

# Controlaire 6x Amplifier

## INSTALLATION INSTRUCTIONS TO CONVERT DURAMITE TYPE SERVO TO RELAYLESS OPERATION

Remove two (2) small self-tapping screws that fasten dust cover to servo case. Save screws for reinstallation.

Remove cover by raising end opposite motor shaft and pull all wires through grommet in end of case. If Duramite has been previously used be certain to clip wires at plug before pulling wires through case.

Unsolder all wires except yellow from switching circuit board. Leave white wire soldered to motor if long enough. Unsolder green wire at motor and discard, also discard all wires removed from switching circuit board.

Trim yellow wire just long enough so that it will reach solder patch for brown wire — strip and solder in place as indicated in Fig. 1.

Trim all short wires on servo Amplifier so that they are no more than two (2") inches long, strip and then tin. Solder each in their correct location using wire color code as shown in Fig. 1. The last short wire, the green one, is soldered in a later operation. Remove thrust washers on top of sector gear post and combination gear — note carefully the correct location for each of the thrust washers for correct reinstallation — remove thrust washer from top of second combination gear and remove second combination gear. Motor and crown gear remain in place, but remove thrust washers on top of crown gear and from sector gear post.

Insert insulator board in place, making certain that it does not project beyond each end of case to interfere with proper installation of the dust cover.

Slide Servo Amplifier with cover assembly into base between side of the motor, sector gear post and side of case. The case sides may be pressed outward to make the insertion easier. When Servo Amplifier is properly located, use the hole in base to drill pilot hole in the bottom of the case —

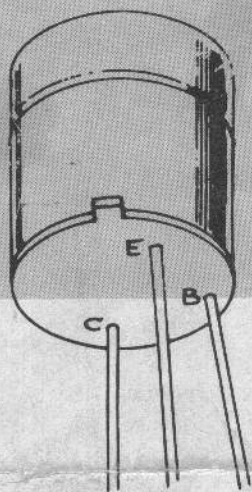
use No. 60 drill for this operation. Remove Servo Amplifier and drill the case with a 3/32" drill. Clean burrs from drilled hole and blow out all metal chips. Reinstall Servo Amplifier in case as described previously and fasten with small self-tapping screw furnished with kit. Dress all long wires toward motor end and press wires down between the motor and Servo Amplifier.

Solder short green wire to motor. If white wire is not long enough replace with wire same length as others. Re-install thrust washer on top of crown gear and on sector gear post. Re-install combination gear on sector gear and insert thrust washer down on top of gear. Re-install second combination gear, press out side of case to facilitate this operation. Slide larger diameter thrust washer on top of this gear. Re-install sector gear on sector gear post — make certain that drive lug is directly in center before completing this installation — place last (large diameter) thrust washer in place on top of sector to complete this operation. Twist all long wires together, including the white one, and insert through grommet in side of dust cover.

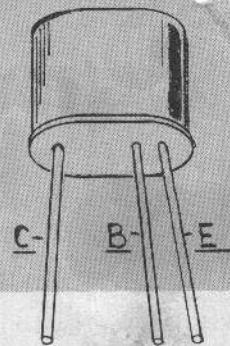
Install dust cover in place over servo case, be certain that cover is placed properly over motor so that motor shaft extends through the side of the dust cover. The dust cover is properly in place when the two (2) gear shafts snap into place in the holes in top of dust cover. Use two previously removed small self-tapping screws to secure the dust cover to the Servo case to complete the conversion of a Duramite to a Transmite self-neutralizing servo. Omit the brown wire and two (2) 2N229 Transistors indicated with an asterisk in Fig. 1 to make a Transmite trim servo.

It is suggested that your completed servos be marked to identify that they are converted and whether it is a trim or self-neutralizing type. India ink markings, permatized with clear dope is as good a way of identifying as any.

