

## 359K EQUALIZER DESCRIPTION

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### 1. GENERAL

**1.01** This section describes the 359K equalizer, which is a plug-in apparatus unit designed for use in V4 telephone repeater applications.

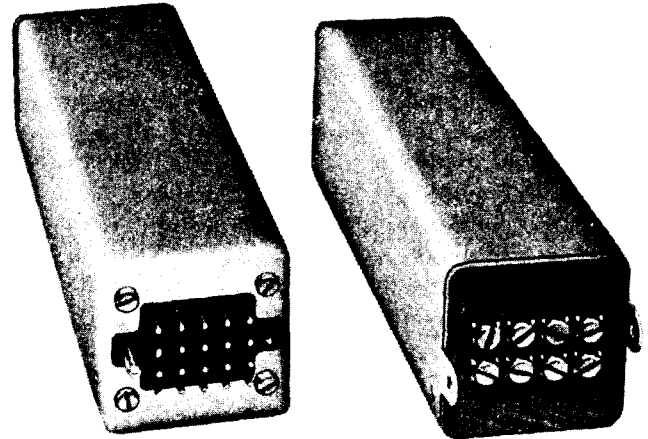
**1.02** The 359K equalizer is an adjustable low-frequency loss equalizer intended for use in applications where circuit gain and loss equalization are required for H44-loaded exchange cable. The 359K equalizer is used in conjunction with a 227-type amplifier to provide adjustable loss equalization, when needed, to flatten the frequency attenuation characteristic of H44-loaded exchange cable over the frequency range of 200 to 3000 Hz.

**1.03** The 359K equalizer contains the same circuit components as the low-frequency section of the 359A equalizer, but contains no high-frequency section since H44 facilities do not ordinarily need high-frequency equalization in the 200- to 3000-Hz range. Unlike the 359A, however, it selects the 600-ohm ports of both amplifiers toward the cable facilities.

### 2. EQUIPMENT DESCRIPTION

**2.01** The 359K equalizer (see Fig. 1) is a plug-in unit equipped with a 20-pin connector plug and is designed to be plugged directly into the equalizer connector socket of the repeater mounting shelf.

**2.02** The 359K equalizer consists of seven resistors and four capacitors mounted on a printed wiring board and housed in a metal can approximately 1-3/4 inches wide by 1-3/4 inches high by 7 inches long. Tabs are provided on the front of the can



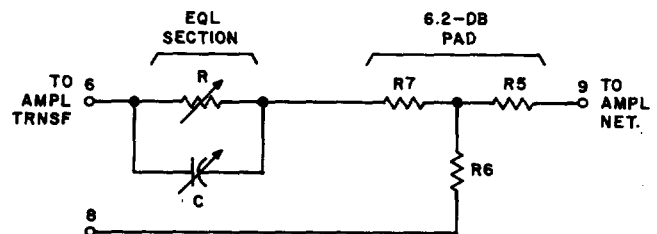
**Fig. 1—359K Equalizer**

to facilitate removal of the equalizer from the repeater mounting shelf with the use of a 602C or 602D tool.

**2.03** Eight screw-type switches mounted in the faceplate permit selection of the indicated component values, as required, when adjusting equalization.

### 3. CIRCUIT DESCRIPTION

**3.01** The general circuit configuration of the 359K equalizer is illustrated in Fig. 2. Resistor R and capacitor C are the low-frequency equalizer; resistors R5, R6, and R7 make up a 600-ohm, 6.2-dB pad.



**Fig. 2—359K Equalizer—General Circuit Configuration**

**3.02** Figure 3 is a schematic of the 359K equalizer illustrating typical circuit connections when plugged into the equalizer socket of a 24V4 or 44V4 repeater. The transmitting side is strapped to provide connections to the AMPL OUT and MON jacks and also connects the 600-ohm transmitting amplifier output to the 4-wire line (H44-loaded cable).

**3.03** The receiving side of the 359K equalizer contains the equalizing components for equalizing the H44-loaded cable. Received transmission signals from the 4-wire line (H44-loaded cable) at terminals 2 and 4 are connected to the 600-ohm receiving amplifier input through terminals 1 and 3. Terminals 6, 8, and 9 connect the equalizing section into the receiving amplifier circuit and select the proper transformer secondary tap to make the input impedance 600 ohms.

