

RECORDER AMPLIFIER

(From page 37)

As a matter of fact, direct coupling was tried. The values of R_7 and R_{11} were juggled to make the grid of V_3 a few volts negative with respect to cathode. Although the circuit worked satisfactorily with one 12AX7, substitution of another 12AX7 caused the grid to go positive with respect to cathode. Both tubes checked good on a tube tester. Although this may have been the result of one chance in a thousand, it was felt that this was one chance too many, and orthodox RC coupling was therefore used.

V. COMBATTING HUM

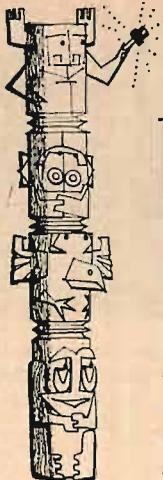
The principal obstacle to a satisfactory signal-to-noise ratio in a tape amplifier is hum. It may consist of the 60-cps fundamental, the 120-cps second harmonic originating in the B+ supply, or the 180-cps third harmonic emanating from the power transformer or transport motor. The battle against hum is of sufficient importance to justify a separate section on this subject.

The following steps were employed to reduce hum to a minimum. Some of these measures produce several db improvement and others only a fraction of a db. Added all together, however, they make possible an inexpensive tape recorder having an impressive signal to noise ratio of 50 db for half-track recording at 7.5 ips, at the same time maintaining low distortion, wide frequency response, and conformance to NARTB equalization.

1. *Common Ground.* All grounds for V_1 , V_2 , V_3 , the shield of the cable leading to the record-playback head, and the arm of S_{1b} were connected to a common lug well-soldered to the chassis at a point near V_1 . This common ground is identified as Point A in Fig. 4.

2. *Hum-Bucking Pot.* A 100-ohm 2-watt wirewound pot (R_{22}) was placed across the 6.3 volt heater supply, with the arm returned to the common ground (Point A). Use of a d.c. heater supply would not render the pot needless inasmuch as the pot helps cancel 60-cps hum introduced at the head and other points as well as hum attributable to use of a.c. on the heaters.

3. *Selected 6AU6.* For best results in playback, as well as when recording from microphone, V_1 must have superior characteristics with respect to hum, noise, and microphones. Although preferred (and relatively expensive) audio pentodes, namely the domestic 5879 and foreign Z729 and EF86, were considered for V_1 , the writers decided instead to use a selected 6AU6, which can be fully as good. The problem of selection is facilitated by the fact that the 6AU6 is

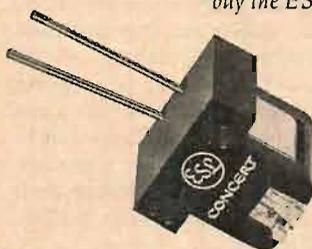


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*Vol. 2, No. 3 (December 1956). Authorized quotation No. 60. Please consult The Audio League Report, Vol. 1, No. 6-7 (March-April 1955) for the complete technical report and listening evaluation of the ESL. Subscription: 12 issues, \$4, from P. O. Box 262, Mt. Vernon, N. Y.

Circle 67a



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