

# 8097v1: 2 Watt Mono Amplifier Kit/Module (LM380)

## General Guidelines for Electronic Kits and Assembled Modules

Thank you for choosing one of our products. Please take some time to carefully read the important information below concerning use of this product. The assembly and operating instructions are on the following pages. Help with component identification can be found on our website at [www.quasarelectronics.com/componentid.htm](http://www.quasarelectronics.com/componentid.htm). If you are unsure about any aspect of the assembly or use of this product please contact our Support Team before proceeding.



**WEEE Directive (Waste Electrical and Electronic Equipment) Notice To All European Union Citizens. Important environmental information about this product.**

The crossed out wheeled bin symbol on this product, package or documentation indicates that disposal of this product after its lifecycle could harm the environment. Do not dispose of this product (or batteries if used) as unsorted municipal waste. It should be disposed by a specialized company for recycling. The unit should be returned to your distributor or to a local recycling service. Please respect the local environmental rules. If in doubt contact your local authorities about waste disposal rules.

### **Safety: General rules concerning safe use of our Kits or Modules.**

**To ensure your safety, please observe these safety measures. In no way are these complete. As safety requirements vary, please check with your local authorities, in order to comply with local requirements. If in doubt, seek the help of a qualified person.**

**Battery or wall-adaptor operated devices are safe devices. They do not require special attention unless mains voltage is connected to an output e.g. a relay.**



To ensure electrical safety, and also protection from fire or personal injury, make sure your mains operated equipment complies with these safety hints:

- Use a suitable plastic enclosure. If a metal enclosure is used, make sure it is properly earthed.
- Use a power switch if the device consumes more than 10W. Use a double pole switch for mains operated, transformer-less kits.
- Mount a fuse in series with the mains switch. Use a slow blow (T) 50mA fuse for transformers up to 10W and a 100mA fuse for transformers up to 20W.
- Use a mains input connector, or a robust power cord with a clamp.
- Internal wiring carrying mains voltages must have a minimum cross-sectional area of 0.5mm<sup>2</sup>.

If supplied, attach the power rating label near the power cord of the device and fill-out the mains voltage, frequency, power consumption and fuse values.

### **Troubleshooting and Support**

90% of non-working kits are due to poor soldering.

We operate a Get-You-Going service for non-working kits but there is a charge based on the time and components needed to complete the repair. Quite often it is not economically viable for us to repair and it is cheaper to supply a new ready made product at full cost.

### **Disclaimer**

Quasar Electronics reserves the right to change product specifications or to discontinue products without notice. Quasar Electronics cannot be held responsible for any loss or damage, direct or indirect, which might occur from the use of a product. Quasar Electronics Kits or Modules are intended for educational and demonstration purposes only. They are not intended for use in commercial applications. If they are used in such applications the purchaser assumes all responsibility for ensuring compliance with all local laws. In addition, they are not suitable for use as or as a part of life support systems, or systems that might create a hazardous situation of any kind.

## 8097v1: 2 Watt Mono Amplifier Kit/Module (LM380)

This board is a simple 2 Watt mono amplifier module built around the National Semiconductor LM380 amplifier Integrated Circuit.

- The IC has a low component count
- No external heatsink is necessary
- It is short circuit and overload protected
- High gain
- Wide operating voltage

It is available in kit format (8097KT) and as a pre-assembled module (AS8097).

### Specifications

D.C. supply	10 - 20 V at 300 mA
Idle current	< 25 mA, 7-15 mA typical
Power output	> 2 Watt max. (4-8 Ohms, 20V) > 1 Watt max. (4-8 Ohms, 12V) > 0.5 Watt RMS continuous
Freq. Resp.	< 20 Hz to >100 kHz – 3dB
Distortion	< 0.2 % @ 1W
S/N ratio	> 85 dB
Gain	~ 50 x or 34 dB maximum
Input level	< 100mV for full output
Input Z	~ 10K Ohm

### Assembly Instructions

Assembly is very straight forward although it should be noted that soldering of some component pins will require extra time. This is because the copper foil is designed to act as a heatsink so it will take longer to heat some solder connections to the correct temperature for soldering. Solder the integrated circuit in place first before installing the rest of the components. Make sure you get the I.C. and the electrolytic capacitors the correct way around. The IC has a notch at one end, which is marked on the PC board overlay. The electrolytic capacitors are polarized and have minus sign marked on them. They MUST be inserted correctly into the PCB. Leave the potentiometer until last.

