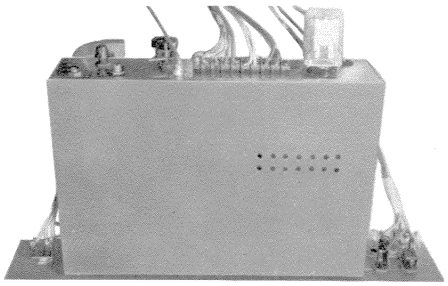
OMNIVOX (continued from page 1)

A block diagram of this system is shown in Fig. 1. Only four tubes are needed in the functional amplifier and control stages. In addition, a 6AL7-GT twin indicator tube provides constant monitoring of the signal applied to the telephone line when using the phone patch. The indicator tube provides a sensitive means for determining optimum balance of the hybrid circuit, gives a visual indication of "zero-beat" and furnishes an indication of the amount of ALC voltage developed.



TOP VIEW of the OMNIVOX model with chassis cover in place. Vent holes in cover and chassis deck provide air circulation around tubes.

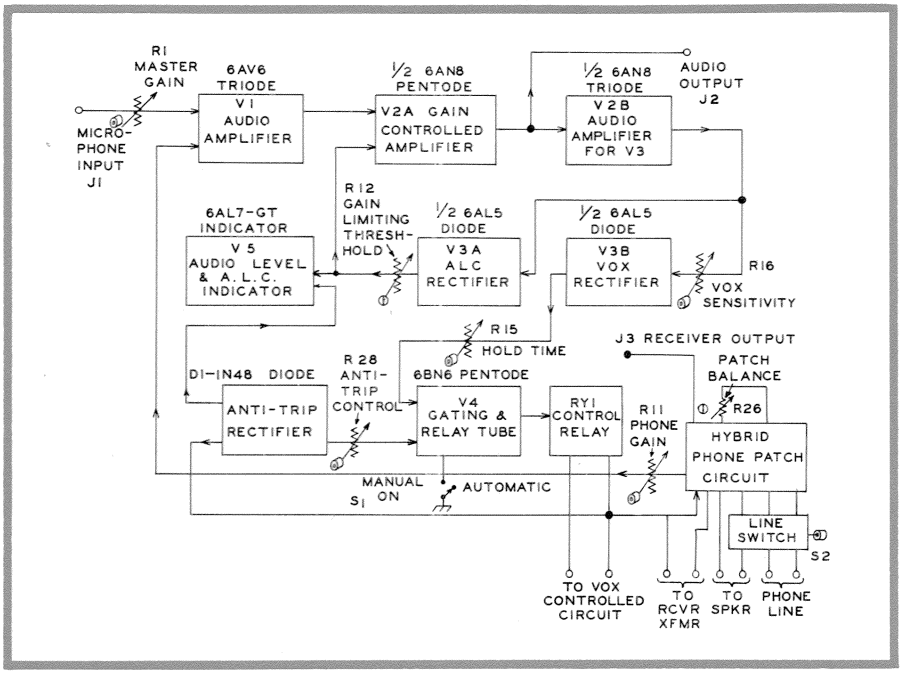


FIG. 1. BLOCK DIAGRAM of the OMNIVOX circuit, showing audio amplifier at top, bias rectifier and indicator tube at center, VOX circuit at bottom and hybrid phone patch at lower right corner. All controls except **Gain Limiting Threshold (R_{12}), Calibrate (R_{35})** and **Patch Balance (R_{26})** are on the front panel.

The gain of the audio system is about 70 decibels, providing adequate amplification from a crystal or other high impedance low level microphone to yield 22 volts at the audio output terminals when no ALC voltage is developed.

The input amplifier in the schematic diagram, Fig. 2, is driven through the master gain control (R_1) which provides the load for the crystal microphone. It also acts with R_2 and R_{11} as a voltage divider to control the amount of telephone signal fed to V_1.

Preamplifier V_1 drives the pentode section of a 6AN8 (V_{2A}), connected as a gain controlled audio amplifier. Inter-stage coupling capacitors C_2 and C_3 provide low frequency attenuation. Circuit and tube capacitances coupled with C_8 provide high frequency attenuation, resulting in the audio frequency response characteristic shown in Fig. 3.

The output circuit of V_{2A} is composed of R_7, C_7, C_8, R_9 and R_{10} in series with the load connected to the output jack (J_2) and the input impedance of V_{2B} connected through R_{20}. When the OMNIVOX is in the "receive" (R_{Y1} not energized) condition, the audio output jack (J_2) is grounded through one of the normally closed contacts of R_{Y1}.

Thus, no audio output can appear at J_2 from the speaker feeding into the microphone, even though both audio stages may be operating at full gain. The paralleled resistance of R_9 and R_{10} is 50,000 ohms, and this, in shunt with R_7, provides a load resistance of 33,000 ohms for V_{2A}. The audio voltage developed across this load resistance is coupled to V_{2B} to provide additional gain for the rectifier circuits of V_3 which provide a positive voltage from V_{3A} for driving the gating tube (V_4), and a negative voltage from V_{3B} for the ALC bias on V_{2A}.

In addition, should the positive going output of V_{2A} exceed the 7.5 volts developed by R_{21} and C_{14} in the cathode circuit of V_{2B}, the 47,000-ohm resistance of R_{20} is shunted across the plate load to reduce the peak gain and provide moderate limiting action. Should greater clipping be desired, R_{20} can be reduced. The peak voltage at which clipping begins can be adjusted by changing the value of R_{21} to develop more or less DC voltage. (It is recommended that R_{21} be no less than 600 ohms.)

THE OUTPUT OF V_{2B} is coupled through C_{13} to V_{3A} where it is rectified and filtered through C_{10}, R_{21}, R_{37} and C_4 to provide a negative voltage proportional to the amplitude of the

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