OPERATING INSTRUCTIONS

for

VACUUM TUBE TESTER
MODEL KS-15750-L1

THE HICKOK ELECTRICAL INSTRUMENT COMPANY
10514 Dupont Avenue • Cleveland 8, Ohio

STANDARD RETMA GUARANTEE

The Hickok Electrical Instrument Company warrants instruments manufactured by it to be free from defective material or factory workmanship and agrees to repair such instruments which under normal use and service, discloses the defect to be the fault of our manufacturing. Our obligation under this warranty is limited to repairing any instrument or test equipment which proves to be defective, when returned to us, transportation prepaid, within ninety (90) days from the date of original purchase and provided the serial number has been made known to us promptly for our records.

This warranty does not apply to any of our products which have been repaired or altered by unauthorized persons or service stations in any way so as, in our judgment, to injure their stability or reliability or which have been subject to misuse, negligence, or accident, or which have had the serial number altered, effaced, or removed. Neither does this warranty apply to any of our products which have been connected, installed, or adjusted otherwise than in accordance with the instructions furnished by us. Accessories including all vacuum tubes not of our manufacture used with this product are not covered by this warranty.

This warranty is in lieu of all other warranties expressed or implied and no representatives or person is authorized to assume for us any other liability in connection with the sale of our products.

Parts will be made available for a minimum period of five (5) years after the manufacture of this equipment has been discontinued. Parts include all materials, charts, instructions, diagrams, accessories, et cetera, which have been furnished in the standard model.

RETURNING EQUIPMENT FOR REPAIR

Before returning any equipment for service, under warranty or otherwise, the factory must first be contacted giving the nature of the trouble. Instructions will then be given for either correcting the trouble or returning the equipment. Upon authorization, this equipment should be forwarded directly to the Hickok factory located at 10636 Leuer Avenue, Cleveland 8, Ohio, or to a designated service station in your locality. All correspondence pertaining to repairs should be directed to Hickok Electrical Instrument Company, 10514 Dupont Avenue, Cleveland 8, Ohio, or to the authorized service station designated.

REGISTRATION CARD

The above guarantee is contingent upon the attached registration card being returned to the factory immediately upon receipt of the equipment.

THE INSTRUMENT PACKED HEREWITH IS:

	PACKER'S CHECK
1 MODEL KS-15750-L1 VACUUM TUBE TESTER	
ACCESSORIES INCLUDED WITH THE TESTER ARE:	
1 - BOOKLET INSTRUCTIONS	
2 - GRID LEADS WITH CLIP	
1 - VECTOR #1175 ADAPTER	

SERIAL NO.

SIGNED:

INSTRUCTIONS FOR OPERATION OF MODEL KS-15750-L1

Read these instructions through before attempting to operate the tester.

1. There are two rectifier tubes, an 83 and a 5Y3 necessary to operate this tester. They are included.

The Short Lamp is a 1/25 watt, 110 volt, miniature bayonet base type NE51 neon signal lamp made by The General Electric Company. This lamp will last indefinitely unless broken.

The Fuse Lamp is a standard No. 81, single contact auto bulb. This can be procured from any auto dealer or gasoline station attendant. This fuse lamp is in the primary circuit of the transformer.

2. Use on 60 cycles, 110-125 volt circuit.

FUNCTIONS OF THE VARIOUS CONTROLS:

3. The line adjustment control rheostat in the KS-15750-L1 tester is connected with a small A.C. voltmeter as a constant calibration indicator which is normally always in circuit. The small A.C. voltmeter may also be used to register 60 cycles A.C. line voltage fed to the set by operating the test button P7 designated "LINE TEST" in the lower right part of the control panel. Reset the A.C. voltmeter to the red mark at 100 volts after depressing P4.

4. SELECTORS - The row of selector dials across the center of the control panel is for the purpose of conducting proper voltages to the tube's base pins. The operation of setting these dials is similar to DIALING A TELEPHONE NUMBER. On the roll data chart, below the word SELECTORS, appear the dialing numbers. These dialing numbers consist of two letters and five figures. Example: JR-6237-5. Starting at the left, the first dial is turned until the letter "J" appears through the window. The second dial is turned until "R" appears. The third dial indicates 6; the fourth, 2; the fifth, 3; the sixth, 7 and the seventh, 5.

The lettered dials control the filament or heater connections. The numbered dials control the GRID, PLATE, SCREEN, CATHODE and SUPPRESSOR in that order. In the example given above the heater terminals are connected to pins 8 and 1. The GRID is connected to pin 6; PLATE, to pin 2; SCREEN, to pin 3; CATHODE, to pin 7 and SUPPRESSOR, to pin 5.

These dial switches are electrically interlocked in such a way that it is impossible to connect two different voltage elements to the same pin. Thus accidental shorts are avoided.

The dialing system is designed so that a minimum of dial setting is required. For example, the heater setting is practically always JR so that these two dials seldom need resetting. It will also be noticed that when testing duo-diode triode tubes the amount of dialing has been reduced to a minimum.

The KS-15750-L1 set also provides a cathode activity test circuit controlled by the toggle switch designated "CATH. ACT" with a "NORM." position and a "TEST" position. In the "TEST" position the filament voltage of a tube is reduced by 10% of its Normal Value.

5. SHORT TEST - Turning the SHORTS switch successively through the positions 1-2-3-4-5 connects the various pairs of elements in turn across the test voltage. Tubes having shorted elements will complete the circuit and cause the neon SHORT lamp to glow. Tubes may be tested for shorts, either hot or cold.

A short is indicated by a steady glow of the neon lamp in certain positions of the SHORTS switch. Ordinarily shorts so indicated will be in the order of 100,000 to 200,000 ohms, and of course sometimes less, but never as much as 0.4 megohm.

6. LOCATING SHORTED ELEMENTS - In the following table (X) under any SHORT switch position indicates that the neon lamp glows in that position.

