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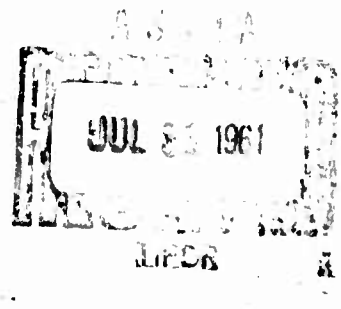
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HANDBOOK OF INSTRUCTIONS FOR

TEST SET, ELECTRON TUBE QRC-133A(T)

61-4-1NOX



the **hallicrafters** co.

4401 WEST 5TH AVENUE

Chicago 24, Ill.

CONTAINS 34 PAGES

HANDBOOK OF INSTRUCTIONS
FOR
TEST SET, ELECTRON TUBE
QRC-133A(T)

CONTRACT NO. AF(600)-21206

The Hallicrafters Company
4401 West Fifth Avenue
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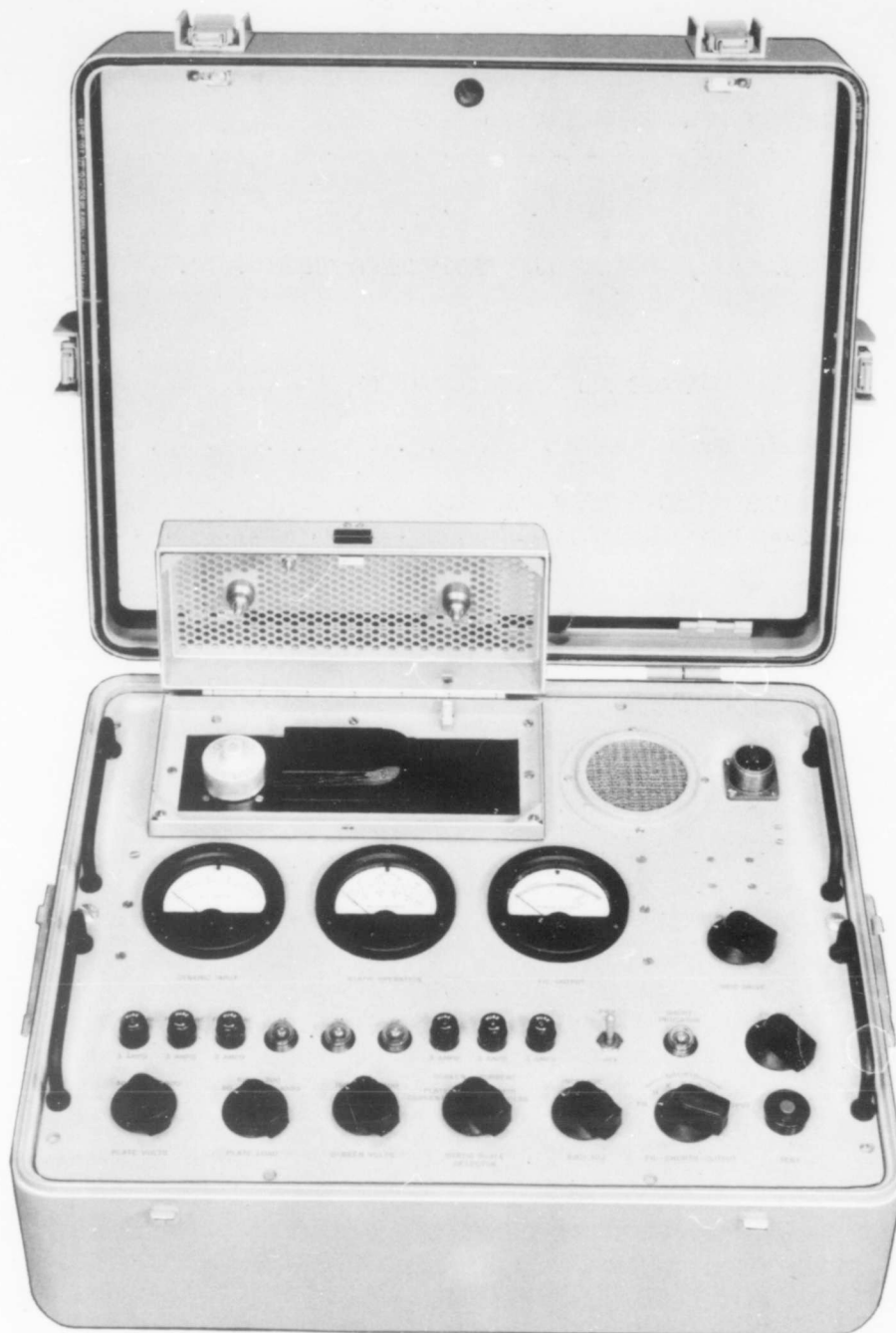
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092-012276

Figure 1-1. Test Set, Electron Tube QRC-133A(T).

SECTION I

DESCRIPTION AND LEADING PARTICULARS

1-1. GENERAL.

1-2. This publication contains instructions for the operation and maintenance of Test Set, Electron Tube QRC-133A(T) designed and manufactured by The Hallicrafters Company under Air Force Contract NO. AF33(600)-21206.

1-3. PURPOSE OF EQUIPMENT.

1-4. Test Set, Electron Tube QRC-133A(T) tests air cooled power tetrodes for shorts between elements and for proper dynamic and static operation. It provides air cooling and the necessary operating voltages for the following tube types: Y-180, Y-169, 4CX300A, 4CX250B, 4X150, A2575(6816), and 7457. The tester operates from 115 volts AC, 60-cycles power. Maximum operator safety is provided for all tests made.

1-5. DESCRIPTION OF EQUIPMENT.

1-6. The test set is housed in a ruggedized, drawn aluminum combination case. An automatic pressure relief valve permits easy opening of the case under any atmospheric pressure condition. The cover is secured with snap lock fasteners and detachable hinges.

1-7. GO-NO GO INDICATION.

1-8. Test Set, Electron Tube QRC-133A(T) is designed to give a GO-NO GO indication of the condition of the tube's G_m and power gain. A neon light indicates the presence of a short circuit.

1-9. METERS.

