

# DIY KIT 47. 8 WATT AUDIO POWER AMPLIFIER

The National Semiconductor LM383 (and its equivalent TDA2003 from other manufacturers) is a proven and successful audio amplifier. It comes in a 5 pin TO-220 package suitable for mounting onto almost any heatsink (unlike DIL packages such as the LM380 & LM386.) Although it operates at low voltage this does not mean low power. It can drive loads as low as 1.6 ohm (5 8-ohm speakers in parallel) yet it is capable of delivering up to 11 watts from a 16V supply. It is an ideal building block for many audio projects. You must supply your own 8W speaker.

Download the LM383 data sheet from  
[www.national.com](http://www.national.com)

The main features of the LM383 include:

- 5V - 20V supply range
- current limiting & thermally protected. The chip shuts down if the temperature reaches 150°C
- few external parts required
- no turn-on transients

Note how the gain of the amplifier is obtained. R2 & R3 form a voltage divider string. The 470uF capacitor couples a small fraction of the output signal back to the inverting input on pin 2. This voltage divider sets the gain to 101, or just above 40dB. To reduce the gain increase the value of R3. An R3 of 10R reduces the gain to 23 (27dB). To increase the gain increase the value of R2.

The 1R resistor (R4) in series with the 100nF mylar capacitor (C4) form what is called a **Zobel** network which eliminates any tendency for the amplifier to go into high frequency oscillation. At high frequencies the speaker is seen as an inductive load to the signal & R4/C4 provide a dampening network. (That is, it makes the load appear resistive.) The output of the LM383 is Class B. It has an efficiency of 60% to 70%.

## Components

1R brown black gold	R4	1
220R red red brown	R2	1
2R2 red red gold	R3	1
10K potentiometer		1
10uF mini ecap	C1	1
470uF/16V ecal	C2	1
1000 uF/35V ecap	C3	1
100nF monoblok	C5	1
100nF mylar	C4	1
100uF/25V	C6	1
LM383 IC		1
Kit 47 PCB		1
Terminal block 2 pole		3
Heatsink HS215		1
Nut & bolt set		1
Documentation		1

## ASSEMBLY INSTRUCTIONS

Check off the components in the Kit against the Component listing. Make sure you identify every component. It is generally easiest if you solder the lowest height components first, the resistors and then the capacitors. Make sure to get the electrolytic capacitors around the correct way. Mount the LM383 last. Use some heat sink compound between the IC and the heatsink. After it is soldered in do not put any strain on the heatsink because it is unsupported except by the pins of the IC.

You may like to mount the volume potentiometer not on the PCB but in the wall of a box some inches away. Run wires from the corresponding pads on the PCB to the potentiometer.

## WHAT TO DO IF IT DOES NOT WORK

Poor soldering is the most likely reason. Check all solder joints carefully under a good light. Next check that all components are in their correct position on the PCB. Are the electrolytic capacitors around the correct way.

