ZinAmp

Beautiful sound, for people who love music

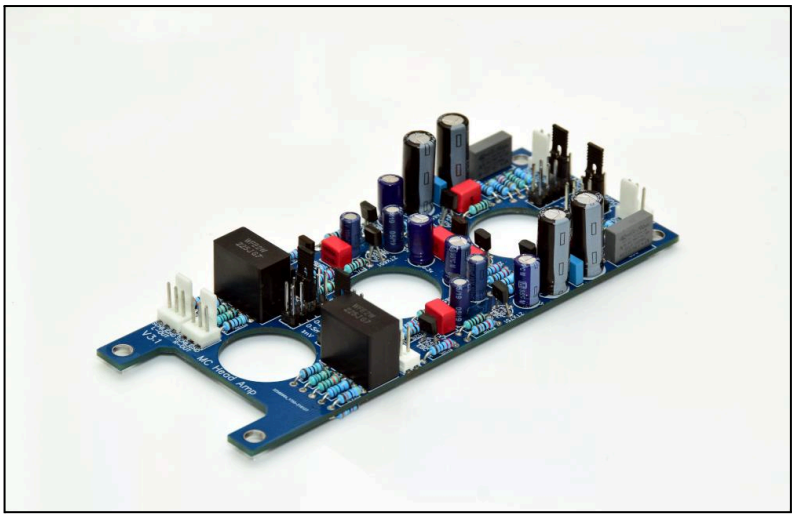
Datasheet Moving Coil Head Amp

Application & Purpose:

Very high-fidelity, low noise head amp with selectable gain and loading. Amplifies the small-signal from a moving-coil phono cartridge to an amplitude suitable for a normal RIAA pre-amp.

Designed for use with ZinAmp Valve Phono Amp. Mounts on top of Valve amp and valves protrude up through the holes on the pcb.

Very low-noise transistors give this amplifier low levels of 'johnson' noise (hiss).



Specification:

PCB Dimensions	139mm x 56mm x 1.6mm
Channels	Two (stereo)
Gain	Selectable - x3 to x70 (9.5dB - 37dB)
Input Impedance	Selectable - 47R to 1k
Devices	2N4401/03 low-noise transistors
Frequency Response	Overall Range: 20Hz - 50kHz
Output Impedance	< 200Ω
Supply Voltage	12v (-6v | +6v)
Idle Supply Current	30mA
THD	Typically < 0.003% - mostly lower 2nd order

Details:
An exceptionally high-quality and low-noise stereo head-amp for connecting a moving coil-cartridge to an RIAA phono stage. Typical moving coil signals are less than 0.5mV. Lowest gain setting is x3, max gain is x70. Cartridge loadings from 47R to 1k are also selectable.

Circuit Topology:
The circuit is based on a symmetrical design made popular by John Linsley Hood in the 1970s. It is essentially two amplifiers in parallel; each the polar opposite of the other. This arrangement doubles the number of input devices handling the signal which lowers noise levels. It also provides zero voltage-offset at the input and output, making the amplifier very simple to interface to a subsequent RIAA phono-stage.

NOTE: This circuit has no RIAA equalisation. RIAA equalisation is achieved using a downstream RIAA phono-stage.

Setup and Usage:

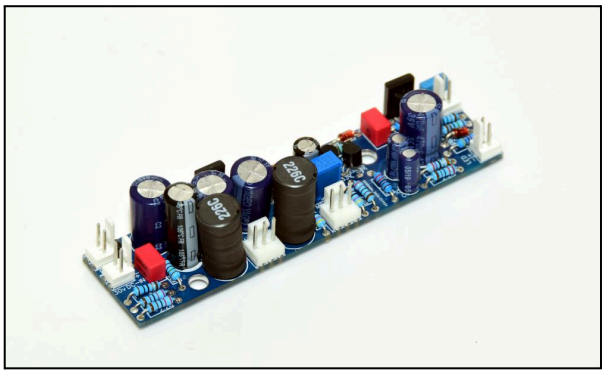
This module features holes in the PCB. It can be mounted on top of a ZinAmp Valve Phono amplifier module and the vales protrude up through the holes. This makes for a very compact and neat installation into a small box. Jumper switches on both this module and the Valve phono amp have been positioned to be easily accessible when stacked this way. Note the cutaway in the board, pictured above; this is to allow access to the jumper switches on the RIAA Phono amp beneath.

Power Requirements:

The working voltage for this module is -/+ 6v i.e. 12v. This can be provided in a number of ways e.g DC mains adaptor, battery etc. However, this module is designed to be used with a Valve phono amp. If you are installing this module into a ZinAmp phono-amp kit, then the power supply is built into the main host-board and you simply connect this module to it.

