**Note that this is a work in progress and will be updated from time to time. Example plots for a variety of detected problems may be found at:

higgs.hep.upenn.edu/systest/TRT/dsm/dev/GALLERY
Introduction

Diagnostic test programs often indicate symptoms that are not sufficient to uniquely identify board problems. This guide provides expected measured values at key locations on AR1FS for chip and board control functions. Since all active roof boards use the same ASIC triplet, values will be the same for all boards although topology will be different. It should be a simple matter to identify locations on other boards by using silk screen indicators and measured values from this guide to match up with locations on the board of interest.
AR1FS  DTMROC Side UP
AR1FS Termination Area

Each Leg of the termination resistors connects through a 50 ohm resistor to a common node. BX, Cin have a 0 ohm in series with 50 ohm

<table>
<thead>
<tr>
<th>Component</th>
<th>Voltage (V)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cin +,-</td>
<td>0.86, 1.2</td>
</tr>
<tr>
<td>BX +,-</td>
<td>0.99, 1.02</td>
</tr>
<tr>
<td>Reset +,-</td>
<td>0.88, 1.2</td>
</tr>
<tr>
<td>Cout +,-</td>
<td>1.12, 1.13</td>
</tr>
</tbody>
</table>

**TEST** (pwr off) across +,- nodes
Without data cable plugged in 100 ohms. Test at far end of Cable for full continuity test
Add ~ 20 ohms for cable.

Cout +,- 1.12V, 1.13V
Two 60 ohm resistors to independent node.
**TEST** (pwr off) Across +,- connection
data cable unplugged 120 ohms, plugged to patch panel = 60 ohms
AR1FS (top) DTMROC Control

- **TP Bias**: 18k, (16k) 1.13V
- **TP Even**: 10, (7.5k) 2.4V
- **TP Odd**: 10, (7.5k) 2.4V
- **Lo Th 1**: 1k, (6.5k) 1.3V
- **Hi Th 1**: 1k, (6.5k) 1.3V
- **Lo Th 0**: 1k, (6.5k) 1.3V
- **Hi Th 0**: 1k, (6.5k) 1.3V
- **ADJ12**: 1k, (7.9k) 0V
- **Xenon Select**: 1k, (11.8k) 0V

Stuffed, (Meas Res), Pwr up Voltage to gnd.

Data Out Resistor
- 120 ohms Data Connector “off”
- 60 ohms Data Connector “on” and attached to PP

Pos # 5

Active Roof   Repair Aids
AR1FS (top) DTMROC Control

Pos # 8  In other layouts Threshold resistors can be here

TP Bias  18k (16k)
TP Even  10  (7.5k)
TP Odd   10  (7.5k)
Lo Th 1  1k  (6.5k)
Hi Th 1  1k  (6.5k)
Lo Th 0  1k  (6.5k)
ADJ12   1k  (7.9k)
Hi Th 0  1k  (6.5k)
Xenon Select 1k
(location varies side to side of DTMROC)

Data Out Resistor

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1FS Bottom Side Resistors

Stuffing errors that affect the performance of a whole ASDBLR ASIC.

4.7 ohm Preamp Filter
Green box.
Lo gain Thresh. Ramp
No test pulse response.

12K ohm Ternary
Output reference
Red box
Outputs always high if missing.
ASDBLR Chipwide problems

Symptom: Outputs High for one (or more) ASDBLR’s (Whole Chip)
→ 12K resistor shown (red box) on previous page broken disconnected to ball of ASDBLR.
→ OR - Low Threshold problem shorted to gnd or open.

Check:
Measure resistance. 12k? If yes then…
Measure voltage on each side of 12K (+3 and -1.99V)
missing -1.99 V at +3V → chip is not connected or bad resistor solder joint.
one side at – 2.3V → broken resistor or bad solder joint to +3V.
if OK power up board and check
1K threshold resistors for 1.28V on both sides.
if OK then measure V across 1K resistor, look for more than 1mV drop. If no drop ASDBLR ball is not connected.
ASDBLR chipwide problems

Symptom - very low gain, low noise all channels.
PROBLEM → Unstuffed 4.7 ohm resistor. Check preamp input pins for expected value of >700mV, if resistor is not stuffed, expect ~0mV.