A NEW UNIT OSCILLATOR, 180 to 600 Mc

Butterfly circuits with their wide tuning ranges and trouble-free operation at frequencies from about 100 to 1000 Mc are used in many General Radio Unit Oscillators. Their wide ranges and stable characteristics have helped to establish these inexpensive and versatile units as almost indispensable equipment in many laboratories and on many test benches.

Butterfly-type unit oscillators for 50 to 250 Mc and for 250 to 920 Mc have been available, but, in order to cover the military aeronautical bands between 225 and 420 Mc, both of these units are needed. The new TYPE 1209-BL Unit Oscillator covers this range in a single unit.

As the type number indicates, the new unit oscillator is a modification of the familiar 250-to-920 Mc TYPE 1209-B Unit Oscillator. By elimination of one of the two parallel inductance branches of the butterfly circuit, all frequencies are reduced by a factor of $\sqrt{2}$. At the same time the minimum output obtainable at any frequency is increased from 200 to 300 milliwatts. All other characteristics and the external appearance are unchanged.

SPECIFICATIONS

Frequency Range: 180 to 600 Mc.

Tuned Circuit: Modified butterfly, with no sliding contacts.

Frequency Control: 4-in. dial with calibration over 270°. Precision drive with 4½:1 reduction.

Frequency Calibration Accuracy: ± 1%.

Warm-up Frequency Drift: 0.2%.

Output System: Short coaxial line with adjustable coupling loop on one end and coaxial connector on other. Maximum power can be delivered to load impedances normally met in coaxial systems.

Output Power: Into 50 ohms, 300 mw at any frequency.

Modulation: Plate modulation of 30% at audio frequencies can be produced by external source of 40 volts. Input impedance is about 8000 ohms. When amplitude modulation without incidental f-m is required, the TYPE 1000-P6 Crystal Diode Modulator or TYPE 1000-P7 Balanced Modulator is recommended.

Power Supply Requirements: 330 v at 36 ma; 6.3 v at 0.4 amp.

Power Supplies Recommended:

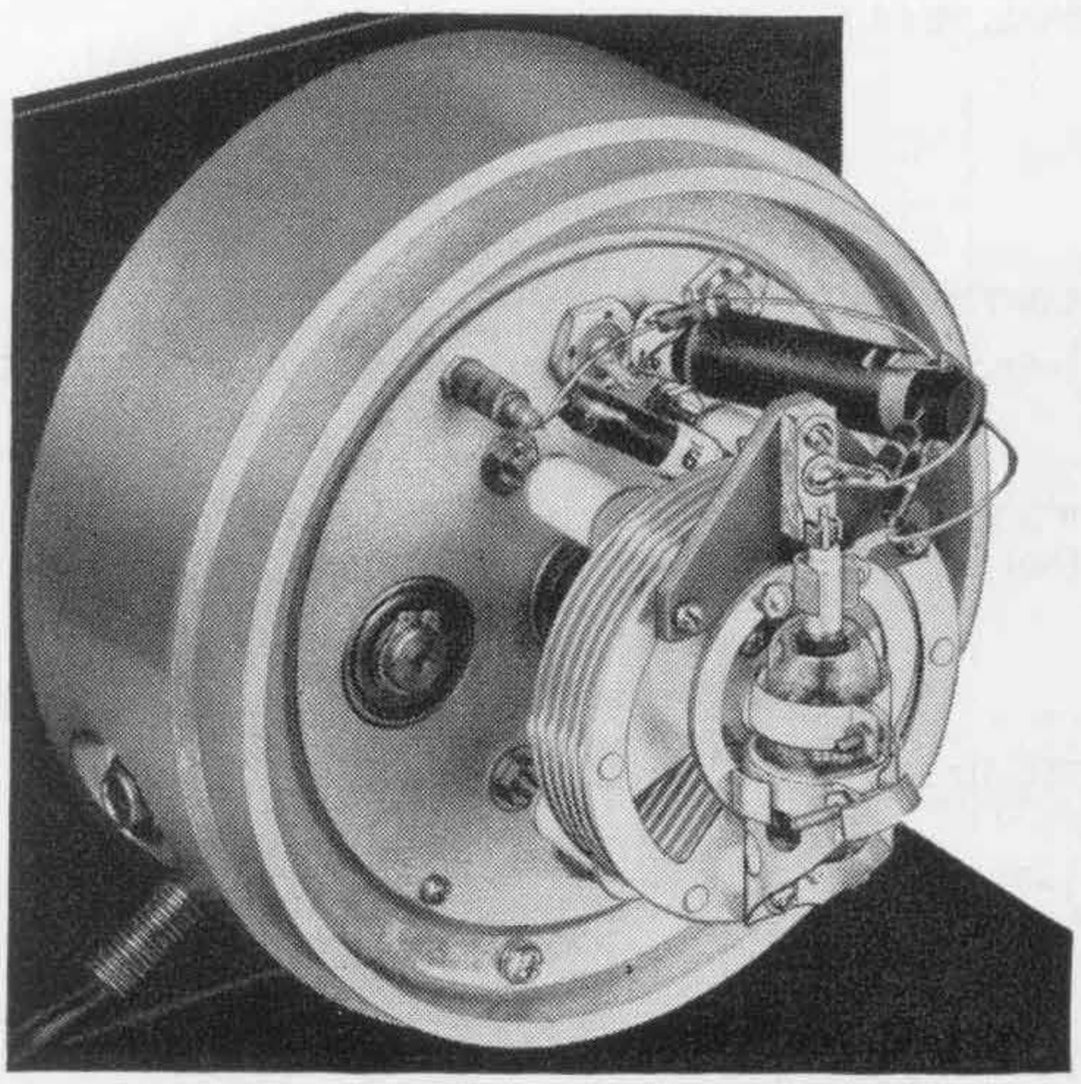
Standard: TYPE 1203-B Unit Power Supply, 115 volts, 50 to 60 cycles.

