

CHAPTER 10

Volume Expansion and Compression

Volume Expansion — Volume Compression — Typical volume expander — Requirements for received sound to be identical with that in the studio.

It is possible in an amplifier to vary the gain in such a manner that the greater the input the greater the gain. Such procedure is called volume expansion and the reverse action is called volume compression. It is not possible here to comment on the desirability of such systems since many factors have to be considered. Various types of expansion or contraction characteristics can be produced and a wide variation of the time constant can be obtained. In general a time constant of about one-fifth of a second is usually considered reasonably satisfactory, but with elaborate amplifiers it is possible to obtain a more rapid pickup and a slower decline.

A typical arrangement of a volume expander is a resistance-capacitance coupled super-control pentode which is used to amplify the incoming signals, and a separate amplifier also operated from the incoming signal, the output of which is used to feed a diode rectifier and thence to provide negative bias to the control grid of the super-control amplifier. Many arrangements may be adopted, either single or push-pull, the push-pull arrangement being preferable since even harmonic distortion is balanced out. The super-control

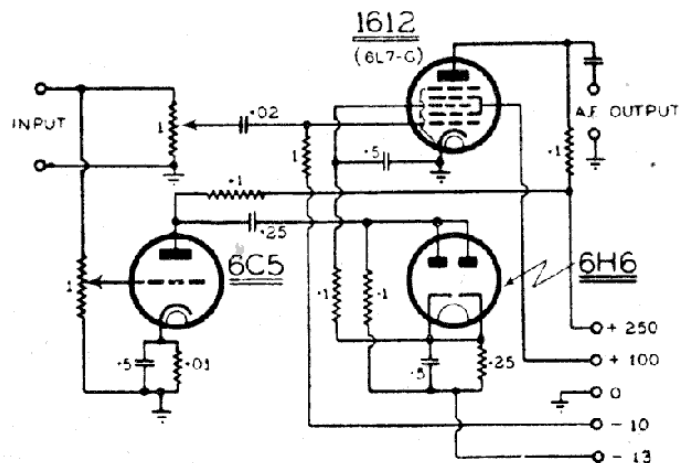


Figure 1

control valve may be either an ordinary R.F. pentode or one of the 6L7-G type. In the latter case use is made of the two separate grids, one being used for the signal input and the other for the control. A very widely used arrangement is shown in Fig 1, which is reasonably satisfactory provided that the input voltage does not exceed 0.25 volt R.M.S.; at higher input voltages the distortion becomes appreciable. In order to avoid microphonic troubles the controlled stage should be Radiotron 1612, this being a non-microphonic equivalent of the 6L7.

Volume compressors are somewhat similar to volume expanders except that the action is inverted.

All existing types of volume expanders and compressors necessarily need to be a compromise. If it is desired to make the received sound identical with that in the studio, it is necessary to have identical contraction and expansion characteristics, and zero time delay. This can only be obtained or approached closely by a system in which a monitor signal is transmitted in order to control the gain in the reproducing amplifier to correspond with the compression in the studio.