

648A FILTER DESCRIPTION

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1. GENERAL

1.01 This section describes the 648A filter, which is designed for use in V4 telephone repeater applications.

1.02 This section is reissued to add an insertion-delay characteristic curve.

1.03 The 648A filter is a balanced low-pass filter with a 3-dB cutoff frequency of 3150 Hz. It is used to prevent singing in a 4-wire repeater section operated at a gain and extended by means of a 2-wire facility. Near cutoff, where the hybrid balance between the 2-wire facility and its precision network is poor, the trans-hybrid loss may be too low to maintain a net loss around the 4-wire loop. When the 648A filter is inserted into the 4-wire section, the filter loss compensates for poor balance and prevents singing.

2. EQUIPMENT DESCRIPTION

2.01 The 648A filter (see Fig. 1) consists of capacitors and inductors mounted on a printed-wiring board and housed in an aluminum can. The filter is approximately 1-3/4 inches wide, 1-3/4 inches high, and 7 inches long. It is a plug-in unit equipped with a 20-pin connector which plugs into a connector socket on the 24V4C repeater mounting shelf or other equipment socket. Tabs are provided on the front of the can so that the filter can be removed from its connector socket by the use of a 602C or 602D tool. A screw-type switch mounted on the filter faceplate provides

capacitance adjustment as required by circuit conditions.

3. CIRCUIT DESCRIPTION

3.01 The 648A filter (see Fig. 2) is a 2-section ladder network consisting of five capacitors and two inductors. The circuit is designed to have a minimum insertion loss over the voice-frequency band with a cutoff frequency (3.0-dB point) of 3150 Hz. The filter works between 600-ohm impedances, and the return loss of the 1,5 side against 600 ohms when the 7,9 or 19,20 side is terminated in 600 ohms is greater than 11 dB over the 300- to 2900-Hz band. The insertion-loss characteristic of the 648A filter is shown in Fig. 3, and the return-loss characteristic is shown in Fig. 4.

3.02 The 0.059- μ F capacitor C5 may be used or not, as required, by adjusting the screw-type switch C on the filter faceplate. The capacitor should not be used when an equivalent capacitance is supplied by an external circuit connected to filter terminals 19 and 20 (such as the 656A input transformer). ♦Equivalent capacitance is not supplied by the 227-type amplifiers, V3 amplifiers, or 849-type network.♦ The capacitor is connected into the circuit by turning the screw into the faceplate; the capacitor is removed from the circuit by turning the screw out two full turns. When the filter is connected to a 600-ohm resistive termination, screw-type switch C/ should be turned down.

3.03 The filter performance characteristics of Fig. 3 and 4 were measured with an input power level of -10 dBm. When the level is raised to +20 dBm, the 3-dB cutoff frequency is lowered to about 3100 Hz. The passband losses remain substantially the same but the characteristic from about 3000 to 3900 Hz moves down about 50 Hz. ♦An insertion-delay characteristic is shown in Fig. 5.♦

