

Critical Item: 10 x 2 Switch Card

Find Number: 76-28041 12 ea.

APR 28 1999

Criticality Category: 1S

SYSTEM

Hypergol Vapor Detection Sys

AREA	CRIT	TOTAL LRU'S
LOA	1S	12

SAA No: 09IT09-001

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

NASA

PMN/ L72-3564-02

Part No: NONE

Name: RCVS III

Mfg/ Electrospace Systems Inc./

Drawing/

Part No: 76-28041

Sheet No: MCR7656 VOL. III 5.5.1 (REV K)

Function: This RCVS Critical Item is used in support of a critical user system. Provides switch capability for 2 outputs to be connected to any of it's 10 inputs.

Critical Failure Mode/Failure Mode No: * Failure Mode - Loss of output/09IT09-001.503; * Failure Mode - Erroneous output/09IT09-001.504

* 10 x 2 Switch Card failures would result in loss of communications between a FEP and HIM interface resulting in loss of the data path for the critical system being monitored/controlled.

Failure Cause: Electrical/Electronic failure of LRU piece part

Failure Effect:

SYSTEM	FAILURE EFFECT	CRIT
Hypergol Vapor Detection System (LOA)	Loss of output signal will fail to provide the console operator with an input that would indicate a leak in the hypergol propellant servicing system. Loss of the capability to detect a leak during hazardous operations could result in loss of life and/or vehicle. Time to effect: Immediate. Detection method: Software detects loss of communication.	1S

10 x 2 Switch Card (Continued)

ACCEPTANCE RATIONALE

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Design: The 10 x 2 Switch Card was designed per the requirements of the following documents.

1. CP09IT0910: General design requirements specification for LPS/CCMS.
2. CP09IT0917: Contract end item assembly specifications for V&DA for LPS/CCMS.

These specifications support the Shuttle design and procurement philosophy procurement of hardware that is not undergoing development but to procure "off-the-shelf hardware" and to maximum extent possible parts previously qualified through proven design.

Test: Rigorous sets of acceptance tests were performed to verify performance and design requirements of the LPS/CCMS. This process occurred on each end item from "In Process Assembly" phase to "Site Acceptance". Master control procedures (MCPs) 78K-M401 and 78K-M701 were utilized for acceptance testing by MMC. Following this acceptance testing IBM performed integrated testing of each set. Test procedures KSC-LPS-IB-086, Book 3 and KSC-LPS-IB-105, Book 5 were utilized.

Hypergol Vapor Detection Sys

- OMRSD File VI Volume 1 requires a sensor functional test prior to each flow. OMI V3542 "Hypergol Vapor Detection System Operations Support (LPS)" provides an end-to-end verification of the system (LPS/HVDS).
- During loading operations, personnel are stationed on the RSS to provide visual monitor.

Inspection: LPS system integrity is continuously monitored by on-line software programs. These programs provide health and status to system operators. OMRSD File VI requires inspection, cleaning, adjustments, and verification of RCVS operation. OMI C6051.01 "RCVS Subassembly (Main) PM" and C6051.02 "RCVS Subassembly (Local) PM" satisfy these OMRSD requirement. Proper RCVS operation is verified by each user system as part of the end-to-end verification of their integrated system.

Failure History:

The PRACA Data Base was used for this analyses (time frame APR. 88 to Sep. 90). There were 36 Problem Reports initiated on 10 x 2 Switch Cards that relate to failure modes depicted on this CIL sheet. There is a total population of 1788 10 x 2 Switch Cards installed in various CCMS Station Sets. In the basic SAA the timeframe of Jan. 84 to Mar. 88 was used with 55 Problem Reports identified from a total population of 1391 cards installed. Operation use varies from 7 days a week, 24 hours a day as required.

10 x 2 Switch Card (Continued)

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Operational Use:

- **Correcting Action:**

Troubleshooting required to isolate and replace failed unit.

- **Timeframe:**

Varies, troubleshooting required.