

# INSTRUCTION NO. P12072

(Issue No. 1 of 1/55)

## SERVICE INSTRUCTIONS

### FOR THE SERIES C-1 AMPLIFIER

(120-volt, 60-cycle supply only)

## PART I INTRODUCTION

This instruction covers the service of the Series C-1 amplifier used on Bristol Dynamasters with a 120-volt, 60-cycle supply.

Service work on electronic circuits is a specialized technique requiring special test equipment. Only a qualified electronic technician should attempt service inside the amplifier chassis.

If a qualified technician is not available, the amplifier should be returned to the nearest Bristol Company Branch or Main Factory for repair. Adequate stocks of guaranteed, factory-rebuilt exchange amplifiers are maintained at several points throughout the country to assure fast replacement. Contact nearest Bristol office as listed on last page of all instruction books.

## PART II TEST EQUIPMENT

**Multirange volt-ohmmeter** with ranges 0 to 50 and 0 to 500 volts d-c, 0 to 4000 and 0 to 500,000 ohms resistance, voltage sensitivity 20,000 ohms per volt.

A **signal generator**, such as Bristol's Dynaprobe Part No. 91054, is recommended

for producing a test input signal. Figure 1 illustrates how a signal generator can be made.

**Cathode-ray oscilloscope** with an input impedance not less than 500,000 ohms and a vertical sensitivity of .03 volts.

## PART III TEST PROCEDURE

Disconnect all leads to amplifier and remove amplifier from Dynamaster. The amplifier may be removed by loosening the rear mounting screws and unlocking the quick fasteners on the front of the chassis.

Connect a 5000-ohm 10-watt resistor across the output terminals of the amplifier.

**Caution:** Never check an amplifier without first connecting the 5000-ohm resistor across the output terminals of

the amplifier.

Connect a 120-volt, 60-cycle power supply to power terminals marked  $L_1$  and

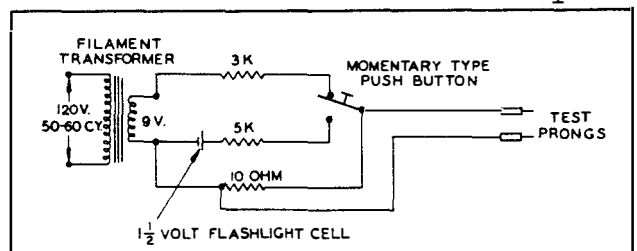


FIGURE 1. WIRING OF TEST INPUT-SIGNAL GENERATOR

Measure		Correct Voltage	Recommended Correction	
From	To		If Voltage Is Too Low	If Voltage Is Too High
B+	Gnd.	360 ± 10	Replace V <sub>4</sub> & plug-in capacitor No voltage. Replace fuse.	Replace V <sub>3</sub>
B <sub>5</sub>	Gnd.	355 ± 10	Replace plug-in capacitor	Replace V <sub>3</sub>
B <sub>4</sub>	Gnd.	330 ± 10	Replace plug-in capacitor	Replace V <sub>1</sub> or V <sub>2</sub>
B <sub>3</sub>	Gnd.	260 ± 10	Replace plug-in capacitor	Replace V <sub>1</sub> or V <sub>2</sub>
S <sub>c</sub>	Gnd.	335 ± 10	Replace V <sub>3</sub>	Replace V <sub>3</sub> Check R <sub>23</sub>
B <sub>1-2</sub>	Gnd.	220 ± 10	Replace plug-in capacitor Check C <sub>21</sub>	Replace V <sub>1</sub>
P <sub>5</sub>	Gnd.	240 ± 10	Check voltage at B <sub>5</sub>	Replace V <sub>3</sub>
P <sub>4</sub>	Gnd.	290 ± 10	Check voltage at K <sub>4</sub>	Check R <sub>19</sub>
P <sub>3</sub>	Gnd.	145 ± 10	Check voltage at K <sub>3</sub>	Check R <sub>15</sub>
P <sub>2</sub>	Gnd.	115 ± 10	Check voltage at K <sub>2</sub>	Check R <sub>7</sub>
P <sub>1</sub>	Gnd.	115 ± 10	Check voltage at K <sub>1</sub>	Check R <sub>3</sub>
K <sub>5</sub>	Gnd.	24 ± 3	Check C <sub>16</sub>	Check R <sub>23</sub>
K <sub>4</sub>	Gnd.	4.8 to 5.7	Check C <sub>13</sub> & R <sub>19</sub>	Check R <sub>18</sub>
K <sub>3</sub>	Gnd.	2.3 ± 0.5	Check C <sub>10</sub>	Check R <sub>14</sub>
K <sub>2</sub>	Gnd.	1.8 ± 0.5	Check C <sub>4</sub>	Check R <sub>6</sub>
K <sub>1</sub>	Gnd.	1.8 ± 0.5	Check C <sub>1</sub>	Check R <sub>2</sub>

