

Electro-Resales LLC

LM386 Mono Amplifier - Kit Builders Guide

A little about the LM386

The LM386 integrated circuit amplifier chip has been around since the late 60's, early 70's and still finds application and use in a number of fields. This is due in part, as it has a couple of features that make it very suitable for multiple end uses. Most notably its ability to run on batteries, particularly a single 9 volt battery and also its ability to develop high gain levels with only one additional component. In its basic form the amplifier has a gain of around 20 x, but with the addition of a capacitor this gain can be increased to 200 x, how to achieve this is explained in this guide.

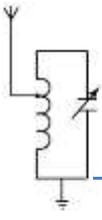
Building the Kit

Our kit contains all the parts you will need to build the amplifier, including the PCB and hardware plus all the electronic components. Our step by step process guides you in assembling the kit. If you have already made some kits this one should take about 15-30 minutes, beginners may need a little longer, but it is suitable for all skill levels.

Start, by reviewing the parts list against the supplied parts:

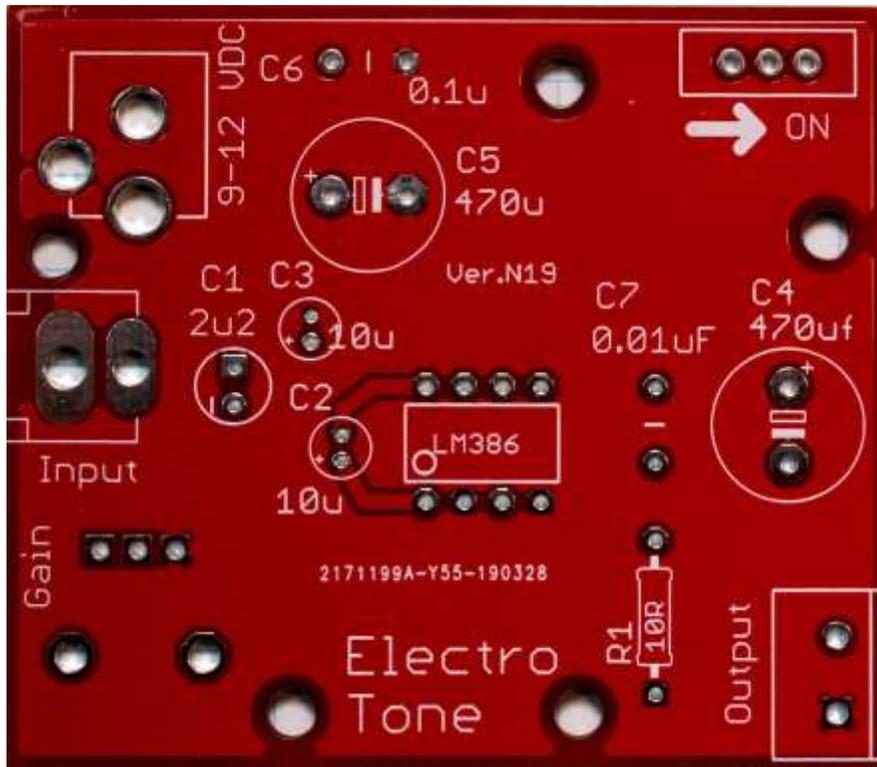
Parts List

Part Name		Quantity	Part Identification
R1	10 Ohm Resistor	1	
C1	2.2uF Electrolytic Capacitor	1	Small brown or red tubular radial capacitor
C2/C3	10uF Electrolytic Capacitor	2	Small red tubular radial capacitor
C4/C5	470uF electrolytic capacitor	2	Medium size black radial capacitor
C6	0.1uF Ceramic capacitor	1	Yellow plastic capacitor marked 104
C7	0.01uF Ceramic capacitor	1	Blue plastic capacitor marked 103
Gain control	10K Ohm Potentiometer	1	PCB style vertical potentiometers
ICI	LM386	1	8 Pin black plastic integrated circuit
Jack	2.1mm Power Jack	1	Black plastic jack with 3 legs
Jack	RCA Jack	1	Yellow RCA jack
5mm Term.	5mm Screw terminal Jack	1	Blue plastic block
S1	SPST Slide switch	1	Small black slide switch
PCB	Double sided Circuit Board	1	Green PCB board – 4" x 3"



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Once the parts list has been verified and parts sorted, take a look at the next photo, which shows the placement of all the parts on the PCB. Compare to the actual PCB to familiarize yourself with the layout. Take a moment to familiarize yourself with this diagram and your parts list before starting construction.

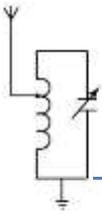


If you see this symbol next to the text in this guide it indicates a tip to assist in making construction easier.

