

# TECH SPORT 6

## ENCODER PC BOARD ASSEMBLY AND WIRE INSTALLATION

NOTE: Before beginning construction, read the instructions and all added notes carefully.

NOTE: Begin transmitter assembly by constructing this PC board. The same set of components are used on the PC Board for either the Acutrol "Closed" Stick model or the Acutrol "Open" Stick model. The only variation is in the lengths and numbers of wires.

Step Number- Perform in sequence.

1. ( ) Open the encoder parts bag and check the parts supplied against the parts list. Pick out the parts that will not vary first then identify the parts that have possible alternates. Any shortages should be reported directly to the factory on the form provided. Any questions concerning parts identification or technical problems should also be mailed to the factory. This circuit design has been field proven in production sets and kit sets since 1970, and should provide trouble free service when properly assembled and properly checked out.
2. ( ) Visually examine the PC board for obvious defects such as unetched bridges, undrilled holes or incorrect board. Refer to Fig. 3 for identification.
3. ( ) While viewing the encoder PC Board from the component side, with the holes for interconnecting wires at the top, start construction. Refer to the encoder overlay drawing Fig. 3 during all steps of construction.

**WARNING** - ALL COMPONENT LEADS SHOULD BE BENT OVER FLUSH WITH BOARD AFTER INSERTION AND THE LEADS SHOULD THEN BE CUT OFF AT THE OUTER PAD DIAMETER. Failure to do so may cause a short through the battery insulator.

**CAUTION:** Solder only the pads with component leads. Do not solder shut any holes for wires.

### PARTS LIST - Encoder G/R

Qty.	Ref Number	Description	Part No.
1	R1	10 ohm $\frac{1}{4}$ w. res. (brn,blk,blk)	000007
6	R2,7,11,15,19	100K Trimmer	000774
5	*R3,12,16,20,26	47K $\frac{1}{4}$ w. res. (yel, purp, org)	000051
7	R5,10,14,18,24,29,32	22K $\frac{1}{4}$ w. res. (red, red, org)	000047
1	**R6	330K $\frac{1}{4}$ w. res. (org, org, yel)	000061
	Alt.	360K (org, blu, yel)	
		390K (org, wht, yel)	
1	R8	2.7K $\frac{1}{4}$ w. res. (red, purp, red)	000036
1	R23	2.2K $\frac{1}{4}$ w. res. (red, red, red)	000035
1	R21	2.2K Trimmer (2K2)	000506
1	R22	1K Slide Pot	000519
2	R27,28	4.7K Trimmer	000738
1	R30	120K $\frac{1}{4}$ w. res. (brn, red, yel)	000056
1	R31	4.7K $\frac{1}{4}$ w. res. (yel, purp, red)	000039
1	C1	100uf Electrolytic Cap.	001169
2	C2,24	.05uf Disc Cap.	001049
8	C3,4,7,11,14,17,20,23	.001uf Disc Cap.	001035
6	*C5,10,13,22,16,18	.047uf Mylar Cap. (yel, purp, org)	001090
7	C6,9,12,15,19,21,25	.005uf Disc Cap.	001042
1	**C8	.068uf Mylar Cap. (blue, gray, org)	001093
7	D1,2,3,4,5,6,7	1N4148 Silicon Diode	000405
7	Q1,2,3,4,5,6,7	M400 Transistor or 2N4124	000443

1	PC Board	005259
10"	#16 Buss Wire	002019
1	Aux. Channel control w/Switching disc	005256

For Closed Sticks:

25"	#26 Ga. Orange wire
20"	#26 Ga. White wire
18 $\frac{1}{2}$ "	#26 Ga. Green wire
11 $\frac{1}{2}$ "	#26 Ga. Red wire
4 $\frac{1}{2}$ "	#26 Ga. Blue wire
4 $\frac{1}{2}$ "	#20 Ga. Black wire
4 $\frac{1}{2}$ "	#20 Ga. Red wire

For Open Sticks:

22 $\frac{1}{2}$ "	#26 Ga. Orange wire
29"	#26 Ga. White wire
24"	#26 Ga. Green wire
51"	#26 Ga. Red wire
4 $\frac{1}{2}$ "	#26 Ga. Blue wire
4 $\frac{1}{2}$ "	#20 Ga. Black wire
4 $\frac{1}{2}$ "	#20 Ga. Red wire

The following components are to be used for the Channel 6 proportional version.

