

## TECHNICAL MANUAL

## ELECTRON TUBE TEST SETS TV-7/U AND TV-7A/U

TM 11-5083 }  
 CHANGES NO. 1 }

DEPARTMENT OF THE ARMY  
 WASHINGTON 25, D. C., 2 September 1955

TM 11-5083, 29 September 1953, is changed as follows:

The title of the manual is changed to read:

ELECTRON TUBE TEST SETS TV-7/U AND TV-7A/U

## CHAPTER 1

## INTRODUCTION |

*Note.* (Added) Electron Tube Test Set TV-7A/U, procured on Order No. 25006-P-54, is similar to Electron Tube Test Set TV-7/U covered in TM 11-5083. Information in this manual pertaining to the TV-7/U applies also to the TV-7A/U except where indicated otherwise.

In the following places in the manual, "(5Y3WGT on the TV-7A/U)" is added after "5Y3GT."

*Page 2, paragraph 4b. Line 4.*

*Page 32, paragraph 38. "Corrective measures" column, item 7.*

*Page 38, figure 13. V102 designation.*

*Page 39, paragraph 42a(6) and (7). Line 2.*

*Page 42, paragraph 42f. Line 6.*

*Page 42, figure 17. V102 designation.*

*Page 48, paragraph 45d(3). Line 1.*

*Page 49, paragraph 51a. Lines 1 and 2.*

## 7. Description

\* \* \* \* \*

b. An indicating meter \* \* \* test lead connections.

*Note.* (Added) On the TV-7A/U, the markings of the BIAS and SHUNT controls are etched into the test set panel (fig. 2.1).



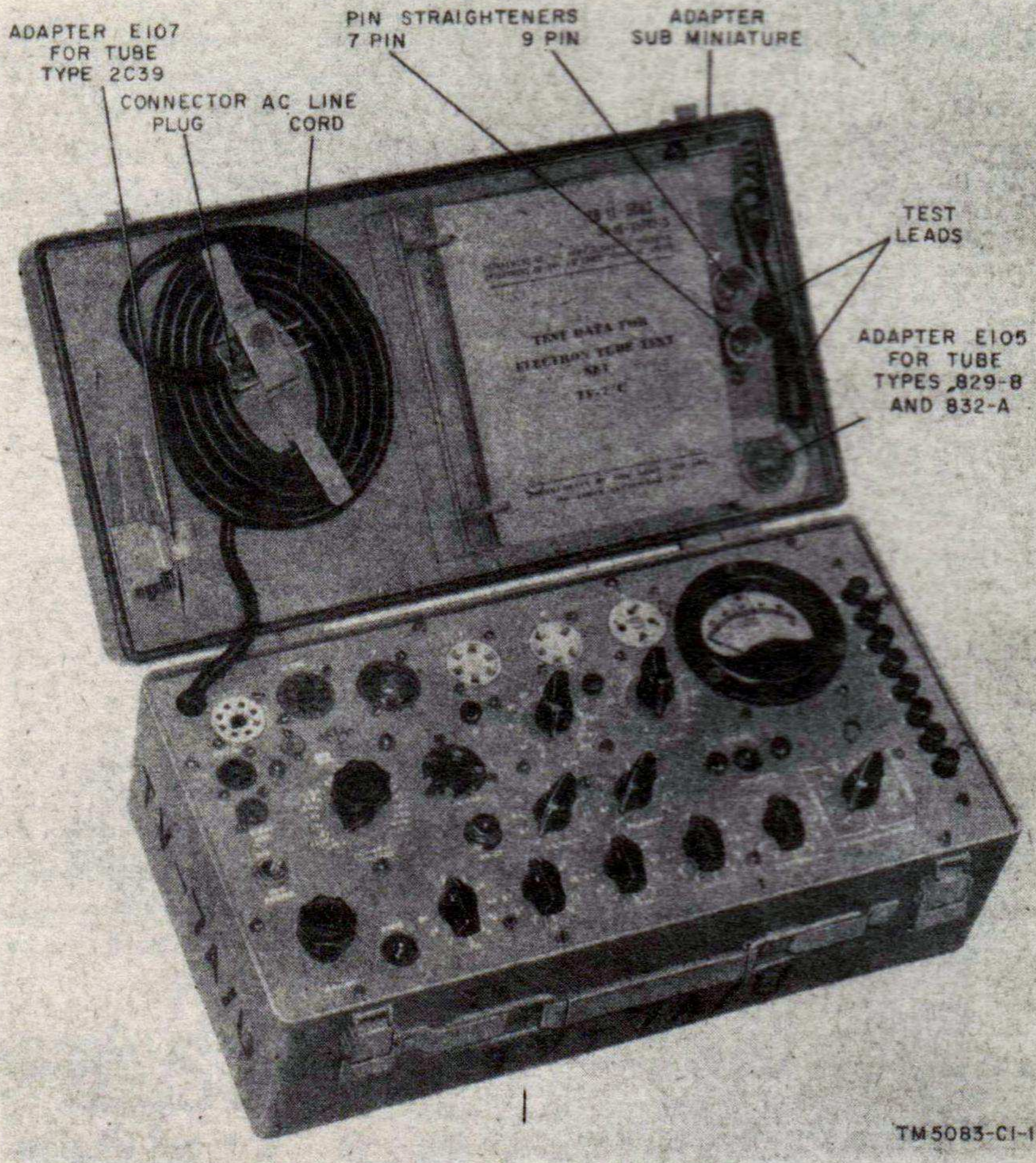


Figure 2.1 (Added). Electron Tube Test Set TV-7A/U, cover open.

## 8. Spare Parts (Superseded)

Quantity		Name	Ref symbol
TV-7/U	TV-7A/U		
2	1	Neon glow lamp, type NE-45	E101
2	1	Pilot lamp, type 47	E102
3	1	Fuse lamp, type 81	E103
1	1	Tube, type 83	V101
1		Tube, type 5Y3GT	V102
	1	Tube, type 5Y3WGT	V102

Figure 4. The following note is added:

NOTE. ALL PANEL DESIGNATIONS APPLY ALSO TO THE TV-7A/U.



## 17. Panel Connections

\* \* \* \* \*

c. All jacks accommodate 3/32-inch diameter tip plugs (**5/64 inch on the TV-7A/U**).

## 18. Test Leads

Two test leads are provided to make connections from the G and P panel jacks to the top caps of tubes as required. These leads are terminated on one end in a 3/32-inch diameter tip plug (**5/64 inch on the TV-7A/U**) and on the other end in a battery-type clip with an insulating cover. When the leads are not in use, stow them inside the top of the case.

## 19. Adapters

Three tube socket adapters are supplied: one (E105) to permit the testing of type 829-B and 832-A tubes in the OCTAL socket of the test set, another (E104) to provide a convenient means for testing sub-miniature tubes with leads instead of pins in the standard OCTAL test socket, and the third (E107), to test **2C39** type tubes (**fig. 5**). Secure the adapters when not in use, to the inside of the top of the case.

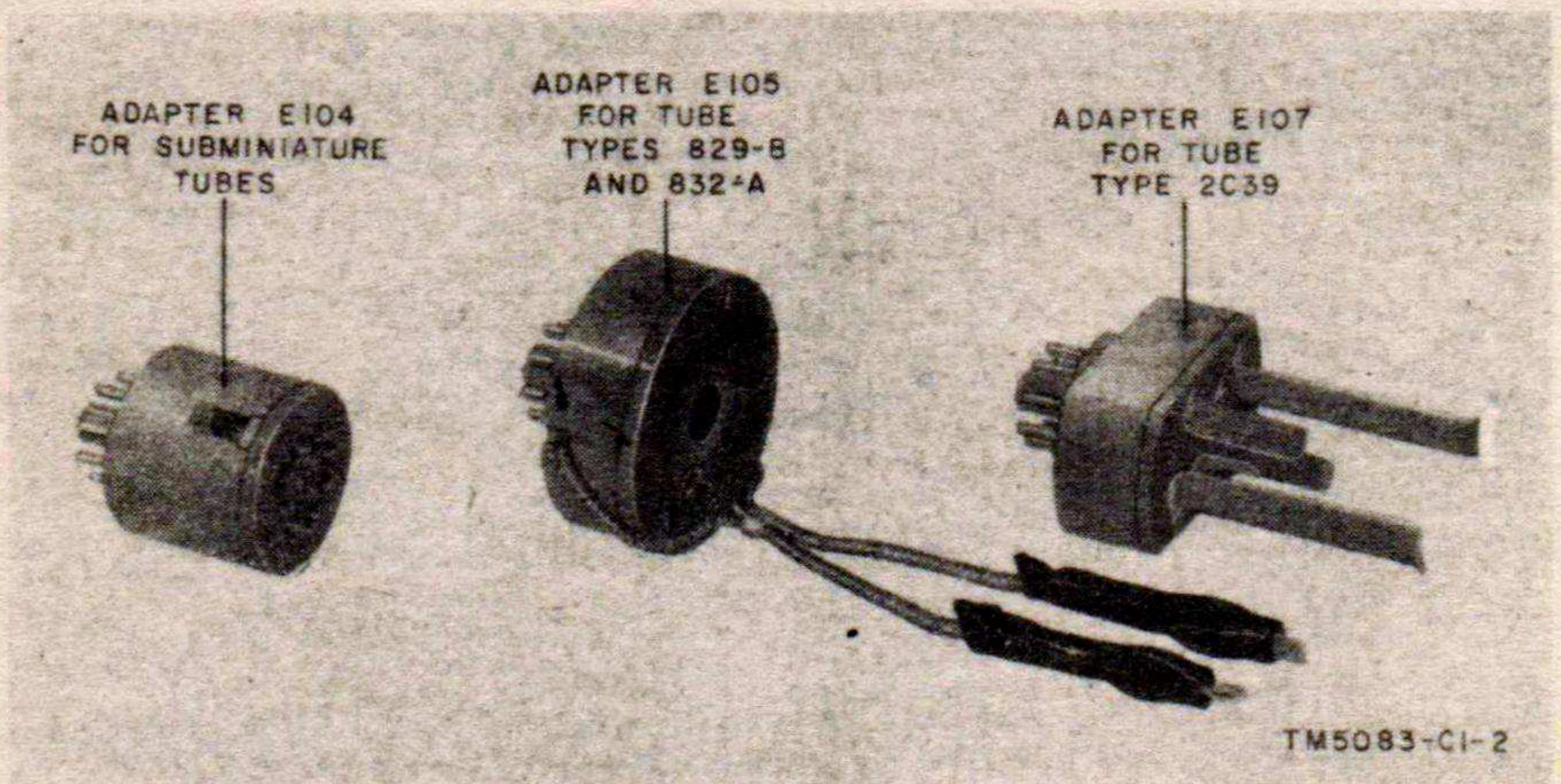


Figure 5 (Superseded). Adapters E104, E105, and E107.