**3.04** The equalization circuit consists of a resistor section R made up of R1, R2, R3, and R4 in parallel with a capacitor section C made up of C1, C2, C3, and C4. All are controlled by associated faceplate screw-type switches. Resistors R5, R6, and R7 form a 6.2-dB fixed pad which prevents interaction between the equalizer and amplifier. Resistor R is adjustable from 0 to 3750 ohms in 250-ohm steps, and capacitor C is adjustable from 0 to 3.75  $\mu\text{F}$  in 0.25- $\mu\text{F}$  steps. The resistors are

bypassed when their associated screw-type switches are closed (turned in) and are included in the circuit when the switches are opened (turned out). The capacitors are added to the circuit when their associated screw-type switches are closed (turned in) and are removed when the screw-type switches are opened (turned out).

**3.05** The 359K equalizer provides compensation for loss distortion in the 4-wire line facilities at frequencies up to approximately 1000 Hz. Figures 4 and 5 illustrate typical equalization losses which may be obtained by various combinations of C and R. Figure 4 shows the results of keeping C constant and varying R; Fig. 5 shows the results of keeping R constant and varying C. Adjustment settings of the equalizer normally used have little effect on either the transmission loss or the transmission frequency characteristics above 1000 Hz.

**3.06** While the equalizer components provide compensation for amplitude distortion, they introduce delay distortion at the same time. Figures 6 and 7 illustrate typical delay-frequency characteristics obtained from various combinations of R and C. Figure 6 shows the results of keeping C constant at 0.25  $\mu\text{F}$  and varying R; Fig. 7 shows the results of keeping R constant at 1500 ohms and varying C.

