

SAA09IT09-001  
REV. A

AUG 08 1991

S050224K  
ATTACHMENT -  
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**Critical Item:** 4 Channel Analog Output Command

**Find Number:** 78K01465 2 ea.

**Criticality Category:** 1S

SYSTEM	AREA	CRIT	TOTAL LRU'S
Hypergol Vapor Detection Sys	LOA	1S	2

<b>SAA No:</b> 09IT09-001 (REV A)	<b>System/Area:</b> LPS/CCMS/FR1/FR2/CR3/CR4
<b>NASA Part No:</b> NONE	<b>PMN/Name:</b> L72-0400/ HIM
<b>Mfg/Part No:</b> 78K01465	<b>Drawing/Sheet No:</b> MCR7656 VOL. III 4.2 (REV CY)

**Function:** This HiM Critical Item which can effect support of a critical user system. It provides an analog output to user GSE.

**Critical Failure Mode/Failure Mode No:** \* Failure Mode - Unsolicited Operations/09IT09-001.487

\* 4 Channel Analog Output Command Card failures could cause unsolicited commands or affect normal HIM I/O communications 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.	1S

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4 Channel Analog Output Command Card (Continued)

**ACCEPTANCE RATIONALE**

**Design:** The 4 Channel Analog Output Command Card was designed per the requirements of the following documents.

1. CP09IT0910: General design requirements specification for LPS/CCMS.
2. CP09IT0916: Contract end item assembly specifications for HIM 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**

- OMI V3542 "Hypergol Vapor Detection System operations support (LPS)" provides an end-to-end verification of the system (LPS/HVDS). System verification is performed prior to all hazardous operations which utilize this system.

During loading operations, personnel are stationed on the RSS to provide visual monitor.

**Inspection:** OMRSD, File VI requires verification of backup power be performed every 360 days on the hardware interface module which contains this LRU. Proper 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 10 Problem Reports initiated on the 4 Ch Analog Output CMD Cards that relate to failure modes depicted on this CIL sheet. There is a total population of 111 4 Ch Analog Output CMD Cards installed in various CCMS Station Sets. In the basic SAA the timeframe of Jan. 84 to Mar. 88 was used with 23 Problem Reports identified from a total population of 125 cards installed. Operation use varies from 7 days a week, 24 hours a day to as required.

**Operational Use:**

- Correcting Action:  
Troubleshooting required to isolate and replace failed unit.
- Timeframe:  
Varies, troubleshooting required.