

Modulator for the Small Transmitter

TELEPHONY OPERATION
FOR THE NEWLY-LICENSED

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Though the speech-amplifier/modulator shown here will only give about 5-6 watts of audio, it is adequate for a low-power or Top Band transmitter and would be an effective audio driver unit for a later high-power modulator.

—Editor.

THERE are more and more amateur licences being issued and it is very often a case of newly-licensed stations getting going on telephony immediately, using some kind of temporary modulation system with the idea that "so long as the other chap can hear me, what does it matter?" One must bear in mind, however, that many of these "temporary" modulation methods can cause very severe interference to other stations.

The writer has, on a number of occasions, lost contact with a DX station just because some local using a "lash-up" rig has switched on at the other end of the band. Some time ago, he worked a station who claimed to be using NBFM—the FM was about ± 20 kc of the nominal frequency, and was very difficult to resolve. However, it was later revealed that cathode modulation of the PA was being

employed, and it was called NBFM just because it happened to frequency-modulate the carrier! Newcomers to Amateur Radio should note that it is good practice to carry out tests on transmitters and modulation systems using an "artificial aerial" load, and only to radiate a signal if the gear is known, by monitor checks, to be working correctly.

The circuit of a simple plate-and-screen modulator is shown in the accompanying diagram. It consists of a 6J7 microphone amplifier, a 6J5, and a metal 6L6 output valve—all these valves are readily available, and are cheap to buy from Magazine advertisers. Using a deaf-aid crystal microphone, this modulator gives quality reported as "excellent," and provides ample modulation for a ten-watt carrier.

An RF24 unit chassis and cabinet were adapted for the construction, making use of the three valve-holder holes originally occupied by the SP61's. Any convenient form of construction can be followed, provided only that the grid and anode leads are, of course, kept as

Table of Values

Fig. 1. Circuit of Simple Modulator by G3KEP

C1, C5	= 25 μ F, 25v. wkg.	R2	= 2,200 ohms, $\frac{1}{2}$ -watt
C8	= electrolytic	R3, R9	= 220,000 ohms $\frac{1}{2}$ -watt
C2, C6	= 8 μ F, 350v. wkg.	R4	= 1 megohm, $\frac{1}{2}$ -watt
	electrolytic	R5, R8	= 47,000 ohms, $\frac{1}{2}$ -watt
C3	= .01 μ F paper	R7	= 100,000 ohms, $\frac{1}{2}$ -watt
C4	= 0.1 μ F, 350v. paper	R6	= 1,000 ohms, $\frac{1}{2}$ -watt
C7	= 0.05 μ F paper	R10	= 330 ohms, $\frac{1}{2}$ -watt
VR1	= 500,000 ohms variable	V1	= 6J7, EF37A
T1	= Modulation transformer, see text	V2	= 6J5, 6C5
R1	= 2.2 megohms, $\frac{1}{2}$ -watt	V3	= 6L6, 6V6

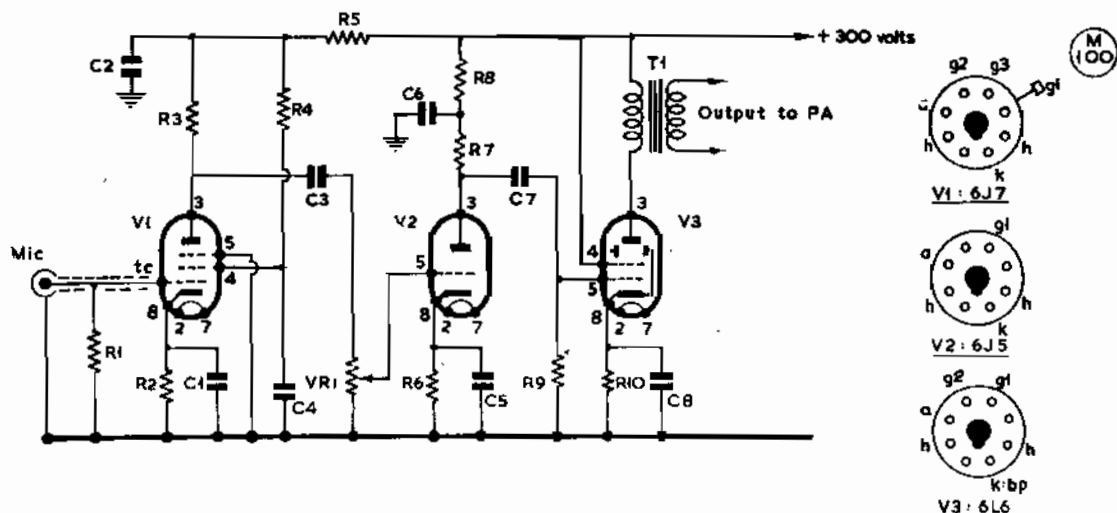


Fig. 1. Circuit of the simple modulator described in the article by G3KEP. With this unit an audio output, of good quality, of about 5-6 watts should be obtained. This is sufficient to modulate fully a standard 10-watt carrier on Top Band, or to drive a high-power audio amplifier for a more ambitious transmitter.

short as possible, and screened wire used where necessary. Any small modulation transformer capable of handling about 6 watts of audio may be used. The old Ferranti OPM1 is available from most "surplus" stores, and provides ratios of 1:1, 1:1.6 and 1:2.7.

