PORTABLE OSCILLATOR PTS/16

Introduction

The PTS/16 is a small six-frequency oscillator for line testing at O.B. points. External power supplies are necessary, and can conveniently be drawn from a SUP/6 unit as used with O.B. equipment OBA/9. (See Instruction S.3, Section 20.)

The output level of the oscillator into 300 ohms is about —58 db, with a small range for adjustment on either side. The six fixed frequencies are 90 and 250 c/s, and 1, 3, 5 and 7 kc/s. The output impedance is approximately 300 ohms, unbalanced.

ing network is of the Wien-bridge type, as can be clearly seen from Fig. 9.11. The use of a Wien bridge in this application has been analysed in Appendix A.

If Fig. 9.11 is compared with the diagram on page A.1, it will be seen that whereas the frequency-determining arms C1, R1-R6 and C2, R7-R12 of the bridge in the PTS/16 are conventional, the arrangement of the amplitude-limiting arms TH 1 and R13 is the inverse of that previously employed. In earlier Wien-bridge oscillators, like the PTS/10,

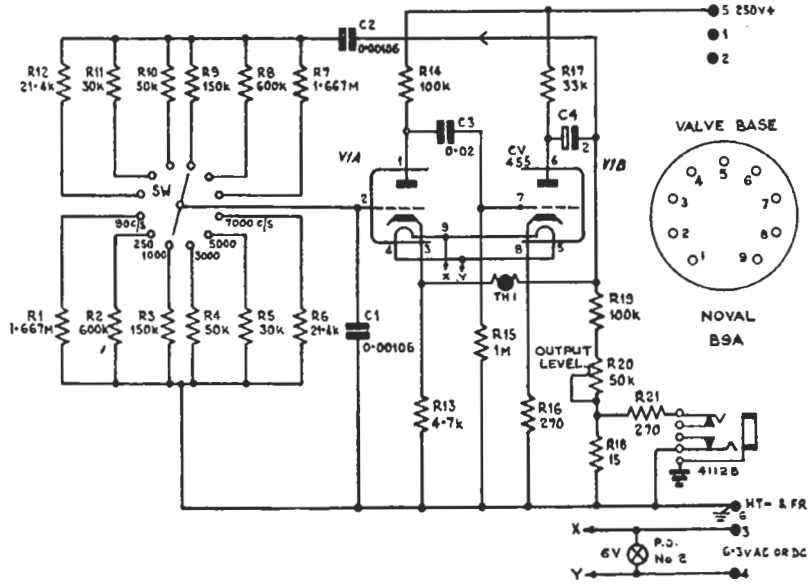

Fig. 9.10. Oscillator PTS/16: Circuit
Drawing No. EA 8284

The overall dimensions are 3½ in. by 3⅜ in. by 5⅛ in., and the weight is 2¼ lb. The instrument can thus be accommodated in the OBA/9-equipment spares box if desired.

Circuit Description

Fig. 9.10 is a circuit diagram of the oscillator, with details of the valve base inset. The double-triode valve, Type CV455, has a centre-tapped 12·5-volt heater, connected as shown for use with the normal 6·3-volt l.t. supply.

The frequency-determining and amplitude-limit-

PTS/12 and PTS/13, the anode of the second stage was connected back to the cathode of the first stage via a resistor, the earthing of the cathode being via a lamp. In the PTS/16, on the other hand, the second-stage anode is connected back to the first-stage cathode via the thermistor, TH 1, and the cathode is earthed via the resistor R13. Since, however, the resistance/temperature coefficient of the lamp is positive, whereas the corresponding coefficient of the thermistor is negative, the net effect of either arrangement is the same.

The capacitors C1 and C2 of the frequency-

determining network are fixed, and the resistors R1-R12 are switched to give the six frequencies required. The thermistor has a resistance when cold of some 50 kilohms, falling to about 10 kilohms for a current of approximately 1 mA when the oscillator is working. The operating value of the thermistor resistance, together with the resistance of R13, gives a negative-feedback ratio which sets the gain from input grid to output anode of the maintaining amplifier to 10 db, the value required for the type of positive-feedback network used, in which C1 is equal to C2, and the two resistances selected from R1-R6 and R7-R12 are also equal.