Starting Construction

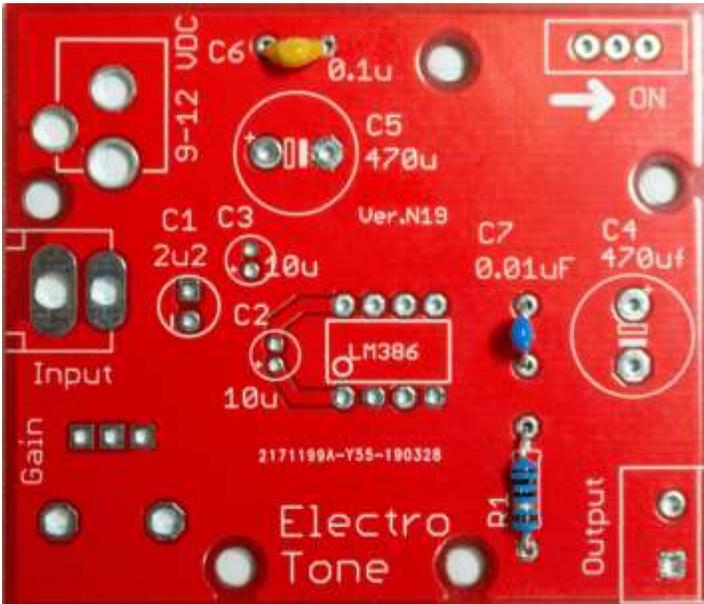
Step 1.

The first step is to insert and solder the 10 Ohm resistor (R1) in the correct location on the PCB. This part is not polarized so maybe inserted either way round. Next insert the capacitor marked 104 (C6) and capacitor marked 103 (C7) in their correct locations. These parts are also not polarized so can be installed either way round.



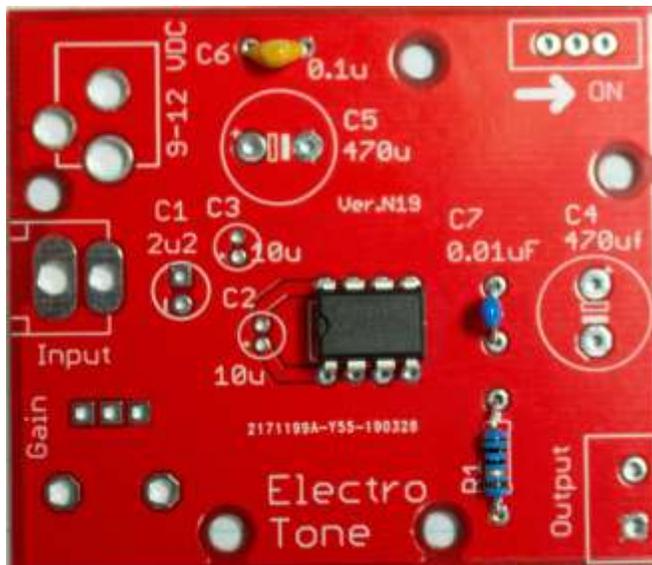
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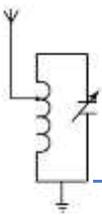
Refer to this image to check your work.



Step 2.

In this part the LM386 is installed, it is important to insert this correctly the circle on the PCB indicates Pin No. 1 on the IC, on the IC itself pin 1 is indicated by a small depression next to the pin or by a half circle depression at the top edge. Make sure to line up the IC correctly, use the next image to check this also.





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Step 3.

Next insert and solder the electrolytic capacitors C1 marked 2.2uF and C3 marked 10uF. These are polarized so make sure they are inserted correctly. Note the PCB legend shows the 2.2 uF (-) leg, while the (+) leg is marked for all the other electrolytics.



Capacitor C2 (10uF) controls the output gain of the amplifier, with it installed the LM386 operates at maximum gain, which is quite loud and may lead to clipping at high volume, with it left out the output gain is still acceptable but will be reduced compared to having C2 installed – your choice, but we recommend starting with it left off the board, installing it later if needed.

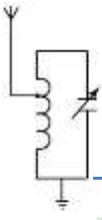
Next install capacitors C4 & C5, remember to observe polarity. Use this image to assist in getting the capacitors installed correctly.



Step 4.

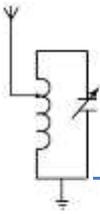


This step completes the build with the hardware being installed, start with the on off slide switch followed by the power jack, RCA jack and screw terminal jack. Once these are installed the gain control potentiometer can be installed. Squeezing the mounting lugs together slightly assists greatly in inserting this part. Position the connection pins over the holes in the PCB, then apply pressure to fully insert the part.



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Completion and initial tests.

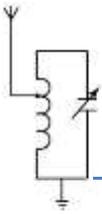
The board is now complete and ready for use. Before applying power though, carefully check the following points to ensure success.

1. Make sure all the resistors and capacitors are in the correct place and oriented correctly.
2. Ensure the chip is inserted the correct way round
3. Carefully check the solder side for solder splashes, shorts of solder or poorly soldered joints, use a magnifier, or have a second pair of eyes take a look. Remove shorts and rewet any joints that look poor.

