ZinAmp
Beautiful sound, for people who love music

Assembly Guide Valve Phono Stage

Introduction:

ZinAmp's Valve Phono Stage is available in 2 versions; MM only or MM & MC

This manual covers building both variants from their respective kits and relevant differences are called out.

Technical questions can be emailed to help@zinamp.co.uk

What to Do:

Assembly of your phono-stage may differ depending on which kit configuration you purchased. For example, if you purchased a kit with readymade wiring, these steps can be ignored.

Please follow the steps in the order indicated. Particularly important is Step 6 - Assembly and test of Assembly and Test of Power Supplies - which is done to declare the construction safe, before proceeding to install the audio components.

What NOT to Do:

We strongly advise against assembling everything, switching on and expecting it to simply "work". This is a complex device and can be unforgiving if wired or assembled incorrectly. Unforgiving means some parts may be burned or destroyed due to being incorrectly installed. Please follow the steps as indicated and if unsure, email help@zinamp.co.uk

Support and Returns Policy - please read

We appreciate that not everyone has the same skills or experience. Analogue audio electronics is a notoriously unforgiving area for the unsuspecting. We urge you to take great care. This starts with reading these instructions through before beginning and to reach out to us for help if you are not sure.

We have devised the following policy to help you decide what to do in the event of a mishap. Electric shocks, explosions and damage conjure emotions that perhaps we didn't foresee. We empathise that you may feel anger towards our product if things go wrong - and we hope this is temporary. We are here to help. The following three situations cover most of the likely scenarios. If you believe our stance on any of these to be unfair or undermine your rights, then please contact us before you begin. The last thing we want is for you to have a pile of unusable metalwork and electronics with our name on it - as this is bad for our brand and for your confidence in us.

1. I started on this and I realise it's not for me:

No problem. If you are able to put everything back in the box undamaged and ship it back to us within 28 days, we will refund you the purchase price in full. If you want us to finish the amp for you, we will invoice you the difference between the self-assembly and assembled product, plus shipping. This second option is available for up to six-months from purchase. Please note, refunds take up to 14 days to materialise as we need to check the contents of the returned box.

2. I had a major mishap and I think I blew something:

Ok, send us an email and tell us what happened, with pictures, if possible. If there was smoke or cracking sounds, the chances are a module is damaged and needs replacing. We sell replacement modules; the prices of most of these are on our website. Please note that in this event, we are unable to offer refunds. We will - however - still try and help you complete your build.

3. I bought this over a year ago and have only now started building it. Can you help me?

Unlimited help and support via email is available for 12 months. If you email us after this period, we will try and answer your questions. If you run into difficulty and damage any modules, we cannot guarantee being able to sell you a compatible replacement as we update our products frequently. We may be able to repair your existing modules, but please be aware there is a charge for this and we ask that you cover postage both ways.

Contents:

Basic Architecture:

The phono stage is built around a main ‘host’ board. It hosts the following modules:

1. High Voltage Switch Mode Power Supply (SMPS)
2. Low Voltage Split-rail Power Supply
3. Cross-feed filter

Additional Boards connect to the host board via ribbon cables. These are:

4. Selector Switch
5. RCA Input/Output Array
6. Volume Control
7. Cross-feed Filter Switch

Assembly Steps - Overview

Assembly comprises the following steps. We recommend taking each step one at a time in the order stipulated below. This will make testing and trouble-shooting relatively straightforward.

1. **Check the holes in the enclosure are tapped:** For most kits, these will be ready-tapped/threaded. If not, these will require an M3 and M4 tap to complete.

2. **Attach Rubber feet to Base:** Four rubber feet are screwed to the base with M3 machine screws; one in each corner.

3. **Assemble and Install RCA Array and Ground Pillar:** The RCA inputs and outputs are on a common PCB (array). These are screwed into the back of the enclosure with the green Ground Pillar.

4. **Install Ground-pin in base:** This allows the enclosure to be grounded, forming a faraday cage around the audio-circuitry, which reduces interference and noise.