1-10. Three meters are provided to measure filament voltage and output, grid voltage, $\pm$ screen current, plate current, and input voltage.

1-11. STATIC SCALE SELECTOR SWITCH.

1-12. The STATIC SCALE SELECTOR switch determines whether grid bias voltage, $\pm$ SCREEN

CURRENT, - SCREEN CURRENT, or PLATE CURRENT is to be measured on the STATIC OPERATION meter.

1-13. BIAS ADJUST CONTROL.

1-14. The BIAS ADJUST control is a continuously variable control from 0 to 50 volts.

1-15. FRONT PANEL SWITCHES.

1-16. Front panel switches select plate voltages of 300, 600, or 900 volts; plate loads of 50, 125, 300 or 1,000 ohms; screen voltages of 150, 200, or 300 volts.

1-17. FIL SHORTS - OUTPUT TEST SWITCH.

1-18. The FIL SHORTS - OUTPUT test switch selects the mode of operation of the test set. In the filament position the filament voltage is measured. In the H, K, G1, G2, PL positions, each element is checked for shorts to every other element. In the test position, the test button may be depressed to apply plate and screen voltage to determine performance of the tube under test.

1-19. PWR ON SWITCH.

1-20. The PWR ON switch applies line voltage to activate the tube tester. The GRID DRIVE adjustment varies the DYNAMIC INPUT to the tube to be checked. Three fuses (3A slow blow) are used, one in each phase; three (3A) spares are provided. Three neon pilot lamps indicate the presence of voltage in each phase.

1-21. FILAMENT VOLTAGE.

1-22. Filament voltage is adjustable by a line adjust control on the front panel. If the DYNAMIC INPUT (drive) to the tube is set while the filament voltage is being monitored, any change in line voltage is monitored and corrected by noting changes in drive and readjusting the line adjust control.

1-23. GRID BIAS VOLTAGE.

1-24. Grid bias voltage is regulated by a zener diode and continuously variable from 0 to 50 volts. Three regulated screen voltages are available: 150, 200, and
e e 5

300 volts. They are regulated by a zener diode and selected by a front panel switch.

1-25. PLATE VOLTAGE.

1-26. Plate voltage is supplied by a 600-volt power supply and a 300-volt power supply which may be selected independently or in series to provide 900 volts.

Since these tubes are essentially constant generators, it is not necessary to regulate these power supplies.

1-27. SAFETY PRECAUTIONS.

1-28. The plates of the tubes are operated at ground for maximum protection of operating personnel from shock hazard.

1-29. The following are the weight and dimensions of the Test Set, Electron Tube:

TABLE 1-1. WEIGHT AND DIMENSIONS OF THE TEST SET, ELECTRON TUBE QRC-133A(T).

WEIGHT	HEIGHT	WIDTH	LENGTH
51 lbs.	12 in.	17 in.	20.625 in.

SECTION II

SPECIAL SERVICE TOOLS

2-1. SPECIAL TOOLS AND FIXTURES.

2-2. A NO. 4 Allen wrench is supplied with the Test Set, Electron Tube QRC-133A(T).

SECTION III
PREPARATION FOR USE

3-1. GENERAL.

3-2. This section contains instructions for unpacking Test Set, Electron Tube QRC-133A(T).

3-3. UNPACKING AND CHECKING.

3-4. The test set is packed with all meters installed. Unpack the equipment and perform the following checks for proper operation.

- a. Examine for damage in shipment. This will be indicated by dents and scratches or chipped or broken receptacles.
- b. Remove the test set from its case and examine all components for signs of physical damage.
- c. Clean and dry equipment if evidence of extreme moisture is present.
- d. Replace the test set into its case and ascertain that it is securely fastened.

3-5. If there is no evidence of damage in shipment, the test set is ready for operation.

SECTION IV

OPERATION INSTRUCTIONS

4-1. This section contains operation instructions for the Test Set, Electron Tube QRC-133A(T).

4-2. To operate the Test Set, Electron Tube proceed as follows:

DANGER

VOLTAGES ARE PRESENT IN THIS EQUIPMENT WHICH ARE
DANGEROUS TO LIFE

- a. Remove the power cable from the storage compartment in the cover of the combination case and connect it between J1 of the test set and the 115-volt, 3-phase, 400 cycle power source.
- b. Turn the PWR switch to the ON position. The blower motor will operate and air will be forced from the tube socket compartment. If the direction of the air flow is reversed there is a phase rotation error in the 3-phase power supply.
- c. Open the protective cover, slide the air deflector(s) to uncover the desired tube socket. Insert the tube to be tested, and close the protective cover.
- d. Set the FIL-SHORTS-OUTPUT switch to the FIL position. Adjust the FIL ADJ control to a reading of 6.0 or 6.3 volts on the FIL-OUTPUT meter (see table 4-1, the tube chart).
- e. Adjust GRID DRIVE for the proper reading on DYNAMIC INPUT meter (see table 4-1, the tube chart). Recheck FIL voltage and readjust if necessary. Any change in line voltage will be detected as a change of drive voltage; if FIL voltage has been readjusted, readjust the GRID DRIVE control until DYNAMIC INPUT meter is returned to original setting.
- f. Set the STATIC SCALE SELECTOR switch to the GRID VOLTS position.

- g. Rotate the BIAS ADJ control to the maximum clockwise position.
 - h. After a one minute warmup, rotate the FIL-SHORTS-OUTPUT switch slowly through the SHORTS position. If the SHORT INDICATOR lamp is illuminated at any position, a short exists from that position to any other at which the lamp is lighted. If no shorts appear, rotate the switch to the OUTPUT position.
 - i. Set the PLATE VOLTS, PLATE LOAD, and SCREEN VOLTS switches to the desired positions (see table 4-1, the tube chart).
 - j. Set the STATIC SCALE SELECTOR switch to the PLATE CURRENT position.
 - k. Depress the TEST switch and adjust the bias by rotating the BIAS ADJ control until the desired plate current is attained (see table 4-1, the tube chart). Note the reading of the OUTPUT meter; a reading in the green area denotes a good tube. Release the TEST switch.
 - l. Set the STATIC SCALE SELECTOR switch to the GRID VOLTS position. Note the reading of STATIC OPERATION meter and compare with tube chart data.
 - m. Switch STATIC SCALE SELECTOR switch to SCREEN CURRENT + or - (see table 4-1, the tube chart). Operate the TEST switch and note the reading of the STATIC OPERATION meter.
 - n. Open the protective cover and allow a 30-second cool off period. Remove the tube.
 - o. Turn the PWR switch to OFF.
 - p. Return cable to the storage compartment.
- 4-3. Listed in table 4-1, tube chart, are the types of tubes that have been tested.