## 20. Tube Test Data

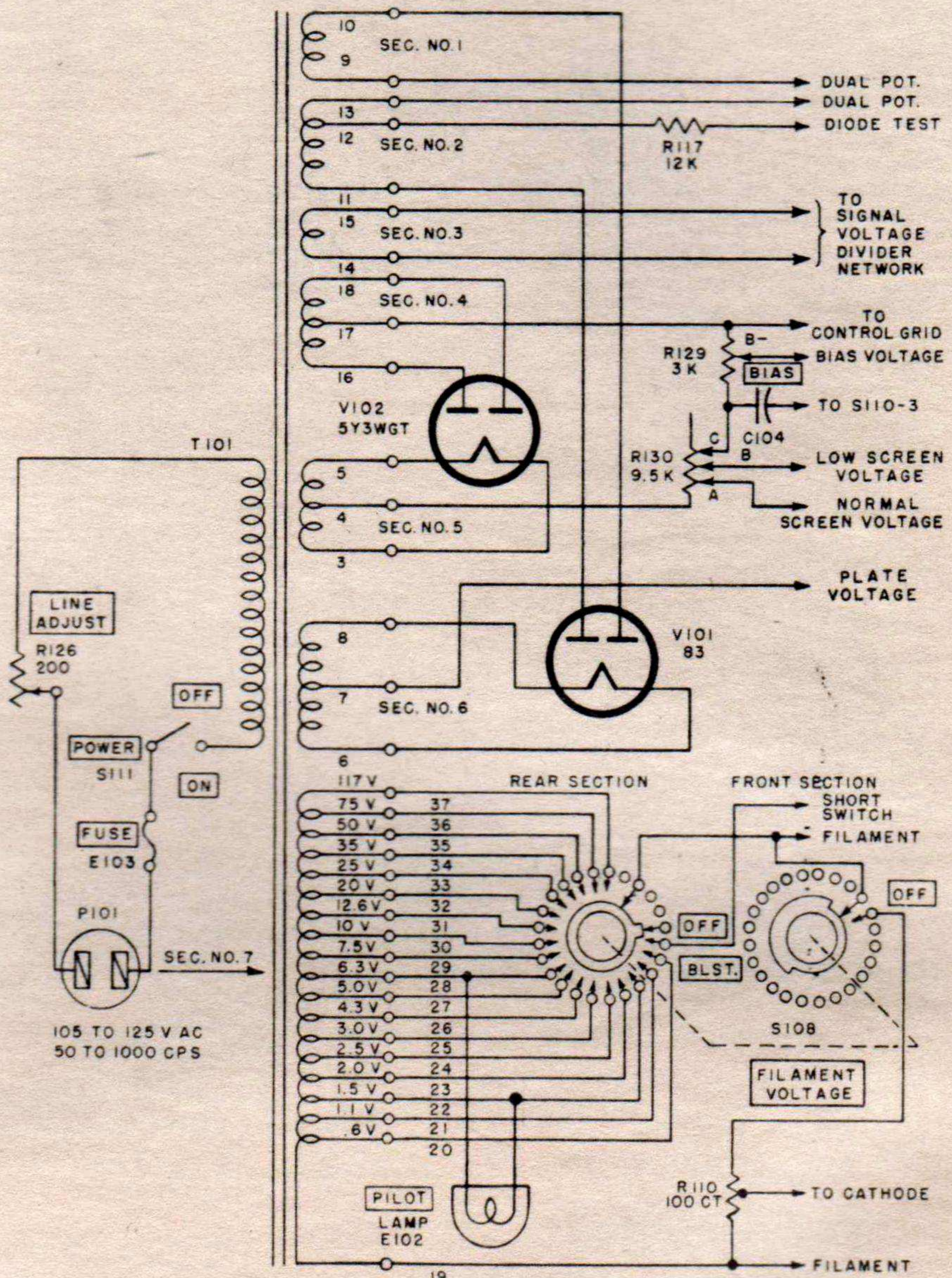
A test data \* \* \* right as follows:

\* \* \* \* \*

d. *Bias*. This column lists the proper settings for the BIAS dial (**BIAS control on the TV-7A/U**). The bias voltage applied to the tube under test is controlled with the BIAS potentiometer.

e. *Shunt*. This column lists the settings for the dial (**panel markings on the TV-7A/U**) of the *SHUNT* resistors which control the sensitivity of the meter circuit. Setting of this dial (**control on the TV-7A/U**) is required



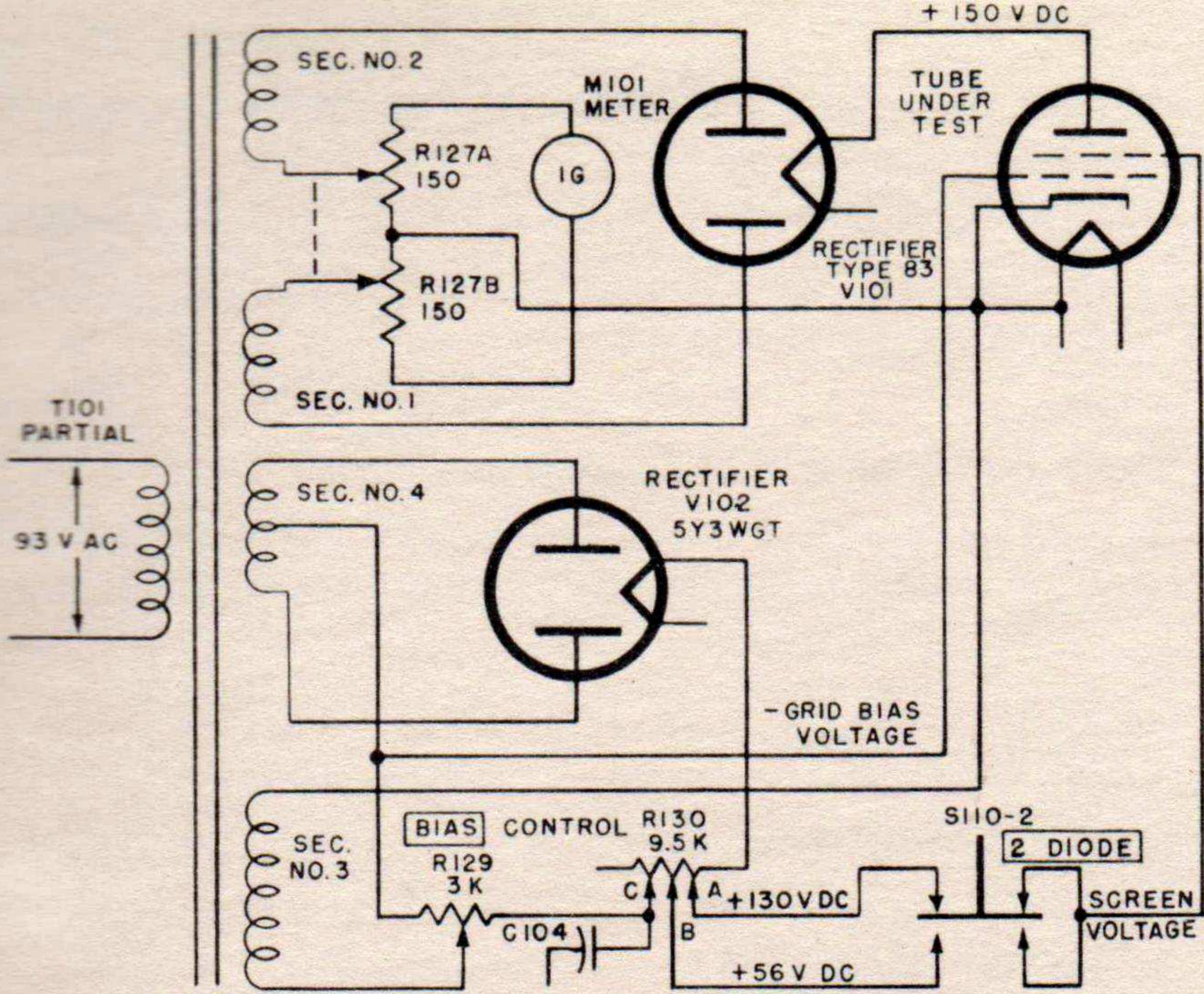


NOTE:  
 ON THE TV-7A/U, SERIAL NUMBERS 1 THROUGH 1200, A 680-OHM RESISTOR R133 IS CONNECTED BETWEEN TUBE V102 FILAMENT AND THE POSITIVE END OF RESISTOR R130. ALSO, RESISTOR R130 IS 8500 OHMS.

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Figure 13.1 (Added). Simplified power supply circuit (TV-7A/U).





NOTE.  
 ON THE TV-7A/U, SERIAL NUMBERS 1 THROUGH 1200,  
 A 680-OHM RESISTOR R133 IS CONNECTED BETWEEN  
 TUBE V102 FILAMENT AND THE POSITIVE END OF  
 RESISTOR R130. ALSO, RESISTOR R130 IS 8,500 OHMS. TM5083-CI-16

Figure 17.1 (Added). Simplified mutual conductance test circuit (TV-7A/U).

only when the FUNCTION SWITCH is in the RANGE A SHUNT position.

\* \* \* \* \*

## 22. Operational Procedure

The operational steps \* \* \* the instructions below.

\* \* \* \* \*

1. Adapters.

\* \* \* \* \*

(3) Also furnished is special adapter E107 for testing the 2C39 type tube in the OCTAL socket of the test set.

\* \* \* \* \*

## 22. Preventive Maintenance Checklist

The following preventive \* \* \* near inflammable liquids.

\* \* \* \* \*



c. *Semiannually.*

(1) Check the 83 and 5Y3GT (**5Y3WGT on the TV-7A/U**) rectifier tubes and replace them if necessary.

*Note.* (Added) Tube type 5Y3WGTA is a preferred tube, developed to replace type 5Y3WGT (V102) used in the TV-7A/U or the 5Y3GT used in the TV-7/U. These two older types, which are interchangeable with the preferred type, should be used until stocks are exhausted.

\* \* \* \* \*

#### 40. Basic Theory of Mutual Conductance Test

a. Examine first the \* \* \* a d-c milliammeter. A center-tapped resistor  $R_m$  is shunted across the milliammeter. The load, resistance \* \* \* of the movement.

\* \* \* \* \*

#### 42. Circuit Analysis

a. *Power Supply Circuit* (fig. 13).

\* \* \* \* \*

(6) Secondary No. 4 \* \* \* to be tested.

\* \* \* \* \*

*Note.* (Added) On the TV-7A/U (serial numbers 1 through 1200), a 680-ohm, 1-watt, voltage-dropping resistor, R133, is connected between transformer terminal No. 4 and the A terminal of resistor R130. This resistor reduces the screen voltage, applied to the tube under test, to a suitable value.

## CHAPTER 5

### FIELD MAINTENANCE INSTRUCTIONS

#### Section II. TROUBLESHOOTING AT FIELD MAINTENANCE LEVEL

**Warning:** (Added) *Dangerous voltages exist in this equipment.* High voltages are present at exposed transformer terminals, rectifiers V101 and V102 socket terminals, components mounted on terminal board E106, LINE ADJUST rheostat R126, and associated circuits. The highest voltage (330 volts) appears between terminals 16 and 18. *Do not take chances!*



## 53. Troubleshooting Data

(Superseded)

Consult the illustrations listed below for troubleshooting data.