# ASSEMBLY INSTRUCTIONS



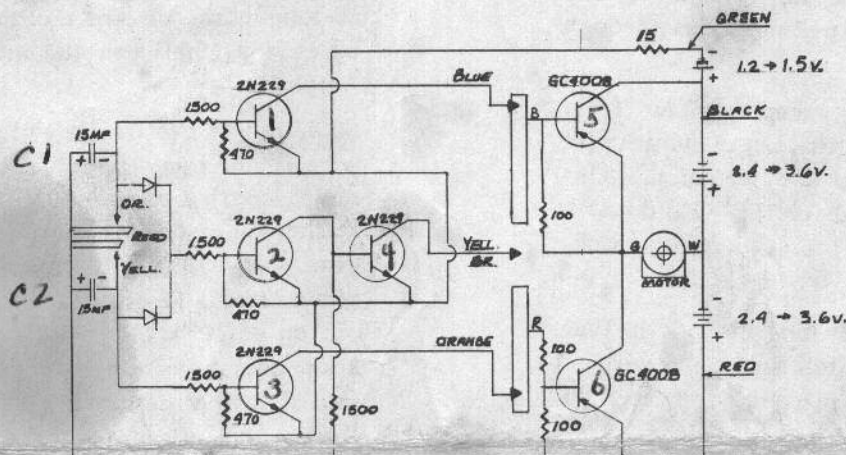
GC 4008



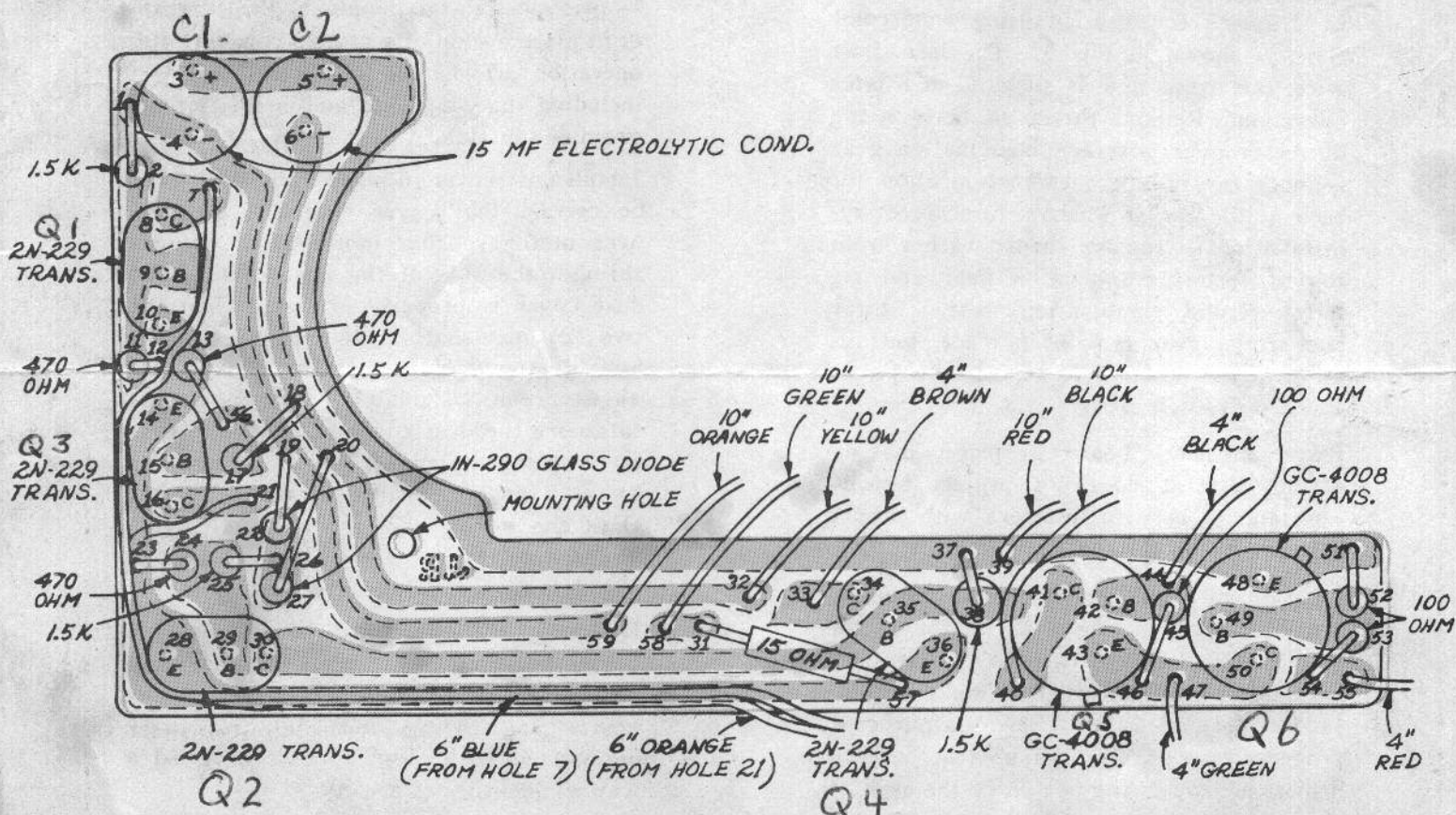
2N 229

FOR TRIM ONLY OPERATION - The transistors covered in operations 11 and 14 are omitted. Also omitted is the 4" brown wire.

These parts are omitted in the trim only amplifier kits.



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# Controlaire 6x Amplifier

## ASSEMBLY INSTRUCTIONS

As components are installed to circuit board, clip excess leads about 1/32" from copper then solder unless otherwise noted.

Mandatory — Read the booklet KIT ASSEMBLY TIPS before you start to assemble this amplifier.

