

MERCURY
MODEL 990
TUBE TESTER

INSTRUCTIONS & TUBE DATA



Model 990

INSTRUCTION MANUAL

and

TUBE DATA CHART



315 Roslyn Road, Mineola, N.Y. 11501

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Chart 990 – 69730A

Tube Data Division

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INTRODUCTION

The Model 990 tube tester is one of the few compact tube testers which include all full sized tube test facilities in a miniature sized package.

The basic test is the industry-approved Dynamic Cathode Emission, supplemented by a sensitive leakage-shorts check. Your Model 990 features the special, unique, open-circuit slide-switch Meter Selection System which frees any and all multiple element terminations. Your Model 990 is therefore, one of the few truly obsolescence-proof tube testers now available in the economy price class!

The Cathode Emission test circuit uses pre-selected loads and voltages and subjects multi-section tubes to individual tests where one overall test would not reveal a questionable condition in one section.

FUNCTION OF PANEL COMPONENTS

1. SOCKETS: The eight panel sockets include all the up-to-date sockets required for modern up to date testing. Note that although the Magnoval and Novar sockets are identical in configuration the larger pin diameter of the Magnoval tube as compared to the Novar tube require separate sockets for both types in the interest of long socket life.

2. METER: The 3-1/2" wide vision meter incorporates a separate 3 color arc for diode testing. The 0-100 linear scale is included for direct comparison readings between the same-type tubes.

SWITCHES X - Y - Z

3. SWITCH X: 12 position FILAMENT SELECTOR picks out one filament termination and feeds it on to the "FIL VOLTS" switch. It also shorts all unselected terminations to circuit ground.

SWITCH Y: 9 position "FILAMENT VOLTS". Switch selects the pre-determined filament voltage for all tubes.

SWITCH Z: 8 position combination Meter Sensitivity switch and series load/voltage selector.

"TEST-SHORTS" Spring-return slide switch. When this switch is pushed to the "TEST" position it switches the anode or cathode (which has been pre-set by one or more of the white push button switches) in to the metering circuit for the Cathode Emission Test. When it is left in the "Shorts" position it connects the preset element to the neon shorts/leakage-indicating circuit.

4. **TWELVE WHITE 3- POSITION SLIDE SWITCHES:** Each of these numbered white slide switches controls the corresponding numbered contact on all sockets. For example, Slide Switch No. 2 connects to contact No. 2 of the Compactron Socket, the Octal Socket and all other sockets.

- When the switches are in the "NORM" position, each element is connected on to the "FIL SELECTOR" Switch.

- When a switch (or switches) is thrown to the "OPEN" position the corresponding tube element is open-circuited.

- When the switch (or switches) is thrown to the "TEST" row the corresponding tube element is thrown into either the "SHORTS" indicating circuit or into the Cathode emission measuring circuit (dependent upon the position of the "TEST-SHORTS" slide button at the lower right of the panel).

5. **GRID CAP LEAD:** Connects internally to numbered circuit 11.

6. **SHORTS-LEAKAGE NEON LAMP.** Faint or bright neon glow indicates a short or leakage up to approximately 1 megohm between the element thrown by the white lever button up to the "TEST" position and all other elements.

TEST PROCEDURE

FIRST.... Make sure that all 12 white slide buttons are down in the "NORM" (normal) position!

THEN... BEFORE plugging the tube into the appropriate socket....

1. Look up the tube type in the data section of this book and set switches "X", "Y", "Z" to the positions listed in the data.

2. Set the white slide button or buttons to the "TEST" row as indicated under the heading "TEST" in the data.

3. If there are buttons listed under the "OPEN" in the data, then set those buttons to the "OPEN" position (middle setting of the white slide buttons).

THEN, AND ONLY THEN.... plug the tube into the appropriate socket in the panel. If the tube has an overhead cap, then attach the grid cap connector to the cap.

Note that the "Magneval" socket and the "Novar" socket look identical. The contact clips, however, are different and a Magneval Tube should never be plugged into the Novar socket. For this reason, all Magneval tubes are indicated as "Mag" next to the tube on the data.

On the other hand no harm is done if a Novar tube is plugged into a Magneval socket, with the exception that the connections may be a bit loose due to the different sizing between the Novar tube pins and Magneval socket clips. Novar tubes, therefore, really should be plugged into the Novar socket.

1. The tube is now automatically set up to reveal cathode shorts. After the tube has heated (usually several seconds) the tube should be lightly tapped with the finger while watching the "Shorts/Leakage" neon lamp for a glow. The tapping will usually show up intermittent short conditions. A short indication will show a cathode-to-grid shorts/leakage or a cathode-to-filament short/leakage. These leakage paths are usually the most troublesome leakage paths in the actual used circuit.

If shorts or leakage are indicated, the tube should be discarded without further testing.

2. If no shorts are indicated, press the "TEST" slide switch at the lower right of the panel and read the meter.

If the tube is a Diode or Rectifier, the data will indicate that the meter is to be read on the "DIODES" arc instead of the main arc.

3. If more than one listing appears in the data for a particular tube, this means that the tube is a multi-section and, therefore, more than one test is to be performed just as though you were testing two or more separate tubes.

4. The test is now complete. Remove the tube and rotate "Y" back to "PWR. OFF". Snap the white slide button, or buttons, back to "NORM" position, ready for the next tube to be tested.

SHORTS/LEAKAGE NOTES

As noted previously, the shorts test reveals shorts or leakage between Cathode (when the tube being tested is cathode-type) and grid, as well as Cathode and Filament. Practically all shorts/leakage trouble relates to these elements.

However, if the operator wishes to examine a tube in further detail he may proceed as follows:

Any white button which is thrown to the "TEST" row automatically connects its corresponding numbered tube element into the neon-indicating shorts-test circuit.

This element is then being short/leakage tested against any and all other elements.

For example: if, in a triode, the plate element is No. 4. . . . then the white button No. 4 would be thrown to "TEST" position and the neon lamp would automatically reveal shorts/leakage between plate and all other elements.

"INTERNAL CONNECTION" NOTE

Many tubes have unused pins which can be used by the tube manufacturer as internal structural support and may, therefore, be internally connected to any tube element. Such pins are usually indicated in the Receiving Tube Manuals as "IC", meaning "Internal Connection".

In the 990 the test problems introduced by these "IC's" are eliminated by throwing the white buttons corresponding to these "IC's" to the "OPEN" position, thereby eliminating cross-connections.

SEE REAR OF BOOK FOR PARTS LIST AND SCHEMATIC.

TUBE	X	Y	Z	TEST	OPEN
1A3●	7	B	3	2	5-6
1A5	7	B	1	5	-
1A7	7	B	2	5	-
1AB6	7	B	2	4	-
1AC6	7	B	2	4	-
1AD2●	1	C	6	4	*
*OPEN-2-3-5-6-7-8-9-10-11					
Connect wire from cap to pin 4 of octal socket.					
1AE4	7	B	2	6	5
1AF4	7	B	2	6	5
1AF5	7	B	2	6	3
1AF5●	7	B	4	3	6
1AH5	7	B	2	6	-
1AH5●	7	B	4	3	-
1AJ4	7	B	2	6	5
1AM4	7	B	2	6	5
1AN5	7	B	2	6	-
1AQ5	7	B	2	4	5
1AS5	7	B	2	6	-
1AS5●	7	B	4	4	-
1AU2●	5	B	6	1	*
*OPEN-2-3-6-7-8-9					
1AU3●	7	B	6	11	*
*OPEN-1-3-5-8					
1AX2●	5	B	8	11	2-8
1AY2●	5	B	6	11	-
Insert leads into pins 5&9 of 9 pin min. socket.					
1B3●	7	B	6	11	*
*OPEN-1-3-5-8					
1B7	7	B	2	5	-
1B8	7	B	1	11	-
1B8	7	B	1	5	-
1B8●	7	B	4	8	-

● = Read on Diode Scale

TUBE	X	Y	Z	TEST	OPEN
1BC2●	5	B	7	11	*
*OPEN-2-3-4-6-7-8-9					
1BG2●	5	B	6	11	-
Insert lead into pins 4&5 of 9 pin. min. socket. Top cap to top lead.					
1C1	7	B	2	4	5
1C2	7	B	2	4	-
1C3	7	B	2	4	2
1C5	7	B	1	5	-
1C7	7	B	2	5	-
1D5	7	B	2	11	-
1D7	7	B	2	5	-
1D8	7	B	2	11	-
1D8	7	B	2	5	-
1D8●	7	B	2	8	-
1D13●	7	B	3	3	-
1DN5	7	B	2	6	5
1DN5●	7	B	4	4	-
1E3	5	B	1	1	-
1E4	7	B	2	5	-
1E5	7	B	1	11	-
1E7	7	B	1	4	1
1E7	7	B	1	5	1
1F1	4	B	2	6	5
1F2	7	B	2	6	5
1F3	7	B	2	6	5
1F5	7	B	2	5	-
1F7	7	B	2	11	-
1F7●	7	B	4	4	-
1F7●	7	B	4	5	-
1FD1	7	B	2	6	-
1FD1●	7	B	3	3	-
1FD9	7	B	2	6	-
1FD9●	7	B	3	3	-

● = Read on Diode Scale

TUBE	X	Y	Z	TEST	OPEN	2 TUBE	X	Y	Z	TEST	OPEN
1G3●	7	B	6	11	*	1P5	7	B	2	11	-
	*OPEN-1-3-5-8					1P10	7	C	2	3	2-5-6
1G4	7	B	1	5	-	1P11	7	C	1	6	5
1G5	7	B	1	5	-	1Q5	7	B	1	5	-
1G6	7	B	1	4	-	1R5	7	B	2	4	5
1G6	7	B	1	5	-						
1G8	7	B	1	4	-	1S2●	5	B	6	11	2-8
1GC5	5	B	1	7	-	1S4	7	B	2	3	5
						1S5	7	B	2	6	-
1H2●	5	B	6	11	2-9	1S5●	7	B	3	3	-
1H4	7	B	2	5	-	1SA6	7	B	2	4	-
1H5	7	B	2	11	-	1SB6	7	B	2	8	5
1H5●	7	B	4	5	-	1SB6●	7	B	4	5	8
1H6	7	B	1	6	-	1T4	7	B	2	6	5
1H6●	7	B	4	4	-	1T5	7	B	2	5	-
1H6●	7	B	4	5	-	1U4	7	B	2	6	5
						1U5	7	B	2	6	-
1J3●	7	B	8	11	*	1U5●	7	B	4	4	-
	*OPEN-1-3-5-8					1U6	7	B	2	4	-
1J5	7	B	1	5	-						
1J6	7	B	3	4	-	1V2●	5	B	6	1	*
1J6	7	B	3	5	-		*OPEN-2-3-6-7-8-9				
1K3●	7	B	8	11	*	1X2●	5	B	6	11	2-8
	*OPEN-1-3-5-8										
1L4	7	B	2	6	5	1Z2●	7	B	6	11	2-5
1L6	7	B	3	4	-	2A4	7	C	2	5	-
						2AF4	4	C	1	5	-
1N2●	7	B	5	11	*	2AH2●	1	B	7	4	*
	*OPEN-1-3-5-8						*OPEN-2-3-5-6-7-8-9-10-11				
1N5	7	B	2	11	-		Connect wire from cap to pin 4 of octal socket.				
1N6	7	B	2	5	-	2AS2●	12	C	6	11	3-5-8
1N6●	7	B	4	6	-	2AV2●	5	B	6	1	*
							*OPEN-2-3-6-7-8-9				
1P1	7	C	1	6	-						

● = Read on Diode Scale

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TUBE	X	Y	Z	TEST	OPEN	TUBE	X	Y	Z	TEST	OPEN
2AZ2●	5	B	6	11	2-8	2GU5	4	C	1	2	7
2B3●	7	C	6	11	1-8	2GW5	4	C	1	5	-
2BA2●	5	B	6	1	*	2GZ5	4	C	1	1	5
	*OPEN-2-3-6-7-8-9					2HA5	4	C	1	2	7
2BJ2●	5	B	6	11	*	2HK5	4	C	1	2	7
	*OPEN-2-3-7-8					2HM5	4	C	1	2	7
2BN4	4	C	1	1	6	2HQ5	4	C	1	2	7
2CN3●	7	B	6	11	3-5	2HR8	5	C	1	3	7
2CW4	12	C	1	8	-	2T4	4	C	1	5	-
2CY5	4	C	1	2	7	2V2●	7	C	6	11	5-6-8
2D21	4	E	1	2	-	2V3●	7	B	6	11	-
2DF4	5	C	2	8	2-7-9	2W3●	8	C	1	4	-
2DS4	12	C	1	8	-	3A2●	5	C	4	11	2-8
2DZ4	4	C	1	5	-	3A3●	7	C	6	11	*
2E24	4	E	1	5	1-4-6	*OPEN-1-3-5-8					
2E26	2	E	1	1	4-6	3A4	7	C	2	4	5
2EA5	4	C	1	2	7	3A5	7	C	1	5	4
2EG4	12	B	1	8	-	3A5	7	C	1	3	4
2EN5●	4	C	1	2	-	3A8	7	C	1	5	1
2EN5●	4	C	1	7	-	3A8	7	C	1	11	1
2ER5	4	C	1	1	7	3A8●	7	C	3	8	1
2ES5	4	C	1	1	7	3AF4	4	C	1	5	-
2EV5	4	C	1	2	7	3AJ8	5	C	1	2	-
2EZ4	7	E	1	5	-	3AJ8	5	C	1	9	-
2FH5	4	C	1	1	7	3AL5●	4	C	1	5	-
2FQ5	4	C	1	1	7	3AL5●	4	C	1	1	-
2FS5	4	C	1	2	7	3AT2●	12	C	6	11	3-8-9
2FV6	4	C	1	7	-	3AU6	4	C	1	7	-
2FY5	4	C	1	1	7	3AV6	4	C	1	2	-
2GK5	4	C	1	1	7	3AV6●	4	C	3	6	-
						3AV6●	4	C	3	5	-

● = Read on Diode Scale

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TUBE	X	Y	Z	TEST	OPEN
3AW2●	12	C	6	11	3-8
3AW3●	7	C	6	11	*
*OPEN-1-3-5-8					
3B2●	7	C	7	11	*
*OPEN-1-3-5-6-8					
3BA6	4	C	1	7	-
3BC5	4	C	1	7	2
3BE6	4	C	1	2	-
3BH2● mag	5	C	6	11	1-9
3BL2●	12	C	6	11	2-6
3BM2●	12	C	5	11	2-6
3BN2●	12	C	6	11	3-8-9
3BN4	4	C	1	1	6
3BN6	4	C	6	1	-
3BS2●	12	C	6	11	3-5-8
3BU6	4	C	1	1	-
3BU6●	4	C	3	5	-
3BU6●	4	C	3	6	-
3BU8	5	C	1	1	-
3BX6	5	C	1	1	3
3BY6	4	C	1	2	-
3BY7	5	C	1	3	1
3BZ6	4	C	1	2	-
3C2●	7	C	7	11	5-6-8
3C4	7	C	1	2	5
3C5	7	C	2	6	8
3CA3●	7	C	7	11	-
3CB6	4	C	1	2	-
3CE5	4	C	1	2	7
3CF6	4	C	1	2	-
3CN3●	7	C	6	11	*
*OPEN-1-3-4-5-6-8					
3CS6	4	C	1	2	-

● = Read on Diode Scale

TUBE	X	Y	Z	TEST	OPEN
3CU3●	7	C	5	11	1-3-5-8
3CY5	4	C	1	2	7
3D21	7	F	1	8	-
3DG4●	3	C	1	5	2
3DG4●	3	C	1	7	2
3DK6	4	C	1	2	-
3DT6	4	C	1	2	-
3DZ4	4	C	1	5	-
3DZ11	5	C	1	1	-
3E5	7	C	2	6	5
3EA5	4	C	1	2	7
3EH7	5	C	1	1	3
3EJ7	5	C	1	1	3
3EM7	8	C	1	3	-
3EM7	8	C	1	6	-
3ER5	4	C	1	1	7
3ES5	4	C	1	1	7
3EV5	4	C	1	2	7
3FH5	4	C	1	1	7
3FQ5	4	C	1	1	7
3FS5	4	C	1	2	7
3FY5	4	C	1	1	7
3GK5	4	C	1	1	7
3GS8	5	C	1	1	-
3GU5	4	C	1	2	7
3GW5	4	C	1	5	-
3GZ5	4	C	1	1	5
3HA5	4	C	1	2	7
3HF5	12	C	1	4	*
*OPEN-6-8-9-10-11					

● = Read on Diode Scale

						5						
TUBE	X	Y	Z	TEST	OPEN		TUBE	X	Y	Z	TEST	OPEN
3HG8	5	C	1	1	3		4BC8	5	D	1	3	-
3HK5	4	C	1	2	7		4BC8	5	D	1	8	-
3HM5	4	C	1	2	7		4BE6	4	D	1	2	-
3HM6	5	C	1	2	-		4BK7	5	D	1	3	-
3HQ5	4	C	1	2	7		4BK7	5	D	1	8	-
3HS8	5	C	1	1	-		4BL8	5	D	1	7	-
3HT6	5	C	1	2	-		4BL8	5	D	1	8	-
							4BN4	4	D	1	1	6
3JC6	5	C	1	2	-		4BN6	4	D	6	1	-
3JD6	5	C	1	2	-		4BQ7	5	D	1	3	-
							4BQ7	5	D	1	8	-
3KF8	5	C	1	1	-		4BS8	5	D	1	3	-
3KT6	5	C	1	2	-		4BS8	5	D	1	8	-
							4BU8	5	D	1	1	-
3M-P26	4	C	1	2	-		4BX8	5	D	1	3	-
							4BX8	5	D	1	8	-
3Q4	7	C	1	3	5		4BY6	4	D	1	2	-
3Q5	7	C	1	5	8		4BZ6	4	D	1	2	-
							4BZ7	5	D	1	3	-
3S4	7	C	2	3	5		4BZ7	5	D	1	8	-
							4BZ8	5	D	1	3	-
3V4	7	C	1	6	5		4BZ8	5	D	1	8	-
3W4	7	C	1	3	5		4CB6	4	D	1	2	-
							4CE5	4	D	1	2	7
4A6	7	D	2	4	8		4CM4	5	D	1	3	7
4A6	7	D	2	5	8		4CM6	5	D	1	7	6
4AB8	5	D	1	2	-		4CS6	4	D	1	2	-
4AB8	5	D	1	9	-		4CX7	5	D	1	3	9
4AU6	4	D	1	7	-		4CX7	5	D	1	8	9
4AV6	4	D	1	1	-		4CY5	4	D	1	2	7
4AV6●	4	D	3	5	-							
4AV6●	4	D	3	6	-		4DE6	4	D	1	2	-
							4DK6	4	D	1	2	-
4BA6	4	D	1	7	-		4DL4	5	D	1	2	3-6-
4BC5	4	D	1	2	7							

● = Read on Diode Scale

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						6						
TUBE	X	Y	Z	TEST	OPEN		TUBE	X	Y	Z	TEST	OPEN
4DT6	4	D	1	2	-		4HT6	5	D	1	2	-
4EH7	5	D	1	1	3							
4EJ7	5	D	1	1	3		4JC6	5	D	1	2	-
4ER5	4	D	1	1	7		4JD6	5	D	1	2	-
4ES8	5	D	1	3	-		4JH6	4	D	1	2	-
4ES8	5	D	1	8	-		4JK6	4	D	1	2	-
4EW6	4	D	1	2	-		4JL6	4	D	1	2	-
							4JN8	5	D	1	3	-
4FY5	4	D	1	1	7		4JN8	5	D	1	8	-
4GJ7	5	D	1	9	-		4KE8	5	D	1	7	-
4GJ7	5	D	1	2	-		4KE8	5	D	1	8	-
4GK5	4	D	1	1	-		4KF8	5	D	1	1	-
4GM6	4	D	1	2	-		4KN8	5	D	1	3	-
4GS7	5	D	1	1	-		4KN8	5	D	1	8	-
4GS7	5	D	1	9	-		4KT6	5	D	1	2	-
4GS8	5	D	1	1	-							
4GW5	4	D	1	5	-		4LJ8	5	D	1	1	-
4GX6	4	D	1	2	-		4LJ8	5	D	1	9	-
4GX7	5	D	1	9	-							
4GX7	5	D	1	2	-		4M-P12	4	D	1	2	-
4GZ5	4	D	1	1	-		4M-P26	4	D	1	2	-
4HA5	4	D	1	2	7							
4HA7	12	D	1	4	5		4R-HH2	5	D	1	3	-
4HA7	12	D	1	3	5		4R-HH2	5	D	1	8	-
4HC7	12	D	1	3	-		4R-HH8	5	D	1	3	-
4HC7	12	D	1	4	-		4R-HH8	5	D	1	8	-
4HG8	5	D	1	2	-							
4HG8	5	D	1	6	-		5AF4	4	D	1	5	-
4HK5	4	D	1	2	7		5AM8	5	D	1	1	-
4HM5	4	D	1	2	7		5AM8●	5	D	1	7	-
4HM6	5	D	1	2	-		5AN8	5	D	1	3	-
4HQ5	4	D	1	2	7		5AN8	5	D	1	9	-
4HR8	5	D	1	3	7		5AQ4●	8	D	1	4	-
4HS8	5	D	1	1	-		5AQ4●	8	D	1	6	-

