

The (relatively) recent trend to use switchmode power supplies in consumer equipment, along with double insulation, has created new problems. All SMPS use small (and allegedly) 'fail-safe' Y-Class capacitors to the chassis, which is not earthed. Use of these caps means that the chassis floats at roughly half the mains voltage, but the impedance is very high. This poses two risks ...

1. Equipment input circuits may be damaged if double insulated appliances with an SMPS are connected while switched on. This is covered elsewhere on the ESP site. Such failures are the result of (typically) half mains voltage being present on the chassis (and therefore the internal circuitry). Connection to earthed equipment may cause a large instantaneous current to flow.
2. Switchmode supply noise and any high frequency noise on the mains now flows in the shield of the interconnect. This is not really an earth loop as such, and the result is more likely to be a harsh (grating) hissing sound. It is quite distinctly different from normal thermal noise, and is also more intrusive.

It *might* be possible to reduce this noise by installing a heavy earth strap that joins each chassis. Strictly speaking, this may be completely illegal, but the rules for double insulated appliances in many countries are often stupid, and fail to address reality. Almost all modern systems will have a mixture of earthed and double insulated equipment, and any rule that states (for example) that "double insulated appliances must not be earthed" is instantly broken when the interconnects are installed. Needless to say, without the interconnects there is no point having the gear in the first place, because there's often no other way to get the signal from one unit to the other. Optical fibre is one method of course, and completely eliminates any possibility of an earth loop. This is not always a viable option.

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