

# Fermi National Accelerator Laboratory

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## **Engineering Note**

**Date: 1/21/2010**

**Project: IHEP Test Beam**

**Doc. No: U100121**

**Subject: Cable Test Procedure**

Testing of the IHEP flex cable is best done using the cable test board we have made specifically for this purpose. There are two connectors on this board and test points on every pin of each connector. CONN1 has pins labeled A1 through A50. CONN2 has pins labeled B1 through B50.

Plug the cable into CONN2 so that the cable extends to the left. Then gently bend the cable and plug the other end of the cable connects to CONN1.

### **Test 1 Continuity of Traces**

First, measure continuity from CONN1 to CONN2 by using a meter with an audible continuity checker. A1 should connect to B1, A6 to B6, A7 to B7, and so on. The cable does not connect positions 2, 3, 4 and 5 because high voltage is carried on conductor position 1.

### **Test 2 Pin-to-Pin Shorts**

When all 46 positions have tested correctly for continuity, test for pin-to-pin shorts. Plug the cable only into CONN1. Put the leads on A6 and A8, then leapfrog to A8 and A10, and so on up to A48 and A50. Then check A7 and A9, A9 and A11, and so on up to A47 and A49. A list of positions that give a beep is shown in Table 1. These are pins that are connected on the cable; most are ground pins but three are +2V power and three others are -2V power.

A beep at any other locations during this test most likely indicates a solder bridge or a piece of loose metal under the connector. Repeat this procedure by plugging the cable only into CONN2 and looking at the B test points.

6-8	7-9
8-10	9-11
10-12	11-13
12-14	13-15
14-16	47-49
48-50	

**Table 1. List of connected pin pairs when doing Test 2.**

### Test 3 Continuity of Power and Ground

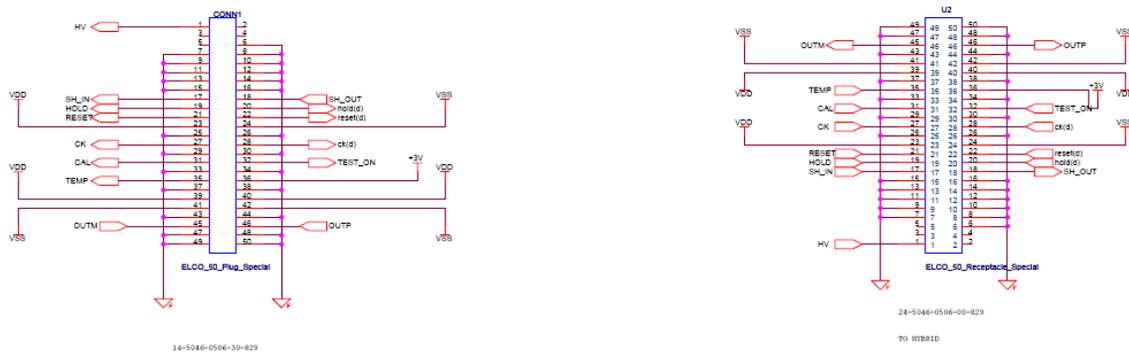
Finally a check is done to make sure all ground and power connections are good. The following table shows the common connections.

Ground: 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 25, 26, 29, 30, 33, 34, 37, 38, 43, 44, 47, 48, 49, 50  
 VDD: 23, 39, 40  
 VSS: 24, 41, 42

**Table 2. List of connected pins when doing Test 3.**

Make sure pin 6 is connected to all the other ground pins, test that pin 23, 39, and 40 are connected, and verify that pins 24, 41, and 42 are interconnected.

The schematic diagram of the cable is shown in Figure 1.



**Figure 1. Schematic diagram of the IHEP cable.**