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WAR DEPARTMENT TECHNICAL MANUAL

U.S. Dept. of Army

OSCILLATOR I-151-A

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The information contained in restricted documents and the essential characteristics of restricted materiel may be given to any person known to be in the service of the United States and to persons of undoubted loyalty and discretion who are cooperating in Government work, but will not be communicated to the public or to the press except by authorized military public relations agencies. (See also par. 28, AR 380-5, 15 Mar 1944.)

WAR DEPARTMENT

17 OCTOBER 1944

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WAR DEPARTMENT TECHNICAL MANUAL

TM 11-2524

OSCILLATOR I-151-A

WAR DEPARTMENT 17 OCTOBER 1944

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WAR DEPARTMENT,
WASHINGTON 25, D. C., 17 OCTOBER, 1944.

TM 11-2524, Ocsillator I-151-A, is published for the information and guidance of all concerned.

[A.G. 300.7 (22 Jun 1944).]

BY ORDER OF THE SECRETARY OF WAR:

G. C. MARSHALL,
Chief of Staff.

OFFICIAL:
J. A. ULIO,
Major General,
The Adjutant General.

DISTRIBUTION:
Armies (Sig) (5); Corps (Sig) (5); SvC (Sig) (5); Depts (5); Def C (2);** Arm & Sv Boards (2); Sig C Rep Shs (2) ASF Deps (Sig Sec) (2); Sig Deps (Oversea); (10); Gen Deps (Sig Sec) (10); PE (2); Sig C Inspec Zones (2); Sig C Proc Dists (2).
**Symbols: IBn 11 (2); IC 4 (10); IU 4 (4); IC 11, 44 (4).
IBn 11: T/O 11-400, Sig AW Orgn, Bn Hq (A).
IC 4: T/O 4-260-1.
IU 4: T/O 4-232; 4-240.
IC 11: T/O 11-107; 11-237; 11-287; 11-400, Sig AW Orgn (B) Co, Hq Team; Rad Rep Plat; 11-500, Sig Sv Orgn (EC) Rad Maint Team; 11-587; 11-592; 11-597; 11-617.
IC 44: T/O & E 44-16; 44-17; 44-116; 44-117; 44-138.

(For explanation of symbols see FM 21-6.)

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DESTRUCTION NOTICE

WHY —To prevent the enemy from using or salvaging this equipment for his benefit.

WHEN —When ordered by your commander.

HOW —1. Smash —Use sledges, axes, handaxes, pickaxes, hammers, crowbars, heavy tools.

2. Cut —Use axes, handaxes, machetes.

3. Burn —Use gasoline, kerosene, oil, flame throwers, incendiary grenades.

4. Explosives —Use firearms, grenades, TNT.

5. Disposal —Bury in slit trenches, fox holes, other holes. Throw in streams. Scatter.

USE ANYTHING IMMEDIATELY AVAILABLE FOR DESTRUCTION OF THIS EQUIPMENT.

WHAT —1. Smash —Controls, panel, case, tubes, resistors, capacitors, chassis.

2. Cut —Cables and all wirings.

3. Burn —All technical manuals, instruction books.

4. Bury or scatter —Any or all of the above pieces after destroying their usefullness.

DESTROY EVERYTHING

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WARNING

HIGH VOLTAGE

is used in the operation
of this equipment.

DEATH ON CONTACT

may result if personnel fail
to observe safety precautions.

SAFETY NOTICE

Voltages as high as 520 volts are exposed when the set is operating. Extreme care must be exercised when working inside the unit.

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FIRST AID TREATMENT FOR ELECTRIC SHOCK

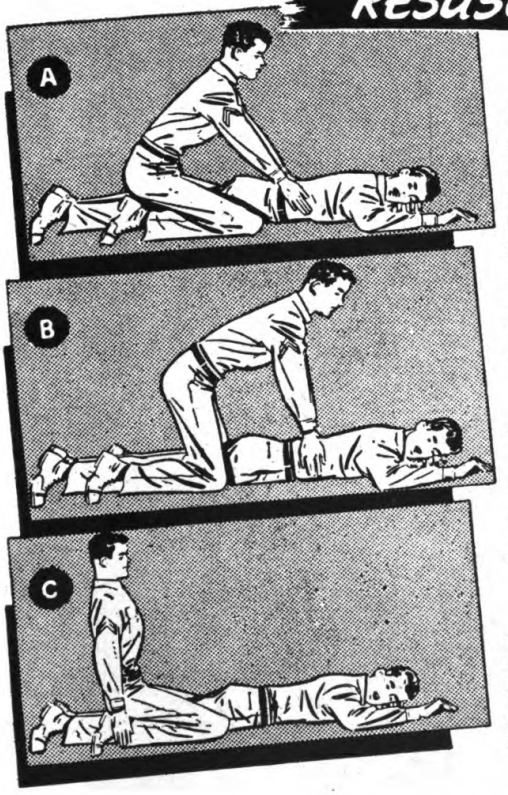
I. FREE THE VICTIM FROM THE CIRCUIT IMMEDIATELY.

Shut off the current. If this is not immediately possible, use a dry nonconductor (rubber gloves, rope, board) to move either the victim or the wire. Avoid contact with the victim. If necessary to cut a live wire, use an axe with a dry wooden handle. Beware of the resulting flash.

II. ATTEND INSTANTLY TO THE VICTIM'S BREATHING.

Begin resuscitation at once on the spot. Do not stop to loosen the victim's clothing. Every moment counts. Keep the patient warm. Wrap him in any covering available. Send for a doctor. Remove false teeth or other obstructions from the victim's mouth.

RESUSCITATION



POSITION

1. Lay the victim on his belly, one arm extended directly overhead, the other arm bent at the elbow, the face turned outward and resting on hand or forearm, so that the nose and mouth are free for breathing (fig. A).

2. Straddle the patient's thighs, or one leg, with your knees placed far enough from his hip bones to allow you to assume the position shown in figure A.

3. Place your hands, with thumbs and fingers in a natural position, so that your palms are on the small of his back, and your little fingers just touch his lowest ribs (fig. A).

FIRST MOVEMENT

4. With arms held straight, swing forward slowly, so that the weight of your body is gradually brought to bear upon the victim. Your shoulders should be directly over the heels of your hands at the end of the forward swing (fig. B). Do not bend your elbows. The first movement should take about 2 seconds.

SECOND MOVEMENT

5. Now immediately swing backward, to remove the pressure completely (fig. C).

6. After 2 seconds, swing forward again. Repeat this pressure-and-release cycle 12 to 15 times a minute. A complete cycle should require 4 or 5 seconds.

CONTINUED TREATMENT

7. Continue treatment until breathing is restored or until there is no hope of the victim's recovery. Do not give up easily. Remember that at times the process must be kept up for hours.