TABLE 4-1. TUBE CHART.

. TYPE	FIL VOLTS	PLATE VOLTS	PLATE LOAD (OHMS)	SCREEN VOLTS	GRID DRIVE (VOLTS RMS)	BIAS RANGE (VOLTS)	PLATE CURRENT (MA)	SCREEN CURRENT (MA RMS)
4CX300A	6.0	900	1000	300	3.5	-20 to -26	300	-2 to -6.5
Y-180	6.0	900	1000	300	3.5	-20 to -26	300	-2 to -6.5
4CX300A	6.0	600	50	300	4.0	-10 to -15	500	-3 to -7
4CX250B	6.0	600	125	300	3.5	-22 to -28	200	-1 to -5
7457	6.3	300	125	200	3.5	0 to -4	200	+2 to +6
7457	6.3	300	125	150	4.0	0	140	+2 to +5
6816	6.3	300	125	200	3.5	0 to -4	200	+2 to +6
6816	6.3	300	125	150	4.0	0	140	+2 to +5
4X150A	6.0	600	125	300	3.5	0	200	-3 to -6
Y-169	6.0	900	1000	300	3.5	-30 to -35	150	-2 to -6.5

SECTION V

INSPECTION AND MAINTENANCE

5-1. GENERAL.

5-2. This section includes instructions for inspection and proper maintenance of the Test Set, Electron Tube QRC-133A(T). A visual inspection should be performed before operating the test set and any obvious faults corrected. Any part which fails to meet standards must be repaired or replaced. The following is a list of checks for the test set:

- a. Inspect test set for dents, scratches, broken handles, and meter windows.
- b. Remove front panel (chassis) from case.
- c. Remove dirt, corrosion and moisture from all components.
- d. Examine all components for evidence of overheating and for frayed insulation.
- e. Examine connectors for evidence of damage (bent pins, scarred threads, and dented sleeves).
- f. Insure that components and wiring are spaced properly and cannot cause short circuits.
- g. Check for missing or loose screws.
- h. Replace all defective or missing components.
- i. Check resistances and voltages at check points listed.

WARNING

VOLTAGES UP TO 1000 VOLTS ARE PRESENT WHEN THE TEST SET IS IN OPERATION.

1. When making voltage tests, rest test set on handles.
 - (a) Short out test switch S2. (Interlock switch S3 is not activated.)
 - (b) Connect power cable between J1 and 115 volts AC, 3-phase, 400-CPS source.

- (c.) Place operating controls in positions indicated in upper section of table 6-1 and table 6-2 of voltage and resistance charts. (See Trouble Shooting Section VI.)
 - (d.) Place power switch to PWR ON position.
 - (e.) Connect voltmeter leads to indicated test points.
 - (f.) Depress interlock switch.
 - (g.) Note readings and release switch.
 - (h.) Repeat for all voltage test positions.
 - (i.) Place 4CX300 tube of known quality in socket and set operating conditions.
2. Take ohmmeter readings with power OFF.

SECTION VI

TROUBLESHOOTING

6-1. GENERAL.

6-2. This section contains instructions for troubleshooting Test Set, Electron Tube QRC-133A(T).

6-3. A voltage and resistance chart, tables 6-1 and 6-2, is to be used in conjunction with the troubleshooting chart, table 6-3.

6-4. NO LOAD TEST AND LOAD TEST.

6-5. Listed at the top of each chart is the proper position for each control of the test set during voltage measurements. Column one and column three list the points between which the measurements are taken. The fourth column (VOLTAGE) lists the voltage as measured between points of column one and column three. The fifth column (RESISTANCE) lists the resistance as measured between points of column one and column three. The sixth column (REMARKS) are the conditions under which the measurements are taken.

TABLE 6-1. NO LOAD TEST, VOLTAGE AND RESISTANCE CHART.

Control settings:					
a. PLATE VOLTS - 600			e. FIL-SHORTS-OUTPUT - GRID DRIVE - 0		
b. PLATE LOAD - 50			f. Short S2 with Jumper Lead		
c. SCREEN VOLTS - 300			g. Use S3 to actuate K1		
d. STATIC SCALE SELECTOR- PLATE CURRENT - BIAS ADJ full counterclockwise			h. Line voltage 115 volts AC, 3 phase, 400 CPS		
TEST POINT	TO	TEST POINT	VOLTAGE	RESISTANCE	REMARKS
CR21-CATH		T2-6	660	100K	No Load
CR11-CATH		T2-6	320	7K	No Load
CR7-CATH		GND	80	2.2K	No Load
CR7-CATH		GND	50	2.2K	S3 actuated

TABLE 6-1. NO LOAD TEST, VOLTAGE AND RESISTANCE CHART (CONT).

TEST POINT	TO	TEST POINT	VOLTAGE	RESISTANCE	REMARKS
CR30-CATH		T2-6	300	50K	No Load
CR29-CATH		T2-6	200	10.5K	No Load
CR28-CATH		T2-6	150	2.6K	No Load
CR1-ANODE		T2-6	50	1K	Bias Full CW
T1-21		GND		0.7	
T1-22		GND		0.7	
T1-23		GND		0.7	
T1-41		GND		7K	
T1-42		GND		7K	
T1-43		GND		7K	
T1-61		GND		6.5K	
T1-62		GND		6.5K	
T1-63		GND		6.5K	
T2-1		GND		3	
T2-2		GND		0	
T2-3		GND		INF	
T2-4		GND		INF	
T2-5		GND		650K	
T2-6		GND		650K	
T2-7		GND		650K	
T2-8		GND		650K	
T2-9		GND		650K	
T3-1		GND		7	
T3-2		GND		2	
T3-3		GND		5	

TABLE 6-1. NO LOAD TEST, VOLTAGE AND RESISTANCE CHART (CONT).

