FM Tuning Indicator

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Features of a new indicator tube for FM receivers.

A S the FM band continues to gain in popularity and widens in the offering of its program coverage, an increased use of these static-free facilities will be made not only by the listening public, but also for recording studios, transcriptions of programs and tape recordings for future use. Such services require that no distortion at all be present in the signal source, consequently an accurately tuned receiver is the answer.

Appearance on the market of such precise tuners as the Browning RV-10 FM tuner, or RJ-12A FM/AM tuner, possessing tremendous gain ahead of the audio-restoring stages, precludes the employment of the familiar 6U5 tuning eye, connected so as to indicate the maximum limiter current, as a means of resonance indication. For the amount of voltage developed across the limiter grid resistor is often so great as to overlap the tuning eye. Hence, it is impossible to find the exact center of the carrier excursion during modulation. It can also be shown that a slight misalignment of the intermediate frequency channel will lead to a false tuning point, and consequent audio distortion, especially when a high percentage modulation signal is being received. Fortunately, this situation can be remedied through the installation of a new tuning eye indicator tube, the 6AL7-GT, diagrammed in Fig. 1. Requiring an octal socket and a six-wire cable, the installation in either of the above-mentioned tuners requires less than an hour, including time to remove the presently installed resonance indicator (6U5).



Fig. 1. Schematic of 6AL7GT.

Figure 2 shows the limiting stages and discriminator of these tuners, which are identical. The new resonance indicator is wired so that it functions as an indicator of maximum limiting current and also as a zero-center voltmeter, connected to the output of the discriminator. This is one of several possible methods of employing this tube, but it is the method employing its versatility to the fullest for use in an FM tuning system.

It will be necessary to make up the wiring harness and socket, as these do not come ready-made at the present time. Secure an octal socket and shell, and a 3300-ohm, ½-watt resistor. Connect the resistor between pins 6 & 8, mounting the resistor across the base of the socket, and using the lower wiring holes in the contacts. Then

strap pins 1, 2, and 6 together and join that lead of the cable that will be used as ground. Terminal 3 is connected to the cable lead going to B, while terminal 4 will connect to the discriminator cable lead. Pin 5 connects to the lead connecting with the a-v-c voltage line, whether that line be in the FM tuner or in the combination FM/AM tuner. Terminal 7 is the active heater lead, connected to the heater supply line. All connections from the cable are made to the tuner at the identical points from which the presently installed cable connects. However, it will be necessary to attach the discriminator lead that comes from pin 4 to RC filter network before going to the hot diode cathode pin on the 6H6 discriminator socket. In these tuners, this is also #4. Use a 3-5 megohm. 1-watt resistor, and an 0.05-µf condenser as shown for this circuit element. Failure to connect the capacitor will cause the zero center deflection plate to fringe at the edge with modulation taking place, thus making it difficult to tune. However, this combination will in no manner load the diode, nor interfere with the installed standard 75 micro-second deemphasis circuit.

To understand the action of the 6AL7-GT in tuning a station accurately, refer to Fig. 3. The target of this tube is a translucent screen, of two vertical columns. The lower half of both columns is connected to the limiter circuit, so that as the a-v-c voltage increases, this will cause a shortening of the beam. This action aids in locating stations easily. However, the upper left-half of the beam remains at ground potential at all times, as a reference point to which

the upper right beam is adjusted for zero direct current voltage occurring across the discriminator loading resistors. Consequently, to obtain perfect tuning of the set, the lower half of the beam should rise as far as possible while the line across the upper segment should be a horizontal line. Tuning through a few stations will soon familiarize the user with the ac-



Fig. 3. Target of 6AL7GT.

tion of the eye.

It may happen, in those locations where signals are strong, that there will be so much limiter current flowing as to practically extinguish the beam on the tube. This can be corrected easily by using a voltage-dividing network across the a-v-c line, comprising two 2-megohm, ½-watt resistors in series, with the deflection electrode connected at the midpoint of the resistor network. Such a load will in no matter interfere with the a-v-c action of the receiver.

The installation of this new indicator will well repay the effort and cost involved, as it assures the perfect tuning of your FM tuner.

While some users may well prefer to install expensive meters for tuning, the device described serves as well.



Fig. 2. Limiter and discriminator stages of typical FM tuner.