OPERATING INSTRUCTIONS

TYPE 1210-C

UNIT R-C OSCILLATOR

GENERAL RADIO COMPANY
OPERATING INSTRUCTIONS

TYPE 1210-C

UNIT R-C OSCILLATOR

Form 1210-0100-G
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GENERAL RADIO COMPANY
WEST CONCORD, MASSACHUSETTS, USA
SPECIFICATIONS

Frequency
Range: 20–500,000 cps in five ranges: 20–200, 200–2000, 2000–20,000, 20,000–200,000, and 50,000–500,000 cps.

Controls: Range selection switch and 4-inch precision gear-driven dial. Dial has two scales, 2–20 and 50–500, and is geared to a slow-motion knob that covers each decade in about 4 1/2 turns.

Accuracy: ±3%.

Stability: Warm-up drift is less than 1%, essentially complete in 1 to 2 hours.

Output
Control: Logarithmic, calibrated 0–50 db.

Low-impedance: (for loads of 500 ohms and higher) 0–7 v, open circuit, constant within ±1 db up to 200 kc; internal output impedance 50 ohms at full output, 1250 ohms at half output; no-load distortion less than 1% from 200 cps to 10 kc, less than 1.5% over entire frequency range. Attenuator calibration is reliable for loads of 12,000 ohms and above. Hum is at least 60 db below output voltage level.

High-impedance: (for loads of 10,000 ohms and higher) 0–45 v, open circuit, constant within ±1 db from 300 cps to 150 kc; distortion less than 5% from 200 cps to 200 kc, no load (reduced under load). Internal output impedance 14,000 ohms regardless of attenuator setting. Hum at least 50 db below maximum output voltage level.

Square Wave: 0–30 v peak-to-peak, open circuit; rise time approximately 1/5 μsec, (decreases to about 0.15 μsec with load of 1000 ohms); overshoot approximately 1%; hum at least 60 db below output voltage level; internal output impedance 2500 ohms.

Tube Component: One each 6BQ7-A, 0B2, 6189/12AU7-WA, 12AU7.

Terminals: Two jack-top Type 938 binding posts, one grounded to panel.

Power Input: 6.3 v ac or dc at 1 amp; 300 v dc at 60 ma.

Power Supply Recommended: Type 1203-B Unit Power Supply for operation from 115 v, 50–60 cps.

The Type 1201-B Unit Regulated Power Supply will provide a slight improvement in frequency stability on the highest frequency range.

Instrument will operate satisfactorily on power-supply frequencies up to 400 cps, with either power supply.

Accessories Available: For higher output (3 watts) use Type 1206-B Unit Amplifier for graphic recording, Type 907-R144 Dial Drive

Mounting: Gray finish; aluminum panel and chassis; bench mounting. The Type 480-P1U3 Relay Rack Adaptor Panel is available for use with oscillator and power supply combination. Panel height, 7 inches.

Dimensions: (Oscillator and Power Supply, as shown) width 18, height 5 1/4, depth 7 inches (380 by 145 by 175 mm) over-all.

Net Weight: 5 1/2 pounds (2.5 kg).

Output of the Type 1210-C Unit Oscillator with Type 1206-B Unit Amplifier, into 600-ohm load.

Typical output and harmonic distortion characteristics of the Type 1210-C Unit RC Oscillator as functions of frequency and load.

GENERAL RADIO EXPERIMENTER reference: Volume 32, No. 11, April, 1958.
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Figure 1. Type 1210-C Unit Oscillator.
UNIT R-C OSCILLATOR

Section 1

INTRODUCTION

1.1 PURPOSE. The Type 1210-C Unit R-C Oscillator (Figure 1) is a capacitance-tuned oscillator that combines the standard features of this type of instrument with square-wave output and "sweepability." With the square-wave output, both low- and high-frequency square-wave tests of transient behavior are possible. Since the instrument can be swept mechanically (refer to paragraph 3.2.1), frequency characteristics can be recorded either on level recorders or on cathode-ray oscilloscopes.