1	R33	5K Trimmer	000745
1	R34	100K Trimmer	000774
1	R35	47K resist. (yel, purp, org)	000051
1	R36	4.7K resist. (yel, purp, red)	000039
2	R37,38	22K resist. (red, red, org)	000047
2	C28,30	.005uf Disc Cap.	001042
1	C26	.047uf Mylar Cap.	001090
1	C27	.001uf Disc Cap.	001035
1	C29	.05uf Disc Cap.	001049
7"ea.		#26 Ga. Green, white, Orange wire	
1		Aux. Channel control w/4-5K Pot element	005255

The following additional wires will be supplied for the 6 channel proportional version.

7"ea. #26 Ga. Green, White, Orange wire.

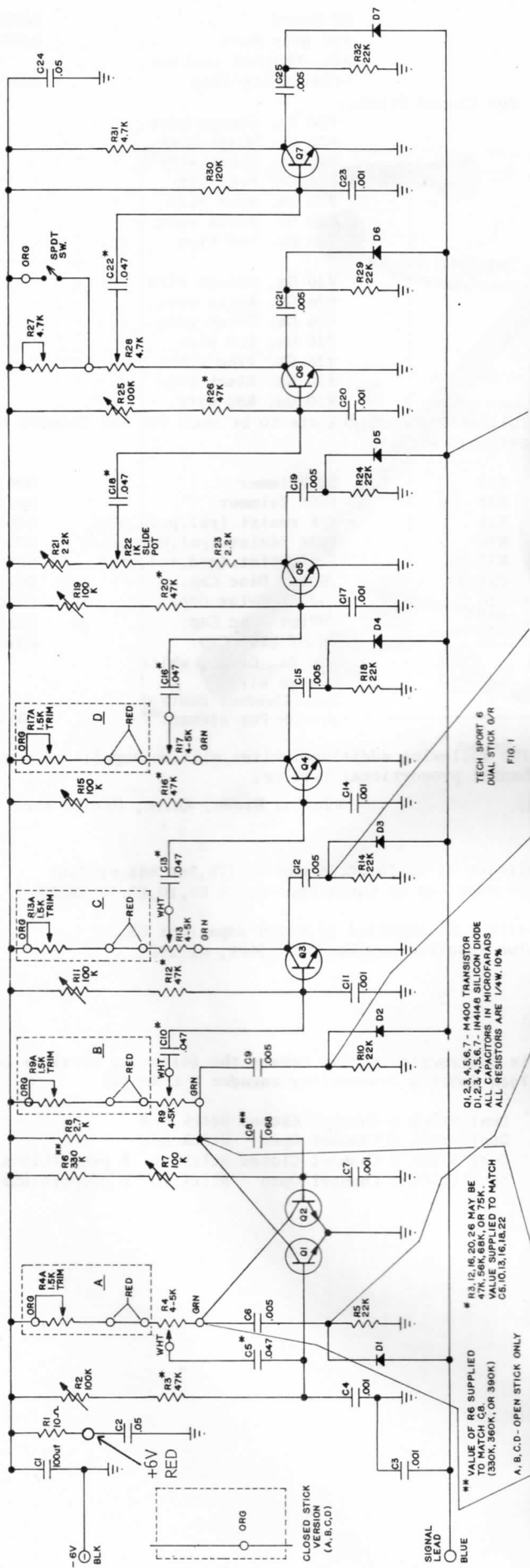
\*Resistors R3,12,16,20,26 may be 47K,56K,68K, or 75K. Value supplied to match capacitors C5,10,13,16,18,22.

\*\*Resistor R6 supplied to match capacitor C8. Value supplied may be: 330K,360K, or 390K.

NOTE:

This instruction manual covers the following versions of the Tech Sport 6 Transmitter encoder P C Board:

Dual Stick 6 Channel Closed Stick G/R
Dual Stick 6 Channel Open Stick G/R
Dual Stick 6 Channel Closed Stick Ch. 6 proportional
Dual Stick 6 Channel Open Stick Ch. 6 proportional