5. **Install the Fuse, DC Jack and Power Switch:** These all connect to the mainboard with Molex KK254 connectors

6. **Assemble and Test Power Supplies:** If your main board is assembled, you only need to test the power

7. **Assemble MM Valve Amp and Cross-feed Filter, then Fit Valves:** If your main board is assembled, you only need to Fit the Valves.

8. **Switch on test and balance the Split-rail supply:** Check supply voltages to the CF filter and ensure equal +/- DC voltages.

9. **Install Selector Switch, CF Switch and Volume control:** These may require some soldering, depending on your kit.

10. **Connect Boards with Ribbon Cables:** Each ribbon cable has a ‘way around’ i.e. a wrong-way and right-way. Check the images provided to ensure a neat and compact installation.

11. **Assemble and Install Moving Coil Module:** If your MC module is assembled, you only need to install it.

12. **Audio Test:** a set of simple steps to ensure everything is connected correctly.

13. **Lid On & Secure Enclosure:** Includes final fitting of selector and volume dials

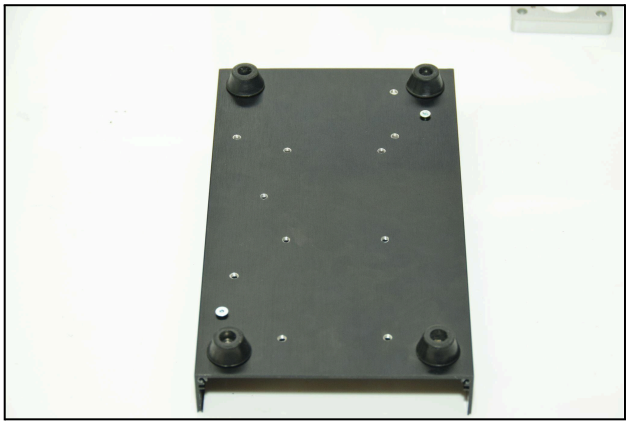
Assembly:

1. Check the holes in the enclosure are tapped:

The metal enclosure has a number of holes in it. All of the 3mm and 4mm holes need to be tapped with M3 or M4 thread-tap. This may already be done, depending on the configuration of kit you have purchased. The larger holes i.e. those on the back and front panels.

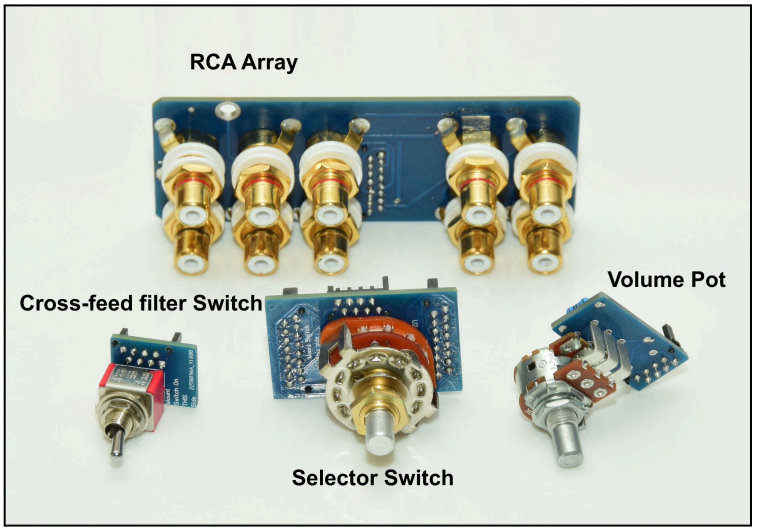
2. Attach Rubber feet to Base:

Depending on your kit configuration, you may or may not have feet attached to the box. These are screwed into the corners with M3 machine screws. Place a washer on each machine screw and punch a hole through the rubber foot with a screwdriver; this will allow the screw to protrude unhindered.



Enclosure Base with feet attached

3. Assemble the Switches and Connectors



Solder the **RCA connectors into the Array** board as shown. The right channel is Red and forms the bottom row. Left is black and forms the top row.

SAFETY WARNING. When soldering RCA connectors, we recommend the following precautions as harmful vapours may be emitted if excessive heat is applied.