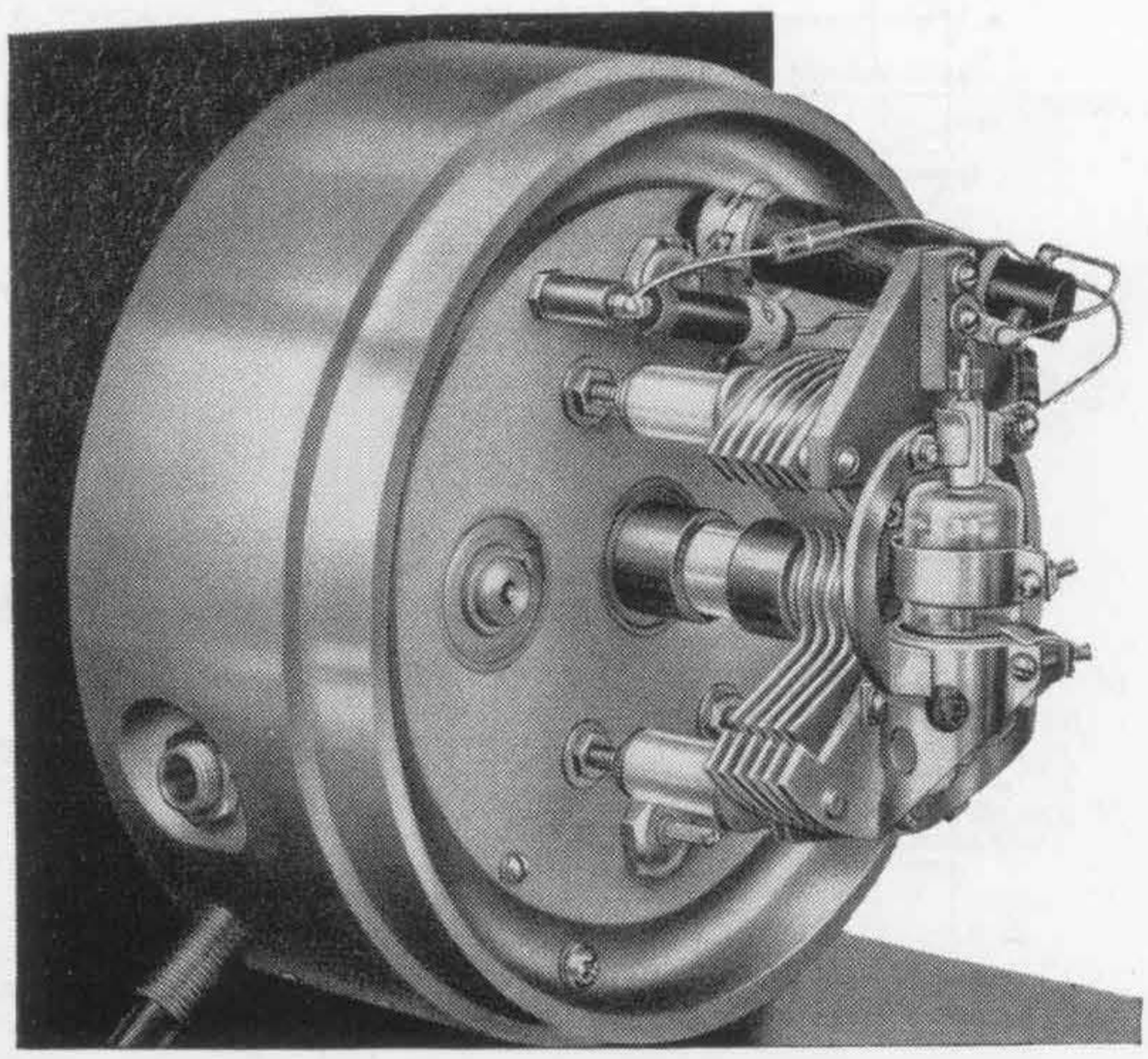
Stabilized Plate Voltage: TYPE 1201-A Unit Regulated Power Supply, 105 to 125 volts, 50 to 60 cycles.