KIND OF SHORT	1	2	3	4	5
HEATER - CATH.	X				
HEATER - GRID.	X	X			
HEATER - SCRN.	X	X	X		
HEATER - PLT.	X	X	X	X	
HEATER - SUP.	X	X	X	X	X
CATH. - GRID.		X			
CATH. - SCRN.		X	X		
CATH. - PLT.		X	X	X	
CATH. - SUP.		X	X	X	X
GRID. - SCRN.			X		
GRID. - PLT.			X	X	
GRID. - SUP.			X	X	X
SCRN. - PLT.				X	
SCRN. - SUP.				X	X
PLT. - SUP.					X

A two position toggle switch associated with the SHORTS TEST circuit provides a NORMAL test voltage of 100V peak and a LOW test voltage value of 50V peak. The NORMAL test voltage position should always be used except in cases specifying a LOW test voltage under NOTATIONS on the Roll Chart.

HEATER CATHODE LEAKAGE

A particularly troublesome defect in tubes, especially those used in television, is a leakage between heater and cathode. This leakage may be quite high, sometimes running to several megohms. It may be too high to cause the neon lamp to glow in the ordinary way. However, these leaks may be detected on your new Model KS-15750-L1.

You will note that a heater-cathode short will cause the neon lamp to glow on position 1 (one). While the short switch is resting on position 1, during short test operation a condenser will be charging through the leak. If the switch is turned from position 1 to position 2, a sharp flash of the neon lamp will be seen. This will not repeat until the switch is again turned to position 1 allowing the condenser to recharge through the leakage.

This high resistance leakage test should be made for both positions of the NORMAL - LOW toggle switch when investigating difficult heater-cathode faults.

7. NOISE TEST - The short test circuit is also used in making noise tests on vacuum tubes. Connections are made from the noise test jacks to the antenna and ground posts of any radio receiver. The tube under test is tapped with the finger as the SHORTS switch is turned through positions 1-2-3-4-5.

Intermittent disturbances which are too brief to register on the neon lamp will be reproduced by the loud speaker as static.

8. GAS TEST - Gas current in a tube or grid leakage current due to poor grid to filament insulation may be detected by the switch insertion of the Micromhos Meter into the grid circuit of a tube under test. In this setup the normal plate and screen grid voltages are applied by means of the P4 pushbutton switch. This test is made with the standard normal grid bias applied with the usual setting of the BIAS ADJUST dial as for a regular transconductance measurement. In addition, the gas test P5 Push Switch is operated which transfers the DC Micromhos Meter from its normal plate circuit position directly into the control grid circuit to measure grid current, if any, directly in DC microamperes. The "SIG. OFF" P6 switch also is simultaneously operated with the P5 switch to remove the grid signal for the test, for the presence of a grid signal could,

in certain cases, produce false readings. In this test, the Micromhos Meter, used as a DC Microammeter, is in series in the grid circuit. Under the test conditions just described the Micromhos Meter will read 3-1/3 microamperes per small scale division.

9. DYNAMIC TRANSCONDUCTANCE - The Push Switch P4 is mechanically divided into two sections, non-locking and locking. Both sections perform identical electrical functions. If momentary contact is needed, press the non-locking button. If extensive tests are to be made, use the locking button. The locking button is released by pressing the non-locking button.

The indicating meter will register the tube's value in eight ranges: 3000, 6000, 15,000 Micromhos with HIGH Signal; 60,000, 30,000, 15,000, 6000, 600 Micromhos with LOW Signal. A "SHUNT" range is also provided to be used when checking Diodes and Rectifier tubes.

The Micromho switch automatically changes the signal from HIGH to LOW, when the appropriate setting is made.

On the roll chart following "SELECTORS" is a column designated "BIAS VOLTS". This is the negative grid bias to be applied to the tube being tested. The voltage is read on the small grid bias voltmeter in the upper left of the control panel. Bias voltage is read in two ranges, 0-5 and 0-50 D.C. volts. Make final adjustment after pressing P4 switch.

Directly above the grid bias voltmeter are two binding posts which are normally shorted by an attached bar. These posts are marked SELF BIAS + (pos.) and - (neg.). They provide means for inserting a self biasing resistor into the cathode circuit of the tube being tested. These posts are bridged, within the tester, by a 2000 mfd capacitor. When using self bias set the normal bias to zero volts.

For certain tubes Roll Chart settings are given for a SELF BIAS Gm test in addition to a voltage BIAS test. Either test may be used, but usually the SELF BIAS Gm test will provide more consistent results. The required value of SELF BIAS resistance is always found under the NOTATIONS column.

NOTE

A suitable low resistance D.C. milliammeter connected between these posts will measure the total cathode current.

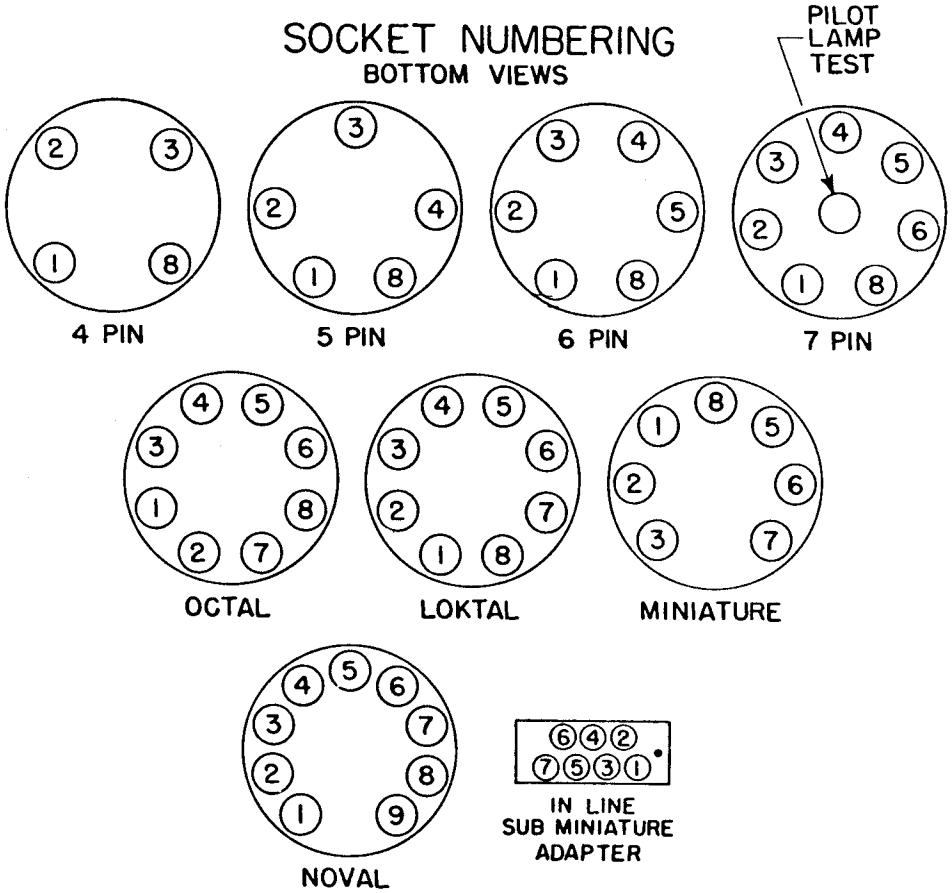
The Micromho values printed on the data roll are minimum values. A satisfactory tube should read above the value given on the chart.

