



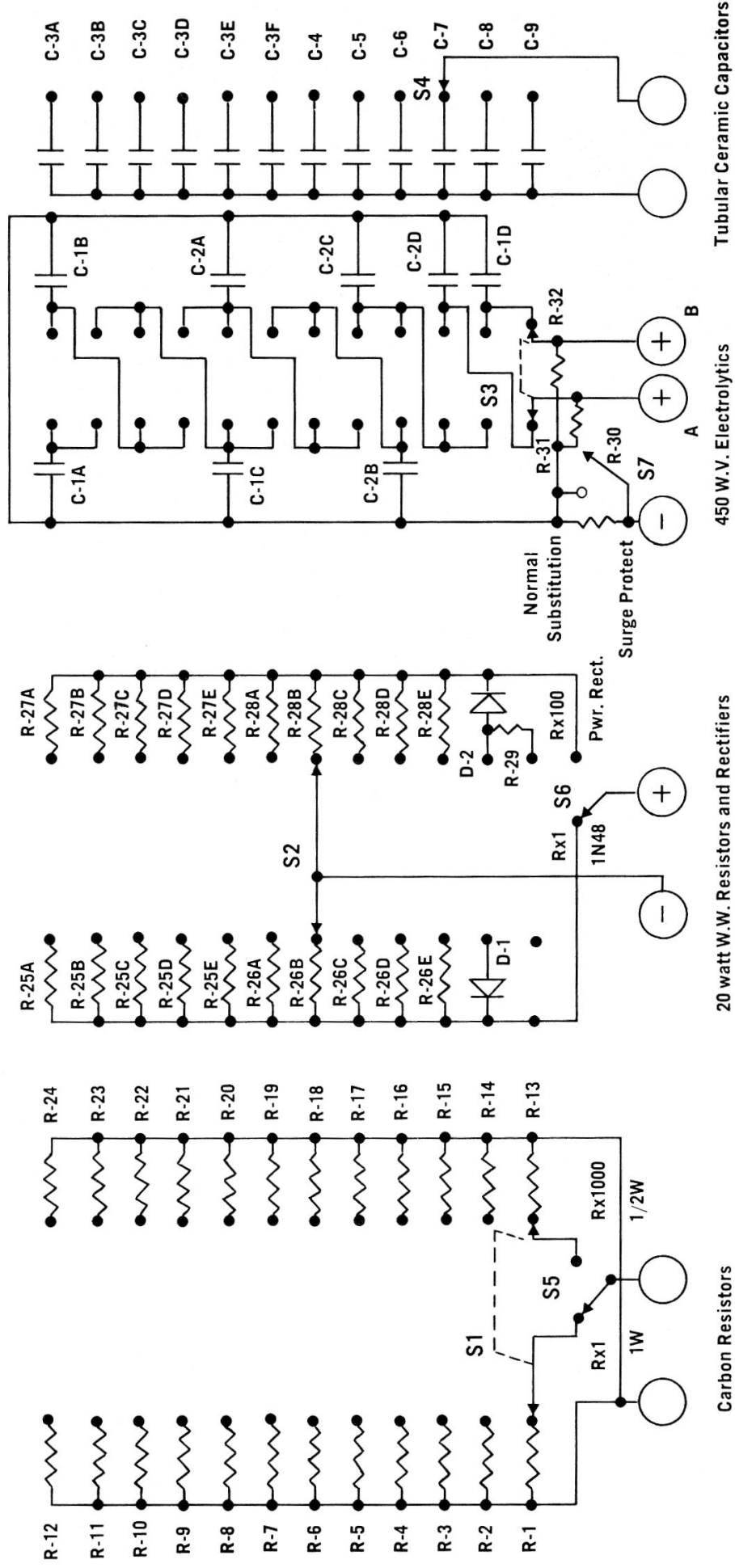
Model 501

COMPONENT SUBSTITUTOR

INSTRUCTION MANUAL

MERCURY
ELECTRONICS CORP.

manufacturers of quality electronic products



MODEL 501 COMPONENT SUBSTITUTOR

INTRODUCTION

The Model 501 is an electronic component substitutor providing more component values than any other instrument of its type.

Simultaneous substitution of a wide combination of components is possible with the Model 501; and the easy-to-read panel makes operation the utmost in simplicity.

SPECIFICATIONS

Carbon Resistors:

1 Watt 10%: 10, 18, 33, 56, 100, 180, 330, 560,
1,000, 1,800, 3,300, 5,600 ohms.
1/2 Watt 10%: 10K, 18K, 33K, 56K, 100K, 180K, 330K,
560K, 1M, 1.8M, 3.3M, 5.6M ohms.