Try the circuit board for a proper fit into the bottom half of the case. If it is very tight or will not fit into the space provided, use a small file and square up the edges of the board so a fit can be obtained.

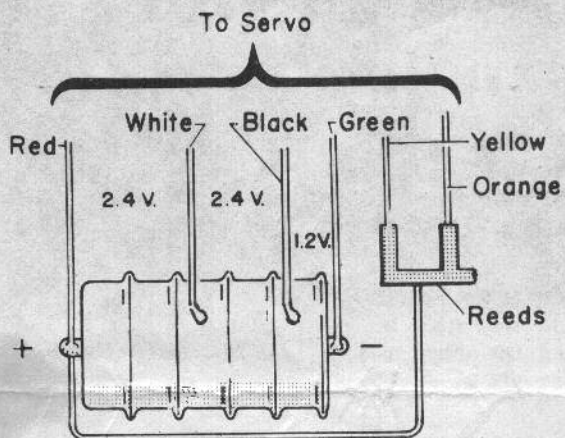
Clean circuit board with fine steel wool until copper is bright and shiny.

1.  
Insert 15 MF electrolytic condenser in holes 6 and 5. Plus in hole 5, minus in hole 6.
2.  
Insert 15 MF electrolytic condenser in holes 3 and 4. Plus in hole 3, minus in hole 4.
3.  
Insert 1.5K resistor (brown, green, red) in holes 1 and 2. Stand over 2.
4.  
Insert 2N-229 transistor in holes 8, 9 and 10. Collector in hole 8, base in hole 9, emitter in hole 10. See diagram for identification of transistor leads.
5.  
Insert 470 resistor (yellow, purple, brown) in holes 11 and 12. Stand over 11.
6.  
Insert 470 resistor (yellow, purple, brown) in holes 13 and 56. Stand over 13.
7.  
Insert 2N-229 transistor in holes 14, 15, and 16. Collector in hole 16, base in hole 15, emitter in hole 14.
8.  
Insert 1.5K resistor (brown, green, red) in holes 17 and 18. Stand over 17.  
Notice: Sometimes in the manufacture of the circuit board the drilled holes at positions 18, 19, 20, break the continuity of their respective lands. Be sure when soldering at these points that your solder joint bridges the land.
9.  
Insert 470 resistor (yellow, purple, brown) in holes 23 and 24. Stand over 24.
10.  
Insert 1.5K resistor (brown, green, red) in holes 25 and 26. Stand over 25.
11.  
Insert 2N-229 transistor in holes 28, 29, and 30. Collector in hole 30, base in hole 29, emitter in hole 28.
12.  
Note the color code markings on the glass body

of the IN-290 diode. There are bands of red, white, and black. Insert the lead from the red band end in hole 22, and the other lead in hole 19. Stand over hole 22.

13.  
Install the IN-290 diode in holes 20 and 27. The lead from the red band end in hole 27 and the other lead in hole 20. Stand over hole 27.
14.  
Insert 2N-229 transistor in holes 34, 35, and 36. Collector in hole 34, base in hole 35, emitter in hole 36.
15.  
Insert a 15 ohm (brown, green, black) resistor in holes 31 and 57. Lay resistor body flat against board surface instead of standing up like other components.
16.  
Insert transistor GC-4008 into board as follows: Collector in hole 41, base in hole 42, emitter in hole 43. Push transistor all the way down so its bottom is flush against circuit board.
17.  
Insert remaining GC-4008 into board, collector in hole 50, base in hole 49, and emitter in hole 48. Again install flush against circuit board.
18.  
Insert 1.5K resistor (brown, green, red) in holes 37 and 38. Stand over 38.
19.  
Insert 100 ohm resistor (brown, black, brown) in holes 45 and 46. Stand over 45.
20.  
Insert 100 ohm resistor (brown, black, brown) in holes 51 and 52. Stand over 52.
21.  
Insert 100 ohm resistor (brown, black, brown) in holes 53 and 54. Stand over 53.
22.  
Strip 1/4" insulation from one end of each of the wires and tin each.  
Insert 6" blue wire in hole 7 and solder.  
Insert 6" orange wire in hole 21.  
Insert 10" orange in hole 59.  
Insert 10" yellow in hole 32.  
Insert 4" brown in hole 33.  
Insert 10" green in hole 58.  
Insert 10" red in hole 39.  
Insert 10" black in hole 40.  
Insert 4" green in hole 47.  
Insert 4" black in hole 44.  
Insert 4" red in hole 55.

This completes the assembly of the amplifier. Arrange wires as shown in top view and wrap tape around wire and board as shown in diagram. This is to hold wires against the PC board.



Wiring Diagram-Battery and Receiver  
Niacads shown-if penlites are used volt-  
ages should be 1.5 V. and 3.0 volts.