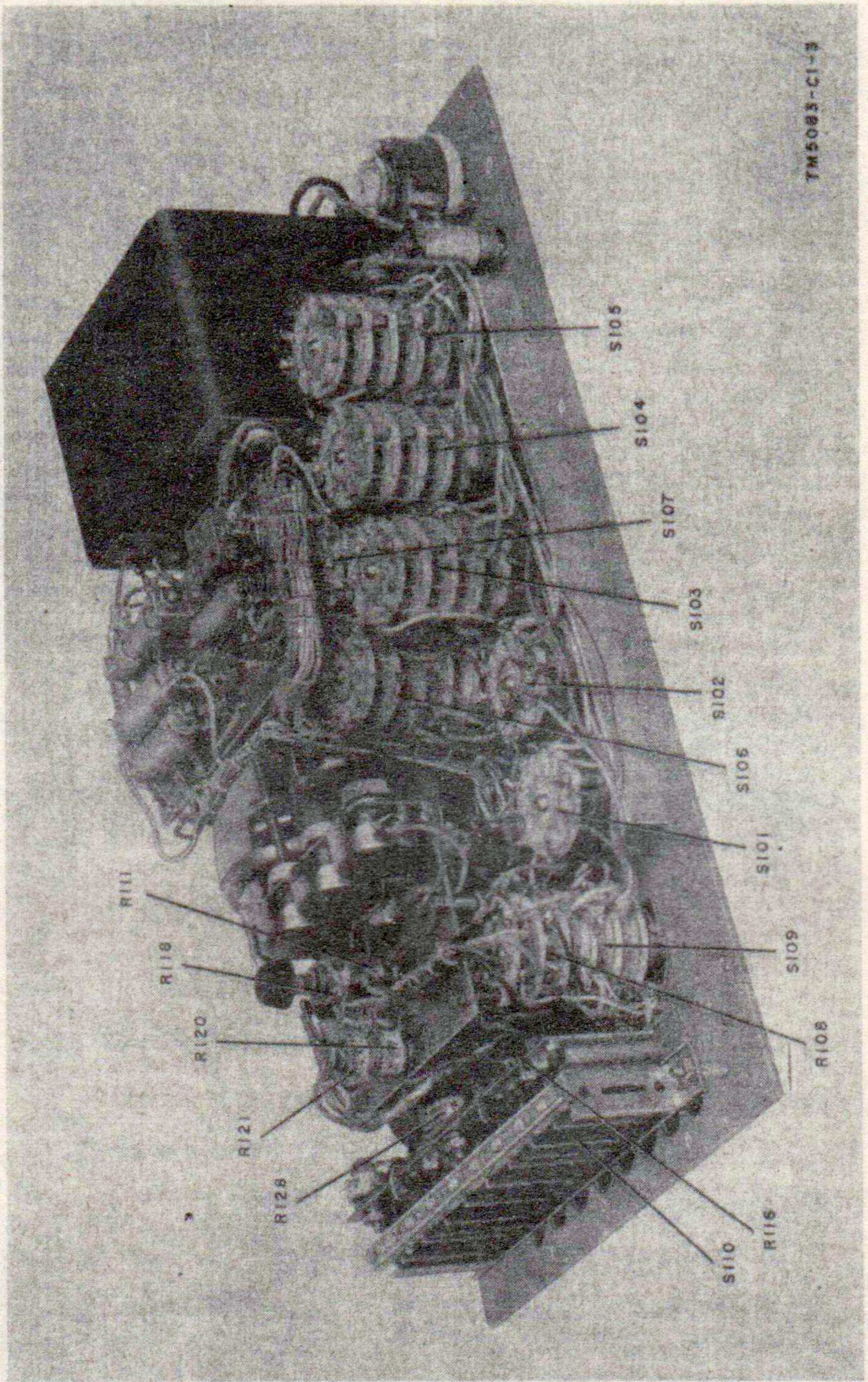
Fig. No.	Caption
21	Voltage calibration check diagram.
22	Internal view of Electron Tube Test Set TV-7/U, front left oblique.
22.1	Internal view of Electron Tube Test Set TV-7A/U (serial numbers 1 through 1200), front left oblique.
22.2	Internal view of Electron Tube Test Set TV-7A/U (serial numbers 1201 through 9492), front left oblique.
23	Internal view of Electron Tube Test Set TV-7/U, front right oblique.
23.1	Internal view of Electron Tube Test Set TV-7A/U (serial numbers 1 through 1200), front right oblique.
23.2	Internal view of Electron Tube Test Set TV-7A/U (serial numbers 1201 through 9492), front right oblique.
24	Internal view of Electron Tube Test Set TV-7/U, rear left oblique.
24.1	Internal view of Electron Tube Test Set TV-7A/U (serial numbers 1 through 1200), rear left oblique.
24.2	Internal view of Electron Tube Test Set TV-7A/U (serial numbers 1201 through 9492), rear left oblique.
25	Internal view of Electron Tube Test Set TV-7/U, rear right oblique.
25.1	Internal view of Electron Tube Test Set TV-7A/U (serial numbers 1 through 1200), rear right oblique.
25.2	Internal view of Electron Tube Test Set TV-7A/U (serial numbers 1201 through 9492), rear right oblique.
26	Internal view of Electron Tube Test Set TV-7/U, direct rear view.
26.1	Internal view of Electron Tube Test Set TV-7A/U (serial numbers 1 through 1200), direct rear view.
26.2	Internal view of Electron Tube Test Set TV-7A/U (serial numbers 1201 through 9492), direct rear view.
27	Transformer diagram.
28	Electron Tube Test Set TV-7/U, schematic diagram.
28.1	Electron Tube Test Set TV-7A/U (serial numbers 1 through 1200), schematic diagram.
28.2	Electron Tube Test Set TV-7A/U (serial numbers 1201 through 9492), schematic diagram.

## 54. Test Equipment Required

The test equipment \* \* \* is listed also.

Test equipment	Publication
Electron Tube Test Set TV-7/U or equal.	TM 11 5083
* * * * *	

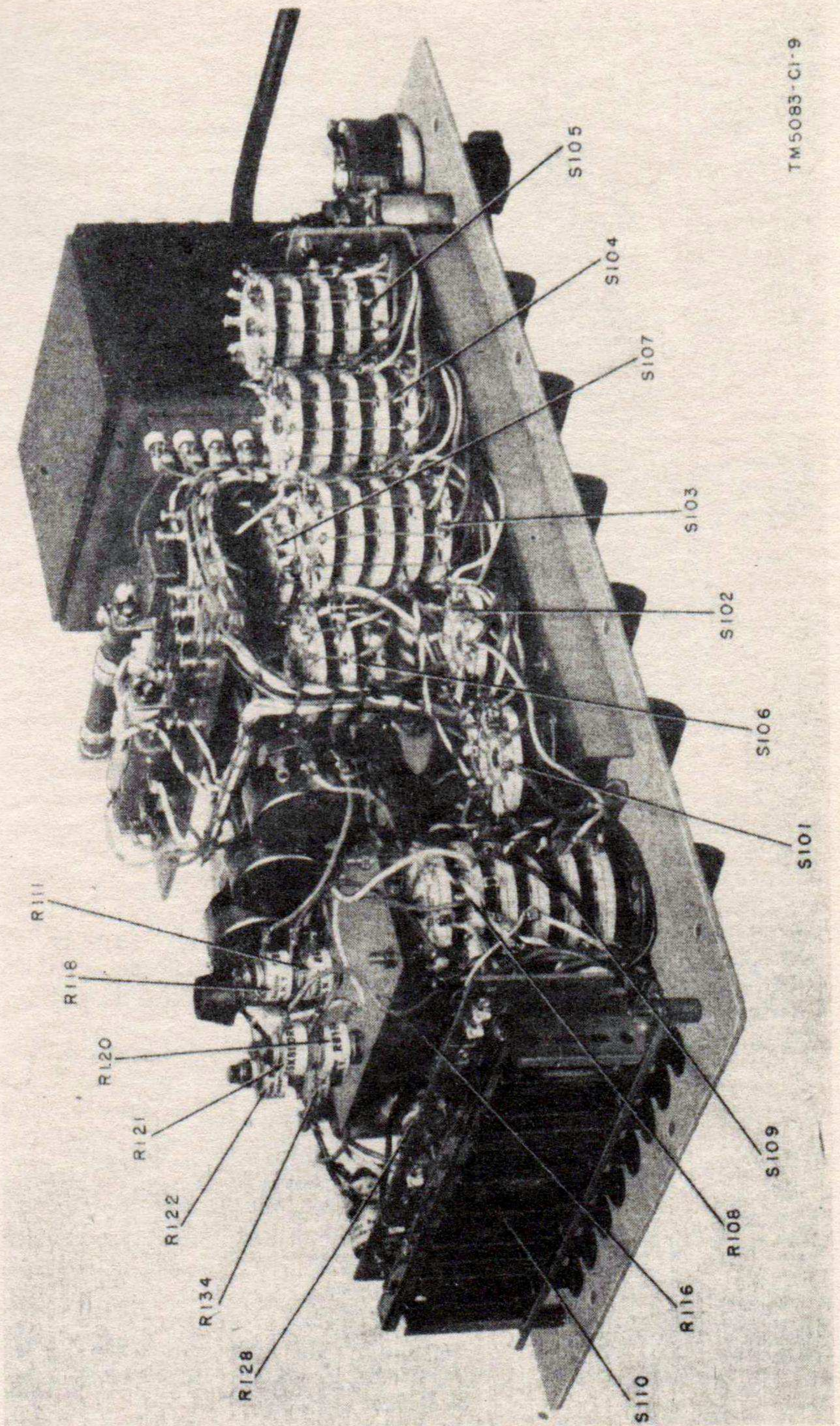




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Figure 22.1 (Added). Internal view of Electron Tube Test Set TV-7A/U (serial numbers 1 through 1200), front left oblique.

