

TUBE TESTER MODEL 580A

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10514 DUPONT AVENUE CLEVELAND 44108, OHIO

PHONE — 541-8060
TWX — CV 662

CABLE — HICKOK, CLEVELAND
WESTERN UNION — KJ

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SECTION 1

GENERAL INFORMATION

1-1. INTRODUCTION.

The Hickok Model 580A Tube Tester combined the characteristics desired for exacting laboratory tube testing as well as the portability and simplicity required by the technician for the maintenance of modern electronic equipment. The design specifications include all accepted standard tests and in addition have the facility to test tubes with individually variable potentials as required to comply with tube manufacturers' tube manuals. Filament, plate, and screen voltages can be preset to provide the voltages specified by the Tube Manuals. Three separate power supply transformers with solid state rectifiers supply stable, long-lasting, trouble-free operation (no vacuum tubes are used in the Model 580A Tube Tester). Filament voltages are variable from 0.6 to 117 v. a. c. in 19 steps. Plate voltages and screen voltages are each separately variable in 11 steps. These variable voltage values provide the combinations most specified in manufacturers' tube manuals.

The d.c. bias voltage is continuously variable from 0 to 50 volts and can be set by means of a calibrated dial or it can be read on the meter mounted on the panel. For accuracy in setting the bias voltage a two position switch is provided which permits readings of 0 to 5 or 0 to 50 volts full scale. A cathode resistor may be inserted into the SELF-BIAS jack on the front panel by means of a phone plug for making self-bias tests. This jack is internally shunted by a 1000 mfd capacitor making an external cathode bypass capacitor unnecessary.

A potentiometer concentrically mounted on the FILAMENT VOLTS switch provides a means of electrically centering the tube filament to prevent 60 cps modulation of the grid-filament circuit during Gm testing.

Dual diodes and triodes with electrically identical sections can be tested with one setting of the selector switches. Each section of the tube can be tested independently for interelement leakage, gas, and mutual conductance by transferring the tube test conditions (the selector switch settings) from one section of the tube under test to the other section by pressing one push button switch.

The Model 580A provides a gas test circuit that permits detection of as little as 50 millimicroamperes of grid current in the tube under test.

Plate, grid, and cathode jacks are provided on the front panel for easy connection to plate, grid, and cathode tube caps.

Life-test of a tube is provided for by means of a push button switch that reduces heater voltage. This permits evaluation of the cathode reserve and an approximation of the life expectancy of a tube.

A unique safety-interlock of the selector switches prevents possible damage to the tube under test or to the Tube Tester due to improper selector switch settings.

1-2. CHANGES.

At the time of publication of this manual no modification had been made to the equipment. A supplement or change sheet may be included with this manual to reflect any changes required to make this manual apply to the instrument with which it is shipped.

1-3. QUICK REFERENCE DATA.

a. POWER REQUIREMENTS - 105 to 125 volts, 50 to 60 cycles, 60 watts.

b. TUBE SOCKET COMPLEMENT -

- (1) 9 pin Novar
- (2) 12 pin Compactron
- (3) 9 and 10 pin Miniature
- (4) 7 pin Miniature
- (5) 8 pin Octal
- (6) 5 pin Nuovistor
- (7) 7 pin Nuovistor
- (8) 8 pin Octal
- (9) 8 pin Subminiature, Round
- (10) 7 pin Subminiature, In-line
- (11) 5-7 pin Acorn
- (12) 7 pin Combination
- (13) 4-5-6 pin Combination

c. Gm RANGE - 60,000 - 30,000 - 10,000 - 3,000 μ mhos. In addition, three rectifier diode ranges and one voltage regulator range are provided.

d. INTER-ELEMENT LEAKAGE - Indicated directly on meter; sensitivity to 50 megohms.

e. TEST VOLTAGES -

(1) FILAMENT: 0-117 volts a. c. variable in 19 steps: .6 - 1.1 - 1.4 - 2.0 - 2.5 - 3.0 - 4.3 - 5.0 - 6.3 - 7.5 - 10.0 - 12.6 - 17 - 20 - 25 - 35 - 50 - 75 - 117.

(2) SIGNAL: 0.28 volts RMS.

(3) PLATE AND SCREEN voltages d. c. , individually variable in 12 steps: 6.3 - 12.6 - 22.5 - 45 - 80 - 100 - 120 - 150 - 180 - 200 - 250 - and 300 v.d.c.

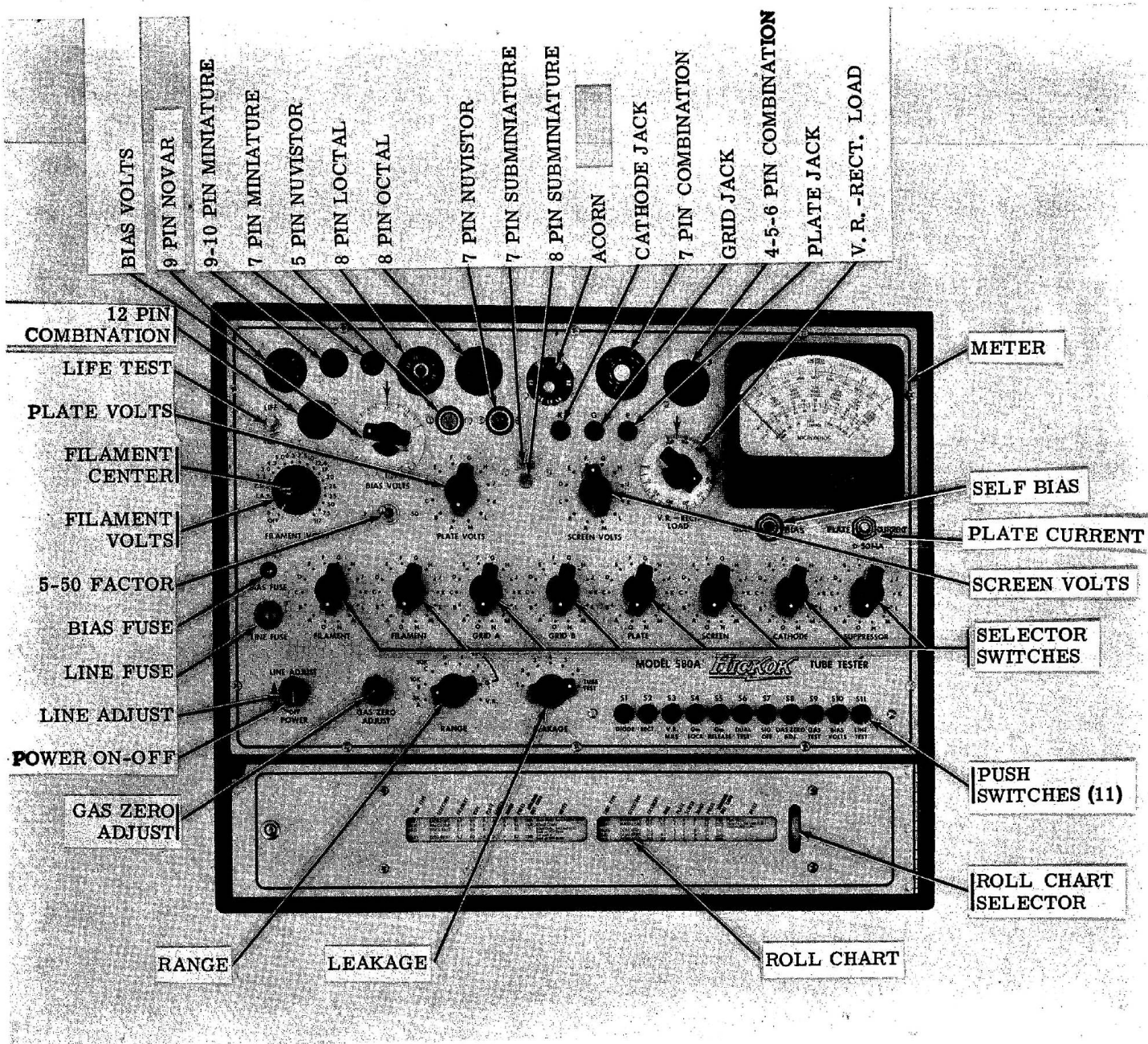
(4) FIXED BIAS: 0 to 50 v. d. c. , continuously variable.

(5) SELF BIAS: Applied to the tube by inserting desired resistance into a phone jack mounted on front panel.

f. CASE - Wood, black leatherette covered.

g. SIZE - 19 inches wide, 15-1/2 inches deep, and 7 inches high. Includes compartment for illuminated roll chart - 3 inches wide, 18 inches long, and 4-1/2 inches deep.

h. weight - 30 pounds.



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Figure 2-1. Front Panel Controls and Connectors

SECTION 2

OPERATION - GENERAL

2-1. POWER REQUIREMENTS.

The Model 580A is designed to operate on 105 to 125 volts, 50 to 60 cycles, 60 watts.

2-2. INSPECTION AND ADJUSTMENT.

Before placing the Model 580A into operation, visually inspect it for any physical damage such as broken or loose knobs, cracked meter glass, etc. All damage claims must be made to the carrier within 48 hours of receipt of the equipment. A damage report sheet is included with this shipment, giving detailed instructions for filing a damage report.

All calibration controls have been preset at the factory, therefore no adjustment of the Model 580A is necessary prior to operation.

2-3. FRONT PANEL CONTROLS AND CONNECTORS

The front panel controls, connectors, and their function or purpose are as follows (See Figure 2-1):

a. **TUBE SOCKETS** - Fifteen types and kinds of tube bases can be accommodated in the front panel sockets. This selection avoids the necessity of using socket adapters.

b. **K, G, and P panel jacks** accommodate leads for tube top caps, where required: (K) cathode, (G) grid, and (P) plate, respectively.

c. **PLATE VOLTS and SCREEN VOLTS** - Twelve position rotary switches provide independently selectable voltages in successive steps.

SWITCH POSITIONS	SCREEN & PLATE VOLTS
A	6.3
B	12.6
C	22.5
D	45.0
E	80.0
F	100.0
G	120.0
H	150.0
J	180.0
K	200.0
L	250.0
M	300.0

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Table 2-1. Screen and Plate Volts Available at Specific Switch Positions

SELECTOR SWITCH SETTING	TUBE PIN NUMBERS
A	1
B	2
C	3
D	4
E	5
F	6
G	7
H	8
J	9
K	10
L	11
M	12
N	NUVISTOR SHELL
O	OPEN

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Table 2-2. Selector Switch Settings and Corresponding Tube Pin Numbers.

d. **V.R. - RECT.LOAD** - Provides variable voltage to regulator tubes during VR tests and a variable load for testing rectifier tubes. Operates in conjunction with the RANGE switch and data on the roll chart.

e. **MICROMHOS meter** - Provides a quantitative indication of test results on eight separate scales: indicating transconductance in micromhos, leakage in ohms, grid bias in volts, VR tube plate potential in volts, VR tube current in milliamperes, and in addition indicates correct setting of the LINE ADJUST control.

f. **SELF BIAS jack** - Provides a means of inserting a self-bias resistor in the cathode circuit of the tube under test, as recommended by the roll chart or tube data handbook. The SELF BIAS jack is of the normally shorted type, unshorting only when the phone plug is inserted.

g. **Selector Switches** - FILAMENT (2), GRID A, GRID B, PLATE, SCREEN, CATHODE, and SUPPRESSOR selectors provide proper switching of internal circuits to apply the correct test potentials to the various pins of the tube under test. Switch positions are alphabetically identified on the panel in order to simplify tube data on the roll chart; A is pin 1, B is pin 2, C is pin 3, etc., except "I" is not represented. See Table 2-2. The pin number equivalent of the alphabetical switch positions are in accordance with the EIA system of pin designations. These selector switches are wired in such a manner that they are electrically interlocked to prevent the application of two different test potentials to the same tube pin. This not only prevents damage to the tube under test, but also prevents damage to the tube tester.

h. **Test Switches** - (S1 through S11) - Actuate the proper test circuits as indicated on the roll chart or in this instruction manual.

i. **LEAKAGE switch** - seven position rotary switch - provides circuitry for detecting inter-element leakage or shorts in the tube under test.

j. **RANGE** - Eight position rotary switch - the switch position determines the proper scale to read on the MICROMHOS meter for specific tests. Positions A, B, C, and D are read on the 3000, 10000, 30000, and 60000 scale (full scale deflection), respectively. Positions E, F, G, and VR are read on scales as shown on the roll chart. The top scale of the MICROMHOS meter marked "BIAS VOLTS" and "LINE TEST" is used in connection with the test switches S10, S11, and LINE ADJUST control.

k. **GAS ZERO ADJUST** - Continuous rotary adjustment - permits a meter zero adjustment before making gas tests.

m. **LINE ADJUST - POWER ON-OFF control** - Permits turning the power to the tube tester "on" or "off", as well as adjusting the input voltage to the proper value as indicated on the MICROMHOS meter at the line marked "LINE ADJUST".

n. **LINE FUSE lamp** - Serves both as a protective device and an overload indicator. This lamp (#81) will light brightly when an overload is placed on the tester or the tube under test.

p. **BIAS FUSE lamp** - This lamp (#49) serves as a protection to the BIAS VOLTS control when testing a tube that may be shorted.

q. **5 - 50 switch** - Two-way toggle switch - Provides multiplier or divider for use in connection with the BIAS VOLTS control.

r. **FILAMENT VOLTS** - A twenty position rotary switch which provides filament voltages in 19 steps from .6 to 117 volts and an OFF position. Also used in connection with filament continuity test.

s. **Filament Center** - Red knob concentrically mounted on the FILAMENT VOLTS switch - Continuously variable resistance which permits electrically centering filamentary type tubes under test.

t. **PLATE VOLTS** - A twelve position rotary switch which provides twelve selected plate voltages. See Table 2-1.

u. **BIAS VOLTS** - A continuously variable control which provides 0 to 5 and 0 to 50 volts for bias adjustment.

v. **LIFE TEST** - A push switch which provides a means of estimating life expectancy of a tube. When this switch is pressed, it reduces filament voltage of the tube under test by 10%, thus making it possible to determine the cathode efficiency and life expectancy of the tube.

2-4. PLATE CURRENT.

A push switch just below the meter is provided for reading plate current of amplifier tubes.

While S4 is held or locked down, press the "PLATE CURRENT" switch and read 0 - 50 milliamperes of plate current on the top scale of the meter.

2-5. GENERAL.

Model 580A Tube Tester is designed to test vacuum tubes in either one of two methods; by a set-up made with information found on the roll chart, or by information found in standard tube manuals. The roll chart method, setting switches by A, B, C, etc., offers simplicity and quick convenience for testing all the common types of tubes. Since the roll chart cannot be brought up-to-date more often than every six months, the tube manual method (transposing the A, B, C's of the switch settings into tube pin numbers 1, 2, 3, etc., see table 2-2) satisfies all requirements for new or experimental type tubes.

2-6. OPERATING PROCEDURES.

To place the Model 580A into operation for either method, proceed with the preliminary set-up in the following manner:

a. By means of the push-push latch to the left of the roll chart, open the lead compartment. Connect the line cord to a source of 105 to 125 volts, 50 to 60 cycle power.

CAUTION

Do not insert tube to be tested into test socket until correct settings of all controls have been made in accordance with the following steps.

SECTION 3

OPERATION - ROLL CHART METHOD

3-1. ROLL CHART METHOD.

As a preliminary to further and more complete testing, a filament continuity check is desirable. To do this proceed as follows:

a. By means of the nylon gear, turn the roll chart until the type number of the tube to be tested appears in the roll chart window. An illuminated window slot aids in the selection of the correct data line.

b. Set the FILAMENT selectors according to the data on the roll chart.

c. Set the FILAMENT VOLTS switch to the OFF position. All other controls and switches may be in any position except as follows.

d. Insert the tube to be tested into the proper test socket, and if applicable make top cap connection as called for on the roll chart under heading "NOTES".

e. Set the POWER ON-OFF control to the ON position.

f. Depress LINE TEST (S11) push switch and hold down while rotating the LINE ADJUST control until meter pointer is directly over LINE TEST mark on the MICROMHOS meter. Release the LINE TEST (S11) push switch.

g. Rotate the LEAKAGE switch to position 6. If there is no reading on the MICROMHOS meter, the tube filament is open. Discard the tube without further testing. If there is a reading, further testing may proceed.

h. Set the balance (six) of the SELECTOR switches in accordance with the two groups of four letters shown in the column on the roll chart headed "SELECTORS". The SELECTOR switches are electrically interlocked in such a way that it is impossible to connect two different voltages to the same tube pin at the same time. Accidental shorts are thus avoided.

i. Set the FILAMENT VOLTS switch as indicated on the roll chart under heading "FILAMENT".

j. Set the BIAS VOLTS control as indicated on the roll chart under heading BIAS.

NOTE

To obtain bias voltages under 5 volts, set the 5-50 switch (5-50 FACTOR, Figure 2-5) on the 5 position and read the BIAS VOLTS scale on the MICROMHOS meter as 0-5 volts. To obtain bias voltages over 5 volts, set the 5-50 switch (5-50 FACTOR, Figure 2-5) on the 50 position and read the BIAS VOLTS scale on the MICROMHOS meter as 0-50 volts.

k. Set the PLATE VOLTS switch as indicated on the roll chart under heading PLATE.

m. Set the SCREEN VOLTS switch as indicated on the roll chart under heading SCREEN.

n. Set the RANGE switch according to the alphabetical setting indicated on the roll chart under heading RANGE.

p. Set the LEAKAGE switch on the first (1) position.

3-2. LEAKAGE TEST.

All tube tests should begin with an inter-element leakage or shorts test. With the tester set-up as indicated above, proceed as follows:

a. Rotate the LEAKAGE switch from position 1, successively through position 6, while lightly tapping the tube at each step and watching the MICROMHOS meter for pointer deflection. Each of the switch positions in combination with one or more other positions indicate a specific leakage path as shown in the table 3-1, Inter-element Leakage Test Chart.

LEAKAGE PATH	LEAKAGE SWITCH POSITIONS					
	1	2	3	4	5	6
HEATER-CATHODE	X	X				
HEATER-GRID A			X	X	X	
HEATER-GRID B			X	X	X	X
HEATER-SCREEN			X			
HEATER-SUPPR.		X				
HEATER-PLATE			X	X		
CATH.-GRID A	X	X	X	X	X	
CATH.-GRID B	X	X	X	X	X	X
CATH.-SCREEN	X	X	X			
CATH.-SUPPR.	X					
CATH.-PLATE	X	X	X	X		
GRID A-GRID B						X
GRID A-SCREEN				X	X	
GRID A-SUPPR.		X	X	X	X	
GRID A-PLATE					X	
GRID B-SCREEN				X	X	X
GRID B-SUPPR.		X	X	X	X	X
GRID B-PLATE					X	X
SCREEN-SUPPR.		X	X			
SCREEN-PLATE				X		
SUPPR.-PLATE		X	X	X		

Table 3-1. Inter-element Leakage Test Chart

Tubes having inter-element leakage paths or shorts will cause the meter pointer to move up scale in various positions of the LEAKAGE switch. A momentary deflection of the meter pointer when the LEAKAGE switch is turned from one position to another may be disregarded as it is caused by the charging of a capacitor in the leakage test circuit. Intermittent meter pointer deflections as a result of tapping the tube indicates loose elements in the tube which might cause noisy or erratic tube operation.

The bottom of the scale of the meter is the LEAKAGE scale. It is calibrated in ohms such that leakage path resistance to 50 megohms can be read directly from the scale. A leakage resistance of less than 50 megohms will cause the meter pointer to begin to indicate. A complete inter-element short will cause the meter pointer to deflect full scale to give a zero ohms reading.

b. A shorted tube or one with excessive inter-element leakage should be discarded with no further testing.

c. Multisection tubes containing dissimilar sections, such as the 6CG8, should be tested for leakage and shorts in both sections.

d. Multisection tubes containing electrically identical sections, such as the 6J6, can make use of the dual test circuit. As an example: For dual triodes make the normal leakage test as described above, then depress and hold down DUAL TEST (S6) push switch while repeating the leakage test for the second section.

e. The circuit used in testing dual triodes is arranged so that the SCREEN selector switch is used as the plate of the second section, and the SUPPRESSOR selector switch is used as the cathode of the second section of the tube under test. Thus, plate to plate, and cathode to cathode leakage or shorts will be identified on the Leakage Test Chart as plate to screen, and cathode to suppressor leakage or shorts.

f. Some tubes will show a shorted condition on certain positions of the LEAKAGE switch even though they are good tubes. These positions are noted in the NOTATIONS column of the roll chart. That is, "Short on 1 and 2" means that a short indication on positions 1 and 2 is normal.

3-3. MUTUAL CONDUCTANCE (Gm) TEST.

This is the basic quality test for tubes used as amplifiers. After the controls are properly set in accordance with the roll chart data and the tube has been tested for leakage or shorts, proceed as follows:

a. Set the LEAKAGE switch to the TUBE TEST position.

b. Recheck the line voltage by means of the MICROMHOS meter and the LINE ADJUST control, and the LINE TEST (S11) push switch. Reset, if necessary.

c. Depress the Gm LOCK (S4) push switch and observe the MICROMHOS meter reading on the particular scale as determined by the RANGE switch.

d. Compare the numerical meter reading with the minimum acceptable value as listed on the roll chart under column headed MINIMUM MUT COND.

e. Release the Gm LOCK (S4) push switch by depressing Gm RELEASE (S5) push switch.

f. In testing filamentary amplifiers, the meter deflection is proportional to the signal in the grid-filament circuit. Since the signal is of power line frequency, and the filament is heated by a.c. it is possible to pick up an additional unwanted signal from the filament. To cancel any such signal, push switch S7 SIG OFF with the Gm switch S4 locked and adjust the red filament centering knob until the meter reads zero. Release the signal switch S7 and read the mutual conductance on the meter.

g. NOTE: On some special types of amplifier tubes the push switch to be used may vary with the particular type of tube under test. Always refer to the roll chart for the correct push switch to use.

3-4. GAS TEST.

In the measurement of grid current due to gas under Class A operation of a tube, the same selector set up as for mutual conductance (Gm) is used. To test for gas (grid current) following the Gm test, proceed as follows:

a. Depress the Gm LOCK (S4) push switch.

b. Recheck the line voltage by means of the MICROMHOS meter and the LINE ADJUST control, and the LINE TEST (S11) push switch. Reset, if necessary.

c. Depress GAS ZERO ADJ (S8) push switch simultaneously with Gm LOCK (S4) push switch, in case (S4) has been released. By means of the GAS ZERO ADJUST control, reset MICROMHOS meter pointer to zero on the upper (0 to 5.0) scale.

d. Depress GAS TEST (S9) push switch and observe the up-scale reading of the meter pointer on the upper (0 to 5.0) scale. This indicates the grid current flow in microamps.

NOTE: Some tubes may tend to provide increasing amounts of grid current as they continue to be heated. Therefore, repeat the gas zero adjust step (sub-paragraph "c", above) prior to taking each successive reading of grid current flow with the S9 push switch.

If there is any grid current flowing due to gas in the tube under test, the meter will deflect up-scale. If the meter deflects down-scale, most likely the tube

under test has a bias of less than 1 volt from the fixed bias supply or from the developed self-bias across the external SELF-BIAS resistor. Grid current deflection

down-scale on the meter for tubes under test when the bias is approximately 1 volt or less is known as grid current due to the contact potential. It is a fundamental property of all indirectly heated type amplifier tubes. Down-scale meter pointer deflection during gas testing is therefore to be disregarded as it is normal. Instead, the fixed bias method of testing using more than 1 volt should be used. For some tubes grid current due to contact potential may occur when the grid bias is as high as 1.3 volts.

Because of the varied applications under which various tubes function most satisfactorily, it is not practical to establish a hard and fast set of standards for maximum permissible grid currents in gas tests. A given grid current for a specific tube may be satisfactory in one application but entirely unsatisfactory in another. Personal experience is the best guide. For example, in an I. F. amplifier strip which has a common A. G. C. circuit, the summation of the grid currents may be detrimental to the circuit function whereas the grid current measurements of the individual tubes may be well within the maximum allowable tube manufacturer's limits. Table 3-2 provides a guide for the determination of maximum permissible grid currents based upon general tube application categories.

3-5. RESERVE LIFE TEST.

This test is used to approximate the future life of the tube under test. The same selector switch settings as for mutual conductance (Gm) are used for this test. After the set up, proceed as follows:

- Depress the Gm LOCK (S4) push switch.
- After the meter pointer has stabilized, observe and note the meter reading on the proper scale as determined by the position of the RANGE switch.
- Depress and hold the LIFE TEST switch until the meter pointer stabilizes again. Note this reading.
- Compare the two readings.

To consider the tube to have a satisfactory future life, the second reading must be in excess of 75% of the first reading. For example: if the first reading is 2000, the second reading must be above 1500. Above 1500 is satisfactory, 1500 is questionable, and if the reading is below 1500, the tube should be considered as having a limited future life.

The LIFE TEST switch reduces the filament voltage on the tube by 10%. The resultant reduction in cathode temperature establishes tube operation which is no longer dependent upon its reserve capacity. Depletion of this reserve will be evident by the decrease in meter reading when the LIFE TEST switch is operated.

CAUTION

It is imperative that grid current testing be terminated if more than 5 microamperes is indicated on the MICROMHOS meter. Under such conditions, as a safety measure, immediately depress the Gm RELEASE (S5) push switch and thus cut off all power. The tube causing this excessive grid current is defective and should be discarded.

LOW LEVEL TRIODE AMPLIFIERS	MAX. PERMISSIBLE GRID CURRENT
6AT6	0.5 μ a
12AT6	0.5 μ a
6AV6	0.5 μ a
12AV6	0.5 μ a
12AX7	1 μ a

LOW LEVEL TRIODE AMPLIFIERS	MAX. PERMISSIBLE GRID CURRENT
6BC8	1 μ a
6BQ7	1 μ a
6BS8	1 μ a
6BZ7	1 μ a
6DJ8	1 μ a
6J6	2 μ a

PENTODE AMPLIFIERS	MAX. PERMISSIBLE GRID CURRENT
6AU6	1 μ a
6BA6	1 μ a
6BC5	1.5 μ a
6BH6	1 μ a
6CB6	1.5 μ a
6BZ6	1.5 μ a
6CF6	1.5 μ a
6DE6	1.5 μ a
6DK6	1.5 μ a
6EW6	1.5 μ a

GENERAL PURPOSE TRIODES	MAX. PERMISSIBLE GRID CURRENT
6C4	1.5 μ a
6CG7	2 μ a
6S4	2.5 μ a
6SN7	2 μ a

POWER PENTODES	MAX. PERMISSIBLE GRID CURRENT
6CA5	1.5 μ a
6AQ5	2 μ a
6CL6	3 μ a
6CM6	2 μ a
6CU5	2 μ a
50C5	2 μ a
6EM5	3 μ a
6L6	3 μ a
6BG6	4 μ a
6CD6	5 μ a
6DQ6	4.5 μ a

Table 3-2. Maximum Permissible Grid Current of Typical Tubes

3-6. RECTIFIER TUBE TEST.

Rectifier tubes, including diodes and diode sections of multisection tubes are tested for emission since they have no mutual conductance. The column headed MINIMUM MUT COND on the roll chart is used to indicate the meter reading which is the rejection point for rectifier tubes. To test rectifier tubes, set up the tube tester as outlined in paragraph 3-1, and proceed as follows:

- a. Depress and hold down DIODE (S1) or RECT (S2) push switch, according to the roll chart.
- b. Note the meter reading on the particular scale as indicated on the panel adjacent to the letter designations on the RANGE switch. An acceptable tube is one which indicates a meter reading in excess of the amount shown on the roll chart in the column headed MINIMUM MUT COND. This amount or less indicates the tube under test has reached the rejection point and should be discarded.
- c. Release DIODE (S1) or RECT (S2) push switch.
- d. To test dual section tubes, complete the above test and repeat for the dual section by depressing both DIODE (S1) or RECT (S2) and DUAL (S6) push switches simultaneously. For acceptable meter reading, again consult the roll chart.

3-7. SPECIAL TUBE TYPES.

The voltage regulator test circuit permits the testing of V.R. tubes under actual operating conditions. The V.R. test circuit measures the voltage drop across the tube under test; hence the striking voltage and the voltage drop for minimum and maximum load currents can be read directly in volts on the test meter.

With the RANGE switch in the V.R. position, the V.R. -RECT. LOAD control determines the magnitude of the test voltage applied to the tube. The V.R. -MILS (S3) push switch converts the test meter from a voltmeter to a milliammeter. The 0-100 MILS scale of the test meter is used to evaluate the results of V.R. test. It reads in ma. dc. Consult the roll chart for information concerning control positions for specific tubes. For example, to test the OA3 according to the roll chart, adjust the meter pointer to the LINE TEST position by means of the LINE TEST (S11) push

switch and the LINE ADJUST control and proceed as follows:

- a. Set the SELECTOR switches to 0000-E0B0 positions.
- b. Set the V.R. RECT LOAD control to 0.
- c. The BIAS VOLTS control may be in any position.
- d. Set the PLATE VOLTS switch to the F position.
- e. Set the SCREEN VOLTS switch to the A position.
- f. Set the RANGE switch in the V.R. position.
- g. In the notations column for the OA3 is the voltage value 100V. marked with a star. This notation represents the approximate starting voltage for the OA3. In the column MINIMUM MUT COND is the voltage value 75V. This represents the nominal operating voltage for the OA3.
- h. Insert the OA3 into the proper test socket.
- i. Depress the Gm LOCK push switch (S4).
- j. Rotate the V.R. -RECT LOAD control slowly clockwise. The meter pointer should begin to indicate a reading. This voltage value is read on the 0 to 200 VOLTS scale.
- k. When the meter indicates approximately 100 volts, the tube should fire. This will cause the meter pointer to hesitate and drop back to the operating voltage value under test. In the case of the OA3, it is 75 volts.
- m. Depress V.R. MILS (S3) push switch. This converts the test meter from a voltmeter to a milliammeter. The meter pointer should indicate approximately 5 ma on the 0 to 100 MILS scale.
- n. While holding the V.R. MILS (S3) depressed, rotate the V.R. -RECT. LOAD control until the meter pointer indicates 40 ma.
- p. Release the V.R. MILS (S3) push switch and read the voltage indicated on the test meter. For a good OA3 tube, the voltage should not have risen more than 5 volts above the nominal operating voltage.

OPERATION - TUBE DATA HANDBOOK METHOD

4-1. TUBE DATA HANDBOOK METHOD.

Considering the great many different kinds of tubes in use today, the roll chart method of referencing tube data for testing vacuum tubes is probably the most convenient method yet devised. New roll charts are published at regular intervals. Nevertheless, with the advent of new tubes almost daily, there is still a lag between the appearance of a new tube on the market and its appearance on the roll chart. Therefore, a knowledge of how to translate tube data handbook information to the controls of the Model 580A Tube Tester is desirable. As an example, using a 6AQ5 vacuum tube, proceed as follows:

a. To make the preliminary set-up, remove the line cord from the lead compartment and connect to a source of 105-125 volts, 50-60 cycles power.

b. Consult a standard tube data handbook for the specific tube to be tested. See figure 4-1 below for a condensed version of such information. This condensed version eliminates data not pertinent to tube testing.

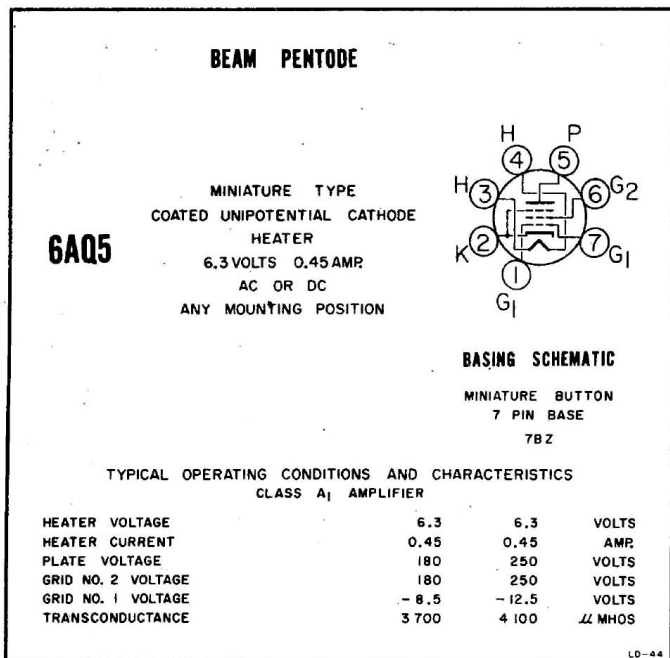


Figure 4-1. Condensed 6AQ5 Tube Data

c. Set the first (left) FILAMENT selector on position C. This is the third switch position (counting A=1, B=2, and C=3) and connects to pin three of the tube under test. See figure 4-1 for tube basing. Pin 3 connects one side of the filament of the tube.

d. Set the second FILAMENT selector on position D. This is the fourth switch position and connects to pin 4 of the tube under test. Pin 4 connects the other side of the filament of the tube.

e. Set the GRID A selector switch on position G. This is the seventh switch position and connects to pin 7 of the tube under test. Pin 7 connects to one terminal of grid 1.

