REV NO.	TITLE
277A3953	TEST INSTRUCTIONS
CONT ON SHEET 2 SH NO. 1	FIRST MADE FOR 277A3957

REVISIONS

TEST INSTRUCTIONS

FOR

ANTI-LATCHUP
277A3957
PRINTED CIRCUIT BOARD

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3EL1

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MADE BY	APPROVALS	DIV OR DEPT.	
D.C.NOLAN 800108	D.C. Nolan	DRIVE SYSTEMS	277A3953
ISSUED 3-18-80		SALEM, VIRGINIA LOCATION	CONT ON SHEET 2 SH NO. 1

1.0 Scope

This document establishes the performance requirements and recommended tests for the anti-latchup printed circuit board.

This specification will check analog transfer functions and component tolerances.

2.0 Test Equipment

Other than the power supplies listed in 3.0, a digital voltmeter, a variable symmetry (duty cycle) square wave generator, a sine wave generator (two generators), and an oscilloscope will be required.

3.0 Power Supplies and Pin Connections

Nominal Voltages	Pin Number
P15	1 , 2
Comm	3 , 4 Connect to earth ground
N15	5 , 6
P24	7 , 8
24 V. Comm.	9 , 10

Note: The 24 V.D.C. source must be isolated (floating) from the other voltages.

4.0 Setup and Initial Loading

4.1 Connections (all inputs referenced to ± 15V common)

1. Connect sine wave generator output to pin #11. Set frequency to 180Hz and level to minimum.
2. Connect square wave generator to pin #15. Set frequency to 60Hz and level to minimum.
3. Connect pin #13 to pin #4.
4. Connect 0.1uf caps from ± 15V busses to common.

4.2 Potentiometer and Rheostat Settings

R1- Set during test

R3- Set full CCW.
R4- Set during test
R5- Set during test

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4.3 Load Resistors

Connect a 10K, ¼ watt resistor from pin #19 to pin #4.

Connect a 100K, ¼ watt resistor from pin #17 to pin #10.

4.4 Jumpers

Jumper TB1 should be placed in the JMP position.
Connect a jumper across (short out) CR13.

5.0 Signal Levels

5.1 TTL Input Levels
None

5.2 TTL Output Levels
None

6.0 Test Procedure

6.1 Preliminary Inspection
A visual inspection should be made to detect any obvious defects in the board (damage,solder bridge,etc.). Set R3 full CCW. Place TB1 in JMP.

6.2 Digital Tests
None

6.3 Hybrid Interface Tests
None

6.4. Analog Tests

1. (a) Connect an oscilloscope to TP13 setup so as to read ± 15V. referred to pins 3 & 4.
   (b) While observing the scope, energize the board.
   (c) Verify that the signal at TP13 goes high (≥+10V.) for 1.5 to 5 sec. and then goes low (≤10V.) thereafter.
2. Set sine wave level to 3.0V rms, 60 Hz ± 1 Hz.
3. Set square wave amplitude to 10.0V peak to peak by observation with oscilloscope.
4. Measure and record the DC voltage at TP10 (V10). 1.364
5. Using potentiometer R1, set the DC voltage at at TP9 to 0.5 ± V10 Change sine wave freq. to 180±10Hz. Measure and record voltage at TP10 - should be less and ½ of voltage set at TP9.
6. Verify that the DC voltage at TP6-10.0V or more negative.
7. Using potentiometer R4, set the DC voltage at TP2 to -10.0V.
8. Using potentiometer R5, set the DC voltage at TP16 to +4.68V.

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6.4 Analog Test (cont'd.)

9. Set square wave symmetry per figure 1 by observation with oscilloscope.

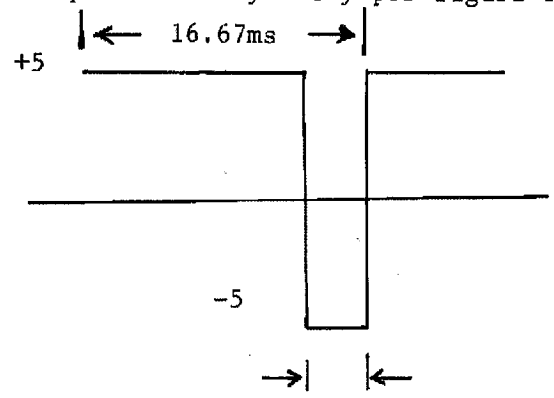

FIGURE 1

10. Verify that the DC voltage at pin #20 $\geq$ 2.0V. Adjust R5 until NO LIMIT LED just comes on adn ON TIME LED is off.

11. By observation witn oscilloscope, change tne symmetry of the square wave as Figure 2.

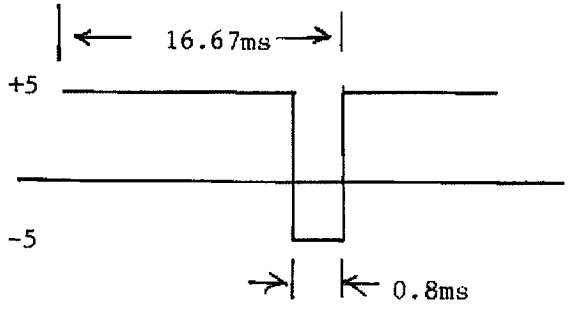

FIGURE 2

12. Verify that the DC voltage at pin #20 $\leq$ 8.0V. Also verify that the ON TIME LED is on and all others off.

13. Set the generator for a symmetric square wave as per Figure 3.

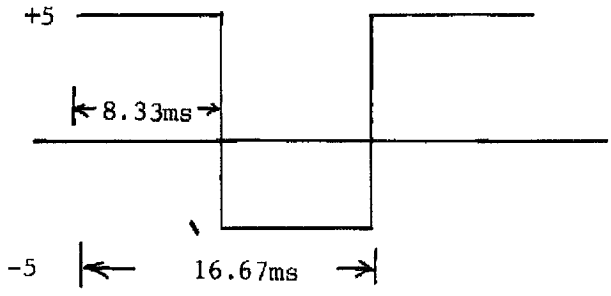

FIGURE 3

14. Verify NO LIMIT LED on and all others off.

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NOTE: Remove the jumper across CR13.

6.4 Analog Tests (continued)

15. While observing LED's, change sine wave frequency to 100Hz and verify no change (No Limit LED on.)
16. While observing LED's, change frequency rapidly to 60Hz.
17. Verify No Limit LED off and ON TIME LED blinks on for approximately 1/10 second and then NO LIMIT LED back on and ON TIME LED off.
18. Change sine wave frequency to 180Hz and press reset button on front panel.
19. Verify DC voltage from pin 17 to pin 9 $\leq$ 5.0V.
20. Rapidly change frequency to 60Hz.
21. After approximately 2 seconds delay, verify DC voltage from 17 to 9 change to $\geq$ 20V and the trip LED is on. If not, verify Step 6.1 completed.
22. Change frequency to 180Hz.
23. Press reset and verify DC voltage from 17 to 9 $\leq$ 5.0V. and the trip LED goes off.
    Note: Remaining measurements referenced to $\pm$ 15 common.
24. Using potentiometer R4, set the DC voltage at TP2 to + 1.0V.
25. Verify the DC voltage at pin #19 to be 1.0V $\pm$0.1. Also, verify the Fixed Limit LED on and all others off. Set TP2 to -8.1 $\pm$ 0.1 VDC with R4.

6.5 Special Tests
None

6.6 Temperature Tests
Tests shall be conducted with element at room temperature.

End of Test

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