TM 11-2516

WAR DEPARTMENT TECHNICAL MANUAL

TUBE TESTER ESPEY MODEL 105

WAR DEPARTMENT *24 OCTOBER 1944*

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WAR DEPARTMENT,
WASHINGTON 25, D. C., 24 OCTOBER, 1944.

TM 11-2516, Tube Tester Espey Model 105, is published for the information and guidance of all concerned.

[A. G. 300.7 (22 Jun 44).]

BY ORDER OF THE SECRETARY OF WAR:

G. C. MARSHALL,
Chief of Staff.

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**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.

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LIST OF ILLUSTRATIONS

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 —Meter, fuse, knobs, controls, transformer, resistor boards, resistors, capacitors, etc.

2. Cut — All cables and wiring.

3. Burn — Burn instruction manual, tube chart, and all papers pertaining to the operation of the unit.

4. Bend — The case, panel, etc. (Break if possible.)

5. Bury or scatter — Any or all of the above after destroying their usefulness.

DESTROY EVERYTHING

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 up to 400 volts a-c are used in this instrument. Be certain that the power cord is removed from the outlet when the under side of the panel is exposed.

FIRST AID TREATMENT FOR ELECTRIC SHOCK

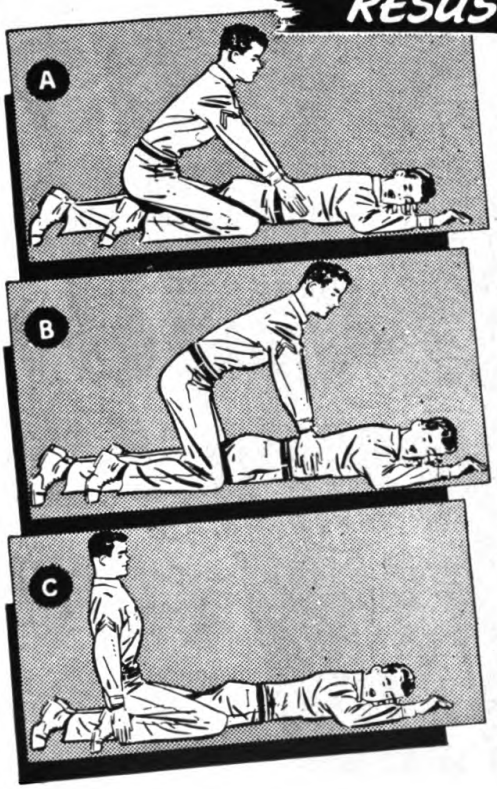
I. FREE THE VICTIM FROM THE CIRCUIT IMMEDIATELY.

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

TL 37451

TL 45577

Frontispiece. Tube tester Espey model 105, with cover removed.

SECTION I

DESCRIPTION

1. GENERAL.

a. The tube tester Espey model 105 has been designed for the purpose of testing standard receiving tubes and some small transmitting tubes. Radio tubes with characteristics usually regarded as standard may also be tested if the variations found are taken into consideration. Values of mutual conductance used are based on the ratings supplied by the tube manufacturers.

b. Mutual conductance of a tube is measured in micromhos by setting the L control at a definite point (G_M) and reading the value on the meter. The wide range of mutual conductance encountered in present-day radio tubes makes necessary a meter of wide range. Therefore, three ranges are provided:

0 — 3,000
0 — 6,000
0 — 15,000

The proper range may be selected by a switch.

c. When an indication of tube quality is desired, the L control is set at the figure given on the tube chart, and the meter pointer will fall in either the green sector (GOOD) or in the red section (REPLACE) of the meter scale, depending upon whether or not the tube meets the specifications of tube manufacturers. During the test, the 0-3,000 scale of the meter is used.

d. The elements of a tube under test, except for filaments or heaters, are energized by direct current from a self-contained power supply.

e. Twelve different tube sockets are provided to accommodate the various types of tube bases now in use. In addition to the regular tubes, the tester checks acorn-type tubes, ballast tubes, magic eye tubes, and pilot lamps. It also tests the new miniature-base tubes.

f. The proper filament voltage for the tube under test is selected by a filament voltage (FIL) switch with fourteen settings between 1.5 volts and 117 volts. There is also a setting for OFF and BLST on the switch. Two continuously variable, rotary, multiple-deck switches are used to select the

proper circuits to the tube terminals. New types of tubes which come into use may therefore be tested, since the possible variations in terminal connections are provided for in these switches.

g. A roller chart is placed along the lower edge of the tube tester, giving the tube type number, the mutual conductance in micromhos to be expected, and the five control settings (A, B, FIL, L, R). The push buttons to be used are noted under the NOTATIONS heading on the panel. The push buttons are arranged in two columns as shown in frontispiece and figure 1. Any special notes required are also indicated on the tube chart.

h. Special provision has been made for the testing of the diode elements of multipurpose tubes. Lower voltages are supplied to test their delicate cathodes in order to avoid injury to the tubes. The various diode elements are tested individually.

i. In testing rectifier tubes, each plate is tested separately by drawing a large current from the cathodes. Meter readings of good tubes will fall in the green sector of the scale.

j. In order to detect shorts or leakage between elements, a neon lamp short test has been provided. This permits the tubes to be checked for shorts while in the test sockets. This may be done whether the tube is hot or cold. Provision is also made in this unit for a noise test. Jacks are provided which need only to be connected to a radio receiver in order to detect noise caused by loose elements or poor contacts in the tube.

k. Leakage between the tube filaments and the cathode structure is indicated when the neon lamp glows on SHORT TESTS switch, positions 4 and 5, and the A and B controls are at 1. This is true only when the No. 6 pin of the tube is the cathode connection of octal base tubes. Leakage between filament and cathode elements in a tube sometimes can be tolerated when the tube is used in certain circuit positions.

l. In order to keep the voltage to the tester circuits at the correct level, the LINE ADJ. knob is adjusted to keep the pointer of the meter at the LINE TEST index mark when the LINE CHECK button is pressed. The unit will operate on line voltages from 95 to 130 volts. The power consumption is 45 watts.

m. All of the units are mounted compactly on a steel panel, enclosed by a steel case with carrying handle.

n. The weight of the unit is 15 pounds. The over-all dimensions are 7½" x 15½" x 5¾".

SECTION II

INSTALLATION AND OPERATION

2. GENERAL.

This section contains detailed instructions for using tube tester Espey model 105. The operator should master these instructions before attempting to use the unit for testing tubes.

3. OFF OR NEUTRAL POSITIONS OF CONTROLS.

a. Turn control knobs to their OFF or neutral positions before beginning the test of any particular tube. This is necessary to prevent damage to the set or to the tubes tested.

b. Set the controls as follows for the OFF or neutral positions, which are shown in figure 1.

(1) Power switch: OFF.
(2) LINE ADJ. control: extreme counterclockwise.
(3) Control A: knob pointer at 1.
(4) Control B: knob pointer at 1.
(5) Control FIL: knob pointer at OFF.
(6) Control L: knob pointer at 80.
(7) Control R: knob pointer at 80.
(8) SHORT TESTS switch: knob pointer at 1.
(9) MICROMHOS switch: knob pointer at 15,000.

> **CAUTION:** Do not operate switches or set controls on settings not indicated on the tube chart. To do so may damage the tube tester, particularly the sensitive meter. Wrong settings of the controls may also burn out the filament of a radio tube under test or damage the tube elements.

c. Handle the tubes to be tested as carefully as possible. If they are tight, remove them from the socket with a slight sidewise pressure.

4. TESTING TUBES WITH TUBE TESTER ESPEY MODEL 105.

It is possible to test certain types of nonstandard tubes as well as all standard receiver tubes in this tube tester. When inserting or removing a loctal or

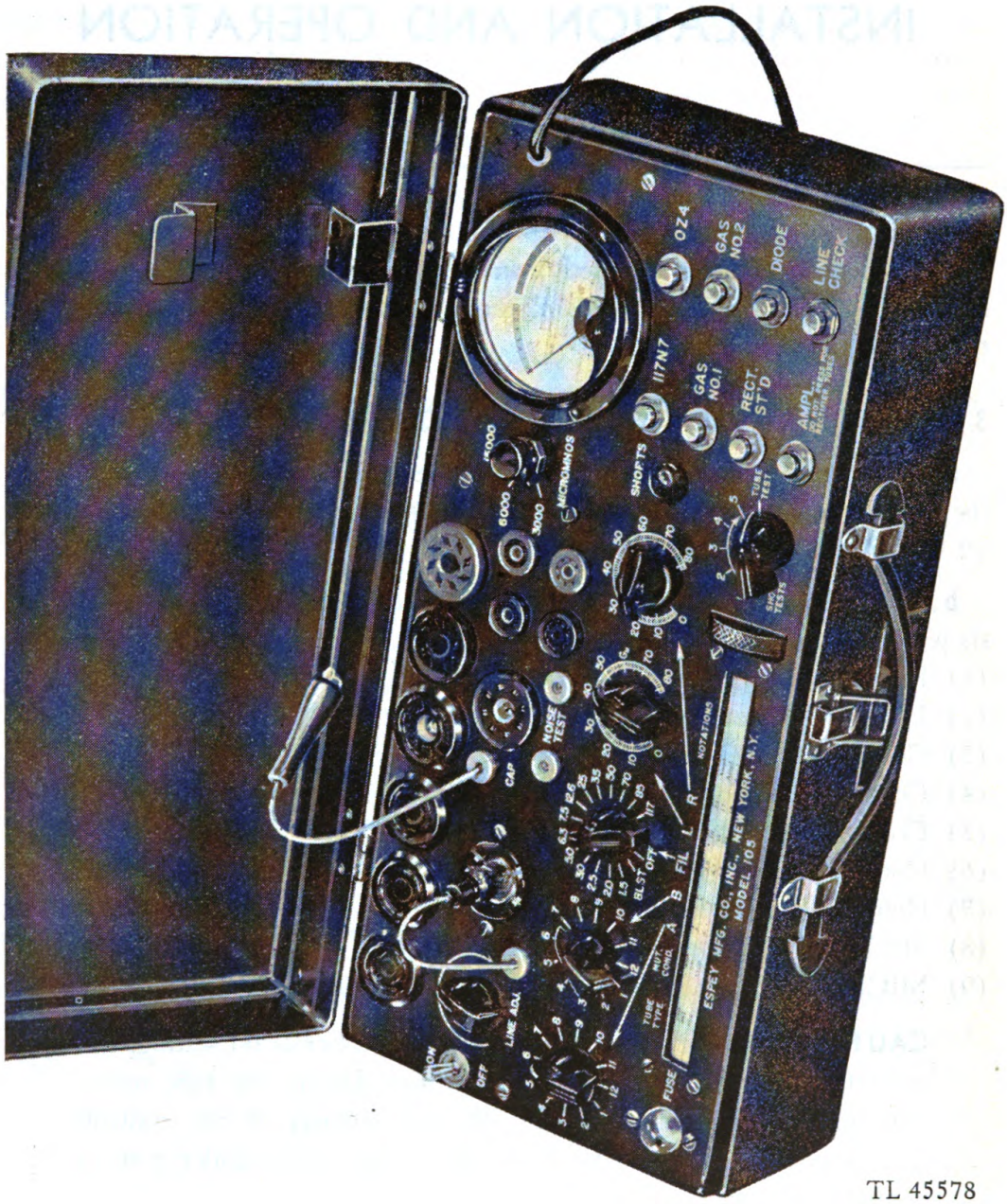


Figure 1. Tube tester showing acorn Tube VT-120 being tested.

an acorn tube from the socket, handle the tube as gently as possible. The tube prongs go directly through the glass seals, and excessive force may crack the glass. A slight sidewise pressure on the tube permits easy removal from the socket. Colored sockets (red and blue) are provided for certain tubes. The word RED or BLUE following the tube type number on the tube chart signifies that the tube is to be inserted in its appropriate colored socket. The black sockets are to be used unless notations on the tube chart specify otherwise. Following is the procedure for testing with tube tester Espey model 105:

a. Preparation for Testing.

