The Passive Network

The most popular form of audio phase shift network employs only R and C in a passive system — no vacuum tubes. There are two popular passive networks and both are manufactured commercially. Both units are designed to work between 300- 3,000 cycles, which is considered adequate for good intelligible speech. The same configuration is employed in each network, however the component values differ because of the design impedance.

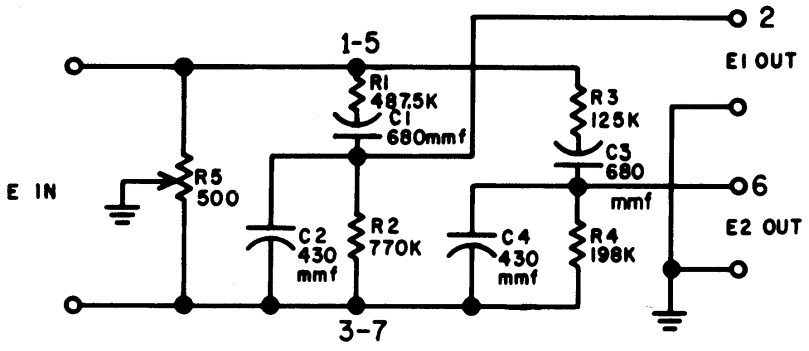
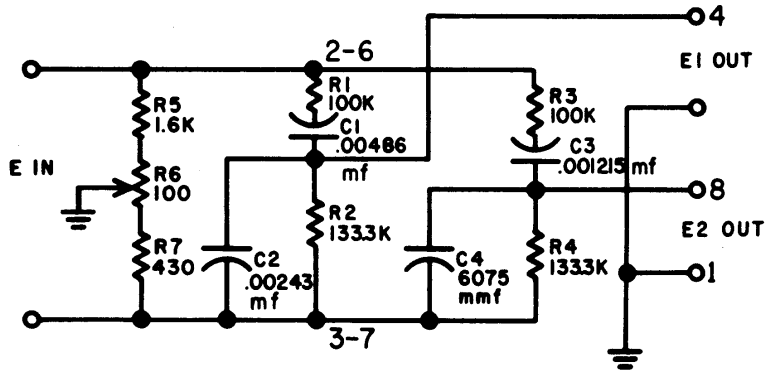


Fig. 4.6A—Complete passive audio phase shift network for 300-3000 cycles. Circled numbers indicate pin connections on the B&W 2Q4 network.

C1, C3—680 mmfd., ± 2% silver mica
C2, C4—430 mmfd., ± 2% silver mica
R1—487,500 ohms, ± 1% deposited carbon, ½w. (IRC)
R2—770,000 ohms, ± 1% deposited carbon, ½w. (IRC)
R3—125,000 ohms, ± 1% deposited carbon, ½w. (IRC)
R4—198,000 ohms, ± 1% deposited carbon, ½w. (IRC)
R5—500 ohm potentiometer, linear taper (Note: this control is not included with the commercial network)

The network shown in fig. 4.6-A is designed for a 500 ohm input impedance and is currently being marketed by the Barker & Williamson Co. (Type 2Q4—Model 350). The network shown in fig. 4.6-A uses 2% tolerance capacitors and 1% tolerance resistors. The maximum phase error between the two outputs is no greater than 1.5°. This would account for a maximum possible sideband suppression of 37.5 db at the worst possible frequency. The figure would probably be degraded slightly by the possibility of errors in the r-f phase shift network or inequalities in the amplitudes of the audio or r-f signals fed to the balanced modulators.



C1—4860 mmfd., ± 1%, silver mica
C2—2430 mmfd., ± 1%, silver mica
C3—1215 mmfd., ± 1%, silver mica
C4—607.5 mmfd., ± 1%, silver mica
R1, R3—100K, ± 1%, ½w.
R2, R4—133.3K ± 1%, ½w.
R5—1.6K ± 5%, ½w.
R6—100 ohm potentiometer, linear taper.
R7—430 ohms, ± 5%, ½ w.

Fig. 4.6B—Passive audio shift network used in the Lakeshore and Central Electronics "Multiphase" exciters. Resistors R5, R6, and R7 are external to the commercially available networks. Circled number indicate pin connections on the Central Electronics PS-1.

The circuit configuration of fig. 4.6-B is the same as the audio phase shift network used by Norgaard in his *SSB Jr.*, in the Central Electronics line of Multiphase exciters, and by Lakeshore Industries. The performance of either circuit is identical, only the component values and the driving impedance is different.

Although component values are given for Fig. 4.6-A and 4.6-B, it will be found that the commercial networks may be purchased for less than the cost of construction. Audio phase shift networks are available from Barker & Williamson, Central Electronics, and Millen Co.