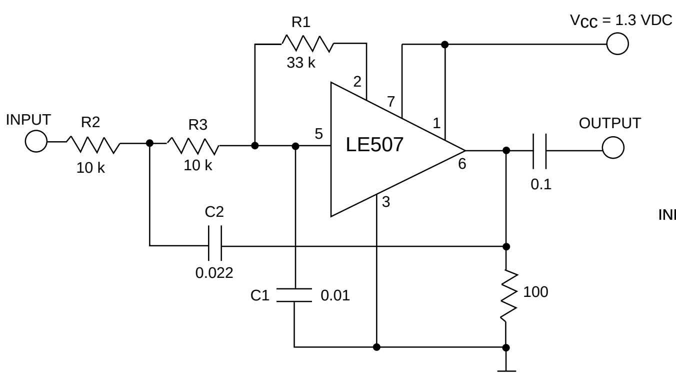
LE507 APPLICATION NOTE

ACTIVE FILTER APPLICATION

The LE507 is a class A, low voltage IC amplifier. Used as an output stage in conjunction with a preamp, it is comprised of 3 stages of its own. All three stages have access to their collectors for frequency shaping, feedback, etc. However the emitter of stage two transistor is separately pinned out, while the emitters of stages one and three use a common pin (6). This arrangement allows for the placement of an emitter resistor, for negative feedback, in the first / third stage (pin 6), or in the second stage (pin 3). With the emitter resistor between pin 6 and ground (pin 3), the gain is determined by the load impedance divided by the emitter resistance $\frac{R_L}{R_E}$.

A bias network is included on-chip to provide a DC bias for the input stage of the amplifier, when using an emitter resistor. Pin 3 and pin 6 can also be connected together and grounded, increasing the gain to 76 dB. With this configuration, the input bias network can no longer be used, and DC feedback from the output to input is required.

The following circuit diagrams show typical applications of the LE507 amplifier.



All external resistors in ohms, all capacitors in µF unless otherwise stated.

Fig.1 Unity Gain Active Low Pass Filter

The resistors and capacitors have nominal values. In order to alter the frequency cut off (fc), scale the value of R by the ratio of the frequency change, e.g.: changing fc from 1 kHz to 1.5 kHz results in a scaling factor of 1.5 times.

New value of $R = \frac{10 \times 10^3}{1.5} = 6.6 \times 10^3 = 6.6\ k\Omega = R2 = R3$

Conditions : fc = 1 kHz at -3 dB, slope = 12 dB/oct.

$$fc = \frac{1.5}{2\pi\sqrt{C1\ C2\ R1\ R2}}$$

R = R2 = R3

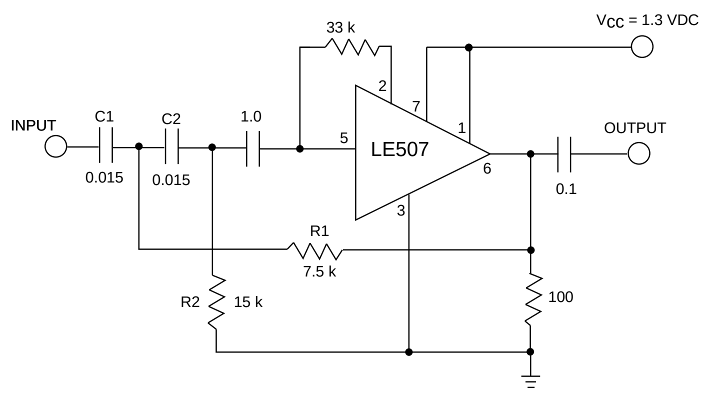
The resistors and capacitors have nominal values. In order to alter the frequency cut off (fc), scale the value of C by the ratio of the frequency change, e.g.: changing fc from 1 kHz to 1.5 kHz results in a scaling factor of 1.5 times.

