

# Full Range Test Oscillator

Type TMV-97-B

## Introduction

The Type TMV-97-B Test Oscillator is a compact, self-contained portable oscillator designed especially for servicing and test purposes. It is an R. F. oscillator, modulated at 400 cycles and covers the frequency range from 90 K. C. to 25,000 K. C. in eight steps. Power for its two Radiotrons, RCA-30, is obtained from two self-contained batteries. The instrument is entirely shielded in an aluminum case.

Controls on the front panel are the "On-Off" switch, vernier tuning dial (calibrated in kilocycles), range switch and output control. Two binding posts are also provided for conveniently connecting its output to the circuit being tested.

The over-all dimensions of the instrument are approximately  $9\frac{3}{4}$ " wide,  $4\frac{1}{2}$ " deep and  $3\frac{1}{2}$ " high (including handle). Its weight is 5 lbs., including batteries.

The following frequency ranges are covered by the eight position Range Switch.

Position	Approximate Frequency Range (K. C.)
1	90-200
2	200-400
3	400-800
4	800-1500
5	1500-3100
6	3100-6800
7	6800-14000
8	14000-25000

The oscillator is shipped complete with Radiotrons, but less batteries. Figure 1 shows the schematic diagram and Figure 3 the wiring diagram. The instrument may be calibrated at the factory, when ordered, at slight additional cost.

## Installation of Batteries

Two batteries are required, one  $4\frac{1}{2}$ -volt filament battery (Burgess No. 2370, Eveready No. 771 or equivalent) and one  $22\frac{1}{2}$ -volt "B" battery (Burgess No. 4156 or equivalent).

Remove the four screws at the top and side edges of the front panel and withdraw the chassis from the cabinet. Make certain that the Radiotrons are firmly in their sockets and the "On-Off" switch is off. Then turn the chassis upside down. Sufficient space is allowed beneath the chassis for insertion of the batteries, which should be located and connected as shown in Figure 2. Turn the case over on its top and replace the chassis while both chassis and cabinet have their bottom uppermost. This assures proper location of the chassis and batteries within the case. Then turn the oscillator over and replace its front panel mounting screws. The unit is then ready for operation.

## Operation

1. The output of the oscillator is connected to the receiver under test by means of the two binding posts located on its front panel. A reference to the service instructions for the receiver under test will disclose the proper place for making such connections to the receiver.

2. Turn the oscillator "on" and adjust the tuning dial and range switch to obtain the desired frequency signal. The tuning dial is calibrated directly in kilocycles. See notes under "Calibration."

**NOTE**—The vernier tuning ratio may be varied from 6:1 to 20:1 by adjustment of the position of the small arm above the tuning knob. The extreme clockwise position of the arm gives a 20:1 ratio, which is very useful for critical tuning.

3. The output of the oscillator is varied by means of the attenuator operated by the small knob located on the right side of the panel. For comparing sensitivity, it may be necessary to further decrease the output from that obtained at the minimum position of the output control. This may be done by using two carbon resistors, one of 100 ohms and the other of 100,000 ohms resistance, connected in series and placed across the antenna and ground binding posts of the oscillator. (The 100-ohm resistor must be connected to the ground binding post.) Connect the receiver antenna lead to the junction of the two resistors and the ground lead to the ground terminal. Then by recording the position of the output dial setting throughout the receiver range (for same signal output) a good indication of the relative receiver sensitivity may be obtained.

**NOTE**—At the higher frequencies it may be necessary to move the oscillator a short distance from the receiver to avoid stray pickup. Rotation of the oscillator about a vertical axis will locate a position at which no pickup occurs.

## Calibration

The individual oscillators will be found to be within plus or minus 3% of the dial scale reading. However, if it is desirable to have a more accurate calibration than this, a separate correction card is included for each owner to calibrate his own instrument. This is done by tuning in stations in the various ranges on a receiving set and then beating them with the test oscillator for zero beat. The frequency of the test oscillator will then be identical with that of the station. By noting the oscillator dial reading and the station frequency, a very accurate correction curve may be plotted on this card.