1.2 DESCRIPTION.

1.2.1 CONTROLS. The following controls are on the panel of the Type 1210-C Unit R-C Oscillator:

<table>
<thead>
<tr>
<th>Name</th>
<th>Description</th>
<th>Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>FREQUENCY RANGE</td>
<td>5-position rotary switch</td>
<td>Selects frequency range.</td>
</tr>
<tr>
<td>DECIBELS</td>
<td>Rotary knob</td>
<td>Varies output level.</td>
</tr>
<tr>
<td>SINE WAVES - SQUARE WAVES</td>
<td>3-position rotary switch</td>
<td>Selects sine-wave low-impedance, sine-wave high-impedance, or square-wave output.</td>
</tr>
<tr>
<td>None</td>
<td>4-inch circular dial</td>
<td>Selects frequency.</td>
</tr>
</tbody>
</table>

1.2.2 CONNECTIONS. The following table lists the connections on the Type 1210-C Unit R-C Oscillator.

<table>
<thead>
<tr>
<th>Connection</th>
<th>Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>Multipoint connector</td>
<td>Power supply connection</td>
</tr>
<tr>
<td>Jack-top binding posts (2)</td>
<td>Output terminals</td>
</tr>
</tbody>
</table>
Figure 2. Elementary Schematic Diagram for Type 1210-C Unit R-C Oscillator.
TYPE 1210-C UNIT R-C OSCILLATOR

Section 2

PRINCIPLES OF OPERATION

2.1 OSCILLATOR CIRCUIT. The oscillator circuit is essentially a series-parallel R-C network. (See Figure 2.) At operating frequency, the voltage from the network is one-third the input voltage, and of the same phase as the input. At frequencies above and below operating frequency, the output and input voltages differ in phase and the attenuation is greater than 3 to 1. When an amplifier of zero phase shift and a gain of at least 3 to 1 is connected from the output to the input of the R-C network, the circuit oscillates. Continuously variable capacitors provide at least a 10-to-1 frequency range, and resistor switching provides five decade ranges. Resistors are deposited-carbon-film type for high stability.

2.2 AUTOMATIC GAIN CONTROL CIRCUIT. The oscillator output is rectified and compared with a reference voltage. The resultant difference voltage is filtered and fed back to the grids of the oscillator tube to restrict the level of operation and to yield low distortion.

2.3 OUTPUT AMPLIFIER.

2.3.1 For 0-7-volt sine-wave output, the amplifier uses a modified cathode-follower circuit for low output impedance.

2.3.2 For 0-45-volt sine-wave output, the output tube is a voltage amplifier with degeneration at the oscillator frequency and with a grid leak to provide d-c bias. High output voltage is thus available at satisfactorily low distortion. As the output load is increased, degeneration is also increased and distortion is reduced.

2.3.3 For square-wave output, a Schmitt circuit is used. This circuit yields excellent square waves with a minimum of components and adjustments. Equality of pulse lengths can be obtained by adjustment of R47 (see Figure 3). Overshoot can be set at about 1% by adjustment of C14. Rise time is normally about a third of a microsecond. With a 200-ohm load and a slight readjustment of C14, a rise time of about one-tenth microsecond can be obtained.

![Figure 3. Tube and Component Layout.](image-url)
3.1 POWER SUPPLY.

3.1.1 UNIT POWER SUPPLIES. When plugged into a Type 1203-B Unit Power Supply or Type 1201-B Unit Regulated Power Supply, the Type 1210-C Unit R-C Oscillator is ready for operation from a 115-volt, 50- to 60-cycle power line.

3.1.2 OTHER POWER SUPPLIES. When using a power supply other than a Unit Power Supply, connect the multipoint jack connector (supplied with the Type 1210-C Unit R-C Oscillator) to the power supply. Connections are as follows:

<table>
<thead>
<tr>
<th>Terminal</th>
<th>To</th>
<th>Terminal</th>
<th>To</th>
<th>Terminal</th>
<th>To</th>
</tr>
</thead>
<tbody>
<tr>
<td>13 and 14</td>
<td>Heaters</td>
<td>15</td>
<td>B+</td>
<td>16</td>
<td>B-</td>
</tr>
</tbody>
</table>

(Terminals 14 and 16 are grounded to the oscillator panel.)

3.1.3 POWER-SUPPLY ATTACHING STRIPS. The Type 1210-C Unit R-C Oscillator can be firmly and permanently attached to any Unit Power Supply by means of the two stainless-steel locking strips supplied with the oscillator. One strip is used at the top, and the other at the bottom. It may be necessary first to remove the dust covers of the instruments and to slide the covers and strips in place simultaneously.