● = Read on Diode Scale

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TUBE	X	Y	Z	TEST	OPEN	7 TUBE	X	Y	Z	TEST	OPEN
5AQ5	4	D	1	2	-	5BQ7	5	D	1	3	-
5AR4●	8	D	1	4	1	5BQ7	5	D	1	8	-
5AR4●	8	D	1	6	1	5BR8	5	D	1	3	-
5AR5	4	D	1	2	-	5BR8	5	D	1	8	-
5AS4●	8	D	1	4	-	5BS8	5	D	1	3	-
5AS4●	8	D	1	6	-	5BS8	5	D	1	8	-
5AS8	5	D	1	3	-	5BT8	5	D	1	9	-
5AS8●	5	D	1	8	-	5BT8●	5	D	2	1	-
5AT4●	8	D	1	4	-	5BT8●	5	D	2	2	-
5AT4●	8	D	1	6	-	5BW8	5	D	1	6	-
5AT8	5	D	1	1	-	5BW8●	5	D	2	1	-
5AT8	5	D	1	9	-	5BW8●	5	D	2	3	-
5AU4●	8	D	1	4	-	5BZ7	5	D	1	3	-
5AU4●	8	D	1	6	-	5BZ7	5	D	1	8	-
5AV8	5	D	1	1	-	5CG8	5	D	1	1	-
5AV8	5	D	1	7	-	5CG8	5	D	1	9	-
5AW4●	8	D	1	4	-	5CL8	5	D	1	3	-
5AW4●	8	D	1	6	-	5CL8	5	D	1	8	-
5AX4●	8	D	1	4	-	5CM6	5	D	1	7	6
5AX4●	8	D	1	6	-	5CM8	5	D	1	8	-
5B8	5	D	1	1	-	5CM8	5	D	1	3	-
5B8	5	D	1	7	-	5CQ8	5	D	1	8	-
5BC3●	3	D	1	5	*	5CQ8	5	D	1	7	-
*OPEN - 2-4-6-7-8						5CR8	5	D	1	8	-
5BC3● ^{NOV}	3	D	1	9	*	5CR8	5	D	1	3	-
*OPEN - 2-4-6-7-8						5CU4●	8	D	1	4	-
5BC8	5	D	1	3	-	5CU4●	8	D	1	6	-
5BC8	5	D	1	8	-	5CZ5	5	D	1	7	8
5BE6	4	D	1	2	-	5DB5	5	D	1	2	6-7-8
5BE8	5	D	1	3	-	5DH8	5	D	1	3	-
5BE8	5	D	1	8	-	5DH8	5	D	1	8	-
5BK5	5	D	1	6	7	5DJ4●	7	D	1	3	1-4-5-8
5BK7	5	D	1	3	-	5DJ4●	7	D	1	6	1-4-5-8
5BK7	5	D	1	8	-						

● = Read on Diode Scale

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						8						
TUBE	X	Y	Z	TEST	OPEN		TUBE	X	Y	Z	TEST	OPEN
5EA8	5	D	1	8	-		5J6	4	D	1	5	-
5EA8	5	D	1	7	-		5J6	4	D	1	6	-
5EH8	5	D	1	2	-		5JK6	4	D	1	2	-
5EH8	5	D	1	7	-		5JL6	4	D	1	2	-
5ES8	5	D	1	3	-		5JL8	5	D	1	1	-
5ES8	5	D	1	8	-		5JL8	5	D	1	6	-
5EU8	5	D	1	6	-		5KD8	5	D	1	7	-
5EU8	5	D	1	8	-		5KD8	5	D	1	9	-
5EW6	4	D	1	2	-		5KE8	5	D	1	7	-
							5KE8	5	D	1	8	-
5FG7	5	D	1	1	-		5KZ8	5	D	1	3	-
5FG7	5	D	1	9	-		5KZ8	5	D	1	8	-
5FV8	5	D	1	3	-							
5FV8	5	D	1	8	-		5LJ8	5	D	1	1	-
							5LJ8	5	D	1	9	-
5GH8	5	D	1	8	-		5MB8	5	D	1	3	-
5GH8	5	D	1	7	-		5MB8	5	D	1	8	-
5GJ7	5	D	1	9	-		5M-HH3	4	D	1	5	-
5GJ7	5	D	1	2	-		5M-HH3	4	D	1	6	-
5GM6	4	D	1	2	-		5MK9●	3	D	1	5	-
5GS7	5	D	1	1	-							
5GS7	5	D	1	9	-		5R4●	8	D	1	4	-
5GX6	4	D	1	2	-		5R4●	8	D	1	6	-
5GX7	5	D	1	9	-		5R-K16●	4	D	1	1	-
5GX7	5	D	1	2	-		5R-K16●	4	D	1	8	-
5HA7	12	D	1	4	5		5T4●	8	D	1	4	-
5HA7	12	D	1	3	5		5T4●	8	D	1	6	-
5HB7	5	D	1	2	-		5T8	5	D	1	8	-
5HB7	5	D	1	9	-		5T8●	5	D	1	6	-
5HC7	12	D	1	3	-		5T8●	5	D	1	1	-
5HC7	12	D	1	4	-		5T8●	5	D	1	2	-
5HG8	5	D	1	2	-							
5HG8	5	D	1	6	-		5U4●	8	D	1	4	-
5HZ6	4	D	1	2	-		5U4●	8	D	1	6	-

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TUBE	X	Y	Z	TEST	OPEN	9 TUBE	X	Y	X	TEST	OPEN
5U8	5	D	1	8	-	6AB7	7	E	1	5	-
5U8	5	D	1	7	-	6AB8	5	E	1	2	-
5U9	5	D	1	2	-	6AB8	5	E	1	9	-
5U9	5	D	1	1	-	6AC5	7	E	1	8	-
5V3●	8	D	1	4	-	6AC6	7	E	1	8	-
5V3●	8	D	1	6	-	6AC7	7	E	1	5	-
5V4●	8	D	1	4	-	6AC9	12	E	1	8	-
5V4●	8	D	1	6	-	6AC9●	12	E	1	2	-
5V6	7	D	1	8	-	6AC9●	12	E	1	3	-
5V9	5	D	1	1	-	6AC10	12	E	1	3	-
5V9	5	D	1	9	-	6AC10	12	E	1	6	-
5W4●	8	D	1	4	-	6AC10	12	E	1	4	-
5W4●	8	D	1	6	-	6AD5	7	E	1	8	-
5X4●	8	D	1	3	-	6AD7	7	E	1	1	-
5X4●	8	D	1	5	-	6AD7	7	E	1	5	-
5X8	5	D	1	2	-	6AD8	5	E	1	2	-
5X8	5	D	1	7	-	6AD8●	5	E	3	7	-
5X9	5	D	1	2	-	6AD8●	5	E	3	8	-
5X9	5	D	1	1	-	6AD10	12	E	1	2	-
5Y3●	8	D	2	4	-	6AD10	12	E	1	9	-
5Y3●	8	D	2	6	-	6AE5	7	E	1	8	-
5Y4●	8	D	1	3	-	6AE6	7	E	1	8	-
5Y4●	8	D	1	5	-	6AE7	7	E	1	5	-
5Z4●	8	D	1	4	-	6AE7	7	E	1	8	-
5Z4●	8	D	1	6	-	6AF3●	5	E	1	11	*
6A5	7	E	1	5	8	*OPEN - 1-2-3-6-7-8					
6A8	7	E	1	8	-	6AF4	4	E	1	5	-
6AB4	4	E	1	7	-	6AF5	7	E	1	8	-
6AB6	7	E	1	8	-	6AF9	5	E	1	7	-
						6AF9	5	E	1	2	-
						6AF11	12	E	1	7	-
						6AF11	12	E	1	5	-
						6AF11	12	E	1	9	-
						6AG5	4	E	1	2	7
						6AG6	7	E	1	8	-

● = Read on Diode Scale

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						10						
TUBE	X	Y	Z	TEST	OPEN	TUBE	X	Y	Z	TEST	OPEN	
6AG7	7	E	1	5	-	6AM6	4	E	1	2	-	
6AG9	12	E	1	6	-	6AM8	5	E	1	2	-	
6AG9	12	E	1	9	-	6AM8●	5	E	1	7	-	
6AG11	12	E	1	2	-	6AN4	4	E	1	5	-	
6AG11	12	E	1	4	-	6AN5	4	E	1	2	7	
6AG11	12	E	1	9	-	6AN6●	7	E	1	2	-	
6AG11	12	E	1	11	-	6AN6●	7	E	1	3	-	
6AH4	7	E	1	8	-	6AN6●	7	E	1	4	-	
6AH5	7	E	1	8	-	6AN6●	7	E	1	5	-	
6AH6	4	E	1	7	-	6AN7	5	E	1	9	-	
6AH7	7	E	1	2	-	6AN7	5	E	1	2	-	
6AH7	7	E	1	4	-	6AN8	5	E	1	3	-	
6AH9	1	E	1	4	-	6AN8	5	E	1	9	-	
6AH9	1	E	1	7	-	6AQ4	4	E	1	2	1-5-6	
6AJ5	4	E	1	2	7	6AQ5	4	E	1	2	-	
6AJ7	7	E	1	5	-	6AQ6	4	E	1	1	-	
6AJ8	5	E	1	9	-	6AQ6●	4	E	3	5	-	
6AJ8	5	E	1	2	-	6AQ6●	4	E	3	6	-	
6AJ9	5	E	1	2	-	6AQ7	8	E	1	6	-	
6AJ9	5	E	1	1	-	6AQ7●	8	E	3	3	-	
6AK5	4	E	1	2	7	6AQ7●	8	E	3	1	-	
6AK6	4	E	1	7	-	6AQ8	5	E	1	3	-	
6AK7	7	E	1	5	-	6AQ8	5	E	1	8	-	
6AK8	5	E	1	8	-	6AR5	4	E	1	2	-	
6AK8●	5	E	1	6	-	6AR8	5	E	1	7	-	
6AK8●	5	E	1	1	-	6AR11	12	E	1	6	-	
6AK8●	5	E	1	2	-	6AR11	12	E	1	11	-	
6AL3●	5	E	1	11	*	6AS5	4	E	1	1	-	
*OPEN-1-2-3-6-7-8						6AS6	4	E	1	2	-	
6AL5●	4	E	1	5	-	6AS7	8	E	1	3	-	
6AL5●	4	E	1	1	-	6AS7	8	E	1	6	-	
6AL6	7	E	1	8	-	6AS8	5	E	1	3	-	
6AL7	7	E	6	8	-	6AS8●	5	E	2	8	-	
6AL11	12	E	1	2	-	6AS11	12	E	1	7	-	
6AL11	12	E	1	9	-	6AS11	12	E	1	5	-	
6AM5	4	E	1	2	-	6AS11	12	E	1	9	-	

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●● = Read on Diode Scale

TUBE	X	Y	Z	TEST	OPEN	11 TUBE	X	Y	Z	TEST	OPEN
6AT6	4	E	1	1	-	6AY11●	12	E	1	2	-
6AT6●	4	E	3	5	-	6AY11●	12	E	1	11	-
6AT6●	4	E	3	6	-	6AY11	12	E	1	4	-
6AT8	5	E	1	1	-	6AY11	12	E	1	9	-
6AT8	5	E	1	9	-	6AZ8	5	E	1	7	-
6AU4●	8	E	1	3	2	6AZ8	5	E	1	3	-
6AU5	7	E	1	3	-						
6AU6	4	E	1	7	-	6B4	7	E	1	5	-
6AU7	9	C	1	3	-	6B6	7	E	1	11	-
6AU7	9	C	1	8	-	6B6●	7	E	3	4	-
6AU8	5	E	1	1	-	6B6●	7	E	3	5	-
6AU8	5	E	1	6	-	6B8	7	E	1	11	-
6AV4●	4	E	1	1	-	6B8●	7	E	3	4	-
6AV4●	4	E	1	6	-	6B8●	7	E	3	5	-
6AV5	7	E	1	3	-	6B10	12	E	1	2	-
6AV6	4	E	1	1	-	6B10	12	E	1	7	-
6AV6●	4	E	3	5	-	6B10●	12	E	1	8	-
6AV6●	4	E	3	6	-	6B10●	12	E	1	10	-
6AV11	12	E	1	3	-	6BA3●	5	E	1	9	*
6AV11	12	E	1	6	-	*OPEN - 1-3-6-8					
6AV11	12	E	1	4	-	6BA6	4	E	1	7	-
6AW8	5	E	1	1	-	6BA7	5	E	1	3	-
6AW8	5	E	1	6	-	6BA8	5	E	1	1	-
6AX3●	12	E	1	7	-	6BA8	5	E	1	6	-
6AX4●	8	E	1	3	2	6BA11	12	E	1	8	-
6AX5●	7	E	1	3	-	6BA11	12	E	1	10	-
6AX5●	7	E	1	5	-	6BC4	5	E	1	6	-
6AX6●	7	E	1	4	-	6BC5	4	E	1	2	7
6AX6●	7	E	1	8	-	6BC7●	5	E	1	1	-
6AX7	9	C	1	3	-	6BC7●	5	E	1	7	-
6AX7	9	C	1	8	-	6BC7●	5	E	1	9	-
6AX8	5	E	1	8	-	6BC8	5	E	1	3	-
6AX8	5	E	1	7	-	6BC8	5	E	1	8	-
6AY3● _{NOV}	5	E	1	9	*	6BD4	7	E	4	1	-
*OPEN - 1-3-6-8						6BD5	7	E	1	3	-

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TUBE	X	Y	Z	TEST	OPEN	12 TUBE	X	Y	Z	TEST	OPEN
6BD6	4	E	1	7	-	6BJ5	4	E	1	2	-
6BD7	5	E	1	2	-	6BJ6	4	E	1	2	-
6BD7●	5	E	3	6	-	6BJ7●	5	E	1	1	-
6BD7●	5	E	3	8	-	6BJ7●	5	E	1	7	-
6BD11	12	E	1	7	-	6BJ7●	5	E	1	9	-
6BD11	12	E	1	5	-	6BJ8	5	E	1	9	-
6BD11	12	E	1	9	-	6BJ8●	5	E	1	3	-
6BE3●	12	E	1	7	5-9	6BJ8●	5	E	1	2	-
6BE6	4	E	1	2	-	6BK4	7	E	2	1	*
6BE7	5	E	1	8	-	*OPEN - 3-4-6-8					
6BE8	5	E	1	3	-	6BK5	5	E	1	6	7
6BE8	5	E	1	8	-	6BK6	4	E	1	1	-
6BF5	4	E	1	2	-	6BK6●	4	E	3	5	-
6BF6	4	E	1	1	-	6BK6●	4	E	3	6	-
6BF6●	4	E	3	5	-	6BK7	5	E	1	3	-
6BF6●	4	E	3	6	-	6BK7	5	E	1	8	-
6BF8●	5	E	1	1	-	6BK8	5	E	1	3	-
6BF8●	5	E	1	2	-	6BK11	12	E	1	3	-
6BF8●	5	E	1	3	-	6BK11	12	E	1	6	-
6BF8●	5	E	1	7	-	6BK11	12	E	1	4	-
6BF8●	5	E	1	8	-	6BL4●	8	E	1	3	*
6BF8●	5	E	1	9	-	*OPEN - 1-2-4-6					
6BF11	12	E	1	2	-	6BL7	8	E	1	3	-
6BF11	12	E	1	9	-	6BL7	8	E	1	6	-
6BG6	7	E	1	3	-	6BL8	5	E	1	8	-
6BH3● NOV	5	E	1	9	*	6BL8	5	E	1	7	-
*OPEN - 1-3-6-8						6BM5	4	E	1	2	-
6BH5	5	E	1	3	-	6BM8	5	E	1	8	-
6BH6	4	E	1	2	-	6BM8	5	E	1	2	-
6BH8	5	E	1	1	-	6BN4	4	E	1	1	6
6BH8	5	E	1	6	-	6BN5	5	E	1	3	-
6BH11	12	E	1	2	-	6BN6	4	E	6	1	-
6BH11	12	E	1	5	-	6BN7	5	E	1	3	-
6BH11	12	E	1	11	-	6BN7	5	E	1	6	-
6BJ3●	12	E	1	7	-						

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TUBE	X	Y	Z	TEST	OPEN	TUBE	X	Y	Z	TEST	OPEN
6BN8	5	E	1	9	-	6BV11	12	E	1	8	-
6BN8●	5	E	1	3	-	6BV11	12	E	1	5	-
6BN8●	5	E	1	2	-	6BW4●	5	E	1	1	-
6BN11	12	E	1	8	-	6BW4●	5	E	1	7	-
6BN11	12	E	1	2	-	6BW6	5	E	1	3	6
6BQ5	5	E	1	3	1-6-8	6BW7	5	E	1	3	-
6BQ6	7	E	1	8	-	6BW8	5	E	1	6	-
6BQ7	5	E	1	3	-	6BW8●	5	E	1	3	-
6BQ7	5	E	1	8	-	6BW8●	5	E	1	2	-
6BR3●	5	E	1	11	*	6BW11	12	E	1	10	-
*OPEN-1-2-3-6-7-8						6BW11	12	E	1	2	-
6BR5	5	E	1	2	3-6-8	6BX6	5	E	1	3	1
6BR7	5	E	1	3	-	6BX7	8	E	1	3	-
6BR7●	5	E	1	6	-	6BX7	8	E	1	6	-
6BR7●	5	E	1	7	-	6BX8	5	E	1	3	-
6BR8	5	E	1	3	-	6BX8	5	E	1	8	-
6BR8	5	E	1	8	-	6BY5●	7	E	1	1	3
6BS3● nov	5	E	1	9	*	6BY5●	7	E	1	8	3
*OPEN-1-3-6-8						6BY6	4	E	1	2	-
6BS4	4	E	1	5	-	6BY7	5	E	1	3	1
6BS8	5	E	1	3	-	6BY8	5	E	1	9	-
6BS8	5	E	1	8	-	6BY8●	5	E	1	3	-
6BT6	4	E	1	1	-	6BY11	12	E	1	2	-
6BT6●	4	E	3	5	-	6BY11	12	E	1	9	-
6BT6●	4	E	3	6	-	6BZ3●	12	E	1	7	*
6BT8	5	E	1	9	-	*OPEN-5-6-8-9					
6BT8●	5	E	2	1	-	6BZ6	4	E	1	2	-
6BT8●	5	E	2	2	-	6BZ7	4	E	1	3	-
6BU5	8	E	1	5	-	6BZ7	5	E	1	8	-
6BU6	4	E	1	1	-	6BZ8	5	E	1	3	-
6BU6●	4	E	3	5	-	6BZ8	5	E	1	8	-
6BU6●	4	E	3	6	-						
6BU8	5	E	1	1	-	6C4	4	E	1	7	2
6BV8	5	E	1	1	-	6C5	7	E	1	8	-
6BV8●	5	E	1	8	-						
6BV8●	5	E	1	7	-						

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TUBE	X	Y	Z	TEST	OPEN
6C8	7	E	1	4	-
6C8	7	E	1	8	-
6C9	5	E	1	10	-
6C9	5	E	1	6	-
6C10	12	E	1	4	8
6C10	12	E	1	6	8
6C10	12	E	1	3	8
6C12	5	E	1	9	-
6C12	5	E	1	2	-
6C16	5	E	1	8	-
6C16	5	E	1	7	-
6C31	7	E	1	11	-
6C31	7	E	1	5	-
6CA4●	5	E	1	1	-
6CA4●	5	E	1	7	-
6CA5	4	E	1	1	-
6CA7	7	E	1	8	-
6CB5	7	E	1	3	6
6CB6	4	E	1	2	-
6CD3●	12	E	1	7	*
*OPEN-5-6-8-9					
6CD6	7	E	1	3	-
6CD7	7	E	4	8	-
6CE3●	12	E	1	7	*
*OPEN-2-3-5-6-8-9-11					
6CE5	4	E	1	2	7
6CF6	4	E	1	2	-
6CF8	5	E	1	3	-
6CG3●	12	E	1	7	*
*OPEN-2-5-6-8-9					
6CG6	4	E	1	7	-
6CG7	5	E	1	3	-
6CG7	5	E	1	8	-
6CG8	5	E	1	1	-
6CG8	5	E	1	9	-

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TUBE	X	Y	Z	TEST	OPEN
6CH3● nov	5	E	1	9	*
*OPEN-1-3-6-8					
6CH6	5	E	1	3	-
6CH7	5	E	1	3	9
6CH7	5	E	1	8	9
6CH8	5	E	1	1	-
6CH8	5	E	1	6	-
6CJ3● nov	5	E	1	9	*
*OPEN-1-3-6-8					
6CJ6	5	E	1	9	-
6CK3● nov	5	E	1	9	*
*OPEN-1-3-6-8					
6CK4	7	E	1	8	-
6CK6	5	E	1	3	-
6CL3● nov	5	E	1	9	*
*OPEN-1-3-6-8					
6CL5	7	E	1	3	6
6CL6	5	E	1	1	-
6CL8	5	E	1	3	-
6CL8	5	E	1	8	-
6CM3 nov	4	E	1	9	-
6CM4	5	E	1	3	7
6CM5	7	E	1	8	-
6CM6	5	E	1	7	6
6CM7	5	E	1	3	-
6CM7	5	E	1	9	-
6CM8	5	E	1	8	-
6CM8	5	E	1	3	-
6CN6	7	E	1	8	-
6CN7	5	E	1	6	9
6CN7●	5	E	1	1	9
6CN7●	5	E	1	2	9
6CQ4●	8	E	1	3	2
6CQ6	4	E	1	2	-
6CQ8	5	E	1	8	-
6CQ8	5	E	1	7	-