NOTE

Among the more common filament pin combinations are:

7 pin miniature	3 & 4
Octal	2 & 7
Noval 9 pin miniature	4 & 5
Compactron	1 & 12

f. GRID B of the selector switches is for the second control grid in a dual tube and is not used in this test, therefore set it on the 0 or zero position.

g. Set the PLATE selector switch on position E. This is the fifth switch position and connects to pin 5 of the tube under test.

h. Set the SCREEN selector switch on position F. This is the sixth switch position and connects to pin 6 of the tube under test. Pin 6 connects to grid 2.

i. Set the CATHODE selector switch on position B. This is the second switch position and connects to pin 2 of the tube under test. Pin 2 connects to the cathode of the tube. It also has an internal connection to a third grid. See figure 4-1.

j. The SUPPRESSOR of the selector switches is not used in this test, therefore set it on position O.

k. Set the FILAMENT VOLTS switch to the 6.3 position.

l. Set the BIAS VOLTS switch to the 8.5 position, and the 5-50 switch to the 50 position.

m. Set the PLATE VOLTS switch to the J position as this is the 180 volts position according to table 2-1.

n. Set the SCREEN VOLTS switch to the J position as this is the 180 volts position according to table 2-1.

p. Set the RANGE selector to the B or 10K position. The 10K indicates that the final test reading will be taken from the 10000 scale of the test meter.

q. Set the LEAKAGE switch to the TUBE TEST position.

r. Insert the tube to be tested into the proper test socket, and where applicable (not this particular tube) make top cap connection.

s. Set the POWER ON-OFF control to the ON position. Allow sufficient time for the TUBE under test to reach its operating temperature before proceeding.

t. Depress LINE TEST (S11) push-button and hold down while rotating LINE ADJUST control until meter pointer is directly over LINE TEST on the MICROMHOS meter.

4-2. LEAKAGE TEST.

All tube tests should begin with an inter-element leakage or shorts test. With the tester set-up as indicated above, proceed as in paragraph 3-2. Sub-paragraph 3-2f is not applicable.

4-3. MUTUAL CONDUCTANCE (Gm) TEST.

This is the basic quality test for tubes used as amplifiers. After completing the above leakage test and without changing controls, proceed as follows:

a. Set the LEAKAGE switch to the tube test position.

b. Recheck the line voltage by means of the MICROMHOS meter and the LINE ADJUST control, and the LINE TEST (S11) push switch. Reset, if necessary.

c. Depress the Gm LOCK (S4) push switch and observe the test meter reading on the 10000 scale. Since the tube data book (figure 4-1) calls for 3700 μ mhos transconductance with 180 volts on the plate, 180 volts on the screen (grid 2) and 8.5 volts on the control grid (grid 1) the meter pointer should indicate approximately that amount. The minimum acceptable reading under these conditions is 2300 μ mhos. This amount represents 63% of the design center of 3700 μ mhos. Any reading below 2300 indicates the tube should be discarded.

d. Release the Gm LOCK (S4) push switch by depressing Gm RELEASE (S5) push switch.

4-4. GAS TEST

In the measurement of grid current due to gas under Class A operation of a tube, the same selector switch set up is used as for mutual conductance (Gm) testing. To test for gas (grid current), proceed as in paragraph 3-4.

4-5. RESERVE LIFE TEST

This test is used to approximate the future life of the tube under test. The same selector settings used for mutual conductance (Gm) testing are used for this test. To make a reserve lifetest, proceed as in paragraph 3-5.

4-6. DETECTOR DIODE TEST

Rectifier tubes (including diodes and diode sections of multi-section tubes) are tested for emission, as this test best affords a true indication of a rectifier tube's quality. For the purpose of testing, these tubes may be roughly classified into two groups: the first group consists of detector diodes of the 10 volt, 2 ma and 10 volt, 4 ma types, and they are tested with the DIODE (S1) push switch and its associated circuitry.

The second group consists of tubes whose primary function is power rectification; therefore, these tubes are tested under conditions closely simulating actual operating conditions by means of the circuitry associated with the RECT (S2) push switch.

To test detector diodes make the preliminary set-up by removing the line cord from the lead compartment and connect to a source of 105-125 volts, 50-60 cycles power. Proceed as follows:

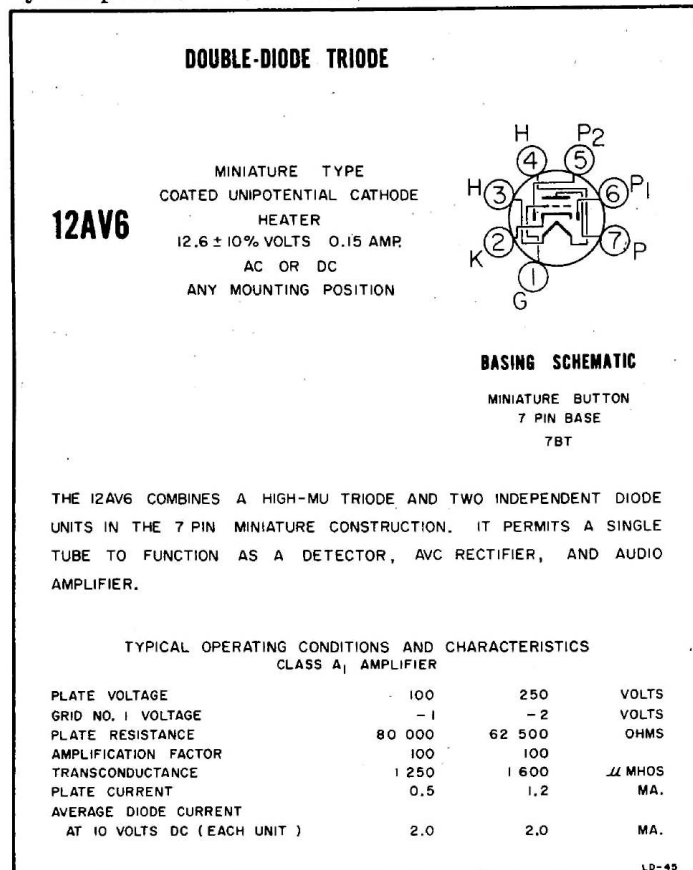


Figure 4-2. Condensed 12AV6 Tube Data

a. Consult a standard tube data handbook for the specific tube to be tested. As an example see figure 4-2, for a condensed version of such information. This condensed version eliminates data not pertinent to tube testing.

b. Set the first (left) FILAMENT selector on position C. This is the third switch position (counting A=1, B=2, and C=3) and connects to pin 3 of the tube under test. See figure 4-2 for tube basing. Pin 3 connects one side of the filament of the tube.

c. Set the second FILAMENT selector on position D. This is the fourth switch position and connects to pin 4 of the tube under test. Pin 4 connects the other side of the filament of the tube.

d. GRID A and GRID B selectors are not used in this test, therefore set both on 0 or zero positions.

e. Set the PLATE selector on position E. This is the fifth switch position and connects to pin 5 of the tube under test. Pin 5 connects to one of the diode plates of the tube.

f. Set the SCREEN selector on position F. This is the sixth switch position and connects to pin 6 of the tube under test. Pin 6 connects to the other diode plate of the tube.

g. Set the CATHODE selector on position B. This is the second switch position and connects to pin 2 of the tube under test. Pin 2 connects to the cathode of the tube.

h. The SUPPRESSOR selector is not used in this test, therefore set it on position 0 or zero.

i. Set the FILAMENT VOLTS switch on the 12.6 volts position.

j. Set the BIAS VOLTS control on the 0 or zero position.

k. To set the PLATE VOLTS, the SCREEN VOLTS, and the RANGE switches, apply the following rule. If the tube under test is rated at 10 volts, 2 ma., set the PLATE VOLTS switch on position B, the SCREEN VOLTS switch on position A, and the RANGE switch on position B. That is B, A, B, in that order.

If the tube under test is rated at 10 volts, 4 ma., set the PLATE VOLTS switch on position C, the SCREEN VOLTS switch on position A, and the RANGE switch on position C. That is C, A, C, in that order.

In this case, since the 12AV6 is rated at 10 volts, 2 ma., use the first rule, i. e., (BAB).

Set the PLATE VOLTS switch on position B,
Set the SCREEN VOLTS switch on position A, and
Set the RANGE switch on position B.

m. Set the POWER ON-OFF switch to the ON position.

n. Depress LINE TEST (S11) push switch and hold down while rotating LINE ADJUST control until meter pointer is directly over LINE TEST on the MICROMHOS meter.

p. Insert the 12AV6 tube to be tested into the proper test socket. Allow sufficient time for the tube to warm to operating temperature.

q. Depress DIODE (S1) push switch and observe the reading on the MICROMHOS meter. With the RANGE switch on position B, any reading below 5000 indicates the tube should be discarded. If the RANGE switch is on position C (as in 10 volts, 4 ma., tests) any reading below 10000 indicates the tube should be discarded.

In this case, since the RANGE switch is on position B, any reading below 5000 should be cause for rejection of the tube.

r. Release DIODE (S1) push switch.

s. Depress and hold down DUAL TEST (S6) push switch.

t. Depress DIODE (S1) push switch and observe

the reading on the MICROMHOS meter. This combination of switches provides for testing the other section of dual tubes. The same rules for rejection prevail on both sections of the tube.

u. Release both push switches.

4-7. POWER RECTIFIER TEST.

Rectifier tubes other than 2 and 4 milliamperes at 10 volts dc (detector diodes) are set-up for testing in a different manner than in paragraph 4-6. Figure 4-4, Power Rectifier Emission Nomograph, provides a means of programming the tester to check cathode emission of power rectifier tubes by the tube data handbook method. Control and switch positions obtained from the nomograph (figure 4-4) will not necessarily agree with the roll chart information given for the same tube type; nor will an "unsafe" combination of control settings, as determined from the nomograph, necessarily reflect an "unsafe" condition when the same combination of settings is given on the roll chart. This is because a complex programming sequence is used in determining roll chart information. To reduce this sequence to a nomograph, certain simplifying assumptions are made. In spite of these assumptions, the nomograph method provides information only slightly less accurate than the roll chart method.

To use the nomograph, one operating point on the geometrical index line A of the nomograph must be determined. The information to determine this point is derived from a tube data handbook in one of two ways: first, this information may be found under "Typical Operating Conditions" as the tube voltage drop per plate at a rated plate current, and second, this point may be found as a point on the "E-I Characteristic Curve". Once the operating point is known, the nomograph is used to determine the settings for the V.R.-RECT.LOAD control and the SCREEN VOLTS and RANGE switches.

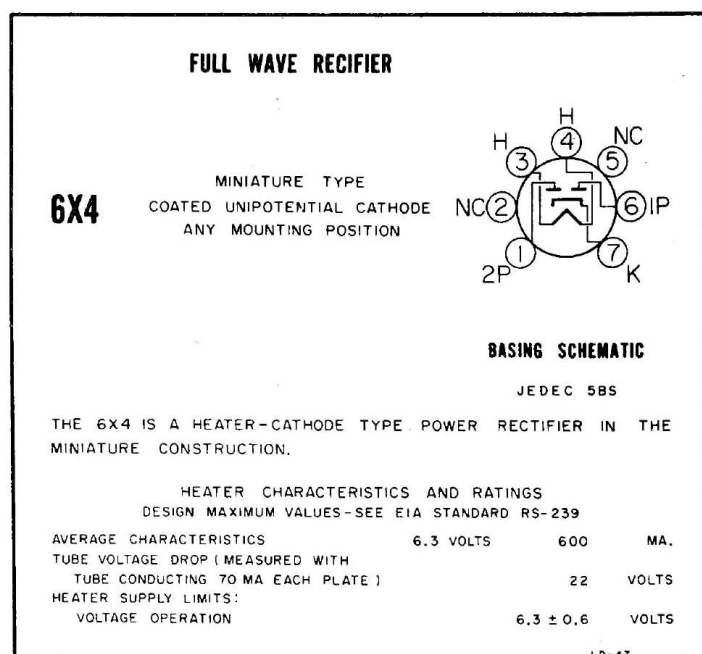
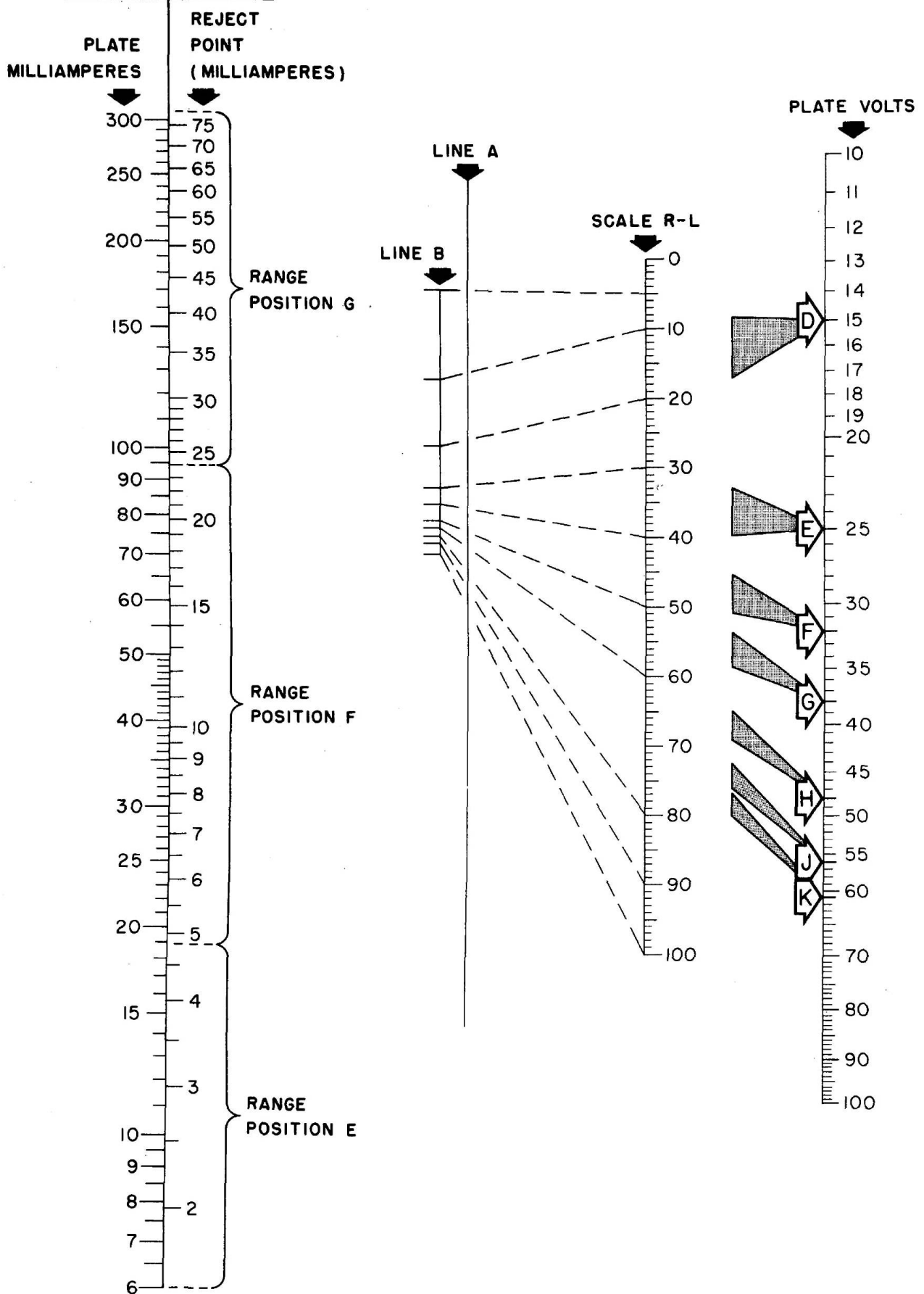


Figure 4-3. Condensed 6X4 Tube Data



LD-46

Figure 4-4. Power Rectifier Emission Nomograph

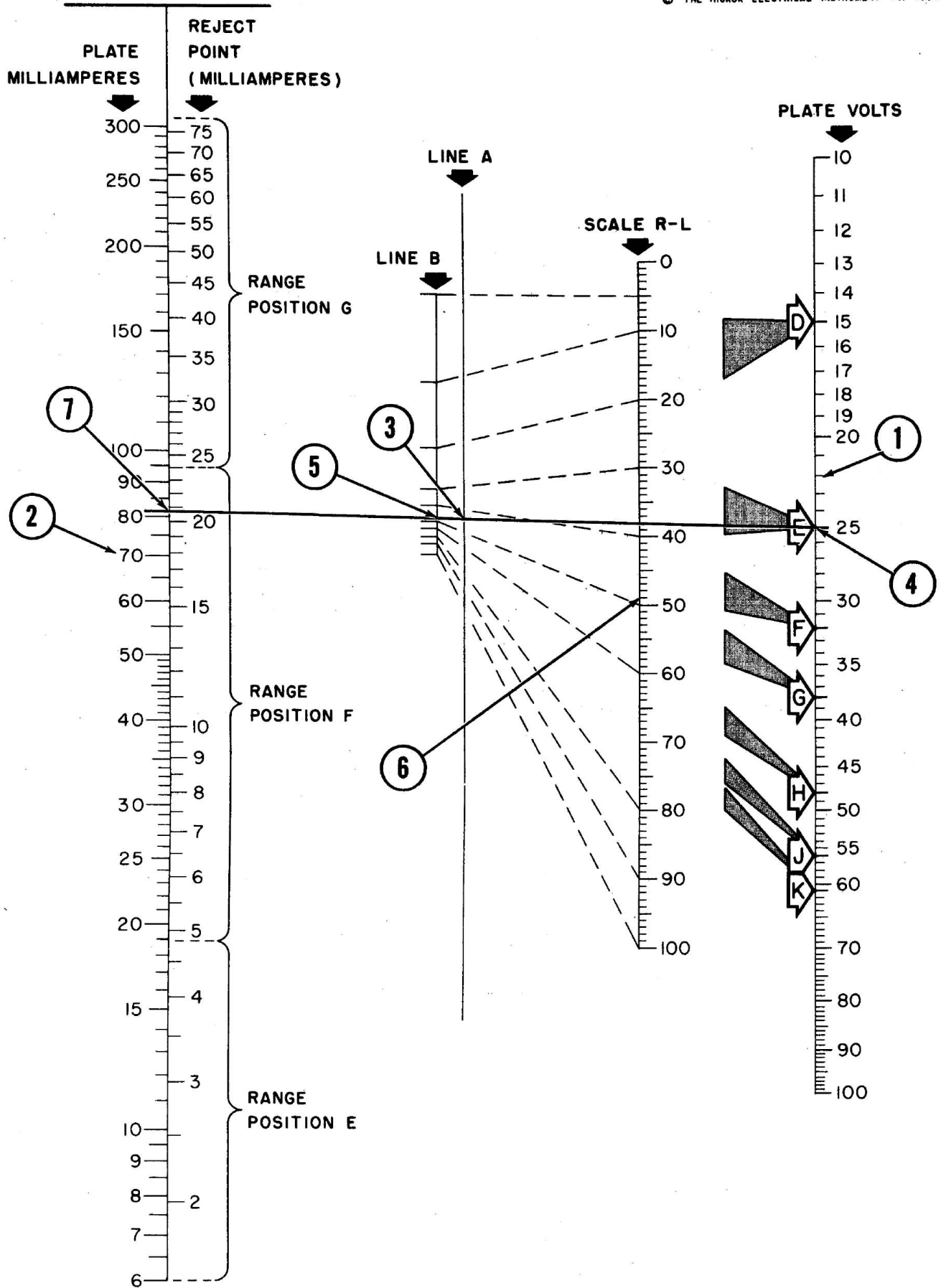


Figure 4-5. Method of Using the Power Rectifier Emission Nomograph

To test rectifier tubes other than detector diodes, consult a standard tube data handbook for the specific tube to be tested. As an example, see figure 4-3 of tube 6X4 for a condensed version of such information. This condensed version eliminates data not pertinent to tube testing.

To test the 6X4 make the preliminary set-up (remove the line cord from the lead compartment, connect to a source of 105-125 volts, 50-60 cycles power) and proceed as follows:

a. Set the first (left) FILAMENT selector on position C. This is the third switch position (counting A=1, B=2, and C=3) and connects to pin three of the tube under test. See figure 4-3 for tube basing. Pin 3 connects one side of the filament of the tube.

b. Set the second FILAMENT selector on position D. This is the fourth switch position and connects to pin 4 of the tube under test. Pin 4 connects the other side of the filament of the tube.

c. Set the GRID A and GRID B selectors on position O. These are the off positions.

d. Set the PLATE selector on position A. This is the first switch position and connects to pin 1 of the tube under test. Pin 1 connects to plate 2 of the tube.

e. Set the SCREEN selector on position F. This is the sixth switch position and connects to pin 6 of the tube under test. Pin 6 connects to plate 1 of the tube.

f. Set the CATHODE selector on position G. This is the seventh switch position and connects to pin 7 of the tube under test. Pin 7 connects to the cathode of the tube.

g. Set the LEAKAGE switch on the TUBE TEST position.

h. Set the FILAMENT VOLTS switch on the 6.3 position.

i. Determine the SCREEN VOLTS switch setting by using the nomograph (figure 4-5), in the following manner:

1). Using the 6X4 tube (figure 4-3) as an example, place a straightedge on the nomograph between Plate Volts (22 volts) indicated by a number 1 in a circle, and Plate Milliamperes (70ma.) indicated by a number 2 in a circle in figure 4-5.

2). Scribe a mark on the nomograph at the intersection of the straightedge and the geometrical index line, Line A. This is the operating point for use with the 6X4 tube. This operating point is indicated on the sample nomograph by a number 3 in a circle.

3). Connect with a straightedge the operating point on Line A (circle 3) with the point of the lettered triangle immediately below the Plate Volts point (circle 1). This point is indicated on the sample nomograph

by a number 4 in a circle. This line, determined by the straightedge is called the information line. The letter within the lettered triangle is the test setting for the SCREEN VOLTS switch. In this case set the SCREEN VOLTS switch on the E position.

NOTE

The information line determined by circle 3 and circle 4 must pass through the shaded triangle adjacent and to the left of the lettered triangle. If the information line does not meet this condition, use the closest lettered triangle that will permit the information line to pass through a shaded triangle. The lower edges of the shaded triangles represent the maximum possible setting of the V.R.-RECT. LOAD control. The upper edges of the shaded triangles represent the lowest possible setting that will not cause damage to the tester components due to excessive current.

j. Project the information line across the full width of the nomograph. Mark the point at which this line intersects Line B. This point (circle 5) when proportionally projected to Scale R-L (rectifier load) provides the V.R.-RECT. LOAD control setting. In this case the projection indicates a Scale R-L reading of 49 (circle 6). Set the V.R.-RECT. LOAD control on 49.

k. The projected information line for any tube must pass through one of the three brackets titled "Range Position E, F, or G". These brackets indicate the test settings for the RANGE switch. In this case it passes through Range Position F. Set the RANGE switch in the F position.

m. The point at which the information line intersects the Reject Point (Milliamperes) scale indicates in milliamperes the meter reading for tube rejection. In this case 20.8 ma is shown, therefore any reading below 20.8 ma is cause to discard the tube as having unsatisfactory life expectancy. See circle 7 on the nomograph.

n. Set the POWER ON-OFF control to the ON position.

p. Depress LINE TEST (S11) push switch and hold down while rotating the LINE ADJUST control until meter pointer is directly over LINE TEST on the MICROMHOS meter.

q. Insert the 6X4 tube to be tested into the proper test socket. Allow sufficient time for the tube to warm to operating temperature.

r. Depress RECT. (S2) push switch and observe reading on the MICROMHOS meter. Any reading below 20.8 ma indicates the tube should be discarded.

SECTION 5

CIRCUIT DESCRIPTION

5-1. GENERAL.

The Model 580A Tube Tester provides all the requirements for determining the condition of new replacement tubes as well as that of tubes which have been in service for some time. Various categories of tests, their requirements, and their characteristics are as follows:

a. The Model 580A Tube Tester employs the dynamic mutual conductance test method. The mutual conductance of the tube under test is indicated on the meter scale directly in micromhos.

NOTE

The terms mutual conductance and transconductance are used interchangeably. Either term may be defined as the ratio between the change of plate current due to a small change in control grid voltage itself. Used as a figure of merit. Characteristic symbol G_m .

b. In addition to the mutual conductance test, it is essential that the tube tester provide adequate means of testing for shorted elements and excessive gas content.

c. In connection with diodes, a straight emission test must be employed rather than the mutual conductance test.

d. To evaluate the quality of a voltage regulator tube a means must be provided to measure the voltage drop across the tube under varying conditions of current conduction.

e. Some means of adjusting the voltage input to the tube tester must be provided to maintain proper test potentials in all elements under varying conditions of line voltage.

5-2. POWER SUPPLY CIRCUIT DESCRIPTION.

The transformers, T101, T102, and T103 are supplied with primary voltage from a 105-125 volt, 50-60 cycle line through the POWER ON-OFF control, the LINE FUSE lamp, and the LINE ADJUST control R130. The LINE ADJUST control standardizes the voltage across the primaries of the transformers at 100 volts. See figure 5-1.

The secondary of transformer T101 consists of a multi-tapped winding designed to supply the various filament or heater voltages for the tubes under test. Voltages shown on the schematic wiring diagram in the back of this manual are nominal and may vary slightly under load, depending on the type of tube under test. Switch S102 provides for reduction of filament voltage by 10% for LIFE TEST of tubes.

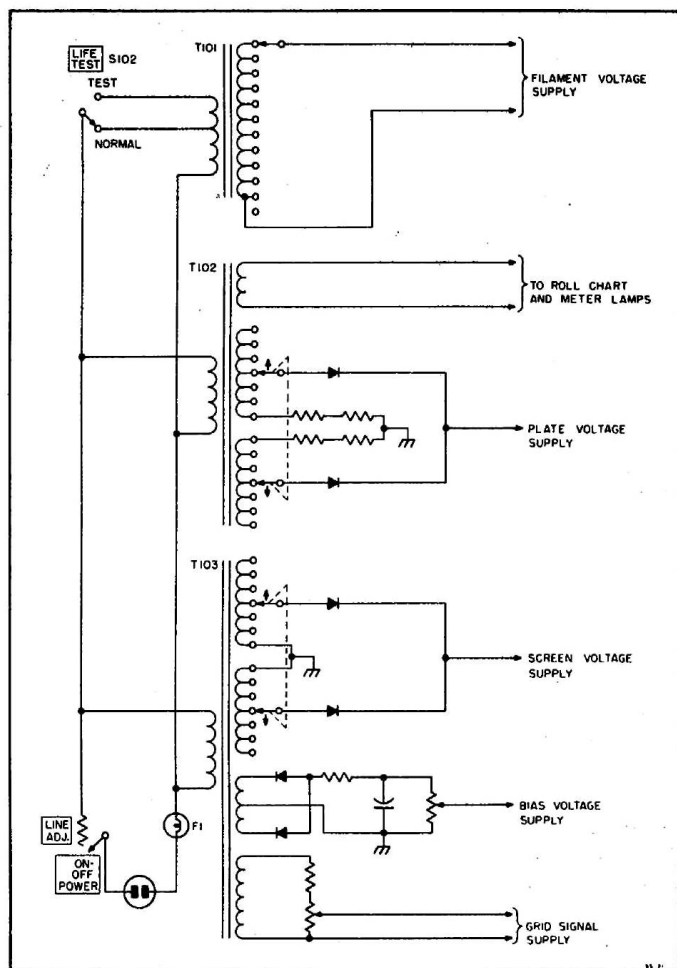


Figure 5-1. Simplified Schematic of Power Supply

The secondary of transformer T102 is tapped to supply 6.3, 12.6, 22.5, 45, 80, 100, 120, 150, 180, 200, 250, or 300 volts to the semiconductor rectifier network consisting of CR4, CR5, CR6, and CR7 which in turn supplies this rectified voltage to the plate of the tube under test. The PLATE VOLTS switch selects the appropriate plate voltage according to the roll chart or according to table 2-1.

The secondary of transformer T103 is tapped to supply 6.3, 12.6, 22.5, 45, 80, 100, 120, 150, 180, 200, 250, or 300 volts to the semiconductor rectifier network consisting of CR8, CR9, CR10, and CR11 which in turn supplies the rectified voltage to the screen grid of the tube under test. The SCREEN VOLTS switch selects the appropriate screen voltage according to the roll chart or according to table 2-1.

**WARNING
HIGH VOLTAGE**

Dangerous voltages are present within this equipment and at the top cap connections of certain tubes when under test.

The secondary winding of transformer T103 also supplies voltage for mutual conductance tests. This signal voltage is taken from the tap on resistor R142 and is held to 0.28 volts RMS. The 100 volt secondary winding of transformer T103 supplies the bias voltage. This bias voltage is rectified by semi-conductors CR12 and CR13. The appropriate bias voltage is obtained by the setting of the BIAS VOLTS control according to the roll chart or according to the data in the tube data handbooks.

5-3. LEAKAGE TEST CIRCUIT DESCRIPTION.

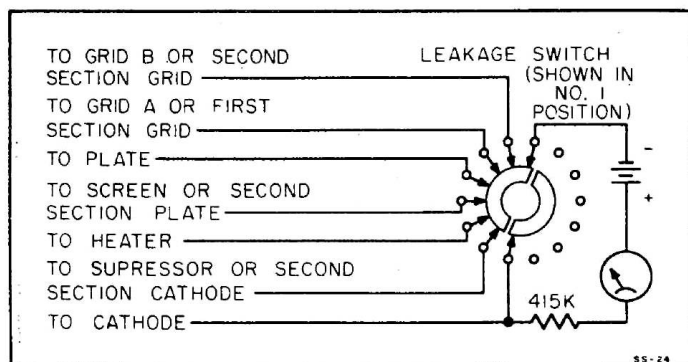


Figure 5-2. Leakage Test Circuitry

To determine the extent of inter-element leakage or to detect the presence of an inter-element short, the LEAKAGE switch is used to establish circuitry as shown in figure 5-2. The negative supply, taken directly from the grid bias rectifiers, in series with the meter and a resistance, effectively form an ohmmeter which is sensitive from 50 megohms to 0 ohms (full scale deflection).

5-4. MUTUAL CONDUCTANCE (G_m) TEST CIRCUIT DESCRIPTION.

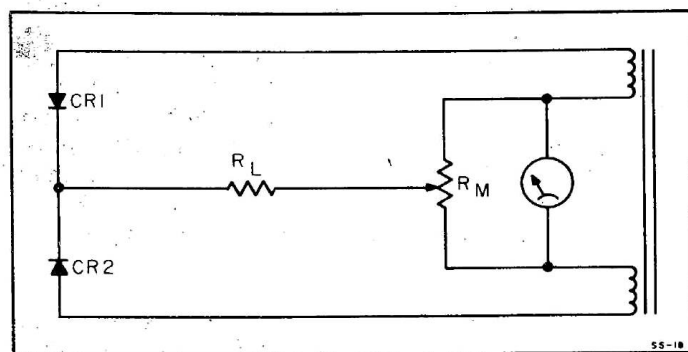


Figure 5-3. Simplified Schematic of Full-wave Rectifier Circuit

Examine first the simple full-wave rectifier circuit shown in figure 5-3. The two power transformer secondary windings have their inner ends connected to a milliammeter. Across the milliammeter is a center-tapped resistor R_M . The load is shown as a resistance R_L , connected between the center tap and the rectifier cathodes in any full-wave rectifier circuit. When the anode of CR1 is positive, electron flow is through the upper half of R_M , and the meter pointer tends to deflect in one direction. When the anode of CR2 is positive, electron flow is through the lower

half of R_M , and the meter pointer tends to deflect in the opposite direction. With the load resistance R_L fixed and equal forces acting on the meter in both cases, the meter pointer stays at zero because of its inertia; it cannot follow variations at the power line frequency.

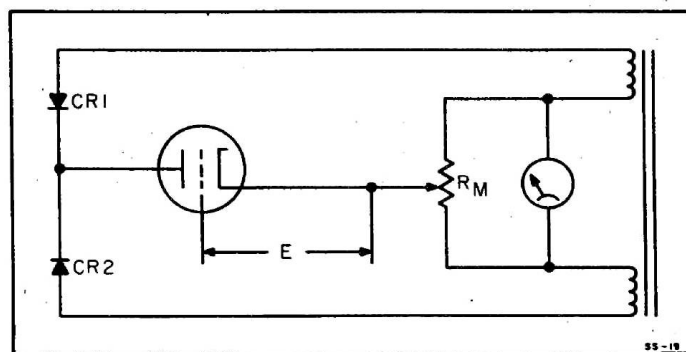


Figure 5-4. Substitution of Electron Tube

If the electron tube to be tested is substituted for the fixed load resistance, and a fixed bias E is applied to the tube as in figure 5-4, the meter will still read zero because an electron tube under steady-state conditions acts like a fixed resistance.

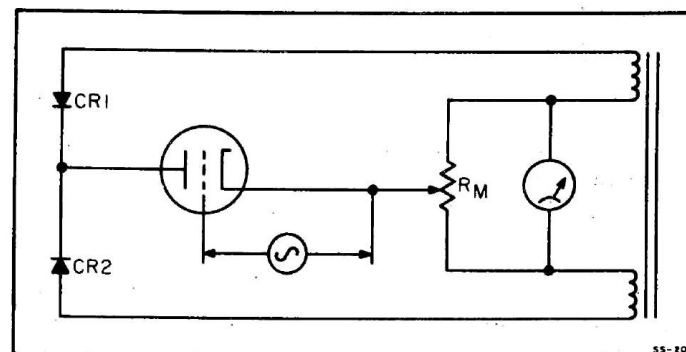


Figure 5-5. Addition of AC Potential

If an ac potential is applied to the grid of the tube under test in addition to the dc bias as in figure 5-5, the circuit becomes equivalent to that employed for quality and mutual conductance tests in the Model 580. When this ac potential swings the grid positive, the plate current of the tube is increased, and the plate-cathode resistance is correspondingly lowered, more current flows through R_M and the deflecting force on the meter is greater than before. When the grid swings negative on the other half-cycle, the resistance of the tube under test is increased and the deflecting force on the meter is less. With unbalanced currents on adjacent half-cycles and consequent unequal forces on the meter, the meter reading becomes proportional to the difference in currents. Since this difference is created by the ac grid potential, the meter indicates the plate current changes produced by the applied grid voltage change, or in other words, the meter indicates mutual conductance.