Note: Points K<sub>1</sub>, K<sub>2</sub>, etc., were marked C<sub>1</sub>, C<sub>2</sub>, etc., on earlier models.

FIGURE 2. TABLE OF D-C VOLTAGE CHECKS BASED ON A LINE VOLTAGE OF 117 VOLTS AND A 5000-OHM 10 WATT RESISTOR ACROSS THE OUTPUT TERMINALS OF AMPLIFIER

L<sub>2</sub>. This is the nominal operating voltage and any variation from it will produce slightly lower or higher test readings.

**Warning:** There are dangerous voltages in the amplifier. Never touch any part with bare hands unless the power is off.

**A. D-C Voltmeter Check**

A quick method of locating the defective stage is by the use of a d-c voltmeter.

With the amplifier removed from the instrument, proceed as follows:

1. Connect a 5000-ohm 10-watt resistor across the output terminals of the amplifier.
2. Connect a 120-volt, 60-cycle supply to power terminals (L<sub>1</sub> and L<sub>2</sub>).
3. Turn gain control to zero (extreme counterclockwise position).
4. Connect negative lead of voltmeter to the ground connection on the amplifier. Test with the other voltmeter lead at the points listed in table, Figure 2.

The voltages given in the table (Figure 2) were taken with a 20,000 ohm per volt meter and with a line voltage of 117 volts. If the line voltage is greater or less than 117 volts, the d-c voltage given in the voltage table will vary proportionally. **For example:** If the line voltage is 110 volts, the B+ voltage instead of being approximately 360 volts

$$\text{will be } \frac{110}{117} = \frac{x}{360} \text{ or } x = \frac{110 \times 360}{117} = 338.$$

Therefore, the B+ voltage will be approximately 338 volts with a line voltage of 110 volts.

For optimum damping and sensitivity, the voltage between K<sub>4</sub> and ground should not vary more than specified values.

All d-c voltages above 100 volts should not vary more than ±10 volts from specified values.

Voltages between K<sub>1</sub>, K<sub>2</sub> and K<sub>3</sub> and ground should not vary more than ±0.5 volts from specified values.

Voltage between K<sub>5</sub> and ground should not vary more than ±3 volts from specified value.

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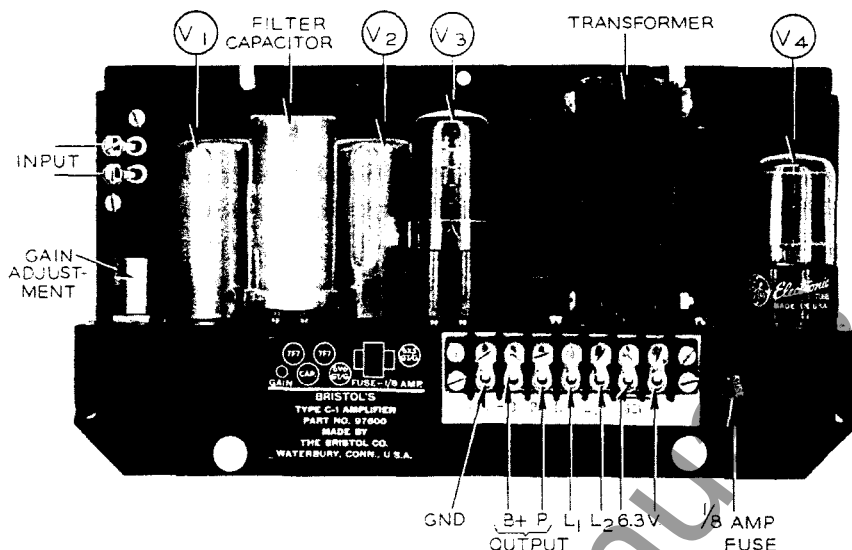


