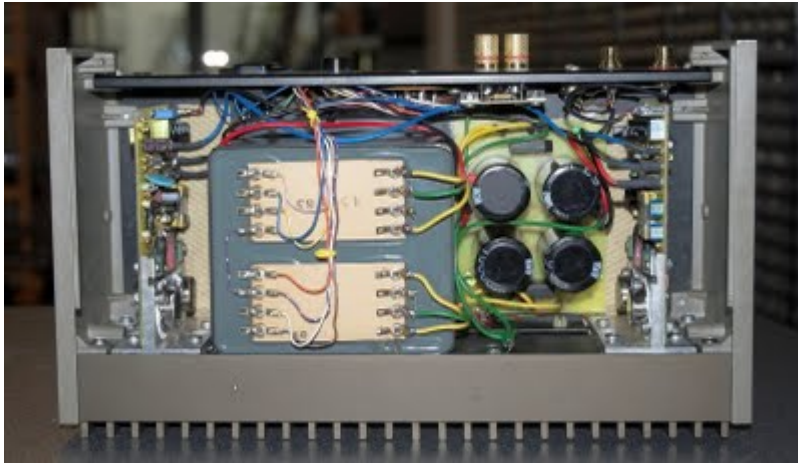


Installation instructions for the 405 Dual Mono Psu version 1.1



This document explains the installation of the Dada/JPE dual mono power supply for the Quad 405 and 405-2, all models. Although it is developed for the Quad 405 range, it is a general double Psu and can be used in other applications. The PSU is available in the DaDa Electronics [Webshop](#) .

Joost & Stefaan 27 September 2009

Introduction

This dual mono power supply is a fully functional replacement of the original power supply, but it has a lower crosstalk figure as a result and the elco capacity is being doubled, giving a more stable power supply voltage. In a standard 405 the secondary windings of the transformer are combined to form a single supply.

In post 405 amplifiers, like the 606 each channel has its own supply. There are two reasons for this new 606-style design. First of all it is necessary to support the more elaborate protection circuitry in the successors of the 405, second, it lowers the mutual interference of the two channels. By building the amplifier as a four pole device, the channel interference is at its minimum, because there is no common ground plane or wiring, it can/will also reduce earth loops in the feeding cabling systems.

Preparation and beware!

Start with a clean bench and the necessary tools. Although the Psu board is not very sensitive for static electricity, discharge yourself by placing your hands on the bare metal of the chassis before you touch the electronics. Or wear a special bracelet connected to the chassis. Read this instruction before you start working on the amplifier. If you power up the PSU without the amplifier modules, the voltage on the capacitors will be there for a long time! Discharge the elco's with a bleeder resistance with a value of 1K. In the full floating setup the chassis is not connected to the signal earth anymore. For safety reasons the chassis must be connected to the wall socket or the pre-amp via a power chord with a proper earth connection!

Tools

- Philips no 2 screwdriver
- Soldering iron, 25W, a soldering station with temperature control is the best
- Wire cutters and clippers
- A DC multimeter

Removing parts

For easy access: remove the top, bottom and side plates of the amplifier.

Remove the wiring from the capacitors and the rectifier bridge. Cut the wires where they are entering the cable beam. Remove the capacitors and the clips. Remove the Rectifier bridge. Remove all wires from the secondary windings of the transformer, leave the blank connecting wires in place on each secondary winding. Also remove the wires connected to the negative (black) speaker terminals.

Mounting the Psu in the chassis

Place the plastic self adhesive feet in the corresponding holes. Clean the area where the feet are to be placed with a solvent. Mount the board after the wires are soldered to the connecting pins, by removing the protective tape. and push the board firmly in position. You can always remove the board from the pins. Before final installation, test the placement procedure with the protective tape still in place.