Suitable Power Supplies:

If you are using this MC Head Amp in your own installation i.e. not with a ZinAmp phono stage, then we make a make a simple linear regulated power supply for this module that can be powered from a 30v DC adaptor. This is on our website **here**



Linear Regulated Power Supply - click image for link to website

This power supply will also power out solid state MM phono stage if you are using that. it has very very clean DC and this is essential for the MC Headamp. Ripple in your DC supply will be audible - this is due to the very high gain of this module.

9v Battery:
This module will also perform admirably well with a 9v battery, with no loss of performance and the benefit of totally-clean DC. The only disadvantage is your battery may expire in the middle of your music. A rechargeable 9v battery should give you 5-8hours of listening between charges.

Alternative power supplies:
If you have an existing installation with an existing DC power supply that you might think is suitable (i.e. -/+ 6vDC), then you can try this. Do beware of hum from ripple in the DC supply. Electromagnetic noise from a nearby transformer is also likely to cause audible hum. MC amplification is very sensitive to interference, so be prepared to experiment and contact us if you have questions.

High Gain - warning !!!

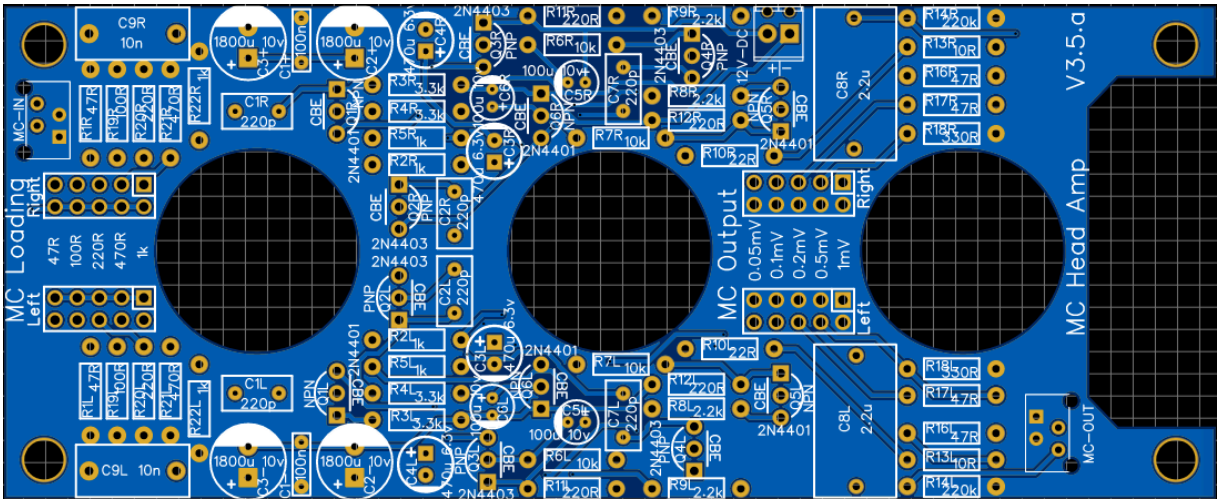
This amplifier is capable of gain of up to x30. We recommend you select the lowest gain setting recommended for your cartridge and increase one division at a time. This will avoid the risk of signal clipping and damage to down-stream equipment. Settings are clearly marked on the PCB.

SETTING GAIN TO MAX TO ENSURE A 'NICE LOUD AMP' IS A BAD IDEA!!

