

Critical Item: Summing Amplifier Module
Total Quantity: 1
Find Number: 84K05134
Criticality Category: 1S

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| SAA No: 09IT09-001 | System/Area: LPS CCMS/FR1/FR2/CR3 |
| NASA Part No: 84K05134 | PMN/ Name: L72-5100 |
| Mfg/ Part No: None | Drawing/ Sheet No: KSC-CLCS-51.5 3.5 |

Function: The summing amplifiers sum 4 isolated balanced inputs, 124 ohm, 0.5 to 5.0 volts, peak-to-peak and provide two summed 124 ohm balanced outputs of 1.0 to 4.0 volts, peak-to-peak. Summing amplifiers provide signal conditioning for the LPS Ground Data Buses (GSE, PCM, LDB).

Critical Failure Mode/Failure Mode No: Loss of output/09IT09-001.525 and Erroneous output (unbalanced)/09IT09-001.526.

Failure Cause: Piece part failure.

Failure Effect: Loss of output or erroneous output would result in loss of a data downlink between Pad HIM and the FEP. For the Hypergol Vapor Detection System supporting launch pad operations this would mean loss of a capability to detect leaks during hazardous operations which could lead to loss of life/vehicle in the event of an undetected leak. Detection method: System status checks will detect failure. Time to effect: Immediate.

ACCEPTANCE RATIONALE

Design:

- The Summing Amplifier Module was designed per the following; 84K03100 "SCE Specification", 84K03101 "SCE Chassis Specification", and 84K03102 "SCE Power Supply Assembly Specification".
- The design supports reliability and maintainability requirements associated with fault detection and isolation, accessibility, test points, and diagnostics.

Test:

- OMRSD File VI Volume I, Baseline 12/13, requires an end-to-end system test of the HVDS prior to each use. OMI V3542 "Hypergol Vapor Detection System Operations Support" provides this test. This test verifies proper operation of the WDM transmitter as well as HVDS system sensors and HIM operations.
- During hypergol loading operations, personnel (in SCAPE) are positioned on the RSS to provide visual monitor capability.

Inspection:

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- LPS system integrity is continuously monitored by on-line software programs (i.e. HWMON, EMON, etc.). These programs provide health and status data to systems operators. FEPs poll the HIMs on a cyclic basis (1, 10, or 100 times/second) verifying the communication link.

Failure History:

- Current data on test failures, unexplained anomalies, and other failures experienced during ground processing activities can be found in the PRACA database. Since no units were installed at the time this analysis was performed no PRACA data was available.
- The GIDEP failure data interchange was researched and no failure data was found on this component in the critical failure mode.

Operational Use:

- **Correcting Action:**

For the Hypergol Vapor Detection System, loss of this amplifier during loading operations would result in termination of loading. Once terminated the faulty amplifier would be replaced.

- **Timeframe:**

Replacing a failed amplifier would take approximately 30 to 59 minutes.