

Stan's Safari 28

STAN SCRUTINISES THE SOURCE OF ALL HI-FI POWER
– MAINS ELECTRICITY

“Having a three-phase supply is a real boon because you can put all the nasty stuff like the cookers; heaters and computers on two of the phases and keep one of the phases relatively uncluttered for the audio equipment”

In recent months a surfeit of manufacturers have been offering me special mains cables and heavyweight boxes to install between my hi-fi and the power socket. These are generally consigned to the “for later; much later” folder, because mains electricity is not something to which I give a great deal of thought, as the infrastructure at Curtis Towers rather spoils me.

The resident mains supply is a full three phase affair with a hefty 100amp fuse on each leg. It comes directly from a substation transformer which is hidden in the shrubbery somewhere down the bottom of my garden, and the cable has to continue for some distance before it reaches any of my neighbours. One result is that I can see little if any interference is polluting my supply, and secondly I don't suffer from loads on my line, so tonight the voltage measures 244V at the peak television hour, while most of the time it sits close to the 250V legal maximum.

Having a three-phase supply is a real boon because you can put all the nasty stuff like the cookers; heaters and computers on two of the phases and keep one of the phases relatively uncluttered for the audio equipment. However three-phase wiring is not for amateurs because there is up to 440 volts across the wires and that's enough to really, really hurt. During a lifetime of invigorating mains supply shocks, I've only experienced the one three-phase belt, and have treated such wiring with great care and respect ever since.

Electricity leaves the power station and is distributed along cables and pylons as three phases, and the electricity company will normally take care to keep the load balanced across the phases. So with three power cables buried under the street the first house will be wired to phase A; the second to B; the third to C; and so on. That way you're not sharing your immediate neighbour's supply, although it's a matter of pot luck if you share a phase with a DIY enthusiast who has all manner of heavy duty woodworking machinery in his garage.

This mains supply is something that most of us take for granted, and few appreciate the potential benefits of changes on the mains power side of the

equipment (see NVA *BMU* review, p18). Which might not be considered odd because even designers who should know better tend to assume that the mains supply is always near enough perfect. However, in practice that supply suffers from a number of problems, including a variety of RF interference signals; transient spikes; an asymmetrical wave-shape with consequent distortion harmonics, and fluctuations in level.

I'd guess that maybe 99.9% of hi-fi enthusiasts stick with the power cables that came boxed with the equipment, and often plug the system into the nearest wall socket *via* one or two distribution boards purchased at an attractive price from the nearest branch of Argos. The system works OK so why change things?

Let's start with the wall socket. In the UK it is likely to be fed from a ring-main, a power cable that starts at the distribution box (fuse-box) and continues from socket to socket in a daisy chain until the cable arrives back at the box. The primary advantage of the ring main is that no single outlet can load down the supply to the detriment of an outlet in another room; every outlet gives the same output voltage. One disadvantage, however, is that if one appliance, like Gran's old sewing machine, puts interference onto the mains, it will appear on every socket. Another is that the cable is interrupted by a screwed connection at every socket on the ring.

For a high-end audio system, the better option is therefore an old style spur connection. In other words a single thick cable wired directly from the distribution box to the mains sockets. Putting that cable into grounded steel trunking connected to a row of steel clad sockets is even better. It may not look that pretty but if you combine that structure with shielded mains cables you will have done your best to minimise the pickup of radiated RF interference. Why does the spur work so well? It's because with a ring main any noise generated by a piece of electrical equipment will be passed from socket to socket and only be attenuated by the combined load of everything that is plugged into that ring. However the spur goes straight back to the distribution box which acts as a low-impedance node, and any signal at that node is going to be attenuated by the total load of the house; every ring main; every lighting spur. So it's almost a case of the more lights you turn on the better.

Shielding the power cables also has other benefits. All the power cables from your system generally go to one set of outlets, and they are usually tied together or laid on top of each other. They also tend to pass over and close to the audio interconnects and speaker cables, giving the opportunity for mains