



Model 2000

MUTUAL CONDUCTANCE TUBE TESTER

INSTRUCTION MANUAL

MERCURY
ELECTRONICS CORP.

manufacturers of quality electronic products

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INTRODUCTION

The Mercury Model 2000 introduces a new concept in Dynamic Mutual Conductance tube testing. A combination of lever-switch versatility and multiple-socket speed brings a true Mutual Conductance (G_m) tube tester into the popular-price range for the first time.

The Model 2000 tests for shorts between any tube elements. The 2-color GAS scale on the meter shows grid leakage and gas content with a sensitivity of over 150 megohms. Tubes such as rectifiers, power amplifiers, etc. are checked for Dynamic Cathode Emission (E_m), with tube quality shown on the 3-color meter scale.

The Model 2000 circuit is designed for maximum speed and accuracy in testing. During a normal test procedure no damage to tubes or to the tester can occur. There is automatic compensation built in, thus avoiding need for a line-adjust control, and the entire instrument is line isolated for safety and long life.

The Model 2000 also tests transistors for large signal current gain, with test results shown directly on the BETA scale of the meter. **No transistor chart is necessary.** Transistor leakage current, diode forward and reverse currents are also included in the transistor test.

The Model 2000 provides thirteen 3-position levers which are normally left in the lower position, marked "K". Levers 1 through 10 represent corresponding tube elements. The heater circuits are independent, thus removing the need for an "open" position usually found in lever switch circuits. Levers 11 through 13 control the Grid, Heater Return and Plate circuits, respectively. Need for a separate bias control is eliminated since this is automatically accomplished by the setting of the Grid circuit lever. The Plate circuit lever automatically selects the proper plate and screen voltage, enabling the Model 2000 to test all tubes including gas tubes, battery types, high voltage types, etc.

The SELECTOR knob provides 12 heater voltage settings, which cover all tubes in use today. The LOAD control adjusts meter sensitivity. The FUNCTION switch sets up the tests in proper sequence, and also serves as the POWER switch.

The POWER jewel lights when the instrument is turned on, and the SHORTS jewel is used to detect inter-element shorts up to 1 megohm.

The modern 4½ inch meter has a dual-range “Gm” scale which enables dynamic mutual conductance to be measured over a range of 0-5000 micromhos or 0-25,000 micromhos.

The 3-color “Em” scale measures dynamic cathode emission of tube types where no Gm test can be made, or where cathode emission is recommended as of more significance. A mark labeled “Diodes O.K.” provides a quality test of low output diodes.

The 2-color “GAS” scale measures the tendency of a tube to have grid emission due to gas. This circuit has over 150 megohm sensitivity and is highly reliable as a means of catching faulty performance due to a tube’s gassy condition.

The tube chart provides automatic guidance as to which test is to be made, and which meter scale is to be read.

The panel also contains 17 sockets plus a variety of pin straighteners. Included are the new 12-pin Compactron, 10-pin Decal, 10-pin Sylvania, 5 and 7-pin Nuovistor, 9-pin Magnoval, 9-pin Novar and special 9-pin Noval tube sockets. This brings the Model 2000 completely up to date.

The case is compact and lightweight, finished in smart gray leatherette. Included are three transistor test leads, a tube chart and instruction manual.

SPECIFICATIONS

- Lever switch test principle overcomes obsolescence caused by new base pin arrangements or new internal jumpers in tubes.
- Tests all tubes up to date including the rare 1 and 9-pin Noval filament connections.
- Sockets pins are long lasting phosphor bronze.
- A variety of pin straighteners is mounted on the handsome two-toned panel.
- 2-color GAS scale on meter shows grid leakage and gas content with a sensitivity of over 150 megohms.
- Detects inter-element shorts up to 1 megohm.

- Dynamic mutual conductance measured over a range of 0 – 5000 and 0 – 25,000 micromhos.
- Automatic compensation built in, thus avoiding need for a line-adjust control.
- Line isolated for safety and long life.
- Housed in a handsome, sturdy leatherette case with convenient compartment for cables.

TEST PROCEDURE FOR TUBES

PRELIMINARY

Tests are generally made following clockwise sequence of the FUNCTION switch positions:

- a) Initial set-up, as given on the tube chart, is made with the FUNCTION switch at “OFF” or at “SHORTS”.
- b) After insertion of the tube, the FUNCTION switch is advanced to the “SHORTS” position, and the tube is tested for inter-element shorts according to the instructions entitled “Test for Shorts.”
- c) With the FUNCTION switch at “SHORTS” position, set levers for “Gm” or “Em” test – then advance the FUNCTION switch to “Gm-Em” and read the designated meter scale for tube quality.
- d) With the FUNCTION switch at “Gm-Em,” set levers for GAS test – then advance FUNCTION switch to “GAS-GRID LEAKAGE” position, and read the meter “GAS” scale.
- e) Re-set all levers to the “K” position (unless directed to do otherwise in “NOTES” column of tube chart) and rotate FUNCTION switch back to “SHORTS” position before testing next tube.

NOTE: If the above sequence is observed in making all tube tests, danger of damage to the meter will be avoided, which may occur if the FUNCTION switch is advanced to “Gm-Em” or to “GAS” position before the levers are properly set, or if the FUNCTION switch is inadvertently left at either of these positions at the start of the next test.

