Model 1101
TUBE TESTER

INSTRUCTION MANUAL

MERCURY
ELECTRONICS CORP.
manufacturers of quality electronic products

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MERCURY ELECTRONICS CORP.

MINEOLA, NEW YORK

INTRODUCTION

The Model 1101 is a compact, ultra-modern tube tester designed for maximum performance in high-speed testing of practically all tube types used in radio, television, high-fidelity, and industrial equipment.

The Model 1101 uses the time-proven principle of Dynamic Cathode Emission for Quality test. Shorts and leakage between any internal elements are shown by the panel indicator lamp. All sections of multi-section tubes are tested separately.

Circuitry is designed for simple and safe testing of all tubes. When following proper test procedure, it is impossible to burn out a tube in the Model 1101. Tubes listed on the Tube Chart include a complete coverage of Hi Fi, industrial and foreign types.

THE PANEL AND CONTROLS

1. **SOCKETS**

   There are sixteen sockets in Model 1101 which provide all heater pin arrangements in use today. Socket types include the 7-pin, 9-pin and 10-pin miniatures, plus Octal, Loctal, 5 & 7-pin Nuvistor, Novar and Compactron 12-pin. Also included are the two latest types: Magnoval and Decal.

2. **METER**

   The 3½ inch meter has a 3-color GOOD-WEAK-BAD scale for tube quality testing. A diode test line shows diode QUALITY to be good for all meter readings over the start of this line.

3. **SPEC.-REG. SWITCH** (Special-Regular)

   This slide switch is always left in the REG. (lower) position unless the symbol (S) appears in the column W of the tube chart, in which case the switch is moved up to SPEC. position.

4. **ROTARY SWITCHES** X, Y and Z

   Switch X is a 12-position switch that connects the proper pin element to the meter.

   Switch Z is a 12-position switch that connects the proper pin element to the return circuit.

   Switch Y is a 10-position heater switch, and also serves as the main power switch.

5. **SWITCH W**

   This switch has four positions which provide the proper limiting resistance for the QUALITY test.

6. **"PRESS FOR QUALITY" SWITCH**

   This is a spring-return slide switch normally in the upper position for SHORTS test. It is used only to get QUALITY readings on the meter.

7. **SHORTS-GRID LEAKAGE INDICATOR**

   This clear-view neon indicator shows a short or leakage of any type between any two pins of a tube. It is sensitive to 2 megohms. This indicator also tests continuity of panel lamps, using the lamp receptacle built into socket 11.

8. Pin Straighteners are provided for Compactron, Novar, and miniature 7-pin and 9-pin tubes.
9. The Model 1101 also includes a power indicator jewel.

Preliminary

TEST PROCEDURE

1. Be sure to set controls before inserting the tube in its socket. In this way, damage will be avoided due to excessive heater voltage being applied to the tube.
2. Check for SHORTS and LEAKAGE before testing for QUALITY. Do not test a tube for QUALITY if the SHORTS-GRID LEAKAGE indicator glows when the tube is inserted in its socket, or else damage to the tube or tube tester circuitry may result.

A. Receiving Tube Test

Shorts and Leakage Test

1. Plug the line cord into the power line. The power indicator jewel should glow when you advance switch Y from the OFF position.
2. Set controls X, Y, Z, and W, as directed on the Tube Chart alongside the listing of the tube you wish to test. If this tube is listed more than once, the test must be performed again for each additional listing. This provides a test of each section in multi-section tubes.
3. The slide switch marked SPEC.-REG. should always remain at the REG (lower) position, unless the symbol (S) appears in column W of your Tube Chart. Where (S) appears, use the SPEC. (upper) position of this switch.

4. Plug the tube into the designated socket and allow ten seconds for warm-up.

5. Observe the SHORTS - GRID LEAKAGE neon indicator. Any glow shows that there is a SHORT or LEAKAGE between cathode and heater or between cathode and grid.

Quality Test

1. If tube showed a short in preceding test, do not test for quality, or damage to tube or tester might result. The tube is bad and should be replaced.