Battery Operation: TYPE 1202-A Unit Vibrator Power Supply, 6- or 12-volt battery or 115 volts, 50 to 60 cycles.

Adjustable Plate Voltage: TYPE 1204-B Unit Variable Power Supply, 115 volts, 60 cycles.

Figure 1. (*Left*) View of butterfly circuit in the Type 1209-B Unit Oscillator. (*Right*) Rear view of Type 1209-BL, showing how one of the parallel inductance branches of the butterfly is removed to lower the frequency range.





Constant Output Level vs. Frequency: TYPE 1263-A Amplitude Regulating Power Supply with TYPE 874-VR Voltmeter Rectifier, TYPE 874-Q6 Adaptor, and TYPE 274-NF Patch Cord, 115 or 230 volts, 50 to 60 cycles.

Oscillator Tube: Sylvania Type RT 434.

Mounting: Aluminum casting surrounded by spun-aluminum shield. Assembly is mounted on L-shaped panel-and-chassis piece.

Accessories Supplied: TYPE 874-R22 Cable, TYPE 974-C58 Cable Connector, Jones socket, and telephone plug.

Accessories Available: Modulator, Sweep Drives, Relay Rack Adaptor Panels are available as listed in General Radio Catalog.

Dimensions: Height 6¼ in., width 9¼ in., depth 7 in., over-all.

Weight: 6¼ lbs.

