

PORTABLE OSCILLATOR PTS/15

Introduction

The PTS/15 is a miniature battery-operated oscillator designed for use on O.B. work, in conjunction with an OBA/8 amplifier, for sending line-up tone to the controlling studio centre. It has a fixed frequency of 900 c/s, and an output of about -54 db into 300 ohms.

It uses a single subminiature pentode in a 4-section resistance-capacitance oscillator network. To provide an adequate output, the valve is driven rather hard, and the harmonic content is therefore high, although this is not of great importance in the application for which the instrument is designed.

sent to line is decided by the setting of the OBA/8 volume control, the battery can continue to be used as long as oscillation is maintained.

Circuit Description

Fig. 9.9 shows the circuit diagram of the oscillator, with details of the valve base and battery connections inset. Positive feedback between anode and grid is applied via the frequency-determining network C1-C5, R1-R6, which rotates the phase of the grid signal by 180 degrees exactly at one particular frequency determined by component values. Provided that the gain of the valve is not less than the loss in the feedback network,

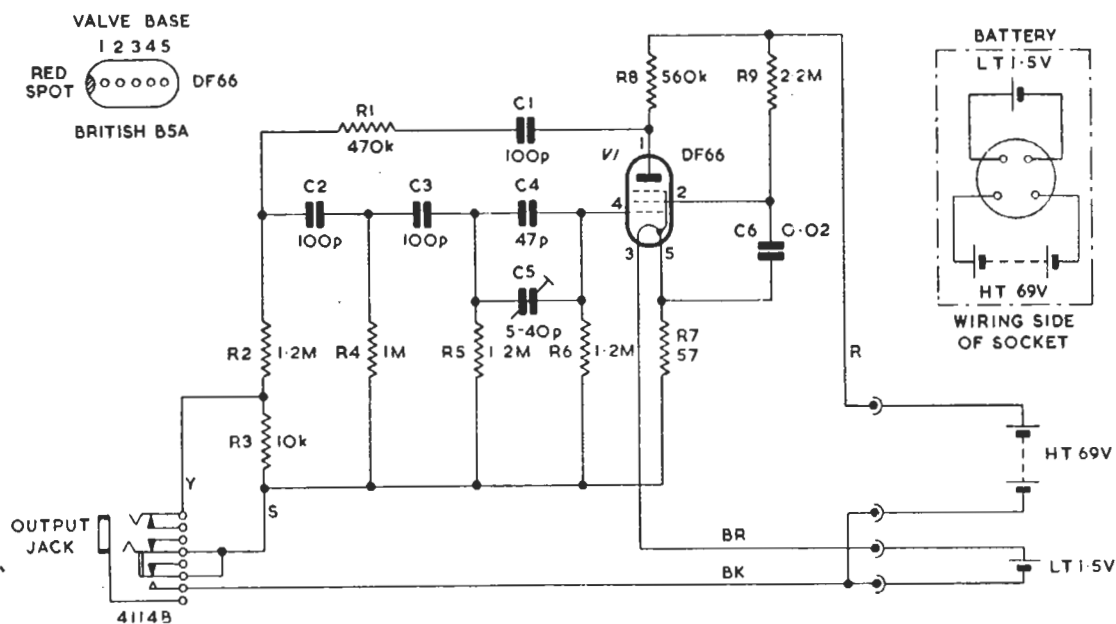


Fig. 9.9. Portable Oscillator PTS/15 : Circuit
Drawing No. EA 7788

The small receiver-type battery provides 69 volts h.t. and 1.5 volts l.t., the l.t. supply being switched on only while there is a plug in the output jack. With normal use, the battery should last for several months.

As the battery deteriorates, the output level gradually falls, and finally reaches about -67 db before oscillation ceases; since, however, the level

oscillation occurs at this particular frequency. Accurate adjustment to 900 c/s is effected by the trimming capacitor C5.

Grid bias is derived from the filament-voltage dropping resistor R7, which reduces the 1.5-volt supply to 0.625 volt. The total anode load is of the order of 500 k Ω . The output impedance is 10 k Ω and is intended to feed into a 300- Ω load.

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Mechanical Construction

The instrument is mounted in a rectangular case measuring $5\frac{1}{8}$ in. by 4 in. by $2\frac{3}{8}$ in. The bottom and sides of the case are constructed from a single bent-up duralumin sheet: screwed to this are two laminated-plastic end-plates, to which in turn is attached a top panel carrying the output jack. Two further panels, which are a sliding fit in grooves in the end-plates, are accessible when the top panel is removed; one of these sliding panels divides the battery compartments from the oscillator compartment, the other forms a withdrawable chassis, on which the oscillator components, including the valve-holder, are mounted facing inwards, the wiring being run on the reverse side of the chassis and brought out to individual components through small holes.

Flexible leads from the oscillator chassis and output jack are connected to a 4-pin plug, which engages with a socket wired to the battery terminals. The battery plug and socket are accessible when the top panel of the case is removed.

General Data

Valve

Mullard DF66 on British B5A subminiature (flat) base.

Supplies

H.T. supply, 69 V, $80 \pm 20 \mu\text{A}$.

L.T. supply, 1.5 V, $15 \pm 1.5 \text{mA}$.

Battery

Either Ever Ready B114, or Exide Drymex 514.

Impedances

Output $Z=10 \text{ k}\Omega$

Normal load $Z=300 \Omega$

Component Types

Trimming capacitor C5, T.C.C. Type TCK 0540.
Screen-decoupling capacitor C6, T.C.C. Type CP33N, $\pm 20\%$.

Other capacitors, Hunt Type L1/2S, $\pm 2\%$.

Cathode-bias resistor R7, Welwyn Type SA 3611,
 0.125 W , $\pm 2\%$.

Other resistors, Erie Type 9, 0.25 W , $\pm 5\%$.

Output jack, S.T. and C. Type 4114B.

Battery connector, 4-pin Carr 'Fastener', Cat.
No. 2745.

Valve socket, McMurdo Type XSM 5 US.

Test Data

Test Conditions

H.T. voltage, not less than 66 V.

L.T. voltage, not less than 1.45 V.

Load resistance, 300Ω .

Frequency

900 c/s; limits of adjustment, $\pm 18 \text{ c/s}$.

Output Level

-54 db ± 3 db.

Percentage Total Harmonic Content

Less than 10%.

Maintenance

Battery Replacement

Remove the two screws at each end of the top-panel, and lift the panel clear of the case. Withdraw the plug attached to the oscillator from the socket attached to the battery, and slide the battery out of the case. Attach a new battery to the socket, referring to the inset sketch (Fig. 9.9) for the method of wiring. Insert the battery in its compartment, connect plug and reassemble the case.

Valve Replacement

Remove the top-panel, unplug the battery, and slide the component-mounting panel out of the case. When replacing a valve, take care that the red spot on the valve-base is adjacent to the red spot on the panel. Replace the rubber band securing the valve.

Frequency Adjustment

After a change of any component, including the valve but excluding the battery, the frequency should be re-checked and, if necessary, re-adjusted to 900 c/s. (The trimmer capacitor can only be reached when the component-mounting panel is withdrawn from the case.) Since the h.t. and l.t. voltages have a slight but appreciable effect on the frequency of oscillation, it is desirable to use a reasonably fresh battery for the test.

To measure the frequency, feed tone from the PTS/15 through an OBA/8 amplifier, and beat the output with a supply from a calibrated 900-c/s source.

G.H. 1253