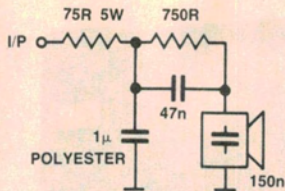


Motorola speaker filter

Phillip Denniss of Chippendale NSW has designed a circuit to smooth the lower cut-off point of Motorola Piezo Ceramic speakers, in particular, the 3½" Super Horn (models KSN 1001A, 1005A, 1032A and 1003A).

Although they are rugged, very efficient and reasonably cheap, they suffer from a fairly high, lower cut-off point at about 4 kHz with a very savage cut-off slope of approximately 20 dB/octave. The proposed circuit smooths out the fast cut-off at the expense of sensitivity. However, the loss of sensitivity is not really a problem since the drivers are very efficient.



The circuit is a two stage filter made from resistors and capacitors only. No inductors are used which makes the circuit attractive, and the input impedance is still quite high, preserving the 'no load' effect of the driver.

The idea was to reduce the cut-off slope to about 6 dB/octave for as long as possible without undue loss of sensit-

ivity. Therefore the 3 dB of the filter was chosen at about 2 kHz. This determines where the roll-off resumes its rapid plunge. The second half of the filter has a step response, where roll-off starts at about 1 kHz and levels out again around 4.5 kHz.

The capacitive load presented by the tweeter (150n) is quite handy, and I use it as part of the filter. It also allows the use of filter sections that are basically non interactive, which simplifies design and implementation.

The circuit was originally used with Magnavox 8-30 bass drivers as a stop gap measure.

The filter significantly cuts

back the harshness of the tweeter since it broadens the response, although I did find it necessary to use a little treble boost to add some brilliance. I had hoped that the staggered roll-off points would smooth the response without too much attenuation, since the signal to the tweeter is basically reduced by the same factor as the roll-off point.

By including a resistor of 20-30 ohms in series with the 1µ capacitor, the first section of the filter can be altered to give a step response similar to the second section.

Well it's worth trying and the only really expensive part is the tweeter.