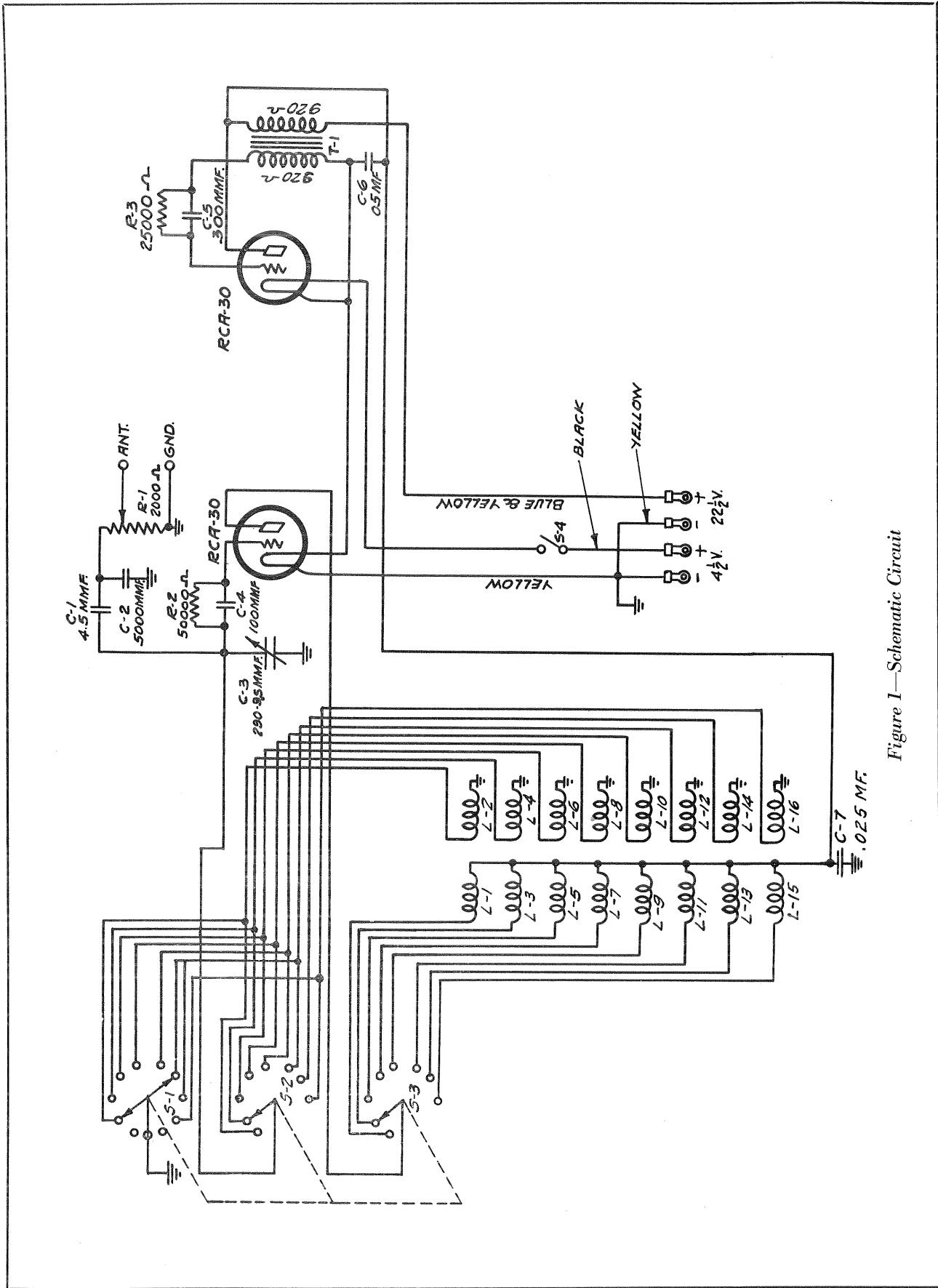


Figure 1—Schematic Circuit

For the lower frequencies, 90 K. C. to 550 K. C., a calibration is readily made by using harmonics of the oscillator for checking against frequencies in the broadcasting band. For example, 175 K. C. can be checked by beating its fourth harmonic with Station WLW, the frequency of which is 700 K. C.

**NOTE**—An adapter may be obtained, which when plugged into the modulator tube socket provides an unmodulated (CW) output signal.

## Maintenance

The battery voltages should be checked if at any time the output of the oscillator becomes weak. The drain on the batteries is small, so that their expected life is approximately 15 hours' operation. However, the batteries should be replaced when the filament battery voltage is less than 3 volts and the "B" battery voltage is less than 17 volts. Always replace the batteries by withdrawing the entire unit from the front of the cabinet. Never remove the back panel.

## REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	DESCRIPTION	List Price	Stock No.	DESCRIPTION	List Price
2039	Switch—Single pole, single throw toggle switch.....	\$0.72	3986	Scale—Attenuator potentiometer dial scale..	\$0.66
2744	Capacitor—4.5 mmfd. capacitor (C1)— Package of 5.....	1.60	3987	Potentiometer — Attenuator potentiometer (R1).....	1.70
2932	Capacitor—5,000 mmfd. capacitor (C2).....	.50	3988	Post—"Antenna-Ground" binding post.....	.32
3110	Resistor—25,000 ohm— $\frac{1}{4}$ watt carbon resistor (R3)—Package of 5.....	1.00	3990	Clip—Spring steel clip.....	.25
3114	Resistor—50,000 ohm— $\frac{1}{4}$ watt carbon resistor (R2)—Package of 5.....	1.00	4309*	Coil—R. F. oscillation coil (L1, L2, L3, L4).....	2.60
3640	Capacitor—.05 mfd. capacitor (C6).....	.25	4310*	Coil—R. F. oscillation coil (L5, L6, L7, L8).....	2.50
3765	Capacitor—.025 mfd. capacitor (C7).....	.34	4311*	Coil—R. F. oscillation coil (L9, L10, L11, L12).....	3.15
3794	Capacitor—100 mmfd. capacitor (C4).....	.30	4312*	Coil—R. F. oscillation coil (L13, L14).....	2.65
3979	Transformer—A. F. oscillation transformer (T1).....	1.94	4313	Switch—Range switch (S1, S2, S3).....	4.10
3980	Condenser—Tuning condenser (C3).....	1.40	4314	Scale—Range switch dial scale.....	.66
3981	Capacitor—300 mmfd. capacitor (C5).....	.30	4315	Dial—Tuning condenser vernier dial.....	4.68
3982	Handle—Carrying handle.....	.60	4316	Adapter.....	.45
3984	Knob—Moulded knob.....	.30	6300	Socket—Radiotron socket.....	.35
			7817	Holder—Calibration chart holder complete with rivets and cover.....	1.85

\* FOR REPLACEMENT PURPOSES ONLY—ITEM TO BE REPLACED MUST BE RETURNED WITH ORDER.

