

# Local Buss Device Controller Test & Calibration Procedure

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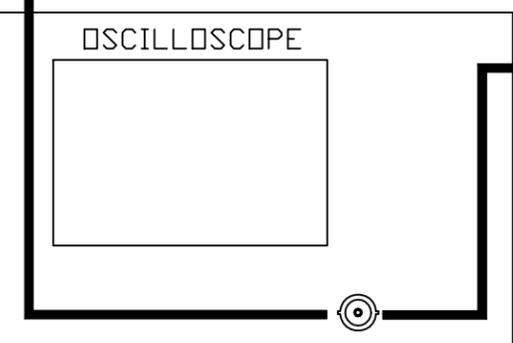
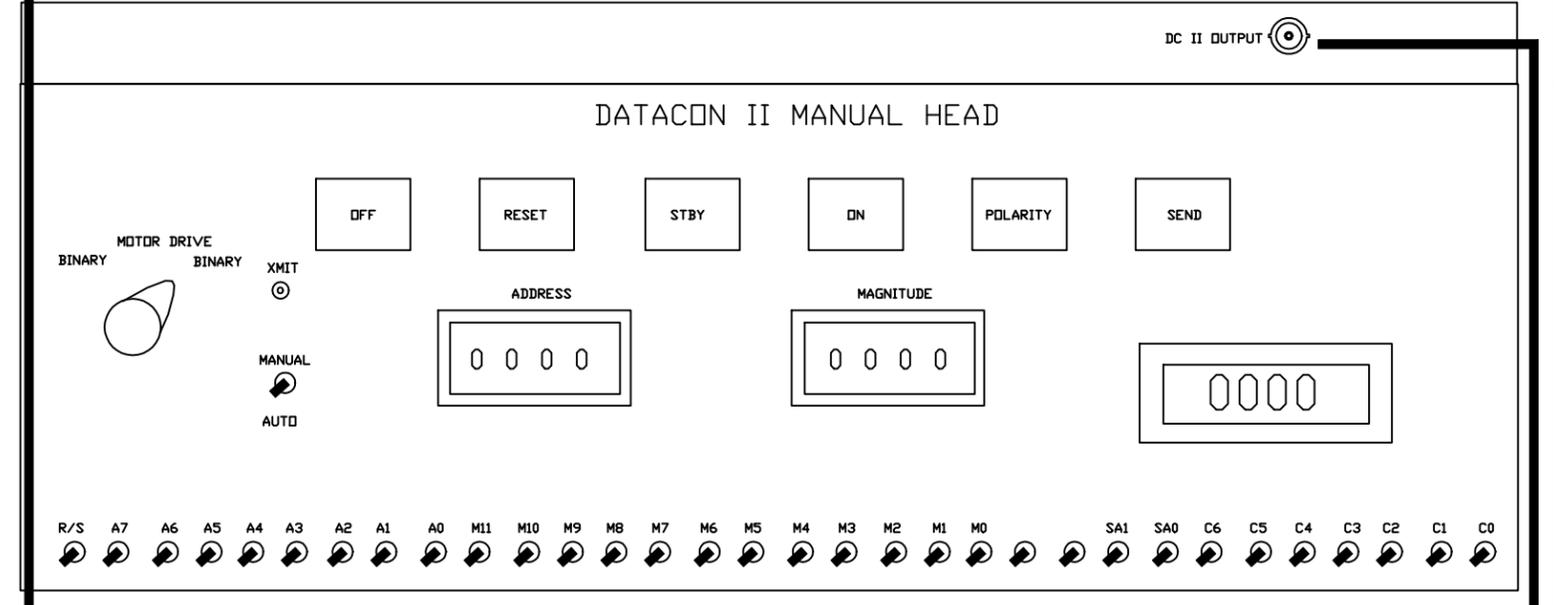
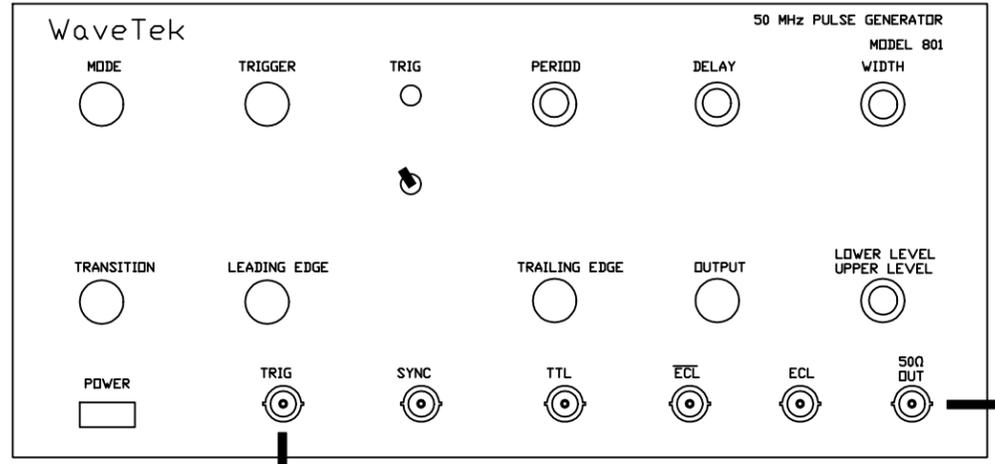
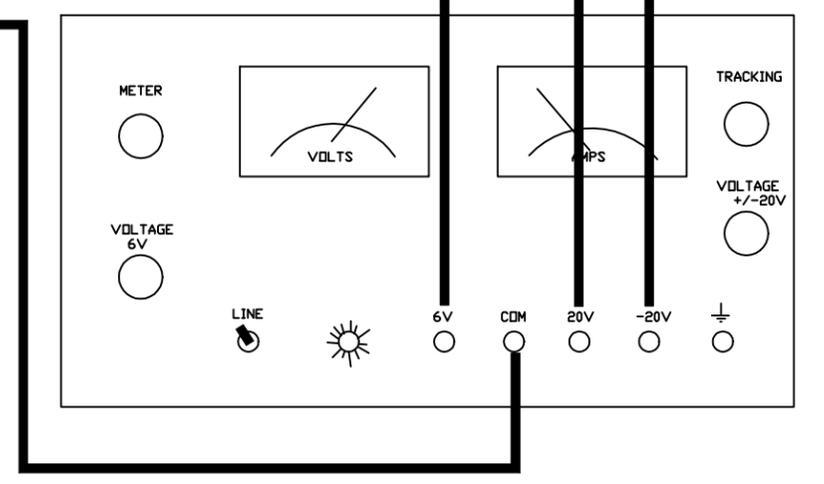
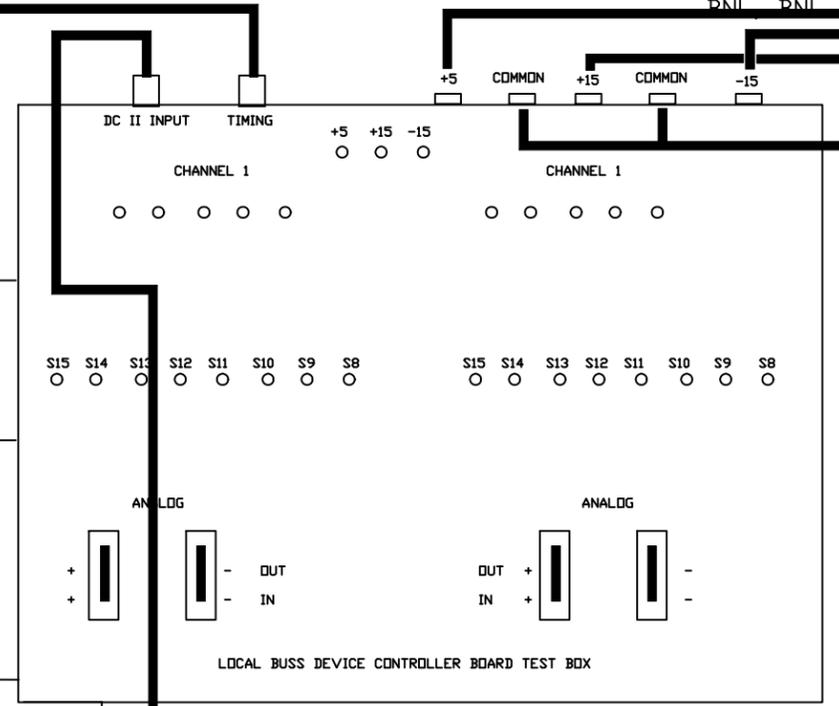
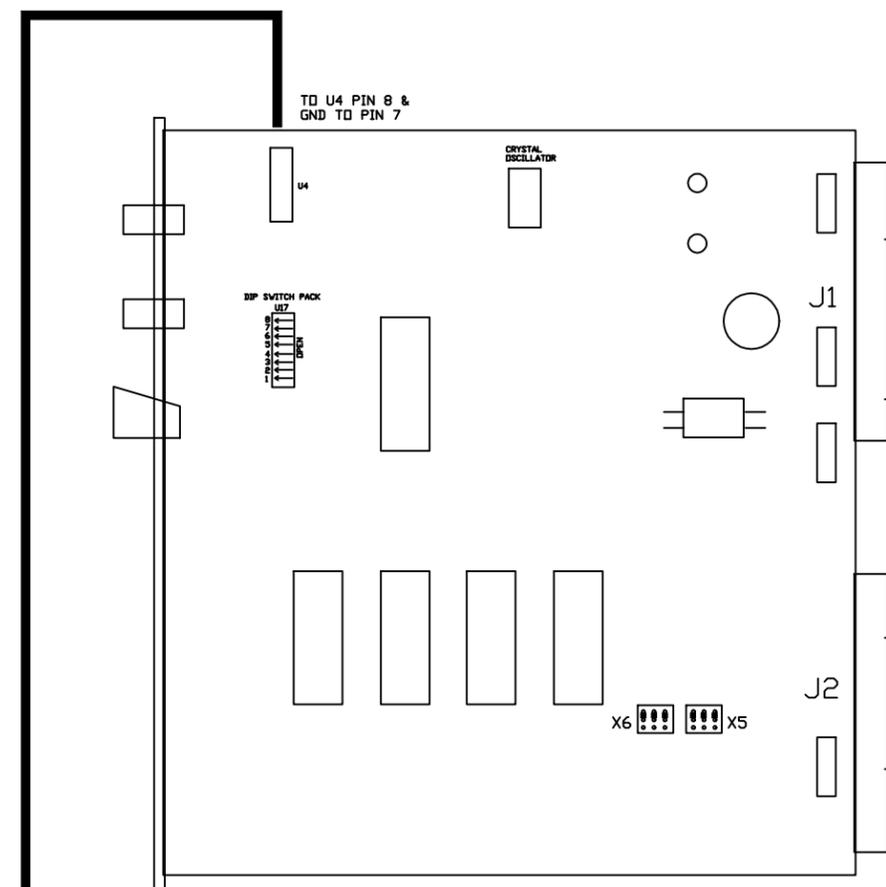
1. Obtain DMM, Oscilloscope, external triggerable pulse generator, test box and manual head or device capable of datacon II format Data I/O, and a bench PS with +5V, +/- 15V
2. Set up pulse generator to put out 10 us wide 15V pulse delayed 50 us from end of reply. Recommend WaveTek Model 801 setup on *Mode* Trigger, *Trigger level* positive pulse, *Period* 2 us, *Delay* 1 ms, *Width* 10 us, *Output* Normal, *Level lower* 0V, *Level upper* 10 V, hook CLRN0T signal (U4-8) from the board under test to the trig input of generator. Output of generator is connected to test box and oscilloscope.
