PFR-105 Title: SPB Turns Counter Faliure

Assembly : THM-SPB-MEC-001	**SubAssembly :** THM-SPB-MEC-500	
Component : THM-SPB-MEC-500	**Units Affected:** X X X X X X	**Units fixed:**
Originator: Dalton		
Organization: SSL - UCB	**Date:** 10/10/05	
Phone: 510.643.9240	**Email :** gdalton@ssl.berkeley.edu	

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

During EFI suite level integration on F4, the turns counter was indicating only half the number of turns on two of the SPB's.

Analyses Performed to Determine Cause

This problem was verified by visually counting the turns and also by measuring the length of cable off the spool. All indications were consistent with the hypothesis that the turns counter was clicking on only half the lobes of the *Meter Wheel Cam* (see fig. 1). While observing the cam, the SPBs were run and it was noted that the roller actuator on the microswitch was riding on top of the 2X #0-80 SHCS that hold the *Meter Wheel Cam* on the *Meter Wheel*. This would cause the Turns Counter to report only half the number clicks. It was also determined that the microswitch actuator could have been bent during a re-stow evolution, causing the actuator to fall off the cam path and onto the SHCS.

Corrective Action/ Resolution

The #0-80 SHCS will be replaced with PHS, which are only half the height and will clear under the *Microswitch Actuator* roller as the cam rotates.

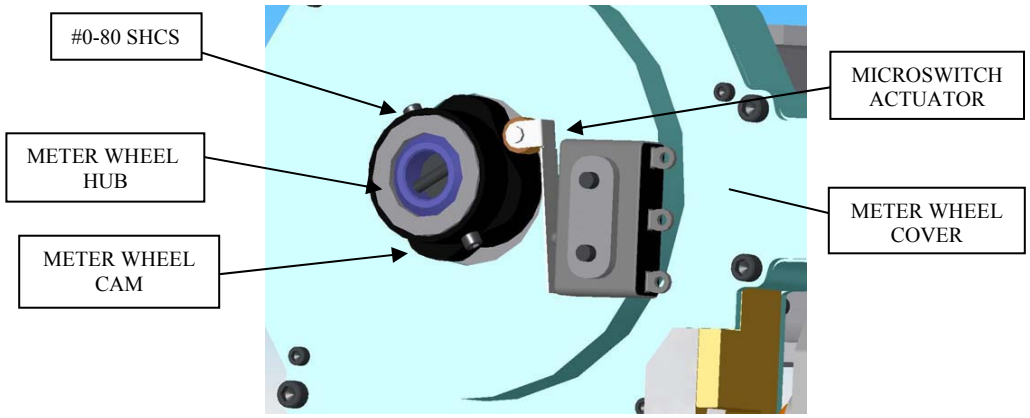

Fig1. Meter Wheel Assembly

(continued next page)

In addition to replacing the fasteners, new #0-80 clearance holes will be drilled in the *Meter Wheel Cam* (part Rev. F), clocked forty five degrees (clockwise) from the existing holes. The new location will permit proper operation of microswitch through various ranges of actuator location on the *Meter Wheel Cam*.

Finally, during the re-stow evolution, proper care will be taken in handling the *Meter Wheel Cover* as to not bend the microswitch actuator. The actuator will be manually depressed to clear the *Meter Wheel Hub* and prevent bending. Before installing #0-80 PHS, the cam will be manually turned and proper operation of the microswitch will be observed.

The combination of these three corrective actions will make the assembly more robust by removing any chance of interference between the microswitch actuator and the #0-80 PHS. After modifications, all SPB's will undergo bench tests to verify proper operation.

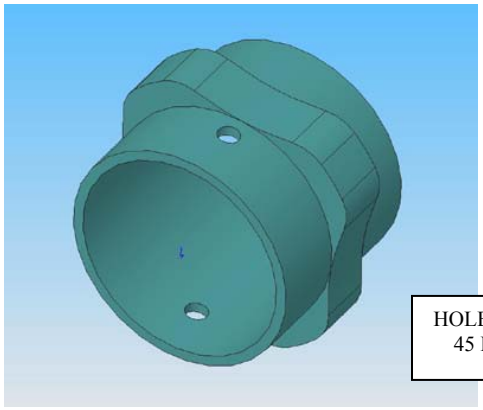

Fig 3. Current Meter Wheel Cam

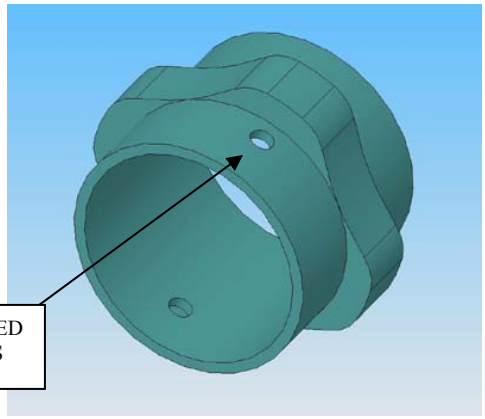

Fig 4. NEW Meter Wheel Cam

Acceptance:
MAM: Ron Jackson_____; MSE: Ellen Taylor_____

PM: Peter Harvey_____; Cognizant Engineer_____

Date of Closure_____