TESTS FOR SHORTS

1. All levers should be at position "K" unless otherwise directed in tube chart column entitled "NOTES." FUNCTION switch may be at "OFF" or at "SHORTS" position.
2. Referring to tube chart, find listing of tube to be tested, and set SELECTOR and LOAD as indicated in first two columns.
3. Advance FUNCTION switch to "SHORTS" position (if it is not already there), insert tube in designated socket, and allow 10-second warm-up.
4. Observe SHORTS indicator lamp during the following procedure:
 - a) Using levers 1 through 10 only, move levers one at a time to "G", then back to "K".
 - b) A steady indicator glow when any lever is at "G" means the tube is shorted, **except where lever number is listed in SHORTS column**, in which case a glow is normal. The normal glow indicates that one or more connections exist between the tube pins listed in the SHORTS GLOW O.K. column.
 - c) Set the levers of all the pins with the common connections of a tube element to "G" at the same time. The SHORTS indicator will go out if the element is not shorted to the rest of the tube. Consult a tube manual for the common and internal tube connections if necessary.
5. Inter-Element Shorts: The tube pin number is the same as the lever number. If a glow obtained when lever 5 is moved to "G", and again when lever 8 is moved to "G", both pins not listed in the SHORTS GLOW O.K. column, then tube pins 5 and 8 are internally shorted to each other. If further investigation is desired, use any tube manual to identify these elements. If the tube is a 6K6, this would represent a short between control grid and cathode ($G_1 - K$). To confirm this diagnosis, put both levers 5 and 8 to "G" at the same time. The glow lamp should go out. If it is still on, then both elements may be shorted to the tube filament.
6. Heater-Cathode (H-K) Shorts: If a glow is obtained only when cathode lever is moved to "G", the tube has a heater-to-cathode short. (Heaters are independent of the lever switches.) The cathode lever can be identified for any particular tube by referring to a tube manual.
7. If tube is shorted, reject it without further test.
8. Panel Lamp Test: Insert miniature lamp into center receptacle of socket 15 with lamp center in contact with the socket center and lamp side in contact with the side of the receptacle. SHORTS indicator will glow if lamp is good.

TEST FOR MUTUAL CONDUCTANCE (G_m)

1. After completing SHORTS test, refer to tube chart columns entitled "G_m-Em," and "Rated G_m." If a value is listed under "Rated G_m," the tube will be tested for transconductance using the following procedure. If there is no listing in the "Rated G_m" column, the tube is to be tested for Dynamic Emission (E_m), using the procedure of the next section, entitled "TEST FOR EMISSION (E_m)."
2. Levers should be set to "G" and/or to "P," as directed in column labeled "G_m-Em."
3. Advance FUNCTION switch to "G_m-Em" position and observe meter Hi Scale (0–25,000 range). Mutual conductance in micromhos should be within 20% of rated value as listed in column entitled "Rated G_m." If a double asterisk (**) appears next to G_m value listing, use meter Lo-Scale (0–5,000 range).

NOTE: If G_m reads a little more than 20% outside of rated value, the technician should use his judgement whether to replace the tube; extra-high G_m should do no harm; extra-low G_m means a sub-standard tube that might still be useful in a non-critical circuit.

TEST FOR EMISSION (E_m)

1. Where no value is listed in the column entitled "Rated G_m", the tube will be tested for dynamic emission.
2. With FUNCTION switch still in "SHORTS" position, set levers to "G" and/or to "P", as directed in column labeled "G_m-Em".
3. Advance FUNCTION switch to "G_m-Em" position and read tube Quality on 3-color GOOD-WEAK-BAD scale entitled "E_m". Diode Quality is good if meter reads over the line entitled "Diodes O.K." Diodes are identified on the tube chart by a single asterisk (*) next to the listing in the first column entitled "TUBE".
4. Return all levers to "K".

TEST FOR GAS

1. If no listing is given in tube chart column entitled "GAS", the test of your tube has been completed. If a listing appears in the "GAS" column, proceed as follows:
2. With FUNCTION switch still in the "G_m-Em" position, set appropriate levers to "G", as directed in column entitled "GAS".

3. Advance FUNCTION switch to "GAS-GRID LEAKAGE" position and observe meter 2-color scale entitled "GAS". If tube is good, there should be little or no meter movement. If meter reads anywhere in the Green Area at the left end of the scale, tube has some gassiness but is acceptable. If meter reads anywhere in Red area, tube should be rejected as sub-standard.
4. Return all levers to "K". Return FUNCTION switch to "SHORTS" position before testing next tube.

NOTE: Tubes with more than one listing are multiple-section tubes. A separate test should be made for each section.

TEST PROCEDURE FOR TRANSISTORS AND DIODES

PRELIMINARY

1. The components in the shaded portion of the Model 2000 panel at the extreme left side is used when testing transistors or diodes.

