

INSTRUCTION BOOK

FOR

Weston Model 774, Type 4

MANUFACTURED BY

WESTON ELECTRICAL INSTRUMENT CORPORATION

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INSTRUCTIONS FOR MODEL 774, TYPE 4



I. GENERAL

1-1. The Model 774 Type 4 is a combination Analyzer and Tube Checker, a part of the I-56-E Test Set. The device is designed to operate on voltages between 105 and 125, at a frequency of 50 or 60 cycles.

1-2. This model provides three separate functions for testing receiver performance.

The analyzer section consists of A.C. and D.C. voltage, ohmmeter and capacity ranges, and will provide all measurements needed for the proper servicing of a receiver. Built into the panel is a socket selector block which, along with the adapters, will facilitate the measurements of voltages and current from the top of the receiver.

The tube checker is the regular Weston Emission Tube Checker, arranged with the necessary features to check all tubes within the scope of a portable device.

1-3. The Model 774 is built on a 50 mill steel panel with the sockets, rotary switches, and toggle switches positioned in a neat and orderly fashion. The upper right hand portion of the panel contains the socket selector analyzer. The meter used in the Model 774 is a standard 100 microampere instrument.

A wooden case houses the completed instrument with a compartment at the top to hold the adapter block and the necessary test cables for the device.

II. ANALYZER SECTION

2-1. The analyzer section of this device consists of the various ranges listed below. On D.C. volts two sensitivities are provided, 10,000 ohms per volt and 1,000 ohms per volt, so that any existing test data taken on the basis of 1,000 ohms per volt can be readily used.

D.C. VOLTS	A.C. VOLTS	D.C. CURRENT
7.5	2.2 (Approx.)	1 Ma.
15	7.5	10 Ma.
50	15	100 Ma.
150	50	500 Ma.
500	150	
1000	500	
	1000	

RESISTANCE	CENTER SCALE	CAPACITY	CENTER SCALE
0-10,000 Ω	50 Ω	0- .1 mfd.	.02 mfd.
0-100,000 Ω	500 Ω	0- 1 mfd.	.2 mfd.
0-1,000,000 Ω	5,000 Ω	0- 10 mfd.	2 mfd.
0-10,000,000 Ω	50,000 Ω	0-100 mfd.	20 mfd.

2-2. CIRCUIT SELECTOR. The "CIRCUIT SELECTOR" located in the left hand lower portion of the panel is a function switch selecting either the various tube checker positions, A.C. volts, D.C. volts, at 10,000 ohms per volt, D.C. volts at 1,000 ohms per volt, ohms, D.C. milliamps, or capacity ranges.

2-3. RANGE SELECTOR. The "RANGE SELECTOR" switch located in the right hand lower portion of the panel selects any of the ranges listed in Paragraph 2-1.

2-4. LINE VOLTAGE CONTROL. The "LINE VOLTAGE" control is used in the analyzer section for setting the pointer to top mark on capacity meter ranges. This control is lo-

cated in the very center of the panel. Note, as will be explained in a later paragraph, that the line voltage control is also used to set the potentials to a given value in the tube checker.

2-5. **TUBE SELECTOR AND OHMMETER ADJUSTER.** The "TUBE SELECTOR and OHMMETER ADJUSTER" located just to the left of the "RANGE SELECTOR" is a tandem control, one section of which is used for setting the pointer to top mark on ohmmeter ranges, and the other section is used as a sensitivity control in the tube checker section. This will be explained in a later paragraph.

2-6. **PIN JACKS.** Below the rectangular "SOCKET SELECTOR UNIT" is located four pin jacks. The function of each pin jack should be thoroughly understood before any attempt is made to use this instrument. The two top pin jacks are used for all measurements, with the several exceptions that will be listed below. The top right hand jack labeled " \pm COMMON" is the low potential side of the circuit, and on D.C. is negative. On A.C. this jack should be connected to the low potential side of the source being measured.

The left top pin jack labeled "VOLTS A.C. D.C. D.C. MA.—OHMS CAPACITY" is to be used for the various functions listed opposite that jack. See paragraphs 3-1; 3-3; 3-4; 3-5; 3-6; 3-7 and 3-8.

The "A.C. VOLTS SERIES CONDENSER" jack is to be used only when it is desired to make a measurement of A.C. volts when D.C. is present in the circuit to be tested. See paragraph 3-2.

When aligning receivers, the "LOW RANGE A.C. VOLTS" jack is used if the measurement is to be taken from the voice coil of a loud speaker. When using this jack the "RANGE SELECTOR" switch is cut out of the circuit and a voltage sensitivity of approximately 2.2 volts A.C. will be obtained. See paragraph 3-9.

These two lower jacks are the exceptions mentioned above, and it should be kept in mind that regardless what pin jack is selected, one of the leads must always be connected to the jack labeled " \pm COMMON."

III. OPERATION OF THE ANALYZER SECTION

3-1. **A.C. Volts.** To measure A.C. Volts, index the "CIRCUIT SELECTOR" to the "A.C. VOLTS" position. Set the "RANGE SELECTOR" to the 1,000 volt position and place the test leads in the two upper pin jacks labeled " \pm COMMON" and "Volts A.C.-D.C. D.C. MA. OHMS CAPACITY." The test leads placed in the "COMMON" pin jack should be connected to the low potential side of the A.C. when ever possible. Rotate the "RANGE SELECTOR" in a counter clockwise position until the pointer reads in the upper half portion of the scale. The voltage should be read from either one of the two red arcs, depending upon the range selected. When selecting voltage ranges of 7.5, 15, or 150, use the upper red arc labeled A.C. When selecting voltage ranges of 50, 500, and 1000, read the lower red arc labeled A.C.

3-2. **Output Measurements.** When taking output measurements, the analyzer is set up in the same way as for A.C. volts with the exception that one test lead is placed in the pin jack labeled "A.C. VOLTS SERIES COND." The other test lead remains in the "COMMON" pin jack.

Output measurements should be taken when it is known that D.C. is present in the A.C. source to be measured. Care should be taken to select the highest voltage range possible, so that the error due to the reactance of the series condenser will be minimized.

3-3. **DECIBELS.** No provision has been made on this instrument to read decibels directly. If such measurements are desired, it can be done easily by setting the instrument up as if "A.C. VOLTS" were to be checked. Refer to the decibel chart on page 25, and note the decibel value opposite the voltage indication taken from the meter. Further note that the chart is arranged to give decibels for 6 milliwatt 500 ohm lines and 6 milliwatt 600 ohm lines.

3-4. **D.C. Volts.** Index the "CIRCUIT SELECTOR" to the position labeled "D.C. VOLTS 10,000 Ω/V " and set the "RANGE SELECTOR" to the 1,000 volt position. Place the test

leads in the two upper pin jacks as described in paragraph 3-1. The test lead in the "COMMON" jack will be negative, and the other lead will be positive. Rotate the "RANGE SELECTOR" switch in a counter clockwise direction until the meter indicates in the upper half portion of the scale if possible.

When selecting voltage ranges of 7.5, 15, and 150, the meter should be read on the black D.C. arc below the ohmmeter arc.

When selecting voltage ranges of 50, 500, and 1000 volts, use the black D.C. arc located between the two red A.C. arcs.

3-5. "D.C. VOLTS at 1,000 Ω/V " sensitivity is available so that any test data on receivers set up on the basis of this sensitivity can be readily used. When making measurements at 1,000 Ω/V sensitivity, follow the instructions given in paragraph 3-4 with the exception that the "CIRCUIT SELECTOR" should be indexed to the "D.C. VOLTS 1,000 Ω/V " position.

3-6. "D.C. Milliampere." When measuring "D.C. MILLIAMPERES," the same procedure should be followed as for D.C. volts with the exception that the "CIRCUIT SELECTOR" should be indexed to the "D.C. MILLIAMPERE" position and the "RANGE SELECTOR" indexed to the 500 milliamper position. Then rotate the "RANGE SELECTOR" in a counter clockwise position until a satisfactory indication is available on the meter.

3-7. "OHMS." The Ohmmeter in the Model 774 is battery operated, and to take measurements, merely rotate the "CIRCUIT SELECTOR" to the "OHMS" position, and rotate the "RANGE SELECTOR" to any one of the four ohmmeter ranges desired. Place the test leads in the two upper pin jacks, short circuit them, and rotate the "TUBE SELECTOR AND OHMMETER ADJUSTER" until the pointer indicates top mark. Place the test leads across the resistance to be measured and note the reading on the ohmmeter arc at the top of the scale. Multiply the reading by the factor indicated opposite the position selected on the "RANGE SELECTOR." When measuring electrolytic condensers for leakage with the ohmmeter, it should be kept in mind that the polarity of the test leads is an important factor. The polarity of the voltage applied to a condenser under test is opposite that of the markings on the panel. In other words, the "COMMON" lead applies the positive potential to the condenser being tested.

3-8. "CAPACITY." When taking measurements of capacity, it is necessary to use a 60 cycle power source having a line voltage between 105 and 125. Rotate the "CIRCUIT SELECTOR" to the "CAP." position and index the "RANGE SELECTOR" to any one of the four capacity ranges. Place the test leads in the upper two pin jacks and short circuit them. Rotate the "LINE VOLTAGE" control until the meter indicates top mark. Place the test leads across the condenser to be checked and note the reading on the bottom, black arc labeled "MICROFARADS." Multiply or divide the reading by the factor indicated on the position used on the "RANGE SELECTOR."

When capacity measurements are to be made on a 50 cycle power source, the measurements should be taken as stated above and then multiply by 6/5 for the correct value.

3-9. **Low Range A.C. Volts.** When aligning radio receivers, it is often convenient to connect the test leads to the voice coil of the loud speaker. To provide a range sufficiently low for this purpose a special jack labeled "LOW RANGE A.C. VOLTS" is provided. Place the test leads in this jack and the jack labeled " \pm COMMON" and rotate the "CIRCUIT SELECTOR" to the "A.C. VOLTS" position. The position of the "RANGE SELECTOR" will have no effect when the test leads are placed in the jacks mentioned above. Top scale mark on the meter will be approximately 2.2 volts A.C. when connected as just described.

NOTE: The step-by-step procedure for using the analyzer section of the Model 774 Type 4 can be found on pages 9; 10 and 11.

IV. OPERATION OF THE "SOCKET SELECTOR UNIT"

4-1. The rectangular bakelite block in the upper right hand portion of the panel is the "SOCKET SELECTOR UNIT." It is to be used for the purpose of taking readings of current, voltage, resistance, and other electrical measurements in a vacuum tube circuit. The cable with the 8 prong plug and the adapters located on the wooden block in the top compartment of the case are parts of the socket selector unit.

The plug on the end of the cable, with its associated adapter may be inserted in the receiver tube socket, and the tube plugged into the socket selector unit. This brings out through the cable all currents and voltages to a

point where they may be measured on the Model 774 Type 4. The charts and tube base lists on pages 12-17 give the base connections for the various tube types. The numbering on each diagram for the various electrodes, corresponds with the engraved numbers on the "SELECTOR UNIT" and skirted adapters.

4-2. TO READ VOLTAGE, plug the jumper leads into the outside jacks on the block. If plate voltage is required, and the base diagram shows the plate to be on pin # 2, and the cathode on pin # 7, then plug the jumper leads into the outside jack opposite # 2 and # 7 on the skirted adapter selected to fit the tube base. The open ends of the two jumper leads should be connected to the required voltmeter range.

4-3. TO READ CURRENT to any electrode, use the inside and outside jacks opposite the pin number on the skirted adapter. If plate current is required, and the base diagram shows the plate to be on pin # 3, then plug the jumper leads into the adjacent jacks opposite the # 3 on the skirted adapter. Inserting the pin in the inside jack opens an internal switch connecting the milliammeter in series with the tube electrode.

4-4. TO READ RESISTANCE across any two terminals such as plate to cathode, use the outside jacks in the same manner as when reading voltage. Be sure that the receiver is turned off when taking resistance readings.

4-5. ADAPTERS. Fifteen adapters are supplied for use with the "SOCKET SELECTOR UNIT." Listed below are the colors of the adapters and the corresponding tube bases with which they are to be used.

4 prong	Red
5 prong	Green
Octal	Orange
Small 7 prong	Light Brown
6 prong	Blue
Loctal	Dark Brown
Large 7 prong	Black
Miniature	Black

For each color there are two adapters, one to be placed on the socket selector block and the other to be placed on the plug at the end of the cable. In the case of the small 7 prong adapter, there is only one unit which is to be placed on the plug at the end of the cable. The socket in the "SOCKET SELECTOR UNIT" block is a small 7 prong socket, and hence no adapter is needed for this service. Further note that with two exceptions each pair of

adapters has, for one of the units, a skirted adapter. The small 7 prong adapter (light brown) and the pair of large 7 prong adapters (black) have no skirted adapters. The reason for this is that the pin numbering on the "SOCKET SELECTOR UNIT" block is proper for these units.

Any adapter having an 8 prong socket at the top with a double slotted key way is to be fastened to the plug at the end of the "SOCKET SELECTOR UNIT" cable. In the case of the miniature adapter, the small cable with the rubber cap at one end should be attached to the plug at the end of the cable. This design was decided upon so that the miniature plug could be placed in small portable receivers not having sufficient space for the larger units.

The skirted octal and loctal adapters have a pin tip lead which should be plugged into either one of the pin jacks marked "PIN TIP."

