

How to Wire Up a Dual Mono Bloc Amp for Zero Noise and Hum

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Attention! The only single point where the two channels join directly is where they are bonded at the input connectors and nowhere else

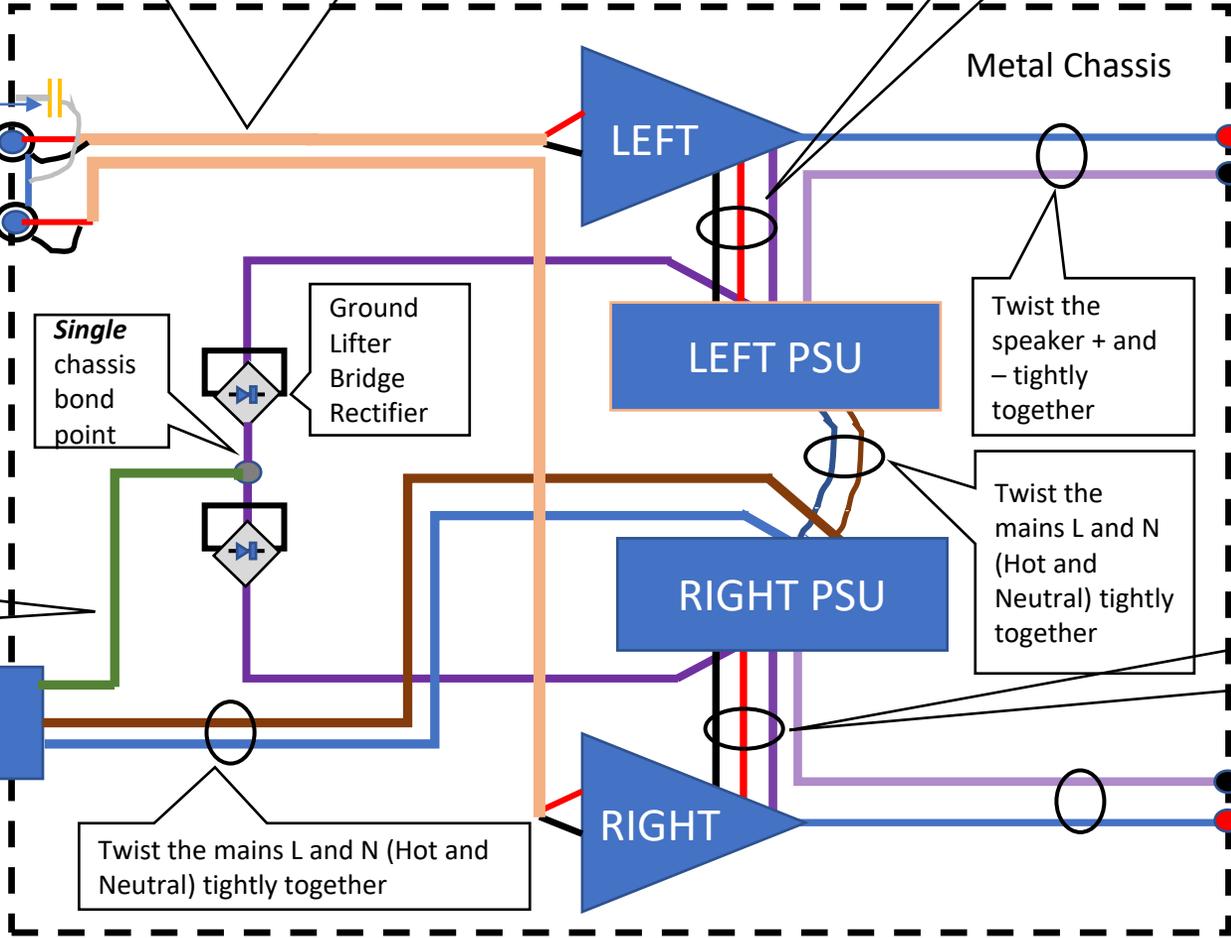
1. Run the two input signal cables next to each other and cable tie them together
2. Drop off to the first module
3. Continue the second around the edge of the chassis to the other module.
4. Ensure there is as big a gap as possible between the input wiring and all other wiring eg run all power and speaker wires on the bottom of the chassis; run input wires around the top edge

Twist the Module +, - and zero V tightly together

1. **Mount the Inputs right next to each other!**
2. Make sure they are insulated from the chassis!
3. Bond the signal returns together
4. Connect a 2 to 5nF *disc ceramic* capacitor from the signal ground to the chassis. Keep the lead lengths to <10mm

Run a thick wire from the IEC socket earth [safety ground] to a SINGLE BOND POINT on the chassis

Use a standard fused, switched IEC power inlet receptacle.