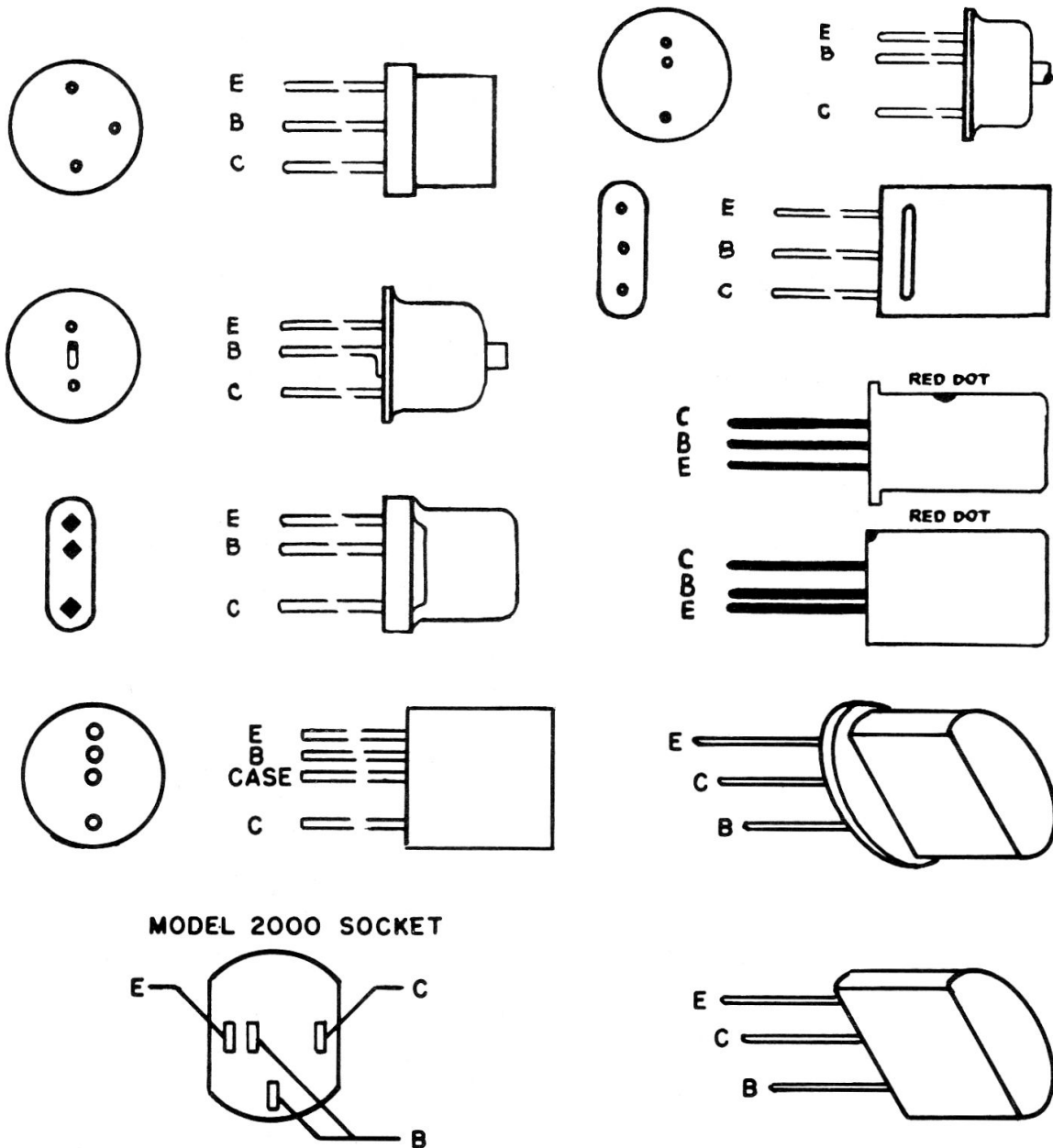
To operate this section, plug the Model 2000 into the power line and set the FUNCTION switch on the main panel to the position marked "TUBE SHORTS TRANSISTOR TEST." Make sure all levers are in the "K" position.

2. Insert the test leads into the three test jacks;
Yellow test lead to jack marked "E,"
Black test lead to jack marked "B,"
Red test lead to jack marked "C."
Do not allow clips to short against each other or to touch the panel.
3. The Transistor Test employed in the Model 2000 **requires no transistor chart.**‡ Low-power transistors are tested for GAIN and for LEAKAGE. Power transistors and diodes are tested for forward-to-reverse current ratio.

‡ A handbook of transistor ratings, such as is published by most transistor manufacturers, may be useful, but is not necessary when testing most transistors with the Model 2000. However, on special types of transistors, the handbook should be used to determine the type (PNP or NPN) and the base connections.

TEST FOR LOW-POWER TRANSISTORS

1. Base diagrams:



2. Set PNP-NPN slide switch to match the type transistor to be tested.

a) Most popular types are PNP.

b) If a transistor is accidentally tested with the switch at the wrong polarity, test results will be reversed, but no damage will be done.

3. Set LEAKAGE-GAIN slide switch to GAIN (lower position).
4. Insert the transistor into the universal panel socket. The emitter, base and collector connections are as indicated in sketch above. For transistors which do not fit the socket, use the clip leads as follows:
 - a) Clip YELLOW test lead to the EMITTER.
 - b) Clip BLACK test lead to the BASE.
 - c) Clip RED test lead to the COLLECTOR:

NOTES: 1. For TETRODE transistors, connect Base 1 to Base 2, and proceed with test, the same as for general purpose types.