V. TUBE CHECKER SECTION

5-1. General. The Tube Checker section of the Model 774 Type 4 is of the emission type, designed to operate on power lines of frequencies between 50 and 60 cycles and between voltage ranges of 105 and 125.

5-2. The circuit features of this device are such that it will check any receiving type of tube in use at the present time. Exceptions to this are gas thyratrons and several of the tuning eye tubes.

The "CIRCUIT SELECTOR" is used to provide the line check measurements and to set up the various loads for the different tube types. The "FILAMENT SELECTOR" can be used to obtain voltages from 1.2 to 100 volts. At the bottom of the panel is located a row of toggle switches lettered from "A" to "H." These switches select the various elements to be tested in the tube. In addition, another toggle switch in the lower right hand portion of the panel makes it possible to reverse the meter connections so that certain tubes, such as the 117N7 can be tested. In the middle left hand portion of the panel is the usual short-check indicator that consists of a $\frac{1}{4}$ watt neon bulb.

The "RANGE SELECTOR" is not used when testing tubes, and it may be left indexed to any position without upsetting the test readings.

5-3. FILAMENT SELECTOR. This is a rotary switch located to the right of the "CIRCUIT SELECTOR" controlling the heater potential supplied to all the sockets. The setting

of this switch should correspond to the number called for in the tube data. **THE SWITCH SHOULD BE INDEXED TO THE REQUIRED POSITION BEFORE PLACING THE TUBE IN THE SOCKET.**

5-4. ELECTRODE SWITCHES. These toggle switches are located at the bottom of the panel and are labeled "A" through "H." By using independent switches, a very high order of flexibility is available and individual element, short, and continuity tests are thus made available. These switches should be set, in accordance with the readings on the tube data card, to the "IN" position for tube test readings. For short-test readings, these switches should all be in the "OUT" position and then indexed to the "IN" position one at a time, while watching the neon lamp. For all cathode leakage indications, all switches should be in the "OUT" position and the "A" switch indexed to the "IN" position.

BEFORE INSERTING A TUBE IN A SOCKET, ASCERTAIN WHETHER THE FILAMENT HAS A CENTER TAP, INDICATED BY A SINGLE DAGGER (†) IMMEDIATELY FOLLOWING THE TUBE TYPE NUMBER. IF SUCH IS THE CASE, INDEX TOGGLE SWITCH "A" TO THE "IN" POSITION. If this is not carefully followed, tubes with center taps are likely to have $\frac{1}{2}$ of the filament damaged due to burn-outs.

5-5. LINE VOLTAGE CONTROL. This control is located in the center of the panel, below the meter, and is a 25 watt vitreous potentiometer controlling all potentials in the tube checker. The "LINE VOLTAGE" control should be set to bring the pointer to the center scale line after the tube has heated. The "CIRCUIT SELECTOR" switch should of course be indexed to the "LINE SHORT CHECK" position for this operation.

5-6. TUBE SELECTOR AND OHMMETER ADJUSTER. The "TUBE SELECTOR" control is located to the left of the "RANGE SELECTOR" and should be set in accordance with the reading on the tube data chart before indexing the functional switch into any position other than the "LINE CHECK."

5-7. CIRCUIT SELECTOR. This is the rotary switch located in the lower left hand portion of the panel. With this switch, the circuits are set up for the proper load and potentials for checking diodes, battery, normal, or special tube types. Following the tube type

number on the tube data chart are certain abbreviations, Di., Bat., and Spec., which refer to Diode, Battery, and Special tube types. The "CIRCUIT SELECTOR" switch should be indexed to the position corresponding to this abbreviation. If no notation is made following the tube type number on the tube data chart, the tube is always considered as a "NORMAL" type, and the "CIRCUIT SELECTOR" should be indexed to this position during test. To make line check measurements, simply rotate the "CIRCUIT SELECTOR" switch to the "LINE SHORT CHECK" position.

5-8. TUBE DATA. The tube data is printed on three separate cards placed in the lid of the device. In addition, the complete tube data can also be found on pages 18-23 of this book.

VI. OPERATION

6-1. NORMAL TYPES. Plug the tester into any nominal 50-60 cycle 110-125 volt a-c line and turn on the tester by rotating the "CIRCUIT SELECTOR" switch to the "LINE SHORT CHECK" position. Refer to the tube data and note the filament and tube selector setting and set these controls accordingly. Note further, whether some reference is made to battery, diode, or special type after the tube number. All tubes that have no reference to any of these types are considered "NORMAL TYPES." The testing of any of the other types will be covered in separate paragraphs.

Determine whether the tube has a center tap filament as indicated on the tube chart by a dagger (†) immediately following the tube type number. Tubes of this type require that the "A" toggle switch be indexed to the "IN" position before inserting the tube in the socket and it should be kept in this position during the complete test. Place the tube in the socket having the corresponding pin arrangement and allow the tube to heat. A correction for line voltage should be made at this time if necessary, by setting the instrument pointer accurately to the line check position, making use of the "LINE VOLTAGE" control. Test the tube for shorts by manipulating each of the switches listed under the "IN" position column, shifting one switch at a time to the "IN" position and returning it to the "OUT" position, watching the neon lamp. If the tube has a small solid black star listed after the tube number, it should be tested for cathode leakage by making use of the "A" switch, watching the neon lamp. Should a short be indicated by the lamp, the tube should be rejected as one that will give trouble in normal receivers.

Now rotate the "CIRCUIT SELECTOR" switch to the "NORMAL TUBES" position. Place each of the switches listed under the "IN" position correctly, and note the test reading. There are two groups of listings for some tubes such as the 6F8 with an "&" sign between them. This tube has two sections and should be tested separately. For this particular tube, switches "B" and "E" should be thrown to the "IN" position and the reading noted, the switches returned to the "OUT" position, and "D" and "F" thrown together to the "IN" position and the reading on the second section taken. The "&" sign in all cases separates the electrode switches from each section of the tube to be tested. After the total emission test has been made, do not neglect to perform the open element test described in paragraph 6-8.

6-2. BATTERY TYPES. These are the low current filament type of tube and must be tested as a separate group. These tubes can be damaged if not correctly handled, and all tubes of this type are marked "Bat." directly after the tube number. When testing these tubes, the "CIRCUIT SELECTOR" switch should be indexed to the "BATTERY TUBES" position, but in all other respects, the procedure is the same as listed under "NORMAL TUBES." Note that all of these tubes are of the filament type and, therefore, no cathode leakage test is required.

6-3. DIODES. Tubes of this type are marked on the tube data card as "Di." and when so designated, the "CIRCUIT SELECTOR" switch should be placed in the "DIODE" position. When testing diode plates, it should be noted that the tube selector control should always be placed in the "O" position. A black line and arrow on the instrument scale is used as the passing line for emission of diode plates. If the meter is above this line the tube should be passed as having sufficient emission in accordance with R.M.A. limits.

Certain tubes, such as the 957 and 958, require that the "CIRCUIT SELECTOR" be set to the "DIODE" position to prevent damage to the emitting surface of the filaments. These tubes have a double star (***) followed by the abbreviation Di. immediately following the tube type number on the tube chart. These tubes are not actually diodes, but are checked in the diode position, and the reject point for such types is 16 on the 50 line DC Volt arc.

6-4. SPECIAL TYPES. Tubes listed with the marking "SPEC." after the tube number, should be checked with the "CIRCUIT SELECTOR" switch indexed to the "SPECIAL TUBES" position. This is used principally for gas rectifier types, but with the exception of the setting of the "CIRCUIT SELECTOR," the procedure for test is normal.

Note: Certain types are marked directly after the tube number on the tube data card with a double dagger (††). These tubes, due to unusual electrode connections must be tested in the "A" socket corresponding to the pin arrangement of the tube to be tested. In all other respects, these tubes are tested in the usual way.

6-5. CENTER TAP FILAMENT TYPES. Center tap filament types may fall under any of the classifications, such as diode, battery, or normal types. Tubes in this category have a single dagger (†) immediately following the tube type number on the tube data chart. It is important to index the "A" toggle switch to the "IN" position before inserting the tube and keep in this position during the complete test. A lighted neon lamp will indicate continuity of third filament connections. No short tests can be made on tubes of this type unless the operator wishes to reduce the filament voltage by $\frac{1}{2}$ and then index the "A" toggle switch to the "OUT" position and perform the short test in the normal manner.

6-6. NORM. REV. TOGGLE SWITCH. In the lower right hand portion of the panel is a toggle switch that performs the function of reversing the meter connections. Ordinarily this switch should be indexed to the "NORMAL" position. If the tube has a "¶" symbol following the tube type number, this toggle switch should be indexed to the reverse position to make the normal tube test. To short check tubes of this type, index the "A" toggle to the "IN" position, leaving "G" toggle in the "IN" position.

6-7. TUBE DATA CHART SYMBOLS. In the preceding paragraphs have been listed the procedure for checking the various tubes having certain symbols following the tube type numbers. The operator of this device should keep in mind that any one tube may have several symbols indicating that the procedure outlined for each one of the symbols should be followed. For instance, a tube type having a

star and a double dagger (* ††) should be checked in an "A" socket corresponding to the pin arrangement of the base, and should be also checked for cathode leakage. The symbols used on the tube chart are listed below and it must be kept in mind that any combination of these symbols might possibly be used following the tube type number.

- When short checking, B&D toggles should be thrown in the "IN" and "OUT" positions together.
- § When testing for open elements or short checking, F&G toggles should be thrown to the "IN" and "OUT" positions together.
- ** Reject Point is 16 on 50 Line DC. Arc.
- † Index switch "A" to "IN" position before inserting tube; keep in this position during complete test. A lighted neon lamp will indicate continuity of third filament connection. No short test; refer to instructions.
- * Test for cathode leakage by throwing "A" switch to "IN" position when the tube is hot; all other switches should be in the "OUT" position.
- †† Test in "A" socket.
 - ¶ Place "Norm." "Rev." toggle in "Rev." position; to short check, index "A" toggle to "IN" position, leaving "G" in the "IN" position.
 - ¶ Place "Norm." "Rev." toggle in "Rev." position.
- & Move grid lead to the cap that gives the higher reading.
- Tie both grids leads together.
- When testing for open elements or short testing, B&H toggles should be thrown to the "IN" and "OUT" positions together. The same holds for C&G toggles. Check for cathode leakage.

6-8. OPEN ELEMENT TEST. In checking for emission on any tube, some of the electrodes handle most of the emission current because of their proximity to the cathode, resulting occasionally in a tube checking good when one of the elements carrying only a very small current is open. Such a tube will not operate in a receiver. With the Weston system of independent electrode switching, this type of fault can be located readily. First, set the tube up for the regular total emission check as outlined in the previous paragraphs, and

then throw each of the electrode switches used for the particular tube alternately from the "IN" position to the "OUT" position. If there is no change in meter indication, the tube should be rejected as bad, due to an open element. If satisfied that the particular element is not open, return its toggle switch to the "IN" position and repeat the above procedure on each of the other electrode switches used in testing that tube shown on the tube data card. Note that certain electrodes in some tubes will give only about $\frac{1}{4}$ division change in meter deflection when a particular switch is pulled from the "IN" position to the "OUT" position. This is normal, as it shows that the element under test is drawing current. **THIS PART OF THE PROCEDURE FOR TESTING TUBES IN AN EMISSION CHECKER IS VERY IMPORTANT.**

6-9. SHORT TESTING. The $\frac{1}{4}$ watt neon lamp operates in conjunction with the power supply to provide a short-testing circuit adjusted to the correct sensitivity. This circuit will indicate any short or leakage that will cause trouble in receivers. All tubes should be short tested before proceeding with the tube tests. The short test is made in the regular test socket after the tube is hot. The "CIRCUIT SELECTOR" switch should be indexed to the "LINE SHORT CHECK" position. To be sure that there are no intermittent shorts, it is advisable to tap the tube with a pencil, watching the neon lamp carefully for intermittent flicker. Where certain tubes are suspected of giving trouble, it may be advisable to allow these tubes to heat for a considerable time in the tester and then check the tube, tapping as mentioned above. Each of the toggle switches listed under the "IN" position headings should be thrown one at a time to the "IN" position while watching the neon lamp.

Note: For step-by-step procedure in checking tubes, see page 9.

VII. SETTING UP TUBE DATA

7-1. Sometimes it is necessary in an emergency to set up tube data for tubes not listed on the data chart. By using the table given below, it is possible to pick proper toggle switches to be indexed to the "IN" position. Reference to the base diagram of the tube to be checked will indicate what pin numbers are involved. Determine the type of base and, referring to the chart, the letter opposite the pin

number is the toggle switch that should be indexed to the "IN" position. For instance, 6K7 tubes have elements on pins 3, 4, 5, and the cap. The 6K7, having an octal base, a glance at the chart indicates that toggle B corresponds to pin 3, C to pin 4, D to pin 5, and E to the grid cap. Cathode connections on heater type tubes can be disregarded as the toggle switch corresponding to this pin must always be set in the "OUT" position.

Toggle Switches	Octal	Loctal	Miniature	Large & Small 7	Six Prong	Five Prong	Four Prong	Miniature A	Loctal A	Octal A	Acorn
B	3	2	3	2	2	2	2	1	1	3	2
C	4	3	4	3	3	3	3	7	3	4	3
D	5	4	5	4	-	-	-	5	4	5	-
E	Cap	5	Cap	Cap	Cap	Cap	Cap	Cap	Cap	Cap	Cap
F	6	6	6	5	4	-	-	6	6	6	6
G	8	7	2	6	5	5	-	2	7	1	5
H	1	-	-	-	-	-	-	-	5	2	-
First Filament Connection	2	1	7	7	6	5	4	4	2	7	1

7-2. It is also necessary to determine whether the filament connections are normal or not for the type of base used. If the filament connections are not normal, the following rule should be used. On the octal base tubes, if one of the filament connections is on pin 2 and the other end of the filament on any other pin, the tube should be checked in the regular octal socket. If on an octal based tube, one of the filament connections terminates at 7 and the other end of the filament terminates at any other pin (except pin # 2) the octal "A" socket should be used.