Power Resistors:

20 Watt 10%: 2.5, 5, 7.5, 10, 15, 25, 50, 75, 100, 150,
250, 500, 750, 1K, 1.5K, 2.5K, 5K,
7.5K, 10K and 15K ohms.

Rectifiers: 1N48 General purpose crystal diode
500 Ma. Selenium power rectifier
750 Ma. Silicon power rectifier

Tubular Condensers:

10%, 600 W.V.: .0001, .0005, .001, .0025, .005, .01,
.015, .02, .05, .1, .22 and .5 mfd.

Electrolytic Condensers:

10%, 450 W.V.: 4, 8, 10, 20, 30, 50, 80, 150 mfd. singly
12, 14, 18, 28, 30, 40, 50, 70, 80, 130,
200 and 230 mfd. in parallel
(With surge protection switch and auto-
matic discharge)

THE PANEL AND CONTROLS

The panel is separated into four sections, each with its own independent output jacks. At the left end is the "Carbon Resistors" section, with a slide switch that enables selection of the dial values directly or multiplied by 1,000. This section provides 24 values of resistance. The test jacks for this section are directly beneath this slide switch, and are not color coded since polarity is not important when substituting resistance.

The second section from the left is for "20 Watt W.W. Power Resistors" and "Rectifiers". The slide switch of this section allows direct substitution of 20-watt, 10% dial scale values of power resistance, or the same values multiplied by 100. Thus, 20 values of power resistance are available. The slide switch also selects whether the rectifier to be substituted is of the crystal diode type or one of two power types. The test jacks in this section are color coded in order to assure correct selection of rectifier polarity.

The third section from the left provides selection of 12 values of capacity to substitute for paper, mica and ceramic or plastic condenser types, rated up to 600 working volts. The test jacks in this section are not color coded because polarity of these condensers is not important.

The section at the right end is for substitution of "Electrolytic Condensers", providing 17 distinct values of capacity, available singly, in parallel, or as dual units with all popular values of dual filter condensers included. This section provides an improved surge protection feature that requires no lock, and does not require two hands for operation. The three test jacks of this section provide a common negative lead; either positive lead can be used, or both positive leads can be used together. All electrolytics are rated at 450 working volts, 10% tolerance.

SUBSTITUTION TEST PROCEDURES

I. CARBON RESISTORS

For values of 10 ohms to 5.6K ohms, 1 watt:

1. Set slide switch of Carbon Resistors section to "Rx1".
2. Insert test leads in jacks of this section.
3. Rotate dial to desired resistance value.
4. Clip test leads into circuit where substitution is desired.

For values of 10K ohms to 5.6 megohms, 1/2 watt:

1. Set slide switch of Carbon Resistors section to "Rx1,000".
2. Proceed as in Steps 2, 3, and 4 above, noting that actual resistance will be 1,000 times the dial reading.

II. 20-WATT WIRE WOUND (POWER) RESISTORS

For values from 2.5 ohms to 150 ohms:

1. Set slide switch of this section to left hand position marked "Rx1".
2. Insert test leads in jacks of this section. It is not necessary to observe lead polarity.
3. Rotate dial to desired resistance value.
4. Clip test leads into circuit where substitution is desired.

For values from 250 ohms to 15,000 ohms:

1. Set slide switch of this section to right hand position marked "Rx100".
2. Proceed as in Steps 2, 3, and 4, above, noting that actual resistance is 100 times the dial reading.

III. RECTIFIERS

To substitute a Crystal Diode:*

1. Set slide switch of Rectifier Section to left hand position marked "1N48".
2. Insert red lead in red jack of this section marked +, and insert black lead in black jack marked -.
3. Rotate dial to position marked "1N48 SELEN."
4. Clip test leads into circuit where crystal diode substitution is desired, with red lead clipped to pos. (cathode) side.

*The 1N48 in the Model 501 will substitute for any popular crystal diode such as 1N34, 1N60, 1N64, etc. *Never* use this component to substitute for a *power* rectifier.

To substitute a Selenium (Power) Rectifier:

1. Set slide switch of Rectifier Section to right hand position marked "PWR. RECT."
2. Insert red lead in red jack of this section marked +, and insert black lead in black jack marked -.
3. Rotate dial to position marked "1N48 SELEN."
4. Clip test leads into circuit where power rectifier substitution is desired, with red lead clipped to pos. (cathode) side.

To substitute a Silicon (Power) Rectifier:

- 1.) Steps 1 and 2, are the same as for Selenium Rectifiers,
- 2.) above.
3. Rotate dial to position marked "SILICON".
4. Same as Step 4, above.

IV. SMALL CAPACITORS

To substitute tubular, ceramic, and other small capacity types, use the third section from the left.

1. Insert test leads in jacks of this section. Polarity is not important.
2. Rotate dial to desired value of capacity in microfarads.
3. Clip test leads into circuit where substitution is desired.