2. Connect case leads to the base on units provided with this extra lead and proceed with test.

d) Read **Beta** (transistor GAIN) on meter scale marked "BETA." Low-power types will have typical values from 20 to 100. If Beta reading falls in this range or higher, transistor has good GAIN. Even if Beta reads very low or there is no reading, continue with the next test step.

5. Set slide switch to LEAKAGE (upper position).

a) Observe 2-color GAS scale (also marked TRANSISTOR-DIODE LEAKAGE).

- b) ● A perfect transistor will show **little or no meter reading.**
 - A good transistor will read in **green** zone marked "O.K."
 - A leaky transistor will read in **red** zone marked "BAD."

6. Results of Test for Low-Power Transistors:

a) If GAIN and LEAKAGE both checked O.K., transistor is **GOOD.**

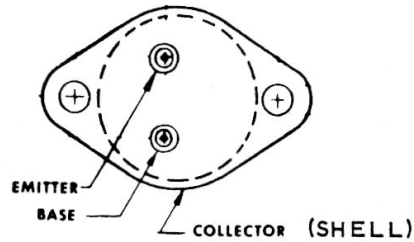
b) A transistor with good GAIN but high LEAKAGE should be replaced.

c) A transistor with no LEAKAGE but with very low GAIN may work in some circuits, but should usually be replaced.

d) If you get a reading of **very low GAIN** and **very high LEAKAGE**, **your polarity** may be wrong: reverse the slide switch setting from PNP to NPN (or from NPN to PNP) and repeat the entire test, doing steps 3, 4, and 5 above.

TEST FOR POWER TRANSISTORS

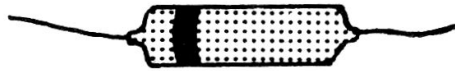
1. Base diagram:



2. Set panel PNP–NPN slide switch to PNP.
3. Clip RED test lead to the shell (**Collector** Terminal), and clip YELLOW test lead to the **E**mitter Terminal of the transistor being tested. Black test lead is not used in this test.
 - a) Note meter reading using BETA scale as a reference number only.
 - b) Change polarity switch to NPN and note second reading.
 - c) The ratio of the higher reading to the smaller reading is the forward-to-reverse current ratio, and should be 2-to-1 or higher. (The higher the transistor power rating, the lower this ratio will be. 10 watt transistors may show a ratio as low as 1.5-to 1.)
4. Change the YELLOW test lead over to the transistor BASE terminal.
 - a) Take readings, using the Beta scale, at PNP and at NPN switch positions.
 - b) Forward-to-reverse current ratio should be 3-to-1 or higher.
5. Change the RED test lead over to the transistor EMITTER terminal.
 - a) Take readings, using the Beta scale, at PNP and at NPN switch positions.
 - b) Forward-to-reverse current ratio should be 3-to-1 or higher.
6. Results of Test for Power Transistors:
 - a) If all forward-to-reverse current ratios are within satisfactory limits, the power transistor is GOOD.
 - b) If any one of the three tests showed too low a difference between forward and reverse currents, the transistor is leaky and may work in some circuits, but should generally be replaced.
 - c) If forward and reverse currents are the same, the transistor is SHORTED.
 - d) If no meter reading can be observed for forward or reverse current, the transistor is OPEN.

TEST FOR CRYSTAL (LOW POWER) DIODES

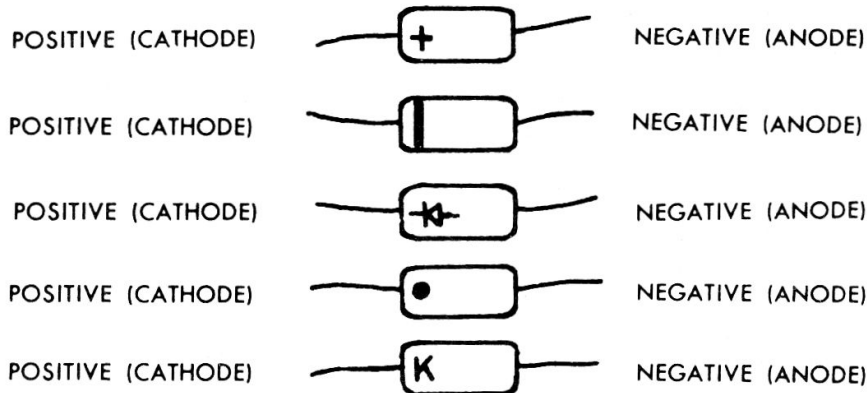
1. Diode Pin Connections:



GENERAL APPEARANCE
(Positive end indicated by the stripe)