FIGURE 3. FRONT VIEW OF SERIES C-1 AMPLIFIER

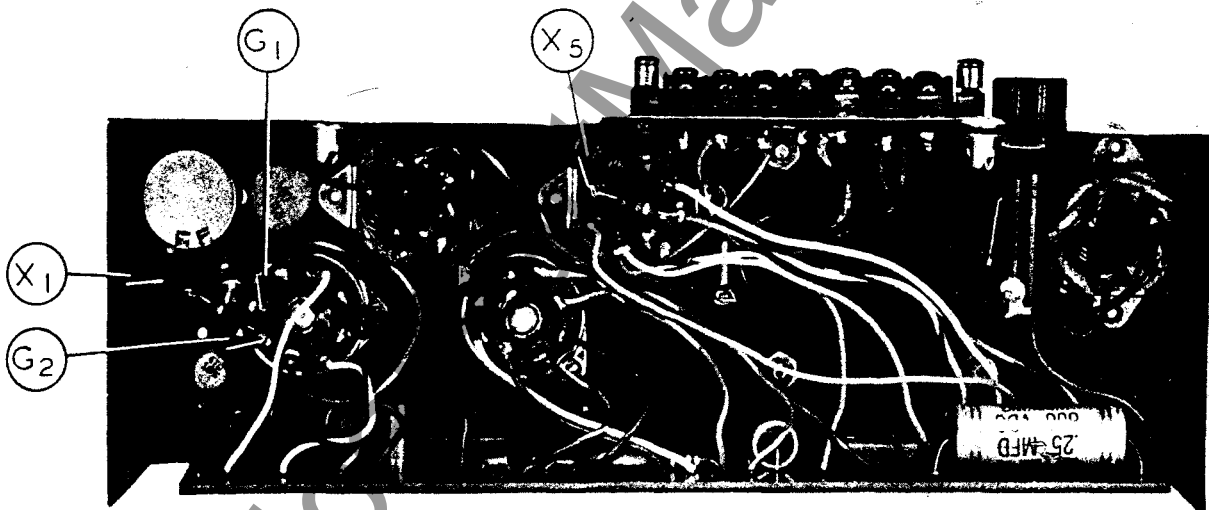


FIGURE 4. BOTTOM VIEW OF SERIES C-1 AMPLIFIER

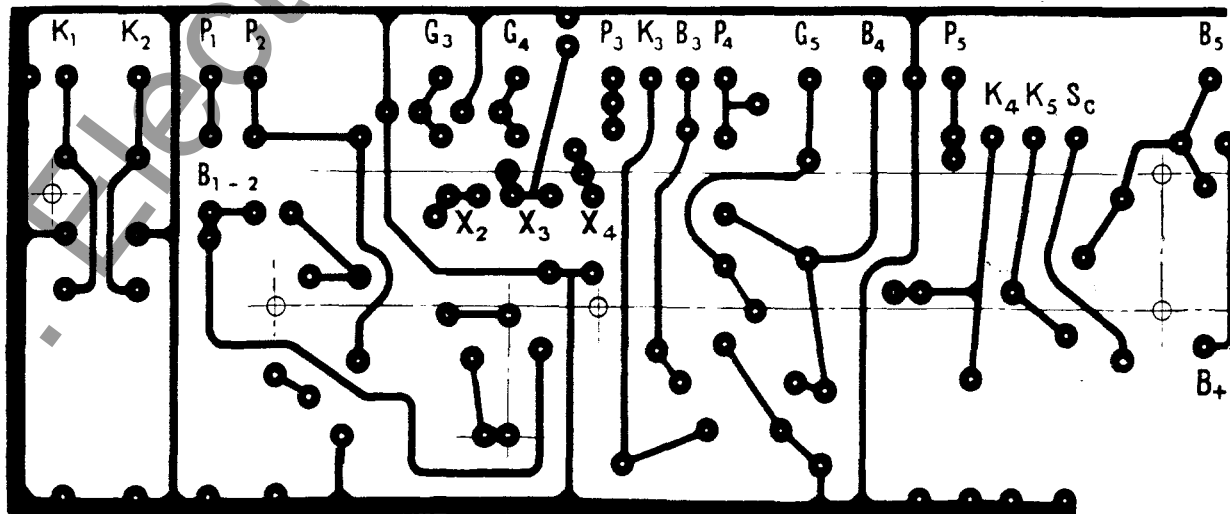


FIGURE 5. PRINTED CIRCUIT SHOWING TEST POINTS

done by checking with an ohmmeter the resistors of that stage. All ohmmeter checks should be made with the power off and the plug-in capacitor and vacuum tubes removed. If the resistors are correct, it can generally be assumed that a capacitor or capacitors associated with that

section of the circuit are defective. Test them by replacement.

This systematic checking of each resistor and capacitor in the defective stage will quickly identify the defective part.