2. If tube shows no shorts, press the QUALITY test slide switch and read tube QUALITY on meter.

3. Tubes have good QUALITY if meter pointer comes to rest anywhere in the green area of the 3-color meter scale. If tube is a diode, it will have "*" written next to its listing on the tube chart. Any QUALITY reading above the start of the "DIODES O.K." line means the diode is good. The diode line starts at 25 on the numerical meter scale.

4. If more than one listing of a tube appears on the tube chart, it is a multi-section tube and a test must be made separately for each section.

5. The tube test is now completed except for a screen (G-2 Short) test that may be desired. This test is described in the following steps:

Screen (G-2 Short) Test

1. The cathode-to-control grid (K-G_1) and cathode-to-heater (K-H) tests, performed in the above procedure, will find over 95% of all shorts occurring in tubes. For those tubes which have a screen grid (such as tetrodes and pentodes) you can check for a short between control grid and screen grid (G_1-to-G_2) as follows:

    1. Refer to the Tube Chart column labeled G-2-SHORT.

    2. Move the designated switch (either X or Z) to the position given in that column.

3. Any glow in the SHORTS indicator means G_1 is shorted to G_2 and the tube should be replaced.

NOTE: Screen shorts are quite rare. There are other types of shorts that are so rare that a test for them is ordinarily not important, unless a shorted condition is suspected.

The Model 1101. can find any short between two pins of a tube. The method for locating other shorts is described on page 8 of the Appendix, under the heading: "Additional Shorts Test Procedure".

B. Picture Tube Test

The picture tube test cable included with the Model 1101 has sockets for the standard 12-pin and the new 8-pin narrow neck 110 degree type tubes. Since all picture tubes are tested for emission in the same manner, no chart of picture tubes is required.

1) Set Switch "X" to position "12".

2) Set Switch "Y" as follows: "E" for 6.3 volt heaters.
"E" for 8.4 volt heaters.
"C" for 2.68 volt heaters and 2.35 volt heaters
"D" for 4.7 volt heaters.
"F" for 12.6 volt heaters.

NOTE: The picture tube charts given free by most CRT manufacturers will serve as a guide to CRT ratings.

3) Set Switch "Z" to position "12".

4) Set "SPEC. -REG." Switch to "REG".

5) Set Switch "W" to position "A".

6) Attach adapter cap to picture tube to be tested.

7) Allow 10 seconds for the picture tube to warm up.

8) If the picture tube is shorted, the "SHORTS" indicator will light. A strong glow indicates a dead short. A faint glow indicates the tube is gassy or has a high-resistance short.

9) Press the "QUALITY" button and read the picture tube quality on the numerical scale of the meter as follows:

READINGS OVER 20... emission is good.

READINGS FROM 5 to 20... emission is weak, although the tube may still give a usable picture for a while. A weak tube can frequently be improved by the use of a "brightener".

READINGS BELOW 5... emission is very poor and the picture tube should be replaced.

APPENDIX

1. Sample Tests

A. Pentode type 6AC7

a. See listing in Tube Chart
b. Set X at position 5
c. Set Y at position E
d. Set Z at position 4
e. Set W at position A

NOTE: Since there is no symbol (S) next to this listing, the SPEC.-REG. switch must be at REG. position.

f. Plug tube into socket 4
g. Observe SHORTS-GRID LEAKAGE indicator
h. If no shorts are indicated, press QUALITY switch and read tube quality on meter.
j. Release QUALITY switch. Refer to G-2 SHORT listing on Tube Chart, and move switch X to position 6. If indicator glows, tube has G-1 to G-2 short.

NOTE: Test for screen shorts may be made after the QUALITY test. Shorts involving the cathode must be made before the QUALITY test, and are automatically found by the initial test set-up.

