REV NO. 2-A

P24B-AL-4960

CONT ON SHEET 13 SH NO. 12

TITLE VOLTAGE COMPARATOR
SCHEMATIC DWG. 992D499, 125D3223
BOARD NO. 994D129 G1, G2, G4, G5 0994D129G002-
FIRST MADE FOR

CONT ON SHEET 13 SH NO. 12

REVISIONS: 2 04 MC APR 29 1974 Raymond ... ; 273-314; ET-273; 273-2; 273-12; 273-132; 273-138; 273-71; PRINTS TO

TEST PROCEDURE — Part A

1. Connect +30V HQ to Pin 17, -22V HQ to Pin 21, and HQ ground to Pin 19. Connect lights L1 and L2 as shown in Test Sketch.

2. Turn R22 and R44 fully CCW.

3. Apply HQ ground to Pins 9, 31, 41, & 39.

4. Adjust R21 so that L1 is just on the point of lighting.

5. Adjust R43 so that VC2 is just on the point of lighting.

6. Remove the grounds from Pins 9, 31, 41, & 39.

7. Hook up board as per test set up.

8. Turn R22 and R44 fully counterclockwise.

9. Close S1.

10. Adjust 2K pot (see test set up) for +8.0 volts at Pin 31. Check that TP8 reads +8.0 volts.

11. Adjust R20 for +9.0 volts at Pin 9. Check that TP1 reads +9.0 volts.

12. Adjust R20 counterclockwise slowly observing L1. When L1 lights stop turning R20.

13. Read the voltage at Pin 9. This should equal +8.0 volts ± 30 mv.

14. Turn R20 clockwise slowly, observing L1. When L1 goes out, stop turning R20.

15. Read the voltage at Pin 9. This should be: (For G1 & G2) 8.08V ± 30 mv.
(For G4 & G5) 8.03V ± 30 mv.
See Note 1.

16. Turn R20 about 3 turns clockwise.

17. Turn R22 fully clockwise.

18. Repeat steps 11 thru 15. This time L1 should go out at +8.2 ± 50 mv.
See Note 2.

19. Turn R22 fully counterclockwise.

20. Adjust 2K pot for -8.0 volts at Pin 31.

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SCHEMATIC DWG. 992D499; 125D3223
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21. Adjust R20 CCW for -7.0 volts at Pin 9.

22. L1 should be out. Adjust R20 CCW slowly observing L1. When L1 lights, stop turning R20.

23. Read the voltage at Pin 9. It should have a value of -8.0 volts ± 30 mv.

24. Adjust R20 slowly CW observing L1. When L1 goes out, stop turning R20.

25. Read the voltage at Pin 9. This should have a value of: (For G1 & G2) -7.92V ± 30 mv. ; (For G4 & G5) -7.97V ± 30 mv. See Note 1.

26. Turn R20 about 3 turns CW.

27. Turn R22 fully CW. Repeat steps 21 thru 25, only this time L1 should go out at -7.8V± 50 mv. See Note 2.

28. Turn R22 fully CCW.

29. Open S1, Close S2.

30. Adjust 2K pot for +8.0 volts at Pin 39. Check that TP9 reads +8.0 volts.

31. Adjust R42 CW for +9.0 volts at Pin 41. TP10 should read +9.0V.

32. L2 should not be lighting. Adjust R42 slowly CCW until L2 lights. When this happens stop turning R42.

33. Read voltage at Pin 41. This should equal 8.0 volts ± 30 mv.

34. Adjust R42 slowly clockwise. L2 should go out. When this happens stop turning R42.

35. Read voltage at Pin 41. This should equal: (For G1 & G2) 8.08V ± 30 mv.
(For G4 & G5) 8.03V ± 30 mv.
See Note 1.

36. Turn R44 fully clockwise. Repeat steps 31 thru 35. This time L2 should go out at +8.2 volts ± 50 mv. See Note 2.

37. Turn R44 fully CCW.

38. Adjust 2K pot (see test set up) for -8.0 volts at Pin 39.

39. Adjust R42 CCW for -7.0 volts at Pin 41.

40. L2 should be out. Turn R42 counterclockwise slowly until L2 lights.

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TITLE VOLTAGE COMPARATOR
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41. Read voltage at Pin 41. This should equal -8.0 volts ± .03 volts.

42. Adjust R42 slowly CW observing L2. When L2 goes out, stop turning R42.

43. Read the voltage at Pin 41. It should be: (For G1 & G2) -7.92V ± 30 mv.
(For G4 & G5) -7.97V ± 30 mv.
See Note 1.

44. Turn R44 completely clockwise. Repeat steps 39 thru 43, only this time L2 should go out at -7.8 volts ± 50 mv. See Note 2.