● = Read on Diode Scale

TUBE	X	Y	Z	TEST	OPEN	15 TUBE	X	Y	Z	TEST	OPEN
6CR6	4	E	1	7	-	6DA4●	8	E	1	3	2
6CR6●	4	E	4	2	-	6DA5	5	E	4	2	3-6-8
6CR8	5	E	1	8	-	6DA6	5	E	1	3	-
6CR8	5	E	1	3	-	6DA7	5	E	2	9	-
6CS5	5	E	1	2	7-8	6DA7	5	E	2	8	-
6CS6	4	E	1	2	-	6DB5	5	E	1	2	7-8
6CS7	5	E	1	9	-	6DB6	4	E	1	2	-
6CS7	5	E	1	8	-	6DC6	4	E	1	2	-
6CS8	5	E	1	8	-	6DC8	5	E	1	2	-
6CS8	5	E	1	3	-	6DC8●	5	E	3	7	-
6CT3●	4	E	1	9	-	6DC8●	5	E	3	8	-
6CU5	4	E	1	1	-	6DE4●	8	E	1	3	2
6CU6	7	E	1	8	-	6DE6	4	E	1	2	-
6CU8	5	E	1	1	-	6DE7	5	E	1	9	-
6CU8	5	E	1	6	-	6DE7	5	E	1	8	-
6CW4	12	E	1	8	-	6DG6	7	E	1	8	-
6CW5	5	E	1	3	1-6-8	6DJ8	5	E	1	3	-
6CW7	5	E	1	1	-	6DJ8	5	E	1	8	-
6CW7	5	E	1	7	-	6DK6	4	E	1	2	-
6CX7	5	E	1	3	9	6DL4	5	E	1	2	-
6CX7	5	E	1	8	9	6DL5	4	E	1	2	7
6CX8	5	E	1	1	-	6DL8	5	E	1	8	-
6CX8	5	E	1	6	-	6DL8	5	E	1	7	-
6CY5	4	E	1	2	7	6DM4●	8	E	1	3	2
6CY7	5	E	1	8	-	6DN6	7	E	1	3	-
6CY7	5	E	1	9	-	6DN7	8	E	1	3	-
6CZ5	5	E	1	7	8	6DN7	8	E	1	6	-
6D1	5	E	1	3	-	6DQ4●	8	E	1	3	2
6D2●	4	E	1	5	-	6DQ5	7	E	1	3	6
6D2●	4	E	1	1	-	6DQ6	7	E	1	8	-
6D4	4	E	1	5	-	6DR4	4	E	1	7	2
6D5	7	A	1	8	-	6DR7	5	E	1	9	-
6D8	7	E	1	8	-	6DR7	5	E	1	8	-
6D10	12	E	1	3	-	6DS4	12	E	1	8	-
6D10	12	E	1	6	-						
6D10	12	E	1	4	-						

● = Read on Diode Scale

● = Read on Diode Scale

TUBE	X	Y	Z	TEST	OPEN	16 TUBE	X	Y	Z	TEST	OPEN
6DS5	4	E	1	2	-	6ED4● ^{mag}	5	E	2	1	-
6DS8	5	E	1	2	-	6EF4	12	E	2	5	*
6DS8	5	E	1	9	-	*OPEN-2-3-4-7-8-10-11					
6DT4●	8	E	1	3	2	6EF6	7	E	1	8	-
6DT5	5	E	1	7	8	6EG6	4	E	1	2	-
6DT6	4	E	1	2	-	6EH4	12	E	2	2	5-9-11
6DT8	5	E	1	3	-	6EH5	4	E	1	1	-
6DT8	5	E	1	8	-	6EH7	5	E	1	1	3
6DW4● ^{nov}	5	E	1	9	*	6EH8	5	E	1	2	-
*OPEN-1-3-6-8						6EH8	5	E	1	7	-
6DW5	5	E	1	7	6	6EJ4	12	E	2	5	-
6DX8	5	E	1	3	-	6EJ7	5	E	1	1	3
6DX8	5	E	1	7	-	6EL7	5	E	1	1	-
6DY5	5	E	1	3	-	6EM5	5	E	1	7	8
6DY7	7	E	1	1	-	6EM7	8	E	1	3	-
6DY7	7	E	1	5	-	6EM7	8	E	1	6	-
6DZ4	4	E	1	5	-	6EQ7●	5	E	2	8	-
6DZ7	7	E	1	1	-	6EQ7	5	E	1	2	-
6DZ7	7	E	1	5	-	6ER5	4	E	1	1	7
6DZ8	5	E	1	8	-	6ES5	4	E	1	1	7
6DZ8	5	E	1	2	-	6ES6	4	E	1	2	-
6E8	7	E	1	5	-	6ES8	5	E	1	3	-
6E8	7	E	1	11	-	6ES8	5	E	1	8	-
6EA4	12	E	2	5	*	6ET6	4	E	1	2	-
*OPEN-2-3-4-8-9-10-11						6ET7	5	E	1	6	-
6EA5	4	E	1	2	7	6ET7●	5	E	3	2	-
6EA7	8	E	1	3	-	6ET7●	5	E	3	3	-
6EA7	8	E	1	6	-	6EU7	2	E	1	4	-
6EA8	5	E	1	8	-	6EU7	2	E	1	9	-
6EA8	5	E	1	7	-	6EU8	5	E	1	6	-
6EB5●	4	E	1	1	-	6EU8	5	E	1	8	-
6EB5●	4	E	1	5	-	6EV5	4	E	1	2	7
6EB8	5	E	1	1	-	6EV7	5	E	1	3	-
6EB8	5	E	1	6	-	6EV7	5	E	1	8	-
6EC4● ^{mag}	5	E	1	11	-	6EW6	4	E	1	2	-

● = Read on Diode Scale

● = Read on Diode Scale

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TUBE	X	Y	Z	TEST	OPEN	TUBE	X	Y	Z	TEST	OPEN
6EW7	5	E	1	8	-	6FJ7	12	E	1	7	6
6EW7	5	E	1	9	-	6FJ7	12	E	1	9	6
6EW8	5	E	1	3	-	6FM7	12	E	1	7	6
6EW8	5	E	1	8	-	6FM7	12	E	1	9	6
6EX6	7	E	1	3	-	6FM8	5	E	1	7	-
6EY6	7	E	1	8	-	6FM8●	5	E	1	1	-
6EZ5	7	E	1	8	-	6FM8●	5	E	1	3	-
6EZ8	5	E	1	1	-	6FN5	7	E	1	3	-
6EZ8	5	E	1	7	-	6FQ5	4	E	1	1	7
6EZ8	5	E	1	9	-	6FQ7	5	E	1	3	-
						6FQ7	5	E	1	8	-
6F5	7	E	1	8	-	6FR7	5	E	1	9	-
6F6	7	E	1	8	-	6FR7	5	E	1	8	-
6F8	7	E	1	4	-	6FS5	4	E	1	2	7
6F8	7	E	1	8	-	6FV6	4	E	1	7	-
6F12	4	E	1	2	-	6FV8	5	E	1	3	-
6F18	5	E	1	3	-	6FV8	5	E	1	8	-
6F19	5	E	1	3	-	6FW5	7	E	1	3	-
6F20	5	E	1	3	-	6FW8	5	E	1	3	-
6FA7	5	E	1	7	-	6FW8	5	E	1	8	-
6FA7●	5	E	3	3	-	6FX5	4	E	1	1	5
6FD6	4	E	1	7	-	6FY5	4	E	1	1	7
6FD7	5	E	1	9	-	6FY7	12	E	1	7	8
6FD7	5	E	1	8	-	6FY7	12	E	1	9	8
6FD10	5	E	1	1	-	6FY8	5	E	1	8	-
6FE5	7	E	1	8	-	6FY8	5	E	1	2	-
6FG5	4	E	1	2	7	6G6	7	E	1	8	-
6FG6	5	E	2	3	2-8	6G11	12	E	1	2	-
6FG7	5	E	1	1	-	6G11	12	E	1	9	-
6FG7	5	E	1	9	-	6G-B3	7	E	1	8	-
6FH5	4	E	1	1	7	6GB5 mag	5	E	1	3	8-9
6FH6	7	E	1	8	-	6GB6	7	E	1	8	-
6FH8	5	E	1	2	-	6G-B7	7	E	1	8	-
6FH8	5	E	1	6	-	6GC5	5	E	1	7	-
						6GC6	7	E	1	3	8

● = Read on Diode Scale

● = Read on Diode Scale

TUBE	X	Y	Z	TEST	OPEN	18 TUBE	X	Y	Z	TEST	OPEN
6GD7	5	E	1	1	-	6GS8	5	E	1	1	-
6GD7	5	E	1	9	-	6GT5 nov	5	E	1	3	8
6GE5	12	E	1	4	*	6GU5	4	E	1	2	7
	*OPEN-5-6-8-9-10					6GU7	5	E	1	3	-
6GE8	5	E	1	2	-	6GU7	5	E	1	8	-
6GE8	5	E	1	7	-	6GV5	12	E	1	4	10
6GF5	12	E	1	4	*	6GV7	5	E	1	9	-
	*OPEN-5-6-8-9-10					6GV7	5	E	1	7	-
6GF7 nov	5	E	1	3	-	6GV8	5	E	1	3	-
6GF7	5	E	1	1	-	6GV8	5	E	1	8	-
6GH8	5	E	1	8	-	6GW5	4	E	1	5	-
6GH8	5	E	1	7	-	6GW6	7	E	1	8	-
6GJ5 nov	5	E	1	3	8-9	6GW8	5	E	1	2	-
6GJ7	5	E	1	2	-	6GW8	5	E	1	7	-
6GJ7	5	E	1	9	-	6GX6	4	E	1	2	-
6GJ8	5	E	1	8	-	6GX7	5	E	1	9	3
6GJ8	5	E	1	7	-	6GX7	5	E	1	2	3
6GK5	4	E	1	1	7	6GY5	12	E	1	4	10
6GK6	5	E	1	1	9	6GY6	4	E	1	2	-
6GK7	5	E	1	1	3	6GY8	5	E	1	1	-
6G-K17●	8	E	1	3	-	6GY8	5	E	1	8	-
6GL7	8	E	1	3	-	6GY8	5	E	1	7	-
6GL7	8	E	1	6	-	6GZ5	4	E	1	1	-
6GM5	5	E	1	7	2-3-8	6H4●	7	E	1	8	-
6GM6	4	E	1	2	-	6H6●	7	E	1	4	-
6GM8	5	E	1	3	-	6H6●	7	E	1	8	-
6GM8	5	E	1	8	-	6HA5	4	E	1	2	7
6GN6	4	E	1	2	-	6HA6	5	E	1	1	-
6GN8	5	E	1	1	-	6HA7	12	E	1	3	-
6GN8	5	E	1	6	-	6HA7	12	E	1	4	-
6GQ7●	5	E	1	1	3	6HB5	12	E	1	4	*
6GQ7●	5	E	1	7	3		*OPEN-5-6-8-9-10				
6GQ7●	5	E	1	9	3	6HB6	5	E	1	1	-
6GS7	5	E	1	1	-	6HB7	5	E	1	2	-
6GS7	5	E	1	9	-	6HB7	5	E	1	9	-

● = Read on Diode Scale

● = Read on Diode Scale

						19						
TUBE	X	Y	Z	TEST	OPEN		TUBE	X	Y	Z	TEST	OPEN
6HC8	5	E	1	8	-		6HT5	12	E	2	6	-
6HC8	5	E	1	2	-		6HT6	5	E	1	2	-
6HD5	12	E	1	4	6-8-10		6HU6	5	E	1	3	2-8
6HD7	4	E	1	2	3		6HU8	5	E	1	2	-
6HD7	4	E	1	9	3		6HU8	5	E	1	6	-
6HE5	12	E	1	4	11		6HW8	5	E	1	7	-
6HE7●	12	E	1	4	7-10		6HZ6	4	E	1	2	-
6HE7	12	E	1	8	7-10		6HZ8	5	E	1	1	-
6HF5	12	E	1	4	2-6-8-9-10-11		6HZ8	5	E	1	6	-
6HF8	5	E	1	1	-		6J4	4	E	1	2	-
6HF8	5	E	1	6	-		6J5	7	E	1	8	-
6HG5	4	E	1	2	-		6J6	4	E	1	5	-
6HG7	4	E	1	2	6-9		6J6	4	E	1	6	-
6HG8	5	E	1	3	-		6J7	7	E	1	8	-
6HG8	5	E	1	1	-		6J8	7	E	1	5	-
6HJ5	12	E	1	2	6-8		6J8	7	E	1	11	-
6HJ7	5	E	1	9	-		6J9	5	E	1	3	-
6HJ7	5	E	1	2	-		6J9	5	E	1	9	-
6HJ8	5	E	1	1	-		6J9	5	E	1	7	-
6HJ8●	5	E	1	7	-		6J10	12	E	1	3	10
6HK5	4	E	1	2	7		6J10	12	E	7	8	10
6HK8	5	E	1	3	-		6J11	12	E	1	6	-
6HK8	5	E	1	8	-		6J11	12	E	1	8	-
6HL5	5	E	1	3	6-8		6JA8	5	E	1	1	-
6HL8	5	E	1	7	-		6JA8	5	E	1	6	-
6HL8	5	E	1	8	-		6JB6 nov	5	E	1	3	9
6HM5	4	E	1	2	7		6JC6	5	E	1	2	-
6HM6	5	E	1	2	-		6JC8	5	E	1	8	-
6HQ5	4	E	1	2	7		6JC8	5	E	1	2	-
6HR5	4	E	1	2	-		6JD6	5	E	1	2	-
6HR6	4	E	1	7	-		6JE6 nov	5	E	1	3	9
6HR8	5	E	1	3	-		6JE8	5	E	1	1	-
6HS5	12	E	1	4	*		6JE8	5	E	1	6	-
*OPEN-5-6-8-9							6JF6 nov	5	E	1	3	9
6HS6	4	E	1	7	-		6JG6 nov	5	E	1	3	8
6HS8	5	E	1	1	-		6JH6	4	E	1	2	-

● = Read on Diode Scale

● = Read on Diode Scale

						20						
TUBE	X	Y	Z	TEST	OPEN		TUBE	X	Y	Z	TEST	OPEN
6JH8	5	E	1	7	-		6K7	7	E	1	8	-
6JK6	4	E	1	2	-		6K8	7	E	1	8	-
6JK8	5	E	1	3	-		6K11	12	E	1	3	-
6JK8	5	E	1	8	-		6K11	12	E	1	6	-
6JL8	4	E	1	2	-		6K11	12	E	1	4	-
6JL8	5	E	1	1	-		6KA8	5	E	1	2	-
6JL8	5	E	1	6	-		6KA8	5	E	1	6	-
6JM6	12	E	1	2	8		6KD6	12	E	1	2	7
6JN6	12	E	1	2	-		6KD8	5	E	1	7	-
6JN8	5	E	1	3	-		6KD8	5	E	1	8	-
6JN8	5	E	1	8	-		6KE8	5	E	1	7	-
6JQ6	4	E	1	7	8		6KE8	5	E	1	8	-
6JQ6●	4	E	2	6	-		6KF8	5	E	1	1	-
6JR6 nov	5	E	1	3	8		6KG6 mag	5	E	1	9	-
6JS6	12	E	1	2	7-9		6KL8	5	E	1	2	-
6JT6 nov	5	E	1	3	8		6KL8●	5	E	3	8	-
6JT8	5	E	1	1	-		6KM6 nov	5	E	1	3	9
6JT8	5	E	1	6	-		6KM8	5	E	1	7	-
6JU6 nov	5	E	1	3	9		6KM8●	5	E	3	3	-
6JU8●	5	E	1	1	-		6KN6	12	E	1	2	7-9-11
6JU8●	5	E	1	3	-		6KN8	5	E	1	3	-
6JU8●	5	E	1	7	-		6KN8	5	E	1	8	-
*6JU8●	5	E	1	9	-		6KR8	5	E	1	1	-
6JV8	5	E	1	1	-		6KR8	5	E	1	6	-
6JV8	5	E	1	6	-		6KS6	4	E	6	1	-
6JW8	5	E	1	8	-		6KS8	5	E	1	1	-
6JW8	5	E	1	7	-		6KS8	5	E	1	6	-
6JX8	5	E	1	9	-		6KT6	5	E	1	2	-
6JX8	5	E	1	2	-		6KT8	5	E	1	6	-
6JY8	5	D	1	1	-		6KT8	5	E	1	1	-
6JY8	5	D	1	6	-		6KU8	5	E	1	6	-
6JZ6	12	E	1	2	9-11		6KU8●	5	E	2	1	-
6JZ8	12	E	1	6	7		6KU8●	5	E	2	2	-
6JZ8	12	E	1	11	-		6KV6 nov	5	E	1	3	8
6K5	7	E	1	8	-		6KV8	5	E	1	1	-
6K6	7	E	2	8	-		6KV8	5	E	1	6	-

● = Read on Diode Scale

● = Read on Diode Scale

* = Shorts Glow O.K. on Switch 2 & 8

						21						
TUBE	X	Y	Z	TEST	OPEN		TUBE	X	Y	Z	TEST	OPEN
6KX8	5	E	1	2	-		6LN8	5	E	1	8	-
6KX8	5	E	1	8	-		6LN8	5	E	1	7	-
6KY6	5	E	1	1	-		6LQ8	5	E	1	1	-
6KY8	nov 5	E	1	1	-		6LQ8	5	E	1	6	-
6KY8	5	E	1	3	-		6LR6	12	E	1	2	-
6KZ8	5	E	1	3	-		6LR8	nov 5	E	1	1	-
6KZ8	5	E	1	8	-		6LR8	5	E	1	3	-
6L5	7	E	1	8	-		6LT8	5	E	1	9	-
6L6	7	E	1	8	-		6LT8●	5	E	1	8	-
6L7	7	E	1	8	-		*6LT8●	5	E	1	6	-
6L12	5	E	1	3	-		6LU8	12	E	1	11	-
6L12	5	E	1	8	-		6LU8	12	E	1	9	-
6L13	5	F	1	3	-		6LX8	5	E	1	8	-
6L13	5	F	1	8	-		6LX8	5	E	1	7	-
6L34	4	E	1	2	-		6LY8	5	E	1	1	-
6LB6	12	E	1	2	7-9-11		6LY8	5	E	1	6	-
6LB8	5	E	1	1	-		6M2	7	E	4	8	-
6LB8	5	E	1	6	-		6M3●	8	E	1	11	1
6LC6	7	E	2	6	3-4-8		6M5	5	E	1	3	-
6LC8	5	E	1	3	7		6M6	7	E	1	8	-
6LC8	5	E	1	7	-		6M11	12	E	1	10	-
6LD6	5	E	1	1	-		6M11	12	E	1	4	-
6LD12	5	E	1	8	-		6M11	12	E	1	9	-
6LD12●	5	E	1	6	-		6MB8	5	E	1	3	-
6LD12●	5	E	1	1	-		6MB8	5	E	1	8	-
6LD12●	5	E	1	2	-		6MD8	nov 5	E	1	6	-
6LE8	5	E	1	3	-		6MD8	5	E	1	8	-
6LF8	5	E	1	1	-		6MD8	5	E	1	9	-
6LF8	5	E	1	6	-		6ME8	5	E	1	7	-
6LH6	2	E	2	6	3-4-8		6MF8	12	E	1	6	-
6LJ8	5	E	1	1	-		6MF8	12	E	1	11	-
6LJ8	5	E	1	9	-		6MG8	5	E	1	7	-
6LM8	5	E	1	7	-		6MG8	5	E	1	8	-
6LM8	5	E	1	8	-		6M-HH3	4	E	1	5	-
							6M-HH3	4	E	1	6	-

● = Read on Diode Scale

● = Read on Diode Scale

* = Shorts Glow O.K. on Switch #1

						22						
TUBE	X	Y	Z	TEST	OPEN		TUBE	X	Y	Z	TEST	OPEN
6MJ8	12	E	1	8	-		6R4	5	E	1	3	-
6MJ8	12	E	1	10	-		6R6	7	E	1	8	-
6MJ8	12	E	1	11	-		6R7	7	E	1	11	-
							6R7●	7	E	3	4	-
6N3●	5	E	1	3	-		6R7●	7	E	3	5	-
6N4	4	E	1	2	6		6R8	5	E	1	8	-
6N6	7	E	1	8	-		6R8●	5	E	1	1	-
6N7	7	E	1	4	-		6R8●	5	E	1	6	-
6N7	7	E	1	5	-		6R8●	5	E	1	7	-
6N8	5	E	1	2	-		6R-HH2	5	E	1	3	-
6N8●	5	E	1	7	-		6R-HH2	5	E	1	8	-
6N8●	5	E	1	8	-		6R-HH8	5	E	1	3	-
6N8K	5	E	1	2	-		6R-HH8	5	E	1	8	-
6N8K●	5	E	3	7	-		6R-K19●	5	E	1	11	-
6N8K●	5	E	3	8	-		6R-P15	4	E	1	3	-
							6R-P22	5	E	1	1	-
6P5	7	E	1	8	-							
6P8G	7	E	1	5	-		6S2●	5	E	1	6	1-4-7
6P8G	7	E	1	11	-		6S4	5	E	1	2	1-7-8
6P9	4	E	1	2	-		6S7	7	E	1	8	-
6P15	5	E	1	3	-		6S8	8	E	1	11	-
6P25	7	E	1	8	-		6S8●	8	E	3	1	-
6PX6	7	E	1	8	-		6S8●	8	E	3	4	-
							6S8●	8	E	3	3	-
6Q4	5	E	1	3	-		6SA7	7	E	1	6	-
6Q6	7	E	1	11	-		6SB7Y	7	E	1	6	-
6Q6●	7	E	3	5	-		6SC7	8	E	1	3	-
6Q7	7	E	1	11	-		6SC7	8	E	1	4	-
6Q7●	7	E	3	4	-		6SD7	7	E	1	5	-
6Q7●	7	E	3	5	-		6SE7	7	E	1	5	-
6Q11	12	E	1	3	-		6SF5	8	E	1	2	-
6Q11	12	E	1	4	-		6SF7	8	E	1	2	-
6Q11	12	E	1	6	-		6SF7●	8	E	3	5	-
6R3●	5	E	1	11	*		6SG7	7	E	1	3	5
							6SH7	7	E	1	3	5