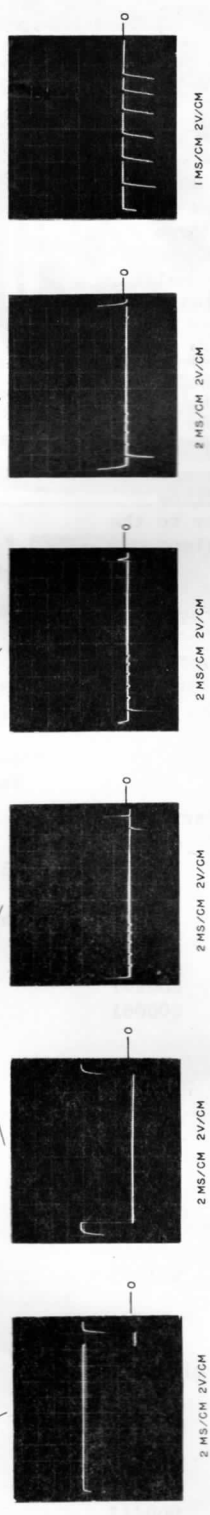


TECH REPORT 6  
DUAL STICK 6/4  
FIG. 1

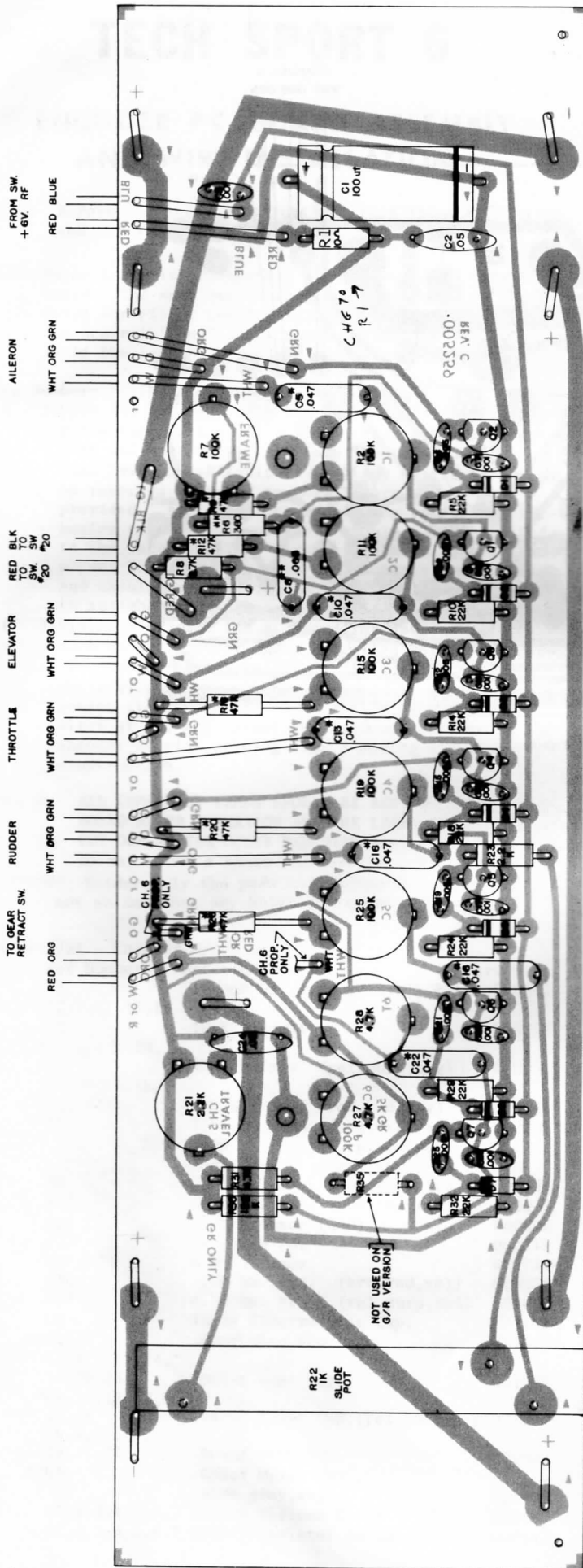
Q1, Q3, 4, 5, 6, 7 - M400 TRANSISTOR  
D1, 2, 3, 4, 5, 6, 7 - IN4448 SILICON DIODE  
ALL CAPACITORS IN MICROFARADS  
ALL RESISTORS ARE 1/4W, 10%

\*\* VALUE OF R6 SUPPLIED TO MATCH C6. (330K, 360K, OR 390K)  
A, B, C, D - OPEN STICK ONLY

\*\* R3, 12, 16, 20, 26 MAY BE 47K, 56K, 68K, OR 75K. (330K, 360K, OR 390K)  
C5, 10, 13, 15, 18, 22



CHANNEL 6 PROPORTIONAL  
FIG. 2



NOTE:

On the clad side of the encoder P C board you will notice small arrow points. The component leads by these points should be bent over in the direction of the arrows, clipped off, and soldered.