10. RECTIFIER TEST - The push switches P1, P2 and P3 are used to test various types of rectifier elements

a. The push switch P1 is used when testing detector diodes. It applies a low voltage which will not injure the delicate cathode. Good diodes will cause the meter pointer to read above the mark, DIODES OK. P1 also reduces the screen voltage to 1/2 normal value. Instructions for its use appear in Notations column of the data chart.

b. Push switch P2 is used when testing cold cathode rectifiers such as the OZ4. This applies a voltage sufficiently high to ionize the tube and start conduction. Good tubes will read above the scale mark "RECTIFIERS OK."

c. Push switch P3 is used when testing ordinary rectifier tubes such as the 5Y3. This switch applies a medium voltage which is best adapted to reveal defects in this type of tube. Good tubes will read above the scale mark "RECTIFIERS OK."



11. SOCKET NUMBERING - In order to reduce dialing to a minimum, the sockets in the Model KS-15750-L1 Tube Tester are numbered as shown above. The numerical values of the lettered dials are as follows:

0	----	A	----	P
1	----	B	----	R
2	----	C	----	S
3	----	D	----	T
4	----	E	----	U
5	----	F	----	V
6	----	G	----	W
7	----	H	----	X
8	----	J	----	Y
9	----	K	----	Z

The letter "I" was omitted because of its resemblance to the figure "1". The letter "Q" was omitted because of its resemblance to the figure "0".

12. METER REVERSE - Directly below the indicating meter is a switch marked REVERSE-NORMAL. With certain tubes such as the 117N7, the meter, when set on NORMAL, will deflect backwards (to the left) when push switch P3 is pressed for rectifier test. In such case, turn the meter switch to REVERSE which will cause the pointer to move up the scale. After this test has been made, return the switch to NORMAL.

13. TOP CAPS - There are two jacks in the upper center of the control panel marked GRID and PLATE. These are used when making connection to the top cap of the tube being tested. On the data chart in the NOTATIONS column opposite tube types having top caps, is the notation CAP=G or CAP=P. G means that the top cap is connected to the GRID and P, to the PLATE jack.

NOTE

The center of the large 7-pin socket is used to check pilot lamps. Set the filament selector switches on JR. Set the filament voltage switch to the proper voltage for the lamp being tested.

14. SPECIAL NOTES - Power line voltage varies with different localities. It may also vary with the different hours of the day.

While a national survey indicates that the average voltage for the USA is about 117 volts, it does not mean that every locality maintains a constant voltage at that level.

Occasionally we have had the complaint that a used tube will test GOOD, but will not work in the radio receiver; but when a NEW tube is substituted, the receiver will operate correctly. The answer is this: Tubes are built to specifications. Our tube testers are designed to test tubes in conformity with these specifications.

The used tube that would not perform in a certain receiver was not receiving its specified filament voltage. The new tube performed because of its initial reserve capacity. The used tube would have performed if it had received its specified filament voltage.

Tube failure frequently occurs in A.C. - D.C. sets where several tubes are connected with their heaters or filaments in series. Sometimes, even though the power line voltage is normal, a series tube with abnormally high filament resistance will rob its companion tube of its normal filament voltage. The robbed tube apparently fails; but when tested under specified conditions, the tube will test GOOD.

15. MATCHING TUBES - The Model KS-15750-L1 is valuable in matching tubes for push-pull stages and other applications where matched tubes are essential.

16. Just below the left column of roll chart data is provision for recording "LAST TUBE". This means the last tube in the left column, thus saving time in selecting data.

17. VOLTAGE REGULATOR TUBE TEST - The KS-15750-L1 Tube Tester has provision for testing V.R. tubes for current and voltage regulation as listed in the tube handbook. Proceed as follows:

1. Set Function Switch to V.R. position.

2. Set Selectors for tube type being tested.

3. Set toggle switch at the right of bias voltmeter to V.R. position.

4. Set P4, Gm-V.R. button in LOCK position.

5. Set knob at right of bias voltmeter so that white dot is at approximate "Start Postion".

6. Turn ON power and insert the V.R. tube in its proper socket.

7. Turn the round knob with white dot slowly to the right. This will cause the large Gm meter to read volts on 0-200 volt scale. Continue to increase the V.R. voltage until the tube "strikes". This is the striking point for the tube being tested. After striking the voltmeter will drop back to a sustaining voltage condition. The 2-inch bias meter will now register the V.R. tube's plate current on the 0-50 V.R.M.A. scale. The regulating knob can now be used to run the tube through its normal milliampere range. The large voltmeter will register the voltage change or regulating voltage range. After completing V.R. test, return controls to normal.

18. NORMAL OR LOW PLATE & SCREEN VOLTAGE. In the lower right of the control panel is a switch for selecting NORMAL (150V) or LOW (65V) plate volts and NORMAL (130V) or LOW (65V) screen volts when testing any tube. The plate and the screen volts are simultaneously normal or low. If a tube requires low voltage for test an appropriate indication will appear in the NOTATIONS column of the data chart.

