PFR-60 Title: FM1 ESA Cover Monitor Readback

Assembly : Instrument Suite	**SubAssembly : ESA**	
Component : ESA Harness	**Units Affected:**	**Units fixed:**
Originator: Michael Ludlam	x x x x x x	X X x X X X
Organization: UCB	**Date: 31/MAY/05**	
Phone: 27732	**Email : mludlam@ssl.berkeley.edu**	

Failure Occurred During (Check one √)

x Functional test □ Qualification test □ S/C Integration □ Launch operations □ Other (Flight Assy)

Environment when failure occurred:

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

Problem Description

(In this section it is important to document the specific symptoms which exhibited the problem. In the event we see it happen again, we would like to know as much as possible.)

During FM1 IDPU/ESA/SCM PA TVAC test the ESA Cover SMA was fired. No positive read back on the cover monitor was observed at memory location 2F04 (PCB ESA Cover HK Monitor Location)

Analyses Performed to Determine Cause

(How do we know how the failure happened? Was it a bad part, bad handling, what?)

The unit was removed from thermal vacuum and the cover was found to have fired properly. A current probe on the IDPU 28V line during the cover firing indicated this too but the monitor did not read correctly. The ETU test cover assembly was substituted for the FM1 ESA and this cover was actuator and the read back was not showing the cover open.

Using the ETU IDPU and a break out box connected to the J203 connector on the PCB the monitor was read back with pin 15 (esa cover monitor line) open (ESA Cover closed) and then grounded (ESA Cover open). The monitor read back correctly. This was repeated on the FM1 IDPU. When the monitor line was grounded to power/agnd the monitor read back correctly. When it was connected to SMA Return the monitor read back did not read correctly. After careful analysis of the PCB and LVPS schematics it was discovered that the SMA Return was not connected to AGND/DGND on either board and that it was an isolated supply. As the monitor line was using SMA return and the multiplexer on the PCB was using AGND the monitor would not read right when the cover was opened.

Corrective Action/ Resolution

(How do we fix the unit? And how do we make sure it doesn't happen again?)

To solve this problem SMA Return was connected to AGND/DGND. The easiest place to do this was in the ESA Harness connecting pin 6 (SMA Return) to pin 2(ESA Power Return). ESA Power Return is connected to AGND on the PCB. This harness modification avoided opening a vibrated flight instrument. Ideally if this was caught earlier the fix would be on the PCB, and connecting the two grounds together in this harness may have grounding implications that should be carefully evaluated through testing as soon as possible. The fix was tested on the FM1 IDPU and found to work correctly. The modification should be made to the other ESA harnesses.

The corrective action above was only performed on FM1 harness. To eliminate the problem, the fix will be performed on THEMIS LVPS. SMARet and AGND will be jumped using a #22AWG bus wire. The negative side of C63 (AGND) will be jumped to Pin 2 of T20(SMARet).

Acceptance:

MAM: Ron Jackson_____; MSE: Ellen Taylor_____

PM: Peter Harvey_____; Cognizant Engineer_____

Date of Closure_____