(1) Plug the power cord of the tester into the a-c power line, 95 to 130 volts, 60 cycles.

(2) Turn the roller tube chart to the type number of the tube to be tested. If the tube is marked with Signal Corps nomenclature, consult section V for the commercial equivalent.

(3) Start at the left and set each control and switch to the position specified on the chart.

(4) Insert the tube in the correct socket on the tester panel. If the tube has a top cap, attach the clip on the lead marked CAP to the tube. When an acorn tube is to be tested, attach the plate clip located to the left of the acorn tube socket.

(5) Turn on the power by throwing the power switch at the upper left-hand side of the tube tester to ON.

(6) Press the LINE CHECK button and rotate the LINE ADJ. control clockwise until the pointer of the meter aligns itself with the index on the meter marked LINE TEST.

b. Testing for Shorts. Turn the SHORT TESTS-TUBE TEST switch successively through positions 1, 2, 3, 4, and 5, while watching the neon lamp. If the neon lamp burns continuously in any of the five positions, the tube contains a short, unless exception is noted in the tube chart. An instantaneous flash of the lamp as the switch is turned is to be disregarded. This is caused by the charging of a capacitor in the circuit. Intermittent shorts may be detected by tapping the tube with the finger while the switch is being turned. Because of cross connections and taps within some of the newer type tubes, the neon lamp will glow on certain positions of the SHORT TESTS switch. Special notation is made in the right-hand column of the tube chart opposite the tube number. (The short test lamp is a ¼-watt, 110-volt, candelabra base, neon signal lamp.) If the tube is free from shorts, proceed with the quality test.

c. Testing Quality of Tube.

(1) After the tube has been heated for a short time, turn the switch from the SHORT TESTS to the TUBE TEST position.

(2) Turn the MICROMHOS switch to the 15,000 range to protect the meter. Press the switch marked AMPL. under the heading NOTATIONS on the tube chart for meter readings. This switch is used more often than any other. The meter pointer should indicate a small reading.
(3) If the pointer reads less than 600, turn the MICROMHOS switch to 3,000.
(4) The meter pointer should fall in either the green sector marked GOOD or the red sector marked REPLACE, depending upon whether or not the tube comes up to the manufacturer's specifications.

d. Mutual Conductance Test. For the mutual conductance in micromhos, set the MICROMHOS switch to 3,000 if the mutual conductance given on the chart is not more than 3,000. If the value given is between 3,000 and 6,000, set the MICROMHOS switch to 6,000 and multiply the reading by 2. If the value given is between 6,000 and 15,000, set the MICROMHOS switch at 15,000 and multiply the reading by 5. Set the L control at G_M whenever mutual conductance value in micromhos is desired. Refer to section III, paragraph 6, for explanation of mutual conductance.

e. Testing Rectifier Tubes. There are two buttons for rectifier tubes. The one marked RECT. ST'D is for filament or heater type rectifier tubes. The button marked OZ4 is used when testing cold cathode rectifier tubes. These tubes should read in the GOOD sector of the scale if satisfactory. Make separate tests for each plate of full-wave rectifier tubes. Two settings for these tubes are given in the tube chart.

f. Diode Tests. Press the DIODE TEST button when testing a diode element of a tube. This places a low voltage on the element as recommended by tube manufacturers. Readings for good tubes with diode elements may fall in the red sector of the meter scale marked REPLACE. Part of the scale is marked DIODES O. K.

> **CAUTION:** Do not press the AMPL. or RECT. ST'D test buttons when testing a diode element, because a high voltage may damage the delicate cathode.

The 117N7 button is used for testing special tubes of this class. In addition, the RECT. ST'D button is also depressed to test the rectifier section of the tube.

g. Magic Eye Tubes (Tuning Indicators). The procedure for testing magic eye tubes varies slightly from that of ordinary tubes. Magic eye tube data will be found at the end of the tube chart in a special grouping.

(1) Controls L, R, and MICROMHOS are not required in making this test.
(2) Follow the indicated chart directions.

h. Ballast Tubes. Ballast tubes may be tested for continuity of filaments and circuits. Operate the SHORT TESTS switch over positions 1 to 5. The glowing of the neon bulb indicates which socket pins of the ballast tube are connected together. Test these tubes by an ohmmeter to check the resistance.

i. Testing Pilot Lamps. To check a pilot lamp or other lamps having a miniature base, proceed as follows:

(1) Set FIL switch to the correct voltage for the lamp under test. The voltage is generally marked on the lamp base, or indicated by bead color.
(2) Hold the lamp in the special socket located in the center of the seven-prong socket on the tester panel. If the lamp glows with normal brilliancy, it is good.

j. Testing for Noise.

(1) Connect the two jacks marked NOISE TEST to the ground and antenna terminals of a radio receiver or to an r-f amplifier with audio amplification.
(2) Insert the questionable tube in the correct socket on the tester.
(3) Turn the radio receiver on and allow it to heat up.
(4) With the controls already set for the tube under test, turn the SHORT TESTS switch through the successive points and gently tap the tube at each point with the finger. Any poor contacts, loose, or microphonic elements in the radio tube under test are amplified in the loud speaker.

k. Testing for Gassy Tubes.

(1) Set controls A, B, and FIL, as indicated on the tube chart for the particular tube to be tested.
(2) Set MICROMHOS switch to 3,000.
(3) Press GAS NO. 1 and turn control L, until the pointer on the meter is on the 100 mark.
(4) Still holding down GAS NO. 1, press GAS NO. 2. If the pointer on the meter does not move more than one division to the right, the tube may be regarded as free from gas.
(5) Some tubes, such as the No. 45 or the 71A tubes, cannot be brought down to the 100-micromho mark. Some tubes occasionally show gas emission after heating for a while. If gas is suspected, allow the tube filament to heat up for a short time.

> **NOTE:** If the tube does not come up to specifications, repeat the tests a second time, being careful to adhere to the instructions. Each control setting should be rechecked.

SECTION III
FUNCTIONING OF PARTS

5. THEORY OF OPERATION (figs. 2, 3, and 4).

a. In order to understand the theory of operation of this unit, examine a simple full-wave rectifier, such as is commonly employed in power supply circuits (fig. 2). The two secondary windings each have one end connected to a direct current milliammeter. Across the milliammeter is a center tap resistor (R). The load resistance (R_L) in a normal power supply circuit would be a radio receiver plate circuit. When an alternating voltage is applied to the primary, causing plate 1 to become positive, the current flows from plate 1 of the rectifier tube to the cathode (K), through the load resistance (R_L) and through the center tap resistor (R) to secondary (S_1). Since this current is dc, the meter pointer tends to deflect. (This direction of deflection is called the P_1 direction.)

b. When plate 2 is positive, the current would flow from this plate to the cathode through the load resistance (R_L), through the other half of the center-tapped resistance (R) and back to secondary winding (S_2). This current tends to cause the meter to deflect in the opposite direction. (This direction of deflection is called the P_2 direction.)

c. Since load resistance (R_L) is constant, the current tending to deflect the meter in both cases is the same; and since the directions are opposite, the net result is zero movement of the pointer.

d. If, instead of having a pure resistance for R_L, a vacuum tube is substituted as in figure 3, with a fixed d-c potential applied between the grid and the cathode, the effect upon the meter (M) will be identical with the effect noted with a pure resistive load.

e. If, in addition to the d-c bias on the grid of the tube, an a-c potential is applied, the voltage on one half of the cycle will add to the bias voltage, making it more negative, and thus decreasing the plate current and increasing the plate resistance of the tube. At the other half of the cycle, the grid voltage will be decreased, the plate current increased, and the plate resistance reduced.

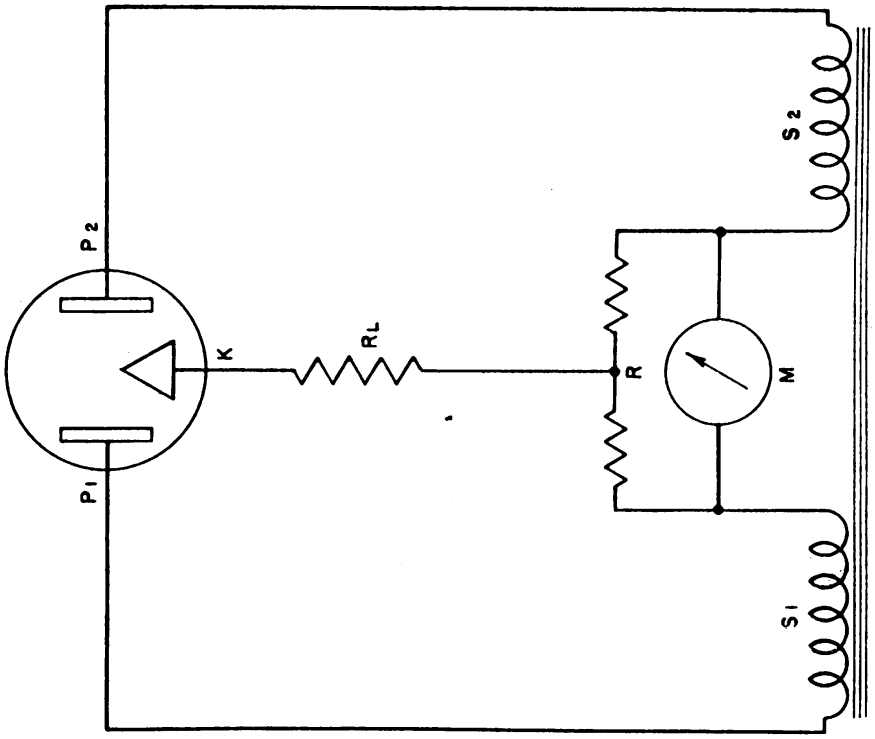


Figure 2. Tube tester Espey model 105, diagram illustrating theory.

