

# PCB Design: **mic preamplifier**

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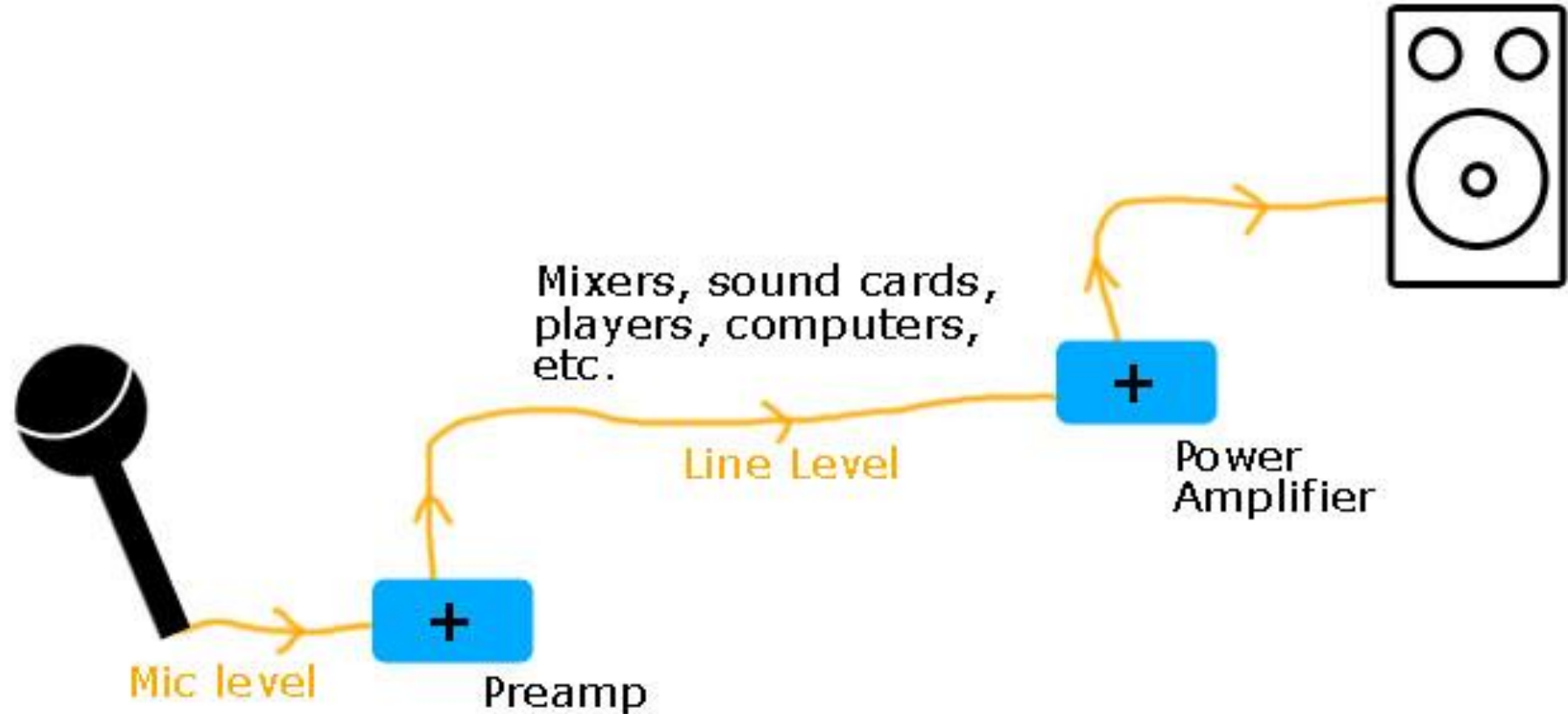


# Microphone preamplifier

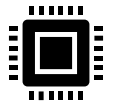
- Microphone signal : too weak  
=> “preamplify” to specified level
- Attached to power amplifier circuit
- If **low quality**  
=> **SNR drop** aka **low signal quality**
- Location: very close to mic (signal source)  
=> limits degradation due to parasitic interference or attenuation during transport



# Microphone preamplifier

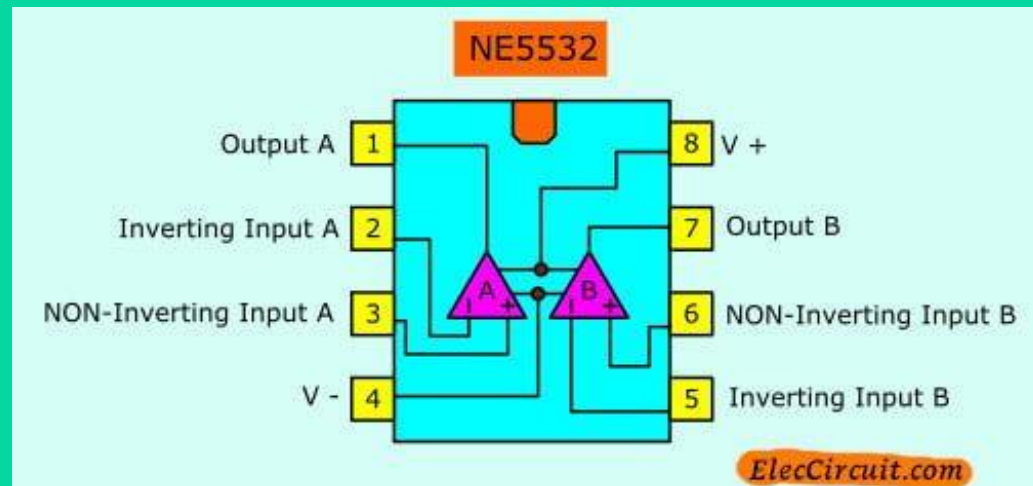
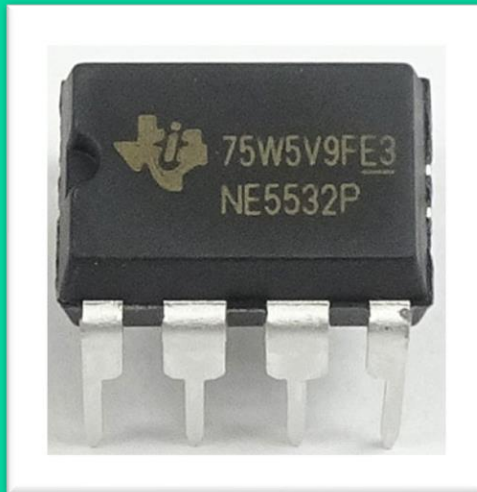


