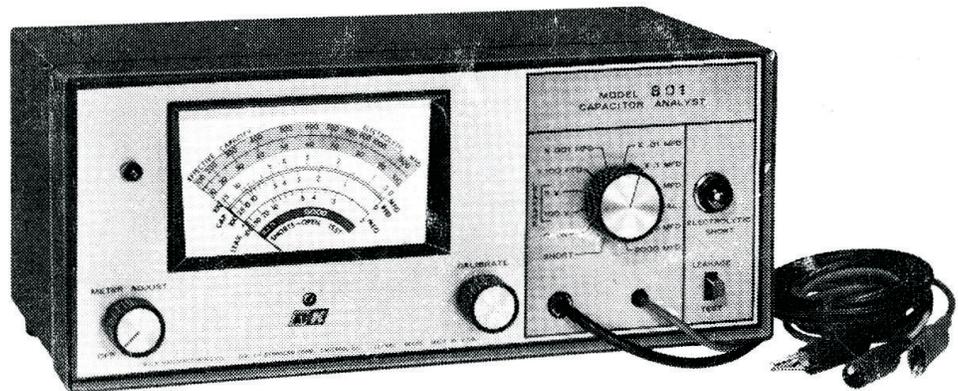


# CAPACITY ANALYZER Model 801

ManualsPlus.com



## INSTRUCTION MANUAL



**B & K MANUFACTURING COMPANY**

DIVISION OF DYNASCAN CORPORATION

1801 W. BELLE PLAINE AVENUE, CHICAGO 13, ILLINOIS

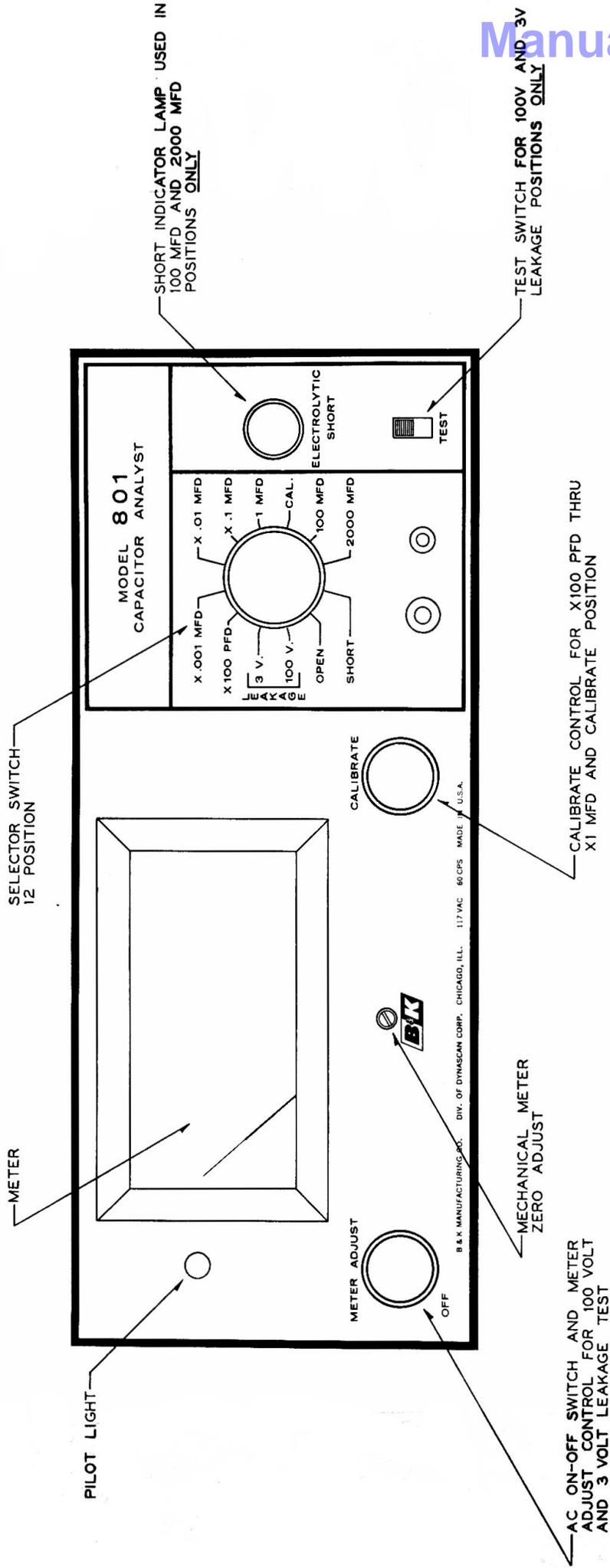


FIGURE 1. CONTROL LOCATIONS

# Model 801

## CAPACITY ANALYZER

### OPERATING INSTRUCTIONS

**NOTE:** This unit was calibrated at the factory for 60 cycle AC operation only.

**CAUTION:** When the Selector switch is in the 100 volt leakage position and the Test switch is depressed, 100 volts DC appears on the RED test lead.

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**1801 West Belle Plaine Avenue**

**Chicago, Illinois 60613**

## **MODEL 801 CAPACITATOR ANALYZER**

### ***What It Will Do:***

1. Analyzes capacitors for defects which would affect the operation of TV sets, radios and other forms of electronic equipment.
2. Evaluates the life expectancy and energy storing capabilities of electrolytic capacitors up to 2000 mfd.
3. Accurately measures the value of other capacitors from 25 pfd to 100 mfd.
4. Tests capacitors "in circuit" or "out of circuit" for "shorts" and "opens".
5. Measures leakage of all capacitors (except electrolytics) under "in circuit" conditions.

## MODEL 801

**CONDENSED OPERATING INSTRUCTIONS**

Read your instruction manual thoroughly before using these condensed operating instructions. If a test result is questionable, refer back to your instruction manual for more detailed information.

Disconnect all power from equipment to be checked.

TESTS 1, 2, 3 & 4 DO NOT APPLY TO ELECTROLYTICS.

CAUTION: This unit was factory calibrated for 60 cycle AC operation only. When the Selector switch is in the 100 volt leakage position and the test switch is depressed, 100 volts DC appears on the RED test lead.

