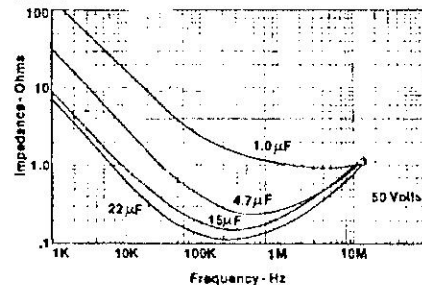


TANTALUM CAPACITORS: YES OR NO?

NO! WHAT I SAID (see *Letters*, Issue # 2, 1978, p.50) is what I meant: tantalums are not suitable for state-of-the-art designs.

The best designs will use DC coupling; but if you have to use capacitors, don't use Al aluminum or Tantalum types. Although I realize capacitors used in the signal path are often a practical solution to many problems (cost being one—add a capacitor and forget about DC offsets due to temperature drift, for example), what can be done to reduce the effects of non-ideal capacitors on the circuit and hence on sound reproduction?

FIG. 1



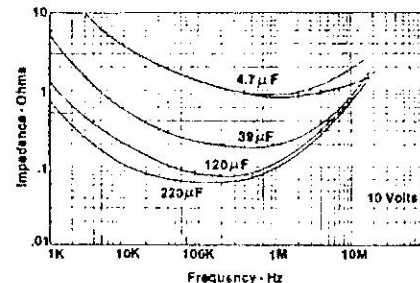
Take a look first at *Fig. 1*, the 4.7µF/50V tantalum capacitor line. The curve beginning at about 30kHz represents deviation from what a capacitor is. Inductance and equivalent series resistance prevent the impedance from continuing its descent: it actually starts to rise again. These curves, taken (by permission) from Siemen's Capacitors Product Guide, are good, for tantalum capacitors; not all Ta caps are this good.

Now look at the 4.7µF curve of *Fig. 2*. This shows the same values except in this case the voltage rating is 10V. As you can see, its performance is appreciably worse, becoming non-linear well within the audio range.

So the first thing we can do is use the high voltage ratings, not the minimum (and least expensive) that will serve.

Another way to improve a large value

FIG. 2



capacitor's circuit performance is to parallel it with a smaller value, high quality type which will continue the impedance curve downward and offset the inductive component of large Ta capacitors. Suitable shunting capacitors are mylar, ceramic, polycarbonate, or polystyrene types.

Modifications to existing equipment such as bypassing power supply filter capacitors with high voltage tantalums, using polycarbonate or, better still, polystyrene caps in RIAA feedback networks, and bypassing large electrolytics make for dramatic sonic improvements.

Replacing Al or Ta types where possible helps immensely; but I like the saying, "the best capacitor is no capacitor at all." State-of-the-art audio design will be pushed a bit further by designs which can use a minimum number of capacitors.

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