



SUPREME

Testing Instruments

"SUPREME BY COMPARISON"

RADIO TESTING INSTRUMENTS

- TUBE TESTERS
- MULTIMETERS
- SET ANALYZERS-STATIC
- SIGNAL GENERATORS
- FREQUENCY MODULATORS
- CATHODE RAY OSCILLOSCOPES
- SET ANALYZERS-DYNAMIC
- ASSOCIATED TEST EQUIPMENT

SUPREME INSTRUMENTS CORPORATION

GREENWOOD :- MISSISSIPPI :- U. S. A.



TENTATIVE TM 11-2517



1944 Model

MODEL 504-A

TUBE, BATTERY AND SET TESTER

ELECTRICAL SPECIFICATIONS

Power Supply Requirements:

(Unless otherwise specified on plate attached to case directly below handle)

Voltage _____ 110/133 volts AC
Frequency _____ 60 cycles
Power Consumption _____ 25 watts

Rectifier Tube _____ Type 71A

MECHANICAL SPECIFICATIONS

Over-all Dimensions:

	Panel	Case
Length _____	11-1/2 inches	14-1/4 inches
Width _____	11-3/4 inches	12-3/8 inches
Depth _____		6 inches

Weights:

Net _____ 15-1/2 pounds
Shipping _____ 19 pounds

This instrument has been checked by the undersigned who is responsible for the completion of the package.

Model 504-A, Serial Number 7636
MENTION ABOVE NUMBERS IN ALL CORRESPONDENCE

Signed 
Shipping Dept.

Stock No. 4778-G

SUPREME INSTRUMENTS CORPORATION
GREENWOOD, MISSISSIPPI
U. S. A.

INTRODUCTION

The Supreme Model 504-A is a complete tube, battery and set tester for checking the static condition of radio receivers and parts as well as many other types of electronic apparatus.

The tube testing circuit of the Model 504-A is designed to classify receiving type tubes by the emission principle. This type of tester has long been recognized to be the most accurate of any simple test on vacuum tubes. By checking the cathode or filament, as the case may be, for its ability to emit electrons or current to the other elements of the tube, the quality of the tube may be accurately classified. In setting the limits on the tubes as shown on the roll chart, Supreme engineers worked closely with tube manufacturers. Recommended loads and voltages are used throughout the tester.

The battery testing function provides a load upon the battery or cell under test which represents the average current drain on that particular type of battery. The discard points used in this section of the Model 504-A are those recommended by the manufacturers of portable radio batteries.

The multimeter section of the Model 504-A incorporates seven choice functions built around a meter with a sensitivity of 500 microamperes. This section includes a total of twenty-nine carefully selected ranges and also provisions for electrolytic and electrostatic capacitor checks. Twenty-seven multimeter functions are operated from only one pair of pin jacks by means of two sets of push button switches which make it a completely automatic unit.

DESCRIPTION OF PANEL AND COMPONENTS

METER:

Four-inch, SUPREME full-vision type. Scales - BAD TUBE-?-GOOD TUBE, red sector, orange sector, and green sector. English reading scale for checking the condition of tubes and batteries.

DIODES----O.K. - (Arrow scale) for checking tubes containing diodes such as 6H6, 75, 6Q7, etc.

OHMS - "2M" non-linear to "0" with "35" mark at center scale - for resistance and continuity measurements.

VOLTS MA - 0/5/10/50 basic linear scale for all current voltage measurements except 0-5 volts A-C and 0-5 volts output.

5 VOLTS A.C. - Used only for 0-5 volts A.C. and 0-5 volts output ranges.

GOOD CAPACITOR--BAD CAPACITOR - Green and red sectors for indicating conditions of electrolytic capacitors.

SOCKETS:

4 hole, 5 hole, 6 hole and bantam, on left side of meter; 7 hole, pilot, octal, loctal and miniature on right side of meter.

PUSH BUTTONS:

Left edge of panel - 10 buttons: "Q" momentary, "L" momentary, 1, 2, 3, 4, 5, 6, 7, and 8. Function selector switch for multimeter section, quality test and the famous SUPREME DOUBLE FILAMENT RETURN SELECTOR for the tube testing section.

PUSH BUTTONS:

Right edge of panel - 10 buttons: Blank locking, 1-9, 2, 3, 4, 5, 6, 7, 8 and blank momentary release. Range selector for multimeter section and element controls for tube testing sections. This is also used for electrolytic condenser test shunts.

PIN JACKS:

Directly below four hole socket. "10 AMP. D.C." - for measurement of high current values. "NOISE TEST" - phone insert terminal for checking noise in vacuum tubes.

PIN JACKS:

Directly below octal socket. "BATT TEST" - for checking portable radio batteries. "2500 D.C.V." - for extremely high D-C voltage measurement.

PIN JACKS:

Directly below roll chart - "-" and

"+" - common multimeter terminals for automatic operation of all multimeter functions except 10 ampere and 2500 volt D-C range.

ROTARY SWITCH:

Directly below left hand corner of meter. Number 1 to 18 on panel - for selecting proper filament voltages in tube and pilot light testing section.

ROTARY SWITCH:

Directly below right hand corner of meter. Positions: A,B,C,D,E,F, and G for applying proper load and anode voltage to tube under test. Position 1.5 V, 4.5 V, 6.0 V, 45 V, and 90 V for inserting proper load and shunts in battery testing section.

ROTARY POTENTIOMETER:

Directly below meter - for ohmmeter adjustment in multimeter section and quality control in tube testing section.

ROTARY POTENTIOMETER:

Directly to left of roll chart with encircling arrow - line adjustment control and power switch. Power is off when this control is in the extreme counter-clockwise position.

NEON LAMP:

Directly to right of roll chart - for visual indication of shorted, leaky or dislocated elements in vacuum tubes. Filament continuity tests.

MODEL NUMBER:

504-A - indicated directly below neon lamp.

SERIAL NUMBER:

Stamped in panel directly below roll chart.

PLEASE MENTION MODEL AND SERIAL NUMBER IN ALL CORRESPONDENCE.

PRELIMINARY INSTALLATION AND ADJUSTMENTS

Connect power supply plug to an A-C supply socket. Be sure that it is of the proper voltage and frequency for which this tester was originally supplied. See "ELECTRICAL SPECIFICATIONS" on the first page of this instruction book.

Depress locking type button "PRESS FOR BATT AND TUBE TESTER" located below button "1-9". Depress and hold down "LINE ADJUST" push button on left hand side of panel.

Adjust "OFF" line adjustment potentiometer

until meter needle indicates as close to center of orange section of tube tester scale as possible. The meter will read in all positions of the potentiometer except in the extreme counter-clockwise or "OFF" position. Recheck this adjustment in case of line voltage fluctuation.

GENERAL OPERATION

Listings for all standard tubes are shown on the roller chart and each "Arrowway" will lead the operator's eye from the number and letter settings to the correct control. To check a tube, first rotate the chart by means of the thumb wheel to the desired tube type. The tube types are listed in numerical-alphabetical order with a few supplementary settings on the lower part of the chart. Footnotes are also listed on the lower part for special notations indicated by reference letters (A,B, C,Dio, etc.) beside the respective tube types.

Set controls as marked in respective columns of the chart, except number under extreme right hand "Arrow-way" by following red "Arrow-ways" to the proper controls.