1. **SHORT TEST:** (in or out of circuit) Rotate *selector* to SHORT—Connect BLUE & BLACK leads to capacitor—Read GOOD-BAD scale—See page 4 in manual.
2. **OPEN TEST:** (in or out of circuit) Rotate *selector* to OPEN—Connect BLUE & BLACK leads to capacitor, close to body—Read GOOD-BAD scale—See page 5 in manual.
3. **LEAKAGE TEST:** (out of circuit) Disconnect one capacitor lead if in circuit—Rotate *selector* to appropriate LEAKAGE position—Connect RED & BLUE leads to capacitor—Rotate *meter adjust* for Inf. (infinity) on leakage scale of meter—Depress test switch and read leakage resistance, in megohms, on leakage scale.

NOTE: for “in circuit” leakage measurements see pages 6, 7 & 8 in manual.

4. **CAPACITY VALUE TEST:** (out of circuit) Disconnect one capacitor lead if in circuit—Rotate *selector* to desired capacity range—Adjust *calibrate* control for full scale on meter (test leads must not be touching)—Connect BLUE & BLACK leads to capacitor, close to body—Read value on scale marked PFD or MFD—See page 9 in manual.
5. **ELECTROLYTIC CAPACITOR TEST:** (out of circuit) Disconnect one capacitor lead if in circuit—Rotate *selector* to CALIBRATE—Adjust *calibrate* control for full scale—Connect BLUE lead to positive side of capacitor—Connect BLACK lead to negative side—Rotate *selector* to desired range—Read value on blue meter scales.

If *electrolytic short* lamp glows brightly with no meter reading, capacitor is **SHORTED**. If the lamp does not glow and there is no meter reading, capacitor is **OPEN**. See pages 10 & 11 in manual.

## SHORTS TEST

### “IN CIRCUIT” MEASUREMENT

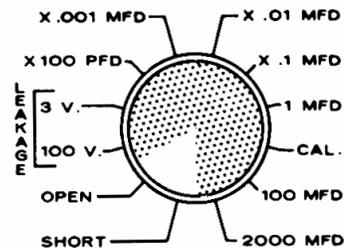
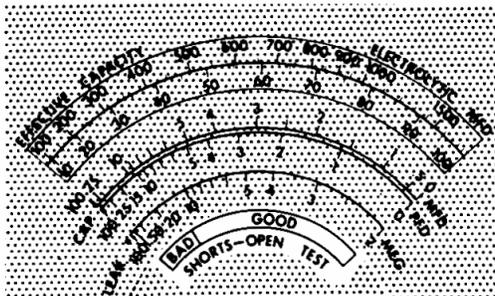
**NOTE:** This test is accurate for all normal television and electronic circuits. In the rare case where the capacitor being tested is shunted by less than 25 ohms (practically a short), the capacitor should be tested out of the circuit.