V. ELECTROLYTIC CAPACITORS

To substitute a single value of capacity:

1. Set slide switch of this section to left hand position marked "SURGE PROTECT".
2. Insert black test lead in black jack marked -; insert red test lead in either red jack marked +A or +B.
3. Observe dial scale marked A or B as corresponding to pos. jack being used, and rotate dial to desired value of electrolytic capacity. Note that jack A provides as low as 4 mfd., while jack B provides as high as 150 mfd. When used singly, the jacks otherwise provide the same capacities.
4. Clip test leads into circuit where electrolytic substitution is desired with red lead clipped to pos. (+) terminal. This gives substitution through the surge protector.
5. Set slide switch to right hand position marked "NORMAL SUBSTITUTION". This gives full substitution in your circuit after avoiding any shock to the circuitry due to surge.

NOTE: After completion of substitution of an electrolytic condenser, leads can safely be disconnected – your Model 501 provides automatic leak-discharge no matter in which position you have left the slide switch.

To substitute Electrolytics in parallel:

Where more capacity is desired, use both red leads at the same time, with red clips connected to the same point in the circuit where you are substituting. Otherwise, steps are the same as for single electrolytics above.

Capacity substituted in this manner is the *sum of both A and B*. This gives up to 230 mfd.

To substitute for a Dual Electrolytic:

1. Set slide switch of this section to left hand position marked "SURGE PROTECT".
2. Insert black test lead in black jack marked -; connect this lead to common negative in circuit where you are substituting.

3. Select dial position that gives closest to the dual value combination you desire.
4. Insert the red leads in pos. jacks A and B, and clip to pos. terminals of electrolytic in circuit where substitution is desired. Refer to dial scales A and B to determine which capacity value is associated with which red lead.
5. Set slide switch to right hand position marked "NORMAL SUBSTITUTION".

VI. APPENDIX

A. Hints on Substitution of Carbon Resistors:

1. As a safe bet, do not substitute a 1-watt resistor for a 2-watt resistor or for any higher-wattage resistor. You can substitute a wire-wound resistor for higher-wattage carbon resistors.
2. Similarly, do not use a 1/2-watt resistor to substitute for any resistor rated higher than 1/2-watt.
3. Where wattage ratings are unknown, they can be estimated from observing the size of the resistor body.
4. Where resistance value is unknown, it is a safe procedure to start by substituting a high value; and gradually reducing this value until the set performs normally.

B. Hints on Substitution of Wire-Wound Resistors:

1. The Model 501 contains all the popular values of fusible resistors used in portable TV sets.
2. Wire-wound resistors may be substituted for *speaker field coils* and *power supply chokes*. If desired values of resistance are not known, it is a safe procedure to start with the highest value of resistance, and gradually reduce this until the set performs normally.
3. Wire-wound resistors may be substituted for Glo-Bar and other temperature-sensitive filament resistors.

C. Hints on Substitution of Condensers:

1. For any tubular or disc type by-pass condenser, too large a value will usually do no harm.
2. For any electrolytic filter condenser, too large a value will generally do no harm.

3. In TV synchronizing circuits you must substitute very close to the exact value of any timing condenser, or else the hold control will be out of range and you won't be able to lock the picture.

D. Substitution of More Than One Component at a Time:

1. With the Model 501, up to *four* components can be substituted at one time. Two sets of test leads are provided. Standard test leads will fit when extra leads are needed.
2. Since each section in the Model 501 is *completely independent*, components may be substituted simultaneously into the same or into different circuits.
3. By connecting the test clips to each other, components may be substituted either in series or in parallel. For example:
 - a) To substitute the combination of a dual 30-50 mfd. filter condenser and a selenium power rectifier, use the hook-up shown in Figure 1. To make this substitution, select the proper components by the method given in the "Substitution Test Procedures" section, Parts III and V. As shown in Figure 1, three red test leads and two black test leads are required.
 - b) The components in the Model 501 can be used also so as to make a bench power supply that will deliver up to 150 volts and up to 100 ma. d.c.

A typical power supply hook-up is shown in Figure 2. When hooking up a circuit of this type, carefully check each test lead connection to make sure it agrees with the diagram of Fig. 2 before turning on the power. Take care that test clips do not short against the chassis or other metal surfaces.

E. Service Notes:

1. All components in the Model 501 are readily accessible for replacement, if it should be required. Layout of parts is carefully arranged for quick identification of any one component.
2. Most components are standard value and may be replaced by exact substitution available at Mercury Electronics Corp., or at any parts supply dealer.
3. With proper use, your Model 501 should not require service for many years.

