Crossover Networks

Twenty six years ago when 20 microfarad capacitors were $20, my home loudspeaker (X-1) used iron cored inductors in the crossover network ahead of the output transformers permitting use of 0.5 microfarad capacitors. Certain purists condemned me for introducing distortion with the iron cores, notwithstanding the fact that the output transformer produced 100 times as much distortion.

When we started producing loudspeakers commercially in 1946, the first 30 units had "high level" networks. We had to abandon the high level idea -- it wouldn't work with the Brook and later McIntosh amplifiers. Also to quiet the hard-nosed critics we used air cored inductors, knowing all the while we could make a better iron cored inductor with lower insertion loss and with distortion quite insignificant compared to the very best of amplifiers.

Our 1946 inductors used approximately 0.1 inch air gaps and the distortion is recalled as being of the order of 0.05 percent at peak amplifier levels.

To reduce insertion loss it is possible to cut the series resistance of our L-1 coil from 0.65 ohms (air core) to 0.35

...The mark of integrity in loudspeakers!
ohms (iron core). With over 0.5 inch air gap the iron never even remotely approaches saturation and the distortion can not be measured at any level.

When stocks of present air cored inductors are depleted a new type coil will be used. The insertion loss will be reduced an inaudible 1/3 decibel. The cost will be reduced perhaps half a dollar which is the current rising price spiral will help us just a little with our efforts to hold the price of the finished speakers.

So be not surprised if you see 2 things that look like transformers in some future crossover networks. And don't complain; the improvement is real but it would take about 3 more improvements of like magnitude to achieve a liminal gain.

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