

A minimalistic chip amplifier

by Mick Feuerbacher, July 2006. Updated [August 2006](#), [August 2006](#).

This project is a minimalistic LM3886 based power amplifier. It has only the minimum number of parts in the signal path: Three resistors - nothing else. These three resistors are required for the functionality of the amp so further simplification in this sense is impossible. Referring to the schematic below, the three resistors are R_g , which sets the input impedance of the amp, and R_f and R_i , which set the gain. In particular in this design the use of an input coupling cap is avoided. This greatly improves clarity and transparency, in particular if the preceding stage has output coupling capacitors. These would otherwise be unnecessarily cascaded with the input capacitors, which is not good for the sound. If you want to build this amp, be however careful if you are not sure if the preceding stage in your system has output coupling caps. If it has not, DC may enter the amp, which will be amplified and sent to your speakers! Also, be careful if you have difficult to drive speakers. The amp has no Zobel network or any other stabilizing components.

Of course finishing the amp requires additional parts, but these are not in the signal path. The LM3886 has a muting function which requires the addition of a resistor R_m to V_- . Also power supply bypassing is required, which here was done with a 2200 μF electrolytic paralleled with a 100 nF film capacitor.

The amp is built point-to-point, i.e. no PCB or matrix board was used. The geometry was chosen according to the following criteria. i) I wanted to have it extremely compact and ii) I minimized the area of any current loops, which lead to unwanted induced voltages in the circuit.

In the following you find an illustrated description of the build process of my amp. It is rather detailed and step-by-step, which may be helpful for beginners. You are invited to use it as a guide for building your own amp - if you do so, I would be grateful for your feedback..

Fig. 1: This is the schematic of the amp. The chip is a National Semiconductors LM3886. The following additional parts are used:

Part	Value	Rating, type
R_g	22k	0.35 W metalfilm
R_f	22k	1 W carbon
R_i	680R	0.35W metalfilm
R_m	10k	0.35 W metalfilm
C_s	2200 μF 63 V electrolytic; 100 nF 100 V MKS	

Please note that R_f is overrated. This is just my personal choice. The minimum power rating for all resistors is 1/4 W.

The gain is chosen fairly high, it amounts to about 33, which makes it possible to use this amp without a pre. For use with a pre, lower the gain to about 20 by changing R_f or R_i .

Optionally, you can add a resistor in series to the input. This resistor should have something like 220R.