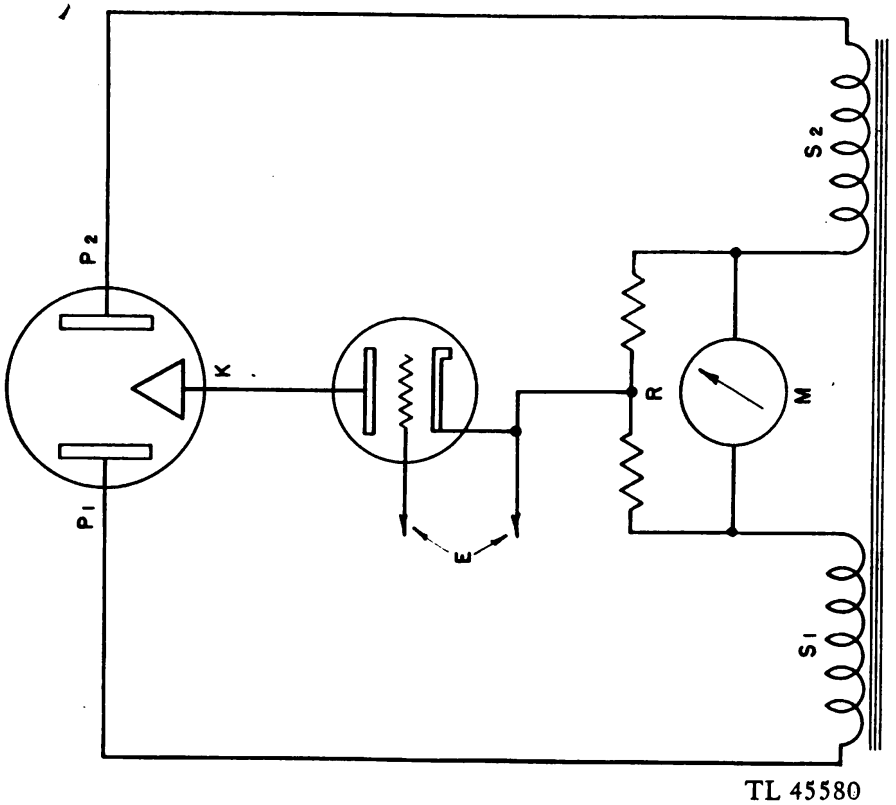


Figure 3. Tube tester Espey model 105, diagram illustrating theory.

f. When an a-c potential applied to the grid is in phase with the voltage applied to P_1, the tendency of the pointer to be deflected in the P_1 direction is greater than the canceling effect caused by the P_2 deflection tendency, because at the instant that P_1 is conducting, a large portion of the grid bias on the tube under test is being canceled by the positive half of the a-c cycle applied to the grid.

g. This reduces the resistance of the tube and permits much more current to flow, thereby causing an appreciably greater deflection of the meter in the P_1 direction. As a result, the meter will indicate an unbalance in the direct currents flowing in the secondaries S_1 and S_2.

h. The split potentiometer is adjusted and the meter calibrated so that the proportion of current flowing through the tube with respect to the a-c voltage applied to the grid indicates directly on the meter the quality of the tube.

i. Tube tester Espey model 105 is basically a power supply unit, arranged as in figure 5. In addition, provision has been made to test a variety of tubes used in modern radios, considering both the various filament voltages and grid voltages, and the number and types of elements used in the tubes. Provision also is made for many other tests, such as tests for gas, microphonics, and noise level.

6. DEFINITION OF MUTUAL CONDUCTANCE.

a. The relationship between a change in the grid voltage of a vacuum tube as related to the change in the plate current—all other element voltages remaining constant—is called the control-grid-plate transconductance of a tube. This figure of merit, in micromhos, is regarded as the most useful single quality of a tube.

b. The mutual conductance values in micromhos, as printed on the tube chart, are furnished by the manufacturers of radio tubes.

c. The term "mutual conductance" implies a reciprocal effect which is not true. A change in grid voltages affects the plate current flow, but a change in plate current does not affect grid voltages.

d. With voltages to other tube elements constant, the formula for mutual conductance is

$$\text{mutual conductance} = \frac{\text{change in plate current}}{\text{change in grid volts}}$$

or as generally written:

$$G_M = \frac{\Delta I_P}{\Delta E_g}$$

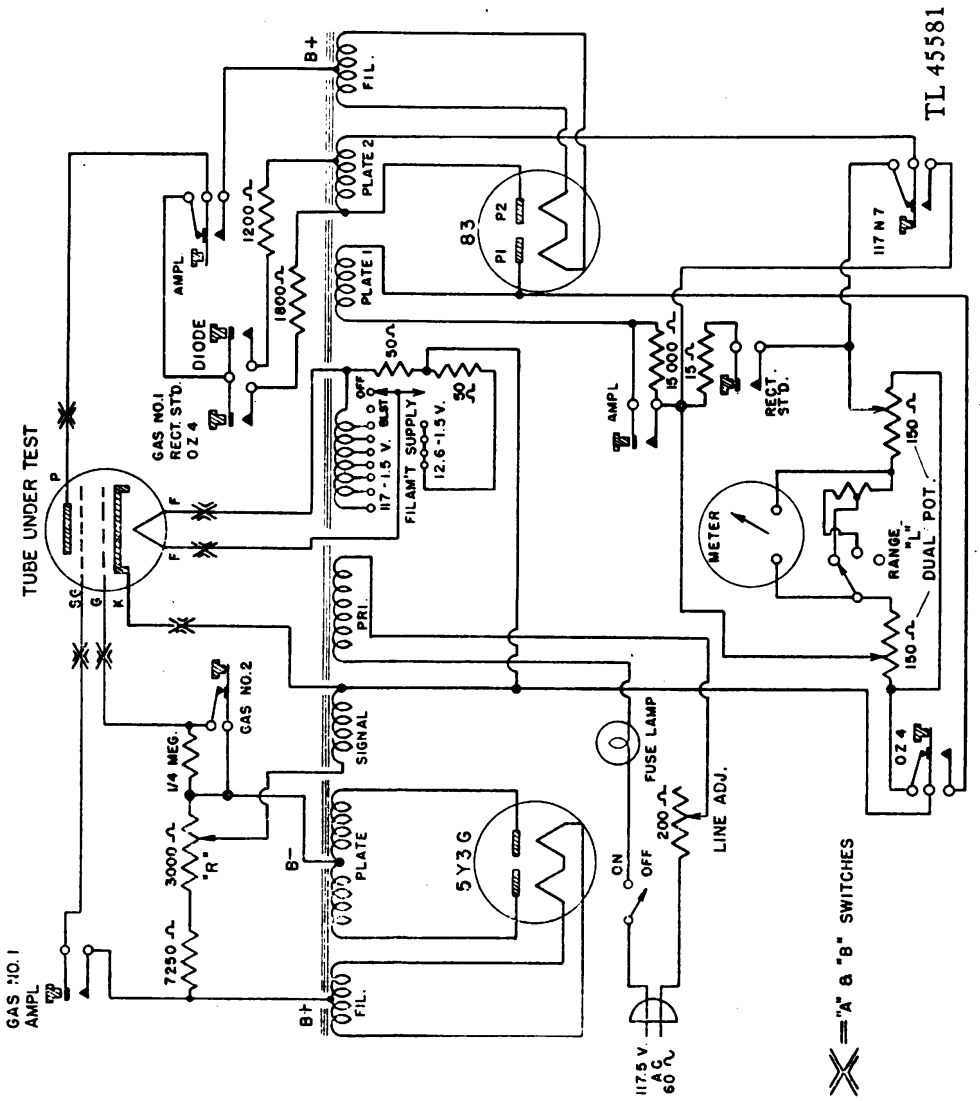


Figure 4. Tube tester Espey model 105, simplified schematic diagram.

7. FUNCTIONS OF COMPONENT PARTS.

a. Rectifier Tests. Filament and heater type rectifier tubes are tested in a circuit which impresses an a-c voltage from one plate winding of the 83 rectifier tube to the plate and cathode or filament of a rectifier tube. The 15-ohm resistor is in circuit across the dual potentiometer (L), and thus shunts out part of the current across the meter. Readings on the meter will fall in the GOOD sector if the rectifier tube is in working order. Each plate of a rectifier tube may be tested separately.

b. Test of OZ4 Type Tube. In testing the OZ4 type of tube, a higher voltage than that used on heater or filament rectifiers is impressed across the elements of the tube. A resistance is inserted in the circuit to limit the current if the tube elements are shorted.

c. Diode Test. Lower voltage is impressed on diode elements and resistance is added to the circuit. Tube rectification is measured as in a regular rectifier tube, except that less voltage is employed.

d. Gas Test. The test for gassy tubes measures the increase in the plate-cathode current flow, owing to the change of grid bias produced by the ionization of gas molecules within the tube envelope. Controls are set so that the grid is made negative just short of plate current cut-off. If no increase in plate current is indicated on the meter when a high resistance is inserted in the grid circuit, then there is no undue amount of gas present.

e. Short Tests. To check for leakage and shorts, one high-voltage secondary is connected in series with a 0.1-mf capacitor and the six-position switch. Leakage or shorts are indicated by continuous glowing of the neon lamp.

f. Noise Tests. To check for noise, an indicator (such as a pair of headphones) is connected through a blocking capacitor across the neon lamp. As the tube is tapped, any noisy parts will be heard in the headphones.

g. Controls A and B. These controls select the proper connections of the test circuits to the twelve sockets, so that the grid, plate, screen grid, cathode, and other tube elements have the proper voltage and circuit connections. The switches are arranged for nearly all possible combinations, so that new types of tubes may be tested when they are produced by tube manufacturers.

h. Power Supply. Tube tester Espey model 105 operates on 95 to 130 volts, a-c, 50 to 60 cycles. A single-pole, single-throw toggle switch (315) turns the current on or off.

i. Fuse. A standard No. 81 auto bulb (502) is used as a fuse.

j. Line Rheostat. In order to allow the tester to be used on varying line voltages, a rheostat is placed in the line circuit. Thus, the voltage at the transformer primary may be set at the same point whenever the unit is in use.

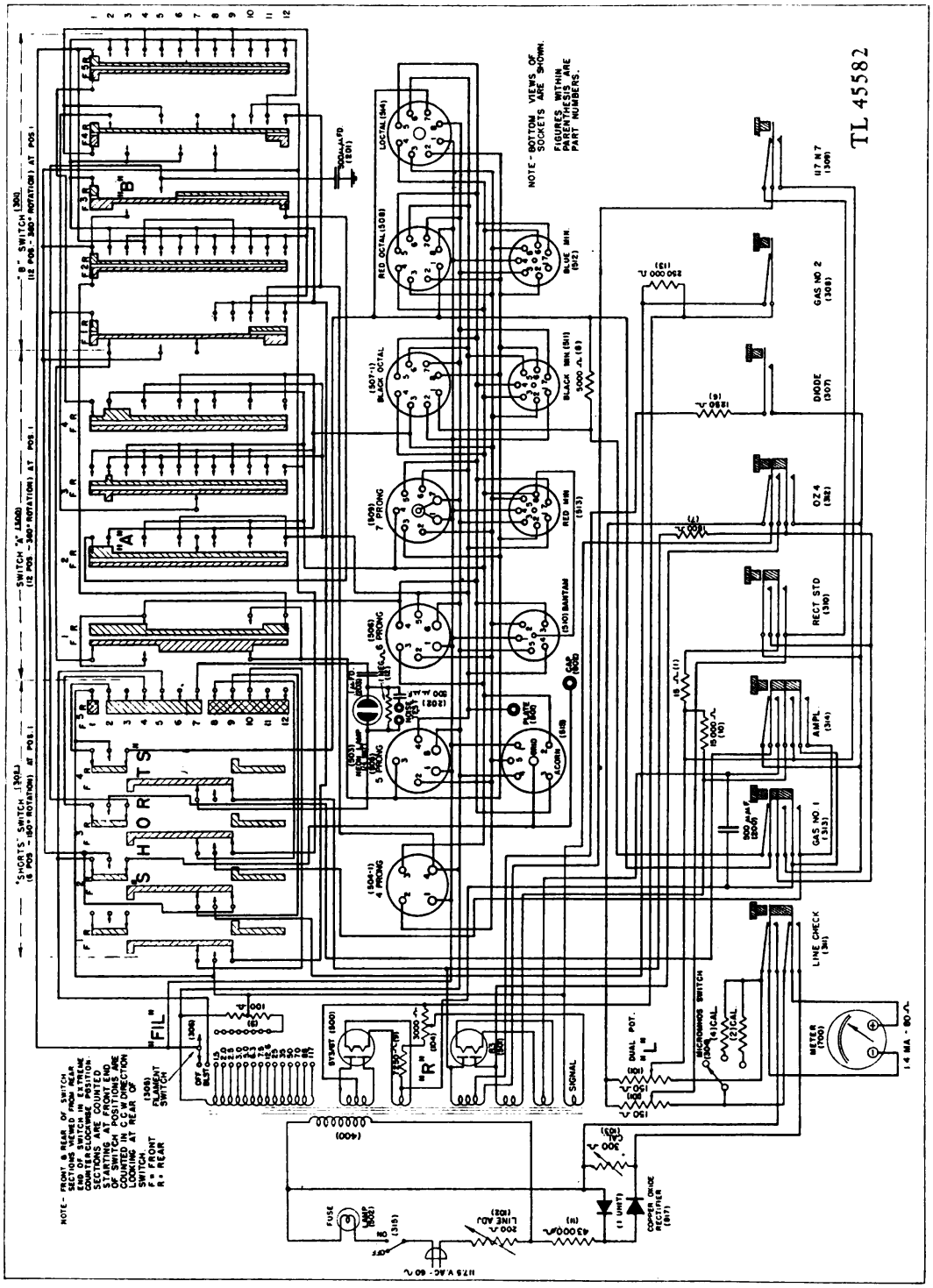


Figure 5. Tube tester Espey model 105, schematic diagram.