When you are happy to continue, make sure the switch (S1) is in the off position, and that the gain control is fully anticlockwise. Power can be from a battery or 12 volt power supply. The jack is a 2.1 mm x 5.5 mm type that has been configured as center positive

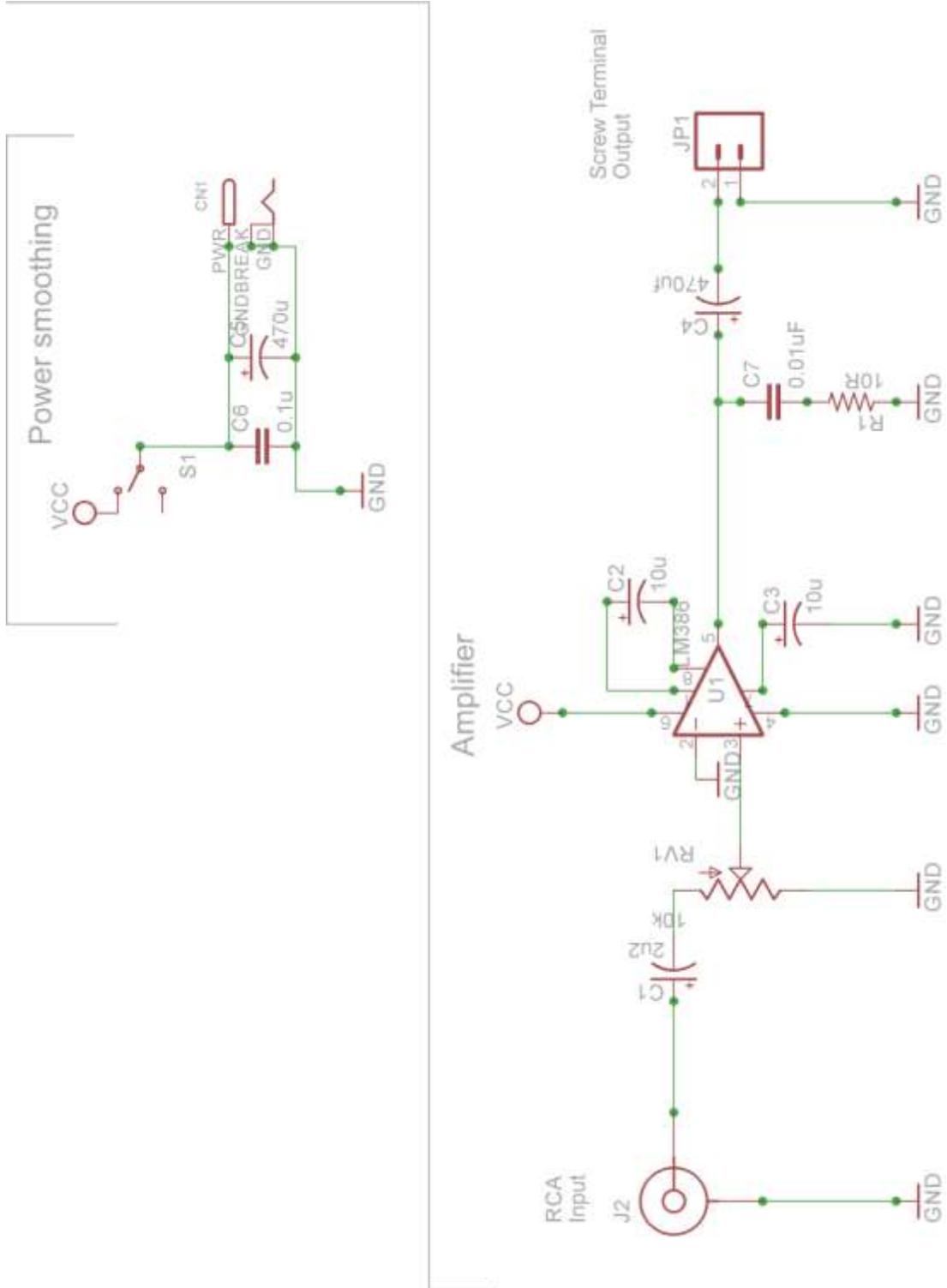
Attach a speaker to the screw terminals, and an input source to the RCA jack. It is best to have the input set to a low gain level initially, move the slider to the ON position and make sure the input source is operating. Changing the gain control should give increased or decreased output volume.

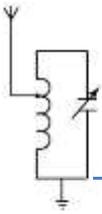
If the board passes these tests it is ready for use. We have included the schematic for your use if the PCB does not operate as expected. Also we are here to help if required. Email us at **steve@electroresales.com**



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Schematic of the LM386 Amplifier





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The small Print

DISCLAIMER

Any person who constructs or works on electronic equipment may be exposed to hazards, including physical injury, the risk of electric shock or electrocution.. These hazards can result in health problems, injury, or death. Only qualified persons who understand and are willing to bear these risks themselves should attempt the construction of electronic equipment. By purchasing this item, the buyer acknowledges these risks.

There is a risk of electric shock, electrocution, burns, or fires that is inherent in the construction and use of electronic equipment. By purchasing this item, the buyer acknowledges these risks.

IN NO EVENT SHALL THE SELLER BE LIABLE FOR ANY SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES OF ANY NATURE including, but not limited to, property damage, personal injury, death or legal expenses. Buyer's recovery from Seller for any claim shall not exceed the purchase price paid by Buyer for the goods, irrespective of the nature of the claim, whether in warrant, contract or otherwise.

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