3. Set up manual head to binary mode.
4. Set up jumpers on board. See diagram
5. Note: If head keeps coming up with ~ 4095, check to see if pulse generator is set up correctly.
6. With oscilloscope observe U2-5, adjust R11 for 1.5 us.
7. With oscilloscope observe U2-13, adjust R10 for 1.5 us.
8. With oscilloscope observe U3-5, adjust R17 for 820 ns
9. With oscilloscope observe U3-13 for 500 ns pulse width.
10. With DMM on Pin 1 U26, send *low* address & "0000" magnitude with manual head, adjust R5 for -10.00VDC.
11. With DMM on U26-1, send *low* address & "2048" magnitude (set manual head for 800 hex). Adjust R6 for 0.00 VDC.
12. Repeat steps 8 & 9 until readings are stable with no further adjustments.
13. With DMM go between U35-12 (+) & U35-11 (-). Send low address & "2048" magnitude (800 hex). Adjust R28 for 0.00 VDC.
14. With DMM as above, send low address & "0000" magnitude (000 hex). Adjust R26 for -10.00VDC.
15. Repeat steps 11 & 12 until readings are stable with no further adjustments.
16. Tie Ch.1 analog out + & - to analog in + & - (jumpers are on test box).
17. With DMM go between U33-12 (+) & U33-11 (-). Send low address., "2048" (800 hex) magnitude, adjust R15 for 0.00VDC.
18. With DMM as above send low address & "0000" (000 hex). Adjust R14 for -10.00VDC.
19. Repeat steps 15 & 16 until readings are stable with no further adjustments.
20. With DMM on U30-8 (+) and analog ground (capacitor C4, positive lead). Send low address & "2048" magnitude. Adjust R36 for 0.00VDC.
21. With DMM go between U28-14 & analog ground. Send low address & "2048" magnitude (800 hex). Observe 0.00VDC on DMM. Adjust R1 for "2048" Readback on manual head.
22. With DMM as above, send low address & "0000" (000hex). Observe -10.00 VDC on DMM. Adjust R2 for "0000" readback on manual head.
