STEREO IMPACT

PROBLEM REPORT
PR-2001
SEP Bias Supply
3/18/2004

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

Assembly: SEP	**SubAssembly: Bias Supply**
Component/Part Number: MOSFET/JANSR2N7390U	**Serial Number: FM1**
Originator: Branislav Kecman	**Organization: Caltech**
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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

The output of SIT_BIAS post-regulator failed during short-circuit test. Prior to the failure the output was at the maximum voltage of 250V. When connected to ground it collapsed as expected, but when disconnected from ground it did not return to 250V, it remained at 0V.

Analyses Performed to Determine Cause

The Bias Supply has a single high-voltage supply with output taps called "100V", "200V" and "300V" that feed several post-regulators that provide bias to individual SEP sensors. Voltage on each tap is controlled by input frequency and is a function of its load. The failed SIT_BIAS post-regulator was using the "300V" tap, but the voltage on it was higher than 300V due to absence of load which had been removed to facilitate this short-circuit test on the post-regulator output. The analysis shows that under this condition it is possible to exceed Vgs (reverse breakdown voltage) of MOSFET on the post-regulator output when it is shorted to ground. The input frequency was set properly to produce 300V on this tap for the normal load condition, but it was too high for the no-load condition, thus producing a higher voltage - a test procedure oversight at the sub-contractor facility, Space Instruments, Inc. The failure occurred on 3/18/04.

Corrective Action/ Resolution

√ Rework | Repair | Use As Is | Scrap

The failed MOSFET part, ref. des. M2C (JANSR2N7390U, S/N 210) was replaced and the test procedure has been modified to instruct the operator to reduce input frequency when removing the load and to check the "300V" tap voltage prior to short-circuit test.

Date Action Taken: 4/13/04 **Retest Results**: Passed all temperature tests

Corrective Action Required/Performed on other Units Serial Number(s): None

Closure Approvals

Subsystem Lead:	Branislav Kecman	Date: 4/19/04
IMPACT Project Manager:	_____	Date _____
IMPACT QA:	_____	Date:_____
NASA IMPACT Instrument Manager:	_____	Date:_____