1. Wear a mask - a dust mask is fine, but ensure it covers your nose and mouth

2. Snip the end of the rca connector so it's flush to the PCB and apply a little flux paste to the joint. This speeds up the soldering and means less heat is required.

3. Limit the time the soldering iron is touching the joint to three-seconds. Remove the soldering iron and wait five seconds before attempting to resolder, regardless of whether a successful joint has been made. Don't overheat the RCA connector otherwise it may melt inside and vapour may be released.

4. Bend each grounding ring with pliers so its tag end sits in the slot as shown. Solder each tag-end to the array-PCB.

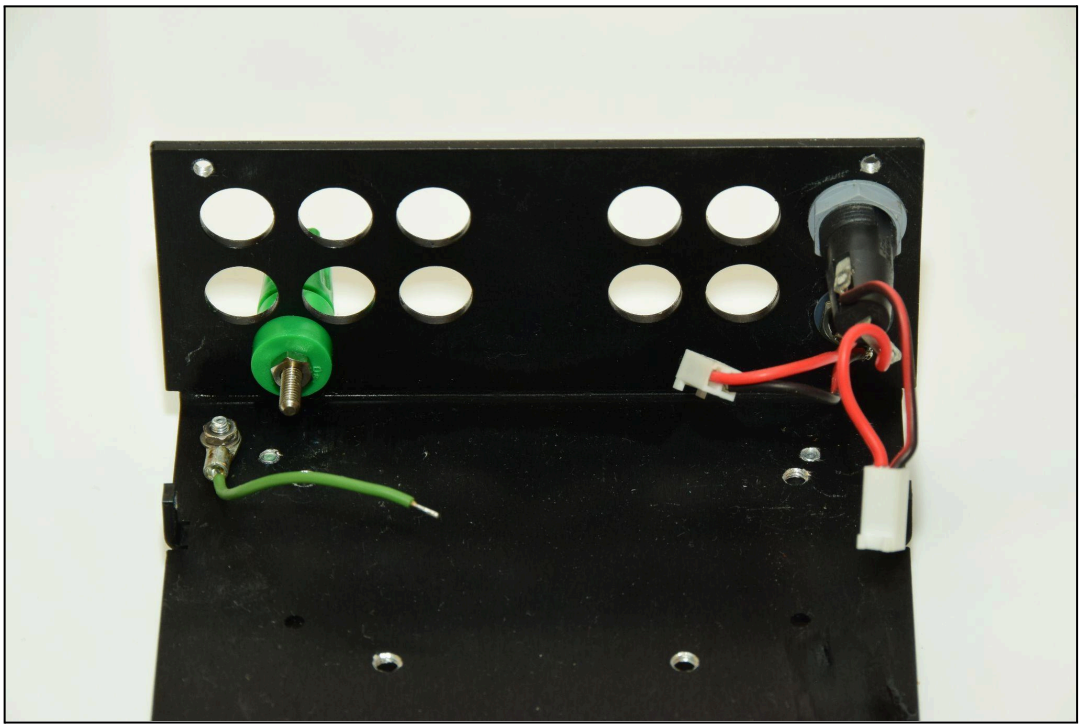
Solder the remaining switches to their respective PCB