TEST POINT	TO	TEST POINT	VOLTAGE	RESISTANCE	REMARKS
T3-4		GND		10	
T3-5		GND		21	
T3-6		GND		INF	
T3-7		GND		INF	
T5-1		GND		8	
T5-2		GND		0	
T5-3		GND		650K	
T5-4		GND		650K	

TABLE 6-2. LOAD TEST, VOLTAGE AND RESISTANCE CHART.

Control settings:					
a. PLATE VOLTS - 600			e. Set FIL to 6.0 volts		
b. PLATE LOAD - 50			f. FIL - SHORTS - TEST - OUTPUT, GRID DRIVE - 4 Volts		
c. SCREEN VOLTS - 300			g. Short S2 with Jumper lead		
d. STATIC SELECTOR - PLATE CURRENT - BIAS ADJ for 500 MA plate current using 4CX300B			h. Use S3 to actuate K1		
			i. Line voltage 115 volts, 3 phase, 400 CPS		
TEST POINT	TO	TEST POINT	VOLTAGE	RESISTANCE	REMARKS
CR-21 CATH		T2-6	620		
CR-11 CATH		T2-6	310		
CR-30 CATH		T2-6	300		
CR-29 CATH		T2-6	200		
CR-28 CATH		T2-6	150		

6-6. The symptoms, possible cause, and remedy are indicated in table 6-3, trouble-shooting chart as follows:

TABLE 6-3. TROUBLESHOOTING CHART.

Symptoms	Possible Cause	Remedy
Lack of blower operation when PWR switch is placed in the ON position, and A ϕ , B ϕ , and C ϕ lights do not illuminate.	No 3-phase power applied to Test Set.	Check for improper or faulty cable.
	Defective PWR ON-OFF switch.	Check and replace, if necessary.
	Defective potentiometer R23.	Check and replace, if necessary.
	Defective transformer T2.	Check and replace, if necessary.
	Defective contacts on selector switch section S8A or S8B.	Check and replace, if necessary.
No filament voltage or filament voltage can be adjusted.	Defective interlock S9.	Check and replace, if necessary.
	Defective transformer T2, potentiometer R17, resistor R1.	Check and replace, if necessary.
	Defective autotransformer T4, transformer T5, or meter M3.	Check and replace, if necessary.
No DC bias voltage.	Defective CR28, CR29, or CR30, R9.	Check and replace, if necessary.
No DYNAMIC INPUT.	Defective switch S2, interlock switch S3, R5, CR4 through CR7, relay K1.	Check and replace, if necessary.
No SCREEN VOLTS.	Defective power transformer T1, CR8 through CR25.	Check and replace, if necessary.
Lack of 300, 600, or 900 volts DC.	Defective selector switch S4.	Check and replace, if necessary.
	Defective transformer T3.	Check and replace, if necessary.
	Defective switch S5.	Check and replace, if necessary.
No PLATE LOAD current.		

SECTION VII

CALIBRATION

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7-1. CALIBRATION.

7-2. No calibration is necessary for the Test Set, Electron Tube QRC-133A(T).

SECTION VIII

REPLACEABLE PARTS LIST

8-1. GENERAL.

8-2. This section contains a description and part number of each of the replaceable parts used in Test Set, Electron Tube, QRC-133A(T). Reference symbols are identical to those component symbols indicated on the schematic diagram (see figure 8-8) and on the illustrations of the test Set. Figures 8-1, 8-2, and 8-3, illustrate the components of the test set.

8-3. MANUFACTURER'S CODE NUMBERS.

8-4. The code numbers listed below are used in the replaceable parts list to denote the manufacturers of specific parts. The code numbers were taken from the Federal Supply Code for Manufacturers (Cataloging Handbook H-4-1).

CODE NO.	VENDORS NAME AND ADDRESS
00340	Jetron Co., Milwaukee, Wis.
04713	Motorola Inc., Semiconductor Products Division, Phoenix, Ariz.
24455	General Electric Co., Lamp Group, Nela Park (Cleveland), Ohio
25140	Globe Industries, Inc., Dayton, Ohio
26916	Hallicrafters Co., Chicago, Ill.
49956	Raytheon Mfg. Co., Waltham, Mass.
54294	Shallcross Mfg. Co., Selma, N. C.
58474	Superior Electric Co., Bristol, Conn.
71279	Cambridge Thermionic Corp., Cambridge, Mass.
71400	Bussmann Fuse Division of McGraw-Edison Co., St. Louis, Mo.
72092	Eitel-McCullough, Inc., San Bruno, Calif.
74970	Johnson, E. F., Co., Waseca, Minn.
81349	Military Specifications
89571	Johnson Electric Co., Chicago, Ill.
91637	Dale Products, Inc., Columbus, Nebr.
96214	Texas Instruments, Inc., Apparatus Division, Dallas, Texas
96906	Military Standards
97198	Control Switch Division, Controls Co. of America, Chicago, Ill.

8-5. Table 8-1 contains a replaceable parts list for the Test Set, Electron Tube.

TABLE 8-1. REPLACEABLE PARTS LIST FOR TEST SET, ELECTRON TUBE QRC-133(T)