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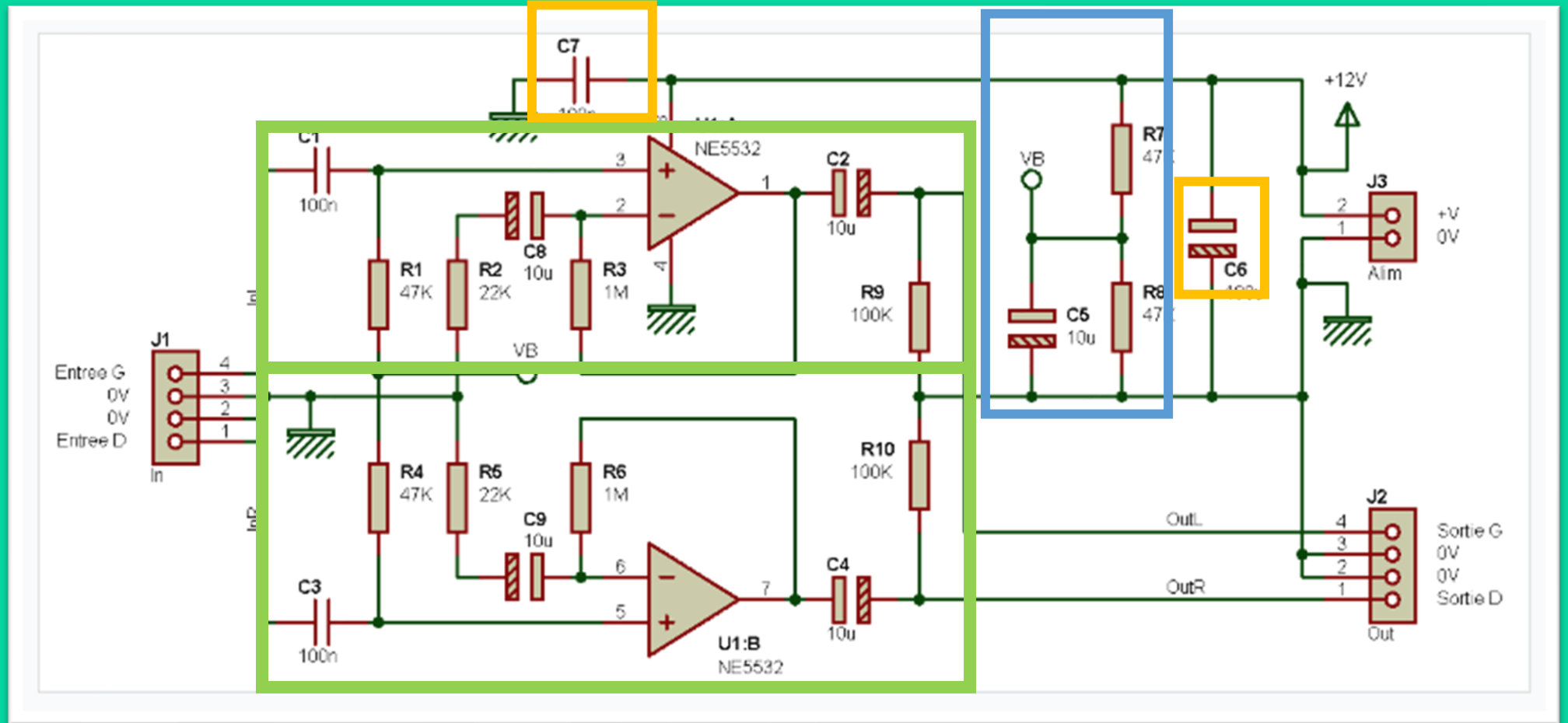


# NE5532

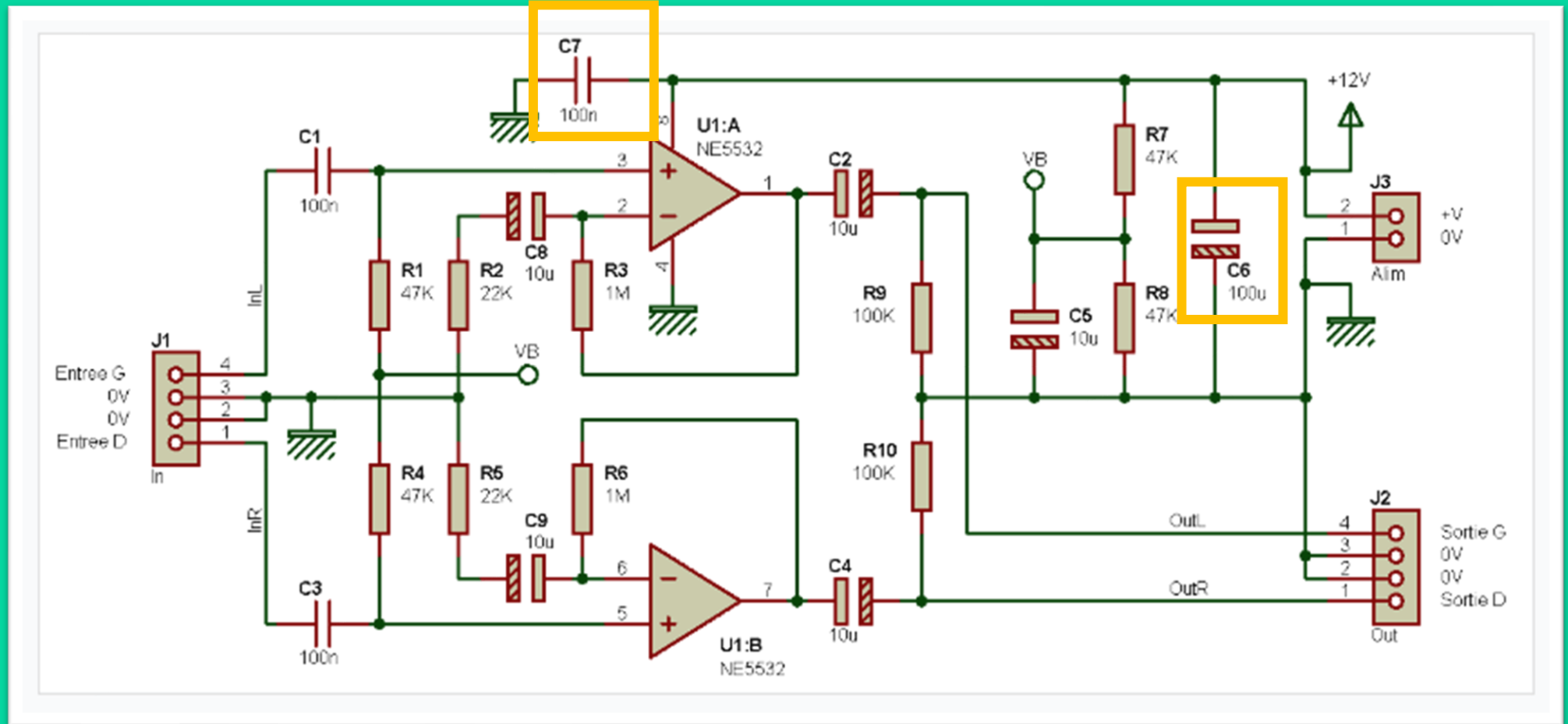
- = dual high-performance low noise op amp
- Higher small-signal bandwidth, lower noise level
- Contains 2 op amps => Double mic preamp