1. Selector Switch - switch and ribbon connector are on opposite sides

2. Crossfeed filter switch - ensure the 'flat' on the screw barrel is facing upwards

3. Volume Pot - note the orientation of the board and switch from the picture above

4. Fit the Ground, Fuse and Power Terminals into the back panel



1. **Ground Wire** - 5cm green wire, connected to chassis

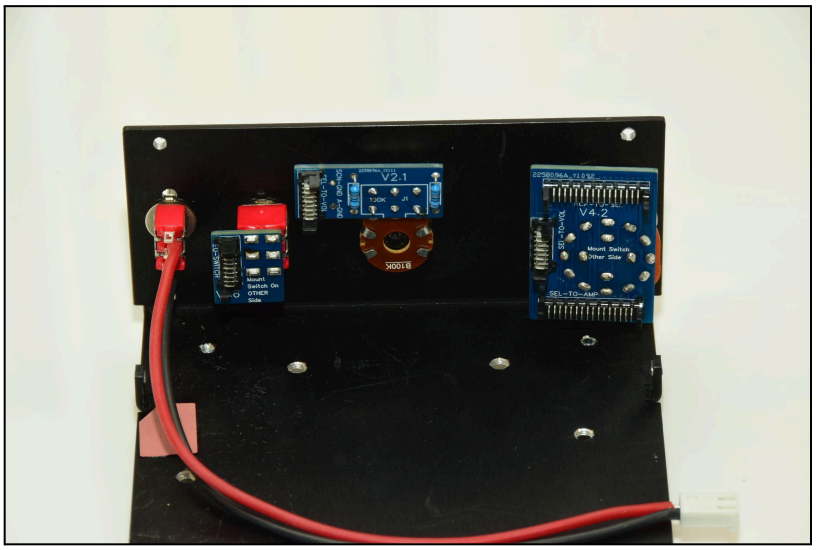
2. **Earth Pillar** - on back panel - green 4mm banana socket

3. **Fuse Holder** - fit a 1.5A slow-blow glass fuse and solder 5cm lengths of hookup wire terminating in a Molex KK254 connector block

4. **DC Socket** - Solder 5cm lengths of hookup wire - black -ve and red +ve. Terminate in a Molex KK254 connector block. Black on the left, Red on the right.

   Note: Test the polarity of the DC socket by connecting the 18v DC adaptor. Use a multimeter and check the polarity is +ve on the red wire and -ve on the black wire. Getting this wrong may cause untold damage!

5. Install Switches and Volume Pot into the Front Panel

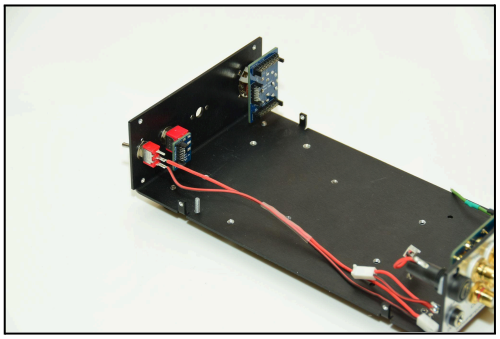


1. **Selector Switch** - observe the right way up by the writing on the PCB

2. **Volume Pot** - observe the right way up by the writing on the PCB

3. **Cross-feed Filter Switch** - observe the right way up by the writing on the PCB

4. **Power Switch** - The flat on the screw barrel of the switch should face ‘up’. Solder two lengths of hookup wire - 220mm long, terminating in a Molex KK254 connector block. Connect the two lower pins of the switch. Leave the upper pin disconnected.



6. Fit RCA Array in Rear Panel

The RCA array inserts into the rear panel and is held in place with the nut of each RCA socket. The nylon shoulder washer goes in the inside and the plain washer on the outside, then the nut.

A 5cm length of green wire is required to ground the copper foil of the ribbon cable. Solder this into the RCA array as shown above.

7. Assemble and Test Power Supplies:

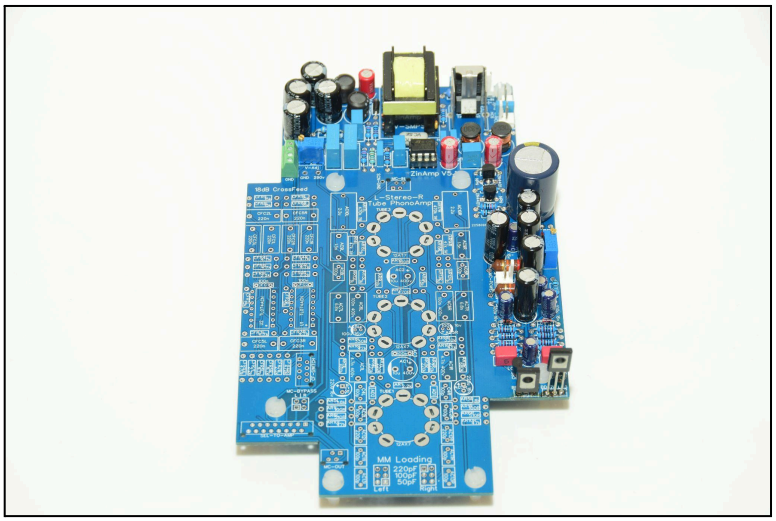
If you're assembling your own board, start with the power supply components as shown below. It's important to check the power is working at the correct DC voltages before proceeding to install the rest of the components.