5-5. GAS TEST CIRCUIT DESCRIPTION.

The gas test circuit consists of a transistorized dc current amplifier as one arm of a bridge. See figure 5-6. To set up the circuitry of figure 5-6, the GAS ZERO ADJ. (S8) push switch must be depressed.

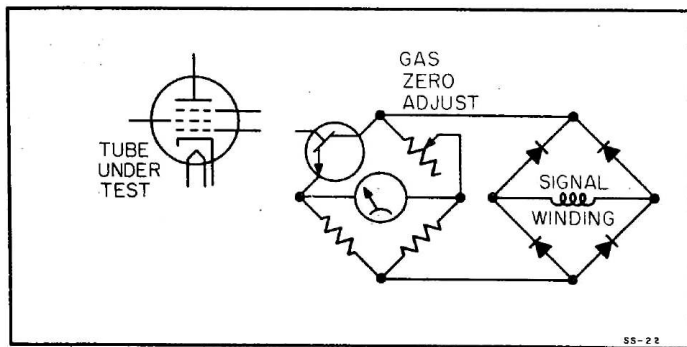


Figure 5-6. Simplified Schematic of Gas Test Bridge Circuit

The GAS ZERO ADJ (S8) push switch when depressed, mechanically actuates the SIG. OFF (S7) push switch which connects the signal winding to the circuit as a source of power. The GAS ZERO ADJ. (S8) push switch places the meter in the bridge circuit. The bridge may now be balanced by means of the GAS ZERO ADJUST control.

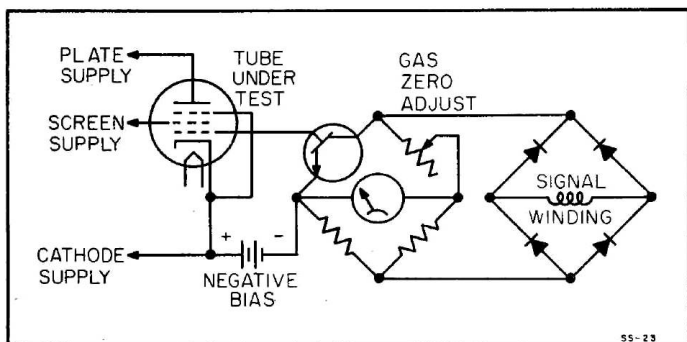


Figure 5-7. Simplified Schematic of Gas Test Circuitry

Depressing the GAS TEST (S9) push switch will result in the circuitry shown in figure 5-7. Note that the Gm LOCK push switch must be actuated to supply tube potentials and that the GAS ZERO ADJ. (S8) push switch must be actuated to keep the meter in the bridge circuit. Any grid current will result in a change of the apparent collector-emitter resistance of the transistor, thus unbalancing the bridge and causing a current to flow through the meter. The amount of current flow is indicative of the amount of unwanted gas in a tube. Therefore, it is an accurate measure of the acceptance or rejection of a tube under test.

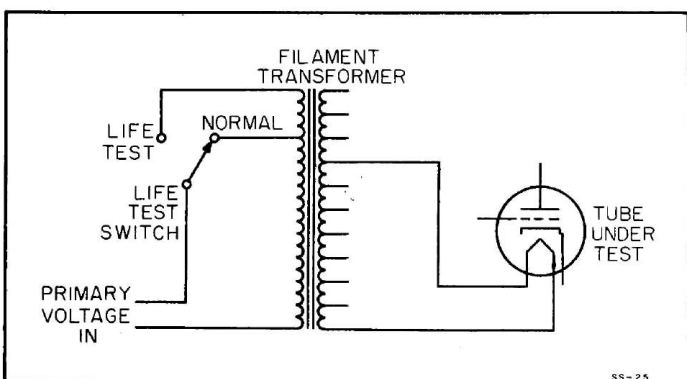


Figure 5-8. Simplified Schematic of Life Test Circuitry

5-6. LIFE TEST CIRCUIT DESCRIPTION.

The major indication of the amount of reserve life remaining in a vacuum tube is its ability to maintain (re: Gm or emission) the same value of quality under conditions of slightly lower than normal filament voltage. The life test is effected by reducing the filament voltage more than slightly and observing the resultant change in the quality reading. This reduction in filament voltage is accomplished by increasing the number of turns in the primary winding of the filament transformer, and thus reducing the secondary voltage. See figure 5-8. Filament voltage is reduced so that the resultant change in cathode temperature will be sufficient to lower the quality reading of tubes with maximum reserve capacity. This filament voltage reduction permits a continuous grading (from maximum to minimum) of the quantity of reserve life remaining in the tube under test.

5-7. RECTIFIER TEST CIRCUIT DESCRIPTION

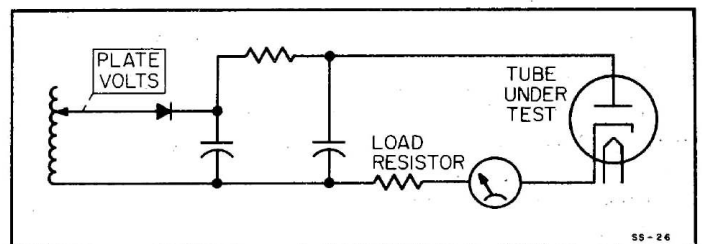


Figure 5-9. Simplified Detector Diode Test Circuit

Two separate test circuits are employed in the testing of rectifier tubes, depending upon whether the tube is a detector diode or a power rectifier. For the testing of detector diodes the DIODE (S1) push switch is used to establish the circuitry shown in figure 5-9. Note that filtered dc is applied to the plate of the tube under test and that cathode current is measured.

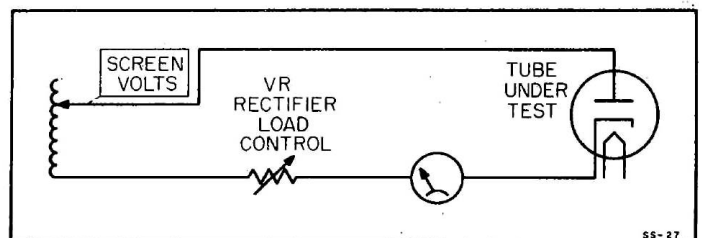


Figure 5-10. Simplified Power Rectifier Test Circuit

For testing of power rectifier tubes the RECT. (S2) push switch is used to establish the circuitry shown in figure 5-10. Note that the circuitry of figure 5-10 differs from that of figure 5-9 in that ac voltage is applied to the plate in figure 5-10. Cathode current is again used as an indication of the tube's quality.

Measuring the cathode current of a rectifier is an evaluation of its emission characteristics. Therefore, it is a measure of the acceptance or rejection of the tube under test. This measure is obtained from either the roll chart or a tube data handbook.

5-8. VR TUBE TEST CIRCUIT DESCRIPTION.

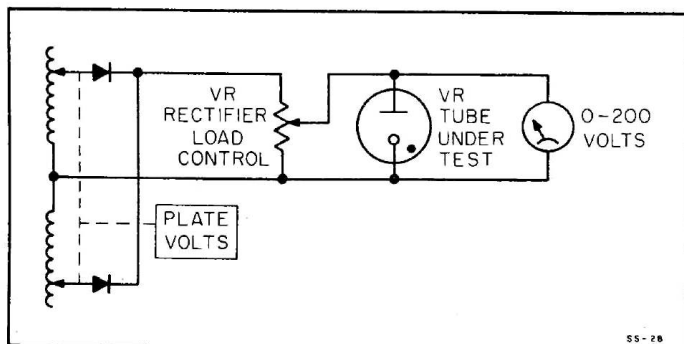


Figure 5-11. Simplified VR Tube Test Voltage Measuring Circuit

The quality of a voltage regulator tube is determined by its ability to satisfactorily pass a given range of current with a limited change in voltage drop across the tube. This quality is called regulation. To test VR tubes it is necessary to determine the firing point of the tube or that point where the minimum amount of voltage will make the tube conduct current.

The RANGE switch position VR in conjunction with the Gm LOCK (S4) push switch will establish the circuitry shown in figure 5-11. To determine how well the VR tube is regulating, the current through the tube must be changed and the corresponding change in anode-to-cathode voltage must be noted.

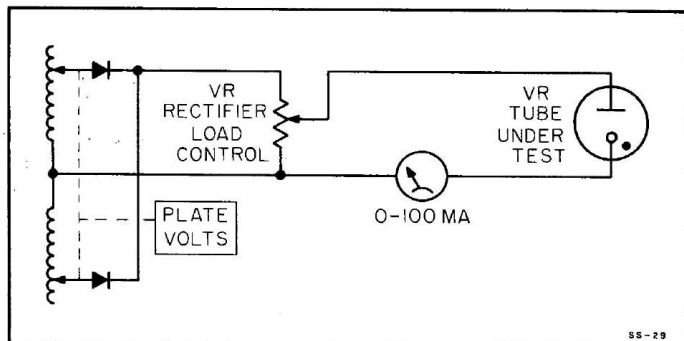


Figure 5-12. Simplified VR Tube Test Current Measuring Circuit

Hence, the VR MILS (S3) push switch is actuated to convert the voltmeter of figure 5-11 to a milliammeter in the cathode circuit as shown in figure 5-12. After changing the current by means of the V. R. -RECT. LOAD control, the V. R. MILS (S3) push switch may be released to re-establish the circuitry of figure 5-11, thus permitting the change in anode-to-cathode voltage to be observed.

5-9. DUAL TEST CIRCUIT DESCRIPTION.

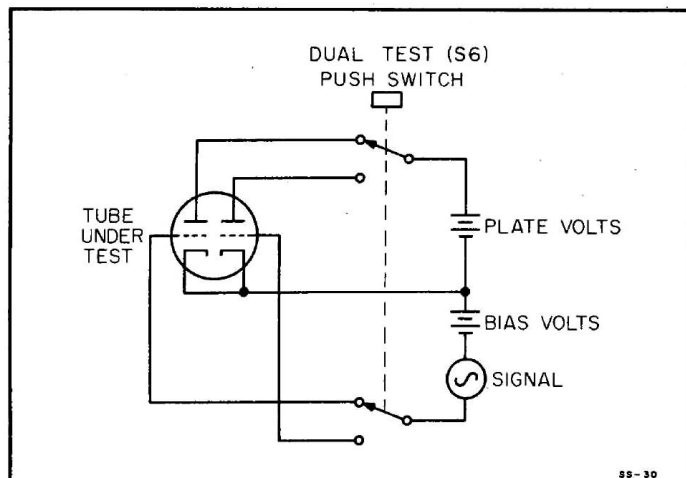
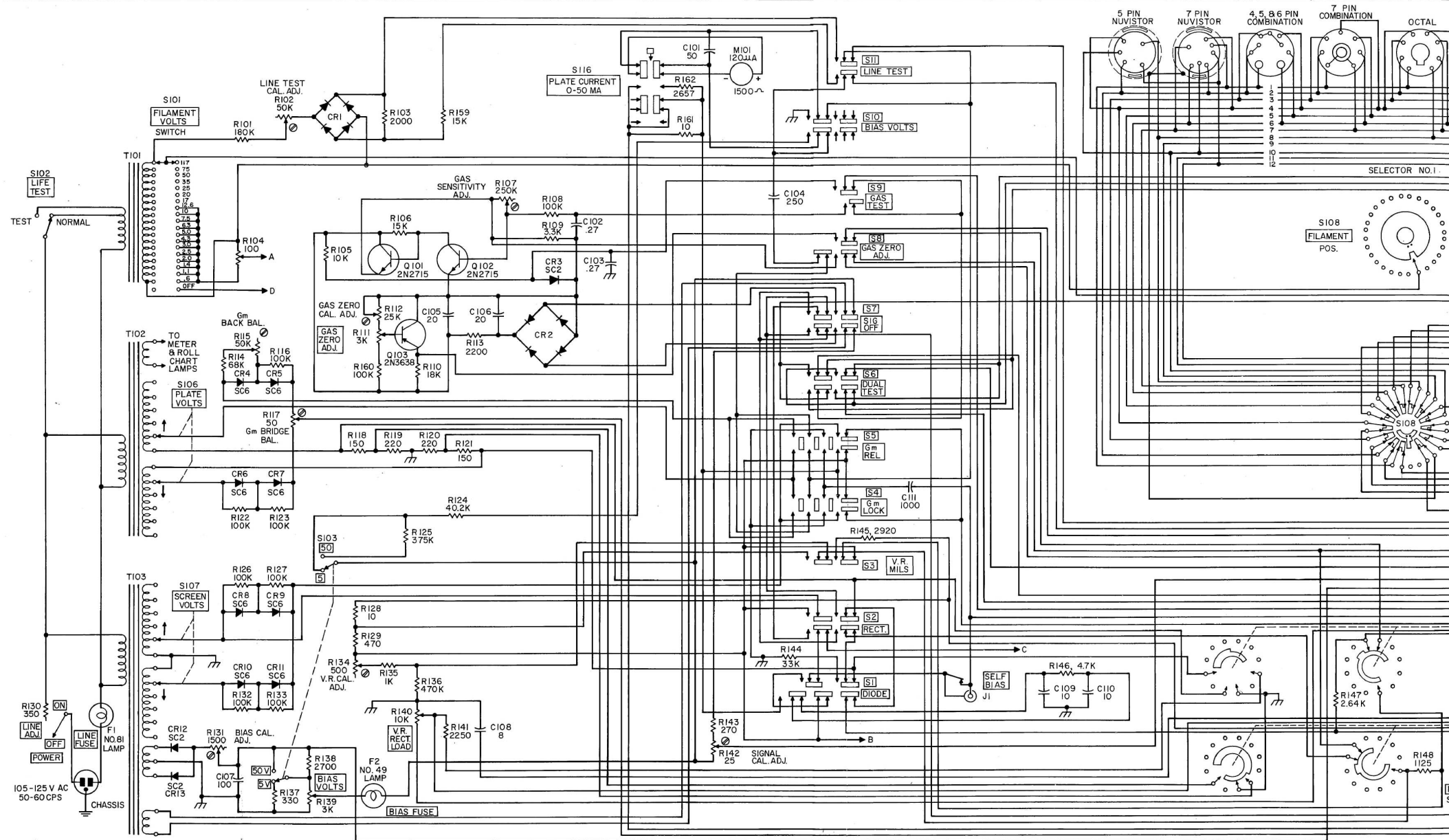
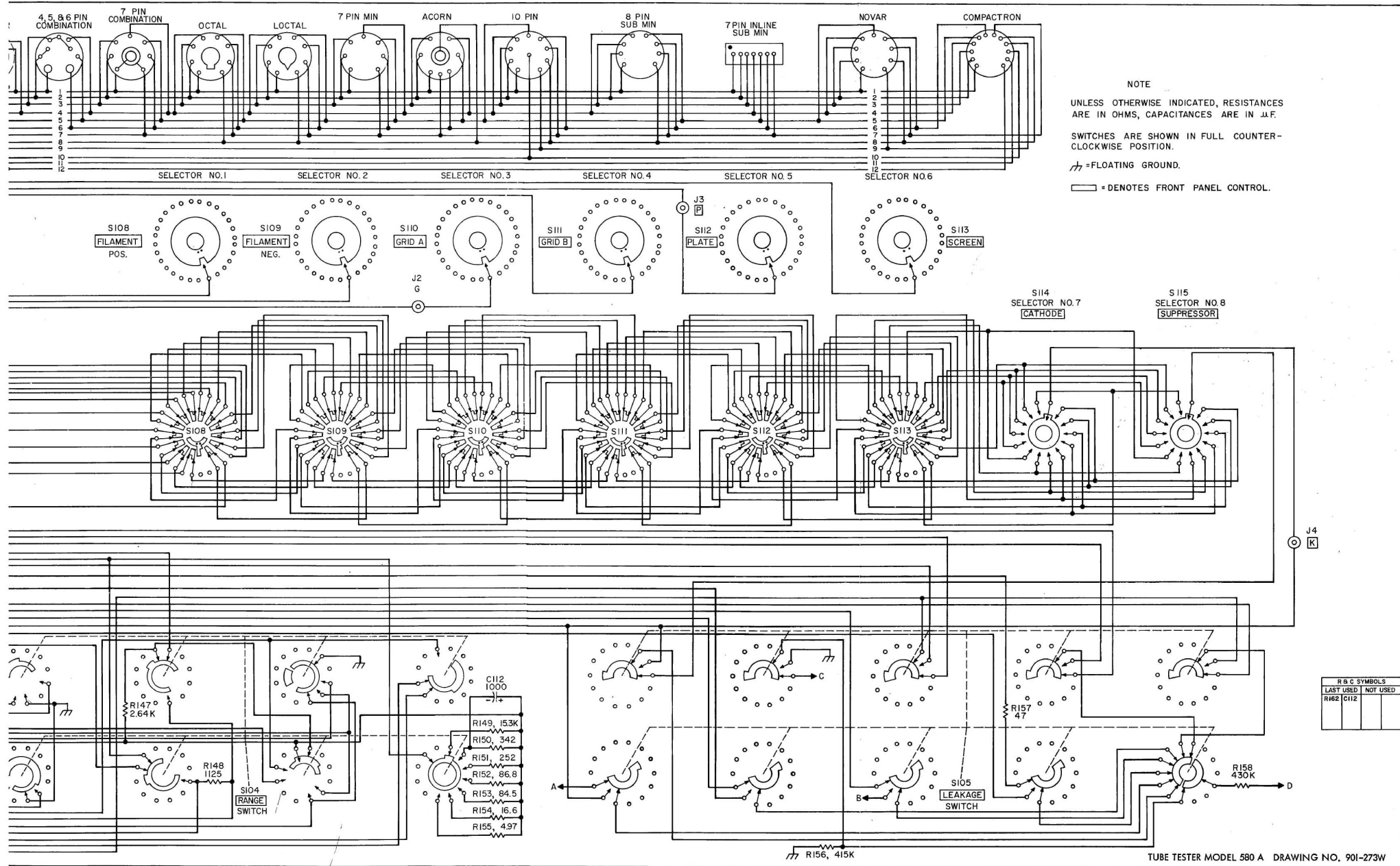


Figure 5-13. Dual Test Switching Circuitry

The DUAL TEST (S6) push switch establishes the circuitry to permit testing of multi-section tubes. This switch transfers the test circuitry from the first section of the tube under test (plate number 1 and grid number 1) to the second section of the tube (plate number 2 and grid number 2). Keeping in mind that the SCREEN selector is used as the plate number 2 selector and that the GRID B selector is used as the grid number 2 selector, observe in figure 5-13 how this circuit is affected.





R & C SYMBOLS	
LAST USED	NOT USED
R147	C112



Obsolete Tube Types

SUPPLEMENTARY TEST DATA

for

MODELS 580 & 580A

TUBE TESTERS

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PHONE — 541-8060

TWX — CV 662

CABLE — HICKOK, CLEVELAND

WESTERN UNION — KJ

TUBE TYPE	FIL.	SELECTORS	BIAS	PLT	SCRN	RANGE	PRESS	MIN. MUT. COND	NOTATIONS FOR EXPLANATIONS - SEE BACK COVER
0A4	OFF	0000-E0B0	---	J	A	VR	S4	70V	NOTES 1 & 2. 80 V. REG. = 10 VOLTS FROM 5 TO 25 MA. JUMPER A 100 K OHM RESISTOR FROM PIN 7 OF ANY SOCKET TO 'P'.
0Y4	OFF	GH00-E0AC	0.0	A	J	G	S2	4000	SET LOAD AT 27 READ ON 10000 SCALE
1A5	1.4	GBE0-C000	4.5	E	E	A	S4	500	NOTE 3.
1A7	1.4	GB00-CDFE	0.0	F	C	A	S4	300	NOTE 3. PENTODE SECTION. CAP = G.
1A7	1.4	GBEC-F000	0.0	F	B	A	S4	250	NOTE 3. OSC. SECTION. CAP = K.
1AC5	1.1	DEB0-GH00	3.0	D	D	A	S4	400	NOTE 3.
1AD5	1.1	DEB0-GH00	1.4	D	D	A	S4	250	NOTE 3.
1AE4	1.1	AGF0-BC00	1.0	E	E	A	S4	800	NOTE 3.
1AF4	1.4	AGF0-BC00	1.0	E	E	A	S4	950	NOTE 3.
1AF5	1.4	AGF0-ED00	1.0	E	E	A	S4	350	NOTE 3. PENTODE SECTION.
1AF5	1.4	AG00-C000	0.0	B	A	B	S1	4000	DIODE SECTION.
1AG5	1.1	DFE0-AB00	2.0	D	D	A	S4	150	NOTE 3. PENTODE SECTION.
1AG5	1.1	DF00-C000	0.0	B	A	B	S1	5000	DIODE SECTION. READ 0-10000 SCALE.
1AJ5	1.1	DFE0-AB00	1.0	D	D	A	S4	250	NOTE 3. PENTODE SECTION.
1AJ5	1.1	DF00-C000	0.0	B	A	B	S1	5000	DIODE SECTION. READ 0-10000 SCALE.
1AK5	1.1	DFE0-AB0C	1.0	D	D	A	S4	150	NOTE 3. PENTODE SECTION.
1AU3	1.1	GB00-0000	0.0	A	H	E	S2	10000	CAP = P. SET LOAD AT 0 READ 0-60000 SCALE.
1AX2	1.4	AB00-0000	0.0	A	G	E	S2	10000	CAP = P. SET LOAD AT 0 READ 0-60000 SCALE.
1B4	2.0	FA00-BC00	3.0	J	D	A	S4	400	NOTE 3. CAP = G.
1C3	1.4	AG00-B000	3.0	E	A	A	S4	450	NOTE 3.
1C5	1.4	GBE0-C000	7.0	E	E	A	S4	950	NOTE 3.
1D5	2.0	GB00-C000	3.0	J	D	A	S4	400	NOTE 3. CAP = G.
1DN5	1.4	AGF0-BC00	1.0	D	D	A	S4	450	NOTE 3. PENTODE SECTION.
1DN5	1.4	GA00-D000	0.0	B	A	B	S1	6200	DIODE SECTION.
1E3	1.1	DEA0-H000	3.5	H	A	B	S4	2200	NOTE 3.
1H5	1.4	GB00-C000	1.0	F	A	A	S4	200	NOTE 3. TRIODE SECTION. CAP = G.
1H5	1.4	GB00-E000	0.0	B	A	B	S1	5000	DIODE SECTION. READ 0-10000 SCALE.
1H6	2.0	GBF0-C000	2.7	G	A	A	S4	300	NOTE 3. TRIODE SECTION.
1H6	2.0	GB00-E000	0.0	B	A	B	S1	5000	NOTE 5. DUAL DIODE. READ 0-10000 SCALE.
1J3	1.1	GB00-0000	0.0	A	H	E	S2	10000	CAP = P. SET LOAD AT 0 READ 0-60000 SCALE.
1L4	1.4	AGF0-BC00	1.0	E	E	A	S4	600	NOTE 3.
1L6	1.4	GAF0-BECD	0.0	F	C	A	S4	400	NOTE 3. PENTODE SECTION. NOTE 4.
1L6	1.4	GADB-CE0F	0.0	F	C	A	S4	350	NOTE 3. OSC. SECTION. NOTE 4.
1LA4	1.4	HAFO-BC00	4.5	E	E	A	S4	500	NOTE 3.
1LA6	1.4	HAFO-BECD	0.0	E	C	A	S4	400	NOTE 3. PENTODE SECTION. NOTE 4.
1LA6	1.4	HADB-CE0F	0.0	F	C	A	S4	350	NOTE 3. OSC. SECTION. NOTE 4.
1LB4	1.4	HAFO-BC00	9.0	F	E	A	S4	550	NOTE 3.
1LC5	1.4	HAFO-BC00	0.0	F	D	A	S4	500	NOTES 3 & 4.
1LC6	1.4	HAFO-BECD	0.0	F	C	A	S4	450	NOTE 3. PENTODE SECTION. NOTE 4.
1LC6	1.4	HADB-CE0F	0.0	F	C	A	S4	350	NOTE 3. OSC. SECTION. NOTE 4.
1LD5	1.4	HAFO-BC00	1.0	E	D	A	S4	250	NOTE 3. PENTODE SECTION.
1LD5	1.4	HA00-D000	0.0	B	A	B	S1	6200	DIODE SECTION.
1LE3	1.4	HAFO-B000	3.0	E	A	A	S4	450	NOTE 3.
1LF3	1.4	HAFO-B000	3.0	E	A	A	S4	450	NOTE 3.
1LG5	1.4	HAFO-BC00	1.5	E	E	A	S4	700	NOTES 3 & 4.
1LN5	1.4	AHFO-BC00	1.0	F	F	A	S4	500	NOTES 3 & 4.
1N5	1.4	GB00-C000	1.0	F	F	A	S4	450	NOTE 3. CAP = G.
1Q5	1.4	GBE0-C000	5.0	E	E	A	S4	1200	NOTE 3.
1Q6	1.1	DEB0-GH00	1.0	E	E	A	S4	350	NOTE 3. PENTODE SECTION.
1Q6	1.1	DE00-F000	0.0	B	A	B	S1	4000	DIODE SECTION.
1T4	1.4	AGF0-BC00	1.0	E	E	A	S4	550	NOTE 3.
1T6	1.1	DECO-AHFO	1.0	E	E	A	S4	350	NOTE 3. PENTODE SECTION. NOTE 4.
1T6	1.1	DE00-F000	0.0	B	A	B	S1	6200	DIODE SECTION.
1U5	1.4	AGF0-BC00	1.0	E	E	A	S4	400	NOTE 3. PENTODE SECTION.
1U5	1.4	AG00-D000	0.0	B	A	B	S1	6200	DIODE SECTION.
1U6	1.4	GAFO-BECD	0.0	F	C	A	S4	400	NOTE 3. AMPL. SECTION. NOTE 4.
1U6	1.4	GADB-CE0F	0.0	F	C	A	S4	350	NOTE 3. OSC. SECTION. NOTE 4.

TUBE TYPE	FIL.	SELECTORS	BIAS	PLT	SCRN	RANGE	PRESS	MIN. MUT. COND	NOTATIONS FOR EXPLANATIONS - SEE BACK COVER
1V	6.3	FA00-B0C0	0.0	A	E	G	S2	5000	SET LOAD AT 11. READ ON 10000 SCALE.
1V5	1.1	DEB0-GH00	3.0	D	D	A	S4	350	NOTE 3.
1V6	1.1	DGCO-ABEF	0.0	D	D	A	S4	550	NOTE 3 PENTODE SECTION. NOTE 4.
1V6	1.1	DGEB-FOCA	3.0	D	A	A	S4	200	NOTE 3 TRIODE SECTION. NOTE 4.
1W4	1.4	AGFO-BC00	9.0	E	E	A	S4	550	NOTE 3.
1Z2	1.4	AB00-0000	0.0	A	D	E	S2	16000	CAP = P. SET LOAD AT 0 READ 0-60000 SCALE.
2A3	2.5	FACO-B000	45.0	L	A	B	S4	3300	NOTE 3.
2B3	1.4	GB00-0000	0.0	A	E	E	S2	10000	CAP = P. SET LOAD AT 0 READ 0-60000 SCALE.
2B7	2.5	GA00-BCF0	3.0	L	F	A	S4	600	PENTODE SECTION. CAP = G.
2B7	2.5	GA00-EDF0	0.0	B	A	B	S1	5000	NOTE 5. DUAL DIODE. READ 0-10000 SCALE.
2B23	6.3	GB00-C0H0	0.0	A	L	F	S2	500	SET LOAD AT 20# PLACE A 5.1 K, 1 W RESISTOR ACROSS THE SELF BIAS JACK READ ON 3000 SCALE.
2C50	12.6	GHDA-EBFC	11.0	K	A	B	S4	1800	NOTE 5. DUAL TRIODE.
2C52	12.6	GHDA-EBFC	2.0	L	A	A	S4	1200	NOTE 5. DUAL TRIODE.
2DZ4	2.5	CD80-A0E0	3.4	F	A	B	S4	4100	
2E22	6.3	FACO-0BDE	5.0	J	B	B	S4	2500	NOTE 3 CAP = P. NOTE 4.
2E24	6.3	GBEO-OCFO	8.0	L	H	B	S4	3300	NOTE 3. SHORT ON 1&2. CAP = P.
2E25	6.3	GBEO-ODOH	5.0	H	H	B	S4	2000	NOTE 3 CAP = P. NOTE 4.
2E26	6.3	GBEO-OCAN	13.5	H	H	B	S4	2500	CAP = P.
2E30	6.3	DCAO-EF0B	20.0	L	L	B	S4	2300	NOTES 3 & 4.
2E31	1.1	ECDO-AB00	1.0	C	C	A	S4	300	NOTE 3.
2E32	1.1	ECDO-AB00	1.0	C	C	A	S4	300	NOTE 3.
2E35	1.1	ECDO-AB00	1.3	D	D	A	S4	300	NOTE 3.
2E36	1.1	ECDO-AB00	1.3	D	D	A	S4	300	NOTE 3.
2E41	1.1	DFEO-AB00	1.0	C	C	A	S4	200	NOTE 3. PENTODE SECTION.
2E41	1.1	DF00-C000	0.0	B	A	B	S1	4000	DIODE SECTION.
2E42	1.1	DFEO-AB00	1.0	C	C	A	S4	200	NOTE 3. PENTODE SECTION.
2E42	1.1	DF00-C000	0.0	B	A	B	S1	4000	DIODE SECTION.
2V2	2.5	GB00-0000	0.0	A	H	E	S2	20000	CAP = P. SET LOAD AT 0 READ 0-60000 SCALE.
2X2A	2.5	FA00-0000	0.0	A	D	E	S2	22000	CAP = P. SET LOAD AT 0 READ 0-60000 SCALE.
3A4	2.5	AGDO-FC00	8.4	H	E	A	S4	1200	NOTE 3.
3A5	3.0	AGEO-F000	2.5	E	A	A	S4	1100	NOTE 3. TRIODE NO. 1.
3A5	3.0	GACO-B000	2.5	E	A	A	S4	1100	NOTE 3. TRIODE NO. 2.
3C2	3.0	GB00-0000	0.0	A	D	E	S2	16000	CAP = P. SET LOAD AT 0 READ 0-60000 SCALE.
3CF6	3.0	DCAO-EFBG	1.0	G	G	B	S4	4500	
3D6	2.5	HAFO-BC00	4.5	J	E	A	S4	1500	NOTE 3.
3E5	2.5	AGFO-BCED	7.0	E	E	A	S4	900	NOTE 3.
3E6	3.0	HAFO-BC00	1.0	E	E	A	S4	1050	NOTES 3 & 4.
3ES5	3.0	CDBD-E0AD	1.0	K	A	C	S4	5500	
3FQ5	3.0	DCBO-EDGO	1.3	H	A	C	S4	7500	
3FQ5A	3.0	DCBO-EDGO	1.3	H	A	C	S4	8000	
3GS8	3.0	DEGO-HBAJ	1.0	F	E	A	S4	750	PENTODE NO. 1.
3GS8	3.0	DEGO-CBAF	1.0	F	E	A	S4	750	PENTODE NO. 2.
3GU5	3.0	DCAO-EFBO	1.0	H	H	C	S4	6800	
3HM6	3.0	DEBO-GHCJ	1.0	G	G	C	S4	9500	
3HS8	3.0	DEGO-HBAJ	1.0	G	E	A	S4	700	PENTODE NO. 1.
3HS8	3.0	DEGO-CBAF	1.0	G	E	A	S4	700	PENTODE NO. 2.
3HT6	3.0	DEBO-GHCJ	1.0	G	G	C	S4	8500	
3LE4	2.5	HAFO-BC00	9.0	E	E	A	S4	1000	NOTE 3.
3LF4	2.5	HAFO-BC00	6.6	F	F	A	S4	1350	NOTE 3.
3Q4	3.0	GACO-F000	4.5	F	E	A	S4	1250	NOTE 3.
3Q5	2.5	GBEO-CD00	6.6	F	F	A	S4	1250	NOTE 3.
3S4	2.5	GACU-B000	2.7	E	D	A	S4	500	NOTE 3.
4A6	3.0	GBEO-F000	1.5	E	A	A	S4	550	NOTE 3. TRIODE NO. 1.
4A6	3.0	RGDU-C000	1.5	E	A	A	S4	550	NOTE 3. TRIODE NO. 2.
4BA6	4.3	DCAO-EFGB	1.0	L	F	B	S4	2500	

