



PFR-067 Title: temperature dependence in TV on VACT MON

Assembly : FM1 IDPU	SubAssembly : PCB SN004	
Component : actuator monitor	Units Affected:	Units fixed:
Originator: Corinna Chen	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
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Failure Occurred During (Check one ✓)

☒ Functional test ☐ Qualification test ☐ S/C Integration ☐ Launch operations ☐ Other (Flight Assy)

Environment when failure occurred:

☐ Ambient ☐ Vibration ☐ Shock ☐ Acoustic
☐ Thermal ☐ Vacuum ☒ 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 Suite thermal vacuum, VACT_MON, space craft actuator monitor read different values during hot, cold, and ambient temperatures. The actuator monitor read 70 during ambient testing. As recorded on TV FM1 suite LPT, the actuator monitor read 75 during cold cycles and 64 on hot cycles. During all testing, the actuator supply was set to 28V.

Analyses Performed to Determine Cause

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

The opto-coupler HCNR201 is used for the actuator monitor. The current actuator monitor design had too much current driving the photo-diode device. Due to the amount of current, the voltage for the op-amp comparator is too high and the common mode range was too small for a reliable output for the actuator monitor. The error in the comparator is significant and likely to cause unreliable readbacks.

Corrective Action/ Resolution

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

Three resistors were changed on the actuator monitor current. The change will correct the amount of current driving the photo-diode device and decrease the input voltage for the comparator op-amp. During these changes, the actuator monitor has also been scaled to 2V for a nominal actuator voltage reading. The modification was implemented on FM4. The actuator readback is steady and under a heat gun, the readback did not exhibit deviation. The monitor modification was implemented on FM1 PCB and will be carried out on all PCBs as time and testing allows.

Changes have been performed on FM1, FM4, and, FM5 as of 7/12/05.

FM1 thermal vacuum hot/cold cycle was conducted on 9/6/05 and during temperature changes, no deviation from the actuator monitor was exhibited. As of 9/7/05 all flight boards have had the modification.

Acceptance:

MAM: Ron Jackson _____; MSE: Ellen Taylor _____

PM: Peter Harvey _____; Cognizant Engineer _____

Date of Closure _____