NOTE: In a diode it is merely necessary to identify which end is positive

ALTERNATE METHODS OF INDICATING THE POSITIVE END

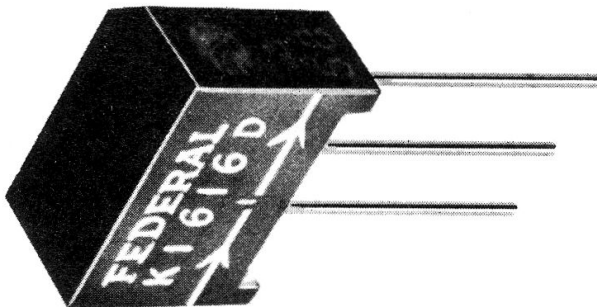


2. Set panel PNP–NPN slide switch to PNP.
3. Clip RED test lead to diode cathode (pos. end).
Clip YELLOW test lead to diode anode (neg. end).
BLACK test lead is not used in this test.
 - a) Observe forward current on 3-color Em scale (also marked TUBE-DIODE FORWARD CURRENT).
 - b) Meter should read over the line marked DIODES O.K.
4. Change polarity by switching to NPN.
 - a) Observe leakage current on 2-color GAS scale (also marked TRANSISTOR-DIODE LEAKAGE).
 - b) Meter should read little or nothing.
5. Results of Test for Crystal Diodes:
 - a) If diode forward current is over the DIODES O.K. line on the Em scale, and leakage current is in the green (O.K.) zone of the GAS scale, diode is GOOD.

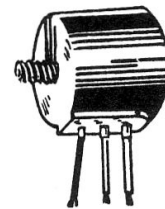
- b) A diode with good forward current but high leakage should be replaced.
 - c) If forward and leakage currents are equal, the diode is SHORTED.
 - d) If there is no meter reading for either forward or leakage, the diode is OPEN.
6. Using the Model 2000 to find Diode Polarity.
- a) Set panel PNP–NPN slide switch to PNP.
 - b) Connect RED test lead to one end of diode.
 - c) Connect YELLOW test lead to other end of diode.
 - d) BLACK test lead is not used in this test.
 - e) If meter reads diode forward current (over the DIODES O.K. line on 3-color Em scale), RED lead is connected to cathode.
 - f) If meter reads diode leakage (little or no meter reading), YELLOW lead is connected to cathode.
 - g) Perform the test procedure of steps 2 through 5 above.

TEST FOR DUO-DIODES

1. Duo-Diode Types:

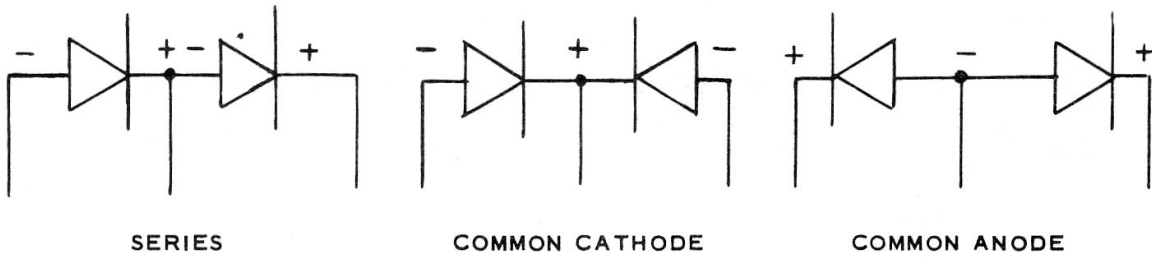


Selenium Type
Popular in TV Horizontal
A.F.C. Circuits



Copper Oxide Type
Used as Meter Rectifier

2. Circuits of Duo-diodes:

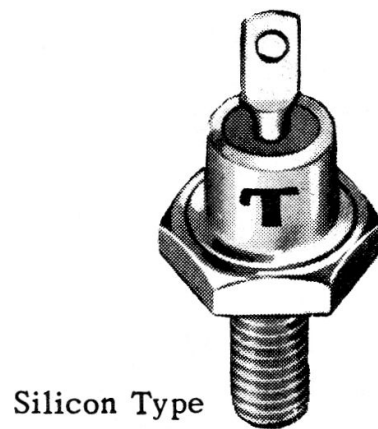
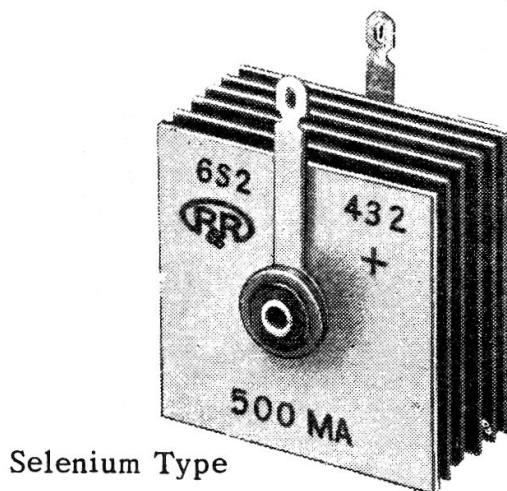


3. A duo-diode can be tested exactly like two separate diodes:

- a) Using center pin and one end pin of the duo-diode, perform the test procedure of steps 2 through 5 of the preceding section entitled "Test for Crystal Diodes."
 - b) Repeat the same test, using center pin and the other end pin.
 - c) Unless both diode sections are good, the duo-diode should be replaced. (Meter rectifier types will show a higher leakage than crystal types, but forward-to-reverse current ratio should be 15-to-1 or better.)
4. To identify the internal circuit of an unmarked duo-diode, follow the test procedure of step 6, above, under "Test for Crystal Diodes."
- a) Identify anode and cathode of each section, and test duo-diode quality at the same time.
 - b) The circuit will be one of the three illustrated above.