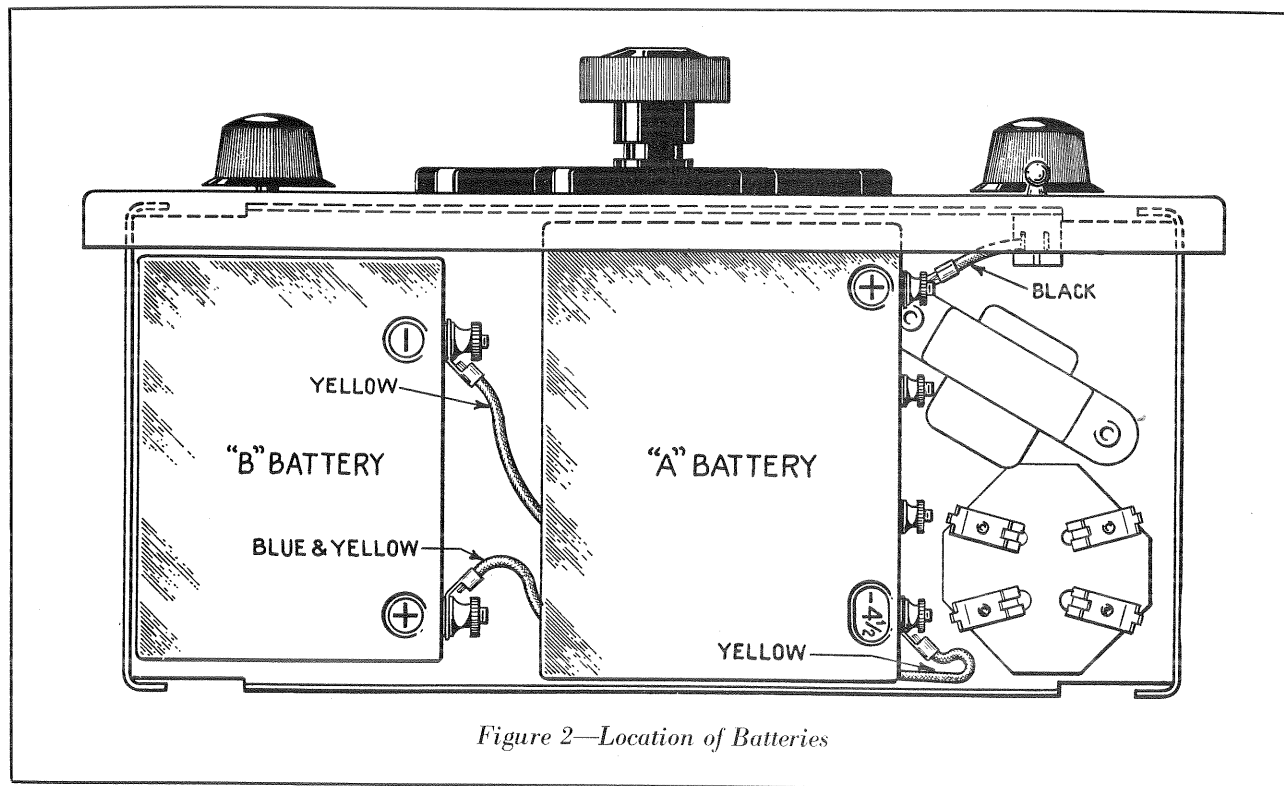


Figure 2—Location of Batteries

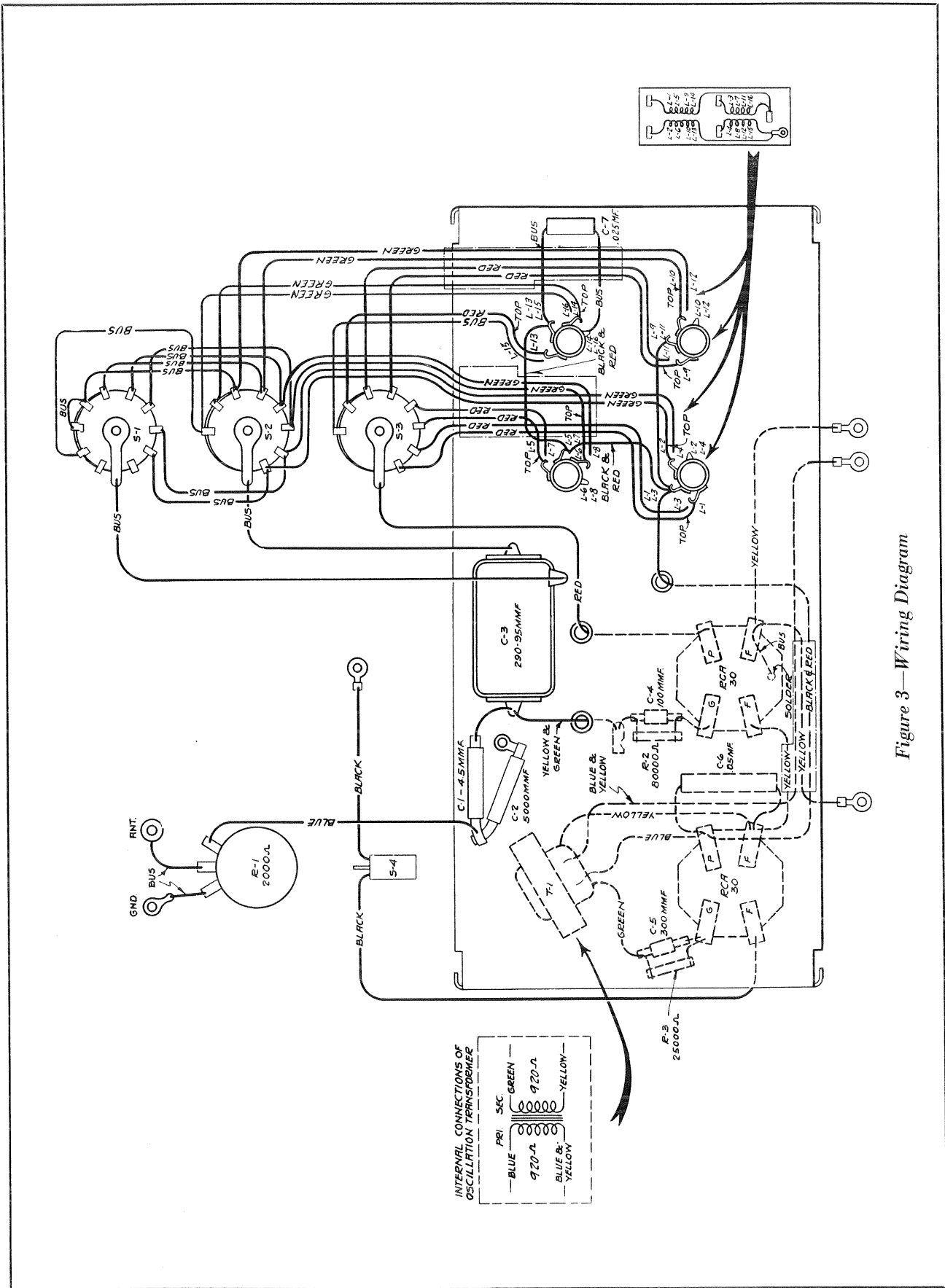


Figure 3—Wiring Diagram