

Critical Item: Wavelength Division Multiplexing (WDM)
Digital Transmitter Module

APR 28 1993

Total Quantity: 2

Find Number: 80K54843

Criticality Category: 1S

SAA No: 09IT09-001

System/Area: LPS CCMS/FR1/FR2/CR3

NASA

PMN/

Part No: 80K54843

Name: L72-0500-02

Mfg/

Drawing/

Part No: None

Sheet No: MCR7656 Vol. III-5.7.1

Function: Provides fiber optic cable media interface with digital transmitters for transmission of data between LCC and GSE located in the LC-39 Area.

Critical Failure Mode/Failure Mode No: Loss of output/09IT09-001.521 and Erroneous output (distorted)/09IT09-001.522.

Failure Cause: Piece part failure.

Failure Effect:

Loss of output. Loss of GSE Data Link. For the Hypergol Vapor Detection System supporting launch Pad operations this means loss of a capability to detect leaks during hazardous operations. Possible loss of life/vehicle in the event of a hazardous condition. Detection method: System status checks will detect failure. Time to effect: Immediate.

Erroneous output (distorted). Erroneous data between LCC and Launch Pad HIMs. For the Hypergol Vapor Detection System supporting launch Pad operations this means loss of a capability to detect leaks during hazardous operations. 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 WDM Transmitter Modules were designed per 80K50910, "Specification For Launch Processing System Fiber Optic Terminal Equipment".
- The design supports reliability and maintainability requirements associated with fault detection and isolation, accessibility, test points, and diagnostics.

Test:

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- 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:

- 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. The PRACA database was researched (01/94 - 03/99) and 28 failures have occurred in the critical failure mode, however, none resulted in loss of life/vehicle or damage to vehicle hardware.
- 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 data communication during loading operations would result in termination of loading. Once terminated the faulty transmitter would be replaced.

- **Timeframe:**

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