

# Cables and RF Interference

MARTIN COLLOMS CONDUCTS A GROUNDBREAKING INVESTIGATION INTO THE INCREASING PROBLEM FACING OUR HI-FI SYSTEMS FROM RADIO FREQUENCY INTERFERENCE

MARTIN COLLOMS

Cables are an essential part of the hi-fi separates experience. To join things up electrically requires various different cables that are fit for purpose: ultra-thin examples for connecting very low level pickup cartridge outputs; line level interconnects to link sources, pre-amplifiers and power amplifiers; cables of significant bulk and low impedance to feed speakers; and last (but not, it transpires, least) mains cables to feed power from the wall sockets to the equipment.

Various views exist on the relative sonic importance of each cable type, and even when the need for superior quality is accepted, there's often disagreement over which particular example is better, and why. Indeed, there's very little consensus throughout the whole field of cable design and its evaluation, and dissent varies with geographical location and the profusion of possible equipment permutations and combinations.

While many enthusiasts maintain that cables do deliver significant sonic differences, they're frequently at a loss to explain convincingly why, and repeatability is an ever present problem during cable listening tests. Some just abandon the subject in sheer frustration and join the: "not different; prove it" camp.

In attempting to pin down reasons, a number of people, self included, have been content simply to observe that cables can change sound quality in many situations, sometimes for the better, even if the results may not be consistent between different audio components and systems. It's a topic that remains very frustrating.

While *HIFICRITIC* has reported on the sound quality of numerous speaker and interconnect cables, the contribution of mains products, some of considerable cost, has often been less certain, and the performance benefits have usually been an order of magnitude smaller than that found with 'audio' cables. An explanation could lie in the power nature of mains cable currents, as distinct from supposedly more delicate audio signals travelling in connecting cables. It seems that a fresh approach is required, examining the whole field, reviewing available data and practice, and exploring some more recent findings.

## RFI: The Foundation

Recently some crystallisation of thought has arisen from several quarters on the whole concept of audio system cables. Ironically its greatest impact currently seems to be on the more contentious mains variety,

but ultimately it's likely to influence the design and performance of all audio cables.

Three years back (*Vol1 No1*), I mentioned the work of Grodinsky on audio components, in particular amplifiers and speakers as a system, and how, 30 years ago, he found that low level radio and related breakthrough (RFI) was a significant factor in sound quality. He included cables, of course, and showed to his satisfaction that the primary issue was how well the connected system, including the cables, dealt with RFI. His solution involved balancing the whole system with regard to RFI, using screening and lossy high frequency terminations, and in 1986 he was granted a patent for part of this work.

There is now something of an explosion in activity on RFI, some still experimental, which I think is beginning to result in unambiguous performance gains. At the same time recent decades have seen an explosion in the use of the radio spectrum. Our environment is now quite well saturated with a variety of electromagnetic signals, from very low frequencies to high microwaves, from 50kHz to 1,500MHz.

Audio equipment is not really designed to work in the face of such provocation, unless it is some kind of radio or tuner, despite the protests of some 'flat earth' audio designers and commentators. In theory all equipment should be designed to reject and ignore RFI, and when that rejection fails, then not be unduly disturbed by it. In practice most 'consumer electronics', including hi-fi in the general sense is reasonably immune to RFI, and is designed to be so under legislative edict. But then most consumer electronics hi-fi is not designed to reveal the subtleties of high quality sound reproduction for experienced critical listeners. Nor was the MP3 data compressed audio coding designed for such persons. (The MP3 criterion was that 95% would, or could not be aware of the designed data reduction on a section of then contemporary music excerpts presented in short A/B and A/B/X glimpses.)

Hi-fi enthusiasts make up the remaining 5%, and almost by definition will hear the impairment and loss of information, and in my experience especially when allowed to hear the whole track. Thus I contend that 'reasonable' system behaviour in the face of RFI provocation is just not good enough for genuine high sound quality hi-fi.

I contend that the side effects of RFI are substantially audible and are plaguing our systems, imparting added grain and sibilance, and a loss

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