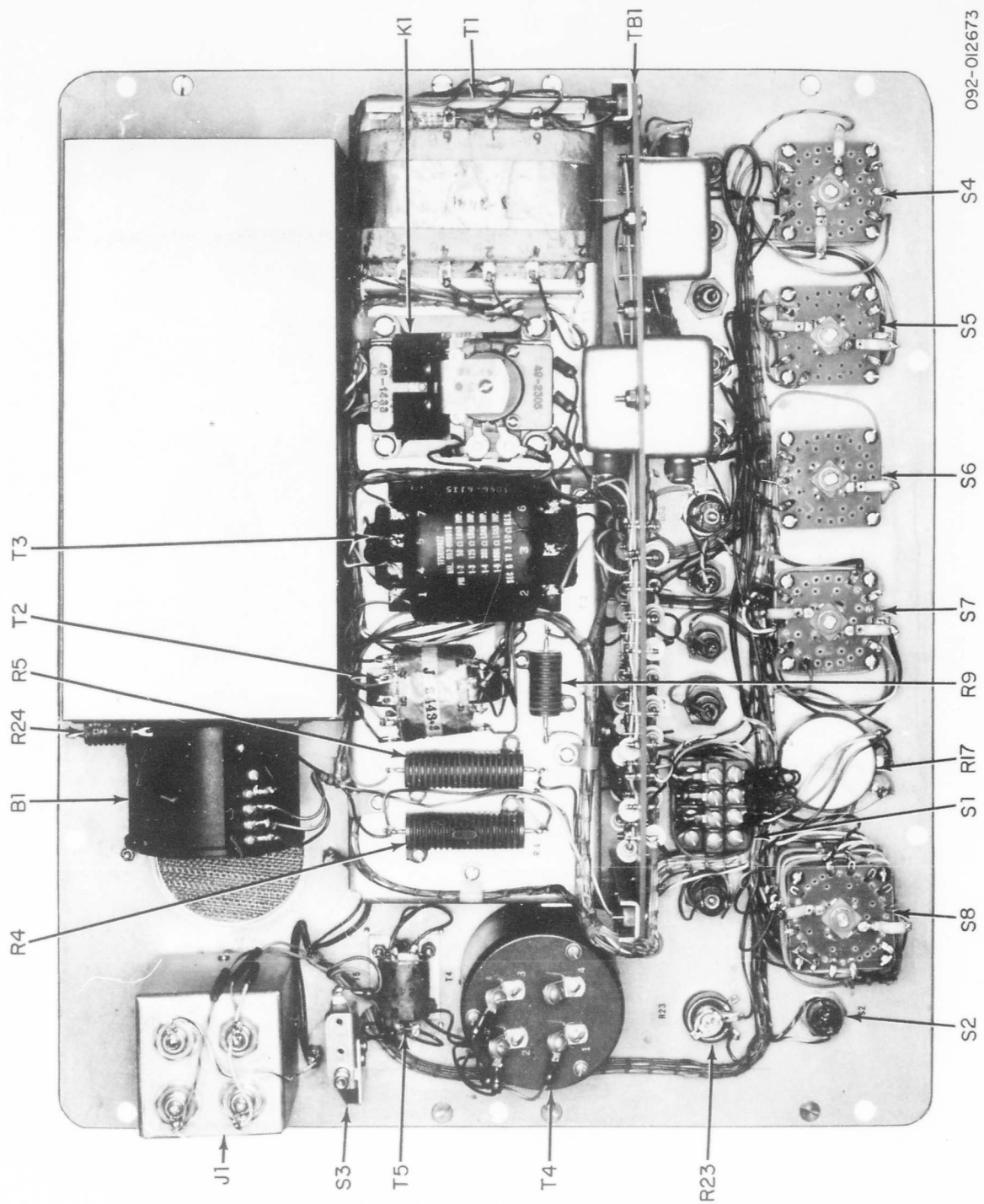
REF SYMBOL	FIGURE NO.	DESCRIPTION	MFR CODE	MFR PART NO.	HLC PART NO.	FEDERAL STOCK NO.
B1	8-1	Motor, Alternating Current (200 vac, 3 phase, 400 cps)	25140	19A911	020-000290	
C1		Not Used				
C2	8-3	Capacitor, Fixed, Paper (1.0 uF, 10%, 600VDCW)	81349	CP53B1EF105K1	495-536605-213	
C3	8-3	Capacitor, Fixed, Paper (1.0 uF, 10%, 1000VDCW)	81349	CP53B1EG105K1	495-536606-213	
C4	8-3	Capacitor, Fixed, Tantalum (9.0 uF, 10%, 125VDCW)	81349	CL44BP09OSP1	045-000756	
C5	8-3	Capacitor, Fixed, Paper (2.0 uF, 10%, 600VDCW)	81349	CP53B1EF205K1	495-536905-213	
C6	8-3	Capacitor, Fixed, Paper (0.047 uF, 10%, 600VDCW)	81349	CP05A1EF473K1	495-053405-113	
CR1	8-2	Semiconductor Device, Diode	04713	10M50Z5	019-002724	
CR2	8-3	Semiconductor Device, Diode	81349	JAN 1N547	019-002653	
CR3	8-3	Same as CR2				
CR4	8-3	Same as CR2				
CR5	8-3	Same as CR2				
CR6	8-3	Same as CR2				
CR7	8-3	Same as CR2				
CR8	8-3	Same as CR2				
CR9	8-3	Same as CR2				
CR10	8-3	Same as CR2				
CR11	8-3	Same as CR2				
CR12	8-3	Same as CR2				
CR13	8-3	Same as CR2				
CR14	8-3	Same as CR2				
CR15	8-3	Same as CR2				
CR16	8-3	Same as CR2				
CR17	8-3	Same as CR2				
CR18	8-3	Same as CR2				
CR19	8-3	Same as CR2				
CR20	8-3	Same as CR2				
CR21	8-3	Same as CR2				
CR22	8-3	Same as CR2				
CR23	8-3	Same as CR2				
CR24	8-3	Same as CR2				
CR25	8-3	Same as CR2				
CR26	8-3	Same as CR2				
CR27	8-3	Same as CR2				
CR28	8-2	Semiconductor Device, Diode	04713	1N3005B/10M100Z5	019-002826	
CR29	8-2	Same as CR1				
CR30	8-2	Semiconductor Device, Diode	04713	1N3011B/10M150Z5	019-002827	
CR31	8-3	Same as CR2				
CR32	8-3	Same as CR2				
DS1	8-2	Lamp, Neon Glow (105-125v)	24455	NE51H	039-000654	
DS2	8-2	Same as DS1				
DS3	8-2	Same as DS1				
DS4		Not Used				
DS5	8-2	Same as DS1				
F1	8-2	Fuse, Cartridge (3 amp, 125v)	81349	F03G3R00B	036-000657	
F2	8-2	Same as F1				
F3	8-2	Same as F1				
Spare	8-2	Same as F1				
Spare	8-2	Same as F1				
Spare	8-2	Same as F1				
J1	8-1	Connector, Receptacle, Electrical	96906	MS3102E-18-4F	010-002135	
K1	8-1	Relay, Armature, 3PDT	81349	AN3335-1	021-000603	
M1	8-2	Voltmeter, AC (special scale)	26916			
M2	8-2	Armature, DC (special scale)	26916		082-000548	
M3	8-2	Voltmeter, AC (special scale)	26916		082-000550	