1. Remove all power from the circuit in which the capacitor to be tested is located.
2. Rotate the *Selector* switch to the SHORT position. See Figure 1.
3. Connect the BLUE and BLACK test leads to the leads of the capacitor.
4. Read GOOD-BAD scale. If the meter pointer is in the blue (good) area of the scale, the capacitor is not shorted. If the meter pointer is in the red (bad) area, the capacitor is shorted.

**NOTE:** A good capacitor may peg the meter to the right.

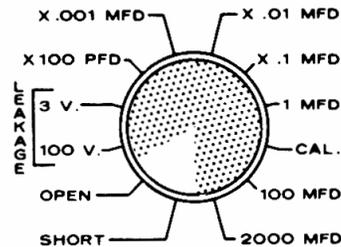
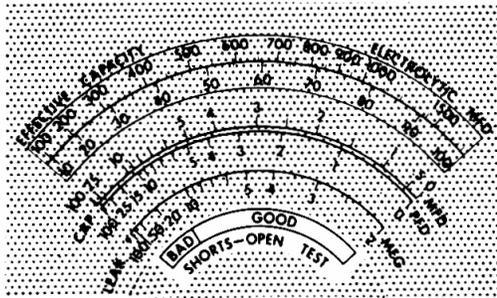
### “OUT OF CIRCUIT” MEASUREMENT

Disconnect one lead of the suspected capacitor and perform the above steps.



SCALE & SELECTOR LOCATION FOR SHORTS TEST

## OPENS TEST



SCALE & SELECTOR LOCATION FOR OPENS TEST

### “IN CIRCUIT” MEASUREMENT

**NOTE:** This test is accurate for all normal television and electronic circuits with the following exceptions: If the capacitor is less than 25 pfd, the meter will show open (or bad)—If the shunting resistance is less than 50 ohms, the capacitor will show open. If either of these conditions exist the capacitor should be tested out of the circuit. **DO NOT TEST CAPACITORS BELOW 25 pfd in circuit. THEY WILL TEST “BAD” EVEN THOUGH THEY MAY BE PERFECTLY GOOD.**

1. Remove all power from the circuit in which the capacitor to be tested is located.
2. Rotate the *Selector* switch to the OPEN position.
3. Connect the BLUE and BLACK test leads to the leads of the capacitor. Be sure the test leads are connected securely and as close to the body of the capacitor as possible.

**NOTE:** The meter may peg to the right with the test leads unconnected or when a good capacitor is tested.

4. Read GOOD-BAD scale. If the meter pointer is in the red (bad) area, the capacitor is open. If the meter pointer is in the blue (good) area, the capacitor is not open.

### “OUT OF CIRCUIT” MEASUREMENT

Disconnect one lead of the suspected capacitor and perform the above steps.

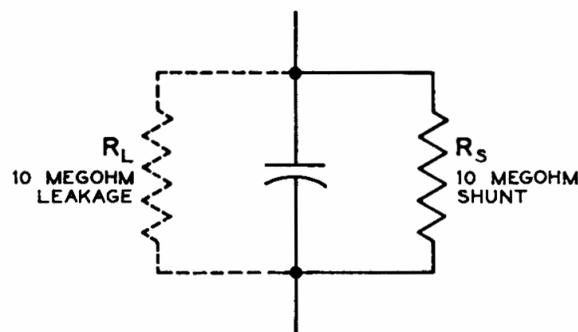
LEAKAGE TEST

**NOTE:** To test leakage of Electrolytics see page 10.

A capacitor that is neither shorted nor open will indicate some leakage resistance, but it is the amount of leakage that determines whether or not a capacitor should be replaced. Generally, a capacitor whose leakage has dropped below 100 megohms should be replaced as a safety precaution because it is deteriorating or has become marginal. If the leakage resistance is 20 to 25 megohms or less, the capacitor is defective and should be replaced. Ceramic capacitors are the exception to this rule because of their inherent low leakage resistance.