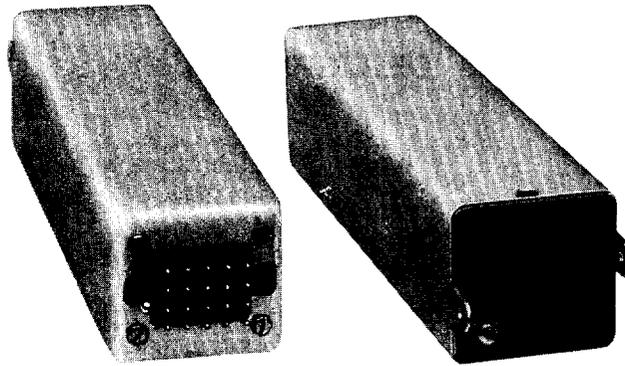


Fig. 1—648A Filter

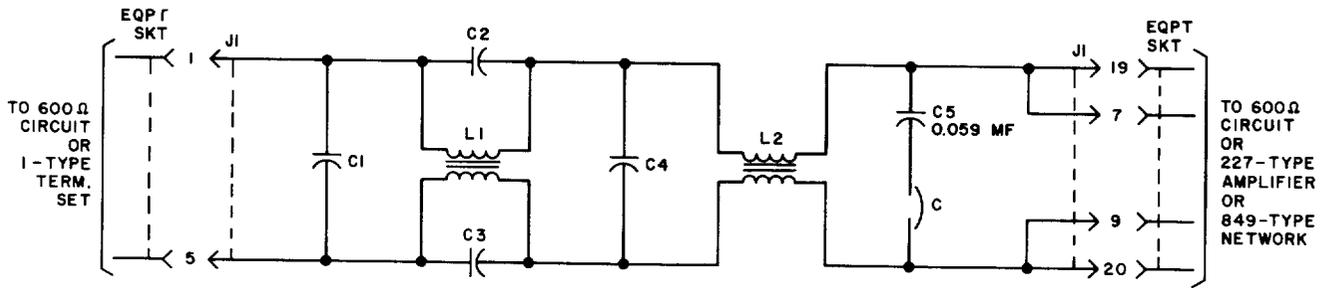


Fig. 2—648A Filter—Schematic

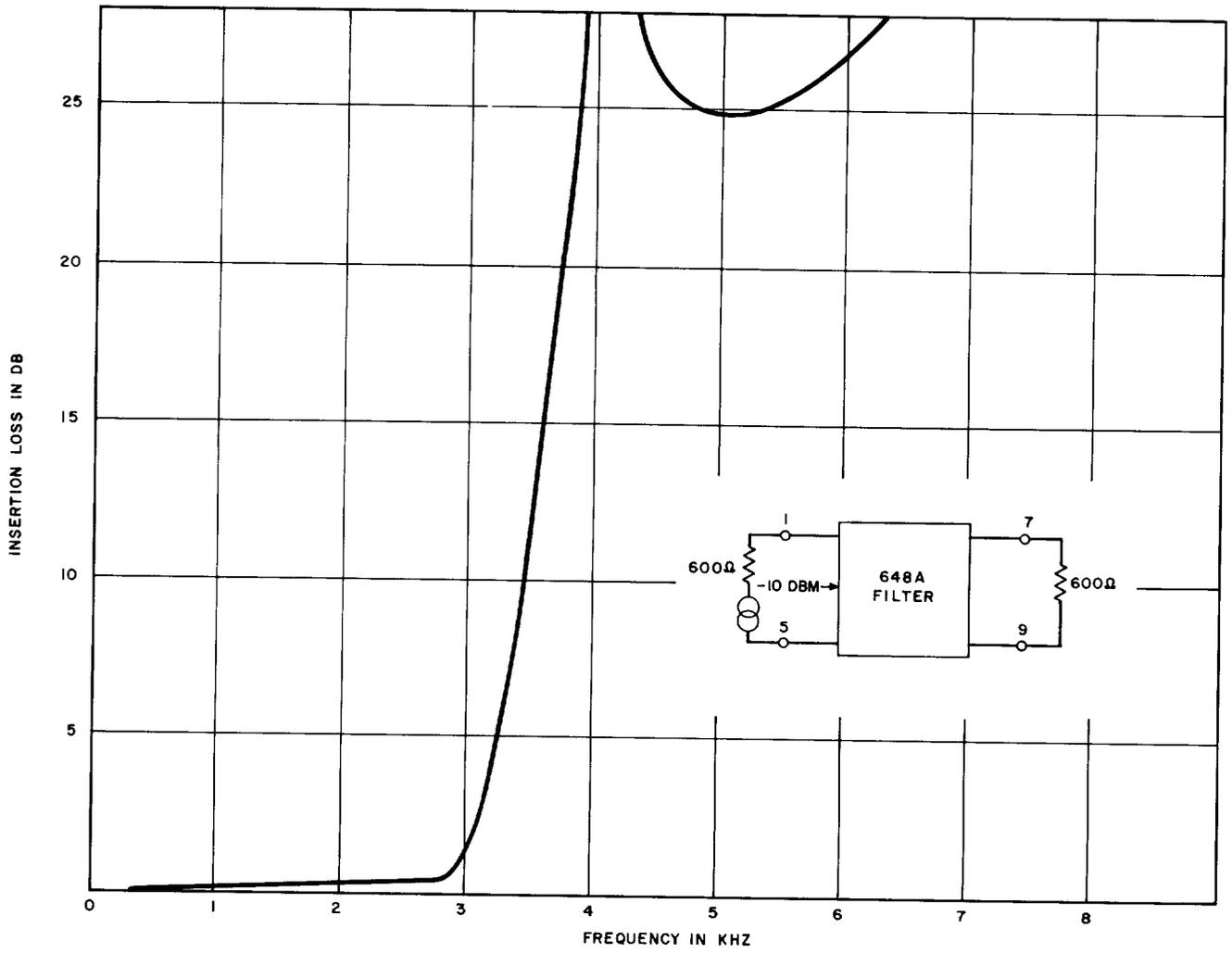


Fig. 3—648A Filter—Insertion-Loss Characteristic