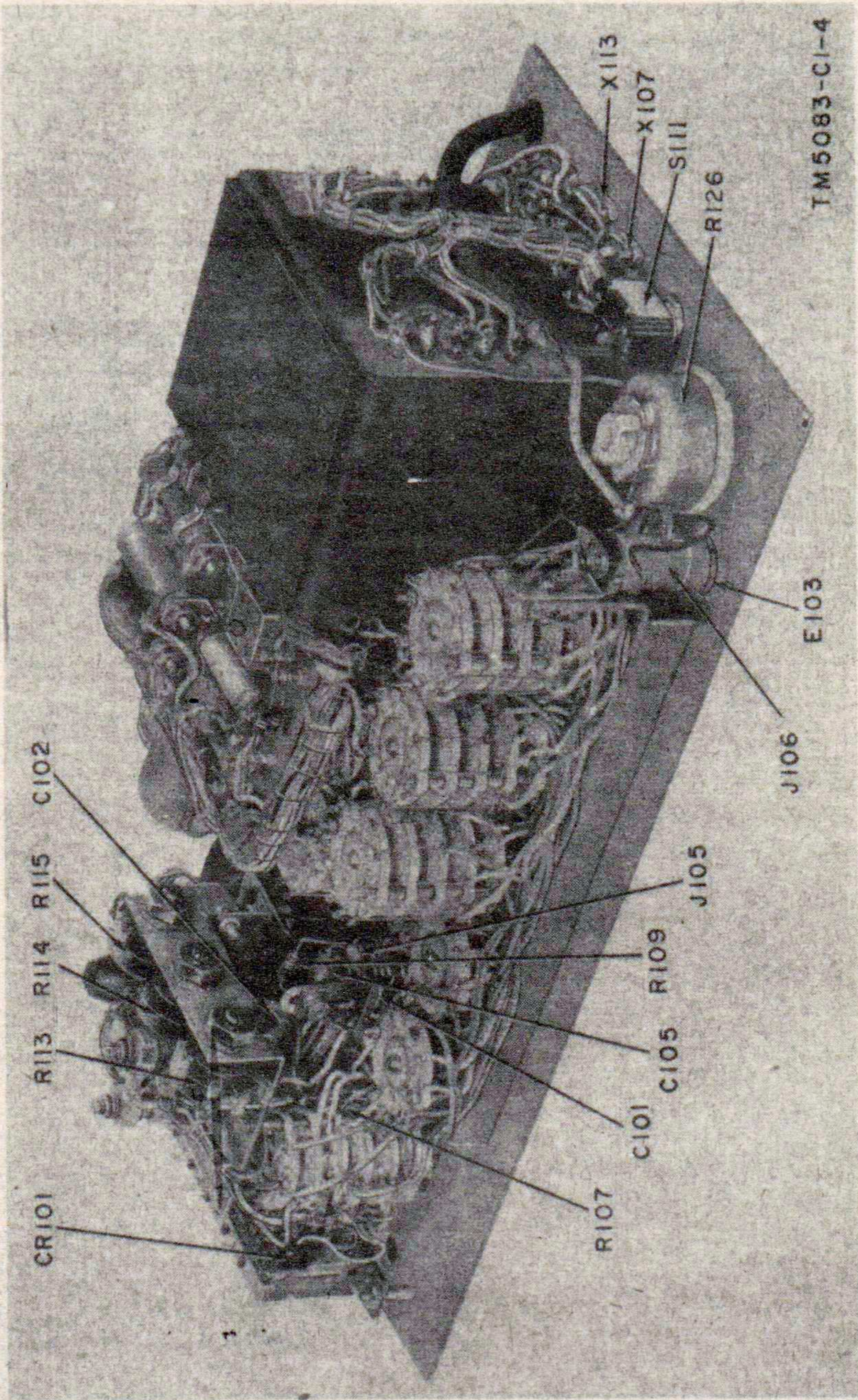




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Figure 22.2 (Added). Internal view of Electron Tube Test Set TV-7A/U (serial numbers 1201 through 9492), front left oblique.





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Figure 23.1 (Added). Internal view of Electron Tube Test Set TV-7A/U (serial numbers 1 through 1200), front right oblique.



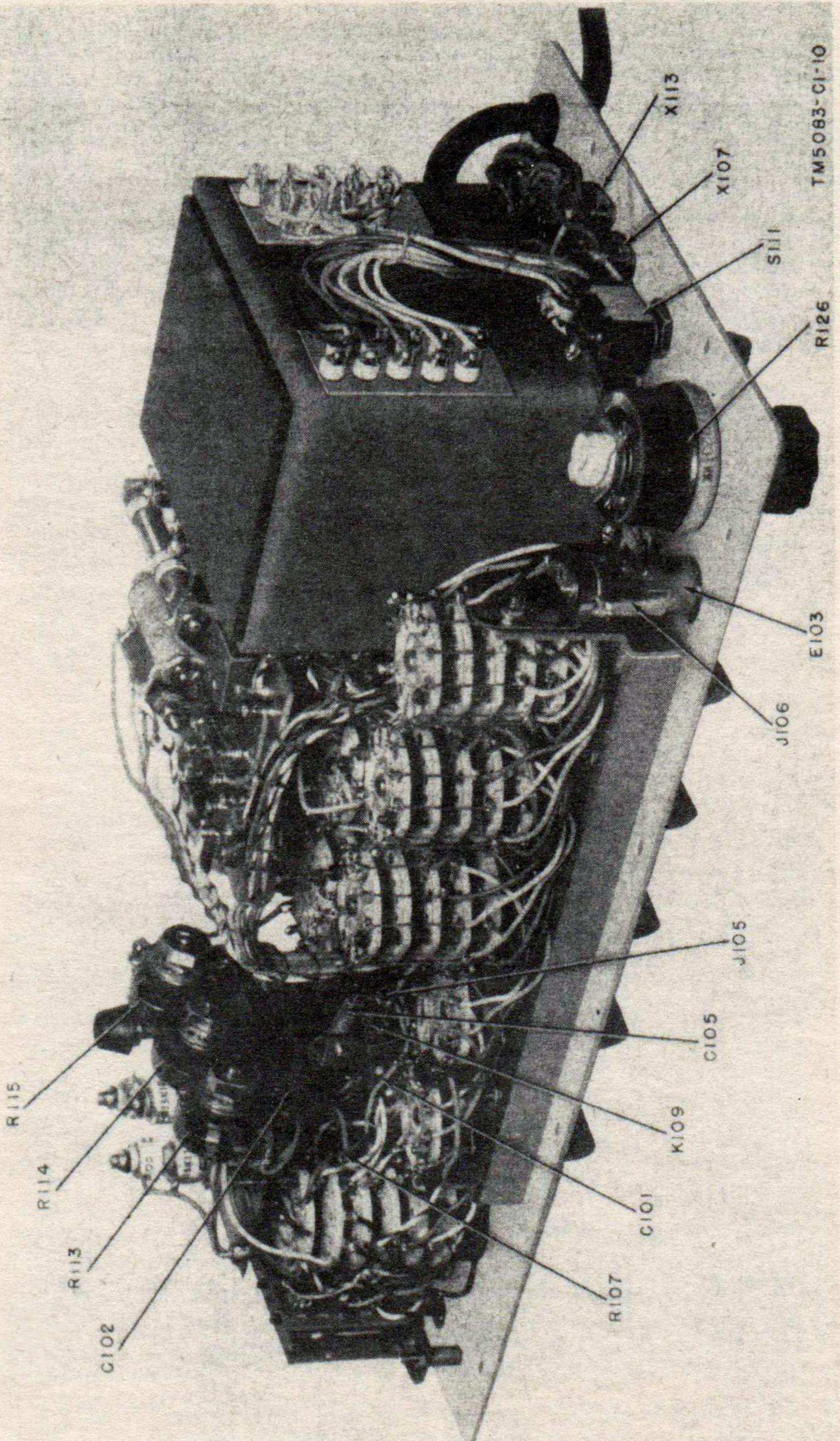
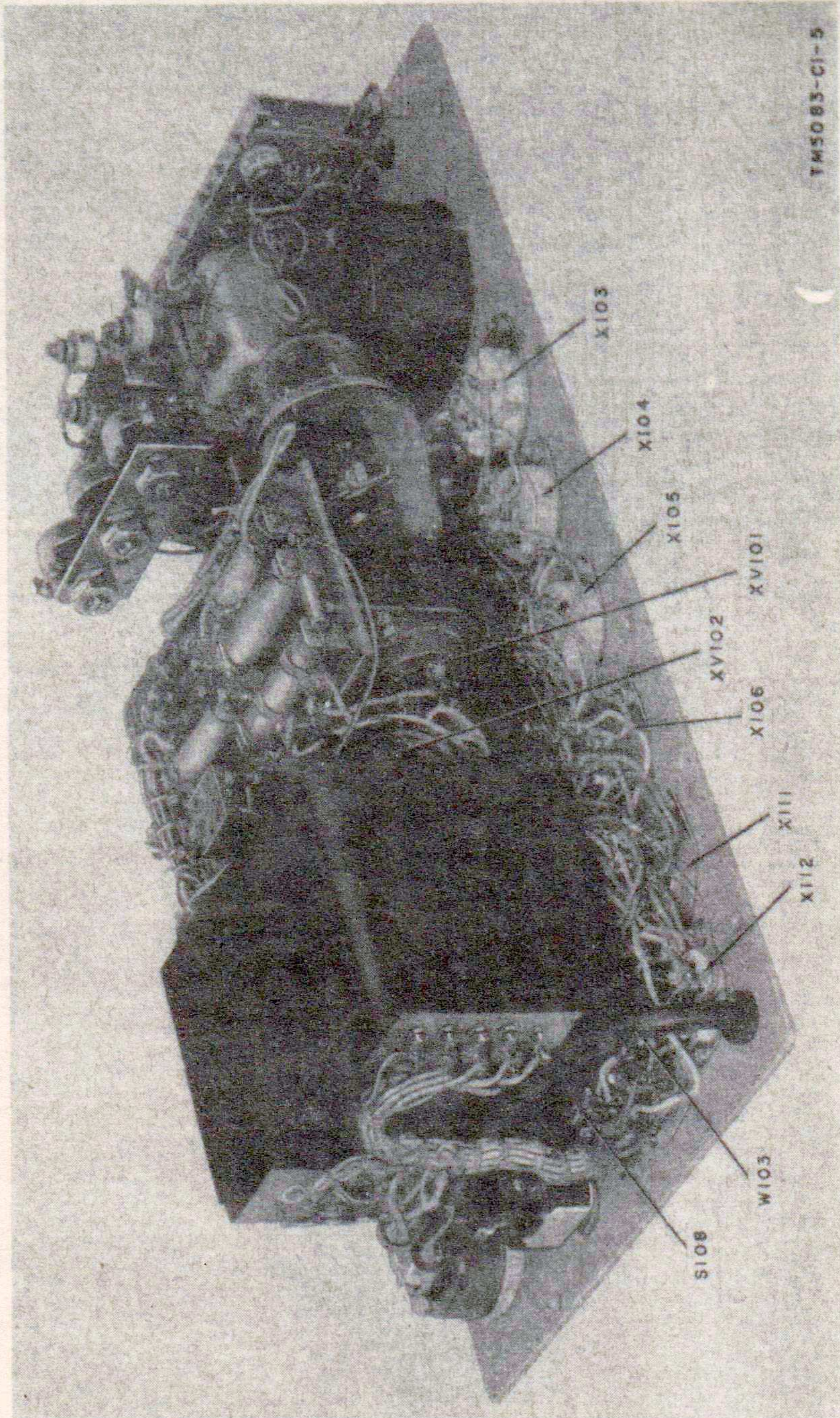


Figure 23.2 (Added). Internal view of Electron Tube Test Set TV-7A/U (serial numbers 1201 through 9492), front right oblique.