8. During artificial respiration, have someone loosen the victim's clothing. Wrap the victim warmly; apply hot bricks, stones, etc. Do not give the victim liquids until he is fully conscious. If the victim must be moved, keep up treatment while he is being moved.

9. At the first sign of breathing, withhold artificial respiration. If natural breathing does not continue, immediately resume artificial respiration.

10. If operators must be changed, the relief operator kneels behind the person giving artificial respiration. The relief takes the operator's place as the original operator releases the pressure.

11. Do not allow the revived patient to sit or stand. Keep him quiet. Give hot coffee or tea, or other internal stimulants.

HOLD RESUSCITATION DRILLS REGULARLY

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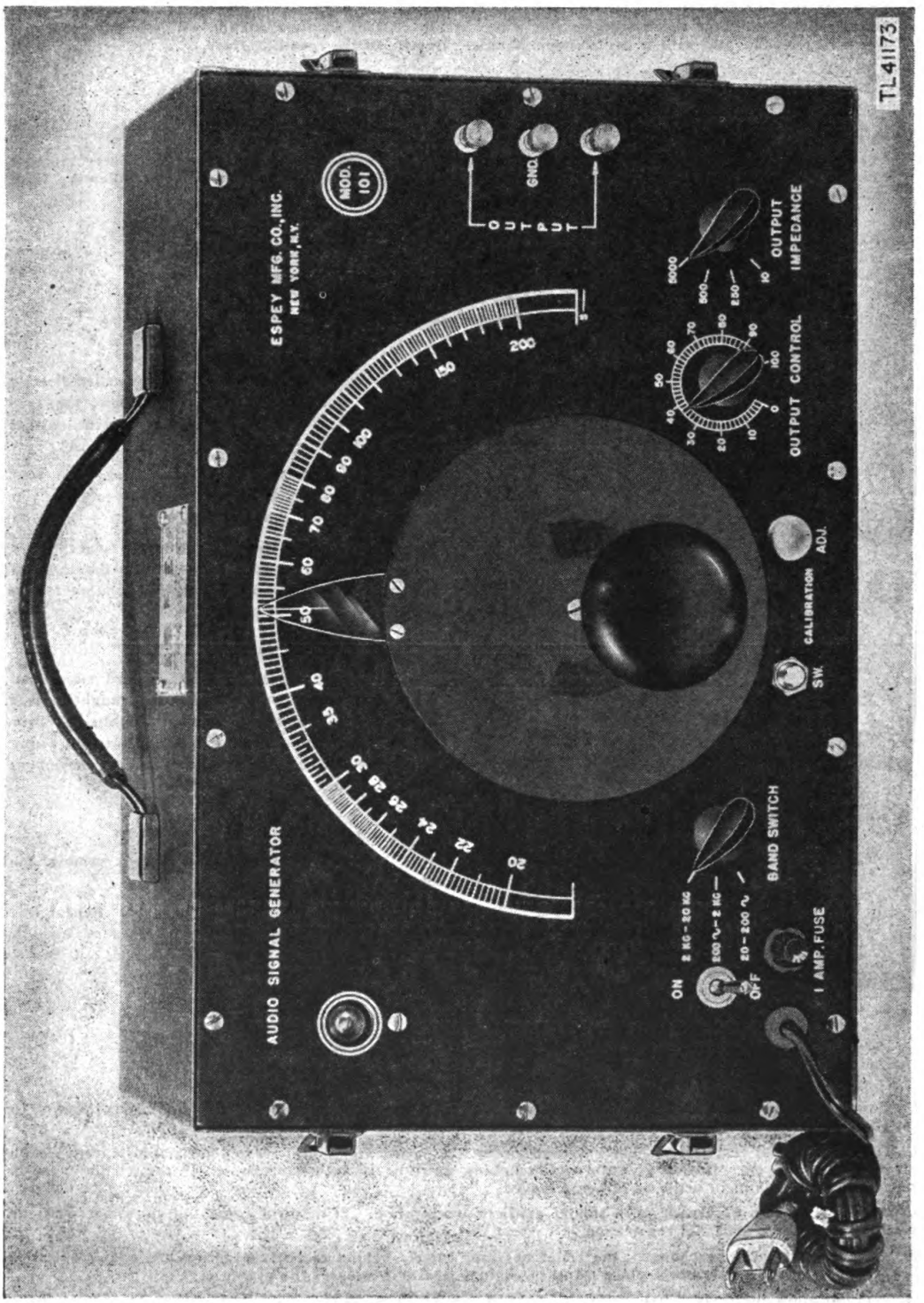


Figure 1. Oscillator I-151-A, with cover removed.

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SECTION 1

DESCRIPTION

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1. GENERAL. An audio oscillator is a device for producing a signal of predetermined frequency which may be used for various tests in electronic equipment. These tests are made by applying a test signal to various points of the circuit under test, and observing the effect of the circuit upon the injected signal. An audio oscillator with a calibrated frequency dial may also be used as a secondary frequency standard.

2. OSCILLATOR I-151-A. This unit is an audio-frequency oscillator operating from an a-c line of 110-120 volts at 60 cycles. Its output covers the frequency range of from 20 cycles to 20,000 cycles in 3 bands as follows: 20-200, 200-2,000, and 2,000-20,000 cycles. All the controls and switch are mounted on the front panel. The chassis, attached to the front panel, supports the internal components, such as the transformer, tubes, resistors, etc. To remove the chassis, unscrew the fourteen screws around the edge of the panel and pull it forward. The set can be calibrated against the 60-cycle line by means of the neon lamp which is normally used as an ON-OFF indicator. Calibration can be made from the front panel. *However, this adjustment should not be attempted by inexperienced personnel.* The set weighs 25 pounds and the dimensions are 15 by 7 by 9½ inches. Two views of the instrument are shown in figures 1 and 2.