There are two power supplies on the main board:

- **High Voltage Fly-back Regulator supply - rear**: This puts out voltages in the region of 290vDC. Take care not to touch it!

- **Low voltage Regulated supply - right**: Regulates DC voltages for the heater filaments (12.6v), Cross-feed Filter (-/+8v) and the Moving Coil head-amp (-/+6v). This supply has a 1k pot which is used to balance the split voltages so they are even. This balancing step happens later.

Take care to observe the polarity of any components - in particular Diodes, and Electrolytic Capacitors.



To test the power supplies, follow these steps:

1. Screw the seven nylon bolts and nuts into the board as shown. This will allow you to sit the board safely above the enclosure, so that it won't short to ground

2. Connect the DC supply, fuse and power switch to the main board - use a meter to check the DC supply is the correct way around.

3. Switch on. Check for obvious signs of smoke! Assuming there are none, measure the DC voltage at the locations shown in the picture below. Use the trimmer as indicated to set the main high-voltage to 290vDC.

4. Switch off and wait one-minute before touching the board or any of its connections. You can check the main DC voltage. When this is 10v or less, it's safe to touch.

8. Assemble MM Valve Amp and Cross-feed Filter, then Fit Valves:

Solder in the remaining components, starting with the MM phono amp in the centre of the board, then move onto the Cross Feed filter on the left-side of the board.

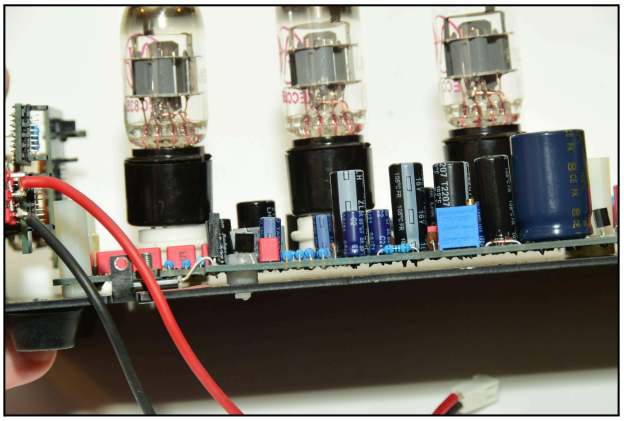
Take care to observe the polarity of any components - in particular Diodes and Electrolytic Capacitors

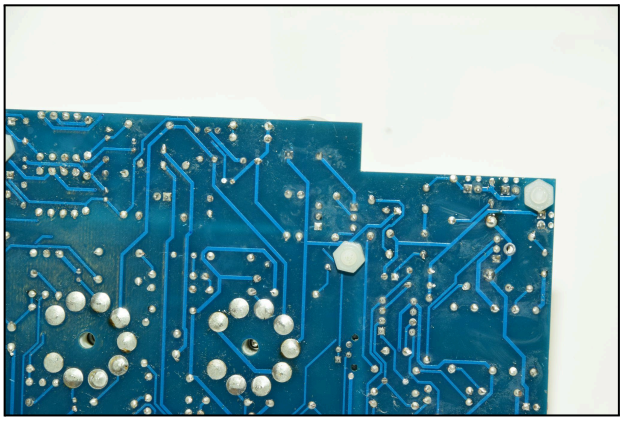
Valves are fitted into risers (aka socket savers). These ensure the valve protrudes through the top of the enclosure so it can dissipate heat. You can test with the valve directly in the board socket, but you must fit the riser/saver before securing the enclosure lid.

9. Switch-on test and balance the Split-rail supply:

Ensure the board is fitted into the enclosure as shown. Note the transistor that is bored to the bottom of the enclosure - the enclosure acts as a heatsink for this transistor and must be bolted down when testing from this point onwards

The board is held off the base of the enclosure with nylon nuts. See pics below:





Place the board on the base of the enclosure and fit the three valves. Observe the position of each valve type; front-two are 12AX7 and the rear-one is 12AT7 (or 12AU7).