45. Turn R44 fully CCW.

46. Connect an oscilloscope in place of L1.

47. Set R20 and R42 for zero volts at TP1 and TP10, respectively.

48. Close S1. Adjust the 2K pot for +5 volts DC at Pin 31.

49. Open S1. Connect S1 to trigger the scope. Close S1 and observe the trace on opening or closing on the scope. The pickup time should be less than 16 ms.

50. Open S1 and observe that dropout time of the VC. It should be less than 30 ms.

51. Connect up the oscilloscope in place of L2.

52. Close S2 and observe the trace on the oscilloscope. The pickup time should be less than 16 ms.

53. Open S2 and observe the trace on the scope. The dropout time should be less than 30 ms.

<u>Failures:</u> Any test that cannot be carried out is a condition for rejection and should be reported to Control Design Engineering.

NOTE 1: For G1 and G2, when the hysteresis pot (R22 or R44) is set full CCW, the difference between pick-up voltage and drop-out voltage must be less than 80 mv. For G4 and G5, when the hysteresis pot (R22 or R44) is set full CCW, the difference between pick-up voltage and drop-out voltage must be less than 30 mv.

NOTE 2: For G1, G2, G4, and G5, when the hysteresis pot (R22 or R44) is set full CW, the difference between pick-up voltage and drop-out voltage must be greater than 200 mv.

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TITLE VOLTAGE COMPARATOR
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Part B

This test should be carried out if the VC output relays have RC contact protection.

1. Connect up the VC board as in Fig. 2.
2. Adjust R20 for -1 V DC at TP8.
3. Set a square wave generator for 1 V amplitude, 100 ms period.
4. Apply the square wave from Pin 6 to Point A (Fig. 2). Monitor the voltage across Ra on an oscilloscope. The wave shape should be as shown in Fig. 2b. The time constant of the exponential should equal 8.45 ms $\pm$ 15%.
5. Adjust R20 for 1 V DC at TP8. Apply the square wave across Point A to Pin 5. The signal across Ra should be the same as in 4.
6. Adjust R42 for -1 V DC at TP9. Apply the square wave across Point B and Pin 3. Monitor the voltage across Rb. It should be similar to that across Ra in step 4.
7. Adjust R42 for +1 V DC at TP9. Apply the square wave from Point B to Pin 1. The signal across Rb should be similar to that across Ra in step 4.

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TITLE VOLTAGE COMPARATOR
SCHEMATIC DWG. 992D499; 125D3223
BOARD NO. 994D129 G1, G2, G4, G5

FIRST MADE FOR

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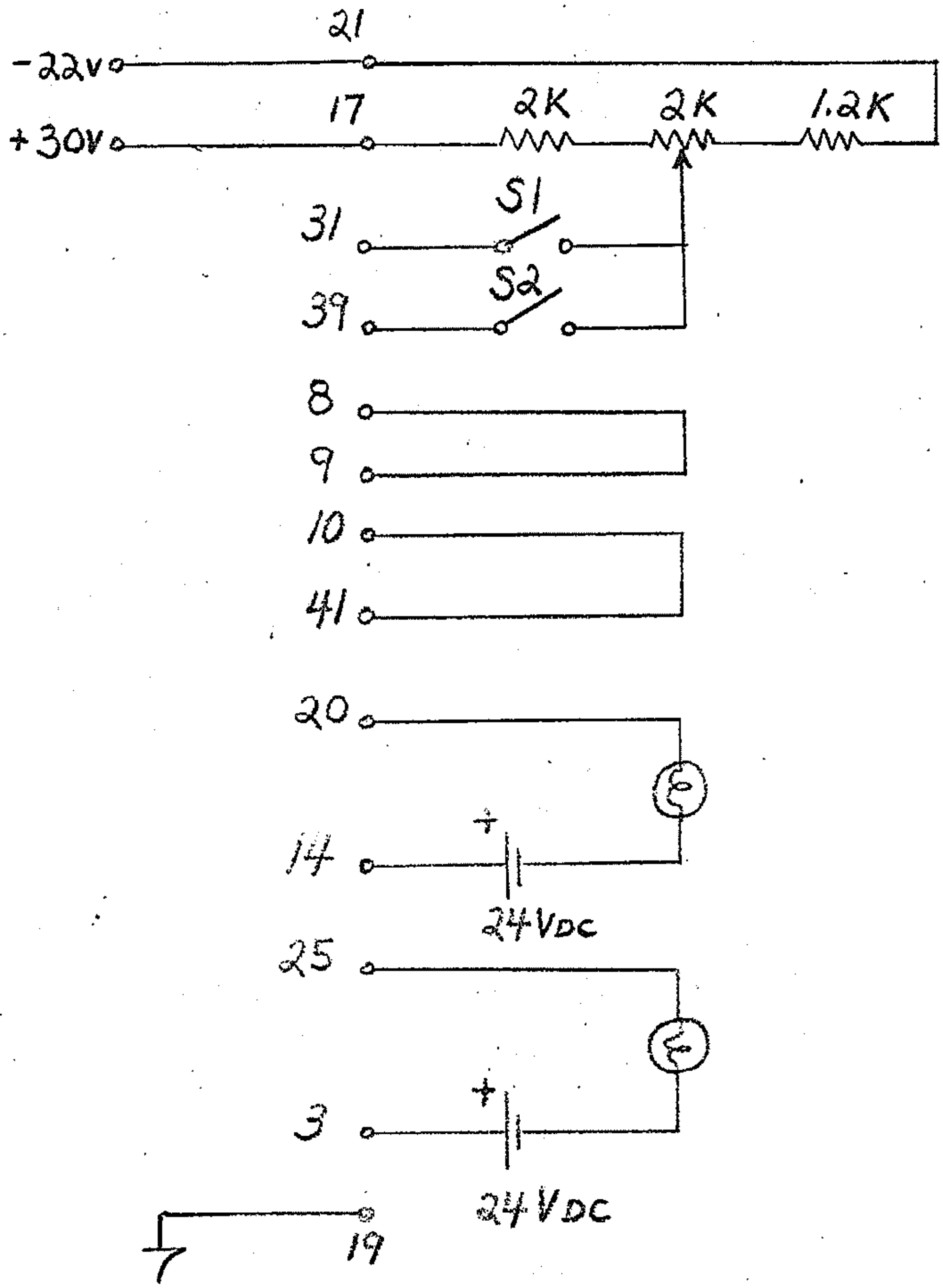
FIG. 1