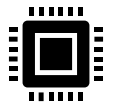


# DOUBLE mic preamp circuit



# Decoupling capacitors C6,C7





# Decoupling capacitors C6,C7

- Deliver current to Op Amps that main power supply can't provide

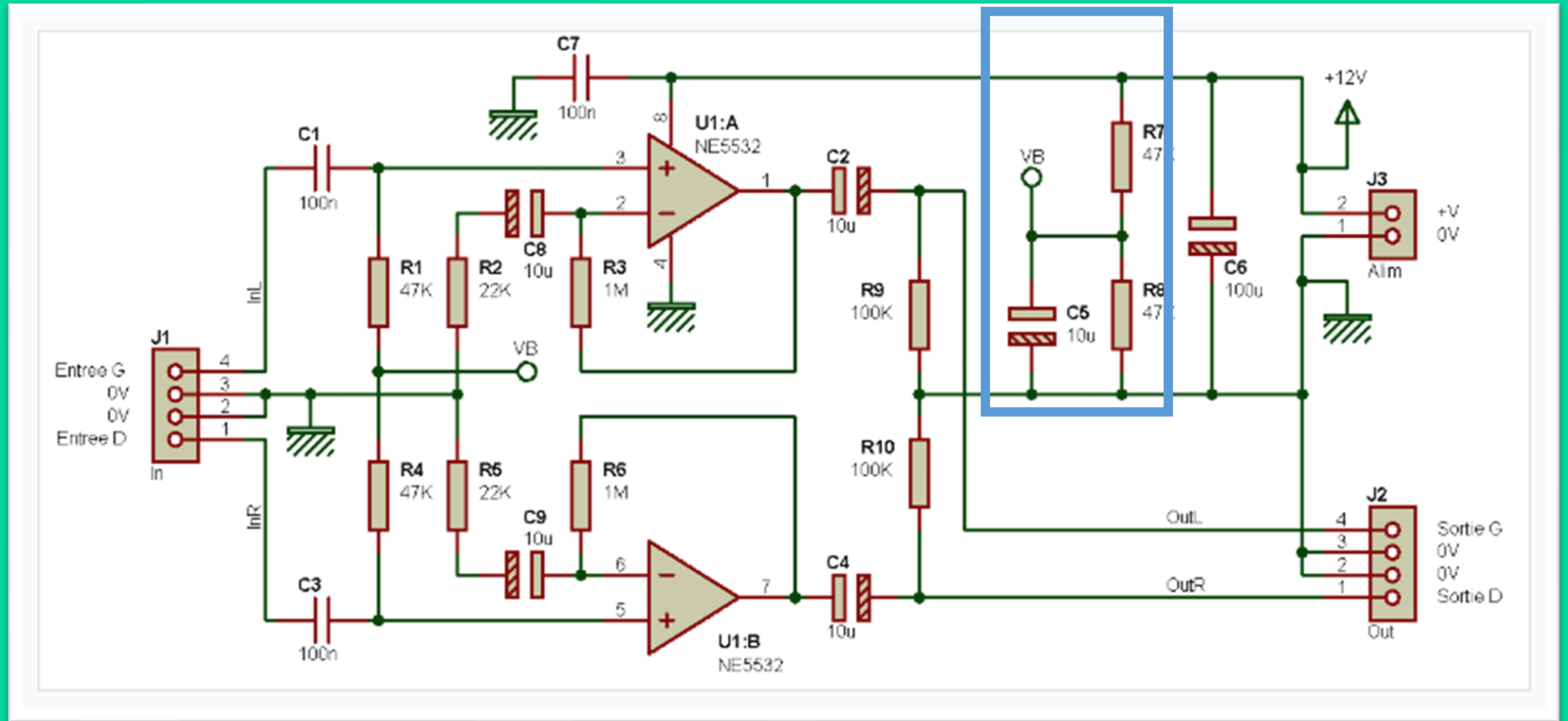
Due to: parasitic impedances

=> keep power supply relatively constant by filtering it

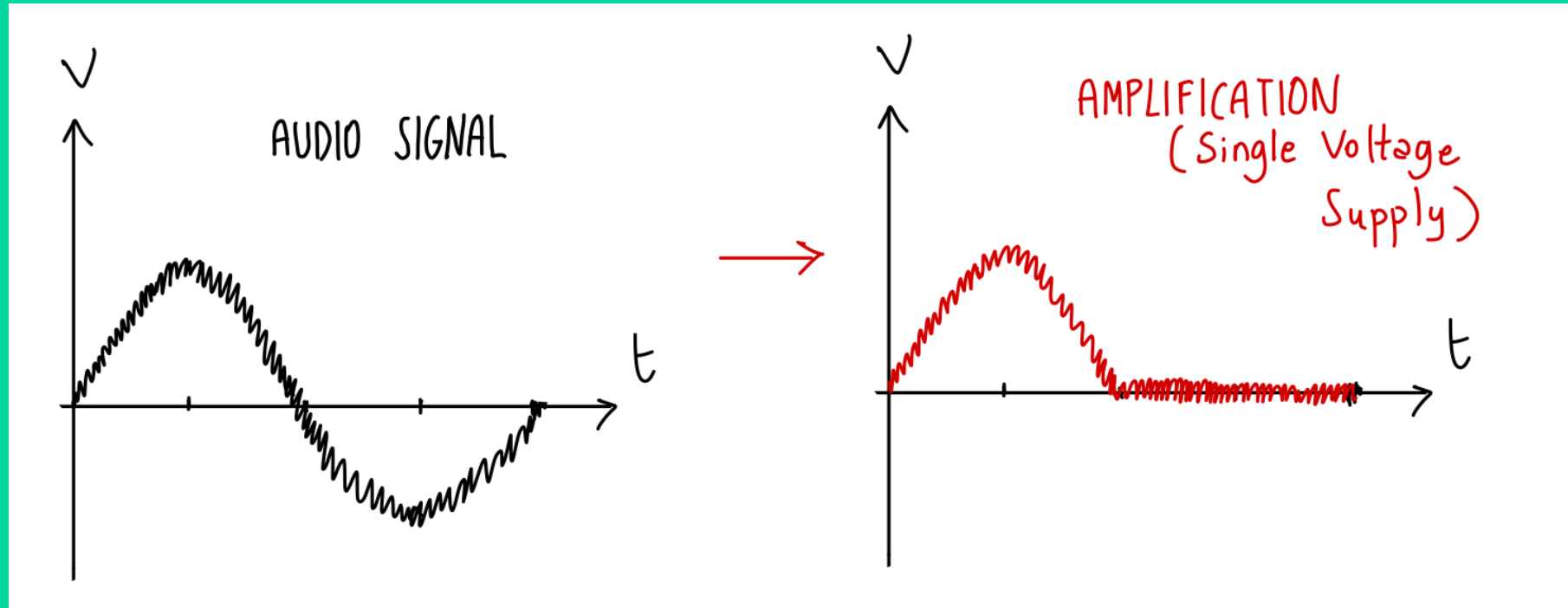
- C7: very close to Op Amp : will filter high frequencies  
BUT low capacitance  
=> C6 for filtering of lower frequencies