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4BE6	4.3	CDGO-EFBA	2.0	L	C	A	S4	300	AMPL. SECTION.
4BE6	4.3	CDAO-FEBG	0.0	F	F	B	S4	4500	OSC. SECTION.
4BX8	4.3	DEGB-FAHC	1.4	E	A	B	S4	4200	NOTE 5. DUAL TRIODE.
4BZ8	4.3	DEGB-FAHC	1.0	G	A	C	S4	5000	NOTE 5. DUAL TRIODE.
4CE5	4.3	DCAD-EFGO	1.0	G	G	B	S4	4800	
4GW5	4.3	DCBO-AOEO	1.1	H	A	C	S4	10500	
5AS4	5.0	HB00-FD00	0.0	A	H	G	S2	6000	NOTE 5. DUAL DIODE SET LOAD AT 20 READ ON 10000 SCALE.
5AW4	5.0	HB00-FD00	0.0	A	E	G	S2	2500	NOTE 5. DUAL DIODE SET LOAD AT 30 READ ON 10,000 SCALE.
5AZ4	5.0	HB00-FD00	0.0	A	G	G	S2	2500	NOTE 5. DUAL DIODE SET LOAD AT 45 READ ON 10000 SCALE.
5BS8	5.0	DEGB-FAHC	2.2	H	A	B	S4	4500	NOTE 5. DUAL TRIODE.
5BZ7	5.0	DEGB-FAHC	2.2	H	A	B	S4	4300	NOTE 5. DUAL TRIODE.
5CM6	5.0	DEFO-JAGO	12.5	L	L	B	S4	2600	
5CR8	5.0	DEBO-FGCH	1.0	H	H	R	S4	4800	PENTODE SECTION.
5CR8	5.0	DEJO-AOHO	2.0	G	A	B	S4	2500	TRIODE SECTION.
5CU4	5.0	HB00-FDAO	0.0	A	E	G	S2	5500	NOTE 5. DUAL DIODE SET LOAD AT 12 READ ON 10000 SCALE.
5EH8	5.0	DEGO-JHFO	1.0	G	G	B	S4	3800	PENTODE SECTION.
5EH8	5.0	DEBO-COAO	1.0	G	A	B	S4	4700	TRIODE SECTION.
5T4	5.0	HB00-FD00	0.0	A	H	G	S2	6000	NOTE 5. DUAL DIODE SET LOAD AT 20 READ ON 10000 SCALE.
5W4	5.0	HB00-FD00	0.0	A	E	F	S2	2100	NOTE 5. DUAL DIODE SET LOAD AT 27 READ ON 3000 SCALE.
5X4	5.0	GH00-EC00	0.0	A	H	G	S2	6000	NOTE 5. DUAL DIODE SET LOAD AT 20 READ ON 10000 SCALE.
5Y4	5.0	GH00-EC00	0.0	A	G	G	S2	2500	NOTE 5. DUAL DIODE SET LOAD AT 45 READ ON 10000 SCALE.
5Z3	5.0	FA00-CB00	0.0	A	H	G	S2	6000	NOTE 5. DUAL DIODE SET LOAD AT 20 READ ON 10000 SCALE.
5Z4	5.0	HB00-FD00	0.0	A	D	G	S2	2700	NOTE 5. DUAL DIODE SET LOAD AT 13 READ ON 10000 SCALE.
6A3	6.3	FAC0-B000	45.0	L	A	B	S4	3300	NOTE 3.
6A5	6.3	GBEO-C000	45.0	L	A	B	S4	3300	
6A6	6.3	GAEC-FB00	2.0	H	A	A	S4	1200	NOTE 5. DUAL TRIODE.
6A7	6.3	GA00-BCFE	1.5	F	D	A	S4	900	PENTODE SECTION. CAP = G.
6A7	6.3	GAEB-DCFO	1.0	F	D	A	S4	750	OSC. SECTION. CAP = K.
6A8	6.3	GB00-CDHE	1.5	F	D	A	S4	900	PENTODE SECTION. CAP = G.
6A8	6.3	GREC-FDHO	1.0	F	D	A	S4	750	OSC. SECTION. CAP = K.
6AB7	6.3	GBDO-HFEC	3.0	M	K	B	S4	3100	
6AB8	6.3	DEJO-FHCG	6.7	J	J	B	S4	2100	PENTODE SECTION.
6AB8	6.3	DEBO-AOCO	2.0	F	A	A	S4	850	TRIODE SECTION.
6AD4	6.3	CFA0-HOEO	1.1	F	A	A	S4	1250	
6AD7	6.3	GBEO-CDHF	16.5	L	L	B	S4	1500	PENTODE SECTION.
6AD7	6.3	GBAO-FOHC	25.0	L	A	A	S4	200	TRIODE SECTION.
6AF6	6.3	GBDO-ECHO	0.0	G	E	D	S4	----	EYE 1 OPEN. EYE 2 CLOSED.
6AF6	6.3	GBCO-EDHO	0.0	G	E	D	S4	----	EYE 1 CLOSED. EYE 2 OPEN.
6AH4	6.3	GBAO-EOHO	23.0	L	A	B	S4	2800	
6AH6	6.3	DCA0-EFGB	2.0	M	H	C	S4	5600	
6AH7	6.3	GHEA-FCDB	6.5	J	A	A	S4	1200	
6AJ4	6.3	HGJO-E0BO	1.1	G	A	C	S4	6300	NOTE 5. DUAL TRIODE.
6AJ5	6.3	DCA0-EFGO	1.0	C	C	B	S4	1500	
6AK4	6.3	CFA0-HOEG	6.5	K	A	B	S4	2400	
6AL7	6.3	GBFO-CEHA	---	M	A	G	S4	----	BIAS CONTROLS UPPER LEFT PATTERN. BIAS = VARY.
6AL7	6.3	GBEO-COHA	---	M	A	G	S4	----	BIAS CONTROLS BOTH LOWER PATTERNS. BIAS = VARY.
6AL7	6.3	GBDO-CEHA	---	M	A	G	S4	----	BIAS CONTROLS UPPER RIGHT PATTERN. BIAS = VARY.
6AM4	6.3	HGJO-E0BO	1.0	K	A	C	S4	6200	
6AN6	6.3	GA00-EDFO	0.0	A	E	F	S2	1300	NOTE 5. DUAL DIODE SET LOAD AT 67 READ ON 3000 SCALE.
6AN6	6.3	GA00-CBFO	0.0	A	E	F	S2	1300	NOTE 5. DUAL DIODE SET LOAD AT 67 READ ON 3000 SCALE.

TUBE TYPE	FIL.	SELECTORS	BIAS	PLT	SCRN	RANGE	PRESS	MIN. MUT. COND	NOTATIONS FOR EXPLANATIONS - SEE BACK COVER
6AQ6	6.3	DCAO-GOBD	3.0	L	A	A	S4	750	TRIODE SECTION.
6AQ6	6.3	DCOO-FEBD	0.0	B	A	B	S1	5000	NOTE 5. DUAL DIODE READ 0-10000 SCALE.
6AQ7	6.3	GHDD-EQFO	2.0	L	A	A	S4	1000	TRIODE SECTION.
6AQ7	6.3	GHDD-CABD	0.0	C	A	C	S1	13500	NOTE 5. DUAL DIODE.
6AR5	6.3	DCAO-EFBD	18.0	L	L	A	S4	1450	
6AR6	6.3	HFGD-CEAD	22.5	L	L	B	S4	3400	
6AR8	6.3	DEFO-JCGB	0.0	L	L	B	S4	2500	NOTE 3. PLATE NO. 1. PLACE A 220 OHM RESISTOR ACROSS THE SELF BIAS JACK. JUMPER FROM PIN NO. 1 OF ANY SOCKET TO 'K'.
6AR8	6.3	DEFO-HCGB	0.0	L	L	B	S4	2500	NOTE 3. PLATE NO. 2. PLACE A 220 OHM RESISTOR ACROSS THE SELF BIAS JACK. JUMPER FROM PIN NO. 1 OF ANY SOCKET TO 'K'.
6AS5	6.3	DCEO-GFAD	8.5	H	F	B	S4	3500	
6AU7	6.3	DEGB-FAHC	8.5	L	A	B	S4	1400	NOTE 5. DUAL TRIODE.
6AV5	6.3	GBAO-EHCO	22.5	L	H	B	S4	3700	
6AX7	6.3	DEGB-FAHC	2.0	L	A	A	S4	1000	NOTE 5. DUAL TRIODE.
6AX8	6.3	DEBO-FCGD	1.6	L	F	B	S4	3000	PENTODE SECTION.
6AX8	6.3	DEJO-AQHD	1.0	H	A	C	S4	5300	TRIODE SECTION.
6AZ5	6.3	CFDD-HAGB	0.0	A	D	F	S2	1000	NOTE 5. DUAL DIODE SET LOAD AT 38 READ ON 3000 SCALE.
6AZ6	6.3	CFDD-BGDE	0.0	A	C	F	S2	500	NOTE 5. DUAL DIODE SET LOAD AT 29 READ ON 3000 SCALE.
6B4	6.3	GBEO-CODD	45.0	L	A	B	S4	3300	NOTE 3.
6B7	6.3	GADD-BCFD	3.0	L	G	A	S4	700	PENTODE SECTION. CAP = G.
6B7	6.3	GADD-EDFD	0.0	B	A	B	S1	5000	NOTE 5. DUAL DIODE READ 0-10000 SCALE.
6BD5	6.3	GBAO-EHCO	12.0	K	K	B	S4	3100	
6BD6	6.3	DCAO-EFGB	3.0	L	F	A	S4	1250	
6BE7	6.3	EDGO-FAHJ	1.0	L	C	A	S4	500	AMPL. SECTION JUMPER FROM PIN NO. 2 OF ANY SOCKET TO 'K'.
6BE7	6.3	EDGJ-AFHB	5.0	F	C	A	S4	1050	OSC. SECTION.
6BE8	6.3	DEJO-FGHC	1.0	L	G	B	S4	3200	PENTODE SECTION.
6BE8	6.3	DEAD-BOCO	1.0	H	A	C	S4	5000	TRIODE SECTION.
6BF5	6.3	DCGO-EFBD	7.5	G	F	B	S4	4700	
6BF6	6.3	DCAO-GOBD	9.0	L	A	A	S4	1200	TRIODE SECTION.
6BF6	6.3	DCOO-FEBD	0.0	B	A	B	S1	5000	NOTE 5. DUAL DIODE READ 0-10000 SCALE.
6BF7	6.3	FCGB-HAED	1.0	F	A	B	S4	3000	NOTE 5. DUAL TRIODE.
6BF8	6.3	DEOD-JHFD	0.0	A	A	F	S2	900	NOTE 5. DUAL DIODE SET LOAD AT 53 READ ON 3000 SCALE.
6BF8	6.3	DEOD-GCFD	0.0	A	A	F	S2	900	NOTE 5. DUAL DIODE SET LOAD AT 53 READ ON 3000 SCALE.
6BF8	6.3	DEOD-BAFD	0.0	A	A	F	S2	900	NOTE 5. DUAL DIODE SET LOAD AT 53 READ ON 3000 SCALE.
6BG6	6.3	GBEO-DHCO	15.0	L	L	B	S4	3800	CAP = P.
6BG7	6.3	FCGB-HAED	1.0	F	A	B	S4	3000	NOTE 5. DUAL TRIODE.
6BJ6	6.3	DCAO-EFGB	1.0	L	F	B	S4	2300	
6BK5	6.3	DECO-AHFO	5.0	L	L	C	S4	5000	
6BK6	6.3	DCAO-GOBE	2.0	L	A	A	S4	1000	TRIODE SECTION.
6BK6	6.3	DCOO-FEBG	0.0	C	A	C	S1	10000	NOTE 5. DUAL DIODE READ 0-30000 SCALE.
6BL4	6.3	GHDD-EQCO	0.0	A	D	G	S2	3100	SET LOAD AT 14 READ ON 10000 SCALE
6BS8	6.3	DEGB-FAHC	2.2	H	A	B	S4	4500	NOTE 5. DUAL TRIODE.
6BT6	6.3	DCAO-GOBD	3.0	L	A	A	S4	750	TRIODE SECTION.
6BT6	6.3	DCOO-FEBD	0.0	C	A	C	S1	10000	NOTE 5. DUAL DIODE READ 0-30000 SCALE.
6BT8	6.3	DEHO-FGJO	2.2	K	H	B	S4	3900	PENTODE SECTION.
6BT8	6.3	DEOD-ABCO	0.0	A	C	F	S2	500	NOTE 5. DUAL DIODE SET LOAD AT 12 READ ON 3000 SCALE.
6BU6	6.3	DCAO-GOBD	9.0	L	A	A	S4	1200	TRIODE SECTION.
6BU6	6.3	DCOO-FEBD	0.0	C	A	C	S1	10000	NOTE 5. DUAL DIODE READ 0-30000 SCALE.
6BV8	6.3	DEBO-COAO	3.6	K	A	B	S4	3500	TRIODE SECTION.
SEE NEXT PAGE FOR CONTINUATION									

TUBE TYPE	FIL.	SELECTORS	BIAS	PLT	SCRN	RANGE	PRESS	MIN. MUT. COND	NOTATIONS FOR EXPLANATIONS - SEE BACK COVER
6BV8	6.3	DE00-JFGH	0.0	A	D	G	S2	3300	NOTE 5. DUAL DIODE SET LOAD AT 10 READ ON 10000 SCALE.
6BW4	6.3	DE00-GAJO	0.0	A	H	G	S2	3000	NOTE 5. DUAL DIODE SET LOAD AT 67 READ ON 10000 SCALE.
6BX6	6.3	DEB0-GHAJ	2.0	J	J	B	S4	4500	
6BX7	6.3	GHDA-EBFC	16.0	L	A	B	S4	4800	NOTE 5. DUAL TRIODE.
6BX8	6.3	DEGB-FAHC	1.4	E	A	B	S4	4200	NOTE 5. DUAL TRIODE.
6BY5	6.3	GB00-DEHA	0.0	A	E	G	S2	4900	NOTE 5. DUAL DIODE SET LOAD AT 11 READ ON 10000 SCALE.
6BZ8	6.3	DEGB-FAHC	1.0	G	A	C	S4	5000	NOTE 5. DUAL TRIODE.
6C5	6.3	GBE0-COHO	8.0	L	A	A	S4	1250	
6C6	6.3	FA00-BCED	3.0	L	F	A	S4	750	CAP = G.
6CF6	6.3	DCA0-EFBG	1.0	G	G	B	S4	4800	
6CH7	6.3	DEGB-FAHC	2.2	H	A	B	S4	4300	NOTE 5. DUAL TRIODE.
6CH8	6.3	DEG0-BCFD	2.2	K	H	B	S4	3900	PENTODE SECTION.
6CH8	6.3	DEHO-JOAO	6.0	K	A	B	S4	2100	TRIODE SECTION.
6CJ6	6.3	DEB0-OGCA	38.5	L	L	B	S4	3900	CAP = P.
6CK4	6.3	GBCO-EOHO	28.0	L	A	B	S4	3500	
6CK6	6.3	DEB0-GACF	5.5	L	L	C	S4	6300	
6CM8	6.3	DEB0-FGCO	2.2	K	H	B	S4	3900	PENTODE SECTION.
6CM8	6.3	DEJO-AOHO	2.0	L	A	A	S4	1250	TRIODE SECTION
6CR6	6.3	DCGO-EFAB	2.0	L	F	A	S4	1400	PENTODE SECTION.
6CR6	6.3	DC00-BOAO	0.0	B	A	B	S1	5000	DIODE SECTION READ 0-10000 SCALE.
6CR8	6.3	DEB0-FGCH	1.0	H	H	B	S4	4800	PENTODE SECTION.
6CR8	6.3	DEJO-AOHO	2.0	G	A	B	S4	2500	TRIODE SECTION.
6CU6	6.3	GBE0-ODHO	22.5	L	H	B	S4	3700	CAP = P.
6D4	6.3	DCA0-GOEO	---	A	D	F	S2	1600	NOTE 6. SET LOAD AT 17 FIRES ABOUT 7V. READ ON 3000 SCALE.
6D6	6.3	FA00-BCED	3.0	L	F	A	S4	1000	CAP = G.
6DA6	6.3	DEB0-GHCJ	2.0	L	F	B	S4	2300	
6DA7	6.3	DEG0-FOHO	8.0	L	A	B	S4	1600	TRIODE NO. 1.
6DA7	6.3	DECO-AOJO	17.5	H	A	B	S4	3600	TRIODE NO. 2.
6DB6	6.3	DCA0-EFBG	1.5	H	H	B	S4	2400	
6DN6	6.3	GBE0-OHCO	18.0	G	G	C	S4	5500	CAP = P.
6DW5	6.3	DECO-JAGO	22.5	K	H	B	S4	3500	
6DX4	6.3	DCFO-GOEO	---	E	A	C	S4	7000	BIAS = 150 OHMS.
6E5	6.3	FACO-ODEO	0.0	L	L	G	S4	----	SHADOW ANGLE = 90 DEGREE CONNECT A 1M OHM RESISTOR FROM 'P' TO PIN 2 OF ANY SOCKET.
6E5	6.3	FACO-ODEO	8.0	L	L	G	S4	----	SHADOW ANGLE = 0 DEGREE CONNECT A 1M OHM RESISTOR FROM 'P' TO PIN 2 OF ANY SOCKET.
6F4	6.3	FAB0-COGO	1.4	E	A	B	S4	3600	
6F5	6.3	GB00-DOHA	2.0	L	A	A	S4	950	CAP = G.
6F6	6.3	GBE0-CDHA	16.5	L	L	B	S4	1550	
6F7	6.3	GAD0-BCFE	3.0	L	F	A	S4	700	PENTODE SECTION. CAP = G.
6F7	6.3	GAEO-DOFC	3.0	F	A	A	S4	300	TRIODE SECTION.
6F8	6.3	GBOE-CFDH	8.0	L	A	B	S4	1650	NOTE 5. DUAL TRIODE. CAP = G.
6FH6	6.3	GBE0-ODHO	22.5	L	H	B	S4	3500	CAP = P.
6FR7	6.3	DEG0-FOHO	3.0	L	A	A	S4	1000	TRIODE NO. 1.
6FR7	6.3	DECO-AOJO	20.0	H	A	B	S4	4500	TRIODE NO. 2.
6FW8	6.3	DEGB-FAHC	1.2	F	A	C	S4	8000	NOTE 5. DUAL TRIODE.
6G6	6.3	GBE0-CDHO	9.0	J	J	A	S4	1450	
6GC6	6.3	GBE0-OHCO	22.5	L	H	B	S4	4100	CAP = P.
6GD7	6.3	DEJO-FGHO	1.1	J	H	C	S4	7500	PENTODE SECTION.
6GD7	6.3	DEAO-BOCO	1.0	G	A	C	S4	6000	TRIODE SECTION.
6GS8	6.3	DEG0-HBAJ	1.0	F	E	A	S4	750	PENTODE NO. 1.
6GS8	6.3	DEG0-CBAF	1.0	F	E	A	S4	750	PENTODE NO. 2.
6GW5	6.3	DCBO-AOEO	1.1	H	A	C	S4	10500	
6H5	6.3	FAEO-DOCO	0.0	L	L	G	S4	----	SHADOW ANGLE = 90 DEGREE CONNECT A 1M OHM RESISTOR FROM PIN 2 OF ANY SOCKET TO 'P'.
6H5	6.3	FAEO-DBCO	30.0	L	L	G	S4	----	SHADOW ANGLE = 0 DEGREE CONNECT A 1M OHM RESISTOR FROM PIN 2 OF ANY SOCKET TO 'P'.

TUBE TYPE	FIL.	SELECTORS	BIAS	PLT	SCRN	RANGE	PRESS	MIN. MUT. COND	NOTATIONS FOR EXPLANATIONS - SEE BACK COVER
6H6	6.3	GB00-ECHD	0.0	A	B	E	S2	4200	NOTE 5. DUAL DIODE SET LOAD AT 22 READ ON 10000 SCALE.
6J5	6.3	GBE0-COHO	8.0	L	A	B	S4	1650	
6J7	6.3	GB00-CDHE	3.0	L	F	A	S4	750	CAP = G.
6J8	6.3	GBOF-CDHE	3.0	F	E	A	S4	550	HEPTODE SECTION. CAP = G.
6J8	6.3	GBE0-FOHO	0.0	F	A	A	S4	1000	TRIODE SECTION.
6JA8	6.3	DEGO-JHFO	1.2	G	G	C	S4	8000	TETRODE SECTION.
6JA8	6.3	DEBO-COAO	2.0	K	A	B	S4	2500	TRIODE SECTION.
6K4	6.3	CDBO-AOEO	7.8	K	A	B	S4	2200	
6K7	6.3	GB00-CDHE	3.0	L	F	A	S4	900	CAP = G.
6K8	6.3	GBOF-CDHE	3.0	F	D	A	S4	350	HEXODE SECTION. CAP = G.
6K8	6.3	GBE0-FOHO	4.0	F	A	A	S4	1100	TRIODE SECTION.
6KS8	6.3	DEGO-JHFO	3.7	H	H	C	S4	6000	PENTODE SECTION.
6KS8	6.3	DEBO-COAO	2.0	K	A	B	S4	2500	TRIODE SECTION.
6L4	6.3	FABO-COGO	1.4	E	A	B	S4	4000	
6L5	6.3	GBE0-COHO	9.0	L	A	A	S4	1200	
6L7	6.3	GB00-CDHE	3.0	L	F	A	S4	750	CAP GRID. CAP = G.
6L7	6.3	GBE0-CDHA	10.0	L	F	A	S4	450	PIN GRID. CAP = K.
6N4	6.3	DCAO-EOBO	3.5	J	A	B	S4	3800	
6N7	6.3	GBED-FCHO	5.0	L	A	B	S4	2000	NOTE 5. DUAL TRIODE.
6N8	6.3	DEBO-FACJ	2.0	L	E	A	S4	1400	PENTODE SECTION.
6N8	6.3	DE00-GHCJ	0.0	B	A	B	S1	5000	NOTE 5. DUAL DIODE.
6P5	6.3	GBE0-COHO	13.5	L	A	A	S4	900	
6Q4	6.3	DEAO-JOCO	1.5	L	A	C	S4	7500	
6Q5	6.3	GBE0-COHO	---	A	F	F	S2	1500	NOTE 6. SET LOAD AT 80 FIRES ABOUT 17V. READ ON 3000 SCALE.
6Q7	6.3	GB00-COHA	3.0	L	A	A	S4	750	TRIODE SECTION. CAP = G.
6Q7	6.3	GB00-EDHC	0.0	B	A	B	S1	5000	NOTE 5. DUAL DIODE. READ 0-10000 SCALE.
6R7	6.3	GB00-COHA	9.0	L	A	A	S4	1200	TRIODE SECTION. CAP = G.
6R7	6.3	GB00-EDHC	0.0	B	A	B	S1	5000	NOTE 5. DUAL DIODE. READ 0-10000 SCALE.
6R8	6.3	DEHO-JOGB	9.0	L	A	A	S4	1200	TRIODE SECTION.
6R8	6.3	DE00-AFGH	0.0	B	A	B	S1	5000	NOTE 5. DUAL DIODE.
6R8	6.3	DE00-BOCJ	0.0	B	A	B	S1	5000	DIODE NO. 3
6S7	6.3	GB00-CDHE	3.0	L	F	A	S4	1100	CAP = G.
6S8	6.3	GH00-FOBO	2.0	L	A	A	S4	700	TRIODE SECTION. CAP = G.
6S8	6.3	GH00-CDEB	0.0	B	A	B	S1	5000	NOTE 5. DUAL DIODE. READ 0-10000 SCALE.
6S8	6.3	GH00-AOBO	0.0	B	A	B	S1	5000	DIODE NO. 3. READ 0-10000 SCALE.
6SA7	6.3	GBHO-CDFE	0.0	F	D	A	S4	400	AMPL. SECTION. JUMPER FROM PIN NO. 1 OF ANY SOCKET TO 'K'.
6SA7	6.3	GBEA-DCFH	0.0	F	F	B	S4	1800	OSC. SECTION.
6SB7	6.3	GBHO-CDFE	0.0	F	D	B	S4	2300	AMPL. SECTION. JUMPER FROM PIN NO. 1 OF ANY SOCKET TO 'K'.
6SB7	6.3	GBEA-DCFH	0.0	F	F	C	S4	5500	OSC. SECTION.
6SC7	6.3	GHDC-EBFO	2.0	L	A	A	S4	800	NOTE 5. DUAL TRIODE.
6SD7	6.3	GBDO-HFEC	2.0	L	G	B	S4	2700	
6SF5	6.3	GHCO-EOBA	2.0	L	A	A	S4	950	
6SF7	6.3	GHBO-FDCA	1.0	L	F	A	S4	1300	PENTODE SECTION.
6SF7	6.3	GH00-EDCF	0.0	B	A	B	S1	5000	DIODE SECTION. READ 0-10000 SCALE.
6SG7	6.3	GBDO-HFEA	2.5	L	H	B	S4	2500	
6SH7	6.3	GBDO-HFEA	1.0	L	H	B	S4	3100	
6SJ7	6.3	GBDA-HFEC	3.0	L	F	A	S4	1050	
6SK7	6.3	GBDO-HFEC	3.0	L	F	A	S4	1250	
6SL7	6.3	GHDA-EBFC	2.0	L	A	A	S4	1000	NOTE 5. DUAL TRIODE.
6SQ7	6.3	GHBO-FOCA	2.0	L	A	A	S4	750	TRIODE SECTION.
6SQ7	6.3	GH00-EDCF	0.0	B	A	B	S1	5000	NOTE 5. DUAL DIODE. READ 0-10000 SCALE.
6SR7	6.3	GHBO-FOCA	9.0	L	A	A	S4	1200	TRIODE SECTION.
6SR7	6.3	GH00-EDCF	0.0	B	A	B	S1	5000	NOTE 5. DUAL DIODE. READ 0-10000 SCALE.
6SS7	6.3	GBDO-HFEC	3.0	L	F	A	S4	1150	
6ST7	6.3	GHBO-FOCA	9.0	L	A	A	S4	1200	TRIODE SECTION.
SEE NEXT PAGE FOR CONTINUATION									

TUBE TYPE	FIL.	SELECTORS	BIAS	PLT	SCRN	RANGE	PRESS	MIN. MUT. COND	NOTATIONS FOR EXPLANATIONS - SEE BACK COVER
6ST7	6.3	GH00-EDCF	0.0	B	A	B	S1	5000	NOTE 5. DUAL DIODE. READ 0-10000 SCALE.
6SU7	6.3	GHDA-EBFC	2.0	L	A	A	S4	1000	NOTE 5. DUAL TRIODE.
6SV7	6.3	GHBO-FDCO	1.0	L	H	B	S4	2300	PENTODE SECTION.
6SV7	6.3	GH00-EOCO	0.0	A	C	F	S2	600	DIODE SECTION. SET LOAD AT 23
6U4	6.3	GH00-EOCO	0.0	A	F	G	S2	5000	READ ON 3000 SCALE.
6U5	6.3	FACO-ODEO	0.0	L	L	G	S4	----	SET LOAD AT 19 READ ON 10000 SCALE
6U5	6.3	FACO-ODEO	25.0	L	L	G	S4	----	SHADOW ANGLE = 90 DEGREE CONNECT A
6U6	6.3	GBEO-CDHO	1.1	G	G	B	S4	3900	1M OHM RESISTOR FROM PIN 2 OF
6V4	6.3	DE00-GACD	0.0	A	E	G	S2	2500	ANY SOCKET TO 'P'.
6V8	6.3	DEFO-AQCH	3.0	L	A	A	S4	750	SHADOW ANGLE = 0 DEGREE# CONNECT A
6V8	6.3	DE00-JOCB	0.0	B	A	B	S1	5000	1M OHM RESISTOR FROM PIN 2 OF
6V8	6.3	DE00-GBHC	0.0	B	A	B	S1	5000	ANY SOCKET TO 'P'.
6Y6	6.3	GBEO-CDHO	12.0	K	G	B	S4	4500	
6ZY5	6.3	GB00-ECHD	0.0	A	F	G	S2	2300	NOTE 5. DUAL DIODE. SET LOAD AT 55
7A4	6.3	HAFO-BOGO	8.0	L	A	B	S4	1650	READ ON 10000 SCALE.
7A5	6.3	HAFO-BCGO	9.0	G	G	B	S4	3500	
7A6	6.3	HA00-FCGB	0.0	A	F	G	S2	2500	NOTE 5. DUAL DIODE. SET LOAD AT 55
7A7	6.3	HAFO-BCGD	3.0	L	F	A	S4	1250	READ ON 10000 SCALE.
7A8	6.3	HAFO-BEGD	4.4	F	D	A	S4	300	AMPL. SECTION. JUMPER FROM PIN
7A8	6.3	HADB-CEGF	0.0	J	F	A	S4	900	NO. 1 OF ANY SOCKET TO 'K'.
7AD7	6.3	HAFO-BCGD	2.4	M	H	C	S4	6000	OSC. SECTION.
7AF7	6.3	HAED-FCGB	10.0	L	A	B	S4	1450	NOTE 5. DUAL TRIODE.
7AG7	6.3	HAFO-BCGD	2.0	L	L	B	S4	2600	
7AH7	6.3	HAFO-BCGD	2.2	L	L	B	S4	2100	
7AK7	6.3	HAFO-BCGD	0.0	H	E	B	S4	3500	
7B4	6.3	HAFO-BOGO	2.0	L	A	A	S4	950	
7B7	6.3	HAFO-BCGD	3.0	L	F	A	S4	1100	
7C5	6.3	HAFO-BCGO	12.5	L	L	B	S4	2600	
7C6	6.3	HACO-BOGO	1.0	L	A	A	S4	600	TRIODE SECTION.
7C6	6.3	HA00-FEGB	0.0	B	A	B	S1	5000	NOTE 5. DUAL DIODE. READ 0-10000
7C7	6.3	HAFO-BCGD	3.0	L	F	A	S4	1000	SCALE.
7E5	6.3	HBAO-CODD	3.0	J	A	B	S4	1900	
7E6	6.3	HACO-BOGO	9.0	L	A	A	S4	1200	TRIODE SECTION.
7E6	6.3	HA00-FEGB	0.0	B	A	B	S1	5000	NOTE 5. DUAL DIODE. READ 0-10000
7E7	6.3	HAFO-BEGO	3.0	L	F	A	S4	800	SCALE.
7E7	6.3	HA00-DCGB	0.0	B	A	B	S1	5000	PENTODE SECTION.
7F7	6.3	HAED-FCGB	2.0	L	A	A	S4	1000	NOTE 5. DUAL DIODE. READ 0-10000
7F8	6.3	GBHA-FCED	3.0	L	A	B	S4	2100	SCALE.
7G7	6.3	HAFO-BCGD	2.0	L	F	B	S4	2800	NOTE 5. DUAL TRIODE.
7H7	6.3	HAFO-BCGD	2.4	L	H	B	S4	2500	NOTE 5. DUAL TRIODE.
7J7	6.3	HAFO-BEGD	3.0	F	E	A	S4	550	
7J7	6.3	HADO-COGO	5.0	H	A	A	S4	950	HEPTODE SECTION.
7K7	6.3	HADO-COBO	2.0	L	A	A	S4	1000	TRIODE SECTION.
7K7	6.3	HA00-EFGD	0.0	B	A	B	S4	5000	TRIODE SECTION.
7L7	6.3	HAFO-BCGD	1.5	L	F	B	S4	1900	NOTE 5. DUAL DIODE. READ 0-10000
7N7	6.3	HAED-FCGB	8.0	L	A	B	S4	1600	SCALE.
7Q7	6.3	HAFO-BCGD	0.0	F	D	A	S4	500	NOTE 5. DUAL TRIODE.
7Q7	6.3	HADO-COGF	0.0	F	F	B	S4	3300	AMPL. SECTION. JUMPER FROM PIN
7R7	6.3	HAFO-BEGO	1.0	L	F	B	S4	2000	NO. 5 OF ANY SOCKET TO 'K'.
7R7	6.3	HA00-DCGB	0.0	B	A	B	S1	5000	OSC. SECTION.