*OPEN-1-2-3-6-7-8

● = Read on Diode Scale

● = Read on Diode Scale

						23					
TUBE	X	Y	Z	TEST	OPEN	TUBE	X	Y	Z	TEST	OPEN
6SH8	5	E	1	7	-	6T10	12	E	1	2	-
6SJ7	7	E	1	5	-	6T10	12	E	1	9	-
6SK7	7	E	1	5	-						
6SL7	8	E	1	3	-	6U3●	5	E	1	3	-
6SL7	8	E	1	6	-	6U4●	8	E	1	3	2
6SN7	8	E	1	3	-	6U6	7	E	1	8	-
6SN7	8	E	1	6	-	6U7	7	E	1	8	-
6SQ7	8	E	1	2	-	6U8	5	E	1	8	-
6SQ7●	8	E	3	4	-	6U8	5	E	1	7	-
6SQ7●	8	E	3	5	-	6U9	5	E	1	2	-
6SR7	8	E	1	2	-	6U9	5	E	1	1	-
6SR7●	8	E	3	4	-	6U10	12	E	1	3	-
6SR7●	8	E	3	5	-	6U10	12	E	1	6	-
6SS7	7	E	1	5	-	6U10	12	E	1	4	-
6ST7	8	E	1	2	-						
6ST7●	8	E	3	4	-	6V3●	5	E	1	11	-
6ST7●	8	E	3	5	-	6V4●	5	E	1	1	-
6SU7	8	E	1	3	-	6V4●	5	E	1	7	-
6SU7	8	E	1	6	-	6V5	8	E	1	5	-
6SV7	8	E	1	2	-	6V6	7	E	1	8	-
6SV7●	8	E	1	5	-	6V7	7	E	1	11	-
6SZ7	8	E	1	2	-	6V7●	7	E	3	4	-
6SZ7●	8	E	3	4	-	6V7●	7	E	3	5	-
6SZ7●	8	E	3	5	-	6V8	5	E	1	6	-
						6V8●	5	E	1	2	-
6T4	4	E	1	5	-	6V8●	5	E	1	9	-
6T7	7	E	1	11	-	6V8●	5	E	1	8	-
6T7●	7	E	3	4	-	6V9	5	E	1	1	-
6T7●	7	E	3	5	-	6V9	5	E	1	9	-
6T8	5	E	1	8	-						
6T8●	5	E	1	1	-	6W4●	8	E	1	3	2
6T8●	5	E	1	6	-	6W5●	7	E	1	3	-
6T8●	5	E	1	2	-	6W5●	7	E	1	5	-
6T9	12	E	1	5	7	6W6	7	E	1	8	-
6T9	12	E	1	9	7	6W7	7	E	1	8	-

● = Read on Diode Scale

● = Read on Diode Scale

						24						
TUBE	X	Y	Z	TEST	OPEN	TUBE	X	Y	Z	TEST	OPEN	
6X4●	4	E	1	1	-	7EY6	7	E	1	8	-	
6X4●	4	E	1	6	-	7GS7	5	E	1	3	-	
6X5●	7	E	1	3	-	7GS7	5	E	1	9	-	
6X5●	7	E	1	5	-	7GV7	5	E	1	9	-	
6X8	5	E	1	2	-	7GV7	5	E	1	7	-	
6X8	5	E	1	7	-	7HG8	5	E	1	6	-	
6X9	5	E	1	2	-	7HG8	5	E	1	2	-	
6X9	5	E	1	1	-	7KY6	5	E	1	1	-	
6Y3●	7	E	6	11	-	7KZ6	5	E	1	1	9	
6Y6	7	E	1	8	-	7M-P18	4	E	1	2	-	
6Y7	7	E	1	4	-							
6Y7	7	E	1	5	-	8A2	5	E	1	8	-	
6Y9	5	E	1	2	-	8A8	5	E	1	7	-	
6Y9	5	E	1	7	-	8AC9●	12	E	1	2	-	
6Y10	12	E	1	9	-	8AC9●	12	E	1	3	-	
6Y10	12	E	1	2	-	8AC9	12	E	1	8	-	
6Z7	7	E	1	4	-	8AC10	12	E	1	3	-	
6Z7	7	E	1	5	-	8AC10	12	E	1	6	-	
6Z10	12	E	7	8	10	8AC10	12	E	1	4	-	
6Z10	12	E	1	3	10	8AR11	12	E	1	6	-	
6ZY5●	7	E	1	3	-	8AR11	12	E	1	11	-	
6ZY5●	7	E	1	5	-	8AU8	5	E	1	1	-	
7AB7	7	E	1	4	6-8	8AU8	5	E	1	6	-	
7AN7	5	E	1	1	8	8AV11	12	E	1	3	-	
7AN7	5	E	1	7	8	8AV11	12	E	1	6	-	
7AU7	9	C	1	3	-	8AV11	12	E	1	4	-	
7AU7	9	C	1	8	-	8AW8	5	E	1	1	-	
7D9	4	E	1	2	-	8AW8	5	E	1	6	-	
7DE7	5	E	1	3	-							
7DJ8	5	E	1	3	-	8B8	5	E	1	8	-	
7DJ8	5	E	1	8	-	8B8	5	E	1	2	-	
7EK7	5	E	1	1	-	8B10	12	E	1	2	-	
7EK7	5	E	1	7	-	8B10	12	E	1	7	-	
7ES8	5	E	1	3	-	8B10●	12	E	1	8	-	
7ES8	5	E	1	8	-	8B10●	12	E	1	10	-	

● = Read on Diode Scale

● = Read on Diode Scale

						25						
TUBE	X	Y	Z	TEST	OPEN	TUBE	X	Y	Z	TEST	OPEN	
8BA8	5	E	1	1	-	8CY7	5	E	1	8	-	
8BA8	5	E	1	6	-	8CY7	5	E	1	9	-	
8BA11	12	E	1	8	-							
8BA11	12	E	1	10	-	8D3	4	E	1	2	-	
8BH8	5	E	1	1	-	8D4	7	E	1	8	-	
8BH8	5	E	1	6	-	8D8	5	E	1	3	-	
8BM11	12	E	1	5	-	8DX8	5	E	1	3	-	
8BM11	12	E	1	10	-	8DX8	5	E	1	7	-	
8BN8	5	E	1	9	-							
8BN8●	5	E	1	3	-	8EB8	5	E	1	1	-	
8BN8●	5	E	1	2	-	8EB8	5	E	1	6	-	
8BN11	12	E	1	8	-	8EM5	5	E	1	7	8	
8BN11	12	E	1	2	-	8ET7	5	E	1	6	-	
8BQ5	5	E	1	3	1-6-8	8ET7●	5	E	3	2	-	
8BQ7	5	E	1	3	-	8ET7●	5	E	3	3	-	
8BQ7	5	E	1	8	-							
8BQ11	12	E	1	6	-	8FQ7	5	E	1	3	-	
8BQ11	12	E	1	11	-	8FQ7	5	E	1	8	-	
8BU11	12	E	1	2	-							
8BU11	12	E	1	5	-	8GJ7	5	E	1	2	-	
8BU11	12	E	1	11	-	8GJ7	5	E	1	9	-	
						8GK6	5	E	1	1	9	
8CG7	5	E	1	3	-	8GN8	5	E	1	1	-	
8CG7	5	E	1	8	-	8GN8	5	E	1	6	-	
8CM7	5	E	1	3	-	8GU7	5	E	1	3	-	
8CM7	5	E	1	9	-	8GU7	5	E	1	8	-	
8CN7	5	E	1	6	9	8GX7	5	E	1	9	3	
8CN7●	5	E	1	1	9	8GX7	5	E	1	2	3	
8CN7●	5	E	1	2	9							
8CS7	5	E	1	9	-	8HA6	5	E	1	1	-	
8CS7	5	E	1	8	-	8HG8	5	E	1	6	-	
8CW5	5	E	1	3	1-6-8	8HG8	5	E	1	2	-	
8CX8	5	E	1	1	-							
8CX8	5	E	1	6	-	8JE8	5	E	1	1	-	
						8JE8	5	E	1	6	-	

● = Read on Diode Scale

● = Read on Diode Scale

						26						
TUBE	X	Y	Z	TEST	OPEN	TUBE	X	Y	Z	TEST	OPEN	
8JK8	5	E	1	3	-	8U9	5	E	1	2	-	
8JK8	5	E	1	8	-	8U9	5	E	1	1	-	
8JL8	5	E	1	1	-							
8JL8	5	E	1	6	-	8X9	5	E	1	2	-	
8JT8	5	E	1	1	-	8X9	5	E	1	1	-	
8JT8	5	E	1	6	-							
8JU8●	5	E	1	1	-	9A8	5	E	1	8	-	
8JU8●	5	E	1	3	-	9A8	5	E	1	7	-	
8JU8●	5	E	1	7	-	9AK8	5	E	1	8	-	
* 8JU8●	5	E	1	9	-	9AK8●	5	E	1	6	-	
8JV8	5	E	1	1	-	9AK8●	5	E	1	1	-	
8JV8	5	E	1	6	-	9AK8●	5	E	1	3	-	
						9AQ8	5	E	1	3	-	
8KA8	5	E	1	2	-	9AQ8	5	E	1	8	-	
8KA8	5	E	1	6	-	9AU7	9	D	1	3	-	
8KR8	5	E	1	1	-	9AU7	9	D	1	8	-	
8KR8	5	E	1	6	-							
8KS8	5	E	1	1	-	9BJ11	12	E	1	6	-	
8KS8	5	E	1	6	-	9BJ11	12	E	1	11	-	
8KT8	5	E	1	1	-	9BM5	4	E	1	2	-	
8KT8	5	E	1	6	-	9BR7	9	D	1	3	9	
8KY8	5	E	1	3	-	9BR7●	9	D	1	6	-	
8KY8	5	E	1	1	-	9BR7●	9	D	1	7	-	
						9BR8	5	E	1	3	-	
8LC8	5	E	1	3	7	9BR8	5	E	1	8	-	
8LC8	5	E	1	7	-	9BW6	5	E	1	3	2-6	
8LE8	5	E	1	3	-							
8LT8	5	E	1	9	-	9CL8	5	E	1	3	-	
8LT8●	5	E	1	8	-	9CL8	5	E	1	8	-	
** 8LT8●	5	E	1	6	-							
						9D6	4	E	1	2	-	
8R-HP1	5	E	1	8	-	9D7	5	E	1	1	-	
8R-HP1	5	E	1	2	-	9DZ8	5	E	1	8	-	
8SN7	8	E	1	3	-	9DZ8	5	E	1	2	-	
8SN7	8	E	1	6	-							

● = Read on Diode Scale

* = Shorts Glow O.K. on Switch 2 & 8

● = Read on Diode Scale

** = Shorts Glow O.K. on Switch #1

						27						
TUBE	X	Y	Z	TEST	OPEN		TUBE	X	Y	Z	TEST	OPEN
9EA8	5	E	1	7	-		9X8	5	E	1	2	-
9EA8	5	E	1	8	-		9X8	5	E	1	7	-
9ED4 mag	5	E	2	1	-		10AL11	12	F	1	2	-
9EF6	7	E	1	8	-		10AL11	12	F	1	9	-
9GH8	5	E	1	8	-		10BQ5	5	F	1	3	1-6-8
9GH8	5	E	1	7	-		10C8	5	F	1	3	-
9GV8	5	E	1	3	-		10C8	5	F	1	9	-
9GV8	5	E	1	8	-		10C14	5	G	1	9	-
9JW8	5	E	1	8	-		10C14	5	G	1	2	-
9JW8	5	E	1	7	-		10CW5	5	F	1	3	1-6-8
9KC6	5	E	1	1	-		10DA7	5	F	2	9	-
9KV8	5	E	1	1	-		10DA7	5	F	2	8	-
9KV8	5	E	1	6	-		10DE7	5	F	1	9	-
9KX6	5	E	1	1	9		10DE7	5	F	1	8	-
9KZ8	5	E	1	3	-		10DR7	5	F	1	9	-
9KZ8	5	E	1	8	-		10DR7	5	F	1	8	-
9LA6	5	E	1	1	-		10DX8	5	F	1	3	-
9M-HH3	4	E	1	5	-		10DX8	5	F	1	7	-
9M-HH3	4	E	1	6	-		10EB8	5	F	1	1	-
9M-P12	4	E	1	2	-		10EB8	5	F	1	6	-
9P9	4	E	1	2	-		10EG7	8	F	1	3	-
9R-A6	5	E	1	1	2		10EG7	8	F	1	6	-
9R-AL1	5	E	2	8	-		10EM7	8	F	1	3	-
9R-AL1	5	E	1	9	-		10EM7	8	F	1	6	-
9R-HR2	5	E	1	8	-		10EW7	5	F	1	9	-
9R-HR2	5	E	1	7	-		10EW7	5	F	1	8	-
9U8	5	E	1	8	-		10F18	5	F	1	3	-
9U8	5	E	1	7	-		10FD7	5	F	1	9	-
9V9	5	E	1	1	-		10FD7	5	F	1	8	-
9V9	5	E	1	9	-							

● = Read on Diode Scale

● = Read on Diode Scale

TUBE	X	Y	Z	TEST	OPEN	TUBE	X	Y	Z	TEST	OPEN
10FD12	5	G	1	2	-	10L14	5	G	1	3	-
10FD12●	5	G	1	7	-	10L14	5	G	1	8	-
10FD12●	5	G	1	8	-	10LB8	5	F	1	1	-
10FR7	5	F	1	9	-	10LB8	5	F	1	6	-
10FR7	5	F	1	8	-	10LD12	5	G	1	8	-
10GF7 nov	5	F	1	3	-	10LD12●	5	G	1	6	-
10GF7	5	F	1	1	-	10LD12●	5	G	1	1	-
10GH8	5	F	1	8	-	10LD12●	5	G	1	3	-
10GH8	5	F	1	7	-	10LD14	5	G	1	3	-
10GK6	5	F	1	1	9	10LD14	5	G	1	8	-
10GN8	5	F	1	1	-	10LE8	5	F	1	3	-
10GN8	5	F	1	6	-	10LW8	5	F	1	1	-
10GV8	5	F	1	3	-	10LW8	5	F	1	6	-
10GV8	5	F	1	8	-	10LZ8	5	F	1	1	-
10HA6	5	F	1	1	-	10LZ8	5	F	1	6	-
10HF8	5	F	1	1	-	10P18	5	H	1	3	-
10HF8	5	F	1	6	-	10PL12	5	H	1	8	-
10J10	12	F	1	3	-	10PL12	5	H	1	2	-
10J10	12	F	7	8	-	11AF9	5	F	1	7	-
10JA8	5	F	1	1	-	11AF9	5	F	1	2	-
10JA8	5	F	1	6	-	11AR11	12	F	1	6	-
10JT8	5	F	1	1	-	11AR11	12	F	1	11	-
10JT8	5	F	1	6	-	11BM8	5	F	1	8	-
10JY8	5	F	1	1	-	11BM8	5	F	1	2	-
10JY8	5	F	1	6	-	11BQ11	12	F	1	6	-
10KR8	5	F	1	1	-	11BQ11	12	F	1	11	-
10KR8	5	F	1	6	-	11BT11	12	F	1	8	-
10KU8	5	F	1	6	-	11BT11	12	F	1	6	-
10KU8●	5	F	2	1	-	11BT11	12	F	1	4	-
10KU8●	5	F	2	2	-	11C5	4	F	1	1	-
						11CY7	5	F	1	9	-
						11CY7	5	F	1	8	-

● = Read on Diode Scale

● = Read on Diode Scale

						29						
TUBE	X	Y	Z	TEST	OPEN	TUBE	X	Y	Z	TEST	OPEN	
11FY7	12	F	1	7	8	12AF3●	5	F	1	11	*	
11FY7	12	F	1	9	8		*OPEN - 1-2-3-6-7-8					
11HM7	6	E	1	1	-	12AF4	4	F	1	5	6-7	
11JE8	5	F	1	1	-	12AF6	4	F	1	7	-	
11JE8	5	F	1	6	-	12AG6	4	F	2	2	-	
11KV8	5	F	1	1	-	12AH7	8	F	1	2	-	
11KV8	5	F	1	6	-	12AH7	8	F	1	4	-	
11LQ8	5	F	1	1	-	12AH8	5	F	1	7	-	
11LQ8	5	F	1	6	-	12AH8	5	F	1	2	-	
11R3●	5	F	1	11	-	12AJ6	4	F	1	1	-	
11Y9	5	F	1	2	-	12AJ6●	4	F	3	5	-	
11Y9	5	F	1	7	-	12AJ6●	4	F	3	6	-	
12A4	3	E	1	1	-	12AJ7	5	F	1	9	-	
12A6	7	F	1	8	-	12AJ7	5	F	1	2	-	
12A8	7	F	1	8	-	12AL5●	4	F	1	5	-	
12AB5	5	F	1	7	-	12AL5●	4	F	1	1	-	
12AC6	4	F	2	7	-	12AL8	5	F	1	9	-	
12AD5	5	F	1	3	-	12AL8	5	F	1	7	-	
12AD6	4	F	1	2	-	12AL11	12	F	1	2	-	
12AD7	5	F	1	3	9	12AL11	12	F	1	9	-	
12AD7	5	F	1	8	9	12AQ5	4	F	1	2	-	
12AE6	4	F	1	1	-	12AS5	4	F	1	1	5	
12AE6●	4	F	3	5	-	12AT6	4	F	1	1	-	
12AE6●	4	F	3	6	-	12AT6●	4	F	3	5	-	
12AE7	9	E	1	3	-	12AT6●	4	F	3	6	-	
12AE7	9	E	1	8	-	12AT7	9	E	1	3	-	
12AE10	12	F	1	2	-	12AT7	9	E	1	8	-	
12AE10	12	F	1	9	-	12AU5	7	F	1	3	-	
						12AU6	4	F	1	7	-	
						12AU7	9	E	1	3	-	
						12AU7	9	E	1	7	-	
						12AU8	5	F	1	1	-	
						12AU8	5	F	1	6	-	
						12AV5	7	F	1	3	-	

● = Read on Diode Scale

● = Read on Diode Scale

TUBE	X	Y	Z	TEST	OPEN
12AV6	4	F	1	1	-
12AV6●	4	F	3	5	-
12AV6●	4	F	3	6	-
12AV7	9	E	1	3	-
12AV7	9	E	1	8	-
12AW6	4	F	1	6	-
12AX3●	12	F	1	7	-
12AX4●	8	F	1	3	2
12AX5●	7	F	1	3	-
12AX5●	7	F	1	5	-
12AX7	9	E	1	8	-
12AX7	9	E	1	3	-
12AX12	5	F	1	1	-
12AY3● _{NOV}	5	F	1	9	*
*OPEN - 1-3-6-8					
12AY7	9	E	1	3	-
12AY7	9	E	1	8	-
12AZ7	9	E	1	3	-
12AZ7	9	E	1	8	-
12B4	3	E	1	1	-
12B8	7	F	1	6	-
12B8	7	F	1	1	-
12BA6	4	F	1	7	-
12BA7	5	F	1	3	-
12B-B14 _{MA}	5	F	1	3	-
12BD5	7	F	1	3	-
12BD6	4	F	1	7	-
12BE3●	12	F	1	7	5-9
12BE6	4	F	1	2	-
12BE8	5	F	1	3	-
12BE8	5	F	1	8	-
12BF6	4	F	1	1	-
12BF6●	4	F	4	5	-
12BF6●	4	F	4	6	-

● = Read on Diode Scale

TUBE	X	Y	Z	TEST	OPEN
12BF11	12	F	1	2	-
12BF11	12	F	1	9	-
12BH7	9	E	1	3	-
12BH7	9	E	1	8	-
12BH11	12	F	1	2	-
12BH11	12	F	1	5	-
12BH11	12	F	1	11	-
12BK5	5	F	1	6	7
12BK6	4	F	1	1	-
12BK6●	4	F	3	5	-
12BK6●	4	F	3	6	-
12BL6	4	F	1	7	-
12BL7	8	F	1	6	-
12BL7	8	F	1	3	-
12BM5	4	F	1	2	-
12BN6	4	F	6	1	-
12BQ6	7	F	1	8	-
12BR3●	5	F	1	11	*
*OPEN - 1-2-3-6-7-8					
12BR7	9	E	1	3	-
12BR7●	9	E	1	6	-
12BR7●	9	E	1	7	-
12BS3● _{NOV}	5	F	1	9	*
*OPEN - 1-3-6-8					
12BT3●	12	F	1	7	-
12BT6	4	F	1	1	-
12BT6●	4	F	3	5	-
12BT6●	4	F	3	6	-
12BU6	4	F	1	1	-
12BU6●	4	F	3	5	-
12BU6●	4	F	3	6	-
12BV7	6	E	1	1	-
12BV11	12	F	1	8	-
12BV11	12	F	1	5	-

● = Read on Diode Scale

						31						
TUBE	X	Y	Z	TEST	OPEN		TUBE	X	Y	Z	TEST	OPEN
12BW4●	5	F	1	1	-		12D8	5	F	1	9	1
12BW4●	5	F	1	7	-		12D8	5	F	1	2	1
12BX6	5	F	1	2	1		12DA6	5	F	1	3	-
12BY7	6	E	1	1	-		12DB5	5	F	1	2	7-8
12BZ6	4	F	1	2	-		12DE8	5	F	1	9	-
12BZ7	9	E	1	3	-		12DE8●	5	F	1	2	-
12BZ7	9	E	1	8	-		12DF5●	9	E	1	3	-
							12DF5●	9	E	1	8	-
12C5	4	F	1	1	5		12DF7	9	E	1	3	-
12C8	7	F	1	11	-		12DF7	9	E	1	8	-
12C8●	7	F	3	4	-		12DJ8	5	F	1	3	-
12C8●	7	F	3	5	-		12DJ8	5	F	1	8	-
12CA5	4	F	1	1	-		12DK6	4	F	1	2	-
12CB6	4	F	1	2	-		12DK7	5	F	1	1	8
12CD6	7	F	1	3	-		12DK7●	5	F	1	6	8
12CK3●	5	F	1	9	*		12DK7●	5	F	1	9	8
	*OPEN - 1-3-6-8						12DL8	5	F	1	2	-
12CL3● _{NOV}	5	F	1	9	*		12DL8●	5	F	1	1	-
	*OPEN - 1-3-6-8						12DL8●	5	F	1	9	-
12CM6	5	F	1	7	6		12DM4●	8	F	1	3	2
12CN5	4	F	1	1	-		12DM5	4	F	1	1	-
12CR6	4	F	1	7	-		12DM7	9	E	1	3	-
12CR6●	4	F	4	2	-		12DM7	9	E	1	8	-
12CS5	5	F	1	2	7-8		12DQ4●	8	F	1	3	2
12CS6	4	F	1	2	-		12DQ6	7	F	1	8	-
12CS7	5	F	1	9	-		12DQ7	6	E	1	1	-
12CS7	5	F	1	8	-		12DS7	5	F	1	8	-
12CT8	5	F	1	3	-		12DS7●	5	F	3	1	-
12CT8	5	F	1	9	-		12DS7●	5	F	3	9	-
12CU5	4	F	1	1	-		12DT5	5	F	1	7	8
12CU6	7	F	1	8	-		12DT6	4	F	1	2	-
12CX6	4	F	1	7	-		12DT7	9	E	1	3	-
							12DT7	9	E	1	8	-
12D4●	8	F	1	3	2		12DT8	5	F	1	3	-
							12DT8	5	F	1	8	-