19. 600 MICROMHO RANGE - A low micromho (600) range is incorporated in the KS-15750-L1 Tube Tester. This is provided to make more accurate tests on subminiature and other tubes that require low plate and screen voltages. When the function switch is set on the 600 position low plate, low screen and low (1 volt) signal are automatically applied to the tube under test.

20. SUBMINIATURE TUBES - Seated in a noval socket mounted below the surface of the control panel is a type 1175 adapter for the purpose of testing IN-LINE subminiature tubes. This adapter can be replaced when it becomes worn.

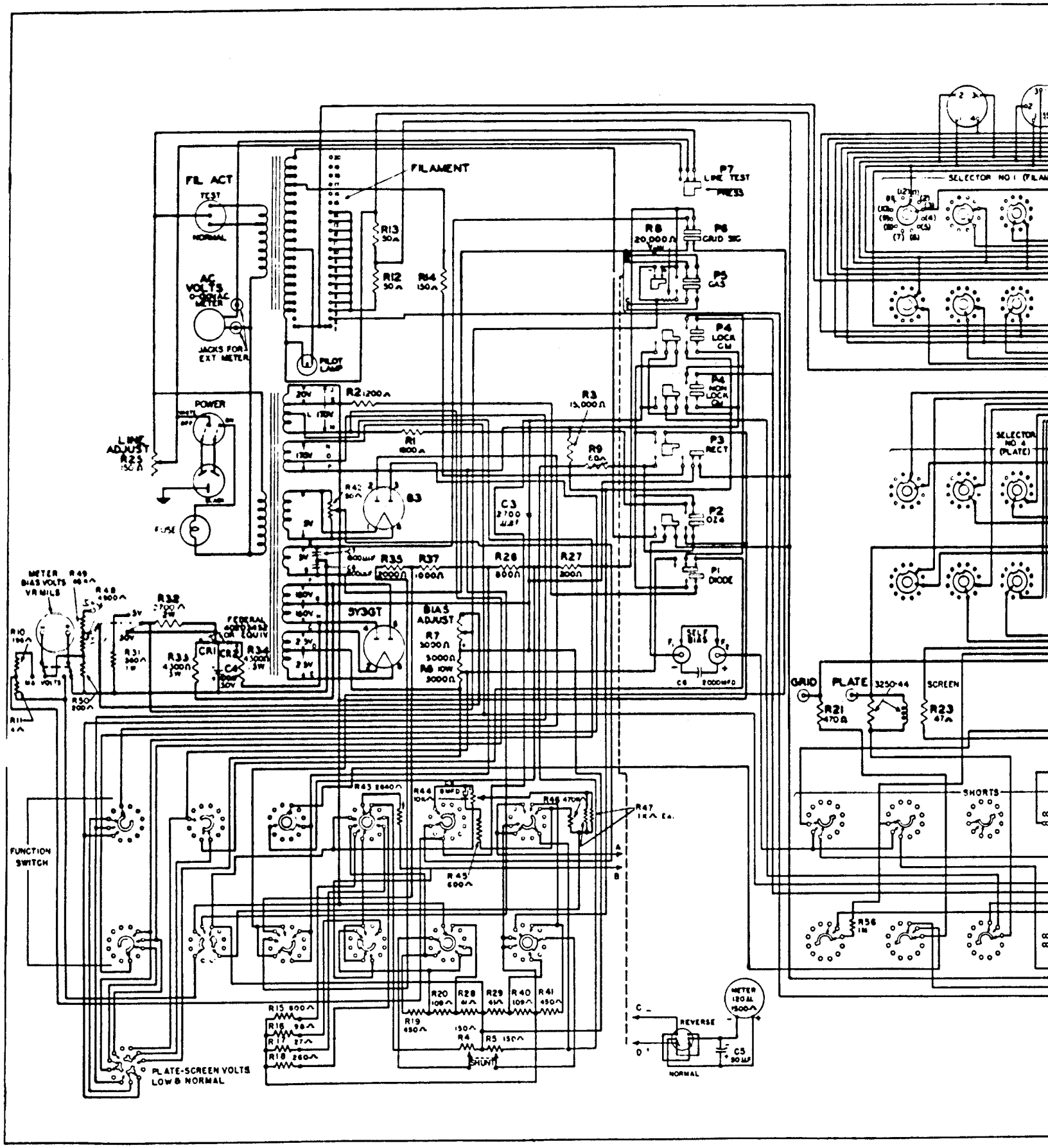
21. PIN STRAIGHTENERS - In the upper center of the control panel are permanently mounted 7-pin and 9-pin straighteners. All 7 and 9-pin button base tubes should be inserted in the regular test socket. This will greatly prolong the life of the regular sockets.