TUBE TYPE	FIL.	SELECTORS	BIAS	PLT	SCRN	RANGE	PRESS	MIN. MUT. COND	NOTATIONS FOR EXPLANATIONS - SEE BACK COVER
7V7	6.3	HAFO-BCGD	2.2	M	H	B	S4	3600	NOTE 5. DUAL DIODE. SET LOAD AT 12 READ ON 10000 SCALE.
7W7	6.3	HAFO-BCGE	2.2	M	H	B	S4	3600	
7X6	6.3	HA00-FCGB	0.0	A	D	G	S2	2800	
7X7	6.3	HACO-BODD	1.0	L	A	A	S4	950	TRIODE SECTION. NOTE 5. DUAL DIODE. SET LOAD AT 29 READ ON 3000 SCALE.
7X7	6.3	HA00-EFDG	0.0	A	C	F	S2	500	
7Y4	6.3	HA00-FCGD	0.0	A	H	G	S2	6000	NOTE 5. DUAL DIODE. SET LOAD AT 20 READ ON 10000 SCALE.
7Z4	6.3	HA00-FCGD	0.0	A	H	G	S2	3000	NOTE 5. DUAL DIODE. SET LOAD AT 67 READ ON 10000 SCALE.
8CY7	7.5	DEGO-FOHD	3.0	L	A	A	S4	800	TRIODE NO. 1.
8CY7	7.5	DECO-AOJO	18.5	H	A	B	S4	3400	TRIODE NO. 2.
8HA6	7.5	DEBO-GHAJ	---	H	F	D	S4	12500	BIAS = 33 OHMS.
8HG8	7.5	DEBO-HJCO	1.5	J	H	C	S4	7500	PENTODE SECTION.
8HG8	7.5	DEFO-GOCO	3.0	F	A	B	S4	3750	TRIODE SECTION.
8JE8	7.5	DEGO-JHFO	2.1	L	J	C	S4	7500	PENTODE SECTION.
8JE8	7.5	DEBO-COAO	2.0	K	A	B	S4	2600	TRIODE SECTION.
8JK8	7.5	DEGO-FOHJ	1.0	F	A	B	S4	4300	TRIODE NO. 1.
8JK8	7.5	DEBO-AOCJ	1.1	G	A	C	S4	8000	TRIODE NO. 2.
8JT8	7.5	DEGO-JHFO	1.7	K	F	C	S4	12500	PENTODE SECTION.
8JT8	7.5	DEBO-COAO	2.0	L	A	B	S4	1700	TRIODE SECTION.
8JU8A	7.5	DE00-HAJB	0.0	A	D	G	S2	3300	NOTE 5. DUAL DIODE. SET LOAD AT 10 READ ON 10000 SCALE.
8JU8A	7.5	DE00-GBHC	0.0	A	D	G	S2	3300	NOTE 5. DUAL DIODE. SET LOAD AT 10 READ ON 10000 SCALE.
8KS8	7.5	DEGO-JHFO	3.7	H	H	C	S4	6000	PENTODE SECTION.
8KS8	7.5	DEBO-COAO	2.0	K	A	B	S4	2500	TRIODE SECTION.
8LE8	7.5	DEJO-FHCG	2.5	F	F	B	S4	3600	PENTODE NO. 1.
8LE8	7.5	DEJO-AHCB	2.5	F	F	B	S4	3600	PENTODE NO. 2.
8SN7	7.5	GHDA-EBFC	8.0	L	A	B	S4	1700	NOTE 5. DUAL TRIODE.
9BR7	10.0	DEBO-AOCO	2.0	L	A	B	S4	3500	TRIODE SECTION.
9BR7	10.0	DE00-GFHD	0.0	A	D	F	S2	1100	NOTE 5. DUAL DIODE. SET LOAD AT 53 READ ON 3000 SCALE.
9CL8	10.0	DEJO-FGHD	1.0	G	G	B	S4	3700	TETRUDE SECTION.
9CL8	10.0	DEAD-BOCO	1.2	H	A	C	S4	5000	TRIODE SECTION.
9DZ8	10.0	DECO-FGBO	9.2	H	G	B	S4	4700	PENTODE SECTION.
9DZ8	10.0	DEAO-JOHO	1.2	G	A	A	S4	850	TRIODE SECTION.
9U8	10.0	DEBO-FCGO	1.0	G	F	B	S4	3100	PENTODE SECTION.
9U8	10.0	DEJO-AOHO	1.0	H	A	C	S4	5000	TRIODE SECTION.
9X8	10.0	DEGO-JHFA	1.0	G	G	B	S4	3500	PENTODE SECTION.
9X8	10.0	DEBO-COFA	1.0	G	A	B	S4	4100	TRIODE SECTION.
10C8	10.0	DEHO-FGJO	1.6	H	H	C	S4	5000	PENTODE SECTION.
10C8	10.0	DEBO-AOCO	2.8	L	A	B	S4	2800	TRIODE SECTION.
10DA7	10.0	DEGO-FOHD	8.0	L	A	B	S4	1600	TRIODE NO. 1.
10DA7	10.0	DECO-AOJO	17.5	H	A	B	S4	3600	TRIODE NO. 2.
10EB8	10.0	DEGO-JHFO	2.2	K	G	C	S4	8000	PENTODE SECTION.
10EB8	10.0	DEBO-COAO	2.0	L	A	B	S4	1700	TRIODE SECTION.
10EW7	10.0	DEGO-FOHD	11.0	L	A	A	S4	1250	TRIODE NO. 1.
10EW7	10.0	DEBO-AOJO	17.5	H	A	B	S4	4700	TRIODE NO. 2.
10FD7	10.0	DEGO-FOHD	3.0	L	A	A	S4	1000	TRIODE NO. 1.
10FD7	10.0	DEBO-AOJO	17.5	H	A	B	S4	4700	TRIODE NO. 2.
10FR7	10.0	DEGO-FOHD	3.0	L	A	A	S4	1000	TRIODE NO. 1.
10FR7	10.0	DECO-AOJO	20.0	H	A	B	S4	4500	TRIODE NO. 2.
10HA6	10.0	DEBO-GHAJ	---	H	F	D	S4	12500	BIAS = 33 OHMS.
11C5	10.0	DCBO-GFAD	7.5	F	F	B	S4	3600	PENTODE SECTION. CAP = G. RECT. SECTION. SET LOAD AT 30 READ ON 10000 SCALE. PENTODE SECTION. CAP = G.
12A4	12.6	DEBO-JOAO	9.0	L	A	C	S4	5000	
12A7	12.6	GA00-BCFE	11.0	G	G	A	S4	600	
12A7	12.6	GA00-EODB	0.0	A	E	G	S2	2600	
12A8	12.6	GB00-CDHE	1.5	F	D	A	S4	900	PENTODE SECTION. CAP = G.
12A8	12.6	GBEC-FDHO	1.0	F	D	A	S4	750	CAP = K. OSC. SECTION.
12AB5	12.6	DECO-JAGO	12.5	L	L	B	S4	2600	
12AC6	12.6	DCBO-FEGA	1.0	B	B	A	S4	450	

TUBE TYPE	FIL.	SELECTORS	BIAS	PLT	SCRN	RANGE	PRESS	MIN. MUT. COND	NOTATIONS FOR EXPLANATIONS - SEE BACK COVER
12AD6	12.6	DCGU-EFBA	0.0	B	B	A	S4	850	AMPL. SECTION.
12AD6	12.6	DCAU-FEBG	0.0	B	B	B	S4	2400	OSC. SECTION.
12AD7	12.6	DEGB-FAHC	2.0	L	A	A	S4	1000	NOTE 5. DUAL TRIODE.
12AE6	12.6	DCAU-GOBD	1.0	B	A	A	S4	600	TRIODE SECTION.
12AE6	12.6	DCDU-FEBD	0.0	B	A	B	S1	5000	NOTE 5. DUAL DIODE. READ 0-10000 SCALE.
12AE7	12.6	DEGU-FQHD	1.6	B	A	B	S4	2500	TRIODE NO. 1.
12AE7	12.6	DEBD-AOCO	1.0	B	A	B	S4	4100	TRIODE NO. 2.
12AF6	12.6	DCAU-EFGB	1.0	B	B	A	S4	900	
12AG6	12.6	DCGU-EFBA	0.0	B	B	A	S4	500	AMPL. SECTION.
12AG6	12.6	DCAU-FEBG	0.0	B	B	B	S4	1600	OSC. SECTION.
12AH7	12.6	GHEA-FCDB	6.5	J	A	A	S4	1200	NOTE 5. DUAL TRIODE.
12AJ6	12.6	DCAU-GOBD	0.6	B	A	A	S4	750	TRIODE SECTION.
12AJ6	12.6	DCDU-FEBD	0.0	B	A	B	S1	5000	NOTE 5. DUAL DIODE. READ 0-10000 SCALE.
12AL8	12.6	DEBD-FCGD	0.5	B	B	C	S4	6000	TETRODE SECTION.
12AL8	12.6	DEHD-AOJD	1.0	B	A	A	S4	600	TRIODE SECTION.
12AS5	12.6	DCFD-GFAU	8.5	H	F	B	S4	3500	
12AU8	12.6	DEGU-JHFD	1.5	K	G	B	S4	4400	PENTODE SECTION.
12AU8	12.6	DEBD-CQAD	1.3	H	A	H	S4	3100	TRIODE SECTION.
12AV7	12.6	DEGB-FAHC	1.0	H	A	C	S4	5000	NOTE 5. DUAL TRIODE.
12AW6	12.6	DCAU-EFGB	1.8	L	H	H	S4	310T	
12AX4	12.6	GHDD-EUCD	0.0	A	J	G	S2	6000	SET LOAD AT 22 READ ON 10000 SCALE
12B7	12.6	HAFO-BCGD	3.0	L	F	A	S4	1250	
12BH7	12.6	DEGB-FAHC	10.5	L	A	B	S4	1900	NOTE 5. DUAL TRIODE.
12BK5	12.6	DECD-AHFD	5.0	L	L	C	S4	5500	
12BK6	12.6	DCAU-GOBE	2.0	L	A	A	S4	1000	TRIODE SECTION.
12BK6	12.6	DCDU-FEBG	0.0	C	A	C	S1	10000	NOTE 5. DUAL DIODE. READ 0-30000 SCALE.
12BL6	12.6	DCAU-EFGB	1.0	B	B	A	S4	850	
12BR7	12.6	DEBD-AOCO	2.0	L	A	B	S4	3500	TRIODE SECTION.
12BR7	12.6	DEDD-GFHD	0.0	A	D	F	S2	1100	NOTE 5. DUAL DIODE. SET LOAD AT 53 READ ON 3000 SCALE.
12BT6	12.6	DCAU-GOBD	3.0	L	A	A	S4	750	TRIODE SECTION.
12BT6	12.6	DCDU-FEBD	0.0	C	A	C	S1	10000	NOTE 5. DUAL DIODE. READ 0-30000 SCALE.
12BU6	12.6	DCAU-GOBD	9.0	L	A	A	S4	1200	TRIODE SECTION.
12BU6	12.6	DCDU-FEBD	0.0	C	A	C	S1	10000	NOTE 5. DUAL DIODE. READ 0-30000 SCALE.
12BV7	12.6	DEBD-GHAC	2.2	L	H	C	S4	8000	
12BW4	12.6	DEDD-GAJD	0.0	A	H	G	S2	3000	NOTE 5. DUAL DIODE. SET LOAD AT 67 READ ON 10000 SCALE.
12BZ7	12.6	DEGB-FAHC	2.0	L	A	B	S4	2000	NOTE 5. DUAL TRIODE.
12C8	12.6	GBDD-CFHD	3.0	L	G	A	S4	800	PENTODE SECTION. CAP = G.
12C8	12.6	GBDD-EDHC	0.0	B	A	B	S1	5000	NOTE 5. DUAL DIODE. READ 0-10000 SCALE.
12CM6	12.6	DEFD-JAGD	12.5	L	L	B	S4	2600	
12CN5	12.6	DCBD-GFAU	1.0	B	B	B	S4	2400	
12CT8	12.6	DEHD-FGJD	1.5	K	G	B	S4	4400	PENTODE SECTION.
12CT8	12.6	DEBD-AOCO	1.3	H	A	B	S4	3100	TRIODE SECTION.
12CX6	12.6	DCAU-EFGB	1.0	B	B	B	S4	1900	
12DE8	12.6	DEAD-FHJD	1.0	B	B	A	S4	950	PENTODE SECTION.
12DE8	12.6	DEDD-COBD	0.0	A	D	F	S2	1200	DIODE SECTION. SET LOAD AT 53 READ ON 3000 SCALE.
12DF5	12.6	DEDD-FAHC	0.0	A	H	G	S2	3000	NOTE 5. DUAL DIODE. SET LOAD AT 67 READ ON 10000 SCALE.
12DF7	12.6	DEGB-FAHC	2.0	L	A	A	S4	1000	NOTE 5. DUAL TRIODE.
12DK6	12.6	DCAU-EFGB	1.0	G	G	C	S4	6000	
12DK7	12.6	DEAD-GCBD	1.0	B	B	B	S4	3100	TETRODE SECTION.
12DK7	12.6	DEDD-FJBD	0.0	B	A	B	S1	6200	NOTE 5. DUAL DIODE.
12DL8	12.6	DEGU-FCBD	0.5	B	B	C	S4	6000	TETRODE SECTION.
12DL8	12.6	DEDD-JAHD	0.0	C	A	C	S1	13500	NOTE 5. DUAL DIODE.
12DQ4	12.6	GHDD-EUCD	0.0	A	J	G	S2	6000	SET LOAD AT 22 READ ON 10000 SCALE
12DQ7	12.6	DEBD-GHAJ	2.1	K	G	C	S4	6500	

TUBE TYPE	FIL.	SELECTORS	BIAS	PLT	SCRN	RANGE	PRESS	MIN. MUT. COND	NOTATIONS FOR EXPLANATIONS - SEE BACK COVER
12DS7	12.6	DEGO-FCHO	1.0	B	B	C	S4	6000	TETRODE SECTION.
12DS7	12.6	DEEO-JAHO	0.0	B	A	B	S1	8500	NOTE 5. DUAL DIODE.
12DU7	12.6	DEAO-FCBO	1.0	B	B	B	S4	3900	TETRODE SECTION.
12DU7	12.6	DEEO-JGBO	0.0	B	A	B	S1	5000	NOTE 5. DUAL DIODE. READ 0-10000 SCALE.
12DV7	12.6	DEGO-FOHO	1.0	B	A	A	S4	450	TRIODE SECTION.
12DV7	12.6	DEEO-CBAO	0.0	B	A	B	S1	5000	NOTE 5. DUAL DIODE. READ 0-10000 SCALE.
12DV8	12.6	DEHO-FCBO	1.1	B	B	C	S4	6000	TETRODE SECTION.
12DV8	12.6	DEEO-JAGO	0.0	C	A	C	S1	13500	NOTE 5. DUAL DIODE.
12DW5	12.6	DECO-JAGO	22.5	K	H	B	S4	3500	
12DW8	12.6	DEGO-FOHO	1.0	B	A	B	S4	1700	TRIODE NO. 1.
12DW8	12.6	DEBO-AOCO	1.0	B	A	B	S4	4100	TRIODE NO. 2.
12DW8	12.6	DEEO-JOHO	0.0	A	F	G	S2	2200	DIODE SECTION. SET LOAD AT 40 READ ON 10000 SCALE.
12DY8	12.6	DEAO-FCBU	1.0	B	B	B	S4	3800	TETRODE SECTION.
12DY8	12.6	DEJO-HOGO	1.0	B	A	A	S4	1250	TRIODE SECTION.
12DZ6	12.6	DCAO-EFGB	1.0	B	B	B	S4	2400	
12DZ8	12.6	DECO-FGBO	9.2	H	G	B	S4	4700	PENTODE SECTION.
12DZ8	12.6	DEAO-JOHO	1.2	G	A	A	S4	850	TRIODE SECTION.
12EA6	12.6	DCAO-EFGB	1.0	B	B	B	S4	2400	
12EC8	12.6	DEJO-FGHO	1.0	B	B	A	S4	1250	PENTODE SECTION.
12EC8	12.6	DEAO-BOCO	1.0	B	A	B	S4	2900	TRIODE SECTION.
12ED5	12.6	CDBO-GFAO	4.5	G	G	C	S4	5300	
12EG6	12.6	DCAO-FOBO	1.0	B	B	A	S4	500	
12EH5	12.6	DCBO-GFAO	3.3	G	G	C	S4	9000	
12EK6	12.6	DCAO-EFGB	1.0	B	B	B	S4	2600	
12EL6	12.6	DCAO-BOGO	0.5	B	A	A	S4	750	TRIODE SECTION.
12EL6	12.6	DCOO-EFGO	0.0	B	A	B	S1	5000	NOTE 5. DUAL DIODE. READ 0-10000 SCALE.
12EM6	12.6	DEAO-FCBO	1.0	B	B	B	S4	3100	TETRODE SECTION.
12EM6	12.6	DEEO-JOBO	0.0	B	A	B	S1	5000	DIODE SECTION. READ 0-10000 SCALE.
12EN6	12.6	GBEO-CDHO	7.5	K	F	C	S4	5000	
12EQ7	12.6	DEBO-GFCA	1.0	F	F	B	S4	2400	PENTODE SECTION.
12EQ7	12.6	DEEO-HOCO	0.0	B	A	B	S1	5000	DIODE SECTION. READ 0-10000 SCALE.
12EZ6	12.6	DCAO-EFGB	0.5	B	B	B	S4	1700	
12F8	12.6	DEHO-CBGJ	0.5	B	B	A	S4	600	PENTODE SECTION.
12F8	12.6	DEEO-FAGO	0.0	B	A	B	S1	5000	NOTE 5. DUAL DIODE. READ 0-10000 SCALE.
12FK6	12.6	DCAO-GOBO	1.0	B	A	A	S4	750	TRIODE SECTION.
12FK6	12.6	DCOO-FEBO	0.0	B	A	B	S1	5000	NOTE 5. DUAL DIODE. READ 0-10000 SCALE.
12FM6	12.6	DCAO-GOBO	1.0	B	A	A	S4	800	TRIODE SECTION.
12FM6	12.6	DCOO-FEBO	0.0	B	A	B	S1	5000	NOTE 5. DUAL DIODE. READ 0-10000 SCALE.
12FR8	12.6	DECO-GFOO	1.0	B	B	B	S4	1700	NOTE 3. PENTODE SECTION.
12FR8	12.6	DEAO-JOBO	1.0	B	A	A	S4	750	TRIODE SECTION.
12FR8	12.6	DEEO-HOBO	0.0	B	A	B	S4	5000	DIODE SECTION. READ 0-10000 SCALE.
12FT6	12.6	DCAO-GOBO	1.0	B	A	A	S4	650	TRIODE SECTION.
12FT6	12.6	DCOO-FEBO	0.0	B	A	B	S1	6200	NOTE 5. DUAL DIODE.
12FV7	12.6	DEGB-FAHC	2.0	F	A	C	S4	6000	NOTE 5. DUAL TRIODE.
12FX8	12.6	DEJO-CAGB	0.0	B	B	A	S4	550	AMPL. SECTION.
12FX8	12.6	DEBO-ACGJ	0.0	B	B	B	S4	2200	OSC. SECTION.
12FX8	12.6	DEFO-HOOO	1.0	B	A	A	S4	900	NOTE 3. TRIODE SECTION.
12G4	12.6	DCFO-AOGO	8.0	L	A	B	S4	1600	
12G8	12.6	DEHO-FOGO	2.6	B	A	A	S4	1600	TRIODE NO. 1.
12G8	12.6	DECO-AOBO	0.8	B	A	A	S4	1600	TRIODE NO. 2.
12GA6	12.6	DCGO-EFBA	1.0	B	B	A	S4	400	AMPL. SECTION.
12GA6	12.6	DCAO-FEBG	0.0	B	B	A	S4	1500	OSC. SECTION.
12H6	12.6	GBOO-ECHD	0.0	A	F	G	S2	2500	NOTE 5. DUAL DIODE. SET LOAD AT 55 READ ON 10000 SCALE.
12J5	12.6	GBEO-COHO	8.0	L	A	A	S4	1650	
12J7	12.6	GBOO-CDHE	3.0	L	F	A	S4	750	CAP = G.
12J8	12.6	DEAO-FCBO	1.0	B	B	B	S4	3400	TETRODE SECTION.
SEE NEXT PAGE FOR CONTINUATION									

TUBE TYPE	FIL.	SELECTORS	BIAS	PLT	SCRN	RANGE	PRESS	MIN. MUT. COND	NOTATIONS FOR EXPLANATIONS - SEE BACK COVER
12J8	12.6	DE00-J0G0	0.0	A	C	F	S2	500	DIODE NO. 1. SET LOAD AT 29 READ ON 3000 SCALE.
12J8	12.6	DE00-H0G0	0.0	A	D	F	S2	2300	DIODE NO. 2. SET LOAD AT 13 READ ON 3000 SCALE.
12K7	12.6	G800-CDHE	3.0	L	G	A	S4	900	CAP = G.
12KL8	12.6	DE80-GFCA	1.0	F	F	B	S4	2700	PENTODE SECTION.
12KL8	12.6	DE00-H0C0	0.0	B	A	B	S1	5000	DIODE SECTION. READ 0-10000 SCALE.
12L6	12.6	G8E0-CDH0	8.7	K	G	C	S4	5000	
12L8	12.6	GFA0-HEBC	9.0	J	J	A	S4	1350	PENTODE NO. 1.
12L8	12.6	GFC0-DEBA	9.0	J	J	A	S4	1350	PENTODE NO. 2.
12Q7	12.6	G800-C0HA	3.0	L	A	A	S4	750	TRIODE SECTION. CAP = G.
12Q7	12.6	G800-EDHC	0.0	B	A	B	S1	5000	NOTE 5. DUAL DIODE. READ 0-10000 SCALE.
12R5	12.6	DC80-GFA0	7.0	F	F	B	S4	4400	
12S8	12.6	GH00-F0B0	2.0	L	A	A	S4	700	TRIODE SECTION. CAP = G.
12S8	12.6	GH00-CDEB	0.0	B	A	B	S1	5000	NOTE 5. DUAL DIODE. READ 0-10000 SCALE.
12S8	12.6	GH00-A0B0	0.0	B	A	B	S1	5000	DIODE NO. 3. READ 0-10000 SCALE.
12SA7	12.6	GBEA-DCFH	0.0	F	F	B	S4	1800	OSC. SECTION.
12SA7	12.6	GBH0-CDFE	0.0	F	D	A	S4	400	AMPL. SECTION. JUMPER FROM PIN NO. 1 OF ANY SOCKET TO 'K'.
12SC7	12.6	GHDC-EBF0	2.0	L	A	A	S4	800	NOTE 5. DUAL TRIODE.
12SF5	12.6	GHCO-E0BA	2.0	L	A	A	S4	950	
12SF7	12.6	GH80-FDCA	1.0	L	F	A	S4	1300	PENTODE SECTION.
12SF7	12.6	GH00-EDCF	0.0	B	A	B	S1	5000	DIODE SECTION. READ 0-10000 SCALE.
12SG7	12.6	GBD0-HFEA	2.5	L	H	B	S4	2500	
12SH7	12.6	GBD0-HFEA	1.0	L	H	B	S4	3100	
12SJ7	12.6	GBDA-HFEC	3.0	L	F	A	S4	1050	
12SK7	12.6	GBD0-HFEC	3.0	L	F	A	S4	1250	
12SL7	12.6	GHDA-EBFC	2.0	L	A	A	S4	1000	NOTE 5. DUAL TRIODE.
12SQ7	12.6	GH80-FOCA	2.0	L	A	A	S4	750	TRIODE SECTION.
12SQ7	12.6	GH00-EDCF	0.0	B	A	B	S1	5000	NOTE 5. DUAL DIODE. READ 0-10000 SCALE.
12SR7	12.6	GH80-FOCA	9.0	L	A	A	S4	1200	TRIODE SECTION.
12SR7	12.6	GH00-EDCF	0.0	B	A	B	S1	5000	NOTE 5. DUAL DIODE. READ 0-10000 RANGE.
12U7	12.6	DEGB-FAHC	0.5	B	A	A	S4	1000	NOTE 5. DUAL TRIODE.
13FR7	12.6	DEG0-FOH0	3.0	L	A	A	S4	1000	TRIODE NO. 1.
13FR7	12.6	DECO-A0JO	20.0	H	A	B	S4	4500	TRIODE NO. 2.
14A7	12.6	HAFO-BCGD	3.0	L	F	A	S4	1250	
14AF7	12.6	HAED-FCGB	10.0	L	A	B	S4	1450	NOTE 5. DUAL TRIODE.
14B6	12.6	HACO-B0G0	2.0	L	A	A	S4	700	TRIODE SECTION.
14B6	12.6	HA00-FEGB	0.0	B	A	B	S1	5000	NOTE 5. DUAL DIODE. READ 0-10000 SCALE.
14B8	12.6	HAFO-BEGD	1.5	F	D	A	S4	900	AMPL. SECTION. JUMPER FROM PIN NO. 3 OF ANY SOCKET TO 'K'.
14B8	12.6	HADB-CEGF	1.0	F	D	A	S4	750	OSC. SECTION.
14C5	12.6	HAFO-BCGD	12.5	L	L	B	S4	2600	
14C7	12.6	HAFO-BCGD	3.0	L	F	A	S4	1000	
14E6	12.6	HACO-BUG0	9.0	L	A	A	S4	1200	TRIODE SECTION.
14E6	12.6	HA00-FEGB	0.0	B	A	B	S1	5000	NOTE 5. DUAL DIODE. READ 0-10000 SCALE.
14F7	12.6	HAED-FCGB	2.0	L	A	A	S4	1000	NOTE 5. DUAL TRIODE.
14F8	12.6	GBHA-FCED	3.0	L	A	B	S4	2100	NOTE 5. DUAL TRIODE.
14H7	12.6	HAFO-BCGD	2.4	L	H	B	S4	2500	
14J7	12.6	HAFO-BEGD	3.0	F	E	A	S4	650	HEPTODE SECTION.
14J7	12.6	HAD0-C0G0	5.0	H	A	A	S4	950	TRIODE SECTION.
14N7	12.6	HAED-FCGB	8.0	L	A	B	S4	1600	NOTE 5. DUAL TRIODE.
14Q7	12.6	HAFO-BCGD	0.0	F	D	A	S4	500	AMPL. SECTION. JUMPER FROM PIN NO. 5 OF ANY SOCKET TO 'K'.
14Q7	12.6	HAD0-C0GF	0.0	F	F	B	S4	3300	OSC. SECTION.
14R7	12.6	HAFO-BEGD	1.0	L	F	B	S4	2000	PENTODE SECTION.
14R7	12.6	HA00-DCGB	0.0	B	A	B	S1	5000	NOTE 5. DUAL DIODE. READ 0-10000 SCALE.

TUBE TYPE	FIL.	SELECTORS	BIAS	PLT	SCRN	RANGE	PRESS	MIN. FUT. COND	NOTATIONS FOR EXPLANATIONS - SEE BACK COVER
14S7	12.6	HAFO-BEGD	2.6	F	F	A	S4	1150	HEPTUDE SECTION.
14S7	12.6	HA00-CDGF	0.0	F	A	A	S4	1100	TRIODE SECTION.
14V7	12.6	HAFO-RCGD	2.2	M	H	B	S4	3600	
14W7	12.6	HAFO-BCGE	2.2	M	H	B	S4	3600	
14X7	12.6	HACO-B000	1.0	L	A	A	S4	950	TRIODE SECTION.
14X7	12.6	HA00-EFDG	0.0	A	C	F	S2	500	NOTE 5. DUAL DIODE. SET LOAD AT 29 READ ON 3000 SCALE.
14Y4	12.6	HA00-FCGU	0.0	A	H	G	S2	6000	NOTE 5. DUAL DIODE. SET LOAD AT 20 READ ON 10000 SCALE.
15A6	12.6	DEBO-GACF	2.9	J	J	C	S4	6000	
15EA7	12.6	GH00-E0FO	3.0	L	A	A	S4	1400	TRIODE NO. 1. SET 'LINE ADJUST' AT 1400 ON 3000 SCALE.
15EA7	12.6	GHA0-B0C0	25.0	J	A	B	S4	3800	TRIODE NO. 2.
15EW6	12.6	DCA0-EF8G	1.0	H	H	C	S4	8500	
17AV5	17.0	GBA0-EHCO	22.5	L	H	B	S4	3700	
17CA5	17.0	DCE0-GFA0	4.5	G	G	C	S4	5500	
17DQ4	17.0	GH00-E0C0	0.0	A	J	G	S2	6000	SET LOAD AT 22 READ ON 10000 SCALE
17HC8	17.0	DECO-FGB0	18.0	L	L	B	S4	3200	PENTODE SECTION.
17HC8	17.0	DEA0-J0H0	3.0	L	A	A	S4	1250	TRIODE SECTION.
17JK8	17.0	DEG0-F0HJ	1.0	F	A	B	S4	4300	TRIODE NO. 1.
17JK8	17.0	DEB0-A0CJ	1.1	G	A	C	S4	8000	TRIODE NO. 2.
17L6	17.0	GBE0-CDHO	8.7	K	G	C	S4	5000	
17R5	17.0	DCB0-GFAU	7.0	F	F	B	S4	4400	
18DZ8	17.0	DECO-FGB0	9.2	H	G	B	S4	4700	PENTODE SECTION.
18DZ8	17.0	DEA0-J0H0	1.2	G	A	A	S4	850	TRIODE SECTION.
18HB8	17.0	DEJU-GFHO	6.0	G	G	B	S4	3900	PENTODE SECTION.
18HB8	17.0	DEAU-CD0B0	1.0	G	A	B	S4	2400	TRIODE SECTION.
19BG6	20.0	GBE0-OHCU	15.0	L	L	B	S4	3800	CAP = P.
19C8	20.0	DEH0-J0G0	1.0	F	A	A	S4	800	TRIODE SECTION.
19C8	20.0	DE00-FBGC	0.0	A	E	F	S2	2100	NOTE 5. DUAL DIODE. SET LOAD AT 27 READ ON 3000 SCALE.
19C8	20.0	DE00-A0G0	0.0	A	E	F	S2	2100	DIODE NO. 3. SET LOAD AT 27 READ ON 3000 SCALE.
19DE7	20.0	DEG0-F0H0	11.0	L	A	A	S4	1250	TRIODE NO. 1.
19DE7	20.0	DEB0-A0J0	17.5	H	A	B	S4	4100	TRIODE NO. 2.
19J6	20.0	DCEF-BAG0	1.0	F	A	B	S4	3300	NOTE 5. DUAL TRIODE.
19T8	20.0	DEH0-J0GF	3.0	L	A	A	S4	750	TRIODE SECTION.
19T8	20.0	DE00-EBGC	0.0	A	D	G	S2	3300	NOTE 5. DUAL DIODE. SET LOAD AT 10 READ ON 10000 SCALE.
19T8	20.0	DE00-A0GH	0.0	A	D	G	S2	3300	DIODE NO. 3. SET LOAD AT 10 READ ON 10000 SCALE.
19V8	20.0	DEFO-A0CH	3.0	L	A	A	S4	750	TRIODE SECTION.
19V8	20.0	DE00-J0CB	0.0	B	A	B	S1	5000	DIODE NO. 1. READ 0-10000 SCALE.
19V8	20.0	DE00-GBHC	0.0	B	A	B	S1	5000	NOTE 5. DUAL DIODE.
19X3	20.0	DE00-J0C0	0.0	A	E	G	S2	5500	SET LOAD AT 12. READ ON 10000 SCALE.
19Y3	20.0	DE00-J0C0	0.0	A	E	G	S2	5500	SET LOAD AT 12 READ ON 10000 SCALE
20EQ7	20.0	DEB0-GFCA	1.0	F	F	B	S4	2400	PENTODE SECTION.
20EQ7	20.0	DE00-H0C0	0.0	B	A	B	S1	5000	DIODE SECTION. READ 0-10000 SCALE.
21A6	20.0	DEB0-OHCJ	23.0	J	J	B	S4	4100	CAP = P.
21EX6	20.0	GBE0-OHCO	30.0	J	J	B	S4	4800	CAP = P.
25A6	25.0	GBE0-CDHO	18.0	H	G	A	S4	1500	
25C6	25.0	GBE0-CDHO	12.0	K	G	B	S4	4500	
25CU6	25.0	GBE0-ODHO	22.5	L	H	B	S4	3700	CAP = P.
25DK4	25.0	CD00-E0G0	0.0	A	E	G	S2	5500	SET LOAD AT 12 READ ON 10000 SCALE
25DQ6	25.0	GRE0-ODHO	22.5	L	H	B	S4	3800	CAP = P.
25DT5	25.0	DECO-JAG0	16.5	L	L	B	S4	3900	
25W6	25.0	GBE0-CDHO	8.7	K	G	C	S4	5000	
25Z6	25.0	GB00-ECHD	0.0	A	D	G	S2	2800	NOTE 5. DUAL DIODE. SET LOAD AT 12 READ ON 10000 SCALE.
26A6	25.0	DCA0-EF8B	1.8	L	F	B	S4	2500	
26A7	25.0	GFA0-HEBC	4.5	C	C	B	S4	3600	PENTODE NO. 1.
26A7	25.0	GFC0-DEBA	4.5	C	C	B	S4	3600	PENTODE NO. 2.
26BK6	25.0	DCA0-G0BE	2.0	L	A	A	S4	1000	TRIODE SECTION.
SEE NEXT PAGE FOR CONTINUATION									

TUBE TYPE	FIL.	SELECTORS	BIAS	PLT	SCRN	RANGE	PRESS	MIN. MUT. COND	NOTATIONS FOR EXPLANATIONS - SEE BACK COVER
26BK6	25.0	DCUO-FERG	0.0	C	A	C	S1	10000	NOTE 5. DUAL DIODE. READ 0-30000 SCALE.
26C6	25.0	DCAU-GOBU	9.0	L	A	A	S4	1200	TRIODE SECTION.
26C6	25.0	DCUO-FERG	0.0	B	A	B	S1	5000	NOTE 5. DUAL DIODE. READ 0-10000 SCALE.
26D6	25.0	DCGO-EFBA	2.0	L	C	A	S4	300	AMPL. SECTION.
26D6	25.0	DCAU-FEBG	0.0	F	F	B	S4	4500	OSC. SECTION.
26E6	25.0	GBEO-CDHO	13.0	K	G	B	S4	4500	
26Z5W	25.0	DEQU-FAHC	0.0	A	E	G	S2	5000	NOTE 5. DUAL DIODE. SET LOAD AT 11 READ ON 10000 SCALE.
32	2.0	FACU-BCUO	3.0	J	D	A	S4	400	NOTE 3. CAP = G.
35CD6	35.0	GBEO-OHCO	30.0	J	J	B	S4	4800	CAP = P.
35DZ8	35.0	DECO-FGBU	9.2	H	G	B	S4	4700	PENTODE SECTION.
35DZ8	35.0	DEAU-JOHO	1.2	G	A	A	S4	850	TRIODE SECTION.
35Y4	35.0	HAUU-BOGU	0.0	A	E	G	S2	5500	SET LOAD AT 12 READ ON 10000 SCALE
35Z3	35.0	HAUU-BOGU	0.0	A	E	G	S2	5500	SET LOAD AT 12 READ ON 10000 SCALE
45	2.5	FACU-BOUO	37.0	K	A	A	S4	1300	NOTE 3.
50A5	50.0	HAUU-BCGU	8.7	K	G	C	S4	5000	
50B5	50.0	DCAU-EFBU	8.0	G	F	B	S4	4700	
50BK5	50.0	DECO-AHCO	5.0	L	L	C	S4	5000	
50C6	50.0	GBEO-CDHO	12.0	K	G	B	S4	4500	
50CA5	50.0	DCEU-GFAU	4.5	G	G	C	S4	5500	
50FA5	50.0	DCBU-GFAU	5.4	F	F	B	S4	3600	
50FY8	50.0	DECO-FGBU	13.5	G	G	B	S4	4700	PENTODE SECTION.
50FY8	50.0	DEAU-JOHO	1.5	G	A	B	S4	1250	TRIODE SECTION.
50L6	50.0	GBEO-CDHO	8.7	K	G	C	S4	5000	
50X6	50.0	HAUU-FCGB	0.0	A	E	G	S2	5200	NOTE 5. DUAL DIODE. SET LOAD AT 12 READ ON 10000 SCALE.
50Y7	50.0	GBUU-ECHD	0.0	A	D	G	S2	2800	NOTE 5. DUAL DIODE. SET LOAD AT 12 READ ON 10000 SCALE.
53	2.5	GAEC-FBDU	2.0	H	A	A	S4	1200	NOTE 5. DUAL TRIODE.
55	2.5	FACU-BOEU	20.0	L	A	A	S4	700	TRIODE SECTION. CAP = G.
55	2.5	FACU-DCUO	0.0	B	A	B	S1	5000	NOTE 5. DUAL DIODE. READ 0-10000 SCALE.
56	2.5	FACU-BOEU	13.5	L	A	A	S4	900	
57	2.5	FACU-BCED	3.0	L	F	A	S4	750	CAP = G.
58	2.5	FACU-BCED	3.0	L	F	A	S4	1000	CAP = G.
59	2.5	GADU-BCFE	18.0	L	L	B	S4	1500	
70L7	75.0	GBEO-CDFO	8.0	F	F	B	S4	4700	PENTODE SECTION.
70L7	75.0	GBUU-HOAC	0.0	A	E	G	S2	3000	RECT. SECTION. SET LOAD AT 25 READ ON 10000 SCALE.
75	6.3	FACU-BOEU	2.0	L	A	A	S4	700	TRIODE SECTION. CAP = G.
75	6.3	FACU-DCEB	0.0	B	A	B	S1	5000	NOTE 5. DUAL DIODE. READ 0-10000 SCALE.
76	6.3	FACU-BOEU	13.5	L	A	A	S4	900	
77	6.3	FACU-BCED	3.0	L	F	A	S4	900	CAP = G.
78	6.3	FACU-BCED	3.0	L	G	A	S4	1050	CAP = G.
83V	5.0	FACU-CBUO	0.0	A	D	G	S2	2700	NOTE 5. DUAL DIODE. SET LOAD AT 12 READ ON 10000 SCALE.
84	6.3	FACU-CBEU	0.0	A	H	G	S2	6000	NOTE 5. DUAL DIODE. SET LOAD AT 20 READ ON 10000 SCALE.
89/89Y	6.3	FACU-BCED	25.0	L	L	A	S4	1100	CAP = G.
117L7/M7	117.0	GBUU-CEHU	5.2	F	F	B	S4	3300	PENTODE SECTION.
117L7/M7	117.0	GBUU-FOAU	0.0	A	E	G	S2	4600	RECT. SECTION. SET LOAD AT 16 READ ON 10000 SCALE.
117N7	117.0	GBUU-HOOU	0.0	A	E	G	--	4600	RECT. SECTION. SET LOAD AT 16 READ ON 10000 SCALE.
									HOLD DOWN S2 AND PRESS S7. NOTE 4.
117N7	117.0	GBUU-CEFU	6.0	F	F	B	S4	4500	PENTODE SECTION.
117P7	117.0	GBUU-HOOU	0.0	A	E	G	S2	4600	RECT. SECTION. SET LOAD AT 16 READ ON 10000 SCALE. NOTE 4.
117P7	117.0	GBUU-CEFU	6.0	F	F	B	S4	4500	PENTODE SECTION.
117Z3	117.0	DCUO-EOFU	0.0	A	E	G	S2	3200	SET LOAD AT 25 READ ON 10000 SCALE
117Z6	117.0	GBUU-ECHD	0.0	A	D	G	S2	3400	NOTE 5. DUAL DIODE. SET LOAD AT 10 READ ON 10000 SCALE.