Normal wiring

In this setup we implement the power supply as a dual supply. The Din connector and the earth connection at that point will stay in place. For Quad 405-2's with factory fitted cinch connectors: read one of the following paragraphs. If you use additional cinch connectors, connect the signal ground to the earth point of the Din chassis part. Also reuse the earth connecting point at the location of the old rectifier bridge. Connect the wires as shown in the diagram. Start with the wires on the Psu, place the Psu in the chassis and connect the other wires. Also connect the two wires leading to the led on the two led pins on the Psu. If the Led is to bright, you can replace the wire link by a resistor, start with 470 Ohm. Both PSU's have there own led connections, so if you wish you can connect a second led (insert a resistor in the holes of the second Psu).

Building a floating amplifier



If you don't use a Pre Amp with fully separated channels, including earth (mass), skip this paragraph!

To built the amplifier as a four pole device, a more complicated route has to be followed. The chassis to earth connection on the Din connector should be removed. Also a new central "earth" point on each amplifier module is necessary. This is created by removing the centre screw on the heat sink, use a special transistor isolation washer (on the heatsink side) and a new bolt and nut, M3x15 (all from a TO220 transistor mounting kit) between the head or the nut (depending of the way the bolt is inserted) and the heat sink. Use a copper or steel washer on the PCB side to ensure a good contact. In this way we can connect wires to this point without making any contact with the heat sink and the chassis. For best results we only use the isolated cinch connectors and remove the wiring

from the Din connector. If you have to use the facilities of the Din connector use the spare pin for a second signal earth connection.

In all Pcb's prior to M12565 issue 3 (serial number 1 to 50000) there is a serious layout problem, the signal (input) ground must be connected to the output ground, in this case our new created "earth" point, or R2 replaced by a wire link!

Quad 405-2 with standard factory fitted cinch connectors. Serial 85000 and higher

There are reports of high values of the DC offset on the speaker output terminals with late versions of the 405-2 with the standard isolated Cinch connectors. This problem is the result of the mixed use of signal earth and chassis earth to connect components on the Pcb. Between those two "earth" connections a resistor R2 with a value of 10 Ohm is placed. In the Quads with a Din connector those resistors are effectively short circuited by connecting the signal ground to the chassis. In the Quads with the cinch connectors R2 is not short circuited anymore, in real life, the problem is smaller when you use a preamp with a common signal ground (as most of us do), the two R2 resistors of both channels are now in parallel, so the value is halved. But the two channels now have shared components, bad news for channel separation! The second action to be taken to minimize the problem: use a power cord to the 405 with an earth connection from the preamp. The voltage difference across R2 should be very low, only depending on the resistance of the wires of the cables. But if you want top performance, every detail counts! Why Quad did change the layout? In an all Quad system (34 or 44 connected to a 405), a hum loop can be introduced, depending on length and routing of the cables, because of the use of cinch cables and an earth connection, via the power cord from the preamp to the chassis of the 405. In the early DIN days the Power Amp was earthed via the signal cable, see also the connection between a 33 and a 303.

How does this relate to our double PSU? Normal or floating?

If you don't experience any hum loops in your current system, in the normal wiring setup: connect the signal ground of the Cinch chassis parts to the chassis, as was the case with the Din connector. If there is a hum loop, solve this one in the power cord of the 405 by disconnecting the earth wire at the 405 side. Is illegal in some countries! In floating mode, there are two solutions, first connect extra wires from the signal ground connection of the cinch chassis part of each channel to the new central earth

point on the corresponding modules, in effect short circuit R2, or replace R2 by a wire link. The latter is the best and more elegant solution in my view. These solutions can also be applied to the normal wiring setup, but it is not so basic anymore.

If a connection between the amplifier ground and the chassis is necessary, build it like Quad did in the 606 and on. Use a separate 10 Ohm resistor with a small capacitor (4n7) in parallel to connect the Psu ground to the chassis.