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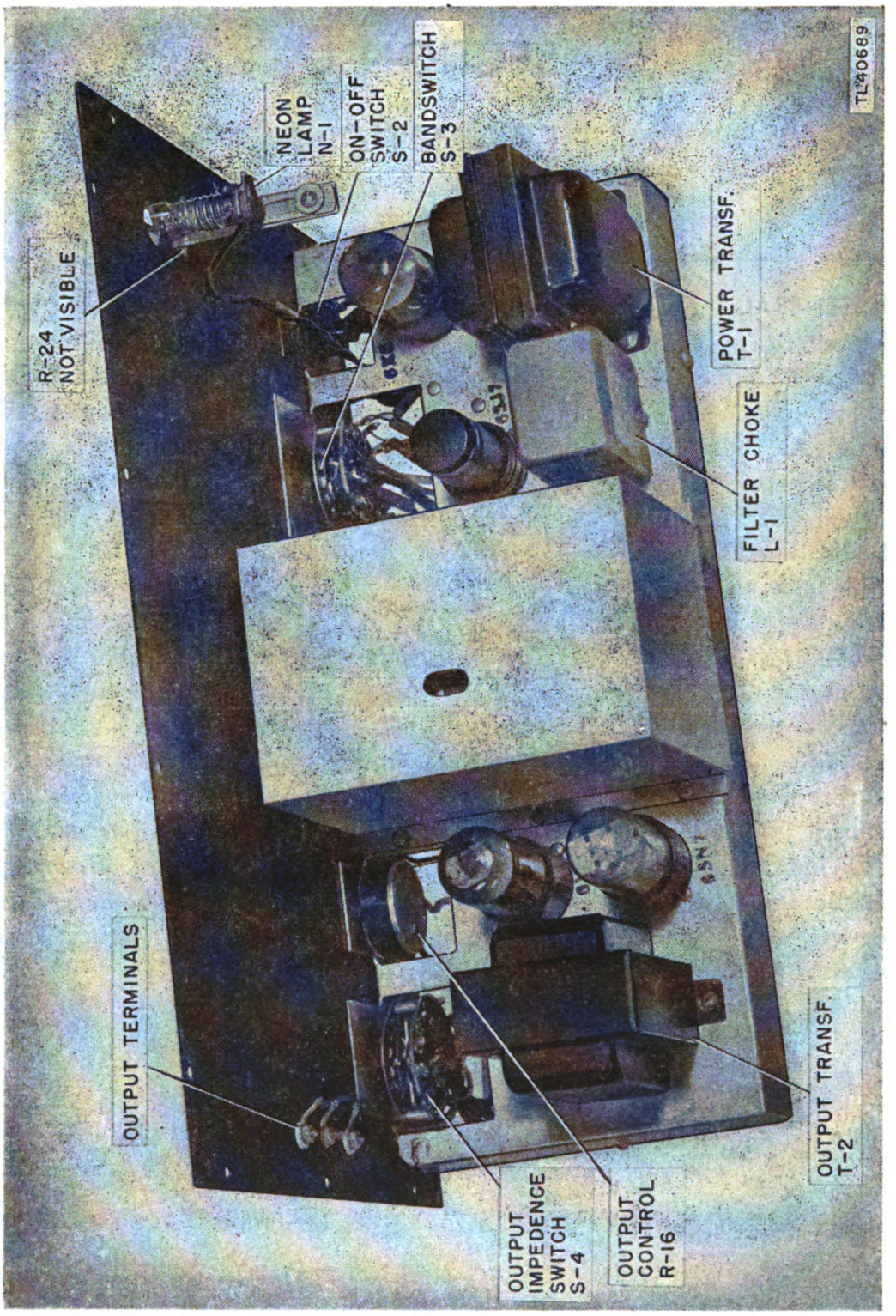


Figure 2. Oscillator I-151-A, chassis removed from case.

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SECTION II

OPERATION

3. INITIAL PROCEDURE. Unpack the set carefully from the case or carton. Since the audio oscillator is furnished with the required tubes in place, it is not necessary that the chassis be removed to insert tubes. The line supply should be checked to determine whether it is of the correct voltage and frequency. Check the fuse located at the lower, left corner by unscrewing it counterclockwise. Plug the line cord into the 11-120-volt a-c supply. Throw the ON-OFF switch to the ON position. The oscillator should be allowed to warm up for about 30 minutes until the tubes and other circuit components become stabilized. The neon bulb should glow while the current is on. If, however, the set does not operate, refer to Section IV for maintenance instructions.

4. CALIBRATION.

a. Set OUTPUT CONTROL to maximum position.

b. Turn scale indicator to extreme right-hand position; at this point the indicator should be at line marked S.

c. Turn BAND SWITCH to 20-200-cycles position and carefully set scale indicator to 60; at this setting the neon laup should not blink when the CALIBRATION SW. is pressed. If the lamp blinks, proceed as follows:

(1) Remove the cover from the CALIBRATION ADJ. (adjacent to the CALIBRATION SW.).

(2) Keep the CALIBRATION SW. depressed and the dial set to 60 cycles, then adjust the trimmer, now exposed, with a non-metallic screwdriver.

(3) The proper adjustment is indicated by zero flicker of the neon light.

5. OPERATION.

a. Set the OUTPUT IMPEDANCE control to match the load presented by the apparatus to be used in conjunction with the signal generator.

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b. Connect the load to the upper and lower OUTPUT binding posts. The center post is used to present a balanced load to ground.

c. Set the BAND SWITCH to the particular range desired as marked on the panel: 20-200 ~, 200 ~-2 KC, and 2 KC-20 KC.

d. Set the calibrated dial to the frequency desired. Scale markings indicate frequency directly for 20-200~ band. Multiply by 10 for the 200~-2KC band and by 100 for the 2KC-20KC band.

e. A balanced output is obtained across the terminal posts. The total impedance of this output is controlled by an OUTPUT IMPEDANCE switch and will give impedance steps of 5,000, 500, 250, and 10 ohms.

f. The signal amplitude may be varied by means of the OUTPUT CONTROL. The waveform of the signal will be sinusoidal for any setting of this control.

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SECTION III
FUNCTIONING OF PARTS

6. OSCILLATOR (fig. 3).

a. The oscillator is of the resistance-capacitance tuned (Wien bridge) type.

b. The frequency is determined by means of two variable ganged capacitors having a 10 to 1 capacitance ratio.

c. A BAND SWITCH provides for further extension of the range by changing the value of the resistance used with these tuning capacitors. There are three bands: 20-200-~, 200 ~-2 KC, and 2 KC-20 KC.

d. Two tubes are used in the oscillator section; a 6SJ7 (VT-116) and a 6V6-GT (VT-107-A). These tubes act as a two-stage resistance-coupled amplifier, having a positive and negative feedback. The feedback network is selective and therefore controls the frequency of oscillation.

e. Stability of operation is obtained by means of negative feedback to the cathode circuit of the 6SJ7 tube through a resistor network. One section of this resistor network consists of two 6-watt, 115-volt, lamps in series which act as a nonlinear resistance element. The amplitude of the signal automatically varies the resistance of the nonlinear element, thus controlling signal amplitude and waveform. For an explanation of the theory of this oscillator, see TM 11-466.

7. AMPLIFIER (fig. 3).

a. The output signal of the oscillator is supplied to a 6SN7 (VT-231) tube, which acts as an amplifier, phase inverter, and push-pull output tube.

b. The plate load of the 6SN7 tube is a center-tapped transformer having a secondary which provides balanced-output impedances of 5,000, 500, 250, and 10 ohms.

c. Selection of the desired impedance is made by means of the OUTPUT IMPEDANCE selector switch.