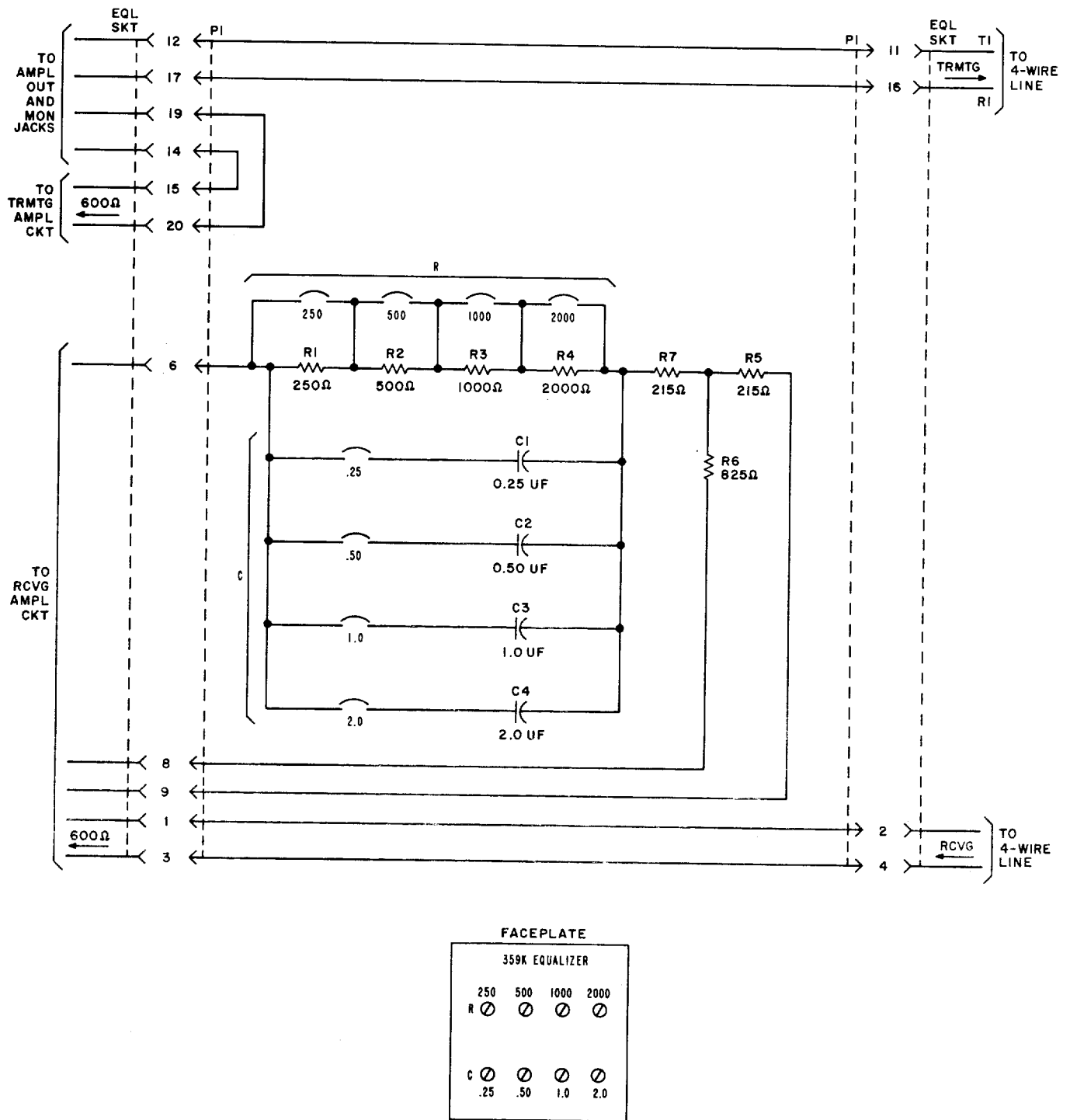


Fig. 3—359K Equalizer—Schematic and Typical Circuit Connections

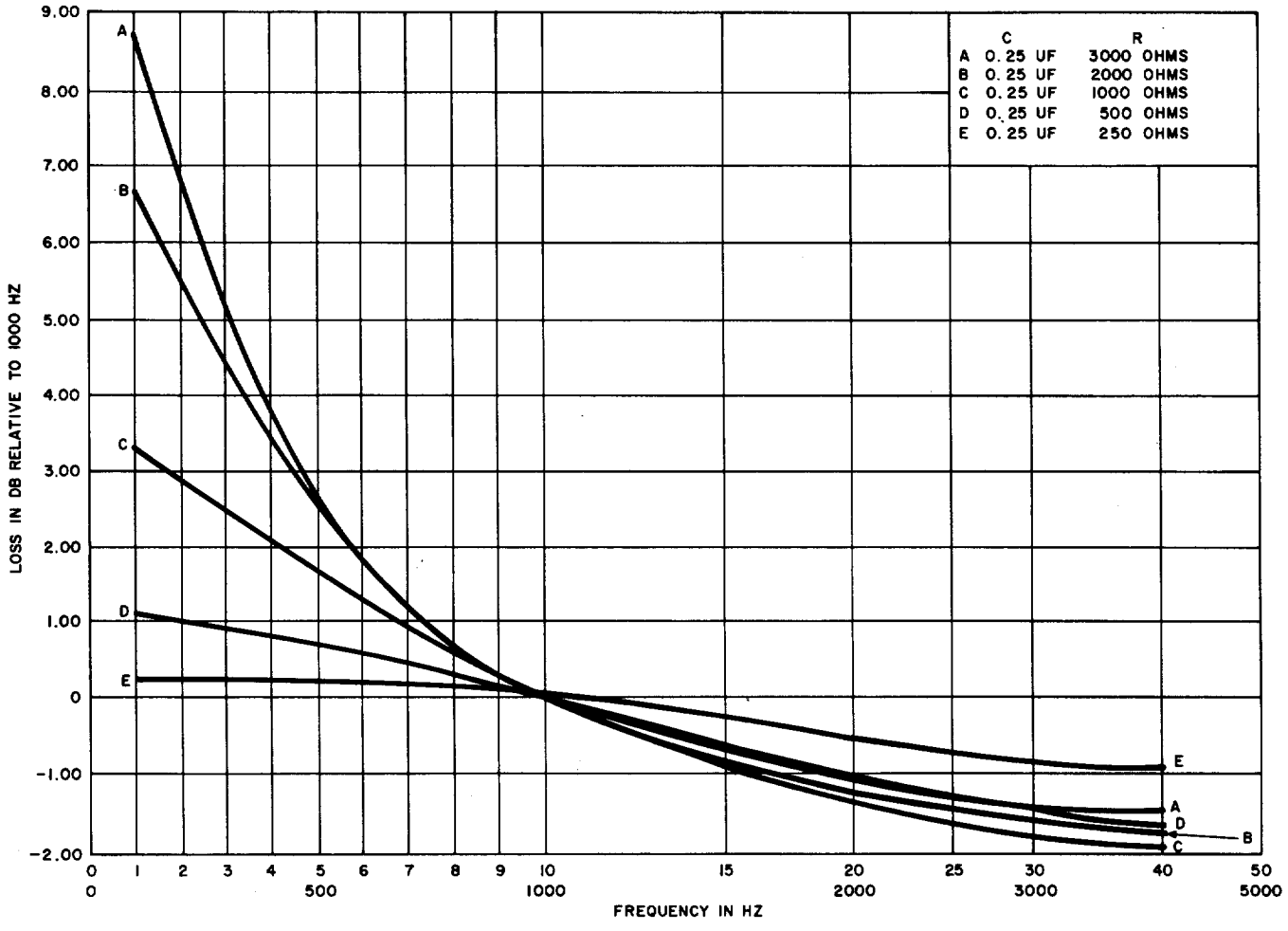


Fig. 4—359K Equalizer—Loss-Frequency Characteristics—Between 600 Ohms—  
Keeping C Constant and Varying R