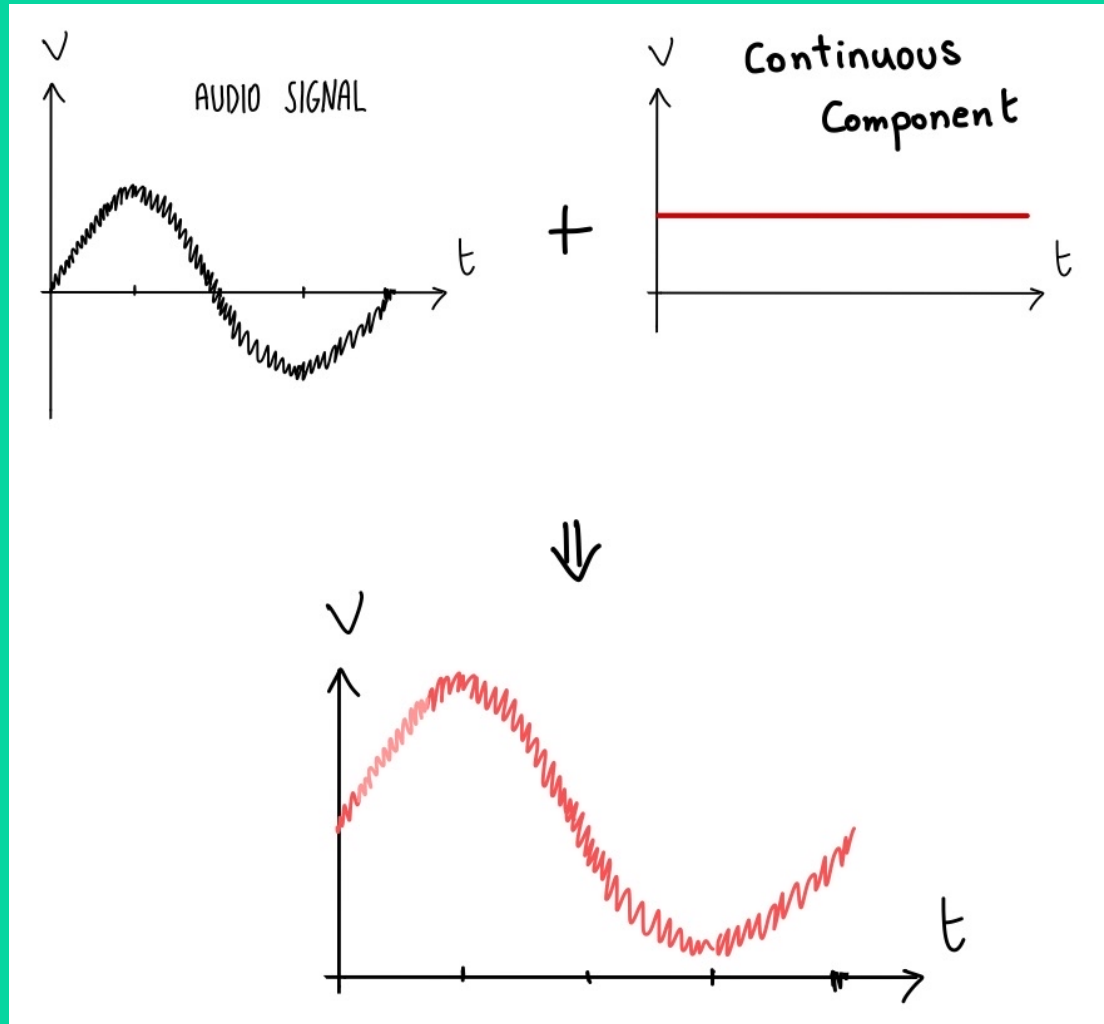
# Virtual Ground



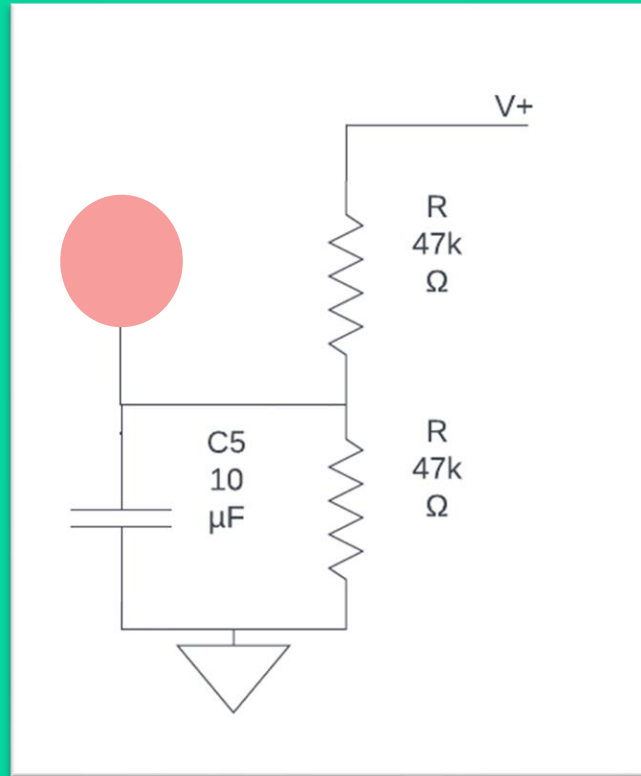
# Virtual ground



# Virtual ground

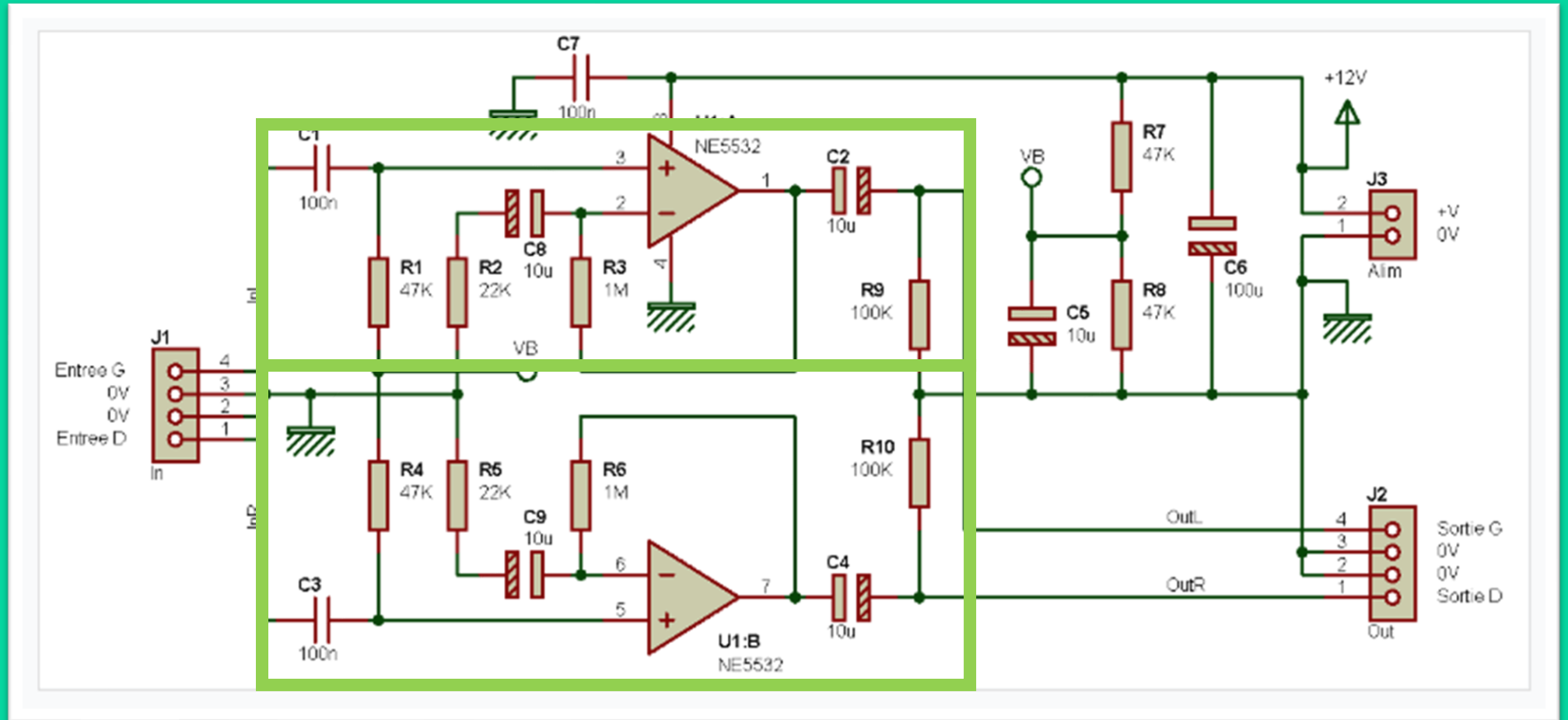


# Virtual ground

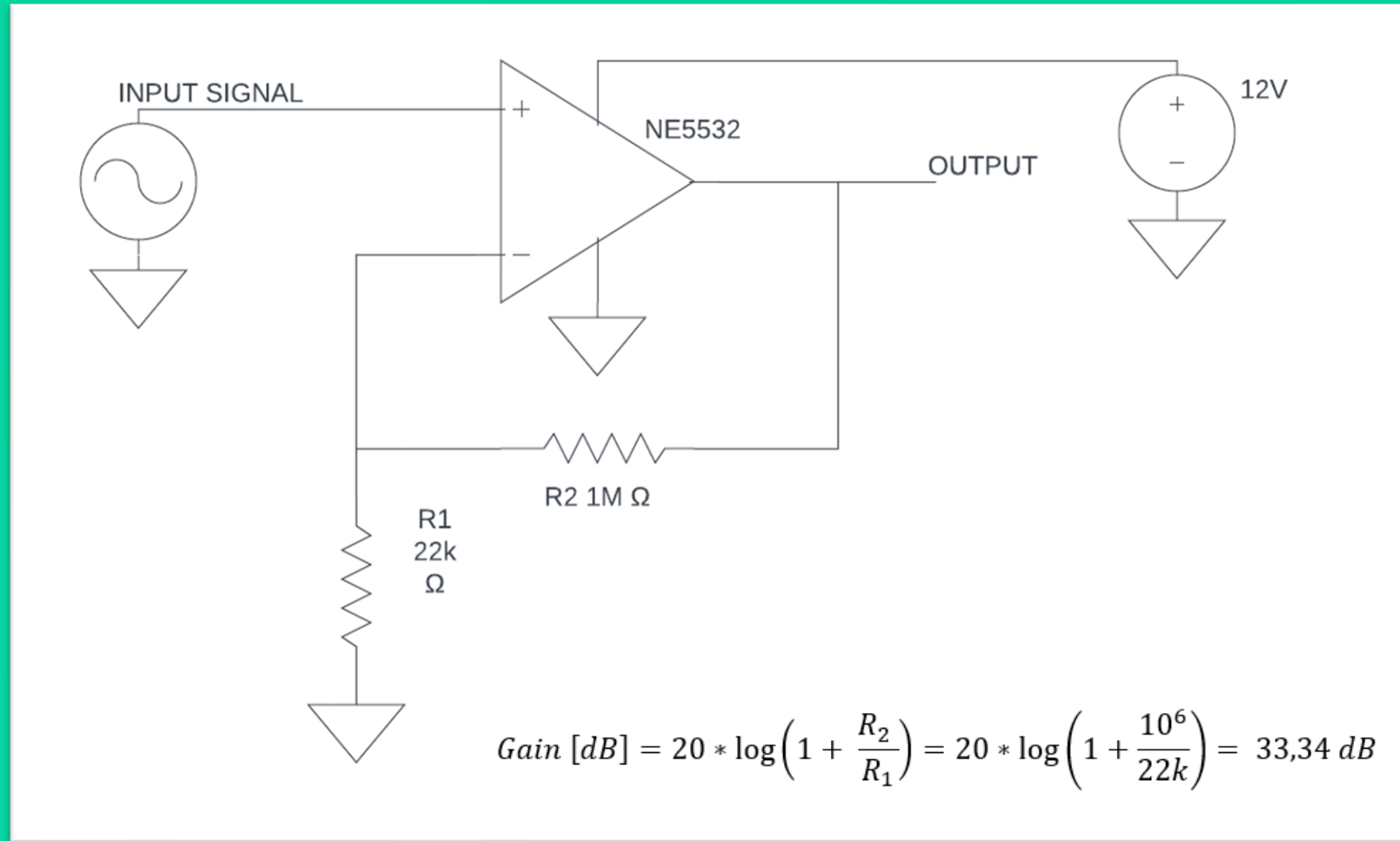