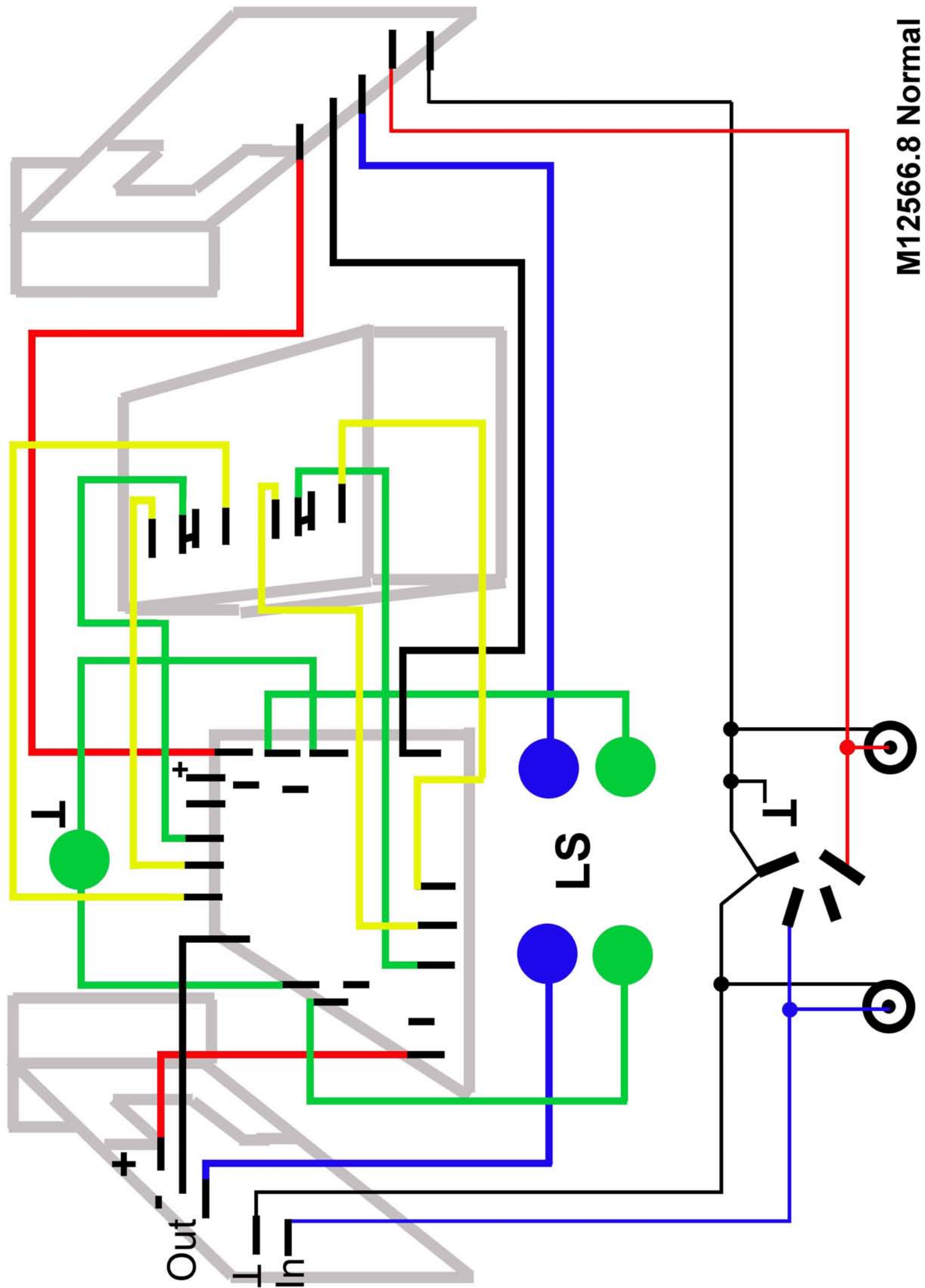
Checks before and after switching on the amplifier