● = Read on Diode Scale

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						32					
TUBE	X	Y	Z	TEST	OPEN	TUBE	X	Y	Z	TEST	OPEN
12DU7	5	F	1	1	8	12EL6	4	F	1	1	-
12DU7●	5	F	3	7	8	12EL6●	4	F	3	5	-
12DU7●	5	F	3	9	8	12EL6●	4	F	3	6	-
12DV7	5	F	2	8	9	12EM5	5	F	1	7	3
12DV7●	5	F	3	2	9	12EM6	5	F	1	1	7-8
12DV7●	5	F	3	3	9	12EM6●	5	F	3	9	7-8
12DV8	5	F	1	2	-	12EN6	7	F	1	8	-
12DV8●	5	F	1	1	-	12EQ7●	5	F	2	8	-
12DV8●	5	F	1	9	-	12EQ7	5	F	1	2	-
12DW4● _{Nov}	5	F	1	9	*	12EZ6	4	F	1	7	-
*OPEN - 1-3-6-8						12F5	7	F	1	8	-
12DW5	5	F	1	7	6	12F8	5	F	1	8	-
12DW7	9	E	1	3	-	12F8●	5	F	3	6	-
12DW7	9	E	1	8	-	12F8●	5	F	3	1	-
12DW8	5	F	1	3	-	12FA6	4	F	1	2	-
12DW8●	5	F	1	7	-	12FK6	4	F	1	1	-
12DW8●	5	F	1	9	-	12FK6●	4	F	3	5	-
12DY7	5	F	1	8	9	12FK6●	4	F	3	6	-
12DY8	5	F	1	7	-	12FM6	4	F	1	1	-
12DY8	5	F	1	2	-	12FM6●	4	F	3	5	-
12DZ6	4	F	1	7	-	12FM6●	4	F	3	6	-
12DZ8	5	F	1	8	-	12FQ7	5	F	1	3	-
12DZ8	5	F	1	2	-	12FQ7	5	F	1	8	-
12E5	7	F	1	8	-	12FQ8	5	F	1	2	-
12EA6	4	F	1	7	-	12FQ8	5	F	1	7	-
12EC8	5	F	1	3	-	12FR8	5	F	1	2	-
12EC8	5	F	1	8	-	12FR8	5	F	2	3	-
12ED5	4	F	1	1	-	12FR8●	5	F	2	8	-
12EF6	7	F	1	8	-	12FV7	9	E	1	3	-
12EG6	4	F	1	2	-	12FV7	9	E	1	8	-
12EH5	4	F	1	1	-	12FX5	4	F	1	1	-
12EK6	4	F	1	7	-	12FX8●	5	F	1	6	-
						12FX8	5	F	1	7	-

● = Read on Diode Scale

● = Read on Diode Scale

TUBE	X	Y	Z	TEST	OPEN	TUBE	X	Y	Z	TEST	OPEN
12FY8	5	F	1	8	-	12J8	5	F	1	2	-
12FY8	5	F	1	2	-	12J8●	5	F	1	8	-
						12J8●	5	F	1	9	-
12G4	4	F	1	7	2	12JB6	5	F	1	3	9
12G8	4	F	2	2	9	12JN6	12	F	1	2	-
12G8	4	F	2	7	9	12JN8	5	F	1	3	-
12G11	12	F	1	2	-	12JN8	5	F	1	8	-
12G11	12	F	1	9	-	12JQ6	4	F	1	7	8
12GA6	4	F	1	2	-	12JQ6●	4	F	2	6	-
12G-B3	7	F	1	8	-	12JS6	12	F	1	2	7-9
12G-B7	7	F	1	8	-	12JT6 nov	5	F	1	3	8
12GC5	5	F	1	7	6-8	12JZ8	12	F	1	6	7
12GC6	7	F	1	3	8	12JZ8	12	F	1	11	7
12GE5	12	F	1	4	*						
*OPEN-5-6-8-9-10						12K5	4	F	1	1	-
12GJ5 nov	5	F	1	3	8-9	12K7	7	F	1	8	-
12G-K17●	8	F	1	3	-	12K8	7	F	1	8	-
12GN6	4	F	1	1	-	12KL8●	5	F	3	8	-
12GN6●	4	F	2	7	-	12KL8	5	F	1	2	-
12GN7	6	E	1	1	-	12L6	7	F	1	8	-
12GT5 nov	5	F	1	3	8						
12GW6	7	F	1	8	-	12MD8 nov	5	F	1	6	-
						12MD8	5	F	1	8	-
12H4	2	E	1	7	-	12MD8	5	F	1	9	-
12H6●	7	F	1	4	-						
12H6●	7	F	1	8	-	12Q7	7	F	1	11	-
12HE7●	12	F	1	4	7-10	12Q7●	7	F	3	4	-
12HE7	12	F	1	8	7-10	12Q7●	7	F	3	5	-
12HG7	6	E	1	1	-						
12HL5	5	F	1	3	6-8	12R5	4	F	1	1	-
12HL7	5	F	1	1	-	12R-K19●	5	F	1	11	-
12J5	7	F	1	8	-	12R-LL5	5	F	1	3	-
12J7	7	F	1	8	-	12R-LL5	5	F	1	8	-

● = Read on Diode Scale

● = Read on Diode Scale

						34						
TUBE	X	Y	Z	TEST	OPEN		TUBE	X	Y	Z	TEST	OPEN
12S8	7	F	1	11	-		12U7	9	E	2	3	-
12S8●	7	F	3	1	-		12U7	9	E	2	8	-
12S8●	7	F	3	4	-							
12S8●	7	F	3	3	-		12V6	7	F	1	8	-
12SA7	7	F	1	6	-							
12SB7	7	F	1	6	-		12W6	7	F	1	8	-
12SC7	8	F	1	3	-							
12SC7	8	F	1	4	-		12X4●	4	F	1	1	-
12SF5	8	F	1	2	-		12X4●	4	F	1	6	-
12SF7	8	F	1	2	-							
12SF7●	8	F	3	5	-		13CM5	7	F	1	8	-
12SG7	7	F	1	3	5		13CW4	12	F	1	8	-
12SH7	7	F	1	3	5							
12SJ7	7	F	1	5	-		13D1	8	G	1	6	-
12SK7	7	F	1	5	-		13D1	8	G	1	3	-
12SL7	8	F	1	3	-		13D2	8	E	1	3	-
12SL7	8	F	1	6	-		13D2	8	E	1	6	-
12SN7	8	F	1	3	-		13D3	5	F	1	8	-
12SN7	8	F	1	6	-		13D3	5	F	1	3	-
12SQ7	8	F	1	2	-		13DE7	5	F	1	9	-
12SQ7●	8	F	3	4	-		13DE7	5	F	1	8	-
12SQ7●	8	F	3	5	-		13DR7	5	F	1	9	-
12SR7	8	F	1	2	-		13DR7	5	F	1	8	-
12SR7●	8	F	3	4	-							
12SR7●	8	F	3	5	-		13EM7	8	F	1	3	-
12SW7	8	F	1	2	-		13EM7	8	F	1	6	-
12SW7●	8	F	1	4	-							
12SW7●	8	F	1	5	-		13FD7	5	F	1	9	-
12SX7	8	F	1	3	-		13FD7	5	F	1	8	-
12SX7	8	F	1	6	-		13FM7	12	F	1	7	6
12SY7	7	F	1	6	-		13FM7	12	F	1	9	6
							13FR7	5	F	1	9	-
12T10	12	F	1	2	-		13FR7	5	F	1	8	-
12T10	12	F	1	9	-							
							13GB5	5	F	1	3	8-9

● = Read on Diode Scale

● = Read on Diode Scale

						35						
TUBE	X	Y	Z	TEST	OPEN	TUBE	X	Y	Z	TEST	OPEN	
13GF7 nov	5	F	1	3	-	14Y7	5	G	1	9	-	
13GF7	5	F	1	1	-	14Y7	5	G	1	2	-	
13J10	12	F	1	3	10	15A6	5	F	1	3	-	
13J10	12	F	7	8	10	15A8	5	F	1	1	-	
13JZ8	12	F	1	6	7	15A8	5	F	1	6	-	
13JZ8	12	F	1	11	-	15AF11	12	F	1	7	-	
						15AF11	12	F	1	5	-	
13V10	12	F	1	2	-	15AF11	12	F	1	9	-	
13V10	12	F	1	9	-							
						15BD11	12	F	1	7	-	
13Z10	12	F	1	3	10	15BD11	12	F	1	5	-	
13Z10	12	F	1	8	10	15BD11	12	F	1	9	-	
14BF11	12	F	1	2	-	15CW4	12	F	1	8	-	
14BF11	12	F	1	9	-	15CW5	5	F	1	3	1-6-8	
14BL11	12	F	1	8	-							
14BL11	12	F	1	6	-	15DQ8	5	F	1	3	-	
14BL11	12	F	1	4	-	15DQ8	5	F	1	7	-	
14BQ11	12	F	1	6	-							
14BQ11	12	F	1	11	-	15EA7	8	F	1	7	-	
14BR11	12	F	1	5	-	15EA7	8	F	1	6	-	
14BR11	12	F	1	7	-	15EW6	4	F	1	2	-	
14BR11	12	F	1	4	-	15EW7	5	F	1	9	-	
						15EW7	5	F	1	8	-	
14DA7	5	F	2	9	-							
14DA7	5	F	2	8	-	15FM7	12	F	1	7	6	
14G6	5	F	1	2	-	15FM7	12	F	1	9	6	
14G6●	5	F	1	8	-	15FY7	12	F	1	7	8	
14G6●	5	F	1	6	-	15FY7	12	F	1	9	8	
14GT8	5	F	2	7	-							
14GT8●	5	F	1	1	-	15HA6	5	F	1	1	-	
14GT8●	5	F	1	3	-	15HB6	5	F	1	1	-	
14GW8	5	F	1	2	-	15HG8	5	F	1	6	3	
14GW8	5	F	1	7	-	15HG8	5	F	1	2	3	

● = Read on Diode Scale

● = Read on Diode Scale

TUBE X Y Z TEST OPEN

15KY8 ^{nov}	5	F	1	1	-
15KY8	5	F	1	3	-
15LE8	5	F	1	3	-
16A5	5	F	1	3	-
16A8	5	F	1	8	-
16A8	5	F	1	2	-
16AQ3●	5	F	1	11	*
*OPEN-1-2-3-6-7-8					
16GK6	5	F	1	1	9
16GK8	5	F	1	8	-
16GK8	5	F	1	2	-
16GY5	12	F	1	4	10
16KA6	12	F	1	10	7-9-11
16LU8	12	F	1	11	-
16LU8	12	F	1	9	-
16Y9	5	F	1	2	-
16Y9	5	F	1	7	-
17AB10	12	F	1	3	10
17AB10	12	F	7	8	10
17AU5	7	F	1	3	-
17AV5	7	F	1	3	-
17AX3●	12	F	1	7	-
17AX4●	8	F	1	3	2
17AY3●	5	F	1	9	*
*OPEN-1-3-6-8					
17B-B14 ^{mag}	5	F	1	3	-
17BD11	12	F	1	7	-
17BD11	12	F	1	5	-
17BD11	12	F	1	9	-
17BE3●	12	F	1	7	5-9

TUBE X Y Z TEST OPEN

17BF11	12	F	1	2	-
17BF11	12	F	1	9	-
17BH3● ^{nov}	5	F	1	9	*
*OPEN-1-3-6-8					
17BQ6	7	F	1	8	-
17BR3●	5	F	1	11	*
*OPEN-1-2-3-6-7-8					
17BS3● ^{nov}	5	F	1	9	*
*OPEN-1-3-6-8					
17BY7	5	F	1	1	1
17BZ3●	12	F	1	7	*
*OPEN-5-6-8-9					
17C5	4	F	1	1	-
17C8	5	F	1	2	-
17C8●	5	F	2	7	-
17C8●	5	F	2	8	-
17C9	5	F	1	10	-
17C9	5	F	1	6	-
17CA5	4	F	1	1	5
17CK3● ^{nov}	5	F	1	9	*
*OPEN-1-3-6-8					
17CL3● ^{nov}	5	F	1	9	*
*OPEN-1-3-6-8					
17CT3	4	F	1	9	-
17CU5	4	F	1	1	-
17D4●	8	F	1	3	2
17DE4●	8	F	1	3	2
17DG6	7	F	1	8	-
17DM4●	8	F	1	3	2
17DQ4●	8	F	1	3	2
17DQ6	7	F	1	8	-
17DW4● ^{nov}	5	F	1	9	*
*OPEN-1-3-6-8					

● = Read on Diode Scale

● = Read on Diode Scale

						37						
TUBE	X	Y	Z	TEST	OPEN	TUBE	X	Y	Z	TEST	OPEN	
17EW8	5	F	1	3	-	17LD8 nov	5	F	1	3	-	
17EW8	5	F	1	8	-	17LD8	5	F	1	1	-	
17FY7	12	F	1	7	-							
17FY7	12	F	1	9	-	17R5	4	F	1	1	-	
17GE5	12	F	1	4	*	17W6	7	F	1	8	-	
*OPEN-5-6-8-9-10												
17GJ5 nov	5	F	1	3	8-9	17X10	12	F	1	3	10	
17GT5 nov	5	F	1	3	8	17X10	12	F	6	8	10	
17GT6	5	F	1	1	-							
17GV5	12	F	1	4	10	17Z3●	5	F	1	11	-	
17GW6	7	F	1	8	-	18A5	7	G	1	3	-	
17GY5	12	F	1	4	9-10-11	18DZ8	5	G	1	8	-	
						18DZ8	5	G	1	2	-	
17H3●	5	F	1	1	2-6-9							
17H-B25	5	F	1	9	-	18FW6	4	G	1	7	-	
17HC8	5	F	1	8	-	18FX6	4	G	1	2	-	
17HC8	5	F	1	2	-	18FY6	4	G	1	1	-	
						18FY6●	4	G	3	5	-	
17JB6 nov	5	F	1	3	9	18FY6●	4	G	3	6	-	
17JG6 nov	5	F	1	3	8	18GB5 mag	5	G	1	3	8-9	
17JK8	5	F	1	3	-	18GD6	4	G	1	7	-	
17JK8	5	F	1	8	-	18GE6	4	G	1	1	-	
17JM6	12	F	1	2	8	18GE6●	4	G	3	5	-	
17JN6	12	F	1	2	-	18GE6●	4	G	3	6	-	
17JQ6	4	F	1	7	8	18GV8	5	G	1	3	-	
17JQ6●	4	F	2	6	-	18GV8	5	G	1	8	-	
17JS6	12	F	1	2	*	18HB8	5	G	1	2	-	
*OPEN-7-9-10-11						18HB8	5	G	1	8	-	
17JT6 nov	5	F	1	3	8	18R-AL1	5	G	2	8	-	
17JZ8	12	F	1	9	7	18R-AL1	5	G	1	9	-	
17JZ8	12	F	1	11	-							
17KV6 nov	5	F	1	3	8	19AJ8	5	G	1	9	-	
17L6	7	F	1	8	-	19AJ8	5	G	1	2	-	

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TUBE	X	Y	Z	TEST	OPEN	TUBE	X	Y	Z	TEST	OPEN
19AQ5	4	G	1	2	7	19HR6	4	G	1	7	-
19AU4●	8	G	1	3	2	19HS6	4	G	1	7	-
19BG6	7	G	1	3	-	19HV8	5	G	1	3	-
19BR5	5	G	1	2	3-6-8	19HV8	5	G	1	8	-
19C8	5	G	1	8	-	19J6	4	G	1	5	-
19C8●	5	G	1	1	-	19J6	4	G	1	6	-
19C8●	5	G	1	6	-	19JC6	5	G	1	1	3
19C8●	5	G	1	3	-	19JN8	5	G	1	3	-
19CG3●	12	G	1	7	*	19JN8	5	G	1	8	-
*OPEN-2-5-6-8-9-10						19KF6 mag	5	G	1	3	-
19CL8	5	G	1	3	-	19KG8	5	G	1	3	-
19CL8	5	G	1	8	-	19KG8	5	G	1	8	-
19D8	5	G	1	9	-	19MR9	4	G	1	7	-
19D8	5	G	1	2	-	19Q9	5	G	1	10	-
19DE7	5	G	1	9	-	19Q9	5	G	1	7	-
19DE7	5	G	1	8	-	19T8	5	G	1	8	-
19EA8	5	G	1	8	-	19T8●	5	G	1	1	-
19EA8	5	G	1	7	-	19T8●	5	G	1	6	-
19EZ8	5	G	1	1	-	19T8●	5	G	1	2	-
19EZ8	5	G	1	7	-	19U3●	5	G	1	3	-
19EZ8	5	G	1	9	-	19V8	5	G	1	6	-
19FL8	5	G	1	2	-	19V8●	5	G	1	2	-
19FL8●	5	G	1	7	-	19V8●	5	G	1	9	-
19FL8●	5	G	1	8	-	19V8●	5	G	1	8	-
19GK6	5	G	1	1	9	19W3●	5	G	1	3	-
19GQ7●	5	G	1	1	3	19X3●	5	G	1	3	-
19GQ7●	5	G	1	7	3	19X8	5	G	1	2	-
19GQ7●	5	G	1	9	3	19X8	5	G	1	7	-

● = Read on Diode Scale

● = Read on Diode Scale

TUBE	X	Y	Z	TEST	OPEN
19Y3●	5	G	1	3	-
20AQ3●	5	G	1	11	*
	*OPEN-1-2-3-6-7-8-9				
20D4	5	E	1	9	-
20D4	5	E	1	2	-
20EG7	8	G	1	3	-
20EG7	8	G	1	6	-
20EQ7	5	G	1	2	-
20EQ7●	5	G	2	8	-
20EW7	5	G	1	9	-
20EW7	5	G	1	8	-
20EZ7	2	G	1	4	3
20EZ7	2	G	1	9	3
21A6	5	G	1	3	-
21AK6	4	G	1	7	-
21EF6	7	G	1	8	-
21EX6	7	G	1	3	-
21GV5	12	G	1	4	9-10-11
21GY5	12	G	1	4	10
21HB3	5	G	1	1	-
21HB5	12	G	1	4	*
	*OPEN-5-6-8-9-10				
21HD5	12	G	1	4	6-8-10
21HJ5	12	G	1	2	6-8
21JV6	12	G	1	2	-
21JZ6	12	G	1	2	9-11

● = Read on Diode Scale

39 TUBE	X	Y	Z	TEST	OPEN
21KA6	12	G	1	10	7-9-11
21KQ6 ^{mag}	5	G	1	9	-
21LR8 ^{nov}	5	G	1	1	-
21LR8	5	G	1	3	-
21LU8	12	G	1	11	-
21LU8	12	G	1	9	-
22BH3● ^{nov}	5	G	1	9	*
	*OPEN-1-3-6-8				
22BW3●	12	G	1	7	*
	*OPEN-5-6-8-9				
22BW6	5	G	1	3	2-6
22DE4●	8	G	1	3	2
22JF6 ^{nov}	5	G	1	3	9
22JG6 ^{nov}	5	G	1	3	8
22JQ6	4	G	1	7	8
22JQ6●	4	G	2	6	-
22JR6 ^{nov}	5	G	1	3	8
22JU6 ^{nov}	5	G	1	3	9
22KM6 ^{nov}	5	G	1	3	9
23JS6	12	G	1	2	7-9
23Z9	12	G	2	3	6
23Z9	12	G	1	10	6
23Z9	12	G	1	8	6
24JE6 ^{nov}	5	G	1	3	9
25A6	7	G	1	8	-
25A7	7	G	1	8	-
25A7●	7	G	1	1	-
25AC5	7	G	1	8	-
25AU4●	8	G	1	3	-

● = Read on Diode Scale

						40						
TUBE	X	Y	Z	TEST	OPEN	TUBE	X	Y	Z	TEST	OPEN	
25AV5	7	G	1	3	-	25FY8	5	G	1	8	-	
25AX4●	8	G	1	3	2	25FY8	5	G	1	2	-	
25B6	7	G	1	8	-	25L6	7	G	1	8	-	
25B8	7	G	1	6	-	25N6	7	G	1	8	-	
25B8	7	G	1	1	-	25W4●	8	G	1	3	2	
25B-B14	5	G	1	3	-	25W6	7	G	1	8	-	
25BK5	5	G	1	6	7	25X6●	7	G	1	4	-	
25BQ6	7	G	1	8	-	25X6●	7	G	1	8	-	
25BR3●	5	G	1	11	*	25Z4●	7	G	1	8	-	
*OPEN-1-2-3-6-7-8						25Z6●	7	G	1	4	-	
25C5	4	G	1	1	-	25Z6●	7	G	1	8	-	
25C6	7	G	1	8	-	25Z6●	7	G	1	8	-	
25CA5	4	G	1	1	-	26A6	4	G	1	7	-	
25CD6	7	G	1	3	-	26BK6	4	G	1	1	-	
25CG3●	12	G	1	7	*	26BK6●	4	G	3	5	-	
*OPEN-2-5-6-8-9						26BK6●	4	G	3	6	-	
25CG6	4	G	1	7	-	26C6	4	G	1	1	-	
25CU6	7	G	1	6	-	26C6●	4	G	3	5	-	
25D4●	8	G	1	3	2	26C6●	4	G	3	6	-	
25D8	7	G	1	5	-	26CG6	4	G	1	7	-	
25D8	7	G	1	11	-	26D6	4	G	1	2	-	
25D8●	7	G	1	8	-	26Z5●	5	G	1	3	9	
25DK4●	4	G	1	7	6	26Z5●	5	G	1	8	9	
25DN6	7	G	1	3	-	27GB5 mag 5	5	G	1	3	8-9	
25DQ6	7	G	1	8	-							
25DT5	5	G	1	7	8							
25E5	7	G	1	8	1-3							
25EC6	7	G	1	3	-							
25EH5	4	G	1	1	-							
25F5	4	G	1	1	-							