In using the Model 801 for "in circuit" leakage resistance measurements, a resistance should not be connected across the capacitor under test because this instrument cannot distinguish between leakage resistance in a capacitor and a shunting resistance connected externally across the capacitor.

**EXAMPLE:** If a capacitor shunted by a 10 meg resistor indicates a reading of 5 megohms on the meter, its actual leakage resistance is 10 megs because two 10 megohm resistors in parallel result in 5 megohms of total resistance. If a shunting resistor does exist, its effect must be treated as though the capacitor leakage resistance and shunting resistor  $R_s$  formed a parallel resistive circuit.



**CAUTION:** When the *Selector* switch is in the 100 VOLT LEAKAGE position and the *Test* switch is depressed, 100 Volts DC appears on the RED test lead. Proper safety precautions should be taken while performing this test. A discharge circuit has been incorporated into the 801 to discharge capacitors after they have been tested in this position.

## LEAKAGE TEST

**COUPLING CAPACITORS.** See Figure 2.

1. Remove all power from the circuit in which the capacitor to be tested is located.
2. Connect the RED test lead to the input or plate side of the capacitor. Connect the BLACK test lead to Ground.
3. Rotate the *Selector* switch to 100 VOLT LEAKAGE if the voltage rating of capacitor is 100 volts or greater, or to 3 VOLT LEAKAGE if voltage rating of capacitor is between 3 volts and 100 volts (capacitors with less than 3 volt rating should not be tested).
4. Adjust *Meter Adjust* control (on front panel) until meter pointer is at INFINITY line (left side of meter).
5. Connect the BLUE test lead to the output or grid side of the capacitor.
6. Depress *Test* switch and read leakage resistance directly from meter in megohms on leakage scale.

NOTE: See Figure 2. When operating at 100 volts, if R2 is below 130K and/or R1 is less than 10K, meter accuracy will be slightly off. When operating at 3 volts, R2 should be several megohms to attain accurate results. The important concern here is whether enough leakage exists in a capacitor to cause trouble in a circuit and the Model 801 will always indicate this.

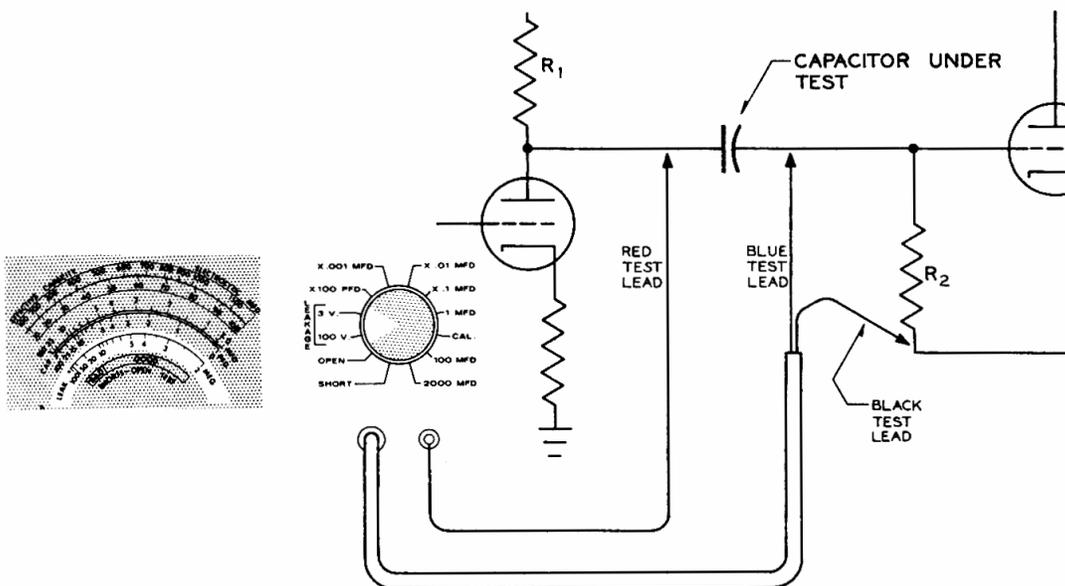


FIGURE 2. LEAKAGE TEST FOR COUPLING CAPACITORS.

