

Power Amplifier Set-up Tips

Cooling

When you are using amps that are fan-cooled and want to allow spaces between pieces of equipment in your rack, make sure you block the front with blank, solid (not perforated) panels. This will allow the rack to act as a chimney with hot air exhausting at the top, not re-circulating between adjacent amplifiers. When you are using convection cooled amps in very high ambient temperatures, you may find that your temperature indicators are starting to illuminate. Typically, adding modest amounts of air movement will enable your amp to dissipate any excessive heat and regain its normal composure. However, if your temperature indicators continue to illuminate, consider the following possible causes:

- Insufficient air movement.
- Overdriving of the input stage (severely into clip).
- Very low-impedance loads.
- High ambient temperatures.

If you can't, or don't want to change the preceding conditions, two possible alternatives are available to add the necessary air movement. First, you can add fans to direct air onto any surface of the amplifier. Second, you can space the amplifiers in the rack using perforated panels or leaving the empty slots open. This will allow the top and bottom covers to act as radiators. In extreme conditions, a combination of these two methods may be required, as would be expected for proper thermal functioning of any amplifier.

Hum & Buzz

- It is imperative that all of your electrical equipment share the same power ground reference.
- Unless you are interfacing to a microphone, the shield of the cable should only be connected at one end.
- Do not pass signal ground between electrical components in a grounded source system.
- If you wish to avoid ground loops, it doesn't matter if you lift the input or output signal ground or your system topology, just be consistent. Personally I prefer to lift the input signal ground and it has always been successful.

- NEVER use a ground lift adapter to lift the power ground on a 3-wire AC cord; this is not its intended purpose. It is better to have it SAFE than SILENT!! Look for the true source of the noise.
- Even when interfacing to an unbalanced load, it is preferable to use two-conductor shielded cable.
- Get rid of the lighting company!

Input Wiring

- For all input connectivity, use shielded wire only. Cables with a foil wrap shield or a high-density braid are superior. Cables with a stranded spiral shield, although very flexible, will break down over time and cause noise problems.
- Try to avoid using unbalanced lines with professional equipment. If you have no choice, keep the cables as short as possible.
- To minimize hum and cross talk, avoid running low-level input, high-level output and AC power feeds in the same path. Try to run differing signal paths at 90 degrees to one another. If you must use a common path for all cables, use a star-quad cable for the low-level signals.
- When changing input connectors or wiring, turn the amplifier level controls all the way down (counter-clockwise) before connecting or disconnecting input plugs.
- When changing output connections, a professional dude will turn the amplifier level down and the AC power off to minimize the chance of short-circuiting the output.

Output Wiring

- Choose carefully when selecting speaker enclosure connectors.
- To prevent possible short circuits, wrap or otherwise insulate exposed loudspeaker cable connectors.
- Do not use connectors that might accidentally tie conductors together when making or breaking the connection (for example, a standard, 1/4-inch stereo phone plug).
- Never use connectors that could be plugged into AC power sockets. Accidental AC input will be an electrifying experience for your equipment. But you will find out real quick if your speakers are any good at 60 Hz.
- Avoid using connectors with low current-carrying capacity, such as XLRs.
- Do not use connectors that have any tendency to short.

- To maintain good bass response, use the lowest DC resistance cable you can afford which will terminate safely in your connectors.

Power Conditioners and Surge Protectors

Use an electrical line "conditioner" between the wall outlet and your amplifier. Besides providing electrical line surge protection, a good line conditioner will smooth out the current delivery to your amplifier, which will in turn smooth out the audio signal to your speakers.

Line noise can result from a number of issues including random fluctuations in the AC current, inferior or damaged wiring, interference from other machines or appliances, overhead fluorescent lighting or even bad weather. "Dirty power" impedes signal clarity by causing disruption of signal integrity. In the example of a television set, static translates to a visually degraded picture or "snow." Audio signals suffer distortion. A dial-up modem might get frequent disconnects, while static on a DSL or cable modem will negatively impact data transfer speeds.