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8. POWER SUPPLY (fig. 3).

a. The power supply has been designed to operate from a 110-volt, 60-cycle, a-c line.

b. The power transformer provides high voltage a-c for the plates of the rectifier tube and also provides filament voltage for all tubes in the unit.

c. The rectifier, of the full-wave type, uses a 6X5 (VT-126-B) tube. This, in conjunction with the filter system, provides the required d-c voltage.

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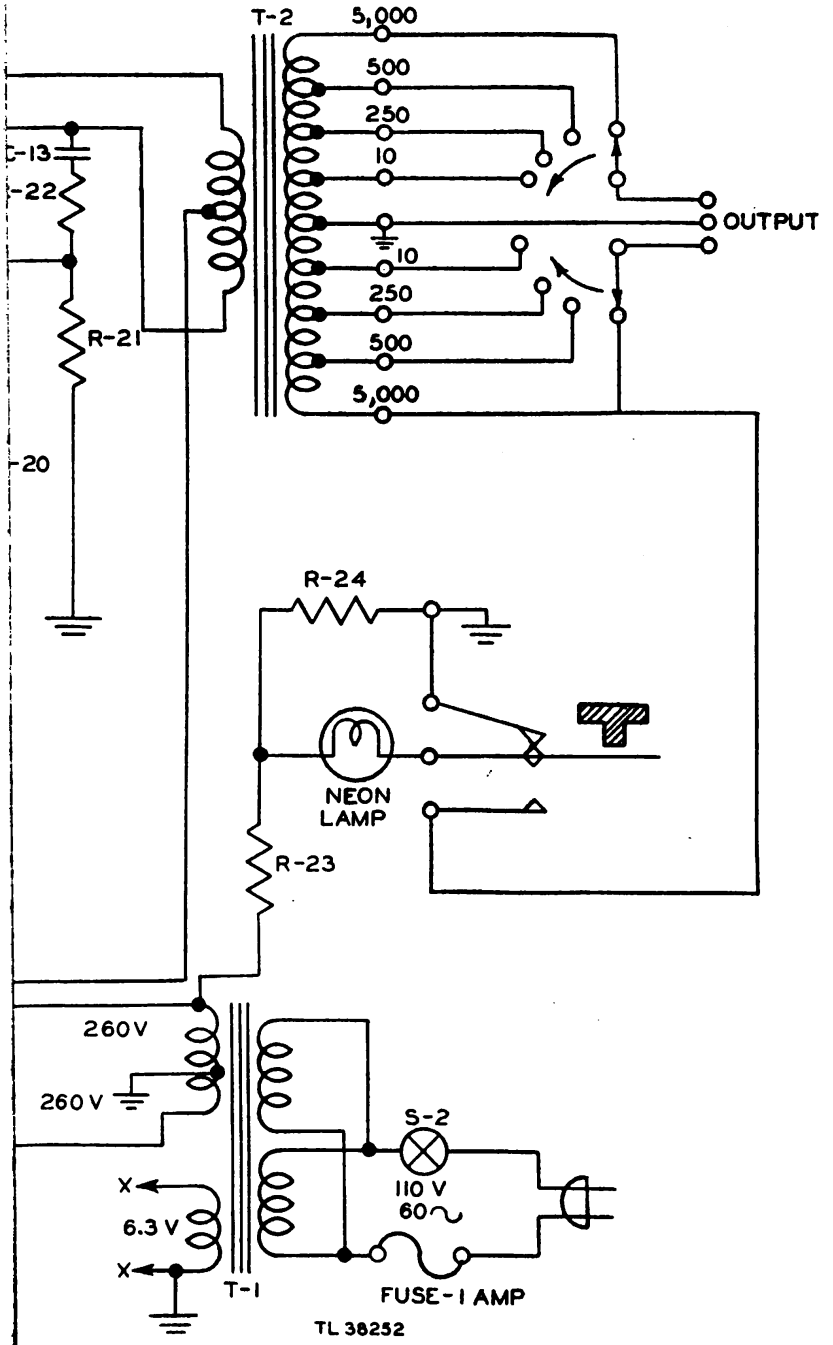


Figure 3. Oscillator I-151-A, schematic diagram.

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SECTION IV

MAINTENANCE

Unsatisfactory performance of this equipment will be reported immediately on W.D., A.G.O. form No. 468. If form is not available, see TM 38-250.

---

9. GENERAL. Do not attempt to adjust or change any of the components of this set in the field (except tubes, calibrating adjustment, fuse, and lamps). The tubes may be replaced if necessary, but after such replacement, the generator should be tested for calibration and distortion.

a. Replacement of Lamps. The neon lamp may be replaced, if damaged, with no further adjustment. The lamp is a standard ¼-watt, 120-volt neon lamp having a candelabra base. Lamps B-1 and B-2 are located on the underside of the chassis (fig. 5).

b. Replacement of Tubes. Remove the fourteen screws around the edge of the panel and pull the panel forward. The tubes are mounted on the chassis. Remove one tube at a time and test it. This will insure inserting the tube in the proper socket.

c. Replacement of Fuse. If the tubes do not light up, check the fuse by unscrewing the fuse holder and examining the fuse. *If the fuse is blown, investigate the cause before inserting a new one.* The replacement fuse should be rated at 1 ampere.

d. Voltage and Resistance Chart. A chart giving all voltage and resistance measurements taken from the tube sockets is shown in figure 4. The location of the tube sockets is shown in the bottom view of the chassis as illustrated in figure 5.

10. MOISTUREPROOFING AND FUNGIPROOFING.

a. General. Communication failures commonly occur when Signal Corps equipment is operated in tropical areas where temperature and relative humidity are extremely high. The following problems are typical:

(1) Resistors and capacitors fail.

(2) Electrolytic action takes place in coils, transformer windings, etc., causing eventual break-down.

(3) Hook-up wire and cable insulation break down. Fungus growth accelerates deterioration.

