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**Trend Analysis  
List**

**Dwg. No. 32-04008.01**

Revision 01  
 December 27, 2007

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## **Preface**

Revision 01 of this document is being released for the Instrument Pre-Ship Review.

## 1 Introduction

The Trend Analysis list is contained in the parent document 34-04001. Comparing the relevant data for the two flight-quality instruments, SN1 and SN2, we see no evident trends with one exception.

The RMS noise level seen on the science data in the D6 channel of SN2 has risen from an initial value of 0.7 ADU RMS at the first pre-vibration Long Form Functional performed in September 2007 to a value of 1.6 ADU RMS after the initial thermal-vacuum exposure later that month. It has remained stable since that time.

Data sheets showing the initial and final trend values for the two instruments are attached.

**4.18 Deviation from Baseline Performance**

Where applicable, test limits have been defined in this procedure and the accompanying Short Form Functional. These limits are intended to encompass all operating conditions. Additionally, we want to assure that the operation of instrument remains stable. To that end we calculate here – when appropriate – the deviation of various parameters from their baseline values. (The nominal, ambient temperature and pressure baseline is available from the CRATER database under the 32-06001 heading.)

Date of Baseline or Database Ref. Number	Initial
32-06001.12 Rev 01	

Test Ref	Parameter	#/LSB	Baseline	This Test	Delta	Limit	OK?
SFF 4.4	+5 Digital	2mv	4.991	4.989		10mv	
	+5 Analog		4.988	4.988			
	-5 Analog		-4.986	-4.984			
	Bulkhead	0.1C	02.2				
	ΔTelescope		+2.5			2.0C	
	ΔAnalog		+4.1				
	ΔDigital		+11.9				
	ΔADC-DC		+5.4				
SFF 4.5	Power	30mw	6.45	6.45		0.2w	
	Bias V, Thin	0.1v	74.2	74.2		0.5v	
	Bias V, Thick	0.1v	219.4	219.3			
	D1 bias I	0.5μa, 12%/C	0.007	0.007			greater of 25% or 2.5μa
	D3 bias I		0.007	0.007			
	D5 bias I		0.060	0.057			
	D2 bias I	5μa, 12%/C	0.05	0.08		Greater of 25% or 25μa	
	D4 bias I		0.06	0.04			
	D6 bias I		0.03	0.02			

NB: Temperature data is entered here as differences between the monitored value and the temperature of the bulkhead, instrument reference. The bulk temperature of the instrument depends upon the environment; to a first order the internal deltas should not.

NB: Temperature data was taken in vaccum after a long soak.

The Primary Science data is recorded here in ADU. For reference, the thick detectors have a scale of approximately 20KeV/LSB; the thin detectors approximately 60KeV/LSB.

Test Ref	Parameter	Baseline	This Test	Delta	Limit	OK?
SFF 4.7	D1 Cal Amp	210.5	210.6		5	
	D2 Cal Amp	214.1	214.3			
	D3 Cal Amp	212.2	212.4			
	D4 Cal Amp	211.1	211.4			
	D5 Cal Amp	208.5	208.5			
	D6 Cal Amp	216.1	216.3			
	D1 Noise	0.6	0.6		0.3	
	D2 Noise	0.6	0.6			
	D3 Noise	0.7	0.7			
	D4 Noise	0.9	0.9			
	D5 Noise	0.9	0.8			
	D6 Noise	0.8	0.8			
LFF 4.11	D1 Zero Cross	2.6	2.2		0.3	
	D2 Zero Cross	2.2	1.3			
	D3 Zero Cross	1.7	0.7			
	D4 Zero Cross	0.4	-0.1			
	D5 Zero Cross	1.6	0.5			
	D6 Zero Cross	1.4	0.8			

**4.18 Deviation from Baseline Performance**

Where applicable, test limits have been defined in this procedure and the accompanying Short Form Functional. These limits are intended to encompass all operating conditions. Additionally, we want to assure that the operation of instrument remains stable. To that end we calculate here – when appropriate – the deviation of various parameters from their baseline values. (The nominal, ambient temperature and pressure baseline is available from the CRaTER database under the 32-06001 heading.)

Date of Baseline or Database Ref. Number	Initial
32-06001.22 Rev 01	

Test Ref	Parameter	#/LSB	Baseline	This Test	Delta	Limit	OK?
SFF 4.4	+5 Digital	2mv	4.998	4.994		10mv	
	+5 Analog		4.998	4.994			
	-5 Analog		-4.988	-4.986			
	Bulkhead	0.1C	20.9	23.5			
	ΔTelescope		-0.3	+0.2		2.0C	
	ΔAnalog		+0.2	+0.6			
	ΔDigital		+2.7	+2.5			
	ΔADC-DC		+2.8	+2.8			
SFF 4.5	Power	30mw	6.59	6.57		0.2w	
	Bias V, Thin	0.1v	74.2	74.1		0.5v	
	Bias V, Thick	0.1v	217.5	217.5			
	D1 bias I	0.5μa, 12%/C	0.004	0.005			greater of 25% or 2.5μa
	D3 bias I		0.008	0.005			
	D5 bias I		0.030	0.032			
	D2 bias I	5μa, 12%/C	0.15	0.18		Greater of 25% or 25μa	
	D4 bias I		0.15	0.18			
	D6 bias I		0.13	0.14			

NB: Temperature data is entered here as differences between the monitored value and the temperature of the bulkhead, instrument reference. The bulk temperature of the instrument depends upon the environment; to a first order the internal deltas should not.

"This Test" is data from 11/19/07, Post Thermal/Vac Retest

The Primary Science data is recorded here in ADU. For reference, the thick detectors have a scale of approximately 20KeV/LSB; the thin detectors approximately 60KeV/LSB.

Test Ref	Parameter	Baseline	This Test	Delta	Limit	OK?
SFF 4.7	D1 Cal Amp	216.8	216.8		5	
	D2 Cal Amp	216.2	216.2			
	D3 Cal Amp	210.6	210.6			
	D4 Cal Amp	213.4	213.8			
	D5 Cal Amp	217.0	217.0			
	D6 Cal Amp	222.3	222.2			
	D1 Noise	0.7	0.7		0.3	
	D2 Noise	0.8	1.0			
	D3 Noise	0.8	1.0			
	D4 Noise	0.8	0.8			
	D5 Noise	0.8	0.9			
	D6 Noise	0.7	1.6	0.9		
LFF 4.11	D1 Zero Cross	2.3	2.4		0.3	
	D2 Zero Cross	1.0	1.0			
	D3 Zero Cross	1.4	1.3			
	D4 Zero Cross	0.7	0.7			
	D5 Zero Cross	1.9	2.1			
	D6 Zero Cross	1.8	2.0			

NB: D6 Noise increased to 1.6 ADU rms during first thermal/vacuum test