k. Voltage Adjustment. The meter on the tube tester is used for setting the voltage to an identical reference point whenever the tester is used. LINE CHECK push-button switch (311) is held down while LINE ADJ. control (102) is turned, until the meter pointer is at the LINE CHECK mark on the meter dial.

l. Transformer. One transformer (400) supplies all the filament, plate, and signal voltages and currents required for testing tubes. The windings are all on one core and the voltages produced, consequently, are all in phase.

m. Grid and Screen Grid Supply. The d-c grid and screen voltages for testing tubes are rectified by a 5Y3GT/G (VT-197-A) rectifier tube.

n. Plate Supply. The plate voltages to the tube under test are obtained from a type 83 (VT-83) rectifier. A mercury rectifier tube is used because of its low and constant voltage drop. The reactance in the plate circuit is kept low.

o. Grid. A winding (marked "signal" in figure 4) impresses an a-c potential on the grid of the tube under test. This a-c potential is superimposed upon the d-c in the grid-cathode circuit. The grid bias on the tube under test is controlled by potentiometer R (104) and the proper setting of this control is given on the tube chart. For all tests except on rectifiers and for the GAS test in amplifier tubes, the grid of the tube under test is at negative potential with the a-c (from the signal winding on the transformer) superimposed. On the GAS test, a ¼-megohm resistor is cut into the grid circuit by switch GAS NO. 2 (308).

p. Filament Supply. (1) The filament supply to the tube under test is obtained from a tapped winding. The following filament voltages are provided:

1.5	3.0	7.5	50
2.0	5.0	12.6	70
2.5	6.3	25.0	85
		35.0	117

(2) The proper voltage for the tube under test is selected by the FIL control (305) which also has an OFF position, and a setting marked BLST. for testing ballast tubes.

(3) On voltage settings of 1.5 volts to 12.6 volts, inclusive, the filament circuit includes a 100-ohm resistor, which gives a center-tapped return on the filament circuit on these settings.

SECTION IV
MAINTENANCE

NOTE: Failure or unsatisfactory performance of equipment used by Army Ground Forces and Army Services Forces will be reported on W.D., A.G.O. Form No. 468 (Unsatisfactory Equipment Report). If Form No. 468 is not available, see TM 38-250. Failure or unsatisfactory performance of equipment used by Army Air Forces will report on Army Air Forces Form No. 54 (unsatisfactory report).

8. GENERAL.

a. Remove the panel of the tube tester only in order to make necessary tube replacements. No other service work should be done on this instrument, except at authorized Signal Corps repair shops or by the manufacturer.

b. The two tubes, 83 and 5Y3GT, which may require replacement in this instrument, are made accessible by removing the panel which is fastened to the case with two screws.

(1) Remove these screws and carefully lift out the panel.
(2) Unhook the clamp which holds the tube.
(3) Remove the tube.
(4) Insert a new tube and tighten the clamp. Then replace the panel.

c. If replacement of tubes does not restore correct operation, turn in the tester as defective. Do not attempt to repair the instrument. Considerable damage may be done to the tube tester if the operator is not entirely familiar with the repair of this type of precision instrument.

d. To replace the No. 81 auto bulb (502) used as a fuse, twist the bulb counterclockwise while depressing it. To install a new lamp, fit pins into slots and twist clockwise, thus locking the bulb.

e. The neon lamp located at the right of control R may be replaced by unscrewing it from its socket. This lamp should last indefinitely, however, unless the glass bulb is broken.

SECTION V
SUPPLEMENTARY DATA

9. COMMERCIAL EQUIVALENTS OF SIGNAL CORPS TUBES.

Signal Corps Tube	Equivalent Commercial Tube	Signal Corps Tube	Equivalent Commercial Tube
VT-24	864	VT-66	6F6
VT-25	10	VT-67	30 Spec.
VT-25-A	10 Spec.	VT-68	6B7
VT-27	30	VT-69	6D6
VT-28	24-A	VT-70	6F7
VT-29	27	VT-72	842
VT-30	01-A	VT-73	843
VT-31	31	VT-74	5Z4
VT-33	33	VT-75	75
VT-35	35/51	VT-76	76
VT-36	36	VT-77	77
VT-37	37	VT-78	78
VT-38	38	VT-80	80
VT-44	32	VT-83	83
VT-45	45	VT-84	84/6Z4
VT-47	47	VT-86	6K7
VT-48	41	VT-86-A	6K7-G
VT-49	39/44	VT-86-B	6K7-GT
VT-50	50, 585, 586	VT-87	6L7
VT-51	841	VT-87-A	6L7-G
VT-52	45 Spec.	VT-88	6R7
VT-54	34	VT-88-A	6R7-G
VT-55	865	VT-89	89
VT-56	56	VT-90	6H6
VT-57	57	VT-91	6J7
VT-58	58	VT-91-A	6J7-GT
VT-63	46	VT-92	6Q7
VT-65	605	VT-83	6B8

Signal Corps Tube	Equivalent Commercial Tube
VT-94	6J5
VT-94-A	6J5-G
VT-94-D	6J5-GT
VT-95	2A3
VT-96	6N7
VT-97	5W4
VT-98	6U5/6G5
VT-99	6F8-G
VT-101	837
VT-103	6SQ7
VT-104	12SQ7
VT-105	6SC7
VT-107	6V6
VT-107-A	6V6-GT
VT-107-B	6V6-G
VT-112	6AC7/1852
VT-114	5T4
VT-115	6L6
VT-115-A	6L6-G
VT-116	6SJ7
VT-116-B (micanol or ceramic base)	6SJ7
VT-117	6SK7
VT-120	954
VT-121	955
VT-124	1A5-GT
VT-125	1C5-GT
VT-126	6X5
VT-126-A	6X5-G
VT-126-B	6X5-GT
VT-131	12SK7
VT-132	12K8
VT-133	12SR7
VT-134	12A6
VT-135	12J5-GT
VT-135-A	12J5
VT-137	1626
VT-138	1629
VT-145	5Z3
VT-146	1N5GT
VT-211	6SG7
VT-212	958
VT-213-A	6L5-G
VT-214	12H6
VT-215	6E5
VT-221	3Q5-GT
VT-223	1H5-GT
VT-227	7184
VT-229	6SL7-GT
VT-231	6SN7-GT
VT-233	6SR7
VT-237	957
VT-238	956
VT-239	1LE3
VT-264	3Q4
VT-268	12SC7

10. DATA FOR TESTING SIGNAL CORPS AND COMMERCIAL TUBES.

Tube Type	Mut Cond	A	B	FIL	L	R	Notations
00A	666	2	10	5.0	23	27	Ampl. Contains Gas
0A4G	.....	10	2	0	50	0	0Z4 Button
01A	725	2	10	5.0	26	39	Ampl.
0Z4	.....	4	8	0	0	0	Check for Shorts
0Z4	.....	2	8	0	60	0	0Z4 Button
0Z4	.....	10	2	0	60	0	0Z4 Button
1A4	750	2	5	2.0	27	24	Ampl.
1A5G	800	8	5	1.5	32	35	Ampl.
1A6	500	1	5	2.0	0	29	Ampl. Sect.
1A6	150	9	7	2.0	60	29	Ampl. Osc. Sect. OK over 120
1A7G	800	7	7	1.5	32	20	Ampl. Pent. Sect.
1A7G	300	12	7	1.5	60	38	Ampl. Osc. Sect. OK over 240
1B4	640	2	5	2.0	18	29	Ampl.
1B5	475	7	8	2.0	60	23	Ampl. Sect. OK over 380
1B5	.....	10	8	2.0	0	0	Diode But.
1B5	.....	12	3	2.0	0	0	Diode But.
1B7G	800	7	7	1.5	32	20	Ampl. Pent. Sect.
1B7G	300	12	7	1.5	60	38	Ampl. Osc. Sect. OK over 240
1C5G	1550	8	5	1.5	55	36	Ampl.
1C6	650	1	5	2.0	20	24	Ampl. Sect.
1C6	300	9	7	2.0	60	41	Ampl. Osc. Sect. OK over 240
1C7G	650	2	5	2.0	20	24	Ampl. Sect.
1C7G	300	12	7	2.0	60	41	Ampl. Osc. Sect. OK over 240
1D5G	750	2	5	2.0	27	24	Ampl.
1D7G	500	2	5	2.0	0	29	Ampl. Sect.
1D7G	200	12	7	2.0	60	35	Ampl. Osc. Sect. OK over 160
1D8GT	925	8	5	1.5	35	41	Ampl. Pent. Sect.
1D8GT	575	11	5	1.5	11	9	Ampl. Tri. Sect.
1D8GT	.....	5	1	1.5	0	0	Diode
1E4G	825	7	5	1.5	32	30	Ampl.
1E5G	640	2	5	2.0	18	29	Ampl.
1E7G	1150	8	8	2.0	45	17	Ampl.
1E7G	1150	11	6	2.0	45	17	Ampl.
1F4	1400	1	5	2.0	51	19	Ampl.
1F5G	1400	8	5	2.0	51	19	Ampl.
1F6	650	1	7	2.0	20	21	Ampl. Sect.
1F6	.....	11	1	2.0	0	0	Diode OK over 500
1F6	.....	5	5	2.0	0	0	Diode OK over 500
1F7G	650	1	5	2.0	20	21	Ampl. Pent. Sect.
1F7G	.....	4	5	2.0	0	0	Diode
1F7G	.....	7	1	2.0	0	0	Diode
1G4G	825	7	5	1.5	33	40	Ampl.
1G5G	1500	8	5	2.0	54	30	Ampl.
1G6G	675	2	9	1.5	22	13	Ampl.
1G6G	675	12	5	1.5	22	13	Ampl.

