

SECTION 21

FIXED FREQUENCY OSCILLATORS: OS2 SERIES

OSCILLATOR OS2/4

General Description

The OS2/4 is a 900-c/s RC oscillator of the Wien-bridge type, with accurate zero-level output from a low-impedance source for level setting. It supersedes the OS/10 (described in Section 7), except where there is a need for the full facilities of the Intermodulation Test Oscillator ITO/1, which is used on A.C. Test Bay AC/55 and is described in Section 20.

The OS2/4 is constructed on a plug-in chassis, of the type used for amplifiers such as the GPA/4A, which are employed with Type-B Studio Equipment. (See Instruction S.3 Section 21.)

Circuit Description (Fig. 35)

The first stage V1 is an RC oscillator of the Wien-bridge type, described in Appendix A and used in other BBC tone sources. It is followed by a conventional amplifying stage V2 to give zero output level.

A double-triode valve is used for the oscillator stage instead of the two separate valves shown in the arrangement described in Appendix A, and the basic circuit is virtually the same as that of the PTS/16 described in Section 9; it is also identical with the oscillator stage of the Intermodulation Test Oscillator ITO/1. (See Section 20.)

Two arms of the bridge are formed by the frequency-determining networks, R1, C1, and R2, C2, and the two resistance arms are formed by R4 and the thermistor TH1. As in the PTS/16 and the TS/10, the thermistor replaces the lamp resistance shown in Appendix A, and the two resistance arms have been interchanged because the thermistor has a negative resistance/temperature coefficient whereas that of a lamp is positive.

Oscillation is produced by positive feedback from the anode of the second half of valve V1 to the grid of the first half, via the series reactance arm C1, R1. The amplitude of the oscillation is limited by negative feedback via the thermistor TH1. The values of C1, R1, and C2, R2 are chosen to give an oscillation frequency of 900 c/s ± 4 per cent.

The output from the bridge is fed to the amplifying stage V2 via a second thermistor TH2 and a

resistance network. This second thermistor helps to correct variations in output level caused by the effect of ambient temperature changes on TH1, and the two thermistors are therefore mounted close together so that they have the same ambient temperature.

The level at the output terminals is adjusted by RV1 to be zero into 600 ohms and the oscillator is designed so that this level is maintained constant to within ± 0.2 dB for all likely changes in supply voltage and ambient temperature. As the output impedance is less than 1 ohm, a change in load impedance from that of a high-impedance amplifier-detector to 100 ohms causes a drop in output level of not more than 0.1 dB.

The adjustment provided by RV1 enables the output level to be varied by at least ± 1 dB about zero level into 600 ohms.

General Data*Power Supply Voltages*

H.T. supply, 290 V ± 15 V.

Valve heaters, 6.3 V ± 0.15 V.

Valve Currents

Cathode currents may be checked by measurement of the voltage across cathode resistors with a high resistance voltmeter (Avometer No. 8) as follows:

V1a 2.4 V across R4

V1b 3.7 V across R6

V2 17.5 V across R15

All should be within $\pm 20\%$

Thermistor TH1

900-c/s current: About 2 mA read on an average meter (Avo).

Output Frequency:

900 c/s $\pm 4\%$.

Output Impedance:

Less than 1 ohm at 900 c/s.

Harmonic Content:

1% approximately at zero level output.

Instruction S.4
Section 21

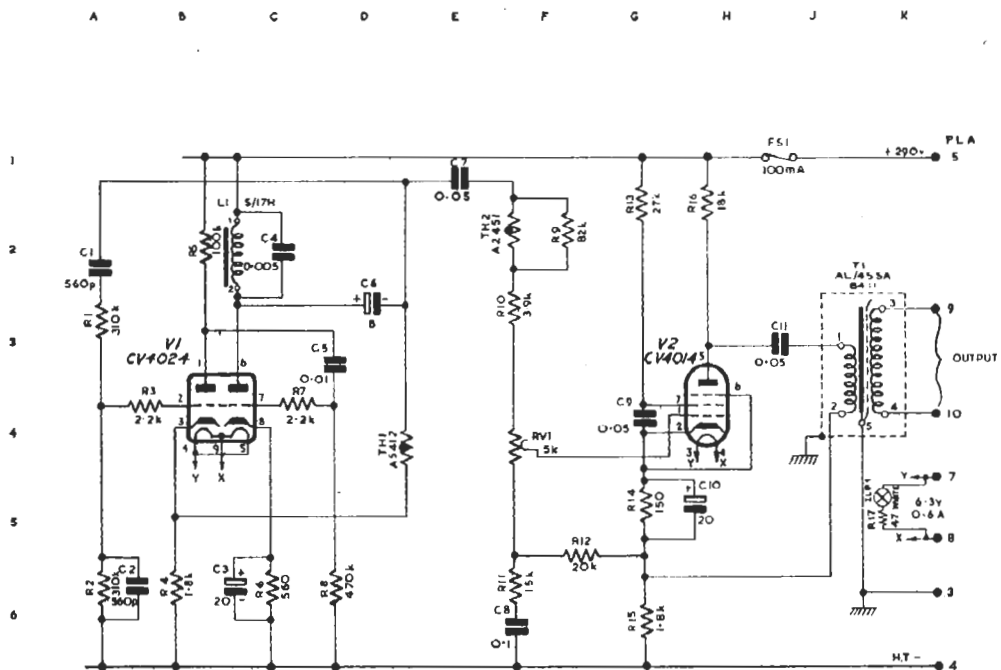
Stability

The output level is stable to within ± 0.2 dB for all likely changes in power supply and ambient temperature. Variation of mains input voltage by

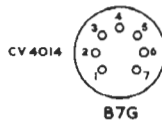
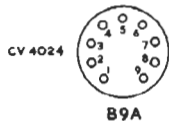
$\pm 10\%$ to the power-supplier normally used should result in an output level change of not greater than ± 0.1 dB.

W.G. 2/63

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VALVE BASES



OSCILLATOR OS2/4 : CIRCUIT