



RCA SERVICE COMPANY, Inc.

A Radio Corporation of America Subsidiary

CAMDEN • NEW JERSEY

MI-9245
MI-12245
MI-12234
MI-12188

CLASSIFICATION: Photophone-Technical-Amplifier

DATE: Feb. 20, 1951

SUBJECT: MI-9245, 12245, 12234, 12188- Feedback

NUMBER: 203-1.04

TO: D1, D2, H1

In subject amplifiers, inverse feedback is employed to reduce distortion and improve output quality.

In these, and similarly designed, amplifiers, wherein the feedback voltage is taken from the primary of the output transformers, any residual hum or ripple which may be present in the rectified and filtered high voltage supply will be feedback along with the signal into the preceding stages. In situations where residual hum may be higher than normal due to capacitor deterioration, rectifier tube unbalance, or other causes, it may occur that the hum voltage feedback will be sufficient to cause excessively high hum level in the amplifier output.

Two means of combating this condition are utilized. In push pull amplifiers such as MI-9245, 12245 and 12234, balanced feedback is employed so that an equal amount of hum voltage is fed back to each side of the preceding feedback stage. When balance has been achieved, the two hum voltages will cancel out in the push pull stage.

In amplifiers such as MI-12188, where the feedback is taken from one end of the output transformer primary to one side of the amplifier input, a hum-bucking voltage is induced in phase opposition to cancel out feedback hum. In this case the hum-bucking voltage is obtained directly from the filter circuit at a point where the hum-bucking voltage will be 180° out of phase with the hum voltage in the feedback circuit. A variable control resistor is connected between the filter circuit and the first amplifier tube, to allow the hum-bucking voltage to be adjusted to the same value as the hum voltage coming back through the feedback circuit.

In situations where it is important that the hum output of the amplifier be held to a minimum, the hum-bucking adjustment in amplifiers of the MI-12188 type can be readjusted whenever necessary. In amplifiers of the MI-9245, 12245, or 12234 type, minimum hum may be obtained by experimentally trying, and interchanging, several pairs of the 6J7 input tubes, to obtain a pair which are matched. In this connection, it is important to note that the two feedback resistors should be approximately equal in value. These resistors are nominally 120,000 ohms each; however, this exact value of resistance is of less importance than having the two resistors in any one amplifier as nearly equal in value as possible. These resistors were originally held to \pm or -1% of equal value in any one amplifier; however, since the variation in 6J7 tubes is quite likely to be of a larger order of magnitude than this, this tolerance may be increased to 5% without serious results. It is conceivable that a slight amount of unbalance in the resistors might even be helpful in obtaining balance, because of the fact that it would permit a slight amount of compensation for 6J7 tubes which ordinarily would not be exactly alike themselves. In such a case, interchanging the two 6J7's might well reduce the objectionable hum to an allowable value.

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