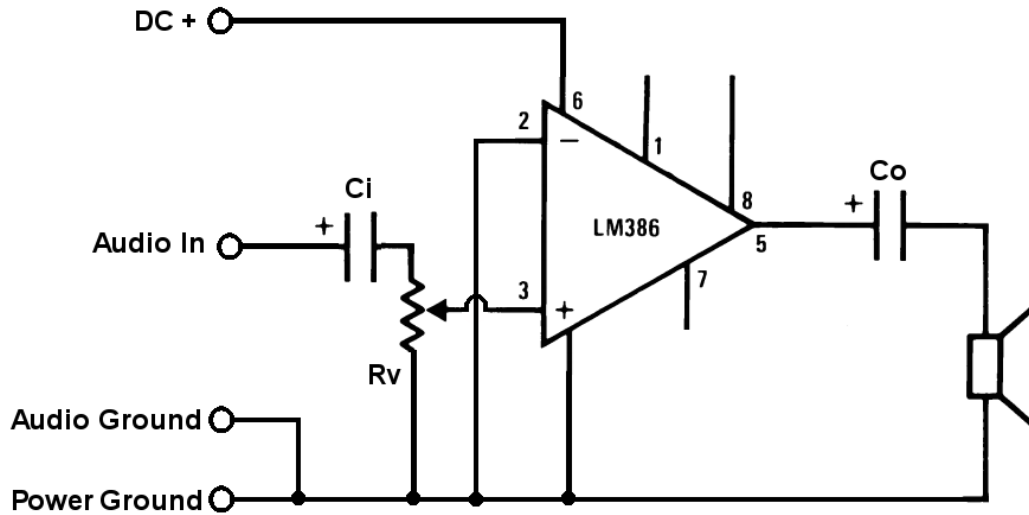


The LM386

LM386s are very useful, and cheap, audio amplifier ICs. They will work from a DC supply of between 5 and 15 volts making them very handy for use with batteries.

This is the simplest possible circuit using one:-



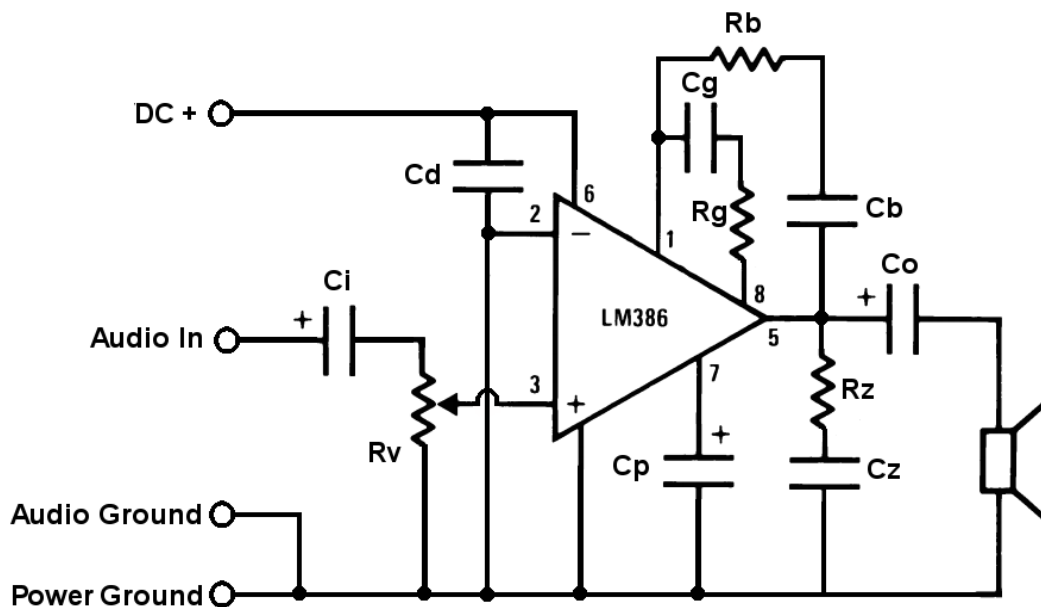
which is often all that is needed.

R_v is the volume control, usually $10K\Omega$.

C_i is the input capacitor. This blocks any DC that may be on the input from getting to the amplifier. $0.1\mu F$ to $1\mu F$ are usual values

C_o is the output coupling capacitor which stops any DC from getting to the speaker. $220\mu F$ is the usual value.

Other refinements can be added as desired:-



R_v, **C_i** and **C_o** are the same as in the simple circuit.

C_d is a power decoupler which shorts out any high frequency interference that the power leads may have picked up. 0.1 μ F is the usual value.

C_g and **R_g** set the gain. The simple circuit has a gain of 20. If a 10 μ F capacitor is fitted between pins 1 and 8 the gain will be 200. The R_g sets values in between.

C_b and **R_b** (0.03 μ F and 10k Ω) form a bass boost which is useful for stopping small speakers from sounding tinny.

R_z and **C_z** (10 Ω and 0.047 μ F) form a Zobel network to prevent high frequency oscillations and instability, though I've never found them necessary.

C_p is a bypass capacitor which helps get rid of noise coming from poorly filtered power supplies. The value depends on how noisy the supply is. Try 10 μ F and if that doesn't work try 47 μ F.

The power output is dependant on the supply voltage and speaker impedance; the higher the supply and/or the lower the speaker impedance the higher the power.

The following PCB design includes all possible components but the ones which aren't wanted can easily be omitted.