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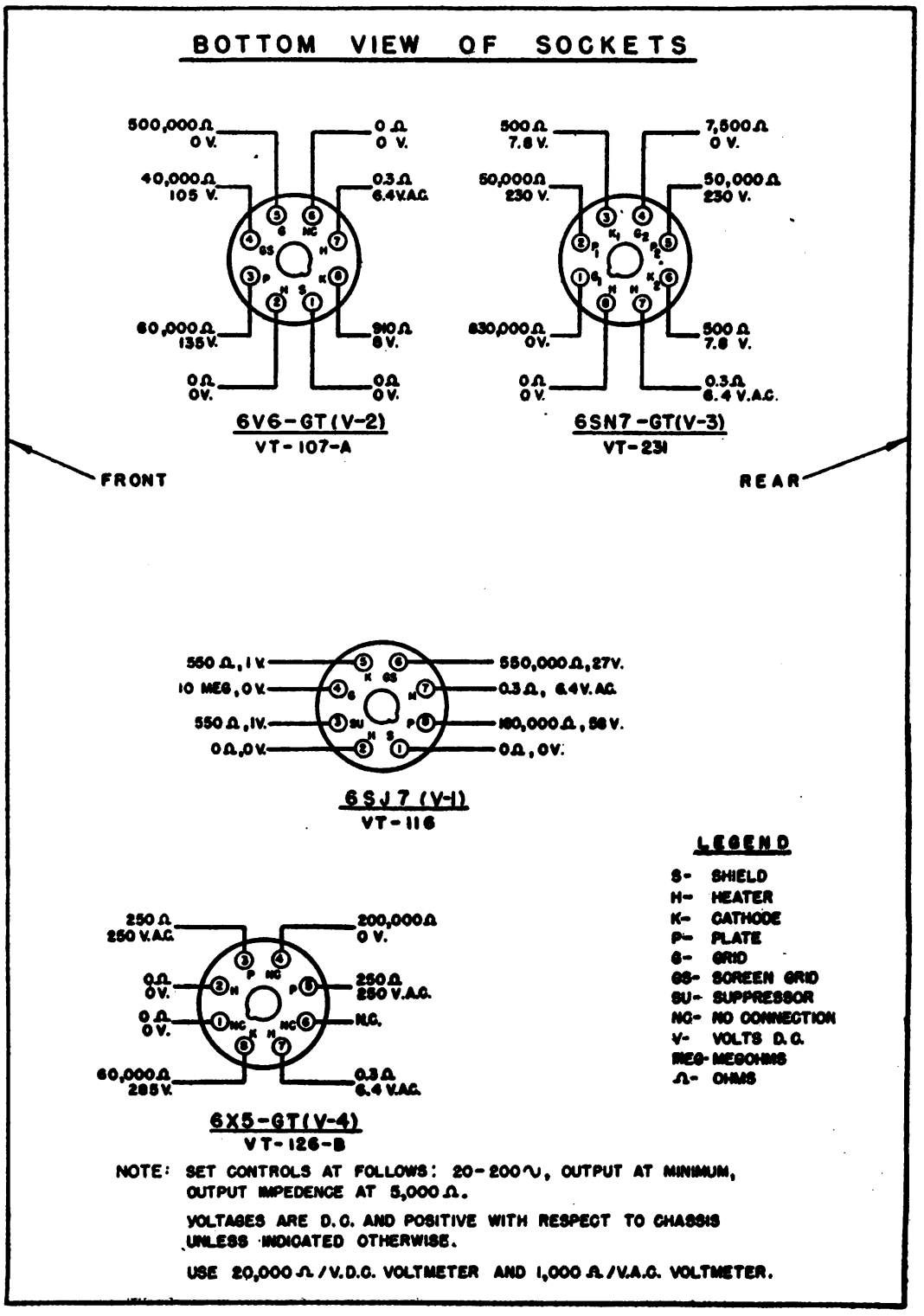


Figure 4. Voltage and resistance chart.

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(4) Moisture forms electrical leakage paths on terminal boards and insulation strips, causing flash-overs.

(5) Moisture provides leakage paths between battery terminals.

b. Treatment. A moistureproofing and fungiproofing treatment has been devised which, if properly applied, provides a reasonable degree of protection against fungus growth, insects, corrosion, salt spray, and moisture. The treatment involves the use of a moisture- and fungi-resistant varnish applied by means of a spray gun.

c. Step-by-Step Instructions.

(1) PREPARATION.

(a) Make all repairs and adjustments necessary for the proper operation of the equipment.

(b) Clean all dirt, dust, rust, fungus, oil, grease, etc. from the equipment to be processed.

(2) DISASSEMBLY.

(a) Release four (4) catches holding cover to case and remove case.

(b) Remove fourteen (14) screws holding front panel assembly to case and one (1) screw holding rear of chassis to case; remove front panel assembly.

(c) Remove seven (7) screws holding shield to capacitor gang; remove shield.

(3) MASKING. Cover the following components with masking tape as shown in figures 6 and 7.

(a) Plates and rotor contacts on the tuning capacitor, item A, figure 6.

(b) Contacts on the band switch, item B, figure 6.

(c) Contacts on the output impedance switch, item C, figure 6.

(d) Plates and rotor contacts on the calibration adjustment capacitor, item C, figure 7.

(e) Three (3) capacitors under tuning capacitor gang, item B, figure 7.

(f) Contacts on the calibration key switch, item A, figure 7.

(4) DRYING.

(a) Place components to be treated in heat chamber.

(b) Bake for two (2) or three (3) hours at 160° F. *Do not exceed 160° F.*

(c) If wax should begin to melt on any of the components, decrease temperature and increase baking time approximately one (1) hour for each 10° drop in temperature.

(5) VARNISHING.