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MADE BY B.D. Murphy, Mar. 26, 1969

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P24B-AL-4960
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TITLE
VOLTAGE COMPARATOR
SCHEMATIC DWG. 992D499; 125D3223
BOARD NO. 994D129 G1, G2, G4, G5

FIRST MADE FOR

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FIG. 2 A

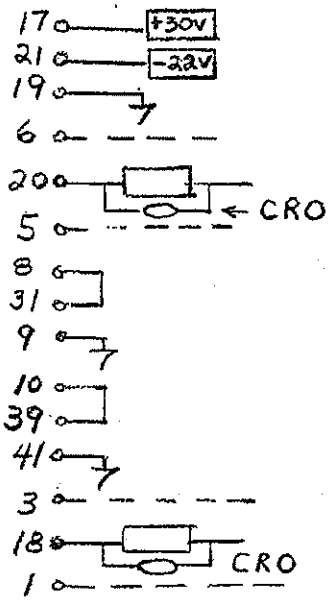
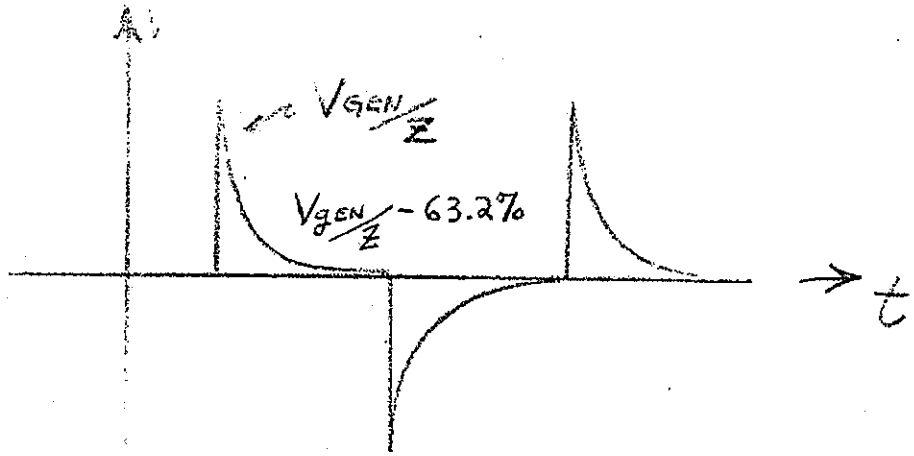


FIG. 2 B



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VOLTAGE COMPARATOR
SCHEMATIC DWG. 992D499; 125D3223
FIRST MADE FOR BOARD NO. 994D129 G1, G2, G4, G5

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PREPARED BY R. J. Pillsworth DATE 4/22/74
R.J. Pillsworth
EHC DESIGN ENGINEERING

APPROVED BY P C Callan DATE 4-26-74
P.C. Callan - MANAGER
EHC DESIGN ENGINEERING

REVIEWED BY C C Bugg DATE 4/25/74
C. Bugg
EHC TEST ENGINEER

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