An A.F. Phase-Shift Test Oscillator

by D. Noble and D. M. Pratt

A RELIABLE audio oscillator capable of providing a pure sinusoidal tone is an indispensable piece of equipment in the amateur workshop. Its uses are numerous, and without an audio oscillator, there are some tests which cannot be carried out on certain types of apparatus. This oscillator can be used to check the modulation of an amateur transmitter, and to practise Morse code as well as for many applications in audio amplifier design and testing.

The completed oscillator.

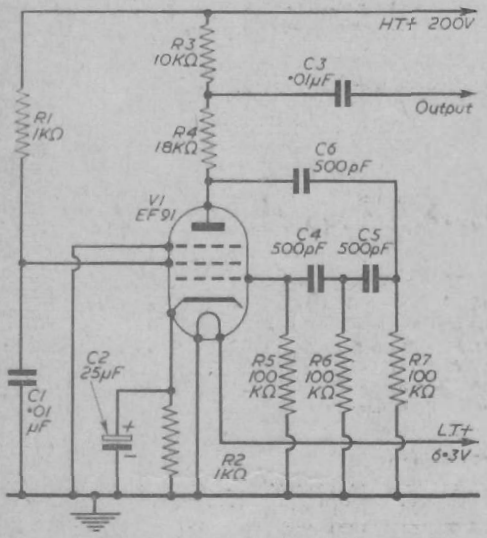


Fig. 1.—The circuit diagram.

The Circuit

A 'phase-shift' oscillator is employed, and this is shown in Fig. 1. The values of the capacitors C4, C5, C6 and the resistors R5, R6, R7 determine the frequency of oscillation and the values suggested in the table are calculated to give a frequency of 1000c/s.

Refinements to the circuits can include an H.T. switch, a potentiometer across the output to provide an adjustment of the output voltage, and a short-circuit type jack socket for a Morse key.

Construction

As can be seen from the illustrations, there are two suggested forms of construction; one of conventional design, and the other employing modern printed circuit techniques. It should be mentioned, however, that the wired version uses a valve with a B9A base, whereas the printed circuit uses a EF91 valve having a B7G base. Also, in the former case, an H.T. switch, output potentiometer and socket, and key jack are provided on the unit.

There are printed circuit kits at present available from PRACTICAL WIRELESS advertisers, and it is intended here to give full constructional details of the printed circuit oscillator so that readers unfamiliar with printed circuit techniques can try their hand at this new method of construction.

The oscillator is built on a piece of copper laminate 2in. by 3in. Having cut a piece of laminate to size, the first step of construction is to cover the copper which is required to form the

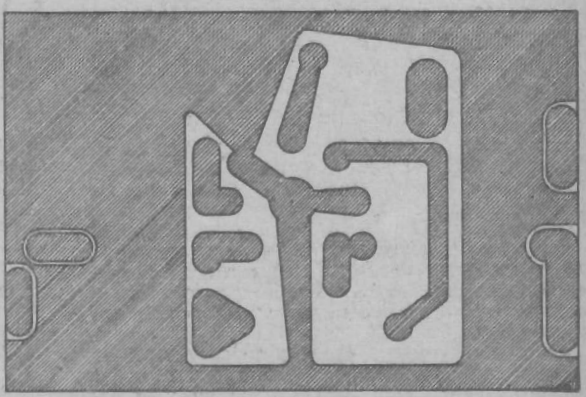


Fig. 2.—The printed wiring (full size).

'printed' wiring with acid-resistant paint. Fig. 2 shows a full scale plan of the panel after it has been painted. This is then etched in the acid, after which the paint is cleaned off with a paint thinner solution. In Fig. 3, the components are shown in position as seen from the underside of the panel, i.e., the components are actually on the reverse side of the laminate.

Drilling

The next step is to drill the printed panel: the valveholder pins, and the points from which external connections are to be made should be drilled with a 3/32in. drill, and the spigot of the valveholder with a 5/32in. drill. Each end of the resistor and capacitor positions are drilled with a No. 55 drill. This may be done easily by placing the components on the panel and marking the ends of the wires of the components with a centre punch.