3.2 OTHER ACCESSORY EQUIPMENT.

3.2.1 SWEEP DRIVE. The oscillator dial is gear driven from a knob for high-resolution manual control. The knob and the pinion gear can be replaced by the Types 908-P1 or 907-R144 Dial Drive. These drives are powered by small synchronous motors, which automatically reverse when their motion in one direction is stopped. Small adjustable stops, furnished with the drives, can be positioned on the oscillator dial to limit the sweep angle to a portion of the frequency range. With this arrangement, a frequency characteristic can be displayed either on a pen-type recorder or on a cathode-ray oscilloscope.

3.2.2 RECORDER. The Type 908-P1 Synchronous Dial Drive can be used with the Type 1521-A Graphic Level Recorder. The recorder pen should be placed on scale (refer to Type 1521-A Operating Instructions) and the CHART DRIVE controls adjusted for a slow paper speed. The dial drive is then placed in operation. Frequency marks can be made on the paper.
by means of a momentary-contact switch across the input terminals or by means of the INPUT ATTENUATION control.

3.2.3 PULSE GENERATOR. The Type 1217-A Unit Pulser provides output pulses of excellent quality (0.5 μsec rise time) at certain discrete frequencies from 30 cycles to 100 kilocycles. When the Unit Pulser is triggered by the Type 1210-C Unit R-C Oscillator, pulses can be obtained at any frequency over the range up to 100 kilocycles. Connect the 0-45-volt output of the oscillator to the EXTERNAL DRIVE terminals of the Unit Pulser (INPUT switch to EXTERNAL TRIGGER). Set the PULSES PER SECOND switch to a rate the same as, or just below, the frequency setting of the Type 1210-C Unit R-C Oscillator.
Section 4

OPERATING PROCEDURE

4.1 FREQUENCY SETTING. The outer scale of the direct-reading four-inch dial is used for the lower four frequency ranges on the FREQUENCY RANGE switch (20-200 c, 200-2000 c, 2-20 kc, and 20-200 kc). The inner scale is used for the 50-500-kc range.

4.2 OUTPUT SYSTEMS.

4.2.1 With the output selector switch set at 0-7 v SINE WAVES, the output terminals are connected to the 5000-ohm output control of a modified cathode-follower circuit. When the output control knob (labeled DECIBELS) is turned fully clockwise, the output impedance is very low (about 50 ohms); the load resistance, however, should not be much less than 500 ohms if excessive distortion is to be avoided. Voltage level is about 7 volts. As the output control knob is turned counterclockwise, the output impedance, which depends on this setting, can be as great as 1250 ohms. When the output control knob is below the -5-db point, the distortion will not be excessive even if the load resistance is less than 500 ohms. For high-impedance loads, the change in output level is given in decibels on the plate at the output control knob. The DECIBELS calibration is sufficiently accurate for use over the entire frequency range. Note that when the output control knob is turned fully clockwise, the arrow points to the end of the circumscribed line (about +5 db) and not to 0. At the full-counterclockwise position the residual output is less than 3 millivolts.

4.2.2 With the output switch set at 0-45 v SINE WAVES, the output terminals are connected through an isolating capacitor to the plate circuit of the amplifier stage. The output control is in the grid circuit. The output impedance of 14 kilohms is thus independent of the setting of the output control, which affects only the voltage level. A 220-kilohm resistor is connected across the output terminals to provide a leakage path for the isolating (electrolytic) capacitor. When the output control knob is at the full-counterclockwise position, the residual voltage is a function of frequency. Typical readings are: less than 0.1 volt from 100 to 20,000 cycles; less than 0.3 volt down to 20 cycles; as much as 1.5 volts at 500 kilocycles. Because of the residual voltage, the DECIBELS calibration of output control is inaccurate for the 0-45-volt range. There is some degeneration in the output stage, and it increases as the load increases. Therefore, loading reduces the distortion.

4.2.3 With the output switch set at the SQUARE WAVES position, the available output is 30 volts peak-to-peak. The rise time is about 1/3
microsecond. The output terminals are connected to the 5000-ohm output control in the plate circuit of the output stage. The output impedance is about 2500 ohms with the control at maximum, and decreases as the control is turned back. The residual voltage, with the control at the full-counterclockwise position, is less than 15 millivolts peak-to-peak. Therefore, if the load impedance is large compared with the output impedance, the DECIBELS calibration of the output control is accurate, even at the lowest settings.

Section 5

SERVICE AND MAINTENANCE

5.1 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 insure proper handling and identification. For instruments not covered by the warranty, a purchase order should be forwarded to avoid unnecessary delay.