TEST FOR POWER RECTIFIER

1. Power types:

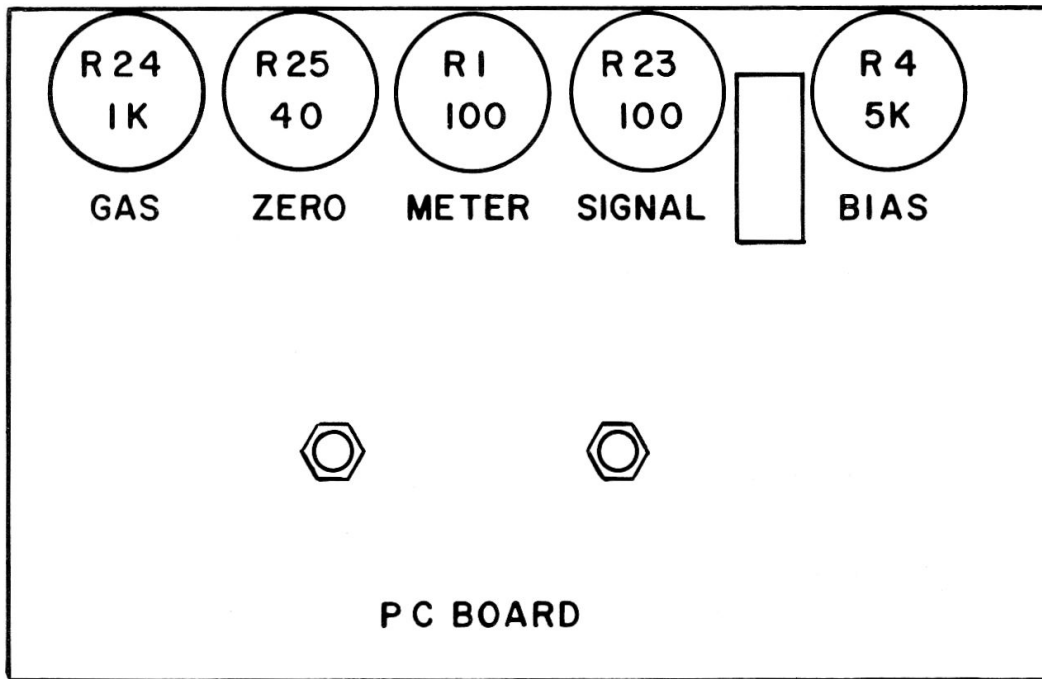


2. Set panel PNP–NPN slide switch to PNP.
3. Conect RED test lead to pos. terminal of rectifier.
4. Connect YELLOW test lead to neg. terminal of rectifier.
5. BLACK test lead is not used in this test.
 - a) Observe forward current reading of rectifier on Beta scale of meter.
6. Change switch setting to NPN.
 - a) Observe reverse current reading of rectifier on Beta scale.
7. Results of Test for Power Rectifier:
 - a) 500 ma. selenium types used in early model TV power supplies will have a forward-to-reverse current ratio of 5-to-1 or better.
 - b) Small radio-type selenium rectifiers will have forward-to-reverse current ratios of 10-to-1 or better.
 - c) Silicon power rectifiers and top-hat power types will show good ratios of 10-to-1 or better.
 - d) Large, low-voltage selenium types, such as 20 amp. types used in auto battery chargers, will normally show a low forward-to-reverse current ratio of 2-to-1 or 3-to-1.
8. To identify polarity of an unmarked rectifier, follow the procedure of step 6 in previous section entitled "Test of Crystal Diodes."

SERVICE NOTES

1. The calibration controls of your Model 2000 are factory-set and should not require further adjustment. If these controls are tampered with, your instrument may require factory re-calibration.
2. The POWER indicator, part no. B3, is one of a pair of type 44 lamp bulbs which regulate the mutual conductance circuit. Should either bulb become burned out, it must be replaced at once or the Gm test circuit will not operate.
3. With an adapter such as the Mercury Model MH-3, tests can be performed on all Black and White and Color Picture Tubes including the latest 90° rectangular color tubes.

CALIBRATION



1. PRELIMINARY SET UP:

- a) Plug line cord into 117 Volt A.C. line.
- b) Set all levers to K.
- c) Turn LOAD Control to zero (0).

2. ZERO CAL.

- a) Set FUNCTION Switch to Gm-Em.
- b) Rotate LOAD Control fully clockwise to 100. Meter indication should remain at zero.
- c) If pointer does not remain at zero, adjust 40 Ohm Zero-Cal Control R-25 for a zero (0) reading on the meter. (See figure above.)
- d) Rotate the LOAD Control from 100 back to zero (0). If Zero-Cal Control has been properly set, the needle should stay on zero (0).

3. METER SENSITIVITY CAL.

- a) Set FUNCTION Switch to Gm-Em.
- b) Place a 500 ma. rectifier (silicon or selenium type rated at 100 volts minimum) with negative terminal to pin 5 of socket 4, and positive (K) terminal to pin 8 of socket 4.

- c) Set Lever 5 to position G; Lever 11 to P.
- d) Rotate LOAD Control to 50 and adjust 100 Ohm Meter Sensitivity Cal Control R-1 for a meter reading of exactly full scale. Return LOAD Control to zero, Levers 5 and 11 to K, and remove diode.