## LEAKAGE TEST

### “IN CIRCUIT” TEST FOR BY-PASS OR OTHER CAPACITORS WITH ONE SIDE GROUNDED. See Figure 3.

NOTE: If the capacitor under test is by-passing a resistor going to B+ then one lead must be disconnected.

The BLACK test lead is not used in this test.

1. Remove all power from the circuit in which the capacitor to be tested is located.
2. Connect the BLUE test lead to the ground side of the capacitor. Connect the RED test lead to the side above ground.
3. Set *Selector* switch to 100 VOLT LEAKAGE if voltage rating of capacitor is above 100 volts, or to 3 VOLT LEAKAGE if rating of capacitor is between 3 volts and 100 volts.
4. Adjust *Meter Adjust* control (on front panel) until meter pointer is at INFINITY line (left side of meter).
5. Depress *Test* switch and read leakage resistance directly in megohms on Leakage scale.

### TESTING CAPACITORS “OUT OF CIRCUIT”

NOTE: The BLACK test lead is not used in this test.

1. Disconnect one capacitor lead if in circuit.
2. Connect the BLUE and RED test leads to the leads of the capacitor.
3. Rotate *Selector* switch to 100 VOLT LEAKAGE if voltage rating of capacitor is above 100 volts, or to 3 VOLT LEAKAGE, if rating of capacitor is between 3 volts and 100 volts.
4. Rotate *Meter Adjust* control to INFINITY line (left side of meter).
5. Depress *Test* switch and read leakage resistance directly in megohms on Leakage scale.

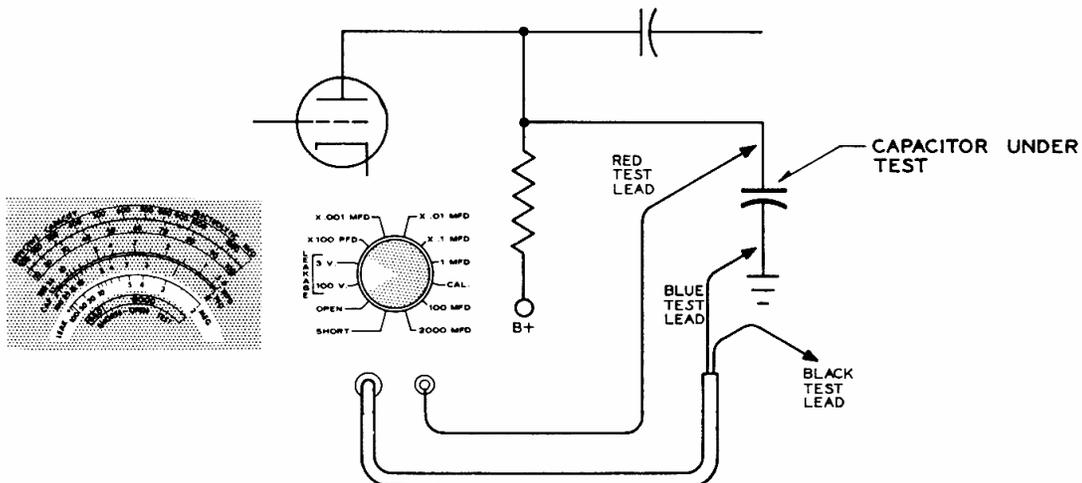


FIGURE 3. LEAKAGE TEST FOR BY-PASS CAPACITORS.

**CAPACITY VALUE TEST**

(from 25 pfd to 100 mfd)

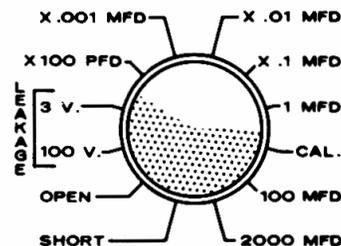
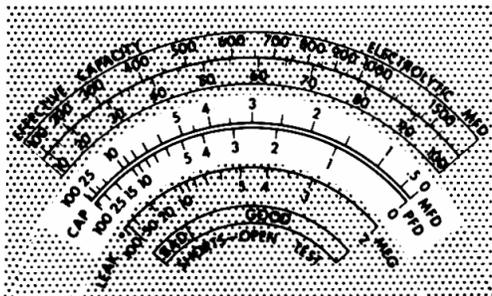
NOTES: The capacitor to be measured must be out of the circuit or have one end disconnected for this test. The RED test lead is not used in this test.

