

# STEREO IMPACT

PROBLEM REPORT

PR-1009

SWEA LVPS Q3 & Q4

05/20/2004

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

<b>Assembly :</b> SWEA FMI	<b>SubAssembly :</b> LVPS board
<b>Component/Part Number:</b>	<b>Serial Number:</b> FM1
<b>Originator:</b> David Stone	<b>Organization:</b> UCB
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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

After a defective part in another section of the board was replaced, the analog supply outputs, previously operational, no longer functioned.

## Analyses Performed to Determine Cause

The analog supply drive transistors Q3 and Q4, both 2N3019, were found to have been damaged, with 10VDC measured across their base-emitter junctions. This is a condition the transistors cannot be expected to survive, and indicates those junctions have become open. (After removal, both junctions of the transistors were found to be open.)

The analog supply section had been functioning normally. This failure occurred 05/07/04, the first time the board was powered after replacing U8, a defective LTC1877 regulator in a section of the board that is not connected to the one involving Q3 and Q4. This suggested an inadvertent faulty connection: loose wire, solder bridge, etc. After the damage was discovered, the transistors were removed and the cause of the failure was sought.

Visual examination of the board disclosed no apparent connection defects. Testing of the board with Q3 and Q4 removed, both unpowered and powered, also failed to reveal any faulty connections or other anomalies. The regulating feedback network in the analog section functioned normally when a test signal was inserted in place of the absent output voltage. Driving the outputs from an external source gave no evidence of any but the expected connections either within the output section or to other sections. Application of an external AC source to the transformer driven by Q3 and Q4 produced reasonable signals at all the analog outputs.

In summary, no evidence was found of a problem that could have damaged Q3 and Q4, and it was first concluded that the damage was caused by some temporary artifact of the previous rework, moving, or testing of the board, which was subsequently cleared. However, an identical failure occurred after the transistors were replaced, making it obvious that the cause was not a one-time anomaly.

At first the analog supply section of the board operated normally with the new transistors, and testing was resumed 05/12/04 on the other section. On 5/18/04, the analog supply outputs were found to be nonfunctional, exactly as in the previous occurrence of this problem. Q3 and Q4 were again burned out as before. At no time before either of these failures were Q3 and Q4 found to be noticeably warm, so it is believed the failures occurred rapidly at some point during testing of the other section of the board. Further

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investigation is underway to discover the cause of these burnouts, including comparison to the ETU unit, which has not experienced similar failures.

<b>Corrective Action/ Resolution</b>			
<input checked="" type="checkbox"/> Rework	<input type="checkbox"/> Repair	<input type="checkbox"/> Use As Is	<input type="checkbox"/> Scrap

**Date Action Taken:** \_\_\_\_\_ **Retest Results:** \_\_\_\_\_

**Corrective Action Required/Performed on other Units**      Serial Number(s): \_\_\_\_\_

<b>Closure Approvals</b>	
Subsystem Lead: _____	Date: _____
IMPACT Project Manager: _____	Date: _____
IMPACT QA: _____	Date: _____
NASA IMPACT Instrument Manager: _____	Date: _____