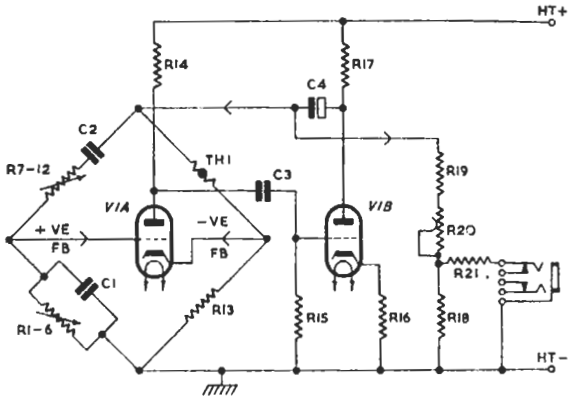

Fig. 9.11. Oscillator PTS/16: Simplified Circuit

The output of the oscillator is brought out to a jack connected across the 15-ohm resistor R15, which forms part of a potential divider across V1B anode load. The output-level control, R20, operates by altering the ratio of this divider between limits of 15 Ω/100 kΩ and 15 Ω/150 kΩ. The 270-ohm padding resistor R21 in series with the jack brings the output impedance of the oscillator up to the region of 300 ohms.

Valve Data

Valve		*Anode Current mA*	*Heater Volts*	*Heater Amps*
CV455	V1A	0·8	6·3	0·15
	V1B	4·0	6·3	0·15

Supplies

H.T. supply, 250 volts, 4·8 mA ± 20%.

L.T. supply, 6·3 volts, 0·3 amp a.c. or d.c.

NOTE :—These supplies obtainable from SUP/6 unit where available.

General Data

Impedances

Output Z = 300 Ω approx. (unbalanced)
Normal load Z = 300 Ω

Output Level

—58 ±4 db into 300 ohms with h.t. supply of 270-230 volts and level control set in mid position approximately. Total range of adjustment, 4 ±1 db. Variation of putput level with frequency, ±0·5 db referred to level at 1 kc/s.

Output Frequencies

90 and 250 c/s, 1, 3, 5, 7 kc/s. All ±2%.

Percentage Total Harmonic Distortion

Less than 1% at 1 kc/s with 270-230 volts h.t.

Component Types

C1, C2, L.E.M. Type 2010 (±1%).
C3 and C4, T.C.C. Types CP34S and CE47L.
Resistors, Welwyn (±1%) :
R1, R7, Type SA3623,
R2, R8, Type SA3622,
R3-R6,R9-R12, Type 3611.
Resistors, Erie Type 9 :
R14, R15, ±20%,
R16, R18, R19, R21, ±10%.
R13, Welwyn Type SA3611 (±5%), or Painton Type 72, or Erie Type 9.
R17, Erie Type 2 (±10%).
R20, Morganite LHNAP 50350 26800.
Switch, N.S.F. Oak Type H, to Drwg. EPA 7901.
Power-supplies connector, F. & E. Type EM-6-14.
Thermistor, S.T. & C. A5412/100.

Operating Instructions

Where OBA/9 equipment is used, a power supply should be taken from the batteries of the SUP/6 unit, using the power cable of the spare OBA/9 amplifier. The output jack of the PTS/16 should be plugged to the input of the working OBA/9 amplifier, or, alternatively, tone may be fed into a ribbon-microphone channel of the mixer ; in the latter circumstances the appropriate fader must be fully up, since there will otherwise be a danger of frequency-response errors due to the unbalanced nature of the tone-source output circuit.

The output level may be set to within 1 db using the gain control of the OBA/9 amplifier, and a fine adjustment obtained with the PTS/16 control.

Where OBA/8 equipment is employed, the necessary h.t. and l.t. supplies for the tone source can be obtained from separate external batteries, via an OBA/9 battery cable. (See S3, Fig. 53)

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