(a) Apply three (3) coats of Lacquer, Fungus-resistant, Spec No. 71-2202

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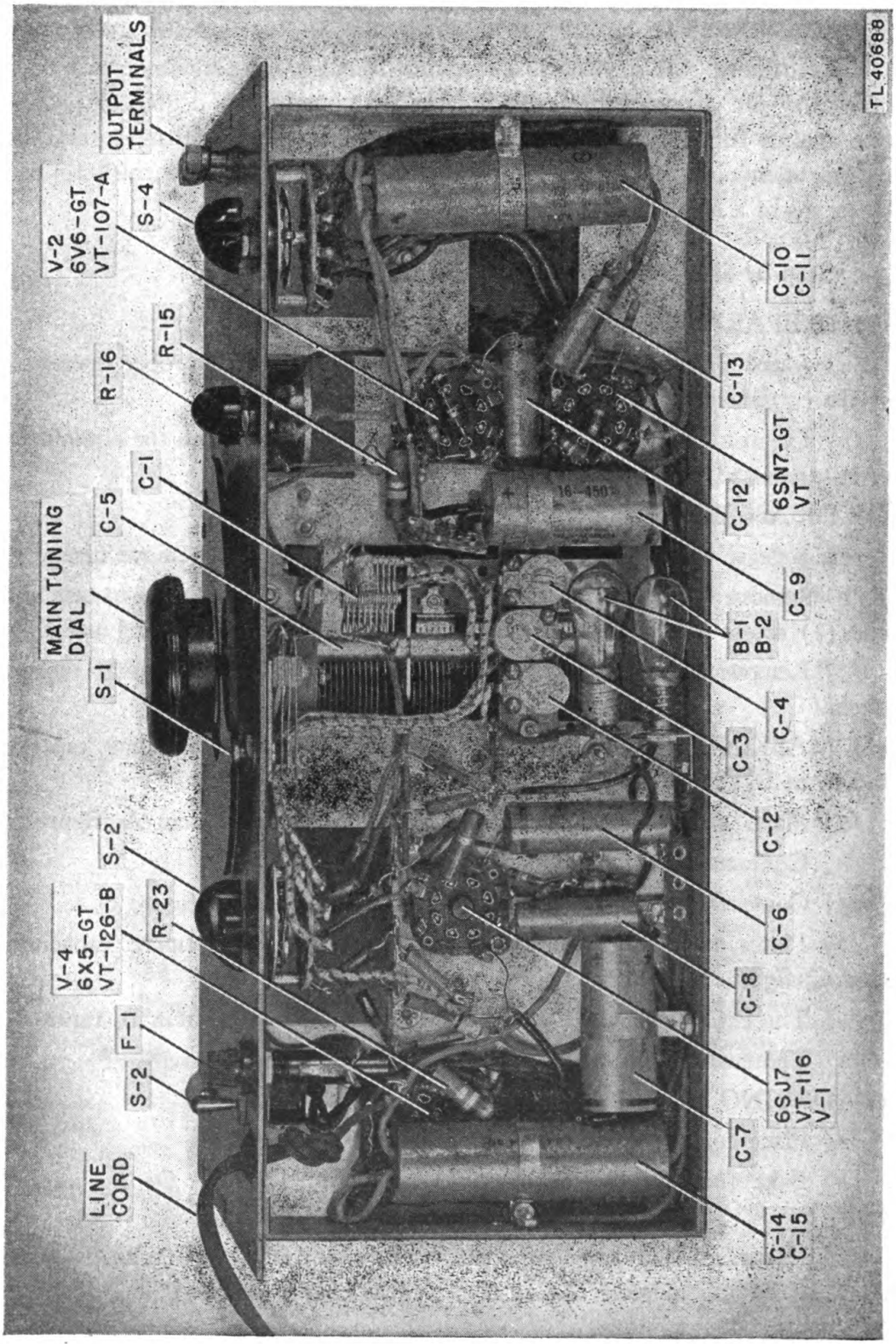


Figure 5. Bottom view of chassis.

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(Stock No. 6G1005.3) or equal, to equipment to be treated, including inside of case, allowing 15 to 20 minutes drying period after each coat.

> **CAUTION:** Varnish spray may have toxic effects. Use respirator if available. Otherwise fasten cheesecloth or other cloth material over the nose and mouth.

(b) Using a brush, apply varnish to those portions not reached by spray gun, making sure that all components are adequately protected by varnish.

(6) REASSEMBLY.

(a) Remove all masking tape.

(b) Reassemble units by following instructions for disassembly in reverse order.

(c) Check overall performance of equipment.

(7) MARKING. Mark the set with "MFP" and the date of treatment. Example: MFP . . . 8 June 1944.

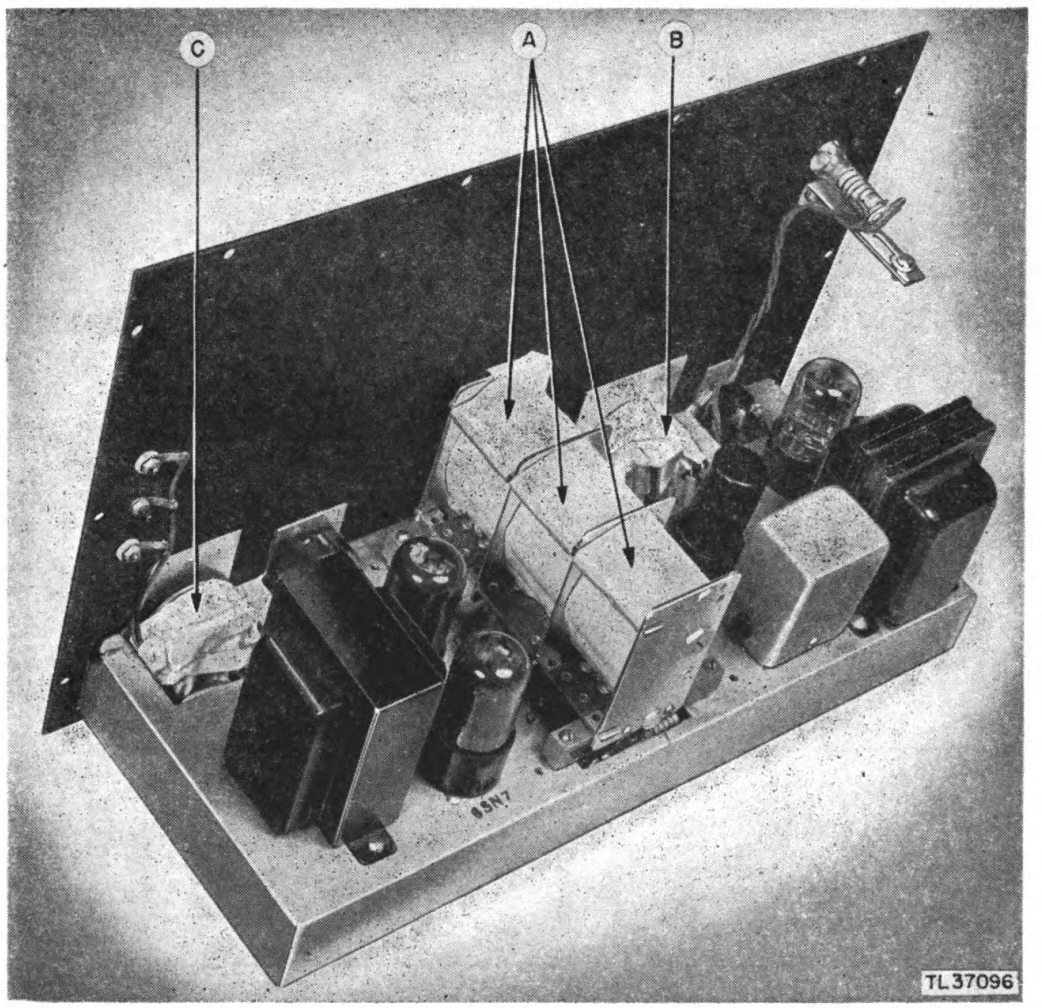


Figure 6. Top of chassis showing masking details.

