

LM386 Guitar Amplifier

Circuit Description:

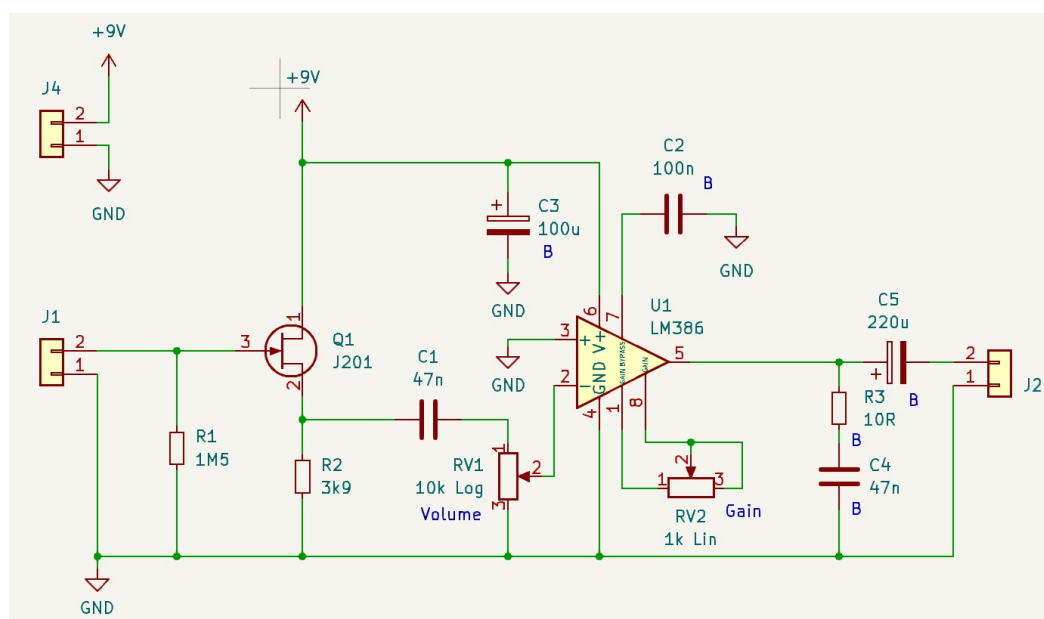
The LM386 guitar amplifier is a popular low-power, solid-state amp utilising a circuit that is both simple and versatile. It is based on the LM386 audio power amplifier chip and incorporates a JFET preamp stage to provide a high-impedance input with additional gain and tone shaping. This combination allows it to deliver a surprising amount of volume and character, making it ideal for practice amps, DIY projects, or even as a portable busking amp.

Referring to the schematic diagram, the signal from the guitar enters via J1 and passes directly to the JFET, Q1. This stage boosts the signal and adds a touch of warmth and dynamic response, mimicking the feel of a tube preamp. The signal then passes to the 10k pot, which acts as a volume control. The wiper of the pot is connected to the IC input (pin 3).

The gain (amplification level) is controlled by the 1k pot, which provides adjustment between around 40x and 200x for clean to distorted sound.

C4 and R3 help to stabilise the output at high frequencies and C5 blocks DC at the output while allowing the amplified signal to pass to the loudspeaker.

Schematic:



Assembly:

Note: The PCB is used by other projects which require additional or fewer components, so you will not be filling all of the available part locations.

Fit parts in the following order:

Q1/Q2 - Use either of these positions depending on whether you are fitting a through-hole or surface mount variant of the J201 JFET.

R3 - 10R metal film resistor.

C2 - 100nf (0.1uF) polybox capacitor.

C1 & C4 - 47nF polybox capacitors.

IC socket in position U1 - align the notch at the top with that shown on the pcb graphic.

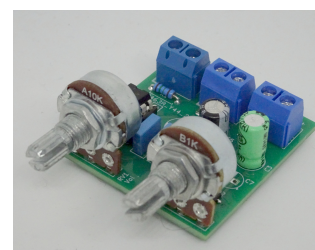
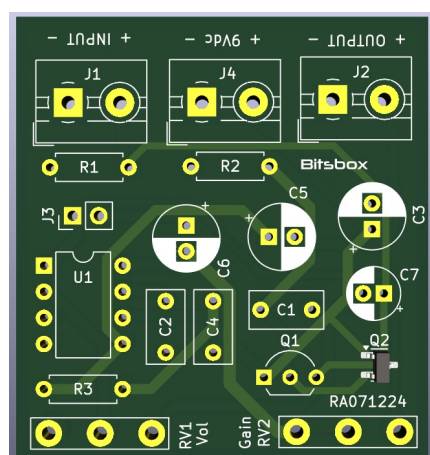
C5 - 220uF capacitor. Take care with the polarity.

C3 - 100uF capacitor. Take care with the polarity.

J1, J2, J4 - screw terminal blocks.

RV1 - 10k log potentiometer.

RV2 - 1k linear potentiometer.



Once you are happy with your assembly, carry out a few continuity checks using a multimeter. Look for continuity between the -ve on the supply terminal block (marked 9Vdc), -ve input terminal, -ve output terminal, pin 3 on the IC socket and pin 4 on the IC socket. Check for continuity between the +ve on the supply terminal block and pin 6 on the IC socket.

Also check that there is no continuity between the + and - on the supply terminal block.

Fit the IC making sure it is orientated correctly - note the notch at the top edge.

Testing:

Connect an 8 Ohm speaker to the output terminal block (it does not matter which board terminal is connected to which speaker terminal).

Connect the signal source i.e. guitar output, to the signal input terminal block .

Turn the volume control, RV1, fully anticlockwise, set the gain control, RV2, to a mid-position and connect power to the terminal block marked 9Vdc. Note the + and - terminals - it is important to get this polarity right to avoid damage to the circuit.

Turn the volume control clockwise and you should hear the output from your source.

Troubleshooting:*No output:*

The majority of problems will be due to assembly errors.

Check, double check and triple check every component position and its connection in the circuit.

Check that the solder joints are good and that there are no solder bridges.

Check that your signal source is switched on and producing an output.

Distorted output:

- Remove the jumper from the header, J3, to reduce the gain.
- Reduce the level of the source e.g. turn down the volume on the signal source.

Help:

If you are still experiencing difficulties, email tech@bitsbox.co.uk for further help.

Developing your circuit further:.

- Build it into an enclosure .
- Incorporate an ON/OFF switch in the +ve supply connection.
- Include a POWER ON led.

Wherever you decide to take it, a range of components is available at www.bitsbox.co.uk to help you realise it.