7-3. On loctal tubes, if one filament connection terminates at pin 1 and the other on any other pin, the tube should be checked in the regular loctal socket. If a loctal based tube has one end of its filaments connected to pin 2 and the other end to any other pin (except pin # 1) the loctal "A" socket should be used.

7-4. On a miniature based tube, if one end of the filament terminates on pin 7 and the other end on any other pin, the tube should be checked in the regular miniature socket. If a miniature based tube has one end of its filament connected to pin 4 and the other end to any other pin (except pin # 7) the tube should be checked in the miniature "A" socket.

7-5. All of the other tubes are checked in sockets corresponding to their pin arrangement and so no difficulty will be experienced with these types.

CAUTION: Any tube having a center tap filament should have the "A" toggle switch indexed to the "IN" position before inserting a tube in the socket.

7-6. In determining the "FILAMENT SELECTOR" position, refer to the table below and select the position that most nearly corresponds to the rated filament voltage of the tube.

Filament Selector Position	Filament Voltage
0	1.1
1	1.5
2	2.0
3	2.5
4	3.3
5	5.0
6	6.3
7	7.5
8	12.0
9	27.5
10	35.0
11	47.0
12	70.0
13	85
14	100

7-7. Do not fail to take into account the type of tube that is to be tested. In other words, diode, battery, normal, and special types. The diode position is used for diode types and for those battery types on which the load on the tube is too great. Whether the load is too great or not can be easily determined by placing the tube in the socket and indexing the circuit selector to the battery position. If the meter indication begins to drop off, the load placed upon the tube is too great and the diode position should be used instead.

7-8. The battery position will be used for those tubes having more than two elements and having filament voltages corresponding to the 1.4 or 2.0 volt types. Center tapped filament tubes with ratings of 2.8 and 4 volts fall under this same classification.

7-9. The "SPECIAL" position should be used only on tubes of the cold cathode rectifier types, such as the 0Z-4.

7-10. All other types should have the circuit selector indexed to the "NORMAL" type position during test.

7-11. After determining the "CIRCUIT SELECTOR" and "FILAMENT SELECTOR" positions, and the toggle switches to be used,

it is then necessary to rotate the "TUBE SELECTOR" control until the meter indicates approximately 36 on the 50 line DC. scale. Several tubes known to be good should be used for determining the "TUBE SELECTOR" position. All "DIODE" types should have the tube selector set to "0." Although this procedure will not give accurate tube test data, it will suffice for a large number of tubes.

7-12. When determining the data for a new tube, if it is noted that the base connections are the same as a tube listed in the tube data, then follow paragraphs 7-6 through 7-11 for setting up the "CIRCUIT SELECTOR," "FILAMENT SELECTOR," and "TUBE SELECTOR." The toggle switches to be used and the symbols following the tube type number would then be the same as for the tube already listed on the data chart.

VIII. STEP-BY-STEP PROCEDURE FOR TESTING TUBES

- 8-1. a. Plug the device into a 60 cycle 110 or 120 volt supply.
- b. Rotate the "CIRCUIT SELECTOR" to the "LINE SHORT CHECK" position.
- c. Set the "FILAMENT SELECTOR" in accordance with the tube data.
- d. If a single dagger (†) appears following the tube type number, index the "A" toggle to the "IN" position before inserting any tubes.
- e. Insert the tube in the socket corresponding to the proper pin arrangement. If a double dagger (††) appears after the tube type number on the tube data chart, the "A" socket should be used.
- f. Rotate the "LINE VOLTAGE" control until the pointer indicates at the "LINE CHECK" mark.
- g. Rotate the "TUBE SELECTOR" to the figure indicated on the tube data chart.
- h. Now short test the tube in the following manner: Index the toggle switches at the bottom of the panel to the "IN" and "OUT" positions one at a time. Use only those toggles called for on the data chart under the "IN" position column. If a star (*) follows the tube type number on the data chart, check for cathode leakage by indexing

the "A" toggle to the "IN" position, while all other toggles are in the "OUT" position. In performing the above procedure, watch the neon lamp for any indications of shorts.

- i. Following the tube type number on the tube data chart may appear one of the following abbreviations. Di., Bat., or Spec. Rotate the "CIRCUIT SELECTOR" to the position indicated by the abbreviation. If no abbreviation appears following the tube type number, the tube is to be considered as a normal type, and the "CIRCUIT SELECTOR" should be rotated to the "NORMAL TUBES" position.
- j. Index the toggle switches at the bottom of the panel to the "IN" position as called for on the tube data chart under the "IN" position column.
- k. Note meter indication. If pointer is in the red or yellow section, reject the tube as bad. If the pointer indicates in the green section, proceed as outlined below with the separate element check.
- l. To check each element separately, set the tube checker up for normal test as indicated above and pull each of the toggle switches, one at a time, to the "OUT" position. A change in meter indications even if only $\frac{1}{4}$ of a division, will indicate that particular element is drawing current.

When satisfied that all the elements are making connection as indicated by the test given above, the tube may be considered as completely satisfactory. THIS LAST DESCRIBED TEST SHOULD NOT BE NEGLECTED IN THE TESTING OF TUBES.

IX. STEP-BY-STEP PROCEDURE FOR SELECTION OF RANGES IN THE ANALYZER SECTION.

9-1. A.C. VOLTS

- a. Index the "CIRCUIT SELECTOR" to the "A.C. VOLTS" position.
- b. Index the "RANGE SELECTOR" to the "1000 V" position.
- c. Place the test leads in the two upper pin jacks. The jack labeled " \pm COMMON" should be connected to that side

of the A.C. source that is nearest ground potential if possible.

- d. Rotate the "RANGE SELECTOR" in a counter-clockwise direction until a satisfactory indication is had on the meter.
- e. If ranges of 7.5, 15, or 150 are selected, use the lower red arc on the meter labeled "A.C."
- f. If ranges of 50, 500, and 1000 are selected, use the lower red arc on the meter labeled "A.C."

9-2. OUTPUT MEASUREMENTS

- a. Index the "CIRCUIT SELECTOR" to the "A.C. VOLTS" position.
- b. Index the "RANGE SELECTOR" to the "1000 V" position.
- c. Place the test leads in the pin jacks labeled " \pm COMMON" and "A.C. VOLTS SERIES COND."
- d. Rotate the "RANGE SELECTOR" in a counter-clockwise direction until a satisfactory reading is obtained. Note that in the case of output measurements the highest practical range should be used to minimize the error due to the reactance of the series condenser.

9-3. DECIBELS

- a. Set the device up for "A.C. VOLTS" measurements. See paragraph 9-1.
- b. Note the meter indication and refer to the Decibel Chart in this instruction book on page 25.
- c. If decibels in a 500 ohm 6 milliwatt line are desired, look under the "500 Ω " column and the decibel value to the left is the power level at 6 milliwatts.
- d. For decibel readings in a 600 ohm line, look down the "600 Ω " column in the chart until a voltage equivalent to the reading is found and directly to the left under the decibel column will be found the value desired.

9-4. "D.C. VOLTS 10,000 Ω/V ."

- a. Index the "CIRCUIT SELECTOR" to "D.C." VOLTS 10,000 Ω/V ."
- b. Index the "RANGE SELECTOR" to the "1000 V" position.

- c. Place the test leads in the two upper pin jacks labeled " \pm COMMON" and "VOLTS A.C. D.C. D.C. MA.—OHMS CAPACITY."

- d. Rotate the "RANGE SELECTOR" in a counter-clockwise direction until a satisfactory indication is obtained on the meter.
- e. When ranges of 7.5, 15, and 150 are selected, the meter indication should be read on the black D.C. arc below the ohmmeter arc.
- f. When voltage ranges of 50, 500, and 1000 are selected, read the meter indication on the black D.C. arc located between the two red A.C. arcs.

9-5. D.C. VOLTS 1000 Ω/V

- a. Index the "CIRCUIT SELECTOR" to the "D.C. VOLTS 1000 Ω/V " position.
- b. Follow paragraphs listed under "D.C. VOLTS 10,000 Ω/V " with the exception of "a."

9-6. D.C. MILLIAMPERES

- a. Index the "CIRCUIT SELECTOR" to the "D.C. MA." position.
- b. Index the "RANGE SELECTOR" to 500 MA. position.
- c. Place the test leads in the two upper pin jacks labeled " \pm COMMON" and "VOLTS A.C. D.C. D.C. MA.—OHMS CAPACITY."
- d. Rotate the "RANGE SELECTOR" in a counter-clockwise direction until a satisfactory reading is obtained.
- e. Read the meter indication on the black D.C. arc between the two red A.C. arcs.

9-7. OHMS

- a. Index the "CIRCUIT SELECTOR" to the "OHMS" position.
- b. Index the "RANGE SELECTOR" to any one of the 4 ranges desired.
- c. Place the test leads in the two upper pin jacks labeled " \pm COMMON" and "VOLTS A.C. D.C. D.C. MA.—OHMS CAPACITY."
- d. Short the test prods and rotate the "TUBE SELECTOR AND OHM-METER ADJUSTER" until the pointer indicates top mark.

- e. Place the test prods across the resistance to be measured, multiplying the meter indication by the factor indicated on the "RANGE SELECTOR" switch.
- f. Keep in mind when testing leakage of electrolytic condensers that the pin jack labeled " \pm COMMON" should be placed on the positive lead of the condenser to be tested.

9-8. CAPACITY

- a. Plug the line cord into a power source having a voltage between 105 and 125, the frequency of which is 60 cycles.
- b. Index the "CIRCUIT SELECTOR" to the "CAP." position.
- c. Index the "RANGE SELECTOR" to any one of the 4 capacity meter ranges desired.
- d. Place the test leads in the two upper pin jacks labeled " \pm COMMON" and "VOLTS A.C. D.C. D.C. MA.—OHMS CAPACITY."
- e. Short the test leads together and rotate the "LINE VOLTAGE" control until the meter indicates top mark.
- f. Place the test leads across the condenser to be checked and the meter indication on the black mfd. arc should be multiplied by the factor indicated on the "RANGE SELECTOR" switch.

9-9. LOW RANGE A.C. VOLTS

- a. Index the "CIRCUIT SELECTOR" to the "A.C. VOLTS" position.
- b. Place the test leads in the pin jacks labeled " \pm COMMON" and "LOW RANGE A.C. VOLTS."
- c. The meter indication at top mark is approximately 2.2 volts.

NOTE: The low range A.C. volts is to be used only when aligning radio receivers when the audio measurement is to be taken from the voice coil of the speaker.

X. SERVICING THE MODEL 774 TYPE 4

10-1. After some period of use, it may be necessary to replace the batteries located in the carrying case.

10-2. To determine whether the batteries are good, merely short circuit the test leads for the ohmmeter on each of the various ranges. If top mark can be reached by turning the ohmmeter adjuster, the batteries may be considered sufficiently good for further use.

10-3. To replace the batteries, remove the 4 wood screws in the corners of the panel and carefully lift the instrument out of the carrying case. Remove the clip from the 1.5 volt battery clamp and replace the cell with a new unit. The 4.5 volt cell can be replaced by removing it from its battery clamp disconnecting the leads and replacing with a new unit.

10-4. If the battery connections should happen to be reversed when replacing with new cells, the meter will either indicate down scale or it will not be possible to make top mark on the $R \times 100$ and $R \times 1000$ ranges.