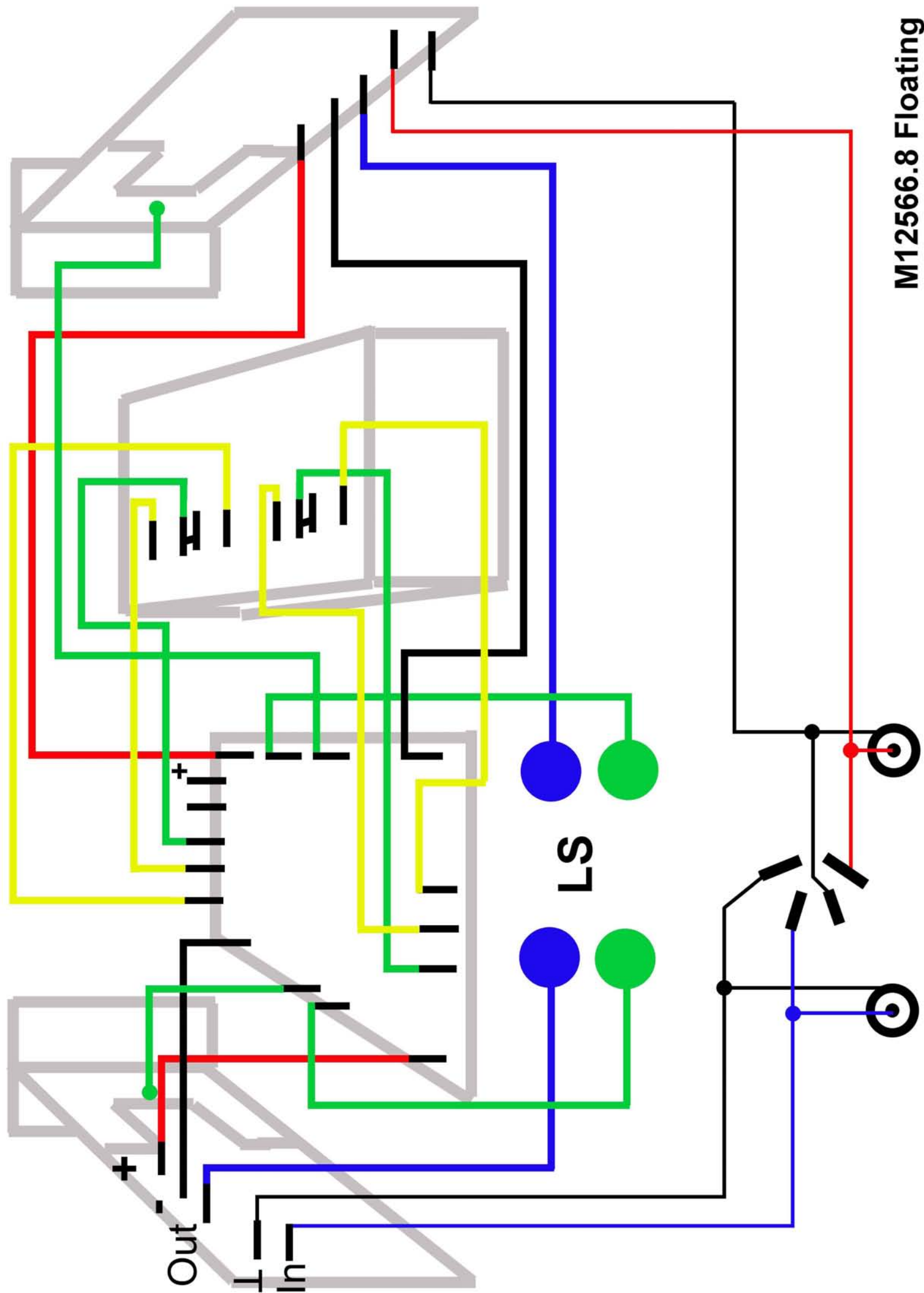
Before switching on the amplifier: check the wiring diagram and Psu connections. If you installed the Psu as a fully floating device, before switching on, check with an ohm meter that there is no connection between one of the green wires and the chassis. Also check that there is no connection between the green wires of the two channels.

Connect the amplifier to the mains socket. On the red wire there should be 50V referring to the chassis or the module earth point. On the black wire there should be -50V. If you installed the Psu as a fully floating device, before switching on, check with an ohm meter that there is no connection between one of the green wires and the chassis. Also check that there is no connection between the green wires of the two channels.