Tube Type	Mut Cond	A	B	FIL	L	R	Notations
1H4G	900	7	5	2.0	36	33	Ampl.
1H5G	275	8	5	1.5	60	13	Ampl. OK over 220
1H5G	.....	8	1	1.5	0	0	Diode
1H6G	475	7	8	2.0	60	23	Ampl. Sect.
1H6G	.....	10	8	2.0	0	0	Diode
1H6G	.....	11	3	2.0	0	0	Diode
1J5G	950	8	5	2.0	37	37	Ampl.
1J6G	1000	8	8	2.0	42	12	Ampl.
1J6G	1000	11	6	2.0	42	12	Ampl.
1LA4	800	6	2	1.5	32	35	Ampl.
1LA6	800	6	3	1.5	32	20	Ampl. Pent. Sect.
1LA6	300	2	8	1.5	60	38	Ampl. Osc. OK over 240
1LB4	925	6	2	1.5	38	42	Ampl.
1LC5	775	6	2	1.5	30	24	Ampl. Short on 4-5
1LC6	1000	6	3	1.5	41	19	Ampl. Pent. Sect.
1LC6	550	2	8	1.5	10	19	Ampl. Osc. Sect.
1LD5	600	6	2	1.5	14	23	Ampl. Pent. Sect.
1LD5	.....	4	9	1.5	0	0	Diode
1LE3	1300	6	2	1.5	50	0	Ampl.
1LH4	275	6	3	1.5	60	13	Ampl. OK over 220
1LH4	.....	10	10	1.5	0	0	Diode
1LN5	750	6	2	1.5	28	9	Ampl.
1N5G	750	8	5	1.5	28	9	Ampl.
1N6G	800	8	5	1.5	31	35	Ampl.
1P5G	800	8	5	1.5	31	9	Ampl.
1Q5G	2100	8	5	1.5	61	30	Ampl.
1R5	650	7	7	1.5	19	29	Ampl. Grid No. 1 Short on 4-5
1R5	500	1	7	1.5	0	29	Ampl. Grid No. 2
1S4	850	4	6	1.5	34	82	Press Diode Button Short on 3-4-5
1S5	525	6	6	1.5	9	28	Ampl. Pent. Sect.
1S5	.....	3	6	1.5	0	0	Diode
1SA6GT	950	3	4	1.5	39	19	Ampl.
1SB6GT	650	2	5	1.5	20	22	Ampl.
1T4	750	1	7	1.5	28	28	Ampl. Short on 4-5
1T5GT	1150	8	5	1.5	46	37	Ampl.
1V	.....	1	5	6.3	40	0	Rect. Std.
2A3	3000	2	10	2.5	67	55	Ampl.
2A3H	3000	2	10	2.5	67	55	Ampl.
2A4G	.....	7	5	2.5	76	82	Press Rect. Std. But. Turn "R" Pot. toward zero. Tube strikes at about 60.
2A5	2000	8	5	2.5	60	24	Ampl.
2A6	750	7	6	2.5	28	9	Ampl. Sect.
2A6	.....	10	6	2.5	0	0	Diode
2A6	.....	10	3	2.5	0	0	Diode
2A7	1000	7	6	2.5	41	18	Ampl. Sect.
2A7	400	10	6	2.5	60	25	Ampl. Osc. Sect. OK over 320
2B6	600	3	2	2.5	15	30	Ampl. input
2B6	2500	7	6	2.5	64	12	Ampl. output short on 3

Tube Type	Mut Cond	A	B	FIL	L	R	Notations
2B7	1000	7	6	2.5	41	25	Ampl. Pent. Sect.
2B7	.....	10	6	2.5	0	0	Diode
2B7	.....	10	3	2.5	0	0	Diode
2W3	.....	4	11	2.5	33	0	Rect. Std.
2Z2	.....	2	7	2.5	35	0	Rect. Std.
3A8GT	750	8	5	2.5	28	10	Ampl. Pent Sect. Short on 4-5
3A8GT	500	11	5	2.5	0	10	Ampl. Tri. Sect. OK over 220
3A8GT	.....	5	1	2.5	0	0	Diode
3B5GT	1500	8	5	2.5	54	49	Ampl. Short on 4-5
3Q4	850	4	6	1.5	34	82	Press Diode Button Short on 3-4-5
3Q5GT	1800	8	5	3.0	58	31	Ampl. Short on 4-5
3S4	750	4	6	2.5	28	82	Press Diode Button Short on 3-4-5
4A6G	1000	2	9	3.0	41	0	Ampl. No. 1 plate
4A6G	1000	12	5	3.0	41	13	Ampl. No. 2 plate
5T4	.....	4	11	5.0	40	0	Rect. Std.
5T4	.....	5	11	5.0	40	0	Rect. Std.
5U4G	.....	4	11	5.0	40	0	Rect. Std.
5U4G	.....	5	11	5.0	40	0	Rect. Std.
5V4G	.....	4	11	5.0	40	0	Rect. Std.
5V4G	.....	5	11	5.0	40	0	Rect. Std.
5W4	.....	4	11	5.0	33	0	Rect. Std.
5W4	.....	5	11	5.0	33	0	Rect. Std.
5X4G	.....	7	9	5.0	40	0	Rect. Std.
5X4G	.....	12	4	5.0	40	0	Rect. Std.
5Y3	.....	4	11	5.0	40	0	Rect. Std.
5Y3	.....	5	11	5.0	40	0	Rect. Std.
5Y4G	.....	7	9	5.0	35	0	Rect. Std.
5Y4G	.....	12	4	5.0	35	0	Rect. Std.
5Z3	.....	2	7	5.0	40	0	Rect. Std.
5Z3	.....	3	7	5.0	40	0	Rect. Std.
5Z4	.....	4	11	5.0	40	0	Rect. Std.
5Z4	.....	5	11	5.0	40	0	Rect. Std.
6A3	3000	2	10	6.3	67	55	Ampl.
6A4	2000	1	5	6.3	60	23	Ampl.
6A5G	3000	7	5	6.3	67	55	Ampl.
6A6	1500	1	5	6.3	53	10	Ampl.
6A6	1500	12	5	6.3	53	10	Ampl.
6A7	1000	7	6	6.3	41	18	Ampl. Pent. Sect.
6A7	400	10	6	6.3	60	25	Ampl. Osc. Sect. OK over 320
6A8	1000	7	7	6.3	41	18	Ampl. Pent. Sect.
6A8	300	12	7	6.3	60	30	Ampl. Osc. Sect. OK over 240
6AB6G	1450	8	5	6.3	53	0	Ampl.
6AC5G	1000	8	5	6.3	40	0	Ampl.
6AC6G	2400	8	5	6.3	63	0	Ampl.
6AC7	4000	4	2	6.3	71	10	Ampl.

Tube Type	Mut Cond	A	B	FIL	L	R	Notations
6AD7G	2000	8	5	6.3	60	24	Ampl. Pent. Sect.
6AD7G	325	5	5	6.3	60	65	Diode Triode Sect. OK over 260
6AE5G	1200	7	5	6.3	47	56	Ampl.
6AE6G	850	7	5	6.3	34	0	Ampl.
6AE6G	750	10	5	6.3	28	0	Ampl.
6AE7GT	1500	1	8	6.3	54	27	Ampl. No. 1 Cathode
6AE7GT	1500	8	8	6.3	54	27	Ampl. No. 2 Cathode
6AF5G	1500	8	5	6.3	53	42	Ampl.
6AG7	6000	4	2	6.3	71	10	Ampl.
6AH7GT	2000	7	9	6.3	60	35	Press Gas No. 1 Short on 2-3
6AH7GT	2000	11	9	6.3	60	35	Press Gas No. 1 Short on 3-4-5
6AL6G	5000	8	5	6.3	73	19	Ampl.
6B4G	3000	7	5	6.3	67	55	Ampl.
6B5	1500	8	5	6.3	52	0	Ampl.
6B6	750	7	5	6.3	28	9	Ampl. Sect.
6B6	.....	10	5	6.3	0	0	Diode
6B6	.....	10	2	6.3	0	0	Diode
6B7	1000	7	6	6.3	41	25	Ampl.
6B7	.....	10	6	6.3	0	0	Diode
6B7	.....	10	3	6.3	0	0	Diode
6B8	1000	7	5	6.3	42	25	Ampl.
6B8	.....	10	5	6.3	0	0	Diode
6B8	.....	10	2	6.3	0	0	Diode
6C5	2000	7	5	6.3	60	17	Ampl.
6C6	1225	1	7	6.3	49	17	Ampl.
6C7	1250	7	6	6.3	49	24	Ampl. Sect.
6C7	.....	10	6	6.3	0	0	Diode
6C7	.....	10	3	6.3	0	0	Diode
6C8G	1000	8	7	6.3	42	14	Ampl.
6C8G	1000	11	7	6.3	42	14	Ampl.
6D5	2000	7	5	6.3	60	47	Ampl.
6D6	1600	1	7	6.3	56	17	Ampl.
6D7	1225	7	6	6.3	48	20	Ampl.
6D8G	1000	7	7	6.3	41	22	Ampl. Pent. Sect.
6D8G	300	12	7	6.3	60	20	Ampl. Osc. Sect. OK over 240
6E6	1400	1	5	6.3	52	23	Ampl.
6E6	1400	12	5	6.3	52	23	Ampl.
6E7	1500	7	6	6.3	55	20	Ampl.
6F5	1000	10	5	6.3	43	10	Ampl.
6F6	2000	8	5	6.3	60	24	Ampl.
6F7	1100	7	6	6.3	45	23	Ampl. Pent. Sect.
6F7	450	10	6	6.3	60	23	Ampl. Triode Sect. OK over 360
6F8G	2000	8	7	6.3	60	13	Ampl.
6F8G	2000	11	7	6.3	60	13	Ampl.
6G6G	2100	8	5	6.3	60	19	Ampl.
6H4GT	.....	4	8	6.3	50	0	Diode
6H6	.....	7	2	6.3	50	0	Diode
6H6	.....	7	5	6.3	50	0	Diode

Tube Type	Mut Cond	A	B	FIL	L	R	Notations
6J5G	2000	7	5	6.3	60	24	Ampl.
6J7	1225	1	9	6.3	48	18	Ampl.
6J8G	1000	8	5	6.3	41	15	Ampl. Heptode Sect.
6J8G	500	11	5	6.3	0	25	Ampl. Triode Sect.
6K5G	1000	7	5	6.3	40	17	Ampl.
6K6G	1600	8	5	6.3	55	28	Ampl.
6K7	1450	8	5	6.3	54	16	Ampl.
6K8	1000	8	5	6.3	41	9	Ampl. Hexode Sect.
6K8	2400	11	5	6.3	63	9	Ampl. Triode Sect.
6L5G	1500	7	5	6.3	56	22	Ampl.
6L6	5000	8	5	6.3	73	19	Ampl.
6L7	650	1	9	6.3	20	19	Ampl. Cap Grid
6L7	650	8	5	6.3	20	22	Ampl. Pin Grid
6N6MG	1500	8	5	6.3	52	0	Ampl.
6N7	1500	2	9	6.3	53	10	Ampl.
6N7	1500	12	5	6.3	53	10	Ampl.
6P5G	1450	7	5	6.3	53	24	Ampl.
6P7	1100	3	12	6.3	45	23	Ampl. Pent. Sect.
6P7	450	6	12	6.3	60	23	Ampl. Triode Sect. OK over 360
6Q6G	1000	7	5	6.3	40	14	Ampl. Sect.
6Q6G	.....	7	2	6.3	0	0	Diode
6Q7	800	7	5	6.3	33	14	Ampl. Sect.
6Q7	.....	10	5	6.3	0	0	Diode
6Q7	.....	10	2	6.3	0	0	Diode
6R7	1900	7	5	6.3	60	17	Ampl. Sect.
6R7	.....	10	5	6.3	0	0	Diode
6R7	.....	10	2	6.3	0	0	Diode
6S7G	1750	8	5	6.3	57	22	Ampl.
6SA7	750	1	7	6.3	28	17	Ampl. Sect.
6SA7	750	7	7	6.3	28	17	Ampl. Osc Sect.
6SC7 Red Socket	1000	10	3	6.3	42	0	Ampl.
6SC7 Red Socket	1000	1	3	6.3	42	0	Ampl.
6SD7GT	2500	4	2	6.3	64	13	Ampl.
6SF5	1500	7	4	6.3	54	15	Ampl.
6SF7 Red Socket	2000	6	7	6.3	60	0	Ampl.
6SF7 Red Socket	.....	8	1	6.3	0	0	Diode
6SG7	3300	4	2	6.3	68	10	Ampl.
6SH7	3400	4	2	6.3	69	0	Ampl.
6SJ7	1575	4	2	6.3	56	18	Ampl.
6SK7	1900	4	2	6.3	59	18	Ampl.
6SL7	1400	8	9	6.3	53	0	Rect. Std. Also Press 117N7
6SL7	1400	10	4	6.3	53	0	Ampl. Short on 2-3
6SN7 Red Socket	2600	4	1	6.3	64	0	Ampl. Short on 2-3
6SN7 Red Socket	2600	10	4	6.3	64	0	Ampl. Short on 2-3