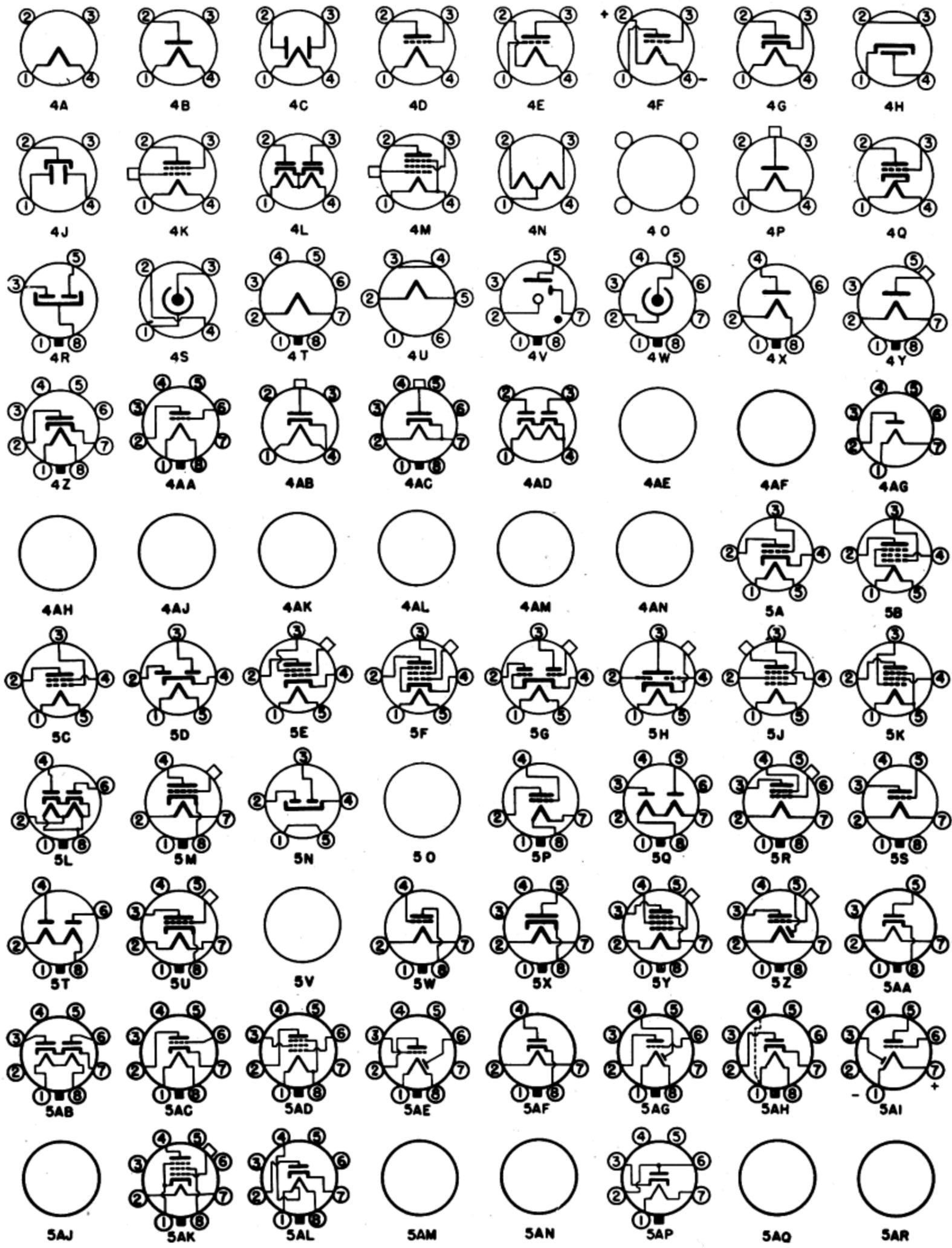
10-5. The batteries listed below may be used to replace those in the device:

1.5 volt cell	4.5 volt cell
Eveready # 950	Bright Star # 03-17
Bright Star # 10 M	Burgess # 5360
Burgess # 2	

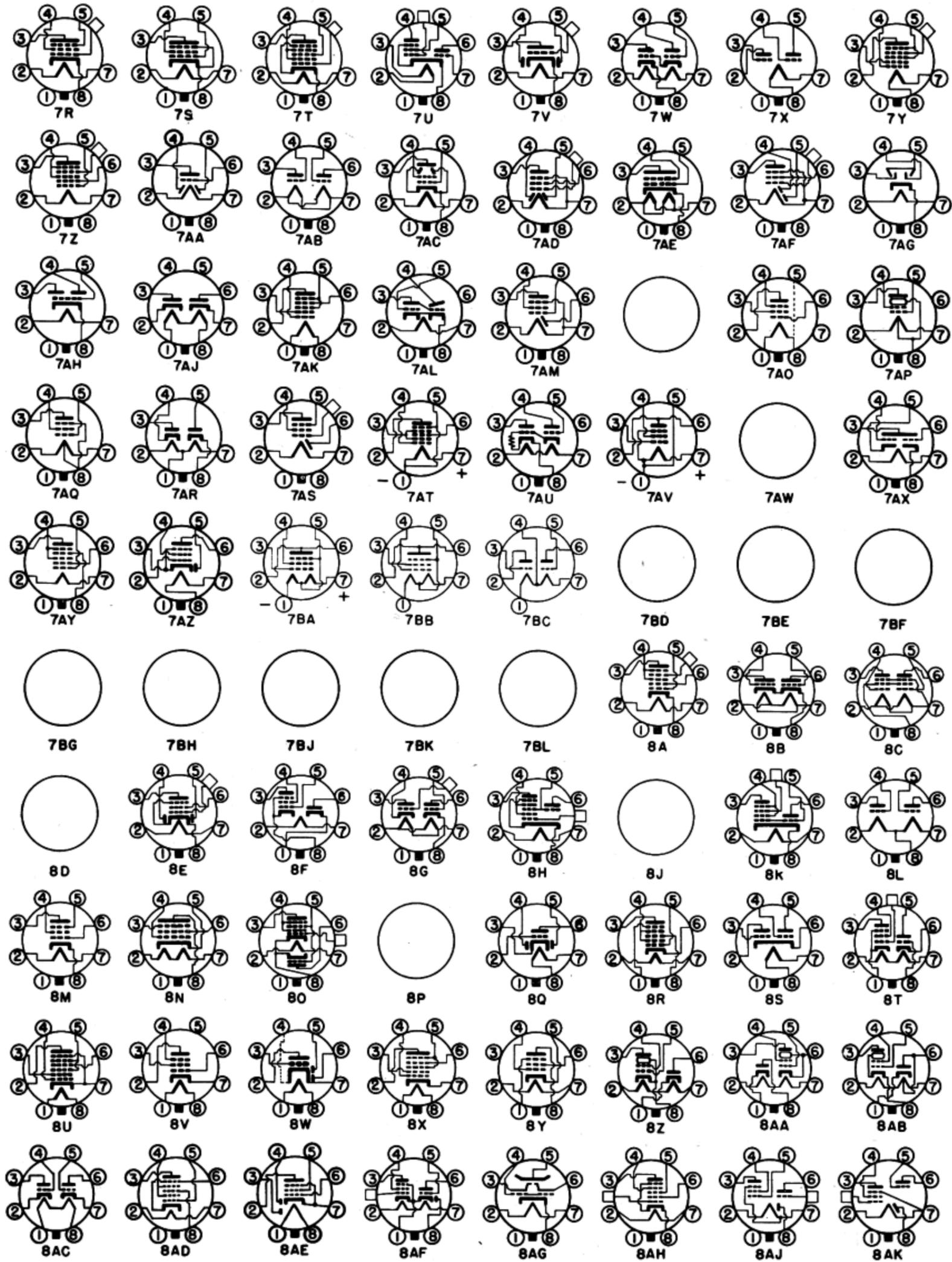
10-6. If, on the tube checker portion, no line check measurement is available when the "CIRCUIT SELECTOR" is indexed to the "LINE SHORT CHECK" position, check the 71A tube to make certain that it is in good condition.

10-7. When replacing the instrument in the carrying case, pull the adapter cable and line cord through the compartment partition and ease the panel into place. Replace the 4 wood screws at the corners of the panel and the instrument will be ready for service again.