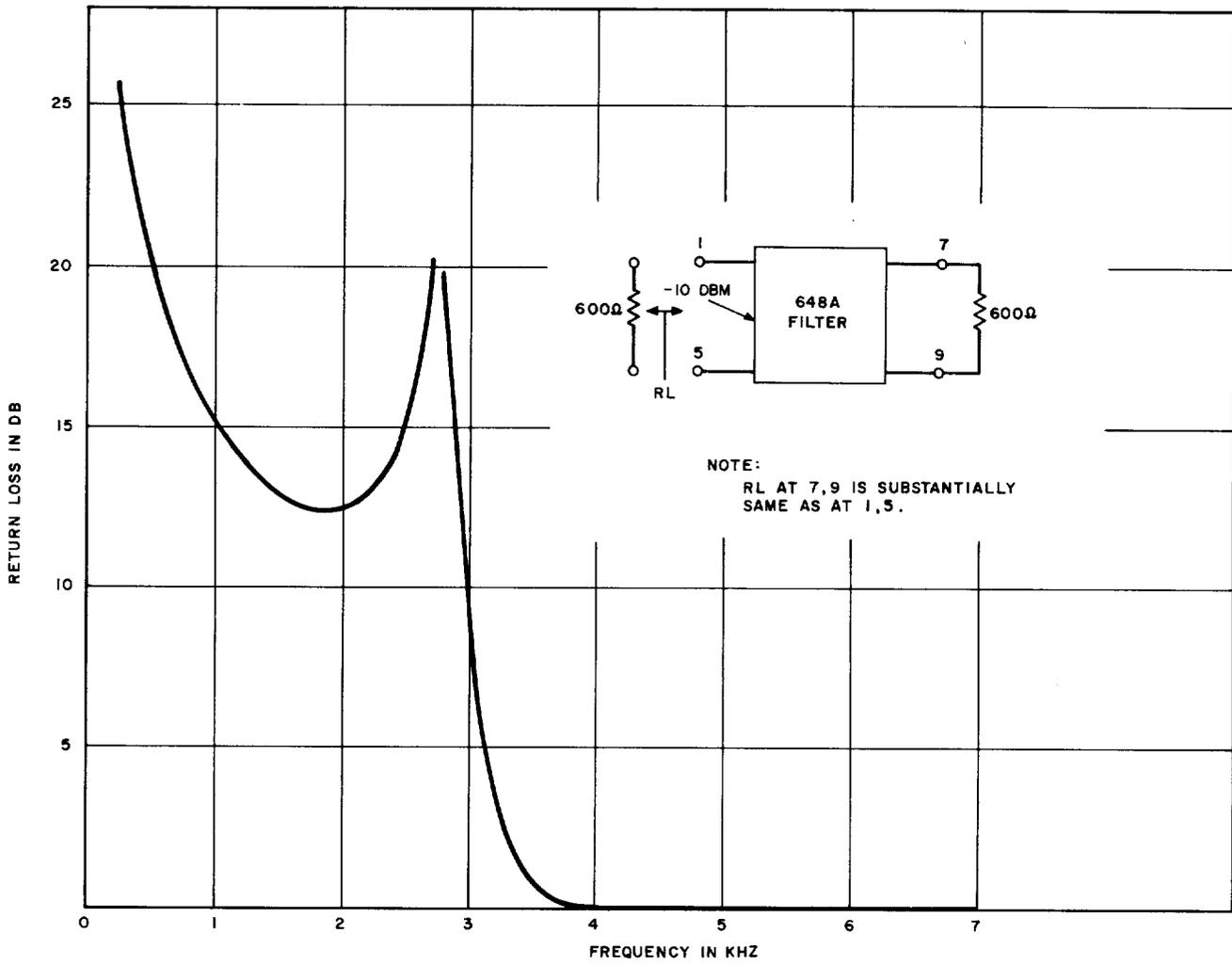
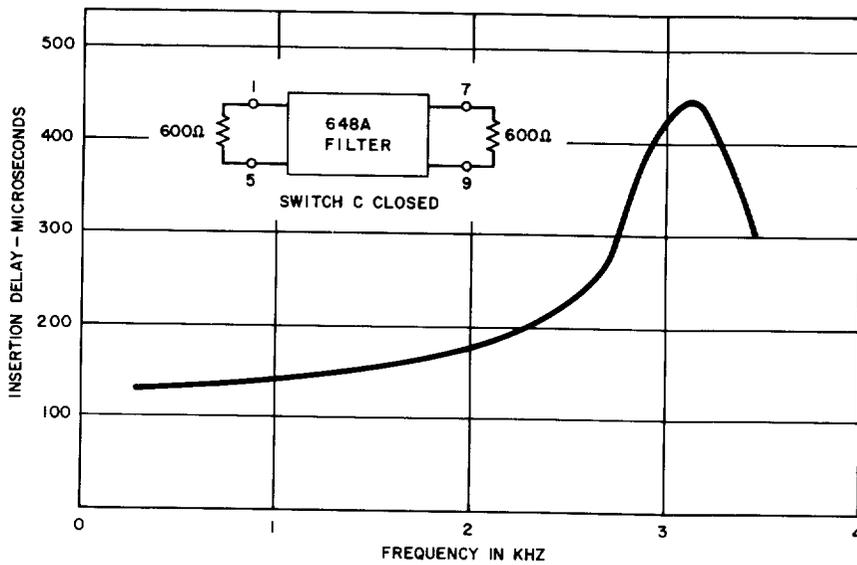


Fig. 4—648A Filter—Return-Loss Characteristic



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Fig. 5 — 648A Filter—Delay Characteristic