4. ( ) Install D1,2,3,4,5,6,7- 1N4148 diodes, observe polarity bands.
5. ( ) Install R30- 120K resistor (brn,red,yel).
6. ( ) Install R31- 4.7K resistor (yel,purp,red).
7. ( ) Install R8- 2.7K resistor (red,purp,red)
8. ( ) \*Install R3,12,16,20,26. 47K Res. (yel,purp, org). Resistors may be 47K,56K,68K, or 75K. Value supplied to match caps C5,10,13,16,18,22.
9. ( ) \*\*Install R6. 330K,360K, or 390K.
10. ( ) Install R1- 10 ohm resistor (brn,blk,blk).
11. ( ) Install R32,29,24,18,14,10,5- 22K resistors (red,red,org).
12. ( ) Install R23,- 2.2K resistor (red,red,red).
13. ( ) Install C25,21,19,15,12,9,6,- .005 Disc caps.
14. ( ) Install C3,23,20,17,14,11,4,7- .001 Disc caps.
15. ( ) Install C2,24- .05 Disc caps.
16. ( ) Install C1- 100uf Electrolytic cap. Observe polarity.
17. ( ) Install Q1,2,3,4,5,6,7- M400 Transistors. Observe position of flat side. Form all transistor leads per Fig. 6.
18. ( ) Install R22- 1K slide pot. Make sure the pot legs are down tight on the board on all four corners. Do not bend the leads, but clip off

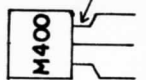


FIG. 6

flush with the top of the solder joint and remove any sharp edges or points.

19. ( ) Install R21- 2.2K Trimmer.
20. ( ) Install R27- 4.7K Trimmer.
21. ( ) Install R28- 4.7K Trimmer.
22. ( ) Install R7,25,19,15,11,2- 100K Trimmers.
23. ( ) Install C8- .068uf Mylar cap.
24. ( ) Install C16,13,10,5,18,22. .047uf Mylar Cap.
25. ( ) Cut 10 standoff from the #16 gauge buss wire, 1" long.

Apply a light solder tin around the standoff hole on the end of each battery connecting land, 10 places.

26. ( ) Bend one end of each standoff 90°, 9/16" from one end. Make a second bend in each standoff 90°, .200" from the first bend. See Fig. 7.
27. ( ) The short legs of the formed standoffs may vary in length, which is OK as they will be clipped off later.

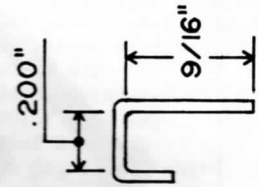


FIG. 7

CAUTION: Bend the transistor leads per illustration, otherwise you may damage the transistor. Hold with pliers to prevent damaging the transistor.

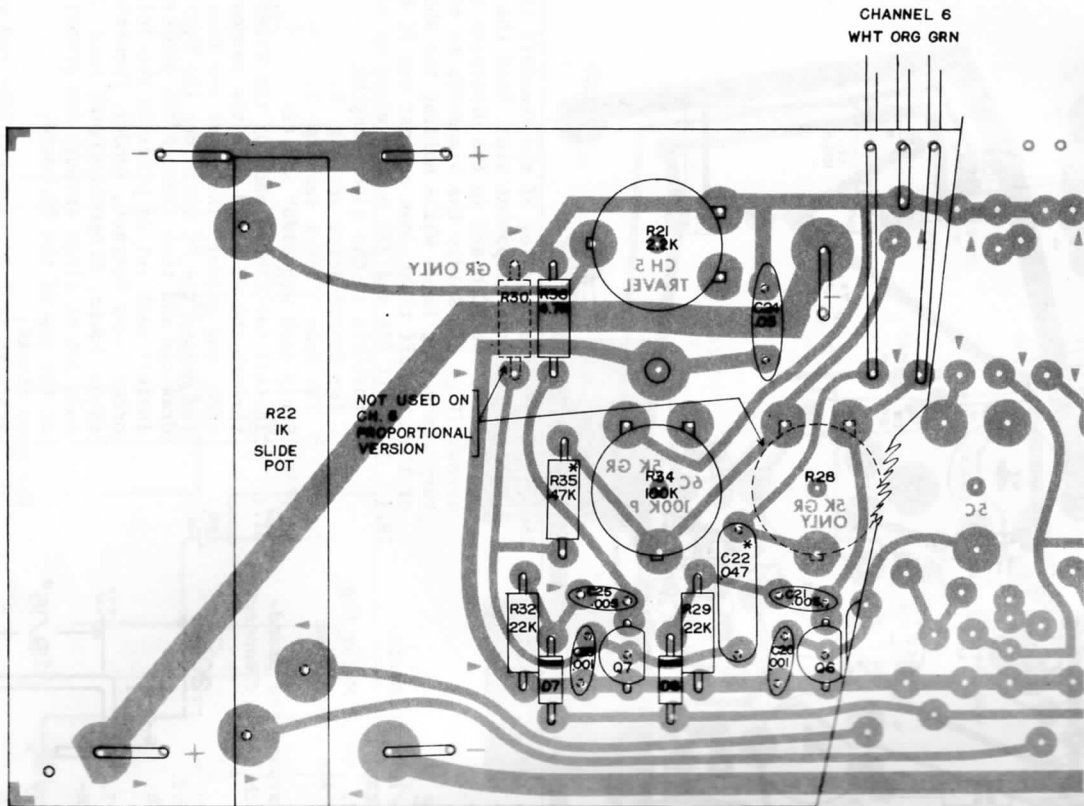
28. ( ) Insert the long leg of the standoff in the PC board from the component side. Bend the short leg flat to the PC board in the direction of the arrows (Fig. 3). Solder the standoffs to the battery connecting lands while holding the short leg of the standoff tight down against the PC board.
29. ( ) Cut all #26 and #20 hookup wires as closely as possible to the given lengths.