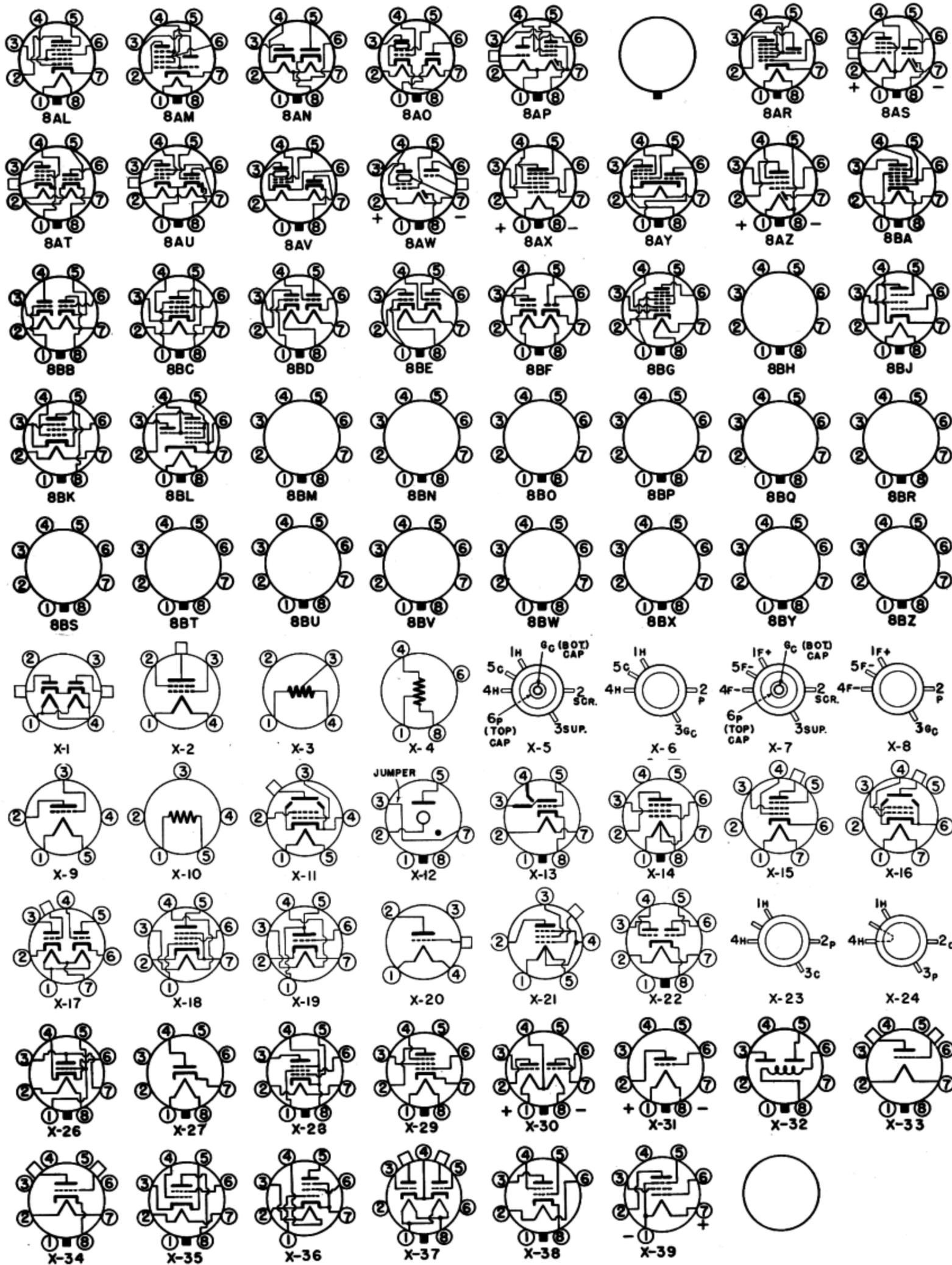
TUBE BASE DIAGRAMS



TUBE BASE DIAGRAMS



TUBE BASE DIAGRAMS



TUBE BASE LIST

Tube Type	Base	Tube Type	Base	Tube Type	Base	Tube Type	Base	Tube Type	Base
00.....	4D	1LH4.....	5AG	6A3.....	4D	6J8-G.....	8H	7B6.....	8W
00A.....	4D	1LN5.....	7AO	6A4/LA.....	5B	6K5-G.....	5U	7B7.....	8V
0A4.....	4V	1N1.....	4T	6A5-G.....	6T	6K6-G.....	7S	7B8.....	8X
0Z3.....	5N	1N5-G.....	5Y	6A6.....	7B	6K7.....	7R	7C5.....	6AA
0Z4.....	4R	1N6-G.....	7AM	6AB5.....	6R	6K8.....	8K	7C6.....	8W
01.....	4D	1P1.....	4T	6AB6.....	7AU	6L5-G.....	6Q	7C7.....	8V
01A.....	4D	1P5-G.....	5Y	6AB7/1853..	8N	6L6.....	7AC	7E6.....	8W
01AA.....	4D	1Q1.....	4T	6AC5-G.....	6Q	6L7.....	7T	7E7.....	8AE
01B.....	4D	1Q5-GT.....	6AF	6AC6-G.....	7W	6N5.....	6R	7F7.....	8AC
1.....	4G	1R1-G.....	4T	6AC7/1852..	8N	6N6-G.....	7AU	7G7.....	8V
1A1.....	4A	1R5.....	7AT	6AD5-G.....	6Q	6N7.....	8B	7H7.....	8V
1A3.....	5AP	1S1-G.....	4T	6AD6-G.....	7AG	6P5-G.....	6Q	7J7.....	8AR
1A4-P.....	4M	1S4.....	7AV	6AD7-G.....	8AY	6P7-G.....	7U	7K7.....	8BF
1A4-T.....	4K	1S5.....	6AU	6AE5-GT....	6Q	6Q6-G.....	6Y	7L7.....	8V
1A5-G.....	6X	1T1-G.....	4T	6AE6-G.....	7AH	6Q7.....	7V	7N7.....	8AC
1A6-GT.....	6L	1T4.....	6AR	6AE7-GT....	7AX	6R6-G.....	6AW	7Q7.....	8AL
1A6S.....	6L	1T5-GT.....	6X	6AF5-G.....	6Q	6R7.....	7V	7R7.....	8AE
1A7-G.....	7Z	1-V.....	4G	6AF6-G.....	7AG	6S6-GT.....	5AK	7S7.....	8BL
1B1.....	4A	1V1.....	4A	6AF7.....	8AG	6S7-G.....	7R	7T7.....	X-29
1B4.....	4K	1Y1.....	4A	6AG5.....	X-36	6SA7.....	8R	7V7.....	8V
1B4-P.....	4M	1Z1.....	4A	6AG7.....	8Y	6SA7-GT....	8AD	7W7.....	8BJ
1B5/25S.....	6M	2.....	4A	6AH5-G.....	6AP	6SC7.....	8S	7Y4.....	5AB
1B7-G.....	7Z	2A3.....	4D	6AL6-G.....	6AM	6SD7-GT....	8N	7Z4.....	5AB
1C1.....	4A	2A3-H.....	4Q	6A7.....	7C	6SE7-GT....	8N	8.....	4A
1C5-G.....	6X	2A4-G.....	5S	6A7-M.....	8A	6SF5.....	6AB	9.....	4A
1C6.....	6L	2A5.....	6B	6A7-S.....	7C	6SF7.....	7AZ	10.....	4D
1C7-G.....	7Z	2A6.....	6G	6A8.....	8A	6SG7.....	8BC	12A.....	4D
1D1.....	4A	2A7.....	7C	6B4-G.....	5S	6SH7.....	8BK	12A5.....	7F
1D5-GP.....	5Y	2B6.....	7J	6B5.....	6AS	6SJ7.....	8N	12A6.....	7AC
1D5-GT.....	5R	2B7.....	7D	6B6-G.....	7V	6SK7.....	8N	12A7.....	7K
1D7-G.....	7Z	2E5.....	6R	6B7.....	7D	6SL7-GT....	8BD	12A8-GT....	8A
1D8-GT.....	8AJ	2G5.....	6R	6B8.....	8E	6SN7-GT....	8BD	12B7.....	8V
1E1.....	4A	2S/4S.....	5D	6C4.....	6BG	6SQ7.....	8Q	12B8-GT....	8T
1E4-G.....	5S	2V3-G.....	4Y	6C5.....	6Q	6SR7.....	8Q	12C8.....	8E
1E5-G.....	5R	2W3.....	4X	6C5-G.....	6Q	6SS7.....	8N	12E5-GT....	6Q
1E5-GP.....	5Y	2X2/879.....	4AB	6C6.....	6F	6ST7.....	8Q	12F5-GT....	5M
1E7-G.....	8C	2Y2.....	4AB	6C7.....	7G	6T5.....	6R	12G7.....	7V
1F1.....	4A	2Y3.....	4C	6C8-G.....	8G	6T7-G.....	7V	12H6.....	7Q
1F4.....	5K	2Y4.....	5D	6D5.....	6Q	6U5/6G5.....	6R	12J5-GT....	6Q
1F5-G.....	6X	2Z2.....	4B	6D6.....	6F	6U6-GT.....	7AC	12J7-GT....	7R
1F6.....	6W	3.....	4A	6D7.....	7H	6U7-G.....	7R	12K7-GT....	7R
1F7-G.....	7AD	3A4.....	7BB	6D8-G.....	8A	6V6.....	7AC	12K8.....	8K
1F7-GH.....	7AD	3A5.....	7BC	6E5.....	6R	6V7-G.....	7V	12Q7-GT....	7V
1F7-GV.....	7AD	3A8-GT.....	8AS	6E6.....	7B	6W5-G.....	6S	12SA7.....	8R
1G1.....	4A	3C5-GT.....	7AQ	6E7.....	7H	6W6-GT.....	7AC	12SA7-GT...8AD	
1G4-G.....	5S	3LE4.....	X-14	6F5.....	5M	6W7-G.....	7R	12SC7.....	8S
1G5-G.....	6X	3LF4.....	6BB	6F5-G.....	5M	6X5.....	6S	12SF5.....	6AB
1G6-G.....	7AB	3Q4.....	7BA	6F6.....	7S	6Y3.....	4AC	12SF7.....	7AZ
1H4-G.....	5S	3Q5-GT.....	7AP	6F7.....	7E	6Y5.....	6J	12SG7.....	8BC
1H5-G.....	5Z	3S4.....	7BA	6F7-S.....	7E	6Y6-G.....	7AC	12SH7.....	8BK
1H6-G.....	7AA	4.....	4A	6F8-G.....	8Q	6Y7-G.....	8B	12SJ7.....	8N
1J1.....	4A	4A6-G.....	8L	6G5.....	6R	6Z3.....	4G	12SK7.....	8N
1J5-G.....	6X	4S.....	5D	6G6-G.....	7S	6Z4.....	5D	12SL7-GT...8BD	
1J6-G.....	7AB	5.....	4A	6G7.....	7N	6Z5.....	6K	12SN7-GT...8BD	
1K1.....	4A	5T4.....	5T	6G7S.....	7N	6Z6.....	7Q	12SQ7.....	8Q
1L1.....	4T	5U4-G.....	5T	6H4-GT.....	5AF	6Z7-G.....	8B	12SR7.....	8Q
1L4.....	X-39	5V4-G.....	5L	6H5.....	6R	6ZY5-G.....	6S	12Z3.....	4Q
1LA4.....	5AD	5W4.....	5T	6H6.....	7Q	7.....	4A	12Z5.....	6K
1LA6.....	7AK	5X3.....	4C	6H7.....	7P	7A4.....	5AC	14.....	5E
1LB4.....	5AD	5X4-G.....	5Q	6H7-S.....	7P	7A5.....	6AA	14A4.....	5AC
1LB6.....	8AX	5Y3-G.....	5T	6H8.....	8E	7A6.....	7AJ	14A5.....	6AA
1LC5.....	7AO	5Y4-G.....	5Q	6J5.....	6Q	7A7-LM.....	8V	14A7.....	8V
1LC6.....	7AX	5Z3.....	4C	6J7.....	7R	7A8.....	8U	14B6.....	8W
1LD5.....	6AX	5Z4.....	5L	6J7-G.....	7R	7B4.....	5AC	14B8.....	8X
1LE3.....	4AA	6.....	4A	6J7-GT.....	7R	7B5.....	6AE	14C5.....	6AA

TUBE BASE LIST

Tube Type	Base	Tube Type	Base	Tube Type	Base	Tube Type	Base	Tube Type	Base
14C7.....	8V	41M.....	7S	84/6Z4.....	5D	879.....	4AB	B.....	4E
14E6.....	8W	42.....	6B	85.....	6G	884.....	6Q	BA.....	4J
14F7.....	8AC	42A2.....	X-4	85AS.....	6G	885.....	5A	BH.....	4J
14H7.....	8V	42B2.....	X-4	85L7.....	8AB	950.....	5K	BR.....	4H
14J7.....	8AR	43.....	6B	85M.....	7V	951.....	4K	BX.....	4D
14N7.....	8AC	43-MG.....	7S	85S.....	6G	954.....	X-5	CK-1005.....	X-32
14Q7.....	8AL	44.....	5F	86M.....	6Q	955.....	X-6	D-1/2.....	4B
14R7.....	8AE	45.....	4D	87S.....	6F	956.....	X-5	D-1.....	4C
14S7.....	8BL	45Z3.....	5AM	88.....	4C	957.....	X-8	DE.....	4D
14W7.....	8BJ	45Z5-GT.....	6AD	88S.....	6F	958.....	X-8	E.....	4D
14Y4.....	5AB	46.....	5C	89.....	6F	959.....	X-7	G.....	4D
14Z3.....	4G	46A1.....	X-10	89RS.....	7N	985.....	5D	GA.....	5B
15.....	5F	46B1.....	X-10	90.....	6N	986.....	4C	G-2.....	5D
17.....	5A	47.....	5B	91.....	6N	1201.....	X-26	G-2S.....	5D
18.....	6B	48.....	6A	92.....	6N	1203.....	X-27	G-4.....	5D
19.....	6C	49.....	5-C	95.....	6B	1204.....	X-28	G-4S.....	5D
20.....	4D	49A2.....	X-4	96.....	4G	1221.....	6F	G-84.....	5D
22.....	4K	49B2.....	X-4	98.....	5D	1223.....	7R	H.....	4D
24A.....	5E	50.....	4D	112A.....	4D	1231.....	8V	HY-114B.....	X-33
24S.....	5E	50A5.....	6AA	117L7-GT.....	8AO	1232.....	8V	HY-615B.....	X-34
25.....	6M	50C6-G.....	7AC	117M7-GT.....	8AO	1284.....	X-29	K-24.....	5E
25A6.....	7S	50L6-GT.....	7AC	117N7-GT.....	8AV	1291.....	X-30	K-27.....	5A
25A7-G.....	8F	50Y6-GT.....	7Q	117P7-GT.....	8AV	1293.....	X-31	KR-1.....	4G
25AC5-GT.....	6Q	50Z6-G.....	7Q	117Z6-GT.....	7Q	1294.....	X-27	KR-2.....	4G
25B5.....	6D	50Z7-G.....	8AN	165R.....	4A	1299.....	6BB	KR-5.....	5B
25B6-G.....	7S	51.....	5E	165R4.....	X-3	1602.....	4D	KR-20.....	6N
25B8-GT.....	8T	52.....	5C	165R8.....	X-3	1603.....	6F	KR-22.....	6N
25C6-G.....	7AC	53.....	7B	181.....	4D	1609.....	5K	KR-25.....	6B
25D8-GT.....	8AF	55.....	6Q	182A.....	4D	1612.....	7T	KR-28.....	5D
25L6.....	7AC	56.....	5A	182B.....	4D	1613.....	7S	KR-31.....	4G
25N6-G.....	7W	56AS.....	5A	183/483.....	4D	1614.....	7AC	KR-98.....	5D
25S.....	6M	56S.....	5A	185R.....	4A	1620.....	7R	KR-7184.....	X-38
25X6-GT.....	7Q	57.....	6F	185R4.....	X-3	1621.....	7S	LA.....	5B
25Y4-GT.....	5AA	57AS.....	6F	185R8.....	X-3	1622.....	7AC	P-861.....	5D
25Y5.....	6E	57S.....	6F	210T.....	4D	1625.....	X-16	PZ.....	5B
25Z3.....	4G	58.....	6F	213.....	4C	1626.....	6Q	PZH.....	5B
25Z4.....	5AA	58AS.....	6F	213B.....	4C	1629.....	X-13	RA-1.....	4Q
25Z5.....	6E	58S.....	6F	216.....	4B	1631.....	7AC	RE-1.....	4C
25Z6.....	7Q	59.....	7A	216B.....	4B	1632.....	7AC	RE-2.....	4B
26.....	4D	59A.....	7A	257.....	5B	1633.....	8BD	RK-19.....	X-1
27.....	5A	59S.....	7A	264.....	4D	1634.....	8S	RK-21.....	4AB
27HM.....	5A	64.....	5E	291.....	5G	1635.....	X-22	RK-22.....	X-1
27S.....	5A	65.....	5E	293.....	5G	1642.....	X-17	RK-24.....	4D
29.....	6N	67.....	5A	295.....	5G	1851.....	7R	RK-33.....	X-17
30.....	4D	68.....	5E	482A.....	4D	1852.....	8N	RK-34.....	X-37
31.....	4D	69.....	5E	482B.....	4D	1853.....	8N	RK-47.....	5J
32.....	4K	70.....	6N	483.....	4D	9001.....	X-18	RK-62.....	4D
32L7-GT.....	8Z	70A7-GT.....	8AB	484.....	5A	9002.....	X-19	SO-1.....	4Q
33.....	5K	70L7-GT.....	8AA	485.....	5A	9003.....	X-18	SO-2.....	4D
34.....	4M	71A.....	4D	486.....	X-9	9004.....	X-23	V-99.....	4E
35.....	5E	75.....	6G	585.....	4D	9005.....	X-24	VR-50.....	4W
35A5-LT.....	6AA	75M.....	7V	586.....	4D	A(5).....	5H	VR-75-30.....	X-12
35L6-GT.....	7AC	75S.....	6G	801.....	4D	A(6).....	6N	VR-90-30.....	4W
35Y4.....	5AL	76.....	5A	803.....	5J	A-22.....	4D	VR-105-30.....	X-12
35Z3-LT.....	4Z	77.....	6F	804.....	5J	A-26.....	4D	VR-150-30.....	X-12
35Z4-GT.....	5AA	77M.....	7R	807.....	X-11	A-28.....	4D	WE-215A.....	4D
35Z5-GT.....	6AD	78.....	6F	837.....	X-15	A-30.....	4Q	WE-231D.....	4D
35Z6-G.....	7Q	78S.....	6F	840.....	5J	A-32.....	4Q	WE-257A.....	X-20
36.....	5E	79.....	6H	841.....	4D	A-40.....	4Q	WE-300A.....	4D
37.....	5A	80.....	4C	842.....	4D	A-48.....	4Q	WE-300B.....	4D
38.....	5F	81.....	4B	843.....	5A	AC-22.....	5E	WE-306A.....	X-21
39/44.....	5F	82.....	4C	864.....	4D	AD.....	4G	WE-307A.....	5J
40.....	4D	82V.....	4L	865.....	X-2	AF.....	4C	WE-350A.....	X-11
40Z5.....	6AD	83.....	4C	874.....	4S	AG.....	4C	WE-713A.....	8BK
41.....	6B	83V.....	4L	878.....	4P	AX.....	4Q	WE-717A.....	X-35
								X-99.....	4D
								XXD.....	8AC
								XXL.....	5AC