5.2 INPUT POWER. The input power at a 115-volt, 60-cycle line is about 35 watts when the oscillator is supplied by a Type 1203-B Unit Power Supply.
**TABLE 1.**

**TABLE OF ADJUSTMENTS**

<table>
<thead>
<tr>
<th>PART</th>
<th>FREQUENCY RANGE</th>
<th>DIAL</th>
<th>OUTPUT SWITCH</th>
<th>OUTPUT CONTROL</th>
<th>ADJUST FOR</th>
</tr>
</thead>
<tbody>
<tr>
<td>R26</td>
<td>200-2000 c</td>
<td>2.5</td>
<td>0-7 v</td>
<td>Clockwise</td>
<td>7.0 v max open-circuit output at 250 cps.</td>
</tr>
<tr>
<td>R17</td>
<td>200-2000 c</td>
<td>2.5</td>
<td>0-7 v</td>
<td>Clockwise</td>
<td>Minimum 2d-harmonic distortion at no load.</td>
</tr>
<tr>
<td>C3, C10</td>
<td>200-2000 c</td>
<td>20</td>
<td>0-7 v</td>
<td>Clockwise</td>
<td>2000 cps, 7.0 v (measured with dust cover on).</td>
</tr>
<tr>
<td>L1</td>
<td>20-200 kc</td>
<td>20</td>
<td>0-7 v</td>
<td>Clockwise</td>
<td>200 kc (measured with dust cover on).</td>
</tr>
<tr>
<td>R47</td>
<td>200-2000 c</td>
<td>10</td>
<td>0-30 v</td>
<td>Clockwise</td>
<td>Square-wave symmetry along time axis.</td>
</tr>
<tr>
<td>C14</td>
<td>200-2000 c</td>
<td>10</td>
<td>0-30 v</td>
<td>Clockwise</td>
<td>Slight overshoot (square wave) - less than 1%.</td>
</tr>
</tbody>
</table>
5.3 REMOVAL OF COVER. To remove the cover, loosen the thumb-screw on the right-hand side of the cabinet.

5.4 TUBE REPLACEMENT AND ADJUSTMENTS. (Refer to Table 1.)

5.4.1 If either the oscillator tube (V1) or the reference-voltage tube (V3) is replaced, the only readjustment usually required is the resetting of R26 for 7.0 volts maximum open-circuit output at 250 cps. A more complete procedure when V1 is replaced involves setting R17 for minimum distortion while maintaining the output at 7.0 volts by means of R26.

5.4.2 The trimmer capacitors (C3 and C10) have been set for correct frequency tracking and for flatness of output over the 200-2000-cycle range, with the cover on. Replacement of V1 may require a slight readjustment of C10.

5.4.3 The dust core of L1 has been set for correct frequency calibration at 200 kilocycles (20-200-kilocycle range) with the cover on.

5.4.4 If the output amplifier tube (V4) is replaced, R47 may require readjustment for equality of pulses during square-wave operation. Also, C14 may require resetting to keep overshoot to less than one percent.

5.4.5 The hub of the frequency dial is insulated from the shaft by a polystyrene sleeve, and is grounded to the panel by spring washers. If this ground is incorrectly made, the 60-cycle beat (0-7-volt range) may materially exceed a swing of 0.3 volt.

5.5 TUBE VOLTAGE AND RESISTANCE MEASUREMENTS. Table 2, page 10, gives the normal d-c voltage and d-c resistance from various tube-socket pins to ground. A deviation of 20 percent from any of these values is not necessarily abnormal.
### TABLE 2

