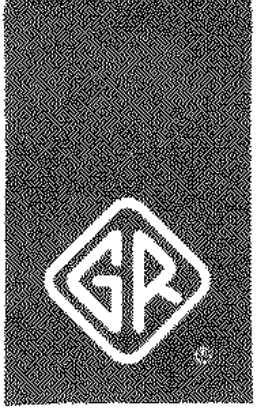
OPERATING INSTRUCTIONS



TYPE 1307-A

TRANSISTOR OSCILLATOR

GENERAL RADIO COMPANY

F

SPECIFICATIONS

Output Frequency:	400 and 1000 cps ±3% at 2-volt output into 600-ohm resistive load. Frequency decreases slightly with increase in output level. A reactive load will shift the frequency, since the load is coupled directly into the tuned circuit.
Output Voltage:	Adjustable, with a maximum of 2 volts into a 600-ohm load.
Distortion:	Less than 5% at 400 cps (2 v into 600-ohm load); less than 6% at 1000 cps (2 v into 600-ohm load)
Voltmeter:	0-3 v ac, calibrated directly in volts at output terminals.
Output Circuit:	21-inch coaxial output cable terminated in Type 274-MB double plug, with no connection to instrument case.
Batteries:	Three mercury A batteries (Mallory RM-1 or equivalent), supplied.
Transistor:	One P-N-P junction transistor (Type 2N1372 or equivalent).
Mounting:	Gray-finished aluminum case.
Accessory Available:	Type 1560-P3 leather carrying case, with strap.
Dimensions:	Width 3-1/8, height 6, depth 2-1/2 inches, (79 by 153 by 64 mm), over-all.
Net Weight:	1-3/4 lb (0.8 kg) with batteries.

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TYPE 1307-A

TRANSISTOR OSCILLATOR

Form 1307-0100-F
January, 1962

GENERAL RADIO COMPANY
WEST CONCORD, MASSACHUSETTS, USA

Figure 1. Panel View of
Type 1307-A Transistor Oscillator.

TYPE 1307-A
TRANSISTOR OSCILLATOR

1 INTRODUCTION.

1.1 PURPOSE. The Type 1307-A Transistor Oscillator (Figure 1) is a pocket-size signal source of 400 or 1000 cps, useful as a power source for the Type 1552-B Sound-Level Calibrator or Type 546-C Audio-Frequency Microvolter. It is also useful in continuity checks of audio systems, in setting operating levels, in checking sensitivity of oscillographs, in making preliminary calibrations of electronic systems, and as a power source for bridge measurements at 400 and 1000 cps.

1.2 DESCRIPTION. The Transistor Oscillator is housed in a 6 by 3-1/8 by 2-1/2 in. aluminum case. On the panel are the FREQUENCY selector switch, the LEVEL control, and a 0 - 3-volt meter to indicate output voltage. The output connector is a Type 274-MB Double Plug at the end of a 21-inch coaxial cable.

1.3 ACCESSORIES. Supplied with the Transistor Oscillator are three Mallory Type RM-1 batteries. Available on order from General Radio Company is a Type 1560-P3 Leather Carrying Case, including strap, for both oscillator and Type 1552-B Sound-Level Calibrator.

2 PRINCIPLES OF OPERATION.

A Type P-N-P junction transistor is connected in a Hartley oscillator circuit as shown in Figure 2. The FREQUENCY switch (S1) is shown in the 1000-cycle position, with the tuning inductor (T1) tapped for this frequency. In the 400-cycle position, the entire winding is used, resulting in a 400-cycle tuned circuit.

An additional winding on T1 supplies the output load. A rectifier-type voltmeter connected across this winding indicates the voltage at the output terminals.

A germanium-rectifier biasing circuit is used to ensure proper starting of the oscillator over a wide temperature range.

3 OPERATING PROCEDURE.

3.1 GENERAL. Operation of the Transistor Oscillator consists merely of attaching the output connector to the load, setting the FREQUENCY switch to the desired frequency, and setting the LEVEL control so that the meter indicates the desired output voltage. To disconnect the batteries and thus turn off the oscillator, turn the FREQUENCY switch to OFF.

3.2 VOLTMETER ERROR. The voltmeter is an average, rectifier-type meter calibrated to indicate directly the voltage at the output terminals. For a sine wave, the indication at 2 volts is the rms value ±3% at 25 C. The temperature coefficient is about +0.06% per degree C. Thus, for a 2-volt out-

put at 0 C, the LEVEL control should be set so that the meter indicates 1.97 volts. A waveform error, which may be as much as the percentage harmonic content of the oscillator, is also possible.

3.3 LOAD IMPEDANCE. The oscillator is designed for a 600-ohm load impedance, but will operate with a higher impedance with some increase in distortion. With a load impedance much lower than 600 ohms the circuit may no longer oscillate.

Frequency is practically independent of load if the load is resistive. A reactive load, however, will affect frequency, since the load is coupled directly into the tuned circuit. For instance, a 1-μf capacitor connected across the output terminals will shift the 400-cycle output down to about 365 cps. Similarly, a 0.1-μf capacitor connected across the output terminals will shift the 1000-cycle output down to about 980 cps.

4 SERVICE AND MAINTENANCE.

4.1 GENERAL. The two-year warranty given with every General Radio instrument attests the quality of materials and workmanship in our products. When difficulties do occur, our service engineers will assist in any way possible.