- **Resistors** : voltage divider  
Identical value
- **Capacitor**: absorb current variations  
& ensure stability to  $0V'$

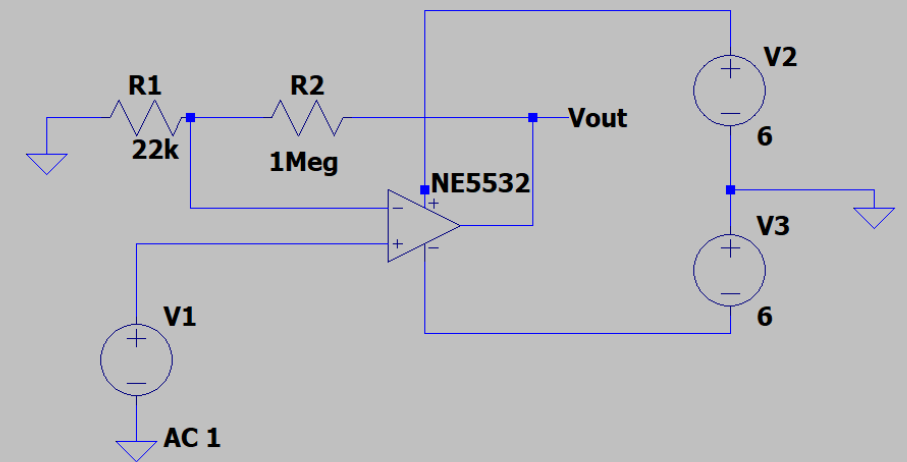
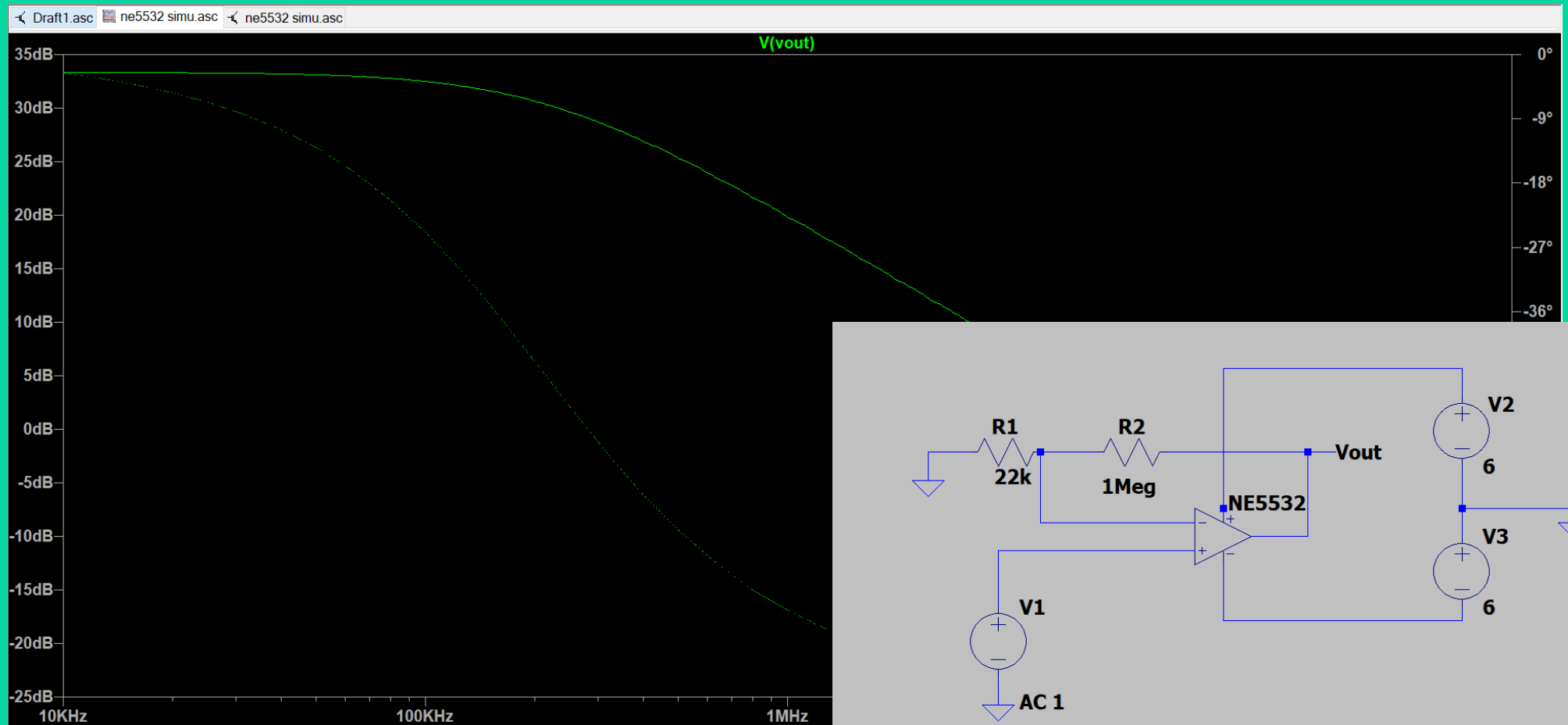
# DOUBLE mic preamp circuit



