

Viewed On: 10/25/2005 13:15:48, [attachments](#) at bottom of page.[Save As HTML](#) | [Print This Page](#)

<b>P R O B L E M  R E C O R D</b>	<b>Details for ACD-02334-017</b> Stage: PR	<b>Date/Time Submitted:</b> 10/05/2005 08:57
		<b>Project:</b> ACD
	<b>Submitter Info:</b> Name: <a href="#">Dave Thompson</a> Code: 661.0 Phone: +1 301 286-8168 Email: <a href="mailto:David.J.Thompson@nasa.gov">David.J.Thompson@nasa.gov</a>	<b>Spacecraft:</b> ACD
		<b>Subsystem/Instrument:</b> ACD
		<b>Component:</b> [left blank]
	<b>Date/Time of Actual Problem:</b> 07/21/2005 00:00	<b>Assembly:</b> [left blank]
	<b>WOA#:</b> 02334	<b>Event/Operation Line Number:</b> 1100
	<b>Configuration Type:</b> [left blank]	<b>Item Number:</b> [left blank]
	<b>Item Revision:</b> [left blank]	<b>Serial Number:</b> [left blank]
	<b>Software Version:</b> [left blank]	
<b>Problem Description:</b> The VETO threshold for channel 1123 (GARC 1, GAFE 13) cannot be set below a minimum value corresponding to about 0.45 pC.		
<b>Required Approvals for Closure:</b> (One signature(s) required from Project Side (minimum role PDL) AND One signature(s) required from QA Side (minimum role QE) Approved by <a href="#">Michael Amato</a> (SE) on 10/19/2005 10:36		
<b>Disposition to Close:</b> (last edited by <a href="#">Dave Thompson</a> on 10/05/2005 08:57) The inability to set one threshold to low values was only discovered during analysis. The attachment describes the work done to try to resolve this issue. We did not find a root cause. This anomaly will have little impact on operation or performance of the ACD, but it should be watched to make sure it does not change or other channels do not develop such a limitation. Because the threshold is within the GAFE ASIC, there is no way to probe the details or make any changes without completely dismantling the ACD. The disposition should be "Use As Is" and watch.		

Fields with a gray background were hidden by the project at the time this PR/PFR was submitted.

[Active Project Revision, Revision PR was created in] = [4,4]

**Attachments:**[Threshold PR](#) (attached by D.Thompson on 10/05/2005 08:58)[Print This Page](#) | [Close Window](#)

**October 4, 2005**

**Information for PR about one ACD channel threshold setting**

During detailed analysis of the VETO threshold scans made during the Thermal Vac tests, one phototube threshold setting is showing an anomaly – it does not operate below some minimum value. The threshold scan was done by setting a series of threshold levels and checking where those thresholds appeared in the PHA data.

The anomalous channel is 1123 (GARC 1, GAFE 13 on chassis 1RB). The command to set the VETO threshold is accepted for any value sent, and the readback gives the value sent.

For a setting of 0.64 pC the threshold appears to be set properly. For lower settings such as 0.256 pC and 0.096 pC, the threshold reaches a minimum, corresponding to approximately 0.45 pC. No commands seem to be able to reduce the operating VETO threshold below this value for this channel.

This effect was seen at all temperatures.

Jim Odom suggested that the Bias DAC setting might be set below zero, so that any PHA setting below this level would appear as 0 (not pedestal). Alex did find an excess of zeros in the PHA data for this channel for events that had low PHA values in the other channel for this same tile. This excess was not seen in other channels.

Bob Hartman checked several aspects of the data:

Because the TCI DAC is so coarse (1 step =  $\sim 0.14$  pC), the VETO calibration script does not give reliable results below about 1/2 pC, which is (unfortunately) about 0.6 MIP. There was considerable difficulty getting that script to work in a halfway reasonable manner, largely (I believe) because it uses software counters.

1RB channel 13 (= PMT 1-123) looks like all the rest in the EGSE testing, both before and after TVAC, but the plots only go down to TCI\_DAC =  $\sim 4$ , which  $\sim 0.56$  pC. It worked just fine with Labview and the PB-5 pulser, down to 0.064 pC.

I checked the state of the VETO\_DAC at the end of the 0.096 and 0.192 pC threshold scan runs before TVAC. The settings are appropriately low, certainly lower than 0.45 pC.

I also checked the Bias\_DAC setting; it was 6, which is correct according to the FullFunc run just before. The pedestal should be at about 198 bins.

Unless the bias offset is somehow not what the Bias DAC setting is, the explanation Jim thought about seems to be unlikely.

At this point, we have no explanation for this anomaly. The VETO discriminator itself is part of the GAFE. There is no reason to think that the ASIC should have changed, and there is no way to test its internal workings. Without an explanation, it is impossible to predict whether this minimum threshold might change or whether other channels might develop this effect.

The impact of this anomaly is that we cannot reduce the threshold on this particular channel below this 0.45 pC level. All the other channels appear to give us complete control over the VETO threshold. As it happens, this threshold is low enough that the ACD operation would not be affected. The PHA data from this channel still provide information about signals below this threshold. Both the VETO and the PHA for the other tube on this same scintillator tile have complete functionality.