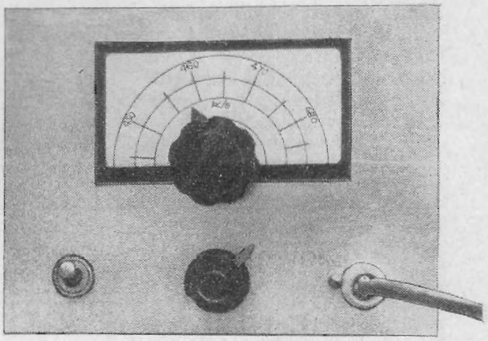
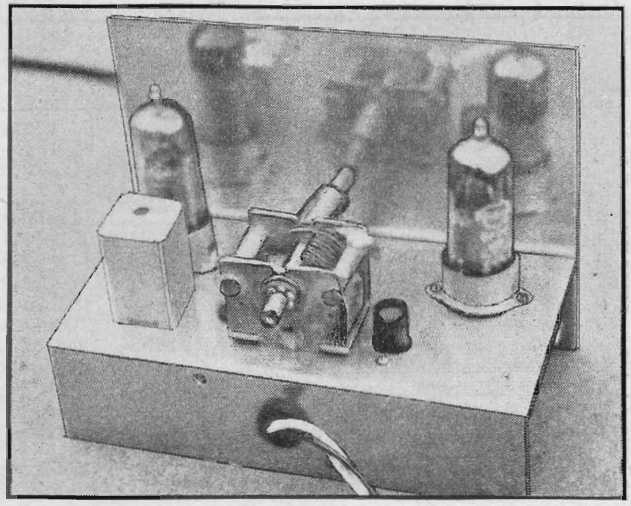
MODULATED TEST OSCILLATOR FOR THE I.F. RANGE



By David Noble, G3MAW
and David M. Pratt, G3KEP

MANY AMATEUR SERVICE ENGINEERS AND constructors are often faced with the problem of aligning the i.f. strips of receivers. Although it is generally considered to be an easy matter to align a receiver i.f. strip by carefully tuning the i.f. transformers in turn for maximum strength of an incoming signal, this method may be overruled if each transformer of the strip is a long way out. This can well be the case with a newly constructed receiver, and it is necessary, therefore, to either possess or to have access to a reliable signal generator covering the i.f. range. Basically, the ideal method of aligning a receiver i.f. strip is to feed on to the grid of the mixer stage a signal at the i.f. frequency modulated with a continuous note. An a.c. meter placed across the loudspeaker terminals should now show a deflection, and the i.f. transformers may be tuned for maximum reading.

The signal generator need not be very elaborate, and can be made as shown on a chassis 3in x 6in x 1½in. The front panel is 4½in x 6in.



In this rear view of the generator can be seen the oscillator coil on the left. The modulation level potentiometer is mounted just to the right of the main tuning condenser

An EF80 operates as a Clapp oscillator variable from 445 to 490 kc/s. The coil L consists of one bank of an i.f. transformer. This was carefully removed from its original former and slid on to a smaller former of the same diameter. For constructors wishing to wind their own coil, it consists of 270 turns of 20/0.002 Litz wire wavewound, $\frac{5}{16}$in bank-width, and on a $\frac{9}{32}$in diameter former. The coil is permeability tuned with a dust iron core. Another EF80 is employed as a 1,000 c/s phase-shift oscillator. The output of this is fed via a condenser to the screen grid of the r.f. oscillator, thereby applying sine wave modulation. The degree of modulation can be adjusted by means of the potentiometer VR_2. Instead of the usual r.f. choke in the cathode of the Clapp oscillator, a 10kΩ carbon potentiometer is fitted, the slider being connected via a 100pF condenser to the output socket. Although this does not permit the output level to be accurately calibrated, it enables a variable signal level to be obtained. It is necessary to calibrate the frequency of the generator using either a receiver which covers the normal i.f. range, or by beating it with another signal generator which is calibrated. The writers' instrument was calibrated using an R.1155 receiver.