4. GAS CAL.

- a) Set FUNCTION Switch to GAS GRID LEAKAGE.
- b) Insert a jumper wire into pins 5 and 8 of socket 4.
- c) Set Lever 5 to position G.
- d) Adjust 1000 Ohm Gas Cal Control R-24 for a meter reading of 17,500 Micromhos on Gm scale.
- e) Return Lever 5 to position K and move Lever 3 to position G. The pointer will hardly move and should stay in the Green (O.K.) zone of lower scale marked "GAS." If the reading is in the Red (Bad) area, replace V1, 6AT6 tube.

Return Lever 3 to position K and remove jumper.

5. SIGNAL CAL.

- a) Set FUNCTION Switch to Gm-Em.
- b) Using a good 6BA6 tube with a rated Gm of 4300 do the following:
 - 1) Set SELECTOR to D.
 - 2) Set LOAD to 80.
 - 3) Set Lever 1 to Position G.
 - 4) Set Levers 5 and 6 to position P.
- c) Insert the 6BA6 tube into socket 8 and allow tube to warm up.
- d) Adjust 100 Ohm Signal Cal. Control R-23 for a reading of 4200 to 4300 on the Gm Lo-scale.
- e) With Lever 1 at position G and Levers 5 and 6 at position P, set Lever 11 to position G and adjust 5000 Ohm Bias Cal. Control R-4 for a reading of 1000 on the Gm Lo-scale.

6. RECHECK

Set Lever 11 back to position K. The meter should read 4200 to 4300 on the Gm Lo-scale. If not, recalibrate R-23 and repeat steps 5d and 5e until both controls are adjusted.

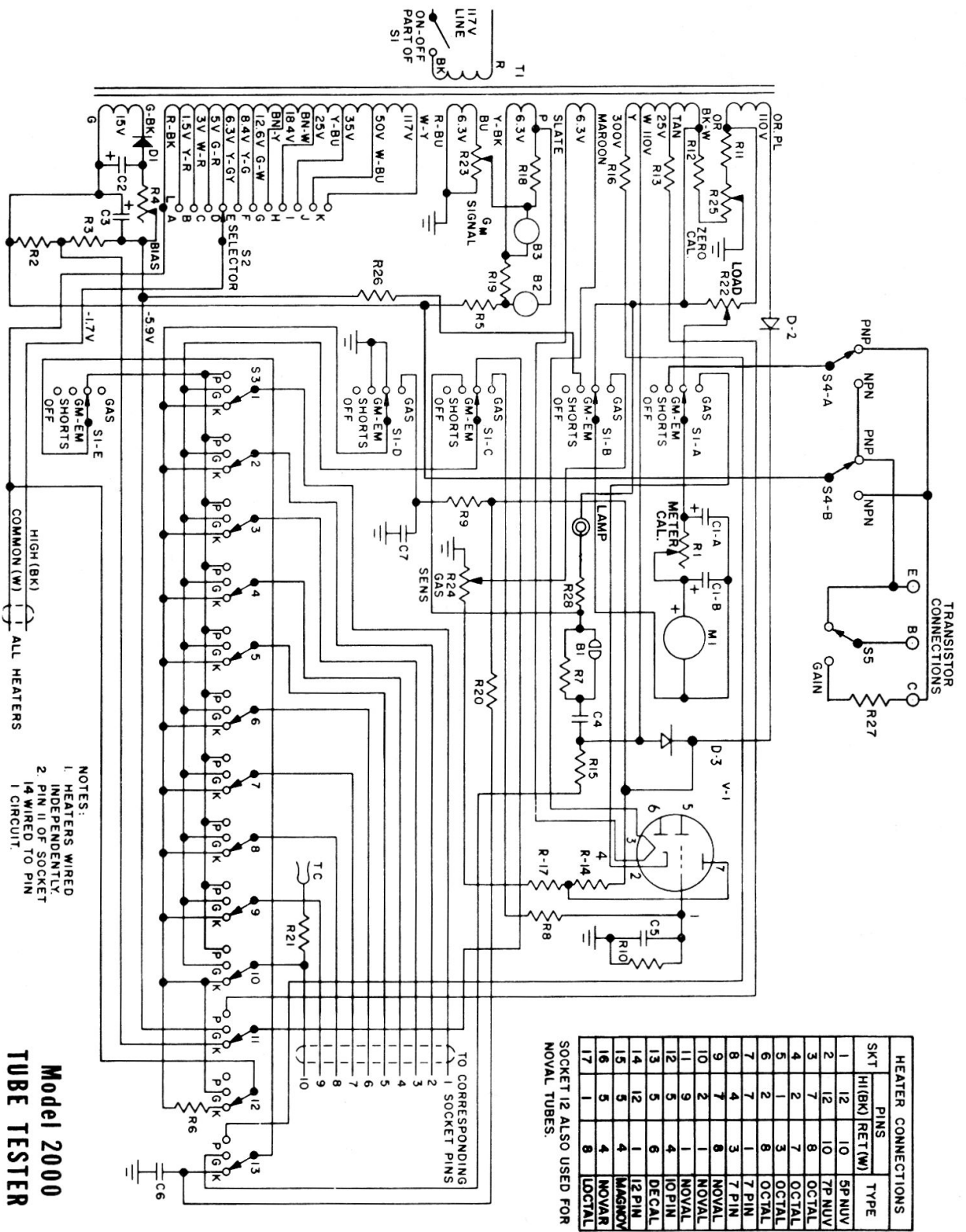
The Model 2000 is now calibrated.