Press momentary "RELEASE FOR LEAKAGE" button to release any previously depressed buttons in same row. Place tube in proper socket and connect top cap lead if tube uses this type of connection. Then press

successively buttons "1-9" to "8" of right hand row. Neon tubes should light when one of the buttons is pressed (showing filament continuity) but should not glow steadily when any of the other buttons are pressed. The button which will light the lamp corresponds to one of the filament or heater terminals of the tube. If the lamp lights when any of the other buttons are pressed, the tube has an internal short.

NOTE: Tubes having tapped heaters will light the neon lamp when one or more of the buttons corresponding to the pin terminations of the heater are pressed.

Button numbers correspond to standard RMA pin termination numbering. If the neon lamp lights when either of two (or more) buttons are pressed, the elements connected to those pin terminations are electrically connected to each other.

When testing tubes for leakage and inter-electrode shorts, the sensitivity of the neon lamp may be increased by holding down the button marked "NEON LAMP SENS." throughout the test. However, under these conditions, good tubes may show a slight amount of leakage between heater and cathode.

If tube has no internal shorts, press "PRESS FOR TUBE TESTER" button and then numbered button or buttons as shown under extreme right hand "Arrow-way". For example, if chart reads "458" press buttons numbered 4,5, and 8.

IMPORTANT: It is important that all tubes being tested be given sufficient time to reach proper operating temperature before the button "Q" is depressed.

Press lower left hand button marked "Q" and note condition of tube on "BAD TUBE-?-GOOD TUBE" meter scale. If tube has indirectly heated cathode, allow sufficient time to reach normal operating temperature. When more than one listing appears for the same type of tube, both tests should be performed in order to determine the merit of the tube.

BATTERY TESTER

Press "RELEASE FOR LEAKAGE AND MULTIMETER" button, then press "PRESS FOR BATT" button in right hand row. Set right hand selector switch to voltage of battery being tested. Connect battery to upper right

hand pin jacks marked "BATT. TEST" observing proper polarity. Press "QUALITY FOR BATT" button and read battery condition on "BAD TUBE-?-GOOD TUBE" scale. For good batteries the meter needle will come to rest in the green "GOOD TUBE" sector.

MULTIMETER

Press "RELEASES FOR LEAKAGE AND MULTIMETER" button to release any previously depressed buttons. For each multimeter range of this instrument, two buttons must be pressed. First, press the button in the left hand row corresponding to the desired function, then press the button in the right hand row corresponding to the required range. For all direct current ranges, the "Q" button must be pressed. All ranges except the 10 ampere and 2500 D-C volt are accessible from the pin jacks on the lower edge of the panel. The 10 ampere range is connected to the upper right hand pin jacks by pressing the "D.C MA." and the "1 AMP" buttons. The 2500 D-C volt range is accessible from a separate set of pin jacks in the upper

right hand side of the panel by pressing the "D.C. VOLTS" and "1000 D.C.V." buttons.

When using the ohms and megohms ranges, first adjust the meter to read full scale (zero ohms) when the two pin jacks at the lower edge of the panel are connected together. This can be done by touching together the two test leads which are being used for resistance measurements. The meter should be readjusted for zero ohms each time the operator changes the instrument range. It is suggested that for the greatest degree of accuracy that when using the 200 ohm range, the pin jacks be shorted with as short a lead as possible.

CONDENSER TESTER

Electrostatic condensers are tested using the 20 megohm range of the multimeter. The amount of leakage permitted depends upon the application: When the condenser is used for coupling purposes, there should be no noticeable deflection of the meter except momentary charge or discharge.

To test electrolytic condensers, press "RELEASE FOR LEAKAGE AND MULTIMETER" button; then press "ELEC COND" button in left hand row. Set right hand selector switch to letter indicated on chart in the back of this book. (Listings are given according to capacity/working voltage.) Press "1-9" button in right hand row.

Connect condenser to pin jacks on lower edge of panel, observing proper polarity, and allow approximately fifteen seconds for the condenser to charge. Note position of meter needle. If needle does not start to drop back within about fifteen seconds, condenser probably has proper protective formation. If needle drops back slowly, allow condenser to form until needle comes to rest. (This will take at least ten minutes for condensers that have been idle for a period

of time.)

If right hand setting in chart is greater than "1", press button "2", then button "3", etc. until the number indicated on the chart is reached, Read condenser's leakage condition on "GOOD CAPACITOR-BAD CAPACITOR" meter scale. If needle rests in red portion or goes off scale, condenser should be rejected. If needle rests in green portion, condenser is satisfactory for use.

APPLICATIONS

TUBE TESTER

Single-purpose tubes (triode, pentode, etc.) require only one test and follow the procedure given in "GENERAL OPERATION INSTRUCTIONS".

Multi-purpose types (including full-wave rectifiers) have more than one listing and must pass all tests to be acceptable.

Cold cathode types have no filament and consequently the neon lamp "SHORT" indicator should not glow continuously during

test unless tube has interconnected pin terminations.

Loctal types have a metal centering pin and should be tested in the socket to the left of the "BATT. TEST" pin jacks.

Pilot lights may be checked by setting switches as indicated in chart on last page. Lamp will light to normal brilliance if good. (Use center contacts in 7-prong socket)

BATTERY TESTER

The voltage settings for all popular types of portable radio batteries are given on the panel and the general operating instructions will apply. To test batter-

ies with voltage ratings between these points, use the next higher setting and make a comparative check against one of known condition.

MULTIMETER AND CONDENSER TESTER

A chart will be found at the end of this manual which will prove of value to a new operator for interpolation purposes.

There are also given the settings for the more popular types of wet and dry electrolytic condensers.

SERVICE AND MAINTENANCE

All functions and ranges of this instrument were carefully inspected and calibrated before shipment from the factory. If for any reason this instrument does not function properly, first check to be sure that all applicable instructions in this manual have been followed. Under normal operating conditions, the battery and tube are the only parts that will require replacement.

METER ZERO ADJUSTMENT

The meter needle should point to zero on the "VOLTS MA" scale before making any measurements with this instrument. If the needle is not indicating zero when in the

normal position (all push buttons up), it may be adjusted by turning the screw on the meter case directly below the glass.

BATTERY INSTALLATION

The Model 504-A uses a two cell 1½-volt dry battery as a source of current for the three ohmmeter ranges. To install this battery, SUPREME Stock #8309, remove the seven screws on the outer edges of the panel. This will allow the instrument to be taken out of the case. Connect the two long battery leads to the terminals of the battery, observing the proper polarity (red wire to "+" terminal). Insert

battery in bracket which is fastened to the bottom of the case.

When the first three ohmmeter ranges will no longer adjust to zero ohms (full scale deflection) replace the 1½-volt battery. Directions for the installation of this battery are given in the preceding paragraph.

ROLL CHART REPLACEMENT

When a sufficient number of new tube types are announced, the factory will release a new edition of the roll chart which may be secured from the Service Department upon application. When requesting new charts, make certain to indicate the edition number of the one in use. This number appears at the beginning of the roll (5141,144 etc.). To install this chart,

remove the instrument from the case as given under BATTERY INSTALLATION. Next, remove the two screws on either side of the chart frame and lift the roller mechanism from the tester. Rotate the thumb wheel until end of chart is located, loosen adhesive tape and pull old chart out of roller. Replace chart by reversing this procedure.

INTERNAL POWER SUPPLY

The megohms ranges, electrolytic leakage section and center scale line adjustment, obtain power from a high voltage winding of the transformer. This A-C voltage is converted to D-C by the type 71A tube

operating as a half-wave rectifier. If the meter does not indicate when the preliminary line adjustment is made, first check this tube and be sure that it is firmly seated in its socket.