Test Data for Signal Corps Tubes on Model 774-4

Tube Type	Fil. Sel.	Tube Sel.	"IN" Pos.	Tube Type	Fil. Sel.	Tube Sel.	"IN" Pos.	Tube Type	Fil. Sel.	Tube Sel.	"IN" Pos.
VT-25	7	38	BC	VT-104*††	8	41	FH	VT-194*	6	44	BCDEF
VT-25-A	7	38	BC	VT-104 Di.††	8	0	C&D	VT-196*	6	43	B&D
VT-27 Bat.	2	19	BC	VT-105*††	6	40	BH&CD	VT-197-A	5	33	C&F
VT-28*	3	40	BCE	VT-107*	6	42	BCD	VT-198-A*	6	42	BCD
VT-29	3	39	BC	VT-107-A*	6	42	BCD	VT-199*	6	42	BCFG
VT-30	5	36	BC	VT-107-B*	6	42	BCD	VT-201*	9	45	BCD
VT-31 Bat.	2	19	BC	VT-112*	6	45	BCFG	VT-201-C*	9	45	BCD
VT-33 Bat.	2	24	BCG	VT-114	5	42	C&F	VT-202*°††	6	43	BDF
VT-35*	3	40	BCE	VT-115*	6	43	BCD	VT-203*††	6	42	BDF
VT-36*	6	40	BCE	VT-115-A*	6	43	BCD	VT-205*††	6	41	FH
VT-37*	6	39	BC	VT-116*	6	42	BCFG	VT-205 Di.††	6	0	C&D
VT-38*	6	39	BCE	VT-116-B*	6	42	BCFG	VT-206-A	5	44	C&F
VT-44 Bat.	2	20	BCE	VT-117*	6	42	BCFG	VT-207*††	8	41	BG&DF
VT-45	3	41	BC	VT-120*	6	42	BCEF	VT-208*	6	42	BCDEF
VT-47	3	41	BCG	VT-121*	6	43	BC	VT-209*	8	45	CFG
VT-48*	6	42	BCF	VT-124 Bat.	1	21	BCD	VT-210 Bat.§	1	26	BCFG
VT-49*	6	41	BCE	VT-125 Bat.	1	26	BCD	VT-211*	6	45	CFG
VT-50	7	37	BC	VT-126*	6	43	B&D	VT-212 Di.**	0	12	BC
VT-51	7	38	BC	VT-126-A*	6	43	B&D	VT-213-A*	6	41	BD
VT-52	7	40	BC	VT-126-B*	6	43	B&D	VT-214 Di.*	8	0	B&D
VT-54 Bat.	2	20	BCE	VT-131*	8	42	BCFG	VT-215*	6	36	BCF
VT-55	7	20	BCE	VT-132*	8	44	BCDEF	VT-221 Bat.†	3	28	ABCD
VT-56*	3	41	BC	VT-132*	8	44	BCDEF	VT-223 Bat.	1	16	BE
VT-57*	3	42	BCEF	VT-133*††	8	41	FH	VT-224*&	6	42	CE&EF
VT-58*	3	42	BCEF	VT-133 Di.††	8	0	C&D	VT-225	5	39	BCEG
VT-63	3	41	BCG	VT-134*	8	42	BCD	VT-227	6	39	BCD
VT-65*	6	41	BD	VT-135*	8	42	BD	VT-229*††	6	41	CD&GH
VT-66*	6	40	BCD	VT-135-A*	8	42	BD	VT-231*††	6	43	CD&GH
VT-67 Bat.	2	19	BC	VT-137*	8	41	BD	VT-233*††	6	41	FH
VT-68*	6	37	BCE	VT-138*	8	37	BCD	VT-233 Di.††	6	0	C&D
VT-68 Di.	6	0	D&F	VT-145	5	39	B&C	VT-234° Bat.	0	19	E
VT-69*	6	41	BCEF	VT-146 Bat.	1	22	BCE	VT-235*°°	6	41	E
VT-70*	6	24	DF	VT-147 Bat.	1	23	BCDEF	VT-237 Di.**	0	3	BC
VT-70*	6	38	BCE	VT-148 Bat.	1	22	BCD	VT-238*	6	43	BCEF
VT-72	7	40	BC	VT-148 Bat.	1	15	EF	VT-239 Bat.	1	24	BF
VT-73*	3	40	BC	VT-148 Di.	1	0	G	VT-243 Di.*	6.3	0	D
VT-74	5	44	C&F	VT-149 Bat.	3	24	ABCE	VT-264 Bat.†	3	28	ABCFG
VT-75*	6	41	BE	VT-149 Bat.†	3	20	ADF	VT-268*††	8	41	BH&CD
VT-75 Di.	6	0	C&F	VT-149 Di.†	3	0	AG				
VT-76*	6	39	BC	VT-150*	6	44	BCDGH				
VT-77*	6	41	BCEF	VT-151*	6	43	BCDEF				
VT-78*	6	41	BCEF	VT-151-B*	6	43	BCDEF				
VT-80	5	36	B&C	VT-152*	6	42	BCD				
VT-83	5	43	B&C	VT-153*	8	38	BEF				
VT-84*	6	42	B&C	VT-153 Di.	8	0	C&D				
VT-86*	6	40	BCDE	VT-161*	8	44	BCDGH				
VT-86-A*	6	40	BCDE	VT-162*	8	42	BCFG				
VT-86-B*	6	40	BCDE	VT-163*	6	41	BE&DF				
VT-87*	6	43	BCDE	VT-164	3	42	BCDG				
VT-87-A*	6	43	BCDE	VT-165	3	42	BCE				
VT-88*	6	41	BE	VT-167	6	44	BCDEF				
VT-88 Di.	6	0	C&D	VT-168-A*	6	45	BCD				
VT-88-A*	6	41	BE	VT-169	8	38	BEF				
VT-88-A Di.	6	0	C&D	VT-170 Bat.	2	20	BCE				
VT-89*	6	40	BCEF	VT-171 Bat.	1	25	BCFG				
VT-90*	6	39	B&D	VT-172 Bat.	1	18	CDF				
VT-91*	6	41	BCDE	VT-172 Di.	1	0	B				
VT-91-A*	6	41	BCDE	VT-173 Bat.	1	25	BFG				
VT-92*	6	42	BE	VT-174 Bat.†	3	28	ABCFG				
VT-92 Di.	6	0	C&D	VT-175*	6	40	BCD				
VT-92-A*	6	42	BE	VT-176*	6	44	BCFG				
VT-92-A Di.	6	0	C&D	VT-177 Bat.	1	18	BF				
VT-93*	6	38	BEF	VT-177 Di.	1	0	D				
VT-93 Di.	6	0	C&D	VT-178 Bat.	1	17	BCDEF				
VT-94*	6	42	BD	VT-179 Bat.	1	24	BCDF				
VT-94-A*	6	42	BD	VT-180 Bat.†	3	32	ABCF				
VT-94-D*	6	42	BD	VT-181*	6	39	C&F				
VT-95	3	43	BC	VT-182 Bat.†	3	30	ABC&AFG				
VT-96*	6	41	BC&DF	VT-183 Di.	1	0	D				
VT-97	5	35	C&F	VT-185 Bat.†	3	32	ABCF				
VT-98*	6	37	BCF	VT-188*	6	42	BC				
VT-99*	6	42	BE&DF	VT-188 Di.	6	0	E&F				
VT-101	8	44	CDEF	VT-189*	6	41	CD&EF				
VT-103*††	6	41	FH	VT-190*	6	45	BCDF				
VT-103 Di.††	6	0	C&D	VT-192*	6	43	BF				
				VT-193*	6	41	BCDF				

° When short checking, B&D toggles should be thrown to the "IN" and "OUT" positions together.

§ When testing for open elements or short checking, F&G toggles should be thrown to the "IN" and "OUT" positions together.

** Reject point is 16 on 50 Line DC. Arc.

† Index switch "A" to "IN" position before inserting tube; keep in this position during complete test. A lighted neon lamp will indicate continuity of third filament connection. No short test; refer to instructions.

* Test for cathode leakage by throwing "A" switch to "IN" position when tube is hot; all other switches should be in the "OUT" position.

†† Test in "A" socket.

¶ Place "Norm." "Rev." toggle in "Rev." position; to short check, index "A" toggle to "IN" position, leaving "G" in the "IN" position.

|| Place "Norm." "Rev." toggle in "Rev." position.

& Move grid lead to the cap that gives the higher reading.

°° Tie both grid leads together.

□ When testing for open elements or short testing, B&H toggles should be thrown to the "IN" and "OUT" positions together. The same holds for C&G toggles. Check for cathode leakage.

Cross Index of VT and Commercial Tube Type Numbers

Signal Corps VT Tube Type	Commercial Tube Type	Signal Corps VT Tube Type	Commercial Tube Type	Signal Corps VT Tube Type	Commercial Tube Type
VT-25	10	VT-94	6J5	VT-172 Bat.	1S5
VT-25-A	10 Special	VT-94-A	6J5-G	VT-173 Bat.	1T4
VT-27 Bat.	30	VT-94-D	6J5-GT	VT-174 Bat.	3S4
VT-28	24A	VT-95	2A3	VT-175	1613
VT-29	27	VT-96	6N7	VT-176	1853
VT-30	01A	VT-97	5W4	VT-177 Bat.	1LH4
VT-31 Bat.	31	VT-98	6U5/6G5	VT-178 Bat.	1LC6
VT-33 Bat.	33	VT-99	6F8-G	VT-179 Bat.	1LN5
VT-35	35/51	VT-101	837	VT-180 Bat.	3LF4
VT-36	36	VT-103	6SQ7	VT-181	7Z4
VT-37	37	VT-104	12SQ7	VT-182 Bat.	1291
VT-38	38	VT-105	6SC7	VT-183 Di.	1294
VT-44 Bat.	32	VT-107	6V6	VT-185 Bat.	1299
VT-45	45	VT-107-A	6V6-GT	VT-188	7E6
VT-47	47	VT-107-B	6V6-G	VT-189	7F7
VT-48	41	VT-112	6AC7/1852	VT-190	7H7
VT-49	39/44	VT-114	5T4	VT-192	7A4
VT-50	50	VT-115	6L6	VT-193	7C7
VT-51	841	VT-115-A	6L6-G	VT-194	7J7
VT-52	45 Special	VT-116	6SJ7	VT-196	6W5-G
VT-54 Bat.	34	VT-116-B	6SJ7 Special	VT-197-A	5Y3-G
VT-55	865	VT-117	6SK7		5Y3-GT
VT-56	56	VT-120	954	VT-198-A	6G6-G
VT-57	57	VT-121	955	VT-199	6SS7
VT-58	58	VT-124 Bat.	1A5-GT	VT-201	25L6
VT-63	46	VT-125 Bat.	1C5-GT	VT-201-C	25L6-GT
VT-65	605	VT-126	6X5	VT-202	9002
VT-66	6F6	VT-126-A	6X5-G	VT-203	9003
VT-67 Bat.	30 Special	VT-126-B	6X5-GT	VT-205	6ST7
VT-68	6B7	VT-131	12SK7	VT-206-A	5V4-G
VT-69	6D6	VT-132	12K8	VT-207	12AH7-GT
VT-70	6F7	VT-133	12SR7	VT-208	7B8-LM
VT-72	842	VT-134	12A6	VT-209	12SG7
VT-73	843	VT-135	12J5-GT	VT-210 Bat.	1S4
VT-74	5Z4	VT-135-A	12J5	VT-211	6SG7
VT-75	75	VT-137	1625	VT-212 Di.	958
VT-76	76	VT-138	1629	VT-213-A	6L5-G
VT-77	77	VT-145	5Z3	VT-214 Di.	12H6
VT-78	78	VT-146 Bat.	1N5-GT	VT-215	6E5
VT-80	80	VT-147 Bat.	1A7-GT	VT-221 Bat.	3Q5-GT
VT-83	83	VT-148 Bat.	1D8-GT	VT-223 Bat.	1H5-GT
VT-84	84	VT-149 Bat.	3A8-GT	VT-224	RK-34
VT-86	6K7	VT-150	6SA7	VT-225	WE307-A
VT-86-A	6K7-G	VT-151	6A8-G	VT-227	KR-7184
VT-86-B	6K7-GT	VT-151-B	6A8-GT	VT-229	6SL7-GT
VT-87	6L7	VT-152	6K6-GT	VT-231	6SN7-GT
VT-87-A	6L7-G	VT-153	12C8 Special	VT-233	6SR7
VT-88	6R7	VT-161	12SA7	VT-234 Bat.	HY-114B
VT-88-A	6R7-G	VT-162	12SJ7	VT-235	HY-615
VT-89	89	VT-163	6C8-G	VT-237 Di.	957
VT-90 Di.	6H6	VT-164	1619	VT-238	956
VT-91	6J7	VT-167	6K8	VT-239 Bat.	1LE3
VT-91-A	6J7-GT	VT-168-A	6Y6-G	VT-243 Di.	1203
VT-92	6Q7	VT-169	12C8	VT-264 Bat.	3Q4
VT-92-A	6Q7-G	VT-170 Bat.	1E5-GP	VT-268	12SC7
VT-93	6B8	VT-171 Bat.	1R5		

