

## MAINS POWER CONDITIONING & FILTERING

Most audio power amplifiers:

1. have no power supply regulation,
2. nor filtering and
3. practically all use "peak rectification" power supplies.

The Halcro amplifiers thoroughly address all these points, and mains conditioners address some of them, but not all.

Power supply regulators essentially maintain a constant mains ripple-free supply voltage to the amplifier circuitry. There are basically 3 different types of power supply regulators which are:

a) Linear regulators. These are the simplest, but they generate a great deal of heat, and so designers of amplifiers are reluctant to use them because amplifiers already generate a great deal of heat at higher powers even without linear regulators.

b) Switching regulators. These are very efficient, that is they do not produce much heat, but they produce radio frequency interference. However, if well designed, this interference can be reduced to insignificant levels- far less in fact by than that borne by the normal mains supply. New E.C. standards are particularly strict in this regard and only allow radio frequency emissions of the order of micro-Watts! The Halcro units use switching regulators which do comply with EC standards.

c) Power factor corrected supplies (PFC). These are very rare in the audio industry, and are expensive to manufacture. These supplies doubly regulate the mains-to-amplifier supply conversion, and thus if designed well are particularly mains signal free. They also have the very substantial advantage in producing no mains current distortion, unlike all other types of supplies, which produce very considerable mains current distortion, which may cause interference to other equipment. (These PFC supplies should really be called "low mains current distortion supplies" and not "power factor corrected supplies," a term adopted by the industry which means something quite different.)

To address the problems cited above, the audio industry now produces 3 different types of mains conditioners:

1. Mains filters. These filter out radio interference signals from the mains (so called "EMI" or "Electro-magnetic Interference.") which can cause substantial degradation to the performance of many brands of amplifiers, especially those which do not have appropriate circuitry to suppress such interference. Thus such filters may be of benefit to some brands. The Halcro units have extremely extensive filters, both pre- and post- power supply, and in addition have EMI suppression within the actual amplifier circuitry. Thus these units will probably be of no benefit to the Halcro amplifier, but may well improve source equipment (preamps, SACD players etc)

2. Mains regeneration supplies. These in effect reproduce a regulated mains supply and thus can be of benefit to amplifiers containing no power supply regulation. The Halcro units are doubly regulated and thus the use of such units will probably be of no benefit to the Halcro equipment. Even though most source equipment has regulated power supplies, these mains regeneration units may assist some source equipment which are susceptible to mains current or voltage distortion.

3. Units combining the above features 1. and 2. The comments above apply to these units.

We are not aware of any mains conditioners which incorporate mains filtering, and mains regeneration, and low mains current distortion circuitry; a feature

Bruce Candy, Physicist  
Head of HALCRO research and development.