Tube Type	Mut Cond	A	B	FIL	L	R	Notations
6SQ7	1000	6	6	6.3	42	0	Ampl. Triode Sect.
	Red Socket						
6SQ7	.....	3	7	6.3	0	0	Diode Diode No. 1
	Red Socket						
6SQ7	.....	7	1	6.3	0	0	Diode Diode No. 2
	Red Socket						
6SR7	1900	6	6	6.3	59	15	Ampl. Triode Sect.
	Red Socket						
6SR7	.....	3	7	6.3	0	0	Diode Diode No. 1
	Red Socket						
6SR7	.....	7	1	6.3	0	0	Diode Diode No. 2
	Red Socket						
6SS7	1850	4	2	6.3	58	16	Ampl.
6T7G	1000	7	5	6.3	40	11	Ampl.
6T7G	.....	10	5	6.3	0	0	Diode
6T7G	.....	10	2	6.3	0	0	Diode
6U6GT	6200	8	5	6.3	73	27	Ampl.
6U7G	1600	8	5	6.3	56	17	Ampl.
6V6	3000	8	5	6.3	67	25	Ampl.
6V6G	3000	8	5	6.3	67	25	Ampl.
6V7G	975	7	5	6.3	40	32	Ampl. Sect.
6V7G	.....	10	5	6.3	0	0	Diode
6V7G	.....	10	2	6.3	0	0	Diode
6W5	.....	8	9	6.3	40	0	Rect. Std.
6W5	.....	9	4	6.3	40	0	Rect. Std.
6W6GT	3000	8	5	6.3	67	46	Ampl.
6W7G	1000	1	9	6.3	41	20	Ampl.
6X5	.....	2	9	6.3	40	0	Rect. Std.
6X5	.....	10	2	6.3	40	0	Rect. Std.
6Y5	.....	9	8	6.3	40	0	Rect. Std.
6Y5	.....	12	8	6.3	40	0	Rect. Std.
6Y6G	7000	8	5	6.3	74	36	Ampl.
6Y7G	1000	2	9	6.3	39	12	Ampl.
6Y7G	1000	12	5	6.3	39	12	Ampl.
6Z3	.....	1	5	6.3	40	0	Rect. Std.
6Z4	.....	7	7	6.3	40	0	Rect. Std.
6Z4	.....	5	1	6.3	40	0	Rect. Std.
6Z5	.....	9	12	6.3	40	0	Rect. Std.
6Z5	.....	12	12	6.3	40	0	Rect. Std.
6Z7G	1200	2	9	6.3	45	0	Ampl.
6Z7G	1200	12	5	6.3	45	0	Ampl.
6ZY5G	.....	7	2	6.3	40	0	Rect. Std.
6ZY5G	.....	7	5	6.3	40	0	Rect. Std.
7A4	2600	6	2	6.3	66	14	Ampl.
7A5	6000	6	2	6.3	71	23	Ampl.
7A6	.....	8	5	6.3	40	0	Diode
7A6	.....	11	5	6.3	40	0	Diode
7A7	1750	6	2	6.3	58	22	Ampl.
7A8	1000	5	3	6.3	41	20	Ampl. Pent. Sect.
7A8	500	8	10	6.3	0	21	Ampl. Osc. Sect.
7B4	1000	6	2	6.3	43	10	Ampl.
7B5	1600	6	2	6.3	56	28	Ampl.

Tube Type	Mut Cond	A	B	FIL	L	R	Notations
7B6	750	2	3	6.3	28	9	Ampl. Short on 1-4-5
7B6	.....	8	3	6.3	0	0	Diode
7B6	.....	6	10	6.3	0	0	Diode
7B7	1700	5	4	6.3	57	22	Ampl.
7B8	1000	5	3	6.3	40	22	Ampl. Pent. Sect.
7B8	500	8	10	6.3	0	15	Ampl. Osc. Sect.
7C5	3000	6	2	6.3	67	25	Ampl.
7C6	600	2	3	6.3	15	8	Ampl. Short on 1-4-5
7C6	.....	8	3	6.3	0	0	Diode
7C6	.....	6	10	6.3	0	0	Diode
7C7	1300	6	2	6.3	49	18	Ampl.
7E6	1900	2	3	6.3	59	15	Ampl. Short on 1-4-5
7E6	.....	8	3	6.3	0	0	Diode
7E6	.....	12	10	6.3	0	0	Diode
7E7	1300	6	3	6.3	49	18	Ampl. Pent. Sect.
7E7	.....	1	8	6.3	0	0	Diode No. 1
7E7	.....	4	8	6.3	0	0	Diode No. 2
7F7	1600	2	9	6.3	56	0	Ampl. No. 1 plate
7F7	1600	12	5	6.3	56	0	Ampl. No. 2 plate
7H7	3000	6	2	6.3	67	0	Ampl.
7J7	800	6	3	6.3	31	15	Ampl. Hexode Sect.
7J7	1000	2	8	6.3	42	15	Ampl. Triode Sect.
7L7	2000	6	2	6.3	60	10	Ampl.
7N7	2000	2	9	6.3	60	13	Ampl. Plate No. 1 Short on 1-4-5
7N7	2000	12	5	6.3	60	13	Ampl. Plate No. 2
7Q7	800	6	2	6.3	33	17	Ampl.
7R7	3000	6	3	6.3	67	8	Ampl. Pent. Sect.
7R7	.....	1	8	6.3	0	0	Diode No. 1 Diode
7R7	.....	4	8	6.3	0	0	Diode No. 2 Diode
7V7	4400	6	2	6.3	72	5	Ampl.
7Y4	.....	1	6	6.3	35	0	Rect. Std.
7Y4	.....	6	6	6.3	35	0	Rect. Std.
10	1250	2	10	7.5	50	32	Ampl.
12A	1650	2	10	5.0	57	36	Ampl.
12A5	.....	1	12	6.3	0	0	Check for Shorts
12A5	1800	2	10	12.6	58	42	Ampl.
12A6	3000	8	5	12.6	67	10	Ampl.
12A7	975	7	6	12.6	39	39	Ampl.
12A7	.....	7	3	12.6	40	0	Rect. Std.
12A8GT	1000	7	7	12.6	41	18	Ampl. Pent. Sect.
12A8GT	300	12	7	12.6	60	30	Ampl. Osc. Sect. OK over 240
12AH7GT	2000	7	9	12.6	60	35	Press Gas No. 1 Short on 2-3
12AH7GT	2000	11	9	12.6	60	35	Press Gas No. 1 Short on 3-4-5
12B7	1900	6	2	12.6	59	18	Ampl.
12B8GT	.....	7	7	12.6	0	0	Test for Shorts
12B8GT	1800	1	7	12.6	58	18	Ampl. Pent. Sect.
12B8GT	2000	11	1	12.6	60	0	Ampl. Triode Sect.

Tube Type	Mut Cond	A	B	FIL	L	R	Notations
12C8	1150	7	5	12.6	45	20	Ampl.
12C8	.....	10	5	12.6	0	0	Diode
12C8	.....	10	2	12.6	0	0	Diode
12F5GT	1000	10	5	12.6	43	10	Ampl.
12H6	.....	7	2	12.6	50	0	Diode
12H6	.....	7	5	12.6	50	0	Diode
12J5GT	2000	7	5	12.6	60	24	Ampl.
12J7GT	1225	1	9	12.6	48	18	Ampl.
12K7GT	1450	8	5	12.6	54	20	Ampl.
12K8	1000	8	5	12.6	41	9	Ampl. Hex. Sect.
12K8	2400	11	5	12.6	63	9	Ampl. Triode Sect.
12Q7GT	800	7	5	12.6	33	14	Ampl.
12Q7GT	.....	10	5	12.6	0	0	Diode
12Q7GT	.....	10	2	12.6	0	0	Diode
12SA7	750	1	7	12.6	28	17	Ampl. No. 1 Grid
12SA7	750	7	7	12.6	28	17	Ampl. No. 2 Grid
12SC7 Red Socket	1000	10	3	12.6	42	0	Ampl.
12SC7 Red Socket	1000	1	3	12.6	42	0	Ampl.
12SF5	1500	7	4	12.6	54	15	Ampl.
12SF7 Red Socket	2000	6	7	12.6	60	0	Ampl.
12SF7 Red Socket	.....	8	1	12.6	0	0	Diode
12SG7	3300	4	2	12.6	68	10	Ampl.
12SH7	3400	4	2	12.6	69	0	Ampl.
12SJ7	1575	4	2	12.6	56	18	Ampl.
12SK7	1900	4	2	12.6	59	18	Ampl.
12SL7GT	1400	8	9	12.6	53	0	Rect. Std. Also Press 117N7
12SL7GT	1400	10	4	12.6	53	0	Ampl. Short on 2-3
12SN7 Red Socket	2600	4	1	12.6	64	0	Ampl. Short on 2-3
12SN7 Red Socket	2600	10	4	12.6	64	0	Ampl. Short on 2-3
12SQ7 Red Socket	1000	6	6	12.6	42	0	Ampl. Triode Sect.
12SQ7 Red Socket	.....	3	7	12.6	0	0	Diode Diode No. 1
12SQ7 Red Socket	.....	7	1	12.6	0	0	Diode Diode No. 2
12SR7 Red Socket	1900	6	6	12.6	59	15	Ampl. Triode Sect.
12SR7 Red Socket	.....	3	7	12.6	0	0	Diode Diode No. 1
12SR7 Red Socket	.....	7	1	12.6	0	0	Rect. Std.
12Z3	.....	1	5	12.6	40	0	Diode Diode No. 2
12Z5	.....	6	1	6.3	0	0	Check for Shorts
12Z5	.....	1	8	12.6	40	0	Rect. Std.
12Z5	.....	12	8	12.6	40	0	Rect. Std.
14A4	2600	6	2	12.6	66	14	Ampl.

