

Hum & Noise

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Hum and noise are probably the most common problems encountered in hifi equipment. A constant hiss, even with the volume control set at minimum indicates noisy transistors or valves in the final gain stage of the preamp or the input stage of the power amp. A small degree of hiss is normal and might be exaggerated by very sensitive speakers, but an excess in one channel, sometimes together with an intermittent crackling means an exceptionally noisy transistor/valve in that channel, which indicates service is necessary.

Hiss which rises with volume setting is normal and comes from the earlier stages of the preamp (amplified by all the stages which follow) but shouldn't intrude over the music except in unusual circumstances.

Hum is much trickier and difficult to diagnose, forming a complete subject in its own right. It can be helpful to disconnect everything and then start reconnecting the items one by one and see when the hum starts (switch off power before every move unless you want to blow up your speakers). A low level of hum from the power amp alone is normal (with the preamp disconnected). If this is excessive from your normal listening position, you might need to have the main reservoir/smoothing capacitors replaced, particularly if the amp is quite old. It might indicate a design weakness if the amp is fairly new, or it might be that the speakers are too sensitive (horn speakers?) for that type of amp (a noisy type!).

When the preamp is reconnected, you can expect some increase in hum level; this is normal but shouldn't intrude. If the hum is constant and stays the same irrespective of volume control setting, you're either using an unshielded interconnect, which, when too near a mains cable, and in conjunction with a preamp with highish output impedance (such as a "passive preamp") is picking up radiated mains field, or more likely you are suffering an "earth loop" - a term which strikes fear in people's hearts, mainly because it's not understood well.

An earth loop is formed when several conditions are met. A situation guaranteed to induce earth-loop hum is when two pieces of equipment are plugged in to the mains some way apart (separate sockets maybe several feet apart), "earthed" (through the earth pins in their three pin plugs); the earth is connected to the "signal ground" inside both units, and then the loop is completed by interconnecting the two units. The desired music signal travels along the "-" or "earth" wire, and so does any inevitable difference in potential between the earths of the two wall sockets, which will get amplified along with the music signal - result; a raspy hum which is constant and very annoying.

Note that this is a worst case situation guaranteed to cause a hum, there are still effects possible if only some of the conditions are met (depending on the design of the equipment's power supplies - sometimes capacitive coupling in the mains transformer is enough to cause a loop, even without the mains earth being linked to the signal earth inside the equipment).

All right, cut all the technical crap, what's the answer, then?

First try plugging the units in to the mains side by side (in the same double wall socket or power strip). This often eliminates the hum, but if not, I can only relate what I would then do myself - I am not recommending it to anybody else because my insurance forbids it.

The simplest solution is to remove the mains earth (disconnect the green/yellow earth wire inside the plug) from one of the units. Make damned sure that wire can't touch any other pin - insulate it very carefully or cut it off very short, unless you want to meet your maker when you next touch the unit. This should stop the hum. If there are several units in your system, each earthed, you may have to repeat this until the hum stops. It is worth checking with a "Continuity checker", or "Ohm-meter" that all units are still earthed via the one remaining earth, which you must retain for safety.

I repeat again, I am not recommending this procedure, it's simply what I do myself in such a situation.

The other answer is to employ a "balanced" signal interconnection between the units, obviously only possible where both units have true balanced XLR sockets, as this doesn't rely on linking earths between the units, thereby breaking the dreaded loop.