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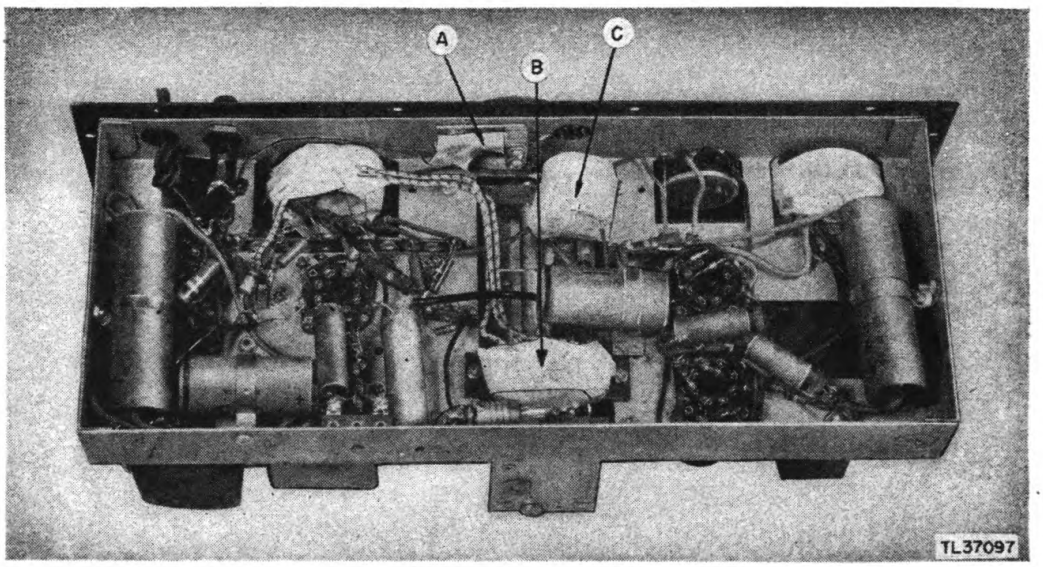


Figure 7. Bottom of chassis showing masking details.

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SECTION V — SUPPLEMENTARY DATA

11. MAINTENANCE PARTS LIST FOR OSCILLATOR I-151-A

Ref symbol	Signal Corps stock No.	Name of part and description	Quan per unit	Orgn stock 1st ech	Orgn stock 2d ech	3d ech	4th ech	Depot stock
	3E4040	LINE CORD: 6-foot, rubber-covered, with molded rubber male plug; #18 copper wire stranded; 41 strands; #34 AWG, type POSJ.	1					*
	3Z3275-1	FUSE EXTRACTOR POST: knurled knob extractor; black bakelite; type #1075A.	1					*
F-1	3Z2601.16	FUSE: 1 amp; 7/32" diam x 1 3/16" long; type 3AG.	1					*
S-2	3Z9849.10-3	SWITCH: SPST toggle; 1/2" hub x 1/4" long; 250v; 3 amp; with bat handle; 1" x 17/32" x 9/16" deep; type #8280.	1					*
T-1	2Z9613.252	TRANSFORMER: power; 2 pri; 115v 60 cycle, 2 secondaries; one C.T. 260-0-260; 40 M.A., the second 6.3v 2 1/4 amp; upright mounting; leads at bottom 2 5/8" x 2 7/16" x 3 1/16"; mgt holes 1 1/2" x 2"	1					*
T-2	2Z9632.228	TRANSFORMER output, pri C.T. 10,000 ohms impedance; one secondary tapped for impedance of 10 ohms; 250 ohms; 500 ohms, 2 3/8" x 2 5/8" x 3 1/8" high; mtg holes 3"; leads at bottom	1					*

* Indicates stock available.

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11. MAINTENANCE PARTS LIST FOR OSCILLATOR I-151-A *(contd).*

Ref symbol	*Signal Corps stock No.*	*Name of part and description*	*Quan per unit*	*Orgn stock*		*3d ech*	*4th ech*	*Depot stock*
				1st ech	*2d ech*			
L-1	3C347-16	CHOKE: filter; resistance 1,500 ohms, 40h; at 12 ma, measured at 10v; 60 cycles, totally enclosed can; leads at bottom; 1⅞" x 1 7/16" x 2¼" high; mtg holes 1".	1					*
V-1	2J6X5GT/G	VACUUM TUBE: 6X5GT; (VT-126-B)	1					*
V-2	2J6V6GT/G	VACUUM TUBE: 6V6GT; (VT-107-A).	1					*
V-3	2J6SJ7	VACUUM TUBE: 6SJ7 metal; (VT-116).	1					*
V-4	2J6SN7GT	VACUUM TUBE: 6SN7GT; (VT-231).	1					*
S-1	3Z9824-41.1	SWITCH: SPST; push button; non-locking; ⅜" bushing; ¼" hub; 1⅞" x ¾" x 1⅛" deep; type #4520.	1					*
S-3	3Z9825-62.122	SWITCH: rotary selector; 3 position; 3 poles; shorting type contacts; bakelite insulation; 1 9/16" x 1⅞" x ¾" deep; ⅜" bushing; ½" shaft; contact resistance less than 2¾ milliohms; type #24195 H1.	1					*
K-1	2Z5748.15	KNOB: round molded; black bakelite; 2⅜" diam, tapped for #8-32 set screw; type #6138.	1					*
K-2	2Z5748.4	KNOB: pointer; molded black bakelite; 1¼" long; tapped for #8-32 set screw; type #6420	1					*
K-3	2Z5748.4	KNOB: pointer; molded black bakelite; 1¼" long; tapped for #8-32 set screw; type #6420.	1					*

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K-4	2Z5748.4	KNOB: pointer; molded black bakelite; 1¼" long; tapped for #8-32 set screw; type #6420.	1						*
N-1	3F4056A/L2	LAMP: neon; ¼-watt; 105-125v; candelabra, screw base; type #NE45.	1						*
B-1	2Z5879-18	LAMP: 6 watt; 115v; clear tungsten filament; candelabra base.	1						*
B-2	2Z5879-18	LAMP: 6 watt; 115v; clear tungsten filament; candelabra base.	1						*
B-A	2Z5884-56	SOCKET: candelabra; screw base; type #273.	2						*
R-1	3Z6960-21.14	RESISTOR: fixed; 93,000 ohms ±1%; carbon; matched pairs; (each ½ watt); 1 watt; type BT-½.	1						*
R-2	3Z6960-21.15	RESISTOR: fixed; 930,000 ohms ±1%; carbon; matched pairs; (each ½ watt); 1 watt; type BT-½.	1						*
R-3	3Z6960-21.16	RESISTOR: fixed; 9.3 megohms ±1%; carbon; matched pairs; (each ½ watt); 1 watt; type BT-½.	1						*
R-4	3Z6960-21.16	RESISTOR: fixed; 9.3 megohms ±1%; carbon; matched pairs; (each ½ watt); 1 watt; type BT-½.	1						*
R-5	3Z6960-21.15	RESISTOR: fixed; 930,000 ohms ±1%; carbon; matched pairs; (each ½ watt); 1 watt; type BT-½.	1						*
R-6	3Z6960-21.14	RESISTOR: fixed; 93,000 ohms ±1%; carbon; matched pairs; (each ½ watt); 1 watt; type BT-½.	1						*

* Indicates stock available.