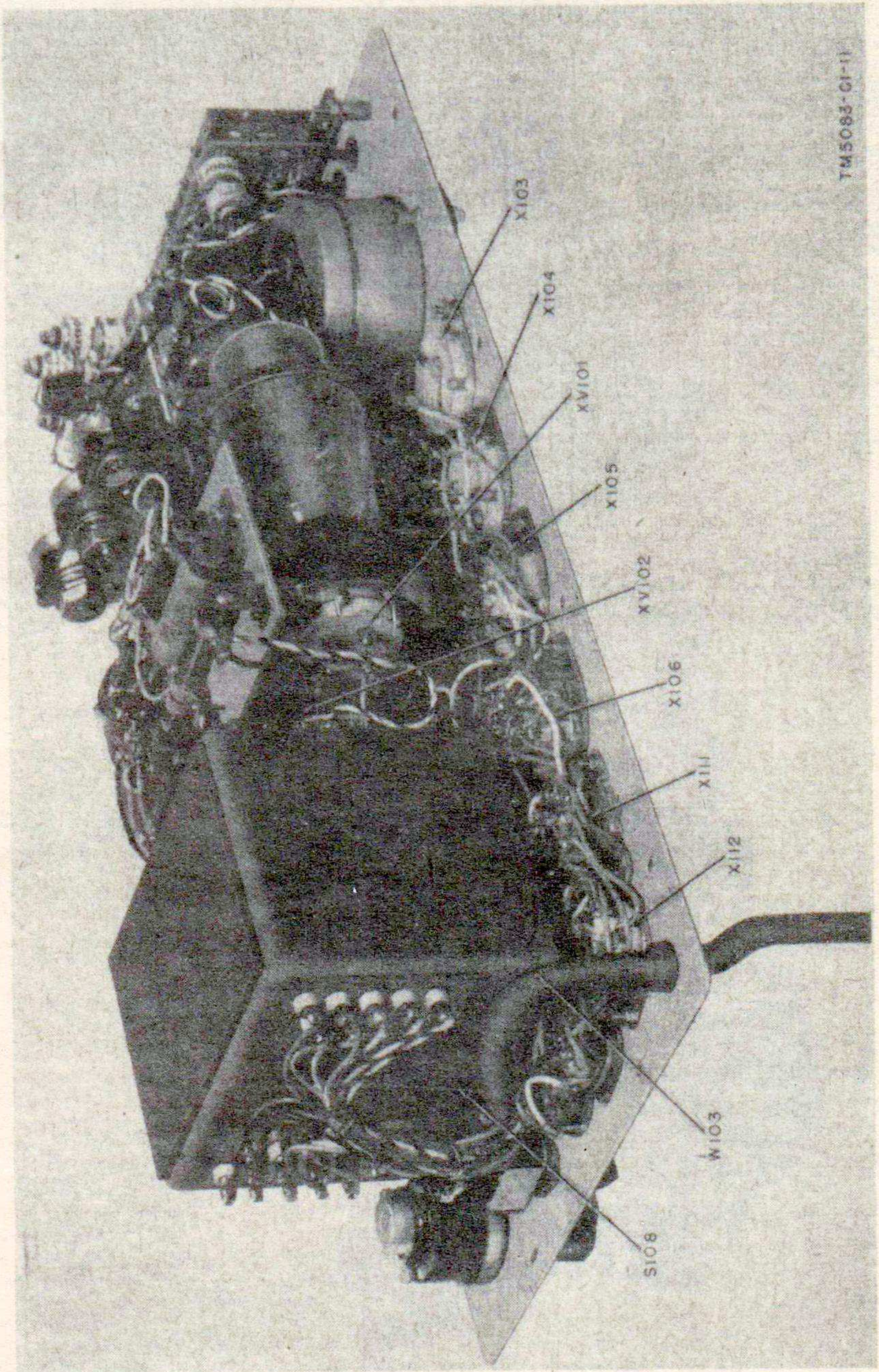
Figure 24. Internal view of Electron Tube Test Set TV-7/U, rear left oblique.



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Figure 24.1 (Added). Internal view of Electron Tube Test Set TV-7A/U (serial numbers 1 through 1200), rear left oblique.

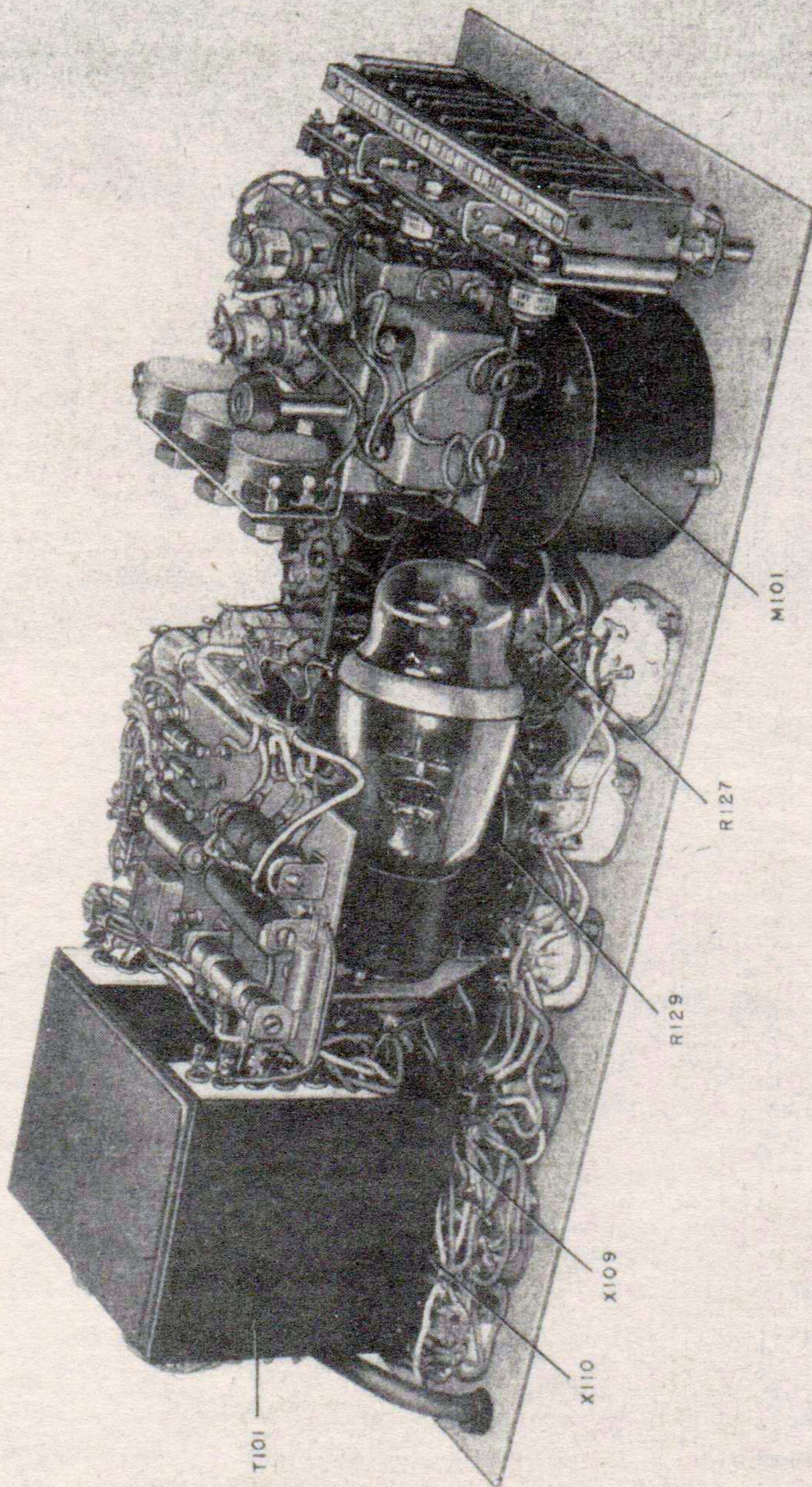




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Figure 24.2 (Added). Internal view of Electron Tube Test Set TV-7A/U (serial numbers 1201 through 9492), rear left oblique.





TM5083-CI-6

Figure 25.1 (Added). Internal view of Electron Tube Test Set TV-7A/U (serial numbers 1 through 1200), rear right oblique.



TM5083-CI-12

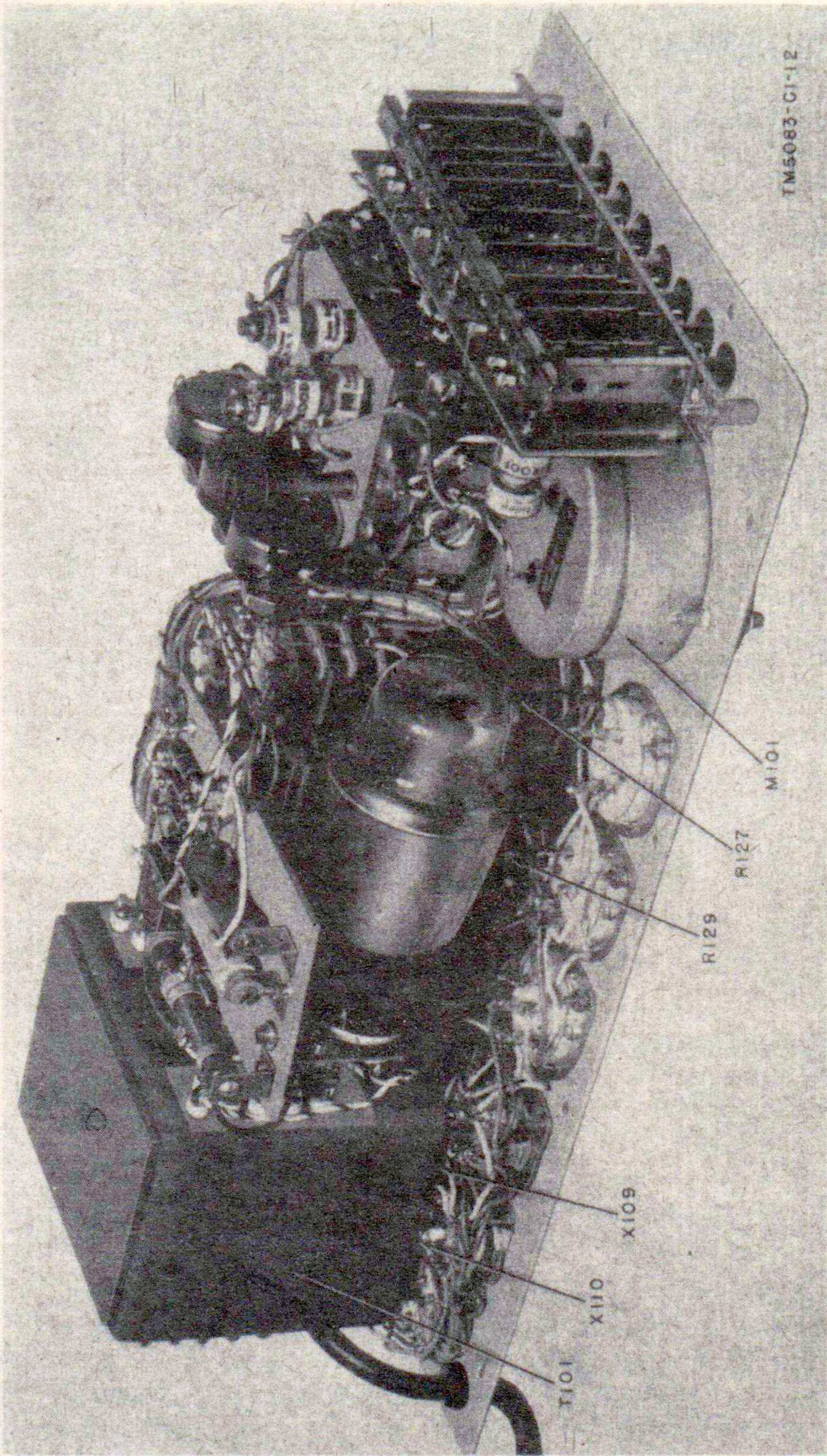


Figure 25.2 (Added). Internal view of Electron Tube Test Set TV-7A/U (serial numbers 1201 through 9492), rear right oblique.



