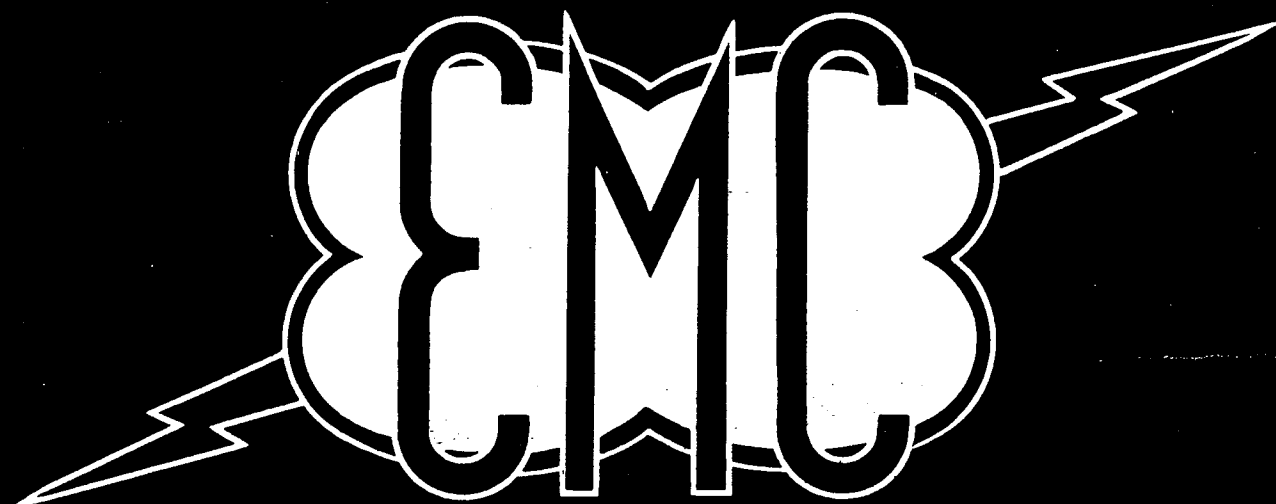


OPERATING MANUAL

EMC Model 801



WARNING: Do not misplace this book. It contains complete instructions necessary for the operation of this instrument. **DO NOT** plug instrument into a **DC POWER LINE!** Unless otherwise indicated, this instrument is designed for 105-135 volt, 60 cycle, AC power.

ELECTRONIC MEASUREMENTS
CORPORATION

625 Broadway, New York, N. Y. 10012

MODEL 801 RESISTANCE CAPACITANCE BRIDGE AND IN CIRCUIT CAPACITANCE CHECKER

GENERAL

Model 801 is a comprehensive condenser checker in that it measures capacity in 4 ranges from 10 mmfd. to 5000 mfd. It measures leakage at any rated voltage up to 500 Volt DC and measures power factor up to 60%. In addition it checks condensers for opens and shorts while still in the circuit without the necessity of having to remove them from the circuit.

It also measures resistance in 4 ranges from .5 ohm to 500 megohms.

For all its functions, Model 801 uses a "Magic Eye" tube as an indicator.

The leakage test has a dual sensitivity, a low sensitivity for checking electrolytic condensers and a high sensitivity for checking paper, mica and ceramic condensers.

Model 801 may also be used to compare resistors, condensers, chokes, or transformers against standards that are connected across the "standard" binding posts. The ratio of the unknown to the standard can be determined from the "Ratio" scale.

Because of the wide range of measurements provided, Model 801 is of great value in servicing TV, Radio, Amplifiers and other electronic devices.

SPECIFICATIONS

Open test on condensers:-----50 mmfd to infinity
shunted by more than
2 K ohms at 50 mmfd
400 ohms at 100 mmfd
30 ohms at 350 mmfd

Short test on condensers:-----up to 20 mfd shunted by at least
100 ohms. Electrolytic condensers are
not checked for shorts.

Test Frequencies:-----60 cycle for short test
20 megacycles for open test

Resistance: 4 ranges-----0.5 ohm to 500 ohms
50 ohms to 50,000 ohms
5000 ohms to 5 megohms
5 megohms to 500 megohms

Capacitance: 4 ranges-----.00001 mfd to .005 mfd
.001 mfd to 0.5 mfd
0.1 mfd to 50 mfd
50 mfd to 5000 mfd

DC voltage for leakage test:-----0-500 volts continuously variable

Power Factor:-----0-60%

Ratio Measurements:-----.05 to 20 or 400 to 1

Tubes Complement:-----1-EZ81, 1-1629

Power Requirements:-----105-130 volts 50-60 cycles

Cabinet Size:-----7" high x 10" wide x 4½" deep.