Single chassis bond point

Ground Lifter Bridge Rectifier

Metal Chassis

LEFT

LEFT PSU

Twist the speaker + and - tightly together

The speaker -ve must be insulated from the chassis

Twist the mains L and N (Hot and Neutral) tightly together

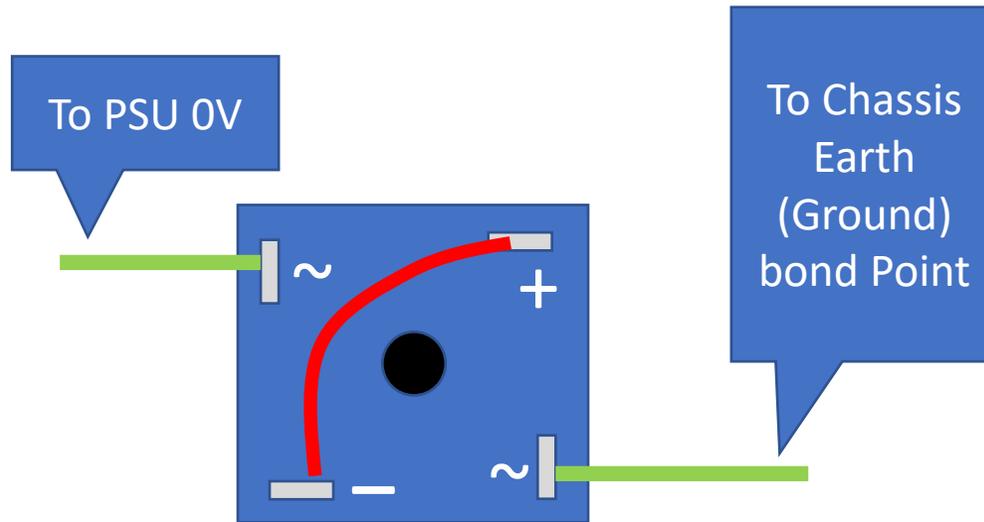
Twist the Module +, - and zero V tightly together

RIGHT PSU

RIGHT

Twist the mains L and N (Hot and Neutral) tightly together

How to Wire a Bridge Rectifier as a Ground Lifter



35A 400V or higher voltage Bridge Rectifier e.g. [KBPC3504](#)
This must conduct the FULL fault current until the RCD/GFCI trips at the mains distribution box. The currents can range from 10 to 150A for at least 1 mains cycle, but can be 2-3 mains cycles. The peak single cycle surge current capability of this particular bridge rectifier is 400 Amps