A good quality power conditioner is designed with internal filter banks to isolate the individual power outlets or receptacles on the power conditioner. This eliminates interference or "cross-talk" between components. If the application will be a home theater system, the noise suppression rating listed in the technical specifications of the power conditioner will be very important. This rating is expressed in decibels (db).

The higher the db rating, the better the noise suppression. Good units start at a rating of about 40–60db for noise filtering. If a device does not state the db rating in its specs it may be better to move on to a different model or manufacturer.

For surge suppression, be sure the unit has an adequate "maximum watt" capacity for your needs. Plasma HDTVs, for example, use more electricity than LCDs. One popular 50-inch plasma HDTV is rated at 555 watts. With a multi-channel receiver and other components, wattage can add up in a home theater system.

The power conditioner will also have a "joule" rating. A joule is a measurement of power or heat required to sustain one watt for one second, known as a watt-second. Since electrical surges are momentary spikes, the joule rating indicates how much watt-energy the suppressor can absorb at once before becoming damaged itself. The higher the joule rating, the greater the protection.

Today's computer and home theater systems represent substantial investments. For this reason some high grade power conditioners come with monetary guarantees against damage to connected equipment due to electrical surge -- in some cases up to US\$500,000. These particular power conditioners also come with lifetime guarantees. Considering their cost, they are a worthwhile investment to protect equipment and provide clean power for the best possible audio/visual experience.

A fine grade power conditioner with all of the features mentioned above and a noise suppression rating of 60db might have a list price of well over one hundred US dollars, but can usually be found for US\$69-\$99 with some diligent shopping. Units with list prices in the two-hundred dollar range normally have extended LED indicator lights and are "flashier." They might also have higher wattage and db ratings, but this is not necessarily true, so check specifications.

Cables and Cable Ends

There is a lot of controversy regarding audiophile cables. [Here is a good introduction to cables.](#) You can buy cheap cables that may cost \$1 per meter and go up from there. The big question is where is the price-benefit point? Simply put, you will want to avoid purchasing the cheapest cables. One guide is to purchase the cables that you can afford without breaking the bank. For a decent USB B Bus cable you should feel comfortable spending \$50-\$100 per half meter. Good HDMI cable will cost \$75 and up for a meter, whereas good entry-level audio interconnects will start at \$75 per meter. The good news is that NO objective tests has show that the \$12,000 per meter audio cable will produce a better sound than the \$120 per meter cable. So, plan on spending some money on good cables, but avoid the extremes..."the cheapest rinky-dinks" and "the most expensive money can buy." In both cases you will be wasting your money.

End caps. Logic tells us that open connectors can be a source of unwanted EMI and RF noise. The best solution are "caps." You can purchase them for almost any type of connector in both male and female.

Speakon Connectors

For amplifiers, the most popular termination device on professional products has been the dual banana. However, recent regulatory requirements in Europe have outlawed the use of the dual banana plug and forced users to terminate speaker cables with spade lugs or bare ends an approach that is clearly not advantageous to the customer who

wants to reconfigure his system or quickly change out a defective product. It is possible that similar regulatory controls will appear worldwide over the next few years.

One solution to this problem is to use the Neutrik Speakon connector. Most amplifier manufacturers wanted to develop a system for you that eliminated the need for specialized, time-consuming, interface cables. The major loudspeaker manufacturers have been using Speakon connectors for the input termination on their products for several years now, so you can be assured of the connector's reliability in the workplace. With Speakon connectors, you can plug straight from the amp to the speaker, and start making those great sounds right away. The Speakon connectors used on most amplifiers meet all known safety regulations. Once wired correctly, the connector cannot be plugged in backwards, causing the type of inverted polarity situations that are common with banana hookups. It will provide a safe, secure and reliable method of interfacing your amplifier to the load.

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