B. Directly heated cathode type 1R5

a. See listing in Tube Chart.
b. Set X at position 4
c. Set Y at position B
d. Set Z at position 12
e. Set W at position B
(SPEC.-REG. Switch remains at REG.)
f. Plug tube into socket 13
g. Observe SHORTS-GRID LEAKAGE indicator.
h. If no SHORTS are indicated, press QUALITY switch, and read tube QUALITY on meter.
j. Release QUALITY switch. Refer to G-2 SHORT listing on Tube Chart, and move switch Z to position 3. If indicator glows, tube has a G-1 - G-2 short.

C. Diode Test, type 1B3

a. See listing in Tube Chart
b. Set X at position 11
c. Set Y at position B
d. Set Z at position 12
e. Set W at position B, noting symbol (S) at this listing
f. Set SPEC.-REG. switch at SPEC.
g. Plug tube into socket 4, connect top cap
h. Observe SHORTS-GRID LEAKAGE indicator
j. If no shorts are indicated, press QUALITY switch, and read tube QUALITY on meter – any reading over the start of the "DIODES O.K." line means tube QUALITY is good.
k. Release QUALITY switch and return SPEC.-REG. switch to REG. Note that the G-2 SHORT column is blank because type 1B3 has no screen.

2. Additional Shorts Test Procedure

This section shows how to find rare types of SHORTS. You will seldom need to use this procedure, unless you suspect that the tube malfunctioning is due to a rare type of SHORT.

a. By using switches X and Z, a short between any two elements in a tube can be found, as follows:

b. Use base diagram of tube as given in popular handbooks available free or at nominal cost from any tube jobber.

c. Set switch X to the number corresponding to one of the base pins to be tested.

d. Set switch Z to the number corresponding to the other base pin to be tested.

e. Observe SHORT-GRID LEAKAGE indicator. If glow occurs, there is a SHORT or LEAKAGE between the two base pins being tested.

f. EXAMPLE – to check for a SHORT between plate and screen of type 6BQ6, set X at position 4 (pin 4 is screen), and set Z at position 11 (plate of 6BQ6 is top cap, which is position 11 of this switch)

NOTE: Shorts between cathode and heater, or cathode and control grid have already been tested in the regular Test Procedure, so do not make any other tests for SHORTS involving heater or cathode.

g. EXAMPLE – to find a short between plate and control grid of triode 6AB4: the base diagram shows Plate (P) is pin 1, and control grid (G-1) is pin 6. Setting X to 1 and Z to 6 will catch any short between these two elements.

h. General Rules

1. If a tube element is connected to two or more base pins, any one of these pins may be used to contact that element. Example: 6CZ5 G-1 may be contacted at either pin 3 or pin 6.

2. Do not leave both X and Z at the same setting, or you will automatically get a dead SHORT indication. As long as QUALITY switch is not pressed, a short indication will do no damage.

3. If you press the QUALITY switch when the indicator shows a short, you may damage the meter or rectifier in the tube tester, as a result of excessive current flow.

3. Continuity Test of Panel Lamps

1. Plug Model 1101 into AC line and turn on power.
2. Set rotary switches as follows:
   X to position 12
   Y to position A
   Z to position 12