TUBE TYPE	FIL.	SELECTORS	BIAS	PLT	SCRN	RANGE	PRESS	MIN. MUT. COND	NOTATIONS FOR EXPLANATIONS - SEE BACK COVER
X-155 GL502A	6.3 6.3	DEGB-FAHC GBEO-CHHF	1.0 ---	G A	A F	C F	S4 S2	5000 2000	NOTE 5. DUAL TRIODE. SET LOAD AT 80. FIRES ABOUT 2 V. READ ON 3000 SCALE. NOTE 6.
CK502AX	1.1	CEDO-AB00	1.2	D	D	A	S4	350	NOTE 3.
CK503AX	1.1	CEDO-AB00	2.0	D	D	A	S4	350	NOTE 3.
CK506AX	1.1	CEDO-AB00	4.5	D	D	A	S4	300	NOTE 3.
CK512AX	0.6	CEDO-AB00	2.0	D	D	A	S4	100	NOTE 3.
CK518AX	1.1	CEDO-AB00	2.0	D	D	A	S4	350	NOTE 3.
CK522AX	1.1	CEDO-AB00	1.2	D	D	A	S4	400	NOTE 3.
CK523AX	1.1	CEDO-AB00	1.2	C	C	A	S4	200	NOTE 3.
CK524AX	1.1	CEDO-AB00	8.0	D	D	A	S4	150	NOTE 3.
CK525AX	1.1	CEDO-AB00	1.2	C	C	A	S4	200	NOTE 3.
CK526AX	1.1	CEDO-AB00	1.5	C	C	A	S4	250	NOTE 3.
CK527AX	1.1	CEDO-AB00	0.0	C	C	A	S4	150	NOTE 3.
CK528AX	1.1	CEDO-AB00	1.2	D	D	A	S4	350	NOTE 3.
CK529AX	1.1	CEDO-AB00	2.5	C	C	A	S4	200	NOTE 3.
CK533AX	1.1	CEDO-AB00	0.0	C	C	A	S4	300	NOTE 3.
CK535AX	1.1	CEDO-AB00	2.5	C	C	A	S4	200	NOTE 3.
CK536AX	1.1	CEDO-AB00	0.0	C	C	A	S4	300	NOTE 3.
CK541DX	1.1	CEDO-AB00	0.0	C	C	A	S4	300	NOTE 3.
CK542DX	1.1	CEDO-AB00	2.0	C	C	A	S4	200	NOTE 3.
CK543DX	0.6	CEDO-BA00	0.5	B	H	A	S1	900	NOTE 3.
CK544DX	1.1	CEDO-AB00	0.6	D	D	A	S4	300	NOTE 3.
CK546DX	1.1	CEDO-AB00	0.0	C	C	A	S4	250	NOTE 3.
GL546	6.3	DCA0-GEBO	---	A	E	F	S2	1300	NOTE 6. SET LOAD AT 61. FIRES ABOUT 0.5 V. READ ON 3000 SCALE.
CK547DX	1.1	CEDO-AB00	1.2	D	D	A	S4	200	NOTE 3.
CK548DX	1.1	CEDO-AB00	1.4	C	C	A	S4	200	NOTE 3.
CK569AX	1.1	ECDO-AB00	0.0	E	D	A	S4	600	NOTE 3.
CK578AX	1.1	CEDO-AB00	6.0	F	F	A	S4	1200	NOTE 3.
629	3.0	FACO-BOEO	---	A	H	G	S2	2500	NOTE 6. SET LOAD AT 65. FIRES ABOUT 1 V. READ ON 10000 SCALE.
801A	7.5	FACO-B000	9.0	M	A	A	S4	1050	NOTE 3.
802	6.3	GADO-OCFE	9.0	M	H	A	S4	1400	CAP = P.
807	6.3	FACO-OBEO	14.0	L	L	B	S4	3800	CAP = P.
809	6.3	FACO-0000	0.0	M	A	B	S4	1650	NOTE 3. CAP = P.
811A	6.3	FACO-0000	0.0	M	A	A	S4	1500	NOTE 3. CAP = P.
812	6.3	FACO-0000	2.0	M	A	B	S4	2300	NOTE 3. CAP = P.
815	6.3	HEGO-ODCB	10.0	G	G	B	S4	2500	PENTODE NO. 1. LEFT CAP = P.
815	6.3	AEBO-ODCG	10.0	G	G	B	S4	2500	PENTODE NO. 2. RIGHT CAP = P.
816	2.5	FA00-0000	0.0	A	J	G	S2	6000	CAP = P. SET LOAD AT 26 READ ON 10000 SCALE.
836	4.3	DA00-0000	0.0	A	E	G	S2	5000	CAP = P. SET LOAD AT 11 READ ON 10000 SCALE.
837	12.6	GADO-OCFE	20.0	M	K	B	S4	2000	CAP = P.
841	7.5	FACO-B000	15.0	M	A	A	S4	300	NOTE 3.
842	7.5	FACO-B000	40.0	K	A	A	S4	650	NOTE 3.
843	2.5	FACO-BOEO	26.0	M	A	A	S4	1000	
864	1.1	FACO-B000	18.0	H	A	A	S4	300	NOTE 3.
865	7.5	FACO-OB00	0.0	M	H	A	S4	350	CAP = P.
879	2.5	FA00-0000	0.0	A	D	E	S2	22000	CAP = P. SET LOAD AT 0 READ 0-60000 SCALE.
950	2.0	FACO-BE00	15.0	H	G	A	S4	600	NOTE 3.
951	2.0	FA00-BC00	3.0	J	D	A	S4	400	NOTE 3. CAP = G.
954	6.3	FAHO-OCGD	3.0	L	F	A	S4	850	CAP = P.
955	6.3	FADO-C0G0	7.0	L	A	A	S4	1400	
956	6.3	FAHO-OCGD	3.0	L	F	A	S4	1150	CAP = P.
957	1.1	FADO-C000	5.0	G	A	A	S4	450	NOTE 3.
958	1.1	FADO-C000	7.0	G	A	A	S4	800	NOTE 3.
959	1.1	FAHO-OC00	3.0	H	E	A	S4	350	NOTE 3. TOP PIN = P.
CK1042	OFF	0000-A0EO	0.0	A	L	F	S2	500	PLACE A 6.8 K OHM, 1 WATT RESISTOR ACROSS THE SELF BIAS JACK. SET D' D AT 26. READ ON 3000 SCALE.
1201	6.3	HBA0-C000	3.0	J	A	B	S4	1900	

TUBE TYPE	FIL.	SELECTORS	BIAS	PLT	SCRN	RANGE	PRESS	MIN. MUT. COND	NOTATIONS FOR EXPLANATIONS - SEE BACK COVER
1203	6.3	HA00-DOGO	0.0	A	D	E	S2	15000	SET LOAD AT 26. PLACE A 10 K OHM, 1 WATT RESISTOR ACROSS THE SELF BIAS JACK. READ ON 60000 SCALE.
1204	6.3	GBEO-CADO	2.0	L	F	A	S4	1100	
1216	6.3	DCEF-BAGO	2.2	F	A	B	S4	2300	NOTE 5. DUAL TRIODE.
1229	2.0	FA00-BC00	3.0	J	D	A	S4	400	NOTE 3. CAP = G.
1230	2.0	FAC0-B000	13.5	J	A	A	S4	550	NOTE 3.
1231	6.3	HAFO-BCGD	2.0	M	H	B	S4	3500	
1232	6.3	HAFO-BCGD	2.0	L	F	B	S4	2800	
1237	2.5	GB00-CF00	0.0	A	B	E	S2	30000	NOTE 5. DUAL DIODE. SET LOAD AT 25 READ ON 60000 SCALE.
1273	6.3	HAFO-BCGD	3.0	L	F	A	S4	1000	
1274	6.3	GB00-ECHO	0.0	A	H	G	S2	6000	NOTE 5. DUAL DIODE. SET LOAD AT 20 READ ON 10000 SCALE.
1280	12.6	HAFO-BCGD	3.0	L	F	A	S4	1000	
1284	12.6	HAFO-BCGD	3.0	L	F	A	S4	1250	
1293	1.4	HAFO-B000	0.0	F	A	A	S4	950	NOTE 3.
1294	1.4	HA00-DOGO	0.0	B	A	B	S1	8500	
1299	2.5	HAFO-BC00	4.5	J	E	A	S4	1500	NOTE 3.
1603	6.3	FA00-BCED	3.0	L	F	A	S4	750	CAP = G.
1609	1.1	FAC0-BE00	2.7	G	E	A	S4	500	NOTE 3.
1612	6.3	GB00-CDHE	3.0	L	F	A	S4	750	CAP GRID. CAP = G.
1612	6.3	GBEO-CDHA	10.0	L	F	A	S4	450	PIN GRID. CAP = K.
1613	6.3	GBEO-CDHA	16.5	L	L	B	S4	1550	
1614	6.3	GBEO-CDHA	14.0	L	L	B	S4	3800	
1619	2.5	GBEO-CD0H	13.0	M	M	B	S4	2800	NOTES 3 & 4.
1620	6.3	GB00-CDHE	3.0	L	F	A	S4	750	CAP = G.
1621	6.3	GBEO-CDHA	16.5	L	L	B	S4	1550	
1622	6.3	GBEO-CDHA	14.0	L	L	B	S4	3800	
1623	6.3	FAC0-0000	0.0	M	A	B	S4	1650	NOTE 3. CAP = P.
1624	2.5	FAC0-0B00	5.0	L	L	B	S4	2500	NOTE 3. CAP = P.
1631	12.6	GBEO-CDHA	14.0	L	L	B	S4	3800	
1632	12.6	GBEO-CDHA	8.0	G	F	B	S4	4700	
1633	25.0	GHDA-EBFC	8.0	L	A	B	S4	1600	NOTE 5. DUAL TRIODE.
1634	12.6	GHDC-EBFA	2.0	L	A	A	S4	800	NOTE 5. DUAL TRIODE.
1635	6.3	GBDE-CFH0	0.0	M	A	A	S4	850	NOTE 5. DUAL TRIODE.
1642	6.3	GAD0-ECFB	16.5	L	A	A	S4	850	NOTE 5. DUAL TRIODE. CAP = G.
1644	12.6	GFA0-HEBC	9.0	J	J	A	S4	1350	PENTODE NO. 1.
1644	12.6	GFC0-DEBA	9.0	J	J	A	S4	1350	PENTODE NO. 2.
1658	2.0	FAC0-B000	13.5	J	A	A	S4	550	NOTE 3.
1659	2.5	FA00-B0EO	2.0	L	A	A	S4	700	CAP = G. TRIODE SECTION.
1659	2.5	FA00-DCEB	0.0	B	A	B	S1	5000	NOTE 5. DUAL DIODE. READ ON 10000 SCALE.
1851	6.3	GB00-CDHE	2.0	M	H	C	S4	5500	CAP = G.
1852	6.3	GB00-HFEC	2.0	M	H	C	S4	5500	
1853	6.3	GB00-HFEC	3.0	M	K	B	S4	3100	
5516	6.3	GBEO-0CA0	19.0	M	L	B	S4	1900	NOTE 3. CAP = P.
5556	4.3	FAC0-B000	25.0	M	A	A	S4	600	NOTE 3.
5610	6.3	DCFO-A0B0	1.5	E	A	B	S4	2500	
5618	6.3	AGFO-BCD0	8.0	L	E	B	S4	2300	NOTES 3 & 4.
5633	6.3	DFCO-0EAB	1.4	F	F	B	S4	2100	TOP LEAD = P.
5634	6.3	DFCO-0EAB	1.3	F	F	B	S4	2200	TOP LEAD = P.
5635	6.3	CFAB-GEHD	1.0	F	A	B	S4	2400	NOTE 5. DUAL TRIODE.
5637	6.3	CDRO-A0EO	1.1	F	A	B	S4	1700	
5638	6.3	DFCO-AEBO	1.6	F	F	B	S4	2100	
5639	6.3	CFA0-EGBU	2.5	L	F	C	S4	5500	
5640	6.3	CFA0-EGHO	9.0	F	F	B	S4	3100	
5641	6.3	CF00-B0EO	0.0	A	E	G	S2	2600	SET LOAD AT 30 READ ON 10000 SCALE
5645	6.3	ECDO-A0B0	2.8	F	A	B	S4	1700	
5646	6.3	ECDO-A0B0	1.1	F	A	A	S4	1300	
5647	6.3	BC00-A0D0	0.0	A	C	F	S2	1000	SET LOAD AT 21 READ ON 3000 SCALE.
5659	12.6	GBFO-CDHU	12.5	L	L	B	S4	1900	
5660	12.6	GB00-CFHO	3.0	L	G	A	S4	800	PENTODE SECTION. CAP = G.
5660	12.6	GB00-EDHC	0.0	B	A	B	S1	5000	NOTE 5. DUAL DIODE. READ 0-10000 SCALE.

TUBE TYPE	FIL.	SELECTORS	BIAS	PLT	SCRN	RANGE	PRESS	MIN. MUT. COND	NOTATIONS FOR EXPLANATIONS - SEE BACK COVER
5661	12.6	GBDO-HFEC	3.0	L	F	A	S4	1250	NOTE 6. SET LOAD AT 67. FIRES ABOUT 1 V. SHORT ON 1. READ ON 3000 SCALE.
5662	6.3	DCAO-GOBE	---	A	E	F	S2	1250	
5663	6.3	DCAO-GEBO	---	A	E	F	S2	1300	NOTE 6. SET LOAD AT 61. FIRES ABOUT 0.5 V. READ ON 3000 SCALE.
5679	6.3	HADO-FCGB	0.0	A	F	G	S2	2500	NOTE 5. DUAL DIODE. SET LOAD AT 55 READ ON 10000 SCALE.
5690	6.3	GFOO-EOHO	0.0	A	E	G	S2	4500	UNIT NO. 1. SET LOAD AT 16 READ ON 10000 SCALE.
5690	6.3	BADO-CODO	0.0	A	E	G	S2	4500	UNIT NO. 2. SET LOAD AT 16 READ ON 10000 SCALE.
5691	6.3	GHDA-EBFC	2.0	L	A	A	S4	1000	NOTE 5. DUAL TRIODE.
5692	6.3	GHDA-EBFC	8.0	L	A	B	S4	1700	NOTE 5. DUAL TRIODE.
5693	6.3	GBDA-HFEC	3.0	L	F	A	S4	1050	NOTE 5. DUAL TRIODE.
5694	6.3	GRDE-CFAH	5.0	L	A	B	S4	1900	
5731	6.3	FADO-COGO	7.0	L	A	A	S4	1400	CAP = G. NOTE 3. SET LOAD AT 39. PLACE A 20 K OHM, 1/2 WATT RESISTOR ACROSS THE SELF BIAS JACK. READ ON 10000 SCALE. NOTES 3 & 4.
5732	6.3	GBDO-COHE	3.0	L	G	A	S4	1050	
5742	4.3	FACU-BODD	0.0	M	A	A	S4	700	
5785	1.1	FGOO-AQOO	0.0	A	B	B	S2	2200	
5812	6.3	DCAO-EFUB	24.5	L	L	B	S4	2700	NOTE 1. JUMPER A 100 K OHM RESISTOR FROM PIN 4 TO PIN 8 OF ANY SOCKET. REG. = 3 VOLTS. FROM 5 TO 25 MA.
5823	OFF	ODDD-AHGO	0.0	E	E	VR	S4	68V	
5824	25.0	GBEO-CDHO	18.0	G	G	B	S4	3100	CAP = P. PLACE A 24 K OHM, 1/2 WATT RESISTOR ACROSS THE SELF BIAS JACK. READ ON 10000 SCALE.
5825	1.4	FADO-ODUD	0.0	A	G	B	S2	5000	
5838	12.6	GBDO-ECHA	0.0	A	H	G	S2	6000	NOTE 5. DUAL DIODE. SET LOAD AT 20 READ ON 10000 SCALE.
5839	25.0	GBDO-ECHO	0.0	A	H	G	S2	6000	NOTE 5. DUAL DIODE. SET LOAD AT 20 READ ON 10000 SCALE.
5851	2.5	GAHO-CFOO	7.5	G	G	A	S4	1000	NOTE 3.
5854	1.1	CEDO-ABOO	2.0	D	D	A	S4	350	NOTE 3.
5875	1.4	CEDO-ABOO	0.0	E	E	B	S4	1550	NOTE 3.
5879	6.3	DEAO-HGCJ	3.0	L	F	A	S4	650	NOTE 3.
5886	1.1	DCGO-ABOO	0.0	B	A	A	S4	100	
5910	1.4	EGFO-BCOO	0.0	E	E	A	S4	550	NOTE 3.
5967	1.1	DBFC-HAOD	0.0	D	A	A	S4	1250	NOTES 3 & 5. DUAL TRIODE.
5992	6.3	GBEO-CDHO	12.5	L	L	B	S4	2500	
6000	25.0	BGAD-EHCO	15.0	M	K	C	S4	5000	NOTE 3.
6007	1.1	CEDO-ABOO	0.2	C	C	A	S4	250	
6008	0.6	CEOD-ABOO	0.0	C	C	A	S4	100	NOTE 3.
6026	6.3	DEGU-HOCO	2.6	G	A	B	S4	3700	NOTE 3.
6029	1.1	BDCO-AODD	4.0	E	A	A	S4	1250	
6087	5.0	HBOO-FDOO	0.0	A	G	G	S2	2500	NOTE 5. DUAL DIODE. SET LOAD AT 45 READ ON 10000 SCALE.
6088	1.1	CEDO-ABOO	1.2	D	D	A	S4	400	NOTE 3.
6094	6.3	CFAO-DBHO	12.5	L	L	B	S4	2600	NOTE 5. DUAL TRIODE.
6099	6.3	DCEF-BAGO	1.1	F	A	B	S4	3300	
6100	6.3	DCFO-AOGO	8.5	L	A	A	S4	1400	NOTE 5. DUAL TRIODE.
6101	6.3	DCEF-BAGO	1.1	F	A	B	S4	3300	
6106	5.0	HBOO-FDOO	0.0	A	G	G	S2	2500	NOTE 5. DUAL DIODE. SET LOAD AT 45 READ ON 10000 SCALE.
6113	6.3	GHDA-EBFC	2.0	L	A	A	S4	1000	NOTE 5. DUAL TRIODE.
6145	6.3	HAFO-BCGD	0.0	H	F	C	S4	6000	NOTE 3.
6147	2.5	GAHO-CFOO	7.5	G	G	A	S4	1000	
6169	6.3	CFAO-BODD	1.0	J	A	B	S4	4100	NOTE 5. DUAL DIODE. SET LOAD AT 29 READ ON 3000 SCALE.
6184	6.3	CFOD-BGDE	0.0	A	C	F	S2	500	
6188	6.3	GHDA-EHFC	2.0	L	A	A	S4	1000	NOTE 5. DUAL TRIODE.
6355	6.3	FCAU-FDGO	0.0	L	J	G	S4	----	EYE 1 OPEN. EYE 2 CLOSED.
6355	6.3	ECDO-BAGO	0.0	L	J	G	S4	----	EYE 2 OPEN. EYE 1 CLOSED.

TUBE TYPE	FIL.	SELECTORS	BIAS	PLT	SCRN	RANGE	PRESS	MIN. MUT. COND	NOTATIONS FOR EXPLANATIONS - SEE BACK COVER
6877	6.3	ECAO-DOHO	12.0	H	A	H	S4	4100	CAP = P. SET LOAD AT 22. PLACE A 6.8 K OHM, 1 WATT RESISTOR ACROSS THE SELF BIAS JACK. READ ON 3000 SCALE. CAP = P. SET LOAD AT 0 READ 0-60000 SCALE.
6888	6.3	GBDO-HFEC	0.0	G	F	B	S4	3800	
6954	6.3	DCAO-EF8G	0.5	H	H	A	S4	1250	
8013A	2.5	FA00-0000	0.0	A	C	B	S2	1500	
8016	1.1	GB00-0000	0.0	A	E	E	S2	10000	
9001	6.3	DCAO-EF80	3.0	L	F	A	S4	850	
9002	6.3	DCFO-A0G0	7.0	L	A	A	S4	1400	
9003	6.3	DCAO-EF80	3.0	L	F	A	S4	1100	
9004	6.3	FA00-C0D0	0.0	A	E	F	S2	2000	
9005	4.3	FA00-D0C0	0.0	A	C	F	S2	500	
9006	6.3	DC00-A0G0	0.0	A	E	F	S2	1300	SET LOAD AT 55 READ ON 3000 SCALE. SET LOAD AT 12 READ ON 3000 SCALE. SET LOAD AT 67 READ ON 3000 SCALE.

NOTATIONS

- NOTE 1: (symbol "†" on Roll Chart) Read 0-100 milliamperes with S3 pressed.
- NOTE 2: (symbol "★" on Roll Chart) Approximate starting voltage for voltage regulator tubes.
- NOTE 3: (symbol "◆" on Roll Chart) Filament Centering. Press and hold down S4 and S7 while adjusting METER to read zero by means of the red FILAMENT CENTER knob mounted concentrically on the FILAMENT VOLTS switch. Then proceed with test.
- NOTE 4: (symbol "✚" on Roll Chart) Verify shorts by setting first FILAMENT SELECTOR switch to "0".
- NOTE 5: (symbol "✕" on Roll Chart) Dual Test: For dual section tubes, make normal leakage test first, then repeat leakage test for second section with S6 pressed. Release S6 and proceed with further first section tests using button indicated in PRESS column. For second section tests, press and hold down S6 together with button indicated in the PRESS column.
- NOTE 6: (symbol "#" on Roll Chart) Set BIAS VOLTS control to 50 volts; press button indicated in the PRESS column; then decrease bias until tube "fires". Note the firing voltage. Reduce BIAS VOLTS control to zero and take quality reading.



MODEL 580 TUBE TESTER

SUPPLEMENTARY DATA EUROPEAN TUBE TYPES

- † Note 1 Read 0-100 milliamperes with S3 pressed.
- ★ Note 2 Approximate starting voltage for voltage regulator tubes.
- ◆ Note 3 Filament Centering: Press S4 and S7. Adjust the filament centering control until the meter reads zero, then proceed with test.
- ✱ Note 4 Verify shorts by setting first Filament selector to "0".
- ⌘ Note 5 Dual Test: For dual triodes, make normal Leakage test first, then repeat Leakage test for second section with S6 pressed. Proceed with first section GM test. On all dual tubes, for second section test, press S6 with button listed in the press column.
- # Note 6 Set BIAS to 50 volts; press indicated button; then decrease BIAS until tube fires. Note the firing voltage. Reduce BIAS to 0 volts and take quality reading.

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10514 DUPONT AVENUE

CLEVELAND 8, OHIO U. S. A.

3200-120

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TUBE TYPE	SELECTORS	FIL	BIAS	PLT	SCRN	RANGE	PRESS	MIN. MUT. COND.	NOTATIONS
1AJ4	AGFO-BCOO	◆1.4	1.0	E	E	A	S4	600	
1C1	AGDO-COFB	1.4	1.0	E	A	A	S4	900	
1M3	DEAO-GOOO	◆1.4	Vary	E	A	G	S4	----	Vary Bias to vary bar length
1N3	DEAO-GOOO	◆1.4	Vary	E	A	G	S4	----	Vary Bias to vary bar length
2FY5	DCBO-EOAO	2.5	1.0	G	A	C	S4	8200	
3AJ8	DEBO-FACO	3.0	2.0	L	F	A	S4	1550	Heptode Sect.
3AJ8	DEJO-HOCO	3.0	1.0	F	A	B	S4	2000	Triode Sect.
3BY7	DEBO-GHAJ	3.0	2.0	L	F	B	S4	3800	
3FY5	DCBO-EOAO	3.0	1.0	G	A	C	S4	8200	
3MP26	DCAO-EFBO	3.0	10.0	G	G	B	S4	2650	
4BL8	DEBO-FCGO	4.3	3.2	L	K	B	S4	3450	Pent. Sect.
4BL8	DEJO-AOHO	4.3	2.0	F	A	B	S4	3150	Triode Sect.
4BN4	DCGO-EOFO	4.3	2.0	H	A	B	S4	4300	
4CM4	DEBO-AOCO	4.3	1.5	J	A	C	S4	8200	
4HA5	DCAO-EOBF	4.3	1.5	H	A	C	S4	9400	
4HG8	DEBO-HJAO	4.3	1.5	J	H	C	S4	7500	Pent. Sect.
4HG8	DEFO-GOAO	4.3	3.0	F	A	B	S4	3750	Triode Sect.
4MP12	DCAO-EFBO	4.3	6.0	J	J	B	S4	3450	
4MP26	DCAO-EFBO	4.3	10.0	G	G	B	S4	2650	
5MHH3	DCEF-BAGO	5.0	1.0	F	A	B	S4	4700	X Dual Triode
6AG6	BGEO-CDHO	6.3	2.0	H	H	C	S4	5700	
6AJ8	DEBO-FACO	6.3	2.0	L	F	A	S4	1550	Heptode Sect.
6AJ8	DEJO-HOCG	6.3	1.0	F	A	B	S4	2000	Triode Sect.
6AK8	DEHO-JOGO	6.3	1.0	F	A	A	S4	900	Triode Sect.
6AK8	DEOO-FOGO	6.3	0.0	B	A	B	S1	5000	Diode No. 1
6AK8	DEOO-BACG	6.3	0.0	A	D	G	S2	2600	X Dual Diode. Set load on 13. Read on 10000 scale
6AL3	DEOO-JOOO	6.3	0.0	A	D	G	S2	4700	Set load on 11. Cap = K. Read on 10000 scale
6AM5	DCAO-EGBO	6.3	13.5	L	L	A	S4	1600	
6AM6	DCAO-EGBF	6.3	2.0	L	L	B	S4	4700	
6AQ4	DCFO-GOBO	6.3	1.5	L	A	B	S4	5300	
6AQ8	DEGB-FAHC	6.3	1.0	E	A	B	S4	2550	X Dual Triode
6BD7A	DEBO-AOCO	6.3	3.0	L	A	A	S4	750	Triode Sect.
6BD7A	DEOO-FHCO	6.3	0.0	B	A	B	S1	5000	X Dual Diode
6BJ5	DCAO-EGBO	6.3	5.5	L	L	C	S4	6300	
6BK8	DEJO-FACH	6.3	2.0	L	H	A	S4	1250	
6BL8	DEBO-FCGO	6.3	3.2	L	K	B	S4	3450	Pent. Sect.
6BL8	DEJO-AOHO	6.3	2.0	F	A	B	S4	3150	Triode Sect.
6BN5	DEAO-GJCH	6.3	9.4	K	K	B	S4	2000	
6BR3	DEOO-JOOO	6.3	0.0	A	D	G	S2	4000	Cap = K. Set load at 10. Read on 10000 scale
6BR5	DEAO-OJBO	6.3	Vary	L	L	D	S4	----	Connect a 500K resistor between "P" and pin 7 of any socket. Vary Bias to vary beam angle.
6BR7	DEBO-GHCJ	6.3	3.0	L	F	A	S4	800	
6BS7	DEOO-GHCJ	6.3	3.0	L	F	A	S4	750	Cap = G
6BT4	HAOO-FBGO	6.3	0.0	A	E	G	S2	2500	X Dual Diode. Set load at 30. Read on 10000 scale. Use Hickok adapter Code 1050-129
6BW6	DEBO-GHCJ	6.3	8.5	J	J	B	S4	2300	
6BY7	DEBO-GHAJ	6.3	2.0	L	F	B	S4	3800	
6CD7	GBDO-EOHO	6.3	Vary	K	A	D	S4	----	Connect a 1 megohm resistor from "P" to pin No. 3 of any socket. Connect a second 1 megohm resistor from "P" to pin No. 6 of any socket. Eye one closes at Bias of about 5V. Eye two closes at Bias of about 25V
6CF8	DEJO-FACH	6.3	2.0	L	H	A	S4	1250	
6CH6	DEBO-GHCJ	6.3	2.5	L	K	C	S4	8200	
6CJ5	AHFO-BEGO	6.3	5.0	L	F	A	S4	630	Use Hickok adapter Code No. 1050-129
6CK5	AHFO-BEGO	6.3	7.0	L	L	C	S4	6300	Use Hickok adapter Code No. 1050-129
6CM4	DEBO-AOCO	6.3	1.5	J	A	C	S4	8750	
6CM5	BGEO-ODHO	6.3	8.2	F	F	C	S4	8800	Cap = P

TUBE TYPE	SELECTORS	FIL	BIAS	PLT	SCRN	RANGE	PRESS	MIN. MUT. COND.	NOTATIONS
6CN6	BGEO-ODHA	6.3	7.0	H	H	B	S4	5000	Cap = P
6CQ6	DEAO-EGBF	6.3	2.5	K	K	A	S4	1550	
6CT7	AHFO-BEGD	6.3	2.0	L	E	A	S4	1250	Pent. Sect. (Use Hickok
6CT7	AHOO-COGO	6.3	0.0	B	A	B	S1	5000	Diode Sect. (Adapter Code No. 1050-129)
6CU7	AHFO-BEGD	6.3	1.0	L	E	B	S4	1500	Hexode Sect. (Use Hickok
6CU7	AHDO-COGO	6.3	1.0	F	A	A	S4	1750	Triode Sect. (Adapter Code No. 1050-129)
6CV7	AHCO-BOGO	6.3	3.0	L	A	A	S4	750	Triode Sect. (Use Hickok
6CV7	AHOO-FEGO	6.3	0.0	B	A	B	S1	5000	X Dual Diode (Adapter Code No. 1050-129)
6CW7	DEFB-JCGA	6.3	1.5	F	A	B	S4	3750	X Dual Triode
6DC8	DEBO-FACJ	6.3	2.0	L	F	B	S4	2400	Pent. Sect.
6DC8	DEOO-GHCO	6.3	0.0	B	A	B	S1	5000	X Dual Diode
6DG7	DCAO-EFGB	6.3	1.0	L	F	B	S4	2500	
6DL4	DECO-HOBO	6.3	1.2	H	A	C	S4	8450	
6DL5	DCAO-EFBO	6.3	9.0	L	L	B	S4	3150	
6DR8	DEBO-FACJ	6.3	1.0	C	C	A	S4	700	Pent. Sect.
6DR8	DEOO-HGCO	6.3	0.0	B	A	B	S1	5000	X Dual Diode
6DS8	DEBO-FACG	6.3	1.0	C	C	A	S4	550	Heptode Sect.
6DS8	DEJO-HOCO	6.3	1.0	B	A	A	S4	900	Triode Sect.
6DX8	DEGO-FJGO	6.3	2.1	J	J	C	S4	6950	Pent. Sect.
6DX8	DEAO-BOCO	6.3	1.7	K	A	B	S4	2500	Triode Sect.
6ES6	DCAO-EFGB	6.3	1.0	C	A	A	S4	1200	
6ET6	DCAO-EFGB	6.3	1.0	C	A	A	S4	1300	
6F12	DCAO-EGBF	6.3	2.0	L	L	B	S4	4500	
6F13	AHFO-BEGD	6.3	1.8	K	K	B	S4	5650	Use Hickok Adapter Code No. 1050-129
6F14	AHFO-BEGD	6.3	1.3	L	G	C	S4	6700	Use Hickok Adapter Code No. 1050-129
6F16	AHFO-BEGO	6.3	2.5	L	F	A	S4	1450	Use Hickok Adapter Code No. 1050-129
6F19	DEBO-GHAJ	6.3	2.0	L	F	B	S4	3600	
6F21	DCAO-EGBF	6.3	2.5	L	K	A	S4	1550	
6FG6	DEAO-FOCO	6.3	1.0	L	L	D	S4	----	Split Bar (Jumper pins 7 and
6FG6	DEAO-FOCO	6.3	20.0	L	L	D	S4	----	Solid Bar (9 of any socket -
6FY5	connect a 470K ohm resistor from this jumper to pin 6.							8200	
6FY5	DCBO-EOAO	6.3	1.0	G	A	C	S4	8200	
6GJ7	DEBO-FGAO	6.3	1.2	J	G	C	S4	6950	Pent. Sect.
6GJ7	DEJO-HOAO	6.3	3.0	F	A	B	S4	5700	Triode Sect.
6GM8	DEGB-FAHC	6.3	1.2	B	A	A	S4	1630	X Dual Triode
6GV8	DEJO-FGHO	6.3	15.0	J	J	B	S4	4700	Pent. Sect.
6GV8	DEBO-AOCO	6.3	1.0	F	A	B	S4	3450	Triode Sect.
6GW8	DEHO-FCGO	6.3	7.0	L	L	C	S4	6300	Pent. Sect.
6GW8	DEAO-JOBO	6.3	1.5	L	A	A	S4	1000	Triode Sect.
6HG8	DEBO-HJAO	6.3	1.5	J	H	C	S4	7500	Pent. Sect.
6HG8	DEFO-GOAO	6.3	3.0	F	A	B	S4	3750	Triode Sect.
6HU6	DEAO-FOCO	6.3	1.0	L	A	D	S4	----	Split Bar (Jumper noval
6HU6	DEAO-FOCO	6.3	15.0	L	A	D	S4	----	Solid Bar (socket pins 7 & 9.
6HU8	Connect a 100K ohm resistor from this jumper to pin 6.							3900	Pent. No. 1
6HU8	DEFO-HJGO	6.3	2.0	L	L	B	S4	3900	Pent. No. 2
6HU8	DEBO-CAGO	6.3	2.0	L	L	B	S4	3900	
6JX8	DEBO-FGCA	6.3	1.0	H	B	A	S4	1400	Heptode Sect.
6JX8	DEJO-HOCO	6.3	1.0	D	A	B	S4	2350	Triode Sect.
6LD3	AHCO-BOGO	6.3	3.0	L	A	A	S4	750	Triode Sect. (Use Hickok Ad-
6LD3	AHOO-FEGO	6.3	0.0	B	A	B	S1	5000	X Dual Diode (apter 1050-129)
6N3	DEOO-JOCO	6.3	0.0	A	D	G	S2	4100	Set load at 7. Read on 10000 scale
6R3	DEOO-JOOO	6.3	0.0	A	D	G	S2	2600	Cap = K. Set load at 11. Read on 10000 scale.
6RK19	DEOO-JOOO	6.3	0.0	A	D	G	S2	4000	Cap = K. Set load at 10. Read on 10000 scale.