SCHEMATIC DIAGRAM

The attached circuit diagram is included for the convenience of the operator. All double throw push button switches make contact with the right hand arrows when in their normal (up) position. If for any

reason the operator should require additional service data, write the "SERVICE ENGINEER" at the factory. BE SURE TO MENTION THE MODEL AND SERIAL NUMBER WHEN REQUESTING INFORMATION.

STOCK NO.	REPLACEMENT PARTS DESCRIPTION
8309	Battery
4965	Chart, tube
8352	Lamp, neon
4203	Meter
6986-87	Test leads, alligator
6744-45	Test leads, pin plugs
7885	Tube, type 71A
4688	Adapter, Acorn

The parts used in the Model 504-A were carefully inspected for mechanical and electrical defects before shipment from the factory. The foregoing list includes

several items which may be easily replaced by the operator should the necessity arise. Orders should be directed to the Service Department of the company.

TYPE MEASUREMENT	RANGE OF MEASUREMENT	BUTTONS PUSHED		READ ON METER SCALE	TO INTERPRET READING
		LEFT	RIGHT		
DIRECT CURRENT	0 to 0.5 MA. 0.5 to 2.5 MA. 2.5 to 10 ⁴ MA. 10 to 50 MA. 50 to 250 MA. 0.25 to 1.0 AMP 1.0 to 10 AMP	D. C. MA. D. C. MA. D. C. MA. D. C. MA. D. C. MA. D. C. MA. D. C. MA.	0.5 MA. 2.5 MA. 10 MA. 50 MA. 250 MA. 1 AMP. 1 AMP.	VOLTS MA 0-5 VOLTS MA 0-5 VOLTS MA 0-10 VOLTS MA 0-50 VOLTS MA 0-50 VOLTS MA 0-10 VOLTS MA 0-10	Divide by 10 Divide by 2 Read Direct Read Direct Multiply by 5 Divide by 10 Read Direct
	Note: For 10 AMP. range, use terminals in upper left hand corner of instrument marked "10 AMP. D.C.". Press "0" button in left hand row for all milliampere (MA.) and ampere (AMP.) readings.				
D-C VOLTAGE	0 to 5 volts 5 to 25 volts 25 to 100 volts 100 to 250 volts 250 to 500 volts 500 to 1000 volts 1000 to 2500 volts	D.C. VOLTS D.C. VOLTS D.C. VOLTS D.C. VOLTS D.C. VOLTS D.C. VOLTS D.C. VOLTS	5 D.C.V. 25 D.C.V. 100 D.C.V. 250 D.C.V. 500 D.C.V. 1000 D.C.V. 1000 D.C.V.	VOLTS MA 0-5 VOLTS MA 0-50 VOLTS MA 0-10 VOLTS MA 0-50 VOLTS MA 0-50 VOLTS MA 0-10 VOLTS MA 0-50	Read Direct Divide by 2 Multiply by 10 Multiply by 5 Multiply by 10 Multiply by 100 Multiply by 50
	Note: For 2500 volt range, use terminals in upper right hand corner of instrument marked "2500 D.C.V.".				
CAPACITOR LEAKAGE	All Capacitors Electrostatic 2 to 50 MFD. 25 to 450 w.v. Electrolytic	MEGOHMS ELEC COND	20 MEG See Instructions	OHMS ∞ - 0 GOOD CAPACITOR BAD CAPACITOR	See Operating Instructions-- Electrostatic and ELECTROLYTIC Condensers
	RESISTANCE	0 to 20 Ω 20 to 200 Ω 200 to 2000 Ω 2000 to 200M Ω 200M Ω to 20 megohms	OHMS-OHMS OHMS-OHMS OHMS-OHMS MEGOHMS MEGOHMS	200 2M 20M 2MEG 20MEG	OHMS ∞ - 0 OHMS ∞ - 0 OHMS ∞ - 0 OHMS ∞ - 0 OHMS ∞ - 0
A-C VOLTAGE		0 to 5 volts 5 to 10 volts 10 to 50 volts 50 to 250 volts 250 to 1000 volts	A.C. VOLTS A.C. VOLTS A.C. VOLTS A.C. VOLTS A.C. VOLTS	5 A.C.V. 10 A.C.V. 50 A.C.V. 250 A.C.V. 1000 A.C.V.	5VOLTS A.C. 0-5 VOLTS MA 0-10 VOLTS MA 0-50 VOLTS MA 0-50 VOLTS MA 0-10
	OUTPUT VOLTAGE (approximate at 400 cycles)	0 to 5 volts 5 to 10 volts 10 to 50 volts 50 to 250 volts 250 to 1000 volts	OUTPUT OUTPUT OUTPUT OUTPUT OUTPUT	5 OUT.V. 10 OUT.V. 50 OUT.V. 250 OUT.V. 1000 OUT.V.	5VOLTS A.C. 0-5 VOLTS MA 0-10 VOLTS MA 0-50 VOLTS MA 0-50 VOLTS MA 0-10

SETTINGS FOR "DRY" ELECTROLYTICS

MFD/WV	CONTROL			SETTINGS
2/450	6	1	0	G 7
4/200	6	1	0	D 8
4/250	6	1	0	E 7
4/350	6	1	0	F 7
4/450	6	1	0	G 5
5/25	6	1	0	A 8
5/50	6	1	0	B 8
5/100	6	1	0	G 8
8/200	6	1	0	D 6
8/250	6	1	0	E 5
8/350	6	1	0	F 5
8/450	6	1	0	G 2
10/25	6	1	0	A 6
10/50	6	1	0	B 6
10/100	6	1	0	C 6
10/200	6	1	0	D 6
10/250	6	1	0	E 4
10/350	6	1	0	F 4
10/450	6	1	0	G 2
12/200	6	1	0	D 5
12/250	6	1	0	E 3
12/350	6	1	0	F 3
12/450	6	1	0	G 1
16/200	6	1	0	C 4
16/250	6	1	0	E 2
16/350	6	1	0	F 2
16/450	6	1	0	G 1
20/25	6	1	0	A 5
20/50	6	1	0	B 5
20/100	6	1	0	C 5
20/200	6	1	0	D 3
20/350	6	1	0	F 1
20/450	6	1	0	G 1
25/25	6	1	0	A 4
25/50	6	1	0	B 4
25/100	6	1	0	C 3
25/200	6	1	0	D 2
30/200	6	1	0	D 1
30/450	6	1	0	G 1
50/25	6	1	0	A 4
50/50	6	1	0	B 4

SETTING FOR "WET" ELECTROLYTICS

MFD/WV	CONTROL			SETTINGS
4/250	6	1	0	E 7
4/350	6	1	0	F 7
4/450	6	1	0	G 7
8/250	6	1	0	E 5
8/350	6	1	0	F 5
8/450	6	1	0	G 5
10/250	6	1	0	E 4
10/350	6	1	0	F 4
10/450	6	1	0	G 4
12/200	6	1	0	D 3
12/350	6	1	0	F 3
12/450	6	1	0	G 3
16/200	6	1	0	D 2
16/350	6	1	0	F 2
16/450	6	1	0	G 2
20/200	6	1	0	D 1
20/350	6	1	0	F 1
20/450	6	1	0	G 1
24/350	6	1	0	F 1
24/450	6	1	0	G 1
25/50	6	1	0	B 1
50/50	6	1	0	B 1

PILOT LAMPS

VOLTAGE	CONTROL			SETTINGS
1.5	1	1	0	90V 47
2.0	1	2	0	90V 47
2.5	1	3	0	90V 47
3.3	1	4	0	90V 47
5.0	1	5	0	90V 47
6.3	1	6	0	90V 47
7.5	1	7	0	90V 47
12.6	1	8	0	90V 47
25.0	1	9	0	90V 47
32.0	1	10	0	90V 47
50.0	1	11	0	90V 47
60.0	1	12	0	90V 47

SERVICE NOTES

The Model 504-A Instrument may be removed from its oak carrying case by removing the seven screws on the extreme outside edge of the panel. When the instrument is replaced in the case, the repairman must make certain that no wire of the point to point or cable wiring of the instrument is pinched between the panel of the instrument and the brass brackets located in the case.