1. Set the *Selector* switch to the appropriate multiplier range.
2. Adjust *Calibrate* control for (zero) full scale reading on the meter face. Be sure the test leads are not in contact with each other. Do not hold the test leads on very low capacity measurement because hand capacity will cause an inaccurate reading.
3. Connect the BLUE and BLACK test leads to the leads of the capacitor.
4. Read the value indicated on the meter face and multiply by the value of the range.

Capacity measurements may be made on any type of capacitor (except electrolytics which are evaluated in another test) as long as it falls within the range of the Model 801 and has a working voltage of 3 volts or more. This permits testing low voltage transistor circuit capacitors as well as those used in vacuum tube circuits.

**INTERPRETING THE METER SCALES:**

Capacitors whose values range between 0 and 10,000 pfd may be read on the PFD scale. Capacitor with values between 0 and 100 mfd are read on the MFD scale. For greatest accuracy, it is recommended that capacitor values greater than 1500 pfd be read on the MFD scale with the selector switch in the X .001 range. A picofarad (PFD) is equivalent to a micromicrofarad.

**SCALE & SELECTOR LOCATION FOR CAPACITY VALUE TEST**

**EXAMPLES:** If the meter indicates 3 on the microfarads scale with the *Selector* switch in the *X .001 MFD* position, the capacitor has a value of  $3 \times .001 = .003$  mfd.

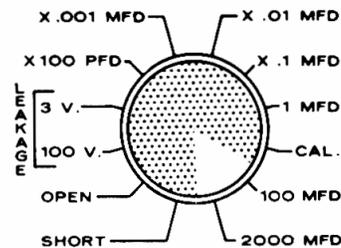
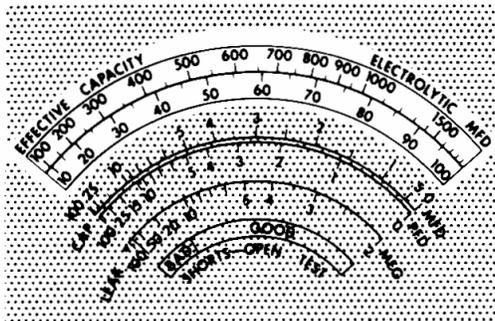
If the meter reads 30 on the same scale, the value of the capacitor will be  $30 \times .001 = .03$  mfd.

If the meter reads 4 on the picofarads scale with the *Selector* switch in the *X 100 pfd* position, the capacitor has a value of  $4 \times 100 = 400$  pfd.

## ELECTROLYTIC CAPACITY TEST

**NOTE:** All electrolytic capacitors must be checked out of circuit. If the rated value of the electrolytic is less than 10 MFD, make the value test on the **X1 MFD** range.

1. Disconnect one end of the capacitor to be tested if it is in circuit.
2. Set the *Selector* switch to **CALIBRATE**, and adjust the *Calibrate* control on the front panel for full scale reading on the meter.
3. Connect the **BLUE** test lead to the **+** terminal of the capacitor. Connect the **BLACK** lead to the **-** terminal of the capacitor. The **RED** lead is not used.
4. Set the *Selector* switch to the desired capacity range (100 mfd or 2000 mfd).
5. Read capacity directly on one of the top scales. If the capacitor has been properly formed, the reading will be an accurate indication of the actual storage ability of the capacitor. If it is more than 20% below the rated capacity, it is "BAD" and should be replaced. The amount of leakage in the capacitor is automatically computed into the meter reading.



SCALE & SELECTOR LOCATION FOR ELECTROLYTIC TEST

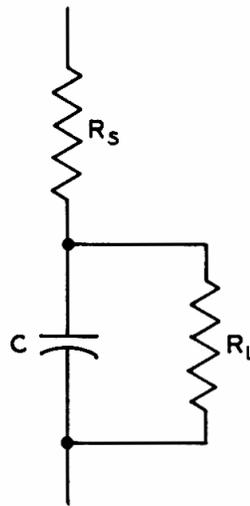
If no reading is observed on the meter, and the *Electrolytic Short lamp* glows very brightly, the capacitor is shorted.

If no reading is observed on the meter, and the *Electrolytic Short lamp* does not light at all, the capacitor is open.

This test should especially be made whenever new rectifiers are installed, as they tend to place a heavy load on the filter capacitors which will shorten their useful life.