New value of $C = \frac{0.015 \times 10^{-6}}{1.5} = 0.01 \times 10^{-6} = 0.01\ \mu F$

Conditions : fc = 1 kHz at -3 dB, slope = 12 dB/oct.

$$fc = \frac{1}{2\pi\sqrt{C1\ C2\ R1\ R2}}$$

C= C1 = C2



All external resistors in ohms, all capacitors in µF unless otherwise stated

Fig. 2 Unity Gain Active High Pass Filter

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HEARING AID APPLICATION

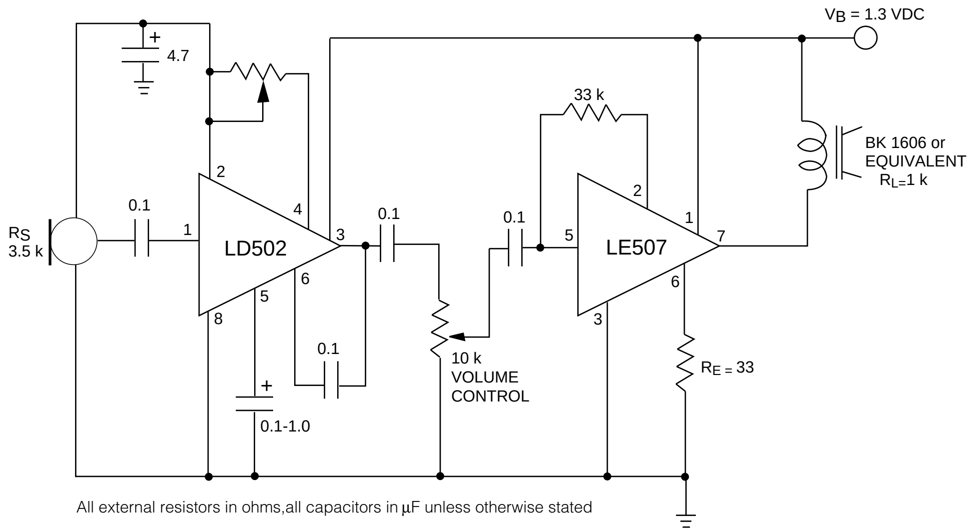

Fig.3 LD502/LE507 Medium Power AGC Class A
Typical Hearing Aid Circuit

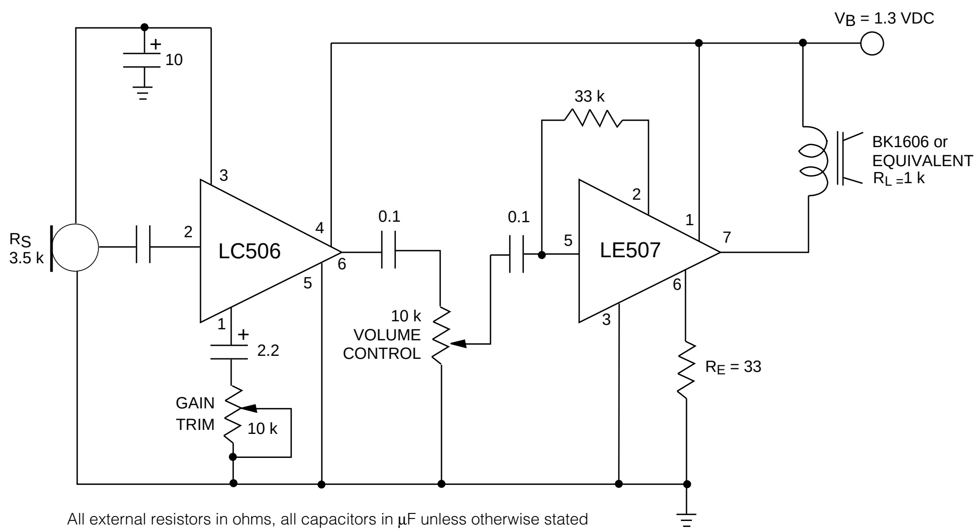

Fig. 4 LC506 / LE507 Typical Hearing Aid Circuit

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