Power Supplies

The signal generator may be run from any

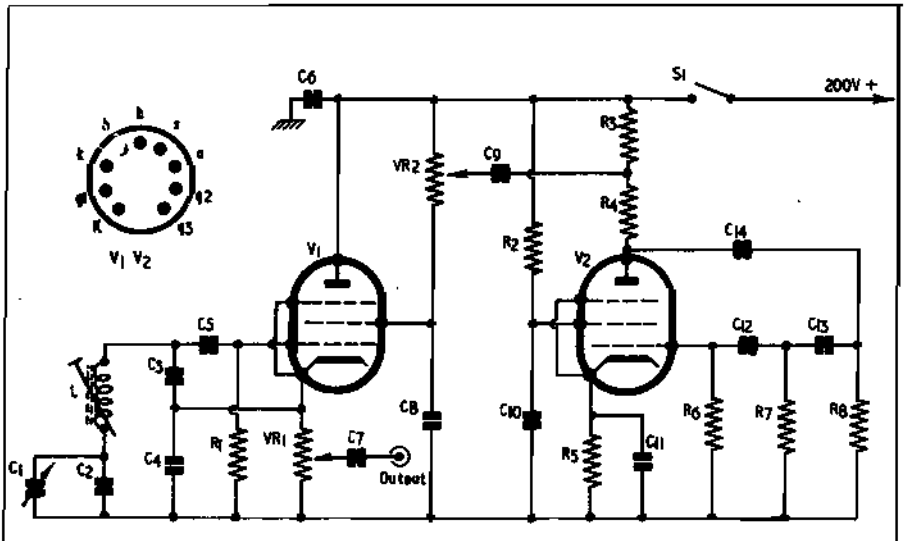


Fig. 1. Circuit diagram of the I.F. Range Modulated Test Oscillator

E735

Components List

Resistors

R_1 100kΩ
R_2, R_5 1,000Ω
R_3 4.7kΩ
R_4 10kΩ
R_6, R_7, R_8 100kΩ

Miscellaneous

VR_1 10kΩ carbon pot.
VR_2 100kΩ carbon pot.
S_1 S.P.S.T. toggle switch
V_1, V_2 Valves type EF80
L See text

Also required:
Two B9A valveholders

Capacitors

C_1 75pF variable
C_2 220pF silvered mica
C_3, C_4 1,000pF silvered mica
C_5 100pF silvered mica
C_6 0.01μF paper
C_7 100pF ceramic
C_8 2,000pF ceramic
C_9 0.02μF paper
C_{10} 0.1μF paper
C_{11} 25μF, 25 volt electrolytic
C_{12}, C_{13}, C_{14} 500pF silvered mica