# Gain: non inverting op amp

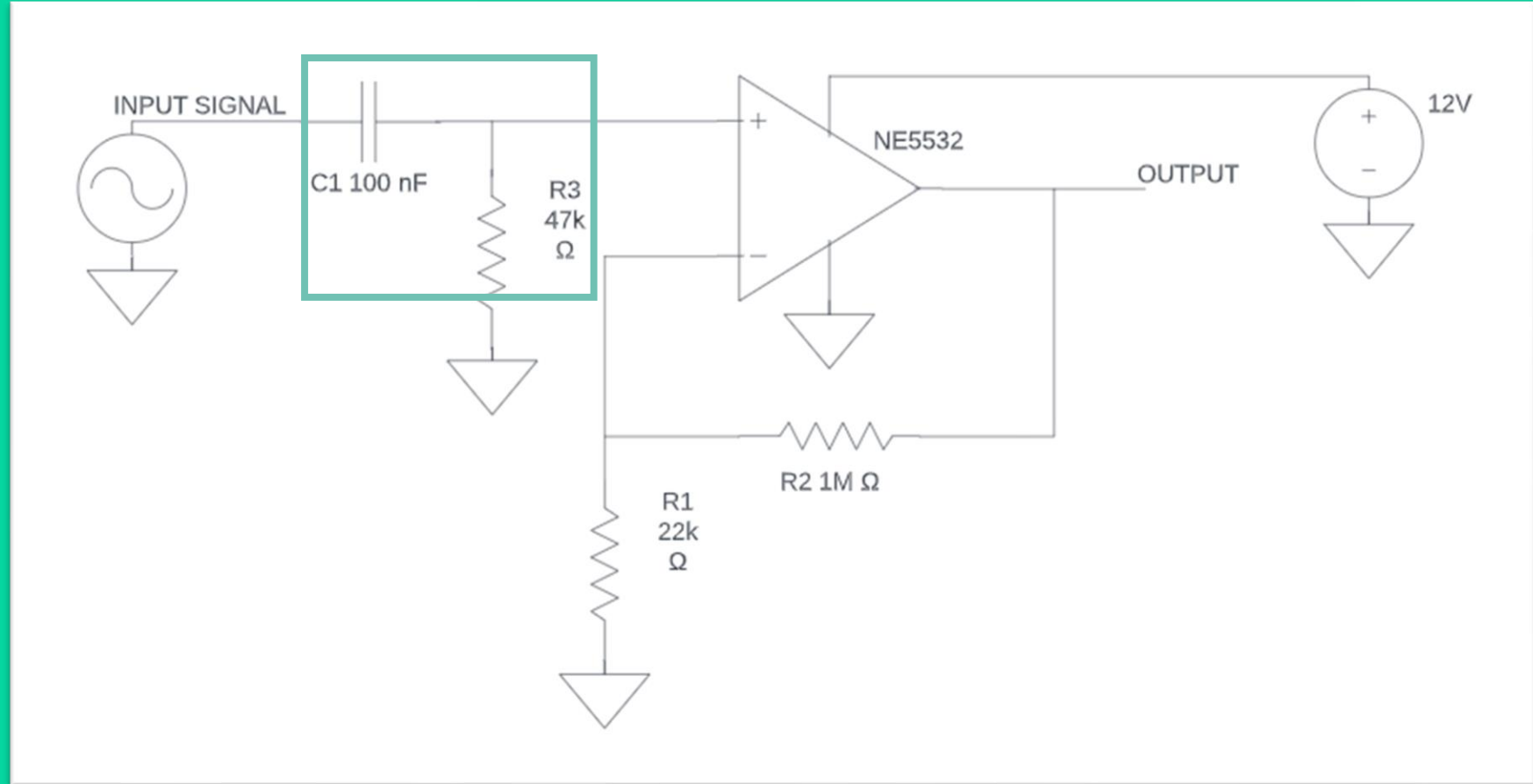


# Gain: simulation



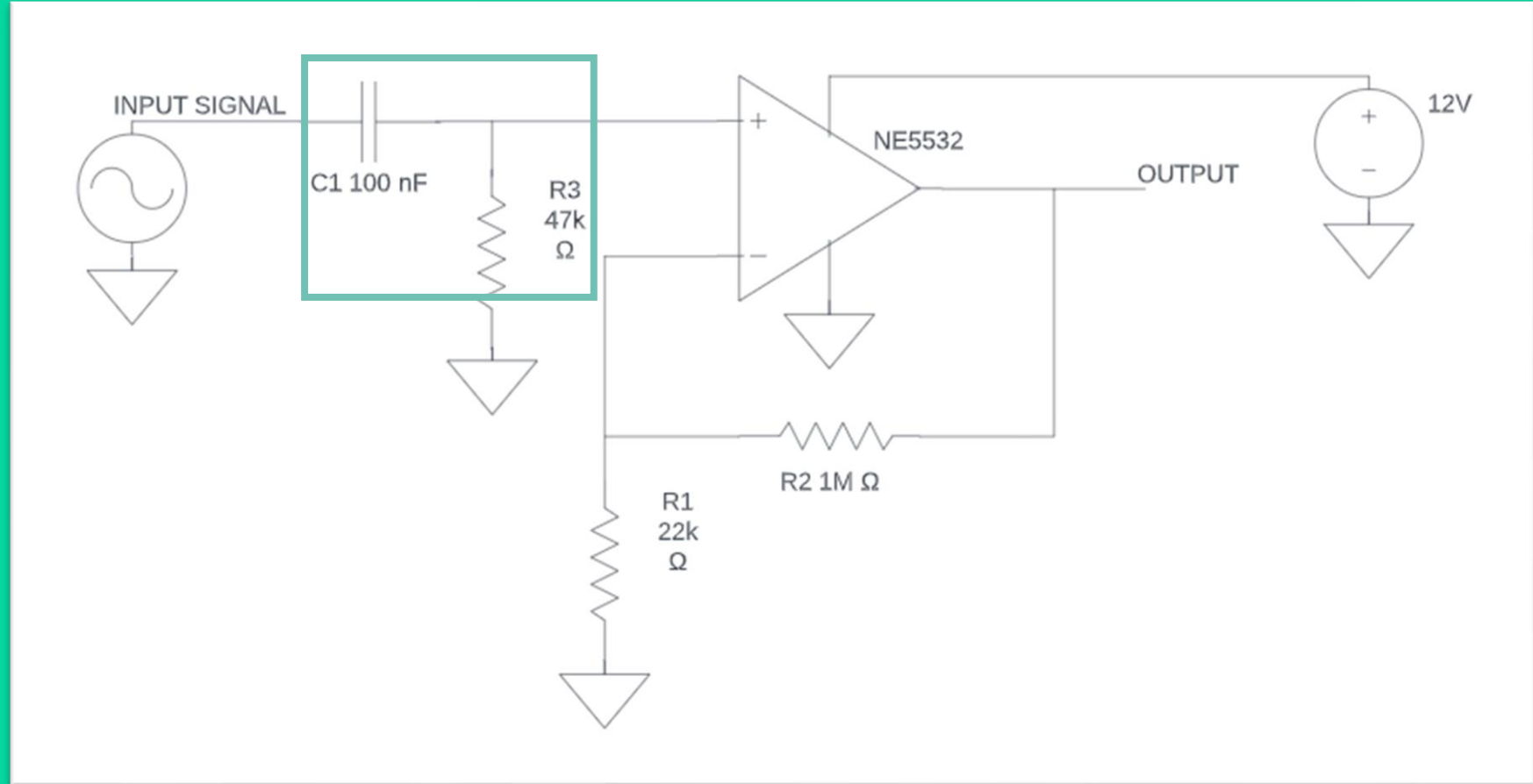
.ac dec 10 10k 100Meg

# R3, C1: High pass filter

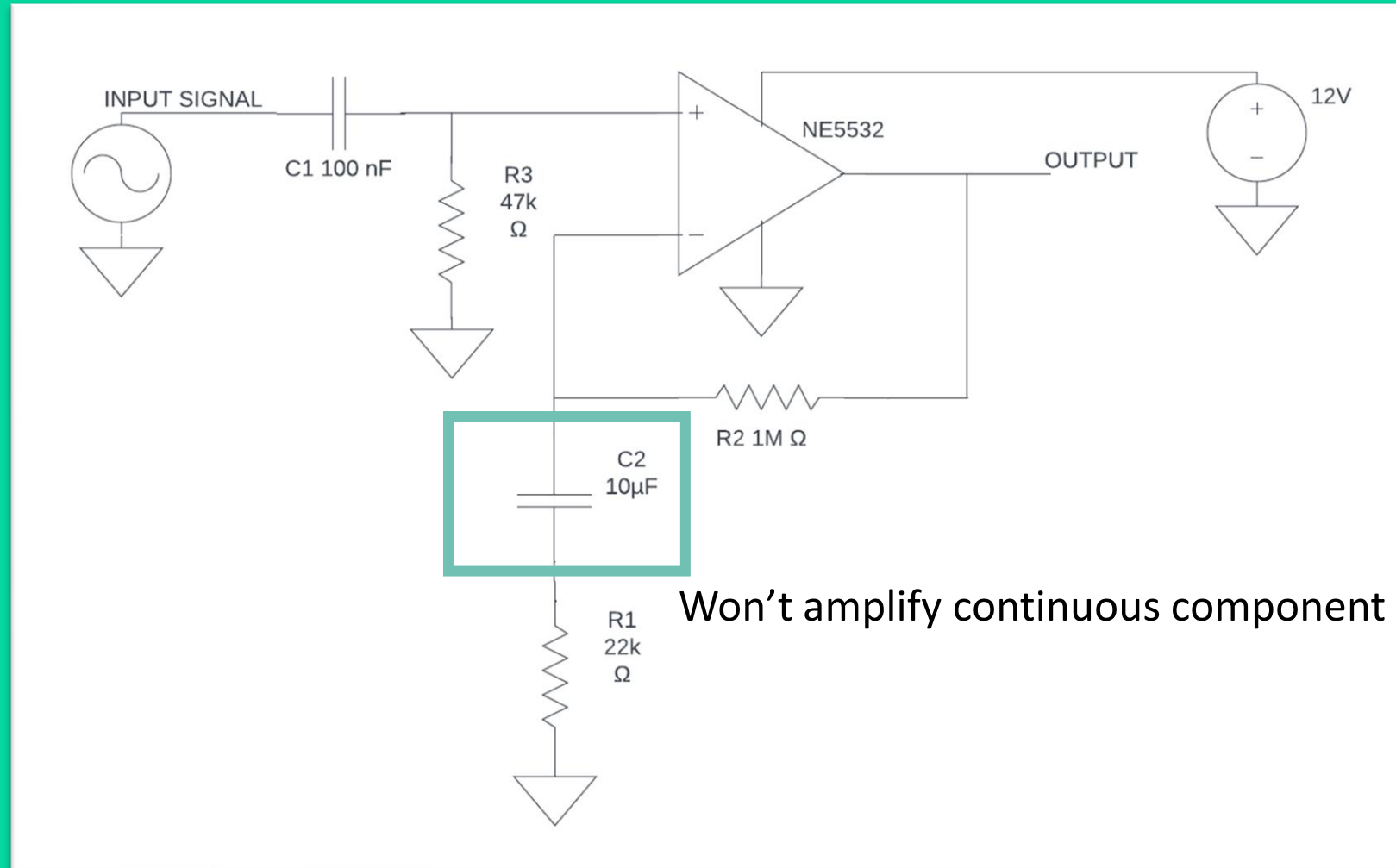




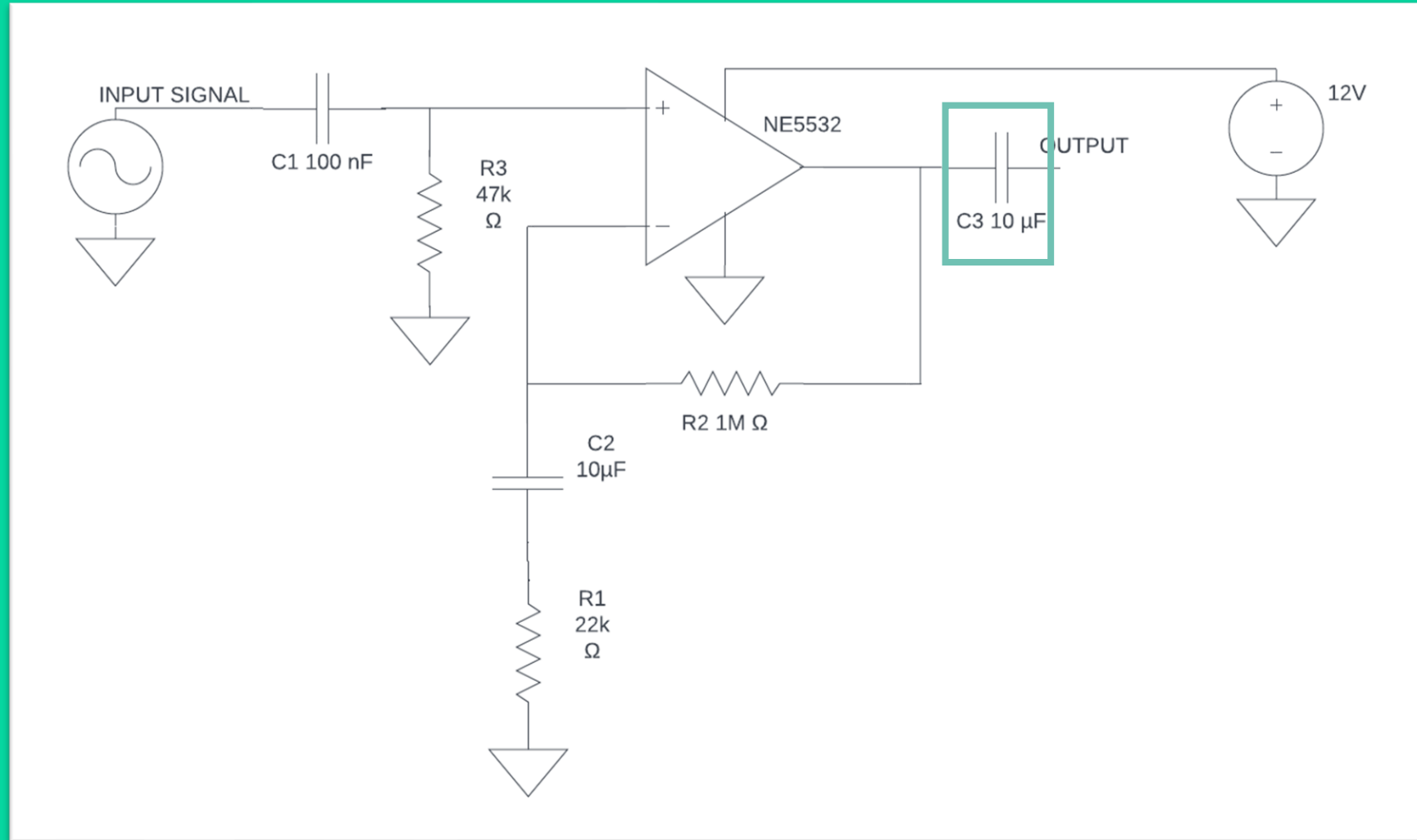
# R3, C1: High pass filter



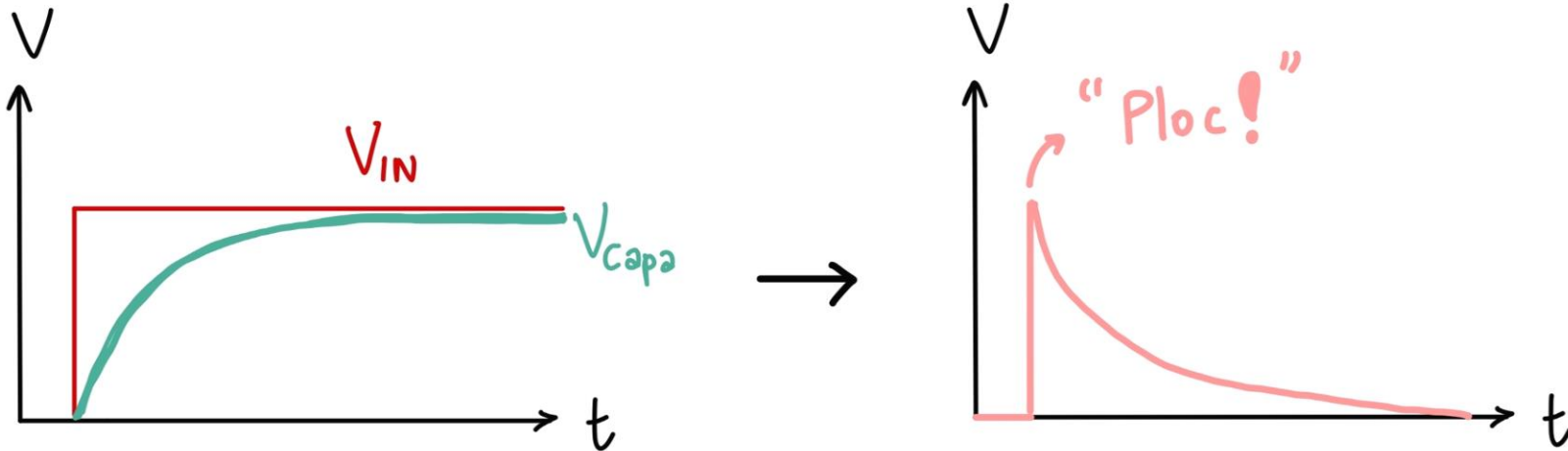
