Crossover Networks

Many thanks for publishing lucid and informative article on Crossover Networks (EFY

March, 1986). However, I would like to point out the following:

1. In the formulae given for calculating the values of C and L there seems to be some error in specifying the units. On substituting the values for 4-ohm speaker system with crossover point at 2500 Hz, the values of C and L come out to be 0.0000159 and 0.0002545 respectively. I think these are values in farad and henry and not microfarad and millihenry as written in the article.

2. In the graph showing impedance curve (Fig. 7 of the article), I presume the Y-axis represents impedance Z and not dB.

3. I beg to differ from learned Mr Osan's contention that electrolytic type capacitors are available only as 'polarised' units. In fact I have personally used 'Crescent' make non-polar electrolytic capacitors, a wide range of which is available with Associated Traders, 43

Old Lajpatrai Market, Chandni Chowk, Delhi.
When we put two capacitors in series (to make the combination behave like a non-polar unit) I think it will add up ESR (equivalent series resistance) of the two capacitors and would result in excessive power loss as compared to single-piece non-polar capacitor.

Kindly enlighten me on the above points through good columns of your informative, interesting, elegant and perhaps one of the most authentic magazines on electronics available in India.

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The author, Mr Jaavinder Oaan, replies:
The formulae given in equations (1) and (2) give the capacitance and inductance in farads and henry respectively. Also, the equation (6) in part II (April issue) of the article gives inductance in henry.

The Y-axis of the curve given in Fig. 7 represents variation in voltage in terms of decibels. The curve was traced from the original, which has plotted on a B&K level recorder to show the variation in voltage across the terminals of a speaker, as the input signal from a constant current source is swept. At resonance, the impedance is maximum, and hence the voltage drop across the speaker is

also the maximum, which is evident from the plot The Y-axis is, therefore, proportional to the impedance of the speaker

Should non-polar electrolytic capacitors be available readily, then by all means they may be used in crossover networks However, as regards the ESR of the non-polar electrolytic, to my knowledge, the construction of a single piece non-polar electrolytic consists internally of two polarised electrolytics, back-to-back in a single can. Therefore, unless the manufacturer is specifically making these capacitors with a low power factor for use in loudspeaker crossover networks, one would not expect there to be a difference in their ESR as compared to two electrolytic capacitors placed back-to-back otherwise.