23. Repeat steps 19 & 20 until readbacks on manual head are within a few counts with no further adjustments.
24. Send low address & "2048" (800 hex) & SA0 (8<sup>th</sup> bit on manual head from the right). Observe "2048" readback on manual head.
25. Send low address & "0000" (000 hex) and SA0. Observe "0000" readback on manual head.
26. Send low address & "any" magnitude & SA1 (9<sup>th</sup> bit on manual head from the right). Observe "4095" readback on manual head.

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27. Send low address, any magnitude & set R/S switch (left most switch on manual head to on position). Turn on switches C3 to C6 on, note on test box C3 to C6 lights come on. Turn off R/S switch then switches C3 to C6.
28. Send low address & "any" magnitude. Observe on test box channel 1 lites C6,C5,C4,C3 extinguish.
29. With low address on manual head go to test box. Toggle channel 1 switches S15 thru S8. Observe on manual head status bits S15 thru S8 on & off.
30. This completes Test & Calibration of Ch1 of LBDC board.
  
31. With DMM on U27-1, send high address & "0000" (000 hex) magnitude with a manual head. Adjust R7 for -10.00VDC
32. With DMM on U27-1 send high address & "2048" (800 hex) magnitude. Adjust R8 for 0.00 VDC.
33. Repeat steps 28 & 29 until readings are stable with no further adjustments.
34. With DMM go between U36-12 (+) & U36-11 (-). Send high address & "2048" (800 hex) magnitude. Adjust R32 for 0.00VDC.
35. With DMM as above, send high address & "0000" (000 hex) magnitude. Adjust R30 for - 10.00VDC.
36. Repeat steps 31 & 32 until readings are stable with no further adjustments.
37. Tie Ch2 analog output + & - to analog input + & - (on test box).
38. With DMM go between U34-12 (+) & U34-11 (-), send high address & "2048" (800 hex) magnitude. Adjust R21 for 0.00VDC.
39. With DMM as above send high address & "0000" (000 hex) magnitude. Adjust R20 for - 10.00VDC.
40. Repeat steps 35 & 36 until readings are stable with no further adjustments.
41. With DMM on U31-8 (+) & analog ground (capacitor C4 positive lead). Send high address and "2048" (800 hex) magnitude. Adjust R38 for 0.00VDC.
42. With DMM between U29-14 & analog ground send high address & "2048" (800 hex) magnitude, observe 0.00VDC on DMM. Adjust R3 for "2048" magnitude on manual head.
43. With DMM as above, send high address & "0000" (000 hex) magnitude. Observe - 10.00VDC on DMM. Adjust R4 for "0000" readback on manual head.
44. Repeat steps 39 & 40 until readbacks on manual head are within a few counts with no further adjustment.
45. Send high address & "2048" (800 hex) & SA0 (8<sup>th</sup> bit on manual head from the right). Observe "2048" readback on manual head.
46. Send high address & "0000" (000 hex) and SA0. Observe "0000" readback on manual head.
47. Send high address & "any" magnitude & SA1 (9<sup>th</sup> bit on manual head from the right). Observe "4095" readback on manual head.
48. Send high address, any magnitude & set R/S switch (left most switch on manual head to on position). Turn on switches C3 to C6 on, note on test box C3 to C6 lights come on (channel 2). Turn off R/S switch then switches C3 to C6.
49. Send high address & "any" magnitude. Observe on test box channel 2 lites C6,C5,C4,C3 extinguish.

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50. With high address on manual head go to test box. Toggle channel 2 switches S15 thru S8.  
Observe on manual head status bits S15 thru S8 on & off.
51. This completes Test & Calibration of Ch2 of LBDC board.



QTY REQD	REF DESIGNATOR	ITEM NO.	DESCRIPTION	MAT'L DWG NO./REV. NO.
			INTERPRET IN GENERAL ACCORDANCE WITH ASME Y14.24M-1989	<b>BROOKHAVEN NATIONAL LABORATORY</b> ASSOCIATED UNIVERSITIES, INC. UPTON, N.Y. 11973
			UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES	
			DECIMAL TOLERANCES .X ±XXX .XX ±XXX .XXX ±XXX ANGULAR TOLERANCE ± XXX	Q.A. CATEGORY A-3 DATE 2/4/2000 DRAWN BY Jappe CHECKED BY DESIGN APPROVAL ENGINEER APPROVAL SUPVR. APPROVAL
				SIZE A DRAWING NUMBER MATERIAL: SCALE: NA WEIGHT: - SHEET
OUTSTANDING ECN	FINISH	BREAK SHARP EDGES MAX. XX MIN. XX	NEXT ASSEMBLY	REV. A