Appendices

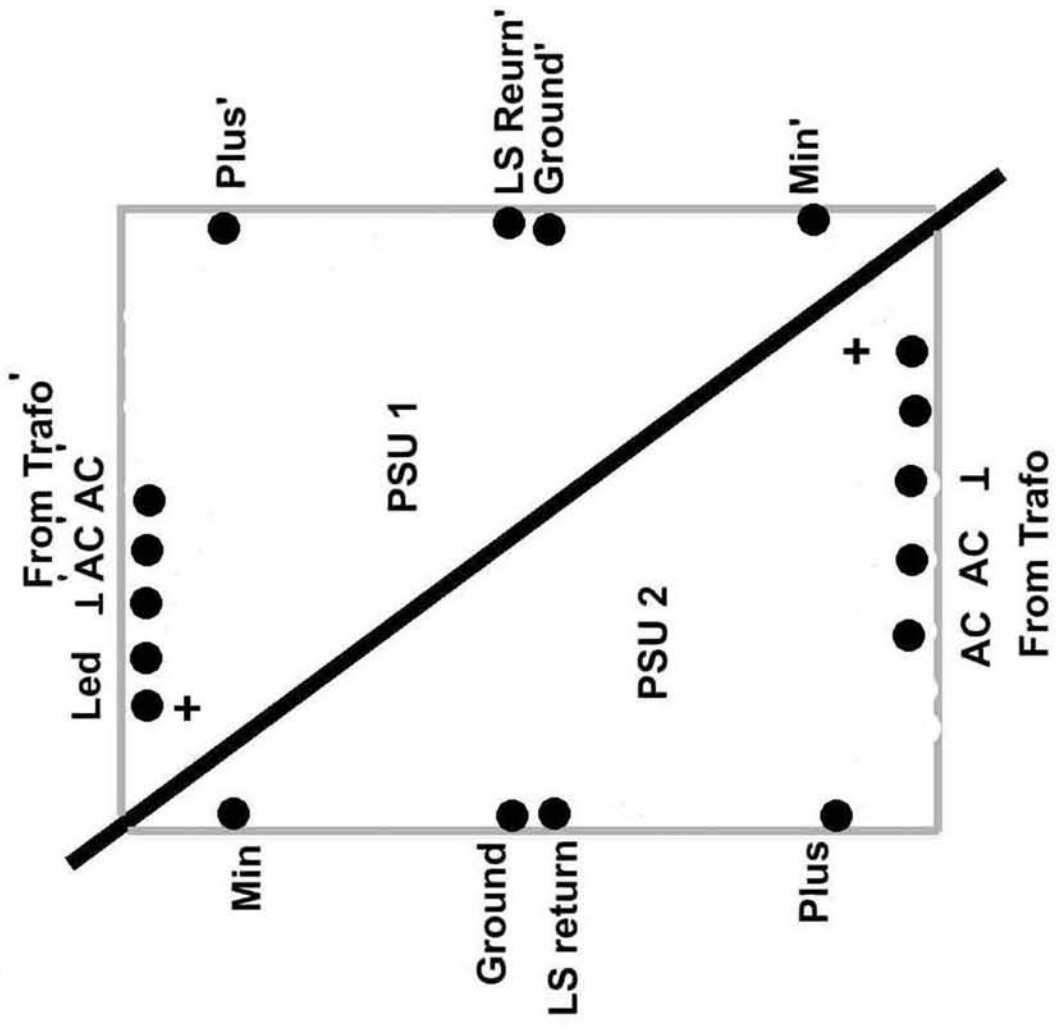
In this paragraph the two wiring possibilities for the M12566.8 Psu are presented. This is the current version for all BHC Aerovox capacitors. Also the top views are there for some older versions of the Pcb and the latest one, M12566.10 special developed for the BHC T capacitors. Check these diagrams with the real Pcb, all the pins are marked at the copper side of the Pcb.





M12566.8 Floating

Top view **M12566.10**



Top view **M12566.8**