For Closed Stick see Fig. 8.  
For Open Stick see Fig. 9.

30. ( ) Strip each wire 1/8" and tin.
31. ( ) Install the tinned ends of the wires through the PC board from the component side and solder. The wires are then routed across the PC board per the overlay drawings and then through the proper holes. Install each set of wires in the following order: Gear Retract, Rudder, Throttle, Elevator, Power, Aileron, Signal lead. Thread each set of wires through the proper holes at the top of the PC board.

For open Sticks:  
Refer to Fig. 4. Lace the 10½" red wires through the holes provided so that one end of the red wire is even with the end of the orange wire. Refer to Fig.4 for the routing of the red and black power wires and the blue RF wire.

For closed Sticks:  
Refer to Fig. 3 and route the wires to the holes provided.



CHANNEL 6 PROPORTIONAL  
FIG. 5

32. ( ) Thoroughly clean all soldering resin from the PC Board. Suggested cleaning fluids: 1,1,1, Trichloroethane acetone dope thinner
33. ( ) Twist each of the sets of wires into a cable. G/R, 2 wires. Rudder, Throttle, Elevator, All. 3 wires for Closed stick and 4 wires for Open stick. Power wire #26 red and signal lead #26 blue 2 wire cable 2 1/2" long.
34. ( ) Lay the completed encoder board on the proper chart on Page 4 (For Closed sticks: Fig. 8. For Open sticks: Fig. 9.) with the component side up. The top edge of the encoder board should be on the "X" line.
35. ( ) Cut all of the wires and wire cables to the sizes shown. The charts are full size.
36. ( ) Inspect all solder joints and repair if necessary.
37. ( ) Inspect the PC Board for correct parts and wiring. Mistakes not caught here are very difficult to correct after the batteries have been installed.

WIRE LENGTHS BEFORE TWIST

Closed Sticks:

WIRE COLOR	SIZE	ALL.	EL.	TH.	RUD.	G/R	POWER	SIG.
ORG	#26	3	3/4	4 1/4	5	7	-	-
WHT	#26	4	4 1/2	6	5 1/2	-	-	-
GRN	#26	4	4 1/4	5	5	-	-	-
RED	#26	-	-	-	7	4 1/2	-	-
BLUE	#26	-	-	-	-	-	4 1/2	-
RED	#20	-	-	-	-	-	4 1/2	-
BLK*	#20	-	-	-	-	-	4 1/2	-

\*ALTERNATE GREEN

Open Sticks:

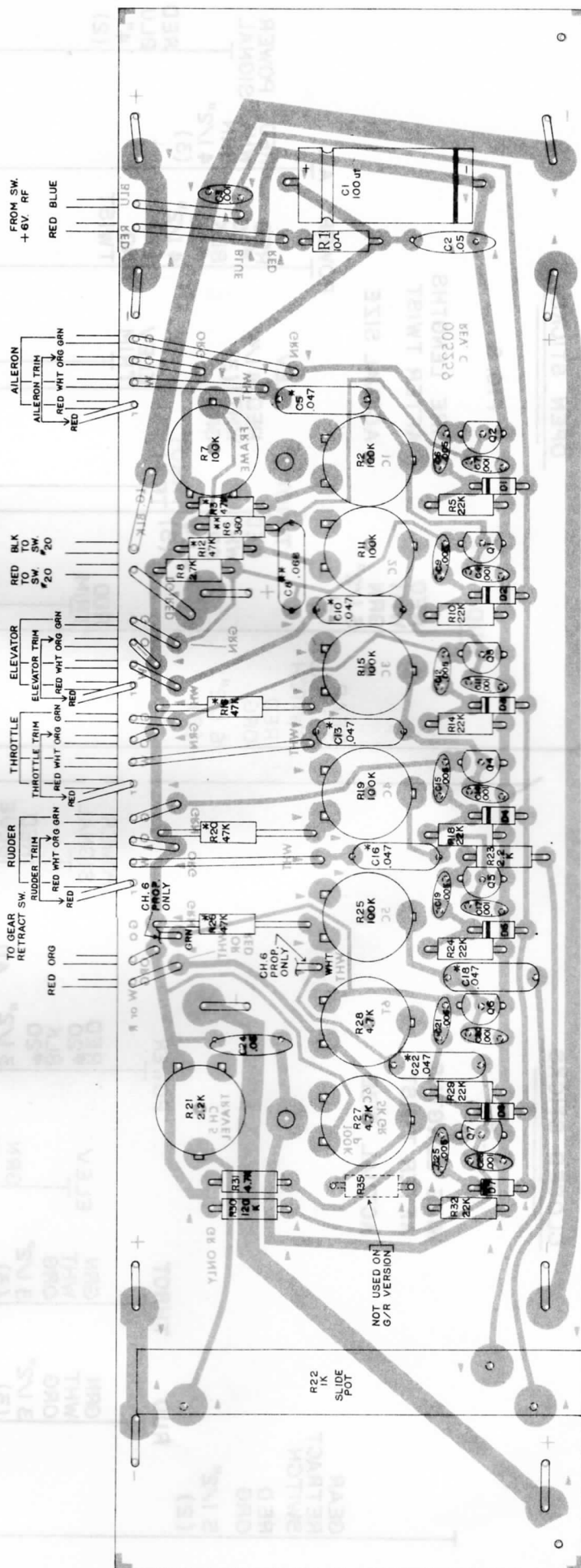
WIRE COLOR	SIZE	ALL.	EL.	TH.	RUD.	G/R	POWER	SIG.
ORG	#26	3	4	4 1/2	4	7	-	-
WHT	#26	6 1/2	6	8	8 1/2	-	-	-
GRN	#26	6 1/2	5	6	6 1/2	-	-	-
RED	#26	9 1/2	9	10 1/2	10 1/2	7	4 1/2	-
BLUE	#26	-	-	-	-	-	-	4 1/2
RED	#20	-	-	-	-	-	-	4 1/2
BLK*	#20	-	-	-	-	-	-	4 1/2

