

OPERATING INSTRUCTIONS

for

TYPE 1307-A

TRANSISTOR OSCILLATOR



GENERAL RADIO COMPANY

CAMBRIDGE 39

MASSACHUSETTS

U. S. A.



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for

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TRANSISTOR OSCILLATOR

Form 841-B
October, 1955



GENERAL RADIO COMPANY

275 MASSACHUSETTS AVENUE

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SPECIFICATIONS

Frequency: 400 and 1000 cycles accurate to $\pm 3\%$ at 2 volts output into a 600-ohm resistive load. The 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: Adjustable. Maximum output is at least 2 volts across 600-ohm load.

Distortion: Less than 5% at 400 cycles at 2 volts across 600-ohm load. It may be slightly higher at 1000 cycles.

Voltmeter: 3 volts full scale, calibrated directly in volts at the output terminals.

Output Circuit: The output cable is terminated in a 274-MB double plug. No connection is made to the case.

Batteries: Three mercury A batteries (Mallory RM-1 or equivalent) are supplied.

Transistor: One P-N-P junction tran-



sistor (Raytheon Type 721 or equivalent) is supplied.

Case: Aluminum, black finish.

Carrying Case: A leather case with straps is available, Type 1555-P1.

Dimensions: 6 x 3-1/8 x 2-1/2 inches, over-all but excluding output cable.

Net Weight: 1 pound, 14 ounces, with batteries.



Panel View of Type 1307-A
Transistor Oscillator

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The Type 1307-A Transistor Oscillator supplies a signal of either 400 or 1000 cycles, and the maximum output voltage with a 600-ohm load is two volts. It is a convenient battery-operated source for the Types 1552-A and 1552-B Sound-Level Calibrators and the Type 546-C Audio-Frequency Microvolter. Because it is so easy to carry and use at any location, it is also useful in continuity checks of audio systems, in setting operating levels, in checking the sensitivity of oscillographs, and in making other preliminary calibrations of electronic systems. In addition, it is a convenient source for bridge measurements at 400 and 1000 cycles.

1.0 OPERATION

1.1 Frequency Control: Turn the FREQUENCY switch to the desired frequency, either 400 or 1000 CYCLES as indicated by the engraved marking.

1.2 Output Control: Set the output to the desired voltage by turning the LEVEL control clockwise for increased output. The frequency decreases slightly with increase in output level.

1.3 Output Terminals: The output cable is terminated in a Type 274-MB Double Plug. No connection is made to the case.

1.4 Output Voltmeter: The voltmeter, three volts full scale, is calibrated to read directly the voltage at the output terminals.

1.5 Turning Instrument Off: The FREQUENCY switch serves also to disconnect the battery when it is in the OFF position. Since the output is

available almost immediately upon turning the FREQUENCY switch to the desired frequency, the batteries will give maximum useful life if the instrument is turned OFF except when actually in use.

1.6 Load: The oscillator is designed to operate into a load impedance of 600 ohms, but it can be operated with a load impedance higher than 600 ohms with some change in distortion. If a load impedance much lower than 600 ohms is used, the circuit may stop oscillating.

If the load is resistive, the frequency is nearly independent of the load. A reactive load, however, will shift the frequency, since the load is coupled directly into the tuned circuit. For example, a one-microfarad capacitor connected across the output terminals will shift the 400-cycle output down to about 365 cycles. Similarly, a 0.1-microfarad capacitor connected across the output terminals

will shift the 1000-cycle output down to about 980 cycles.

1.7 Use with the Types 1552-A and 1552-B Sound-Level Calibrators:

When the output of the Type 1307-A Transistor Oscillator is connected to the Type 1552-A Sound-Level Calibrator, the nominal 400-cycle oscillator frequency is shifted to about 370 cycles, because of the capacitor in the calibrator. The sound-pressure level produced by this calibrator with a 2-volt signal is then 1.3 db less than the rated value at 400 cycles. There is no appreciable shift in frequency when the oscillator is connected to the Type 1552-B Calibrator, so that no correction is necessary.

2.0 CIRCUIT DETAILS

2.1 Diagram: The complete schematic circuit is shown in Figure 1.

2.2 Circuit: The P-N-P junction-type transistor is connected in a

Hartley oscillator circuit for 400-cycle operation. For 1000-cycle operation the tuning capacitor is switched to a tap on the tuning inductor.

The inductor of the tuned circuit contains an additional winding for supplying the output load, and a rectifier-type voltmeter is connected across this winding to indicate the voltage at the output terminals.

The germanium rectifier biasing circuit is used to insure proper starting of the oscillator over a wide range of temperatures.

3.0 SERVICE AND MAINTENANCE NOTES

3.1 Batteries: Three mercury A batteries (Mallory RM-1 or equivalent) are used. If the maximum output is less than two volts with a normal load, the batteries should be replaced.