**VOLTAGE AND RESISTANCE CHART**

<table>
<thead>
<tr>
<th>TUBE</th>
<th>OUTPUT SWITCH POSITION</th>
<th>PLATE VOLTS TO GND</th>
<th>GRID VOLTS RES TO GND</th>
<th>CATHODE VOLTS RES TO GND</th>
</tr>
</thead>
<tbody>
<tr>
<td>V1</td>
<td>ANY</td>
<td>1 +215</td>
<td>2 42.5 - 46.5 1.5 - 14 MΩ*</td>
<td>3 48 3kΩ</td>
</tr>
<tr>
<td>V1</td>
<td>ANY</td>
<td>6 160</td>
<td>7 42 1.5 MΩ</td>
<td>8 45.5 2700Ω</td>
</tr>
<tr>
<td>V2</td>
<td>ANY</td>
<td>1 295</td>
<td>2 114</td>
<td>3 120 23kΩ</td>
</tr>
<tr>
<td>V2</td>
<td>ANY</td>
<td>6 40</td>
<td>7 40 0.3-1 MΩ*</td>
<td>8 49 15kΩ</td>
</tr>
<tr>
<td>V3</td>
<td>ANY</td>
<td>1,5 165</td>
<td>2 148</td>
<td>7 59 8.2kΩ</td>
</tr>
<tr>
<td>(OB2)</td>
<td>ANY</td>
<td></td>
<td>3 150 0.5 MΩ</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>8 1.5 120Ω</td>
<td></td>
</tr>
<tr>
<td>V4</td>
<td>0-7 v</td>
<td>1 290</td>
<td>2 148</td>
<td>3 31 5kΩ</td>
</tr>
<tr>
<td>V4</td>
<td>0-7 v</td>
<td>6 150</td>
<td>7 0</td>
<td>8 9.5-12 1.5kΩ</td>
</tr>
<tr>
<td>V4</td>
<td>0-45 v</td>
<td>1 295</td>
<td>2 26 57 kΩ</td>
<td>3 93 6.8kΩ</td>
</tr>
<tr>
<td>V4</td>
<td>0-45 v</td>
<td>6 90-140†</td>
<td>7 7-12† 57.5 kΩ</td>
<td>8 93 6.8kΩ</td>
</tr>
<tr>
<td>V4</td>
<td>0-30 v</td>
<td>1 240</td>
<td>2 86 270 kΩ</td>
<td>8 93 6.8kΩ</td>
</tr>
<tr>
<td>V4</td>
<td>0-30 v</td>
<td>6 265</td>
<td>7 80 39 kΩ</td>
<td></td>
</tr>
<tr>
<td>(6BQ7-A)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**NOTES**

(1) Input resistance of d-c voltmeter must be at least ten times the value listed in the resistance column.
(2) * - Depends on position of FREQUENCY RANGE switch.
(3) † - Depends on position of output control knob.
(4) Voltage measurements were made with a B supply (PL-1 No. 15 to ground) of 310 volts dc, and a heater supply (PL-1 No. 14 to ground) of 6.3 volts ac.
(5) Resistance measurements were made with the power supply removed and with the B supply terminals shorted (PL-1 No. 15 to ground).
NOTE:
- RESISTORS 1/2 WATT UNLESS OTHERWISE SPECIFIED
- RESISTANCE IN OHMS UNLESS OTHERWISE SPECIFIED
  - $K = 1000 \text{ OHMS}$
  - $M = 1 \text{ MEGOHM}$
- CAPACITANCE VALUES ONE & OVER IN MICROFARADS, LESS THAN ONE IN MICROFARADS UNLESS OTHERWISE NOTED