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11. MAINTENANCE PARTS LIST FOR OSCILLATOR I-151-A *(contd)*.

Ref symbol	*Signal Corps stock No.*	*Name of part and description*	*Quan per unit*	*Orgn stock*		*3d ech*	*4th ech*	*Depot stock*
				1st ech	*2d ech*			
R-7	3ZK6220-23	RESISTOR: fixed; 2,200 ohms ±5%; carbon; bakelite insulation; ½ watt; ⅜" long x 9/64" diam; leads 1½" tinned copper wire; #20 axial; type EB.	1					*
R-8	3RC21BE474K	RESISTOR: 470K ohms ±10%; physically the same as R-7.	1					*
R-9	3Z6700-62	RESISTOR: 100,000 ohms ±5%; physically the same as R-7.	1					*
R-10	3Z6700-62	RESISTOR: 100,000 ohms ±5%; physically the same as R-7.	1					*
R-11	3Z6750-31	RESISTOR: same as R-8.	1					*
R-12	3ZK6091-2	RESISTOR: 910 ohms ±5%; physically the same as R-7.	1					*
R-13	3Z6656-3	RESISTOR: 56,000 ohms ±10%; physically the same as R-7.	1					*
R-14	3RC21BE473K	RESISTOR: 47,000 ohms ±10%; physically the same as R-7.	1					*
R-15	3Z6610-11	RESISTOR: fixed; 10,000 ohms ±10%; 1 watt; carbon; bakelite insulation; 1¼" x ¼" diam; leads 1½" x 0.036" diam; tinned copper wire; axial; type BT-1.	1					*

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R-16	2Z7269.132	RESISTOR: potentiometer; 10,000 ohms; carbon; linear; taper; 3/8" bushing; shaft 1 1/16"; 1 1/8" diam x 1/2" long; type #37.	1					*
R-17	3Z6615-26	RESISTOR: fixed; 15,000 ohms ±10%; physically the same as R-7.	1					*
R-18	3Z6100-66	RESISTOR: fixed; 1,000 ohms ±10%; physically the same as R-7.	1					*
R-19	3ZK6782-4	RESISTOR: fixed; 820,000 ohms ±10%; physically the same as R-7.	1					*
R-20	3RC21BE511J	RESISTOR: fixed; 510 ohms ±5%; physically the same as R-7.	1					*
R-21	3RC20BE752J	RESISTOR: fixed; 7,500 ohms ±5%; physically the same as R-7.	1					*
R-22	3Z6700-62	RESISTOR: fixed; 100,000 ohms ±10%; physically the same as R-7.	1					*
R-23	3Z6750-31	RESISTOR: fixed; 500,000 ohms ±10%; physically the same as R-7.	1					*
R-24	3Z6730-29	RESISTOR: fixed; 300,000 ohms ±20%; physically the same as R-7.	1					*
C-1	3D9075V-22	CAPACITOR: variable; air; min cap 4.8mmf; max 49.6mmf; 17 plates; 0.020" air gap; screwdriver adj; 1 7/32" x 3/4" x 1 3/16" deep; with 5/16" hub; mtg holes 21/32"; type #50L.	1					*

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11. MAINTENANCE PARTS LIST FOR OSCILLATOR I-151-A *(contd).*

Ref symbol	*Signal Corps stock No.*	*Name of part and description*	*Quan per unit*	*Orgn stock*		*3d ech*	*4th ech*	*Depot stock*
				1st ech	*2d ech*			
C-2	3DK9013V-3	CAPACITOR: variable; silver ceramic; 3-13mmf; temp coef better than 0.0002 degrees C; $2\frac{1}{32}$" x $4\frac{1}{64}$"; screwdriver adj; mtg holes $\frac{7}{16}$"; lug terminals; type #TS2A-N300.	1					*
C-3	3DK9013V-3	CAPACITOR: variable; silver ceramic, 3-13mmf; temp coef better than 0.0002 degrees C; $2\frac{1}{32}$" x $4\frac{1}{64}$"; screwdriver adj; mtg holes $\frac{7}{16}$"; lug terminals; type #TS2A-N300.	1					*
C-4	3DK9013V-3	CAPACITOR: variable; silver ceramic; 3-13mmf; temp coef better than 0.0002 degrees C; $2\frac{1}{32}$" x $4\frac{1}{64}$"; screwdriver adj; mtg holes $\frac{7}{16}$"; lug terminals; type #TS2A-N300.	1					*
C-5	3D9800V-2	CAPACITOR: variable; 3 units, (1) & (3); 31 plates; (2) 26 plates; reduction gear ratio 1:10; same as Radio Condenser Co; type #S.O.873264 except for 80-800mmf.	1					*
C-6	3DA500-235	CAPACITOR: fixed, 0.5mf $\pm$20%; 400v; paper; tubular; wax impregnated; 2" x $\frac{3}{4}$" diam; wire leads #18 axial; tinned copper $1\frac{1}{2}$" long.	1					*
C-8	3DA100-38.1	CAPACITOR: fixed; 0.1mf, 400v; paper tubular; wax impregnated; $1\frac{1}{2}$" x $\frac{1}{2}$" diam; wire leads; #20 axial; tinned copper; $1\frac{1}{2}$" long.	1					*

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C-9	3DB16-27	CAPACITOR: fixed; 16mf +60% −40%; dry electrolytic; 2⅛" x 15/16" diam; #18 axial leads 2" long; ends wax filled; hermetically sealed; cardboard covered.	1					*
C-7	3DB16-27	CAPACITOR: fixed; 16mf +60% −40%; dry electrolytic; 2⅛" x 15/16" diam; #18 axial leads 2" long; ends wax filled; hermetically sealed; cardboard covered.	1					*
C-10 C-11	3DB16-28	CAPACITOR: fixed; dual; 16mmf +60% −40%; 450v; 3½" x 1" diam; leads common neg; axial black; positive; semi axial; one red and one green, #18 stranded rubber covered 4" long; ends wax filled; hermetically sealed.	1					*
C-12	3DA50-60.1	CAPACITOR: fixed; 0.05mf ±20%; 400v; paper; tubular; wax impregnated; 1½" x 7/16" diam; wire leads; #20 axial; tinned copper; 1½" long.	1					*
C-13	3DA500-235	CAPACITOR: fixed; 0.5mf ±20%; 400v; paper; tubular; wax impregnated; 2" x ¾" diam; wire leads #18 axial; tinned copper; 1½" long.	1					*
C-14 C-15	3DB16-28	CAPACITOR: fixed; dual; 16mmf +60% −40%; 450v; 3½" x 1" diam; leads common neg; axial black; positive; semi axial; one red and one green; #18 stranded rubber covered 4" long; ends wax filled; hermetically sealed.	1					*

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