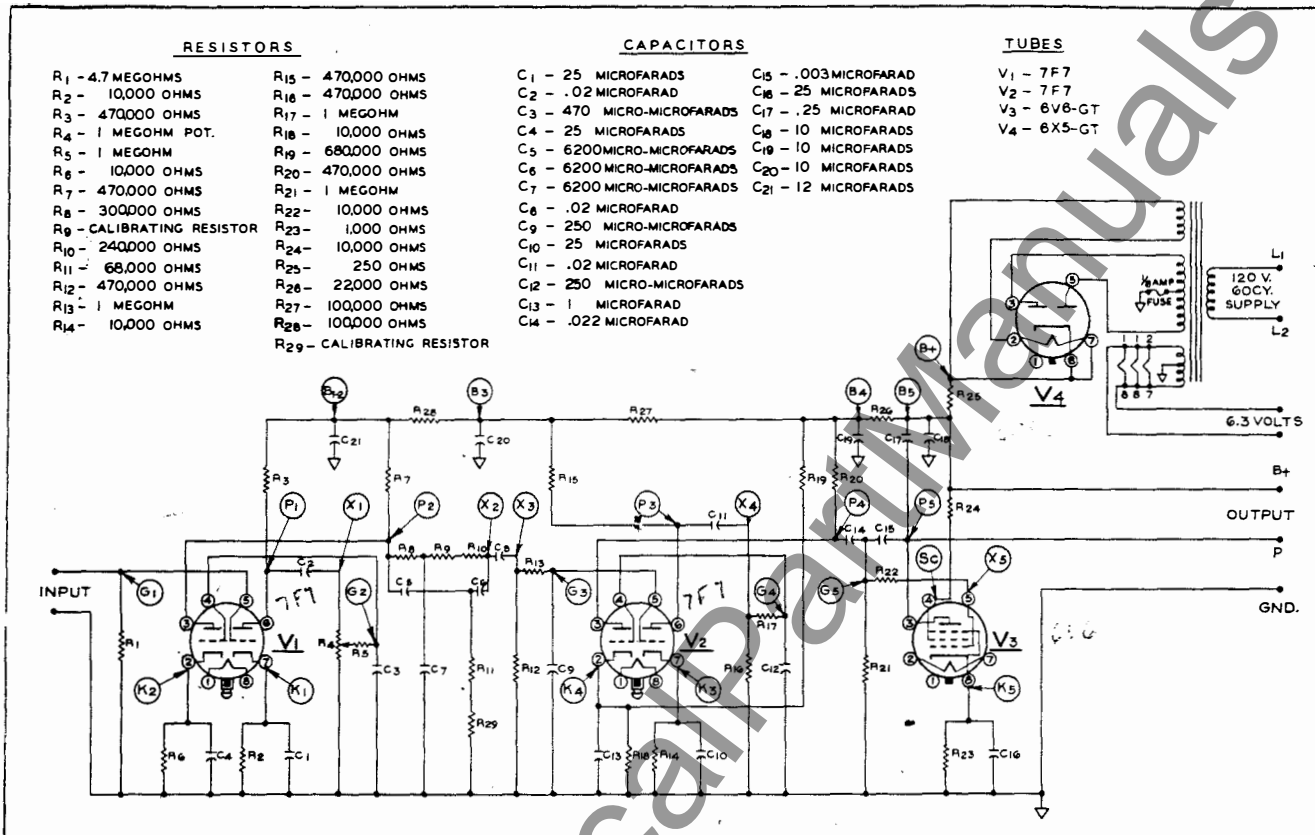


FIGURE 6. SCHEMATIC WIRING DIAGRAM SERIES C-1 AMPLIFIER

