

STEREO IMPACT

PROBLEM REPORT

PR-1009

STEU FM1 Oscillation

2004-06-11

PR Numbers: 1xxx=UCB, 2xxx=Caltech/JPL, 3xxx=UMd, 4xxx=GSFC/SEP, 5xxx=GSFC/Mag,
6xxx=CESR, 7xxx=Keil, 8xxx=ESTEC, 9xxx=MPAe

Assembly : STE-U	SubAssembly : Preamp
Component/Part Number:	Serial Number: FM1
Originator: David Curtis	Organization: U.C. Berkeley
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Failure Occurred During (Check one)

Functional test Qualification test S/C Integration Launch operations

Environment when failure occurred:

Ambient Vibration Shock Acoustic
Thermal Vacuum Thermal-Vacuum EMI/EMC

Problem Description

Occasional bursts of very high noise rates were seen in the STE detectors during thermal vac when the instrument was at the warm part of the cycles. Bursts typically lasted several minutes, and happened as often as twice an hour, but at least a few times each hot soak. They affected mostly detector segments 2 and 3. Some correlation was observed between the onset of this noise and the chamber operations that might cause noise (heaters coming on for example). The noise could be stopped by cycling the detector bias voltage.

Analyses Performed to Determine Cause

While still cycling we observed the preamp output signals that are routed out of the chamber to the IDPU. Snapshots of the signals are attached. Channel 2 looks normal except for the ~1MHz ringing imposed on the waveform. Channel 3 is completely abnormal, showing nothing but oscillation. After 5 cycles we discontinued cycling to diagnose the problem. It was verified that this effect occurs at room temperature, and then at ambient while in the chamber, but did not happen on the bench. However, a low level oscillation was seen on the bench. We believe that the noisy environment of the chamber caused the preamp, which was marginally stable, to go unstable.

Corrective Action/ Resolution

Rework Repair Use As Is Scrap

We adjusted the compensation capacitors on the preamp (C11, C111, C211, C311) to improve stability and eliminate the low level ringing (new value 390pF). We did bench testing and then testing in the chamber at ambient which verified the oscillation had been eliminated. We then continued with the final 2 operational thermal vac cycles. There was no sign of oscillation during those cycles. There was no stress on the circuit due to the oscillation.

Date Action Taken: [2004-6-11](#) **Retest Results:** [Success](#)

Corrective Action Required/Performed on other Units Serial Number(s): [STE-U FM2, STE-D FM1 and FM2](#)

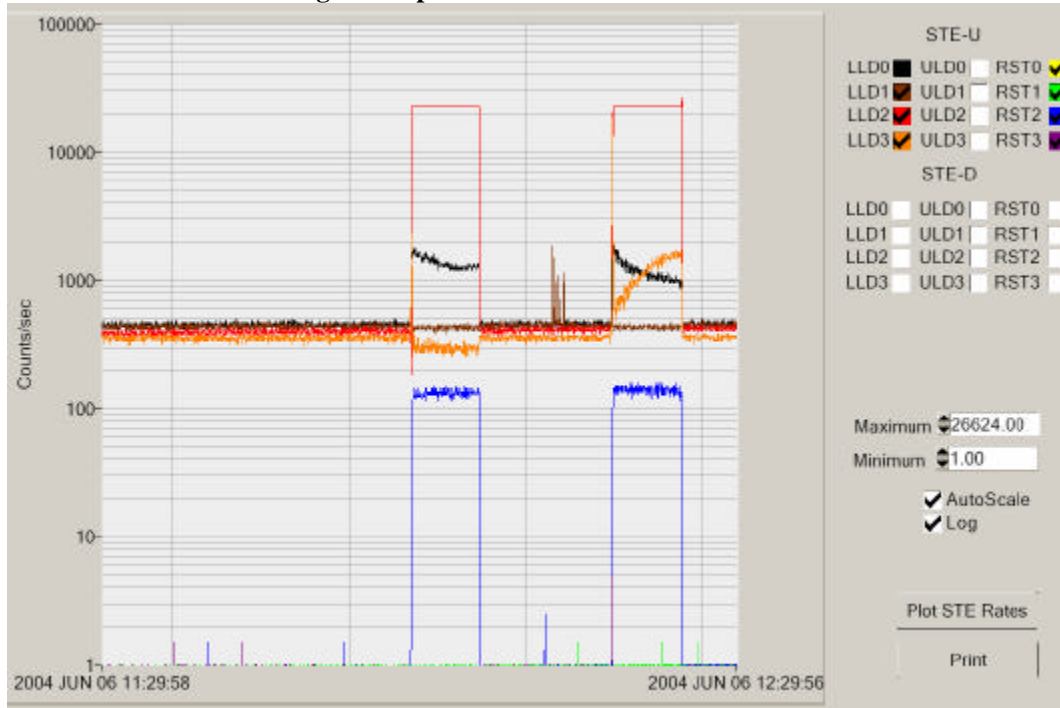
Closure Approvals

Subsystem Lead: _____ Date: _____
IMPACT Project Manager: _____ Date: _____
IMPACT QA: _____ Date: _____
NASA IMPACT Instrument Manager: _____ Date: _____