Check the polarity before connecting the battery or power supply. A DC supply of 10 to 20V at 300 mA or greater is required. A mains adapter type supply is suitable, but may require extra filtering if noise is a problem. If it does not work, recheck all component positions and polarity. Check all solder joints, and all external wiring. The IC itself is quite robust, and there is very little else to go wrong. Poor solder joints are the main cause of problems. A visual inspection using a magnifier will find most “dry joints” or “solder bridges”.

Remember when testing, it will not produce full output for more than a short duration because of limited heat dissipation. For normal music applications you should have no problems as long as the output is kept from severe clipping. This will result in quite audible distortion and should be avoided. It will not produce full output before clipping with a DC input of less than 15V for 8 ohm loads.

If you do require a sustained output of more than ½ watt, you will need to add a heatsink as described in the National data sheet available on our web site.

### Parts List

C1	2.2uF, 25V electrolytic capacitor	1
C2	2200uF, 25V electrolytic capacitor	1
C3	100nF polyester capacitor	1
C4	4.7uF, 25V electrolytic capacitor	1
C5	10uF, 25V electrolytic capacitor	1
C6	10nF polyester capacitor	1
R1	1K Ohm resistor (brown, black, red)	1
R2	2R7 Ohm resistor (red, violet, gold)	1
D1	IN4004 diode	1
VR1	10K Ohm log potentiometer	1
IC1	LM380 Integrated Circuit	1
X1,2,3	2-pole terminal block	3
8097v1	Printed Circuit Board	1

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## Circuit Description

There are only a few external components to support the LM380's operation and the PCB foil design acts as a heatsink for the IC.

C1 is the input coupling capacitor, which blocks any DC that might be present at the input.

C2 is the output coupling capacitor which is required to block the DC level (half supply voltage) that is present at the amplifier output, from reaching the speaker.

C5 and C6 provide power supply decoupling or filtering, and C4 provides an internal supply bypass for extra supply decoupling.

R2 and C3 form a Zobel network for high frequency load stability. The pot provides

an adjustable input level that can be used as a volume control.

D1 is not strictly necessary and is only to prevent damage if the power supply is connected incorrectly.

The National data sheet contains additional information about the LM380. You may download it from our datasheets download page at:

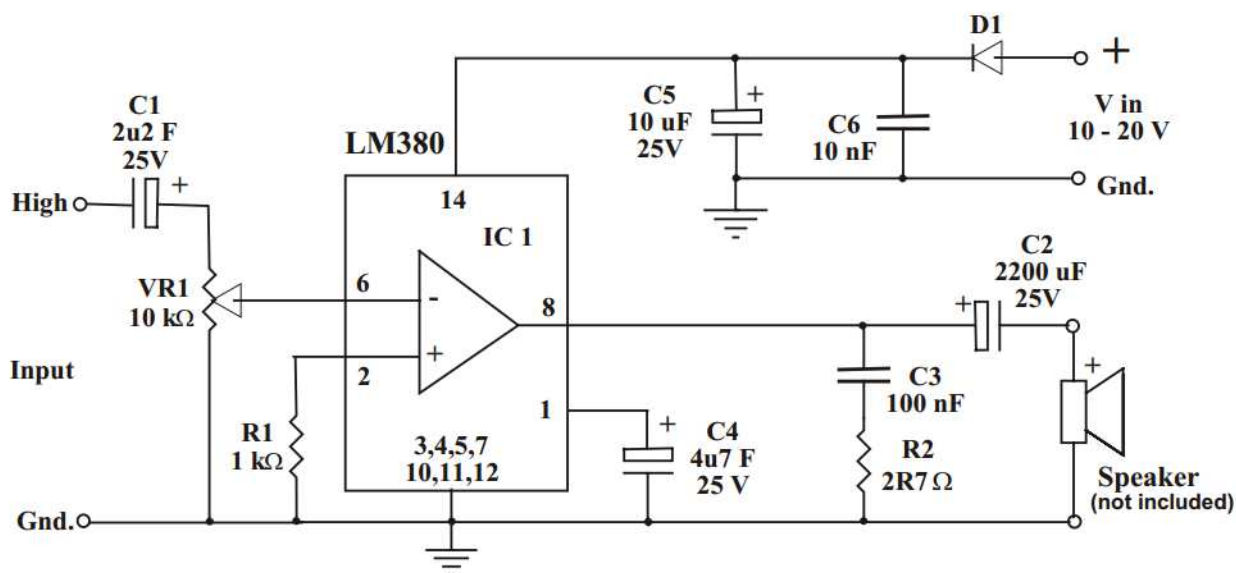
[www.quasarelectronics.co.uk/ds.htm](http://www.quasarelectronics.co.uk/ds.htm)