TABLE 8-1. REPLACEABLE PARTS LIST FOR TEST SET, ELECTRON TUBE QRC-133(T)(CONT)

REF SYMBOL	FIGURE NO.	DESCRIPTION	MFR CODE	MFR PART NO.	HLC PART NO.	FEDERAL STOCK NO.
P1		Connector, Plug, Electrical	81349	MS3106E-18-4S	010-002138	
P2		Connector, Plug, Electrical	81349	MS3106E-24-2P	010-002005	
R1	8-3	Resistor, Fixed, Wire Wound (500 ohm, 1%, 5W)	91637	Type RS-5	446-045501-00	
R2	8-3	Resistor, Fixed, Composition (330,000 ohms, 10%, 1W)	81349	RC32GF334K	450-442334	
R3	8-3	Resistor, Fixed, Wire Wound (2 ohms, 10%, 2W)	91637	Type RS-2A	446-025020-00	
R4	8-1	Resistor, Fixed, Wire Wound (50 ohms, 1%, 50W)	81349	RH50V500F	454-221500-00	
R5	8-1	Resistor, Fixed, Wire Wound (560 ohms, 1%, 50W)	81349	RH50V561F	454-221561-00	
R6	8-3	Resistor, Fixed, Film (17,800 ohms, 1%, 1/2W)	96214	Type CD1-2MR	440-111782-83	
R7	8-3	Same as R6				
R8	8-3	Resistor, Fixed, Composition (620,000 ohms, 5%, 2W)	81349	RC42GF624J	450-541624	
R9	8-1	Resistor, Fixed, Wire Wound (12,000 ohms, 1%, 10W)	81349	RH10V123W	454-201123-00	
R10	8-3	Resistor, Fixed, Film (1 Megohm, 1%, 1/2W)	96214	Type CD1-2MR	440-111004-83	
R11	8-2	Resistor, Fixed, Composition (100 ohms, 10%, 1W)	81349	RC32GF101K	450-442101	
R12	8-2	Same as R11				
R13	8-2	Same as R11				
R14	8-2	Resistor, Fixed, Composition (1,000 ohms, 10%, 1W)	81349	RC32GF102K	450-442102	
R15	8-2	Same as R14				
R16	8-2	Same as R14				
R17	8-1	Resistor, Variable, Wire Wound (1,000 ohms, 10%, 3W)	81349	RA30NASD202A	025-002050	
R18	8-3	Resistor, Fixed, Composition (1 Megohm, 10%, 1/2W)	81349	RC20GF105K	450-242105	
R19	8-3	Resistor, Fixed, Wirewound (100 ohms, 1%, 1W)	91637	Type RS-1B	446-225101-00	
R20	8-3	Resistor, Fixed, Film (8250 ohms, 1%, 1/2W)	81349	RN70B8251F	440-118251-05	
R21	8-3	Resistor, Fixed, Film (16,900 ohms, 1%, 1/2W)	81349	RN70B1692F	440-111692-05	
R22	8-3	Resistor, Fixed, Film (22,100 ohms, 1%, 1/2W)	81349	RN70B2212F	440-112212-05	
R23	8-1	Resistor, Variable, Wire Wound (75 ohms, 10%, 12.5W)	81349	RP111RE750K	025-002022	
R24	8-1	Resistor, Fixed, Wire Wound (50 ohms, 1%, 10W)	81349	RH10V500F	454-201500-00	
S1	8-1	Switch, Toggle, 4PDT	96906	MS24525-22	060-002352	
S2	8-1	Switch, Push, SPST	96906	MS25089-4	060-002354	
S3	8-1	Switch, Sensitive, SPDT	97198	C2-10	060-002336	
S4	8-1	Switch, Rotary (2 pole, 3 position)	54294	2J56A3-1X718	060-002330	
S5	8-1	Switch, Rotary (2 pole, 4 position)	54294	2J56A4-1X720	060-002327	
S6	8-1	Switch, Rotary (1 pole, 3 position)	54294	2J50A3-1X719	060-002328	
S7	8-1	Same as S5				
S8	8-1	Switch, Rotary (8 pole, 7 position)	54294	2H56A7-4X747	060-002404	
S9	8-2	Switch, Sensitive, SPST	81349	AN3234-2	060-000656	
T1	8-1	Transformer, Power, Step-up	89571	J2441	052-000917	
T2	8-1	Transformer, Power, Step-up, Step-down	89571	J2443-2	052-000919	
T3	8-1	Transformer, Audio Frequency	89571	J2442	052-000918	
T4	8-1	Transformer, Variable (115 vac, 400 cps pri, 0-125VAC sec)				
T5	8-1	Transformer, Power Step-down	89571	J2477	052-000921	
TB1	8-1	Terminal Board Assembly	26916		150-003102	
TB2		Terminal Board Assembly	26916		150-002482	

TABLE 8-1. REPLACEABLE PARTS LIST FOR TEST SET, ELECTRON TUBE QRC-133(T)(CONT)

REF SYMBOL	FIGURE NO.	DESCRIPTION	MFR CODE	MFR PART NO.	HLC PART NO.	FEDERAL STOCK NO.
XDS1	8-2	Light, Indicator (Yellow)	72619	95408-H-933	039-000642	
XDS2	8-2	Same as XDS1				
XDS3	8-2	Same as XDS1				
XDS4	8-2	Not Used				
XDS5	8-2	Light, Indicator (clear)	72619	95408-H-937	086-000590	
XF1	8-2	Fuseholder, Extractor Post Type	71400	HKP-H2	006-000968	
XF2	8-2	Same as XF1				
XF3	8-2	Same as XF1				
Spare	8-2	Same as XF1				
Spare	8-2	Same as XF1				
Spare	8-2	Same as XF1				
XV1	8-2	Socket, Electron Tube	74970	124-114-1	006-000977	
XV2	8-2	Socket, Electron Tube	00340	89000	006-000997	
XV3	8-2	Socket, Electron Tube	72092	SK740	006-100855	
		Bushing, Knob	49956	RB-100	077-002687	
		Cable Assembly (includes P1 and P2)	26916		087-006841	
		Case Assembly	26916		150-002864	
		Ferrule, Handle	71279	X1988B0	077-002613	
		Filter, Air	26916		063-204440	
		Handle, Bow	71279	X1075	030-000722	



092-012673

Figure 8-1. Test Set, Electron Tube QRC-133A(T), Front Panel, Rear View.