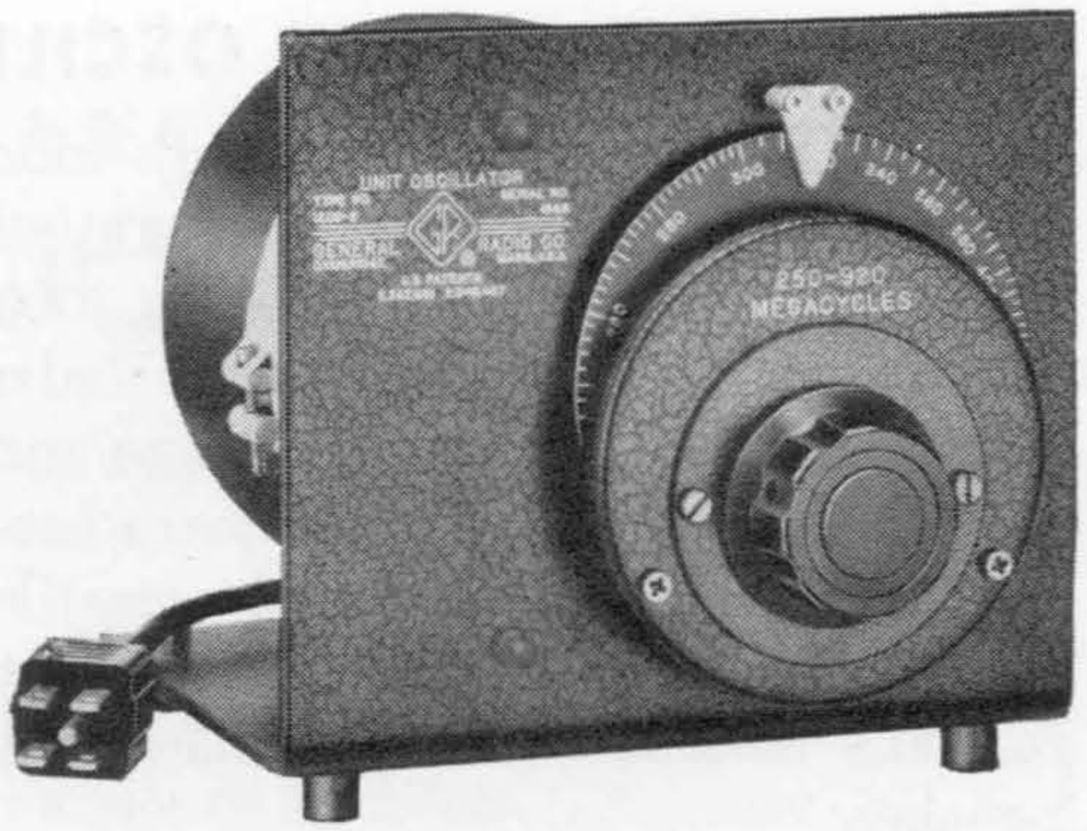


Figure 2. Panel view of the Type 1209-B Unit Oscillator. The new Type 1209-BL is identical in appearance except for the frequency calibration on the dial.

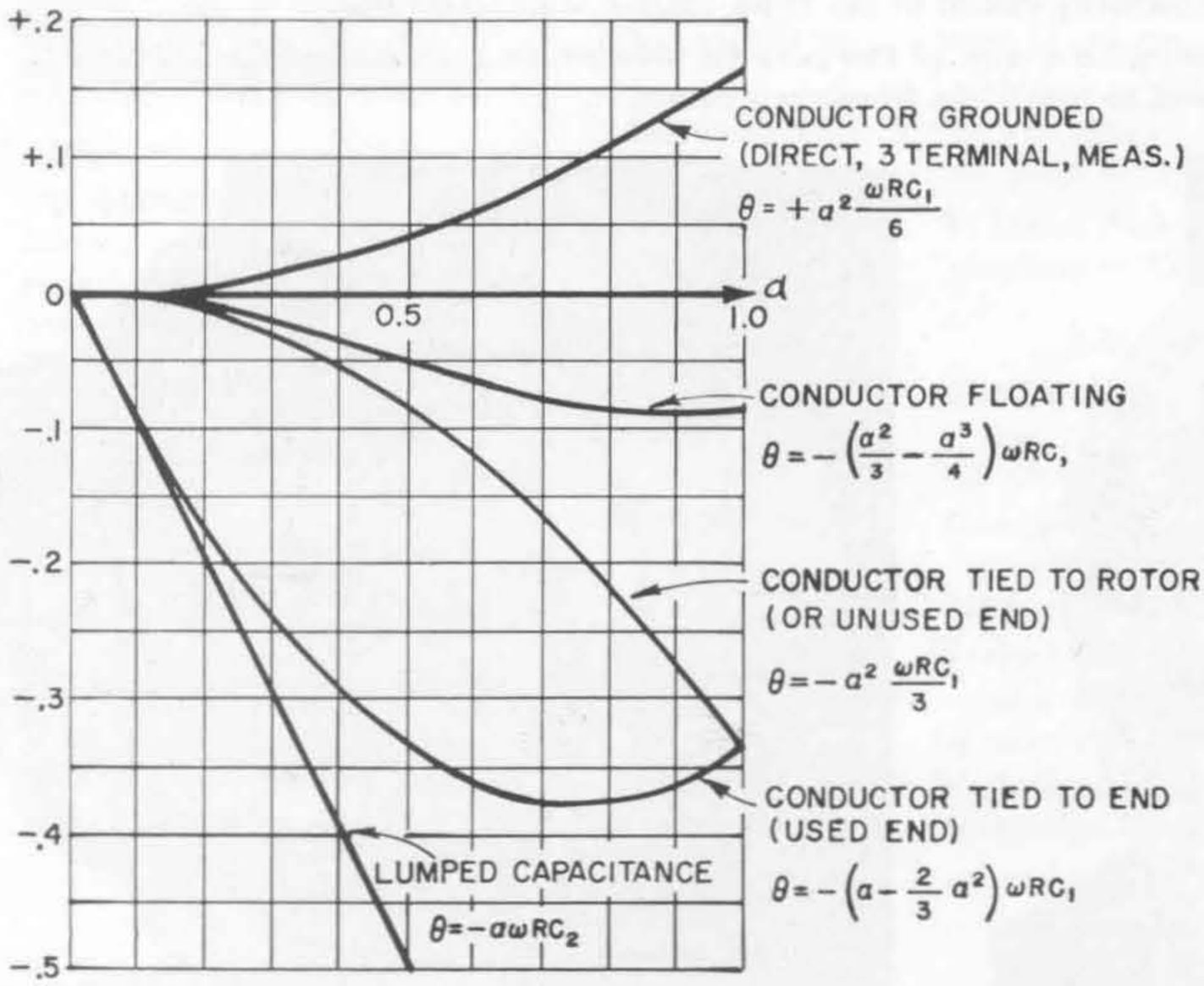
Type		*Code Word*	*Price*
1209-BL	**Unit Oscillator, 180 to 600 Mc**	ADMIT	**$245.00**