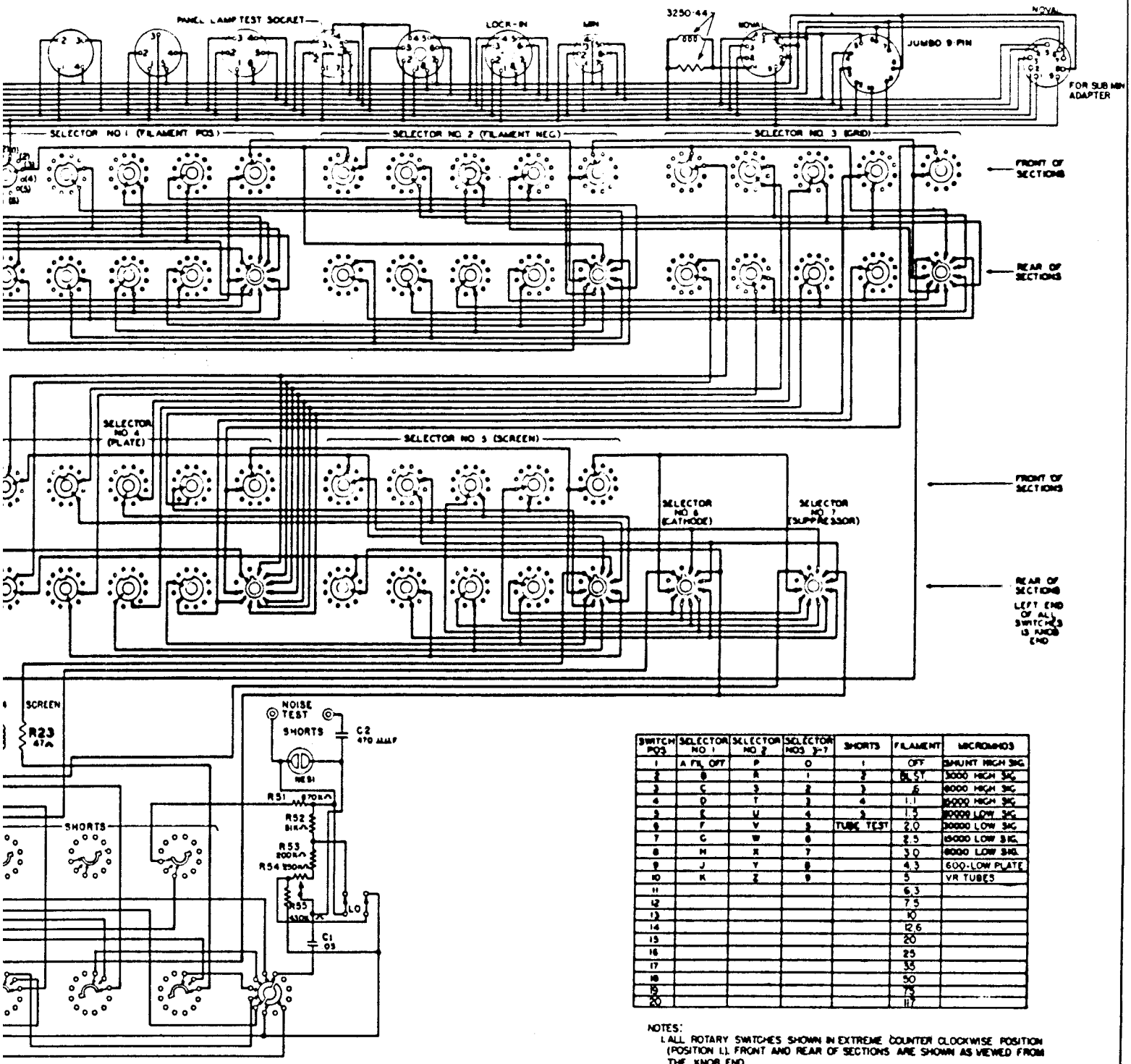
22. LIFT RINGS - On the left and right edges of the control panel are provided lift rings which greatly facilitate the removal of the instrument from the carrying case in case of inspection.

23. JACKS FOR A.C. METER - Immediately beneath the 2" square line voltage meter are two jacks wired in parallel with the volt meter. These are for the purpose of checking the calibration of the ac voltmeter.

PARTS LIST FOR MODEL KS-15750-L1 TUBE TESTER

ITEM NO.	HICKOK PART NO.	DESCRIPTION		MANUFACTURER
1	2490-272	BOOKLET: Instructions		
2	2920-7	BUTTON: Push, Black		
3	2920-8	BUTTON: Push, Red		
4	3145-330	CABINET: Portable, Aluminum		
5	3085-43	CAPACITOR: 2000 mfd.		Sprague
6	3085-44	CAPACITOR: 100 mfd.		Sprague
7	3085-45	CAPACITOR: 50 mfd.		Sprague
8	3085-68	CAPACITOR: 8 mfd.		Cornell Dubilier
9	3095-8	CAPACITOR: .00047 mfd.		
10	3095-50	CAPACITOR: 1500 mmfd.		Elec. Reactance
11	3105-175	CAPACITOR: .05 mfd.		
12	3200-54	CHART: Roll, Tube Test Data		
13	3250-44	CHOKE: Retard		
14	3675-26	CORD: Line, A.C.		General Electric
15	11500-11	KNOB: Bar, with Pointer		
16	11500-46	KNOB: Bar		
17	11500-49	KNOB: 1" Diam.		Kurz-Kasch
18	12270-14	LAMP: Neon, NE 51		General Electric
19	12270-2	LAMP: Fuse, #81 Auto		Tung Sol
20	12270-14	LAMP: Pilot, #47		General Electric
21	12450-145	LEAD: Ass'y, Grid - Plate		
22	440-663	METER: Transconductance		Hickok Electric
23	560-596	METER: Grid Volts - V.R. Mils		Hickok Electric
24	570-061	METER: Line Test		Hickok Electric
25	16925-63	POTENTIOMETER: 3K	R7	Mallory
26	16925-90	POTENTIOMETER: 150-150	R4-R5	Mallory
27	16925-259	POTENTIOMETER: 250K	R54	Centralab
28	18150-171	RECTIFIER: Selenium	CR1-CR2	Federal
29	18410-472	RESISTOR: R23, 47 Ohms, 10%, 1/2 Watt		Allen Bradley
30	18411-471	RESISTOR: R21, 470 Ohms, 5%, 1/2 Watt		Allen Bradley
31	18413-201	RESISTOR: R8, 20K, 5%, 1/2 Watt		Allen Bradley
32	18415-102	RESISTOR: R56, 1 Meg, 10%, 1/2 Watt		Allen Bradley
33	18421-361	RESISTOR: R31, 360 Ohms, 5%, 1 Watt		Allen Bradley
34	18422-101	RESISTOR: R47, 1K, 5%, 1 Watt		Allen Bradley
35	18422-122	RESISTOR: R2, 1.2K, 10%, 1 Watt		Allen Bradley
36	18423-151	RESISTOR: R3, 15K, 5%, 1 Watt		Allen Bradley
37	18432-271	RESISTOR: R32, 2.7K, 5%, 2 Watt		Allen Bradley
38	18525-687	RESISTOR: R46, 470K, 1%, 1/2 Watt		
39	18525-697	RESISTOR: R49, 45K, 1%, 1/2 Watt		
40	18525-698	RESISTOR: R48, 4.9K, 1%, 1/2 Watt		
41	18525-699	RESISTOR: R26, 800 Ohms, 1%, 1/2 Watt		
42	18525-700	RESISTOR: R27, R50, 200 Ohms, 1%, 1/2 Watt		
43	18525-701	RESISTOR: R37, 1K, 1%, 1/2 Watt		
44	18525-702	RESISTOR: R35, 2K, 1%, 1/2 Watt		
45	18525-703	RESISTOR: R19, R41, 450 Ohms, 1%, 1/2 Watt		
46	18525-705	RESISTOR: R43, 2.64K, 1%, 1/2 Watt		
47	18525-707	RESISTOR: R51, 670K, 1%, 1/2 Watt		
48	18525-708	RESISTOR: R52, 51K, 1%, 1/2 Watt		
49	18525-709	RESISTOR: R53, 200K, 1%, 1/2 Watt		
50	18525-710	RESISTOR: R55, 430K, 1%, 1/2 Watt		
51	18575-12	RESISTOR: R1, 1.8K, 10%, 10 Watt		Ohmite
52	18575-19	RESISTOR: R12, R13, 100 Ohms, Center Tapped		Ohmite
53	18575-153	RESISTOR: R33, R34, 4.3K, 5%, 5 Watt		Sprague
54	18575-101	RESISTOR: R6, 10K, Center Tapped		IR C
55	18750-24	RHEOSTAT: R25, 150 Ohms, 25 Watt		Hardwick Hindle
56	18750-26	RHEOSTAT: R44, 10K, 50 Watt		Ohmite
57	19350-112	SOCKET: Ass'y, Pilot & Shorts Indicator		Drake
58	19350-1	SOCKET: Bayonet, Fuse		Drake
59	1050-61	SOCKET: Inline, Adapter		Vector
60	19350-58	SOCKET: 9 Pin Noval		
61	19350-129	SOCKET: Octal		
62	19350-97	SOCKET: Loktal		