PARTS LIST

Sym.	Description	Part No.	Price
R-1	100 ohm humdinger pot	5-1-45	\$.32
R-2	220 ohm ½ W, 1% resistor	1-4-40	.15
R-3	560 ohm ½ W, 1% resistor	1-4-39	.15
R-4	5 K ohm humdinger pot	5-1-46	.47
R-5	10K ohm ½ W, 10% resistor	1-0-33	.04
R-6	47K ohm ½ W, 10% resistor	1-0-48	.04
R-7	820K ohm ½ W, 10% resistor	1-0-5	.04
R-8	4.7M ohm ½ W, 10% resistor	1-0-52	.04
R-9	6.8M ohm ½ W, 10% resistor	1-0-53	.04
R-10	22M ohm ½ W, 10% resistor	1-0-34	.06
R-11	100 ohm 1 W, 10% resistor	1-1-7	.10
R-12	100 ohm 1 W, 10% resistor	1-1-7	.10
R-13	1 K ohm 1 W, 10% resistor	1-1-11	.10
R-14	3.9K ohm 1 W, 10% resistor	1-1-18	.10
R-15	4.7K ohm 1 W, 10% resistor	1-1-19	.10
R-16	15 K ohm 1 W, 10% resistor	1-1-20	.10
R-17	10 K ohm 2 W, 10% resistor	1-2-2	.15
R-18	18 ohm 3 W, 10% resistor	1-3-8	.13
R-19	18 ohm 3 W, 10% resistor	1-3-8	.13
R-20	270 ohm 5 W, 10% resistor	1-3-9	.13
R-21	270 ohm 5 W, 10% resistor	1-3-9	.13
R-22	1 K ohm W. W. pot	5-1-25	1.20
R-23	100 ohm humdinger pot	5-1-45	.32
R-24	1 K ohm humdinger pot	5-1-47	.43
R-25	40 ohm humdinger pot	5-1-48	.38
R-26	6.2K ohm ½W, 10% resistor	1-0-55	.06
R-27	1.2M ohm ½ W, 10% resistor	1-0-14	.04
R-28	120K ohm ½ W, 10% resistor	1-0-15	.04
C1A	250 mfd 15V elect capacitor	3-4-14	.41
C1B	250 mfd 15V elect capacitor	3-4-14	.41
C-2	100 mfd 25V elect capacitor	3-4-9	.30
C-3	100 mfd 25V elect capacitor	3-4-9	.30

Sym.	Description	Part No.	Price
C-4	.01 mfd 600V capacitor	3-1-18	.15
C-5	.01 mfd 600V capacitor	3-1-18	.15
C-6	.01 mfd 600V capacitor	3-1-18	.15
C-7	.05 mfd 600V capacitor	3-1-29	.20
B-1	NE-2 neon lamps	17-1-2	.17
B-2	No. 44 lamp	17-1-4	.11
B-3	No. 44 lamp	17-1-4	.11
D-1	500 ma 100 piv silicon rectifier	19-1-5	.45
D-2	500 ma 700 piv silicon rectifier	19-1-4	.75
D-3	500 ma 700 piv silicon rectifier	19-1-4	.75
S-1	5 pole, 4 pos. Function switch	6-2-26	2.70
S-2	1 pole, 12 pos. Selector switch	6-2-27	1.28
S-3	13 section Lever switch	6-2-20	10.80
S-4	2 pole, 2 pos. slide switch	6-1-3	.20
S-5	1 pole, 2 pos. slide switch	6-1-1	.13
T-1	Power transformer	10-1-8A	9.93
V-1	6AT6 tube	6AT6	.81
M-1	0 – 1 ma meter	11-1-24	16.20
	Printed circuit board	30-1-32	3.35
	Knob, lever type	15-1-12G	.05
	Knob, lined	15-1-14A	.11
	Jewel, clear	16-1-11C	.04
	Jewel, red	16-1-11R	.04
	Case, wood	14-2-8	9.15
	Instruction manual	40-1-101	.50

All Prices Subject to Change Without Notice.



HEATER CONNECTIONS		
SKT	PINS	TYPE
	HI(BK) RET(W)	
1	12	5P NUV
2	12	7P NUV
3	7	8 OCTAL
4	2	7 OCTAL
5	1	3 OCTAL
6	2	8 OCTAL
7	7	7 PIN
8	4	7 PIN
9	7	8 NOVAL
10	2	1 NOVAL
11	9	1 NOVAL
12	5	4 NOVAL
13	5	6 DECAL
14	12	1 12 PIN
15	5	4 MAGNOV
16	5	4 MAGNOV
17	1	8 12CCTAL

SOCKET 12 ALSO USED FOR NOVAL TUBES.

- NOTES:
 1. HEATERS WIRED INDEPENDENTLY.
 2. PIN II OF SOCKET 14 WIRED TO PIN I CIRCUIT.

Model 2000
TUBE TESTER