- SCREW DRIVER ADJUSTMENT
- KNOB CONTROL

Figure 4. Schematic Diagram
Figure 4. Schematic Diagram for Type 1210-C Unit R-C Oscillator.
<table>
<thead>
<tr>
<th>PART NO. (NOTE A)</th>
<th>PART NO. (NOTE A)</th>
</tr>
</thead>
<tbody>
<tr>
<td>R1 12.8M ± 1% 1 w</td>
<td>R46 110k ± 5% 1/2 w</td>
</tr>
<tr>
<td>R2 1.29M ± 1% 1 w</td>
<td>R47 250k ± 10%</td>
</tr>
<tr>
<td>R3 125.0k ± 1% 1/2 w</td>
<td>R48 560k ± 5% 1/2 w</td>
</tr>
<tr>
<td>R4 8.9k ± 1% 1/2 w</td>
<td>R49 6.8k ± 5% 1/2 w</td>
</tr>
<tr>
<td>R5 920 ± 5% 1/2 w</td>
<td>R50 56k ± 5% 1/2 w</td>
</tr>
<tr>
<td>R6 12.8M ± 1% 1 w</td>
<td>R51 120 ± 5% 1/2 w</td>
</tr>
<tr>
<td>R7 1.29M ± 1% 1 w</td>
<td>R52 1.5k ± 5% 1/2 w</td>
</tr>
<tr>
<td>R8 129k ± 1% 1/2 w</td>
<td>R53 220k ± 5% 1/2 w</td>
</tr>
<tr>
<td>R9 13k ± 1% 1/2 w</td>
<td>R54 5k ± 10%</td>
</tr>
<tr>
<td>R10 5.1k ± 1% 1/2 w</td>
<td></td>
</tr>
<tr>
<td>R11 100 ± 5% 1/2 w</td>
<td>C1 603 μF</td>
</tr>
<tr>
<td>R12 300 ± 1% 1/4 w</td>
<td>C2 603 μF</td>
</tr>
<tr>
<td>R13 100 ± 5% 1/2 w</td>
<td>C3 5-20 μF</td>
</tr>
<tr>
<td>R14 2.7k ± 1% 1 w</td>
<td>C4 25</td>
</tr>
<tr>
<td>R15 10k ± 5% 1/2 w</td>
<td>C5 450 dcwv</td>
</tr>
<tr>
<td>R16 100 ± 5% 1/2 w</td>
<td>C6 25</td>
</tr>
<tr>
<td>R17 5.0k ± 10%</td>
<td></td>
</tr>
<tr>
<td>R18 4.7k ± 10% 2 w</td>
<td></td>
</tr>
<tr>
<td>R19 5k ± 1% 1 w</td>
<td></td>
</tr>
<tr>
<td>R20 33k ± 5% 1/2 w</td>
<td></td>
</tr>
<tr>
<td>R21 470k ± 5% 1/2 w</td>
<td></td>
</tr>
<tr>
<td>R22 1M ± 5% 1/2 w</td>
<td></td>
</tr>
<tr>
<td>R23 120k ± 1% 1/2 w</td>
<td></td>
</tr>
<tr>
<td>R24 620k ± 5% 1/2 w</td>
<td></td>
</tr>
<tr>
<td>R25 10k ± 10%</td>
<td></td>
</tr>
<tr>
<td>R26 8.2k ± 5% 1/2 w</td>
<td></td>
</tr>
<tr>
<td>R27 33k ± 5% 1/2 w</td>
<td></td>
</tr>
<tr>
<td>R28 22k ± 5% 1 w</td>
<td></td>
</tr>
<tr>
<td>R29 1.2k ± 5% 1/2 w</td>
<td></td>
</tr>
<tr>
<td>R30 100 ± 5% 1/2 w</td>
<td></td>
</tr>
<tr>
<td>R31 1M ± 5% 1/2 w</td>
<td></td>
</tr>
<tr>
<td>R32 1k ± 10% 1 w</td>
<td></td>
</tr>
<tr>
<td>R33 1M ± 5% 1/2 w</td>
<td></td>
</tr>
<tr>
<td>R34 4.7k ± 5% 1 w</td>
<td></td>
</tr>
<tr>
<td>R35 1k ± 5% 1/2 w</td>
<td></td>
</tr>
<tr>
<td>R36 27k ± 10% 2 w</td>
<td></td>
</tr>
<tr>
<td>R37 27k ± 10% 2 w</td>
<td></td>
</tr>
<tr>
<td>R38 22k ± 10% 2 w</td>
<td></td>
</tr>
<tr>
<td>R39 5.1k ± 5% 1 w</td>
<td></td>
</tr>
<tr>
<td>R40 680k ± 5% 1/2 w</td>
<td></td>
</tr>
<tr>
<td>R41 8.2k ± 5% 1 w</td>
<td></td>
</tr>
<tr>
<td>R42 100 ± 5% 1/2 w</td>
<td></td>
</tr>
<tr>
<td>R43 120k ± 5% 1 w</td>
<td></td>
</tr>
<tr>
<td>R44 470 ± 5% 1/2 w</td>
<td></td>
</tr>
<tr>
<td>R45 1M ± 5% 1/2 w</td>
<td></td>
</tr>
</tbody>
</table>

**NOTES**

(A) Type designations for resistors and capacitors are as follows:

- **COC** - Capacitor, ceramic
- **COB** - Capacitor, electrolytic
- **COL** - Capacitor, oil
- **COM** - Capacitor, mica
- **COT** - Capacitor, trimmer
- **POS C** - Potentiometer, composition
- **POSW** - Potentiometer, wire-wound
- **REC** - Resistor, composition
- **REF** - Resistor, film

(B) All resistances are in ohms, except as otherwise indicated by k (kilohms) or M (megohms).

(C) All capacitances are in microfarads, except as otherwise indicated by μF (micromicrofarads).
Figure 6. Bottom Interior View of Type 1210-C Unit R-C Oscillator.
Figure 5. Top Interior View of Type 1210-C Unit R-C Oscillator.
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