FILAMENT
FIL ACT
TEST
NORMAL
AC VOLTS
JACKS FOR EXT METER
PILOT LAMP
POWER
LINE ADJUST
FUSE
P7 LINE TEST
PRESS
P6 GRID SIG
P5 CAS
P4 LOCK ON
P3 RECT
P2 OSC
P1 DIODE
SELF BIAS
C6 2000MFD
R13 50Ω
R12 50Ω
R14 150Ω
R8 20,000Ω
R2 1200Ω
R3 15,000Ω
R1 1000Ω
R9 60Ω
C3 2700 μμf
R35 2000Ω
R37 1000Ω
R26 800Ω
R27 200Ω
5Y3GT
BIAS ADJUST
R7 3000Ω
R6 10W 3000Ω
R32 700Ω 2W
R33 4,300Ω 3W
R34 4,300Ω 3W
R31 360Ω 1W
C4 30V
METER BIAS VOLTS VR MILS
R49
R48 4900Ω
R10 100Ω
R11 4Ω
R50 200Ω
FUNCTION SWITCH
R43 8640Ω
R44 10Ω
R46 470Ω
R47 1KΩ EA.
R45 600Ω
R20 108Ω
R28 41Ω
R29 41Ω
R40 109Ω
R41 450Ω
R19 450Ω
R15 800Ω
R16 98Ω
R17 27Ω
R18 260Ω
R4 150Ω
R5 150Ω
SHUNT
PLATE-SCREEN VOLTS LOW & NORMAL
REVERSE
NORMAL
C5 50 μf
METER 120 μa 1500Ω
SELECTOR NO 1 (FILAM
SELECTOR NO 4 (PLATE)
GRID
PLATE
3250-44
SCREEN
R21 470Ω
R23 47Ω
SHORTS
R56 1M



SWITCH POS	SELECTOR NO 1	SELECTOR NO 2	SELECTOR NOS 3-7	SHORTS	FILAMENT	MICROMHOS
1	A FIL OFF	P	O	1	OFF	SHUNT HIGH SIG
2	B	R	1	2	0.5T	3000 HIGH SIG
3	C	S	2	3	.6	6000 HIGH SIG
4	D	T	3	4	1.1	10000 HIGH SIG
5	E	U	4	5	1.5	20000 LOW SIG
6	F	V	5	TUBE TEST	2.0	30000 LOW SIG
7	G	W	6		2.5	15000 LOW SIG
8	H	X	7		3.0	8000 LOW SIG
9	J	Y	8		4.3	600-LOW PLATE
10	K	Z	9		5	VR TUBES
11					6.3	
12					7.5	
13					10	
14					12.6	
15					20	
16					25	
17					35	
18					50	
19					75	
20					117	

NOTES:
1. ALL ROTARY SWITCHES SHOWN IN EXTREME COUNTER CLOCKWISE POSITION (POSITION 1.1. FRONT AND REAR OF SECTIONS ARE SHOWN AS VIEWED FROM THE KNOB END.

MODEL KS-15750-L1 TUBE TESTER			
SCHEMATIC WIRING DIAGRAM			
DRAWN	CHECKED	APPROVED	DATE 6-22-55
EJT			864W

The Micromho calibration on the 1575 and KS-15750 L1 and L2 is performed or outlined in the attached procedure, article #5. Equipment required to make the Micromho calibration is an A.C potentiometer or an A.C. source that can be accurately controlled and measured at 30 volts and at 6 volts. Standard resistors required are 6000 ohms, 10 watt + or - 50 ohms and 11.53 K ohms - 10 watt + or - 10 ohms.

NOTE: - All items of Calibration procedure must be performed in sequence of Calibration procedure before making Micromho Calibration.

CEL/pw.

THE HICKOK ELECTRICAL INSTRUMENT CO.

CLEVELAND, OHIO

CODE NO. 19123-75

ISSUE Original

DATE March, 1964

TITLE

CALIBRATION PROCEDURE

TUBE TESTER, 115/230 Volt Operation

MODEL NO. KS 15750-L1 STYLE NO. 901-267

	SIGNATURE	TITLE	DATE
PREPARED BY	H G Mace	Project Eng.	3-24-64
CHECKED BY			
APPROVED BY	J. D. Fisher	Chief Engineer	3-24-64

LIST OF EFFECTIVE PAGES FOR ISSUE _____

PAGE NO.	ISSUE	AUTHOR-IZATION	PAGE NO.	ISSUE	AUTHOR-IZATION	PAGE NO.	ISSUE	AUTHOR-IZATION
1	Orig.							
2	Orig.							
3	Orig.							
4	Orig.							
5	Orig.							
6	Orig.							
7	Orig.							