Connect the power, fuse and switch, ground wires then switch on. The valve-filaments should begin to glow.

Recheck the voltages as shown below. Then use the balance pot on the right to tune the Low Voltages at the MC-POWER pins. Place the black probe of your meter on the

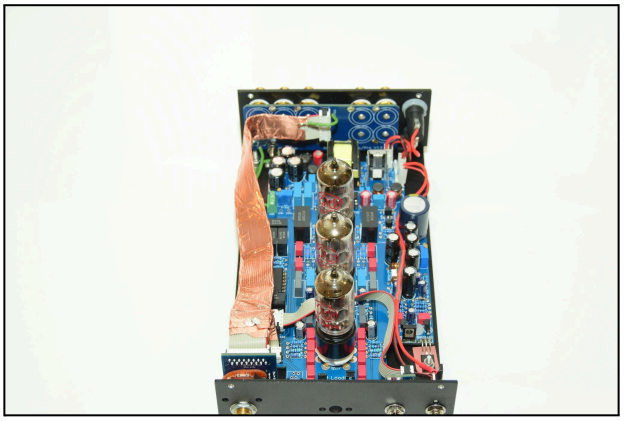
ground pin on the chassis and the red probe on each MC-POWER pin in turn (not together!). You may read -6v at one pin and +9v at the other, or something similar. Turn the pot on the right until the voltages are both equal - at around 8v.

MC-Power is currently unloaded as there should be no MC head-amp installed. With the MC amp installed, the voltages at MC-POWER will drop slightly to approx -6v and +6v.

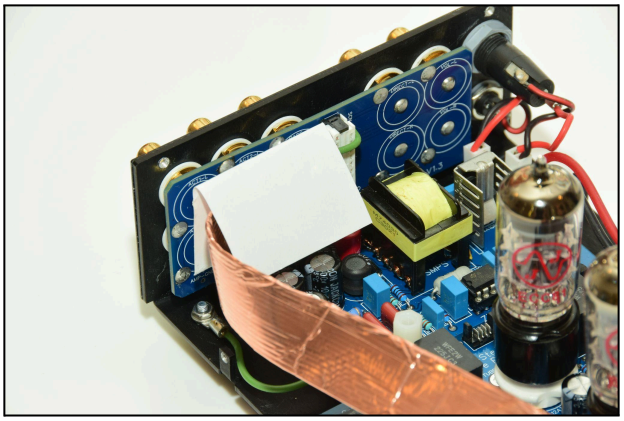
Switch off before moving to the next step.

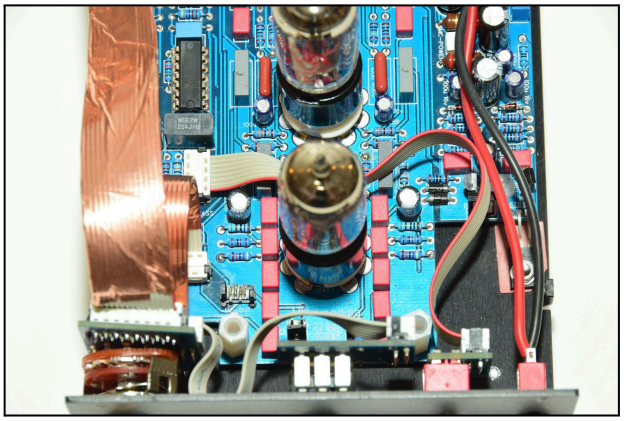
10. Connect Boards with Ribbon Cables

Connect the Molex Picoflex ribbon cables as shown. You will note that each has a right way or a wrong way. Each connector on the board has a thick and a thin locator - thick at one end, thin at the other. Each ribbon cable is constructed so that it has a particular way around. This means when you attach the cable to the connector at one end, then try the other end of the cable, you'll see they locate the opposite way around. Observe the pictures below to see the right (and wrong) way to connect each cable.



Solder the green wire on the RCA array to the copper foil of the ribbon cable. Avoid melting the ribbon cable - apply heat for no more than two seconds.