\*ALTERNATE GREEN

FIG. 8

FIG. 9

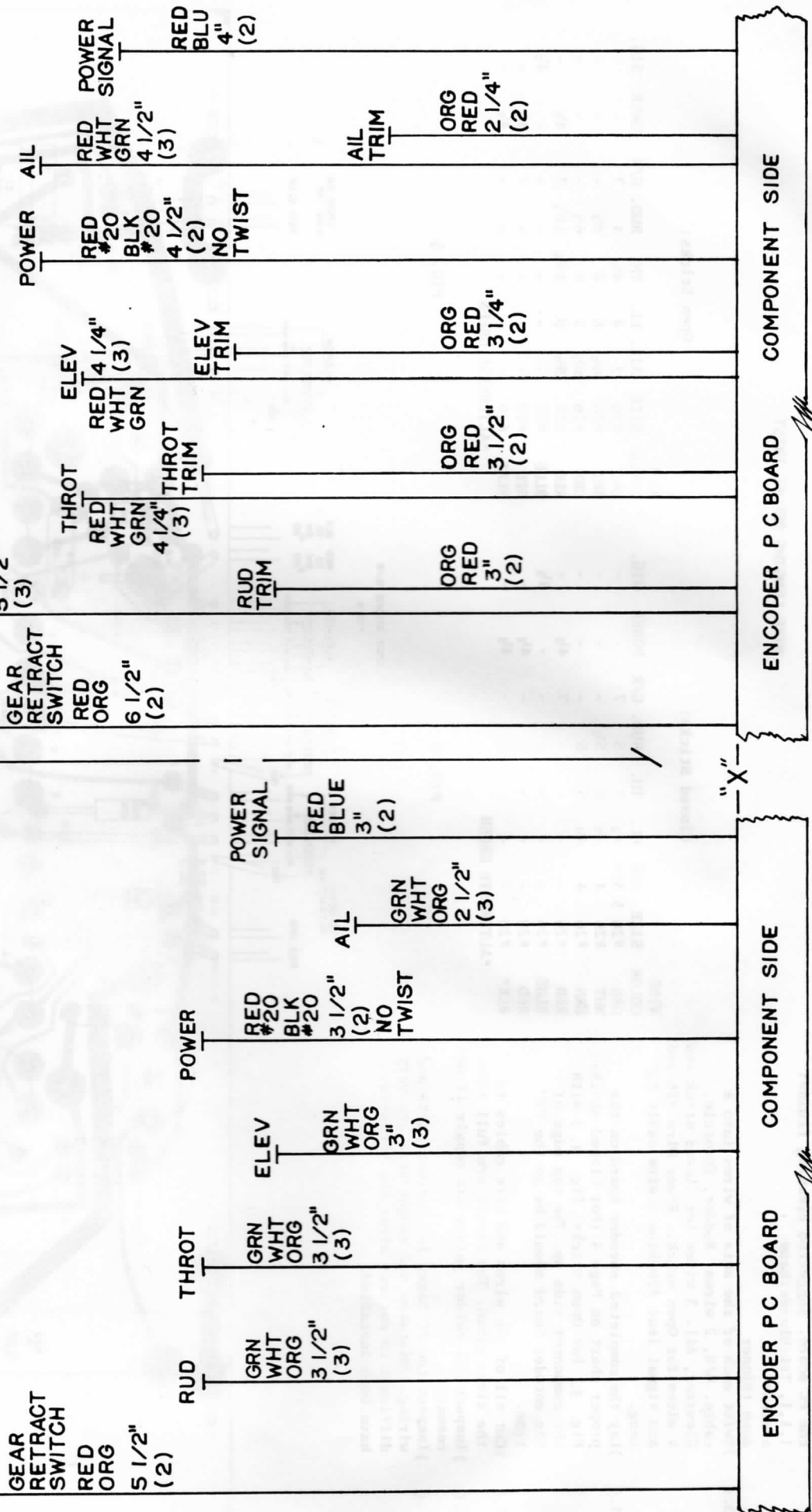
OPEN STICKS G/R  
FIG. 4



CLOSED STICKS

FIG. 8

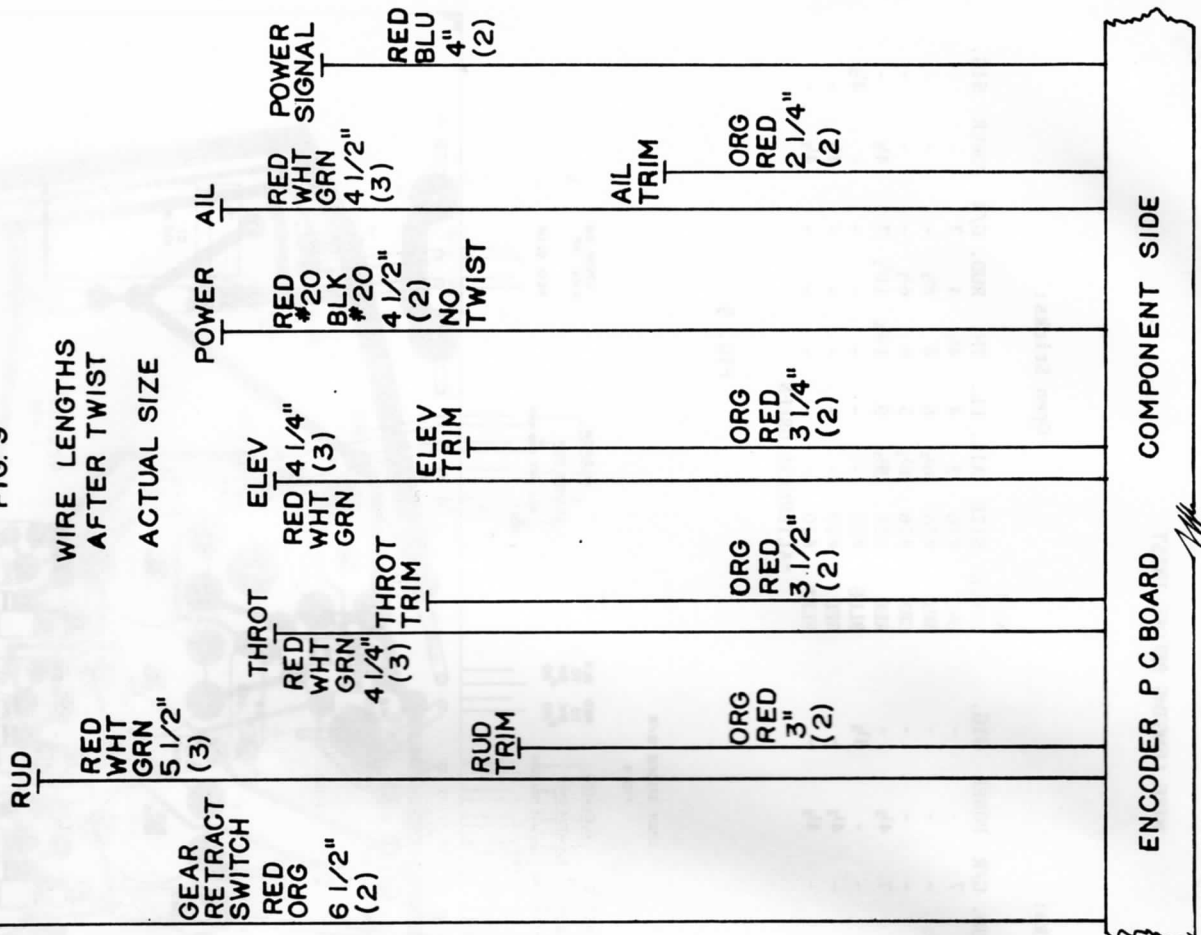
WIRE LENGTHS  
AFTER TWIST  
ACTUAL SIZE



