies)

Q1 J201
Q2 J201

C2 1uF
C2
- audio "coupling capacitor"

VR1 5K
VR1
- for "internal" piezo balance
- multiturn trimpot

VR2 10K
VR2
- mounted externally
- individual pickup gain control
- logarithmic

C3 10uF
R4 6.8K
R4
- "input resistor" of the mixer

R8 180K

OPA2134
6 8 7
−
+
5 4
#8 already powered (see below)
#4 already grounded (see below)

R10 680
C7 10uF

the ring doesnt need to be connected... since its the middle alone... it wont be powered alone generally... though i COULD fake it with an adapter plug... to make the connection if i ever did want JUST the mids

OUT 2

AB switch On/On - mags VS mid piezo pickup

from standard mag pickups

so out 2 needs to be separated from chassi ground i think, or there could be a ground loop, no?

Mid

22M
1K
J201

480pF piezo film
1pF
22M
J201

1uF
5K 10K
10uF
6.8K

R7 100K
R7
- "feedback resistor"
- sets gain amount

Low

22M
1K
J201

480pF piezo film
1pF
22M
J201

1uF
5K 10K
10uF
6.8K

C4 100uF
C4
- a "bypass capacitor" (purpose of steadying the power source... cuts ultra high problem frequencies)
- can be regular electrolytic cap
- ground has to be on other side of the jack switch, otherwise it's always on

R5 100K
R6 100K
4.5 V

suggested that the "trace length" here to the decoupling capacitor be as short as possible

C5 10uF
C5
- "decoupling capacitor"

OPA2134
2 8 1
−
+
3 4

R9 680
R9
- protection against short at output

C6 10uF

ring connector acts as battery off/on switch

OUT 1

CircuitA - Buffer Circuit

CircuitB - Mixer and Gain Circuit
(in "inverting mode", acting as virtual earth mixer)

Piezo Films -
LDT-0-028K
- each can act as an "input capacitor"
[the following from LDT datasheet]
- 480pF source capacitance
[the following from D'series 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
[the following from "Technical Manual" refering to DT1]
- Capacitance: 1.36 nF; Dissipation Factor of 0.018 @ 10 KHz; Impedance of 12 KΩ@ 10 KHz

- potentially try a 1pF capacitor back here to shunt RF to ground
- suggested "try 1pF-100pF 100 pF) to GND at the amplifier pin. The capacitor's impedance profile can create a notch filter at the system's most sensitive frequency"

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