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TUBE	X	Y	Z	TEST	OPEN
27KG6 mag 5	5	G	1	9	-
28GB5 mag 5	5	G	1	3	8-9
28HA6	5	G	1	1	-
28HD5	12	G	1	4	*
*OPEN-6-8-9-10-11					
29GK6	5	G	1	1	9
29KQ6 mag 5	5	G	1	9	-
30A5	4	G	1	1	-
30AE3●	5	G	1	11	*
*OPEN-1-2-3-6-7-8-9					
30AG11●	12	G	1	2	-
30AG11●	12	G	1	11	-
30AG11	12	G	1	4	-
30AG11	12	G	1	9	-
30C1	5	E	1	8	-
30C1	5	E	1	2	-
30CW5	5	G	1	3	1-6-8
30F5	5	E	1	3	-
30HD5	12	G	1	4	*
*OPEN-6-8-9-10-11					
30HJ5	12	G	1	2	6-8
30KD6	12	G	1	2	7
30L1	5	E	1	1	-
30L1	5	E	1	7	-

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TUBE	X	Y	Z	TEST	OPEN
30P4	7	G	1	8	-
30P16	5	F	1	3	-
30P18	5	F	1	3	-
30PL1	5	F	1	8	-
30PL1	5	F	1	2	-
30PL13	5	F	1	8	-
30PL13	5	F	1	2	-
31JS6	12	G	1	2	7-9
32ET5	4	G	1	1	-
32L7	7	G	1	8	-
32L7●	7	G	1	1	-
33GT7	12	G	1	8	7
33GT7●	12	G	1	4	7
33GY7	12	G	1	8	7
33GY7●	12	G	1	4	7
33JV6	12	G	1	2	-
34CD3●	12	G	1	7	*
*OPEN-5-6-8-9					
34CE3●	12	G	4	7	*
*OPEN-2-3-5-6-8-9-11					
34GD5	4	G	1	1	-
34R3●	5	G	1	11	*
*OPEN-1-2-3-6-7-8					
35B5	4	G	1	2	-
35C5	4	G	1	1	-

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TUBE	X	Y	Z	TEST	OPEN	42 TUBE	X	Y	Z	TEST	OPEN
35CD6	7	G	1	3	-	42KN6	12	H	1	2	7-9-11
35DZ8	5	G	1	8	-	45B5	5	H	1	3	1-6-8
35DZ8	5	G	1	2	-	45Z3●	4	H	1	4	-
35EH5	4	G	1	1	-	45Z5●	7	H	1	8	3
35GL6	4	G	1	1	6	50AX6●	7	H	1	4	-
35HB8	5	G	1	2	-	50AX6●	7	H	1	8	-
35HB8	5	G	1	8	-	50B5	4	H	1	2	-
35L6	7	G	1	8	-	50BK5	5	H	1	6	7
35W4●	4	G	1	7	6	50BM8	5	H	1	8	-
35Z4●	7	G	1	8	-	50BM8	5	H	1	2	-
35Z5●	7	G	1	8	3	50C5	4	H	1	1	-
35Z6●	7	G	1	4	-	50C6	7	H	1	8	-
35Z6●	7	G	1	8	-	50CA5	4	H	1	1	-
36AM3●	4	G	1	7	6	50CD6	7	H	1	3	-
36KD6	12	G	1	2	7	50DC4●	4	H	1	7	6
38A3●	5	H	1	3	-	50EH5	4	H	1	1	-
38HE7●	12	G	1	4	7-10	50FA5	4	H	1	1	-
38HE7	12	G	1	8	7-10	50FE5	7	H	1	8	-
38HK7●	12	G	1	4	7-10	50FK5	4	H	1	1	-
38HK7	12	G	1	8	7-10	50FY8	5	H	1	8	-
40FR5	4	H	1	1	-	50FY8	5	H	1	2	-
40KD6	12	H	1	2	7	50HC6	4	H	1	1	6
40Z5	4	H	1	1	3	50HK6	4	H	1	1	6
						50HN5	5	H	1	3	6-8
						50JY6	7	H	1	8	-

● = Read on Diode Scale

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TUBE	X	Y	Z	TEST	OPEN	43 TUBE	X	Y	Z	TEST	OPEN
50L6	7	H	1	8	-	63TP	5	E	1	2	-
50Y6●	7	H	1	4	-	63TP	5	E	1	9	-
50Y6●	7	H	1	8	-	64ME	7	E	4	8	-
50Y7●	7	H	1	4	6	64SPT	5	E	1	3	-
50Y7●	7	H	1	8	6	65ME	5	E	1	2	-
50Z6●	7	H	1	4	-	70A7	7	H	1	8	6
50Z6●	7	H	1	8	-	70L6	7	H	1	8	-
50Z7●	7	H	1	4	6	70L7	7	H	1	6	-
50Z7●	7	H	1	8	6	70L7●	7	H	1	1	-
52KU●	8	D	1	4	-	117L7	7	J	1	8	-
52KU●	8	D	1	6	-	117L7	7	J	1	1	-
53KU●	8	D	1	4	-	117M7	7	J	1	8	-
53KU●	8	D	1	6	-	117M7●	7	J	1	1	-
54KU●	8	D	1	4	-	117N7	7	J	1	6	-
54KU●	8	D	1	6	-	117N7●	7	J	1	8	-
55N3●	5	H	1	3	-	117P7	7	J	1	6	-
56R9	6	F	1	4	7	117P7●	7	J	1	8	-
56R9	7	H	1	10	6	117Z3●	4	J	1	6	1
58HE7●	12	H	1	4	7-10	117Z4●	7	J	1	8	-
58HE7	12	H	1	8	7-10	117Z6●	7	J	1	4	-
60FX5	4	H	1	1	-	117Z6●	7	J	1	8	-
60HL5	5	H	1	3	6-8	213	5	G	1	3	-
63T1	5	E	1	2	-						
63T1	5	E	1	9	-						

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TUBE	X	Y	Z	TEST	OPEN	⁴⁴ TUBE	X	Y	Z	TEST	OPEN
274B●	8	D	1	4	-	1853	7	E	1	5	-
274B●	8	D	1	6	-	2050	7	E	1	8	-
401A	4	E	1	2	7	4604	7	E	1	5	-
403B	4	E	1	2	7	5187	7	E	1	8	-
408A	4	E	1	2	7	5516	7	E	1	5	-
421A	8	E	1	3	-	5590	4	E	1	2	7
421A	8	E	1	6	-	5591	4	E	1	2	7
1201	8	E	1	4	-	5595	4	E	1	2	-
1204	7	E	1	4	6-8	5610	4	E	1	2	-
1216	4	E	1	5	-	5618	7	E	1	6	-
1216	4	E	1	6	-	5626●	4	E	1	5	-
1217	4	E	1	2	-	5626●	4	E	1	1	-
1223	7	E	1	8	-	5654	4	E	1	2	7
1560●	8	D	2	4	-	5686	5	E	1	1	3-8
1560●	8	D	2	6	-	5687	8	E	1	3	-
1611	7	E	1	8	-	5687	8	E	1	6	-
1612	7	E	1	8	-	5691	8	E	1	6	-
1614	7	E	1	8	-	5691	8	E	1	3	-
1620	7	E	1	8	-	5692	8	E	1	3	-
1621	7	E	1	8	-	5692	8	E	1	6	-
1622	7	E	1	8	-	5693	7	E	1	5	-
1626	7	F	1	8	-	5694	7	E	1	1	-
1629	7	F	3	8	-	5694	7	E	1	8	-
1631	7	F	1	8	-	5696	4	E	1	2	-
1632	7	F	1	8	-	5725	4	E	1	2	-
1633	8	G	1	3	-	5726●	4	E	1	5	-
1633	8	G	1	6	-	5726●	4	E	1	1	-
1634	8	F	1	3	-	5727	4	E	1	2	-
1634	8	F	1	4	-	5732	7	E	1	8	-
1635	7	E	1	4	-	5749	4	E	1	7	-
1635	7	E	1	5	-	5750	4	E	1	2	-
1639	8	E	1	3	-	5751	9	E	1	3	-
1639●	8	E	3	5	-	5751	9	E	1	8	-
1639●	8	E	3	6	-	5755	8	E	1	3	-
1852	7	E	1	5	-	5755	8	E	1	6	-

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						45						
TUBE	X	Y	Z	TEST	OPEN	TUBE	X	Y	Z	TEST	OPEN	
5763	5	E	1	7	-	5998	8	E	1	3	-	
5814	9	E	1	3	-	5998	8	E	1	6	-	
5814	9	E	1	8	-	6000	7	G	1	3	-	
5824	7	G	1	8	-	6004●	8	D	2	4	-	
5838●	7	E	1	3	-	6004●	8	D	2	6	-	
5838●	7	E	1	5	-	6005	4	E	1	2	-	
5839●	7	E	1	3	-	6006	4	E	1	3	-	
5839●	7	E	1	5	-	6028	4	E	1	2	7	
5844	4	E	1	5	-	6042	8	E	1	3	-	
5844	4	E	1	6	-	6042	8	E	1	6	-	
5845●	4	D	1	1	-	6045	4	E	1	5	-	
5845●	4	D	1	5	-	6045	4	E	1	6	-	
5852●	7	E	1	3	-	6046	7	G	1	8	-	
5852●	7	E	1	5	-	6054	7	E	1	3	-	
5871	7	E	1	8	-	6057	5	F	1	3	-	
5879	5	E	1	3	-	6057	5	F	1	8	-	
5881	7	E	1	8	-	6058●	4	E	1	5	-	
5910	7	B	2	6	5	6058●	4	E	1	1	-	
5915	4	E	1	2	-	6059	5	E	1	3	-	
5920	4	E	1	5	-	6060	5	F	1	3	-	
5920	4	E	1	6	-	6060	5	F	1	8	-	
5929	4	E	1	5	-	6061	5	E	1	3	-	
5929	4	E	1	6	-	6063●	4	E	1	1	-	
5931●	8	D	2	4	-	6063●	4	E	1	6	-	
5931●	8	D	2	6	-	6064	4	E	1	2	-	
5932	7	E	1	8	-	6065	4	E	1	2	-	
5961	7	E	1	6	-	6066	4	E	1	1	-	
5963	9	E	1	3	-	6066●	4	E	3	6	-	
5963	9	E	1	8	-	6066●	4	E	3	5	-	
5964	4	E	1	5	-	6067	5	F	1	3	-	
5964	4	E	1	6	-	6067	5	F	1	8	-	
5965	9	E	1	3	-	6072	9	E	1	3	-	
5965	9	E	1	8	-	6072	9	E	1	8	-	
5993●	4	E	1	1	-	6080	8	E	1	3	-	
5993●	4	E	1	6	-	6080	8	E	1	6	-	

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TUBE	X	Y	Z	TEST	OPEN	46 TUBE	X	Y	Z	TEST	OPEN
6082	8	E	1	3	-	6188	8	E	1	3	-
6082	8	E	1	6	-	6188	8	E	1	6	-
6084	5	E	1	3	-	6189	9	E	1	3	-
6085	9	E	1	3	-	6189	9	E	1	8	-
6085	9	E	1	8	-	6197	5	E	1	1	8-9
6087●	8	D	2	4	-	6201	9	E	1	3	-
6087●	8	D	2	6	-	6201	9	E	1	8	-
6094	4	E	1	8	-	6202●	4	E	1	1	-
6095	4	E	1	2	-	6202●	4	E	1	6	-
6096	4	E	1	2	7	6203●	5	E	1	1	-
6097●	4	E	1	5	-	6203●	5	E	1	9	-
6097●	4	E	1	1	-	6211	9	E	1	3	-
6099	4	E	1	5	-	6211	9	E	1	8	-
6099	4	E	1	6	-	6216	5	E	1	3	6-8
6100	4	E	1	7	2	6227	5	E	1	3	-
6101	4	E	1	5	-	6265	4	E	1	2	-
6101	4	E	1	6	-	6267	5	E	1	3	-
6106●	8	D	2	4	-	6336	8	E	1	3	-
6106●	8	D	2	6	-	6336	8	E	1	6	-
6113	8	E	1	3	-	6350	5	F	1	2	9
6113	8	E	1	6	-	6350	5	F	1	7	9
6118	7	E	1	8	-	6360	9	E	1	3	-
6118●	7	E	1	5	-	6360	9	E	1	1	-
6118●	7	E	1	4	-	6374●	5	E	1	3	-
6132	5	E	1	3	-	6394	8	E	1	3	-
6134	7	E	1	5	-	6394	8	E	1	6	-
6135	4	E	1	7	2	6443●	5	E	1	3	-
6136	4	E	1	7	-	6463	5	F	1	2	-
6137	7	E	1	5	-	6463	5	F	1	7	-
6146	7	E	1	6	1-4	6485	4	E	1	7	-
6180	8	E	1	3	-	6486	4	E	1	2	8
6180	8	E	1	6	-	6516	4	E	1	2	-
6185	4	E	1	2	-	6520	8	E	1	3	-
6186	4	E	1	2	7	6520	8	E	1	6	-
6187	4	E	1	2	-						

● = Read on Diode Scale

● = Read on Diode Scale

TUBE	X	Y	Z	TEST	OPEN	47 TUBE	X	Y	Z	TEST	OPEN
6528	8	E	1	3	-	6913	9	E	1	3	-
6528	8	E	1	6	-	6913	9	E	1	8	-
6550	7	E	1	8	-	6922	5	E	1	3	-
6660	4	E	1	7	-	6922	5	E	1	8	-
6661	4	E	1	2	-	6927	4	E	1	5	-
6662	4	E	1	2	-	6927	4	E	1	6	-
6663●	4	E	1	5	-	6939	5	F	1	3	-
6663●	4	E	1	1	-	6939	5	F	1	1	-
6664	4	E	1	7	-	6955	9	E	1	3	-
6669	4	E	1	2	-	6955	9	E	1	8	-
6670	12	E	1	5	-	6968	4	E	1	2	7
6670	12	E	1	9	-	6973	5	E	1	7	6-8
6676	4	E	1	2	-	7000	7	E	1	8	-
6677	5	E	1	1	-	7001	4	E	1	2	-
6678	5	E	1	8	-	7025	9	E	1	3	-
6678	5	E	1	7	-	7025	9	E	1	8	-
6679	9	E	1	3	-	7027	7	E	1	8	-
6679	9	E	1	8	-	7032	4	E	1	2	-
6680	9	E	1	3	-	7036	4	E	1	2	-
6680	9	E	1	8	-	7044	8	E	1	3	-
6681	9	E	1	3	-	7044	8	E	1	6	-
6681	9	E	1	8	-	7054	5	F	1	1	9
6686	5	E	1	3	-	7055●	4	E	1	5	-
6687	4	E	1	2	-	7055●	4	E	1	1	-
6688	5	E	1	1	3-6	7056	4	E	1	2	-
6689	5	E	1	3	-	7057	5	F	1	3	-
6760	5	G	1	3	-	7057	5	F	1	8	-
6761	5	E	1	3	-	7058	5	F	1	3	-
6829	9	E	1	2	-	7058	5	F	1	8	-
6829	9	E	1	7	-	7059	5	E	1	8	-
6870	5	F	1	1	-	7059	5	E	1	7	-
6887●	4	E	1	5	-	7060	5	E	1	3	-
6887●	4	E	1	1	-	7060	5	E	1	9	-
6893	7	E	1	1	-	7061	5	F	1	7	-

● = Read on Diode Scale

● = Read on Diode Scale

						48						
TUBE	X	Y	Z	TEST	OPEN	TUBE	X	Y	Z	TEST	OPEN	
7062	5	F	1	3	-	7500	5	E	1	6	-	
7062	5	F	1	8	-	7500●	5	E	1	2	-	
7105	8	E	1	3	-	7500●	5	E	1	9	-	
7105	8	E	1	6	-	7500●	5	E	1	8	-	
7119	5	F	1	6	-	7502	4	E	1	2	-	
7119	5	F	1	3	-	7543	4	E	1	7	-	
7137	5	E	1	2	-	7548	5	E	1	1	3	
7167	4	F	1	2	7	7551	5	F	1	1	9	
7189	5	E	1	3	8	7558	5	E	1	1	9	
7193	7	E	1	8	-	7561	7	G	1	8	-	
7199	5	E	1	6	-	7581	7	E	1	8	-	
7199	5	E	1	8	-	7586	12	E	1	8	-	
7236	8	E	1	3	-	7587	12	E	1	8	-	
7236	8	E	1	6	-	7591	7	E	1	5	-	
7244	4	E	1	5	-	7607	7	E	1	1	4-6	
7244	4	E	1	6	-	7630●	5	F	1	11	-	
7245	4	E	1	2	-	7643	5	E	1	8	-	
7247	9	E	1	3	-	7643	5	E	1	7	-	
7247	9	E	1	8	-	7687	5	E	1	8	-	
7258	5	E	1	3	-	7687	5	E	1	7	-	
7258	5	E	1	9	-	7695	5	H	1	7	3-8	
7308	5	F	1	3	-	7699	5	E	1	3	-	
7316	5	F	1	8	-	7699	5	E	1	1	-	
7318	9	E	1	3	-	7701	5	F	1	1	3-8	
7318	9	E	1	8	-	7716	5	F	1	1	-	
7320	5	E	1	3	-	7716	5	F	1	6	-	
7355	7	E	1	5	-	7717	4	E	1	2	7	
7360	5	E	1	1	-	7719	9	E	1	3	8	
7370	8	G	1	3	-	7721	5	E	1	1	3-6	
7370	8	G	1	6	-	7722	5	E	1	1	3-6	
7408	7	E	1	8	-	7724	5	F	2	7	-	
7494	9	E	1	3	-	7724●	5	F	1	1	-	
7494	9	E	1	8	-	7724●	5	F	1	3	-	
7495	5	E	1	7	-	7728	9	E	1	3	-	
						7728	9	E	1	8	-	

● = Read on Diode Scale

● = Read on Diode Scale

TUBE	X	Y	Z	TEST	OPEN	TUBE	X	Y	Z	TEST	OPEN
7729	9	E	1	3	-	9001	4	E	1	2	7
7729	9	E	1	8	-	9002	4	E	1	2	7
7730	9	E	1	3	-	9003	4	E	1	2	7
7730	9	E	1	8	-	9006●	4	F	1	2	7
7731	5	E	1	8	-	<u>FOREIGN</u>					
7731	5	E	1	7	-						
7732	4	E	1	2	-	B36	8	F	1	3	-
7733	5	F	1	1	6-9	B36	8	F	1	6	-
7734	5	E	1	2	-	B65	8	E	1	3	-
7734	5	E	1	7	-	B65	8	E	1	6	-
7738	4	E	1	5	-	B152	5	F	1	3	9
7754	5	E	1	7	3-8	B152	5	F	1	8	9
7788	5	E	1	1	3	B309	5	F	1	3	9
7802	8	E	1	3	-	B309	5	F	1	8	9
7802	8	E	1	6	-	B319	5	E	1	1	-
7867	7	E	1	3	-	B319	5	E	1	7	-
7868 nov	5	E	1	3	-	B329	5	F	1	3	9
7892	8	E	1	3	-	B329	5	F	1	8	9
7892	8	E	1	6	-	B339	5	F	1	3	9
7895	12	E	1	8	-	B339	5	F	1	8	9
7984	12	F	1	2	6-8-9	B719	5	E	1	3	-
8016●	7	B	6	11	*	B719	5	E	1	8	-
*OPEN-1-3-5-8						BPM04	4	E	1	2	7
8056	12	E	1	4	-	CCA	5	E	1	3	-
8077	5	F	1	1	9	CCA	5	E	1	8	-
8102	5	F	1	2	-	D2M9●	4	E	1	5	-
8102	5	F	1	8	-	D2M9●	4	E	1	1	-
8106	5	F	1	6	2-9	D3A	5	E	1	1	3
8113	4	E	1	2	7	D63●	7	E	1	4	-
8156	12	F	1	2	6-8-9	D63●	7	E	1	8	-
8176●	5	F	1	11	-	D77●	4	E	1	5	-
8233 mag	5	E	1	7	9	D77●	4	E	1	1	-
8278 mag	5	E	1	2	6-8						
8298	7	E	1	6	1-4						
8417	7	E	1	8	-						

● = Read on Diode Scale

● = Read on Diode Scale

						50										
TUBE	X	Y	Z	TEST	OPEN		TUBE	X	Y	Z	TEST	OPEN				
D152	4	E	1	5	-		DH76	7	F	1	11	-				
D152	4	E	1	1	-		DH76●	7	F	3	4	-				
DA90●	7	B	3	3	5-6		DH76●	7	F	3	5	-				
DAC32	7	B	2	11	-		DH77	4	E	1	1	-				
DAC32●	7	B	4	5	-		DH77●	4	E	3	5	-				
DAF91	7	B	2	6	-		DH77●	4	E	3	6	-				
DAF91●	7	B	4	3	-		DH719	5	E	1	6	-				
DAF92	7	B	2	6	-		DH719●	5	E	1	1	-				
DAF92	7	B	4	4	-		DH719●	5	E	1	3	-				
DAF96	7	B	2	6	-		DK31	7	B	1	6	-				
DAF96●	7	B	4	4	-		DK32	7	B	2	5	-				
DC80	5	B	1	1	-		DK91	7	B	2	4	5				
DC90	7	B	1	6	-		DK92	7	B	2	4	-				
DC96	7	B	1	6	-		DK96	7	B	2	4	-				
DCC90	7	C	1	5	4		DL31	7	B	1	5	-				
DCC90	7	C	1	3	4		DL33	7	C	1	5	8				
DCH31	7	B	1	5	-		DL35	7	B	1	5	-				
DCH31	7	B	1	11	-		DL36	7	B	1	5	-				
DD6●	4	E	1	5	-		DL91	7	B	2	3	5				
DD6●	4	E	1	1	-		DL92	7	C	3	2	5				
DD7●	4	E	1	5	-		DL93	7	C	2	4	5				
DD7●	4	E	1	1	-		DL94	7	C	1	6	5				
DDR7	4	E	1	2	-		DL95	7	C	1	3	5				
DF31	7	B	1	11	-		DL96	7	C	1	6	5				
DF32	7	B	1	11	-		DL907	7	B	1	6	-				
DF33	7	B	2	11	-		DLL25	8	B	1	1	-				
DF91	7	B	2	6	5		DLL31	7	B	1	4	-				
DF92	7	B	2	6	5		DLL31	7	B	1	5	-				
DF96	7	B	2	6	5		DLL101	7	B	1	3	-				
DF97	7	B	2	6	-		DLL101	7	B	1	6	-				
DF904	7	B	2	6	5		DLL102	7	C	1	3	-				
DF906	7	B	1	6	-		DLL102	7	C	1	6	-				
DH63	7	E	1	11	-		DP61	7	E	1	2	-				
DH63●	7	E	3	4	-		DY30●	7	B	6	11	*				
DH63●	7	E	3	5	-		*OPEN-1-3-5-8									