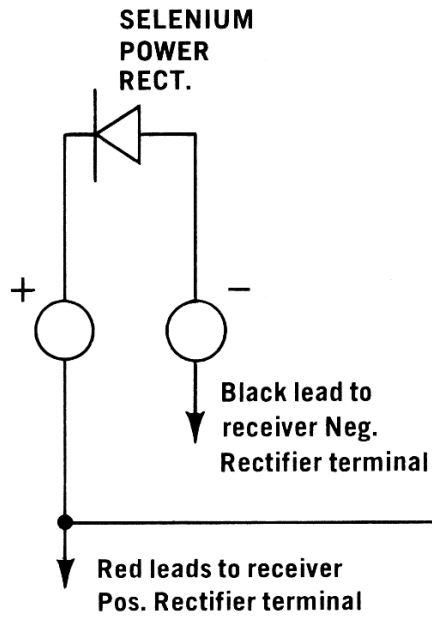
MODEL 501 ELECTRICAL PARTS LIST

Symbol	Description
R-1	10 ohm, 1w, 10% resistor
R-2	18 ohm, 1w, 10% resistor
R-3	33 ohm, 1w, 10% resistor
R-4	56 ohm, 1w, 10% resistor
R-5	100 ohm, 1w, 10% resistor
R-6	180 ohm, 1w, 10% resistor
R-7	330 ohm, 1w, 10% resistor
R-8	560 ohm, 1w, 10% resistor
R-9	1000 ohm, 1w, 10% resistor
R-10	1800 ohm, 1w, 10% resistor
R-11	3300 ohm, 1w, 10% resistor
R-12	5600 ohm, 1w, 10% resistor
R-13	10K ohm, ½ w, 10% resistor
R-14	18K ohm, ½ w, 10% resistor
R-15	33K ohm, ½ w, 10% resistor
R-16	56K ohm, ½ w, 10% resistor
R-17	100K ohm, ½ w, 10% resistor
R-18	180K ohm, ½ w, 10% resistor
R-19	330K ohm, ½ w, 10% resistor
R-20	560K ohm, ½ w, 10% resistor
R-21	1M ohm, ½ w, 10% resistor
R-22	1.8M ohm, ½ w, 10% resistor
R-23	3.3M ohm, ½ w, 10% resistor
R-24	5.6M ohm, ½ w, 10% resistor
R-25	15 ohm, 20w, 4-sec. resistor
R-26	150 ohm, 20w, 4-sec. resistor
R-27	1.5K ohm, 20w, 4-sec. resistor
R-28	15K ohm, 20w, 4-sec. resistor
R-29	47 ohm, 5w, resistor
R-30	500 ohm, 5w, resistor
R-31	330K ohm, 2w, resistor
R-32	330K ohm, 2w, resistor

Symbol	Description
C-1	4-8-10-150 mfd, 450 Volt Electrolytic Condenser
C-2	20-30-50-80 mfd, 450 Volt Electrolytic Condenser
C-3	.0001, .0005, .001, .0025, .005, .01 mfd, 600 Volt Condenser
C-4	.015 mfd, 600 Volt Condenser
C-5	.02 mfd, 600 Volt Condenser
C-6	.05 mfd, 600 Volt Condenser
C-7	.1 mfd, 600 Volt Condenser
C-8	.22 mfd, 600 Volt Condenser
C-9	.5 mfd, 600 Volt Condenser
D-1	IN48 Crystal Diode
D-2	750 ma, Power Rectifier
S-1	2 Pole, 12 Position ROTARY Switch
S-2	2 Pole, 12 Position ROTARY Switch
S-3	2 Pole, 12 Position ROTARY Switch
S-4	1 Pole, 12 Position ROTARY Switch
S-5	SPDT SLIDE Switch
S-6	SPDT SLIDE Switch
S-7	SPST SLIDE Switch

Fig. 1

RECTIFIER SECTION



ELECTROLYTIC SECTION

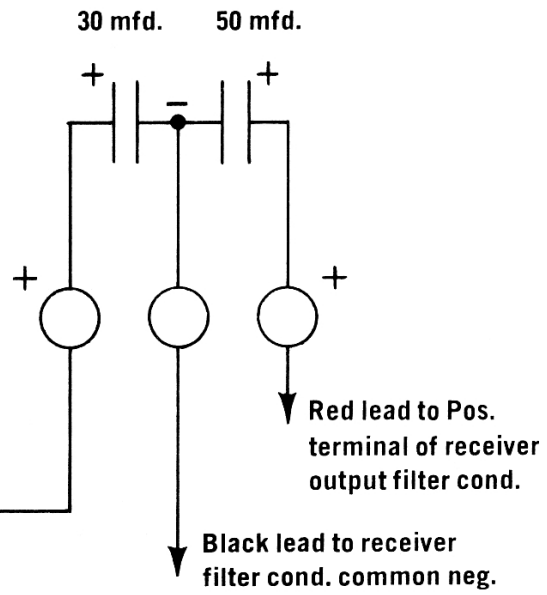


Fig. 2

CARBON RESISTOR SEC

RECTIFIER SEC.

ELECTROLYTIC SEC.

