

**Electrical Test of HDI**  
**With HP Logic Analysis System**  
(J:\glast\documents\Electrical Test Procedure.doc)

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8/20/99

In each step of this test, a certain result is expected. **The expected results are underlined** in the description below. If you find a result other than expected, stop the test immediately and report it to one of the GLAST staffs.

### 1. Setup

- 1.1 Turn on a logic analysis system HP16550A or HP16510A, a power supply HP662x, a power supply Kenwood PWR18-1.8Q, an HV source Keithley 237 (or equivalent instrument).
- 1.2 Wear wrist strap to avoid electrostatic discharge to HDI.
- 1.3 Connect an HV output of Keithley to a LEMO connector on the interface board.
- 1.4 Invoke “electronicsTest.vi” and run it.  
(The program resides J:\glastlab\labview\detectorTest\electronicsTest.vi)
- 1.5 Wait until the logic analyzer is initialized and you see “Ready” in a message field of the window of electronicsTest.
- 1.6 Connect a cable (with a Nanonics connector) attached to the interface board to the left side connector of the HDI to be tested.

### 2. Power on Electronics

- 2.1 Supply powers to HDI by typing “RCL”, “1”, then “Enter” on HP662x.
- 2.2 Supply powers to the interface board by pressing “Output” on PWR18-1.8Q.
- 2.3 Read voltages and currents. **The voltages and currents must be as listed in a table below.** Write down currents on HDI log book if you test it before a burn-in test.

	Power Supply	Voltage	Current (mA)
DVDD	HP662x channel 1	3.0	16.0 – 18.0
AVDD2	HP662x channel 2	2.0	35.0 – 37.0
AVDD	HP662x channel 3	5.0	– 27.0

### 3 HV bias circuit check

You should do a test in this section only when you test HDI after the HDI is bonded to a Kapton sheet on a tray and after the HDI is bent down. Otherwise, skip this section.

- 3.1 Set the Keithley HV source to 10V.
- 3.2 Turn on an operation of the Keithley HV source to output the voltage.
- 3.3 Read the current on the display. **It must be less than 100 nA.**
- 3.4 Measure voltage on bias electrodes on a Kapton sheet with DVM. You should measure it at least one electrode for each ladder with a protective cover on. Use a special probe to touch an electrode, which has a banana terminal on one end and a

wire-wrap wire wrapped on a wooden stick on the other end. Carefully put the stick into a gap between the tray and the cover. **You should see about 9.7 V or above on all the electrodes you touch.**

- 3.5 Remove the special probe and stay away from the tray.
- 3.6 Raise an output voltage to 20 V and read the current. **It must be less than 100 nA.**
- 3.7 Repeat the previous step up to 100 V. You should read the current every 10 V step. **The current must be less than 100 nA at 100 V.**
- 3.8 Lower the voltage to 0 V.
- 3.9 Turn off an operation of the Keighley HV source.

## 4 Electrical Test of HDI with Logic Analyzer

- 4.1 Specify a template file by pushing “Template File” button on the window of electronicsTest.vi. The file is in “J:\glastlab\tests\hdi\_qa\testPattern”.  
To test it from the left side: Use “alltest\_tplL.txt” as a template.  
To test it from the right side: Use “alltest\_tplR.txt” as a template.
- 4.2 Specify an output file name and a log file name by pushing “Output File” button and “Log File” button, respectively. The file names should be as in a table below. Use “R” instead of “L” in front of “.txt” when you test HDI from the right side. Select a directory “J:\glastlab\tests\hdi\_qa\hdiXX”, where XX is an HDI ID.

You are testing HDI...	Output File Name	Log File Name
before burn-in test	PreBurnIn_outL.txt	PreBurnIn_logL.txt
before potting HDI	BeforePot_outL.txt	BeforePot_logL.txt
after bending down HDI	AfterBend_outL.txt	AfterBend_logL.txt
before stacking a tray	BeforeStack_outL.txt	BeforeStack_logL.txt

- 4.3 Type in GTRC address into “GTRC address” field on the window. The GTRC address is written on an HDI data sheet.
- 4.4 Choose “left” or “right” of “Readout direction” field of the window depending on which side of HDI you connect the cable.
- 4.5 Press “Run” button on the window. It takes about 5 minutes to test it.
- 4.6 Once you see “Ready” in a message field of the window, the test is over. You should check three check boxes to the right of “Run” button. **All of the three boxes must show a green check mark.** If you see one red cross mark or more, you should open the log file to diagnose it (or ask Masa to diagnose it if you are not familiar with it).
- 4.7 Disable outputs of Kenwood PWR18-1.8Q by pushing “Output” button.
- 4.8 Disable outputs of HP 662x by pressing “RCL”, “0”, and “Enter” in this order.
- 4.9 Disconnect the cable with the Nanonics connector from HDI you have tested.

## 5 Test the right side of HDI

- 5.1 Connect the cable to the right side connector of the HDI.
- 5.2 Repeat section 2 through 4.
- 5.3 Update the database. Update the HDI database after a pre-burn-in test, and the tray database after other tests.