The Model 801 actually tests the ability of an electrolytic capacitor to perform the function for which it was designed—store up energy on one half cycle and return it to the circuit on the other half cycle. How well an electrolytic does this job is determined by its capacity size, leakage resistance (dielectric resistance), and its equivalent series resistance (internal resistance of plate and lead material and lead connections).

From the diagram it is obvious that the equivalent series resistance ( $R_s$ ) reduces the amount of energy the capacitor can absorb during the charging half cycle. Also, the limited energy that was stored is further attenuated on the discharge half cycle by the leakage resistance ( $R_L$ ). The end result is a reduction in the capacity of the electrolytic.



The capacity, leakage resistance and equivalent series resistance are all measured in one reading by a unique test circuit in the Model 801. This reading tells you the “effective capacity” actually available to do the job.

Electrolytic capacitors normally have a tolerance of — 20% to + 100%, therefore a reading higher than anticipated may be observed. If the meter indicates a value of “effective capacity” 20% below capacitor’s rated value, that capacitor should be replaced because it is less than marginal and cannot do a proper job of filtering.

You may notice that some of the higher value capacitors cause the *Electrolytic Short lamp* to glow dimly. This should not be interpreted as a “short” condition. When “shorted,” the meter will indicate zero capacitance.



**B & K MODEL 801 PARTS AND PRICE LIST**

<b>SCHEMATIC SYMBOL</b>	<b>DESCRIPTION</b>	<b>B &amp; K PART No.</b>	<b>DEALER'S NET</b>
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**RESISTORS**

R-2	1K/250 Ohm Dual Control.....	008-002-9-002	\$1.20
R-7	2.5K Ohm Control W/S-3 Attached.....	008-001-9-014	1.05
R-109	500/150/100 Ohm Triple Control.....	010-001-9-004	1.08
R-121	5K/250/250 Ohm Triple Control.....	010-001-9-003	1.05

**CAPACITORS**

C-3	80/80 MF, 250 Volt Electrolytic W/ins. Cover.....	021-005-9-001	1.68
C-105	200 MF, 4 Volt Electrolytic.....	022-001-9-007	.33
C-106	10 MF, 25 Volt Electrolytic.....	022-001-9-004	.33
C-108	8-50 PF, 4 Volt Trimmer.....	028-003-9-005	.84

**COILS AND TRANSFORMERS**

L-101	Series Test Lead Coil.....	041-001-9-015	1.80
L-102	20 MC Oscillator Coil.....	066-002-9-001	.81
T-1	Power Transformer.....	065-010-9-001	4.65

**SWITCHES**

SW-1	Selector Switch.....	090-002-9-001	7.92
S-2	Test Switch.....	084-002-9-002	.30
S-3 (A&B)	Power and Meter Switch (See R-7).....		

**TUBES AND DIODES**

V-1 & V-2	12AU7.....	235-120-1-217	1.23
D-1 & D-102	Silicon Diode, 100 MA.....	112-351-0-101	.69
D-2, D-104, D-105	Silicon Diode, 500 MA.....	112-500-0-501	.42
D-106	1N48 Diode.....	150-001-9-002	.34
D-103	1N48 Diode (Selected).....	150-001-9-001	.34

SCHEMATIC SYMBOL	DESCRIPTION	B & K PART No.	DEALER'S NET
<b>MISCELLANEOUS</b>			
Case	.....	272-007-9-002	11.49
Foot, Rubber	.....	381-002-9-001	.06
Handle	.....	746-001-9-001	.48
Knob, Large	.....	751-005-9-001	.39
Knob, Small	.....	751-005-9-003	.36
Knob, Small W/Marker	.....	751-005-9-002	.39
Lamp, Indicator	.....	401-001-9-001	.46
Lens, Red	.....	750-001-9-001	.15
Line Cord	.....	420-005-9-001	.36
Meter, 200 $\mu$ a.	.....	320-002-9-001	14.82
Manual, Instruction	.....	480-007-9-001	
Panel, Front	.....	255-007-9-001	1.44
Plug Button, Meter	.....	738-001-9-002	.03
Schematic & Parts List	.....	488-017-9-001	

(Prices subject to change without notice)

Minimum charge \$1.00 per invoice. Orders will be shipped C.O.D. unless previous open account arrangements have been made or remittance accompanies order. Advance remittance must cover postage or express.