● - Read on Diode Scale

● = Read on Diode Scale

						51						
TUBE	X	Y	Z	TEST	OPEN	TUBE	X	Y	Z	TEST	OPEN	
DY80●	7	B	6	11	2-8	EAC91	4	E	1	5	-	
DY86●	5	B	6	11	2-8	EAC91●	4	E	1	2	-	
DY87●	5	B	6	11	2-8	EBC81●	5	E	3	6	-	
E55L mag	5	E	1	7	9	EBC81●	5	E	3	8	-	
E80CC	9	E	1	3	-	EBF32	7	E	1	11	-	
E80CC	9	E	1	8	-	EBF32●	7	E	1	4	-	
E80CF	5	E	1	8	-	EBF32●	7	E	1	5	-	
E80CF	5	E	1	7	-	EBF80	5	E	1	2	-	
E80F	5	E	1	3	-	EBF80●	5	E	1	7	-	
E80L	5	E	1	3	-	EBF80●	5	E	1	8	-	
E81CC	9	E	1	3	-	EBF83	5	E	1	3	-	
E81CC	9	E	1	8	-	EBF89	5	E	1	2	-	
E81L	5	E	1	3	-	EBF89●	5	E	3	7	-	
E83F	5	E	1	3	-	EBF89●	5	E	3	8	-	
E88CC	5	E	1	3	-	EBL31	7	E	1	11	-	
E88CC	5	E	1	8	-	EBL31●	7	E	3	4	-	
E90CC	4	E	1	7	-	EBL31●	7	E	3	5	-	
E90F	4	E	1	2	-	EC80	5	E	1	3	-	
E91AA●	4	E	1	5	-	EC81	5	E	1	3	-	
E91AA●	4	E	1	1	-	EC86	5	E	1	3	7	
E91H	4	E	1	2	-	EC88	5	E	1	2	-	
E92CC	4	E	1	5	-	EC90	4	E	1	7	2	
E92CC	4	E	1	6	-	EC91	4	E	1	2	1-5-6	
E95F	4	E	1	2	7	EC92	4	E	1	7	-	
E180F	5	E	1	1	3-6	EC93	4	E	1	5	-	
E182CC	5	F	1	6	-	EC94	4	E	1	5	-	
E182CC	5	F	1	3	-	EC95	4	E	1	1	7	
E280F	5	E	1	1	3-6	EC806S	5	E	1	3	7	
EAA91●	4	E	1	5	-	EC903	4	E	1	5	-	
EAA91●	4	E	1	1	-	ECC31	7	E	1	4	-	
EAA901●	4	E	1	5	-	ECC31	7	E	1	5	-	
EAA901●	4	E	1	1	-	ECC32	8	E	1	3	-	
EABC80	5	E	1	8	-	ECC32	8	E	1	6	-	
EABC80●	5	E	1	6	-							
EABC80●	5	E	1	1	-							
EABC80●	5	E	1	2	-							

● = Read on Diode Scale

● = Read on Diode Scale

● * Read on Diode Scale

						52						
TUBE	X	Y	Z	TEST	OPEN		TUBE	X	Y	Z	TEST	OPEN
ECC33	8	E	1	3	-		ECF80	5	E	1	8	-
ECC33	8	E	1	6	-		ECF80	5	E	1	7	-
ECC35	8	E	1	3	-		ECF82	5	E	1	8	-
ECC35	8	E	1	6	-		ECF82	5	E	1	7	-
ECC81	9	E	1	3	-		ECF83	5	E	1	8	-
ECC81	9	E	1	8	-		ECF83	5	E	1	1	-
ECC82	9	E	1	3	-		ECF86	5	E	1	3	-
ECC82	9	E	1	8	-		ECF86	5	E	1	1	-
ECC83	9	E	1	3	-		ECF200	5	E	1	2	-
ECC83	9	E	1	8	-		ECF200	5	E	1	1	-
ECC84	5	E	1	1	-		ECF201	5	E	1	2	-
ECC84	5	E	1	7	-		ECF201	5	E	1	1	-
ECC85	5	E	1	3	-		ECF202	5	E	1	2	-
ECC85	5	E	1	8	-		ECF202	5	E	1	1	-
ECC86	5	E	1	3	-		ECF801	5	E	1	9	-
ECC86	5	E	1	8	-		ECF801	5	E	1	2	-
ECC88	5	E	1	3	-		ECF802	5	E	1	8	-
ECC88	5	E	1	8	-		ECF802	5	E	1	7	-
ECC91	4	E	1	5	-		ECF805	5	E	1	9	-
ECC91	4	E	1	6	-		ECF805	5	E	1	7	-
ECC180	5	E	1	3	-		ECH4G	7	E	1	5	-
ECC180	5	E	1	8	-		ECH4G	7	E	1	1	-
ECC186	9	E	1	3	-		ECH33	7	E	1	5	-
ECC186	9	E	1	8	-		ECH33	7	E	1	1	-
ECC189	5	E	1	3	-		ECH80	5	E	1	9	-
ECC189	5	E	1	8	-		ECH80	5	E	1	2	-
ECC801S	9	E	1	3	-		ECH81	5	E	1	9	-
ECC801S	9	E	1	8	-		ECH81	5	E	1	2	-
ECC802S	9	E	1	3	-		ECH83	5	E	1	2	-
ECC802S	9	E	1	8	-		ECH83	5	E	1	9	-
ECC803S	9	E	1	3	-		ECH84	5	E	1	9	-
ECC803S	9	E	1	8	-		ECH84	5	E	1	2	-
ECC808	5	E	1	2	-		ECH200	5	E	1	1	-
ECC808	5	E	1	8	-		ECH200	5	E	1	9	-
							ECL80	5	E	1	2	-
							ECL80	5	E	1	9	-

● = Read on Diode Scale

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TUBE	X	Y	Z	TEST	OPEN
ECL82	5	E	1	8	-
ECL82	5	E	1	2	-
ECL84	5	E	1	3	-
ECL84	5	E	1	7	-
ECL85	5	E	1	3	-
ECL85	5	E	1	8	-
ECL86	5	E	1	7	-
ECL86	5	E	1	2	-
ED2●	4	E	1	5	-
ED2●	4	E	1	1	-
ED500 mag	5	E	2	1	-
EF33	7	E	1	8	-
EF39	7	E	1	8	-
EF80	5	E	1	3	1
EF83	5	E	1	3	-
EF85	5	E	1	3	1
EF86	5	E	1	3	-
EF89	5	E	1	3	-
EF91	4	E	1	2	-
EF92	4	E	1	2	-
EF93	4	E	1	7	-
EF94	4	E	1	7	-
EF95	4	E	1	2	7
EF96	4	E	1	2	7
EF97	4	E	1	2	-
EF98	4	E	1	2	-
EF174	5	E	1	3	-
EF175	5	E	1	3	-
EF183	5	E	1	1	3
EF184	5	E	1	1	3
EF190	4	E	1	2	-
EF800	5	E	1	1	3
EF802	5	E	1	1	3
EF804	5	E	1	3	-
EF804S	5	E	1	3	-

TUBE	X	Y	Z	TEST	OPEN
EF805S	5	E	1	1	3
EF806S	5	E	1	3	-
EF905	4	E	1	2	7
EFL200	5	E	1	2	-
EFL200	5	E	1	7	-
EH90	4	E	1	2	-
EH900S	4	E	1	2	-
EK11	5	E	1	1	-
EK32	7	E	1	8	-
EK90	4	E	1	2	-
EL33	7	E	1	3	-
EL34	7	E	1	8	-
EL35	7	E	1	8	-
EL36	7	E	1	8	-
EL37	7	E	1	8	-
EL38	7	E	1	8	-
EL39	7	E	1	8	-
EL81	5	E	1	9	-
EL82	5	E	1	3	-
EL83	5	E	1	3	-
EL84	5	E	1	3	1-6-8
EL85	5	E	1	3	-
EL86	5	E	1	3	1-6-8
EL90	4	E	1	2	-
EL91	4	E	1	2	-
EL94	7	C	1	6	-
EL95	4	E	1	2	7
EL180	6	E	1	1	-
EL183	5	F	1	3	-
EL500 mag	5	E	1	3	8-9
EL503 mag	5	E	1	2	6-8
EL802	5	E	1	1	-
EL803	5	E	1	3	-
EL803S	5	E	1	3	-
EL804	5	E	1	3	-
EL821	5	E	1	3	-

● = Read on Diode Scale

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TUBE	X	Y	Z	TEST	OPEN
ELL80	5	E	1	2	-
ELL80	5	E	1	6	-
EM34	4	E	4	8	-
EM35	7	E	1	8	-
EM80	5	E	1	2	3-6-8
EM81	5	E	4	2	3-6-8
EM84	5	E	2	3	2-8
EM87	5	E	1	3	2-8
EMM801	5	E	1	1	-
EMM801	5	E	1	7	-
EMM801	5	E	1	9	-
EN91	4	E	1	2	-
EN92	4	E	1	2	-
EN93	4	E	1	5	-
EQ80	5	E	1	8	-
EY80●	5	E	1	3	-
EY81●	5	E	1	11	*
*OPEN - 1-2-3-6-7-8					
EY82●	5	E	1	3	-
EY83●	5	E	1	11	*
*OPEN - 1-2-3-6-7-8					
EY84●	5	E	1	3	-
EY86●	5	E	1	6	1-4-9
EY87●	5	E	1	6	1-4-9
EY88●	5	E	1	11	*
*OPEN - 1-2-3-6-7-8					
EY91●	4	E	1	2	-
EY500● ^{MAG}	5	E	1	11	-
EZ35●	7	E	1	3	-
EZ35●	7	E	1	5	-
EZ80●	5	E	1	1	-
EZ80●	5	E	1	7	-
EZ81●	5	E	1	1	-
EZ81●	5	E	1	7	-

● = Read on Diode Scale

54 TUBE	X	Y	Z	TEST	OPEN
EZ90●	4	E	1	1	-
EZ90●	4	E	1	6	-
EZ91●	4	E	1	1	-
EZ91●	4	E	1	6	-
EZ900●	4	E	1	1	-
EZ900●	4	E	1	6	-
GY501● ^{MAG}	5	C	6	11	-
GZ30●	8	D	1	4	-
GZ30●	8	D	1	6	-
GZ31●	8	D	1	4	-
GZ31●	8	D	1	6	-
GZ32●	8	D	1	4	-
GZ32●	8	D	1	6	-
GZ33●	8	D	1	4	-
GZ33●	8	D	1	6	-
GZ34●	8	D	1	4	-
GZ34●	8	D	1	6	-
H52●	8	D	1	4	-
H52●	8	D	1	6	-
H63	7	E	1	8	-
HAA91●	4	F	1	5	-
HAA91●	4	F	1	1	-
HABC80	5	G	1	8	-
HABC80●	5	G	1	1	-
HABC80●	5	G	1	6	-
HABC80●	5	G	1	2	-
HBC90	4	F	1	1	-
HBC90●	4	F	3	5	-
HBC90●	4	F	3	6	-
HBC91	4	F	1	1	-
HBC91●	4	F	3	5	-
HBC91●	4	F	3	6	-

● = Read on Diode Scale

						55					
TUBE	X	Y	Z	TEST	OPEN	TUBE	X	Y	Z	TEST	OPEN
HCC85	5	F	1	3	-	LCF201	5	D	1	2	-
HCC85	5	F	1	8	-	LCF201	5	D	1	1	-
HCH81	5	F	1	9	-	LCF801	5	D	1	9	-
HCH81	5	F	1	2	-	LCF801	5	D	1	2	-
HD14	7	B	2	11	-	LCF802	5	D	1	8	-
HD14●	7	B	4	5	-	LCF802	5	D	1	7	-
HF93	4	F	1	7	-	LCH200	5	D	1	1	-
HF94	4	F	1	7	-	LCH200	5	D	1	9	-
HK90	4	F	1	2	-	LCL80	5	D	1	2	-
HL90	4	G	1	2	7	LCL80	5	D	1	9	-
HL92	4	H	1	1	-	LCL85	5	E	1	3	-
HL94	4	G	1	1	-	LCL85	5	E	1	8	-
HM04	4	E	1	2	-	LF183	5	D	1	1	3
HP6	4	E	1	2	-	LF184	5	D	1	1	3
HY90●	4	G	1	7	6	LFL200	5	F	1	2	-
						LFL200	5	F	1	7	-
KF35	7	B	1	11	-	LL521 ^{mag}	5	G	1	9	-
KK32	7	B	2	5	-	LN119	5	H	1	8	-
KL35	7	B	2	5	-	LN119	5	H	1	2	-
KT32	7	G	1	8	-	LN152	5	E	1	2	-
KT61	7	E	1	8	-	LN152	5	E	1	9	-
KT63	7	E	1	8	-	LN309	5	F	1	8	-
KT66	7	E	1	8	-	LN309	5	F	1	2	-
KT71	7	H	1	8	-	LY81●	5	F	1	11	-
KT88	7	E	1	8	-	LZ319	5	E	1	8	-
KTW61	7	E	1	8	-	LZ319	5	E	1	7	-
KTZ63	7	E	1	8	-						
						M8082	4	E	1	2	-
L63	7	E	1	8	-	M8083	4	E	1	2	-
L77	4	E	1	8	-						
LCF80	5	E	1	8	-	N14	7	B	1	5	-
LCF80	5	E	1	7	-	N16	7	C	1	5	8
LCF200	5	D	1	2	-	N17	7	C	2	3	5
LCE200	5	D	1	1	-	N18	7	C	1	3	5
						N19	7	C	1	6	5

● = Read on Diode Scale

● = Read on Diode Scale

						56						
TUBE	X	Y	Z	TEST	OPEN		TUBE	X	Y	Z	TEST	OPEN
N77	4	E	1	2	-		PCF86	5	E	1	6	-
N78	4	E	1	2	-		PCF86	5	E	1	2	-
N144	4	E	1	2	-		PCF200	5	E	1	2	-
N147	7	E	1	8	-		PCF200	5	E	1	1	-
N152	5	G	1	3	-		PCF201	5	E	1	2	-
N153	5	F	1	3	-		PCF201	5	E	1	1	-
N154	5	F	1	3	-		PCF801	5	E	1	2	-
N329	5	F	1	3	-		PCF801	5	E	1	9	-
N359	5	G	1	3	-		PCF802	5	E	1	8	-
N369	5	F	1	8	-		PCF802	5	E	1	7	-
N369	5	F	1	2	-		PCF805	5	E	1	9	-
N379	5	F	1	3	1-6-8		PCF805	5	E	1	7	-
N709	5	E	1	3	1-6-8		PCH200	5	E	1	1	-
N727	4	E	1	2	-		PCH200	5	E	1	9	-
PABC80	5	F	1	8	-		PCL81	5	F	1	9	-
PABC80●	5	E	1	6	-		PCL81	5	F	1	1	-
PABC80●	5	E	1	1	-		PCL82	5	F	1	8	-
PABC80●	5	E	1	3	-		PCL82	5	F	1	2	-
PC86	5	D	1	3	7		PCL84	5	F	1	3	-
PC92	4	C	1	7	-		PCL84	5	F	1	7	-
PC95	4	D	1	1	-		PCL85	5	G	1	3	-
PC900	4	D	1	2	7		PCL85	5	G	1	8	-
PCC84	5	E	1	1	8		PCL86	5	E	1	7	-
PCC84	5	E	1	7	8		PCL86	5	E	1	2	-
PCC85	5	E	1	3	-		PD500 <small>MA8</small>	5	E	2	1	-
PCC85	5	E	1	8	-		PF83	5	D	1	3	-
PCC88	5	E	1	3	-		PF86	5	D	1	3	-
PCC88	5	E	1	8	-		PFL200	5	F	1	2	-
PCC88	5	E	1	8	-		PFL200	5	F	1	7	-
PCC189	5	E	1	3	-		PL36	7	G	1	8	1-3
PCC189	5	E	1	8	-		PL38	7	G	1	8	-
PCF80	5	E	1	7	-		PL81	5	G	1	3	-
PCF80	5	E	1	8	-		PL82	5	F	1	3	-
PCF82	5	E	1	8	-		PL83	5	F	1	3	-
PCF82	5	E	1	7	-		PL84	5	F	1	3	1-6-8

● = Read on Diode Scale

● = Read on Diode Scale

TUBE X Y Z TEST OPEN

PL500 ^{MAG} 5 G 1 3 8-9
PL521 ^{MAG} 5 G 1 9 -
PM04 4 E 1 7 -
PM07● 4 E 1 2 -
PY80● 5 G 1 3 -
PY81● 5 F 1 11 -
PY82● 5 G 1 3 -
PY83● 5 F 1 11 -
PY88● 5 G 1 11 *

*OPEN - 1-2-3-6-7-8-9

R18● 5 E 1 3 -
R19● 5 B 6 11 2-8
R52● 8 D 1 4 -
R52● 8 D 1 6 -

SP6 4 E 1 2 -

T2M05 4 E 1 5 -
T2M05 4 E 1 6 -
TS51 4 E 1 2 -
TS54 5 E 1 3 -

U41● 7 B 6 11 *
 *OPEN - 1-3-5-8

U49● 5 E 1 6 -
U50● 8 D 2 6 -
U50● 8 D 2 4 -
U52 8 D 1 4 -
U52● 8 D 1 6 -
U70● 7 E 1 3 -
U70● 7 E 1 5 -
U78● 4 E 1 1 -
U78● 4 E 1 6 -

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TUBE X Y Z TEST OPEN

U147● 7 E 1 3 -
U147● 7 E 1 5 -
U152● 5 G 1 3 -
U153● 5 F 1 11 -
U154● 5 G 1 3 -
U192● 5 G 1 3 -
U319● 5 G 1 3 -
U709● 5 E 1 1 -
U709● 5 E 1 7 -
UAA91 4 G 1 5 -
UAA91 4 G 1 1 -
UABC80 5 G 1 8 -
UABC80● 5 G 1 6 -
UABC80● 5 G 1 1 -
UABC80● 5 G 1 3 -
UBC81 5 F 1 2 -
UBC81● 5 F 1 8 -
UBC81● 5 F 1 6 -
UBF80 5 F 1 2 -
UBF80● 5 F 2 7 -
UBF80● 5 F 2 8 -
UBF89 5 G 1 2 -
UBF89● 5 G 1 7 -
UBF89● 5 G 1 8 -
UC92 4 F 1 7 -
UCC85 5 G 1 3 -
UCC85 5 G 1 8 -
UCH81 5 G 1 9 -
UCH81 5 G 1 2 -
UCL81 5 H 1 9 -
UCL81 5 H 1 1 -
UCL82 5 H 1 8 -
UCL82 5 H 1 2 -
UF80 5 G 1 1 3
UF85 5 G 1 1 3

● = Read on Diode Scale

● = Read on Diode Scale

TUBE	X	Y	Z	TEST	OPEN	58 TUBE	X	Y	Z	TEST	OPEN
UF89	5	F	1	3	-	WD119	5	G	1	2	-
UL84	5	H	1	3	1-6-8	WD119●	5	G	1	7	-
UM80	5	G	1	2	-	WD119●	5	G	1	8	-
UQ80	5	F	1	8	-	WD709	5	E	1	2	-
UU12●	5	E	1	1	-	WD709●	5	E	1	7	-
UU12●	5	E	1	7	-	WD709●	5	E	1	8	-
UY82●	5	H	1	3	-						
UY85●	5	H	1	3	-	X14	7	B	2	5	-
UY89●	5	H	1	3	-	X17	7	B	2	4	5
UY92●	4	G	1	7	-	X18	7	B	2	4	-
						X63	7	E	1	8	-
V2M70●	4	E	1	1	-	X77	4	E	1	2	-
V2M70●	4	E	1	6	-	X79	5	E	1	8	-
V741	4	E	1	7	-	X79	5	E	1	7	-
V884	4	E	1	2	-	X719	5	E	1	9	-
VFT6●	7	E	1	3	-	X719	5	E	1	2	-
VFT6●	7	E	1	5	-	X727	4	E	1	2	-
VT172	7	B	2	6	-	XC95	4	C	1	1	7
VT172●	7	B	3	3	-	XC900	4	C	1	2	7
VT173	7	B	2	6	-	XCC82	9	C	1	3	-
VT174	7	C	2	3	-	XCC82	9	C	1	8	-
VT197A●	8	D	2	4	-	XCC189	5	D	1	3	-
VT197A●	8	D	2	6	-	XCC189	5	D	1	8	-
VT201C	7	G	1	8	-	XCF80	5	D	1	7	-
VT231	8	E	1	3	-	XCF80	5	D	1	8	-
VT231	8	E	1	6	-	XCF801	5	D	1	9	-
VT264	7	C	1	3	-	XCF801	5	D	1	2	-
						XCH81	5	C	1	2	-
W17	7	B	2	6	5	XCH81	5	C	1	9	-
W63	7	E	1	8	-	XCL82	5	E	1	8	-
W76	7	F	1	8	-	XCL82	5	E	1	2	-
W77	4	E	1	2	-	XF80	5	C	1	1	3
W179	5	E	1	3	-	XF85	5	C	1	3	1
W727	4	E	1	7	-	XF183	5	C	1	1	3
						XF184	5	C	1	1	3