CIRCUIT DESCRIPTION

The "In Circuit" capacity checker checks for both opens, intermittents and shorted condensers.

For the SHORT test an AC bias voltage is connected to the grid of the magic eye tube through a current limiting resistor. The tube acts as its own half wave rectifier and conducts only during the half cycle that the plate of the magic eye tube is positive. The test leads are connected between grid and ground. A shorted condenser shorts out the bias voltage causing the eye to open. If it is not shorted, it will not have this effect and the eye will close completely or partially. The impedance of the condenser and the resistor if any which is connected across it, must be at least 10 ohms. Electrolytic condensers are therefore not checked for shorts only for opens.

For the OPEN test the triode section of the magic eye tube is used as a Hartley Oscillator. A secondary coil is coupled to the oscillator coil and is coupled tight enough to cause the oscillator to quit oscillations. Therefore with no condenser or an open condenser connected across the jacks, no bias is developed across the grid leak and the magic eye is open to its widest angle. When a good or a shorted condenser is connected across the secondary, the circuit is detuned sufficiently to permit oscillations to resume. This develops a bias on the grid of the magic eye and causes the eye to close completely or partially. The oscillating frequency is about 20 megacycles.

Resistance and capacity are measured on an AC operated bridge with the magic eye tube as a null indicator. The rheostat that is used to determine the bridge balance, (It has the pointer on it) varies two of the arms of the bridge.

OPERATION

A. IN CIRCUIT CAPACITY CHECKER

1. Set switch to "IN CIRCUIT TESTER" position.
2. Connect test leads to binding posts marked "RES- CAP. TEST."
3. Turn Selector Switch to either "CHECK" position and allow about a minute for the magic eye to warm up.
4. Clip test leads across the capacitor to be checked.
5. Turn switch to "TEST" position. If the eye is open in this position, replace the condenser as it is either open or shorted, depending upon which test you are doing first.
6. If the eye is closed, turn to the remaining TEST position. If the eye closes, the condenser may be considered good as it is neither "open" nor "shorted".
7. If the eye opens in either TEST position, the condenser should be replaced.
8. If the eye flutters in either TEST position when the capacitor is tapped, it is intermittent and should be replaced.
9. Condensers under 100 mmfd should be disconnected from the circuit before testing. Condensers shunted by less than 30 ohms should also be disconnected from the circuit before testing.
10. If the eye has any tendency at all to close as it is turned to the TEST position as compared to its maximum eye opening, the condenser is not shorted or open.

11. Electrolytic condensers should be checked only for OPENS and not for SHORTS.
12. Condensers which are shunted by inductances having impedances of 30 ohms or less at 60 cycles, should be disconnected from the Inductance before measuring for SHORTS and if the inductive impedance is less than 30 ohms at 20 megacycles, it should be disconnected from the condenser before the condenser is measured for OPENS.

B. CONDENSER LEAKAGE TEST

1. Set Switch to "CHECK" position for either "OPEN" or "SHORT" test.
2. Set Switch to "CAP-RES BRIDGE" position.
3. Set Range Switch to "PAPER-MICA TEST" or "ELECTROLYTIC TEST" depending on the type of condenser being checked.
4. Set the "VOLTAGE" control to 0.
5. Connect condenser across "RES-CAP TEST" binding posts. Polarity must be observed when checking electrolytic condensers. The positive side of the electrolytic condenser is connected to the binding post marked "+ " and the negative side to the binding post marked " - ". For paper, mica or ceramic condensers polarity need not be observed. Failure to observe polarity when checking electrolytics may result in damage to the condenser under test.
6. The magic eye tube should have maximum eye opening with the "VOLTAGE" control at "0". This is the normal indication when the condenser has no leakage.
7. Rotate "VOLTAGE" control to the working voltage of the condenser. If the working voltage is above 500V DC turn control to 500V DC.
8. If the condenser is good the eye opening should contract for a moment and then slowly expand again.
9. If the condenser is excessively leaky, the eye opening will disappear completely and it will stay closed. Please note that the eye does not have to expand back to its original maximum opening in order for the condenser to be considered good. Because of the sensitivity of the leakage test, even a very small eye opening particularly in condensers above .1 mfd, indicates a good condenser. Only if the eye stays completely closed can the condenser be considered bad.
10. Electrolytic condensers should remain under test for at least 5 minutes plus 1 minute for each month of shelf storage. This is to allow time for the leakage current to reach its normal value.
11. CAUTION:- Turn the "VOLTAGE" CONTROL back to "0" before disconnecting the condenser from the instrument.