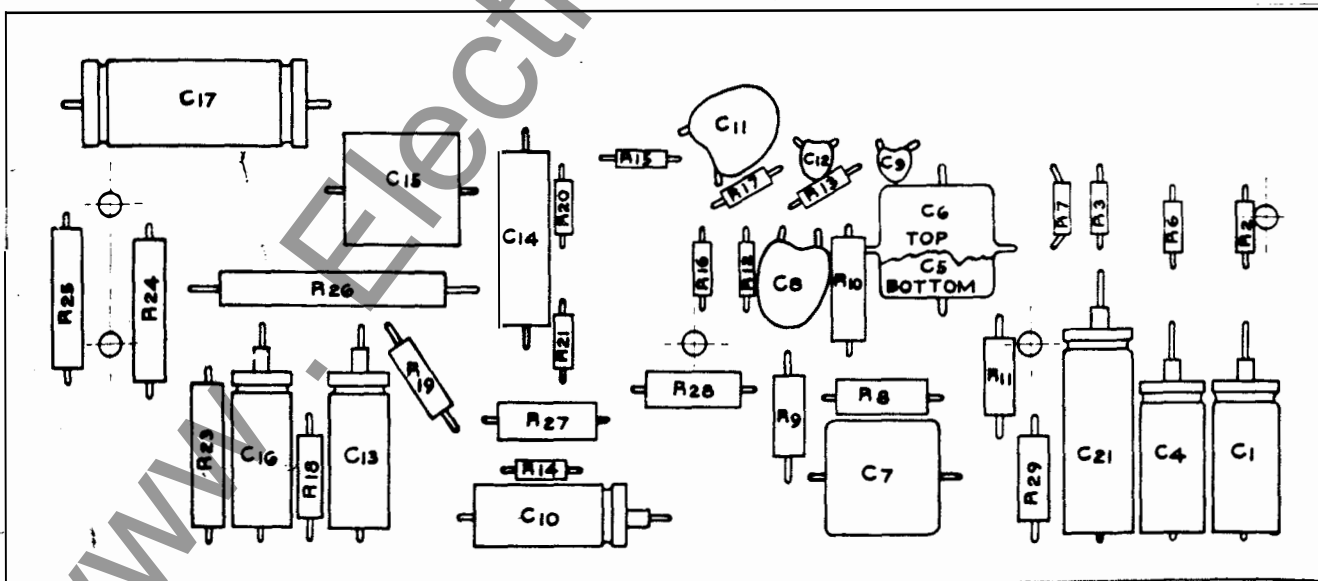


FIGURE 7. COMPONENT SIDE OF PRINTED CIRCUIT BOARD