In order to replace batteries, loosen

the two screws on each side to remove back of instrument. The batteries are held in place in the plastic tube at the top of the instrument. The end cap on this tube can be unscrewed by the use of a screwdriver. When the batteries are replaced, the flat end of the cells should be put in first to insure correct polarity. The end cap should then be replaced so that it is finger-tight.

The batteries should last about 100 hours at 8 hours per day.

3.2 Transistors: If the transistor must be replaced, make sure that the orientation in the socket is correct. The orientation of the Raytheon Type 721 is determined by the colored dot, and that of the RCA 2N34 by the lead spacing.

Most P-N-P junction-type transistors having the characteristics of the Raytheon Type 721 or RCA 2N34 will work properly in the Type 1307-A. Some variation in performance, with

respect to output and distortion, from transistor to transistor can be expected, however.

3.3 Typical Transistor Operating Voltages: Table of d-c transistor voltages measured between socket terminals and positive terminal of battery using General Radio Type 1800-A Vacuum-Tube Voltmeter (10-megohm input connection) and with a 2-volt output from oscillator with no load connected.

Emitter	Base	Collector
-0.1	-0.15	-3.0

Parts List for Type 1307-A Transistor Oscillator

RESISTORS

R-1	=	3 Kilohms	<u>+5%</u>	REC-20BF
R-2	=	27 Ohms	<u>+5%</u>	REC-20BF
R-3	=	5 Kilohms	<u>+10%</u>	1307-40

CONDENSERS

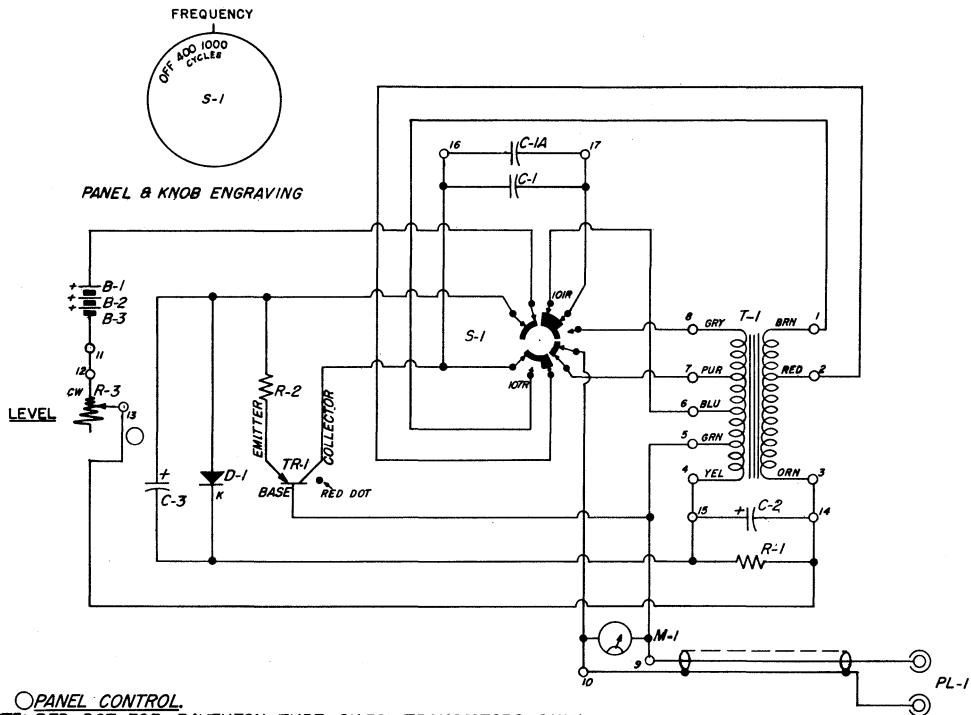
C-1	=	1.0 μ f	<u>+10%</u>	COW-17
*C-1A	=	Determined in Lab		COW-17
C-2	=	100 μ f	20 WVDC	COE-35 + COES-1,1-5/8
C-3	=	50 μ f	15 WVDC	COE-47

*C-1 Plus C-1A to equal 1.075 μ f +2-1/2%

MISCELLANEOUS

S-1	=	Switch	SWRW-104
T-1	=	Transformer	746-426
M-1	=	Meter 0-3 V.A.C.	MEDS-66
PL-1	=	Plug	274-415-3
D-1	=	Crystal Rectifier	IN34-A
**TR-1	=	Transistor Raytheon	CK-721
B-1,B-2,B-3	=	Cell (Mallory)	FM-1

**Alternate: RCA Type 2N34



○ PANEL CONTROL
 NOTE: RED DOT FOR RAYTHEON TYPE CK-721 TRANSISTORS ONLY
 FOR RCA TYPE _____, FOLLOW PIN ORIENTATION & DISREGARD RED DOT

WIRING DIAGRAM FOR TYPE 1307-A TRANSISTOR OSCILLATOR