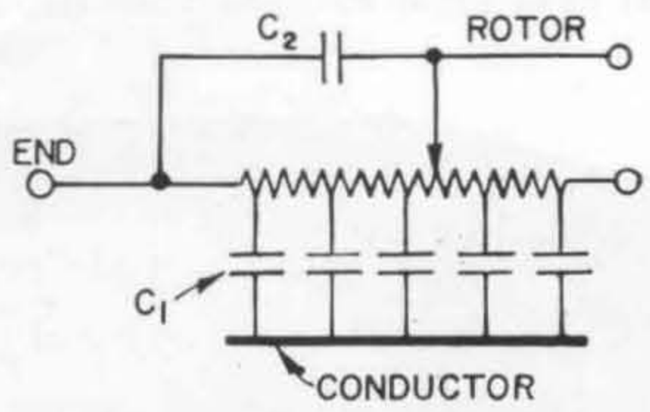
PHASE-ANGLE MEASUREMENT ON RHEOSTATS

An analysis of the effects of inductance and capacitance, both lumped and distributed, on the phase angle of a potentiometer used as a rheostat was presented in a previous article.[1] The distributed capacitance was assumed to be between the winding and a conducting surface (the housing, a metal mandrel, a mounting plate, or a shield), and the curve of the phase angle (θ) vs. fractional rotation (α) took various shapes, depending upon the potential of the conductor. These formulas and curves are summarized in Figure 1. The measured curves of the previous article were chosen to illustrate each effect separately. This article will describe the phase-angle characteristics of several potentiometers to show how their curves depend upon a combination of several effects.

[1] H. P. Hall, "The Phase Angle of Potentiometers used as Rheostats," *General Radio Experimenter*, 32, 4, September, 1957.

Figure 1.





EQUIVALENT CIRCUIT FOR CAPACITANCE

FOR INDUCTANCE:

$\theta = \frac{\omega L}{R}$ (CONSTANT EXCEPT WHEN α IS SMALL)

WHERE:

α = NORMALIZED ROTATION

R = TOTAL RESISTANCE

L = TOTAL INDUCTANCE

C_1 = DISTRIBUTED CAPACITANCE FROM WINDING TO CONDUCTOR

C_2 = LUMPED CAPACITANCE ACROSS RHEOSTAT