Power Supply

It is preferable that the power for this modulator be taken from a separate power supply and not from the one which supplies the transmitter. However, if a common power unit has to be used, it is essential that it has good regulation, with the HT to the VFO satisfactorily stabilised, or frequency modulation will result.

It should be stressed here that unless the RF side of the transmitter is working correctly, much time and effort are likely to be wasted in trying to produce satisfactory results under modulation. Hence, the rig should be set up under artificial load conditions, with local monitoring. The artificial load can be a lamp, or a link-coupled tuned circuit with a lamp in series with the variable condenser, and monitoring can be on the station receiver, using headphones. For adjustment of the transmitter on the aerial, the Radiation Meter, as described by G5GQ in the July 1958 issue of *Short Wave Magazine*, can be used.

The writer would like to express his thanks to G3MAL and to the Bradford Grammar School Amateur Radio Club (G3MHB) for using a modulator circuit to the accompanying design, and for carrying out extensive tests of its capabilities under on-the-air conditions.

NEW G.P.O. MICRO-WAVE LINK

The Southern Television programmes are being carried to the ITA transmitter at Chillerton Down, I.O.W., over a link provided and operated by the Post Office. This link is in two parts. One carries the ITA national network programme from London to the Southern Television studio at Southampton. The other pipes the locally-provided programme and advertising material, inserted at the studio, to the ITA transmitter at Chillerton Down on the Island.

These links total some 125 miles, mostly by microwave radio relays, but partly by coaxial cable at the Southampton end.

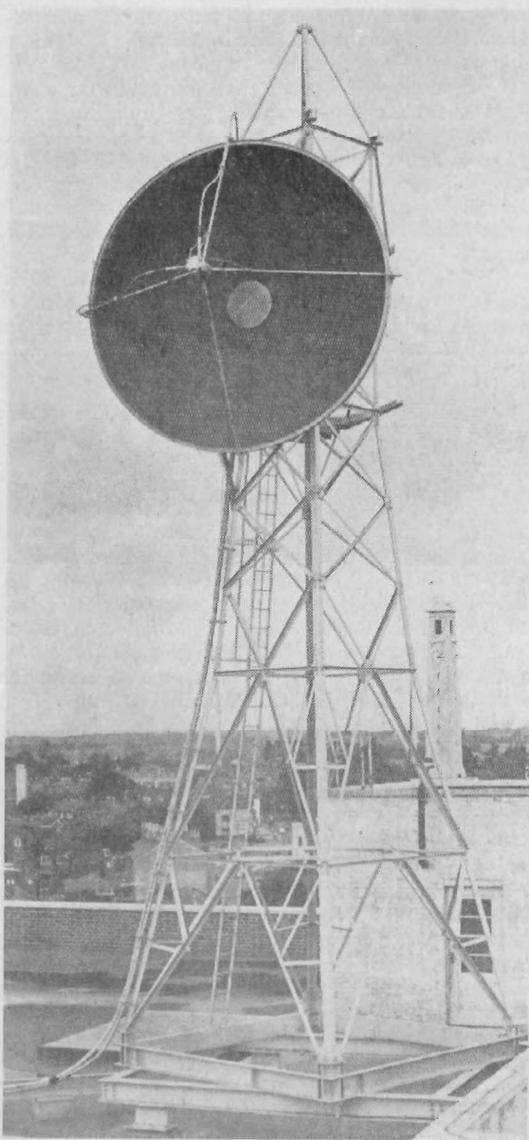
The London-to-Southampton system comprises a two-hop microwave radio-relay link, 83 miles in length, operating in the 4000 mc band and installed on the existing route from Museum Telephone Exchange, London, via a repeater station at Golden Pot, near Alton, Hants, to the receiving terminal situated in the BBC's TV station at Rowridge, Isle of Wight; the signal is then passed on coaxial cable from Rowridge to the ITA station at Chillerton Down. A single-hop microwave radio-relay link, 18 miles in length,

operates in the 2000 mc band to pass the signal to the ITA station at Chillerton Down from the Post Office terminal in Southampton.

To guard against equipment failures during programme time, all the apparatus, with the exception of aerials, is duplicated throughout to provide two independent signal paths.

Some Technical Details

The 4000 mc radio equipment serving the Museum-Golden Pot-Rowridge link was designed, manufactured and installed by the Radio Experimental Branch of the Post Office Engineering



The 30ft. tower and 2000 mc dish at the Southampton radio terminal for the ITA link to the Isle of Wight, provided by the Post Office.