C. CAPACITY TEST AND POWER FACTOR

1. Set Switch to "CHECK" position for either "OPEN" or "SHORT" test.
2. Set Switch to "CAP-RES BRIDGE" position.
3. Set Range Switch to the range desired.
4. Connect condenser across "RES-CAP TEST" binding posts.
5. Rotate the pointer knob until the eye has maximum eye opening. This is the balance position. Move the tuning control knob back and forth slowly until you are sure the eye opening is at its maximum opening. On either side of the balance point, the eye opening will narrow. If the value of the condenser to be measured is unknown and you can't get a satisfactory balance point on one range, rotate the Range Switch through its other positions. Everytime the RANGE switch is changed start with the counter clockwise position and rotate the control knob slowly to its extreme clockwise position until the best balance setting is obtained. The value of the capacitor is read directly on the proper capacity scale.

6. On the .1 mfd to 50 mfd and on the 50 mfd to 5000 mfd ranges, the power factor control is switched into the bridge circuit to allow for balancing the internal resistance present in Electrolytic Condensers. The setting of the POWER FACTOR control therefore affects the eye opening of the bridge. When using these 2 capacity ranges first set the "POWER FACTOR" control to "0" in order to obtain a capacitative balance. If the internal series resistance of the condenser being measured is high, the angle obtained at the capacitative balance position will be less than the normal maximum eye opening. Rotate POWER FACTOR control until the normal maximum eye opening is obtained.
7. Read the % Power Factor of condenser under test. The power factor is a measure of the power loss in a condenser due to its internal resistance. The lower the power factor the better the condenser. As an approximate rule a reading of less than 15 indicates one that is good for any application, a reading of between 15 and 30 indicates a condenser which is suitable for filter applications but not for by passing. A reading of higher than 30 indicates a poor condenser.
8. When measuring very small condensers the value of the distributed wiring capacity of the instrument itself should be subtracted from the reading obtained. To measure this distributed capacity, use the 10 mmfd- 5000 mmfd range and obtain a balance with nothing connected to the instrument terminals. If this value falls below the 10 mmfd marking it can be ignored. Otherwise subtract it from the value obtained with the condenser connected.

D. RESISTANCE MEASUREMENTS

1. Set Switch to "CHECK" position for either "OPEN" or "SHORT" test.
2. Set Switch to "CAP-RES BRIDGE" position.
3. Set RANGE Switch to the range desired.
4. Connect resistor across "RES-CAP TEST" binding posts.
5. Rotate the pointer knob until the eye has maximum eye opening. This is the balance position. Move the tuning control knob back and forth slowly until you are sure the eye opening is at its maximum opening. On either side of the balance point, the eye opening will narrow. If the value of the resistor to be measured is unknown and you can't get a satisfactory balance point on one range, rotate the RANGE switch through its other positions. Everytime the RANGE switch is changed, start with the counter clockwise position and rotate the control knob slowly to its extreme clockwise position until the best balance setting is obtained. The value of the resistor is read directly on the proper resistance scale.

