Critical Item: VMEbus Repeater Cards

Total Quantity: 2

Find Number: 83K02116

Criticality Category: 1S

SAA No:	09IT09-001	**System/Area:**	LPS CCMS/FR1/FR2/CR3/CR4
NASA Part No:	83K02116	**PMN/ Name:**	L72-0400-14/ HIM-II
Mfg/ Part No:	Data Products New England (DNE) Technologies/ 830021160	**Drawing/ Sheet No:**	83K01102/ 8-180

Function: Extends the VMEbus in the HIM from 20 to 40 card slot positions. The VMEbus repeater card set consists of a master and slave card, each plugged into a separate card cage backplane. VMEbus signals are exchanged between the master and slave repeater cards in a manner transparent to the entire bus.

Critical Failure Mode/Failure Mode No: Loss of output/09IT09-001.515.

Failure Cause: Piece part failure.

Failure Effect: FEP will detect loss of data from the I/O cards in the extended chassis. For the Hypergol Vapor Detection System (HIM 6397) this results in loss of capability to detect leaks during hazardous operations at Pads A and B. Possible loss of life/vehicle in the event of a hazardous condition. Detection method: System status checks will detect failure. Time to effect: Immediate.

ACCEPTANCE RATIONALE

Design:

- The HIM-II design requirements are defined in 83K01101 "Hardware Requirements for the Hardware Interface Module (HIM) HWCI P200-HW".
- The VMEbus Repeater is a commercial off the shelf (COTS) assembly. The mean time between failure (MTBF) per MIL-HDBK-217F is 180,000 hours.
- The VMEbus Repeater was manufactured in accordance with industry's best commercial practices for workmanship.
- Ruggedized VMEbus Repeater Cards have an aluminum plate bonded to the printed wiring board to act as a stiffener.
- VMEbus design provides captive retention hardware to ensure positive connector seating.

Test:

- OMRSD File VI Volume I, Baseline 12/13, "LOA MMH/N204 Servicing System", requires a sensor functional test prior to each flow. OMI V3542 "Hypergol Vapor Detection System Operations Support (LPS)" provides this end-to end verification of the system (LPS/HVDS). This functional test verifies system sensors and HIM operation.
- During hypergol loading operations, personnel (in scape) are positioned on the RSS to provide visual monitor capability.

Inspection:

- 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 and their Input/Output Cards on a cyclic basis (1, 10, or 100 times/second) verifying the communication link with HIMs assigned. Along with status and health checks, exception monitoring provides operators notification of any change of state of HIM measurement cards.

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:

- Corrective Action:

  For the Hypergol Vapor Detection System, loss of the HIM during loading operations would result in termination of loading. Once terminated the faulty HIM card would be replaced. Loss of the HIM at any other time would have no critical effect.

- Timeframe:

  Replacing a failed component or the card would take approximately 30 to 59 minutes.