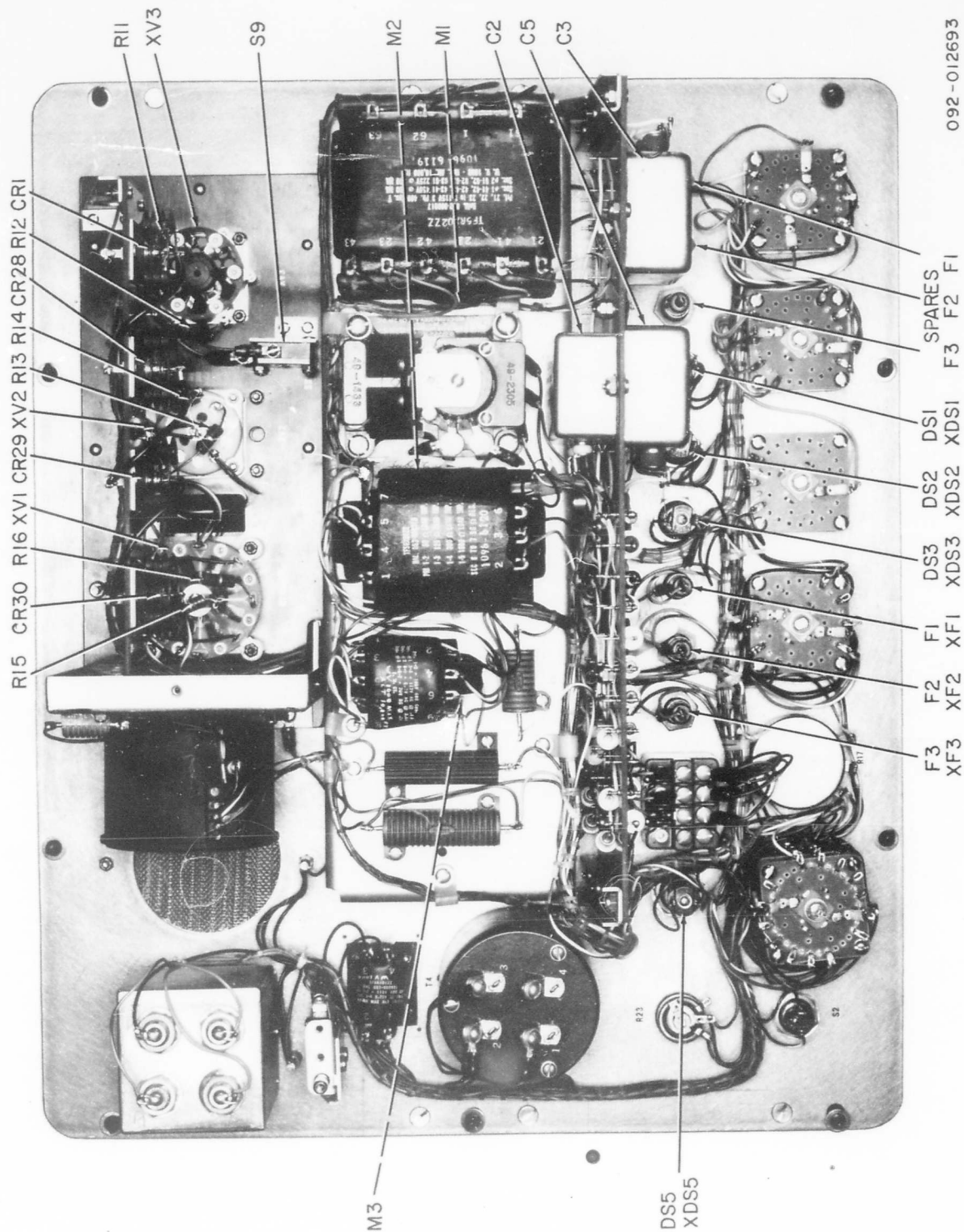


Figure 8-2. Rear of Front Panel Assembly, Top View (Without Tube Socket Cover).