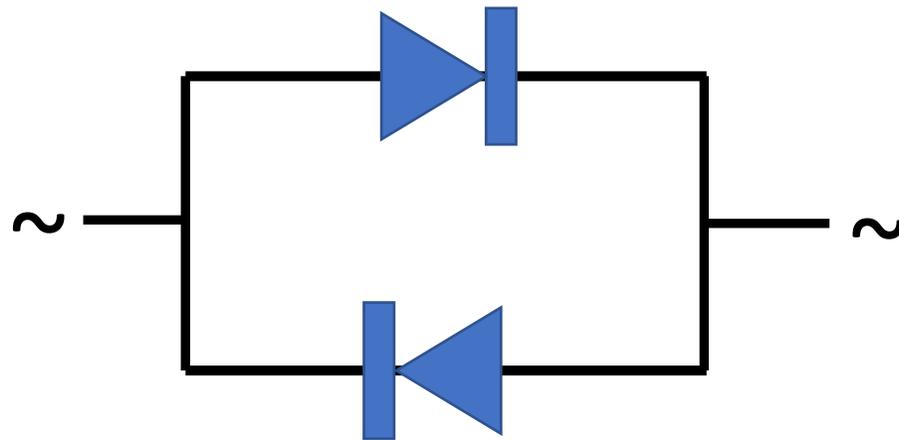


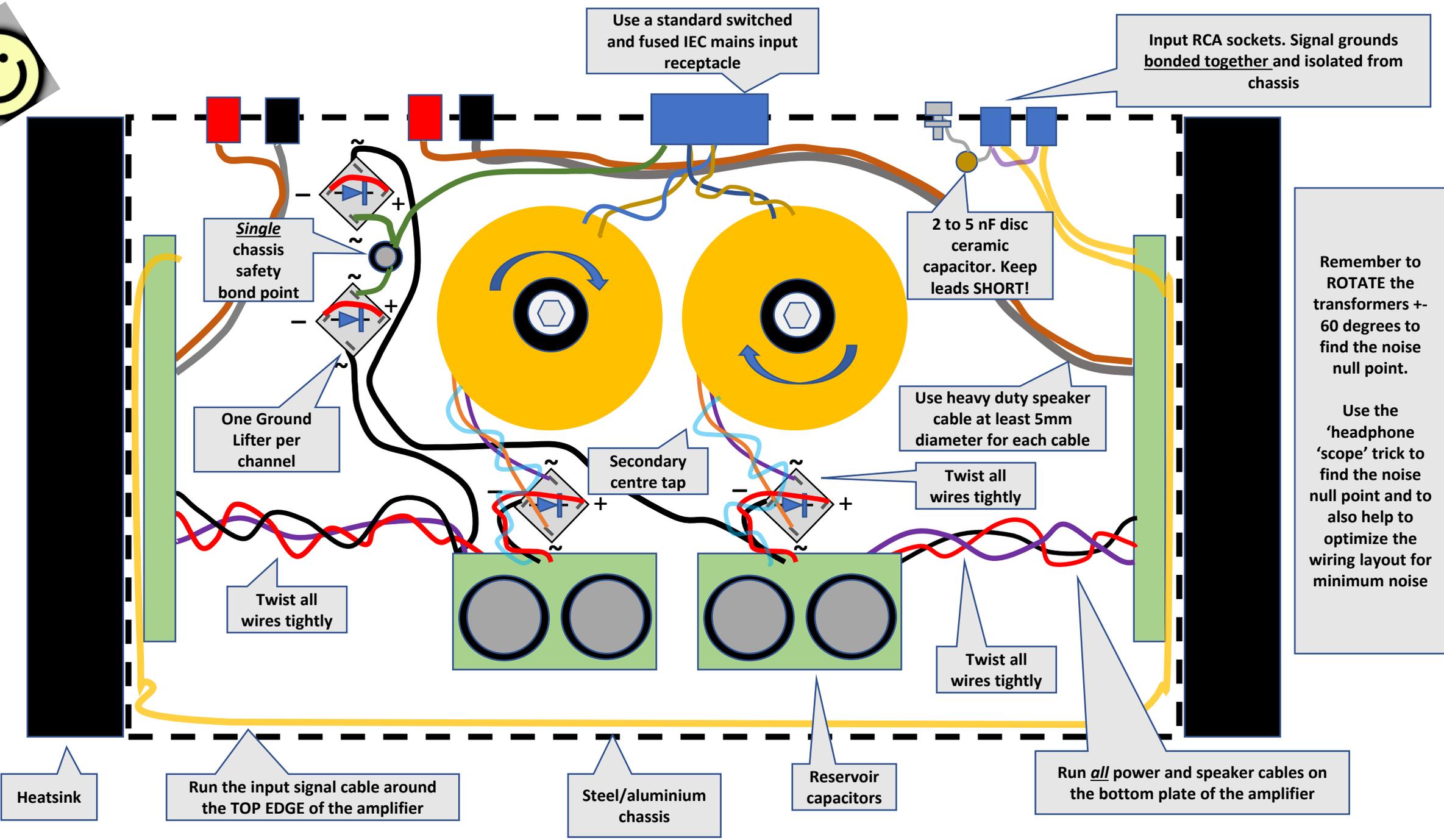
- Use a 35A 400V (or higher voltage) chassis mount Bridge Rectifier
- Wires to and from the rectifier must be at least 2.5mm², as should be the RED wire that connects + to -
- Keep all wires as short as practicable
- Bolt the bridge rectifier directly to the chassis