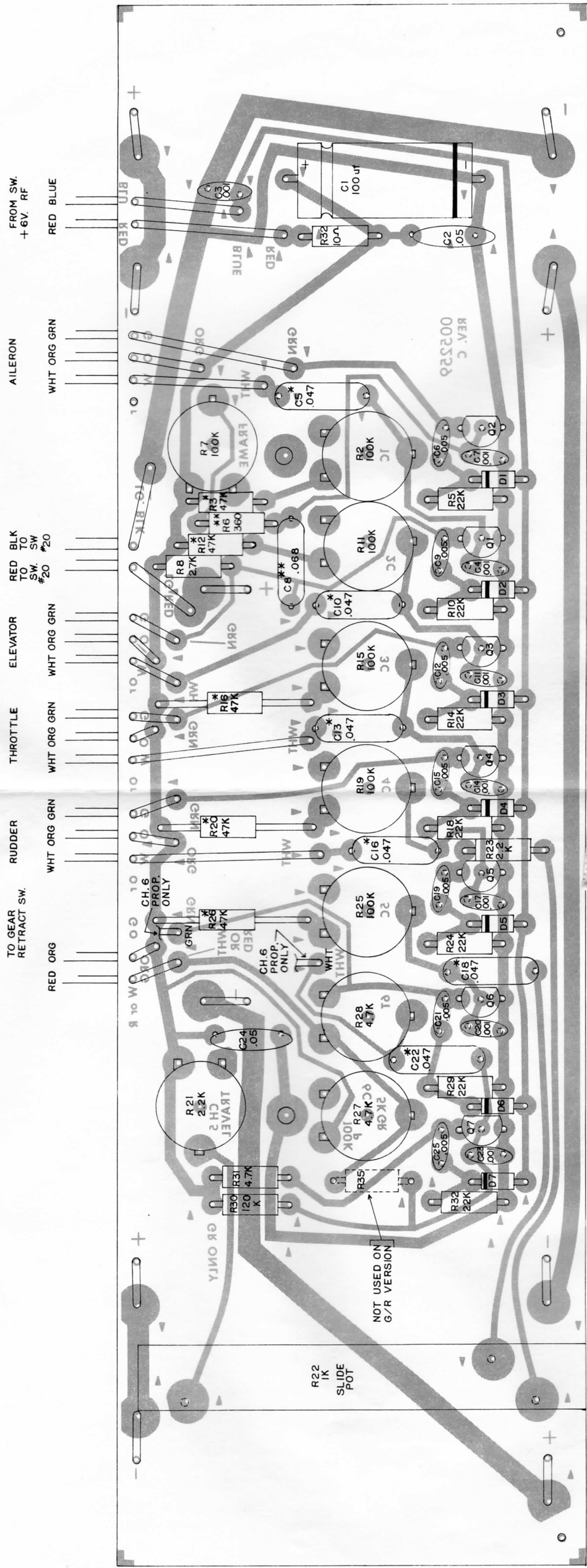
OPEN STICKS

FIG. 9

WIRE LENGTHS  
AFTER TWIST  
ACTUAL SIZE



CLOSED STICKS G/R  
FIG. 3



TECH SPORT 6 ENCODER  
CHANGE NOTICE

PAGE 1 PARTS LIST  
C15, 19, 23, 27, 31 WAS .005 DISC. CHANGED TO .0056 DISC, OR .0047UF, .005UF, OR .0047, OR .005 MYLAR.

PAGE 2 PARTS LIST  
STEP 19 WAS .005 DISC. CHANGED TO SAME AS ABOVE.