● = Read on Diode Scale

● = Read on Diode Scale

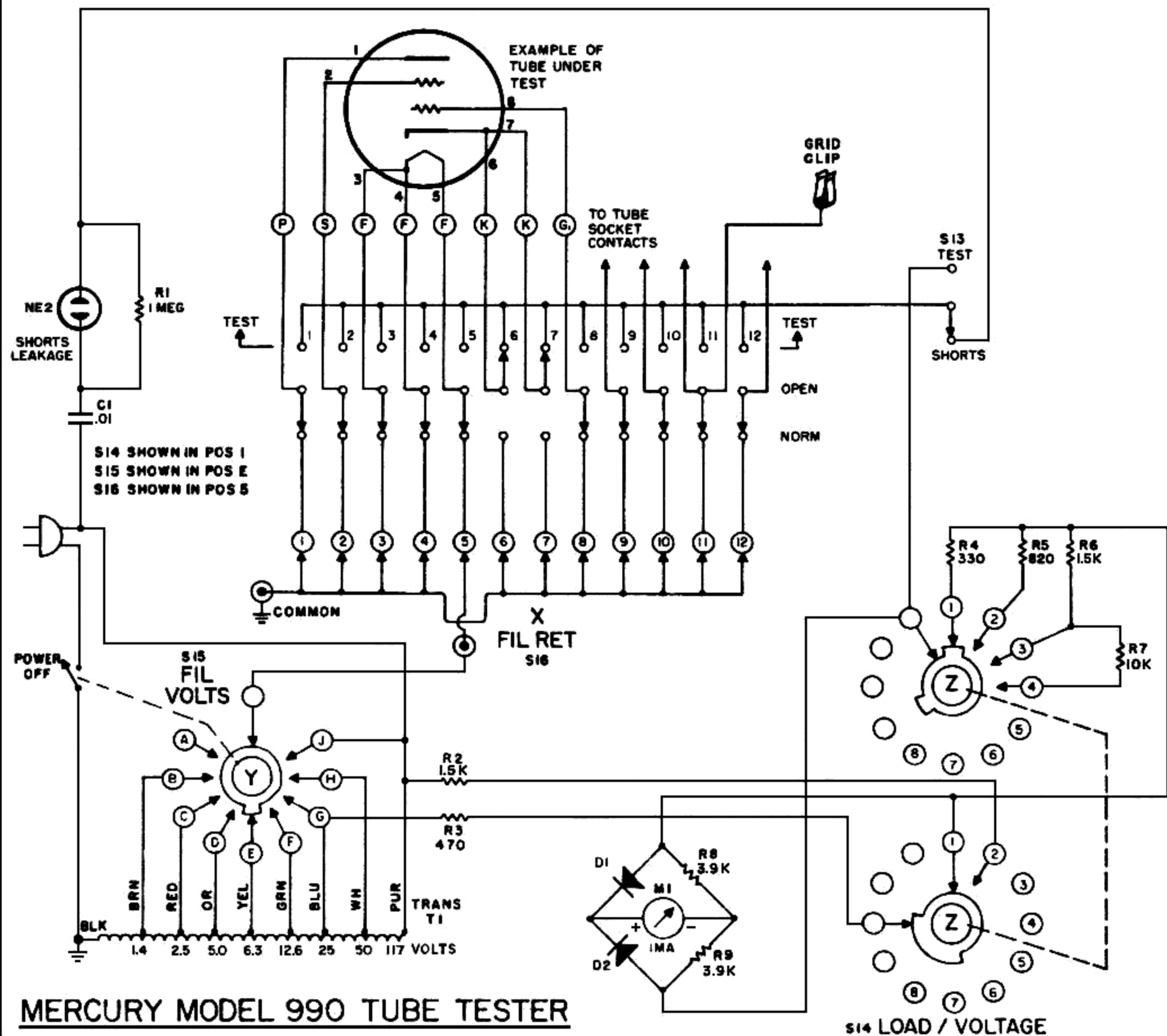
TUBE	X	Y	Z	TEST	OPEN
XL36	7	F	1	8	-
XL84	5	E	1	3	1-6-8
XL86	5	E	1	3	1-6-8
XY88●	5	F	1	11	*
*OPEN - 1-2-3-6-7-8					
YC95	4	C	1	1	7
YC98	5	E	1	1	-
YF183	5	D	1	1	3
YF184	5	D	1	1	3
Z14	7	B	2	11	-
Z63	7	E	1	8	-
Z77	4	E	1	2	-
Z152	5	E	1	3	1
Z179	5	E	1	3	-
Z719	5	E	1	3	1
Z729	5	E	1	3	-
ZD17	7	B	2	6	-
ZD17●	7	B	3	3	-
ZD152	5	E	1	2	-
ZD152	5	E	1	7	-
ZD152	5	E	1	8	-

● = Read on Diode Scale

MODEL 990

REPLACEMENT PARTS LIST

<u>Description</u>	<u>Part Number</u>
470 ohm 1/2w 10% Resistor	1-0-10
3.9k ohm 1/2w 10% Resistor	1-0-20
10k ohm 1/2w 10% Resistor	1-0-33
1500 ohm 1/2w 10% Resistor	1-0-40
820 ohm 1/2w 10% Resistor	1-0-41
1 Megohm 1/2w 10% Resistor	1-0-45
330 ohm 1/2w 10% Resistor	1-0-49
.01 Mfd. 600V. 10% Capacitor	3-1-18
100 Mfd. Electrolytic Capacitor 10%	3-4-9A
Spring Return "Shorts-Test" Slide Switch	6-1-2
3 Position White-Button Slide Switch	6-1-9
2 Pole 10 Position "Y" Switch	6-2-28
1 Pole 12 Position "X" Switch	6-2-61
8 Position "Z" Switch	6-2-62
Octal Socket	8-1-1
Nuvistor - 5 Pin Socket	8-1-15
9-10 Pin Socket	8-1-17
12 Pin Compactron Socket	8-1-18
Decal Socket	8-1-25
7 Pin Miniature Socket	8-1-29
Novar Socket	8-1-26
Magnoval Socket	8-1-40
Transformer	10-1-30
Meter 1 Ma., 950 ohms	11-1-26
Case - Gray Plastic	14-4-5
Knob	15-1-31B
Ne-2 Neon Bulb	17-1-2
Diode	18-1-1
Line Cord	22-1-3
Grid Clip	27-1-3



MERCURY MODEL 990 TUBE TESTER

MERCURY ELECTRONICS CORP.
 Tube Test Data Division
 1744 Rockaway Avenue
 Hewlett, L.I., N.Y. 11557

NEW TUBE RELEASES
 for use with
 Model 990 Chart 69730

TUBE X Y Z TEST OPEN

1DK29● 5 B 6 11 -

Insert leads into pins 4&5 of 9 pin
 min. socket. Top cap to top lead.

2BU2● 12 C 4 11 *

*2-3-5-6-7-8-9

3BT2● 12 C 4 11 *

*2-3-4-5-6-7-8-9-10

3CX3● 3 C 6 11 *

*1-2-4-5-6-7

3CY3● 2 C 6 11 *

*1-3-4-5-6-8

3CZ3● 2 C 6 11 *

*1-3-4-5-6-8

3DA3● 3 C 6 11 *

*1-2-4-5-6-7

3DB3● 2 C 6 11 *

*1-3-4-5-6-8

3DC3● 2 C 5 11 *

*1-3-4-5-6-8

6AK9● 12 E 1 3 6

6AK9 12 E 1 10 6

6AK9 12 E 1 8 6

6AK10 1 E 1 11 -

6AK10 1 E 1 7 -

6AK10 1 E 1 9 -

TUBE X Y Z TEST OPEN

6AL9 12 E 1 6 -

6AL9 12 E 1 9 -

6CA11 12 E 1 3 -

6CA11 12 E 1 6 -

6CA11 12 E 1 9 -

Short glow OK on switch #7

6EL4 2 E 2 5 3-4-6-8

6HV5 1 E 1 4 *

*2-3-5-6-8-9

6LF6 12 E 1 5 *

*6-7-8-9-10-11

6LG6 1 E 1 5 *

*2-3-6-7-8-9

6MN8 12 E 1 8 5-7-9

6MN8 12 E 1 10 5-7-9

6MN8 12 E 1 11 5-7-9

6MQ8 5 E 1 9 -

6MQ8 5 E 1 2 -

8AL9 12 E 1 6 -

8AL9 12 E 1 9 -

8CB11 1 E 1 5 -

8CB11 1 E 1 11 -

9AK10 1 E 1 11 -

9AK10 1 E 1 7 -

9AK10 1 E 1 9 -

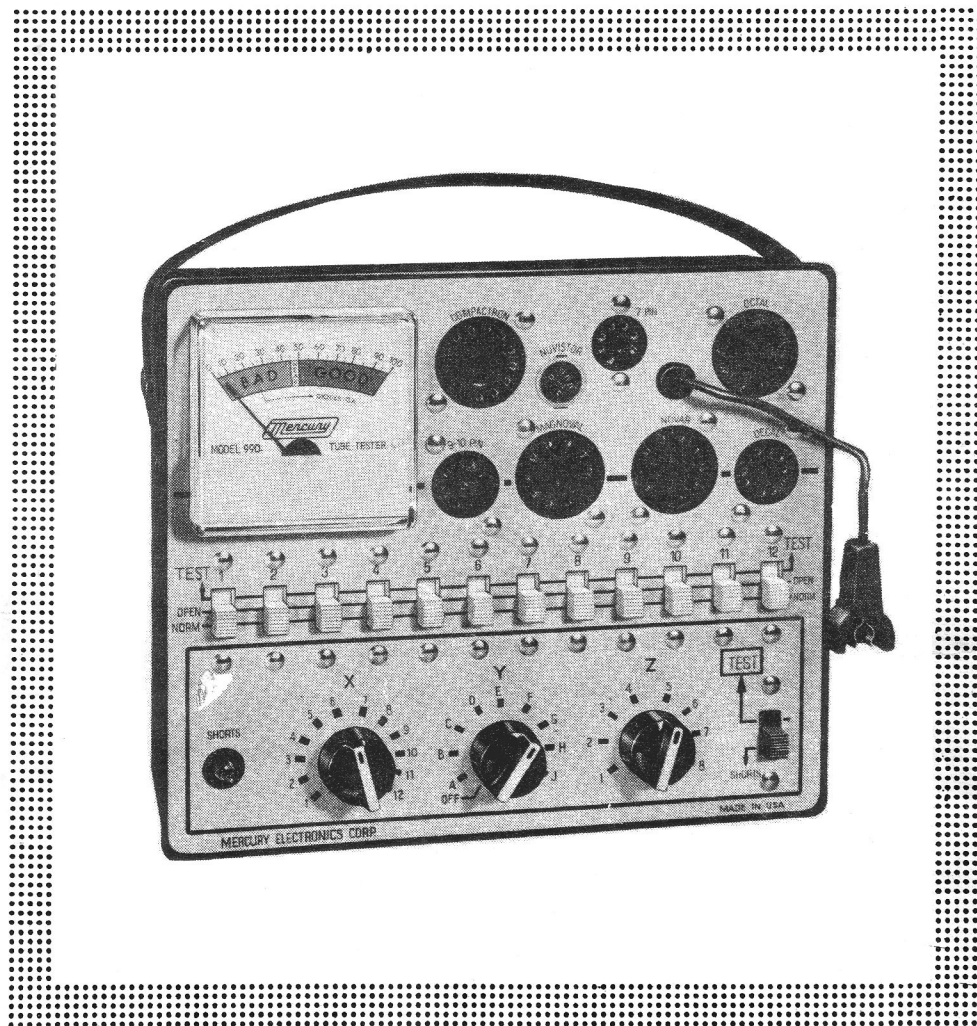
(OVER)

TUBE	X	Y	Z	TEST	OPEN
11CA11	12	F	1	3	-
11CA11	12	F	1	6	-
11CA11	12	F	1	9	-
Short glow OK on switch #7					
11DS5	4	F	1	2	-
11LT8	5	F	1	9	-
11LT8●	5	F	1	8	-
11LT8●	5	F	1	6	-
Short glow OK on switch #1					
13JZ8	12	F	1	6	7
13JZ8	12	F	1	11	-
16AK9●	12	F	1	3	6
16AK9	12	F	1	10	6
16AK9	12	F	1	8	6
16BQ11	1	F	1	5	-
16BQ11	1	F	1	10	-
16BX11	12	F	1	10	-
16BX11	12	F	1	4	-
16BX11	12	F	1	9	-
17BW3	12	F	1	7	5-6-8-9
18AJ10	12	G	1	2	-
18AJ10	12	G	1	9	-
21LG6	1	G	1	5	*
*2-3-6-7-8-9					
25CK3	5	G	1	7	*
*1-2-3-6-8					
25JQ6	5	G	1	7	2-8
25JQ6	5	G	2	6	2
26HU5	7	G	1	1	4-5-6
31AL10	6	F	1	7	-
31AL10	6	F	1	10	-
32HQ7	6	F	1	4	3-10
32HQ7	6	F	1	8	3-10
8032	7	F	1	5	4-6-8

MERCURY
MODEL 990

TESTING & CALIBRATION

Model 990 TUBE TESTER



TEST PROCEDURE



ELECTRONICS CORPORATION

manufacturers of quality electronic products

Mineola, New York 11501

TEST PROCEDURE

CAUTION: Dangerous voltages may be present at the tube sockets and/or at the grid clip during operation. Do not touch the metallic portion of these parts while the TESTER is connected to the power line. Always disconnect the power cord before taking the wired panel out of the case.

CHECK STEP

I. INITIAL SET UP

- () 1. Set slide switches number 1 through 12 at NORM.
- () 2. Set knobs: X at no. 1 position.
Y at PWR OFF position.
Z at No. 1 position
- () 3. Plug line cord into a 110–120 volt, 50–60 Hz power supply.

II. SHORTS TEST

- () 1. Turn knob Y to position A. SHORTS/LEAKAGE neon should not light. Refer to TROUBLE SHOOTING GUIDE in case of difficulty in obtaining the correct results.
- () 2. Set slide switches numbers 1 through 12, one at a time, from NORM to TEST then back to NORM. The neon indicator should not light in each instance.
- () 3. Insulate the 15K ohms 1W 10% test resistor (brown-green- orange-silver) by bending one lead in the opposite direction and inserting the resistor into the large plastic sleeving as shown in Fig. 2. Cut the resistor leads evenly approximately 1/4" from the sleeve. Manipulate the test resistor by holding the insulated portion. Do not touch the exposed leads while applying the test resistor to the panel.
- () 4. Check for the correct SHORTS/LEAKAGE indication with each of the following test set-ups. (Set switch Y at A, switch Z at 1 during this test).

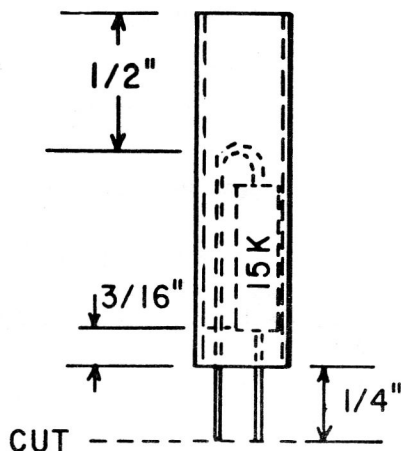


FIGURE NO.2

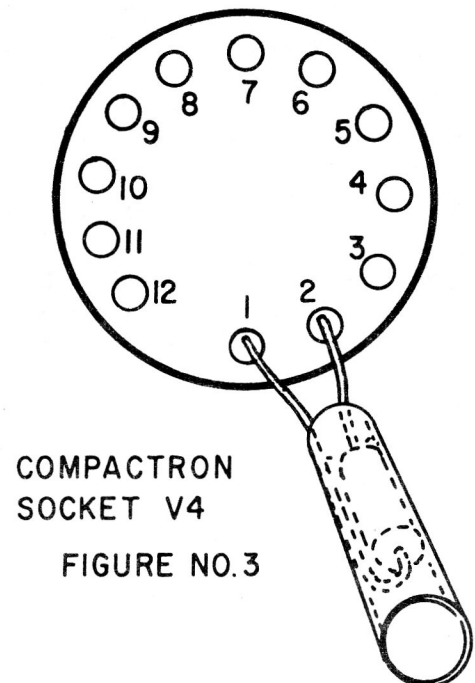


FIGURE NO.3

CHECK	STEP	TEST SET-UP			
		INSERT TEST RESISTOR INTO COMPACTRON PIN NUMBERS	SWITCH X SETTING	SET SWITCH TO TEST POS. (ALL OTHERS AT NORM)	SHORTS/LEAKAGE INDICATOR
()	a.	1-2 (Fig. 3)	1	1	ON
()	b.	1-2	1	1,2	OFF
()	c.	1-2	2	2	ON
()	d.	3-4	3	3	ON
()	e.	3-4	3	3,4	OFF
()	f.	3-4	4	4	ON
()	g.	5-6	5	5	ON
()	h.	5-6	5	5,6	OFF
()	i.	5-6	6	6	ON
()	j.	7-8	7	7	ON
()	k.	7-8	7	7,8	OFF
()	l.	7-8	8	8	ON
()	m.	9-10	9	9	ON
()	n.	9-10	9	9,10	OFF
()	o.	9-10	10	10	ON
()	p.	11-12	11	11	ON
()	q.	11-12	11	11,12	OFF
()	r.	11-12	12	12	ON

III LOAD VOLTAGE TEST

(Switches nos. 1 through 11 at NORM, switch no. 12 at TEST, X at 12, Y at A, Z at 1, test resistor in 11-12; all of these settings carried from the previous test).

Hold main TEST/SHORTS switch (S13) to TEST position and check for the correct meter indication on the 0-100 scale for each of the following X, Y, and Z combinations.

		<u>X</u>	<u>Y</u>	<u>Z</u>	APPROXIMATE * METER READING
()	1.	12	A	1	5
()	2.	12	A	2	13
()	3.	12	A	3	24
()	4.	12	A	4	77
()	5.	12	A	5	27
()	6.	12	A	6	66
()	7.	11	H	7	58
()	8.	11	J	7	0

*Readings may vary $\pm 20\%$ from those shown. However, they should progressively increase from Steps 1 thru 4, and from Steps 5 to 6.

CHECK STEP

TEST SET-UP

IV FILAMENT VOLTAGE TEST

(Switches 1 through 11 at NORM, switch 12 at TEST, X at 11, Y at J, Z at 7, test resistor in 11-12; all of these settings carried from the previous test).

Hold main TEST/SHORTS switch (S13) to TEST position and check for the correct meter indication on the 0-100 scale for each of the following X, Y, and Z combinations:

		X	Y	Z	APPROXIMATE * METER READING
()	1	11	J	7	0
()	2	11	H	7	57
()	3	11	G	7	85
()	4	11	F	7	100
()	5	11	F	4	35
()	6	11	E	4	55
()	7	11	D	4	60
()	8	11	C	4	65
()	9	11	B	4	70
()	10	11	A	4	0

* Readings may vary $\pm 25\%$ from those shown. However, they should progressively increase from Steps 1 thru 4, and from Steps 5 thru 9.

Release main TEST switch (S13), remove test resistor, reset switch #12 to NORM, X to 1, Y to PWR OFF, and Z to 1.

V DYNAMIC TEST

Test a few tubes of known quality by following the test procedure as outlined in the INSTRUCTION MANUAL. Try to select a variety of tubes which will test out each of the tube sockets, and, the grid clip connector. Tubes that are known to be defective should test BAD and good tubes should test GOOD.

CABINET ASSEMBLY

Disconnect the TESTER from the power line and fasten the panel into the case by mounting the three #6-32 x 1/4" screws previously removed in Step 2 of the UNPACKING INSTRUCTIONS.

TROUBLESHOOTING GUIDE

<u>STEP</u>	<u>SYMPTOM</u>	<u>CHECK</u>
II - 1	SHORTS/LEAKAGE INDICATOR LIT METER GOES OFF SCALE	Switch S1-16, neon NE2, resistor R1, capacitor C1. All point-to-point wiring
II - 2	SHORTS/LEAKAGE INDICATOR LIT WITH ANY SWITCH IN THE TEST POSITION SWITCH DOES NOT MOVE FROM NORM TO TEST	Short between the respective socket pin and adjacent pins(all sockets) respective switch. Clearance of wires under switch button
II-4a,b,c	WRONG INDICATION	Socket V4 pins 1 and 2, switches S1-2-13-16, neon NE2, resistor R1, capacitor C1.
II-4d,e,f	WRONG INDICATION	Socket V4 pins 3 and 4, switches S3-4-13-16.
II-4g,h,i	WRONG INDICATION	Socket V4 pins 5 and 6, switches S5-6-13-16.
II-4j,k,l	WRONG INDICATION	Socket V4 pins 7 and 8, switches S7-8-13-16.
II-4m,n,o	WRONG INDICATION	Socket V4 pins 9 and 10, switches S9-10-13-16.
II-4p,q,r	WRONG INDICATION	Socket V4 pins 11 and 12, switches S11-12-13-16.
III - 1	NO INDICATION ON METER	Meter M1, switches S13-14, resistors R3-4-8-9, diodes D1-2, trans T1.
III - 2	INCORRECT METER READING	Resistor R5, switch S14.
III - 3	INCORRECT METER READING	Resistor R6, switch S14.
III - 4	INCORRECT METER READING	Resistor R7, switches S14.
III - 5	INCORRECT METER READING	Resistor R2, switch S14, trans T1.
III - 6	INCORRECT METER READING	Switch S14.
III - 7	INCORRECT METER READING	Switch S14-15.
IV-1 thru 10	INCORRECT METER READING	Switch S14-15, trans T1. If an AC voltmeter is available, check the filament voltages across the test resistor for each switch <u>Y</u> position. They should be the values indicated on the schematic diagram $\pm 10\%$
V	INCORRECT RESULTS FROM ANY SOCKET	Wiring of respective socket