## 58. Voltage Calibration Check

(fig. 21)

Electron Tube Test \* \* \* tests outlined below.

\* \* \* \* \*

f. Filament Voltage Table (TV 7/U Only).

\* \* \* \* \*

f.1. (Added) Filament Voltage Table (TV-7A/U Only).

Filament voltage setting	Minimum	Maximum
.6	.65	.72
1.1	1.06	1.20
1.5	1.28	1.42
2.0	1.90	2.25
2.5	2.58	2.85
3.0	3.25	3.60
4.3	4.30	4.75
5.0	5.35	5.95
6.3	6.6	7.2
7.5	7.4	8.2
10.0	9.8	11.0
12.6	12.3	13.5
20.0	19.8	22.0
25.0	26.8	28.2
35.0	36.5	39.5
50.0	51.5	57.0
75.0	74.0	82.0
117.0	112.0	121.0

\* \* \* \* \*

## 60. Calibration Procedure

a. If tapped resistor R130 (figs. 26, 26.1, or 26.2) is replaced, re-establish proper voltage distribution as follows:

\* \* \* \* \*

(2) Connect the positive (red) lead of the d-c voltmeter to pin 6 and the negative (black) lead to pin 5 of the OCTAL socket **X111**.

\* \* \* \* \*

(4) (Superseded) On the TV-7/U, or the TV-7A/U serial numbers 1 through 1200, loosen and adjust clamp A (fig. 26 or 26.1) of R130 until the voltmeter indicates 40 volts plus or minus 1 volt on the 50-volt scale. On the TV-7A/U, serial numbers 1201 through 9492, loosen and adjust clamp C (fig. 26.2) until the voltmeter indicates 40 volts plus or minus 1 volt.

\* \* \* \* \*



- (7) (Superseded) On the TV-7/U, or the TV-7A/U, serial numbers 1 through 1200, press and hold the 2-DIODE and 3-MUT. COND. buttons. Loosen and adjust clamp B (fig. 26 or 26.1) of R130 until the voltmeter indicates 56 plus or minus 1.5 volts on the 150-volt scale. On the TV-7A/U, serial numbers 1201 through 9492, press and hold the 3-MUT. COND. button. Loosen and adjust clamp A (fig. 26.2) of R130 until the voltmeter indicates 130 volts plus or minus 2 volts on the 150-volt scale.

\* \* \* \* \*

- b. If dual potentiometer \* \* \* calibration as follows:

\* \* \* \* \*

- (4) Connect **6K** resistor between contacts 3 and 6 of the OCTAL socket.

\* \* \* \* \*

- c. Calibrate the meter \* \* \* circuit as follows:

\* \* \* \* \*

- (3) If the TV-7/U meter indicates from 56 to 59, connect a 2- to 15-megohm (**1.5- to 20-megohm on the TV-7A/U**) fixed resistor across resistor R124. Use the resistor value that will return the TV-7/U meter pointer to LINE TEST position.

- (4) If the meter indicates approximately 63 or 64, connect a **10K** to **100K** fixed resistor across rectifier CR101. Use the resistor \* \* \* LINE TEST position.

\* \* \* \* \*

- d. (Added) If variable resistor R114 (figs. 23.1 or 23.2) is replaced, recalibrate range C as follows (TV-7A/U only):

- (1) Set the selector switches at HS53481 (panel settings for type 6L6 tube) and set the FILAMENT VOLTAGE switch to 6.3 volts.
- (2) Insert a 6L6 tube in the OCTAL socket.
- (3) Set the FUNCTION SWITCH to range B.
- (4) Adjust the LINE ADJUST control until the meter pointer is set to the LINE TEST mark.
- (5) With the BIAS control at any point above 50, press the 3MUT. COND. button and adjust the BIAS control until the meter indicates 120.
- (6) Set the FUNCTION SWITCH to range C.
- (7) Press and hold the 3-MUT. COND. button.
- (8) Adjust variable resistor R114 for a meter indication of  $60 \pm \frac{1}{2}$  units and tighten the shaft lock.



(9) Remove the 6L6 tube.

e. (Added) If either variable resistor R113 or R115 (figs. 23.1 or 23.2) is replaced, proceed with the calibration as follows (TV-7A/U only):

- (1) With selector switches set as outlined in paragraph 58, set the FUNCTION SWITCH to range B and the BIAS control to zero.
- (2) Adjust the LINE ADJUST control until the meter pointer is at LINE TEST.
- (3) Apply a 60-cps ac signal of 50 volts rms, in series with a 10K load resistor, between pins 3 and 6 of the OCTAL socket.
- (4) Press and hold the 3-MUT. COND. button.
- (5) If the meter pointer deflects to the left, reverse the line plug.
- (6) If the meter indicates more than 40.5 units, adjust variable resistor R113 to obtain a deflection of  $40 \pm \frac{1}{2}$  units and lock the shaft.
- (7) If the meter indication is less than 39.5 units, adjust variable resistor R115 for a deflection of  $40 \pm \frac{1}{2}$  units and lock the shaft.
- (8) Check for the following readings on the other ranges with the 3-MUT. COND. button pressed.

*Figure 28.* Capacitor C105, 2,200  $\mu\mu\text{f}$ , is added across resistor R109.

Voltage across taps 16 and 17 of transformer T101 is changed to read: **165.**

Voltage across taps 17 and 18 of transformer T101 is changed to read: **165.**

## 62. Removal from Service

\* \* \* \* \*

b. Place the adapters \* \* \* in the cover. **On the TV-7/U, slip the test leads under the coiled line cord which will hold them in place. On the TV-7A/U, insert the test leads between the pin straightener bracket and the edge of the cover (fig. 2.1).**

\* \* \* \* \*

## APPENDIX II

### IDENTIFICATION TABLE OF PARTS

Rescinded



Range

Meter deflection

C

20 ± 1

D

10 ± 1/2

E

10 ± 1/2

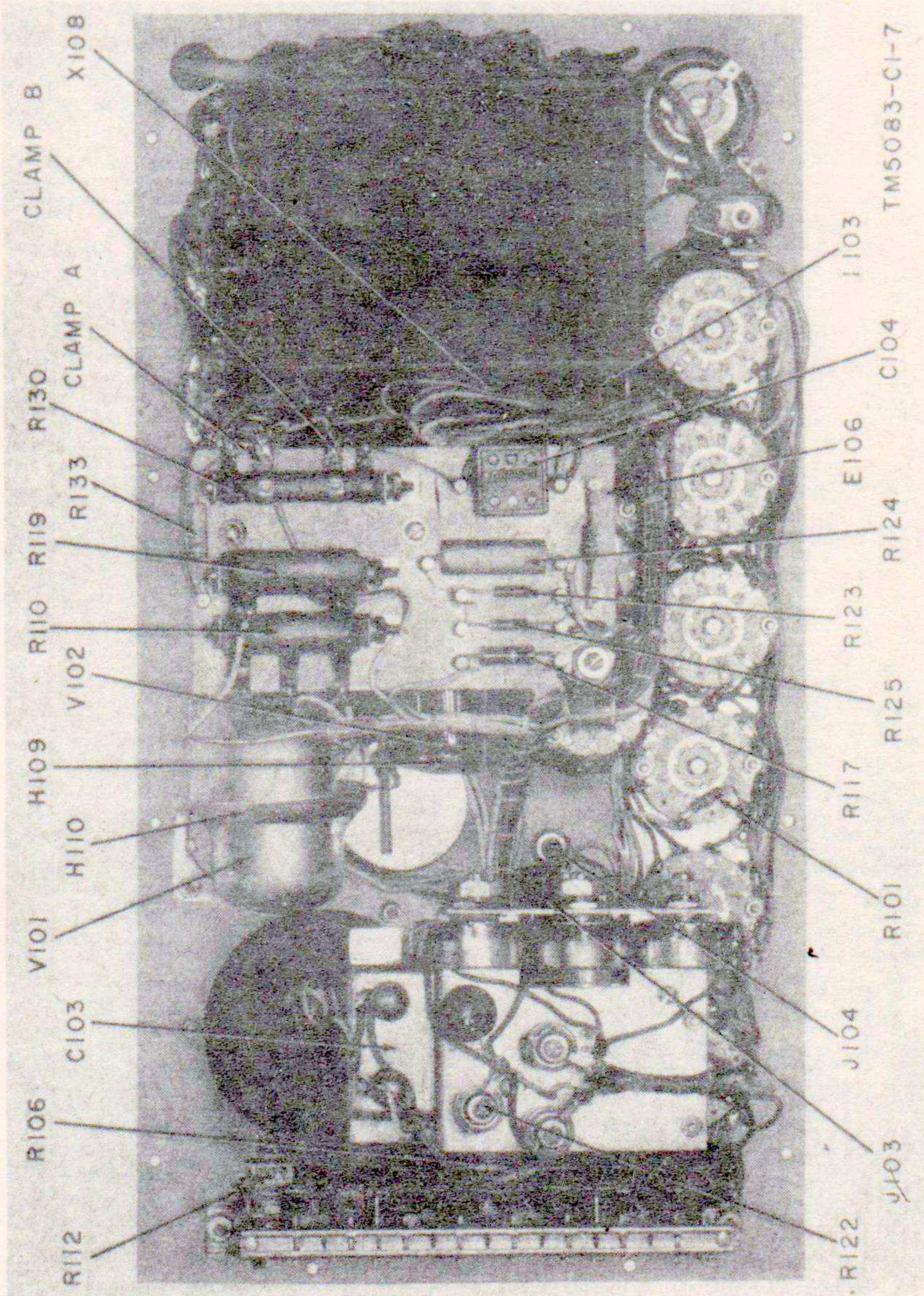


Figure 26.1 (Added). Internal view of Electron Tube Test Set TV-7A/U (serial numbers 1 through 1200), direct rear view.