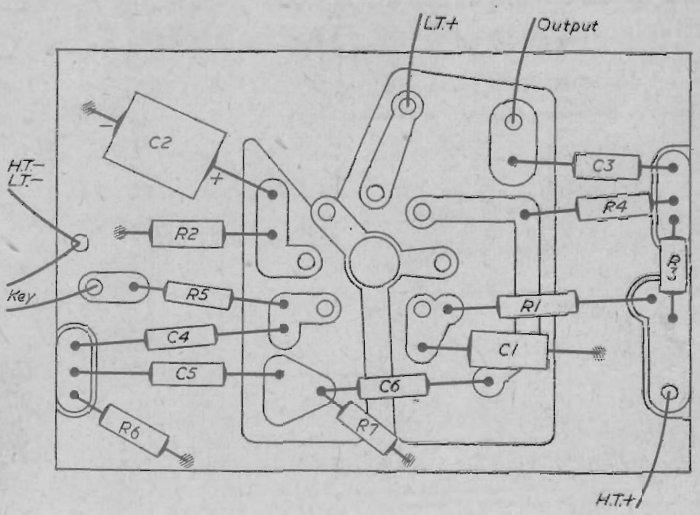
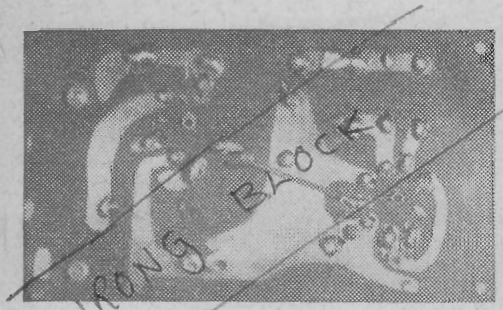


Fig. 3.—The wiring diagram.



The printed wiring.

Components

Before the drilling is carried out, it is recommended that the constructor obtains the components so that any slight changes in the component positions owing to differences in component sizes can be made. In the prototype the 500pF condensers were of very small size. They were about the same size as the resistors used, while the two 0.01μF condensers were a little larger. A special printed circuit B7G valve holder is required, and this may be obtained from most dealers.

It is recommended that small 3/32in. eyelets be fitted into the panel at the positions from which the external connections are to be made. These are provided to prevent the external wire leads from peeling the copper from the panel.

This oscillator unit will operate from a power-pack supplying 6.3V for the EF91 heater, and 200V H.T.

SIMPLE BATTERY CHARGER

By S. G. Wood

THE charger here described has proved both cheap and efficient. As will be seen from Fig. 1, a metal rectifier is employed and the low voltage A.C. input required is supplied by a mains transformer. Fuses are inserted as shown to provide a measure of protection and these can each be of 3A rating. The ammeter A is a small one, reading from 0 to 4A. However, a serviceable meter may be obtained cheaply from a car dismantling yard. The resistance R is necessary to vary the rate of charge, and can be a heavy duty type with a resistance of approximately 15 to 20Ω. As the rate of charge will not exceed 2A, the entire unit may conveniently be housed within a metal box so long as sufficient ventilation is provided.

As with all battery charges, polarity must be observed, and it is always advisable to remove the "stoppers" from each cell before commencing the charge.

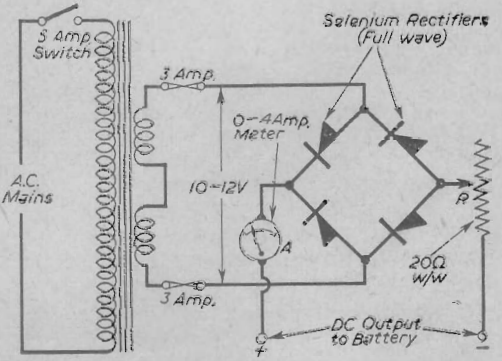


Fig. 1.—The charger circuit.