## Technical Support

If you need help please contact our technical support by email at

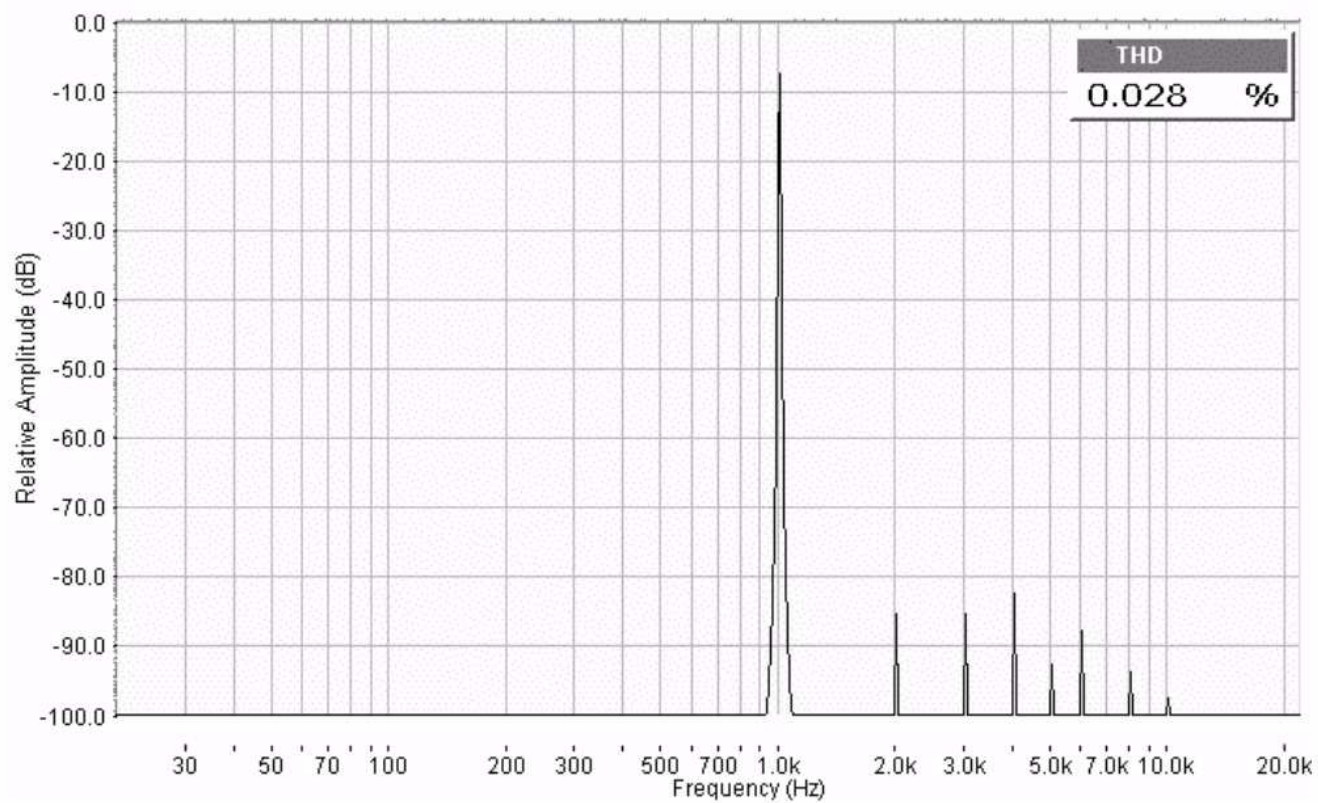
[support@quasarelectronics.co.uk](mailto:support@quasarelectronics.co.uk)

## Circuit Diagram



## 8097v1: 2 Watt Mono Amplifier Kit/Module (LM380)

Harmonic Distortion at 1kHz, 1 Watt output



Product Image