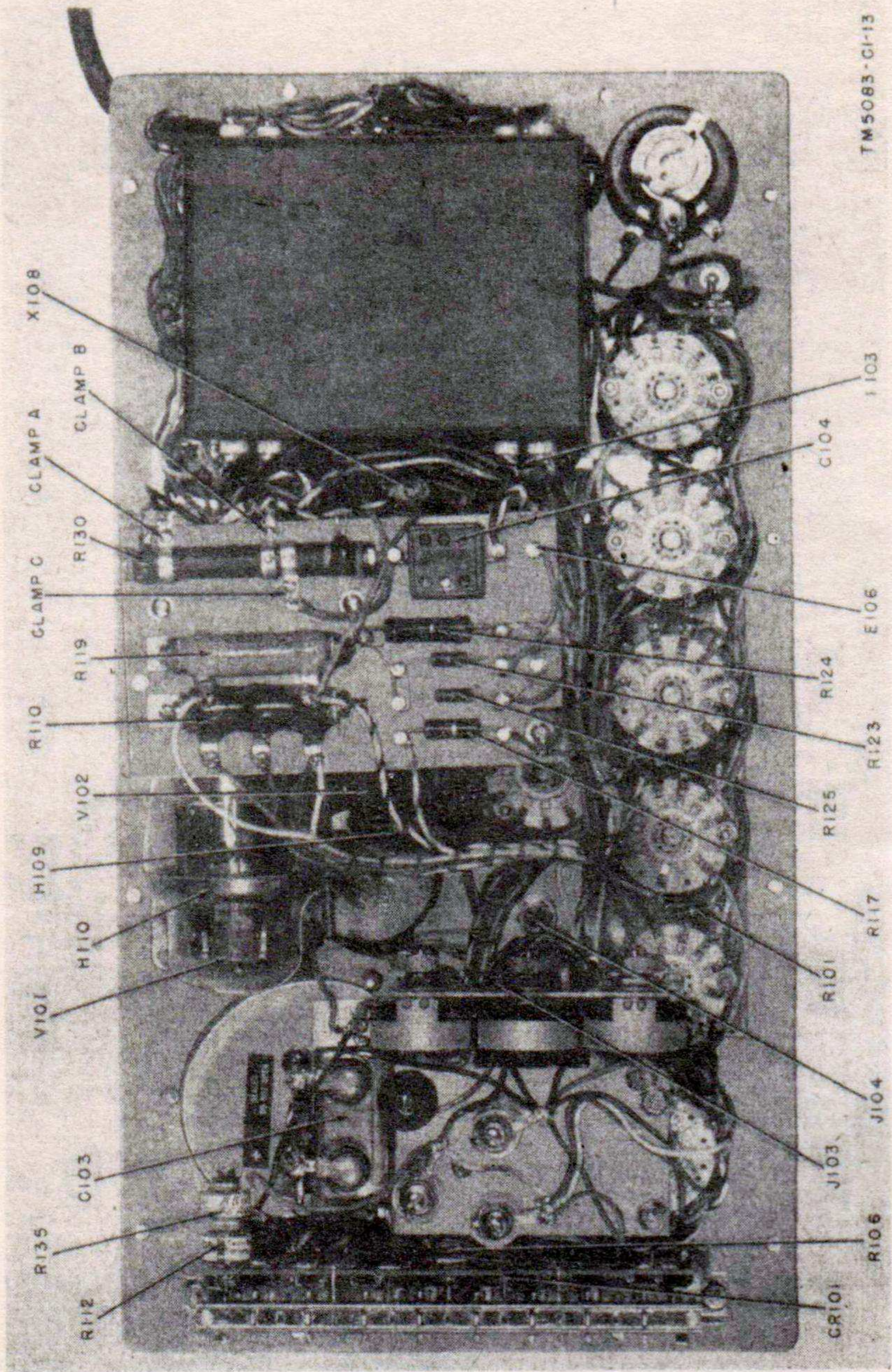
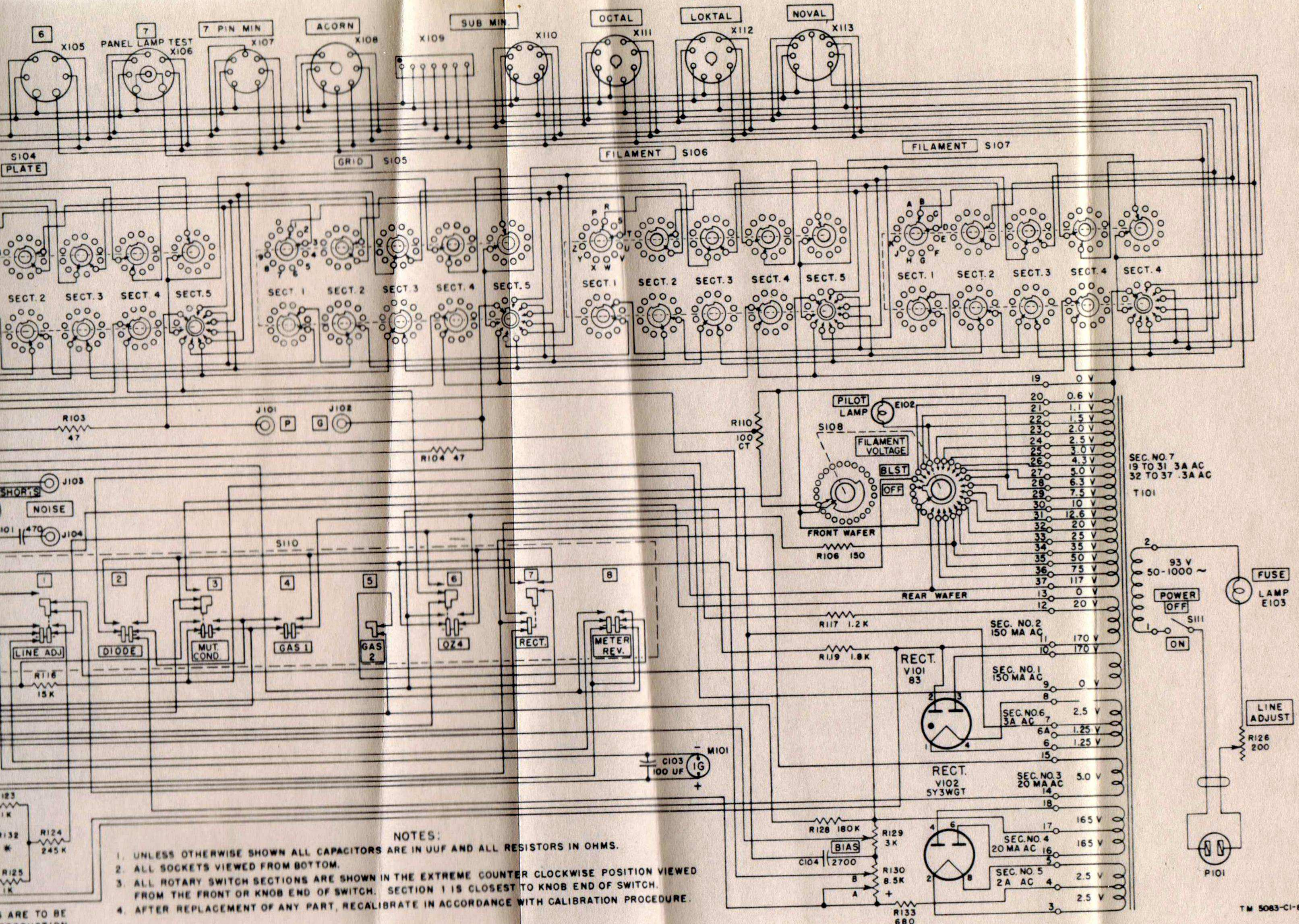


Figure 26.2 (Added). Internal view of Electron Tube Test Set TV-7A/U. (serial numbers 1201 through 9492), direct rear view.



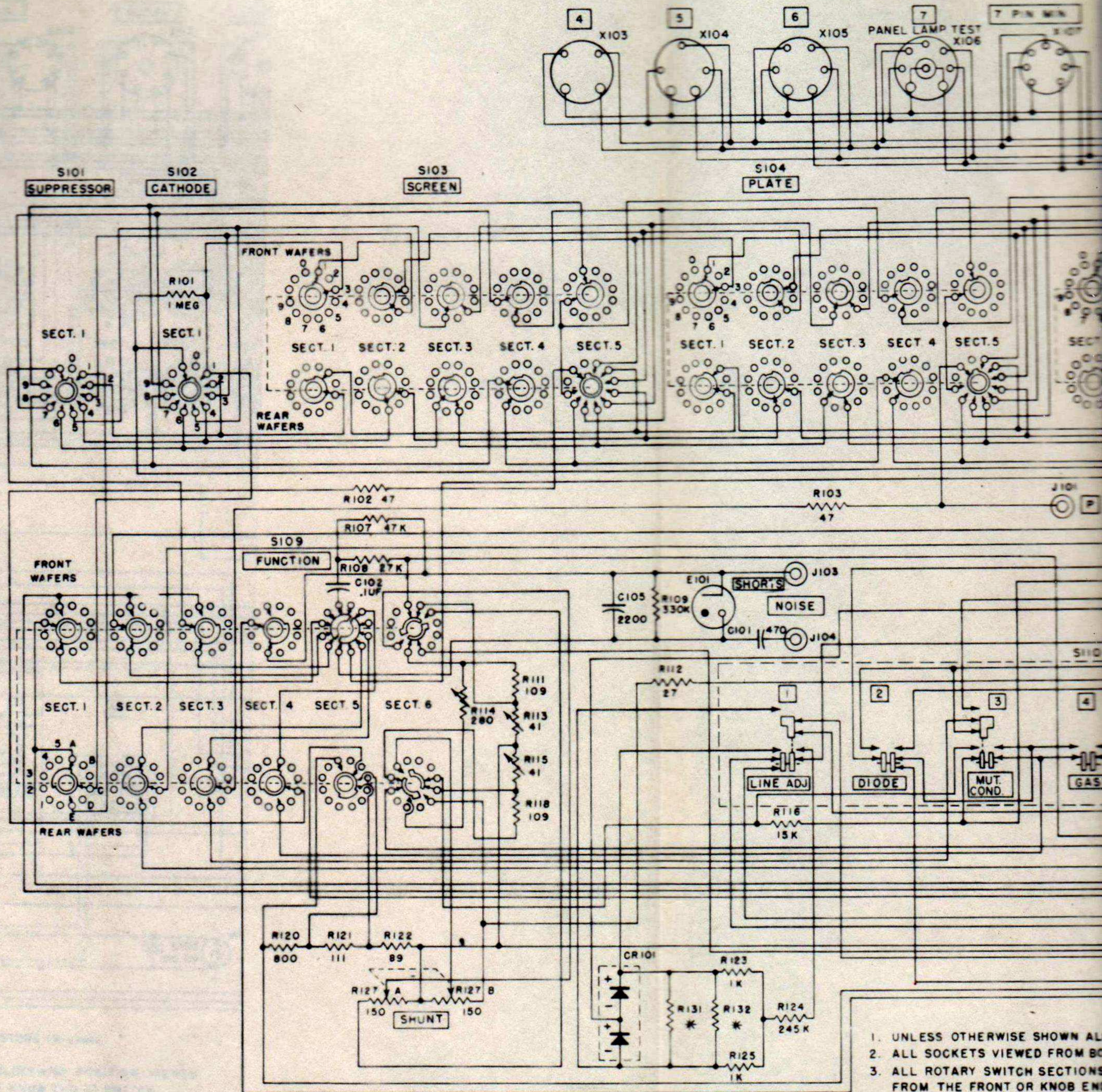


- NOTES:
1. UNLESS OTHERWISE SHOWN ALL CAPACITORS ARE IN UUF AND ALL RESISTORS IN OHMS.
  2. ALL SOCKETS VIEWED FROM BOTTOM.
  3. ALL ROTARY SWITCH SECTIONS ARE SHOWN IN THE EXTREME COUNTER CLOCKWISE POSITION VIEWED FROM THE FRONT OR KNOB END OF SWITCH. SECTION 1 IS CLOSEST TO KNOB END OF SWITCH.
  4. AFTER REPLACEMENT OF ANY PART, RECALIBRATE IN ACCORDANCE WITH CALIBRATION PROCEDURE.