#4203 Meter: The basic sensitivity of this meter is 500 microamperes. The units furnished as replacement parts, have attached a meter calibrating resistor which builds the total meter resistance of 300 ohms as per the circuit diagram. If it becomes necessary to replace the meter, the meter calibrating spool must also be changed. With the instrument removed from the case, placed face down and the chart closest to the repairman, this spool will be located at the lower edge of the left hand switch which is the range selector switch. Care must be exercised in replacing this spool to see that an excessive amount of solder is not used, and that it does not flow down into the switch assembly. If it becomes necessary to open a meter for repair or inspection, it is imperative that the work bench be clean and free of all dust and dirt especially magnetic metal particles. If both the meter and its matched calibrating spool are replaced, it should not be necessary to recalibrate any of the ranges.

#4782 Transformer: This transformer is designed to furnish the necessary voltage for the megohm ranges and also to provide for filament voltages from 3/4 Volt to 117 Volts. With the Model 504-A connected to the proper supply of 117 volts, 60 cycle, the total current drain with no tube under test should not exceed 180 mils. In replacing the transformer, great care should be exercised in connecting the new unit exactly the same as the transformer originally supplied in the instrument.

#8309 Battery: This battery is a 1 1/2 volt unit, one used per instrument. This battery is located on the inside of the oak case and to replace same it will be necessary to remove the instruments from the case as per the instructions. The battery is used to supply the necessary current for the first three ohmmeter ranges. When the ohmmeter ranges fail to zero, this battery should be replaced.

#4962 Potentiometer: This potentiometer is a 300 ohm wire wound, taper W unit, one used per instrument. Failure of this particular potentiometer usually indicates improper operation of the Model 504-A tube and set tests. As is explained fully in the instruction manual attached, tubes should be given sufficient time to come to their full and proper operating temperature before the quality button is depressed. Unless this precaution is observed, excessive current will be drawn through the 4962 potentiometer causing it to burn out. In replacing this potentiometer, it is necessary that the transformer be mechanically disconnected from the panel and lifted up to such an extent that the potentiometer can be removed. It will not be necessary to disconnect any wires from the transformer. Care must be exercised in reconnecting the wires to the potentiometer in order that they be replaced in the proper position. An indication that this potentiometer has become defective will be clearly shown if the instrument is placed in the ohm position and the leads are shorted together and the potentiometer rotated. A defective potentiometer will also be evidenced by the fact that in the testing of tubes above the setting of 50, the pointer of the meter will go off scale to the right. If the proper operating procedure of the tube section of the Model 504-A is strictly adhered to, no difficulty will be encountered with this potentiometer.

#5520 Rectifier: In replacing the copper oxide rectifier, great care must be exercised in preventing excessive heat from damaging the plates. Under no condition should the leads of the rectifier as furnished be removed from the instrument. The rectifier should be handled in such a way as to prevent your fingers from coming in contact with the edge of the plates. After replacing the rectifier, it may be necessary to recalibrate the various A.C. ranges by changing the location of the metal clips on the A.C. calibrating shunts as shown in the circuit diagram of the instruction manual. It will be necessary to carefully loosen these clips by means of a pair of pliers and move to the proper position at which time they should be tightly clamped to the shunt and if possible sealed with some type of speaker cement.

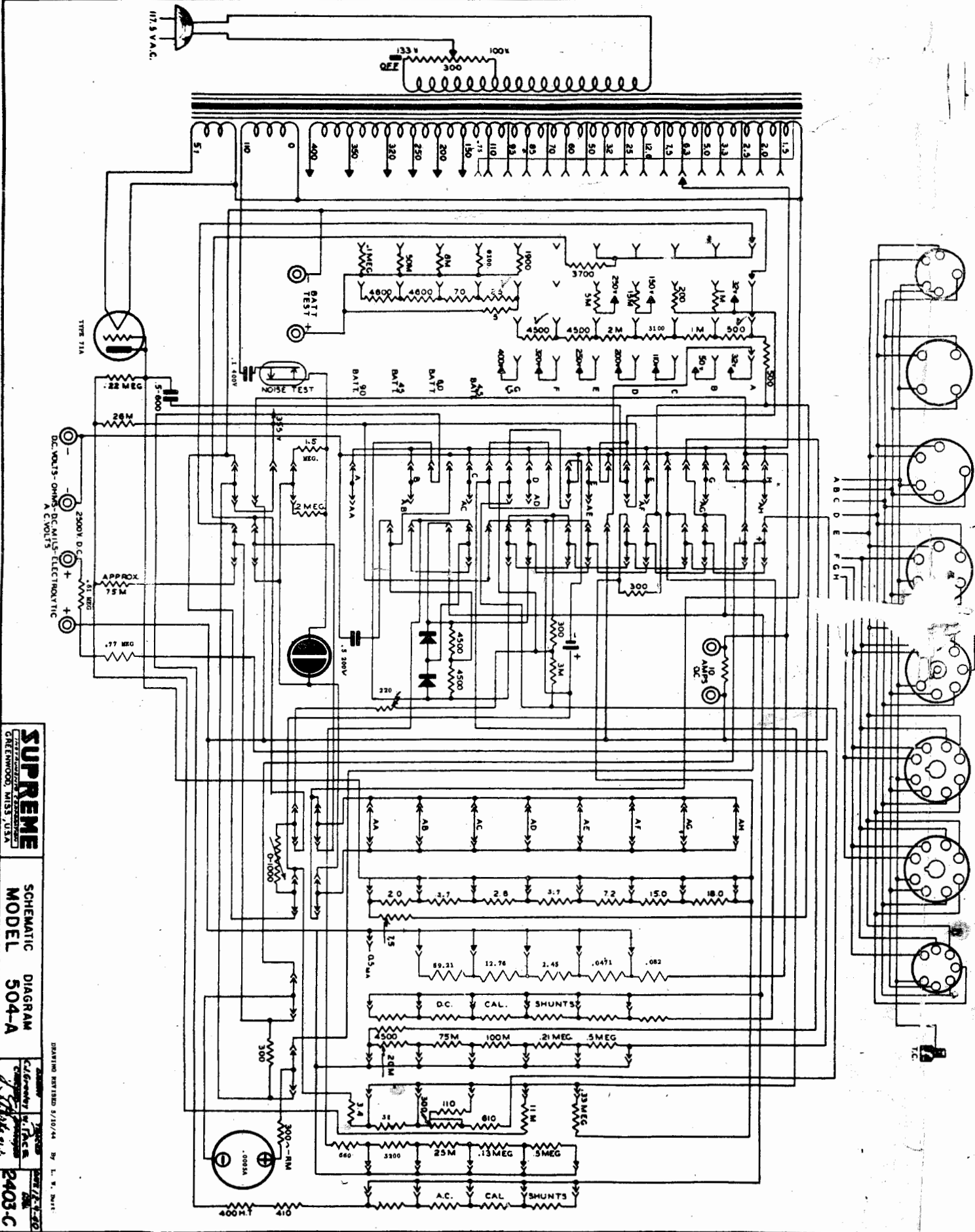
#7413 Condenser: This condenser is a .5 mfd, 600 Volt DC unit. With the instrument removed from the case, placed face down, the tube chart nearest the repairman, this capacitor is located at the left end of the sub-panel directly above the meter. This condenser should be checked for shorted condition if the current drain of the instrument is above 180 mils or the instrument blows line fuses (no fuses in instrument) or if the line adjustment control, stock #4961, is being replaced.