3. Slide switches are not touched during this test, and may remain in any position.

4. Insert lamp bulb firmly into base built in center socket 11. If lamp is good, SHORTS indicator will glow.

4. Trouble Shooting Hints

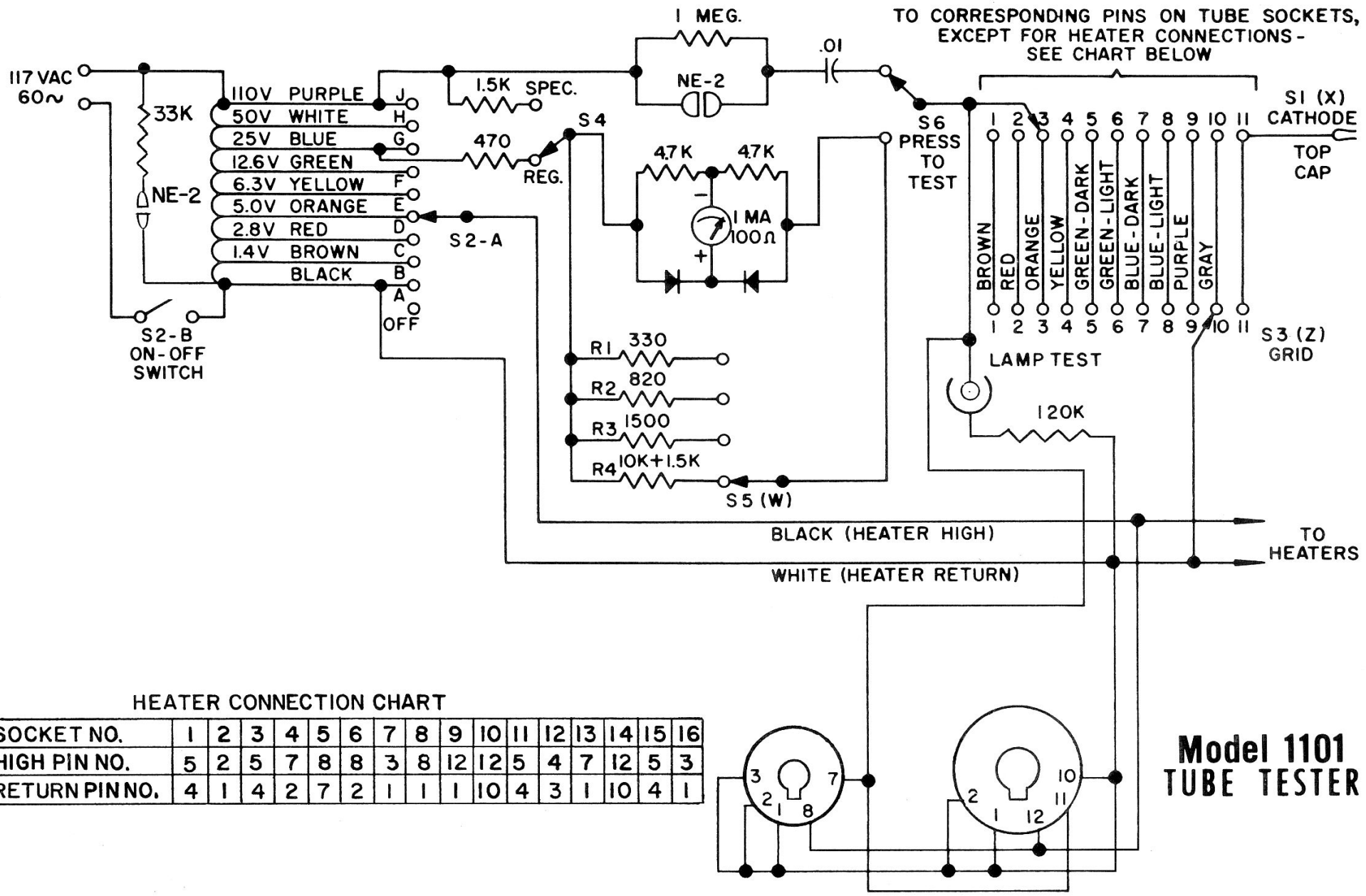
a. No meter movement on QUALITY tests –
   1. Controls X or Z set wrong
   2. No line power
   3. Defective meter
   4. Defective meter rectifier
   5. Current limiting resistor burned open (try another position of switch W)

b. Meter goes off scale –
   1. Controls X or Z set wrong
   2. Tube under test is shorted
   3. Switch W set wrong

c. Continuous Short Indication
   1. Controls X and Z at same setting
   2. Shorted .01 mfd. condenser

d. General Information
   1. The Model 1101 is an unusually trouble-free and reliable circuit With proper use it will never overheat, burn out, damage tubes under test or give misleading test results.

   2. The panel is insulated, and has no shock hazard.



HEATER CONNECTION CHART

SOCKET NO.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
HIGH PIN NO.	5	2	5	7	8	8	3	8	12	12	5	4	7	12	5	3
RETURN PIN NO.	4	1	4	2	7	2	1	1	1	10	4	3	1	10	4	1

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