Alternative Ground Lifter using two back-to-back diodes

- This is not as convenient as using a bridge rectifier but does save a bit of space and wiring
- Use $\geq 100\text{A}$ surge capable diode eg [MUR820](#) or [FFAF30UA60S](#)
- Make sure the diode headers are insulated from the chassis if you bolt them down – they are connected internally to the cathode on non-full pack devices

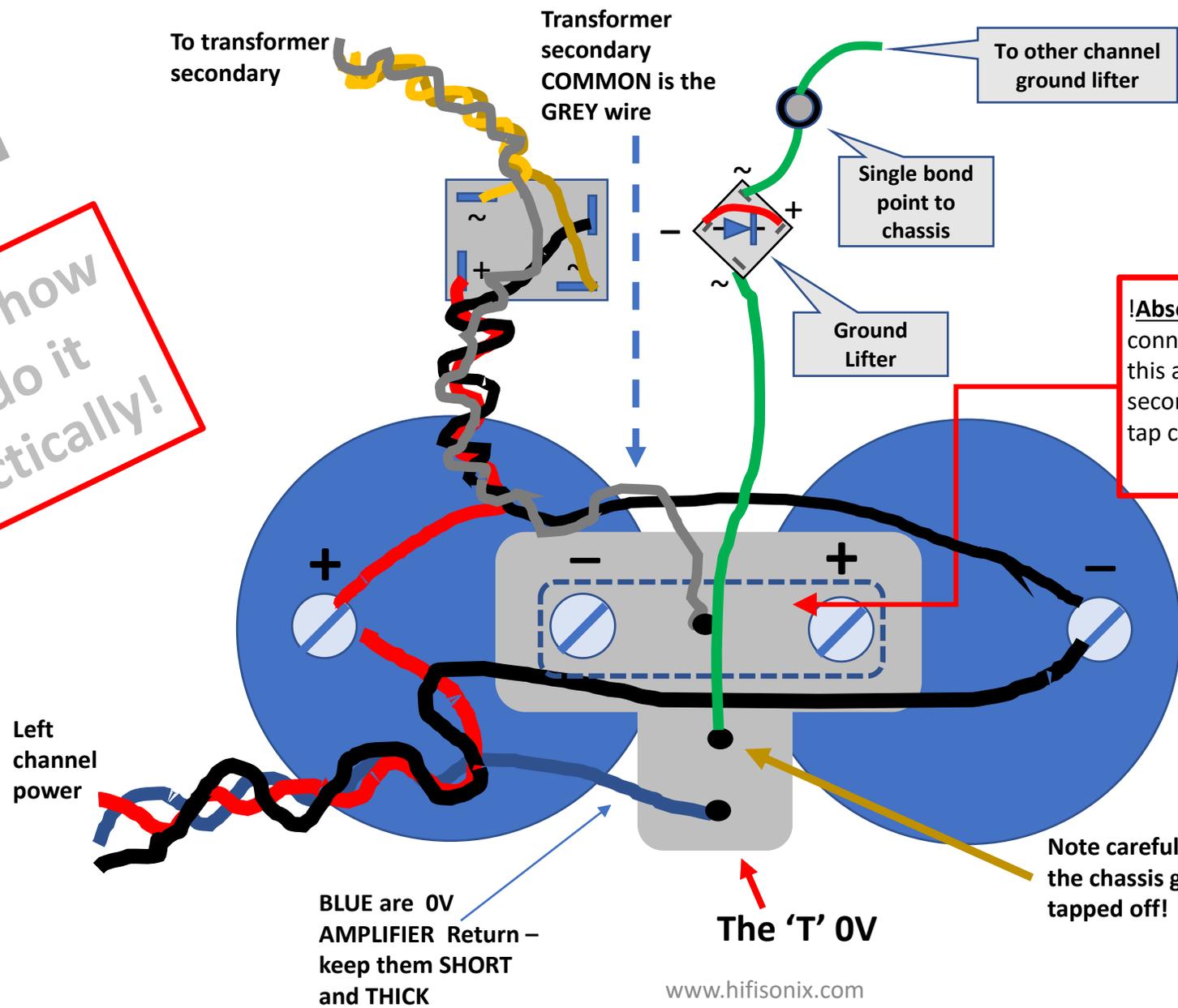




Detail view if using Chassis Mount Reservoir Capacitors



This is how to do it practically!



Where shown, twist all wires tightly! Keep all connections as SHORT as possible

!Absolutely NO connections inside this area except for secondary center tap connection!