#7216 Resistor: These resistors are 2 watt, .22 meg, RMA Coded, Red, Red, Yellow, and gold, one used per instrument. This resistor is located directly back of the meter terminals on the bakelite sub-panel. This is the bleeder resistor for the power supply of the Model 504-A. If the line adjustment potentiometer, stock #4961, is in good condition and no shorts can be found in the instrument and the meter fails to properly register the line adjustment at center scale or the megohm ranges fail to zero properly, it is possible that this resistor has changed value or is defective in some way.

#4961 Potentiometer: This potentiometer is a 300 ohm wire wound, linear, 25 watt ceramic base control, one used per instrument. Little difficulty will be encountered with this control unless a short occurs in the instrument causing it to draw excessive currents. If this control becomes defective, the condenser, stock #7413, which is a .5 mfd, 600 volt unit should be carefully checked to see that it has not become shorted. Proper connections to this potentiometer are essential. This potentiometer serves two purposes. It is the line adjustment control as well as the on and off switch of the instrument.

#8352 Neon lamp: No electrical difficulty will be encountered with this unit. Mechanical breakage caused by rough handling will be the only cause of replacement. This bulb may be replaced from the face of the instrument without removing same from the case unless the base of the lamp in question has become corroded. If this condition exists, it will be necessary to remove the instrument from the case in order to remove the lamp from the socket. This lamp is a 1/2 watt neon lamp, having a candleabra base.

#71A Tube: Little difficulty will be encountered with these tubes with exception of mechanical breakage unless the instrument is subjected to extreme jarring which can cause the filament to break or other elements to short, it will be necessary to remove the instrument from case to replace this tube which is located directly back of the meter.

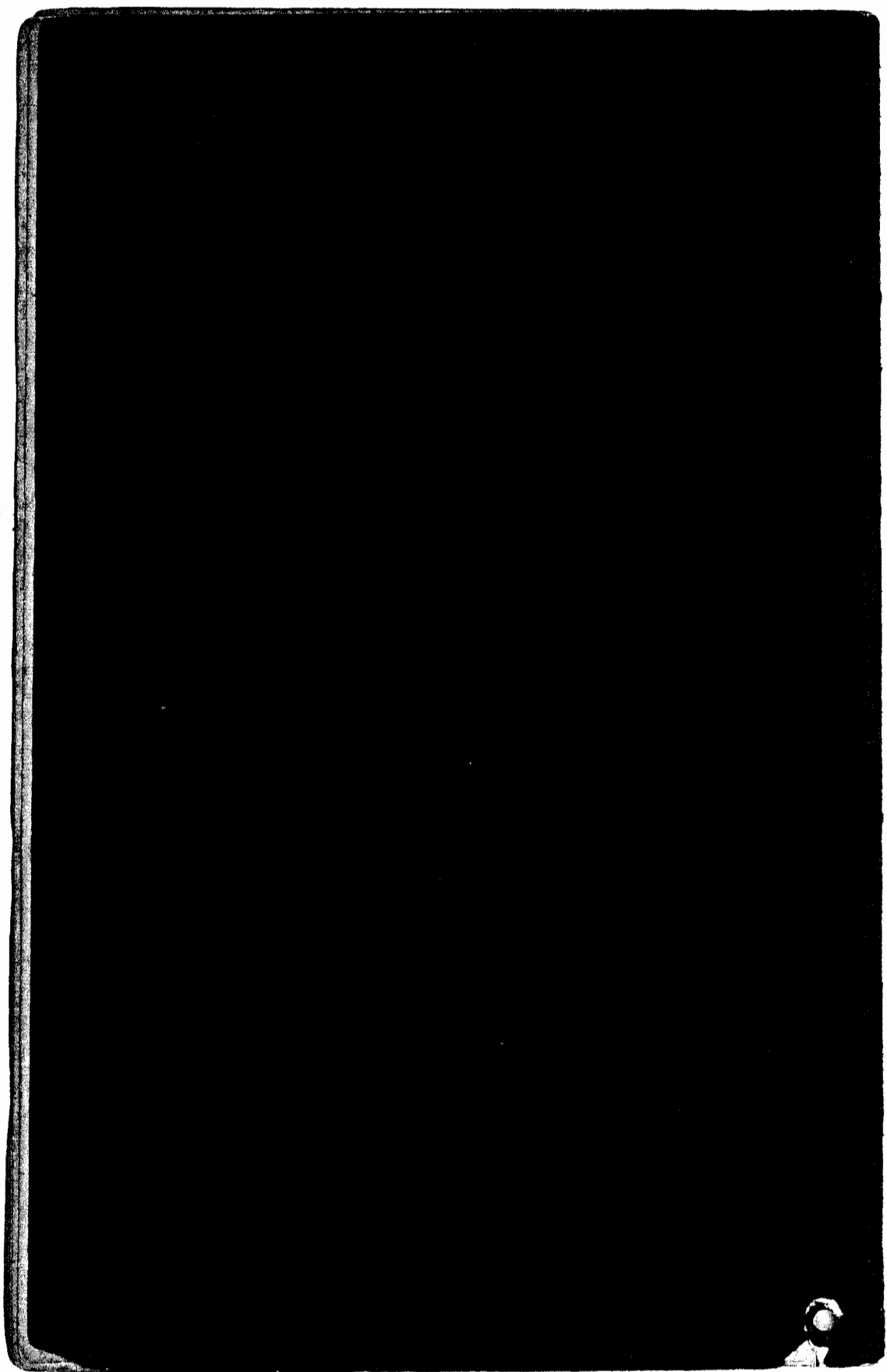


SUPREME
GREENWOOD, MISS. U.S.A.

SCHEMATIC DIAGRAM
MODEL 504-A

DATE 1/17/44
BY L. W. BULL
REVISED 5/10/44
NO. 2403-C

DATE: 1/17/44
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SUPREME MODEL 504-B

ELECTRICAL SPECIFICATIONS

POWER SUPPLY REQUIREMENTS: (unless otherwise specified on plate attached to instrument).
 Voltage.....100/133 volts A-C
 Frequency.....50/60 cycles
 Power Consumption.....25 watts maximum

MECHANICAL SPECIFICATIONS

OVER-ALL DIMENSIONS: PANEL CASE
 Length.....11-1/2 in.....14-1/4 in.
 Width.....11-3/4 in.....12-3/8 in.
 Depth.....6 inches
 WEIGHT:
 Net.....15-1/2 pounds
 Shipping.....19 pounds

STANDARD EQUIPMENT SUPPLIED WITH

THE SUPREME MODEL 504-B

QUANTITY	STOCK	DESCRIPTION	PACKER'S CHECK
1	8899	Booklet, Operating Data	
1	6725	Card, Return Registration	