Figure 281 (Added). Electron Tube Test Set TV-7A/U (serial numbers 1 through 1200), schematic diagram.

TM 5083-CI-8

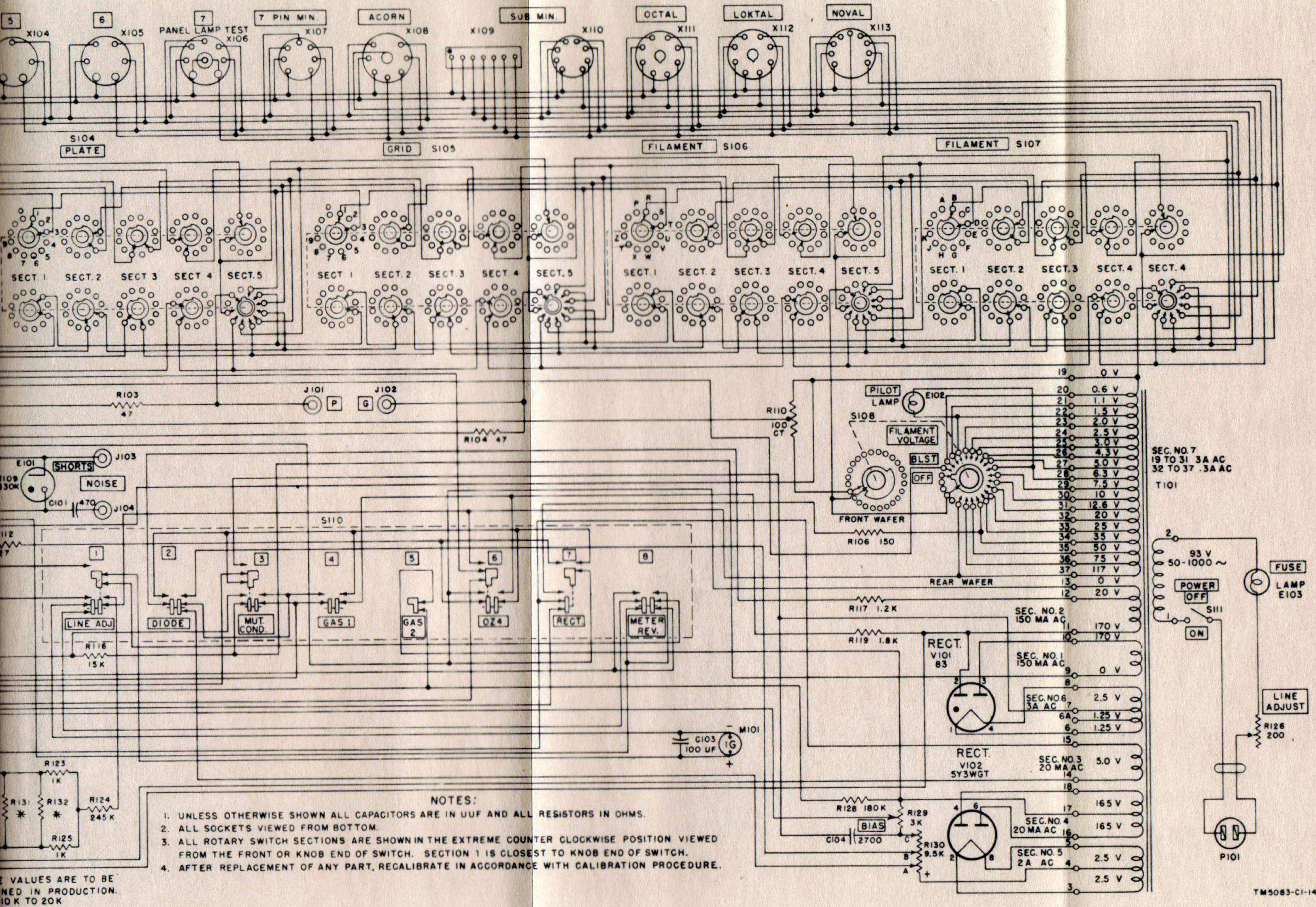




\* THESE VALUES ARE TO BE DETERMINED IN PRODUCTION. RANGE: 10 K TO 20 K

1. UNLESS OTHERWISE SHOWN ALL
2. ALL SOCKETS VIEWED FROM BO
3. ALL ROTARY SWITCH SECTIONS FROM THE FRONT OR KNOB EN
4. AFTER REPLACEMENT OF ANY





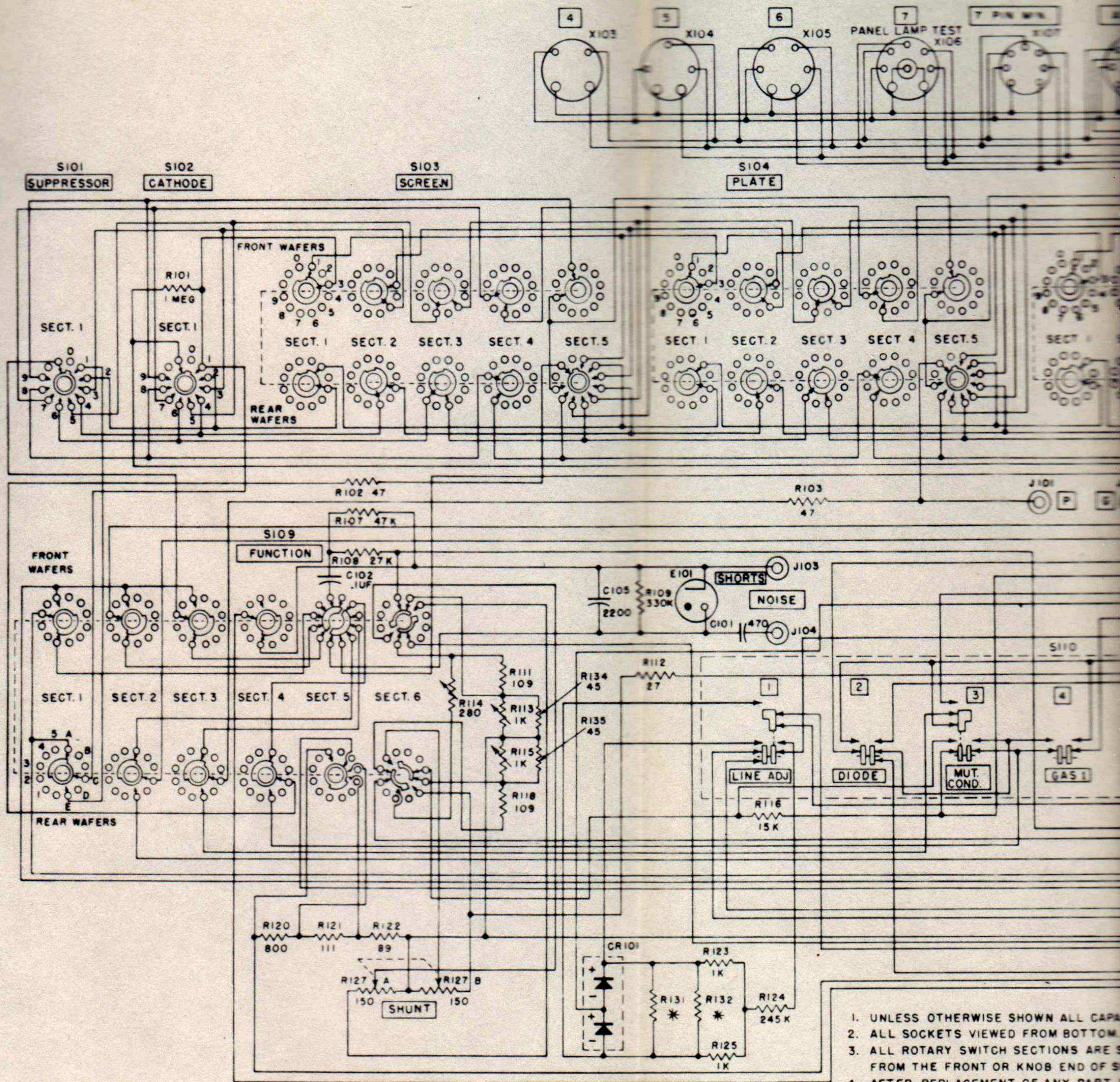
- NOTES:**
1. UNLESS OTHERWISE SHOWN ALL CAPACITORS ARE IN UUF AND ALL RESISTORS IN OHMS.
  2. ALL SOCKETS VIEWED FROM BOTTOM.
  3. ALL ROTARY SWITCH SECTIONS ARE SHOWN IN THE EXTREME COUNTER CLOCKWISE POSITION VIEWED FROM THE FRONT OR KNOB END OF SWITCH. SECTION 1 IS CLOSEST TO KNOB END OF SWITCH.
  4. AFTER REPLACEMENT OF ANY PART, RECALIBRATE IN ACCORDANCE WITH CALIBRATION PROCEDURE.

VALUES ARE TO BE  
 NED IN PRODUCTION.  
 10 K TO 20 K

TM5083-CI-14

Figure 28.2 (Added). Electron Tube Test Set TV-7A/U (serial numbers 1201 through 9492), schematic diagram.





\* THESE VALUES ARE TO BE DETERMINED IN PRODUCTION. RANGE: 10 K TO 20K

1. UNLESS OTHERWISE SHOWN ALL CAPS
2. ALL SOCKETS VIEWED FROM BOTTOM.
3. ALL ROTARY SWITCH SECTIONS ARE SEEN FROM THE FRONT OR KNOB END OF SECTION.
4. AFTER REPLACEMENT OF ANY PART,