In the practical implementation, bunch all the wires going across the reservoir capacitors and cable tie them to minimize any loop areas

Components not drawn to scale



'Headphone Scope' Trick – Quick and Easy Hum/Noise Debugging (1)



A pair of 90 dB at 1mW headphones is much, much more sensitive than a loudspeaker – a typical speaker spec being 1 Watt for 90 dB SPL at 1 meter. Relatively speaking, that's of the same order as a good high gain, low noise measurement preamplifier.

Connect a pair of headphones directly to the output of your amplifier (**do this AFTER it has been switched on and the outputs have settled**) and without any input source connected. Make sure your amp does not have any DC offsets.

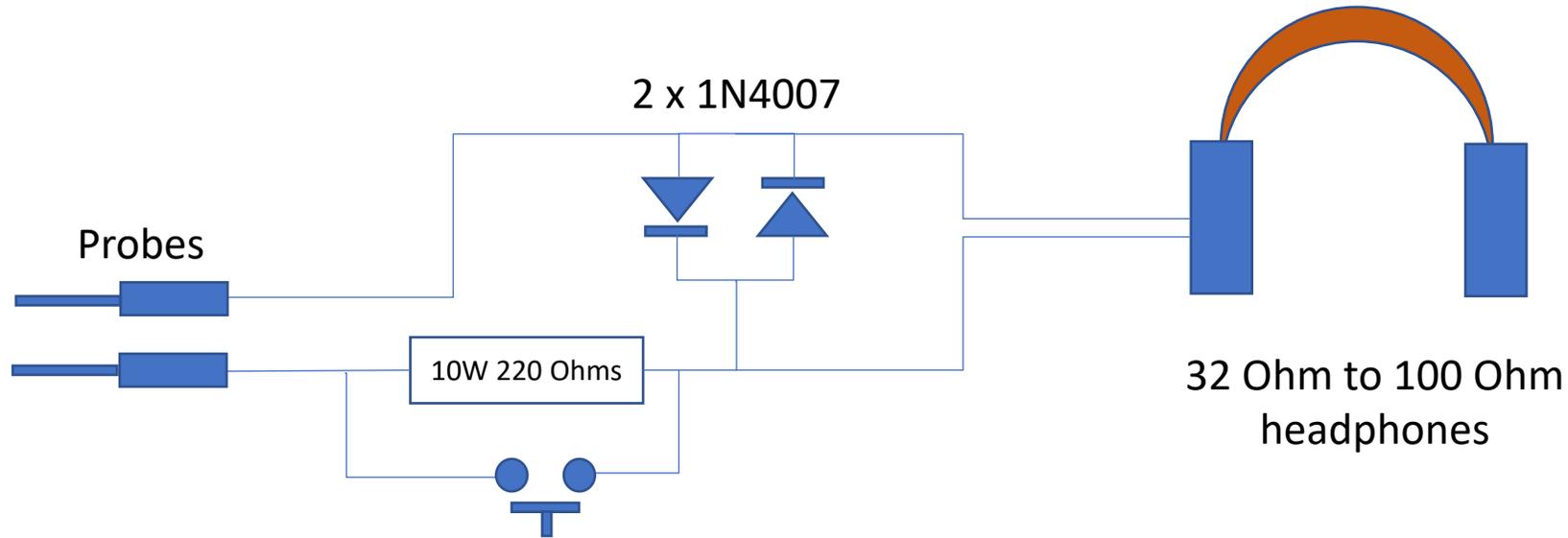
You can then experiment with cable dressing, transformer rotation etc to get the lowest noise on the 'phones.

On a *really good* layout and execution, you should struggle to hear any hum/buzz on the headphones. **Disconnect the headphones before powering down your amp.**

Once you are at this level, you can then use a sound card to do further debugging. A good, practical result will be -90 to -100 dBV as measured on a sound card.



Headphone Trick – Protecting your headphone from overload (2)



Connect the headphone probe across the amplifier output terminals.

Here is a simple way to protect your headphones when using the headphone to probe cable dressing and layout in your amplifier and it will also protect your ears if you happen to probe in the wrong place. You can fit a pushbutton switch across the 220 Ohm resistor – if you hear nothing or little noise, depress the switch to momentarily improve the sensitivity.

Do not connect the headphone probe across DC!