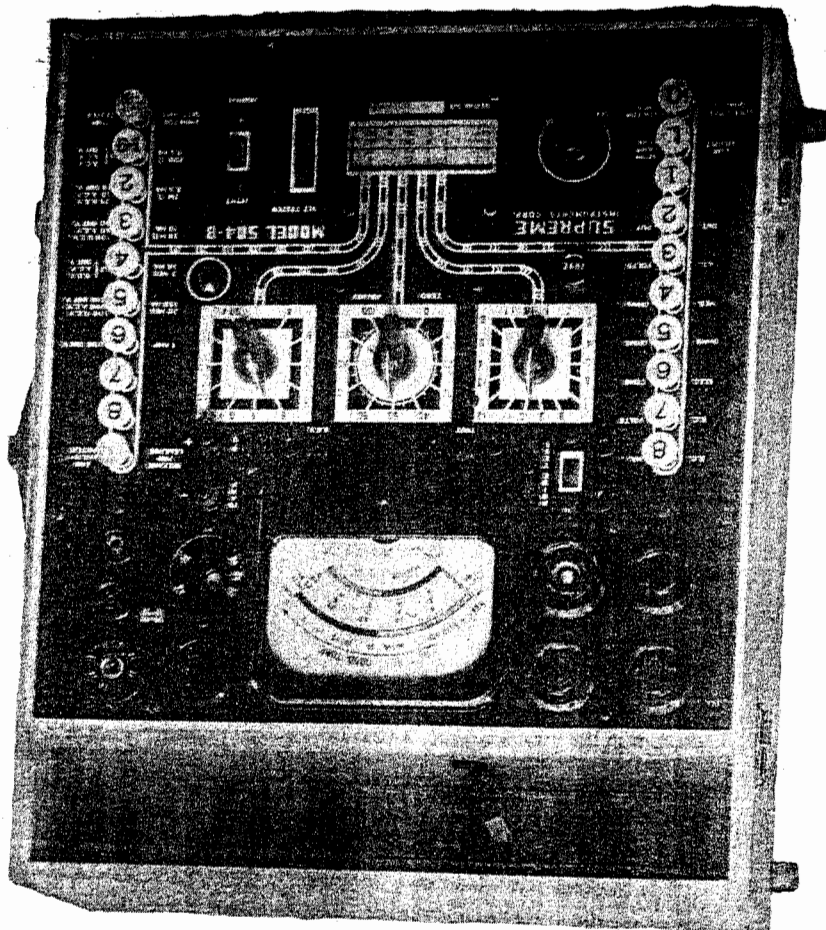
The above list has been checked by the undersigned who is responsible for the completion of this package.

SERIAL #.....
 (Signed).....Shipping Department

MENTION ABOVE NUMBERS IN ALL CORRESPONDENCE.

IMPORTANT

See enclosed colored page for information concerning Registration, Transportation Damages, Warranty, Replacement Parts, Etc.
 The instructions listed on this colored sheet must be compiled with before the warranty policy is applicable. The Model and Serial numbers should be mentioned in all correspondence regarding this tester.



The multimeter section of the Model 504-B incorporates seven choice functions built around a meter with a sensitivity of 500 microamperes. This section includes a total of twenty-nine carefully selected ranges and also provisions for electrolytic and electrostatic capacitor checks. Twenty-seven multimeter functions are operated from only one pair of pin jacks by means of two sets of push button switches which

battery manufacturers. The multimeter section of the Model 504-B are those recommended by the battery. The discard points used in this section average current drain on that particular type of upon the battery under test which represents the load. The battery testing function provides a load

ages are used throughout this tester. tube manufacturers. Recommended loads and volt- charts. SUPREME engineers worked closely with ing the limits on the tubes as shown on the roll the tube may be accurately classified. In set- the other elements of the tube, the quality of for its ability to emit electrons or current to ing the cathode or filament, as the case may be, for making a simplified test of tubes. By check- long been recognized to be the most accurate the emission principle. This type of tester has is designed to classify receiving type tubes by The tube testing circuit of the Model 504-B as many other types of electronic apparatus. condition of radio receivers and parts as well battery and set tester for checking the static The SUPREME Model 504-B is a complete tube.

GENERAL DESCRIPTION

SUPREME MODEL 504-B TUBE TESTER

FOR

INSTRUCTION MANUAL

#8899

Four-inch, SUPREME full-vision type.
 SCALES: BAD TUBE-? GOOD TUBE, red sector, orange sector, and green sector. English reading scale for checking the condition of tubes and batteries.
 DIODES: O.K. (Arrow scale) for checking tubes containing diodes such as 6H6, 75, 6Q7, etc.
 OHMS: '2M' non-linear to '0' with '35' mark at center scale - for resistance and continuity measurements.
 VOLTS MA: 0/5/10/25 basic linear scale for all current and voltage measurements except 0-5 volts A-C and 0-5 volts output.
 5 VOLTS A.C.: Used only for 0-5 volts A-C

METER:

PANEL MARKINGS AND COMPONENTS

Unless otherwise specified, the instrument is designed to operate from 100 to 133 volts at 50/60 cycles. Power consumption is 25 watts. The rectifier tube is a 6X5GT.
 This instrument is protected from damage in case an overload is applied to it by a fuse having a rating of 1 Ampere. If your instrument fails to operate remove the fuse from its fuse-holder and check it with an ohmmeter to see if it is burned out. If it is, replace it with a fuse of the same length having a rating of 1 Ampere. If the second fuse burns out the instructions listed under SERVICE AND MAINTENANCE should be followed. CAUTION! The go-day warranty on the instrument is valid only if it is protected by a fuse having the specified rating! Do not substitute one of higher rating!

POWER SUPPLY REQUIREMENTS

make it a completely automatic unit.

Directly below roll chart, '+', and '-', common
multimeter terminals for automatic operation
of all multimeter functions except 10 ampere
and 2500 volt D-C range.

PIN JACKS:

Directly below meter: 'BATT-TEST' for check-
ing portable radio batteries. 2500 D.C.V.
for extremely high D-C voltage measurement.

PIN JACKS:

Directly under 7 hole socket. Allows phones
to be placed in series with shorts test cir-
cuit for checking noise, when switch is
moved to momentary position.

PIN JACKS:

Directly under 7 hole socket. Allows phones
to be placed in series with shorts test cir-
cuit for checking noise, when switch is
moved to momentary position.

PUSH-BUTTONS:

Right edge of panel - 10 buttons: Blank
locking, 1-9, 2, 3, 4, 5, 6, 7, 8, and blank
momentary release. Range selector for multi-
meter section and element controls for tube
testing sections. This is also used for
electrolytic condenser test shunts.

PUSH-BUTTONS:

4 hole, 5 hole, 6 hole, 7 hole, and pilot on
left side of meter: octal, local, miniature,
bantam, and corn on the right side of meter.

SOCKETS:

GOOD CAPACITOR-BAD CAPACITOR: Green and red
sector for indicating conditions of electro-
lytic capacitors.

Directly below left hand corner of meter.
Number 1 to 18 on panel - for selecting pro-
per filament voltages in tube and pilot
light testing section.

ROTARY SWITCH:

Directly below right hand corner of meter.
Positions: A, B, C, D, E, F, and G for
applying proper load and anode voltage to
tube under test. Position 1.5 V, 4.5 V,
6.0 V, 45 V, and 90 V for inserting proper
load and shunts in battery testing section.

POTENTIOMETER (ZERO ADJUST):

Directly below meter - for ohmmeter adjust-
ment in multimeter section and quality con-
trol in tube testing section.

POTENTIOMETER:

Directly to left of roll chart with encir-
cling arrow - line adjustment control and pow-
er switch. Power is off when this control
is in the extreme counter-clockwise posi-
tion.

NEON LAMP (SHORT):

Directly to upper right of roll chart - for
visual indication of shorted, leaky or dis-
located elements in vacuum tubes. Filament
continuity tests.