Tube Type	Mut Cond	A	B	FIL	L	R	Notations
14B6	1100	2	3	12.6	44	0	Ampl. Triode Sect. Short on 1-4-5
14B6	.....	8	3	12.6	0	0	Diode No. 1
14B6	.....	12	10	12.6	0	0	Diode No. 2
14B8	1000	5	3	12.6	40	22	Ampl. Pent. Sec.
14B8	500	8	10	12.6	0	15	Ampl. Osc. Sect.
14C5	3700	6	2	12.6	69	19	Ampl.
14C7	2275	6	2	12.6	63	9	Ampl.
14E6	1800	2	3	12.6	58	10	Ampl. Short on 1-4-5
14E6	.....	8	3	12.6	0	0	Diode Diode No. 1
14E6	.....	6	10	12.6	0	0	Diode Diode No. 2
14E7	1300	6	3	12.6	50	20	Ampl.
14E7	.....	1	8	12.6	0	0	Diode
14E7	.....	10	10	12.6	0	0	Diode
14H7	3000	6	2	12.6	67	0	Ampl.
14J7	800	6	3	12.6	31	15	Ampl. Hex. Sect.
14J7	1000	2	8	12.6	42	15	Ampl. Triode Sect.
14N7	2000	2	9	12.6	60	13	Ampl. Short on 1-4-5 Plate 1
14N7	2000	12	5	12.6	60	13	Ampl. Plate 2
14Q7	800	6	2	12.6	31	14	Ampl.
14R7	3000	6	3	12.6	67	8	Ampl. Pent. Sect.
14R7	.....	1	8	12.6	0	0	Diode Diode No. 1
14R7	.....	4	8	12.6	0	0	Diode Diode No. 2
14Z3	.....	1	5	12.6	40	0	Rect. Std.
15	625	7	6	2.0	16	18	Ampl.
19	1000	8	8	2.0	42	12	Ampl.
19	1000	11	6	2.0	42	12	Ampl.
20	525	2	10	3.0	0	68	Ampl.
22	500	2	5	3.0	0	37	Ampl.
24	1000	7	6	2.5	42	10	Ampl. Also 24A
25A6	2300	8	5	25.0	62	35	Ampl.
25A7	.....	11	5	25.0	0	0	Check for Shorts
25A7	.....	11	5	25.0	40	0	Rect. Std.
25A7	1800	8	5	25.0	58	35	Ampl.
25AC5G	1500	7	5	25.0	52	0	Ampl.
25B5	1500	8	5	25.0	52	0	Ampl.
25B6G	4000	8	5	25.0	71	43	Ampl.
25B8GT	2000	1	7	25.0	60	18	Ampl. Pentode
25B8GT	1500	11	1	25.0	54	8	Ampl. Triode
25C6G	7000	8	5	25.0	74	36	Ampl.
25D8GT	1900	8	5	25.0	59	15	Ampl. Pent. Sect.
25D8GT	1100	11	5	25.0	45	0	Ampl. Tri. Sect.
25D8GT	.....	5	1	25.0	0	0	Diode
25L6	8000	8	5	25.0	75	15	Ampl.
25N6G	2500	8	5	25.0	64	0	Ampl.
25X6	.....	7	2	25.0	40	0	Rect. Std. Plate No. 1
25X6	.....	7	5	25.0	40	0	Rect. Std. Plate No. 2
25Y5	.....	7	8	25.0	40	0	Rect. Std.
25Y5	.....	12	8	25.0	40	0	Rect. Std.
25Z3	.....	1	5	25.0	40	0	Rect. Std.
25Z4	.....	7	2	25.0	35	0	Rect. Std.

Tube Type	Mut Cond	A	B	FIL	L	R	Notations
25Z5	.....	7	8	25.0	40	0	Rect. Std.
25Z5	.....	12	8	25.0	40	0	Rect. Std.
25Z5MG	.....	7	2	25.0	40	0	Rect. Std.
25Z5MG	.....	7	5	25.0	40	0	Rect. Std.
25Z6	.....	7	2	25.0	40	0	Rect. Std.
25Z6	.....	7	5	25.0	40	0	Rect. Std.
26	1150	2	10	1.5	46	35	Ampl.
27	1000	1	6	2.5	40	34	Ampl. Also 27S
27HM	1450	1	6	2.5	53	29	Ampl.
30	900	2	10	2.0	36	33	Ampl.
31	925	2	10	2.0	35	53	Ampl.
32	640	2	5	2.0	19	30	Ampl.
32L7GT	.....	11	5	25.0	0	0	Test for Shorts
32L7GT	4800	8	5	25.0	71	18	Ampl.
32L7GT	.....	11	5	25.0	40	0	Rect. Std.
33	1450	1	5	2.0	50	29	Ampl.
RK33	1000	3	3	6.3	42	28	Ampl.
RK33	1000	9	3	6.3	42	28	Ampl.
34	600	2	5	2.0	14	27	Ampl.
35	1020	7	6	2.5	42	20	Ampl. Also 35S
35A5	6000	6	2	35.0	71	15	Ampl.
35L6GT	5800	8	5	35.0	71	32	Ampl.
35Z3	.....	1	1	35.0	35	0	Rect. Std.
35Z4GT	.....	10	2	35.0	40	0	Rect. Std.
35Z5GT	.....	1	3	BLST	40	0	Short Test Neon Lights on 1-2-3-4-5
35Z5GT	.....	11	1	35.0	40	0	Rect. Std.
35Z6G	.....	7	2	35.0	40	0	Rect. Std. Plate No. 1
35Z6G	.....	7	5	35.0	40	0	Rect. Std. Plate No. 2
36	1050	7	6	6.3	43	20	Ampl.
37	900	1	6	6.3	36	34	Ampl.
38	1050	7	6	6.3	41	32	Ampl.
38MG	1050	8	5	6.3	41	32	Ampl.
39-44	1000	7	6	6.3	41	23	Ampl.
40	200	2	10	5.0	60	26	Ampl. OK over 160
41	1600	8	5	6.3	55	28	Ampl.
42	2000	8	5	6.3	60	24	Ampl.
43	2300	8	5	25.0	62	35	Ampl.
45	1850	2	10	2.5	59	50	Ampl.
45Z3	.....	10	2	35.0	35	0	Rect. Std. Also Press 117N7
45Z5GT	.....	1	3	BLST	40	0	Short Test Neon Lights on 1-2-3-4-5
45Z5GT	.....	11	1	35.0	40	0	Rect. Std.
46	2000	1	5	2.5	60	25	Ampl.
47	2000	1	5	2.5	60	18	Ampl.
48	2000	8	5	25.0	60	48	Ampl.
49	1125	1	5	2.0	45	40	Ampl.
50	1500	2	10	7.5	53	50	Ampl.
50C6G	7000	8	5	50.0	74	36	Ampl.
50L6GT	6000	8	5	50.0	71	25	Ampl. Left at 71 for CM
50Y6GT	.....	7	2	50.0	40	0	Rect. Std. Plate No. 1
50Y6GT	.....	7	5	50.0	40	0	Rect. Std. Plate No. 2

Tube Type	Mut Cond	A	B	FIL	L	R	Notations
50Z7G	.....	7	6	50.0	40	0	Rect. Std. Short on 4-5
50Z7G	.....	10	2	50.0	40	0	Rect. Std.
51	1020	7	6	2.5	42	20	Ampl. Also 51S
52	2400	1	5	6.3	63	27	Ampl.
53	1500	1	5	2.5	53	10	Ampl.
53	1500	12	5	2.5	53	10	Ampl.
55	975	7	6	2.5	40	32	Ampl.
55	.....	10	6	2.5	0	0	Diode OK over 500
55	.....	10	3	2.5	0	0	Diode OK over 500
56	1450	1	6	2.5	53	26	Ampl.
57	1225	2	5	2.5	48	17	Ampl. Also 57S
57A	1225	2	5	6.3	48	17	Ampl. Also 57AS
58	1450	2	5	2.5	54	20	Ampl. Also 58S
58A	1450	2	5	6.3	54	20	Ampl. Also 58AS
59	2000	8	8	2.5	60	18	Ampl.
64	1050	7	6	6.3	42	26	Ampl. Also 64A
65	1000	7	6	6.3	41	23	Ampl. Also 65A
67	1000	1	6	6.3	40	34	Ampl. Also 67A
68	1050	7	6	6.3	41	32	Ampl. Also 68A
70A7GT	5800	8	5	70.0	71	17	Ampl.
70A7GT	.....	11	5	70.0	0	0	Press Diode Button OK over 300
70L7GT	.....	6	12	70.0	71	34	Check for Shorts
70L7GT	5000	7	7	70.0	71	34	Ampl.
70L7GT	.....	5	1	70.0	40	0	Rect. Std.
71A	1650	2	10	5.0	56	60	Ampl.
75	750	7	6	6.3	28	9	Ampl. Sect.
75	.....	10	6	6.3	0	0	Diode
75	.....	10	3	6.3	0	0	Diode
75MG	750	9	5	6.3	28	9	Ampl. Sect.
75MG	.....	12	2	6.3	0	0	Diode
75MG	.....	12	5	6.3	0	0	Diode
76	1450	1	6	6.3	53	24	Ampl.
77	1225	2	5	6.3	48	17	Ampl.
78	1450	2	5	6.3	54	20	Ampl.
79	1000	2	10	6.3	39	12	Ampl.
79	1000	5	10	6.3	39	12	Ampl.
80	.....	2	7	5.0	35	0	Rect. Std.
80	.....	3	7	5.0	35	0	Rect. Std.
80M	.....	2	7	5.0	40	0	Rect. Std.
80M	.....	3	7	5.0	40	0	Rect. Std.
81	.....	2	7	7.5	33	0	Rect. Std.
82	.....	2	7	2.5	40	0	Rect. Std.
82	.....	3	7	2.5	40	0	Rect. Std.
82V	.....	2	7	2.5	40	0	Rect. Std.
82V	.....	3	7	2.5	40	0	Rect. Std.
83	.....	2	7	5.0	40	0	Rect. Std.
83	.....	3	7	5.0	40	0	Rect. Std.
83V	.....	2	7	5.0	40	0	Rect. Std.
83V	.....	3	7	5.0	40	0	Rect. Std.
84	.....	7	7	6.3	40	0	Rect. Std.
84	.....	5	1	6.3	40	0	Rect. Std.