LIST OF TEST EQUIPMENT

1. DC Voltmeter - 1000 ohms/volt with following ranges:
   a. 200V
   b. 50V
   c. 10V

2. Thermoelement Voltmeter - 100 ohms/volt, 1/2 of 1% full scale accuracy, 100 division scale, full scale ranges of 100 and 200 volts, Weston Model 622 or equivalent.

3. AC VTVM - Ballantine Model 300D or equivalent, having the following ranges:
   a. 0 - 1 volt
   b. 0 - 10 volt
   c. 0 - 100 volt
   d. 0 - 1000 volt

4. DC Milliammeter - 0 - 100 ma.

5. Standard Resistors:

a.	470K	10%	1/2 watt	- P/N 18414-472
b.	10K	1%	1/2 watt	- P/N 18525-372
c.	100K	10%	1/2 watt	- P/N 18414-102
d.	50K	1%	1/2 watt	- P/N 18525-380
e.	6000 ohms	± 50 ohms	10 watt	
f.	11.53K	± 10 ohms	10 watt	

6. Micromho Calibrator - consists of an AC potentiometer and parts (e) and (f) of 5. above.

7. Ground Tester - See Figure A.

8. Variable Frequency Power Supply
   a. 60 cycles - 117V
   b. 400 cycles - 117V

9. 6L6 Tube

10. Dummy Rectifier Tube - See Figure C.

11. Wiring Changes for 230V Operation - See Figure B.

1. Ground Test. Caution high voltage. Connect a lead from the "Ground Tester" to the chassis and with the tube tester face down on the bench, touch all transformer, switch and other available terminals with the other lead from the ground tester. Indicator lamp will glow if circuit is grounded.

2. DC Supplies Check.
   a. Set Up
      1. Set selector switches to JR-5347-2.
      2. Turn VR voltage control fully CCW.
      3. Set shorts switch to "Tube Test".
      4. Set bias VM range to "50".
      5. Set function switch to "3000 High".
      6. Set PLT-SCRN volts switch to "Normal".
      7. Tighten Self Bias shorting bar in position.
      8. Make sure "zero adjust" on meters will adjust pointer above and below zero.
      9. Turn tester on and adjust Line Adjust control until line meter pointer is at red line.

   b. Plate Voltages - 60 Cycles.
      1. Connect 1000 ohm/volt DC meter between (+pin 3) and (-pin 8) of octal test socket.
      2. Press "P4 Lock".
      3. Reading shall be 148 to 156 V.
      4. Set PLT-SCRN volts switch to "Low".
      5. Reading shall be 64 to 70 V.
      6. For out-of-tolerance indications, check line test meter, wiring and circuit components.

   c. Screen Voltages - 60 Cycles.
      1. Connect 1000 ohm/volt DC meter between (+pin 4) and (-pin 8) of octal test socket.
      2. Press "P4 Lock".
      3. Reading shall be 63 to 66 V.
      4. Set PLT-SCRN volts switch to "Normal".
      5. Reading shall be 128 to 134 V.
      6. For out-of-tolerance indications, check wiring, 5Y3 and circuit components.

   d. Plate Voltages - 400 Cycles.
      1. Set variable frequency power supply to 400 cycles, 117 volts.
      2. Turn Line Adjust control fully CCW.
      3. Connect thermoelement voltmeter between (+pin 3) and(-pin 8) of octal socket.

4. Press "P4 Lock".
5. Slowly turn Line Adjust control CW to red line.
6. Reading shall be 148 to 165 V.
7. Turn line adjust control fully CCW.
8. Set PLT-SCRN volts switch to "Low".
9. Press "P4 Lock".
10. Using 100V range of thermoelement voltmeter, slowly turn Line Adjust control CW to red line.
11. Reading shall be 55 to 68 V.
12. For out-of-tolerance indications, check line test meter at 400 cycles.

e. Screen Voltages - 400 Cycles.
1. Connect 1000 ohm/volt DC meter between (+pin 4) and (-pin 8) of octal test socket.
2. Press "P4 Lock".
3. Reading shall be 62 to 67 V.
4. Set PLT-SCRN volts switch to "Normal".
5. Reading shall be 124 to 136.5 V.

3. Meter Check.
a. Bias Voltmeter
1. Set Bias Range switch to "50V".
2. Set VR bias volt switch to "Bias Volts".
3. Connect 1000 ohm/volt DC meter 50 volt range between (-pin 5) and (+pin 8) of octal test socket.
4. Set Bias control fully CW.
5. Reading shall be 50V ± 2% of the full scale value from calibration voltmeter value.
6. Set bias range switch to "5V".
7. Set 1000 ohm/volt meter to 5V range. Connect test meter to arm of bias pot and Self Bias jacks.
8. Reading shall be 5V ± 2%.
9. Varying bias control, check meter at 4, 3, 2 and 1 V. Tolerance is ± 0.1 volt.

b. VR Voltage and Current.
1. Set VR bias volts switch to "VR"
2. Check meter reverse switch for proper operation.
3. Connect 1000 ohm/volt voltmeter between (+pin 3) and (-pin 8) of octal test socket.
4. Press "P4 Lock".
5. Rotate VR volts control and compare Model 1575 meter with DC voltmeter at 80 and 160 volts. Tolerance is ± 2 volts.
6. Rotate VR volts control to 120V. Tolerance is ± 1 volt. If necessary, adjust R45, 560 Ω spool.
7. Connect DC 0 - 100 ma meter to plate (+pin 3) and cathode (-pin 8) of octal test socket.

8. Set Function switch to VR position. Press P4, rotate VR control slowly CW and read VR mils on Bias voltmeter 0 - 50 ma. Compare 40 mils against standard meter. Tolerance is ± 1 mil.
9. For out-of-tolerance indication, check R11 - 4 ohm spool or meter.

4. AC Voltage Check.
   a. AC Plate Voltages.
      1. Connect AC VTVM between pins 3 and 8 of octal test socket.
         (a) Press "P1" Read 18 to 20 V.
         (b) Press "P2" Read 285 to 300 V.
         (c) Press "P3" Read 35 to 39 V.

   b. Filament Voltages.
      1. Connect AC VTVM between pin 2 and pin 7 of octal socket. Using suitable ranges, switch through all positions of filament switch and check readings.