Co-axial socket
Chassis and front panel

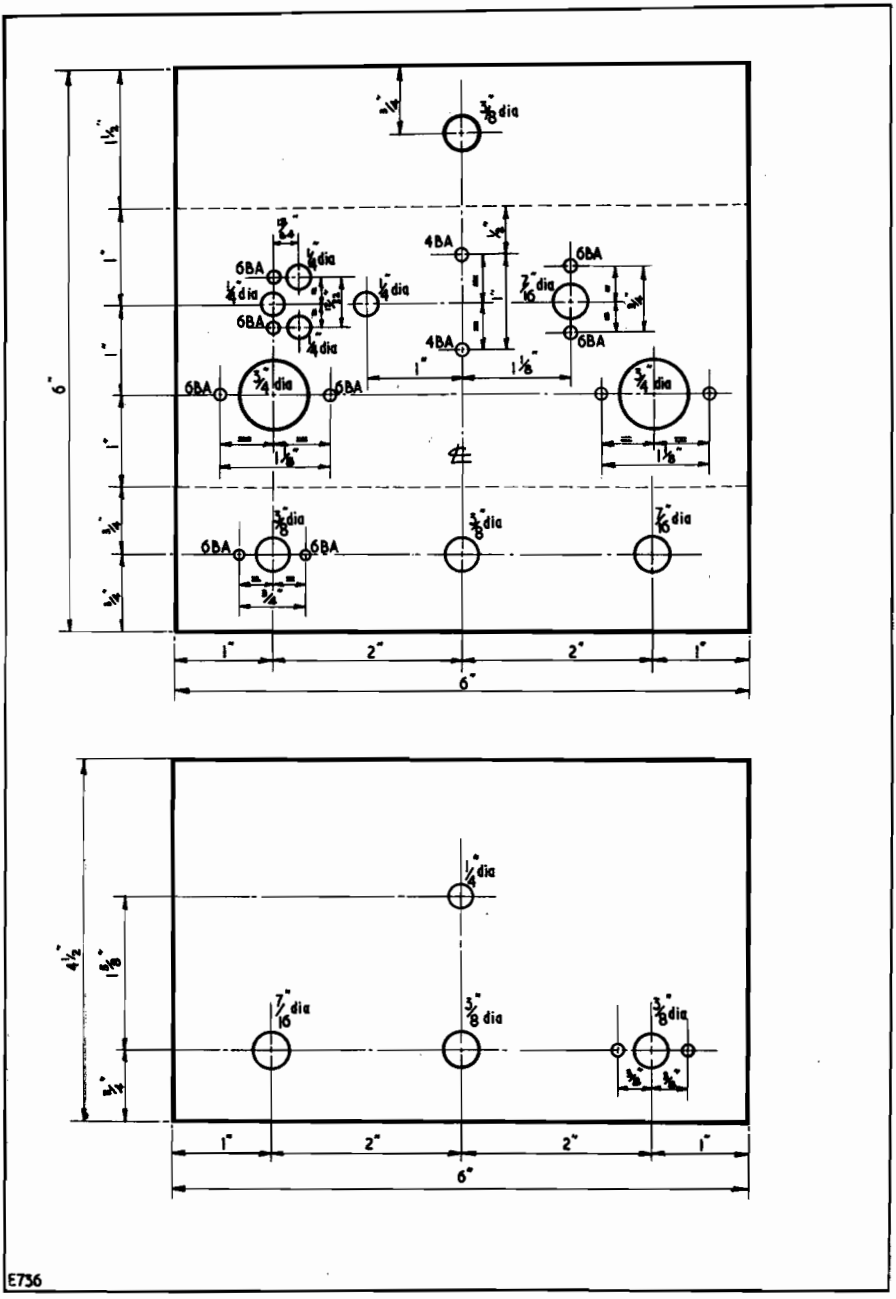


Fig. 2. Drawing showing chassis drilling dimensions. The chassis sides should be bent upwards on the dotted lines shown

Fig. 3. Dimensions for drilling the aluminium front panel

suitable power supply capable of providing 6.3 volts at 0.6 amp, and about 200 volts at 30mA.

Alignment Procedure

The receiver to be aligned must have its tuning condenser vanes fully meshed, and the local oscillator should be rendered inoperative by connecting a short piece of wire across the appropriate section of the tuning gang. The signal generator should now be set to the i.f. of the receiver, and connected to the control grid of the mixer valve. An a.c. voltmeter is connected to the loudspeaker terminals, and working backwards through the receiver beginning with the secondary of the last i.f. transformer, and ending with the primary of the first transformer, the cores should be trimmed for maximum deflection of the meter. As the circuits come into line, the gain of the strip will increase, and it is necessary to reduce the signal generator output to prevent the a.v.c. operating. During the alignment, however, the receiver volume control must be kept in the same position.

This little alignment generator has proved indispensable during the servicing and construction of receivers, and the circuit given should prove of interest to many readers.