Commercial Tube Test Data for Model 774-4

Tube Type	Fil. Sel.	Tube Sel.	"IN" Position	Tube Type	Fil. Sel.	Tube Sel.	"IN" Position	Tube Type	Fil. Sel.	Tube Sel.	"IN" Position
1A3 § Di.	1	0	FG	4A6-G Bat. †	4	24	ABC & ADF	6Q6 *	6	41	BE
1A7-G Bat.	1	23	BCDEF	5T4	5	42	C & F	6Q6 Di.	6	0	D
1C5-GT Bat.	1	26	BCD	5U4-G	5	39	C & F	6Q7 *	6	42	BE
1C7-G Bat.	2	23	BCDEF	5V4-G	5	44	C & F	6Q7 Di.	6	0	C & D
1D7 Bat.	2	18	BCDEF	5W4	5	35	C & F	6R6 *	6	40	BDE
1D8-GT Bat.	1	22	BCD	5X4-G ††	5	39	B & D	6R7 *	6	41	BE
1D8-GT Bat.	1	15	EF	5Y3-G	5	33	C & F	6R7 Di.	6	0	C & D
1D8-GT Di.	1	0	G	5Y4-G ††	5	33	B & D	6S7 *	6	41	BCDE
1E5-GP Bat.	2	20	BCE	5Z3	5	39	B & C	6SA7 *	6	44	BCDGH
1F6-G Bat.	2	19	BCE	5Z4	5	44	C & F	6SA7-G *	6	44	BCDG
1F6-G Di.	2	0	F & G	6A7 *	6	42	BCDEF	6SC7 †† *	6	40	BH & CD
1F7-GV Bat.	2	19	BEF	6A8 *	6	43	BCDEF	6SD7 *	6	44	BCFG
1F7-GV Di.	2	0	C & D	6AB5/6N5 *	6	33	BCF	6SF5 †† *	6	43	BD
1G5 Bat.	2	25	BCD	6AB6-G *	6	37	BCD	6SF7 †† *	6	41	CFH
1G6-G Bat.	1	23	BC & DF	6AB7/1853 *	6	44	BCFG	6SF7 Di. ††	6	0	D
1H5-GT Bat.	1	16	BE	6AC5-G *	6	42	BD	6SG7 *	6	45	CFG
1H5-GT Di.	1	0	D	6AC6 *	6	31	BCD	6SH7 *	6	45	CFG
1L4 Bat.	1	25	BGF	6AD7-G *	6	41	BCD	6SJ7 *	6	42	BCFG
1LA4 Bat.	1	21	BCF	6AD7-G *	6	22	FH	6SK7 *	6	42	BCFG
1LA6 Bat.	1	19	BCDEF	6AE5-GT *	6	42	BD	6SL7 †† *	6	41	CD & GH
1LB4 Bat.	1	22	BCF	6AE6-G *	6	41	BCD	6SN7 †† *	6	43	CD & GH
1LC5 Bat.	1	25	BCDF	6AE7-GT *	6	43	BCD	6SQ7 †† *	6	41	FH
1LC6 Bat.	1	17	BCDEF	6AG5 Bat. * ††	6	33	BDF	6SQ7 Di. ††	6	0	C & D
1LD5 Bat.	1	21	BCF	6AG7 *	6	43	CFGH	6SR7 †† *	6	41	FH
1LD5 Di.	1	0	D	6AL6 *	6	44	CDE	6SR7 Di. ††	6	0	C & D
1LE3 Bat.	1	24	BF	6B7 *	6	37	BCE	6SS7 *	6	42	BCFG
1LH4 Bat.	1	18	BF	6B7 Di.	6	0	D & F	6ST7 †† *	6	41	FH
1LH4 Di.	1	0	D	6B8 *	6	38	BEF	6ST7 Di. ††	6	0	C & D
1LN5 Bat.	1	24	BCDF	6B8 Di.	6	0	C & D	6T5 *	6	36	BCF
1N5-GT Bat.	1	22	BCE	6C4 ††°*	6	42	BDF	6T7-G *	6	40	BE
1N6-G Bat.	1	21	BCD	6C5 *	6	41	BD	6T7-G Di.	6	0	C & D
1N6-G Di.	1	0	F	6C6 *	6	41	BCEF	6U5/6G5 *	6	37	BCF
1P5-GT Bat.	1	22	BCE	6C7 *	6	41	BE	6U6-G *	6	44	BCD
1Q5-GT Bat.	1	28	BCD	6C7 Di.	6	0	D & F	6U7-G *	6	41	BCDE
1R5 Bat.	1	25	BCFG	6C8-G *	6	41	BE & DF	6V6 *	6	42	BCD
1S4 Bat. §	1	26	BCFG	6D6 *	6	41	BCEF	6V7-G..*	6	37	BE
1S5 Bat.	1	18	CDF	6D7 *	6	42	BCDE	6V7-G Di.	6	0	C & D
1S5 Di.	1	0	B	6D8-G *	6	40	BCDEF	6X5 *	6	43	B & D
1SA6-GT Bat.	1	24	BCFG	6E5 *	6	36	BCF	6Y5 *	6	43	B & G
1SB6-GT Bat.	1	21	BCG	6E6 *	6	40	BC & FG	6Y6-G *	6	45	BCD
1T4 Bat.	1	25	BFG	6E7 *	6	42	BCDE	6ZY5 *	6	41	B & D
1T5-GT Bat.	1	22	BCD	6F5 *	6	43	CE	7A4 *	6	43	BF
1-V *	6	43	B	6F6 *	6	40	BCD	7A5 *	6	44	BCF
2A3	3	43	BC	6F8-G *	6	42	BE & DF	7A6 Di. *	6	0	C & F
2A5 *	3	41	BCF	6G6 *	6	42	BCD	7A7 *	6	43	BCDF
2A6 *	3	42	BE	6H4-G Di. *	6	0	C	7A8 *	6	42	BCDEF
2A6 Di.	3	0	C & F	6H6 *	6	39	B & D	7B4 *	6	43	BF
2A7 *	3	41	BCDEF	6J5 *	6	42	BD	7B5 *	6	42	BCF
2B7 *	3	35	BCE	6J7 *	6	41	BCDE	7B6 *	6	42	BC
2B7 Di.	3	0	D & F	6J8-G *	6	44	BCDEF	7B6 Di.	6	0	E & F
3A4 †§ Bat.	3	30	ABCFG	6K5-G *	6	42	BE	7B7 *	6	42	BCDF
3A5 † Bat.	3	29	ABG & ADF	6K6-GT *	6	42	BCD	7B8 *	6	42	BCDEF
3A8-GT Bat. †	3	24	ABCE	6K7 *	6	40	BCDE	7C5 *	6	43	BCF
3A8-GT Bat. †	3	20	ADF	6K8 *	6	41	BCDEF	7C6 *	6	40	BC
3A8-GT Di. †	3	0	AG	6L5-G *	6	41	BD	7C6 Di.	6	0	E & F
3B5-GT Bat. †	3	26	ABCD	6L6 *	6	43	BCD	7C7 *	6	41	BCDF
3C5 Bat. †	3	27	ABCD	6L7 *	6	43	BCDE	7E6 *	6	42	BC
3LE4 Bat. †	3	28	ABCF	6N6-G *	6	40	BCD	7E6 Di.	6	0	E & F
3LF4 † Bat.	3	32	ABCF	6N7 *	6	41	BC & DF	7E7 *	6	40	BEF
3Q4 Bat. †	3	28	ABCFG	6P5-G *	6	39	BD	7E7 Di.	6	0	C & D
3Q5-GT Bat. †	3	28	ABCD	6P7-G *	6	40	CDE	7F7 *	6	41	CD & EF
3S4 Bat. †	3	28	ABCFG					7G7/1232 *	6	45	BCDF
								7H7 *	6	45	BCDF
								7J7 *	6	44	BCDEF
								7L7 *	6	44	BCDF

Commercial Tube Test Data for Model 774-4

Tube Type	Fil. Sel.	Tube Sel.	"IN" Position	Tube Type	Fil. Sel.	Tube Sel.	"IN" Position	Tube Type	Fil. Sel.	Tube Sel.	"IN" Position
7N7 *	6	43	CD & EF	26	1	36	BC	117L7-GT *	14	43	BCD
7Q7 *	6	44	BCDEF	27 *	3	39	BC	117L7-GT *	14	45	F
7V7 *	6	45	BCDF					117N7-GT *	14	44	BCD
7Y4 *	6	42	C & F	35A5 *	10	44	BCF	117N7-GT †	14	45	GI
7Z4 *	6	39	C & F	35L6-GT *	10	44	BCD	117P7-GT *	14	44	BCD
				35Y4 †	10	45	AB	117P7-GT †	14	45	GI
10	7	38	BC	35Z3 *	10	45	B	117Z4-GT *	14	44	D
				35Z4-GT *	10	45	D	117Z6-GT *	14	44	B & D
12A8-GT *	8	42	BCDEF	35Z5-GT †	10	45	AD				
12AH7 **†	8	41	BG & DF	35Z6 *	10	45	B & D	OZ4 Spec.	1	45	B & D
12F5-GT *	8	42	BE					XXD *	8	41	CD & EF
12H6 * Di.	8	0	B & D	35/51 *	3	40	BCE	XXL *	6	43	BF
12J5-GT *	8	42	BD	36 *	6	40	BCE				
12J7-GT *	8	42	BCDE	37 *	6	39	BC				
12K7-GT *	8	41	BCDE	38 *	6	39	BCE				
12K8-GT *	8	44	BCDEF	39/44 *	6	41	BCE				
12Q7-GT *	8	42	BE								
12Q7-GT Di.	8	0	C & D	41 *	6	42	BCF				
12SA7 *	8	44	BCDGH	42 *	6	39	BCF				
12SC7 ††	8	41	BH & CD	43 *	9	43	BCF				
12SF5 ††	8	43	BD								
12SF7 ††	8	41	CFH	45Z3 *§	11	44	FG				
12SF7 Di. ††	8	0	D	45Z5-GT †	11	45	AD				
12SG7 *	8	45	CFG								
12SH7 *	8	45	CFG								
12SJ7 *	8	42	BCFG								
12SK7 *	8	42	BCFG	45	3	41	BC				
12SL7 **†	8	41	CD & GH								
12SN7 **†	8	43	CD & GH	50A5 *	11	45	BCF				
12SQ7 †† *	8	41	FH	50C6 *	11	44	BCD				
12SQ7 Di. ††	8	0	C & D	50L6-GT *	11	45	BCD				
12SR7 †† *	8	41	FH	50Y6-GT *	11	44	B & D				
12SR7 Di. ††	8	0	C & D	50Z6 *	11	44	B & D				
				50Z7 †	11	44	AB & AD				
14A4 *	8	43	BF								
14A5 *	8	42	BCF	50	7	37	BC				
14A7 *	8	42	BCDF	53 *	3	41	BC & FG				
14B6 *	8	42	BC	55 *	3	37	BE				
14B6 Di.	8	0	E & F	55 Di.	3	0	C & F				
14B8 *	8	42	BCDEF	56 *	3	41	BC				
14C5 *	8	43	BCF	57 *	3	42	BCEF				
14C7 *	8	43	BCDF	58 *	3	42	BCEF				
14E6 *	8	42	BC	59 *	3	40	BCDF				
14E6 Di.	8	0	E & F								
14F7 *	8	42	CD & EF	70A7-GT	12	45	BCD				
14H7 *	8	45	BCDF	70A7-GT ‖	12	45	G				
14J7 *	8	44	BCDEF	70L7-GT *	12	45	BCD				
14N7 *	8	43	CD & EF	70L7-GT *	12	44	G				
14Q7 *	8	44	BCDEF								
14S7 *	8	45	BCDEF	75 *	6	41	BE				
14W7 *	8	45	BCEF	75 Di.	6	0	C & F				
14Y4 *	8	42	C & F	76 *	6	39	BC				
14Z3 *	8	43	B	77 *	6	41	BCEF				
				78 *	6	41	BCEF				
24-A *	3	40	BCE	80	5	36	B & C				
				81	7	29	B				
25A6 *	9	42	BCD	82	3	43	B & C				
25A7-G *	9	41	BCD	83	5	43	B & C				
25A7-G *	9	44	F	84/6Z4 *	6	42	B & C				
25AC5 *	9	42	BD	85 *	6	37	BE				
25L6-G *	9	45	BCD	85 Di.	6	0	C & F				
25Z5 *	9	44	B & G								

* When short checking, B&D toggles should be thrown to the "IN" and "OUT" positions together.

§ When testing for open elements or short checking, F&G toggles should be thrown to the "IN" and "OUT" positions together.

** Reject Point is 16 on 50 Line DC Arc.

† Index switch "A" to "IN" position before inserting tube; keep in this position during complete test. A lighted neon lamp will indicate continuity of third filament connection. No short test; refer to instructions.

* Test for cathode leakage by throwing "A" switch to "IN" position when tube is hot; all other switches should be in the "OUT" position.

†† Test in "A" socket.

‡ Place "Norm." "Rev." toggle in "Rev." position; to short check, index "A" toggle to "IN" position, leaving "G" in the "IN" position.

‖ Place "Norm." "Rev." toggle in "Rev." position.

& Move grid lead to the cap that gives the higher reading.

°° Tie both grid leads together.

□ When testing for open elements or short testing, B&H toggles should be thrown to the "IN" and "OUT" positions together. The same holds for C&G toggles. Check for cathode leakage.