E. RATIO MEASUREMENTS

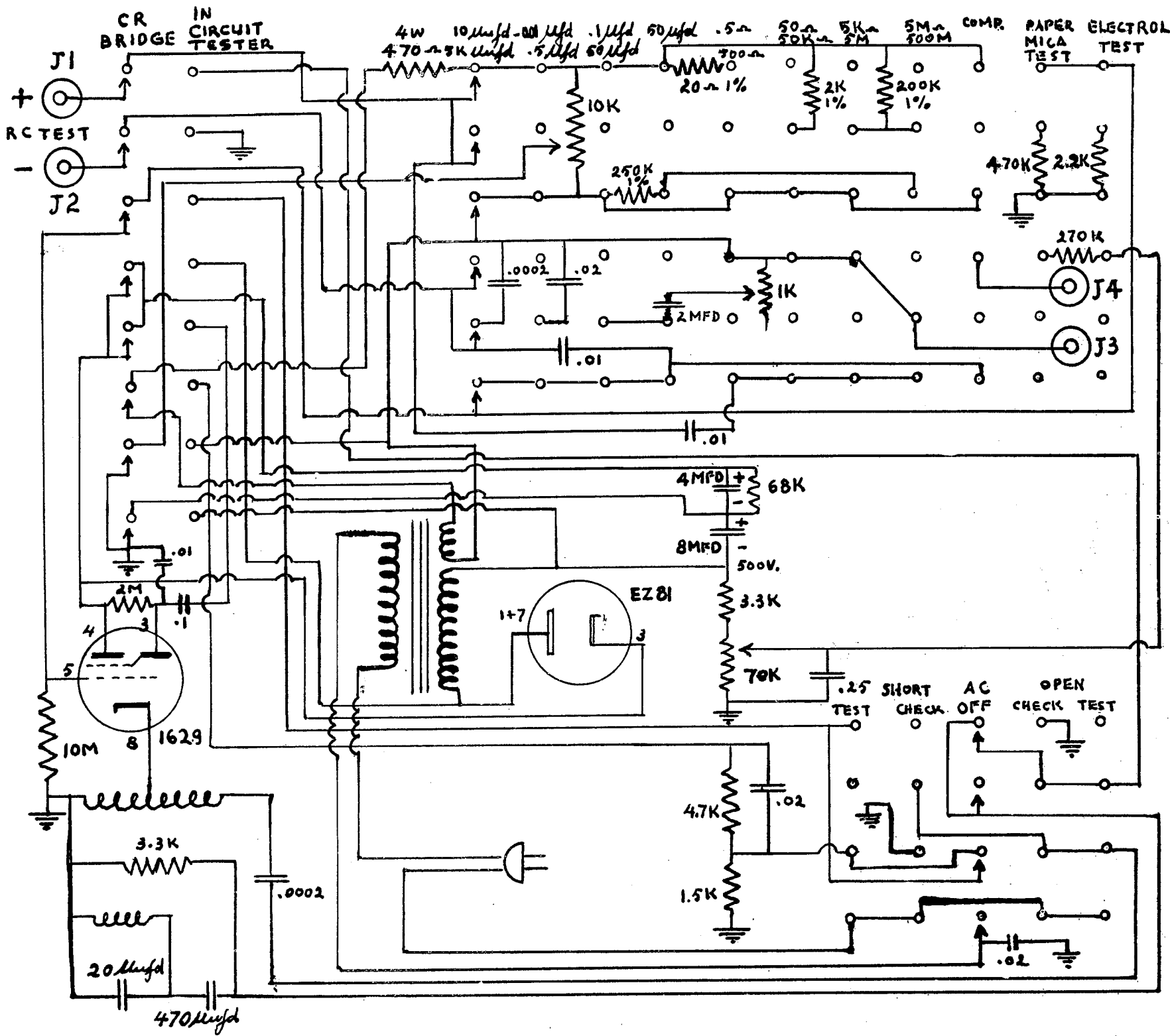
1. Set Switch to "CHECK" position for either "OPEN" or "SHORT" test.
2. Set Switch to "CAP-RES BRIDGE" position.
3. Connect the standard resistor, choke, coil, transformer, speaker, or condenser to the "STANDARD" binding posts. Resistors and Condensers whose range falls within the scope of the instrument need not be compared in this way, since they can be measured directly.
4. Connect the unknown resistor, choke, coil, transformer, speaker or condenser to the "RES-CAP TEST" binding posts.
5. Adjust the bridge for balance or maximum eye opening.
6. Read the ratio on the RATIO scale.
7. For all resistor, chokes, coils, transformers, or speakers divide the known value of the standard by the reading on the RATIO scale to obtain the value of the unknown.

8. For all condensers, multiply the known value of the standard condenser by the reading on the RATIO Scale to obtain the value of the unknown condenser.

GUARANTEE

This instrument is guaranteed for 90 days from date of purchase to be free from any defect in workmanship or material. ELECTRONIC MEASUREMENTS CORPORATION will replace any defective part or parts within this period without charge, if tests at our factory show that the defect was not caused by abuse or tampering.

ELECTRONIC MEASUREMENTS CORPORATION reserves the right to make changes in design or add improvements to equipment manufactured by them without incurring any obligation to incorporate such changes or improvements in equipment previously sold by them.



DATE 8/20/50

DRAWN BY J. J. Stan
CHECKED BY

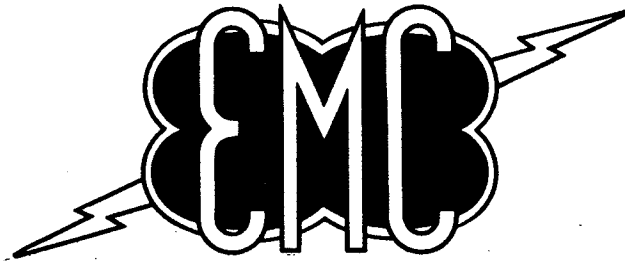
TITLE Model 801 R.C. Bridge and In-Circuit Tester
COMPANY

COMPANY

ELECTRONIC MEASUREMENTS CORPORATION

Manufacturers of ELECTRICAL TESTING EQUIPMENT

"EMC GIVES MORE MEASUREMENT VALUE PER DOLLAR"



**ELECTRONIC MEASUREMENTS
CORPORATION**

625 Broadway, New York, N. Y. 10012