TUBE TYPE	SELECTORS	FIL	BIAS	PLT	SCRN	RANGE	PRESS	MIN. MUT. COND.	NOTATIONS
6RP22	DEBO-FCAG	6.3	3.0	L	H	B	S4	4700	Cap = P. Read on 60000 scale
6S2A	DBOO-O000	6.3	0.0	A	D	E	S2	22000	
7AN7	DEFB-JCGA	7.5	1.5	J	A	B	S4	3750	X Dual Triode
7ES8	DEGB-FAHC	7.5	1.3	F	A	C	S4	8500	X Dual Triode
7HG8	DEBO-HJAO	7.5	1.5	J	H	C	S4	7500	Pent. Sect.
7HG8	DEFO-GOAO	7.5	3.0	F	A	B	S4	3750	Triode Sect.
8A8	DEBO-FCGO	7.5	2.0	J	J	B	S4	4000	Pent. Sect.
8A8	DEJO-AOHO	7.5	2.0	F	A	B	S4	3150	Triode Sect.
8B8	DECO-FGBO	7.5	6.0	F	F	B	S4	4300	Pent. Sect.
8B8	DEAO-JOHO	7.5	1.2	H	A	B	S4	1500	Triode Sect.
8CW5	DEBO-GJCO	7.5	12.5	J	J	B	S4	6300	
8D3	DCAO-EGBF	7.5	2.0	L	L	B	S4	4800	
8DX8	DEGO-FJGO	7.5	2.1	J	J	C	S4	6950	Pent. Sect.
8DX8	DEAO-BOCO	7.5	1.7	K	A	B	S4	2500	Triode Sect.
9A8	DEBO-FCGO	10.0	2.0	J	J	B	S4	4000	Pent. Sect.
9A8	DEJO-AOHO	10.0	2.0	F	A	B	S4	3100	Triode Sect.
9AB4	DCFO-AOGO	10.0	2.0	L	A	B	S4	3500	
9AK8	DEHO-JOGO	10.0	1.0	F	A	A	S4	900	Triode Sect.
9AK8	DEOO-FOGO	10.0	0.0	B	A	B	S1	5000	Diode No. 1
9AK8	DEOO-BACG	10.0	0.0	A	D	G	S2	2600	X Dual Diode. Set load on 13. Read on 10000 scale
9AQ8	DEGB-FAHC	10.0	1.0	E	A	B	S4	2550	X Dual Triode
9CG8	DEJO-FGHO	10.0	1.0	G	G	B	S4	3500	Pent. Sect.
9CG8	DEAO-BOCO	10.0	1.0	G	A	B	S4	4100	Triode Sect.
9D6	DCAO-EGBF	10.0	2.5	K	K	A	S4	1600	
9GV8	DEJO-FGHO	10.0	15.0	J	J	B	S4	4700	Pent. Sect.
9GV8	DEBO-AOCO	10.0	1.0	F	A	B	S4	3500	Triode Sect.
10LD3	AHCO-BOGO	12.6	3.0	L	A	A	S4	750	Triode Sect. (Use Hickok
10LD3	AHOO-FEGO	12.6	0.0	B	A	B	S1	5000	X Dual Diode (Adapter 1050-129
10LD12	DEHO-JOGO	25.0	1.0	F	A	A	S4	900	Triode Sect.
10LD12	DEOO-FOGO	25.0	0.0	B	A	B	S1	5000	Diode No. 1
10LD12	DEOO-BACG	25.0	0.0	A	D	G	S2	2600	X Dual Diode Set Load at 13. Read on 10000 scale.
10P18	DEBO-GJCO	50.0	12.5	J	J	C	S4	6300	
10PL12	DECO-FGBO	50.0	6.0	E	E	B	S4	4300	Pent. Sect.
10PL12	DEAO-JOHO	50.0	1.2	H	A	B	S4	1500	Triode Sect.
12AC5	AHFO-BECO	12.6	5.0	L	F	A	S4	600	Use Hickok Adapter Code No. 1050-129
12AJ7	DEBO-FACG	12.6	2.0	K	G	A	S4	1500	Heptode Sect.
12AJ7	DEJO-HOCO	12.6	1.0	F	A	B	S4	2350	Triode Sect.
12BR3	DEOO-JOOO	12.6	0.0	A	D	G	S2	4000	Cap = K. Set load at 10. Read on 1000 scale.
12BX6	DEBO-GHAJ	12.6	2.0	J	J	B	S4	4500	
12DA6	DEBO-GHCJ	12.6	2.0	L	F	B	S4	2300	
12GB3	BGEO-ODHO	12.6	7.7	F	F	C	S4	8800	Cap = P
12HU8	DEFO-HJGO	12.6	2.0	L	L	B	S4	3900	Pent. No. 1
12HU8	DEBO-CAGO	12.6	2.0	L	L	B	S4	3900	Pent. No. 2
12RK19	DEOO-JOOO	12.6	0.0	A	D	G	S2	4000	Cap = K. Set load at 10. Read on 10000 scale.
13CM5	BGEO-ODHO	12.6	8.2	F	F	C	S4	8800	Cap = P
14GW8	DEHO-FCGO	12.6	7.0	L	L	C	S4	6300	Pent. Sect.
14GW8	DEAO-JOBO	12.6	1.5	L	A	A	S4	1000	Triode Sect.
14K7	AHFO-BEGD	12.6	1.0	L	E	B	S4	1500	Hexode Sect. (Use HickokAd-
14K7	AHDO-COGO	12.6	1.0	F	A	A	S4	1750	Triode Sect. (apter 1050-129
14L7	AHCO-BOGO	12.6	3.0	L	A	A	S4	750	Triode Sect. (Use Hickok Ad-
14L7	AHOO-FEGO	12.6	0.0	B	A	B	S1	5000	X Dual Diode (apter 1050-129
15DQ8	DEHO-FJGO	17.0	2.1	J	J	C	S4	6950	Pent. Sect.
15DQ8	DEAO-BOCO	17.0	1.7	K	A	B	S4	2500	Triode Sect.
15EW7	DEGO-FOHO	17.0	11.0	L	A	A	S4	1250	Triode No. 1
15EW7	DEBO-AOJO	17.0	17.5	H	A	B	S4	4700	Triode No. 2
16A5	DEBO-GJCO	17.0	10.4	J	J	C	S4	5800	
16A8	DECO-FGBO	17.0	16.0	K	K	B	S4	4000	Pent. Sect.
16A8	DEAO-JOHO	17.0	1.0	F	A	A	S4	1400	Triode Sect.

TUBE TYPE	SELECTORS	FIL	BIAS	PLT	SCRN	RANGE	PRESS	MIN. MUT. COND.	NOTATIONS
16AQ3	DEOO-JOOO	17.0	0.0	A	D	G	S2	3700	Cap = K. Set load on 11. Read on 10000 scale
17C8	DEBO-FACJ	17.0	2.0	L	E	A	S4	1400	Pent. Sect.
17C8	DEOO-GHCO	17.0	0.0	B	A	B	S1	5000	X Dual Diode
17EW8	DEGB-FAHC	17.0	2.1	K	A	B	S4	3650	X Dual Triode
17BR3	DEOO-JOOO	17.0	0.0	A	D	G	S2	4000	Cap = K. Set load at 10. Read on 10000 scale.
17RK19	DEOO-JOOO	17.0	0.0	A	D	G	S2	4000	Cap = K. Set load at 10. Read on 10000 scale.
17Z3	DEOO-JOOO	17.0	0.0	A	D	G	S2	2600	Cap = K. Set load at 11. Read on 10000 scale.
18GV8	DEJO-FGHO	17.0	15.0	J	J	B	S4	4700	Pent. Sect.
18GV8	DEBO-AOCO	17.0	1.0	F	A	B	S4	3500	Triode Sect.
18J6	DCEF-BAGO	17.0	1.1	F	A	B	S4	3300	X Dual Triode
19AJ8	DEBO-FACG	20.0	2.0	L	F	A	S4	1550	Heptode Sect.
19AJ8	DEJO-HOCO	20.0	1.0	F	A	B	S4	2000	Triode Sect.
19BR5	DEAO-OJBO	20.0	Vary	L	L	D	S4	----	Connect a 500K resistor between "P" and pin No. 7 of any socket. Vary Bias to vary beam angle.
19BX6	DEBO-GHAJ	20.0	2.0	J	J	B	S4	4500	
19BY7	DEBO-GHAJ	20.0	2.0	L	F	B	S4	3800	
19D8	DEBO-FACO	20.0	2.0	L	F	A	S4	1550	Heptode Sect.
19D8	DEJO-HOCO	20.0	1.0	F	A	B	S4	2000	Triode Sect.
19EW7	DEGO-FOHO	20.0	11.0	L	A	A	S4	1250	Triode No. 1
19EW7	DEBO-AOJO	20.0	17.5	H	A	B	S4	4700	Triode No. 2
19FL8	DEBO-FACJ	20.0	2.0	L	F	B	S4	2400	Pent. Sect.
19FL8	DEOO-GHCO	20.0	0.0	B	A	B	S1	5000	X Dual Diode
19G3	BGOO-OOCO	4.0	0.0	B	A	B	S1	5000	Cap = P
20EW7	DEGO-FOHO	20.0	11.0	L	A	A	S4	1250	Triode No. 1
20EW7	DEBO-AOJO	20.0	17.5	H	A	B	S4	4700	Triode No. 2
25E5	BGEO-ODHO	25.0	8.2	F	F	C	S4	8800	Cap = P
25BR3	DEOO-JOOO	25.0	0.0	A	D	G	S2	4000	Cap = K. Set load at 10. Read on 10000 scale.
25RK19	DEOO-JOOO	25.0	0.0	A	D	G	S2	4000	Cap = K. Set load at 10. Read on 10000 scale.
26AQ8	DEGB-FAHC	25.0	1.0	E	A	B	S4	2550	X Dual Triode
28AK8	DEHO-JOGO	25.0	1.0	F	A	A	S4	900	Triode Sect.
28AK8	DEOO-FOGO	25.0	0.0	B	A	B	S1	5000	Diode No. 1
28AK8	DEOO-BACG	25.0	0.0	A	D	G	S2	2600	X Dual Diode. Set load on 13. Read on 10000 scale.
30A5	DJBO-GFAO	35.0	6.7	F	F	B	S4	5850	Before placing tube in socket proceed with test.
30AE3	DEOO-JOOO	25.0	0.0	A	D	G	S2	4700	Cap = K. Set load at 11. Read on 10000 scale
30L1	DEFB-JCGA	7.5	1.5	F	A	B	S4	3750	X Dual Triode.
31A3	AHOO-BOGO	35.0	0.0	A	D	G	S2	3700	Set load at 10. Read on 10000 scale. Use Hickok Adapter Code No. 1050-129
35D5	DEAO-FBCO	35.0	6.5	F	F	B	S4	5050	
38A3	DEOO-JOCO	35.0	0.0	A	D	G	S2	3700	Set load at 10. Read on 10000 scale.
45A5	AHFO-BEGO	50.0	7.0	L	L	C	S4	6300	
45B5	DEBO-GJCO	50.0	12.5	J	J	C	S4	6300	
90C1	OOOO-EOGO	OFF	---	F	A	VR	†S3	90V	★110V. Press S4. Regulation = 12V. From 1 to 40MA
95A1	OOOO-EOAO	OFF	---	F	A	VR	†S3	95V	Connect a 470K ohm resistor between pins 1 and 4 (any socket). ★110V Press S4. Regulation = 5V from 2 to 10 MA.
5920	DCEF-BAGO	6.3	1.8	F	A	B	S4	3800	X Dual Triode
6057	DEGB-FAHC	12.6	2.0	L	A	A	S4	1000	X Dual Triode
6059	DEBO-GHCJ	6.3	3.0	L	F	A	S4	800	
6060	DEGB-FAHC	12.6	1.0	F	A	B	S4	2500	X Dual Triode
6061	DEBO-GHCJ	6.3	8.5	J	J	B	S4	2300	
6063	DCOO-FAGO	6.3	0.0	A	E	G	S2	2400	X Dual Diode. Set load at 30. Read on 10000 scale

TUBE TYPE	SELECTORS	FIL	BIAS	PLT	SCRN	RANGE	PRESS	MIN. MUT. COND.	NOTATIONS
6065	DEAO-EGBF	6.3	2.5	L	K	A	S4	1500	
6066	DCAO-GOBO	6.3	3.0	L	A	A	S4	750	Triode Sect.
6066	DCOO-FEBO	6.3	0.0	B	A	B	S1	5000	X Dual Diode
6067	DEGB-FAHC	12.6	8.5	L	A	A	S4	1400	X Dual Triode
6118	GBOO-COHA	6.3	3.0	L	A	A	S4	750	Triode Sect. Cap = G
6118	GBOO-EDHA	6.3	0.0	B	A	B	S1	5000	X Dual Diode
6132	DEBO-GHCJ	6.3	2.5	L	K	C	S4	8200	
6227	DEBO-GHCJ	6.3	1.0	K	K	B	S4	5700	
6252	AGFB-OCDO	12.6	10.0	K	K	B	S4	3800	Tetrode No. 1 (Use Hickok Right Cap = P (Adapter Tetrode No. 2 (Code No. Left Cap = P (1050-107
6252	AGBF-OCDO	12.6	10.0	K	K	B	S4	3800	
6267	DEJO-FACH	6.3	2.0	L	H	A	S4	1250	
6374	DEOO-KOCO	6.3	0.0	A	D	G	S2	2500	Set load at 11. Read on 10000 scale.
6375	DEAO-HOOO	11.1	4.5	H	A	B	S4	2200	
6516	DCAO-EGBO	6.3	13.5	L	L	A	S4	1600	
6687	DCAO-EFBG	6.3	0.0	E	E	B	S4	1500	Grid No. 1
6687	DCGO-EFBA	6.3	4.0	E	E	A	S4	1350	Grid No. 3
6689	DEBO-FACJ	6.3	1.0	F	F	B	S4	5200	
6907	AGFB-OCDO	12.6	10.0	K	K	B	S4	3800	Tetrode No. 1 (Use Hickok Right Cap = P (Adapter Tetrode No. 2 (Code No. Left Cap = P (1050-107
6907	AGBF-OCDO	12.6	10.0	K	K	B	S4	3800	
6927	DCEF-BAGO	6.3	1.1	F	A	B	S4	3300	X Dual Triode
7062	DEGB-FAHC	12.6	1.9	H	A	B	S4	4000	X Dual Triode
7320	DEBO-GJCO	6.3	7.2	L	L	C	S4	7000	
7534	BGEO-ODHO	6.3	15.5	L	H	C	S4	17400	Cap = P
7643	DEBO-FCGO	6.3	3.2	L	K	B	S4	3450	Pent. Sect.
7643	DEJO-AOHO	6.3	2.0	F	A	B	S4	3150	Triode Sect.
7693	DCAO-EFBG	6.3	1.0	F	F	B	S4	2100	
7694	DCAO-EFBG	6.3	1.0	L	F	B	S4	2300	
7788	DEBO-GFAH	6.3	1.2	G	H	D	S4	31500	
18045	DEBO-GHCJ	20.0	3.0	K	K	B	S4	6900	
18046	DEBO-GHCJ	20.0	3.0	K	K	B	S4	6900	
AX9903	AGFB-OCDO	12.6	12.0	L	J	C	S4	5000	Tetrode No. 1 (Use Hickok Right Cap = P (Adapter Tetrode No. 2 (Code No. Left Cap = P (1050-107
AX9903	AGBF-OCDO	12.6	12.0	L	J	C	S4	5000	
AZ41	GHOO-FOOO	4.3	0.0	A	E	G	S2	2900	Diode No. 1. Set load on 22. Read on 10000 scale.
AZ41	GHOO-BOOO	4.3	0.0	A	E	G	S2	2900	Diode No. 2. Set load at 22 Read on 10000 scale. Use Hickok Adapter 1050-129
B36	GHDA-EBFC	12.6	8.0	L	A	B	S4	1700	X Dual Triode
B65	GHDA-EBFC	6.3	8.0	L	A	B	S4	1700	X Dual Triode
C3G	AHFO-CDGO	6.3	1.8	K	H	C	S4	8900	
CCA	DEGB-FAHC	6.3	100Ω	E	A	C	S4	8500	X Dual Triode
D77	DCOO-GBAE	6.3	0.0	A	D	G	S2	3300	X Dual Diode. Set load at 10. Read on 10000 scale
D152	DCOO-GBAE	6.3	0.0	A	D	G	S2	3300	X Dual Diode. Set load at 10. Read on 10000 scale.
DA90	GAOO-BOCO	1.4	0.0	B	A	B	S1	5000	
DAF91	AGFO-EDOO	1.4	1.0	E	E	A	S4	400	Pent. Sect.
DAF91	AGOO-COOO	1.4	0.0	B	A	B	S1	6200	Diode Sect.
DAF92	AGFO-BCOO	1.4	1.0	E	E	A	S4	400	Pent. Sect.
DAF92	AGOO-DOOO	1.4	0.0	B	A	B	S1	6200	Diode Sect.
DC70	DEAO-HOOO	1.1	4.5	H	A	B	S4	2200	
DC90	AGEO-BOOO	1.4	3.0	F	A	A	S4	750	
DCC90	AGEO-FOOO	3.0	2.5	E	A	A	S4	1100	Triode No. 1
DCC90	AGCO-BOOO	3.0	2.5	E	A	A	S4	1100	Triode No. 2
DDR7	CDAO-EGBO	6.3	13.5	L	L	B	S4	1600	
DF33	GBOO-CDOO	1.4	1.0	F	F	A	S4	450	Cap = G

TUBE TYPE	SELECTORS	FIL	BIAS	PLT	SCRN	RANGE	PRESS	MIN. MUT. COND.	NOTATIONS
DF61	CEDO-ABOO	♦1.1	1.0	E	E	A	S4	600	
DF62	CEDO-ABOO	♦1.1	1.0	D	D	A	S4	1250	
DF67	CEDO-ABOO	♦0.6	1.15	C	C	A	S4	60	
DF91	AGFO-BCOO	♦1.4	1.0	F	E	A	S4	550	
DF92	AGFO-BCOO	♦1.4	1.0	F	E	A	S4	630	
DF96	AGFO-BCOO	♦1.4	1.0	E	E	A	S4	530	
DF904	AGFO-BCOO	♦1.4	1.0	F	F	A	S4	550	
DH63	GBOO-COHA	6.3	3.0	L	A	A	S4	750	Triode Sect. Cap = G
DH63	GBOO-EDHC	6.3	0.0	B	A	B	S1	5000	X Dual Diode
DH77	DCAO-GOBO	6.3	3.0	L	A	A	S4	750	Triode Sect.
DH77	DCOO-EFBO	6.3	0.0	B	A	B	S1	5000	X Dual Diode
DK91	GAFO-BCOD	*1.4	0.0	E	C	A	S4	300	Pent. Sect. Note 3
DK91	GADO-CBOF	*1.4	0.0	D	D	A	S4	500	Osc. Sect. Note 3
DL33	GBEO-CDOO	♦2.5	6.6	F	F	A	S4	1250	
DL35	GBEO-CDOO	♦1.4	7.0	E	E	A	S4	950	
DL36	GBED-CDOO	♦1.4	5.0	E	E	A	S4	1200	
DL63	GBOO-COHA	6.3	9.0	L	A	A	S4	1200	Triode Sect. Cap = G
DL63	GBOO-EDHC	6.3	0.0	B	A	B	S1	5000	X Dual Diode
DL66	CEDO-ABOO	♦1.1	1.4	C	C	A	S4	200	
DL67	CEDO-ABOO	♦1.1	1.0	C	C	A	S4	200	
DL91	AGCO-FDOO	♦1.4	4.5	D	D	A	S4	750	
DL92	GACO-BDOO	♦2.5	2.7	E	D	A	S4	500	
DL93	AGDO-FCOO	♦2.5	8.4	H	E	A	S4	1200	
DL94	GAFO-BCOO	♦3.0	4.5	E	E	A	S4	1250	
DL95	GACO-FDOO	♦3.0	4.5	E	E	A	S4	1250	
DL96	AGFO-BCOO	♦3.0	5.2	E	E	A	S4	850	
DL98	DECO-GA00	♦2.5	25.0	K	H	A	S4	1150	
DM70	DEAO-GOOO	♦1.4	Vary	E	A	G	S4	----	Vary Bias to vary bar length
DM71	DEAO-GOOO	♦1.4	Vary	E	A	G	S4	----	Vary Bias to vary bar length
DP61	DCAO-EFGO	6.3	1.8	J	G	B	S4	3200	
DY30	GBOO-O000	1.1	0.0	A	E	E	S2	10000	Cap = P. Read on 60000 scale
DY86	DBOO-O000	1.4	0.0	A	D	E	S2	22000	Cap = P. Read on 60000 scale
DY87	DBOO-O000	1.4	0.0	A	D	E	S2	22000	Cap = P. Read on 60000 scale
E80CC	DEGB-FAHC	12.6	5.5	L	A	B	S4	1700	X Dual Triode
E80CF	DEBO-FCGO	6.3	3.2	L	K	B	S4	3450	Pent. Sect.
E80CF	DEJO-AOHO	6.3	2.0	F	A	B	S4	3150	Triode Sect.
E80F	DEJO-FACH	6.3	2.0	L	F	A	S4	1150	
E80L	DEBO-GHCJ	6.3	2.5	K	K	B	S4	5700	
E81CC	DEGB-FAHC	12.6	2.0	L	A	B	S4	3500	X Dual Triode
E81L	DEBO-GHCJ	6.3	2.0	K	K	C	S4	7200	
E82CC	DEGB-FAHC	12.6	8.5	L	A	A	S4	1400	X Dual Triode
E83CC	DEGB-FAHC	12.6	2.0	L	A	A	S4	1000	X Dual Triode
E83F	DEBO-FACJ	6.3	1.0	F	F	B	S4	5200	
E84L	DEBO-GJCO	6.3	7.2	L	L	C	S4	7000	
E86C	DEBO-AOCO	6.3	1.5	J	A	C	S4	8750	
E88CC	DEGB-FAHC	6.3	1.2	F	A	C	S4	7850	X Dual Triode
E90CC	DCEF-BAGO	6.3	1.8	F	A	B	S4	3800	X Dual Triode
E90F	DCAO-EFBG	6.3	1.0	F	F	B	S4	2100	
E91AA	DCOO-GBAE	6.3	0.0	A	D	G	S2	3300	X Dual Diode. Set load at 11. Read on 10000 scale.
E91H	DCAO-EFBG	6.3	0.0	E	E	B	S4	1500	Grid No. 1
E91H	DCGO-EFBA	6.3	4.0	E	E	A	S4	1350	Grid No. 3
E91N	DCAO-FOBE	6.3	#	A	F	G	S2	2400	Set load to 30. Fires about 2V. Read on 10000 scale
E92CC	DCFE-ABGO	6.3	1.7	H	A	B	S4	3750	X Dual Triode
E95F	DCAO-EFGO	6.3	1.8	J	G	B	S4	3200	
E99F	DCAO-EFBG	6.3	1.0	L	F	B	S4	2300	
E130L	BGEO-ODHO	6.3	14.0	H	F	C	S4	8800	Cap = P
E180CC	DEGB-FAHC	12.6	1.9	H	A	B	S4	4000	X Dual Triode
E180F	DEBO-GJAH	6.3	100 Ω	J	H	C	S4	9700	
E182CC	DEGB-JAFC	12.6	2.0	G	A	C	S4	10000	X Dual Triode
E182F	CJAO-FHDO	6.3	1.9	H	H	C	S4	8000	
E186F	DEBO-GJAH	6.3	100 Ω	J	H	C	S4	10000	

TUBE TYPE	SELECTORS	FIL	BIAS	PLT	SCRN	RANGE	PRESS	MIN. MUT. COND.	NOTATIONS
E188CC	DEGB-FAHC	6.3	120 Ω	F	A	C	S4	7250	X Dual Triode
E810F	DEBO-GFAH	6.3	1.2	G	H	D	S4	31500	
E2134	DCAO-EGBO	6.3	7.8	J	J	B	S4	6000	
EAA91	DCOO-GBAE	6.3	0.0	A	D	G	S2	3300	X Dual diode. Set load at 10. Read on 10000 scale.
EABC80	DEHO-JOGO	6.3	1.0	F	A	A	S4	900	Triode Sect.
EABC80	DEOO-FOGO	6.3	0.0	B	A	B	S1	5000	Diode No. 1
EABC80	DEOO-BACG	6.3	0.0	A	D	G	S2	2600	X Dual Diode. Set load on 13. Read on 10000 scale
EAF42	AHFO-BEGD	6.3	2.0	L	E	A	S4	1250	Pent. Sect. (Use Hickok Adapt-
EAF42	AHOO-COGO	6.3	0.0	B	A	B	S1	5000	Diode Sect. (er 1050-129
EB41	AHOO-FEGC	6.3	0.0	A	D	G	S2	3300	X Dual Diode. Set load on 10. Read on 10000 scale
									Use Hickok Adapter 1050-129
EB91	DCOO-BGEA	6.3	0.0	A	D	G	S2	3300	X Dual Diode. Set load on 10. Read on 10000 scale
EBC33	AHCO-BOGO	6.3	6.0	L	A	A	S4	1250	Triode Sect. Cap = G
EBC33	AHOO-FEGO	6.3	0.0	B	A	B	S1	5000	X Dual Diode
EBC41	AHCO-BOGO	6.3	3.0	L	A	A	S4	750	Triode Sect. (Use Hickok Ad-
EBC41	AHOO-FEGO	6.3	0.0	B	A	B	S1	5000	X Dual Diode (apter 1050-129
EBC81	DEBO-AOCO	6.3	3.0	L	A	A	S4	750	Triode Sect.
EBC81	DEOO-FHCO	6.3	0.0	B	A	B	S1	5000	X Dual Diode
EBC90	DCAO-GOBO	6.3	3.0	L	A	A	S4	750	Triode Sect.
EBC90	DCOO-FEBO	6.3	0.0	B	A	B	S1	5000	X Dual Diode
EBC91	DCAO-GOBO	6.3	2.0	L	A	A	S4	1000	Triode Sect.
EBC91	DCOO-EFBO	6.3	0.0	B	A	B	S1	5000	X Dual Diode
EBF32	BGOO-CFHO	6.3	3.0	L	G	A	S4	750	Pent. Sect. Cap = G
EBF32	BGOO-EDHO	6.3	0.0	B	A	B	S1	5000	X Dual Diode
EBF80	DEBO-FACJ	6.3	2.0	L	E	A	S4	1400	Pent. Sect.
EBF80	DEOO-GHCO	6.3	0.0	B	A	B	S1	5000	X Dual Diode
EBF83	DEBO-FACJ	6.3	1.0	C	C	A	S4	700	Pent. Sect.
EBF83	DEOO-HGCO	6.3	0.0	B	A	B	S1	5000	X Dual Diode
EBF89	DEBO-FACJ	6.3	2.0	L	F	B	S4	2400	Pent. Sect.
EBF89	DEOO-HGCO	6.3	0.0	B	A	B	S1	5000	X Dual Diode
EC80	DEBO-JOCO	6.3	1.5	L	A	C	S4	7600	
EC81	DEAO-HOCO	6.3	2.0	G	A	B	S4	2500	
EC86	DEBO-AOCO	6.3	1.5	J	A	C	S4	8700	
EC88	DECO-HOBO	6.3	1.2	H	A	C	S4	8450	
EC90	DCFO-EOGO	6.3	8.5	L	A	A	S4	1400	
EC91	DCFO-GOBO	6.3	1.5	L	A	B	S4	5300	
EC92	DCFO-AOGO	6.3	1.5	F	A	B	S4	3400	
EC93	DCFO-GOEO	6.3	2.6	E	A	B	S4	4100	
EC95	CDBO-EOGF	6.3	1.2	K	A	C	S4	6500	
EC97	DCBO-EOAO	6.3	1.0	G	A	C	S4	8200	
EC806S	DEBO-AOCO	6.3	1.5	J	A	C	S4	8700	
EC900	DCAO-EOBF	6.3	1.5	H	A	C	S4	9400	
ECC33	HGAD-BECF	6.3	4.0	L	A	B	S4	2550	X Dual Triode
ECC40	HAFC-EBDG	6.3	5.6	L	A	B	S4	1800	X Dual Triode. Use Hickok Adapter Code No. 1050-129
ECC81	DEGB-FAHC	12.6	2.0	L	A	B	S4	3500	X Dual Triode
ECC82	DEGB-FAHC	12.6	8.5	L	A	A	S4	1400	X Dual Triode
ECC83	DEGB-FAHC	12.6	2.0	L	A	A	S4	1000	X Dual Triode
ECC84	DEFB-JCGA	6.3	1.5	F	A	B	S4	3750	X Dual Triode
ECC85	DEGB-FAHC	6.3	1.0	F	A	B	S4	2500	X Dual Triode
ECC86	DEGB-FAHC	6.3	1.2	B	A	A	S4	1630	X Dual Triode
ECC88	DEGB-FAHC	6.3	1.2	F	A	C	S4	7850	X Dual Triode
ECC91	DCEF-BAGO	6.3	1.1	F	A	B	S4	3300	X Dual Triode
ECC186	DEGB-FAHC	12.6	8.5	L	A	A	S4	1400	X Dual Triode
ECC189	DEGB-FAHC	6.3	1.3	F	A	C	S4	8400	X Dual Triode
ECC230	GHDA-EBFC	7.5	40.0	G	A	B	S4	4200	X Dual Triode
ECC801S	DEGB-FAHC	12.6	2.0	L	A	B	S4	3500	X Dual Triode
ECC802S	DEGB-FAHC	12.6	8.5	L	A	A	S4	1400	X Dual Triode