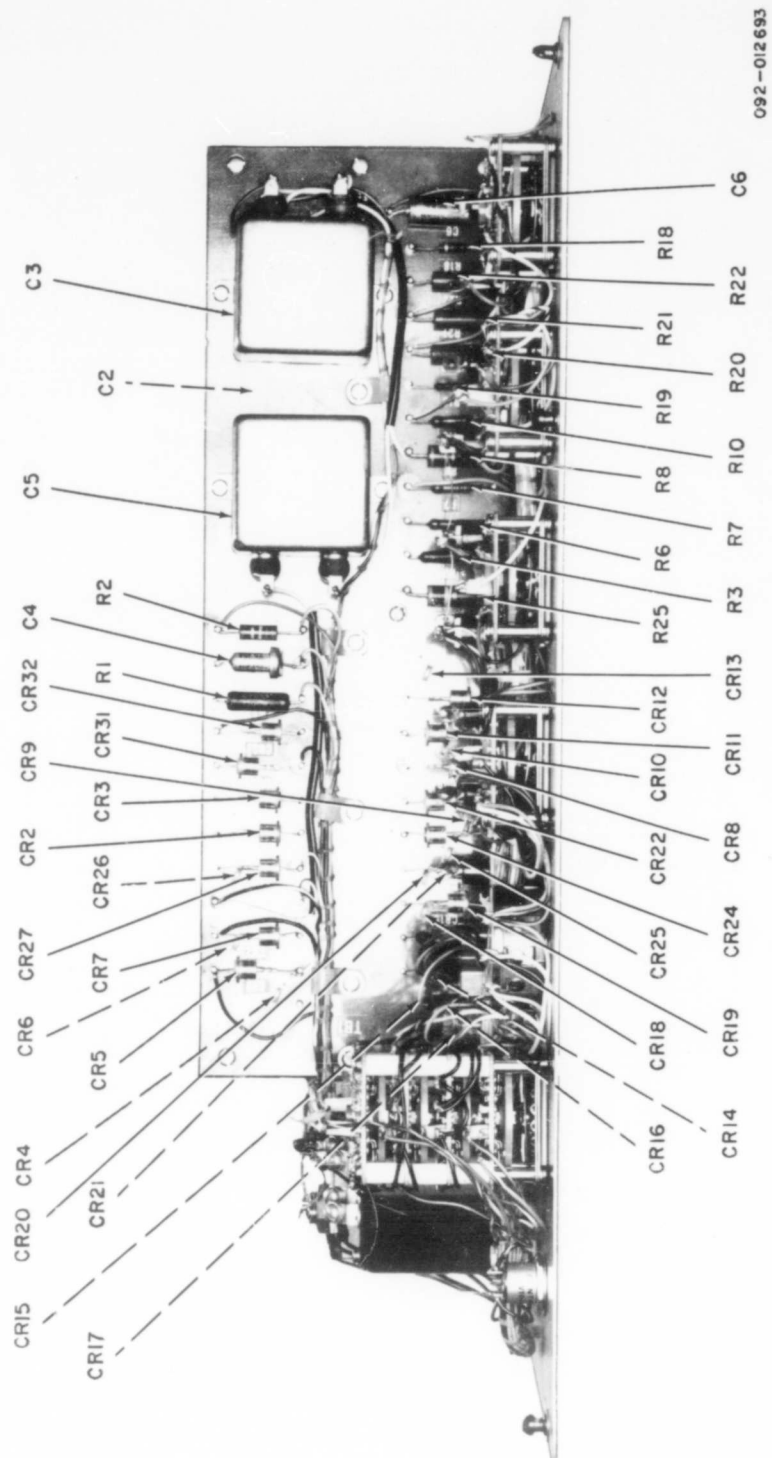


Figure 8-3. Terminal Board Assembly.

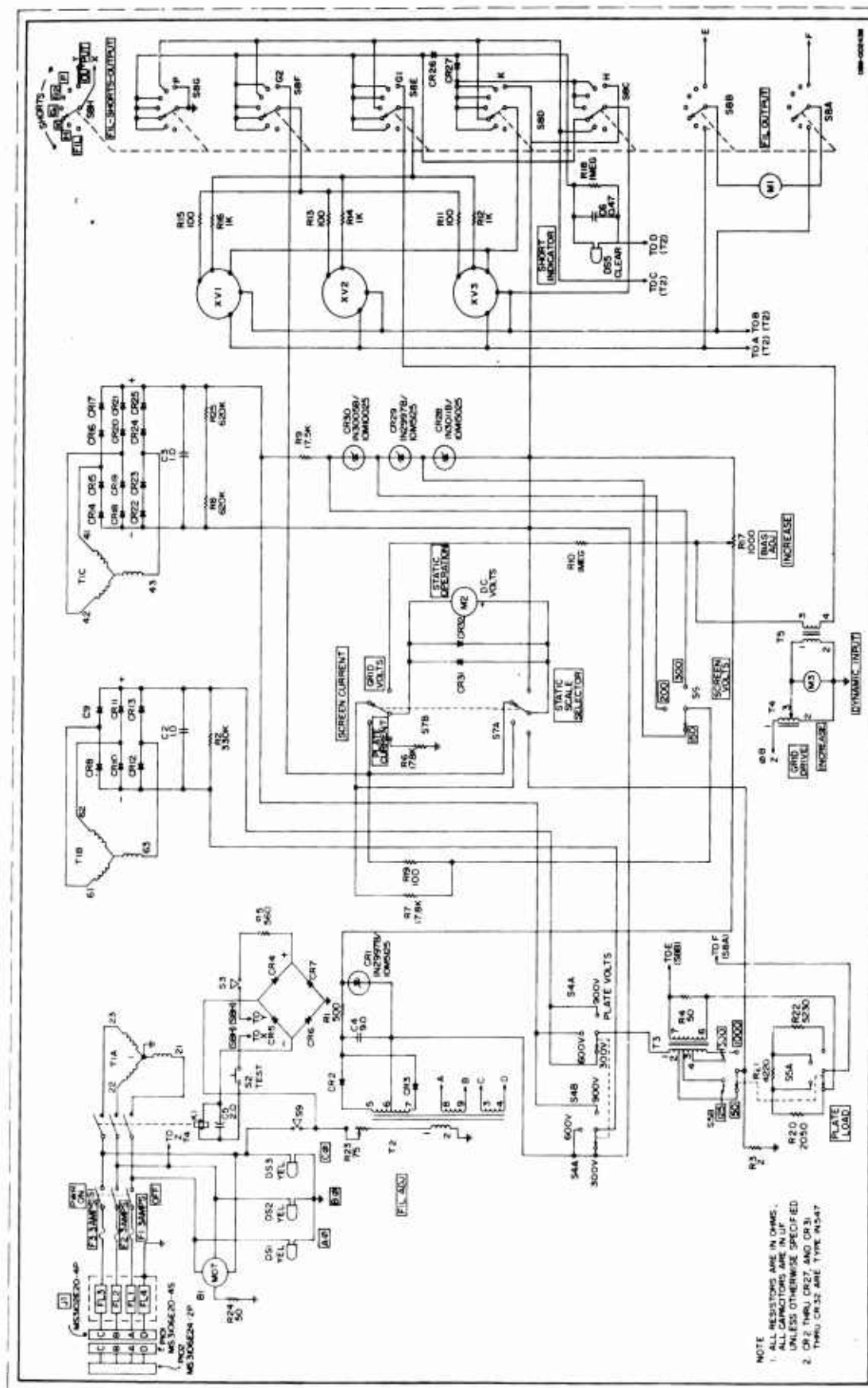


Figure 8-4. Schematic Diagram, Test Set, Electron Tube QRC-133A(T).

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