In case of difficulties that cannot be eliminated by the use of these service instructions, please write or phone our Service Department, giving full information of the trouble and of steps taken to remedy it. Be sure to mention the serial and type numbers of the instrument.

Before returning an instrument to General Radio for service, please write to our Service Department or nearest district office (see back cover), requesting a Returned Material Tag. Use of this tag will ensure proper handling and identification. For instruments not covered by the warranty, a purchase order should be forwarded to avoid unnecessary delay.

4.2 BATTERY REPLACEMENT. Three mercury batteries are used in the oscillator. If the maximum output is less than two volts with a 600-ohm load, replace these batteries.

To replace batteries, first loosen the two screws on each side of the case and remove the back of the instrument. The batteries are held in place in the plastic tube at the top of the instrument. Using a screwdriver, unscrew the end cap of this tube. Remove the batteries and insert replacements, with the flat ends first to insure correct polarity. Then

replace the end cap so that it is finger-tight. Batteries should last about 100 hours at eight hours a day.

4.3 TRANSISTORS. If the transistor must be replaced, make sure that the orientation in the socket is correct, as shown in Figure 2. Most P-N-P junction-type transistors having the characteristics of a 2N1372 type will operate satisfactorily in the circuit. Some variation in output and distortion can be expected between individual transistors.

The following dc voltages were measured between transistor socket terminals and battery positive terminal with a General Radio Type 1800 Vacuum-Tube Voltmeter (10-megohm input connection), and with a 2-volt oscillator output with no load connected:

Emitter -0.1; Base -0.15; Collector -3.0.

4.4 PARTS LIST

B1	BATTERY, Mallory Type RM-1	
B2	BATTERY, Mallory Type RM-1	
B3	BATTERY, Mallory Type RM-1	
C1	CAPACITOR, Wax, 1.0μf ±10% 100dcwv	COW-17
C1A	CAPACITOR, Wax (value determined in GR lab so that C1 plus C1A equal 1.075μf ±2-1/2%)	COW-17
C2	CAPACITOR, Electrolytic, 100μf 25dcwv	COE-35
C3	CAPACITOR, Electrolytic, 60 μf 25 dcwv	COE-47
D1	CRYSTAL RECTIFIER	1N34-A
M1	METER, 0-3v ac.	MEDS-66
PL1	PLUG,	274-415
R1	RESISTOR, Composition, 3k ±5% 1/2w	REC-20BF
R2	RESISTOR, Composition, 27Ω ±5% 1/2w	REC-20BF
R3	RESISTOR, Variable, 5k ±10%	1307-40
R4	RESISTOR, Composition, 820Ω ±5% 1/2w	REC-20BF
S1	SWITCH, Rotary	SWRW-104
T1	TRANSFORMER	746-426
Q1	TRANSISTOR, Type 2N1372, or equivalent	

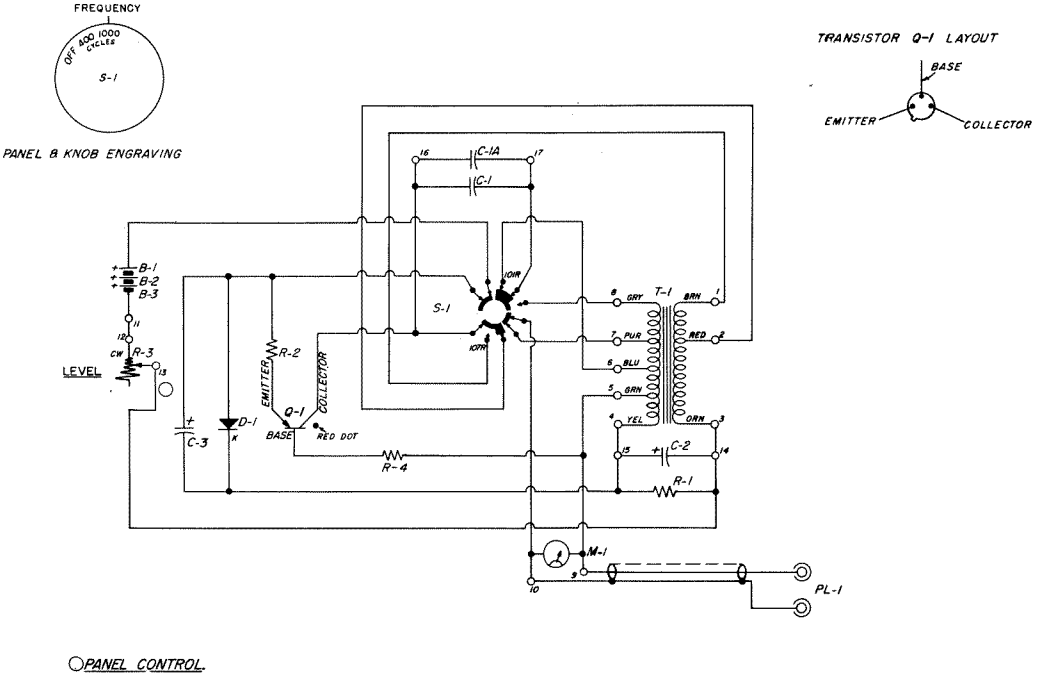

Figure 2. Wiring Diagram for Type 1307-A Transistor Oscillator.

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