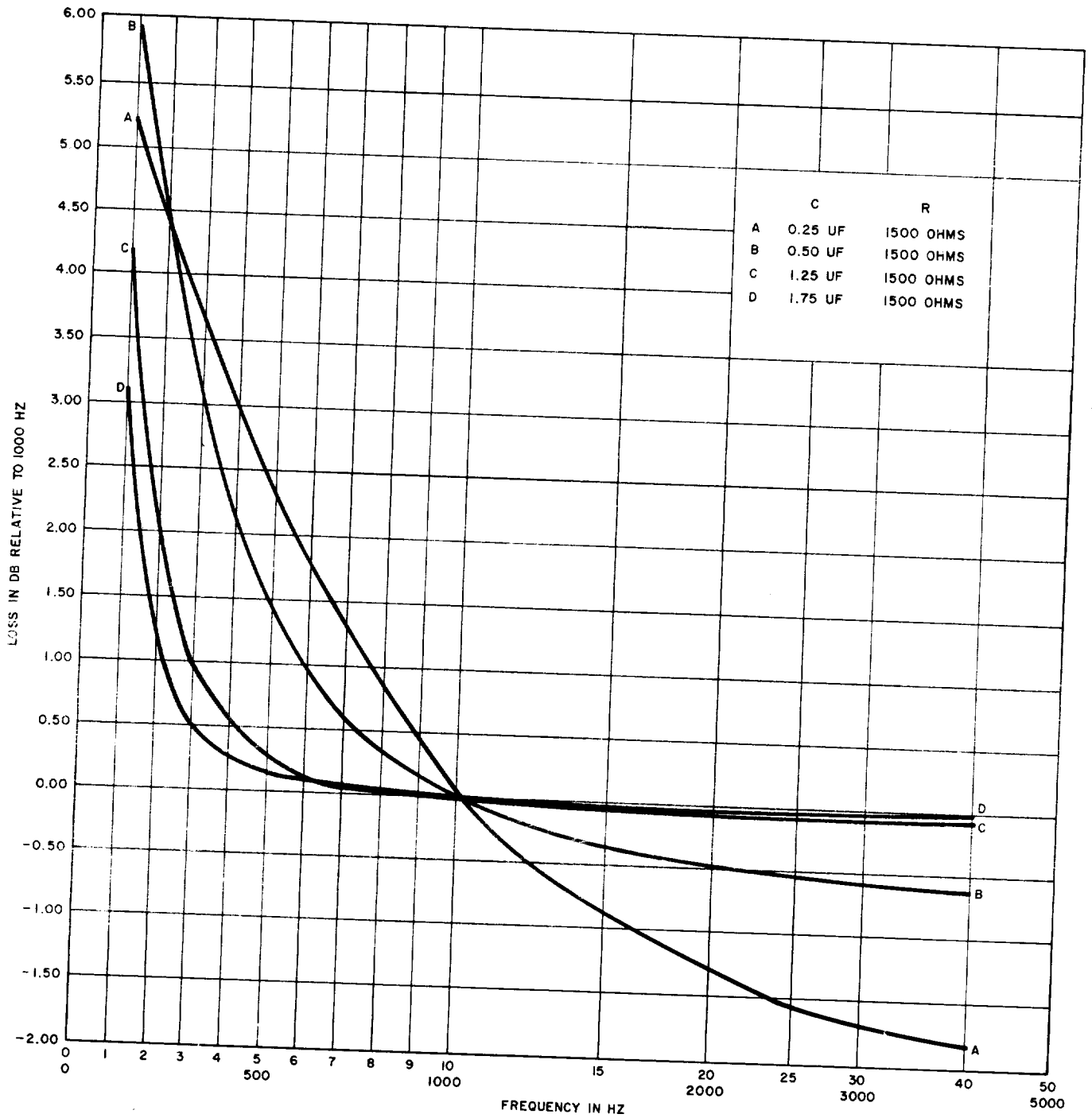
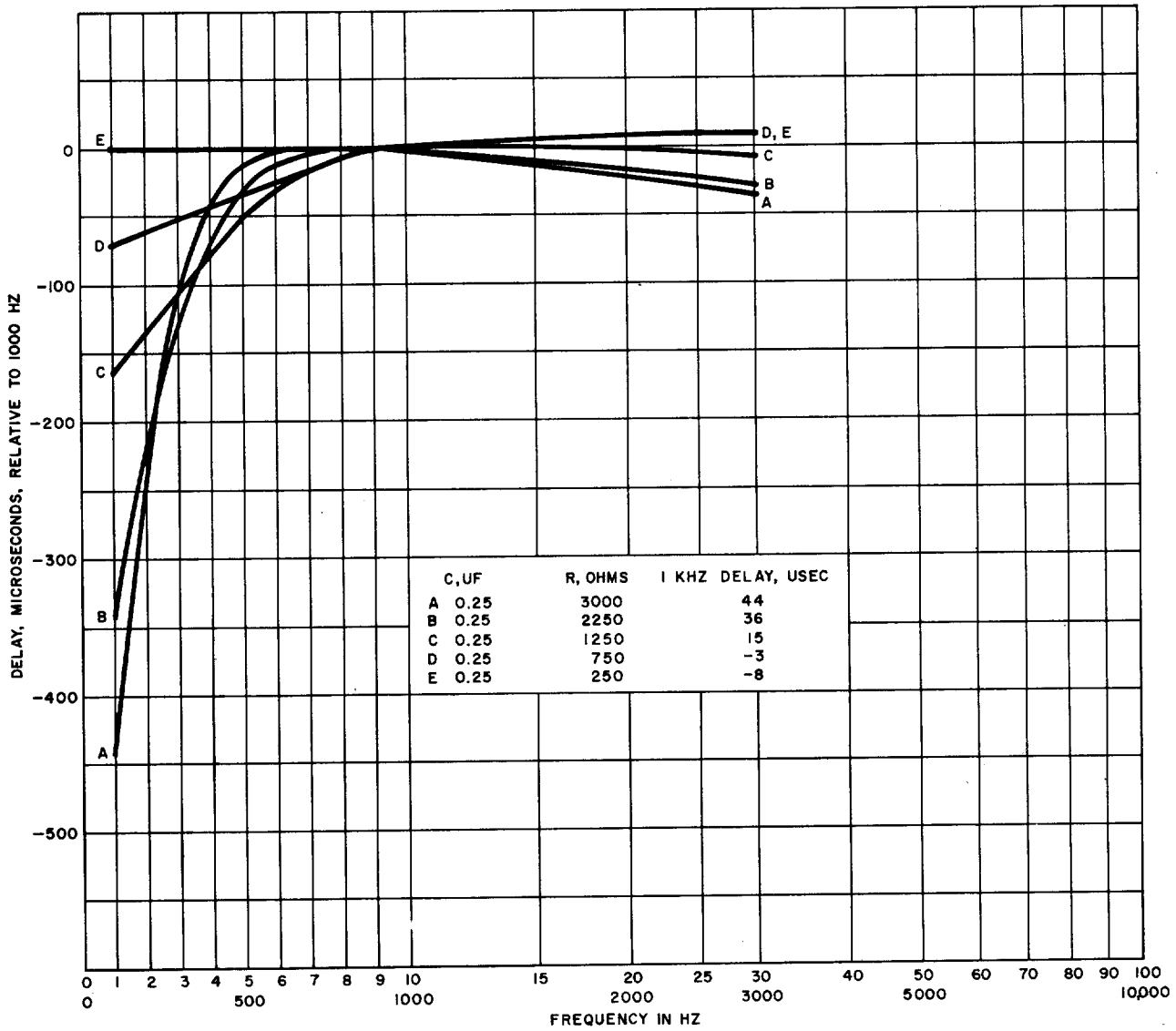