Tube Type	Mut Cond	A	B	FIL	L	R	Notations
85	975	7	6	6.3	40	32	Ampl. Sect.
85		10	6	6.3	0	0	Diode
85		10	3	6.3	0	0	Diode
89	1550	2	5	6.3	54	30	Ampl.
99	425	2	10	3.0	60	45	Ampl. OK over 340
117L7GT	6000	2	8	117.0	72	28	Ampl. Short on 1-4-5
117L7GT		5	8	117.0	40	0	Rect. Std.
117M7GT	6500	2	8	117.0	74	10	Ampl. Short on 1-4-5
117M7GT		5	8	117.0	40	0	Rect. Std.
117N7GT	7000	8	10	117.0	75	25	Ampl.
117N7GT		4	3	117.0	40	0	Rect. Std. Also Press 117N7 Rect. Button
117P7GT	4000	8	10	117.0	70	25	Ampl.
117P7GT		4	3	117.0	40	0	Rect. Std. Also Press 117N7
117Z4GT		10	2	117.0	40	0	Rect. Std.
117Z6G		2	7	117.0	76	0	Gas No. 1
117Z6G		10	2	117.0	76	0	Gas No. 1
205D	1250	2	10	5.0	48	27	Ampl.
551	1020	7	6	2.5	42	20	Ampl.
807	4200	4	7	6.3	71	25	Ampl. GM Connect Plate to top Contact of 7 Pin Soc.
841	350	2	10	7.5	60	28	Ampl. OK over 280
842	1150	2	10	7.5	46	50	Ampl.
864	650	2	10	1.5	18	37	Ampl.
884		7	5	6.3	40	0	Rect. Std. strikes at 60 on R
885		1	6	2.5	40	0	Rect. Std. strikes at 60 on R
950	950	1	5	2.0	37	37	Ampl.
951	640	2	5	2.0	18	29	Ampl.
954	1100	6	7	6.3	44	17	Ampl.
955	1900	9	7	6.3	59	18	Ampl.
956	1500	6	7	6.3	53	14	Ampl.
1231	4000	5	4	6.3	71	10	Ampl.
1232	2000	5	4	6.3	60	15	Ampl.
1609	725	1	5	1.5	26	18	Ampl.
1612	650	1	9	6.3	20	19	Ampl. Cap Grid
1612	650	8	5	6.3	20	22	Ampl. Pin Grid
1620	1225	1	9	6.3	48	18	Ampl.
1621	2000	8	5	6.3	60	24	Ampl.
1622	5000	8	5	6.3	73	19	Ampl.
1632	8000	8	5	12.6	75	15	Ampl.
1633	1500	8	9	25.0	54	27	Rect. Std. Also Press 117N7
1633	1500	10	4	25.0	54	27	Ampl. Short on 2-3
1851	4000	8	5	6.3	71	10	Ampl.
1852	4000	4	2	6.3	71	10	Ampl.
1853	3500	4	2	6.3	71	10	Ampl.
2050		8	5	6.3	40	*	Rect. Std. * strikes at 32 on R

Tube Type	Mut Cond	A	B	FIL	L	R	Notations
2051	.....	8	5	6.3	40	*	Rect. Std. * strikes at 32 on R
WUN-A	600	8	8	2.5	11	37	Ampl. No. 1 Grid
WUN-A	600	8	6	2.5	11	37	Ampl. No. 2 Grid
HY113	500	7	5	1.5	0	40	Ampl.
HY115	370	7	5	1.5	60	32	Ampl. OK over 290
HY123	500	7	5	1 5	0	45	Ampl.
HY125	450	7	5	1.5	60	45	Ampl. OK over 360
HY145	370	7	5	1.5	60	32	Ampl. OK over 290
HY155	450	7	5	1.5	60	45	Ampl. OK over 360
XXL	3000	6	2	6.3	67	0	Ampl.
XXD	2500	12	5	12.6	64	0	Ampl. Plate No. 1 Short on 1-4-5
XXD	2500	2	9	12.6	64	0	Ampl.

TO TEST MAGIC EYE TUBES

Press AMPL. Button

6AB5—6E5—6G5—6H5—6N5—6T5—6U5

A	B		Fil.	L	R
12	3	Eye Open	6.3	.....	.....
12	2	Eye Closed	6.3	.....	.....

6AD6—6AF6

A	B		Fil.	L	R
2	8	Eye No. 1 open, No. 2 closed	6.3	.....	.....
3	8	Eye No. 2 open, No. 1 closed	6.3	.....	.....

9001 Red Socket	1100	1	9	6.3	44	17	Ampl. Short on 4-5
9002 Blue Socket	1900	2	9	6.3	59	18	Ampl. Short on 4-5
9003 Red Socket	1500	1	9	6.3	54	14	Ampl. Short on 4-5

11. MAINTENANCE PARTS LIST FOR TUBE TESTER ESPEY MODEL 105.

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
504-1	2Z8674.8	SOCKET: black bakelite; type S-4.	1					*
505	2Z8687	SOCKET: black bakelite; type S-5.	1					*
506	2Z8688	SOCKET: black bakelite; type S-6.	1					*
509	2Z8677.6	SOCKET: black bakelite; type 78-7cd.	1					*
507-1	2Z8799-137	SOCKET: black bakelite; type S-8.	1					*
507-2	2Z8799-137	SOCKET: black bakelite; type S-8.	1					*
508	2Z8799-137	SOCKET: red bakelite; type S-8.	1					*
514	2Z8678.21	SOCKET: black bakelite; type 78-8L.	1					*
511	2Z8677.5	SOCKET: black bakelite; type 78-7P.	1					*
512	2Z8677.5	SOCKET: blue bakelite; type 78-7P.	1					*
510	2Z8675.20	SOCKET: black bakelite: type 78-6N.	1					*
513	2Z8677.5	SOCKET: red bakelite; type 78-7P.	1					*
515	2Z8761-26	SOCKET: black bakelite; acorn type 455-2.	1					*
542	2Z8674.8	SOCKET: black bakelite; type S-4.	1					*
600-1	2Z5822-13	KNOB: black bakelite; type S-292-3L.	1					*
600-2	2Z5822-13	KNOB: black bakelite; type S-292-3L.	1					*

600-4	2Z5822-13	KNOB: black bakelite; type S-292-3L.	1					*
600-5	2Z5822-13	KNOB: black bakelite; type S-292-3L.	1					*
600-6	2Z5822-13	KNOB: black bakelite; type S-292-3L.	1					*
600-7	2Z5822-13	KNOB: black bakclite; type S-292-3L.	1					*
600-3	2Z5822-13	KNOB: black bakelite; type S-292-3L.	1					*
601	2Z5821-4.1	KNOB: black bakelite; Davies type No. 1400.	1					*
315	3Z9843-1	SWITCH: S.P.S.T.; toggle; bat handle.	1					*
300	3Z9825-70.6	SWITCH: 4-wafer; Oak "H" type; "A" control.	1					*
301	3Z9825-70.7	SWITCH: 5-wafer; Oak "H" type; "B" control.	1					*
302	3Z9825-70.5	SWITCH: 5-wafer; Oak "H" type.	1					*
304	3Z9825-70.8	SWITCH: 1-wafer; Oak "H" type.	1					*
305	3Z1605-21	SWITCH: Valley type No. 32117.	1					*
306	3Z9824-41.1	SWITCH: S.P.S.T.; special assem.	1					*
309	3Z9824-41.3	SWITCH: push-button (117N7); type No. 4522.	1					*
313	3Z9824-41.10	SWITCH: push-button (GAS NO. 1); type No. 4528.	1					*
310	3Z9824-41.6	SWITCH: push-button; (RECT. ST'D); type No. 4523.	1					*
314	3Z9824-41.9	SWITCH: push-button (AMPL.) check; type No. 4529.	1					*
312	3Z9824-41.8	SWITCH: push-button (OZ4); type No. 4526.	1					*
308	3Z9824-41.5	SWITCH: push-button (GAS NO. 2); type No. 4521.	1					*

* Indicates stock available.

11. MAINTENANCE PARTS LIST FOR TUBE TESTER ESPEY MODEL 105 *(Continued).*

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*			
307	3Z9824-41.1	SWITCH: push-button (DIODE); type No. 4520.	1					*
311	3Z9824-41.7	SWITCH: push-button (LINE CHECK); type No. 4525.	1					*
700	3F3464-1.1	METER: type DO-41 per Espey specifications; dwg No. 3.061 (dial only).	1					*
803	2Z5581-4	TIP JACK: red; Eby; type No. 52.	4					*
516	2Z5885-11	SOCKET: special auto headlight socket; Morse type No. 21.	1					*
517	2Z5884-51	BASE: socket assem.; candelabra screw; base socket with "L" bracket.	1					*
502	6Z6806.14	LAMP: 6 cp; 6-8v; single-contact; bayonet base; Eveready Mazda No. 81.	1		*	*		*
503	2Z5884	LAMP: ¼w; 105-120v neon lamp with candelabra base.	1		*	*		*
800	3E7147-3	LINE: 8' black rubber line cord with approved plug.	1					*
801	3E5700-177/L2	WIRE: lead: insulated grid cap assem. with 8" lead; type No. 90-AL.	1					*
802	3F5700-177/L1	INSULATED GRID CLIP ASSEM: No. 45-GR Mueller clip; with No. 87 rubber shield; 10" lead; 12" long.	1					*
602	2Z5822-90	KNOB: black fibre; ¼" wide x 1¾" diam.	1					*

812	3F2810	GEAR: fibre; 32 pitch; 20 teeth; 1/8" face; 3/16" bore.	3					*
400	2Z9614-75	TRANSFORMER: pri ; 95v. sec 1; 160v; 60 ma; sec 2; 160v; 60 ma.	1					*
501	2J83	TUBE: type 83 (VT-83).	1		*	*		*
500	2J5Y3GT	TUBE: type 5Y3GT/G (VT-197-A).	1		*	*		*
817	3F14050/R1	RECTIFIER: copper-oxide; type 5049, B-2.	1					*
102	3Z7200-10	RHEOSTAT: 200-ohm; wire-wound; no OFF position; type PW-25.	1					*
103	3Z7230-6	RHEOSTAT: 300-ohm; wire-wound; screwdriver adjust control; type MB-300.	1					*
101	3Z7150-5	POTENTIOMETER: dual control 150-ohm; each section; wire-wound.	1					*
104	3Z7330-3	POTENTIOMETER: 3,000-ohm; 10w; wire-wound; type 3TP.	1					*
6	3RC31AE122K	RESISTOR: fixed; 1,200-ohm; 1w; carbon; ±10%; type MB-1.	1					*
8	3Z6583	RESISTOR: fixed; 5,000-ohm; ½w; carbon; ±10%; type MB-½.	1					*
12	3Z6700-117	RESISTOR: fixed; 100,000-ohm; ½w; carbon; ±20%; type MB-½.	1					*

* Indicates stock available.

11. MAINTENANCE PARTS LIST FOR TUBE TESTER ESPEY MODEL 105 *(Continued).*

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
11	3RC31AE433J	RESISTOR: fixed; 43,000-ohm; 1w; carbon; ±10%; type MB-1.	1					*
1	3F3802-577	RESISTOR: factory calibrated; 15-ohm; wire-wound; on ½" form.	1					*
5	3Z6010-144	RESISTOR: fixed; 100-ohm; tapped at 50-ohm; 25w; wire-wound; phenocote; ±5%; Wirthy type.	1					*
7	3Z6180-21	RESISTOR: fixed; 1,800-ohm; 1w; wire-wound; phenocote; ±5%; Wirthy type.	1					*
9	3ZK6570-17	RESISTOR: fixed; 7,000-ohm; 10w; wire-wound; phenocote; ±5%; 10C-Caarostat.	1					*
13	3Z6725-44	RESISTOR: fixed; 250,000-ohm; ½w; carbon; ±20%; type CM-½.	1					*
10	3RC31AE153J	RESISTOR: fixed; 15,000-ohm; 1w; carbon; ±5%; type MB-1.	1					*
2	3Z600167-5	RESISTOR: factory calibrated; 15.5-ohm; wire-wound on 1½" form.	1					*
4	3Z6006E5-4	RESISTOR: Espey calibrated; 63-ohm; wire-wound.	1					*
203	3D277	CAPACITOR: 0.1mf; 400v; ±10%; paper molded; type 345.	1					*

201	3D9500-61	CAPACITOR: 500mmf; 500v; ±10%; paper molded; type MWW.	1						*
202	3D9500-61	CAPACITOR: 500mmf; 500v; ±10%.	1						*
200	3D9500-61	CAPACITOR: 500mmf; 500v; ±10%; mica; type MWW.	1						*

* Indicates stock available.

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