A small piece of folded white card or paper will prevent the RCA terminals being shorted-to-ground by the copper foil of the ribbon cable. The two foiled ribbon cables on the selector switch should touch. This ensures both copper screens are grounded.

11. MM Audio test

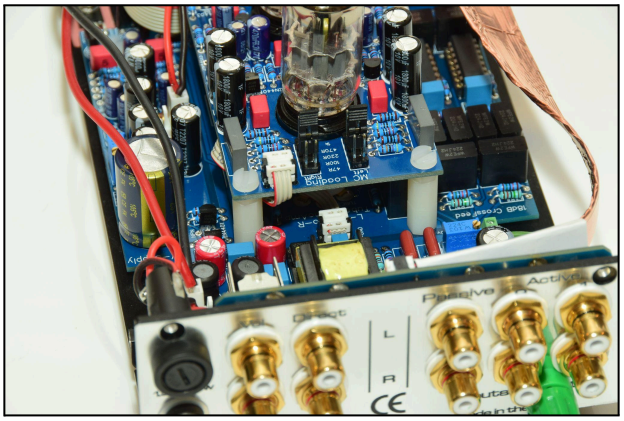
Before installing the MC module or putting the lid on, it is prudent to test the MM valve amp with a moving magnet (MM) source.

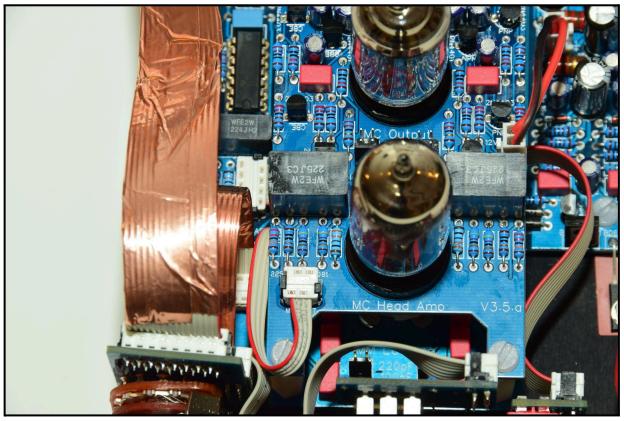
1. Turn the selector switch fully anti-clockwise
2. Connect a turntable to the left-most RCA inputs
3. Connect a downstream amplifier to the volume controlled output - right-most RCAs
4. Switch on the phono amp before switching on the downstream amplifier - to avoid any startup noises.
5. Test the volume control works as expected

Any unexpected sound or behaviour, switch off before attempting to diagnose

12. Install MC Module

The MC Module fits over the top of the Valves as shown. Two ribbon cables and one Molex KK254 2-way power cable connect the MC module to the main board. Observe the correct polarity of the power connector.





13. MC Audio Test

The MC Module fits over the top of the Valves as shown. Two ribbon cables and one Molex KK254 2-way power cable connect the MC module to the main board. Observe the correct polarity of the power connector.

1. Turn the selector to the middle position
2. Connect a turntable to the second-left RCA connectors

3. Connect a downstream amplifier to the volume controlled output - right-most RCAs

4. Switch on the phono amp before switching on the downstream amplifier - to avoid any startup noises.

5. Test the volume control works as expected

Any unexpected sound or behaviour, switch off before attempting to diagnose

14. Fit Lid and Front Panel and Dials

The bag of screws provided are used to fix the front panel and lid. The counter sunk screws go in the side holes. The pan-head screws in the back and the Allen bolts in the front.

DON'T OVER-TIGHTEN - Aluminium threads strip easily!!

Dials require an allen key key to tighten them.

15. Final Clean

Clean off any finger marks or first using a fibre cloth sprayed with a little water-based glass cleaner (windex etc). Don't use metal polish or anything abrasive nor any solvents. Don't use WD40 or similar products on the metalwork.

You may find a nice lustre can be applied to the anodised finish by wiping a small quantity of petroleum jelly (Vaseline) into the bodywork and front-panel and wiping off with a soft cloth. Use sparingly and apply evenly. An even lustre takes time and care but is worth the effort.