FUSEHOLDER:

Directly to upper left of roll chart -
holds one ampere fuse for protection of
instrument.

SLIDE SWITCH:

Directly to right of roll chart - for spec-
ial test on 117N7 tube. Leave in DOWN (N)
position for tests on all other tubes.

ROTARY SWITCH:

BINDING POSTS:

Directly under acorn socket. Used for checking 10 ampere D-C.

MODEL NUMBER:

504-B - indicated directly below neon lamp.

SERIAL NUMBER:

Stamped in panel directly below roll chart.

OPERATION

1. Connect power supply cable to a convenient A-C supply socket after you have made certain that it is the proper voltage and frequency. (See POWER SUPPLY REQUIREMENTS).

2. Depress locking type button 'PRESS FOR BATT AND TUBE TESTER' located below button '1-9'.

3. On the chart locate the tube type to be tested and set the controls as indicated by the red 'arrow-ways'. THE RIGHT HAND COLUMN ON THE TUBE CHART INDICATES THE BUTTONS IN THE RIGHT HAND ROW OF PUSH-BUTTONS WHICH ARE TO BE PRESSED. Press these buttons down.

4. Place the tube in the correct socket. Press and hold down 'LINE ADJUST' push button on left hand side of panel. Turn line adjustment potentiometer, and after allowing approximately 30 seconds for the rectifier tube in the instrument to warm up, adjust it until the meter needle points directly to the '2' which lies in the orange section of the tube tester scale. The meter will read in all positions of the potentiometer except in the extreme counterclockwise or 'OFF' position. Check this adjustment in case of line voltage fluctuation.

5. Press momentary 'RELEASE FOR LEAKAGE' button to release any previously depressed buttons in same row. Then press successively buttons '1-9'.

Be sure proper settings are made as out-

CAUTION!

Exceptions to rules of operation are some-
times necessary, in these cases a letter follows
the listing of the tubes on the chart. Example:
3525(F). Explanation is found at the end of the
chart. Tubes not listed on the chart will be
found in Supplement to this Instruction Manual.

CHART FOOTNOTES

Some tubes require more than one test as
indicated on the roller chart. The separate sec-
tions are checked as outlined above for single
tube as listed on chart.

MULTI-PURPOSE TUBES

scale.
dition of tube on 'BAD TUBE-GOOD TUBE' meter
lower left hand button marked 'Q' and note con-
ly 30 seconds for tube to heat and then press
plained above in Paragraph 3. Allow approximate-
button or buttons as shown on chart and as ex-
'PRESS FOR TUBE TESTER' button and then numbered
6. If the tube has no internal shorts, press
and cathode.

When testing tubes for leakage and inter-
electrode shorts, the sensitivity of the neon
lamp may be increased by holding down the button
marked 'NEON LAMP SENS.' throughout the test.
However, under these conditions, good tubes may
show a slight amount of leakage between heater

will be shown.
note which indicates the buttons on which shorts
the tube number and refers to the proper foot-
all cases where this is normal a letter follows
element other than the filament is shorted. In
than one switch causes the lamp to glow, some
when one of the buttons is pressed but when more
to '8' in right hand row. Neon lamp should light

lined before tube is inserted into socket. At the end of tests, turn line adjusting potentiometer to "OFF" and leave until next test is to be made.

BALLAST TUBES

Ballast tubes are checked for opens, loose connections, and bad welds. Press momentary 'RELEASE FOR LEAKAGE' button to release any previously depressed buttons in same row. The ballast tube is inserted in the proper socket. The neon lamp should light when the indicated buttons are pressed. Any flickering of the neon lamp when the tube is tapped indicates a poorly welded joint.

PILOT LAMPS

Set controls as shown in chart below and lamp should light with normal brilliance when inserted in special socket in center of 7 hole tube socket.

VOLTAGE	CONTROL	SETTINGS
1.5	1	90V 47
2.0	1	90V 47
2.5	1	90V 47
3.3	1	90V 47
5.0	1	90V 47
6.3	1	90V 47
7.5	1	90V 47
12.6	1	90V 47
25.0	1	90V 47
32.0	1	90V 47
50.0	1	90V 47
60.0	1	90V 47

BATTERY TESTS

Press 'RELEASE FOR LEAKAGE AND MULTIMETER' button, then press 'PRESS FOR BATT' button in right hand row. Set right hand selector switch to voltage of battery being tested. Connect

When using the ohms and megohms ranges, first adjust the potentiometer controlling the line adjustment as explained in paragraph 4 under 'OPERATION'. Then connect the two pin jacks at the lower edge of the panel together and adjust the potentiometer labelled 'ZERO OHMS' until the meter reads full scale (zero ohms). The pin jacks can be connected by touching together the two test leads which are being used for resistance measurements. The meter should be readjusted for zero ohms each time the operator changes the instrument range. When the test leads are touched, a 'tingling' will be noted which is caused by the voltage

Press 'RELEASE FOR LEAKAGE AND MULTIMETER' button to release any previously depressed buttons. For each multimeter range of this instrument, two buttons must be pressed. First, press the button in the left hand row corresponding to the desired function, then pressing the button in the right hand row corresponding to the required range. For all direct current ranges, the button labelled 'PRESS FOR MILLS' must be pressed. All ranges except the 10 ampere and 2500 D-C volt are accessible from the pin jacks on the lower edge of the panel. The 10 ampere range is connected to the upper right hand binding post by pressing the 'D.C. MILLS' the '1 AMP' and the 'PRESS FOR MILLS' buttons. The 2500 D-C volt range is accessible from a separate set of pin jacks directly below the meter by pressing the 'D.C. VOLTS' and '1,000 D.C.V.' buttons.

MULTIMETER OPERATION

'GOOD TUBE' sector.
meter needle will come to rest in the green 'GOOD TUBE' scale. For good batteries the button and read battery condition on 'BAD TUBE' ing proper polarity. Press 'QUALITY FOR BATT' battery to pin jacks marked 'BATT TEST' observ-