TUBE TYPE	SELECTORS	FIL	BIAS	PLT.	SCRN	RANGE	PRESS	MIN. MUT COND.	NOTATIONS
EK90	CDGO-EFBA	6.3	2.0	L	C	A	S4	300	Ampl. Sect.
EK90	CDAO-FEBG	6.3	0.0	F	F	B	S4	4500	Osc. Sect.
EL34	BGEO-CDHA	6.3	13.5	L	L	C	S4	6900	
EL36	BGEO-ODHO	6.3	8.2	F	F	C	S4	8800	Cap = P
EL37	BGEO-CDHO	6.3	10.0	H	H	B	S4	5000	
EL38	BGEO-ODHA	6.3	7.0	H	H	B	S4	5000	Cap = P
EL41	AHFO-BEGO	6.3	170Ω	H	H	B	S4	5000	Use Hickok Adapter Code No. 1050-129
EL42	AHFO-BEGO	6.3	360Ω	K	K	B	S4	2000	Use Hickok Adapter Code No. 1050-129
EL81	DEBO-OGCF	6.3	38.5	K	K	B	S4	2900	Cap = P
EL83	DEBO-GACF	6.3	5.5	L	L	C	S4	6300	
EL84	DEBO-GJCO	6.3	7.3	L	L	C	S4	7200	
EL85	DEAO-GJCF	6.3	360Ω	K	K	B	S4	2000	
EL86	DEBO-GJCO	6.3	12.5	J	J	C	S4	6300	
EL90	DCGO-EFBO	6.3	8.5	J	J	B	S4	2300	
EL91	DCAO-EGBO	6.3	13.5	L	L	A	S4	1600	
EL95	DCAO-EFBO	6.3	9.0	L	L	B	S4	3150	
EL360	BGEO-ODHO	6.3	8.2	F	F	C	S4	8800	Cap = P
EL803	DEBO-GACF	6.3	5.5	L	L	C	S4	6300	
EL821	DEBO-GHCJ	6.3	2.5	L	K	C	S4	8200	
EL822	DEBO-GHCJ	6.3	2.5	L	K	C	S4	8200	
ELL80	DEFO-HJGO	6.3	2.0	L	L	B	S4	3900	Pent. No. 1
ELL80	DEBO-CAGO	6.3	2.0	L	L	B	S4	3900	Pent. No. 2
EM34	GBDO-EOHO	6.3	Vary	K	A	D	S4	----	Connect a 1 megohm resistor from "P" to pin No. 3 of any socket. Connect a second 1 megohm resistor from "P" to pin 6 of any socket. Eye one closes at Bias of about 5V. Eye two closes at Bias of about 25.0V.
EM80	DEAO-OJBO	6.3	Vary	L	L	D	S4	----	Connect a 500K resistor between "P" and pin 7 of any socket. Vary Bias to vary beam angle.
EM81	DEAO-OJBO	6.3	Vary	L	L	D	S4	----	Connect a 470K resistor from "P" to pin 7. Vary Bias to vary beam angle.
EM84	DEAO-FOCO	6.3	1.0	L	L	D	S4	----	Split Bar (Jumper pins 7 & 9)
EM84	DEAO-FOCO	6.3	20.0	L	L	D	S4	----	Solid Bar (of any socket.)
EM87	DEAO-FOCO	6.3	1.0	L	A	D	S4	----	Connect a 470K ohm resistor from this jumper to pin 6.
EM87	DEAO-FOCO	6.3	15.0	L	A	D	S4	----	Split Bar (Jumper Noval)
EQ80	EDGO-FAHJ	6.3	1.0	L	C	A	S4	500	Solid Bar (pins 7 & 9.)
EQ80	EDGJ-AFHB	6.3	5.0	F	C	A	S4	1050	Ampl. Sect. Jumper from pin No. 2 of any socket to "K".
EY81	DEOO-JOOO	6.3	0.0	A	D	G	S2	2600	Osc. Sect.
EY82	DEOO-JOCO	6.3	0.0	A	D	G	S2	4100	Cap = K. Set load at 11. Read on 10000 scale.
EY84	DEOO-OOCO	6.3	0.0	A	E	G	S2	4400	Set load at 7. Read on 10000 scale.
EY86	DBOO-OOOO	6.3	0.0	A	D	E	S2	22000	Cap = P. Set load at 11. Read on 10000 scale.
EY87	DBOO-OOOO	6.3	0.0	A	D	E	S2	22000	Cap = P. Read on 60000 scale.
EY88	DEOO-JOOO	6.3	0.0	A	D	G	S2	4700	Cap = P. Read on 60000 scale
EY91	DCOO-COBO	6.3	0.0	A	E	G	S2	2400	Set load at 11. Cap = K. Read on 10000 scale.
EZ35	GBOO-ECHA	6.3	0.0	A	E	G	S2	2400	Set load at 30. Read on 10000 scale.
EZ40	AHOO-FBGO	6.3	0.0	A	E	G	S2	2500	X Dual Diode. Set load at 30. Read on 10000 scale.
EZ80	DEOO-GACO	6.3	0.0	A	E	G	S2	2500	X Dual Diode. Set load at 30. Read on 10000 scale. Use Hickok Adapter Code 1050-129
EZ81	DEOO-GACO	6.3	0.0	A	D	G	S2	3300	X Dual Diode. Set load at 30. Read on 10000 scale.
EZ90	DCOO-FAGO	6.3	0.0	A	E	G	S2	2400	X Dual Diode. Set load at 10. Read on 10000 scale.
GZ30	HBOO-FDOO	5.0	0.0	A	D	G	S2	2700	X Dual Diode. Set load at 30. Read on 10000 scale.

TUBE TYPE	SELECTORS	FIL	BIAS	PLT.	SCRN	RANGE	PRESS	MIN. MUT. COND.	NOTATIONS
EK90	CDGO-EFBA	6.3	2.0	L	C	A	S4	300	Ampl. Sect.
EK90	CDAO-FEBG	6.3	0.0	F	F	B	S4	4500	Osc. Sect.
EL34	BGEO-CDHA	6.3	13.5	L	L	C	S4	6900	
EL36	BGEO-ODHO	6.3	8.2	F	F	C	S4	8800	Cap = P
EL37	BGEO-CDHO	6.3	10.0	H	H	B	S4	5000	
EL38	BGEO-ODHA	6.3	7.0	H	H	B	S4	5000	Cap = P
EL41	AHFO-BEGO	6.3	170Ω	H	H	B	S4	5000	Use Hickok Adapter Code No. 1050-129
EL42	AHFO-BEGO	6.3	360Ω	K	K	B	S4	2000	Use Hickok Adapter Code No. 1050-129
EL81	DEBO-OGCF	6.3	38.5	K	K	B	S4	2900	Cap = P
EL83	DEBO-GACF	6.3	5.5	L	L	C	S4	6300	
EL84	DEBO-GJCO	6.3	7.3	L	L	C	S4	7200	
EL85	DEAO-GJCF	6.3	360Ω	K	K	B	S4	2000	
EL86	DEBO-GJCO	6.3	12.5	J	J	C	S4	6300	
EL90	DCGO-EFBO	6.3	8.5	J	J	B	S4	2300	
EL91	DCAO-EGBO	6.3	13.5	L	L	A	S4	1600	
EL95	DCAO-EFBO	6.3	9.0	L	L	B	S4	3150	
EL360	BGEO-ODHO	6.3	8.2	F	F	C	S4	8800	Cap = P
EL803	DEBO-GACF	6.3	5.5	L	L	C	S4	6300	
EL821	DEBO-GHCJ	6.3	2.5	L	K	C	S4	8200	
EL822	DEBO-GHCJ	6.3	2.5	L	K	C	S4	8200	
ELL80	DEFO-HJGO	6.3	2.0	L	L	B	S4	3900	Pent. No. 1
ELL80	DEBO-CAGO	6.3	2.0	L	L	B	S4	3900	Pent. No. 2
EM34	GBDO-EOHO	6.3	Vary	K	A	D	S4	----	Connect a 1 megohm resistor from "P" to pin No. 3 of any socket. Connect a second 1 megohm resistor from "P" to pin 6 of any socket. Eye one closes at Bias of about 5V. Eye two closes at Bias of about 25.0V.
EM80	DEAO-OJBO	6.3	Vary	L	L	D	S4	----	Connect a 500K resistor between "P" and pin 7 of any socket. Vary Bias to vary beam angle.
EM81	DEAO-OJBO	6.3	Vary	L	L	D	S4	----	Connect a 470K resistor from "P" to pin 7. Vary Bias to vary beam angle.
EM84	DEAO-FOCO	6.3	1.0	L	L	D	S4	----	Split Bar (Jumper pins 7 & 9)
EM84	DEAO-FOCO	6.3	20.0	L	L	D	S4	----	Solid Bar (of any socket.)
EM87	DEAO-FOCO	6.3	1.0	L	A	D	S4	----	Connect a 470K ohm resistor from this jumper to pin 6.
EM87	DEAO-FOCO	6.3	15.0	L	A	D	S4	----	Split Bar (Jumper Noval)
EQ80	EDGO-FAHJ	6.3	1.0	L	C	A	S4	500	Solid Bar (pins 7 & 9.)
EQ80	EDGJ-AFHB	6.3	5.0	F	C	A	S4	1050	Ampl. Sect. Jumper from pin No. 2 of any socket to "K".
EY81	DEOO-JOOO	6.3	0.0	A	D	G	S2	2600	Osc. Sect.
EY82	DEOO-JOCO	6.3	0.0	A	D	G	S2	4100	Cap = K. Set load at 11. Read on 10000 scale.
EY84	DEOO-OOCO	6.3	0.0	A	E	G	S2	4400	Set load at 7. Read on 10000 scale.
EY86	DBOO-OOOO	6.3	0.0	A	D	E	S2	22000	Cap = P. Set load at 11. Read on 10000 scale.
EY87	DBOO-OOOO	6.3	0.0	A	D	E	S2	22000	Cap = P. Read on 60000 scale.
EY88	DEOO-JOOO	6.3	0.0	A	D	G	S2	4700	Cap = P. Read on 60000 scale
EY91	DCOO-COBO	6.3	0.0	A	E	G	S2	2400	Set load at 11. Cap = K. Read on 10000 scale.
EZ35	GBOO-ECHA	6.3	0.0	A	E	G	S2	2400	Set load at 30. Read on 10000 scale.
EZ40	AHOO-FBGO	6.3	0.0	A	E	G	S2	2500	✗ Dual Diode. Set load at 30. Read on 10000 scale.
EZ80	DEOO-GACO	6.3	0.0	A	E	G	S2	2500	✗ Dual Diode. Set load at 30. Read on 10000 scale. Use Hickok Adapter Code 1050-129
EZ81	DEOO-GACO	6.3	0.0	A	D	G	S2	3300	✗ Dual Diode. Set load at 30. Read on 10000 scale.
EZ90	DCOO-FAGO	6.3	0.0	A	E	G	S2	2400	✗ Dual Diode. Set load at 10. Read on 10000 scale.
GZ30	HBOO-FDOO	5.0	0.0	A	D	G	S2	2700	✗ Dual Diode. Set load at 30. Read on 10000 scale.

TUBE TYPE	SELECTORS	FIL	BIAS	PLT	SCRN	RANGE	PRESS	MIN. MUT. COND.	NOTATIONS
GZ32	BHOO-FDOO	5.0	0.0	A	D	G	S2	2700	X Dual Diode. Set load at 12. Read on 10000 scale.
GZ33	BHOO-FDOO	5.0	0.0	A	H	G	S2	6000	X Dual Diode. Set load at 20. Read on 10000 scale.
GZ34	BHOO-FDOO	5.0	0.0	A	D	G	S2	3100	X Dual Diode. Set load at 13. Read on 10000 scale.
H63	GBOO-DOHA	6.3	2.0	L	A	A	S4	950	Cap = G
HABC80	DEHO-JOGF	20.0	3.0	L	A	A	S4	750	Triode Sect.
HABC80	DEOO-FBGC	20.0	0.0	A	D	F	S2	1200	X Dual Diode. Set load at 53. Read on 3000 scale.
HABC80	DEOO-AOGH	20.0	0.0	A	D	F	S2	1200	Diode No. 3. Set load at 53. Read on 3000 scale.
HBC90	DCAO-GOBO	12.6	3.0	L	A	A	S4	7500	Triode Sect.
HBC90	DCOO-FEBO	12.6	0.0	B	A	B	S1	5000	X Dual Diode
HBC91	DCAO-GOBO	12.6	2.0	L	A	A	S4	1000	Triode Sect.
HBC91	DCOO-FEBO	12.6	0.0	B	A	B	S1	5000	X Dual Diode
HCC85	DEGB-FAHC	17.0	1.1	F	A	B	S4	2900	X Dual Triode
HCH81	DEBO-FACG	12.6	2.0	K	G	A	S4	1500	Heptode Sect.
HCH81	DEJO-HOCO	12.6	1.0	F	A	B	S4	2350	Triode Sect.
HD14	GBOO-COOO	1.4	1.0	F	A	A	S4	200	Triode Sect. Cap = G
HD14	GBOO-EOOO	1.4	0.0	B	A	B	S1	5000	Diode Sect.
HD30	DECO-GAoo	2.5	25.0	K	H	A	S4	1150	
HD93	ABOO-OOOO	1.1	0.0	A	E	E	S2	10000	Cap = P. Read on 60000 scale.
HD94	GBEO-ODHO	6.3	22.5	L	H	B	S4	3500	Cap = P
HD96	GBEO-ODHO	25.0	22.5	L	H	B	S4	3500	Cap = P
HF93	DCAO-EFGB	12.6	1.0	L	F	B	S4	2800	
HF94	DCAO-EFGB	12.6	1.0	L	H	B	S4	3300	
HK90	CDGO-EFBA	12.6	2.0	L	C	A	S4	300	Ampl. Sect.
HK90	CDAO-FEBG	12.6	0.0	F	F	B	S4	4500	Osc. Sect.
HL90	DCAO-EFBO	20.0	8.5	J	J	B	S4	2300	
HL92	DCBO-GFAO	50.0	8.0	G	F	B	S4	4700	
HL94	DJBO-GFAO	35.0	6.7	F	F	B	S4	5850	Before placing tube in socket
jumper a 33 ohm, 2 watt resistor between pins 3 and 9 of any socket. Then proceed with test.									
HMO4	CDGO-EFBA	6.3	2.0	L	C	A	S4	300	Ampl. Sect.
HMO4	CDAO-FEBG	6.3	0.0	F	F	B	S4	4500	Osc. Sect.
HP6	DCAO-EGBF	6.3	2.0	L	L	B	S4	4700	
HY90	DCOO-EOGO	35.0	0.0	A	E	G	S2	5500	Set load at 12. Read on 10000 scale.
KT61	BGEO-CDHO	6.3	2.0	H	H	C	S4	5700	
KT66	BGEO-CDHO	6.3	15.0	L	L	B	S4	4000	
KT88	BGEO-CDHO	6.3	15.0	H	H	B	S4	3800	
KTZ63	GBOO-CDHE	6.3	3.0	L	F	A	S4	750	Cap = G
L63	GBEO-COHO	6.3	8.0	L	A	B	S4	1650	
L77	DCFO-EOGO	6.3	8.5	L	A	A	S4	1400	
LC900	DCAO-EOBF	3.0	1.5	H	A	C	S4	9400	
LN119	DECO-FGBO	6.3	6.0	E	E	B	S4	4300	Pent. Sect.
LN119	DEAO-JOHO	6.3	1.2	H	A	B	S4	1500	Triode Sect.
LN152	DEJO-FHCG	6.3	6.7	J	J	B	S4	2100	Pent. Sect.
LN152	DEBO-AOOO	6.3	2.0	F	A	A	S4	850	Triode Sect.
M8079	DCOO-GBAE	6.3	0.0	A	D	G	S2	3300	X Dual Diode. Set load on 11. Read on 10000 scale
M8081	DCEF-BAGO	6.3	1.1	F	A	B	S4	3300	X Dual Triode
M8100	DCAO-EFGO	6.3	2.0	J	G	B	S4	3100	
M8136	DEGB-FAHC	12.6	8.5	L	A	A	S4	1400	X Dual Triode
M8137	DEGB-FAHC	12.6	2.0	L	A	A	S4	1000	X Dual Triode
M8162	DEGB-FAHC	12.6	2.0	L	A	B	S4	3500	X Dual Triode
N17	GACO-BDOO	2.5	2.7	E	D	A	S4	500	
N18	GACO-FDOO	2.5	4.5	E	E	A	S4	1250	
N19	GAFO-BCOO	3.0	4.5	E	E	A	S4	1250	
N77	DCAO-EGBO	6.3	13.5	L	L	A	S4	1600	
N78	DCAO-EGBO	6.3	5.5	L	L	C	S4	6300	
N119	DEBO-GJCO	50.0	12.5	J	J	B	S4	6300	

TUBE TYPE	SELECTORS	FIL	BIAS	PLT.	SCRN	RANGE	PRESS	MIN. MUT. COND.	NOTATIONS
N144	CDAO-EGBO	6.3	13.5	L	L	B	S4	1600	Use Hickok Adapter Code No. 1050-129 Cap = P
N151	AHFO-BEHO	6.3	360 Ω	K	K	B	S4	2000	
N152	DEBO-OHCJ	20.0	23.0	J	J	B	S4	4100	
N153	DEBO-GACF	12.6	2.9	J	J	C	S4	6000	
N154	DEBO-GJCO	17.0	10.4	J	J	C	S4	6400	
N309	DEBO-GACF	12.6	2.9	J	J	C	S4	6000	
N329	DEBO-GJCO	17.0	10.4	J	J	C	S4	6400	
N359	DEBO-OHCJ	20.0	23.0	J	J	B	S4	4100	
N709	DEBO-GJCO	6.3	7.2	L	L	C	S4	7000	
N727	DCGO-EFBO	6.3	8.5	J	J	B	S4	2300	
OM4	AHCO-BOGO	6.3	6.0	L	A	A	S4	1250	Triode Sect. Cap = G X Dual Diode Triode Sect. Diode No. 1 X Dual Diode. Set load on 13. Read on 10000 scale.
OM4	AHOO-FEGO	6.3	0.0	B	A	B	S1	5000	
PABC80	DEHO-JOGO	10.0	1.0	F	A	A	S4	900	
PABC80	DEOO-FOGO	10.0	0.0	B	A	B	S1	5000	
PABC80	DEOO-BACG	10.0	0.0	A	D	G	S2	2600	
PC86	DEBO-AOCO	4.3	1.5	J	A	C	S4	8750	
PC95	DCBO-EOGF	3.0	1.2	K	A	C	S4	6500	
PC97	DCBO-EOAO	4.3	1.0	G	A	C	S4	8200	
PCC84	DEFB-JCGA	7.5	1.5	F	A	B	S4	3750	
PCC85	DEGB-FAHC	10.0	1.0	F	A	B	S4	2500	
PCC88	DEGB-FAHC	7.5	1.2	F	A	C	S4	7850	X Dual Triode X Dual Triode X Dual Triode Pent. Sect. Triode Sect. Pent. Sect. Triode Sect. Pent. Sect. Triode Sect. Pent. Sect. Triode Sect.
PCC189	DEGB-FAHC	7.5	1.3	F	A	C	S4	8400	
PCF80	DEBO-FCGO	10.0	2.0	J	J	B	S4	3450	
PCF80	DEJO-AOHO	10.0	2.0	F	A	B	S4	3150	
PCF82	DEBO-FCGO	10.0	1.0	G	F	B	S4	3100	
PCF82	DEJO-AOHO	10.0	1.0	G	A	B	S4	4700	
PCF86	DEBO-HJAO	7.5	1.5	J	H	C	S4	7500	
PCF86	DEFO-GOAO	7.5	3.0	F	A	B	S4	3750	
PCL82	DECO-FGBO	17.0	6.0	E	E	B	S4	4300	
PCL82	DEAO-JOHO	17.0	1.2	H	A	B	S4	1500	
PCL84	DEHO-FJGO	17.0	2.1	J	J	C	S4	6950	Pent. No. 1 Pent. No. 2 Set load on 12. Read on 10000 scale. Cap = K. Set load at 11. Read on 10000 scale. Set load at 12. Read on 10000 scale. Cap = K. Set load on 11. Read on 10000 scale.
PCL84	DEAO-BOCO	17.0	1.7	K	A	B	S4	2500	
PCL85	DEJO-FGHO	20.0	15.0	J	J	B	S4	4700	
PCL85	DEBO-AOCO	20.0	1.0	F	A	B	S4	3450	
PCL86	DEHO-FCGO	12.6	7.0	L	L	C	S4	6300	
PCL86	DEAO-JOBO	12.6	1.5	L	A	A	S4	1000	
PF86	DEJO-FACH	4.3	2.0	L	H	A	S4	1260	
PL21	DCAO-FOBE	6.3	#	A	F	F	S2	2000	
PL36	BGEO-ODHO	25.0	8.2	F	F	C	S4	8800	
PL81	DEBO-OHCJ	20.0	23.0	J	J	B	S4	4100	
PL82	DEBO-GJCO	17.0	10.4	J	J	C	S4	5800	Set load on 12. Read on 10000 scale. Cap = K. Set load at 11. Read on 10000 scale. Set load at 12. Read on 10000 scale. Cap = K. Set load on 11. Read on 10000 scale. X Dual Triode Tetrode No. 1 Tetrode No. 2
PL83	DEBO-GACF	12.6	2.9	J	J	C	S4	6300	
PL84	DEBO-GJCO	12.6	12.5	J	J	C	S4	7200	
PLL80	DEFO-HJGO	12.6	2.0	L	L	B	S4	3900	
PLL80	DEBO-CAGO	12.6	2.0	L	L	B	S4	3900	
PMO4	DCAO-EFGB	6.3	1.0	F	F	A	S4	1900	
PMO5	DCAO-EFGO	6.3	2.0	J	G	B	S4	3100	
PMO7	DCAO-EGBF	6.3	2.0	L	L	B	S4	4800	
PY80	DEOO-JOCO	20.0	0.0	A	E	G	S2	5500	
PY81	DEOO-JOOO	17.0	0.0	A	D	G	S2	2600	
PY82	DEOO-JOCO	17.0	0.0	A	E	G	S2	5500	X Dual Triode Tetrode No. 1 Tetrode No. 2
PY88	DEOO-JOOO	25.0	0.0	A	D	G	S2	4700	
QA2403	DCAO-EGBF	6.3	2.0	L	L	B	S4	4800	
QA2406	DEGB-FAHC	12.6	2.0	L	A	B	S4	3500	
QQEO2/5	DECA-HGBO	12.6	3.5	K	H	C	S4	6500	
QQEO2/5	DEAC-FGBO	12.6	3.5	K	H	C	S4	6500	

TUBE TYPE	SELECTORS	FIL	BIAS	PLT	SCRN	RANGE	PRESS	MIN. MUT. COND.	NOTATIONS
QQEO3/12	DECA-HGBO	12.6	10.0	J	H	B	S4	2100	Tetrode No. 1
QQEO3/12	DEAC-FGBO	12.6	10.0	J	H	B	S4	2100	Tetrode No. 2
QQEO3/20	AGFB-OCDO	12.6	10.0	K	K	B	S4	3800	Tetrode No. 1 (Use Hickok Right Cap = P (Adapter
QQEO3/20	AGBF-OCDO	12.6	10.0	K	K	B	S4	3800	Tetrode No. 2 (Code No. Left Cap = P (1050-107
QQEO6/40	AGFB-OCDO	12.6	12.0	L	J	C	S4	5000	Right Cap = P (Use Hickok
QQEO6/40	AGBF-OCDO	12.6	12.0	L	J	C	S4	5000	Left Cap = P (Adapter Code (No. 1050-107
QQVO3/10	DECA-HGBO	12.6	10.0	J	H	B	S4	2100	Tetrode No. 1
QQVO3/10	DEAC-FGBO	12.6	10.0	J	H	B	S4	2100	Tetrode No. 2
QQVO3/20A	AGFB-OCDO	12.6	10.0	K	K	B	S4	3800	Tetrode No. 1 (Use Hickok Right Cap = P (Adapter
QQVO3/20A	AGBF-OCDO	12.6	10.0	K	K	B	S4	3800	Tetrode No. 2 (Code No. Left Cap = P (1050-107
QS95/10	OOOO-EAO	OFF	---	F	A	VR	S3	95V	Connect a 470K ohm resistor
STV85/10	OOOO-AOBO	OFF	---	H	A	VR	S3	85V	Regulation = 5V from 2 to 10 MA. ★125V. Press S4. Regulation = 3V from 1 to 10 MA
STV108/30	OOOO-EOBO	OFF	---	G	A	VR	S3	108V	★115V. Press S4 Regulation = 2V from 5 to 30 MA
STV150/30	OOOO-EOBO	OFF	---	J	A	VR	S3	150V	★155V. Press S4. Regula- tion = 2V from 5 to 30 MA
U26	DBOO-OOOO	6.3	0.0	A	D	E	S2	22000	Cap = P. Read on 60000 scale
U49	DBOO-OOOO	6.3	0.0	A	D	E	S2	22000	Cap = P. Read on 60000 scale
U70	GBOO-ECHA	6.3	0.0	A	E	G	S2	2400	X Dual Diode. Set load at 30. Read on 10000 scale.
U78	DCOO-FAGO	6.3	0.0	A	E	G	S2	2400	Dual diode. Set load on 30. Read on 10000 scale.
U119	DEOO-JOCO	35.0	0.0	A	D	G	S2	3700	Set load at 7. Read on 10000 scale.
U152	DEOO-JOCO	20.0	0.0	A	E	G	S2	5500	Set load on 12. Read on 10000 scale.
U153	DEOO-JOOO	20.0	0.0	A	D	G	S2	2600	Cap = K. Set load at 11. Read on 10000 scale.
U154	DEOO-JOCO	20.0	0.0	A	E	G	S2	5500	Set load on 12. Read on 10000 scale.
U192	DEOO-JOCO	20.0	0.0	A	E	G	S2	5500	Set load at 12. Read on 10000 scale.
U381	DEOO-JOCO	35.0	0.0	A	D	G	S2	3700	Set load at 11. Read on 10000 scale.
U709	DEOO-GACO	6.3	0.0	A	D	G	S2	3300	X Dual diode. Set load at 10. Read on 10000 scale.
UABC80	DEHO-JOGO	25.0	1.0	F	A	A	S4	900	Triode Sect.
UABC80	DEOO-FOGO	25.0	0.0	B	A	B	S1	5000	Diode No. 1
UABC80	DEOO-BACG	25.0	0.0	A	D	G	S2	2600	X Dual Diode. Set load on 13. Read on 10000 scale.
UAF42	AHFO-BEGD	12.6	2.0	L	E	A	S4	1250	Pent. Sect. (Use Hickok
UAF42	AHOO-COGO	12.6	0.0	B	A	B	S1	5000	Diode Sect. (Adapter 1050-129
UBC41	AHCO-BOGO	12.6	3.0	L	A	A	S4	750	Triode Sect. (Use Hickok Ad-
UBC41	AHOO-FEGO	12.6	0.0	B	A	B	S1	5000	X Dual Diode (apter 1050-129
UBC81	DEBO-AOCO	12.6	3.0	L	A	A	S4	750	Triode Sect.
UBC81	DEOO-FHCO	12.6	0.0	B	A	B	S1	5000	X Dual Diode
UBF80	DEBO-FACJ	17.0	2.0	L	E	A	S4	1400	Pent. Sect.
UBF80	DEOO-GHCO	17.0	0.0	B	A	B	S1	5000	X Dual Diode
UBF89	DEBO-FACJ	20.0	2.0	L	F	B	S4	2400	Pent. Sect.
UBF89	DEOO-GHCO	20.0	0.0	B	A	B	S1	5000	X Dual Diode
UC92	DCFO-AOGO	10.0	2.0	L	A	B	S4	3500	
UCC85	DEGB-FAHC	25.0	1.0	E	A	B	S4	2550	X Dual Triode
UCH42	AHFO-BEGD	12.6	1.0	L	E	B	S4	1500	Hexode Sect. (Use Hickok Ad-
UCH42	AHDO-COGO	12.6	1.0	F	A	A	S4	1750	Triode Sect. (apter 1050-129
UCH81	DEBO-FACO	20.0	2.0	L	F	A	S4	1550	Heptode Sect.
UCH81	DEJO-HOCO	20.0	1.0	F	A	B	S4	2000	Triode Sect.

TUBE TYPE	SELECTORS	FIL	BIAS	PLT	SCRN	RANGE	PRESS	MIN. MUT. COND.	NOTATIONS
UCL82	DECO-FGBO	50.0	6.0	E	E	B	S4	4300	Pent. Sect. Triode Sect. Use Hickok Adapter Code No. 1050-129
UCL82	DEAO-JOHO	50.0	1.2	H	A	B	S4	1500	
UF41	AHFO-BEGO	12.6	5.0	L	F	A	S4	630	
UF80	DEBO-GHAJ	20.0	2.0	J	J	B	S4	4500	Use Hickok Adapter Code No. 1050-129
UF85	DEBO-GHAJ	20.0	2.0	L	F	B	S4	3800	
UF89	DEBO-GHAJ	12.6	2.0	L	F	B	S4	2300	
UL41	AHFO-BEHO	50.0	7.0	L	L	C	S4	6300	
UL84	DEBO-GJCO	50.0	12.5	J	J	C	S4	6300	
UM80	DEAO-OJBO	20.0	Vary	L	L	D	S4	----	Connect a 500K ohm resistor
between "P" and pin 7 of any socket. Vary Bias to vary beam angle.									
UY41	AHOO-BOGO	35.0	0.0	A	D	G	S2	3700	Set load at 10. Read on 10000 scale. Use Hickok Adapter Code No. 1050-129.
UY85	DEOO-JOCO	35.0	0.0	A	D	G	S2	3700	Set load at 10. Read on 10000 scale.
W17	AGFO-BCOO	♦1.4	1.0	E	E	A	S4	550	Pent. Sect. Note 3 Osc. Sect. Note 3 Hexode Sect. Triode Sect. Heptode Sect. Triode Sect. Ampl. Sect. Osc. Sect.
W77	DCAO-EGBF	6.3	2.5	K	K	A	S4	1600	
X17	GAFB-BCOD	♦1.4	0.0	E	C	A	S4	300	
X17	GADO-CBOF	♦1.4	0.0	D	D	A	S4	500	
X78	DCBO-EAOG	3.0	3.0	L	E	A	S4	500	
X78	DCGO-FOOO	1.0	1.0	F	A	B	S4	1750	
X719	DEBO-FACO	6.3	2.0	L	F	A	S4	1550	
X719	DEJO-HOCO	6.3	1.0	F	A	B	S4	2000	
X727	CDGO-EFBA	6.3	2.0	L	C	A	S4	300	
X727	CDAO-FEBG	6.3	0.0	F	F	B	S4	4500	
XC95	DCBO-EOGF	2.5	1.2	K	A	C	S4	6500	
XC97	DCBO-EOAO	2.5	1.0	G	A	C	S4	8200	
XC900	DCAO-EOBF	2.0	1.5	H	A	C	S4	9400	
XCC189	DEGB-FAHC	4.3	1.3	F	A	C	S4	8400	
XCF80	DEBO-FCGO	4.3	3.2	L	K	B	S4	3450	
XCF80	DEJO-AOHO	4.3	2.0	F	A	B	S4	3150	
XCH81	DEBO-FACO	3.0	2.0	L	F	A	S4	1550	
XCH81	DEJO-HOCO	3.0	1.0	F	A	B	S4	2000	
XCL82	DECO-FGBO	7.5	6.0	E	E	B	S4	4300	
XCL82	DEAO-JOHO	7.5	1.2	H	A	B	S4	1500	
XCL84	DEHO-FJGO	7.5	2.1	J	J	C	S4	6950	
XCL84	DEAO-BOCO	7.5	1.7	K	A	B	S4	2500	
XCL85	DEJO-FGHO	10.0	15.0	J	J	B	S4	4700	
XCL85	DEBO-AOCO	10.0	1.0	F	A	B	S4	3450	
XF80	DEBO-GHAJ	3.0	2.0	J	J	B	S4	4500	
XF85	DEBO-GHAJ	3.0	2.0	L	F	B	S4	3800	
XF183	DEBO-GHCJ	3.0	2.0	K	F	C	S4	7850	
XF184	DEBO-GHCJ	3.0	2.5	K	K	C	S4	9500	
XL36	BGEO-ODHO	12.6	8.2	F	F	C	S4	8800	
XL84	DEBO-GJCO	7.5	7.3	L	L	C	S4	7200	
XL86	DEBO-GJCO	7.5	12.5	J	J	C	S4	6300	
XY88	DEOO-JOOO	17.0	0.0	A	D	G	S2	3700	
Cap = P									
YC95	DCBO-EOGF	3.0	1.2	K	A	C	S4	6500	
YC97	DCBO-EOAO	3.0	1.0	G	A	C	S4	8200	
YCC189	DEGB-FAHC	5.0	1.3	F	A	C	S4	8400	
YF183	DEBO-GHCJ	4.3	2.0	K	F	C	S4	7850	
YF184	DEBO-GHCJ	4.3	2.5	K	K	C	S4	9500	
Z63	GBOO-CDHE	6.3	3.0	L	F	A	S4	750	
Z77	DCAO-EGBF	6.3	2.0	L	L	B	S4	4800	
Z150	AHFO-BEGO	6.3	2.0	L	L	B	S4	5700	
Cap = G									
Use Hickok Adapter Code No. 1050-129									
Z152	DEBO-GHAJ	6.3	2.0	J	J	B	S4	4500	
Z719	DEBO-GHAJ	6.3	2.0	J	J	B	S4	4500	
Z729	DEJO-FACH	6.3	2.0	L	H	A	S4	1260	
ZD17	AGFO-EDOO	♦1.4	1.0	E	E	A	S4	400	
ZD17	AGOO-COOO	1.4	0.0	B	A	B	S1	5000	
ZD152	DEBO-FACJ	6.3	2.0	L	E	A	S4	1400	
ZD152	DEOO-GHCO	6.3	0.0	B	A	B	S1	5000	
X Dual Diode									