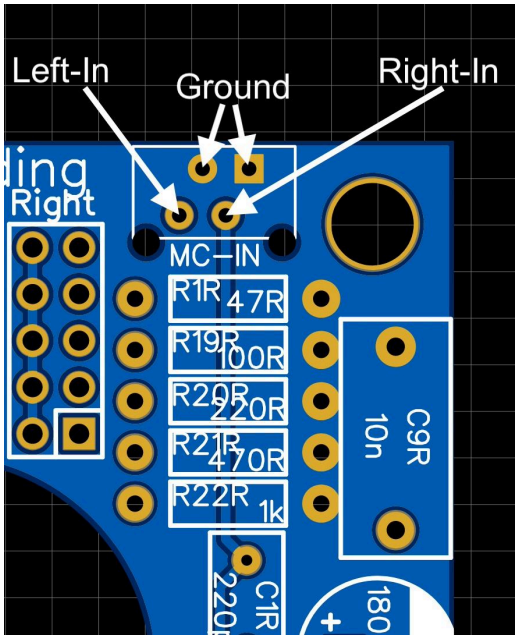
Use of Jumper Switches

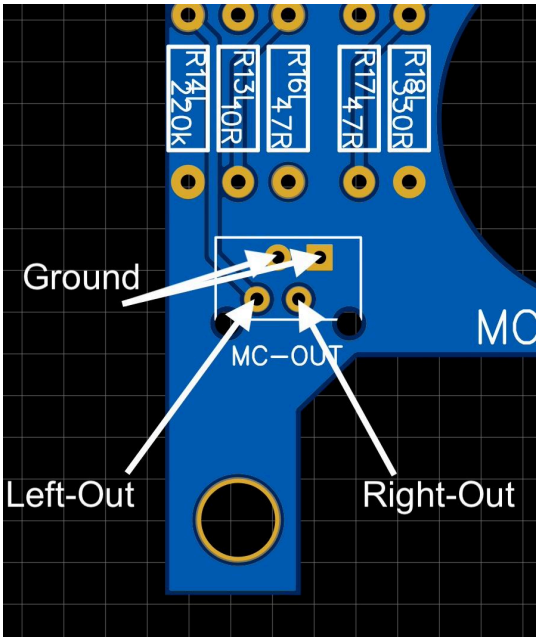
Jumper switches are used to select cartridge loading and signal gain. These are simple, compact and add negligible noise. Replacing these with external switches or selector switches as part of an installation is likely to add noise. If you are considering adding custom switches for these settings, take particular care to screen and shield any wires and/or switches themselves. The use of switches inside the installation - e.g. Arduino relays - is probably better as these can be kept inside a metal enclosure and will keep external EMI out. Keep transformers well away from this module!

Bare PCB:



Audio Terminals:





Connectors:

Connector	Connector Type	Part Number	RS Cat No
MC-IN	Molex Picoflex -4 Pin header	90325-0004	324-8104
MC-OUT	Molex Picoflex -4 Pin header	90325-0004	324-8104
12v DC-IN	Molex KK254 - 2pin header Can be substituted for screw-down type terminal block (2.54mm pitch)	22-27-2021 790-1098	483-8461 790-1098

Parts List:

Designator	Value/Spec	Qty	Manufacturer	Manufacturer Part	Supplier Part
C1+,C1-	100n	2	Epcos	B32529C1104K000	896-1332
C2+,C2-,C3+,C3-	1800u 10v	4	Panasonic	EEUFS1A182L	145-8571
C3L,C3R,C4L,C4R	470u 6.3v	4	Vishay	MAL203854471E3	684-1888
C5L,C5R,C6L,C6R	100u 10v	4	Rubycon	16PK100MEFC5X11	763-9396
C1L,C1R,C7L,C7R	220p	4	Wima	FKP2/220/100/5	484-1984
C8L,C8R	2.2u	2	Panasonic	ECWFE2W225JA	105-1076
C9L,C9R	10n	2	Kemet	R46KF210040H1M	165-0062
MC Output & MC Loading	PCB Header	4	Amphenol FCI	77313-118-10LF	673-7531
MC Output & MC Loading	Shorting Link	4	RS-PRO	251-8575	251-8575
Q1L,Q1R,Q5L,Q5R,Q6L,Q6R	2N4401	6	OnSemi	2N4401	739-0439
Q2L,Q2R,Q3L,Q3R,Q4L,Q4R	2N4403	6	OnSemi	2N4403	739-0445
R1L,R1R,R16L,R16R,R17L,R17R	47R	6	TE Connectivity	LR1F47R	148-174
R3L,R3R,R4L,R4R	3.3k	4	TE Connectivity	LR1F3K3	125-1162
R8L,R8R,R9L,R9R	2.2k	4	Vishay	MRS25000C2201FCT00	683-3449
R6L,R6R,R7L,R7R	10k	4	TE Connectivity	LR1F10K	125-1164
R10L,R10R	22R	2	TE Connectivity	LR1F22R	148-095
R13L,R13R	10R	2	TE Connectivity	LR1F10R	125-1154
R14L,R14R	220k	2	TE Connectivity	LR1F220K	149-060
R18L,R18R	330R	2	TE Connectivity	LR1F330R	125-1157
R19L,R19R	100R	2	TE Connectivity	LR1F100R	125-1155

R11L,R11R,R12L,R12RR20L,R20R	220R	6	TE Connectivity	LR1F220R	148-348
R21L,R21R	470R	2	TE Connectivity	LR1F470R	125-1158
R2L,R2R,R5L,R5R,R22L,R22R	1k	6	Vishay	MRS25000C1001FCT00	683-3165

Parts available from RS Online. Also try Farnell, Mouser and other online suppliers.

Parts from different manufacturers can be substituted where spec is sufficient

Supplier trading names may differ by country.