Nominal	Min.	Max.	Nominal	Min.	Max.
0.6	0.6	0.7	7.5	7.7	8.3
1.1	1.1	1.2	10.0	10.1	11.0
1.5	1.45	1.6	12.6	12.4	13.4
2.0	2.10	2.3	20.0	20.2	21.9
2.5	2.7	3.0	25.0	26.0	28.5
3.0	3.10	3.4	35.0	36.7	39.7
4.3	4.4	4.8	50.0	52.0	57.0
5.0	5.2	5.7	75.0	79.0	86.0
6.3	6.3	6.9	117.0	122.0	133.0

      2. Move Cath. Act. switch to test, voltage should drop 10%.

   c. Signal Voltages.
      1. Connect AC VTVM between pin 5 and pin 8 of octal socket.
      2. Set function switch to positions listed below and check readings.
         (a) Shunt - 4.8 to 5.2 V
         (b) 3000 High - 4.8 to 5.2 V
         (c) 6000 High - 4.8 to 5.2 V
         (d) 15,000 High - 4.8 to 5.2 V
         (e) 60,000 Low - .24 to .26 V
         (f) 30,000 Low - .48 to .52 V
         (g) 15,000 Low - .98 to 1.02 V
         (h) 6000 Low - .98 to 1.02 V
         * (i) 600 Low - .98 to 1.02 V

         * Press Meter Range X2, read .48 to .52 V
      3. For out-of-tolerance indications, check resistors R-26, -27, -35, -37.

5. Micromhos.
   a. Connect Micromho calibrator between pins 3 and 8 of octal test socket. Make line adjust to red line.
   b. Set AC pot to 30 volts, use 6000 ohm resistor.
   c. Set Shunt dial at 73.
   d. Press P4 lock and twist rear half of shunt pot until meter reads 1000 ± 2 div.

e. Lock rear section of shunt pot to front section with solder.
f. Recheck dial setting at 73.
g. With AC pot set at 30 volts, check and adjust the following ranges:

High 3000	-	should read 1000	± 1 div.	- Check R28 or R29, 41 ohms
High 6000	-	should read 1000	± 1 div.	- Check R18, 270 ohms
High 15,000	-	should read 1000	± 1 div.	- Check R17, 70 ohms
Low 60,000	-	should read 20,000	± 1 div.	- Check R16, 105 ohms
Low 30,000	-	should read 10,000	± 1 div.	- Check R16, 105 ohms
Low 15,000	-	should read 5,000	± 1 div.	- Check R16, 105 ohms
Low 6000	-	should read 5,000	± 1 div.	- Check R15, 610 ohms

h. For low 600 range, set AC pot at 6.0 volts, use 11,530 ohms. Meter should read 500 ± 2 div. to correct, adjust pot (R42) across 83 tube filaments.

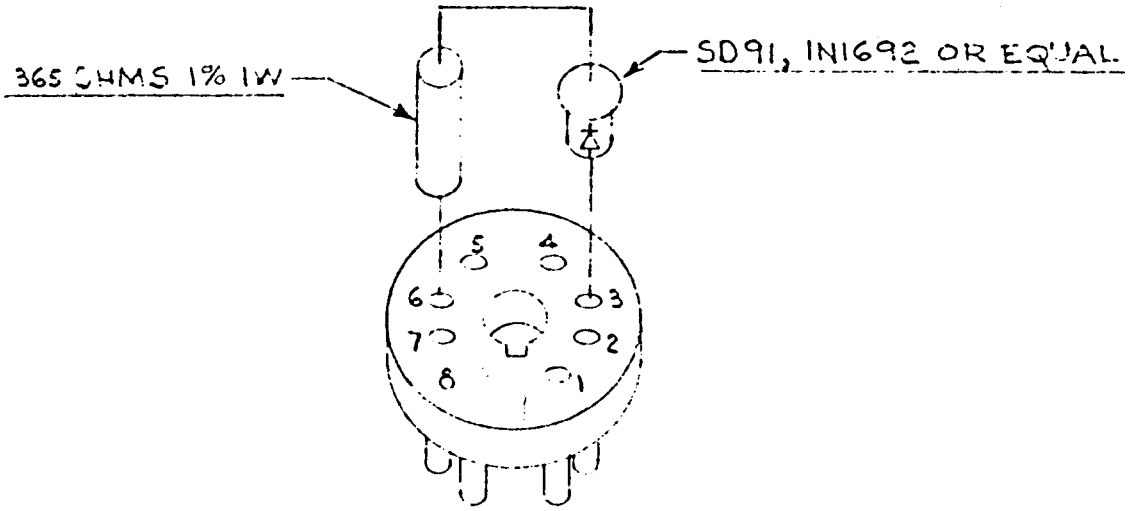
6. Shorts.
   a. Adjust line adjust until meter pointer rests 2 divisions above the red line.
   b. Connect a 470K resistor across pins 3 and 5 of loctal socket.
   c. Adjust potentiometer "R54" mounted on board at rear of line test meter until neon lamp just glows with toggle switch in normal position.
   d. Readjust line meter to red line, neon lamp should not glow.

7. Rectifiers.
   a. Set selectors to JR-5346-2.
   b. Function switch on Shunt.
   c. Shunt dial at 73.
   d. Press P3. Adjust line meter to red line.
   e. Adjust spool R9 until meter reads at center of top scale, 100 ± 1 div.

8. 230 Volt Operation.
   Make changes in wiring as per Figure B. Replace #81 fuse lamp with #63 lamp. Connect tester to an accurate 220 volt source. Press P7 and adjust meter pot until line test meter reads 220 volts. Lock pot with cement.

DUMMY RECTIFIER TUBE FOR MODEL 1575

FIG "C"



SET SELECTORS JR-5346-2

FUNCTION ON-SHUNT

SHUNT DIAL - 73

PRESS P3 - ADJUST TO REDLINE
METER SHOULD READ 100 ± 1 DIV. (Center Scale)
ADJUST SPOOL R9 TO CORRECT