Fig. 5—359K Equalizer—Loss-Frequency Characteristics—Between 600 Ohms—  
Keeping R Constant and Varying C



**Fig. 6—359K Equalizer—Delay-Frequency Characteristics—Between 600 Ohms—  
Varying R for C=0.25 μF**

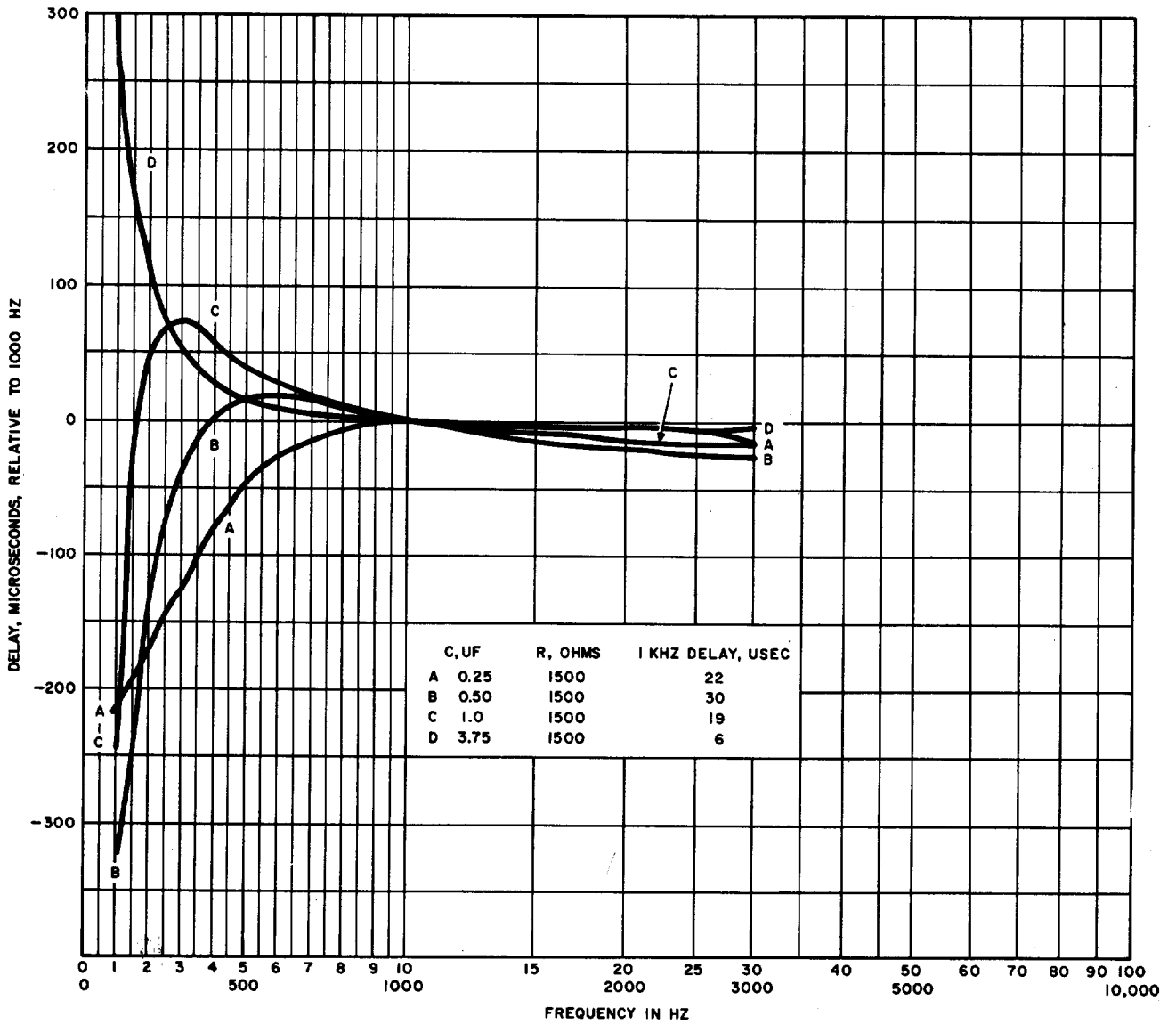


Fig. 7—359K Equalizer—Delay-Frequency Characteristics—Between 600 Ohms—  
Varying C for R=1500 Ohms