TYPE MEASUREMENT	RANGE OF MEASUREMENT	BUTTONS PUSHED		READ ON METER SCALE	TO INTERPRET READING
		LEFT	RIGHT		
DIRECT CURRENT	0 to 0.5 MA.	D. C. MA.	0.5 MA.	VOLTS MA 0-5	Divide by 10
	0.5 to 2.5 MA.	D. C. MA.	2.5 MA.	VOLTS MA 0-25	Divide by 10
	2.5 to 10 MA.	D. C. MA.	10 MA.	VOLTS MA 0-10	Read Direct
	10 to 50 MA.	D. C. MA.	50 MA.	VOLTS MA 0-5	Multiply by 10
	50 to 250 MA.	D. C. MA.	250 MA.	VOLTS MA 0-25	Multiply by 10
	0.25 to 1.0 AMP	D. C. MA.	1 AMP.	VOLTS MA 0-10	Divide by 10
	1.0 to 10 AMP	D. C. MA.	1 AMP.	VOLTS MA 0-10	Read Direct
NOTE: For 10 AMP. range, use binding posts marked "10 AMP. D.C." PRESS "0" BUTTON IN LEFT HAND ROW FOR ALL MILLIAMPERE (MA.) AND AMPERE (AMP.) READINGS.					
D-C VOLTAGE	0 to 5 volts	D.C. VOLTS	5 D.C.V.	VOLTS MA 0-5	Read Direct
	5 to 25 volts	D.C. VOLTS	25 D.C.V.	VOLTS MA 0-25	Read Direct
	25 to 100 volts	D.C. VOLTS	100 D.C.V.	VOLTS MA 0-10	Multiply by 10
	100 to 250 volts	D.C. VOLTS	250 D.C.V.	VOLTS MA 0-25	Multiply by 10
	250 to 500 volts	D.C. VOLTS	500 D.C.V.	VOLTS MA 0-5	Multiply by 100
	500 to 1000 volts	D.C. VOLTS	1000 D.C.V.	VOLTS MA 0-10	Multiply by 100
	1000 to 2500 volts	D.C. VOLTS	1000 D.C.V.	VOLTS MA 0-25	Multiply by 100
NOTE: For 2500 volt range, use pin jacks marked "2500 D.C.V.".					
RESISTANCE	0 to 20 Ω	OHMS-OHMS	200	OHMS ω -0	Divide by 10
	20 to 200 Ω	OHMS-OHMS	20M	OHMS ω -0	Read Direct
	200 to 2000 Ω	OHMS-OHMS	20M	OHMS ω -0	Multiply by 10
	2000 to 200M Ω	MEG-OHMS	20MEG	OHMS ω -0	Multiply by 1000
A-C VOLTAGE	0 to 5 volts	A.C. VOLTS	5 A.C.V.	SVOLTS A.C. 0-5	Read Direct
	5 to 10 volts	A.C. VOLTS	10 A.C.V.	VOLTS MA 0-10	Read Direct
	10 to 50 volts	A.C. VOLTS	50 A.C.V.	VOLTS MA 0-5	Multiply by 10
	50 to 250 volts	A.C. VOLTS	250 A.C.V.	VOLTS MA 0-25	Multiply by 10
	250 to 1000 volts	A.C. VOLTS	1000 A.C.V.	VOLTS MA 0-10	Multiply by 100
OUTPUT VOLTAGE (approximate at 400 cycles)	0 to 5 volts	OUTPUT	5 OUT.V.	SVOLTS A.C. 0-5	Read Direct
	5 to 10 volts	OUTPUT	10 OUT.V.	VOLTS MA 0-10	Read Direct
	10 to 50 volts	OUTPUT	50 OUT.V.	VOLTS MA 0-5	Multiply by 10
	50 to 250 volts	OUTPUT	250 OUT.V.	VOLTS MA 0-25	Multiply by 10
	250 to 1000 volts	OUTPUT	1000 OUT.V.	VOLTS MA 0-10	Multiply by 100

If right hand setting in chart is greater than '1', press button '2', then button '3', etc. until the number indicated on the chart is reached. Read capacitor leakage condition on 'GOOD CAPACITOR-BAD CAPACITOR' meter scale. If needle rests in red portion or goes off scale, capacitor should be rejected. If needle rests in green portion, capacitor is satisfactory for use.

Electrostatic capacitors are tested using the 20 megohm range of the multimeter. The amount of leakage permitted depends upon the application. When the capacitor is used for coupling purposes, there should be no noticeable deflection of the meter except momentary charge or discharge. To test electrolytic capacitors, press 'RELEASE FOR LEAKAGE AND MULTI-METER' button; then press 'ELEC COND' button in left hand row. Set right hand selector switch to letter indicated in chart on page 15. (Listings are given according to capacity working voltage.) Press '1-5' button in right hand row. Connect capacitor to pin jacks on lower edge of panel, observing proper polarity, and allow approximately fifteen seconds for the capacitor to charge. Note position of meter needle. If needle drops back slowly, allow capacitor to form until needle comes to rest. (This will take at least ten minutes for capacitors that have been idle for a period of time.)

CAPACITOR TESTER

used to operate the megohm ranges. This will not cause injury and does not indicate a defect in the instrument. It is suggested that for the greatest degree of accuracy that when using the 200 ohm range, the pin jacks be shorted with as short a lead as possible.

SETTINGS FOR "DHW" ELECTROLYTICS				SETTINGS FOR "WET" ELECTROLYTICS			
HTD/W	CONTROL	SETTINGS	HTD/W	CONTROL	SETTINGS	HTD/W	CONTROL
2/450	1	0	6	1	0	6	1
4/200	1	0	6	1	0	6	1
4/250	1	0	6	1	0	6	1
4/350	1	0	6	1	0	6	1
4/450	1	0	6	1	0	6	1
5/25	1	0	6	1	0	6	1
5/50	1	0	6	1	0	6	1
5/100	1	0	6	1	0	6	1
5/200	1	0	6	1	0	6	1
5/250	1	0	6	1	0	6	1
5/350	1	0	6	1	0	6	1
5/450	1	0	6	1	0	6	1
8/250	1	0	6	1	0	6	1
8/200	1	0	6	1	0	6	1
8/100	1	0	6	1	0	6	1
8/250	1	0	6	1	0	6	1
8/350	1	0	6	1	0	6	1
8/450	1	0	6	1	0	6	1
10/25	1	0	6	1	0	6	1
10/50	1	0	6	1	0	6	1
10/100	1	0	6	1	0	6	1
10/200	1	0	6	1	0	6	1
10/250	1	0	6	1	0	6	1
10/350	1	0	6	1	0	6	1
10/450	1	0	6	1	0	6	1
12/200	1	0	6	1	0	6	1
12/250	1	0	6	1	0	6	1
12/350	1	0	6	1	0	6	1
12/450	1	0	6	1	0	6	1
16/200	1	0	6	1	0	6	1
16/250	1	0	6	1	0	6	1
16/350	1	0	6	1	0	6	1
16/450	1	0	6	1	0	6	1
20/25	1	0	6	1	0	6	1
20/50	1	0	6	1	0	6	1
20/100	1	0	6	1	0	6	1
20/200	1	0	6	1	0	6	1
20/350	1	0	6	1	0	6	1
20/450	1	0	6	1	0	6	1
25/25	1	0	6	1	0	6	1
25/50	1	0	6	1	0	6	1
25/100	1	0	6	1	0	6	1
25/200	1	0	6	1	0	6	1
30/200	1	0	6	1	0	6	1
30/250	1	0	6	1	0	6	1
30/350	1	0	6	1	0	6	1
30/450	1	0	6	1	0	6	1
50/25	1	0	6	1	0	6	1
50/50	1	0	6	1	0	6	1

TYPE	RANGE OF BUTTONS PUSHED	RIGHT METER SCALE	READ ON TO INTERPRET
CAPACITOR LEAKAGE	2 to 50 MFD. ELEC COND	See Chart Below	See CAPACITOR HAD CAPACITOR GOOD
All Capacitors ELEC	MEG OHMS	20 MEG	OHMS ∞ - 0
Electrolytic	See Instruc-	See Instruc-	tions above.

SUPREME INSTRUMENTS CORPORATION
 GREENWOOD, MISSISSIPPI
 U.S.A.

The parts used in the SUPREME Model 504-B were carefully inspected for mechanical and electrical defects at the factory. Under normal conditions and average use the life of the tube will be equal to those in radio receivers (approximately 1500 hours). Any special parts which are not available from regular dealers stocks may be ordered from your nearest SUPREME distributor by describing the item and giving the Model and Serial numbers of your unit.

REPLACEMENT PARTS

All functions and ranges of the SUPREME Model 504-B were carefully tested and calibrated before shipment from the factory. Under normal operating conditions this instrument should give a long and trouble-free service. However, if for any reason this instrument should fail to operate properly, write the Service Engineer at the factory. Submit complete information regarding the difficulty and full instructions will be forwarded in detail. The Model and Serial numbers, position of controls, inoperative section, and any other information should be given in your first letter.

SERVICE AND MAINTENANCE