# C2: no wrong amplification

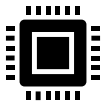


# C3: remove cont. component

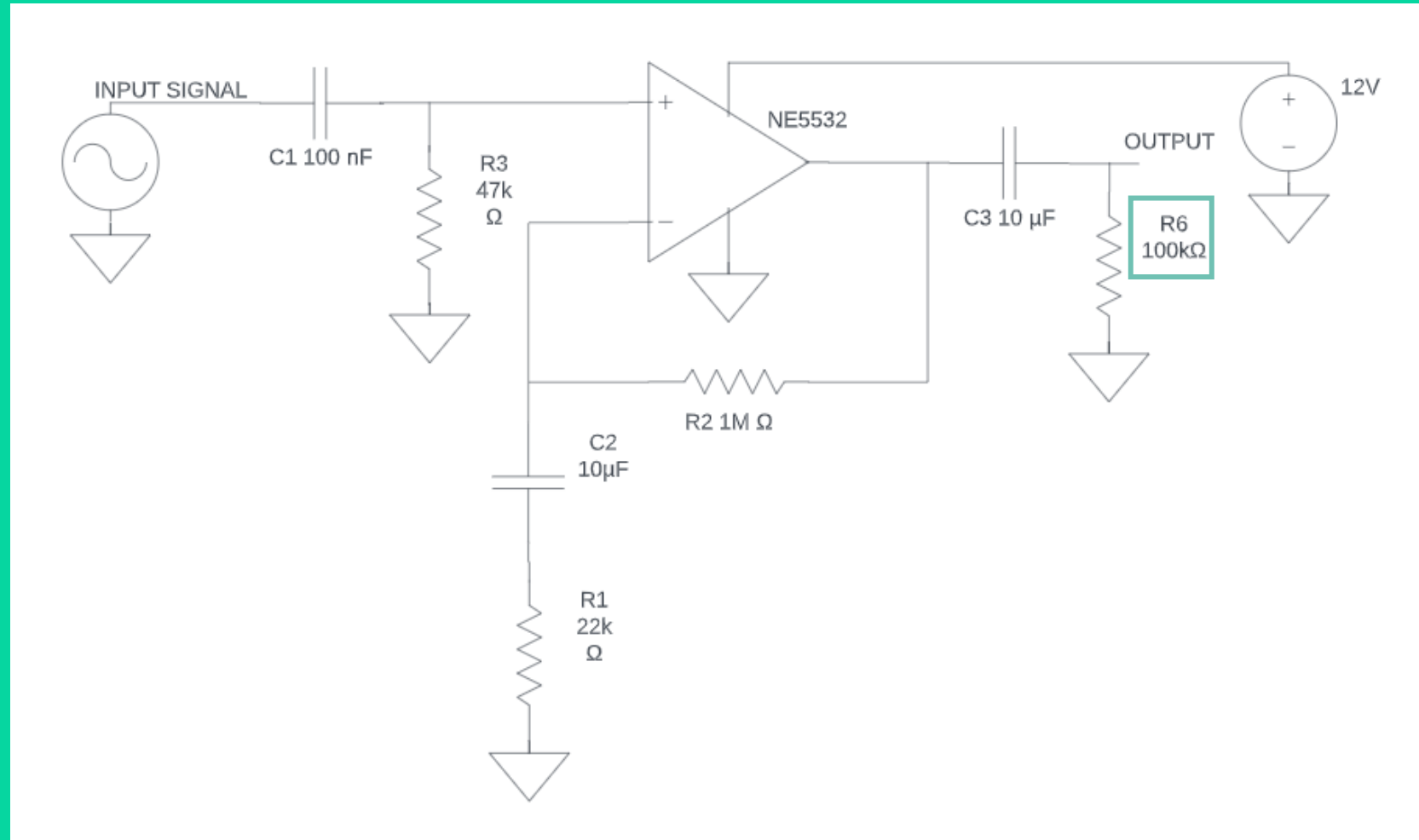


# C3: impulse due to charging time





# R6: compensate impulsions





# Altium

- Schematic/ interpretation mistakes:
  - Polarised capacitors inversely connected
  - VB not connected
    - => no connection to virtual mass
- Preamp very close to mic => PCB Design is better



# Bibliography

- [http://www.sonelec-musique.com/electronique\\_realisations\\_preampli\\_micro\\_005.html](http://www.sonelec-musique.com/electronique_realisations_preampli_micro_005.html)
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