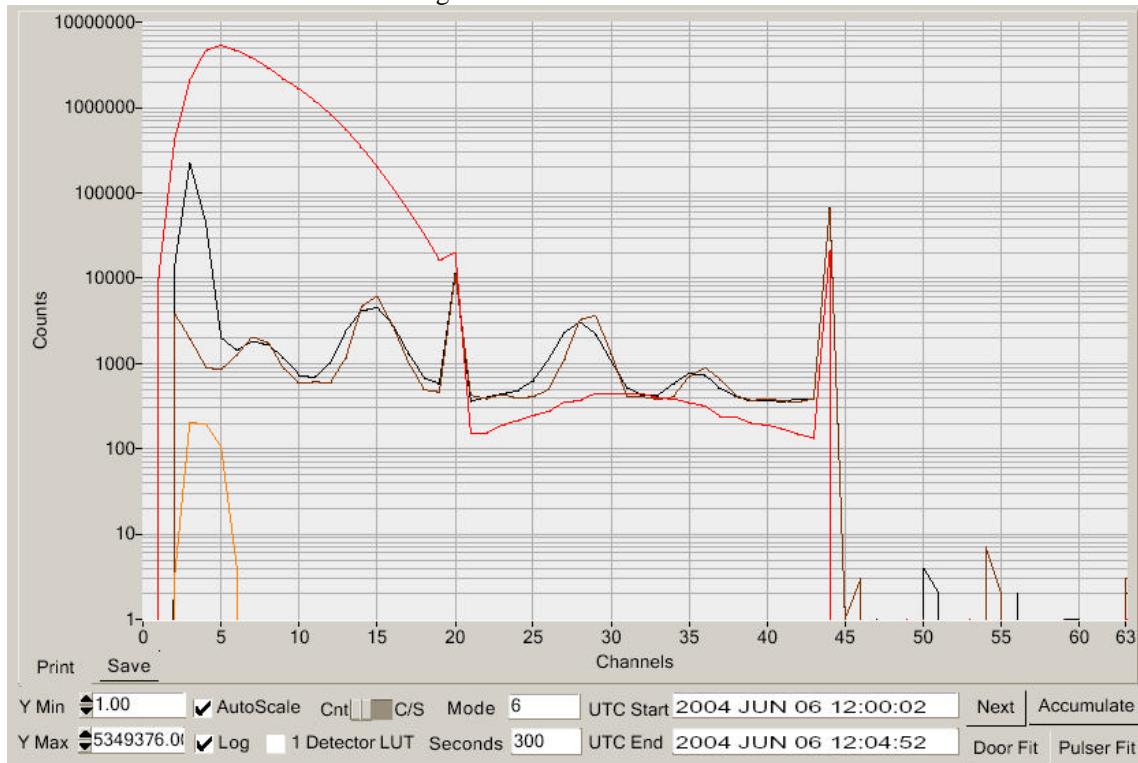
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STE Monitor Rates showing 2 examples anomalous rates observed in the thermal vac chamber

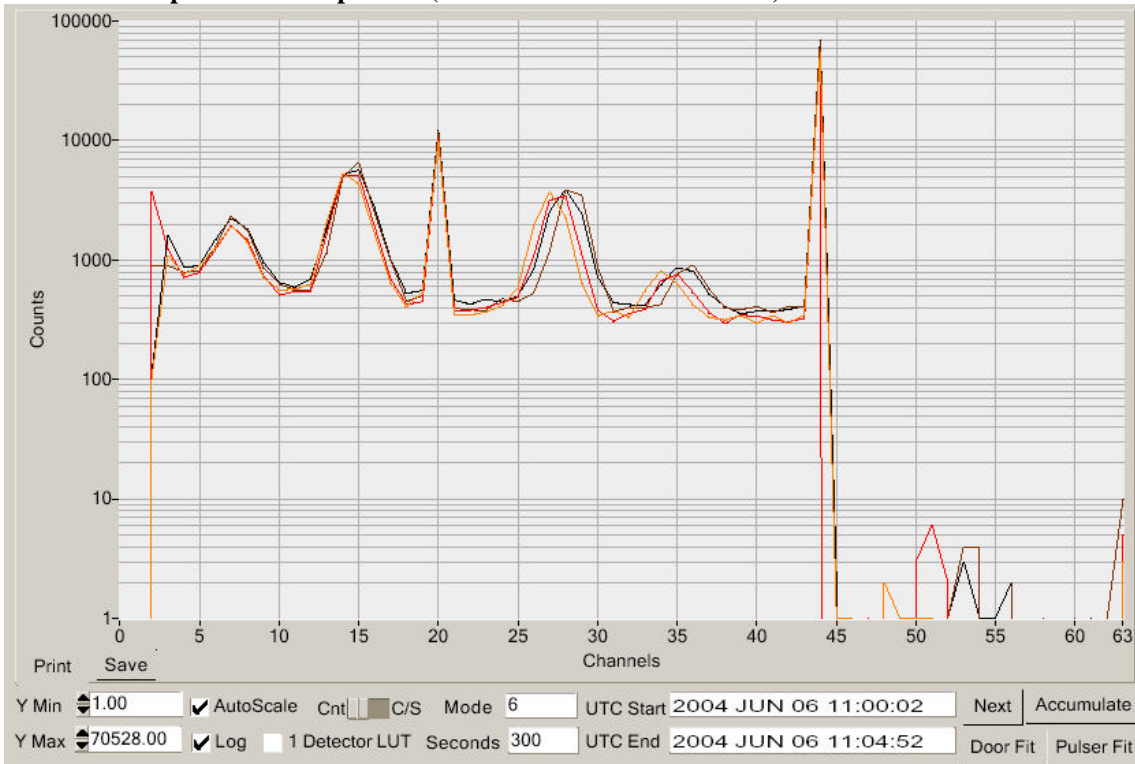


STE Spectra during anomalous rates event
Different colors are different detector segments



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Normal STE Spectra for comparison (counts from STE door source)



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STE-U FM1 Preamp Outputs during Oscillation