Supplementary Commercial Tube Test Data

Model 774-4

Tube Type	Fil. Sel.	Tube Sel.	"IN" Position
71-A	5	40	BC
79 *	6	42	BC & EG
82V	3	43	B & C
83V	5	43	B & C
88M *	6	40	BCDE
89 *	6	40	BCEF
183	5	39	BC
231-D Bat.	3	14	BC
239-A Bat.	1	14	BC
244-A *	2	37	BC
245-A *	2	31	BCE
252-A	5	39	BC
259-A *	2	40	BCE
262-A *	8	35	BE
271-A	5	36	BC
274-A	5	39	B & C
275-A	5	41	BC
283-A *	2	28	BCE
305-E	6	43	BCEF
307-A	5	39	BCEG
328 *	7	39	BCEF
350-A *	6	45	BCE
482-A	5	39	BC
484 *	4	42	BC
485 *	4	42	BC
585	7	38	BC
586	7	38	BC
713-A * Bat.	6	33	CFG
717-A **	6		CFG
802 *	6	41	CDEF
837 *	8	44	CDEF
841	7	38	BC
842	7	40	BC
864 Bat.	0	19	BC
865 *	7	20	BCE
954 *	6	42	BCEF
955 *	6	43	BC
956 *	6	43	BCEF
957 ** Di.	0	3	BC
958 ** Di.	0	12	BC
959 ** Di.	0	8	BCEF
986	5	43	B & C

Tube Type	Fil. Sel.	Tube Sel.	"IN" Position
1201 □††	6	44	BCGH
1203 * Di.	6	0	D
1204 †† Bat.	6	29	BCH
1221 *	6	40	BCEF
1223 *	6	40	BCDE
1231 *	6	46	BCDF
1232/7G7 *	6	46	BCDF
1284 *	8	42	BCDF
1291 † Bat.	3	30	ABC & AFG
1293 Bat.	1	24	BF
1294 Di.	1	0	D
1299 † Bat.	3	32	ABCF
1603 *	6	40	BCEF
1610	3	40	BCG
1612 *	6	43	BCDE
1619	3	42	BCDG
1620	6	42	BCDE
1621 *	6	41	BCD
1622 *	6	42	BCDE
1624	3	42	BCE
1626 *	8	41	BD
1629 *	8	37	BCD
1851 *	6	44	BCDE
1852/6AC7 *	6	45	BCFG
1853/6AB7 *	6	44	BCFG
9001 *††	6	42	BDF
9002 * *††	6	43	BDF
9003 *††	6	42	BDF
9004 * Di.	6	0	B
9005 Di.	4	0	C
HY-114-B°° Bat.	0	19	E
HY-615 *°°	6	41	E
KR-1 *	6	43	B
KR-2 *	5	44	B
KR-5	6	39	BCG
KR-25 *	3	40	BCF
KR98			
01A	5	36	BC
0A4G Spec.	1	40	DEF
R-30	3	39	BC
R-100	5	30	B
R-200	5	33	B

Tube Type	Fil. Sel.	Tube Sel.	"IN" Position
RK-19	7	44	E
RK-24 Bat.	2	19	BC
RK-33 *	6	42	CE & DF
RK34 * &	6	42	CE & EF

° When short checking, B&D toggles should be thrown to the "IN" and "OUT" positions together.

§ When testing for open elements or short checking, F&G toggles should be thrown to the "IN" and "OUT" positions together.

** Reject Point is 16 on 50 Line DC. Arc.

† Index switch "A" to "IN" position before inserting tube; keep in this position during complete test. A lighted neon lamp will indicate continuity of third filament connection. No short test; refer to instructions.

* Test for cathode leakage by throwing "A" switch to "IN" position when tube is hot; all other switches should be in the "OUT" position.

†† Test in "A" socket.

‡ Place "Norm." "Rev." toggle in "Rev." position to short check, index "A" toggle to "IN" position, leaving "G" in the "IN" position.

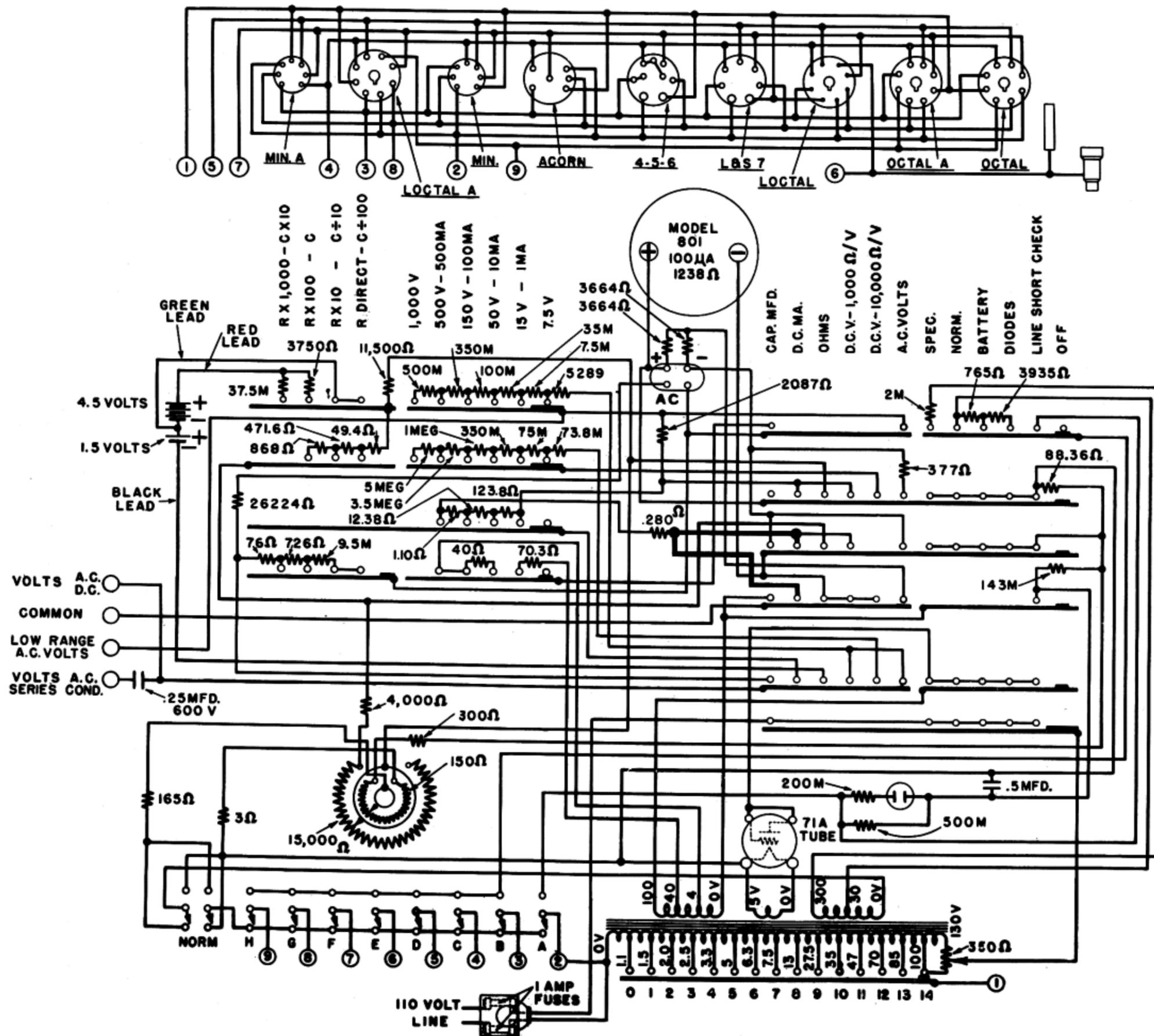
|| Place "Norm." "Rev." toggle in "Rev." position.

& Move grid lead to the cap that gives the higher reading.

°° Tie both grid leads together.

□ When testing for open elements or short testing, B&H toggles should be thrown to the "IN" and "OUT" positions together. The same holds for C&G toggles. Check for cathode leakage.

Wiring Diagram - Model 774, Type 4



DECIBEL READINGS

Power Level DB	Volts—Based on 6 M.W. at 0 DB In		Power Ratio to 0 DB	Power 6 MW at 0 DB Watts	Voltage Ratio to 0 DB
	500 ohms	600 ohms			
-10	0.5477	.6000	0.1000	0.0006000	0.31623
- 9	0.6145	.6732	0.1259	0.0007553	0.35481
- 8	0.6895	.7554	0.1585	0.0009509	0.39811
- 7	0.7737	.8475	0.1995	0.0011972	0.44668
- 6	0.8681	.9509	0.2512	0.0015071	0.50119
- 5	0.9740	1.0670	0.3162	0.0018975	0.56234
- 4	1.0928	1.1972	0.3981	0.0023886	0.63096
- 3	1.2262	1.3433	0.5012	0.0030071	0.70795
- 2	1.3758	1.5071	0.6310	0.0037857	0.79433
- 1	1.5437	1.6910	0.7943	0.0047660	0.89125
0	1.7321	1.8974	1.0000	0.0060000	1.00000
+ 1	1.9434	2.1289	1.2589	0.0075535	1.1220
+ 2	2.1805	2.3886	1.5849	0.0095093	1.2589
+ 3	2.4466	2.6801	1.9953	0.0119716	1.4125
+ 4	2.7451	3.0071	2.5110	0.0150713	1.5849
+ 5	3.0801	3.3741	3.1623	0.0189747	1.7783
+ 6	3.4559	3.7867	3.9811	0.0238865	1.9953
+ 7	3.8776	4.2477	5.0119	0.030071	2.2387
+ 8	4.3507	4.7660	6.3096	0.037857	2.5119
+ 9	4.8816	5.3475	7.9433	0.047660	2.8184
10	5.4772	6.0000	10.0000	0.060000	3.1623
11	6.1455	6.7321	12.589	0.075535	3.5481
12	6.8954	7.5536	15.849	0.095093	3.9811
13	7.7368	8.4752	19.953	0.119716	4.4668
14	8.6808	9.5094	25.119	0.150713	5.0119
15	9.7400	10.670	31.623	0.189747	5.6234
16	10.9285	11.972	39.811	0.238865	6.3096
17	12.2620	13.433	50.119	0.30071	7.0795
18	13.7582	15.071	63.096	0.37857	7.9433
19	15.4369	16.910	79.433	0.47660	8.9125
20	17.3205	18.974	100.000	0.60000	10.0000
21	19.434	21.289	125.89	0.75535	11.220
22	21.805	23.886	158.49	0.95093	12.589
23	24.466	26.801	199.53	1.19716	14.125
24	27.451	30.071	251.19	1.50713	15.849
25	30.801	33.741	316.23	1.89747	17.783
26	34.559	37.867	398.11	2.38865	19.953
27	38.776	42.477	501.19	3.0071	22.387
28	43.507	47.660	630.96	3.7857	25.119
29	48.816	53.475	794.33	4.7660	28.184
30	54.772	60.000	1000.00	6.0000	31.623
31	61.455	67.321	1258.9	7.5535	35.481
32	68.954	75.536	1584.9	9.5093	39.811
33	77.368	84.752	1995.3	11.9716	44.668
34	86.808	95.094	2511.9	15.0713	50.119
35	97.400	106.70	3162.3	18.9747	56.234
36	109.285	119.72	3981.1	23.8865	63.096
37	122.620	134.33	5011.9	30.071	70.795
38	137.582	150.71	6309.6	37.857	79.433
39	154.369	169.10	7943.3	47.660	89.125
40	173.205	189.74	10000.0	60.000	100.000
41	194.34	212.89	12589.2	75.535	112.20
42	218.05	238.86	15848.9	95.093	125.89
43	244.66	268.01	19952.6	119.716	141.25
44	274.51	300.71	25118.9	150.713	158.49
45	308.01	337.41	31622.8	189.747	177.83
46	345.59	378.67	39810.7	238.865	199.53
47	387.76	424.77	50118.7	300.71	223.87
48	435.07	476.60	63095.7	378.57	251.19
49	488.16	534.75	79432.7	476.60	281.84
50	547.72	600.00	100000.0	600.00	316.25

ADDITIONAL TUBE DATA FOR THE FOLLOWING MODELS

Model 773 - - Second Conversion
 Model 774 Type 1 First Conversion
 Model 774 Types 4 & 5
 Model 777 Types 1, 2, 3, 4, 5, & 6 First Conversion
 Model 777 Types 7, 7A, 8, & 9

Tube Type	Fil. Sel.	Tube Sel.	"IN" Pos.	Tube Type	Fil. Sel.	Tube Sel.	"IN" Pos.
2E22	6	44	BCEG	6S8-GT Di*††	6	0	B&C&G
6AG7 *	6	46	CFGH	6X4 *††	6	41	B&F
6AJ5 *††	6	45	BDF	7W7 *	6	45	BCEF
6AK6 *††	6	42	BDFG	12AT6 *††	8	43	BC
6AQ5 *††△	6	46	BCDF	12AT6 Di*††	8	0	D&F
6AQ6 *††	6	42	BC	12BA6 *††	8	45	BDFG
6AQ6 Di*††	6	0	D&F	12BE6 *††	8	45	BCDF
6AS6 *††	6	45	BCDF	12BF6 *††	8	41	BC
6AT6 *††	6	43	BC	12BF6 Di*††	8	0	D&F
6AT6 Di*††	6	0	D&F	14AF7/XXD *	8	41	CD&EF
6AU6 *††	6	45	BDFG	26A6 *††	9	46	BDFG
6BA6 *††	6	45	BDFG	26C6 *††	9	40	BC
6BE6 *††	6	45	BCDF	26C6 Di*††	9	0	D&F
6BF6 *††	6	41	BC	26D6 *††	9	45	BCDF
6BF6 Di*††	6	0	D&F	35W4 †††	10	46	AD
6J4 *††▽	6	46	BCDF	50B5 *††△	11	45	BCDF
6S8-GT *††	6	42	EF	117Z3 *††◊	14	45	BD

NOTES: All symbols following tube type numbers refer to notes on regular tube data card. Symbols listed below are new and do not appear on regular data card.

▽ When testing for open elements or short checking, toggles B, D & F should be thrown to the "IN" or "OUT" positions together.

△ The same holds for toggles B & C. See note above.